PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Materials and installation for industrial control devices including pushbutton stations, control and relay panels.

1.2 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 26 05 00 – Common Work Results - Electrical.

1.3 REFERENCES

.1 Canadian Standards Association (CSA)

.1 CSA C22.2 No.14, Industrial Control Equipment.

.2 National Electrical Manufacturers Association (NEMA)

.1 NEMA ICS 1, Industrial Control and Systems: General Requirements.

1.4 SUBMITTALS

.1 Include schematic, wiring, interconnection diagrams.

1.5 QUALITY ASSURANCE

.1 Submit to Department Representative one copy of test results.

PART 2 PRODUCTS

2.1 AC CONTROL RELAYS

.1 Control Relays: to CSA C22.2 No.14 and NEMA ICS 1.

.2 Convertible contact type: contacts field convertible from NO to NC, electrically held, with solid state timer as indicated. Coil rating: as indicated. Contact rating: as indicated.

.3 Sealed contact type: electrically held. Coil rating: as indicated. Contact rating: as indicated.

.4 Universal pole type: electrically held convertible from NO to NC by changing wiring connections. Coil rating: as indicated. Contact rating: as indicated.

.5 Fixed contact plug-in type: general purpose low coil current. Coil rating: as indicated. Contact rating: as indicated.

.6 Socket bases and DIN mounting rails for plug-in type relays.

2.2 RELAY ACCESSORIES

.1 Standard contact cartridges: normally-open - convertible to normally-closed in field.

2.3 OILTIGHT LIMIT SWITCHES

.1 Snap action type: roller rod or fork lever, top, side, push or wobble stick actuator, CSA type 1 enclosure. Contact rating as indicated.

.2 Surface mounted.

.3 Standard contact block.

2.4 SEALED CONTACT OILTIGHT LIMIT SWITCHES

.1 Lever type switches: roller fork or rod operated, single or double pole, double throw. Contact rating: as indicated.

.2 Push type switches: actuated by rod or plunger located on side of operating head, spring return single pole, throw. Contact rating: as indicated.

.3 Wobble stick cat whisker type switches: actuated by rod or stick extending from tip of operating head. Moving rod in any direction operates contacts. Single pole, double throw. Contact rating: as indicated.

.4 Lever operated: time delay switch: adjustable time delay from 1/2s to 15s plus 25%. Contact rating: as indicated.

.5 Plug-in construction switches: CSA Type 4, two or four circuit, lever push or wobble stick type, contact rating: as indicated.

2.5 SOLID STATE TIMING RELAYS

.1 Construction: AC operated electronic timing relay with solid-state timing circuit to operate output contact. Timing circuit and output contact completely encapsulated to protect against vibration, humidity and atmospheric contaminants.

.2 Operation: on-delay or off-delay.

.3 Potentiometer: self contained to provide time interval adjustment.

.4 Supply voltage: 120 or 24 V, AC, 60 Hz, as indicated.

.5 Temperature range: minus 20 degrees C to 60 degrees C.

.6 Output contact rating: maximum voltage 300 V AC or DC. Current: NEMA ICS 1 as indicated.

.7 Timing ranges: minimum 0.5 maximum 60s.

2.6 INSTANTANEOUS TRIP CURRENT RELAYS

.1 Enclosure: CSA Type 1.

.2 Contacts: NO, NC automatic reset with adjustable tripping point.

.3 Control: 3 wire, with provision for shorting contacts during accelerating period of motor.

.4 Contact rating: NEMA ICS 1 as indicated.

2.7 OPERATOR CONTROL STATIONS

.1 Enclosure: CSA Type1, surface mounting:

2.8 PUSHBUTTONS

.1 Illuminated, Standard duty. Operator recessed mushroom type, as indicated, with 1-NO and 1-NC auxiliary contacts rated as indicated. Labels as indicated. Stop pushbuttons coloured red, provision for padlocking in depressed position and labelled "emergency stop".

2.9 SELECTOR SWITCHES

.1 Maintained 2 or 3 position labelled as indicated standard duty, operators wing lever, contact arrangement as indicated, rated as indicated.

2.10 INDICATING LIGHTS

.1 Standard duty, full voltage, transformer LED type, push-to-test, lens colour: as indicated, supply voltage as indicated, labels as indicated.

2.11 CONTROL AND RELAY PANELS

.1 CSA Type 1 sheet steel enclosure (sprinkler proof where required) with hinged padlockable access door, accommodating relays, timers, labels, as indicated, factory installed and wired to identified terminals.

2.12 CONTROL CIRCUIT TRANSFORMERS

.1 Single phase, dry type.

.2 Primary: 208, 240 or 600 V, 60 Hz ac.

.3 Secondary: 120 V, or 24V ac.

.4 Rating: 50, 150, 250, 350 or 500 VA, as indicated.

.5 Secondary fuse: size as required.

.6 Close voltage regulation as required by magnet coils and solenoid valves.

2.13 THERMOSTAT (LINE VOLTAGE)

.1 Wall mounted, for exhaust fan control.

.2 Full load rating: Amps as indicated at 120 V.

.3 Temperature setting range: 10 degrees C to 30 degrees C.

.4 Thermometer Range: 10 degrees C to 30 degrees C.

.5 Markings in 5 degrees increments.

.6 Differential temperature fixed at 20 degrees C.

PART 3 EXECUTION

3.1 INSTALLATION

.1 Install pushbutton stations, control and relay panels, control devices and interconnect as required on control wiring diagrams as per drawings.

3.2 FIELD QUALITY CONTROL

.1 Perform tests in accordance with Section 26 05 00 – Common Work Results - Electrical .

.2 Depending upon magnitude and complexity, divide control system into convenient sections, energize one section at a time and check out operation of section.

.3 Upon completion of sectional test, undertake group testing.

.4 Check out complete system for operational sequencing.

END OF SECTION