

LiftMaster®



electric gate operators
spec sheets



LiftMaster®

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Electric Gate Operators:
 - 1. Residential/Commercial Light Duty DC swing gate operator. (LiftMaster / Chamberlain / Elite RSW12V RoboSwing)
 - 2. Residential linear swing gate operator. (Chamberlain / LiftMaster LA 400 Series)
 - 3. Residential solar linear swing gate operator. (Chamberlain / LiftMaster LA 412 Series)
 - 4. Residential linear swing gate operator. (LiftMaster / Chamberlain / Elite Miracle-One)
 - 5. Single-family Residential/Commercial Light Duty DC slide gate operator. (LiftMaster / Chamberlain / Elite RSL12V RoboSlide)
 - 6. Residential/medium-duty DC slide gate operator. (Chamberlain / LiftMaster Mega Slide)
 - 7. Commercial AC swing gate operator. (LiftMaster / Chamberlain / Elite CSW200 UL Series)
 - 8. Commercial DC swing gate operator. (Chamberlain / LiftMaster CSW24V Mega Swing)
 - 9. Commercial AC slide gate operator. (LiftMaster / Chamberlain / Elite SL3000UL Series)
 - 10. Emergency access Commercial AC slide gate operator. (Chamberlain / LiftMaster / Elite SL3000ULE Series)
 - 11. Commercial DC slide gate operator. (Chamberlain / LiftMaster CSL24V Mega Slide-X)
 - 12. Commercial overhead door and gate operator. (Chamberlain / LiftMaster / Elite HCT)
 - 13. Heavy-Duty Commercial slide gate operator. (Chamberlain / LiftMaster SL 575)
 - 14. Heavy-Duty Hydraulic slide gate operator. (Chamberlain / LiftMaster HS 670)
 - 15. Industrial slide gate operator. (Chamberlain/ LiftMaster SL 585)
 - 16. Heavy-Duty Industrial slide gate operator. (Chamberlain / LiftMaster SL 595)

1.2 RELATED SECTIONS

- A. Section 02820 - Fences and Gates: Adjoining fences and gates.
- B. Section 03300 - Cast-In-Place Concrete: Concrete mounting pads.
- C. Section 11150 - Parking Control Equipment.
- D. Division 16 - Requirements for electrical connections.

1.3 REFERENCES

- A. National Electrical Manufacturers Association (NEMA): NEMA ICS 6 - Industrial Control and Systems: Enclosures.
- B. Underwriters' Laboratories (UL): UL 325 - Standard for Safety for Door, Drapery, Gate, Louver, and Window Operators and Systems.
- C. Underwriters' Laboratories (UL): UL 991 - Standard for Tests for Safety-Related Controls Employing Solid-State Devices.
- D.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Equipment list, system description, electrical wiring diagrams for installation, and 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.
- C. Shop Drawings: Submit shop drawings showing layout, profiles, and product components, including anchorage, edge conditions, and accessories.
 - 1. Operation, installation, and maintenance manuals including wiring diagrams.
 - 2. Risers, layouts, and special wiring diagrams showing any changes to standard drawings

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging with labels intact until ready for installation.
- B.
- C. Schedule delivery of door operator so that spaces are sufficiently complete that door operators can be installed immediately upon delivery.
- D. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.6 QUALITY ASSURANCE

- A. Perform installation by factory authorized contractor specifically trained in gate operation systems of the type found within this section.
- B. Provide documentation of maintenance and repair service availability for emergency conditions.
- C. Provide quarterly maintenance for one year following Substantial Completion of the Project.

1.7 WARRANTY

- A. Warranty: Manufacturer's standard warranty for two years on electronics and mechanism and 10 years on chassis and cover.
- B. Warranty: Manufacturer's standard warranty for three years on single family residential applications.
- C. Warranty: Manufacturer's standard warranty for seven years on single home applications.
- D. Warranty: Manufacturer's standard warranty of five years for commercial installations.

- E. Warranty: 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.; 845 Larch Avenue, Elmhurst, IL 60126-1196. ASD. 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 RESIDENTIAL SWING GATE OPERATORS

- A. **LiftMaster / Chamberlain / Elite RoboSwing RSW12V Residential Swing Gate Operator:** Residential operator with built-in battery backup for gates up to 400 pounds (181 kg) and up to 16 feet (5 m) in length with a traveling speed of 15 to 17 seconds for a 90 degree opening.
 - 1. **Photo Eye: Chamberlain / LiftMaster CPS-UN4 Thru-beam Photo Eyes;** safety equipment is recommended by UL325 to protect entrapment areas. UL listed to UL325 standards and tested with RoboSwing operators; NEMA 4 rated; 45 ft (13716 mm) sensing distance. Includes sending and receiving eyes, 2 ft (610 mm) cable leads and brackets.
 - 2. **Photo Eye: Chamberlain / LiftMaster 50-220 Thru-beam Photo Eyes;** safety equipment is recommended by UL325 to protect entrapment areas. UL listed to UL325 standards and tested with RoboSwing operators; Weather-resistant; 30 ft (9144 mm) sensing distance. Includes sending and receiving eyes and 2 hood/ brackets.
 - 3. **Loop Detector: Chamberlain / LiftMaster LD7LP Loop Detector;** 10-30VAC/DC power input; 1 Relay; 1 Channel; automatic frequency settings, automatic sensitivity levels; low power current draw; compact size.
 - 4. **Hardware: Chamberlain / LiftMaster Elite Series Power Hinge;** pair, double 5/8 (16 mm) ball bearings for smooth operation; 3/4 inch (19 mm) solid stainless steel shaft; continuous cycle operation, self-lubricating/ no grease fittings; unique design so the gate never hits the post.
 - a. **Powerhinge:** For use on steel gates with steel mounting posts; weight capacity 3,000 lb (1361 kg) per pair.
 - b. **Powerhinge2:** For use on aluminum gates with steel mounting posts; weight capacity 1,000 lb (453 kg) per pair.
 - c. **Powerhinge3:** For use on aluminum gates with aluminum mounting posts; weight capacity 1,000 lb (453 kg) per pair.
 - 5. **Mounting: Chamberlain / LiftMaster 50-19503 Push-to-Open bracket:** Allows the gate to swing out from the property.
 - 6. **Pedestals: MPEL PED42 Pedestal;** 6 inches42 inches (1067 mm) high; mounts to pre-existing concrete pad; 11 gauge steel construction; power coated black; 2 inch x 2 inch (51 mm x 51 mm) square post; faceplate with universal hole pattern. Includes hardware.

7. **UL 312 and UL 991 Listed.**
- B. **Chassis:** 1/4 inch (6 mm) gold yellow zinc dichromate-plated steel chassis.
- C. **Operator Enclosure:** High density polyethylene plastic with a stainless steel access door.
- D. **Operator Motor:** 12V DC motor and plug-in transformer; provides up to 250 operating cycles per day.
- E. **Operator Motor:** 12V DC motor provides for varying number of operating cycles per day, depending on available solar power.
1. **Solar Power Supply:** "Solar-3" 12V power system.
- F. **Battery Backup:** SwingBarrier gate housing shall contain an integral and internally-mounted battery backup system to automatically engage in the event of a power loss and auto-reset to normal operation when power is restored; battery backup shall provide complete operation, up to 50 cycles, of not only the gate operator, but all DC control devices and sensing devices, including all sensing loops, to maintain normal operation of the swing barrier gate system in the event of a power loss; battery charging shall be accomplished by an integral regulated battery management system that maintains proper battery levels to insure no disruption in service in the event of line power failure.
1. **Battery:** Provide 7-amp 12V DC battery.
- G. **Gear Reduction:** Two gear reducers in synthetic oil bath.
- H. **Control Circuit:** Microprocessor (RISC) electronics and solid-state control board; low-voltage control inputs provide for connection of optional external devices including loop detectors, access control systems, and radio receivers.
- I. **Additional Required Controls:**
1. On-board plug in module Internally-mounted 312 HM radio receiver.
2. Inherent obstruction sensing allowing a closing gate to reverse to open and an opening gate to stop, and reverse 2 seconds, and stop again.
3. Automatic Closing Timer: Timer-to-close providing adjustable timer settings between 0 and 60 seconds.
4. Alarm: Activates when moving gate is physically stopped by an obstruction.
- J. **Non-scissor swing aluminum arm designed to be free of pinch points and to bend when at the break point if the gate encounters an obstruction.**
- K. **Equipment:** Provide optional remote controls.
- L. **Heater:** Chamberlain / LiftMaster G6518CSW Self-regulating Heater Coil; keeps operator gearbox and batteries at suitable temperature when outside temperature is below 0 degrees F (-18 degrees C) for extended periods of time. Installs into the frame of the operator.

2.3 RESIDENTIAL LINEAR SWING GATE OPERATOR

A. Chamberlain / LiftMaster LA 400 Residential Linear Gate Operator:

Residential 24V DC linear swing gate operator for single linear actuator arm; for open inside/close outside or open outside/close inside operation of swing gates up to 550 lbs. (250 kg) and lengths to 16 feet (5 m) for each leaf.

1. **Photo Eye: Chamberlain / LiftMaster CPS-UN4 Thru-beam Photo Eyes;** safety equipment is recommended by UL325 to protect entrapment areas. UL listed to UL325 standards and tested with LA 400 operators; NEMA 4 rated; 45 ft (13716 mm) sensing distance. Includes sending and receiving eyes, 2 ft (610 mm) cable leads and brackets.
2. **Photo Eye: Chamberlain / LiftMaster 50-220 Thru-beam Photo Eyes;** safety equipment is recommended by UL325 to protect entrapment areas. UL listed to UL325 standards and tested with LA 400 operators; Weather-resistant; 30 ft (9144 mm) sensing distance. Includes sending and receiving eyes and 2 hood/ brackets.
3. **Loop Detector: Chamberlain / LiftMaster LD7LP Loop Detector;** 10-30VAC/DC power input; 1 Relay; 1 Channel; automatic frequency settings, automatic sensitivity levels; low power current draw; compact size.
4. **Hardware: Chamberlain / LiftMaster Elite Series Power Hinge;** pair, double 5/8 (16 mm) ball bearings for smooth operation; 3/4 inch (19 mm) solid stainless steel shaft; continuous cycle operation, self-lubricating/ no grease fittings; unique design so the gate never hits the post.
 - a. **Powerhinge:** For use on steel gates with steel mounting posts; weight capacity 3,000 lb (1361 kg) per pair.
 - b. **Powerhinge2:** For use on aluminum gates with steel mounting posts; weight capacity 1,000 lb (453 kg) per pair.
 - c. **Powerhinge3:** For use on aluminum gates with aluminum mounting posts; weight capacity 1,000 lb (453 kg) per pair.
5. **Mounting: Chamberlain / LiftMaster 50-19503 Push-to-Open bracket:** Allows the gate to swing out from the property.
6. **Pedestals: PED42 Pedestal;** 42 inches (1067 mm) high; mounts to pre-existing concrete pad; 11 gauge steel construction; power coated black; 2 inch x 2 inch (51 mm x 51 mm) square post; faceplate with universal hole pattern. Includes hardware.

B. Chamberlain / LiftMaster LA 400-CONT Residential Linear Gate Operator:

Residential 24V DC linear swing gate operator for single or double gates (using master/ second package); for open inside/close outside or open outside/close inside operation of swing gates up to 550 lbs. (250 kg) and lengths to 16 feet (5 m) for each leaf.

1. **Photo Eye: Chamberlain / LiftMaster CPS-UN4 Thru-beam Photo Eyes;** safety equipment is recommended by UL325 to protect entrapment areas. UL listed to UL325 standards and tested with LA 400-CONT operators; NEMA 4 rated; 45 ft (13716 mm) sensing distance. Includes sending and receiving eyes, 2 ft (610 mm) cable leads and brackets.
2. **Photo Eye: Chamberlain / LiftMaster 50-220 Thru-beam Photo Eyes;** safety equipment is recommended by UL325 to protect entrapment areas. UL listed to UL325 standards and tested with LA 400-CONT operators; Weather-resistant; 30 ft (9144 mm) sensing distance. Includes sending and receiving eyes and 2 hood/ brackets.
3. **Loop Detector: Chamberlain / LiftMaster LD7LP Loop Detector;** 10-30VAC/DC power

- input; 1 Relay; 1 Channel; automatic frequency settings, automatic sensitivity levels; low power current draw; compact size.
4. **Hardware: Chamberlain / LiftMaster Elite Series Power Hinge;** pair, double 5/8 (16 mm) ball bearings for smooth operation; 3/4 inch (19 mm) solid stainless steel shaft; continuous cycle operation, self-lubricating/ no grease fittings; unique design so the gate never hits the post.
 - a. **Powerhinge:** For use on steel gates with steel mounting posts; weight capacity 3,000 lb (1361 kg) per pair.
 - b. **Powerhinge2:** For use on aluminum gates with steel mounting posts; weight capacity 1,000 lb (453 kg) per pair.
 - c. **Powerhinge3:** For use on aluminum gates with aluminum mounting posts; weight capacity 1,000 lb (453 kg) per pair.
 5. **Mounting: Chamberlain / LiftMaster 50-19503 Push-to-Open bracket:** Allows the gate to swing out from the property.
 6. **Pedestals: PED42 Pedestal; 42 inches (1067 mm) high;** mounts to pre-existing concrete pad; 11 gauge steel construction; power coated black; 2 inch x 2 inch (51 mm x 51 mm) square post; faceplate with universal hole pattern. Includes hardware.
- C. Chamberlain / LiftMaster LA 412-CONT Solar Residential Linear Gate Operator:** Residential 12V Solar DC linear swing gate operator for single or double gates (using master/second package); for open inside/close outside or open outside/close inside operation of swing gates up to 550 lbs. (250 kg) and lengths to 16 feet (5 m) for each leaf.
1. **Photo Eye: Chamberlain / LiftMaster CPS-UN4 Thru-beam Photo Eyes;** safety equipment is recommended by UL325 to protect entrapment areas. UL listed to UL325 standards and tested with LA 400-CONT operators; NEMA 4 rated; 45 ft (13716 mm) sensing distance. Includes sending and receiving eyes, 2 ft (610 mm) cable leads and brackets.
 2. **Photo Eye: Chamberlain / LiftMaster 50-220 Thru-beam Photo Eyes;** safety equipment is recommended by UL325 to protect entrapment areas. UL listed to UL325 standards and tested with LA 400-CONT operators; Weather-resistant; 30 ft (9144 mm) sensing distance. Includes sending and receiving eyes and 2 hood/ brackets.
 3. **Loop Detector: Chamberlain / LiftMaster LD7LP Loop Detector;** 10-30VAC/DC power input; 1 Relay; 1 Channel; automatic frequency settings, automatic sensitivity levels; low power current draw; compact size.
 4. **Hardware: Chamberlain / LiftMaster Elite Series Power Hinge;** pair, double 5/8 (16 mm) ball bearings for smooth operation; 3/4 inch (19 mm) solid stainless steel shaft; continuous cycle operation, self-lubricating/ no grease fittings; unique design so the gate never hits the post.
 - a. **Powerhinge:** For use on steel gates with steel mounting posts; weight capacity 3,000 lb (1361 kg) per pair.
 - b. **Powerhinge2:** For use on aluminum gates with steel mounting posts; weight capacity 1,000 lb (453 kg) per pair.
 - c. **Powerhinge3:** For use on aluminum gates with aluminum mounting posts; weight capacity 1,000 lb (453 kg) per pair.
 5. **Mounting: Chamberlain / LiftMaster 50-19503 Push-to-Open bracket:** Allows the gate to swing out from the property.

- D. **Chamberlain / LiftMaster LA 400-S Residential Linear Gate Operator:** Residential 24V DC linear swing gate operator for master/second applications; second linear actuator arm; junction box and direct burial cable; for open inside/close outside or open outside/close inside operation of swing gates up to 550 lbs. (250 kg) and lengths to 16 feet (5 m) for each leaf.
1. **Photo Eye: Chamberlain / LiftMaster CPS-UN4 Thru-beam Photo Eyes;** safety equipment is recommended by UL325 to protect entrapment areas. UL listed to UL325 standards and tested with LA 400-S operators; NEMA 4 rated; 45 ft (13716 mm) sensing distance. Includes sending and receiving eyes, 2 ft (610 mm) cable leads and brackets.
 2. **Photo Eye: Chamberlain / LiftMaster 50-220 Thru-beam Photo Eyes;** safety equipment is recommended by UL325 to protect entrapment areas. UL listed to UL325 standards and tested with LA 400-S operators; Weather-resistant; 30 ft (9144 mm) sensing distance. Includes sending and receiving eyes and 2 hood/ brackets.
 3. **Loop Detector: Chamberlain / LiftMaster LD7LP Loop Detector;** 10-30VAC/DC power input; 1 Relay; 1 Channel; automatic frequency settings, automatic sensitivity levels; low power current draw; compact size.
 4. **Hardware: Chamberlain / LiftMaster Elite Series Power Hinge;** pair, double 5/8 (16 mm) ball bearings for smooth operation; 3/4 inch (19 mm) solid stainless steel shaft; continuous cycle operation, self-lubricating/ no grease fittings; unique design so the gate never hits the post.
 - a. **Powerhinge:** For use on steel gates with steel mounting posts; weight capacity 3,000 lb (1361 kg) per pair.
 - b. **Powerhinge2:** For use on aluminum gates with steel mounting posts; weight capacity 1,000 lb (453 kg) per pair.
 - c. **Powerhinge3:** For use on aluminum gates with aluminum mounting posts; weight capacity 1,000 lb (453 kg) per pair.
 5. **Mounting: Chamberlain / LiftMaster 50-19503 Push-to-Open bracket:** Allows the gate to swing out from the property.
 6. **Pedestals: PED42 Pedestal;** 42 inches (1067 mm) high; mounts to pre-existing concrete pad; 11 gauge steel construction; power coated black; 2 inch x 2 inch (51 mm x 51 mm) square post; faceplate with universal hole pattern. Includes hardware.
- E. **UL Classification:**
1. Conforms to Class I, when tested in accordance with UL325
 2. Conforms to Class II, when tested in accordance with UL325.
 3. Conforms to Class III, when tested in accordance with UL325.
 4. Conforms to Class IV, when tested in accordance with UL325.
- F. **Operator: Low voltage 24V DC** with variable speed soft start/stop with electronic limit switch system that provides extended gate system life; provides a travel speed of 15 seconds to provide a 90° opening for up to 100 cycles per day; left- or right-hand operation.
- G. **Operator Motor: 12V DC** motor provides for varying number of operating cycles per day, depending on available solar power; left- or right-hand operation.
1. Solar Power Supply: "Solar-3" 12V power system.
- H. **Battery Backup:** The weatherproof control housing shall contain a standard, integral battery backup system to automatically engage in the event of a power loss and auto-reset to normal

operation when power is restored; battery backup shall provide complete operation of the gate operator and all DC control devices and sensing devices, including all sensing loops, to insure proper and expected operation of the barrier gate system in the event of a power loss; battery charging shall be accomplished by an integral regulated battery management system that maintains proper battery levels to insure no disruption in service in the event of line power failure.

1. **Batteries:** Provide two 7-amp 12V DC batteries per gate operator for battery backup power.
- I. **Control Circuit:** Microprocessor electronics and solid-state control board in a weatherproof housing; low-voltage control inputs to provide for connection of a full range of optional external devices including safety loop detector, photocell sensors, telephone entry access systems, access control systems, radio receivers, and a keyed manual disconnect (to provide release and manual operation of the gate in emergency situations); provides LED indication of all input, status, and diagnostic capabilities.
- J. **Additional Required Controls:**
 1. Internally-mounted RF receiver tuned at 315 MHz pre-wired for compatibility with LiftMaster Security+ transmitters.
 2. Inherent obstruction sensing providing separate force adjustments for both open and closed directions, allowing a closing gate to reverse to open and an opening gate to stop.
 3. Timer-to-close providing adjustable timer settings between 0 and 120 seconds which resets upon receiving additional open commands.
 4. Bi-Part latch for dual or double gate applications requiring one leaf to open or close before the other.
- K. **Equipment: Provide the following optional equipment.**
 1. Master/Second option providing a cable extension kit consisting of a direct burial wire, junction box and connecting hardware to provide synchronized movement between two gate operators in a double gate installation at a single entrance.
 2. Solar panel package that allows for operation as an independent unit with the use of a DC adapter and solar panel.
 3. Antenna package including antenna, 15 ft. cable, and mounting hardware for repositioning radio antenna.
 4. Push-to-Open bracket permitting gate to swing out from the property
 5. Remote controls.

2.4 RESIDENTIAL LINEAR SWING GATE OPERATOR

- A. **LiftMaster / Chamberlain / Elite Miracle-One Residential Linear Gate Operator:** Residential 24V DC linear swing gate operator for single or double gates (using master/second package); for open inside/close outside or open outside/close inside operation of swing gates up to 600 lbs. (272 kg) and lengths to 15 feet (4 m) for each leaf.
 1. **Loop Detector: Chamberlain / LiftMaster LD7LP Loop Detector;** 10-30VAC/DC power input; 1 Relay; 1 Channel; automatic frequency settings, automatic sensitivity levels; low power current draw; compact size.

2. **Hardware: Chamberlain / LiftMaster Elite Series Power Hinge;** pair, double 5/8 (16 mm) ball bearings for smooth operation; 3/4 inch (19 mm) solid stainless steel shaft; continuous cycle operation, self-lubricating/ no grease fittings; unique design so the gate never hits the post.
 - a. **Powerhinge:** For use on steel gates with steel mounting posts; weight capacity 3,000 lb (1361 kg) per pair.
 - b. **Powerhinge2:** For use on aluminum gates with steel mounting posts; weight capacity 1,000 lb (453 kg) per pair.
 - c. **Powerhinge3:** For use on aluminum gates with aluminum mounting posts; weight capacity 1,000 lb (453 kg) per pair.
 3. **Locks: Chamberlain / LiftMaster Elite Series MG1300 Magnetic Lock;** provides added security for a gate as it automatically locks and unlocks as the gate is activated to open and close. 12 VDC power input; 1,300 lb (589 kg) holding force. Includes transformer, junction box with knockouts, pivoting armature, mounting plate and hardware. Provide Q240MAU relay module.
 4. **Pedestals: PED42 Pedestal; 42 inches (1067 mm) high;** mounts to pre-existing concrete pad; 11 gauge steel construction; power coated black; 2 inch x 2 inch (51 mm x 51 mm) square post; faceplate with universal hole pattern. Includes hardware.
- B. UL Classification:**
1. Conforms to Class I, when tested in accordance with UL325
 2. Conforms to Class II, when tested in accordance with UL325.
 3. Conforms to Class III, when tested in accordance with UL325.
 4. Conforms to Class IV, when tested in accordance with UL325.
- C. Operator Motor: Low voltage 24V DC** 12 amp motor with variable speed soft start/stop using limit switch system that provides 600 lbs. of operating torque without a positive stop requirement; provides a travel speed of 14 to 18 seconds to provide a 90° opening for up to 100 cycles per day; protection is provided via spike suppressors.
- D. Operator Motor: 12V DC** motor with plug-in transformer; provides up to 70 operating cycles per day.
- E. Operator Motor: 12V DC** motor provides for varying number of operating cycles per day, depending on available solar power.
1. Solar Power Supply: "Solar-3" 12V power system.
- F. Battery Backup:** Weatherproof control housing shall contain a standard, integral battery backup system to automatically engage in the event of a power loss and auto-reset to normal operation when power is restored; battery backup shall provide complete operation of the gate operator for 100-200 cycles and all DC control devices and sensing devices, including all sensing loops, to insure proper and expected operation of the barrier gate system in the event of a power loss; battery charging shall be accomplished by an integral regulated battery management system that maintains proper battery levels to insure no disruption in service in the event of line power failure.
1. **Batteries:** Provide two 7-amp 12V DC batteries per gate operator for battery backup power.

- G. Control Circuit: Microprocessor electronics and solid-state control board in a weatherproof housing; low-voltage control inputs to provide for connection of a full range of optional external devices including safety loop, photocell sensors, telephone entry access systems, and keyed manual disconnect switch operation (to provide release and manual operation of the gate in emergency situations); provides outputs for sensor alarm, alarm system, and magnetic locks; provides LED indication of all input and output functions.
- H. **Additional Required Controls:**
1. Internally-mounted RF receiver tuned at 315 MHz.
 2. Inherent obstruction sensing providing a slight reverse/full stop if an object is contacted while opening or a complete reopen if an object is contacted while closing.
 3. Timer-to-close providing adjustable timer settings between 3 and 60 seconds or push open/stop/close operation.
 4. Integral anti-theft system alarm with external alarm reset button.
- I. **Equipment: Provide the following optional equipment.**
1. Master/Second option providing a cable extension kit consisting of a direct burial wire, junction box and connecting hardware to provide synchronized movement between two gate operators in a double gate installation at a single entrance.
 2. Solar panel package that allows for operation as an independent unit with the use of a DC adapter and solar panel.
 3. Radio receivers.
 4. Remote controls.

2.5 SINGLE FAMILY RESIDENTIAL SLIDE GATE OPERATORS

- A. **LiftMaster / Chamberlain / Elite RSL12V RoboSlide Residential Slide Gate Operator:**
Single family residential operator with built-in battery backup for gates up to 800 pounds (363 kg) and up to 2025 feet (6 m) in length with a traveling speed of up to 911 inches (22979 mm) per second.
1. **Photo Eye: Chamberlain / LiftMaster CPS-UN4 Thru-beam Photo Eyes;** safety equipment is recommended by UL325 to protect entrapment areas. UL listed to UL325 standards and tested with RSLRoboSlide operators; NEMA 4 rated; 45 ft (13716 mm) sensing distance. Includes sending and receiving eyes, 2 ft (610 mm) cable leads and brackets.
 2. **Photo Eye: Chamberlain / LiftMaster 50-220 Thru-beam Photo Eyes;** safety equipment is recommended by UL325 to protect entrapment areas. UL listed to UL325 standards and tested with RSLRoboSlide operators; Weather-resistant; 30 ft (9144 mm) sensing distance. Includes sending and receiving eyes and (2) hood/ brackets.
 3. **Loop Detector: Chamberlain / LiftMaster LD7LP Loop Detector;** 10-30VAC/DC power input; 1 Relay; 1 Channel; automatic frequency settings, automatic sensitivity levels; low power current draw; compact size.
 4. **Hardware: Chamberlain / LiftMaster Elite Series Power Hinge;** pair, double 5/8 (16 mm) ball bearings for smooth operation; 3/4 inch (19 mm) solid stainless steel shaft; continuous cycle operation, self-lubricating/ no grease fittings; unique design so the gate never hits the post.

- a. **Powerhinge:** For use on steel gates with steel mounting posts; weight capacity 3,000 lb (1361 kg) per pair.
 - b. **Powerhinge2:** For use on aluminum gates with steel mounting posts; weight capacity 1,000 lb (453 kg) per pair.
 - c. **Powerhinge3:** For use on aluminum gates with aluminum mounting posts; weight capacity 1,000 lb (453 kg) per pair.
 5. **Mounting:** Chamberlain / LiftMaster MPEL Mounting Plate; for post mounting. Multiple mounting options with 3 inch (76 mm) round or 4 inch (102 mm) square posts.
 6. **Locks:** Chamberlain / LiftMaster Elite Series MG1300 Magnetic Lock; provides added security for a gate as it automatically locks and unlocks as the gate is activated to open and close. 12 VDC power input; 1,300 lb (589 kg) holding force. Includes transformer, junction box with knockouts, pivoting armature, mounting plate and hardware. Provide Q400MAU relay module.
 7. **Locks:** Chamberlain / LiftMaster Elite Series SGLOCK12V Solenoid Lock; provides added security for a gate as it automatically locks and unlocks as the gate is activated to open and close. Low power accessory when used with RSLRoboSlide operators; 3,500 lb (1587 kg) holding force. Fail secure feature keeps the unit locked in the case of a power failure and keyed manual override release for emergencies.
 8. **Heater:** Chamberlain / LiftMaster G6518SL HTRKITRSW Self-regulating Heater Coil; keeps operator gearbox and batteries at suitable temperature when outside temperature is below 0 degrees F (-18 degrees C) for extended periods of time. Installs into the frame of the operator.
 9. **Pedestals:** MPEL PED42 Pedestal; 6 inches42 inches (1067 mm) high; mounts to pre-existing concrete pad; 11 gauge steel construction; power coated black; 2 inch x 2 inch (51 mm x 51 mm) square post; faceplate with universal hole pattern. Includes hardware.
 10. UL 325 and UL 991 Listed
- B. **Chassis:** 1/8 inch (3 mm) yellow gold zinc dichromate -plated steel chassis.
- C. **Operator Enclosure:** High density polyethylene plastic.
- D. **Operator Motor:** 12V DC motor with plug-in transformer; provides up to 12070 operating cycles per day.
- E. **Operator Motor:** 12V DC motor provides for varying number of operating cycles per day, depending on available solar power.
1. Solar Power Supply: "Solar-3" 12V power system.
- F. **Battery Backup:** SlideBarrier gate housing shall contain an integral and internally-mounted battery backup system to automatically engage in the event of a power loss and auto-reset to normal operation when power is restored; battery backup shall provide complete operation, up to 50 cycles, of not only the gate operator, but all DC control devices and sensing devices, including all sensing loops, to maintain normal operation of the slidebarrier gate system in the event of a power loss; battery charging shall be accomplished by an integral regulated battery management system that maintains proper battery levels to insure no disruption in service in the event of line power failure.
1. **Battery:** Provide 7-amp 12V DC battery.

- G. **Gear Reduction:** 1530:1 gear reducer in synthetic oil bath.
- H. **Control Circuit: Microprocessor (RISC) electronics and solid-state control board;** low-voltage control inputs provide for connection of optional external devices including loop detectors, access control systems, and radio receivers.
- I. **Additional Required Controls:**
 - 1. Integrated plug-in module Internally-mounted 312 HM radio receiver.
 - 2. Inherent obstruction sensing allowing a closing gate to reverse to open and an opening gate to stop, and reverse 2 seconds, and stop again.
 - 3. Electronic Shut-off.
 - 4. Automatic Closing Timer: Timer-to-close providing adjustable timer settings between 0 and 60 seconds.
 - 5. Coupling: Provides for smooth gate operation.
 - 6. Alarm: Activates when moving gate is physically stopped by an obstruction.
 - 7. Surge Suppressor: Protects operator from near lightning strikes.
- J. **Equipment: Provide the following optional equipment.**
 - 1. Safety loop system.
 - 2. Remote controls.

2.6 RESIDENTIAL/MEDIUM-DUTY DC SLIDE GATE OPERATORS

- A. **Chamberlain / LiftMaster Mega Slide (MSLDCBB) Slide Gate Operator:**

DC-powered operator with built-in battery backup for gates up to 1000 pounds (454 kg) and up to 32 feet (10 m) in length with a traveling speed of up to 12 inches (305 mm) per second.

 - 1. **Loop Detector: Chamberlain / LiftMaster LD7LP Loop Detector;** 10-30VAC/DC power input; 1 Relay; 1 Channel; automatic frequency settings, automatic sensitivity levels; low power current draw; compact size.
 - 2. **Hardware: Chamberlain / LiftMaster Elite Series Power Wheel;** solid cold-rolled steel; gold zinc plated; continuous cycle operation; maintenance free.
 - a. AH107: 4 inch (102 mm) wheel; 2 pieces; 3,000 lb (1361 kg) weight capacity.
 - b. AH110: 6 inch (152 mm) wheel; 1 piece; 5,000 lb (2268 kg) weight capacity.
 - 3. **Hardware: Chamberlain / LiftMaster Elite Series Wheel Covers; CVRPWST4;** 4 inch (102 mm) wheel cover; 2 pieces wheel covers guard against pinch points to meet ASTM standards and ensure UL325 compliance. Steel construction; power coated black; manufactured exclusively for use with the Power Wheel.
 - 4. **Hardware: Chamberlain / LiftMaster VTRACK V-Track;** 10 ft (3048 mm) length by 4 inch (102 mm) width; unpainted, 12 gauge hot-dipped galvanized steel construction; single piece design, 90 degree rounded angle top; multiple anchoring holes for ease of installation.
 - 5. **Locks: Chamberlain / LiftMaster Elite Series MG1300 Magnetic Lock;** provides added security for a gate as it automatically locks and unlocks as the gate is activated to open and close. 12 VDC power input; 1,300 lb (589 kg) holding force. Includes transformer, junction box with knockouts, pivoting armature, mounting plate and hardware. Provide 912B relay module.

6. **Heater:** Chamberlain / LiftMaster MA201 Thermostat Control Heater; designed to automatically maintain a suitable temperature inside a control enclosure for temperatures below 32 degrees F (0 degrees C).
 7. **Pedestals:** PED42 Pedestal; 42 inches (1067 mm) high; mounts to pre-existing concrete pad; 11 gauge steel construction; power coated black; 2 inch x 2 inch (51 mm x 51 mm) square post; faceplate with universal hole pattern. Includes hardware.
 8. **Pedestals:** PED4272 Dual height Pedestal; 42 and 72 inches high; mounts to pre-existing concrete pad; 11 gauge steel construction; power coated black; 2 inch x 2 inch (51 mm x 51 mm) square post; faceplate with universal hole pattern. Includes hardware.
 9. **Emergency:** Chamberlain / LiftMaster ACP17 Fire Access Box.
- B. **Chassis:** Manufactured from 1/4 inch (6 mm) rustproof T-6 aluminum alloy for superior heat and corrosion resistance; powder-coated.
- C. **Operator Enclosure:** High density polyethylene plastic.
- D. **Operator Motor:** 1/2 HP continuous duty 24VDC operator that provides for up to 6000 operating cycles per day; left- or right-hand operation.
- E. **Battery Backup:** Barrier gate housing shall contain an integral and internally-mounted battery backup system to automatically engage in the event of a power loss and auto-reset to normal operation when power is restored; battery backup shall provide complete operation of not only the gate operator, but all DC control devices and sensing devices, including all sensing loops, to maintain normal operation of the barrier gate system in the event of a power loss; gate(s) open on power failure with a 15 second delay; battery charging shall be accomplished by an integral regulated battery management system that maintains proper battery levels to insure no disruption in service in the event of line power failure.
1. **Batteries:** Provide two 12V DC batteries per gate operator for battery backup power.
- F. **Gear Reduction:** Heavy-duty 10:1 gear reducer in synthetic oil bath.
- G. **Control Circuit:** Microprocessor (RISC) electronics and solid-state control board; low-voltage control inputs provide for connection of optional external devices including loop detectors, telephone entry systems, access control systems, and radio receivers.
- H. **Additional Required Controls:**
1. Internally-mounted 312 HM radio receiver.
 2. Inherent obstruction sensing providing separate force adjustments for both open and closed directions, allowing a closing gate to reverse to open and an opening gate to stop.
 3. Soft start/stop capabilities providing extended gate system life.
 4. Dynamic electronic braking to provide gate position control and ensure consistent gate closing without coasting.
 5. Dual gate operation capabilities to allow two separate gate operators to operate in unison at a single entrance.
 6. Automatic Closing Timer: Timer-to-close providing adjustable timer settings between 1 and 33 seconds.

- I. **Equipment:** Provide the following optional equipment.
1. Sequenced Access Management System providing ability to control a slide gate operator in tandem with a barrier gate operator.
 2. Programmable output relay.
 3. Radio receivers.
 4. Remote controls.
 5. Heater kit:
 - a. 150 watt.
 - b. 500 watt.

2.7 COMMERCIAL SWING GATE OPERATORS

A. **Chamberlain / LiftMaster / Elite CSW200UL High-Traffic Commercial Swing Gate Operator:**

For gates up to 600 lbs. (272 kg) and 18 ft. (5 m) in length with a traveling speed of 13 to 15 seconds for a 90 degree opening.

1. **Loop Detector: Chamberlain / LiftMaster Elite Series AELD Loop Detector;** plug-In detector, no wiring needed. 24VDC power input; 2 Relays; 1 Channel; 4 frequency settings, 2 sensitivity levels with boost feature for high-profile vehicles; designed for and tested with CSW200UL operators.
2. **Hardware: Chamberlain / LiftMaster Elite Series Power Hinge;** pair, double 5/8 (16 mm) ball bearings for smooth operation; 3/4 inch (19 mm) solid stainless steel shaft; continuous cycle operation, self-lubricating/ no grease fittings; unique design so the gate never hits the post.
 - a. **Powerhinge:** For use on steel gates with steel mounting posts; weight capacity 3,000 lb (1361 kg) per pair.
 - b. **Powerhinge2:** For use on aluminum gates with steel mounting posts; weight capacity 1,000 lb (453 kg) per pair.
 - c. **Powerhinge3:** For use on aluminum gates with aluminum mounting posts; weight capacity 1,000 lb (453 kg) per pair.
3. **Mounting: Chamberlain / LiftMaster MPEL Mounting Plate;** for post mounting. Multiple mounting options with 3 inch (76 mm) round or 4 inch (102 mm) square posts.
4. **Locks: Chamberlain / LiftMaster Elite Series MG1300 Magnetic Lock;** provides added security for a gate as it automatically locks and unlocks as the gate is activated to open and close. 12 VDC power input; 1,300 lb (589 kg) holding force. Includes transformer, junction box with knockouts, pivoting armature, mounting plate and hardware. Provide Q400MAU relay module.
5. **Heater: Chamberlain / LiftMaster G6518CSW Self-regulating Heater Coil;** keeps operator gearbox and batteries at suitable temperature when outside temperature is below 0 degrees F (-18 degrees C) for extended periods of time. Installs into the frame of the operator.
6. **Pedestals: MPEL PED42 Pedestal; 6 inches42 inches (1067 mm) high;** mounts to pre-existing concrete pad; 11 gauge steel construction; power coated black; 2 inch x 2 inch (51 mm x 51 mm) square post; faceplate with universal hole pattern. Includes hardware.
7. **Pedestals: PED4272 Dual height Pedestal; 42 and 72 inches high;** mounts to pre-existing concrete pad; 11 gauge steel construction; power coated black; 2 inch x 2 inch (51 mm x 51 mm) square post; faceplate with universal hole pattern. Includes hardware.

B. Chamberlain / LiftMaster / Elite CSW200ULST High-Traffic Commercial Swing Gate

Operator: For gates up to 600 lbs. (272 kg) and 18 ft. (5 m) in length with a traveling speed of 13 to 15 seconds for a 90 degree opening.

1. **Loop Detector: Chamberlain / LiftMaster Elite Series AELD Loop Detector;** plug-In detector, no wiring needed. 24VDC power input; 2 Relays; 1 Channel; 4 frequency settings, 2 sensitivity levels with boost feature for high-profile vehicles; designed for and tested with CSW200ULST operators.
2. **Hardware: Chamberlain / LiftMaster Elite Series Power Hinge;** pair, double 5/8 (16 mm) ball bearings for smooth operation; 3/4 inch (19 mm) solid stainless steel shaft; continuous cycle operation, self-lubricating/ no grease fittings; unique design so the gate never hits the post.
 - a. **Powerhinge:** For use on steel gates with steel mounting posts; weight capacity 3,000 lb (1361 kg) per pair.
 - b. **Powerhinge2:** For use on aluminum gates with steel mounting posts; weight capacity 1,000 lb (453 kg) per pair.
 - c. **Powerhinge3:** For use on aluminum gates with aluminum mounting posts; weight capacity 1,000 lb (453 kg) per pair.
3. **Mounting: Chamberlain / LiftMaster MPEL Mounting Plate;** for post mounting. Multiple mounting options with 3 inch (76 mm) round or 4 inch (102 mm) square posts.
4. **Locks: Chamberlain / LiftMaster Elite Series MG1300 Magnetic Lock;** provides added security for a gate as it automatically locks and unlocks as the gate is activated to open and close. 12 VDC power input; 1,300 lb (589 kg) holding force. Includes transformer, junction box with knockouts, pivoting armature, mounting plate and hardware. Provide Q400MAU relay module.
5. **Heater: Chamberlain / LiftMaster G6518CSW Self-regulating Heater Coil;** keeps operator gearbox and batteries at suitable temperature when outside temperature is below 0 degrees F (-18 degrees C) for extended periods of time. Installs into the frame of the operator.
6. **Pedestals: MPEL PED42 Pedestal; 6 inches42 inches (1067 mm) high;** mounts to pre-existing concrete pad; 11 gauge steel construction; power coated black; 2 inch x 2 inch (51 mm x 51 mm) square post; faceplate with universal hole pattern. Includes hardware.
7. **Pedestals: PED4272 Dual height Pedestal; 42 and 72 inches high;** mounts to pre-existing concrete pad; 11 gauge steel construction; power coated black; 2 inch x 2 inch (51 mm x 51 mm) square post; faceplate with universal hole pattern. Includes hardware.

C. Chamberlain/Elite CSW200ULDM High-Traffic High Temperature Commercial Swing Gate Operator:

High temperature rated, dual motor, commercial slide gate operator for gates up to 800 pounds (363 kg) and 18 feet (5 m) in length with a traveling speed of 13 to 15 seconds for a 90 degree opening.

1. **Loop Detector: Chamberlain / LiftMaster Elite Series AELD Loop Detector;** plug-In detector, no wiring needed. 24VDC power input; 2 Relays; 1 Channel; 4 frequency settings, 2 sensitivity levels with boost feature for high-profile vehicles; designed for and tested with CSW200ULDM operators.
2. **Hardware: Chamberlain / LiftMaster Elite Series Power Hinge;** pair, double 5/8 (16 mm) ball bearings for smooth operation; 3/4 inch (19 mm) solid stainless steel shaft;

continuous cycle operation, self-lubricating/ no grease fittings; unique design so the gate never hits the post.

- a. **Powerhinge:** For use on steel gates with steel mounting posts; weight capacity 3,000 lb (1361 kg) per pair.
- b. **Powerhinge2:** For use on aluminum gates with steel mounting posts; weight capacity 1,000 lb (453 kg) per pair.
- c. **Powerhinge3:** For use on aluminum gates with aluminum mounting posts; weight capacity 1,000 lb (453 kg) per pair.
3. **Mounting: Chamberlain / LiftMaster MPEL Mounting Plate;** for post mounting. Multiple mounting options with 3 inch (76 mm) round or 4 inch (102 mm) square posts.
4. **Locks: Chamberlain / LiftMaster Elite Series MG1300 Magnetic Lock;** provides added security for a gate as it automatically locks and unlocks as the gate is activated to open and close. 12 VDC power input; 1,300 lb (589 kg) holding force. Includes transformer, junction box with knockouts, pivoting armature, mounting plate and hardware. Provide Q400MAU relay module.
5. **Heater: Chamberlain / LiftMaster G6518CSW Self-regulating Heater Coil;** keeps operator gearbox and batteries at suitable temperature when outside temperature is below 0 degrees F (-18 degrees C) for extended periods of time. Installs into the frame of the operator.
6. **Pedestals: MPEL PED42 Pedestal; 6 inches42 inches (1067 mm) high;** mounts to pre-existing concrete pad; 11 gauge steel construction; power coated black; 2 inch x 2 inch (51 mm x 51 mm) square post; faceplate with universal hole pattern. Includes hardware.
7. **Pedestals: PED4272 Dual height Pedestal; 42 and 72 inches high;** mounts to pre-existing concrete pad; 11 gauge steel construction; power coated black; 2 inch x 2 inch (51 mm x 51 mm) square post; faceplate with universal hole pattern. Includes hardware.

D. Chamberlain/Elite CSW200UL1HP Heavy-Duty 1 HP Commercial Swing Gate Operator:

Operator with dual 1/2 HP motors with 250 lbs of pulling torque for gates up to 1000 pounds (454 kg) and 20 feet (6 m) in length with a traveling speed of 13 to 15 seconds for a 90 degree opening.

1. **Loop Detector: Chamberlain / LiftMaster Elite Series AELD Loop Detector;** plug-In detector, no wiring needed. 24VDC power input; 2 Relays; 1 Channel; 4 frequency settings, 2 sensitivity levels with boost feature for high-profile vehicles; designed for and tested with CSW200UL1HP operators.
2. **Hardware: Chamberlain / LiftMaster Elite Series Power Hinge;** pair, double 5/8 (16 mm) ball bearings for smooth operation; 3/4 inch (19 mm) solid stainless steel shaft; continuous cycle operation, self-lubricating/ no grease fittings; unique design so the gate never hits the post.
 - a. **Powerhinge:** For use on steel gates with steel mounting posts; weight capacity 3,000 lb (1361 kg) per pair.
 - b. **Powerhinge2:** For use on aluminum gates with steel mounting posts; weight capacity 1,000 lb (453 kg) per pair.
 - c. **Powerhinge3:** For use on aluminum gates with aluminum mounting posts; weight capacity 1,000 lb (453 kg) per pair.
3. **Mounting: Chamberlain / LiftMaster MPEL Mounting Plate;** for post mounting. Multiple mounting options with 3 inch (76 mm) round or 4 inch (102 mm) square posts.
4. **Locks: Chamberlain / LiftMaster Elite Series MG1300 Magnetic Lock;** provides added

security for a gate as it automatically locks and unlocks as the gate is activated to open and close. 12 VDC power input; 1,300 lb (589 kg) holding force. Includes transformer, junction box with knockouts, pivoting armature, mounting plate and hardware. Provide Q400MAU relay module.

5. **Heater: Chamberlain / LiftMaster G6518CSW Self-regulating Heater Coil;** keeps operator gearbox and batteries at suitable temperature when outside temperature is below 0 degrees F (-18 degrees C) for extended periods of time. Installs into the frame of the operator.
 6. **Pedestals: MPEL PED42 Pedestal; 6 inches42 inches (1067 mm) high;** mounts to pre-existing concrete pad; 11 gauge steel construction; power coated black; 2 inch x 2 inch (51 mm x 51 mm) square post; faceplate with universal hole pattern. Includes hardware.
 7. **Pedestals: PED4272 Dual height Pedestal; 42 and 72 inches high;** mounts to pre-existing concrete pad; 11 gauge steel construction; power coated black; 2 inch x 2 inch (51 mm x 51 mm) square post; faceplate with universal hole pattern. Includes hardware.
- E. **UL Classification:**
1. Conforms to Class I, when tested in accordance with UL325
 2. Conforms to Class II, when tested in accordance with UL325.
 3. Conforms to Class III, when tested in accordance with UL325.
 4. Conforms to Class IV, when tested in accordance with UL325.
- F. **Chassis:** 1/4 inch (6 mm) gold zinc-plated steel chassis.
- G. **Operator Enclosure:**
1. High density polyethylene plastic.
 2. 16-gauge stainless steel.
- H. **Operator Motor:**
1. One 1/2 HP, 4 amp, instant-reversing 120 VAC motor with electrical limit switch system capable of 75 cycles per hour; left- or right-hand mounting.
 2. Two 1/2 hp, 4 amp, instant-reversing 120 VAC motors (one for open, one for close) with electrical limit switch system capable of continuous cycles; left- or right-hand mounting.
 3. Two 1/2 hp gate motors (one for open, one for close) capable of 60 cycles per hour with electrical limit switch system and generating 250 lbs. of pulling torque; left- or right-hand mounting.
- I. **Gear Reduction:** 30:1 gear reduction using worm-gear in synthetic oil bath.
- J. **Control Circuit:** Microprocessor electronics and solid-state control board in a weatherproof housing; low-voltage control inputs to provide for connection of a full range of optional external devices including safety loop, exit loop, photocell sensors, telephone entry access systems, computer attachment, keyed manual disconnect switch operation (to provide release and manual operation of the gate in emergency situations), fire dept. keyed manual disconnect, and 3-button push-button station; provides outputs for sensor alarm, alarm system, and magnetic locks; provides LED indication of all input and output functions; provides modular plug-in loop detector technology for safety and exit loops.

K. Additional Required Controls:

1. Internally-mounted RF receiver tuned at 315 MHz for use with LiftMaster DIP switch, billion code, and Security+ remote controls.
2. Inherent obstruction sensing providing a slight reverse/full stop if an object is contacted while opening or a complete reopen if an object is contacted while closing.
3. Entrapment sensor to temporarily shut off motor for 3 seconds upon contacting an obstruction which causes the operator to labor, followed by a slight reverse of direction away from the obstruction before shutting off the motor again resulting in a full stop of the gate.
4. Soft start/stop capabilities providing extended gate system life.
5. Timer-to-close providing adjustable timer settings between 0 and 60 seconds.
6. On-board 3-push button control for close, stop, and open of gate.
7. Two-stage surge/lightning protection protecting against a lightning strike within a 50-ft radius.
8. Emergency release to manually operate the gate.
9. Dual gate operation capabilities to allow two separate gate operators to operate in unison at a single entrance.
10. Internal alarm to activate whenever the gate encounters an obstruction.
11. Master/Second capability to provide synchronized movement between two gate operators in a double gate installation at a single entrance.

L. Non-scissor swing aluminum arm designed to be free of pinch points and to bend when at the break point if the gate encounters an obstruction.**M. Equipment: Provide the following optional equipment.**

1. **Battery Backup:** An externally mounted battery backup system to automatically engage in the event of a power loss and auto-reset to normal operation when power is restored; battery backup shall provide complete operation of not only the gate operator, but all control and sensing devices, including all sensing loops, to ensure proper and expected operation of the barrier gate system in the event of a power loss; battery charging shall be accomplished by a regulated battery management system that maintains proper battery levels to insure no disruption in service in the event of line power failure.
2. **Heater to keep gearbox at optimum temperature range.**
3. **Integrated, plug-in loop detector modules to create safety and exit loops.**

2.8 COMMERCIAL DC SWING GATE OPERATOR**A. Chamberlain/LiftMaster CSW24V MEGA SWING (Model Number:**

CSW24V MSWDCBB) Swing Gate Operator: DC-powered operator with built-in battery backup for push or pull to open gates up to 600 650 lbs (295 kg) and up to 18 feet (5 m) long for each leaf; traveling speed of up to 12 inches (305 mm) per second 15 to 17 seconds for 90 degree travel.

1. **Loop Detector: Chamberlain / LiftMaster LD7LP Loop Detector;** 10-30VAC/DC power input; 1 Relay; 1 Channel; automatic frequency settings, automatic sensitivity levels; low power current draw; compact size.
2. **Loop Detector: Chamberlain / LiftMaster LOOPDETLM Loop Detector, plug-in module into Expansion control board; No cross talk;** automatic frequency settings, 8 sensitivity

levels; manual frequency override; low power draw, compact size.

3. **Hardware: Chamberlain / LiftMaster Elite Series Power Hinge;** pair, double 5/8 (16 mm) ball bearings for smooth operation; 3/4 inch (19 mm) solid stainless steel shaft; continuous cycle operation, self-lubricating/ no grease fittings; unique design so the gate never hits the post.
 - a. **Powerhinge:** For use on steel gates with steel mounting posts; weight capacity 3,000 lb (1361 kg) per pair.
 - b. **Powerhinge2:** For use on aluminum gates with steel mounting posts; weight capacity 1,000 lb (453 kg) per pair.
 - c. **Powerhinge3:** For use on aluminum gates with aluminum mounting posts; weight capacity 1,000 lb (453 kg) per pair.
4. **Locks: Chamberlain / LiftMaster Elite Series MG1300 Magnetic Lock;** provides added security for a gate as it automatically locks and unlocks as the gate is activated to open and close. 12 VDC power input; 1,300 lb (589 kg) holding force. Includes transformer, junction box with knockouts, pivoting armature, mounting plate and hardware. Provide 912B relay module.
5. **Heater: Chamberlain / LiftMaster UN201 Thermostat Control Heater;** designed to automatically maintain a suitable temperature inside a control enclosure for temperatures below 32 degrees F(0 degrees C).
6. **Pedestals: MPEL PED42 Pedestal; 6 inches42 inches (1067 mm) high;** mounts to pre-existing concrete pad; 11 gauge steel construction; power coated black; 2 inch x 2 inch (51 mm x 51 mm) square post; faceplate with universal hole pattern. Includes hardware.
7. **Pedestals: PED4272 Dual height Pedestal; 42 and 72 inches high;** mounts to pre-existing concrete pad; 11 gauge steel construction; power coated black; 2 inch x 2 inch (51 mm x 51 mm) square post; faceplate with universal hole pattern. Includes hardware.

B. UL Classification:

1. Conforms to Class I, when tested in accordance with UL325. UL 325 and UL 991 Listed Class I, II, III, IV.
2. Conforms to Class II, when tested in accordance with UL325.
3. Conforms to Class III, when tested in accordance with UL325.
4. Conforms to Class IV, when tested in accordance with UL325.

C. Chassis: Manufactured from 1/4 inch (6 mm) steel with yellow zinc dichromate plating.rustproof T-6 aluminum alloy for superior heat and corrosion resistance; powder-coated.

D. Operator Enclosure: High density polyethylene plastic. 2 piece Poly-Carbonate High impact resistance enclosure. Front part of enclosure removable for servicing.

E. Operator Motor: 1/2 HP Continuous Duty 24VDC operator that provides for continuous operating cycles; left- or right-hand operation.

F. Battery Backup: The swing barrier gate housing shall contains an integral and internally-mounted battery backup system to automatically engage in the event of a power loss and auto-reset to normal operation when power is restored (user selectable to battery operation or gates automatically open on loss of AC); battery backup shall provide complete operation of not only the gate operator, but all DC control devices and sensing devices, including all sensing

loops, to maintain normal operation of the swing barrier gate system in the event of a power loss; gate(s) open on power failure when user selected on control board with a 15 second delay; battery charging shall be accomplished by an integral regulated battery management system that maintains proper battery levels to insure no disruption in service in the event of line power failure.

1. **Batteries:** Provide two 7-amp 12V DC batteries per gate operator for battery backup power.
- G. **Gear Reduction:** Heavy-duty 900:1 gear reducer in synthetic oil bath.
- H. **Control Circuit: Microprocessor (RISC) electronics and solid-state control board;** low-voltage control inputs to provide for connection of a full range of optional external devices including loop detectors, access control systems, and radio receivers.
- I. **Additional Required Controls:**
1. Internally-mounted 312 HM radio receiver. Built in Security plus 2.0 radio for extended range
 2. Inherent obstruction sensing providing separate force adjustments for both open and closed directions, allowing a closing gate to reverse to open and an opening gate to stop and reverse 2 seconds.
 3. Soft start/stop capabilities providing extended gate system life.
 4. Dynamic electronic braking to provide gate position control and ensure consistent gate closing without coasting.
 5. Wireless or twisted pair Dual gate operation capabilities to allow two separate gate operators to operate in unison at a single entrance.
 6. Automatic Closing Timer: Timer-to-close providing adjustable timer settings between 1 and 33 90 seconds.
 7. MyQ and Gate Monitor wireless accessory compatible
 8. Dual gate operation 2-wire or wireless control system that provides for the operation of two separate gate operators in unison at a single entrance and also provides the ability to connect accessories to either operator.
 9. Non-scissor swing aluminum arm designed to be free of pinch points and to bend when at the break point if the gate encounters an obstruction.
- J. **Equipment: Provide the following optional equipment.**
1. Sequenced Access Management System providing ability to control a swing gate operator in tandem with a barrier gate operator.
 2. Dual Programmable output Aux relays (when expansion board connected).
 3. Radio receivers.
 4. Remote controls.
 5. Heater model available kit:
 - a. 150 watt.
 - b. 500 watt.

2.9 COMMERCIAL SLIDE GATE OPERATORS

A. Chamberlain/Elite SL3000UL High-Traffic Commercial Slide Gate Operator:

Operator for gates up to 1000 lbs. (454 kg) and 37 ft. (11 m) in length with a traveling speed of up to 12 inches (305 mm) per second.

1. **Loop Detector: Chamberlain / LiftMaster Elite Series AELD Loop Detector;** plug-In detector, no wiring needed. 24VDC power input; 2 Relays; 1 Channel; 4 frequency settings, 2 sensitivity levels with boost feature for high-profile vehicles; designed for and tested with SL3000UL operators.
2. **Hardware: Chamberlain / LiftMaster Elite Series Power Wheel;** solid cold-rolled steel; gold zinc plated; continuous cycle operation; maintenance free.
 - a. AH107: 4 inch (102 mm) wheel; 2 pieces; 3,000 lb (1361 kg) weight capacity.
 - b. AH110: 6 inch (152 mm) wheel; 1 piece; 5,000 lb (2268 kg) weight capacity.
3. **Hardware: Chamberlain / LiftMaster Elite Series Wheel Covers; CVRPWST4;** 4 inch (102 mm) wheel cover; 2 pieces wheel covers guard against pinch points to meet ASTM standards and ensure UL325 compliance. Steel construction; power coated black; manufactured exclusively for use with the Power Wheel.
4. **Hardware: Chamberlain / LiftMaster VTRACK V-Track;** 10 ft (3048 mm) length by 4 inch (102 mm) width; unpainted, 12 gauge hot-dipped galvanized steel construction; single piece design, 90 degree rounded angle top; multiple anchoring holes for ease of installation.
5. **Mounting: Chamberlain / LiftMaster MPEL Mounting Plate;** for post mounting. Multiple mounting options with 3 inch (76 mm) round or 4 inch (102 mm) square posts.
6. **Mounting: Chamberlain / LiftMaster MSEL Steel Stand;** for mounting to concrete pad. Stand height 7.5 inches (190.5 mm).
7. **Locks: Chamberlain / LiftMaster Elite Series MG1300 Magnetic Lock;** provides added security for a gate as it automatically locks and unlocks as the gate is activated to open and close. 12 VDC power input; 1,300 lb (589 kg) holding force. Includes transformer, junction box with knockouts, pivoting armature, mounting plate and hardware. Provide Q400MAU relay module.
8. **Heater: Chamberlain / LiftMaster G6518SL Self-regulating Heater Coil;** keeps operator gearbox and batteries at suitable temperature when outside temperature is below 0 degrees F (-18 degrees C) for extended periods of time. Installs into the frame of the operator.
9. **Pedestals: PED42 Pedestal; 42 inches (1067 mm) high;** mounts to pre-existing concrete pad; 11 gauge steel construction; power coated black; 2 inch x 2 inch (51 mm x 51 mm) square post; faceplate with universal hole pattern. Includes hardware.
10. **Pedestals: MPEL PED42 Pedestal; 6 inches42 inches (1067 mm) high;** mounts to pre-existing concrete pad; 11 gauge steel construction; power coated black; 2 inch x 2 inch (51 mm x 51 mm) square post; faceplate with universal hole pattern. Includes hardware.
11. **Emergency: Chamberlain / LiftMaster ACP17 Fire Access Box.**

B. Chamberlain/Elite SL3000ULD High-Traffic High Temperature Commercial Slide Gate Operator:

High temperature rated, dual motor, commercial slide gate operator for gates up to 800 pounds (363 kg) and 37 feet (11 m) in length with a traveling speed of up to 12 inches (305 mm) per second.

1. **Loop Detector: Chamberlain / LiftMaster Elite Series AELD Loop Detector;** plug-In detector, no wiring needed. 24VDC power input; 2 Relays; 1 Channel; 4 frequency settings, 2 sensitivity levels with boost feature for high-profile vehicles; designed for and tested with SL3000ULDM operators.
 2. **Hardware: Chamberlain / LiftMaster Elite Series Power Wheel;** solid cold-rolled steel; gold zinc plated; continuous cycle operation; maintenance free.
 - a. AH107: 4 inch (102 mm) wheel; 2 pieces; 3,000 lb (1361 kg) weight capacity.
 - b. AH110: 6 inch (152 mm) wheel; 1 piece; 5,000 lb (2268 kg) weight capacity.
 3. **Hardware: Chamberlain / LiftMaster Elite Series Wheel Covers; CVRPWST4;** 4 inch (102 mm) wheel cover; 2 pieces wheel covers guard against pinch points to meet ASTM standards and ensure UL325 compliance. Steel construction; power coated black; manufactured exclusively for use with the Power Wheel.
 4. **Hardware: Chamberlain / LiftMaster VTRACK V-Track;** 10 ft (3048 mm) length by 4 inch (102 mm) width; unpainted, 12 gauge hot-dipped galvanized steel construction; single piece design, 90 degree rounded angle top; multiple anchoring holes for ease of installation.
 5. **Mounting: Chamberlain / LiftMaster MPEL Mounting Plate;** for post mounting. Multiple mounting options with 3 inch (76 mm) round or 4 inch (102 mm) square posts.
 6. **Mounting: Chamberlain / LiftMaster MSEL Steel Stand;** for mounting to concrete pad. Stand height 7.5 inches (190.5 mm).
 7. **Locks: Chamberlain / LiftMaster Elite Series MG1300 Magnetic Lock;** provides added security for a gate as it automatically locks and unlocks as the gate is activated to open and close. 12 VDC power input; 1,300 lb (589 kg) holding force. Includes transformer, junction box with knockouts, pivoting armature, mounting plate and hardware. Provide Q400MAU relay module.
 8. **Heater: Chamberlain / LiftMaster G6518SL Self-regulating Heater Coil;** keeps operator gearbox and batteries at suitable temperature when outside temperature is below 0 degrees F (-18 degrees C) for extended periods of time. Installs into the frame of the operator.
 9. **Pedestals: MPEL PED42 Pedestal;** 6 inches42 inches (1067 mm) high; mounts to pre-existing concrete pad; 11 gauge steel construction; power coated black; 2 inch x 2 inch (51 mm x 51 mm) square post; faceplate with universal hole pattern. Includes hardware.
 10. **Pedestals: PED4272 Dual height Pedestal;** 42 and 72 inches high; mounts to pre-existing concrete pad; 11 gauge steel construction; power coated black; 2 inch x 2 inch (51 mm x 51 mm) square post; faceplate with universal hole pattern. Includes hardware.
 11. **Emergency: Chamberlain / LiftMaster ACP17 Fire Access Box.**
- C. Chamberlain/Elite SL3000UL1HP Heavy-Duty 1 HP Commercial Swing Gate Operator:** Operator with dual 1/2 HP motors with 210 lbs of pulling torque for gates up to 2000 pounds (907 kg) and 37 feet (11 m) in length.
1. **Loop Detector: Chamberlain / LiftMaster Elite Series AELD Loop Detector;** plug-In detector, no wiring needed. 24VDC power input; 2 Relays; 1 Channel; 4 frequency settings, 2 sensitivity levels with boost feature for high-profile vehicles; designed for and tested with SL3000UL1HP operators.
 2. **Hardware: Chamberlain / LiftMaster Elite Series Power Wheel;** solid cold-rolled steel; gold zinc plated; continuous cycle operation; maintenance free.
 - a. AH107: 4 inch (102 mm) wheel; 2 pieces; 3,000 lb (1361 kg) weight capacity.

- b. AH110: 6 inch (152 mm) wheel; 1 piece; 5,000 lb (2268 kg) weight capacity.
 - 3. **Hardware: Chamberlain / LiftMaster Elite Series Wheel Covers; CVRPWST4;** 4 inch (102 mm) wheel cover; 2 pieces wheel covers guard against pinch points to meet ASTM standards and ensure UL325 compliance. Steel construction; power coated black; manufactured exclusively for use with the Power Wheel.
 - 4. **Hardware: Chamberlain / LiftMaster VTRACK V-Track;** 10 ft (3048 mm) length by 4 inch (102 mm) width; unpainted, 12 gauge hot-dipped galvanized steel construction; single piece design, 90 degree rounded angle top; multiple anchoring holes for ease of installation.
 - 5. **Mounting: Chamberlain / LiftMaster MPEL Mounting Plate;** for post mounting. Multiple mounting options with 3 inch (76 mm) round or 4 inch (102 mm) square posts.
 - 6. **Mounting: Chamberlain / LiftMaster MSEL Steel Stand;** for mounting to concrete pad. Stand height 7.5 inches (190.5 mm).
 - 7. **Locks: Chamberlain / LiftMaster Elite Series MG1300 Magnetic Lock;** provides added security for a gate as it automatically locks and unlocks as the gate is activated to open and close. 12 VDC power input; 1,300 lb (589 kg) holding force. Includes transformer, junction box with knockouts, pivoting armature, mounting plate and hardware. Provide Q400MAU relay module.
 - 8. **Heater: Chamberlain / LiftMaster G6518SL Self-regulating Heater Coil;** keeps operator gearbox and batteries at suitable temperature when outside temperature is below 0 degrees F (-18 degrees C) for extended periods of time. Installs into the frame of the operator.
 - 9. **Pedestals: MPEL PED42 Pedestal; 6 inches42 inches (1067 mm) high;** mounts to pre-existing concrete pad; 11 gauge steel construction; power coated black; 2 inch x 2 inch (51 mm x 51 mm) square post; faceplate with universal hole pattern. Includes hardware.
 - 10. **Pedestals: PED4272 Dual height Pedestal; 42 and 72 inches high;** mounts to pre-existing concrete pad; 11 gauge steel construction; power coated black; 2 inch x 2 inch (51 mm x 51 mm) square post; faceplate with universal hole pattern. Includes hardware.
 - 11. **Emergency: Chamberlain / LiftMaster ACP17 Fire Access Box.**
- D. **UL Classification:**
- 1. Conforms to Class I, when tested in accordance with UL325
 - 2. Conforms to Class II, when tested in accordance with UL325.
 - 3. Conforms to Class III, when tested in accordance with UL325.
 - 4. Conforms to Class IV, when tested in accordance with UL325.
- E. **Chassis:** 1/4 inch (6 mm) gold zinc-plated steel chassis.
- F. **Operator Enclosure:** High density polyethylene plastic.
- G. **Operator Motor:**
- 1. One 1/2 HP instant reversing 120VAC continuous duty gear-driven motor.
 - 2. Two 1/2 HP instant reversing 120VAC continuous duty gear-driven motors. One motor opens the gate, the other motor closes the gate.
 - 3. Two 1/2 HP parking gate gear-driven motors that work together equaling 1 HP. Capable of 35 cycles per hour.

- H. **Gear Reduction:** 30:1 gear reduction using worm-gear in synthetic oil bath with a solenoid-activated brake system that prevents back-driving.
- I. **Control Circuit:** OmniControl solid-state control board; low-voltage control inputs to provide for connection of a full range of optional external devices including loop detectors, access control systems, and radio receivers.
 - 1. An adjustable timer (0-60 seconds) shall be integral to the control board to permit automatic gate closing; timer deactivation shall also be available to permit push open/close gate operation.
 - 2. The board shall provide inputs for exit loop, center loop, and safety loop detectors.
 - 3. Alarm reset button shall instantly reset the built-in safety alarm siren on the operator, allowing normal function without waiting for the alarm status to time out.
- J. **Additional Required Controls:**
 - 1. Soft stop capabilities providing a more accurate gate cycle.
 - 2. Factory installed 412HM radio receiver.
 - 3. Inherent obstruction sensing providing separate, single force adjustments for both open and closed directions, allowing a closing gate to reverse to the opposite limit and stop when encountering an obstruction.
 - 4. Surge/lightning protection against lightning strike within a 50 foot (15 m) radius.
 - 5. Maglock control relay to activate and deactivate an optional magnetic lock for securing the gate.
 - 6. UL 325-compliant entrapment warning alarm system providing ability to offer a warning tone which begins 3-seconds prior to gate movement and continues during gate operation.
 - 7. Loop detector inputs allowing for the connection of exit, shadow, and interrupt loop detectors.
 - 8. Dual gate operation 2-wire control system that provides for the operation of two separate gate operators in unison at a single entrance and also provides the ability to connect accessories to either operator.
 - 9. Automatic Closing Timer: Timer-to-close providing adjustable timer settings between 1 and 180 seconds which resets upon receiving any additional open commands.
- K. **Mounting:** Left- or right-hand mounting capabilities to provide flexibility in determining orientation of operator either prior to or during installation.
- L. **Electronic Motor Disconnect:** Prevents operation of the motor while under manual operation.
- M. **Accessory Power:** 120 V AC power receptacle (NEMA 5-15).
- N. **Equipment: Provide the following optional equipment.**
 - 1. Gearbox heater.
 - 2. Power Backup: Model DC2000.
 - 3. Integrated loop detector.
 - 4. Post mounting plate.
 - 5. Quick Close Circuit: Gate control to deter unauthorized vehicle entry.
 - 6. Power Wheels:

- a. 4 inch (102 mm).
- b. 5 inch (127 mm).
- c. 6 inch (152 mm).
- d. Cold-rolled, heat treated steel.
- e. Gold zinc-plated.

2.10 EMERGENCY ACCESS SLIDE GATE OPERATORS

A. Chamberlain/Elite SL3000ULE3:

High-traffic commercial slide gate operator with emergency access, for gates up to 1000 lbs. (454 kg) and 37 ft. (11 m) in length with a traveling speed of up to 12 inches (305 mm) per second.

1. **Loop Detector: Chamberlain / LiftMaster Elite Series AELD Loop Detector;** plug-In detector, no wiring needed. 24VDC power input; 2 Relays; 1 Channel; 4 frequency settings, 2 sensitivity levels with boost feature for high-profile vehicles; designed for and tested with SL3000ULE3 operators.
2. **Hardware: Chamberlain / LiftMaster Elite Series Power Wheel; solid cold-rolled steel;** gold zinc plated; continuous cycle operation; maintenance free.
 - a. AH107: 4 inch (102 mm) wheel; 2 pieces; 3,000 lb (1361 kg) weight capacity.
 - b. AH110: 6 inch (152 mm) wheel; 1 piece; 5,000 lb (2268 kg) weight capacity.
3. **Hardware: Chamberlain / LiftMaster Elite Series Wheel Covers; CVRPWST4;** 4 inch (102 mm) wheel cover; 2 pieces wheel covers guard against pinch points to meet ASTM standards and ensure UL325 compliance. Steel construction; power coated black; manufactured exclusively for use with the Power Wheel.
4. **Hardware: Chamberlain / LiftMaster VTRACK V-Track;** 10 ft (3048 mm) length by 4 inch (102 mm) width; unpainted, 12 gauge hot-dipped galvanized steel construction; single piece design, 90 degree rounded angle top; multiple anchoring holes for ease of installation.
5. **Mounting: Chamberlain / LiftMaster MPEL Mounting Plate;** for post mounting. Multiple mounting options with 3 inch (76 mm) round or 4 inch (102 mm) square posts.
6. **Mounting: Chamberlain / LiftMaster MSEL Steel Stand;** for mounting to concrete pad. Stand height 7.5 inches (190.5 mm).
7. **Locks: Chamberlain / LiftMaster Elite Series MG1300 Magnetic Lock;** provides added security for a gate as it automatically locks and unlocks as the gate is activated to open and close. 12 VDC power input; 1,300 lb (589 kg) holding force. Includes transformer, junction box with knockouts, pivoting armature, mounting plate and hardware. Provide Q400MAU relay module.
8. **Heater: Chamberlain / LiftMaster G6518SL Self-regulating Heater Coil;** keeps operator gearbox and batteries at suitable temperature when outside temperature is below 0 degrees F (-18 degrees C) for extended periods of time. Installs into the frame of the operator.
9. **Pedestals: MPEL PED42 Pedestal;** 6 inches 42 inches (1067 mm) high; mounts to pre-existing concrete pad; 11 gauge steel construction; power coated black; 2 inch x 2 inch (51 mm x 51 mm) square post; faceplate with universal hole pattern. Includes hardware.
10. **Pedestals: PED4272 Dual height Pedestal;** 42 and 72 inches high; mounts to pre-existing concrete pad; 11 gauge steel construction; power coated black; 2 inch x 2 inch (51 mm x 51 mm) square post; faceplate with universal hole pattern. Includes hardware.

11. **Emergency: Chamberlain / LiftMaster ACP17 Fire Access Box.**

B. Chamberlain/Elite SL3000ULDCE3:

High temperature rated, dual motor, commercial slide gate operator with emergency access, for gates up to 800 pounds (363 kg) and 37 feet (11 m) in length with a traveling speed of up to 12 inches (305 mm) per second.

1. **Loop Detector: Chamberlain / LiftMaster Elite Series AELD Loop Detector;** plug-In detector, no wiring needed. 24VDC power input; 2 Relays; 1 Channel; 4 frequency settings, 2 sensitivity levels with boost feature for high-profile vehicles; designed for and tested with SL3000ULDCE3 operators.
2. **Hardware: Chamberlain / LiftMaster Elite Series Power Wheel;** solid cold-rolled steel; gold zinc plated; continuous cycle operation; maintenance free.
 - a. AH107: 4 inch (102 mm) wheel; 2 pieces; 3,000 lb (1361 kg) weight capacity.
 - b. AH110: 6 inch (152 mm) wheel; 1 piece; 5,000 lb (2268 kg) weight capacity.
3. **Hardware: Chamberlain / LiftMaster Elite Series Wheel Covers; CVRPWST4;** 4 inch (102 mm) wheel cover; 2 pieces wheel covers guard against pinch points to meet ASTM standards and ensure UL325 compliance. Steel construction; power coated black; manufactured exclusively for use with the Power Wheel.
4. **Hardware: Chamberlain / LiftMaster VTRACK V-Track;** 10 ft (3048 mm) length by 4 inch (102 mm) width; unpainted, 12 gauge hot-dipped galvanized steel construction; single piece design, 90 degree rounded angle top; multiple anchoring holes for ease of installation.
5. **Mounting: Chamberlain / LiftMaster MPEL Mounting Plate;** for post mounting. Multiple mounting options with 3 inch (76 mm) round or 4 inch (102 mm) square posts.
6. **Mounting: Chamberlain / LiftMaster MSEL Steel Stand;** for mounting to concrete pad. Stand height 7.5 inches (190.5 mm).
7. **Locks: Chamberlain / LiftMaster Elite Series MG1300 Magnetic Lock;** provides added security for a gate as it automatically locks and unlocks as the gate is activated to open and close. 12 VDC power input; 1,300 lb (589 kg) holding force. Includes transformer, junction box with knockouts, pivoting armature, mounting plate and hardware. Provide Q400MAU relay module.
8. **Heater: Chamberlain / LiftMaster G6518SL Self-regulating Heater Coil;** keeps operator gearbox and batteries at suitable temperature when outside temperature is below 0 degrees F (-18 degrees C) for extended periods of time. Installs into the frame of the operator.
9. **Pedestals: MPEL PED42 Pedestal;** 6 inches42 inches (1067 mm) high; mounts to pre-existing concrete pad; 11 gauge steel construction; power coated black; 2 inch x 2 inch (51 mm x 51 mm) square post; faceplate with universal hole pattern. Includes hardware.
10. **Pedestals: PED4272 Dual height Pedestal;** 42 and 72 inches high; mounts to pre-existing concrete pad; 11 gauge steel construction; power coated black; 2 inch x 2 inch (51 mm x 51 mm) square post; faceplate with universal hole pattern. Includes hardware.
11. **Emergency: Chamberlain / LiftMaster ACP17 Fire Access Box.**

C. Chamberlain/Elite SL3000UL1HPE3: Operator with emergency access with dual 1/2 HP motors with 210 lbs of pulling torque for gates up to 2000 pounds (907 kg) and 37 feet (11 m) in length.

1. **Loop Detector: Chamberlain / LiftMaster Elite Series AELD Loop Detector;** plug-

In detector, no wiring needed. 24VDC power input; 2 Relays; 1 Channel; 4 frequency settings, 2 sensitivity levels with boost feature for high-profile vehicles; designed for and tested with SL3000UL1HPE3 operators.

2. **Hardware: Chamberlain / LiftMaster Elite Series Power Wheel;** solid cold-rolled steel; gold zinc plated; continuous cycle operation; maintenance free.
 - a. AH107: 4 inch (102 mm) wheel; 2 pieces; 3,000 lb (1361 kg) weight capacity.
 - b. AH110: 6 inch (152 mm) wheel; 1 piece; 5,000 lb (2268 kg) weight capacity.
3. **Hardware: Chamberlain / LiftMaster Elite Series Wheel Covers; CVRPWST4;** 4 inch (102 mm) wheel cover; 2 pieces wheel covers guard against pinch points to meet ASTM standards and ensure UL325 compliance. Steel construction; power coated black; manufactured exclusively for use with the Power Wheel.
4. **Hardware: Chamberlain / LiftMaster VTRACK V-Track;** 10 ft (3048 mm) length by 4 inch (102 mm) width; unpainted, 12 gauge hot-dipped galvanized steel construction; single piece design, 90 degree rounded angle top; multiple anchoring holes for ease of installation.
5. **Mounting: Chamberlain / LiftMaster MPEL Mounting Plate;** for post mounting. Multiple mounting options with 3 inch (76 mm) round or 4 inch (102 mm) square posts.
6. **Mounting: Chamberlain / LiftMaster MSEL Steel Stand;** for mounting to concrete pad. Stand height 7.5 inches (190.5 mm).
7. **Locks: Chamberlain / LiftMaster Elite Series MG1300 Magnetic Lock;** provides added security for a gate as it automatically locks and unlocks as the gate is activated to open and close. 12 VDC power input; 1,300 lb (589 kg) holding force. Includes transformer, junction box with knockouts, pivoting armature, mounting plate and hardware. Provide Q400MAU relay module.
8. **Heater: Chamberlain / LiftMaster G6518SL Self-regulating Heater Coil;** keeps operator gearbox and batteries at suitable temperature when outside temperature is below 0 degrees F (-18 degrees C) for extended periods of time. Installs into the frame of the operator.
9. **Pedestals: MPEL PED42 Pedestal; 6 inches42 inches (1067 mm) high;** mounts to pre-existing concrete pad; 11 gauge steel construction; power coated black; 2 inch x 2 inch (51 mm x 51 mm) square post; faceplate with universal hole pattern. Includes hardware.
10. **Pedestals: PED4272 Dual height Pedestal;** 42 and 72 inches high; mounts to pre-existing concrete pad; 11 gauge steel construction; power coated black; 2 inch x 2 inch (51 mm x 51 mm) square post; faceplate with universal hole pattern. Includes hardware.
11. **Emergency: Chamberlain / LiftMaster ACP17 Fire Access Box.**

D. UL Classification:

1. Conforms to Class I, when tested in accordance with UL325
2. Conforms to Class II, when tested in accordance with UL325.
3. Conforms to Class III, when tested in accordance with UL325.
4. Conforms to Class IV, when tested in accordance with UL325.

E. Chassis: 1/4 inch (6 mm) gold zinc-plated steel chassis.

F. Operator Enclosure: High density polyethylene plastic.

G. Operator Motor:

1. One 1/2 HP instant reversing 120VAC continuous duty gear-driven motor. Motor shall be able to be back-driven manually for emergency access during a power outage. Locate an emergency release button that disconnects and resets the operator on front cover of the gate operator.
2. Two 1/2 HP instant reversing 120VAC continuous duty gear-driven motors. One motor opens the gate, the other motor closes the gate. Motor shall be able to be back-driven manually for emergency access during a power outage. Locate an emergency release button that disconnects and resets the operator on front cover of the gate operator.
3. Two 1/2 HP parking gate gear-driven motors that work together equaling 1 HP. Capable of 35 cycles per hour. Motor shall be able to be back-driven manually for emergency access during a power outage. Locate an emergency release button that disconnects and resets the operator on front cover of the gate operator.

H. Gear Reduction: 30:1 gear reduction using worm-gear in synthetic oil bath with a solenoid-activated brake system that prevents back-driving.**I. Control Circuit:** OmniControl solid-state control board; low-voltage control inputs to provide for connection of a full range of optional external devices including loop detectors, access control systems, and radio receivers.

1. An adjustable timer (0-60 seconds) shall be integral to the control board to permit automatic gate closing; timer deactivation shall also be available to permit push open/close gate operation.
2. The board shall provide inputs for exit loop, center loop, and safety loop detectors.
3. Alarm reset button shall instantly reset the built-in safety alarm siren on the operator, allowing normal function without waiting for the alarm status to time out.

J. Additional Required Controls:

1. Soft stop capabilities providing a more accurate gate cycle.
2. Factory installed 412HM radio receiver.
3. Inherent obstruction sensing providing separate, single force adjustments for both open and closed directions, allowing a closing gate to reverse to the opposite limit and stop when encountering an obstruction.
4. Surge/lightning protection against lightning strike within a 50 ft. (15 m) radius.
5. Maglock control relay to activate and deactivate an optional magnetic lock for securing the gate.
6. UL 325-compliant entrapment warning alarm system providing ability to offer a warning tone which begins 3-seconds prior to gate movement and continues during gate operation.
7. Loop detector inputs allowing for the connection of exit, shadow, and interrupt loop detectors.
8. Dual gate operation 2-wire control system that provides for the operation of two separate gate operators in unison at a single entrance and also provides the ability to connect accessories to either operator.
9. Automatic Closing Timer: Timer-to-close providing adjustable timer settings between 1 and 180 seconds which resets upon receiving any additional open commands.

- K. **Mounting:** Capabilities to provide flexibility in determining orientation of operator either prior to or during installation.
- L. **Electronic Motor Disconnect:** Prevents operation of the motor while under manual operation.
- M. **Accessory Power:** 120 V AC power receptacle (NEMA 5-15).
- N. **Equipment:** Provide the following optional equipment.
 - 1. Gearbox heater.
 - 2. Power Backup: Model DC2000.
 - 3. Integrated loop detector.
 - 4. Post mounting plate.
 - 5. Quick Close Circuit: Gate control to deter unauthorized vehicle entry.
 - 6. Power Wheels:
 - a. 4 inch (102 mm).
 - b. 5 inch (127 mm).
 - c. 6 inch (152 mm).
 - d. Cold-rolled, heat treated steel.
 - e. Gold zinc-plated.

2.11 COMMERCIAL DC SLIDE GATE OPERATORS

- A. **Chamberlain/LiftMaster CSL24V Mega Slide-X (MSLX) Slide Gate Operator:**
DC-powered operator with built-in battery backup for gates up to 15001000 pounds (454 kg) and up to 50 32 feet (10 16 m) in length with a traveling speed of up to 12 inches (305 mm) per second.
 - 1. **Loop Detector: Chamberlain / LiftMaster LD7LP Loop Detector;** 10-30VAC/DC power input; 1 Relay; 1 Channel; automatic frequency settings, automatic sensitivity levels; low power current draw; compact size.
 - 2. **Loop Detector: Chamberlain / LiftMaster LOOPDETLT Loop Detector, plug-in module into Expansion control board;** No cross talk; automatic frequency settings, 8 sensitivity levels; manual frequency override; low power draw, compact size.
 - 3. **Hardware: Chamberlain / LiftMaster Elite Series Power Wheel;** solid cold-rolled steel; gold zinc plated; continuous cycle operation; maintenance free.
 - a. AH107: 4 inch (102 mm) wheel; 2 pieces; 3,000 lb (1361 kg) weight capacity.
 - b. AH110: 6 inch (152 mm) wheel; 1 piece; 5,000 lb (2268 kg) weight capacity.
 - 4. **Hardware: Chamberlain / LiftMaster Elite Series Wheel Covers; CVRPWST4;** 4 inch (102 mm) wheel cover; 2 pieces wheel covers guard against pinch points to meet ASTM standards and ensure UL325 compliance. Steel construction; power coated black; manufactured exclusively for use with the Power Wheel.
 - 5. **Hardware: Chamberlain / LiftMaster VTRACK V-Track;** 10 ft (3048 mm) length by 4 inch (102 mm) width; unpainted, 12 gauge hot-dipped galvanized steel construction; single piece design, 90 degree rounded angle top; multiple anchoring holes for ease of installation.
 - 6. **Locks: Chamberlain / LiftMaster Elite Series MG1300 Magnetic Lock;** provides added security for a gate as it automatically locks and unlocks as the gate is activated to open and close. 12 VDC power input; 1,300 lb (589 kg) holding force. Includes transformer,

junction box with knockouts, pivoting armature, mounting plate and hardware. Provide 912B relay module.

7. Heater: Chamberlain / LiftMaster MA201 Thermostat Control Heater; designed to automatically maintain a suitable temperature inside a control enclosure for temperatures below 32 degrees F (0 degrees C).
 8. Pedestals: MPEL PED42 Pedestal; 6 inches 42 inches (1067 mm) high; mounts to pre-existing concrete pad; 11 gauge steel construction; power coated black; 2 inch x 2 inch (51 mm x 51 mm) square post; faceplate with universal hole pattern. Includes hardware.
 9. Pedestals: PED4272 Dual height Pedestal; 42 and 72 inches high; mounts to pre-existing concrete pad; 11 gauge steel construction; power coated black; 2 inch x 2 inch (51 mm x 51 mm) square post; faceplate with universal hole pattern. Includes hardware.
 10. Emergency: Chamberlain / LiftMaster ACP17 Fire Access Box.
- B. UL Classification:**
UL 325 and UL 991 Listed Class I, II, III, IV.
- C. Chassis:** Powder-coated 1/4 inch (6 mm) gold yellow zinc dichromate-plated steel chassis.
- D. Operator Enclosure:** 2 piece Poly-Carbonate High impact resistance enclosure. Front part of enclosure removable for servicing. High density polyethylene plastic.
- E. Operator Motor:** 1/2 HP continuous duty 24VDC operator that provides for continuous operating cycles; left- or right-hand operation.
- F. The slide barrier gate housing shall** contains an integral and internally-mounted battery backup system to automatically engage in the event of a power loss and auto-reset to normal operation when power is restored (user selectable to battery operation or gates automatically open on loss of AC); battery backup shall provide complete operation of not only the gate operator, but all DC control devices and sensing devices, including all sensing loops, to maintain normal operation of the slide barrier gate system in the event of a power loss; gate(s) open on power failure when user selected on control board with a 15 second delay; battery charging shall be accomplished by an integral regulated battery management system that maintains proper battery levels to insure no disruption in service in the event of line power failure.
1. **Batteries:** Provide two 7-amp 12V DC batteries per gate operator for battery backup power.
- G. Gear Reduction:** Heavy-duty size 60 gear reducer in synthetic oil bath.
- H. Control Circuit: Microprocessor (RISC) electronics and solid-state control board;** low-voltage control inputs provide for connection of optional external devices including loop detectors, telephone entry systems, access control systems, and radio receivers.
- I. Additional Required Controls:**
1. Internally-mounted 312 HM radio receiver. Built in Security plus 2.0 radio for extended range
 2. Inherent obstruction sensing providing separate force adjustments for both open and

closed directions, allowing a closing gate to reverse to open and an opening gate to stop and reverse 2 seconds.

3. Soft start/stop capabilities providing extended gate system life.
4. Dynamic electronic braking to provide gate position control and ensure consistent gate closing without coasting.
5. Wireless or twisted pair Dual gate operation capabilities to allow two separate gate operators to operate in unison at a single entrance.
6. Automatic Closing Timer: Timer-to-close providing adjustable timer settings between 1 and 33 90 seconds.
7. LiftMaster Internet Gateway and Gate Monitor wireless accessory compatible.
8. Dual gate operation 2-wire or wireless control system that provides for the operation of two separate gate operators in unison at a single entrance and also provides the ability to connect accessories to either operator.

J. Equipment: Provide the following optional equipment.

1. Sequenced Access Management System providing ability to control a slide gate operator in tandem with a barrier gate operator.
2. Dual Programmable output Aux relays (when expansion board connected).
3. Radio receivers.
4. Remote controls.
5. Heater model available kit:
 - a. 150 watt.
 - b. 500 watt.

2.12 COMMERCIAL OVERHEAD DOOR AND GATE OPERATORS

A. Chamberlain/Elite HCT Commercial Overhead Door and Gate Operator:

High-traffic, heavy-duty DC-powered operator with built-in electronic reversing device.

1. **Photo Eye: Chamberlain / LiftMaster CPS-N4 Thru-beam Photo Eyes;** safety equipment is recommended by UL325 to protect entrapment areas. UL listed to UL325 standards and tested with HCT operators; NEMA 4 rated; 45 ft (13716 mm) sensing distance. Includes sending and receiving eyes, 2 ft (610 mm) cable leads and brackets.
2. **Loop Detector: Chamberlain / LiftMaster Elite Series AELD Loop Detector;** plug-In detector, no wiring needed. 24VDC power input; 2 Relays; 1 Channel; 4 frequency settings, 2 sensitivity levels with boost feature for high-profile vehicles; designed for and tested with HCT operators.
3. **Locks: Chamberlain / LiftMaster Elite Series MG1300 Magnetic Lock;** provides added security for a gate as it automatically locks and unlocks as the gate is activated to open and close. 12 VDC power input; 1,300 lb (589 kg) holding force. Includes transformer, junction box with knockouts, pivoting armature, mounting plate and hardware. Provide Q400MAU relay module.
4. **Accessory: Chamberlain / LiftMaster 71-REDGRN-HCT Warning Light Box;** red and green lights signal if door is moving or stationary.

- B. Operator:** Industrial-duty assembly, with electric motor and factory prewired motor controls, internal auxiliary reversal circuit, 3-button OPEN/CLOSE/STOP control station, conduit and wiring from control to motor, and accessories required for proper operation.

- C. **Motor:** High-starting torque, continuous-duty, industrial-type protected against overload by current sensing or thermal overload device.
- D. **Motor Starter, Controls, Enclosures:** 115V motor, UL approved microprocessor solid-state. Motor control device shall be enclosed in NEMA 1 enclosure integral with operator. Control enclosures shall conform to ANSI/NEMA ICS 6. A NEMA Type 1 with OPEN/CLOSE/STOP control station.
 - 1. If UL approved Self-Monitoring Safety Operation in 115V single phase application is required, control system must include a CPS, CPS-N4 Self-Monitoring Sensor to detect obstructions in doorway.
- E. **Control Circuit:** Microprocessor electronics and solid-state control board in a weatherproof housing; low-voltage control inputs to provide for connection of a full range of optional external devices including loop detectors, telephone entry access systems, keyed manual disconnect switch operation (to provide release and manual operation of the gate in emergency situations), fire dept. keyed manual disconnect, and 3-button push-button station; provides outputs for sensor alarm, and alarm system; provides LED indication of all input and output functions; provides modular plug-in loop detector technology.
- F. **Alarm:** Activates when moving gate is physically stopped by an obstruction. If gate hits an object twice while opening or closing, the system will shut down and the alarm will sound for five minutes. After five minutes, the system will automatically reset itself. To reset within the five-minute period, the manual reset button must be activated.
- G. **Limit Assembly:** Fully adjustable, driven linear-type switch mechanism synchronizing door with operator. Low-friction nylon limit nuts shall be fitted on threaded steel shaft, rotating on oil tight self-lubricating bronze bushings. Motor shall be removable without affecting limit switch settings.
- H. **Track:** Heavy-duty, 12 gauge, gold-zinc plated steel.
- I. **Primary Speed Reduction Device:** Gear reducer 40:1 geared, lubricated by oil bath.
- J. **Trolley Assembly:** 2 inch (51 mm) by 2 inch (51 mm) gold-zinc plated steel angle rails with trolley included plated steel rail spacer with nylon chain guide assembly.
- K. **Additional Required Controls:**
 - 1. Radio Receiver: 412HM receiver with standard external antenna. Receiver memory shall accept up to 18 Security+ transmitters or up to 31 LiftMaster transmitter codes of any type.
 - 2. Inherent Obstruction Sensing: Electronic Reversing Device (ERD) to reverse gate if gate encounters a vehicle while closing, and stop and reverse if it hits a vehicle while opening; adjustable timer that can be set for 3 to 60 seconds to temporarily hold gate open before closing.
 - 3. Emergency key release to manually operate gate in case of power failure.

- L. **Equipment:** Provide the following optional equipment.
1. **Photo-Eyes:** Commercial Protector System (CPS) non-contact photo safety sensor that senses an obstruction and signals the operator to reverse to open.
 2. **Sensing Edge:** Electric or pneumatic sensing device installed on the bottom edge of the gate to sense an obstruction and signal the operator to stop and reverse to open.
 3. **Treadle:** Signals the gate to open or close when a vehicle drives over the treadle.
 4. **STAR 250 Receiver** allows up to 250 transmitters to be individually added, blocked or deleted.
 5. **Transmitters.**
 6. **Plug-in Loop Detectors:** Chamberlain Elite Model AELD loop detectors.
 - a. Exit loop.
 - b. Center loop.
 - c. Safety loop.

2.13 HEAVY-DUTY COMMERCIAL SLIDE GATE OPERATORS

A. **Chamberlain/LiftMaster Slide Gate Operator Model SL 575:**

Continuous cycle belt/chain-reduction operator for gates up to 1800 pounds (816 kg) and 50 feet (15 m) in length with a traveling speed of up to 10 inches (254 mm) per second.

1. **Photo Eye: Chamberlain / LiftMaster CPS-N4 Thru-beam Photo Eyes;** safety equipment is recommended by UL325 to protect entrapment areas. UL listed to UL325 standards and tested with SL 575 operators; NEMA 4 rated; 45 ft (13716 mm) sensing distance. Includes sending and receiving eyes, 2 ft (610 mm) cable leads and brackets.
2. **Loop Detector: Chamberlain / LiftMaster G714167NH Loop Detector;** plug-In detector, no wiring needed. 24VAC power input; 2 Relays; 1 Channel; 4 frequency settings, 8 sensitivity settings with boost feature for high-profile vehicles; designed for and tested with SL 575 operators.
3. **Hardware: Chamberlain / LiftMaster Elite Series Power Wheel;** solid cold-rolled steel; gold zinc plated; continuous cycle operation; maintenance free.
 - a. AH107: 4 inch (102 mm) wheel; 2 pieces; 3,000 lb (1361 kg) weight capacity.
 - b. AH110: 6 inch (152 mm) wheel; 1 piece; 5,000 lb (2268 kg) weight capacity.
4. **Hardware: Chamberlain / LiftMaster Elite Series Wheel Covers; CVRPWST4;** 4 inch (102 mm) wheel cover; 2 pieces wheel covers guard against pinch points to meet ASTM standards and ensure UL325 compliance. Steel construction; power coated black; manufactured exclusively for use with the Power Wheel.
5. **Hardware: Chamberlain / LiftMaster VTRACK V-Track;** 10 ft (3048 mm) length by 4 inch (102 mm) width; unpainted, 12 gauge hot-dipped galvanized steel construction; single piece design, 90 degree rounded angle top; multiple anchoring holes for ease of installation.
6. **Locks: Chamberlain / LiftMaster Elite Series MG1300 Magnetic Lock;** provides added security for a gate as it automatically locks and unlocks as the gate is activated to open and close. 12 VDC power input; 1,300 lb (589 kg) holding force. Includes transformer, junction box with knockouts, pivoting armature, mounting plate and hardware.
 - a. Provide Q240MAU relay module.
 - b. Provide Q400MAU relay module.
 - c. Provide 912B relay module.
7. **Heater: Chamberlain / LiftMaster 6532449 Thermostat Control Heater, Fin Type;**

designed to automatically maintain a suitable temperature inside a control enclosure down to -40 degrees F (-40 degrees C). Adjustable from 30 degrees to 120 degrees F (0 degrees to 50 degrees C). Used on operators 115V and 575V.

8. **Heater: Chamberlain / LiftMaster 6532448 Thermostat Control Heater, Fin Type;** designed to automatically maintain a suitable temperature inside a control enclosure down to -40 degrees F (-40 degrees C). Adjustable from 30 degrees to 120 degrees F (0 degrees to 50 degrees C). Used on operators 208V - 460V.
9. **Pedestals: PED42 Pedestal;** 42 inches (1067 mm) high; mounts to pre-existing concrete pad; 11 gauge steel construction; power coated black; 2 inch x 2 inch (51 mm x 51 mm) square post; faceplate with universal hole pattern. Includes hardware.
10. **Pedestals: PED4272 Dual height Pedestal;** 42 and 72 inches high; mounts to pre-existing concrete pad; 11 gauge steel construction; power coated black; 2 inch x 2 inch (51 mm x 51 mm) square post; faceplate with universal hole pattern. Includes hardware.
11. **Emergency: Chamberlain / LiftMaster ACP17 Fire Access Box.**

B. UL Classification:

1. Conforms to Class I, when tested in accordance with UL325.
2. Conforms to Class II, when tested in accordance with UL325.
3. Conforms to Class III, when tested in accordance with UL325.
4. Conforms to Class IV, when tested in accordance with UL325.

C. Operator Enclosure: Weather-resistant, hinged, lockable, 16-gauge steel enclosure over a 10 gauge steel frame.

D. Operator Motor:

1. **1/2 HP Continuous Duty motor** with built-in overload protection for gates up to 1200 lbs. (544 kg) and 40 ft. (12 m) overhead or 25 ft. (8 m) cantilever in length.
 - a. 115 VAC 60 Hz Single Phase operation.
 - b. 208 VAC 60 Hz Single Phase operation.
 - c. 230 VAC 60 Hz Single Phase operation.
 - d. 208 VAC 60 Hz Three Phase operation.
 - e. 230 VAC 60 Hz Three Phase operation.
 - f. 460 VAC 60 Hz Three Phase operation.
 - g. 575 VAC 60 Hz Three Phase operation.
2. **1 HP Continuous Duty motor** with built-in overload protection for gates up to 1800 lbs. (816 kg) and 50 ft. (15 m) overhead or 32 ft. (10 m) cantilever in length.
 - a. 15 VAC 60 Hz Single Phase operation.
 - b. 208 VAC 60 Hz Single Phase operation.
 - c. 230 VAC 60 Hz Single Phase operation.
 - d. 208 VAC 60 Hz Three Phase operation.
 - e. 230 VAC 60 Hz Three Phase operation.
 - f. 460 VAC 60 Hz Three Phase operation.
 - g. 575 VAC 60 Hz Three Phase operation.

E. Open and Close Limit Settings: Limit switches shall be modular and fully adjustable.

F. Control Circuit: LiftMaster Model GL solid-state digital logic control board including low-

voltage control, external spike and surge protection, separate open and close external sensor inputs, fully adjustable inherent obstruction detection system, dual gate operation, built-in radio receiver, and optional external devices including loop detectors and telephone entry systems.

G. Additional Required Controls:

1. Internally-mounted RF receiver tuned at 315 MHz.
2. Inherent obstruction sensing providing separate, single force adjustments for both open and closed directions, allowing a closing gate to reverse to the opposite limit and stop when encountering an obstruction.
3. External obstruction sensing providing separate open and close cycle input connections for external contact and non-contact sensors.
4. Maglock control relay to activate and deactivate an optional magnetic lock for securing the gate.
5. UL 325-compliant entrapment warning alarm system providing ability to offer a warning tone which begins 3-seconds prior to gate movement and continues during gate operation.
6. Loop detector inputs allowing for the connection of exit, shadow, and interrupt loop detectors.
7. Control wiring distance can exceed 1,000 feet (305 meters) to allow flexibility of gate operator placement.
8. Dual gate operation 2-wire control system that provides for the operation of two separate gate operators in unison at a single entrance and also provides the ability to connect accessories to either operator.
9. Automatic Closing Timer: Timer-to-close providing adjustable timer settings between 1 and 180 seconds which resets upon receiving any additional open commands.
10. Sequenced Access Management System providing ability to control a slide gate operator in tandem with a barrier gate operator.
11. Maximum run timer to protect gate and operator from damage by limiting run time to 120 seconds.

H. Emergency Release: External manual hydraulic release for manual operation of gate during emergencies and maintenance work.

I. Emergency Stop: Stop button in a weather-tight outdoor enclosure to halt operation of the operator in an emergency situation.

J. Accessory Power: One 24 VAC connection for operator accessories, including a radio receiver and loop detectors.

K. Equipment: Provide the following optional equipment.

1. Plug-in loop detectors.
2. Thermostat controlled heater.
3. Auxiliary contact blocks.
4. Remote antenna mounting kit.

2.14 HEAVY DUTY HYDRAULIC SLIDE GATE OPERATORS

A. Chamberlain/Lift Master HS 670 Heavy Duty Hydraulic Model GC:

Continuous-cycle 1 HP operator for gates up to 3000 pounds (1361 kilograms) and 80 feet (24 meters) in length with a traveling speed of up to 12 inches (305 mm) per second.

1. **Photo Eye: Chamberlain / LiftMaster CPS-N4 Thru-beam Photo Eyes;** safety equipment is recommended by UL325 to protect entrapment areas. UL listed to UL325 standards and tested with HS 670 operators; NEMA 4 rated; 45 ft (13716 mm) sensing distance. Includes sending and receiving eyes, 2 ft (610 mm) cable leads and brackets.
2. **Loop Detector: Chamberlain / LiftMaster G714167NH Loop Detector;** plug-In detector, no wiring needed. 24VAC power input; 2 Relays; 1 Channel; 4 frequency settings, 8 sensitivity settings with boost feature for high-profile vehicles; designed for and tested with HS 670 operators.
3. **Hardware: Chamberlain / LiftMaster Elite Series Power Wheel;** solid cold-rolled steel; gold zinc plated; continuous cycle operation; maintenance free.
 - a. AH107: 4 inch (102 mm) wheel; 2 pieces; 3,000 lb (1361 kg) weight capacity.
 - b. AH110: 6 inch (152 mm) wheel; 1 piece; 5,000 lb (2268 kg) weight capacity.
4. **Hardware: Chamberlain / LiftMaster Elite Series Wheel Covers; CVRPWST4;** 4 inch (102 mm) wheel cover; 2 pieces wheel covers guard against pinch points to meet ASTM standards and ensure UL325 compliance. Steel construction; power coated black; manufactured exclusively for use with the Power Wheel.
5. **Hardware: Chamberlain / LiftMaster VTRACK V-Track;** 10 ft (3048 mm) length by 4 inch (102 mm) width; unpainted, 12 gauge hot-dipped galvanized steel construction; single piece design, 90 degree rounded angle top; multiple anchoring holes for ease of installation.
6. **Locks: Chamberlain / LiftMaster Elite Series MG1300 Magnetic Lock;** provides added security for a gate as it automatically locks and unlocks as the gate is activated to open and close. 12 VDC power input; 1,300 lb (589 kg) holding force. Includes transformer, junction box with knockouts, pivoting armature, mounting plate and hardware.
 - a. Provide Q240MAU relay module.
 - b. Provide Q400MAU relay module.
 - c. Provide 912B relay module.
7. **Pedestals: PED42 Pedestal;** 42 inches (1067 mm) high; mounts to pre-existing concrete pad; 11 gauge steel construction; power coated black; 2 inch x 2 inch (51 mm x 51 mm) square post; faceplate with universal hole pattern. Includes hardware.
8. **Pedestals: PED4272 Dual height Pedestal;** 42 and 72 inches high; mounts to pre-existing concrete pad; 11 gauge steel construction; power coated black; 2 inch x 2 inch (51 mm x 51 mm) square post; faceplate with universal hole pattern. Includes hardware.
9. **Emergency: Chamberlain / LiftMaster ACP17 Fire Access Box.**

B. Chamberlain/Lift Master HS 670 Heavy Duty Hydraulic Model GI: Continuous-cycle 2 HP operator for gates up to 5000 pounds (2268 kilograms) and 80 feet (24 meters) in length with a traveling speed of up to 18 inches (457 mm) per second.

1. Photo Eye:
2. Loop Detector:
3. Hardware:
4. Mounting:

5. Locks:
6. Heater:
7. Pedestals:

C. UL Classification:

1. Conforms to Class I, when tested in accordance with UL325.
2. Conforms to Class II, when tested in accordance with UL325.
3. Conforms to Class III, when tested in accordance with UL325.
4. Conforms to Class IV, when tested in accordance with UL325.

D. Operator Enclosure: Powder-coated, weatherproof, locking, 14 gauge galvanized steel cabinet over a metal frame.

E. Operator Motor:

1. GC Model: 1 HP Continuous Duty motor with built-in overload protection.
 - a. 115 VAC 60 Hz Single Phase operation.
 - b. 208 VAC 60 Hz Single Phase operation.
 - c. 230 VAC 60 Hz Single Phase operation.
2. GI Model: 2 HP Continuous Duty motor with built-in overload protection.
 - a. 208 VAC 60 Hz Three Phase operation.
 - b. 230 VAC 60 Hz Three Phase operation.
 - c. 460 VAC 60 Hz Three Phase operation.
 - d. 575 VAC 60 Hz Three Phase operation.

F. Open and Close Limit Settings: NEMA 4 limit switches that are modular and fully adjustable.

G. Control Circuit: LiftMaster Model GL solid-state digital logic control board including low-voltage control, external spike and surge protection, separate open and close external sensor inputs, fully adjustable inherent obstruction detection system, dual gate operation, built-in radio receiver, and optional external devices including loop detectors and telephone entry systems.

H. Additional Required Controls:

1. Internally-mounted RF receiver tuned at 315 MHz.
2. Inherent obstruction sensing providing separate, single force adjustments for both open and closed directions, allowing a closing gate to reverse to the opposite limit and stop when encountering an obstruction.
3. External obstruction sensing providing separate open and close cycle input connections for external contact and non-contact sensors.
4. Maglock control relay to activate and deactivate an optional magnetic lock for securing the gate.
5. UL 325-compliant entrapment warning alarm system providing ability to offer a warning tone which begins 3-seconds prior to gate movement and continues during gate operation.
6. Loop detector inputs allowing for the connection of exit, shadow, and interrupt loop detectors.
7. Control wiring distance can exceed 1,000 feet (305 meters) to allow flexibility of gate operator placement.

8. Dual gate operation 2-wire control system that provides for the operation of two separate gate operators in unison at a single entrance and also provides the ability to connect accessories to either operator.
 9. Automatic Closing Timer: Timer-to-close providing adjustable timer settings between 1 and 180 seconds which resets upon receiving any additional open commands.
 10. Sequenced Access Management System providing ability to control a slide gate operator in tandem with a barrier gate operator.
 11. Maximum run timer to protect gate and operator from damage by limiting run time to 120 seconds.
- I. **Emergency Release:** Manual hydraulic release for manual operation of gate during emergencies and maintenance work.
- J. **Emergency Stop:** Stop button in a weather-tight outdoor enclosure to halt operation of the operator in an emergency situation.
- K. **Accessory Power:** One 24 VAC connection for operator accessories, including a radio receiver and loop detectors.
- L. **Equipment: Provide the following optional equipment.**
1. Plug-in loop detectors.
 2. Self regulating reservoir heater.
 3. Auxiliary contact blocks.
 4. Fire release option.
 5. Remote antenna mounting kit.
 6. Remote controls.

2.15 INDUSTRIAL SLIDE GATE OPERATORS

A. Chamberlain/LiftMaster Slide Gate Operator Model SL 585:

Continuous cycle gear-driven operator for gates up to 1600 pounds (726 kg) and 70 feet (21 m) in length with a traveling speed of up to 11 inches (279 mm) per second.

1. **Photo Eye: Chamberlain / LiftMaster CPS-N4 Thru-beam Photo Eyes;** safety equipment is recommended by UL325 to protect entrapment areas. UL listed to UL325 standards and tested with SL 585 operators; NEMA 4 rated; 45 ft (13716 mm) sensing distance. Includes sending and receiving eyes, 2 ft (610 mm) cable leads and brackets.
2. **Loop Detector: Chamberlain / LiftMaster G714167NH Loop Detector;** plug-In detector, no wiring needed. 24VAC power input; 2 Relays; 1 Channel; 4 frequency settings, 8 sensitivity settings with boost feature for high-profile vehicles; designed for and tested with SL 585 operators.
3. **Hardware: Chamberlain / LiftMaster Elite Series Power Wheel;** solid cold-rolled steel; gold zinc plated; continuous cycle operation; maintenance free.
 - a. AH107: 4 inch (102 mm) wheel; 2 pieces; 3,000 lb (1361 kg) weight capacity.
 - b. AH110: 6 inch (152 mm) wheel; 1 piece; 5,000 lb (2268 kg) weight capacity.
4. **Hardware: Chamberlain / LiftMaster Elite Series Wheel Covers; CVRPWST4;** 4 inch (102 mm) wheel cover; 2 pieces wheel covers guard against pinch points to meet ASTM standards and ensure UL325 compliance. Steel construction; power coated black;

manufactured exclusively for use with the Power Wheel.

5. **Hardware: Chamberlain / LiftMaster VTRACK V-Track;** 10 ft (3048 mm) length by 4 inch (102 mm) width; unpainted, 12 gauge hot-dipped galvanized steel construction; single piece design, 90 degree rounded angle top; multiple anchoring holes for ease of installation.
6. **Mounting: Chamberlain / LiftMaster Elite Series MG1300 Magnetic Lock;** provides added security for a gate as it automatically locks and unlocks as the gate is activated to open and close. 12 VDC power input; 1,300 lb (589 kg) holding force. Includes transformer, junction box with knockouts, pivoting armature, mounting plate and hardware.
 - a. Provide Q240MAU relay module.
 - b. Provide Q400MAU relay module.
 - c. Provide 912B relay module.
7. **Heater: Chamberlain / LiftMaster 6532449 Thermostat Control Heater, Fin Type;** designed to automatically maintain a suitable temperature inside a control enclosure down to -40 degrees F (-40 degrees C). Adjustable from 30 degrees to 120 degrees F (0 degrees to 50 degrees C). Used on operators 115V and 575V.
8. **Heater: Chamberlain / LiftMaster 6532448 Thermostat Control Heater, Fin Type;** designed to automatically maintain a suitable temperature inside a control enclosure down to -40 degrees F (-40 degrees C). Adjustable from 30 degrees to 120 degrees F (0 degrees to 50 degrees C). Used on operators 208V - 460V.
9. **Pedestals: PED42 Pedestal;** 42 inches (1067 mm) high; mounts to pre-existing concrete pad; 11 gauge steel construction; power coated black; 2 inch x 2 inch (51 mm x 51 mm) square post; faceplate with universal hole pattern. Includes hardware.
10. **Pedestals: PED4272 Dual height Pedestal;** 42 and 72 inches high; mounts to pre-existing concrete pad; 11 gauge steel construction; power coated black; 2 inch x 2 inch (51 mm x 51 mm) square post; faceplate with universal hole pattern. Includes hardware.
11. **Emergency: Chamberlain / LiftMaster ACP17 Fire Access Box.**

B. UL Classification:

1. Conforms to Class I, when tested in accordance with UL325
2. Conforms to Class II, when tested in accordance with UL325.
3. Conforms to Class III, when tested in accordance with UL325.
4. Conforms to Class IV, when tested in accordance with UL325.

C. Operator Enclosure: Weather-resistant, hinged, lockable, 16-gauge steel enclosure with baked-on powdercoat finish over a 7 gauge steel frame.

D. Operator Motor:

1. 1/2 HP Continuous Duty motor with built-in overload protection for gates up to 1200 lbs. (544 kg) and 40 ft. (12 m) overhead or 25 ft. (8 m) cantilever in length.
 - a. 115 VAC 60 Hz Single Phase operation.
 - b. 208 VAC 60 Hz Single Phase operation.
 - c. 230 VAC 60 Hz Single Phase operation.
 - d. 208 VAC 60 Hz Three Phase operation.
 - e. 230 VAC 60 Hz Three Phase operation.
 - f. 460 VAC 60 Hz Three Phase operation.

- g. 575 VAC 60 Hz Three Phase operation.
 - 2. 1 HP Continuous Duty motor with built-in overload protection for gates up to 1800 lbs. (816 kg) and 50 ft. (15 m) overhead or 32 ft. (10 m) cantilever in length.
 - a. 15 VAC 60 Hz Single Phase operation.
 - b. 208 VAC 60 Hz Single Phase operation.
 - c. 230 VAC 60 Hz Single Phase operation.
 - d. 208 VAC 60 Hz Three Phase operation.
 - e. 230 VAC 60 Hz Three Phase operation.
 - f. 460 VAC 60 Hz Three Phase operation.
 - g. 575 VAC 60 Hz Three Phase operation.
- E. **Gear Reduction:** 20:1 gear reduction using worm-gear in synthetic oil bath with a solenoid-activated brake system that prevents back-driving.
- F. **Open and Close Limit Settings:** Limit switches shall be modular and fully adjustable.
- G. **Control Circuit:** LiftMaster Model GL solid-state digital logic control board including low-voltage control, external spike and surge protection, separate open and close external sensor inputs, fully adjustable inherent obstruction detection system, dual gate operation, built-in radio receiver, and optional external devices including loop detectors and telephone entry systems.
- H. **Additional Required Controls:**
 - 1. Internally-mounted RF receiver tuned at 315 MHz.
 - 2. Inherent obstruction sensing providing separate, single force adjustments for both open and closed directions, allowing a closing gate to reverse to the opposite limit and stop when encountering an obstruction.
 - 3. External obstruction sensing providing separate open and close cycle input connections for external contact and non-contact sensors.
 - 4. Maglock control relay to activate and deactivate an optional magnetic lock for securing the gate.
 - 5. UL 325-compliant entrapment warning alarm system providing ability to offer a warning tone which begins 3-seconds prior to gate movement and continues during gate operation.
 - 6. Loop detector inputs allowing for the connection of exit, shadow, and interrupt loop detectors.
 - 7. Control wiring distance can exceed 1,000 feet (305 meters) to allow flexibility of gate operator placement.
 - 8. Dual gate operation 2-wire control system that provides for the operation of two separate gate operators in unison at a single entrance and also provides the ability to connect accessories to either operator.
 - 9. Automatic Closing Timer: Timer-to-close providing adjustable timer settings between 1 and 180 seconds which resets upon receiving any additional open commands.
 - 10. Sequenced Access Management System providing ability to control a slide gate operator in tandem with a barrier gate operator.
 - 11. Maximum run timer to protect gate and operator from damage by limiting run time to 120 seconds.

- I. **Emergency Release:** External manual hydraulic release for manual operation of gate during emergencies and maintenance work.
- J. **Emergency Stop:** Stop button in a weather-tight outdoor enclosure to halt operation of the operator in an emergency situation.
- K. **Accessory Power:** One 24 VAC connection for operator accessories, including a radio receiver and loop detectors.
- L. **Equipment: Provide the following optional equipment.**
 - 1. Plug-in loop detectors.
 - 2. Self-regulating gearbox heater.
 - 3. Auxiliary contact blocks.
 - 4. Remote antenna mounting kit.

2.16 HEAVY-DUTY INDUSTRIAL SLIDE GATE OPERATORS

A. **Chamberlain/LiftMaster Slide Gate Operator Model SL 595:**

Continuous cycle gear-driven operator for gates up to 2500 pounds (1134 kg) and 90 feet (27 m) in length with a traveling speed of up to 12 inches (305 mm) per second.

- 1. **Photo Eye: Chamberlain / LiftMaster CPS-N4 Thru-beam Photo Eyes;** safety equipment is recommended by UL325 to protect entrapment areas. UL listed to UL325 standards and tested with SL 595 operators; NEMA 4 rated; 45 ft (13716 mm) sensing distance. Includes sending and receiving eyes, 2 ft (610 mm) cable leads and brackets.
- 2. **Loop Detector: Chamberlain / LiftMaster G714167NH Loop Detector;** plug-In detector, no wiring needed. 24VAC power input; 2 Relays; 1 Channel; 4 frequency settings, 8 sensitivity settings with boost feature for high-profile vehicles; designed for and tested with SL 595 operators.
- 3. **Hardware: Chamberlain / LiftMaster Elite Series Power Wheel;** solid cold-rolled steel; gold zinc plated; continuous cycle operation; maintenance free.
 - a. AH107: 4 inch (102 mm) wheel; 2 pieces; 3,000 lb (1361 kg) weight capacity.
 - b. AH110: 6 inch (152 mm) wheel; 1 piece; 5,000 lb (2268 kg) weight capacity.
- 4. **Hardware: Chamberlain / LiftMaster Elite Series Wheel Covers; CVRPWST4;** 4 inch (102 mm) wheel cover; 2 pieces wheel covers guard against pinch points to meet ASTM standards and ensure UL325 compliance. Steel construction; power coated black; manufactured exclusively for use with the Power Wheel.
- 5. **Hardware: Chamberlain / LiftMaster VTRACK V-Track;** 10 ft (3048 mm) length by 4 inch (102 mm) width; unpainted, 12 gauge hot-dipped galvanized steel construction; single piece design, 90 degree rounded angle top; multiple anchoring holes for ease of installation.
- 6. **Mounting: Chamberlain / LiftMaster Elite Series MG1300 Magnetic Lock;** provides added security for a gate as it automatically locks and unlocks as the gate is activated to open and close. 12 VDC power input; 1,300 lb (589 kg) holding force. Includes transformer, junction box with knockouts, pivoting armature, mounting plate and hardware.
 - a. Provide Q240MAU relay module.
 - b. Provide Q400MAU relay module.

- c. Provide 912B relay module.
 - 7. **Heater: Chamberlain / LiftMaster 6532449 Thermostat Control Heater, Fin Type;** designed to automatically maintain a suitable temperature inside a control enclosure down to -40 degrees F (-40 degrees C). Adjustable from 30 degrees to 120 degrees F (0 degrees to 50 degrees C). Used on operators 115V and 575V.
 - 8. **Heater: Chamberlain / LiftMaster 6532448 Thermostat Control Heater, Fin Type;** designed to automatically maintain a suitable temperature inside a control enclosure down to -40 degrees F (-40 degrees C). Adjustable from 30 degrees to 120 degrees F (0 degrees to 50 degrees C). Used on operators 208V - 460V.
 - 9. **Pedestals: PED42 Pedestal; 42 inches (1067 mm) high;** mounts to pre-existing concrete pad; 11 gauge steel construction; power coated black; 2 inch x 2 inch (51 mm x 51 mm) square post; faceplate with universal hole pattern. Includes hardware.
 - 10. **Pedestals: PED4272 Dual height Pedestal; 42 and 72 inches high;** mounts to pre-existing concrete pad; 11 gauge steel construction; power coated black; 2 inch x 2 inch (51 mm x 51 mm) square post; faceplate with universal hole pattern. Includes hardware.
 - 11. **Emergency: Chamberlain / LiftMaster ACP17 Fire Access Box.**
- B. UL Classification:**
- 1. Conforms to Class I, when tested in accordance with UL325
 - 2. Conforms to Class II, when tested in accordance with UL325.
 - 3. Conforms to Class III, when tested in accordance with UL325.
 - 4. Conforms to Class IV, when tested in accordance with UL325.
- C. Operator Enclosure:** Fully enclosed, NEMA 3R, weather-resistant, hinged, lockable, 16-gauge steel enclosure with baked-on high durability powdercoat finish over a 7 gauge steel frame.
- D. Operator Motor:**
- 1. **1/2 HP Continuous Duty motor** with built-in overload protection for gates up to 1100 lbs. (499 kg) and 45 ft (13716 mm). (14 m) overhead or 25 ft. (8 m) cantilever in length.
 - a. 115 VAC 60 Hz Single Phase operation.
 - b. 208 VAC 60 Hz Single Phase operation.
 - c. 230 VAC 60 Hz Single Phase operation.
 - 2. **1 HP Continuous Duty motor** with built-in overload protection for gates up to 1700 lbs. (771 kg) and 70 ft. (21 m) overhead or 35 ft. (11 m) cantilever in length.
 - a. 208 VAC 60 Hz Three Phase operation.
 - b. 230 VAC 60 Hz Three Phase operation.
 - c. 460 VAC 60 Hz Three Phase operation.
 - d. 575 VAC 60 Hz Three Phase operation
 - 3. **2 HP Continuous Duty motor** with built-in overload protection for gates up to 2500 lbs. (1334 kg) and 90 ft. (27 m) overhead or 45 ft (13716 mm). (14 m) cantilever in length.
 - a. 208 VAC 60 Hz Three Phase operation.
 - b. 230 VAC 60 Hz Three Phase operation.
 - c. 460 VAC 60 Hz Three Phase operation.
 - d. 575 VAC 60 Hz Three Phase operation.
- E. Gear Reduction:** 20:1 gear reduction using worm-gear in synthetic oil bath with a solenoid-activated brake system that prevents back-driving.

- F. Open and Close Limit Settings:** Limit switches shall be modular and fully adjustable.
- G. Control Circuit:** LiftMaster Model GL solid-state digital logic control board including low-voltage control, external spike and surge protection, separate open and close external sensor inputs, fully adjustable inherent obstruction detection system, dual gate operation, built-in radio receiver, and optional external devices including loop detectors and telephone entry systems.
- H. Additional Required Controls:**
1. Internally-mounted RF receiver tuned at 315 MHz.
 2. Inherent obstruction sensing providing separate, single force adjustments for both open and closed directions, allowing a closing gate to reverse to the opposite limit and stop when encountering an obstruction.
 3. External obstruction sensing providing separate open and close cycle input connections for external contact and non-contact sensors.
 4. Maglock control relay to activate and deactivate an optional magnetic lock for securing the gate.
 5. UL 325-compliant entrapment warning alarm system providing ability to offer a warning tone which begins 3-seconds prior to gate movement and continues during gate operation.
 6. Loop detector inputs allowing for the connection of exit, shadow, and interrupt loop detectors.
 7. Control wiring distance can exceed 1,000 feet (305 meters) to allow flexibility of gate operator placement.
 8. Dual gate operation 2-wire control system that provides for the operation of two separate gate operators in unison at a single entrance and also provides the ability to connect accessories to either operator.
 9. Automatic Closing Timer: Timer-to-close providing adjustable timer settings between 1 and 180 seconds which resets upon receiving any additional open commands.
 10. Sequenced Access Management System providing ability to control a slide gate operator in tandem with a barrier gate operator.
 11. Maximum run timer to protect gate and operator from damage by limiting run time to 120 seconds.
- I. Emergency Release:** External manual hydraulic release for manual operation of gate during emergencies and maintenance work.
- J. Emergency Stop:** Stop button in a weather-tight outdoor enclosure to halt operation of the operator in an emergency situation.
- K. Accessory Power:** One 24 VAC connection for operator accessories, including a radio receiver and loop detectors.
- L. Equipment: Provide the following optional equipment.**
1. Integral thermostat controlled heater.
 2. Auxiliary contact blocks.
 3. Remote antenna mounting kit.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions including the following:
 - 1. Mount directly to concrete pad, firmly secured, plumb and level.
 - 2. Mount to mounting pedestal; provide base plate.
 - 3. Wire in accordance with National Electric Code.
 - 4. Enclose all splices in easily accessible junction boxes or on terminal boards.
 - 5. Tag and identify all cable runs in all junction boxes.
- B. Test system and adjust to assure components and accessories are properly connected and in working order.

3.4 PROTECTION

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

3.5 MAINTENANCE

- A. Maintain at three-month intervals during specified maintenance period, checking external reversing devices once per month.

END OF SECTION

notes

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