

**LOW VOLTAGE VEHICULAR TRAFFIC SIGNAL ASSEMBLIES – ADVANCED  
TRANSPORTATION CONTROLLER CABINET  
(1-18-24)**

ARTICLE 650-2 is deleted and the following substituted:

**650-2 Materials.**

Use vehicular signal assemblies that meet the requirements of Section 995 and are listed on the Department's Approved Product List (APL). Use low voltage vehicular traffic signal assemblies that meet the requirements of Developmental Specification Dev995ATCC and are listed on the Department's APL. Vehicular traffic signal assemblies must meet the requirements of Section 603 and the Institute of Transportation Engineers (ITE) Standard for Vehicle Traffic Control Signal Heads.

Provide vehicular traffic signal assemblies as a complete and functioning unit. Components include, but are not limited to, signal housing, light emitting diode (LED) signal modules, visors, backplates, and assembly hardware.

All sections of multi-section assemblies must be from the same manufacturer.

SUBARTICLE 650-3.5 is deleted and the following substituted:

**650-3.5 Wiring Connections:** Do not splice signal cable. Connect the proper signal cable to the terminals in each signal head in order to provide the proper signal indication display when the cables are connected to the signal controller. For signal heads that operate on 120 volts alternating current, wire a separate neutral circuit and return it to the controller cabinet from each vehicular movement as shown in the Contract Documents.

ARTICLE 650-6 is deleted and the following substituted:

**650-6 Basis of Payment.**

Price and payment will be full compensation for all work specified in this Section.

Payment will be made under:

|                   |  |
|-------------------|--|
| Item No. 650-1-   | Vehicular Traffic Signal – per assembly.                           |
| Item No. 650-2-   | Vehicular Signal Auxiliaries – per each.                           |
| Item No. 923-650- | Low Voltage Vehicular Traffic Signal – ATC Cabinet – per assembly. |

**LOW VOLTAGE PEDESTRIAN SIGNAL ASSEMBLIES – ADVANCED TRANSPORTATION  
CONTROLLER CABINET  
(REV 2-13-24)**

ARTICLE 653-2 is deleted and the following substituted:

**653-2 Materials.**

Use pedestrian signals that meet the requirements of Standard Section 995 and are listed on the Department's Approved Product List (APL). Use low voltage pedestrian signals that meet the requirements of Developmental Specification Dev995ATCC and are listed on the Department's APL. Pedestrian signal assemblies must meet the requirements of the latest edition of the Federal Highway Administration's (FHWA) Manual on Uniform Traffic Control Devices (MUTCD) and the Institute of Transportation Engineers (ITE) standard for Pedestrian Traffic Control Signal Indications.

ARTICLE 653-5 is deleted and the following substituted:

**653-5 Basis of Payment.**

Price and payment will be full compensation for all work specified in this Section.

Payment will be made under:

|                   |   |
|-------------------|---|
| Item No. 653-     | Pedestrian Signal – per assembly.                           |
| Item No. 923-653- | Low Voltage Pedestrian Signal - ATC Cabinet - per assembly. |

**TRAFFIC CABINETS – ADVANCED TRANSPORTATION CONTROLLER CABINET  
(REV 2-13-24)**

SUBARTICLE 676-2.1 is deleted and the following substituted:

**676-2.1 General:** Use traffic signal controller cabinets, ITS cabinets, and small equipment enclosures that meet the requirements of Section 995-11 and are listed on the Department's Approved Product List (APL). Use advanced transportation controller (ATC) cabinets and accessories that meet the requirements of Developmental Specifications Dev995ATCC and are listed on the Department's APL. Provide the cabinet with an automatic transfer switch if shown in the Plans. New signal installations must include controller cabinets that will interface with the dimming circuit of LED street lighting with an auxiliary relay if shown in the Plans. Provide cabinets with No. 2 locks unless otherwise shown in the Plans.

ARTICLE 676-6 is deleted and the following substituted:

**676-6 Basis of Payment.**

Price and payment will be full compensation for all work specified in this Section.

Payment will be made under:

|                   |   |
|-------------------|---|
| Item No. 676- 1-  | Traffic Signal Controller Cabinet – each. |
| Item No. 676- 2-  | ITS Cabinet – each.                       |
| Item No. 676- 3-  | Small Equipment Enclosure – each.         |
| Item No. 923-676- | ATC Cabinet – each.                       |

**ADVANCED TRANSPORTATION CONTROLLER ACCESSORIES – ADVANCED  
TRANSPORTATION CONTROLLER CABINET  
(REV 2/13/24)**

ARTICLE 678-2 is deleted and the following substituted:

**678-2 Materials.**

Meet the following requirements:

|                               |                            |
|-------------------------------|----------------------------|
| Conflict Monitor*             | Section 995                |
| Malfunction Management Unit*  | Section 995                |
| Power Supply*                 | Section 995                |
| Load Switch*                  | Section 995                |
| Flasher*                      | Section 995                |
| Flash Transfer Relay          | NEMA TS2-2021, Section 6.4 |
| Model 206L Power Supply Unit* | Section 995                |
| Model 208 Monitor Unit*       | Section 995                |
| Model 210 Monitor Unit*       | Section 995                |
| Power Distribution Assembly*  | Section 995                |
| Input File*                   | Section 995                |

|  |                               |
|--|-------------------------------|
| Model 430 Flash Transfer Relay .....                                     | CALTRANS TEES 2020, 6.4.5.1.5 |
| Time Switch* .....   | Section 995                   |
| Serial Interface Unit (Model 2218)* .....                                | Section 995                   |
| High Density Switch Pack/Flasher Unit (Model 2202-HV)* .....             | Section 995                   |
| High Density Switch Pack/Flasher Unit (Model 2202-LV)* .....             | Section 995                   |
| Cabinet Monitor Unit (Model 2212-HV)* .....                              | Section 995                   |
| Cabinet Monitor Unit (Model 2212-LV)* .....                              | Section 995                   |
| Auxiliary Display Unit (Model 2220)* .....                               | Section 995                   |
| Flash Transfer Relay Unit * .....  | Section 995                   |
| Cabinet Power Supply (Models 2216-24-HV, 2216-2412-HV, 2217, 2248)* .... | Section 995                   |

\*Use products listed on the Department's APL.

## **HIGHWAY SIGNING – ADVANCED TRANSPORTATION CONTROLLER CABINET (REV 2-13-24)**

SUBARTICLE 700-2.1 is deleted and the following substituted:

### **700-2.1 General Requirements:** Meet the following requirements:

|  |                |
|--|----------------|
| Flowable Fill for precast foundation .....                                   | Section 124    |
| Structural Concrete .....  | Section 346    |
| Non-Structural Concrete .....  | Section 347    |
| Reinforcing Steel .....  | Section 415    |
| Structural Steel Welding .....   | Section 460    |
| Repair of Galvanized Surfaces .....  | Section 562    |
| Transformer Base .....   | Section 965    |
| Structural Steel and Miscellaneous Metal Items<br>(other than aluminum)..... | Section 962    |
| Aluminum Items .....   | Section 965    |
| Retroreflective Sign Sheeting* .....   | Section 994    |
| Sign Panel Fabrication .....   | Section 994    |
| Internally Illuminated Signs* .....  | Section 995-14 |
| Highlighted Signs* .....   | Section 995-15 |
| Dynamic Message Signs* .....   | Section 995-16 |
| Electronic Display Signs<br>(ERS, ESFS, BOS)* .....                          | Section 995-17 |
| Electronic Display Sign for ATC Cabinet*<br>(BOS).....                       | Dev995ATCC     |
| Sign Beacon* .....   | Section 995-18 |
| In-street Sign* .....  | Section 995-19 |

\*Use products listed on the Department's Approved Products List (APL).

SUBARTICLE 700-10.14 is deleted and the following substituted:

### **700-10.14 Payment Items:** Payment will be made under:

|                   |  |
|-------------------|--|
| Item No. 700- 1-  | Single Column Ground Sign Assembly, each.      |
| Item No. 700- 2-  | Multi-Column Ground Sign Assembly, each.       |
| Item No. 700- 3-  | Sign Panel, each.                              |
| Item No. 700- 4-  | Overhead Static Sign Structure, each.          |
| Item No. 700- 5-  | Internally Illuminated Signs, each.            |
| Item No. 700- 7-  | Embedded Dynamic Message Sign - each.          |
| Item No. 700- 8-  | Front Access Dynamic Message Sign - each.      |
| Item No. 700- 9-  | Walk-in Dynamic Message Sign - each.           |
| Item No. 700- 10- | Dynamic Message Sign Support Structure - each. |

|                       |  |
|-----------------------|--|
| Item No. 700- 13-     | Retroreflective Sign Strip, each.                      |
| Item No. 700- 14-     | Enhanced Highway Sign Assembly, each.                  |
| Item No. 700- 15-     | In Street Sign Assembly, each.                         |
| Item No. 923-700- 11- | Electronic Display Sign for ATC Cabinet, per assembly. |

**TRAFFIC CONTROL SIGNAL AND DEVICE MATERIALS – ADVANCED TRANSPORTATION CONTROLLER CABINET**  
**(REV 4-18-24)**

SUBARTICLE 995-4.2.9 is deleted and the following substituted:

**995-4.2.9 Electrical:** For AC voltage supplied vehicular traffic signal assemblies, electrical conductors for LED signal modules must be a minimum of 36 inches in length. Each lead from the LED module must be terminated with insulated slide-on terminals. The conductors must be color coded to identify the color of the module as follows:

1. White must identify the neutral lead.
2. Red circular signals must be identified with a red lead, yellow circular signals with a yellow lead, and green circular signals with a green lead.
3. Red arrows must be identified with a red and black tracer lead, yellow arrows with a yellow and black tracer lead, and green arrows with a green and black tracer lead.

Low voltage vehicular traffic signal assemblies must be compatible with the output electrical characteristics of the Model 2202 High Density Switch Pack/Flasher Unit described in ATC 5301 v02.02 Section 6.2. Electrical conductors for LED signal modules must be a minimum of 36 inches in length. Each lead from the LED module must be terminated with insulated slide-on terminals.

For DC voltage supplied signal assemblies, the conductors must be color coded to identify the color of the module as follows:

1. Black must identify the negative lead.
2. Red circular signals must be identified with a red lead, yellow circular signals with a yellow lead, and green circular signals with a brown lead.
3. Red arrows must be identified with a red lead, yellow arrows with a yellow lead, and green arrows with a brown lead.

SUBARTICLE 995-5.4 is deleted and the following substituted:

**995-5.4 Electrical:** For AC voltage supplied pedestrian signal assemblies, wiring and terminals must meet the size, insulation, and length of the current ITE Pedestrian Traffic Control Signal Indicators LED specification. Wires must not have bare wiring exposed where wires are secured.

The AC voltage supplied pedestrian signal must include a terminal block containing a minimum of three circuits, each with two noncorrosive screw-type terminals. Each terminal must accommodate three No. 18 AWG conductors and be labeled for ease of identification. The terminal block must not be obstructed and be visible when the housing is open.

Low voltage pedestrian signal assemblies must be compatible with the output electrical characteristics of the Model 2202 High Density Switch Pack/Flasher Unit described in ATC 5301 v02.02 Section 6.2. For low voltage pedestrian signal assemblies, the conductors must be color coded with orange for the hand, blue for the walking person, orange with blue stripes for the countdown (if required) and black as the negative lead.

ARTICLE 995-11 is expanded by the following new Subarticle:

**995-11.8 Advanced Transportation Controller (ATC) Cabinet:** ATC cabinets include all terminals and facilities necessary for traffic signal control and meeting the following requirements:

ATC 5301 v02.02 Advanced Transportation Controller (ATC) Cabinet Standard Version 02, March 18, 2019.

The ATC Cabinet standard defines the following two versions:  
 High Voltage (HV) version fulfills the need for operation on traditional 120 VAC service voltage to control 120 VAC low power (non-incandescent) signal heads

Low Voltage (LV) version fulfills the need for operation on 48 VDC alternate power sources, such as battery and solar, to control low voltage DC signal heads.

The ATC cabinet housing shall meet the NEMA traffic signal controller cabinet or the Type 170 traffic signal controller cabinet housing requirements with base sizes shown in Table 995ATCC-1 and Table 995ATCC-2:

NEMA TS2 Controller Cabinet      NEMA TS 2 2021  
 Type 170 Cabinets                      CALTRANS TEES 2020

| Table 995 ATCC-1<br>NEMA-Style Cabinet Sizes |           |           |
|--|-----------|-----------|
| Size   | Width     | Depth     |
| 3  | 24" - 27" | 15" - 17" |
| 4  | 24" - 27" | 16" - 18" |
| 5  | 30" - 34" | 16" - 18" |
| 6  | 44" - 49" | 24" - 27" |
| 7  | 44" - 49" | 24" - 27" |

| Table 995 ATCC-2<br>CALTRANS TEES Cabinet Sizes |        |        |
|---|--------|--------|
| Housing Type                                    | Width  | Depth  |
| 1   | 24.25" | 30.25" |
| 2   | 24.25" | 20.25" |
| 3, 4  | 44.5"  | 28"    |

**995-11.8.1 Documentation:** Documentation shall meet the requirements of Standard Subarticle 995-11.2.1.

**995-11.8.2 Police Panel Switches:** For all cabinets, the police panel shall have the following:

AUTO/FLASH switch  
 MANUAL ON/OFF switch  
 Manual Jack

**995-11.8.3 Service Panel:** All terminals and facilities on panels must be clearly identified using permanent silk-screened text.

AUTO FLASH  
 SIGNALS ON/OFF  
 STOP TIME ON/OFF

**995-11.8.4 Doors and Locks:** For HV NEMA and LV NEMA cabinets, the doors and locks shall meet the requirements of Standard Subarticle 995-11.2.4.

For HV Type 170 and LV Type 170 cabinets, the doors and locks shall meet the requirements of CALTRANS TEES Chapter 6 Sections 2 and 8.

For all cabinets, the doorframes shall be double flanged out on all 4 sides and shall have the strikers hold tension on and form a firm seal between the door gasketing and the frame. The dimension between the door edge and the enclosure external surface when the door is closed and locked shall be 0.156 (+/- 0.08) inch.

**995-11.8.5 Ventilation:** For HV NEMA and LV NEMA cabinets, the ventilation shall meet the requirements of Standard Subarticle 995-11.2.6.

For HV Type 170 and LV Type 170 cabinets, the ventilation shall meet the requirements of CALTRANS TEES 6.2.4.

**995-11.8.6 Shelves:** For HV NEMA and LV NEMA cabinets, the shelves shall meet the requirements of Standard Subarticle 995-11.2.7. Provide an aluminum drawer shelf with a storage compartment. The storage compartment must have telescoping drawer guides for full extension. The compartment top must have a non-slip plastic laminate attached.

For HV Type 170 and LV Type 170 cabinets, the shelves shall meet the requirements of Standard Subarticle 995-11.3.3. RS-232 connector for communications to the C2S port is not required.

**995-11.8.7 Mounting Hardware:** For HV NEMA and LV NEMA cabinets, the mounting hardware shall meet the requirements of Standard Subarticle 995-11.2.8.

For HV Type 170 and LV Type 170 cabinets, the mounting hardware shall meet the requirements of CALTRANS TEES Chapter 6 Sections 2 and 8.

**995-11.8.8 Cabinet Light and Receptacle:** For HV NEMA and LV NEMA cabinets, the cabinet light shall meet the requirements of Standard Subarticle 995-11.2.9.3.

For HV and LV NEMA cabinets, the receptacle shall meet the requirements in Standard Subarticle 995-11.2.9.3.

For HV Type 170 and LV Type 170 cabinets, the cabinet light shall meet the requirements of Standard Subarticle 995-11.3.5.

For HV Type 170 and LV Type 170 cabinets, the power distribution unit shall meet the requirements of CALTRANS TEES 6.4.3.

**995-11.8.9 Wiring:** For all cabinets, the wiring shall meet the requirements of ATC 5301 v02.02 Chapter 12.

**995-11.8.10 Electrical:** For HV NEMA cabinets, meet the requirements of Standard Subarticle 995-11.2.9.

For HV Type 170 cabinets, meet the requirements of Standard Subarticles 995-11.3.14.1 and 995-11.3.14.2.

**995-11.8.11 Electrical Isolation:** For HV Type 170 cabinets, within the circuit of any device, module, or PCB, electrical isolation shall be provided between DC logic ground, equipment ground and the AC- neutral conductor. They shall be electrically isolated from each other by 500 MΩ, minimum, when tested at the input terminals with 100 Volts DC.

For HV NEMA cabinets, the resistance between AC neutral and logic ground shall exceed 10 megaohms. Within the controller unit, the logic ground shall not be connected to AC neutral or earth ground. Earth ground shall not be connected to AC neutral or logic ground. AC neutral shall not be connected to logic ground or earth ground.

**995-11.8.12 Surge Protection:** The HV NEMA cabinets shall meet the requirements of Standard Subarticle 995-11.2.9.8 and the HV Type 170 cabinets shall meet the requirements of Standard Subarticle 995-11.3.6. For AC outputs, the cabinet shall meet the requirements of ATC 5301 v02.02 Chapter 11.

**995-11.8.13 Cabinet Rack:** If required, the cabinet shall include a standard 19 inch EIA/TIA equipment rack. Clearance in the rack between the rails shall be 17-3/4 inches. The rack shall be yellow zinc plated 10 gauge steel, tapped with #10-32 holes on standard EIA spacing.

**995-11.8.14 Swing-out Rack Assembly:** If required, provide Type 170 cabinets with a pullout and rotatable rack assembly as well as an interface panel mounted on the top of the rack assembly and attached to the top shelf. Meet the requirements of Standard Subarticle 995-11.3.10.

**995-11.8.15 Sunshield:** If required, sunshields must be mounted with tamper resistant hardware to standoffs that provide an air gap a minimum of one inch between the exterior cabinet walls and the sunshields. Sunshield standoffs located on the roof of the cabinet must be welded to the cabinet body. Construct sunshields of 0.125 inch thick 5052-H32 aluminum sheet with corners that are rounded and smoothed for safety. Sunshields are not included in the housing dimensions.

**995-11.8.16 Generator and Auxiliary Power Connection:** Provide a generator and auxiliary power connection as required by Standard Subarticle 995-11.6.

**995-11.8.17 Slots:** Slots include mechanical mounting hardware and electrical connectors necessary to house interchangeable modules.

**995-11.8.17.1 Serial Interface Unit (SIU) Slot:** The Serial Interface Unit Slot shall meet the requirements of ATC 5301 v02.02 Section 7.1.

**995-11.8.17.2 Cabinet Monitor Unit (CMU) Slot:** The Cabinet Monitor Unit Slot shall meet the requirements of ATC 5301 v02.02 Section 7.2.

**995-11.8.17.3 IN Slot:** The IN Slot shall meet the requirements of ATC 5301 v02.02 Section 7.3.

**995-11.8.17.4 OUT Slot:** The OUT Slot shall meet the requirements of ATC 5301 v02.02 Section 7.4.

**995-11.8.18 Interfaces:** Interfaces connect cabinet elements including the IN/OUT slots, controller unit, CMU, and cabinet control switches.

**995-11.8.18.1 SIU IN/OUT Interface:** The SIU IN interface and the SIU OUT interface shall meet the requirements of ATC 5301 v02.02 Section 8.1.

**995-11.8.18.2 SB#1/SB#2 Interface:** Serial Bus #1 (SB#1) and Serial Bus #2 (SB#2) shall meet the requirements of ATC 5301 v02.02 Section 8.2.

**995-11.8.18.3 SB#3 Interface:** The Serial Bus #3 (SB#3) shall meet the requirements of ATC 5301 v02.02 Section 8.3.

**995-11.8.18.4 CC Interface:** The Cabinet Control (CC) interface shall meet the requirements of ATC 5301 v02.02 Section 8.4.

**995-11.8.18.5 Output Termination Functionality:** The Output Termination Functionality shall meet the requirements of ATC 5301 v02.02 Section 8.5.

**995-11.8.19 Protocols:** The protocols described are Serial Bus #1 (SB#1), Serial Bus #2 (SB#2), and Serial Bus #3 (SB#3). The SB #1 shall consist of four interface links (TXD  $\pm$  and RXD  $\pm$ , TXC  $\pm$  and RXC  $\pm$ ) conforming to the requirements of the TIA-485-A, SB#2 shall be dedicated to gathering preprocessed data from the Cabinet Smart Input Devices resident in the input functionalities. SB #3 is used by the CMU2212 to communicate with the 2202 HDSP/FU and the model 2220 ADU.

**995-11.8.19.1 SB#1 Communications Protocol:** The Serial Bus #1 Communications Protocol shall meet the requirements of ATC 5301 v02.02 Section 9.1.

**995-11.8.19.2 SB#2 Communications Protocol:** The Serial Bus #2 Communications Protocol shall meet the requirements of ATC 5301 v02.02 Section 9.2.

**995-11.8.19.3 SB#3 Communications Protocol:** The Serial Bus #3 Communications Protocol shall meet the requirements of ATC 5301 v02.02 Section 9.3.

**995-11.8.20 Environmental Requirements:** Ensure equipment meets all requirements of ATC 5301 v02.02 Section 11.

SUBARTICLE 995-12.1 is deleted and the following substituted:

**995-12.1 General:** Traffic controller accessories must meet the industry standards in Table ATCC 995-3.

| Table ATCC 995-3<br>Traffic Controller Accessory Standards |                                  |
|--|----------------------------------|
| Device   | Standard                         |
| Conflict Monitor   | NEMA TS1-1989, Section 6         |
| Malfunction Management Unit                                | NEMA TS2-2021, Section 4         |
| Power Supply   | NEMA TS2-2021, Section 5.3.5     |
| Load Switch  | NEMA TS2-2021, Section 6.2       |
| Flasher  | NEMA TS2-2021, Section 6.3       |
| Bus Interface Unit   | NEMA TS2-2021, Section 8         |
| Model 2061 Power Supply Unit                               | CALTRANS TEES, 2020, 3.4         |
| Model 208 Monitor Unit                                     | CALTRANS TEES, 2020, 3.5         |
| Model 210 Monitor Unit                                     | CALTRANS TEES, 2020, 3.6         |
| Power Distribution Assembly                                | CALTRANS TEES, 2020, 6.4.3       |
| Input File   | CALTRANS TEES, 2020, 6.4.4       |
| Serial Interface Unit (Model 2218)                         | ATC 5301 v02.02, Section 6.1     |
| High Density Switch Pack/Flasher Unit (Model 2202-HV)      | ATC 5301 v02.02, Section 6.2     |
| High Density Switch Pack/Flasher Unit (Model 2202-LV)      | ATC 5301 v02.02, Section 6.2     |
| Cabinet Monitor Unit (Model 2212-HV)                       | ATC 5301 v02.02, Section 6.3     |
| Cabinet Monitor Unit (Model 2212-LV)                       | ATC 5301 v02.02, Section 6.3     |
| Auxiliary Display Unit (Model 2220)                        | ATC 5301 v02.02, Section 6.5     |
| Flash Transfer Relay Unit                                  | ATC 5301 v02.02, Section 8.5.2.3 |

| Table ATCC 995-3<br>Traffic Controller Accessory Standards         |                              |
|--|------------------------------|
| Device   | Standard                     |
| Cabinet Power Supply (Models 2216-24-HV, 2216-2412-HV, 2217, 2248) | ATC 5301 v02.02, Section 6.4 |

Ensure all traffic controllers perform all specified functions during and after being subjected to the environmental testing procedures described in NEMA TS-2, Sections 2.2.7, 2.2.8, and 2.2.9. Ensure all traffic controller accessories for ATC cabinets meet the requirements of ATC 5301 v02.02 Section 11.

SUBARTICLE 995-17.2.14 is expanded by the following new Subarticle:

**995-17.2.14.3 Advanced Transportation Controller Cabinet Blank Out Sign**

**Power:** Blank Out Signs must be compatible with the output electrical characteristics of the Model 2202 High Density Switch Pack/Flasher Unit described in ATC 5301 v02.02 Section 6.2.

Do Not Use Without CO Specs Authorization