PART 1 - GENERAL

1.1 REFERENCES

.1 American National Standards Institute (ANSI)
- .1 ANSI C12.7-2014, Requirements for Watthour Meter Sockets.
- .2 ANSI/IEEE C57.13-2016, Requirements for Instrument Transformers.

.2 Canadian Standards Association
- .1 CSA Type 1 Enclosure
- .2 CSA Type 4X Enclosures
- .3 CSA Type 12 Enclosures

1.2 SUBMITTALS

.1 Submit shop drawings and manufacturer's installation instructions in accordance with Section 01 33 00 - Submittal Procedures.

.2 Include:
- .1 Information as specified for each device.
- .2 Manufacturer's detailed installation instructions.

.3 Pre-Installation Tests: Submit samples at random from equipment shipped, as requested by Departmental Representative, for testing before installation. Replace devices not meeting specified performance and accuracy.

.4 Manufacturer's Instructions: Submit manufacturer's installation instructions for specified equipment and devices.

1.3 CLOSEOUT SUBMITTALS

.1 Submit operating and maintenance data for inclusion in operation and maintenance manual in accordance with Section 01 78 00 - Closeout Submittals.

1.4 WARRANTY

.1 Provide a one (1) year parts and labour warranty for all field devices, starting from the date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GENERAL

.1 Control devices of each category to be of same type and manufacturer.

.2 External trim materials to be corrosion resistant. Assemble internal parts in watertight, shockproof, vibration-proof, heat resistant assembly.

.3 Operating conditions: 0 - 32°C with 10 - 90% RH (non-condensing) unless otherwise specified.

.4 Terminations: use standard conduit box with slot screwdriver compression connector block unless otherwise specified.

.5 Transmitters to be unaffected by external transmitters (eg. walkie talkies).

.6 Account for hysteresis, relaxation time, maximum and minimum limits in applications of sensors and controls.

.7 Outdoor installations: use weatherproof construction in CSA 4X enclosures.

.8 Devices installed in user occupied space must not exceed Noise Criteria (NC) of 35. Noise generated by any device must not be detectable above space ambient conditions.

2.2 PROGRAMMABLE THERMOSTAT

.1 Wall mounted 7-day programmable thermostat control for rooftop unit: 24V.

2.3 CONTROL RELAY (SOLID STATE)

.1 Technical Performance: 240V 10 amp capacity. Normally open or normally closed to suit the application, suitable for switching inductive AC loads.

2.4 CONTROL RELAY (ELECTRO MECHANICAL)

.1 Technical Performance: a high impedance relay to produce a dry contact.

2.5 PANELS

.1 Wall mounted enameled steel abinets with hinged and key-locked front door.

.2 Multiple panels as required to handle requirements with additional space to accommodate 25% additional capacity as required by the Departmental Representative without adding additional cabinets.

.3 Panels to be lockable with same key.

2.6 WIRING

.1 Run all wiring in conduit.

.2 Wiring must be continuous without joints.

.3 Refer to Division 26.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Install field control devices.

.2 Temperature transmitters, humidity transmitters, current-to-pneumatic transducers, solenoid air valves, controllers, relays: install in CSA 2 enclosures or as required for specific applications. Provide for electrolytic isolation in all cases when dissimilar metals make contact.

.3 Support field-mounted transmitters, sensors on pipe stands or channel brackets.

.4 Install wall mounted devices on plywood panel properly attached to wall.

3.2 TEMPERATURE AND HUMIDITY SENSORS

.1 Stabilize to provide minimum field adjustments or calibrations.

.2 Readily accessible and adaptable to each type of application to allow for quick easy replacement and servicing without special tools or skills.

.3 Outdoor installation:
.1 Protect from solar radiation and wind effects by stainless steel shields.
.2 Install in CSA 4X enclosures.

3.2 TEMPERATURE AND HUMIDITY SENSORS (Cont'd)

.4 Duct installations:
.1 Do not mount in dead air space.
.2 Location to be within sensor vibration and velocity limits.
.3 Securely mount extended surface sensor used to sense average temperature.
.4 Thermally isolate elements from brackets and supports so as to respond to air temperature only.
.5 Support sensor element separately from coils, filter racks.

.5 Averaging duct type temperature sensors:
.1 Sensor length to be not less than 1.0m per $1.0m^2$ of duct cross- sectional area.
.2 Use multiple sensors where single sensor does not meet minimum length ratio. Wire multiple sensors in series for freeze protection applications.
.3 Wire multiple sensors separately for temperature measurement.
.4 Use either software averaging algorithm to derive overall average for control purposes or separate inputs, based on site requirements.

.6 Thermowells: install for piping installations. Where pipe diameter is less than well insertion length, locate well in elbow. Thermowell to restrict flow by less than 30%.

3.3 PANELS

.1 Arrange for conduit and tubing entry from top, bottom or either side.

.2 Use modular multiple panels if necessary to handle all requirements, with space for additional 20% PCU or FID if applicable without adding additional panels. Space to accommodate maximum capacity of associated controller (ECU, LCU, MCU, PCU, TCU).

.3 Wiring and tubing within panels: locate in trays or individually clipped to back of panel.

.4 Identify wiring and conduit clearly.

3.4 IDENTIFICATION

.1 Identify field devices properly.

3.5 TESTING

.1 Calibrate and test field devices for accuracy and performance. Submit report detailing tests performed, results obtained to Departmental Representative for approval. Departmental Representative will verify results at random. Provide testing equipment and manpower necessary for this verification.

END