

PART 1 - GENERAL

1.1 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.

1.2 SYSTEM
DESCRIPTION

- .1 Work covered by sections referred to above consists of fully operational EMCS, including, but not limited to, following:
 - .1 Building Controllers.
 - .2 Control devices.
 - .3 Data communications equipment necessary to effect EMCS data transmission system.
 - .4 Field control devices.
 - .5 Software/Hardware complete with full documentation.
 - .6 Complete operating and maintenance manuals.
 - .7 Training of personnel.
 - .8 Acceptance tests, technical support during commissioning, full documentation.
 - .9 Wiring interface co-ordination of equipment supplied by others.
 - .10 Miscellaneous work as specified in these sections and as indicated.
- .2 Design Requirements:
 - .1 Design and provide conduit and wiring linking elements of system.
 - .2 Supply sufficient programmable controllers of types to meet project requirements. Quantity and points contents as reviewed by Departmental Representative prior to installation.
 - .3 Location of controllers as reviewed by Departmental Representative prior to installation.
 - .4 Provide utility power to EMCS and emergency power to EMCS.
 - .5 Metric references: in accordance with CAN/CSA Z234.1.
- .3 Language Operating Requirements:
 - .1 Provide English or French operator selectable access codes.
 - .2 Use non-linguistic symbols for displays on graphic terminals wherever possible. Other information to be in English and French.
 - .3 Operating system executive: provide primary hardware-to-software interface with associated documentation to be in English and French.
 - .4 System manager software: include in English and French system definition point database, additions, deletions or modifications, control loop statements, use of high level programming languages, report generator utility and other OS utilities used for maintaining optimal operating efficiency.
 - .5 Include, in English and French:
 - .1 Input and output commands and messages from operator-initiated functions and field

related changes and alarms as defined in CDL's or assigned limits (i.e. commands relating to day-to-day operating functions and not related to system modifications, additions, or logic re-definitions).

.2 Graphic "display" functions, point commands to turn systems on or off, manually override automatic control of specified hardware points. To be in French and English at specified OWS and to be able to operate one terminal in English and second in French. Point name expansions in both languages.

.3 Reporting function such as trend log, trend graphics, alarm report logs, energy report logs, maintenance generated logs.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Material Delivery Schedule: provide Departmental Representative with schedule within 2 weeks after award of Contract.

1.5 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.
 - .1 Furnish test report within 40 days of award of contract listing each component to be re-used and indicating whether it is in good order or requires repair by Departmental Representative.
 - .2 Failure to produce test report will constitute acceptance of existing devices by contractor.

- .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 by Departmental Representative.
- .7 Remove existing controls not re-used or not required. Place in approved storage for disposition as directed.

1.6 DESIGNATED
CONTRACTOR

- .1 Hire the services of AirTron or its authorized representative to complete the work of all EMCS sections.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 There is an existing AirTron system presently installed in the building. All material must be selected to ensure compatibility with the existing AirTron system.

PART 3 - EXECUTION

3.1 MANUFACTURER'S
RECOMMENDATIONS

- .1 Installation: to manufacturer's recommendations.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

- .1 Public Works and Government Services Canada (PWGSC) /Real Property Branch/Architectural and Engineering Services.
 - .1 MD13800-September 2000, Energy Management and Control Systems (EMCS) Design Manual. English:
<ftp://ftp.pwgsc.gc.ca/rps/docentre/mechanical/me214-e.pdf>

1.2 SEQUENCING

- .1 Present sequencing of operations for system, in accordance with MD13800 - Energy Management and Control Systems (EMCS) Design Manual.
- .2 VAV Boxes: pressure independent VAV box damper to modulate to maintain the space temperature setpoint.
- .3 Where a heat pump is present, the EMCS shall sequence the VAV box as the first stage of cooling and start the heat pump as required if the space temperature rises above the setpoint.
- .4 The EMCS shall start and stop the fan powered VAV box fans on a time of day schedule.
- .5 The EMCS shall monitor the carbon dioxide concentration within the return air ceiling space, and modulate the outdoor air intake damper of the central air handling unit #3 to maintain a CO2 concentration of 700ppm above outdoor conditions.

1.3 CONTROL POINTS

- .1 EMCS control points shall include, but not be limited to:
 - Temperature sensor analog input signal
 - VAV box analog output signal
 - Fan powered VAV box digital output signal for ON/OFF fan control
 - Heat pump analog output signal
- .2 Remove from building automation system programming and graphics all unused control points from VAV boxes being removed under the scope of the project.