How to choose the right Cooling Unit suitable to the Load.

To choose the right Cooling Unit to match with the size of the load and the control Unit, the following information should be taken into consideration, i.e.,

1. The volume of the heat inside the control unit (Q1)
2. The Degree of heat temperature produced by the equipment inside the control unit (Q2).

The Formula is as the following:

P	=	Q1 + Q2
P	=	Power of the Cooling Unit, expressed in Watt (W).
Q1	=	Volume of the heat inside the control unit, expressed in Watt (W)
Q2	=	Degree of heat temperature produced by the equipment inside the control unit, expressed in Watt (W).

Q1 can be obtained by the calculation from Q1 = A x « x at

A	=	Area of the sides of the control unit, expressed in sq. m (m2)
A	=	(WxHx2) + (DxHx2) + (DxWx2)
μ	=	Co-efficiency of the control unit made from steel = 5W/M2.K
Δt	=	Difference between the environmental temperature (Ta) and required temperature inside the control unit (Tb), expressed in Celcius Degree (°C)
Δt	=	Ta-Tb°C

Q2 can be obtained by the calculation from the power loss of the equipment inside the control unit (Inverter ,Servo drive ,PLC ,Monitor ,Transformer ,etc.)

Power loss = Summarize 3% of all equipments power consumption (From the label) expressed in (W)

In order to cover the heat loss we recommend to have 20% for its factor.

P = P x 1.2

Suggestions to choose the right Cooling Units:

1. Choose the model that can cope with the loss of coolness leaking out from the control unit.
2. If the control unit is installed near the heat producing source, the cooling units with higher capacity than the indicated requirement should be the choice.
3. Do not adjust the temperature difference more than 10°C between the environmental temperature and the temperature inside the control unit.

Example:

How to choose the "Cooling Unit"
Visma Asia Co. Ltd.,

To choose the right "cooling unit" in proportion to the size of the load and control unit, the following details should be taken into consideration, i.e.,

P	=	Q1+Q2
P	=	Power of the cooling units, expressed in Watts (w).
Q1	=	Volume of heat inside the control unit, expressed in Watts (w).
Q2	=	Degree of heat temperature caused by the equipment inside the control unit, expressed in (w).

Area of all the sides of the control unit;

W	=	1100 mm
H	=	650 mm
D	=	400 mm.

Q1 can be obtained by the calculation from the following formula, i.e.,

Q1	=	A x U x ΔT
A	=	Area of sides of the control unit in sq.m (m2)
A	=	[(1.1 x 0.65)x2] + [(0.4x0.65)x2]+ [(0.4x1.1)x2]
	=	1.43+0.52+0.88
	=	2.83 m2
U	=	The Co-efficiency of the control unit made from steel = watt/W/M2.K.
U	=	5W/M2.K.
ΔT	=	The difference between the environmental temperature and the temperature inside the control unit is expressed in Celcius Degree (°C).
ΔT	=	40-30 °C
	=	10 °C
Q1	=	A x U x ΔT
	=	2.83 x 5 x 10
	=	**141 W**

Q2 can be obtained by the calculation from the power loss of the equipment inside the control unit (from the producer).

- Inverter 22 KW. (22x1000) x 3% 1 set = 660 W
- Inverter 7.5 KW. (7.5x1000) x 3% 1 set = 225W
  - **Total = 850 W**

P	=	Q1 + Q2
	=	141 + 850W
P	=	**991W**

There must be the factor which we suggest for 20%

P	**=**	**P x 1.2**
	=	**991 x 1.2**
	=	1189.2 W

Suggestions for the installation of an air-conditioner of 1200W = 1 set.

1. The equipment produces the heat less than the indicated information.
2. The operation of the machine does not required to work 24 hours.
3. The area for the installation is limited.

The recommended model can generate the coolness from 28-30 °C.