

IM502319

Data Exchange and Management Between Inventor, AutoCAD Electrical, and Vault

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Learning Objectives

- Learn how to import AutoCAD Electrical data to Inventor and Inventor to AutoCAD Electrical.
- Learn how to create a link between AutoCAD Electrical component and Inventor component
- Learn how to map AutoCAD Electrical into the Item Properties of Vault
- Learn about managing AutoCAD Electrical data and Inventor data on Vault Professional

Description

Inventor software and AutoCAD Electrical software are powerful products of electromechanical design. The data in these two software systems can be transferred to each other bidirectionally. We can manage the data of electromechanical design via Vault software. We can create a BOM with objects drawn in AutoCAD Electrical and Inventor in Vault. We can map the Properties of our AutoCAD Electrical project to Vault Items. Come to this session to see how.

Speaker(s)

Gökhan Kaya
Technical Team Leader Arkance System Turkiye - Autodesk Expert Elite



I am a Mechanical Engineer and Autodesk Expert Elite. I have been studying the master's degree on Dynamic of Machine at Mechanical Engineering. I have been working at Prota Altar an Arkance Systems Company as a technical team leader and consulting since two years and seven months. I have given design-related courses (courses) at various universities in Turkey. I live in Istanbul. I have a pretty family with a wife and a son. I love my family and job. I am hardworking and I get on well with my colleagues. I have experience in MFG PDM and PLM

Melike Ozdemir:

Technical Sales Specialist D&M (Turkey, Israel), Autodesk



I hold a Bachelor's degree in Mechatronic Engineering from Marmara University (Turkey) and M.T.& Management Engineering from Istanbul Technical University. I have over eight years of experience, presales and post sales, six of them in technical sales. My first professional experience was working as presales at a Solidworks reseller and my last role was working as Presales and Technical Support Specialist at Platinum Partner Protta in Turkey. And I have been working at Autodesk since mid-July as Technical Sales Specialist D&M (Turkey, Israel). My main areas of expertise are in Inventor, AutoCAD Electrical, Fusion 360 and Vault.

Learning Objective 1 and 2: how to import AutoCAD Electrical data to Inventor and Inventor to AutoCAD Electrical.

A - Autocad Electrical and Inventor SYNC

Matching the 2d Schematic drawing with the 3D design achieve in getting accurate results during production and assembly.

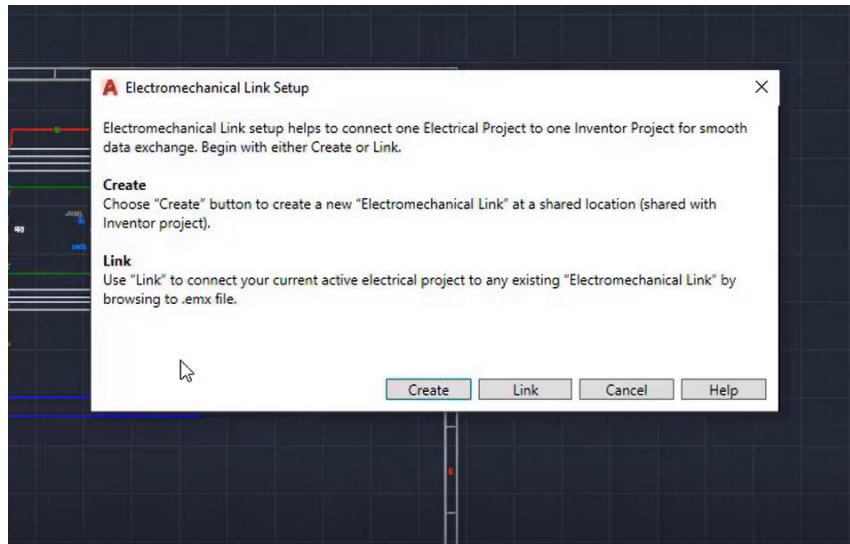
1- Create Link

Sync by matching the links with each other in the Inventor assembly environment.

We can define our similar pins, transfer our wire types, share the product information of our 2d and 3d elements by synchronizing our libraries. And also get our from/to lists for wires, do automatic wiring by importing the cable information between terminals to Autocad Electrical and synchronize location and installation information.

a-Autocad Electrical Link

Start by creating links on the Autocad electromechanical base and create a folder.

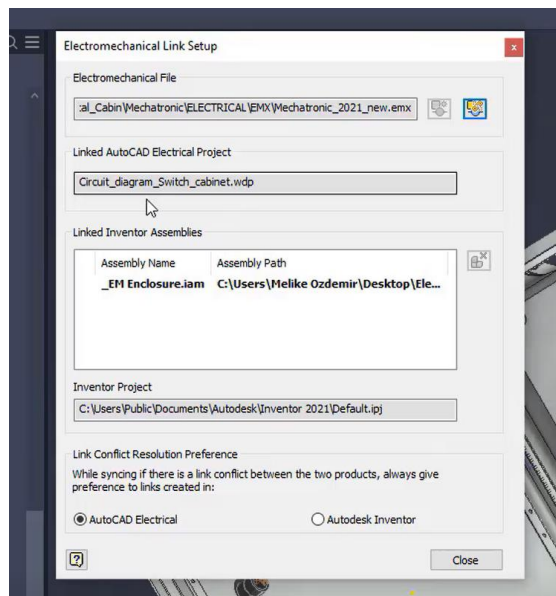


Electromechanical Link

If we want to ensure all information transfer, we must start by creating the links. So we can send all our electrical information to inventor.

b-Inventor Link

Continue synchronization by matching the links with each other in the Inventor assembly environment.

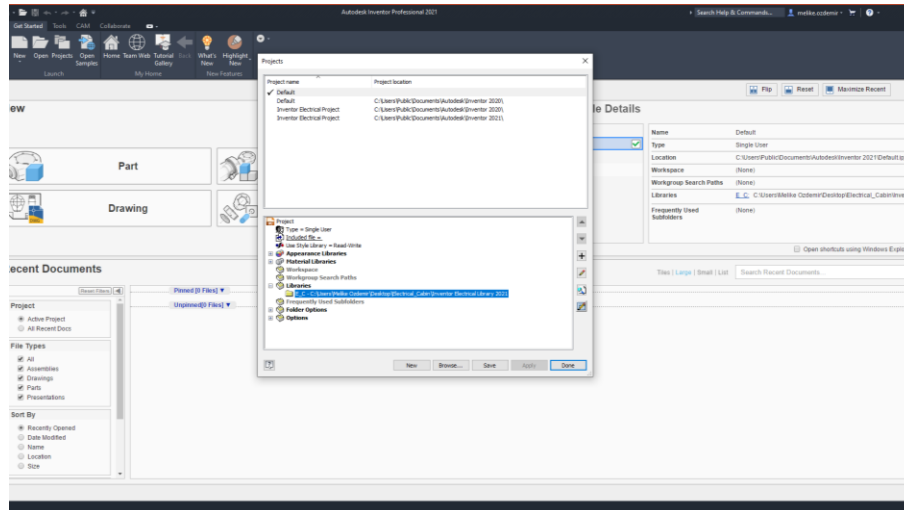


Electromechanical Link

If we want to see the information of the electrical parts in the inventor, we need to match the link we produced in Electrical.

c- Library Link

Match libraries in Inventor.



Library Link

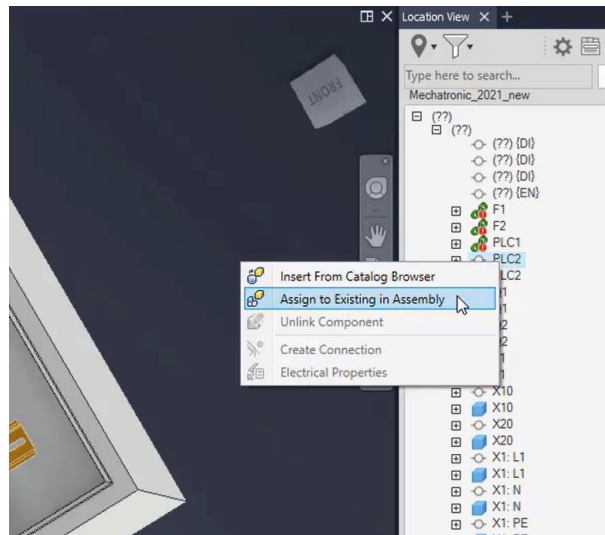
We match the library we use in Autocad Electrical with our library in Inventor. Because we save the 3D designs of 2D components to our library.

2- Match Component

Match the 3D parts in the Inventor assembly with the icons you use in Electrical. That will provide you with location and product information.

a- "Assign to existing in assembly"

Start by creating links on the Autocad electromechanical base and create a folder.

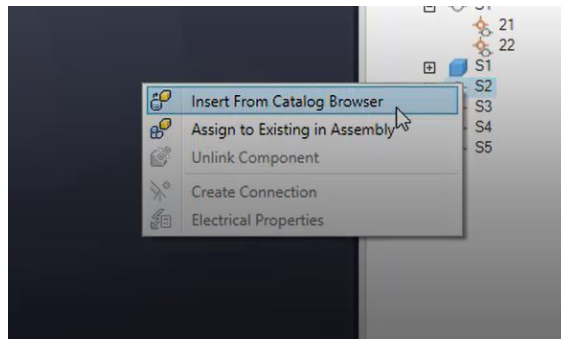


Match Component

Find the part in the Inventor environment and check what name it has from the model browser. Then find the name of that part from the list in the location view. Right-click and select "Assign to existing in assembly".

b- Inventor Link

In Inventor, chose the electrical catalogue browser and checking your catalogue information in settings. Then Copy the parts that you used in the assembly and that you want to reach from the library all the time. Add it to the library folder.



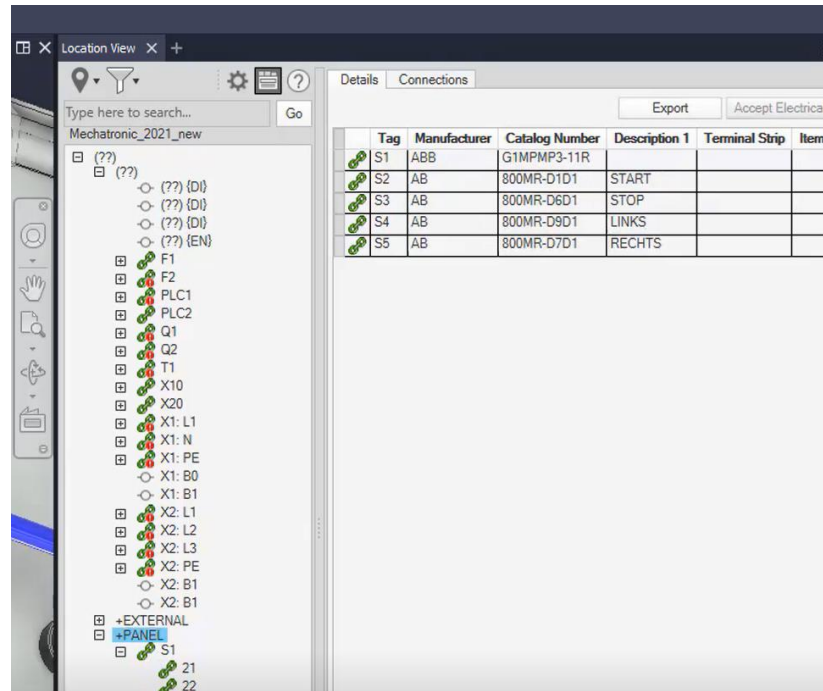
Electromechanical Link

Select the parts that are not in the assembly but will be matched by calling them from the library. Clicking on "Insert from catalogue browser". Choosing the component to match from the library.

c- Matching Library

If you want to match a component in the library with its 3D drawing and use it every time call it. Or you want to change the existing 3D drawing.

code, catalogue information and pin numbers. You can see which wire it's on. If you synchronize with Inventor, you can access this information in Inventor.

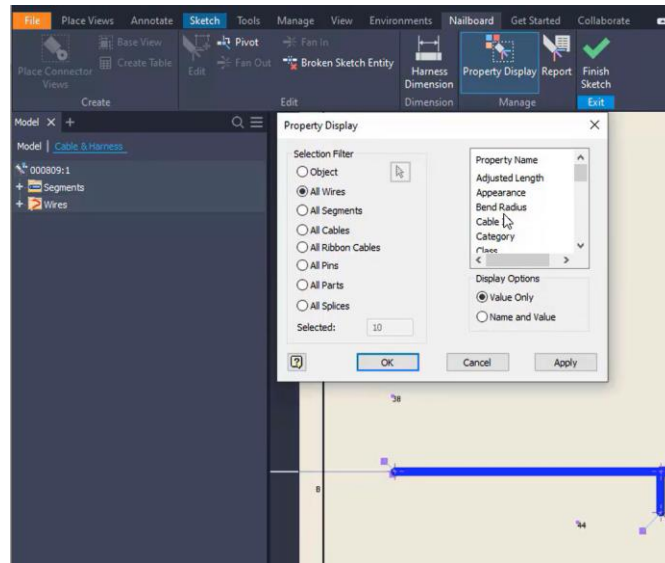


Location View

Look at the detail in the location view. Here see the wire number, location, pin numbers, component type, manufacturer and connections of your component. Click on the panel, see the list of all components in the panel.

5- Drawing

Also need technical drawing. Click on the Nailboard. And switch to the technical drawing environment in Inventor. It moves all the segments selected into the drawing environment. And now, use all the technical drawing skills of Inventor.



Location View

Show the cable dimensions and add all the information want with the "property display" feature. Cable ID, wire ID, pin, properties of cables etc. Whatever you need. Besides, show the parts where the cables are connected. Use the "Place Connector Views" tab for this..

Learning Objective 3: How to map AutoCAD Electrical into the Item Properties of Vault

Component information from the AutoCAD Electrical parts catalog databases can also be imported into Vault Professional. Vault Professional reads the information from the project database.

About Vault Professional

Autodesk Vault manages the work in progress files within a project. By nature, Vault is a multiple-user system that supports concurrent engineering. With Vault, you can manage all data from one central storage location. Versions of files and the file relationships are maintained with Vault. Think of Vault as the file management system.

Drawing data can populate Vault Professional's Item Master, and can be compiled with other Bill of Material data from other CAD systems like AutoCAD Electrical, AutoCAD Mechanical and Autodesk Inventor. This compiled BOM data can then be synchronized with upstream application such as ERP/MRP.

AutoCAD Electrical

AutoCAD Electrical Project Descriptions

An AutoCAD Electrical project file is a text file, with no property fields. The project file contains information about the project including, project settings or defaults, included drawing file names, drawing description lines, and most important to Vault Professional, project description lines.

Line 1

Line 2

Line 10

Line 11

Line 12

Project Description (for report headers and title block update)

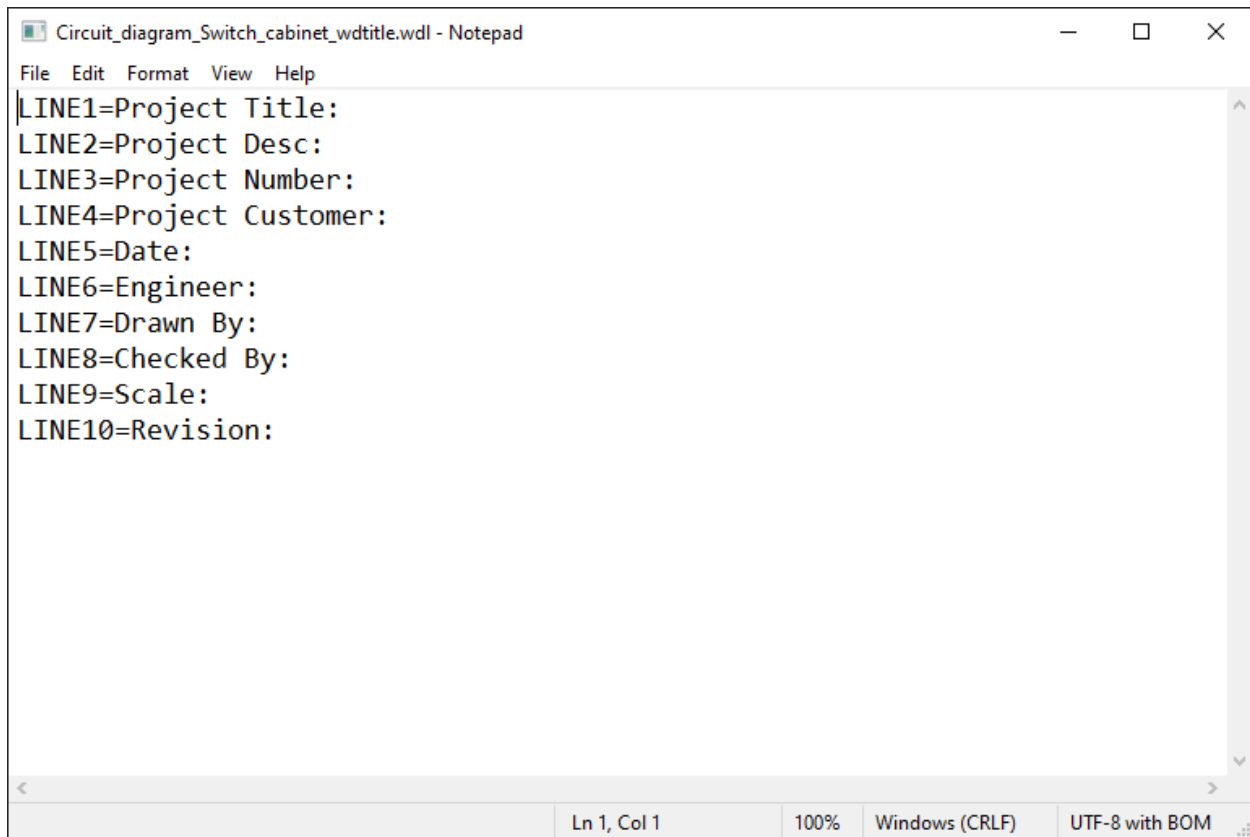
Project Title:	AU 2022	☐ in reports
Project Desc:	Mechatronic Workflow	☐ in reports
Project Number:	10.577.1332	☐ in reports
Project Customer:	Autodesk	☐ in reports
Date:		☐ in reports
Engineer:	Gökhan Kaya	☐ in reports
Drawn By:		☐ in reports
Checked By:		☐ in reports
Scale:	1:1	☐ in reports
Revision:	A	☐ in reports
Line11		☐ in reports
Line12		☐ in reports

OK Cancel < < > >|

Project Descriptions

WDL Mapping File

We can use alias names that are more descriptive. this file is text file and it can modify by Notepad. wdl file contains masks The mapping of the Line#'s to their aliases is accomplished through the use of a text file with a WDL extension.



wdl file opened in notepad

Vault Professional can be mapped to either the original name or the alias. If you map to the alias names, data is only mapped when the alias name is an exact match to the item property mapping. If the alias name is changed, or does not exist in the project file no data is transferred into the vault item property.

You can create and map both the Line# and the Alias name to a single vault item property. Whatever one is found first is the one used by Vault Professional.

AutoCAD Electrical Catalog Data

Component information from the AutoCAD Electrical parts catalog databases can also be imported into Vault Professional.

Category: CA (Capacitors) Search: Enter search text such as catalog number, manufacturer, color and style. Global Search

Results

CATALOG	MANUFACTURER	DESCRIPTION	POWER	VOLTAGE	MISCELLANEOUS1
2GCA281318A0030	ABB	LV CAPACITOR CLMD13 250/230VAC, 50Hz, 3-PHASE AS	3.3/2.8KVA	250/230VAC	MODULAR SYSTEM, INDOOR (OUTDOOR ON REQ), IP42 (IP54 ON
2GCA281319A0030	ABB	LV CAPACITOR CLMD13 250/230VAC, 50Hz, 3-PHASE AS	6.5/5.5KVA	250/230VAC	MODULAR SYSTEM, INDOOR (OUTDOOR ON REQ), IP42 (IP54 ON
2GCA281320A0030	ABB	LV CAPACITOR CLMD13 250/230VAC, 50Hz, 3-PHASE AS	9.5/8KVA	250/230VAC	MODULAR SYSTEM, INDOOR (OUTDOOR ON REQ), IP42 (IP54 ON
2GCA281321A0030	ABB	LV CAPACITOR CLMD43 250/230VAC, 50Hz, 3-PHASE AS	13/11KVA	250/230VAC	INDOOR (OUTDOOR ON REQ), IP42 (IP54 ON REQ)
2GCA280953A0030	ABB	LV CAPACITOR CLMD43 250/230VAC, 50Hz, 3-PHASE AS	19/16KVA	250/230VAC	INDOOR (OUTDOOR ON REQ), IP42 (IP54 ON REQ)
2GCA280954A0030	ABB	LV CAPACITOR CLMD53 250/230VAC, 50Hz, 3-PHASE AS	28/24KVA	250/230VAC	INDOOR (OUTDOOR ON REQ), IP42 (IP54 ON REQ)
2GCA280955A0030	ABB	LV CAPACITOR CLMD53 250/230VAC, 50Hz, 3-PHASE AS	38/32KVA	250/230VAC	INDOOR (OUTDOOR ON REQ), IP42 (IP54 ON REQ)
2GCA280956A0030	ABB	LV CAPACITOR CLMD63 250/230VAC, 50Hz, 3-PHASE AS	47/40KVA	250/230VAC	INDOOR (OUTDOOR ON REQ), IP42 (IP54 ON REQ)
2GCA280957A0030	ABB	LV CAPACITOR CLMD63 250/230VAC, 50Hz, 3-PHASE AS	57/48KVA	250/230VAC	INDOOR (OUTDOOR ON REQ), IP42 (IP54 ON REQ)
2GCA280958A0030	ABB	LV CAPACITOR CLMD63 250/230VAC, 50Hz, 3-PHASE AS	66/56KVA	250/230VAC	INDOOR (OUTDOOR ON REQ), IP42 (IP54 ON REQ)
2GCA280554A0030	ABB	LV CAPACITOR CLMD13 415/400VAC, 50Hz, 3-PHASE AS	2.7/2.5KVA	415/400VAC	MODULAR SYSTEM, INDOOR (OUTDOOR ON REQ), IP42 (IP54 ON
2GCA280555A0030	ABB	LV CAPACITOR CLMD13 415/400VAC, 50Hz, 3-PHASE AS	6/5.5KVA	415/400VAC	MODULAR SYSTEM, INDOOR (OUTDOOR ON REQ), IP42 (IP54 ON
2GCA281533A0030	ABB	LV CAPACITOR CLMD13 415/400VAC, 50Hz, 3-PHASE AS	7.2/6.7KVA	415/400VAC	MODULAR SYSTEM, INDOOR (OUTDOOR ON REQ), IP42 (IP54 ON
2GCA280556A0030	ABB	LV CAPACITOR CLMD13 415/400VAC, 50Hz, 3-PHASE AS	11/10KVA	415/400VAC	MODULAR SYSTEM, INDOOR (OUTDOOR ON REQ), IP42 (IP54 ON
2GCA280557A0030	ABB	LV CAPACITOR CLMD13 415/400VAC, 50Hz, 3-PHASE AS	13.5/12.5K	415/400VAC	MODULAR SYSTEM, INDOOR (OUTDOOR ON REQ), IP42 (IP54 ON

Record Count: 2112 Search Database: Primary

Catalog Browser

Components contain some headers. You can add more fields

Create Category

Categories are labels that provide a way to group objects logically. A category can automatically assign user-defined properties to objects in the Vault. Categories can also be used to automatically assign lifecycle definitions or revision values to files.

We create two categories for Autocad Electrical Project and Files in vault environment

- File Category
- **Electrical Project** for Project Files: lifecycle is managed in the project category but no need to User define property
- **Electrical Drawing** for 2D Drawing Files: lifecycle is managed in the project category and we can map property

Vault Professional reads the information from the project database

Vault Professional manages the AutoCAD Electrical project by using a Vault Professional entity called an item. The AutoCAD Electrical project file is assigned to an item.

We can assign Electrical Project to Electrical Component as Vault items

There are three different types of property associations commonly used for mapping to AutoCAD Electrical.

Electrical

AutoCAD Electrical drawing files and extract Bill of Material data .

Electrical Project

AutoCAD Electrical project file and extract project line data so Project descriptions

Reference Designator

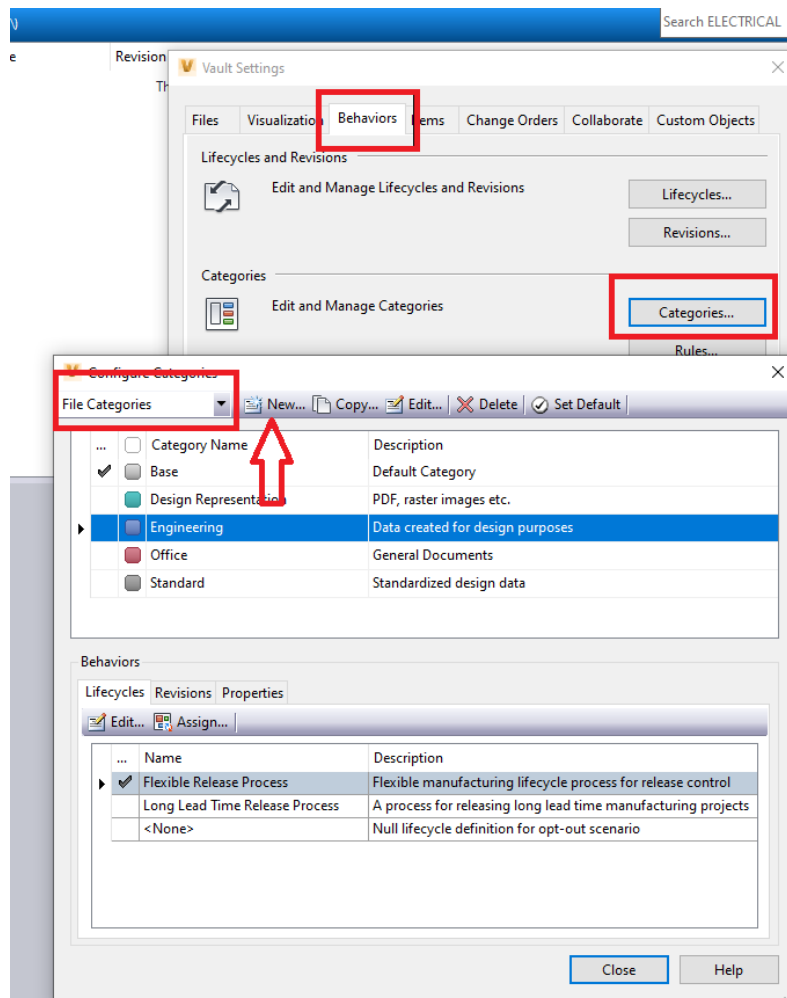
AutoCAD Electrical drawing files and extract Description and Rating data example location information

Now let's create these categories and assign the rules

Note: User authorization must be Admin, so that we can create Category

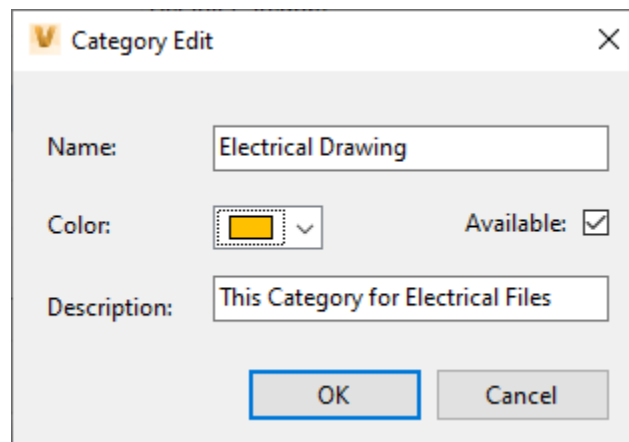
Start Vault Pro Client and enter *User name, Password, Server* and *Vault* into Login Window and click Ok button

Go Tools>Administration>Vault Setting and click Categories button at Behaviours tabs



Create Category

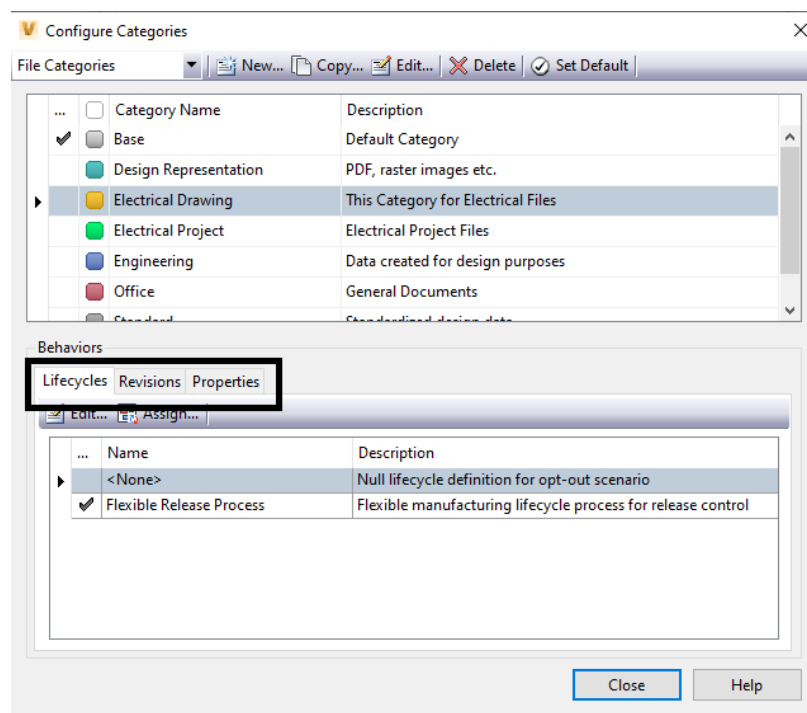
After selecting File Categories in the filter section, and then click the new button and write the category name "Electrical Drawing" and choose a color (Orange). this color makes us realize the category



Edit Category

I repeat the same process for drawing

We can assign lifecycles, Revision and Properties to these categories



Category Behaviors

Now I will create a rule for these categories so that the files will be automatically assigned to their own category when they are first sent to the Vault server.

For this, I click the Rule button at Behaviours tabs in the Settings window.

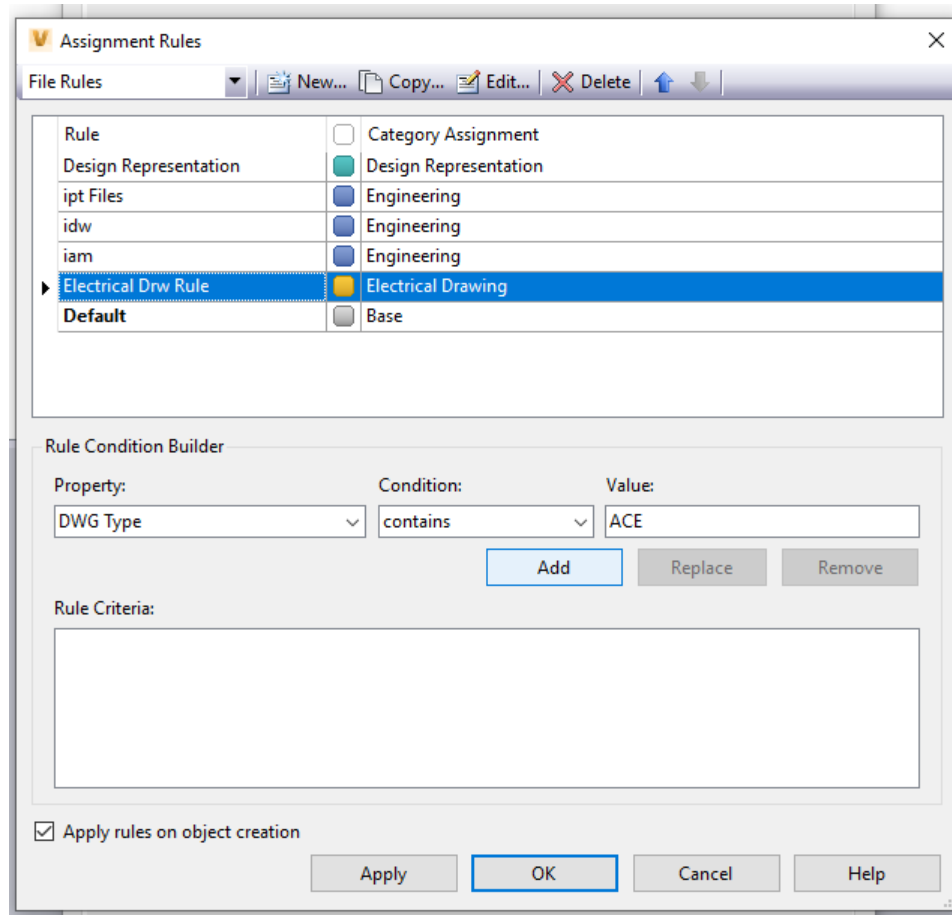
Click New button on Assignment Rule Window and enter Rule Name: Electrical Drw File then select Category Assignment as Electrical Drawing then click ok

Now define the condition for the rule

Select Property as DWG Type

Select Condition as contain

And enter Ace at Value



Create Rule

Click “Apply rules on object creation for use

In the rules window, I see only the file rules with the Filter and create rule by click the new button.

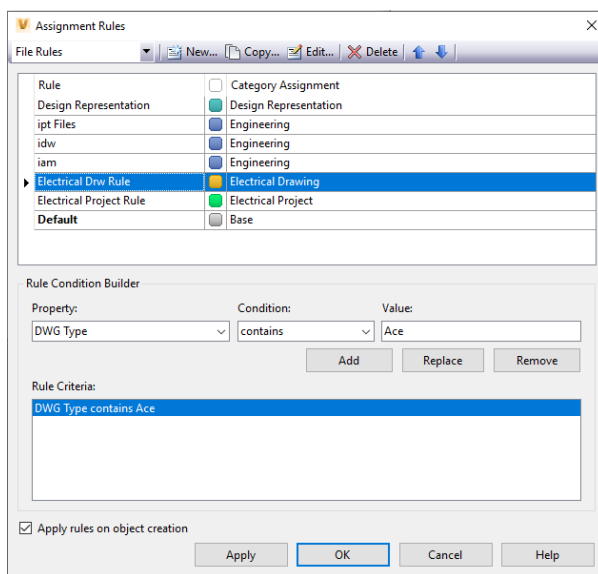
I repeat the same operations for Project (.wdt) files..

For Rule Condition

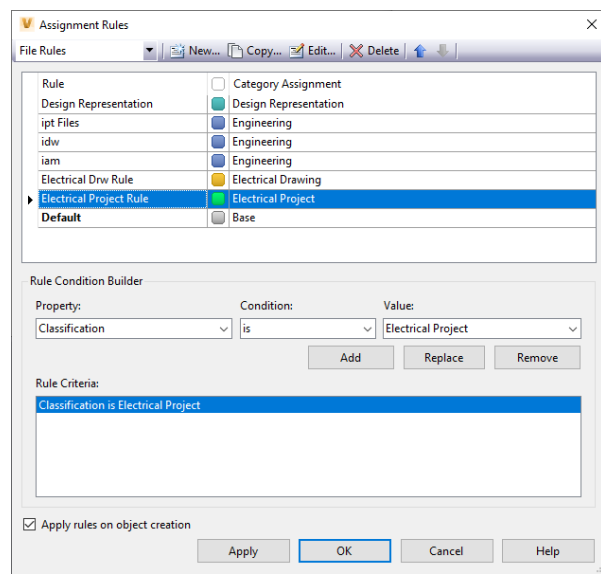
Property : Classification

Rule Condition: is

Value: Autocad Electrical Project



Rule for Drawing



Rule for Project

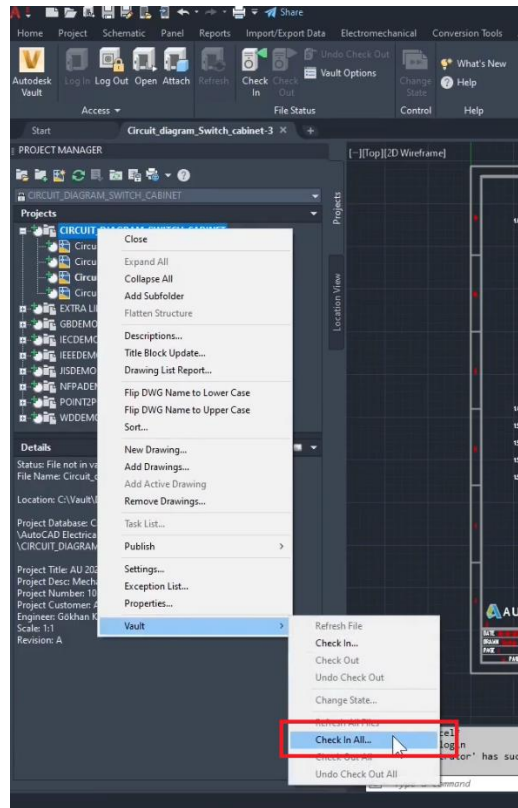
Autocad Electrical Project File Check in Vault

As the first step, we check in the Autocad Electrical Project to the vault. Because We use to map the data from this Project properties to Vault Professional Items

Let's send the project to the server for managing and mapping item and files

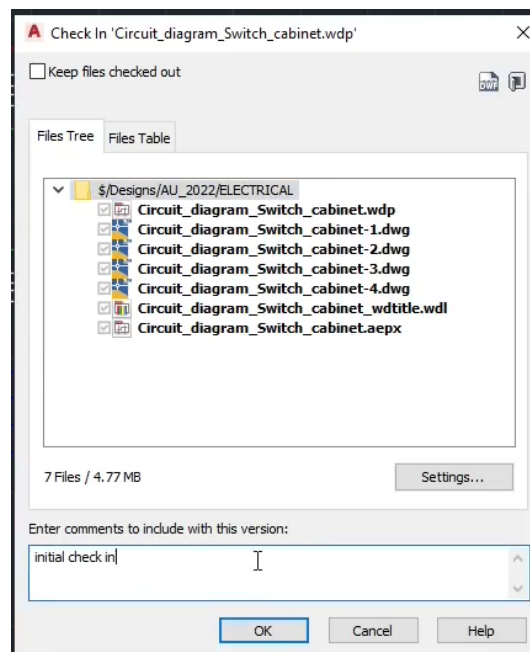
First of all login vault in Autocad Electrical

Select project caption on project manager window and check in it to vault with the «check in all» command All files



Check in All

the system will find the necessary files you can not see emx file on check in list but they will send

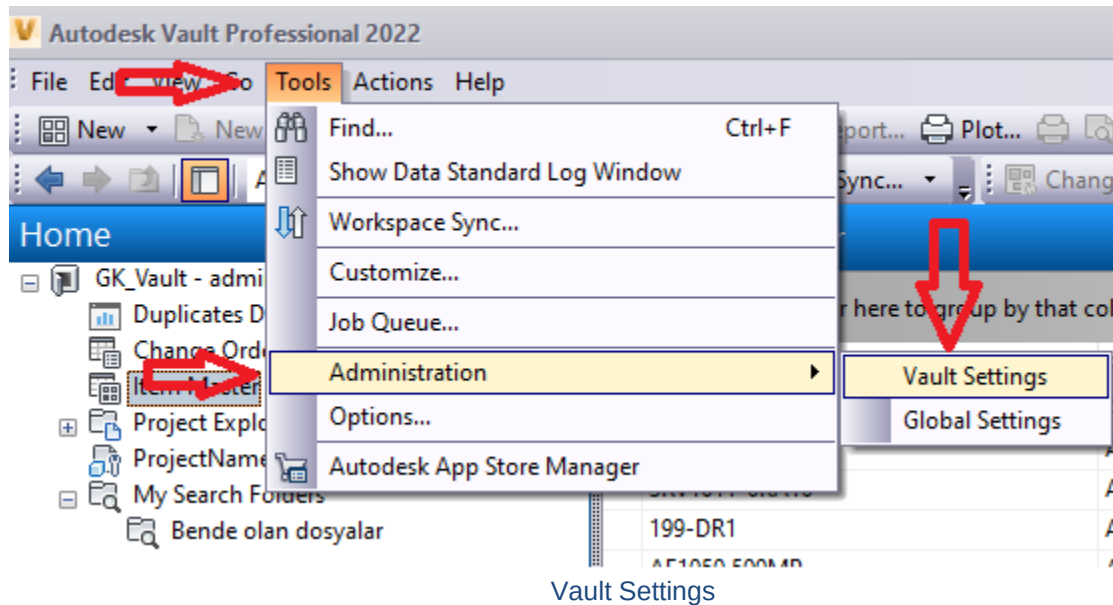


Check in All Window

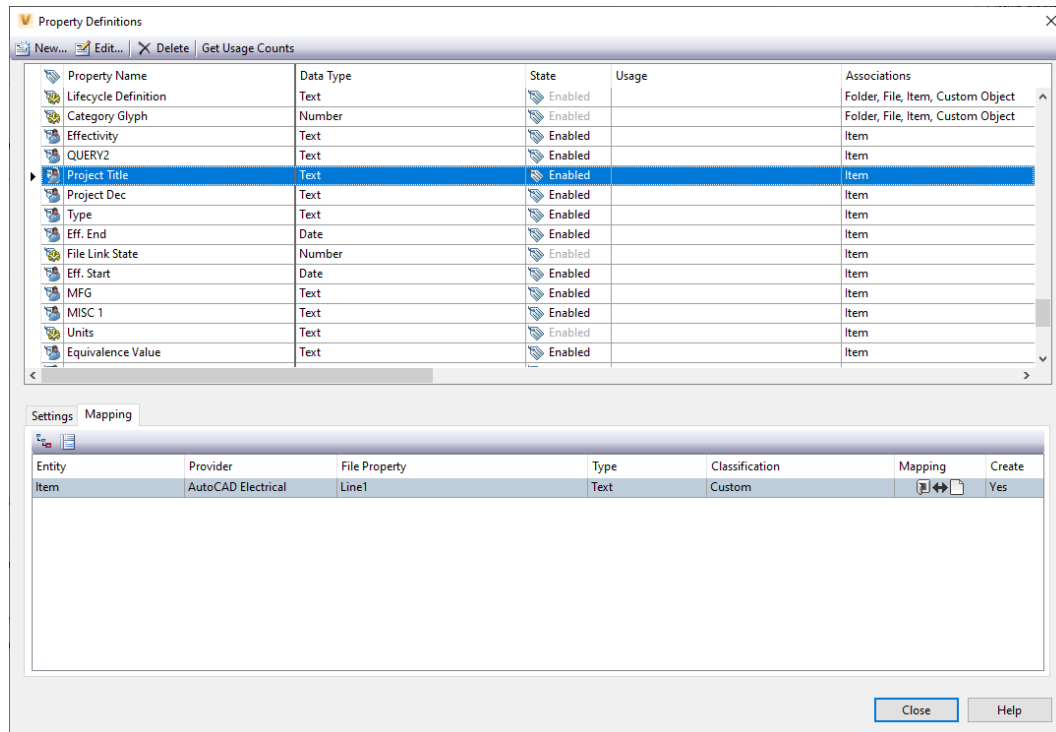
Mapping Vault Professional Item Properties

Each item in Vault Professional is assigned properties that hold the data. These item properties in Vault Professional get mapped to the data in AutoCAD Electrical

You can find all the setup tools through the Tools menu, under Administration > Vault Settings.



Vault Settings dialog box is displayed then The properties button is clicked on the behavior tab. When you click the properties button, the properties window opens and the available properties are listed.



Properties Window

Property Associations

There are three different types of property associations commonly used for mapping to AutoCAD Electrical.

- **Electrical**
- **Electrical Project**
- **Reference Designator**

Electrical: AutoCAD Electrical drawing files and extract Bill of Material data.

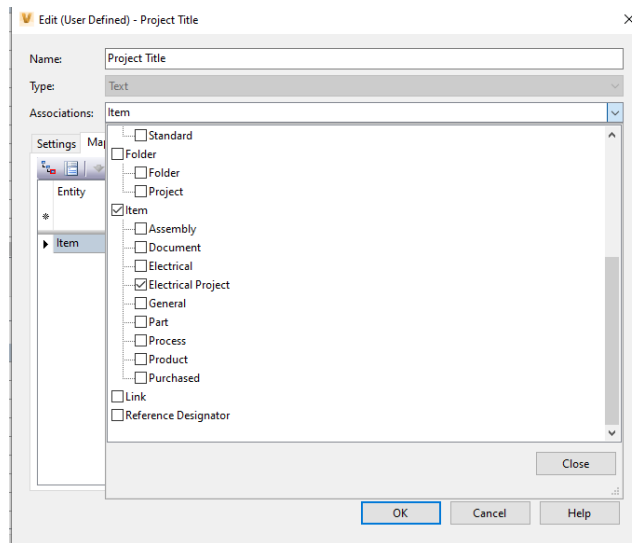
Electrical Project: AutoCAD Electrical project file and extract project line data. Exams Project Descriptions

Reference Designator: AutoCAD Electrical drawing files and extract Description and Rating data

You work inside of AutoCAD Electrical to perform the initial check in of the your project into Vault. This is the project used to map the data from AutoCAD Electrical to Vault Professional item properties.

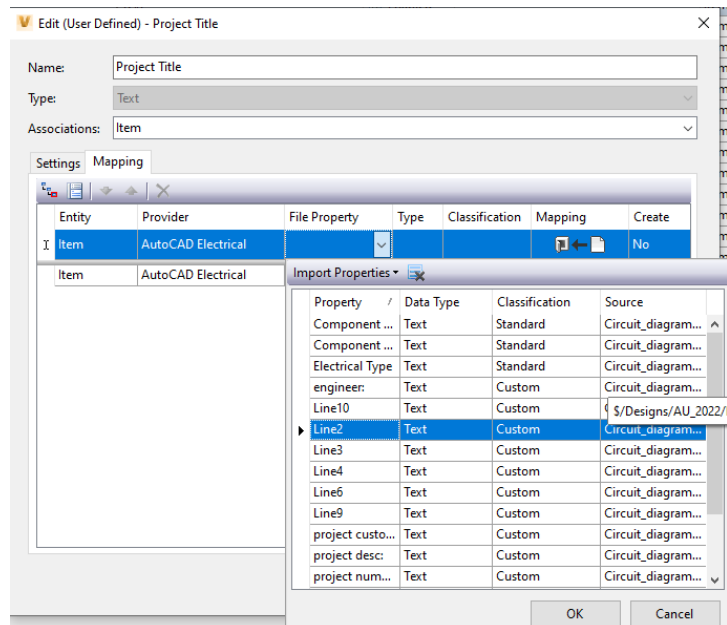
Create Map data from project file to Item

First of all, let's go to the properties window from the vault settings window. Again let's create a new property and name it. I am naming it as 'Project Title'. And select Associations as Electrical Project for Item



Association

after that switch the mapping tab and click to create the map. Select entity item and Provider Autocad electrical



Import From File

click on import vault in the file properties section and select my project file then standard and custom properties will be listed.

I find and select the property I want to map. I chose line 1

In the mapping section, we need to choose the flow direction of the data.

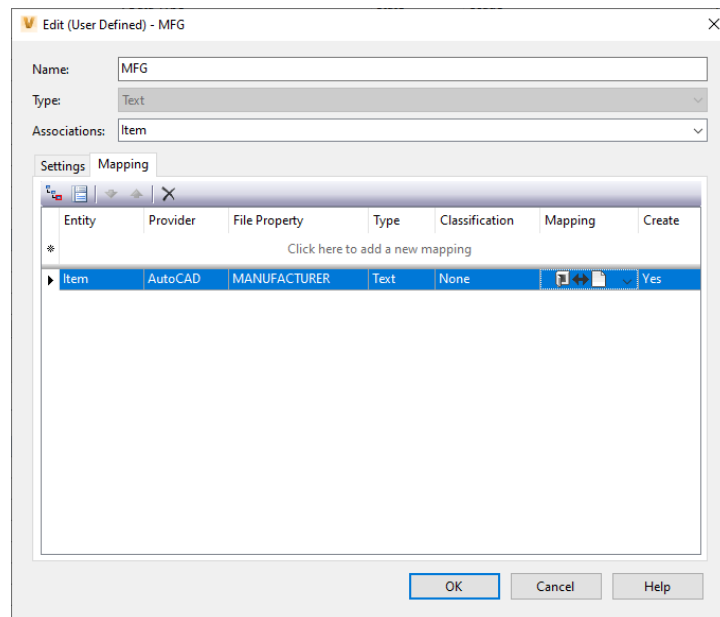
There are three different types direction mapping

- **Bidirectional** data can be updated bilaterally
- **Vault to file Direction:** There is a data flow from the vault to the file, flow is one way
- **File to Vault** There is a data flow from the file to the vault, flow is one way

Now

Let's define electrical components properties

we will do the same processes, but we choose electrical as a category for component property
Select dwg file to execute map then select dwg properties



Map

we will do the same processes, for

Description

MFG

QUERY 2

QUERY 3

.....

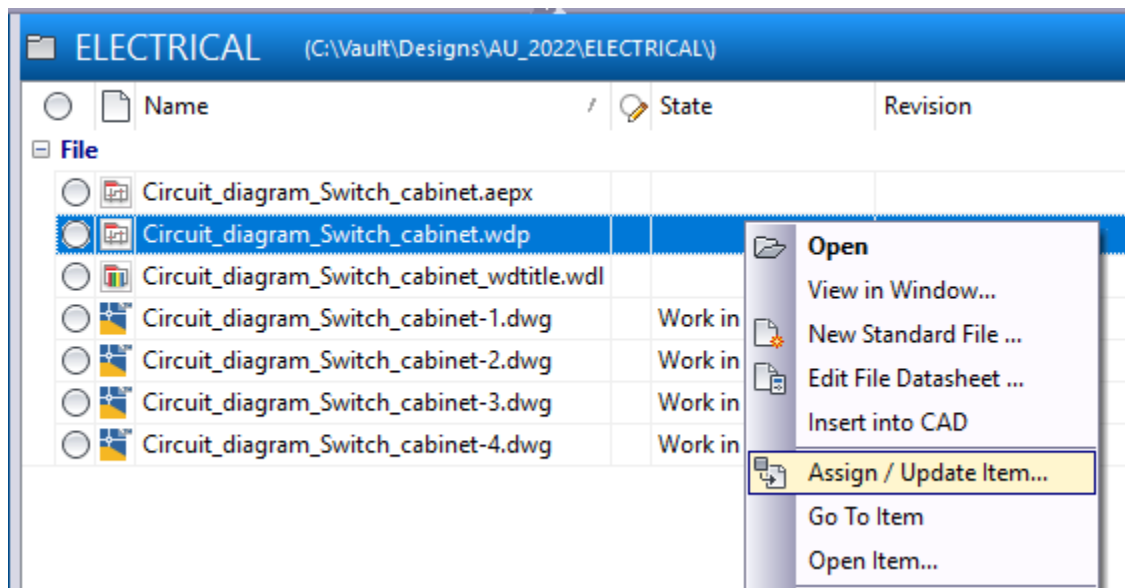
.....

we repeat these operations for all the properties we want to create
I create item and update To see the new properties I created

Learning Objective 3: about managing AutoCAD Electrical data and Inventor data on Vault Professional

Create Items and Bill of Materials

Autocad Electrical Project file uses dwg files included in the project. In order to create the item of the components used in the project, it will be sufficient to create an item from the project file.



Create item from Project Files

The features we created will be listed in the item of the project file. Also, the components used in the project will be listed in the boom. Meanwhile, the item of the components will be created.

Location	Number	Tag	Quantity	Title (Item, CO)	Revision	L	State (Historical)	DESC1	DESC2	DESC3	MFG	QUE...
Installation												
Location: PANEL												
	800MR-D101	S5	1	800MR-D101	A		Work in Progress	RECHTS			AB	
	800MR-D101	S4	1	800MR-D101	A		Work in Progress	LINKS			AB	
	800MR-D101	S3	1	800MR-D101	A		Work in Progress	STOP			AB	
	800MR-D101	S2	1	800MR-D101	A		Work in Progress	START			AB	
	5911-080-7	S1	1	5911-080-7	A		Work in Progress				ABB	
	MCB4-011	S1	1	MCB4-011	A		Work in Progress				ABB	
	G1MPMP3-11R	S1	1	G1MPMP3-11R	A		Work in Progress				ABB	
Location: EXTERNAL												
	1LA7060-4AB10	M1	1	1LA7060-4AB10	A		Work in Progress				SE...	
Location												
	3044102	X2	3	3044102	A		Work in Progress				PH...	
	3022218	X2	2	3022218	A		Work in Progress				PH...	
	2010-1202	X10	1	2010-1202	A		Work in Progress				WA...	
	3044115	X1	1	3044115	A		Work in Progress				PH...	
	3045114	X1	1	3045114	A		Work in Progress				PH...	
	3044102	X1	1	3044102	A		Work in Progress				PH...	
	3022218	X1	2	3022218	A		Work in Progress				PH...	
	6SL3211-0AB13-7BA1	T1	2	6SL3211-0AB13-7BA1	A		Work in Progress	UMRL...			SE...	
	3RT1016-1BB42	Q2	1	3RT1016-1BB42	A		Work in Progress	RECHTS			SE...	

Electrical Component BOM

Lifecycle & Revision Management

We can perform revision and Lifecycle management on both files and Items. We divided our files into two categories. these are project files and drawing files We can manage release processes in project files by lifecycle. No need to create properties and map in project files but you can create User Defined properties this files If you want to create

We need to manage the release revision processes of drawing files. We should be able to access the drawing at any time, and we can create a property and map if we want.

Yes

we will need to manage items similar to the file Management

Now how to do it step by step

- After creating and finishing the drawing files and we release the files to lock then the items are updated or create Do not forget the items must not be released during the update process
- As the item properties are mapped, the update will be read from the files.
- When releasing the item, the linked documents must be released We check all related files . and we release, if related files are not released
- If a revision is to be made in the design properties, the status of the Drawing and project file are selected as working progress. the revision of files will automatically increase to the next value
- In the same way, we make the status of the items as working progress. So that you can update item properties
- We make the necessary updates both in the file and in the items. Then we can update items and sync properties
- The files are released again to finish the revision process.
- After the files are released, the items are updated for the last time . so item properties are up to date
- Items are released as the final stage to finish the revision.
- Files is released and items is released so Revision progress is finished