

1. General

1.1. General Notes

- .1 The requirements of Division 0 and Division 1 of these specifications apply to all section of these specifications.
- .2 It is the intent of these specifications to describe an addition to a working building automation system, conforming to all applicable codes and standards. All work shall be provided in such a manner as to provide a complete and working system.

1.2. Cooperation

- .1 The drawings are diagrammatic in nature and cannot show all the details of the installation. The contractor is responsible for interpreting the drawings and providing suitable installations as best as possible based on the intent of the drawings.
- .2 If dimensions are provided in the drawings or specifications, the implications shall be field checked before ordering any material. Notify the Departmental representative immediately if any interferences or discrepancies arise due to design parameters. Coordinate with all other contractors with respect to any changes required in the contract documents for equipment or material installation.
- .3 Store materials out of the way of other contractors and keep all work areas clean daily.

1.3. Shop Drawings

- .1 Refer to Divisions 0 and 1 for additional shop drawings requirements.
- .2 Submit within two business days of award, a list of all equipment to be provided, complete with manufacturer and model number. Identify all equipment with expected long lead times.
- .3 Shop drawings shall be reviewed and returned electronically.
- .4 All applicable approvals shall be shown, such as CSA, ULC, FM, etc.
- .5 Equipment and materials shall not be ordered until the Departmental representative as returned a shop drawing marked "reviewed" or "reviewed as modified". The Contractor shall assume all responsibility to ensure all modifications are made to shop drawings marked "reviewed as modified" before ordering equipment or materials.

1.4. Insurance

- .1 The contractor shall obtain and maintain insurance which will fully protect themselves and the Departmental representative for any and all claims.

1.5. Codes, Fees and Certificates

- .1 The contractor shall procure and pay all fees for all work required by these specifications, unless specifically noted otherwise.
- .2 All work done by the contractor shall be done in the strictest adherence with all applicable codes and standards.
- .3 All changes required by the Authority having jurisdiction shall be made at no cost to the Departmental representative.

1.6. Penetrations

- .1 All penetrations through fire rated structures shall be properly fire-stopped to a listed assembly.

1.7. Trial Period

- .1 It is understood that the systems, equipment and materials installed under this contract are under a trial period until fully accepted by the Departmental representative. Certificate of substantial performance is not acceptance of the system by the Departmental representative.

1.8. Start-up

- .1 The contractor shall start-up all equipment as per the manufacturer's instruction.
- .2 Complete all manufacturer's recommended start-up procedures and paperwork, and include the information in the operation and maintenance manual.
- .3 Equipment shall be operated for a minimum of 1 week by the contractor before handing over to the Departmental representative.
- .4 Notify the Departmental representative and Departmental representative before start-up tests are scheduled and allow the Departmental representative and/or Departmental representative to witness the start-up.
- .5 Where appropriate, the manufacturer's representative shall be present to conduct the start-up.

1.9. Training

- .1 The contractor shall provide a minimum of 2 hours of training on the operation and maintenance of all newly installed equipment and systems.
- .2 Training shall include changes and operation of the building management's system integration with the new systems.
- .3 The contractor shall, at the request of the departmental representative, engage a factory representative for the training.
- .4 Timing of the training shall be coordinated with the departmental representative and shall be scheduled at the departmental representative's convenience.
- .5 The contractor shall keep record of all information provided during the training and all persons who attended the training.
- .6 The training shall be recorded in a standard video format and be included in the O&M manuals.

1.10. Electrical Wiring

- .1 The Contractor is responsible for all low-voltage wiring and all other higher voltage wiring not explicitly noted on the electrical drawings but required for a properly functioning system.
- .2 All wiring shall comply with Division 26 specifications.

1.11. Testing and Commissioning

- .1 Notify the Departmental representative and Departmental representative before commissioning tests are scheduled and allow the Departmental representative and/or Departmental representative to witness the testing.
- .2 Test the equipment through all operations. Ensure proper operation and set-up of all equipment.
- .3 Make record of any deficiencies in the operation and take measures to immediately correct deficiencies.

1.12. Deficiencies

- .1 The Contractor shall review their own work and make deficiency lists prior to review by the Departmental representative. Deficiencies are to be corrected when possible before the Departmental representative review, otherwise, the list shall be provided to the Departmental representative before the Departmental representative's review.

1.13. Guarantees and Warranties

- .1 The contractor shall guarantee the Departmental representative a labour and materials warranty for all equipment, material and systems provided as part of this contact for a period of one year from the date of substantial performance unless otherwise specified.

2. Products

2.1. Controls and Equipment

- .1 The facility was an existing building control system. All new equipment, sensors, actuators, equipment, etc shall be compatible with the existing system. All equipment, sensors, etc. shall already be in use in the facility.
- .2 Where applicable, Contractor to extend existing control panels to provide required sequence of operations.
- .3 The contractor is responsible for sourcing any high-voltage and low-voltage power required for equipment.

2.2. Identification

- .1 Provide lamicoid or metal engraved name plate for all equipment. Name plates shall include tag number and all major performance data.

3. Execution

3.1. Identification

- .1 Provide all equipment with nameplates.

End of Section

1. General

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- .1 This section generally describes the control points required for a complete system operation as more generally described in the other sections of Division 25.
- .2 It is not the intention of this section to limit control points to only these listed.
- .3 Where points are listed here, they shall be display on the graphically user interface.

1.2. Abbreviations

- AI: Analog Input
- AO: Analog Input
- DI: Binary digital input
- DO: Binary digital output

1.3. AC-1 & AC-2

Description	Type	Device	Units	Remarks
Unit enable	DO	contact	On/off	One per unit
Alarm	DI	Contact	Ok/alarm	One per unit
Room temperature	AI	Thermostat	°C	Separate from AC-1/2 thermostats. Use to alarm if room temperature exceed users input high limit.
Selection valve	DO	3-way valve	A or B	Used to select operating AC unit.

End of Section

1. General

1.1. Sequences

- .1 The following sequences of operation describe the general principles of operation expected for the contractor to implement. It is the responsibility of the contractor to interpret the intent of the sequences and provide all automation equipment and labour required to implement the intention.

1.2. Pumps

- .1 Overview
 - .1 Cooling units operate their fan and internal valves based on a self-contained control system. The purpose of the building automation system is to provide lead/lag control over the units and monitor the room temperature.
- .2 Normal Operation
 - .1 Switch unit operation (between AC-1 and AC-2) on a weekly basis. Departmental representative to provide day/time of the switch over.
 - .2 Switch over done by providing enable/disable signals to each unit and by operating the 3-way selection valve to control the available chilled water.
- .3 Alarms
 - .1 Monitor alarm status on AC units. Provide alarm signal to operator on AC alarm.
 - .2 Monitor space temperature. Alarm on space temperature above user defined limit.

End of Section