SECTION 16902
ELECTRIC CONTROLS AND RELAYS

PART 1   GENERAL

1.1 SECTION INCLUDES:
A) Pushbutton and selector switches.
B) Control stations.
C) Relays.
D) Time-delay relays.
E) Control power transformers.
F) Control panels.

1.2 REFERENCES
A) NEMA ICS 1 - General Standards for Industrial Control Systems.
B) NEMA ICS 2 - Standards for Industrial Control Devices, Controllers and Assemblies.
C) NEMA ICS 6 - Enclosures for Industrial Controls and Systems.
D) NEMA ST 1 - Standard for Specialty Transformers (Except General Purpose Type).

1.3 SUBMITTALS
A) Submit shop drawings under provisions of Section 01300.
B) Submit shop drawings to NEMA ICS 1 indicating control panel layouts, wiring connections and diagrams, dimensions, support points.
C) Submit product data under provisions of Section 01300.
D) Submit product data for each component specified.

1.4 PROJECT RECORD DOCUMENTS
A) Submit record documents under provisions of Section 01700.
B) Accurately record actual locations of control equipment. Revise diagrams included in Drawings to reflect actual control device connections.

1.5 OPERATION AND MAINTENANCE DATA
A) Submit operation data under provisions of Section 01700.
B) Include instructions for adjusting and resetting time-delay relays, timers and counters.
C) Submit maintenance data under provisions of Section 01700.
D) Include recommended preventive maintenance procedures and materials.

1.6 QUALIFICATIONS
A) Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum three years documented experience.

PART 2   PRODUCTS

2.1 CONTROL SWITCHES AND STATIONS
A. Contacts: NEMA ICS 2; Form C.
B. Contact Ratings: NEMA ICS 2; as scheduled.
C. Pushbutton Operator: NEMA ICS 2; as scheduled.
D. Control Stations: NEMA ICS 2; as scheduled.
2.2 CONTROL RELAYS
   A. Contacts: NEMA ICS 2; Form C.
   B. Contact Ratings: NEMA ICS 2; as scheduled.
   C. Coil Voltage: as scheduled.

2.3 TIME-DELAY RELAYS
   A. Contacts: NEMA ICS 2; as scheduled.
   B. Contact Ratings: NEMA ICS 2; Class A150.
   C. Coil Voltage: as scheduled.
   D. Time-Delay Relays: NEMA ICS 2; as scheduled.

2.4 CONTROL POWER TRANSFORMERS
   A. Transformer: NEMA ST 1; machine tool transformer with isolated secondary winding.
   B. Power Rating: 500 va.
   C. Voltage Rating: as required.

2.5 ENCLOSURES
   A. Control Station Enclosure: NEMA ICS 6; Type as required to meet conditions of installation unless indicated on the Drawings.
   B. Relay Enclosure: NEMA ICS 6; Type as required to meet conditions of installation unless indicated on the Drawings.

2.6 FABRICATION
   A. Control Panels: Shop fabricated control panels to NEMA ICS 1, using cabinets and terminal blocks furnished under the provisions of Section 16160.

PART 3  EXECUTION

3.1 INSTALLATION
   A Install devices and equipment in accordance with manufacturer's instructions.
   B Install individual relays and time delay relays in enclosures.
   C Install cabinets under the provisions of Section 16160.
   D Make electrical wiring interconnections as shown on Drawings.

END OF SECTION