

This section specifies Instrumentation and Control for **View® Dynamic Glass** in CSI format for use by design professionals for use in Project Manuals. Typically edit by deletion based on your project requirements. Please call 408-514-6512 or visit www.viewglass.com for more information.

SECTION 26 09 00 – INSTRUMENTATION AND CONTROL FOR DYNAMIC GLAZING

PART 1 - GENERAL

1.1 SUMMARY

- A. Related Documents: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Section Includes: Control system for Manufacturer's Glass Dynamic Glass system. Work by the electrical subcontractor includes, but is not limited to, installation of the dynamic glass system's wiring and controls. Work also includes wiring and controls outside of the framing system.
- C. Related Requirements:
 - 1. Section 08 80 00 – Dynamic Glazing.
 - 2. Section 25 13 00 - Integrated Control Network for Dynamic Glazing.
 - 3. Division 26 - Electrical

1.2 DEFINITIONS

- A. Refer to other divisions for industry standard glass and glazing definitions. The following apply to this section:
 - 1. IGU: Insulating Glass Unit.
 - 2. IGU Pigtail: Wire extruding from each Dynamic Glass insulating glass unit.
 - 3. Window Controller: Control module for Dynamic Glass System.
 - 4. IGU Cable: Wire that connects one IGU pigtail to one Window Controller.
 - 5. Control Sensor: Photo sensor that detects light levels.
 - 6. Wall Interface: Wall mounted user interface display.
 - 7. Window Controller:
 - a. Controller that sends voltage signal to one or multiple IGUs.
 - b. A device connected to trunk line via a drop cable and responsible for facilitating power delivery to connected IGU(s)
 - 8. Controls Integrated in Shop: For shop glazed units, in addition to dynamic glass.
 - a. Note: Control components including window controller and cables can be integrated into the framing system by the glazier. This is the recommended method to ensure higher quality product and lower install cost and complexity.
 - 9. Controls Integrated in Field: For field glazed units.
 - a. Note: Control components including the window controller and cables need to be integrated into the framing system or building envelope by the Electrical Contractor.
 - 10. BACnet: ASHRAE, ANSI, and ISO standard communications protocol for building automation and control networks.

1.3 SYSTEM DESCRIPTION

- A. Basic controls: Dynamic Glass insulated glass units shall be operated by manufacturer's Dynamic Glass control system.
 - 1. Dynamic glass control system must be model-based to optimize user comfort while accounting for solar position and occupant locations.
 - a. System glare control shall primarily be done via calculations of sun angle, window location, and penetration depth, not via light sensors
 - b. The system shall utilize a single exterior photo sensor to minimize installation and wiring costs but provide the capability to monitor light levels every 30 degrees to optimize user comfort
 - c. System must enable the ability to monitor the performance of the windows remotely with the capability to push software upgrades and make any program changes required by user and/or changing conditions of the surrounding area

2. Dynamic glass wiring must be CANBus communication based with a perimeter trunk line carrying power and data back to the control panel.
3. Dynamic glass wiring must be capable of taking an IGU offline without impacting adjacent and downstream IGUs
4. Dynamic glass must have flexible rezoning capability where zones can be modified without hardware or wiring changes
5. Dynamic glass wiring featuring pre-terminated connections to minimize wiring errors and labor costs
6. Dynamic Wall Interface must be color touchscreen based and configurable to control multiple zones from a single interface
7. Dynamic glass control system must use only one externally mounted sensor and not utilize internal light sensors
8. Provide designated 110v – 240v circuit feed to Manufacturer's Dynamic Glass Control Panel.

1.4 SUBMITTALS

- A. Comply with Division 01 General Requirements and submit for approval:
 1. Product Data: Manufacturer's Dynamic Glass literature including data sheets, installation instructions, use restrictions and limitations.
 2. Interconnect drawing: Electrical subcontractor shall review View Interconnect drawings and note any revisions to View related to trunk line lengths and window controller locations.
 - a. Interconnect wiring diagrams: Show framing system and integrated cables, cable routing, components, location of connectors, and exit from framing.
 - b. Include identification, lengths, quantities and locations of cabling and components.
 - c. Large scale drawings for fabrication, installation and erections including plans, elevations, details, anchorages, connections and accessories along with head, jamb, sill and joining details. Provide templates for work installed by others.
 - d. Take accurate field measurements before fabrication and indicate same on shop drawings.
- B. Ensure electrical schematics and shop drawings for control system have been reviewed and approved by manufacturer before being submitted.

1.5 QUALITY ASSURANCE

- A. Installer qualifications:
 1. Experienced with comparable installations and having successful performance on not less than 3 such installations.
 2. Acceptable to manufacturer.
- B. Controls, Software, and Services installers will attend a minimum of (1) pre-installation training session conducted by View Project Manager either in person or via web hosted by View Project Manager prior to Controls, Software, and Services installation. Attendance at training session to be confirmed by View Project Manager.
- C. Pre-Installation Meetings: Conduct meeting to review procedures, schedules, safety, and coordination with other project elements.
 1. Recommended Attendance: Architect, Contractor, glazing contractor, framing manufacturer, electrical contractor, automation engineer, Dynamic Glass manufacturer.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Comply with product requirements, delivery storage and handling provisions of Division 01 and the following:
 1. Do not deliver components until job is ready for installation.
 2. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
 3. Store materials in original packaging, protected from exposure to harmful environmental conditions including static electricity, and at temperature and humidity conditions recommended by manufacturer.

4. All cables supplied by manufacturer shall have an installation temperature rating of -20 C to 80 C. If the cables are to be installed below 0 C, the cables shall be conditioned for 24 hours at room temperature prior to installation.

1.7 PROJECT CONDITIONS

- A. Verify conditions including:
 1. That frame channel dimensions are adequate for wire runs as designed.
 2. That penetrations for frame/sensor cables are in place and correctly located.
- B. Environmental Requirements: Install assemblies only in indoor, clean, climate controlled spaces using the final building mechanical system.

1.8 WARRANTY

- A. For Controls, Software, and Services Components necessary for operation and control of insulating glass units, the manufacturer shall warrant the system free of defects in material and workmanship as follow:
 1. Warranty period shall commence on the date of delivery of components by the system manufacturer.
 2. Warranty period: 5 years.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Basis-of-Design: View Dynamic Glass Instrumentation and Control assemblies as manufactured or supplied by:

VIEW Inc.
195 S. Milpitas Blvd, Milpitas, CA 95035
Telephone: 408-514-6512
E-mail: salesops@viewglass.com
Internet: <http://www.viewglass.com>.
- B. Substitutions: Not permitted
- C. Proposed substitutions: Will be reviewed only if submitted in writing for approval by the design professional of record a minimum of 10 working days prior to the bid date and made available to all bidders. Proposed substitutes shall be accompanied by review of specification noting compliance on a line-by-line basis.

2.2 MATERIALS

- A. Dynamic Glass Control Panel:
 1. Wall mounted enclosure housing power supplies and controllers operating control system, typically containing up to six Class 2 power outputs.
 2. Power specification:
 - a. Input Power: 100-240 VAC (single-phase), 50/60 Hz.
 - b. Output Power (at each power output): 24VDC, 4.0A.
 3. Components include:
 - a. Master Controller.
 - b. Network Controller.
 - c. Class 2 Power supplies.
 4. Where required, utilize a control panel with Class 1 power outputs:
 - a. Input Power: 100-240 VAC (single-phase), 50/60 Hz.
 - b. Output Power (at each power output): 30VDC, 4.0A.
 - c. Class 1 power supplies are used in the control panel; all other components are the same as section 2.2 (A) (3).
- B. Cabling: Provide cabling by system manufacturer using only approved parts and including:
 1. Trunk line cable.
 2. Trunk tee connector.
 3. Drop line cable.

4. Trunk power cable.
 5. Trunk power connector.
 6. IGU cable.
- C. Window controller: Controllers shall be connected to at least one insulating glass unit. Refer to definitions for functional description.
- D. IGU pigtail: Manufacturer's custom cable as follows:
1. Length: 12 inches (300mm)
 2. Termination: IP67 rated, environmentally sealed, 5/16 inch (8mm) circular connector.
 3. Minimum diameter hole through framing: 7/16 inch (11mm).
- E. Control Sensor:
1. Outdoor Photo sensor: up to 100,000 Lux.
 2. To be determined by manufacturer's engineering team.
- F. Optional Accessories:
1. Power Injection Panel: Used in installations requiring additional power as determined by manufacturer.
 2. Pull Box: Used to conceal and protect cable connections to control panel.
 3. Wall Interface:
 - a. Wall-mounted hardware or software-based interface for overriding the tinting of a zone or a group of zones
 - b. Note: Hardware-based version requires connection to window controller.
- G. AC Wiring: Supplied under other sections by Electrical contractor.
- H. Ethernet Wiring: Supplied under other sections by Electrical contractor or IT facilities installers.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine site conditions and ensure that:
1. Controls network is comprised of a single linear trunk line from control panel to end of façade and each window controller branches off trunk line.
 2. Equipment, conduit, gang boxes, and other related materials are installed and ready to receive Work of this Section.
 3. Conduit and boxes are concealed.
- B. Correct conditions deemed unsatisfactory and do not proceed until required corrections are complete.

3.2 CONTROLS INSTALLATION

- A. Using approved submittals, install products in accordance with manufacturer's instructions, recommendations, restrictions and limitations and in environment meeting specified conditions.
- B. Options for Control Integration:
1. In-Shop: Install Window Controller, cables and other control components per framing manufacturer's wiring diagram.
 2. In-Field: Install Window Controller, cables and other control components per interconnect wiring diagrams.
- C. Install Trunk Line cables according to the instructions to form a linear network.
1. Utilize trunk tees and drop cables as required to connect Window Controllers.
 2. Ensure Trunk Line cable is connected with Trunk Tees as required for its entire length.
 3. Ensure Trunk Line cable has trunk terminators installed at each end of line.
- D. Ensure Trunk line wire run lengths comply with Manufacturer's Dynamic Glass Control System Design Rules.
1. Refer to approved interconnect drawings for details.
- E. Install drop cables from Trunk Tees to Window Controllers.

- F. Install pre-labeled Window Controllers using provided mounting holes at locations specified on View Interconnect drawings.
 - 1. Ensure Controllers are accessible for service after installation.
- G. Make final connection between IGU cables (installed by glazier and labeled to match window controller) and window controller.
- H. Do not modify IGU pigtails, especially the pre-terminated connector. Contact manufacturer's product support if connector is damaged.
- I. Complete View Glass Site Installation and Verification Checklist requirements for low voltage subcontractor to verify Controls, Software, and Services integrity. Controls, Software, and Services testing procedures are to be conducted after IGU installation and testing completed.
- J. Evaluate any performance irregularities and recommend corrective action for any Controls, Software, and Services component or IGU test failure to general contractor and View Glass project manager.
- K. Provide signed and dated Site Installation and Verification Checklist to general contractor verifying that all installed Controls, Software, and Services components are functional based on View test procedures.
- L. Provide Site Installation and Verification Checklist verifying that all installed Controls, Software, and Services components are functional based on View test procedures signed and dated by General Contractor.

3.3 PROGRAMMING OF DYNAMIC GLASS SYSTEM

- A. Initial Programming Confirmation: Confirm and define specific programming requirements for Manufacturer's Dynamic Glass system controls.
- B. Pre-programming of Controls: Pre-program controls at factory to match initial programming requirements.
- C. Final programming: Using manufacturer's personnel, modify and complete programming at end of commissioning period.

END OF SECTION 26 09 00

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