DIN EN IEC 61804-4

ICS 35.060; 35.240.50

Ersatz für
DIN EN 61804-4:2016-08
Siehe Anwendungsbeginn

Geräte und Geräteintegration in Unternehmenssysteme – Funktionsbausteine für die Prozessautomation und elektronische Gerätebeschreibungssprache – Teil 4: Interpretation von Gerätebeschreibungen (IEC 61804-4:2020); Englische Fassung EN IEC 61804-4:2020

Devices and integration in enterprise systems –
Function blocks (FB) for process control and electronic device description language (EDDL) –
Part 4: EDD interpretation
(IEC 61804-4:2020);
English version EN IEC 61804-4:2020

Les dispositifs et leur intégration dans les systèmes de l'entreprise –
Blocs fonctionnels (FB) pour les procédés industriels et le langage de description électronique de produit (EDDL) –
Partie 4: Interprétation EDD
(IEC 61804-4:2020);
Version anglaise EN IEC 61804-4:2020

Gesamtumfang 143 Seiten

DKE Deutsche Kommission Elektrotechnik Elektronik Informationstechnik in DIN und VDE

Documents
Document Sharing Hub

Full document details: DIN EN IEC 61804-4:2021-08

Anwendungsbeginn

Anwendungsbeginn für die von CENELEC am 2020-07-29 angenommene Europäische Norm als DIN-Norm ist 2021-08-01.

Für DIN EN 61804-4:2016-08 besteht eine Übergangsfrist bis 2023-07-29.

Nationales Vorwort

Vorausgegangener Norm-Entwurf: E DIN EN IEC 61804-4:2020-12.

Für dieses Dokument ist das nationale Arbeitsgremium DKE/K 956 „Industrielle Kommunikation“ der DKE Deutsche Kommission Elektrotechnik Elektronik Informationstechnik in DIN und VDE (www.dke.de) zuständig.

Aktuelle Informationen zu diesem Dokument können über die Internetseiten von DKE (www.dke.de) und DIN (www.din.de) durch eine Suche nach der Dokumentennummer aufgerufen werden.

Die enthaltene IEC-Publikation wurde vom IEC/SC 65E „Devices and integration in enterprise systems“ erarbeitet und unterliegt dem Copyright der IEC.

Das IEC-Komitee hat entschieden, dass der Inhalt dieses Dokuments bis zu dem Datum (stability date) unverändert bleiben soll, das auf der IEC-Website unter „http://webstore.iec.ch“ zu diesem Dokument angegeben ist. Zu diesem Zeitpunkt wird entsprechend der Entscheidung des Komitees das Dokument

- bestätigt,
- zurückgezogen,
- durch eine Folgeausgabe ersetzt oder
- geändert.

Diese Ausgabe wurde durch Zusammenführung von Material aus verschiedenen Varianten bestehender EDDL-Spezifikationen erstellt, einschließlich denen von der FieldComm Group (Foundation™ Fieldbus[1], HART®[2]), PROFIBUS™[3] Nutzerorganisation e.V. (PNO) und ISA100_Wireless™[4] Compliance Institute (ISA100 WCI). Alle Stellen, an denen eine Profilabweichung vorliegen kann, sind nun in dem Kontext angegeben, in dem die relative Abweichung zu finden ist. Daher können die Formatierung und Nummerierung dieser Ausgabe von den einzelnen Spezifikationen, aus denen diese Ausgabe abgeleitet wurden, abweichen.

Zukünftige Normen dieser Reihe werden den neuen, allgemeinen Titel tragen, wie oben angegeben. Titel bestehender Normen dieser Reihe werden zum Zeitpunkt der nächsten Ausgabe aktualisiert.

Für den Fall einer undatierten Verweisung im normativen Text (Verweisung auf ein Dokument ohne Angabe des Ausgabedatums und ohne Hinweis auf eine Abschnittsnummer, eine Tabelle, ein Bild usw.) bezieht sich die Verweisung auf die jeweils aktuellste Ausgabe des in Bezug genommenen Dokuments.

---

1 FOUNDATION™ Fieldbus ist ein eingetragenes Warenzeichen der FieldComm Group. Diese Information dient nur zur Unterrichtung der Anwender dieses Dokuments und bedeutet keine Empfehlung des genannten Produkts durch IEC. Gleichwertige Produkte dürfen verwendet werden, wenn sie nachweisbar zu den gleichen Ergebnissen führen.

2 HART® ist ein eingetragenes Warenzeichen der FieldComm Group. Diese Information dient nur zur Unterrichtung der Anwender dieses Dokuments und bedeutet keine Empfehlung des genannten Produkts durch IEC. Gleichwertige Produkte dürfen verwendet werden, wenn sie nachweisbar zu den gleichen Ergebnissen führen.

3 PROFIBUS™ und PROFINET sind Warenzeichen der PROFIBUS Nutzerorganisation e.V. Diese Angabe dient nur der Unterrichtung der Anwender dieses Dokuments und bedeutet keine Empfehlung des genannten Produkts durch IEC. Gleichwertige Produkte dürfen verwendet werden, wenn sie nachweisbar zu den gleichen Ergebnissen führen.

4 ISA100_Wireless™ ist ein Warenzeichen des ISA100 Wireless Compliance Institute. Diese Information dient nur zur Unterrichtung der Anwender dieses Dokuments und bedeutet keine Empfehlung des genannten Produkts durch IEC. Gleichwertige Produkte dürfen verwendet werden, wenn sie nachweisbar zu den gleichen Ergebnissen führen.

Documents
Document Sharing Hub

Full document details: DIN EN IEC 61804-4:2021-08

Für den Fall einer datierten Verweisung im normativen Text bezieht sich die Verweisung immer auf die in Bezug genommene Ausgabe des Dokuments.

Der Zusammenhang der zitierten Dokumente mit den entsprechenden deutschen Dokumenten ergibt sich, soweit ein Zusammenhang besteht, grundsätzlich über die Nummer der entsprechenden IEC-Publikation. Beispiel: IEC 60068 ist als EN 60068 als Europäische Norm durch CENELEC übernommen und als DIN EN 60068 ins Deutsche Normenwerk aufgenommen.

Das Präsidium des DIN hat mit Präsidialbeschluss 1/2004 festgelegt, dass DIN-Normen, deren Inhalt sich auf internationale Arbeitsergebnisse der Informationsverarbeitung gründet, unter bestimmten Bedingungen allein in englischer Sprache veröffentlicht werden dürfen. Diese Bedingungen sind für die vorliegende Norm erfüllt.

Da sich die Benutzer der vorliegenden Norm der englischen Sprache als Fachsprache bedienen, wird die Englische Fassung der EN IEC 61804-4 veröffentlicht. Zu deren Einleitung, Abschnitt 1, der den Anwendungsbereich festlegt und Abschnitt 3 (außer Unterabschnitt 3.4), der die Begriffe, Begriffe zu modularen Geräten, Abkürzungen und Akronyme festlegt, wurde eine Übersetzung angefertigt und als informativer Nationaler Anhang NA der vorliegenden Norm hinzugefügt. Für die meisten der verwendeten Begriffe existieren keine gebräuchlichen deutschen Benennungen, da sich die deutschen Anwender in der Regel ebenfalls der englischen Benennungen bedienen. Diese Norm steht nicht in unmittelbarem Zusammenhang mit Rechtsvorschriften und ist nicht als Sicherheitsnorm anzusehen.

Das Original-Dokument enthält Tabellen und Bilder in Farbe, die in der Papierversion in einer Graustufen-Darstellung wiedergegeben werden. Elektronische Versionen dieses Dokuments enthalten die Tabellen und die Bilder in der originalen Farbdarstellung.

Änderungen

Gegenüber DIN EN 61804-4:2016-08 wurden folgende Änderungen vorgenommen:

a) die Kommunikationsprofile ISA100 und GPE wurden hinzugefügt;

b) eine Beschreibung der Regeln für ein Layout mit optimierter Spaltenbreite wurde hinzugefügt;

c) die Beschreibung der Verkettung von Labels und Hilfe wurde hinzugefügt;

d) Farbbänder für Diagramme vom Typ Meter wurden hinzugefügt.

Frühere Ausgaben

DIN EN 61804-4: 2016-08

AVA Documents
Document Sharing Hub

Full document details: DIN EN IEC 61804-4:2021-08

Nationaler Anhang NA
(informativ)

Auszugsweise Übersetzung

Reihenfolge und Inhalt der folgenden Abschnitte sind identisch mit denen in den jeweiligen Abschnitten der Englischen Fassung.

Einleitung

Dieser Teil von IEC 61804

- enthält eine Übersicht über die Anwendung von EDDL;
- gibt Beispiele, die die Anwendung der EDDL-Konstrukte zeigen;
- zeigt, wie die Anwendungsfälle erfüllt werden; und
- zeigt für jedes Beispiel die richtige Interpretation der EDD-Anwendung.

Dieser Teil von IEC 61804 ist keine EDDL-Anleitung und ist nicht dazu vorgesehen, die EDDL-Spezifikation zu ersetzen.

Es werden Anweisungen für die EDD-Anwendung gegeben, die beschreiben, was ausgeführt wird, ohne die für die Host-Implementierung anzuwendende Technologie vorzuschreiben. So beschreibt z. B. das FILE-Konstrukt Daten, die von der EDD-Anwendung im Namen der EDD gespeichert werden. Das FILE-Konstrukt legt nicht fest, wie die Daten gespeichert werden. Die EDD-Anwendung kann je nach Wahl eine Datenbank, eine flache Datei (en: flat file) oder irgendeine andere Implementierung nutzen.

Die EDDL-Funktionen sind für jede der Kommunikationstechnologien durch das Profil begrenzt. Die Beschreibungen in diesem Teil von IEC 61804 beziehen sich auf diese Merkmale in einem allgemeinen Sinn, und nicht alle Kommunikationstechnologien unterstützen alle beschriebenen Merkmale. Um die von den einzelnen Kommunikationstechnologien unterstützten Merkmale zu verstehen, muss auf die Profildefinitionen in IEC 61804-3 verwiesen werden.

Documents
Document Sharing Hub

Full document details: DIN EN IEC 61804-4:2021-08

1 Anwendungsbereich

In diesem Teil von IEC 61804 wird die EDD-Interpretation für EDD-Anwendungen und EDDS zur Unterstützung der EDD-Interoperabilität festgelegt. Dieses Dokument soll sicherstellen, dass Feldgeräteentwickler die EDDL-Konstrukte in gleichbleibender Weise nutzen und dass die EDD-Anwendungen die EDD in gleicher Weise interpretieren. Es ergänzt die EDDL-Spezifikation, um die Interoperabilität von EDDL-Anwendungen zu fördern und die Übertragbarkeit der EDD zwischen EDDL-Anwendungen zu verbessern.

3 Begriffe, Abkürzungen, Akronyme und Konventionen

3.1 Allgemeine Begriffe

Für die Anwendung dieses Dokuments gelten die Begriffe nach IEC 61804-3 und die folgenden Begriffe.

ISO und IEC stellen terminologische Datenbanken für die Verwendung in der Normung unter den folgenden Adressen bereit:

- IEC Electropedia: verfügbar unter http://www.electropedia.org/
- ISO Online Browsing Platform: verfügbar unter http://www.iso.org/obp

3.1.1
EDD-Entwickler
en: EDD developer
Einzelperson oder Arbeitsgruppe, die eine EDD entwickelt

3.1.2
Container
en: container
Benutzerschnittstellenelemente, die andere Benutzerschnittstellenelemente enthalten

Anmerkung 1 zum Begriff: Zu den Containern können Menüs, Fenster, Dialoge, Tabellen, Seiten, Gruppen und andere Container gehören.

3.1.3
enthaltenes Objekt
en: contained item
Benutzerschnittstellenelemente, die in Containern enthalten sein können

Anmerkung 1 zum Begriff: Zu den enthaltenen Objekten können Variablen, Methoden, Graphen, Diagramme, Bilder und statischer Text gehören.

3.1.4
Geräteentwickler
en: device developer
Einzelperson oder Arbeitsgruppe, die ein Gerät und eine EDD zur Beschreibung dieses Geräts entwickelt

3.1.5
Organizer
en: handheld
Gerät mit begrenzter Anzeigenauflösung, die eine Beschränkung für die Benutzerschnittstelle von EDD-Anwendungen darstellt

3.2 Begriffe zu modularen Geräten

3.2.1
Kanal
en: channel
Verbindung zu einem Prozess, der gemessen oder gesteuert bzw. geregelt wird

AVA Documents
Document Sharing Hub

Full document details: DIN EN IEC 61804-4:2021-08

3.2.2
Komponente
en: component
Software- oder Hardware-Objekt, das im Konzept des modularen Geräts enthalten ist

Anmerkung 1 zum Begriff: Eine Komponente kann nicht getrennt von dem sie hostenden modularen Gerät funktionieren. Eine Komponente darf einen oder mehrere Typen modularer Geräte unterstützen.

3.2.3
Schnittstelle
en: interface
grundlegende Erklärungen von Basiskonstrukten

Anmerkung 1 zum Begriff: Eine Schnittstelle legt alle öffentlichen Teile fest, die von den Komponenten genutzt werden dürfen.

3.2.4
modales Fenster
en: modal window
Nachfolgerfenster, mit dem die Benutzer interagieren müssen, bevor sie zum Betrieb der Hauptanwendung zurückkehren können, wodurch der Arbeitsfluss auf dem Anwendungshauptfenster unterbrochen wird

3.2.5
modulares Gerät
en: modular device
Gerät, das eine Vielzahl von Software- und/oder Hardware-Komponenten enthalten kann

3.3 Abkürzungen und Akronyme

CP	Kommunikationsprofil en: Communication Profile
CPF	Kommunikationsprofilfamilie en: Communication Profile Family
CS	Kommunikationsserver en: Communication Server
EDD	elektronische Gerätebeschreibung en: Electronic Device Description
EDDL	elektronische Gerätebeschreibungssprache en: Electronic Device Description Language
FDI	Feldgeräteintegration en: Field Device Integration
FF	Foundtion Fieldbus en: Foundation Fieldbus
GPE	Allgemeine Protokoll-Erweiterungen en: Generic Protocol Extensions
HART	Highway Addressable Remote Transducer
ISA100	ISA100_Wireless™ en: Wireless™
PB	PROFIBUS
PC	Arbeitsplatzrechner en: Personal Computer

Documents
Document Sharing Hub
Full document details: DIN EN IEC 61804-4:2021-08

PI	PROFIBUS und PROFINET International
PI PROFILE PA	PI-spezifisches Profil für zur Prozessautomation dienende Feldgeräte en: PI specific profile for Process Automation field devices
PN	PROFINET

Documents
Document Sharing Hub

Full document details: DIN EN IEC 61804-4:2021-08

– Leerseite

Documents
Document Sharing Hub

Full document details: DIN EN IEC 61804-4:2021-08

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN IEC 61804-4

August 2020

ICS 25.040.40; 35.240.50

Supersedes EN 61804-4:2016 and all of its amendments and corrigenda (if any)

English Version

Devices and integration in enterprise systems - Function blocks (FB) for process control and electronic device description language (EDDL) - Part 4: EDD interpretation (IEC 61804-4:2020)

Les dispositifs et leur intégration dans les systèmes de l'entreprise - Blocs fonctionnels (FB) pour les procédés industriels et le langage de description électronique de produit (EDDL) - Partie 4: Interprétation EDD (IEC 61804-4:2020)

Geräte und Geräteintegration in Unternehmenssysteme – Funktionsbausteine für die Prozessautomation und elektronische Gerätebeschreibungssprache - Teil 4: Interpretation von Gerätebeschreibungen (IEC 61804-4:2020)

This European Standard was approved by CENELEC on 2020-07-29. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Documents
Document Sharing Hub

Full document details: DIN EN IEC 61804-4:2021-08

European foreword

The text of document 65E/633/CDV, future edition 2 of IEC 61804-4, prepared by SC 65E "Devices and integration in enterprise systems" 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 61804-4:2020.

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) 2021-04-29
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2023-07-29

This document supersedes EN 61804-4:2016 and all of its amendments and corrigenda (if any).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

Endorsement notice

The text of the International Standard IEC 61804-4:2020 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 standards indicated:

IEC 61804-2:2018	NOTE	Harmonized as EN IEC 61804-2:2018 (not modified)
IEC 62769-100[5]	NOTE	Harmonized as EN IEC 62769-100[6]
IEC 62769-115-2	NOTE	Harmonized as EN IEC 62769-115-2[7]

[5] To be published. Stage at the time of publication: IEC AFDIS 62769-100:2020.

[6] To be published. Stage at the time of publication: FprEN IEC 62769-100:2020.

[7] To be published. Stage at the time of publication: FprEN IEC 62769-115-2:2020.

Documents
Document Sharing Hub

Full document details: DIN EN IEC 61804-4:2021-08

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.

Publication	Year	Title	EN/HD	Year
IEC 61784-1	–	Industrial communication networks – Profiles Part 1: Fieldbus profiles	EN IEC 61784-1	–
IEC 61784-2	–	Industrial communication networks – Profiles – Part 2: Additional fieldbus profiles for real-time networks based on ISO/IEC/IEEE 8802-3	EN IEC 61784-2	–
IEC 61804-3	–	Devices and integration in enterprise systems – Function blocks (FB) for process control and electronic device description language (EDDL) – Part 3: EDDL syntax and semantics	EN IEC 61804-3	–
IEC 61804-5	–	Devices and intergration in enterprise systems – Function blocks (FB) for process control and electronic device description language (EDDL) – Part 5: EDDL Builtin library	EN IEC 61804-5	–
IEC 62734	–	Industrial networks – Wireless communication network and communication profiles – ISA 100.11a	EN 62734	–
IEC 62769-4[Z1]	–	Field Device Integration (FDI) – Part 4: FDI Packages	EN 62769-4[Z2]	–
IEC 62769-7[Z3]	–	Field Device Integration (FDI) – Part 7: FDI Communication Devices	EN 62769-7[Z4]	–

[Z1] To be published. Stage at the time of publication: IEC RFDIS 62769-4:2020.

[Z2] To be published. Stage at the time of publication: prEN 62769-4:2018.

[Z3] To be published. Stage at the time of publication: IEC RFDIS 62769-7:2020.

[Z4] To be published. Stage at the time of publication: prEN 62769-7:2018.

Documents
Document Sharing Hub

Full document details: DIN EN IEC 61804-4:2021-08

CONTENTS

European foreword 10
Annex ZA (normative) Normative references to international publications with their corresponding European publications 11
INTRODUCTION 19
1 Scope 20
2 Normative references 20
3 Terms, definitions, abbreviated terms acronyms and conventions 20
3.1 General terms and definitions 20
3.2 Terms and definitions related to modular devices 21
3.3 Abbreviated terms and acronyms 21
3.4 Conventions 22
4 EDDL user interface description 22
4.1 Overview 22
4.2 Menu conventions for handheld applications 23
4.3 Menu conventions for PC-based applications 23
4.3.1 Overview 23
4.3.2 Online root menus 24
4.3.3 Offline root menu 25
4.3.4 Example of EDD menu structure 25
4.3.5 User interface 30
4.4 Label concatenation for indirect variable references 34
4.4.1 General 34
4.4.2 Simple variable references 35
4.4.3 Complex variable references 35
4.5 Help concatenation 37
4.5.1 General 37
4.5.2 Simple variable references 37
4.5.3 Complex variable references 38
4.6 Containers and contained items 39
4.6.1 Overview 39
4.6.2 Permitted and default STYLEs 39
4.6.3 Containers 41
4.6.4 Contained items 43
4.7 Layout rules 49
4.7.1 Overview 49
4.7.2 Controlling the layout by LAYOUT_TYPE attribute 50
4.7.3 Layout rules for WIDTH and HEIGHT 53
4.7.4 Layout rules for COLUMNBREAK and ROWBREAK 57

Documents
Document Sharing Hub
Full document details: DIN EN IEC 61804-4:2021-08

4.7.5 Layout examples 62
4.7.6 Conditional user interface 76
4.8 Graphical elements 82
5 EDDL data description 86
5.1 EDDL application stored device data 86
5.1.1 Overview 86
5.1.2 FILE 86
5.1.3 LIST 88
5.2 Exposing data items outside the EDD application 94
5.3 Initialization of EDD instances 95
5.3.1 Overview 95
5.3.2 Initialization support 95
5.3.3 TEMPLATE 95
5.4 Device model mapping 95
5.4.1 BLOCK_A 95
5.4.2 BLOCK_B 96
6 EDDL METHOD programming and usage of builtins 96
6.1 Method environment 96
6.1.1 General 96
6.1.2 Security 96
6.1.3 Device data 97
6.1.4 Method TYPE and parameters 97
6.1.5 Abort processing 98
6.2 Implementation requirements 98
6.3 Builtin MenuDisplay 99
6.4 Division by zero and undetermined floating values 101
6.4.1 Integer and unsigned integer values 101
6.4.2 Floating-point values 101
7 Modular devices 102
7.1 Overview 102
7.2 EDD identification 102
7.3 Instance object model 102
7.4 Offline configuration 103
7.5 Online configuration 103
7.6 Simple modular device example 103
7.6.1 General 103
7.6.2 Separate EDD file example with direct EDD referencing 104
7.6.3 Separate EDD file example with classification EDD referencing and interfaces 106
7.6.4 One EDD file example 109

Documents
Document Sharing Hub

Full document details: DIN EN IEC 61804-4:2021-08

7.6.5 Combination of single and separate modular device example ... 110
7.7 Upload and download for modular devices ... 110
7.8 Diagnostic ... 111
7.9 Reading modular device topology ... 111
7.9.1 SCAN ... 111
7.9.2 Detect module type ... 113
7.10 Configuration check ... 113
8 Session management ... 114
8.1 Overview ... 114
8.2 Data management ... 114
8.2.1 Overview ... 114
8.2.2 Caching for online session ... 115
8.2.3 Caching for offline session ... 116
8.2.4 Caching for dialogs and windows ... 117
8.2.5 Caching for METHODs ... 117
8.3 UI aspects of editing sessions ... 120
8.4 User roles ... 121
9 Offline and online configuration ... 121
9.1 Overview ... 121
9.2 Offline dataset ... 122
9.3 Offline configuration ... 122
9.4 Online dataset ... 122
9.5 Online configuration ... 122
9.6 Upload and download ... 123
9.6.1 Overview ... 123
9.6.2 Error recovery ... 124
9.6.3 Upload procedure ... 124
9.6.4 Download procedure ... 126
10 EDDL communication description ... 128
10.1 General ... 128
10.2 Parsing data received from the device ... 128
10.3 Parsing complex data items ... 129
10.4 Foundation Fieldbus ... 129
10.5 ISA100_Wireless communication model ... 133
Annex A (normative) Device simulation ... 136
Annex B (informative) Predefined identifiers ... 137
Annex C (informative) Description of EDDL profiles ... 140
C.1 Communication Server (CS) ... 140
C.2 Foundation Fieldbus (FF) ... 140

Documents
Document Sharing Hub

Full document details: DIN EN IEC 61804-4:2021-08

C.3 Generic Protocol Extension (GPE) 140
C.4 HART 140
C.5 ISA100 140
C.6 PROFIBUS (PB) 140
C.7 PROFINET (PN) 140
Annex D (normative) Upload/download caching model 141
Bibliography 143

Figure 1 – EDD example of root menus 30
Figure 2 – Example of an EDD application for diagnostics 31
Figure 3 – Example of an EDD application for process variables 32
Figure 4 – Example of an EDD application for primary variables 32
Figure 5 – Example of an EDD application for process-related device features 33
Figure 6 – Example of an EDD application for device features 33
Figure 7 – Example of an EDD application for maintenance features 34
Figure 8 – Usage of COLLECTION MEMBERS in MENUs of STYLE GROUP 42
Figure 9 – Displaying single bits of BIT_ENUMERATED 44
Figure 10 – Displaying multiple bits of BIT_ENUMERATED 45
Figure 11 – Example of an EDD application for a variable of type BIT_ENUMERATED 45
Figure 12 – EDD example with a "write-only" variable (HANDLING WRITE) 46
Figure 13 – Basic layout elements 49
Figure 14 – Example of layout with equal column width 51
Figure 15 – Example of layout with optimized column width 51
Figure 16 – Cell body in a layout with optimized column width (label to the left) 52
Figure 17 – Cell body in a layout with optimized column width (label on top) 52
Figure 18 – EDD source code for a layout with VARIABLEs spanning columns 55
Figure 19 – Layout with VARIABLEs spanning multiple columns 56
Figure 20 – EDD source code for layout for protruding elements example 57
Figure 21 – Layout for protruding elements 57
Figure 22 – EDD source code for layout for partially filled rows example 58
Figure 23 – Layout for partially filled rows 58
Figure 24 – EDD source code for layout for partially filled rows example 59
Figure 25 – Layout for partially filled rows 59
Figure 26 – EDD source code for layout for oversized elements example 60
Figure 27 – Oversized element in a layout with equal column width 60
Figure 28 – Oversized element in a layout with optimized column width 60
Figure 29 – EDD source code example for a layout for columns in stacked group 61
Figure 30 – Layout for columns in stacked group 61
Figure 31 – EDD source code for layout for columns with GRAPHs in stacked group example 62

Documents
Document Sharing Hub
Full document details: DIN EN IEC 61804-4:2021-08

Figure 32 – Layout for columns with GRAPHs in stacked group 62
Figure 33 – Example of an EDD for an overview menu 63
Figure 34 – Example of an EDD application for an overview window 63
Figure 35 – EDD source code for a layout with menu items spanning a single column 63
Figure 36 – Example of a layout with menu items spanning a single column 64
Figure 37 – Example of an EDD using COLUMNBREAK 64
Figure 38 – Example of an EDD application for an overview window 65
Figure 39 – EDD example for an overview window 65
Figure 40 – Example of an EDD application for an overview window 66
Figure 41 – EDD source code for a layout with small in-line images 66
Figure 42 – Example of a layout with small in-line images 67
Figure 43 – EDD source code for a multi-column layout with GROUP 68
Figure 44 – Example of a multi-column layout with GROUP 69
Figure 45 – Example of an EDD for in-line graphs and charts 69
Figure 46 – Example of an EDD application for an in-line graph 70
Figure 47 – Example of an EDD for full-width graphs and charts 70
Figure 48 – Example of an EDD application for a full-width graph in a layout with equal column width 71
Figure 49 – Example of an EDD application for a full-width graph in a layout with optimized column width 71
Figure 50 – Example of an EDD for nested containers 72
Figure 51 – Example of an EDD application for nested containers 73
Figure 52 – Example of an EDD for EDIT_DISPLAYS 73
Figure 53 – Example of an EDD application for EDIT_DISPLAYS 74
Figure 54 – Example of an EDD for images 74
Figure 55 – Example of an EDD application for images 75
Figure 56 – Example of an EDD for large inline-images 75
Figure 57 – Example of layout with a large inline-image 76
Figure 58 – EDD example for VALIDITY in online session 77
Figure 59 – Example of an EDD application for a gauge with limit regions 83
Figure 60 – Example of an EDD for a gauge with limit regions 85
Figure 61 – Example of a file declaration 87
Figure 62 – Example of comparing valve signatures 88
Figure 63 – Example of more complex file declaration 89
Figure 64 – Example of reviewing the stored radar signals 90
Figure 65 – Example of an EDD that inserts, replaces, or compares radar signals 94
Figure 66 – Example of a BLOCK_A 96
Figure 67 – Example of a wizard 100
Figure 68 – The different relations of a module 103
Figure 69 – Components and possible configuration of the modular devices 104

Documents
Document Sharing Hub

Full document details: DIN EN IEC 61804-4:2021-08

Figure 70 – Separate EDD file example with direct EDD referencing 105
Figure 71 – EDD example for module1 106
Figure 72 – EDD example for module2 106
Figure 73 – EDD example for modular device 107
Figure 74 – EDD example for module1 108
Figure 75 – EDD example for module2 108
Figure 76 – EDD example for module2 110
Figure 77 – Upload/download order of a modular device 110
Figure 78 – Example of a SCAN METHOD 112
Figure 79 – Example of a DETECT METHOD 113
Figure 80 – Example of a CHECK_CONFIGURATION METHOD 114
Figure 81 – Data caching for an online session 116
Figure 82 – Data caching for an offline session 116
Figure 83 – Sub dialogs or windows using a shared edit cache 117
Figure 84 – Sub dialogs or windows using separate edit caches 117
Figure 85 – Data caching for nested METHODs 118
Figure 86 – Data caching for a METHOD invoked within a dialog or window 118
Figure 87 – Data caching for a METHOD invoking a dialog using an edit cache 119
Figure 88 – Data caching for a METHOD invoking a dialog 119
Figure 89 – Data flow for download to the device 123
Figure 90 – Data flow for upload from the device 123
Figure 91 – Example device with 2 unique BLOCK_A definitions 130
Figure 92 – Example EDD for a device with 2 unique BLOCK_A definitions 131
Figure 93 – BLOCK_A example with PARAMETER_LISTS 132
Figure 94 – Example EDD for a BLOCK_A with PARAMETER_LISTS 133
Figure 95 – Example ISA100_Wireless device objects representation 134
Figure 96 – Example EDD for a ISA100_Wireless device with 2 unique BLOCK_A definitions 134
Figure 97 – BLOCK_A example with PARAMETER_LISTS 135
Figure 98 – Example EDD for a BLOCK_A with PARAMETER_LISTS 135
Figure D.99 – Upload caching model 141
Figure D.100 – Download caching model 142

Table 1 – List of defined root menu identifiers for handhelds 23
Table 2 – List of defined root menu identifiers for PC-based devices 24
Table 3 – Fall back alternatives for online root menus 24
Table 4 – Fall back alternatives for offline root menus 25
Table 5 – Label rule summary for simple variable references 35
Table 6 – Label rule summary for simple variable references 35

Documents
Document Sharing Hub
Full document details: DIN EN IEC 61804-4:2021-08

Table 7 – Prefix rule summary for complex variable references 36
Table 8 – Prefix rule summary for complex variable references 36
Table 9 – Body rule summary for complex variable references 36
Table 10 – Body rule summary for complex variable references 36
Table 11 – Suffix rule summary for complex variable references 37
Table 12 – Suffix rule summary for complex variable references 37
Table 13 – Help rule summary for simple variable references 37
Table 14 – Help rule summary for simple variable references 37
Table 15 – Help prefix rule summary for complex variable references 38
Table 16 – Help prefix rule summary for complex variable references 38
Table 17 – Help suffix rule summary for complex variable references 38
Table 18 – Help suffix rule summary for complex variable references 38
Table 19 – Permitted contained items and default STYLES 40
Table 20 – Uninitialized state of VARIABLEs on user interface 43
Table 21 – Example of "write-only" variable in an online dialog 47
Table 22 – Description of layout content 50
Table 23 – Minimum and maximum width for input fields spanning one column 52
Table 24 – WIDTH and HEIGHT span and applicability 54
Table 25 – Example 1 VALIDITY in an online session 78
Table 26 – Example 2 VALIDITY in an online session 79
Table 27 – Example 3 VALIDITY in an online session 80
Table 28 – Example 4 VALIDITY in an online session 81
Table 29 – Examples of floating-point results 101
Table 30 – Usages of COMPONENT_PATH 102
Table 31 – Diagnostic classifications 111
Table 32 – Terminology for session management 114
Table 33 – Terminology used in data management 115
Table 34 – Builtins for method cache controlling 120
Table 35 – List of defined upload menu identifiers 124
Table 36 – List of defined download menu identifiers 126
Table B.1 – ARRAY predefined identifiers 137
Table B.2 – COLLECTION predefined identifiers 137
Table B.3 – COMMAND predefined identifiers 137
Table B.4 – IMAGE predefined identifiers 137
Table B.5 – MENU predefined identifiers 138
Table B.6 – METHOD predefined identifiers 139
Table B.7 – VARIABLE predefined identifiers 139

Documents
Document Sharing Hub

Full document details: DIN EN IEC 61804-4:2021-08

INTRODUCTION

This part of IEC 61804

- contains an overview of the use of EDDL;
- provides examples demonstrating the use of the EDDL constructs;
- shows how the use cases are fulfilled; and
- shows the proper EDD application interpretation for each example.

This part of IEC 61804 is not an EDDL tutorial and is not intended to replace the EDDL specification.

Instructions are provided for the EDD application, which describe what will be performed without prescribing the technology used in the host implementation. For example, the FILE construct describes data that is stored by the EDD application on behalf of the EDD. The FILE construct does not specify how the data is stored. The EDD application can use a database, a flat file, or any other implementation it chooses.

EDDL features are limited by profile for each of the communication technologies. The descriptions in this part of IEC 61804 refer to these features in a general sense and not all communication technologies will support all of the features described. The profile definitions in IEC 61804-3 are referred to in order to understand the features supported by each communication technology.

AVA Documents
Document Sharing Hub

DEVICES AND INTEGRATION IN ENTERPRISE SYSTEMS – FUNCTION BLOCKS (FB) FOR PROCESS CONTROL AND ELECTRONIC DEVICE DESCRIPTION LANGUAGE (EDDL) –

Part 4: EDD interpretation

1 Scope

This part of IEC 61804 specifies EDD interpretation for EDD applications and EDDs to support EDD interoperability. This document is intended to ensure that field device developers use the EDDL constructs consistently and that the EDD applications have the same interpretations of the EDD. It supplements the EDDL specification to promote EDDL application interoperability and improve EDD portability between EDDL applications.

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.

IEC 61784-1, *Industrial communication networks – Profiles – Part 1: Fieldbus profiles*

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

IEC 61804-3, *Devices and integration in enterprise systems – Function blocks (FB) for process control and electronic device description language (EDDL) – Part 3: EDDL syntax and semantics*

IEC 61804-5, *Devices and integration in enterprise systems – Function blocks (FB) for process control and electronic device description language (EDDL) – Part 5: EDDL Builtin library*

IEC 62734, *Industrial networks – Wireless communication network and communication profiles – ISA 100.11a*

IEC 62769-4[8], *Field Device Integration (FDI) – Part 4: FDI Packages*

IEC 62769-7[9], *Field Device Integration (FDI) – Part 7: FDI Communication devices*

3 Terms, definitions, abbreviated terms acronyms and conventions

3.1 General terms and definitions

For the purposes of this document, the terms and definitions given in IEC 61804-3 and the following apply.

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

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

[8] Under preparation. Stage at the time of publication: IEC RFDIS 62769-4:2020.

[9] Under preparation. Stage at the time of publication: IEC RFDIS 62769-7:2020.

Documents
Document Sharing Hub

Full document details: DIN EN IEC 61804-4:2021-08

3.1.1
EDD developer
individual or team that develops an EDD

3.1.2
container
user interface elements that contain other user interface elements

Note 1 to entry: Containers can include menus, windows, dialogs, tables, pages, groups, and other containers.

3.1.3
contained item
user interface elements that can be contained in containers

Note 1 to entry: Contained items can include variables, methods, graphs, charts, images, static text.

3.1.4
device developer
individual or team that develops a device and an EDD that describes the device

3.1.5
handheld
device with limited display resolution that restricts EDD applications user interface

3.2 Terms and definitions related to modular devices

3.2.1
channel
connection to a process that is being measured or controlled

3.2.2
component
software or hardware item contained within the modular device concept

Note 1 to entry: A component cannot function separately from a modular device hosting it. A component may support one or more types of modular devices.

3.2.3
interface
basic declarations of basic constructs

Note 1 to entry: An interface defines all public parts that components may use.

3.2.4
modal window
child window that requires users to interact with it before they can return to operating the parent application, thus preventing the workflow on the application main window

3.2.5
modular device
device that can contain a variety of software and/or hardware components

3.3 Abbreviated terms and acronyms

CP	Communication Profile
CPF	Communication Profile Family
CS	Communication Server
EDD	Electronic Device Description

Documents
Document Sharing Hub
Full document details: DIN EN IEC 61804-4:2021-08

EDDL	Electronic Device Description Language
FDI	Field Device Integration
FF	Foundation Fieldbus
GPE	Generic Protocol Extension
HART	Highway Addressable Remote Transducer
ISA100	ISA100_Wireless™
PB	PROFIBUS
PC	Personal computer
PI	PROFIBUS and PROFINET International
PI PROFILE PA	PI specific profile for Process Automation field devices
PN	PROFINET

3.4 Conventions

There exists some differences using and interpreting EDDL based on the used communication network and device model. Annex C includes a description of each of the EDDL profiles.

The different communication networks used within this part of IEC 61804 are:

- HART (according to IEC 61784-1 CPF9)
- FOUNDATION fieldbus (according to IEC 61784-1 CPF1)
- PROFIBUS (according to IEC 61784-1 CPF3)
- PROFINET (according to IEC 61784-2 CPF3)
- Communication Server
  - IEC 62769-4 FDI Technical Specification: Part 4: FDI Packages
  - IEC 62769-7 FDI Technical Specification: Part 7: Communication Devices
- ISA100_Wireless (according to IEC 62734)
- GPE (Generic Protocol Extension)
  - IEC 62769-4 FDI Technical Specification: Part 4: FDI Packages
  - IEC 62769-7 FDI Technical Specification: Part 7: Communication Devices.

EDD examples in this document show parts of EDD implementations and are incomplete.

EDDL keywords are written in upper case letters. If more than one basic construct item is meant the keyword is written in uppercase letters added with a lower case ‘s’ for example VARIABLEs.

The capitalized word Builtin refers to functions specified in IEC 61804-5.

EXAMPLE Builtin MenuDisplay refers to the Builtin named MenuDisplay specified in IEC 61804-5.

4 EDDL user interface description

4.1 Overview

Most EDD applications can be characterized as either a PC application or a handheld application. Due to the relatively small screen of a handheld device, handheld applications can only display a small amount of

Documents
Document Sharing Hub
Full document details: DIN EN IEC 61804-4:2021-08

information at any given time. On the other hand, PC applications can provide a much more beneficial user interface, largely due to their larger screen size.

To support the capabilities of PC applications, the MENU construct has been extended in IEC 61804-3 compared to previous definitions in IEC 61804-2:2004. Due to the differences in the user interfaces of PC applications and handheld applications, it is expected that many devices will define two MENU hierarchies – one for handheld applications and the other for PC applications. Some MENUs may be used in both hierarchies. Therefore, the entire hierarchy does not need to be specified twice.

Different menu structures for different classes of applications are possible. This document shall be used to create menu structures in an EDD that are interpreted by applications in an unambiguous way. To provide interoperability across applications, this document shall be followed. Annex B lists predefined identifiers that may be used by EDD applications to access standardized information.

4.2 Menu conventions for handheld applications

EDD applications use specific menus in the EDDs to show the user interface of the device (see Table 1). In addition, user interface items can be described for handhelds and PCs at once. For handhelds, strings can have beside a language code, a specific country code zz to specify shorter strings or lower resolution images (see IEC 61804-3). In order to fit in a limited display space, a handheld application may render all menus using STYLE TABLE. Handheld applications shall render references to images in MENUs of STYLE TABLE always as hyperlink.

Table 1 – List of defined root menu identifiers for handhelds

Menu identifier	Default STYLE	Short description
root_menu	TABLE	Handheld root menu for HART devices. This is mandatory for all HART EDDs.
Menu_Top*	TABLE	Legacy root menu prefix for BLOCK_A MENU_ITEMs for FOUNDATION fieldbus and ISA100_Wireless devices e.g. Menu_Top_TB.
offline_root_menu	TABLE	Offline configuration. Handhelds may optionally support this menu.
hh_process_variables_root_menu	TABLE	Process variable views for FOUNDATION fieldbus and HART devices.
hh_device_root_menu	TABLE	Device feature views for set up for FOUNDATION fieldbus and HART devices.
hh_diagnostic_root_menu	TABLE	Diagnostic views for FOUNDATION fieldbus and HART devices.

4.3 Menu conventions for PC-based applications

4.3.1 Overview

EDD applications use special menus in the EDDs to show the user interface of the device. Such menus are defined for diagnostic, process variables, device features, and offline configuration. Table 2 defines identifiers for the different root menus with its default STYLEs. The default STYLE is used by the EDD application if the STYLE attribute is not defined in the MENU. The “Usage” column in Table 2 defines how the EDD application has online or offline access to the device parameter (see Clause 8).

Documents
Document Sharing Hub
Full document details: DIN EN IEC 61804-4:2021-08

Table 2 – List of defined root menu identifiers for PC-based devices

MENU identifier	Default STYLE	Usage	Short description
device_root_menu	MENU	Online	Device feature views for set up
diagnostic_root_menu	MENU	Online	Diagnostic views
maintenance_root_menu	MENU	Online	Maintenance feature views
offline_root_menu	TABLE	Offline	Offline configuration
process_variables_root_menu	MENU	Online	Process variable views

For HART EDDs, the EDD application shall display offline_root_menu with a default STYLE WINDOW if STYLE is not defined.

PROFIBUS and PROFINET allow in submenus to define different parameter access by defining ACCESS ONLINE or ACCESS OFFLINE.

The EDDs should contain the online root menus from Table 2. The online root menus are optional for PROFIBUS, PROFINET and FOUNDATION fieldbus. The offline root menu is optional for FOUNDATION fieldbus and ISA100_Wireless. HART EDDs shall have root_menu, in addition to all root menus in Table 2. GPE shall have at least one Online menu. GPE shall have the offline_root_menu. Communication Server shall have at least one Online menu.

4.3.2 Online root menus

4.3.2.1 General

If none of the online root menus exists then communication profile specific entry points shall be used (see Table 3).

Table 3 – Fall back alternatives for online root menus

Communication profile	Description of fall back alternatives
FF, ISA100	Menus declared in the BLOCK_A MENU_ITEMS attribute, e.g. device_root_menu_aiblock. If block based menus are not defined, then a MENU of STYLE TABLE shall be generated from the BLOCK_A PARAMETERS attribute.
HART	root_menu, in STYLE TABLE.
PB, PN	Menu_Main_Specialist if exists or Menu_Main_Maintenance. These menus include online and offline sub-menus. These would be rendered as STYLE MENU.

4.3.2.2 Diagnostic root menu

The diagnostic_root_menu includes views that show the device state, detailed diagnostic information and may include graphical views that show, for example, a valve signature.

4.3.2.3 Process variables root menu

The process_variables_root_menu includes views that show process measurements and set points with their quality and important information for process operators, for example, ranges.

Documents
Document Sharing Hub
Full document details: DIN EN IEC 61804-4:2021-08

4.3.2.4 Device root menu

The device_root_menu includes features for a device. These features can be split into process-related and device-specific features. This structure is not required if the number of features is too small for splitting. Submenus that represent any structuring are allowed on the device feature menu. In case of such submenus, the menus that are underneath can be split into process-related and device-specific features.

4.3.2.5 Maintenance root menu

The maintenance_root_menu should contain features for maintaining the device during the runtime phase and e.g. showing information about last maintenance inspection.

4.3.3 Offline root menu

The offline_root_menu is a menu hierarchy including e.g. data items and methods for offline configuration. It contains, in particular, all of the application-specific parameters of the device and may also contain important read-only and writeable variables. For more information about application-specific parameters, see 9.3. The menu can have offline methods, for example, configuration assistants.

If the offline root menu does not exist, the communication profile specific entry point shall be used (see Table 4).

Table 4 – Fall back alternatives for offline root menus

Communication profile	Description of fall back alternatives
FF, ISA100	BLOCK_A PARAMETERS
HART	MENU upload_variables
PB, PN	Table_Main_Specialist if exists or Table_Main_Maintenance

4.3.4 Example of EDD menu structure

The EDD example in Figure 1 includes additional menus that can be added to an EDD for PC applications. These menus are additional to the existing menus for the applications. This example is specific for a device with an interface according to HART. Examples for devices with an interface according FOUNDATION fieldbus, ISA100_Wireless, PROFIBUS, PROFINET, Communication Server profile and GPE profile would be very similar.

Documents
Document Sharing Hub
Full document details: DIN EN IEC 61804-4:2021-08

```
MENU diagnostic_root_menu
{
    LABEL "Diagnostics";
    STYLE MENU;          /* not required to define STYLE in this case, */
                    /* because of default STYLE of the root menu */
    ITEMS
    {
        status_window,           /* menu: style=window */
     self_test           /* method */
    }
}

MENU status_window
{
    LABEL "Status";
    STYLE WINDOW;
    ITEMS
    {
        standard_diagnostics_page,        /* menu: style=page */
        devspec_diagnostics_page     /* menu: style=page */
    }
}

MENU standard_diagnostics_page
{
    LABEL "Standard";
    STYLE PAGE;
    ITEMS
    {
         device_status               /* variable */
    }
}

MENU devspec_diagnostics_page
{
    LABEL "Device Specific";
    STYLE PAGE;
    ITEMS
    {
        xmtr_specific_status_1,      /* variable */
        xmtr_specific_status_2       /* variable */
    }
}

METHOD self_test
{
    LABEL "Self Test";
    DEFINITION
    {
         /* elided */
    }
}

MENU maintenance_root_menu
{
    LABEL "Maintenance";
    STYLE MENU;          /* not required to define STYLE in this case, */
                    /* because of default STYLE of the root menu */

    ITEMS
    {
        device_mode_dialog,          /* menu: style=dialog */
        teach_in             /* method */
    }
}
MENU device_mode_dialog
{
    LABEL "Device Mode";
    STYLE DIALOG;
    ITEMS
    {
        mode_page                   /* menu: style=page */
    }
}

MENU mode_page
```


Documents
Document Sharing Hub

Full document details: DIN EN IEC 61804-4:2021-08

```
{
    LABEL "Process Variables";
    STYLE PAGE;
    ITEMS
    {
        transducer_group,           /* menu: style=group */
        function_group              /* menu: style=group */
    }
}

MENU transducer_group
{
    LABEL "Transducer";
    STYLE GROUP;
    ITEMS
    {
        trans_target_mode,          /* variable */
        trans_actual_mode           /* variable */
    }
}

MENU function_group
{
    LABEL "Function";
    STYLE GROUP;
    ITEMS
    {
        func_target_mode,           /* variable */
        func_actual_mode            /* variable */
    }
}

METHOD teach_in
{
    LABEL "Teach-in";
    DEFINITION
    {
        /* elided */
    }
}

MENU process_variables_root_menu
{
    LABEL "Process Variables";
    STYLE MENU;          /* not required to define STYLE in this case, */
                    /* because of default STYLE of the root menu */

    ITEMS
    {
        overview_window,     /* menu: style=window */
        primary_vars_window      /* menu: style=window */
    }
}

MENU overview_window
{
    LABEL "Overview";
    STYLE WINDOW;
    ITEMS
    {
        process_vars_page        /* menu: style=page */
    }
}

MENU process_vars_page
{
    LABEL "Process Variables";
    STYLE PAGE;
    ITEMS
    {
        pressure_group,      /* menu: style=group */
        temperature_group        /* menu: style=group */
    }
}

MENU pressure_group
```


Documents
Document Sharing Hub
Full document details: DIN EN IEC 61804-4:2021-08

```
{
    LABEL "Pressure";
    STYLE GROUP;
    ITEMS
    {
        pv_digital_value,         /* variable */
        pv_upper_range_value,         /* variable */
        pv_lower_range_value      /* variable */
    }
}

MENU temperature_group
{
    LABEL "Temperature";
    STYLE GROUP;
    ITEMS
    {
        sv_digital_value,         /* variable */
        sv_upper_range_value,         /* variable */
        sv_lower_range_value      /* variable */
    }
}

MENU primary_vars_window
{
    LABEL "Primary Variables";
    STYLE WINDOW;
    ITEMS
    {
        pressure_chart_page,      /* menu: style=page */
        temperature_chart_page    /* menu: style=page */
    }
}

MENU pressure_chart_page
{
    LABEL "Pressure";
    STYLE PAGE;
    ITEMS
    {
        pressure_chart            /* chart */
    }
}

CHART pressure_chart
{
    /* elided */
}

MENU temperature_chart_page
{
    LABEL "Temperature";
    STYLE PAGE;
    ITEMS
    {
        temperature_chart         /* chart */
    }
}

CHART temperature_chart
{
    /* elided */
}

MENU device_root_menu
{
    LABEL "Device";
    STYLE MENU;           /* not required to define STYLE in this case, */
                      /* because of default STYLE of the root menu */

    ITEMS
    {
        process_related_window,   /* menu: style=window */
        device_specific_window,   /* menu: style=window */
        master_reset          /* method */
    }
```


Documents
Document Sharing Hub

Full document details: DIN EN IEC 61804-4:2021-08

```
}

MENU process_related_window
{
    LABEL "Process Related";
    STYLE WINDOW;
    ITEMS
    {
        identification_page,     /* menu: style=page */
        output_info_page     /* menu: style=page */
    }
}

MENU identification_page
{
    LABEL "Identification";
    STYLE PAGE;
    ITEMS
    {
        tag,             /* variable */
        manufacturer,            /* variable */
        device_type,         /* variable */
        device_revision,     /* variable */
        descriptor,          /* variable */
        message          /* variable */
    }
}


MENU output_info_page
{
    LABEL "Output Information";
    STYLE PAGE;
    ITEMS
    {
        range_values_group,      /* menu: style=group */
        sensor_limits_group      /* menu: style=group */
    }
}

MENU range_values_group
{
    LABEL "Range Values";
    STYLE GROUP;
    ITEMS
    {
        pv_units,            /* variable */
        pv_urv,          /* variable */
        pv_lrv               /* variable */
    }
}

MENU sensor_limits_group
{
    LABEL "Sensor Limits";
    STYLE GROUP;
    ITEMS
    {
        sensor_units,            /* variable */
        upper_sensor_limit,      /* variable */
        lower_sensor_limit       /* variable */
    }
}

MENU device_specific_window
{
    LABEL "Device Specific";
    STYLE WINDOW;
    ITEMS
    {
        identification_page,     /* menu: style=page */
        calibration_page     /* menu: style=page */
    }
}

MENU calibration_page
```


Documents
Document Sharing Hub
Full document details: DIN EN IEC 61804-4:2021-08

```
{
    LABEL "Calibration";
    STYLE PAGE;
    ITEMS
    {
        sensor_limits_group,     /* menu: style=group */
        sensor_trim_group        /* menu: style=group */
    }
}

MENU sensor_trim_group
{
    LABEL "Sensor Trim";
    STYLE GROUP;
    ITEMS
    {
         upper_sensor_trim_point,/* variable */
         lower_sensor_trim_point,/* variable */
         sensor_trim         /* method */
    }
}

METHOD master_reset
{
    LABEL "Master Reset";
    DEFINITION
    {
        /* elided */
    }
}
```

Figure 1 – EDD example of root menus

4.3.5 User interface

4.3.5.1 Diagnostics

Figure 2 shows an example of an EDD application for diagnostics.

Documents
Document Sharing Hub

Full document details: DIN EN IEC 61804-4:2021-08

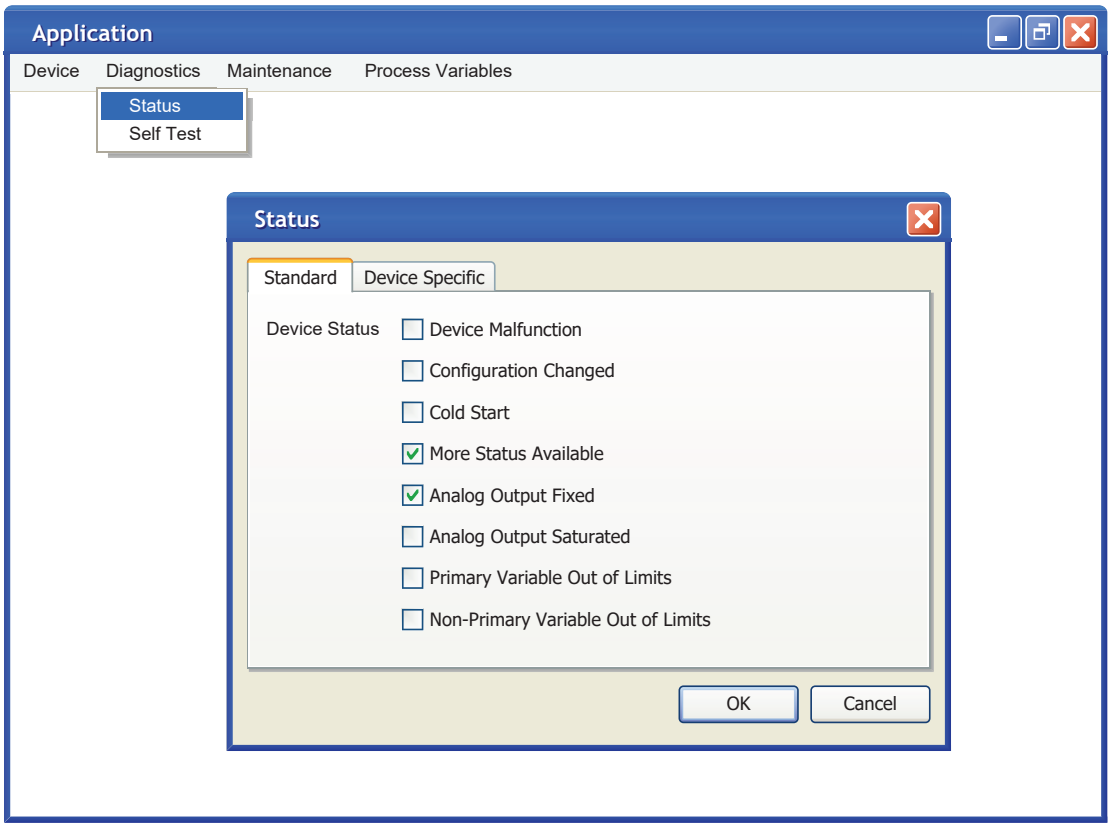

Figure 2 – Example of an EDD application for diagnostics

Documents
Document Sharing Hub
Full document details: DIN EN IEC 61804-4:2021-08

4.3.5.2 Process variables

Figure 3 and Figure 4 show examples of EDD applications for process variables.

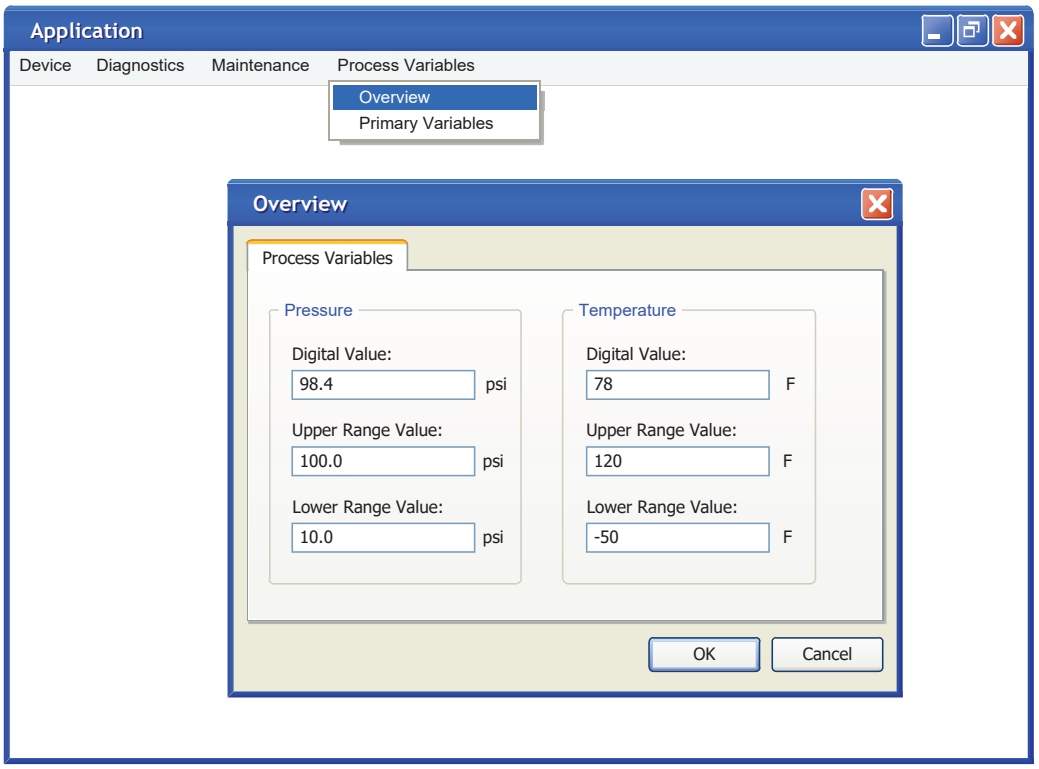

Figure 3 – Example of an EDD application for process variables

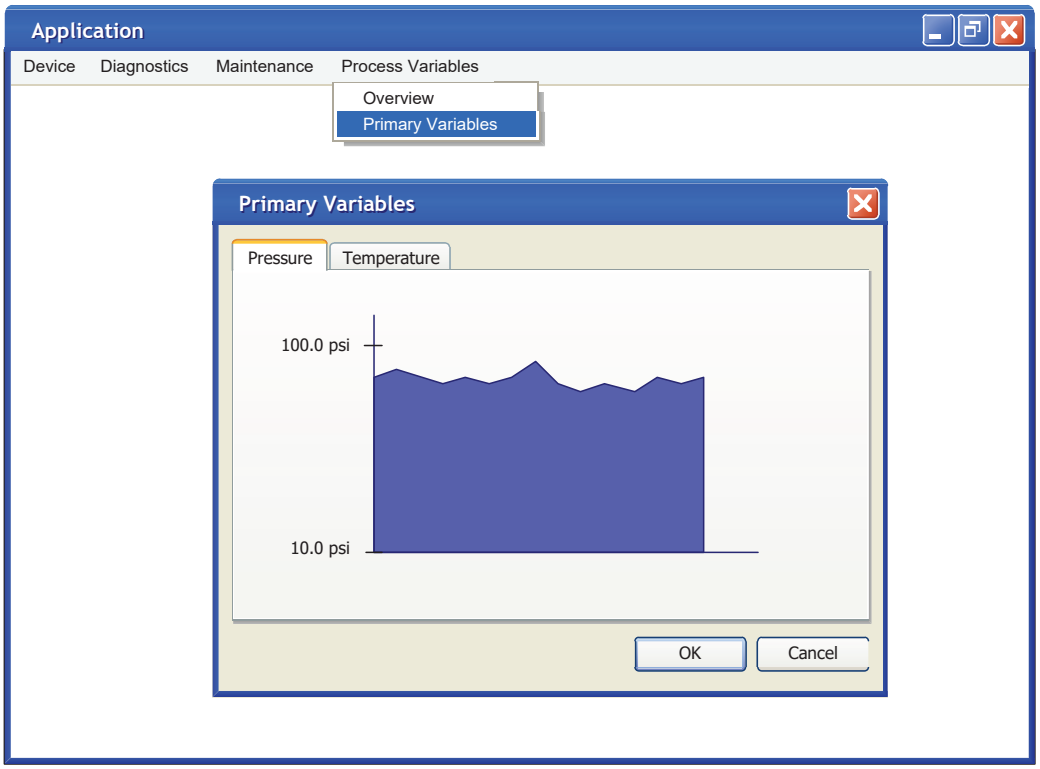

Figure 4 – Example of an EDD application for primary variables

Documents
Document Sharing Hub
Full document details: DIN EN IEC 61804-4:2021-08

4.3.5.3 Device features

Figure 5, Figure 6 and Figure 7 show examples of EDD applications for device features.

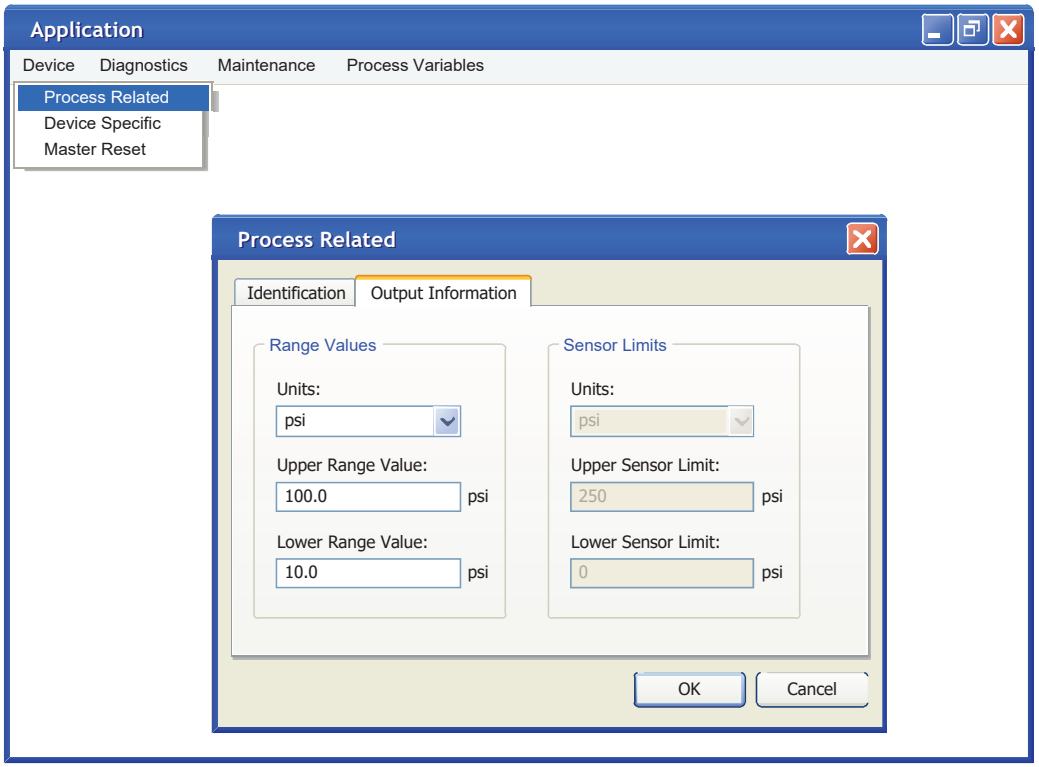

Figure 5 – Example of an EDD application for process-related device features

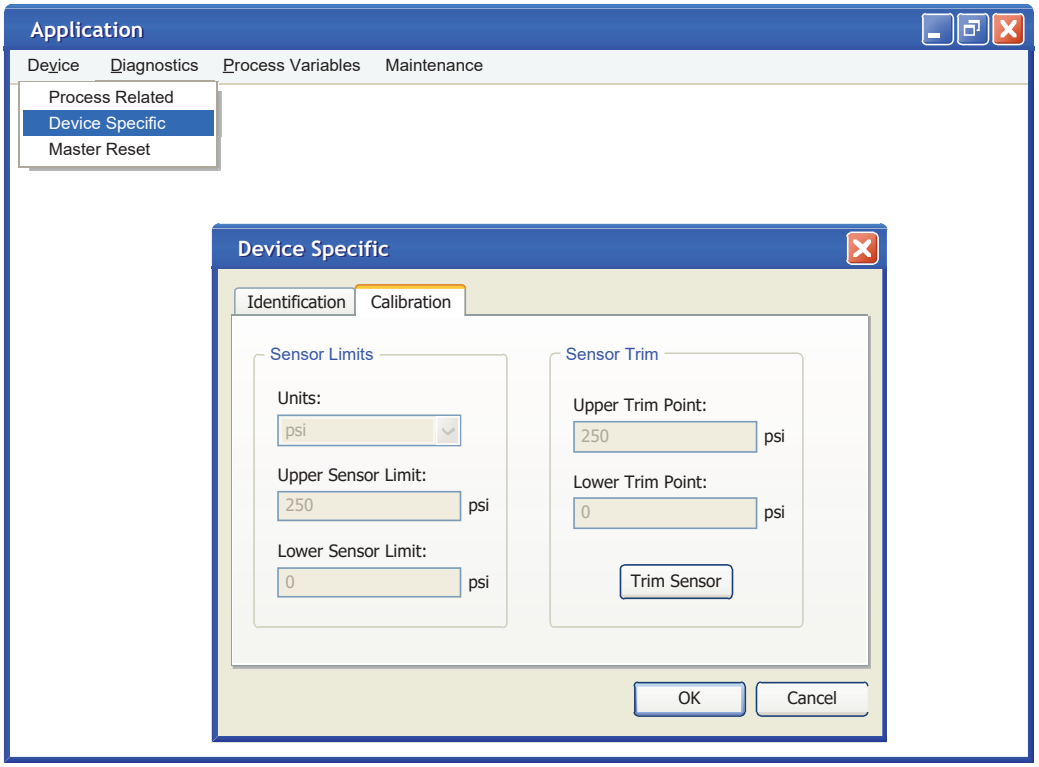

Figure 6 – Example of an EDD application for device features

Documents
Document Sharing Hub
Full document details: DIN EN IEC 61804-4:2021-08

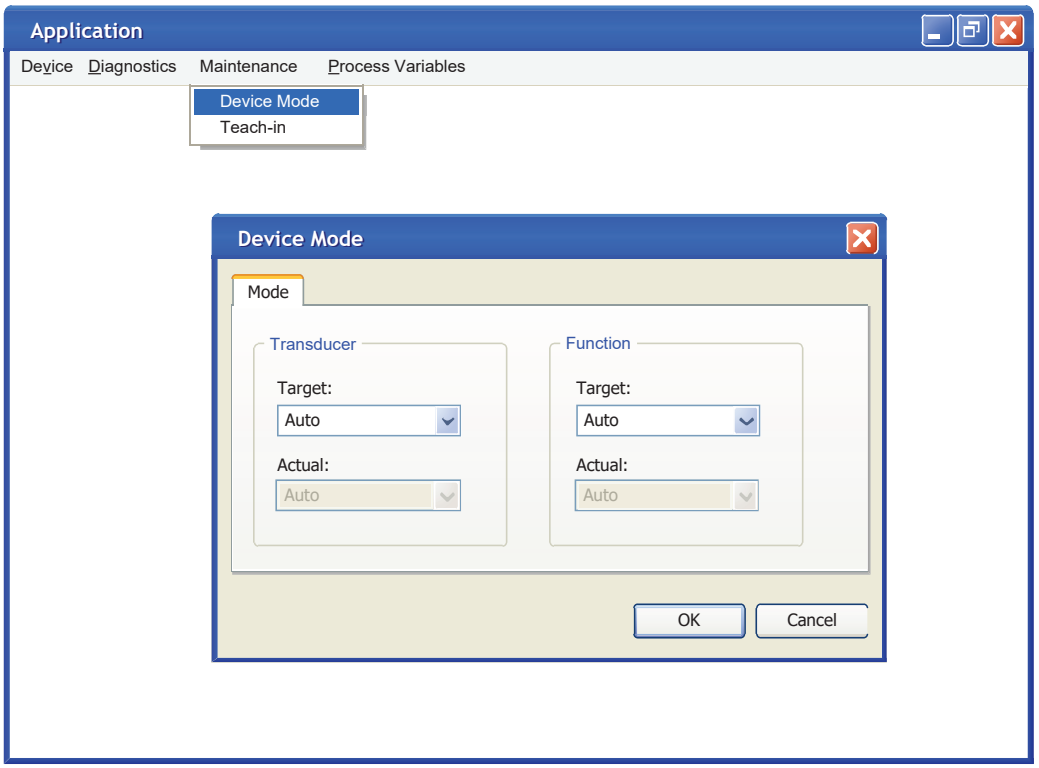

Figure 7 – Example of an EDD application for maintenance features

4.4 Label concatenation for indirect variable references

4.4.1 General

For indirect variable-references only, the LABEL displayed shall be a concatenation of the strings found in the EDD item containers through which the VARIABLE was referenced. This occurs, for example, when a VARIABLE is referenced via a COLLECTION MEMBER or ARRAY ELEMENT. For example, PV.DEVICE_VARIABLE.DIGITAL_VALUE is an indirect reference to a VARIABLE via both arrays and collections. A reference is defined as:

```
reference:= [ identifier | reference [ expression ] |
              reference . identifier ]
```

To specify Label concatenation, variable-references will be classified as a direct, simple, or complex reference.

A "direct reference" is:

```
direct-reference:= identifier
```

String concatenation is not applicable to direct references.

A "simple reference" is:

```
simple-reference:= [ identifier [ expression ] | identifier . identifier ]
```

And a "complex reference" is:

```
complex-reference:= [ simple-reference . identifier |
                      simple-reference [ expression ] |
                      complex-reference . identifier |
                      complex-reference [ expression ] ]
```

Label concatenation is only applicable to simple and complex (indirect) variable-references. Direct variable-references do not have concatenated Labels.

Documents
Document Sharing Hub
Full document details: DIN EN IEC 61804-4:2021-08

In the following subclauses, any label or description that holds an empty string (“”) shall be treated as if it does not exist.

4.4.2 Simple variable references

For simple variable-references, the Label and Description of the simple variable-reference are space concatenated together. See the summary in Table 5 and Table 6.

Table 5 – Label rule summary for simple variable references

Reference type	Label + description exists	Only label exists	Only description exists	Neither label nor description exists
FILE REFERENCE_ARRAY COLLECTION	Label shall be the space concatenation of the term's Label and the term's Description.	Label shall be the term's Label.	Label shall be the term's Description.	Same Label as direct variable-reference.
RECORD	Label shall be the term's Description.	Label shall be the term's Label.	Label shall be the term's Description.	Same Label as direct variable-reference.

Table 6 – Label rule summary for simple variable references

Reference type	Label exists	
	Yes	No
LIST VALUE_ARRAY	Label shall be Label "[n]" where n is the value of the index.	Label shall be "[n]" where n is the value of the index.

4.4.3 Complex variable references

The LABEL for a complex variable-reference is constructed by space concatenating the Prefix, Body and Suffix strings together.

Prefix-string

The LABEL Prefix-string is generated based on the first term in the complex variable-reference. In the case of a file, reference-array, block, record, or collection reference, the first non-null Description-string is used. See the Prefix rules summarized in Table 7 and Table 8.

Notice that if a FILE, REFERENCE_ARRAY, BLOCK or COLLECTION reference is the first term in the complex variable-reference and it does not have a corresponding Description-string, the search for a Prefix-string continues with the next term in the complex variable-reference. This process is repeated until the Prefix-string is generated or final term in the complex variable-reference is encountered. If the Prefix-string is generated the process continues with the construction of the Body and Suffix strings.

If the final term is encountered with no Prefix-string being generated then the rules for simple variable-references are used to generate the LABEL using the final term in the complex variable-reference.

Documents
Document Sharing Hub
Full document details: DIN EN IEC 61804-4:2021-08

Table 7 – Prefix rule summary for complex variable references

Reference type	Description exists	
	Yes	No
FILE REFERENCE_ARRAY COLLECTION RECORD BLOCK_A	Prefix is Description.	Skip this term. Continue to next term in the complex variable-reference to locate Prefix string.

Table 8 – Prefix rule summary for complex variable references

Reference type	Label exists	
	Yes	No
LIST VALUE_ARRAY	Prefix shall be Label "[n]" where n is the value of the index.	Prefix shall be "[n]" where n is the value of the index.

Body-string

The Body-string is a sequential concatenation of strings generated from the intermediate terms in the complex variable-reference. See Table 9 and Table 10 for a summary of the rules for constructing the Body-string.

Generation of the Body-string ceases when the final term in the complex variable-reference is reached. The Body-string shall be the null (i.e., "") string if the final term is reached before a Body-string is created. The final term in the complex variable-reference shall be used to generate the Suffix.

Table 9 – Body rule summary for complex variable references

Reference type	
FILE COLLECTION RECORD	Nothing is concatenated to the Body-string.
LIST VALUE_ARRAY	[n] is concatenated to the Body-string where n is the value of the index found in the reference.

Table 10 – Body rule summary for complex variable references

Reference type	Prefix is from a FILE, COLLECTION or REFERENCE_ARRAY	
	Yes	No
REFERENCE_ARRAY	Nothing is concatenated to the Body-string.	[n] is concatenated to the Body-string where n is the index.

Suffix-string

The Suffix-string is generated from the final term in the complex variable-reference. See Table 11 and Table 12 for a summary of the rules for constructing the Suffix-string.

AVA Documents
Document Sharing Hub

Full document details: DIN EN IEC 61804-4:2021-08

Table 11 – Suffix rule summary for complex variable references

Reference type	
LIST VALUE_ARRAY	[n] is Suffix where n is the value of the index.

Table 12 – Suffix rule summary for complex variable references

Reference type	Description exists	
	Yes	No
FILE REFERENCE_ARRAY COLLECTION RECORD	Suffix is Description.	No Suffix (i.e., an empty string).

4.5 Help concatenation

4.5.1 General

The Help-string for a simple or complex variable-reference is generated in a manner similar to that used for the Label-string and depends on whether it is a simple or complex variable-reference.

In the following clauses, any help that holds an empty string (“”) shall be treated the same as if the help does not exist.

4.5.2 Simple variable references

For simple variable-references, the help string is generated using the rules in Table 13 and Table 14.

Table 13 – Help rule summary for simple variable references

Reference type	Container's help + member/element help exists	Only container's help exists	Only member/element help exists	Neither help exists
FILE REFERENCE_ARRAY COLLECTION RECORD	Help shall be space concatenation of both Help-strings.	Help shall be Container's Help.	Help shall be Member/Element Help.	Help shall be same as with direct variable-reference.

Table 14 – Help rule summary for simple variable references

Reference type	Container's help exists	
	Yes	No
LIST VALUE_ARRAY	Help shall be Container's Help.	Help shall be an empty string.

Documents
Document Sharing Hub
Full document details: DIN EN IEC 61804-4:2021-08

4.5.3 Complex variable references

For a complex variable-reference, in general, there is possibly a Help-string Prefix and Suffix. Unlike Label concatenation, there is no Help-string Body. Basically, the Help string is the first-found Help space-concatenated to the Help from the final term in the complex variable-reference. If both the Help Prefix and Suffix are empty strings then the Help-string shall be an empty string.

The Help Prefix is generated based on the first term in the complex variable-reference. In the case of a FILE, REFERENCE_ARRAY, or COLLECTION reference, the first non-empty Member/Element Help is used. See the Prefix rules summarized in Table 15 and Table 16.

If the final term is encountered with no Prefix being generated then the rules for simple variable-references are used to generate the Help based on the final term in the complex variable-reference.

Table 15 – Help prefix rule summary for complex variable references

Reference type	
LIST VALUE_ARRAY	Prefix is Help string from the list or value-array (possibly empty).

Table 16 – Help prefix rule summary for complex variable references

Reference type	Member/element help exists	
	Yes	No
FILE REFERENCE_ARRAY COLLECTION RECORD	Help Prefix is Member/Element Help string.	Skip this reference. Continue to next reference to locate HELP Prefix string.

The Help suffix is generated from the final term in the complex variable-reference (see Table 17 and Table 18).

Table 17 – Help suffix rule summary for complex variable references

Reference type	
LIST VALUE_ARRAY	Suffix is Help string from referenced VARIABLE (possibly empty).

Table 18 – Help suffix rule summary for complex variable references

Reference type	Member/element help exists	
	Yes	No
FILE REFERENCE_ARRAY COLLECTION RECORD	Help Suffix is Member/Element Help string.	No Suffix (i.e., an empty string).

Documents
Document Sharing Hub
Full document details: DIN EN IEC 61804-4:2021-08

4.6 Containers and contained items

4.6.1 Overview

The user interface extensions are based on a simple user interface model. The model consists of two concepts:

- containers; and
- contained items.

Containers are so named because they contain other user interface elements. Containers may include: menus, windows, dialogs, tables, pages, groups, and other containers. Containers correspond to a MENU. They are distinguished from one another via the STYLE attribute. This STYLE attribute indicates how the MENU will be displayed.

Contained items include e.g. variables, methods, edit displays, graphs, charts, images, static text.

4.6.2 Permitted and default STYLEs

Table 19 defines permitted user interface items in containers, substitutes and default STYLEs are not defined. If the style of a menu is not defined, then a default style may be used depending on the menu where the menu is contained and the content of the menu.

General rules:

If the ACCESS online or offline of a contained MENU is different to the access of the container, the EDD application shall use STYLE WINDOW in a window otherwise shall use STYLE DIALOG.

Documents
Document Sharing Hub
Full document details: DIN EN IEC 61804-4:2021-08

Table 19 – Permitted contained items and default STYLES

Container (Parent)	Permitted contained items (Child items)															Default STYLE of contained items (used if STYLE is not defined or in case of conflicts)
	MENU	DIALOG, WINDOW	PAGE	GROUP	TABLE	EDIT_DISPLAY	VARIABLE	COLLECTION, RECORD	ARRAY, LIST	CHART, GRAPH, GRID	IMAGE	static text	METHOD	PLUGIN	COLUMNBREAK, ROWBREAK	SEPARATOR	
MENU	✓	1	X	X	10	✓	8	D	8	2	2	✓	✓	✓	6	6	**Communication profiles: CS, FF, GPE, ISA100, PB, PN** MENU if no data item is in the menu, otherwise DIALOG. **Communication profiles: HART** MENU
DIALOG, WINDOW	✓	1	✓	✓	7	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	5	PAGE
PAGE	✓	1	X	✓	7	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	5	GROUP
GROUP	✓	1	X	✓	7	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	5	GROUP if the parent of the parent GROUP is not of STYLE GROUP. DIALOG rendered as button or hyperlink if the parent of the parent GROUP is of STYLE GROUP.
TABLE	X	9	X	X	✓	✓	3	D	✓	2	3	✓	✓	✓	6	6	TABLE

Key

✓ Shall be rendered as defined for the contained item; e.g., for a “MENU” according to its STYLE attribute.

X Not allowed. Default STYLE shall be used to solve this conflict (see column “Default STYLE of contained items”).

D Default STYLE shall be used (see column “Default STYLE of contained items”).

1 Shall be rendered as button or hyperlink by using the LABEL. The item shall be presented when the button or hyperlink is selected.

2 Shall be rendered as a button or hyperlink by using the LABEL. The item shall be presented on a dialog (i.e., a modal window), when the button or hyperlink is selected.

3 Shall be rendered as button or hyperlink by using the LABEL, or inline. If not rendered inline, then the item shall be presented on a dialog (i.e., a modal window), when the button or hyperlink is selected.

4 Shall be rendered as a button or hyperlink by using the LABEL. The item shall be presented on a modeless window, when the button or hyperlink is selected.

5 Shall be interpreted as COLUMNBREAK.

6 Shall be rendered as a line or ignored.

7 **Communication profiles: CS, FF, GPE, ISA100, PB, PN**
Shall be rendered according to note “✓”.
Communication profiles: HART
Shall be rendered according to note “**X**”.

8 **Communication profiles: CS, FF, GPE, ISA100, PB, PN**
Shall be rendered according to note “**2**”.
Communication profiles: HART
Shall be ignored and not presented.

Documents
Document Sharing Hub
Full document details: DIN EN IEC 61804-4:2021-08

9	**Communication profiles: CS, FF, GPE, ISA100, PB, PN** Shall be rendered according to note "**1**". **Communication profiles: HART** Shall be rendered according to note "**X**".
10	**Communication profiles: CS, FF, GPE, ISA100, PB, PN** Shall be rendered according to note "**4**". **Communication profiles: HART** Shall be rendered according to note "**D**" if subordinate to DIALOG or WINDOW, otherwise according to note "**4**".

4.6.3 Containers

4.6.3.1 Menu

Communication profiles: CS, FF, GPE, ISA100, PB, PN

A menu of STYLE MENU takes the form of a drop-down menu, a pop-up menu or a navigation bar.

Communication profiles: HART

A menu of STYLE MENU takes the form of a drop-down menu or a pop-up menu.

4.6.3.2 Window

A menu of STYLE WINDOW takes the form of a modeless window. The LABEL of the menu shall be used as the caption for the window.

4.6.3.3 Dialog

A MENU of STYLE DIALOG shall be a modal window. If a dialog contains a subordinated window, the EDD application shall manage the window as a modal subdialog. The LABEL of the menu shall be used as the caption for the window.

4.6.3.4 Table

Communication profiles: CS, FF, GPE, ISA100, PB, PN

A menu of STYLE TABLE shall be rendered as a table. Each item shall be represented as one or multiple rows, e.g. ARRAYs. The submenus build a hierarchy, which shall be shown.

Communication profiles: HART

A menu of STYLE TABLE shall be rendered as a cascaded menu tree. Each item shall be represented as one or multiple rows, e.g. ARRAYs. The submenus build a hierarchy, which shall be shown. The label of the MENU-item (including BIT_ENUMERATED VARIABLEs) shall be displayed. Selecting MENU item shall cause the contents to be displayed.

4.6.3.5 Page

A menu of STYLE PAGE within a WINDOW or DIALOG shall be rendered as a tab and spans the entire canvas width. When multiple pages (tabs) are rendered in the same window or dialog, each tab shall be individually selectable to enable the contents of a particular tab. The LABEL of the menu shall be used as the caption for the tab. There shall be an implicit ROWBREAK before and after the PAGE.

The EDD application shall interpret ROWBREAKs or other items between pages as horizontal separations.

COLUMNBREAKs and SEPARATORs between pages shall be ignored.

AVA Documents
Document Sharing Hub

Full document details: DIN EN IEC 61804-4:2021-08

4.6.3.6 Group

A menu of STYLE GROUP takes the form of a group box. The LABEL of the menu shall be used as the caption for the group. In order to maintain a clear arrangement on the user interface, the following restricting rules apply.

- The nesting level of GROUP declarations is restricted to two. In other words, a GROUP may contain further GROUPs but these may not contain further GROUPs.
- When a second layer GROUP contains a GROUP, this GROUP shall be rendered as either a button or a hyperlink. The LABEL shall appear on the button or as the hyperlink text. When the button or hyperlink is pressed, a corresponding dialog shall be opened on top of the calling dialog or window.

Within a GROUP, usually logically related parameters and methods are grouped. The title of the GROUP indicates this relation, for example, “AnalogInput 1”. Often the same string is also used in the labels of the GROUP items, for example, “AnalogInput1_StaticRevision” or “Analog Input1_Blockmode”. In order to avoid this duplication of information, the EDD developer may assemble the items of a GROUP in a COLLECTION in order to override the original labels. If the parameters are to be referred to in a GROUP the parameters can be referenced using the COLLECTION; in other cases, especially without additional semantic context, the parameters can be referenced directly.

Figure 8 shows an EDD example with COLLECTION MEMBERS within a MENU of STYLE GROUP.

```
VARIABLE ai1_strev
{
    LABEL "Analog Input 1: Static Revision";
    TYPE INTEGER(4);
}

VARIABLE ai1_blomo
{
    LABEL "Analog Input 1: Block Mode";
    TYPE INTEGER(1);
}

MENU ai1_group_double                /* Leads to double display of */
{
    LABEL "Analog Input 1";
    STYLE GROUP;
    ITEMS
    {
        ai1_strev,
        ai1_blomo
    }
}

COLLECTION ai1_groupcol
{
    MEMBERS
    {
        strev,ai1_strev,"Static Revision";
        blomo,ai1_blomo,"Block Mode";
    }
}

MENU ai1_group_single                /* Leads to single display of */
{
    LABEL "Analog Input 1";
    STYLE GROUP;
    ITEMS
    {
        ai1_groupcol.strev,
        ai1_groupcol.blomo
    }
}
```

Figure 8 – Usage of COLLECTION MEMBERS in MENUs of STYLE GROUP

Documents
Document Sharing Hub
Full document details: DIN EN IEC 61804-4:2021-08

4.6.4 Contained items

4.6.4.1 Overview

How a container renders contained items is described in 4.6.3.1. All containers render contained items in the same way. Contained items, such as methods, variables and others, have a LABEL attribute. In order not to disturb the layout of the EDD application, for example, with oversized buttons for methods, the EDD developer should not use very long strings for LABELs. For this reason, some EDD applications may truncate these labels. However, there shall be some methodology, such as a "tool tip", "pop- up window", “expanding window”, etc., to display the entire string to the user.

4.6.4.2 Methods

A method should be rendered as a button or a hyperlink. The LABEL of the corresponding METHOD should appear on the button or as the hyperlink text. When the button or hyperlink is pressed, the corresponding METHOD should be executed.

4.6.4.3 Variables

4.6.4.3.1 General

The label, value and, if defined, the units of the variable should be displayed in a manner consistent with the definition of the corresponding VARIABLE.

The general handling of variables are as follows.

- HANDLING = READ or the menu item attribute is READ_ONLY: the value of the variable should not be editable.
- HANDLING = WRITE: the value should not be read from the device due to being referenced as a contained item, e.g. in a MENU.
- HANDLING = READ & WRITE: The value should be editable.
- CLASS = DYNAMIC: the value should be updated continuously with current read values from the device. If the value has been edited, continuous updates shall no longer occur so that the edited value is not overwritten with the value read from the device.

For string type VARIABLEs the value should not be truncated or wrapped in multiple lines. Word wrapping could be confused with a true "new line"characters ('\n') in the string value.

When no VARIABLE value is available to be displayed, e.g. due to a change in VALIDITY or HANDLING, the EDD application shall indicate that the variable is in uninitialized state.

Table 20 shows how the EDD application should indicate the uninitialized state of VARIABLEs.

Table 20 – Uninitialized state of VARIABLEs on user interface

VARIABLE TYPE	Uninitialized state indication
Numeric values ENUMERATED String values Date, time and duration values	Blank with indication of “uncertain” state close to the value field
BIT_ENUMERATED	Indication of no bit set along with indication of “uncertain” state close to the value field
BOOLEAN	Indication of FALSE along with indication of “uncertain” state close to the value field

Documents
Document Sharing Hub
Full document details: DIN EN IEC 61804-4:2021-08