CITY OF FORT WAYNE MASTER UPDATED: 4/17/17

SECTION 40 67 06

Miscellaneous Control Panel Devices

1. – GENERAL
	1. DESCRIPTION
		1. Summary:
			1. Control panel devices for Process Instrumentation and Control Systems.
		2. Related Sections:
			1. Section 40 61 13, Process Control System General Provisions
			2. Section 40 61 16, Process Control Narrative
			3. Section 40 61 63, Process Control System – Training
			4. Section 40 61 93, Process Control System - Input Output List
			5. Section 40 64 00, Programmable Logic Controllers
	2. SUBMITTALS
		1. General:
			1. Comply with the requirements of Section 40 61 13, Process Control System General Provisions.
			2. Submit Product Data and Shop Drawings in one complete submittal package for this section.
2. QUALITY ASSURANCE
	1. Standardization:
		1. Devices shall be latest and most modern design at time of bidding.
		2. As much as possible devices shall be products of one manufacturer to achieve standardization for maintenance, spare parts, operation, and service.
	2. Manufacturer Qualifications
		1. Firms experienced in manufacturing instrumentation of types and capacities indicated that have record of successful in‑service performance.
	3. Items provided under this section shall be listed or labeled by Underwriters Laboratories Inc. (UL) or other Nationally Recognized Testing Laboratory (NRTL).
		1. Term "NRTL" shall be as defined in Occupational Safety and Health Administration (OSHA) Regulation 1910.7.
		2. Terms "listed" and "labeled" shall be as defined in National Electrical Code (NEC), Article 100.
3. ‑ PRODUCTS
	1. PUSHBUTTONS, SELECTOR SWITCHES AND PILOT LIGHTS.
		1. Manufacturers:
			1. GE CR104P Series.
			2. Allen Bradley 800T.
			3. Square D Class 9001, Type K.
			4. Or equal.
		2. Construction:
			1. Heavy duty.
			2. Watertight.
			3. Oil-tight.
			4. Flush panel mounting.
			5. Size to mount in 30.5-mm diameter.
			6. Match NEMA rating of related enclosure.
		3. Pushbuttons:
			1. Flush head unless specified elsewhere.
			2. Contact Blocks:
				1. Double break silver contacts.
				2. AC Ratings: 7,200 va make, 720 va break.
				3. Single pole, double throw or double pole, single throw.
				4. Up to six tandem blocks.
			3. Momentary contact unless specified elsewhere.
			4. Non-illuminated.
			5. Legend plates, as required, for type of operation or as specified elsewhere.
		4. Remote Emergency Stop:
			1. Jumbo red mushroom head.
			2. Contact Blocks:
				1. Double break silver contacts.
				2. Ac Ratings: 7,200 va make, 720 va break.
				3. Single pole, double throw or double pole, single throw.
				4. Up to six tandem blocks.
			3. Push/pull.
			4. Maintained contact.
			5. Non-illuminated.
			6. Legend plates:
				1. Extra large.
				2. Red.
				3. Emergency.
		5. Selector Switches:
			1. Maintained position unless specified elsewhere.
			2. Contact Blocks:
				1. Double break silver contacts.
				2. Arc Ratings: 7,200 va make, 720 va break.
				3. Single pole, double throw or double pole, single throw.
				4. Up to six tandem blocks.
			3. Operators:
				1. Number of positions as specified elsewhere.
				2. Standard knob type unless specified elsewhere.
			4. Legend plates as required for type of operation or specified elsewhere.
		6. Pilot Lights:
			1. LED Lamp.
			2. Full voltage (120Vac) lamps
			3. Colored lens as specified elsewhere.
			4. Interchangeable lenses.
			5. Push to test.
			6. Legend plates as specified elsewhere.
		7. Nameplates:
			1. Engraved laminated plastic.
			2. Letters 3/16 in. high.
			3. Black letters on white background.
			4. Identify per equipment controlled, using names found on Drawings.
	2. MOTOR STARTER CONTROL RELAYS.
		1. Manufacturers:
			1. Square D.
			2. Cutler Hammer.
			3. Or approved equal.
		2. Construction:
			1. Industrial type.
			2. 300 v rated.
			3. AC operation.
			4. Used for operation of large motor starter coils or other 120 vac loads whose current requirements (continuous or inrush) exceed capacity of control relays listed below.
		3. Operating data:
			1. Pickup time: 11 ms maximum.
			2. Dropout time: 6 ms maximum.
		4. Coil:
			1. Molded construction.
			2. 120 vac, 60 Hz.
			3. Continuous rated.
			4. 155 va inrush, maximum.
			5. 22 va sealed, maximum.
		5. Contacts:
			1. Double break.
			2. Silver alloy.
			3. Convertible.
			4. Color-coded to indicate status.
			5. 60 amp make, 6 amp break (120 vac inductive).
		6. DIN rail-mounting capability.
		7. Accessories:
			1. Add-on pole attachment.
				1. 4 NO and 4 NC contacts.
				2. Add-on to 0 to 4-pole relay.
				3. Latch attachment.
	3. CONTROL RELAYS.
		1. Manufacturers:
			1. Allen Bradley 700 series.
			2. Square D.
			3. Or equal.
		2. Operating Data:
			1. Pickup Time: 13 ms maximum.
			2. Dropout Time: 10 ms maximum.
			3. Operating Temperature: -45°F to 150°F.
		3. ac Coil:
			1. 120 or 240 vac.
			2. Continuous rated.
			3. 3.5 va inrush maximum.
			4. 1.2 va sealed, maximum.
			5. 50 to 60 Hz.
			6. Minimum Dropout Voltage: 10% of coil rated voltage.
		4. dc Coil:
			1. 24 or 120 Vdc.
			2. Continuous rated.
			3. Minimum Coil Resistance:
				1. 24 Vdc: 450 Ω.
				2. 120 Vdc: 9,000 Ω.
		5. Contacts:
			1. Low current - Gold flashed fine silver, gold diffused for 1 amp or less resistive load.
			2. Current loop contacts – Bifurcated gold flashed fine silver, gold diffused for 4-20ma signals.
			3. Silver cadmium oxide.
			4. 4 form C.
				1. Exception: Interposing relays can have a single form C contact.
			5. 120 vac.
			6. 10 amp make, 1.5 amp break, (inductive).
		6. Rated at 10 million operations.
		7. DIN rail mountable.
		8. Enclosed and protected by polycarbonate cover.
		9. Provide relay-retaining clips.
	4. TIMERS
		1. 24-hour Clock Timer (Repeat Cycle):
			1. Manufacturers:
				1. Tork Time Controls.
				2. Intermatic.
				3. Or equal.
			2. Mounting: Surface.
			3. Display: 24-hour LCD.
			4. Contacts: 1 SPDT rated 20 A.
			5. Set Points: 288 per 24-hour.
			6. Skip Feature: 1 to 7 day adjustable.
			7. Minimum On-Off Time: 5 min.
			8. Time cycle programmable by keypad.
			9. Power: 120 vac, 60 Hz.
		2. Elapsed Time Meters:
			1. Manufacturers:
				1. Engler.
				2. Eagle Signal.
				3. Or equal.
			2. Mounting: Surface.
			3. Digits: 5, non-reset.
			4. Power: 120 vac, 60 Hz.
		3. Interval/Duration Timer (Rear of Panel):
			1. Manufacturers:
				1. Potter and Brumfield, CN series.
				2. Eagle Signal DM 100 series.
				3. Or equal.
			2. Mounting: Plug-in with dust tight cover.
			3. Type: Integrated circuit.
			4. Range: 0.5 sec to 99 min. Field selectable.
			5. Contacts: 2 DPDT contacts rated 10 amp, 120 vac.
			6. Power: 120 vac, 60 Hz.
		4. Interval/Duration Timer (Front of Panel):
			1. Manufacturers:
				1. Eagle Signal, CX300 series.
				2. Or equal.
			2. Type: Microprocessor.
			3. Timing Range: Five ranges from 200 sec to 200-hr field selectable.
			4. Contacts: 10 amp, 120 vac.
			5. Controls: Membrane switches for operator input.
	5. TERMINAL BLOCKS
		1. Manufacturers:
			1. Phoenix Contact.
			2. Weidmuller.
			3. Or equal.
		2. 300 v rating for 120 v circuits and below, 600 v rating for 480 v circuits.
		3. Clamping screw type.
		4. Isolating end caps for each terminal.
		5. Identification on both terminals.
		6. Clip-mounted on DIN rail.
		7. Accept AWG 12 to 22.
		8. Feed-Through Terminals:
			1. 20 Amp rating
		9. Switched Terminals:
			1. Knife disconnect with test sockets.
			2. 10 Amp rating.
			3. Analog signals shall use switched terminals.
		10. Fused Terminals:
			1. Hinged fuse removal/disconnect.
			2. 10 Amp rating.
			3. Include blown fuse indication.
			4. Shall be used for each discrete I/O point
	6. THERMOSTAT FOR CONTROL PANEL TEMPERATURE SENSING
		1. Manufacturers:
			1. Stego
			2. Or equal.
		2. Operating range -45o C to 80o C
		3. High temp:
			1. Normally closed open on rise
		4. Low temp:
			1. Normally open closes on rise
		5. DIN Rail Mount
	7. DC POWER SUPPLIES
		1. Manufacturers:
			1. Phoenix Contact
			2. Sola
			3. Or equal.
		2. General
			1. Power supply shall be fully enclosed, and provide screw terminations. All wiring points and plug connections shall be "touch safe" with no live voltages that can make contact with a misplaced finger in accordance with IEC 529. Housing shall be at least IP20. Or equal.
			2. Power Supplies shall have an efficiency of at least 80% with high efficiency models (~90%) available
			3. The power shall have an MTBF (Mean Time Between Failures) greater than 500,000 hours according to IEC 1709
			4. The power supply shall be able to withstand shock of 30G in all space directions according to IEC 68-2-27 and vibration up to 2.3G 90 min. (<15hz, amplitude = +/-2.5mm/15-150hz) according to IEC 68-2-6
			5. Power supplies shall be UL508 listed to allow the use of the power supply at full rated output amperage with no "de-rating".
			6. Power supply shall be 10A. Additional loads shall require multiple power supplies.
		3. Mounting
			1. All power supplies shall have integral metal mounting foot to attach to 35mm DIN-rail conforming to DIN EN50022.
		4. Wire Connections
			1. Attach wires to the power supplies by means of a cable-clamping terminal block activated by a screw. Connections shall be gas-tight, and the terminal block shall be fabricated with non-ferrous, non-corrosive materials.
			2. Wire connection for currents less than 20A shall use pluggable terminals on both input and output ends.
			3. Pluggable terminals shall accept wire sizes 24 through 14 AWG.
		5. Equipment
			1. Nominal current rating to be based on an operating temperature of 60°C or higher
			2. Power supplies shall have a visible "DC Power OK" indicator. This indicator will flash when the output drops below 10% of the adjusted output voltage.
			3. Ambient temperature range for operation shall be at least -25°C to +70°C
			4. Residual ripple shall not exceed 100 mV peak to peak at nominal current values
			5. Integral "fine" surge suppression shall be incorporated into the power supply
			6. Power supplies shall conform to CE electromagnetic compatibility as described in EN61000-6-2 and EN 50081-2.
			7. Power supplies shall have means of limiting DC current in case of short circuit or an overload and shall automatically reset themselves when the fault is corrected.
			8. Power supplies when wired in parallel will not require external circuitry.
			9. Power supplies shall have a voltage monitoring relay contact and signaling output to the PLC’s DC discrete input.
			10. Input must auto-range between 85 to 264VAC and 90 to 350VDC for 1 phase power supplies with no manual intervention.
			11. Input must auto-range between 320 to 575VAC and 450 to 800VDC for 3 phase power supplies with no manual intervention.
			12. Power supplies shall have a power factor of at least 0.6, with higher power factor models available as described by EN61000-3-2.
	8. ELECTRONIC CURRENT ISOLATOR
		1. Manufactures:
			1. Phoenix Contact Model MCR Series.
		2. Solid state instrument to electrically isolate one instrument loop from another instrument loop. Convertor to accept 4/20mAdc input and provide equal but isolated and power-boosted output.
		3. Mounting: DIN Rail.
		4. Temperature compensated, calibration-free.
		5. Signals: Input 4/20mAdc into 50ohms. Output: 4-20mAdc into output load up to 500ohms.
		6. Isolation: Common mode up to 700vac between input and output.
	9. UNINTERRUPTIBLE POWER SUPPLY
		1. Manufacturers
			1. Double-conversion true-online
				1. Liebert GXT3 Series (GXT3-1000MT120)
		2. Tower or rack installation
			1. Maintain at least 4 inches (100mm) clearance in the front and rear of unit as not to obstruct the air inlets on the front panel and rear panel of the UPS.
		3. Minimum features to include
			1. Power factor correction
			2. Internal batteries
			3. Frequency conversion
			4. Internal automatic bypass to utility in case of adverse UPS conditions
			5. Manual bypass capability
		4. Address the following potential power problems
			1. Power spikes and transients
			2. EMI/RFI noise
			3. Voltage sags and brownout conditions
			4. Harmonics
			5. Power-factor corrected loads
			6. Outages
			7. Frequency variations
		5. Environmental Parameters
			1. Humidity Range Operating: 0 - 95%
			2. Max Operating Temperature: 104 °F
			3. Min Operating Temperature: 32 °F
			4. Sound Emission: 45 dBA
		6. Batteries
			1. UPS shall include a minimum of 3 sealed lead acid batteries with the option to connect a maximum of four extension battery packs..
			2. Batteries shall be hot-swappable batteries.
			3. Full Load - up to 5 min
			4. Half Load - up to 15 min
			5. Recharge Time – 3 hours to 90% capacity after full discharge with 100% load till UPS auto-shutdown
		7. Output Wave Shape
			1. Pure Sine Wave
		8. Output Frequency:
			1. 40Hz~70Kz; Auto Sensing
		9. UPS shall be wired to the PLC, OIT, and network equipment to maintain power for ability to signal to plant SCADA of field conditions.
		10. UPS shall be installed with hardwired automatic failover to deliver line power to the load of the UPS. Failover shall be monitored and alarmed on SCADA.
	10. PROXIMITY SWITCHES (BUILDING INTRUSION)
		1. Manufactures:
			1. ADT
			2. GE Sentrol
			3. Or Equal
		2. Dry contacts suitable for connection for PLC discrete input.
	11. PROXIMITY SWITCHES (CONTROL PANEL INTRUSION)
		1. Control panel intrusion switch to be provided by the enclosure manufacturer.
		2. Dry contacts suitable for connection for PLC discrete input.
	12. SURGE SUPPRESSOR (CONTROL POWER)
		1. Manufacturer
			1. Islatrol – IE Series
		2. Application-Surge Protector shall be wired to protect exclusively the following:
			1. PLC
			2. Ethernet Switch
			3. HMI
			4. Radio
			5. Any other computer equipment in panel
		3. Alarm fault shall be indicated external to the control panel.
		4. DIN Rail Mount Package
		5. Surge and Filter Protective Device
		6. Certifications
			1. UL 1449 Third Edition
			2. UL1283
			3. CE
		7. UL1449 Voltage Protection Rating
			1. Line to Ground : 600V
			2. Line to Neutral : 400 V
			3. Neutral to Ground : 500 V
		8. Indicators
			1. LED power indicator light
		9. All mode transient protection with Line to Neutral value of 25 kA
		10. Form C contact for remote status indication by PLC
		11. Line Voltage
			1. 120 VAC
		12. Connection Mode
			1. Line to Neutral
		13. Frequency Rating
			1. 47 ... 63 Hz
		14. Maximum Continuous Operating Voltage
			1. 150 VAC
		15. Maximum Discharge Current
			1. Line to Ground : 15 kA
			2. Line to Neutral : 15 kA
			3. Neutral to Ground : 15 kA
		16. Current Ampacity
			1. 20 A
	13. PUMP PROTECTION RELAY (PPR)
		1. Manufacturers
			1. Pump protection relay to be provided by pump manufacturer, coordinate relay provision, type, mounting requirements, and wiring requirements with Contractor. Pump protection relays shall be installed into control panels.
		2. Operation Principle
			1. Current Sensing
		3. Environment
			1. -20 to 65°C (-4 to 149°F)
		4. Supply Voltage
			1. 120 VAC 50-60 Hz ±10%
		5. Relay Contact Rating
			1. 10 Amps @ 120 VAC
		6. Voltage to Sensor
			1. 12 VDC ±10%
		7. Values of Operation
			1. 3.0 mA<I<22 mA = OK conditions.
			2. I < 3.0 mA = High temp. ±5%(or interrupt).
			3. I > 22.0 mA = Leakage ±5% (or short circuit).
			4. I = current measured by the relay.
		8. Power Indicator Lights
			1. Green LED On = Supply Voltage present.
			2. Green LED Off = No Supply Voltage present.
		9. Leakage Requirements
			1. Contact: Form "C" 10 A @ 120 VAC (N.C. contact for interlocking)
			2. Reset: Automatic (N.O. contact for alarm)
			3. Red LED On = Leakage indicated
			4. Red LED Off = No leakage indicated
		10. Temperature Requirements
			1. Contact: Form "C" 10 A @ 120 VAC (N.C. contact for interlocking, N.O. contact for alarm)
			2. Reset: Manual - by interrupting the supply for 1 sec. or by setting the toggle switch in the "Manual" mode.
			3. Automatic - by setting the toggle switch in the "Auto Reset" mode.
			4. Red LED On = Over-temperature indicated.
			5. Red LED Off = No Over-temperature indicated
		11. Physical Size
			1. Width: 2.125"
			2. Height: 4.250"
			3. Depth: 3.470" (+ socket depth)
		12. Approvals
			1. UL - File E101681
	14. OPERATOR INTERFACE TERMINAL
		1. All equipment specified in this Section shall be the product of a single manufacturer.
		2. Manufacturer:
			1. Rockwell Automation
			2. No substitutes.
		3. PANELVIEW PLUS
		4. General
			1. Microprocessor based graphical operator interface.
			2. NEMA 4X, front of panel mount for indoor applications.
			3. Comply with manufacturer recommendations for outdoor applications.
			4. 0-55°C operating range.
			5. Touch screen.
			6. Ethernetinterface.
			7. Application memory standard 512 MB.
			8. 512 MB nonvolatile flash
		5. Display
			1. 18 Bit Color.
			2. Color active-matrix thin film transistor
		6. Display Functionality:
			1. Pushbutton.
			2. Pilot light.
			3. Numeric data entry and display.
			4. Alarm display.
			5. Bar graph display.
			6. Time display.
			7. Selector switch.
			8. Bit mapped graphics.

NTS: Confirm owners current part number and identify at each location the correct model number for each required terminal.

* + 1. Each station shall be constructed of identical parts and components and shall be provided as follows:
			1. 2177P-T15C21D8S in-plant locations
			2. 2711P-T10C21D8S remote stations

NTS: Radio telemetry system shall be coordinated with the own and the owners existing system. The owner maintains multiple communication methods including licensed - 900MHz, spread spectrum – 900MHz, and cellular. The owner will make the final determination base on project location and propagation study.

NTS: Communication equipment specified in section 27 and shall be incorporated into the control panel construction for the owner to have a complete system. Specifier to modify 2.15

* 1. RADIO COMMUNICATION EQUIPMENT
		1. Furnish and install a high security, process control network and complete telemetry system which shall include antenna mountings, panels, and interfaces.
		2. The radio telemetry system shall include all appurtenances, hardware, and components to install the radio system in a neat and workman like manner. Radio telemetry system shall be provided by J&K communications (as outlined in associated quote provided through the System Supplier contract).
		3. All local codes relating to antenna height requirements, aircraft flight paths, and other pertinent issues must be adhered to. The system shall communicate with the Utility's SCADA system via radio, configured to coordinate with the Owner's system for remote communications.
		4. Manufacturer:
			1. GE MDS
			2. No substitutes.
		5. Coordination.
			1. SYSTEM SUPPLIER is responsible for coordination of network and telemetry communications for this project with J&K communications.

J&K Communicatons

Jon Shew II

 222S. Tower View Dr.

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(260) 244-7975

* 1. FIXED MANAGED DATA SWITCHES-DIN RAIL MOUNTED
		1. Manufacturers:
			1. Allen Bradley.
			2. No Substitutes.
		2. Features:
			1. Stratix Series Ethernet switch.
			2. Store and forward switch in compliance with IEEE 802.3, 2 priority classes in accordance with IEEE 802.1D, TCP/IP protocol.
			3. Fiber Interface (1000 BASE FX):
				1. 1-port minimum.
				2. 1000-Mbps.
				3. Multimode LC.
				4. Provide SFP/LC transceivers in order to utilize ALL available fiber port sockets.
			4. Twisted-Pair Interface:
				1. 8-ports minimum. Sized per application requirements.
				2. Autosensing 10/100 Mbps.
				3. RJ45 connection.
			5. Managed. Layer 2.
			6. IGMP Snooping enabled.
			7. 24 VDC power supply, external
			8. Ambient temperature (operation) – 0 °C to 60 °C.
			9. Environmental Rating IP20
	2. UTP PATCH CORDS FOR EQUIPMENT ENCLOSURES
		1. Provide Category 6 Modular Patch Cords as follows:
			1. Power sum rated. Patch cords are not required for the data jack location.
			2. Patch cords shall not exceed 3 feet in length unless specifically required for application.
			3. Conform to the requirements of EIA/TIA 568B Commercial Building Telecommunications Cabling Standard, Horizontal Cabling Section, and UL® LAN Certification and Follow-up Program.
			4. Equipped with an 8 pin modular connector on each end and conform to the length(s) specified on the detailed drawing.
			5. Round, and 24-AWG copper, stranded conductors, tightly twisted into individual pairs.
			6. Built‑in exclusion features to prevent accidental polarity reversals and split pairs.
		2. UL® Verified for EIA/TIA 568A Electrical Performance
		3. UL® and c (UL®) Listed for Fire Safety
		4. ISO 9001 Certified Manufacturer
		5. Austel Approved
		6. FCC Compliant
		7. Lucent Technologies Patch Cord D8SA, Panduit, or equal.
1. ‑ EXECUTION
	1. INSTALLATION
		1. Install and wire in accordance with System Supplier’s and/or Equipment manufacturer’s written instructions and approved submittals, applicable requirements of the NEC, NECA “Standard of Installation”, and recognized industry practices.
		2. Touch up panel finish if marred during installation.
		3. Equipment grounding shall follow manufacturer’s installation requirements.

+ + END OF SECTION + +