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SECTION 40 63 43

Building Automation Controller

PART 1 - GENERAL

1.1   DESCRIPTION

A.   Scope:
   1.   Contractor shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish and install a fully functional Building Automation Controller (BAC) system.
   2.   The hardware and architecture of the system shall be that of a BACBAC A BAC with components no longer supported or being removed from support within two years by BAC manufacturer shall not be acceptable.
   3.   The hardware required for the BAC is shown on the BAC block diagram and is comprised of the following types of major monitoring processing and control equipment units:
      a.   Support for ring redundancy for the Ethernet networks.
      b.   Local and remote I/O subsystem support.
      c.   I/O drivers to communicate with BAC's.
      e.   Network communication devices.
      f.   Power Supplies.
      g.   Telemetry Units.
      h.   I/O Cards.
      i.   I/O Chassis and Cabling.

1.2   TERMS

A.   The terms listed below are used throughout this Section and are defined as such:
   1.   Human Machine Interface (HMI): Operator Interface to the BAC. Allows operator intervention and monitoring of all systems and subsystems connected to the BAC system.
   2.   Building Automation Controller: (BAC): The controlling device used to control, and monitor hardware connected to it by way of networks or I/O cards. The BAC may be identified under different names such as small logic controller, mini or micro.
   3.   Backplane: Usually will indicate the I/O chassis that the power supply, BAC and I/O cards, and network cards reside in.
   4.   I/O Cards: Can be either analog, discrete, thermocouple or counter cards that interface between field devices and BAC.

5. Network Switch: Data concentrator where one or more networks are integrated.
6. Server: Computer having one or more CPU's used for a specific task such as data depository, web management. The server is typically connected to the plant network.
7. Peripheral Devices: Includes, but not limited to, printer(s), display devices and standalone intelligent devices, such as remote HMI stations.
8. BAC System: Includes all parts listed above.

1.3 QUALITY ASSURANCE

A. Contractor shall engage the services of a BAC manufacturer to provide all equipment listed in this Section. The System manufacturer shall demonstrate a minimum of five years of experience providing BAC systems and be able to show evidence of at least five installations of equal or greater size to the one being specified.

1.4 WARRANTY

A. Provide one-year standard manufacturer's warranty.

B. Provide lifetime manufacturer's warranty for the programmable logic controller equipment when the appropriate surge protection and power supplies from the same manufacturer are utilized on the incoming power to the BAC network equipment.

PART 2 - PRODUCTS

2.1 BAC SYSTEMS

A. The BAC configuration indicated is diagrammatic. The BAC system shall include as a minimum power supply, network connections, I/O cards, CPU and an HMI as shown and as required to achieve the specified functionality.

B. The final system configuration shall utilize the System Manufacturer's standard hardware and software to meet the functional requirements of these Specifications.

C. All equipment furnished under this Contract shall be provided to meet the functional requirements of these Specifications plus a 20 percent growth in project requirements, (e.g., graphic displays, alarms, additional instrumentation and equipment). All equipment shall be provided under this Contract, such that the entire 20 percent project growth can be implemented into the BAC, without any additional hardware cost to the Owner.

D. The BAC system shall be modular in design with the ability to add I/O modules without the necessity of a backplane chassis.

E. The BAC system should have as a minimum the following features and capabilities:

1. CPU:
   a. Must be Niagara 4.0 or above compliant
   b. Programmable using Niagara workbench and wire sheet programming scheme
   c. Online and offline programming capabilities.
   d. The BAC shall be rated UL 61010-1, UL 61010-2-201 and CSA 22.2 compliant
   d. Diagnostic LED's or indicating lights to identify processor usage, communication status, and power on.
   e. Internal Clock.
   f. 1 GB of RAM memory
   g. Support flash memory with up to 4 GB compact SD cards.
   h. Web based interface for controller information such as Host ID, Ethernet ports, date time and another general controller set up.
   i. Web based interface for hardware data point test with onboard I/O
   j. Direct connection of I/O cards via backplane
   k. 4 configurable Ethernet ports with 2 separate NIC cards
   l. 2 configurable RS 485 ports on board of controller
   m. Input voltage: 19.2 – 30 VDC; nominal 24 VDC.
   n. Operating temperature: -25 ºC to 55 ºC
   o. Manufacturer: Provide Phoenix Contact ILC 2050 BI

2. The HMI shall provide operator access to the BAC system for monitoring and control purposes via the integrated web server built in the BAC. The HMI shall include the following hardware features as a minimum:
   a. 200 MHz processor.
   b. 16 MB Flash memory/ 32 MB SDRAM.
   c. 9.0" TFT resistive touchscreen display with 800 x 480 resolution.
   d. Two USB ports.
   e. One RJ-45 Ethernet port.
   f. Operating System to be Windows CE.
   g. Rating: IP65.
   h. Operating temperature: 0 ºC to 55 ºC
   i. Manufacturer: Provide Phoenix Contact Web Panel or approved equal.

3. I/O Modules:
   a. All I/O modules shall be DIN rail mountable. Modules shall meet noise emission according to EN 61000-6-3 and noise immunity according to EN 61000-6-2. Analog inputs and outputs shall be electrically isolated. All I/O modules shall be certified to 61010-1 and UL 61010-2-201 compliant Input/output module performance specifications are specified below:
   b. Analog Inputs
      Analog Current Inputs (4 to 20 mA DC):
      1) Input Range: 4 to 20 mA DC
      2) Power: Provided via backplane
      2) Overload/transient protection.
      3) Resolution A/D: 12 bits
      4) Precision of IO within 0.3%

5)   Termination to block: No. 16 -28 AWG via spring cage terminal
6)   Number of inputs: Four
7)   Manufacturer: Provide Phoenix Contact IB IL AI 4/I/4-20-ECO

Analog Voltage Inputs (0 – 10 V DC):
1)   Input Range: 0 to 10 V DC
2)   Power: Provided via backplane
3)   Overload/transient protection.
4)   Resolution A/D: 12 bits
5)   Precision of IO within 0.3%
6)   Termination to block: No. 16 -28 AWG via spring cage terminal
7)   Number of inputs: Four
8)   Manufacturer: Provide Phoenix Contact IB IL AI 4/U/0-10-ECO

c.   Analog Outputs:
Analog Current Outputs (4 to 20 mA DC):
1)   Input Range: 4 to 20 mA DC
2)   Power: Provided via backplane
3)   Overload/transient protection.
4)   Resolution A/D: 12 bits
5)   Precision of IO within 0.3%
6)   Termination to block: No. 16 -28 AWG via spring cage terminal
7)   Number of outputs: Four
8)   Manufacturer: Provide Phoenix Contact IB IL AO 4/I/4-20-ECO

Analog Voltage Outputs (0 – 10 V DC):
1)   Input Range: 0 to 10 V DC
2)   Power: Provided via backplane
3)   Overload/transient protection.
4)   Resolution A/D: 12 bits
5)   Precision of IO within 0.3%
6)   Termination to block: No. 16 -28 AWG via spring cage terminal
7)   Number of outputs: Four
8)   Manufacturer: Provide Phoenix Contact IB IL AO 4/U/0-10-ECO

d.   Digital Input - 120 VAC.
1)   Input ON-state Voltage: 77 to 135 VAC.
2)   Input OFF-state Voltage: 0 to 40 VAC.
3)   Termination to block: No. 16 -28 AWG via spring cage terminal
4)   Number of inputs: One.
5)   Manufacturer: Provide Phoenix Contact IB IL 120 DI-PAC

e.   Digital Input - 24 VDC.
1)   Input ON-state Voltage: 15 to 30 VDC.
2)   Input OFF-state Voltage: -3 to 5 VDC.
3)   Termination to block: No. 16 -28 AWG via spring cage terminal
4)   Number of inputs: Eight
5)   Manufacturer: Provide Phoenix Contact IB IL 24 DI 8/HD-ECO

f. Digital Output (Switch):
   1) Voltage: 24 VDC.
   2) Current: 500 mA maximum.
   3) Connection: 1-wire.
   4) Overload and short circuit protection.
   5) Termination to block: No. 16 -28 AWG via spring cage terminal
   6) Number of outputs: Eight
   7) Manufacturer: Provide Phoenix Contact IB IL 24 DO 8/HD-ECO

g. Digital Output (Relay):
   1) Voltage: 5 – 253 VAC.
   2) Current: 3 A maximum.
   3) Connection: Floating SPDT relay contact.
   4) Termination to block: No. 16 -28 AWG via spring cage terminal
   5) Number of inputs: One or four.
   6) Manufacturer: Provide Phoenix Contact IB IL 24/230 DOR

PART 3 - EXECUTION

3.1   ENVIRONMENTAL CONDITIONS

A. The complete monitoring and control system and associated input/output wiring will be used in an industrial environment where there will be high energy AC fields, DC control pulses, and varying ground potentials between the transducers or input contact locations and the system components. The system design shall be adequate to provide proper protection against interferences from all such possible situations.

B. The BAC components shall be designed and constructed for satisfactory operation and long, low maintenance service under the following environmental conditions:
   1. Temperature range: 0 to 55°C continuous.
   2. Relative humidity: 0 through 70 percent (non-condensing).

C. The control rooms will normally be air-conditioned to achieve environmental conditions outlined above. No positive control of relative humidity is provided or contemplated. However, in the event of a failure of the air conditioning system, the entire monitoring and control system shall be capable of operating continuously and satisfactorily with ambient temperatures between 0 and 55°C and with relative humidity to 95 percent (non-condensing).

+ + END OF SECTION + +