

PART 1 - GENERAL

1.1 SUMMARY

- .1 Section Includes:
 - .1 General requirements for building Energy Monitoring and Control System (EMCS) that are common to NMS EMCS Sections.

1.2 REFERENCES

- .1 American National Standards Institute (ANSI)/The Instrumentation, Systems and Automation Society (ISA).
 - .1 ANSI/ISA 5.5, Graphic Symbols for Process Displays.
- .2 American National Standards Institute (ANSI)/ Institute of Electrical and Electronics Engineers (IEEE).
 - .1 ANSI/IEEE 260.1, American National Standard Letter Symbols Units of Measurement (SI Units, Customary Inch-Pound Units, and Certain Other Units).
- .3 American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE).
 - .1 ASHRAE STD 135, BACNET - Data Communication Protocol for Building Automation and Control Network.
- .4 Canadian Standards Association (CSA International).
 - .1 CAN/CSA-Z234.1, Canadian Metric Practice Guide.
- .5 Consumer Electronics Association (CEA).
 - .1 CEA-709.1-B-2002, Control Network Protocol Specification.
- .6 Department of Justice Canada (Jus).
 - .1 Canadian Environmental Assessment Act (CEAA).
 - .2 Canadian Environmental Protection Act (CEPA).
- .7 Electrical and Electronic Manufacturers Association (EEMAC).
 - .1 EEMAC 2Y-1, Light Gray Colour for Indoor Switch Gear.
- .8 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
 - .1 Material Safety Data Sheets (MSDS).
- .9 Transport Canada (TC).
 - .1 Transportation of Dangerous Goods Act (TDGA).

1.3 ACRONYMS AND ABBREVIATIONS

- .1 Acronyms used in EMCS:
 - .1 AEL - Average Effectiveness Level.
 - .2 AI - Analog Input.
 - .3 AIT - Agreement on International Trade.
 - .4 AO - Analog Output.
 - .5 BACnet - Building Automation and Control Network.
 - .6 BC(s) - Building Controller(s).
 - .7 BECC - Building Environmental Control Center.
 - .8 CAD - Computer Aided Design.

- .9 CDL - Control Description Logic.
- .10 CDS - Control Design Schematic.
- .11 COSV - Change of State or Value.
- .12 CPU - Central Processing Unit.
- .13 DI - Digital Input.
- .14 DO - Digital Output.
- .15 DP - Differential Pressure.
- .16 ECU - Equipment Control Unit.
- .17 EMCS - Energy Monitoring and Control System.
- .18 HVAC - Heating, Ventilation, Air Conditioning.
- .19 IDE - Interface Device Equipment.
- .20 I/O - Input/Output.
- .21 ISA - Industry Standard Architecture.
- .22 LAN - Local Area Network.
- .23 LCU - Local Control Unit.
- .24 MCU - Master Control Unit.
- .25 NAFTA - North American Free Trade Agreement.
- .26 NC - Normally Closed.
- .27 NO - Normally Open.
- .28 OS - Operating System.
- .29 O&M - Operation and Maintenance.
- .30 OWS - Operator Work Station.
- .31 PC - Personal Computer.
- .32 PCI - Peripheral Control Interface.
- .33 PCMCIA - Personal Computer Micro-Card Interface Adapter.
- .34 PID - Proportional, Integral and Derivative.
- .35 RAM - Random Access Memory.
- .36 SP - Static Pressure.
- .37 ROM - Read Only Memory.
- .38 TCU - Terminal Control Unit.
- .39 USB - Universal Serial Bus.
- .40 UPS - Uninterruptible Power Supply.
- .41 VAV - Variable Air Volume.

1.4 DEFINITIONS

- .1 Point: may be logical or physical.
 - .1 Logical points: values calculated by system such as set points, totals, counts, derived corrections and may include, but not limited to result of and statements in CDL's.
 - .2 Physical points: inputs or outputs which have hardware wired to controllers which are measuring physical properties, or providing status conditions of contacts or relays which provide interaction with related equipment (stop, start) and valve or damper actuators.
- .2 Point Name: composed of two parts, point identifier and point expansion.
 - .1 Point identifier: comprised of three descriptors, "area" descriptor, "system" descriptor and "point" descriptor, for which database to provide 25 character field for each point identifier. "System" is system that point is located on.
 - .1 Area descriptor: building or part of building where point is located.
 - .2 System descriptor: system that point is located on.

- .3 Point descriptor: physical or logical point description. For point identifier "area", "system" and "point" will be short forms or acronyms. Database must provide 25 character field for each point identifier.
 - .2 Point expansion : comprised of three fields, one for each descriptor. Expanded form of short form or acronym used in "area", "system" and "point" descriptors is placed into appropriate point expansion field. Database must provide 32 character field for each point expansion.
 - .3 Bilingual systems to include additional point identifier expansion fields of equal capacity for each point name for second language.
 - .1 System to support use of numbers and readable characters including blanks, periods or underscores to enhance user readability for each of the above strings.
 - .3 Point Object Type: points fall into following object types:
 - .1 AI (analog input).
 - .2 AO (analog output).
 - .3 DI (digital input).
 - .4 DO (digital output).
 - .5 Pulse inputs.
 - .4 Symbols and engineering unit abbreviations utilized in displays: to ANSI/ISA S5.5.
 - .1 Printouts: to ANSI/IEEE 260.1.
- 1.5 SYSTEM DESCRIPTION
- .1 Refer to mechanical drawings for system architecture.
 - .2 Modify and update existing EMCS as required to accommodate mechanical modifications.
 - .3 Design Requirements:
 - .1 Design and provide conduit and wiring linking elements of system.
 - .2 Location of controllers as reviewed by Departmental Representative prior to installation.
 - .3 Metric references: in accordance with CAN/CSA Z234.1.
- 1.6 QUALITY ASSURANCE
- .1 Ensure qualified supervisory personnel continuously direct and monitor Work and attend site meetings.
 - .2 Health and Safety:
 - .1 Do construction occupational health and safety in accordance with Section 01 35 28 Health and Safety Requirements.
 - .3 Sustainable Requirements:
- 1.7 DELIVERY, STORAGE AND HANDLING
- .1 Material Delivery Schedule: provide Departmental Representative with schedule within 2 weeks after award of Contract.
 - .2 Waste Management and Disposal:
 - .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
 - .2 Collect and separate for disposal packaging material for recycling in accordance with Waste Management Plan.

- .3 Separate for reuse and recycling and place in designated containers Steel Metal Plastic waste in accordance with Waste Management Plan.
- .4 Place materials defined as hazardous or toxic in designated containers.
- .5 Handle and dispose of hazardous materials in accordance with Regional and Municipal, regulations.
- .6 Label location of salvaged material's storage areas and provide barriers and security devices.
- .7 Ensure emptied containers are sealed and stored safely.
- .8 Divert unused metal materials from landfill to metal recycling facility as approved by Departmental Representative.
- .9 Fold up metal and plastic banding, flatten and place in designated area for recycling.

1.8 EXISTING- CONTROL COMPONENTS

- .1 Utilize existing control wiring and piping as required.
- .2 Re-use field control devices that are usable in their original configuration provided that they conform to applicable codes, standards specifications.
 - .1 Do not modify original design of existing devices without written permission from Departmental Representative.
 - .2 Provide for new, properly designed device where re-usability of components is uncertain.
- .3 Inspect and test existing devices intended for re-use within 30 days of award of contract, and prior to installation of new devices.
- .4 Non-functioning items:
 - .1 Provide with report specification sheets or written functional requirements to support findings.
 - .2 Departmental Representative will repair or replace existing items judged defective yet deemed necessary for EMCS.
- .5 Submit written request for permission to disconnect controls and to obtain equipment downtime before proceeding with Work.
- .6 Assume responsibility for controls to be incorporated into EMCS after written receipt of approval from Departmental Representative.
 - .1 Be responsible for items repaired or replaced by Departmental Representative.
 - .2 Be responsible for repair costs due to negligence or abuse of equipment.
 - .3 Responsibility for existing devices terminates upon final acceptance of EMCS applicable portions of EMCS as approved by Departmental Representative.
- .7 Remove existing controls not re-used or not required. Place in approved storage for disposition as directed.

PART 2 - PRODUCTS

2.1 EQUIPMENT

- .1 Components shall be BacNet native.
- .2 Complete list of equipment and materials to be used on project and forming part of bid tender documents by adding manufacturer's name, model number and details of materials, and submit for approval.

2.2 ADAPTORS

- .1 Provide adaptors between metric and imperial components.

PART 3 - EXECUTION

3.1 MANUFACTURER'S RECOMMENDATIONS

- .1 Installation: to manufacturer's recommendations.

END OF SECTION