INTERNATIONAL STANDARD

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Information technology – Home electronic system (HES) architecture –

Part 3-6: Media and media dependent layers – Twisted pair for network based control of HES Class 1

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IEC and ISO draw attention to the fact that it is claimed that compliance with this document may involve the use of a patent primarily concerning activities as described in clause 5: Requirements for HES Class 1, Twisted Pair Type 0 (TP0).

Schneider Electric Industries SAS has informed IEC and ISO that they have the patent applications or granted patents as listed below:

EP 0370 921 B1, EP 0911 777 A1.

IEC and ISO draw attention to the fact that it is claimed that compliance with this document may involve the use of a patent primarily concerning activities as described in 6.2: Requirements for analogue bus signals and 6.3: Medium attachment unit (MAU).

Siemens AG (Regensburg) has informed IEC and ISO that they have the patent applications or granted patents as listed below:

EP 0365 696 B1, EP 0487 759 B1, EP 0489 194 B1, EP 0643 893 B1, EP 0770 285 B1, EP 0854 587 A1, EP 0858 142 A1, EP 0858 194 A1, WO 00/42694 A1.

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EP-B-0'749'070

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International Standard ISO/IEC 14543-3-6 was prepared by subcommittee 25: Interconnection of information technology equipment, of ISO/IEC joint technical committee 1: Information technology.

This International Standard is a product family standard. It shall be used in conjunction with ISO/IEC 14543-2-1, 14543-3-3, 14543-3-4, 14543-3-5 and 14543-3-7.

The list of all currently available parts of ISO/IEC 14543 series, under the general title *Information technology – Home electronic system (HES) architecture,* can be found on the IEC web site.

This International Standard has been approved by vote of the member bodies, and the voting results may be obtained from the address given on the title page.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

INTRODUCTION

The reference model for Open System Interconnection (OSI), specified in ISO/IEC 7498, assigns the functions that are needed for communications between two entities that are connected by medium to seven logical layers. This International Standard specifies interconnection of entities used for home and building control via the medium twisted pair. It specifies the medium and medium dependent functions such as the cable, the connectors and the transmission technology in terms of the Physical Layer and the Data Link Layer according to ISO/IEC 7498.

Currently, ISO/IEC 14543, *Information technology – Home Electronic System (HES) architecture*, consists of the following parts:

Part 2-1: *Introduction and device modularity*
Part 3-1: *Communication layers – Application layer for network based control of HES Class 1*
Part 3-2: *Communication layers – Transport, network and general parts of data link layer for network based control of HES Class 1*
Part 3-3: *User process for network based control of HES Class 1*
Part 3-4: *System management – Management procedures for network based control of HES Class 1*
Part 3-5: *Media and media dependent layers – Powerline for network based control of HES Class 1*
Part 3-6: *Media and media dependent layers – Twisted pair for network based control of HES Class 1*
Part 3-7: *Media and media dependent layers – Radio frequency for network based control of HES Class 1*
Part 4: *Home and building automation in a mixed-use building (technical report)*
Part 5-1: *Intelligent grouping and resource sharing for HES Class 2 and Class 3 – Core protocol (under consideration)*
Part 5-2: *Intelligent grouping and resource sharing for HES Class 2 and Class 3 – Device certification (under consideration)*
Additional parts may be added later.

INFORMATION TECHNOLOGY – HOME ELECTRONIC SYSTEM (HES) ARCHITECTURE –

Part 3-6: Media and media dependent layers – Twisted pair for network based control of HES Class 1

1 Scope

This part of ISO/IEC 14543 defines the mandatory and optional requirements for the medium specific physical and data link layer for twisted pair for network based control of HES Class 1 in its two variations called TP0 and TP1.

NOTE Data link layer interface and general definitions, which are media independent, are specified in ISO/IEC 14543-3-2.

2 Normative references

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

ISO/IEC 14543-2-1, *Information technology – Home Electronic System (HES) architecture – Part 2-1: Introduction and device modularity*

ISO/IEC 14543-3-2, *Information technology – Home electronic system (HES) architecture – Part 3-2: Communication layers – Transport, network and general parts of data link layer for network based control of HES Class 1*

ISO/IEC 14543-3-3, *Information technology – Home Electronic System (HES) architecture – Part 3-3: User process for network based control of HES Class 1*

ISO/IEC 14543-3-4, *Information technology – Home Electronic System (HES) architecture – Part 3-4: System management – Management procedures for network based control of HES Class 1*

ISO/IEC 14543-3-5, *Information technology – Home Electronic System (HES) architecture – Part 3-4: Media and media dependent layers – Powerline for network based control of HES Class 1*

ISO/IEC 14543-3-7, *Information technology – Home Electronic System (HES) architecture – Part 3-6: Media and media dependent layers – Radio frequency for network based control of HES Class 1*

IEC 60189-2, *Low-frequency cables and wires with PVC insulation and PVC sheath – Part 2: Cables in pairs, triples, quads and quintuples for inside installations*

IEC 60227-2, *Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V – Part 2: Test methods*

IEC 60245-2, *Rubber insulated cables – Rated voltages up to and including 450/750 V – Part 2: Test methods*

IEC 60332-1 (all subparts), *Tests on electric and optical fibre cables – Part 1: Test for a vertical flame propagation for a single insulated wire or cable*

IEC 60754-2, *Test on gases evolved during combustion of electric cables – Part 2: Determination of degree of acidity of gases evolved during the combustion of materials taken from electric cables by measuring pH and conductivity*

IEC 61000-4-5, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test*

IEC 61000-6-1, *Electromagnetic compatibility (EMC) – Part 6-1: Generic standards – Immunity for residential, commercial and light-industrial environments*

IEC 61000-6-2, *Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity for industrial environments*

EN 50090-2-2, *Home and Building Electronic Systems (HBES) – Part 2-2: System overview – General technical requirements*

3 Terms, definitions and abbreviations

3.1 Definitions

For the purposes of this part the terms and definitions given in ISO/IEC 14543-2-1 and the following apply.

3.1.1
HES Class 1 Twisted Pair Type 0
Twisted Pair medium Twisted Pair Type 0 (TP0) is a physical layer specification for data and power transmission on a single twisted pair, allowing asynchronous character-oriented data transfer in a half duplex bi-directional communication mode, using a specifically unbalanced/unsymmetrical base-band signal coding with collision avoidance under SELV conditions

3.1.2
HES Class 1 Twisted Pair Type 1
Twisted Pair medium Twisted Pair Type 1 (TP1) is a physical layer specification for data and power transmission on a single twisted pair, allowing asynchronous character-oriented data transfer in a half duplex bi-directional communication mode, using a specifically balanced/symmetrical base-band signal coding with collision avoidance under SELV conditions

3.1.3
distributed power supply
the bus is powered in a distributed way by a number of the devices connected to the line (compared to a centralised power supply)

3.1.4
Logical Tag Extended HEE
usage of the L_Data_Extended frame dedicated to extended group addressing

3.1.5
Remote Powered Devices
remote Powered Bus Devices (RPD) do not extract their energy for the application circuit and the bus controller from the bus but from another independent source of energy, for example, mains. Owing to the reduced DC power consumption of RPD, a bus line equipped with such devices requires less power from the installed Power Supply Unit (PSU). The connection of bus-controller and application to the same electrical potential reduces the effort of galvanic separation in RPD