

SECTION 32 31 13 CHAIN LINK VERTICAL PIVOT GATES**-OR-****SECTION 32 31 19 ORNAMENTAL VERTICAL PIVOT GATES****-OR-****SECTION 32 31 19.53 DECORATIVE METAL VERTICAL PIVOT GATES**

The following specification has been developed by:

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assist Architects and Designers in the specification of vertical pivot gate (VPG) systems. VPG's are electrically operated vehicle gates that lift by pivoting vertically at the operator. VPG style of operation has advantages over sliding or swinging gates in the speed of operation and the ability to operate free of road or other obstructions (e.g. snow, ice, curbs, slopes and plant growth). The operator is controlled using low voltage DC power with battery backup allowing operation in the event of utility company power failure. In addition the system is able to be operated in a stand alone mode utilizing solar power cells to maintain battery charge. The systems are furnished as a complete assembly with framing and operator. Pickets or mesh fabric which matches the adjacent fence line can be provided by AutoGate after coordination and approval.

Notes to the specifier are included in the boxes. Options that must be selected by the specifier are shown in brackets []. Inapplicable clauses shall be deleted.

PART 1 - GENERAL**1.1 SUMMARY****A. Section Includes:**

1. Vertically pivoting low voltage electrically operated vehicle access gate.
 - a. Fully welded gate frame.
 - b. Gate operator of a vertical pivot type, for opening and closing the gate.
 - c. Security fence panels of [chain link fabric] [vertical pickets] [wire mesh] [materials matching the contiguous fence line].
 - d. Receiving yoke.

Note: Coordinate the following with other sections of the specifications to avoid duplication and conflicts.

2. Concrete and earthwork for operator and yoke pads.
3. [Push Button Gate Controls.]
4. [Contact Edge] [and] [or] [Photoelectric non-contact] external entrapment protection devices.

B. Products Not Furnished or Installed under This Section:

1. Electrical power service to the gate operator.
2. Line Fencing.
3. [Bollards and guardrails to protect operator.]
4. [Active anti ram barriers.]
5. [Automatic gate control systems.]
6. [Solar powered battery re-chargers.]

1.2 RELATED SECTIONS

- A. Section [____] - Line fencing.
- B. Section [____] - Earthwork for Foundations.
- C. Section [____] - Cast-In-Place Concrete.
- D. Section [____] - Electrical power and distribution.

1.3 PERFORMANCE REQUIREMENTS

- A. Gate Dimensions[Each]:
 - 1. Width - [Ex: 22 feet] [_____ feet] [As indicated on sheet / drawing #_____].
 - 2. Height - Operator Pad surface to top of gate [Ex:6 feet, 8 feet] [_____ feet].
[As indicated _____]
- B. Structural Performance: Engineer, fabricate, and install gate systems to withstand gate dead loads and wind live loads of 75 mph.

Note: If there are questions concerning wind loading and wind bracing during design phases, contact AutoGate for recommended details and loading for special gate designs and sizes. 75 MPH is AutoGate's wind loading for standard style and sized gates.

For gates that require Wind Ratings in excess of the standard AutoGate cable wind bracing, specify Masted Wind Bracing in PART 2. The design certification meets or exceeds the International Building Code (IBC) Section 1609.6 Simplified Wind Load Method for 90 MPH wind loading and the 150 MPH hurricane wind loading when used in accordance with the manufacturer's specifications for installation and operation.

1.4 SUBMITTALS

- A. Product Data: Submit sufficient manufacturer's data to indicate compliance with these specifications. Mark data to indicate:
 - 1. Details of material and construction.
 - 2. Recommended installation requirements to properly accommodate the proposed Gate and accessories.
- B. Shop Drawings: Submit shop drawings for fabrication and installation of ornamental metal work. Include plans, elevations and detail sections. Indicate materials, methods, finishes and types of joinery, fasteners, anchorages and accessory items. Provide setting diagrams and templates for anchorages, sleeves, and bolts installed by others. Shop drawings to be field verified by installer.

1.5 REFERENCES

- A. Comply with applicable (Federal/State/Local) code and project standards. Comply with requirements of Authorities Having Jurisdiction (AHJ) in Project location.
 - 1. Standards: Comply and adhere to current Operation Control Systems and Gate Panel Construction Standards outlined in a., b., and c. below.

- a. UL 325 - Standard for Safety for Door, Drapery, Gate, Louver, and Window Operators and Systems.
 - b. CAN/CSA-C22.2 No. 247 Operators and Systems of Doors, Gates, Draperies, and Louvers
 - c. ASTM F2200 - Standard Specification for Automated Vehicular Gate Construction.
2. Electrical Components, Devices, and Accessories: NFPA 70, Article 100.

Note: Include the following for Chain Link Fences or include other infill panels fence standards as applicable

- B. Chain link Fencing Standards:
 - 1. Fencing and Gates: Chain Link Fence Manufacturer's Institute "Specifications for Fence-Posts, Gates and Accessories". Install in accordance with ASTM F567.

1.6 QUALITY ASSURANCE

- A. Gate Operator Manufacturer Qualifications: Minimum three (3) years documented experience producing systems specified in this section. Furnish UL 325 Listing Certification from the Nationally Recognized Testing Laboratory for Gate Operator specified in this section.
- B. Gate Panel Fabricator Qualifications: Minimum three (3) years documented experience in automated gate panel fabrication. Furnish detailed drawing of gate panel construction/fabrications that is in compliance with ASTM F2200.
- C. Installer Qualifications: An experienced installer who has completed fences and gates similar in material, design, and extent to those indicated for this Project and whose work has resulted in construction with a record of successful in-service performance as well as compliance with section 1.5 A. 1. previously outlined.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Store components to avoid damage from moisture, abrasion, and other construction activities. Carefully store materials off the ground to provide proper protection against oxidation caused by ground contact.

1.8 PROJECT CONDITIONS

- A. Field Measurements and Verification: Installer shall measure, verify and generate dimensions where Gate and Operator are to be located. Indicate specific location of gate with regard to existing roadways, proposed roadways, curb locations, grade changes and elevations. Indicate specific location of Gate Operator and its respective concrete foundation; include surrounding landscaping, fencing, buildings and other fixed stationary objects near the gate operator and gate panel in both open and closed positions.

1.9 COORDINATION AND SEQUENCING

- A. Coordinate gate installation with line fencing and paving. Gate and Operator can be installed independent of paving providing that the Operator concrete foundation is in place, including electrical control conduits. Upon completion of installation place the Gate in an open position and maintain vertically clear of traffic and surrounding fence line installation.
- B. Operators are designed for 120 volt 20 amp primary service and 24 Volt DC battery back-up (recommended two (2) Group 24, sealed 12V, Marine Starting batteries to be field supplied and installed). Installer is to coordinate electrical service with electrical design and electrical trades. Service connection is supplied via underground conduit and recommended to include a GFCI circuit breaker (subject to code or project specifications). Connection is made into a 4" x 4" handy box inside the Operator. Within the box wire GFCI Duplex Receptacle "HOT" off of the main breaker. Receptacle may be used for loads under 20 Amps such as hand tools and the like.

1.10 WARRANTY

- A. Standard Warranty: Provide manufacturer's standard three (3) year warranty against defective materials and workmanship after Date of Substantial Completion. Any materials, parts, components, or attachments not manufactured by AutoGate are covered by the applicable manufacturer's warranty.
- B. [Optional if desired by owner, delete if not desired] Two Year Extended Warranty: Provide an two year extended manufacturer's warranty for the entire warranty period covering defective materials and workmanship for the following additional extended period beyond the standard three year warranty.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURER

- A. Acceptable Products: **AutoGate, Inc.** Berlin Heights, Ohio. **Model VPG2490 Vertical Pivot Gate System.**

Note: AutoGate offers custom gate configurations as required to meet any fence line design and picket style. If not indicated on the drawings, or as an option, select from the following standard AutoGate styles and delete those not desired. Refer to AutoGate website or literature for design details.

- 1. Cornhusker 100 - post and rail.
- 1. Barracuda 200 - Barrier.
- 1. Chain Link 300 - mesh and diagonal bracing.
- 1. Catawba 400 - vertical picket's with concave/convex sloped rail.
- 1. Buckeye 500 - vertical picket's center welded to gate frame.
- 1. Congress 600 - vertical picket's with convex top rail.
- 1. Saratoga 700 - vertical spear picket's through ornamental top rail.
- 1. Prestigious 800 - vertical spear picket through double convex top rail.
- 1. Ohioan 900 - vertical spear picket and double top rail.

- B. Requests for substitutions will be considered in accordance with provisions of [the contract and bid conditions] [Section [_____] of Division 01].

2.2 GATE CONSTRUCTION

A. Materials:

1. Aluminum Assembly Framing:
 - a. Plate, Shapes and Bar: ASTM B221, alloy 6061-T6 or 6063-T6.
 - b. Extrusions: Alloy and temper 6063-T6 except formed elbows shall be 6063-T4:
 - c. Round Aluminum Pipe: Standard weight extruded structural aluminum pipe, alloy 6063-T6, mill finish, complying with ASTM B429.
 - d. Provide lock washer or other locking device at all bolted connections.
2. Steel Assembly Framing:
 - a. High strength steel pipe triple coated in accordance with ASTM F1043 Group IC; SS40 as manufactured by Allied Tube & Conduit.
 - 1) External coatings per ASTM F1043 Type B; internal coatings per ASTM F1043 Type D.
 - 2) Post welding treatments: All welded joints to be coated ZRC or equivalent zinc rich coating.
 - b. Steel Tubes: ASTM A500 Cold-Formed Welded Pipe and Structural Tubing Hot-Dipped, Zinc-Coated.
 - c. Steel Shapes plates and bars: ASTM A36.
3. Threaded Fasteners:
 - a. All exterior screws, bolts, nut and washers shall be 300 Series non-magnetic Stainless steel.
 - b. Provide lock washers or other locking devices such as deformed thread lock or nylon locking nuts at all bolted connections.

Note: Include any applicable requirements for fencing material if not included in the line fence specification or simply reference the applicable section of the specifications.

2. Infill panels: Refer to Section __ ____.

B. Fabrication:

1. Fabricate frames of gates from [aluminum] [steel] tubing [Note: steel available up to 20' in length and 8' in height, aluminum available up to 25' in length and 8' in height]. Assemble gate frames by welding at corners. Infill gate frames with panels to match adjacent fence panels.
2. Configuration: Size and space members in compliance with applicable codes and project specifications. All gate framing members shall be unspliced single pipe or tube length.
3. Bracing:
 - a. Provide diagonal welded pipe gate trusses to prevent sag.
 - b. Cable Wind Bracing: Required for gates between 16' or more in length and up to 20' in length. Provide 3/16 aircraft coated cable anchored to the operator and at 2/3 the length of the gate.
 - c. Masted Wind Bracing: Required for gates over 20' or more in length or more than 7' in height, and/or code requirement beyond 75 mph winds.

- 1) Provide continuous tube elements which attach to the operator and extend a minimum of 2/3 the length of the gate. Wind bracing is also secured to the bottom of the gate with strut plates.
 4. Fully assemble gate leaves in the manufacturer's shop with no joints splices or bolted sections. Open tube ends or sections are not acceptable.
 5. Welding: Make exposed joints butt tight, flush, and hairline. Continuously seal joined members by continuous welds.
- C. Fabricated frame and infill fabrics: Epoxy coating, PVC Coating, or unpainted mill finish fabrics to match fence line color.
- D. Barbed wire assemblies: Extend gate post and vertical frame members 12 inches above top of chain-link fabric.
- E. Provide components required for receiving yoke anchorage of gate ends. Fabricate anchors and related components of material and finish matching gate frame.

2.3 GATE OPERATORS

- A. Provide gate operator system, including gate operator, field supplied manufacturer recommended batteries, external entrapment B1 type Non-Contact sensing devices **[and] [or]** external entrapment B2 type Contact Sensing devices.
1. Gate Speed: Fully open to fully closed and fully closed to open not less than 10-12 seconds.
 2. Frequency of Use: Continuous duty.

Note: In case of power failure battery system using 2 - Group 24, 12 Volt, Marine Starting batteries will operate gates for a minimum of 24 hours. Normal operation occurs when power resumes. Note AutoGate does not provide batteries; batteries are to be supplied by the Subcontractor installing the operator.

3. Battery Powered Back Up DC Drive System: Operator to run on 24 Volt DC current integral power supply with stand-by battery system with built-in battery maintainer and "over-charge" protection.
 - a. Field supplied: Provide two (2) 12v batteries, complying with gate operator manufacturer's requirements (Group 24, 12 Volt, Sealed Marine Starting).
 - b. Power supply to operator: 120VAC (20 Amp) .
4. Gate Operator Enclosure: Fabricate operator enclosure from steel tubing and sheet metal. Continuous seal weld all frames seams with welds ground smooth. Screwed frames are not acceptable.

Note: All AutoGate operator enclosures are fabricated from galvanealed steel and continuously seal welded prior to finishing to prevent rusting. Standard operator color of Black is powder coated. Shop applied, PPG Sprayed Enamel (if not selecting Black). Exceeded 1000 hrs salt spray test. Standard Gate colors are black, white, gray, brown, & green) Custom colors are available with a provided RAL# or sample supplied.

- a. Frame: 2" Sq., 11 Ga. (.120) Steel Tubing
- b. Skins: 18 Ga. Galvanneal Sheet
- c. Mounting Pads: 3" wide x 3/8" thick 304 Stainless Steel.
- d. Finish: Standard Operator skins are powder coated Black. Gate panels and optional operator skins colors are finished with AutoGate's spray

- application for the color of [Grey] [White] [Brown] [Green] [or Custom color _____ RAL# or sample needed for matching].
5. Mechanical Gate Operator Drive:
 - a. 24 VDC high torque gear motor and DBL reduction DBL “V” belt design.
 - b. Integral right angle Anti-Back drive and locking preventing falling and/or unauthorized motor operation.
 - c. Hydraulic components of any kind are not acceptable.
 6. Control Circuitry: Solid state coated AutoGate Genesis® Control Board in electrical enclosure. Sealed gate position sensor ensure weather and moisture-proof integrity. (Boards tested to –40° F).
 - a. Internal Operator Factory Wiring: 16 & 18 Ga. single conductor. Copper w/electrolytic copper compression terminals tin-plated for maximum corrosion prevention.
 - b. Accessories. Consult accessory manufacturer for installation and specific wiring instructions.

Note: Reference appropriate Class in the following paragraph for your project. Delete non-applicable classes. Contact AutoGate should you have questions.

Class I RESIDENTIAL VEHICULAR GATE OPERATOR – A vehicular gate operator (or system) intended for use in garages or parking areas associated with a residence of one to four single families.

Class II - COMMERCIAL / GENERAL ACCESS VEHICULAR GATE OPERATOR – A vehicular gate operator (or system) intended for use in a commercial location or building such as a multi-family housing unit (five or more single family units), hotel, garages, retail store or other buildings accessible by or servicing the general public.

Class III - INDUSTRIAL / LIMITED ACCESS VEHICULAR GATE OPERATOR – A vehicular gate operator (or system) intended for use in an industrial location or building such as a factory or loading dock area or other locations not accessible by or intended to service the general public.

Class IV - RESTRICTED ACCESS VEHICULAR GATE OPERATOR – A vehicular gate operator (or system) intended for use in a guarded industrial location or building such as an airport security area or other restricted access locations not servicing the general public, in which unauthorized access is prevented via supervision by security personnel.

- B. Gate Operator System shall be Listed to UL 325 [Class I] [Class II] [Class III] [Class IV] and the gate panel shall be fabricated in accordance with ASTM F2200.
 1. Type A Entrapment Sensing Device - Operator shall have inherent gate position and speed sensing system as part of the gate operator system. Type A shall be constructed such that it may not be removed or bypassed.
 2. Operator shall have provision for connection of Control System and for connection of [or supplied with] External Entrapment Sensing Device specified herein after.
- C. External Entrapment Sensing Device: Provide the following external entrapment protection devices as appropriate for the specific site conditions to protect against all potential entrapment zones. All entrapment areas/zones must be identified by the

installer and have physical restrictions of pedestrian access such as fence sections or barrier screening preventing reach through or standing in the entrapment zone or the installer shall supply additional external entrapment protection devices to protect pedestrians in all entrapment areas.

Note: The same type of device shall not be utilized for both entrapment protection means. Use of a single device to cover both the opening and closing directions is in accordance with the requirement; however a single device is not required to cover both directions. A combination of one Type B1 for one direction and one Type B2 for the other direction is the equivalent of one device for the purpose of complying with the requirements of either the primary or external entrapment protection means.

- 1. Photo Beams Type B1 - Non-contact sensor; Acceptable Products:
 - a. EMX Industries Model#: IRB-MON Transmitter / receiver type
 - b. EMX Industries Model#: IRB-RET Retro-reflective type
 - c. OMRON E3K-R10K4
 - 2. Safety Edges (Contact Edges) Type B2 - Contact sensor (edge device or the equivalent) Acceptable Product:
 - a. ASO GmbH Model 15-10
 - b. ASO GmbH Model 45
 - c. Miller Edge Model CPT 233
- D. *[If desired by owner or required per project]* Operator Options:
- 1. Provide surge and spike protection *[Recommended by AutoGate – Shall be Field Supplied per governing code compliance, owner acceptance, or as outlined in project specifications].*
 - 2. Provide Audible/Audible-Visual Warning Device(s) activated *[when gate is in motion] [warning lights or strobe on at all times].*
 - 3. Provide External Emergency Stop Button *[Mounted near the operator. Recommended to be 6' away from any portion of the moving gate in any position so as to discourage reaching through the gate and entrapment circumstances.]*

2.4 CONTROL SYSTEMS

Note: Include basic constant contact control system unless more sophisticated controls are specified in a separate section. Any dry contact type operator system is compatible with the AutoGate VPG2490.

- A. Operation control system: Remote-control stations, safety devices, and weatherproof enclosures; coordinate electrical requirements with building electrical system.
 - 1. Control Station (located remotely from gate and operator a minimum of 6' per UL 325): Constant pressure control station located in direct line of site to the gate and operator, *[Two Position (Open/close)] [Three position (Open, close, stop)].* Provide key switch to lock out open and close buttons.

Or

- 1. Gate Operation control systems are specified under Section __ ____.

2. Card Reader: Functions only when authorized card is presented (Brand___/Model___).
3. Digital Keypad Entry Unit: Multiple- [programmable] code (Brand___/Model___).
4. Radio Control: Digital system consisting of code-compatible universal receiver for each gate.
5. Telephone Entry System (Brand___/Model___).
6. 365 day timer [24/7 timer built into and standard on the VPG2490 system]
7. Vehicle Loop Detector.
8. Vehicle Presence Detector.
9. Probe or Microwave vehicle sensor (Brand___/Model___).

- B. Provide emergency stop button in an outdoor weather tight enclosure.

2.5 ACCESSORIES

- A. [Optional, select if desired] Provide ADA compliant [audible] [and] [or] [visible] warning device to signal both directions when the gate is opening and closing. [Program the VPG2490 Genesis® Control Board to activate the device(s) 1 to 5 seconds prior to gate movement to alert nearby pedestrians or security personnel.]
- B. [Required] Provide UL 325 compliant warning signs visible on each side of gate. Installer to ensure signs are visible on both sides of the gate in both the open and closed positions.
- C. [Optional but may be required per DOT or other State/Federal/Security Standard] Provide retro-reflective tape on gate frame (MUTCD, FHWA, etc. compliant)
- D. [Optional, select if desired] Provide Gate Panel mounted LED warning lights (visible in single/both directions of travel, mounted on top of gate or mounted mid-section horizontally)
- E. Optional Items (Heat packages are based on geographic need or request dependent, contact AutoGate for applicable locations and conditions.):
1. Gearmotor Heat Cable: Provide thermostatically controlled electric heat cable to maintain favorable operational temperature. Contact AutoGate for geographical recommended or required locations for the gearmotor heat cable. [Recommended for sustained temperatures for 3 days or more of 30° - 20°F, required when 20°F and below.]
 2. Auxiliary heater in cabinet
 3. Concrete pad heat system: Provide thermostatically and snow sensing system designed to heat the concrete pad the operator is mounted to.
 4. Heat Mat: Provide thermostatically controlled heat mat for the “throat” area of the operator to melt any buildup of snow.
 5. Extreme Cold/Arctic Operator Heat system: Provide an insulated Operator Cabinet and include a thermostatically controlled electric space heater with integral circulating fan. [Recommended for locations that have sustained temperatures at or below 0°F or -18°C.]

2.6 SETTING MATERIAL

- A. Ready-mixed concrete complying with ASTM C94: Normal-weight concrete 3000-psi 28 days compressive strength, 3-inch slump, and aggregate.
 - 1. Portland cement: ASTM C150, Type I.
 - 2. Aggregates: ASTM C33, 1-inch maximum size.
- B. Reinforcing Bars: ASTM A615 or governing code/project specification.
- C. Service and control conduit: Rigid Schedule 40 PVC embedded in concrete. All other conduit and wiring as specified in Division [26] [16].
- D. Expansion Bolts: Threaded or wedge type; galvanize ferrous castings, ASTM A47 malleable iron or ASTM A27 cast steel.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Installer's Examination: Examine conditions under which construction activities of this section are to be performed and insure all specified criteria is adhered to.
- B. Submit written notification to Architect/Engineer, Authority Having Jurisdiction, and system manufacturer if such conditions are unacceptable.
- C. Beginning installation constitutes installer's acceptance of conditions.

3.2 ELECTRICAL SERVICE & CONTROLS

- A. Provide all power and control wiring required for the work in accordance with the applicable provisions of Division [26] [16] and NEC 70.
- B. Perform all trenching and backfilling associated with this Section. Conduit shall be direct buried except under areas of vehicular traffic where it shall be reinforced concrete encased.
- C. Grounding system: All equipment and branch circuits shall be grounded. Provide driven ground rod at service. Provide separate ground wire in all branch circuits.

3.3 PADS & RECEIVING YOKES

- A. Foundations: Construct pads and yoke bases as indicated on the drawings with top of concrete flat and level.
- B. Excavation:
 - 1. Locate concrete foundations for operator base on firm, undisturbed soil.
 - 2. Yoke Excavation: Drill or hand-excavate holes.
- C. Vibrate or tamp concrete for consolidation. Finish top of foundations, smooth and even. Cure concrete 72 hours before place operator.

- D. Fasteners: Install operators and receiving yoke plates with expansion bolts or hardware provided by the Gate system manufacturer.

3.4 OPERATOR INSTALLATION

- A. Install units in accordance with the manufacturer's instructions.
 - 1. Operator Expansion Bolt Mounting: Anchor through operator footpad holes to concrete substrate.
 - 2. Install all loose shipped operator lower panels, debris shields if ordered, and guarding per manufacturer instructions.
- B. External Entrapment Sensing Device: Installer shall be responsible for providing, installing, and testing all external entrapment protection devices as appropriate for the specific site conditions to protect pedestrians in all potential entrapment zones. Identifying all potential entrapment zones and the proper operation of these safety devices shall be verified and training as to the operation and maintenance of these devices for the users and owners shall be documented.

3.5 GATE INSTALLATION

- A. Connect gate to operator in accordance with gate manufacturer's instruction.
- B. Install gate so that it is plumb and level when fully closed within the following tolerances:
 - 1. Maximum misalignment from true position: 1/4 inch (6.0 mm).
 - 2. Maximum misalignment between adjacent separated members: 1/8 inch (3.0 mm).

3.6 ADJUSTING

- A. Adjust and lubricate operating components for smooth, accurate operation free of binding and racking.

3.7 START-UP AND DEMONSTRATION

- A. Manufacturer's Service Representative: Provide at least 2 hours of manufacturer's representatives time for start-up and initial operation. Make a final check of each gate operation with Owner's personnel present and immediately before date of substantial completion or commissioning.
- B. Instruct Owner's personnel in proper use, operation, and maintenance of gate. Review emergency provisions, including procedures to be followed if gate does not close or open. Review and demonstrate manually opening and closing the gate system in the event of total loss of power.
- C. Instruct Owner's personnel in proper use, operation, and maintenance of all accessories and entrapment protection devices and provisions such as but not limited to: lights, access controls, photo eyes, contact sensors, barrier screening or fencing, etc.

- D. Train Owner's personnel in normal procedures to be followed in checking for sources of damage to wind bracing, operational failures or malfunctions.
- E. Full Wind Rating and Derating: Full wind load rating is subject to the wind bracing remaining in excellent condition and not compromised. Periodic inspection is a must in order to maintain full wind load rating. Any dents, bends, nicks and loose bolts will affect the performance of the bracing must be corrected or repaired. Additional, non-factory supplied signage must be approved by manufacturer.
- F. Determine that control systems and operating devices are functioning properly.
- G. [Adjust applicable automatic timers for periods required and as directed.]

3.8 CLEANING AND PROTECTION

- A. Remove dust or other foreign matter from component surfaces; clean finishes in accordance with manufacturer's instructions. Clean units in accordance with the manufacturer's instructions.
- B. Protection: After installation, protect installed work until project completion.
 - 1. Ensure that finishes and structure of installed systems are not damaged by subsequent construction activities.
 - 2. If minor damage to finishes occurs, repair damage in accordance with manufacturer's recommendations; provide replacement components if repaired finishes are unacceptable to Architect.

END OF SECTION 32 31 XX (02829)