Samsung HVAC

DVM-Pro CAD Mode

Samsung HVAC Equipment Selection and Design Software

Edition Information

Date	Version	Author	Edit Summary	Remarks
18.08.10	US V1.0	Sungmin J	First draft	
18.09.26	US V1.1	Sungmin J	Minor revisions	

Contents

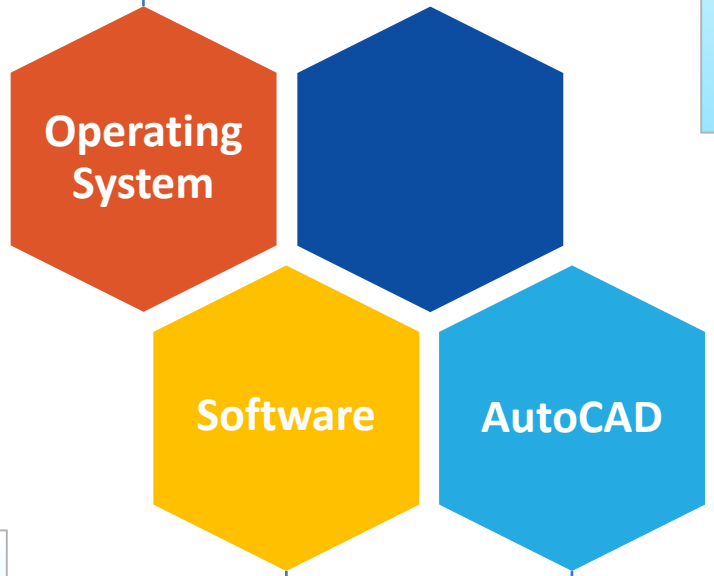
1. Introduction – What is DVM-Pro

Samsung Equipment Selection and Design Software

- Sales Mode: Equipment selection software
- CAD Mode: System design software
  (equipment selection + CAD)

CAD Mode is an add-on feature for AutoCAD, which provides tools within AutoCAD software that can be used to draw Samsung systems

1. Introduction – Supported OS and Requirements



Windows 7 / 8 / 10 (32bit & 64bit)

※Mac OS not supported

.Net Framework 3.5 must be installed

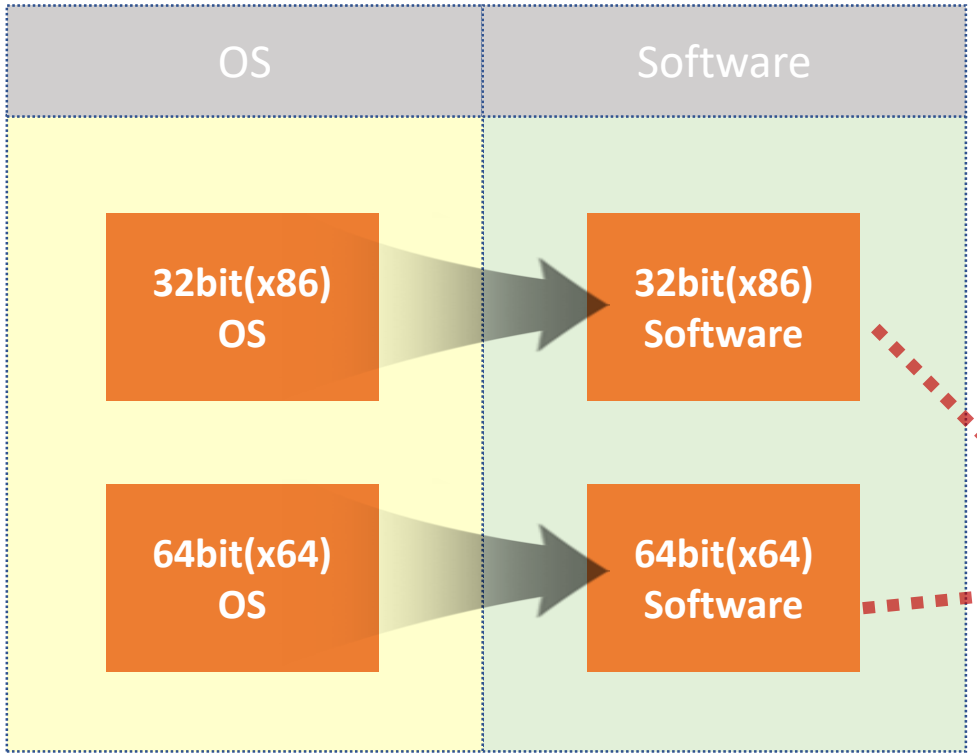
Compatible Editions

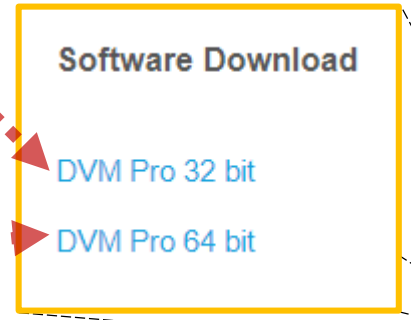
- AutoCAD : 2010 ~ 2018
- AutoCAD Mechanical : 2010 ~ 2018

※Other editions (LT, MEP, etc.) not supported

1. Introduction – Compatibility

❖ **Download compatible software**





Download link:
https://dvmdownload.com/Software-Downloads/DVM-Pro-Design-Software

2. Software Basics – Starting the Software

❖ Software Execution

2. Software Basics – Managing Files

❖ Handling DWG and DVMC

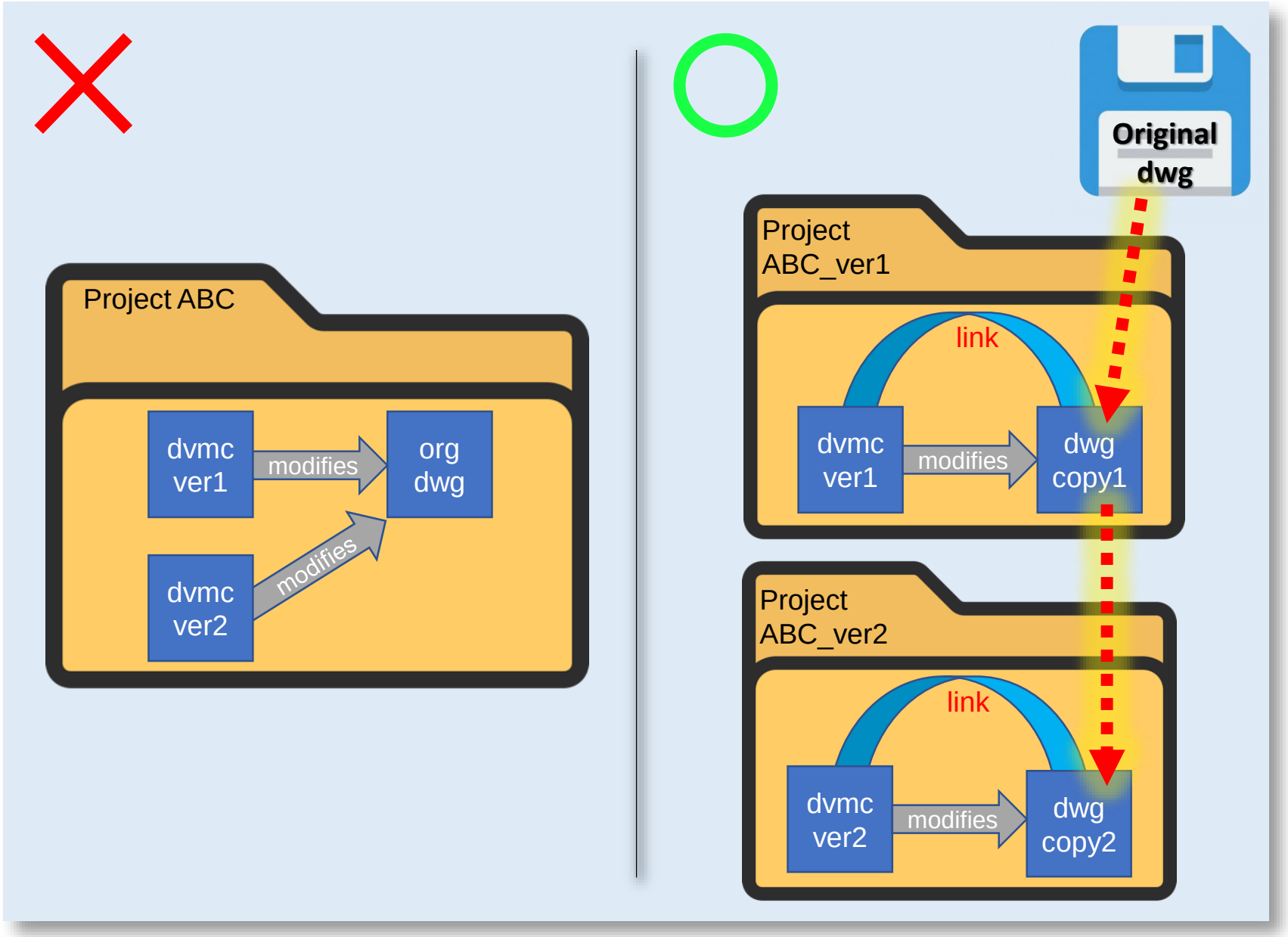
DVM-Pro CAD Mode modifies DWG itself

- back up original DWG
- work using a copy of DWG
- multiple DWG for multiple versions

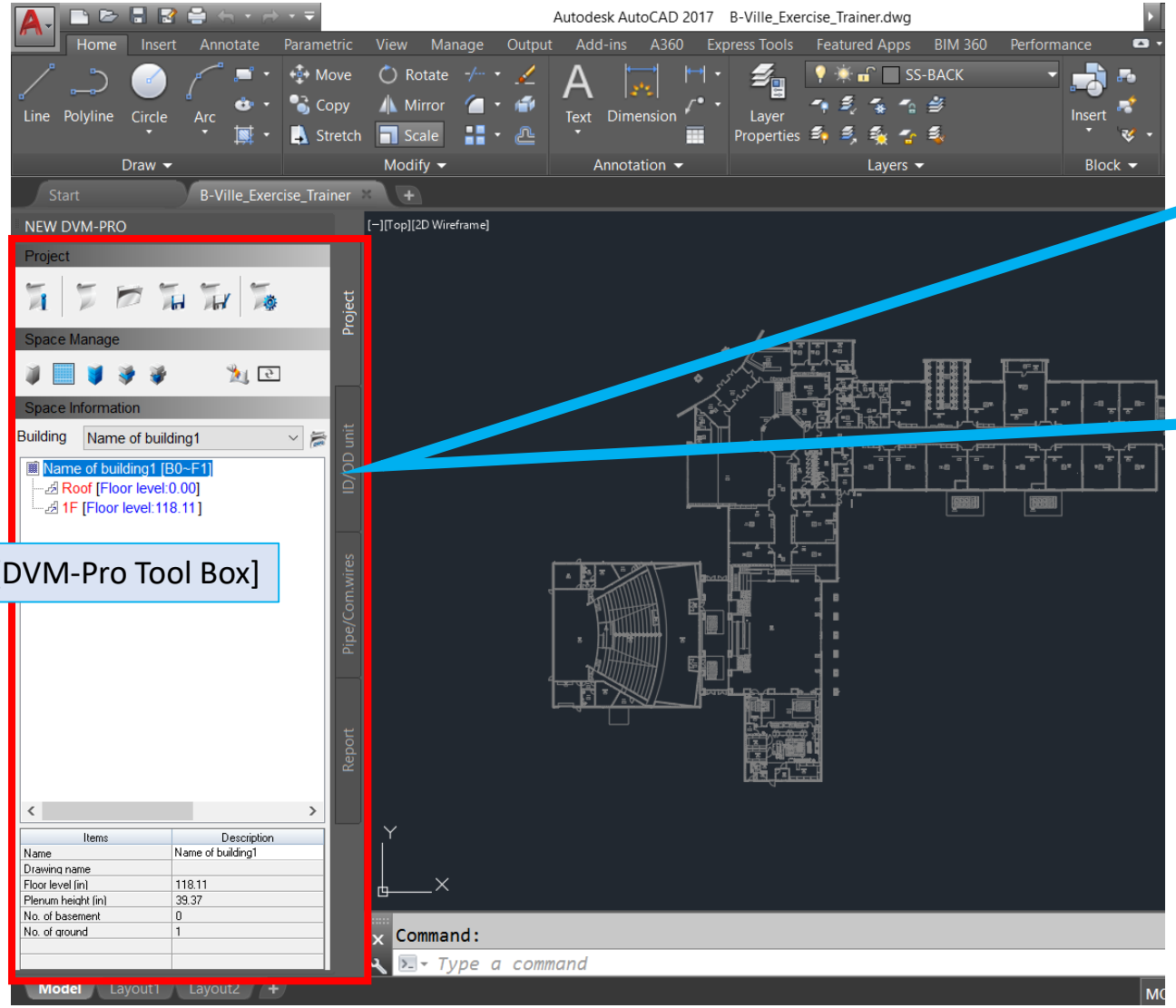
Good practice

1. Dedicated folder for each project
2. copy the original DWG, and name it with the version info
3. Use same name for both DVM-Pro project file and DWG file

- DO NOT use 'save as' in DVM-Pro CAD Mode
- DO NOT change the name of a DWG file that is linked to a project file



2. Software Basics – DVM-Pro Tool Box



[DVM-Pro Tool Box]

[Project]
- Enter project information
- Project file Load / Save / Save AS
- Preferences

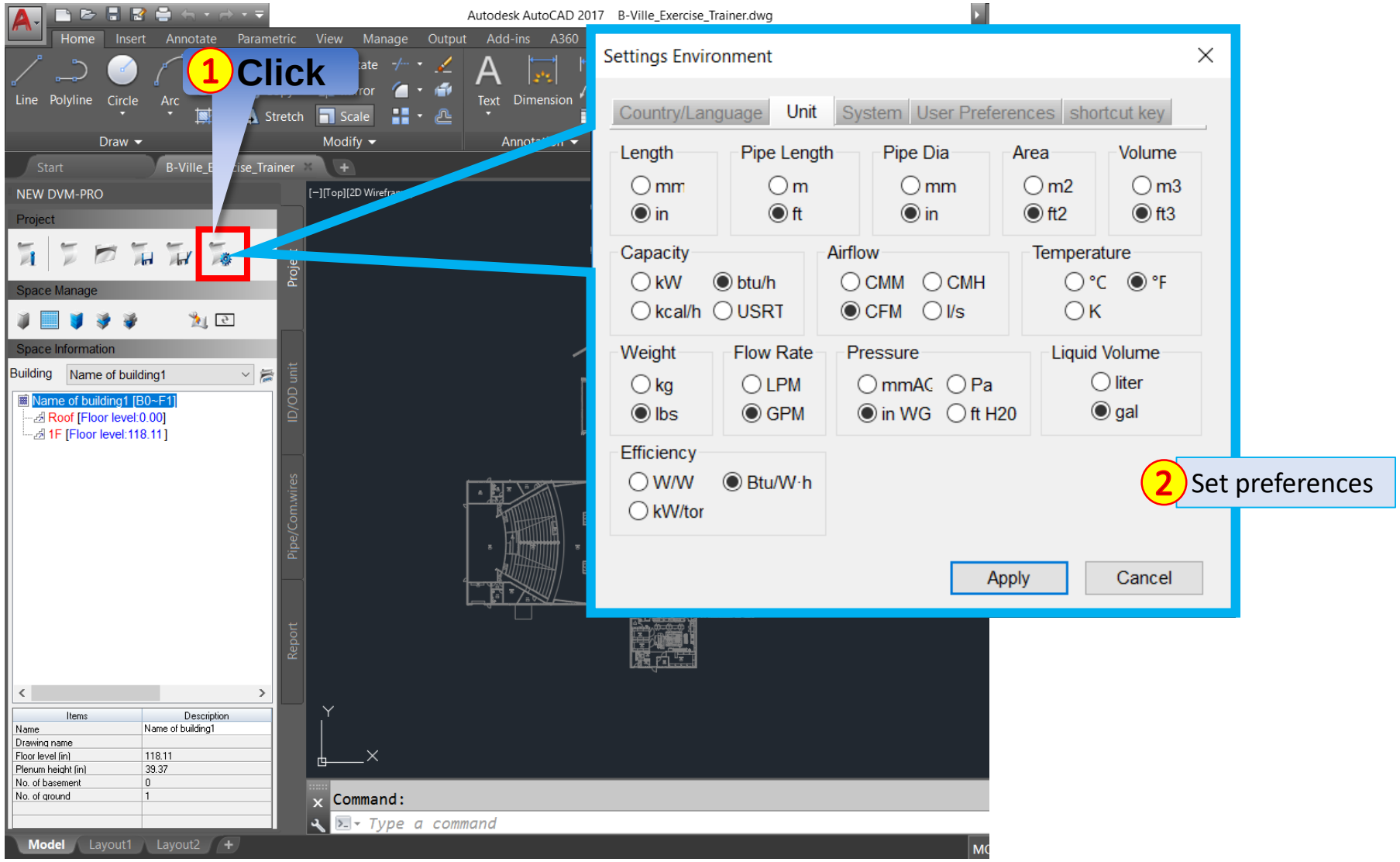
[ID/OD unit]
- IDU/ODU unit sizing and selection
- IDU/ODU placement and formation

[Pipe/Com.wires]
- IDU-ODU refrigerant piping
- Communication line wiring
- PIT (chase)
- Drain piping, vertical condensate pipe, condensate outlet

[Report]
- Project information, equipment list with specifications

2. Software Basics – Software Settings 1

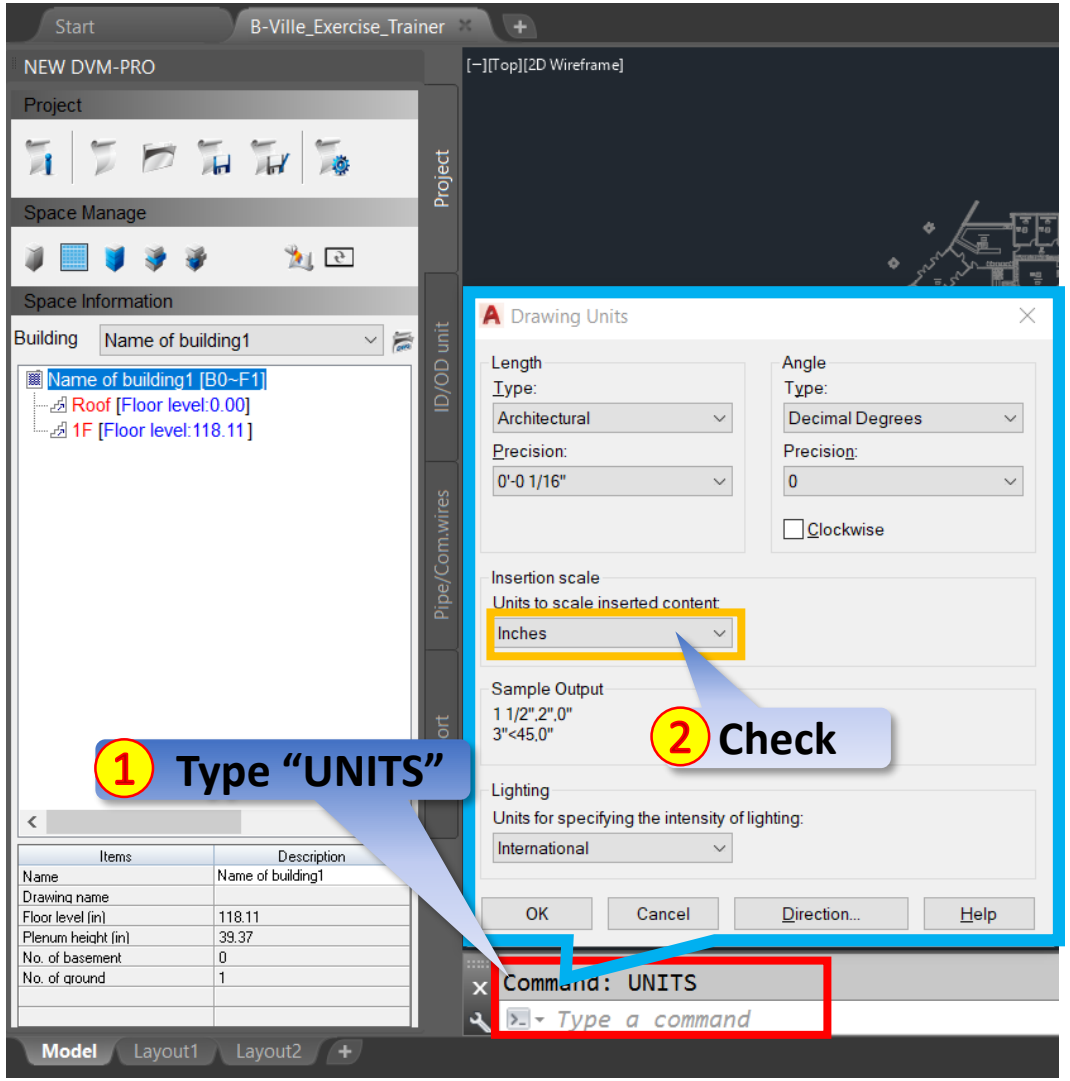
❖ **Project Tab – Preferences [DSE]**



2. Software Basics – Software Settings 2

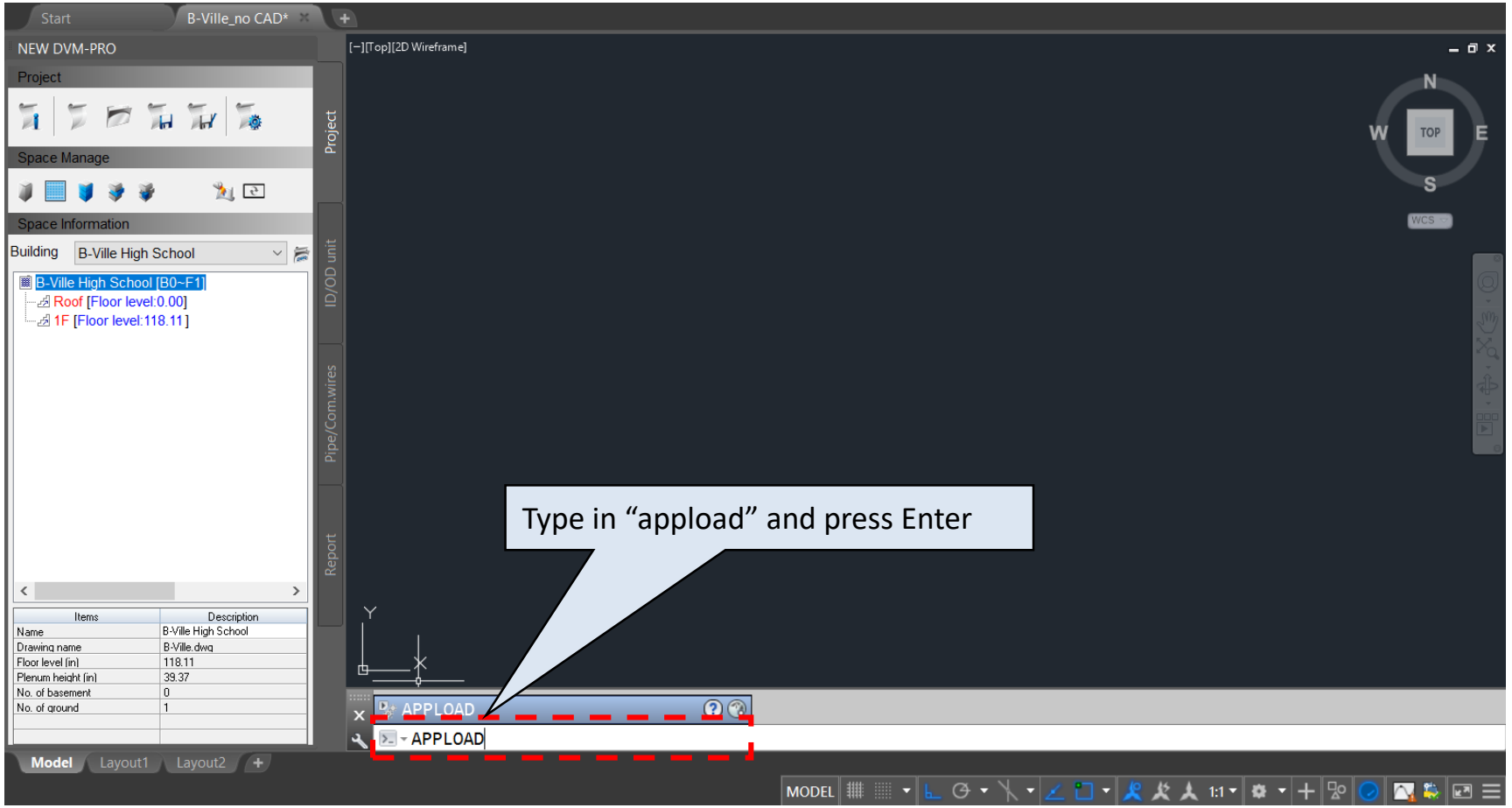
❖ Project Tab – AutoCAD Unit Settings

NOT NECESSARY that you do this, but **if you want** to check or change the measurement unit of the drawing, type “UNITS” in command line.



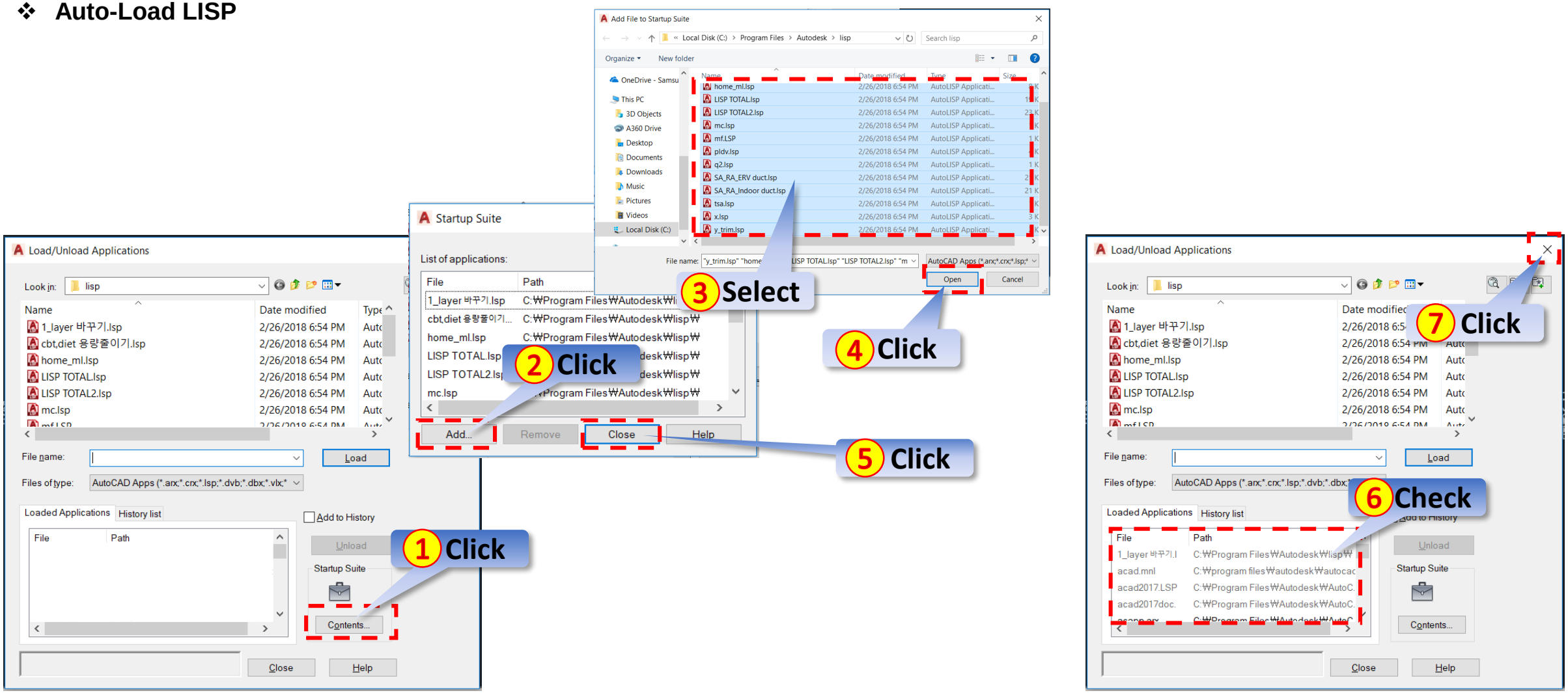
2. Software Basics – Loading LISP

❖ **Auto-Load LISP**



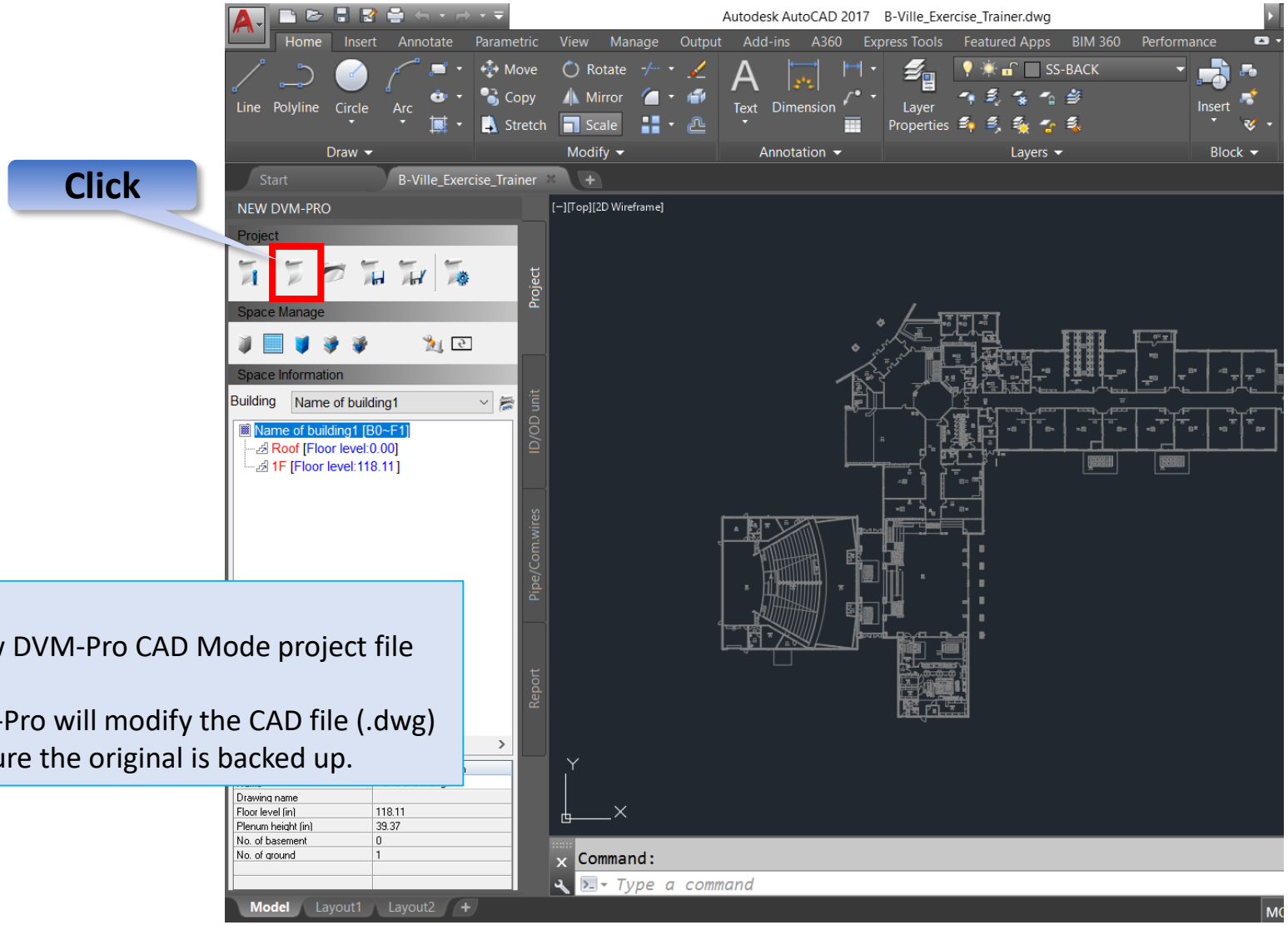
2. Software Basics – Loading LISP

❖ **Auto-Load LISP**



3. DVM-Pro CAD Mode – Tools

a) Project Tab – New Project [NDP]

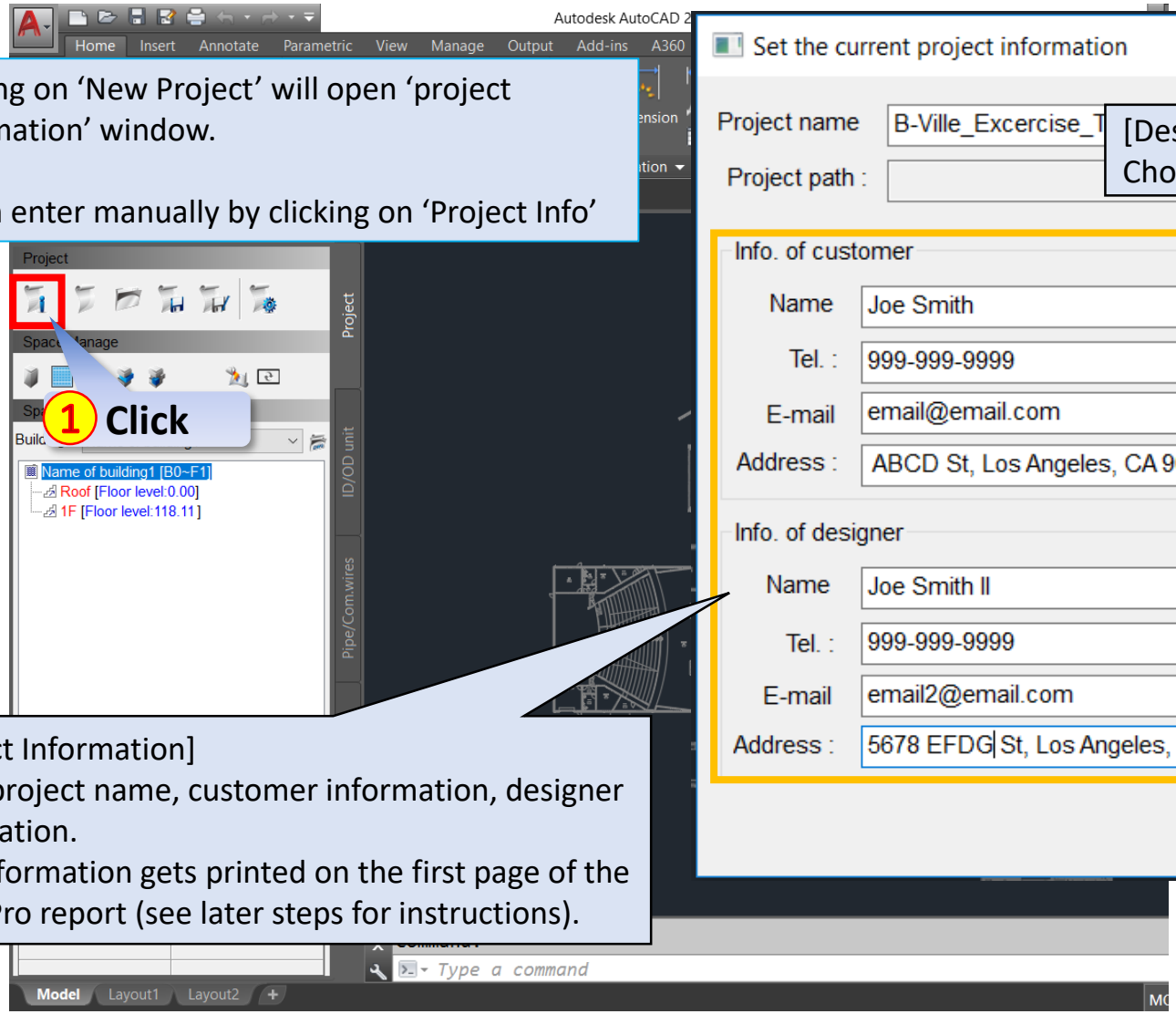


[New Project]
Creates a new DVM-Pro CAD Mode project file

※ since DVM-Pro will modify the CAD file (.dwg) itself, make sure the original is backed up.

3. DVM-Pro CAD Mode – Tools

a) Project Tab – Project Information and Design Condition

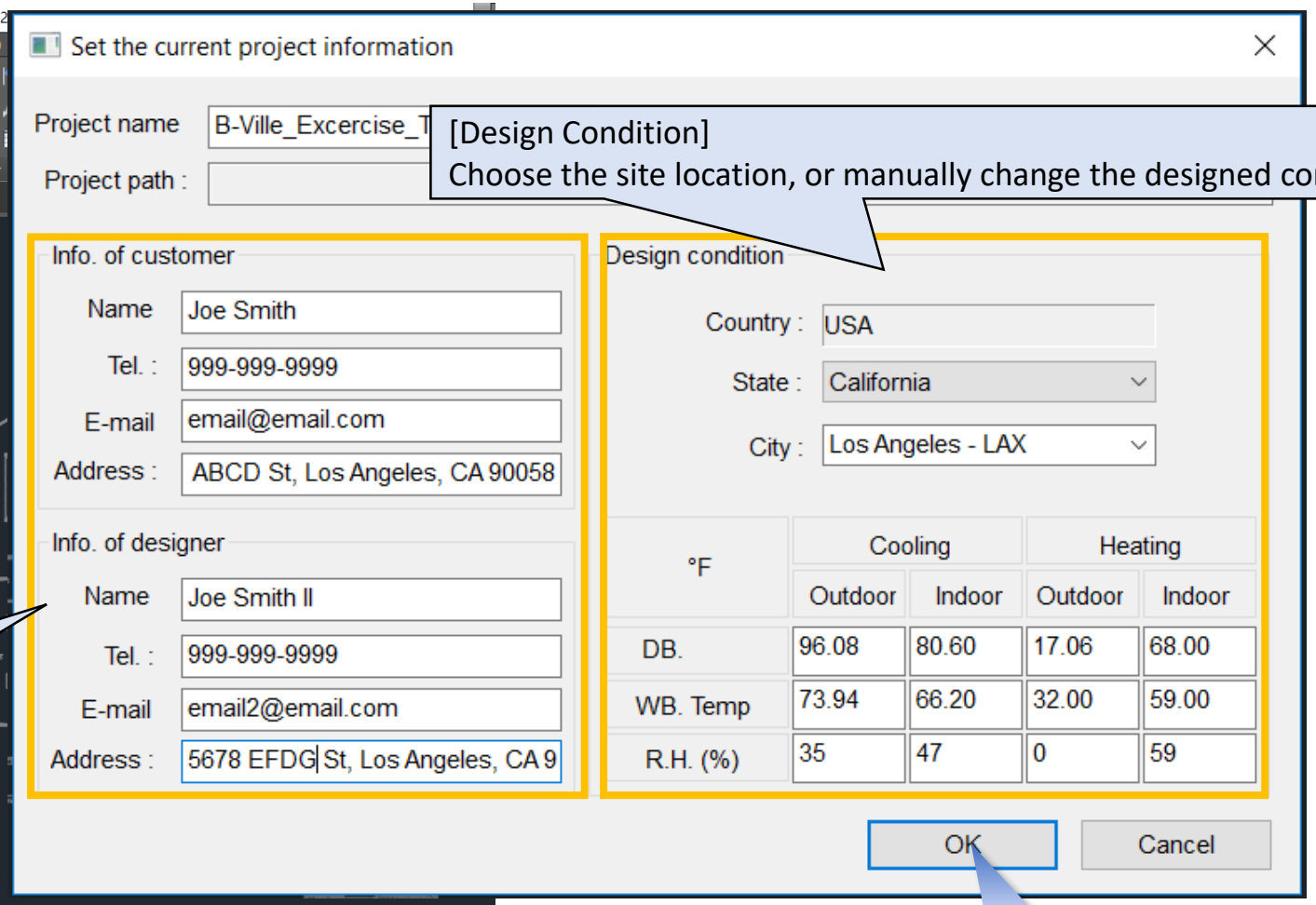


Clicking on 'New Project' will open 'project information' window.

※ can enter manually by clicking on 'Project Info'

1 Click

[Project Information]
Enter project name, customer information, designer information.
This information gets printed on the first page of the DVM-Pro report (see later steps for instructions).

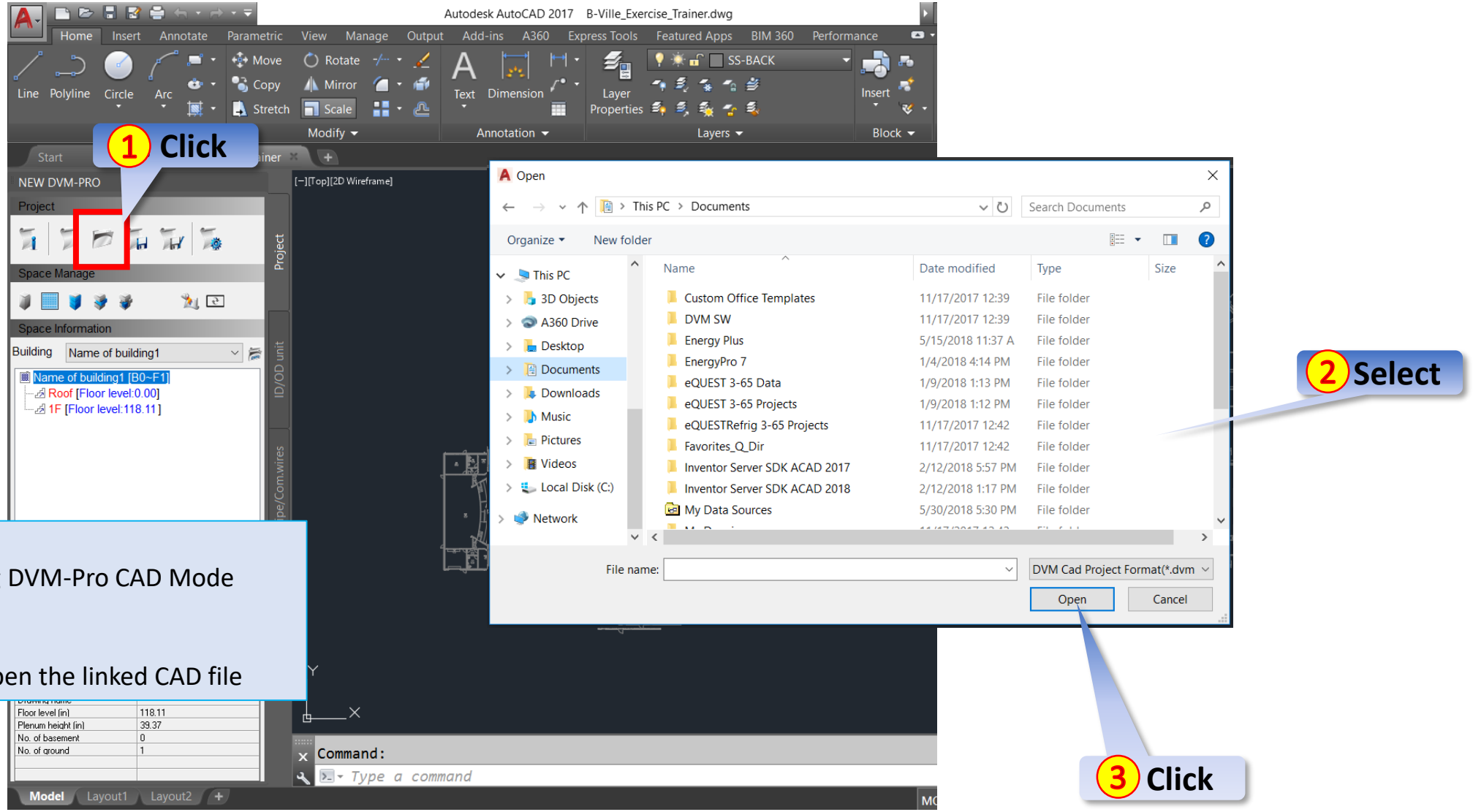


[Design Condition]
Choose the site location, or manually change the designed condition.

2 Click

3. DVM-Pro CAD Mode – Tools

a) Project Tab – Open Project [ODP]



[Open Project]
Opens an existing DVM-Pro CAD Mode project file

※ this will also open the linked CAD file

3. DVM-Pro CAD Mode – Tools

a) Project Tab – Save Project [SDP]

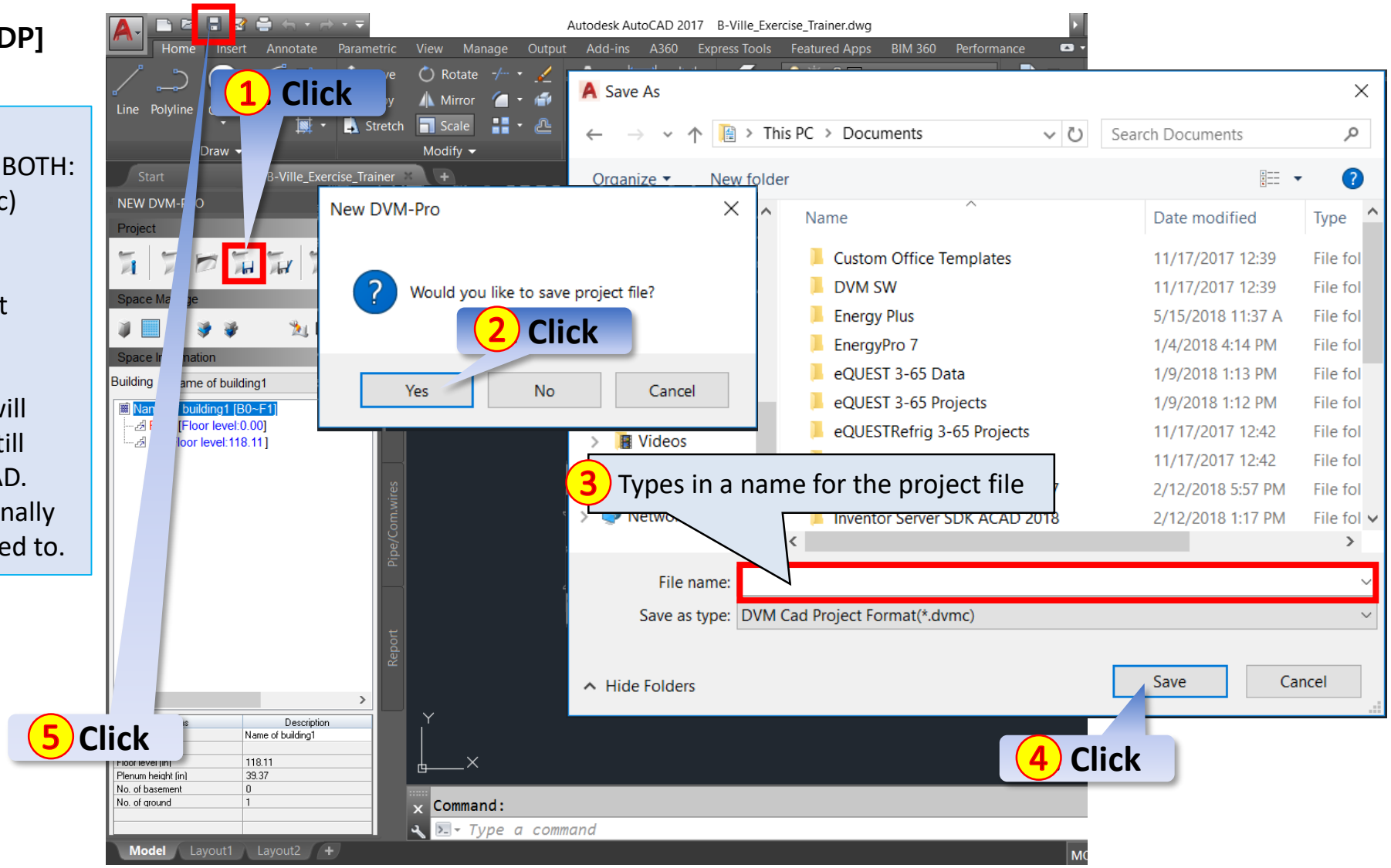
[Save Project]
"Save" and "Save As" functions saves BOTH:

- DVM-Pro project file (.dvmc)
- linked CAD file (.dwg)

※ Remember to save often to prevent losing unsaved works.

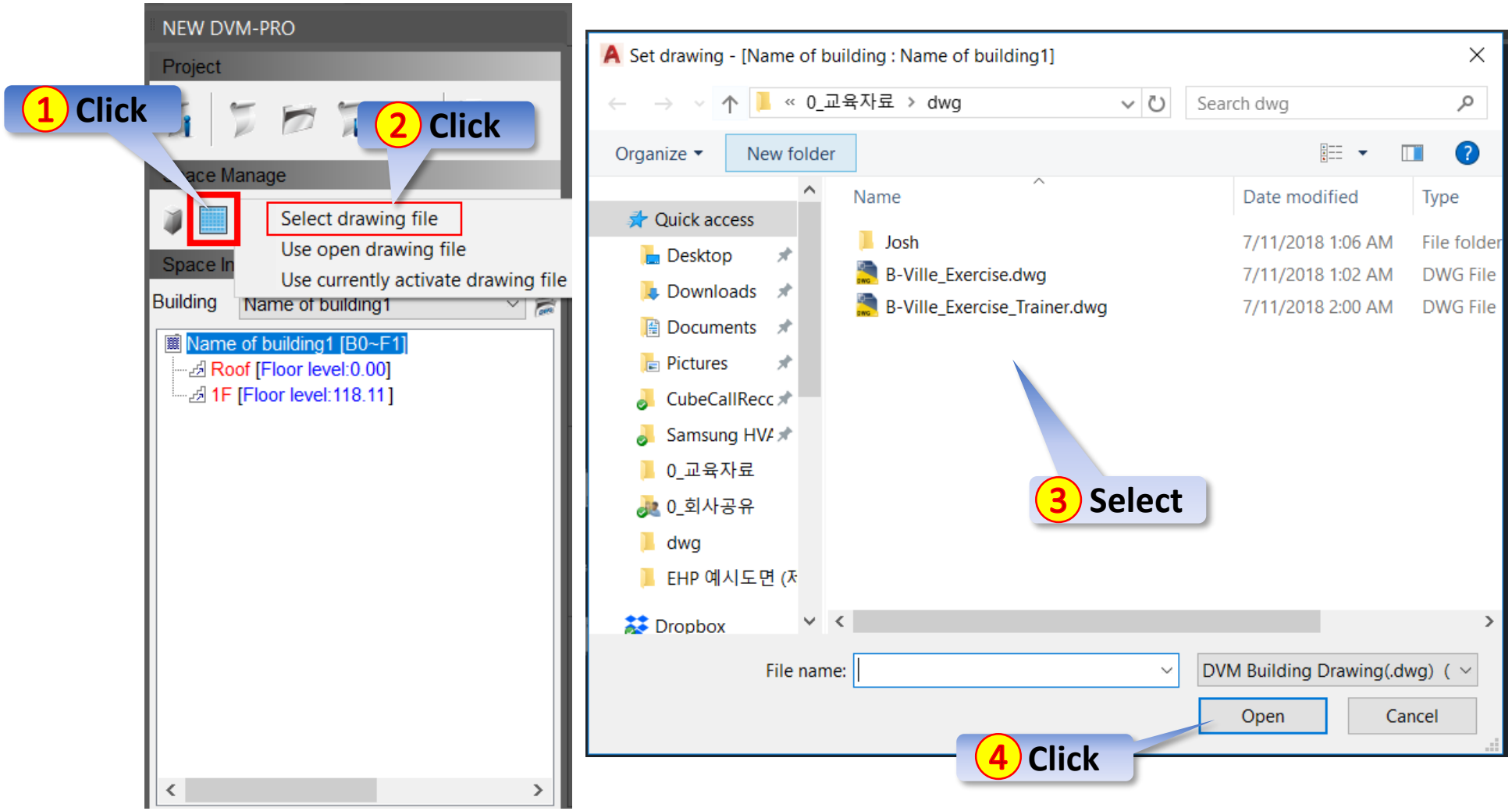
※ Although DVM-Pro's save feature will save both the .dvmc & .dwg, please still make sure that you save from AutoCAD. There is a known error, which occasionally does not save .dwg file as it is supposed to.

Do not use 'Save As', as it will create another project file that is linked to the same dwg file. This means, two project files will be linked to one DWG and such conflict may lead to problems.



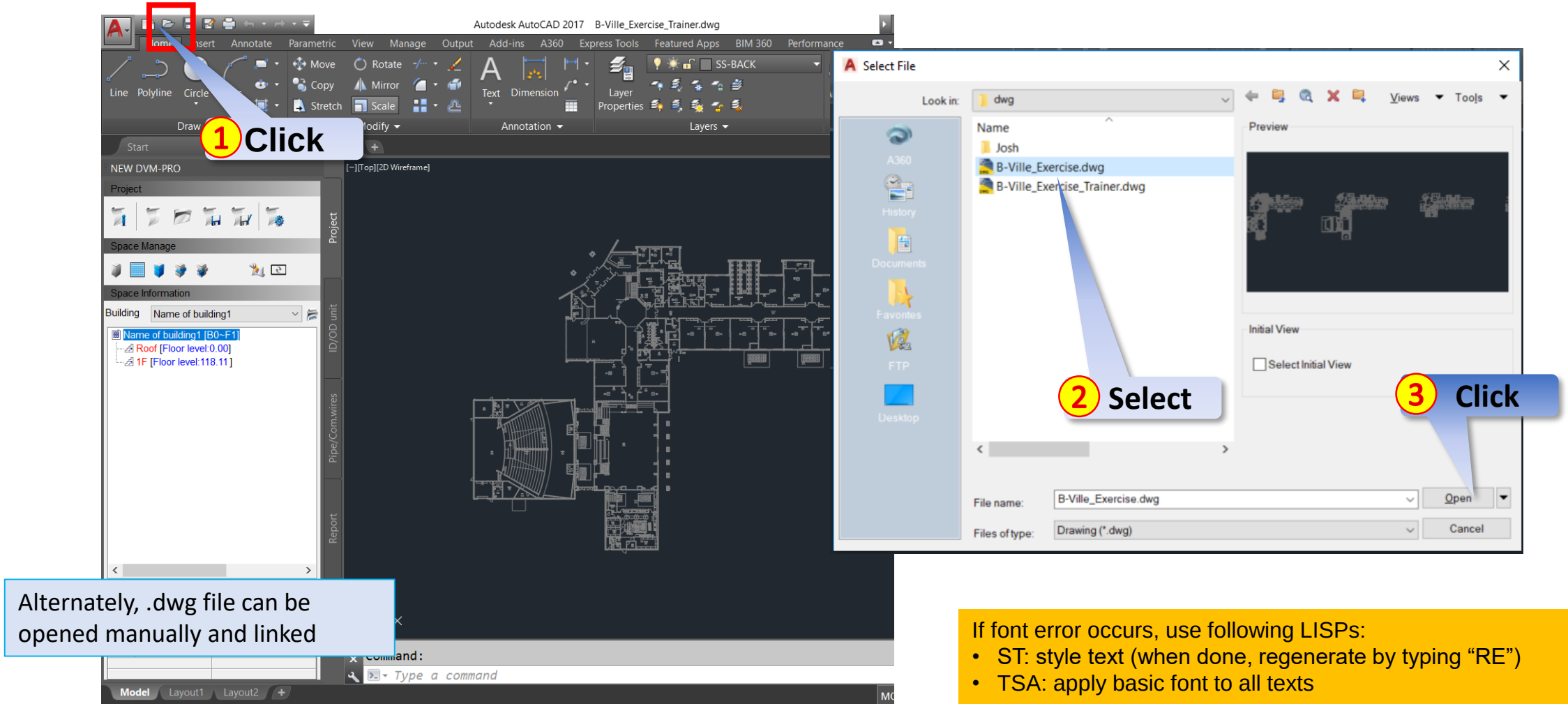
3. DVM-Pro CAD Mode – Tools

a) Project Tab – Linking .dwg file with the project file [SDF/SDO/SDA]



3. DVM-Pro CAD Mode – Tools

a) Project Tab – Linking .dwg file with the project file [SDF/SDO/SDA]

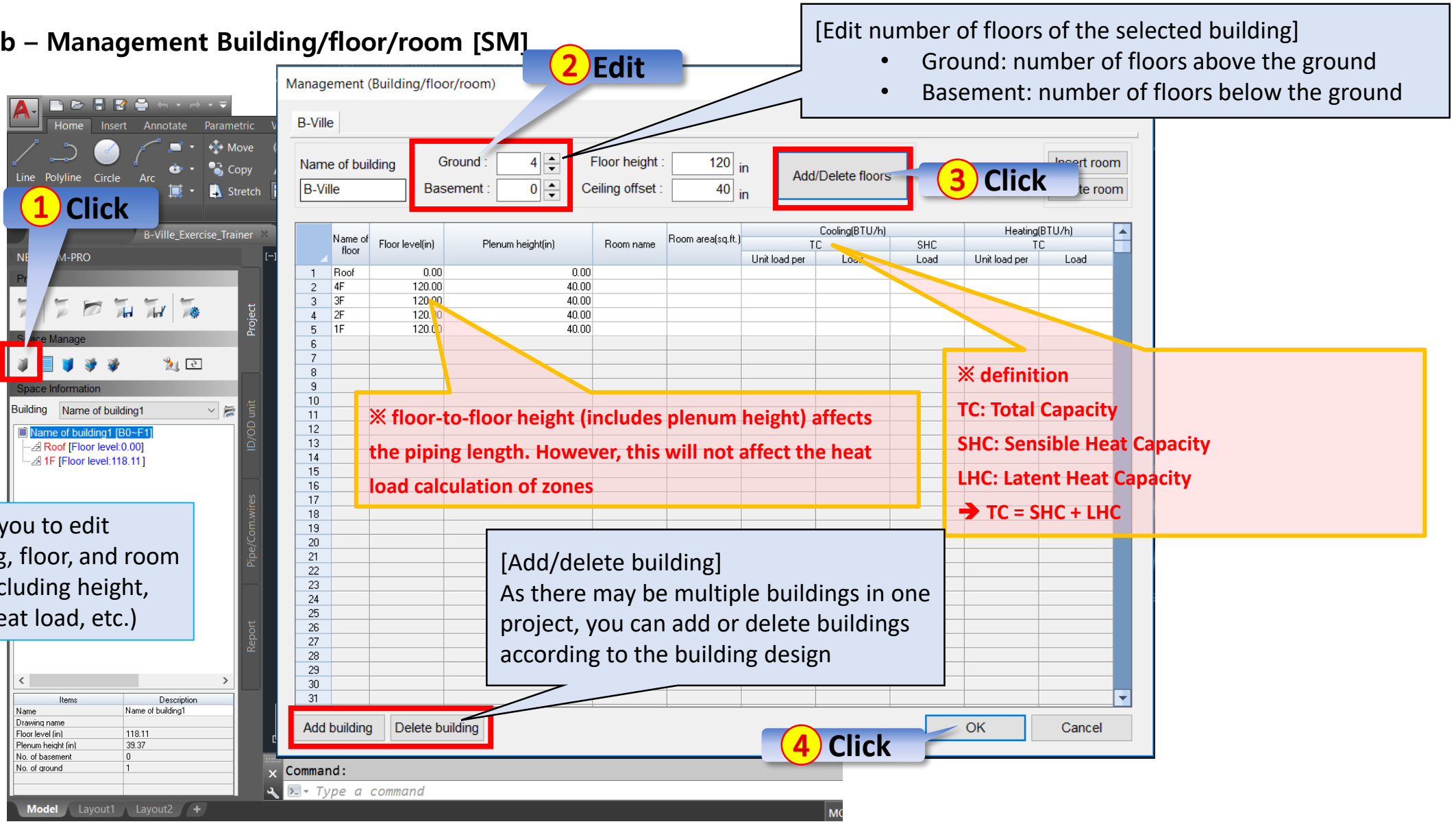


If font error occurs, use following LISPs:

- ST: style text (when done, regenerate by typing “RE”)
- TSA: apply basic font to all texts

3. DVM-Pro CAD Mode – Tools

a) Project Tab – Management Building/floor/room [SM]



[Edit number of floors of the selected building]
- Ground: number of floors above the ground
- Basement: number of floors below the ground

Allows you to edit building, floor, and room info (including height, area, heat load, etc.)

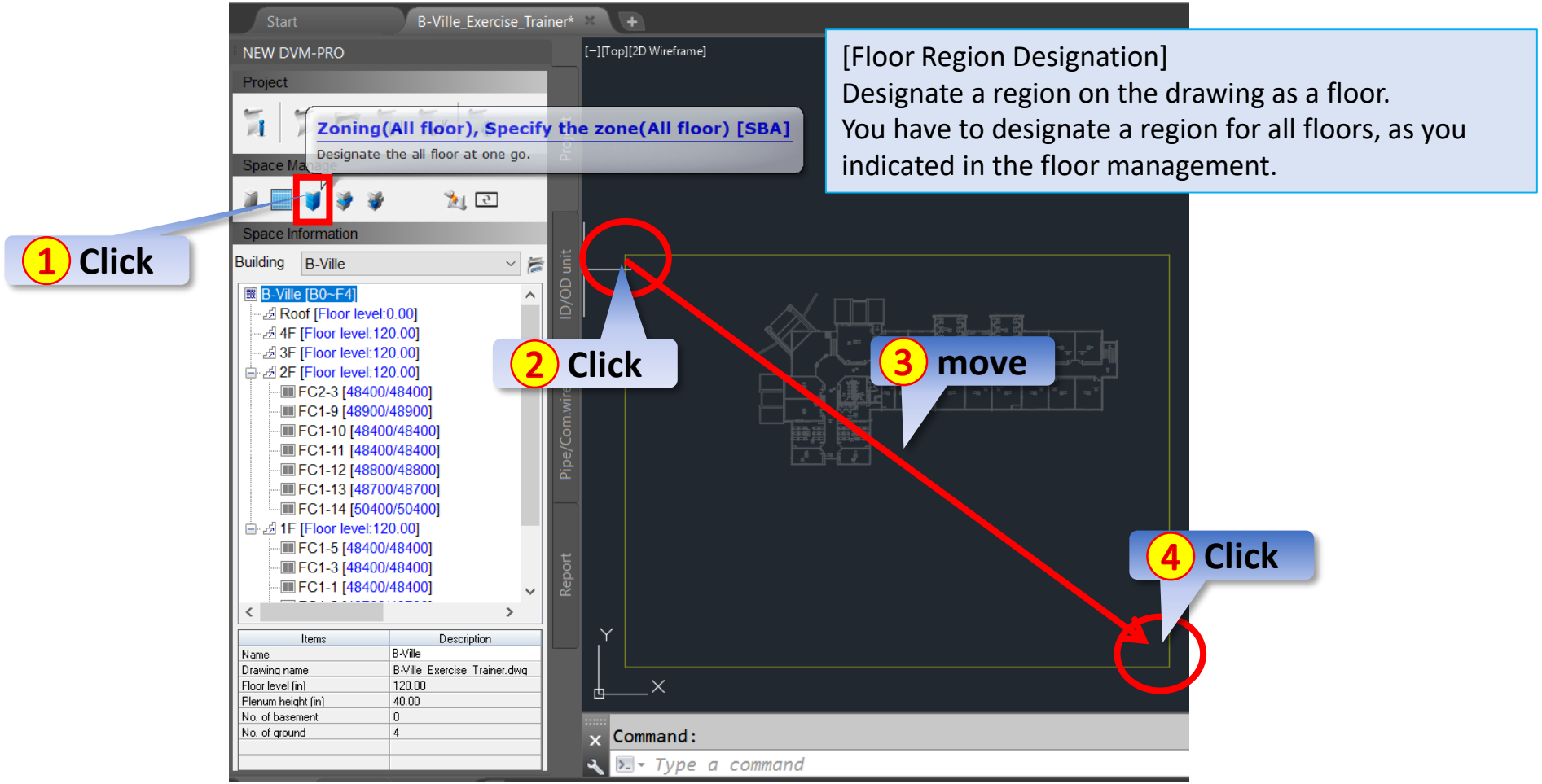
※ floor-to-floor height (includes plenum height) affects the piping length. However, this will not affect the heat load calculation of zones

※ definition
TC: Total Capacity
SHC: Sensible Heat Capacity
LHC: Latent Heat Capacity
➔ TC = SHC + LHC

[Add/delete building]
As there may be multiple buildings in one project, you can add or delete buildings according to the building design

3. DVM-Pro CAD Mode – Tools

a) Project Tab – Creating Floors [SBA]

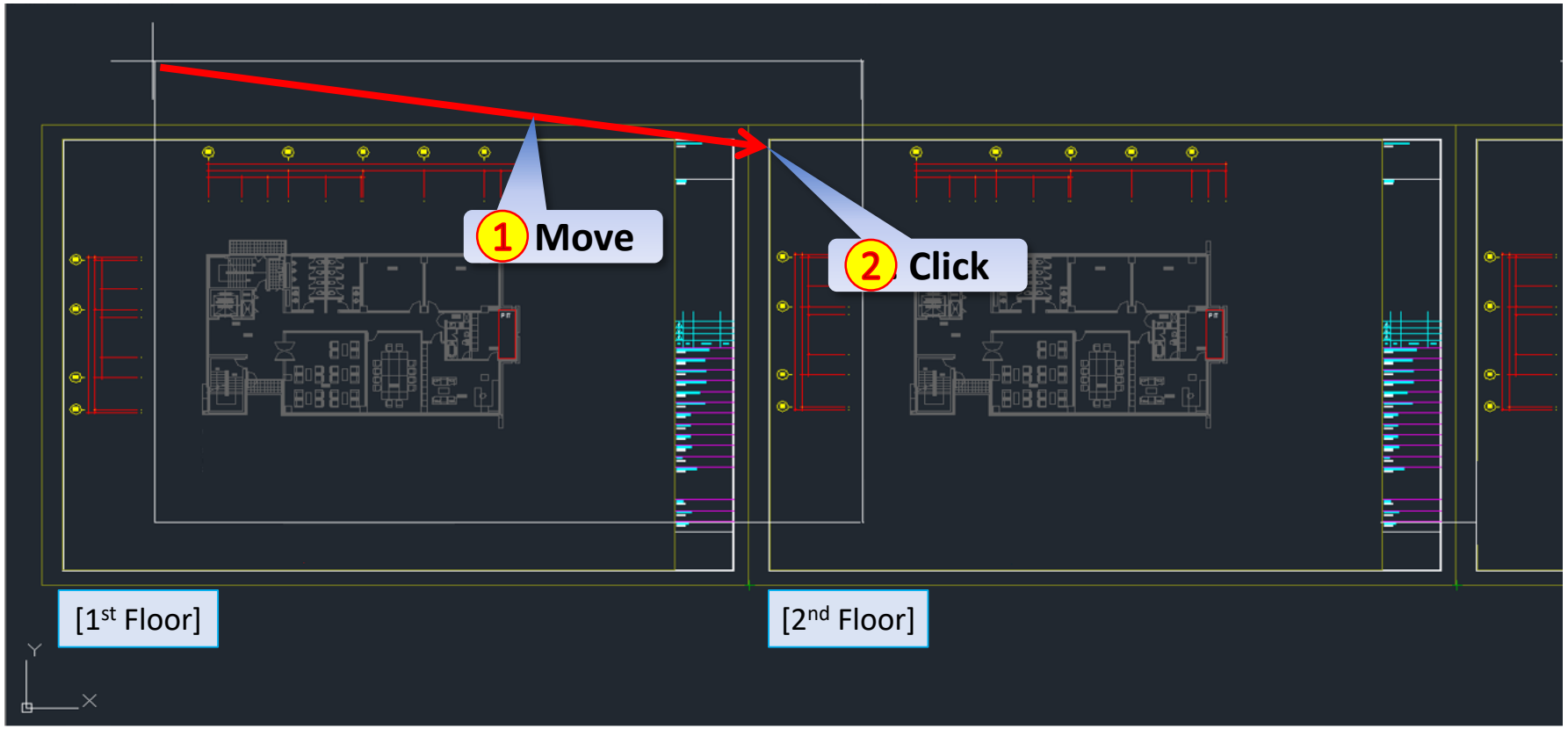


3. DVM-Pro CAD Mode – Tools

a) Project Tab – Creating Floors [SBA]

```
>> Building(B-Ville) Name of floor(2F) Specify the zoning
SBA >> Specify the point :
```

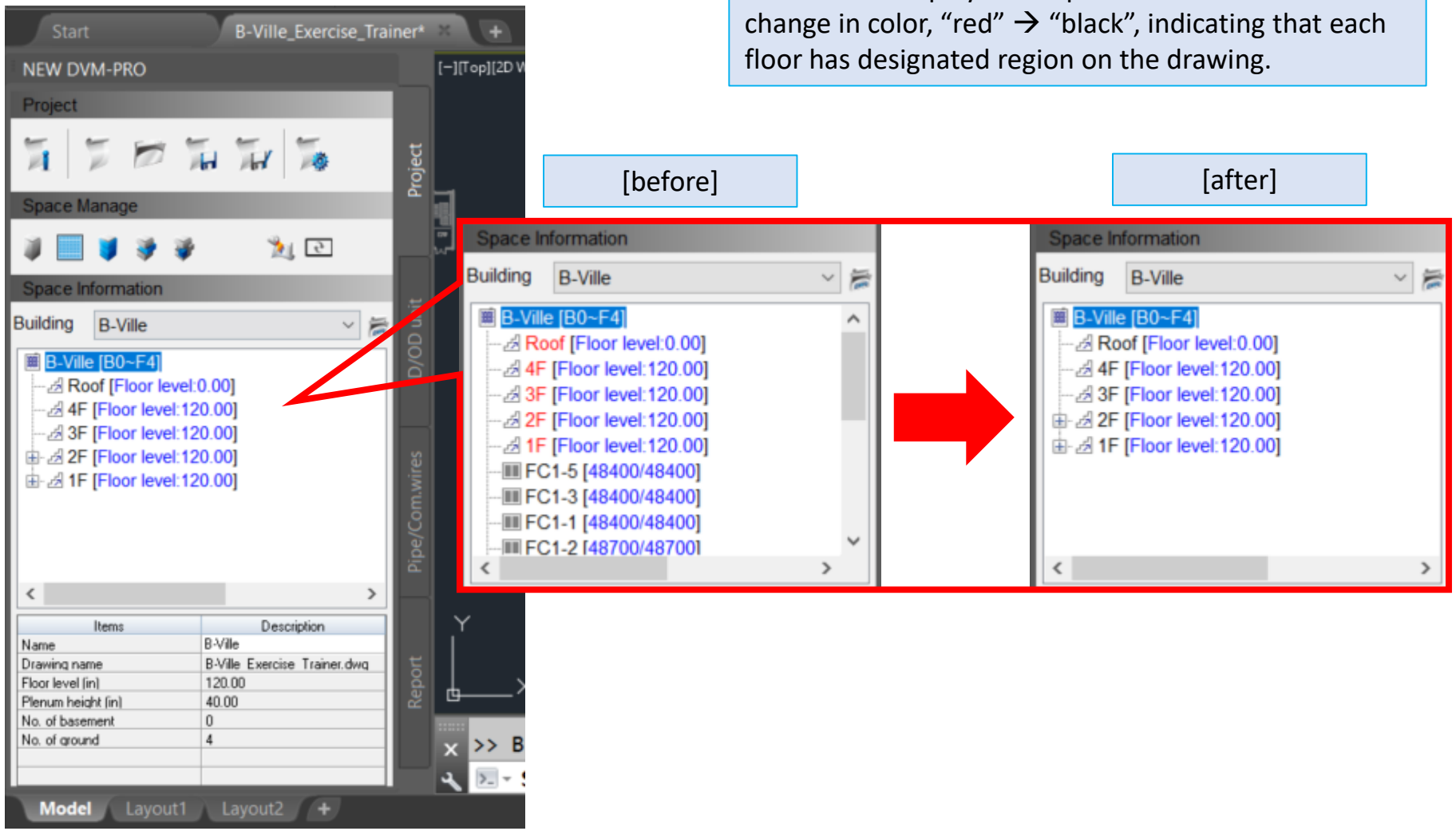
[Simple Region Designation]
Stamping Method:
Once first floor region is set, the region as a yellow frame will stay and move with the mouse cursor. It can be used like a stamp to designate regions for the rest of the floors



3. DVM-Pro CAD Mode – Tools

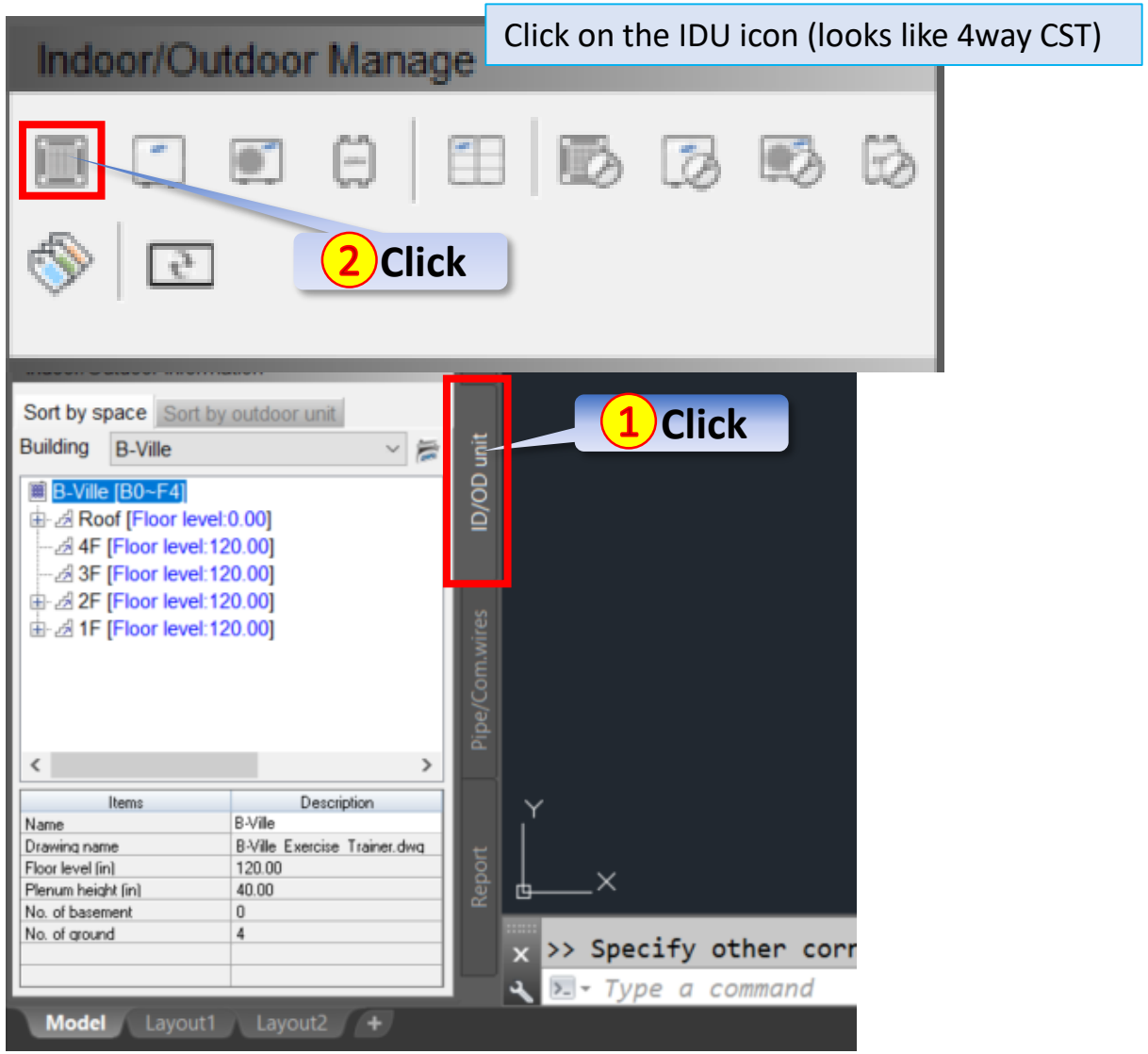
a) Project Tab – Creating Floors [SBA]

[Space Information]
Once the floor region selection is complete, floor information displayed in 'Space Information' box will change in color, "red" → "black", indicating that each floor has designated region on the drawing.



3. DVM-Pro CAD Mode – Tools

b) ODU/IDU Tab – IDU Selection [DIN]

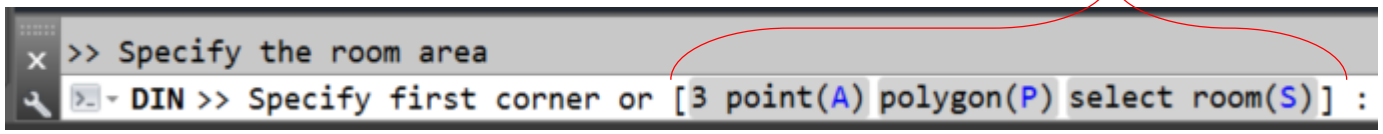


3. DVM-Pro CAD Mode – Tools

b) ODU/IDU Tab – IDU Selection [DIN]: Zoning

Two parts to IDU selection process
1. Zoning (IDU sizing based on the design condition)
2. IDU type/model selection

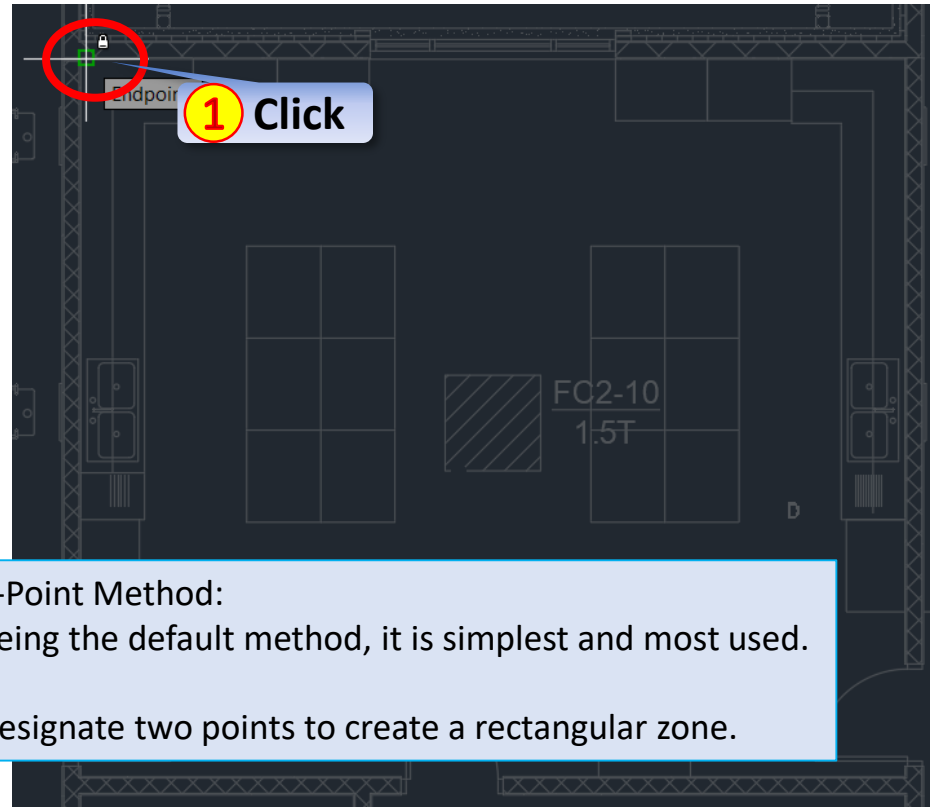
There are four zoning methods
1. 2-Point (default)
2. 3-Point
3. Polygon
4. Select Room (for pre-existing zone)



3. DVM-Pro CAD Mode – Tools

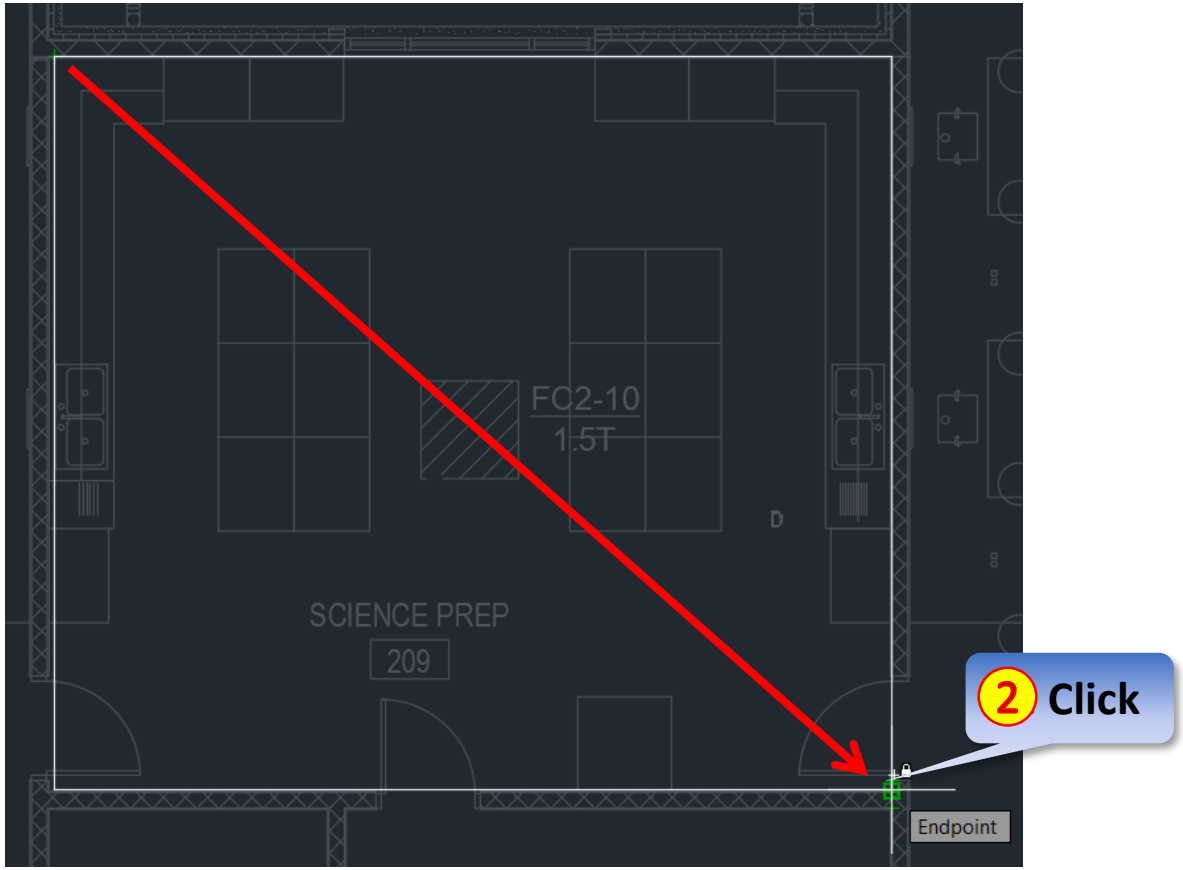
b) ODU/IDU Tab – IDU Selection [DIN]: Rectangular Zone, "2-Point" Method (Default)

```
>> Specify the room area
DIN >> Specify first corner or [3 point(A) polygon(P) select room(S)] :
```



2-Point Method:
Being the default method, it is simplest and most used.

Designate two points to create a rectangular zone.

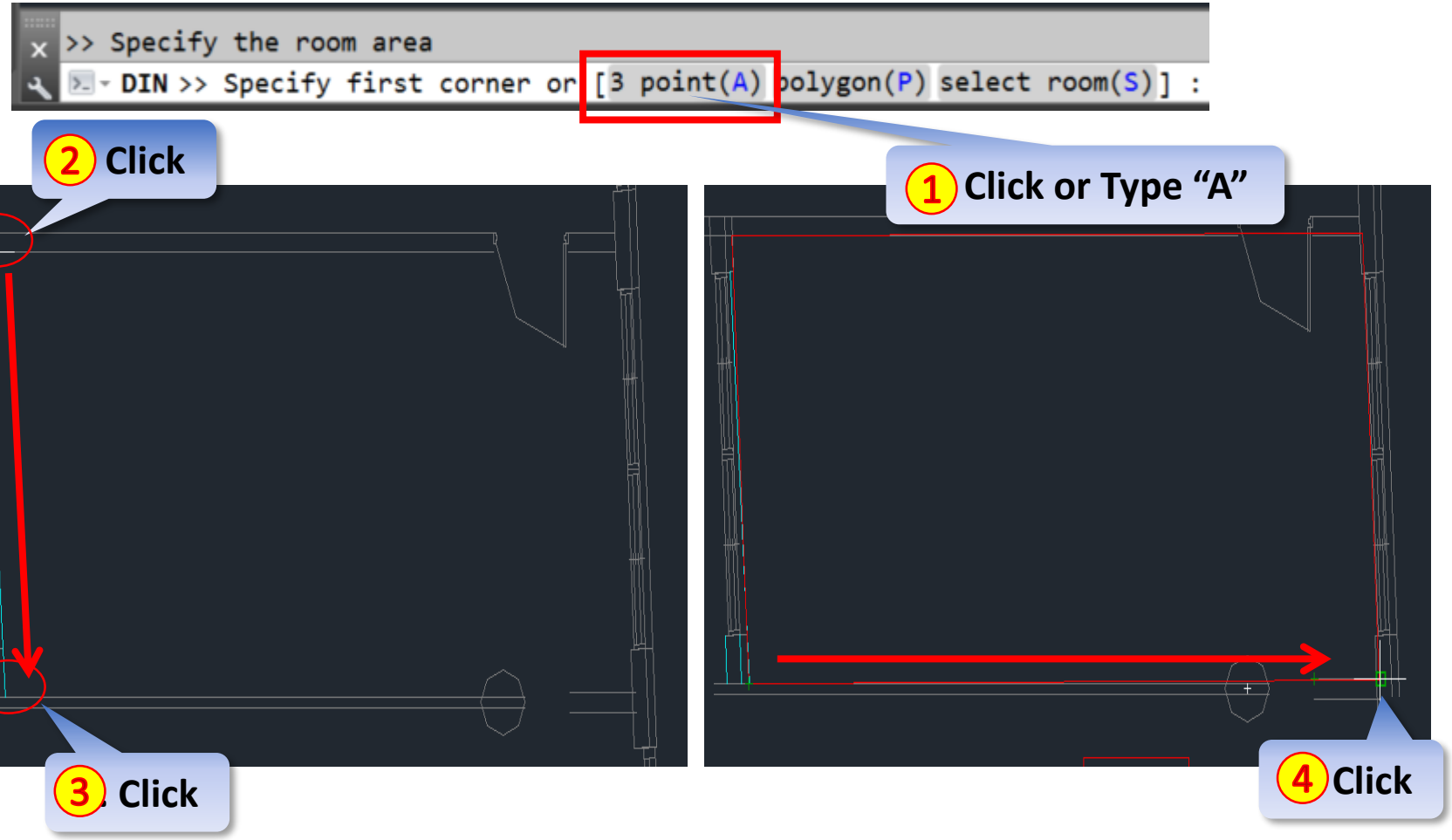


3. DVM-Pro CAD Mode – Tools

b) ODU/IDU Tab – IDU Selection [DIN]: Parallel Zone "3-Point" Method

3-Point Method:
Creates parallelogram-shaped zones.

Designate three vertices of parallelogram.

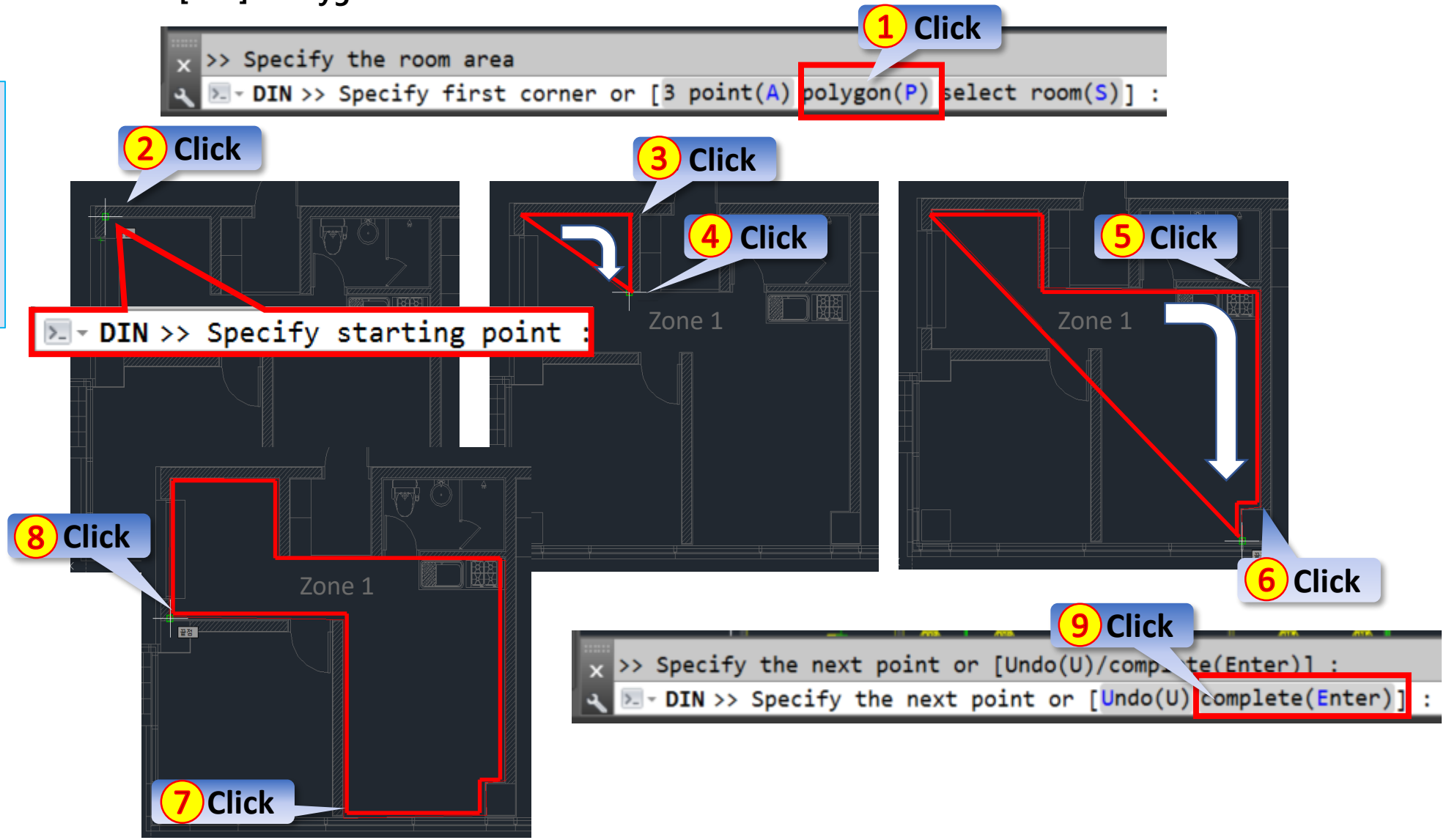


3. DVM-Pro CAD Mode – Tools

b) ODU/IDU Tab – IDU Selection [DIN]: "Polygon" Method

Polygon Method:
Useful for zones of non-simple shapes.

Sequentially click on all vertices of the zone.

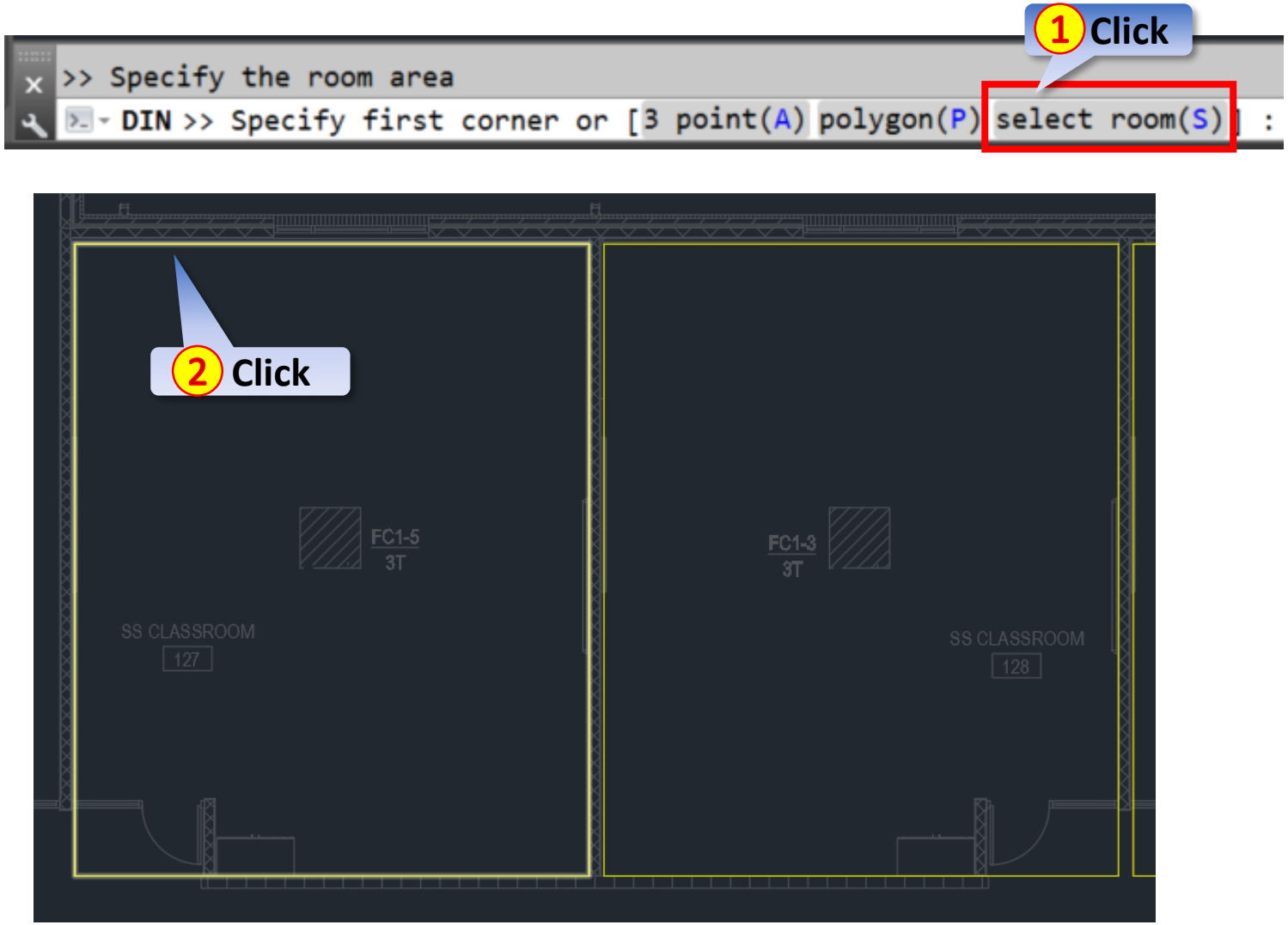


3. DVM-Pro CAD Mode – Tools

b) ODU/IDU Tab – IDU Selection [DIN]: “Select Room” Method

Select Room Method: Place IDU in an existing zone.

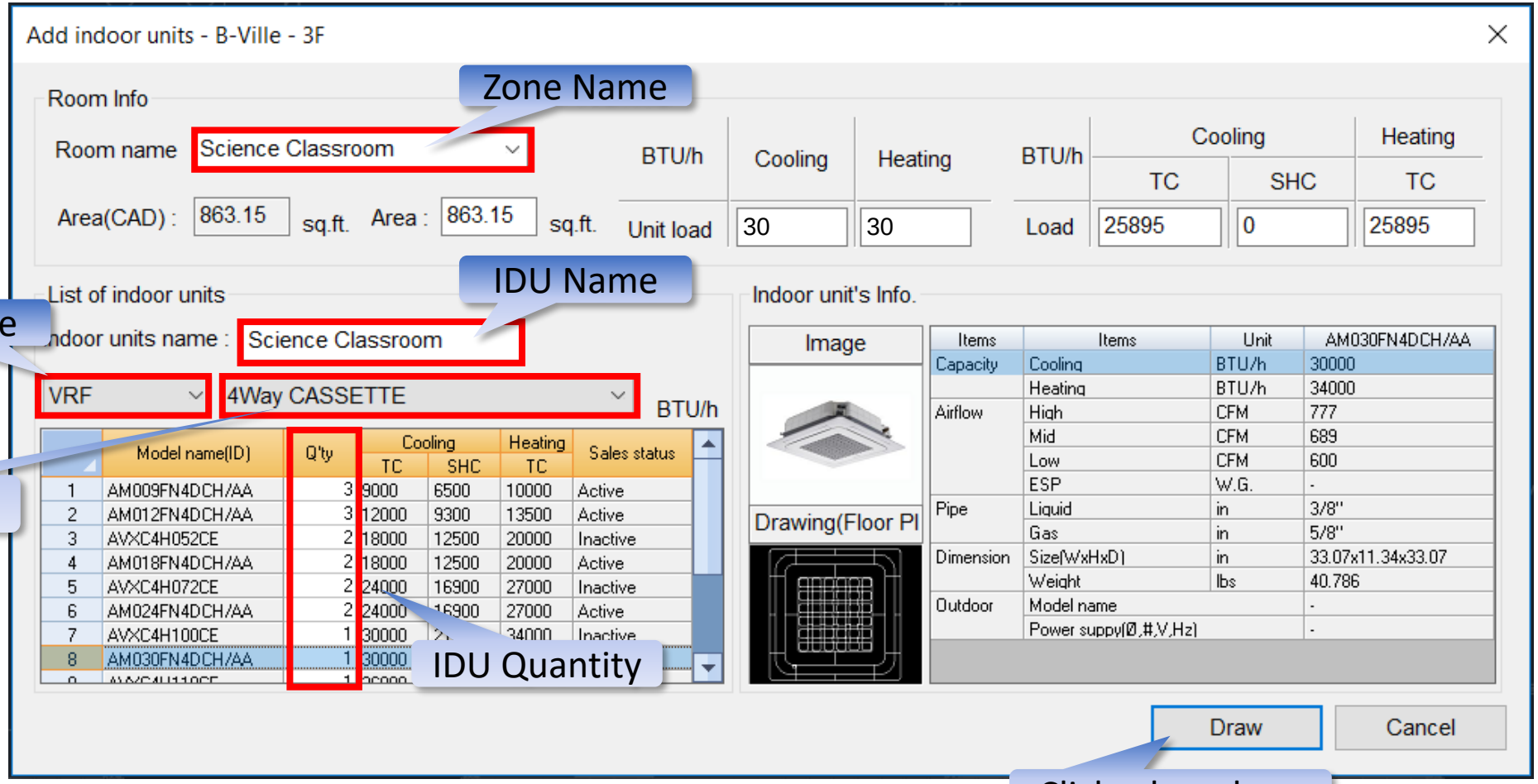
Click on the boundary/edge of a zone.



3. DVM-Pro CAD Mode – Tools

b) ODU/IDU Tab – IDU Selection [DIN]: IDU Info and Type

Creating a zone will open the IDU selection window, where you input IDU info and select IDU type/model



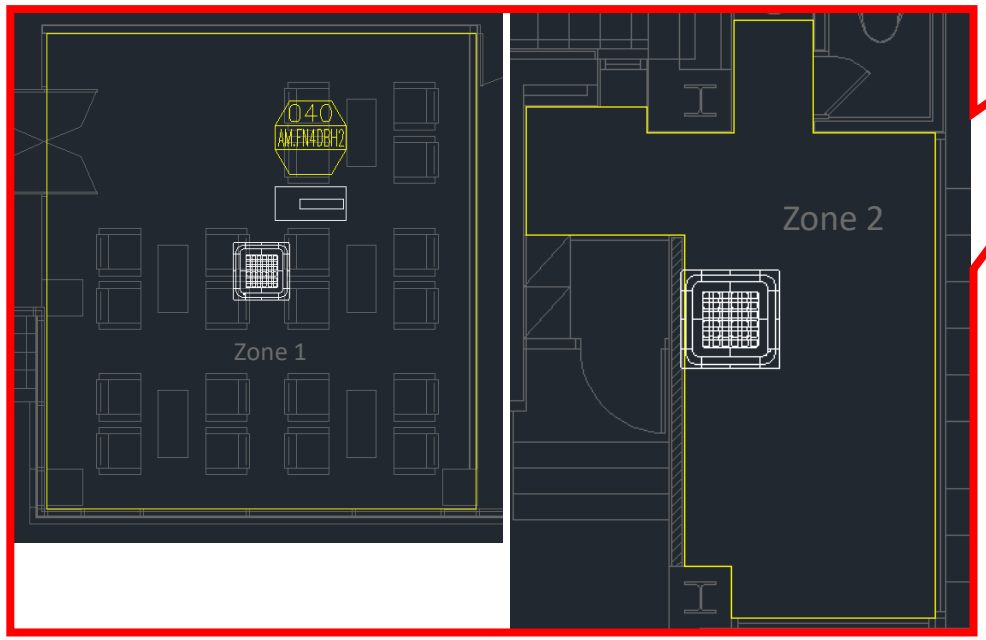
3. DVM-Pro CAD Mode – Tools

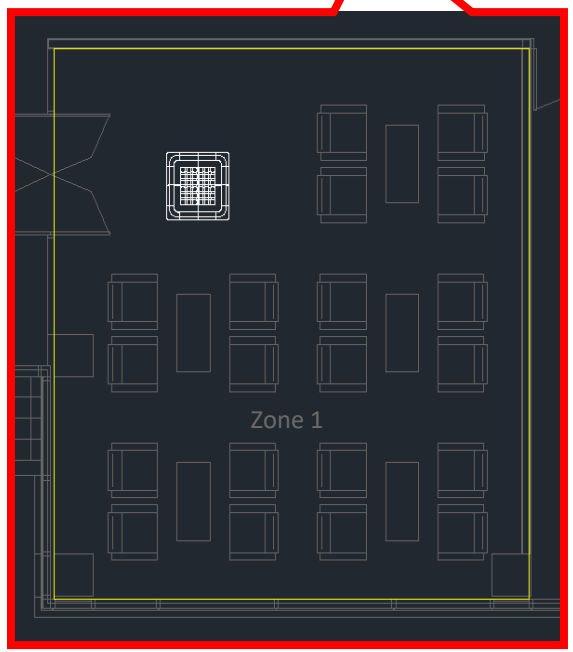
b) ODU/IDU Tab – IDU Selection: 4-Way CST Placement

Two methods of IDU placement

1. Center (Automatic)
2. User Deployment (Manual)

```
>> Specify the indoor position
DIN >> Select the indoor arrangement method [Center(C) User deployment(U)]<Centering(C)> :
```





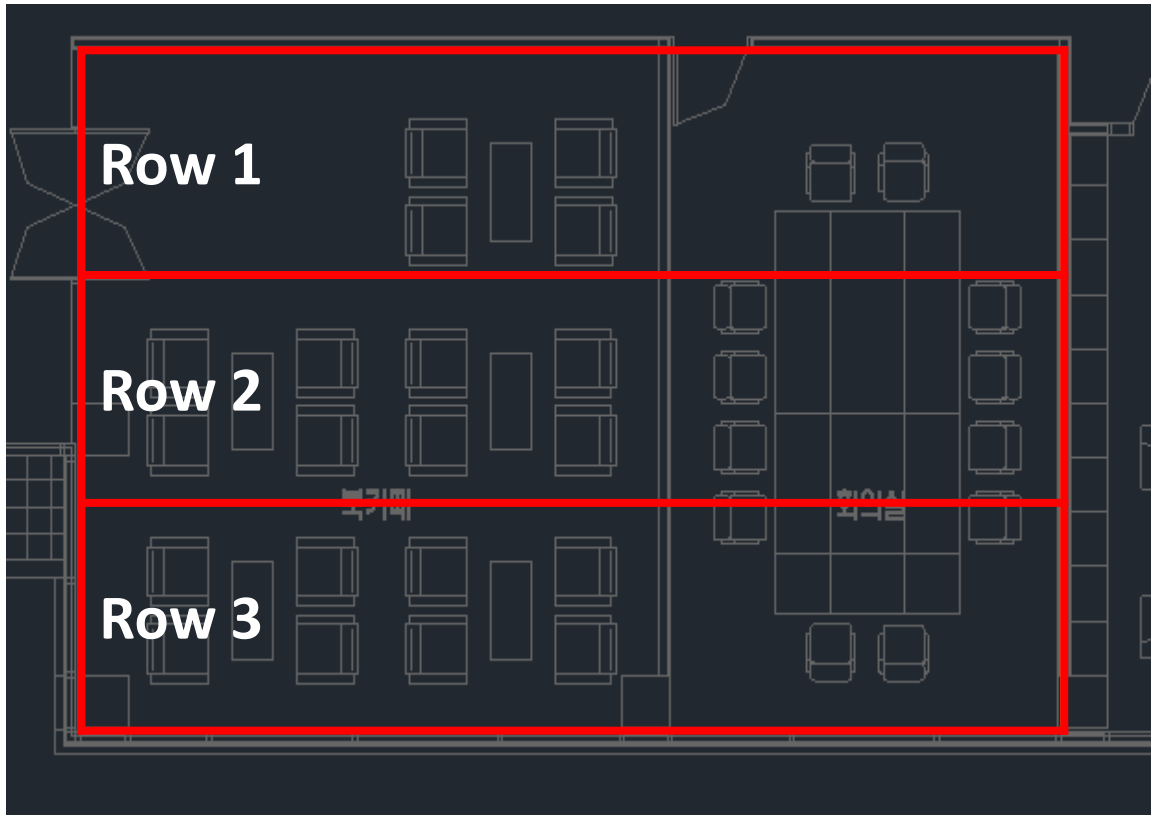
Center (C):
Places the IDU at the geometrical center

User Deployment (U):
User can manually choose a location for the IDU

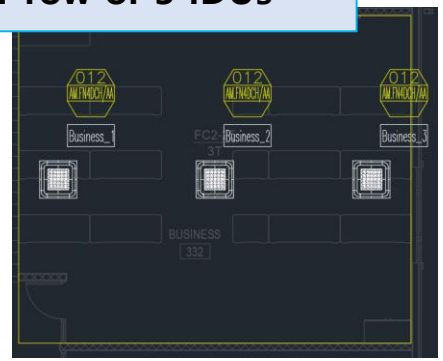
3. DVM-Pro CAD Mode – Tools

b) ODU/IDU Tab – IDU Selection: 4-Way CST Placement (Center and Number of Rows)

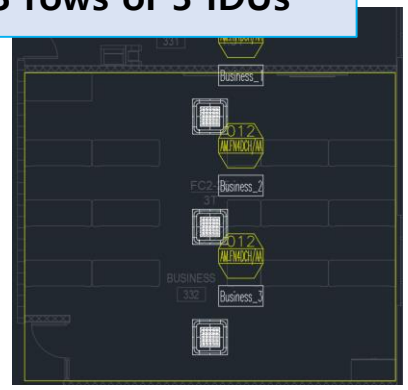
```
>> Select the indoor arrangement method [Center(C)/User deployment(U)]<Centering(C)> :C
DIN >> Enter the number of rows <2>:
```



1 row of 3 IDUs

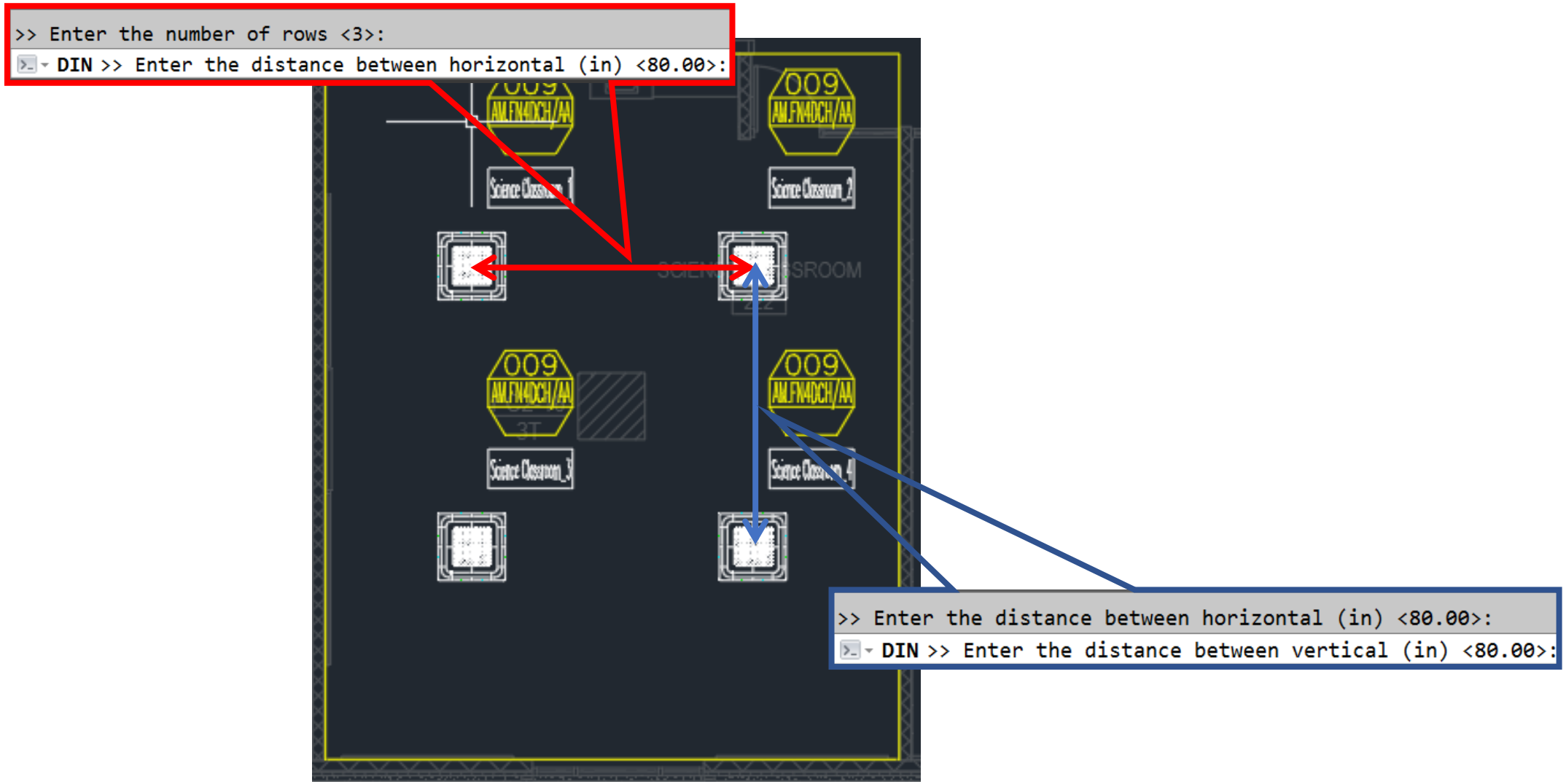


3 rows of 3 IDUs



3. DVM-Pro CAD Mode – Tools

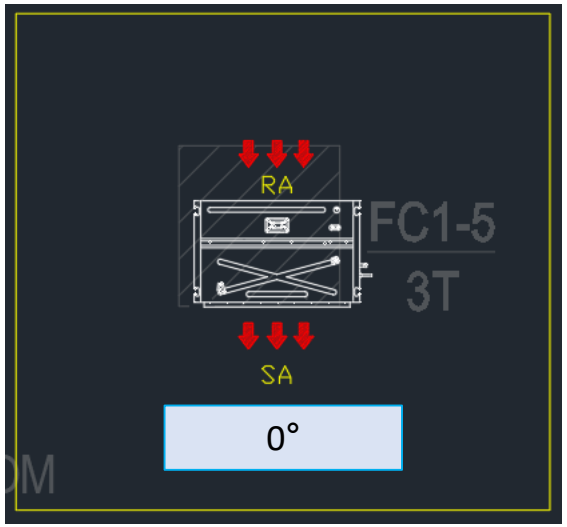
b) ODU/IDU Tab – IDU Selection: 4-Way CST Placement (IDU-IDU Horizontal and Vertical separation)

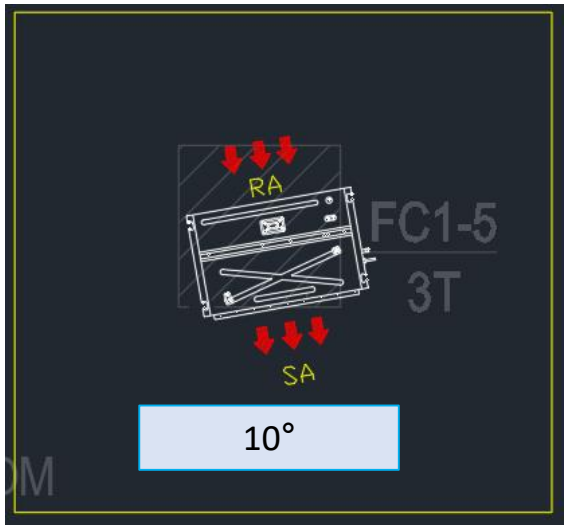


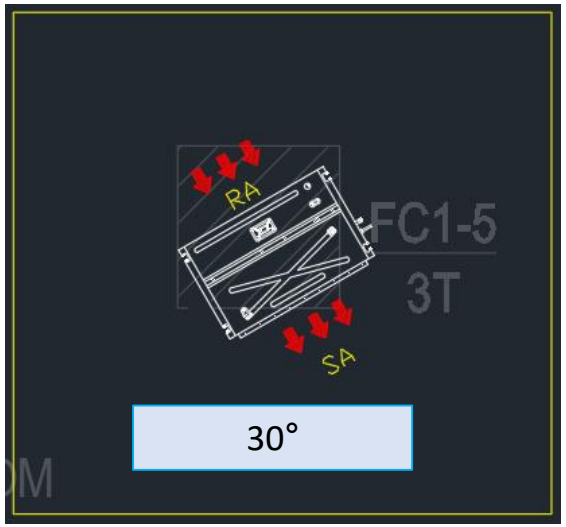
3. DVM-Pro CAD Mode – Tools

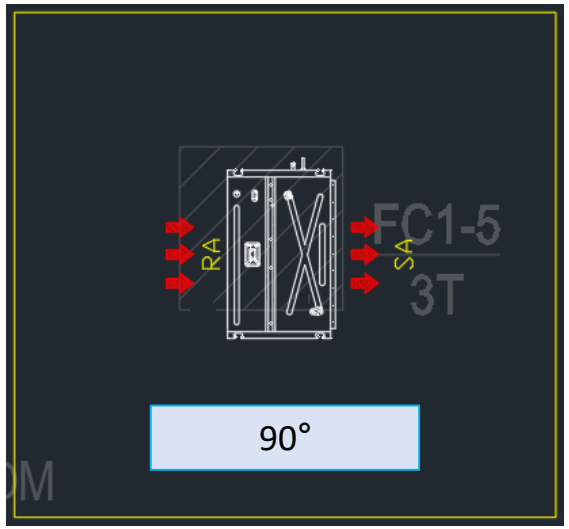
b) ODU/IDU Tab – IDU Selection: 4-Way CST Placement (IDU Orientation - Rotation Angle)

```
>> Enter the distance between vertical (in) <120.00>:
DIN >> Enter the rotation angle (degree) <0.00>:
```







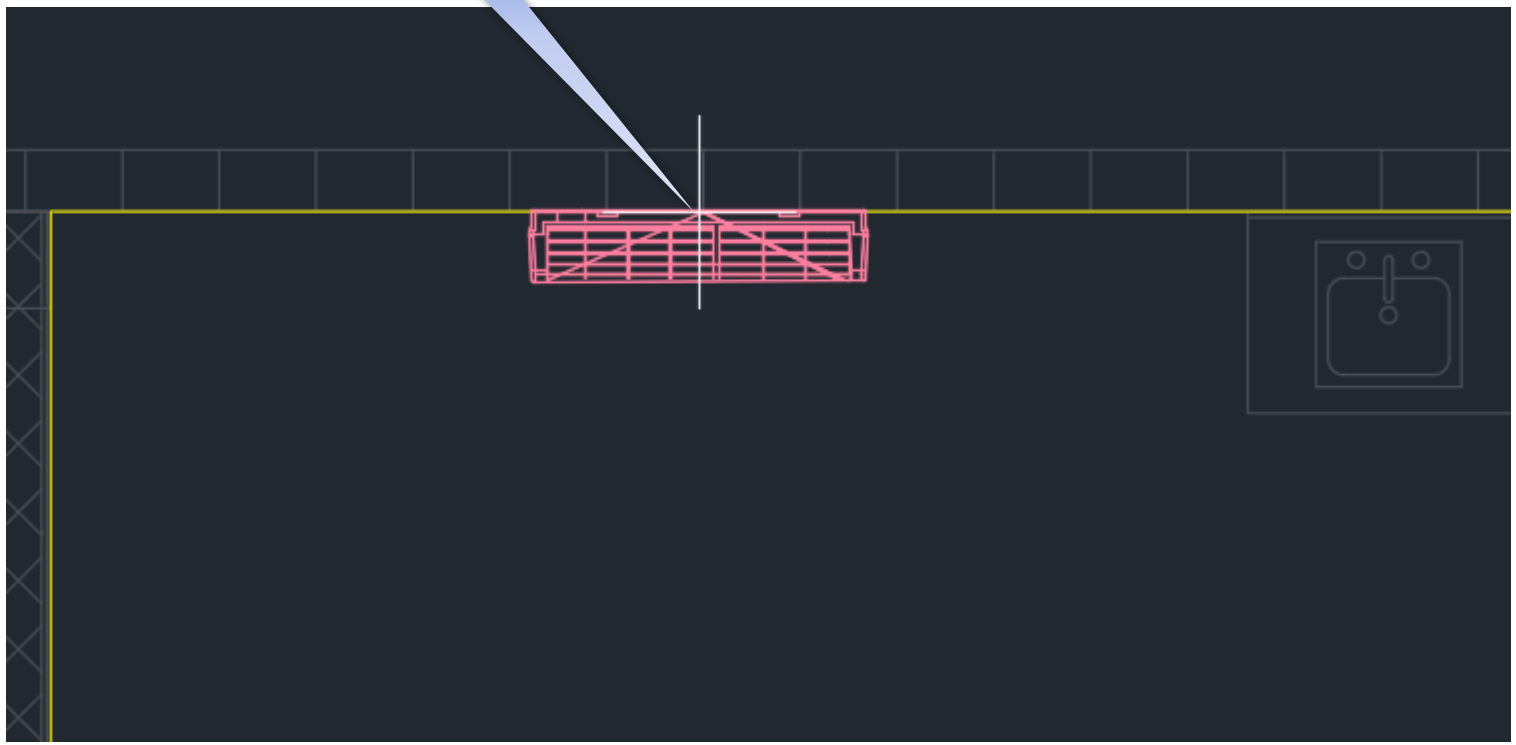


3. DVM-Pro CAD Mode – Tools

b) ODU/IDU Tab – IDU Selection: Wall Mount Placement

Click

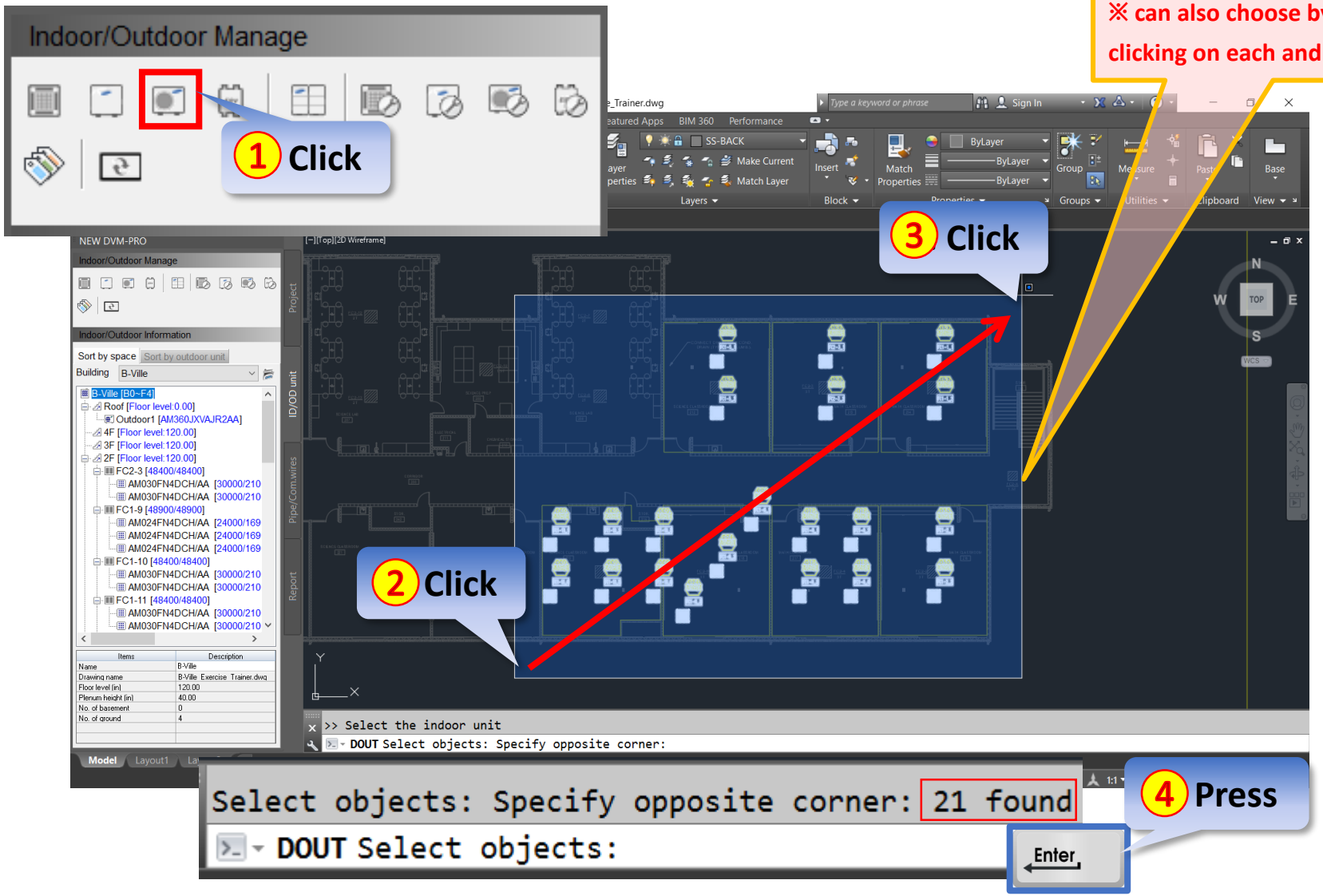
Drag the IDU close to the wall and click on the center of the location where it should be mounted.
It will automatically stick to the wall in the right orientation.



3. DVM-Pro CAD Mode – Tools

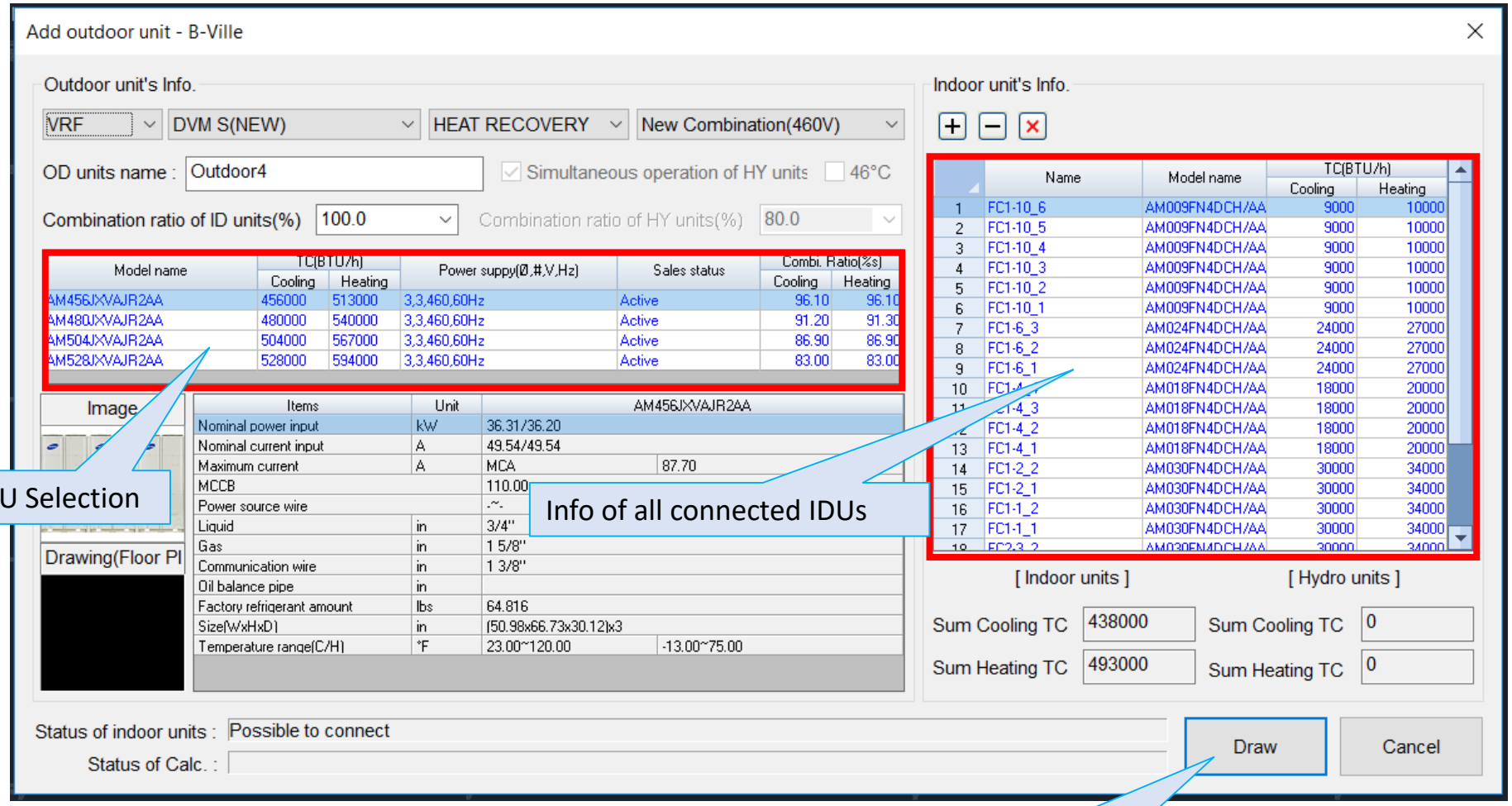
b) ODU/IDU Tab – ODU Selection [DOUT]

Choose all IDUs for a respective ODU (making up a system)



3. DVM-Pro CAD Mode – Tools

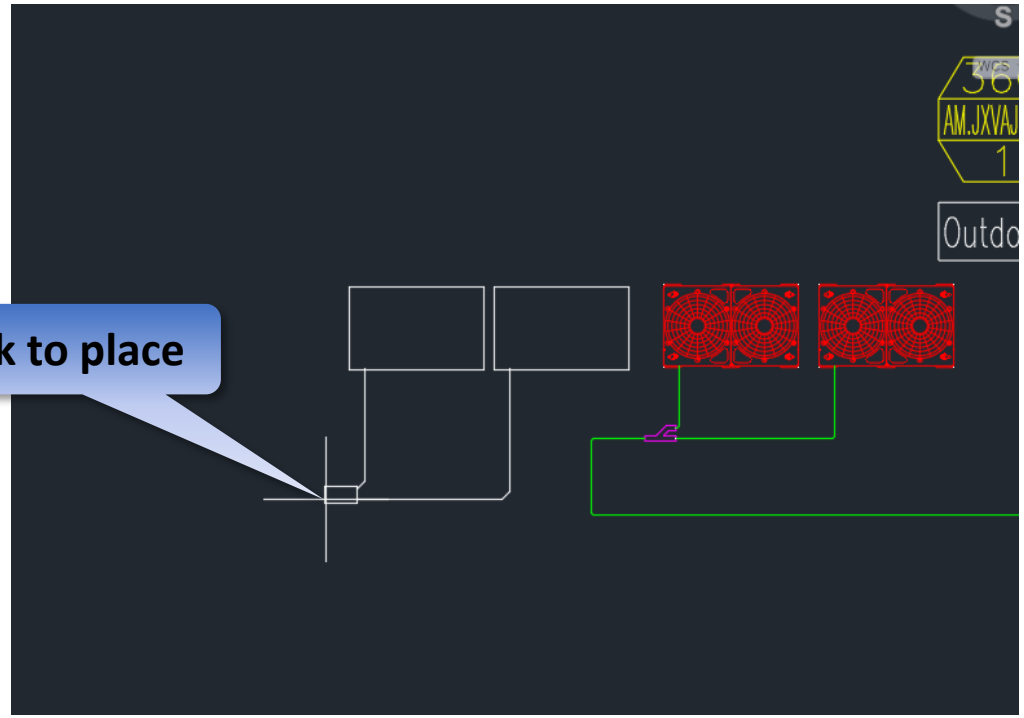
b) ODU/IDU Tab – ODU Selection [DOUT]



3. DVM-Pro CAD Mode – Tools

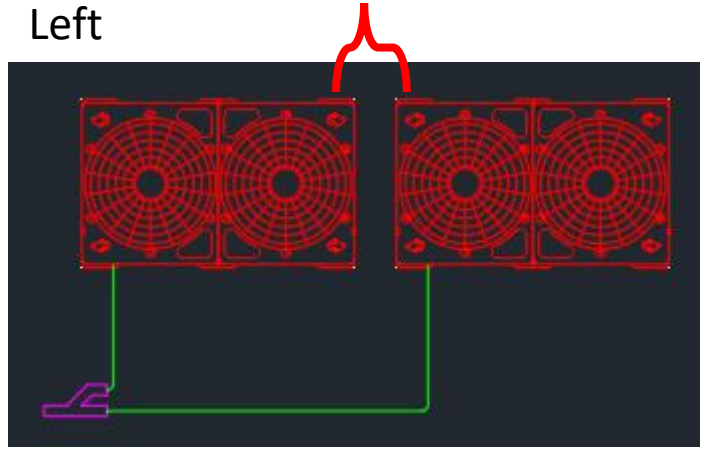
DOUT >> Distance between outdoor units (in) <MAX 242.48>

b) ODU/IDU Tab – ODU Selection [DOUT]

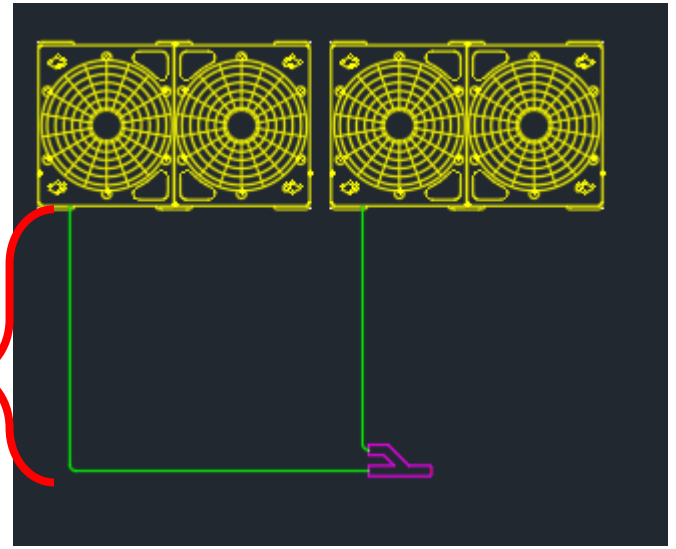


DOUT >> Distance between outdoor unit and the piping (in)

Left

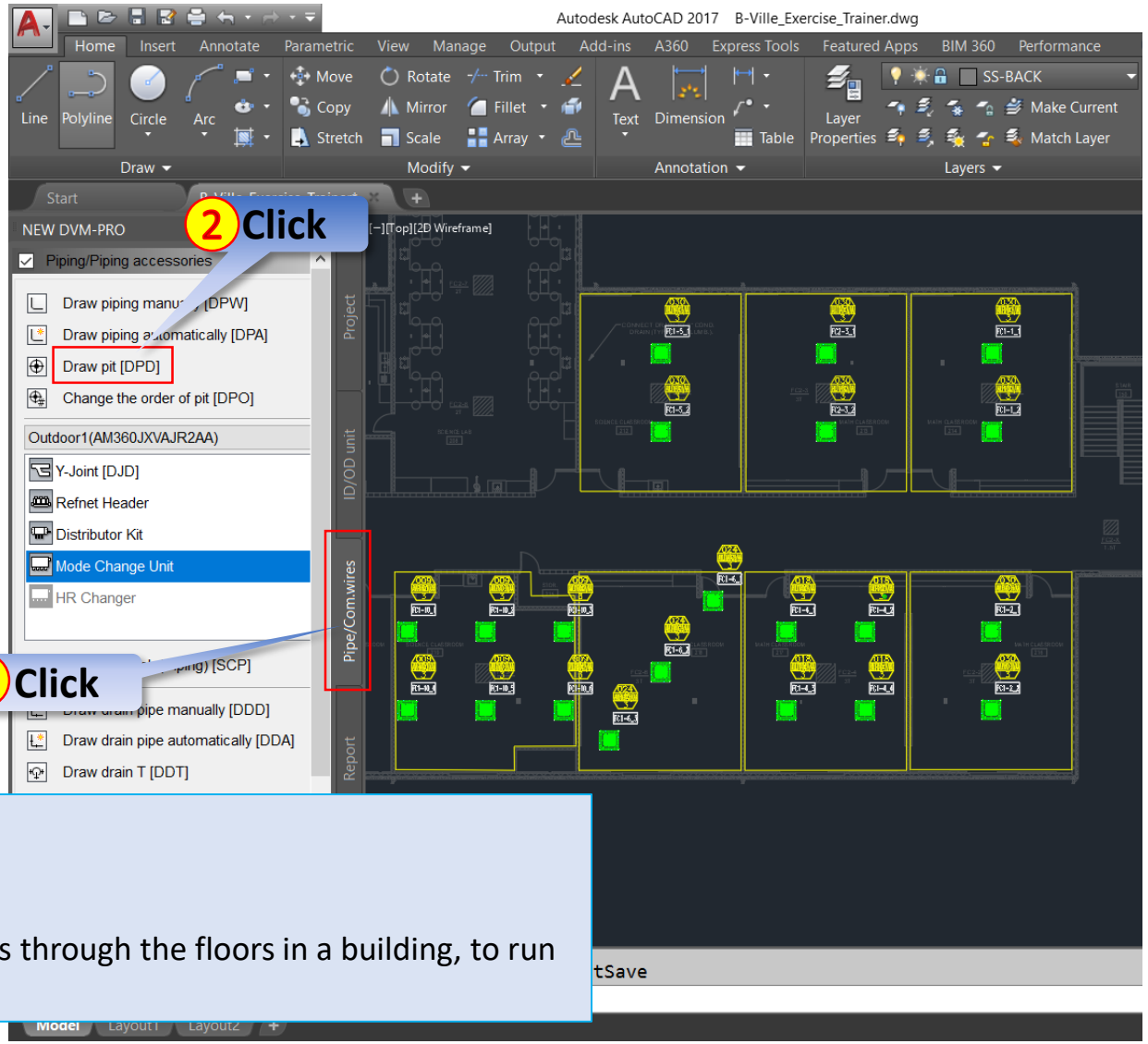


Right



3. DVM-Pro CAD Mode – Tools

c) Piping/Wiring Tab – Draw PIT [DPD]



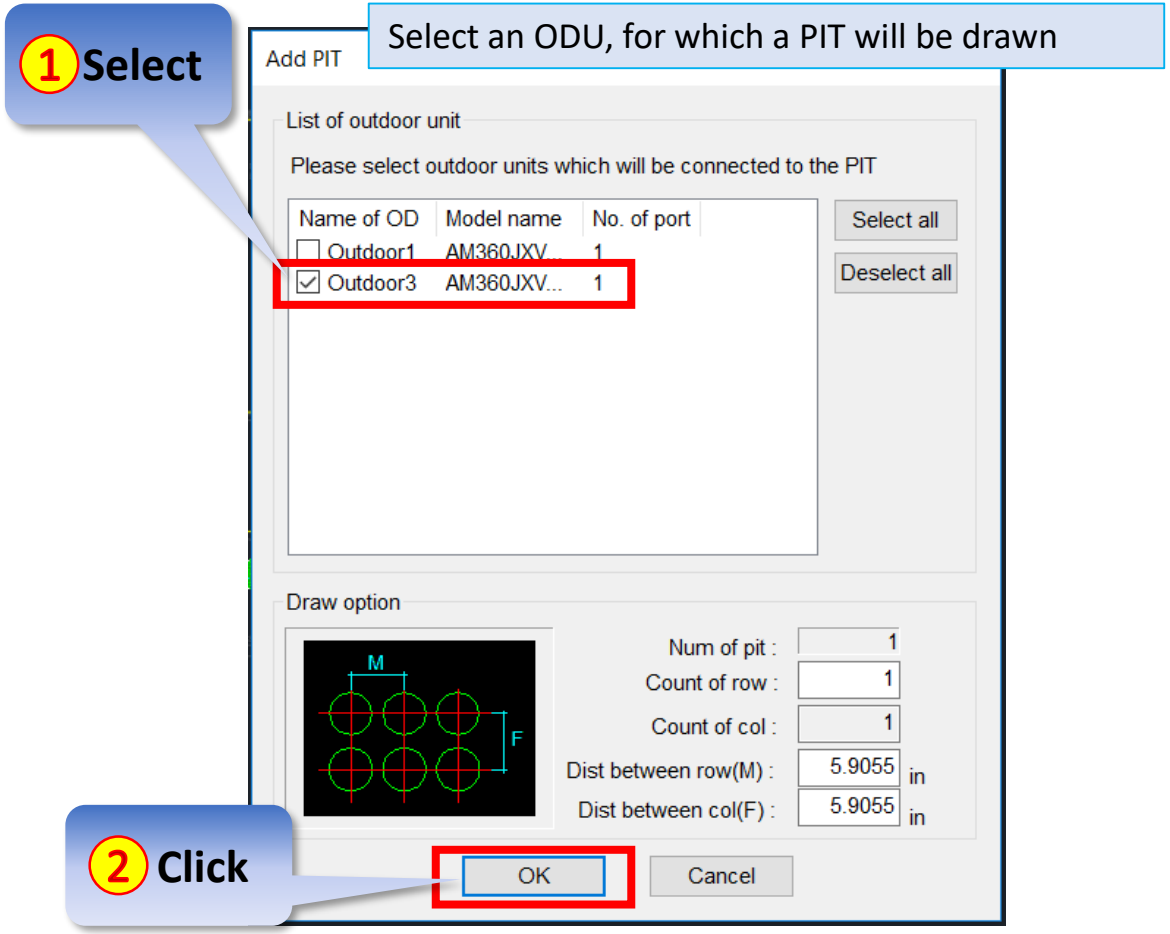
※ Definition

PIT:
A hollow vertical space that extends through the floors in a building, to run pipes and wires between the floors

3. DVM-Pro CAD Mode – Tools

c) Piping/Wiring Tab – Draw PIT [DPD]

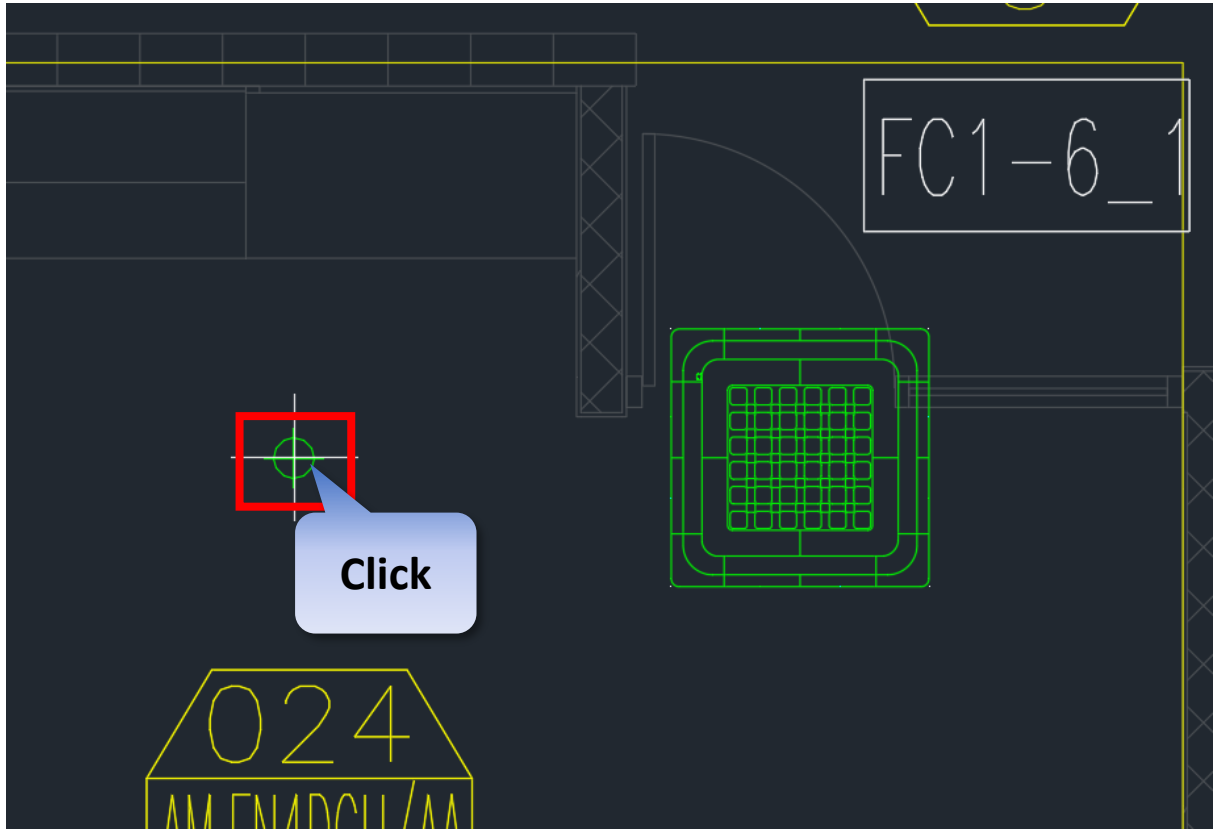
※ The concept of PIT in DVM-Pro CAD Mode is not exactly a hallow vertical space that you can run multiple pipes and wires. There has to be one PIT for every floor-penetrating pipe/wire.



3. DVM-Pro CAD Mode – Tools

c) Piping/Wiring Tab – Draw PIT [DPD]

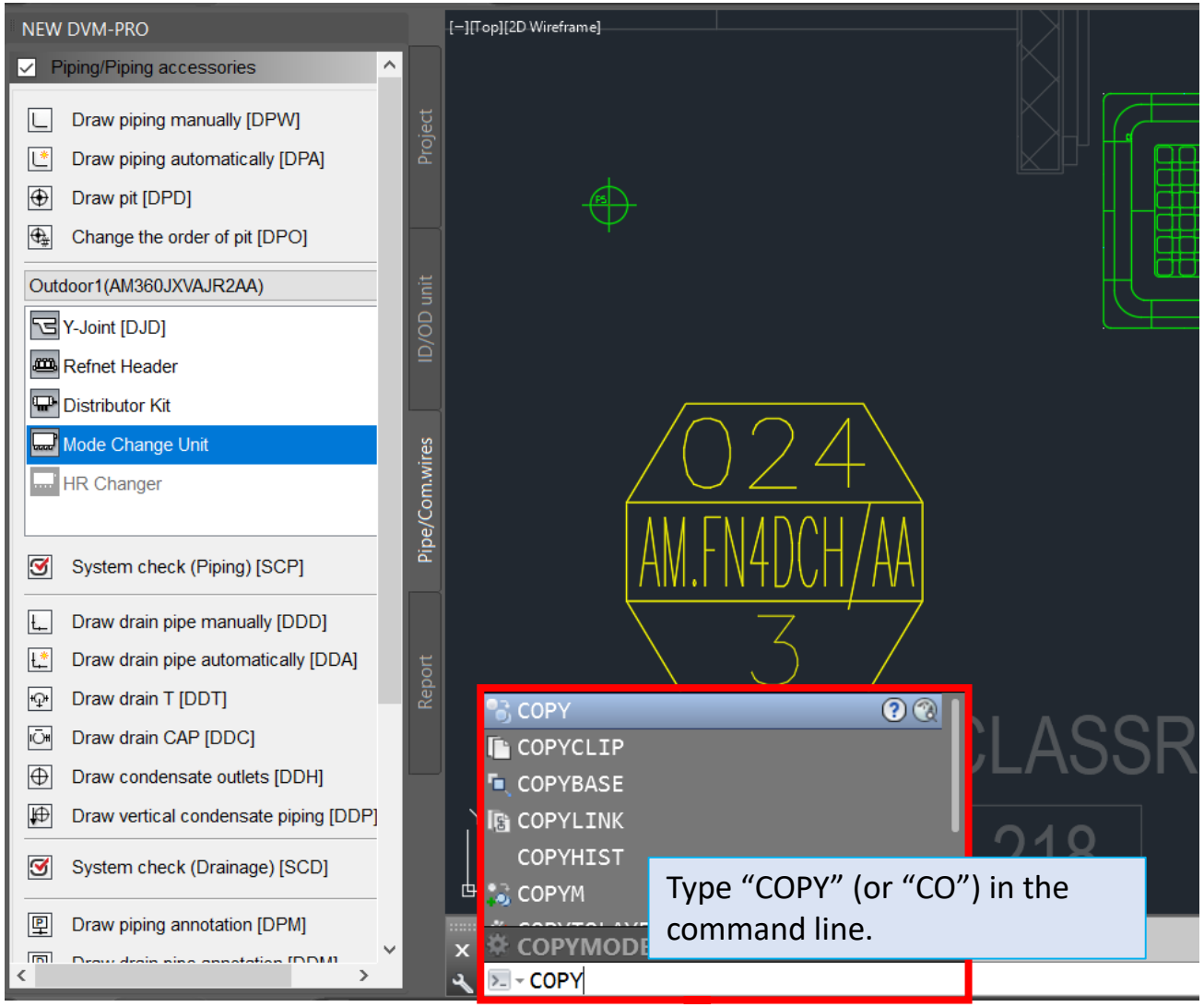
Place the PIT appropriately



3. DVM-Pro CAD Mode – Tools

c) Piping/Wiring Tab – Creating Multiple PITs

You can repeat the procedures explained in the previous slides, but the easiest way is to COPY (AutoCAD's native command)

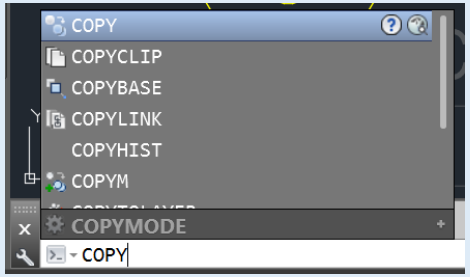


3. DVM-Pro CAD Mode – Tools

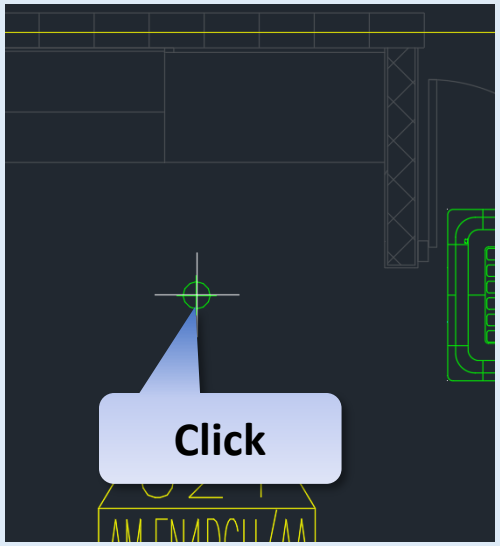
c) Piping/Wiring Tab – Creating Multiple PITs

※ DVM-Pro considers PIT connections to be completely vertical, so make sure that the base points you designate stay lying on the same spot on the plane (horizontally “unmoving”).
This means, you must choose a point well, such as a corner of the building or PIT, etc.

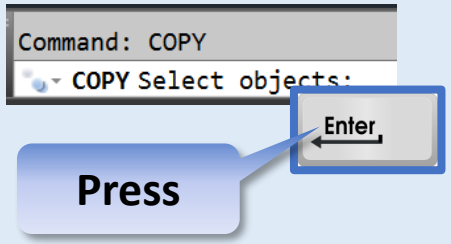
1 Command



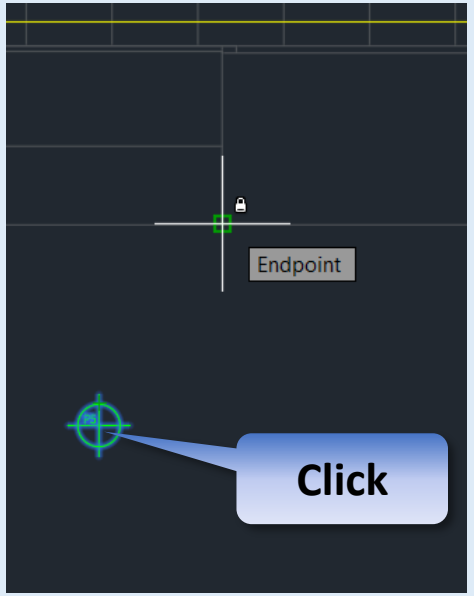
2 Select PIT



3 Confirm



4 Base Point



3. DVM-Pro CAD Mode – Tools

c) Piping/Wiring Tab – Creating Multiple PITs

Copy the object on the desired location by clicking on the respective base point

Copied object (PIT) will follow the mouse cursor and move synchronously with it.

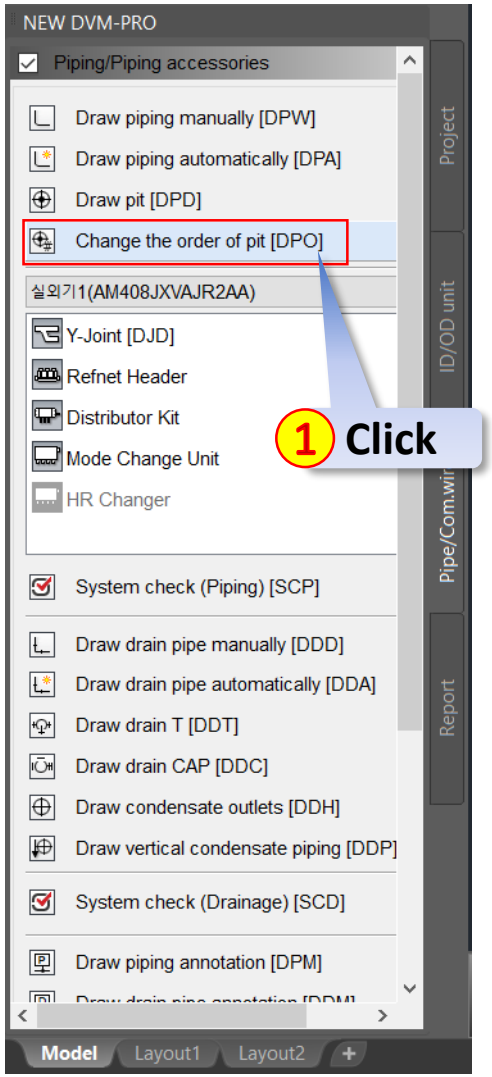
3 Click

```
Specify base point or [Displacement/mOde] <Displacement>:
COPY Specify second point or [Array] <use first point as displacement>:
```

```
Specify second point or [Array] <use first point as displacement>:
COPY Specify second point or [Array Exit Undo] <Exit>:
```

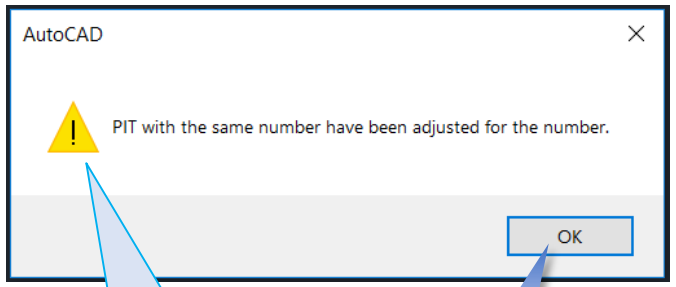
3. DVM-Pro CAD Mode – Tools

c) Piping/Wiring Tab – PIT Order



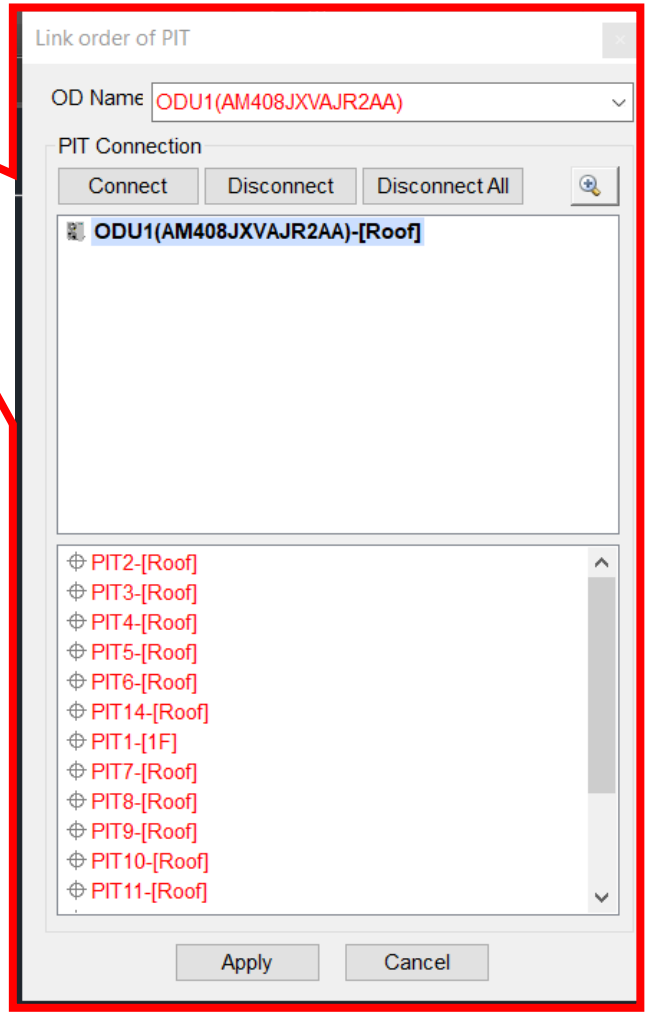
1 Click

"Link order of PIT" windows pop-up



2 Click

※ It is **not an error** message. Since copying PITs will produce many PITs of a same number, so the software automatically assigns different number to each PIT.



3. DVM-Pro CAD Mode – Tools

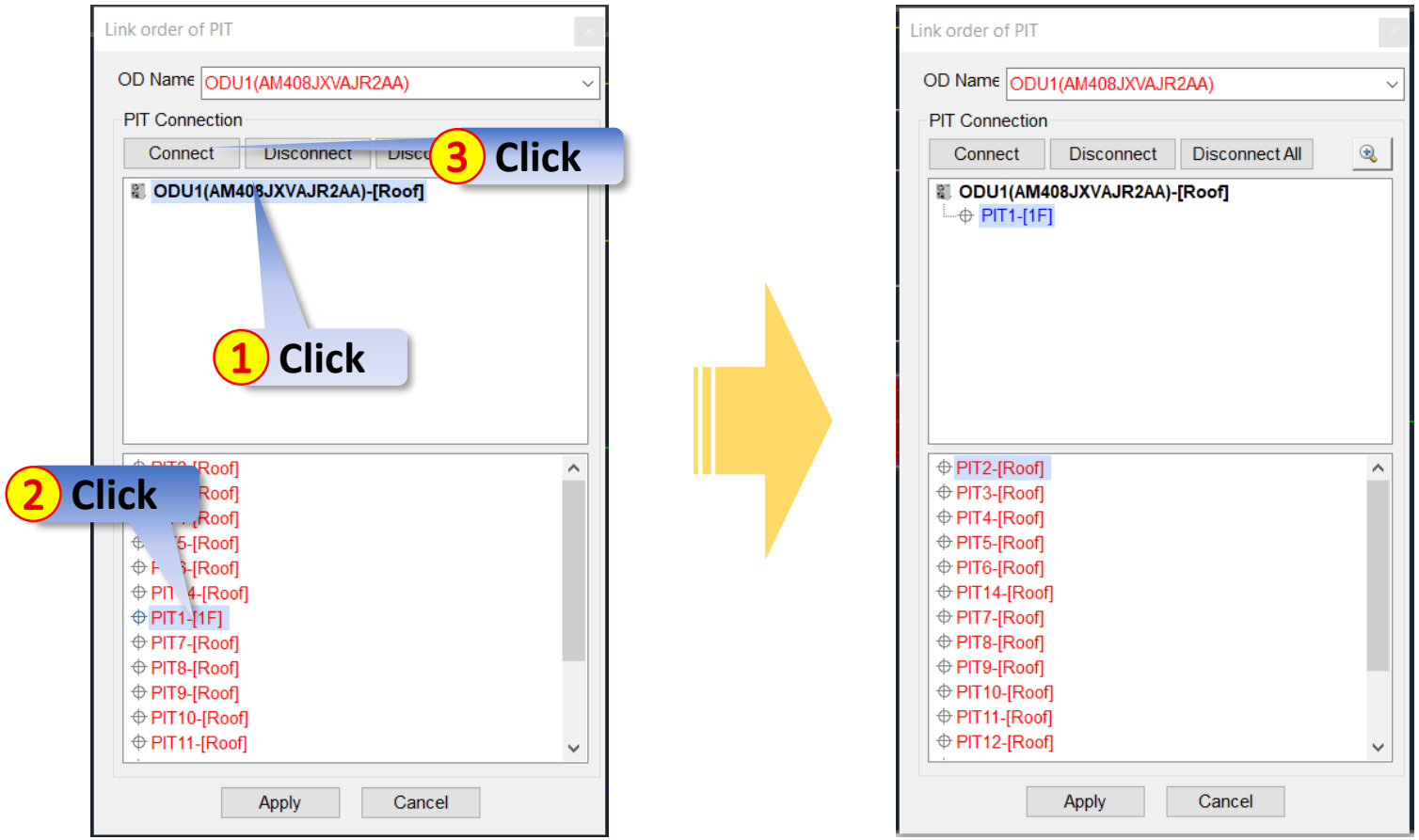
c) Piping/Wiring Tab – PIT Order

- Choose an ODU, click on the PIT that it connects to, and click “Connect”.

- “Disconnect” disconnects a PIT.

- “Disconnect All” disconnects all PITs.

For example,
To place ‘PIT1’ under ‘ODU1’:



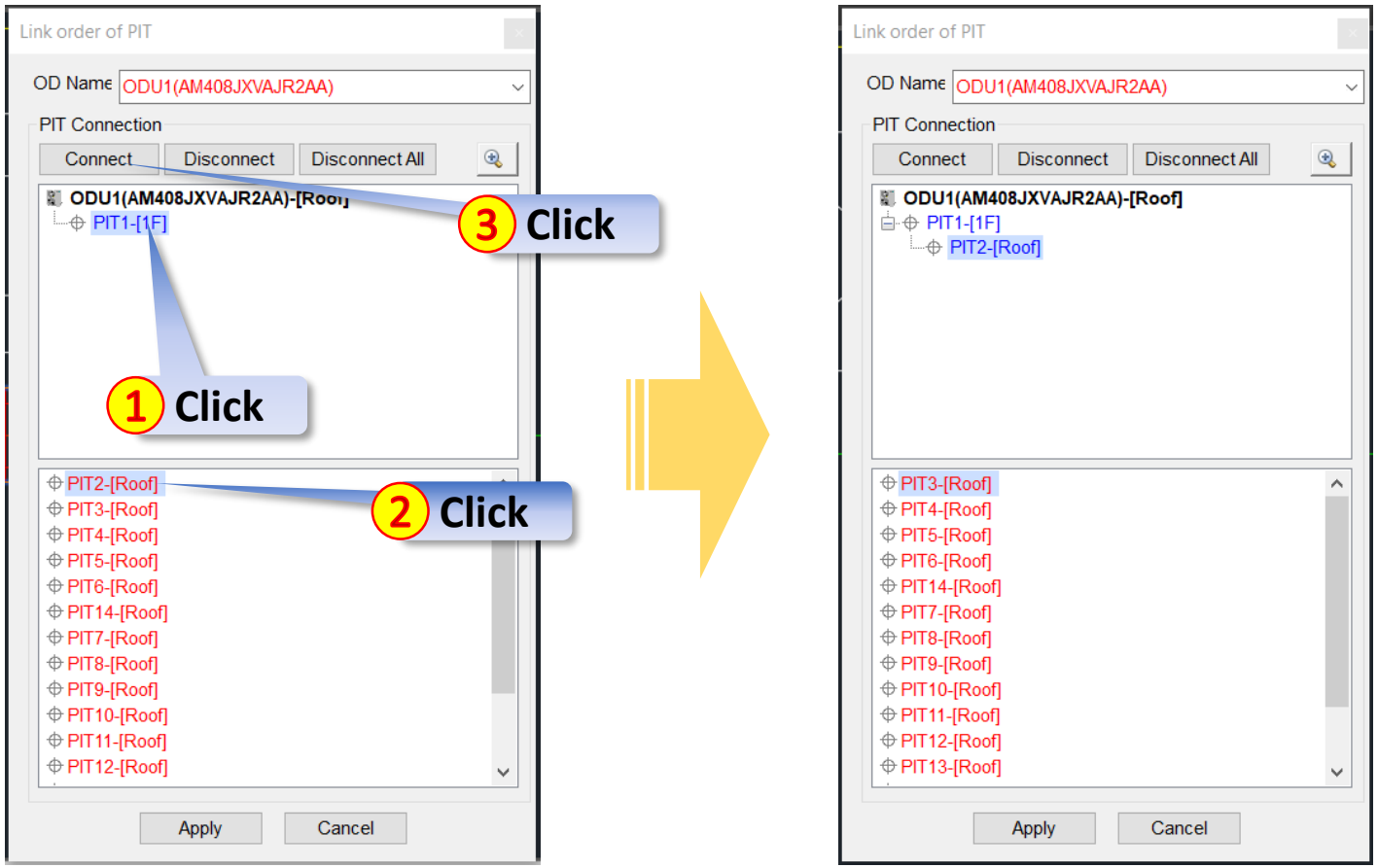
3. DVM-Pro CAD Mode – Tools

c) Piping/Wiring Tab – PIT Order

- Repeat the process until all PITs are connected/ordered properly

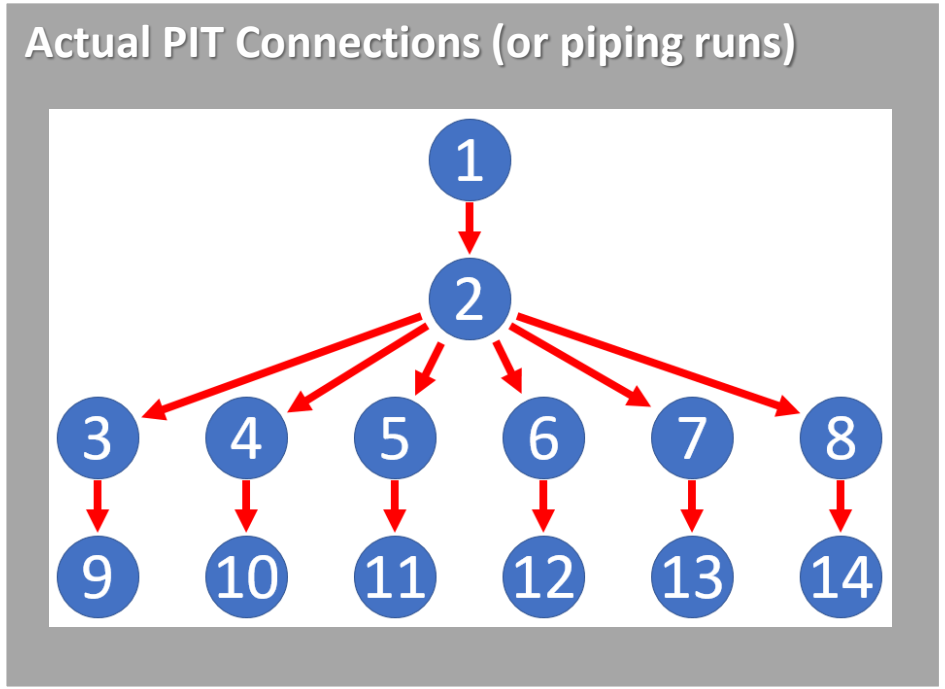
- When done, click “Apply”.

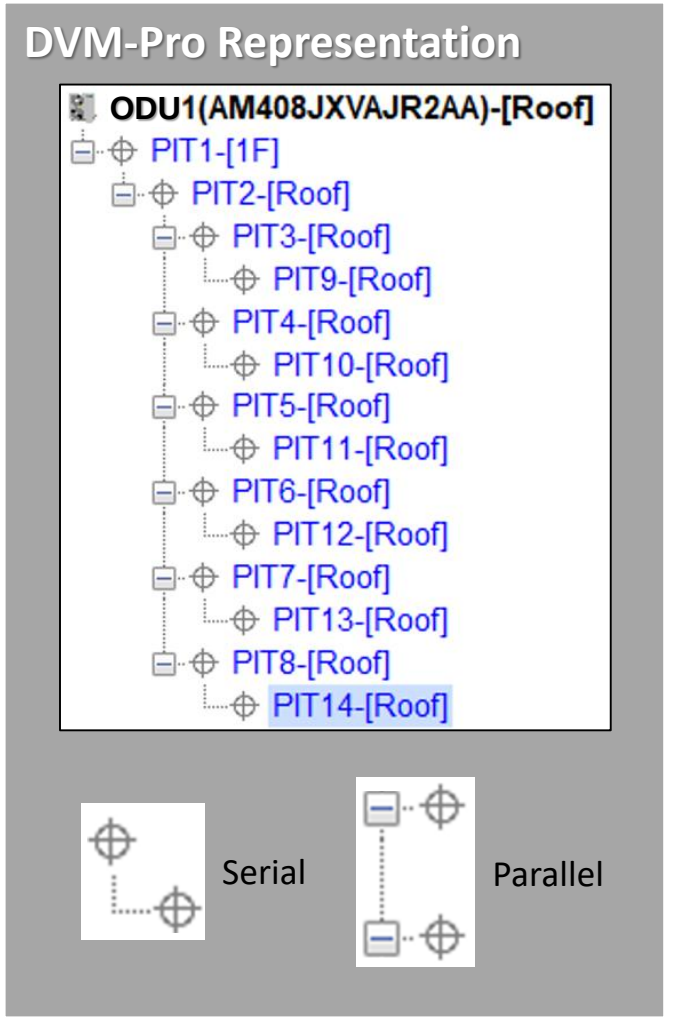
For example,
To continue to place ‘PIT2’ under ‘PIT1’ :



3. DVM-Pro CAD Mode – Tools

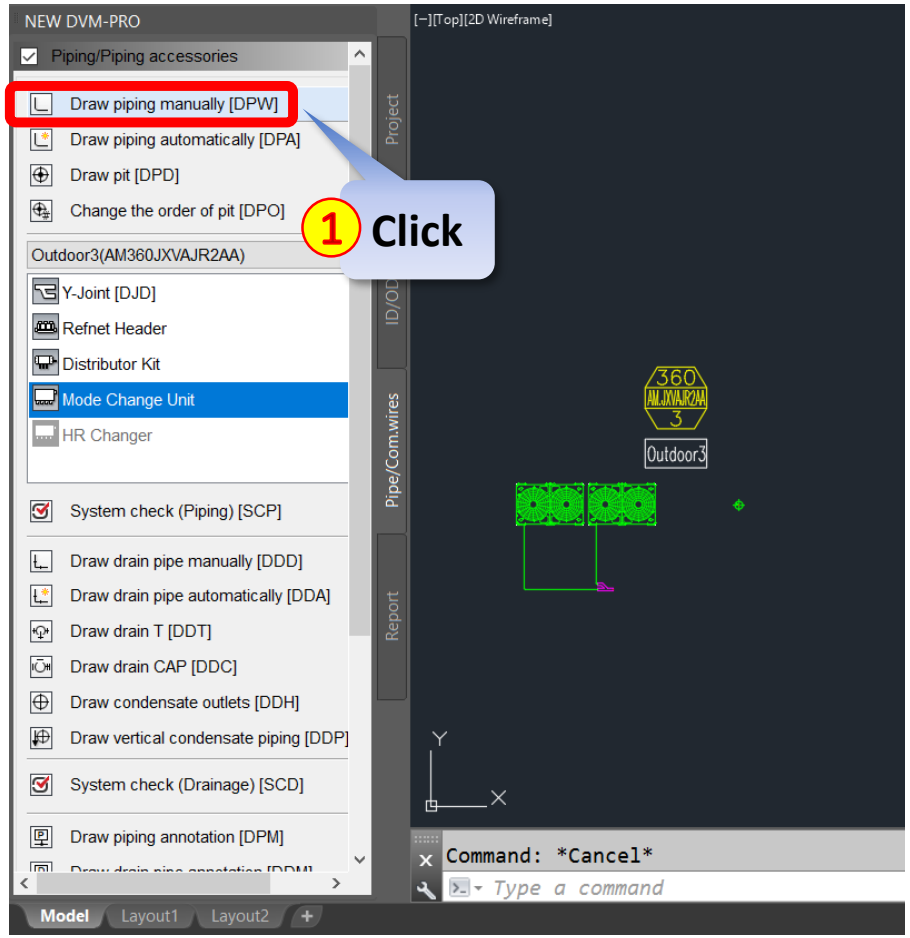
c) Piping/Wiring Tab – PIT Order, DVM-Pro representation

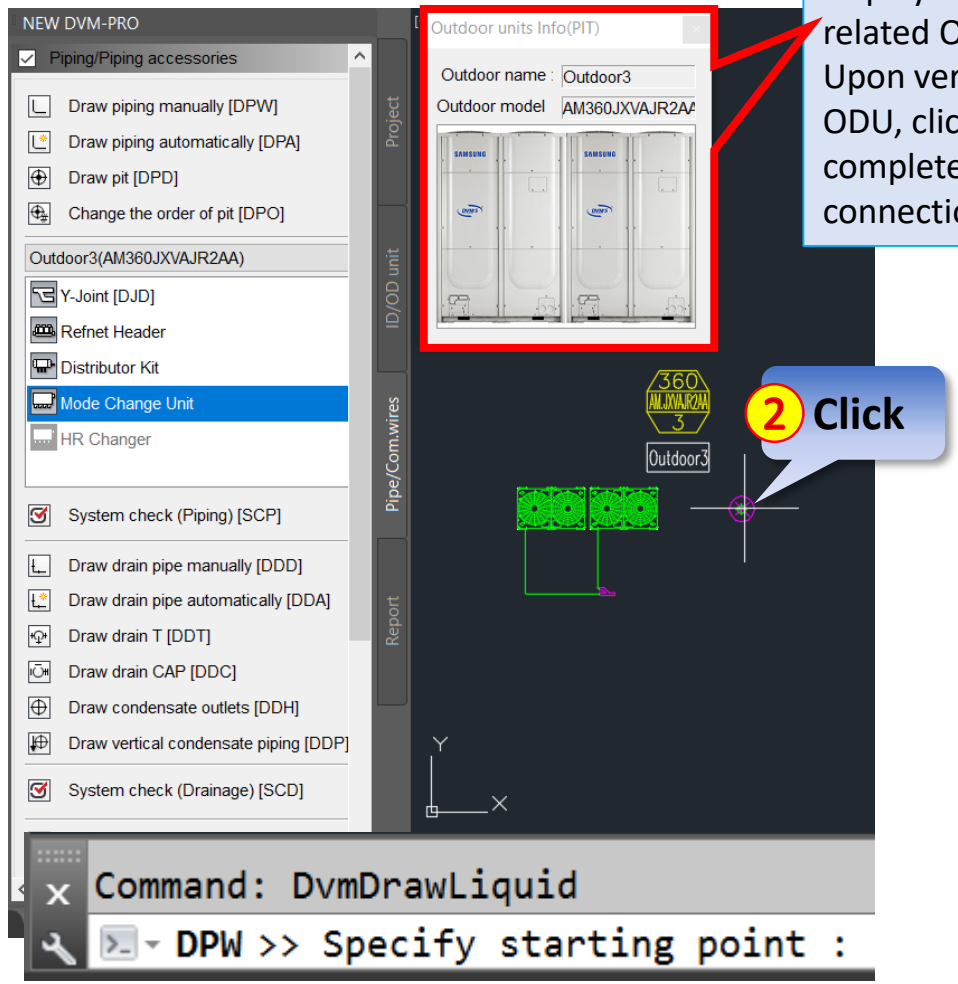




3. DVM-Pro CAD Mode – Tools

c) Piping/Wiring Tab – Draw Piping Manually [DPW], PIT to ODU

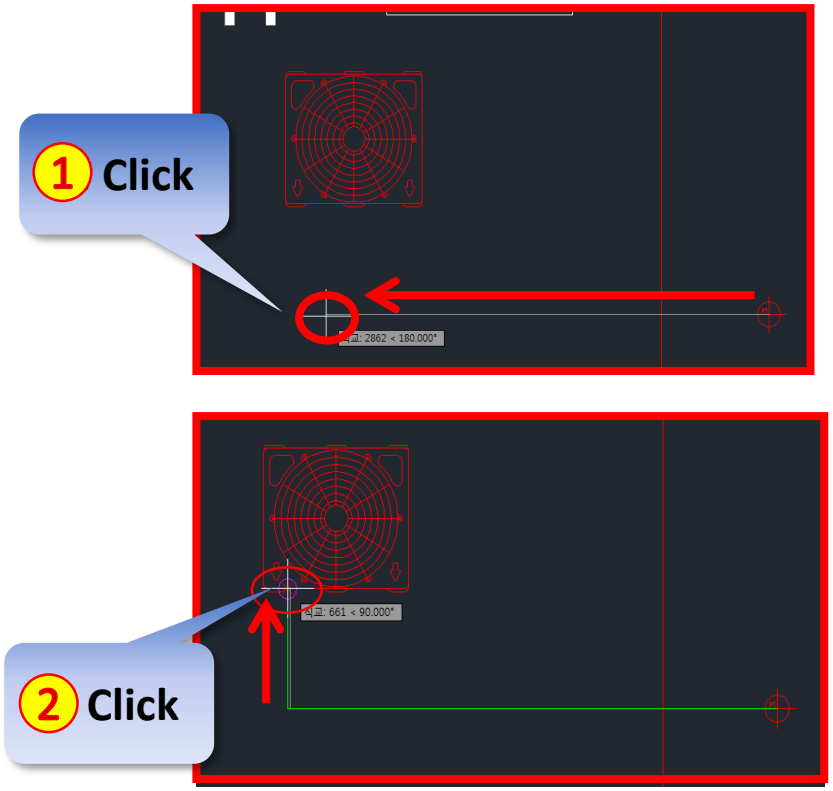




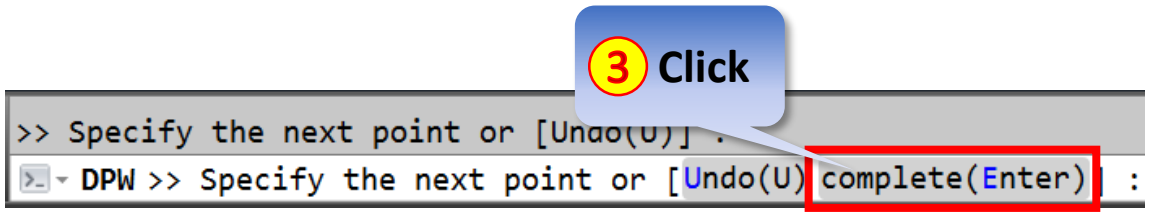
When the mouse pointer hovers over a PIT, it will display the info of the related ODU.
Upon verifying the correct ODU, click on the PIT to complete the piping connection.

3. DVM-Pro CAD Mode – Tools

c) Piping/Wiring Tab – Draw Piping Manually [DPW], PIT to ODU



Once the connection is completed for the piping, it will automatically end the drawing.



OR
You can press Enter to end the piping in the middle of the process

※ this will leave the piping incomplete as it is

3. DVM-Pro CAD Mode – Tools

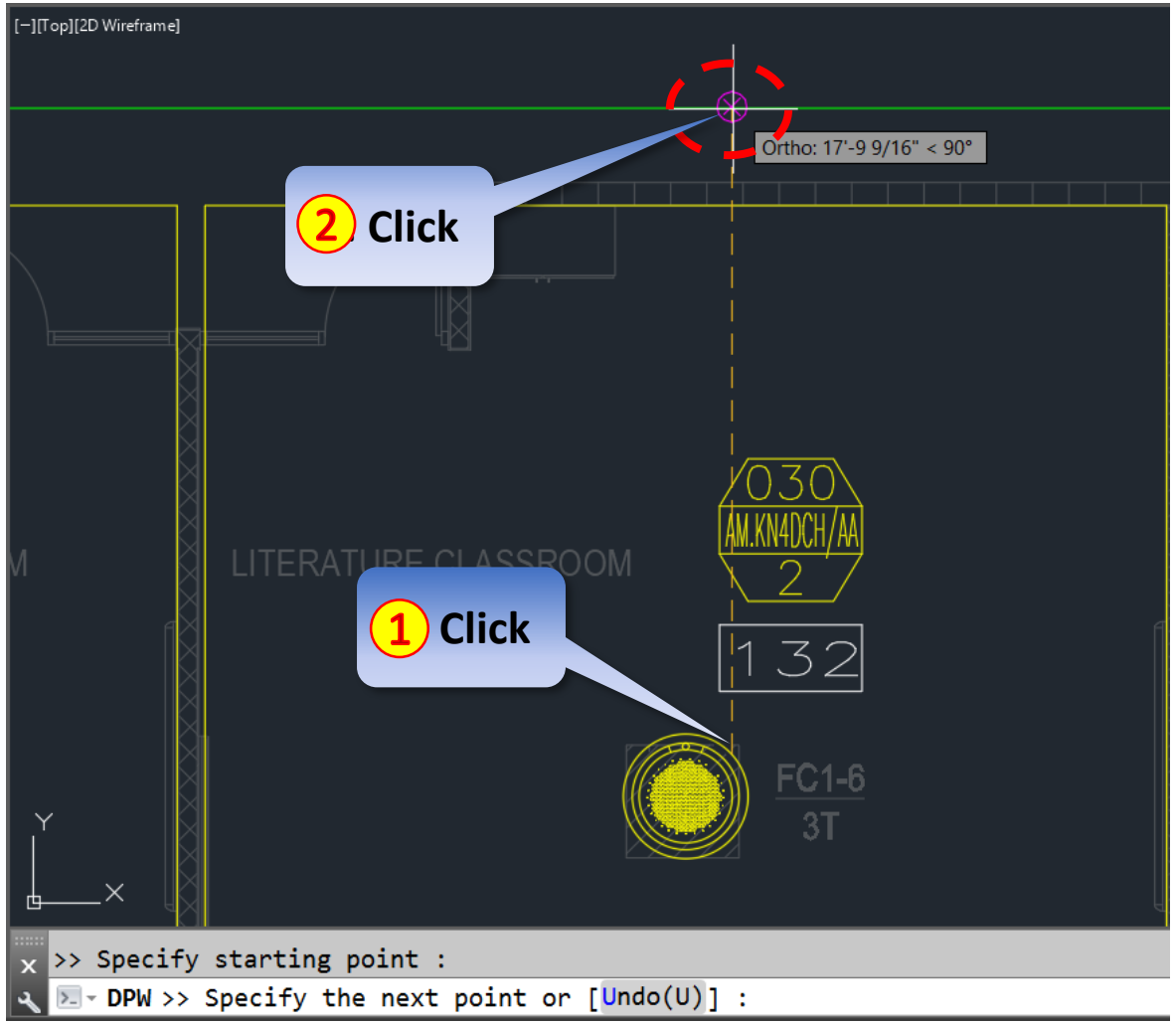
c) Piping/Wiring Tab – Draw Piping Manually [DPW], PIT to IDU

Connect first the farthest IDU from the PIT.

3. DVM-Pro CAD Mode – Tools

c) Piping/Wiring Tab – Draw Piping Manually [DPW], PIT to IDU

Add branches to the main piping, by clicking on the IDU port and specifying the main piping branching location.



3. DVM-Pro CAD Mode – Tools

c) Piping/Wiring Tab – Draw Piping Manually [DPW], PIT to IDU

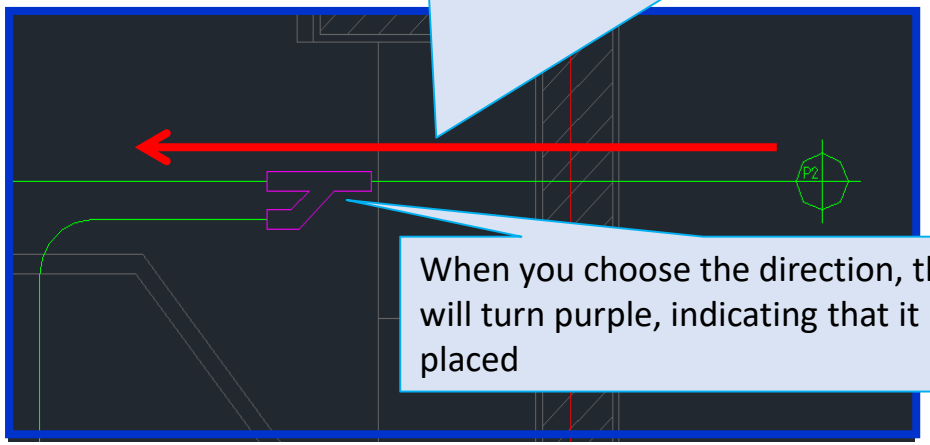
Y-joint will appear

If the direction of the y-joint has to be changed, click “Yes”, if not “No”

```
>> Specify the next point or [Undo(U)] :
DPW >> Do you want to change the Y-Joint direction? [yes(Y) no(N)]<N>:
```

Choose

※ when choosing y-joint direction, consider the direction of the piping (ODU → PIT → IDU)

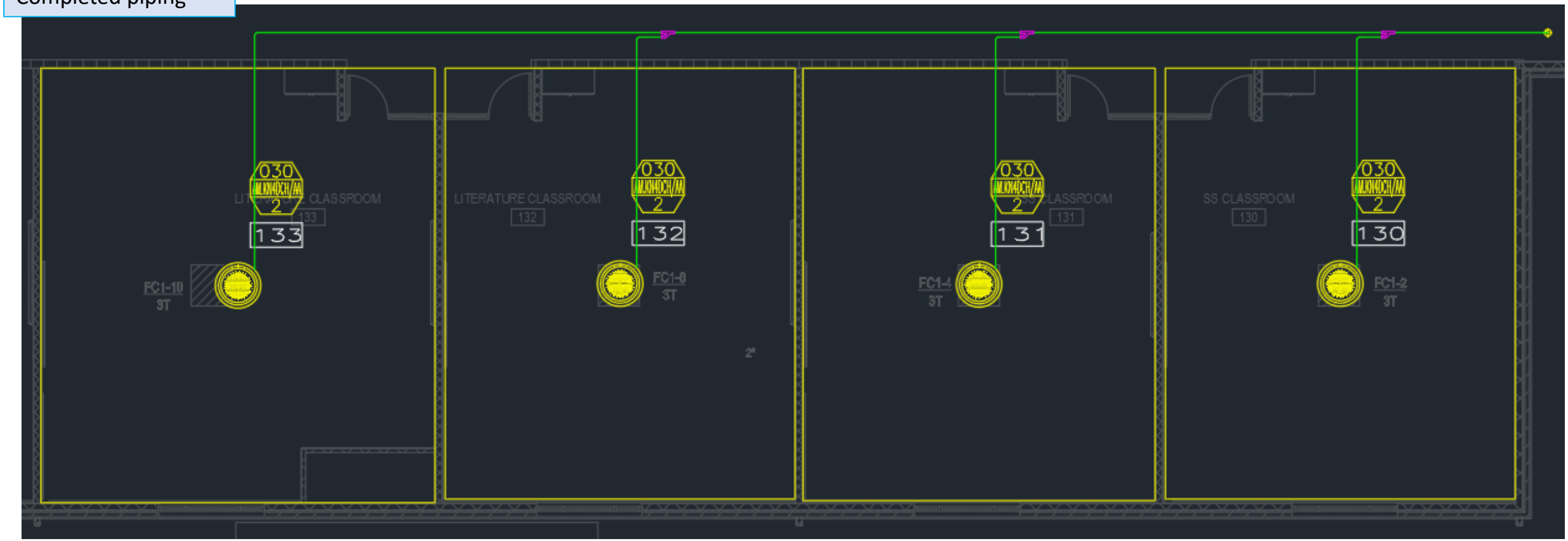


When you choose the direction, the y-joint will turn purple, indicating that it has been placed

3. DVM-Pro CAD Mode – Tools

c) Piping/Wiring Tab – Draw Piping Manually [DPW], PIT to IDU

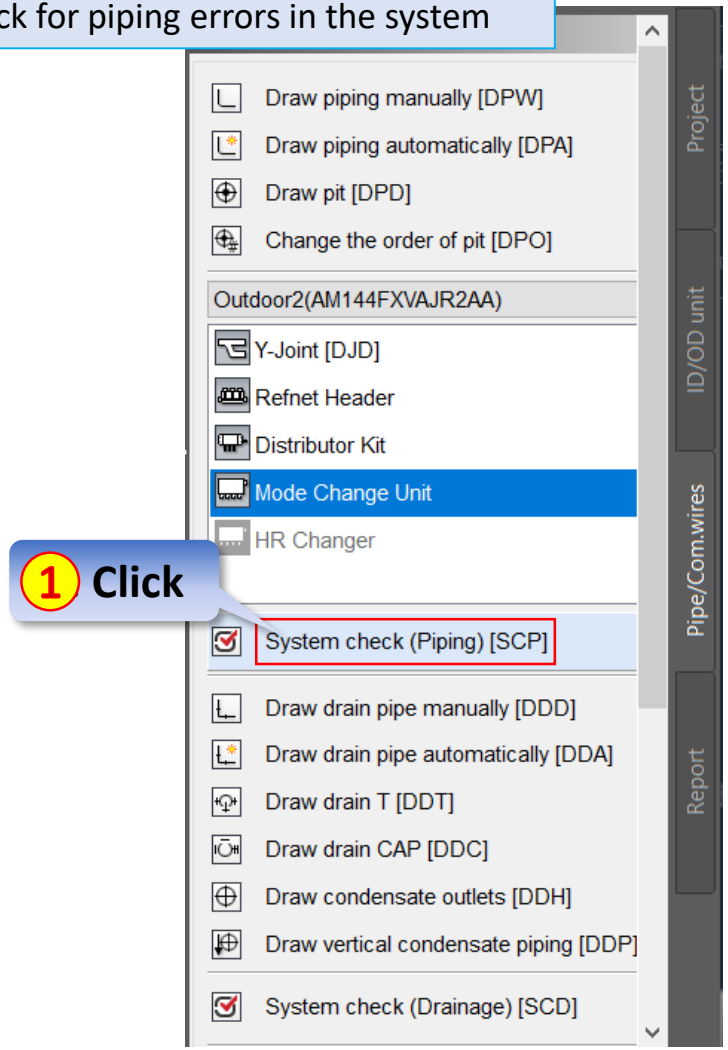
Completed piping

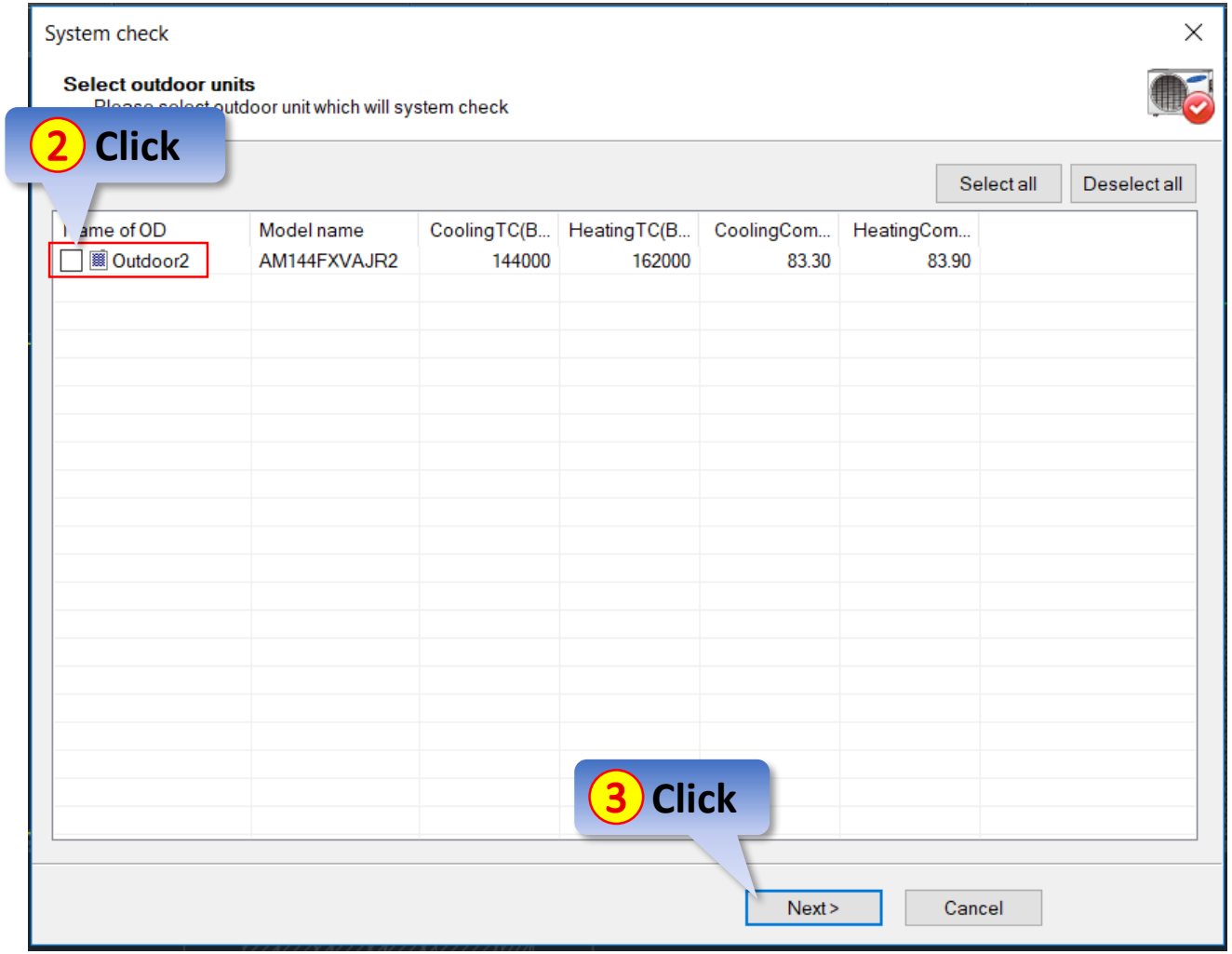


3. DVM-Pro CAD Mode – Tools

c) Piping/Wiring Tab – System Check Piping [SCP]

This will check for piping errors in the system

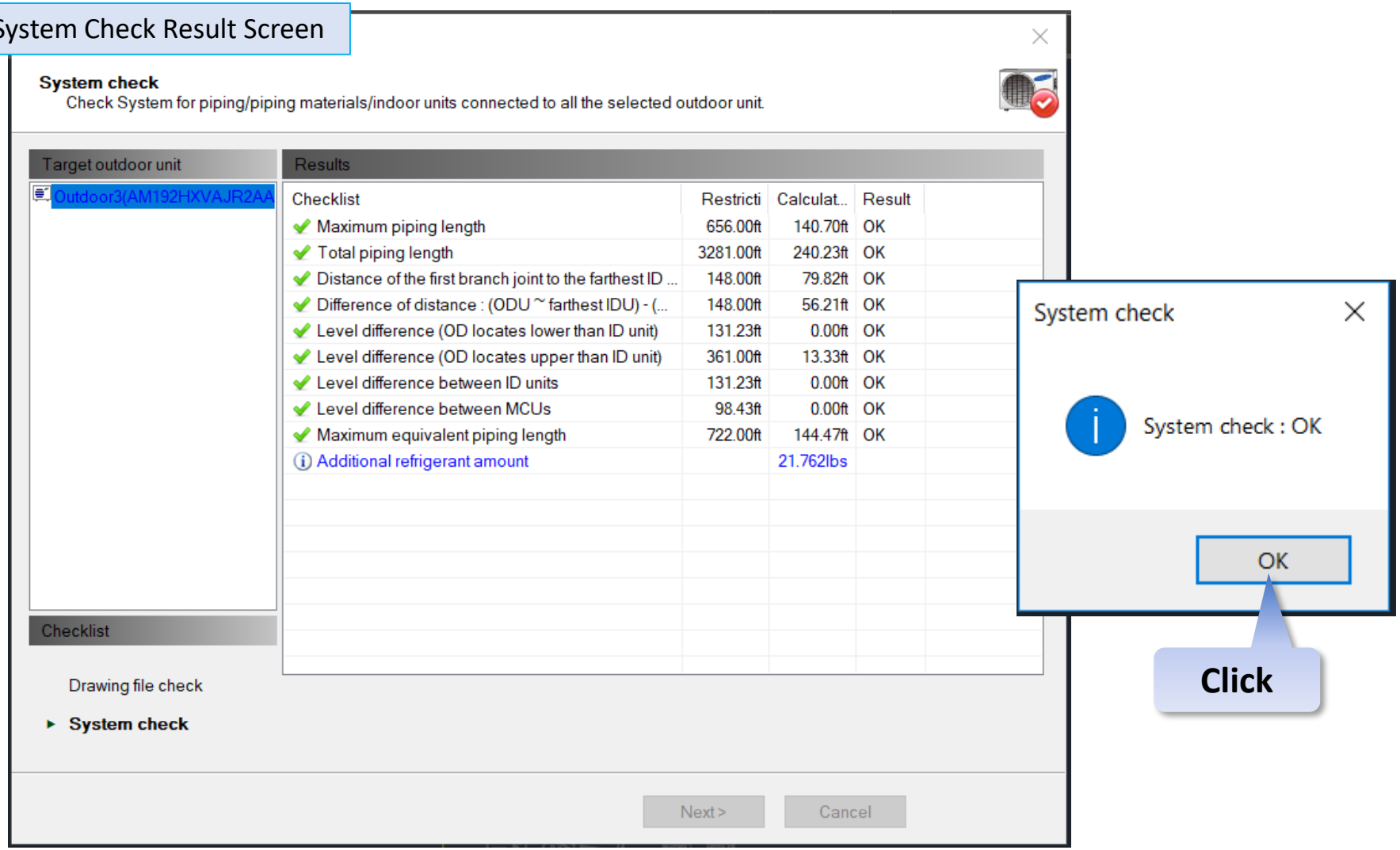




3. DVM-Pro CAD Mode – Tools

c) Piping/Wiring Tab – System Check Piping [SCP]

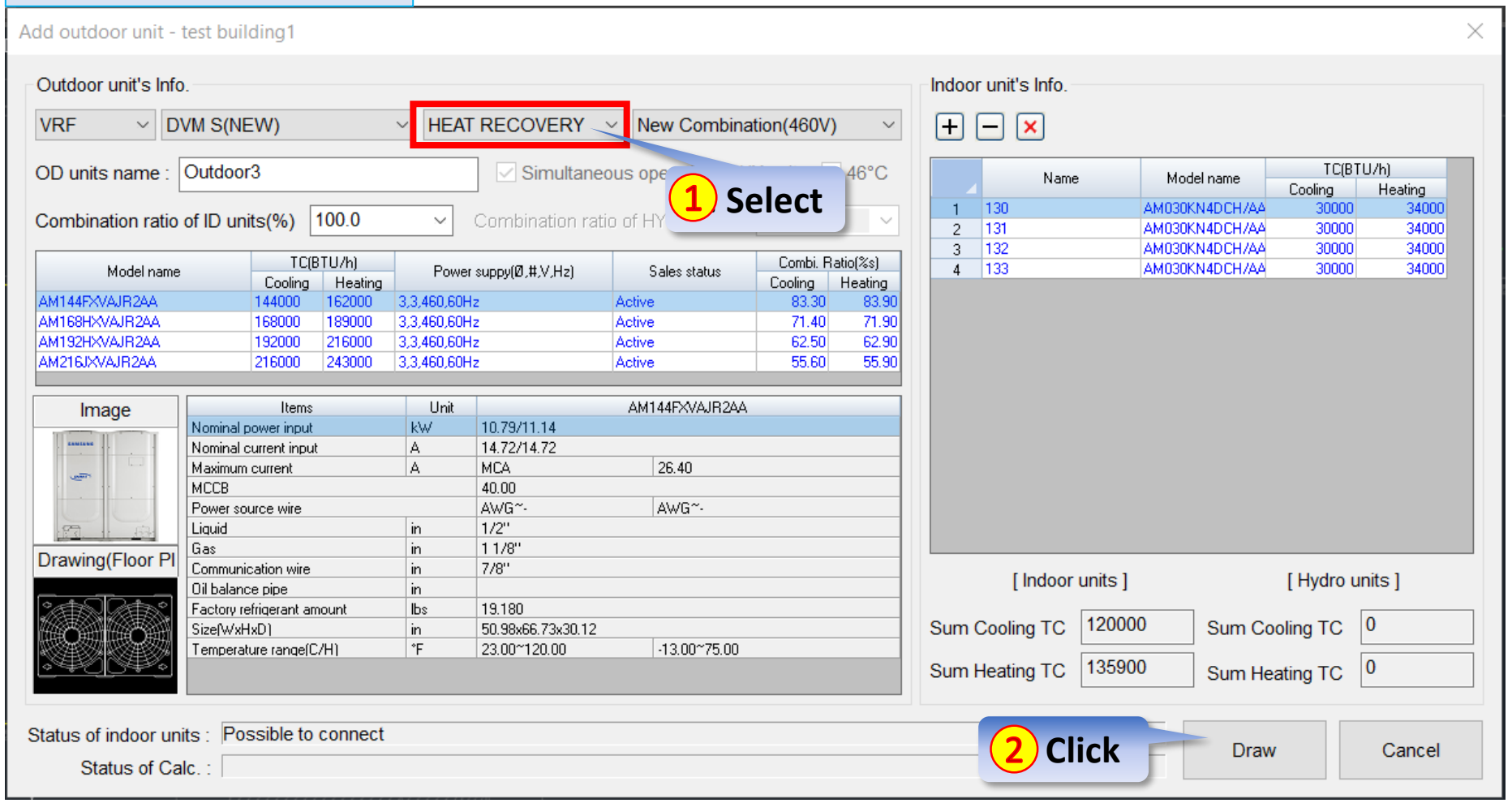
System Check Result Screen



3. DVM-Pro CAD Mode – Tools

c) Piping/Wiring Tab – HR

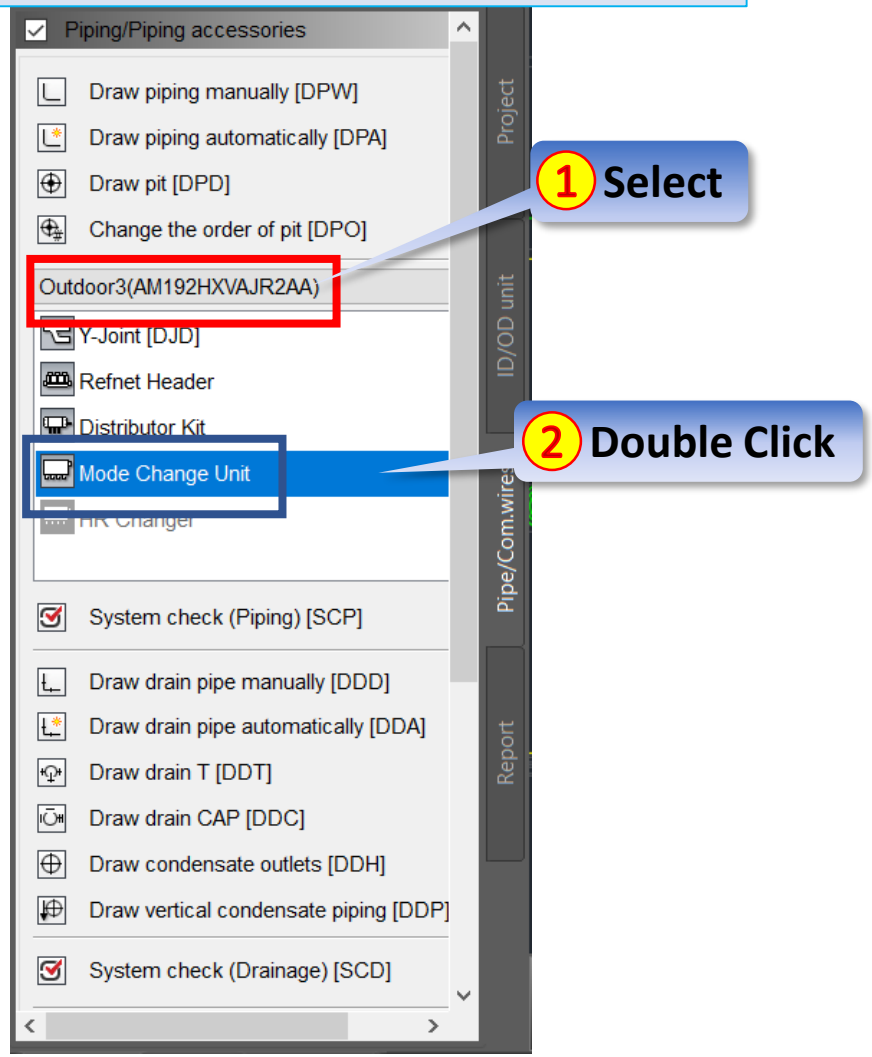
ODU selection for HQ system



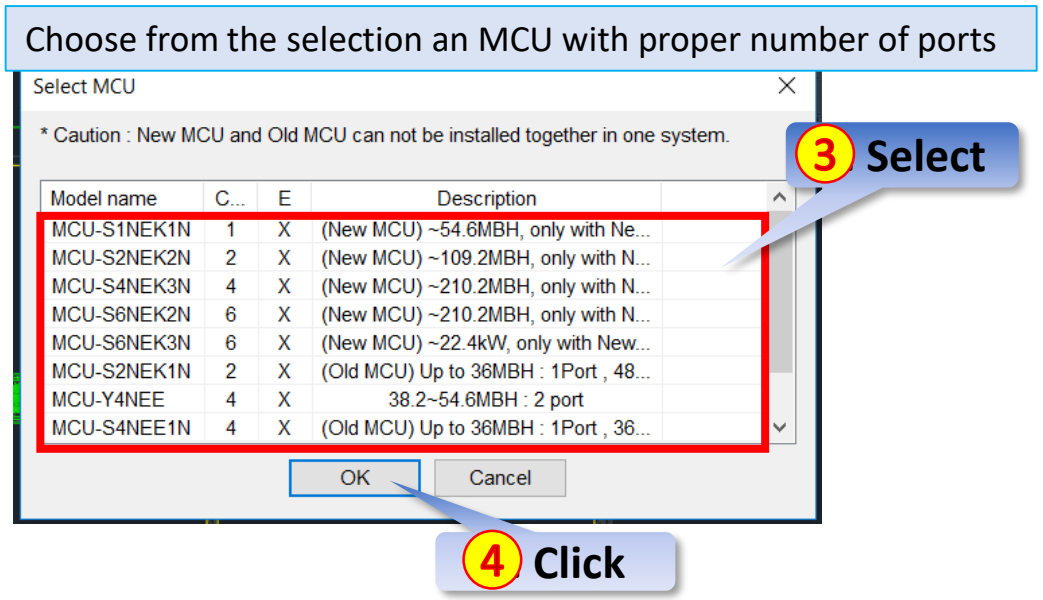
3. DVM-Pro CAD Mode – Tools

c) Piping/Wiring Tab – HR, MCU

※ HR system must have MCU as its element

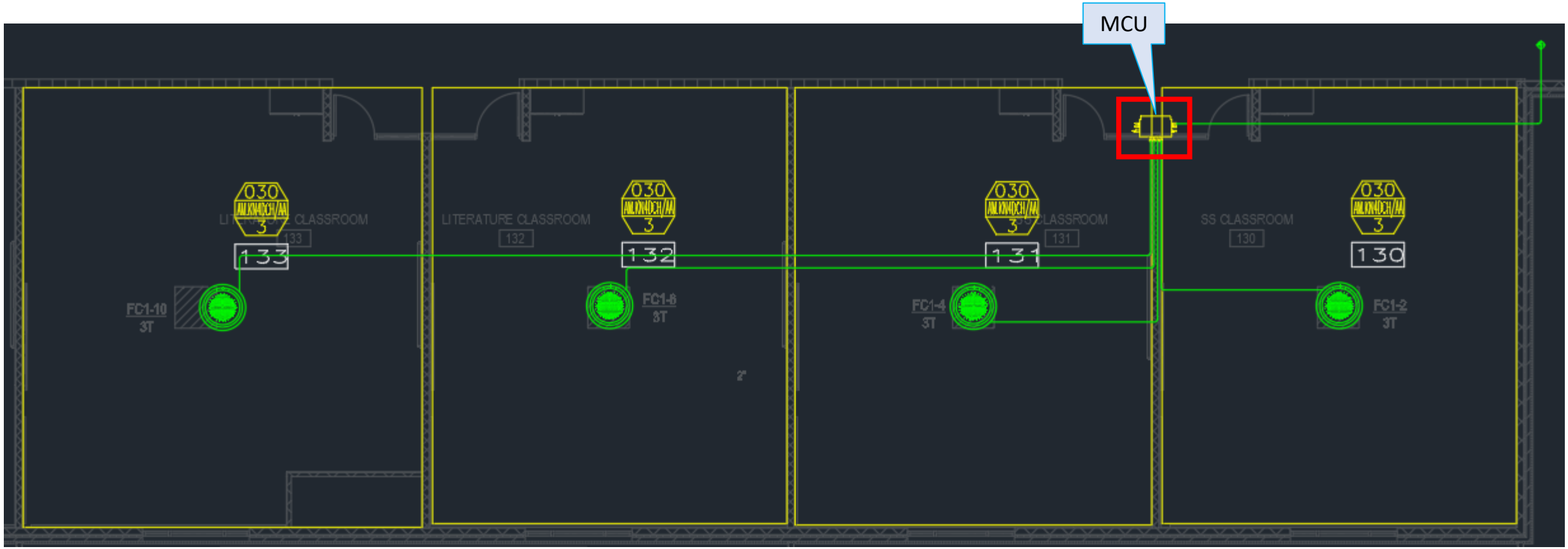


Choose from the selection an MCU with proper number of ports



3. DVM-Pro CAD Mode – Tools

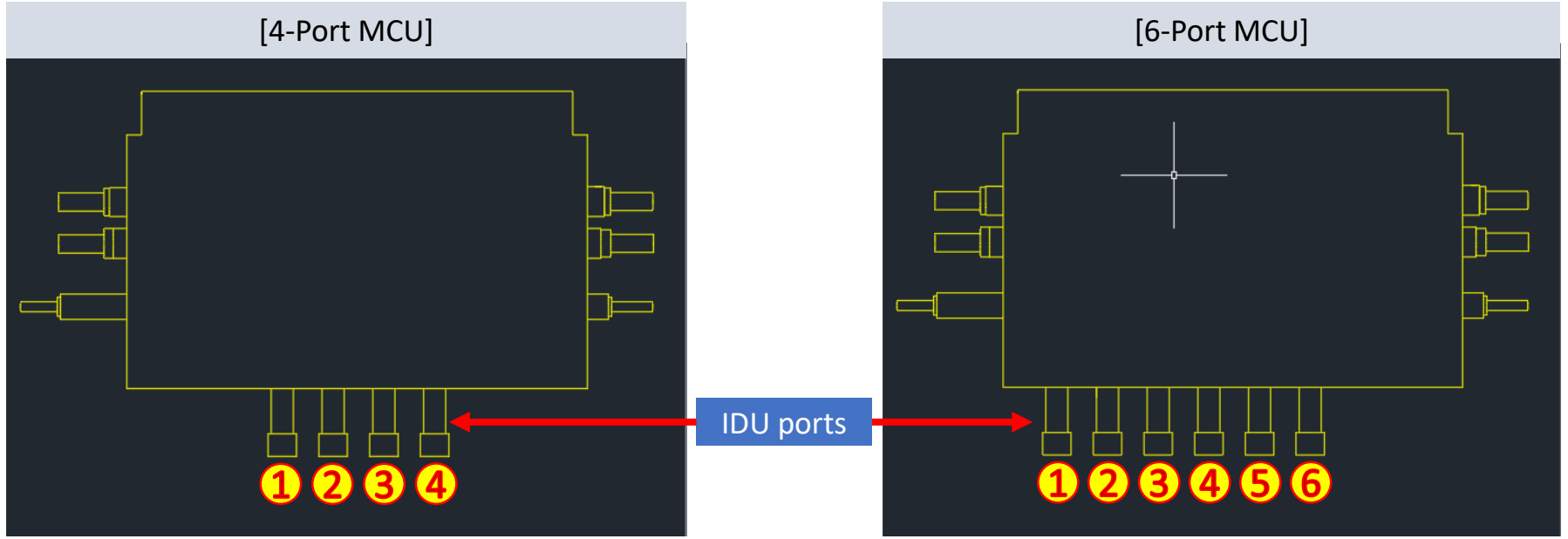
c) Piping/Wiring Tab – HR, MCU



3. DVM-Pro CAD Mode – Tools

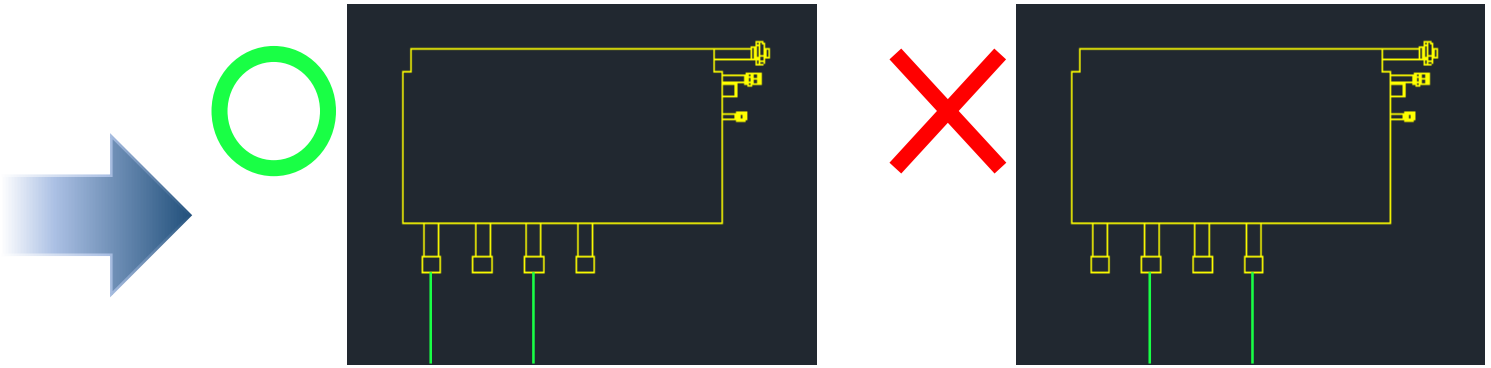
c) Piping/Wiring Tab – HR, MCU Port Numbering & Twinning

With IDU ports directed downward, port numbering starts from left



DVM-Pro representation of twinned ports.

- DO NOT use y-joint
- Start connection from port#1 (left most port)
- Skip the next port

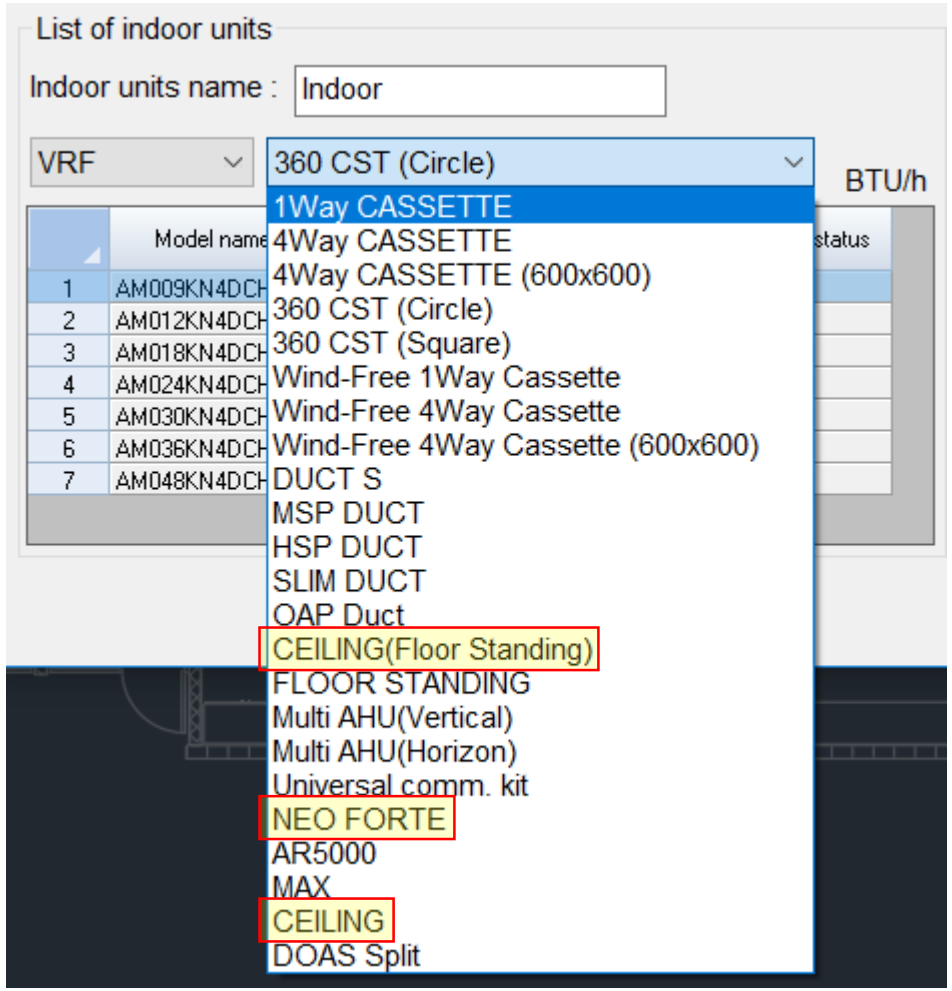


3. DVM-Pro CAD Mode – Tools

c) Piping/Wiring Tab – IDUs with distributor Kit (EEV kit)

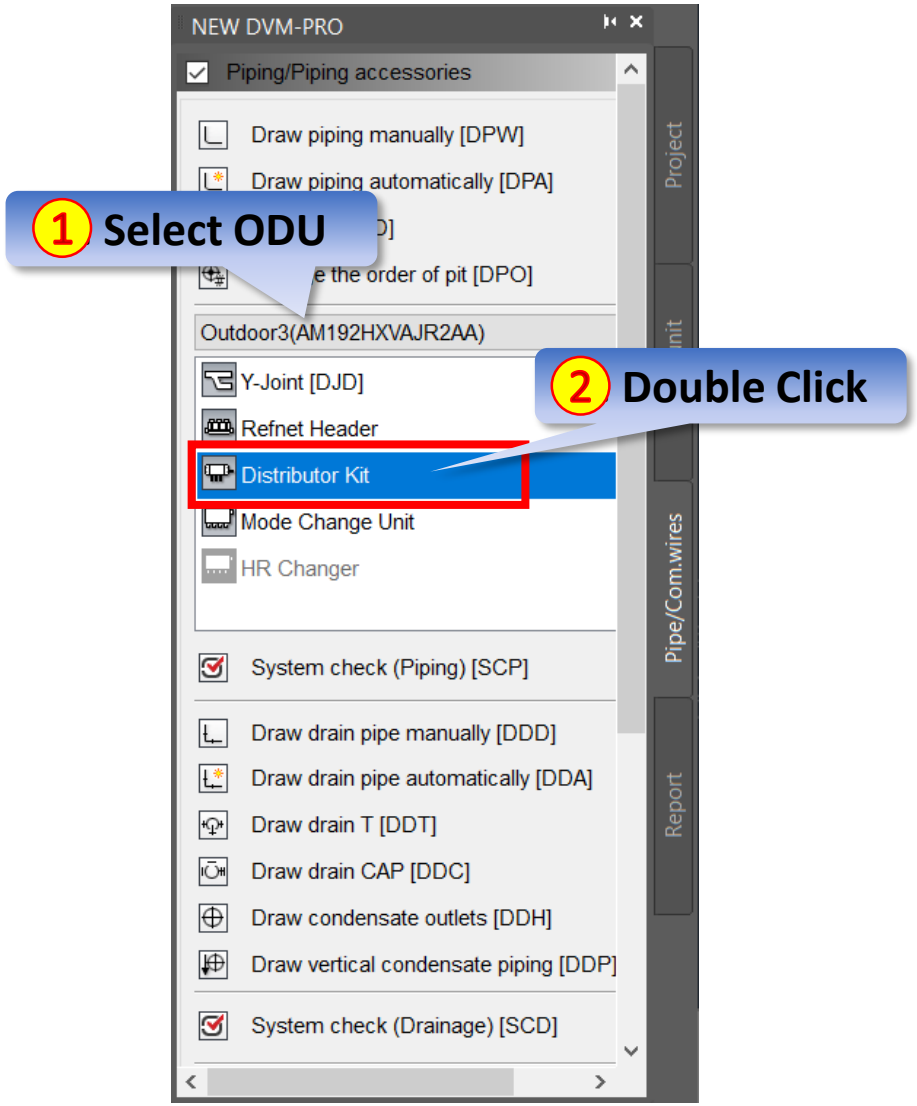
Some IDU types need external EEV kit

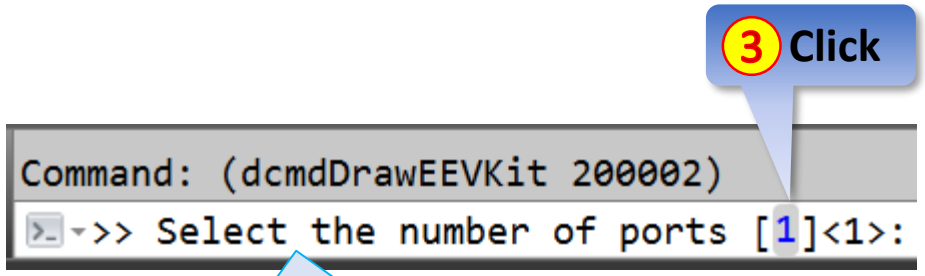
- ❑ Under Ceiling (console)
- ❑ Ceiling
- ❑ Old Wall Mount = Neo Forte w/o EEV (AM024FNTDCH)
  - ➢ Below wall mounts do not need EEV:
    - Neo Forte w/ EEV AM024HNQDCH
    - AR5000
    - Max



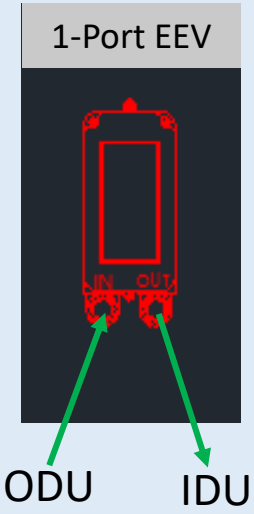
3. DVM-Pro CAD Mode – Tools

c) Piping/Wiring Tab – IDUs with distributor Kit (EEV kit)





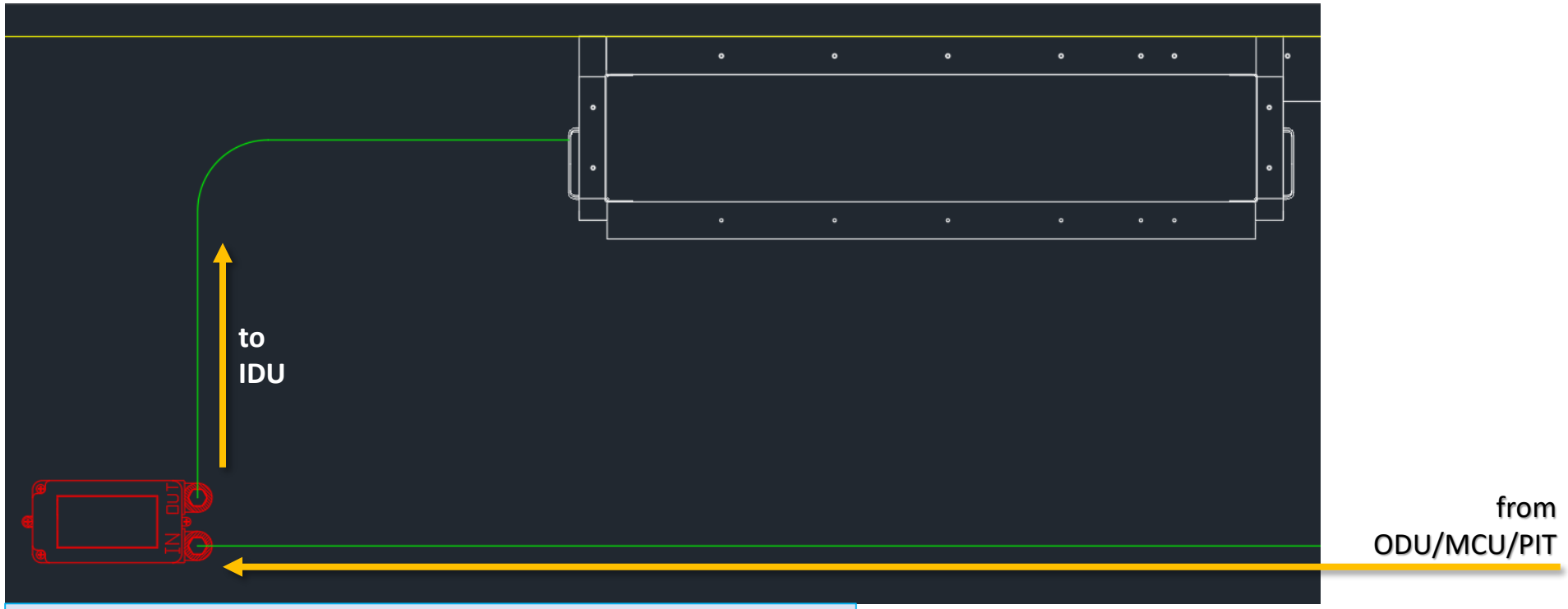
※ Why does it ask???
For some countries, EEV with multiple number of ports are available.



※ Two connections:
- IN = refrigerant pipe from ODU
- OUT = refrigerant pipe to IDU

3. DVM-Pro CAD Mode – Tools

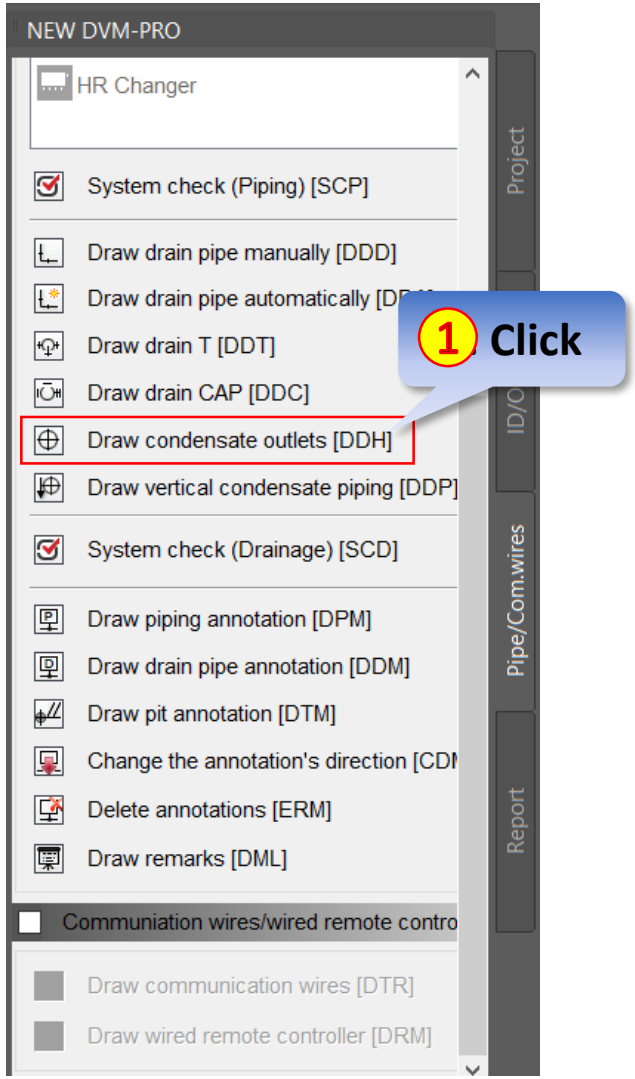
c) Piping/Wiring Tab – IDUs with distributor Kit (EEV kit)

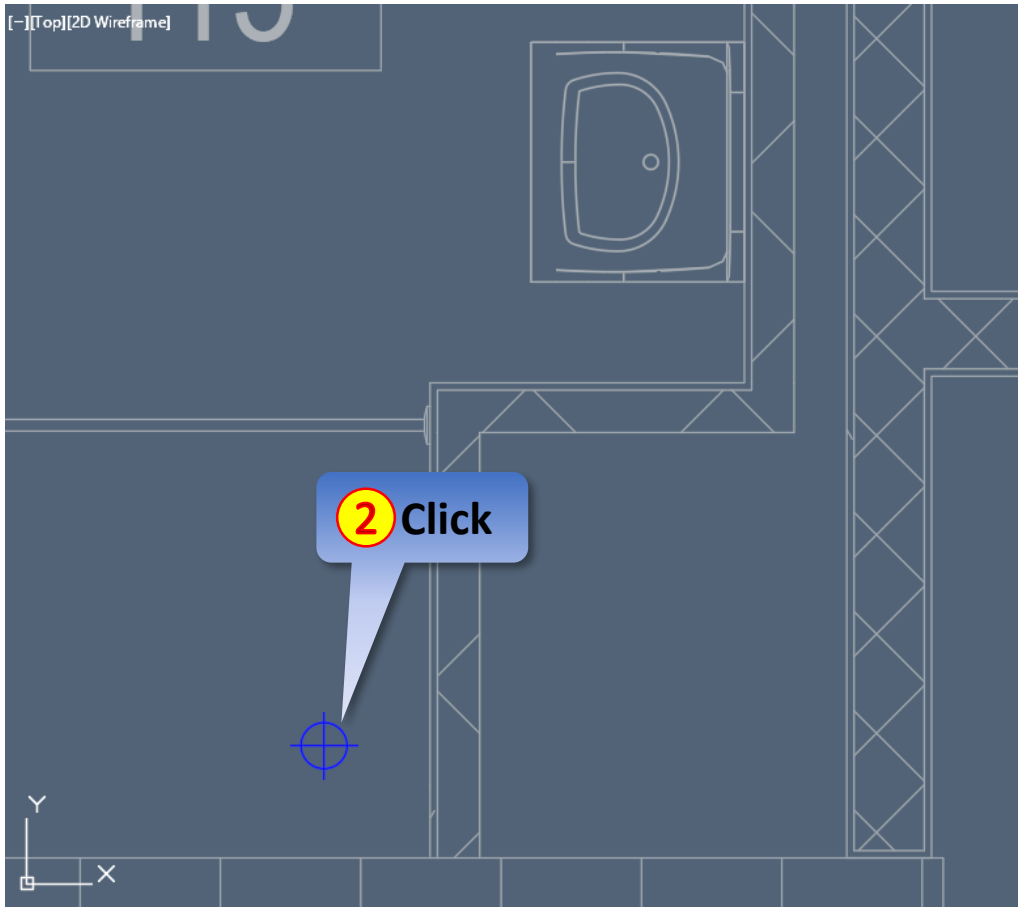


※ distance between an IDU and the EEV should not exceed 6.5ft

3. DVM-Pro CAD Mode – Tools

c) Piping/Wiring Tab – Draw Condensate Outlets [DDH]

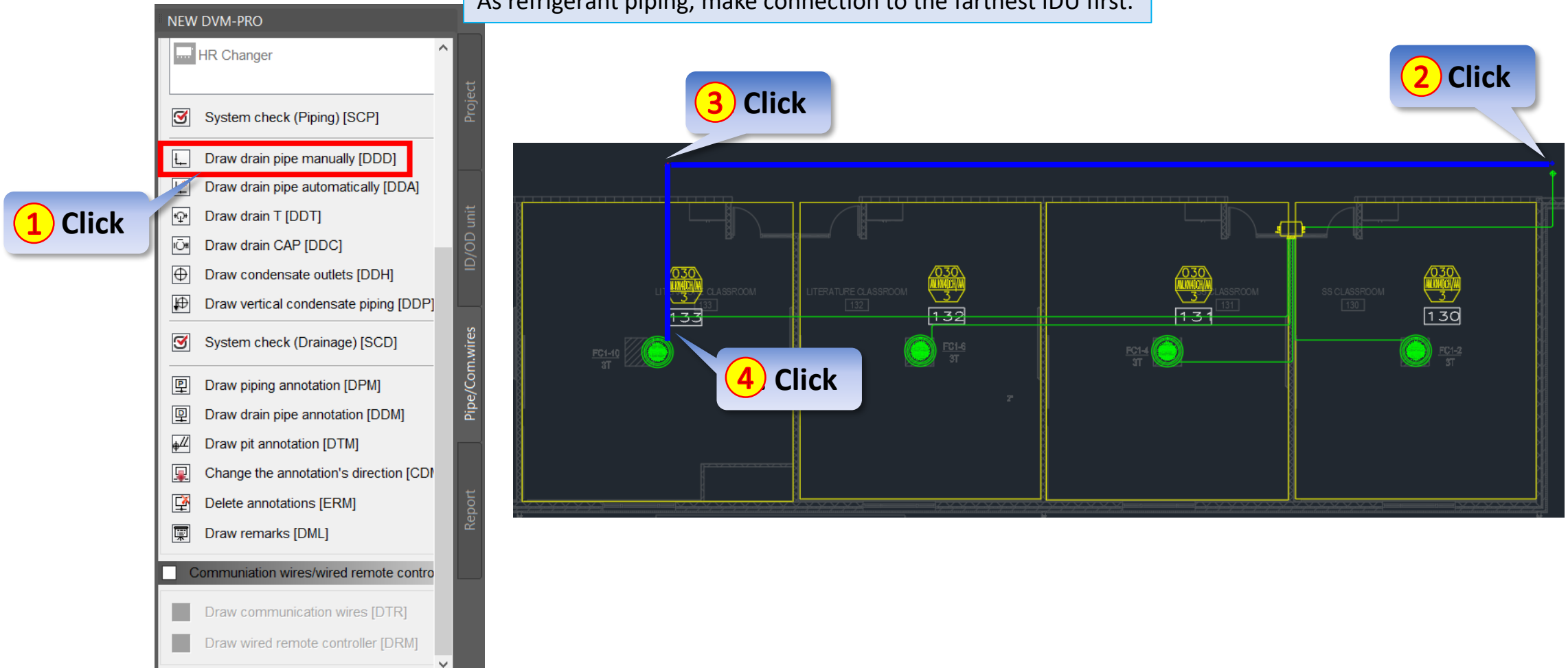




3. DVM-Pro CAD Mode – Tools

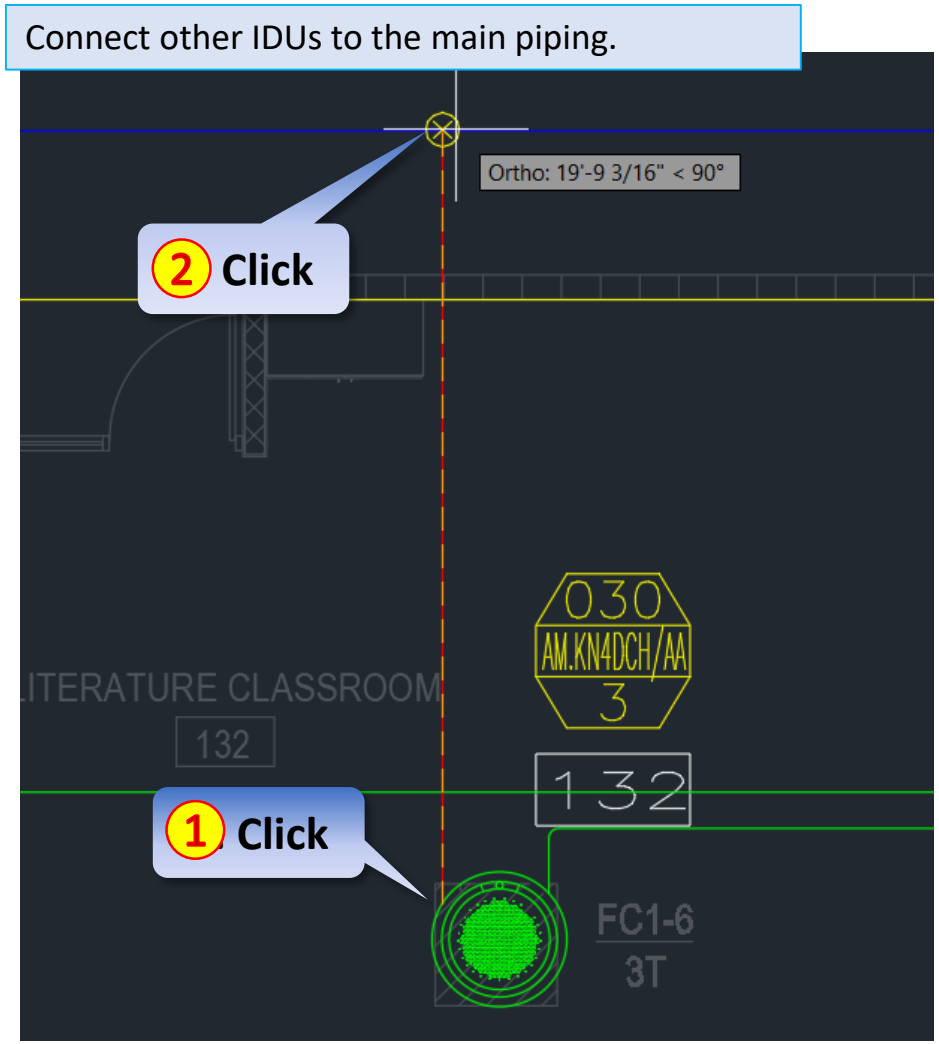
c) Piping/Wiring Tab – Draw Drain Pipe Manually [DDD]

As refrigerant piping, make connection to the farthest IDU first.

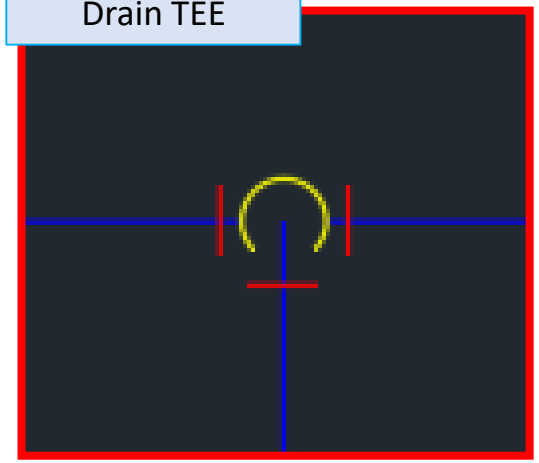


3. DVM-Pro CAD Mode – Tools

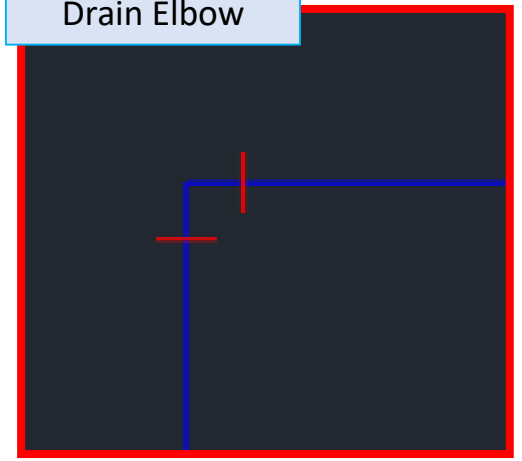
c) Piping/Wiring Tab – Draw Drain Pipe Manually [DDD]



Drain TEE



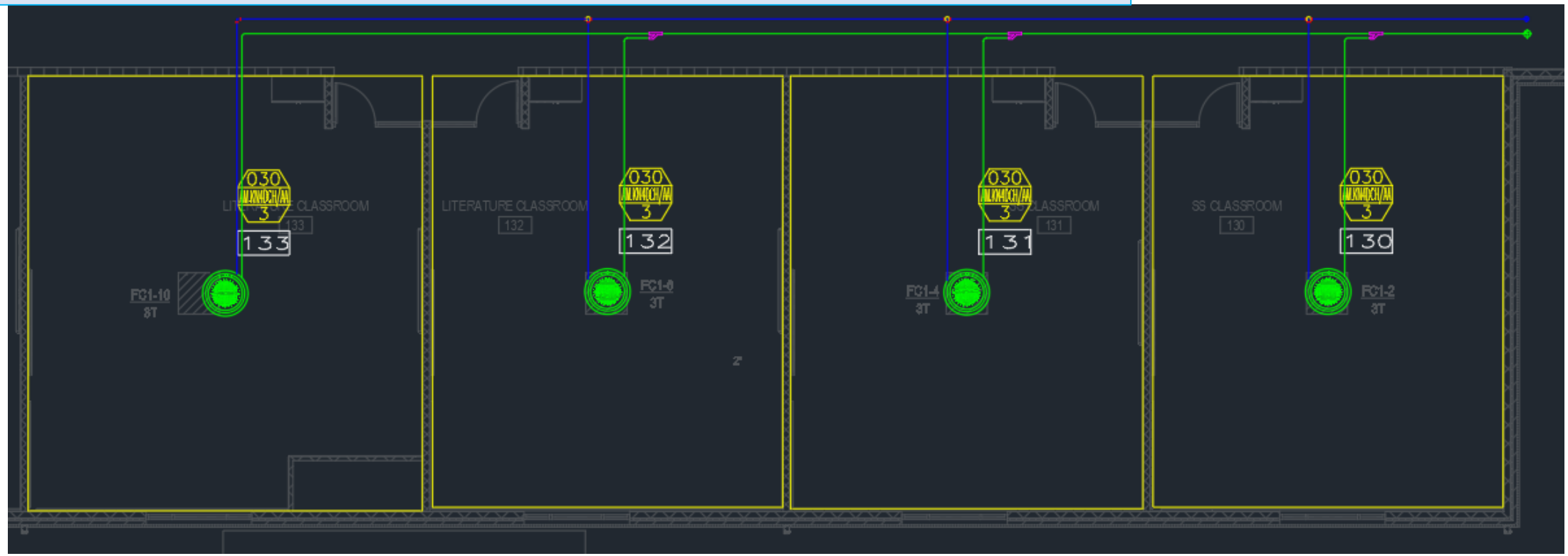
Drain Elbow



3. DVM-Pro CAD Mode – Tools

c) Piping/Wiring Tab – Draw Drain Pipe Manually [DDD]

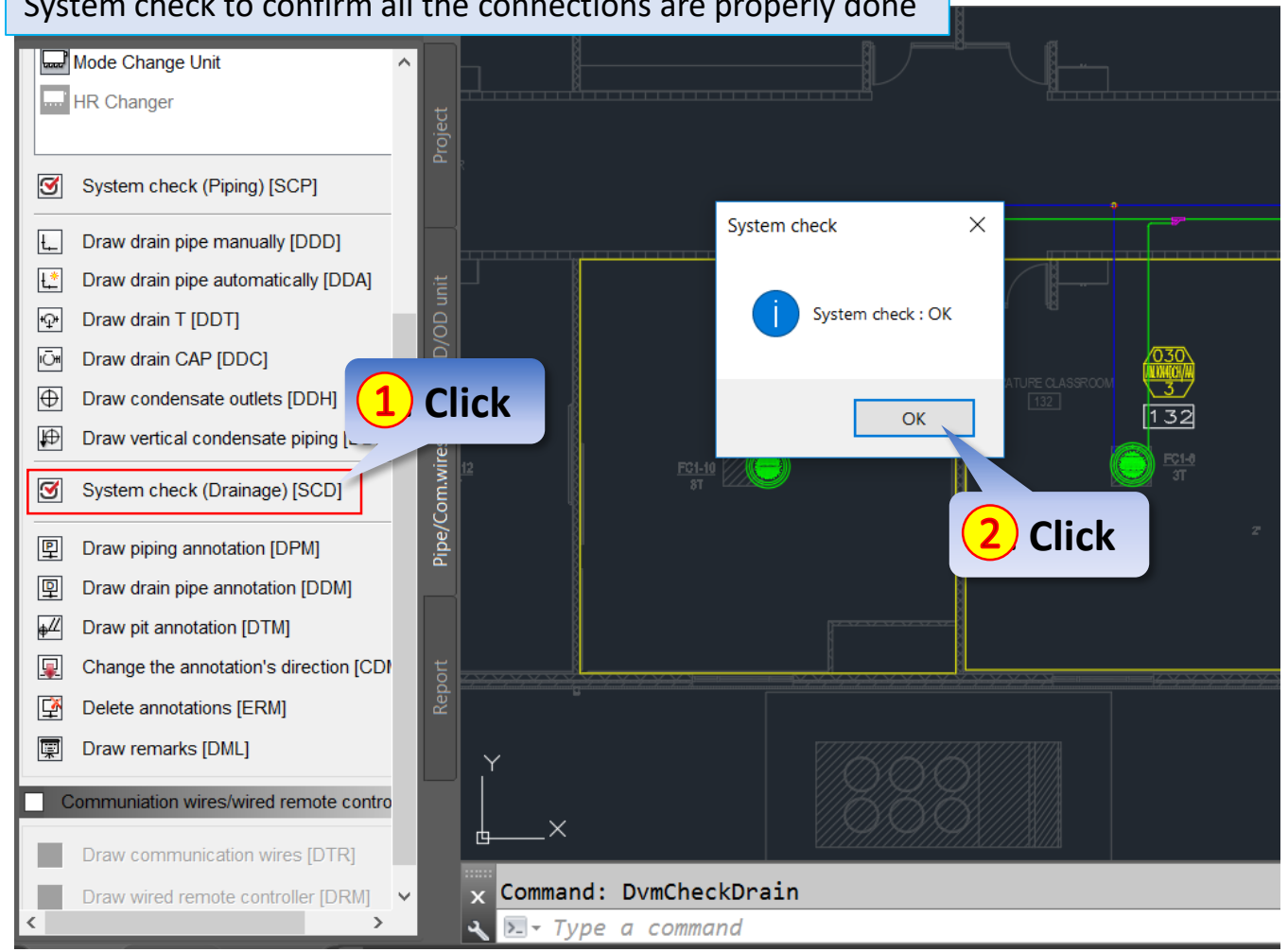
Draw piping for each and every IDU.
Make sure the system is complete with connection to an outlet.



3. DVM-Pro CAD Mode – Tools

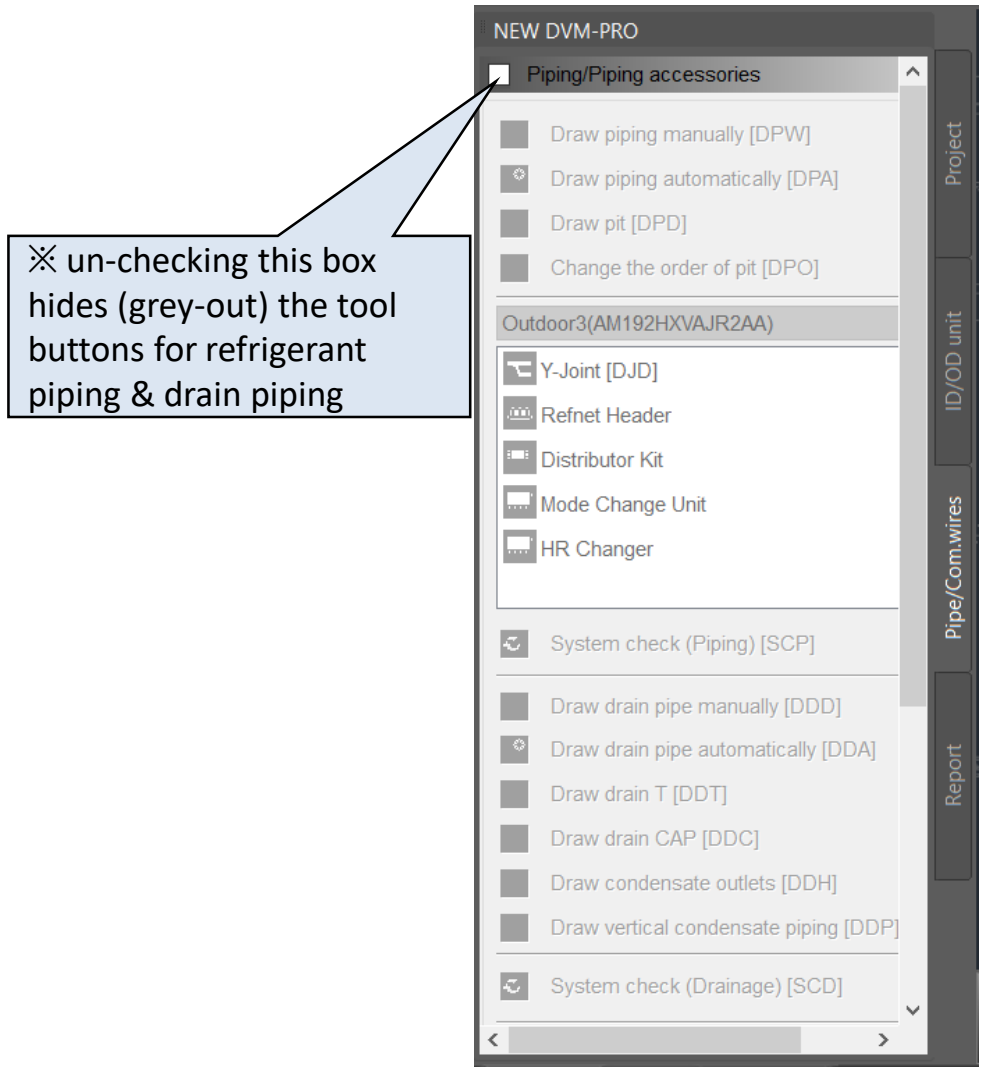
c) Piping/Wiring Tab – System Check [SCD]

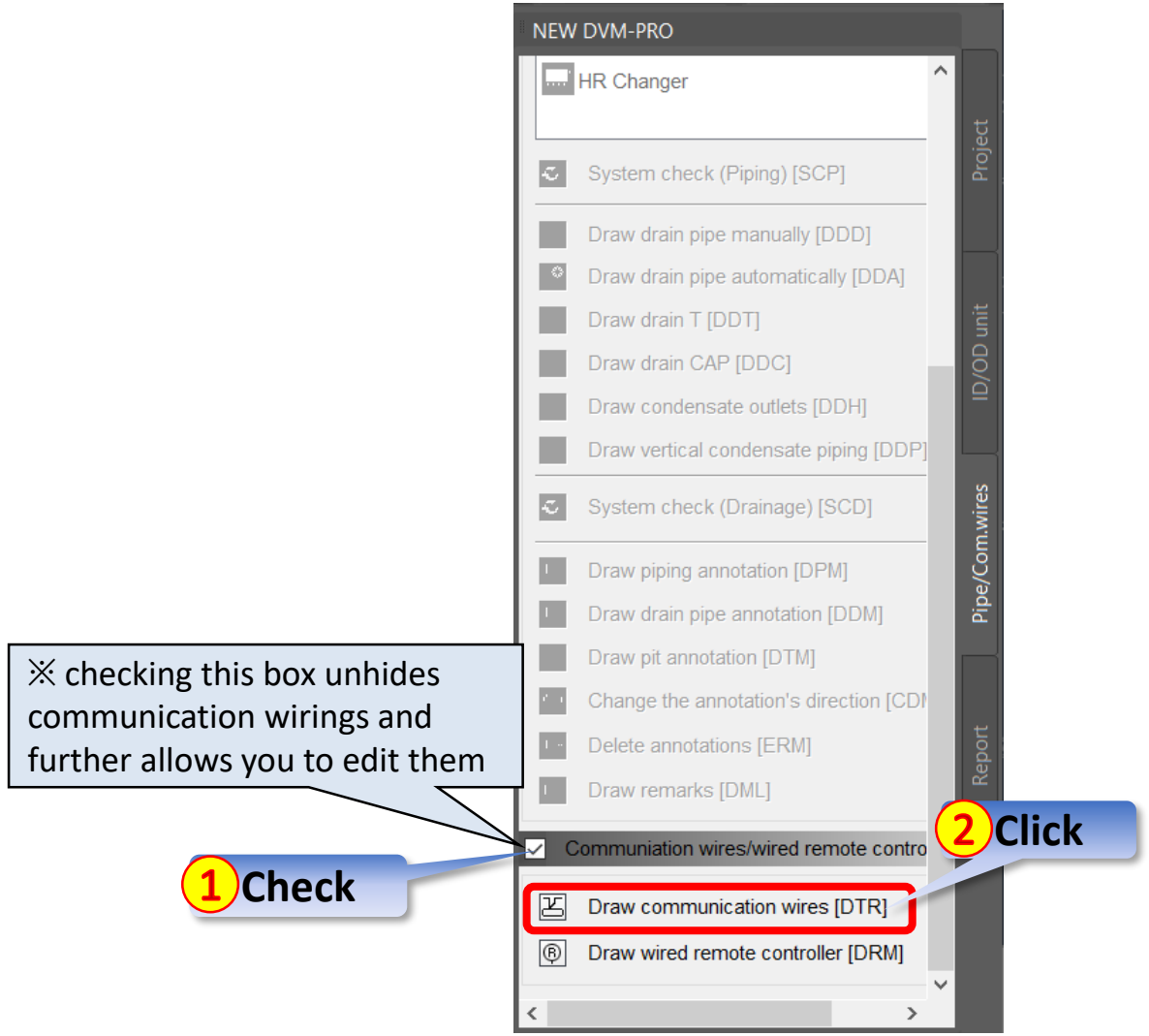
System check to confirm all the connections are properly done



3. DVM-Pro CAD Mode – Tools

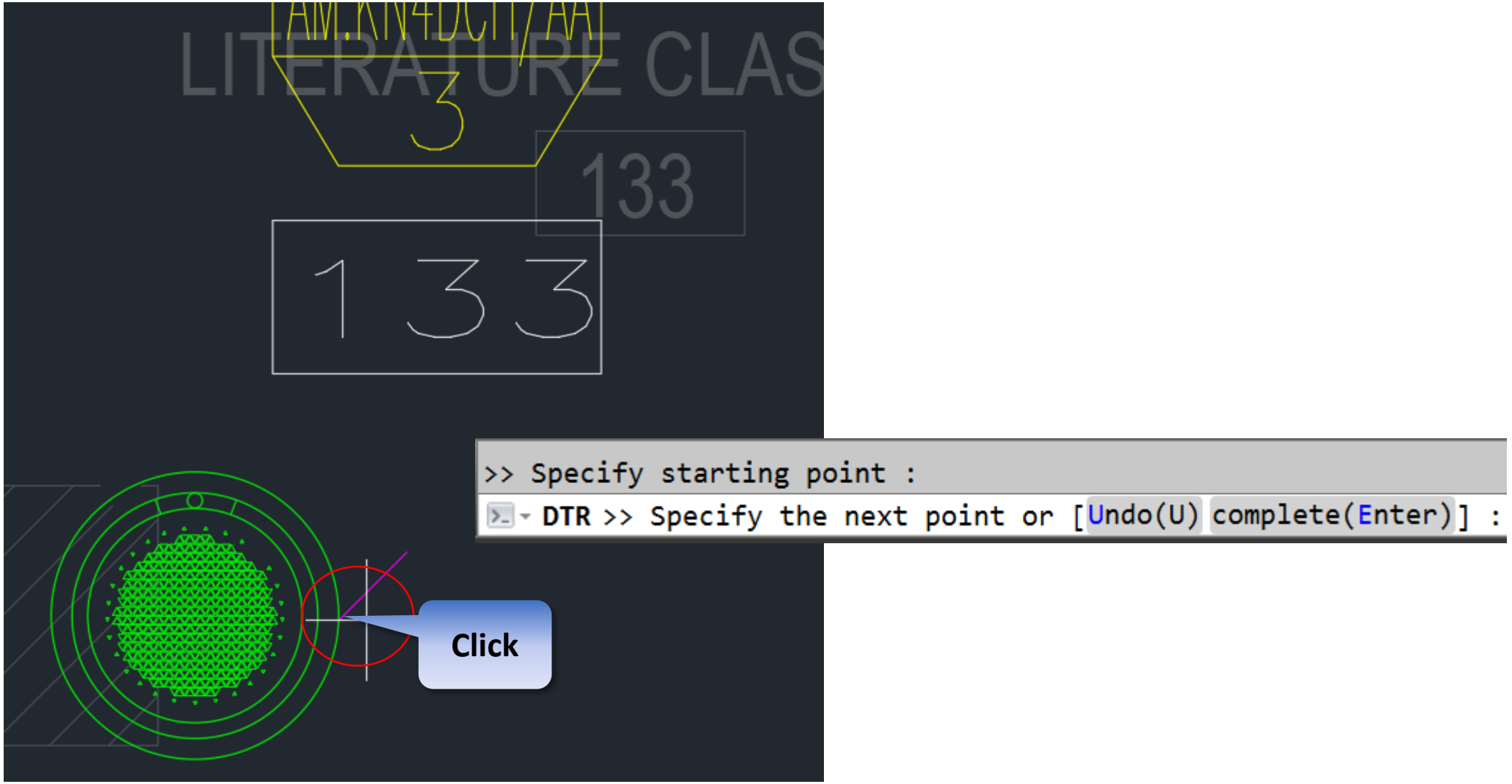
c) Piping/Wiring Tab – Draw Communication Wires [DTR]





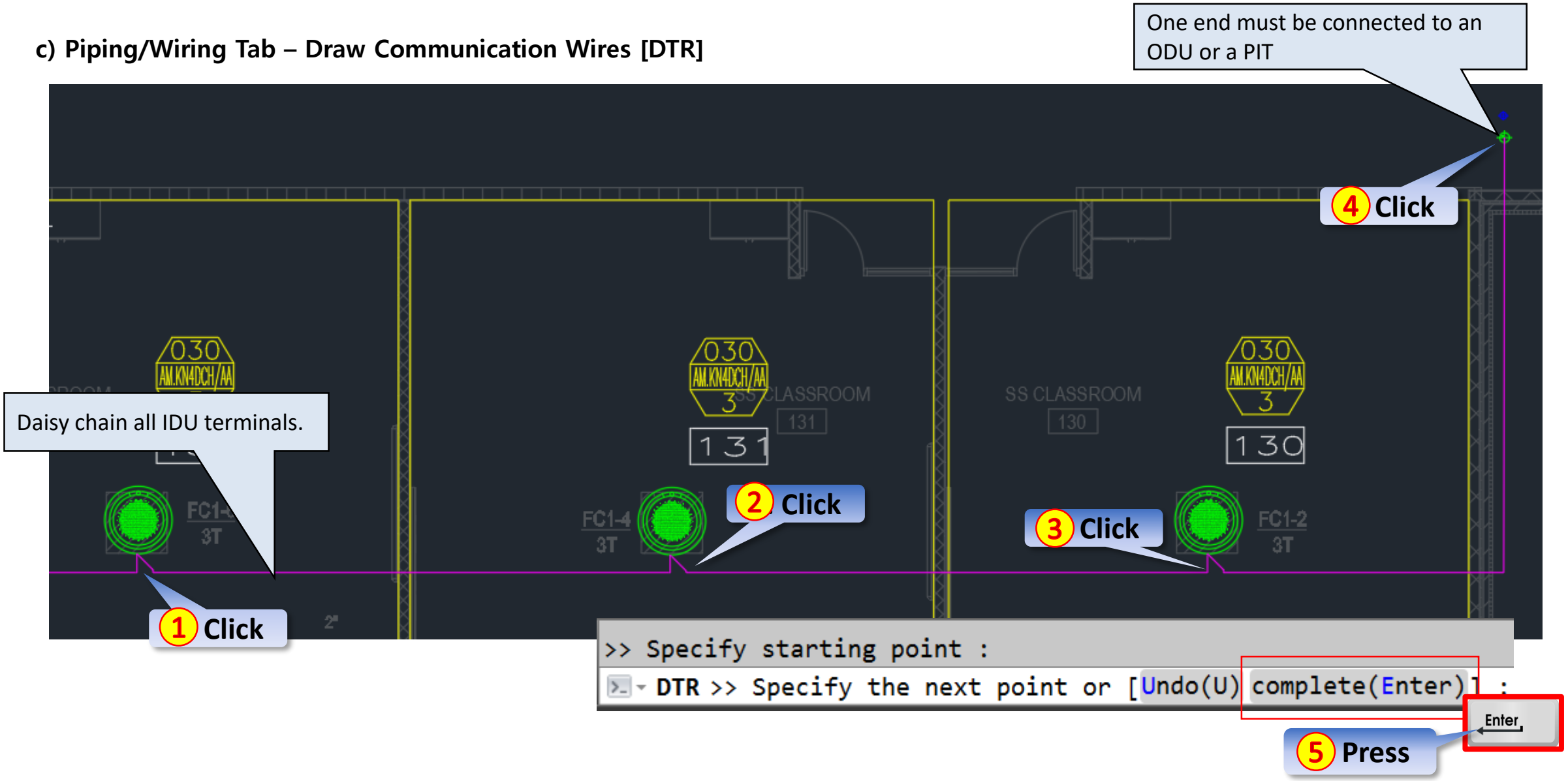
3. DVM-Pro CAD Mode – Tools

c) Piping/Wiring Tab – Draw Communication Wires [DTR]



3. DVM-Pro CAD Mode – Tools

c) Piping/Wiring Tab – Draw Communication Wires [DTR]



3. DVM-Pro CAD Mode – Tools

c) Piping/Wiring Tab – Draw Remarks [DML]

※ “Remarks” = legend

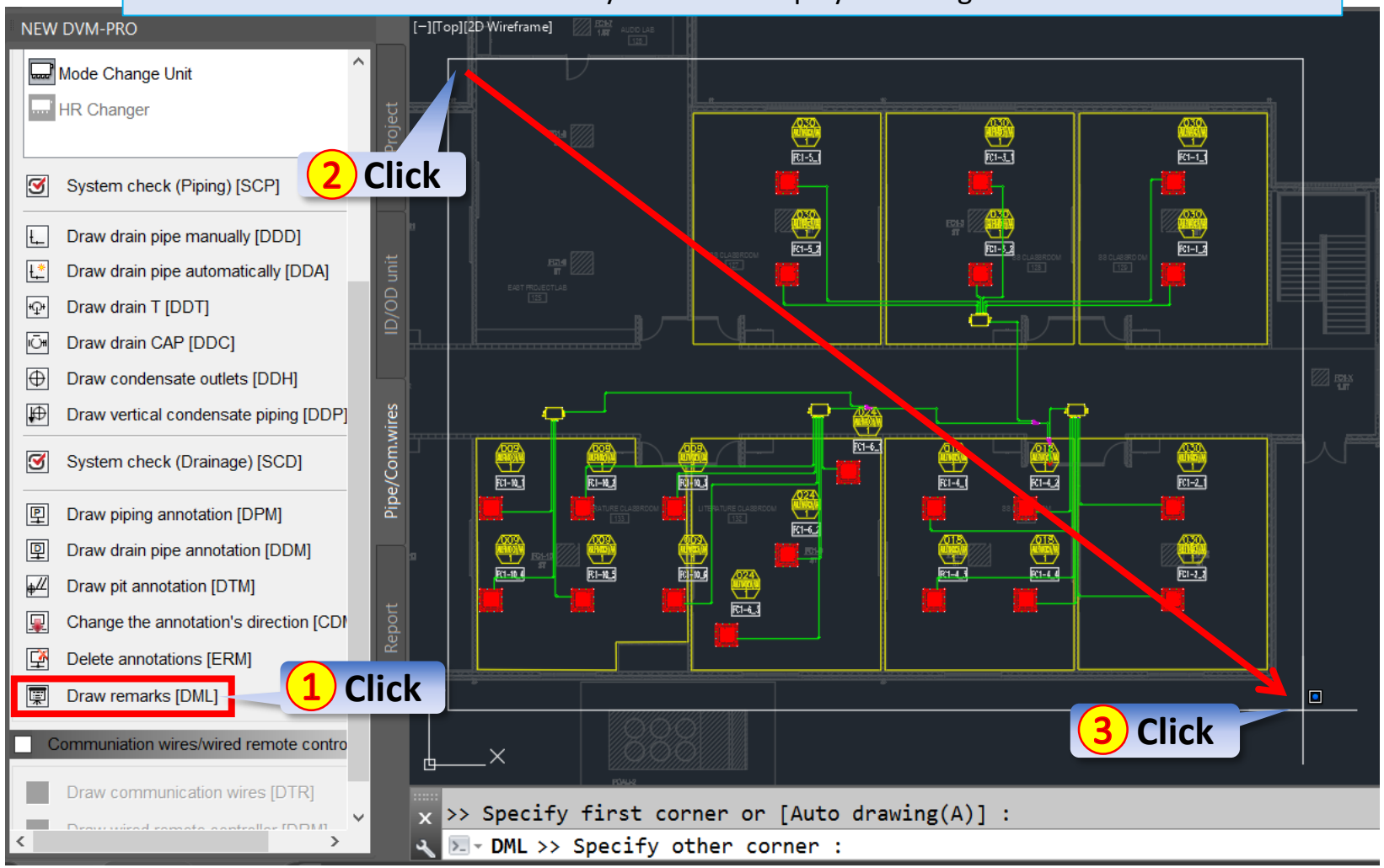
Sign	Ref. Dia
A	ø1/4"
B	ø3/8"
C	ø1/2"
D	ø5/8"
E	ø3/4"
F	ø7/8"
H	ø1 1/8"
J	ø1 3/8"
L	ø1 5/8"

Sign	Mode	Q'ty
6R	MXJ-YA2500M	1
7R	MXJ-YA3100M	2
52	MXJ-YA2512M	1
55	MXJ-YA3419M	1
56	MXJ-YA4119M	1
M15	MCU-S6NEK2N	3
M16	MCU-S4NEK3N	1

Legend

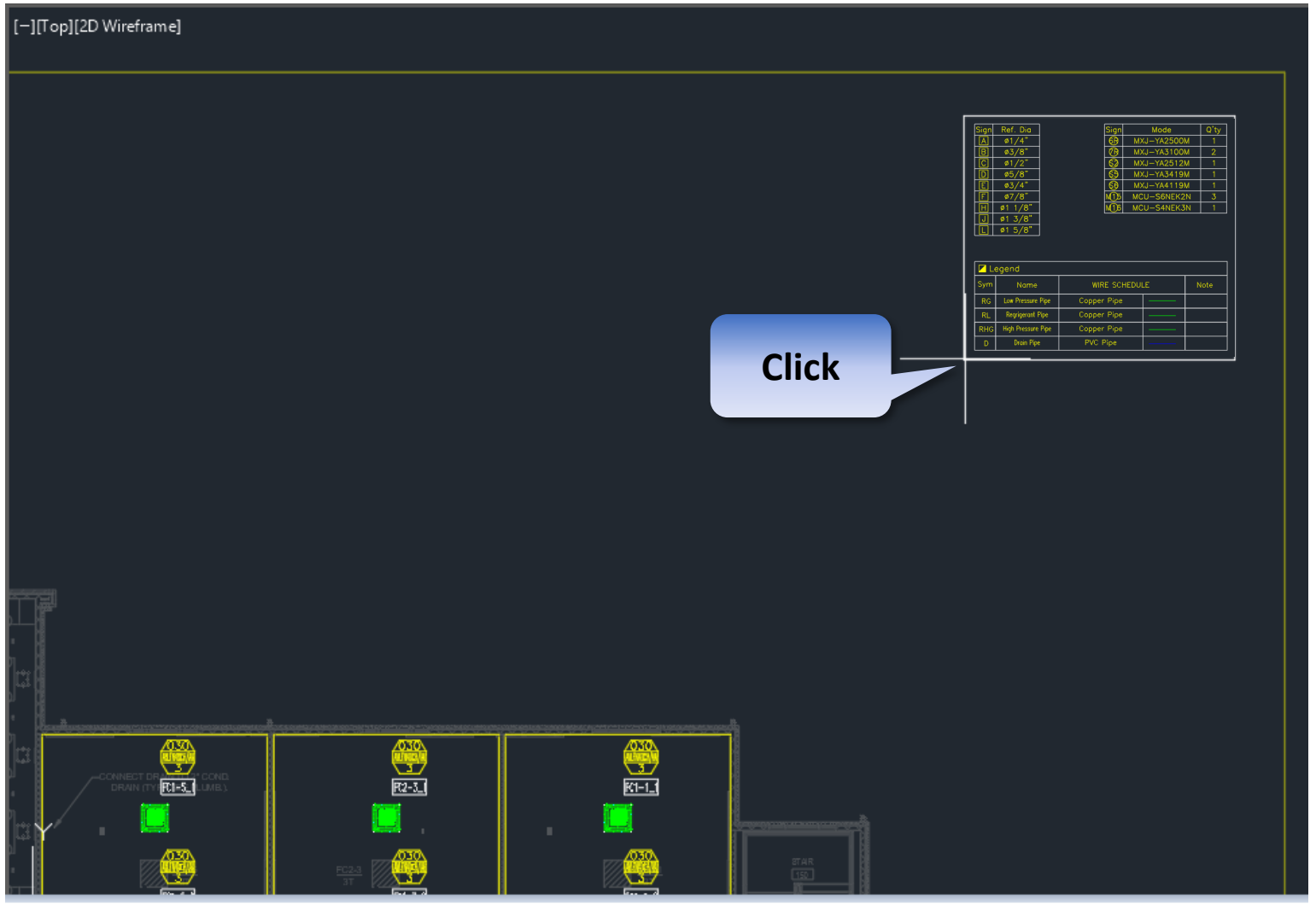
Sym	Name	WIRE SCHEDULE		Note
RG	Low Pressure Pipe	Copper Pipe		
RL	Regrigerant Pipe	Copper Pipe		
RHG	High Pressure Pipe	Copper Pipe		
D	Drain Pipe	PVC Pipe		

Box an area so that all the elements you wish to display in the legend are contained within it.



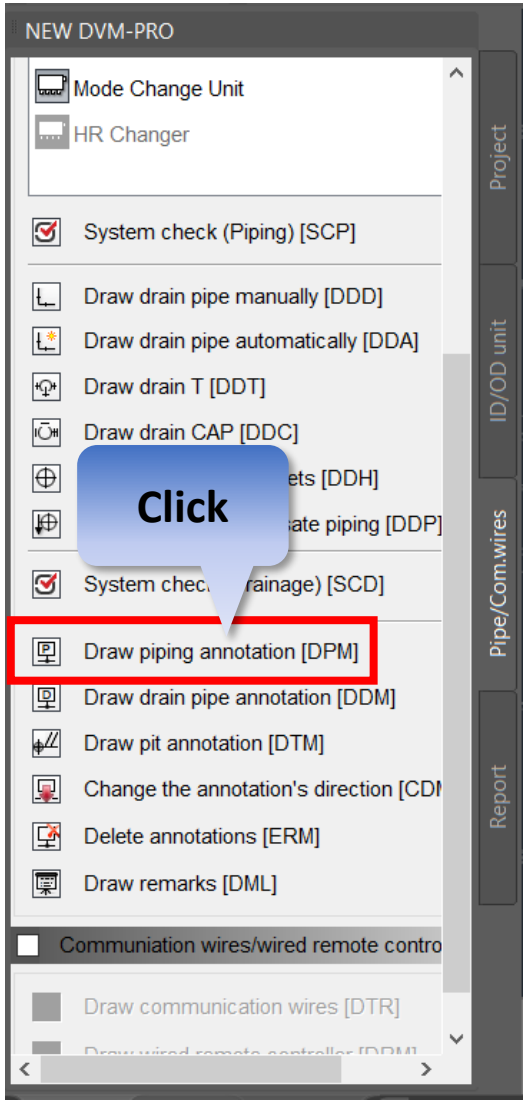
3. DVM-Pro CAD Mode – Tools

c) Piping/Wiring Tab – Draw Remarks [DML]

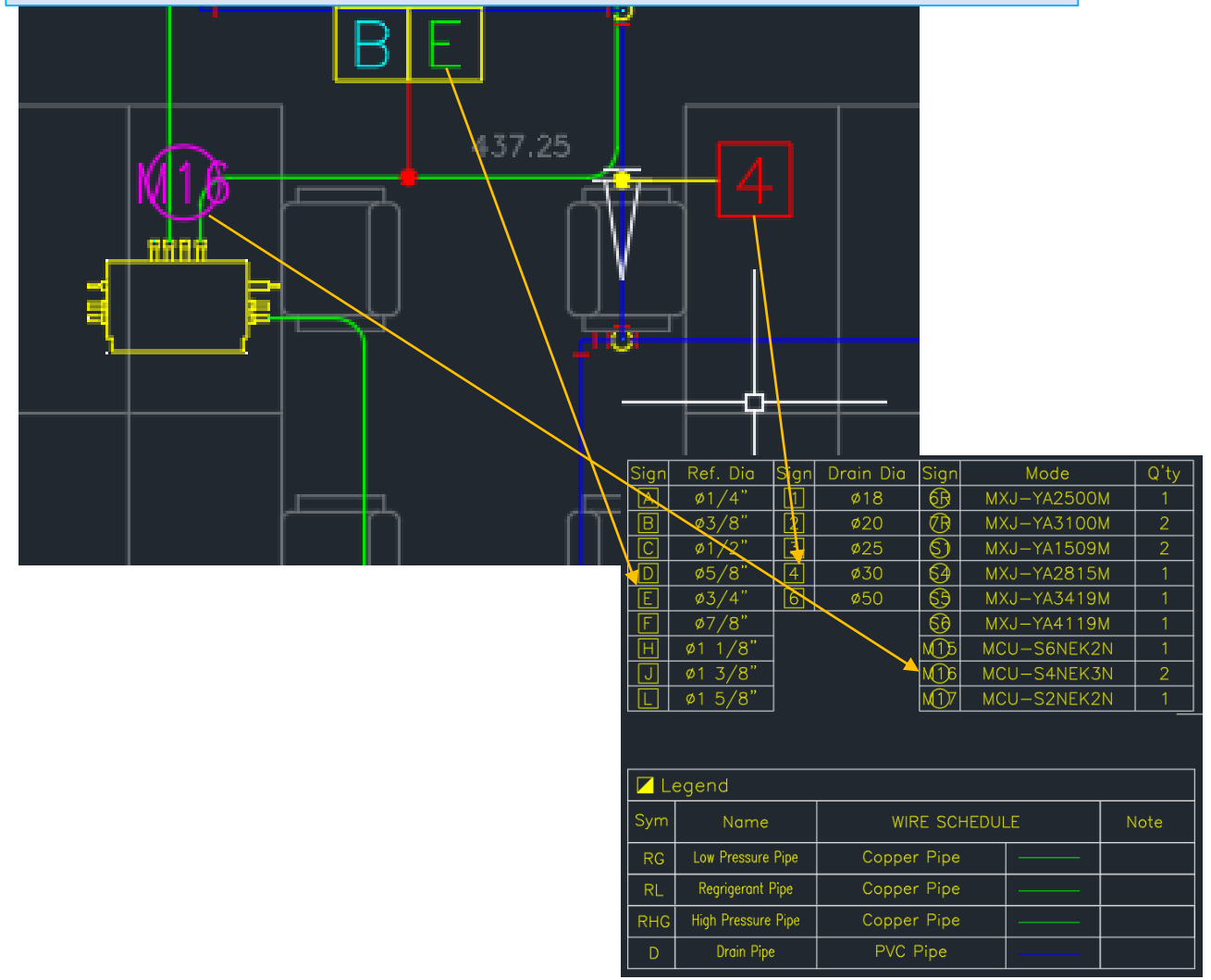


3. DVM-Pro CAD Mode – Tools

c) Piping/Wiring Tab – Draw Piping Annotation [DPM]

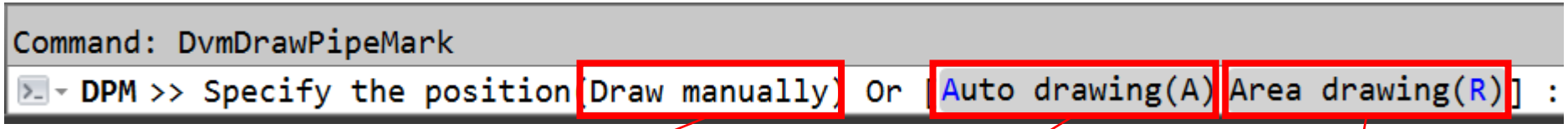


"Annotation" = tag with a symbol as referenced in the legend

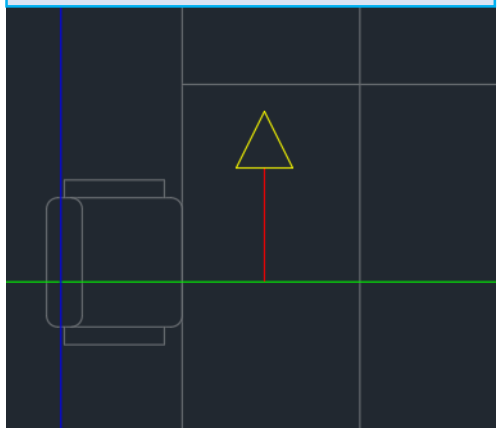


3. DVM-Pro CAD Mode – Tools

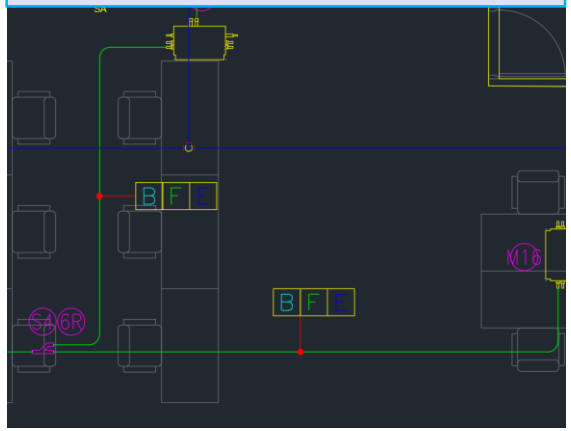
c) Piping/Wiring Tab – Draw Piping Annotation [DPM]



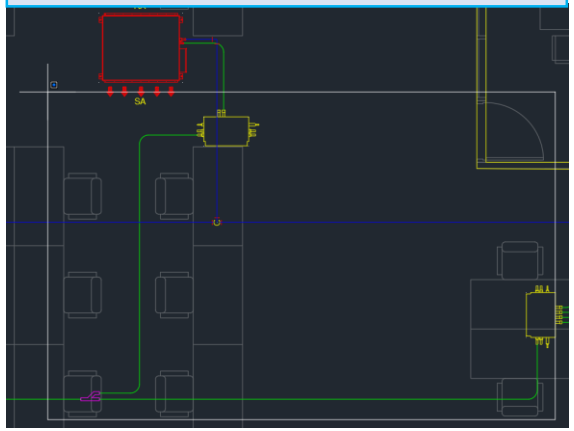
"Manual drawing" lets you choose which piping to label.



"Auto drawing" automatically labels all the existing pipings.

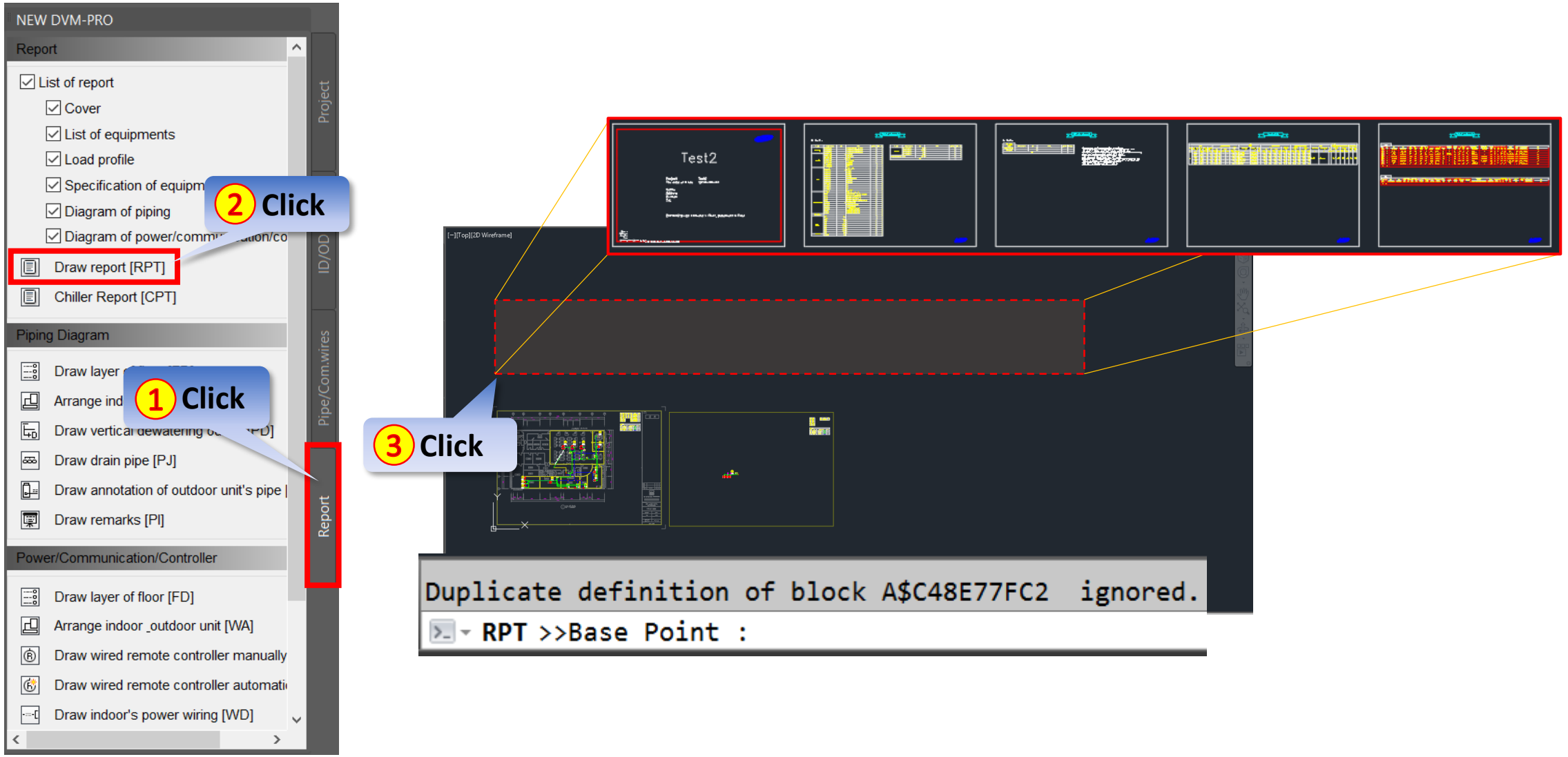


"Area drawing" labels all the pipings within the area you select.



3. DVM-Pro CAD Mode – Tools

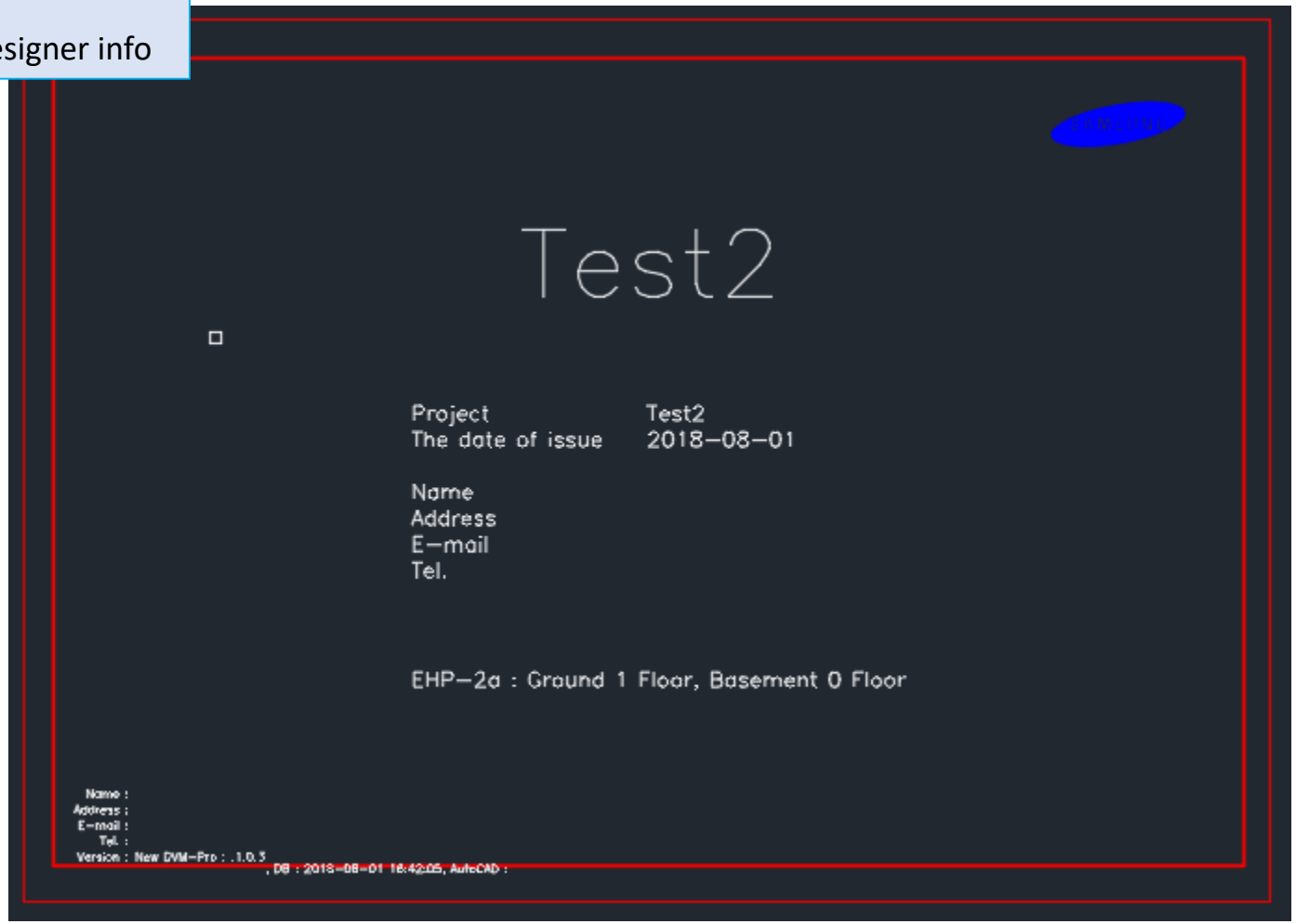
d) Report Tab – Draw Report [RPT]



3. DVM-Pro CAD Mode – Tools

d) Report Tab – Draw Report [RPT]

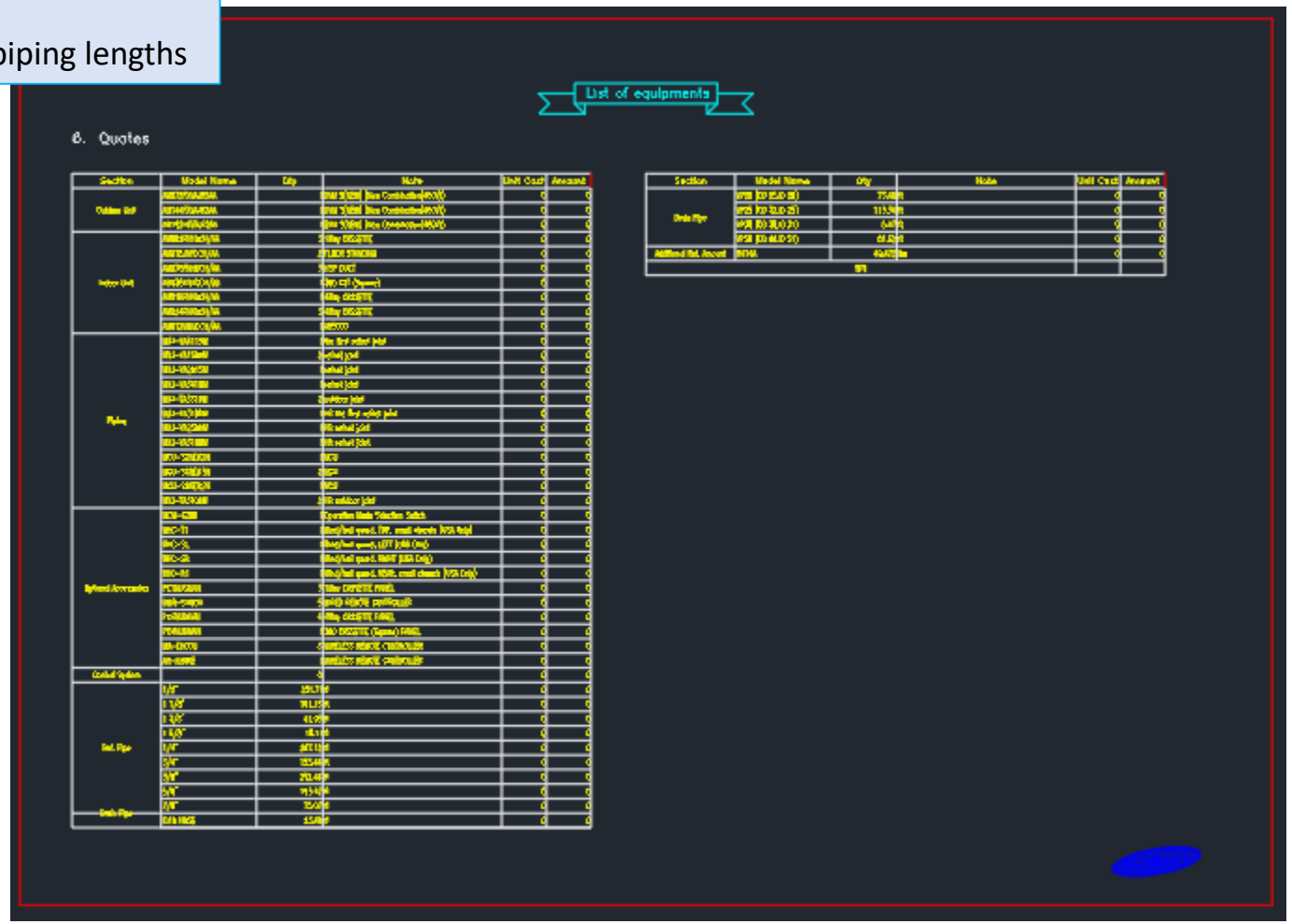
Report 1st page:
Project info, customer info, designer info



3. DVM-Pro CAD Mode – Tools

d) Report Tab – Draw Report [RPT]

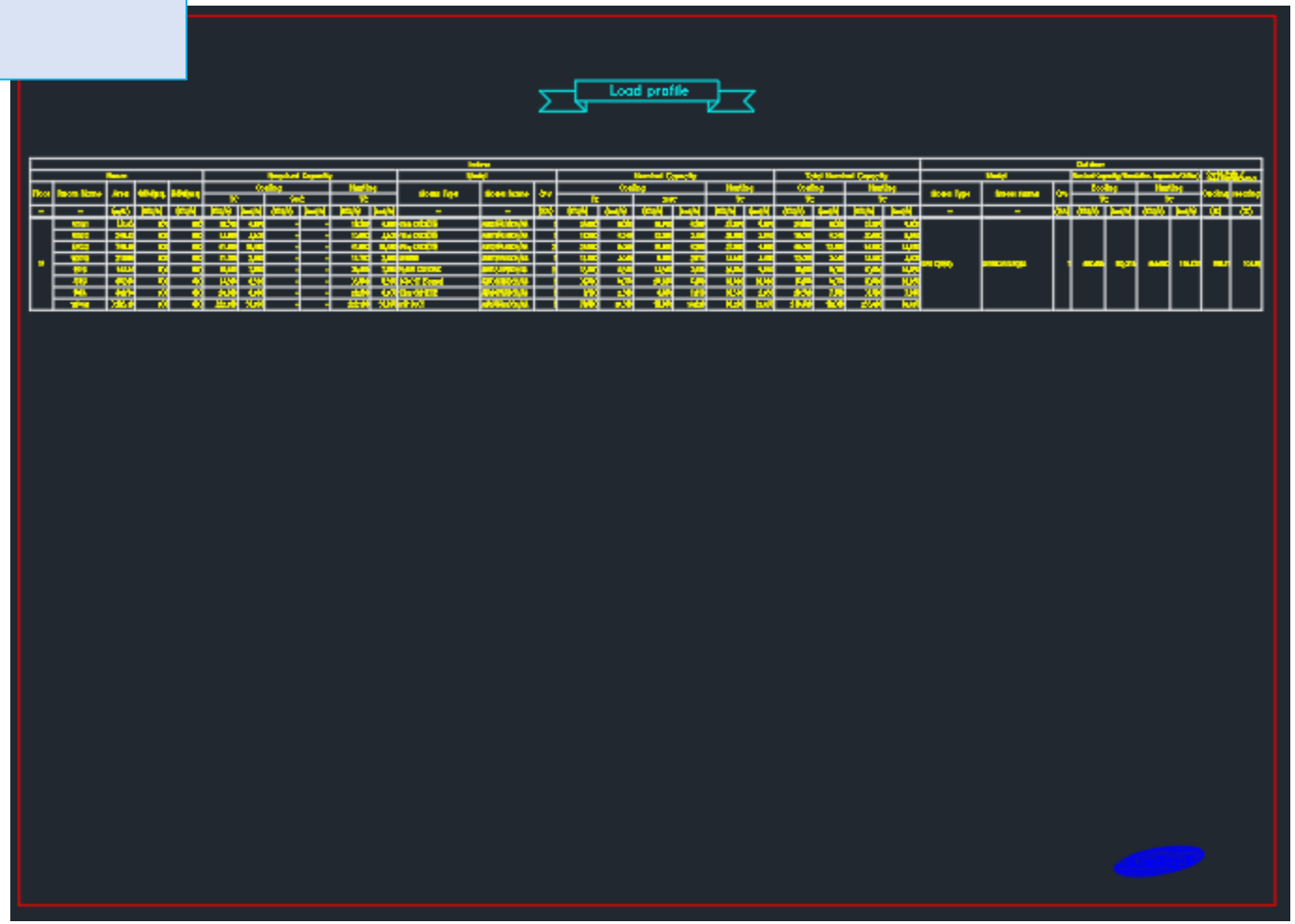
Report 2nd page:
List of Equipment, calculated piping lengths



3. DVM-Pro CAD Mode – Tools

d) Report Tab – Draw Report [RPT]

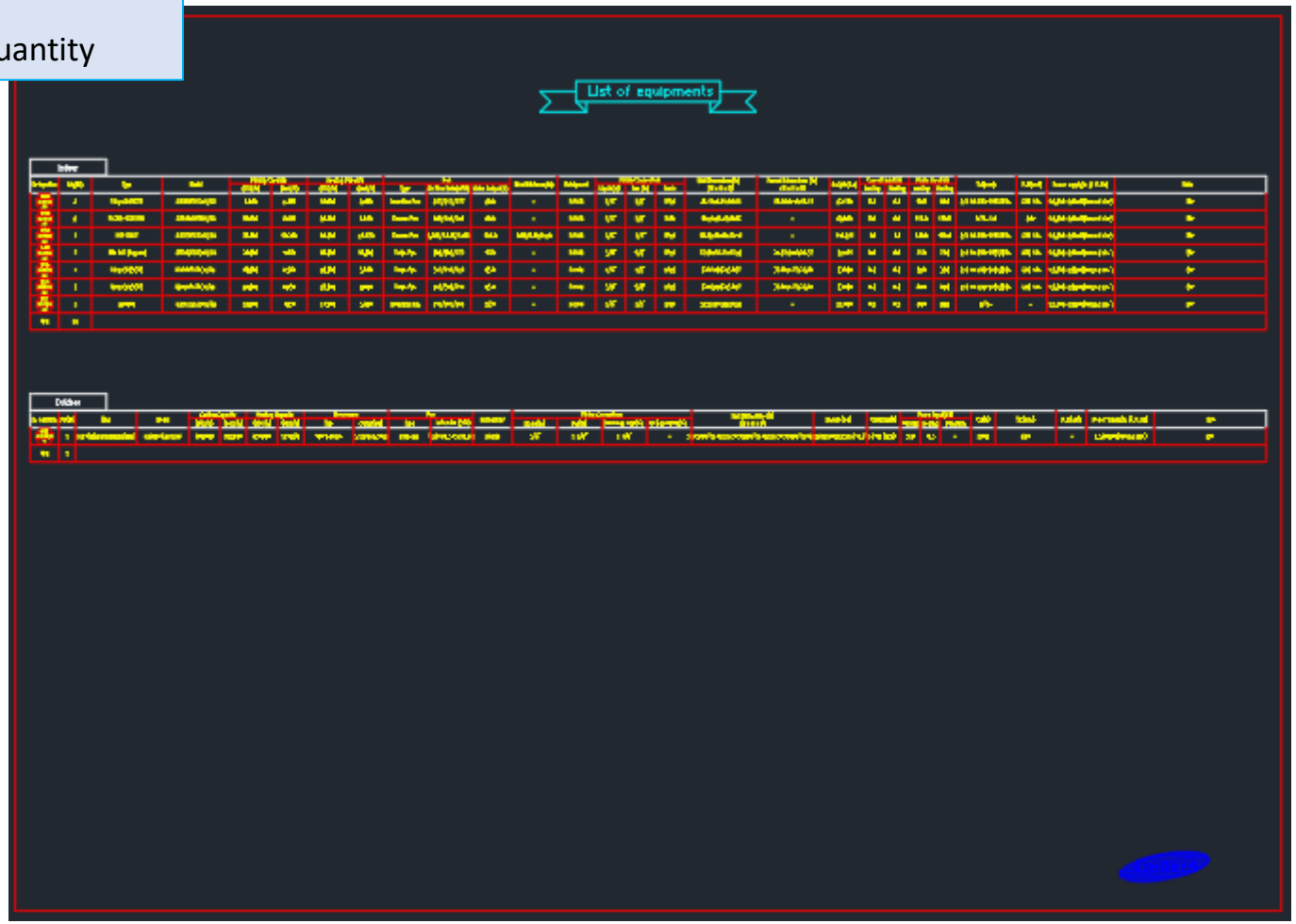
Report 3rd page:
Load Profile (heat load info)



3. DVM-Pro CAD Mode – Tools

d) Report Tab – Draw Report [RPT]

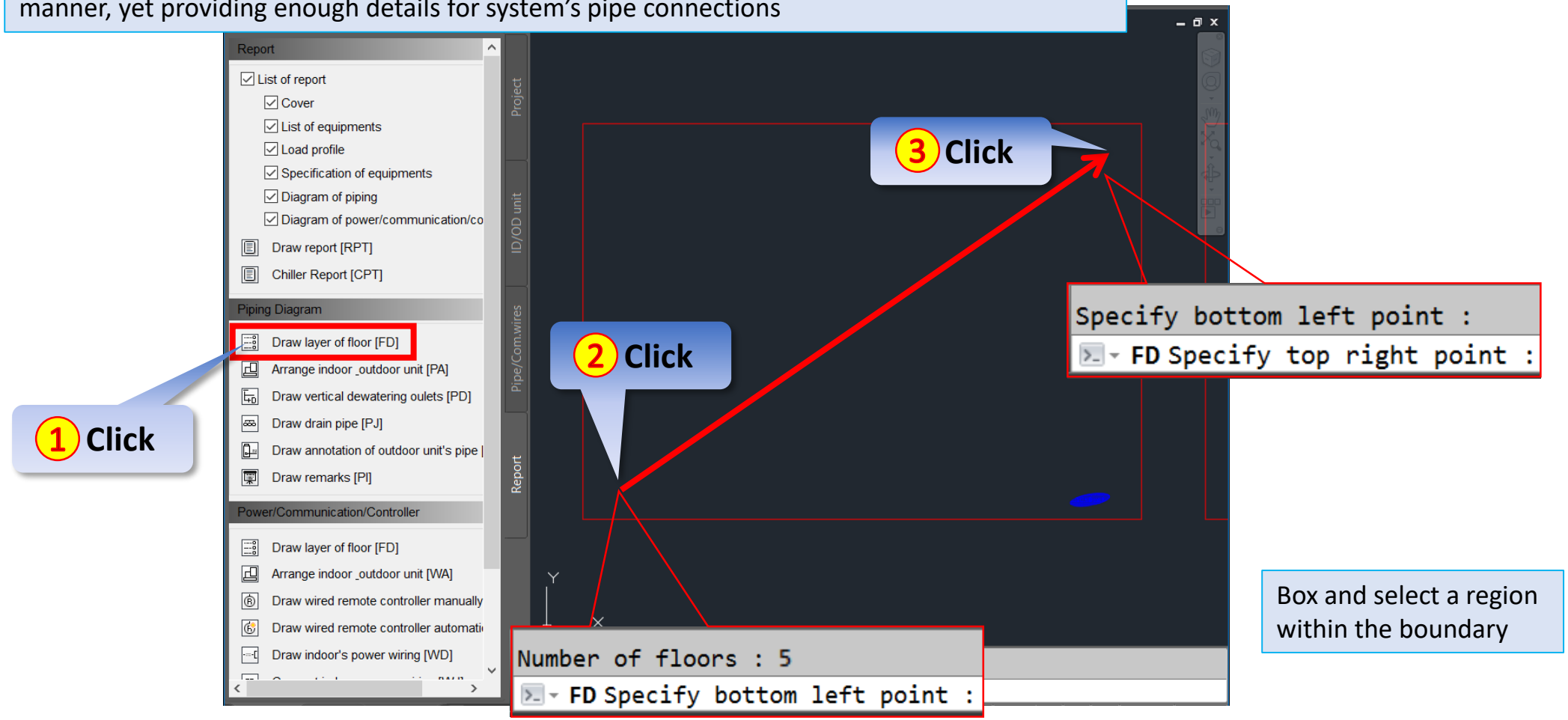
Report 4th page:
List of Equipment with spec, quantity



3. DVM-Pro CAD Mode – Tools

d) Report Tab – Piping Diagram, Draw Layer of Floor [FD] – Area Designation

5th page (blank) is for building cross section, where IDUs & ODUs are represented in a simple manner, yet providing enough details for system's pipe connections

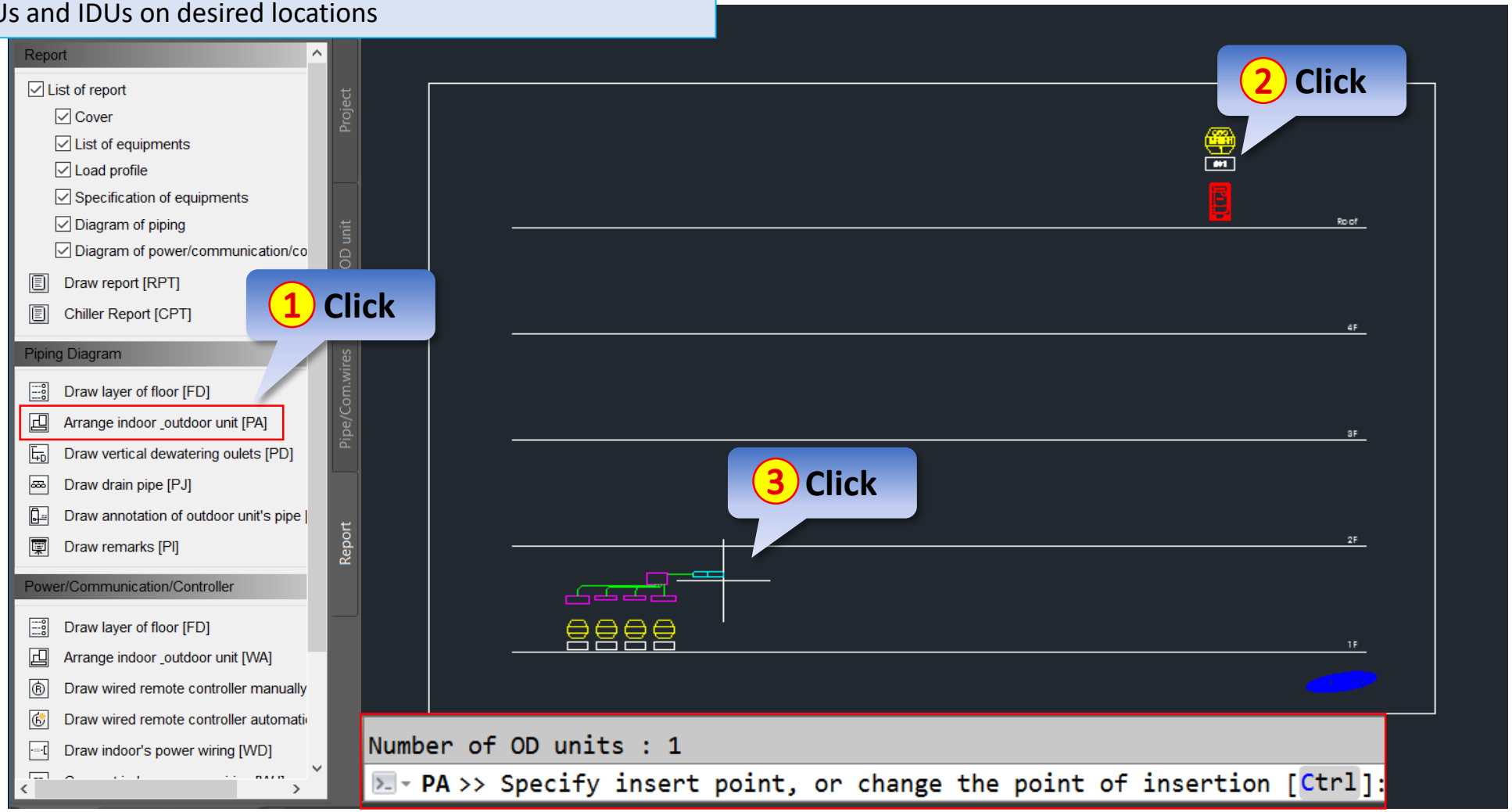


Box and select a region within the boundary

3. DVM-Pro CAD Mode – Tools

d) Report Tab – Piping Diagram, Arrange Indoor Outdoor Unit [PA] – ODU IDU Placement

Drop ODUs and IDUs on desired locations



3. DVM-Pro CAD Mode – Tools

d) Report Tab – Piping Diagram, Draw Annotation of Outdoor unit's pipe [PT], Draw Remarks [PI]

Draw annotations and remarks

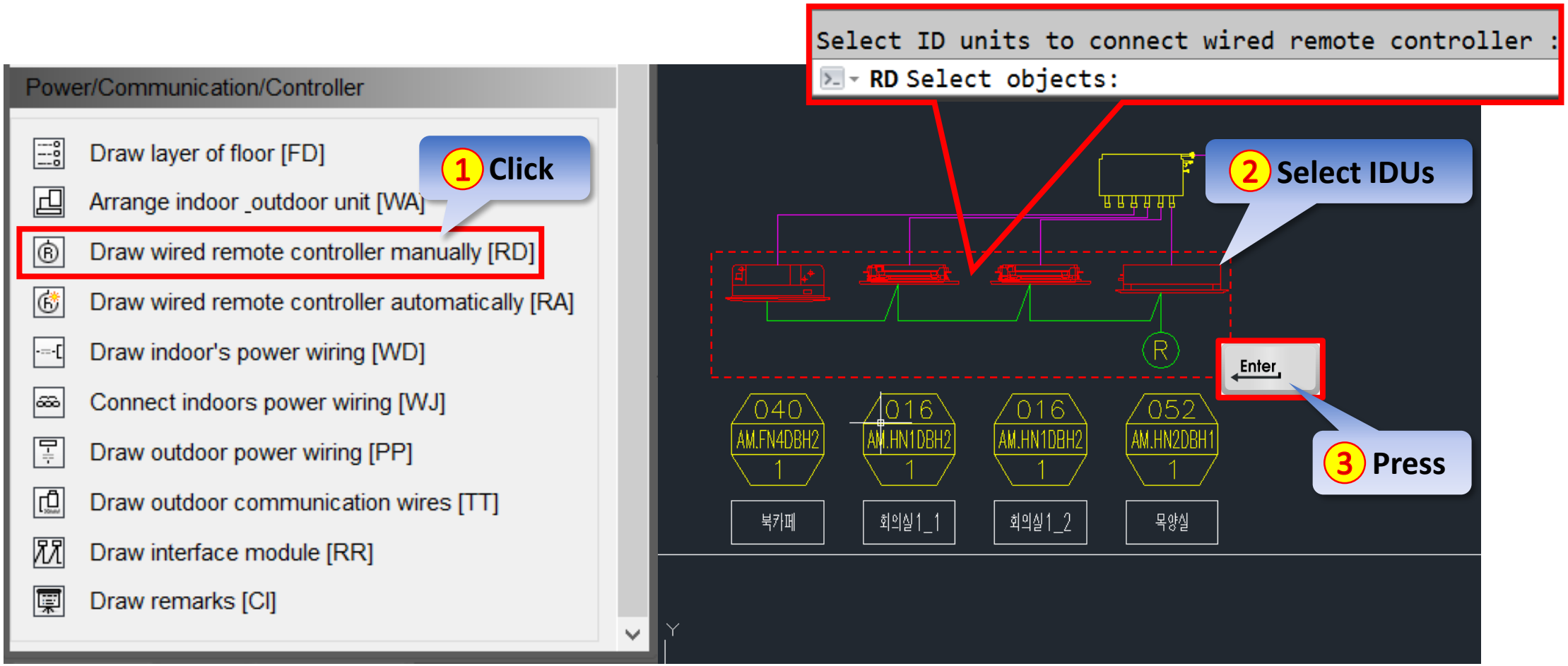
3. DVM-Pro CAD Mode – Tools

d) Report Tab – Power/Communication/Controller Diagram, Draw Layer of Floor [FD], Arrange Indoor Outdoor Unit [WA]

Draw floor layers, place ODUs and IDUs, and draw wiring

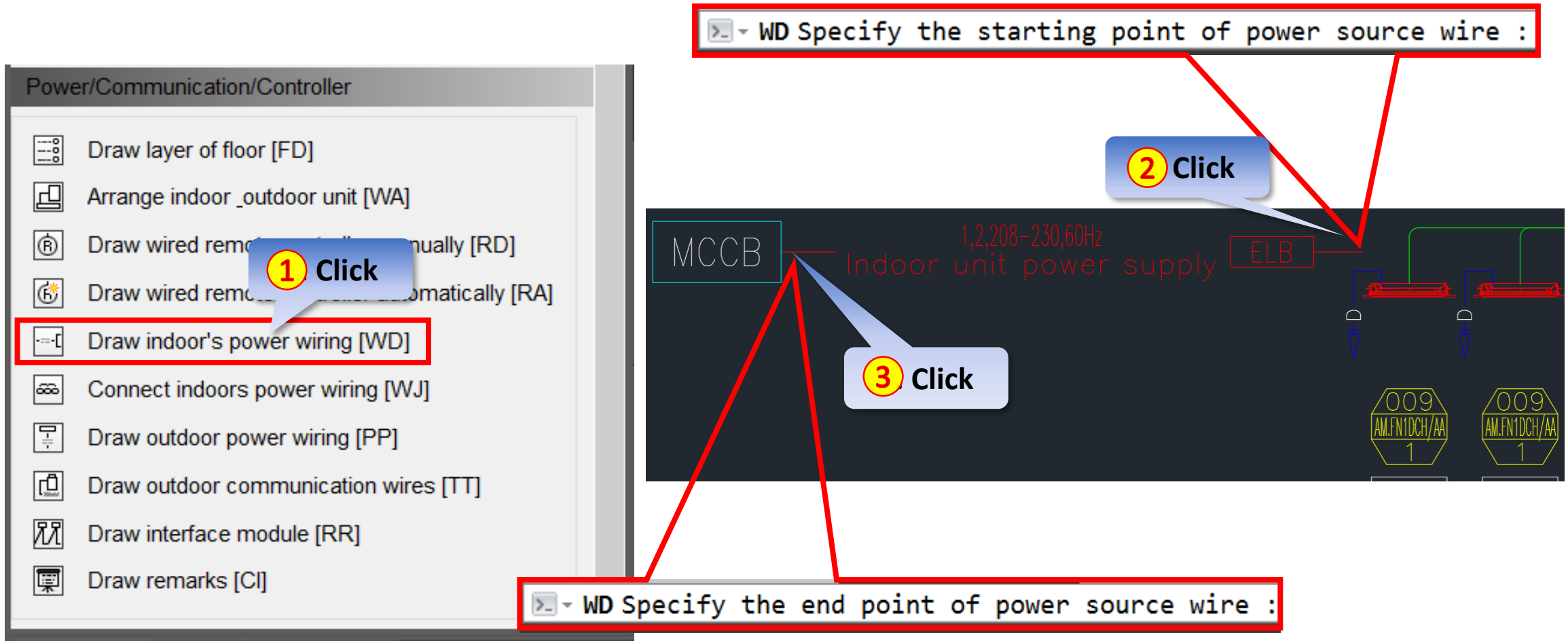
3. DVM-Pro CAD Mode – Tools

d) Report Tab – Power/Communication/Controller Diagram, Drawing Wired Controller [RD]



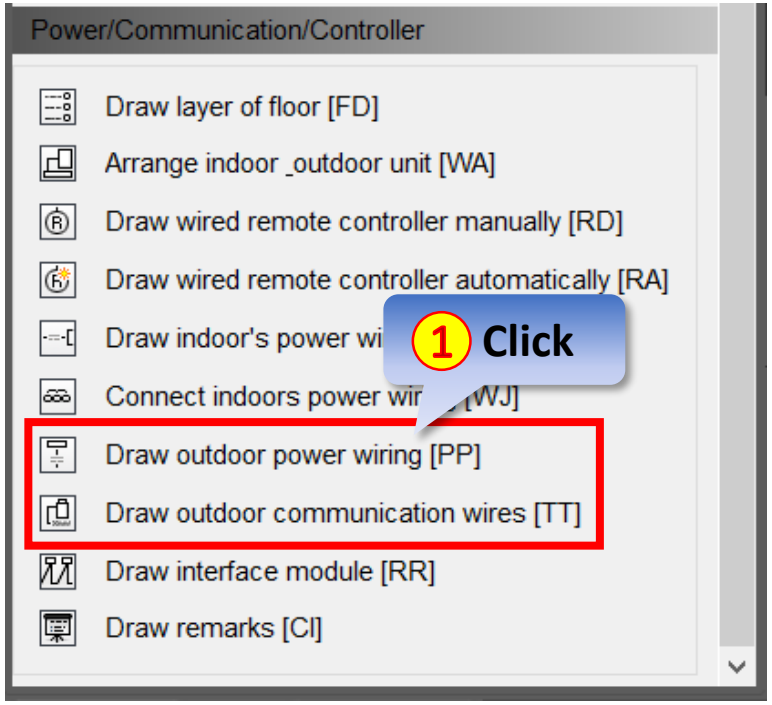
3. DVM-Pro CAD Mode – Tools

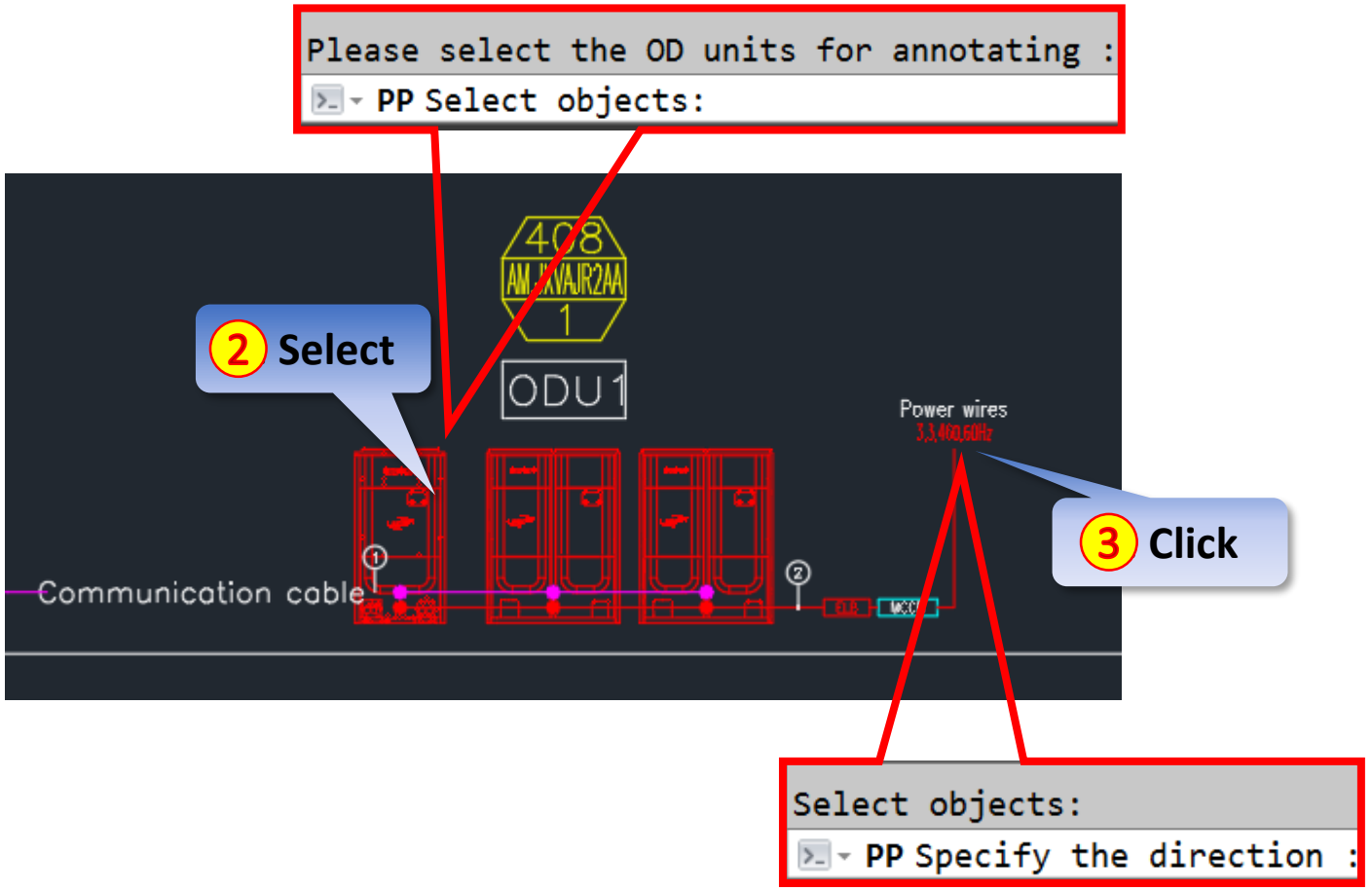
d) Report Tab – Power/Communication/Controller Diagram, Wiring [WD]



3. DVM-Pro CAD Mode – Tools

d) Report Tab – Power/Communication/Controller Diagram, Draw Outdoor Power Wiring [PP], Draw Outdoor Communication Wires [TT]

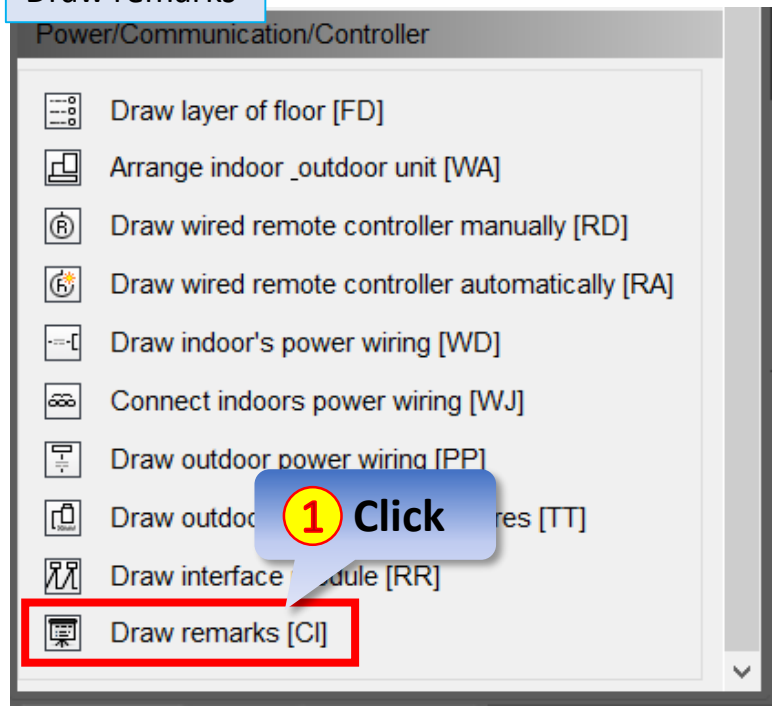


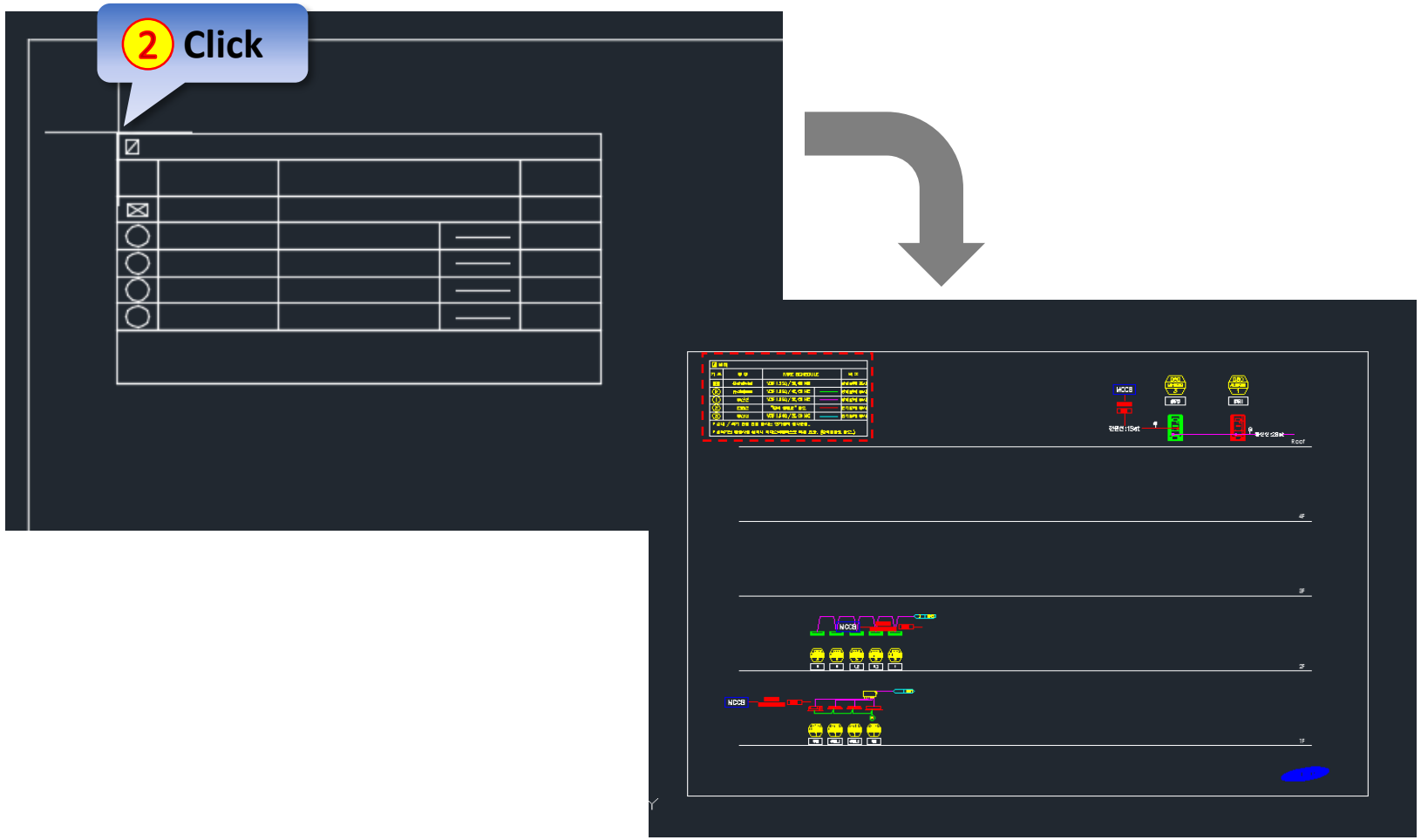


3. DVM-Pro CAD Mode – Tools

d) Report Tab – Power/Communication/Controller Diagram, Draw Remarks [CI]

Draw remarks





Samsung Electronics

Thank You