Florida Department of Transportation

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GOVERNOR

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ANANTH PRASAD, P.E.
SECRETARY

July 18, 2012

Monica Gourdine
Program Operations Engineer
Federal Highway Administration
545 John Knox Road, Suite 200
Tallahassee, Florida 32303

Re: Office of Design, Specifications
Section **785**
Proposed Specification: **7850204 Intelligent Transportation Systems – Infrastructure.**

Dear Ms. Gourdine:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

This change is proposed by Gene Glotzbach of the Traffic Engineering and Operations Office to incorporate current standard warranty language for consistency with other specifications, to clarify manufacturer's warranty requirements for equipment and to increase allowable let-through voltage on video SPDs.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to SP965TT or trey.tillander@dot.state.fl.us.

If you have any questions relating to this specification change, please call me at 414-4140.

Sincerely,

Signature on File

V. Y. "Trey" Tillander, III, P.E.
State Specifications Engineer

TT/ft
Attachment
cc: Florida Transportation Builders' Assoc.
State Construction Engineer

INTELLIGENT TRANSPORTATION SYSTEMS - INFRASTRUCTURE.

(REV ~~8-5-11~~*5-17-12*) ~~(FA 8-9-11) (1-12)~~

SUBARTICLE 785- 2.4 (of the Supplemental Specifications) is deleted and the following substituted:

785-2.4 Surge Protective Devices:

785-2.4.1 General: Provide all ITS field installation sites with both primary and secondary surge protection on the AC power. Connect the primary surge protection at the service entrance or main disconnect. Connect the secondary surge protection on the power distribution to the equipment.

785-2.4.2 SPD at Power Entry Point: Install a SPD at the closest termination/disconnection point where the supply circuit enters the ITS device cabinet. Locate the SPD on the load side of the main disconnect and ahead of any and all ITS electronic devices. Configure the SPD to operate at 120 volt single phase (i.e., line, neutral and ground) or 120/240 volt single phase (line 1, line 2, neutral and ground) as required to match the supply circuit configuration. Ensure that the SPD maximum surge current rating is 80kA per phase or greater. *Ensure*~~Verify~~ that the SPD has been labeled to indicate that the unit is ~~UL~~ listed and meets the requirements of UL 1449, Third Edition.

Ensure that the SPD has a visual indication system that monitors the weakest link in each mode and shows normal operation or failure status and also provides one set of normally open (NO)/normally closed (NC) Form C contacts for remote alarm monitoring. The enclosure for a SPD shall have a NEMA 4 rating.

785-2.4.3 SPD at Point of Use: Install a SPD at the point the ITS devices receive 120 volt power. *Ensure that these devices comply with the functional requirements shown in Table 785-1.* Ensure that the units are rated at 15 or 20 amps load and ~~a minimum of 20kA of surge current capacity and~~*are* configured with receptacles.

Ensure that these units have internal fuse protection and provide common mode (L+N-G) protection.

785-2.4.4 SPD for Low-Voltage Power, Control, Data and Signal Systems: Install a specialized SPD on all conductive circuits including, but not limited to, data communication cables, coaxial video cables, and low-voltage power cables. Ensure that these devices comply with the functional requirements shown in Table 785-1 for all available modes (i.e. power L-N, N-G; L-G, data and signal center pin-to-shield, L-L, L-G, and shield-G where appropriate).

Table 785-1				
SPD Minimum Requirements				
Circuit Description	Clamping Voltage	Data Rate	Surge Capacity	Maximum Let-Through Voltage
12 VDC	15-20 V	N/A	5kA per mode (8x20 µs)	<150 Vpk

Table 785-1				
SPD Minimum Requirements				
Circuit Description	Clamping Voltage	Data Rate	Surge Capacity	Maximum Let-Through Voltage
24 VAC	30-55 V	N/A	5kA per mode (8x20 µs)	<175 Vpk
48 VDC	60-85 V	N/A	5kA per mode (8x20 µs)	<200 Vpk
120 VAC at POU	150-200 V	N/A	20kA per mode (8x20 µs)	<550 Vpk
Coaxial Composite Video	4-8 V	N/A	10kA per mode (8x20 µs)	<*65*~~30~~ Vpk *(8x20 µs/1.2x50µs; 6kV, 3kA)*
RS422/RS485	8-15 V	Up to 10 Mbps	10kA per mode (8x20 µs)	<30 Vpk
T1	13-30 V	Up to 10 Mbps	10kA per mode (8x20 µs)	<30 Vpk
Ethernet Data	7-12 V	Up to 1 Gbps	1kA per mode (10x1000 µs)	<30 Vpk

Install a SPD that has an operating voltage matching the characteristics of the circuit. Ensure that these specialized SPDs are *listed and meet the requirements of* UL 497B or UL 497C ~~listed~~, as applicable.

ARTICLE 785- 6 (of the Supplemental Specifications) is deleted and the following substituted:

785-6 ~~Guaranty Provision~~*Warranty*.

785-6.1 General: ~~Ensure that the manufacturers' warranties on SPDs, ITS field cabinets, and ITS equipment shelters are fully transferable from the Contractor to the Department.~~ Ensure that *~~manufacturer's~~*~~these warranties require~~ the manufacturer *will*~~to~~ furnish replacements for any part or equipment found to be defective during the warranty period at no cost to the Department *or maintaining agency* within 10 calendar days of notification ~~by the Department~~.

785-6.2 Lowering Devices: Ensure that the lowering devices ~~furnished, assembled, fabricated, or installed are~~ *have a manufacturer's warranty covering*~~warranted by the manufacturer against~~ defects ~~in materials or workmanship for~~

~~a period of no less than~~*for a minimum of* three years from the date of final acceptance by the Engineer in accordance with 5-11 *and Section 608*~~of all work to be performed under the Contract~~. ~~If the manufacturer's warranties for the components are for a longer period, those longer period warranties will apply.~~

785-6.3 Surge Protective Devices: *Ensure that the*~~Provide a~~ SPD *has a manufacturer's warranty covering failures for a minimum of* ~~that is warranted by its manufacturer against any failures caused by electrical events, including direct lightning strikes, for a period of not less than~~ 10 years *from the date of final acceptance by the Engineer in accordance with 5-11 and Section 608.*~~or the SPD device manufacturer's standard warranty period, whichever is greater.~~

The term "failure" for warranty replacement is defined as follows:

Parallel-connected, power-rated SPD units are considered in failure mode when any of the visual indicators shows failure mode when power is applied to the terminals at the unit's rated voltage, or the properly functioning over-current protective device will not reset after tripping.

Series-connected, low-voltage power, data, or signal units are considered in the failure mode when an open circuit condition is created and no data/signal will pass through the SPD device or a signal lead is permanently connected to ground.

In the event that the SPD, including any component of the unit, should fail during the warranty period, the entire SPD shall be replaced by the manufacturer at no cost to the Department *or maintaining agency*. ~~Costs relating to the removal of the SPD, shipping and handling, and the reinstallation of the SPD shall be paid by the Department.~~

785-6.4 ITS Field Cabinet: Ensure that the ITS field cabinet has a manufacturer's warranty covering defects ~~in assembly, fabrication, and materials~~ for a minimum of two years from the date of final acceptance in accordance with 5-11 ~~of all work to be performed under the Contract~~*and Section 608*. ~~If the manufacturer's warranties for the cabinet and components are for a longer period, those longer period warranties will apply.~~

785-6.5 ITS Equipment Shelter: Ensure that the equipment shelter, its components, and hardware have a manufacturer's warranty covering defects ~~in assembly, fabrication, and materials~~ for a minimum of one year from the date of final acceptance in accordance with 5-11 ~~of all work to be performed under the Contract~~*and Section 608*. ~~If the manufacturer's warranties for the equipment shelter or components are for a longer period, those longer period warranties will apply.~~

INTELLIGENT TRANSPORTATION SYSTEMS - INFRASTRUCTURE.
(REV 5-17-12)

SUBARTICLE 785- 2.4 (of the Supplemental Specifications) is deleted and the following substituted:

785-2.4 Surge Protective Devices:

785-2.4.1 General: Provide all ITS field installation sites with both primary and secondary surge protection on the AC power. Connect the primary surge protection at the service entrance or main disconnect. Connect the secondary surge protection on the power distribution to the equipment.

785-2.4.2 SPD at Power Entry Point: Install a SPD at the closest termination/disconnection point where the supply circuit enters the ITS device cabinet. Locate the SPD on the load side of the main disconnect and ahead of any and all ITS electronic devices. Configure the SPD to operate at 120 volt single phase (i.e., line, neutral and ground) or 120/240 volt single phase (line 1, line 2, neutral and ground) as required to match the supply circuit configuration. Ensure that the SPD maximum surge current rating is 80kA per phase or greater. Ensure that the SPD has been labeled to indicate that the unit is listed and meets the requirements of UL 1449, Third Edition.

Ensure that the SPD has a visual indication system that monitors the weakest link in each mode and shows normal operation or failure status and also provides one set of normally open (NO)/normally closed (NC) Form C contacts for remote alarm monitoring. The enclosure for a SPD shall have a NEMA 4 rating.

785-2.4.3 SPD at Point of Use: Install a SPD at the point the ITS devices receive 120 volt power. Ensure that these devices comply with the functional requirements shown in Table 785-1. Ensure that the units are rated at 15 or 20 amps load and are configured with receptacles.

Ensure that these units have internal fuse protection and provide common mode (L+N-G) protection.

785-2.4.4 SPD for Low-Voltage Power, Control, Data and Signal Systems: Install a specialized SPD on all conductive circuits including, but not limited to, data communication cables, coaxial video cables, and low-voltage power cables. Ensure that these devices comply with the functional requirements shown in Table 785-1 for all available modes (i.e. power L-N, N-G; L-G, data and signal center pin-to-shield, L-L, L-G, and shield-G where appropriate).

Table 785-1

SPD Minimum Requirements

Circuit Description	Clamping Voltage	Data Rate	Surge Capacity	Maximum Let-Through Voltage
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RS422/RS485	8-15 V	Up to 10 Mbps	10kA per mode (8x20 µs)	<30 Vpk
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Ethernet Data	7-12 V	Up to 1 Gbps	1kA per mode (10x1000 µs)	<30 Vpk

Install a SPD that has an operating voltage matching the characteristics of the circuit. Ensure that these specialized SPDs are listed and meet the requirements of UL 497B or UL 497C, as applicable.

ARTICLE 785- 6 (of the Supplemental Specifications) is deleted and the following substituted:

785-6 Warranty.

785-6.1 General: Ensure that the manufacturer will furnish replacements for any part or equipment found to be defective during the warranty period at no cost to the Department or maintaining agency within 10 calendar days of notification.

785-6.2 Lowering Devices: Ensure that the lowering devices have a manufacturer's warranty covering defects for a minimum of three years from the date of final acceptance by the Engineer in accordance with 5-11 and Section 608.

785-6.3 Surge Protective Devices: Ensure that the SPD has a manufacturer's warranty covering failures for a minimum of 10 years from the date of final acceptance by the Engineer in accordance with 5-11 and Section 608.

The term “failure” for warranty replacement is defined as follows:

Parallel-connected, power-rated SPD units are considered in failure mode when any of the visual indicators shows failure mode when power is applied to the terminals at the unit’s rated voltage, or the properly functioning over-current protective device will not reset after tripping.

Series-connected, low-voltage power, data, or signal units are considered in the failure mode when an open circuit condition is created and no data/signal will pass through the SPD device or a signal lead is permanently connected to ground.

In the event that the SPD, including any component of the unit, should fail during the warranty period, the entire SPD shall be replaced by the manufacturer at no cost to the Department or maintaining agency.

785-6.4 ITS Field Cabinet: Ensure that the ITS field cabinet has a manufacturer’s warranty covering defects for a minimum of two years from the date of final acceptance in accordance with 5-11 and Section 608.

785-6.5 ITS Equipment Shelter: Ensure that the equipment shelter, its components, and hardware have a manufacturer’s warranty covering defects for a minimum of one year from the date of final acceptance in accordance with 5-11 and Section 608.