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# Engineering data exchange format for use in industrial automation systems engineering - Part 1: Architecture and General Requirements

## EESTI STANDARDI EESSÖNA

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ICS 25.040.40, 35.060, 35.240.50

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English Version

Engineering data exchange format for use in industrial  
automation systems engineering - Part 1: Architecture and  
General Requirements  
(IEC 62714-1:2014)

Format d'échange de données techniques pour une  
utilisation dans l'ingénierie des systèmes d'automatisation  
industrielle - AutomationML - Partie 1: Architecture et  
exigences générales  
(CEI 62714-1:2014)

Datenaustauschformat für Planungsdaten industrieller  
Automatisierungssysteme (AutomationML) - Teil 1:  
Architektur und allgemeine Festlegungen  
(IEC 62714-1:2014)

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## Foreword

The text of document 65E/385/FDIS, future edition 1 of IEC 62714-1, 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 62714-1:2014.

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- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2017-07-31

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|                    |      |                                  |
|--------------------|------|----------------------------------|
| IEC 60027 (Series) | NOTE | Harmonized as EN 60027 (Series). |
| IEC 62264-1        | NOTE | Harmonized as EN 62264-1.        |
| IEC 62714-2        | NOTE | Harmonized as EN 62714-2         |
| ISO 80000-1        | NOTE | Harmonized as EN ISO 80000-1.    |

**Annex ZA**  
(normative)**Normative references to international publications  
with their corresponding European publications**

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE 1 When 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:  
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| Publication    | Year   | Title  | EN/HD    | Year   |
|----------------|--------|--|----------|--------|
| IEC 62424      | 2008   | Representation of process control engineering - Requests in P&I diagrams and data exchange between P&ID tools and PCE-CAE tools  | EN 62424 | 2009   |
| IEC 62714      | series | Engineering data exchange format for use in industrial automation systems engineering  | EN 62714 | series |
| ISO/IEC 9834-8 | -      | Information technology - Procedures for the operation of object identifier registration authorities: General procedures and top arcs of the international object identifier tree | -        | -      |
| ISO/PAS 17506  | -      | Industrial automation systems and integration - COLLADA digital asset schema specification for 3D visualization of industrial data   | -        | -      |

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## INTRODUCTION

IEC 62714 is a solution for data exchange focusing on the domain of automation engineering.

The data exchange format defined in the IEC 62714 series (Automation Markup Language, AML) is an XML schema based data format and has been developed in order to support the data exchange in a heterogeneous engineering tools landscape.

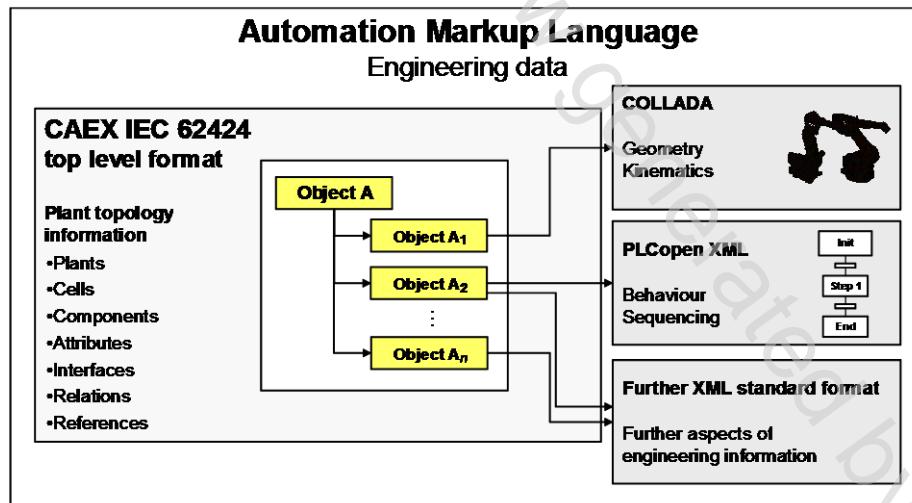
The goal of AML is to interconnect engineering tools in their different disciplines, e.g. mechanical plant engineering, electrical design, process engineering, process control engineering, HMI development, PLC programming, robot programming, etc.

AML stores engineering information following the object oriented paradigm and allows modelling of physical and logical plant components as data objects encapsulating different aspects. An object may consist of other sub-objects, and may itself be part of a larger composition or aggregation. Typical objects in plant automation comprise information on topology, geometry, kinematics and logic, whereas logic comprises sequencing, behaviour and control. Therefore, an important focus in the data exchange in engineering is the exchange of object oriented data structures, geometry, kinematics and logic.

AML combines existing industry data formats that are designed for the storage and exchange of different aspects of engineering information. These data formats are used on an “as-is” basis within their own specifications and are not branched for AML needs.

The core of AML is the top-level data format CAEX that connects the different data formats. Therefore, AML has an inherent distributed document architecture.

Figure 1 illustrates the basic AML architecture and the distribution of topology, geometry, kinematics and logic information.



**Figure 1 – Overview of the engineering data exchange format AML**

Due to the different aspects of AML, the IEC 62714 series consists of different parts focussing on different aspects:

- IEC 62714-1: Architecture and general requirements

This part specifies the general AML architecture, the modelling of engineering data, classes, instances, relations, references, hierarchies, basic AML libraries and extended AML concepts. It is the basis of all future parts, and it provides mechanisms to reference other sub formats.

- IEC 62714-2: Role class libraries  
This part is intended to specify additional AML libraries.
- IEC 62714-3: Geometry and kinematics  
This part is intended to specify the modelling of geometry and kinematics information.
- IEC 62714-4: Logic  
This part is intended to specify the modelling of logics, sequencing, behaviour and control related information.

Further parts may be added in the future in order to interconnect further data standards to AML.

As long as no further parts describe the integration of further standards, it is important to focus on a limited set of sub data formats. Otherwise it would open up the usage of any data format and data exchange would not work.

Annex A gives an informative introduction, use cases and examples regarding AML.

Annex B gives an informative XML representation of the libraries defined in this part of IEC 62714.