

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