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Function blocks (FB) for process control –

**Part 2:
Specification of FB concept**



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CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope.....	7
2 Normative references	7
3 Terms, definitions and abbreviated terms and acronyms.....	8
3.1 Terms and definitions	8
3.2 Abbreviated terms and acronyms	14
4 General Function Block (FB) definition and EDD model	14
4.1 Device structure (device model)	14
4.2 Block combinations	25
5 Detailed block definition	28
5.1 General	28
5.2 Application FBs	28
5.3 Component FBs	36
5.4 Technology Block	36
5.5 Device (Resource) Block	45
5.6 Algorithms common to all blocks	47
6 FB Environment.....	49
7 Mapping to System Management.....	49
8 Mapping to Communication	49
9 Conformance statement.....	51
Annex A (informative) Parameter description	52
Annex B (normative) IEC 61804 Conformance Declaration.....	58
Bibliography.....	59
Figure 1 – Position of the IEC 61804 series related to other standards and products	6
Figure 2 – FB structure is derived out of the process (P&ID view)	15
Figure 3 – FB structure may be distributed between devices.....	16
Figure 4 – IEC 61804 FBs can be implemented in different devices	17
Figure 5 – General components of devices	17
Figure 6 – Block types of IEC 61804	18
Figure 7 – IEC 61804 block overview (graphical representation not normative).....	19
Figure 8 – UML class diagram of the device model	22
Figure 9 – Measurement process signal flow.....	26
Figure 10 – Actuation process signal flow	26
Figure 11 – Application process signal flow.....	27
Figure 12 – Analog Input FB	28
Figure 13 – Analog Output FB.....	30
Figure 14 – Discrete input FB	31
Figure 15 – Discrete Output FB.....	32

Figure 16 – Calculation FB.....	34
Figure 17 – Control FB.....	35
Figure 18 – Temperature Technology Block	36
Figure 19 – Pressure Technology Block	39
Figure 20 – Modulating actuation technology block	41
Figure 21 – On/Off Actuation Technology Block	43
Figure 22 – Harel state chart	46
Figure 23 – Application structure of ISO OSI Reference Model	49
Figure 24 – Client/Server relationship in terms of OSI Reference Model	50
Figure 25 – Mapping of IEC 61804 FBs to APOs	50
Table 1 – References of model elements	21
Table 2 – Variables and parameter description template	24
Table 3 – Example of temperature sensors of Sensor_Type.....	37
Table 4 – Device status state table	45
Table 5 – Device status transition table	46
Table A.1 – Parameter description	52
Table B.1 – Conformance (sub)clause selection table	58
Table B.2 – Contents of (sub)clause selection tables	58

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

FUNCTION BLOCKS (FB) FOR PROCESS CONTROL –

Part 2: Specification of FB concept

FOREWORD

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The International Electrotechnical Commission (IEC) draws attention to the fact that it is claimed that compliance with this document may involve the use of patents

U.S. Patent No. 5,333,114

U.S. Patent No. 5,485,400

U.S. Patent No. 5,825,664

U.S. Patent No. 5,909,368

U.S. Patent Pending No. 08/916,178

Australian Patent No. 638507

Canadian Patent No. 2,066,743

European Patent No. 0495001

Validated in:

UK – Patent No. 0495001

France – Patent No. 0495001

Germany – Patent No. 69032954.7

Netherlands – Patent No. 0495001

Japan Patent No. 3137643

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This International Standard has been prepared by subcommittee 65C: Digital communications, of IEC technical committee 65: Industrial-process measurement and control.

This second edition, together with the first edition of IEC 61804-3, cancels and replaces the first edition of IEC 61804-2 published in 2004. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) transfer of the EDDL-specific clauses to IEC 61804-3;
- b) the FB-specific subclauses 4.1 and 4.2 as well as Clauses 5, 6, 7 and 8 are unchanged.

The text of this standard is based on the following documents:

CDV	Report on voting
65C/405/CDV	65C/420/RVC

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

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

The list of all parts of the IEC 61804 series, under the general title *Function Blocks (FB) for process control*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

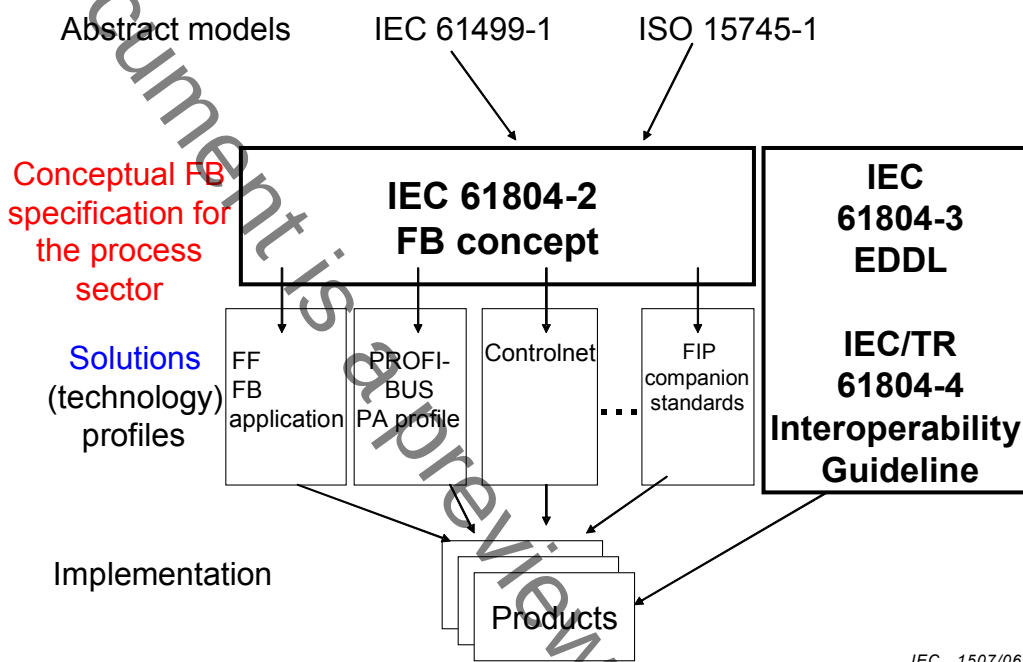
- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

INTRODUCTION

This part of IEC 61804 provides conceptual Function Block specifications, which can be mapped to specific communication systems, and their accompanying definitions by industrial groups.

The EDDL fills the gap between the conceptual FB specification of IEC 61804-2 and a product implementation. Figure 1 shows these aspects.



IEC 1507/06

Figure 1 – Position of the IEC 61804 series related to other standards and products

FUNCTION BLOCKS (FB) FOR PROCESS CONTROL –

Part 2: Specification of FB concept

1 Scope

This part of IEC 61804 is applicable to Function Blocks (FB) for process control.

This standard specifies FB by using the result of harmonization work as regards several elements:

- c) the device model which defines the components of an IEC 61804-2 conformant device;
- d) conceptual specifications of FBs for measurement, actuation and processing. This includes general rules for the essential features to support control, whilst avoiding details which stop innovation as well as specialization for different industrial sectors.

This standard defines a subset of the requirements of IEC 61804-1 (hereafter referred to as Part 1) only, while Part 1 describes requirements for a distributed system.

The conformance statement in Annex B, which covers the conformance declaration, is related to this standard only. Requirements of Part 1 are not part of these conformance declarations.

The standardization work for FB was carried out by harmonizing the description of concepts of existing technologies. It results in an abstract level that allowed the definition of the common features in a unique way. This abstract vision is called here the conceptual FB specification and mapped to specific communication systems and their accompanying definitions by the industrial groups. This standard is also based on the abstract definitions of IEC 61499-1.

NOTE This standard can be mapped to ISO 15745-1.

There are solutions on the market today, which fulfil the requirements of this standard and show how the conceptual specification is implemented in a given technology. New technologies will need to find equivalent solutions (see Figure 4).

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 60050-351:1998, *International Electrotechnical Vocabulary (IEV) – Part 351: Automatic control*

IEC 60584-1, *Thermocouples – Part 1: Reference tables*

IEC 61131-3:2003, *Programmable controllers – Part 3: Programming languages*

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

IEC 61499-1:2005, *Function blocks – Part 1: Architecture*

IEC 61499-2:2005, *Function blocks – Part 2: Software tools requirements*

IEC 61804-1:2003, *Function blocks (FB) for process control – Part 1: Overview of system aspects*

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

ISO/IEC 9899, *Programming languages – C*

ISO/IEC 10646-1, *Information technology – Universal Multiple-Octet Coded Character Set (UCS) – Part 1: Architecture and Basic Multilingual Plane*

3 Terms, definitions, and abbreviated terms and acronyms

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions, some of which have been compiled from the referenced documents, apply.

3.1.1

algorithm

finite set of well-defined rules for the solution of a problem in a finite number of operations

3.1.2

application

software functional unit that is specific to the solution of a problem in industrial-process measurement and control

NOTE An application may be distributed among resources and may communicate with other applications.

3.1.3

application function block

FB which has no input or output to the process

3.1.4

attribute

property or characteristic of an entity, for instance, the version identifier of an FB type specification

[IEC 61499-1]

NOTE The formal description of attributes is part of the solution profiles to achieve domain-specific interoperability. IEC 61804 defines the general rules to define the attributes and specifies the EDDL to describe attributes, which may be described in solution profiles.

3.1.5

component function block

FB instance which is used in the specification of an algorithm of a composite FB type

NOTE A component FB can be an FB or a composite FB type.

3.1.6

composite FB type

FB type whose algorithm is expressed entirely in terms of interconnected component FBs and variables

[IEC 61499-1]