



BSI Standards Publication

Industrial networks — Profiles

Part 1-3: Fieldbus profiles — Communication Profile Family 3

National foreword

This British Standard is the UK implementation of EN IEC 61784-1-3:2023. It is identical to IEC 61784-1-3:2023. It partially supersedes BS EN IEC 61784-1:2019.

The UK participation in its preparation was entrusted to Technical Committee GEL/65/3, Industrial communications: process measurement and control, including fieldbus.

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

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Communication Profile Family 3
(IEC 61784-1-3:2023)

Réseaux industriels - Profils - Part 1-3: Profils de bus de
terrain - Famille de profils de communication 3
(IEC 61784-1-3:2023)

Industrielle Kommunikationsnetze - Profile - Teil 1-3:
Feldbusprofile - Kommunikationsprofilfamilie (CPF) 3
(IEC 61784-1-3:2023)

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European foreword

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- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2026-04-26

This document, together with other parts of the same series, partially supersedes EN IEC 61784-1:2019 and all of its amendments and corrigenda (if any).

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Endorsement notice

The text of the International Standard IEC 61784-1-3:2023 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standard indicated:

IEC 60079-14	NOTE Approved as EN 60079-14
IEC 60793 (series)	NOTE Approved as EN IEC 60793 (series)
IEC 61131-3	NOTE Approved as EN 61131-3
IEC 61158-1	NOTE Approved as EN IEC 61158-1
IEC 61158-3 (series)	NOTE Approved as EN 61158-3 (series)
IEC 61158-4 (series)	NOTE Approved as EN 61158-4 (series)
IEC 61158-5 (series)	NOTE Approved as EN 61158-5 (series)
IEC 61158-5-10	NOTE Approved as EN IEC 61158-5-10
IEC 61158-6 (series)	NOTE Approved as EN 61158-6 (series)
IEC 61158-6-10	NOTE Approved as EN IEC 61158-6-10
IEC 61784-1 (series)	NOTE Approved as EN IEC 61784-1 (series)
IEC 61784-2 (series)	NOTE Approved as EN IEC 61784-2 (series)

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60079-11	-	Electrical apparatus for explosive gas atmospheres - Part 11: Intrinsic safety "i"	EN 60079-11	-
IEC 60079-25	-	Explosive atmospheres - Part 25: Intrinsically safe electrical systems	EN IEC 60079-25	-
IEC 61010	series	Safety requirements for electrical equipment for measurement, control, and laboratory use	EN IEC 61010	series
IEC 61131-2	-	Industrial-process measurement and control - Programmable controllers - Part 2: Equipment requirements and tests	EN 61131-2	-
IEC 61158	series	Industrial communication networks - Fieldbus specifications	EN IEC 61158	series
IEC 61158-2	2023	Industrial communication networks - Fieldbus specifications - Part 2: Physical layer specification and service definition	EN IEC 61158-2	2023
IEC 61158-3-3	2014	Industrial communication networks - Fieldbus specifications - Part 3-3: Data-link layer service definition - Type 3 elements	EN 61158-3-3	2014
IEC 61158-4-3	2019	Industrial communication networks - Fieldbus specifications - Part 4-3: Data-link layer protocol specification - Type 3 elements	EN IEC 61158-4-3	2019
IEC 61158-5-3	2014	Industrial communication networks - Fieldbus specifications - Part 5-3: Application layer service definition - Type 3 elements	EN 61158-5-3	2014
IEC 61158-6-3	2019	Industrial communication networks - Fieldbus specifications - Part 6-3: Application layer protocol specification - Type 3 elements	EN IEC 61158-6-3	2019

EN IEC 61784-1-3:2023 (E)

IEC 61784-1-0	2023	Industrial networks - Profiles - Part 1-0: Fieldbus profiles - General concepts and terminology	EN IEC 61784-1-0	2023
IEC 61784-2-3	2023	Industrial networks - Profiles - Part 2-3: Additional real-time fieldbus profiles based on ISO/IEC/IEEE 8802-3 - CPF 3	EN IEC 61784-2-3	2023
ISO 15745-3	2003	Industrial automation systems and integration - Open systems application integration framework - Part 3: Reference description for IEC 61158 based control systems	-	-
TIA-485-A	1998	Electrical Characteristics of Generators and Receivers for Use in Balanced Digital Multipoint Systems	-	-

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**INDUSTRIAL NETWORKS –
PROFILES –****Part 1-3: Fieldbus profiles –
Communication Profile Family 3****FOREWORD**

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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Attention is drawn to the fact that the use of some of the associated protocol types is restricted by their intellectual-property-right holders. In all cases, the commitment to limited release of intellectual-property-rights made by the holders of those rights permits a layer protocol type to be used with other layer protocols of the same type, or in other type combinations explicitly authorized by their respective intellectual property right holders.

NOTE Combinations of protocol types are specified in the IEC 61784-1 series and the IEC 61784-2 series.

IEC 61784-1-3 has been prepared by subcommittee 65C: Industrial networks, of IEC technical committee 65: Industrial-process measurement, control and automation. It is an International Standard.

This first edition, together with the other parts of the same series, cancels and replaces the fifth edition of IEC 61784-1 published in 2019. This first edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to IEC 61784-1:2019:

- a) split of the original IEC 61784-1 into several subparts, one subpart for the material of a generic nature, and one subpart for each Communication Profile Family specified in the original document.

The text of this International Standard is based on the following documents:

Draft	Report on voting
65C/1207/FDIS	65C/1236/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts of the IEC 61784-1 series, published under the general title *Industrial networks – Profiles – Part 1: Fieldbus profiles*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

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

INTRODUCTION

The IEC 61784-1 series provides a set of Communication Profiles (CP) in the sense of ISO/IEC TR 10000-1. These answer the need of identifying the protocol families co-existing within the IEC 61158 series, as a result of the international harmonization of fieldbus technologies available on the market. More specifically, these profiles help to correctly state the compliance with the IEC 61158 series, and to avoid the spreading of divergent implementations, which would limit its use, clearness and understanding. Additional profiles to address specific market concerns, such as functional safety or information security, can be addressed by future parts of the IEC 61784-1 series.

The IEC 61784-1 series contains several Communication Profile Families (CPF), which specify one or more communication profiles. Such profiles identify, in a strict sense, protocol subsets of the IEC 61158 series via protocol specific communication profiles. They do not define device profiles that specify communication profiles together with application functions needed to answer the need of a specific application ("application profiles").

It is agreed that these latter classes of profiles would facilitate the use of the IEC 61158 series of standards; the profiles defined in the IEC 61784-1 series are a necessary step to achieve that task.

It is also important to clarify that interoperability – defined as the ability of two or more network systems to exchange information and to make mutual use of the information that has been exchanged (see ISO/IEC TR 10000-1) – can be directly achieved on the same link only for those devices complying with the same communication profile.

Profiles contained in the IEC 61784-1 series are constructed of references to IEC 61158-2 and the IEC 61158-3, IEC 61158-4, IEC 61158-5 and IEC 61158-6 series, and other IS, TS or worldwide-accepted standards, as appropriate¹. Each profile is required to reference at least one part of the IEC 61158 series in addition to IEC 61158-1.

Two or more Profiles, which are related to a common family, are specified within a "Communication Profile Family" (CPF).

¹ International Standardised Profiles may contain normative references to specifications other than International Standards; see ISO/IEC JTC 1 N 4047: *The Normative Referencing of Specifications other than International Standards in JTC 1 International Standardized Profiles – Guidelines for ISP Submitters*.

INDUSTRIAL NETWORKS – PROFILES –

Part 1-3: Fieldbus profiles – Communication Profile Family 3

1 Scope

This part of IEC 61784-1 defines Communication Profile Family 3 (CPF 3). CPF 3 specifies a set of protocol specific communication profiles (CPs) based on the IEC 61158 series (Type 3 and Type 10) and other standards, to be used in the design of devices involved in communications in factory manufacturing and process control.

NOTE 1 All CPs are based on standards or draft standards or International Standards published by the IEC or on standards or International Standards established by other standards bodies or open standards processes.

NOTE 2 Some CPs of CPF 3 are specified in IEC 61784-2-3.

Each CP selects an appropriate consistent and compatible subset of services and protocols from the relevant set that is defined and modelled in the IEC 61158 series. For the selected subset of services and protocols, the profile also describes any possible or necessary constraints in parameter values.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

NOTE All parts of the IEC 61158 series, as well as the IEC 61784-1 series and the IEC 61784-2 series are maintained simultaneously. Cross-references to these documents within the text therefore refer to the editions as dated in this list of normative references.

IEC 60079-11, *Explosive atmospheres – Part 11: Equipment protection by intrinsic safety "i"*

IEC 60079-25, *Explosive atmospheres – Part 25: Intrinsically safe electrical systems*

IEC 61010 (all parts), *Safety requirements for electrical equipment for measurement, control and laboratory use*

IEC 61131-2, *Industrial-process measurement and control – Programmable controllers – Part 2: Equipment requirements and tests*

IEC 61158 (all parts), *Industrial communication networks – Fieldbus specifications*

IEC 61158-2:2023, *Industrial communication networks – Fieldbus specifications – Part 2: Physical layer specification and service definition*

IEC 61158-3-3:2014, *Industrial communication networks – Fieldbus specifications – Part 3-3: Data-link layer service definition – Type 3 elements*

IEC 61158-4-3:2019, *Industrial communication networks – Fieldbus specifications – Part 4-3: Data-link layer protocol specification – Type 3 elements*

IEC 61158-5-3:2014, *Industrial communication networks – Fieldbus specifications – Part 5-3: Application layer service definition – Type 3 elements*

IEC 61158-6-3:2019, *Industrial communication networks – Fieldbus specifications – Part 6-3: Application layer protocol specification – Type 3 elements*

IEC 61784-1-0:2023, *Industrial networks – Profiles – Part 1-0: Fieldbus profiles – General concepts and terminology*

IEC 61784-2-3:2023, *Industrial networks – Profiles – Part 2-3: Additional real-time fieldbus profiles based on ISO/IEC/IEEE 8802-3 – CPF 3*

ISO 15745-3:2003, *Industrial automation systems and integration – Open systems application integration framework – Part 3: Reference description for IEC 61158-based control systems*

TIA-485-A:1998, *Electrical Characteristics of Generators and Receivers for Use in Balanced Digital Multipoint Systems*

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

3.1 Terms and definitions

For the purposes of this document, all terms and definitions provided in the IEC 61158 series and IEC 61784-1-0 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

3.2 Abbreviations and symbols

3.2.1 Common abbreviations and symbols

For the purposes of this document, all abbreviations and symbols defined in the IEC 61158 series and IEC 61784-1-0 apply.

CP	communication profile
CPF	communication profile family
MAU	medium attachment unit

3.2.2 Other abbreviations and symbols

CE	"Conformité Européenne" (i.e., "European Conformity")
DP-V0	PROFIBUS DP version 0
DP-V1	PROFIBUS DP version 1
EMC	electro-magnetic compatibility
IS	intrinsically safe (as an adjective) intrinsic safety (as a noun)
RS 485	MAU according to TIA-485-A
RS 485-IS	MAU according to TIA-485-A and applicable to IS

3.3 Conventions

For the purposes of this document, the conventions defined in IEC 61784-1-0 apply.

4 CPF 3 (PROFIBUS & PROFINET²)

4.1 General overview

Communication Profile Family 3 (CPF 3) defines communication profiles using Type 3 and Type 10 of IEC 61158 series, which corresponds to parts of the communication systems commonly known as PROFIBUS and PROFINET. CP 3/1 and CP 3/2 are specified in this document. CP 3/4, CP3/5, and CP 3/6 are RTE specific PROFINET profiles and specified in IEC 61784-2-3.

Table 1 gives an overview of the specified profile sets.

Table 1 – CPF 3: overview of profile sets

Layer	Profile 3/1				Profile 3/2
Application	IEC 61158-5-3, IEC 61158-6-3				
Data-link	IEC 61158-3-3, IEC 61158-4-3 Asynchronous transmission				IEC 61158-3-3, IEC 61158-4-3 Synchronous transmission
Physical	0 ^a	2 ^a	3 ^a	4 ^a	1 ^a
NOTE PROFIBUS uses Profile 3/1 and 3/2. PROFIBUS DP is the name of AL protocol and service part, which is identical for CP 3/1 and CP 3/2 and uses the Type 3 DL parts.					
^a These numbers are the CP identifier used within Communication Feature List (GSD) in keyword "Physical Interface". Coding: 0: RS 485 (TIA-485-A); optional RS 485-IS 1: Manchester coded and bus powered (MBP); optional IS (MBP-IS) and lower power (MBP-LP) 2: Plastic fiber; 3: Glass multi mode fiber or Glass single mode fiber; 4: PCF fiber.					

NOTE 1 See Annex A for an overview of PROFIBUS communications concepts and definition of DP-V0, DP-V1 and Options.

An implementation profile like temperature transmitter or master device shall select from CPF 3 these behaviors that are needed for a certain device type. The manufacturer of a device shall describe the selection for CP 3/1 and CP 3/2 by writing a Communication Feature List (GSD) according ISO 15745-3:2003, 6.2. The GSD is necessary to specify an implementation profile.

It is recommended to perform a conformance test, which is not normative but specified within the consortium PROFIBUS International. Each CP 3/1 and CP 3/2 conformant device shall have a type specific GSD, which is part of the conformance test.

The CPF3 specifies in this document two distinct profiles:

- Profile 3/1**
Profile 3/1 is a subset of IEC 61158 Type 3 services and protocols and uses the as physical layer (PhL) four different media, see Table 1. A Communication Profile (CP) identifier identifies these.
- Profile 3/2**
Profile 3/2 is a subset of IEC 61158 Type 3 services and protocols and uses the Manchester coded bus powered (MBP) synchronous transmission of PhL specified in Type 3. Based on

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different transmission technologies for PROFIBUS DP, the DLL contains different interfaces to the PhL. That causes different communication profiles for PROFIBUS DP.

The MBP non-IS PhL is the basis for the extended specification for IS (MBP-IS) and low power (MBP-LP) capability. MBP-LP supports IS. Slave devices with a MAU supporting MBP-LP are also usable in systems that require MBP-IS or MBP. Slave devices with a MAU supporting MBP-IS are also usable in a system that requires MBP. Figure 1 shows this hierarchy.

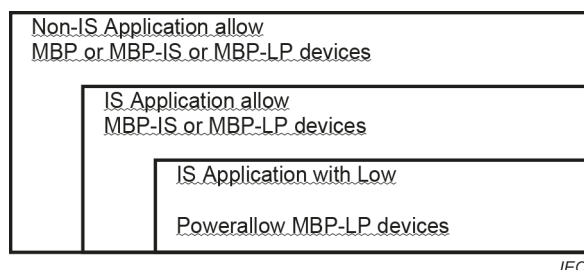


Figure 1 – CP 3/2 Slave devices usable in applications

NOTE 2 Additional CPs are defined in IEC 61784-2-3.

NOTE 3 CP 3/3 has been withdrawn.

4.2 CP 3/1 (PROFIBUS DP)

4.2.1 Physical layer

4.2.1.1 PhL selection

Table 2 specifies the selection of IEC 61158-2 for devices of all types of this profile. 4.2.1.2 specifies additional considerations.

Table 2 – CP 3/1: PhL selection

Clause	Header	Presence	Constraints
1	Scope	YES	—
2	Normative references	Partial	Relevant references only
3	Terms and definitions	Partial	See Table 3
4	Symbols and abbreviated terms	Partial	See Table 4
5	DLL – PhL interface	—	—
5.1	General	YES	—
5.2 – 5.3	—	NO	—
5.4	Type 3: Required services	—	—
5.4.1	Synchronous transmission	NO	—
5.4.2	Asynchronous transmission	YES	—
Next subclauses	—	NO	—
6	Systems management – PhL interface	—	—
6.1	General	YES	—
6.2	Type 1: Systems management – PhL interface	NO	—
6.3	Type 3: Systems management – PhL interface	—	—
6.3.1	Synchronous transmission	NO	—
6.3.2	Asynchronous transmission	YES	—
Next subclauses	—	NO	—

Clause	Header	Presence	Constraints
7	DCE Independent sublayer (DIS)	—	—
7.1	General	YES	—
7.2	Type 1: DIS	NO	—
7.3	Type 3: DIS	—	—
7.3.1	Synchronous transmission	NO	—
7.3.2	Asynchronous transmission	YES	—
Next subclauses	—	NO	—
8	DTE – DCE interface and MIS-specific functions	—	—
8.1	General	YES	—
8.2	Type 1: DTE – DCE interface	NO	—
8.3	Type 3: DTE – DCE interface	—	—
8.3.1	Synchronous transmission	NO	—
8.3.2	Asynchronous transmission	YES	—
Next subclauses	—	NO	—
9	Medium dependent sublayer (MDS)	—	—
9.1	General	YES	—
9.2 – 9.4	—	NO	—
9.5	Type 3: MDS: Wire and optical media	—	—
9.5.1	Synchronous Transmission	NO	—
9.5.2	Asynchronous Transmission	YES	—
Next subclauses	—	NO	—
10	MDS – MAU interface	—	—
10.1	General	YES	—
10.2 – 10.4	—	NO	—
10.5	Type 3: MDS – MAU interface: Wire and optical media	—	—
10.5.1	Synchronous Transmission	NO	—
10.5.2	Asynchronous Transmission	YES	—
Next subclauses	—	NO	—
11 – 21	—	NO	—
22	Type 3: Medium Attachment Unit: Asynchronous Transmission, wire medium	—	—
22.1	Medium Attachment Unit for non intrinsic Safety	YES	For RS 485
22.2	Medium Attachment Unit for intrinsic Safety	YES	For RS 485-IS
23	Type 3: Medium Attachment Unit: Asynchronous Transmission, optical medium	YES	For Plastic, Glass and PCF fiber
Next clauses	—	NO	—
Annex A – H	—	NO	—
Annex I	(normative) Type 3: Connector specification	—	—
I.1	Connector for synchronous transmission	NO	—
I.2	Connector for asynchronous transmission	YES	For RS 485
I.3	Connector for fiber optic cable	YES	For Plastic, Glass and PCF fiber

Clause	Header	Presence	Constraints
Annex J	(normative) Type 3: Redundancy of PhL and medium	YES	Redundancy is optional
Annex K	(normative) Type 3: Optical network topology	YES	For Plastic, Glass and PCF fiber
Annex L	Reference design examples for asynchronous transmission, wire medium, intrinsically safe	YES	For RS 485-IS
Next annexes	—	NO	—

Table 3 – CP 3/1: PhL selection of Clause 3

Clause	Header	Presence	Constraints
3.1	Common terms and definitions	Partial	See 3.4
3.2 – 3.3	—	NO	—
3.4	Type 3: Terms and definitions	Partial	Relevant terms and definitions only
Next subclauses	—	NO	—

Table 4 – CP 3/1: PhL selection of Clause 4

Clause	Header	Presence	Constraints
4.1	Symbols	—	—
4.1.1 – 4.1.2	—	NO	—
4.1.3	Type 3: Symbols	YES	—
Next subclauses	—	NO	—
4.2	Abbreviated terms	—	—
4.2.1 – 4.2.2	—	NO	—
4.2.3	Type 3: Abbreviations	Partial	Relevant abbreviations only
Next subclauses	—	NO	—

4.2.1.2 Electrical safety

Devices shall comply with the legal requirements of that country where they are deployed (for example, as indicated by the CE mark). The measures for protection against electrical shocks (i.e. electrical safety) within industrial applications shall be based on the IEC 61010 series or IEC 61131-2 depending on device type specified therein."

4.2.2 Data-link layer

4.2.2.1 DLL service selection

4.2.2.1.1 General selection

Table 5 specifies the selection of the Data-link services within IEC 61158-3-3.

Table 5 – CP 3/1: General DLL service selection

Clause	Header	Presence	Constraints
1	Scope	YES	—
2	Normative references	Partial	Relevant references only
3	Terms, definitions, symbols, abbreviations and conventions	—	—
3.1	Reference model terms and definitions	Partial	Used when applicable
3.2	Service convention terms and definitions	Partial	Used when applicable
3.3	Common data-link service terms and definitions	Partial	Used when applicable
3.4	Additional Type 3 data-link specific definitions	YES	—
3.5	Common symbols and abbreviations	Partial	Relevant symbols and abbreviations only
3.6	Additional Type 3 symbols and abbreviations	YES	—
3.7	Common conventions	Partial	Used when applicable
3.8	Additional Type 3 conventions	YES	—
4	Connectionless-mode Data-link Service	Partial	See 4.2.2.1.2 to 4.2.2.1.4
5	DL-management service	Partial	See 4.2.2.1.2 to 4.2.2.1.4

4.2.2.1.2 Selection for DP-master (class 1)

4.2.2.1.2.1 DP-V0 master (class 1)

Table 6 specifies CP 3/1 DL services, which are part of DP-master (class 1) and using features named DP-V0.

Table 6 – CP 3/1: DLL service selection for DP-V0 master (class 1)

Clause	Header	Presence	Constraints
4.1	General	YES	—
4.2	Model of the connectionless-mode Data-link Service	YES	—
4.3	Sequence of primitives	Partial	—
4.4	Detailed description of DL services	—	—
4.4.1	Send Data with Acknowledge (SDA)	NO	—
4.4.2	Send Data with No Acknowledge (SDN)	—	—
4.4.2.1	Function	YES	—
4.4.2.2	Types of primitives and parameters	YES	—
4.4.2.3	SDN request primitive	YES	—
4.4.2.4	SDN indication primitive	YES	Option
4.4.2.5	SDN confirm primitive	YES	—
4.4.3	Send and Request Data with Reply (SRD)	—	—
4.4.3.1	Function	YES	—
4.4.3.2	Types of primitives and parameters of SRD data-reply	YES	—
4.4.3.3	SRD data-reply request primitive	YES	—
4.4.3.4	SRD data-reply indication primitive	YES	—
4.4.3.5	SRD data-reply confirm primitive	YES	—
4.4.3.6	Types of primitives and parameters of SRD reply-update	YES	—
4.4.3.7	SRD reply-update request primitive	YES	—
4.4.3.8	SRD reply-update confirm primitive	YES	—
4.4.4	Send and Request Data with Multicast reply (MSRD)	NO	—
4.4.5	Clock Synchronisation (CS)	NO	—

Table 7 specifies CP 3/1 DLM services, which are part of DP-master (class 1) and using features named DP-V0.

Table 7 – CP 3/1: DLM service selection for DP-V0 master (class 1)

Clause	Header	Presence	Constraints
5.1	General	YES	—
5.2	Facilities of the DLMS	YES	—
5.3	Services of the DL-management	Partial	—
5.4	Overview of interactions	Partial	—
5.5	Detailed specification of services and interactions	—	—
5.5.1	Reset	YES	—
5.5.2	Set Value	YES	See DLE-variables in IEC 61158-3-3, Table 22 and Table 23
5.5.3	Get Value	YES	Option Only subset of DLE-variables according to IEC 61158-3-3
5.5.4	Event	YES	Only subset of Event/Fault according to IEC 61158-3-3
5.5.5	Ident	YES	Option
5.5.6	DLSAP Status	YES	Option
5.5.7	DLSAP Activate	YES	—
5.5.8	DLSAP Activate Responder	YES	Option
5.5.9	DLSAP Activate Subscriber	NO	—
5.5.10	DLSAP Deactivate	YES	—

4.2.2.1.2.2 DP-V1 master (class 1)

Table 8 specifies CP 3/1 DL services, which are part of DP-master (class 1) and using features named DP-V1 and Options.

Table 8 – CP 3/1: DLL service selection for DP-V1 master (class 1)

Clause	Header	Presence	Constraints
4.1	General	YES	—
4.2	Model of the connectionless-mode Data-link Service	YES	—
4.3	Sequence of primitives	YES	Used when applicable
4.4	Detailed description of DL services	—	—
4.4.1	Send Data with Acknowledge (SDA)	NO	—
4.4.2	Send Data with No Acknowledge (SDN)	—	—
4.4.2.1	Function	YES	—
4.4.2.2	Types of primitives and parameters	YES	Used when applicable
4.4.2.3	SDN request primitive	YES	—
4.4.2.4	SDN indication primitive	YES	Option
4.4.2.5	SDN confirm primitive	YES	—
4.4.3	Send and Request Data with Reply (SRD)	—	—
4.4.3.1	Function	YES	—
4.4.3.2	Types of primitives and parameters of SRD data-reply	YES	—
4.4.3.3	SRD data-reply request primitive	YES	—
4.4.3.4	SRD data-reply indication primitive	YES	Option
4.4.3.5	SRD data-reply confirm primitive	YES	—
4.4.3.6	Types of primitives and parameters of SRD reply-update	YES	Option
4.4.3.7	SRD reply-update request primitive	YES	Option
4.4.3.8	SRD reply-update confirm primitive	YES	Option
4.4.4	Send and Request Data with Multicast reply (MSRD)	—	—
4.4.4.1	Function	YES	Option
4.4.4.2	Types of primitives and parameters of MSRD MCT-data-reply	YES	Option
4.4.4.3	MSRD MCT-DATA-REPLY request primitive	YES	Option
4.4.4.4	MSRD MCT-data-reply indication primitive	NO	—
4.4.4.5	MSRD MCT-data-reply confirm primitive	YES	Option
4.4.4.6	Type of primitive and parameters of MSRD DXM data reply	YES	Option
4.4.4.7	MSRD DXM data reply indication primitive	YES	Option
4.4.4.8	SRD reply-update request primitive	NO	—
4.4.4.9	SRD reply-update confirm primitive	NO	—
4.4.5	Clock Synchronisation (CS)	—	—
4.4.5.1	Function	YES	Option
4.4.5.2	Types of primitives and parameters of the CS time event	YES	Option
4.4.5.3	CS time event request primitive	YES	Option
4.4.5.4	CS time event confirm primitive	YES	Option
4.4.5.5	Types of primitives and parameters of the CS clock value	YES	Option
4.4.5.6	CS clock value request primitive	YES	Option
4.4.5.7	CS clock value indication primitive	YES	Option
4.4.5.8	CS clock value confirm primitive	YES	Option

Table 9 specifies CP 3/1 DLM services, which are part of DP-master (class 1) and using features named DP-V1 and Options.

Table 9 – CP 3/1: DLM service selection for DP-V1 master (class 1)

Clause	Header	Presence	Constraints
5.1	General	YES	—
5.2	Facilities of the DLMS	YES	—
5.3	Services of the DL-management	YES	Used when applicable
5.4	Overview of interactions	YES	Used when applicable
5.5	Detailed specification of services and interactions	—	—
5.5.1	Reset	YES	—
5.5.2	Set Value	YES	—
5.5.3	Get Value	YES	Option
5.5.4	Event	YES	—
5.5.5	Ident	YES	Option
5.5.6	DLSAP Status	YES	Option
5.5.7	DLSAP Activate	YES	—
5.5.8	DLSAP Activate Responder	YES	Option
5.5.9	DLSAP Activate Subscriber	YES	—
5.5.10	DLSAP Deactivate	YES	—

4.2.2.1.3 Selection for DP-master (Class 2)**4.2.2.1.3.1 DP-V0 master (Class 2)**

Table 10 specifies CP 3/1 DL services, which are part of DP-master (class 2) and using features named DP-V0.

Table 10 – CP 3/1: DLL service selection for DP-V0 master (class 2)

Clause	Header	Presence	Constraints
4.1	General	YES	—
4.2	Model of the connectionless-mode Data-link Service	YES	—
4.3	Sequence of primitives	YES	Used when applicable
4.4	Detailed description of DL services	—	—
4.4.1	Send Data with Acknowledge (SDA)	NO	—
4.4.2	Send Data with No Acknowledge (SDN)	—	—
4.4.2.1	Function	YES	—
4.4.2.2	Types of primitives and parameters	YES	Used when applicable
4.4.2.3	SDN request primitive	YES	Option
4.4.2.4	SDN indication primitive	NO	—
4.4.2.5	SDN confirm primitive	YES	Option
4.4.3	Send and Request Data with Reply (SRD)	—	—
4.4.3.1	Function	YES	—
4.4.3.2	Types of primitives and parameters of SRD data-reply	YES	Used when applicable
4.4.3.3	SRD data-reply request primitive	YES	—
4.4.3.4	SRD data-reply indication primitive	NO	—
4.4.3.5	SRD data-reply confirm primitive	YES	—

Clause	Header	Presence	Constraints
4.4.3.6	Types of primitives and parameters of SRD reply-update	NO	—
4.4.3.7	SRD reply-update request primitive	NO	—
4.4.3.8	SRD reply-update confirm primitive	NO	—
4.4.4	Send and Request Data with Multicast reply (MSRD)	NO	—
4.4.5	Clock Synchronization (CS)	NO	—

The CP 3/1 DLM services, which are part of DP-master (class 2) and using features named DP-V0, are the same as specified for DP-V0-master (class 1) in Table 7.

4.2.2.1.3.2 DP-V1 master (Class 2)

Table 11 specifies CP 3/1 DL services, which are part of DP-master (class 2) and using features named DP-V0.

Table 11 – CP 3/1: DLL service selection for DP-V1 master (class 2)

Clause	Header	Presence	Constraints
4.1	General	YES	—
4.2	Model of the connectionless-mode Data-link Service	YES	—
4.3	Sequence of primitives	YES	Used when applicable
4.4	Detailed description of DL services	—	—
4.4.1	Send Data with Acknowledge (SDA)	NO	—
4.4.2	Send Data with No Acknowledge (SDN)	—	—
4.4.2.1	Function	YES	—
4.4.2.2	Types of primitives and parameters	YES	Used when applicable
4.4.2.3	SDN request primitive	YES	Option
4.4.2.4	SDN indication primitive	NO	—
4.4.2.5	SDN confirm primitive	YES	Option
4.4.3	Send and Request Data with Reply (SRD)	—	—
4.4.3.1	Function	YES	—
4.4.3.2	Types of primitives and parameters of SRD data-reply	YES	Used when applicable
4.4.3.3	SRD data-reply request primitive	YES	—
4.4.3.4	SRD data-reply indication primitive	NO	—
4.4.3.5	SRD data-reply confirm primitive	YES	—
4.4.3.6	Types of primitives and parameters of SRD reply-update	NO	—
4.4.3.7	SRD reply-update request primitive	NO	—
4.4.3.8	SRD reply-update confirm primitive	NO	—
4.4.4	Send and Request Data with Multicast reply (MSRD)	—	—
4.4.4.1	Function	YES	Option
4.4.4.2	Types of primitives and parameters of MSRD MCT-data-reply	YES	Option
4.4.4.3	MSRD MCT-DATA-REPLY request primitive	NO	—
4.4.4.4	MSRD MCT-data-reply indication primitive	NO	—

Clause	Header	Presence	Constraints
4.4.4.5	MSRD MCT-data-reply confirm primitive	NO	—
4.4.4.6	Type of primitive and parameters of MSRD DXM data reply	YES	Option
4.4.4.7	MSRD DXM data reply indication primitive	YES	Option
4.4.4.8	SRD reply-update request primitive	NO	—
4.4.4.9	SRD reply-update confirm primitive	NO	—
4.4.5	Clock Synchronization (CS)	—	—
4.4.5.1	Function	YES	Option
4.4.5.2	Types of primitives and parameters of the CS time event	YES	Option
4.4.5.3	CS time event request primitive	YES	Option
4.4.5.4	CS time event confirm primitive	YES	Option
4.4.5.5	Types of primitives and parameters of the CS clock value	YES	Option
4.4.5.6	CS clock value request primitive	YES	Option
4.4.5.7	CS clock value indication primitive	YES	Option
4.4.5.8	CS clock value confirm primitive	YES	Option

The CP 3/1 DLM services, which are part of DP-master (class 2) and using features named DP-V1 and Options, are the same as specified for DP-V1-master (class 1) in Table 9.

4.2.2.1.4 Selection for DP-slave

4.2.2.1.4.1 DP-V0 slave

Table 12 specifies CP 3/1 DL services, which are part of DP-slave and using features named DP-V0.

Table 12 – CP 3/1: DLL service selection for DP-V0 slave

Clause	Header	Presence	Constraints
4.1	General	YES	—
4.2	Model of the connectionless-mode Data-link Service	YES	—
4.3	Sequence of primitives	YES	Used when applicable
4.4	Detailed description of DL services	—	—
4.4.1	Send Data with Acknowledge (SDA)	NO	—
4.4.2	Send Data with No Acknowledge (SDN)	—	—
4.4.2.1	Function	YES	—
4.4.2.2	Types of primitives and parameters	YES	Used when applicable
4.4.2.3	SDN request primitive	NO	—
4.4.2.4	SDN indication primitive	YES	—
4.4.2.5	SDN confirm primitive	NO	—
4.4.3	Send and Request Data with Reply (SRD)	—	—
4.4.3.1	Function	YES	—
4.4.3.2	Types of primitives and parameters of SRD data-reply	YES	Used when applicable
4.4.3.3	SRD data-reply request primitive	NO	—
4.4.3.4	SRD data-reply indication primitive	YES	—
4.4.3.5	SRD data-reply confirm primitive	NO	—
4.4.3.6	Types of primitives and parameters of SRD reply-update	YES	—
4.4.3.7	SRD reply-update request primitive	YES	—
4.4.3.8	SRD reply-update confirm primitive	YES	—
4.4.4	Send and Request Data with Multicast reply (MSRD)	NO	—
4.4.5	Clock Synchronization (CS)	NO	—

Table 13 specifies CP 3/1 DLM services, which are part of DP-slave and using features named DP-V0.

Table 13 – CP 3/1: DLM service selection for DP-V0 slave

Clause	Header	Presence	Constraints
5.1	General	YES	—
5.2	Facilities of the DLMS	YES	—
5.3	Services of the DL-management	YES	Used when applicable
5.4	Overview of interactions	YES	Used when applicable
5.5	Detailed specification of services and interactions	—	—
5.5.1	Reset	YES	—
5.5.2	Set Value	YES	Only subset of DLE-variables according to IEC 61158-3-3
5.5.3	Get Value	YES	Option Only subset of DLE-variables according to IEC 61158-3-3
5.5.4	Event	YES	Only subset of Event/Fault according to IEC 61158-3-3
5.5.5	Ident	YES	Option Only local
5.5.6	DLSAP Status	YES	Option Only local
5.5.7	DLSAP Activate	YES	Restrictions to parameter values according to IEC 61158-3-3
5.5.8	DLSAP Activate Responder	YES	Restrictions to parameter values according to IEC 61158-3-3
5.5.9	DLSAP Activate Subscriber	NO	—
5.5.10	DLSAP Deactivate	YES	—

4.2.2.1.4.2 DP-V1 slave

Table 14 specifies CP 3/1 DL services, which are part of DP-slave and using features named DP-V1 and Options.

Table 14 – CP 3/1: DLL service selection for DP-V1 slave

Clause	Header	Presence	Constraints
4.1	General	YES	—
4.2	Model of the connectionless-mode Data-link Service	YES	—
4.3	Sequence of primitives	YES	Used when applicable
4.4	Detailed description of DL services	—	—
4.4.1	Send Data with Acknowledge (SDA)	NO	—
4.4.2	Send Data with No Acknowledge (SDN)	—	—
4.4.2.1	Function	YES	—
4.4.2.2	Types of primitives and parameters	YES	Used when applicable
4.4.2.3	SDN request primitive	NO	—
4.4.2.4	SDN indication primitive	YES	—
4.4.2.5	SDN confirm primitive	NO	—
4.4.3	Send and Request Data with Reply (SRD)	YES	—
4.4.3.1	Function	YES	—
4.4.3.2	Types of primitives and parameters of SRD data-reply	YES	Used when applicable
4.4.3.3	SRD data-reply request primitive	NO	—
4.4.3.4	SRD data-reply indication primitive	YES	—
4.4.3.5	SRD data-reply confirm primitive	NO	—
4.4.3.6	Types of primitives and parameters of SRD reply-update	YES	—
4.4.3.7	SRD reply-update request primitive	YES	—
4.4.3.8	SRD reply-update confirm primitive	YES	—
4.4.4	Send and Request Data with Multicast reply (MSRD)	—	—
4.4.4.1	Function	YES	Option
4.4.4.2	Types of primitives and parameters of MSRD MCT-data-reply	YES	Option
4.4.4.3	MSRD MCT-DATA-REPLY request primitive	NO	—
4.4.4.4	MSRD MCT-data-reply indication primitive	YES	Option
4.4.4.5	MSRD MCT-data-reply confirm primitive	NO	—
4.4.4.6	Type of primitive and parameters of MSRD DXM data reply	YES	Option
4.4.4.7	MSRD DXM data reply indication primitive	YES	Option
4.4.4.8	SRD reply-update request primitive	YES	Option
4.4.4.9	SRD reply-update confirm primitive	YES	Option
4.4.5	Clock Synchronization (CS)	—	—
4.4.5.1	Function	YES	Option
4.4.5.2	Types of primitives and parameters of the CS time event	NO	—
4.4.5.3	CS time event request primitive	NO	—
4.4.5.4	CS time event confirm primitive	NO	—
4.4.5.5	Types of primitives and parameters of the CS clock value	YES	Option
4.4.5.6	CS clock value request primitive	NO	—
4.4.5.7	CS clock value indication primitive	YES	Option
4.4.5.8	CS clock value confirm primitive	NO	—

Table 15 specifies CP 3/1 DLM services, which are part of DP-slave and using features named DP-V1 and Options.

Table 15 – CP 3/1: DLM service selection for DP-V1 slave

Clause	Header	Presence	Constraints
5.1	General	YES	—
5.2	Facilities of the DLMS	YES	—
5.3	Services of the DL-management	YES	Used when applicable
5.4	Overview of interactions	YES	Used when applicable
5.5	Detailed specification of services and interactions	—	—
5.5.1	Reset	YES	—
5.5.2	Set Value	YES	Only subset of DLE-variables according to IEC 61158-3-3
5.5.3	Get Value	YES	Option Only subset of DLE-variables according to IEC 61158-3-3
5.5.4	Event	YES	Only subset of Event/Fault according to IEC 61158-3-3
5.5.5	Ident	YES	Option Only local
5.5.6	DLSAP Status	YES	Option Only local
5.5.7	DLSAP Activate	YES	Restrictions to parameter values according to IEC 61158-3-3
5.5.8	DLSAP Activate Responder	YES	—
5.5.9	DLSAP Activate Subscriber	YES	Option
5.5.10	DLSAP Deactivate	YES	—

4.2.2.2 DLL protocol selection

4.2.2.2.1 General selection

Table 16 specifies the selection of the data-link protocol within IEC 61158-4-3.

Table 16 – CP 3/1: General DLL protocol selection

Clause	Header	Presence	Constraints
1	Scope	YES	—
2	Normative references	Partial	Relevant references only
3	Terms, definitions, symbols and abbreviations	—	—
3.1	Reference model terms and definitions	Partial	Used when applicable
3.2	Service convention terms and definitions	Partial	Used when applicable
3.3	Common terms and definitions	Partial	Used when applicable
3.4	Additional Type 3 definitions	YES	—
3.5	Common symbols and abbreviations	Partial	Relevant symbols and abbreviations only
3.6	Type 3 symbols and abbreviations	YES	—
4	Common DL protocol elements	YES	—
5	Overview of the DL-protocol	Partial	See Table 17 and 4.2.2.2.2 to 4.2.2.2.4
6	General structure and encoding of DLPDUs, and related elements of procedure	Partial	See Table 18 and 4.2.2.2.2 to 4.2.2.2.4
7	DLPDU-specific structure, encoding and elements of procedure	Partial	See Table 19 and 4.2.2.2.2 to 4.2.2.2.4
8	Other DLE elements of procedure	Partial	See 4.2.2.2.2 to 4.2.2.2.4
Annex A	DL-protocol state machines	YES	—
Annex B	Type 3 (synchronous): exemplary FCS implementations	YES	—
Annex C	Type 3: Exemplary token procedure and message transfer periods	YES	—

Table 17 – CP 3/1: DLL protocol selection of Clause 5

Clause	Header	Presence	Constraints
5.1	General	YES	—
5.2	Overview of the medium access control and transmission protocol	YES	—
5.3	Transmission mode and DL entity	YES	—
5.4	Service assumed from the PhL	—	—
5.4.1	Asynchronous transmission	YES	—
5.4.2	Synchronous transmission	NO	—
5.5	Operational elements	—	—
5.5.1	Overview	YES	—
5.5.2	Bit time t_{BIT}	YES	—
5.5.3	Asynchronous transmission	YES	—
5.5.4	Synchronous transmission	NO	—
5.5.5	Timers and counters	—	—
5.5.5.1	Asynchronous transmission	YES	—
5.5.5.2	Synchronous transmission	NO	—
5.6	Cycle and system reaction times	—	—
5.6.1	Asynchronous transmission	YES	—
5.6.2	Synchronous transmission	NO	—

Table 18 – CP 3/1: DLL protocol selection of Clause 6

Clause	Header	Presence	Constraints
6.1	DLPDU granularity	—	—
6.1.1	Asynchronous transmission – UART character	YES	—
6.1.2	Synchronous transmission	NO	—
6.2	Length octet (LE, LEr)	YES	—
6.3	Address octet	YES	—
6.4	Control octet (FC)	YES	—
6.5	DLPDU content error detection	—	—
6.5.1	Asynchronous transmission – frame checksum (FCS)	YES	—
6.5.2	Synchronous transmission – frame check sequence (FCS)	NO	—
6.6	DATA_UNIT	YES	—
6.7	Error control procedures	—	—
6.7.1	Asynchronous transmission	YES	—
6.7.2	Synchronous transmission	NO	—

Table 19 – CP 3/1: DLL protocol selection of Clause 7

Clause	Header	Presence	Constraints
7.1	DLPDUs of fixed length with no data field	—	—
7.1.1	Asynchronous transmission	YES	—
7.1.2	Synchronous transmission	NO	—
7.2	DLPDUs of fixed length with data field	—	—
7.2.1	Asynchronous transmission	YES	—
7.2.2	Synchronous transmission	NO	—
7.3	DLPDUs with variable data field length	—	—
7.3.1	Asynchronous transmission	YES	—
7.3.2	Synchronous transmission	NO	—
7.4	Token DLPDU	—	—
7.4.1	Asynchronous transmission	YES	—
7.4.2	Synchronous transmission	NO	—
7.5	ASP DLPDU	Partial	See Table 22, Table 26, Table 34, and Table 38
7.6	SYNCH DLPDU	Partial	See Table 22, Table 26, Table 34, and Table 38
7.7	Time Event (TE) DLPDU	Partial	See Table 22, Table 26, Table 34, and Table 38
7.8	Clock Value (CV) DLPDU	Partial	See Table 22, Table 26, Table 34, and Table 38
7.9	Transmission procedures	YES	—
7.9.1	Asynchronous transmission	YES	—
7.9.2	Synchronous transmission	NO	—

4.2.2.2.2 Selection for DP-master (class 1)

4.2.2.2.2.1 DP-V0 master (class 1)

Table 20 specifies the CP 3/1 selection of the time parameters of the Data-link protocol, which are part of DP-master (class 1) and using features named DP-V0.

Table 20 – CP 3/1: Time variable selection for DP-V0 master (class 1)

Clause	Variable name	Usage	Constraint
5.5.3.1	Synchronization time (T_{SYN})	M	—
5.5.3.2	Synchronization interval time (T_{SYNI})	M	—
5.5.3.3	Station delay time (T_{SDx})	M	—
5.5.3.4	Quiet time (T_{QUI})	M	—
5.5.3.5	Ready time (T_{RDY})	M	—
5.5.3.6	Safety margin (T_{SM})	M	—
5.5.3.7	Idle time (T_{Idx})	M	—
5.5.3.8	Transmission delay time (T_{TD})	M	—
5.5.3.9	Slot time (T_{SL})	M	—
5.5.3.10	Time-out (T_{TO})	M	—
5.5.3.11	GAP update time (T_{GUD})	M	—
5.5.3.12	Isochronous Mode	—	—
5.5.3.13	Send delay time (T_{SD})	—	—
5.5.3.14	Receive delay time (T_{RD})	—	—
5.5.3.15	Clock synchronization interval time (T_{CSI})	—	—

Table 21 specifies the CP 3/1 selection of the timers and counters of the Data-link protocol, which are part of DP-master (class 1) and using features named DP-V0.

Table 21 – CP 3/1: Timer and counter selection for DP-V0 master (class 1)

Clause	Timer or counter	Usage	Constraint
5.5.5.1.1	token-rotation-timer	M	—
5.5.5.1.1	idle-timer	M	—
5.5.5.1.1	slot-timer	M	—
5.5.5.1.1	time-out-timer	M	—
5.5.5.1.1	syn-interval-timer	M	—
5.5.5.1.1	GAP-update-timer	M	—
5.5.5.1.1	isochronous-cycle-timer	—	—
5.5.5.1.1	passive-spare-timer	—	—
5.5.5.1.1	send-delay-timer	—	—
5.5.5.1.1	receive-delay-timer	—	—
5.5.5.1.2	DLPDU_sent_count	O	—
5.5.5.1.2	Retry_count	O	—
5.5.5.1.2	DLPDU_sent_count_sr	O	—
5.5.5.1.2	Error_count	O	—
5.5.5.1.2	SD_count	O	—
5.5.5.1.2	SD_error_count	O	—

Table 22 specifies the CP 3/1 selection of the types of DLPDUs of the Data-link protocol, which are part of DP-master (class 1) and using features named DP-V0.

Table 22 – CP 3/1: DLPDU selection for DP-V0 master (class 1)

Clause	DLPDU	Usage	Constraint
7.1.1	DLPDUs of fixed length with no data field	M	—
7.2.1	DLPDUs of fixed length with data field	M	Option for sending
7.3.1	DLPDUs with variable data field length	M	—
7.4.1	Token DLPDU	M	—
7.5	ASP DLPDU	—	—
7.6	SYNCH DLPDU	—	—
7.7	Time Event (TE) DLPDU	—	—
7.8	Clock Value (CV) DLPDU	—	—

Table 23 specifies the CP 3/1 selection of the states of the media access control of the Data-link protocol, which are part of DP-master (class 1) and using features named DP-V0.

Table 23 – CP 3/1: MAC state selection for DP-V0 master (class 1)

Clause	MAC state	Usage	Constraint
8.2.2	Offline	M	—
8.2.3	Passive_Idle	O	—
8.2.4	Listen_Token	M	—
8.2.5	Active_Idle	M	—
8.2.6	Claim_Token	M	—
8.2.7	Wait_T _{CT}	—	—
8.2.8	Use_Token	M	—
8.2.9	Await_Data_Response	M	—
8.2.10	Check_Access_Time	M	—
8.2.11	Pass_Token	M	—
8.2.12	Check_Token_Pass	M	—
8.2.13	Await_Status_Response	M	—

The CP 3/1 selection of the clock synchronization protocol for DP-master (class 1) using features named DP-V0 is empty.

4.2.2.2.2 DP-V1 master (class 1)

Table 24 specifies the CP 3/1 selection of the time parameters of the Data-link protocol, which are part of DP-master (class 1) and using features named DP-V1 and Options.

Table 24 – CP 3/1: Time selection for DP-V1 master (class 1)

Clause	Times	Usage	Constraint
5.5.3.1	Synchronization time (T_{SYN})	M	—
5.5.3.2	Synchronization interval time (T_{SYNI})	M	—
5.5.3.3	Station delay time (T_{SDx})	M	—
5.5.3.4	Quiet time (T_{QUI})	M	—
5.5.3.5	Ready time (T_{RDY})	M	—
5.5.3.6	Safety margin (T_{SM})	M	—
5.5.3.7	Idle time (T_{Idx})	M	—
5.5.3.8	Transmission delay time (T_{TD})	M	—
5.5.3.9	Slot time (T_{SL})	M	—
5.5.3.10	Time-out (T_{TO})	M	—
5.5.3.11	GAP update time (T_{GUD})	M	—
5.5.3.12.1	Isochronous cycle time (T_{CT})	O	—
5.5.3.12.2	IsoM synchronization message time (T_{SYNCH})	O	—
5.5.3.12.3	Active spare time message time (T_{ASM})	O	—
5.5.3.12.4	Real isochronous cycle time (T_{RCT})	O	—
5.5.3.12.5	Spare time (T_{RES})	O	—
5.5.3.12.6	Passive spare time (T_{PSP})	O	—
5.5.3.12.7	Time shift (T_{SH})	O	—
5.5.3.13	Send delay time (T_{SD})	O	—
5.5.3.14	Receive delay time (T_{RD})	O	—
5.5.3.15	Clock synchronization interval time (T_{CSI})	O	—

Table 25 specifies the CP 3/1 selection of the timers and counters of the Data-link protocol, which are part of DP-master (class 1) and using features named DP-V1 and Options.

Table 25 – CP 3/1: Timer and counter selection for DP-V1 master (class 1)

Clause	Timer or counter	Usage	Constraint
5.5.5.1.1	token-rotation-timer	M	—
5.5.5.1.1	idle-timer	M	—
5.5.5.1.1	slot-timer	M	—
5.5.5.1.1	time-out-timer	M	—
5.5.5.1.1	syn-interval-timer	M	—
5.5.5.1.1	GAP-update-timer	M	—
5.5.5.1.1	isochronous-cycle-timer	O	—
5.5.5.1.1	passive-spare-timer	O	—
5.5.5.1.1	send-delay-timer	O	—
5.5.5.1.1	receive-delay-timer	O	—
5.5.5.1.2	DLPDU_sent_count	O	—
5.5.5.1.2	Retry_count	O	—
5.5.5.1.2	DLPDU_sent_count_sr	O	—
5.5.5.1.2	Error_count	O	—
5.5.5.1.2	SD_count	O	—
5.5.5.1.2	SD_error_count	O	—

Table 26 specifies the CP 3/1 selection of the types of DLPDUs of the Data-link protocol, which are part of DP-master (class 1) and using features named DP-V1 and Options.

Table 26 – CP 3/1: DLPDU selection for DP-V1 master (class 1)

Clause	DLPDU	Usage	Constraint
7.1.1	DLPDUs of fixed length with no data field	M	—
7.2.1	DLPDUs of fixed length with data field	M	Option for sending
7.3.1	DLPDUs with variable data field length	M	—
7.4.1	Token DLPDU	M	—
7.5	ASP DLPDU	O	—
7.6	SYNCH DLPDU	O	—
7.7	Time Event (TE) DLPDU	O	—
7.8	Clock Value (CV) DLPDU	O	—

Table 27 specifies the CP 3/1 selection of the states of the media access control of the Data-link protocol, which are part of DP-master (class 1) and using features named DP-V1 and Options.