NEMA Standards Publication

NEMA TS 4-2016

Hardware Standards for Dynamic Message Signs (DMS) with NTCIP Requirements

National Electrical Manufacturers Association

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FOREWORD

This NEMA Standards Publication, TS 4-2016, *Hardware Standards for Dynamic Message Signs (DMS), with NTCIP Requirements*, was developed to standardize minimum performance requirements and specifications for design and implementation of dynamic traffic messaging equipment that can be safely installed and provided to the end user with operational features based on current technology. Within NEMA TS 4-2016, any reference to a specific manufacturer is strictly for the purpose of defining interchangeability where there exists no nationally recognized standard covering all the requirements. The manufacturer references do not constitute a preference. NEMA TS 4-2016 is intended to reduce hazards to persons and property when traffic-messaging equipment is properly selected and installed in conformance with the requirements herein.

A future version of NEMA TS 4-2016 may address alternative non-grid power sources.

The user's attention is called to the possibility that compliance with NEMA TS 4-2016 may require use of an invention covered by patent rights. By publication of NEMA TS 4-2016, no position is taken with respect to the validity of any claims or of any patent rights in connection therewith.

In the preparation of NEMA TS 4-2016, input of users and other interested parties has been sought and evaluated. Inquiries, comments, and proposed or recommended revisions should be submitted to the concerned NEMA product subdivision by contacting the:

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The Dynamic Message Sign Technical Committee developed NEMA TS 4-2016 under the auspices of the NEMA Transportation Management Systems and Associated Control Devices Section (3TS), of which it is a part.

At the time that NEMA TS 4-2016 was prepared, the following NEMA members and their representatives were active voting members of the NEMA 3TS Dynamic Message Sign Technical Committee (3TS DMS TC):

- Adaptive Micro Systems, Inc. www.adaptivedisplays.com
- Daktronics, Inc. www.daktronics.com (Co-Chairs)
- Parsons delcantechnologies.com
- SES America sesamerica.com
- Skyline Products, Inc. www.skylineproducts.com
- Ver-Mac, Inc. www.ver-mac.com

3TS section approval of NEMA TS 4-2016 does not necessarily imply that all Section members voted for its approval or participated in its development. When NEMA TS 4-2016 was approved, the Transportation Management Systems and Associated Control Devices Section was composed of the following members:

- Adaptive Micro Systems, Inc. www.adaptivedisplays.com
- Applied Information, Inc. appinfoinc.com
- Daktronics, Inc. www.daktronics.com
- Eberle Design, Inc. www.editraffic.com
- Horizon Signal Technologies, Inc. www.horizonsignal.com
- Intelight Inc. www.intelight-its.com
- John Thomas, Inc. www.jtitraffic.com
- OMJC Signal, Inc. www.omjcsignal.com

- Parsons delcantechnologies.com
- Peek Traffic Corporation www.peektraffic.com
- SES America sesamerica.com
- Siemens Industry, Inc. www.industry.usa.siemens.com
- Skyline Products, Inc. www.skylineproducts.com
- TransCore, ITS, LLC www.transcore.com
- Ver-Mac, Inc. www.ver-mac.com

History

As the implementation of dynamic message signage and general light emitting technology increased in the United States during the late 1980s and early 1990s, various transportation departments tried a number of diverse technologies to meet their signing needs. This eventually led to a wide variety of agency specifications developed across the country, a number of opposing philosophies for implementation by the users, and some unsubstantiated claims by manufacturers. It also led to conflicting definitions and references from one agency to the next for what constituted a dynamic message sign (DMS) or its use.

In 1995, based on industry need, NEMA created the NEMA 3TS Transportation Section.

In August 1997, the DMS manufacturers formed a new committee of the NEMA Transportation Section and met for the first time to outline a plan for developing this hardware standard. Between 1997 and 2005, the NEMA 3TS section developed NEMA TS 4-2005. In 2005 NEMA TS 4-2005 was published and used by the transportation industry.

In 2012, the NEMA 3TS Section authorized a project to revise existing NEMA TS 4-2005. That project resulted in NEMA TS 4-2016, which removes older DMS technology and incorporates the new full color technology available. The 3TS Section, particularly its Dynamic Message Sign Technical Committee also worked to harmonize NEMA TS 4-2016 with EN 12966-1 for Environmental, Display, and testing requirements. The major sections overhauled during this project are Section 2 Environmental Requirements, Section 5 Display Properties, Section 8 Electronics and Electrical. Minor revisions occurred in other portions of NEMA TS 4-2016 to reflect the removal of older display technologies. NEMA TS 4-2016 incorporates all of the current best practices of the industry for specifying a DMS.

Section 1
General

1.1 Scope and Introduction

The goal of NEMA TS 4-2016 is to provide the user with safe, dependable, functional, and easily maintained Dynamic Message Sign (DMS) equipment.

NEMA TS 4-2016 defines the minimum hardware and functional characteristics of electronically controlled DMS used for displaying messages to travelers.

NEMA TS 4-2016 predominantly addresses DMS.

Conformance to NEMA TS 4-2016 is defined in Section 11.

Portions of NEMA TS 4-2016 may be referenced as part of agency (procurement) specifications.

NEMA TS 4-2016 is not intended to be, or is meant to take the place of any application guides for DMS.

Items such as sign siting practices, selection of character heights, siting of cabinets and relations between legibility and travel speed, etc. were all considered to be outside the scope of NEMA TS 4-2016.

1.2 References

The following standards (normative references) contain provisions which, through reference in this text, constitute provisions of NEMA TS 4-2016. Additional documents and standards (other references) are referenced that might provide a more complete understanding. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard should apply the most recent editions of the standards indicated.

1.2.1 Normative References

AASHTO LTS-6	*Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, 6th Edition*
ANSI/AWS D8.8M:2014	*Specification for Automotive Weld Quality Arc-Welding of Steel*
ASTM E810-03(2013)	*Standard Test Method for Coefficient of Retroreflection of Retroreflective Sheeting Utilizing the Coplanar Geometry*
CIE 1931	*Color Specification—The CIE 1931 Standard Colorimetric System and the CIE 1964 Supplementary Standard Colorimetric System*
EN 55022	*Limits and Methods of Measurement of Radio Disturbance Characteristics of Information Technology Equipment*
EN 12966:2014	*Road vertical signs—Variable message traffic signs*
IEC/EN 61000-6-1	*Electromagnetic compatibility (EMC)—Part 6-1: Generic Standards—Immunity standard for residential, commercial and light-industrial environments*
FMVSS, Part 571	National Highway Traffic Safety Administration, 49 CFR Part 571, *Federal Motor Vehicle Safety Standards (FMVSS)*