

PART 1 - GENERAL

- 1.1 SECTION INCLUDES .1 Materials and installation for industrial control devices including pushbutton stations, control and relay panels.
- 1.2 REFERENCES .1 Canadian Standards Association (CSA International)
.1 CSA C22.2 No.14-10, Industrial Control Equipment.
.2 National Electrical Manufacturers Association (NEMA)
.1 NEMA ICS 1-2000(R2005, R2008), Industrial Control and Systems: General Requirements.
- 1.3 SHOP DRAWINGS .1 Submit shop drawings in accordance with Section 01 33 00.
.2 Include schematic, wiring, interconnection diagrams.
- 1.4 QUALITY ASSURANCE .1 Submit to Departmental Representative one copy of test results.
- 1.5 WASTE MANAGEMENT AND DISPOSAL .1 Separate and recycle waste materials in accordance with Section 01 74 20.

PART 2 - PRODUCTS

- 2.1 AC CONTROL RELAYS .1 Control Relays: to CSA C22.2 No.14.
.2 Convertible contact type: contacts field convertible from NO to NC, electrically held permanent magnet latched double-voltage type with sliding barrier to permit access to contacts only or coil only, with pneumatic solid state timer and poles overlap type. Coil rating: 120V, 50VA. Contact rating: 300V, 15A.
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- 2.1 AC CONTROL RELAYS (Cont'd)
- .3 Sealed contact type: electrically held permanent magnet latched with poles and front mounted contact block to provide additional poles. Coil rating: 120V, 50VA. Contact rating: 300V, 15A.
 - .4 Universal pole type: electrically held mechanically held latch type with poles, convertible from NO to NC by changing wiring connections. Coil rating: 120V, 50VA. Contact rating: 300V, 15A.
 - .5 Fixed contact plug-in type: general purpose low coil current heavy duty with poles. Coil rating: as indicated. Contact rating: as indicated.
- 2.2 RELAY ACCESSORIES
- .1 Standard contact cartridges: normally-open - convertible to normally-closed in field.
- 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 external to provide time interval adjustment.
 - .4 Supply voltage: 120 VAC, 60 Hz.
 - .5 Temperature range: minus 10°C to 40°C.
 - .6 Output contact rating: maximum voltage 300 V AC or DC. Current: 15 A.
 - .7 Timing ranges: minimum 1.0 min, maximum 30 min.
- 2.6 INSTANTANEOUS TRIP CURRENT RELAYS
- .1 Enclosure: CSA Type 1.
 - .2 Contacts: NO, NC automatic reset with adjustable tripping point.
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<u>2.6 INSTANTANEOUS TRIP CURRENT RELAYS (Cont'd)</u>	.3	Control: 3 wire, with provision for shorting contacts during accelerating period of motor.
	.4	Contact rating: NEMA ICS 1.
<u>2.7 PUSHBUTTONS</u>	.1	Illuminated, Heavy duty Oil tight. Flush mounted on enclosure. Green and red, with 1-NO and 1-NC contacts rated at 10A, 120 VAC, labels as indicated.
<u>2.8 SELECTOR SWITCHES</u>	.1	Maintained, 3 position labelled HAND-OFF-AUTO heavy duty oil tight, knob, contact arrangement as indicated, rated 120V, 10A AC.
<u>2.9 INDICATING LIGHTS</u>	.1	Heavy duty oil tight, full voltage, LED type, push-to-test, lens colour: red and green as indicated, supply voltage: 120 V, lamp voltage: 120 V, labels as indicated.
<u>2.10 CONTROL AND RELAY PANELS</u>	.1	CSA Type 1 sheet steel enclosure with hinged padlockable access door, accommodating relays, timers, labels as indicated, factory installed and wired to identified terminals.
<u>2.11 CONTROL CIRCUIT TRANSFORMERS</u>	.1	Single phase, dry type.
	.2	Primary: 120 VAC, 60 Hz for variable air volume boxes; 208 VAC, 60 Hz for motor starters.
	.3	Secondary: 24 VAC for variable air volume boxes; 120 VAC for motor starters.
	.4	Rating: 500 VA.
	.5	Secondary fuse: 25 A at 24 VAC, 5.
	.6	Close voltage regulation as required by magnet coils and solenoid valves.

- 2.12 THERMOSTAT
(LINE VOLTAGE)
- .1 Wall mounted, for exhaust fan control.
 - .2 Full load rating: 8 A at 120 V.
 - .3 Temperature setting range: 5 degrees C to 30 degrees C.
 - .4 Markings in 5 degrees increments.

PART 3 - EXECUTION

- 3.1 INSTALLATION
- .1 Install pushbutton stations, control and relay panels, control devices and interconnect.

- 3.2 FIELD QUALITY CONTROL
- .1 Depending upon magnitude and complexity, divide control system into convenient sections, energize one section at time and check out operation of section.
 - .2 Upon completion of sectional test, undertake group testing.
 - .3 Check out complete system for operational sequencing.