

**Part 1 General**

**1.1 REFERENCES**

- .1 American National Standards Institute (ANSI)
  - .1 ANSI/ISA S5.5, Graphic Symbols for Process Displays.
  - .2 ANSI/IEEE 260.1, Letter Symbols for SI and Certain Other Units of Measurements (SI Units, Customary Inch-Pound Units and Certain Other Units).
- .2 Canadian Standards Association (CSA)
  - .1 CAN/CSA-C22.2 No.0, General Requirements, Canadian Electrical Code, Part II.
  - .2 CAN/CSA-Z234.1, Canadian Metric Practice Guide.

**1.2 ACRONYMS, ABBREVIATIONS AND DEFINITIONS**

- .1 Acronyms used in EMCS.
  - .1 AI - Analog Input
  - .2 AO - Analog Output
  - .3 BACnet - Building Automation and Control Network
  - .4 CAD - Computer Aided Design
  - .5 CDL - Control Description Logic
  - .6 COSV - Change of State or Value
  - .7 CPU - Central Processing Unit
  - .8 DI - Digital Input
  - .9 DO - Digital Output
  - .10 ECU - Equipment Control Unit
  - .11 EMCS - Energy Monitoring and Control System
  - .12 HVAC - Heating, Ventilation, Air Conditioning
  - .13 IDE - Interface Device Equipment
  - .14 I/O - Input/Output
  - .15 ISA - Industry Standard Architecture
  - .16 LAN - Local Area Network
  - .17 LCU - Local Control Unit
  - .18 LonTalk - Echelon Corporation (proprietary protocol)
  - .19 MCU - Master Control Unit
  - .20 OS - Operating System
  - .21 O&M - Operation and Maintenance
  - .22 OWS - Operator Work Station
  - .23 PC - Personal Computer
  - .24 PCI - Peripheral Control Interface



- .25 PCMCIA - Personal Computer Micro-Card Interface Adapter
- .26 RAM - Random Access Memory
- .27 ROM - Read Only Memory
- .28 TCU - Terminal Control Unit
- .29 USB - Universal Serial Bus
- .30 UPS - Uninterruptible Power Supply
- .2 Definitions:
  - .1 Point: a point may be logical or physical. Logical points are values calculated by system such as totals, counts, derived corrections i.e. as result of and/or statements in CDL's. Physical points are inputs or outputs which have hardware wired to controllers which are measuring or providing status conditions of contacts or relays providing interaction with related equipment (stop, start) or valve or damper actuators.
  - .3 Symbols and engineering unit abbreviations utilized in displays: to ANSI/ISAS 5.5.
    - .1 Printouts: to ANSI/IEEE 260.

### **1.3 PERMITS AND FEES**

- .1 In accordance with General Conditions of Contract.

### **1.4 GENERAL DESCRIPTION**

- .1 Refer to control schematics and system descriptions for system architecture.
- .2 Work consists of replacement of 28 rooftop units, two exhaust fans, and the addition of two more rooftop units and exhaust fans. The intent of this project is to only replace the equipment, not change the sequencing and setpoints of the existing system. The new equipment to be added shall tie into the existing controls system. Work covered by Division 25 includes, but is not limited to, the following:
  - .1 Building Controllers.
  - .2 Control devices as listed in I/O Summaries.
  - .3 Reconnection, or new connections, to existing OWS.
  - .4 Data communications equipment necessary to effect an EMCS data transmission system including gateway and LAN hardware and software for connection to BACnet network.
  - .5 Field control devices.
  - .6 Complete operating and maintenance manuals and field training of operators, programmers and maintenance personnel.
  - .7 Acceptance tests, technical support during commissioning, full documentation.
  - .8 Wiring interface co-ordination of equipment supplied by others.



- .9 Miscellaneous work as specified in these sections and as indicated.

## **1.5 METRIC REFERENCES**

- .1 Conform to CAN/CSA-Z234.1.
- .2 Provide required adapters between Metric and Imperial components.

## **1.6 STANDARDS COMPLIANCE**

- .1 All equipment and material to be from manufacturer's regular production, CSA certified, manufactured to standard quoted plus additional specified requirements.
- .2 Where CSA certified equipment is not available submit such equipment to inspection authorities for special inspection and approval before delivery to site.
- .3 Submit proof of compliance to specified standards with shop drawings and product data. Label or listing of specified organization is acceptable evidence.
- .4 For materials whose compliance with organizational standards/codes/specifications is not regulated by an organization using its own listing or label as proof of compliance, furnish certificate stating that material complies with applicable referenced standard or specification.

## **1.7 EMCS CONTRACTOR QUALIFICATIONS**

- .1 EMCS contractor to:
  - .1 Have local office within 100 km of project for at least 5 years, staffed by trained personnel capable of providing instruction, routine maintenance, emergency service on systems,
  - .2 Provide record of successful installations performed by Contractor submitting tender of experience with similar computer-based systems.
  - .3 Have access to local supplies of essential parts and provide 7 year guarantee of availability of spare parts after obsolescence.
- .2 Acceptable EMCS Contractor: Johnson Controls

## **1.8 SYSTEM DESIGN RESPONSIBILITY**

- .1 Design and provide all conduit and wiring linking all elements of system, including future capability.
- .2 Supply sufficient programmable controllers of all types to meet project requirements. Quantity and points contents to be approved by Departmental Representative prior to installation.



- .3 Location of controllers to be approved by Departmental Representative prior to installation.
- .4 Provide utility power to controllers.

## **1.9 LANGUAGE OPERATING REQUIREMENTS**

- .1 Operator to interface to system in English.
- .2 Use non-linguistic symbols for displays on graphic terminals wherever possible. All other information to be in English.
- .3 Operating system executive: primary hardware-to-software interface (specified as part of hardware purchase) with associated documentation to be in English.

## **1.10 MATERIALS DELIVERY SCHEDULE**

- .1 Provide Departmental Representative with "Materials Delivery Schedule" within 2 weeks after award of Contract.

## **Part 2 Products**

### **2.1 EXISTING SYSTEMS MANUFACTURER**

- .1 Johnson Controls

### **2.2 LOCKABLE PANELS**

- .1 Panel to be NEMA rated to suit environmental requirements.
- .2 To have hinged doors equipped with standard keyed-alike cabinet locks, keyed to same key.

## **Part 3 Execution**

### **3.1 MANUFACTURER'S RECOMMENDATIONS**

- .1 Installation to be to manufacturer's recommendations. Provide printed copies of recommendations with shop drawings or product data.

### **3.2 PAINTING**

- .1 Clean and touch up marred or scratched surfaces of factory finished equipment to match original finish.
- .2 Restore to new condition, finished surfaces which have been damaged too extensively to be primed and touched up to make good.



- .3 Clean and prime exposed hangers, racks, fastenings, and other support components.
- .4 Paint all unfinished equipment installed indoors to CEMA 2Y.1.

### **3.3 OPERATOR INSTRUCTION**

- .1 During and after system commissioning this Trade shall provide on-site operator instruction to the Departmental Representative's operating personnel. Operation instruction during normal working hours shall be performed by competent representatives familiar with the installed system.
- .2 At a time mutually agreed upon with the Departmental Representative the Control Contractor shall give sessions each of eight (8) hours of instructions to up to five (5) of the Departmental Representative's designated personnel on the operation of all equipment in the system and describe its intended use.
- .3 Training to be accomplished as follows:
  - .1 Initial instruction period – 1 day at 8 hours.
  - .2 Followed by one (1) – eight (8) hour instruction periods within the maintenance period at a date requested by the Departmental Representative.
  - .3 Record attendance log for each training period and submit to Departmental Representative.
- .4 An Owner's Manual, prepared for the project by the Control Contractor shall be used during instruction. Copies of the Owner's Manual shall be provided to the Departmental Representative with Operation and Maintenance Manuals.

**END OF SECTION 25 05 01**