PUBLICLY
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SPECIFICATION

IEC PAS 62409

First edition
2005-06

Real-time Ethernet for Plant Automation (EPA®)

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International Electrotechnical Commission
Международная Электротехническая Комиссия

PRICE CODE XH

For price, see current catalogue

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INTRODUCTION

Considering the increasingly use of information technology (IT) with established standards, such as TCP/IP and XML, in modern industrial automation, this PAS provides a EPA® (Ethernet for Plant Automation) system architecture and communication services and protocols specification to meet the demand of deterministic communication based on the commonly known as Ethernet. EPA network uses provision from ISO/IEC 8802-3:2000 for the lower communication stack layers and additionally provide more predictable and reliable real-time data transfer and means for support of precise synchronization of automation equipment.

It contains the following items:

1) EPA system architecture
2) Date Link Layer protocol specification
3) Application Layer Service definition
4) Application Layer protocol specification
5) XML based EPA Device Description specification

In EPA systems, regular Ethernet traffic is supported in parallel. For that purpose of higher transmission priority, a registered number 0X88BC for LENGTH/TYPE segment is used.

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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FOREWORD

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The EPA has the patent applications listed below:

China Publication Number 03142040.0

China Publication Number 031200001.9.

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A PAS is a technical specification not fulfilling the requirements for a standard but made available to the public .

IEC-PAS 62409 has been processed by subcommittee 65C: Digital communications, of IEC technical committee 65: Industrial-process measurement and control.

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/357/NP	65C/373/RVN

Following publication of this PAS, the technical committee or subcommittee concerned will transform it into an International Standard.

It is intended that the content of this PAS will be incorporated in the futures new editions of the various parts of IEC 61158 series and/or IEC 61784 series according to the structure of these series.

This PAS shall remain valid for an initial maximum period of three years starting from 2005-06. The validity may be extended for a single three-year period, following which it shall be revised to become another type of normative document or shall be withdrawn.

Real-time Ethernet for Plant Automation (EPA®)

1 Scope

This PAS defines the EPA (Ethernet for Plant Automation) system structure, data link layer protocol, application layer service definition and protocol based on ISO/IEC 8802-3:2000, RFC 791, RFC 768 and so on. XML-based device description is also defined.

This PAS can be used for manufacturing and process automation.

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.

IEC 61588:2004, *Precision clock synchronization protocol for networked measurement and control system*

IEC 61158 (all parts), *Digital data communications for measurement and control – Fieldbus for use in industrial control systems*

IEC 61158-5:2003, *Digital data communications for measurement and control – Fieldbus for use in industrial control systems – Part 5: Application layer service definition*

IEC 61784-1:2003, *Profile sets for continuous and discrete manufacturing relative to fieldbus use in industrial control systems*

IEC 61499 (all parts), *Function blocks*

IEC 61499-1 *Function Blocks for industrial-process measurement and control systems – Part 1 – Architecture*

IEC 61804 (all parts), *Function blocks (FB) for process control*

IEC 61804-1, *Function Blocks for process control – Part 1: Overview of system aspects*

IEC 61804-2, *Function Blocks for process control – Part 2: Specification of FB concept and Electronic Device Description Language (EDDL)*

ISO/IEC 7498-1:1994, *Information technology – Open Systems Interconnection – Basic Reference Model: the Basic Model*

ISO/IEC 8802-3:2000, *Information technology – Telecommunications and information exchange between systems – Local and metropolitan area networks – Specific requirements – Part 3: Carrier sense multiple access with collision detection (CSMA/CD) access method and Physical Layer specifications*

ISO/IEC 8824-1:2002 *Information technology -- Abstract Syntax Notation One (ASN.1): Specification of basic notation*

ISO/IEC 10731:1994, *Information technology – Open Systems Interconnection – Basic Reference Model – Conventions for the definition of OSI services*

ISO/IEC 9545:1994, *Information technology – Open Systems Interconnection – Application Layer structure*

ISO 646:1991, *Information technology – ISO 7-bit coded character set for information interchange*

ISO 2375:2003, *Information technology – Procedure for registration of escape sequences and coded character sets*

IEEE Std 754:1985, *Binary floating-point arithmetic*

RFC 768, *User Datagram Protocol*

RFC 791, *Internet protocol*

RFC 792, *Internet Control Message Protocol*

RFC 793, *Transmission Control Protocol*

RFC 826, *An Ethernet Address Resolution Protocol*

RFC 919, *Broadcasting Internet Datagrams*

RFC 922, *Broadcasting Internet Datagrams In the Presence of Subnets*

RFC 959, *File Transfer Protocol (FTP)*

RFC 1112, *Host Extensions for IP Multicasting*

RFC 1157, *A Simple Network Management Protocol (SNMP)*

RFC 1533, *DHCP Options and BOOTP Vendor Extensions*

RFC 1541, *Dynamic Host Configuration Protocol (DHCP)*

RFC 2030, *Simple Network Time Protocol (SNTP) Version 4 for IPv4, IPv6 and OSI*