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ESS Rules for documentation of electrical systems

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1. DOCUMENTATION

Documentation owned by ESS are protected in accordance to ISO16016 "Protection notices for restricting the use of documents and products".

1.1 Required documentation, descriptions and manuals

Technical documentation shall be delivered with all the equipment that is delivered to the ESS facility. The set of documentation delivered shall comply as applicable with the SS-EN 13460:2009 "Documentation – Documentation for Maintenance" Chapter 5 as well as other applicable directives and requirements stated in this document. Reason is that a certain level of documentation is needed for CE-marking but also for operation, service and maintenance of the equipment installed.

In addition documentation of an electrical part, assembly or system shall include drawings listed in Table 1 Electrical drawings and reports within the ESS" below.

Document type:	Information presented in document:
Arrangement drawings	Gives detailed information of where things are located at the facility. Also applicable for drawings of cable runways etc.
Front page	General information of the set of drawings.
Table of contents	Gives information of contents.
Fuse table	Gives information of protection devices installed.
Block diagram	Gives information of principal parts and functions within a system.
Single line diagram	Gives an overview of a system. Single line diagrams shall be performed for power distribution and for communication.
Circuit Diagram	Gives detailed information of electrical circuits and functions.
Cabinet lay-out	Gives detailed information the assembly.
Parts list	Gives information of parts included in the design.
Cable lists	Gives information of cable types and routing.
Terminal connection list	Gives detailed information of cables and cores connected.

Table 1 Electrical drawings and reports within the ESS

NOTE: Documentation of calculations, analyses and verifications performed shall be handed over in accordance to applicable standards e.g. AFS2008:3 & SS 436 40 00. All relevant certificates shall be handed over to the ESS.

1.2 Preparation of documents for use in electrotechnology

Documentation delivered shall conform to SS-EN 61082 "Preparation of documents used in electrotechnology – Part 1: Rules".

1.3 Classification and naming of documents

Naming of documents & files

Documents and files shall be named in accordance to the "Configuration management plan" <u>ESS-0003688</u>.

Naming of files

Drawing files shall be named in accordance to the "Configuration management plan" ESS-0003688.

Naming of sheets in electrical drawings

Sheets of electrical drawings shall be designated in accordance to SS-EN 61355-1 "Classification and designation of documents for plants, systems and equipment – Part 1 rules and classification tables" and SS-EN 61082 "Preparation of documents used in electrotechnology – Part 1: Rules".

This means that documents shall be designated with the tag.id of the object it belongs to followed by document code and page number:

FBS-Name &	Document code	Page number
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As an example we can use motor M3 in transport system W1 and its reference documents:

Tag id of the object: =W1.M3

Datasheets has the document code DA and therefore datasheet of the electrical motor will be designated:

=W1.M3&DA1

Circuit diagrams have the document code FS and will therefore be designated: =W1.M3&FS1

Service and maintenance descriptions have the document code EDC and will therefore be designated:

=W1.M3&EDC1

Documents delivered to the ESS shall be designated in accordance to Table 2 Documents classes and naming of documents within the ESS" below. SS-EN 61082 – Tabel C.1 and SS-EN 61355 – Tabel A.2 gives further information regarding designation of documents if not covered in the table below.

Designation:	Document type:
AA	Front page
AB	Table of contents
DA	Datasheet
EDC	Service and maintenance description
FA	Overview diagram
	Single line diagrams
	Block diagrams
FS	Circuit diagram
FQ	Fuse tables
MA	Connection diagram
	Connection table
	Terminal connection diagram
MB	Cable diagram
	Cable lists
LD	General layout
	Arrangement drawings
	Drawings of cable routes
LU	Cabinet layout
PC	Parts list/BOM-list

Table 2 Documents classes and naming of documents within the ESS

1.4 Documentation formats

The electrical drawings and associated reports shall be delivered in ePLAN .zw1 format. Drawings and reports shall also be delivered in intelligent PDF-format. Drawings must be with full functionality which means that all connections, parts and references etc. has been linked properly in the CAD-tool. Imported .dwg files in ePLAN doesn't give any intelligence. That means that the ability to automatically generate reports and connect data to objects is lost, which is not acceptable.

It is preferred that arrangement drawings and drawings of e.g. cable runways are based on CATIA V6.

Civil design models based on Revit shall be delivered in .rvt format with floor plans defined and with work sharing turned off. Drawings shall also be delivered as CATIA V6 compatible files as below.

General requirements on hand-over CAD-files:

- 2D drawings shall be delivered as a pdf file and a file format compatible with CATIA V6 (recommended dxf and/or dwg) and the native file.
- If 3D files are available they shall be delivered. In this case drawing files shall be delivered in a format compatible with CATIA V6 (preferrabily sat, step or igs) plus the native file.

All office documents shall be delivered in MS Word and PDF format.

2. SYMBOLS

Symbols used in electrical documentation shall conform to the symbol standard IEC 60617.

3. NAMING AND STRUCTURING

Objects within the ESS shall be tagged in accordance with: <u>ESS-0036752</u>, Decision summary for ESS naming, tagging and structuring of data.

For more information see:

ESS-0048668 - "ESS Breakdown Structures Guideline"

ESS-0015433 - "ESS rule for Electrical Design"

4. PARTS DATABASE

Parts used in the design shall preferably be registered in the ESS parts database. Suppliers shall as far as possible strive to use the ESS parts database but if so is not reasonable supplier is responsible to provide a list of components for approval by the ESS. The list of components shall be equivalent to the ESS parts list as shown in appendix 1. The parts list in appendix 1 is an example of how an ESS parts list could look.

5. REVISIONING AND VERSIONING OF DOCUMENTS

Revisions and versioning of drawings are of great importance for traceability in the design work. Within ESS revisions are indexed in accordance to Table 3 Index" below. The first digit in the index indicates the revision of the document and the second digit indicates the version of the revision. The revision of the document will changed only when the document has reached the lifecycle released in the PLM-system CHESS. All lifecycle steps between released revisions will be indicated as versions of the revision.

Design phase:	Index (Examples):
Initial design	1.1 (First preliminary version of revision 1)
Detailed design	1.2 (Second preliminary version of revision 1)
Detailed documentation	1 (First released revision)

Table 3 Indexes of revisions

Example:

Initial design

A drawing was submitted for initial design review in revision 1, version 1 (Rev.1.1). The design proposal was rejected in the review and the drawing has to be updated. When the drawing is sent for review next time the revision will still be revision 1, but the version will change to version 2 (Rev.1.2). T

Detailed design

The same drawing has now been updated and submitted for detailed design review in revision 1, version 3 (Rev.1.3). The design proposal was rejected in the review and the drawing has to be updated. When the drawing is sent for review next time the revision will still be revision 1, but the version will change to version 4 (Rev.1.4).

Detailed documentation

Same drawing has now been approved in the detailed documentation review in revision 1, version 5 (Rev.1.5) which means that it has been released in the PLM-system. Once released in CHESS full revisions will be shown only, in this case Rev.1 will be present.

NOTE: Once released in CHESS full revisions will be shown only. There is no integration between ePLAN and CHESS which means that this information has to be added manually. To avoid confusion it is of great importance that the index stated in the drawing header corresponds to the index in CHESS.

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6. REFERENCES

- 1. SS-EN 13460:2009 Documentation Documentation for maintenance.
- 2. SS-EN 61082 Preparation of document used in electrotechnology.
- 3. SS-EN 61355 Classification and designation of documents for plants, systems and equipment.
- 4. SS-EN 81346 Industrial systems, installations and equipment and industrial products Structuring principles and reference designations.
- 5. <u>ESS-0008797</u> ESS Procedure for Management of Controlled Documents.

DOCUMENT REVISION HISTORY

Revision	Reason for and description of change	Author	Date
1	First revision of the Rule for Documentation of Electrical Systems.	Jonas Widing	2016-04-12

APPENDIX 1 - EXAMPLE OF ESS PARTS LIST

Delignation Delignation Type native Supplies	Quantity DIN rail Cover profile 1 Cover					ESS_Parts_list_ver1
Delightform Part	ntity DIN rail Cover profile Cover profile Cover profile Cover profile Cover profile					
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MAY POLE C. A. De-700000 DEC. 2000000 DEC. 2000000 DEC. 2000000 DEC. 20000000 DEC. 20000000 DEC. 200000000 DEC. 2000000000000000000000000000000000000	Cover profile		CD-HF COVER 40	PXC	PXC.3240288	
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STATE STAT	CIRCLITT REFAKER 400V 10KA		SS13010	SIE	SIE.5513010 STE 5594202-7	
STATEON STATEON STATE STATEON STATE STATEON STATEON	Auxillary switch		55T3010	SIE	SIE.SST3010	
STATE STAT	CIRCUIT BREAKER 400V 10KA		5SY4202-7	SIE	SIE.55Y4202-7	
Section Proc. Pr	Auxillary switch		55T3010	SIE	SIE,55T3010	
1971	Electronic device circuit breake		CBM E8 24DC/0.5-10A NO-K CBM E8 24DC/0.5-10A NO-R	PXC	PXC.2905/44 PXC.2905744	
19 19 19 19 19 19 19 19	OUTPUT COUP. DEV. 24-220V/		3RS1800-1BP00	SIE	SIE.3RS1800-18P00	
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CECTORS SECTION STEE STEE SECTION STEE SECTION SEC	Memory Card 4MB		6E5/590-1AE80-0AA0 6E5/954-8I (71)-0AA0	SIE SIE	SIE.6E5/590-1AE80-0AA0 SIE.6E57954-81 C07-0AA0	
Comparison	AI 8XU/I/RTD/TC ST		6ES7531-7KF00-0AB0	SIE	SIE.6ES7531-7KF00-0AB0	
Color	Front connector, 40-pin		6E57592-1BM00-0XB0	SIE	SIE.6E57592-1BM00-0XB0	
CECTOR: INCRORMAGE STREET	AI 8XU/I/RTD/TC ST		6E5/531-7KH00-0AB0	SIE	SIE,6E5/531-7KF00-0AB0 STE 6EC7E97-19M00-0VB0	
CECTORS:18800-0000 SIE SIE ESCROSI-7800-0000 SIE ESCROSI-7800-0000 CECTOR:18800-0000 SIE SIE ESCROSI-7800-0000 SIE ESCROSI-7800-0000 CECTOR:18800-0000 SIE SIE ESCROSI-1890-0-000 SIE ESCROSI-1890-0-000 CHE 40000 DIC DIC 280029 DIC 280029 CHE 40000 DIC DIC 280029 DIC 280029 CHE 40000 DIC DIC 280029 DIC 280029 CHE 50000 DIC 280029 DIC 280029 DIC 280029 <td>AT 8XU/I/RTD/TC ST</td> <td></td> <td>6ES/332-1BHIOCOXBO 6ES/531-7KE00-0AB0</td> <td>SIE</td> <td>SIE-0E3/332-1BH00-0AB0 SIE-6E57531-7KF00-0AB0</td> <td></td>	AT 8XU/I/RTD/TC ST		6ES/332-1BHIOCOXBO 6ES/531-7KE00-0AB0	SIE	SIE-0E3/332-1BH00-0AB0 SIE-6E57531-7KF00-0AB0	
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Discreption	DI 16X24VDC HF Front connector, 40-nin		6ES/521-1BH00-0AB0 6ES/592-1BM00-0x80	SE	SIE.6E5/521-1BH00-0AB0 SIE.6E57592-1BM00-0XB0	
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DQ \$15.00.00.00 STEE STEE\$ STEE\$ STEE\$ STEE\$	Front connector, 40-pin		6ES7592-1BM00-0XB0	SIE	SIE.6ES7592-1BM00-0XB0	
Provide Counterfor, 40 pm 662-7922-1800-00080 SIE SI	DQ 16X24VDC/0.5A ST		6E57522-1BH00-0AB0	SIE	SIE.6ES7522-1BH00-0AB0	
SECTOR SECTION SIE SIE	Front connector, 40-pin		6ES/592-1BM00-0XB0	SIE	SIE,6ES/592-1BM00-0XB0	
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Chief 40000 PMC PMC2240392 PMC2240392 PMC2240390 PMC224039	PM 1507, 70W		6EP1332-4BA00	SIE	SIE.6EP1332-4BA00	
Chief-40020 DNC PNC.2340350 PNC.2340	Power supply unit		UNO-PS/1AC/24DC/ 60W	PXC	PXC.2902992	
Chief 60000 Div.C Div.C.2340350 Div.C.	Cable duct		CD-HF 40X80	PAC	PXC.3240350	
Dict. 24,0350 Dict. 24,035	Cable duct		CHF 40X80	DVC.	PXC.3240350	
Cable duct	Cable duct		CD-HF 40X80	PXC	PXC.3240350	
Cable duct	Cable duct		CD-HF 40X80	PXC	PXC,3240350	
Column C	Cable duct		CD-HF 40X80	PXC	PXC,3240350	
Consection terminal block Across	Cable duct		CD-HF 80X80	PXC	PXC.3240359	
MECONSTITUTION MECO	Cable duct		CD-HF 60X80	PXC	PXC,3240354	
NEX.0182130	Cable duct		CD-HF 60X80	PXC	PXC,3240354	
Act Act	FQAR-PG 2x2x0,5		NEX.0182130	NEX	NEX.0182130	
MC-018623-00 MC-018626-00 MC-0	HOAR-PG 2X2X0,5		NEX.0182130	NEX.	NEX.0182130	
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