

Open data communication in building automation, controls and building management — Control network protocol —

Part 2: Twisted pair communication —

The European Standard EN 14908-2:2005 has the status of a British Standard

ICS 97.120

National foreword

This British Standard is the official English language version of EN 14908-2:2005. Together with BS EN 14908-1 it supersedes DD ENV 13154-2:1998 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee RHE/16, Performance requirements for control systems, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this committee can be obtained on request to its secretary.

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the *BSI Catalogue* under the section entitled “International Standards Correspondence Index”, or by using the “Search” facility of the *BSI Electronic Catalogue* or of British Standards Online.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 20, an inside back cover and a back cover.

The BSI copyright notice displayed in this document indicates when the document was last issued.

Amendments issued since publication

Amd. No.	Date	Comments

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 25 November 2005

© BSI 25 November 2005

English Version

Open Data Communication in Building Automation, Controls and
Building Management - Control Network Protocol - Part 2:
Twisted Pair Communication

Réseau ouvert de communication de données pour
l'automatisation, la régulation et la gestion techniques du
bâtiment - Protocole de réseau pour le bâtiment - Partie 2 :
Communications par paires torsadées

Firmenneutrale Datenkommunikation für die
Gebäudeautomation und Gebäudemanagement -
Gebäudedatennetzprotokoll - Teil 2: Kommunikation über
paarig verdrehte Leitungen

This European Standard was approved by CEN on 11 August 2005.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

Contents

Foreword	3
Introduction	4
1 Scope.....	5
2 Normative References	5
3 Network Overview	5
4 System Specifications.....	5
4.1 General Aspects	5
4.2 Cable.....	5
4.3 Topology	6
4.3.1 Free or Bus Topology.....	6
4.3.2 Repeater	6
4.4 Cable Termination	6
4.4.1 Free-topology Segment.....	6
4.4.2 Bus Topology Segment.....	6
4.5 Segment Configuration	7
4.6 Power Specifications.....	7
5 Link Power	8
5.1 General.....	8
5.2 Source	8
5.3 Power Supply Requirements	9
5.4 Passive Coupler Circuit	11
6 Node Specifications	12
6.1 Link Power	12
6.2 Hot Plugging	12
6.3 Transmitter/Receiver Interface to the MAC Sub-Layer	13
6.3.1 Physical Layer Protocol Data Unit	13
6.3.2 Frame Format.....	13
6.3.3 Transmit Waveform	14
6.4 Impedance.....	17
7 Communication Parameters	18
Annex A (informative).....	19
Environmental Specifications	19
Bibliography	20

Foreword

This European Standard (EN 14908-2:2005) has been prepared by CEN /TC 247, "Building Automation, Controls and Building Management", the secretariat of which is held by SNV.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 2006, and conflicting national standards shall be withdrawn at the latest by April 2006.

This European Standard supersedes ENV 13154—2:1998.

This publication is copyright under the Berne Convention and the Universal Copyright Convention. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by means, electronic, mechanical, photocopying, recording, or otherwise, without the permission of the European Committee for Standardization (CEN), the European Committee for Electrotechnical Standardization (CENELEC), their National Standards Bodies and their Licensees to reproduce this European Standard in full and including this copyright notice for the purposes of European standardisation.

This European Standard is part of a series of standards for open data transmission in building automation, control and in building management systems. The content of this European Standard covers the data communications used for management, automation/control and field functions.

EN 14908-2 is part of a series of European Standards under the general title *Control Network Protocol (CNP)*, which comprises the following parts:

Part 1: *Protocol Stack*¹

Part 2: *Twisted Pair Communication*¹

Part 3: *Power Line Channel Specification*¹

Part 4: *IP-Communication*¹

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

¹ Under preparation.

¹ Under preparation.

Introduction

This European Standard has been prepared to provide mechanisms through which various vendors of building automation, control, and building management systems may exchange information in a standardised way. It defines communication capabilities.

This European Standard is to be used by all involved in design, manufacture, engineering, installation and commissioning activities.

This European Standard has been made in response to the essential requirements of the Constructive Products Directive.

1 Scope

This European Standard specifies the control network protocol (CNP) free-topology twisted-pair channel and serves as a companion European Standard to prEN14908-1. The channel supports communication at 78,125 kbps between multiple nodes, each of which consists of a transceiver, a protocol processor, an application processor, a power supply, and application electronics.

This European Standard covers the complete physical layer (OSI Layer 1), including the interface to the Media Access Control (MAC) sub-layer and the interface to the medium. Parameters that are controlled by other layers but control the operation of the physical layer are also specified.

2 Normative References

The following referenced documents are indispensable for the application of this European Standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 14908-1:2005, *Open Data Communication in Building Automation, Controls and Building Management - Building Network Protocol - Part 1: Protocol Stack*.

EN 50173-1, *Information technology - Generic cabling systems- Part 1: General requirements and office areas*

3 Network Overview

The CNP free-topology twisted-pair channel supports up to 128 nodes on a single network segment with an optional link power source that supplies DC power to the nodes on the network. The channel is specified to support free-topology wiring, and will accommodate bus, star, loop, or any combination of these topologies. The total network length and number of nodes may be extended by use of CNP channel physical layer repeaters, or CNP compliant routers. The channel data rate is 78,125 kbps. Nodes can be either locally powered or link powered. A link-powered node derives its power from the network. The power is delivered on the same two conductors that carry data. Nodes are polarity-insensitive with respect to data as well as DC power. A locally powered node derives its power from a local source. The data is transmitted using Differential Manchester encoding, which is polarity-insensitive.

4 System Specifications

4.1 General Aspects

This section specifies the cable type used, terminations required with bus or free topology, maximum node counts and distances for link and locally powered schemes, and the maximum steady state power that can be drawn from the link power supply.

4.2 Cable

The cable shall conform to EN 50173-1.

4.3 Topology

4.3.1 Free or Bus Topology

The network may use either a singly-terminated free topology or a doubly-terminated bus topology.

4.3.2 Repeater

Two network segments may be interconnected with a channel physical layer repeater. No more than one physical layer repeater shall be in a path between any two nodes on a network. Physical layer repeaters shall not be interconnected in such a way as to create a loop.

Each port of a physical layer repeater shall meet the specifications stated in 6.2, 6.3.3, and 6.4. The delay through the repeater shall not exceed 36 μ s.

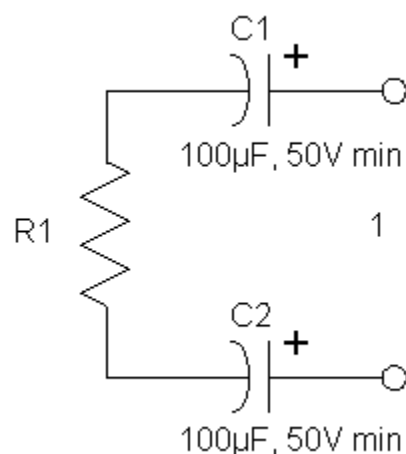
4.4 Cable Termination

4.4.1 Free-topology Segment

A free-topology segment shall have a single termination. If the segment is locally powered, an RC network as shown in Figure 1 shall be used, with $R1 = 52,3 \Omega \pm 1 \%$, 1/8 W. The termination may be located anywhere on the segment. If the segment is link-powered, the termination shall be provided by the link power source. See Figure 5. The link power source and termination may be located anywhere on the segment.

4.4.2 Bus Topology Segment

A bus topology segment shall have two terminations, one at each end of the bus. If the segment is locally powered, an RC network as shown in Figure 1 shall be used, with $R1 = 105 \Omega \pm 1 \%$, 1/8 W at each end. If the segment is link-powered, the link power source shall provide one termination. See Figure 5. The other termination shall be an RC network as shown in Figure 1, with $R1 = 105 \Omega \pm 1 \%$, 1/8 W.



Key
1 Network Connection

Figure 1 — Termination