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Air to Air Heat Exchanger Selection Tool
Operating Instructions

Contents

1 Overview

The "Air to Air Heat Exchanger Selection Tool" is a tool for selection of total heat exchanger units for a required amount of ventilation, and for calculation of the amount of heat recovered and the investment recovery period. By registering the required input information, calculations are performed automatically, and graphs and forms can be created.

2 System requirements

The following shows the ideal system requirements for this software:

Item	Necessary environment
Operating System	Windows XP with SP3 or later, Windows Vista, Windows 7, Windows 8
Office System	Office 2003, 2007, 2010, 2013

The following runtime libraries are installed before beginning installation of the settings file creation software.

·　Microsoft®.NET Framework 4.0

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3 Features of Air to Air Heat Exchanger Selection Tool

3-1 Select a Total Heat Exchanger Unit

Total heat exchanger unit settings are set on the basis of the required amount of ventilation; the Supply air (SA) value is calculated by setting the Outdoor air (OA)/Return air (RA) values.

Fig. 3-1 Selection tab screen

3-2　　Confirm Using a Psychrometric Chart

Outdoor air (OA)/Return air (RA)/Exhaust air (EA)/Supply air (SA) are displayed on psychrometric chart.
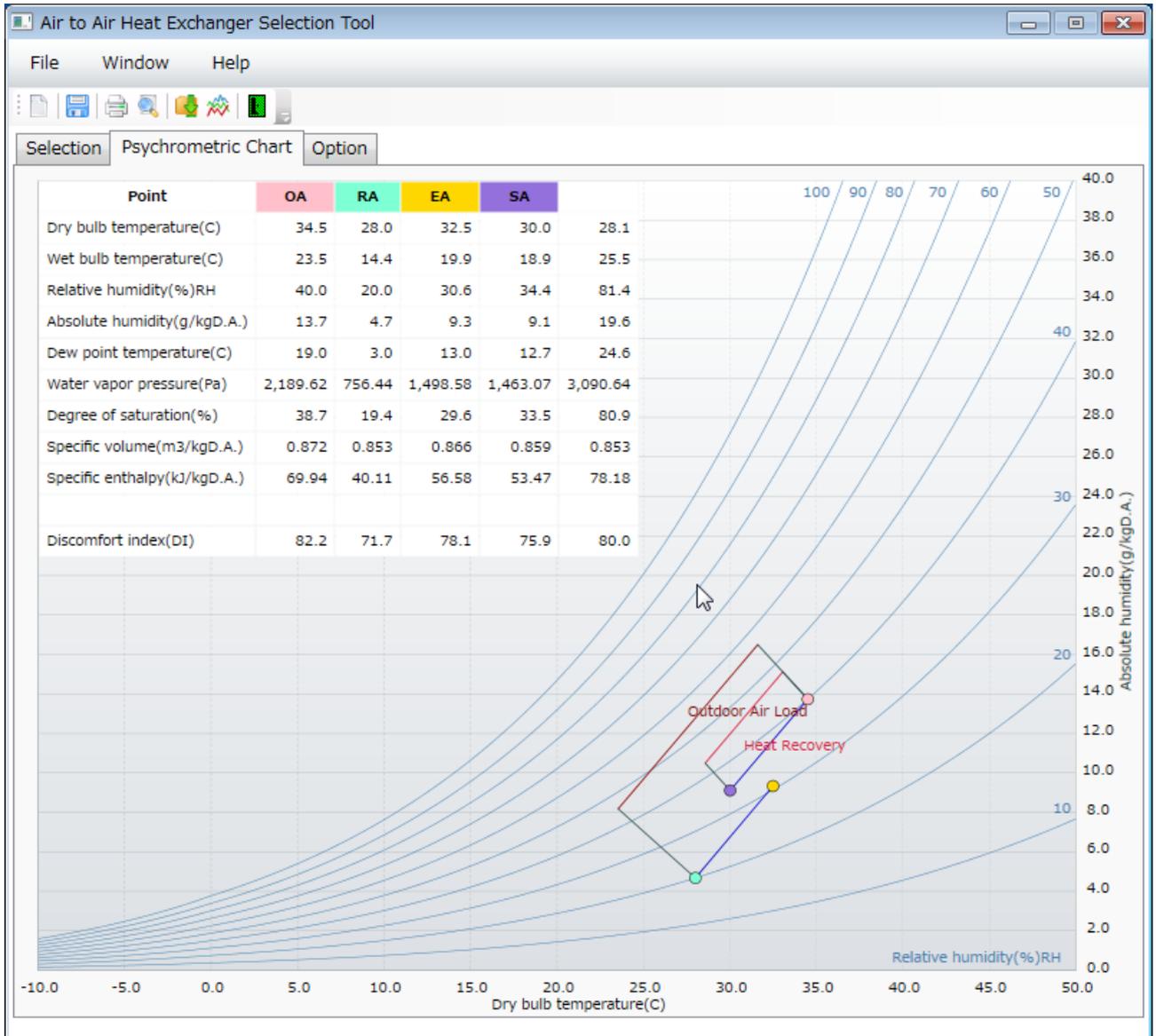
Fig. 3-2 Psychrometric chart tab screen

3-3   Set Models, Display Units, Other Settings

Models, display units, prices, and other settings are set; the settings are reflected in the different screens.
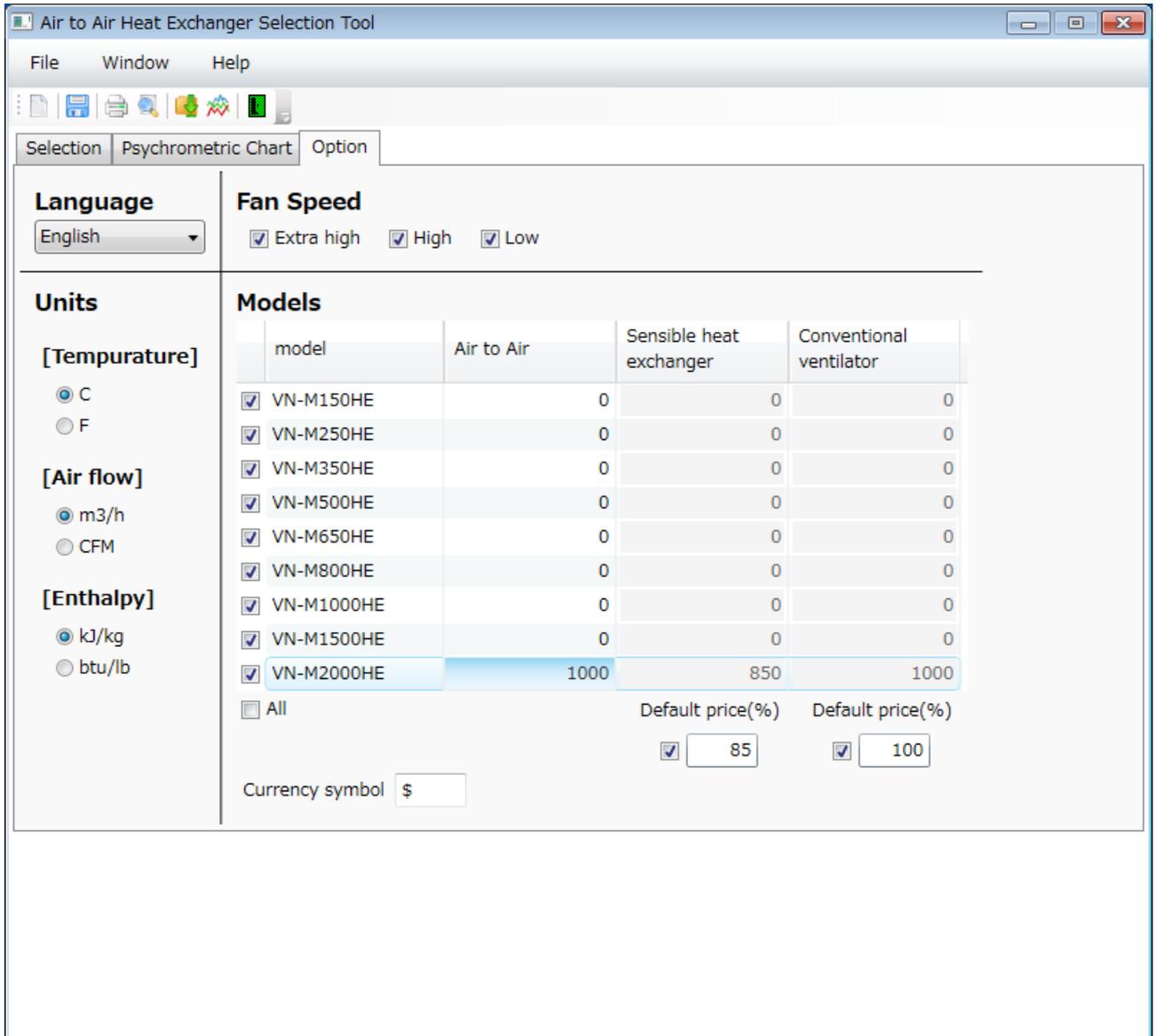
Fig. 3-3 Option tab screen

3-4   Set Necessary Data for Calculations

The necessary data to calculate the amount of heat recovered and the investment recovery period is set.

Calculation Setting

[Conditions]

Indoor	Heating	Cooling	
Dry bulb temperature	15.0	28.0	C
Relative humidity	0.0	20.0	%
Outdoor			
Dry bulb temperature	0.0	34.5	C
Relative humidity	0.0	40.0	%

[Operation Time]

	Heating	Cooling	
hour/day	0	0	h
day/month	0	0	day
month/year	0	0	month

[Cost, COP]

	Heating	Cooling	
Energy cost	0.01	0.01	Price/kWh
COP	1.5	1.5	kW/kW

OK

Fig. 3-4 Calculation settings screen

3-5   Check Version Information

Upon clicking About on the Help menu, the version of this software is displayed.

Fig. 3-5 Menu (version information)

Fig. 3-6 Version information screen

4 Using the Air to Air Heat Exchanger Selection Tool

4-1 Starting and Exiting the Air to Air Heat Exchanger Selection Tool

4-1-1 Start the Air to Air Heat Exchanger Selection Tool

There are two methods for starting the Air to Air Heat Exchanger Selection Tool: from the desktop icon, and from the Windows menu.

(1) Start the Air to Air Heat Exchanger Selection Tool.

・ From the desktop icon

Double-click the desktop icon.

Fig. 4-1 Air to Air Heat Exchanger Selection Tool icon

・ From the Windows menu

From the Start menu select All programs → Toshiba → Air to Air Heat Exchanger Selection Tool → Air to Air Heat Exchanger Selection Tool.

(2) Startup of the Air to Air Heat Exchanger Selection Tool is completed.

Upon starting the Air to Air Heat Exchanger Selection Tool, either from the desktop icon or from the Windows menu, the Selection tab screen is displayed, and thereafter, various functions can be used.
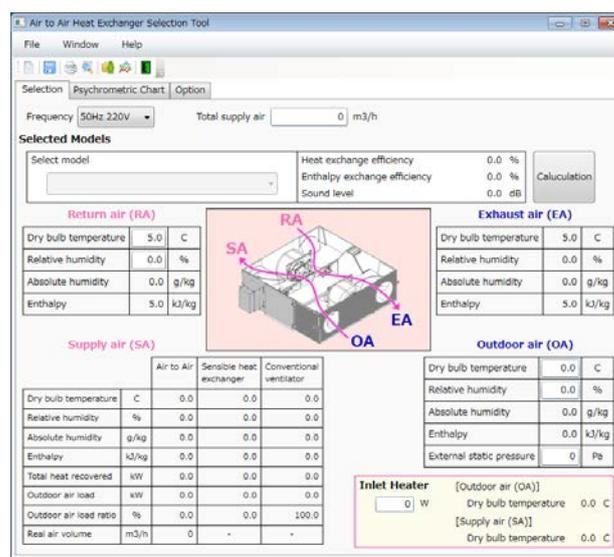
Fig. 4-2 Selection tab screen

4-1-2　Exit the Air to Air Heat Exchanger Selection Tool

To exit the Air to Air Heat Exchanger Selection Tool, click the Close button, the Exit button, or the Exit menu item.

Fig. 41 Close button
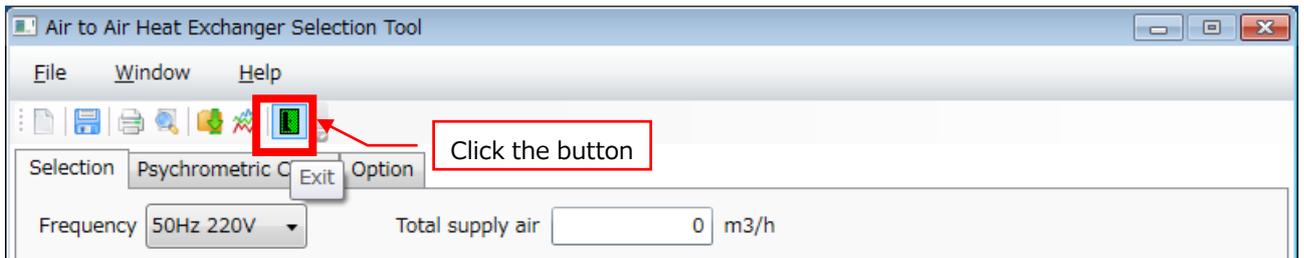
Fig. 42 Exit button
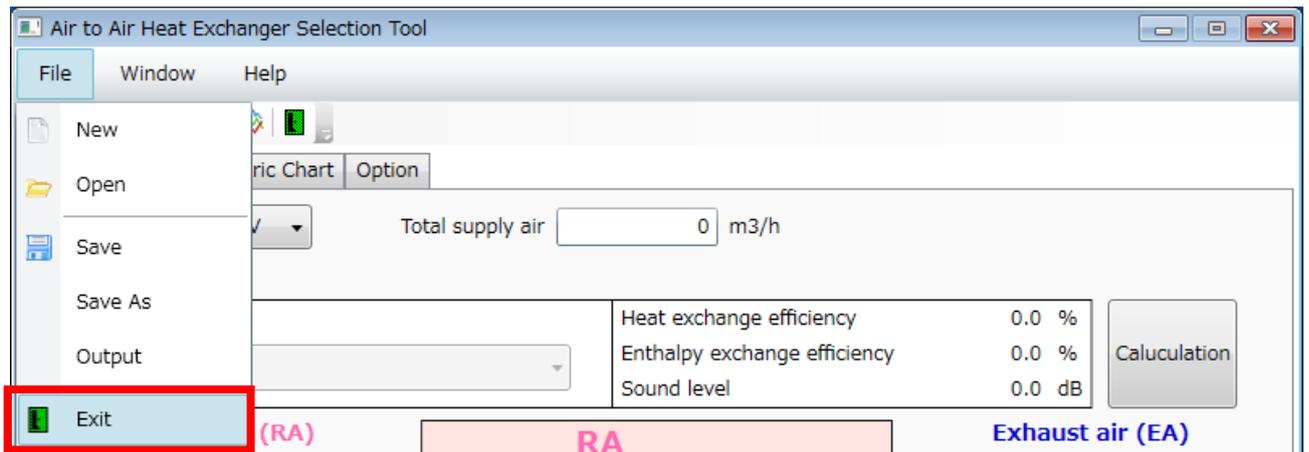
Fig. 43 Exit menu item

4-2　Before Selecting a Total Heat Exchanger Unit

Before selecting a total heat exchanger unit, settings for total heat exchanger unit models, display units in the Tool, and other settings are made on the Option tab screen.

Items which can be set are Language, Units, Fan speed, Models, and Price.

Fig. 4-6 Option tab screen

4-2-1 Units Settings

Units displayed on the different screens are set. Please refer to the following table for units of item that can be set.

Item	Units		Initial value
Temperature	°C	°F	°C
Air flow	m³/h	CFM	m³/h
Enthalpy	kJ/kg	BTU/lb	kJ/kg

4-2-2 Fan Speed Settings

Fan Speed for the total heat exchanger unit can be selected among Extra high, High, and Low. Only models with Fan Speed total heat exchanger unit selected are displayed in Select model on the Selection tab screen.

4-2-3 Models Setting

Only selected models are displayed in Select model on the Selection tab screen. If ALL is selected, all models are selected in Select model on the Selection tab screen.

4-2-4 Price Setting

Prices for each model and currency units are set. If Default Price is checked, price setting cannot be input. The price set for a model is a multiple of the Default Price.

4-3　Select Total Heat Exchanger Unit

The following procedure is used to select total heat exchanger unit.

(1)　Select Frequency.

(2)　Set Total supply air.

(3)　Set Select model.

(4)　In Return air (RA), set the Dry bulb temperature and the Relative humidity.

(5)　In Outdoor air (OA), set the Dry bulb temperature, the Relative humidity, and the External static pressure.

However, the total heat exchanger units which can be selected change depending on the value set for the External static pressure.

(6)　If heating settings appear, set the power for the heater.
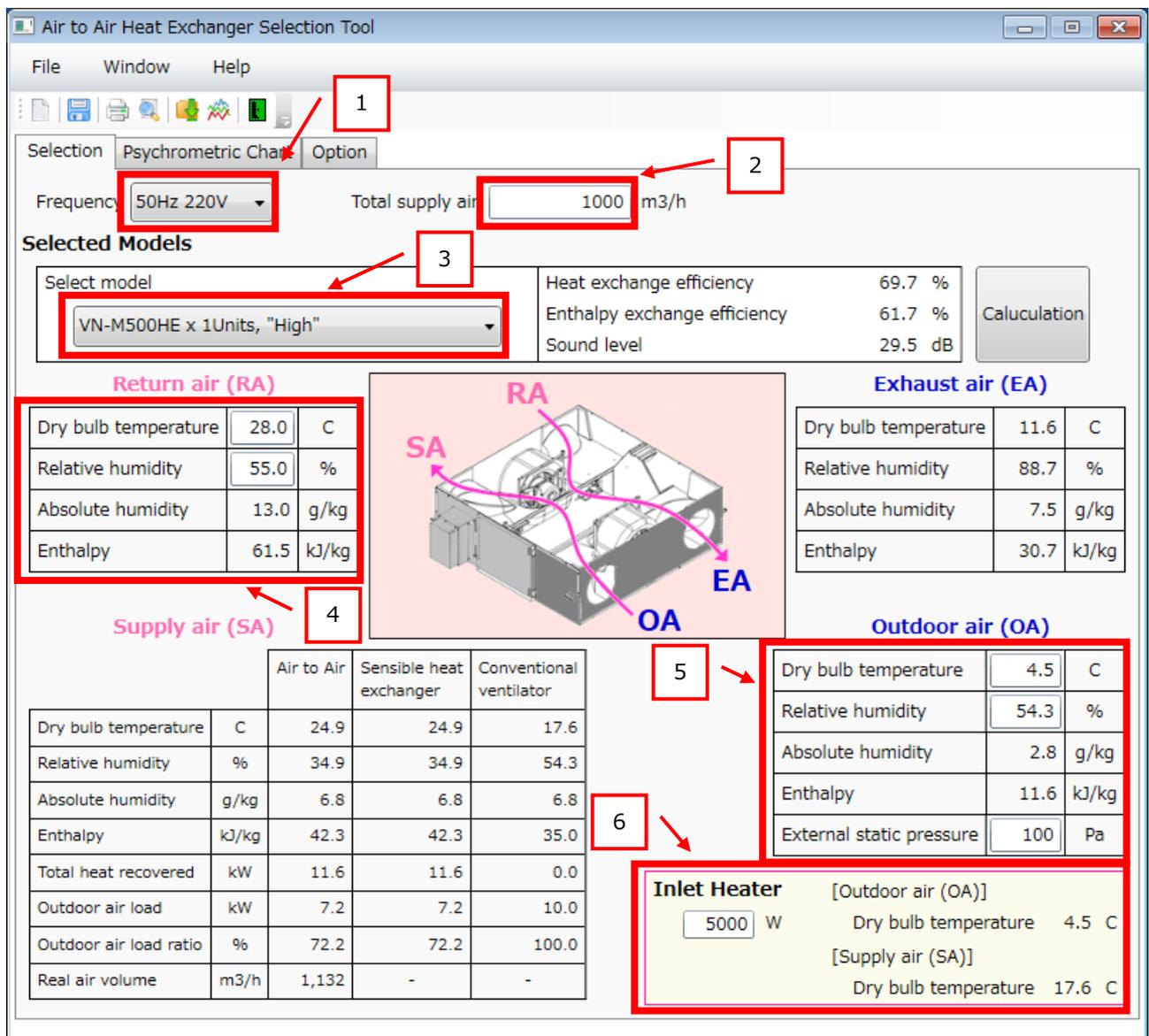
Fig. 4-7 Selection tab screen

Operation switches between cooling and heating according to the relative magnitudes of the Return air (RA) and the Outdoor air (OA) Dry bulb temperatures.

· If Dry bulb temperature of Return air (RA) < Dry bulb temperature of Outdoor air (OA)

Return air (RA)		
Dry bulb temperature	28.0	C
Relative humidity	55.0	%
Absolute humidity	13.0	g/kg
Enthalpy	61.5	kJ/kg

Supply air (SA)

Exhaust air (EA)		
Dry bulb temperature	32.5	C
Relative humidity	50.6	%
Absolute humidity	15.6	g/kg
Enthalpy	72.7	kJ/kg
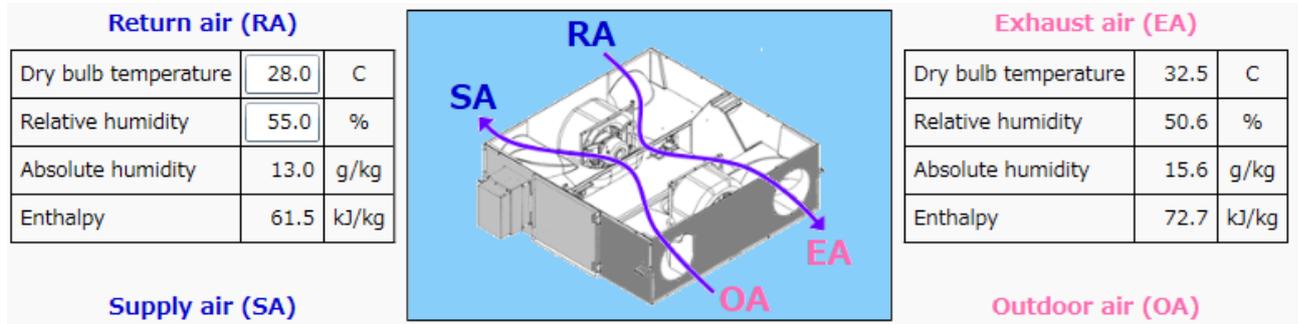
Outdoor air (OA)

Fig. 4-8 Case of cooling

· If Dry bulb temperature of Return air (RA) ≧ Dry bulb temperature of Outdoor air (OA)

Return air (RA)		
Dry bulb temperature	28.0	C
Relative humidity	55.0	%
Absolute humidity	13.0	g/kg
Enthalpy	61.5	kJ/kg

Supply air (SA)

Exhaust air (EA)		
Dry bulb temperature	11.6	C
Relative humidity	88.7	%
Absolute humidity	7.5	g/kg
Enthalpy	30.7	kJ/kg

Outdoor air (OA)
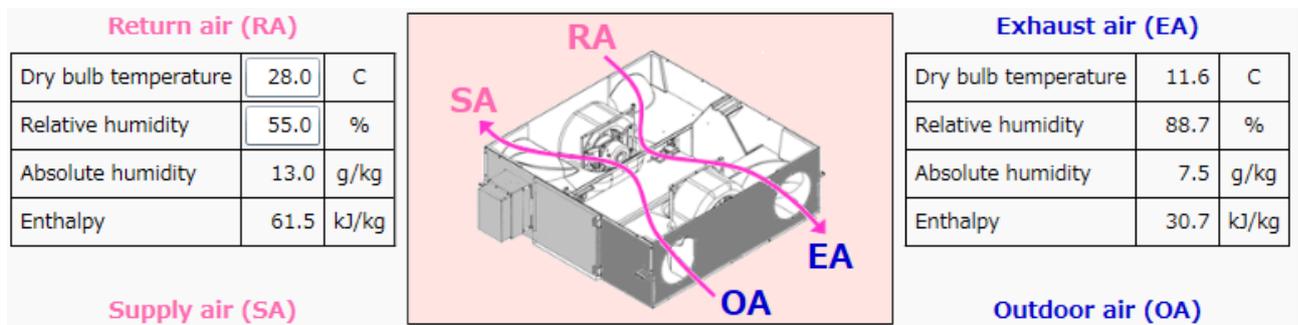
Fig. 4-9 Case of heating

The settings made on the Selection tab screen are reflected in the Psychrometric chart tab screen and Calculation Results forms. Upon clicking the Calculation button on the Selection tab screen, the Calculation Setting screen is displayed. When changing necessary data for calculations, please make changes using the Calculation screen.

Calculation Setting

[Conditions]

Indoor	Heating	Cooling	
Dry bulb temperature	15.0	28.0	C
Relative humidity	0.0	20.0	%
Outdoor			
Dry bulb temperature	0.0	34.5	C
Relative humidity	0.0	40.0	%

[Operation Time]

hour/day	0	0	h
day/month	0	0	day
month/year	0	0	month

[Cost, COP]

Energy cost	0.01	0.01	Price/kWh
COP	1.5	1.5	kW/kW

OK

Fig. 4-10 Calculation Setting screen

Air to Air Heat Exchanger

Edit Date:2013/09/12

Air to Air Heat Exchanger Calculation Results

Selected Model

Model	VN-M800HE	1Units
Fan speed	Extra high	
Heat exchange efficiency	71.9	%
Enthalpy exchange efficiency (Heating)	67.0	%
Enthalpy exchange efficiency (Cooling)	58.6	%
Sound pressure level	37.0	dB

Room Conditions

Real air volume	1,109	m3/h
External static pressure	0	Pa

Conditions

	Heating			Cooling		
	Temperature(C)	Humidity(%)	Enthalpy(kJ/kg)	Temperature(C)	Humidity(%)	Enthalpy(kJ/kg)
Outdoor	15.0	40.0	25.8	30.0	60.0	71.2
Indoor	20.0	50.0	38.6	25.0	50.0	50.3
Supply air	18.6	46.4	34.3	26.4	58.9	59.0

Results

	Outdoor air load(kW)			Total heat recovered (kW)	Outdoor air load ratio(%) (Air to air)	Operation Time(h)	Money saved (¥)
	Air to Air Heat Exchanger	Sensible Heat exchanger	Conventional Ventilator				
Heating	1.6	3.4	4.7	3.2	33.0	1,000	4,753
Cooling	3.2	6.3	7.7	4.5	41.4	1,000	6,787
Total	4.8	9.7	12.4	7.7	-	2,000	11,540

Recovered money (¥)

	Air to Air Heat Exchanger	Sensible Heat exchanger	Conventional Ventilator
Heating	2,346	5,077	7,099
Cooling	4,788	9,510	11,575
Total	7,135	14,587	18,675
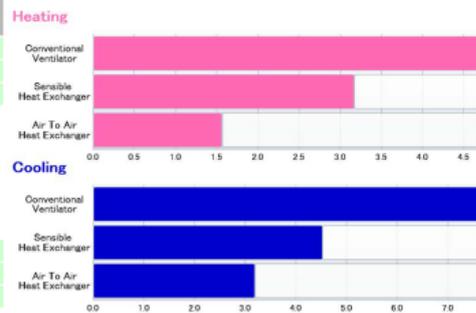
Price

Air to Air Heat Exchanger	35,000	¥
Sensible Heat exchanger	28,000	¥
Conventional Ventilator	17,500	¥

Outdoor Air Load

Heating

Cooling

Annual Cost

● Conventional Ventilator ● Sensible Heat Exchanger ● Air to Air
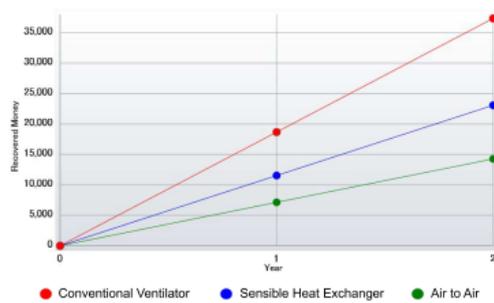
Pay Back
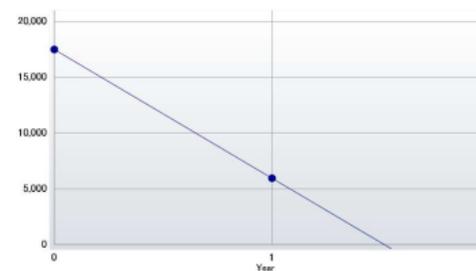
Legal information
Toshiba Carrier do not accept any responsibility for the results calculated by the softwore.

Fig. 4-11 Calculation Results form

The Calculation Setting screen can also be displayed using the Calculation Setting button, or from the Calculation Setting menu item.
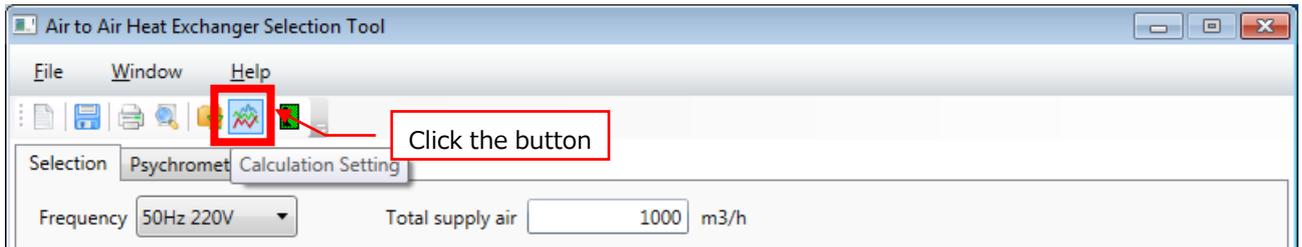
Fig. 4-12 Calculation Setting button
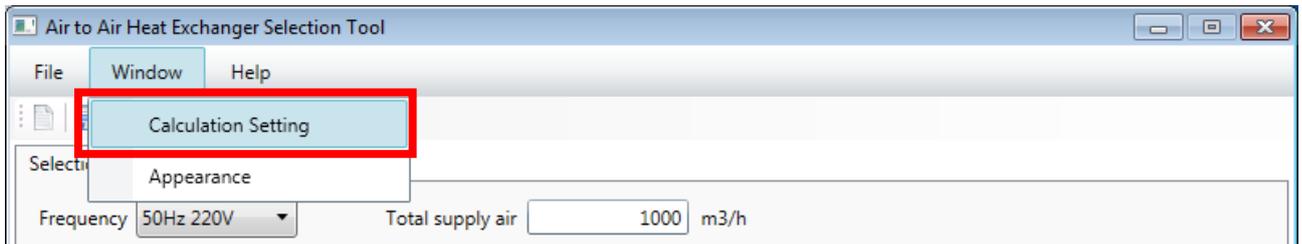
Fig. 4-13 Calculation Setting menu item

4-4   Check Settings Using the Psychrometric Chart Tab Screen

The Outdoor air (OA), Return air (RA), Exhaust air (EA), and Supply air (SA) set on the Selection tab screen can be checked on the psychrometric chart. When the cursor is moved along the psychrometric chart, the numeric values of the Psychrometric Points at the cursor position are displayed (Data in the red rectangle.)
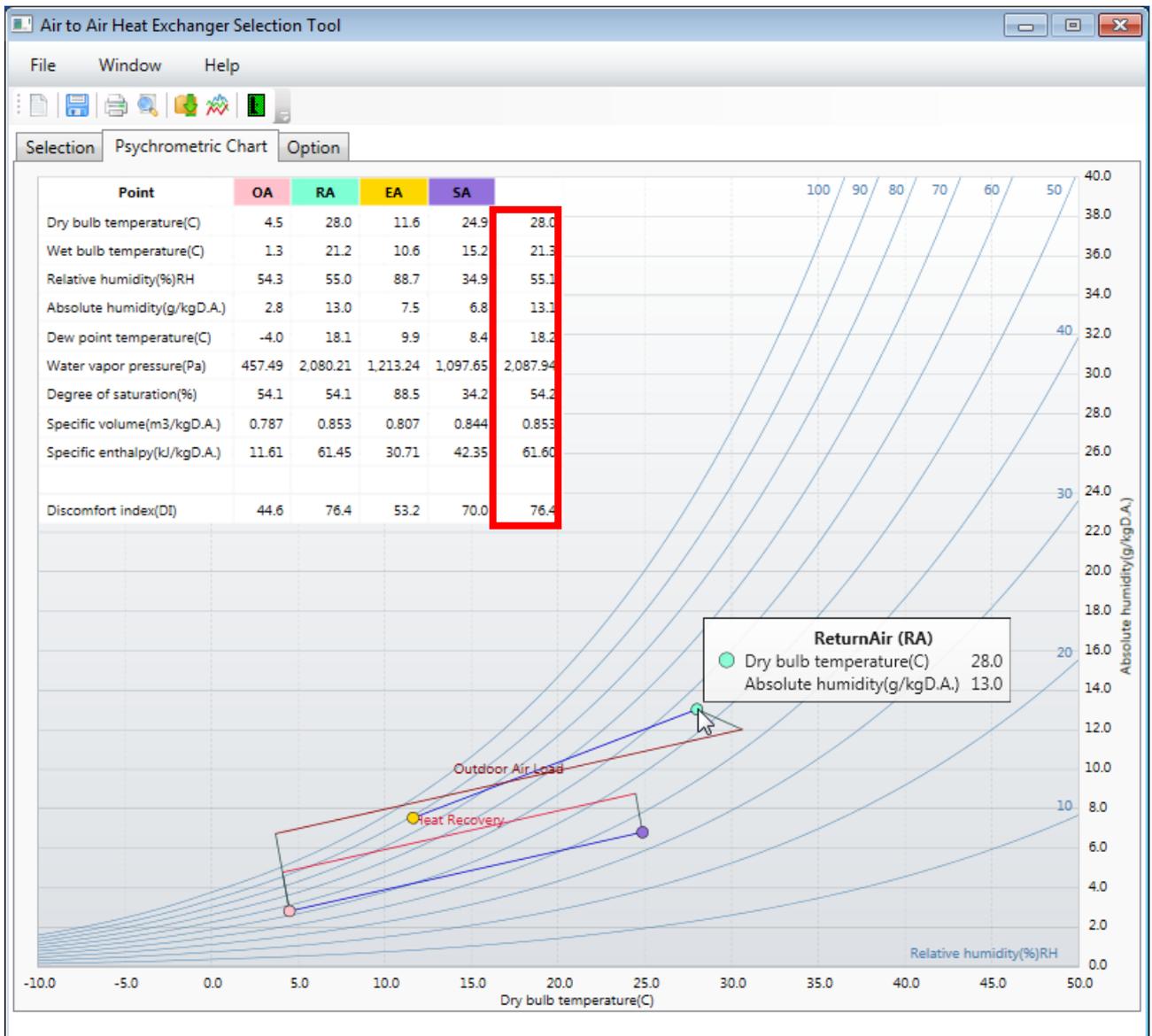
Fig. 4-14 Psychrometric chart tab screen

4-5　Save Selected Settings

To save the selected settings, click the Save button, the Save menu item, or the Save As menu item.
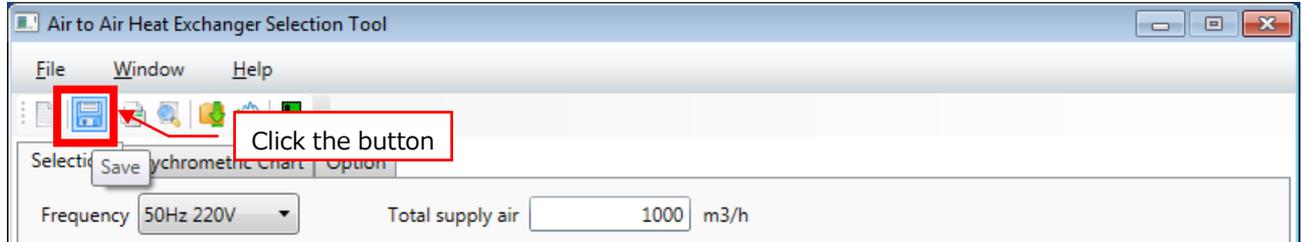
Fig. 4-15 Save button
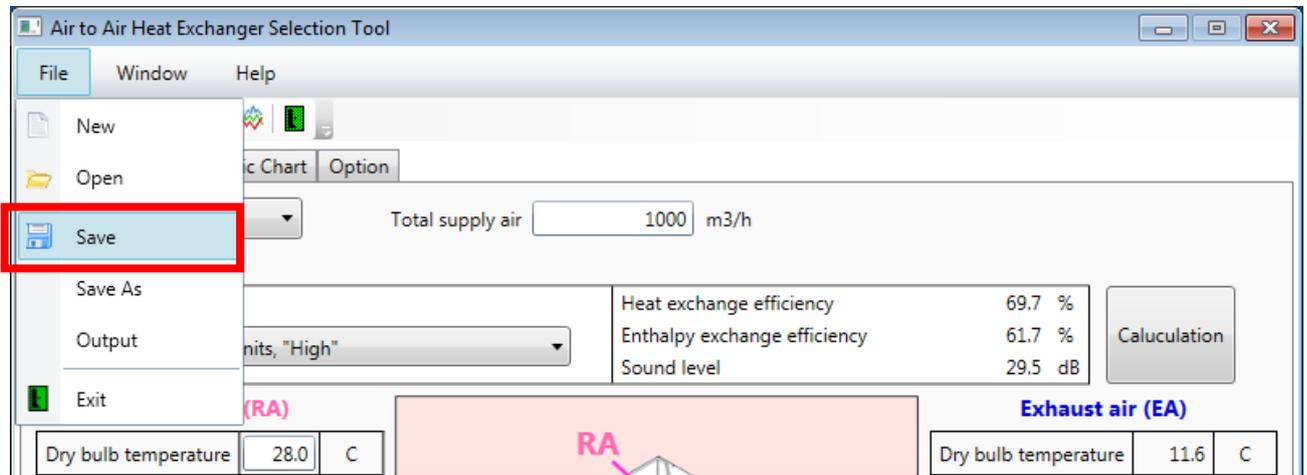
Fig. 4-16 Save menu item
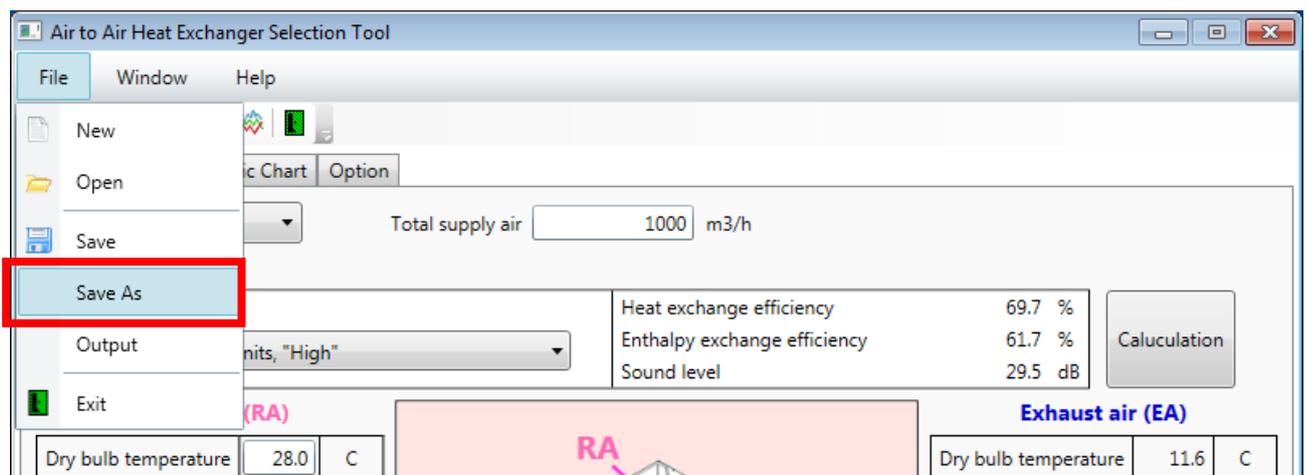
Fig. 4-17 Save As menu item

When saving a new file, or when clicking the Save As menu item, a file save screen is displayed. Set the location for saving and the file name and save the file.
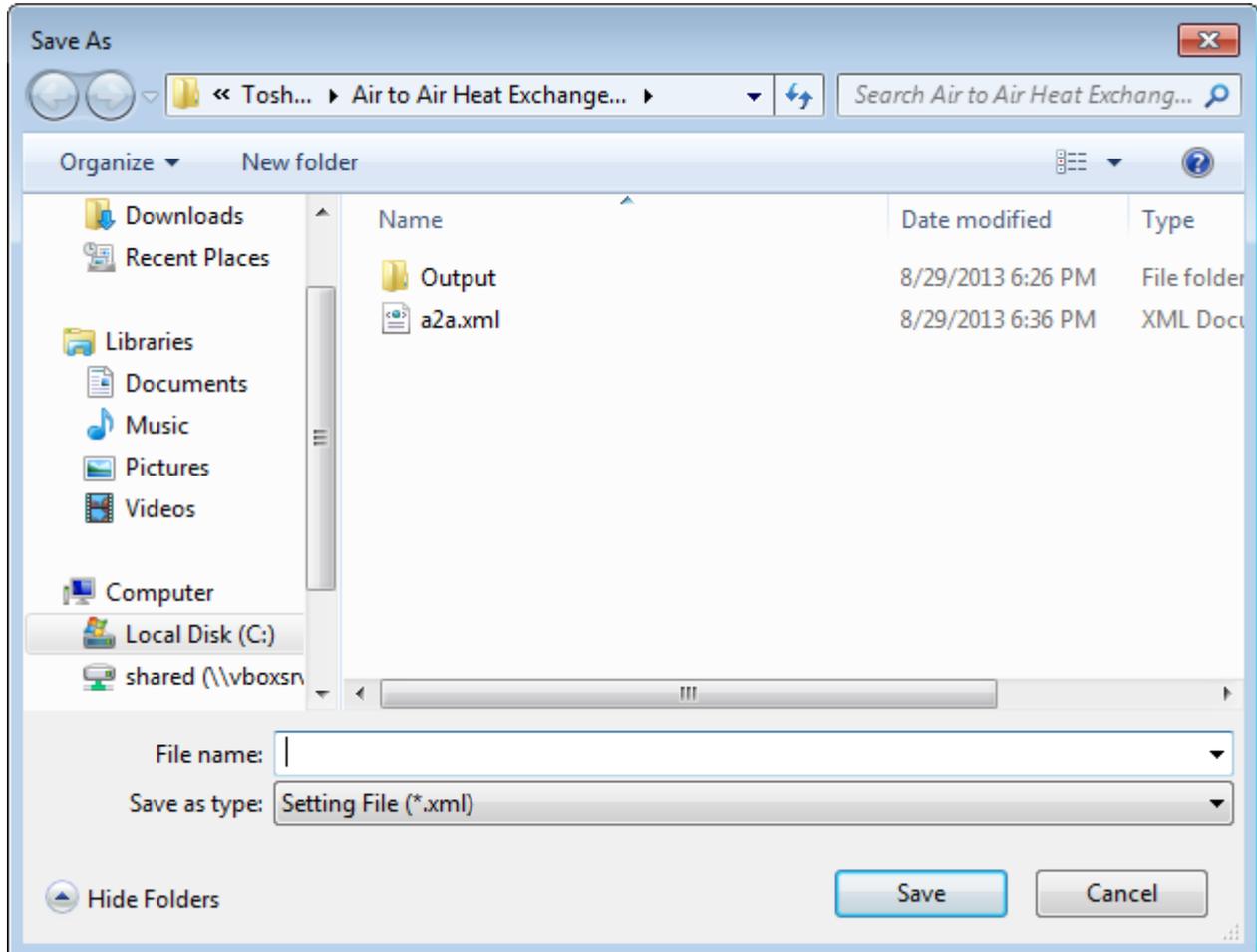
Fig. 4-18 File save screen

When saving a setting file, a setting file saving confirmation dialog box is displayed. When the OK button is clicked, data is saved, overwriting any existing file, and the data input screen is displayed again. If the Cancel button is clicked, the data input screen is displayed again without saving data.
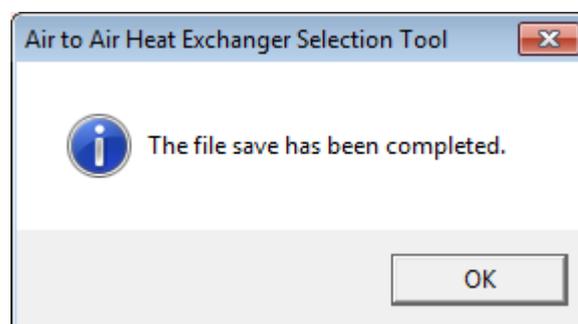
Fig. 4-19 File save screen

4-6　Create a New File

To create a new file, click the New button or the New menu item.
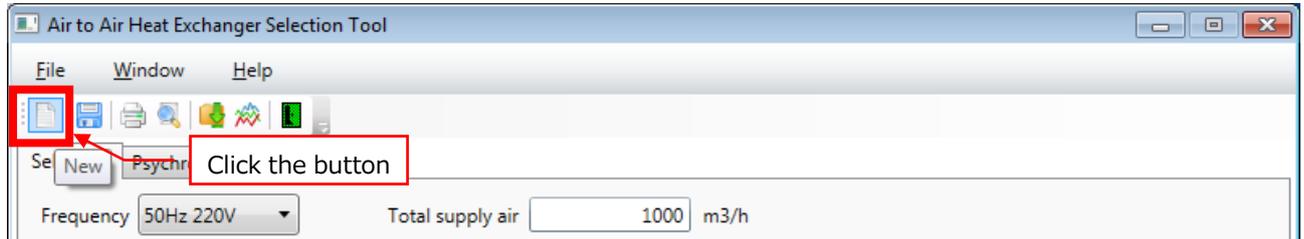
Fig. 4-20 New button
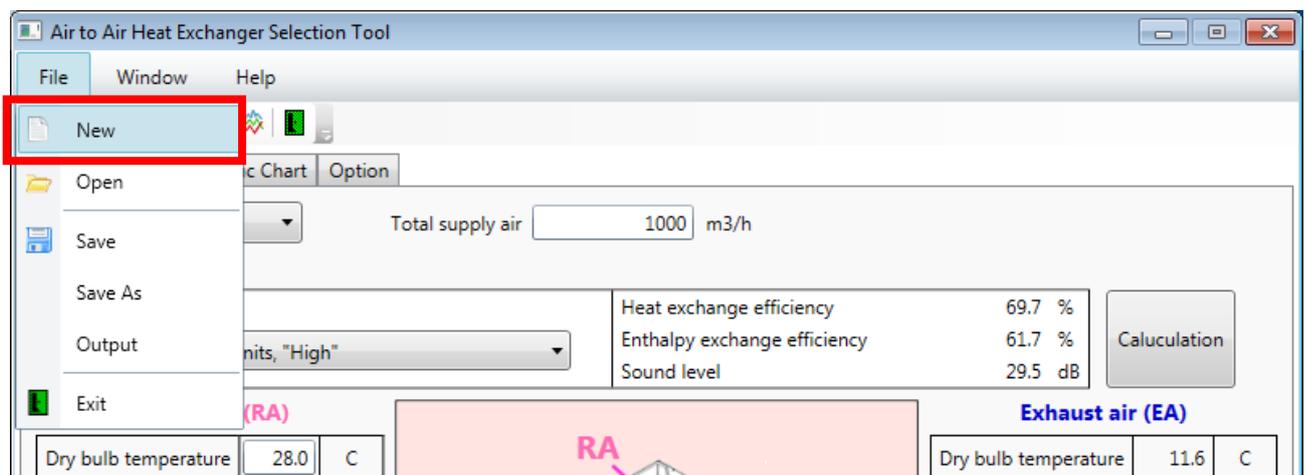
Fig. 4-21 New menu item

When creating a new file, a file creation confirmation dialog box is displayed. When the OK button is clicked, a new file is created.
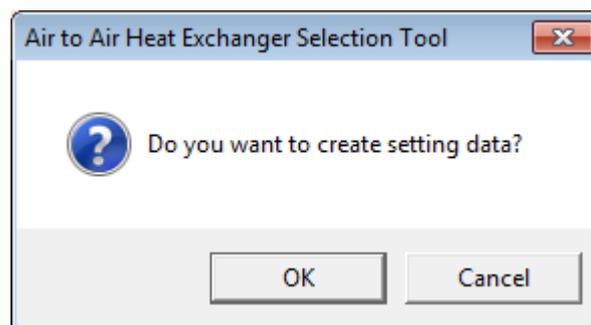
Fig. 4-22 File creation confirmation dialog box

4-7　　Select a File and Edit Existing Data

To select a file and edit existing data, click the Open menu item.
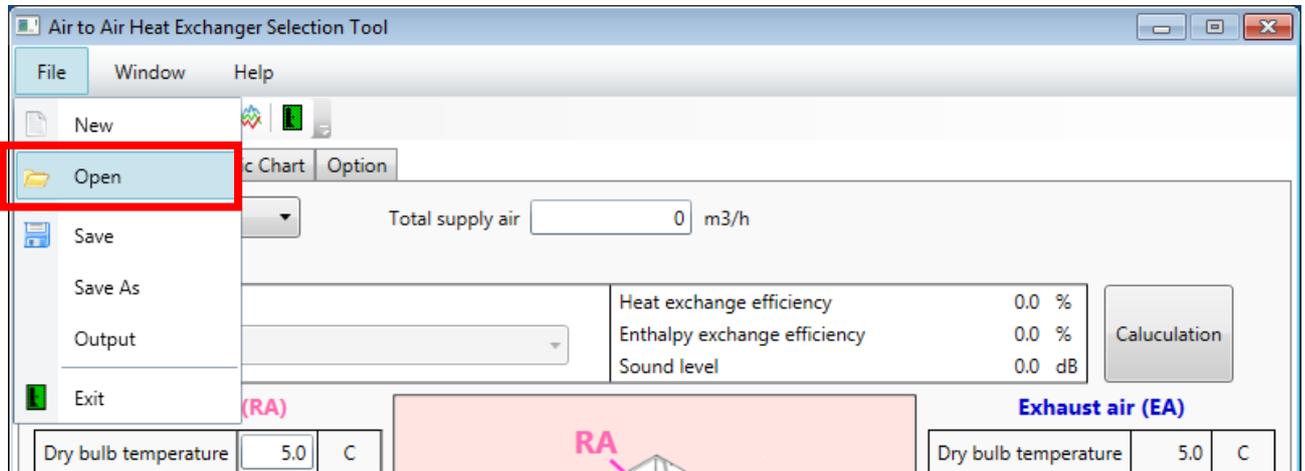
Fig. 4-23 Open menu item
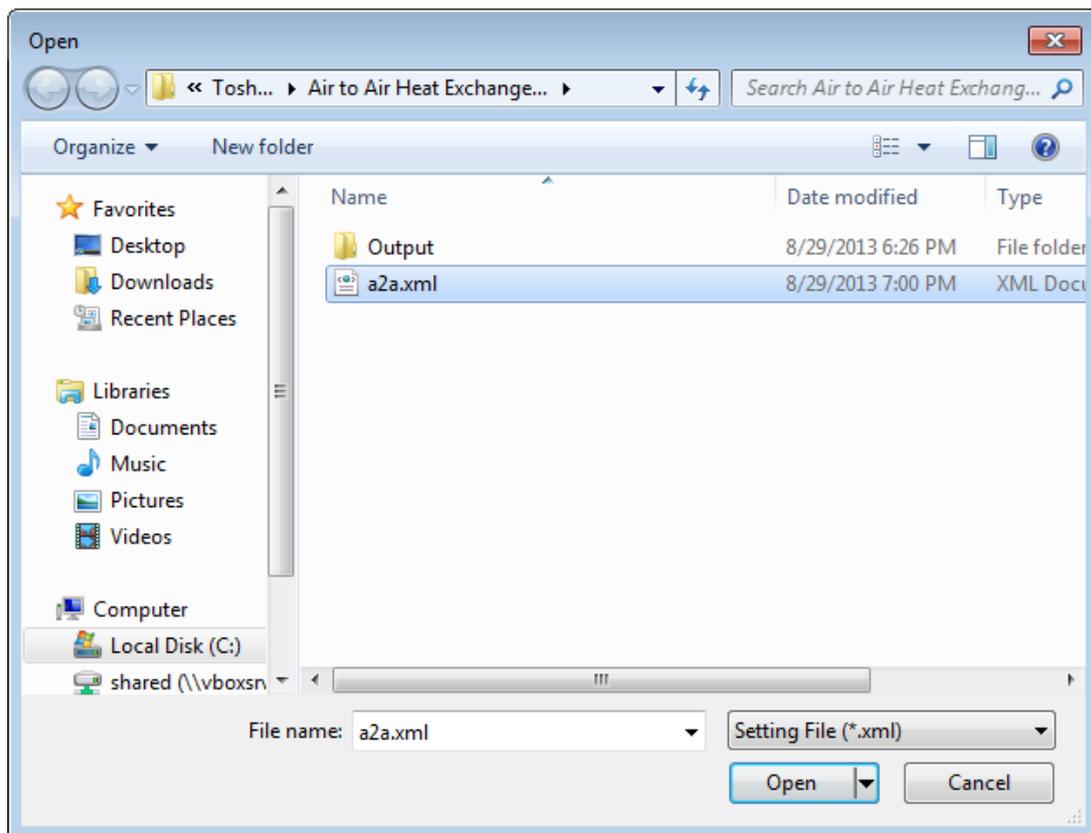
Fig. 4-24 File selection screen

When the file selection screen is displayed, select the file to be edited. After selecting a file, the Selection tab screen (Fig. 3-1) is displayed.

4-8   Output Selected Settings

To output selected settings, click the Output button or the Output menu item. The Output screen is displayed.
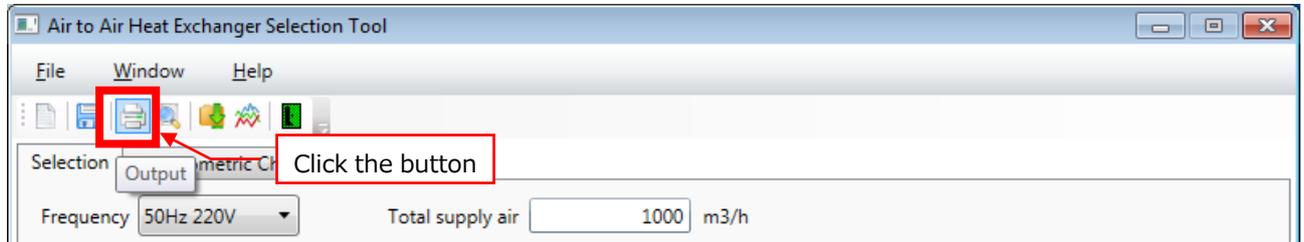
Fig. 4-25 Output button
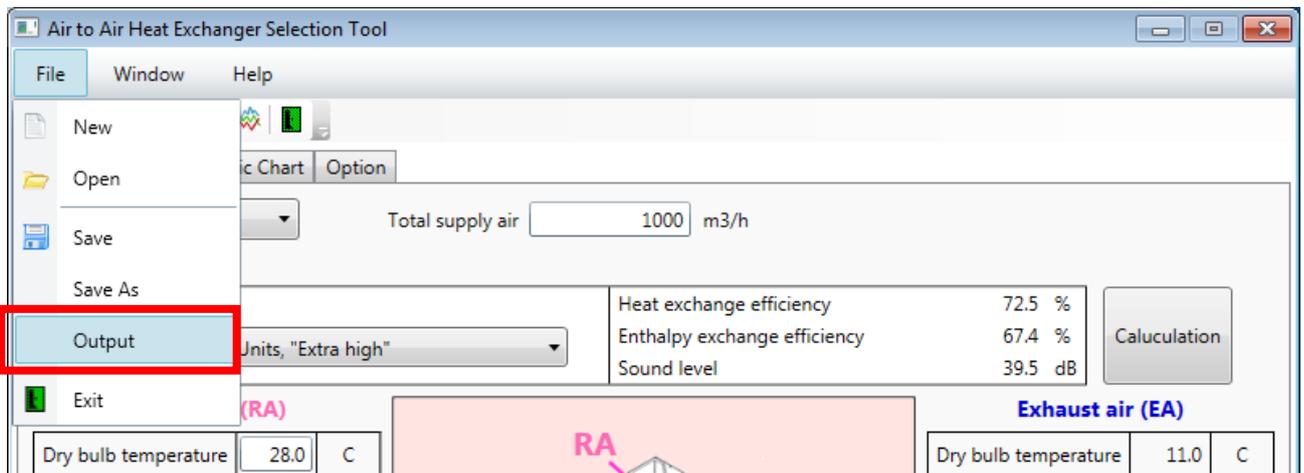
Fig. 4-26 Output menu item
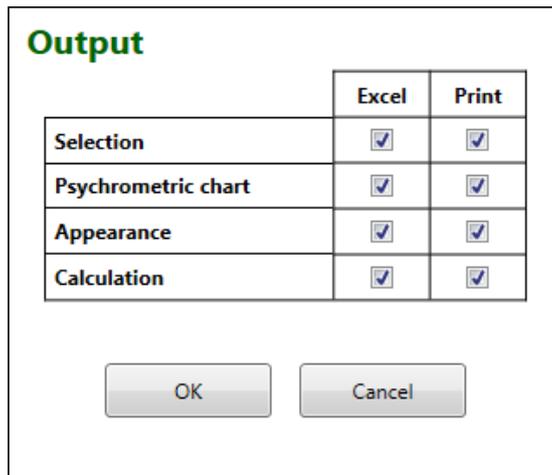
Fig. 4-27 Output screen

On the Output screen, select whether to output the selected results as a file in Excel format or to print the results, and click the OK button.

When outputting an Excel format file, a save destination specification screen is displayed. Specify the destination to which to save the output file.
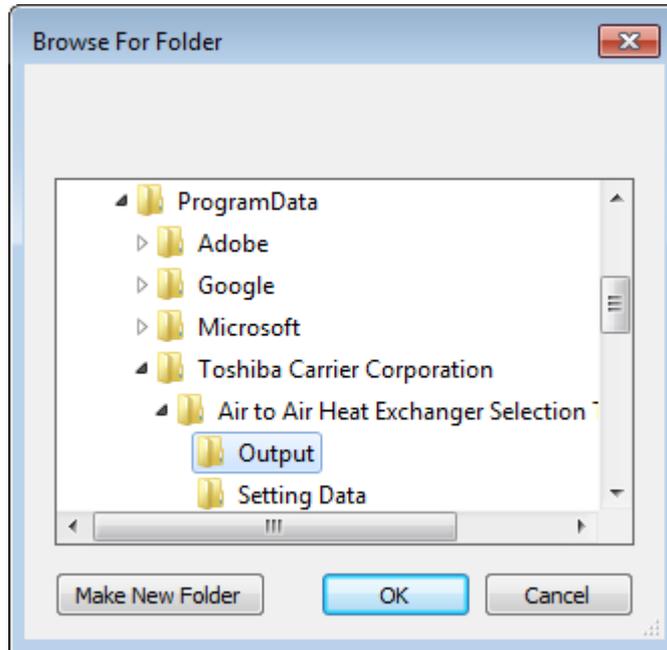
Fig. 4-28 Save destination specification screen

4-9　Check the Report Preview

To check a preview of the report, click the Print Preview button. The Report Preview screen is displayed.

On the Report Preview screen, Selection, Calculation, and Psychrometric Chart results can be checked.
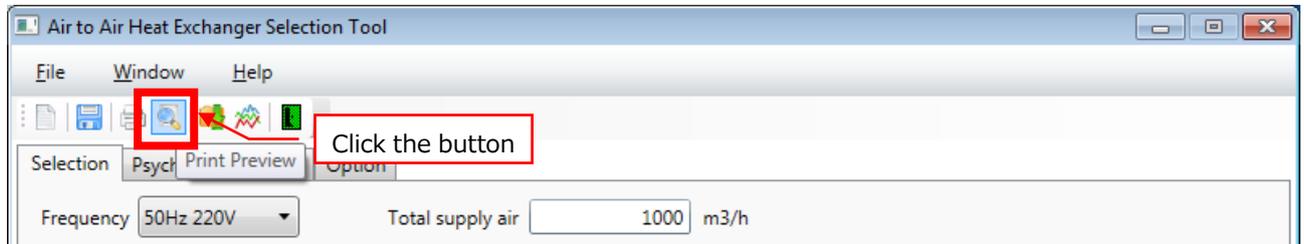
Fig. 4-29 Print Preview button
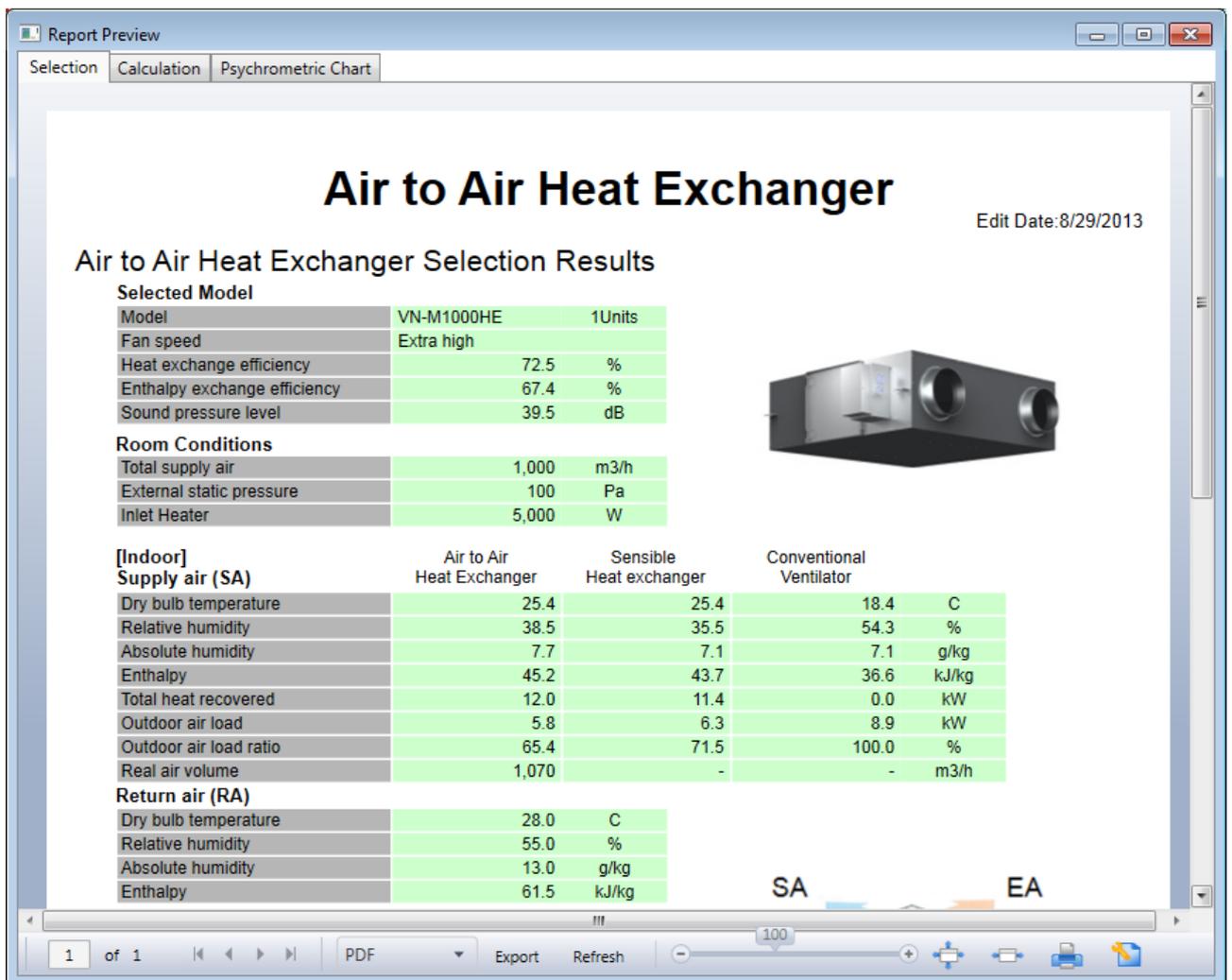
Fig. 4-30 Report Preview screen (Selection Results)

4-10　Display Model Specifications

To display the specifications of a model selected on the Selection tab screen, click the Appearance button.
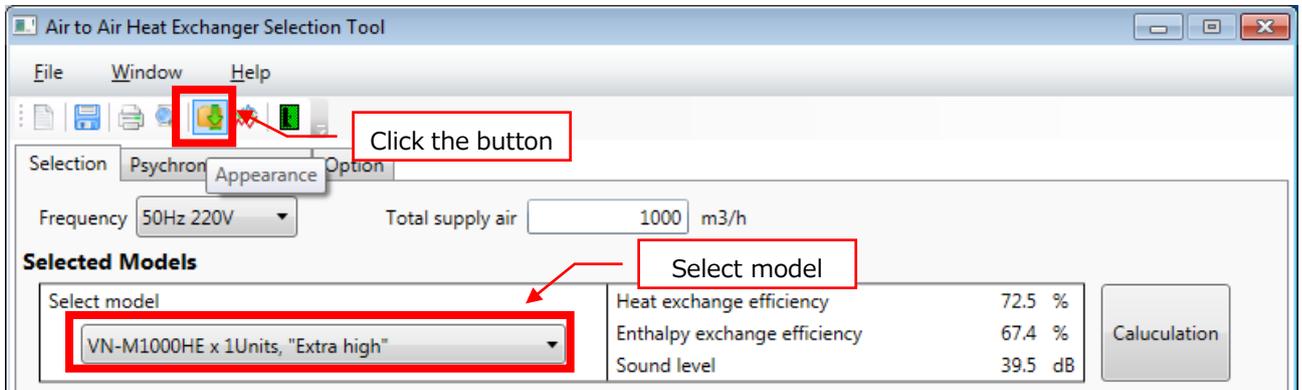
Fig. 4-31 Appearance button
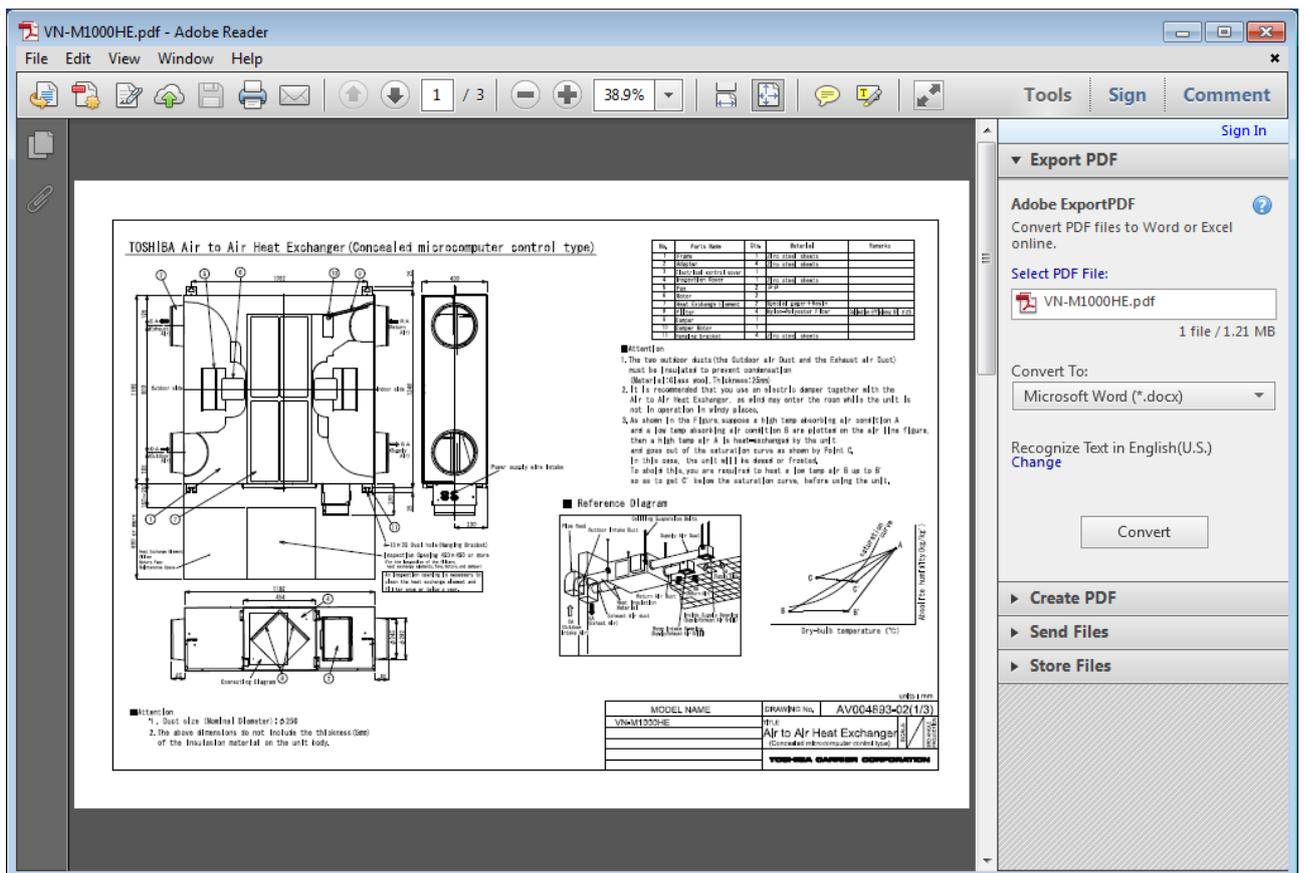
Fig. 4-32 Specifications of selected model

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Air to Air Heat Exchanger Selection Tool
Operating Instructions

September, 2013

TOSHIBA CARRIER CORPORATION