7810100 ITS – MOTORIST INFORMATION SYSTEMS
COMMENTS FROM INTERNAL/INDUSTRY REVIEW

Rudy Powell
State Specifications Office
414-4280

Comments: (9-27-11) Internal Review
Is this highlighted sentence needed? This is a general statement and I thought specific references are made for individual components like the first sentence in 781-3.1.1.

▪ **781-3·Dynamic·Message·Signs.**¶
→ ***781-3.1·Sign·Types:*** *Dynamic·Message·Signs·must·meet·the·requirements·of·NEMA·TS4-2005.·Dynamic·Message·Signs·(DMS)·are·classified· by·the·type·of·sign·display· and·the·type·of·mechanical·construction.· Provide·monochrome,·tri-color,· or·full-color· signs·as·shown·in·the·eContract·dDocuments.·Use·only· equipment·and·components·that·meet·the·requirements· of·these·minimum·specifications· and·are·listed· on·the·Department's·Approved·Product·List·(APL).*¶
→ → ***781-3.1.1·Front·Access·DMS:***·*Ensure·that·front·access·signs·meet·the·requirements·of·NEMA·TS4·2005,·section· 3.2.5.*¶

Response:

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Missy Hollis
414-4182
melissa.hollis@dot.state.fl.us

Comments: (10-12-11)
Verify if sign & structure will continue to be paid as one assembly, or whether separate items will be used (C-Team discussion 10-11-11). If separate items are used, 781-7 and 781-8 should be updated accordingly.

Response:

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Dorian Haro
Product Manager
ADDCO d.b.a. IMAGO North America
Direct: (651) 558-3533
Dorian.Haro@imagoscreens.com

Comments: (11-9-11)
781-3.2 Sign Housing Requirements for all DMS
ADDCO/IMAGO North America offers front access and embedded DMS that do not follow traditional housing designs. Signs are constructed with a modular approach. Both amber and color DMS are assembled from modular LED display boards which together form the front face of the sign. There are no front face aluminum masks or large polycarbonate sheets. These housings are not welded together but are assembled following the standards and industry recommendations pointed out in the specification.

781-3.2.1 Sign Housing for Walk-in DMS

Limiting the seams on the top of the housing to a maximum of three may not be practical for the manufacturing process. For smaller size walk-in DMS this is not an issue; larger size walk-in DMS where housing widths reach 30ft it becomes impractical to manufacture and increases costs. Requiring that the walk-in DMS housing meet NEMA TS4 2005 standards should suffice as the design guiding standard. In regards to the sign housing emergency lighting, please clarify how long it would be required for this to remain in operation in the event of a power outage.

781-3.2.3.2 Housing Face for Front Access and Embedded DMS

Limiting the use of captive fasteners on the housing face may not be conducive to alternate methods of securing display modules to the supportive structure, such as the case of a modular DMS. Please consider revising this to allow for non captive fasteners not to exceed 4 locking points so as to permit one person to perform any and all repair or maintenance tasks.

781-3.2.4 Sign Housing Ventilation System

Airflow volume monitoring and filter change prediction will most likely require manufacturers to create proprietary methods and NTCIP objects to accomplish this which may not be in FDOT's interest as it will create more diversity instead of standardizing reporting method.

781-3.3.2 Optical, Electrical, and Mechanical Specifications for Display Modules

Experience in manufacturing front access DMS in various environmental conditions with the use of epoxy to encapsulate the LEDs has demonstrated that NEMA TS4 2005 Section 5 requirements are met. Please consider revising the specification in regards to this point.

781-3.6 Uninterruptible Power Supply (UPS)

Please clarify whether the display of amber text messages for a minimum of two hours also applies to color signs with an RGB pixel arrangement.

781-3.7 Operational Support Supplies

Please clarify what a System Interface Circuit is. Manufacturer component and equipment definitions will vary among them.

781-3.8.3 Display System Hardware

Requiring that various DMS components reside within the sign housing may not be practical for repair and service activities as it will require personnel to access the sign housing. This requirement will also preclude any modular DMS design from being offered. Please consider allowing a modular design in which all DMS components reside inside the ground-mount controller cabinet. This allows one person to perform any repair or service to be carried out on the side of the road without the need of a bucket truck. Unnecessary shoulder or lane closures are also avoided.

Additional Comments

1. It is highly recommended that the NEMA TS4 2005 Section 5.5.1.1 Light Emitting Technology with its respective Table 5-16 be included and required to be met in the specification. Color LED uniformity of the respective red, green, and blue LEDs should be required to be sourced from reputable LED manufacturers from color bins meeting the dominant wavelength values.
2. There are many benefits of using color DMS in comparison to amber only DMS, one of which is the reproduction of MUTCD symbols and graphics. However, color LED DMS do have limitations on the colors they can replicate based on an RGB LED pixel arrangement. One of these limitations is the reproduction of the color amber at 590nm and orange at 605nm. Both the red and green LEDs need to be on at the correct intensity values in order to correctly replicate these two colors. Over time LEDs will inevitably fade and the color will slightly shift on the CIE chromaticity graph. The result is a "yellowish" looking amber over time. Orange is not faithfully reproduced with red and green LED only. Both amber and orange can be very important to

display on a DMS. Amber is traditional for all DMS signs. Orange is used on most, if not all, construction related signage. In order to overcome this obstacle we highly recommend adding a requirement to the color DMS to include a forth amber LED per pixel. The resulting pixel arrangement therefore to be RGBY (Y for Yellow LED) or RGBA (A for Amber LED), depending on nomenclature used.

Response:

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Trevor Slaight
Project Manager, Southeast Region
Office: 605-692-0200 ext. 57308
Mobile: 605-691-9725
Website: www.daktronics.com
DAKTRONICS
Quality on Display

Comments: (11-9-11)
781-3.2 - *Ensure that no internal frame connections or external skin attachments rely soley upon adhesive bonding or rivets.* Daktronics believes that the purpose of this spec is not to spec out the use of rivets or chemical bonding, but for them not to be used without a back up fastener.

781-3.3.1 - ***781-3.3.1 LED and Pixel Specifications:*** *Ensure that LED lamps have a minimum viewing angle of 30 degrees. Ensure amber LEDs have a peak wavelength of 590 ± 2 nanometers.* NEMA TS4 5.5.1.1 Light Emitting Technology lists 590 +/- 5 nm.

781-3.3.1 - *Ensure that full color displays produce an overall luminous intensity of at least 12400 candelas per square meter when operating at 100% intensity.* Daktronics suggests adding an overall luminous intensity rating for full color signs.

781-3.6 - ***781-3.6 Uninterruptible Power Supply (UPS):*** Daktronics suggests that a more specific definition be written for the UPS system so that all manufactures will be required to provide the same capability.

781-3.6 - ***781-3.6 Uninterruptible Power Supply (UPS):*** ~~*If a UPS is required in the cContract dDocuments for walk-in DMS, ensure the UPS is installed within the sign housing or as shown in the pPlans. If a UPS is required in the cContract dDocuments for front access and embedded signs, ensure the UPS is installed within the control cabinet or as shown in the pPlans. Signs with UPS must be able to operate on battery power and display amber text messages for a minimum of two hours. Ensure the system uses sealed absorbed glass mat (AGM) batteries.*~~ Daktronics suggest specifying a more defining statement for the UPS system so that all manufacture give a uniform solution. Daktronics suggests that a more specific definition be written for the UPS system so that all manufactures will be required to provide the same capability.

781-3.6 Uninterruptible Power Supply (UPS): *If a UPS is required in the Contract Documents for walk-in DMS, ensure the UPS is installed within the sign housing or as shown in the Plans. If a UPS is required in the Contract Documents for front access and embedded signs, ensure the UPS is installed within the control cabinet or as shown in the Plans.*

Amber Signs that are required to display a message by use of a UPS must be able to display amber text messages during battery back-up mode for a minimum of two hours. An amber text message to be supported during back-up mode is defined as 30% of VMS pixels illuminated to 100% intensity.

RGB signs that are required to display a message by use of a UPS must be able to display graphic messages during battery back-up mode for a minimum of two hours. The minimum graphic message to be supported during backup mode is defined as 20% of the pixels on in red, green, or blue color as text, symbols, or other, and 80% of the pixels on as white or other color background. This message will be capable of displaying at 100% intensity during utility mode, and will automatically reduce to 50% intensity shortly after entering back-up mode.

Daktronics suggests specifying that the display must be capable of displaying RGB messages during both utility power mode and back-up mode. The intent of this specification is to reduce the possibility of operator error, by not requiring operators to generate/obtain and load/control special power-limited power loss messages (e.g., 30% amber pixels with black background) that are different than the messages to be displayed when utility power is assumed to be good. We believe that relying on operators to manage this scenario invites “operator error”. The only UPS listed on the APL has a limited power capacity. If the special power-limited power loss messages were not designed properly, the power capability of the UPS could be exceeded, and then the UPS and thus the display would not be functional when most needed during emergency situations.

During back-up mode, the power supply redundancy will be retained.

All run-time calculations during back-up mode assume minimum ambient temperature will be 32F.

Ensure the system uses sealed absorbed glass mat (AGM) batteries.

Response:

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