

LiftMaster®



commercial door operators
spec sheets

LiftMaster®

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Trolley-Type Door Operators:
 - 1. Trolley-type door operators for apartment/condominium applications.
 - 2. Trolley-type continuous-duty door operators for standard lift sectional doors.
 - 3. Trolley-type door operators for standard lift sectional doors.

- B. Hoist-Type Door Operators:
 - 1. Hoist-type door operators for rolling doors, shutters, and grilles.
 - 2. Hoist-type continuous-duty door operators for rolling doors, grilles and industrial sectional doors with vertical or high lift.
 - 3. Hoist-type door operators for high or vertical lift sectional doors and small rolling doors or grilles.
 - 4. Hoist-type slow-speed door operators for rolling sheet doors

- C. Jackshaft-Type Door Operators:
 - 1. Jackshaft-type door operators for high or vertical lift sectional doors and limited rolling door and grille applications.
 - 2. Jackshaft-type door operators for counter shutter, rolling grille and small rolling door applications.
 - 3. Jackshaft-type door operators for high or vertical lift sectional doors and small rolling doors or grilles.

- D. Industrial-duty single and bi-parting door operators.

1.2 RELATED SECTIONS

- A. Section 06100 - Rough Carpentry: Installation and requirements for blocking and nailers.

- B. Section 16050 - Basic Electrical Materials and Methods: Installation and requirements for electrical connections.

1.3 REFERENCES

- A. National Electrical Manufacturers Association (NEMA): NEMA ICS 6 - Industrial Control and Systems: Enclosures.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01300.

- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.

4. Cleaning methods.
- C. Shop Drawings: Submit shop drawings showing layout, profiles, and product components, including anchorage, edge conditions, and accessories.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging with labels intact until ready for installation.
- B. Schedule delivery of door operator so that spaces are sufficiently complete that door operators can be installed immediately upon delivery.

1.6 WARRANTY

- A. Manufacturer's standard limited lifetime warranty against material and manufacturing defects.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: LiftMaster / The Chamberlain Group, Inc., which is located at: 845 Larch Ave.; Elmhurst, IL 60126. ASD. Toll Free Tel: 800-282-6225. Fax: 630-993-6024. Email: specs@liftmaster.com Web: www.liftmaster.com
- B. Substitutions: Not permitted.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 TROLLEY-TYPE DOOR OPERATORS FOR APARTMENT/CONDOMINIUM APPLICATIONS

A. Low-Profile Apartment House Operators:

Model APT Operator by LiftMaster / Chamberlain, Elmhurst, IL, resilient mount motor with overload protection and emergency disconnect with auto-reconnect trolley assembly for manual door operation.

1. Electric Operator:

Low-profile assembly, cULus Listed and cULus Labeled, with electric motor and factory-prewired motor controls, 3-button OPEN/CLOSE/STOP control station, conduit-encased wiring from control circuit to motor, and accessories required for proper operation; operator shall drive the door at a speed of approximately 6 to 7 inches (150 mm) to 7 inches (178 mm) per second. Operator vertical profile shall not exceed 11 inches (279 mm).

- a. Drive Reduction: Heavy-duty 5L V-belt and chain/sprocket secondary; all reduction sprockets and pulleys shall be drilled and pinned to steel shafts plated for resistance to corrosion; operator shall be equipped with permanently lubricated ball bearings on output shaft, adjustable friction clutch and quick disconnect door

- arm to facilitate manual operation.
 - b. Brake: Standard solenoid brake to stop and hold a door at any position
 - c. Limit Switches: Fully adjustable, driven linear-type switch mechanism synchronizing operator with door; low friction nylon limit nuts fitted on treaded steel shaft that rotates on oil-tight self-lubricating bronze bushings; motor shall be removable with affecting limit switch settings.
 - d. Electric Motor: High-starting torque, 1/2 Horsepower, 115 volts, 1 phase resilient-mount continuous-duty type motor, protected against overload by current sensing and thermal overload devices.
 - e. Solid-State Motor Control and Enclosure: LiftMaster LOGIC 4.0 motor control shall be UL approved microprocessor solid-state type and shall include the capability to select one of seven wiring types; additional features shall include a maintenance alert diagnostic system, programmable timer-to-close w/timer defeat input, mid-stop programming capabilities and a maximum run timer to provide motor overrun protection; motor control shall be housed in a NEMA 1 enclosure integral to the operator and shall conform to ANSI/NEMA ICS6.
 - 1) Radio Receiver: LiftMaster LOGIC 4.0 on-board, 3-channel receiver with standard external antenna; equipped to accept Security+ Rolling Code Technology remote transmitters and Trinary Dip Switch remote transmitters, with memory for up to 23 Security+ remote transmitters or an unlimited number of Trinary Dip Switch remote transmitters.
 - f. 3-Button Control Station: 3-button station providing OPEN/CLOSE/STOP functionality shall be NEMA Type 1 with maintenance alert indicator to signal intervals for routine door and operator maintenance.
 - g. Door Drive: Full #48 roller chain with emergency disconnect for manual door operation.
 - h. Track: Heavy-duty, double-angle, 11 gauge galvanized steel.
 - i. Trolley Assembly: 2 inch (51 mm) by 2 inch (51 mm) galvanized steel angle rails with cast aluminum trolley including plated steel rail spacers with a nylon chain-guide assembly..
2. **Primary Entrapment Protection Safety Devices:**
- a. Industrial/Commercial Monitored Photo Sensors: CPS-U fully monitored, non-contact, infrared beam photo sensor system shall reverse, in conjunction with the Logic 4 operator, a closing door to the full open position when an obstruction is sensed; photo sensors shall be mounted no higher than 6 inches (152 mm) maximum above the floor.
 - b. NEMA 4 Monitored Photo Sensors: CPS-UN4 fully monitored, non-contact, infrared beam reversing photo sensor system, with NEMA 4 watertight enclosure shall reverse, in conjunction with the Logic 4 operator, a closing door to the full open position when an obstruction is sensed; photo sensors shall be mounted no higher than 6 inches (152 mm) maximum above the floor.
 - c. Monitored Sensing Edge Interface: CPS-EI edge interface shall provide a means to attach a 4-wire monitored sensing edge to a Logic 4 operator for continuous monitoring purposes; the edge, in conjunction with the Logic 4 operators shall reverse a closing door to the full open position when an obstruction is sensed; sensing edge supplied by others.
3. **Ancillary Entrapment Protection Safety Devices:**

- a. Retro-Reflective Photo Sensors: CPS-RN4 non-monitored, non-contact, infrared beam photo sensor with polarized reflector for use in conjunction with the CPS-EI edge interface and monitored 4-wire sensing edge; shall reverse a closing door to the full open position when an obstruction is sensed; photo sensor shall be mounted no higher than 6 inches (152 mm) maximum above the floor.
 - b. Non-Monitored Electric Sensing Edge: 2-wire non-monitored electric edge shall reverse a closing door to the full open position when an obstruction is sensed
 - c. Pneumatic Sensing Edge: Pneumatic (air hose) sensing edge shall reverse a closing door to the full open position when an obstruction is sensed.
4. **Trolley Track:** 2 inch (51 mm) by 2 inch (51 mm) galvanized steel angle rails with automatic reconnecting trolley and shall include plated steel rail spacers with nylon chain-guide assembly; nylon inserts will be provided on trolley mechanism and rail spacers to reduce vibration and chain noise.

2.3 TROLLEY-TYPE CONTINUOUS-DUTY DOOR OPERATORS FOR STANDARD LIFT SECTIONAL DOORS

A. Heavy Industrial-Duty Operators:

Model GT Operator by LiftMaster / Chamberlain, Elmhurst, IL, continuous-duty, high-starting torque motor with overload protection and emergency disconnect for manual door operation.

1. Electric Operator: Heavy industrial-duty assembly, cULus Listed and cULus Labeled, complete with electric motor and factory-prewired motor controls, wormgear reduction unit, electric solenoid-actuated brake, 3-button OPEN/CLOSE/STOP control station along with conduit-encased wiring from control circuit to motor and accessories required for proper operation; operator shall be capable of driving door at a speed of approximately 11 to 12 inches (279 mm) to 12 inches (304 mm) per second.
 - a. Primary Drive Reduction: Wormgear-in-oil-bath gear reducer with synthetic "All Climate" oil with 45:1 speed reduction; adjustable torque limiter and quick disconnect door arm to facilitate manual operation; permanently lubricated ball bearings on output shaft; and, output and door driven sprockets
 - b. Brake: Electric solenoid-actuated brake that is capable of stopping and holding a door at any position.
 - c. Limit Switches: Fully adjustable, driven linear-type switch mechanism synchronizing operator with door; low friction nylon limit nuts fitted on treaded steel shaft that rotates on oil-tight self-lubricating bronze bushings; motor shall be removable with affecting limit switch settings.
 - d. Electric Motor: High-starting torque, continuous-duty, industrial-type protected against overload by current sensing and thermal overload devices.
 - 1) Motor Specification:
 - (a) 115V-60Hz-1 Phase; 1/2 HP.
 - (b) 115V-60Hz-1 Phase; 3/4 HP.
 - (c) 115V-60Hz-1 Phase; 1 HP.
 - (d) 115V-60Hz-1 Phase; 1-1/2 HP.
 - (e) 230V-60Hz-1 Phase; 1/2 HP.
 - (f) 230V-60Hz-1 Phase; 3/4 HP.
 - (g) 230V-60Hz-1 Phase; 1 HP.
 - (h) 230V-60Hz-1 Phase; 1-1/2 HP.

- (i) 208/230V-60Hz-3 Phase; 1/2 HP.
 - (j) 208/230V-60Hz-3 Phase; 3/4 HP.
 - (k) 208/230V-60Hz-3 Phase; 1 HP.
 - (l) 208/230V-60Hz-3 Phase; 1-1/2 HP.
 - (m) 460V-60Hz-3 Phase; 1/2 HP.
 - (n) 460V-60Hz-3 Phase; 3/4 HP.
 - (o) 460V-60Hz-3 Phase; 1 HP.
 - (p) 460V-60Hz-3 Phase; 1-1/2 HP.
 - (q) 575V-60Hz-3 Phase; 1/2 HP.
 - (r) 575V-60Hz-3 Phase; 3/4 HP.
 - (s) 575V-60Hz-3 Phase; 1 HP.
 - (t) 575V-60Hz-3 Phase; 1-1/2 HP.
- e. Motor Control and Enclosure: LiftMaster LOGIC 4.0 motor control shall be UL approved microprocessor solid-state type and shall include the capability to select one of seven wiring types; additional features shall include a maintenance alert diagnostic system, programmable timer-to-close w/timer defeat input, mid-stop programming capabilities and a maximum run timer to provide motor overrun protection; motor control shall be housed in a NEMA 1 enclosure integral to the operator and shall conform to ANSI/NEMA ICS6.
- 1) Radio Receiver: LiftMaster LOGIC 4.0 on-board, 3-channel receiver with standard external antenna; equipped to accept Security+ Rolling Code Technology remote transmitters and Trinary DIP Switch remote transmitters, with memory for up to 23 Security+ remote transmitters or an unlimited number of Trinary Dip Switch remote transmitters.
- f. 3-Button Control Station: 3-button station providing OPEN/CLOSE/STOP functionality shall be NEMA Type 1 with maintenance alert indicator to signal intervals for routine door and operator maintenance.
- g. Door Drive: Full #41 roller chain with emergency disconnect for manual door operation.
- h. Track: Heavy-duty, double-angle, 11 gauge galvanized steel.
- i. Trolley Assembly: 2 inch (51 mm) by 2 inch (51 mm) galvanized steel angle rails with cast aluminum trolley including plated steel rail spacers with nylon chain-guide assembly.
- 2. Primary Entrapment Protection Safety Devices:**
- a. Industrial/Commercial Monitored Photo Sensors: CPS-U fully monitored, non-contact, infrared beam photo sensor system shall reverse, in conjunction with the Logic 4 operator, a closing door to the full open position when an obstruction is sensed; photo sensors shall be mounted no higher than 6 inches (152 mm) maximum above the floor.
 - b. NEMA 4 Monitored Photo Sensors: CPS-UN4 fully monitored, non-contact, infrared beam reversing photo sensor system, with NEMA 4 watertight enclosure shall reverse, in conjunction with the Logic 4 operator, a closing door to the full open position when an obstruction is sensed; photo sensors shall be mounted no higher than 6 inches (152 mm) maximum above the floor.
 - c. Monitored Sensing Edge Interface: CPS-EI edge interface shall provide a means to attach a 4-wire monitored sensing edge to a Logic 4 operator for continuous monitoring purposes; the edge, in conjunction with the Logic 4 operators shall

reverse a closing door to the full open position when an obstruction is sensed; sensing edge supplied by others.

3. Ancillary Entrapment Protection Safety Devices:

- a. Retro-Reflective Photo Sensors: CPS-RN4 non-monitored, non-contact, infrared beam photo sensor with polarized reflector for use in conjunction with the CPS-EI edge interface and monitored 4-wire sensing edge; shall reverse a closing door to the full open position when an obstruction is sensed; photo sensor shall be mounted no higher than 6 inches (152 mm) maximum above the floor.
- b. Non-Monitored Electric Sensing Edge: 2-wire non-monitored electric edge shall reverse a closing door to the full open position when an obstruction is sensed
- c. Pneumatic Sensing Edge: Pneumatic (air hose) sensing edge shall reverse a closing door to the full open position when an obstruction is sensed.

2.4 TROLLEY-TYPE DOOR OPERATORS FOR STANDARD LIFT SECTIONAL DOORS

A. Light-Duty Operators:

Model ATS 211X Operator by LiftMaster / Chamberlain, Elmhurst, IL, for residential and commercial doors, with anti-burglary coding radio receiver.

1. **Electric Operator:** Light-duty assembly, cULus Listed and cULus Labeled, complete with electric motor and factory-prewired motor controls; single button OPEN/CLOSE/STOP control station; UL and CSA listed self-monitoring infrared sensing device integral to operator system and accessories required for proper operation; operator shall be capable of driving the door at a speed of approximately 8 inches (203 mm) to 9 inches (229mm) per second.
 - a. Limit Switches: Fully adjustable, driven linear-type switch mechanism synchronizing operator with door.
 - b. Electric Motor: High-starting torque, 1/2 Horsepower, 115 volts, 1 phase motor with instant reverse function and motor overload protection. Motor starter shall be of solid-state circuitry and enclosed in a NEMA 1 enclosure.
 - c. Radio Receiver: LiftMaster 315HM on-board, single-channel receiver with external antenna and equipped to accept Security+ Rolling Code Technology remote transmitters and Trinary Dip Switch remote transmitters. Receiver memory shall accept up to 23 Security+ remote transmitters or unlimited number of Trinary Dip Switch remote transmitters.
 - d. 3-Button Control Station: 1-button station providing OPEN/STOP/CLOSE/ REVERSE operation shall be NEMA Type 1
2. **Self-Monitoring Safety Operation Application:**

Operator shall include inherent automatic safety reversal of door (on close) / automatic stop of door (on open) upon encountering an obstruction and shall be provided with fully monitored, non-contact, infrared beam photo sensors to be mounted 6 inches (152 mm) maximum above the floor that reverse a closing door to the full open position when an obstruction is sensed.
3. **Track:** Heavy-duty steel "I" beam configuration with automatic reconnect trolley in case of manual operation.

2.5 TROLLEY-TYPE DOOR OPERATORS FOR STANDARD LIFT SECTIONAL DOORS

A. Medium-Duty Operators:

Model MT Operator by LiftMaster / Chamberlain, Elmhurst, IL, limited-duty (recommended duty of 12 cycles per hour), high-starting torque motor with overload protection and emergency disconnect for manual door operation.

1. **Electric Operator:** Medium-duty assembly, cULus Listed and cULus Labeled, complete with electric motor and factory-prewired motor controls, 3-button OPEN/CLOSE/STOP control station, conduit-encased wiring from control circuit to motor and accessories required for proper operation; operator shall provide a door speed of approximately 8 inches (203 mm) to 10 inches (229 mm) per second.
 - a. Primary Speed Reduction: Heavy-duty 4L V-belt and #41 chain and sprocket with sprocket reduced secondary; operator shall be equipped with adjustable friction clutch, quick disconnect door arm for manual door operation, oil-tight bushings on output shaft and output and door driven sprockets.
 - b. Limit Switches: Fully adjustable, driven linear-type switch mechanism synchronizing operator with door; low friction nylon limit nuts fitted on threaded steel shaft that rotates on oil-tight self-lubricating bronze bushings; motor shall be removable without affecting limit switch settings.
 - c. Electric Motor: High-starting torque, 1/2 Horsepower, 115 volts, 1 phase motor with an internal automatic reset thermal overload device to protect against overload.
 - d. Motor Control and Enclosure: LiftMaster Medium Duty Logic motor control shall be a microprocessor solid-state type PCB; the control board shall provide the capability to select one of two wiring types, diagnostic LEDs for operator status and troubleshooting, programmable timer-to-close w/timer defeat capabilities and a maximum run timer to provide motor overrun protection; motor control shall be housed in a NEMA 1 enclosure integral to the operator and shall conform to ANSI/NEMA ICS6.
 - 1) Radio Receiver: LiftMaster Medium Duty Logic on-board, 3-channel receiver with external antenna; equipped to accept Security+ Rolling Code Technology remote transmitters and Trinary Dip Switch remote transmitters, with memory for up to 20 Security+ remote transmitters or an unlimited number of Trinary Dip Switch remote transmitters.
 - e. 3-Button Control Station: 3-button station providing OPEN/CLOSE/STOP within a NEMA 1 Type enclosure.
 - f. Operator Modifications: Electric solenoid-actuated brake capable of stopping and holding a door at any position.
 - g. Door Drive: Full #48 roller chain and emergency disconnect for manual door operation.
 - h. Track: Heavy-duty, double-angle, 11 gauge galvanized steel.
 - i. Trolley Assembly: 2 inch (51 mm) by 2 inch (51 mm) galvanized steel angle rails with cast aluminum trolley including plated steel rail spacers with nylon chain-guide assembly.
2. **Primary Entrapment Protection Safety Devices:**
 - a. Industrial/Commercial Monitored Photo Sensors: CPS-U fully monitored, non-contact, infrared beam photo sensor system shall reverse, in conjunction with

the Logic 4 operator, a closing door to the full open position when an obstruction is sensed; photo sensors shall be mounted no higher than 6 inches (152 mm) maximum above the floor.

- b. NEMA 4 Monitored Photo Sensors: CPS-UN4 fully monitored, non-contact, infrared beam reversing photo sensor system, with NEMA 4 watertight enclosure shall reverse, in conjunction with the Logic 4 operator, a closing door to the full open position when an obstruction is sensed; photo sensors shall be mounted no higher than 6 inches (152 mm) maximum above the floor.
 - c. Monitored Sensing Edge Interface: CPS-EI edge interface shall provide a means to attach a 4-wire monitored sensing edge to a Logic 4 operator for continuous monitoring purposes; the edge, in conjunction with the Logic 4 operators shall reverse a closing door to the full open position when an obstruction is sensed; sensing edge supplied by others.
3. **Ancillary Entrapment Protection Safety Devices:**
- a. Retro-Reflective Photo Sensors: CPS-RN4 non-monitored, non-contact, infrared beam photo sensor with polarized reflector for use in conjunction with the CPS-EI edge interface and monitored 4-wire sensing edge; shall reverse a closing door to the full open position when an obstruction is sensed; photo sensor shall be mounted no higher than 6 inches (152 mm) maximum above the floor.
 - b. Non-Monitored Electric Sensing Edge: 2-wire non-monitored electric edge shall reverse a closing door to the full open position when an obstruction is sensed
 - c. Pneumatic Sensing Edge: Pneumatic (air hose) sensing edge shall reverse a closing door to the full open position when an obstruction is sensed.

2.6 TROLLEY-TYPE DOOR OPERATORS FOR STANDARD LIFT SECTIONAL DOORS

- A. **Industrial-Duty Operators:** Model T Operator by LiftMaster / Chamberlain, Elmhurst, IL, continuous-duty, high-starting torque motor with overload protection and emergency disconnect for manual door operation.
1. **Electric Operator:** Industrial-duty assembly, cULus Listed and cULus Labeled, complete with electric motor and factory-prewired motor controls, internal auxiliary reversal circuit, 3-button OPEN/CLOSE/STOP control station, conduit-encased wiring from control circuit to motor and accessories required for proper operation; operator shall be capable of driving door at a speed of approximately 8 to 12 inches (279 mm) per second. Vertical operator profile shall not exceed 12 inches (279 mm).
 - a. Drive Reduction: Heavy-duty 5L V-belt and chain/sprocket secondary; all reduction sprockets and pulleys shall be drilled and pinned to steel shafts plated for resistance to corrosion; operator shall be equipped with permanently lubricated ball bearings on output shaft, adjustable friction clutch and quick disconnect door arm to facilitate manual operation.
 - b. Brake: Electric solenoid-actuated brake capable of stopping and holding a door at any position
 - c. Limit Switches: Fully adjustable, driven linear-type switch mechanism synchronizing operator with door; low friction nylon limit nuts fitted on treaded steel shaft that rotates on oil-tight self-lubricating bronze bushings; motor shall be removable with affecting limit switch settings.
 - d. Electric Motor: High-starting torque, continuous-duty, industrial-type protected

against overload by current sensing and thermal overload devices.

- 1) Motor Specification:
 - (a) 115V-60Hz-1 Phase; 1/3 HP.
 - (b) 115V-60Hz-1 Phase; 1/2 HP.
 - (c) 115V-60Hz-1 Phase; 3/4 HP.
 - (d) 115V-60Hz-1 Phase; 1 HP.
 - (e) 230V-60Hz-1 Phase; 1/3, 1/2, 3/4 or 1HP.
 - (f) 230V-60Hz-1 Phase; 1/3 HP.
 - (g) 230V-60Hz-1 Phase; 1/2 HP.
 - (h) 230V-60Hz-1 Phase; 3/4 HP.
 - (i) 230V-60Hz-1 Phase; 1 HP.
 - (j) 208/230V-60Hz-3 Phase; 1/3 HP.
 - (k) 208/230V-60Hz-3 Phase; 1/2 HP.
 - (l) 208/230V-60Hz-3 Phase; 3/4 HP.
 - (m) 208/230V-60Hz-3 Phase; 1 HP.
 - (n) 460V-60Hz-3 Phase; 1/3 HP.
 - (o) 460V-60Hz-3 Phase; 1/2 HP.
 - (p) 460V-60Hz-3 Phase; 3/4 HP.
 - (q) 460V-60Hz-3 Phase; 1 HP.
 - (r) 575V-60Hz-3 Phase; 1/3 HP.
 - (s) 575V-60Hz-3 Phase; 1/2 HP.
 - (t) 575V-60Hz-3 Phase; 3/4 HP.
 - (u) 575V-60Hz-3 Phase; 1 HP.
 - e. Motor Control and Enclosure: LiftMaster LOGIC 4.0 motor control shall be UL approved microprocessor solid-state type and shall include the capability to select one of seven wiring types; additional features shall include a maintenance alert diagnostic system, programmable timer-to-close w/timer defeat input, mid-stop programming capabilities and a maximum run timer to provide motor overrun protection; motor control shall be housed in a NEMA 1 enclosure integral to the operator and shall conform to ANSI/NEMA ICS6.
 - 1) Radio Receiver: LiftMaster LOGIC 4.0 on-board, 3-channel receiver with standard external antenna; equipped to accept Security+ Rolling Code Technology remote transmitters and Trinary Dip Switch remote transmitters, with memory for up to 23 Security+ remote transmitters or an unlimited number of Trinary Dip Switch remote transmitters.
 - f. 3-Button Control Station: 3-button station providing OPEN/CLOSE/STOP functionality shall be NEMA Type 1 with maintenance alert indicator to signal intervals for routine door and operator maintenance.
 - g. Door Drive: Full #48 (1/3 HP & 1/2 HP models) or #41 (3/4 HP and 1 HP models) roller chain with emergency disconnect for manual door operation.
 - h. Track: Heavy-duty, double-angle, 11 gauge galvanized steel.
 - i. Trolley Assembly: 2 inch (51 mm) by 2 inch (51 mm) galvanized steel angle rails with cast aluminum trolley including plated steel rail spacers with a nylon chain-guide assembly.
2. Primary Entrapment Protection Safety Devices:
 - a. Industrial/Commercial Monitored Photo Sensors: CPS-U fully monitored, non-contact, infrared beam photo sensor system shall reverse, in conjunction with

- the Logic 4 operator, a closing door to the full open position when an obstruction is sensed; photo sensors shall be mounted no higher than 6 inches (152 mm) maximum above the floor.
- b. NEMA 4 Monitored Photo Sensors: CPS-UN4 fully monitored, non-contact, infrared beam reversing photo sensor system, with NEMA 4 watertight enclosure shall reverse, in conjunction with the Logic 4 operator, a closing door to the full open position when an obstruction is sensed; photo sensors shall be mounted no higher than 6 inches (152 mm) maximum above the floor.
 - c. Monitored Sensing Edge Interface: CPS-EI edge interface shall provide a means to attach a 4-wire monitored sensing edge to a Logic 4 operator for continuous monitoring purposes; the edge, in conjunction with the Logic 4 operators shall reverse a closing door to the full open position when an obstruction is sensed; sensing edge supplied by others.
3. **Ancillary Entrapment Protection Safety Devices:**
- a. Retro-Reflective Photo Sensors: CPS-RN4 non-monitored, non-contact, infrared beam photo sensor with polarized reflector for use in conjunction with the CPS-EI edge interface and monitored 4-wire sensing edge; shall reverse a closing door to the full open position when an obstruction is sensed; photo sensor shall be mounted no higher than 6 inches (152 mm) maximum above the floor.
 - b. Non-Monitored Electric Sensing Edge: 2-wire non-monitored electric edge shall reverse a closing door to the full open position when an obstruction is sensed
 - c. Pneumatic Sensing Edge: Pneumatic (air hose) sensing edge shall reverse a closing door to the full open position when an obstruction is sensed.

2.7 HOIST-TYPE DOOR OPERATORS FOR ROLLING DOORS, SHUTTERS, AND GRILLES

- A. **Industrial-Duty Operators with Internal Door Lock Sensor:** Model DH Operator by LiftMaster / Chamberlain, Elmhurst, IL, continuous-duty, high-starting torque motor with overload protection, internal door lock sensor to prevent accidental operation of a locked door and an emergency chain hoist with electric interlock.
1. **Electric Operator:** Industrial-duty assembly, cULus Listed and cULus Labeled, with electric motor and factory-prewired motor controls, internal door lock sensor, positive locking mechanical system acting as a holding brake, manually operated chain hoist, 3-button OPEN/CLOSE/STOP control station, conduit-encased wiring from control to motor, and accessories required for proper operation; door speed of approximately 8 inches (203 mm) to 9 inches (229 mm) per second.
 - a. Drive Reduction: Heavy-duty 5L V-belt primary reduction and chain/sprocket secondary and third stage reduction; all reduction sprockets and pulleys shall be drilled and pinned to steel shafts plated for resistance to corrosion; operator shall be equipped with permanently lubricated ball bearings on output shaft, adjustable friction clutch and output and door driven sprockets.
 - b. Limit Switches: Fully adjustable, driven linear-type switch mechanism synchronizing operator with door; low friction nylon limit nuts fitted on treaded steel shaft that rotates on oil-tight self-lubricating bronze bushings; motor shall be removable with affecting limit switch settings.
 - c. Electric Motor: High-starting torque, continuous-duty, industrial-type protected against overload by current sensing and thermal overload devices.

- 1) Motor Specification:
 - (a) 115V-60Hz-1 Phase; 1/3 HP.
 - (b) 115V-60Hz-1 Phase; 1/2 HP.
 - (c) 115V-60Hz-1 Phase; 3/4 HP.
 - (d) 115V-60Hz-1 Phase; 1 HP.
 - (e) 230V-60Hz-1 Phase; 1/3, 1/2, 3/4 or 1HP.
 - (f) 230V-60Hz-1 Phase; 1/3 HP.
 - (g) 230V-60Hz-1 Phase; 1/2 HP.
 - (h) 230V-60Hz-1 Phase; 3/4 HP.
 - (i) 230V-60Hz-1 Phase; 1 HP.
 - (j) 208/230V-60Hz-3 Phase; 1/3 HP.
 - (k) 208/230V-60Hz-3 Phase; 1/2 HP.
 - (l) 208/230V-60Hz-3 Phase; 3/4 HP.
 - (m) 208/230V-60Hz-3 Phase; 1 HP.
 - (n) 460V-60Hz-3 Phase; 1/3 HP.
 - (o) 460V-60Hz-3 Phase; 1/2 HP.
 - (p) 460V-60Hz-3 Phase; 3/4 HP.
 - (q) 460V-60Hz-3 Phase; 1 HP.
 - (r) 575V-60Hz-3 Phase; 1/3 HP.
 - (s) 575V-60Hz-3 Phase; 1/2 HP.
 - (t) 575V-60Hz-3 Phase; 3/4 HP.
 - (u) 575V-60Hz-3 Phase; 1 HP.
 - d. Motor Control and Enclosure: LiftMaster LOGIC 4.0 motor control shall be UL approved microprocessor solid-state type and shall include the capability to select one of seven wiring types; additional features shall include a maintenance alert diagnostic system, programmable timer-to-close w/timer defeat input, mid-stop programming capabilities and a maximum run timer to provide motor overrun protection; motor control shall be housed in a NEMA 1 enclosure integral to the operator and shall conform to ANSI/NEMA ICS6.
 - 1) Radio Receiver: LiftMaster LOGIC 4.0 on-board, 3-channel receiver with standard external antenna; equipped to accept Security+ Rolling Code Technology remote transmitters and Trinary Dip Switch remote transmitters, with memory for up to 23 Security+ remote transmitters or an unlimited number of Trinary Dip Switch remote transmitters.
 - e. Internal Door Lock Sensor: Sensing circuit to stop operator when door is locked.
 - f. 3-Button Control Station: 3-button station providing OPEN/CLOSE/STOP functionality shall be NEMA Type 1 with maintenance alert indicator to signal intervals for routine door and operator maintenance.
 - g. Door Drive: Full #50 roller chain; operator shall be equipped with an electrically interlocked, floor level disconnect and chain hoist for manual operation.
 - h. Operator Modifications: Electric solenoid-actuated brake capable of stopping and holding a door at any position.
2. Primary Entrapment Protection Safety Devices:
 - a. Industrial/Commercial Monitored Photo Sensors: CPS-U fully monitored, non-contact, infrared beam photo sensor system shall reverse, in conjunction with the Logic 4 operator, a closing door to the full open position when an obstruction is sensed; photo sensors shall be mounted no higher than 6 inches (152 mm)

- maximum above the floor.
 - b. NEMA 4 Monitored Photo Sensors: CPS-UN4 fully monitored, non-contact, infrared beam reversing photo sensor system, with NEMA 4 watertight enclosure shall reverse, in conjunction with the Logic 4 operator, a closing door to the full open position when an obstruction is sensed; photo sensors shall be mounted no higher than 6 inches (152 mm) maximum above the floor.
 - c. Monitored Sensing Edge Interface: CPS-EI edge interface shall provide a means to attach a 4-wire monitored sensing edge to a Logic 4 operator for continuous monitoring purposes; the edge, in conjunction with the Logic 4 operators shall reverse a closing door to the full open position when an obstruction is sensed; sensing edge supplied by others.
- 3. **Ancillary Entrapment Protection Safety Devices:**
 - a. Retro-Reflective Photo Sensors: CPS-RN4 non-monitored, non-contact, infrared beam photo sensor with polarized reflector for use in conjunction with the CPS-EI edge interface and monitored 4-wire sensing edge; shall reverse a closing door to the full open position when an obstruction is sensed; photo sensor shall be mounted no higher than 6 inches (152 mm) maximum above the floor.
 - b. Non-Monitored Electric Sensing Edge: 2-wire non-monitored electric edge shall reverse a closing door to the full open position when an obstruction is sensed
 - c. Pneumatic Sensing Edge: Pneumatic (air hose) sensing edge shall reverse a closing door to the full open position when an obstruction is sensed.

2.8 HOIST-TYPE DOOR OPERATORS FOR ROLLING DOORS, SHUTTERS, AND GRILLES

A. Industrial-Duty Operators:

Model H Operator by LiftMaster / Chamberlain, Elmhurst, IL, continuous-duty, high-starting torque motor with overload protection and an emergency chain hoist with electric interlock.

1. **Electric Operator:** Industrial-duty assembly, cULus Listed and cULus Labeled, with electric motor and factory-rewired motor controls. positive locking mechanical system acting as a holding brake, manually operated chain hoist, 3-button OPEN/CLOSE/STOP control station, conduit-encased wiring from control circuit to motor, positive locking mechanical system acting as a holding brake, and accessories required for proper operation; door speed of approximately 8 inches (203 mm) to 9 inches (229 mm) per second.
 - a. Drive Reduction: Heavy-duty 5L V-belt primary reduction and chain/sprocket secondary and third stage reduction; all reduction sprockets and pulleys shall be drilled and pinned to steel shafts plated for resistance to corrosion; operator shall be equipped with permanently lubricated ball bearings on output shaft, adjustable friction clutch and output and door driven sprockets.
 - b. Limit Switches: Fully adjustable, driven linear-type switch mechanism synchronizing operator with door; low friction nylon limit nuts fitted on treaded steel shaft that rotates on oil-tight self-lubricating bronze bushings; motor shall be removable with affecting limit switch settings.
 - c. Electric Motor: High-starting torque, continuous-duty, industrial-type protected against overload by current sensing and thermal overload devices.
 - 1) Motor Specification:
 - (a) 115V-60Hz-1 Phase; 1/3 HP.

- (b) 115V-60Hz-1 Phase; 1/2 HP.
 - (c) 115V-60Hz-1 Phase; 3/4 HP.
 - (d) 115V-60Hz-1 Phase; 1 HP.
 - (e) 230V-60Hz-1 Phase; 1/3, 1/2, 3/4 or 1HP.
 - (f) 230V-60Hz-1 Phase; 1/3 HP.
 - (g) 230V-60Hz-1 Phase; 1/2 HP.
 - (h) 230V-60Hz-1 Phase; 3/4 HP.
 - (i) 230V-60Hz-1 Phase; 1 HP.
 - (j) 208/230V-60Hz-3 Phase; 1/3 HP.
 - (k) 208/230V-60Hz-3 Phase; 1/2 HP.
 - (l) 208/230V-60Hz-3 Phase; 3/4 HP.
 - (m) 208/230V-60Hz-3 Phase; 1 HP.
 - (n) 460V-60Hz-3 Phase; 1/3 HP.
 - (o) 460V-60Hz-3 Phase; 1/2 HP.
 - (p) 460V-60Hz-3 Phase; 3/4 HP.
 - (q) 460V-60Hz-3 Phase; 1 HP.
 - (r) 575V-60Hz-3 Phase; 1/3 HP.
 - (s) 575V-60Hz-3 Phase; 1/2 HP.
 - (t) 575V-60Hz-3 Phase; 3/4 HP.
 - (u) 575V-60Hz-3 Phase; 1 HP.
- d. Motor Control and Enclosure: LiftMaster LOGIC 4.0 motor control shall be UL approved microprocessor solid-state type and shall include the capability to select one of seven wiring types; additional features shall include a maintenance alert diagnostic system, programmable timer-to-close w/timer defeat input, mid-stop programming capabilities and a maximum run timer to provide motor overrun protection; motor control shall be housed in a NEMA 1 enclosure integral to the operator and shall conform to ANSI/NEMA ICS6.
- 1) Radio Receiver: LiftMaster LOGIC 4.0 on-board, 3-channel receiver with standard external antenna; equipped to accept Security+ Rolling Code Technology remote transmitters and Trinary Dip Switch remote transmitters, with memory for up to 23 Security+ remote transmitters or an unlimited number of Trinary Dip Switch remote transmitters.
- e. 3-Button Control Station: 3-button station providing OPEN/CLOSE/STOP functionality shall be NEMA Type 1 with maintenance alert indicator to signal intervals for routine door and operator maintenance.
- f. Door Drive: Full #50 roller chain; operator shall be equipped with an electrically interlocked, floor level disconnect and chain hoist for manual operation.
- g. Operator Modifications: Electric solenoid-actuated brake capable of stopping and holding a door at any position.
2. **Primary Entrapment Protection Safety Devices:**
- a. Industrial/Commercial Monitored Photo Sensors: CPS-U fully monitored, non-contact, infrared beam photo sensor system shall reverse, in conjunction with the Logic 4 operator, a closing door to the full open position when an obstruction is sensed; photo sensors shall be mounted no higher than 6 inches (152 mm) maximum above the floor.
 - b. NEMA 4 Monitored Photo Sensors: CPS-UN4 fully monitored, non-contact, infrared beam reversing photo sensor system, with NEMA 4 watertight enclosure

shall reverse, in conjunction with the Logic 4 operator, a closing door to the full open position when an obstruction is sensed; photo sensors shall be mounted no higher than 6 inches (152 mm) maximum above the floor.

- c. Monitored Sensing Edge Interface: CPS-EI edge interface shall provide a means to attach a 4-wire monitored sensing edge to a Logic 4 operator for continuous monitoring purposes; the edge, in conjunction with the Logic 4 operators shall reverse a closing door to the full open position when an obstruction is sensed; sensing edge supplied by others.

3. Ancillary Entrapment Protection Safety Devices:

- a. Retro-Reflective Photo Sensors: CPS-RN4 non-monitored, non-contact, infrared beam photo sensor with polarized reflector for use in conjunction with the CPS-EI edge interface and monitored 4-wire sensing edge; shall reverse a closing door to the full open position when an obstruction is sensed; photo sensor shall be mounted no higher than 6 inches (152 mm) maximum above the floor.
- b. Non-Monitored Electric Sensing Edge: 2-wire non-monitored electric edge shall reverse a closing door to the full open position when an obstruction is sensed
- c. Pneumatic Sensing Edge: Pneumatic (air hose) sensing edge shall reverse a closing door to the full open position when an obstruction is sensed.

2.9 HOIST-TYPE CONTINUOUS-DUTY DOOR OPERATORS FOR ROLLING DOORS, GRILLES AND INDUSTRIAL SECTIONAL DOORS WITH VERTICAL OR HIGH LIFT

A. Heavy Industrial-Duty Gear-Reduced Operators:

Model GH Operator by LiftMaster / Chamberlain, Elmhurst, IL, continuous-duty high-starting torque motor with overload protection and emergency chain hoist with electric interlock.

- 1. **Electric Operator:** Industrial-duty assembly, cULus Listed and cULus Labeled, with electric motor and factory-rewired motor controls, wormgear reduction unit, electric solenoid-actuated brake, manually operated chain hoist, 3-button OPEN/CLOSE/STOP control station, conduit-encased wiring from control circuit to motor, and accessories required for proper operation; operator shall be capable of driving door at a speed of approximately 8 inches (203 mm) to 9 inches (229 mm) per second
 - a. Primary Speed Reduction Device: Wormgear-in-oil-bath gear reducer with synthetic "All Climate" oil with 45:1 speed reduction; permanently lubricated ball bearings on output shaft; and, output and door driven sprockets.
 - b. Brake: Electric solenoid-actuated brake capable of stopping and holding a door at any position.
 - c. Limit Switches: Fully adjustable, driven linear-type switch mechanism synchronizing operator with door; low friction nylon limit nuts fitted on treaded steel shaft that rotates on oil-tight self-lubricating bronze bushings; motor shall be removable with affecting limit switch settings.
 - d. Electric Motor: High-starting torque, continuous-duty, industrial-type protected against overload by current sensing and thermal overload devices.
 - 1) Motor Specification:
 - (a) 115V-60Hz-1 Phase; 1/2 HP.
 - (b) 115V-60Hz-1 Phase; 3/4 HP.
 - (c) 115V-60Hz-1 Phase; 1 HP.
 - (d) 115V-60Hz-1 Phase; 1-1/2 HP.

- (e) 230V-60Hz-1 Phase; 1/2 HP.
 - (f) 230V-60Hz-1 Phase; 3/4 HP.
 - (g) 230V-60Hz-1 Phase; 1 HP.
 - (h) 230V-60Hz-1 Phase; 1-1/2 HP.
 - (i) 208/230V-60Hz-3 Phase; 1/2 HP.
 - (j) 208/230V-60Hz-3 Phase; 3/4 HP.
 - (k) 208/230V-60Hz-3 Phase; 1 HP.
 - (l) 208/230V-60Hz-3 Phase; 1-1/2 HP.
 - (m) 208/230V-60Hz-3 Phase; 2 HP.
 - (n) 208/230V-60Hz-3 Phase; 3 HP.
 - (o) 208/230V-60Hz-3 Phase; 5 HP.
 - (p) 460V-60Hz-3 Phase; 1/2 HP.
 - (q) 460V-60Hz-3 Phase; 3/4 HP.
 - (r) 460V-60Hz-3 Phase; 1 HP.
 - (s) 460V-60Hz-3 Phase; 1-1/2 HP.
 - (t) 460V-60Hz-3 Phase; 2 HP.
 - (u) 460V-60Hz-3 Phase; 3 HP.
 - (v) 460V-60Hz-3 Phase; 5 HP.
 - (w) 575V-60Hz-3 Phase; 1/2 HP.
 - (x) 575V-60Hz-3 Phase; 3/4 HP.
 - (y) 575V-60Hz-3 Phase; 1 HP.
 - (z) 575V-60Hz-3 Phase; 1-1/2 HP.
 - (aa) 575V-60Hz-3 Phase; 2 HP.
 - (ab) 575V-60Hz-3 Phase; 3 HP.
 - (ac) 575V-60Hz-3 Phase; 5 HP.
- e. Motor Control and Enclosure
- 1) LiftMaster LOGIC 4.0 motor control shall be UL approved microprocessor solid-state type and shall include the capability to select one of seven wiring types; additional features shall include a maintenance alert diagnostic system, programmable timer-to-close w/timer defeat input, mid-stop programming capabilities and a maximum run timer to provide motor overrun protection; motor control shall be housed in a NEMA 1 enclosure integral to the operator and shall conform to ANSI/NEMA ICS6.
 - (a) Radio Receiver: LiftMaster LOGIC 4.0 on-board, 3-channel receiver with standard external antenna; equipped to accept Security+ Rolling Code Technology remote transmitters and Trinary Dip Switch remote transmitters, with memory for up to 23 Security+ remote transmitters or an unlimited number of Trinary DIP Switch remote transmitters.
 - 2) Contactor-style (Mechanical) Motor Starter, Control, and Enclosure: Motor starter shall be an across-the-line, mechanically interlocked, magnetic-reversing contactor; motor control shall be housed in a NEMA 1 enclosure integral to the operator; control enclosures shall conform to ANSI/NEMA ICS 6; control enclosures shall conform to ANSI/NEMA ICS6.
- f. 3-Button Control Station: 3-button station providing OPEN/CLOSE/STOP functionality shall be NEMA Type 1 with maintenance alert indicator to signal intervals for routine door and operator maintenance.
- g. Door Drive: Operator shall be equipped with roller chain and sprockets as

specified below, an electrically interlocked, floor level disconnect, a chain hoist for manual operation and an electric solenoid-actuated brake to stop motor and hold the door in any position:

- 1) Roller Chain and Sprocket: 50B40 door sprocket and #50 drive chain, motor rated up to 1HP.
 - 2) Roller Chain and Sprockets: 50B60 door sprocket and #50 drive chain, motor rated from 1-1/2 to 2HP.
 - 3) Roller Chain and Sprockets: 80B60 door sprocket and #80 drive chain, motor rated at 3HP.
 - 4) Roller Chain and Sprockets: As required for 5HP based upon door specification
2. **Primary Entrapment Protection Safety Devices:**
- a. Industrial/Commercial Monitored Photo Sensors: CPS-U fully monitored, non-contact, infrared beam photo sensor system shall reverse, in conjunction with the Logic 4 operator, a closing door to the full open position when an obstruction is sensed; photo sensors shall be mounted no higher than 6 inches (152 mm) maximum above the floor.
 - b. NEMA 4 Monitored Photo Sensors: CPS-UN4 fully monitored, non-contact, infrared beam reversing photo sensor system, with NEMA 4 watertight enclosure shall reverse, in conjunction with the Logic 4 operator, a closing door to the full open position when an obstruction is sensed; photo sensors shall be mounted no higher than 6 inches (152 mm) maximum above the floor.
 - c. Monitored Sensing Edge Interface: CPS-EI edge interface shall provide a means to attach a 4-wire monitored sensing edge to a Logic 4 operator for continuous monitoring purposes; the edge, in conjunction with the Logic 4 operators shall reverse a closing door to the full open position when an obstruction is sensed; sensing edge supplied by others.
3. **Ancillary Entrapment Protection Safety Devices:**
- a. Retro-Reflective Photo Sensors: CPS-RN4 non-monitored, non-contact, infrared beam photo sensor with polarized reflector for use in conjunction with the CPS-EI edge interface and monitored 4-wire sensing edge; shall reverse a closing door to the full open position when an obstruction is sensed; photo sensor shall be mounted no higher than 6 inches (152 mm) maximum above the floor.
 - b. Non-Monitored Electric Sensing Edge: 2-wire non-monitored electric edge shall reverse a closing door to the full open position when an obstruction is sensed
 - c. Pneumatic Sensing Edge: Pneumatic (air hose) sensing edge shall reverse a closing door to the full open position when an obstruction is sensed.

2.10 HOIST-TYPE DOOR OPERATORS FOR HIGH OR VERTICAL LIFT SECTIONAL DOORS AND SMALL ROLLING DOORS OR GRILLES

A. Medium-Duty Operators:

Model MH Operator by LiftMaster / Chamberlain, Elmhurst, IL, limited-duty (recommended duty of 12 cycles per hour), high-starting torque motor with overload protection and emergency chain hoist with electric interlock.

1. **Electric Operator:** Medium-duty assembly, cULus Listed and cULus Labeled, with electric motor and factory-rewired motor controls, emergency floor-level manual chain

hoist mechanism with electrical interlock, electric solenoid-actuated brake, 3-button OPEN/CLOSE/STOP control station, conduit-encased wiring from control circuit to motor, and accessories required for proper operation; operator shall provide a door speed of approximately 8 inches (203 mm) to 9 inches (229 mm) per second.

- a. Primary Speed Reduction: Heavy-duty 4L V-belt and #41 chain and sprocket with sprocket reduced secondary; operator shall be equipped with adjustable friction clutch and output and door driven sprockets.
 - b. Brake: Electric solenoid-actuated brake capable of stopping and holding a door at any position.
 - c. Limit Switches: Fully adjustable, driven linear-type switch mechanism synchronizing operator with door; low friction nylon limit nuts fitted on threaded steel shaft that rotates on oil-tight self-lubricating bronze bushings; motor shall be removable without affecting limit switch settings.
 - d. Electric Motor: High-starting torque, 1/2 Horsepower, 115 volts, 1 phase motor with an internal automatic reset thermal overload device to protect against overload.
 - e. Motor Control and Enclosure: LiftMaster Medium Duty Logic motor control shall be a microprocessor solid-state type PCB; the control board shall provide the capability to select one of two wiring types, diagnostic LEDs for operator status and troubleshooting, programmable timer-to-close w/timer defeat capabilities and a maximum run timer to provide motor overrun protection; motor control shall be housed in a NEMA 1 enclosure integral to the operator and shall conform to ANSI/NEMA ICS6.
 - 1) Radio Receiver: LiftMaster Medium Duty Logic on-board, 3-channel receiver with external antenna; equipped to accept Security+ Rolling Code Technology remote transmitters and Trinary Dip Switch remote transmitters, with memory for up to 20 Security+ remote transmitters or an unlimited number of Trinary Dip Switch remote transmitters.
 - f. 3-Button Control Station: 3-button station providing OPEN/CLOSE/STOP within a NEMA 1 Type enclosure
 - g. Door Drive: Full #41 roller chain; operator shall be equipped with an electrically interlocked, floor level disconnect and chain hoist for manual operation.
2. **Primary Entrapment Protection Safety Devices:**
- a. Industrial/Commercial Monitored Photo Sensors: CPS-U fully monitored, non-contact, infrared beam photo sensor system shall reverse, in conjunction with the Logic 4 operator, a closing door to the full open position when an obstruction is sensed; photo sensors shall be mounted no higher than 6 inches (152 mm) maximum above the floor.
 - b. NEMA 4 Monitored Photo Sensors: CPS-UN4 fully monitored, non-contact, infrared beam reversing photo sensor system, with NEMA 4 watertight enclosure shall reverse, in conjunction with the Logic 4 operator, a closing door to the full open position when an obstruction is sensed; photo sensors shall be mounted no higher than 6 inches (152 mm) maximum above the floor.
 - c. Monitored Sensing Edge Interface: CPS-EI edge interface shall provide a means to attach a 4-wire monitored sensing edge to a Logic 4 operator for continuous monitoring purposes; the edge, in conjunction with the Logic 4 operators shall reverse a closing door to the full open position when an obstruction is sensed;

sensing edge supplied by others.

3. **Ancillary Entrapment Protection Safety Devices:**
 - a. Retro-Reflective Photo Sensors: CPS-RN4 non-monitored, non-contact, infrared beam photo sensor with polarized reflector for use in conjunction with the CPS-EI edge interface and monitored 4-wire sensing edge; shall reverse a closing door to the full open position when an obstruction is sensed; photo sensor shall be mounted no higher than 6 inches (152 mm) maximum above the floor.
 - b. Non-Monitored Electric Sensing Edge: 2-wire non-monitored electric edge shall reverse a closing door to the full open position when an obstruction is sensed
 - c. Pneumatic Sensing Edge: Pneumatic (air hose) sensing edge shall reverse a closing door to the full open position when an obstruction is sensed.

2.11 HOIST-TYPE SLOW-SPEED DOOR OPERATORS FOR ROLLING SHEET DOORS

A. Medium-Duty Operators:

Model MHS Operator by LiftMaster / Chamberlain, Elmhurst, IL, limited-duty (recommended duty of 12 cycles per hour), high-starting torque motor with overload protection and emergency chain hoist with electric interlock.

1. **Electric Operator:** Medium-duty assembly, UL Listed and UL Labeled, with electric motor and factory-prewired motor controls, emergency floor-level manual chain hoist mechanism with electrical interlock, electric solenoid-actuated brake, 3-button OPEN/CLOSE/STOP control station, conduit-encased wiring from control circuit to motor, and accessories required for proper operation; operator shall provide a door speed of approximately 4 inches (203 mm) to 5 inches (229 mm) per second.
 - a. Primary Speed Reduction: Heavy-duty 4L V-belt and #41 chain and sprocket with sprocket reduced secondary; operator shall be equipped with adjustable friction clutch and output and door driven sprockets.
 - b. Brake: Electric solenoid-actuated brake capable of stopping and holding a door at any position.
 - c. Limit Switches: Fully adjustable, driven linear-type switch mechanism synchronizing operator with door; low friction nylon limit nuts fitted on threaded steel shaft that rotates on oil-tight self-lubricating bronze bushings; motor shall be removable without affecting limit switch settings.
 - d. Electric Motor: High-starting torque, 1/2 Horsepower, 115 volts, 1 phase motor with an internal automatic reset thermal overload device to protect against overload.
 - e. Motor Control and Enclosure: LiftMaster Medium Duty Logic motor control shall be a microprocessor solid-state type PCB; the control board shall provide the capability to select one of two wiring types, diagnostic LEDs for operator status and troubleshooting, programmable timer-to-close w/timer defeat capabilities and a maximum run timer to provide motor overrun protection; motor control shall be housed in a NEMA 1 enclosure integral to the operator and shall conform to ANSI/NEMA ICS6.
 - 1) Radio Receiver: LiftMaster Medium Duty Logic on-board, 3-channel receiver with external antenna; equipped to accept Security+ Rolling Code Technology remote transmitters and Trinary Dip Switch remote transmitters, with memory for up to 20 Security+ remote transmitters or an unlimited

- number of Trinary Dip Switch remote transmitters.
- f. 3-Button Control Station: 3-button station providing OPEN/CLOSE/STOP within a NEMA 1 Type enclosure.
 - g. Door Drive: Full #41 roller chain; operator shall be equipped with an electrically interlocked, floor level disconnect and chain hoist for manual operation.
2. **Primary Entrapment Protection Safety Devices:**
 - a. Industrial/Commercial Monitored Photo Sensors: CPS-U fully monitored, non-contact, infrared beam photo sensor system shall reverse, in conjunction with the Logic 4 operator, a closing door to the full open position when an obstruction is sensed; photo sensors shall be mounted no higher than 6 inches (152 mm) maximum above the floor.
 - b. NEMA 4 Monitored Photo Sensors: CPS-UN4 fully monitored, non-contact, infrared beam reversing photo sensor system, with NEMA 4 watertight enclosure shall reverse, in conjunction with the Logic 4 operator, a closing door to the full open position when an obstruction is sensed; photo sensors shall be mounted no higher than 6 inches (152 mm) maximum above the floor.
 - c. Monitored Sensing Edge Interface: CPS-EI edge interface shall provide a means to attach a 4-wire monitored sensing edge to a Logic 4 operator for continuous monitoring purposes; the edge, in conjunction with the Logic 4 operators shall reverse a closing door to the full open position when an obstruction is sensed; sensing edge supplied by others.
 3. **Ancillary Entrapment Protection Safety Devices:**
 - a. Retro-Reflective Photo Sensors: CPS-RN4 non-monitored, non-contact, infrared beam photo sensor with polarized reflector for use in conjunction with the CPS-EI edge interface and monitored 4-wire sensing edge; shall reverse a closing door to the full open position when an obstruction is sensed; photo sensor shall be mounted no higher than 6 inches (152 mm) maximum above the floor.
 - b. Non-Monitored Electric Sensing Edge: 2-wire non-monitored electric edge shall reverse a closing door to the full open position when an obstruction is sensed
 - c. Pneumatic Sensing Edge: Pneumatic (air hose) sensing edge shall reverse a closing door to the full open position when an obstruction is sensed.

2.12 JACKSHAFT-TYPE DOOR OPERATORS FOR HIGH OR VERTICAL LIFT SECTIONAL DOORS AND LIMITED ROLLING DOOR AND GRILLE APPLICATIONS

- A. **Industrial-Duty Operators with Internal Door Lock Sensor:** Model DJ Operator by LiftMaster / Chamberlain, Elmhurst, IL, continuous-duty, high-starting torque motor with overload protection, internal door lock sensor to prevent accidental operation of a locked door and emergency disconnect for manual door operation.
 1. **Electric Operator:** Industrial-duty assembly, cULus Listed and cULus Labeled, with electric motor and factory-prewired motor controls, internal door lock sensor, positive locking mechanical system acting as a holding brake, an emergency disconnect for manual operation of the door, 3-button OPEN/CLOSE/STOP control station, conduit-encased wiring from control circuit to motor, and accessories required for proper operation; provides door speed of approximately 8 to 9 inches (203 mm) to 9 inches (229 mm) per second.
 - a. Drive Reduction: Heavy-duty 5L V-belt primary reduction and chain/sprocket

secondary and third stage reduction; all reduction sprockets and pulleys shall be drilled and pinned to steel shafts plated for resistance to corrosion; operator shall be equipped with permanently lubricated ball bearings on output shaft, adjustable friction clutch, floor level disconnect and output and door driven sprockets.

- b. Limit Switches: Fully adjustable, driven linear-type switch mechanism synchronizing operator with door; low friction nylon limit nuts fitted on treaded steel shaft that rotates on oil-tight self-lubricating bronze bushings; motor shall be removable with affecting limit switch settings.
- c. Electric Motor: High-starting torque, continuous-duty, industrial-type protected against overload by current sensing and thermal overload devices.
 - 1) Motor Specification:
 - (a) 115V-60Hz-1 Phase; 1/3 HP.
 - (b) 115V-60Hz-1 Phase; 1/2 HP.
 - (c) 115V-60Hz-1 Phase; 3/4 HP.
 - (d) 115V-60Hz-1 Phase; 1 HP.
 - (e) 230V-60Hz-1 Phase; 1/3, 1/2, 3/4 or 1HP.
 - (f) 230V-60Hz-1 Phase; 1/3 HP.
 - (g) 230V-60Hz-1 Phase; 1/2 HP.
 - (h) 230V-60Hz-1 Phase; 3/4 HP.
 - (i) 230V-60Hz-1 Phase; 1 HP.
 - (j) 208/230V-60Hz-3 Phase; 1/3 HP.
 - (k) 208/230V-60Hz-3 Phase; 1/2 HP.
 - (l) 208/230V-60Hz-3 Phase; 3/4 HP.
 - (m) 208/230V-60Hz-3 Phase; 1 HP.
 - (n) 460V-60Hz-3 Phase; 1/3 HP.
 - (o) 460V-60Hz-3 Phase; 1/2 HP.
 - (p) 460V-60Hz-3 Phase; 3/4 HP.
 - (q) 460V-60Hz-3 Phase; 1 HP.
 - (r) 575V-60Hz-3 Phase; 1/3 HP.
 - (s) 575V-60Hz-3 Phase; 1/2 HP.
 - (t) 575V-60Hz-3 Phase; 3/4 HP.
 - (u) 575V-60Hz-3 Phase; 1 HP.
- d. Motor Control and Enclosure: LiftMaster LOGIC 4.0 motor control shall be UL approved microprocessor solid-state type and shall include the capability to select one of seven wiring types; additional features shall include a maintenance alert diagnostic system, programmable timer-to-close w/timer defeat input, mid-stop programming capabilities and a maximum run timer to provide motor overrun protection; motor control shall be housed in a NEMA 1 enclosure integral to the operator and shall conform to ANSI/NEMA ICS6.
 - 1) Radio Receiver: LiftMaster LOGIC 4.0 on-board, 3-channel receiver with standard external antenna; equipped to accept Security+ Rolling Code Technology remote transmitters and Trinary Dip Switch remote transmitters, with memory for up to 23 Security+ remote transmitters or an unlimited number of Trinary Dip Switch remote transmitters.
- e. Internal Door Lock Sensor: Sensing circuit to stop operator when door is locked.
- f. 3-Button Control Station: 3-button station providing OPEN/CLOSE/STOP functionality shall be NEMA Type 1 with maintenance alert indicator to signal

- intervals for routine door and operator maintenance.
 - g. Door Drive: Full #50 roller chain; operator shall be equipped with a floor level disconnect for manual operation of the door.
 - h. Operator Modifications: Electric solenoid-actuated brake capable of stopping and holding a door at any position.
2. **Primary Entrapment Protection Safety Devices:**
- a. Industrial/Commercial Monitored Photo Sensors: CPS-U fully monitored, non-contact, infrared beam photo sensor system shall reverse, in conjunction with the Logic 4 operator, a closing door to the full open position when an obstruction is sensed; photo sensors shall be mounted no higher than 6 inches (152 mm) maximum above the floor.
 - b. NEMA 4 Monitored Photo Sensors: CPS-UN4 fully monitored, non-contact, infrared beam reversing photo sensor system, with NEMA 4 watertight enclosure shall reverse, in conjunction with the Logic 4 operator, a closing door to the full open position when an obstruction is sensed; photo sensors shall be mounted no higher than 6 inches (152 mm) maximum above the floor.
 - c. Monitored Sensing Edge Interface: CPS-EI edge interface shall provide a means to attach a 4-wire monitored sensing edge to a Logic 4 operator for continuous monitoring purposes; the edge, in conjunction with the Logic 4 operators shall reverse a closing door to the full open position when an obstruction is sensed; sensing edge supplied by others.
3. **Ancillary Entrapment Protection Safety Devices:**
- a. Retro-Reflective Photo Sensors: CPS-RN4 non-monitored, non-contact, infrared beam photo sensor with polarized reflector for use in conjunction with the CPS-EI edge interface and monitored 4-wire sensing edge; shall reverse a closing door to the full open position when an obstruction is sensed; photo sensor shall be mounted no higher than 6 inches (152 mm) maximum above the floor.
 - b. Non-Monitored Electric Sensing Edge: 2-wire non-monitored electric edge shall reverse a closing door to the full open position when an obstruction is sensed
 - c. Pneumatic Sensing Edge: Pneumatic (air hose) sensing edge shall reverse a closing door to the full open position when an obstruction is sensed.

2.13 JACKSHAFT-TYPE DOOR OPERATORS FOR HIGH OR VERTICAL LIFT SECTIONAL DOORS AND LIMITED ROLLING DOOR AND GRILLE APPLICATIONS

A. Industrial-Duty Operators:

Model J Operator by LiftMaster / Chamberlain, Elmhurst, IL, continuous-duty, high-starting torque motor with overload protection and emergency disconnect for manual door operation.

1. **Electric Operator:** Industrial-duty assembly, cULus Listed and cULus Labeled, complete with electric motor and factory-prewired motor controls, positive locking mechanical system acting as a holding brake, emergency disconnect for manual operation of the door, 3-button OPEN/CLOSE/STOP control station, conduit-encased wiring from control circuit to motor, and accessories required for proper operation; operator shall be capable of driving door at a speed of approximately 8 inches (203 mm) to 9 inches (229 mm) per second
 - a. Drive Reduction: Heavy-duty 5L V-belt primary reduction and chain/sprocket secondary and third stage reduction; all reduction sprockets and pulleys shall be

- drilled and pinned to steel shafts plated for resistance to corrosion; operator shall be equipped with permanently lubricated ball bearings on output shaft, adjustable friction clutch and output and door driven sprockets.
- b. Limit Switches: Fully adjustable, driven linear-type switch mechanism synchronizing operator with door; low friction nylon limit nuts fitted on treaded steel shaft that rotates on oil-tight self-lubricating bronze bushings; motor shall be removable with affecting limit switch settings.
 - c. Electric Motor: High-starting torque, continuous-duty, industrial-type protected against overload by current sensing and thermal overload devices.
 - 1) Motor Specification:
 - (a) 115V-60Hz-1 Phase; 1/3 HP.
 - (b) 115V-60Hz-1 Phase; 1/2 HP.
 - (c) 115V-60Hz-1 Phase; 3/4 HP.
 - (d) 115V-60Hz-1 Phase; 1 HP.
 - (e) 230V-60Hz-1 Phase; 1/3, 1/2, 3/4 or 1HP.
 - (f) 230V-60Hz-1 Phase; 1/3 HP.
 - (g) 230V-60Hz-1 Phase; 1/2 HP.
 - (h) 230V-60Hz-1 Phase; 3/4 HP.
 - (i) 230V-60Hz-1 Phase; 1 HP.
 - (j) 208/230V-60Hz-3 Phase; 1/3 HP.
 - (k) 208/230V-60Hz-3 Phase; 1/2 HP.
 - (l) 208/230V-60Hz-3 Phase; 3/4 HP.
 - (m) 208/230V-60Hz-3 Phase; 1 HP.
 - (n) 460V-60Hz-3 Phase; 1/3 HP.
 - (o) 460V-60Hz-3 Phase; 1/2 HP.
 - (p) 460V-60Hz-3 Phase; 3/4 HP.
 - (q) 460V-60Hz-3 Phase; 1 HP.
 - (r) 575V-60Hz-3 Phase; 1/3 HP.
 - (s) 575V-60Hz-3 Phase; 1/2 HP.
 - (t) 575V-60Hz-3 Phase; 3/4 HP.
 - (u) 575V-60Hz-3 Phase; 1 HP.
 - d. Motor Control and Enclosure: LiftMaster LOGIC 4.0 motor control shall be UL approved microprocessor solid-state type and shall include the capability to select one of seven wiring types; additional features shall include a maintenance alert diagnostic system, programmable timer-to-close w/timer defeat input, mid-stop programming capabilities and a maximum run timer to provide motor overrun protection; motor control shall be housed in a NEMA 1 enclosure integral to the operator and shall conform to ANSI/NEMA ICS6.
 - 1) Radio Receiver: LiftMaster LOGIC 4.0 on-board, 3-channel receiver with standard external antenna; equipped to accept Security+ Rolling Code Technology remote transmitters and Trinary Dip Switch remote transmitters, with memory for up to 23 Security+ remote transmitters or an unlimited number of Trinary Dip Switch remote transmitters.
 - e. 3-Button Control Station: 3-button station providing OPEN/CLOSE/STOP functionality shall be NEMA Type 1 with maintenance alert indicator to signal intervals for routine door and operator maintenance.
 - f. Door Drive: Full #50 roller chain; operator shall be equipped with a floor level

- g. disconnect for manual operation of the door.
- g. Operator Modifications: Electric solenoid-actuated brake capable of stopping and holding a door at any position.
- 2. **Primary Entrapment Protection Safety Devices:**
 - a. Industrial/Commercial Monitored Photo Sensors: CPS-U fully monitored, non-contact, infrared beam photo sensor system shall reverse, in conjunction with the Logic 4 operator, a closing door to the full open position when an obstruction is sensed; photo sensors shall be mounted no higher than 6 inches (152 mm) maximum above the floor.
 - b. NEMA 4 Monitored Photo Sensors: CPS-UN4 fully monitored, non-contact, infrared beam reversing photo sensor system, with NEMA 4 watertight enclosure shall reverse, in conjunction with the Logic 4 operator, a closing door to the full open position when an obstruction is sensed; photo sensors shall be mounted no higher than 6 inches (152 mm) maximum above the floor.
 - c. Monitored Sensing Edge Interface: CPS-EI edge interface shall provide a means to attach a 4-wire monitored sensing edge to a Logic 4 operator for continuous monitoring purposes; the edge, in conjunction with the Logic 4 operators shall reverse a closing door to the full open position when an obstruction is sensed; sensing edge supplied by others.
- 3. **Ancillary Entrapment Protection Safety Devices:**
 - a. Retro-Reflective Photo Sensors: CPS-RN4 non-monitored, non-contact, infrared beam photo sensor with polarized reflector for use in conjunction with the CPS-EI edge interface and monitored 4-wire sensing edge; shall reverse a closing door to the full open position when an obstruction is sensed; photo sensor shall be mounted no higher than 6 inches (152 mm) maximum above the floor.
 - b. Non-Monitored Electric Sensing Edge: 2-wire non-monitored electric edge shall reverse a closing door to the full open position when an obstruction is sensed
 - c. Pneumatic Sensing Edge: Pneumatic (air hose) sensing edge shall reverse a closing door to the full open position when an obstruction is sensed.

2.14 JACKSHAFT-TYPE DOOR OPERATORS FOR COUNTER SHUTTER, ROLLING GRILLE AND SMALL ROLLING DOOR APPLICATIONS

A. Light-Duty Gear-Reduced Operators:

Model LGJ Operator by LiftMaster / Chamberlain, Elmhurst, IL, limited duty (recommended duty of 7 cycles per hour) high-starting torque 1/4 HP motor with emergency disconnect for manual door operation and internal door lock sensor to prevent accidental operation of a locked door.

- 1. **Electric Operator:** Light-duty assembly, cULus Listed and cULus Labeled, with electric motor and factory-prewired motor controls, 3-button OPEN/CLOSE/STOP control station, conduit-encased wiring from control circuit to motor, and accessories required for proper operation; operator shall be capable of driving door at a speed of approximately 8 inches (203 mm) to 9 inches (229 mm) per second.
 - a. Primary Speed Reduction: Wormgear-in-oil-bath; operator equipped with floor level disconnect and output and door driven sprocket
 - b. Limit Switches: Fully adjustable, driven linear-type switch mechanism synchronizing operator with door. Low friction nylon limit nuts fitted on threaded

- steel shaft that rotates on oil-tight self-lubricating bronze bushings. Motor shall be removable without affecting limit switch settings.
- c. Electric Motor: High-starting torque, 1/4 Horsepower, 115 volts, 1 phase motor rated for a maximum capacity of 7 cycles per hour.
 - d. Control and Motor Drive: Solid-state circuit board design with internal door lock-sensing circuit.
 - e. Internal Door Lock Sensor: Speed sensor and sensing circuit to stop operator when door is locked or obstructed while opening, or reverse the door if obstructed when closing.
 - f. 3-Button Control Station: 3-button station providing OPEN/CLOSE/STOP shall be NEMA Type 1 with maintenance alert indicator to signal intervals for routine door and operator maintenance.
 - g. Door Drive: Full #41 roller chain; operator shall be equipped with an electrically interlocked, floor level disconnect for manual operation.
2. **Safety Devices:**
- a. Industrial/Commercial Monitored Photo Sensors: CPS-U non-contact, infrared beam photo sensor system shall reverse a closing door to the full open position when an obstruction is sensed; photo sensors shall be mounted no higher than 6 inches (152 mm) maximum above the floor.
 - b. NEMA 4 Monitored Photo Sensors: CPS-UN4 non-contact, infrared beam reversing photo sensor system, with NEMA 4 watertight enclosure, shall reverse a closing door to the full open position when an obstruction is sensed; photo sensors shall be mounted no higher than 6 inches (152 mm) maximum above the floor.
 - c. Monitored Sensing Edge Interface: CPS-EI edge interface shall provide a means for attachment of a 4-wire monitored sensing edge to the operator; the edge shall reverse a closing door to the full open position when an obstruction is sensed; sensing edge supplied by others.
 - d. Non-Monitored Electric Sensing Edge: 2-wire non-monitored electric edge shall reverse a closing door to the full open position when an obstruction is sensed
 - e. Pneumatic Sensing Edge: Pneumatic (air hose) sensing edge shall reverse a closing door to the full open position when an obstruction is sensed.

2.15 JACKSHAFT-TYPE DOOR OPERATORS FOR HIGH OR VERTICAL LIFT SECTIONAL DOORS AND SMALL ROLLING DOORS OR GRILLES

A. Medium-Duty Operators:

Model MGJ Operator by LiftMaster / Chamberlain, Elmhurst, IL, limited-duty (recommended duty of 12 cycles per hour), high-starting torque motor with overload protection and emergency disconnect for manual door operation.

1. **Electric Operator:** Medium-duty assembly, cULus Listed and cULus Labeled, with electric motor and factory-rewired motor controls, emergency floor-level disconnect for manual operation, 3-button OPEN/CLOSE/STOP control station, conduit-encased wiring from control circuit to motor, and accessories required for proper operation; operator shall provide a door speed of approximately 8 inches (203 mm) to 9 inches (229 mm) per second.
 - a. Primary Speed Reduction: Wormgear-in-oil-bath reducer; operator equipped with

- floor-level disconnect and output and door driven sprockets.
 - b. Limit Switches: Fully adjustable, driven linear-type switch mechanism synchronizing operator with door; low friction nylon limit nuts fitted on threaded steel shaft that rotates on oil-tight self-lubricating bronze bushings; motor shall be removable without affecting limit switch settings.
 - c. Electric Motor: High-starting torque, 1/2 Horsepower, 115 volts, 1 phase motor with an internal automatic reset thermal overload device to protect against overload.
 - d. Motor Control and Enclosure: LiftMaster Medium Duty Logic motor control shall be a microprocessor solid-state type PCB; the control board shall provide the capability to select one of two wiring types, diagnostic LEDs for operator status and troubleshooting, programmable timer-to-close w/timer defeat capabilities and a maximum run timer to provide motor overrun protection; motor control shall be housed in a NEMA 1 enclosure integral to the operator and shall conform to ANSI/NEMA ICS6.
 - 1) Radio Receiver: LiftMaster Medium Duty Logic on-board, 3-channel receiver with external antenna; equipped to accept Security+ Rolling Code Technology remote transmitters and Trinary Dip Switch remote transmitters, with memory for up to 20 Security+ remote transmitters or an unlimited number of Trinary Dip Switch remote transmitters.
 - e. 3-Button Control Station: 3-button station providing OPEN/CLOSE/STOP within a NEMA 1 Type enclosure.
 - f. Door Drive: Full #41 roller chain; operator shall be equipped with an electrically interlocked, floor level disconnect for manual operation.
2. **Primary Entrapment Protection Safety Devices:**
- a. Industrial/Commercial Monitored Photo Sensors: CPS-U fully monitored, non-contact, infrared beam photo sensor system shall reverse, in conjunction with the Logic 4 operator, a closing door to the full open position when an obstruction is sensed; photo sensors shall be mounted no higher than 6 inches (152 mm) maximum above the floor.
 - b. NEMA 4 Monitored Photo Sensors: CPS-UN4 fully monitored, non-contact, infrared beam reversing photo sensor system, with NEMA 4 watertight enclosure shall reverse, in conjunction with the Logic 4 operator, a closing door to the full open position when an obstruction is sensed; photo sensors shall be mounted no higher than 6 inches (152 mm) maximum above the floor.
 - c. Monitored Sensing Edge Interface: CPS-EI edge interface shall provide a means to attach a 4-wire monitored sensing edge to a Logic 4 operator for continuous monitoring purposes; the edge, in conjunction with the Logic 4 operators shall reverse a closing door to the full open position when an obstruction is sensed; sensing edge supplied by others.
3. **Ancillary Entrapment Protection Safety Devices:**
- a. Retro-Reflective Photo Sensors: CPS-RN4 non-monitored, non-contact, infrared beam photo sensor with polarized reflector for use in conjunction with the CPS-EI edge interface and monitored 4-wire sensing edge; shall reverse a closing door to the full open position when an obstruction is sensed; photo sensor shall be mounted no higher than 6 inches (152 mm) maximum above the floor.
 - b. Non-Monitored Electric Sensing Edge: 2-wire non-monitored electric edge shall

- c. reverse a closing door to the full open position when an obstruction is sensed
- c. Pneumatic Sensing Edge: Pneumatic (air hose) sensing edge shall reverse a closing door to the full open position when an obstruction is sensed.

2.16 JACKSHAFT-TYPE DOOR OPERATORS FOR HIGH OR VERTICAL LIFT SECTIONAL DOORS OR SMALL ROLLING DOORS AND GRILLES

A. Medium-Duty Operators:

Model MJ Operator by LiftMaster / Chamberlain, Elmhurst, IL. Limited-duty (recommended duty of 12 cycles per hour), high-starting torque motor with overload protection and emergency disconnect for manual door operation.

1. **Electric Operator:** Medium-duty assembly, cULus Listed and cULus Labeled, with electric motor and factory-rewired motor controls, emergency floor-level manual chain hoist mechanism with electrical interlock, electric solenoid-actuated brake, 3-button OPEN/CLOSE/STOP control station, conduit-encased wiring from control circuit to motor, and accessories required for proper operation; operator shall provide a door speed of approximately 8 inches (203 mm) to 9 inches (229 mm) per second.
 - a. Primary Speed Reduction: Heavy-duty 4L V-belt and #41 chain and sprocket with sprocket reduced secondary; operator shall be equipped with adjustable friction clutch and output and door driven sprockets.
 - b. Brake: Electric solenoid-actuated brake capable of stopping and holding a door at any position.
 - c. Limit Switches: Fully adjustable, driven linear-type switch mechanism synchronizing operator with door; low friction nylon limit nuts fitted on threaded steel shaft that rotates on oil-tight self-lubricating bronze bushings; motor shall be removable without affecting limit switch settings.
 - d. Electric Motor: High-starting torque, 1/2 Horsepower, 115 volts, 1 phase motor with an internal automatic reset thermal overload device to protect against overload.
 - e. Motor Control and Enclosure: LiftMaster Medium Duty Logic motor control shall be a microprocessor solid-state type PCB; the control board shall provide the capability to select one of two wiring types, diagnostic LEDs for operator status and troubleshooting, programmable timer-to-close w/timer defeat capabilities and a maximum run timer to provide motor overrun protection; motor control shall be housed in a NEMA 1 enclosure integral to the operator and shall conform to ANSI/NEMA ICS6.
 - 1) Radio Receiver: LiftMaster Medium Duty Logic on-board, 3-channel receiver with external antenna; equipped to accept Security+ Rolling Code Technology remote transmitters and Trinary Dip Switch remote transmitters, with memory for up to 20 Security+ remote transmitters or an unlimited number of Trinary Dip Switch remote transmitters.
 - f. 3-Button Control Station: 3-button station providing OPEN/CLOSE/STOP within a NEMA 1 Type enclosure.
 - g. Door Drive: Full #41 roller chain; operator shall be equipped with a floor level disconnect for manual operation of the door.
2. **Primary Entrapment Protection Safety Devices:**
 - a. Industrial/Commercial Monitored Photo Sensors: CPS-U fully monitored, non-

contact, infrared beam photo sensor system shall reverse, in conjunction with the Logic 4 operator, a closing door to the full open position when an obstruction is sensed; photo sensors shall be mounted no higher than 6 inches (152 mm) maximum above the floor.

- b. NEMA 4 Monitored Photo Sensors: CPS-UN4 fully monitored, non-contact, infrared beam reversing photo sensor system, with NEMA 4 watertight enclosure shall reverse, in conjunction with the Logic 4 operator, a closing door to the full open position when an obstruction is sensed; photo sensors shall be mounted no higher than 6 inches (152 mm) maximum above the floor.
 - c. Monitored Sensing Edge Interface: CPS-EI edge interface shall provide a means to attach a 4-wire monitored sensing edge to a Logic 4 operator for continuous monitoring purposes; the edge, in conjunction with the Logic 4 operators shall reverse a closing door to the full open position when an obstruction is sensed; sensing edge supplied by others.
3. **Ancillary Entrapment Protection Safety Devices:**
- a. Retro-Reflective Photo Sensors: CPS-RN4 non-monitored, non-contact, infrared beam photo sensor with polarized reflector for use in conjunction with the CPS-EI edge interface and monitored 4-wire sensing edge; shall reverse a closing door to the full open position when an obstruction is sensed; photo sensor shall be mounted no higher than 6 inches (152 mm) maximum above the floor.
 - b. Non-Monitored Electric Sensing Edge: 2-wire non-monitored electric edge shall reverse a closing door to the full open position when an obstruction is sensed
 - c. Pneumatic Sensing Edge: Pneumatic (air hose) sensing edge shall reverse a closing door to the full open position when an obstruction is sensed.

2.17 INDUSTRIAL-DUTY SINGLE AND BI-PARTING DOOR OPERATORS

A. Heavy Industrial-Duty Operators:

Model GSD Operator by LiftMaster / Chamberlain, Elmhurst, IL, continuous-duty high-starting torque motor with overload protection and emergency disconnect for manual operation.

1. **Electric Operator:** Heavy industrial-duty assembly, cULus Listed and cULus Labeled, with electric motor and factory-prewired motor controls, 3-button OPEN/CLOSE/STOP control station, conduit-encased wiring from control circuit to motor, and accessories required for proper operation; door speed of approximately 11 inches (279 mm) to 12 inches (304 mm) per second.
 - a. Primary Speed Reduction Device: Wormgear-in-oil-bath gear reducer with synthetic "All Climate" oil with 45:1 speed reduction; sprockets and pulleys shall be drilled and pinned to steel shafts and all shafts shall be plated for resistance to corrosion; operator shall be equipped with adjustable friction clutch, quick disconnect door arm for manual door operation and permanently lubricated ball bearings on output shaft.
 - b. Brake: Electric solenoid-actuated brake capable of stopping and holding a door at any position.
 - c. Limit Switches: Fully adjustable, driven linear-type switch mechanism synchronizing operator with door; low friction nylon limit nuts fitted on treaded steel shaft that rotates on oil-tight self-lubricating bronze bushings; motor shall be removable with affecting limit switch settings.

- d. Electric Motor: High-starting torque, continuous-duty, industrial-type protected against overload by current sensing and thermal overload devices.
 - 1) Motor Specification:
 - (a) 115V-60Hz-1 Phase; 1/2 HP.
 - (b) 115V-60Hz-1 Phase; 3/4 HP.
 - (c) 115V-60Hz-1 Phase; 1 HP.
 - (d) 115V-60Hz-1 Phase; 1-1/2 HP.
 - (e) 230V-60Hz-1 Phase; 1/2 HP.
 - (f) 230V-60Hz-1 Phase; 3/4 HP.
 - (g) 230V-60Hz-1 Phase; 1 HP.
 - (h) 230V-60Hz-1 Phase; 1-1/2 HP.
 - (i) 208/230V-60Hz-3 Phase; 1/2 HP.
 - (j) 208/230V-60Hz-3 Phase; 3/4 HP.
 - (k) 208/230V-60Hz-3 Phase; 1 HP.
 - (l) 208/230V-60Hz-3 Phase; 1-1/2 HP.
 - (m) 460V-60Hz-3 Phase; 1/2 HP.
 - (n) 460V-60Hz-3 Phase; 3/4 HP.
 - (o) 460V-60Hz-3 Phase; 1 HP.
 - (p) 460V-60Hz-3 Phase; 1-1/2 HP.
 - (q) 575V-60Hz-3 Phase; 1/2 HP.
 - (r) 575V-60Hz-3 Phase; 3/4 HP.
 - (s) 575V-60Hz-3 Phase; 1 HP.
 - (t) 575V-60Hz-3 Phase; 1-1/2 HP.
- e. Motor Control and Enclosure: LiftMaster LOGIC 4.0 motor control shall be UL approved microprocessor solid-state type and shall include the capability to select one of seven wiring types; additional features shall include a maintenance alert diagnostic system, programmable timer-to-close w/timer defeat input, mid-stop programming capabilities and a maximum run timer to provide motor overrun protection; motor control shall be housed in a NEMA 1 enclosure integral to the operator and shall conform to ANSI/NEMA ICS6.
 - 1) Radio Receiver: LiftMaster LOGIC 4.0 on-board, 3-channel receiver with standard external antenna; equipped to accept Security+ Rolling Code Technology remote transmitters and Trinary Dip Switch remote transmitters, with memory for up to 23 Security+ remote transmitters or an unlimited number of Trinary Dip Switch remote transmitters.
- f. 3-Button Control Station: 3-button station providing OPEN/CLOSE/STOP functionality shall be NEMA Type 1 with maintenance alert indicator to signal intervals for routine door and operator maintenance.
- g. Track: Heavy duty, double angle, 11 gauge galvanized steel.
- h. Door Drive: #41 roller chain with emergency disconnect for manual door operation.
- i. Trolley Assembly: 2 inch (51 mm) by 2 inch (51 mm) galvanized steel rails with cast aluminum trolley along with plated steel rail spacers on nylon chain guide assembly; angle brackets provided for wall-mounting.
- j. Operator Modifications:
 - 1) Provide Damp Environment Operator Modification for applications where severe moisture, but not direct spray, is present.
 - 2) Provide NEMA 4 Operator Modification for applications where operator

is subjected to direct water spray and/or water-tight/oil-tight/dust-tight protection is required.

- 3) Provide NEMA4X Operator Modification for applications where operator is subjected to direct water spray, water-tight/oil-tight/dust-tight protection is required and/or corrosion resistance is required.

2. Primary Entrapment Protection Safety Devices:

- a. Industrial/Commercial Monitored Photo Sensors: CPS-U fully monitored, non-contact, infrared beam photo sensor system shall reverse, in conjunction with the Logic 4 operator, a closing door to the full open position when an obstruction is sensed; photo sensors shall be mounted no higher than 6 inches (152 mm) maximum above the floor.
- b. NEMA 4 Monitored Photo Sensors: CPS-UN4 fully monitored, non-contact, infrared beam reversing photo sensor system, with NEMA 4 watertight enclosure shall reverse, in conjunction with the Logic 4 operator, a closing door to the full open position when an obstruction is sensed; photo sensors shall be mounted no higher than 6 inches (152 mm) maximum above the floor.
- c. Monitored Sensing Edge Interface: CPS-EI edge interface shall provide a means to attach a 4-wire monitored sensing edge to a Logic 4 operator for continuous monitoring purposes; the edge, in conjunction with the Logic 4 operators shall reverse a closing door to the full open position when an obstruction is sensed; sensing edge supplied by others.

3. Ancillary Entrapment Protection Safety Devices:

- a. Retro-Reflective Photo Sensors: CPS-RN4 non-monitored, non-contact, infrared beam photo sensor with polarized reflector for use in conjunction with the CPS-EI edge interface and monitored 4-wire sensing edge; shall reverse a closing door to the full open position when an obstruction is sensed; photo sensor shall be mounted no higher than 6 inches (152 mm) maximum above the floor.
- b. Non-Monitored Electric Sensing Edge: 2-wire non-monitored electric edge shall reverse a closing door to the full open position when an obstruction is sensed
- c. Pneumatic Sensing Edge: Pneumatic (air hose) sensing edge shall reverse a closing door to the full open position when an obstruction is sensed.

2.18 INDUSTRIAL-DUTY SINGLE AND BI-PARTING DOOR OPERATORS

A. Industrial-Duty Operators:

Model SD Operator by LiftMaster / Chamberlain, Elmhurst, IL, continuous-duty high-starting torque motor with overload protection and emergency disconnect for manual door operation; Model SD; Chamberlain, Elmhurst, IL.

1. **Electric Operator:** Industrial-duty assembly, cULus Listed and cULus Labeled, with electric motor and factory-prewired motor controls, internal auxiliary reversal circuit, 3-button OPEN/CLOSE/STOP control station, conduit-encased wiring from control circuit to motor, and accessories required for proper operation; door speed of approximately 11 inches (279 mm) per second,
 - a. Drive Reduction: Heavy-duty 5L V-belt and chain/sprocket secondary; all reduction sprockets and pulleys shall be drilled and pinned to steel shafts plated for resistance to corrosion; operator shall be equipped with permanently lubricated ball bearings on output shaft, adjustable friction clutch and door

- disconnect mechanism to facilitate manual operation.
- b. Brake: Electric solenoid-actuated brake capable of stopping and holding a door at any position
 - c. Limit Switches: Fully adjustable, driven linear-type switch mechanism synchronizing operator with door; low friction nylon limit nuts fitted on treaded steel shaft that rotates on oil-tight self-lubricating bronze bushings; motor shall be removable with affecting limit switch settings.
 - d. Electric Motor: High-starting torque, continuous-duty, industrial-type protected against overload by current sensing and thermal overload devices.
 - 1) Motor Specification:
 - (a) 115V-60Hz-1 Phase; 1/3 HP.
 - (b) 115V-60Hz-1 Phase; 1/2 HP.
 - (c) 115V-60Hz-1 Phase; 3/4 HP.
 - (d) 115V-60Hz-1 Phase; 1 HP.
 - (e) 230V-60Hz-1 Phase; 1/3, 1/2, 3/4 or 1HP.
 - (f) 230V-60Hz-1 Phase; 1/3 HP.
 - (g) 230V-60Hz-1 Phase; 1/2 HP.
 - (h) 230V-60Hz-1 Phase; 3/4 HP.
 - (i) 230V-60Hz-1 Phase; 1 HP.
 - (j) 208/230V-60Hz-3 Phase; 1/3 HP.
 - (k) 208/230V-60Hz-3 Phase; 1/2 HP.
 - (l) 208/230V-60Hz-3 Phase; 3/4 HP.
 - (m) 208/230V-60Hz-3 Phase; 1 HP.
 - (n) 460V-60Hz-3 Phase; 1/3 HP.
 - (o) 460V-60Hz-3 Phase; 1/2 HP.
 - (p) 460V-60Hz-3 Phase; 3/4 HP.
 - (q) 460V-60Hz-3 Phase; 1 HP.
 - (r) 575V-60Hz-3 Phase; 1/3 HP.
 - (s) 575V-60Hz-3 Phase; 1/2 HP.
 - (t) 575V-60Hz-3 Phase; 3/4 HP.
 - (u) 575V-60Hz-3 Phase; 1 HP.
 - e. Motor Control and Enclosure: LiftMaster LOGIC 4.0 motor control shall be UL approved microprocessor solid-state type and shall include the capability to select one of seven wiring types; additional features shall include a maintenance alert diagnostic system, programmable timer-to-close w/timer defeat input, mid-stop programming capabilities and a maximum run timer to provide motor overrun protection; motor control shall be housed in a NEMA 1 enclosure integral to the operator and shall conform to ANSI/NEMA ICS6.
 - 1) Radio Receiver: LiftMaster LOGIC 4.0 on-board, 3-channel receiver with standard external antenna; equipped to accept Security+ Rolling Code Technology remote transmitters and Trinary Dip Switch remote transmitters, with memory for up to 23 Security+ remote transmitters or an unlimited number of Trinary Dip Switch remote transmitters.
 - f. 3-Button Control Station: 3-button station providing OPEN/CLOSE/STOP functionality shall be NEMA Type 1 with maintenance alert indicator to signal intervals for routine door and operator maintenance.
 - g. Track: Heavy duty, double angle, 11 gauge galvanized steel.

- h. Door Drive: #41 roller chain drive with emergency disconnect for manual door operation.
 - i. Trolley Assembly: 2 inch (51 mm) by 2 inch (51 mm) galvanized steel rails with cast aluminum trolley along with plated steel rail spacers on a nylon chain guide assembly; angle brackets provided for wall mounting.
2. **Primary Entrapment Protection Safety Devices:**
- a. Industrial/Commercial Monitored Photo Sensors: CPS-U fully monitored, non-contact, infrared beam photo sensor system shall reverse, in conjunction with the Logic 4 operator, a closing door to the full open position when an obstruction is sensed; photo sensors shall be mounted no higher than 6 inches (152 mm) maximum above the floor.
 - b. NEMA 4 Monitored Photo Sensors: CPS-UN4 fully monitored, non-contact, infrared beam reversing photo sensor system, with NEMA 4 watertight enclosure shall reverse, in conjunction with the Logic 4 operator, a closing door to the full open position when an obstruction is sensed; photo sensors shall be mounted no higher than 6 inches (152 mm) maximum above the floor.
 - c. Monitored Sensing Edge Interface: CPS-EI edge interface shall provide a means to attach a 4-wire monitored sensing edge to a Logic 4 operator for continuous monitoring purposes; the edge, in conjunction with the Logic 4 operators shall reverse a closing door to the full open position when an obstruction is sensed; sensing edge supplied by others.
3. **Ancillary Entrapment Protection Safety Devices:**
- a. Retro-Reflective Photo Sensors: CPS-RN4 non-monitored, non-contact, infrared beam photo sensor with polarized reflector for use in conjunction with the CPS-EI edge interface and monitored 4-wire sensing edge; shall reverse a closing door to the full open position when an obstruction is sensed; photo sensor shall be mounted no higher than 6 inches (152 mm) maximum above the floor.
 - b. Non-Monitored Electric Sensing Edge: 2-wire non-monitored electric edge shall reverse a closing door to the full open position when an obstruction is sensed
 - c. Pneumatic Sensing Edge: Pneumatic (air hose) sensing edge shall reverse a closing door to the full open position when an obstruction is sensed.

PART 3 EXECUTION

3.1 PREPARATION

- A. Do not proceed with installation until substrates have been properly prepared and deviations from manufacturer's recommended tolerances are corrected.
- B. If preparation is the responsibility of another installer, notify Architect in writing of deviations from manufacturer's recommended installation tolerances and conditions. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions. Commencement of installation constitutes acceptance of conditions.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions and in proper relationship with adjacent construction. Test for proper operation and adjust until satisfactory results are obtained. Demonstrate operation to Owner's personnel.

3.3 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

notes

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