This section specifies Communication and Control for View® Smart Windows in CSI format for use by design professionals in Project Manuals. Edit by deletion based on your project requirements. Please call 408-263-9200 or visit www.view.com for more information.

# SECTION 25 13 00 INTEGRATED CONTROL NETWORK FOR SMART WINDOWS

# PART 1 - GENERAL

* 1. **SUMMARY**
		1. Related Documents: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
		2. Section Includes: Requirements for integrated automation and remote monitoring for Manufacturer’s Smart Window System. Work includes, but is not limited to, the following:
			1. Connecting the Smart Window Building Controller, ensuring functionality of edge services, cloud connectivity, and connectivity of all other elements of the Smart Window network
			2. Ensuring remote connectivity from Manufacturer HQ to the Smart Window Building Controller for Manufacturer personnel to commission, configure, and maintain the system
			3. Ensuring that the Smart Window mobile and cloud applications function properly for users both inside and outside the firewall (if applicable)
			4. Connecting a separate private VLAN for the control panels to communicate together (if applicable)
			5. Connecting to a BMS system (as applicable) using REST APIs

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|  | C. | Related Requirements: |
|  | 1. Section 08 80 00 – Smart Glazing
2. Section 26 09 00 – Power for Instrumentation for Smart Windows
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|  | 3. Section 27 10 00 - Instrumentation and Control for Smart Windows |
|  | 4. 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: Insulated Glass Unit
2. BMS: Building Management System
3. Building Controller: Enterprise-grade server that serves as a control and automation hub for the Smart Window system
4. Central Network Hub: A telecom cabinet that houses the main networking components that connect and manage the various components of the Smart Window System
5. Control Panel: Wall-mounted enclosure that houses the control components and power sources responsible for operating a set of windows in the Smart Window system
6. Quad Network Window Controller: Control module for Smart Window System that
	1. Sends and receives electrical and data signals for up to four windows
	2. Is connected directly to trunk line and responsible for facilitating power delivery to connected IGU(s)
	3. Delivers power over ethernet (PoE) to connected devices
7. REST API: REST (Representational State Transfer) APIs (Application Programming Interfaces) are commonly used communication protocols between different software systems on the internet
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| **1.3** |  | **SYSTEM DESCRIPTION** |
|  | A. | Basic Controls:1. Smart Window Insulated Glass Units (IGUs) shall be operated by the manufacturer’s Smart Window control system
2. The Smart Window control system consists of a network of one Central Network Hub and one or more Control Panels mounted at the project site (usually in the electrical room or closet), Quad Network Window Controllers mounted behind an access panel or a suitable equivalent area, and associated wiring for data and power
3. The Control Panel contains power supplies and components that communicate with the Quad Network Window Controllers. The Central Network Hub contains the Smart Window Building Controller, that controls all the critical functions and services required to operate the glass. These include the scheduler, interfaces for mobile devices and BMS, critical glass control parameters, and the building dimensions and parameters for the manufacturer’s automatic control mode. The Quad Network Window Controllers connect to the IGUs, computes and provides the precise voltage required to operate the windows at various tint states
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| **1.4** |  | **SUBMITTALS** |
|  | A. | Comply with Division 01 General Requirements and submit for approval: |
|  |  | 1. Product Data: Manufacturer’s Smart Window literature including data sheets, installation |
|  |  | instructions, use restrictions and limitations |

# QUALITY ASSURANCE

* + 1. Integrated Automation Installer Qualifications:
			1. Experienced with comparable installations and having successful performance on not less than 3 such installations
			2. Acceptable to Smart Window manufacturer

# PROJECT CONDITIONS

* + 1. Environmental Requirements: Install assemblies only in an indoor, clean, climate-controlled space using the final building mechanical system.

# WARRANTY

* + 1. 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. The warranty period shall commence on the date of delivery of components by the system manufacturer.
			2. Warranty period: 5 years

# PART 2 - PRODUCTS

* 1. **MANUFACTURER**
		1. Basis-of-Design: ‘View Net’ or View’s Smart Window Integrated Automation Control and Monitoring Network assemblies as manufactured or supplied by:

VIEW Inc.

195 S. Milpitas Blvd, Milpitas, CA 95035 Telephone: 408-263-9200

E-mail: salesops@view.com Internet: <http://www.view.com>

* + 1. Substitutions: Not permitted
		2. 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.

# PART 3 - EXECUTION

* 1. **BUILDING CONTROLLER CONNECTIVITY**
		1. Verify Smart Window Building Controller (housed in the Central Network Hub) connectivity to the corporate IT network, Manufacturer HQ, the Smart Window Control Network, and to either public or private DNS/ NTP server.
		2. Ensure the Building Controller is installed in the Corporate IT infrastructure such that the rest of the system components operate correctly, including:
			1. Communication to the Quad Network Window Controllers on the private network.
			2. Communication to the Smart Window mobile and cloud applications for users both inside and outside the corporate network/firewall.
		3. Control Panels required to service multiple floors or buildings shall be connected to the Building Controller using fiber-optic cables in a ring topology, as per integration drawings, to allow critical communication to/from the Control Panels and the associated Quad Network Window Controllers.

# REMOTE CONNECTIVITY

* + 1. Verify Remote Connectivity from Manufacturer HQ to the Smart Window Building Controller to enable consistent remote access for Manufacturer’s personnel to commission, configure, monitor, and maintain the system.
			1. Connectivity Options: Provide connection through the following as applicable.
				1. Firewall via DMZ using routable IP address for the Building Controller – if Inbound/Outbound restrictions are added, use port mapping. Firewall via port mapping using routable IP address for the Building Controller
				2. Firewall restricted to the Smart Window IP address range (for extra security) via port mapping or DMZ.
				3. Firewall with VPN access.
				4. Guest/Vendor network separate from your business network.
			2. Outbound Requirements:
				1. TCP port 53: Required for DNS, can use a customer provided internal DNS server
				2. UDP port 123: Required for NTP servers. Public us.pool servers used by default, can use customer internal server as requested
				3. TCP port 443: HTTPS based outbound connection used for remote monitoring, application control and software updates
				4. TCP port 8443: HTTPS based outbound connection for authenticating users and ensuring authorization
				5. TCP port 8883: MQTT over TLS
				6. TCP port 1883: Required for cloud connectivity

# MOBILE AND CLOUD APPLICATION CONNECTIVITY

* + 1. Verify operation of Smart Window mobile and cloud applications for users inside and outside the corporate network/firewall. Applications shall have direct communication with the Building Controller via Wi-Fi or cellular network.

# FINAL OPERATIONAL TESTING CONNECTIVITY

* + 1. After Smart Window system start-up, conduct an overall system test to verify system is operational per system operating instructions.

# END OF SECTION 25 13 00

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