



**SPECIAL PROVISIONS
FOR
TRAFFIC SIGNALIZATION**

**Linn County
IM-380-6(285)25--13-57**

**Effective Date
August 17, 2021**

THE STANDARD SPECIFICATIONS, SERIES 2015, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

4189.01 UNDERGROUND. (Replace the following Article)

A. Handhole.

1. **Granular Base:** Comply with the following gradations; however, the Engineer may authorize a change in gradation, subject to materials available locally at the time of construction.

**Table 4189.01-1: Granular Base
Gradation**

Sieve	Percent Passing
2"	100
1 1/2"	80 to 90
1"	15 to 20
3/4"	0 to 0.5

2. **Handhole:** Handhole shall be Quazite Open Bottom Box (Nestible) style enclosures. They shall be Hubbell Power Systems product number PR2732BA36 or approved equal.
3. **Cover:** Shall be Hubbell Power Systems product number PR2700HA0046 or approved equal. Include "TRAFFIC SIGNAL" text on lid.

4189.02 DETECTION. (Replace the following Articles)

A. Pedestrian Push Button Detectors.

1. **Assembly.**
 - a. Ensure the entire assembly is weather tight, secure against electrical shock, withstands continuous hard usage.
 - b. Provide a removable contact assembly mounted in a die cast aluminum case.

- c. Ensure contacts are normally open with no current flowing except at the moment of actuation.
- d. Ensure the contacts are entirely insulated from the housing and operating button with terminals for making connections.
- e. Provide housing with one outlet for 1/2 inch pipe.

2. Accessible Pedestrian Signals (APS) Push Button Stations.

- a. **Housing:** Die cast aluminum, weather tight, secure against electrical shock and withstands continuous hard usage.
- b. **Audible and Vibrotactile Features:** Audible walk indication tone, vibrotactile arrow, and locator tone complying with MUTCD.
- c. **Voice Messages:** As specified in the contract documents and per MUTCD.
- d. **Speaker:** Weatherproof with automatic volume adjustment to 5 dBA over ambient sound. Maximum volume 100 dB at 3 feet.
- e. **Push Button:** Nonrusting metal alloy, ADA compliant, 2 inch diameter with tactile arrow and 3 pounds maximum operational force.
- f. **Switch:** Solid state rated at 20 million operations minimum.
- g. **Program and Audio File Updates:** USB or Ethernet.
- h. **Operating Temperature:** -30°F to 165°F.
- i. **Signs:** MUTCD signs R 10-3e (9 inches by 15 inches) on all APS units
- j. **Braille Message:** Include on all APS pushbuttons.
- k. **Audio Files:** Provide a copy of custom audio files to the City on USB drive or CD
- l. **Hardware:** The APS pushbuttons, control unit, and interconnect board shall be POLARA iNavigator: Accessible Pedestrian Signals (iN2), iCCU-S, and iN2-ICB or approved equals.

B. Video/Radar Hybrid Detection System: Detects vehicles near the stop bar by processing video images and detects vehicles in advance of the stop bar by processing radar data. The video and radar provide detection outputs to the traffic signal controller.

- 1. The video/radar hybrid detection system shall be the Iteris Vantage Next with Vantage Vector Video/Radar Hybrid System.
- 2. The configuration will consist of two to four units as specified in the contract documents, Skybracket camera mounting assemblies, cabling, software, shelf mount processor with SDLC link, cabinet equipment, and all equipment necessary for set-up and operation in a field environment.

4189.03 COMMUNICATIONS (Replace the following Articles)

A. Traffic Monitoring System.

1. General.

Provide as specified in the contract documents including video camera in dome, dome mounting bracket and hardware, camera controller, cabling from camera to controller cabinet, and all accessories and hardware necessary for a complete and operational system.

2. Pan/Tilt/Zoom (PTZ) Dome Camera.

- a. High definition (HD) video resolution.
- b. The PTZ dome camera shall be Axis Q6155-E with mounting hardware or equivalent.

B. Bluetooth Travel Time Reliability System.

1. General.

Detects Bluetooth signals from vehicles that are used for advanced traffic monitoring. Provide as specified in the contract documents including Bluetooth travel time reliability unit, unit

mounting bracket and hardware, cabling from unit to controller cabinet, and all accessories and hardware necessary for a complete and operational system.

2. Bluetooth Travel Time Reliability Unit.

- a. Units shall be Power over Ethernet (PoE).
- b. The Bluetooth travel time reliability units shall be BlueTOAD Spectra Ethernet or approved equal.

4189.04 CABINET AND CONTROLLER. (Replace the following Articles)

A. NEMA Controller, Cabinet, and Auxiliary Equipment: Comply with the latest edition NEMA TS2 Standards.

1. Controller and Auxiliary Equipment.

- a. The City shall furnish traffic signal controller with 55 pin A-connector and SDLC connector.
- b. The Malfunction Management Unit shall be furnished by the City.
- c. The Ethernet Switch Shall be Control RocketLinx ES8520-XT fully managed layer 2 switch.

2. Signal Cabinet.

a. General Requirements.

- 1) Cabinet shall be NEMA TS-2 Type 1.
- 2) Base mount controller cabinets shall be NEMA P size with 8 phase-16 load switch back panel and 15 inch cabinet riser.
- 3) Cabinet shall have a rack for four preemption inputs.
- 4) Cabinet shall be supplied with all necessary components for a fully operational traffic signal including network components. All components shall comply with any relevant NEMA standards.
- 5) Transfer switch: Reliance C30A1L, or approved equal, transfer switch installed and prewired on signal cabinet, right side near top.

b. Cabinet Construction.

- 1) The controller and all associated equipment shall be housed in weatherproof metal cabinet of clean-cut design and appearance
- 2) Cabinet, riser, and all mounting attachments shall be natural, brushed aluminum.
- 3) Cabinet lifting eyes shall be installed on cabinet.
- 4) A hinged door shall be provided permitting complete access to the interior of cabinet. When closed, the door shall fit closely to gasket material, making the cabinet weather and dust resistant. The door shall be provided with a strong lock and No. 2 key.
- 5) Provide a stop and catch arrangement for the door. Door shall be able to be stopped at open angles of 90 degrees and 180 degrees, \pm 10 degrees.
- 6) Provide a police door in the cabinet door with a skeleton key lock. Police panel shall have signal/off switch, flash/normal switch, auto/manual control switch and pluggable manual pushbutton. Label all switches.
- 7) Provide a service panel on inside of cabinet door with controller on/off, flash/normal, stop time on/off/normal and flash/normal switch. Label all switches.
- 8) Provide two 10 inch deep mounting shelves. Top shelf is for network switch and power supply (left side), detector rack with power supply (right side). Provide brackets under top shelf for one RU 19 inch rack device. Bottom shelf is for monitor, controller, pedestrian detector unit and MMU. Provide slide out print drawer/laptop table with bottom shelf.
- 9) Screws used for mounting shelves or other mounting purposes shall not protrude beyond the outside wall of the cabinet.
- 10) Provide a GFCI service outlet located in an accessible place. Outlet to be powered by a separate circuit from service pedestal, which must be a different circuit than the battery backup circuit.

- 11) Provide LED lighting controlled by a door-actuated switch to illuminate all parts of the cabinet interior during nighttime hours.
- 12) Provide a wall-mounted fiber enclosure in the top left side of the cabinet. It shall be easily removed by loosening four mounting screws. Enclosure shall be Panduit FWME4.
- 13) Provide a thermostatically controlled dual-fan unit with a minimum rating of 100 cfm to provide forced air ventilation through the cabinet. The fan unit shall be mounted to the inside top of the cabinet and shall be easily removed and replaced without having to dismantle any part of the cabinet or exhaust duct system. The thermostat controlling the fan shall be adjustable. The electrical circuit controlling the fan shall be able to be de-energized for fan replacement without affecting the signal operation. The fan shall intake air through filtered vents located near the bottom of the cabinet or cabinet door and exhaust it through a weather-proof, screened duct located near the top of the cabinet. 12 inch by 16 inch pleated cloth type filters shall be used to cover the air intakes into the cabinet. Filters shall be easily removed and replaced.

c. Cabinet Connecting Cables, Wiring and Panels.

- 1) Provide TS-2 type 2 A connector, 55 pin.
- 2) Provide SDLC cable for detection controller unit. Include jack for future SDLC cable.
- 3) Provide circuit breakers for all overload protection instead of fuses.
- 4) Provide eight AC receptacles in cabinet for network or detection devices, no GFCI feature.
- 5) Provide surge suppression and line filter in power inlet panel.
- 6) Provide clear plastic cover over power inlet panel.

d. Cabinet Warranty.

The equipment furnished shall be new, of the latest model fabricated in first-class workmanlike manner from good quality material. The manufacturer shall replace free of charge to the purchaser any part that fails in any manner by reason of defective material or workmanship within a period of 18 months from date of shipment from the supplier's factory, but not to exceed one year from the date of operation after installation.

e. Cabinet Documentation: Provide two printed sets and electronic format (PDF) of the following diagrams and documentation:

- 1) Complete schematic diagram, accurate and current for unit supplied.
- 2) Complete physical description of unit.
- 3) Complete installation procedure for unit.
- 4) Specifications and assembly procedure for any attached or associated equipment required for operation.
- 5) Warranty and guarantee on unit, if any.
- 6) Any relevant manuals.

B. Service Cabinet and Back-To-Back Battery Back-Up System: Provide a combination battery backup/electrical service with meter and lighting controller.

1. General Requirements.

- a. Provide metered disconnect for traffic signal.
- b. Provide metered disconnect for street lighting.
- c. Provide dedicated conduits that connect the unit with the adjacent handholes and traffic signal controller cabinet as specified in the plans.
- d. The service pedestal shall be part of the continuously grounded traffic signal system.
- e. Provide two 2-pole lighting circuits, controlled by photocell.

2. Cabinet Construction.

- a. Fabrication from 1/8 inch anodized or natural brushed aluminum.
- b. Small and low profile with no exposed fasteners.
- c. Durable all welded construction.
- d. Vandal proof doors with hasp stress rated to 2000 lbs.
- e. Factory wired and tested before shipment.

- f. UL approved copper cable busing and control wiring.
 - g. Meets EUSERC requirements.
 - h. Metered circuits up to 100 Amps.
 - i. Dual Cabinets external dimensions: 20.5 inches wide by 50 inches high by 19.25 inches deep, excluding door handles.
 - j. Internal parts fabricated from 14 gauge cold rolled steel.
 - k. Welded construction with welding materials specifically designed for the material used.
 - l. Stainless steel fasteners, latches, and hardware and continuous piano style hinges.
 - m. No exposed nuts, bolts, screws, rivets, or other fasteners on the exterior.
 - n. Removable back pan mounted on four welded 1/4 inch studs.
 - o. Fully framed side hinged outer doors with swagged close tolerance sides for flush fit with top drip lip and closed cell neoprene flange compressed gaskets. Base mounting detail identical to existing cabinets for emergency replacement.
- 3. Dead front Safety Door.**
- a. Hinged dead front panel with 1/4 turn latch and knurled knobs for distribution and control panel.
 - b. Hinged dead front door on the same side as the front door minimum opening of 120 degrees.
 - c. GFCI service outlet mounted in dead front panel.
- 4. Power Distribution Panel.**
- a. Main breakers shall be 1 pole, 2 pole, 3 pole as appropriate for the installation, and in accordance with the local utility.
 - b. Provide circuit breakers for the following: battery backup, signal A (after backup), signal B (after backup), 2-pole lighting A, 2-pole lighting B, service outlets, one spare breaker, and control circuit.
 - c. Industrial grade circuit breakers. No plug-in circuit breakers.
 - d. Install all branch circuit breakers in a vertical position with handle up for 'On', handle down for 'Off'.
 - e. U.L. approved copper THHN cable busing, fully rated.
- 5. Battery Back-Up System.**
- a. Vandal-resistant construction.
 - b. 1400 VA, 950 Watts, Industry Standard run time 3 hours - all LED Intersection.
 - c. Typical Intersection (700 watts) run time 2 hours, with 6 to 8 hours of selected flash.
 - d. Inverter Tilt-out housing for easy maintenance.
 - e. No tools required for inverter 110 contact connections and simple slide-in installation with weight not to exceed 28 pounds.
 - f. Full power bypass and isolation switches.
 - g. Transient voltage protection.
 - h. Power analyzer with triple redundant bypass.
 - i. Double conversion UPS with conditioned power.
 - j. Power conflict monitor with isolation and transfer module.
 - k. Watchdog timer with redundant 5 ms delay and hard transfer to utility power.
 - l. Low battery and on battery relay outputs.
 - m. Ethernet port for local or remote monitoring.
 - n. Intelligent battery management system with microprocessor controlled smart battery charger, automatic self-test, and cell guard for longer life and faster recharge times.
 - o. 24V 18AH batteries AGM/VRLA (absorbed glass mat/valve regulated lead acid), compact, lightweight and not to exceed 25 pounds.
 - p. Seismically rated fixed position framed battery trays.
 - q. Quick swap hot battery replacement system.
 - r. Heavy duty smart safety battery connection system, 30A silver plated plugs.
 - s. Battery manufacturer's 2 year warranty.

6. Control Compartment.

- a. All components to match existing components in use for maintenance of spare parts and known reliability.
- b. Factory prewired cabinet.
- c. All control wiring: 19 strand No. 14 AWG THHN.
- d. Provide permanent terminal labels.

7. Identification Nameplates.

Identify the function of circuit breakers, switches and other components as required by laminated engraved plastic nameplates fastened with minimum of two 1/4 inch, #4-40 machine screws.

4189.05 POLES, HEADS, AND SIGNS. (Replace the following Article)

E. Pedestrian Push Button Post.

The pedestrian pushbutton stations shall be Frey Manufacturing CP6ACT4840TCSS Crosswalk Pedestal or approved equal.