NEMA BS 31016-2024

Residential Controls—ClimateTalk 2.1 CT-485 Networking Specification

Published by:

National Electrical Manufacturers Association
1300 North 17th Street, Suite 900
Rosslyn, Virginia 22209

www.nema.org

NOTICE AND DISCLAIMER

The information in this publication was considered technically sound by the consensus of persons engaged in the development and approval of the document at the time it was developed. Consensus does not necessarily mean that there is unanimous agreement among every person participating in the development of this document.

The National Electrical Manufacturers Association (NEMA) standards and guideline publications, of which the document contained herein is one, are developed through a voluntary consensus standards development process. This process brings together volunteers and/or seeks out the views of persons who have an interest in the topic covered by this publication. While NEMA administers the process and establishes rules to promote fairness in the development of consensus, it does not write the document and it does not independently test, evaluate, or verify the accuracy or completeness of any information or the soundness of any judgments contained in its standards and guideline publications.

NEMA disclaims liability for any personal injury, property, or other damages of any nature whatsoever, whether special, indirect, consequential, or compensatory, directly or indirectly resulting from the publication, use of, application, or reliance on this document. NEMA disclaims and makes no guaranty or warranty, express or implied, as to the accuracy or completeness of any information published herein, and disclaims and makes no warranty that the information in this document will fulfill any of your particular purposes or needs. NEMA does not undertake to guarantee the performance of any individual manufacturer or seller's products or services by virtue of this standard or guide.

In publishing and making this document available, NEMA is not undertaking to render professional or other services for or on behalf of any person or entity, nor is NEMA undertaking to perform any duty owed by any person or entity to someone else. Anyone using this document should rely on his or her own independent judgment or, as appropriate, seek the advice of a competent professional in determining the exercise of reasonable care in any given circumstances. Information and other standards on the topic covered by this publication may be available from other sources, which the user may wish to consult for additional views or information not covered by this publication.

NEMA has no power, nor does it undertake to police or enforce compliance with the contents of this document. NEMA does not certify, test, or inspect products, designs, or installations for safety or health purposes. Any certification or other statement of compliance with any health or safety-related information in this document shall not be attributable to NEMA and is solely the responsibility of the certifier or maker of the statement.

FOREWORD

ClimateTalk is a universal language for innovative, cost-effective solutions that optimize performance, efficiency, and home comfort. The ClimateTalk Open Standards define a set of messages and commands to enable interoperability, enhanced user interface, and machine-to-machine control independent of the physical layer connecting the devices.

This document defines the Networking as well as the Session and Transport requirements for CT-485. Corresponding to OSI Layers 3, 4, and 5, the Networking specification defines the higher-level network functionality, including routing, addressing, and network timing, as well as the requirements for a CT-485 device to operate within a defined network structure.

These standards are periodically reviewed by the Residential Controls Section of NEMA for any revisions necessary to keep them up-to-date with advancing technology. Proposed or recommended revisions should be submitted to:

NEMA Technical and Industry Affairs Department
National Electrical Manufacturers Association
1300 North 17th Street, Suite 900
Rosslyn, Virginia 22209

This standards publication was developed by Emerson and copyright was transferred to NEMA. Section approval of the standard does not necessarily imply that all section members voted for its approval or participated in its development. At the time it was approved, the group was composed of the following members:

Apcom Inc.—Franklin, TN
Braeburn Systems LLC—Montgomery, IL
Emerson Automation Solutions—Rosemont, IL
Johnson Controls—Goode, VA
Resideo Technologies, Inc.—Golden Valley, MN
White-Rodgers/Copeland-St. Louis, MO

CONTENTS

Figures

Tables

HISTORY OF STANDARDS

The Residential Controls Section of NEMA was formed in 1940 to promote the standardization of products within the scope of the section. NEMA standards are voluntary and are designed to eliminate misunderstandings between the purchaser and the manufacturer.

This publication is one of a series sponsored by the Residential Controls Section. Other publications in this series are identified as Pub. No. NEMA BS XX (followed by the year of issue).

The present publication, NEMA BS 31016-2024, is published in accordance with NEMA's policy of periodic review and revision to keep NEMA Standards contemporary with industry needs and technological advancement.

<This page is intentionally left blank.>

1 General

1.1 Scope

ClimateTalk is an open standard that defines a set of messages and commands to enable interoperability, enhanced user interface, and machine-to-machine control independent of the physical layer connecting the devices.

The messages and commands defined by the ClimateTalk Information Model (CIM) are the presentation and application layers as defined by the OSI model[1]. ClimateTalk applications are fully defined at Layer 7 of the OSI model by a combination of a device-specific application profile, the *Generic Application Specification*, and the command reference.

ClimateTalk messages can be carried over any physical medium following the OSI model. The ClimateTalk Presentation Layer defines how messages are executed over the various physical mediums in use.

CT-485 and CT-LWP are wired serial physical and network layers designed to support the formation of ClimateTalk networks and transport ClimateTalk messages, but other OSI-based protocols—including wireless transports—can be used, as well.

CT-485 is a physical, data link, and networking set of specifications that define one of the physical media over which ClimateTalk messages are sent. CT-485 is a variant of EIA/TIA-485[2] standards with provisions against incorrect wiring and grounding requirements that meet the needs of residential systems.

This document defines the Network Layer requirements for CT-485, which corresponds to OSI Layer 3. The Network Layer in CT-485 includes some of the functions performed by the OSI Transport Layer and Session Layer.

Included in the network specification is higher-level network functionality, including routing, addressing, and network timing, as well as the requirements for a CT-485 device to operate within a defined network structure.

---

[1] http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=20269

[2] http://standardsdocuments.tiaonline.org/tia-tsb-89-a.htm