

PROCUREMENT SPECIFICATION

Electrical Control Devices

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SECTION XX XX XX
ELECTRICAL CONTROL DEVICES

PART 1 GENERAL

1.01 QUALIFICATIONS

A. Manufacturer

1. The manufacturer shall have a minimum of 25 years of experience in the manufacture of electrical control devices.
2. The approved manufacturers are:
 - a) Rockwell Automation Allen-Bradley
 - b) Substitutions: None permitted

B. Certification

1. To ensure all quality and corrective action procedures are documented and implemented, all manufacturing locations shall be certified to the ISO-9001 Series of Quality Standards.
2. Third-party manufacturers and brand labeling shall not be allowed.

1.02 RELATED DOCUMENTS

- A. Drawings and general provisions of the contract apply to this section.
- B. The following sections contain requirements that relate to this section:
 1. Section 40 90 00, Process Control System General Requirements
 2. Section 40 95 13, Process Control Panels and Hardware
 3. Section _____

1.03 REFERENCES

- A. The electrical control devices shall comply with applicable local code requirements and the National Electrical Code (NEC).
- B. Certifications shall include UL, CSA and agencies as specified herein.

1.04 ENVIRONMENTAL REQUIREMENTS

- A. The supplier shall confirm specified service conditions during and after installation of products.
- B. The supplier shall maintain the area free of dirt and dust during and after installation of products.

1.05 SUBMITTALS

- A. Submittals shall be made in accordance with Section 01 33 00, Submittal Procedures.
- B. Shop drawings (to NEMA ICS 1) shall be submitted to indicate control panel layouts, wiring connections and diagrams, dimensions and support points.

- C. Product data for each electrical control device specified shall be submitted and included as part of the system in which the device is specified.
- D. The manufacturer's installation and user instructions shall be submitted, providing:
 - 1. Receiving, handling and storage instructions.
 - 2. Instructions for adjusting and resetting devices.
 - 3. Recommended preventive maintenance procedures.

1.06 PROJECT RECORD

- A. Actual locations of the electrical control devices shall be accurately recorded.
- B. Diagrams included in the drawings shall be revised to reflect actual connections.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Allen-Bradley® Electrical Control Devices (No substitution)

2.02 ELECTRICAL CONTROL DEVICES

- A. The electrical control devices shall include: **[include applicable devices]**
 - 1. Pilot Devices
 - 2. Relays and Timers
 - 3. Miniature Circuit Breakers
 - 4. Terminal Blocks and Fuse Blocks
 - 5. Alarms and Signals
 - 6. Power Supplies
 - 7. Sensing Devices
 - 8. Intrinsic Barriers
 - 9. Signal Conditioners/Isolators
- B. The electrical control devices shall be interoperable with standard electrical equipment.

2.03 PILOT DEVICES **[select applicable device(s)]**

- A. 30.5 MM PUSH BUTTONS, SELECTOR SWITCHES AND PILOT LIGHTS
 - 1. 30.5 mm push buttons, selector switches and pilot lights shall be Allen-Bradley heavy industrial: **[select applicable style(s)]**
 - a) Type 4/13 watertight/oiltight metal [Bulletin 800T], or
 - b) Type 4/4X/13 corrosion-resistant/watertight/oiltight plastic [Bulletin 800H]
 - 2. 30.5 mm push buttons, selector switches and pilot lights shall provide EN/IEC 60529 IP66/65 degree of protection.
 - 3. 30.5 mm push buttons, selector switches and pilot lights shall have electrical ratings of:
 - a) Dielectric strength – 2200V for 1 minute [or 300V for 1 minute (Logic Reed)]

- b) Electrical design life cycles – 10,000,000 at max. rated load [200,000 at max rated load (Logic Reed)]
- 4. 30.5 mm push buttons, selector switches and pilot lights shall have an operating range of -40 to 131°F (-40 to 55°C).
- 5. Illuminated devices shall offer universal LED that accepts 12 to 130 VAC/VDC voltage input. **[option]**
- 6. 30.5 mm push buttons shall have a diaphragm seal for protection from liquids, particles and corrosive agents.
- 7. 30.5 mm selector switches shall incorporate a positive detent to prevent the switch from hanging up between positions.

B. 22.5 MM PUSH BUTTONS, SELECTOR SWITCHES AND PILOT LIGHTS

- 1. 22.5 mm push buttons, selector switches and pilot lights shall be Allen-Bradley internationally rated: **[select applicable style(s)]**
 - a) Type 4/4X/13 chemical-resistant engineering grade thermoplastic [Bulletin 800FP], or
 - b) Type 4/13 chrome-plated die-cast metal [Bulletin 800FM]
- 2. 22.5 mm push buttons, selector switches and pilot lights shall provide EN/IEC 60529 IP66/65 degree of protection.
- 3. 22.5 mm push buttons, selector switches and pilot lights shall have ratings of:
 - a) Dielectric strength – 2500V for 1 minute
 - b) Mechanical durability per EN 60947-5-1 (Annex C) – up to 10,000,000 cycles, depending on device
- 4. 22.5 mm push buttons, selector switches and pilot lights shall have an operating range of -13 to 158°F (-25 to 70°C).
- 5. 22.5 mm push buttons, selector switches and pilot lights shall have a latch with snap-fit design, stackable contact blocks and a rotating collar for easy latch removal.
- 6. 22.5 mm push buttons shall have a diaphragm seal for protection from liquids, particles and corrosive agents.
- 7. 22.5 mm selector switches shall incorporate a positive detent to prevent the switch from hanging up between positions.

C. POTENTIOMETER DEVICES

- 1. 30.5 mm potentiometer devices shall be Allen-Bradley heavy industrial: **[select applicable style(s)]**
 - a) Type 4/13 watertight/oiltight metal [Bulletin 800T], or
 - b) Type 4/4X/13 corrosion-resistant/watertight/oiltight plastic [Bulletin 800H]
- 2. Potentiometer devices shall be rated for 300 VAC/VDC, 2 W maximum (6 VDC minimum):
 - a) Mechanical design life – Min. 25,000 cycles
 - b) Rotational torque – 3 to 12 in-oz
 - c) Stopping torque – Min. 12 in-lb

3. Potentiometer devices shall have single-turn operation, 312 degree rotation.
4. Potentiometer devices shall be finger-safe. [option]

D. CONTROL STATIONS

1. Control stations shall provide Allen-Bradley heavy industrial 30.5 mm push button(s) or selector switch with appropriate contact action, button/lever type and color/legend marking. Devices shall be: [select applicable style(s)]
 - a) Type 4/13 watertight/oiltight metal [Bulletin 800T], or
 - b) Type 4/4X/13 corrosion-resistant/watertight/oiltight plastic [Bulletin 800H]
2. Control stations shall be constructed of: [select applicable style(s)]
 - a) Die-cast aluminum
 - b) Chlorosulfonated-polyethylene-booted operator – stainless steel
 - c) Chlorosulfonated-polyethylene-booted operator – glass polyester
 - d) Bootless operator – stainless steel
 - e) Bootless operator – glass polyester

2.04 RELAYS AND TIMERS [select applicable device(s)]

A. RELAYS – TIME DELAY

1. Allen-Bradley time delay relays [Bulletin 700-HT] shall mount on tube-type bases with pin-style socket mounting.
2. Time delay relays shall have 10A, B300, DPDT contact ratings and coil voltages as shown on drawings.
3. Time delay relays shall have adjustable timing ranges [or fixed timing ranges to avoid tampering]. Timing ranges shall be as shown on drawings.

B. RELAYS – GENERAL PURPOSE

1. Allen-Bradley general purpose relays [Bulletin 700-HA] shall have tube-base/Octal 8-pin [or 11-pin] terminals and ON/OFF flag indicators.
2. General purpose relay contacts shall be silver nickel [or silver nickel bifurcated or gold-plated bifurcated] and have 10A, B300, DPDT [or 3PDT] ratings. Coil voltages shall be as shown on drawings.
3. General purpose relays shall have an electrical schematic on the faceplate, a clear cover for visual inspection and snap-in marker ability.
4. General purpose relays shall have LED status indicators, push-to-test and manual override. [options]

C. RELAYS – MINIATURE

1. Allen-Bradley miniature relays [Bulletin 700-HC] shall be square-base, 4-pole, plug-in type with blade-style terminals and ON/OFF flag indicators.
2. Miniature relay contacts shall be silver nickel [or gold-plated silver nickel] and have 7A [or 10A], DPDT [or 4PDT] ratings. Coil voltages shall be as shown on drawings.
3. Miniature relays shall have an electrical schematic on the faceplate and a clear cover for visual inspection.
4. Miniature relays shall have LED status indicators and push-to-test button with incorporated manual override lever. [options]

D. RELAYS – INDUSTRIAL-TYPE

1. Allen-Bradley industrial-type relays [Bulletin 700-P] shall be ruggedly constructed (10 million operation mechanical life), 2-pole [or 4-pole, 8-pole, 12-pole], configured N.O./N.C. as shown on drawings, and panel- [or strip-, DIN rail-] mounted.
2. Industrial-type relays shall be finger-safe.
3. Industrial-type relay contacts shall be silver nickel with a double-break and bifurcated design and 10A, A600 rating for AC [5A, P600 rating for DC].
4. Accessories shall include adder decks, time delay, latching, surge suppressors and/or mounting strip. **[options]**

E. TIMERS – PNEUMATIC

1. Allen-Bradley pneumatic timers [Bulletin 700-PT] shall be open-type and mounted on Allen-Bradley industrial-type relays [Bulletin 700-P].
2. Pneumatic timer contacts shall be 1 N.O. and 1 N.C., rated 10A.
3. Timing modes shall be On-Delay and Off-Delay with ranges of 0.1 to 60 seconds as shown on drawings.

F. TIMERS – SOLID-STATE

1. Allen-Bradley solid-state timers [Bulletin 700-FS] shall be DIN rail-mounted.
2. The solid-state timer contacts shall be available as SPDT or DPDT, 8A.
3. Solid-state timers shall be available with On-Delay, Off-Delay, On- and Off-Delay, One-Shot and Flasher operating modes as required on the drawings.
4. Solid-state timers shall have coil surge protection and adjustable timing ranges of 0.05 seconds to 60 hours as shown on drawings.

G. TIMERS – PROGRAMMABLE

1. Allen-Bradley programmable timers [Bulletin 700-HX] shall be digital timing relays with LCD display and shall be socket- [or panel-] mounted.
2. Programmable timer contacts shall be SPDT, rated 5A, B300.
3. Programmable timer panel surface shall offer Type 4X/IP66 protection.
4. Programmable timers shall be configurable for Signal On-Delay, Power On-Delay, Off-Delay, Repeat Cycle, One-Shot and Cumulative operating modes as required on the drawings.
5. Programmable timers shall have timing ranges of 0.000 seconds to 9999 hours, depending on selected mode and as shown on drawings.

2.05 MINIATURE CIRCUIT BREAKERS

- A. Miniature circuit breakers shall be Allen-Bradley Circuit Breakers [Bulletin 1489-M].
- B. Miniature circuit breakers shall be thermal-magnetic, current-limiting type, sized as specified on the drawings:
 1. 0.5A to 63A current rating
 2. 1-, 2- or 3-pole
 3. Type C or Type D tripping characteristic

- C. Miniature circuit breakers shall be UL Listed (E197878), CSA Certified (259391), CE Marked, VDE and CCC Certified and RoHS Compliant. Standards compliances shall include:
 - 1. UL 489
 - 2. CSA C22.2, No. 5.1
 - 3. EN 60947-2
 - 4. GB 14048.2
- D. Miniature circuit breakers shall be rated for:
 - 1. Voltage – Max. 480Y/277 VAC (UL/CSA); U_e 230/400 VAC (IEC)
 - 2. Interrupting capacity – 10 kA (UL/CSA); 15 kA (IEC)
- E. Housing shall satisfy Insulation Group II/RAL 7035, shall have IP20 finger-safe design, shall be suitable for DIN rail mounting and shall include status indicator window and scratch- and solvent-resistant printing.
- F. Miniature circuit breakers shall support reversible line and load connections and shall have dual terminals that:
 - 1. Connect up to 4 wires, or 2 wires and a bus bar.
 - 2. Clamp from both sides.
 - 3. Have a unique design that directs wires into openings to prevent wiring misses.
- G. Miniature circuit breakers shall be compatible with UL 508 Listed bus bars, auxiliary contacts, signal contacts, shunt trips and toggle-mount lockout attachments.

2.06 TERMINAL BLOCKS AND FUSE BLOCKS [select applicable device(s)]

A. TERMINAL BLOCKS – CONTROL, #22 to #8 AWG

- 1. Control terminal blocks shall be Allen-Bradley screw-type, feed-through [Bulletin 1492-J].
- 2. Control terminal blocks shall be certified:
 - a) UR/CSA – #22 to #8 AWG wire range, 50A maximum current, 600 VAC/VDC voltage rating
 - b) IEC – 6 mm² wire range, 41A maximum current, 800 VAC/VDC voltage rating
 - c) ATEX – 6 mm² (#20 to #10 AWG) wire range, 36A maximum current, 550 VAC/VDC voltage rating
- 3. Control terminal blocks shall have a snap-in card marking system. [option]

B. TERMINAL BLOCKS – POWER

- 1. Power terminal blocks shall be Allen-Bradley [Bulletin 1492-PD]: [select applicable style(s)]
 - a) Mini-block – 3-pole, rated at 600 VAC/VDC, 115A
 - b) Open-style power distribution block with aluminum or copper connectors – 3-pole [or 1-pole], rated at 600 VAC/VDC, 175 to 760A
 - c) Open-style feed-through/splicer terminal block with aluminum or copper connectors – 3-pole [or 1-pole], rated at 600 VAC/VDC, 175 to 760A

2. Power terminal blocks shall be certified by UR, CSA and CE.
3. Wire ranges and tightening torques shall be labeled on the block.
4. Power terminal blocks shall have a write-on marking surface or marker retention feature. **[option]**

C. FUSE BLOCKS

1. Allen-Bradley fuse block kits [Bulletin 1491] shall be used for protection of transformers and control circuits capable of delivering no more than 200,000 RMS symmetrical amps, 600V maximum.
2. Fuse block kits shall be 1-pole, 2-pole or 3-pole.
3. Each pole shall have a fuse cover. **[option]**

2.07 ALARMS AND SIGNALS **[select applicable device(s)]**

A. ALARM HORN

1. The alarm horn shall be an Allen-Bradley High Performance Electronic Horn [Bulletin 855H] and shall have up to 4 stages and low current consumption.
2. The alarm horn shall have a UV-stable plastic housing and non-moving parts.
3. The alarm horn shall have an on-board microphone, 45 alarm tones selectable by DIP switch and fine volume control via potentiometer.
4. The alarm horn shall allow synchronized output in multi-horn installations and shall have the ability to replicate content to other devices (master/slave).

B. ALARM BEACON

1. The alarm beacon shall be an Allen-Bradley [Bulletin 855B] with high-intensity, minimum 5-Joule Xenon, minimum 20-Watt Halogen or LED illumination as required on the drawings.
2. The alarm beacon shall have polycarbonate housing and lens, available in square or round configuration, and Type 4/4X/13, IP65/IP66 ingress rating as required on the drawings.
3. Flashing frequency shall be 1 Hz.
4. Alarm beacon lens colors shall be red, green, amber, blue, yellow or clear as required on the drawings.

C. ALARM LIGHT TOWER

1. The alarm light tower shall consist of Allen-Bradley Control Tower™ Stack Lights [Bulletin 854J or K], stacked 1 [or 2, 3, 4, 5] module(s) high and shall be surface- [or vertical-, quick-release-, pole-] mounted.
2. The alarm light tower shall be 40 mm [or 60 mm] size and the terminal block shall be top-mounted on the base.
3. The light modules shall be Type 4/4X/13, IP65 and are: **[select applicable style(s)]**
 - a) Steady incandescent
 - b) LED (steady, flashing or strobe)
 - c) Piezo Electric Sound Module
4. The alarm light tower shall include a continuous (or pulsing) piezo [or transducer] sound module. **[option]**
5. The alarm light tower shall have a DeviceNet base. **[option]**

D. SIGNAL ALARM (PANEL MOUNT)

1. The signal alarm shall be an Allen-Bradley Panel Mount Signaling Alarm [Bulletin 855P] in a 30 mm [or 45 mm, 65 mm] size, that mounts in a standard 22.5 mm hole.
2. The signal alarm shall have polycarbonate base and lens.
3. The signal alarm shall be: **[select applicable style(s)]**
 - a) Sounder
 - b) Selectable steady or flashing LED
 - c) Combination sounder and LED
 - d) Strobe
 - e) Dual circuit
4. The signal alarm shall be rear-securing and finger-safe.

2.08 POWER SUPPLIES **[select applicable device(s)]**

A. CONTROL POWER TRANSFORMER

1. The control power transformer shall be an Allen-Bradley Global Control Transformer [Bulletin 1497], single-phase and sized as shown on drawings.
2. The control power transformer shall be epoxy encapsulated and shall offer EN 60-529 finger-safe protection.
3. The control transformer shall have a: **[select applicable style]**
 - a) Dual primary and secondary fuse block, pre-wired and top-mounted.
 - b) Primary and secondary fuse block, factory-installed or panel-mounted.

B. 24 VDC POWER SUPPLIES

1. 24 VDC power supplies shall be Allen-Bradley [Bulletin 1606-XL] with active or passive PFC choke and input as shown in drawings [or auto-select input].
2. 24 VDC power supplies shall have low inrush current, and power supplies with greater than 100-Watt output shall incorporate a minimum 120% Power Burst design.
3. 24 VDC power supplies shall have NEC Class 2 "Limited Power" output. **[option]**

C. UPS

1. The UPS shall be an Allen-Bradley Industrial Uninterruptible Power Supply [Bulletin 1609-B/D] with 120 VAC input voltage and output power as shown on drawings.
2. The UPS shall be back-of-panel- [or DIN rail-] mounted.
3. The UPS shall provide:
 - a) Surge protection to 380 Joules
 - b) Overload protection, resulting in delayed shutdown at 110 to 130% and immediate shutdown at 130%
 - c) Protection against output short on line – over-current protection from premises branch circuit
 - d) Protection against output short on battery, resulting in shutdown
 - e) Thermal protection

4. The UPS shall have USB communications and software, integrated remote on/off and dry I/O contacts.
5. The UPS shall have EtherNet/IP communications, expandable battery capacity and/or pure sine wave output. [options]
6. The UPS shall perform to 40°C [50°C, with hi-temp battery].

2.09 SENSING DEVICES [select applicable device(s)]

A. LIMIT SWITCHES

1. The Allen-Bradley limit switch [Bulletin 802T] shall have Type 4/13 oiltight construction with synthetic rubber seals.
2. The limit switch's operating head shall rotate and fasten or clamp in at least 4 positions 90 degrees apart.
3. The contacts shall be snap-action type.
4. The switch base shall have 2 through holes for front mounting and 2 tapped holes for rear mounting.

B. PROXIMITY SWITCHES

1. The Allen-Bradley proximity switch [Bulletin 872C] shall operate on 3-wire DC [or 2-wire AC] and shall have a nickel-plated brass [or stainless steel, plastic] barrel and plastic face.
2. The proximity switch shall have the size, connection, shielding and output configuration (N.O., N.C., PNP, NPN) shown on drawings.
3. The proximity switch shall have short circuit, overload, false pulse, reverse polarity and transient noise protection.
4. The proximity switch shall provide extended [or long range] sensing. [options]

C. PHOTOELECTRIC SENSORS

1. The Allen-Bradley Series 9000™ photoelectric sensor shall have a Valox® housing with 1200 PSI washdown rating, acrylic lens and neoprene cover.
2. The photoelectric sensor shall have the voltage, sensing distance, output type and connection shown on drawings.
3. The enclosure shall be Type 3/4X/6P/12/13 with IP67/69K protection.
4. The photoelectric sensor shall have a 360 degree visible status indicator and universal 30 mm [or through-hole] mounting.

D. PRESSURE SENSORS

1. The pressure sensor shall be an Allen-Bradley Pressure Control: [select applicable style]
 - a) General industrial [Bulletin 836] with copper alloy [or stainless steel] bellows
 - b) Machine tool [Bulletin 836T] with copper alloy [or stainless steel] bellows [or piston-type actuator]
 - c) Solid-state [Bulletin 836E] display model with 316L stainless steel housing [or non-display model with 304 stainless steel housing] and 316L stainless steel sensing element; the sensor shall have programmable outputs [display models only].

2. The pressure sensor shall have the enclosure rating, pressure range, electrical output and connection shown on drawings.

E. TEMPERATURE SENSORS

1. The temperature sensor shall be an Allen-Bradley Temperature Control: **[select applicable style]**
 - a) Electromechanical [Bulletin 837] direct immersion [or remote bulb/capillary] with brass [or stainless steel] packing glands
 - b) Solid-state [Bulletin 837E] display model [or non-display model] with 316L stainless steel housing and probe; the sensor shall have programmable outputs.
2. The temperature sensor shall have the enclosure rating, temperature ranges, probe length and connection shown on drawings.

F. LEVEL SENSORS

1. The level sensor shall be an Allen-Bradley: **[select applicable style]**
 - a) Automatic float switch [Bulletin 840] wall- [or floor-] mounted, with 2-pole contact configuration, rated A600 and N300
 - b) Solid-state level switch [Bulletin 840E] AC version [or DC version] with on-site control and 316L stainless steel housing
2. The level sensor shall have the enclosure rating and connections shown on drawings.

G. FLOW SENSORS

1. The flow sensor shall be an Allen-Bradley solid-state flow and temperature sensor [Bulletin 839E] with a flow rate range of 0.03 to 3 meters/second (0.1 to 9.84 feet/second), a 316L stainless steel housing rated IP66 and a 316L stainless steel probe. The sensor shall have a display and programmable outputs.
2. The flow sensor shall have the probe length, electrical output and connections shown on drawings.

2.10 INTRINSIC BARRIERS **[select applicable device(s)]**

A. INTRINSIC SAFETY BARRIERS – DRY CONTACTS

1. The dry-contact intrinsic safety barrier, used to limit energy to field devices in hazardous locations, shall be an Allen-Bradley Zener Barrier [Bulletin 937] interface device, housed in a 12.5 mm module and DIN rail-mounted with on-device status indication and easily-wired, removable terminals.
2. The intrinsic barrier shall be approved for Division 2/Zone 2 and be certified by UL, FM, ATEX, IECEx, CSA, NEPSI, CCOE, KOSHA, SIMTARS, GOST and CE.
3. The interface device shall contain a fuse for fault protection and zener diodes to limit voltage and shall provide resistance to excessive current as shown on drawings.
4. The interface device shall provide signal break and short-circuit monitoring.

B. INTRINSIC SAFETY BARRIERS – 2-WIRE AND 3-WIRE

1. The 2-wire or 3-wire intrinsic safety barrier, used to limit energy to field devices in hazardous locations, shall be an Allen-Bradley Galvanic Isolator [Bulletin 937] device, housed in a 12.5 mm [or 20 mm] module and DIN rail-mounted with on-device status indication and easily-wired, removable terminals.
2. The device shall include a built-in zener barrier and transformer-based isolation.
3. The intrinsic barrier shall be approved for Division 2/Zone 2 and be certified by UL, FM, ATEX, IECEx, CSA, NEPSI, CCOE, KOSHA, SIMTARS, GOST and CE.
4. The device shall meet the I/O type, functionality and power requirements shown on drawings.
5. The device shall provide signal break and short-circuit monitoring.

C. TRANSMITTER SYSTEM

1. The intrinsic barrier transmitter system shall be an Allen-Bradley Galvanic Isolator [Bulletin 937] with transmitter functionality, DIN rail-mounted with on-device status indication and easily-wired, removable terminals.
2. The system shall include a built-in zener barrier, transformer-based isolation, transmitter and power supply.
3. The intrinsic barrier shall be approved for Division 2/Zone 2 and be certified by UL, FM, ATEX, IECEx, CSA, NEPSI, CCOE, KOSHA, SIMTARS, GOST and CE.
4. The system shall meet the size, I/O type, functionality and power requirements shown on drawings.
5. The system shall provide signal break and short-circuit monitoring.

2.11 SIGNAL CONDITIONERS/ISOLATORS

- A. The signal conditioner/isolator shall be an Allen-Bradley Analog Signal Conditioner [Bulletin 931]: **[select applicable style]**
 1. High-density device – 6 mm wide, current/voltage isolator [or current/voltage converter, RTD converter, thermocouple, HART isolator]
 2. Standard device – 12.5 to 22.5 mm wide, as shown on drawings, current/voltage isolator [or current/voltage converter, RTD converter, thermocouple, line monitoring isolator, line monitoring converter, bridge converter, frequency converter]
 3. Universal device – 12.5 mm [or 45 mm] wide, programmable converter for current, voltage, RTD, thermocouple, potentiometer, resistance and frequency signals
- B. The signal conditioner/isolator shall mount on DIN rail and provide local status indications and alarms via relay contact closures.
- C. The signal conditioner/isolator shall be approved for hazardous locations, UL (Class 1, Division 2) and ATEX (Zone 2). **[option]**

PART 3 EXECUTION

3.01 DELIVERY, STORAGE AND HANDLING

- A. The supplier shall coordinate the shipping of equipment.
- B. The supplier shall store the equipment in a clean and dry space.

- C. The supplier shall protect the devices from dirt, water, construction debris and traffic.

3.02 INSTALLATION

- A. The supplier shall verify all settings have been properly adjusted prior to energizing.
- B. The supplier shall ensure accessibility to electrical control devices.

3.03 SPARE MATERIALS

- A. The supplier shall provide one (1) spare electrical control device of each type utilized.

3.04 WARRANTY

- A. The manufacturer shall provide their standard parts warranty for eighteen (18) months from the date of shipment or twelve (12) months from the date of being energized, whichever occurs first.
- B. The manufacturer shall confirm this warranty as part of the submittal.

END OF SECTION

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