IEC/PAS 62633

Edition 1.0   2009-08

PUBLICLY AVAILABLE SPECIFICATION

PRE-STANDARD

Industrial communication networks – Profiles – Additional Fieldbus profiles for real-time networks based on ISO/IEC 8802-3 – SNpTYPE

IEC/PAS 62633:2009(E)

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INTERNATIONAL
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INDUSTRIAL COMMUNICATION NETWORKS – PROFILES – ADDITIONAL FIELDBUS PROFILES FOR REAL-TIME NETWORKS BASED ON ISO/IEC 8802-3 – SNpTYPE

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IEC-PAS 62633 has been processed by subcommittee 65C: Industrial networks, of IEC technical committee 65: Industrial-process measurement, control and automation.

The text of this PAS is based on the following document:	This PAS was approved for publication by the P-members of the committee concerned as indicated in the following document
Draft PAS	**Report on voting**
65C/530/PAS	65C/534/RVD

Following publication of this PAS, which is a pre-standard publication, the technical committee or subcommittee concerned may transform it into an International Standard.

This PAS shall remain valid for an initial maximum period of 3 years starting from the publication date. The validity may be extended for a single 3-year period, following which it shall be revised to become another type of normative document, or shall be withdrawn.

INTRODUCTION

This PAS contains an additional profile – SNpTYPE – which may be integrated into a future new edition of IEC 61784-2.

INDUSTRIAL COMMUNICATION NETWORKS – PROFILES – ADDITIONAL FIELDBUS PROFILES FOR REAL-TIME NETWORKS BASED ON ISO/IEC 8802-3 – SNpTYPE

1   Scope

This Clause is identical in form and content for all CPFs to that of IEC 61784-2:2007.

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.

This Clause is identical in form and content for all CPFs to that of IEC 61784-2:2007.

IEC 61784-2:2007, *Industrial communication networks – Profiles – Part 2: Additional fieldbus profiles for real-time networks based on ISO/IEC 8802-3*

3   Terms, definitions, abbreviated terms, acronyms, and conventions

3.1   Terms and definitions

For the purposes of this document, the following terms and definitions apply, in addition to those of IEC 61784-2:2007.

3.1.30
real time frame line (RTFL)
<CPF SNpFAMILY>
communication model for communication with high real time requirements

3.1.31
real time frame network (RTFN)
<CPF SNpFAMILY>
communication model for communication with low real time requirements

3.2   Abbreviated terms and acronyms

The following additional abbreviated terms and acronyms for CPF SNpFAMILY apply, in addition to those of IEC 61784-2:2007.

RTFL   Real time frame line

RTFN   Real time frame network

3.3 Symbols

The following additional subclause for the symbols of the new CPF SNpFAMILY applies, in addition to those of IEC 61784-2:2007.

3.3.12 CPF SNpFAMILY symbols

Symbol	Definition	Unit
l_B	Distance along the cable in backward direction	m
l_C	Cable length	m
l_F	Distance along the cable in forward direction	m
NoDoB	Number of devices in backward direction	—
NoDoF	Number of devices in forward direction	—
NoS	Number of switching devices	—
t_{CD}	Cable delay	ns/m
t_{cyc}	Cycle time of communication system/relation	μs
t_D	Delivery time	μs
t_{data}	Transmit time of data frame(s)	μs
t_{pd}	Propagation delay	μs
t_{STsink}	Sink stack traversal time	μs
t_{STsrc}	Source stack traversal time	μs
t_{SW}	Delay time of a switch	μs

3.4 Conventions

This Subclause is identical in form and content for all CPFs to that of IEC 61784-2:2007.

4 Conformance to communication profiles

This Clause is identical in form and content for all CPFs to that of IEC 61784-2:2007.

5 RTE performance indicators

This Clause is identical in form and content for all CPFs to that of IEC 61784-2:2007.

6 Conformance tests

This Clause is identical in form and content for all CPFs to that of IEC 61784-2:2007.

7 Communication Profile Family SNpFAMILY (SafetyNET p¹) - RTE communication profiles

7.1 General overview

Communication Profile Family SNpFAMILY defines profiles based on IEC/PAS 61158-3-22 through IEC/PAS 61158-6-22.

In this part of IEC 61784, the following communication profiles are specified for CPF SNpFAMILY.

- Profile SNpFAMILY/1

  This profile defines protocol and service selection for devices which utilize the communication model real time frame line (RTFL).

- Profile SNpFAMILY/2

  This profile defines protocol and service selection for devices which utilize the communication model real time frame network (RTFN).

7.2 Profile SNpFAMILY/1

7.2.1 Physical layer

The physical layer shall be based on standard Ethernet hardware according to ISO/IEC 8802-3.

CP SNpFAMILY/1 devices shall use a data rate of 100 Mbit/s and full-duplex transmission mode. A combination of full-duplex and 100Base-TX with auto crossover function (wire, 2 twisted pairs) should be used.

When using cables, they shall be rated Cat5e or better, and shielded in an appropriate way (FTP, STP or SFTP) depending upon EMC constraints.

7.2.2 Data link layer

Data link layer is described in IEC/PAS 61158-3-22 and IEC/PAS 61158-4-22. Table 1 specifies the use of the services included in this profile. Table 2 specifies the use of the protocol included in this profile.

Table 1 – CP SNpFAMILY/1: DLL service selection

Clause or subclause of IEC/PAS 62633	Header	Presence	Constraints
4	Data-link layer services and concepts	—	—
4.1	Operating principle	YES	—
4.2	Communication models	—	—
4.2.1	Overview	YES	—
4.2.2	RTFL device reference model	YES	—
4.2.3	RTFN device reference model	NO	—
4.3	Topology	—	—

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1 SafetyNET p is a trade name of the Pilz GmbH & Co. KG. This information is given for the convenience of users of this International Standard and does not constitute an endorsement by IEC of the trade name holder or any of its products. Compliance to this profile does not require use of the trade name SafetyNET p. Use of the trade name SafetyNET p requires permission of the trade name holder.

Clause or subclause of IEC/PAS 62633	Header	Presence	Constraints
4.3.1	RTFL topology	YES	—
4.3.2	RTFN topology	NO	—
4.4	Addressing	—	—
4.4.1	Overview	YES	—
4.4.2	RTFL device addressing	YES	—
4.4.3	RTFN device addressing	NO	—
4.5	Gateway	YES	—
4.6	Interaction models	—	—
4.6.1	Overview	YES	—
4.6.2	Producer-consumer	YES	—
4.6.3	Publisher-subscriber	NO	—
4.7	Synchronization concept	YES	—
5	Communication services	—	—
5.1	Overview	Partial	Only services selected by this CP
5.2	Communication management services	—	—
5.2.1	Overview	YES	—
5.2.2	Network verification	—	—
5.2.2.1	DL-Network verification service (NV)	YES	—
5.2.2.2	DL-RTFN scan network read service (RTFNSNR)	NO	—
5.2.3	Communication management	—	—
5.2.3.1	DL-RTFN connection establishment service (RTFNCE)	NO	—
5.2.3.2	DL-RTFN connection release service (RTFNCR)	NO	—
5.2.3.3	DL-RTFL control service (RTFLCTL)	YES	—
5.2.3.4	DL-RTFL configuration service (RTFLCFG)	YES	—
5.2.3.5	DL-Read configuration data service (RDCD)	YES	—
5.3	CDC service	YES	—
5.4	MSC services	YES	—
5.5	Time synchronization	—	—
5.5.1	DL-DelayMeasurement start service (DMS)	YES	—
5.5.2	DL-DelayMeasurement read service (DMR)	YES	—
5.5.3	DL-PCS configuration service (PCSC)	YES	—
5.5.4	DL-Sync master configuration service (SYNC_MC)	YES	—
5.5.5	DL-Sync start service (SYNC_START)	YES	—
5.5.6	DL-Sync stop service (SYNC_STOP)	YES	—
5.6	Media independent interface (MII) management services	YES	—

Table 2 – CP SNpFAMILY/1: DLL protocol selection

Clause or subclause of IEC/PAS 62633	Header	Presence	Constraints
4	DL-protocol overview	—	—
4.1	Operating principle	YES	—
4.2	Communication model	—	—
4.2.1	Overview	YES	—
4.2.2	RTFL device reference model	YES	—
4.2.3	RTFN device reference model	NO	—
4.3	Topology	—	—
4.3.1	RTFL topology	YES	—
4.3.2	RTFN topology	NO	—
4.4	Frame processing	—	—
4.4.1	Communication model RTFL	YES	—
4.4.2	Communication model RTFN	NO	—
4.5	General communication mechanisms	YES	—
4.6	Gateway	YES	—
4.7	Interaction models	—	—
4.7.1	Overview	YES	—
4.7.2	Producer-consumer	YES	—
4.7.3	Publisher-subscriber	NO	—
5	DLPDU structure	—	—
5.1	Overview	YES	—
5.2	Data types and encoding rules	YES	—
5.3	DLPDU identification	YES	—
5.4	General DLPDU structure	—	—
5.4.1	Type SNpTYPE frame inside an Ethernet frame	YES	—
5.4.2	Type SNpTYPE frame inside a VLAN tagged Ethernet frame	NO	—
5.4.3	Type SNpTYPE frame inside an UDP datagram	NO	—
5.4.3	Type SNpTYPE frame structure	YES	—
5.5	Communication management DLPDUs	—	—
5.5.1	Network verification DLPDUs	YES	—
5.5.2	RTFN scan network read DLPDUs	NO	—
5.5.3	Identification data	YES	—
5.5.4	RTFN connection management DLPDU	NO	—
5.5.5	ID data	NO	—
5.5.6	RTFL control DLPDU	YES	—
5.5.7	RTFL configuration DLPDU	YES	—
5.6	Cyclic data channel (CDC) DLPDUs	—	—
5.6.1	Cyclic data channel line (CDCL) DLPDU	YES	—
5.6.2	Cyclic data channel network (CDCN) DLPDU	NO	—
5.7	Cyclic data channel (CDC) DLPDU data	YES	—
5.8	Message channel (MSC) DLPDUs	—	—