LCN SPECIFICATIONS

PART 1 - GENERAL
1.1 QUALITY ASSURANCE
A. Reference Standards

1. American National Standards Institute (ANSI/BHMA):

A117.1	Providing Accessibility and Usability for Physically Handicapped People
A156.10	For Power Operated Pedestrian Doors
A156.4	Door Controls - Closers
A156.15	Life Safety Closer Holder Release Devices
A156.18	Materials and Finishes
A156.19	Power Assist and Low Energy Power Operated Doors

2. Americans with Disabilities Act (ADA)
3. American Society for Testing and Material (ASTM): Specification B117-9 Method of Finish Corrosion Testing
4. Underwriters Laboratory (UL):

228	Door Closers-Holders
UL10C	Standard Positive Pressure Fire Test of Door Assemblies
UL10B	Standard for Fire Test of Door Assemblies

5. National Fire Protection Association (NFPA):

No. 80	Fire Doors and Windows
No. 101	Life Safety Code

B. Source Quality Control

1. Obtain each kind of hardware (latch and lock sets, hinges, closers, etc.) from only one manufacturer, although several may be indicated as offering products complying with requirements.
2. All products shall meet grade 1 or the highest level of cycle test requirements of the applicable ANSI/BHMA standard.

C. Supplier Qualifications

1. Supplier must be a recognized builders hardware supplier who has been furnishing hardware in the projects vicinity for a period of not less than two years.
2. Supplier must be or employ an experienced hardware consultant who is available, at reasonable times during the course of the work, for consultation about the project's hardware requirements, to Owner, Architect, and Contractor.

D. Fire-rated Openings

1. Provide hardware for fire rated openings in compliance with NFPA Standard No. 80, NFPA Standard No. 101, and local building codes.
2. ***[Manual hold-open arm function not allowed.]*** Provide hardware which has been tested and listed by UL for types and sizes of doors required and complies with the requirements of door and frame labels.

PART 2 - PRODUCTS
2.3 MATERIALS AND FABRICATION
A. General

1. Closers shall be installed to allow door swing as shown on plans. Doors swinging into exit corridors should provide for corridor clear width as required by codes.

2.8 CLOSERS AND DOOR CONTROL DEVICES
A. General

All closers shall be as manufactured by LCN CLOSERS, Princeton, Illinois, USA, and shall have the following features:

1. ***[Applies to 4010, 4020, 4040, 4110, 4210, 4510, 5010 Series only.]*** All manual door closers shall be certified to exceed ten million (10,000,000) full load operating cycles by a recognized independent testing laboratory.
2. All manual closers shall carry a manufacturers ten (10) year warranty.
3. All closers with electrical or pneumatic components shall carry a manufacturers two (2) year warranty. ***[Items 4 through 12 apply to closer cylinder, items 13 through 16 apply to closer arms.]***
4. Fully hydraulic, rack and pinion action with high strength cast iron cylinders and one piece forged steel pistons.
5. Fluid of a type requiring no seasonal adjustments.
6. ***[Delete for 1460, 1260, 330, 3030, 3130 and 4030 Series.]*** Pinion shaft minimum diameter of 11/16".
7. Hydraulic regulation controlled by tamper-proof, non-critical screw valves, adjustable with a hex wrench.
8. Separate adjustments for backcheck, general speed, and latch speed.
9. ***[Applies to 1260, 1460, 4010, 4020, 4040, 4110, 4210, 4510, 5010 Series.]*** Where detailed on double lever arm closers, provide a delayed action feature to delay closing up to one minute from maximum opening to approximately 75°.
10. Backcheck shall be properly located for protection of the door, frame, and applied hardware.
11. ***[Applies to 2210, 4110, 4210, 4210T, 4510, and 4510T Series only.]*** Where detailed, provide advanced variable backcheck to start backcheck function at approximately 45°.
12. Include high efficiency, low friction full compliment pinion bearings.
13. ***[Delete for 1260, 1460, 6030 Series.]*** Forged steel main arms.
14. ***[Applies to 4110, 4210, 4510 Series and all EDA and CUSH arms.]*** Forged steel main and forearms.
15. ***[Applies to all single lever arm (track type) closers.]*** Where detailed, provide a quiet, low friction track and roller assembly and provisions for an optional bumper assembly to assist backcheck and/or hold-open clip.
16. ***[Applies to all double lever arm closers, except EDA or CUSH arms.]*** Reversible shoe to increase latching power of the closer.

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B. Size of Closers

1. Sized in accordance with ANSI/BHMA Standard A156.4 as shown in the applicable TABLE OF SIZES listed in the current LCN General Catalog.
2. ***[Applies to 330, 2010, 2310ME, 2610, 3030, 4010T, 4020T, 4110T, 4210T, 4310ME, 4410ME, 4510T Series.]*** Closing power of sized closers shall be adjustable to increase closing power fifteen (15) percent.
3. ***[Applies to 2030, 6030 Series.]*** Closing power of sized closers shall be adjustable to increase closing power thirty five (35) percent.
4. ***[Applies to 1460T, 2210, 4010, 4020, 4110, 4210, 4510, 4820, 5010, 5030 Series.]*** Closing power of sized closers shall be adjustable to increase closing power fifty (50) percent.
5. Closing power of non-sized cylinders shall be adjustable over a range of sizes; ***[Applies to 1261, 1461, 1460T, 4011, 4021, 4040SE, 4041, 4041T, 4111, 4211, 4511, 4631, 4642, 4811, 4822, 4841, 4031, 4031T Cylinders.]***

C. Barrier Free Manual Closers

1. All closers for openings that must meet the minimum requirements of the ADA act, in lieu of ANSI/BHMA Standard A156.4, shall be sized in accordance with the applicable REDUCED OPENING FORCE table in the current LCN General Catalog.
2. All size 1 manual closers shall provide or be adjustable to provide less than 5 pounds opening force on a 36" door leaf and delay closing time in accordance with the ADA requirements.

D. Combination Door Closers and Holders

1. Provide closer/holders designed to hold the door in the open position under normal usage and to release and automatically close the door under fire conditions. Closer will include an integral electro-magnetic holder mechanism designed for use with UL listed fire detectors, provided with normally closed switching contacts.
2. ***[Applies to all ME models.]***
   Where detailed, multi-point closer/holders shall incorporate a hold-open bypass feature from 0º up to either 80º or 140º.
3. ***[Applies to 4310 ME only.]***
   Where detailed, multi-point closer/holders shall provide a swing-free function with a no-drift feature.

E. High Security Closers

1. Provide closers designed to resist vandalism and tampering.
2. All exposed fasteners shall be TORX machine screws with a security pin.
3. All closer adjustments shall be shielded by the cover or finish plate, after installation.
4. Arm and, where furnished, high security roller assembly shall be designed to prevent disassembly.
5. ***[4210 and 4510 Series only.]*** All surface mounted high security closers shall include a cast iron cylinder certified by an independent testing laboratory to exceed ten million (10,000,000) operating cycles, heavy gauge metal covers with four mounting screws and double lever arms manufactured to prevent disassembly.
6. ***[4210T and 4510T Series only.]*** All surface mounted high security closers shall include a cast iron cylinder certified by an independent testing laboratory to exceed ten million (10,000,000) operating cycles, heavy gauge metal covers with four mounting screws, heavy duty arm with special security roller, and a heavy gauge high security track designed to eject foreign objects.
7. ***[2210 and 2210 DPS only.]*** All concealed high security closers shall include a cast iron cylinder certified by an independent testing laboratory to exceed ten million (10,000,000) operating cycles, 3/8" steel mounting plate, heavy duty arm with special security roller, and a heavy gauge high security track designed to eject foreign objects.
8. ***[2210 DPS only.]*** A built-in door position switch shall be optional with concealed closers.

F. Automatic Operators

1. Where low kinetic energy, as defined by ANSI/BHMA Standard 156.19, automatic operators are indicated for doors required to be accessible to the disabled. Provide pneumatic, electrohydraulic or electromechanical **[2610, 2810, 2850, 2860, 2910, 2950, 2960, 4630, 4640, 4810, 4820, 4840, 9130, 9140, 9150, 9530, 9540, 9550, 9560, 9730, 9740, 9750, 9760 Series]** operators complying with the ADA for opening force and time to close standards.

-Or-

1. Where high energy, as defined by ANSI/BHMA Standard 156.10 automatic operators are indicated for pedestrian doors. Provide electromechanical high energy operators **[2510, 2550, 9330, 9340, 9350 Series]**. These automatic operators require the use of guide rails and safety devices. Must be installed by a certified American Association of Automatic Door Manufacturers Installer (AAADM installer).
2. Full closing force shall be provided when the power or assist cycle ends **[2610, 2810, 2850, 2860, 2910, 2950, 2960, 4630, 4640, 4810, 4820, 4840, 9130, 9140, 9150, 9530, 9540, 9550, 9560, 9730, 9740, 9750, 9760 Series]**.
3. **[2610, 4810, 4820, 4840]** Locate power unit and pneumatic exhaust away from door to minimize noise and vibration in pedestrian areas.
4. All automatic operator systems shall include the following features and functions.
   a) Provisions for separate conduits to carry high and low voltage wiring in compliance with the National Electrical Code, section 725-31.
   b) The operator will be designed to prevent damage to the mechanism if the system is actuated while the door is latched or if the door is forced closed during the opening cycle.
   c) All covers, mounting plates and arm systems shall be powder coated and successfully pass a minimum

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of 100 hours testing as outlined in ANSI/BHMA Standard A156.18 **[2610, 4630, 4640, 4810, 4820, 4840 Series]**.

-Or-

c)Electromechanical automatic operators shall be standard anodized either in aluminum or dark bronze. Custom anodized finishes and custom paint are available and can be specified. **[2810, 2850, 2860, 2910, 2950, 2960, 9130, 9140, 9150, 9530, 9540, 9550, 9560, 9730, 9740, 9750, 9760 Series]**
d) UL listed for use on labeled doors
e) [**4630, 4640, 4810, 4820, 4840 Series**] shall be non-handed with spring power over a range of at least four sizes either 1 through 4 or 2 through 5.

-Or-

e) **[2810, 2850, 2860, 2910, 2950, 2960, 9130, 9140, 9150, 9530, 9540, 9550, 9560, 9730, 9740, 9750, 9760 Series]** are handed and feature a spring return.
f) Provisions in the control box or module shall provide control {inputs and outputs} for; electric strike delay, auxiliary contact, sequential operations, fire alarm systems, actuators, swing side sensors, stop side sensors. **[2610, 4630, 4640, 4810, 4820, 4840, 9130, 9140, 9150 Series]**

5. [**4630, 4640 Series**] All electrohydraulic automatic operators shall include the following features or functions:
a) Second Chance Feature: When an obstruction or resistance to the opening swing is encountered the operator will pause at that point, then attempt to continue opening the door. If the obstruction or resistance remains, the operator will again pause the door.
b) Easily accessible main power and maintain hold-open switches will be provided on the operator.
c) An electronically controlled clutch to provide adjustable opening force.
d) A microprocessor to control all motor and clutch functions.
e) An on-board power supply capable of delivering both 12V and 24V outputs up to a maximum of 1.0 ampere combined load.
f) All input and output power wiring shall be protected by a resettable circuit breaker.

-Or-

5. All electromechanical automatic operators shall include the following features of functions:
a) Maximum 8 1/2 lbs of manual opening force **[2910, 2950, 2960, 9130, 9140, 9150, 9730, 9740, 9750, 9760 Series]**.
b) Maximum 15 lbs of manual opening force **[2810, 2850, 2860, 9530, 9540, 9550, 9560 Series]**.
c) Maximum 30 lbs of manual opening force **[2510, 2550, 9330, 9340, 9350 Series]**.
d) Bottom loaded header for easy access to controls **[2810, 2850, 2860, 2910, 2950, 2960, 9540, 9550, 9560, 9730, 9740, 9750, 9760 Series]**.
e) Power Boost, which adds an additional 25 lbs of closing force at latch **[2510, 2550, 2810, 2850, 2860, 9330, 9340, 9350, 9530, 9540, 9550, 9560 Series]**.
f) Self contained automatic operators in a cast aluminum housing and a forged steel arm **[2510, 2550, 2810, 2850, 2860, 2910, 2950, 2960, 9130, 9140, 9150, 9330, 9340, 9350, 9530, 9540, 9550, 9560, 9730, 9740, 9750, 9760 Series]**.

2.12 HARDWARE FINISHES

A. Finish

1. All closers with powder coat finishes shall exceed a minimum 100 hour salt spray test, as described in ANSI/BHMA Standard A156.4 and ASTM B117.
2. All closers detailed with plated finishes shall include plated covers (or finish plates), arms, and visible fasteners.
3. All electromechanical automatic operators supplied with anodized finishes.
4. All closers must be shipped with a finish.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General

1. Installation shall be in accordance with the templates and installation instructions packaged with the closers at the time of manufacture.
2. Installation shall be made with fasteners packaged with the closer by the manufacturer.
3. All electrical connections shall be made in accordance with the manufacturers recommendations.
4. Clean installed closer to remove dirt, debris, and marks incidental to installation work.
5. Installation instructions and templates are to be turned over to the Owners representative upon completion of the installation work.
6. Factory trained representative will be available for job site inspection of major projects upon completion of the hardware installation work.

3.2 ADJUSTMENT

A. Adjustment

1. Install and regulate all closers in accordance with the installation instructions packaged with the closers at the time of manufacture.
2. If unfamiliar with LCN products furnished, consult factory representative prior to installation for assistance.

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LCN ANSI CROSS REFERENCE

ANSI FUNCTION NUMBER TO LCN PRODUCT **SURFACE MOUNTED** **ANSI Standard A156.4-2000**

ANSI NUMBER	MOUNTING	LCN CLOSER	PT-4A	PT-4B	PT-4C	PT-4D	PT-4F	PT-4G	PT-4H	PT-4J
C02011	HINGE SIDE	4031	X	X	X	X			X	
		4040XP	X	X	X	X			X	
		1070	X	X	X	X	X		X	
		1260	X	X	X	X	X		X	
		1460	X	X	X	X	X		X	
		4010	X	X	X	X	X		X	
		4040	X	X	X	X	X		X	
		4510	X	X	X	X	X		X	X
C02021	PARALLEL	1070	X	X	X	X			X	
		4031	X	X	X	X		X	X	
		4040XP	X	X	X	X		X	X	
		1260	X	X	X	X	X	X	X	
		1460	X	X	X	X	X	X	X	
		4040	X	X	X	X	X	X	X	
		4110	X	X	X	X	X	X	X	X
		4210	X	X	X	X	X	X	X	X
C02031	BRACKET	4040XP	X	X	X	X			X	
		4010	X	X	X	X	X		X	
		4040	X	X	X	X	X		X	
C02041	TOP JAMP	1070	X	X	X	X			X	
		4031	X	X	X	X			X	
		4040XP	X	X	X	X			X	
		1260	X	X	X	X	X		X	
		1460	X	X	X	X	X		X	
		4020	X	X	X	X	X		X	
		4040	X	X	X	X	X		X	
C02051	HINGE SIDE HOLD OPEN	1070	X	X	X	X			X	
		4031	X	X	X	X			X	
		4040XP	X	X	X	X			X	
		1260	X	X	X	X	X		X	
		1460	X	X	X	X	X		X	
		4010	X	X	X	X	X		X	
		4040	X	X	X	X	X		X	
C02061	PARALLEL HOLD OPEN	1070	X	X	X	X			X	
		4031	X	X	X	X		X	X	
		4040XP	X	X	X	X		X	X	
		1260	X	X	X	X	X	X	X	
		1460	X	X	X	X	X	X	X	
		4040	X	X	X	X	X	X	X	
		4110	X	X	X	X	X	X	X	X
		4210	X	X	X	X	X	X	X	X
C02071	BRACKET HOLD OPEN	4010	X	X	X	X	X		X	
		4040	X	X	X	X	X		X	
C02081	TOP JAMP HOLD OPEN	1070	X	X	X	X			X	
		4031	X	X	X	X			X	
		4040XP	X	X	X	X			X	
		1260	X	X	X	X	X		X	
		1460	X	X	X	X	X		X	
		4020	X	X	X	X	X		X	
		4040	X	X	X	X	X		X	
C02091	HINGE SIDE FUSIBLE LINK	4010	X	X	X	X	X		X	
C02101	PARALLEL FUSIBLE LINK	4110	X	X	X	X	X		X	X

Note: All closers listed in this section are certified grade 1 = 1,500,000 cycles, PT4A = 15% adjustable closing force, PT4B = 35% adjustable closing force, PT4C = 50% adjustable closing force, PT4D = adjustable hydraulic backcheck, PT4F = delayed action, PT4G = built-in factory dead stop (Cush-N-Stop), PT4H = spring power adjustable over a range of sizes, PT4J = backcheck position advanced 15 degrees.

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LCN ANSI CROSS REFERENCE

ANSI FUNCTION NUMBER TO LCN PRODUCT **SURFACE MOUNTED** **ANSI Standard A156.4-2000**

ANSI NUMBER	MOUNTING	LCN CLOSER	PT-4A	PT-4B	PT-4C	PT-4D	PT-4F	PT-4G	PT-4H	PT-4J
C02111	BRACKET FUSIBLE LINK	4010	X	X	X	X	X		X	
C02121	TOP JAMP FUSIBLE LINK	4020	X	X	X	X	X		X	
C02171	HINGE SIDE TELEPHONE BOOTH	4010TEL				X				
		4110TEL				X				
C02211	HINGE SIDE TRACK	1460T	X	X	X	X			X	
		4010T	X	X	X	X			X	
		4031T	X	X	X	X			X	
		4040T	X	X	X	X			X	
		4510T	X	X	X	X			X	X
C02221	HINGE SIDE HOLD OPEN TRACK	1460	X	X	X	X			X	
		4010	X	X	X	X			X	
		4031	X	X	X	X			X	
		4040	X	X	X	X			X	
C02231	STOP FACE TRACK	1460	X	X	X	X			X	
		4031	X	X	X	X			X	
		4040	X	X	X	X			X	
		4110	X	X	X	X			X	
		4210	X	X	X	X			X	X
C02241	STOP FACE HOLD OPEN TRACK	1460	X	X	X	X			X	
		4031	X	X	X	X			X	
		4040	X	X	X	X			X	
		4110	X	X	X	X			X	
C02251	TOP JAMP TRACK	1460	X	X	X	X			X	
		4000	X	X	X	X			X	
		4020	X	X	X	X			X	
		4031	X	X	X	X			X	
		4040	X	X	X	X			X	
C02261	TOP JAMB HOLD OPEN TRACK	1460	X	X	X	X			X	
		4020	X	X	X	X			X	
		4031	X	X	X	X			X	
		4040	X	X	X	X			X	
C02271	TOP JAMB PUSH SIDE FLUSH FRAME TRACK	4031	X	X	X	X			X	
C02281	TOP JAMB PUSH SIDE FLUSH FRAME HOLD OPEN TRACK	4031	X	X	X	X			X	
C03011	HINGE SIDE	1070	X	X	X	X			X	
		1260	X	X	X	X	X		X	
		1371	X	X	X	X	X		X	
C03021	PARALLEL	1070	X	X	X	X			X	
		1370	X	X	X	X	X		X	
		1260	X	X	X	X	X	X	X	
C03041	TOP JAMB	1070	X	X	X	X			X	
		1260	X	X	X	X	X		X	
		1370	X	X	X	X	X		X	
C03051	HINGE SIDE HOLD OPEN	1070	X	X	X	X			X	
		1260	X	X	X	X	X		X	
		1370	X	X	X	X	X		X	
C03061	PARALLEL HOLD OPEN	1070	X	X	X	X			X	
		1370	X	X	X	X	X		X	
		1260	X	X	X	X	X	X	X	
C03081	TOP JAMB HOLD OPEN	1070	X	X	X	X			X	
		1260	X	X	X	X	X		X	
		1370	X	X	X	X	X		X	

Note: All closers listed in this section are certified grade 1 = 1,500,000 cycles, PT4A = 15% adjustable closing force, PT4B = 35% adjustable closing force, PT4C = 50% adjustable closing force, PT4D = adjustable hydraulic backcheck, PT4F = delayed action, PT4G = built-in factory dead stop (Cush-N-Stop), PT4H = spring power adjustable over a range of sizes, PT4J = backcheck position advanced 15 degrees.

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LCN ANSI CROSS REFERENCE

ANSI FUNCTION NUMBER TO LCN PRODUCT

CONCEALED IN DOOR ANSI Standard A156.4-2000

ANSI NUMBER	MOUNTING	ARM	LCN CLOSER	PT-4A	PT-4D		
C04011	CONCEALED IN DOOR	REG	3030	X	X		
		HO	3030H	X	X		
C04021	CONCEALED IN DOOR	REG	330	X	X		
		HO	330H	X	X		
C04031	CONCEALED IN DOOR	STANDARD	3130		X		
		HO	3130H		X		

Note: All closers listed in this section are certified grade 1 = 1,500,000 cycles.
PT4A = 15% adjustable closing force, PT4D = adjustable hydraulic backcheck.

OVERHEAD CONCEALED ANSI Standard A156.4-2000

ANSI NUMBER	MOUNTING	ARM	LCN CLOSER	PT-8A	PT-8B	PT-8D	PT-8E	PT-8F	PT-8J	PT-8L			
C05011	BUTT HINGE	REG	5010	X	X	X	X	X	X	X			
			5030	X	X	X	X	X		X			
C05021	PIVOT	REG	5010	X	X	X		X	X	X			
			5030	X	X	X		X		X			
C05031	BUTT HINGE	STANDARD	2010	X	X		X	X		X			
			2030	X	X		X	X		X			
			2210	X		X	X	X		X			
			2210 DPS	X		X	X	X		X			
C05041	PIVOT	STANDARD	2010	X	X			X		X			
			2030	X	X			X		X			
			2210	X		X		X		X			
			2210 DPS	X		X		X		X			
C05071	PIVOT	STANDARD	2010	X	X			X		X			
			2030	X	X			X		X			
C05081	PIVOT	STANDARD	6030	X	X			X		X			
C05091	BUTT HINGE	HO	5010	X	X	X	X	X	X	X			
			5030	X	X	X	X	X		X			

Note: All closers listed in this section are certified grade 1 = 1,500,000 cycles.
PT8A = door under control from 7 degrees of maximum door opening to close, PT8B = hold-open between 85 and 180 degrees, PT8D = 50% adjustable PT8E = single acting, 165 degrees of opening, double acting 165 degrees of opening either way, PT8F = adjustable hydraulic backcheck, PT8J = delayed action, PT8L = 35% adjustable closing force.

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LCN ANSI CROSS REFERENCE

LIFE SAFETY CLOSER/ HOLDER RELEASE DEVICES **ANSI Standard A156.15-2001**

ANSI NUMBER	MOUNTING	ARM	LCN CLOSER	PT4D	PT4N	PT4P				
C00011	WALL	N/A	7830, 7840, 7850							
	WALL	N/A	1960, 1970, 1980							
C00021	FLOOR	N/A	7820							
C00031	FLOOR	N/A	7870							
C00191	HINGE SIDE	STANDARD	4040SE	X	X	X				
			4040SEL	X	X	X				
C00231	STOP FACE	STANDARD	4040SE	X	X	X				
			4040SEL	X	X	X				
C00311	TOP JAMB	REG	4410HSA	X	X					
			4410ME	X	X					
C00351	HINGE SIDE	STANDARD	4310HSA	X	X					
			4310ME	X	X					
C00371	HINGE SIDE	SF	4310ME	X	X					
C00391	TOP JAMB	DE	4310HSA	X	X					
			4310ME	X	X					
C00471	HINGE SIDE	REG	4040SEH			X				
C00511	PUSH SIDE	REG	4040SEH			X				
C00611	CONCEALED	STANDARD	3130SE	X		X				
			3130SEL	X		X				
C00651	CONCEALED	STANDARD	2310ME	X	X					

Note: Options are; PT4D = adjustable hydraulic backcheck, PT4N = adjustable spring power, and PT4P = adjustable hold-open intensity.

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MATERIALS

LCN is committed to providing the best door closers in the world. In addition to the mechanical advantages derived from proven designs, much of the durability of the closer and arm system is directly related to the materials used in their manufacture.

Precision machined **cast iron cylinders** and **forged steel pistons** work together because of the compatibility of their basic elements. **Heat treated pinions and pistons** spread the load over a large gear tooth system to better handle the wear and stress of millions of operating cycles. Upper and lower full compliment pinion bearings provide the support and load capacity required by the design of the closer. **All weather fluid** eliminates the need for seasonal adjustments.

Forged steel main arms are superior to stamped steel arms used on closers where price is the primary concern. Specially designed shoe and elbow joints provide maintenance free service. A state-of-the-art, **powder coat** process delivers a high quality, corrosion resistant finish on all metal parts in popular architectural finishes.

LCN always uses the best materials available to provide the exceptional value and long service life that you, our customer, have every right to expect.

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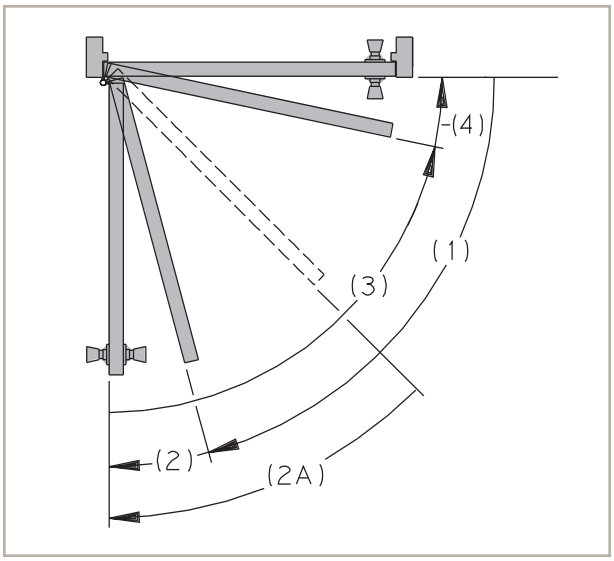
PROPER DOOR CONTROL

Today practically every door in modern commercial, industrial, and institutional buildings is opened by the person passing through and closed by a mechanical door closer which should keep the door under orderly control at all times. The power to close the door is generated by the springs inside the closer. Regulated hydraulic circuits control the speed of the doors closing swing. Ideal door "conduct" is illustrated and described in the diagram below. It can be achieved by equipping each door with the appropriate LCN door closer.

Perfect door operation…
The aim of mechanical control.



This diagram shows the main part or stages in correct door operation, whether under manual or mechanical control or a combination of the two.

(1) On the opening swing, the door closers function is to let the door open easily, except at the end of the swing where backcheck is applied.
(2) Backcheck is a feature that cushions the opening swing to prevent the door from slamming into the stop. Special closers designed for potentially abusive applications begin the backcheck function much earlier (2A) such as LCN's advanced variable backcheck (AVB).
(3) Through the long closing arc, a uniform, reasonable (main) speed should be maintained.
(4) The latching arc allows the door to close quietly and firmly.

Opening the door builds up the power, which later closes the door.
As a controlled door is opened, the spring of the closer is compressed which builds up the power to close the door. Normally, more opening force would be required as spring compression increases. However, as an LCN closer changes it's arm geometry while the door opens, it increases the door leverage. This offsets the spring compression, resulting in greater ease in opening the door.

In opening, more leverage for the person.
The changing arm geometry gives increased leverage over the door to overcome the growing power of the spring allowing one to pass through the door easily.

In closing, more leverage for the closer.
When the person releases the door and the closer takes over, spring power is applied through the arm system to close the door. Because the spring has been compressed, its power is very high. As the door closes the spring expands, providing the power to close the door.

Special closers for reduced opening force.
The 1990 Americans with Disabilities Act (ADA) and ANSI Standard A117.1 describe maximum opening force limitations for certain non-fire rated doors. The last page of each closer section in the catalog includes a section titled REDUCED OPENING FORCE CLOSERS. This section lists closers in that specific series that will comply with a maximum opening force based on the width of the door.

Any manual door closer, including those certified by BHMA to conform to ANSI Standard A156.4, that is selected, installed, and adjusted based on ADA or other reduced opening force requirements may not provide sufficient power to reliably close and latch the door.

Refer to AUTOMATIC OPERATORS section for information on electric, pneumatic and electromechanical systems that meet reduced opening force requirements without affecting closer power.

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HOW TO SELECT A DOOR CLOSER

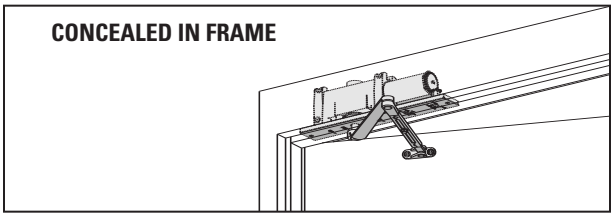
CONCEALED OR SURFACE MOUNTED CLOSERS

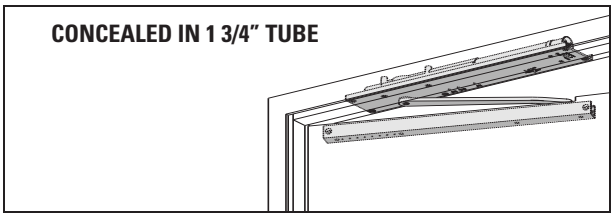
Door closers are available in two styles - concealed or surface mounted. In choosing a closer style for a particular application, consideration should be given to the type of door being controlled, frame conditions, aesthetic requirements, and control features needed. Information contained in the following material can serve as a guide in selecting the style and model of closer to meet specific requirements.

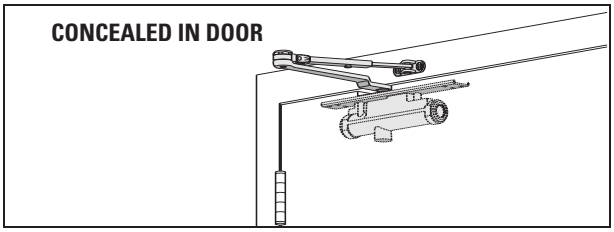
IF CONCEALED, WHERE?

Closers concealed in the head frame over the door are out of sight and entirely out of the pedestrians way. They cannot be harmed by scrub water, cleaning chemicals or floor dirt, and are protected from airborne contaminants, like dust. They are easy to reach for regulation without removing any parts. Closers for frame sections as thin as 1 3/4" (44 mm) are available.

Closers located within the door itself are also hidden and protected but recommended for interior doors only.

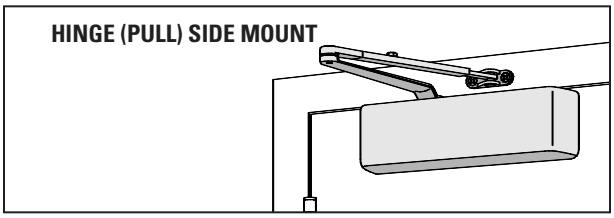


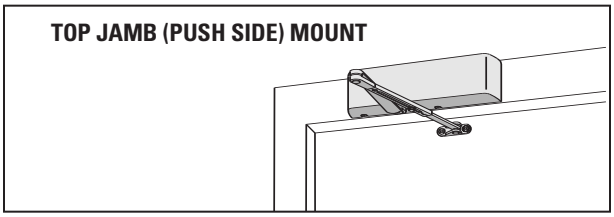


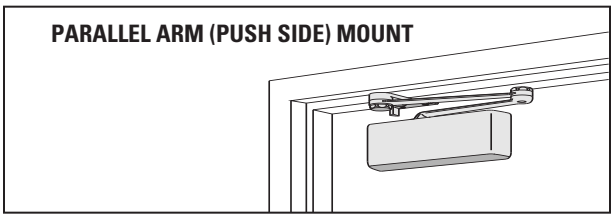


SURFACE MOUNTED CLOSERS - LOCATION?

Closer location is subject to the considerations of practicality and appearance. Good taste usually decrees that closers on doors along a corridor be located on the room side of the door so they are out of the line of sight from the corridor. Closers should be placed on the inside of exterior doors for appearance and to shelter them from the elements.







WHERE ARE HEAVY DUTY CLOSERS REQUIRED?

Heavy duty closers should always be used in these places:

1) Schools or public buildings where heavy or abusive usage is expected.
2) Exterior doors.
3) Doors subject to draft, winds, or air pressure differentials.
4) High frequency doors such as those on department stores, malls, or mixed use tenancies.

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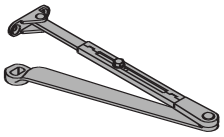
MECHANICAL CONSIDERATIONS

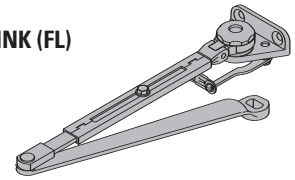
WHICH ARM SYSTEM?

Double lever arm closers can provide control under difficult conditions for either interior or exterior doors. A parallel arm system is a type of double lever arm where the main arm is parallel to the face of the closed door. Functions available in double lever arm systems are;

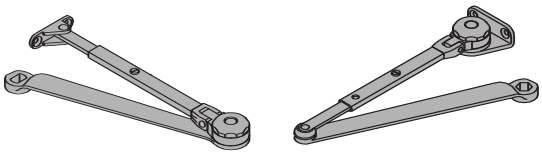
REGULAR (REG)



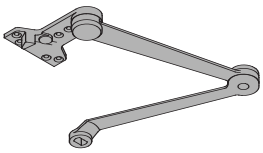
FUSIBLE LINK (FL)



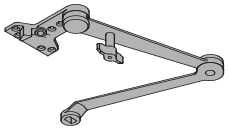
HOLD-OPEN (H)



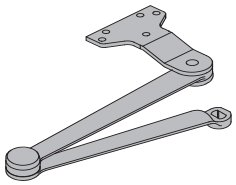
CUSH-N-STOP (CUSH)



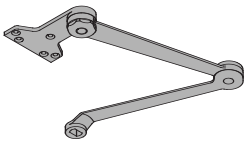
HOLD-OPEN CUSH-N-STOP (HCUSH)



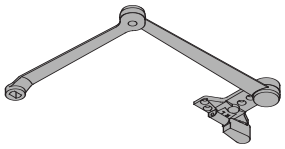
EXTRA DUTY (EDA)



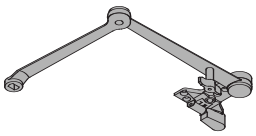
HOLD-OPEN EXTRA DUTY (HEDA)



SPRING CUSH (SCUSH)

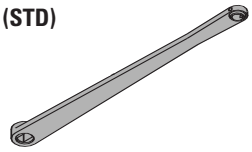


SPRING HOLD-OPEN CUSH (SHCUSH)

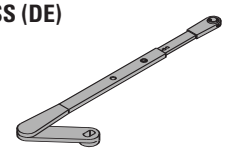


Single lever arm (track) closers may be used on interior or sheltered exterior doors. The hold-open function in a single lever arm system is provided by either the track or the cylinder assembly. Available single lever arms are;

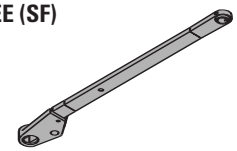
STANDARD (STD)



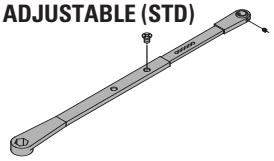
DOUBLE EGRESS (DE)



SWING-FREE (SF)



STANDARD ADJUSTABLE (STD)



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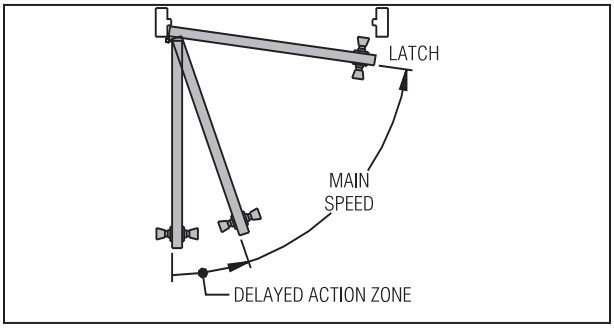
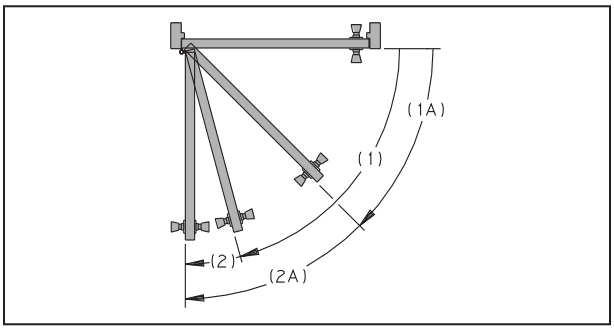
DO YOU NEED SPECIAL CYLINDER FUNCTIONS?

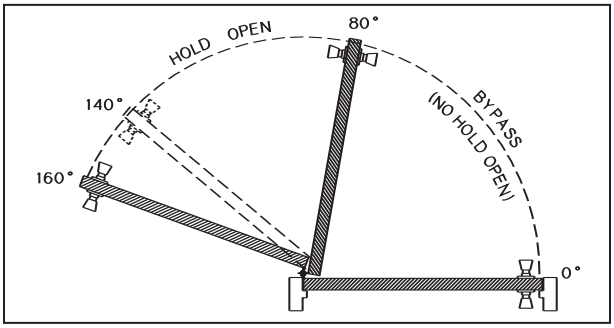
Many LCN closers can be ordered with a delayed action function built into the cylinder. **Delayed action** (DEL) is a special hydraulic circuit that provides additional time to pass through the door. A special regulating screw controls the closing speed from maximum opening through approximately 75°. After that point the normal main speed resumes control to close the door. Delayed action is not available with single lever arm (track) closers.



Advanced Variable Backcheck (AVB) is available with high security and 4110 series closers to begin cushioning the opening swing at about 45° (2A) instead of the usual 75° (2). AVB is especially suited for potentially abusive applications.



Multi-point (ME series) closer/holders can be ordered with a hold-open bypass at either 80° or 140° function. This feature does not allow hold-open to take effect until opened beyond the selected degree of bypass.



IS SEASONAL ADJUSTMENT REQUIRED?

Temperature changes can affect the operation of common door closers by changing the viscosity of the hydraulic fluid inside the closer. As temperature rises, the fluid thins out and closes the door more rapidly. As temperatures decrease, the fluid thickens causing the closer to close the door very slowly.

LCN uses all weather Ultra X fluid to eliminate the need for seasonal adjustment.

HOW WILL THE DOORS BE HUNG?

While butt hinges provide the most common method of hanging doors, some doors are hung on pivots centered in the door, others on offset pivots. Surface mounted closers will handle doors hung in any of these three ways. LCN 4020 Series closers can even control a "balanced" door installation. Concealed closers may conflict in location with pivot leaves and thus may require special templating.

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MECHANICAL CONSIDERATIONS

HOW FAR SHOULD THE DOOR OPEN?

Three basic rules apply to maximum degree of opening.

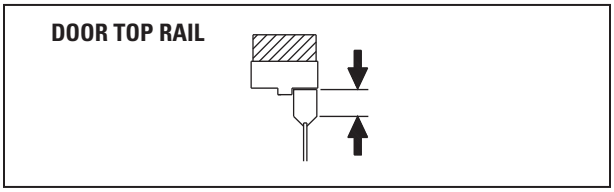
1. It is best to let the door swing as far as it can swing freely. Some closers are mounted in different locations for different degrees of opening.
2. Use a mechanical stop when a door can not swing 180° or at the selected hold-open point of a double lever arm system. The mechanical stop can be mounted on the floor, wall, overhead, or built into the closer arm.
3. The closer should be positioned so backcheck takes place well in advance of the stop position to cushion the opening swing and prevent door and frame damage from an abrupt stop.

DOOR DIMENSIONS?

The width of the door is the main consideration in determining the correct closer size. Size here refers to the minimum spring power and hence the closing force, generated by the closer. In the catalog, the interior and exterior TABLE OF SIZES for each closer are set up for ranges of door width and assume normal operating conditions. If a door is of exceptional height, weight, special construction, or if drafts and air pressure differentials exist, increased closer power should be considered.

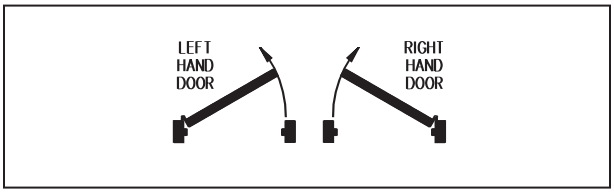
Door thickness may be a factor. A concealed-in-the-door closer should not be used in a hollow metal door less than 1 1/2" (38 mm) thick or a wood door under 1 3/4" (44 mm). Exceptionally thick doors can affect hinge and pivot centers to the extent that closer functions and geometry are also affected.

The depth of the doors top rail is important to nearly every closer installation. Narrow top rails may require plates to successfully mount the closer. An insufficient top rail in flush, hollow, or composite filled doors may make concealed-in-the-door installations impractical.



HAND OF A DOOR?

Some door closers are handed. When approaching a door from the push side, if hinged on the left, it is a left hand door; if hinged on the right, it is a right hand door.



For purposes of handing door closers, right hand reverse bevel and left hand are identical. Also, left hand reverse bevel and right hand are identical.

The hand of the closer is the same as the hand of the door for all except corner bracket installations that require a closer handed opposite the hand of the door.

WILL A STANDARD CLOSER AND TEMPLATE MEET YOUR NEEDS?

Occasionally the physical limitations of the selected closer may not provide the desired functions or degree of opening. Standard templated locations may interfere with other applied hardware. In these situations, contact the LCN Applications Engineering Department for assistance. Customized installation templates or products may be available to solve an unusual application.

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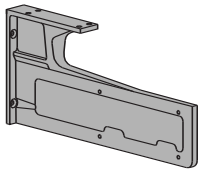
WHY USE PLATES, BRACKETS, ADAPTERS AND OTHER SPECIAL PIECES?

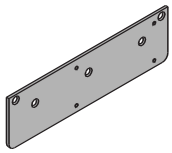
Corner brackets were once the only satisfactory way to install a closer on the push side of a door. They still meet special requirements which other mountings do not satisfy.

CORNER BRACKET



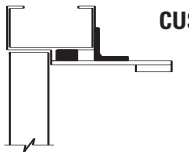
A drop plate is now commonly used to drop (lower) closers to meet special conditions or adapt a closer to door or frame surfaces that are not adequate for normal mounting patterns.

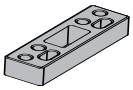
DROP PLATE



Specialized brackets, adapters, and parallel arm shoes are available to simplify the installation of closers with a variety of frame and door conditions. The most commonly used are listed with each closer. Consult LCN for assistance if you are not sure.

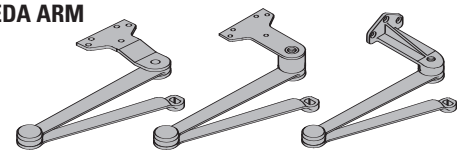
CUSH SHOE SUPPORT





BLADE STOP SPACER

EDA ARM

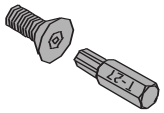


WHAT FASTENERS SHOULD BE USED?

LCN closers are shipped with a wood and machine screw pack or Self-Reaming and Tapping screws (SRT) unless other fasteners are ordered. These screw packs are suitable for wood or properly reinforced hollow metal frames and metal or solid core wood doors. For wood door applications, LCN recommends the use of wood screws. For selected closers, metric machine screws are available in lieu of UNC/UNF machine screws.

When attaching closers to hollow core doors, optional THROUGH BOLTS (TB) are recommended to minimize crushing or squeezing the door. Through bolting can also provide a very strong mechanical connection for potentially abusive applications. Because the TB barrel extends completely through the door, the door thickness must be specified when ordering if it is other than 1 3/4" (44 mm). TB's are only available for 1/4-20 machine screws.

For high security applications, TORX machine screws are available with most closers. These are standard for all exposed fasteners with HIGH SECURITY CLOSERS. TORX fasteners feature a hex lobular drive with a security pin in the center. They can only be installed or removed with a special set of bits that are available from LCN.



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MECHANICAL CONSIDERATIONS

WHAT FINISH IS DESIRED?

The finest closers in the world feature a state-of-the-art metal finishing process. Powder coating provides superior protection against the effects of weathering and is an environmentally friendly process. The high quality, chip resistant finish is far superior to any previously offered. Corrosion resistance surpasses 100 hours salt spray testing (four times the industry standard), a level previously attainable only with top coated, two part epoxy based primers. Non-metallic components and fasteners also provide the same high level of corrosion resistance.

LCN offers custom finishing services to complement special installations. This provides a custom appearance and all the corrosion resistance inherent in the standard powder coated finishes. It is recommended that the customer submit a physical sample of desired custom finish with the closer order. Custom powder coat finishes are available at additional cost. A metal cover must be ordered when custom powder coat finishes are desired.

With some exceptions, visible components such as covers, arms, fasteners, and finish plates are available in plated finishes. Tracks are painted to complement the plated finish. Hidden assemblies such as cylinders and mounting plates are supplied with a powder coated finish. Plated finishes are available at additional cost.

For installations where a higher level of protection against weathering is required, LCN offers a special rust inhibiting (SRI) process at an additional cost. Metal components receive an SRI pretreatment and a standard or custom powder coat finish. The SRI process with a powder coat finish exceeds the protection level available with powder coated parts. SRI can not be ordered with plated or anodized finishes.
All closers must be shipped with a finish.

INSTALLATION PROCESS?

Before installation of the door closer;

► review the installation instructions provided with the door closer.

► verify the desired installation and template with the hardware schedule. Review other applied door hardware for possible interference.

► verify that the frame attachments and door hinges or pivots are securely installed.

► verify that the door is hung properly and operates smoothly through it's entire range of opening. Misalignment, sagging or other conditions that prevent free movement of the door must be corrected prior to installation of the door closer. LCN recommends $\leq$ 1/4 lbf to open the door before installing closers for ADA applications.

► check latching mechanisms for proper operation and release.

► verify that the door and frame have specified reinforcements.

► verify that all required tools are available.

Complete the installation by;

► follow the installation instructions and use fasteners provided with the closer.

► using the template provided with the closer, layout, drill and tap (for metal screws) the required mounting holes. Be sure to use the proper size drill bit and tap to ensure maximum holding power by the screws.

► for closers with adjustable spring power, adjust the cylinder spring power based on the width of the door as described in the installation instructions.

► the hydraulic back check, main speed and latch speed regulation adjustments of the door closer have been adjusted at the factory to meet normal installation conditions. If further adjustments are required to the hydraulic regulation, follow the directions included with the installation instructions.

► lightly wipe the cover and arm surfaces with a soft, clean, dry cloth to remove any dirt or smudges that occurred during the installation.

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