

## SECTION 26 09 00

### INSTRUMENTATION AND CONTROL FOR ELECTRICAL SYSTEM

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section includes:
  - 1. SageGlass® control system for use with SageGlass® electronically tintable insulated glass units.
- B. Related Sections:
  - 1. Section 08 88 00 – Special Function Glazing.
  - 2. Division 25 - Integrated Automation.
  - 3. Division 26 - Electrical.

##### 1.2 DEFINITIONS

THE FOLLOWING FRAME WIRE HARNESS EXTENDS PIGTAIL AND CONNECTS TO CENTRAL CONTROL LOCATION.

- A. Frame Wire Harness: Wire that runs through framing system and connects IGU pigtail to low-voltage wiring on interior of building.
- B. IGU Pigtail: Wire that extends from individual insulated glass units.
- C. IGU: Insulated Glass Unit.
- D. Tinted: On state, with lowest visible light transmission.
- E. Untinted: Off state, with highest visible light transmission.
- F. Wall Station: Wall mounted control interface

##### 1.3 SUBMITTALS

- A. Product Data: Manufacturer's Product Data sheets including installation instructions.

SHOP DRAWINGS NOT PROVIDED BY SAGE ELECTROCHROMICS. THESE NEED TO BE PROVIDED BY OTHERS.

- B. Shop Drawings: Indicate wiring diagram, connections to frame wire harnesses, and other related connections. Indicate locations of materials and routing of wiring.

##### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Acceptable to SAGE Electrochromics and capable of preparing data for control systems, based on testing and engineering analysis of SAGE Electrochromics' standard units in assemblies similar to those indicated for this Project.
- B. Pre-Installation Meetings: Conduct pre-installation meeting or teleconference with the following parties in attendance:
  - 1. Architect, Contractor, glazing contractor, framing manufacturer, SageGlass® IGU manufacturer, electrical contractor, and other parties related to Work of this Section, to review procedures, schedules, safety, and coordination with other elements of Project.

##### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Comply with manufacturer's instruction for receiving, handling, storing, and protecting materials.

- B. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- C. Store materials in original packaging, protected from exposure to harmful environmental conditions, including static electricity, and at temperature and humidity conditions recommended by manufacturer.

#### 1.6 PROJECT / SITE CONDITIONS

- A. Verify location of junction boxes and wall switches near IGUs.
- B. Verify location of wire penetration into building.
- C. Verify location of control panels within building.

#### 1.7 WARRANTY

- A. Warrant SageGlass® Controls against defects in material or workmanship for a period of five years from the date of shipping of the Controls from the manufacturer.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

**NOTE: SAGEGLASS® ELECTRICALLY TINTABLE IGUs CAN ONLY BE OPERATED WITH A SAGEGLASS® CONTROL SYSTEM.**

- A. Subject to compliance with requirements, provide products from the following manufacturer:
  - 1. SAGE Electrochromics, Inc.  
One Sage Way.  
Faribault, MN 55021.  
Telephone: 877-SAGEEC1 (877-724-3321).  
Fax: 1-507-333-0145.  
E-mail: [commercialsales@sage-ec.com](mailto:commercialsales@sage-ec.com) or [technicalservices@sage-ec.com](mailto:technicalservices@sage-ec.com).  
Internet: <http://www.sage-ec.com>.

#### 2.2 MATERIALS

**EDIT NOTE: DELETE THE FOLLOWING CONTROL SYSTEM IF NOT REQUIRED ON PROJECT.**

- A. SageGlass® Panel Mounted Control System:
  - 1. Wall Station:
    - a. Peak Power: 1 Watt
    - b. Max input voltage: 12 Volts DC
    - c. Max input current: 0.1 Amp
    - d. Fuse rating: 4 Amps
    - e. Height: 4.1 inch (10.4 cm)
    - f. Width: 1.75 inch (4.45 cm)
    - g. Depth: 1.0 inch (2.54 cm)
  - 2. Sage Glass® AT-410 Panel-Mounted Controls (One AT-410 required for every 4 IGUs within the same zone):
    - a. Electrical Peak Power: 40 watts.
    - b. Maximum Input Voltage: 12 volts DC.
    - c. Maximum Input Current: 3.4 amps.
    - d. Fuse Rating: 4 amps.
    - e. Maximum Output Voltage: 10 volts DC.
    - f. Maximum Output Current: 1 amp.

- g. Height: 2.4 inch (6.1 cm).
- h. Width: 4.3 inch (10.9 cm).
- i. Depth: 0.8 inch (2.1 cm).
- 3. Sage Glass® AT-SIM Panel-Mounted RS-232 serial interface module:
  - a. One 9-pin bidirectional serial port.
  - b. Two dry contact inputs.
  - c. Two LED outputs, 20mA each.
  - d. Height: 2.4 inch (6.1 cm).
  - e. Width: 4.3 inch (10.9 cm).
  - f. Depth: 0.8 inch (2.1 cm).
- 4. Power Supply:
  - a. UL Listed, Class 2.
  - b. Electrical Peak Power: 60 watts.
  - c. Input voltage: 120 volts AC.
  - d. Max output voltage: 12 volts DC.
  - e. Max output current: 5 amps.
- 5. 120V AC Power Cord.
- 6. Enclosure: Indoor surface or flush mounted with cover:
  - a. Height: 42 inch (106.68 cm)
  - b. Width: 14.5 inch (36.83 cm)
  - c. Depth: 3.5 inch (8.89 cm)

EDIT NOTE: DELETE THE FOLLOWING CONTROL SYSTEM IF NOT REQUIRED ON PROJECT.

- B. SageGlass® AT-410S Control System integrated with wall station:
  - 1. Peak Power: 40 watt.
  - 2. Maximum Input Voltage: 12 volts DC.
  - 3. Maximum Input Current: 3.4 amp.
  - 4. Fuse Rating: 4 amps.
  - 5. Maximum Output Voltage: 10 volts DC.
  - 6. Maximum Output Current: 1 amp.
  - 7. Height: 4.1 inches (10.4 cm).
  - 8. Width: 1.75 inches (4.45 cm).
  - 9. Depth: 1 inch (2.54 cm).
  - 10. Power Supply:
    - a. UL Listed, Class 2.
    - b. Electrical Peak Power: 60 watts.
    - c. Max output voltage: 12 volts DC.
    - d. Max output current: 5 amps.

THE FOLLOWING MATERIALS ARE NOT FURNISHED BY SAGE ELECTROCHROMICS. THESE NEED TO BE PROVIDED BY CONTRACTOR.

- C. Class II Wiring:
  - 1. Control System to Frame Wire Harness: Multi-conductor type with insulation required by NEC or applicable building codes; gages appropriate to system design.
  - 2. Control System to Wall Station 4-conductor, dual twisted pair type, 26 AWG minimum conductor size, with insulation required by NEC or applicable building codes.
- D. 120V AC Wiring:
  - 1. 120V AC, 15A service to receptacles in each control enclosure.

## 2.3 ACCESSORIES

THE FOLLOWING MATERIALS ARE NOT FURNISHED BY SAGE ELECTROCHROMICS. THESE NEED TO BE PROVIDED BY CONTRACTOR.

- A. Gang Boxes: Single or double gang type as required to house wall stations.
- B. Splice Connectors: Low voltage type, such as wire nuts or terminal strips, for connecting IGU frame wire harness and interior low voltage control.
- C. Faceplates: Provide standard "Decora" type faceplates to fit installed gang boxes.
- D. Junction Boxes: Sized appropriately for necessary Class II connections between the frame wire harnesses and field wiring.
- E. Receptacles: 120V 15A receptacles installed in control enclosures (two receptacles per panel).

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Ensure that equipment, conduit, gang boxes, and other related materials are installed and ready to receive Work of this Section.
  - 1. Ensure conduit and boxes are concealed.
- B. Install products per SAGE Electrochromics' instructions.
- C. Install wall station and control panels in dry locations only.
- D. Ensure wire run lengths between control system and IGU pigtail comply with the following distances:

<u>Wire Size</u>	<u>Max. Distance Between Window and Control</u>
18 AWG	300 feet
20 AWG	200 feet
22 AWG	120 feet
24 AWG	70 feet
- E. Ensure wire run between control panel and wall station is no longer than 2000 feet.
- F. Wall Station: Install in standard single gang wall mounted junction box.
- G. Cross functional team required.

### 3.2 COMMISSIONING

- A. Before start-up of SageGlass® system, conduct visual inspection to verify system is installed per code and in working order. Verify proper wire connections to and from equipment and insulated glass units.
- B. When system is in start-up, conduct an overall system test and verify system is operating per system SAGE Electrochromics' operating instructions.

## END OF SECTION

THE INFORMATION CONTAINED IN THIS PUBLICATION IS OFFERED FOR ASSISTANCE IN THE SPECIFICATION OF SAGE ELECTROCHROMICS, INC. PRODUCTS. IT IS NOT INTENDED TO BE COMPLETE AND SAGE ELECTROCHROMICS DOES NOT ASSUME ANY RESPONSIBILITY FOR THE ADEQUACY OF THE SPECIFICATION FOR A PARTICULAR APPLICATION. DUE TO CONTINUAL RESEARCH AND PRODUCT IMPROVEMENT, THE SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE

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