SEE System Design

IGE+XAO Group

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Shaping the Future
of the Electrical PLM,
CAD and Simulation

Agenda

- Engineering Software Range
- Basic Engineering: SEE System Design
  - Main Features
  - System Diagrams module
  - Fluids Diagrams (PFD, P&ID, HVAC)
  - Electrical Diagrams
  - Rendering Module
- Detailed Engineering
  - Architecture
  - SEE Cabling
  - SEE Generative View
  - SEE Electrical Expert
- Wrap Up
  - Different disciplines working together

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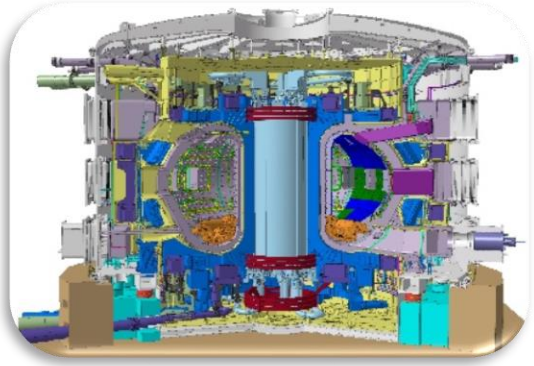
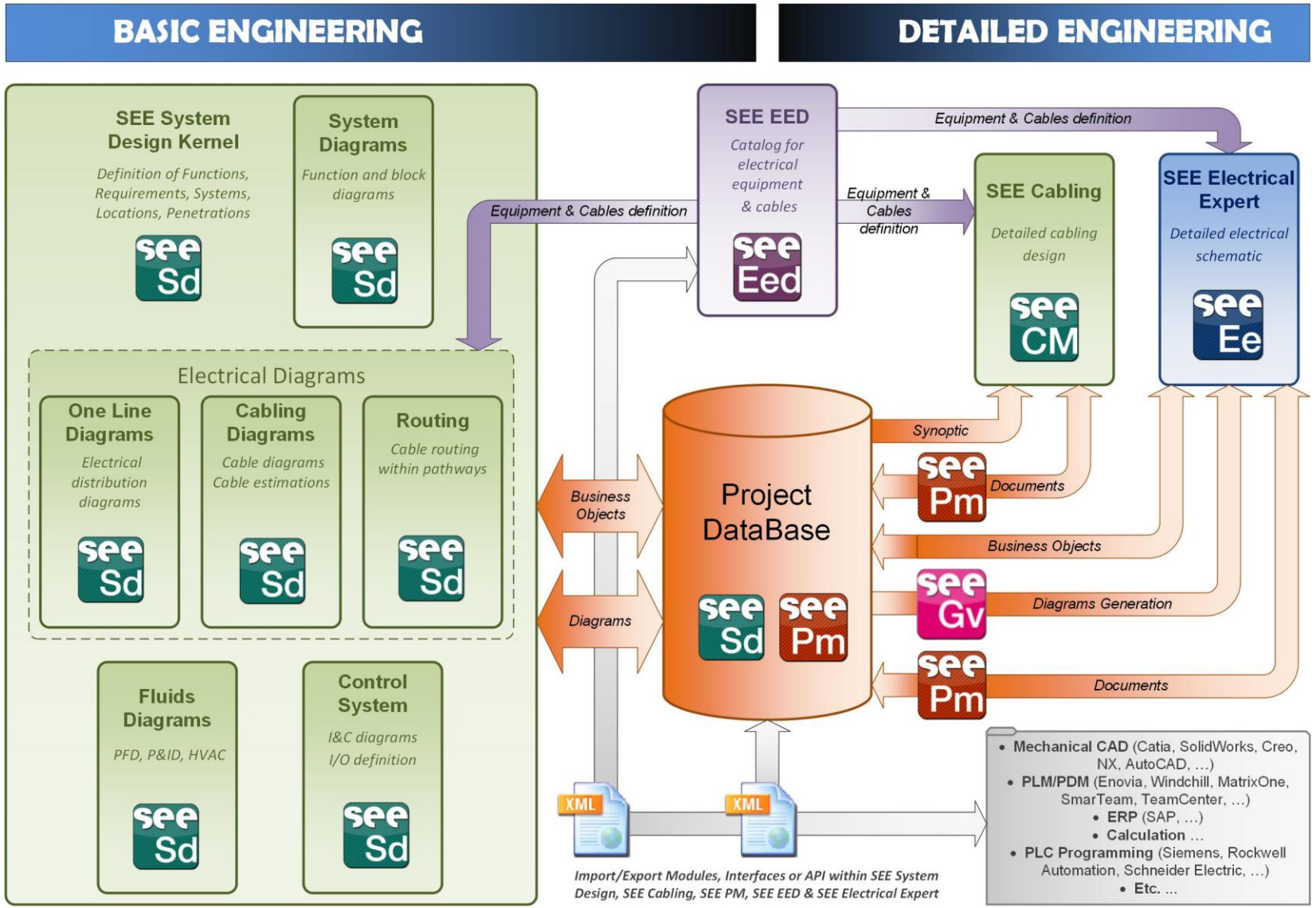
Targeted businesses






Engineering Software Range



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SEE System Design: Main Features

- SEE Systems Design is a CAE tool (Computed Aided Engineering).
- SEE Systems Design is used to design Basic Engineering:
  System diagrams, Fluids diagrams, Electrical diagrams,…
- SEE Systems Design communicates with Detail Engineering tools
  (such as SEE Cabling and SEE Electrical Expert).
- SEE Systems Design is composed of different modules which can be used in concurrent engineering on the same project.
- SEE Systems Design is highly customizable.
- Based on SEE Object Manager technology
  - One (relational) Database for many types of Diagrams
  - « Data Centric » architecture: One Business Object with multiples representations in different diagrams
  - Microsoft Visio as 2D Graphical Editor

SEE System Design: Main diagrams

- System Diagrams: Manage Requirements, Functions, Systems
- Electrical One-Line Diagrams
- PFD, P&ID & HVAC Diagrams
- Cabling Diagrams
- Cable Routing including pathway network definition
- Control System Diagrams including management of PLCs and their I/Os

+ Several others views can be generated by Rendering Module

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System Diagrams module

The System Diagrams module is made to define a Product or a Plant through Functions and Systems breakdowns.

The main features of this design are:

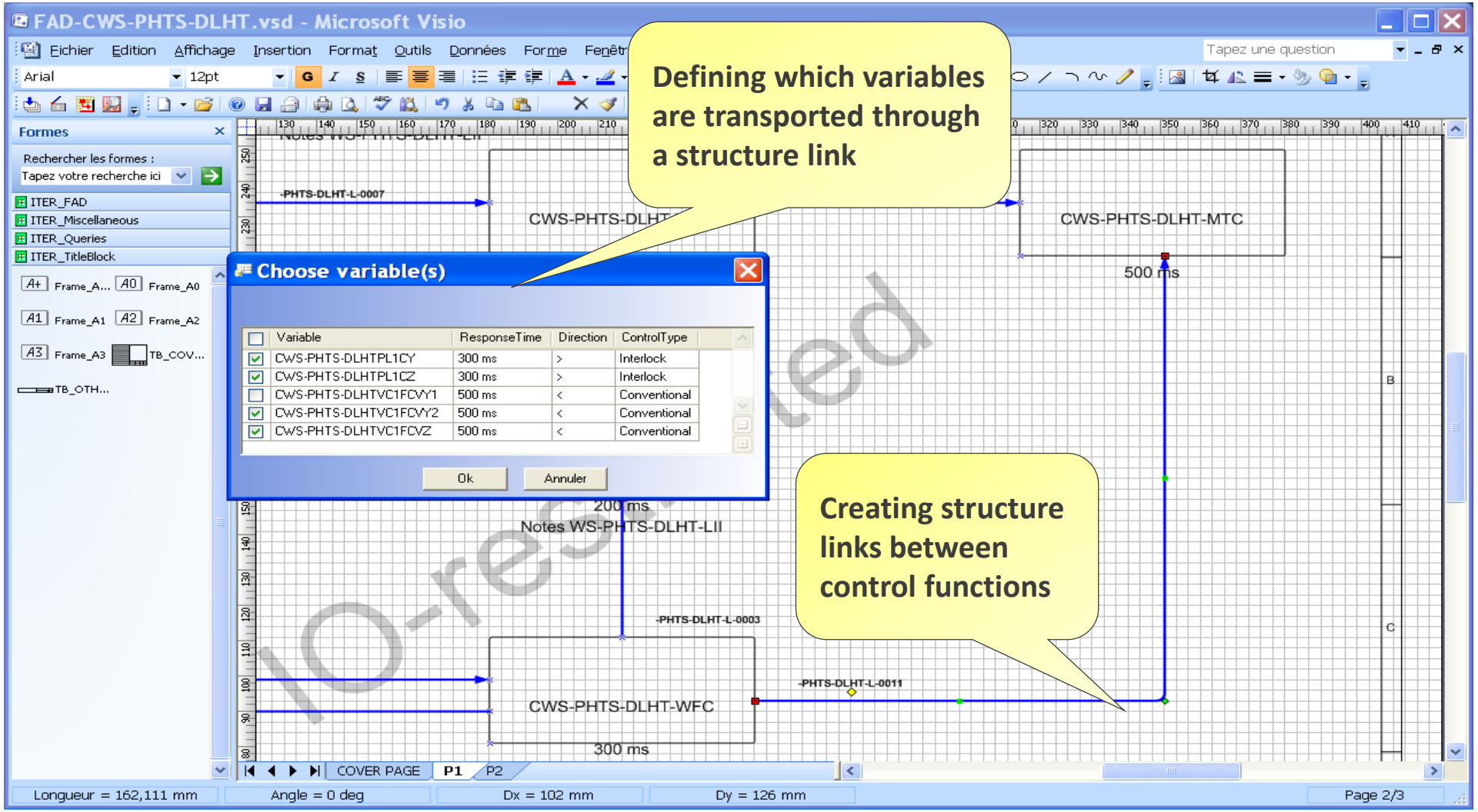
- Defining Requirements,
- Identifying the Functions decomposition of the installation: FBS
- Identifying the Systems decomposition of the installation: PBS
- Designing the Links between those objects.

Several complementary features are available such as:

- Top-down approach to decompose the installation.
- Reference-Instances mechanism: defining a standard system (called system reference) and re-use it in several contexts.

Example: Functional Analysis Diagrams

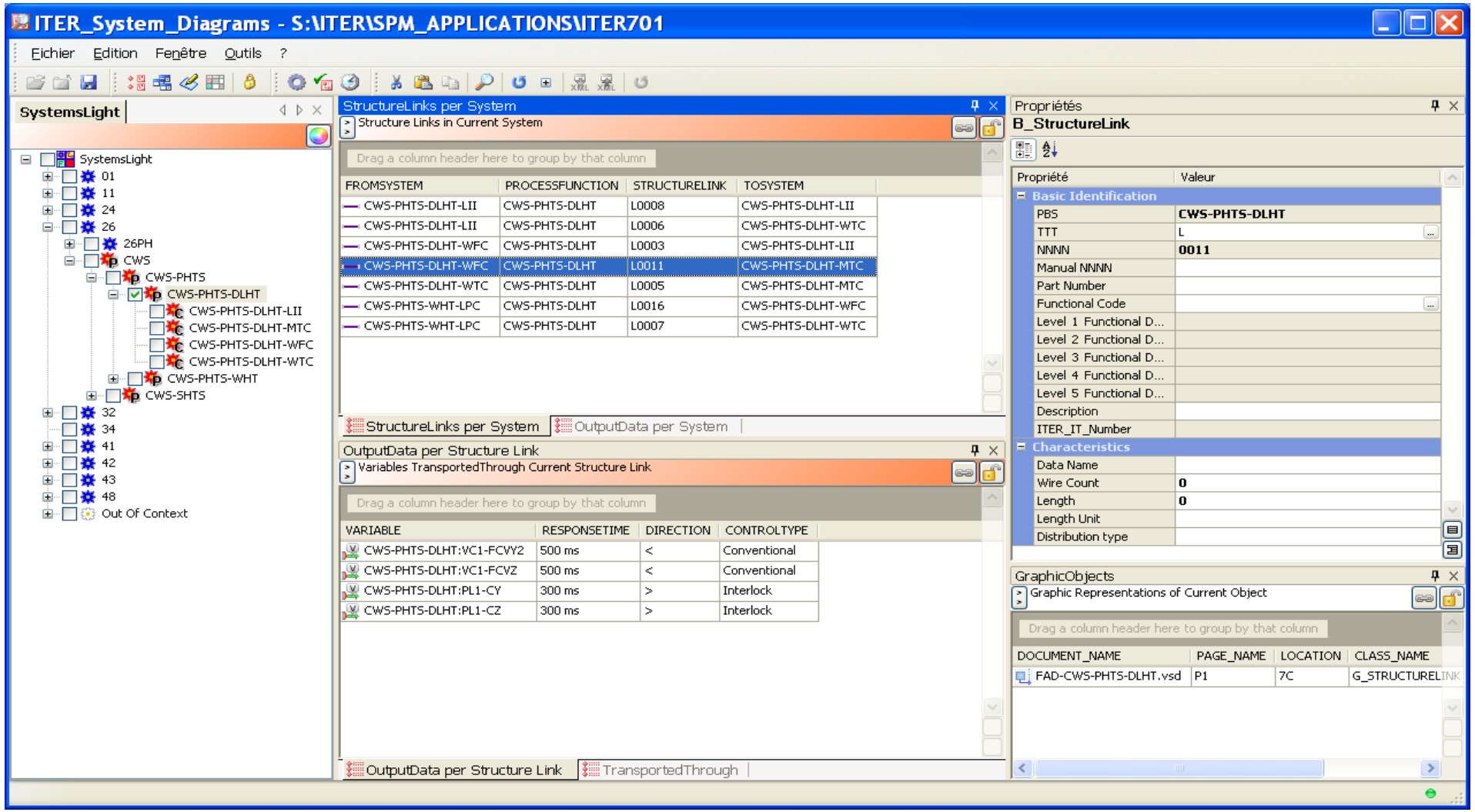
View and edit through a diagram (Visio)



System Diagrams module

Example: Functional Analysis Diagrams

View through SOM Explorer



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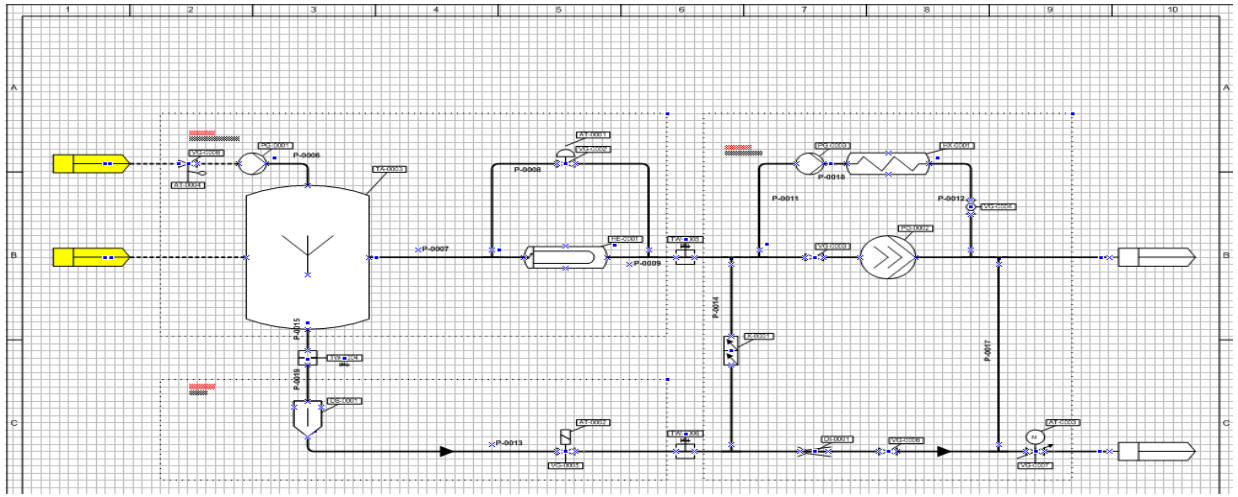
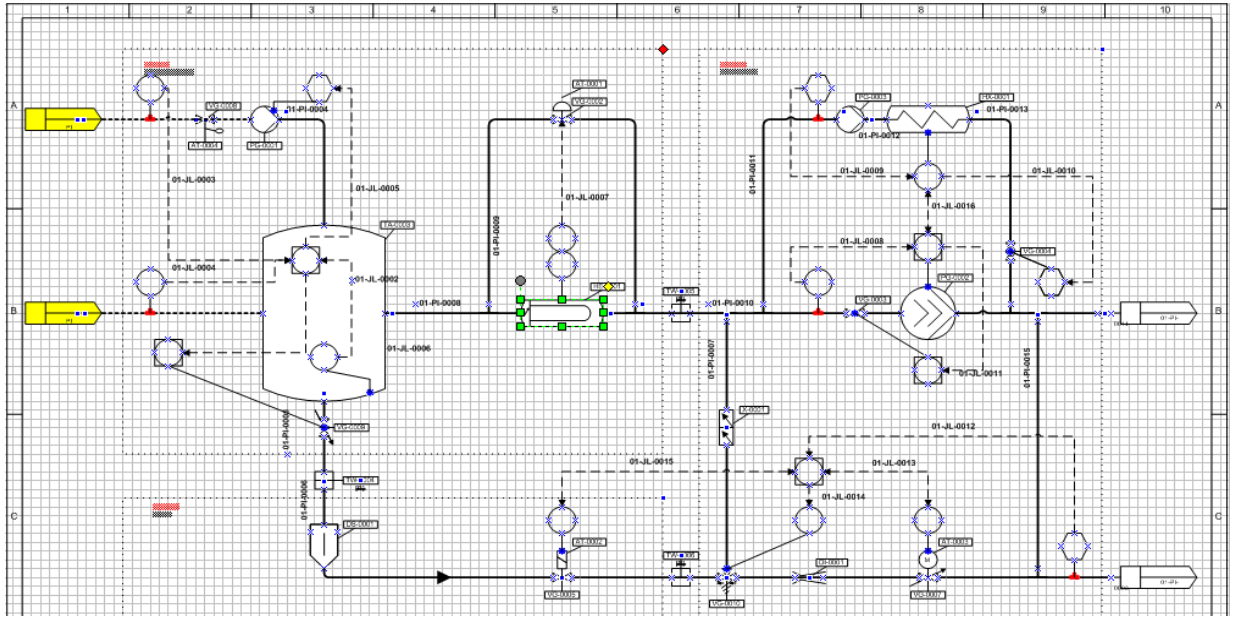
  - Demonstration movie

Fluids Diagrams



P.F.D.

- Equipment Devices
- Piping Network
- Locations (and penetrations)



P&ID

Add:

- Instrumentation
- Logical Links

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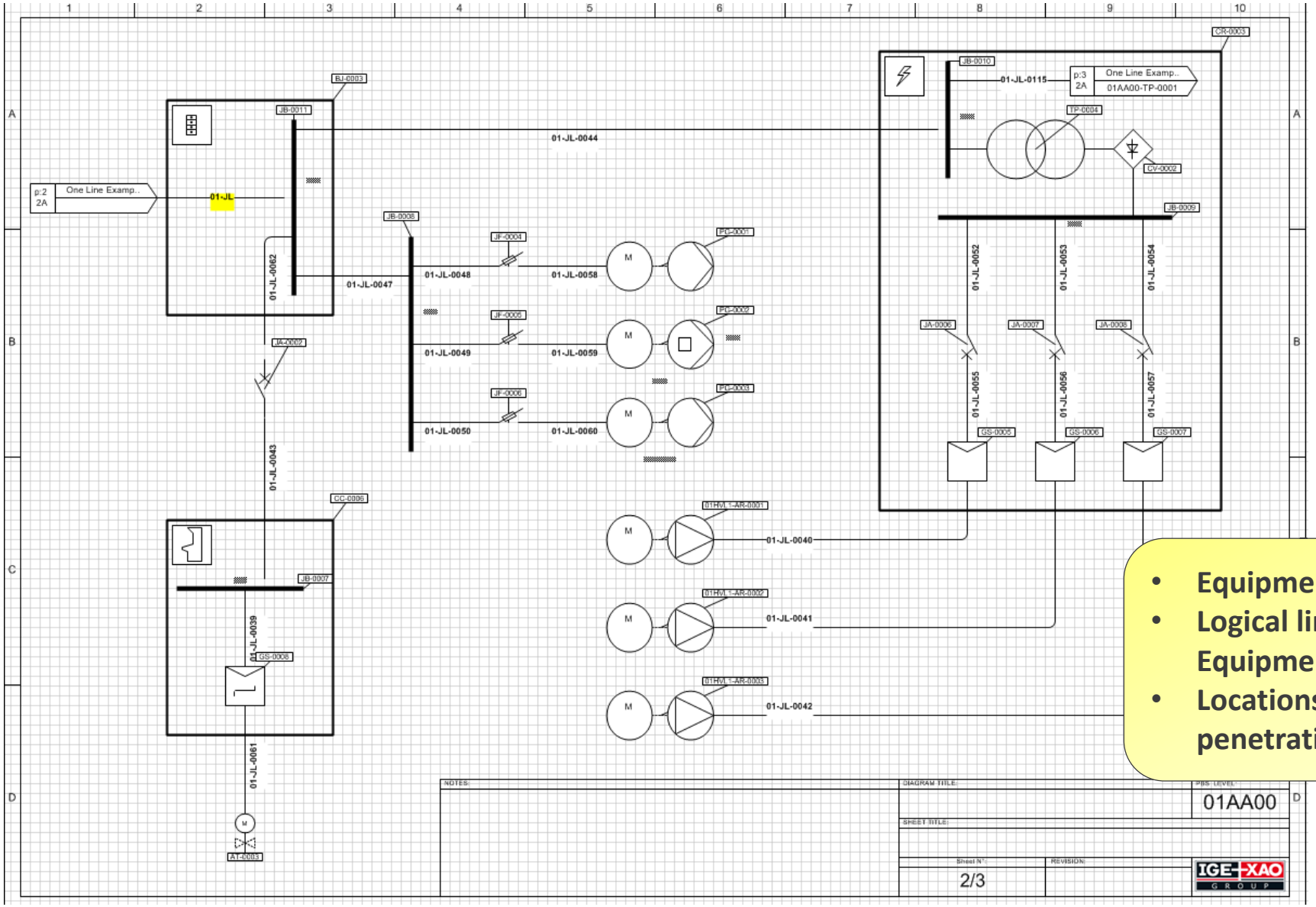
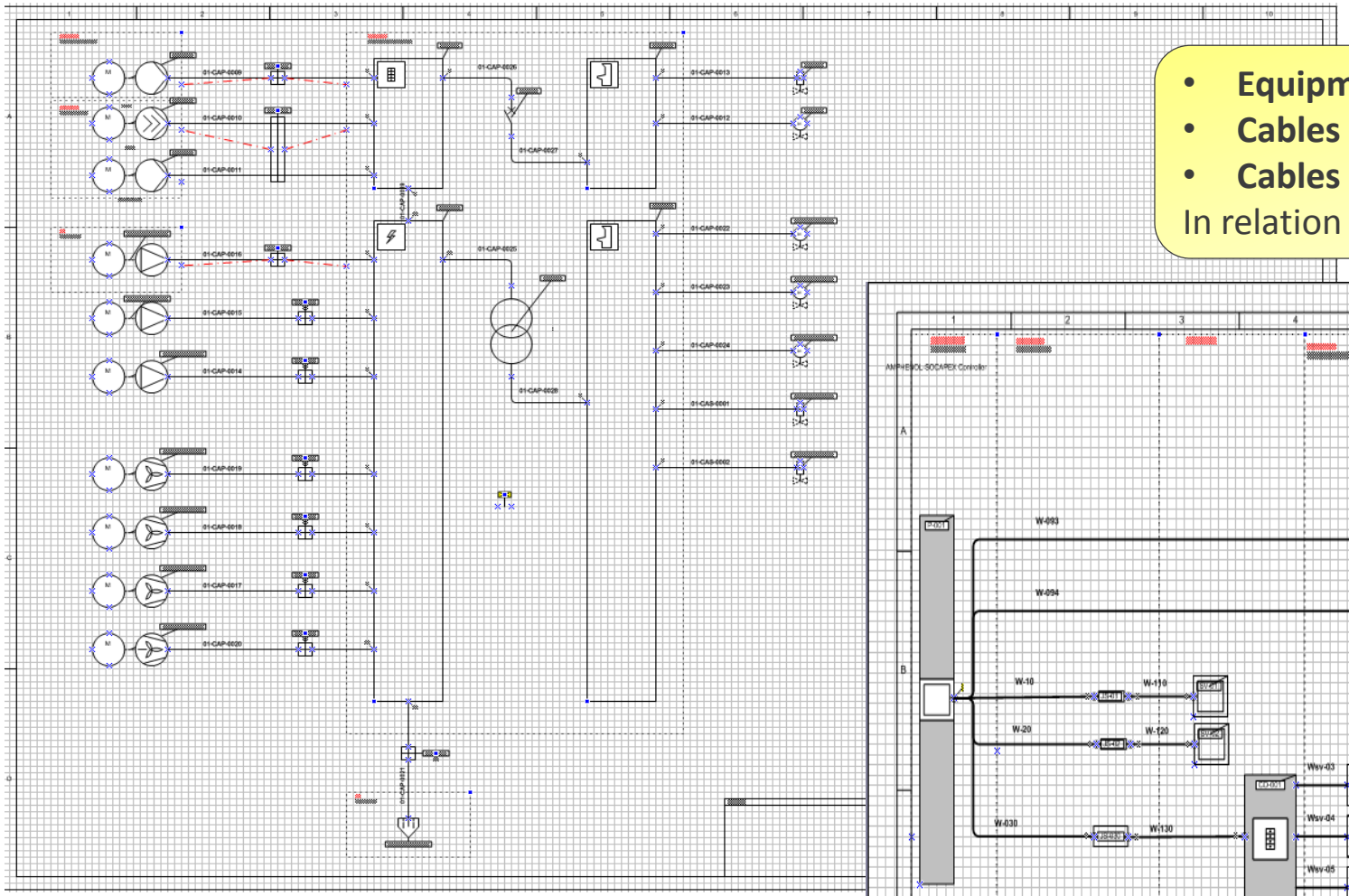
Electrical One Line Diagrams



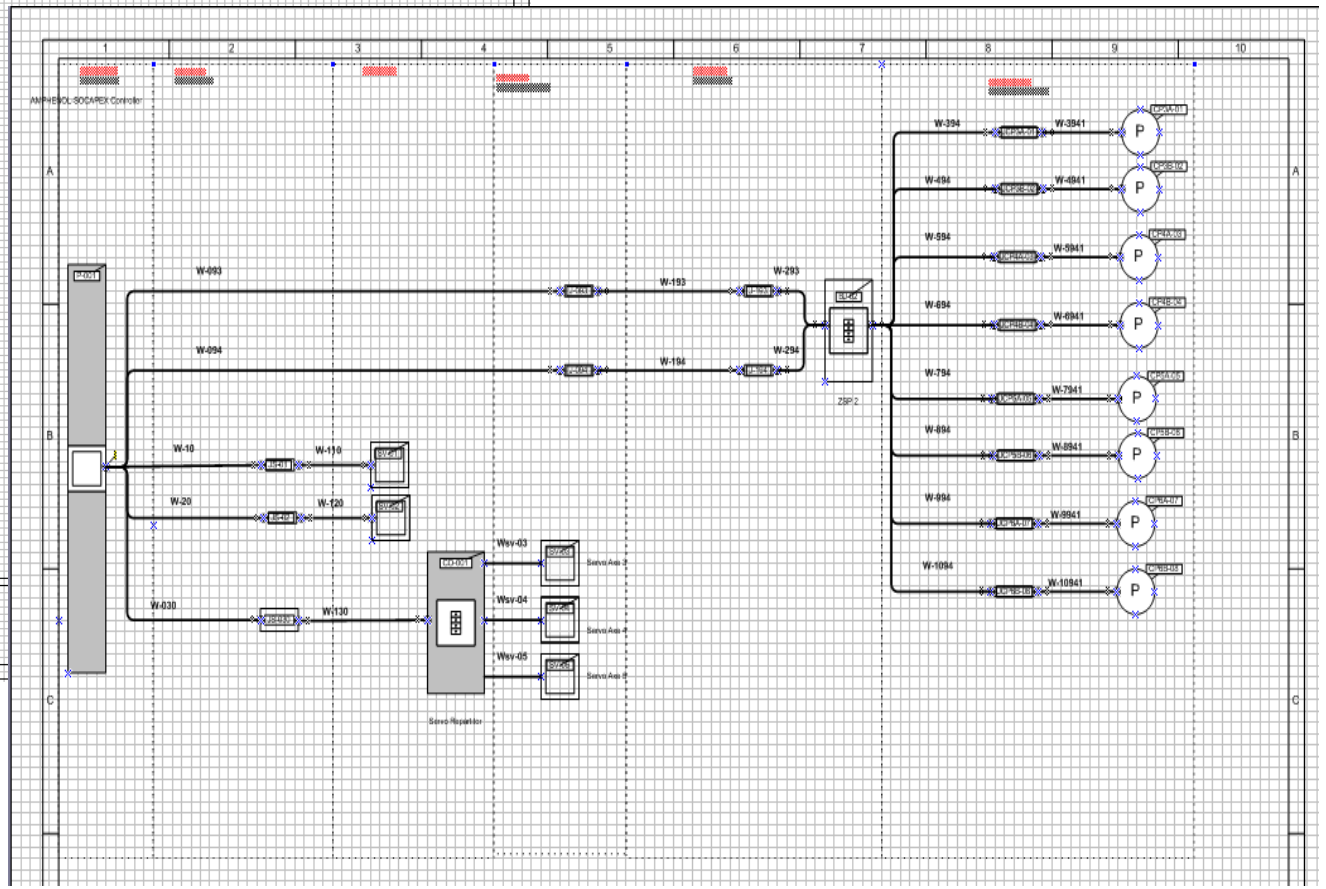
- Equipment Devices
- Logical links between Equipment Devices
- Locations (and penetrations)

Cabling Diagrams

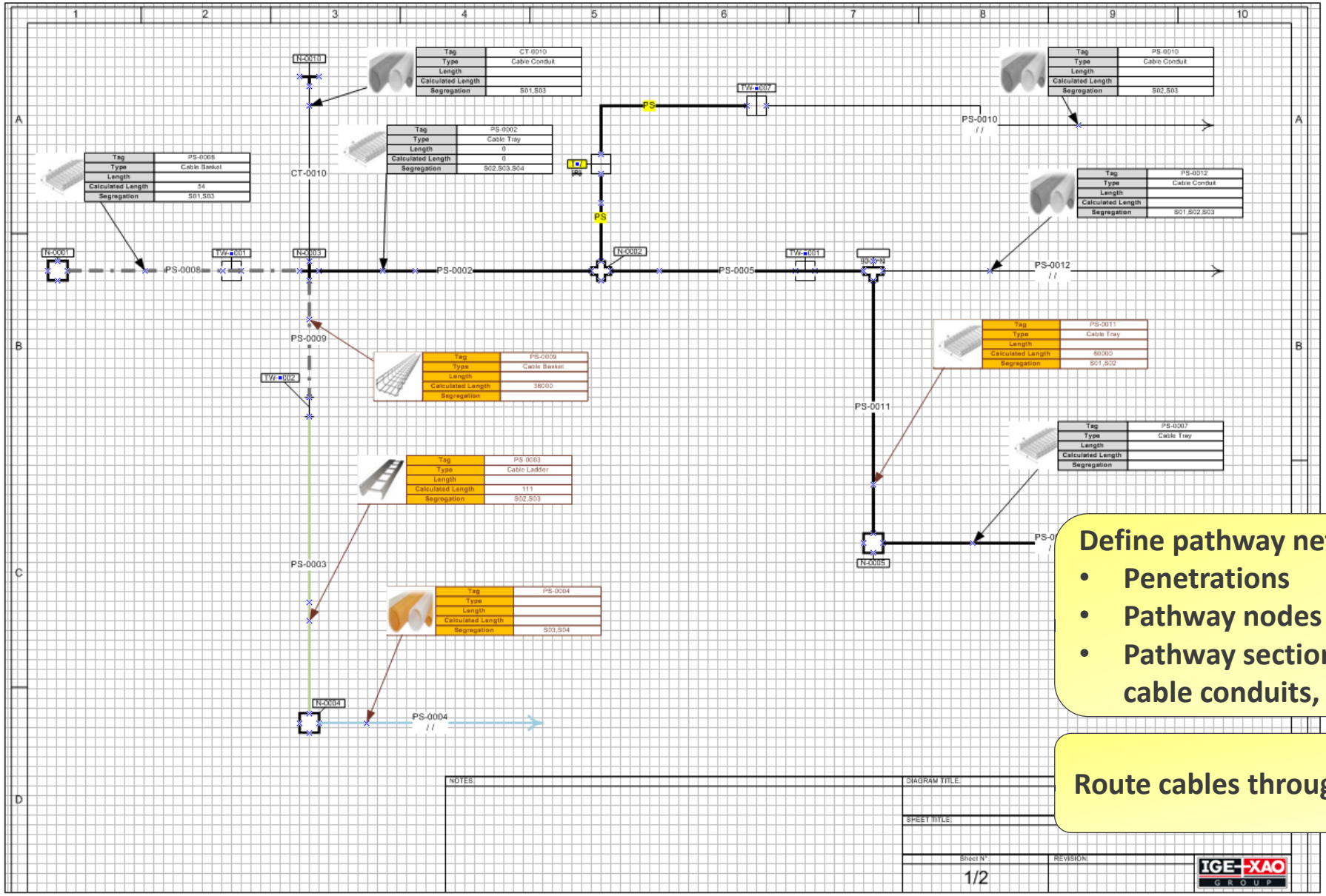


- **Equipment Devices**
- **Cables**
- **Cables ports**

In relation with SEE EED Catalog



Routing Diagrams



Define pathway network

- **Penetrations**
- **Pathway nodes**
- **Pathway sections (cable trays, cable conduits, …)**

Route cables through Pathway Network

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Rendering module

Rendering module provides powerful design functionalities which can add semantic on a single diagram.

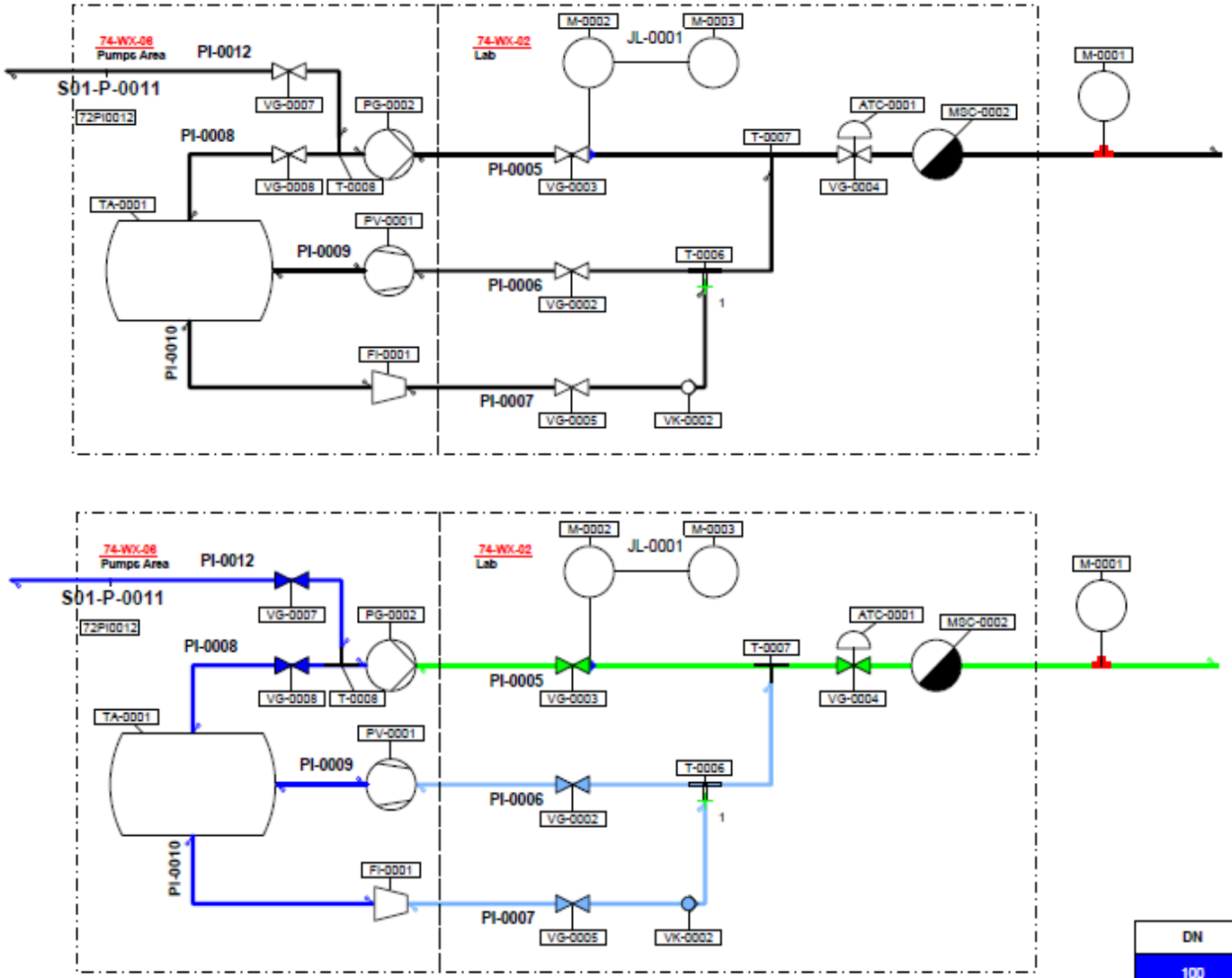
Principle:

- A single diagram can be visualized with multiple points of view
- Each view is dedicated to highlight specific information useful for a specific discipline (craft)
- Each view may use specific semantic to highlight specific information
- Each view is named a “rendering” of the general diagram.

Categories of rendering:

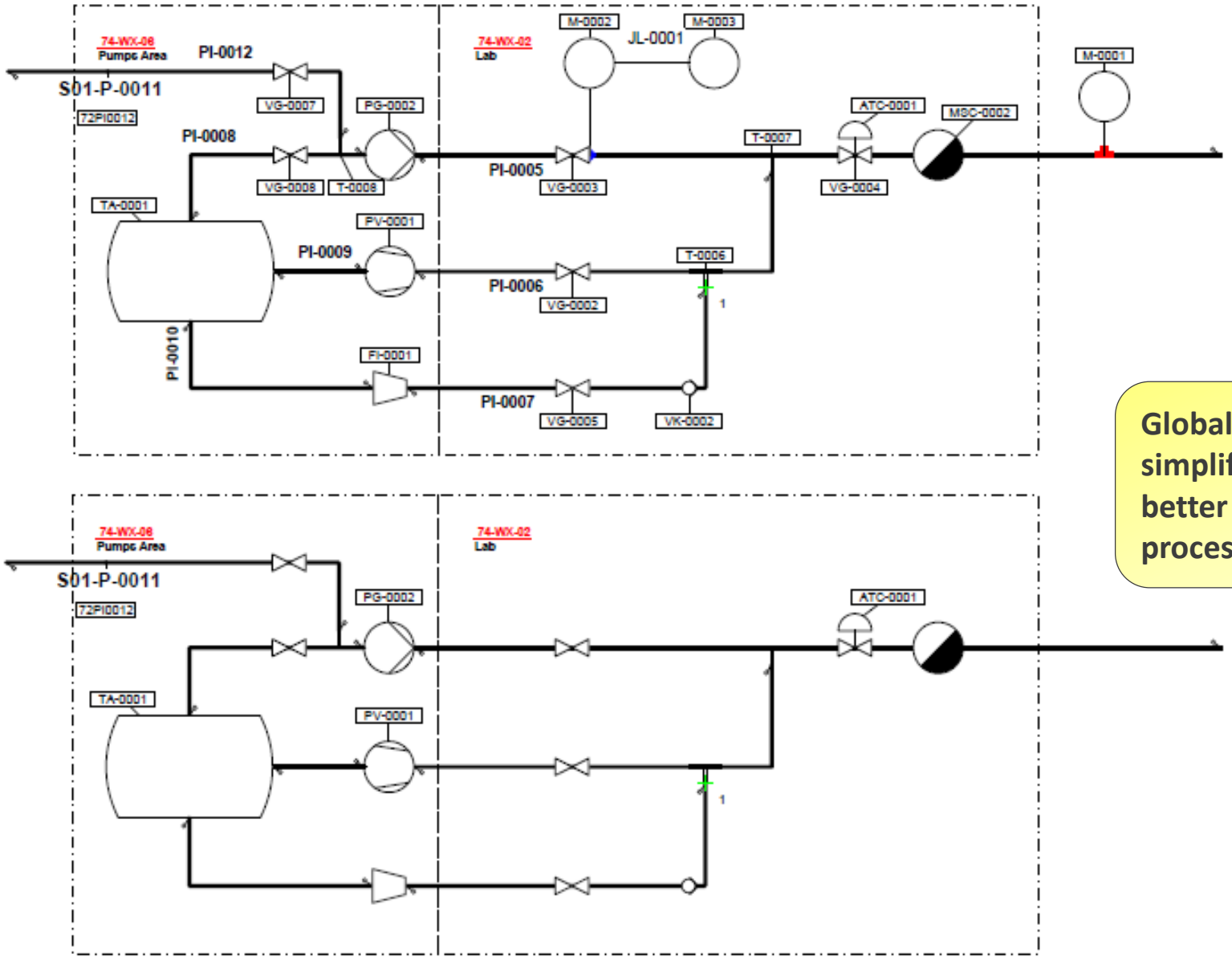
- Colorizations
- Global renderings
- State rendering
- Combinations of renderings.

Example of colorization



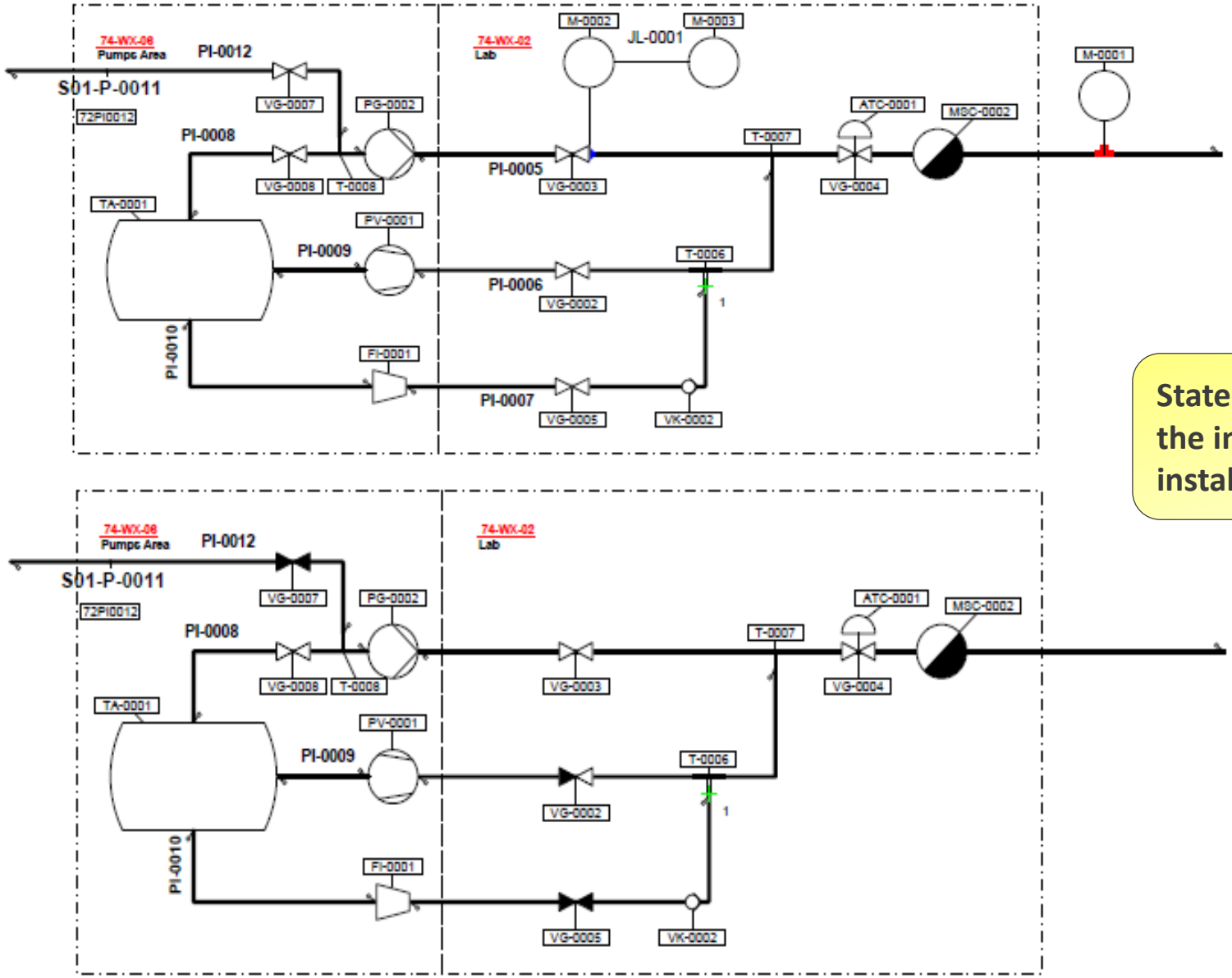
Colorization to highlight different values of diameter property used in the diagram

Example of global rendering



Global rendering used to simplify the diagram for a better understanding of the process

Example of state rendering



State rendering used to visualize the influence of a state of the installation on the diagram

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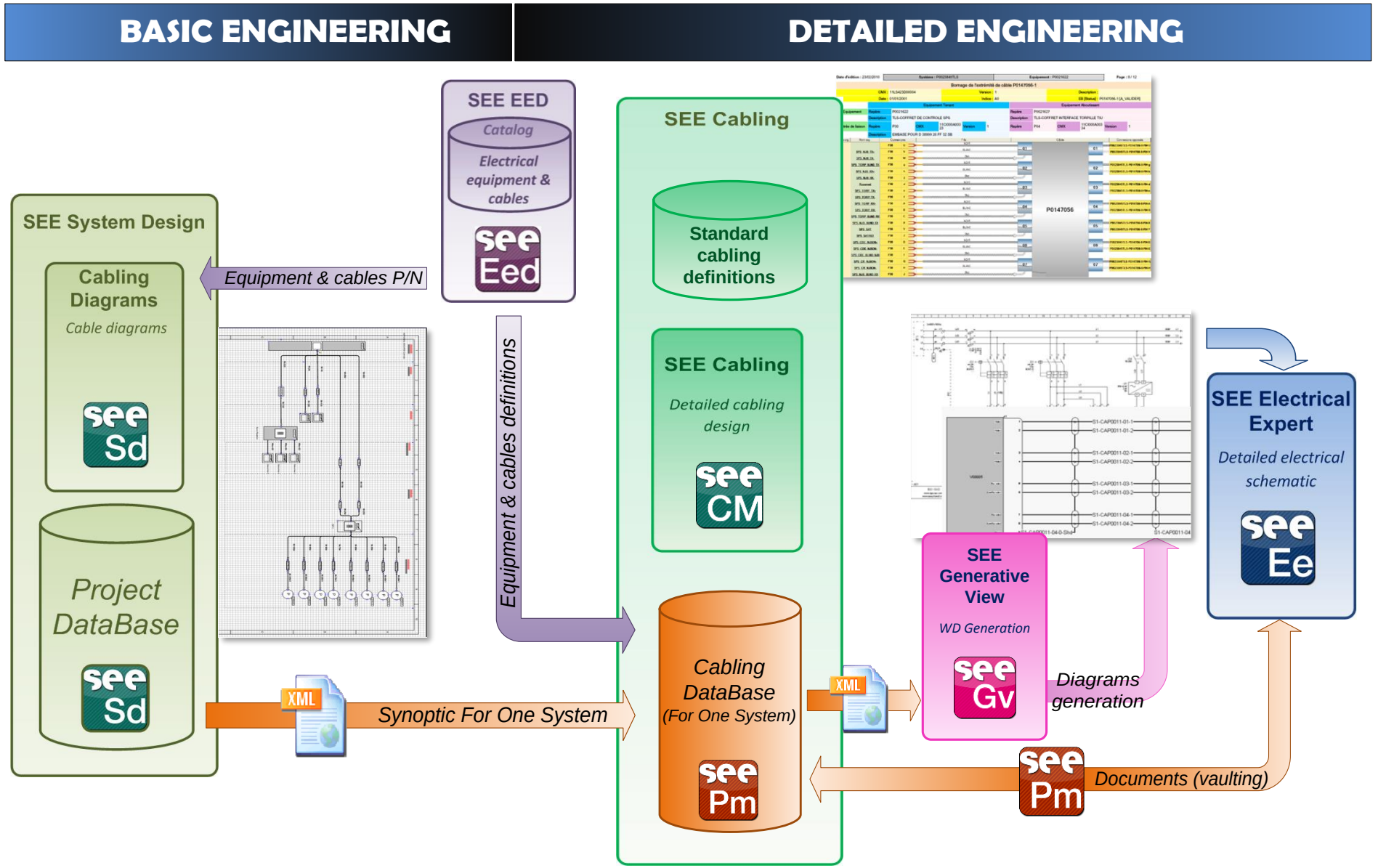
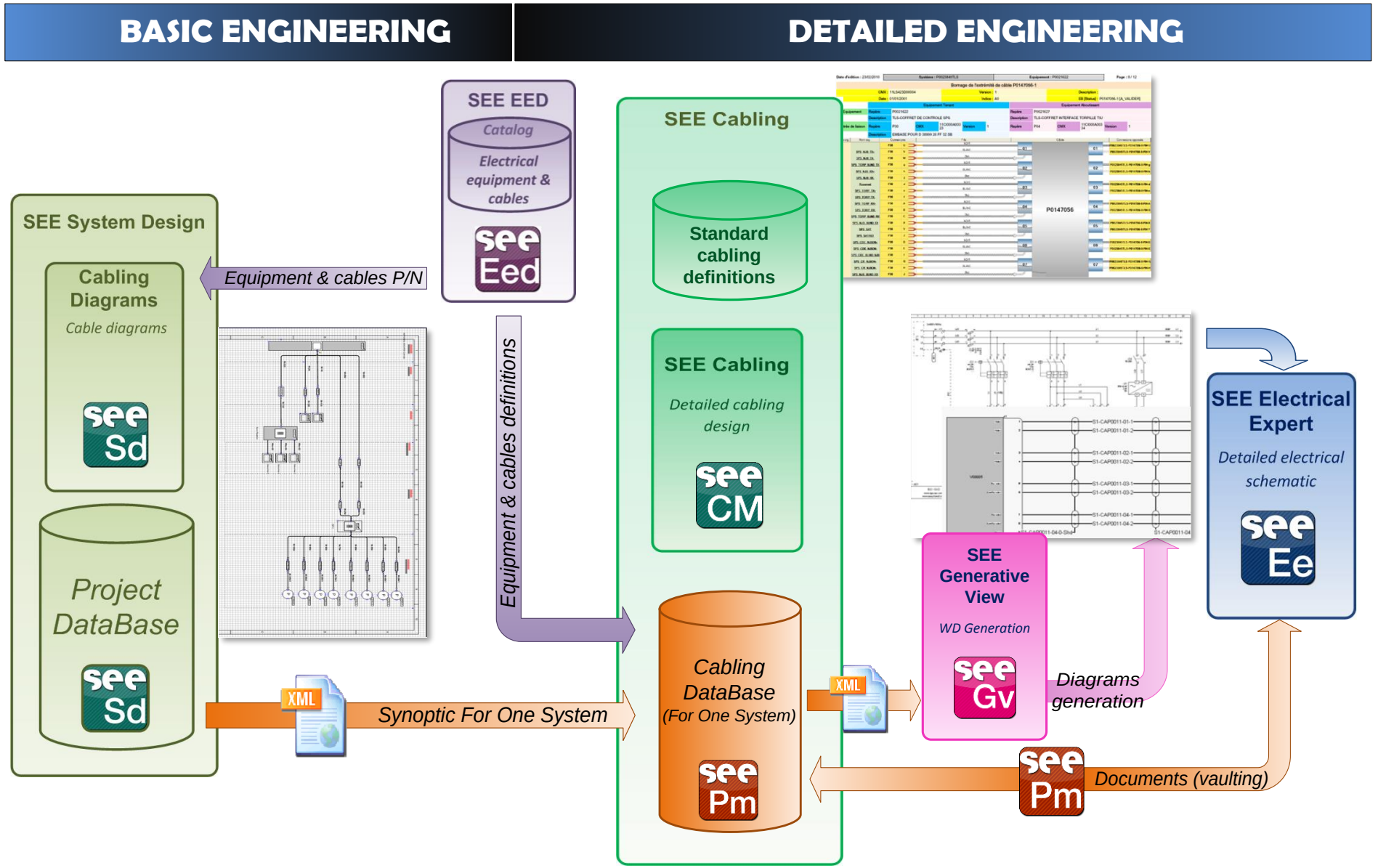
Detailed Engineering Architecture



Detailed Engineering Architecture



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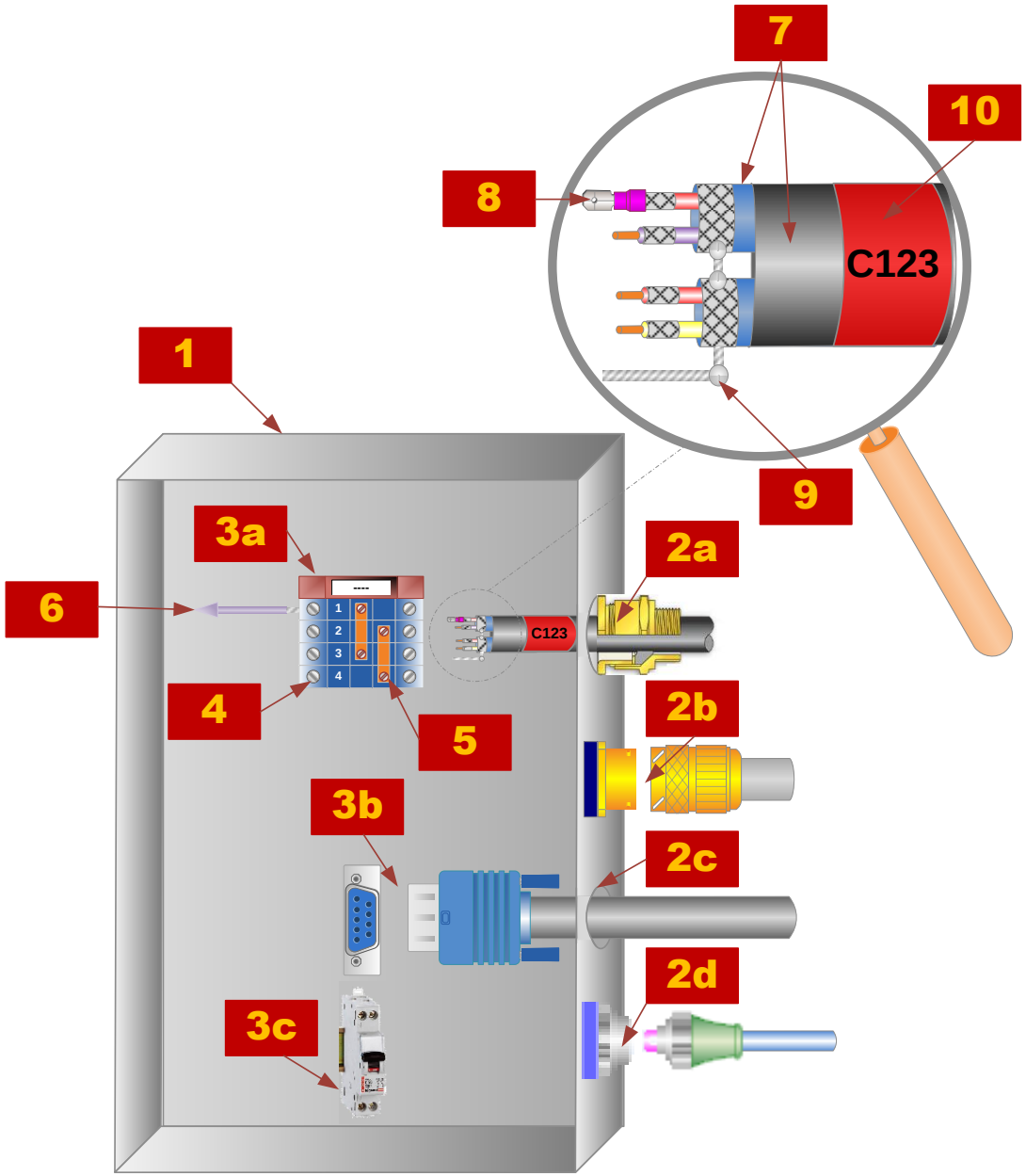
Electrical Objects managed by SEE Cabling



1	Equipment
2a	PassThrough (CableGland)
2b	PassThrough (Connector)
2c	PassThrough (CableShaft)
2d	PassThrough (Optical Connector)
3a	Connective Equipment (Terminal Block)
3b	Connective Equipment (Connector)
3c	Connective Equipment (Device Terminal Block)
4	Connective Equipment Element (Terminal)
5	Pin SET (shunt)
6	Wire (Internal)
7	Cable
8	Wire Extremity
9	Connection Adon
10	Accesory

SEE Cabling: Main Functionalities

INPUTS

- Equipment Devices & Cables installation from SEE Systems Design (Cabling Diagrams) or other synoptic design tool.
- Equipment Devices & Cables definition from SEE EED Catalogue

OUTPUT: Description of cables extremities

- Connection of wires on terminals or pins
- Shielding Description (several methods are proposed)
- Shunt management: on the same terminal device or from different connectors.
- Signal management: Tracing from transmitter to receivers
- Accessories management for all devices

Functionalities

- Manual Cabling of a wire on a pin
- Automatic Cabling (for extremities or for Equipment Devices) from a catalog of standards.
- Live Cycle management for cables extremities
- Export of cabling reports on Excel or PDF
- Global Update: Ex. Switching P/N for a project

Cabling report: by Equipment Devices

Status Terminal or Connectors Cables Destination

Date d'édition : 23/02/2010 | Système : P0023845TLS | Equipement : P0021622 | Page : 3 / 12

Répartition des câbles sur l'équipement

Ind.				Câbles	Descriptions	Opposés
A.0		(P10/P10)	P10		P0023845TLS-P0147047	P0023790-P0154538
A.0		(P20/P20)	P20		P0023845TLS-P0137355	P0000041-P0044940
A.0		(P30/P30)	P30		P0023845TLS-P0147056	P0023845TLS-P0021627
A.0		(P40/P40)	P40		P0023845TLS-P0147057	P0023845TLS-P0021626
B.0		(P90/P90)	P90		P0023845TLS-P0147048	INS-NAVIRE-P0118396
B.0		(P91/P91)	P91		P0023845TLS-P0147049	INS-NAVIRE-P0103597
B.0		(P92/P92)	P92		P0023845TLS-P0162001	P0000032-P0103603

Cabling report: Detail by Equipment Devices

Date d'édition : 23/02/2010 | Système : P0023845TLS | Equipement : P0021622 | Page : 8 / 12

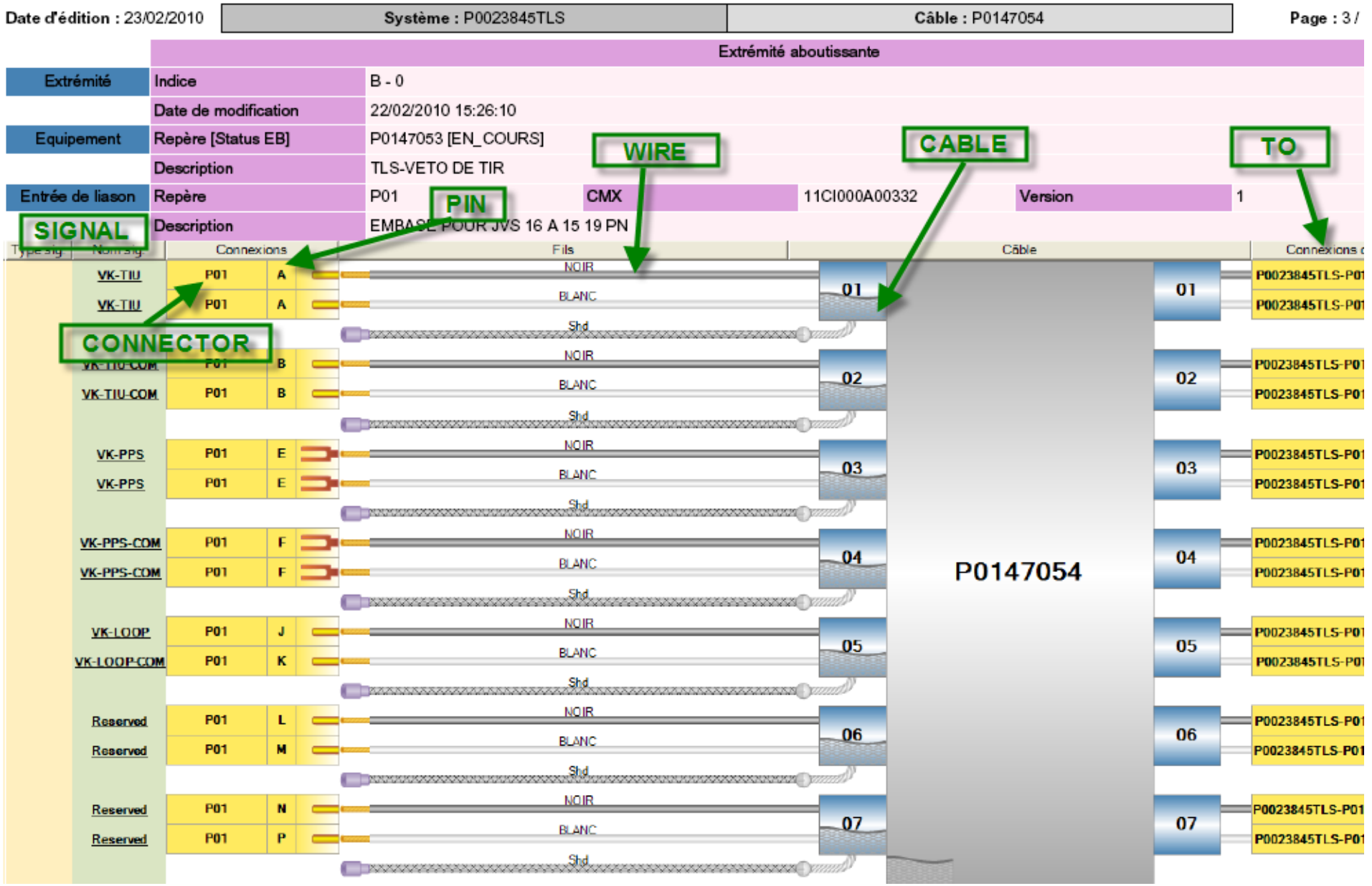
Bornage de l'extrémité de câble P0147056-1

CMX :	11LS423D00004	Version :	1	Description :	
Date :	01/01/2001	Indice :	A0	EB [Status] :	P0147056-1 [A_VALIDER]

		Equipement Tenant					Equipement Aboutissant				
Equipement	Repère	P0021622					Repère	P0021627			
	Description	TLS-COFFRET DE CONTROLE SPS					Description	TLS-COFFRET INTERFACE TORPILLE TIU			
Entrée de liaison	Repère	P30	CMX	11CI000A00323	Version	1	Repère	P04	CMX	11CI000A00334	Version	1
	Description	EMBASE POUR D 38999 26 FF 32 SB										

Type sig.	Nom sig.	Connexions		Fils	Câble	Connexions opposés
		P30	U	NOIR	01	P0023845TLS-P0147056-0-P04-U
	SPS_NJB_TX+	P30	V	BLANC		P0023845TLS-P0147056-0-P04-V
	SPS_NJB_TX-	P30	W	Shd		
	SPS_TORP_BLIND_TX	P30	g	NOIR	02	P0023845TLS-P0147056-0-P04-g
	SPS_NJB_RX+	P30	h	BLANC		P0023845TLS-P0147056-0-P04-h
	SPS_NJB_RX-	P30	j	Shd		
	Reserved	P30	d	NOIR	03	P0023845TLS-P0147056-0-P04-d
	SPS_TORP_TX+	P30	c	BLANC		P0023845TLS-P0147056-0-P04-c
	SPS_TORP_TX-	P30	f	Shd		
	SPS_TORP_RX+	P30	A	NOIR	04	P0023845TLS-P0147056-0-P04-A
	SPS_TORP_RX-	P30	B	BLANC		P0023845TLS-P0147056-0-P04-B
	SPS_TORP_BLIND_RX	P30	C	Shd	P0147056	
	SPS_NJB_BLIND_TX	P30	X	NOIR	05	P0023845TLS-P0147056-0-P04-X
	SPS_SAT	P30	Y	BLANC		P0023845TLS-P0147056-0-P04-Y
	SPS_SATRET	P30	Z	Shd		
	SPS_CDE_NJBON+	P30	D	NOIR	06	P0023845TLS-P0147056-0-P04-D
	SPS_CDE_NJBON-	P30	E	BLANC		P0023845TLS-P0147056-0-P04-E
	SPS_CDE_BLIND_NJB	P30	F	Shd		
	SPS_CR_NJBON+	P30	G	NOIR	07	P0023845TLS-P0147056-0-P04-G
	SPS_CR_NJBON-	P30	H	BLANC		P0023845TLS-P0147056-0-P04-H
	SPS_NJB_BLIND_RX	P30	J	Shd		

Cabling Report: Detail by Cable



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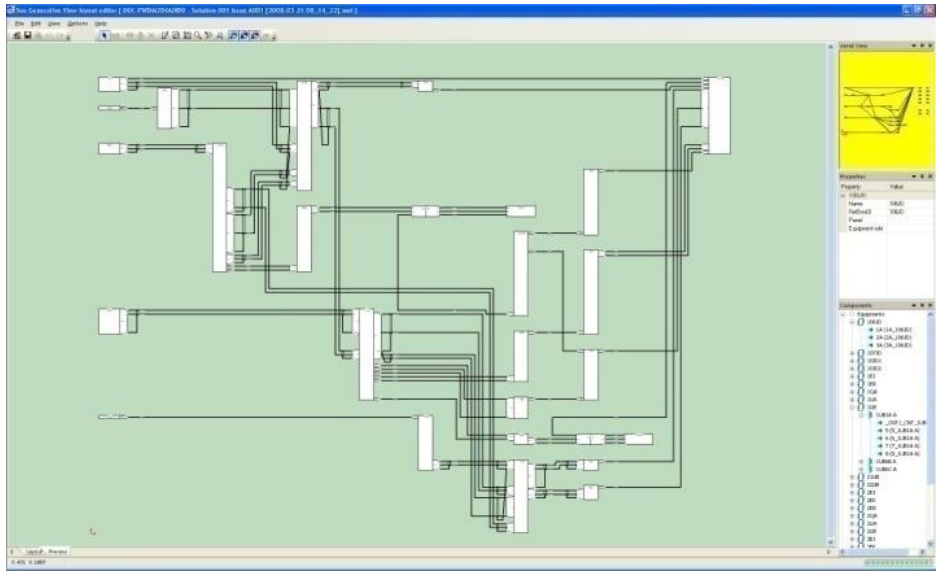
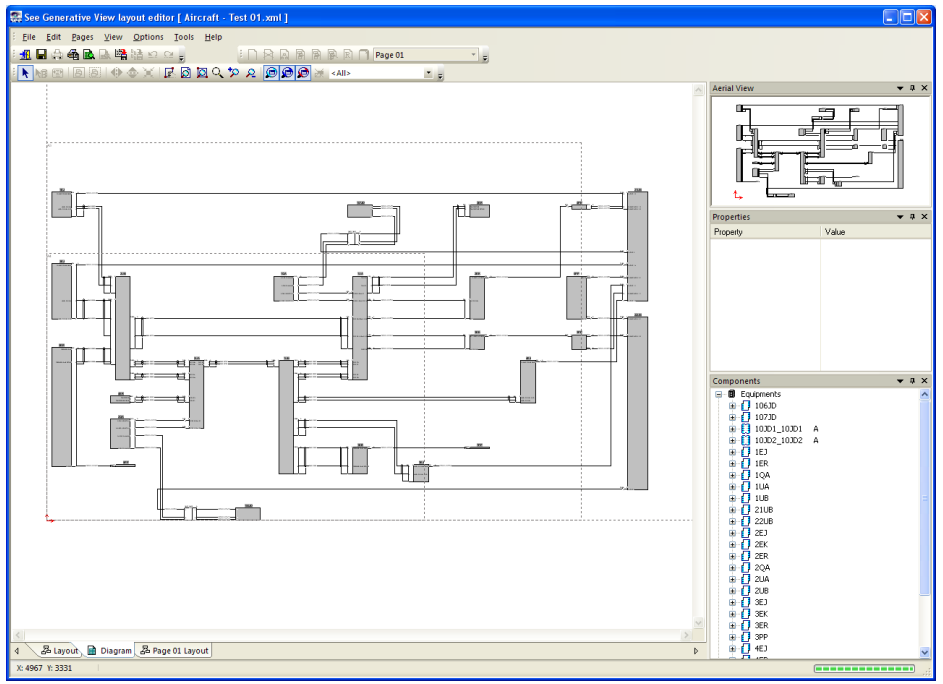
Wiring Diagram Generation





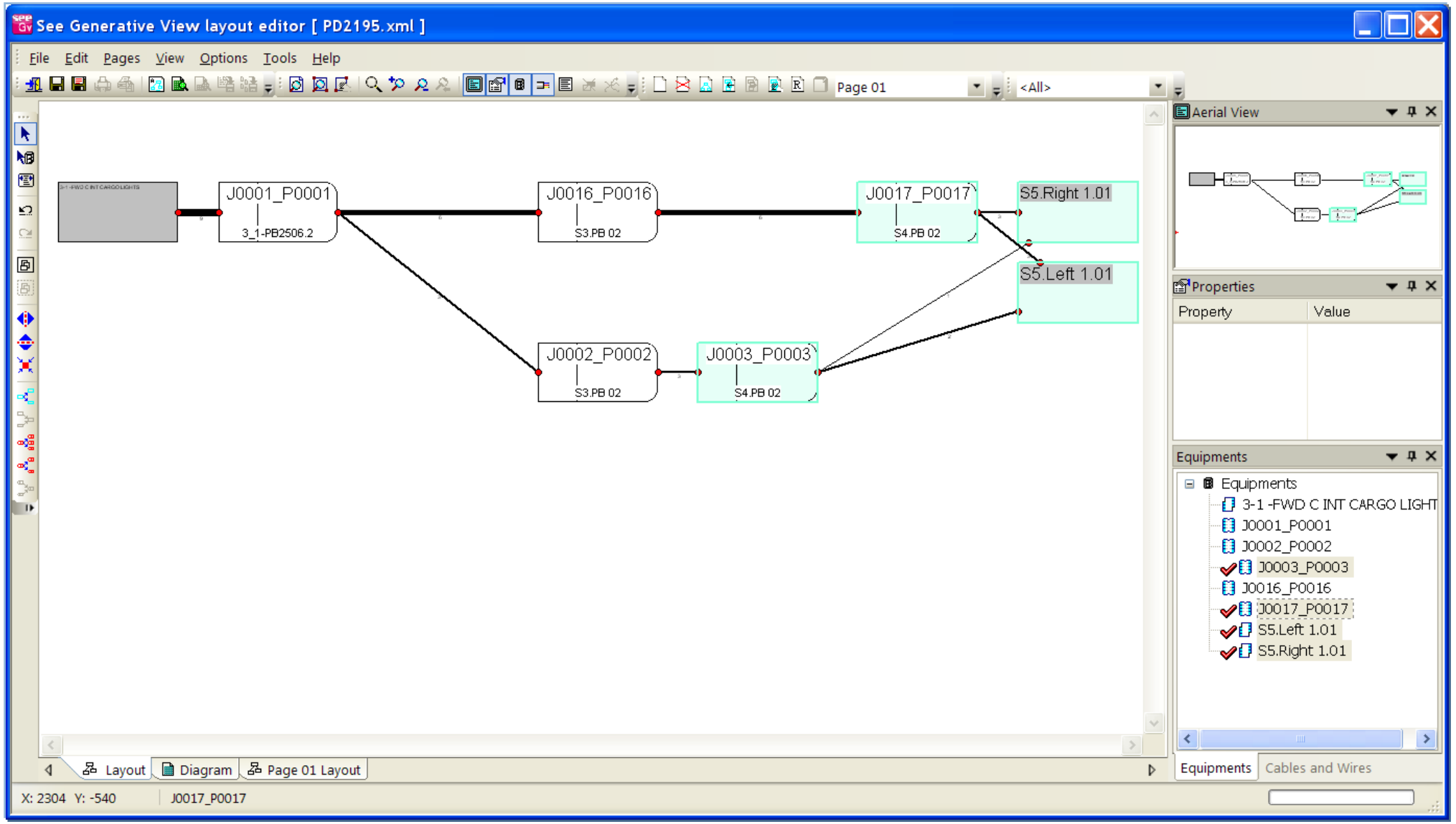
SEE Generative View

Semi-Automatic generation of wiring diagrams for engineering review.

- Data extraction for Diagram generation
  - For one Functional Diagram
  - For one Equipment Devices Device
  - For one Net
  - …
- Extraction is generated
  - For engineering review ➔ SEE Generative View
  - For customer documentation ➔ SEE Electrical Expert

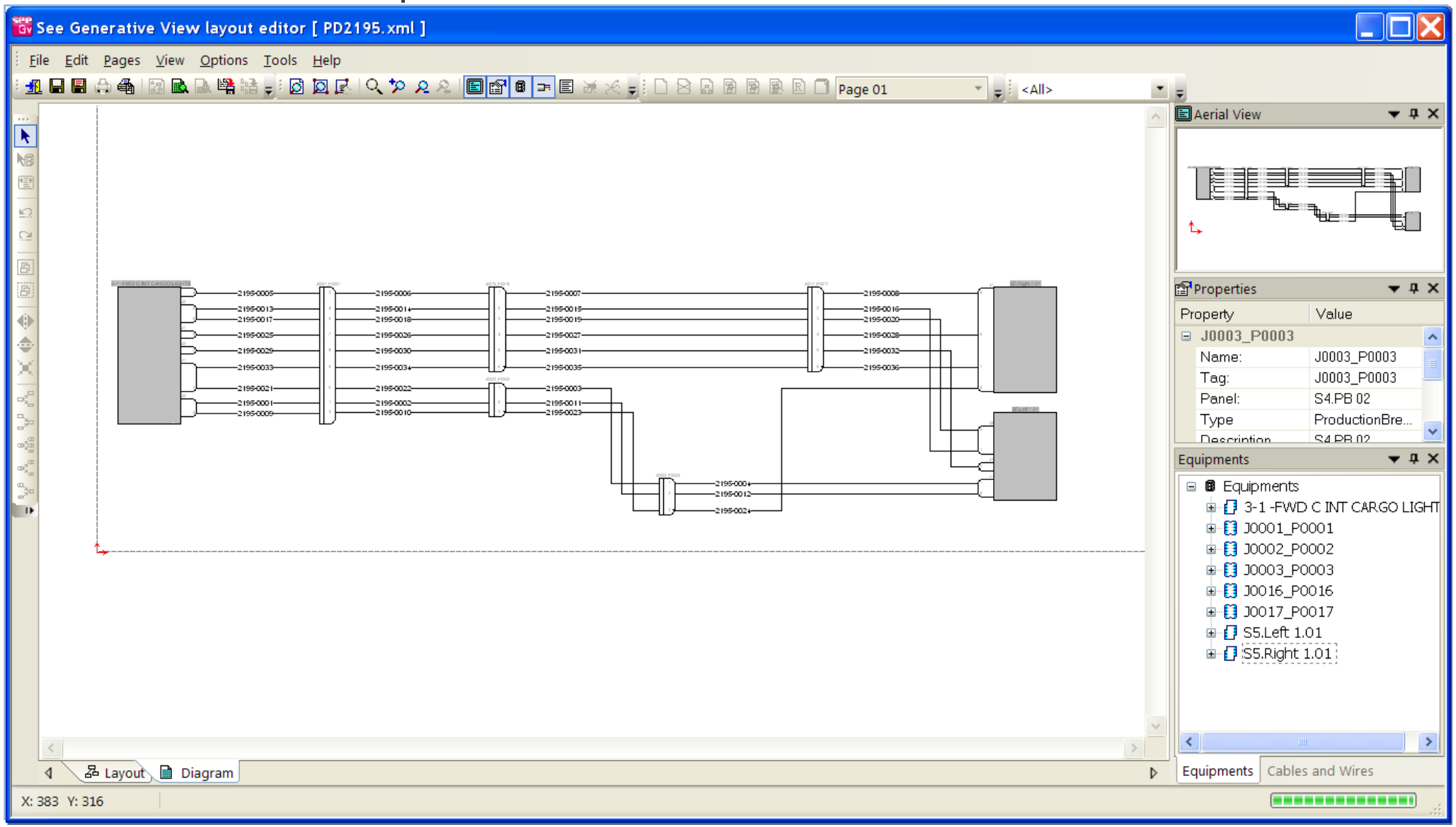
Wiring Diagram Generation

SEE Generative View: Step 1 - Layout



Wiring Diagram Generation

SEE Generative View: Step 2 - Generation of WD



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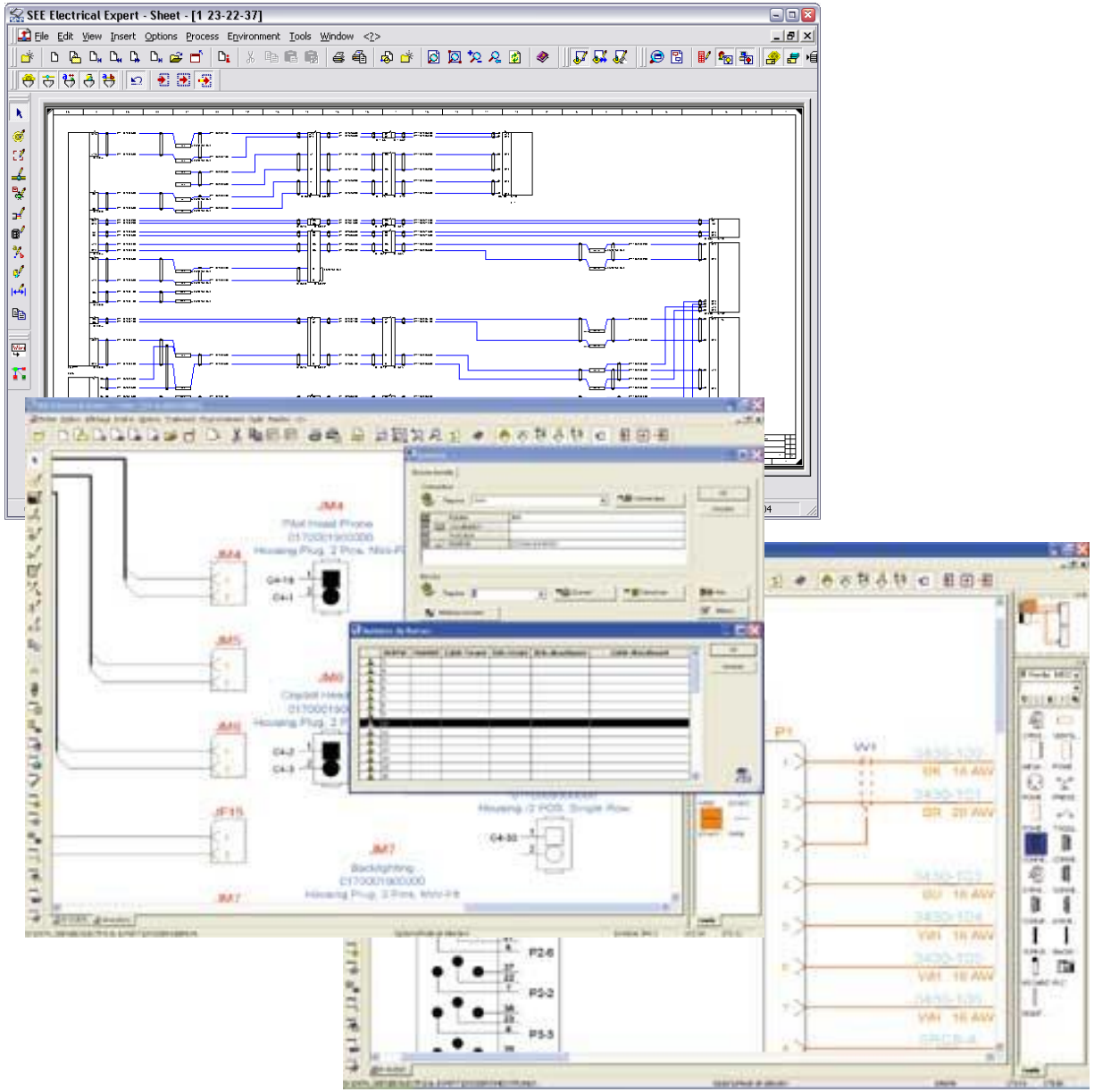
Detailed Wiring Diagrams



SEE Electrical Expert

All the power of electrical schematics CAD dedicated to detailed design

- SEE Electrical Expert provides all the tools for wiring diagrams
- SEE Electrical Expert combines, at the same time:
  - Wiring diagrams
  - Data exchange (ODBC, OLE, SQL, HTML, XML, DXF, AutoCAD, Visual Basic for Applications)

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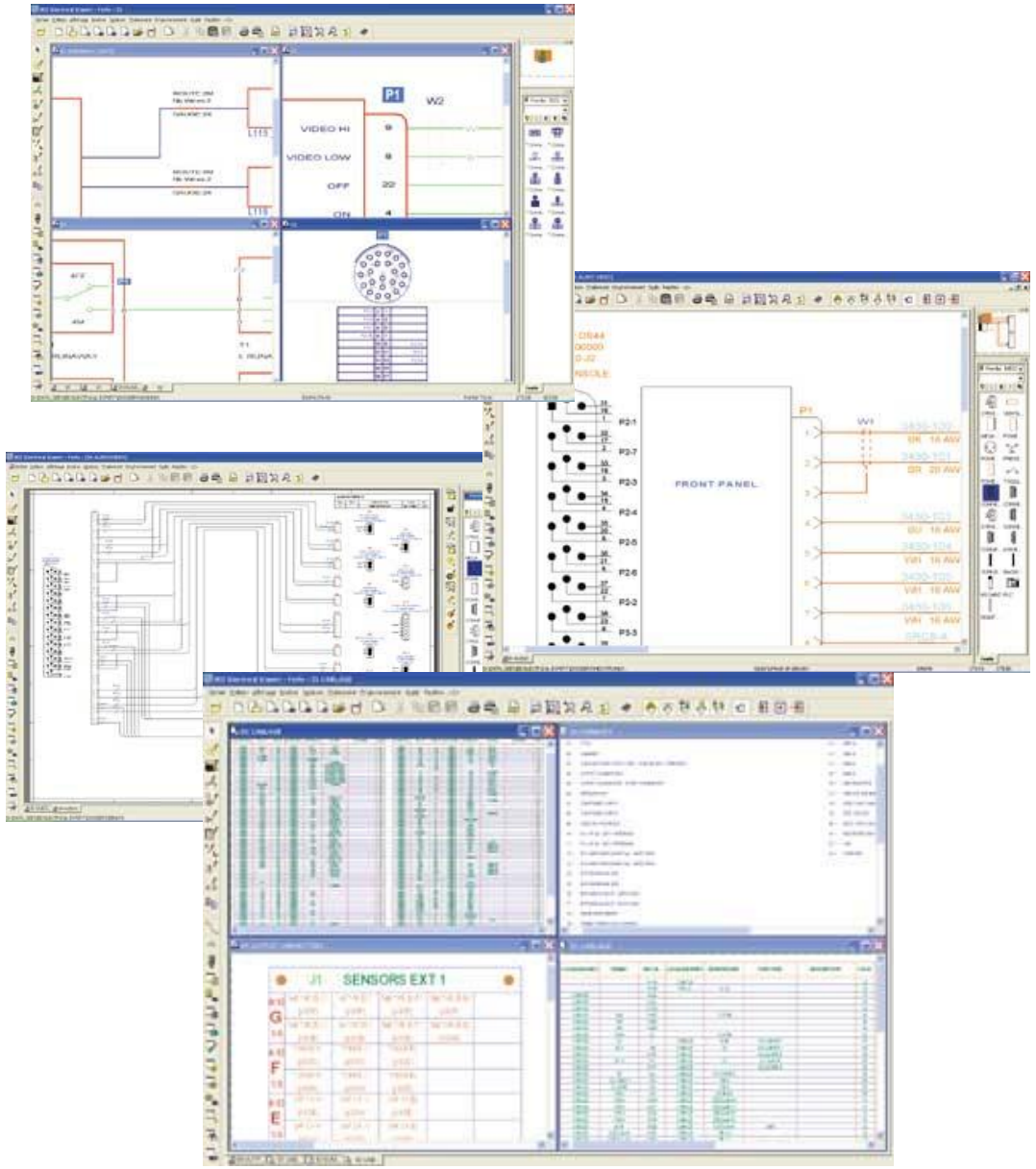

SEE Electrical Expert

- Management of diagrams,
  - creation and modification of diagrams
  - symbols management (creation, modification, deletion)
  - management of components
  - management of catalogs…
- Management of wires, cables & connectors,
  - wires & cables creation & modification,
  - real time signals management,
  - creation and modification of connector pins according to chosen Equipment Devices (pin number, gauge,…)
  - automatic numbering
  - real-time control (pin duplication, exceeding capacity)…
- Management of lists,
  - Equipment Devices lists
  - wire lists
  - cable lists
  - manufacturing lists…

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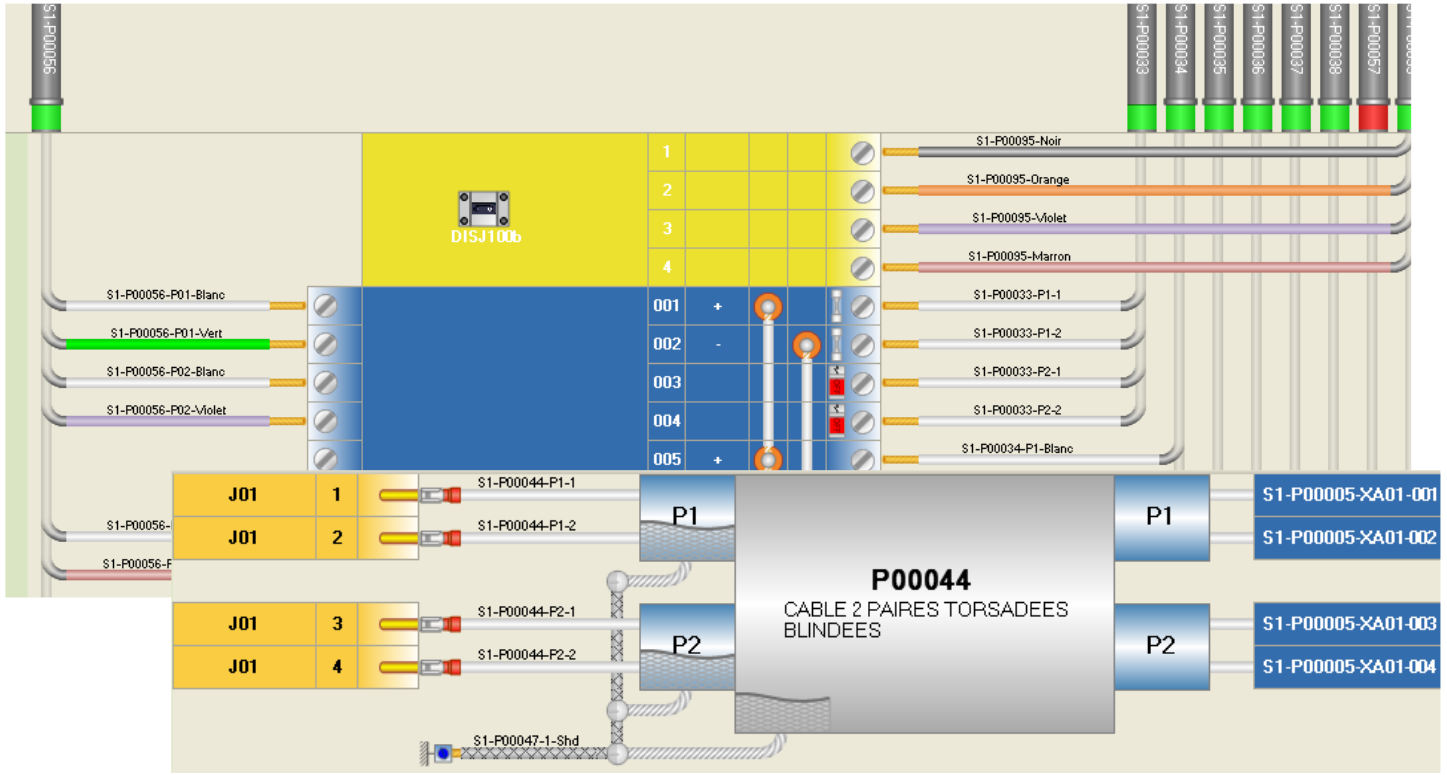
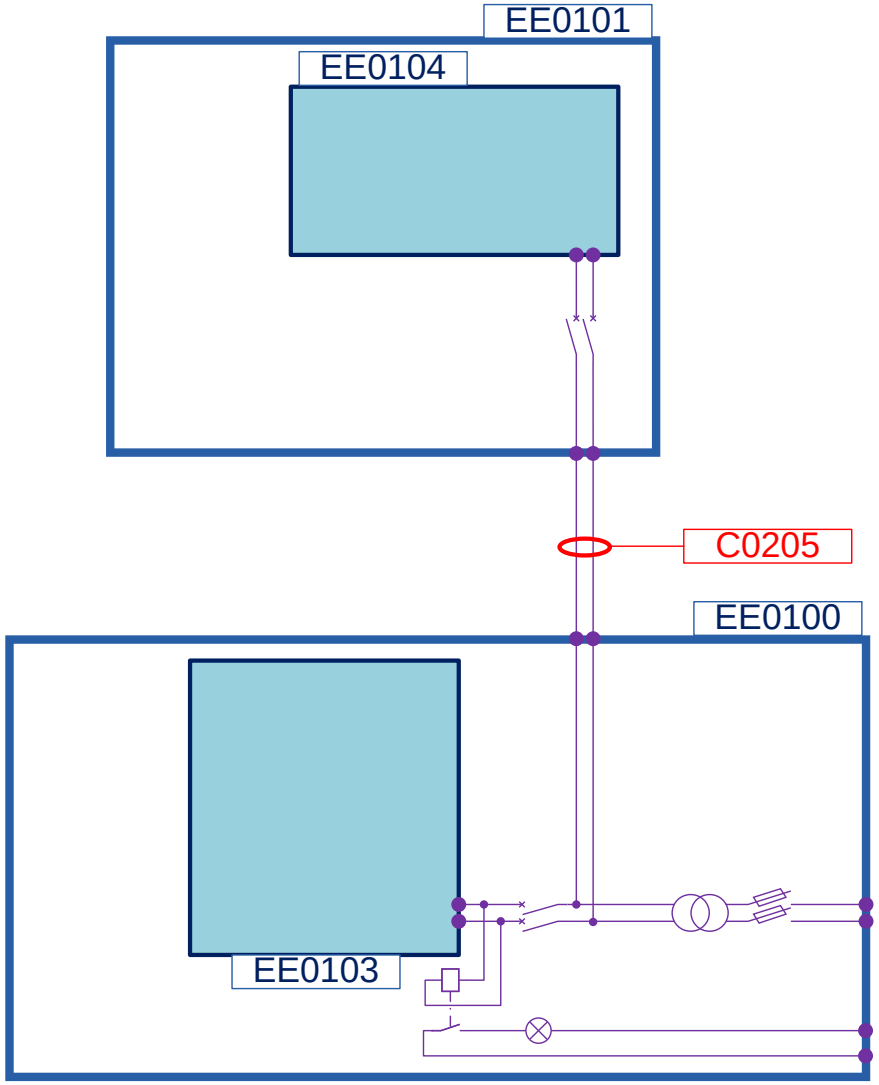


Cabling Management

- Electrical Devices
- Connectors and Terminal blocks
- Pins and Terminals
- Shunts
- Cables
- Wires
- Signals

SEE Electrical Expert



Wiring Diagrams

- Electrical Devices
- Connectors and Terminal blocks
- Pins and Terminals
- Cables
- Wires
- Etc.

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Thank you