NEMA BS 31013-2024

Residential Controls—ClimateTalk 2.1 Generic Application Specification

Published by:

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

www.nema.org

© 2024 by the National Electrical Manufacturers Association. All rights including translation into other languages, reserved under the Universal Copyright Convention, the Berne Convention for the Protection of Literary and Artistic Works, and the International and Pan American Copyright Conventions.

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.

© 2024 National Electrical Manufacturers Association

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 application requirements corresponding to OSI Layer 7 that are generic for any subsystem operation and interaction with other devices on a ClimateTalk network.

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

© 2024 National Electrical Manufacturers Association

CONTENTS

Page

Foreword i
History of Standards iv
1 General 1
1.1 Scope 1
1.2 References 2
1.3 Definitions 3
1.4 Acronyms 4
1.5 Word Usage 4
2 Warm and Cold Start Procedures 4
2.1 Types of Start-up 4
2.2 Cold Start Procedure 4
2.3 Warm Start Procedure 5
3 Frame Format 5
3.1 Message Header Elements 5
3.2 Packet Header Elements 5
3.3 Packet Payload Element 7
3.4 Message Footer Element 7
4 Application Interface 7
4.1 Node Types 7
4.2 Send Methods 8
4.3 Shared Data 8
4.4 Network Node List 12
4.5 Subsystem Installation Test 13
5 Message Data Interfaces (MDIs) 13
5.1 Manufacturer ClimateTalk ID 13
5.2 Database Identification (DB ID) Tag 14
5.3 Identification Message Data Interface (MDI) 16
6 Error Reporting 16
6.1 Invalid Message 16
6.2 Unknown Application Message Type 16
6.3 Unknown Application Payload 16
6.4 Subsystem Busy Response 17
6.5 Subsystem Unresponsive 17
7 User Menus 17
7.1 Support Requirements 17
7.2 Overview 17
7.3 System Elements 18
7.4 User Menu Organization 18
7.5 User Menu Interface 19

© 2024 National Electrical Manufacturers Association

7.6 Client Interface 19
7.7 Server Interface 22
8 CT User Menu Tags 24
8.1 CTUM Tag Overview 24
8.2 Control Rules 31
Annex A—Simple CTUM Header Files 33
Annex B—Sample Shared Data Structures 39
Annex C—Bibliography 42

Figures

1 OSI Layers for ClimateTalk Implementation 2
2 DB ID Tag Bit-by-Bit Breakout 14
3 DB ID Datagram Example 14
4 ClimateTalk User Menu Block Diagram 17
5 User Menu Hierarchy 19
6 ClimateTalk User Menu Viewed as Webpage 25
7 ClimateTalk User Menu Tag Reference Table 28
8 CTUM Tag Conversion Table 31
9 Shared Data Example 39

Tables

1 ClimateTalk Message Structure Elements 5
2 Message Type Bit Decoding 6
3 Packet Number Field 6
4 Application Shared Data Detail 9
5 Network Shared Data Storage Detail 10
6 Example Node List of Length 64 13
7 DB ID Tag Example—Sample System Sensor MDI 15
8 CTUM User Menu Fetch 20
9 CTUM User Menu Update 21
10 CTUM Response to Client Fetch 23
11 CTUM Response to Client Post 23
12 Shared Data Organization 40
13 Shared Data Legend 41

© 2024 National Electrical Manufacturers Association

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 31013-2024, is published in accordance with NEMA's policy of periodic review and revision to keep NEMA Standards contemporary with industry needs and technological advancement.

© 2024 National Electrical Manufacturers Association

<This page is intentionally left blank.>

© 2024 National Electrical Manufacturers Association

notesy lilit yud klik ,weivra ni yitmentu

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.

This document defines the generic application requirements for all devices designed to ClimateTalk open standards. This profile defines how all devices interact with other devices on a ClimateTalk network. Profiles begin with the requirements in this document and expand on them to satisfy the needs of their application.

The ClimateTalk open standards package shown in Figure 1—OSI Layers for ClimateTalk Implementation prescribes the mandatory requirements to ensure proper network formation of interoperable devices. Membership in the ClimateTalk Alliance, as well as successful completion of mandatory conformance testing, is required to list a product as a ClimateTalk Certified Device.

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

© 2024 National Electrical Manufacturers Association