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Industrial communication networks - Fieldbus specifications - Part 6-26: Application layer protocol specification - Type 26 elements

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 06/23

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English Version

**Industrial communication networks - Fieldbus specifications -
Part 6-26: Application layer protocol specification - Type 26
elements
(IEC 61158-6-26:2023)**

Réseaux de communication industriels - Spécifications des
bus de terrain - Partie 6-26: Spécification du protocole de la
couche liaison de données - Eléments de type 26
(IEC 61158-6-26:2023)

Industrielle Kommunikationsnetze - Feldbusse - Teil 6-26:
Protokollspezifikation des Application Layer
(Anwendungsschicht) - Typ 26-Elemente
(IEC 61158-6-26:2023)

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EN IEC 61158-6-26:2023 (E)**European foreword**

The text of document 65C/1204/FDIS, future edition 2 of IEC 61158-6-26, prepared by SC 65C "Industrial networks" of IEC/TC 65 "Industrial-process measurement, control and automation" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 61158-6-26:2023.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2024-02-02
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2026-05-02

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

- | | | |
|----------------------|------|-------------------------------------|
| IEC 61158-1 | NOTE | Approved as EN IEC 61158-1 |
| 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.cencenelec.eu.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61158-5-26	2023	Industrial communication networks - Fieldbus specifications - Part 5-26: Application layer service definition - Type 26 elements	-	-
IEC 61158-2-21	2023	Industrial networks - Profiles - Part 2-21: Additional real-time fieldbus profiles based on ISO/IEC/IEEE 8802-3 - CPF 21	-	-
ISO/IEC 7498-1	-	Information technology - Open Systems Interconnection - Basic reference model: The basic model	-	-
ISO/IEC/IEEE 8802-3	-	Telecommunications and exchange between information technology systems - Requirements for local and metropolitan area networks - Part 3: Standard for Ethernet	-	-
ISO/IEC 8822	-	Information technology - Open Systems Interconnection - Presentation service definition	-	-
ISO/IEC 8824-1	-	Information technology - Abstract Syntax Notation One (ASN.1) - Part 1: Specification of basic notation	-	-
ISO/IEC 8825-1	-	Information technology - ASN.1 encoding rules: Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER) and Distinguished Encoding Rules (DER)	-	-
ISO/IEC 9545	-	Information technology - Open Systems Interconnection - Application layer structure	-	-
ISO/IEC 9899	-	Information technology - Programming languages - C	-	-
IETF RFC 768	-	User Datagram Protocol	-	-
IETF RFC 791	-	Internet Protocol Darpa Internet Program Protocol Specification	-	-
IETF RFC 792	-	Internet Control Message Protocol	-	-

EN IEC 61158-6-26:2023 (E)

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IETF RFC 793	-	Transmission Control Protocol Darpa Internet Program Protocol Specification	-	-
IETF RFC 796	-	Address mappings	-	-
IETF RFC 826	-	Ethernet Address Resolution Protocol: Or Converting Network Protocol Addresses to 48.bit Ethernet Address for Transmission on Ethernet Hardware	-	-
IETF RFC 894	-	Standard for the Transmission of IP Datagrams over Ethernet Networks	-	-
IETF RFC 919	-	Broadcasting Internet Datagrams	-	-
IETF RFC 922	-	Broadcasting Internet datagrams in the presence of subnets	-	-
IETF RFC 950	-	Internet Standard Subnetting Procedure	-	-



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**Industrial communication networks – Fieldbus specifications –
Part 6-26: Application layer protocol specification – Type 26 elements**





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IEC Secretariat
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

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CONTENTS

FOREWORD.....	11
INTRODUCTION.....	13
1 Scope.....	14
1.1 General.....	14
1.2 Specifications	15
1.3 Conformance	15
2 Normative references	15
3 Terms, definitions, symbols, abbreviated terms and conventions	16
3.1 Terms and definitions from other ISO/IEC standards.....	17
3.1.1 Terms and definitions from ISO/IEC 7498-1	17
3.1.2 Terms and definitions from ISO/IEC 8822	17
3.1.3 Terms and definitions from ISO/IEC 9545	17
3.1.4 Terms and definitions from ISO/IEC 8824-1	17
3.1.5 Terms and definitions from ISO/IEC 8825-1	18
3.2 Type 26 specific terms and definitions	18
3.3 Abbreviated terms and symbols	22
3.4 Conventions.....	24
3.4.1 Conventions used in state machines.....	24
3.4.2 Convention for abstract syntax description.....	26
3.4.3 Convention for reserved bits and octets	26
3.4.4 Conventions for bit description in octets	26
4 FAL syntax description	27
4.1 General.....	27
4.2 Overview of Type 26 fieldbus	27
4.2.1 Application field and Common-memory	27
4.2.2 Structure of Type 26 protocol.....	28
4.2.3 Structure of Type 26 FAL.....	29
4.2.4 Data link layer	30
4.3 Operating principle.....	31
4.3.1 Overview	31
4.3.2 Logical ring maintenance	31
4.3.3 Node addition	34
4.3.4 Node in a logical ring	38
4.3.5 Node drop-out	39
4.3.6 Data transmission.....	39
4.3.7 Data transmission frames	49
4.4 FAL PDU abstract syntax	52
4.4.1 Basic abstract syntax.....	52
4.4.2 Transparent-msg- PDU	55
4.4.3 Token-PDU.....	55
4.4.4 Participation-req-PDU	56
4.4.5 Byte-block-read PDUs	56
4.4.6 Byte-block-write PDUs.....	56
4.4.7 Word-block-read PDUs	56
4.4.8 Word-block-write PDUs.....	57
4.4.9 Network-parameter-read PDUs	57
4.4.10 Network-parameter-write PDUs.....	57

4.4.11	Stop-command PDUs	57
4.4.12	Operation-command PDUs	58
4.4.13	Profile-read PDUs.....	58
4.4.14	Trigger-PDU	58
4.4.15	Log-data-read PDUs	58
4.4.16	Log-data-clear PDUs	59
4.4.17	Message-return PDUs	59
4.4.18	Vendor-specific-msg PDUs	59
4.4.19	Start-TK-hld-time-mrmt PDUs	60
4.4.20	Terminate-TK-hld-time-mrmt PDUs	60
4.4.21	Start-GP_Comm-sndr-log PDUs.....	60
4.4.22	Terminate-GP_Comm-sndr-log PDUs	60
4.4.23	Set-remote-node-config-para PDUs	61
4.4.24	Read-rmt-partici-node-mgt-info-para PDUs	61
4.4.25	Read-rmt- node-mgt-info-para PDUs.....	61
4.4.26	Read-rmt-node-set-info-para PDUs.....	61
4.4.27	Reset-node PDUs	62
4.4.28	Cyclic-data PDUs	62
4.4.29	Extended-prticipation-req-PDU	62
4.4.30	Extended-network-parameter-read PDUs.....	63
4.4.31	Extended-network-parameter-write PDUs	63
4.5	Data type assignments.....	63
5	Transfer syntax.....	65
5.1	Encoding rules	65
5.1.1	Basic encoding	65
5.1.2	Fixed length Unsigned encoding	65
5.1.3	Fixed length BitString encoding	65
5.1.4	OctetString encoding	65
5.1.5	SEQUENCE encoding.....	65
5.2	PDU elements encoding.....	65
5.2.1	FALARHeader	65
5.2.2	Transparent-msg PDU	69
5.2.3	Token-PDU.....	70
5.2.4	Participation-req-PDU.....	71
5.2.5	Byte-block-read PDUs	72
5.2.6	Byte-block-write PDUs	74
5.2.7	Word-block-read PDUs	75
5.2.8	Word-block-write PDUs.....	77
5.2.9	Network-parameter-read PDUs	79
5.2.10	Network-parameter-write PDUs.....	83
5.2.11	Stop-command PDUs	85
5.2.12	Operation-command PDUs	87
5.2.13	Profile-read PDUs.....	89
5.2.14	Trigger-PDU	92
5.2.15	Log-data-read PDUs	92
5.2.16	Log-data-clear PDUs	98
5.2.17	Message-return PDUs	100
5.2.18	Vendor-specific-msg PDUs	102
5.2.19	Start-TK-hld-time-mrmt PDUs	105

5.2.20	Terminate-TK-hld-time-mrmt PDUs	106
5.2.21	Start-GP_Comm-sndr-log PDUs.....	110
5.2.22	Terminate-GP_Comm-sndr-log PDUs	111
5.2.23	Set-remote-node-config-para PDUs	114
5.2.24	Read-rmt-partici-node-mgt-info-para PDUs	117
5.2.25	Read-rmt- node-mgt-info-para PDUs.....	120
5.2.26	Read-rmt-node-set-info-para PDUs.....	123
5.2.27	Reset-node PDUs	125
5.2.28	Cyclic-data PDUs	126
5.2.29	Extended-participation-request PDU	129
5.2.30	Extended-network-parameter-read PDUs.....	129
5.2.31	Extended-network-parameter-write PDUs	132
6	FAL protocol state machines structure	135
6.1	Overview.....	135
6.2	Common variables, parameters, timers, counters, lists and queues	136
6.2.1	V(3CWT), P(3CWT), T(3CWT): Three-lap-time-period-of-the-token-circulation	136
6.2.2	V(ACK): ACK received	136
6.2.3	V(ACK_TN): ACK to this node	137
6.2.4	V(AWT), P(AWT), T(AWT): Waiting-time-period-for-receiving-message-acknowledge.....	137
6.2.5	V(CBN): Current fragment number for fragmented cyclic-data transmission	137
6.2.6	V(CTFG): Cyclic-data fragment transfer.....	137
6.2.7	V(CTRen), P (CTRen): Cyclic-data on CM1 and CM2 receive enable.....	137
6.2.8	V(CTRQ): Cyclic-data transfer request.....	137
6.2.9	V(ExCTRQ): Cyclic-data of CM3 transfer request	138
6.2.10	C(ExCT): Cumulative count of extended-cyclic-data transmission	138
6.2.11	V(ExCTRen), P(ExCTRen): Cyclic-data on CM3 receive enable.....	138
6.2.12	V(ExTBN), P(ExTBN): Total fragment number of Cyclic-data on CM3	138
6.2.13	V(ExTSZ), P(ExTSZ): Total cyclic-data size on CM3.....	138
6.2.14	C(MCNT): Cumulative count of message transmission carried over	138
6.2.15	V(MCV): Message transmission carried over.....	138
6.2.16	V(MFT), P(MFT), T(MFT): Allowable-minimum-frame-interval-time.....	138
6.2.17	V(MmtCntType): Measurement control type	139
6.2.18	V(MRVRQ): Message receive request.....	139
6.2.19	V(MSRQ): Message transfer request	139
6.2.20	Q(MSRXQ): Message-RX-Queue	139
6.2.21	Q(MTXQ): Message-TX-Queue	139
6.2.22	V(NMTP): No message transmission in previous cycle.....	139
6.2.23	V(PAT), P(PAT), T(PAT): Participation-request-frame-acceptance-time	140
6.2.24	V(PnMgtIF): Participation-node-management-information List.....	140
6.2.25	V(PWT), T(PWT): Participation-request-frame-transmission-waiting-time.....	140
6.2.26	V(RCT): Allowable-refresh-cycle-time	140
6.2.27	V(RMT), T(RMT): Refresh-cycle-measurement-time.....	140
6.2.28	C(RTX): Retransmission count.....	141
6.2.29	V(SEQ): Sequence number value List.....	141
6.2.30	V(SN): Successor node	141
6.2.31	V(SrtMmt): Measurement started	141

6.2.32	Q(SVRXQ): Server-RX Queue	141
6.2.33	Q(SVTXQ): Server-TX Queue	141
6.2.34	V(TBN), P(TBN): Total fragment number of Cyclic-data on CM1 and CM2	141
6.2.35	V(TDT), P(TDT), T(TDT): Joining-token-detection-time	141
6.2.36	V(THT), P(THT), T(THT): Token-holding-time	142
6.2.37	V(TK): Token holding	142
6.2.38	V(TKH): Token holding node	142
6.2.39	V(TN): Node identifier number	142
6.2.40	V(TrWT), T(TrWT): Trigger-frame-transmission-waiting-time	142
6.2.41	V(TSZ), P(TSZ): Total cyclic-data size on CM1 and CM2	142
6.2.42	V(TW), P(TW), T(TW)(): Token-watchdog-time	142
6.2.43	V(VSEQ): Version of sequence number value List	142
6.3	Functions used in state tables	143
7	FAL service protocol machine (FSPM)	146
7.1	Overview	146
7.2	Cyclic-data protocol machine	146
7.2.1	Overview	146
7.2.2	Cyclic-data primitives between FAL user and FSPM	146
7.2.3	State table	147
7.3	Message data protocol machine	149
7.3.1	Overview	149
7.3.2	Message-data primitive between FAL user and FSPM	149
7.3.3	State table	153
7.4	Load measurement protocol machine	163
7.4.1	Overview	163
7.4.2	Load measurement primitives between FAL user and FSPM	163
7.4.3	State table	164
7.5	General purpose communication server protocol machine	168
7.5.1	Overview	168
7.5.2	GP command server primitives between FAL user and FSPM	168
7.5.3	State table	168
7.6	Network management protocol machine	170
7.6.1	Overview	170
7.6.2	Network management primitives	170
7.6.3	State table	171
8	Application relationship protocol machine (ARPM)	174
8.1	Overview	174
8.2	Cyclic-TX/RX control	175
8.2.1	Overview	175
8.2.2	Cyclic-TX/RX control primitives between FSPM and ARPM	175
8.2.3	State table	176
8.3	Message-TX/RX control	176
8.3.1	Overview	176
8.3.2	Message-TX/RX control primitives between FSPM and ARPM	176
8.3.3	State table	177
8.4	Command server TX/RX control	177
8.4.1	Overview	177
8.4.2	Command server TX/RX primitives between FSPM and ARPM	178

8.4.3	State table	178
8.5	AR control.....	178
8.5.1	Overview	178
8.5.2	AR control primitives between FSPM and ARPM.....	179
8.5.3	State table	179
9	DLL mapping protocol machine (DMPM).....	202
9.1	Overview.....	202
9.2	Mapping of DMPM service primitives and DLL service primitives.....	202
9.3	Mapping DMPM service port to DLSAP	204
9.4	Mapping of Network address to each node.....	204
	Bibliography.....	206
	Figure 1 – Bit identification in an octet	26
	Figure 2 – Bit identification in multiple octets (four-octet case).....	27
	Figure 3 – Data sharing with the CM	28
	Figure 4 – Protocol stack for Type 26 fieldbus	29
	Figure 5 – The structure of ASEs for Type 26 FAL	30
	Figure 6 – A token circulation on a logical ring.....	32
	Figure 7 – Logical ring recovery.....	34
	Figure 8 – An example in case of start simultaneously with another node	36
	Figure 9 – Start alone case.....	37
	Figure 10 – Node addition: in-ring start-up state	38
	Figure 11 – Data sharing with the CM	40
	Figure 12 – Configuration of the Common-memory	41
	Figure 13 – Example of train of multiple extended-cyclic-data frames	42
	Figure 14 – APDUs of cyclic-data frames containing fragmented data.....	43
	Figure 15 – Example of sequential diagram of ACK over UDP channel	46
	Figure 16 – Delivery confirmation checked by TCP protocol.....	47
	Figure 17 – Train of data frames and a token frame	49
	Figure 18 – Frame structure.....	50
	Figure 19 – Structure of Trans-msgData	70
	Figure 20 – Structure of B_BlK_Rd_rspData with M_RLT = 0	73
	Figure 21 – Structure of B_BlK_Rd_rspData in case of M_RLT = 1.....	73
	Figure 22 – Structure of B_BlK_Wt_reqDat.....	75
	Figure 23 – Structure of B_BlK_Wt_rspData in case of M_RLT = 1.....	75
	Figure 24 – Structure of W_BlK_Rd_rspData with M_RLT = 0	77
	Figure 25 – Structure of W_BlK_Rd_rspData in case of M_RLT = 1	77
	Figure 26 – Structure of W_BlK_Wt_reqDat.....	79
	Figure 27 – Structure of W_BlK_Wt_rspData in case of M_RLT = 1	79
	Figure 28 – Structure of Net-para-Rd-rspData with M_RLT = 0	81
	Figure 29 – Structure of Net-para-Rd-rspData with M_RLT = 1	82
	Figure 30 – Structure of Net-para-Wrt-reqData.....	84
	Figure 31 – Structure of Net-para-Wrt-rspData with M_RLT = 1	85
	Figure 32 – Structure of Stop-cmdData with M_RLT = 1.....	87

Figure 33 – Structure of Op-cmdData with M_RLT = 1	88
Figure 34 – Structure of Profile-readData with M_RLT = 0	90
Figure 35 – Structure of Profile-readData with M_RLT = 1	92
Figure 36 – Structure of Log-readData with M_RLT = 0.....	94
Figure 37 – Structure of Log-readData with M_RLT = 1.....	98
Figure 38 – Structure of Log-clearData	99
Figure 39 – Structure of Msg-return-reqData	101
Figure 40 – Structure of Msg-return-rspData	102
Figure 41 – Structure of V_msg_reqData	104
Figure 42 – Structure of V_msg_rspData in case of M_RLT = 0	104
Figure 43 – Structure of V_msg_rspData in case of M_RLT = 1	105
Figure 44 – Token-holding-time measurement result.....	109
Figure 45 – Structure of Sndr-logData.....	114
Figure 46 – Structure of Set-remote-node-config-para-ReqData.....	116
Figure 47 – Structure of Set-remote-node-config-para-RspData	117
Figure 48 – Structure of Read-rmt-partici-node-mgt-info-ReqData.....	119
Figure 49 – Structure of Read-rmt-partici-node-mgt-info-RspData	119
Figure 50 – Structure of Rmt-node-mgt-info-paraData.....	122
Figure 51 – Structure of Set-info-para-read-data	124
Figure 52 – Structure of ACKdata	128
Figure 53 – Structure of Ex-Net-para-Rd-rspData with M_RLT = 0	131
Figure 54 – Structure of Ex-Net-para-Rd-rspData with M_RLT = 1	132
Figure 55 – Structure of Ex-Net-para-Wrt-reqData	134
Figure 56 – Structure of Ex-Net-para-Wrt-rspData with M_RLT = 1	135
Figure 57 – Relationship between FAL protocol machines	136
Figure 58 – Overall structure of FSPM	146
Figure 59 – State transition diagram of Cyclic-data protocol machine.....	147
Figure 60 – State transition diagram of Message-data protocol machine	154
Figure 61 – State transition diagram of Load measurement protocol machine	164
Figure 62 – State transition diagram of GP-command-server protocol machine	169
Figure 63 – State transition diagram of Network management protocol machine	172
Figure 64 – Overall structure of ARPM.....	175
Figure 65 – State transition diagram of Cyclic-TX/RX control	176
Figure 66 – State transition diagram of Message-TX/RX control.....	177
Figure 67 – State transition diagram of Command server TX/RX protocol machine	178
Figure 68 – Overall state transition diagram of AR control protocol machine	180
Figure 69 – State transition diagram for message-data transmission.....	196
Figure 70 – State transition diagram for ACK creation and message-data reception.....	199
Figure 71 – Overall structure of DMPM	202
Figure 72 – DLSAP mapping.....	204
Figure 73 – Structure of IP address	205
Table 1 – Conventions used for state machines	25

Table 2 – Conventions used in state machine	25
Table 3 – Available functions to message-data transfer on UDP channel	44
Table 4 – Data transmission frame and the TCD value	50
Table 5 – Upper layer operating condition matrix	67
Table 6 – Transparent-msg-PDU specific values	70
Table 7 – Token-PDU specific values	71
Table 8 – Participation-req -PDU specific values	71
Table 9 – Byte-block-read-req-PDU specific values	72
Table 10 – Byte-block-read-rsp-PDU specific values	72
Table 11 – Byte-block-write-req-PDU specific values	74
Table 12 – Byte-block-write-rsp-PDU specific values	74
Table 13 – Word-block-read-req-PDU specific values	76
Table 14 – Word-block-read-rsp-PDU specific values	76
Table 15 – Word-block-write-req-PDU specific values	78
Table 16 – Word-block-write-rsp-PDU specific values	78
Table 17 – Network-parameter-read-req-PDU specific values	80
Table 18 – Network-parameter-read-rsp-PDU specific values	80
Table 19 – Values of data elements of Net-para-Rd-rspData	82
Table 20 – Network-parameter-write-req-PDU specific values	83
Table 21 – Network-parameter-write-rsp-PDU specific values	83
Table 22 – Values of the data elements of Net-para-Wrt-reqData	84
Table 23 – Stop-command-req-PDU specific values	85
Table 24 – Stop-command-rsp-PDU specific values	86
Table 25 – Operation-command-req-PDU specific values	87
Table 26 – Operation-command-rsp-PDU specific values	88
Table 27 – Profile-read-req-PDU specific values	89
Table 28 – Profile-read-rsp-PDU specific values	90
Table 29 – Trigger-PDU specific values	92
Table 30 – Log-data-read-req-PDU U specific values	93
Table 31 – Log-data-read-rsp-PDU specific values	93
Table 32 – Contents of Log-readData	94
Table 33 – Log-data-clear-req-PDU specific values	98
Table 34 – Log-data-clear-rsp-PDU specific values	99
Table 35 – Message-return-req-PDU specific values	100
Table 36 – Message-return-rsp-PDU specific values	100
Table 37 – Vendor-specific-msg-req-PDU specific values	102
Table 38 – Vendor-specific-msg-rsp-PDU specific values	103
Table 39 – Start-TK-hld-time-mrmt-req-PDU specific values	105
Table 40 – Start-TK-hld-time-mrmt-rsp-PDU specific values	106
Table 41 – Terminate-TK-hld-time-mrmt-req-PDU specific values	107
Table 42 – Terminate-TK-hld-time-mrmt-rsp-PDU specific values	108
Table 43 – Value of the data element of TK-hld-timeData	109
Table 44 – Start-GP_Comm-sndr-log-req-PDU specific values	110

Table 45 – Start-GP_Comm-sndr-log-rsp-PDU specific values	111
Table 46 – Terminate-GP_Comm-sndr-log-req-PDU specific values	112
Table 47 – Terminate-GP_Comm-sndr-log-req-PDU specific values	113
Table 48 – Value of the data element of Sndr-logData	114
Table 49 – Set-remote-node-config-para-req-PDU specific values	115
Table 50 – Set-remote-node-config-para-rsp-PDU specific values	115
Table 51 – Value of the data element of Set-remote-node-config-para-ReqData	116
Table 52 – Bit definition of Update flag	117
Table 53 – Value of the data element of Set-remote-node-config-para-RspData	117
Table 54 – Read-rmt-partici-node-mgt-info-para-req-PDU specific values	118
Table 55 – Read-rmt-partici-node-mgt-info-para-rsp-PDU specific values	118
Table 56 – Value of the data element of Read-rmt-partici-node-mgt-info-RspData	120
Table 57 – Read-rmt- node-mgt-info-para-req-PDU specific values	120
Table 58 – Read-rmt- node-mgt-info-para-rsp-PDU specific values	121
Table 59 – Value of the data element of Rmt-node-mgt-info-paraData	122
Table 60 – Bit definition of Node status	123
Table 61 – Read-rmt-node-set-info-para-req-PDU specific values	123
Table 62 – Read-rmt-node-set-info-para-rsp-PDU specific values	124
Table 63 – Value of the data element of Set-info-para-read-data	125
Table 64 – Rest-node-req-PDU specific values	125
Table 65 – Rest-node-rsp-PDU specific values	126
Table 66 – Cyclic-data-w/wo-ACK-PDU specific values	126
Table 67 – Extended-cyclic-data-PDU specific values	127
Table 68 – Value of the element of ACKdata	128
Table 69 – Value of R_STSx field	128
Table 70 – Extended-participation-req-PDU specific values	129
Table 71 – Extended-network-parameter-read-req-PDU specific values	130
Table 72 – Extended-network-parameter-read-rsp-PDU specific values	131
Table 73 – Values of data elements of Ex-Net-para-Rd-rspData	131
Table 74 – Ex-network-parameter-write-req-PDU specific values	133
Table 75 – Ex-network-parameter-write-rsp-PDU specific values	134
Table 76 – Values of data elements of Ex-Net-para-Wrt-reqData	135
Table 77 – Value of R_STSx field	137
Table 78 – Functions used in state tables	143
Table 79 – Cyclic-data primitives between FAL user and FSPM	147
Table 80 – State table of Cyclic-data protocol machine	148
Table 81 – Message-data primitives between FAL user and FSPM	150
Table 82 – State table of Message-data protocol machine	154
Table 83 – Load measurement primitives between FAL user and FSPM	163
Table 84 – State table of Load measurement protocol machine	164
Table 85 – GP command server primitives between FAL user and FSPM	168
Table 86 – State table of General purpose command server protocol machine	169
Table 87 – Primitives used in network management protocol machine	170

Table 88 – State table of Network management protocol machine.....	172
Table 89 – Cyclic-TX/RX control primitives between FSPM and ARPM	175
Table 90 – State table of Cyclic-TX/RX control.....	176
Table 91 – Message-TX/RX control primitives between FSPM and ARPM	177
Table 92 – State table of Message-TX/RX control	177
Table 93 – Command server TX/RX primitives between FSPM and ARPM	178
Table 94 – State table of Command server TX/RX protocol machine.....	178
Table 95 – AR control primitives between FSPM and ARPM	179
Table 96 – Overall AR control state table	181
Table 97 – State table for message-data transmission	196
Table 98 – State table for ACK creation and message-data reception	200
Table 99 – Mapping of DMPM primitives and DLL service primitives	203
Table 100 – Supposed Transport service primitives	203
Table 101 – Mapping of output and input ports to DL-SAP	204

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**INDUSTRIAL COMMUNICATION NETWORKS –
FIELDBUS SPECIFICATIONS –****Part 6-26: Application layer protocol specification –
Type 26 elements**

FOREWORD

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

IEC 61158-6-26 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 second edition cancels and replaces the first edition published in 2019. This edition constitutes a technical revision.

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

- a) expand Common-memory-area as a new Common-memory-area-3 (CM3);
- b) add new protocol elements with expansion of Common-memory-area:
 - Extended-cyclic-data transfer element;
 - Extended-participation-request element;
 - Extended-network-parameter-read element;
 - Extended-network-parameter-write element.

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

Draft	Report on voting
65C/1204/FDIS	65C/1245/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 61158 series, published under the general title *Industrial communication networks – Fieldbus specifications*, can be found on the IEC web site.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under 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.

INTRODUCTION

This part of IEC 61158 is one of a series produced to facilitate the interconnection of automation system components. It is related to other standards in the set as defined by the "three-layer" fieldbus reference model described in IEC 61158-1.

The application protocol provides the application service by making use of the services available from the data-link or other immediately lower layer. The primary aim of this document is to provide a set of rules for communication expressed in terms of the procedures to be carried out by peer application entities (AEs) at the time of communication. These rules for communication are intended to provide a sound basis for development in order to serve a variety of purposes:

- as a guide for implementers and designers;
- for use in the testing and procurement of equipment;
- as part of an agreement for the admittance of systems into the open systems environment;
- as a refinement to the understanding of time-critical communications within OSI.

This document is concerned, in particular, with the communication and interworking of sensors, effectors and other automation devices. By using this document together with other standards positioned within the OSI or fieldbus reference models, otherwise incompatible systems can work together in any combination.

INDUSTRIAL COMMUNICATION NETWORKS – FIELDBUS SPECIFICATIONS –

Part 6-26: Application layer protocol specification – Type 26 elements

1 Scope

1.1 General

The fieldbus Application Layer (FAL) provides user programs with a means to access the fieldbus communication environment. In this respect, the FAL can be viewed as a "window between corresponding application programs".

This part of IEC 61158 provides common elements for basic time-critical and non-time-critical messaging communications between application programs in an automation environment and material specific to Type 26 fieldbus. The term "time-critical" is used to represent the presence of a time-window, within which one or more specified actions are required to be completed with some defined level of certainty. Failure to complete specified actions within the time window risks failure of the applications requesting the actions, with attendant risk to equipment, plant and possibly human life.

This document defines in an abstract way the externally visible behavior provided by the Type 26 of the fieldbus Application Layer in terms of:

- the abstract syntax defining the application layer protocol data units conveyed between communicating application entities;
- the transfer syntax defining the application layer protocol data units conveyed between communicating application entities;
- the application context state machine defining the application service behavior visible between communicating application entities; and
- the application relationship state machines defining the communication behavior visible between communicating application entities.

The purpose of this document is to define the protocol provided to:

- define the wire-representation of the service primitives defined in IEC 61158-5-26, and
- define the externally visible behavior associated with their transfer.

This document specifies the protocol of the Type 26 fieldbus Application Layer, in conformance to the OSI Basic Reference Model (see ISO/IEC 7498-1) and the OSI Application Layer Structure (see ISO/IEC 9545).

FAL services and protocols are provided by FAL application-entities (AE) contained within the application processes. The FAL AE is composed of a set of object-oriented Application Service Elements (ASEs) and a Layer Management Entity (LME) that manages the AE. The ASEs provide communication services that operate on a set of related application process object (APO) classes. One of the FAL ASEs is a management ASE that provides a common set of services for the management of the instances of FAL classes.

Although these services specify, from the perspective of applications, how request and responses are issued and delivered, they do not include a specification of what the requesting and responding applications are to do with them. That is, the behavioral aspects of the applications are not specified; only a definition of what requests and responses they can send/receive is specified. This permits greater flexibility to the FAL users in standardizing such object behavior. In addition to these services, some supporting services are also defined in this document to provide access to the FAL to control certain aspects of its operation.

1.2 Specifications

The principal objective of this document is to specify the syntax and behavior of the application layer protocol that conveys the application layer services defined in IEC 61158-5-26.

A secondary objective is to provide migration paths from previously existing industrial communications protocols. It is this latter objective which gives rise to the diversity of protocols standardized in subparts of the IEC 61158-6 series.

1.3 Conformance

This document does not specify individual implementations or products, nor does it constrain the implementations of application layer entities within industrial automation systems.

There is no conformance of equipment to the application layer service definition standard. Instead, conformance is achieved through implementation of this application layer protocol specification.

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 61158-5-26:2023, *Industrial communication networks – Fieldbus specification – Part 5-26: Application layer service definition – Type 26 elements*

IEC 61784-2-21:2023, *Industrial networks – Profiles – Part 2-21: Additional real-time fieldbus profiles based on ISO/IEC/IEEE 8802-3 – CPF 21*

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

ISO/IEC/IEEE 8802-3, *Telecommunications and exchange between information technology systems – Requirements for local and metropolitan area networks – Part 3: Standard for Ethernet*

ISO/IEC 8822, *Information technology – Open Systems Interconnection – Presentation service definition*

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

ISO/IEC 8825-1, *Information technology – ASN.1 encoding rules: Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER) and Distinguished Encoding Rules (DER)*

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

ISO/IEC 9899, *Information technology – Programming languages – C*

IETF RFC 768, J. Postel, *User Datagram Protocol*, August 1980, available at <https://www.rfc-editor.org/info/rfc768> [viewed 2022-02-18]

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