Samsung Modelling Guide for eQUEST

SAMSUNG

Disclaimer

The information contained in this eQUEST Modeling Guide and in the DVM S library file (the “Information”) is for informational purposes only and should not be construed as engineering or other technical advice. Samsung is under no obligation to update or keep current the information or to correct any inaccuracies therein. Samsung and its affiliates, directors, employees and agents expressly disclaim any liability or responsibility for any loss or damage arising out of the content, accuracy or appropriateness of the Information or from the use of all or any part of the Information by any person. You should obtain your own professional advice and conduct your own independent evaluation with respect to the subject matter herein. Samsung is not responsible for, and does not make any assurances regarding, the function or suitability of eQUEST Building Energy Analysis Software.

Contents

1. Introduction

This document aims to provide guidance for building a simulation model when analyzing annual energy consumption and conservation standard for energy and environmental design at the design stage of a HVAC system.

It guides through the process of *1) installation of the library file for Samsung DVM S units* and *2) building a DVM S system on eQUEST Version 3.65,* which is a building energy analysis software. Please visit the eQUEST website (http://doe2.com/-equest/index.html) for information about downloading a copy of eQUEST (including instructions).

The library file can be downloaded at https://www.dvmdownload-.com/. The library file includes 33 models of air-cooled heat pump/heat recovery outdoor units (North American models) and 80 models of the following indoor unit types: duct, AHU, 1way/4way cassette, wall-mount, ceiling, and floor standing. Each model was built on the basis of the cooling and heating performance curves (capacity ratio modifier function of temperature, energy input ratio modifier function of temperature, part-load ratio correction factors, and piping correction factors). The rated specifications of the outdoor and indoor units are shown in Appendix A and Appendix B, respectively.

The results of any simulation are only a guideline and actual system performance will depend on conditions in addition to the relevant units' rated specifications. In order to increase the accuracy of a simulation, it is critical to use measured data from an actual building and HVAC system. Even if the DVM S system modeling is carried out per these instructions, Samsung HVAC does not represent or warrant that system performance will match the simulation results.

2. Program Installation

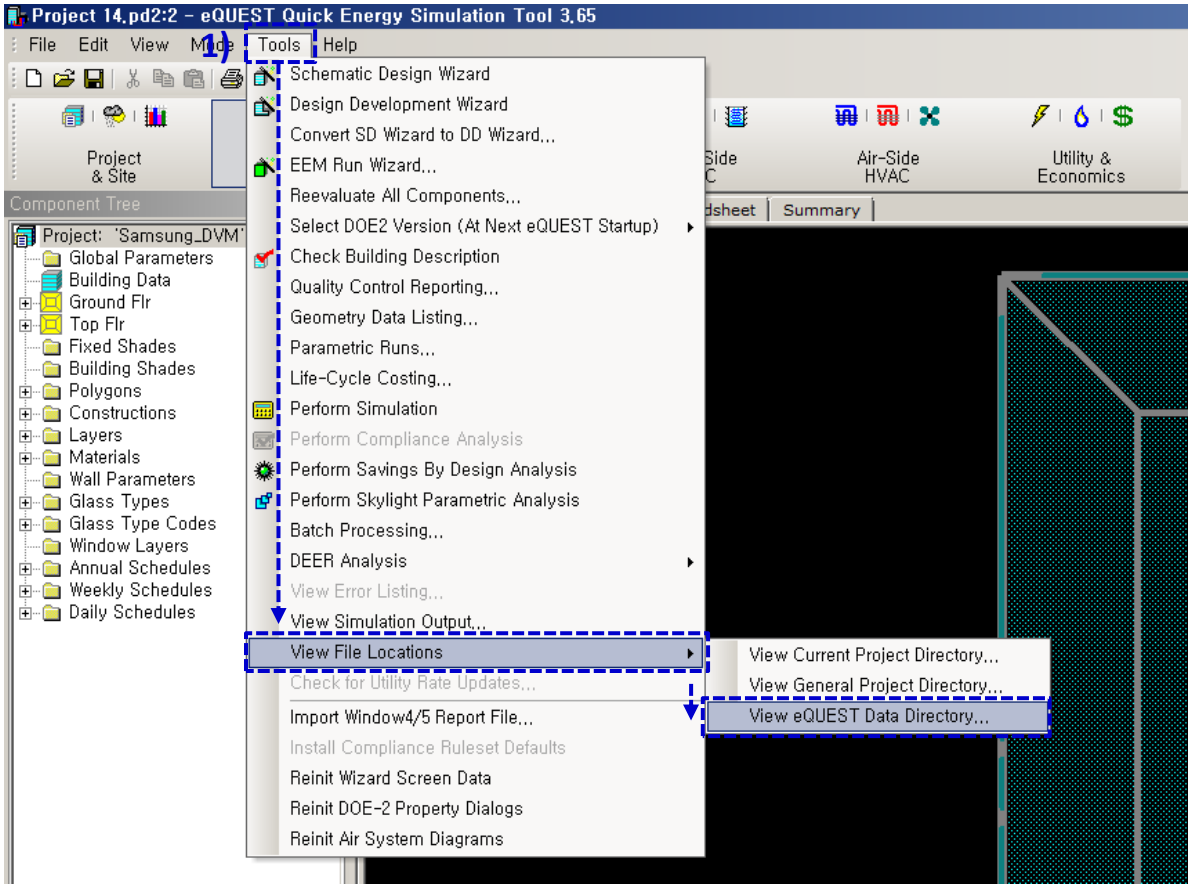
- Connect the below address and download eQUEST Version 3.65 S/W

  · Access the site

  : http://doe2.com/equest/index.html

3. Importing SAMSUNG DVM S Library File

1) Have a new or current project file open, then select ‘Tools’ → ‘View File Locations’ → ‘View eQUEST Data Directory’
2) From “eQUEST 3-65 Data” folder, open “DOE-2” folder.
3) Replace/overwrite the old “BDLLIB.DAT” with the new “BDLLIB.DAT” that was downloaded from Samsung HVAC Website.
4) Restart the eQUEST software.



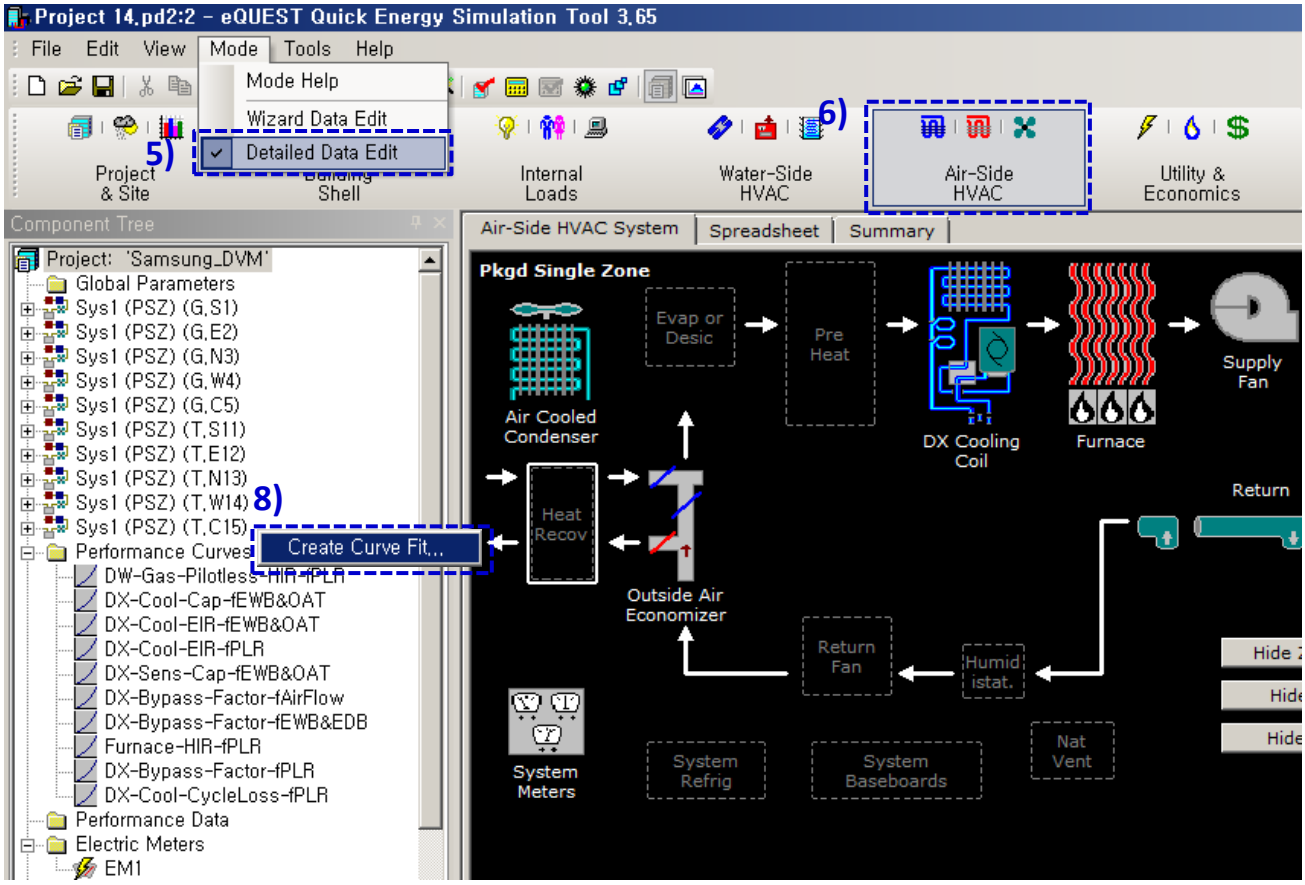
3. Importing SAMSUNG DVM S Library File

5) From ‘Mode’ tab → check ‘Detailed Data Edit’

6) From the top navigation bar → click ‘Air-Side HVAC’

7) ‘Component Tree’ → ‘Performance Curves’ folder lists the performance curves of all the systems registered in the software library.

8) Right click “Performance Curves” folder → ‘Create Curve Fit…’



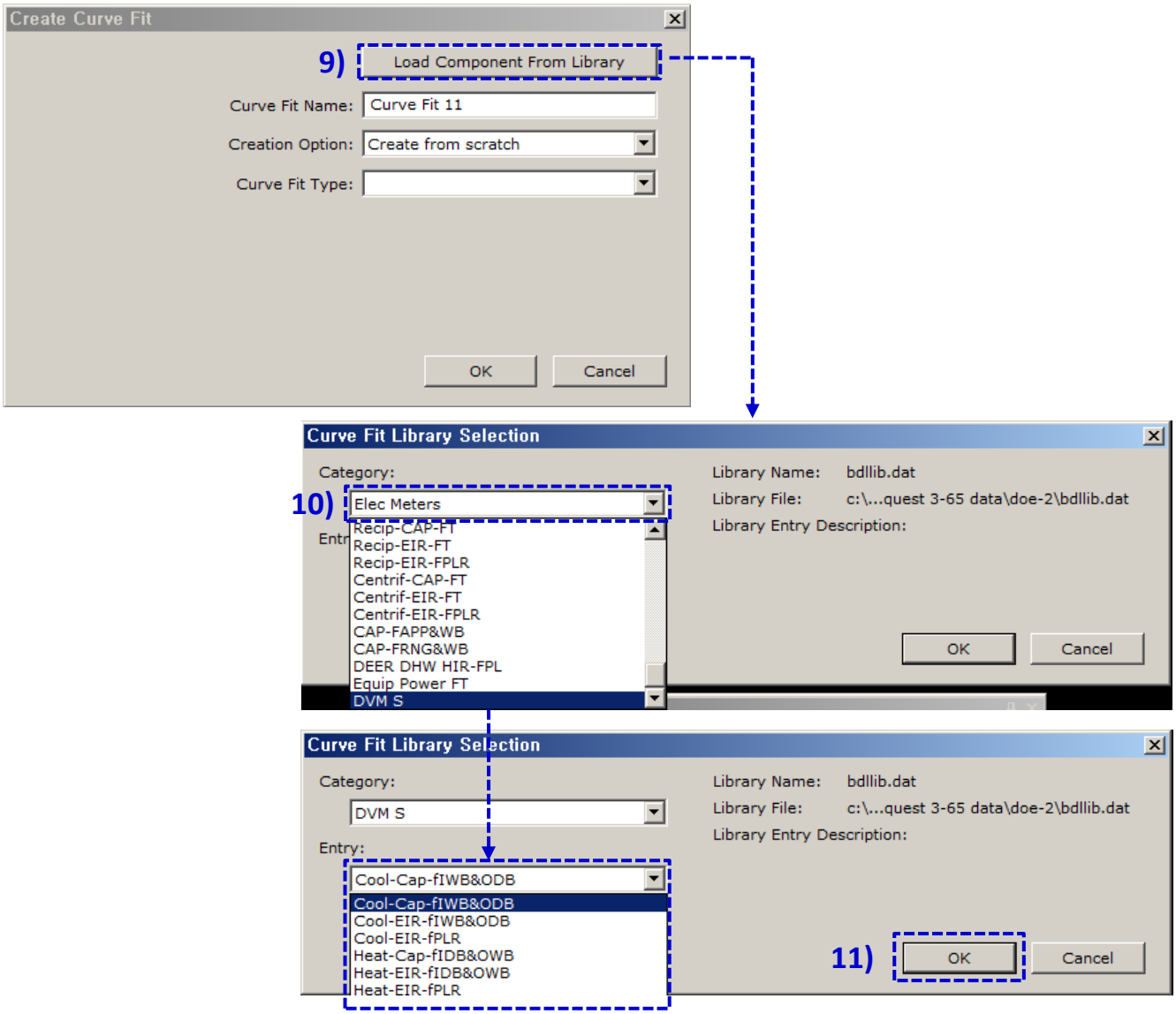
3. Importing SAMSUNG DVM S Library File

9) From ‘Create Curve Fit’ window → click ‘Load Component From Library’

10) From ‘Curve Fit Library Selection’ window

‘Category’ = ‘DVM S’ & ‘Entry’ = select a Performance Curves

11) Click ‘Ok’

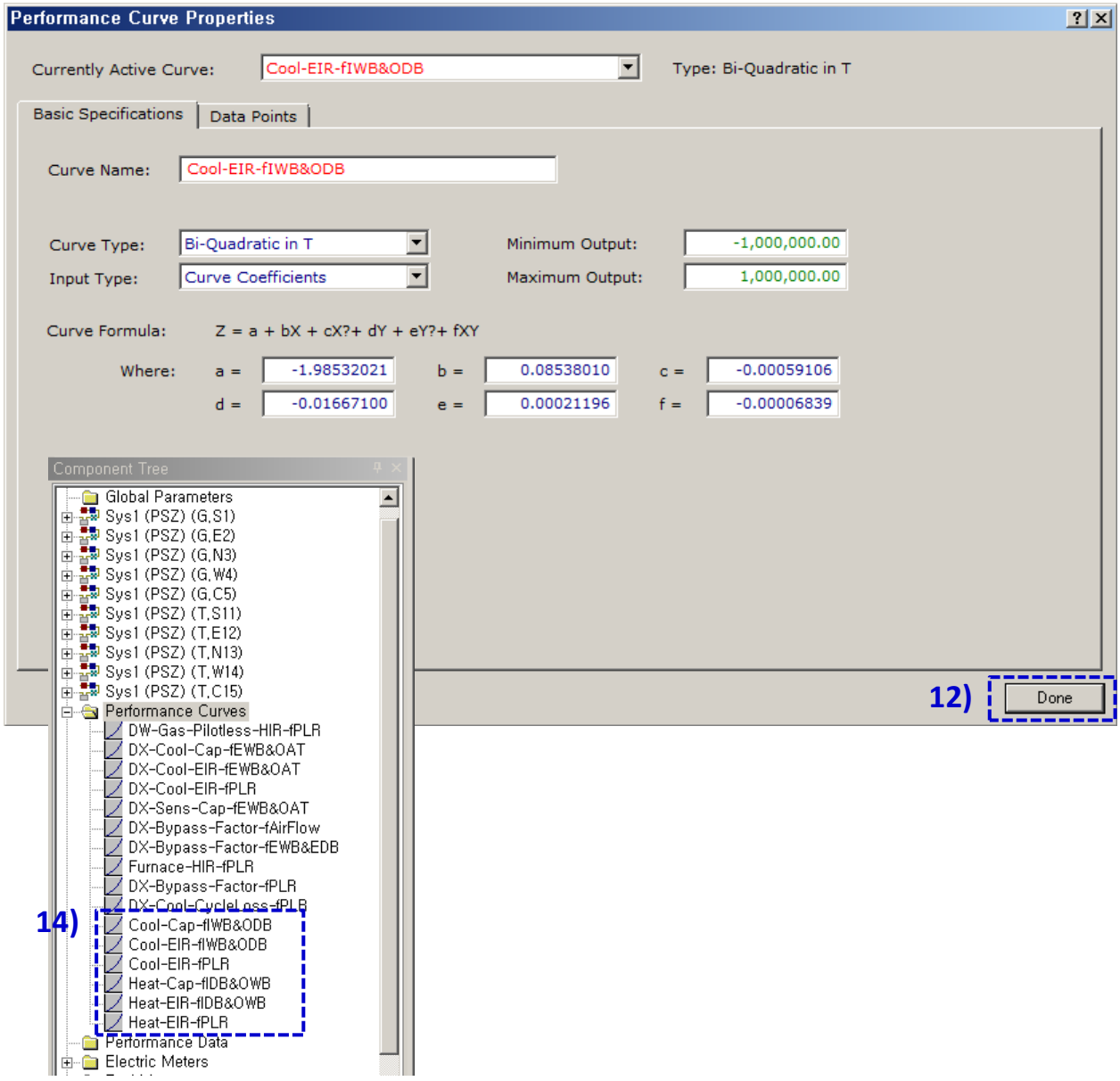


3. Importing SAMSUNG DVM S Library File

12) Review the details on 'Performance Curve Properties' Window, then click 'Done'

13) For all DVM S Performance Curves, repeat steps 10 ~ 12

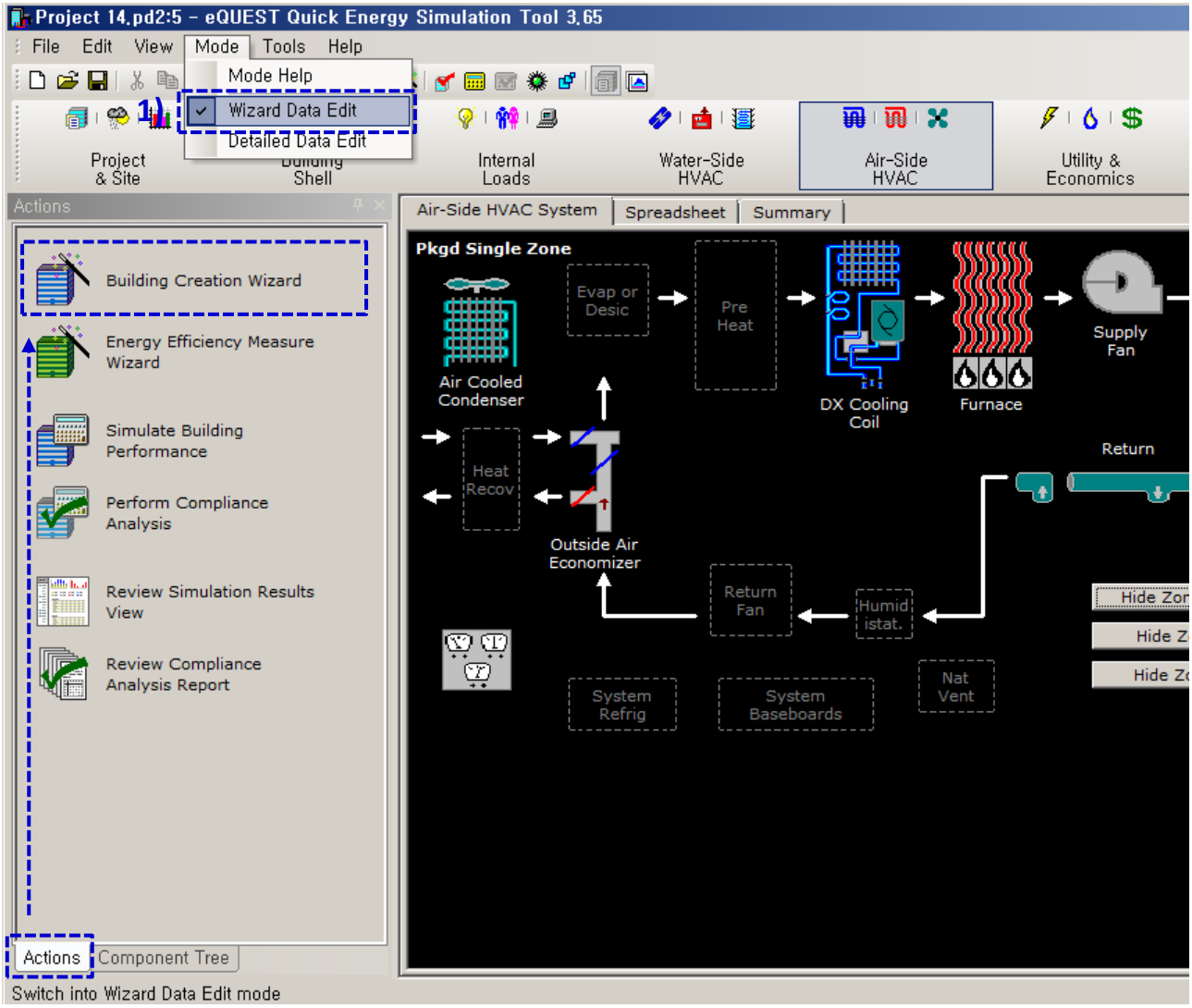
14) 'Component Tree' → 'Performance Curves' folder lists all added DVM S Performance Curves



4. System Modeling - Air-cooled outdoor units

1) From ‘Mode’ tab → check ‘Wizard Data Edit’

2) Click ‘Actions’ tab on the bottom left → select ‘Building Creation Wizard’



4. System Modeling - Air-cooled outdoor units

3) On the bottom left of the eQuest Schematic Design Wizard window, select '19 of 43' from the drop down box to go to pg. 19

4) Make proper selections

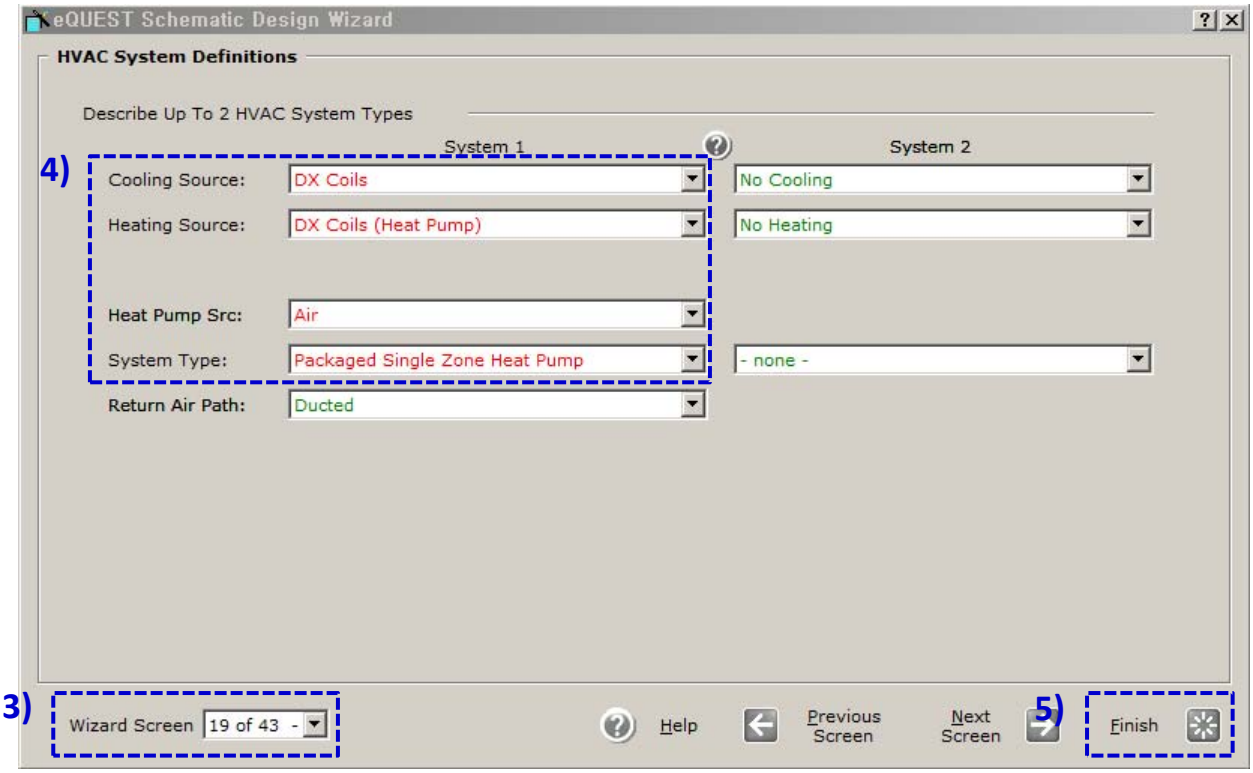
   Cooling Source = 'DX Coils'

   Heating Source = 'DX Coils (Heat Pump)'

   Heat Pump Src = 'Air'

   System Type = 'Packaged Single Zone Heat Pump'

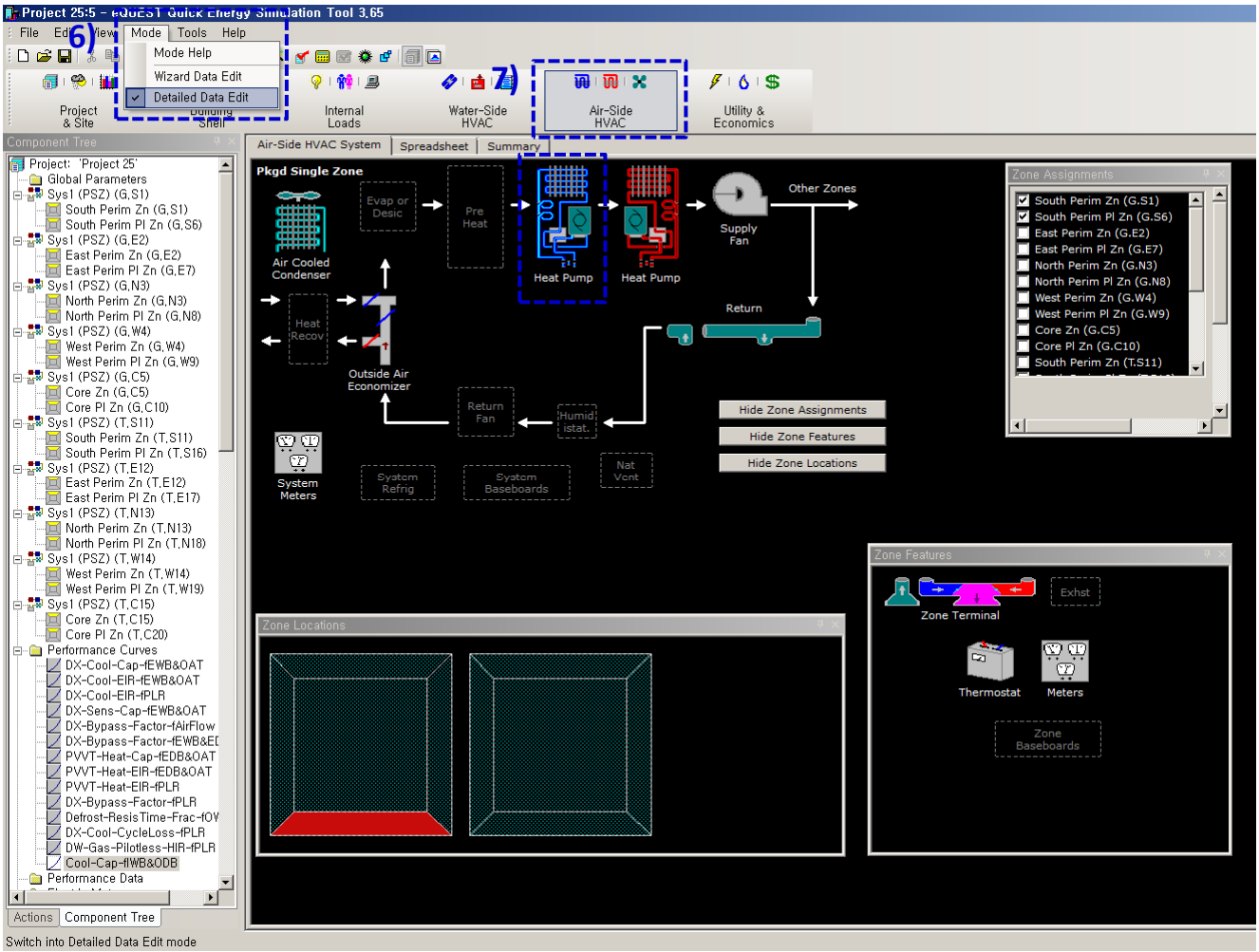
5) Click 'Finish'



4. System Modeling - Air-cooled outdoor units

6) Select: Mode > Detailed Data Edit

7) On “Navigation bar”, select Air-Side HVAC, then double click “Heat Pump” Cooling coil icon from the System diagram.



4. System Modeling - Air-cooled outdoor units

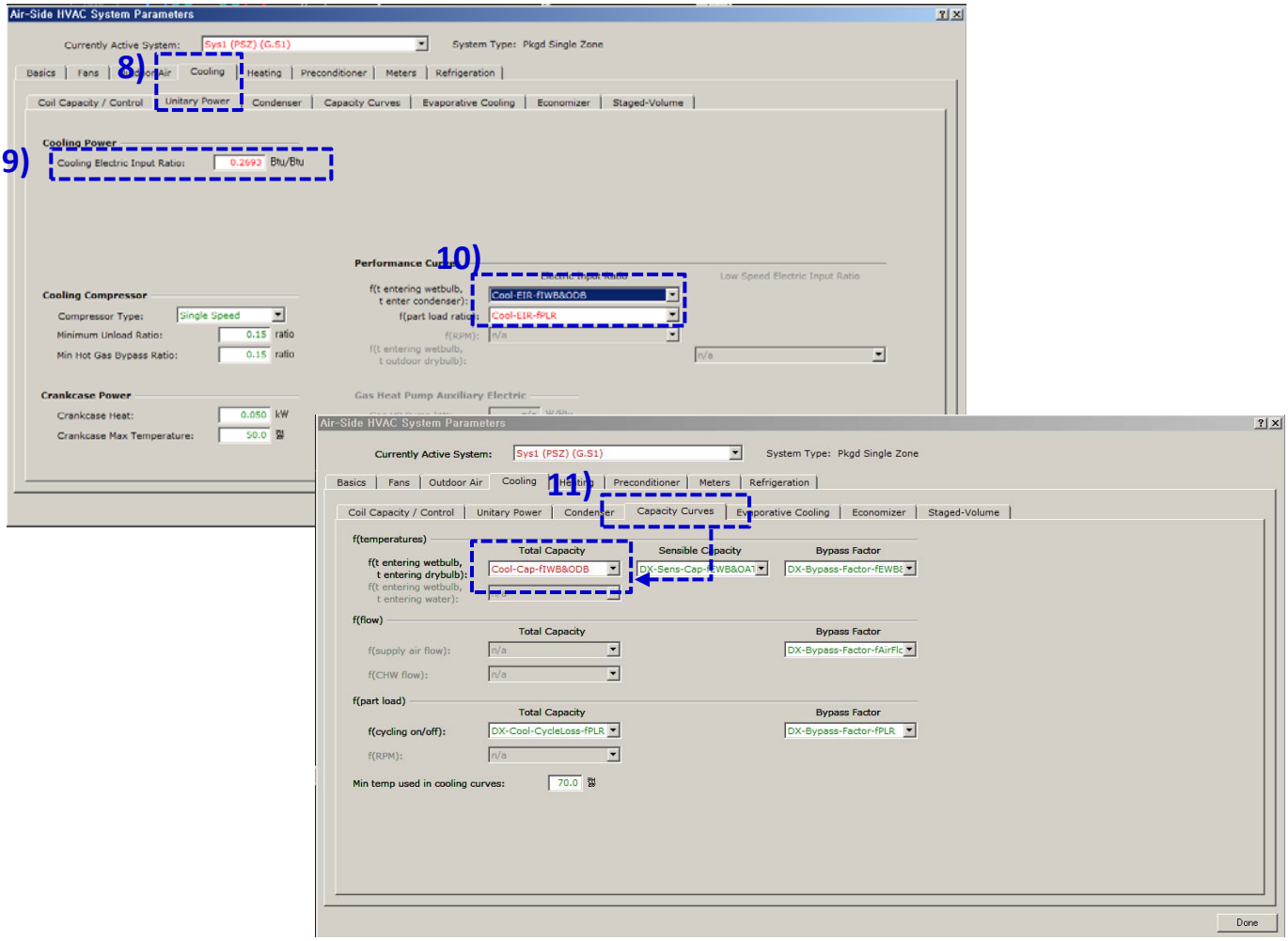
8) On “Air-Side HVAC System Parameters” window, select Cooling > Unitary Power”

9) Input the value in Cooling Power, Cooling Electric Input Ratio.

(refer to Appendix A Outdoor Unit Specifications)

10) For Cooling Electric Input Ratio Curves, refer back to pg.3 and select "Cool-EIR-fIWB&ODB” Curve and "Cool-EIR-fPLR” Curve

11) From “Capacity Curves” tab, select "Cool-Cap-fIWB&ODB” Curve for Total Capacity.



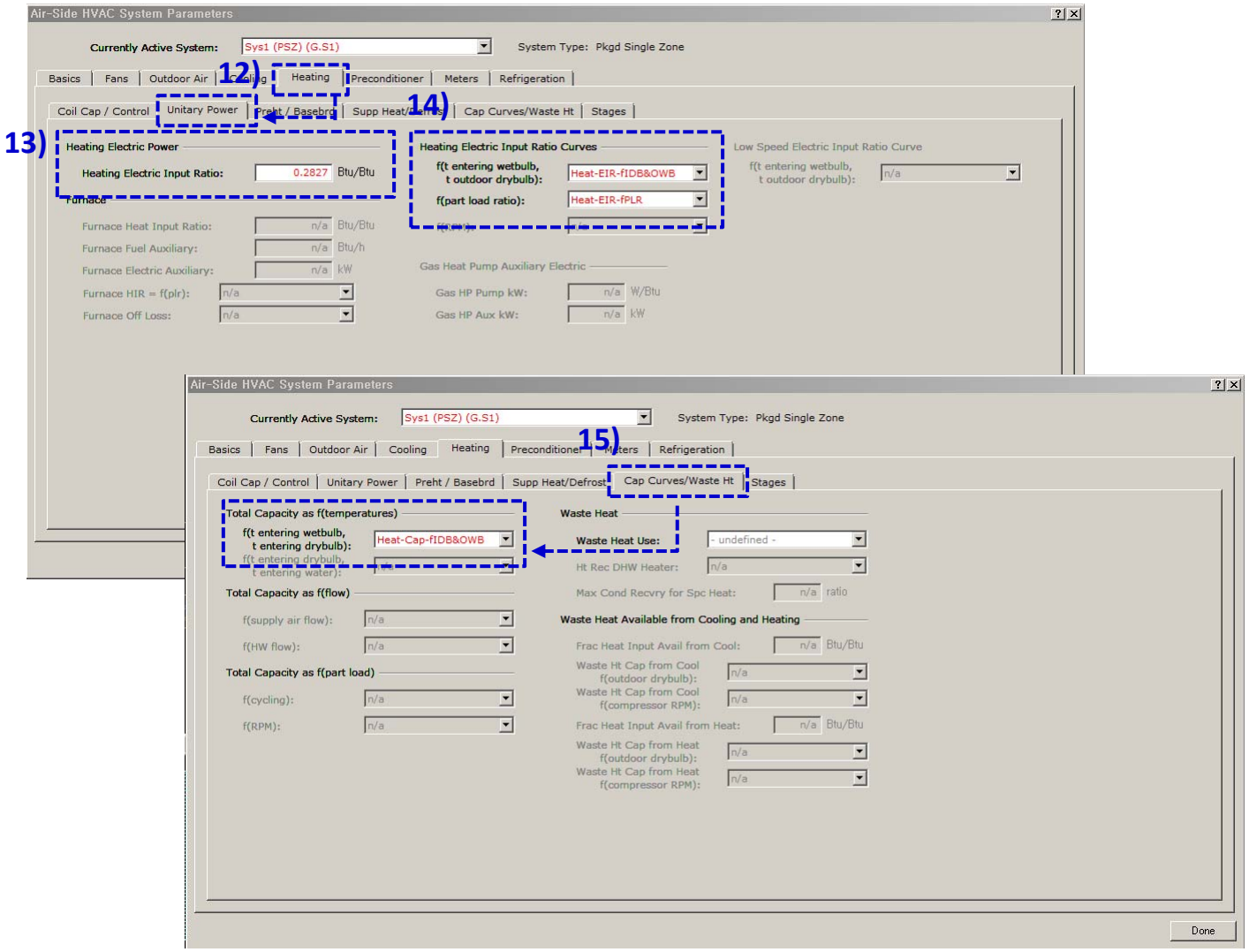
4. System Modeling - Air-cooled outdoor units

12) “Air-Side HVAC System Parameters” window, go to Heating > Unitary Power tab.

13) Under Heating Electric Power, input the value for Heating Electric Input Ratio (refer to Appendix A Outdoor Unit Specifications)

14) For Heating Electric Input Ratio Curves, refer back to pg.3 and select “Heat-EIR-fIDB&OWB” Curve and “Heat-EIR-fPLR” Curve.

15) From “Cap Curves/Waste Ht” tab, select Total Capacity as f(temperature).



4. System Modeling - Air-cooled outdoor units

16) “Air-Side HVAC System Parameters” window, go to Fan > Fan Power and Control tab.

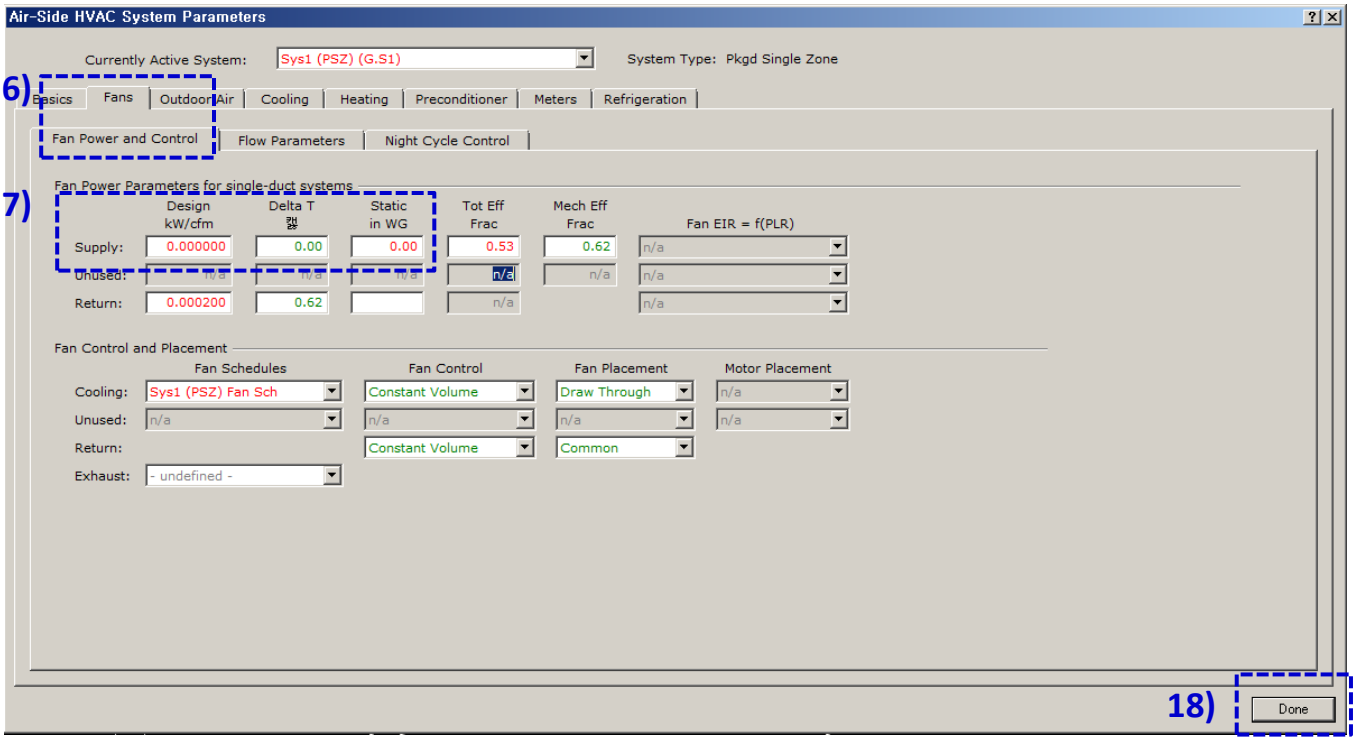
17) Input the fan’s Full Load Energy Rate and Static Pressure.

(refer to Appendix B Indoor Unit Specifications)

In eQUEST, only one indoor unit can be modeled in one system. If the target system includes multiple indoor units, the average of full load energy rate is calculated. The calculation method is as follows.

- Target indoor units : AM007FNLDCH X 1ea, AM012FNLDCH X 2ea, AM024FNLDCH X 3ea
- Cooling Capacity : (7500 X 1) + (12000 X 2) + (24000 X 3) = 103500 [BTU/h]
- Average Full Load Energy : {(7500 X 1 X 0.0001664) + (12000 X 2 X 0.0002124) + (24000 X 3 X 0.0002488)} / (103500) = 0.000234 [kW/CFM]

18) Click ‘Done’



Appendix A Outdoor Unit Specifications

Model	Heating			Cooling		
	Capacity [MBH]	Input [kW]	EIR [-]	Capacity [MBH]	Input [kW]	EIR [-]
AM216KXVGJH/AA	243	15.41	0.22	216	17.37	0.27
AM072FXVAFH2AA	81	4.80	0.20	72	4.34	0.21
AM096FXVAFH2AA	108	6.28	0.20	96	5.64	0.20
AM120FXVAFH2AA	135	8.92	0.23	120	8.10	0.23
AM144FXVAFH2AA	162	11.14	0.23	144	10.79	0.26
AM168HXVAFH2AA	189	13.64	0.25	168	13.86	0.28
AM192HXVAFH2AA	216	16.33	0.26	192	16.44	0.29
AM072FXVAJH2AA	81	4.80	0.20	72	4.34	0.21
AM096FXVAJH2AA	108	6.64	0.21	96	6.13	0.22
AM120FXVAJH2AA	135	8.92	0.23	120	8.59	0.24
AM144FXVAJH2AA	162	11.14	0.23	144	10.79	0.26
AM168HXVAJH2AA	189	13.64	0.25	168	13.86	0.28
AM192HXVAJH2AA	216	16.33	0.26	192	16.44	0.29
AM072KXVTFH/AA	81	5.01	0.21	72	4.45	0.21
AM096KXVTFH/AA	108	6.49	0.20	96	5.94	0.21
AM072KXVTJH/AA	81	5.01	0.21	72	4.45	0.21
AM096KXVTJH/AA	108	6.49	0.20	96	5.94	0.21

Appendix A Outdoor Unit Specifications

Model	Heating			Cooling		
	Capacity [MBH]	Input [kW]	EIR [-]	Capacity [MBH]	Input [kW]	EIR [-]
AM072FXVAFR2AA	81	4.80	0.20	72	4.34	0.21
AM096FXVAFR2AA	108	6.28	0.20	96	5.64	0.20
AM120FXVAFR2AA	135	8.92	0.23	120	8.10	0.23
AM144FXVAFR2AA	162	11.14	0.23	144	10.79	0.26
AM168HXVAFR2AA	189	13.64	0.25	168	13.86	0.28
AM192HXVAFR2AA	216	16.33	0.26	192	16.44	0.29
AM072FXVAJR2AA	81	4.80	0.20	72	4.34	0.21
AM096FXVAJR2AA	108	6.64	0.21	96	6.13	0.22
AM120FXVAJR2AA	135	8.92	0.23	120	8.59	0.24
AM144FXVAJR2AA	162	11.14	0.23	144	10.79	0.26
AM168HXVAJR2AA	189	13.64	0.25	168	13.86	0.28
AM192HXVAJR2AA	216	16.33	0.26	192	16.44	0.29
AM072KXVTFR/AA	81	4.63	0.19	72	4.08	0.19
AM096KXVTFR/AA	108	6.00	0.19	96	5.45	0.19
AM072KXVTJR/AA	81	4.63	0.19	72	4.08	0.19
AM096KXVTJR/AA	108	6.00	0.19	96	5.45	0.19

Appendix B Indoor Unit Specifications

Model	Cooling Capacity [Btu/h]	Heating Capacity [Btu/h]	Max Airflow [CFM]	Fan Power [W]	Energy Rate Units [kW / CFM]	Static Pressure [in. wg]
AM007MNMDCH	7500	8500	318.0	27	0.0000849	0.039
AM009MNMDCH	9500	10500	318.0	27	0.0000849	0.039
AM012MNMDCH	12000	13500	353.0	31	0.0000878	0.039
AM015MNMDCH	15000	17000	388.0	38	0.0000979	0.039
AM018MNMDCH	18000	20000	600.0	80	0.0001333	0.039
AM024MNHDCH	24000	27000	777.0	114	0.0001467	0.205
AM027MNHDCH	27000	30000	812.0	125	0.0001539	0.205
AM030MNHDCH	30000	34000	848.0	132	0.0001557	0.205
AM036MNHDCH	36000	40000	1024.0	165	0.0001611	0.205
AM048MNHDCH	48000	54000	1377.0	272	0.0001975	0.205
AM009FN4DCH	9000	10000	547.4	32	0.0000585	0
AM012FN4DCH	12000	13500	547.4	32	0.0000585	0
AM018FN4DCH	18000	20000	547.4	32	0.0000585	0
AM024FN4DCH	24000	27000	618.0	40	0.0000647	0
AM030FN4DCH	30000	34000	777.0	65	0.0000837	0
AM036FN4DCH	36000	40000	847.6	75	0.0000885	0
AM048FN4DCH	48000	54000	1024.2	95	0.0000928	0

Appendix B Indoor Unit Specifications

Model	Cooling Capacity [Btu/h]	Heating Capacity [Btu/h]	Max Airflow [CFM]	Fan Power [W]	Energy Rate Units [kW / CFM]	Static Pressure [in. wg]
AM007FNLDCH	7500	8500	282.5	47	0.0001664	0.04
AM009FNLDCH	9500	10500	317.8	60	0.0001888	0.04
AM012FNLDCH	12000	13500	353.2	75	0.0002124	0.04
AM018FNLDCH	18000	20000	547.4	140	0.0002558	0.04
AM024FNLDCH	24000	27000	582.7	145	0.0002488	0.04
AM030FNLDCH	30000	34000	1094.8	95	0.0000868	0.04
AM036FNLDCH	36000	40000	1200.7	120	0.0000999	0.12
AM048FNLDCH	48000	54000	1342.0	180	0.0001341	0.12
AM024JNHDCH	24000	27000	653.0	82	0.0001256	0.20
AM027JNHDCH	27000	30000	742	91	0.0001226	0.20
AM030JNHDCH	30000	34000	883.0	108	0.0001223	0.20
AM036JNHDCH	36000	40000	954.0	140	0.0001468	0.20
AM048JNHDCH	48000	54000	1236.0	200	0.0001618	0.20
AM054JNHDCH	54000	61400	1413.0	280	0.0001982	0.20
AM036FNHDCH	36000	40,000	988.9	210	0.0002124	0.39
AM048FNHDCH	48000	54,000	1377.3	330	0.0002396	0.39
AM076FNHDCH	76000	85200	2048.3	530	0.0002587	0.59

Appendix B Indoor Unit Specifications

Model	Cooling Capacity [Btu/h]	Heating Capacity [Btu/h]	Max Airflow [CFM]	Fan Power [W]	Energy Rate Units [kW / CFM]	Static Pressure [in. wg]
AM096FNHDCH	96000	108000	2542.8	790	0.0003107	0.59
AM012JNZDCH	12000	13500	373.0	64	0.0001716	0.40
AM018JNZDCH	18000	22000	531.0	94	0.0001770	0.40
AM024JNZDCH	24000	27000	706.0	144	0.0002040	0.40
AM030JNZDCH	30000	34000	1053.0	218	0.0002070	0.40
AM036JNZDCH	36000	40000	1053.0	218	0.0002070	0.40
AM048JNZDCH	48000	54000	1410.0	290	0.0002057	0.40
AM054JNZDCH	54000	60000	1603.0	341	0.0002127	0.40
AM060JNZDCH	60000	64000	1768.0	380	0.0002149	0.40
AM072JNZDCH	72000	80000	2110.0	620	0.0002938	0.40
AM007FN1DCH	7500	8500	247.2	40	0.0001618	0
AM009FN1DCH	9500	10500	247.2	45	0.0001820	0
AM012FN1DCH	12000	13500	282.5	50	0.0001770	0
AM005KNNDCH	5000	6000	300.0	18	0.0000600	0
AM007KNNDCH	7500	8700	300.0	18	0.0000600	0
AM009FNNDCH	9500	10500	353.0	24	0.0000680	0
AM012FNNDCH	12000	13500	371.0	28	0.0000755	0

Appendix B Indoor Unit Specifications

Model	Cooling Capacity [Btu/h]	Heating Capacity [Btu/h]	Max Airflow [CFM]	Fan Power [W]	Energy Rate Units [kW / CFM]	Static Pressure [in. wg]
AM018FNNDCH	18000	20000	459.0	36	0.0000784	0
AM020FNNDCH	20000	23000	477.0	38	0.0000797	0
AM009KN4DCH	9000	10000	565.1	26	0.0000460	0
AM012KN4DCH	12000	13500	565.1	26	0.0000460	0
AM018KN4DCH	18000	20000	565.1	26	0.0000460	0
AM024KN4DCH	24000	27000	671.0	38	0.0000566	0
AM030KN4DCH	30000	34000	900.6	54	0.0000600	0
AM036KN4DCH	36000	40000	988.9	71	0.0000718	0
AM048KN4DCH	48000	54000	1112.5	91	0.0000818	0
AM007HNQDCH	7500	8500	275.5	37	0.0001343	0
AM009HNQDCH	9500	10500	275.5	37	0.0001343	0
AM012HNQDCH	12000	13500	328.4	45	0.0001370	0
AM018HNQDCH	18000	20000	423.8	55	0.0001298	0
AM020HNQDCH	20000	23000	494.4	57	0.0001153	0
AM024HNQDCH	23200	23800	494.4	60	0.0001214	0
AM018FNCDCH	18000	20000	494.4	72	0.0001456	0
AM024FNCDCH	24000	27000	635.7	80	0.0001258	0

Appendix B Indoor Unit Specifications

Model	Cooling Capacity [Btu/h]	Heating Capacity [Btu/h]	Max Airflow [CFM]	Fan Power [W]	Energy Rate Units [kW / CFM]	Static Pressure [in. wg]
AM036JNCDCH	36000	40000	1035.0	92	0.0000889	0
AM048JNCDCH	48000	54000	1286.0	160	0.0001244	0
AM006JNFDCH	6000	6700	175.0	35	0.0002000	0
AM009JNFDCH	9500	10500	250.0	40	0.0001600	0
AM012JNFDCH	12000	13500	350	50	0.0001429	0
AM018JNFDCH	18000	20000	550	110	0.0002000	0
AM024JNFDCH	24000	27000	550.0	110	0.0002000	0
AM006JNGDCH	6000	6700	175.0	35	0.0002000	0
AM009JNGDCH	9500	10500	250.0	40	0.0001600	0
AM012JNGDCH	12000	13500	350	50	0.0001429	0
AM018JNGDCH	18000	20000	550.0	110	0.0002000	0
AM024JNGDCH	24000	27000	550.0	110	0.0002000	0

SAMSUNG

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Ver.1.0

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