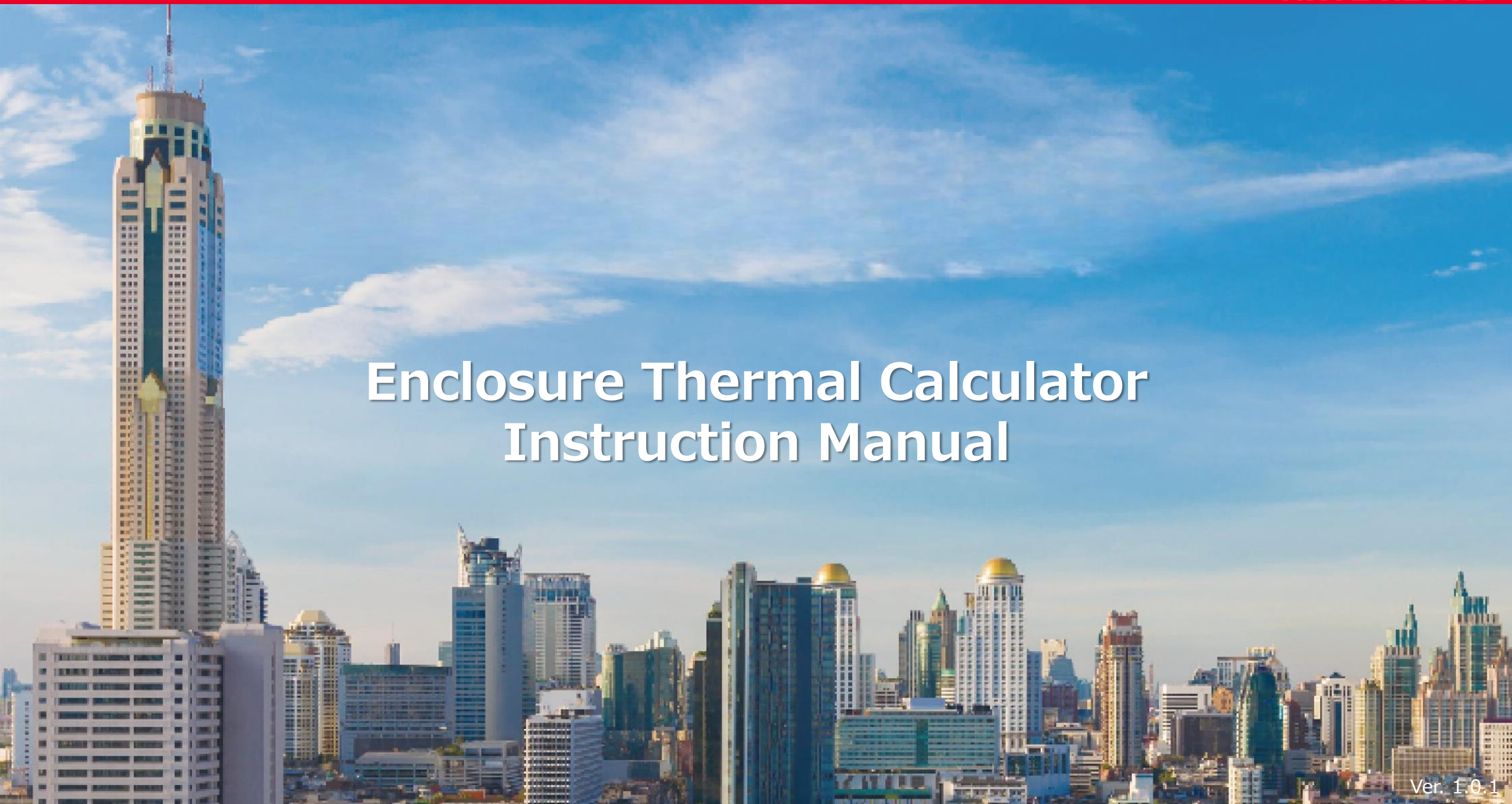
NITTO KOGYO



Enclosure Thermal Calculator
Instruction Manual

Ver. 1.0.1

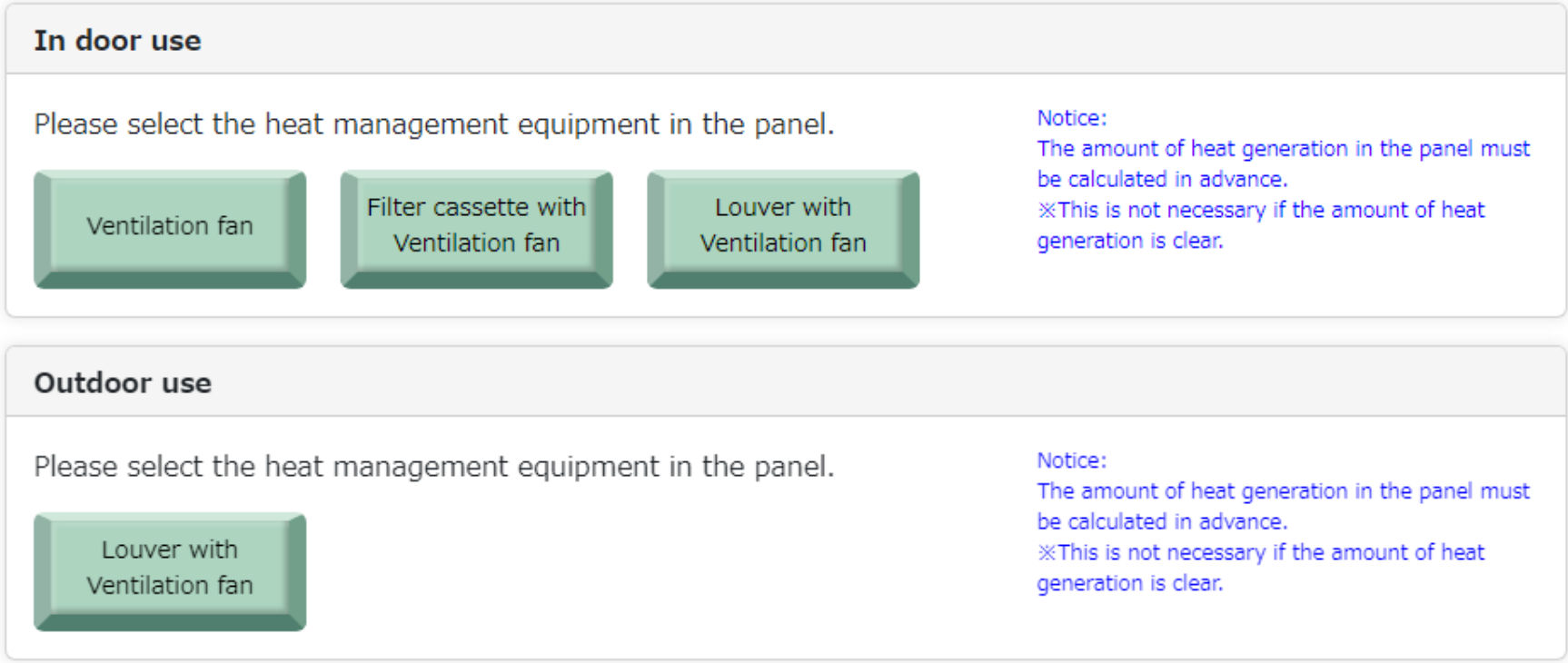
⚠ Read before use

- The selection result of calculation is intended to be used only as a guide and may not achieve the specified performance depending on the enclosure sealness, position of heat generating devices, and filter stain and so on.
- Using multiple products may cause the products to interfere with each other and prevent them from achieving their required performance. Use sufficient margin when making selections.
- The selection result of ventilation devices is calculated from only required capacity not considering the enclosure size, so check the devices are installable to the enclosure or not by yourself.
- Outdoor fan models are included in the selectable models for Indoor Enclosure Thermal Calculator, but these are selected for indoor use. Please note that the selection does not take into account the amount of heat transferred by solar radiation when used outdoors. When selecting for outdoor use, please use Outdoor Enclosure Thermal Calculator.

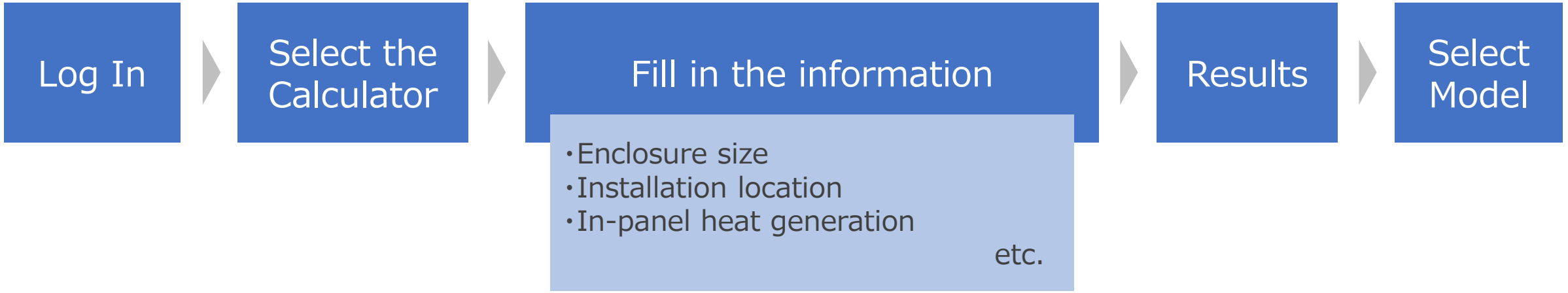
What is Enclosure Thermal Calculator ?

Enclosure Thermal Calculator is a free tool designed to help you calculate the temperature inside the enclosure (Indoor/ Outdoor use) and find the right thermal management product to match your requirements.

Calculable products



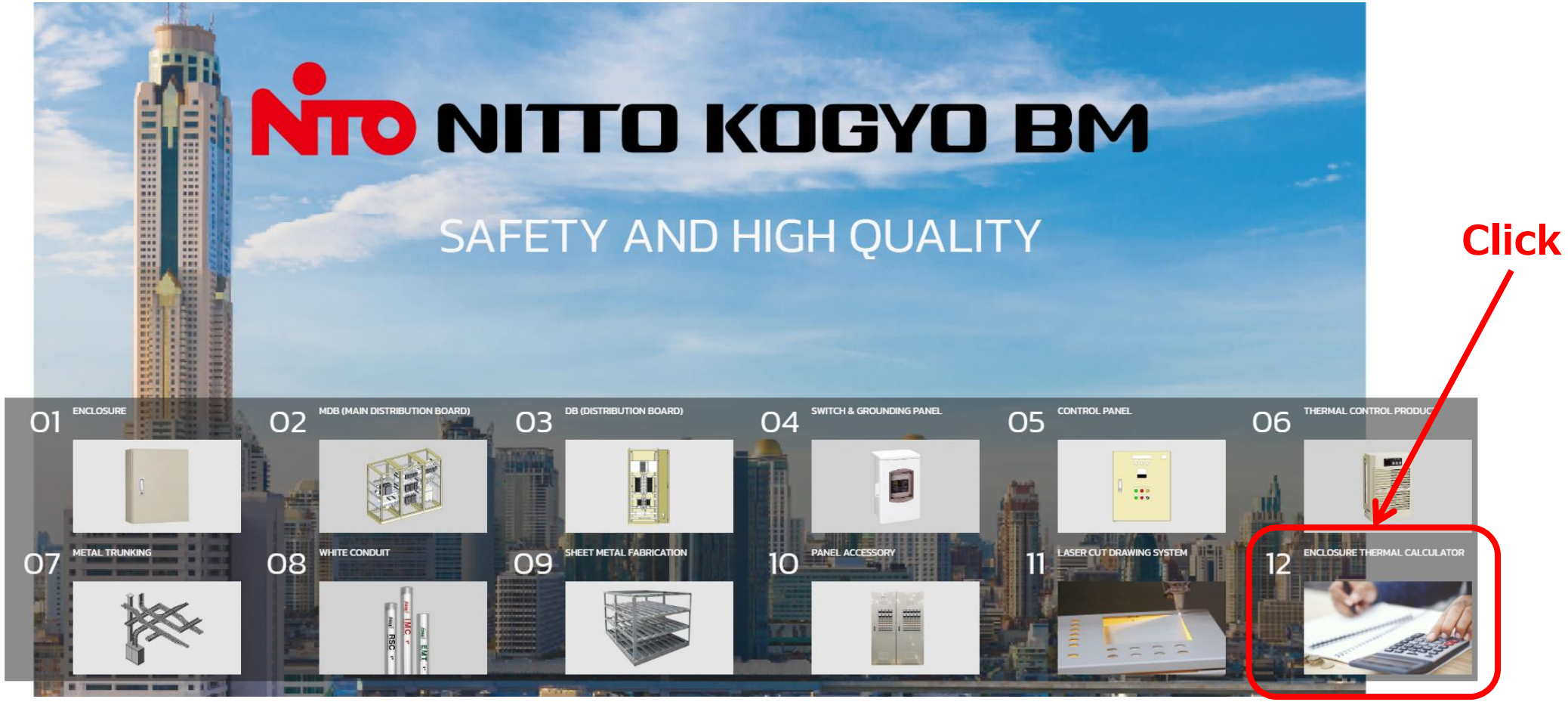
Calculation Flow



1. Registration

Log In | Select the Calculator | Fill in the information (Calculate in-panel heat generation) | Results | Select Model

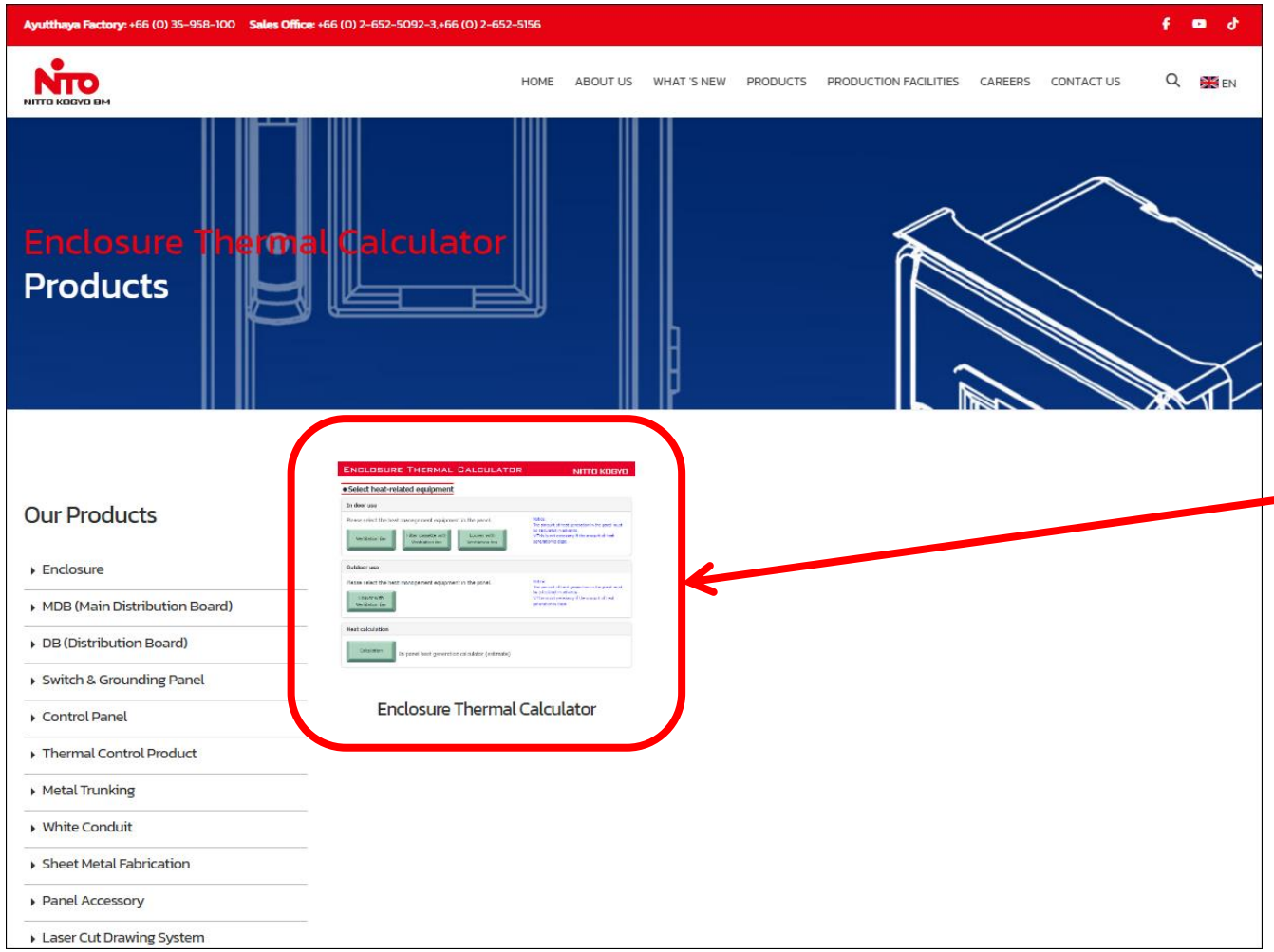
You can enter from the first page of our website. https://th.nito-bm.com/



Or entering the URL. https://www.nito-service.com/therm-calc/

1. Registration

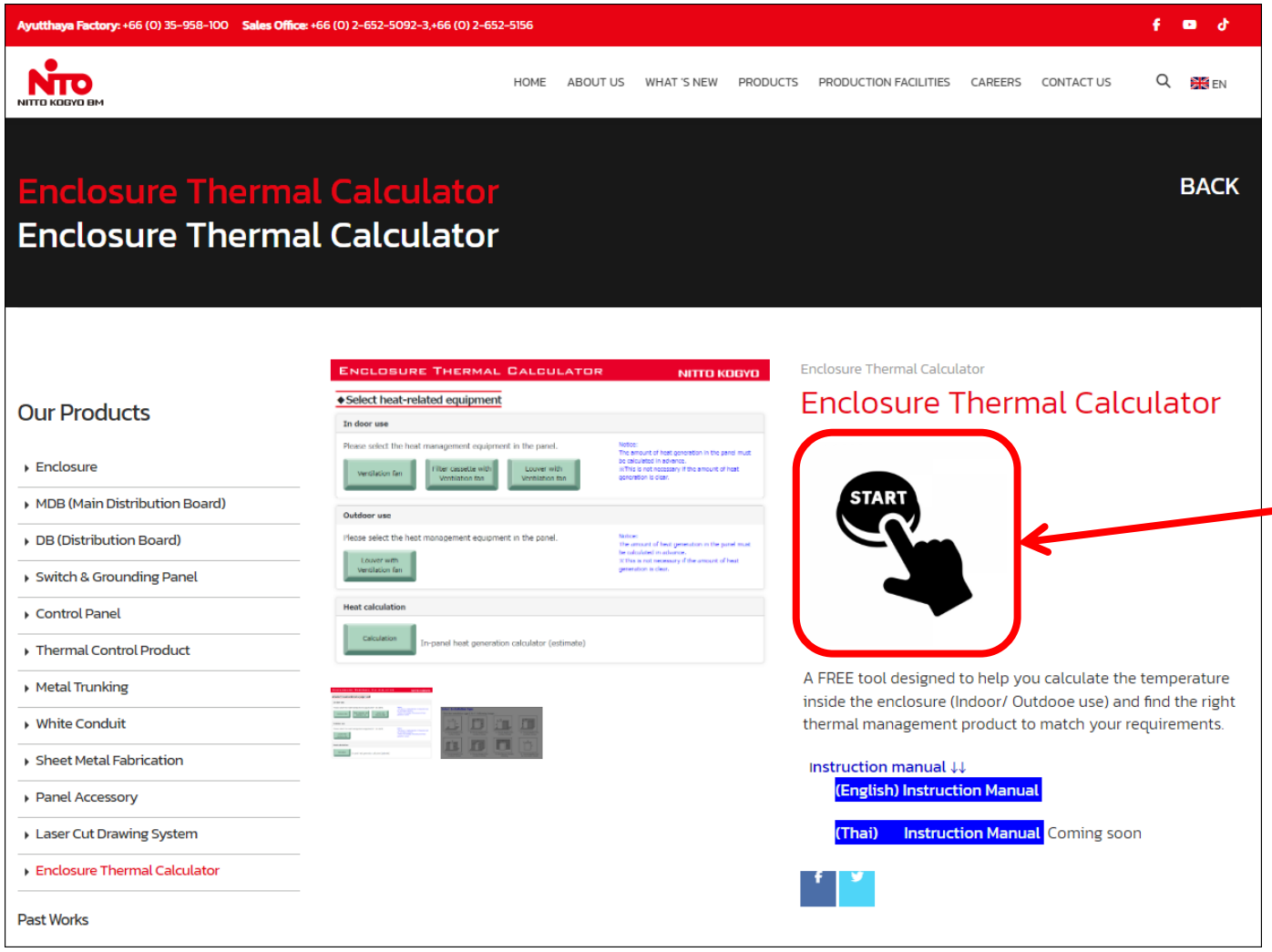
Log In | Select the Calculator | Fill in the information (Calculate in-panel heat generation) | Results | Select Model



Click

1. Registration

Log In | Select the Calculator | Fill in the information (Calculate in-panel heat generation) | Results | Select Model



Click

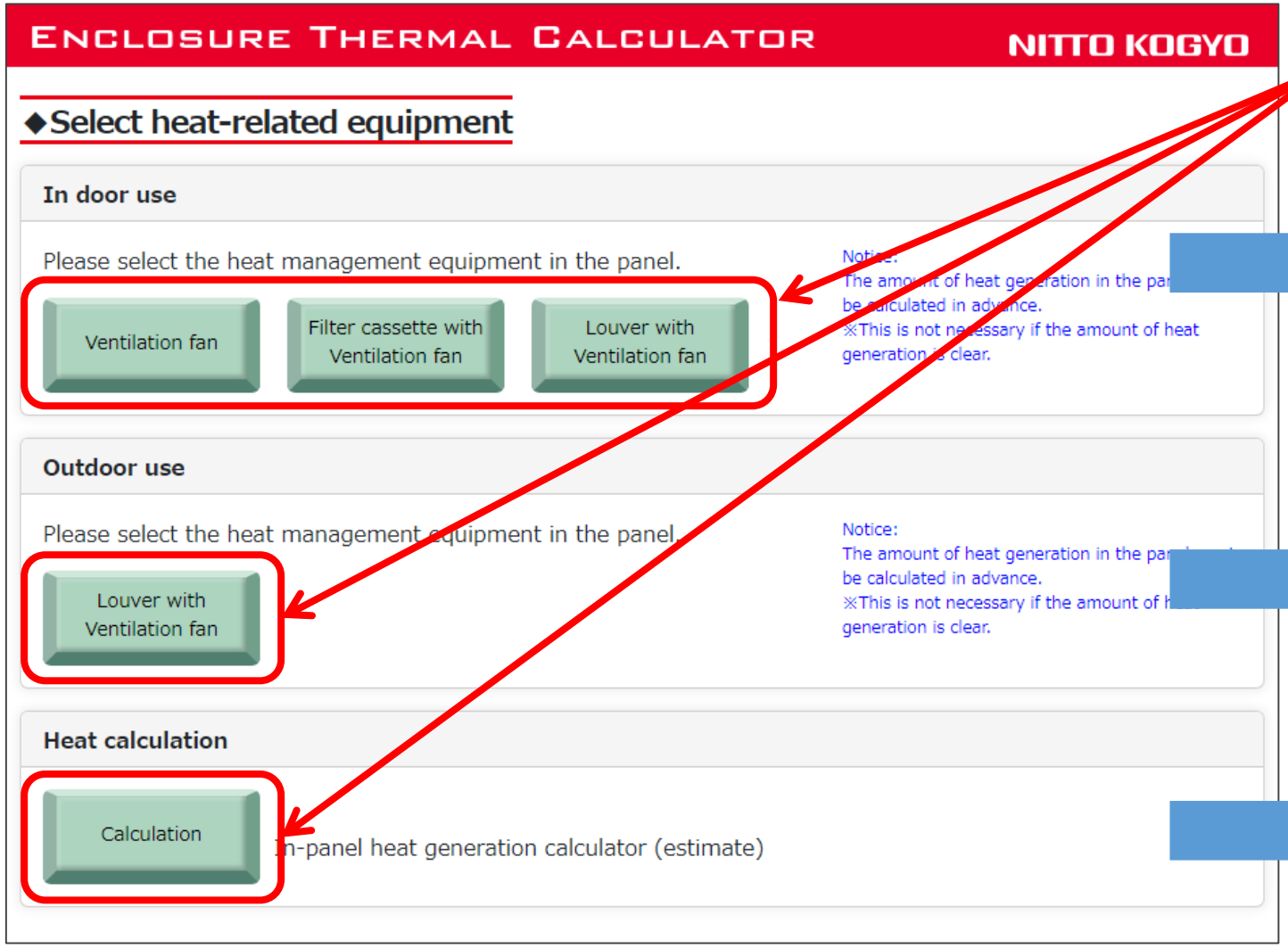
1. Registration

Log In | Select the Calculator | Fill in the information (Calculate in-panel heat generation) | Results | Select Model

Please fill in
&
Click “START FREE”

2. How to use

Log In | **Select the Calculator** | Fill in the information (Calculate in-panel heat generation) | Results | Select Model



Click the button for the item you want to calculate

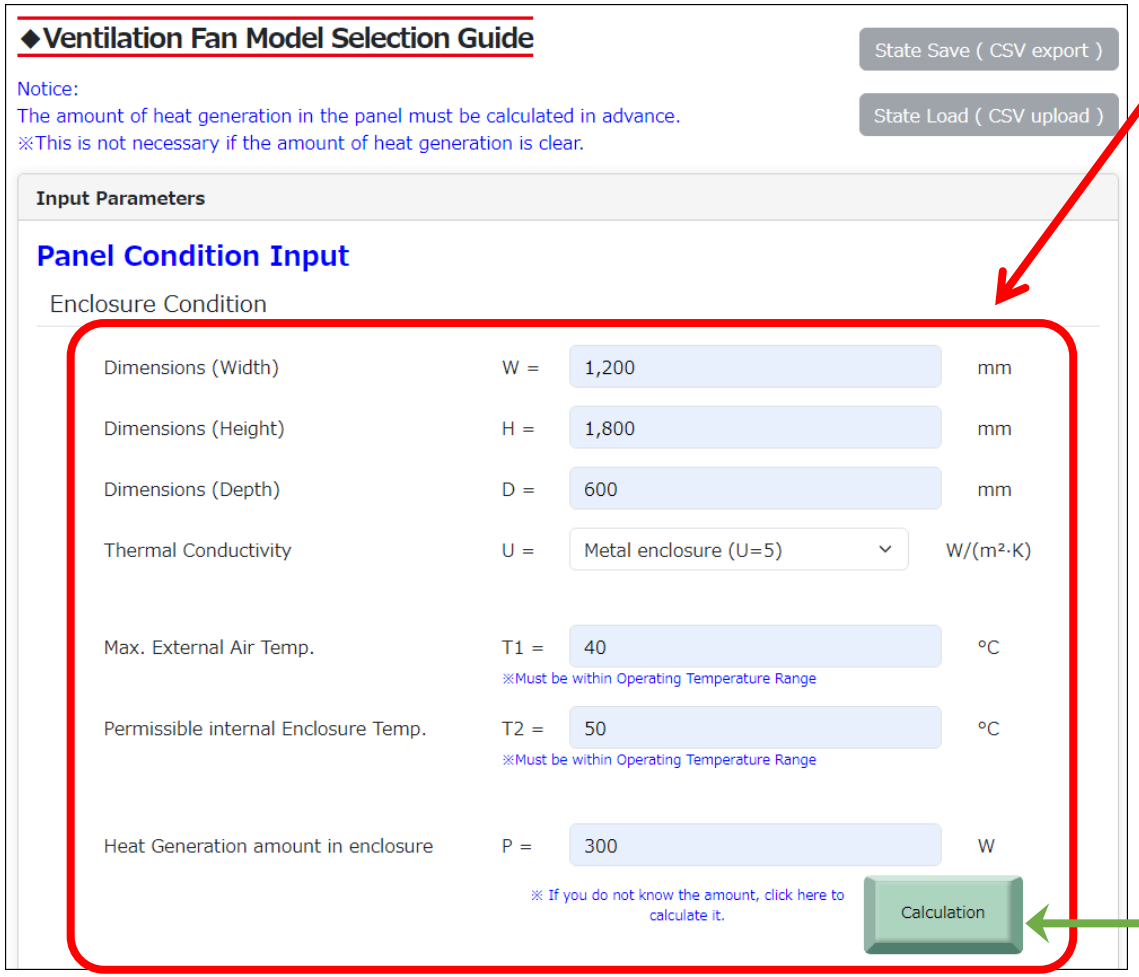
For Indoor Use

For Outdoor Use

For calculating heat generation of mounted devices

2. How to use

For Indoor and Outdoor



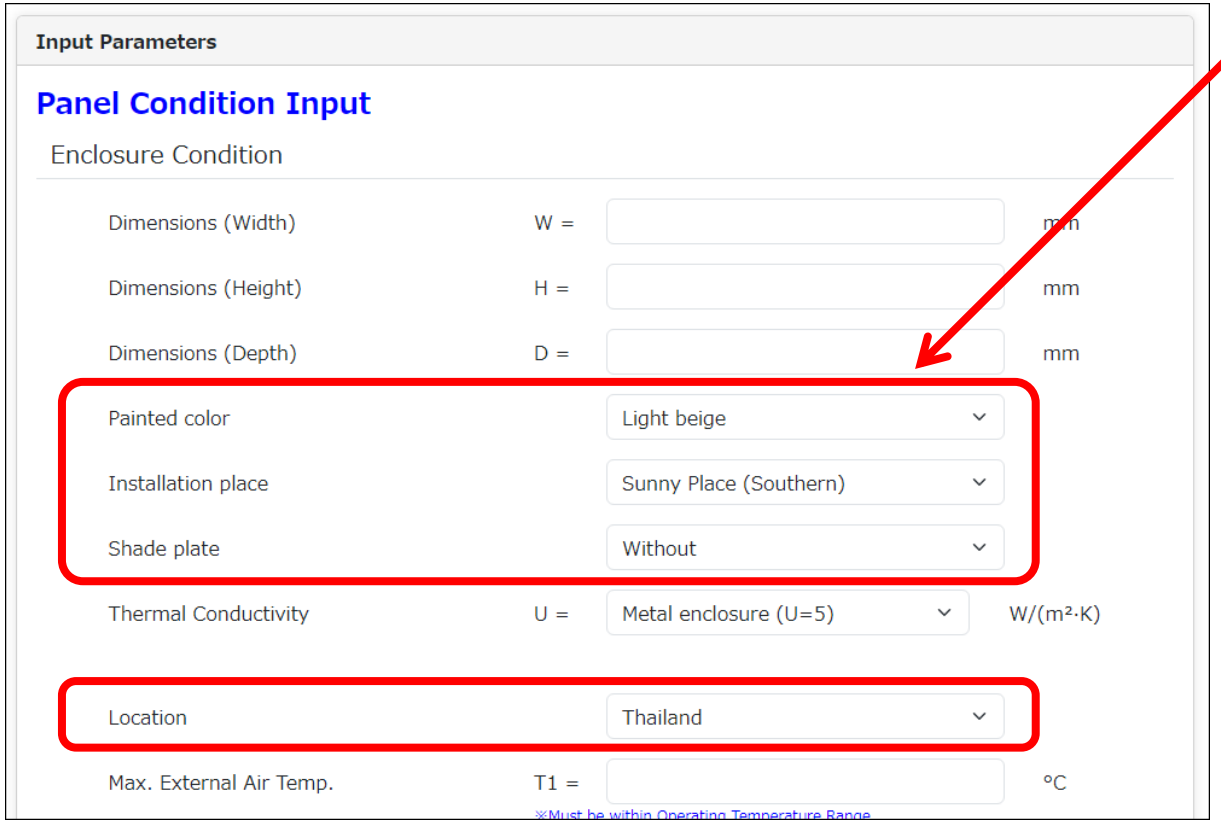
Fill in the information below

- Enclosure dimensions (W, H, D)
- Thermal Conductivity (U)
  - Select the material of the enclosure (Metal/Resin)
- Max. external air temp. (T1)
- Permissible internal enclosure temp. (T2)
  - Must be higher than (T1)
- Heat generated inside the enclosure (P)
  - The total value of the mounted equipment inside.
  - If the amount of heat generated cannot be determined, approximate values can be calculated from on-board equipment from the **“Calculation” button**.

*Details on page12-page22

2. How to use

For Outdoor

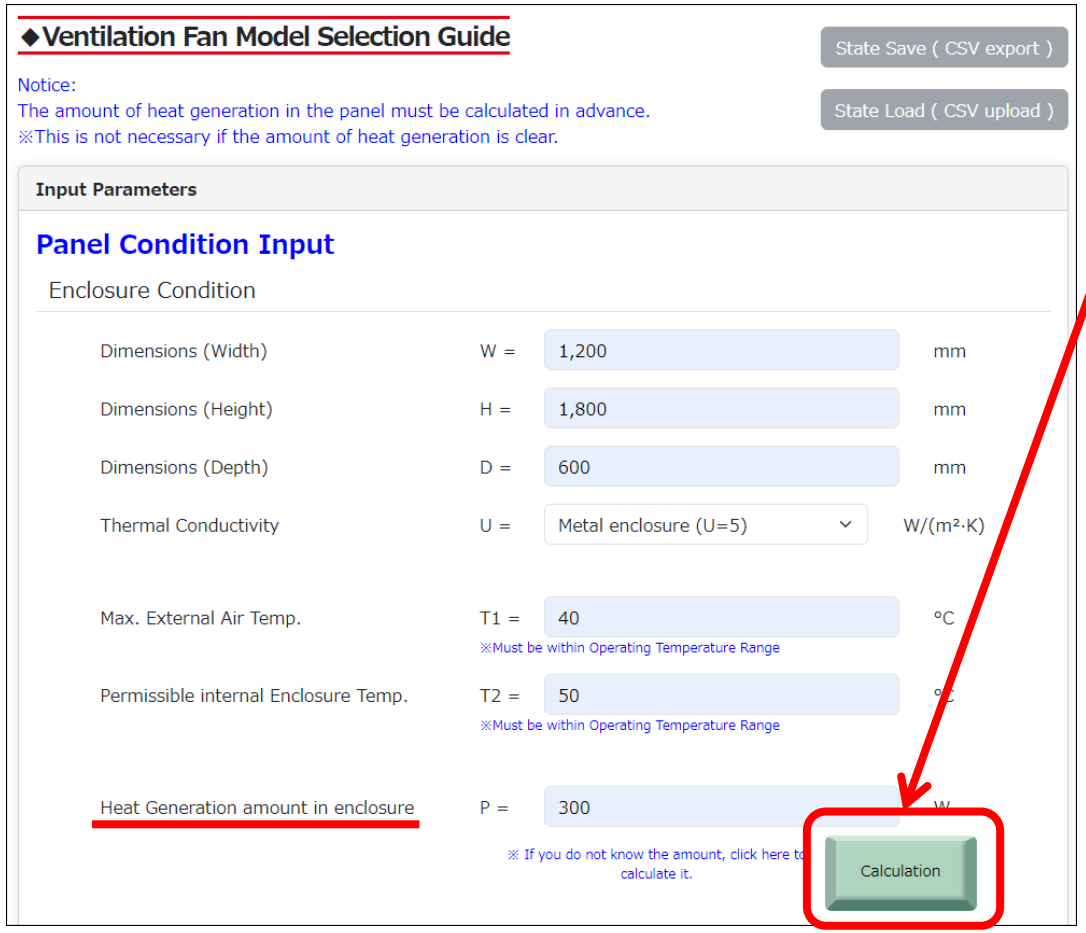


For Outdoor, the following additional fields are required

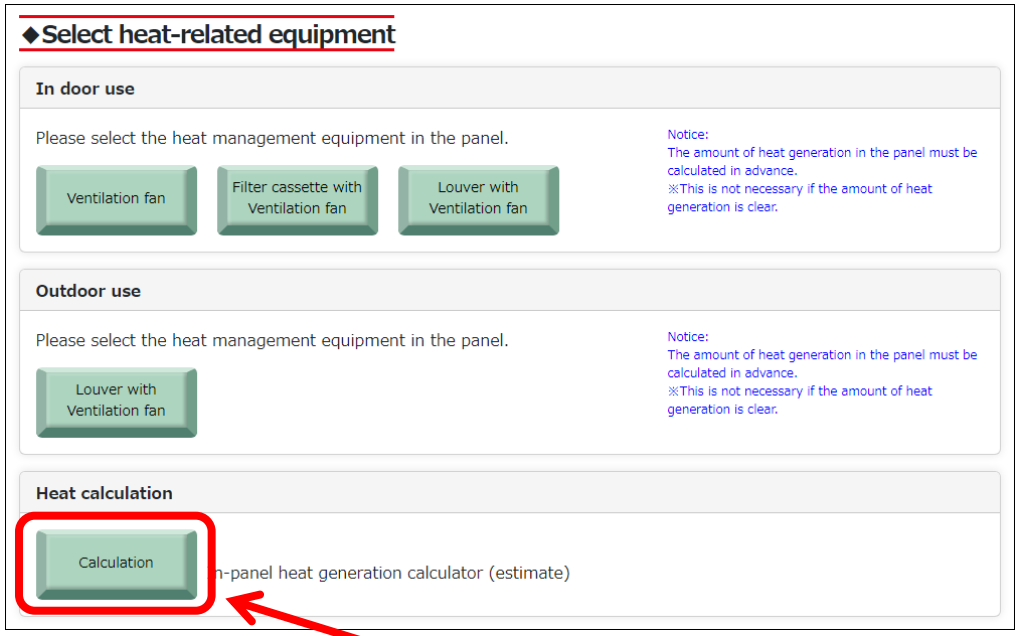
- Painted color
  - Select the color of the enclosure (Light beige/Grey/White/Cream/Brown/SUS)
- Installation place
  - Select the Installation place (Sunny/Roofed)
- Shade plate
  - Select with or without shading plate
- Location
  - Select the location (Thailand/Singapore/Malaysia/China)

2. How to use

How to calculate in-panel heat generation



Click the “Calculation” button



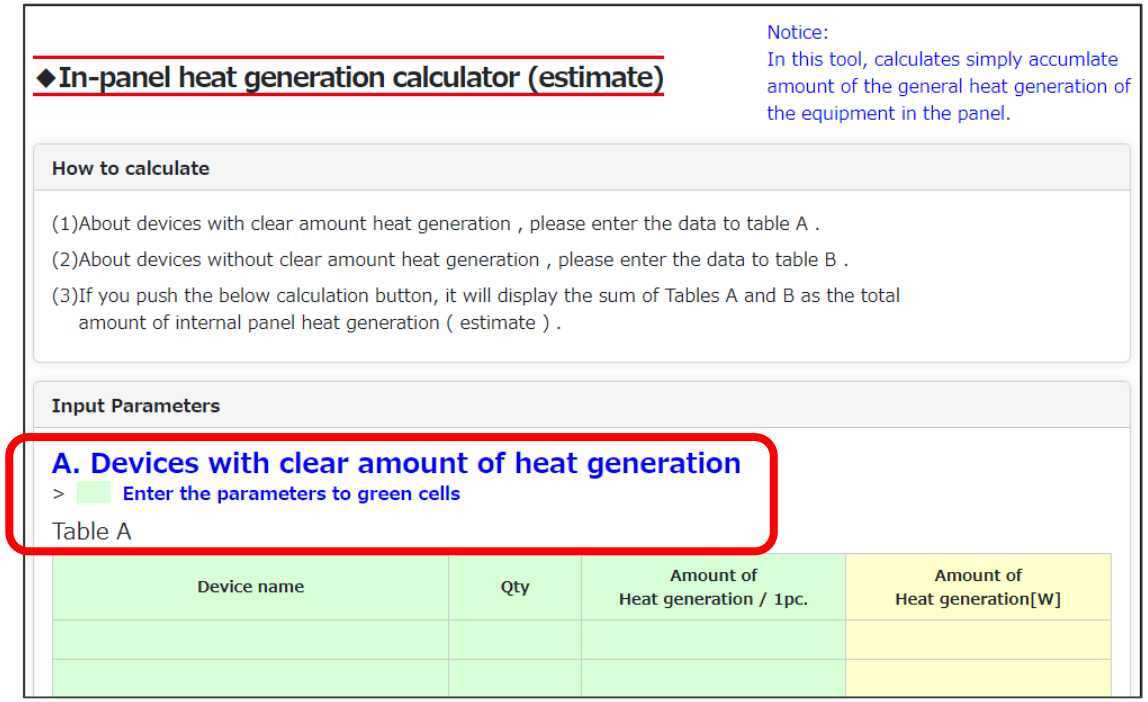
Or you can also enter from the TOP menu

2. How to use

How to calculate in-panel heat generation

If the amount of heat generation of each device is **clear**

Use **Table A**



◆In-panel heat generation calculator (estimate)

Notice:
In this tool, calculates simply accumlate amount of the general heat generation of the equipment in the panel.

How to calculate

(1)About devices with clear amount heat generation , please enter the data to table A .
(2)About devices without clear amount heat generation , please enter the data to table B .
(3)If you push the below calculation button, it will display the sum of Tables A and B as the total amount of internal panel heat generation (estimate) .

Input Parameters

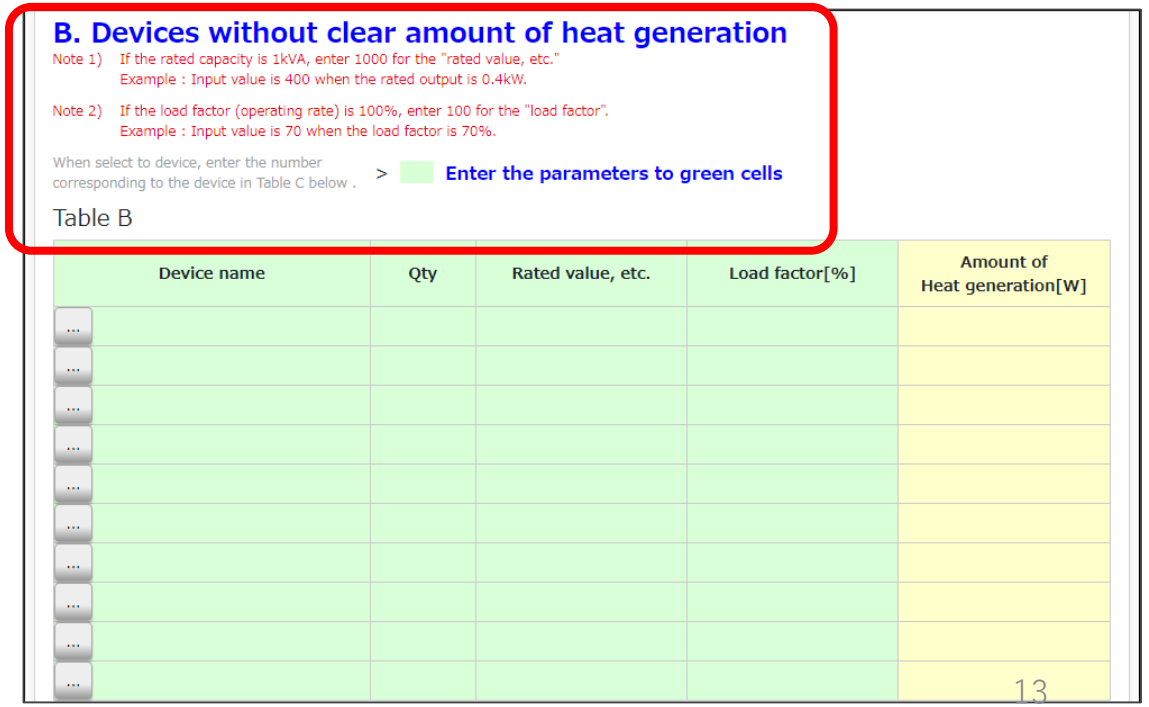
A. Devices with clear amount of heat generation
> Enter the parameters to green cells

Table A

Device name	Qty	Amount of Heat generation / 1pc.	Amount of Heat generation[W]

If the amount of heat generation of each device is **not clear**

Use **Table B**



B. Devices without clear amount of heat generation

Note 1) If the rated capacity is 1kVA, enter 1000 for the "rated value, etc."
Example : Input value is 400 when the rated output is 0.4kW.

Note 2) If the load factor (operating rate) is 100%, enter 100 for the "load factor".
Example : Input value is 70 when the load factor is 70%.

When select to device, enter the number corresponding to the device in Table C below . > Enter the parameters to green cells

Table B

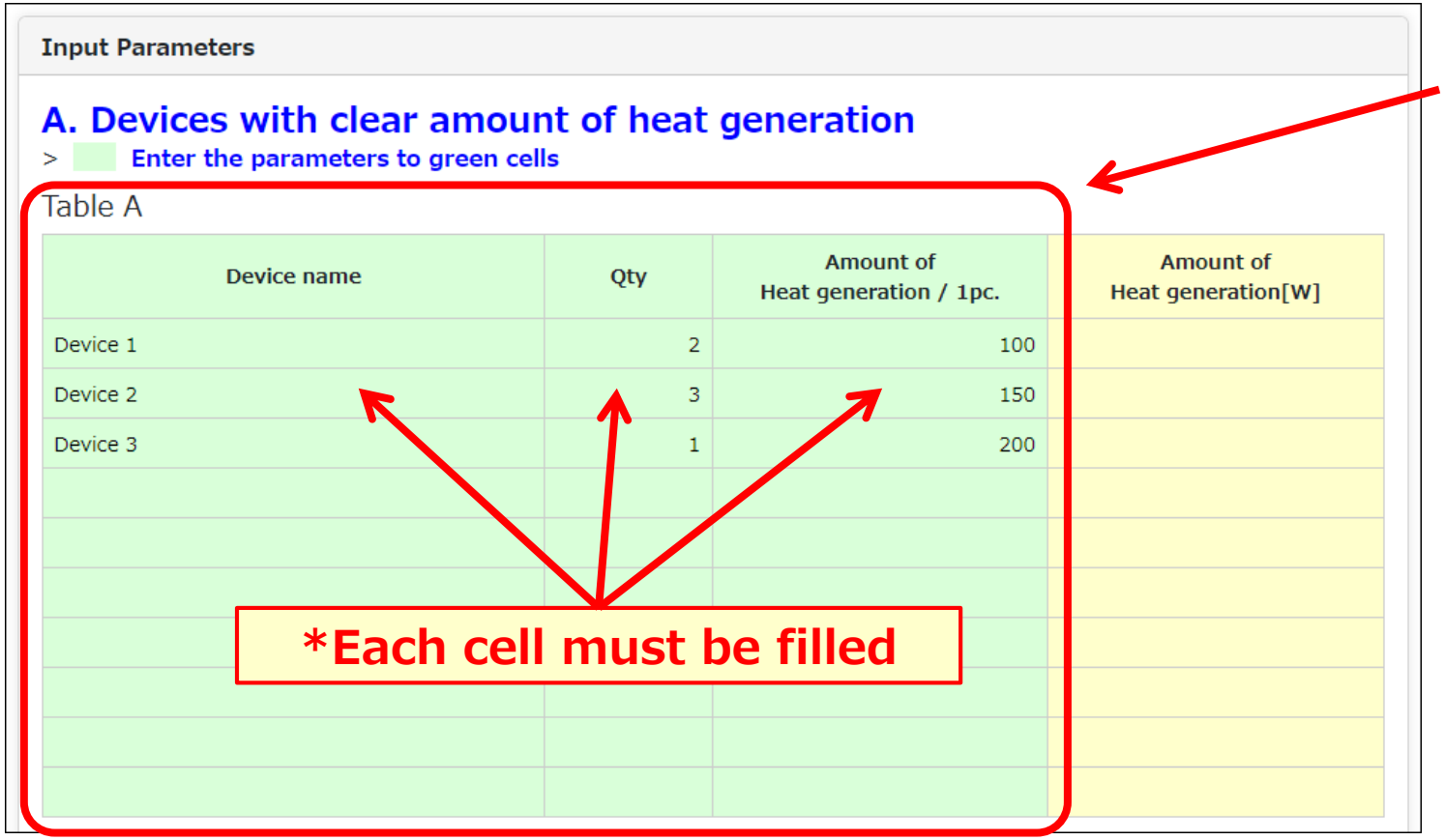
Device name	Qty	Rated value, etc.	Load factor[%]	Amount of Heat generation[W]
...				
...				
...				
...				
...				
...				
...				
...				
...				

2. How to use

How to calculate in-panel heat generation

Table A (amount clear)

If the amount of heat generation of each device is **clear** → Use **Table A**



Input Parameters

A. Devices with clear amount of heat generation

> Enter the parameters to green cells

Table A

Device name	Qty	Amount of Heat generation / 1pc.	Amount of Heat generation[W]
Device 1	2	100	
Device 2	3	150	
Device 3	1	200	

*Each cell must be filled

① Fill in the green area

- Device name
  - Arbitrary name
- Qty.
- Amount of Heat generation
  - per 1pc.

2. How to use

How to calculate in-panel heat generation

Table A (amount clear)

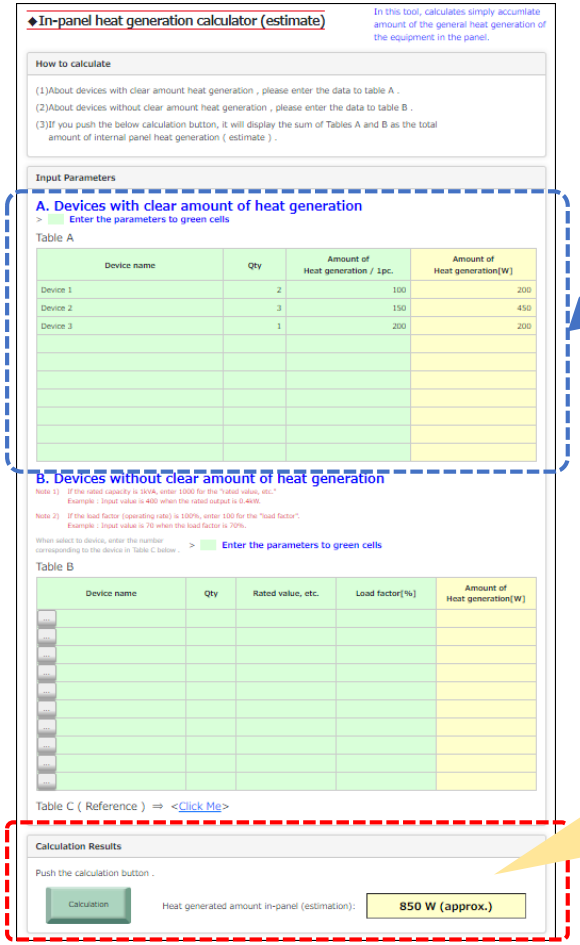
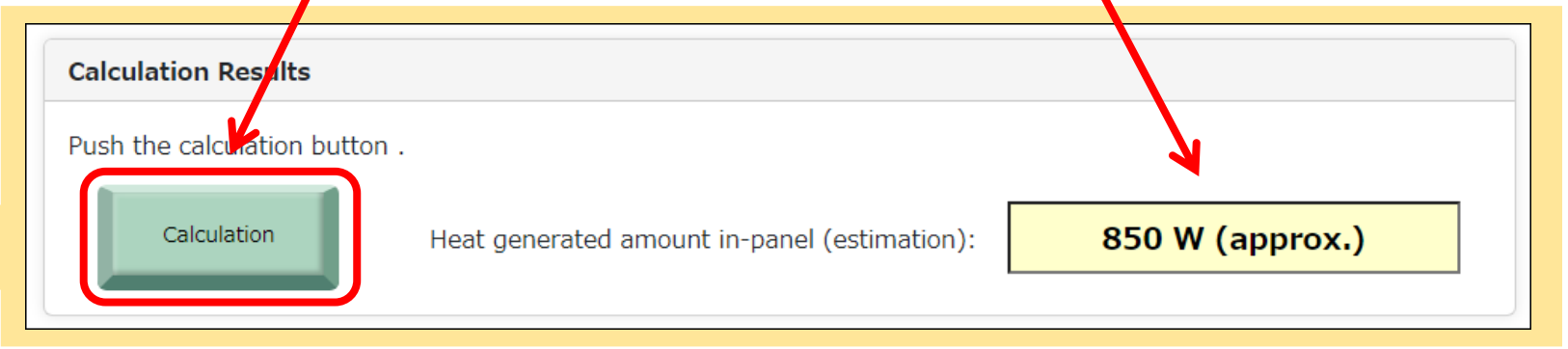


Table A

② **Press the “Calculation” button**

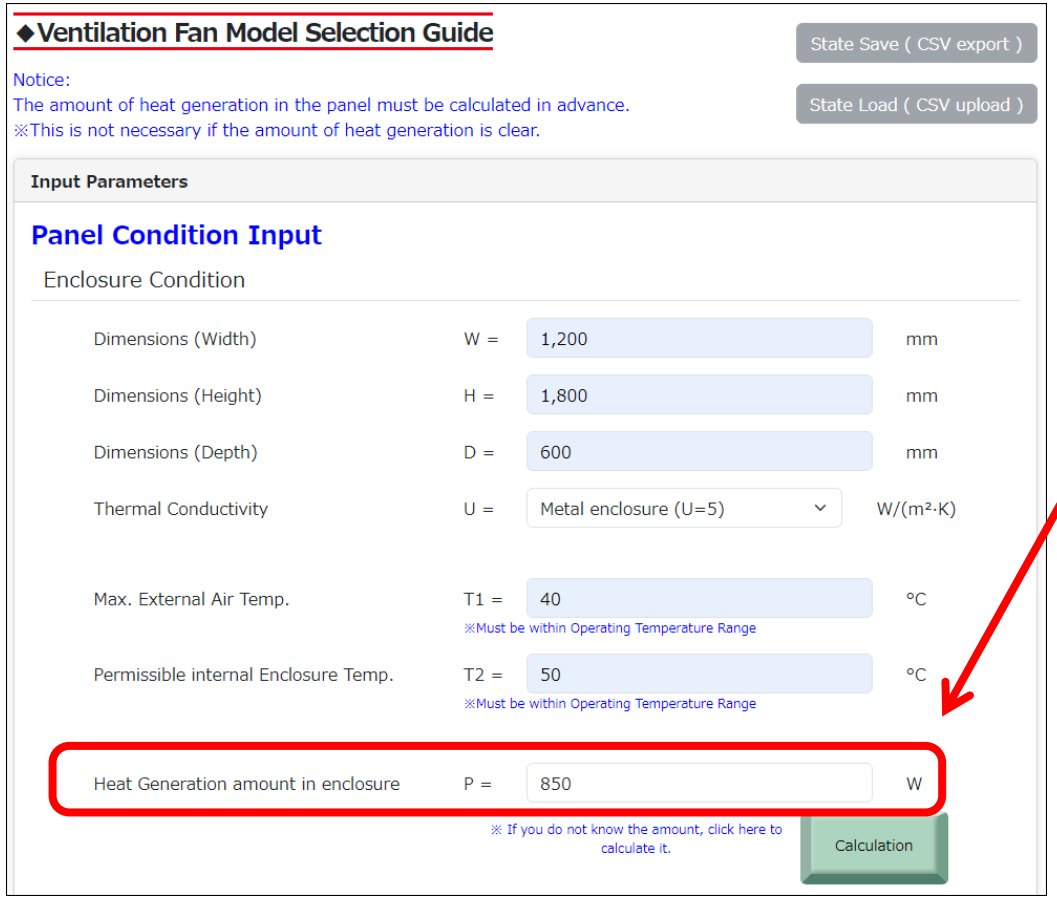
③ **Total amount will be displayed**



2. How to use

How to calculate in-panel heat generation

Table A (amount clear)



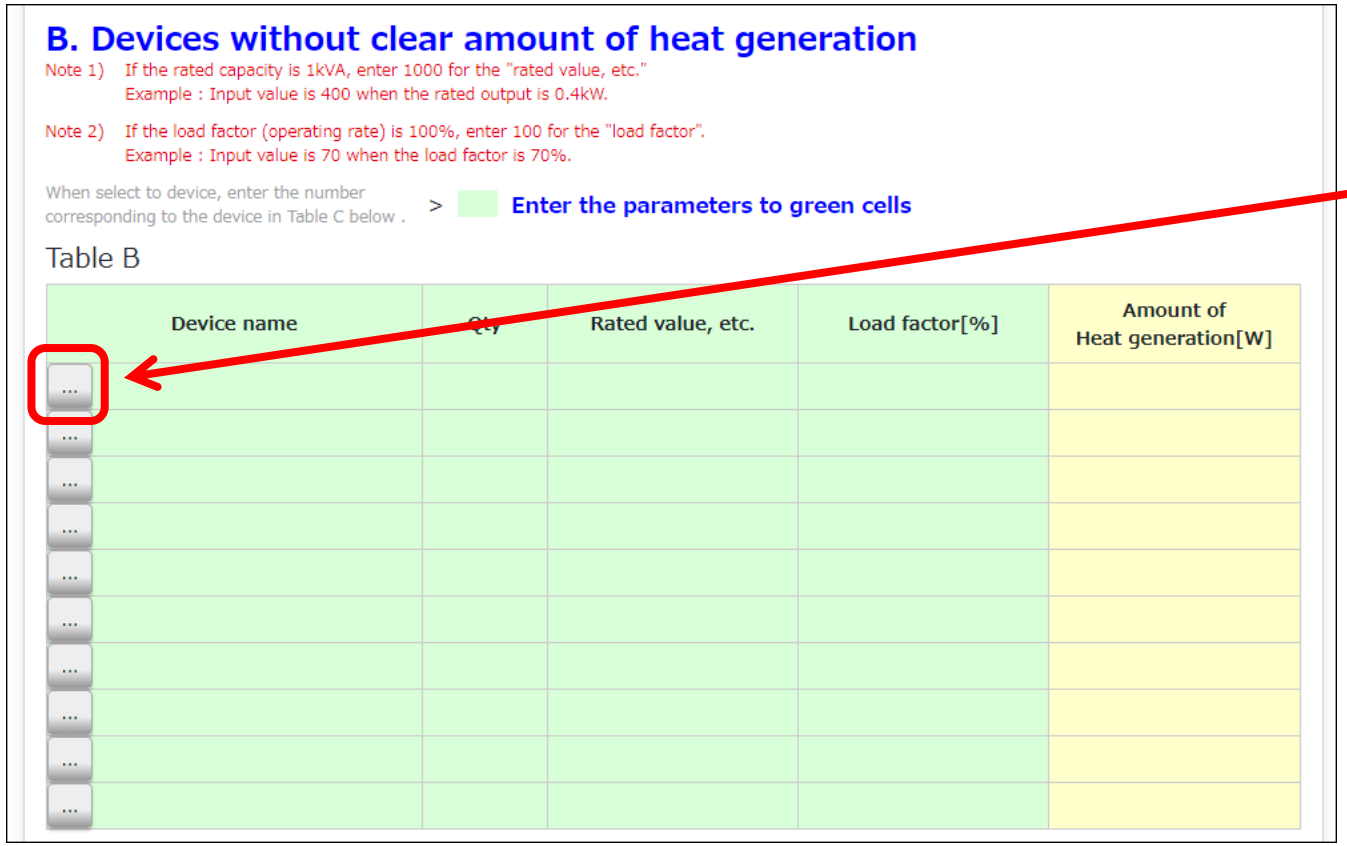
④ Go back to the first sheet and enter the total amount

2. How to use

How to calculate in-panel heat generation

Table B (amount not clear)

If the amount of heat generation of each device is **not clear** → Use **Table B**



B. Devices without clear amount of heat generation

Note 1) If the rated capacity is 1kVA, enter 1000 for the "rated value, etc."
Example : Input value is 400 when the rated output is 0.4kW.

Note 2) If the load factor (operating rate) is 100%, enter 100 for the "load factor".
Example : Input value is 70 when the load factor is 70%.

When select to device, enter the number corresponding to the device in Table C below . > Enter the parameters to green cells

Table B

	Device name	Q'ty	Rated value, etc.	Load factor[%]	Amount of Heat generation[W]
...					
...					
...					
...					
...					
...					
...					
...					
...					
...					

① **Press the ... button.**

2. How to use

How to calculate in-panel heat generation

Table B (amount not clear)

Reference Table for entering Table B .

Please select the equipment to generate heat .

OK

Table C

No.	Device Name	Rated Value	Amount of Heat Generation	Remark
●Power supply / Transformer				
1	Transformer 100VA	~100VA	Rated value *15% (Approx.)	・Power loss = amount of heat generation
2	Transformer 300VA	~300VA	Rated value *10% (Approx.)	・The smaller size, the higher heat generation ratio.
3	Transformer 500VA	~500VA	Rated value * 8% (Approx.)	
4	Transformer 1kVA	~1kVA	Rated value * 7% (Approx.)	
5	Transformer 3kVA	~3kVA	Rated value * 5% (Approx.)	
6	Transformer 5kVA	~5kVA	Rated value * 4% (Approx.)	
7	Transformer 10kVA	~10kVA	Rated value * 3% (Approx.)	
8	Transformer 50kVA	~50kVA	Rated value * 2.5% (Approx.)	
9	Transformer 100kVA	~ 100kVA	Rated value * 2% (Approx.)	
10	Voltage regulator 500VA	~500VA	Rated value *10% (Approx.)	・Power loss = amount of heat generation
11	Voltage regulator 1kVA	~1kVA	Rated value * 7% (Approx.)	・The smaller size, the higher heat generation ratio.
12	Voltage regulator 40kVA	~40kVA	Rated value * 5% (Approx.)	
13	Voltage power supply 5kVA	~5kVA	Rated value *20% (Approx.)	・Power loss = amount of heat generation
14	Voltage power supply 10kVA	~10kVA	Rated value *15% (Approx.)	

A list of common devices will appear

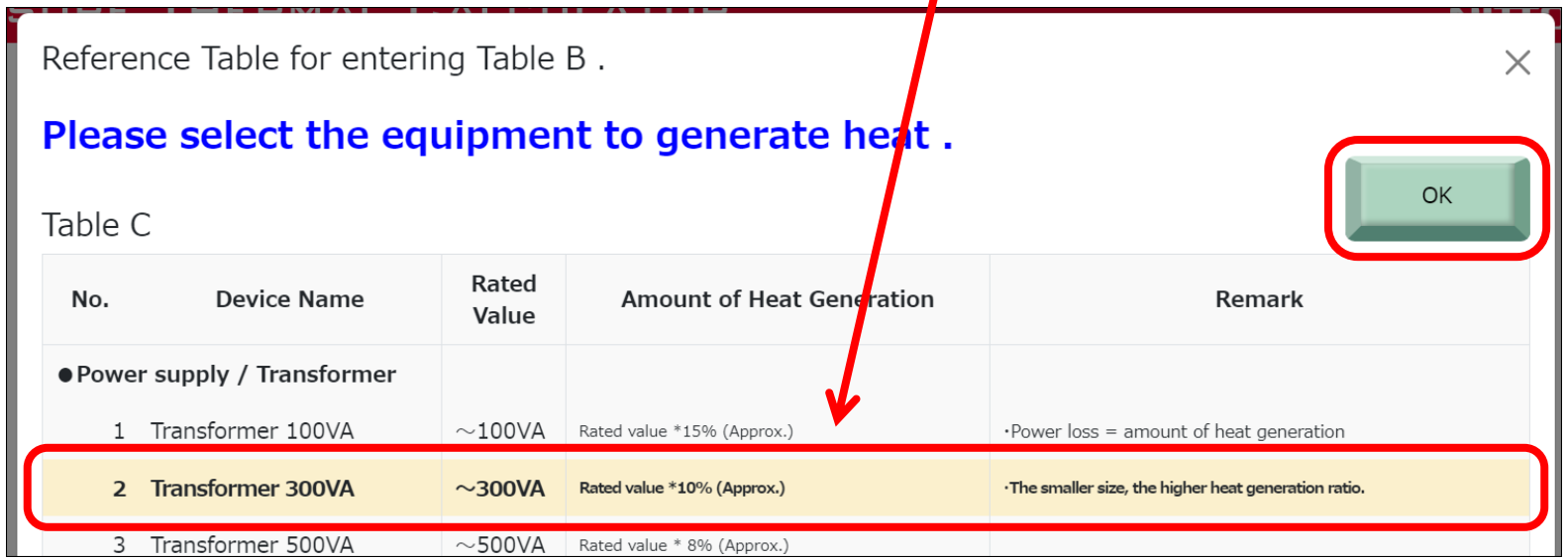
- Power supply / Transformer
- Amplifiers
- Circuit device
- Control devices
- Information/communications devices
- Other

2. How to use

How to calculate in-panel heat generation

Table B (amount not clear)

② Press and select the device you plan to install.



③ Press “OK” button

* The color will change to yellow when you click the device

2. How to use

How to calculate in-panel heat generation

Table B (amount not clear)

④ Device name will be set.

Table B

	Device name	Qty	Rated value, etc.	Load factor[%]	Amount of Heat generation[W]
...	2 Transformer 300VA	1	300	10	
...	24 AC servo amp. 3kVA	1	3000	5	
...					

⑤ Fill in the other green cell.

Table C

No.	Device Name	Rated Value	Amount of Heat Generation
●Power supply / Transformer			
1	Transformer 100VA	～100VA	Rated value *15% (Approx.)
2	Transformer 300VA	～300VA	Rated value *10% (Approx.)
3	Transformer 500VA	～500VA	Rated value * 8% (Approx.)

Note 1)
If the rated value is 1kVA, enter 1000 for the "rated value, etc."
Ex) When the rated value is 0.4kW, input 400.

Note 2)
If the load factor (operating rate) is 100%, enter 100 for the "load factor".
Ex) When the load factor is 70%, input 70.

2. How to use

How to calculate in-panel heat generation

Table B (amount not clear)

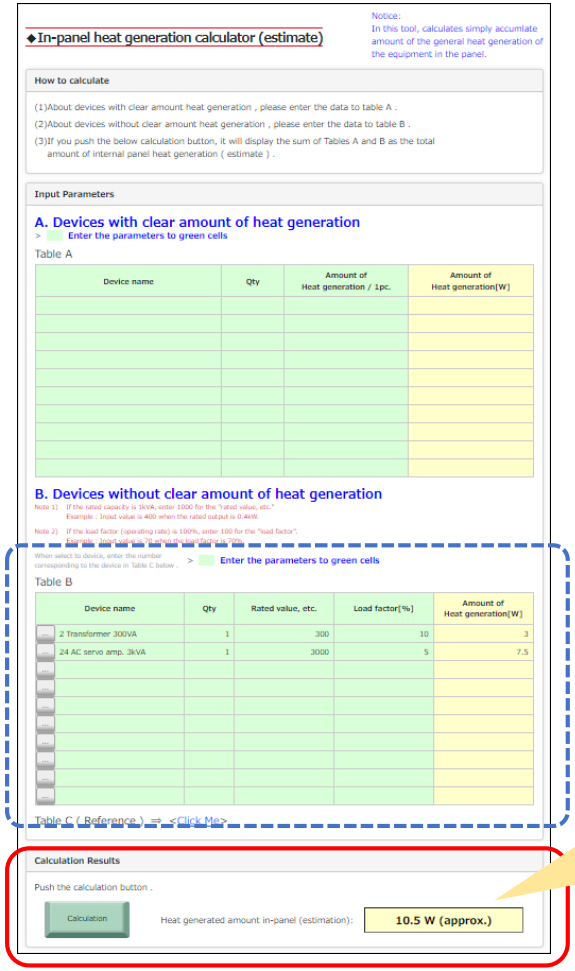
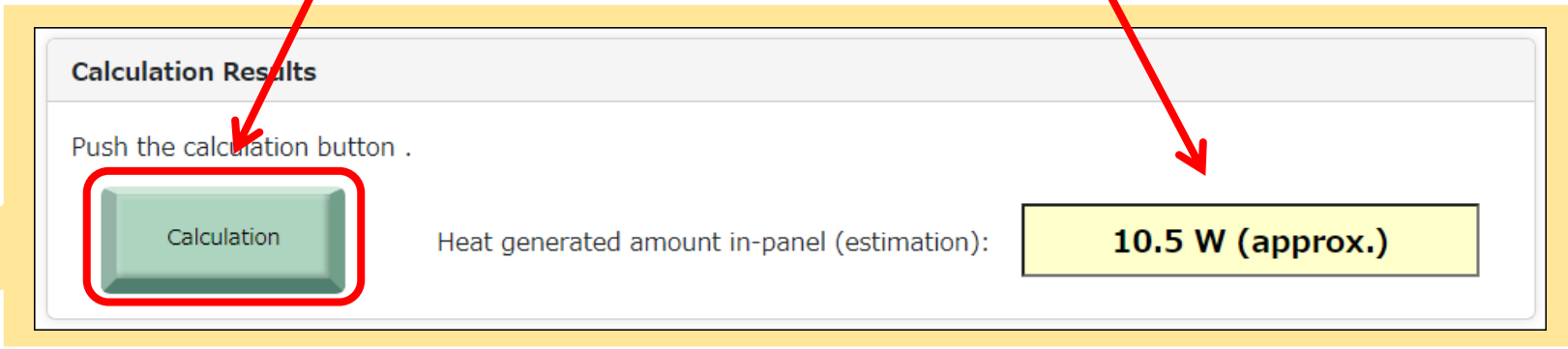


Table B

⑥ **Press the “Calculation” button**

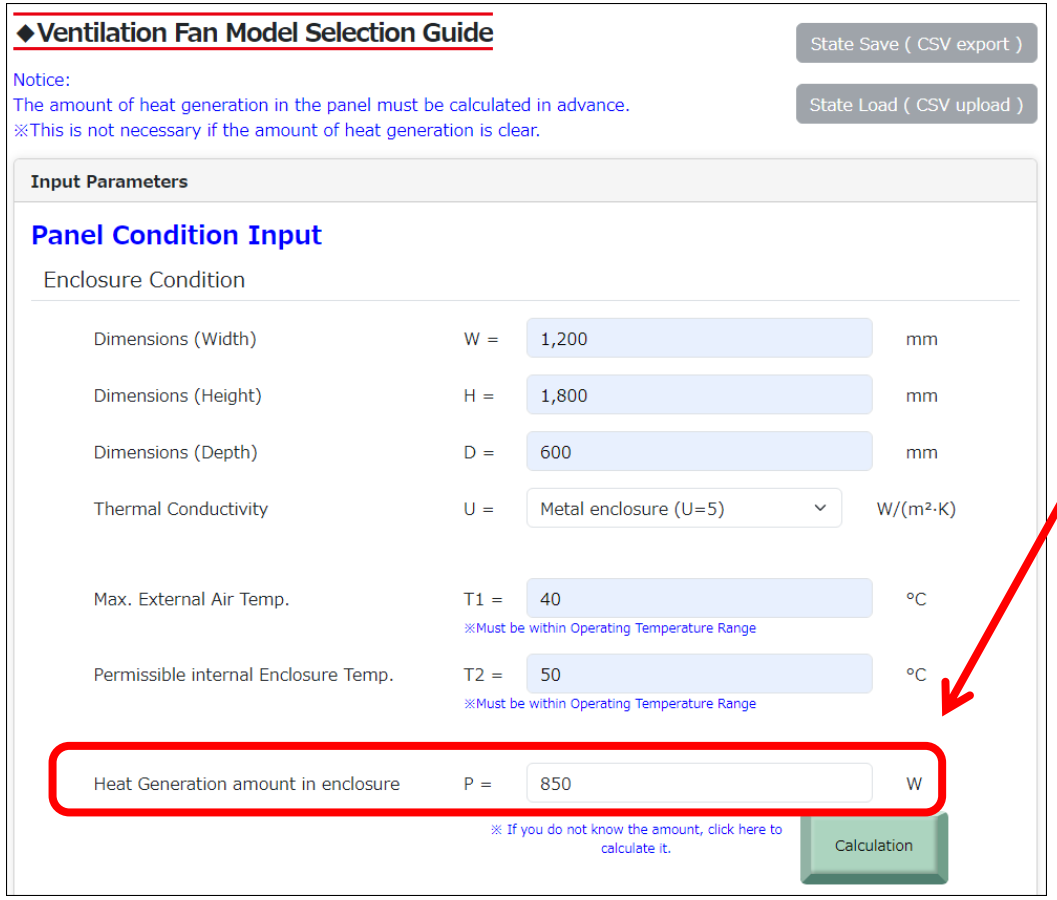
⑦ **Total amount will be displayed**



2. How to use

How to calculate in-panel heat generation

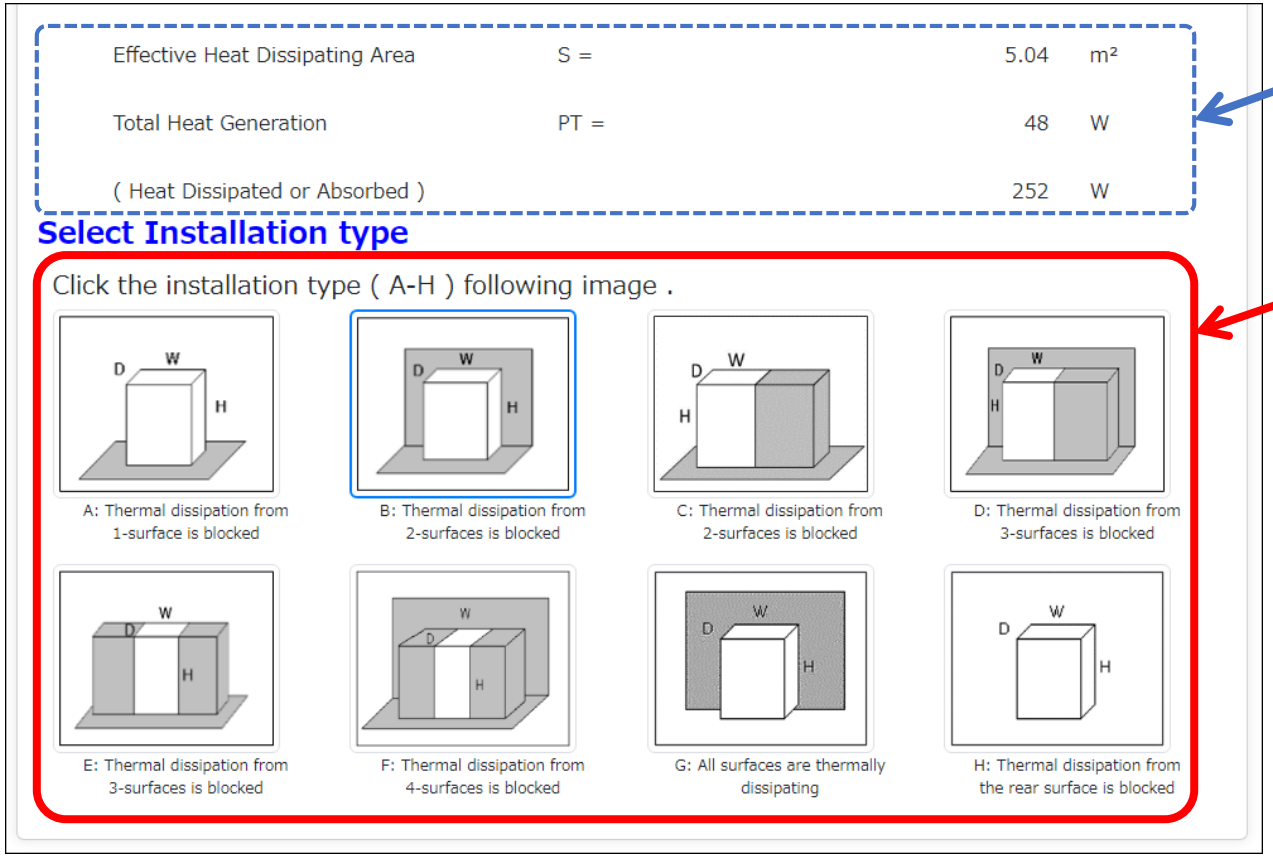
Table B (amount not clear)



⑧ Go back to the first sheet and enter the total amount

2. How to use

For Indoor and Outdoor

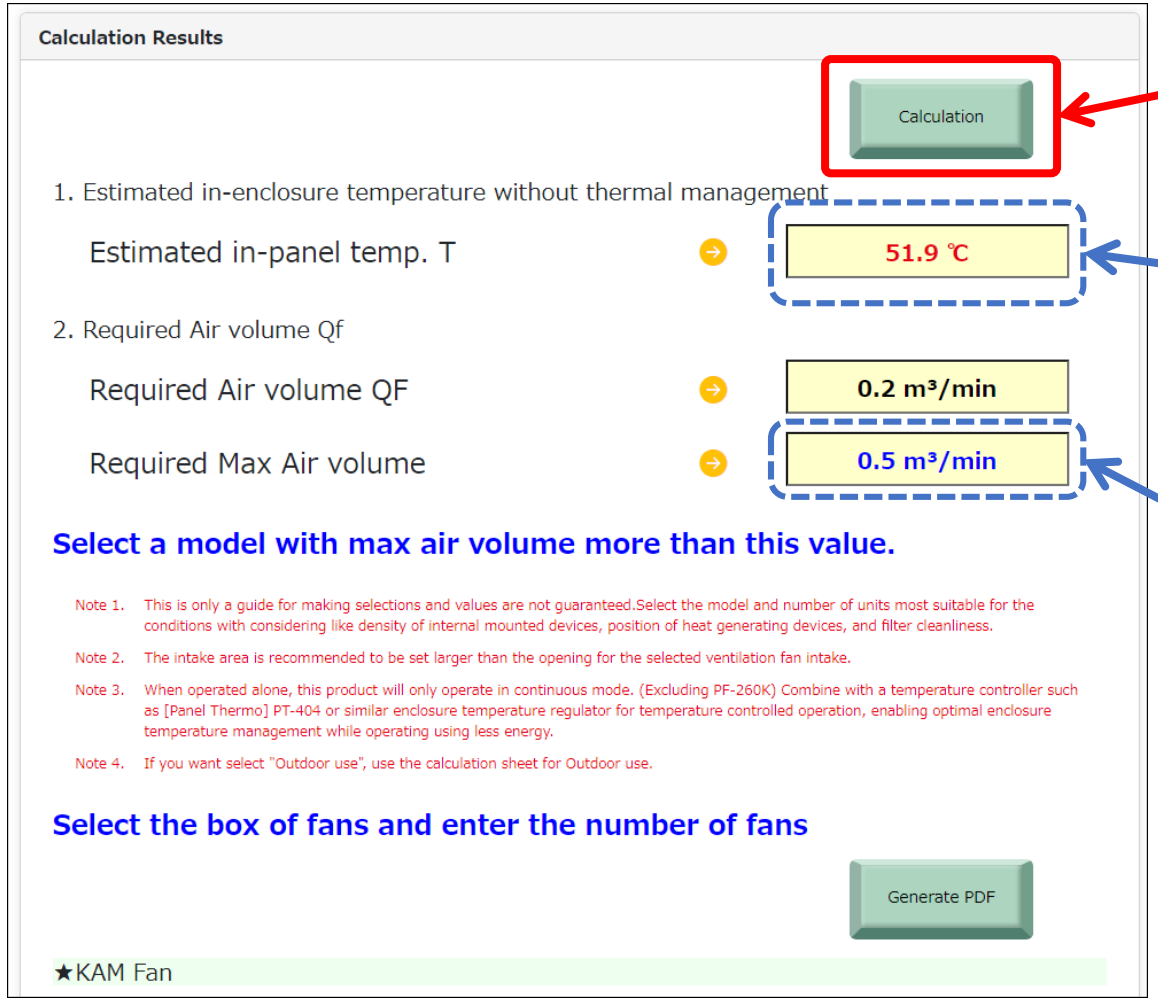


Calculated automatically

Select the installation type

2. How to use

For Indoor and Outdoor



Press the “Calculation” button

Estimated in-panel temp.

If this temp. is higher than permissible internal enclosure temp., thermal management is required.

Products with performance exceeding this number are required.

2. How to use

For Indoor and Outdoor

Required Max Air volume	0.5 m³/min

Select a model that exceed the "Required Max Air volume" from the list below.

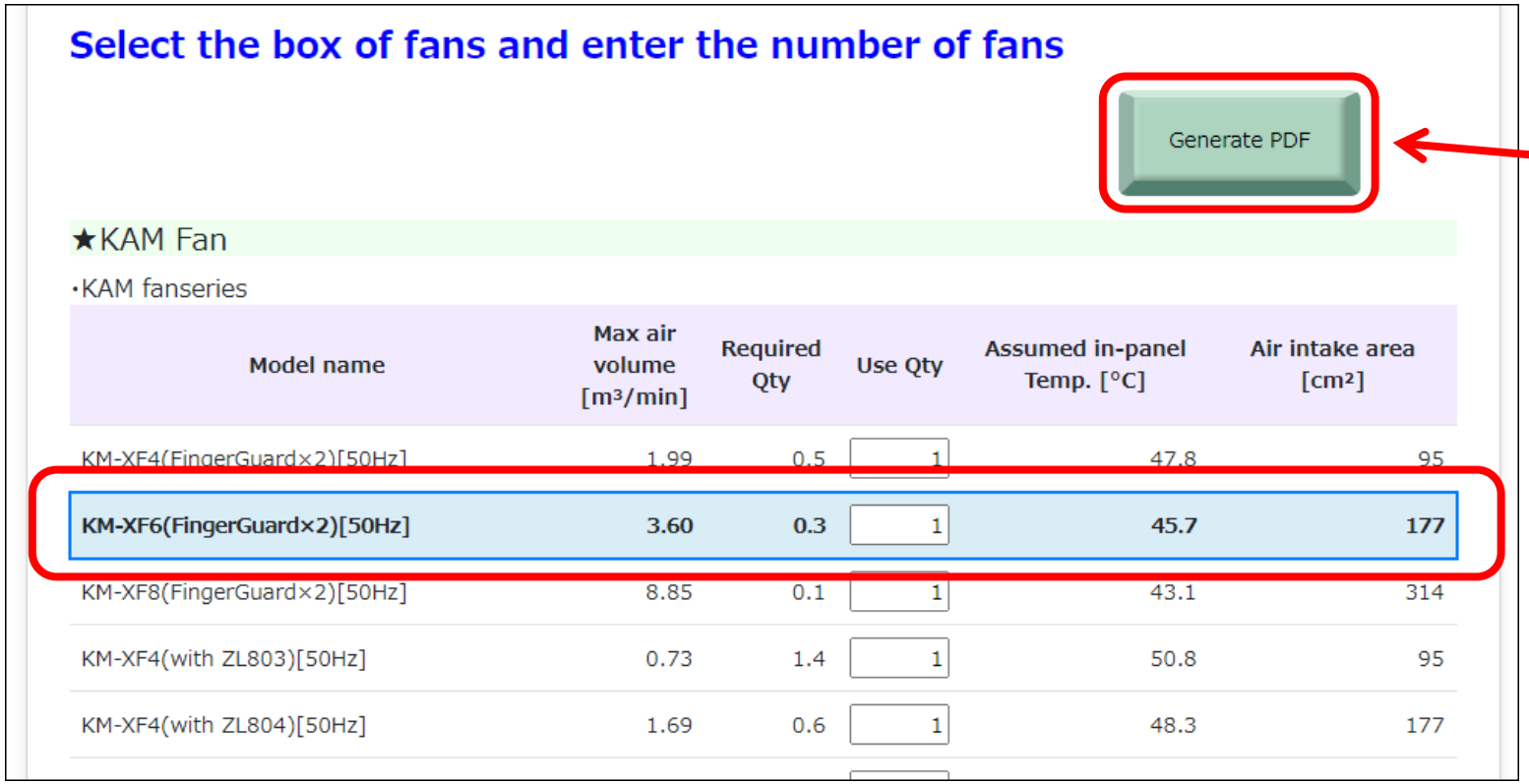
★KAM Fan

・KAM fanseries

Model name	Max air volume [m³/min]	Required Qty	Use Qty	Assumed in-panel Temp. [°C]	Air intake area [cm²]
KM-XF4(FingerGuard×2)[50Hz]	1.99	0.3	1	46.7	95
KM-XF6(FingerGuard×2)[50Hz]	3.60	0.1	1	44.9	177
KM-XF8(FingerGuard×2)[50Hz]	8.85	0.1	1	42.6	314
KM-XF4(with ZL803)[50Hz]	0.73	0.7	1	49.2	95

2. How to use

How to generate PDF



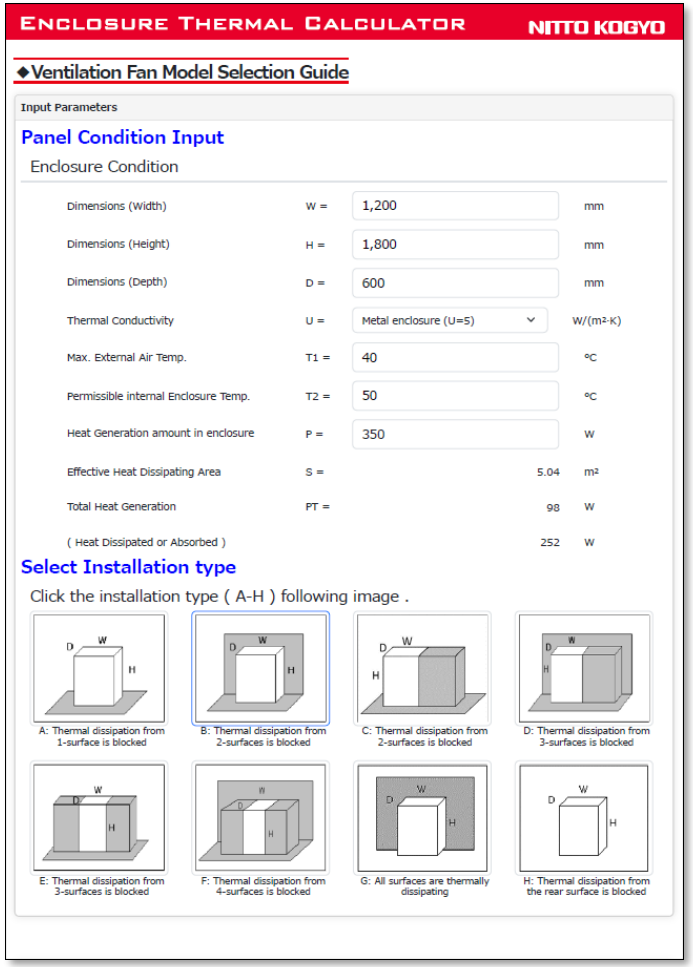
Press the model you want to include in the PDF and press “Generate PDF”

* The color will change to blue when you click the model.

* Multiple models can be selected.

2. How to use

How to generate PDF



ENCLOSURE THERMAL CALCULATOR NITTO KOGYO

◆Ventilation Fan Model Selection Guide

Input Parameters

Panel Condition Input

Enclosure Condition

Dimensions (Width)	W =	1,200	mm
Dimensions (Height)	H =	1,800	mm
Dimensions (Depth)	D =	600	mm
Thermal Conductivity	U =	Metal enclosure (U=5)	W/(m²·K)
Max. External Air Temp.	T1 =	40	°C
Permissible internal Enclosure Temp.	T2 =	50	°C
Heat Generation amount in enclosure	P =	350	W
Effective Heat Dissipating Area	S =	5.04	m²
Total Heat Generation	PT =	98	W
(Heat Dissipated or Absorbed)		252	W

Select Installation type

Click the installation type (A-H) following image .

A: Thermal dissipation from 1-surface is blocked

B: Thermal dissipation from 2-surfaces is blocked

C: Thermal dissipation from 2-surfaces is blocked

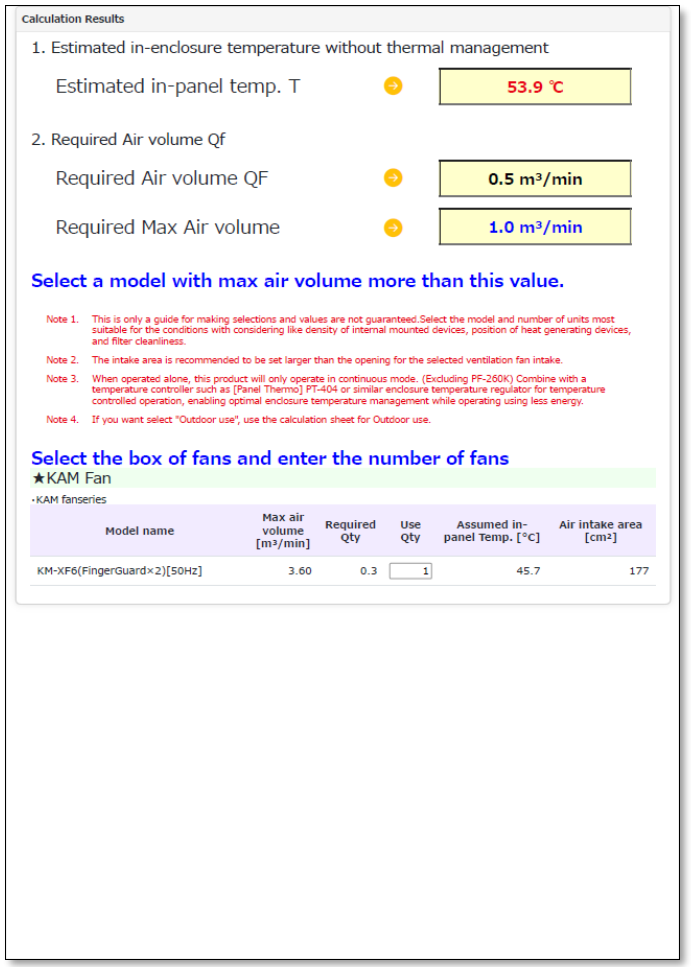
D: Thermal dissipation from 3-surfaces is blocked

E: Thermal dissipation from 3-surfaces is blocked

F: Thermal dissipation from 4-surfaces is blocked

G: All surfaces are thermally dissipating

H: Thermal dissipation from the rear surface is blocked



Calculation Results

1. Estimated in-enclosure temperature without thermal management

Estimated in-panel temp. T → 53.9 ℃

2. Required Air volume Qf

Required Air volume QF → 0.5 m³/min

Required Max Air volume → 1.0 m³/min

Select a model with max air volume more than this value.

Note 1. This is only a guide for making selections and values are not guaranteed.Select the model and number of units most suitable for the conditions with considering like density of internal mounted devices, position of heat generating devices, and filter cleanliness.

Note 2. The intake area is recommended to be set larger than the opening for the selected ventilation fan intake.

Note 3. When operated alone, this product will only operate in continuous mode. (Excluding PF-260K) Combine with a temperature controller such as [Panel Thermo] PT-404 or similar enclosure temperature regulator for temperature controlled operation, enabling optimal enclosure temperature management while operating using less energy.

Note 4. If you want select "Outdoor use", use the calculation sheet for Outdoor use.

Select the box of fans and enter the number of fans

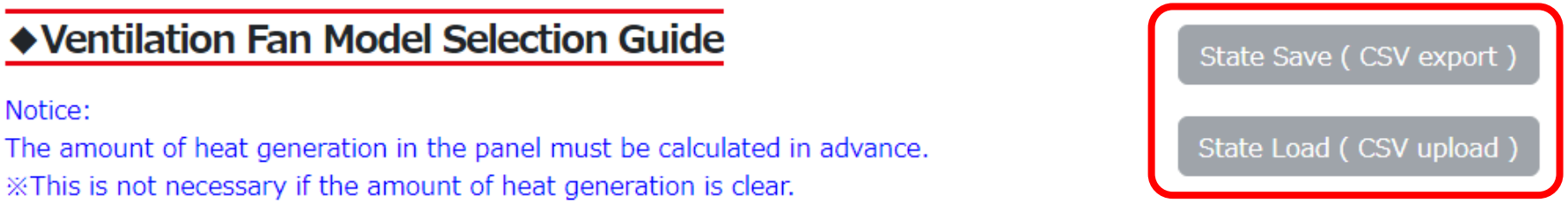
★KAM Fan

·KAM fanseries

Model name	Max air volume [m³/min]	Required Qty	Use Qty	Assumed in-panel Temp. [°C]	Air intake area [cm²]
KM-XF6(FingerGuard×2)[50Hz]	3.60	0.3	1	45.7	177

3. Notes

- Cookies are retained for 90 days upon login.
- Calculation screen will lose session after 3 hours of inactivity.
- Some products may need to be imported.
- “State Save & Load” function will be implemented in due course.



For more information, please contact to

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