



The Original

Hager Companies has been manufacturing the original Continuous Geared Aluminum Hinges for over 25 years. The unique design of Roton® consists of three important parts: an internal rolling contact gear profile, a high-strength cover channel and solid bearings made of celanex. Working together, these parts evenly distribute door weight and maintain door alignment for superior performance.

Lifetime Warranty

Hager Companies offers a lifetime warranty. We believe in our product line and warrant our Roton® aluminum continuous geared hinges are free of any defects and take pride in our workmanship. As long as the hinges are installed according to our instructions, the hinges will not fail under normal usage.

Fire-Rated Bearings

To make it easy for our customers to purchase our Roton® Continuous Geared Aluminum Hinge, we provide fire-rated bearings for all fire-rated hinges. The UL stamp denotes the hinge is fire-rated. Best of all we do not charge for this.

Friction Free

Roton® Continuous Geared Aluminum Hinges are lubricated to eliminate the need for any assistance in maintaining a quiet performance.

LEED/Green Requirements

Environmentally-friendly building means thinking about every detail. Roton® hinges meet LEED requirements as they are made of recycled material.

Table of Contents

Product Information	2
General Information	6
Door and Frame Dimensioning	8
Electric Hinge Modifications	11
500 Series	16
750 Series	19
780 Series	21
1200 Series	40

PRODUCT INFORMATION

Door and Frame Preparation

All Roton® Continuous Geared Hinges are surface applied. Cutout design and spacing coordination is thereby eliminated in both new construction and restoration work. Reinforcement plates are not required in doors or frames except where the gauge is too thin for the fasteners in relation to the door weight or where abusive operation is anticipated. Blank frames may be ordered with strike prep only or with a strike prep furnished on both sides to eliminate handing with any Roton® model that will cover the frame rabbet. Doors should always be ordered without cutouts except for use in labeled openings in which the tested door assembly may have manufacturing restrictions. Continuous frame mortar guards are desirable for masonry walls to avoid screw fastener interference with the mortar. An effective mortar guard made from an ordinary 1" (25 mm) x 2" (51 mm) stud, fastened to the back side of the frame can also be used. Check with both the frame supplier and the contractor for the best method. The main cause of door and frame breakdown is "kickback shock" transferred to conventional butt hinges or pivots. Installing Roton® hinges bond the door frame into a single, integrated unit, dissipating impact loads harmlessly.

Door Closers

Conventional surface or concealed sliding closers may be used with Roton®. (Note: Pivot type floor closers with a fixed, conflicting pivot point may not be used.) Closers will last considerably longer, adjust to operating requirements more readily and show consistent settings due to the reduced operating forces of Roton® hinging.

Standard Finishes

Roton® hinges are available in either satin etched, clear anodized aluminum (similar to US28), or dark bronze exterior anodized coating.

Special Anodizing

Roton® hinges are available in various colors, including black, and gold, as well as other anodized finishes with fasteners to match. Final assembly must be completed by Hager because of special non-removable metal coatings applied to all hinges during assembly. Users are cautioned against attempting to refinish any Roton® product. All hinges ordered in special colors should be ordered at the same time to guarantee finish uniformity. Supply color chip for best match.

Painted Hinges

Hager can supply unfinished materials to selected finishers for special projects which require unusual colors or coatings, but require final assembly be completed by Hager. Because of special non-removable metal coatings applied to all hinges during assembly, users are cautioned against attempting to refinish any Roton® product. Lead time of up to 10-12 weeks may be required.

Standard Lengths

Roton® hinge standard lengths are for 6'8" doors - 79", for 7' doors - 83", for 7'2" doors - 85", for 8' doors - 95" and for 10' doors - 119", for convenience in application to nominal doors. This provides for threshold clearance, head clearance and door height allowances for carpeting. Other lengths may be ordered as non-standard items.

Roton® hinges are always installed flush with the top edge of the door. Recommended 1/8" (3 mm) for head clearance.

Where multiple net heights are likely to appear on the same job, group the sizes to 1/2" (13 mm) increments to be consistent in appearance. Generally, up to 1/2" (13 mm) of door heel exposure is acceptable, but all Roton® hinges should be within 1".

Extra Long Hinges

Hager Companies manufactures hinges over 119" (3023 mm) long as two separate lengths with a staggered joint for onsite connection. Hager will select hinge segment lengths from standard sizes for best economics in relation to quantity required. Handing specifications are required to position the cuts inconspicuously and to finish symmetrical pairs in double door applications (25 mm) of the net door height.

Non-Standard Lengths

All non-standard length Roton® hinges are trimmed from the bottom only and conform to published templates. If the desired length does not go through any screw holes, the hinge is manufactured as requested. If the desired length would cut through screw holes, the customer would have two options: Hager will suggest the closest length that does not go through a screw hole. If that length is not acceptable and the project requires the exact length specified, the item becomes an industrial part and the interfering screw holes would be eliminated. If the desired length would cut through bearings slots, Hager will cut through the bearing slots. This would not affect the integrity of the hinge and the cover channel would cover the cut slots leaving an aesthetically pleasing product.





PRODUCT INFORMATION

Field Modifications

While Roton® hinges can be cut in the field, any product modifications may void all warranties. Should in the field modifications be required, cut only from the bottom of the hinge. Do not cut through bearings or screw holes. When cutting electric hinges it is extremely important to clamp both hinge leaves securely to prevent hinge “chatter” which can damage the hinge’s internal wiring. Consult Hager Technical Service before proceeding.

Template Hinges

Hager Companies has developed templated hole patterns for Roton® hinge models in standard lengths. Drawings are available by contacting Hager Companies Customer Service or accessing the Hager website at www.hagerco.com. Due to normal variances inherent in the manufacturing process, Roton® custom length hinges are deemed by Hager to be non-templated.

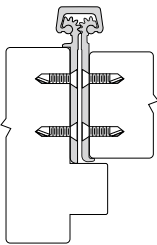
Special Hinges

Any hinge may be ordered with special hole locations for unusual frame or door conditions. Please provide specifications for each leaf when placing an order.

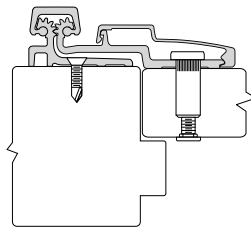
Process for Choosing the Correct Roton® Model

Determine	Select
Door and frame application (flush door and frame, inset door, door thickness, door height, etc.)	Roton® model
Frequency of door cycling and weight of door	Light, standard, heavy or extra heavy duty, lead lined
Door and frame material	Fasteners
Door opening finish	Roton® finish
Fire rating requirements, if needed	With stud or without stud

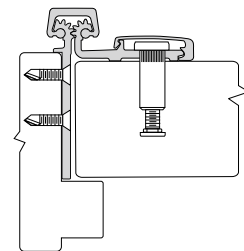
Concealed



Full Surface



Half Surface



Fire Ratings -Underwriters Laboratory Fire Rating File #A14627



780 Series Roton® continuous geared hinges with stainless steel studs are approved for use on 4’x10’ metal or wood swing type doors. 780 Series Roton® continuous geared hinges without stainless steel studs are approved for use on 4’x8’ single swing metal doors and 4’x10’ single swing wood doors used without stainless steel studs limited to 20 minute fire rating without hose stream.

- Hollow metal, tin-clad, sheet-metal and steel covered composite type rated up to and including 3-hours
- Wood composite doors rated up to and including 1-1/2 hours
- Wood core doors rated up to 20 minutes without hose stream, non-studded
- 780 Series Roton® continuous geared hinges meet requirements for positive pressure UL10C, UL10B and UBC7-2 Part 1


BHMA Certified

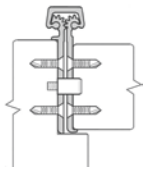


BHMA Certification Program was developed as a means for manufacturers of builders hardware to indicate compliance with American National Standards sponsored by BHMA. Participating manufacturers certify compliance with the standards based on a continuing program of passing the prescribed tests.



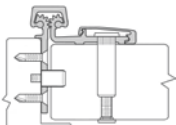
PRODUCT INFORMATION

UL10C Fire-Rated Roton®	Fully Concealed	Full Surface	Half Surface	NOTES: 1. All Roton® hinges will be marked with UL stamp if they are fire-rated.  2. Several hinge models cannot be fire-rated. Check each profile.
20 Minute Fire-Rated Wood Core Door x Fire-Rated Hollow Metal Frame	UL — FF STANDARD			
20 Minute Fire-Rated Metal Door x Fire-Rated Hollow Metal Frame	UL — FF STANDARD			
30 Minute Fire-Rated Wood Composite Door x Fire-Rated Hollow Metal Frame	UL — FF STANDARD			
30 Minute Fire-Rated Metal Door x Fire-Rated Hollow Metal Frame	UL — FF STANDARD			
45 Minute Fire-Rated Wood Composite Door x Fire-Rated Hollow Metal Frame	UL — FF STANDARD			
45 Minute Fire-Rated Metal Door x Fire-Rated Hollow Metal Frame	UL — FF STANDARD			
60 Minute Fire-Rated Wood Door x Hollow Metal Frame	UL — FF STANDARD			
60 Minute Fire-Rated Metal Door x Hollow Metal Frame	UL — FF STANDARD			
90 Minute Fire-Rated Metal Door x Fire-Rated Hollow Metal Frame	UL — FF STANDARD			
90 Minute Fire-Rated Wood Composite Door x Fire-Rated Hollow Metal Frame	UL — STUD REQUIRED * Must Specify			
3-hour Fire-Rated Metal Door x Fire-Rated Hollow Metal Frame	UL — STUD REQUIRED * Must Specify			



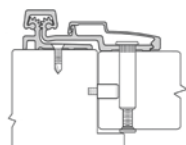
Fully Concealed with Stud

These models are concealed between the frame and the hinge edge of the door. Models available include: 780-041HD, 780-041LL, 780-111, 780-111HD, 780-111LL, 780-112, 780-112HD, 780-112LL, 780-124HD, 780-124LL, 780-224, 780-224HD, 780-224LL, 780-226, 780-226HD, and 780-226LL.



Half Surface with Stud

These models have the frame leaf concealed between the frame and the edge of the door. The door leaf is mounted to the door with thru-bolts or screws. Models available include: 780-045HD, 780-046HD, 780-053, 780-053HD, and 780-054HD.



Full Surface with Stud

These models have the frame leaf mounted to the face of the frame and the face of the door. The door leaf is mounted to the face of the door with thru-bolts. Models available include: 780-057HD, 780-157, 780-157HD, 780-210, and 780-210HD.

Checking the Load

To assist in the selection of an appropriate Roton® hinge series, divide the door weight including the weight of the hardware by the number of bearings in the Roton® hinge under consideration, then use the following guideline, with a maximum 4'0" wide door:

750 Series:	5-1/8" Centers	(Typical 7' door: 16 bearings)
780 Series:	5-1/8" Centers	(Typical 7' door: 16 bearings)
780 HD & LL:	2-9/16" Centers	(Typical 7' door: 32 bearings)

Frequency	Load
Low frequency interior doors	20 lbs. per bearing
Low frequency, very heavy doors (lead lined x-ray doors, ballistics doors, high security doors) with double rows of fasteners	30 lbs. per bearing
Medium frequency interior doors	15 lbs. per bearing
Medium frequency exterior doors	10 lbs. per bearing
High frequency exterior doors	7.5 lbs. per bearing
Very high frequency doors	5 lbs. per bearing





PRODUCT INFORMATION

Painted Cover Channels

Painted Roton® cover channels in bone white are offered as a standard stock color option. This is only available on the standard Roton cover channel.

Polished Cover Channels

Any Roton® hinge may be ordered with a polished clear cover channel (similar to US26) to complement clear anodized hinge leaves or a polished gold cover channel (similar to US3) to complement satin gold anodized hinge leaves.

Rounded Back (RBCC)



Hospital Tip and TIPIT® Compatibility		
Part #	Molded Hospital Tip	TIPIT®
750-134		•
750-138		•
780-045		•
780-046		•
780-053		•
780-054		•
780-057	•	
780-110	•	•
780-111	•	•
780-112	•	•
780-113	•	•
780-124	•	•
780-155		•
780-210	•	•
780-224	•	•
780-226	•	•

Roton® Cover Channel Compatibility		
Hinge Model	Flat FBCC	Round RBCC
750-134	•	•
750-138	•	•
780-041	•	•
780-045	•	•
780-046	•	•
780-053	•	•
780-054	•	•
780-057	•	•
780-110	•	•
780-111	•	•
780-112	•	•
780-113	•	•
780-155	•	•
780-157	•	
780-210	•	•
780-224	•	•
780-226	•	•
1200-600	•	
1200-650	•	

* Round Back (RBCC) is not compatible with Molded Hospital Tip option.

GENERAL INFORMATION

Bearing At Top

This application allows for the bearing to be set at the very top of the cover channel. The cover channel is flush with the top of the geared hinge, preventing any obstructions or debris to be inserted in the top channel.

780 Series Concealed Molded Hospital Tip



780 Series Concealed and several Full Surface models including the 780-057, 780-157 & 780-210 can be prepared with a smooth tapered top bearing. This option is ideal for use in hospitals and correctional facilities to help provide a clean and safe environment. For Roton® Ligature-Resistant Opening Solutions see our TIPIT® section below.

TIPIT®



Designed to work with in new and retrofit applications, the TIPIT® was designed with safety in mind. When openings are fitted with the patented TIPIT® in conjunction with our Roton® Continuous Geared Hinge, this combination provides a safe environment while meeting institutional requirements for preventing objects from being hung from the top of the hinge. Available in two models, Concealed and Full Surfaces and two finishes, Gray and Black.

Tamper Resistant Hinge

This application is intended for use in hospital psychiatric areas and places of high security. The hinge is prepared with a hospital tip (concealed models only) and every other bearing is supplied with a set screw to lock against the inside of the cover channel for additional security.

Dutch Door Hinges

Hager Companies will prepare any of its hinge models for a dutch door application. The frame leaf is furnished as a continuous extrusion and the door leaf is cut to fit the dutch door heights specified. Handing, overall net door height, amount of clearance between the top and bottom doors, their individual heights and door and frame materials should be clearly specified.

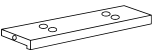
Special Holes

Any hinge may be ordered with special hole locations for unusual frame or door conditions. Please provide specifications for each leaf.

Bearing Replacement Kits

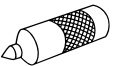
Available in standard or heavy duty and in clear anodized or dark bronze anodized finish for 780 and 1200 Series Roton®.

Marking Jigs



Marking jigs are available to locate the centers of the top end frame screws. These jigs must be ordered at the same time as the hinges to ensure fabrication accuracy.

Center Punches



Self-centering punches are available for #12 countersunk screws that are supplied. To make sure screw heads seat properly, accurate center punching is required.

Shim Stock



For clearance between the door and frame that may be excessive, a continuous shim is helpful (applied behind the frame leaf only). Anodized aluminum extrusions are supplied with no holes.

Item Marking

Marking and special packaging for job-site identification.

Replacement Moldings



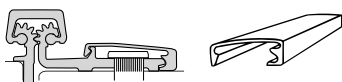
780-210M

Replacement door leaf molding for 780-210, 780-210HD, 780-045HD, and 780-046HD. Furnished with Allen head set screw and wrench. Shipped in standard lengths for trimming in the field.



780-247M

Replacement frame leaf molding for 780-157, and 780-157HD. Shipped in standard lengths for trimming in the field.



780-052M

Replacement door leaf molding for 780-053, 780-053HD, 780-054HD, 780-155HD, 780-057, 780-057HD, 780-157, and 780-157HD. Furnished with Allen head screw and wrench. Shipped in standard lengths for trimming in the field.

GENERAL INFORMATION

Fasteners

Hager Companies uses custom made, carefully engineered, and thoroughly tested fasteners exclusively. Each fastener is designed for ease of use as well as durability. Appropriate fasteners are furnished with each hinge, together with installation instructions for typical metal or wood doors and frames. The standard screw pack includes self-drilling screws. If wood screws are required, please specify on order and wood screws will be substituted.

Fasteners for Use with Hinges in the 500 Series

8 - 18 X 3/4" Truss Phillips Head Screw

Fasteners for Use with Hinges in the 750 and 780 Series Metal Doors or Frames (Undercut Head Phillips Countersunk Screws):

Two types of screws are available for metal doors and frames: the Dril-Kwik® screw (with drill point tip) and the thread forming screw (no tapping necessary). The #12-24 x 11/16" self-drilling screw has a machine thread in the screw shank. The #12-24 x 13/32" thread-forming screw has a machine thread in the screw shank.

The standard screw pack contains #12-24 Dril-Kwik® self-drilling machine thread. This screw has a hardened steel drill point built into the end of the screw, allowing it to be installed without a pre-drilled hole if the metal thickness is no more than 1/8" (3.2 mm). It forms its own threads as the screw is drilled into the door or frame. It is longer than most screws of the type because of the built-in drill point.

When installing the self-drilling screw, make certain that the installer is familiar with the proper use and torque settings of a screw gun. Proper center-punching is extremely important with self-drilling screws. If center-punching is omitted or incorrectly done, the screw will "walk" in the same way as a drill bit, resulting in cocked screw heads and improperly closing hinge leaves.

The optional self-threading screw is typically used on grout filled frames to prevent bowing of the frame. This screw has a short tapered section at the tip. A drilled pilot hole (range: 0.173" to 0.185") is required prior to tapping.

Either of these screws may be used for the attachment of Roton® hinges to metal doors or frames, generally without reinforcement except in thin aluminum or with doors of very heavy weight or anticipated abuse. Both types require center-punching to ensure that the screw sits properly in the hinge leaf. Self-centering countersinking center-punches are available.

In all cases, care should be taken to ensure that no drill chips build up behind the hinge. It is best to premark the holes and drill for self-threading screws with the hinge removed, or hold the hinge very tightly against the door or frame when using the self-drilling screws.

Hinges normally requiring sex bolts will be furnished with suitable mounting holes. Blank leaves, special countersinking, or door fastening with pan-head screws are available upon request.

If special fasteners are required, customers must supply them except upon prior agreement. Please consult the factory for alternate fastener recommendations.

Fasteners for Use with Hinges in the 1200 Series

1/4" - 20 x 1" Undercut Flat Phillips Head Screw

Sex Bolts (Thru-Bolts)

On all applicable surface-mounted hinges, sex bolt sets are furnished in the hardware package together with a transfer punch for accurate marking of the 3/8" (10 mm) drilled holes required. The 1/4"-20 bolt has a 3/8" (10 mm) shoulder under a 9/16" (14 mm) pan head so that it can be reversed for exterior in-swing doors or for additional security.

Roton® sex bolts are intentionally designed to be shorter than the door thickness for proper clamping action with doors of slightly varying thickness and gauge in the 1" (25 mm) - 2-1/2" (63.5 mm) range. Unless otherwise requested, bolts suitable for the 1-3/8" (35 mm) - 1-3/4" (45 mm) range will be shipped. Shorter or longer bolts may be requested. Bolts that are outside the door thickness range of 1" (25 mm) - 2-1/2" (63.5 mm) must be provided by the installer.

DOOR AND FRAME DIMENSIONING

Half Surface Models

780-045HD, 780-046HD, 780-053, 780-053HD, 780-054HD, and 780-155HD.

Designed primarily for work involving new doors and frames, one leaf concealed and one leaf surface mounted. They can also be used on retrofit work where a new door can be ordered to fit an existing frame if the existing door is made of wood and can be reduced in size to accommodate the 1/8" (3.2 mm) leaf thickness, or the frame is to be replaced and can be furnished with an oversized header.

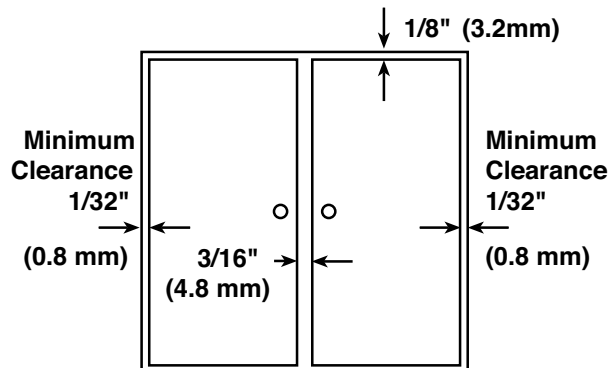
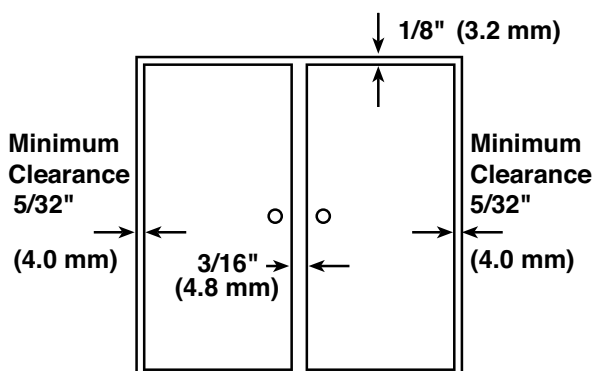
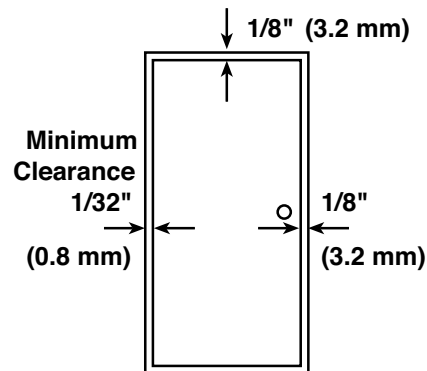
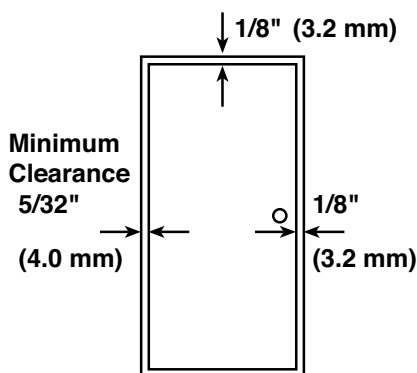
Clearance required as follows:

Single Doors (Square and Beveled Edge)

A. Leaf thickness	1/8" (3.2 mm)
B. Additional allowance for frame irregularities	1/32" (0.8 mm)
C. Lockside clearance for single door	1/8" (3.2 mm)
Total	9/32" (7.2 mm)

Pairs of Doors (Square and Beveled Edge)

A. Leaf thickness	1/8" (3.2 mm)
B. Additional allowance for frame irregularities	1/32" (0.8 mm)
C. Edge to edge clearance (recommended)*	3/16" (4.8 mm)
D. Second allowance for frame irregularities	1/32" (0.8 mm)
E. Second leaf thickness	1/8" (3.2 mm)
Total	1/2" (12.8 mm)



Full Surface Models

780-057HD, 780-157, 780-157HD, 780-210, and 780-210HD.

The above models are designed for retrofit applications and require no special dimensioning. Full surface models are designed to be mounted to the exposed surface of the door and frame. No additional clearance is required except for door and frame painting.

Clearance required as follows:

Single Doors (Square and Beveled Edge)

A. Additional allowance for frame irregularities	1/32" (0.8 mm)
B. Lockside clearance for single door	1/8" (3.2 mm)
Total	5/32" (4.0 mm)

Pairs of Doors (Square and Beveled Edge)

A. Additional allowance for frame irregularities	1/32" (0.8 mm)
B. Edge to edge clearance (recommended)*	3/16" (4.8 mm)
C. Second allowance for frame irregularities	1/32" (0.8 mm)
Total	1/4" (6.4 mm)

*For fire-rated doors, please refer to door manufacturer's requirement for edge to edge clearance to maintain compliance with NFPA requirements.



DOOR AND FRAME DIMENSIONING

Concealed Models

750-134, 750-138, 780-110HD, 780-111, 780-111HD, 780-111LL, 780-112, 780-112HD, 780-112LL, 780-124HD, 780-124LL, 780-224, 780-224HD, 780-224LL, 780-226HD, and 780-226LL. The following are not recommended for doors with beveled edged applications – 780-041HD and 780-041LL.

Designed primarily for work involving new doors and frames, these models have parallel, fully concealed leaves. They can also be used on retrofit work where a new door can be ordered to fit an existing frame if the existing door is made of wood and can be reduced in size to accommodate the 5/16" (7.9 mm) hinge thickness, or the frame is to be replaced and can be furnished with an oversized header.

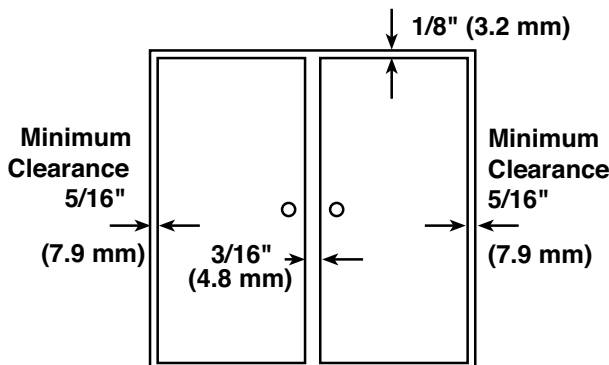
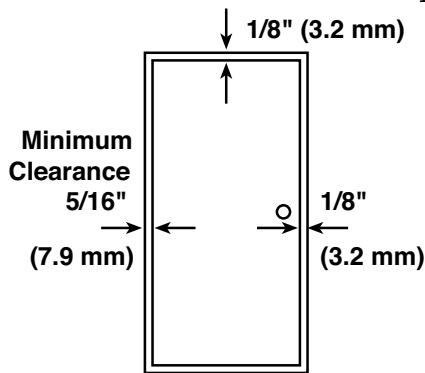
Clearance required as follows:

Single Doors (Square Edged)

A. Hinge thickness	5/16" (7.9 mm)
B. Additional allowance for frame irregularities	1/32" (0.8 mm)
C. Lockside clearance for single door	1/8" (3.2 mm)
Total	15/32" (11.9 mm)

Single Doors (Beveled Edged)

A. Hinge thickness	5/16" (7.9 mm)
B. Additional allowance for frame irregularities	1/32" (0.8 mm)
C. Lockside clearance for single door	1/8" (3.2 mm)
D. Allowance for beveled edge	1/32" (0.8 mm)
Total	1/2" (12.7 mm)



Pairs of Doors (Square Edged)

A. Hinge thickness	5/16" (7.9 mm)
B. Additional allowance for frame irregularities	1/32" (0.8 mm)
C. Edge to edge clearance (recommended)*	3/16" (4.8 mm)
D. Second allowance for frame irregularities	1/32" (0.8 mm)
E. Second hinge thickness	5/16" (7.9 mm)
Total	7/8" (22.2 mm)

Pairs of Doors (Beveled Edged)

A. Hinge thickness	5/16" (7.9 mm)
B. Allowance for beveled edge	1/32" (0.8 mm)
C. Additional allowance for frame irregularities	1/32" (0.8 mm)
D. Edge to edge clearance (recommended)*	3/16" (4.8 mm)
E. Second allowance for frame irregularities	1/32" (0.8 mm)
F. Second allowance for beveled edge	1/32" (0.8 mm)
G. Second hinge thickness	5/16" (7.9 mm)
Total	15/16" (23.8 mm)

Concealed Model Exceptions - 780-113HD

Single Doors (Square Edged)

A. Hinge thickness	13/16" (20.6 mm)
B. Additional allowance for frame irregularities	1/32" (0.8 mm)
C. Lockside clearance for single door	1/8" (3.2 mm)
Total	31/32" (24.6 mm)

Single Doors (Beveled Edged)

A. Hinge thickness	13/16" (20.6 mm)
B. Additional allowance for frame irregularities	1/32" (0.8 mm)
C. Lockside clearance for single door	1/8" (3.2 mm)
D. Allowance for beveled edge	1/32" (0.8 mm)
Total	1" (25.4 mm)

Pairs of Doors (Square Edged)

A. Hinge thickness	13/16" (20.6 mm)
B. Additional allowance for frame irregularities	1/32" (0.8 mm)
C. Edge to edge clearance (recommended)*	3/16" (4.8 mm)
D. Second allowance for frame irregularities	1/32" (0.8 mm)
E. Second hinge thickness	13/16" (20.6 mm)
Total	1-7/8" (47.6 mm)

Pairs of Doors (Beveled Edged)

A. Hinge thickness	13/16" (20.6 mm)
B. Allowance for beveled edge	1/32" (0.8 mm)
C. Additional allowance for frame irregularities	1/32" (0.8 mm)
D. Edge to edge clearance (recommended)*	3/16" (4.8 mm)
E. Second allowance for frame irregularities	1/32" (0.8 mm)
F. Second allowance for beveled edge	1/32" (0.8 mm)
G. Second hinge thickness	13/16" (20.6 mm)
Total	1-15/16" (49.2 mm)

*For fire-rated doors, please refer to door manufacturer's requirement for edge to edge clearance to maintain compliance with NFPA requirements.

DOOR AND FRAME DIMENSIONING

Concealed Model

Single Doors (Square Edged)

A. Hinge thickness	15/16" (23.8 mm)
B. Additional allowance for frame irregularities	1/32" (0.8 mm)
C. Lockside clearance for single door	1/8" (3.2 mm)
Total	1-3/32" (27.8 mm)

Pair of Doors (Square Edged)

A. Hinge thickness	15/16" (23.8 mm)
B. Additional allowance for frame irregularities	1/32" (0.8 mm)
C. Edge to edge clearance (recommended)*	3/16" (4.8 mm)
D. Second allowance for frame irregularities	1/32" (0.8 mm)
E. <u>Second hinge thickness</u>	<u>15/16" (23.8 mm)</u>
Total	2-1/8" (54.0 mm)

1200-600XHD, 1200-650XHD

Single Doors (Square Edged)

A. Hinge thickness	15/32" (11.9 mm)
B. Additional allowance for frame irregularities	1/32" (0.8 mm)
C. <u>Lockside clearance</u>	<u>1/8" (3.2 mm)</u>
Total	5/8" (15.9 mm)

Single Doors (Beveled Edged)

A. Hinge thickness	15/32" (11.9 mm)
B. Additional allowance for frame irregularities	1/32" (0.8 mm)
C. Lockside clearance for single door	1/8" (3.2 mm)
D. <u>Allowance for beveled edge</u>	<u>1/32" (0.8 mm)</u>
Total	21/32" (16.7 mm)

Pair of Doors (Square Edged)

A. Hinge thickness	15/32" (11.9 mm)
B. Additional allowance for frame irregularities	1/32" (0.8 mm)
C. Edge to edge clearance (recommended)*	3/16" (4.8 mm)
D. Second allowance for frame irregularities	1/32" (0.8 mm)
E. <u>Second hinge thickness</u>	<u>15/32" (11.9 mm)</u>
Total	1-3/16" (30.2 mm)

Pair of Doors (Beveled Edged)

A. Hinge thickness	15/32" (11.9 mm)
B. Allowance for beveled edge	1/32" (0.8 mm)
C. Additional allowance for frame irregularities	1/32" (0.8 mm)
D. Edge to edge clearance (recommended)*	3/16" (4.8 mm)
E. Second allowance for frame irregularities	1/32" (0.8 mm)
F. Second allowance for beveled edge	1/32" (0.8 mm)
G. <u>Second hinge thickness</u>	<u>15/32" (11.9 mm)</u>
Total	1-1/4" (31.8 mm)

Single Doors (Beveled Edged)

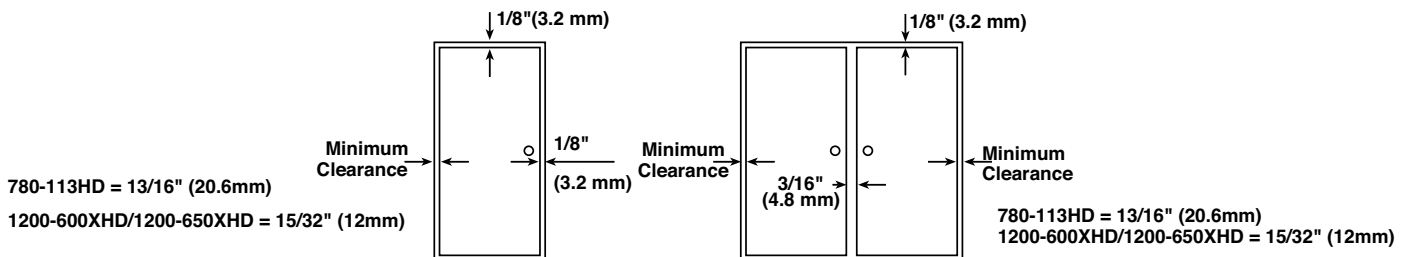
A. Hinge thickness	1/2" (12.7 mm)
B. Additional allowance for frame irregularities	1/32" (0.8 mm)
C. Lockside clearance for single door	1/8" (3.2 mm)
D. <u>Allowance for beveled edge</u>	<u>1/32" (0.8 mm)</u>
Total	11/16" (17.5 mm)

Pair of Doors (Square Edged)

A. Hinge thickness	1/2" (2.7 mm)
B. Additional allowance for frame irregularities	1/32" (0.8 mm)
C. Edge to edge clearance (recommended)*	3/16" (4.8 mm)
D. Second allowance for frame irregularities	1/32" (0.8 mm)
E. <u>Second hinge thickness</u>	<u>1/2" (12.7 mm)</u>
Total	11/4" (31.8 mm)

Pair of Doors (Beveled Edged)

A. Hinge thickness	1/2" (12.7 mm)
B. Allowance for beveled edge	1/32" (0.8 mm)
C. Additional allowance for frame irregularities	1/32" (0.8 mm)
D. Edge to edge clearance (recommended)*	3/16" (4.8 mm)
E. Second allowance for frame irregularities	1/32" (0.8 mm)
F. Second allowance for beveled edge	1/32" (0.8 mm)
G. <u>Second hinge thickness</u>	<u>1/2" (2.7 mm)</u>
Total	1-5/16" (33.3 mm)



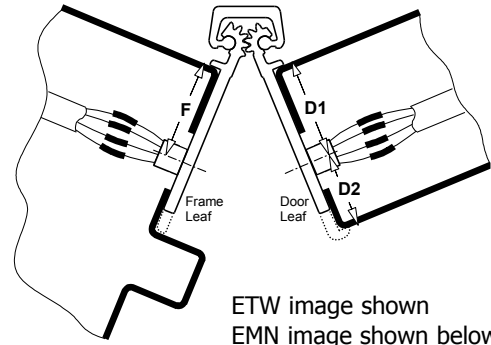
*For fire-rated doors, please refer to door manufacturer's requirement for edge to edge clearance to maintain compliance with NFPA requirements.



ELECTRIC HINGE MODIFICATIONS

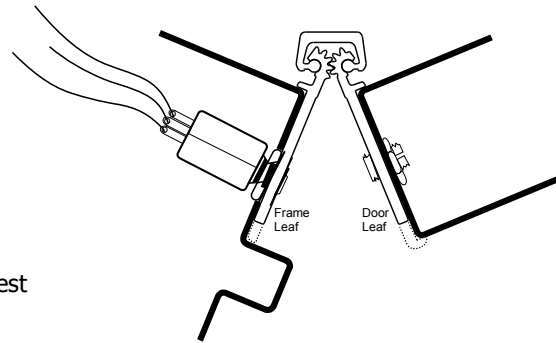
Concealed Electric Through-Wire and Monitoring:

- To order, use symbol "ETM" plus the number of wires required as a suffix, ie: 780-224LL 85" Bronze ETM - 4
- This combines the continuous electric conductors and the miniature switch to provide both power transfer and monitoring
- Four, six, eight or ten continuous electric conductors
- Miniature switch is incorporated into the frame leaf
- Specify handing and the dimension from the top edge of the door to the centerline of each electric modification location
- Templates regarding location of monitoring switch, available upon request



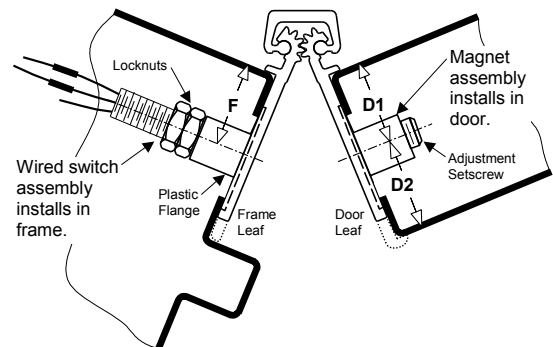
Exposed Electric Switches

- To order, use symbol "E1S" as a suffix, ie: 780-112HD 85" Clear E1S
- Miniature push button switch is incorporated in the hinge frame leaf to monitor position of the door
- Three 12" wire leads
- Each monitoring hinge only needs one E1S switch
- Specify handing and the dimension from the top edge the door to the centerline of the electric switch location
- Templates regarding location of contact switch available upon request



Concealed Electric Monitoring

- To order, use symbol "EMN", as a suffix, ie: 780-224HD 119" Bronze EMN
- Miniature switch is incorporated into the frame leaf
- Three 12" wire leads
- Specify handing and the dimension from the top edge of the door to the centerline of electric monitoring location
- Templates regarding location of monitoring switch available upon request



Von Duprin EPT 2 or EPT 10 Electric Power Transfer Preparation

Concealed Leaf
Half Surface

- Hinge leaf cutout to accommodate power transfer device
- Specify handing and the dimension from the top edge of the door to the centerline of the power transfer location

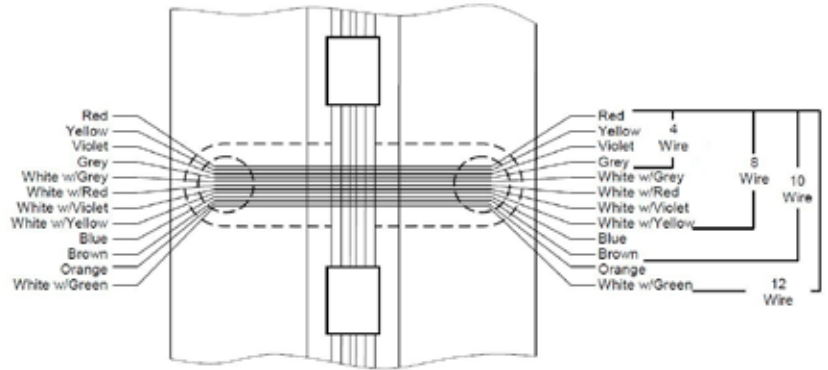
Note: Special Electric Modifications and EPT locations may require additional charges if screw holes have to be moved. Contact Hager Companies Customer Service for charges.



ELECTRIC HINGE MODIFICATIONS

Concealed Electric Through-Wire

- To order, use symbol "ETW" plus the number of wire leads, 12" per side required as a suffix, ie: 780-112HD 85" Clear ETW - 4
- Transfers power discreetly from building to door hardware
- 4, 8, 10 or 12 wire continuous electric conductors
- Specify handing and the dimension from the top edge of the door to the centerline of electric through-wire location
- Templates regarding location of through-wires available upon request



Removable Electric Through-Wire

- To order, use symbol "RETW", ie: 780-112HD 85" Clear RETW
- Transfers power discreetly from building to door hardware
- 4" removable 10 or 12 wire ETW module can easily be removed for adjustment or service
- Available on these heavy duty models only: 780-057HD, 780-111HD, 780-112HD, 780-124HD, 780-157HD, 780-224HD, 780-226HD
- Specify handing and the dimension from the top edge of the door to the centerline of electric monitoring location
- Templates regarding location of module available upon request



Component #	Finish	# of Wires
7-102-1860	Clear	10
7-112-1870	Dark Bronze	10
7-112-7825	Gold	10
7-112-1875	Black	10
7-102-1870	Clear	12
7-112-1872	Dark Bronze	12
7-112-1876	Gold	12
7-112-1881	Black	12

Mortar Box - 430

- Serves as a mortar shield
- Overall dimensions: 9" (229 mm) length with tabs, 7" (178 mm) inside, 1-3/4" x 1-3/4" (45 mm x 45 mm) inside dimension
- Galvanized steel 0.040" (1 mm)
- Top and bottom knockouts for standard conduit fittings



Exposed Electric Contacts

- To order, use symbol "E" plus the number of contacts required as a suffix, ie: 780-112HD 85" Clear E4
- Transfers power to door in closed position
- Must have at least two contacts to transfer power
- Specify handing and the dimension from the top edge of the door to the centerline of the electric contact location
- Templates regarding location of contacts available upon request

ELECTRIC HINGE MODIFICATIONS

Quick Connect

Available for ETM, ETW, and RETW options. Top and bottom knockouts for standard conduit fittings.

Concealed Electric Monitoring (EMN)

- Miniature switch is incorporated into the frame leaf.
- Specify handing and the dimension from the top edge of the door to the centerline of the electric monitoring location.
- Special Electric Modifications and EPT locations may require additional charges if screw holes have to be moved.
- Templates regarding location of monitoring switch available upon request.

Concealed Electric Through-Wire and Monitoring (ETM)

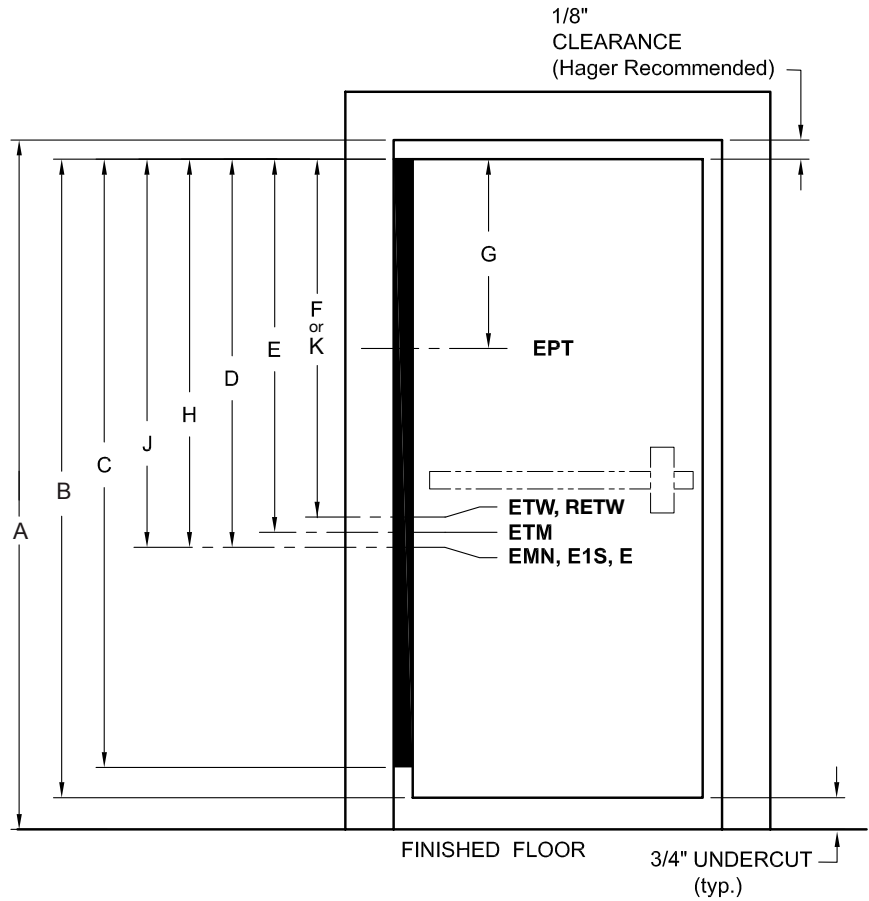
- Electric Preparation
 - ETM-4
 - ETM-8
 - ETM-10
- All ETM have 28-gauge continuous conductors.
- This combines the continuous electric conductors and the miniature switch to provide both power transfer and monitoring.
- Miniature switch is incorporated into the frame leaf.
- Specify handing and the dimension from the top edge of the door to the centerline of each electric modification location.
- Templates regarding location of monitoring switch available upon request.

Concealed Electric Through-Wire (ETW)

- Electric Preparation
 - ETW-4
 - ETW-8
 - ETW-10
 - ETW-12
- All ETW have 28-gauge continuous conductors.
- 12" per side required as a suffix.
- Cut out for prep - 1/2" drilled hole.
- Transfers power discreetly from building to door hardware.
- Specify handing and the dimension from the top edge of the the door to the centerline of the electric through-wire location.
- Special electric modifications and EPT locations may require additional charges if screw holes have to moved. Contact Hager Customer Service for charges.
- Templates regarding location of through-wires available upon request.

ELECTRIC HINGE MODIFICATIONS

- A** = Opening
- B** = Door height
- C** = Actual hinge length
- D** = C.L. of **EMN** (electric monitor)
- E** = C.L. of **ETM** (electric through-wires & monitor)
- F** = C.L. of **ETW** (electric through-wires)
- G** = C.L. of **EPT** (electric power transfer)
- H** = C.L. of **E1S** (exposed switch)
- J** = C.L. of **E** (exposed contact)
- K** = C.L. of **RETW** (removable electric through-wires)



For ease of ordering, Hager Companies has established standard locations for power transfer cutouts. All standard location dimensions are referenced from the top edge of the door to the centerline of the power transfer cutout. Please specify handing.

	Opening	Door Height	Actual Hinge Length	EMN	ETM	ETW	EPT	E1S	E	RETW
79 SD	80"	79-1/8"	79"	40-3/4"	42-3/4"	40-3/4"	34-3/8"	42-1/2"	42-1/2"	–
79 HD	80"	79-1/8"	79"	40-3/4"	43-3/8"	40-3/4"	34-3/8"	42-1/2"	42-1/2"	43-3/8"
83 SD	84"	83-1/8"	83"	45-5/16"	44-3/4"	45-5/16"	36-3/8"	46-1/2"	46-1/2"	–
83 HD	84"	83-1/8"	83"	45-5/16"	45-3/8"	45-5/16"	36-3/8"	46-1/2"	46-1/2"	45-3/8"
85 SD	86"	85-1/8"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
85 HD	86"	85-1/8"	85"	46-5/16"	46-3/8"	46-5/16"	37-3/8"	48-1/2"	48-1/2"	46-3/8"
95 SD	96"	95-1/8"	95"	56-3/8"	55-13/16"	56-3/8"	47-1/2"	59-3/4"	59-3/4"	–
95 HD	96"	95-1/8"	95"	56-3/8"	56-1/2"	56-3/8"	47-1/2"	59-3/4"	59-3/4"	56-1/2"
119 SD	120"	119-1/8"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
119 HD	120"	119-1/8"	119"	81-1/4"	81-5/16"	81-1/4"	72-5/16"	83-3/4"	83-3/4"	81-5/16"

SD = Standard Duty

HD = Heavy Duty





ELECTRIC HINGE MODIFICATIONS

Part Number	Von Duprin EPT 2 or EPT 10 Power Transfer Preparation	Exposed Electric Contacts	Exposed Electric Switches	Concealed Electric Through-Wire	Concealed Electric Monitoring	Concealed Electric Through-Wire and Monitoring	Removable Electric Through-Wire
	EPT	E	E1S	ETW	EMN	ETM	RETW
780-045HD	•						
780-046HD	•						
780-053	•						
780-053HD	•						
780-054HD	•						
780-057HD				•			•
780-110HD			•				
780-111	•	•	•	•	•	•	
780-111HD	•	•	•	•	•	•	•
780-111LL	•	•	•	•	•	•	
780-112	•	•	•	•	•	•	
780-112HD	•	•	•	•	•	•	•
780-112LL	•	•	•	•	•	•	
780-124HD	•	•	•	•	•	•	•
780-124LL	•	•	•	•	•	•	
780-157				•			•
780-224	•	•	•	•	•	•	
780-224HD	•	•	•	•	•	•	•
780-224LL	•	•	•	•	•	•	
780-226HD	•	•	•	•	•	•	•
780-226LL	•	•	•	•	•	•	
1200-600	•			•			
1200-650	•			•			

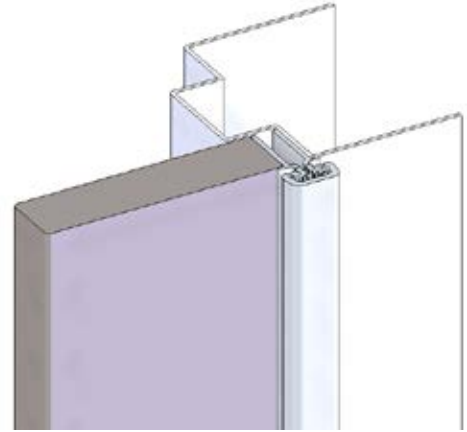
500 SERIES LIGHT DUTY - 500-048 - LIGHT DUTY, CONCEALED LEAF HINGE

SPECIFICATIONS

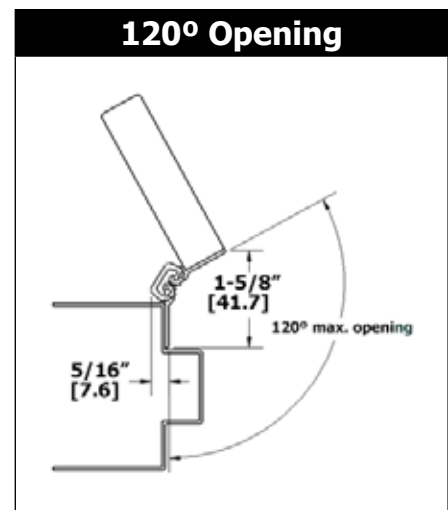
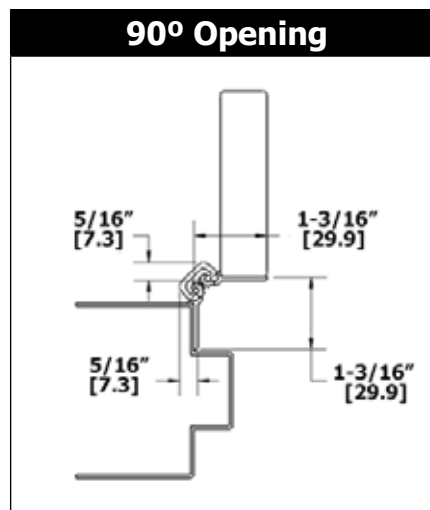
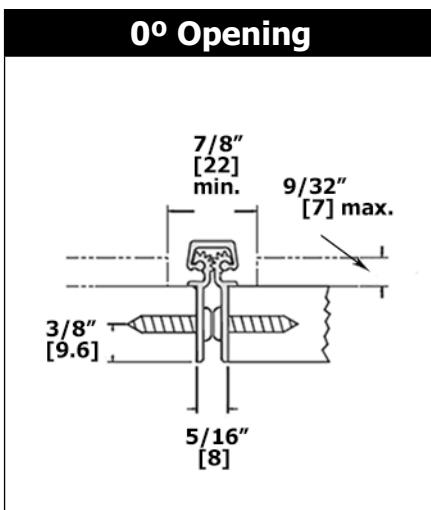
Material:	Aluminum 6063-T6 - 1/16" (1.5 mm) leaf thickness
Clearance:	5/16" (8 mm)
Fasteners:	<ul style="list-style-type: none"> • Standard: #8-18 x 3/4" Truss Head Phillips tapping AB zinc plated steel. • For sheet metal or wood applications.
Length Options:	Standard and custom lengths available

FEATURES

- Universal hinge used for a wide variety of applications including marine applications, wood cabinet construction, medical equipment, portable exhibits and displays, electronic cabinets, switchboxes, etc.
- Bearings spaced to distribute door weight evenly up to 50 lbs.
- Can be used for vertical or horizontal applications
- Alignment ribs for easy installation and proper hinge location



Length		Fastener Count	
Inches	Millimeters	# For Door	# For Jamb
24	610	6	6
36	914	9	9
48	1219	12	12
72	1829	18	18



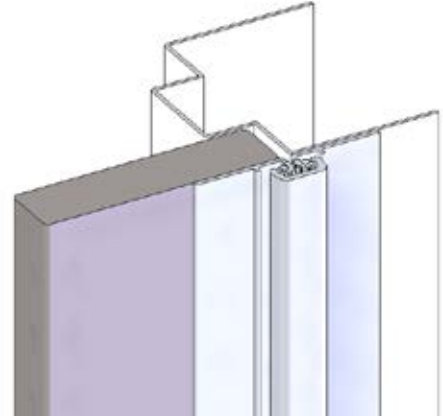


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500 SERIES LIGHT DUTY - 500-220 - LIGHT DUTY, FULL SURFACE HINGE

SPECIFICATIONS

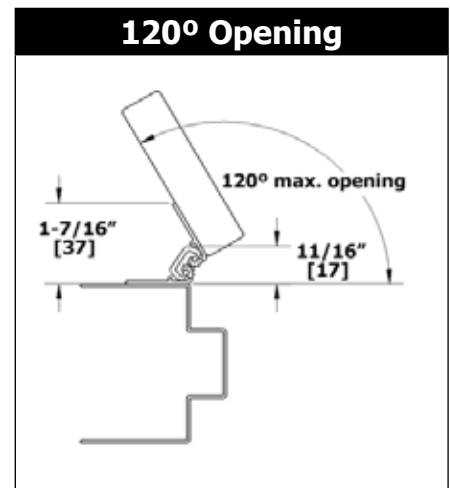
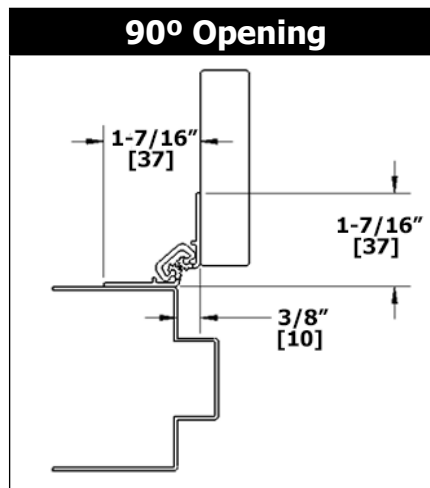
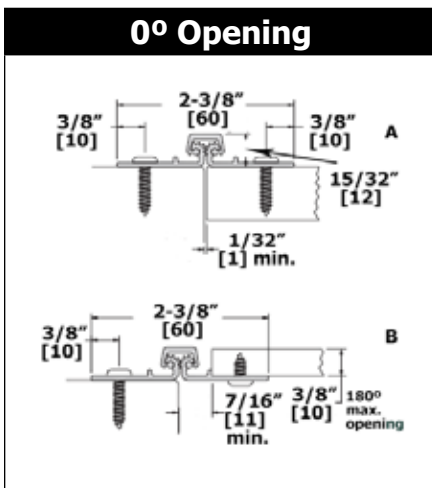
Material:	Aluminum 6063-T6 - 1/16" (1.5 mm) nominal leaf thickness
Clearance:	1/32" (1 mm) minimum
Fasteners:	<ul style="list-style-type: none"> Standard: #8-18 x 3/4" Truss Head Phillips tapping AB zinc plated Steel For sheet metal or wood applications Shorter screws required for 90° and 180° openings when applied as shown in "B" (not provided) Shorter screws required for openings past 90° when applied as shown in "C" (not provided)
Length Options:	Standard and custom lengths available



FEATURES

- Universal hinge used for a wide variety of applications including marine applications, wood cabinet construction, medical equipment, portable exhibits and displays, electronic cabinets, switchboxes, etc.
- Allows either inset or outset applications for recessed or surface mounting
- Bearings spaced to distribute door weight evenly up to 50 lbs.
- Can be used for vertical or horizontal applications
- Alignment ribs for easy installation and proper hinge location

Length		Fastener Count	
Inches	Millimeters	# For Door	# For Jamb
24	610	6	6
36	914	9	9
48	1219	12	12
72	1829	18	18

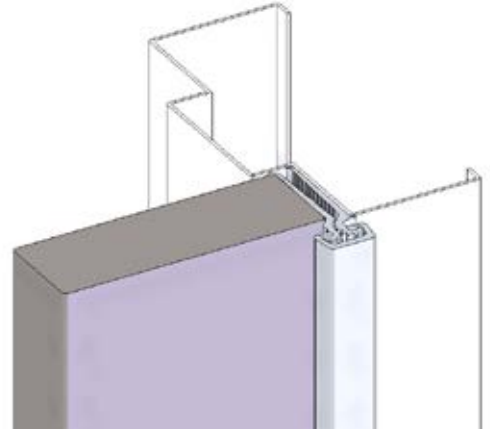




750 SERIES CONCEALED LEAF - 750-134 - STANDARD DUTY

SPECIFICATIONS

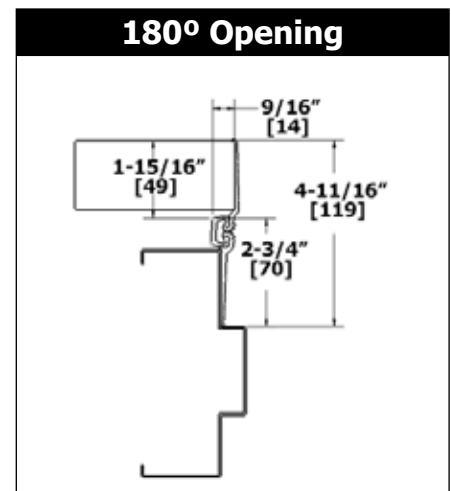
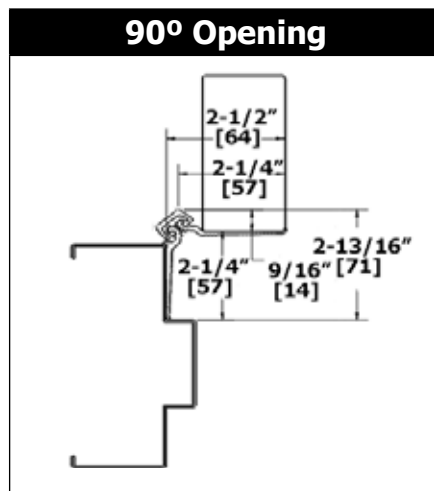
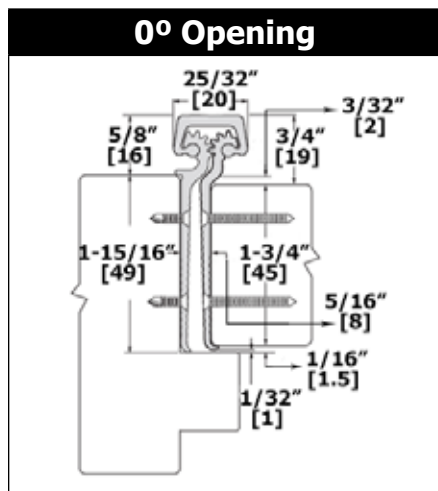
Material:	Aluminum 6063-T6
Clearance:	5/16" (8 mm) hinge side plus standard lockside clearance
Fasteners:	<ul style="list-style-type: none"> • Standard: Dril-Kwik® - #12-14 x 1-1/2" Flat Head Sheet Metal Screws • Standard: Dril-Kwik® - #12-24 x 11/16" Flat Head Screws • Additional options available upon request
Length Options:	Standard and custom lengths available
Door/Frame Reinforcement:	None required



FEATURES

- For medium frequency, 1-3/4" (44mm) thick solid core wood interior doors up to 100 lbs.
- Door edge protection lip
- Offset joint to clear casing
- Frame leaf alignment rib for proper hinge locations

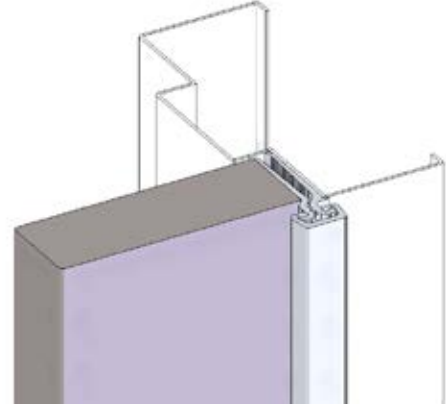
Length		Fastener Count	
Inches	Millimeters	# For Door	# For Jamb
79	2007	15	15
83	2108	19	19
85	2159	19	19
95	2413	20	20
119	3023	23	23



750 SERIES CONCEALED LEAF - 750-138 - STANDARD DUTY

SPECIFICATIONS

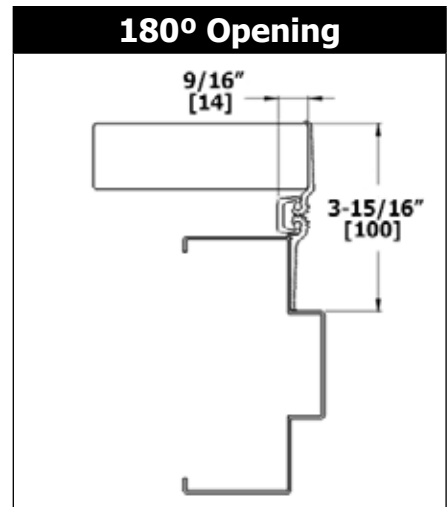
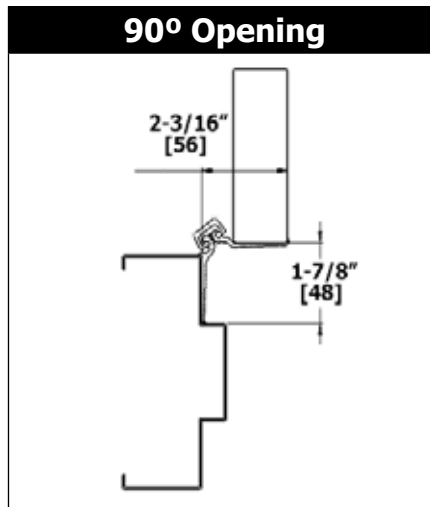
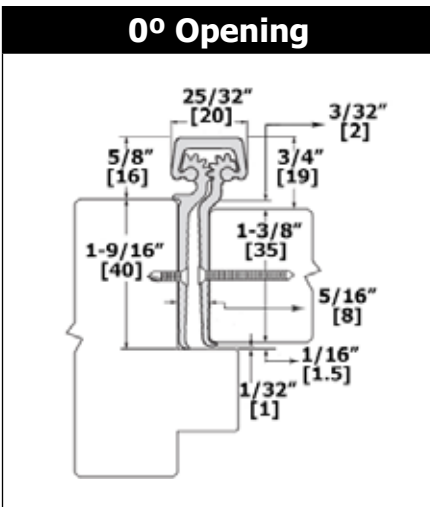
Material:	Aluminum 6063-T6
Clearance:	5/16" (8 mm) hinge side plus standard lockside clearance
Fasteners:	<ul style="list-style-type: none"> • Standard: Dril-Kwik® - #12-14 x 1-1/2" Flat Head Sheet Metal Screws • Standard: Dril-Kwik® - #12-24 x 11/16" Flat Head Screws • Additional options available upon request
Length Options:	Standard and custom lengths available
Door/Frame Reinforcement:	None required



FEATURES

- For medium frequency, 1-3/8" (35mm) thick solid core wood interior doors up to 100 lbs.
- Door edge protection lip
- Offset joint to clear casing
- Frame leaf alignment rib for proper hinge location

Length		Fastener Count	
Inches	Millimeters	# For Door	# For Jamb
79	2007	16	16
83	2108	18	18
85	2159	18	18
95	2413	20	20
119	3023	26	26

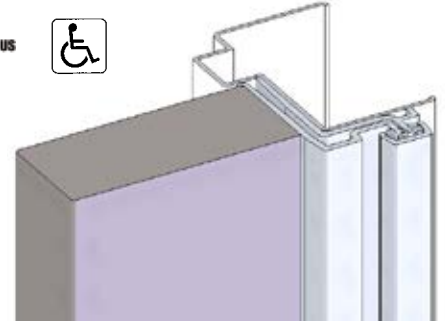




780 SERIES CONCEALED LEAF - 780-041HD | 780-041LL - HEAVY DUTY OR LEAD LINED

SPECIFICATIONS

- Material:** Aluminum 6063-T6
- Clearance:** 5/16" (8 mm) hinge side plus standard lockside clearance
- Fasteners:**
- Standard: Dril-Kwik® - #12-24 x 11/16" Flat Head Screws
 - Additional options available upon request
- LL Fasteners:**
- Standard: 1/2 Dril-Kwik® Screws, 1/2 Wood Screws
 - Optional: Dril-Kwik® - #12-24 x 11/16" Flat Head Screws
 - Additional options available upon request
- Length Options:** Standard and custom sizes available
- Door/Frame Reinforcement:** None required to 200 lbs., heavier weight use 16-gauge channel
- Optional Fire Rating:** Up to 3-hour metal and 90-minute wood composite (with studs)
- Notes:** See additional fire rating details on page 3

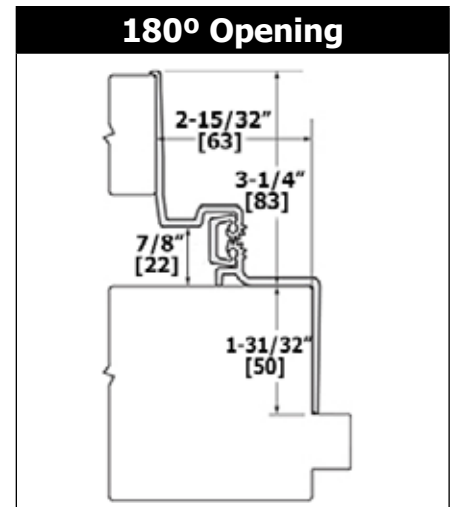
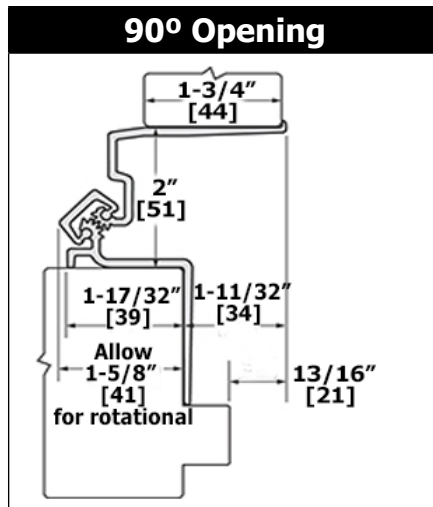
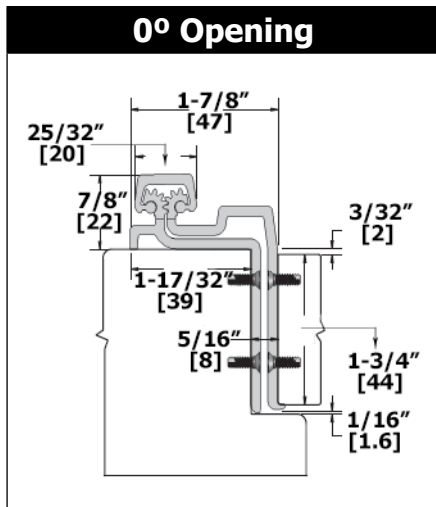


(Left hand shown)

FEATURES

- Heavy duty for high frequency doors - for wood or metal doors 1-3/4" (44 mm) thick
- Lead lined model for hospital x-ray room doors with double row of screws to straddle lead (specify "LL")
- Door edge protection lip
- Swing-clear action and ADA compliant for classroom or patient room doors
- Not recommended for doors with a beveled edge on the hinge side

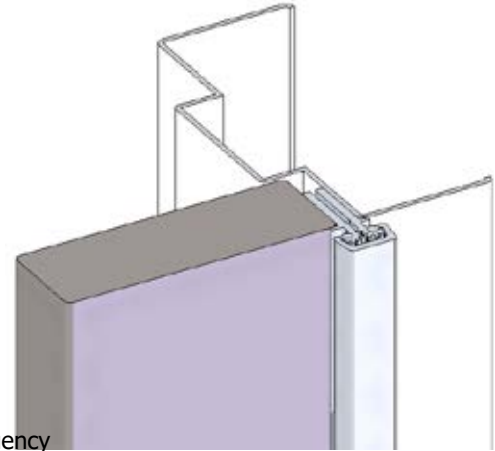
Length		Fastener Count			
Inches	Millimeters	# Per Door		# Per Jamb	
		HD	LL	HD	LL
79	2007	15	32	15	32
83	2108	19	36	19	36
85	2159	19	36	19	36
95	2413	20	42	20	42
119	3023	23	48	23	48



780 SERIES CONCEALED LEAF - 780-110HD - HEAVY DUTY

SPECIFICATIONS

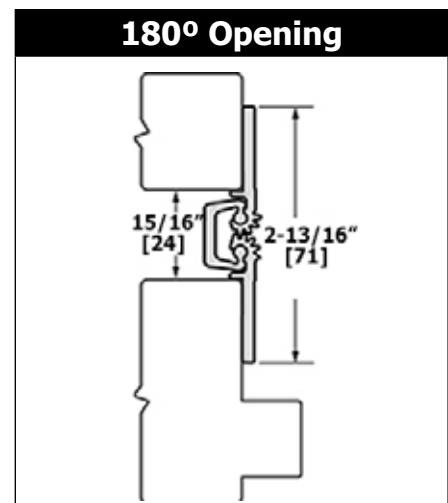
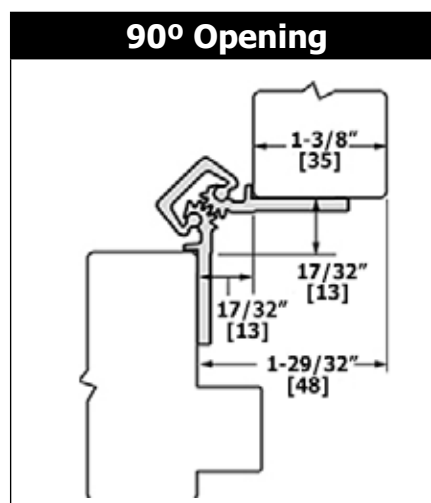
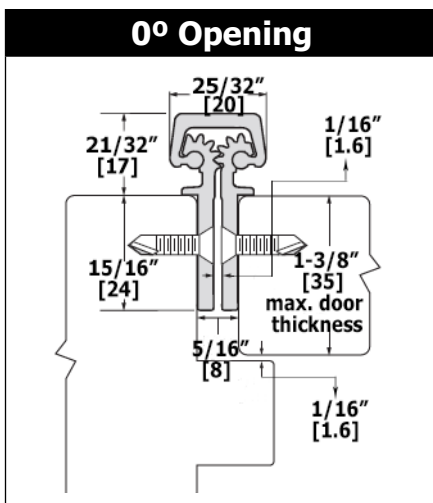
Material:	Aluminum 6063-T6
Clearance:	5/16" (8 mm) hinge side plus standard lockside clearance
Fasteners:	<ul style="list-style-type: none"> • Standard: Dril-Kwik® - #12-24 x 11/16" Flat Head Screws • Additional options available upon request
Length Options:	Standard and custom lengths available
Door/Frame Reinforcement:	None required to 200 lbs., heavier weight use 16-gauge channel
Notes:	See additional fire rating details on page 3



FEATURES

- Heavy duty for high frequency doors or heavy, medium frequency doors. For doors 1" (25mm) to 1-3/8" (35mm) thick
- Frame and door leaf alignment ribs for proper hinge and door location

Length		HD Fastener Count	
Inches	Millimeters	# For Door	# For Jamb
79	2007	16	16
83	2108	18	18
85	2159	18	18
95	2413	20	20
119	3023	26	26

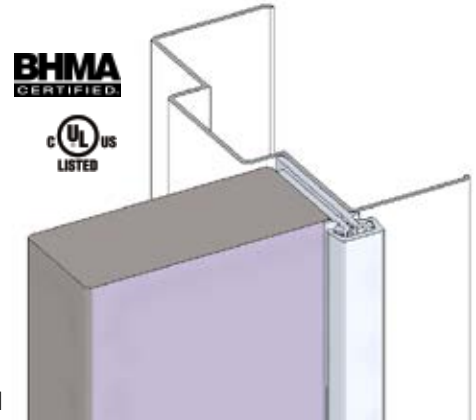




780 SERIES CONCEALED LEAF - 780-111* | 780-111HD* | 780-111LL - STANDARD DUTY, HEAVY DUTY OR LEAD LINED

SPECIFICATIONS

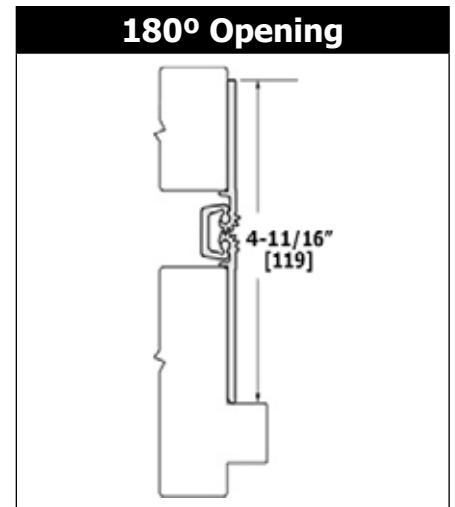
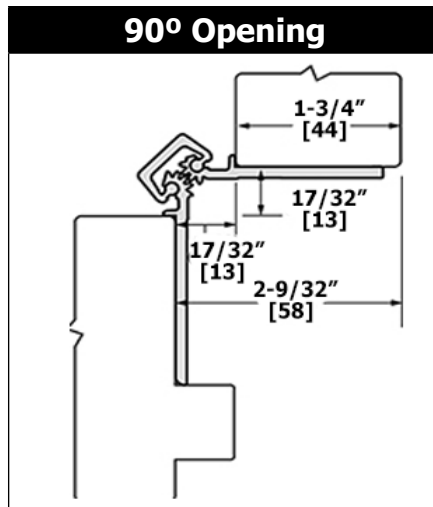
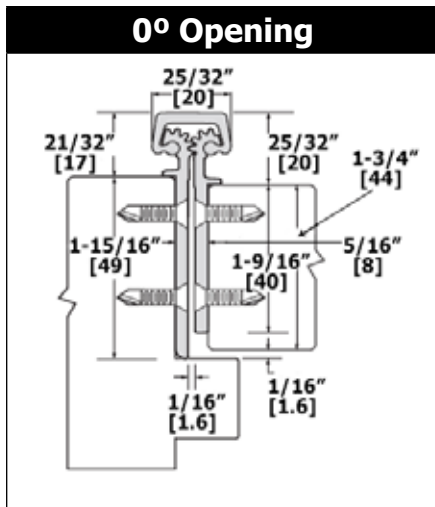
- Material: Aluminum 6063-T6
- Clearance: 5/16" (8 mm) hinge side plus standard lockside clearance
- Fasteners:
 - Standard: Dril-Kwik® - #12-24 x 11/16" Flat Head Screws
 - Optional: 1/2 Dril-Kwik® Screws, 1/2 Wood Screws
- LL Fasteners:
 - Standard: 1/2 Dril-Kwik® Screws, 1/2 Wood Screws
 - Optional: Dril-Kwik® - #12-24 x 11/16 Flat Head Screws
 - Additional options available upon request
- Length Options: Standard and custom lengths available
- Door/Frame Reinforcement: None required to 200 lbs., heavier weight use 16-gauge channel
- Optional Fire Rating: Up to 3-hour metal and 90-minute wood composite (with studs)
- Notes: See additional fire rating details on page 3



FEATURES

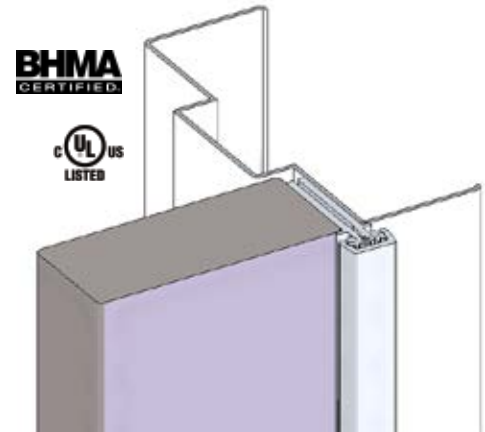
- Standard duty for medium frequency doors. Heavy duty for high frequency doors or heavy, medium frequency doors.
- Lead lined model for hospital x-ray room doors with double row of screws to straddle lead (Specify "LL")
- Frame and door leaf alignment ribs for proper hinge and door location
- 1/8" (3 mm) inset

Length		Fastener Count					
Inches	Millimeters	# For Door			# For Jamb		
		SD	HD	LL	SD	HD	LL
79	2007	15	15	32	15	15	32
83	2108	19	19	36	19	19	36
85	2159	19	19	36	19	19	36
95	2413	20	20	42	20	20	42
119	3023	23	23	48	23	23	48



SPECIFICATIONS

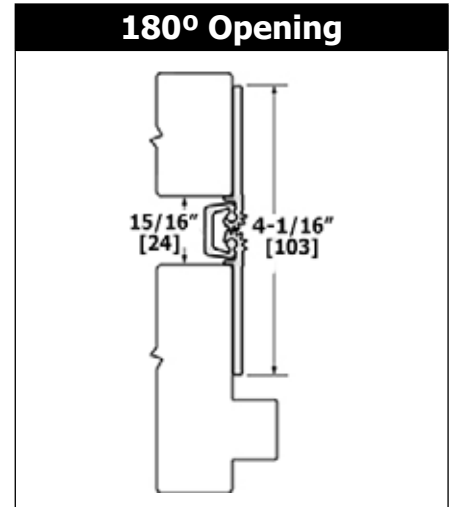
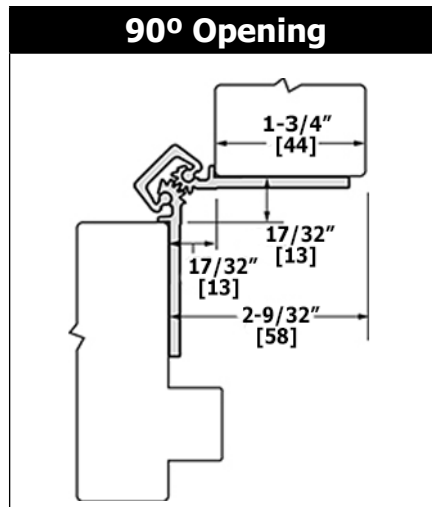
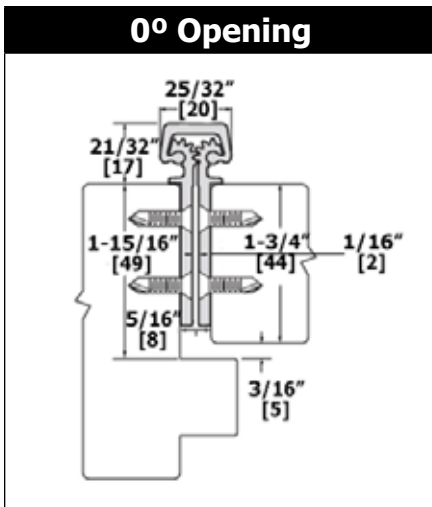
Material:	Aluminum 6063-T6
Clearance:	5/16" (8 mm) hinge side plus standard lockside clearance
Fasteners:	<ul style="list-style-type: none"> • Standard: Dril-Kwik® -12-24 x 11/16" Flat Head Screws • Optional: 1/2 Dril-Kwik® Screws, 1/2 Wood Screws • Additional options available upon request
LL Fasteners:	<ul style="list-style-type: none"> • Standard: 1/2 Dril-Kwik® Screws, 1/2 Wood Screws • Optional: Dril-Kwik® - #12-24 x 11/16" Flat Head Screws • Additional options available upon request
Length Options:	Standard and custom lengths available
Door/Frame Reinforcement:	None required to 200 lbs., heavier weight use 16-gauge channel
Optional Fire Rating:	Up to 3-hour metal and 90-minute wood composite (with studs)
Notes:	See additional fire rating details on page 3



FEATURES

- Standard duty for medium frequency doors. Heavy duty for high frequency doors or heavy, medium frequency doors.
- Lead lined model for hospital x-ray room doors with double row of screws to straddle lead (Specify "LL")
- Frame and door leaf alignment ribs for proper hinge and door location

Length		Fastener Count					
Inches	Millimeters	# For Door			# For Jamb		
		SD	HD	LL	SD	HD	LL
79	2007	15	15	32	15	15	32
83	2108	19	19	36	19	19	36
85	2159	19	19	36	19	19	36
95	2413	20	20	42	20	20	42
119	3023	23	23	48	23	23	96

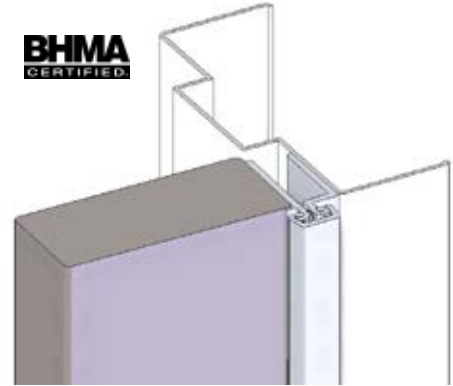




780 SERIES CONCEALED LEAF - 780-113HD - HEAVY DUTY

SPECIFICATIONS

Material:	Aluminum 6063-T6
Clearance:	13/16" (21 mm) hinge side plus standard lockside clearance
Fasteners:	<ul style="list-style-type: none"> • Standard: Dril-Kwik® - #12-24 x 11/16 Flat Head Screws • Optional: 1/2 Dril-Kwik® Screws, 1/2 Wood Screws • Additional options available upon request
Length Options:	Standard and custom lengths available
Door/Frame Reinforcement:	None required to 200 lbs., heavier weight use 16-gauge channel
Notes:	See additional fire rating details on page 3

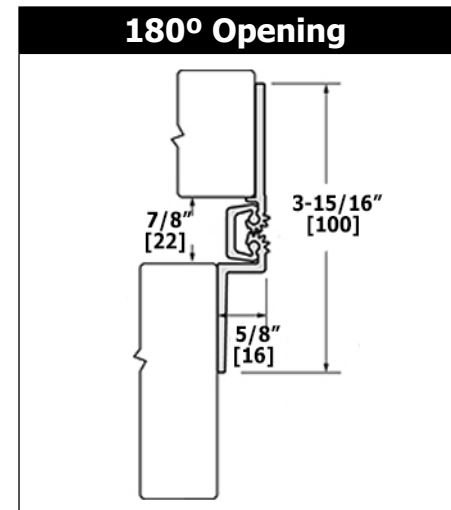
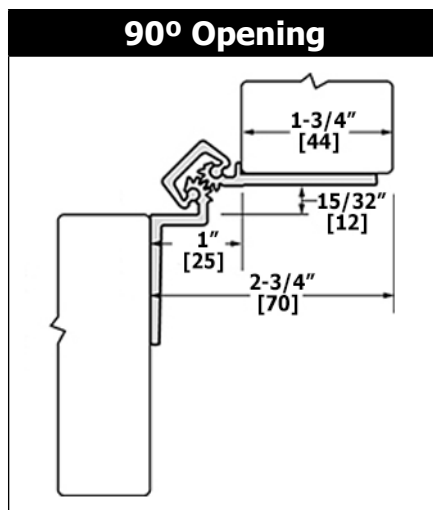
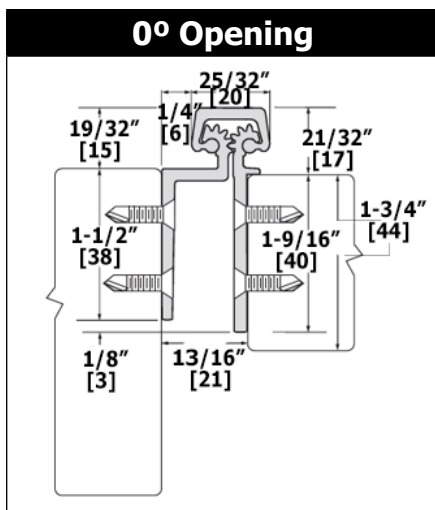


(Left hand shown)

FEATURES

- Heavy duty for high frequency doors or heavy, medium frequency doors
- "Safety Hinge" for early education centers, nursing homes, etc. (when used without frame stop)
- Door leaf alignment rib for proper door location
- 1/16" (1.5mm) inset

Length		HD Fastener Count	
Inches	Millimeters	# For Door	# For Jamb
79	2007	15	16
83	2108	19	18
85	2159	19	18
95	2413	20	20
119	3023	23	26

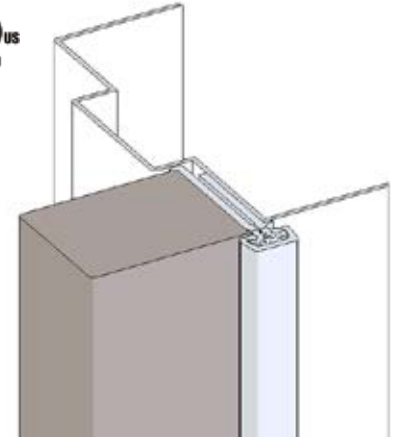




780 SERIES CONCEALED LEAF - 780-124HD*- 780-124LL - HEAVY DUTY OR LEAD LINED

SPECIFICATIONS

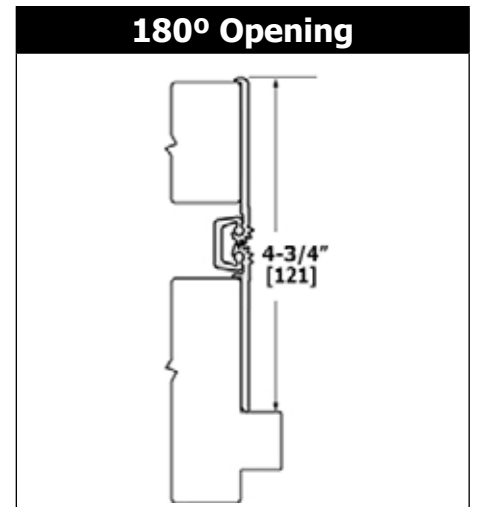
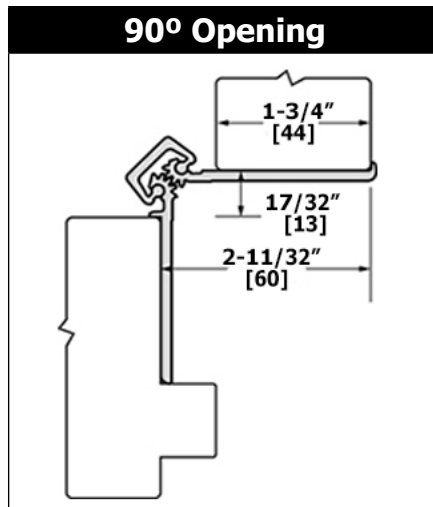
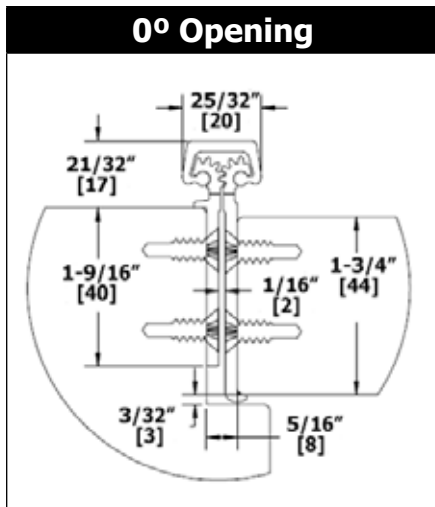
Material:	Aluminum 6063-T6
Clearance:	5/16" (8 mm) hinge side plus standard lockside clearance
Fasteners:	<ul style="list-style-type: none"> Standard: Dril-Kwik® - #12-24 x 11/16" Flat Head Screws Optional: 1/2 Dril-Kwik® Screws, 1/2 Wood Screws Additional options available upon request
LL Fasteners:	<ul style="list-style-type: none"> Standard: Dril-Kwik® - #12-24 x 11/16" Flat Head Screws Additional options available upon request
Length Options:	Standard and custom lengths available
Door/Frame Reinforcement:	None required to 200 lbs., heavier weight use 16-gauge channel
Optional Fire Rating:	Up to 3-hour metal and 90-minute wood composite (with studs)
Notes:	See additional fire rating details on page 3



FEATURES

- Heavy duty for high frequency doors or heavy, medium frequency doors
- Lead-lined model for hospital x-ray room doors with double row of screws to straddle lead (Specify "LL")
- Frame alignment rib for proper hinge and door location
- Door edge protection tip

Length		Fastener Count			
Inches	Millimeters	# Per Door		# Per Jamb	
		HD	LL	HD	LL
79	2007	15	32	15	32
83	2108	19	36	19	36
85	2159	19	36	19	36
95	2413	20	42	20	42
119	3023	23	48	23	48

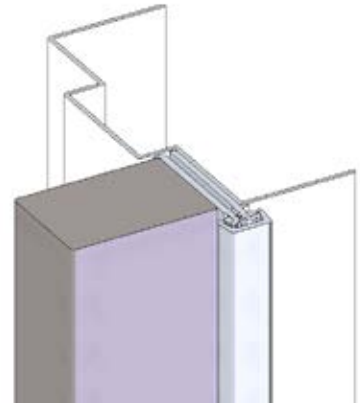




780 SERIES CONCEALED LEAF - 780-224* | 780-224HD* | 780-224LL - STANDARD DUTY, HEAVY DUTY OR LEAD LINED

SPECIFICATIONS

- Material: Aluminum 6063-T6
- Clearance: 5/16" (8 mm) hinge side plus standard lockside clearance
- Fasteners:
 - Standard: Dril-Kwik® - #12-24 x 11/16" Flat Head Screws
 - Optional: 1/2 Dril-Kwik® Screws, 1/2 Wood Screws
 - Additional options available upon request
- LL Fasteners:
 - Standard: 1/2 Dril-Kwik® Screws, 1/2 Wood Screws
 - Optional: Dril-Kwik® - #12-24 x 11/16" Flat Head Screws
 - Additional options available upon request
- Length Options: Standard and custom lengths available
- Door/Frame Reinforcement: None required to 200 lbs., heavier weight use 16-gauge channel
- Optional Fire Rating: Up to 3-hour metal and 90-minute wood composite (with studs)
- Notes: See additional fire rating details on page 3

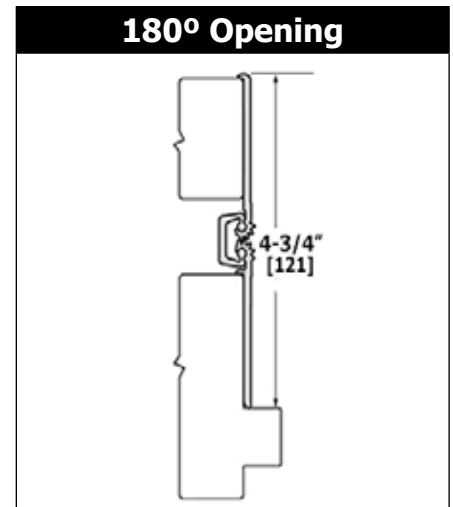
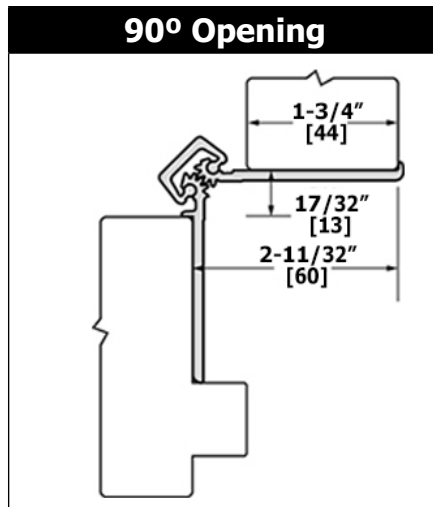
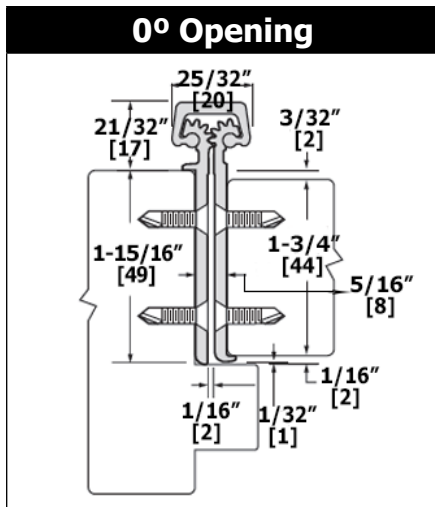


(Left hand shown)

FEATURES

- Standard duty for medium frequency doors. Heavy duty for high frequency doors or heavy, medium frequency doors. All for doors 1-3/4" (44 mm) thick.
- Lead lined model for hospital x-ray room doors with double row of screws to straddle lead (Specify "LL")
- Door edge protection lip
- Frame leaf alignment rib for proper hinge and door location
- 3/32" (2 mm) inset hinge and door location

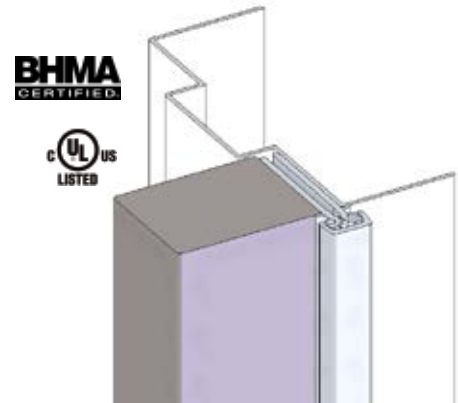
Length		Fastener Count					
Inches	Millimeters	# For Door			# For Jamb		
		SD	HD	LL	SD	HD	LL
79	2007	15	15	32	15	15	32
83	2108	19	19	36	19	19	36
85	2159	19	19	36	19	19	36
95	2413	20	20	42	20	20	42
119	3023	23	23	48	23	23	48



780 SERIES CONCEALED LEAF - 780-226HD* | 780-226LL - HEAVY DUTY OR LEAD LINED

SPECIFICATIONS

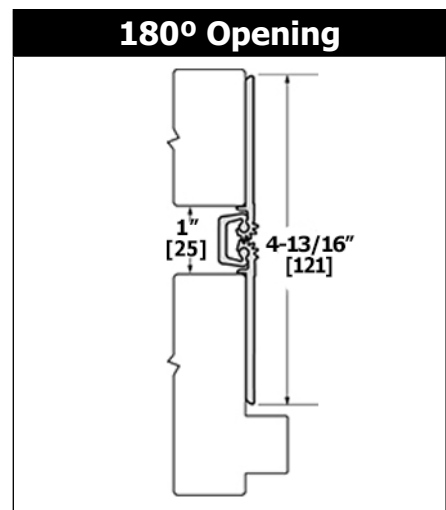
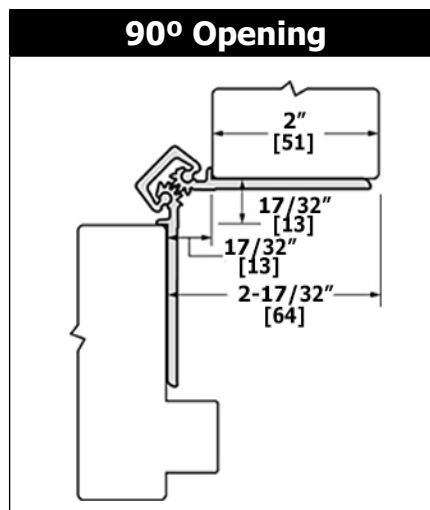
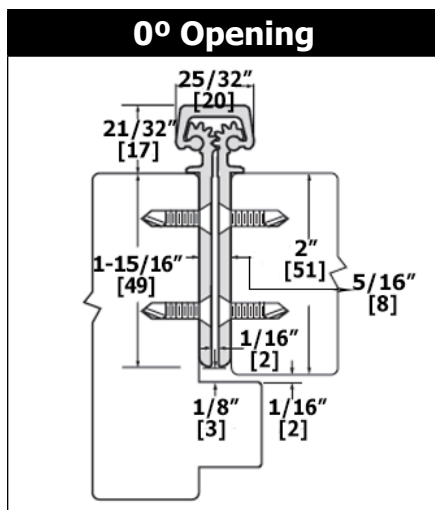
Material:	Aluminum 6063-T6
Clearance:	5/16" (8 mm) hinge side plus standard lockside clearance
Fasteners:	<ul style="list-style-type: none"> Standard: Dril-Kwik® - #12-24 x 11/16" Flat Head Screws Optional: 1/2 Dril-Kwik® Screws, 1/2 Wood Screws Additional options available upon request
LL Fasteners:	<ul style="list-style-type: none"> Standard: 1/2 Dril-Kwik® Screws, 1/2 Wood Screws Optional: Dril-Kwik® - #12-24 x 11/16" Flat Head Screws Additional options available upon request
Length Options:	Standard and custom lengths available
Door/Frame Reinforcement:	None required to 200 lbs., heavier weight use 16-gauge channel
Optional Fire Rating:	Up to 3-hour metal and 90-minute wood composite (with studs)
Notes:	See additional fire rating details on page 3



FEATURES

- Heavy duty for high frequency doors or heavy, medium frequency doors. All for doors 2" (51 mm) thick or greater.
- Lead lined model for hospital x-ray room doors with double row of screws to straddle lead (Specify "LL")
- Frame and door leaf alignment ribs for proper hinge and door location

Length		Fastener Count			
		# Per Door		#Per Jamb	
Inches	Millimeters	HD	LL	HD	LL
79	2007	15	32	15	32
83	2108	19	36	19	36
85	2159	19	36	19	36
95	2413	20	42	20	42
119	3023	23	48	23	48



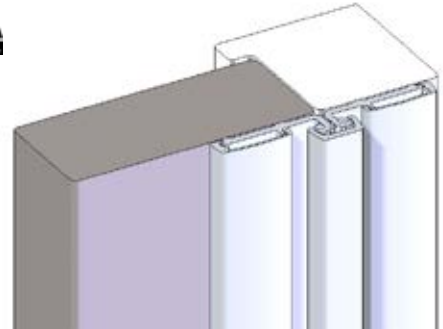


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780 SERIES FULL SURFACE - 780-057HD - HEAVY DUTY

SPECIFICATIONS

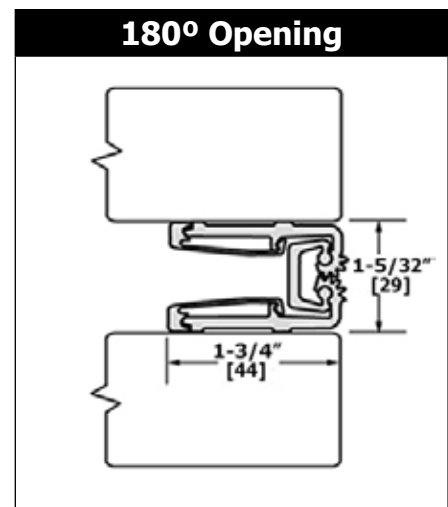
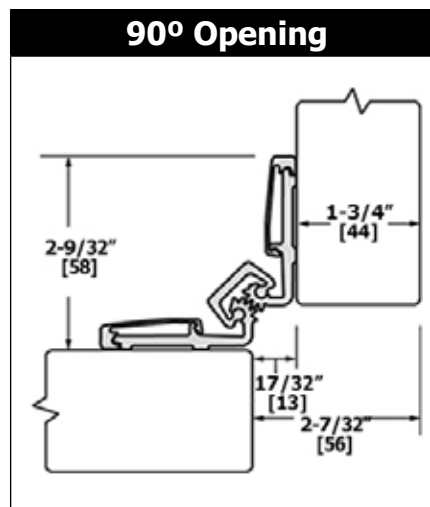
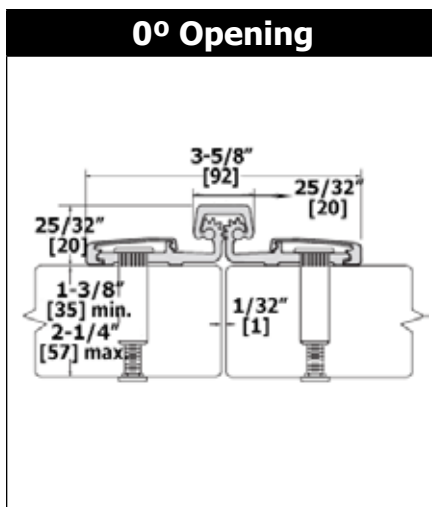
Material:	Aluminum 6063-T6
Clearance:	1/32" (1 mm) minimum recommended between doors
Fasteners:	<ul style="list-style-type: none"> • Standard: 1/4 x 20 x 1-1/4" Sexbolt (fastener + post) • Standard: Dril-Kwik® -#12-24 x 11/16" Pan Head Screws • Additional options available upon request
Length Options:	Standard and custom lengths available
Door Reinforcement:	None required
Optional Fire Rating:	Up to 3-hour metal and 90-minute wood composite (with studs)
Notes:	See additional fire-rating details on page 3



FEATURES

- Heavy-duty for high frequency doors or heavy, medium frequency doors
- Bi-fold applications
- Security moldings

Length		HD Fastener Count	
Inches	Millimeters	# Sex Bolts	# Pan Head
79	2007	16	34
83	2108	16	38
85	2159	16	38
95	2413	20	38
119	3023	24	46

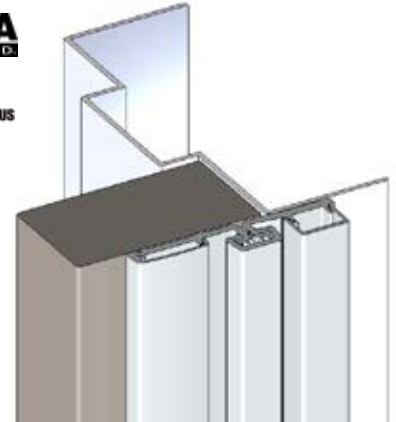




780 SERIES FULL SURFACE - 780-157 | 780-157HD - STANDARD DUTY OR HEAVY DUTY

SPECIFICATIONS

- Material:** Aluminum 6063-T6
- Clearance:** 1/32" (1 mm) minimum recommended for hinge side plus standard lockside clearance
- Fasteners:**
- Standard: 1/4-20 x 1-1/4" Sexbolt (fastener + post)
 - Standard: Dril-Kwik® - #12-24 x 11/16" Pan Head Screws
 - Additional options available upon request
- Length Options:** Standard and custom lengths available
- Door Reinforcement:** None required
- Frame Reinforcement:** None required to 200 lbs., heavier weight use 16-gauge channel
- Optional Fire Rating:** Up to 3-hour metal and 90-minute wood composite (with studs)
- Notes:** See additional fire-rating details on page 3

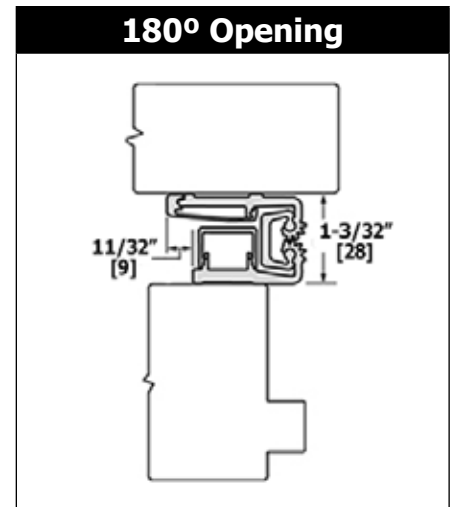
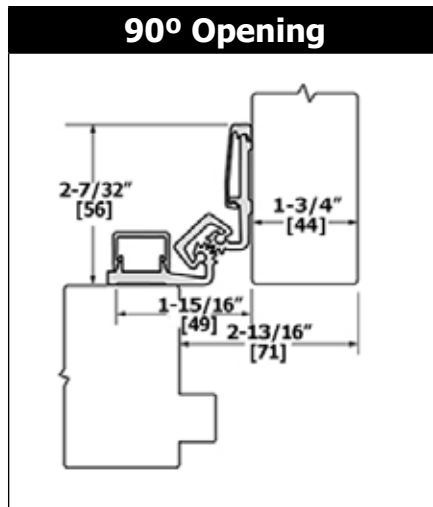
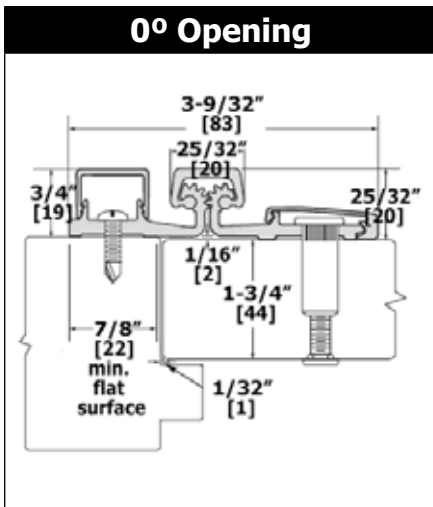


(Left hand shown)

FEATURES

- Standard duty for medium frequency doors. Heavy duty for high frequency doors or heavy, medium frequency doors.
- For surface applications where frame face dimension is limited
- Security molding
- 1/16" (1.5mm) inset

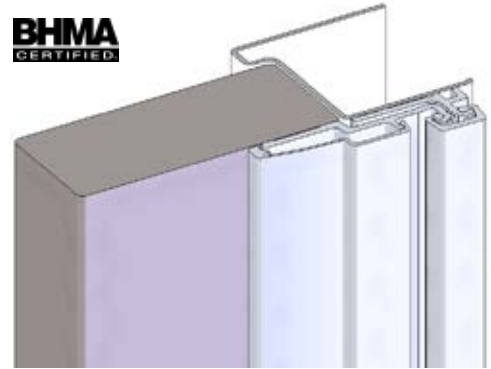
Length		Fastener Count			
Inches	Millimeters	# Sex Bolts		# Pan Head	
		SD	HD	SD	HD
79	2007	8	8	34	34
83	2108	8	8	38	38
85	2159	8	8	38	38
95	2413	10	10	38	38
119	3023	12	12	46	46



780 SERIES FULL SURFACE - 780-210 | 780-210HD - STANDARD DUTY OR HEAVY DUTY

SPECIFICATIONS

Material:	Aluminum 6063-T6
Clearance:	1/32" (1 mm) minimum recommended for hinge side plus standard lockside clearance. 1-5/8" (41 mm) minimum frame face required plus 3/16" (5 mm) rotational clearance
Fasteners:	<ul style="list-style-type: none"> Standard: 1/4-20 x 1-1/4" Sexbolt (fastener + post) Standard: Dril-Kwik® - #12-24 x 11/16" Flat Head Screws Additional options available upon request
Length Options:	Standard and custom lengths available
Door Reinforcement:	None required
Frame Reinforcement:	None required to 200 lbs. heavier weight use 16-gauge channel
Optional Fire Rating:	Up to 3-hour metal and 90-minute wood composite (with studs)
Notes:	See additional fire-rating details on page 3

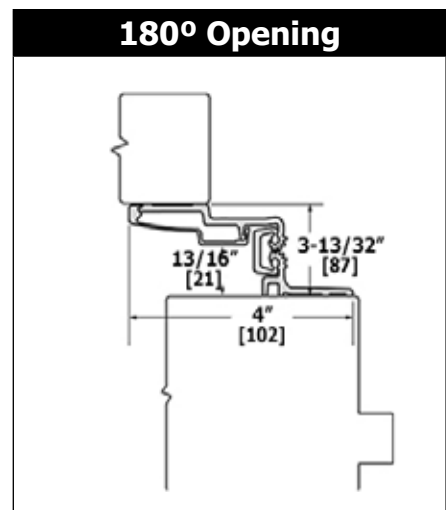
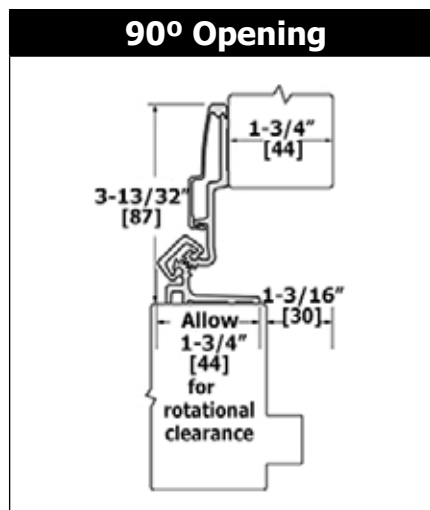
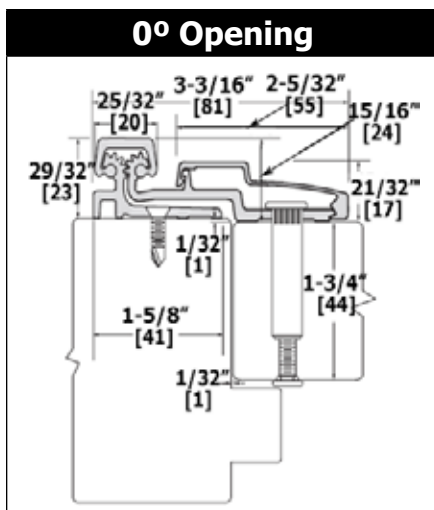


(Left hand shown)

FEATURES

- Standard duty for medium frequency doors. Heavy duty for high frequency doors or heavy, medium frequency doors.
- Can be used with any door and frame material
- Security molding
- 1/32" (1 mm) inset

Length		Fastener Count					
Inches	Millimeters	# Sex Bolts		# Pan Head		# For Jamb	
		SD	HD	SD	HD	SD	HD
79	2007	8	8	17	17	17	17
83	2108	8	8	19	19	19	19
85	2159	8	8	19	19	19	19
95	2413	10	10	19	19	19	19
119	3023	12	12	23	23	23	23



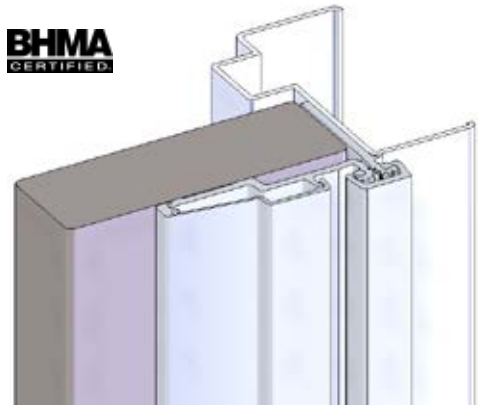


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780 SERIES HALF SURFACE - 780-045HD - HEAVY DUTY

SPECIFICATIONS

Material:	Aluminum 6063-T6
Clearance:	5/32" (4 mm) minimum recommended hinge side plus standard lockside clearance
Fasteners:	<ul style="list-style-type: none"> • Standard: 1/4-20 x 1-1/4" Sexbolt (fastener + post) • Standard: Dril-Kwik® - #12-24 x 11/16" Flat Head Screws • Additional options available upon request
Length Options:	Standard and custom lengths available
Door Reinforcement:	None required
Frame Reinforcement:	None required to 200 lbs., heavier weight use 16-gauge channel
Optional Fire Rating:	Up to 3-hour metal and 90-minute wood composite (with studs)
Notes:	See additional fire-rating details on page 3

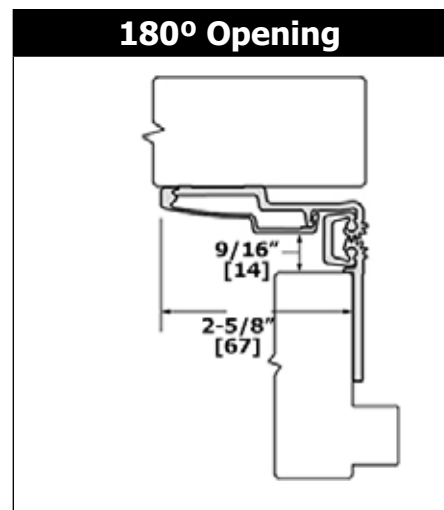
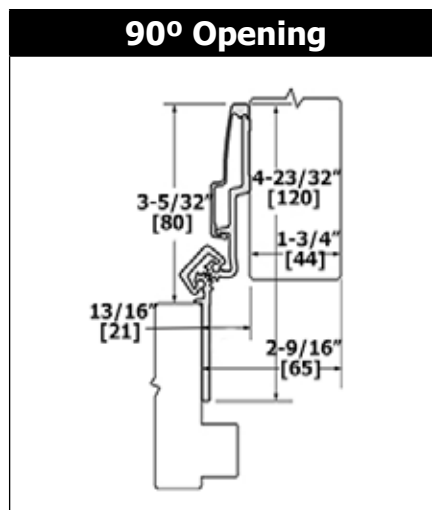
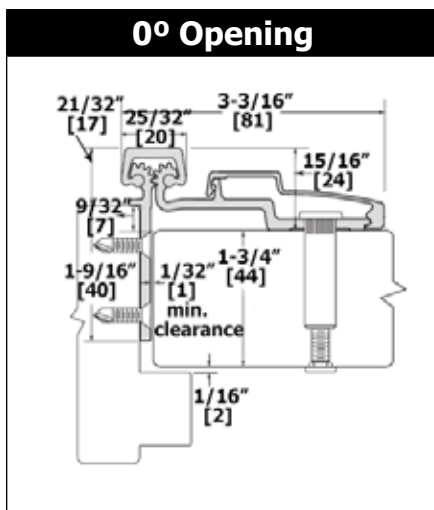


(Left hand shown)

FEATURES

- Heavy duty for high frequency doors or heavy, medium frequency doors
- Frame leaf alignment rib for proper hinge location
- Security molding
- 9/32" (7mm) inset

Length		HD Fastener Count		
Inches	Millimeters	# Sex Bolts	# Pan Head	# For Jamb
79	2007	8	17	15
83	2108	8	19	19
85	2159	8	19	19
95	2413	10	19	20
119	3023	12	23	23

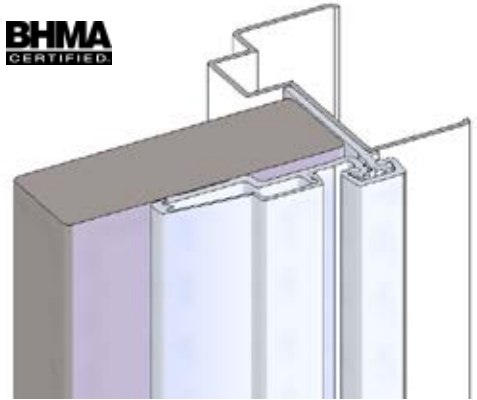




780 SERIES HALF SURFACE - 780-046HD - HEAVY DUTY

SPECIFICATIONS

Material:	Aluminum 6063-T6
Clearance:	5/32" (4 mm) minimum recommended hinge side plus standard lockside clearance
Fasteners:	<ul style="list-style-type: none"> • Standard: 1/4-20 x 1-1/4" Sexbolt (fastener + post) • Standard: Dril-Kwik® - #12-24 x 11/16" Flat Head Screws • Additional options available upon request
Length Options:	Standard and custom lengths available
Door Reinforcement:	None required
Frame Reinforcement:	None required to 200 lbs., heavier weight use 16-gauge channel
Optional Fire Rating:	Up to 3-hour metal and 90-minute wood composite (with studs)
Notes:	See additional fire-rating details on page 3

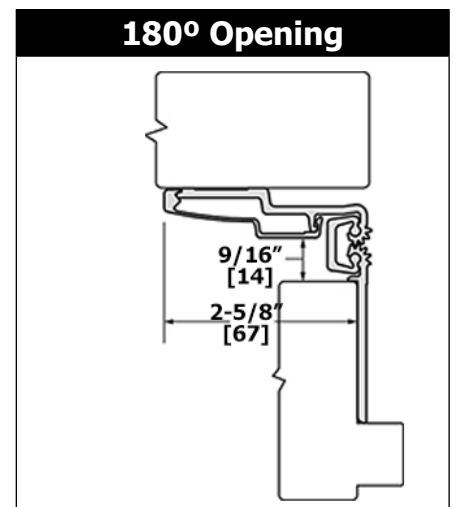
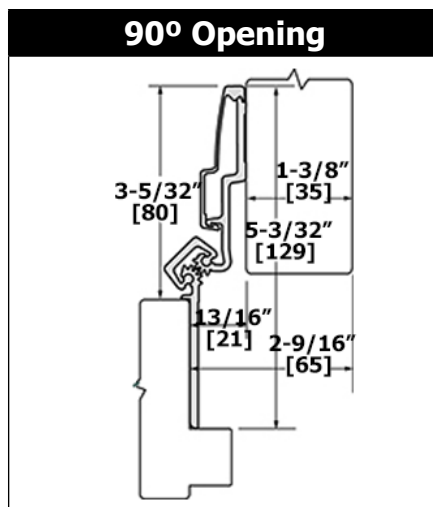
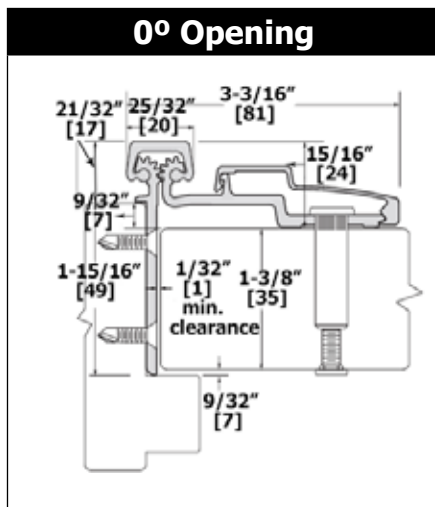


(Left hand shown)

FEATURES

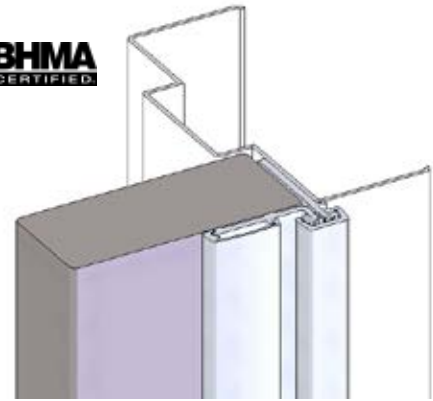
- Heavy duty for high frequency doors or heavy, medium frequency doors
- Complete frame rabbet coverage for 1-3/4" (45mm) frames, with 1-3/8" (35mm) doors.
- Frame leaf alignment rib for proper hinge location
- Security molding
- 9/32" (7mm) inset

Length		HD Fastener Count		
Inches	Millimeters	# Sex Bolts	# Pan Head	# For Jamb
79	2007	8	17	15
83	2108	8	19	19
85	2159	8	19	19
95	2413	10	19	20
119	3023	12	23	23



SPECIFICATIONS

- Material: Aluminum 6063-T6
- Clearance: 5/32" (4 mm) minimum recommended hinge side plus standard lockside clearance
- Fasteners:
 - Standard: 1/4-20 x 1-1/4" Sexbolt (fastener + post)
 - Standard: Dril-Kwik® - #12-24 x 11/16" Flat Head Screws
 - Additional options available upon request
- Length Options: Standard and custom lengths available
- Door Reinforcement: None required
- Frame Reinforcement: None required to 200 lbs., heavier weigh use 16-gauge channel
- Optional Fire Rating: Up to 3-hour metal and 90-minute wood composite (with studs)
- Notes: See additional fire-rating details on page 3

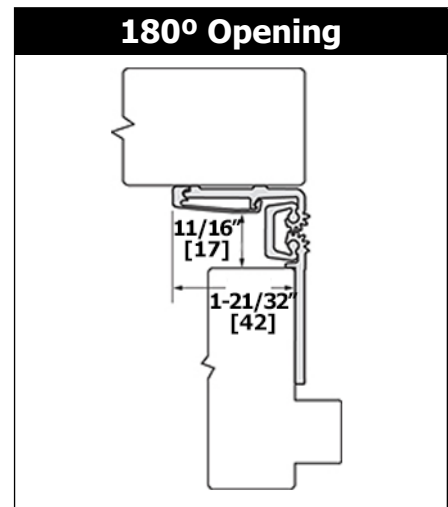
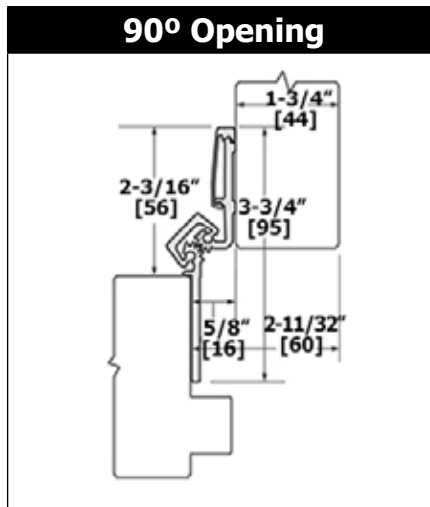
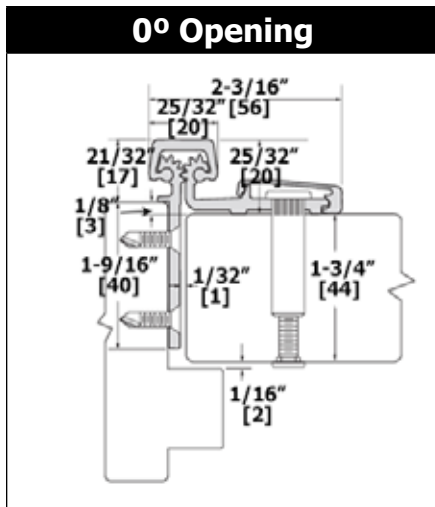


(Left hand shown)

FEATURES

- Standard duty for medium frequency doors. Heavy duty for high frequency doors or heavy, medium frequency doors
- Frame leaf alignment rib for proper hinge location
- Security molding
- 1/8" (3mm) inset

Length		Fastener Count					
Inches	Millimeters	# Sex Bolts		# Pan Head		# For Jamb	
		SD	HD	SD	HD	SD	HD
79	2007	8	8	17	17	15	15
83	2108	8	8	19	19	19	19
85	2159	8	8	19	19	19	19
95	2413	10	10	19	19	20	20
119	3023	12	12	23	23	23	23

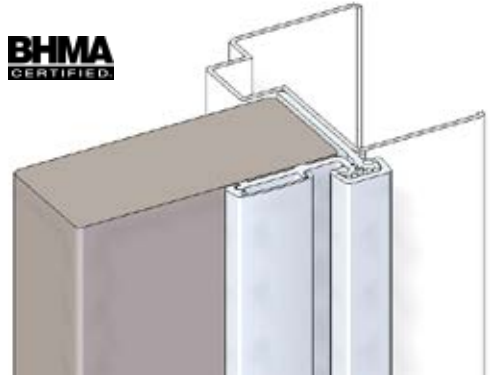




780 SERIES HALF SURFACE - 780-054HD - HEAVY DUTY

SPECIFICATIONS

Material:	Aluminum 6063-T6
Clearance:	5/32" (4 mm) minimum recommended hinge side plus standard lockside clearance
Fasteners:	<ul style="list-style-type: none"> • Standard: 1/4-20 x 1-1/4" Sexbolt (fastener + post) • Standard: Dril-Kwik®-#12-24 x 11/16" Flat Head Screws • Additional options available upon request
Length Options:	Standard and custom lengths available
Door Reinforcement:	None required
Frame Reinforcement:	None required to 200 lbs., heavier weight use 16-gauge channel
Optional Fire Rating:	Up to 3-hour metal and 90-minute wood composite (with studs)
Notes:	See additional fire rating details on page 3

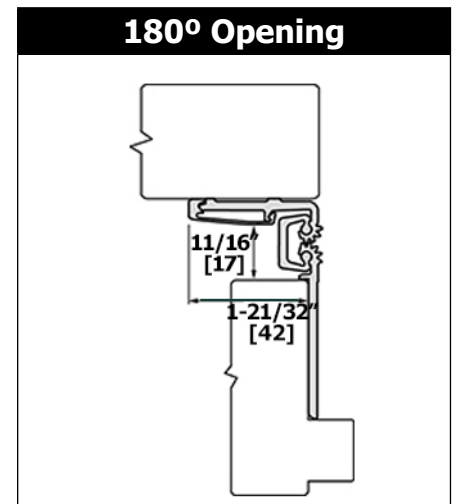
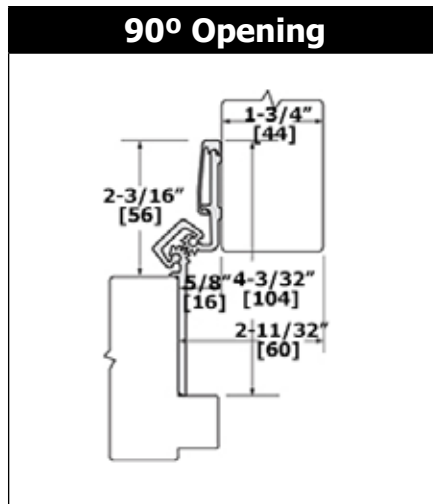
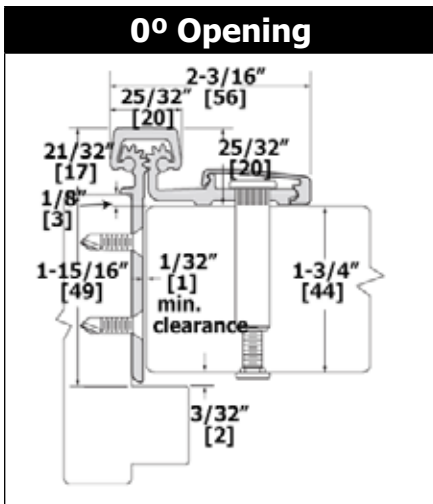


(Left hand shown)

FEATURES

- Heavy duty for high frequency doors or heavy, medium frequency doors
- Frame leaf alignment rib for proper hinge location
- Security molding
- 1/8" (3mm) inset

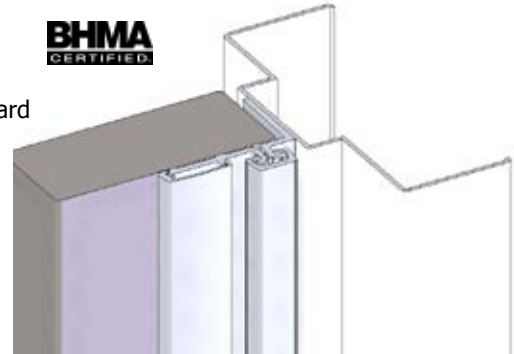
Length		HD Fastener Count		
Inches	Millimeters	# Sex Bolts	# Pan Head	# For Jamb
79	2007	8	17	15
83	2108	8	19	19
85	2159	8	19	19
95	2413	10	19	20
119	3023	12	23	23



780 SERIES HALF SURFACE - 780-155HD - HEAVY DUTY

SPECIFICATIONS

Material:	Aluminum 6063-T6
Clearance:	5/32" (4 mm) minimum recommended hinge side plus standard lockside clearance
Fasteners:	<ul style="list-style-type: none"> • Standard: 1/4-20 x 1-1/4" Sexbolt (fastener + post) • Standard: Dril-Kwik® -#12-24 x 11/16" Flat Head Screws • Additional options available upon request
Length Options:	Standard and custom lengths available
Door Reinforcement:	None required
Frame Reinforcement:	None required to 200 lbs., heavier weight use 16-gauge channel

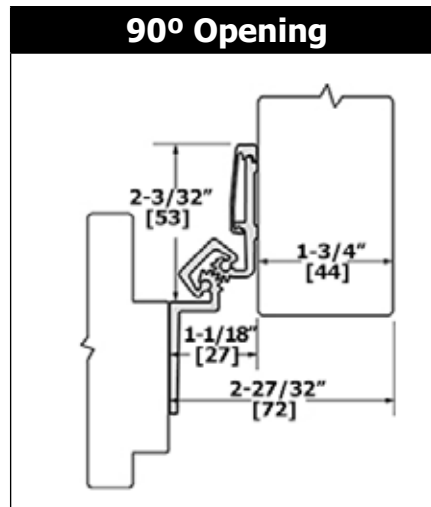
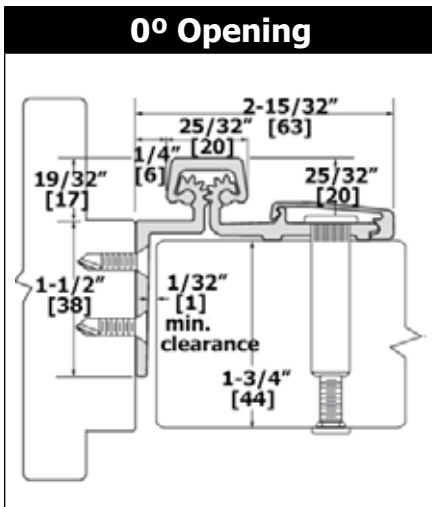


(Left hand shown)

FEATURES

- Heavy duty for high frequency doors or heavy, medium frequency doors
- For center hung and double egress conversions
- Security molding

Length		HD Fastener Count		
Inches	Millimeters	# Sex Bolts	# Pan Head	# For Jamb
79	2007	8	17	16
83	2108	8	19	18
85	2159	8	19	18
95	2413	10	19	20
119	3023	12	23	26





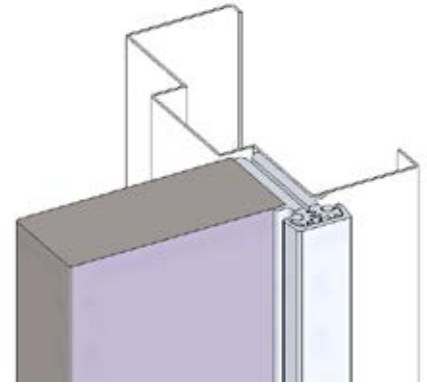
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1200 SERIES EXTRA HEAVY DUTY - 1200-600XHD - CONCEALED LEAF HINGE

SPECIFICATIONS

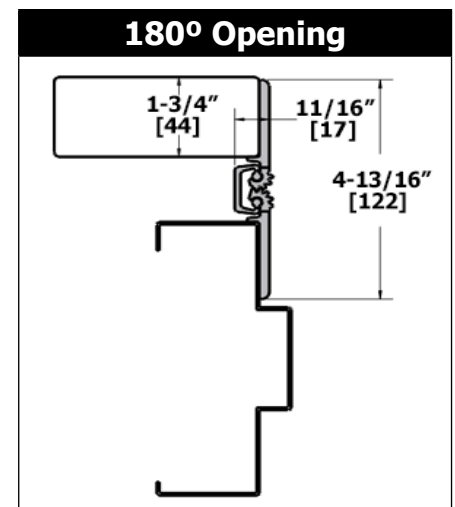
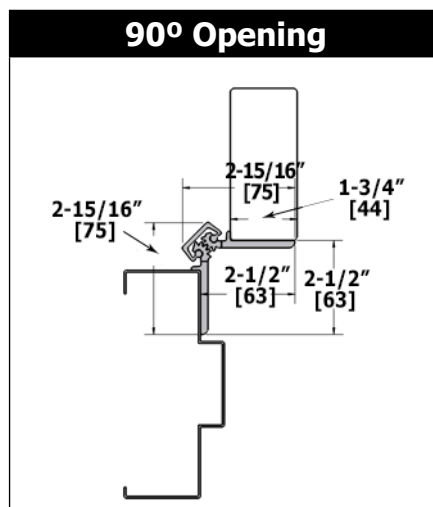
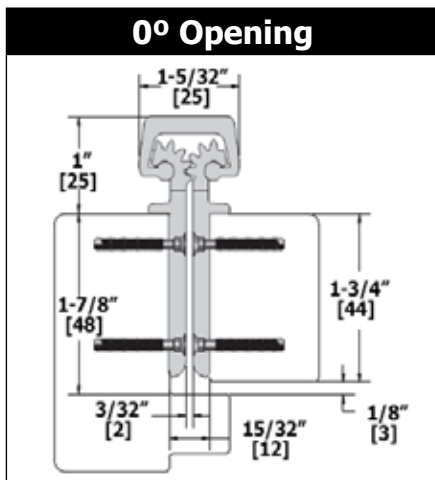
Material:	Aluminum 6063-T6
Clearance:	15/32" (12mm) hinge side plus standard lockside clearance
Fasteners:	<ul style="list-style-type: none"> • Standard: Dril-Kwik® 1/4-20 x 1" Screws • Optional: 1/4-14 x 1-1/2" Wood Screw • Additional options available upon request
Length Options:	Standard and custom lengths available
Door/Frame Reinforcement:	For doors up to 200 lbs. Use 1/8" reinforcement for doors greater than 200 lbs.



FEATURES

- Strong enough to swing doors heavier than 600 lbs., wider than 4 feet, and taller than 10 feet. Extra heavy duty for heavy, high frequency doors or extremely heavy, low frequency doors; for doors 1-3/4" (45mm) to 2-3/8" (60mm) thick.
- Lead-lined model for hospital x-ray room doors with double row of screws to straddle lead (specify "LL")
- Frame and door leaf alignment ribs for proper hinges and door location

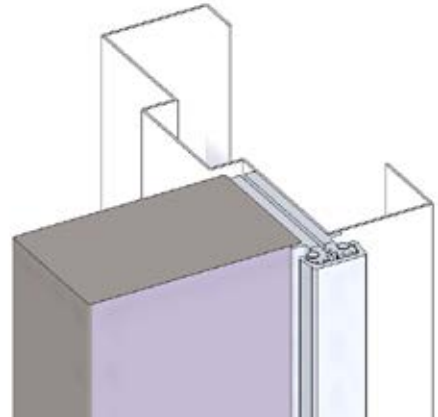
Length		XHD Fastener Count	
Inches	Millimeters	# Per Door	# Per Jamb
79	2007	22	22
83	2108	26	26
85	2159	26	26
95	2413	28	28
119	3023	33	33



1200 SERIES EXTRA HEAVY DUTY - 1200-650XHD - CONCEALED LEAF HINGE

SPECIFICATIONS

Material:	Aluminum 6063-T6
Clearance:	15/32" (12 mm) hinge side plus standard lockside clearance
Fasteners:	<ul style="list-style-type: none"> • Standard: Dril-Kwik® 1/4-20 x 1" Screws • Optional: 1/4-14 x 1-1/2" Wood Screw • Additional options available upon request
Length Options:	Standard and custom lengths available
Door/Frame Reinforcement:	For doors up to 200 lbs. Use 1/8" reinforcement for doors greater than 200 lbs.



FEATURES

- Strong enough to swing doors heavier than 600 lbs., wider than 4 feet, and taller than 10 feet. Extra heavy duty for heavy, high frequency doors or extremely heavy, low frequency doors; for doors thicker than 2-3/8" (60mm)
- Lead-lined model for hospital x-ray room doors with double row of screws to straddle lead (specify "LL")
- Frame and door leaf alignment ribs for proper hinges and door location

Length		XHD Fastener Count	
Inches	Millimeters	# Per Door	# Per Jamb
79	2007	22	22
83	2108	26	26
85	2159	26	26
95	2413	28	28
119	3023	33	33

