DVM Pro : Sales mode

Tutorial (Ver.1.2)

SAMSUNG

Contents

Part1. Introduction

1.1 DVM pro Introduction..... 6

1.2 Installation..... 7

1.3 SAC Design Process 8

Part2. Basic Design (DVM S HP)

2.1 Modeling Scenario..... 10

2.2 Start with DVM Pro 11

2.3 Create Project 12

2.4 Load Design 13

2.5 Select Product type..... 14

2.6 Select Indoor units 15

2.7 Select Outdoor unit 17

2.8 Select Accessory 19

2.9 Building management 24

2.10 Piping 26

2.11 System Check 29

2.12 Simulation 30

2.13 Wiring 31

2.14 Controller 32

2.15 Report 35

Contents

Part3. Advanced Design1 (DVM S HR)

3.1 Modeling Scenario…….…. 37

3.2 Start with DVM Pro …….. 38

3.3 Create Project ……..….. 39

3.4 Load Design ……..…. 40

3.5 Select Product type……..……... 41

3.6 Select Indoor units ……... 42

3.7 Select Outdoor unit …….. 43

3.8 Select Accessory …….. 45

3.9 Building management ……..…….. 50

3.10 Piping ……..…….. 52

3.11 System Check ……..…. 54

3.12 Controller ……... 55

3.13 Report …….. 57

Contents

Part4. Advanced Design2 (Hydro Unit)

4.1 Modeling Scenario…….…. 59

4.2 Start with DVM Pro …….. 60

4.3 Create Project ……..….. 61

4.4 Load Design ……..…. 62

4.5 Select Product type…….……... 63

4.6 Select Indoor units ……... 64

4.7 Select Outdoor unit …….. 66

4.8 Select Accessory ……. 69

4.9 Building management ……..…….. 74

4.10 Piping ……..…….. 76

4.11 System Check ……..…. 77

4.12 Report …….. 78

Part5. Additional Function

5.1 Pricing Function…..……..…. 80

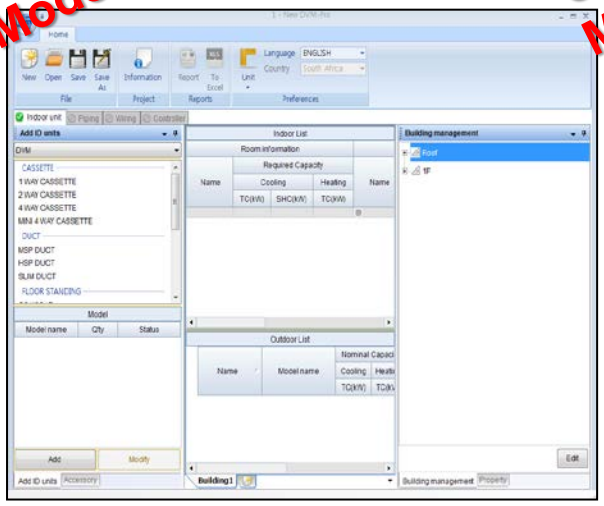
Part 1. Introduction

1.1 DVM Pro Introduction

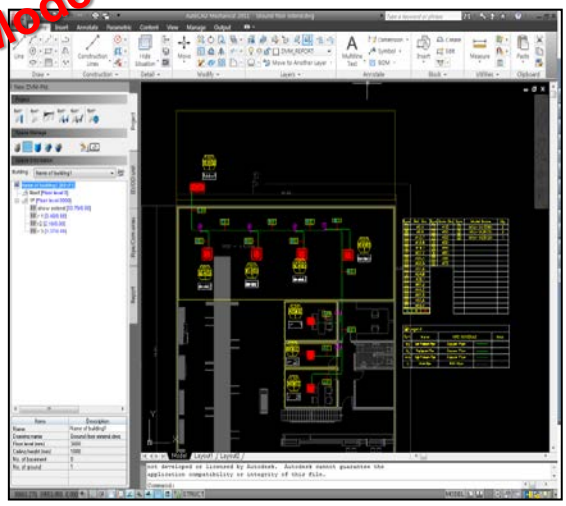
What is DVM Pro?

- To help users design SAC very quickly and accurately
- DVM Pro is composed of ‘Sales mode” and “CAD mode”.
  1. Sales mode : Simple design with generating model list
  2. Cad mode : Design SAC on AutoCAD drawing.
     ※ Auto CAD program must be installed.

Sales Mode



Cad Mode



1.2 Installation

Software Installation (Down load)

Connect the below address and download new file to install DVM Pro software.

- 32bit user : http://dvm.inno-lab.co.kr/dvmsetup/setup_x86(Contain%20.Net).zip
- 64bit user : http://dvm.inno-lab.co.kr/dvmsetup/setup_x64(Contain%20.Net).zip

Compatible OS and CAD version

- OS(Operating System) : “Win 7 / 8 / 10”
- CAD : “AutoCAD & AutoCAD Mechanical Version(2010~2018)”

※ Make sure Auto CAD “light version” is not allowable.

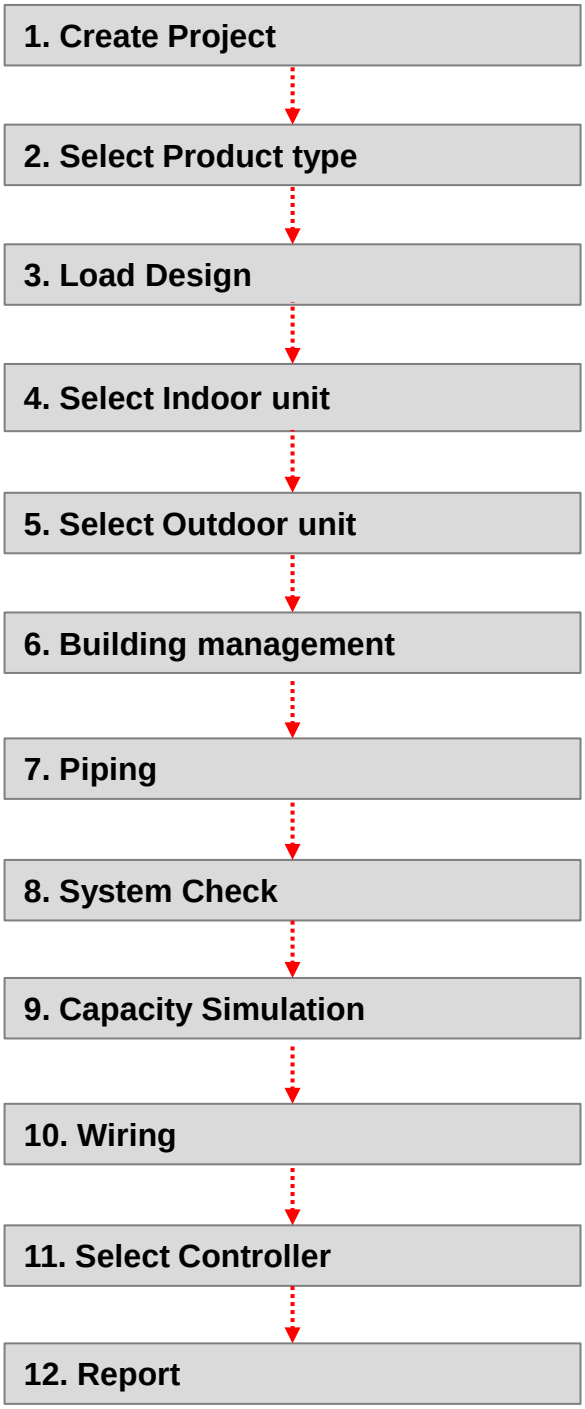
How to contact DVM Pro team?

When you have any question or find some errors, please contact DVM Pro team.

- Email : dvm.pro@samsung.com

1.3 Design Process

Flow Chart



Part 2 : Basic Design

Market with DVM S HP

(Tutorial with 1st Scenario)

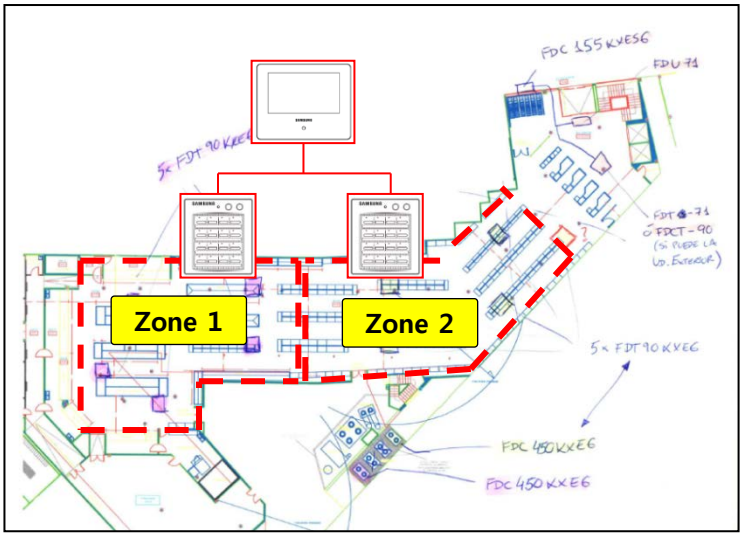
Purpose :

1. Understand the design process for SAC.
2. Learn how to use DVM Pro S/W.
3. Part 2 is focused on the basic design.
   - DVM S HP with 360 CST
   - On-Off Controller, Touch Controller

2.1 Modeling Scenario

Approach

- Building type : Supermarket
- Area : 400m2
- Indoor unit : 360 CST
- Controller : On-Off controller for Each zone and Touch controller
- Longest pipe : 180m



- Load Requirements
  1. (Example of Zone1) TC = 0.21kW/m2(*Unit load) x 180m2(Area) = 38kW
  2. (Example of Zone1) SHC = TC x 0.71 (*Sensible heat ratio)

System (Outdoor unit)	Room/Zone	Area (m2)	Load Requirements (KW)		
			Cooling		Heating
			TC	SHC	TC
System 1	Zone1	180	38	27	32
System 2	Zone2	220	46	33	40

* Unit load (kW/m2) : 0.21 / 0.18 (Cooling TC / Heating TC)

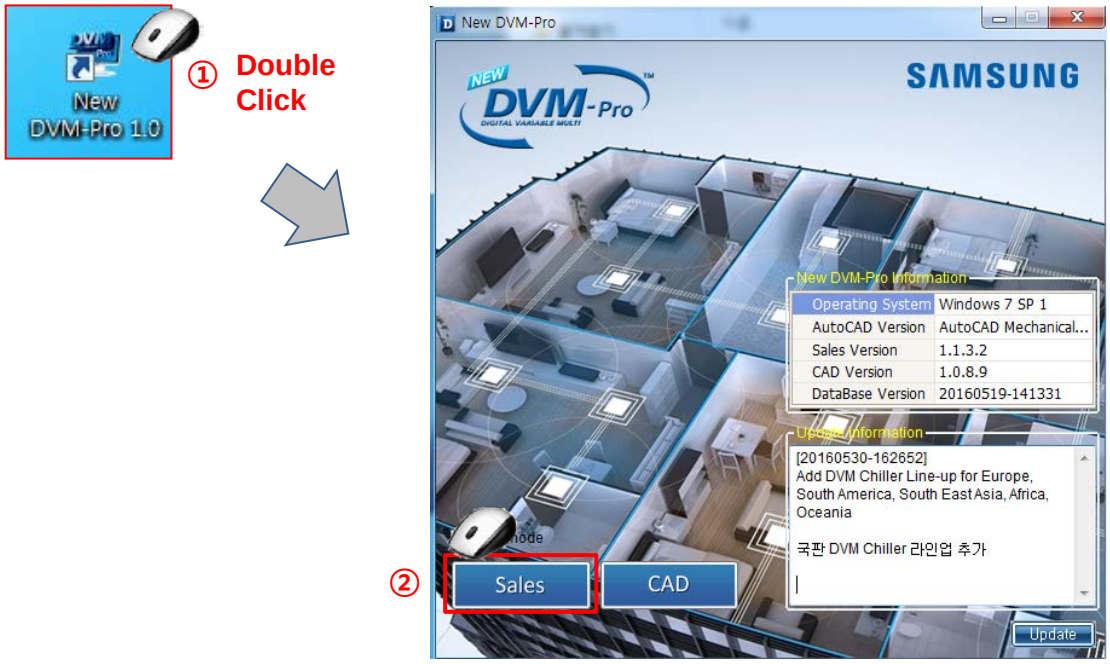
Design Tip

- TC(Total Capacity) = SHC(Sensible Heat Capacity) + LHC(Latent Heat Capacity)
- SHC: Capacity that changes temperature
- LC: Capacity that changes a phase such as the dehumidification.
- Designers need to consider SHC in high humidity places especially near the beach and lake.
  Normally, when humidity is higher, air-conditioner more work for LHC(dehumidification).
  On the other hand, SHC is smaller so that adjusting temperature may not be enough.

Start with DVM Pro

Design steps

1. To start DVM Pro, **double click a icon "New DVM Pro 1.0"** on desktop..
2. **Click "Sales"** button to start Sales mode of DVM Pro.
3. New window popped up.



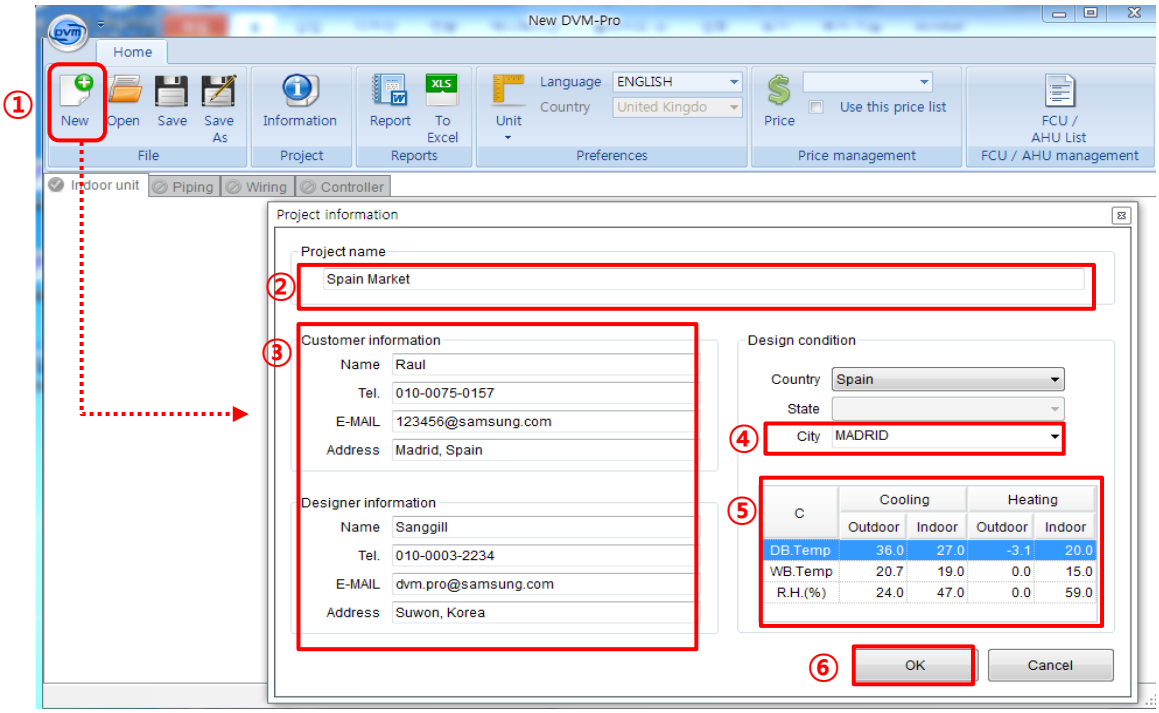
Usage Tip

Version Information

Create Project

Design steps

1. To create the project**, click "New**" button, then new window is popped up.
2. **Enter the project name**: the project name will be saved as a file name.
3. Enter the customer information and designer information (Optional)
   : This will be represented on the report.
4. Enter Design condition : **Select city "Madrid"**
5. Design condition (Weather)
   : Firstly weather condition is represented based on your city,
   and then user can edit the data manually.
6. **Click "OK"** button to complete to create a project.



Usage Tip

Saving File extension is ".dvms".

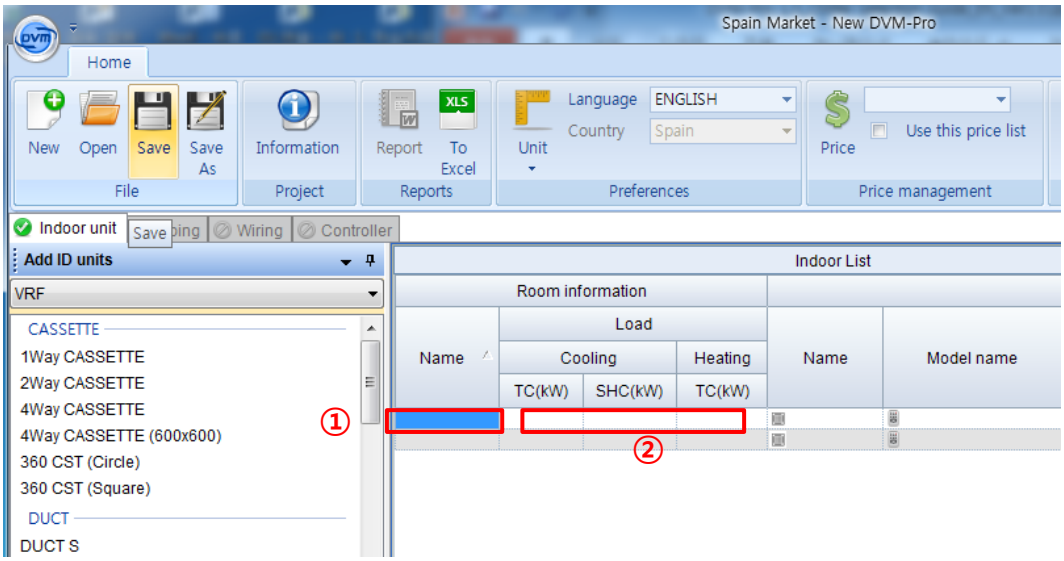
If user wants to select models from other countries, please request the authorization for the country to DVM Pro team by email, dvm.pro@samsung.com.

Load design

Design steps

1. To generate room information,
   enter room names by double clicking (or click+enter) a vacant space.
2. Input load requirements for each room or zone according to the below load calculation.
   - Load Calculation

System (Outdoor unit)	Room/Zone	Area (m2)	Load Requirements (KW)		
			Cooling		Heating
			TC	SHC	TC
System 1	Zone1	180	**38**	**27**	**32**
System 2	Zone2	220	**46**	**33**	**40**



Usage Tip

According to this input load, the quantity of indoor units is automatically calculated for each room.

Without entering load, user can also select indoor units and quantity.

Design Tip

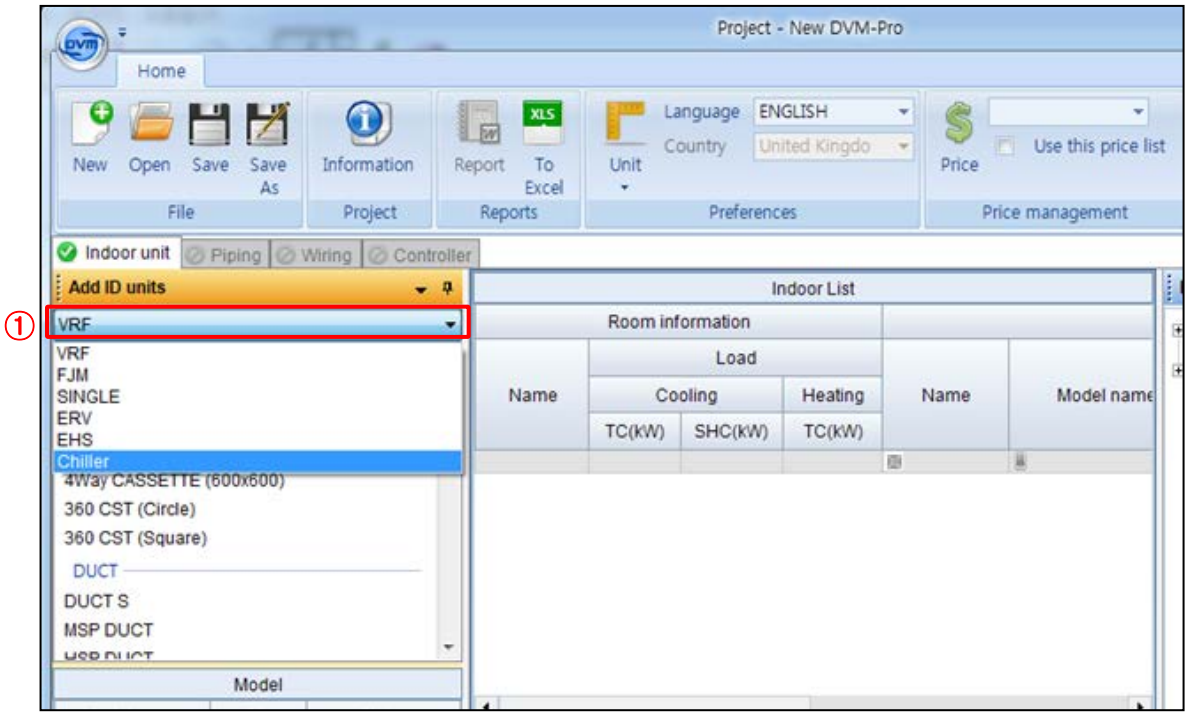
To meet customer's requirements, cooling(TC, SHC) and heating load need to be entered.

2.5 Select Product type

Select product type

Design steps

1. Click the below tap and select a product type on drop/down menu. **(Select VRF)**



Design Tip

For the proper SAC selection, many design factors should be considered such as the system capacity, pipe length, installation space, the number of indoor units, and so on.

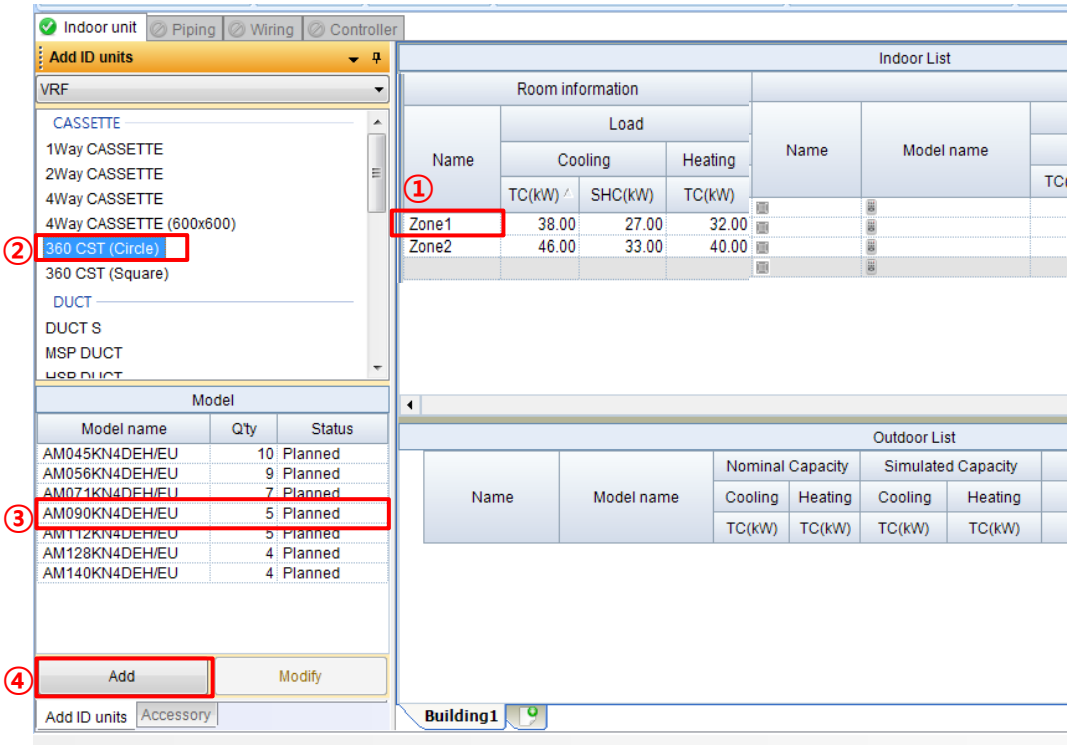
※ To check those design and installation factors, please refer to TDB or installation manual.

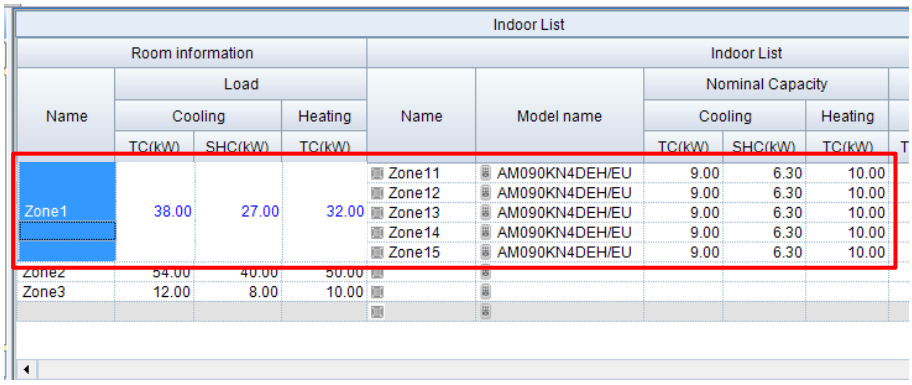
2.6 Select Indoor units

1) Select indoor units

Design steps

1. Click each room to select indoor units.
2. Select indoor unit type : **360 CST**
3. Select a model **(AM090KN4DEH/EU)** and check the quantity. (User can change the quantity manually.)
4. Click “Add” button to complete the selection of indoor units



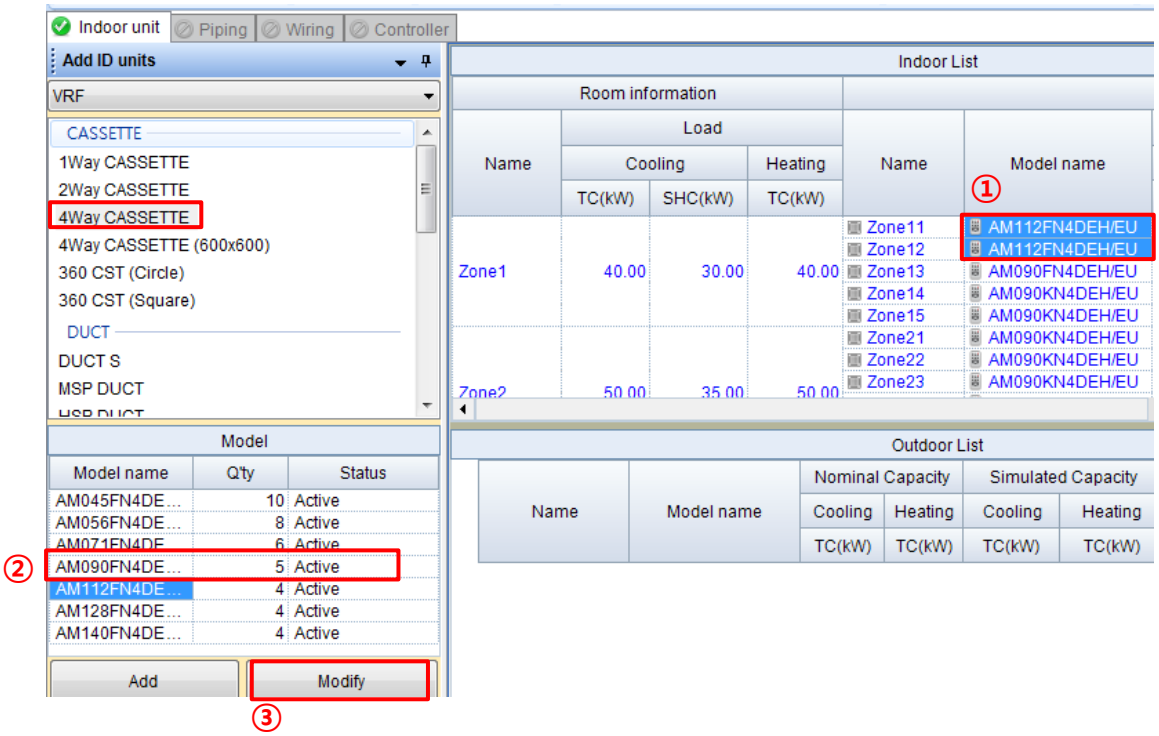


2.6 Select Indoor units

2) Modification / delete

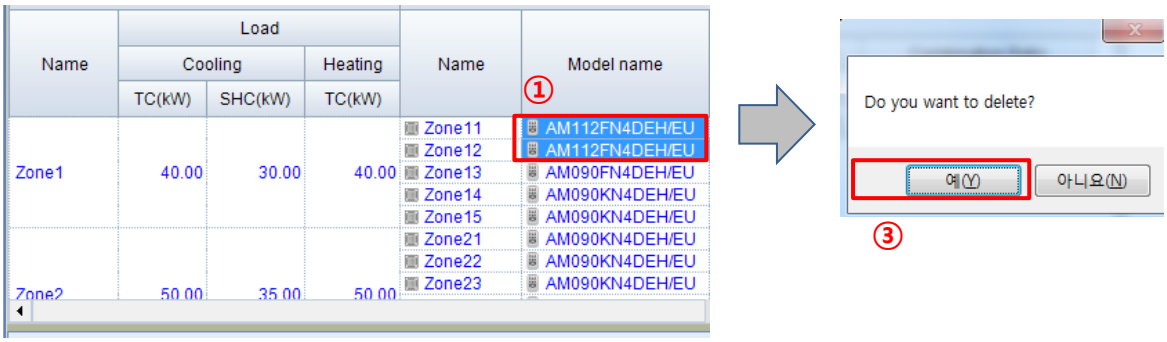
Design steps (Change to other indoor units)

1. Click the designed indoor units. (two **AM112FN4DEH/EU**)
2. Select indoor units you want to replace (**AM090FN4DEH/EU)**
3. Click “Add” button to complete the selection of indoor units



Design steps (Delete indoor units)

1. Click the designed indoor units or room name. (two **AM112FN4DEH/EU**)
2. Enter “Delete” key on your keyboard.
3. Click “Yes” button.

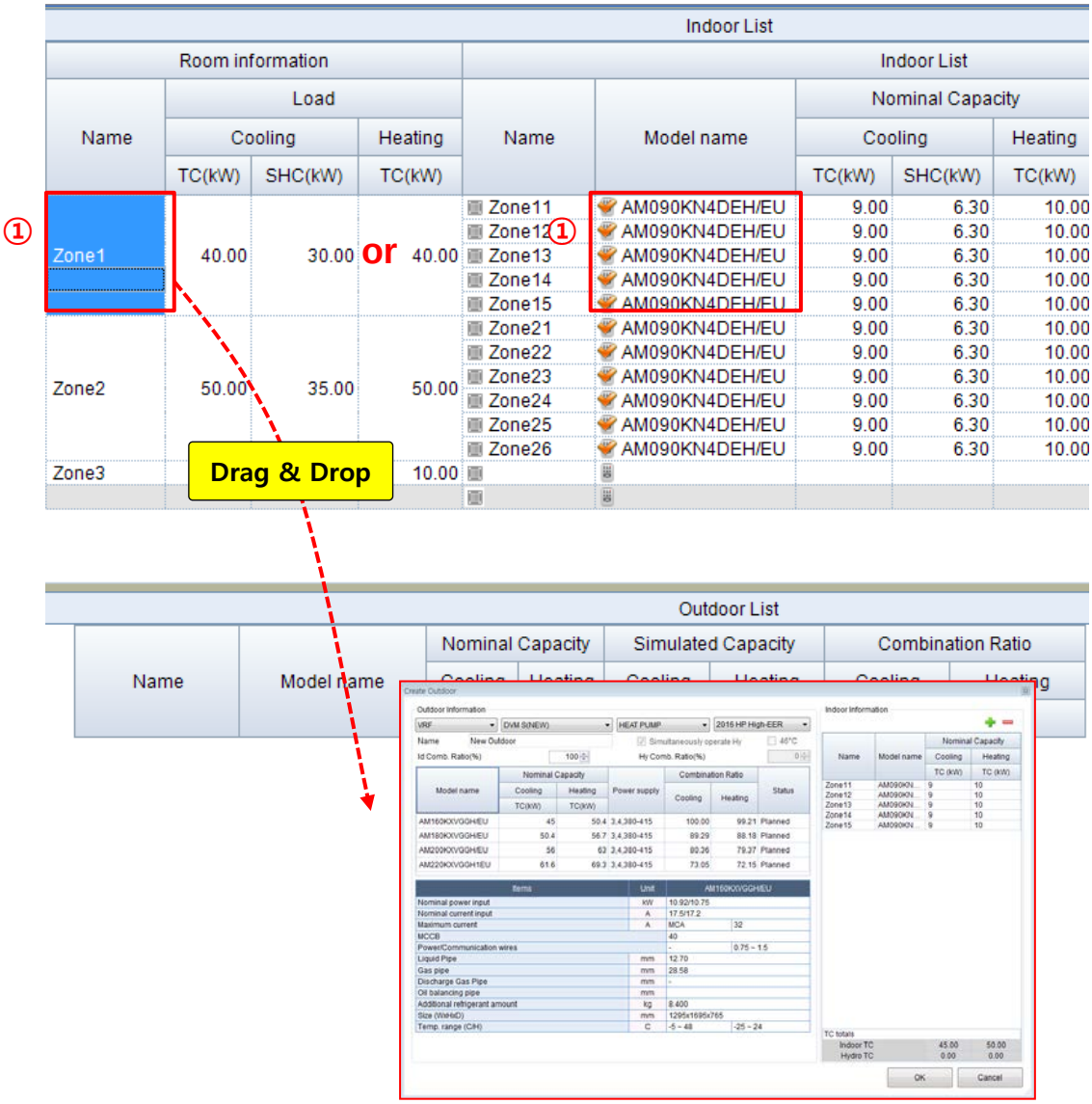


2.7 Select Outdoor units

Select outdoor unit 1

Design steps

1. Click rooms or indoor units together using “Ctrl” key which connect to one outdoor unit system.
   Here, **click “Zone1”** to select System1(outdoor unit).
2. **Drag & drop “Zone1” box** to the outdoor units list below.
3. New window, “Create Outdoor” is popped up.



2.7 Select Outdoor units

Select outdoor unit 2

Design steps

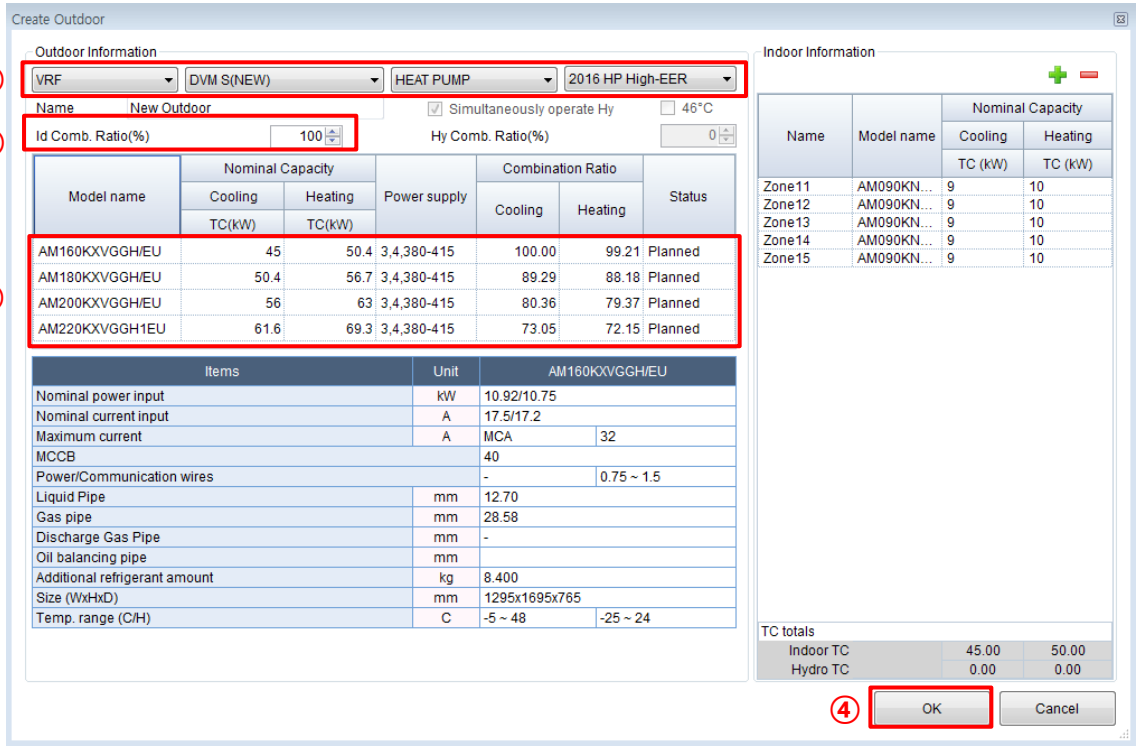
1.Select the type of outdoor unit.

Here, select a outdoor type **: VRF → DVM S → HEAT PUMP → 2016 HP High EER**

2. Enter the combination ratio, **130%.**

3. Select the model among the recommendation models. : **Select AM140KXVGGH/EU**

4. Click “OK” button to complete the selection of outdoor unit.



5. Select the other outdoor unit for “System 2” with same way from previous page (Select ODU2).

Design Tip

User can enter combination ratio manually under the limitation of it, and models are recommended based on combination ratio.

※ Combination ratio = Total capacity of indoor units / Capacity of outdoor unit.

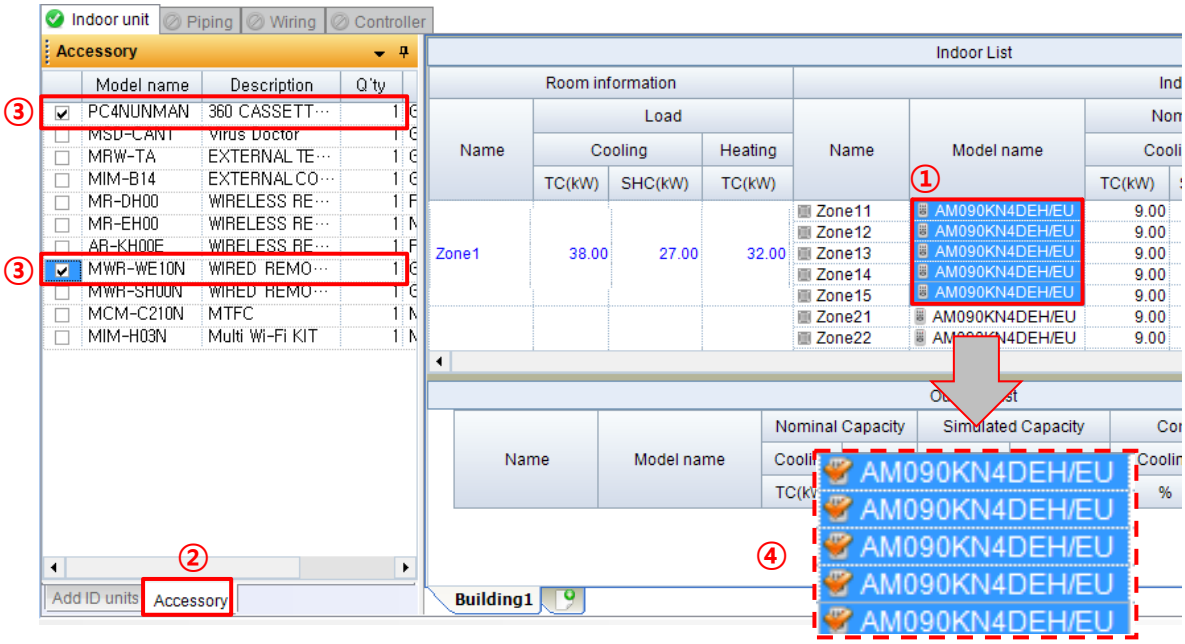
※ Limitation of VRF’s combination ratio : 50% ~ 130%

2.8 Select Accessary

Select accessories

Design steps

1. Click indoor unit models to select accessories.
2. Click “Accessory” tap
3. Select accessories : **360 Circle panel and Wired remote controller**
4. When accessories are selected, the related indoor units are marked with the orange color.



Design Tip

When you select cassette type indoor units, you should select compatible “Panel”, otherwise accessory list are not represented on the report.

2.8 Select Accessary

※ Accessary list (Indoor unit)

Panel

Product	Image	Model	Remark
Panel		PC1NUSMAN	Slim 1Way Cassette
		PC1NUPMAN	Slim 1Way Cassette (Z-sliding)
		PC1MWSKAN	1Way Cassette (1.7 kW, 2.2 kW)
		PC2NUSMEN	2Way cassette
		PC4SUSMAN	4Way Cassette S(600x600) (Waffle)
		PC4SUSMEN	4Way Cassette S(600x600) (Classic)
		PC4NUSKAN	4 Way cassette S (Waffle)
		PC4NUSKEN	4 Way cassette S (Classic)
		PC4NBSKAN	4 Way cassette S (Waffle, Black)
		PC4NUDMAN	360 CST Square (White)
		PC4NUNMAN	360 CST Circular (White)
		PC4NBDMAN	360 CST Square (Black)
		PC4NBNMAN	360 CST Circular (Black)

2.8 Select Accessary

※ Accessary list (Indoor unit)

Controller

Classification	Product	Image	Model	Remark
Individual Control System	Wireless remote controller		MR-EH00	-
	Wired remote controller		MWR-WE10N (Multi function)	
			MWR-WW00N	DVM S Hydro Unit
	Simplified wired remote controller		MWR-SH00N	-
			MWR-VH02	ERV
Others	Operation mode selection switch		MCM-C200	DVM S Series (Except HR Models)
	External room sensor		MRW-TA	Cassette, Wall-mount, Ceiling, Duct, Console
	Compatible interface module		MIM-N01	Nasa-No Nasa
	ERV interface module		MIM-N10	ERV (Nasa)
	External contact interface module		MIM-B14	-
	S-Converter		MIM-C02N	-
	MTFC (Multi tenant function controller)		MCM-C210N	-
	Wireless signal receiver		MRK-A10N	-
	External room sensor		MRW-TA	Cassette, Wall-mount, Ceiling, Duct, Console
			MRW-TS	Zone Controller (SINGLE)

2.8 Select Accessary

※ Accessary list (Indoor unit)

Others

Product	Image	Model	Remark
S-Plasma Ion KIT		MSD-CAN1	4Way Cassette S 4Way Cassette S(600x600)
		MSD-EAN1	ERV-Plus
Motion detect Sensor		MCR-SMA	4Way Cassette S (600x600)
ERV CO2 Sensor		MOS-C1	ERV, ERV PLUS
External room sensor		MRW-TA	Cassette, Wall-mount,Ceiling, Duct, Console
Drain Pump		MDP-N047SNC0D	OAP Duct (14.0 kW)
		MDP-N047SNC1D	HSP Duct (22.0 / 28.0 kW) OAP Duct (22.4 / 28.0 kW)
		MDP-M075SGU1D	MSP Duct (9.0 / 11.2 kW)
		MDP-M075SGU2D	MSP Duct (12.8 / 14.0 kW) HSP Duct (11.2 / 12.8 / 14.0 kW)
		MDP-M075SGU3D	MSP Duct (5.6 / 7.1 kW)
		MDP-E075SEE3D	Slim Duct (2.0~14.0 kW)
		MDP-G075SP	Duct S (External, All Capacities)
		MDP-G075SQ	Duct S (Internal, 3.5 kW~14 kW)
AHU KIT		MXD-K025AN	7.0kW~8.75kW
		MXD-K050AN	14.0kW~17.5kW
		MXD-K075AN	21.0kW~26.25kW
		MXD-K100AN	28.0kW~35.0kW
		MCM-D201N	28kW~35kW / 56kW~70kW / 84kW~105kW / 112kW~140kW

2.8 Select Accessary

※ Accessary list (Outdoor unit)

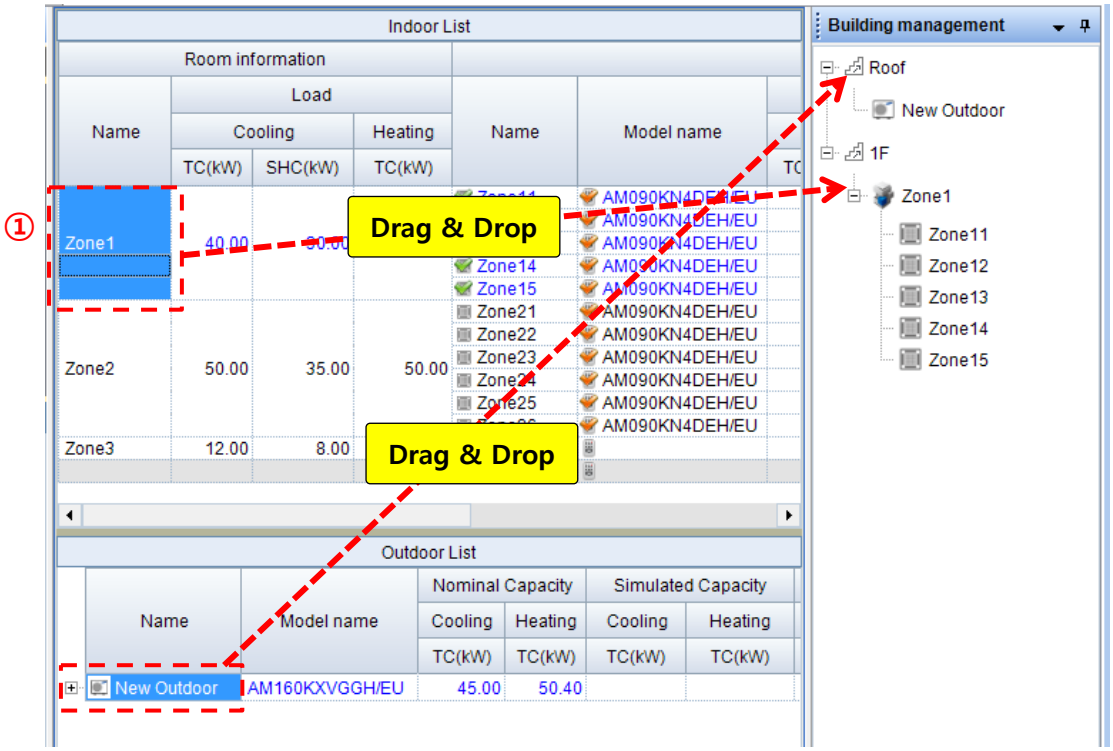
Others

Product	Image	Model	Remark
Operation mode selection switch		MCM-C200	DVM S Series (Except HR Models)
PDM KIT		MXD-A38K2A	8~12HP
		MXD-A12K2A	14~16HP
		MXD-A58K2A	18~26HP

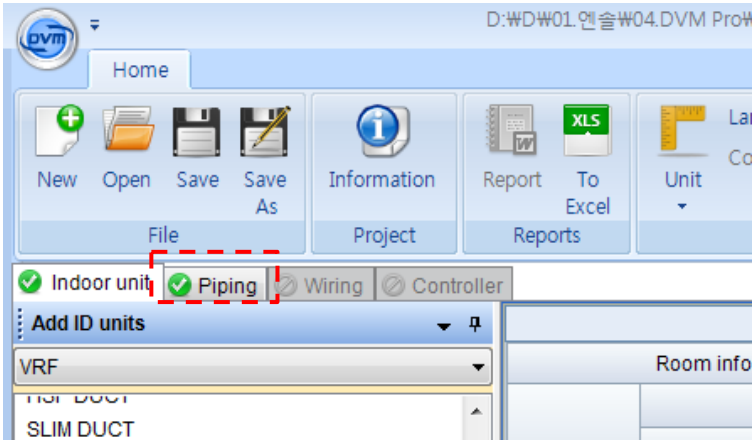
Building management

Design steps

1. Click rooms or indoor units to the installation floor on “Building management” by drag & drop.
2. Every indoor units and outdoor units should be placed to the floors on “Building management”.



3. After placing all of products to spaces on “Building management” ,
   “Piping” tap is activated.

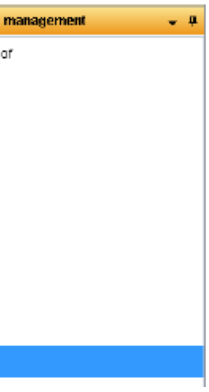


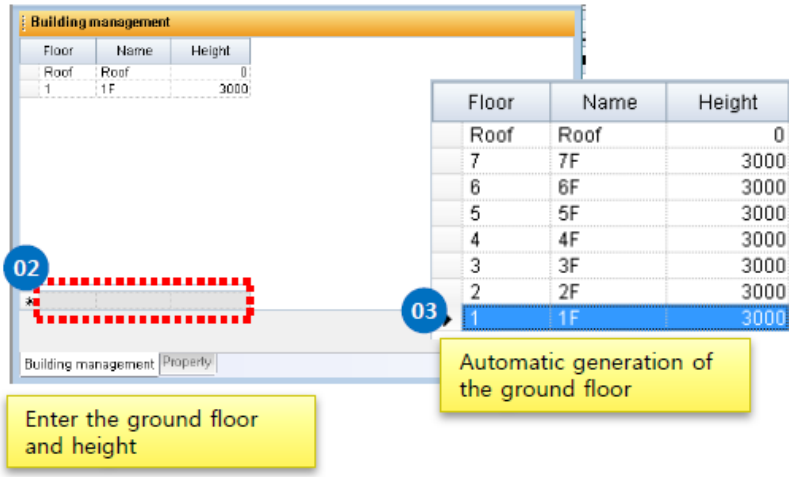
2.9 Building Management

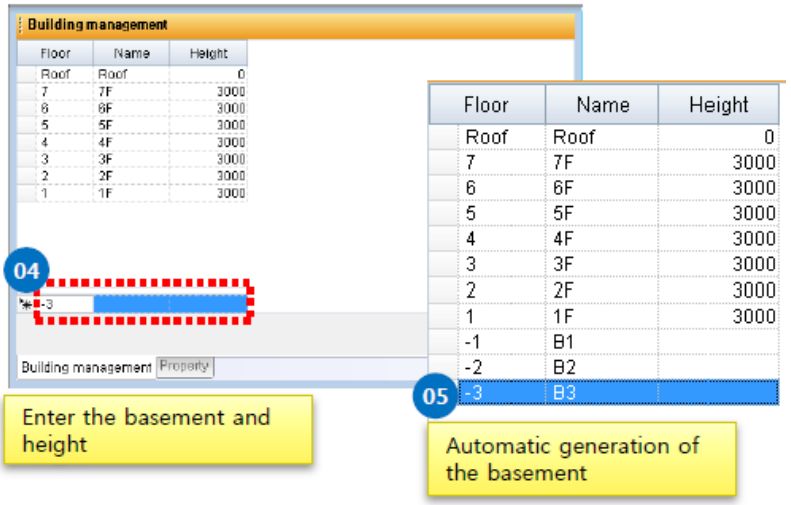
※ Generate floors

Design steps

1. Click “Edit” button.



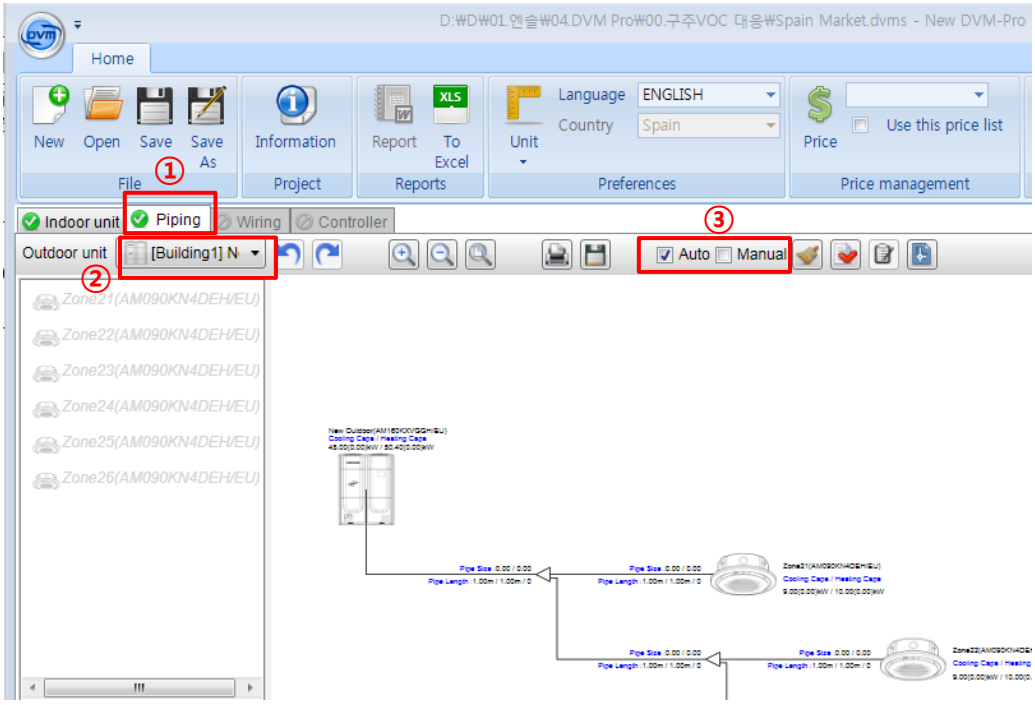




1) Piping placement : Auto

Design steps

1. Click “Piping” tap to start the piping design.
2. Select each system of outdoor units.
3. Click “Auto” to complete the piping placement.
4. (When selecting “Manual”) Refer to next page.



Design Tip

When a designer want to make **a quick report**, and already know that there is no problem regarding the pipe distance, skip other steps such as entering pipe information.

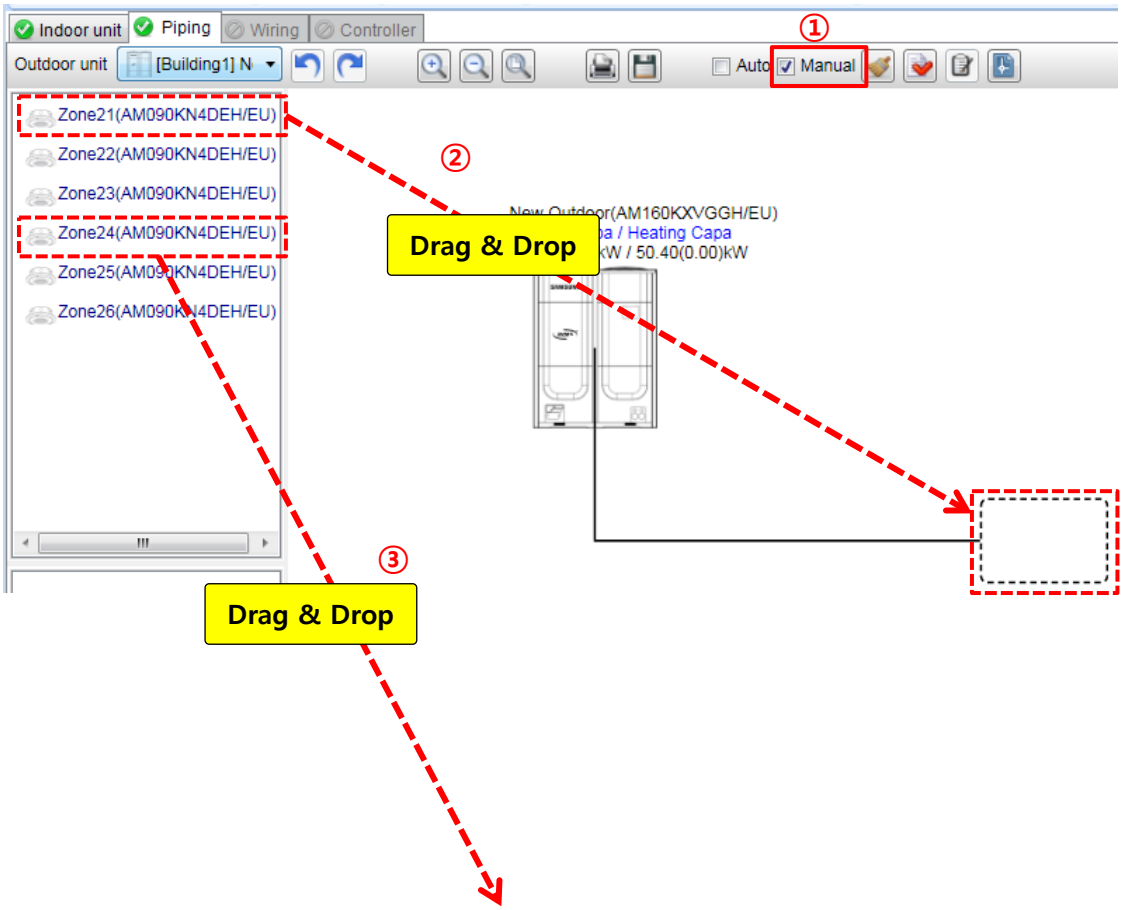
Just **click “Auto” and “System check”**. Then he/she can generate the report.

2) Piping placement : Manual

Design steps

1. Click “Manual” to start the piping placement.
2. Drag & drop indoor units.

   User can select several indoor units and place them together by “Ctrl” key.
3. After placing one indoor unit, place the other indoor units to the piping line.
4. Move all indoor units with same way.



3) Input piping size

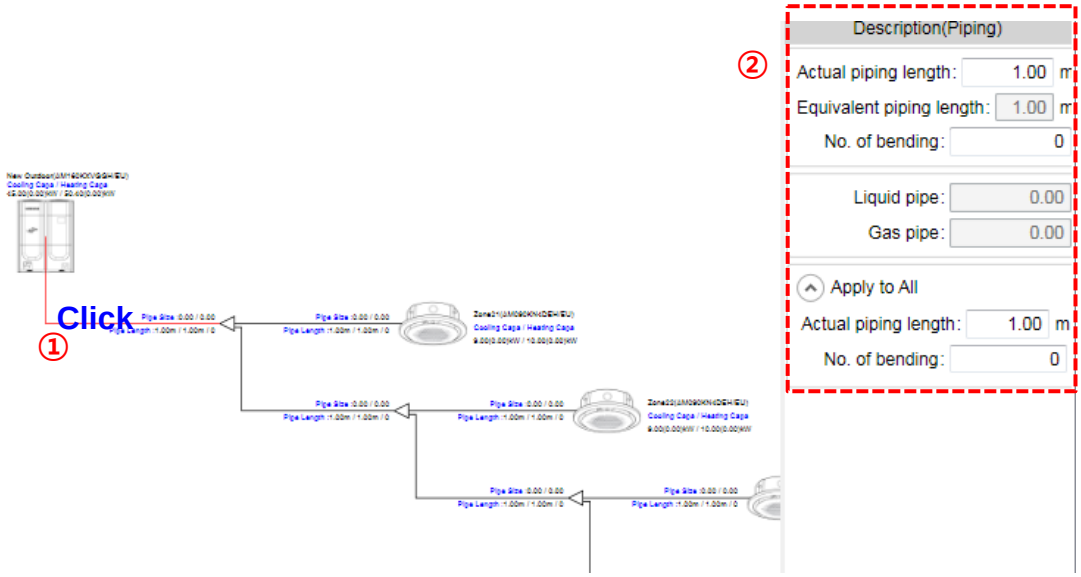
Design steps

1. Click each pipe line, then input space appears to the right side.

(Input piping data)

2. Enter actual piping length and number of bending.

- Main pipe: 220m, the other pipes: 1m.



Design Tip

Input this piping data as accurate as possible because the result of “System check” and “Capacity simulation” can differ based on the piping length.

Without entering data, every pipe line has the length of 1m.

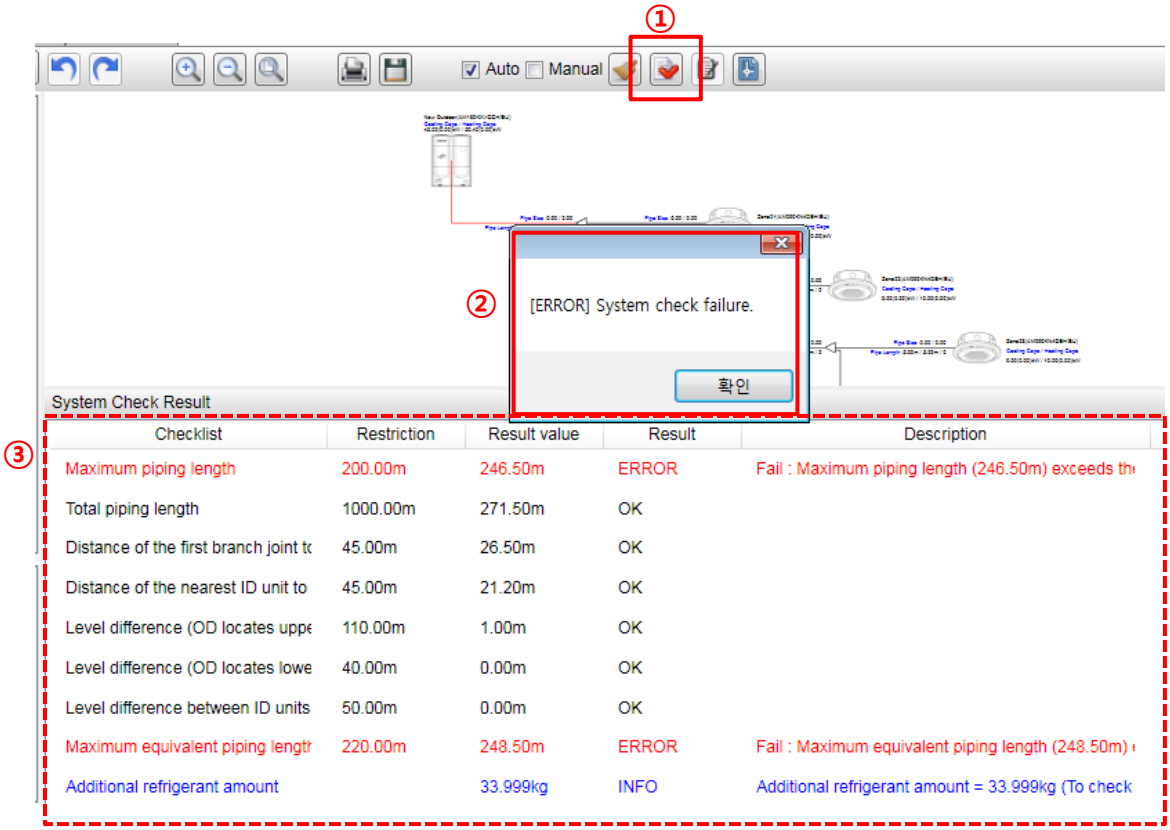
System Check

Design steps

1. Click “System check” button.
2. “ERROR” appears.
3. Solve the problem with below RED messages.

   Here, Max. piping length exceeds product’s limitation.

   → Change main pipe from 220m to 180m.
4. Click “System check” again.
5. Without any red comments, system check is completed.



Checklist	Restriction	Result value	Result	Description
Maximum piping length	200.00m	246.50m	ERROR	Fail : Maximum piping length (246.50m) exceeds th
Total piping length	1000.00m	271.50m	OK	
Distance of the first branch joint tc	45.00m	26.50m	OK	
Distance of the nearest ID unit to	45.00m	21.20m	OK	
Level difference (OD locates uppe	110.00m	1.00m	OK	
Level difference (OD locates lowe	40.00m	0.00m	OK	
Level difference between ID units	50.00m	0.00m	OK	
Maximum equivalent piping lengtl	220.00m	248.50m	ERROR	Fail : Maximum equivalent piping length (248.50m)
Additional refrigerant amount		33.999kg	INFO	Additional refrigerant amount = 33.999kg (To check

Design Tip

This function shows what user make wrong design or mistakes so that help users design SAC properly.

This S/W includes the variable limitation logics according to an installation manual.

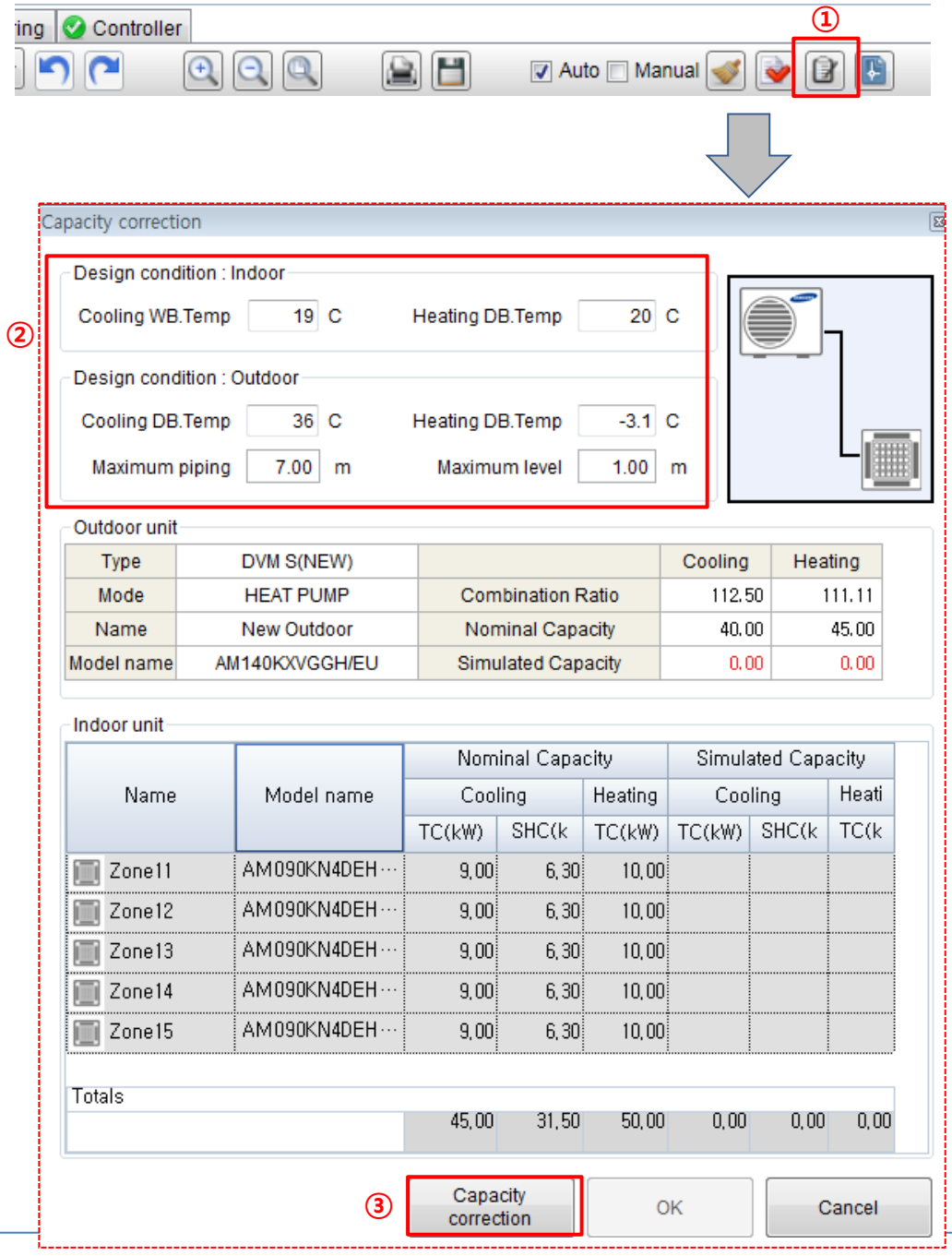
User also can check the amount of additional refrigerant.

2.12 Simulation

Capacity correction

Design steps

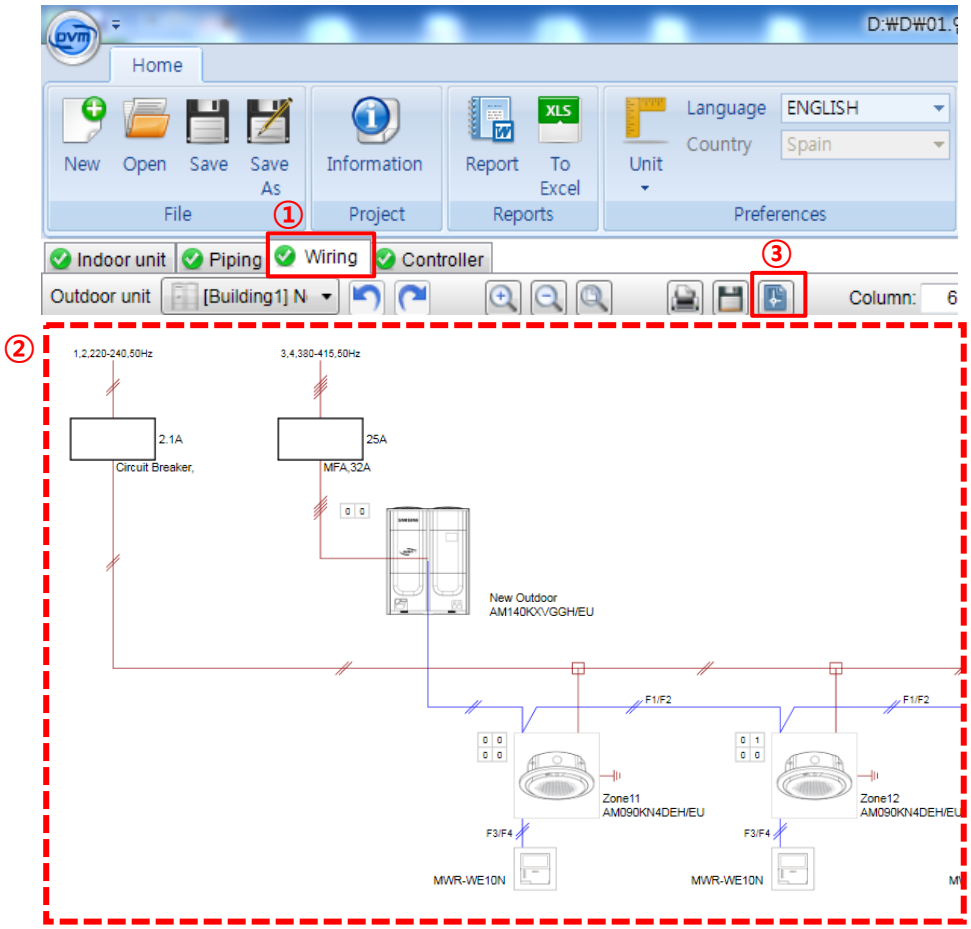
1. Click the button “Capacity correction”, then new window is appeared.
2. Check “design condition and change the data if needed.
3. Click “Capacity correction” button.



Wiring

Design steps

1. Click “Wiring tab”
2. Wiring information such as the power supply, MCA, MFA is represented automatically.
3. This wiring configuration can be saved as CAD drawing file.



Controller 1

- Select On-Off controller and Touch controller for 2 systems.

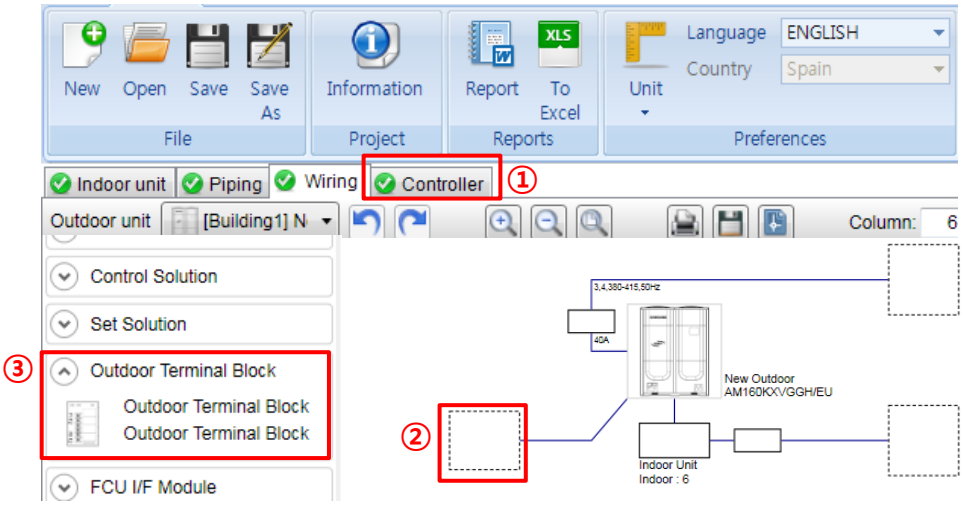
Design steps

1. Click “Controller” tab

(To Select for System 1)

2. **Click a vacant box**.

3. Select compatible controller. (First, **select outdoor terminal block** for DVM S)

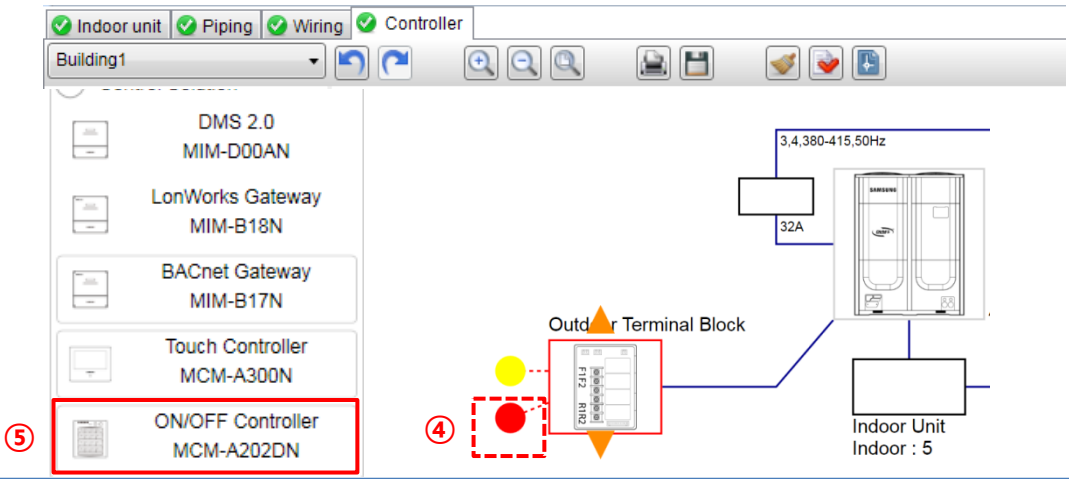


4. Click yellow circle to select controller.

   Here **click the below circle** to select “On-Off controller”.

   (There are 2 types of circles. Upper one is to connect to F1, F2, the below one is to connect to R1, R2.)

5. **Click “On-Off controller”**

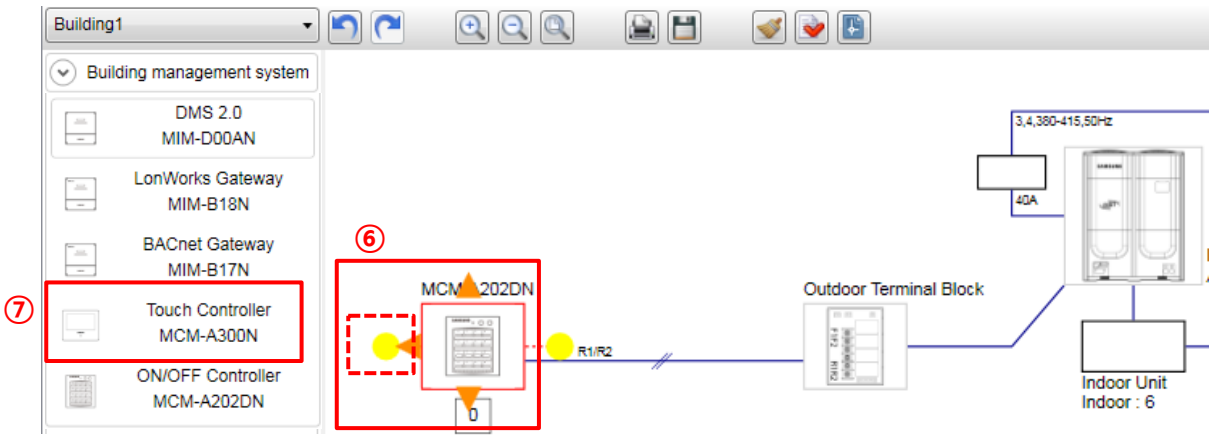


Controller 2

- Select On-Off controller and Touch controller for 2 systems.

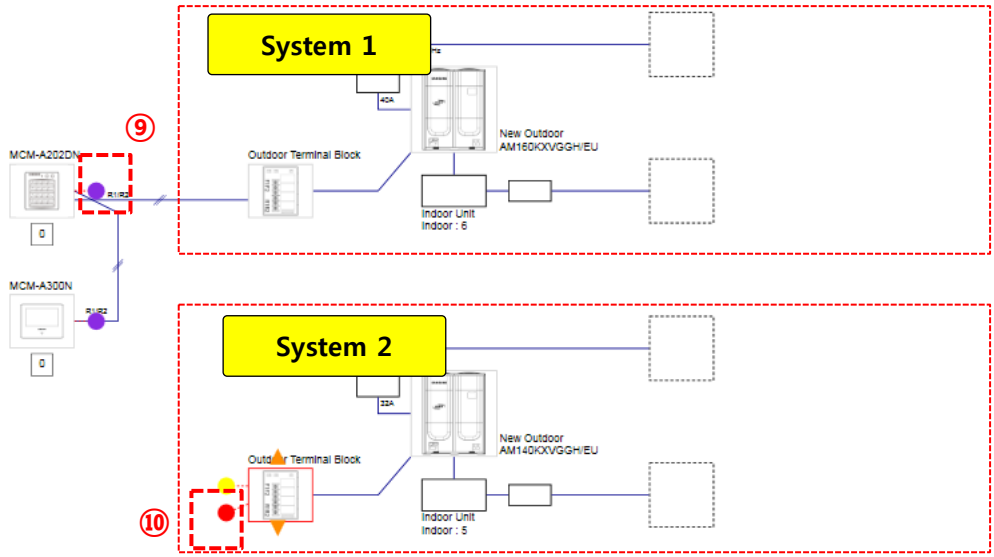
Design steps

6. Click “On-Off controller” box, and the yellow circle.
7. **Click “ Touch Controller”**



(Select controller for System 2)

8. Select outdoor terminal box.(Refer to step 2~3)
9. Click a terminal box and a below yellow circle(R1/R2).
10. Click a purple circle to complete the connection of controllers.



2.14 Controller

Design Tip

When connecting Outdoor unit and controller, there are 2 ways.

- Using F1/F2 : Control one outdoor unit system and connected indoor units.
  (On-Off controller, Touch controller, Wi-fi kit)
- Using R1/R2 : Control several outdoor unit system and connected indoor units.
  (On-Off controller, Touch controller, DMS, BACnet, Lonworks)

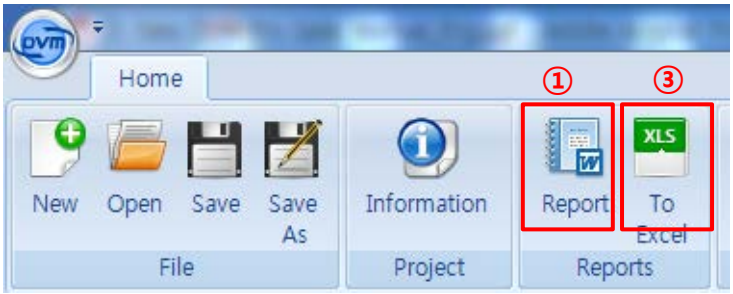
※ Controller

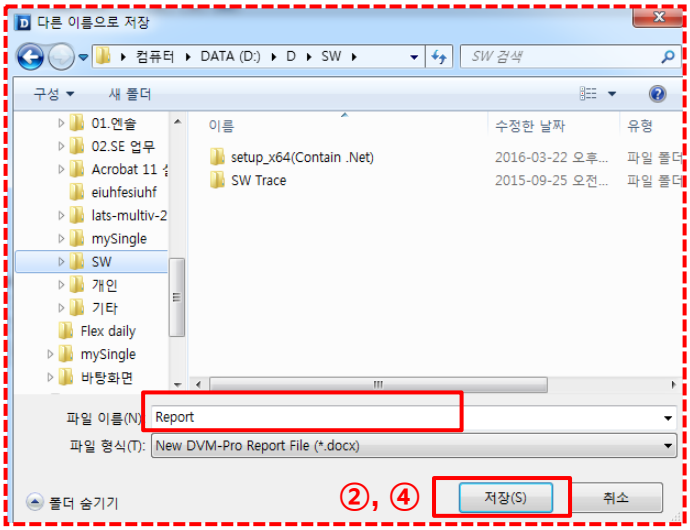
Classification	Product	Image	Model	Remark
Integrated Management System	DMS 2.0		MIM-D00AN	-
	S-NET 3		MST-P3P	-
	PIM		MIM-B16N	-
Building Management System	BACnet Gateway		MIM-B17N	-
	LonWorks Gateway		MIM-B18N	-
Centralized Control System	On/Off controller		MCM-A202DN	-
	Touch controller		MCM-A300N	-

Generate Report

Design steps

1. Click “Report” button.
2. Enter a file name and click “Save” button.
3. Click “ To Excel” button to generate the designed Product list.
4. Enter a file name and click “Save” button.





Usage Tip

There are 2 types of report.

- “Report” button: Includes all of designed information
- “To Excel” button: Includes only designed product list

Part 3 : Advanced Design1

Small Hotel with DVM S HR

(Tutorial with 2st Scenario)

Purpose :

1. Understand the design process for SAC.
2. Learn how to design DVM S HR
3. Part 2 is focused on the advanced design.
   - DVM S HR with 1Way CST
   - MCU(Mode Control Unit) design
   - Control : Key-Tag with DMS2.5
4. Most of design steps are same as Part2: Basic design.
   Only big difference is how to design MCU in **Piping step.**

3.1 Modeling Scenario

Approach

- Building type : Small Hotel
- Area : 100m2 x 3floors
- Owner's requirement : **Simultaneous Cooling and Heating with SLIM DUCT**
- Controller : **Key Tag with DMS2.5**
- Longest pipe : 70m

- Load Requirements
  1. (Example of Zone1) TC = 0.20kW/m2(*Unit load) x 100m2(Area) = 20kW
  2. (Example of Zone1) SHC = TC x 0.71 (*Sensible heat ratio)

System (Outdoor unit)	Room/Zone	Area (m2)	Load Requirements (KW)		
			Cooling		Heating
			TC	SHC	TC
System 1	Floor1	100	20	14	15
	Floor2	100	20	14	15
	Floor3	100	20	14	15

* Unit load (kW/m2) : 0.20 / 0.15 (Cooling TC / Heating TC)

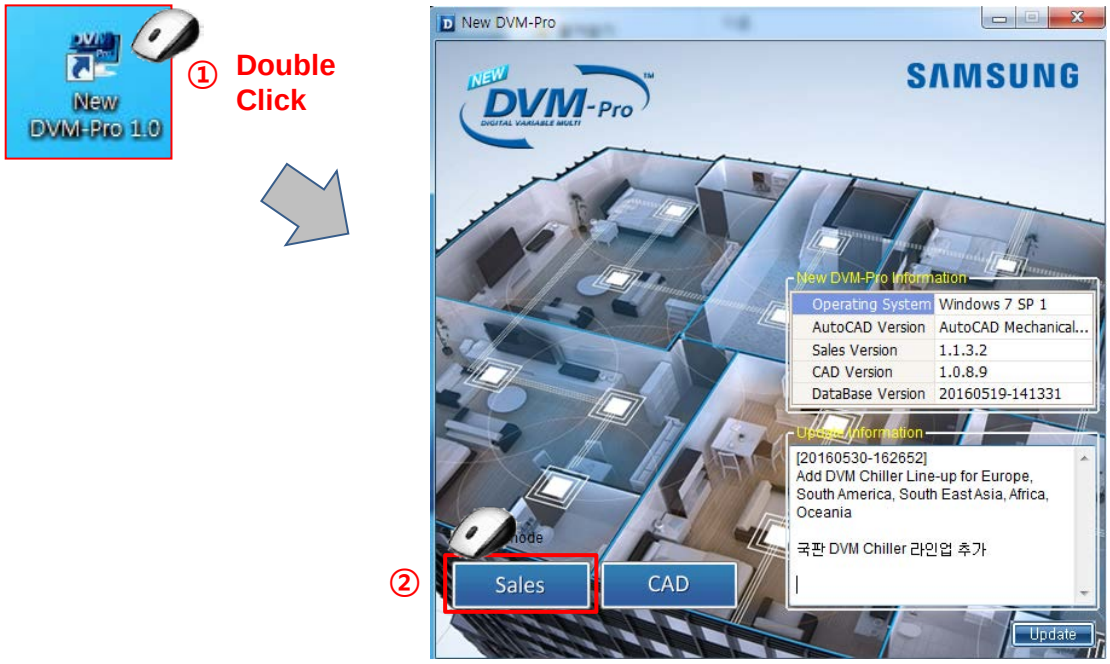
Design Tip

- TC(Total Capacity) = SHC(Sensible Heat Capacity) + LHC(Latent Heat Capacity)
- SHC: Capacity that changes temperature
- LC: Capacity that changes a phase such as the dehumidification.
- Designers need to consider SHC in high humidity places especially near the beach and lake.
  Normally, when humidity is higher, air-conditioner more work for LHC(dehumidification).
  On the other hand, SHC is smaller so that adjusting temperature may not be enough.

Start with DVM Pro

Design steps

1. To start DVM Pro, **double click a icon "New DVM Pro 1.0"** on desktop..
2. **Click "Sales"** button to start Sales mode of DVM Pro.
3. New window popped up.



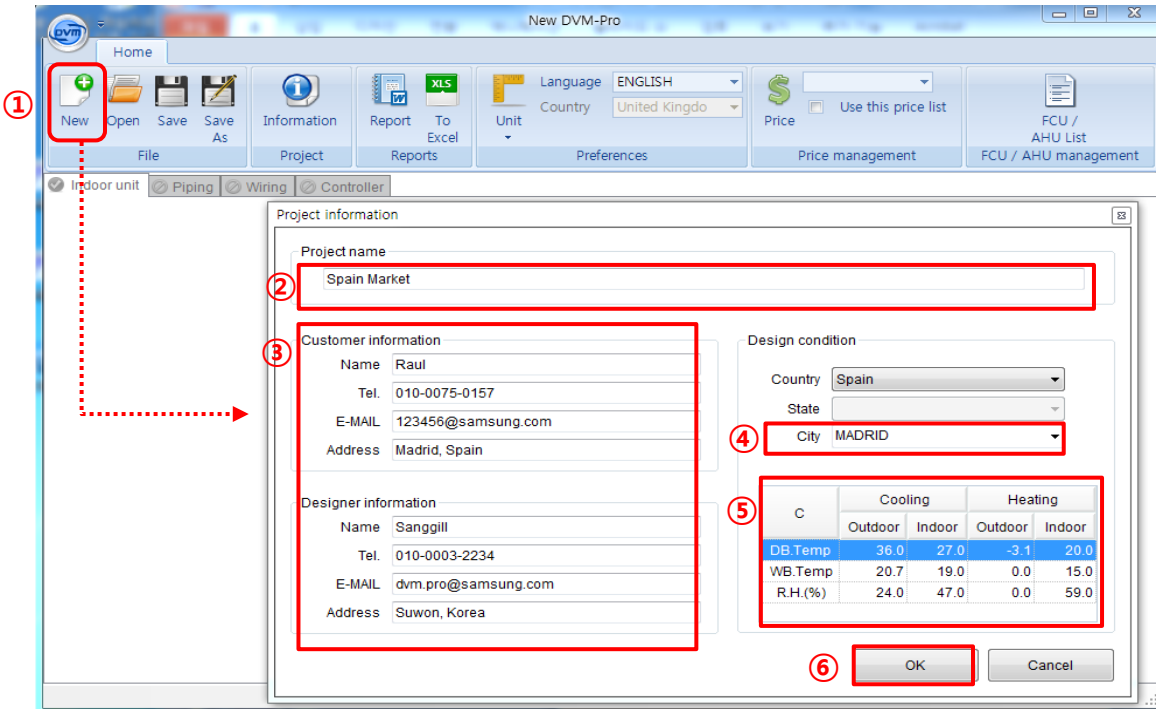
Usage Tip

Version Information

Create Project

Design steps

1. To create the project**, click "New**" button, then new window is popped up.
2. **Enter the project name**: the project name will be saved as a file name.
3. Enter the customer information and designer information (Optional)
   : This will be represented on the report.
4. Enter Design condition : **Select city "Madrid"**
5. Design condition (Weather)
   : Firstly weather condition is represented based on your city,
   and then user can edit the data manually.
6. **Click "OK"** button to complete to create a project.



Usage Tip

Saving File extension is ".dvms".

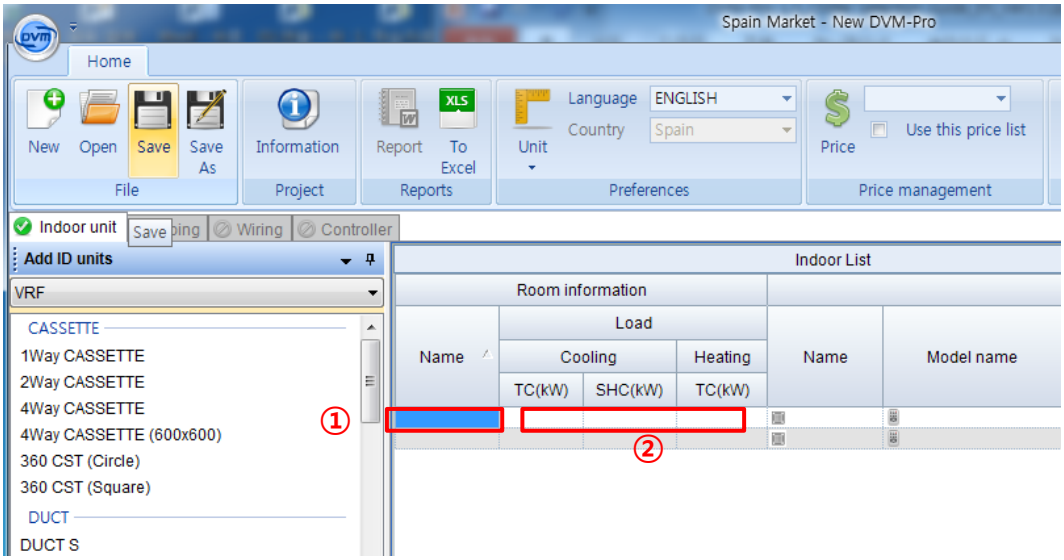
If user wants to select models from other countries, please request the authorization for the country to DVM Pro team by email, dvm.pro@samsung.com.

Load design

Design steps

1. To generate room information,
   enter room names by double clicking (or click+enter) a vacant space.
2. Input load requirements for each room or zone according to the below load calculation.
   - Load Calculation

System (Outdoor unit)	Room/Zone	Area (m2)	Load Requirements (KW)		
			Cooling		Heating
			TC	SHC	TC
System 1	Floor1	100	**20**	**14**	**15**
	Floor2	100	**20**	**14**	**15**
	Floor3	100	**20**	**14**	**15**



Usage Tip

According to this input load, the quantity of indoor units is automatically calculated for each room.
Without entering load, user can also select indoor units and quantity.

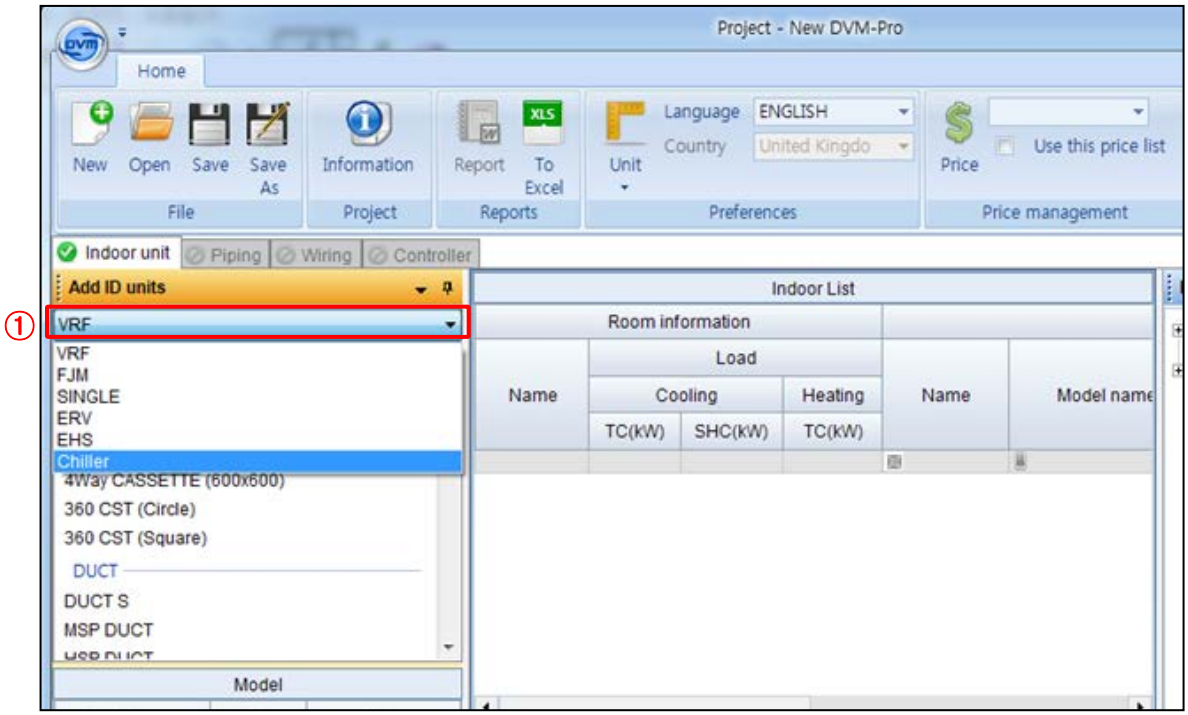
Design Tip

To meet customer's requirements, cooling(TC, SHC) and heating load need to be entered.

Select product type

Design steps

1. Click the below tap and select a product type on drop/down menu. **(Select VRF)**



Design Tip

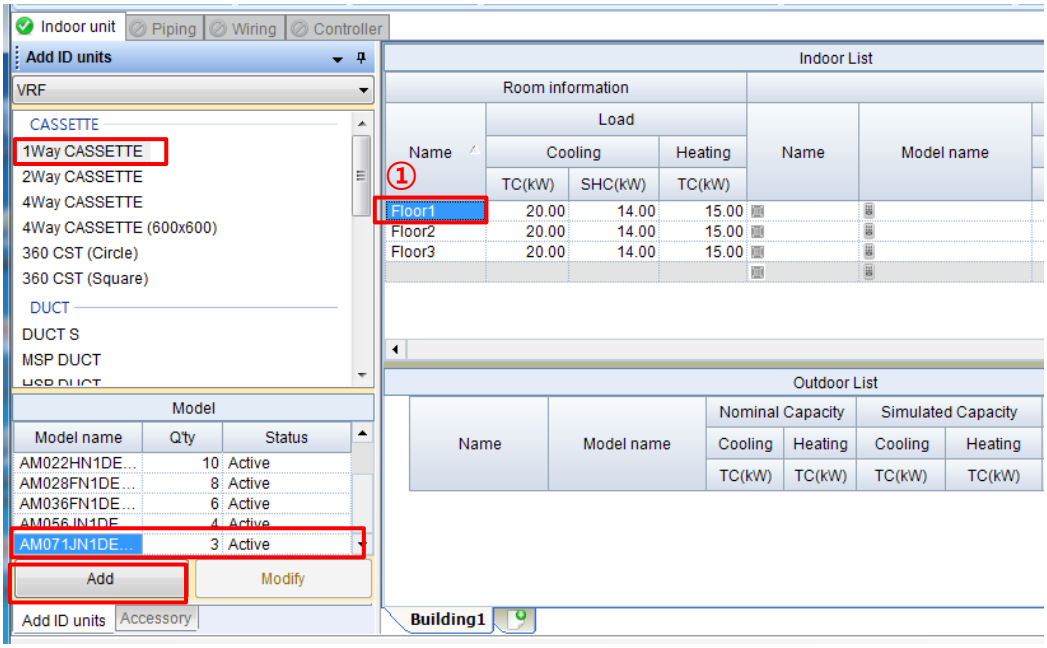
For the proper SAC selection, many design factors should be considered such as
the system capacity, pipe length, installation space, the number of indoor units, and so on.

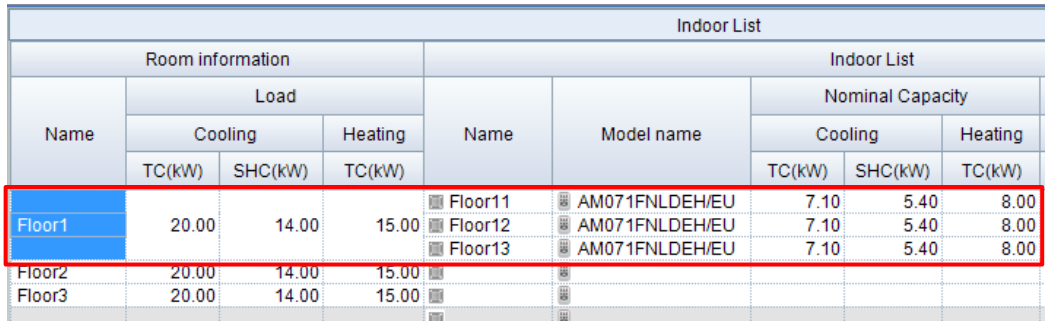
※ To check those design and installation factors, please refer to TDB or installation manual.

Select indoor units

Design steps

1. Click each room to select indoor units.
2. Select indoor unit type : **SLIM DUCT**
3. Select a model **(AM071FNLDEH/EU)** and check the quantity. (User can change the quantity manually.)
4. Click “Add” button to complete the selection of indoor units



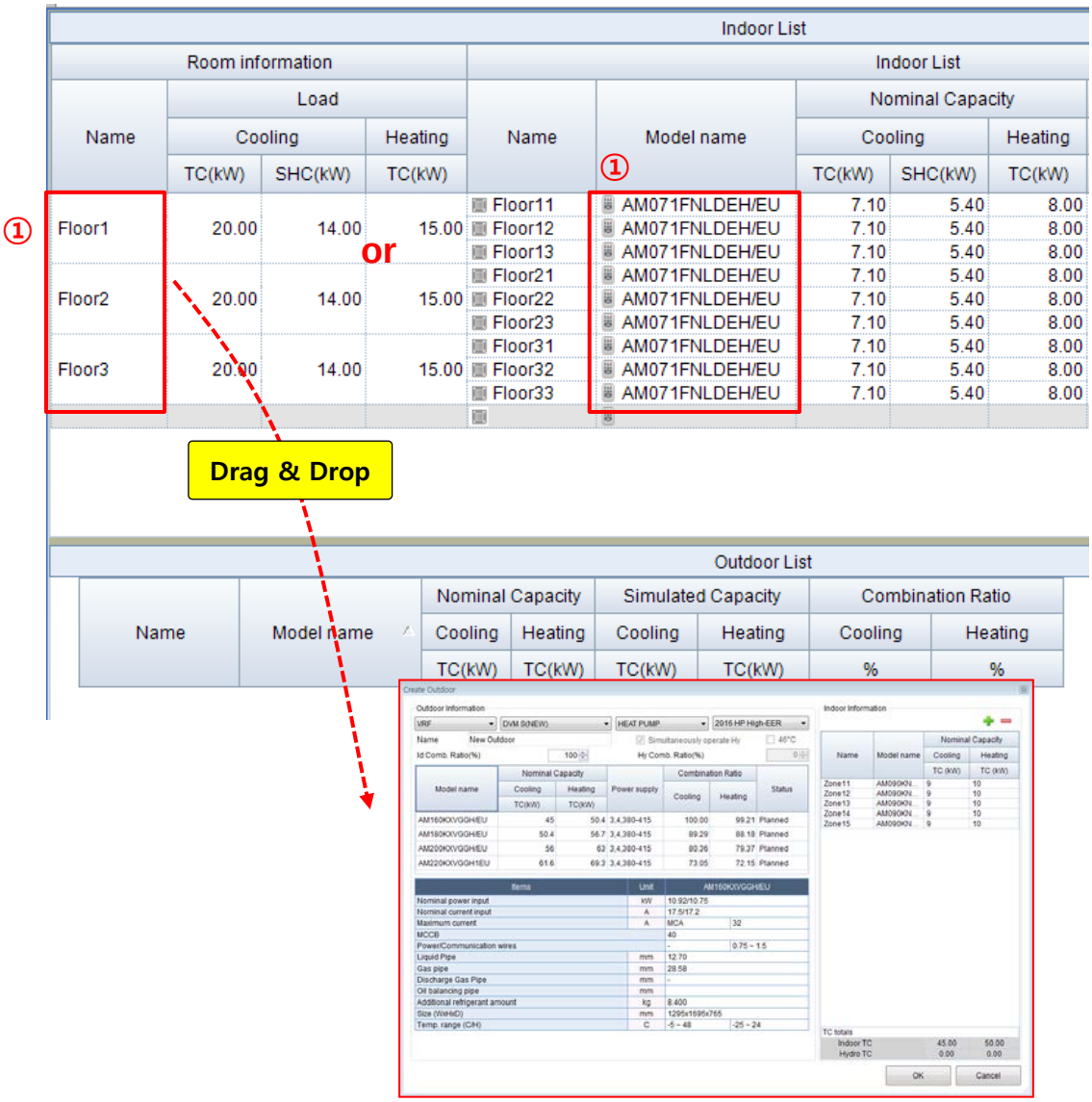


3.7 Select Outdoor units

Select outdoor unit 1

Design steps

1. Click rooms or indoor units together using “Ctrl” key which connect to one outdoor unit system.
   Here, **click “Floor1, 2, 3” together** to select System1(outdoor unit).
2. **Drag & drop the selected boxes** to the outdoor units list below.
3. New window, “Create Outdoor” is popped up.



3.7 Select Outdoor units

Select outdoor unit 2

Design steps

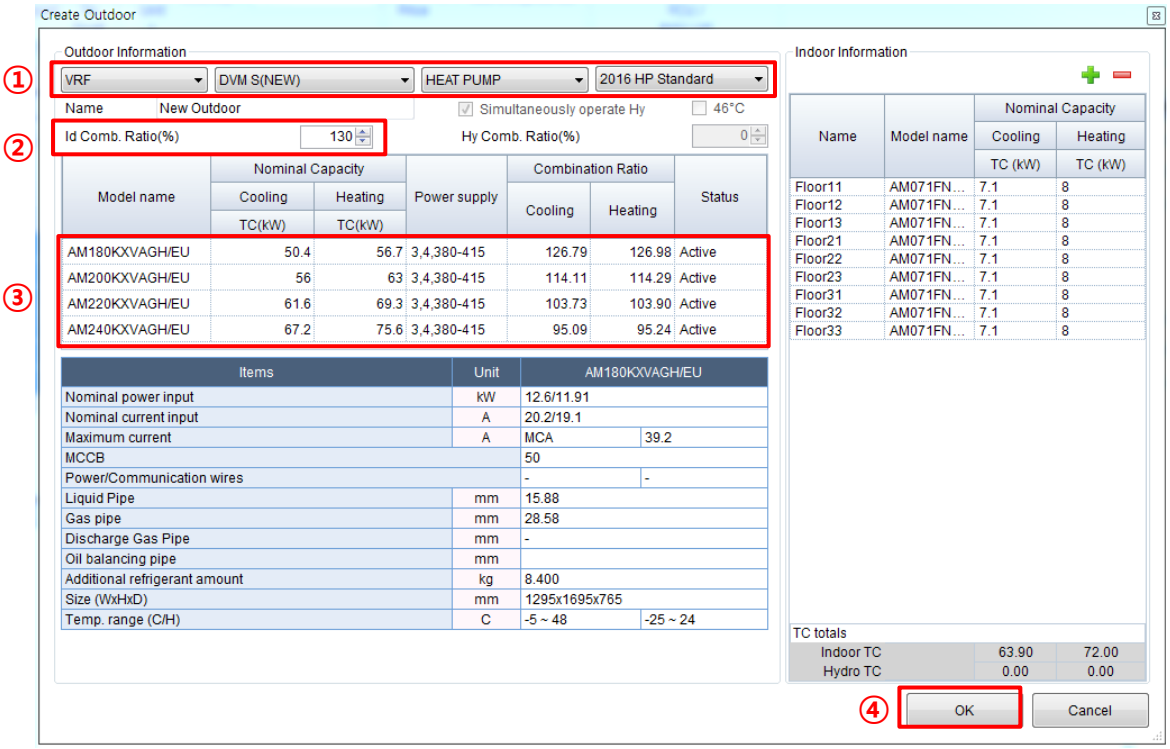
1.Select the type of outdoor unit.

Here, select a outdoor type **: VRF → DVM S → Heat Recovery → 2015 High EER**

2. Enter the combination ratio, **130%.**

3. Select the model among the recommendation models. : **Select AM180JXVHGR/EU**

4. Click “OK” button to complete the selection of outdoor unit.



Design Tip

User can enter combination ratio manually under the limitation of it, and models are recommended based on combination ratio.

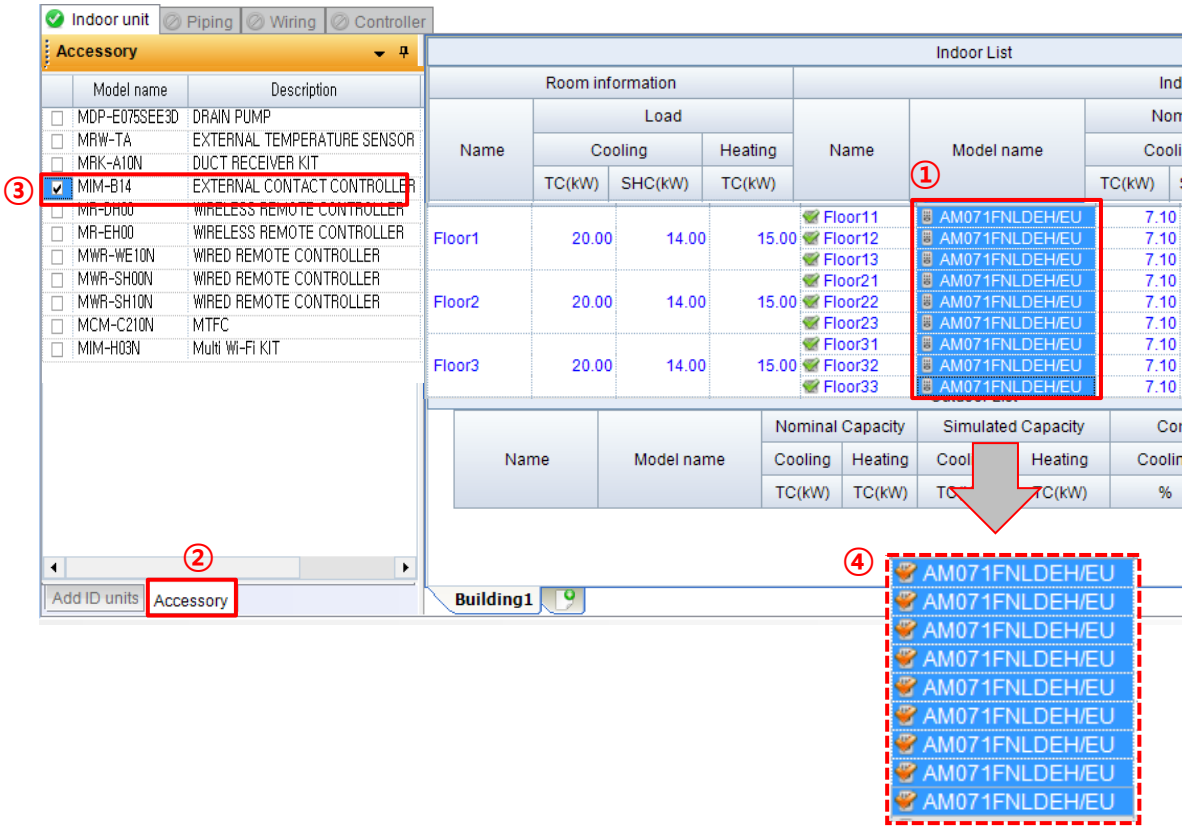
※ Combination ratio = Total capacity of indoor units / Capacity of outdoor unit.

※ Limitation of VRF’s combination ratio : 50% ~ 130%

Select accessories

Design steps

1. Click indoor unit models to select accessories.
2. Click “Accessory” tap
3. Select accessories : **MIM-B14(External Contact Controller)**
4. When accessories are selected, the related indoor units are marked with the orange color.



Design Tip

When designing Duct type IDU, you need to choose drain type and control method considering customer’s desire.

- Drain type : Drain pump or Drain hose
- Control : Wired-remote controller or Receiver with Wireless remote controller
- External temperature sensor for more accurate temperature control.

To use Key-tag function, MIM-B14(External Contact Controller) is mandatory to be selected.

3.8 Select Accessory

※ Accessory list (Indoor unit)

Panel

Product	Image	Model	Remark
Panel		PC1NUSMAN	Slim 1Way Cassette
		PC1NUPMAN	Slim 1Way Cassette (Z-sliding)
		PC1MWSKAN	1Way Cassette (1.7 kW, 2.2 kW)
		PC2NUSMEN	2Way cassette
		PC4SUSMAN	4Way Cassette S(600x600) (Waffle)
		PC4SUSMEN	4Way Cassette S(600x600) (Classic)
		PC4NUSKAN	4 Way cassette S (Waffle)
		PC4NUSKEN	4 Way cassette S (Classic)
		PC4NBSKAN	4 Way cassette S (Waffle, Black)
		PC4NUDMAN	360 CST Square (White)
		PC4NUNMAN	360 CST Circular (White)
		PC4NBDMAN	360 CST Square (Black)
		PC4NBNMAN	360 CST Circular (Black)

3.8 Select Accessory

※ Accessory list (Indoor unit)

Controller

Classification	Product	Image	Model	Remark
Individual Control System	Wireless remote controller		MR-EH00	-
	Wired remote controller		MWR-WE10N (Multi function)	
			MWR-WW00N	DVM S Hydro Unit
	Simplified wired remote controller		MWR-SH00N	-
			MWR-VH02	ERV
Others	Operation mode selection switch		MCM-C200	DVM S Series (Except HR Models)
	External room sensor		MRW-TA	Cassette, Wall-mount, Ceiling, Duct, Console
	Compatible interface module		MIM-N01	Nasa-No Nasa
	ERV interface module		MIM-N10	ERV (Nasa)
	External contact interface module		MIM-B14	-
	S-Converter		MIM-C02N	-
	MTFC (Multi tenant function controller)		MCM-C210N	-
	Wireless signal receiver		MRK-A10N	-
	External room sensor		MRW-TA	Cassette, Wall-mount, Ceiling, Duct, Console
			MRW-TS	Zone Controller (SINGLE)

3.8 Select Accessory

※ Accessory list (Indoor unit)

Others

Product	Image	Model	Remark
S-Plasma Ion KIT		MSD-CAN1	4Way Cassette S 4Way Cassette S(600x600)
		MSD-EAN1	ERV-Plus
Motion detect Sensor		MCR-SMA	4Way Cassette S (600x600)
ERV CO2 Sensor		MOS-C1	ERV, ERV PLUS
External room sensor		MRW-TA	Cassette, Wall-mount,Ceiling, Duct, Console
Drain Pump		MDP-N047SNC0D	OAP Duct (14.0 kW)
		MDP-N047SNC1D	HSP Duct (22.0 / 28.0 kW) OAP Duct (22.4 / 28.0 kW)
		MDP-M075SGU1D	MSP Duct (9.0 / 11.2 kW)
		MDP-M075SGU2D	MSP Duct (12.8 / 14.0 kW) HSP Duct (11.2 / 12.8 / 14.0 kW)
		MDP-M075SGU3D	MSP Duct (5.6 / 7.1 kW)
		MDP-E075SEE3D	Slim Duct (2.0~14.0 kW)
		MDP-G075SP	Duct S (External, All Capacities)
		MDP-G075SQ	Duct S (Internal, 3.5 kW~14 kW)
AHU KIT		MXD-K025AN	7.0kW~8.75kW
		MXD-K050AN	14.0kW~17.5kW
		MXD-K075AN	21.0kW~26.25kW
		MXD-K100AN	28.0kW~35.0kW
		MCM-D201N	28kW~35kW / 56kW~70kW / 84kW~105kW / 112kW~140kW

3.8 Select Accessory

※ Accessory list (Outdoor unit)

Others

Product	Image	Model	Remark
Operation mode selection switch		MCM-C200	DVM S Series (Except HR Models)
PDM KIT		MXD-A38K2A	8~12HP
		MXD-A12K2A	14~16HP
		MXD-A58K2A	18~26HP

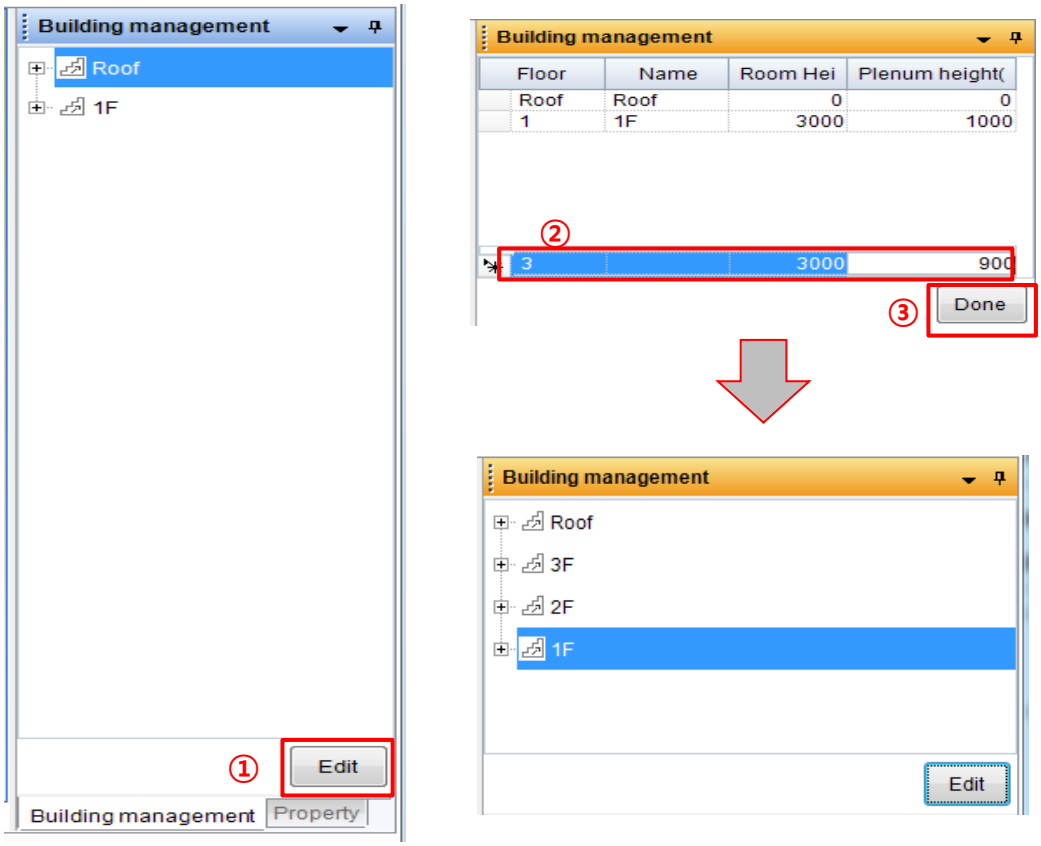
3.9 Building Management

1) Generate floors

Design steps

1. Click “Edit” button.
2. Input floor information
   - 1st box : Floor number. **Here, enter “3” in the first box.**
   - 3rd box (Room height) : Enter 3000 (mm)
   - 4th box (Plenum height) : Enter 900 (mm)

3. Click “Done” button



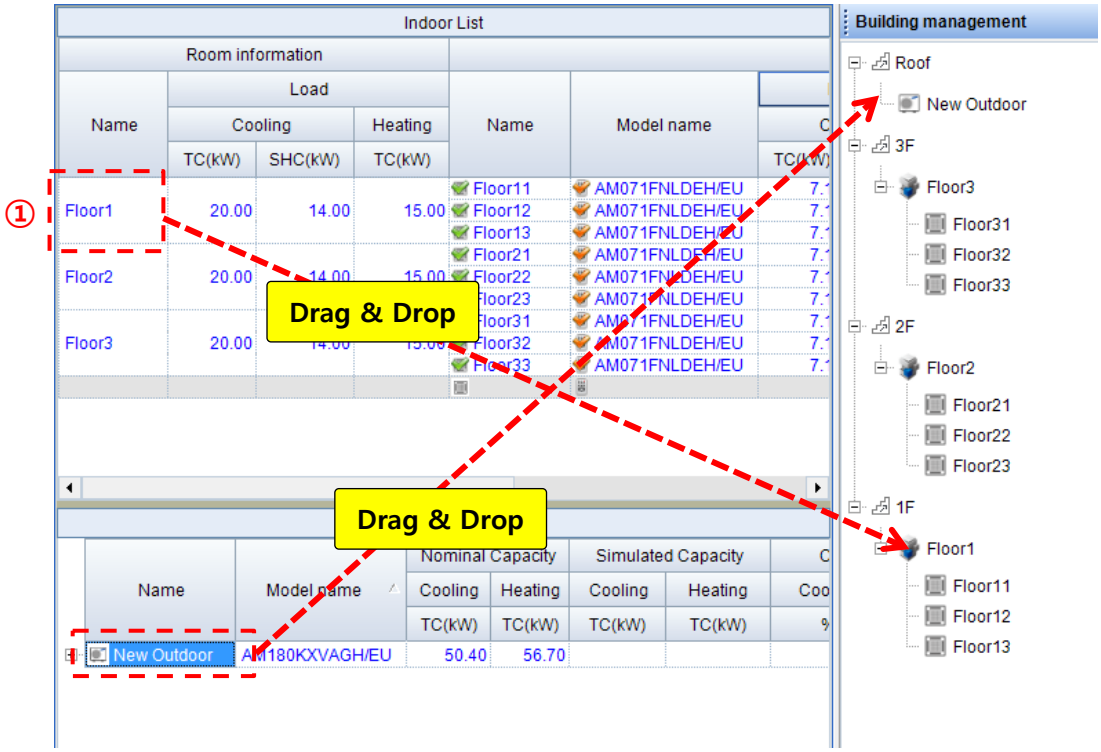
Design Tip

- Room Height : From a bottom of a floor to a bottom of a next floor
- Plenum Height : From a ceiling of a floor to a bottom of a next floor

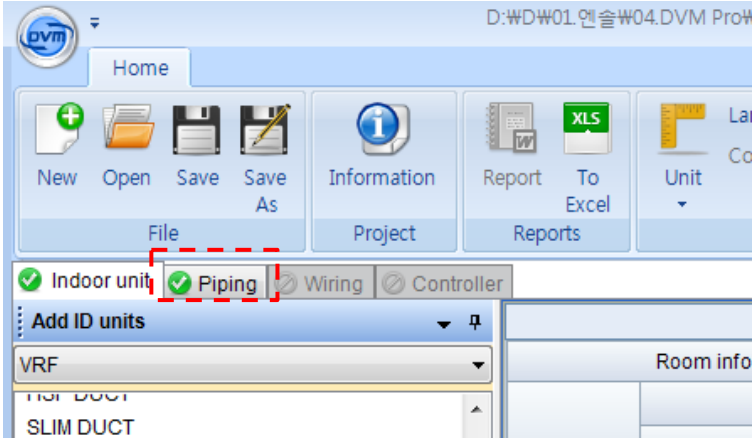
2) Building management

Design steps

1. Click each room or indoor units to the installation floor on “Building management” by drag & drop.
2. Every indoor units and outdoor units should be placed to the floors on “Building management”.



3. After placing all of products to spaces on “Building management” ,
   “Piping” tap is activated.



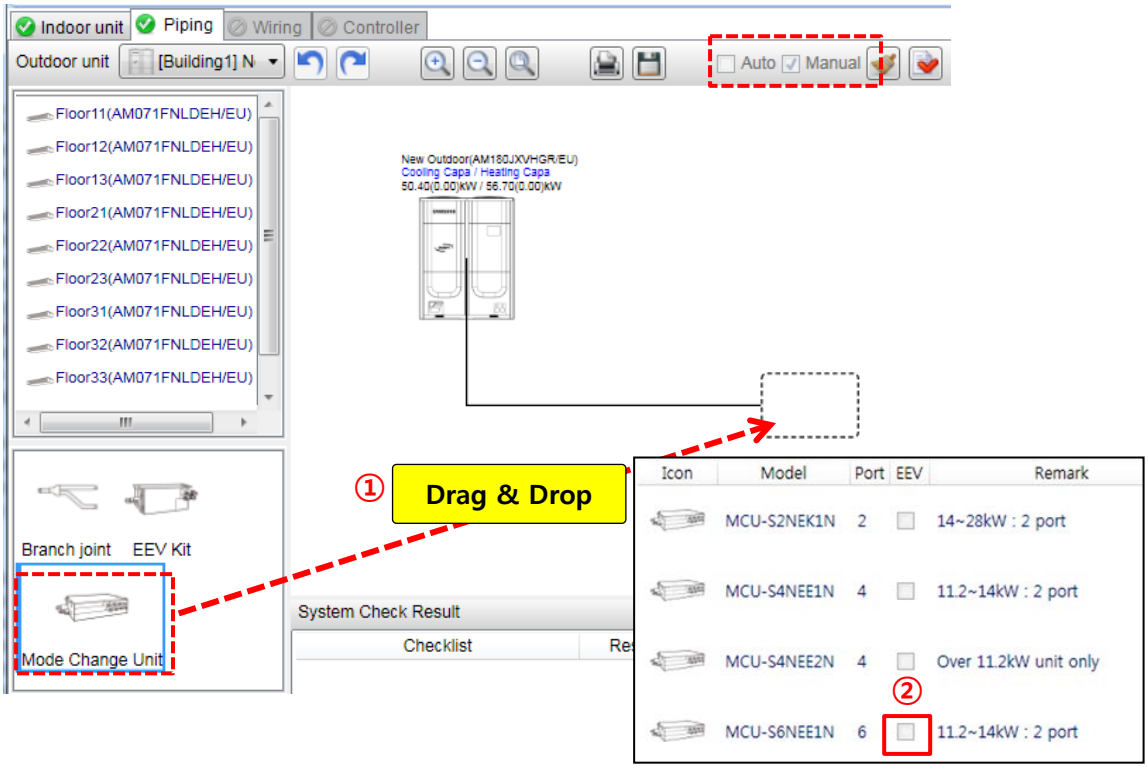
Piping placement : Manual

Design steps

0. “Manual” is activated

1. Drag & drop MCU (Mode Change Unit)

2. Select the type of MCU among 4 types. : Here select 6 port MCU(MCU-S6NEE1N).



Design Tip

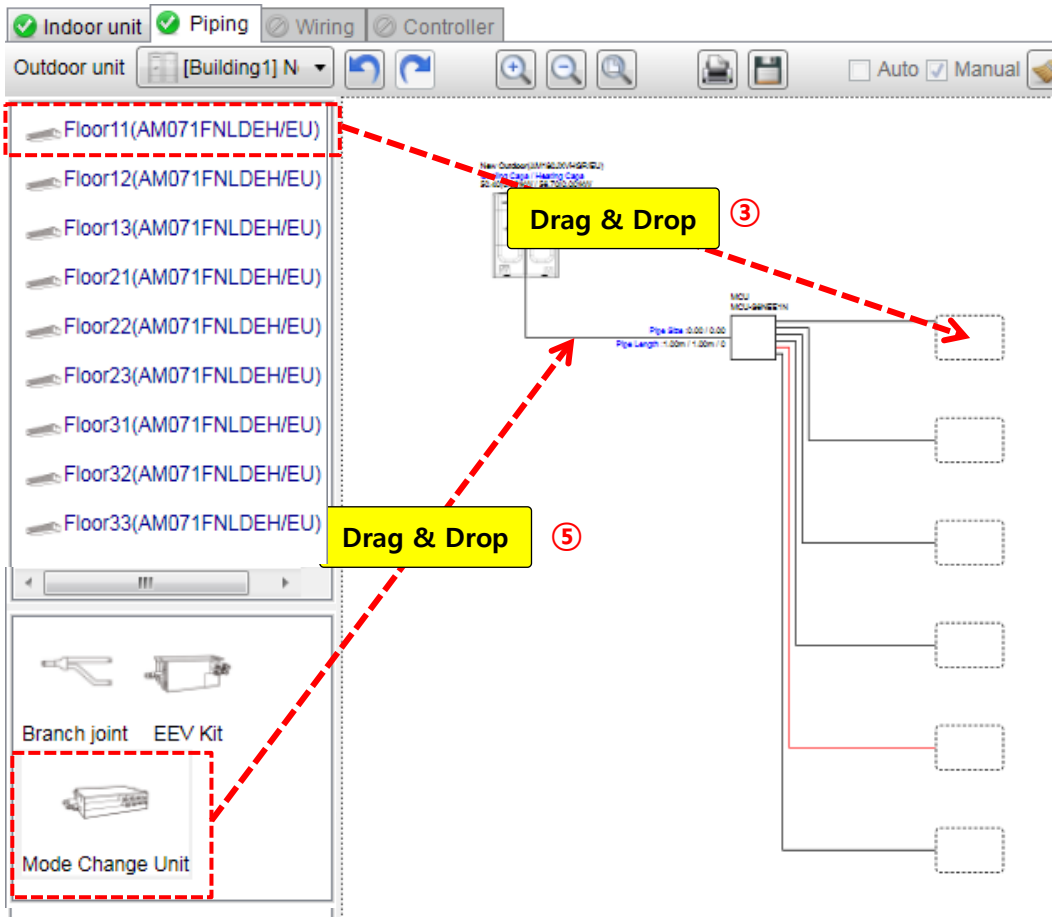
When you select DVM S HR(Heat Recovery), “Auto” pipe function is not available.

DVM S HR must be connected to all of indoor units via MCU(Mode Control Unit).

Piping placement : Manual

Design steps

3. Drag & drop indoor units.
4. After placing one indoor unit, place the other indoor units to the vacant boxes
5. If you need more MCU, Drag & drop MCU to a pipe line



Design Tip

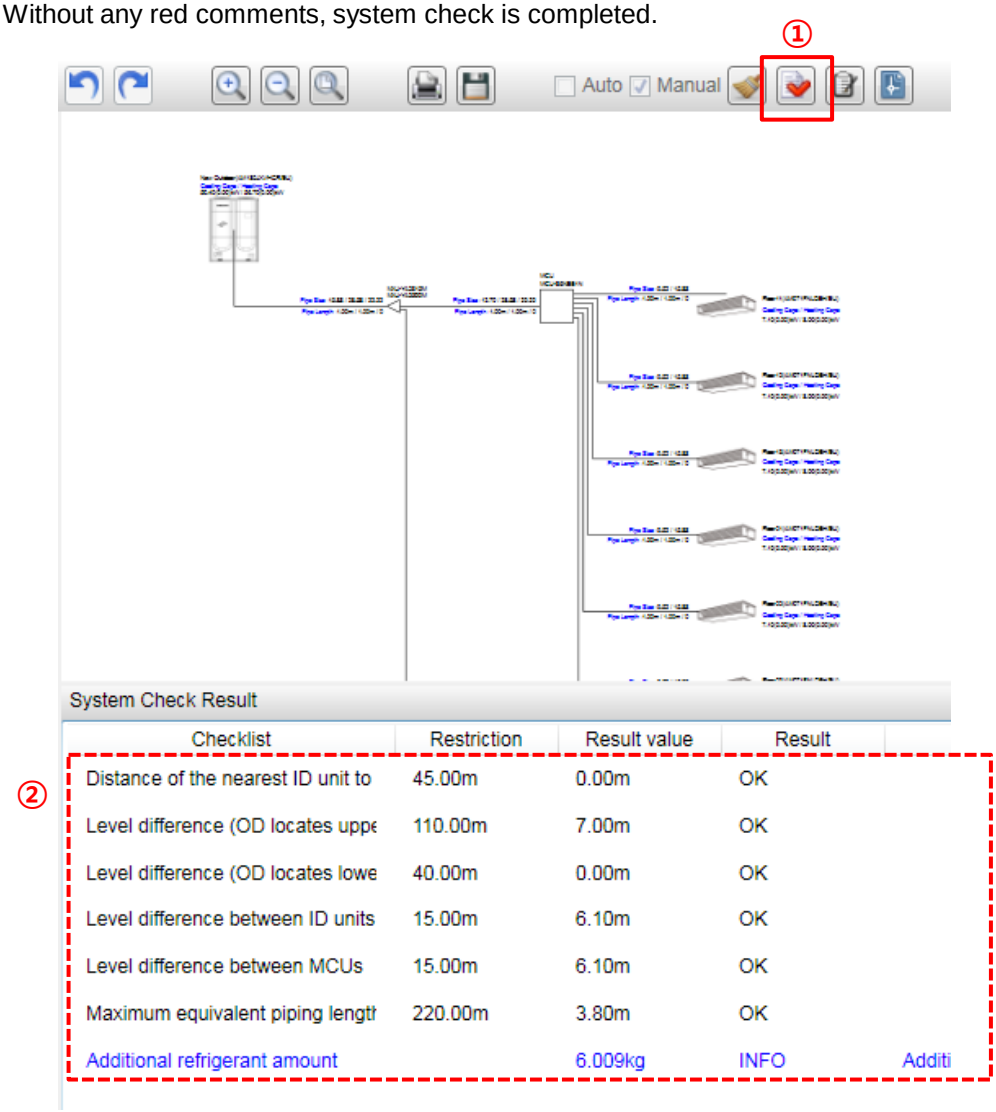
When you select DVM S HR(Heat Recovery), “Auto” pipe function is not available.

DVM S HR must be connected to all of indoor units via MCU(Mode Control Unit).

System Check

Design steps

1. Click “System check” button.
2. Without any red comments, system check is completed.



Design Tip

This function shows what user make wrong design or mistakes so that help users design SAC properly.

This S/W includes the variable limitation logics according to an installation manual.

User also can check the amount of additional refrigerant.

Controller 1

- Select DMS2.5 to use Key-tag

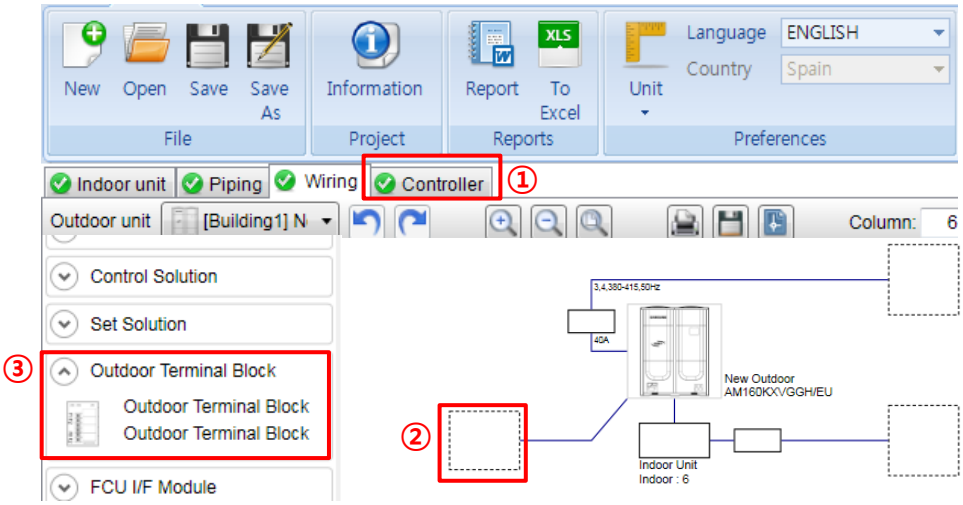
Design steps

1. Click “Controller” tab

(To Select for System 1)

2. **Click a vacant box**.

3. Select compatible controller. (First, **select outdoor terminal block** for DVM S)

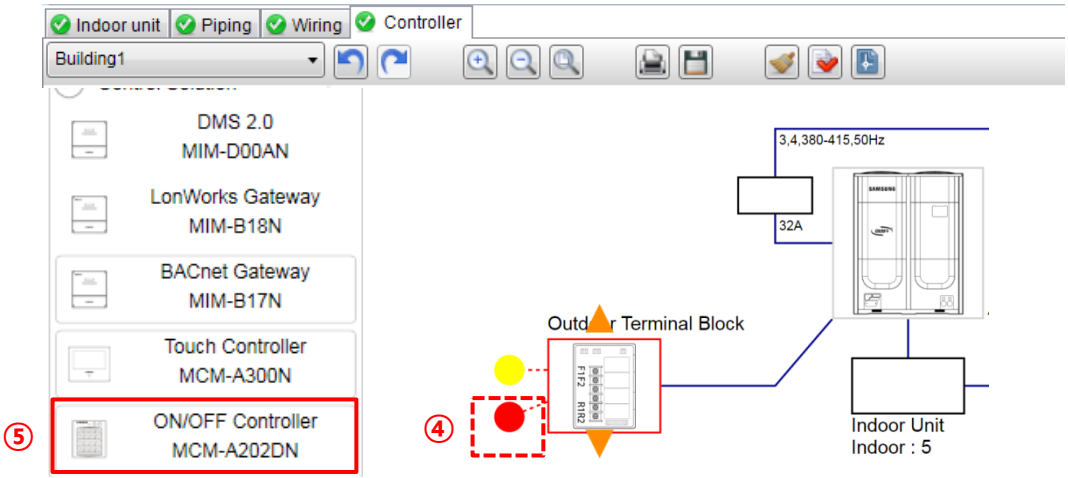


4. Click yellow circle to select controller.

   Here **click the below circle** to select “On-Off controller”.

   (There are 2 types of circles. Upper one is to connect to F1, F2, the below one is to connect to R1, R2.)

5. **Click “DMS 2.5”**



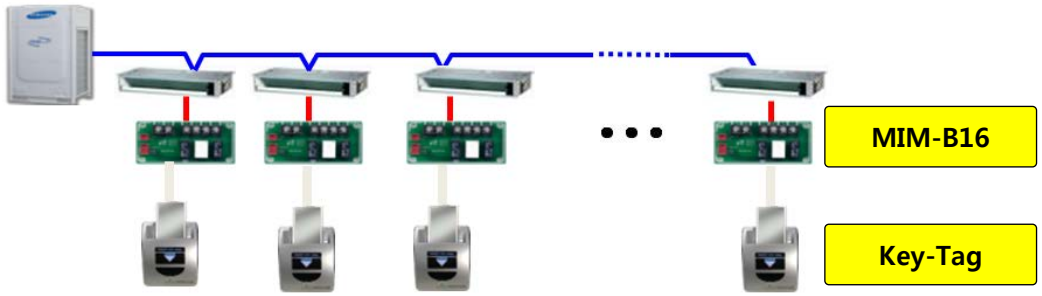
3.12 Controller

Design Tip

When connecting Outdoor unit and controller, there are 2 ways.

- Using F1/F2 : Control one outdoor unit system and connected indoor units.
  (On-Off controller, Touch controller, Wi-fi kit)
- Using R1/R2 : Control several outdoor unit system and connected indoor units.
  (On-Off controller, Touch controller, DMS, BACnet, Lonworks)

- To use Key-tag, every indoor unit need MIM-B16(selected in Accessary tap)



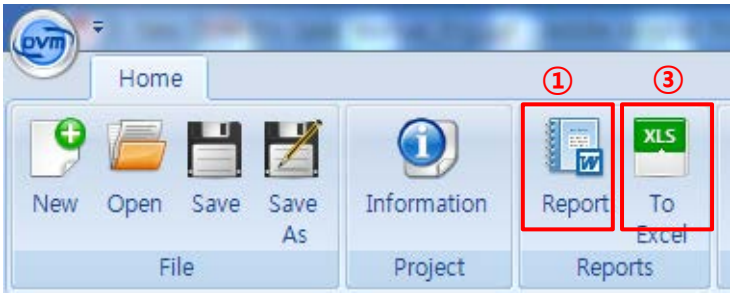
※ Controller

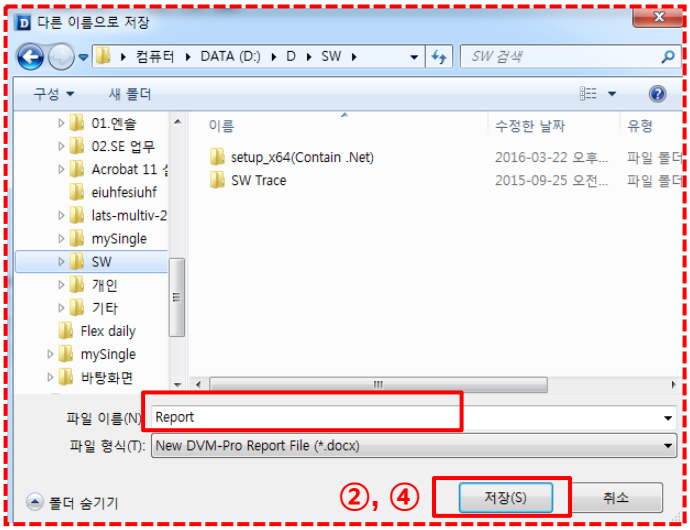
Classification	Product	Image	Model	Remark
Integrated Management System	DMS 2.0		MIM-D00AN	-
	S-NET 3		MST-P3P	-
	PIM		MIM-B16N	-
Building Management System	BACnet Gateway		MIM-B17N	-
	LonWorks Gateway		MIM-B18N	-
Centralized Control System	On/Off controller		MCM-A202DN	-
	Touch controller		MCM-A300N	-

Generate Report

Design steps

1. Click “Report” button.
2. Enter a file name and click “Save” button.
3. Click “ To Excel” button to generate the designed Product list.
4. Enter a file name and click “Save” button.





Usage Tip

There are 2 types of report.

- “Report” button: Includes all of designed information
- “To Excel” button: Includes only designed product list

Part 4 : Advanced Design2

Luxury House with Hydro Unit

(Tutorial with 3st Scenario)

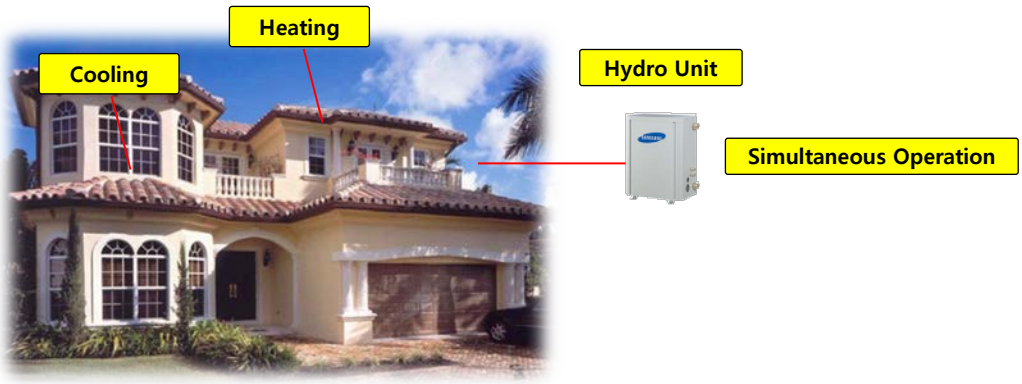
Purpose :

1. Understand the design process for SAC.
2. Learn how to design DVM Hydro unit
3. Part 4 is focused on the advanced design.
   - DVM Hydro Unit HE
4. Most of design steps are same as Part2: Basic design.
   Big difference is how to design **Hydro Unit HE/HT.**

4.1 Modeling Scenario

Approach

- Building type : Luxury House
- Area : 200m2 x 2floors
- Owner's requirement : **Using Hydro Unit HE and Duct type IDU**
- Longest pipe : 70m



- Load Requirements
  1. (Example of Floor1) TC = 0.20kW/m2(*Unit load) x 200m2(Area) = 40kW
  2. (Example of Floor1) SHC = TC x 0.71 (*Sensible heat ratio)

System (Outdoor unit)	Room/Zone	Area (m2)	Load Requirements (KW)		
			Cooling		Heating
			TC	SHC	TC
System 1	Floor1	200	40	28	30
	Floor2	200	40	28	30
	Hydro Unit HE		20	-	30

* Unit load (kW/m2) : 0.20 / 0.15 (Cooling TC / Heating TC)

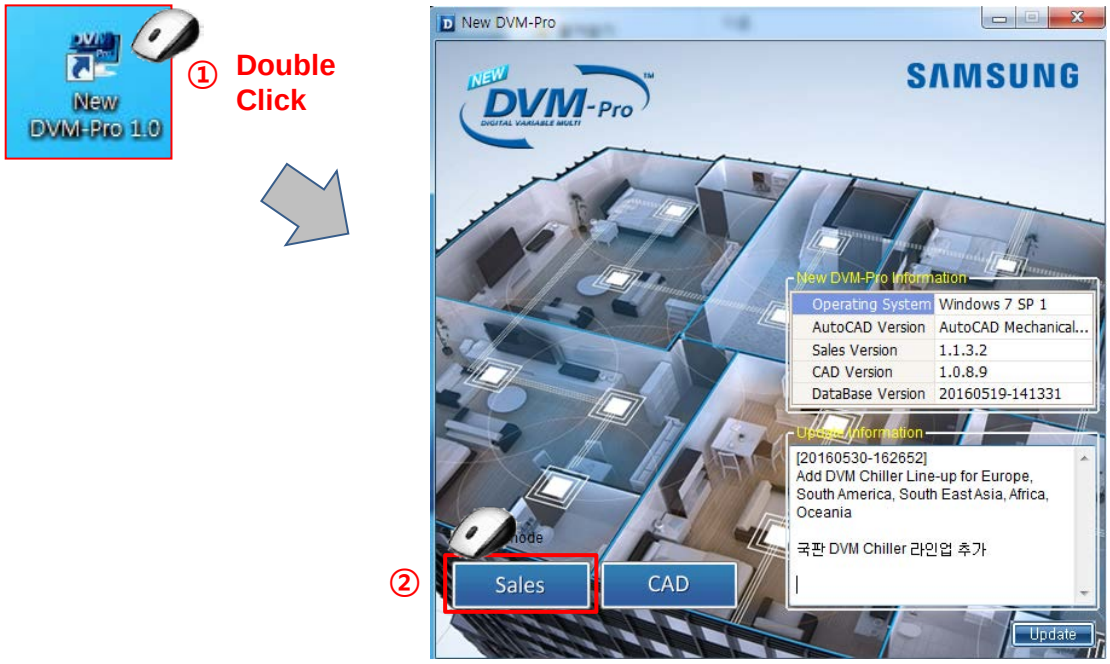
Design Tip

- TC(Total Capacity) = SHC(Sensible Heat Capacity) + LHC(Latent Heat Capacity)
- SHC: Capacity that changes temperature
- LC: Capacity that changes a phase such as the dehumidification.
- Designers need to consider SHC in high humidity places especially near the beach and lake.
  Normally, when humidity is higher, air-conditioner more work for LHC(dehumidification).
  On the other hand, SHC is smaller so that adjusting temperature may not be enough.

Start with DVM Pro

Design steps

1. To start DVM Pro, **double click a icon "New DVM Pro 1.0"** on desktop..
2. **Click "Sales"** button to start Sales mode of DVM Pro.
3. New window popped up.



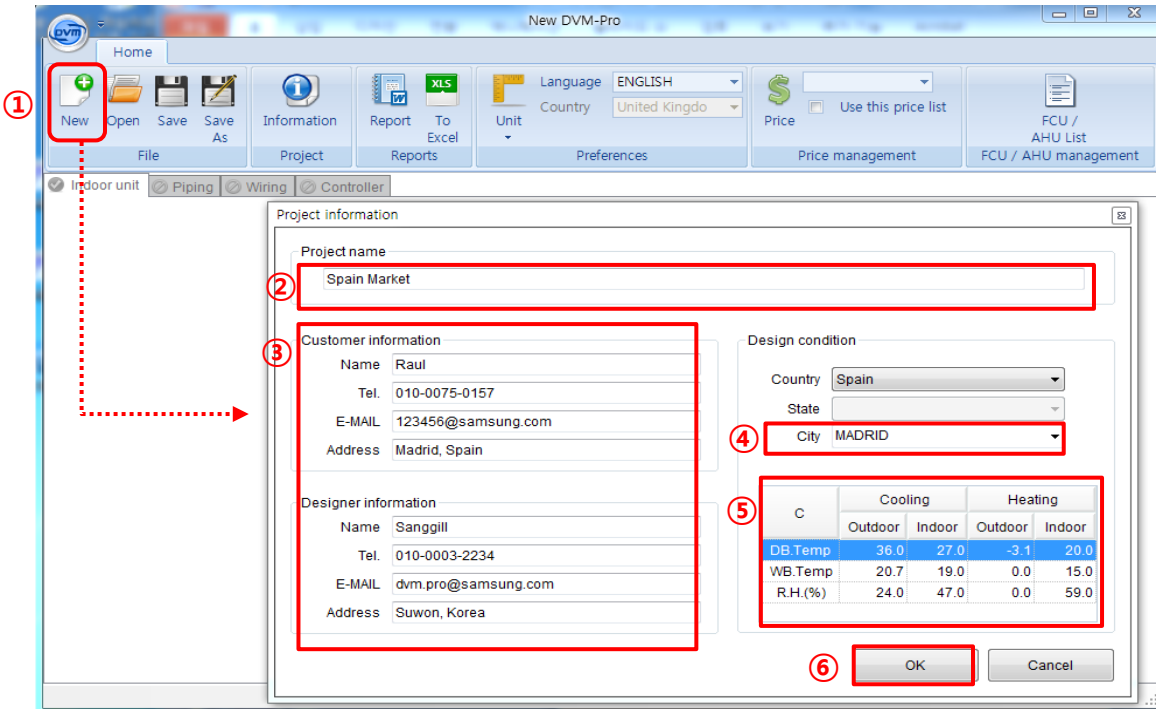
Usage Tip

Version Information

Create Project

Design steps

1. To create the project**, click "New**" button, then new window is popped up.
2. **Enter the project name**: the project name will be saved as a file name.
3. Enter the customer information and designer information (Optional)
   : This will be represented on the report.
4. Enter Design condition : **Select city "Madrid"**
5. Design condition (Weather)
   : Firstly weather condition is represented based on your city,
   and then user can edit the data manually.
6. **Click "OK"** button to complete to create a project.



Usage Tip

Saving File extension is ".dvms".

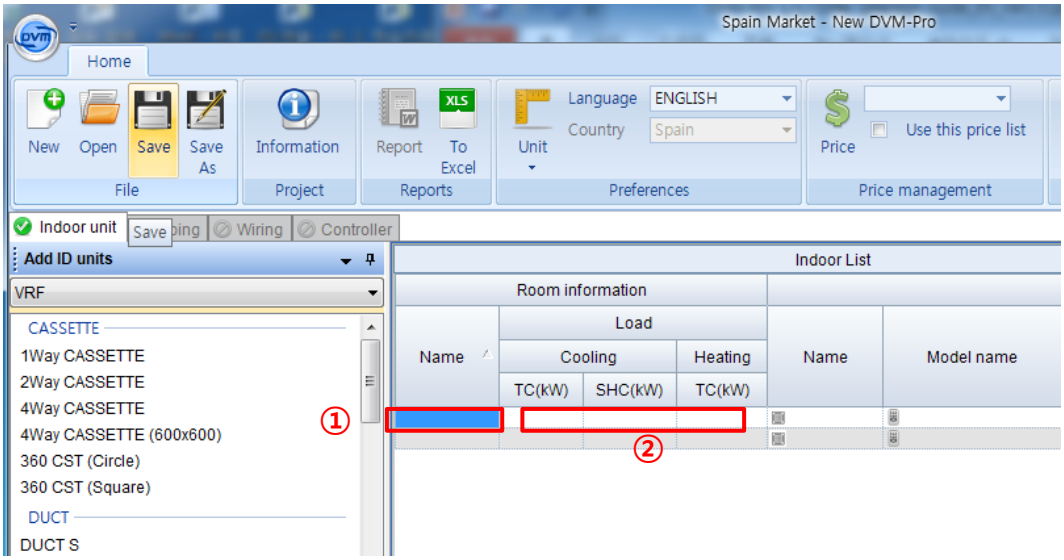
If user wants to select models from other countries, please request the authorization for the country to DVM Pro team by email, dvm.pro@samsung.com.

Load design

Design steps

1. To generate room information,
   enter room names by double clicking (or click+enter) a vacant space.
2. Input load requirements for each room or zone according to the below load calculation.
   - Load Calculation

System (Outdoor unit)	Room/Zone	Area (m2)	Load Requirements (KW)		
			Cooling		Heating
			TC	SHC	TC
System 1	Floor1	200	40	28	30
	Floor2	200	40	28	30
	Hydro Unit HE		20	-	30



Usage Tip

According to this input load, the quantity of indoor units is automatically calculated for each room.
Without entering load, user can also select indoor units and quantity.

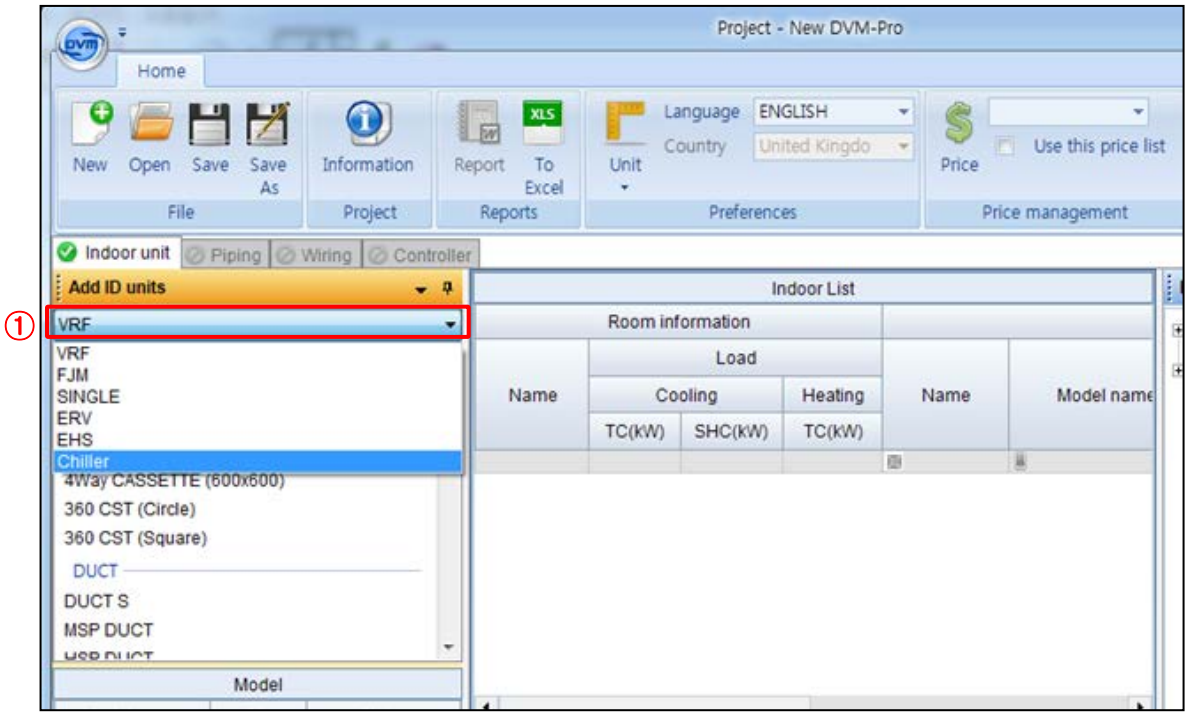
Design Tip

To meet customer's requirements, cooling(TC, SHC) and heating load need to be entered.

Select product type

Design steps

1. Click the below tap and select a product type on drop/down menu. **(Select VRF)**



Design Tip

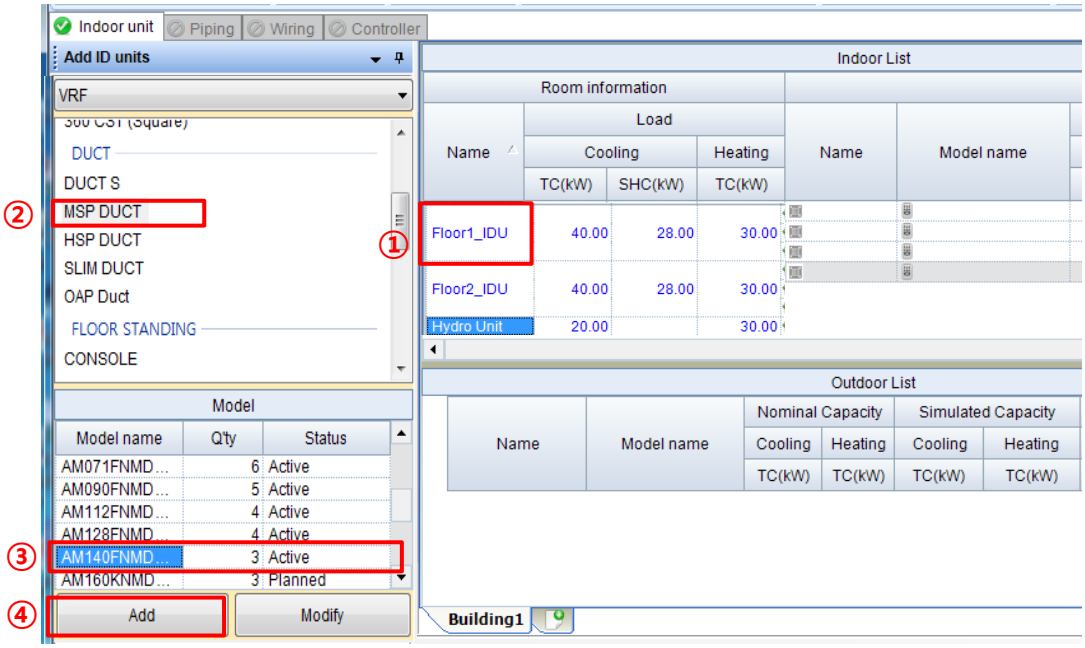
For the proper SAC selection, many design factors should be considered such as
the system capacity, pipe length, installation space, the number of indoor units, and so on.

※ To check those design and installation factors, please refer to TDB or installation manual.

Select indoor units (MSP Duct)

Design steps

1. Click each room to select indoor units.
2. Select indoor unit type : **MSP duct**
3. Select a model **(AM140FNMDEH/EU)** and check the quantity. (User can change the quantity manually.)
4. Click “Add” button to complete the selection of indoor units.

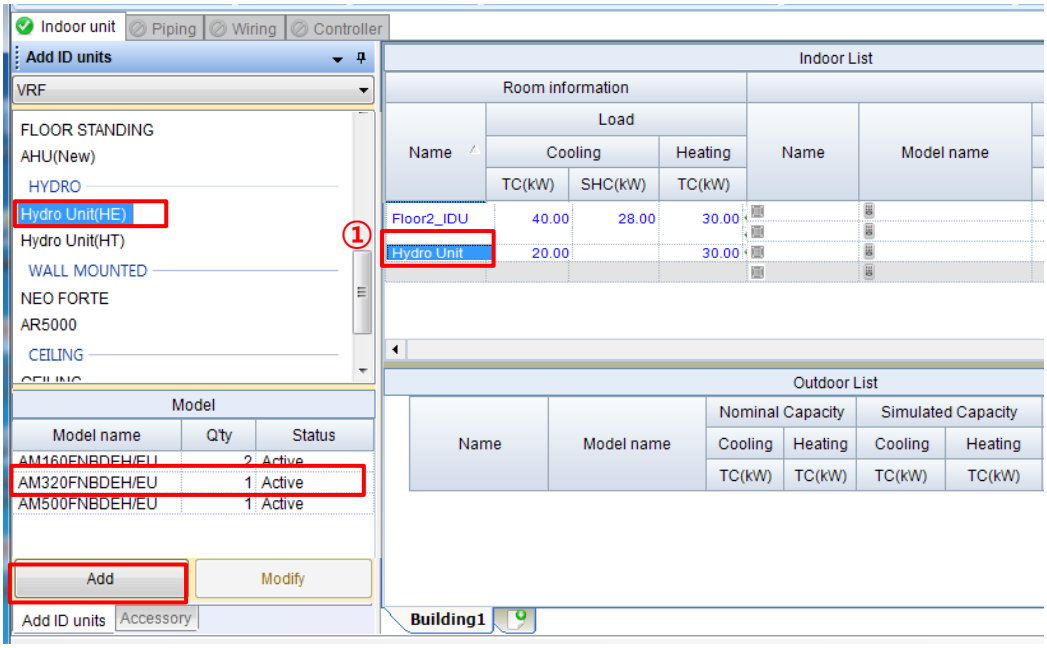


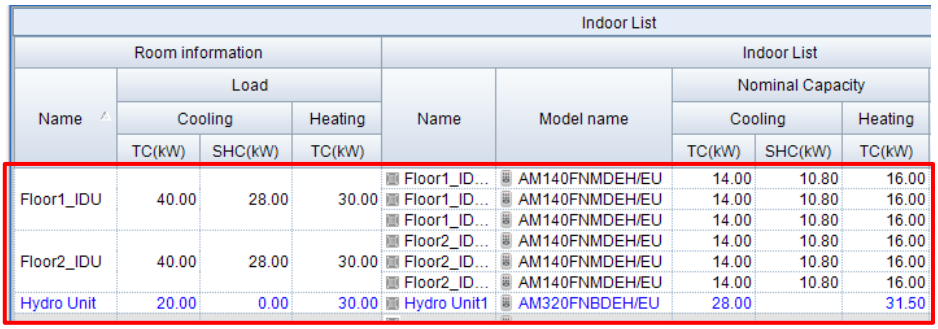
4.6 Select Indoor units

Select indoor units (Hydro Unit HE)

Design steps

1. Click each room to select indoor units.
2. Select indoor unit type : **Hydro Unit(HE)**
3. Select a model **(AM320FNBDEH/EU)** and check the quantity. (User can change the quantity manually.)
4. Click “Add” button to complete the selection of indoor units



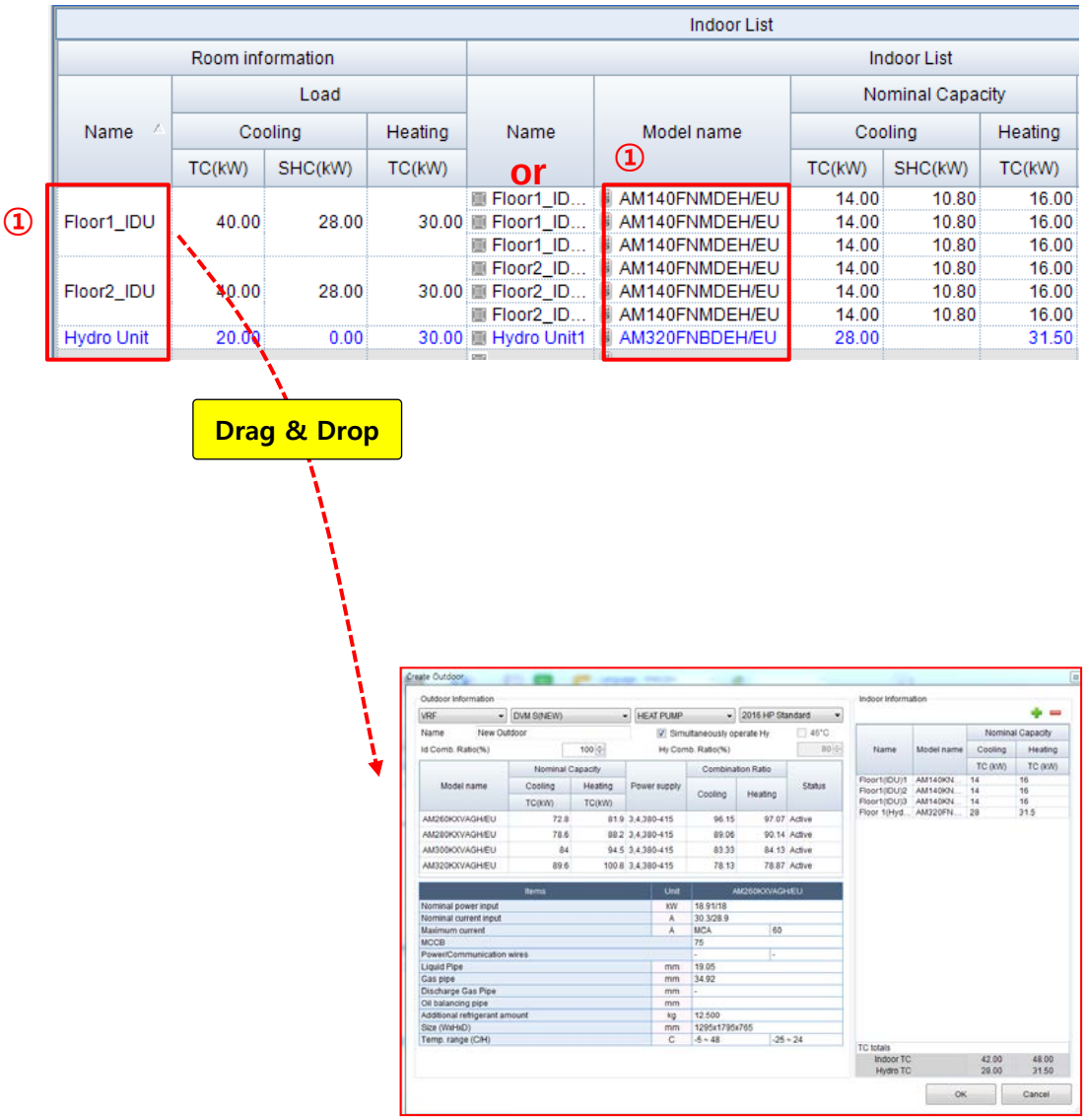


4.7 Select Outdoor units

Select outdoor unit 1

Design steps

1. Click rooms or indoor units together using “Ctrl” key which connect to one outdoor unit system.
   Here, **click “Floor1, Floor2, and Hydro unit” together** to select System1(outdoor unit).
2. **Drag & drop the selected boxes** to the outdoor units list below.
3. New window, “Create Outdoor” is popped up.



4.7 Select Outdoor units

Select outdoor unit 2 - Simultaneous operation

Design steps

1.Select the type of outdoor unit.

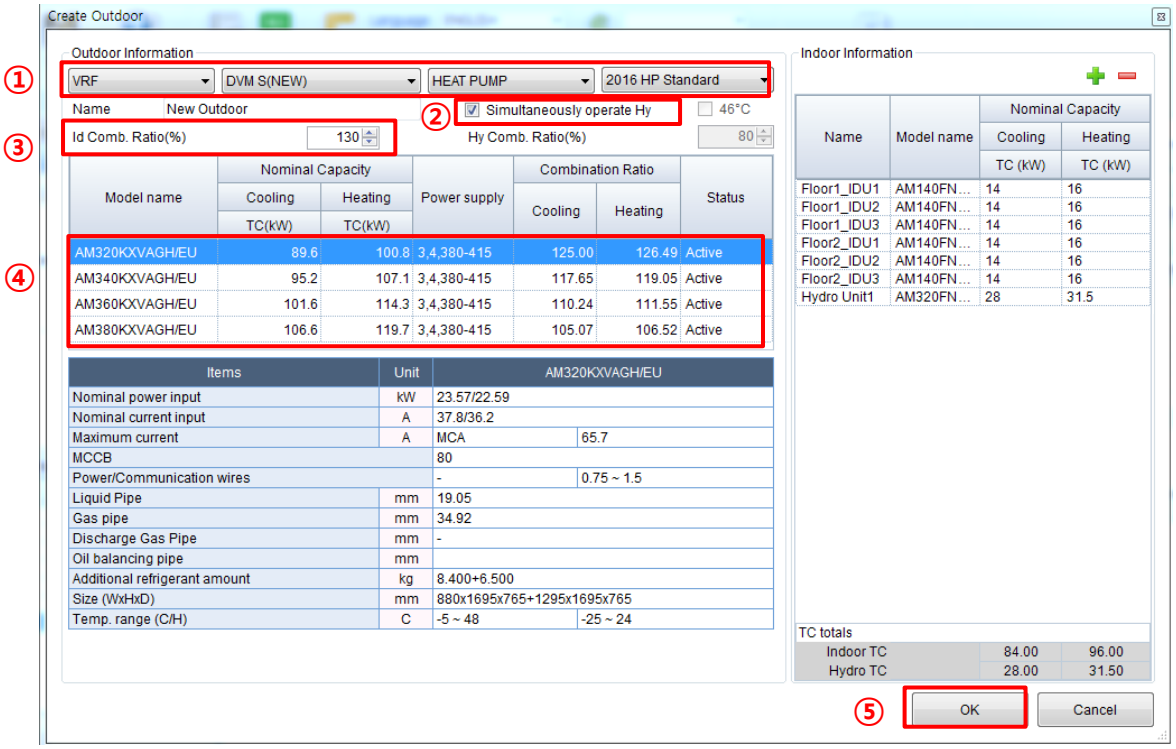
Here, select a outdoor type **: VRF → DVM S → Heat Pump → 2016 HP Standard**

2. Click "Simultaneously operate Hy"

3. Enter the combination ratio, **130%.**

4. Select the model among the recommendation models. : **Select AM320JXVAGH/EU**

5. Click "OK" button to complete the selection of outdoor unit.



Design Tip

When designing Hydro Unit HE, there are 2 ways to select outdoor unit.

Operation Type	Combination ratio	DVM Pro
Hydro unit & indoor unit	50% ~ 130%	Click "Simultaneously operation"
Indoor unit : Cooling only Hydro unit : Heating only	50% ~ **180%** Indoor unit's ratio : under100% Hydro unit's ratio : under 80%	Do not Click "Simultaneously operation"

4.7 Select Outdoor units

※ Separate operation

Design steps

1.Select the type of outdoor unit.

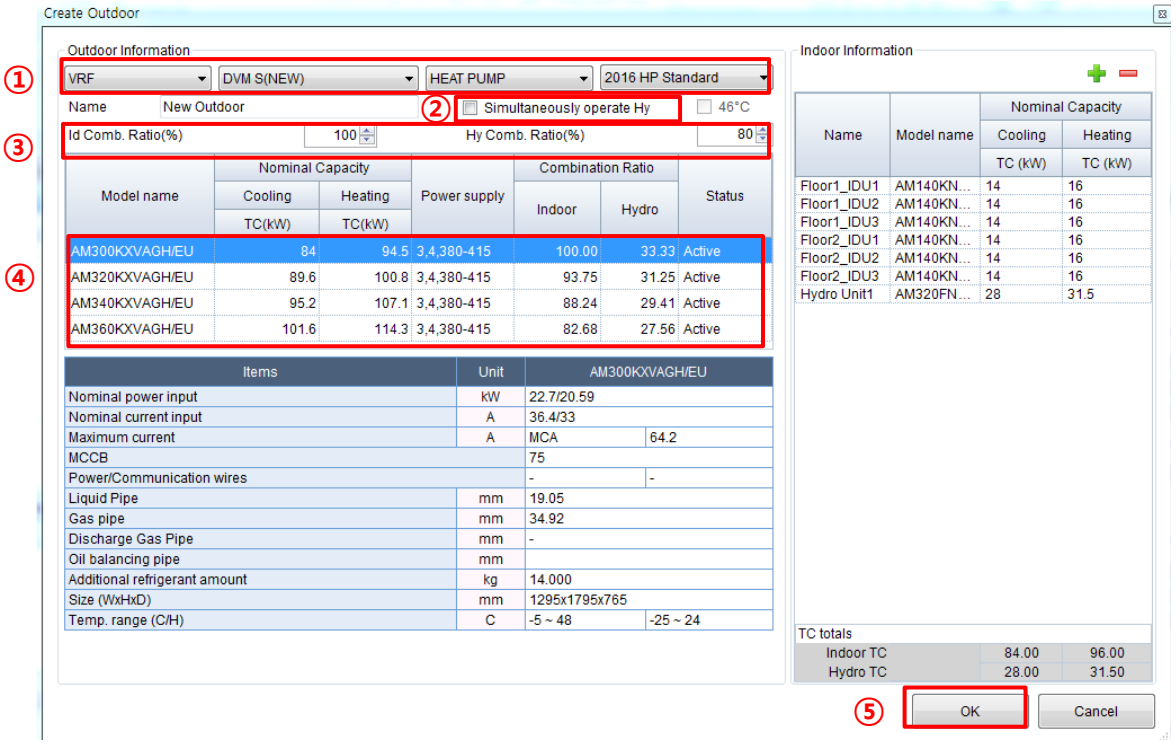
Here, select a outdoor type **: VRF → DVM S → Heat Pump → 2016 HP Standard**

2. **Do not Click** "Simultaneously operate Hy"

3. Enter **100%** of combination ratio and **80%** of Hydro combination ratio.

4. Select the model among the recommendation models. : **Select AM300KXVAGH/EU**

5. Click "OK" button to complete the selection of outdoor unit.



Design Tip

When designing Hydro Unit HE, there are 2 ways to select outdoor unit.

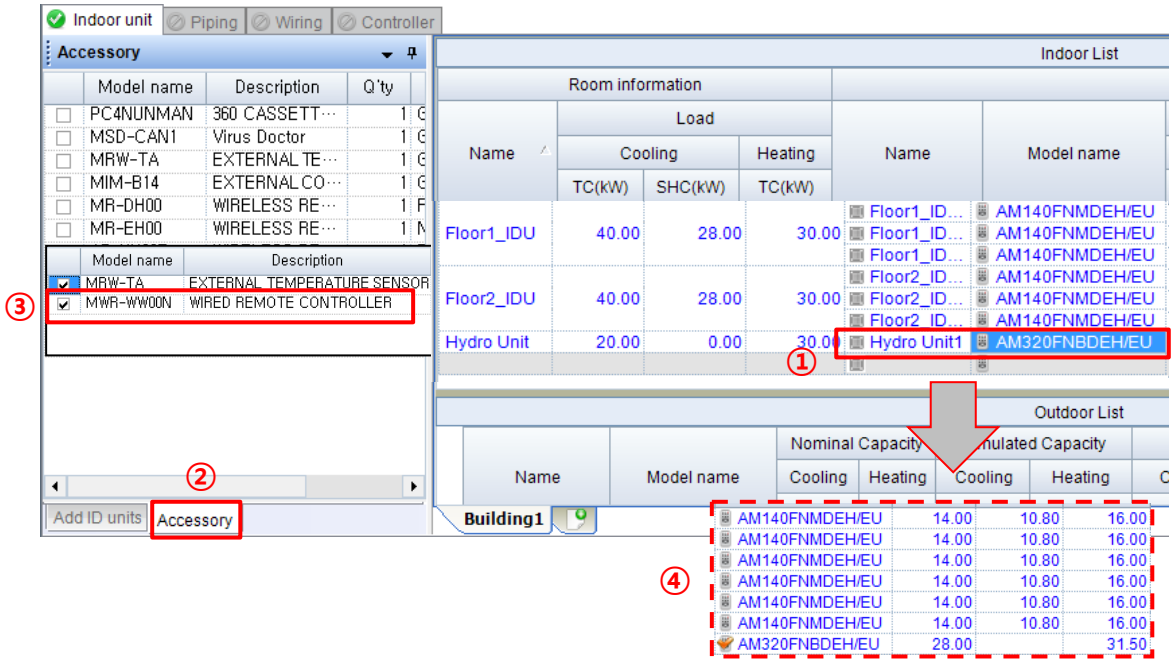
Operation Type	Combination ratio	DVM Pro
Hydro unit & indoor unit	50% ~ 130%	Click "Simultaneously operation"
Indoor unit : Cooling only Hydro unit : Heating only	50% ~ **180%** Indoor unit's ratio : under100% Hydro unit's ratio : under 80%	Do not Click "Simultaneously operation"

4.8 Select Accessory

Select accessories

Design steps

1. Click Hydro Unit model
2. Click “Accessory” tab
3. Select accessories : **MRW-WW00N (Wired Remote Controller only for Hydro unit)**
4. When accessories are selected, the related indoor units are marked with the orange color.



Design Tip

When designing Duct type IDU, you need to choose drain type and control method considering customer’s desire.

- Drain type : Drain pump or Drain hose
- Control : Wired-remote controller or Receiver with Wireless remote controller
- External temperature sensor for more accurate temperature control.

To control Hydro unit, MRW-WW00N is required. (Wired Remote Controller only for Hydro unit)

4.8 Select Accessory

※ Accessory list (Indoor unit)

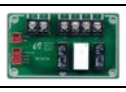
Panel

Product	Image	Model	Remark
Panel		PC1NUSMAN	Slim 1Way Cassette
		PC1NUPMAN	Slim 1Way Cassette (Z-sliding)
		PC1MWSKAN	1Way Cassette (1.7 kW, 2.2 kW)
		PC2NUSMEN	2Way cassette
		PC4SUSMAN	4Way Cassette S(600x600) (Waffle)
		PC4SUSMEN	4Way Cassette S(600x600) (Classic)
		PC4NUSKAN	4 Way cassette S (Waffle)
		PC4NUSKEN	4 Way cassette S (Classic)
		PC4NBSKAN	4 Way cassette S (Waffle, Black)
		PC4NUDMAN	360 CST Square (White)
		PC4NUNMAN	360 CST Circular (White)
		PC4NBDMAN	360 CST Square (Black)
		PC4NBNMAN	360 CST Circular (Black)

4.8 Select Accessory

※ Accessory list (Indoor unit)

Controller

Classification	Product	Image	Model	Remark
Individual Control System	Wireless remote controller		MR-EH00	-
	Wired remote controller		MWR-WE10N (Multi function)	
			MWR-WW00N	DVM S Hydro Unit
	Simplified wired remote controller		MWR-SH00N	-
			MWR-VH02	ERV
Others	Operation mode selection switch		MCM-C200	DVM S Series (Except HR Models)
	External room sensor		MRW-TA	Cassette, Wall-mount, Ceiling, Duct, Console
	Compatible interface module		MIM-N01	Nasa-No Nasa
	ERV interface module		MIM-N10	ERV (Nasa)
	External contact interface module		MIM-B14	-
	S-Converter		MIM-C02N	-
	MTFC (Multi tenant function controller)		MCM-C210N	-
	Wireless signal receiver		MRK-A10N	-
	External room sensor		MRW-TA	Cassette, Wall-mount, Ceiling, Duct, Console
			MRW-TS	Zone Controller (SINGLE)

4.8 Select Accessory

※ Accessory list (Indoor unit)

Others

Product	Image	Model	Remark
S-Plasma Ion KIT		MSD-CAN1	4Way Cassette S 4Way Cassette S(600x600)
		MSD-EAN1	ERV-Plus
Motion detect Sensor		MCR-SMA	4Way Cassette S (600x600)
ERV CO2 Sensor		MOS-C1	ERV, ERV PLUS
External room sensor		MRW-TA	Cassette, Wall-mount,Ceiling, Duct, Console
Drain Pump		MDP-N047SNC0D	OAP Duct (14.0 kW)
		MDP-N047SNC1D	HSP Duct (22.0 / 28.0 kW) OAP Duct (22.4 / 28.0 kW)
		MDP-M075SGU1D	MSP Duct (9.0 / 11.2 kW)
		MDP-M075SGU2D	MSP Duct (12.8 / 14.0 kW) HSP Duct (11.2 / 12.8 / 14.0 kW)
		MDP-M075SGU3D	MSP Duct (5.6 / 7.1 kW)
		MDP-E075SEE3D	Slim Duct (2.0~14.0 kW)
		MDP-G075SP	Duct S (External, All Capacities)
		MDP-G075SQ	Duct S (Internal, 3.5 kW~14 kW)
AHU KIT		MXD-K025AN	7.0kW~8.75kW
		MXD-K050AN	14.0kW~17.5kW
		MXD-K075AN	21.0kW~26.25kW
		MXD-K100AN	28.0kW~35.0kW
		MCM-D201N	28kW~35kW / 56kW~70kW / 84kW~105kW / 112kW~140kW

4.8 Select Accessory

※ Accessory list (Outdoor unit)

Others

Product	Image	Model	Remark
Operation mode selection switch		MCM-C200	DVM S Series (Except HR Models)
PDM KIT		MXD-A38K2A	8~12HP
		MXD-A12K2A	14~16HP
		MXD-A58K2A	18~26HP

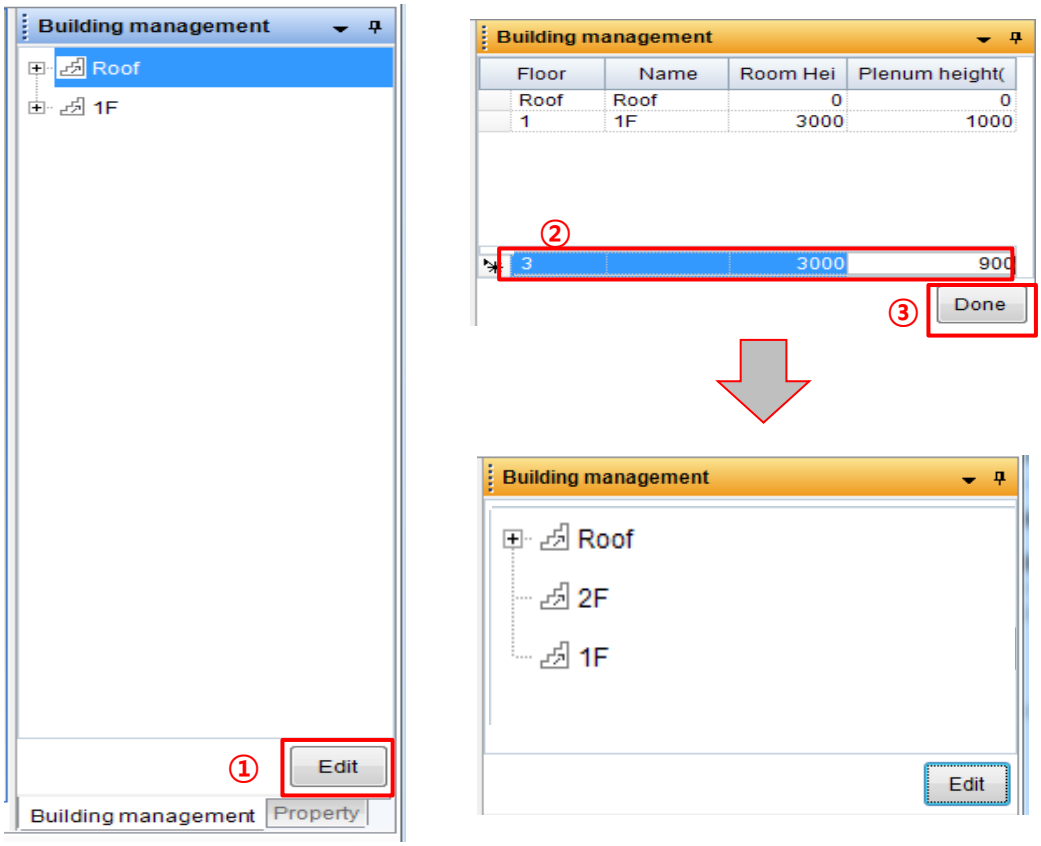
4.9 Building Management

1) Generate floors

Design steps

1. Click “Edit” button.
2. Input floor information
   - 1st box : Floor number. **Here, enter “2” in the first box.**
   - 3rd box (Room height) : Enter 3000 (mm)
   - 4th box (Plenum height) : Enter 900 (mm)

3. Click “Done” button



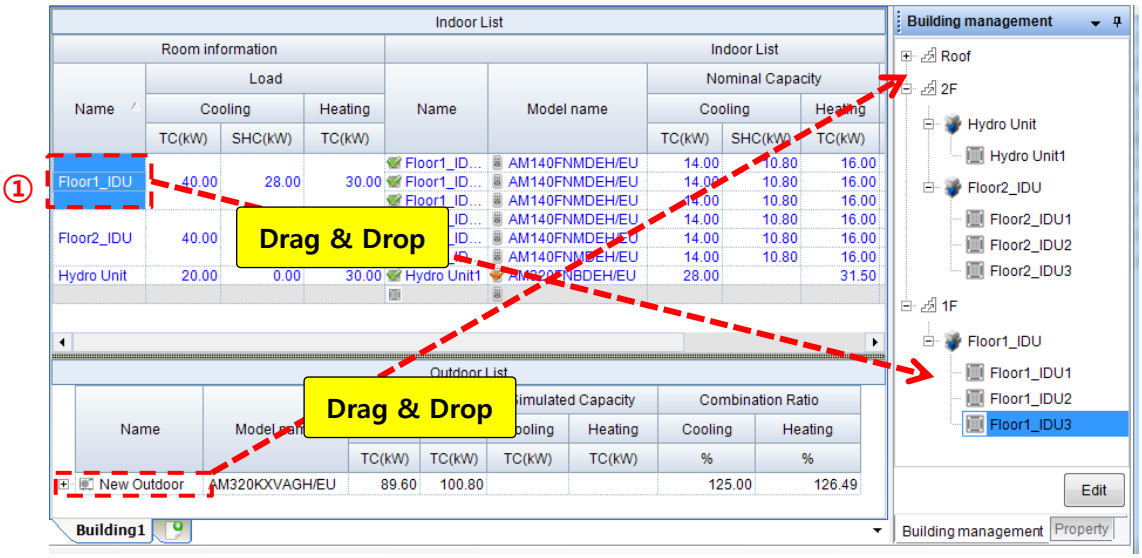
Design Tip

- Room Height : From a bottom of a floor to a bottom of a next floor
- Plenum Height : From a ceiling of a floor to a bottom of a next floor

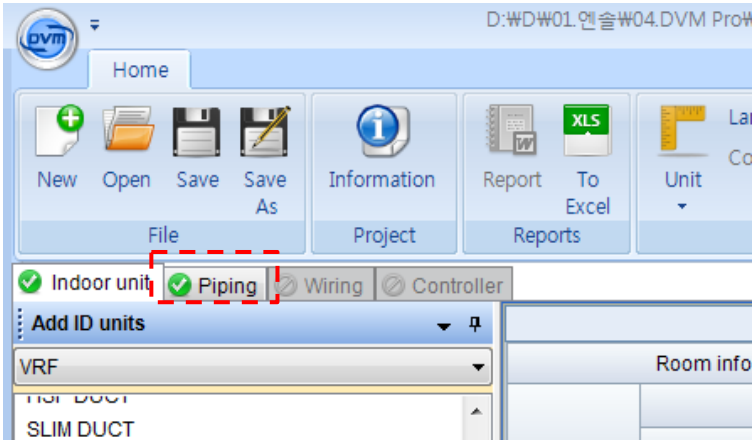
2) Building management

Design steps

1. Click each room or indoor units to the installation floor on “Building management” by drag & drop.
2. Every indoor units and outdoor units should be placed to the floors on “Building management”.



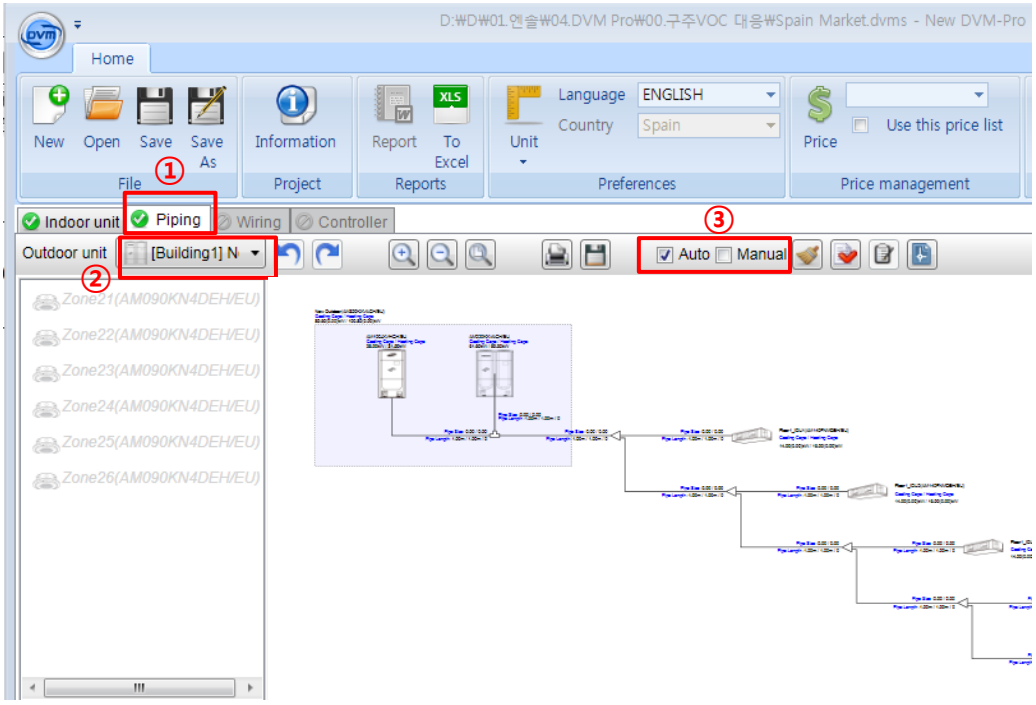
3. After placing all of products to spaces on “Building management” ,
   “Piping” tap is activated.



Piping placement : Auto

Design steps

1. Click “Piping” tap to start the piping design.
2. Select each system of outdoor units.
3. Click “Auto” to complete the piping placement.
4. (When selecting “Manual”) Refer to 2.10.(Piping placement : Manual)



Design Tip

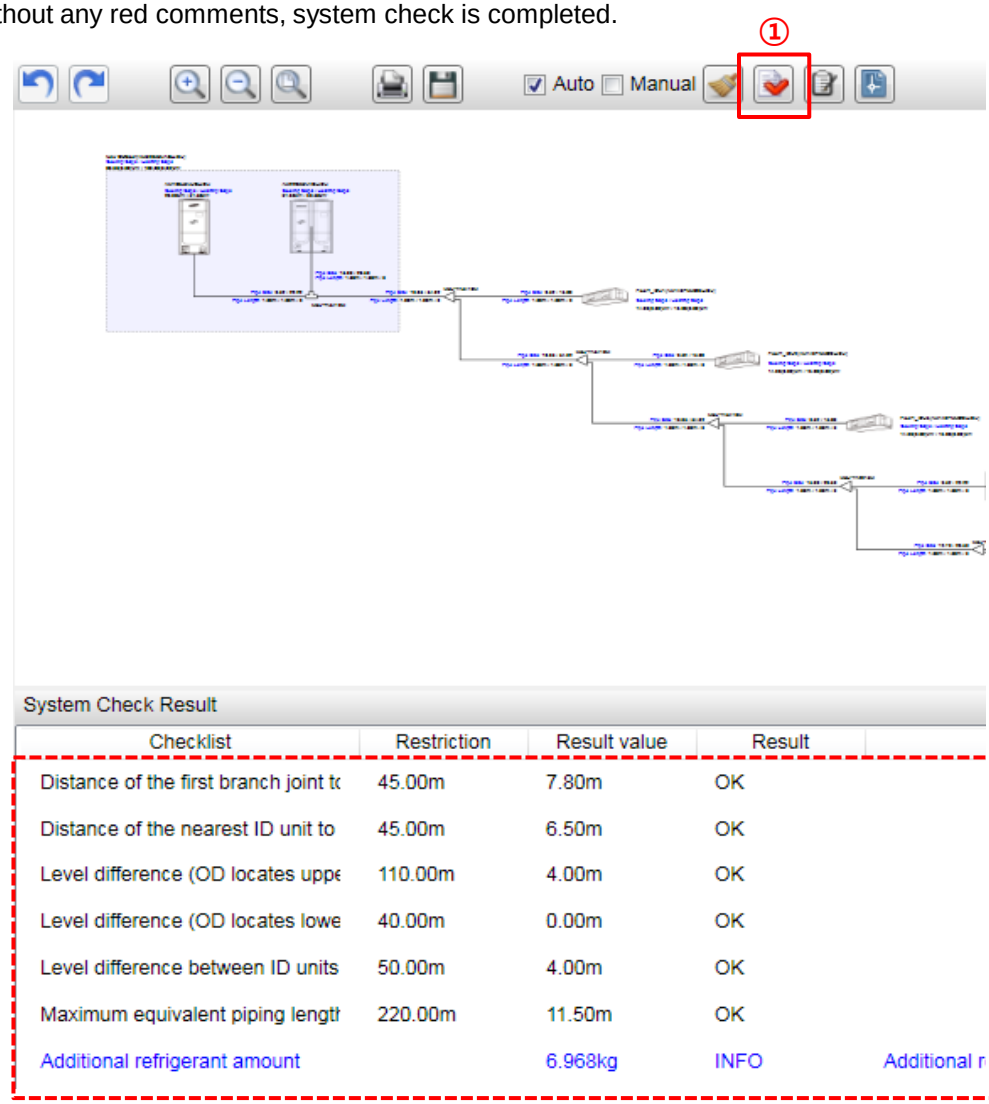
When a designer wants to make **a quick report**, and already know that there is no problem regarding the pipe distance, skip other steps such as entering pipe information.

Just **click “Auto” and “System check”**. Then he/she can generate the report.

System Check

Design steps

1. Click “System check” button.
2. Without any red comments, system check is completed.



Design Tip

This function shows what user make wrong design or mistakes so that help users design SAC properly.

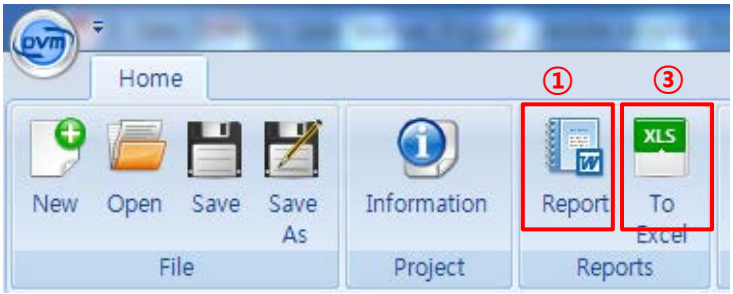
This S/W includes the variable limitation logics according to an installation manual.

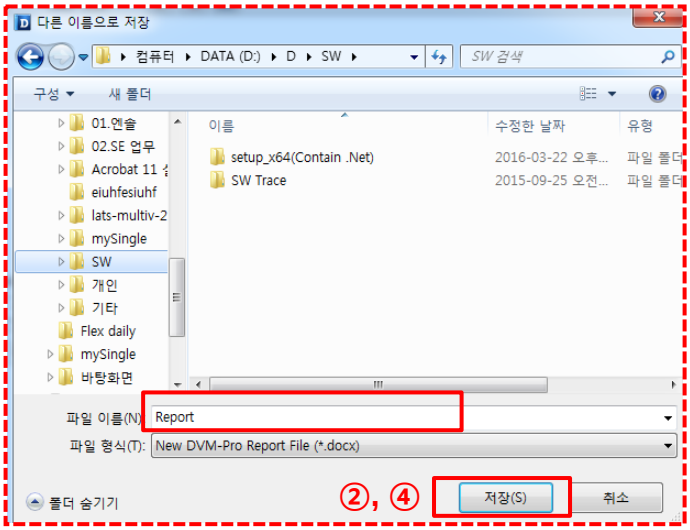
User also can check the amount of additional refrigerant.

Generate Report

Design steps

1. Click “Report” button.
2. Enter a file name and click “Save” button.
3. Click “ To Excel” button to generate the designed Product list.
4. Enter a file name and click “Save” button.





Usage Tip

There are 2 types of report.

- “Report” button: Includes all of designed information
- “To Excel” button: Includes only designed product list

Part 5 : Additional Function

Pricing function

: Using this function, Pricing information can be represented on the report.

Report Sample

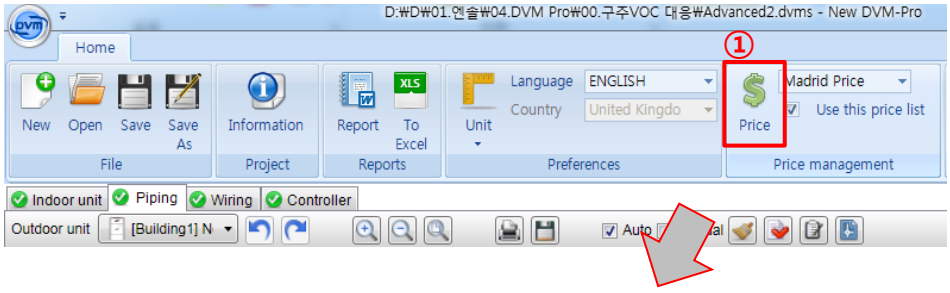
5. Total Equipment List

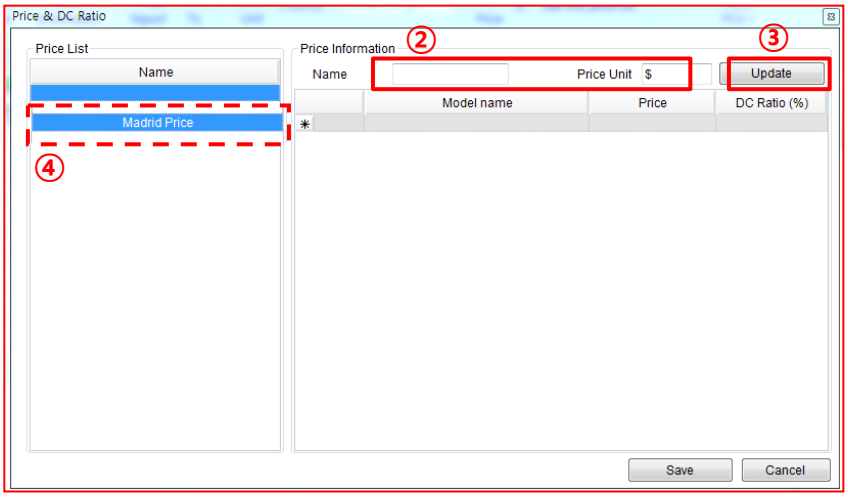
Index	Model	Qty	Remark(Categories)	Unit Price ($)	Amount
Outdoor unit	AM100JXVHGH/EU	1	DVM S(NEW)	2000	2000
	AM220KXVAGH/EU	1	DVM S(NEW)	1000	1000
Indoor unit	AM140FNMDEH/EU	6	MSP DUCT	3000	18000
	AM320FNBDEH/EU	1	Hydro Unit(HE)	4000	4000
	MXJ-TA3419M	1	Y-Joint	0	0
	MXJ-YA3419M	3	Y-Joint	0	0

Design steps

(Generate Price List)

1. Click “Price” button.
2. To generate Price List, Enter a Name and Price unit : **“Madrid Price” and “$”**
3. Click “Update” button.
4. A price list is generated.





Pricing function

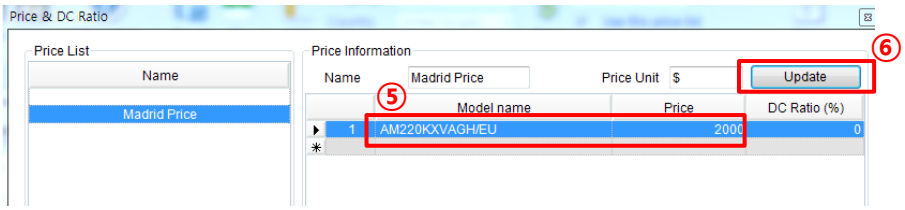
: Using this function, Pricing information can be represented on the report.

Design steps

(Input Price information – Method1)

5. To enter price information : **Here input AM220KXVAGH/EU, 2000**

6. Click “Update” button.



(Input Price information – Method2: **Recommended**)

6. At first, make a excel list using the Report excel file.

7. Copy(Ctrl + C) the excel list.

8. Click the below box and Paste(Ctrl + V) it.

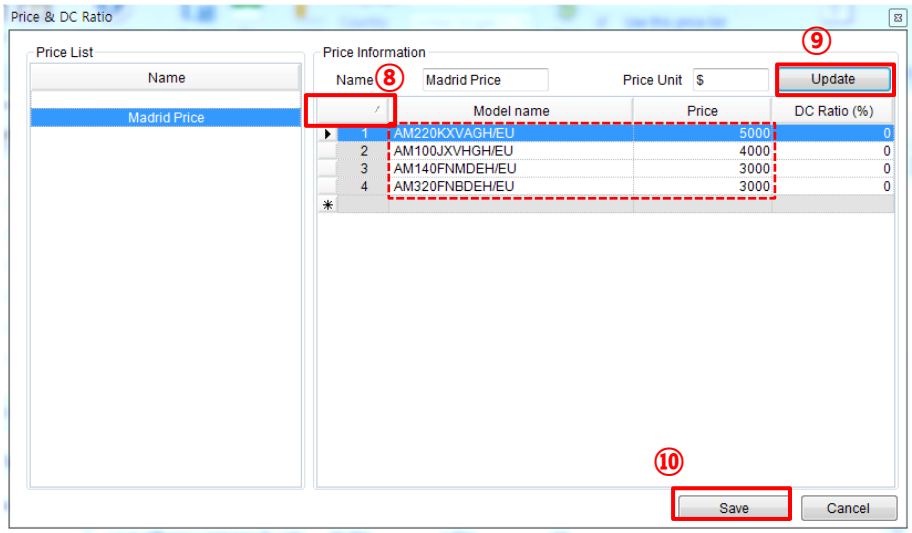
9. Click “Update” button.

10. Click “Save” button.

⑥	1	AM220KXVAGH/EU	5000
⑦	2	AM100JXVHGH/EU	4000
	3	AM140FNMDEH/EU	3000
	4	AM320FNBDEH/EU	3000
	5	MWR-WW00N	1000

⑤

④



SAMSUNG

2016.07
Ver.1.1

Samsung Electronics Co., LTD.
B2B PM / SE
Head Office (Suwon Korea) 129, Samsung-Ro, Yeongtong-Gu, Suwon City, Gyeonggi-Do, Korea 443-742 Website : www.samsung.com/global/business/system-air-conditioner
Email : airconditioner@samsung.com