

SECTION 230904 - BAS COMMUNICATION DEVICES**PART I. GENERAL****I.1 SECTION INCLUDES**

- A. EBMS Gateway (BPOC)
- B. VFD Network Requirements

I.2 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Section *{Insert Applicable Specification Section}*- Basic Mechanical Requirements
- C. Section 230900 - Building Automation System (BAS) General
- D. Section 230901 - BAS Basic Materials, Interface Devices, and Sensors
- E. Section 230903 - BAS Field Panels
- F. Section 230905 - BAS Software
- G. Section *{Insert Applicable Specification Section(s)}* – Sequences of Operation
- H. Section 230801 - BAS Commissioning

I.3 DESCRIPTION OF WORK

- A. Contractor shall provide all interface devices and software to provide an integrated system connecting controllers and Gateways to the UNC EMCS VLAN.

PART II. PRODUCTS**II.1 EBMS GATEWAY (BPOC)**

- A. Building Point of Connection shall be an Echelon iLon 100 E3 Web Server. Substitutions (i.e. Loytec 1250) shall be on a case by case basis and only after submission and approval of the gateway's features and capabilities, including Web Services description language documentation.

II.2 VFD NETWORK REQUIREMENTS

- A. Variable frequency drives shall include a ANSI 709.1 network connection consisting of a ANSI 709.3 TP/FT-10 connector.
- B. The VFD shall be a microprocessor-based communications device that acts as a gateway between the BAS network and the applicable VFD.
- C. The VFD shall contain its own microprocessor, RAM, battery, communication ports and, power supply.
- D. Each VFD shall support full bi-directional communications translation as more fully specified in Section 230905.

- E. All available points shall be mapped to the Interface. Contractor shall submit points list from the VFD manufacturer.
- F. Communication capabilities shall include, but not be limited to; run-stop control, speed set adjustment, proportional/integral/derivative PID control adjustments, current limit, acceleration/deceleration time adjustments, and lock and unlock the keypad. The drive shall have the capability of allowing the BAS to monitor feedback such as process variable feedback, output speed / frequency, current (in amps), % torque, power (kW), kilowatt hours (resettable), operating hours (resettable), and drive temperature. The BAS shall also be capable of monitoring the VFD relay output status, digital input status, and all analog input and analog output values. All diagnostic warning and fault information shall be transmitted over the serial communications bus. Remote VFD fault reset shall be possible. The following additional status indications and settings shall be transmitted over the serial communications bus; keypad "Hand" or "Auto" selected, bypass selected, the ability to change the PID setpoint, and the ability to force the unit to bypass (if bypass is specified). The BAS system shall also be able to monitor if the motor is running in the VFD mode or bypass mode (if bypass is specified) over the communications interface. A minimum of 15 field parameters shall be capable of being monitored.
- G. The VFD shall allow the BAS to control the drive's digital and analog outputs via the serial interface. This control shall be independent of any VFD function. For example, the analog outputs may be used for modulating chilled water valves or cooling tower bypass valves. The drive's digital (relay) outputs may be used to actuate a damper, open a valve or control any other device that requires a maintained contact for operation. In addition, all of the drive's digital and analog inputs shall be capable of being monitored by the BAS system.

PART III. EXECUTION

III.1 INSPECTION:

- A. Examine areas and conditions under which control systems are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

III.2 INSTALLATION OF CONTROL SYSTEMS:

- A. General: Install and configure one or more EBMS gateway(s) to provide interface between UNC EBMS LAN and building ANSI 709.1 control network. Install systems and materials in accordance with manufacturer's instructions, roughing-in drawings and details shown on drawings. Determine the number of iLon 100 R3s required based on network capacity and point capacity of the iLon 100 R3. If multiple iLon 100 R3s are needed, ensure that their combined network usage on the control network does not exceed the 30% bandwidth utilization.
- B. Provide all interface devices and software to provide an integrated system and coordinate with all other Divisions of the Specifications and suppliers to assure all systems are interoperable and data specified provided.
- C. Coordinate closely with the Owner, or designated representative, to establish IP addresses and communications to assure proper operation of the building control system with the UNC EMCS VLAN

- D. BPOC shall be capable of synchronizing time with a UNC time server. BPOC shall be capable of pushing correct time to any controller with a real time clock.
- E. Use Local Data Points for network communication. The use of External Data Points for integration is not permitted.
- F. Bind points on the 709.1 network to the BPOC as nvi's and nvo's. These bindings shall use the following communication methods (in addition to general requirements for the 709.1 control network):
 - a) Binding must use send on change of value
 - b) Analog data from the 709.1 network to the BPOC (bound as nvis) shall use unacknowledged send once except for points requiring alarming, which shall use acknowledged send. Binary data shall use acknowledged send.
 - c) Data from the BPOC (bound as nvo's) to the 709.1 network shall use acknowledged send
- G. The following points shall be bound as nvi's to the BPOC:
 - a) All hardware I/O points
 - b) All system/building/zone setpoints.
 - c) All points on the building control network which have an alarm associated with it.
 - d) All system/building/zone mode and status variables.
- H. Implement override function of all setpoints and start/stop commands and shall provide SNVTs to perform the override bound as nvo's to the BPOC to support the issuing of overrides from the EBMS via Web Services at the BPOC.
- I. For any schedules residing in the BPOC, the BPOC shall be configured such that the schedule can be queried or changed via Web Services.
- J. For any schedules residing elsewhere on the 709.1 network, provide SNVTs bound as nvo's to the BPOC to support modification of these schedules. Contractor shall provide SNVTs bound as nvi's to the BPOC to support the querying of schedules.
- K. Configure BPOC to expose all nvi's as readable via Web Services and nvo's as writeable via Web Services. Contractor submittals shall document this mapping.
- L. BPOC shall be configured to provide alarm information via Web Services for the following events:
 - 1. Any control network fault
 - 2. Any communication error on the control network
- M. Contractor may implement additional supervisory control functionality in the BPOC. If additional supervisory control functionality is implemented in the BPOC, then the BPOC and that functionality shall be subject to the requirements for supervisory control as covered elsewhere in these specifications.

END OF SECTION 230904