

# Guide Specification for the Vykon Niagara Edge 10 controller (VEC-10)

*[Note to specifier: Provide additional details such as sequence of operation, graphics description, alarm handling, points list, networking details etc. as required.]*

## 1.0 SYSTEM EDGE CONTROLLER (SEC)

- A. These controllers are designed to perform the function of programmable equipment controllers (PEC), application specific controllers (ASC) and advanced unitary controllers (AUC) manage communications between itself and other system network controllers (SNC) and with any operator workstations (OWS) that are part of the BAS, and perform control and operating strategies for the system based on information from any controller connected to the BAS.
- B. The controllers shall be fully programmable utilizing an embedded Niagara Workbench toolset to meet the unique requirements of the facility it shall control.
- C. The controllers shall be capable of peer-to-peer communications with other SEC's and with any OWS connected to the BAS, whether the OWS is directly connected, connected via cellular modem or connected via the Internet. All peer to peer communications shall be encrypted.
- D. The communication protocols utilized for peer-to-peer encrypted communications between SEC's will be Niagara 4 Fox. BACnet TCP/IP, Modbus TCP and SNMP shall be optional and only used when specified. Use of a proprietary communication protocol for peer-to-peer communications between SEC's is not allowed.
- E. The SEC shall employ a device count capacity license model that supports expansion capabilities. Shall support up to 78 IO points (10 on board IO, up to an additional 68 IO points via Niagara based expansion modules)
- F. The SEC shall be enabled to support and shall be licensed with the following Open protocol drivers (client and server) by default:
  - 1. BACnet
  - 2. MODBUS
  - 3. SNMP
- G. The SEC shall be capable of executing application control programs to provide:
  - 1. Calendar functions.
  - 2. Scheduling.
  - 3. Trending.
  - 4. Alarm monitoring and routing.
  - 5. Time synchronization.
  - 6. Integration of SNMP, BACnet, and MODBUS controller data.
  - 7. Application specific and custom control algorithms.
  - 8. Analytics algorithms, alarms, graphics
- H. The SEC shall provide the following hardware features as a minimum:
  - 1. Two 10/100 Mbps Ethernet ports. The SEC shall include two Ethernet ports that are capable and by default will route data between the two ports to allow for daisy chaining. See specification and drawings for network details.
  - 2. Optically isolated RS-485 port

3. 512 MB DDR SDRAM
  4. 2GB total eMMC flash storage
  5. High Speed Field Bus Expansion
  6. -20-60°C Ambient Operating Temperature
  7. Integrated 24 VAC/DC Global Power Supply
  8. Employ Encrypted Safe Boot Technology
  9. 5 Universal inputs: Type 3 (10K) thermistors, 0-100K ohm, 0-10VDC, 0-20mA with external resistor, Dry Contact
  10. 2 Analog outputs: 0-10VDC, 4mA max output current
  11. 3 Digital outputs: Triac, 24VAC @.5 amp
  12. Optional 68 points of IO expansion – combination of Niagara IO-R-16, IO-R-34 (no exceptions)
- I. The SEC shall support standard Web browser access via the Intranet/Internet. It shall support a minimum of 16 simultaneous users.
- J. The SEC shall provide alarm recognition, storage, routing, management and analysis to supplement distributed capabilities of equipment or application specific controllers.
- K. The SEC shall be able to route any alarm condition to any defined user location whether connected to a local network or remote via cellular modem, or wide-area network.
1. Alarm generation shall be selectable for annunciation type and acknowledgement requirements including but not limited to:
    - a. Alarm.
    - b. Return to normal.
    - c. To default.
  2. Alarms shall be annunciated in any of the following manners as defined by the user:
    - a. Screen message text.
    - b. Email of complete alarm message to multiple recipients.
    - c. Pagers via paging services that initiate a page on receipt of email message.
    - d. Graphics with flashing alarm object(s).
  3. The following shall be recorded by the SEC for each alarm (at a minimum):
    - a. Time and date.
    - b. Equipment (air handler #, access way, etc.).
    - c. Acknowledge time, date, and user who issued acknowledgement.
- L. Programming software and all controller "Setup Wizards" shall be embedded into the SEC. External Niagara based engineering tools shall also be supported.
- M. Application Control Engine (ACE)
1. Niagara ACE technology shall be utilized for all SECS
  2. Upon reboot and or return to power after a power failure, the control engine shall restart in less than 10 seconds.
- N. The SEC shall support the following security functions.
1. Module code signing to verify the author of programming tool and confirm that the code has not been altered or corrupted.
  2. Role-Based Access Control (RBAC) for managing user roles and permissions.
  3. Require users to use strong credentials.
  4. Data in Motion and Sensitive Data at Rest be encrypted.
  5. LDAP and Kerberos integration of access management.
  6. Secure Boot technology
  7. 802.1X
  8. FIPS 140-2
- O. The SEC shall support the following data modeling structures to utilize Search; Hierarchy; Template; and Permission functionality:

1. Metadata: Descriptive tags to define the structure of properties.
  2. Tagging: Process to apply metadata to components
  3. Tag Dictionary
  4. Niagara Analytics
- P. The SEC shall employ Niagara template functionality. Templates are a containerized set of configured data tags, graphics, histories, alarms that are set to be deployed as a unit based upon manufacturer's controller and relationships. Templates shall be employed in this project and used in the SEC. Template files shall be provided to the owner. All lower level communicating controllers connected to the SEC (PEC, AUC, VAV, VFD...) shall have an associated template file for reuse on future project additions.
- Q. The SEC shall be provided with a software license that allows for all revisions, bug fixes, feature enhancements from the manufacturer for the life of the current major software release (Niagara 4) at no additional charge. Labor to implement software upgrades after the warranty shall not be included.
- R. SEC shall be based on the Tridium Vykon Edge 10 hardware and Niagara 4 software platform.
1. No exceptions.
  2. The latest Niagara 4 revision shall be provided at the time of system acceptance.
- S. Sequence of Operation
1. See specifications and drawings for sequence details and detailed points list.
- T. Acceptable Niagara Brands
1. Vykon VEC-10 (No exceptions).