ORIGINATION FORM
Proposed Revisions to the Specifications

(Please provide all information - incomplete forms will be returned)

Date: May 4, 2020

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Office: Traffic Engineering and Ope

Specification Section: 676

Article/Subarticle: 676-2.3,676-2.5,676-2.5.9,676-2.6

****Will the proposed revision require changes to:**

Publication	Yes	No	Office Staff Contacted and date contacted
Standard Plans Index	◉	○	Rick/Cheryl 5/4/20
Traffic Engineering Manual	○	◉	Javier Ponce 5/4/20
FDOT Design Manual	○	◉	Bobby Bull 5/4/20
Construction Project Administration Manual	○	◉	Scott Arnold 5/4/20
Basis of Estimate/Pay Items	◉	○	Missy Hollis 5/4/20
Structures Design Guidelines	○	◉	Ben Goldsberry 5/4/20
Approved Product List	◉	○	Karen Byram 5/4/20
Materials Manual	○	◉	Susan Musselman 5/4/20

**This section must be completed prior to processing proposed revisions.

Will this revision necessitate any of the following:

Design Bulletin ☐ **Construction Bulletin** ☐ **Estimates Bulletin** ☐ **Materials Bulletin** ☐

Are all references to external publications current? **Yes** ○ **No** ◉

If not, what references need to be updated? (Please include changes in the redline document.)

NEMA TS 2 2016

Why does the existing language need to be changed?

-Model 662 is on the FDOT APL but there is no Standard Specification.
-Model P44 is on the FDOT APL but there is no Standard Specification.
-Contractors have been installing cabinets on CCTV pole with mounting straps covering the handhole.
-The automatic transfer switch eliminates the need for indicator lights.

Summary of the changes:

-In 676-2.3, added the Model 662 cabinet.
-In 676-2.5, added Model P44 to Table 1.
-Added new Subarticle 676-2.5.9 Adapter Bracket: If shown in the plans, provide an adapter bracket for pole mount cabinets.
-Added a sentence in 676-3.3 for mounting straps to avoid handholes.
-In 676-2.6.1 Automatic Transfer Switch: Deleted the paragraphs describing indicator lights and relay circuits.

Are these changes applicable to all Department jobs? **Yes** ◉ **No** ○

If not, what are the restrictions?

Contact the State Specifications Office for assistance in completing this form.

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M E M O R A N D U M

DATE: May 28, 2020

TO: Specification Review Distribution List

FROM: Daniel Strickland, P.E., State Specifications Engineer

SUBJECT: Proposed Specification: **6760201 Traffic Cabinets.**

In accordance with Specification Development Procedures, we are sending you a copy of a proposed specification change.

This change was proposed by Derek Vollmer by the Traffic Engineer and Operations Office to update the requirements to NEMA TS-2-2016.

Please share this proposal with others within your responsibility. Review comments are due within four weeks and should be sent to Mail Station 75 or online at http://fdotewp1.dot.state.fl.us/programmanagement/development/industryreview.aspx . Comments received after **June 25, 2020**, may not be considered. Your input is encouraged.

DS/rf

Attachment

TRAFFIC CABINETS
(REV 5-5-20)

SUBARTICLE 676-2.1 is deleted and the following substituted:

676-2 Materials.

676-2.1 General: Use traffic cabinets and accessories that are listed on the Department's Approved Product List (APL). Cabinets must be permanently marked with a label including the manufacturer's name or trademark, model/part number, and the year and month of manufacture. Place the label on the inside of the main door using a water resistant method. The label must be visible after installation. If shown in the Plans, new installations must include controller cabinets that will interface with the dimming circuit of LED street lighting with an auxiliary relay.

Painted and unpainted cabinets must meet the applicable requirements in Aluminum Cabinets, NEMA TS-2-2016~~2003~~, 7.7.2.

SUBARTICLE 676-2.2 is deleted and the following substituted:

676-2.2 NEMA Traffic Signal Controller Cabinets: Provide NEMA traffic signal controller cabinets with all terminals and facilities necessary for traffic signal control meeting the following requirements:

NEMA TS1 Controller Cabinet..... NEMA TS-1-1989
NEMA TS2 Controller Cabinet..... NEMA TS 2 2016~~2003~~

SUBARTICLE 676-2.3 is deleted and the following substituted:

676-2.3 Type 170 Traffic Signal Controller Cabinets: Provide Type 170 traffic signal controller cabinets with all terminals and facilities necessary for traffic signal control and meeting the following requirements:

Model 332, 334 and 336S Cabinets.....
.....CALTRANS TEES 2009

Model 336S cabinet must incorporate input surge protection mounted on a fold-down termination panel at the input file.

Model 332 cabinets must incorporate a lower input termination panel. Model 332 and 334 cabinets must be base mounted. The Model 332 cabinet must have an auxiliary MODEL 420 output file, and be configured for 8 vehicle, 4 pedestrian, and 4 overlaps.

Model 552A designation is given to Model 332 cabinet assemblies that include a swing-out EIA 19 inch rack cage.

Model 662 designation is given to Model 552A cabinets with a 66 inch height.

Cabinets must comply with figures for traffic control signals and devices available on the Department's State Traffic Engineering and Operations Office website at the following URL:
https://www.fdot.gov/traffic/Traf_Sys/Product-Specifications.shtm.

All terminals and facilities on panels must be clearly identified using permanent silk-screened text.

SUBARTICLE 676-2.5 is deleted and the following substituted:

676-2.5 Intelligent Transportation System Cabinets: The cabinet shell must conform to NEMA 3R requirements, be constructed of unpainted sheet aluminum alloy 5052-H32 with a minimum thickness of 0.125 inches and have a smooth, uniform natural aluminum finish without rivet holes, visible scratches or gouges on the outer surface. Other finishes are acceptable if approved.

The minimum dimensions for cabinets are listed below.

Table 676-1
Minimum Cabinet Dimensions in Inches

Cabinet Type	Height	Width	Depth
336	36” - 39”	24” - 26”	20’ - 22”
336S	46” - 48”	24” - 26”	22” - 24”
334	66” - 68”	24” - 26”	30” - 32”
P44	55”-59”	26”-29”	44”-46”

The cabinet must be weather resistant and constructed with a crowned top to prevent standing water. All exterior cabinet welds must be gas tungsten arc (TIG) welds and all interior cabinet welds must be gas metal arc (MIG) or TIG welds. All exterior cabinet and door seams must be continuously welded and smooth and all inside and outside edges of the cabinet must be free of burrs, rounded and smoothed for safety. All welds must be neatly formed and free of cracks, blow holes and other irregularities. Use ER5356 aluminum alloy bare welding electrodes conforming to AWS A5.10 requirements for welding on aluminum. Procedures, welders and welding operators must conform to AWS requirements as contained in AWS B3.0 and C5.6 for aluminum.

The cabinet must have a lifting eye plate on both sides of the top of the cabinet for lifting and positioning it. Each lifting eye must be secured with a minimum of two bolts to the cabinet body and have a lift point opening diameter of 0.75 inches and capable of supporting a weight load of 1,000 pounds. All external bolt heads must be tamperproof.

Ground-mount cabinets must include a removable base plate and two aluminum plates, welded inside, for anchoring the cabinet to a concrete or composite type base as shown in the Plans. Fabricate the plates from aluminum alloy 5052-H32 a minimum of 4 inches wide by 0.125 inches thick. Provide the cabinet with four 1 inch diameter holes for anchoring.

SUBARTICLE 676-2.5.7 is deleted and the following substituted:

676-2.5.7 Ventilation: Provide ventilation through the use of a louvered vent at the bottom of the door. Vent depth must not exceed 0.25 inch. Provide an air filter a minimum of 192 square inches and 1 inch thick behind the vent. The filter must be removable and held firmly in place so that all intake air is filtered.

Provide a bottom trough and a spring-loaded upper clamp to hold the filter in place. The bottom trough must drain any accumulated moisture to the outside of the field cabinet.

ITS field cabinets must have dual thermostatically controlled fans, one thermostat per fan, rated for continuous duty with a service life of at least three years. Mount thermostats on the inside top of the cabinet. Thermostats must be user adjustable to allow temperature settings ranging from a minimum of 70°F to a maximum of 140°F and capable of activating the fans within plus or minus 5 degrees of the set temperature. Use UL listed exhaust fans having a minimum air flow rating of 100 cubic feet per minute. Electric fan motors must have ball or roller bearings. Vent the exhaust air from openings in the roof of the field cabinet.

SUBARTICLE 676-2.5 is expanded by the following:

676-2.5.8 Electrical Requirements: All equipment must conform to applicable UL, NEC, EIA, ASTM, ANSI, and IEEE requirements. SPD's must be accessible from the front of any panel used in the cabinet. Connect the SPD for the cabinet's main AC power input on the load side of the cabinet circuit breaker. All wiring must be laced. All conductors must be stranded copper.

676-2.5.8.1 Service Panel Assembly: Provide a service panel assembly to function as the entry point for AC power to the cabinet and the location for power filtering, transient suppression and equipment grounding. Provide branch circuits, SPDs, and grounding as required for the load served by the cabinet, including ventilation fans, internal lights, electrical receptacles, etc.

676-2.5.8.2 Terminal Blocks: Terminate electrical inputs and outputs on terminal blocks. The voltage and current rating of the terminal block must be greater than the voltage and current rating of the wire fastened to it.

Terminate conductors on terminal blocks using insulated terminal lugs large enough to accommodate the conductor to be terminated. When two or more conductors are terminated on field wiring terminal block screws, use a terminal ring lug for termination of those conductors. Number all terminal block circuits and cover the blocks with a clear insulating material to prevent inadvertent contact.

676-2.5.8.3 Ground Buss Bar: Fabricate ground buss bars of copper or aluminum alloy material compatible with copper wire and provide at least two positions where a No. 2 AWG stranded copper wire can be attached.

Mount the ground buss bar on the side of the cabinet wall adjacent to the service panel assembly for the connection of AC neutral wires and chassis ground wires. If more than one ground buss bar is used in a cabinet, use a minimum of a No. 10 AWG copper wire to interconnect them. Connect the equipment rack to the ground buss bar in the cabinet to maintain electrical continuity throughout the cabinet.

Follow the PANI recommendations of USDA-RUS-1751 for connections to the ground buss bar. Producer (P) or electrical power and sources of stroke current connections shall be on the left end of the buss bar. Absorbing (A) or grounding wires shall be connected immediately right of the P connections. Non-isolated (N) connections such as doors and vents shall be connected to the right of the A connections. Isolated (I) equipment grounds from equipment in the cabinet shall be connected on the right end of the buss bar.

676-2.5.8.4 Power Distribution Assembly: Furnish a power distribution assembly that fits in the EIA 19 inch rack and provides for protection and distribution of 120 V_{AC} power unless otherwise shown in the Plans.

676-2.5.8.5 Interior Lighting: Provide one or more light fixtures that illuminate the entire interior of the cabinet. All light fixtures must automatically turn on when the main cabinet door is opened and turn off when the door is closed.

676-2.5.9 Adapter Bracket: If shown in the plans, provide an adapter bracket for pole mounted cabinets that is slotted or otherwise designed to allow banding straps to be installed to avoid pole handholes.

SUBARTICLE 676-2.6.1 is deleted and the following substituted:

676-2.6.1 Automatic Transfer Switch: The transfer switch must meet UL 1008 and be rated equal to or higher than the design load of the cabinet's main breaker and the generator input twist-lock connector rating. The transfer switch must provide a means of switching between normal utility power and auxiliary backup generator power. Switching time cannot exceed 250 milliseconds. Ensure that the transfer switch does not allow simultaneous active power from more than one source and does not allow generator backflow into normal utility AC circuits.

~~Provide the automatic transfer switch with indicators that display the status of connected power sources and indicate which power source is actively energizing the cabinet. The utility-on indicator must be clearly visible outside the cabinet and the indicators on/off state must be obvious from a distance of 30 feet.~~

~~If a relay circuit is used to provide switching, the normally closed circuits must be connected to normal utility power. The relay must be energized solely by the generator. When energized, the relay must break the connection to normal utility power and make connection to the generator power input. Any automatic transfer switch or relay operated switch must include a bypass switch that disables automatic switching and permits manual selection of the power sources connected to the cabinet.~~

SUBARTICLE 676-3.3 is deleted and the following substituted:

676-3.3 Intelligent Transportation System Cabinet Installation: Mount the cabinet as shown in the Plans, and provide the cabinet with the necessary base or pole mount hardware. Ensure that pole and structure-mounted field cabinets have mounting brackets on the side so that both cabinet doors are fully functional. Mounting straps must not obstruct pole handhole.

Make provisions for all telephone, data, control, and confirmation connections between the ITS device and field cabinet and for any required wiring harnesses and connectors.

Place a heavy-duty resealable plastic bag on the backside of the main cabinet door for storing a list of terminal block connections and other cabinet documentation.

Place all equipment in the cabinet according to the recommendations of the manufacturer. Maintain a minimum clearance of 6 inches between the top of the cabinet and the top of any equipment placed on the top shelf of the cabinet and a minimum clearance of 2 inches between each side of the cabinet and any equipment placed on the cabinet shelves.