PART 1 - GENERAL

1.1 SUMMARY

A. Section includes Local Control Units for the Direct Digital Control System.

B. Local Control Units refer to individual DDC based controllers utilized at the zone level and on other select process equipment. Stanford uses free programmable controllers for all DDC applications. Pre-programmed “application specific” controllers do not have flexibility to accomplish advanced sequences & alarms. Vendor furnished subsystem equipment supplied with application specific controllers may be integrated.

C. Related Sections:
   1. 25 1423 Field Panels
   2. 25 1516 Software for Programming Local Control Unit

1.2 REFERENCES

A. Refer to 25 0000 Integrated Automation

1.3 DEFINITIONS

A. Refer to 25 0000 Integrated Automation

B. AI Analog Input

C. Dry Contact Contact closure without an electrical output (switch)

D. I/O Inputs and Outputs.

E. mA Milliamps

F. MS/TP Master/Slave Token Passing communications bus

G. NO/NC Normally Open/Closed

H. Ohm Unit of electrical resistance

I. PID Proportional Integral Derivative (the three parameters required in control loops)

J. Stand-Alone Capable to operate or control without the need to communicate to other controllers

K. TAB Test Adjust and Balance

Note: Edit list to meet project requirements.

1.4 SYSTEM DESCRIPTION

A. Local Control Units shall be utilized for the following applications:
   1. Primary Equipment
      a. Air Handling Units
      b. Building Heating Hot Water System
      c. Building Chilled Water System
      d. Process Cooling Water
      e. Domestic Hot Water System
2. Secondary Equipment (Equipment dependent on Primary Equipment)
   a. Variable Air Volume Terminal Units
   b. Constant Air Volume Terminal Units
   c. Fan Coil Units
   d. Reheat Coils
   e. Exhaust Fans
   f. Convectors
   g. Radiators

B. Each Local Control Unit shall have sufficient memory to support its own operating system and databases, including:
   1. Control processes
   2. Energy management applications
   3. Maintenance support applications
   4. Custom processes
   5. Operator I/O

C. Local Control Units, fundamentally designed for use as Secondary Equipment Controllers (as indicated in Manufactures data sheet) shall not be acceptable for Primary Equipment applications.

D. Each Local Control Unit shall be capable of performing control and monitor functions including:
   1. Stand-alone system control. (Normal control of each independent systems operation shall continue without the need for a communication network).
   2. Fully programmable to perform specific control sequences in contract documents. Ability to revise sequences, timers, delays, intervals, as required to meet design intent and field conditions, for a fully operations system.
   3. Sufficient IO to control a single mechanical equipment system with a single controller.
   4. Accepting analog inputs such as voltages, current, etc.
   5. Accepting discrete inputs from isolated, dry-type contacts (no grounds or no voltage) of either normally open (NO) or normally closed (NC) configuration.
   6. Convert controller information into output signals to actuators and field control devices.
   7. Maintain set points, flow limits, and occupancy schedules, etc. indefinitely in each controller’s non-volatile memory.
   8. In the event of loss of power, equipment should have non-volatile memory for all controller configuration data.
   9. Upon restoration of normal power the Unit shall automatically resume full operation without manual intervention.
   10. Should control unit memory be lost for any reason, the user shall have the ability to reload the program from the Building Controls System Server.

1.5 SUBMITTALS
   A. Refer to 25 0000 Integrated Automation.

1.6 QUALITY ASSURANCE
   A. Local Control Units shall maintain LonMark and/or BTL certification.
   B. Design system to have less than 50% Bandwidth Utilization on any network or segment.
   C. Mount Local Control Units outside of equipment and accessible for maintenance.
   D. Local Control Units shall provide sufficient internal memory for the specified control sequences and have at least 25 percent of the memory available for future use.
E. At time of final Functional Performance Test, demonstrate the sequence of operation for each system to Owner.

F. Provide services to assist Testing, Adjust and Balancing of systems.

G. Provide weather protection cover or weatherproof control devices where required for control devices located outdoors. All control devices located outdoors shall be rated for the anticipated environment. Include provisions for supplemental ventilation when control devices must be located within these outdoor control panels. Refer to section 25 1423 enclosure requirements.

H. Each Primary Equipment Local Control Unit shall have 20 percent spare capacity for future point connection. At minimum include the following spare I/O’s for each major piece of equipment (non-terminal) controlled:
   1. 2 spare AI’s
   2. 2 spare AO’s
   3. 2 spare DI’s
   4. 2 spare DO’s

Note: Update spare inputs as needed per project

PART 2 - PRODUCTS

2.1 LOCAL CONTROL UNITS

A. Manufacture: Distech or Approved Equal

B. Must include the following:
   1. Programs and parameters stored in nonvolatile memory.
   3. Be expandable so that one control unit controls one piece of equipment.

C. Applications
   1. HVAC
      a. Air Handling Unit
         1) Performance Requirements:
            a) Operating Temperatures 32 to 122 Deg F
            b) Operating Humidity 10 to 90% RH
         2) Advanced programming ability including PID loops, time delay, schedules, real-time clock, optimum start, stage sequencing, logical gates, mathematical and comparator functions, psychometric functions, persistent values
         3) Software configurable inputs: contact closure; resistance, 0-10VDC, 4-20 mA
         4) Outputs: relay(0-12 VDC); analog 0-10 VDC, 4-20 mA
      b. Variable Air Volume / Constant Air Volume / Reheat Coils
         1) Integral actuator for air volume control (if available).
         2) Include Analog Output for reheat control where applicable.
         3) Performance Requirements:
            a) Min. Actuator Torque 35 in-lb
b) Operating Temperatures 32 to 122 Deg F

c) Operating Humidity 10 to 90% RH

c. Fan Coil Unit/Exhaust Fan / Convector / Radiator

1) Performance Requirements:

a) Operating Temperatures 32 to 122 Deg F

b) Operating Humidity 10 to 90% RH

2) Advanced programming ability including fan-in, PID loops, time delay, schedules, real-time clock, optimum start, stage sequencing, logical gates, mathematical and comparator functions, psychometric functions, persistent values

3) Software configurable inputs: contact closure; resistance, 0-10VDC, 4-20 mA

4) Outputs: relay(0-12 VDC); analog 0-10 VDC, 4-20 mA

2. Process

a. Hot Water and Process Cooling Water system

1) Performance Requirements:

a) Operating Temperatures 32 to 122 Deg F

b) Operating Humidity 10 to 90% RH

2) Advanced programming ability including fan-in, PID loops, time delay, schedules, real-time clock, optimum start, stage sequencing, logical gates, mathematical and comparator functions, psychometric functions, persistent values

3) Software configurable inputs: contact closure; resistance, 0-10VDC, 4-20 mA

4) Outputs: relay(0-12 VDC); analog 0-10 VDC, 4-20 mA

Note: Many vendors open and close VAV box to calibrate air-flow sensor. For critical pressure zones, make sure uninterruptable calibration is required.

PART 3 - EXECUTION

3.1 LOCAL CONTROL UNITS

A. Provide controllers to accomplish monitoring and control of systems

B. Provide additional miscellaneous equipment necessary for complete system control.

C. To ensure stand-alone capability, provide a Local Control Unit for each equipment (or group) such as Air Handling Unit, Heating Hot Water, Chilled Water, Exhaust Systems, etc.

D. Provide additional I/O modules as needed to accomplish control sequences and meet point-list requirements.

E. Applications

1. HVAC

   a. Variable Air Volume / Constant Air Volume / Reheat Coils

       1) Provide coordination such as shipping, scheduling, and technical support for Air Terminal factory mounting and proper operation.
2) To ensure stand-alone capability, provide a Local Control Unit for each terminal or fan coil unit.
3) Coordinate power requirements with electrical, controls scope downstream side of 120 volt breaker.

END OF SECTION