



# ECM-SERIES <sup>เครื่องรักษาอุณหภูมิภายในตู้คอนโทรล</sup> User's Guide

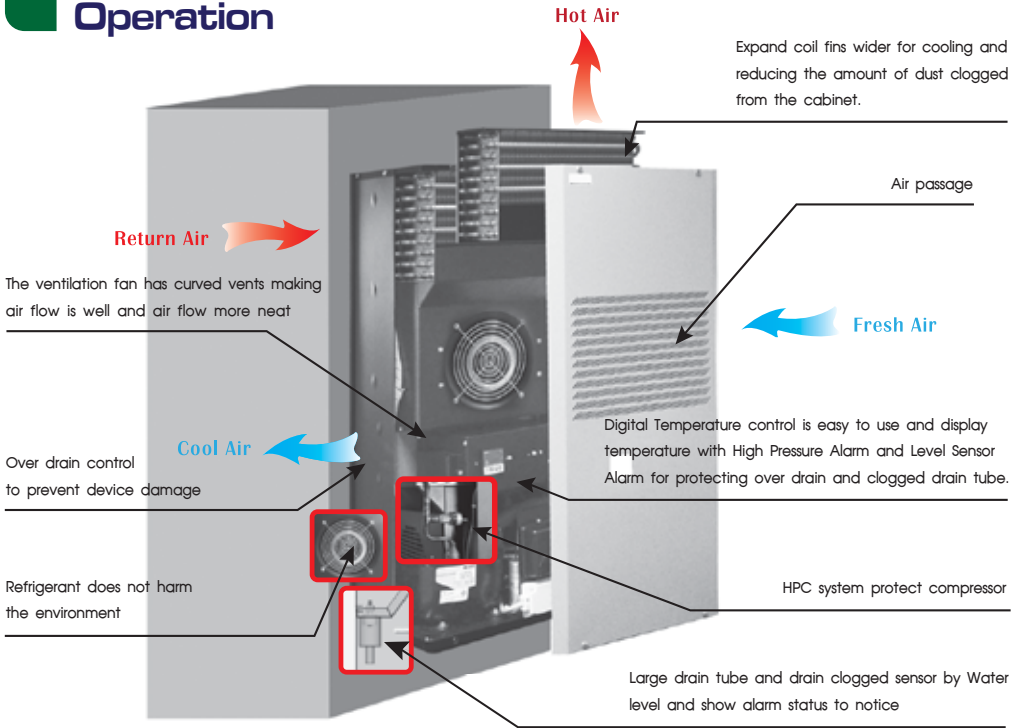
## AIR CONDITIONER FOR CONTROL BOXES





Website : [www.primusthai.com](http://www.primusthai.com)

**Operation**



## 1. Application

The Electronic Enclosure Cooling Module Type ECM-Series has been designed and made to maintain the internal temperature inside the control cabinet by producing the cool air inside the control cabinet to prevent any damages to the equipment that is sensitive to the changing of temperature.

The Cooling Module is suitable to be used where the ambient temperature are about +40 °C to +50 °C, whereas the ordinary air conditioner cannot be used where the ambient temperature is too high.

## 2. Specification

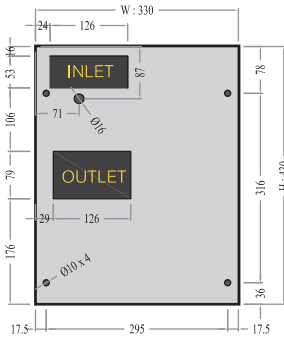
MODEL		UNITS	ECM-1000	ECM-1000 SUS	ECM-2700	ECM-2700 SUS	ECMV-4000	ECMV-4000 SUS	ECM-7000	ECM-7000 SUS	ECM-13000	ECM-13000 SUS	ECM-4000	ECM-4000 SUS
Material		-	Steel	SUS304	Steel	SUS304	Steel	SUS304	Steel	SUS304	Steel	SUS304	Steel	SUS304
Supply Voltage		V-Ph-Hz	220-240/1/(50/60Hz)				220-240/1/50Hz		220-240/1/(50/60Hz)				220-240/1/50Hz	
Cooling Capacity L35L35		W	330		800		1400		2000		3800		1400	
Cooling Capacity L35L50		W	270		680		1170		1700		2700		1170	
Cooling Capacity		BTU/h	1000		2700		4000		7000		13000		4000	
Dimension (Width/Height/Depth)		mm	330/430/181		310/635/210		412/930/255		412/930/252.5		505/1230/370		604/360/450	
Max Running Current		A	1.2		2.1		4		4.7		8.8		4	
Start Current		A	5		12		17		20		38		17	
Start Delay Time (D1)		min.	1 - 60 (Default 3 minute)											
Sensor Delay Time (D2)		min.	1 - 60 (Default 1 minute)											
Recovery Time (D3)		min.	1 - 60 (Default 1 minute)											
Condensator Fan Air Flow		m <sup>3</sup> /h	188		460		593		1220		1231		367	
Evaporation Fan Air Flow		m <sup>3</sup> /h	115		300		312		780		1891		675	
Condensator Fan Power Consumption/Current		W/A	35/0.29		62/0.28		62/0.28		87/0.44		189/0.94		87/0.44	
Evaporation Fan Power Consumption/Current		W/A	18/0.12		35/0.29		62/0.28		62/0.28		189/0.94		62/0.28	
Internal Temperature Limits		°C	25-45											
Outer Temperature Limits		°C	20-55											
Internal Protection Degree		IP	IP54											
External Protection Degree		IP	IP30		IP34									
Protection System	Clot Water Pipe		-		√		√		√		√		√	
	Compressor		-		-		√		√		√		√	
Refrigerant Charge		kg	0.25		0.35		0.65		0.65		1		0.6	
Refrigerant		R					134a				R404		134a	
Noise Level		(Max)dB	57.9		67.3		67.0		70.6		75.0		67.0	
Weight		kg	19		29		45		48		92		50	

### 3. Installation

Make the cutouts of the discharge air and the return air; drill the holes for fixing the screws in accordance to the given design of the mounting cutout of each type of the air cooler.

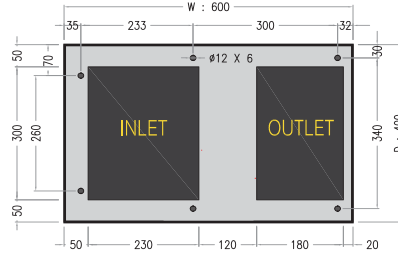
**PE-1000**

**PE-1000 SUS**



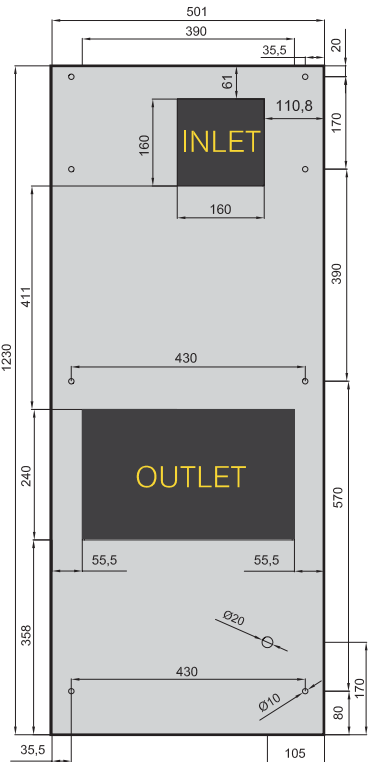
**PE-4000**

**PE-4000 SUS**



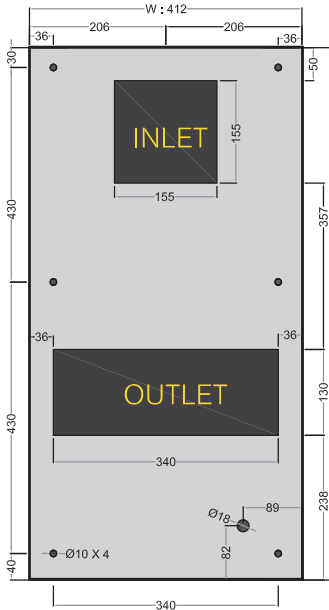
**PEV-13000**

**PEV-13000 SUS**



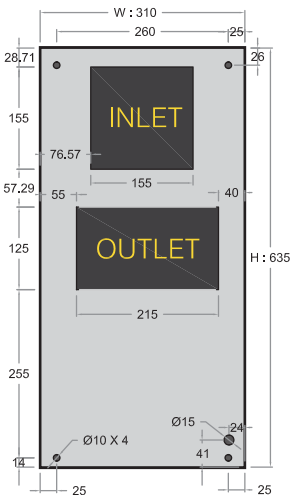
**PEV-4000 / PE-7000**

**PEV-4000 SUS/PE-7000 SUS**



**PE-2700**

**PE-2700 SUS**



## Precaution

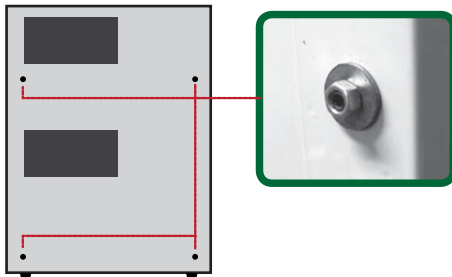
Be careful, before drilling any holes in the control cabinet, the equipment inside the control cabinet should be covered by the trick and dry cloth to protect them any damages that might cause by the slag.

Mounting the enclosure sealing gasket with the control cabinet before installing the cooling module to the control cabinet.

## Importance

The right procedure to fix the Enclosure sealing gasket to prevent the leaking of the Enclosure should be firmly mounted between the cooling module and control cabinet.

Mounting a cutting layout to the panel of the Prior to mounting, mark all position on panel. Cut the panel off, and then install the cooling module follow the layout position.



### Remark :

M6 Screw, should be screwed from the inside of cabinet.

## Prior to mounting, ensure that

- The side of the control cabinet and the unit should be located where there is good ventilation
- The location should be free from dirt and moisture
- The electric power supply should be the same as the specification of the name plate
- The damage of packaging might also cause of damage to the unit
- The unit should be install at lease 200 mm. from the wall
- The unit should be install at lease 200 mm. from the equipment inside the cabinet to prevent a good circulation of the ventilation
- Unit should only be fixed vertically in the specified position
- The condensate drainage is provide
- Electric connection and repair must be by authorized specialist, the prolongation of the operation life of the unit
- To avoid an increase in condensation the control cabinet must be firmly closed, do not adjust the temperature lower than 28 C
- The power supply must be not supplied from any Inverter or Converter equipment

## Instruction

Incase of adjusting the temperature of the control cabinet to be lower than 28 °C (due to having some type of CPU Chip which require temperature at 20 °C), a precision air conditioner of multi stage system is recommended

## 4. Electrical Connection

Connecting the cooling module to the main electric supply, the voltage and frequency must be checked to be the same value with the specification.

The cooling module must be connected to the main via isolating device, do not use any additional Thermostat connected before.

Line protection should be provided by means of the breaker specified on the specification on the user's guide.

### Precaution

Do not connect the Neutral with the ground rod in the earth that is connected to the electric line. This practice will cause the under voltage and damage the coolers.

### Importance

- Tighten the Electrical line and Neutral connection
- Voltage and current check while the unit is still running

## 5. Technical Information

### 5.1 Fault signal and protection

The cooling module consists of four main components; the coolant compressor, evaporator, condenser and the pressure control which are connected by suitable pipe work (350Psi). Pressure tested before filled with a readily boiling substance; the coolant. All the fault signal, protection and the temperature controller of the air cooler are controlled by a Hipresent Control electronic board. The next generation control will be a Microprocessor control board, for more function and more output.

**Remark :** The air coolers are properly work, LED will display continuously green

### 5.2 Condensate discharge

To drain the condensate water from the air cooler drain pan, a hose should be connected to the aluminium pipe of the of the cooling module and route the hose directly downward.

### 5.3 General Instruction

Storage, the cooling module should not be stored / keep to temperature above 70 C. Transportation, The cooling module must be transported upright.

**Remark :** If the cooling module are not correctly positioned during transporting compressor might be damage. Old and worn out of cooling module should be send back to the manufacturer in order to destroy properly to prevent and harmful consequence to the remaining of refrigerant and lubricant inside the compressor

## 6. Maintenance and Warranty

The Electronic Enclosure Cooling Module Type ECM-Series are very easy to maintenance. The fin coil of cooling module should be constantly cleaned under supervisor two times a year.

**Warranty :** One year warranty commencing from the purchased date.

## Introduction



## ECM-SERIES

Air Conditioner for the control cabinet box has been designed and made for cooling and controlling the humidity inside the electronics cabinet box at a suitable level for long service life and precision. And there is a protection device when refrigerant pressure malfunctions.

Air Conditioner in Model Series PE has compressor coil heat ventilation by "Fin Coil" which is larger. The dust will not stick on "Fin Coil" and made cooling has more efficiency better than Filter and the devices have a longer service life.



## Equipment accessories



### 1. HIGH PRESSURE SAFETY SWITCH

A high-pressure protection device will stop the compressor when the refrigerant system pressure over a setting value  
(Model PE-7000, PE-4000)



### 2. TEMPERATURE CONTROLLER

The temperature Controller will control the air condition function for the controlling temperature inside cabinet boxes such as control boxes, electrical boxes, etc.



### 3. FLORT LEVEL SWITCH

Float level switch will detect water flow when the drain tube has clogged.The device will TURN OFF to stop compressor operation.  
(Model PE-2700, PE-4000, PE-7000, PEV-4000 only)



### 4. NUT TO HOLD

Nuts to hold for installation Air Conditioner with Control box.

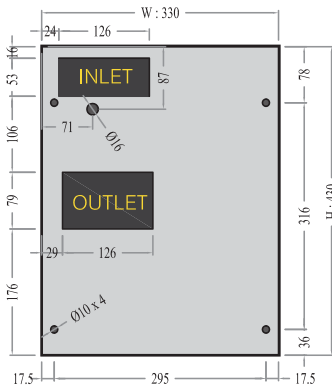


### 5. PREVENT AIR LEAKAGE

The devices are made for preventing air leakage from the environment go to the inside cabinet box.

# ECM-1000 WALL TYPE

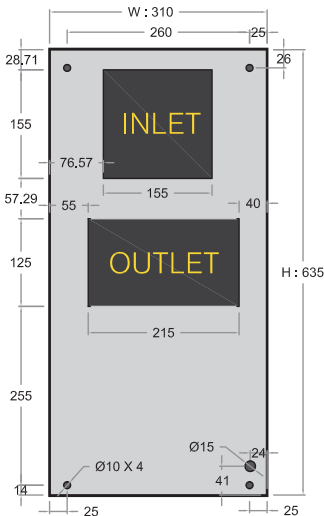
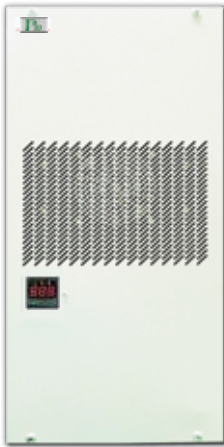
## TECHNICAL SPECIFICATION



MODEL	UNITS	ECM-1000	ECM-1000SUS
Material	-	Steel	SUS304
Supply Voltage	V-Ph-Hz	220-240/1/(50/60Hz)	
Cooling Capacity L35L35	W	330	
Cooling Capacity L35L50	W	270	
Cooling Capacity	BTU/h	1000	
Dimension (Width/Height/Depth)	mm	330/430/181	
Max Running Current	A	1.2	
Start Current	A	5	
Start Delay Time (D1)	min.	1-60 (Default 3 minute)	
Sensor Delay Time (D2)	min.	1-60 (Default 1 minute)	
Recovery Time (D3)	min.	1-60 (Default 1 minute)	
Condensator Fan Air Flow	m <sup>3</sup> /h	188	
Evaporation Fan Air Flow	m <sup>3</sup> /h	115	
Condensator Fan Power Consumption/Current	W/A	35/0.29	
Evaporation Fan Power Consumption/Current	W/A	18/0.12	
Internal Temperature Limits	°C	25-45	
Outter Temperature Limits	°C	20-55	
Internal Protection Degree	IP	IP54	
External Protection Degree	IP	IP30	
Protection System	Clot Water Pipe	-	
	Compressor	-	
Refrigerant Charge	kg	0.25	
Refrigerant	R	134a	
Noise Level	(Max) dB	57.9	
Weight	kg	19	

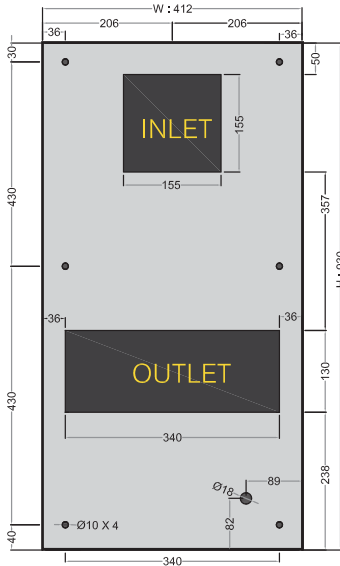
# ECM-2700 WALL TYPE

## TECHNICAL SPECIFICATION



MODEL	UNITS	ECM-2700	ECM-2700SUS
Material	-	Steel	SUS304
Supply Voltage	V-Ph-Hz	220-240/1/(50/60Hz)	
Cooling Capacity L35L35	W	800	
Cooling Capacity L35L50	W	680	
Cooling Capacity	BTU/h	2700	
Dimension (Width/Height/Depth)	mm	310/635/210	
Max Running Current	A	2.1	
Start Current	A	12	
Start Delay Time (D1)	min.	1-60 (Default 3 minute)	
Sensor Delay Time (D2)	min.	1-60 (Default 1 minute)	
Recovery Time (D3)	min.	1-60 (Default 1 minute)	
Condensor Fan Air Flow	m <sup>3</sup> /h	460	
Evaporation Fan Air Flow	m <sup>3</sup> /h	300	
Condensor Fan Power Consumption/Current	W/A	62/0.28	
Evaporation Fan Power Consumption/Current	W/A	35/0.29	
Internal Temperature Limits	°C	25-45	
Outer Temperature Limits	°C	20-55	
Internal Protection Degree	IP	IP54	
External Protection Degree	IP	IP34	
Protection System	Clot Water Pipe	√	
	Compressor	-	
Refrigerant Charge	kg	0.35	
Refrigerant	R	134a	
Noise Level	(Max) dB	67.3	
Weight	kg	29	

# ECMV-4000 WALL TYPE

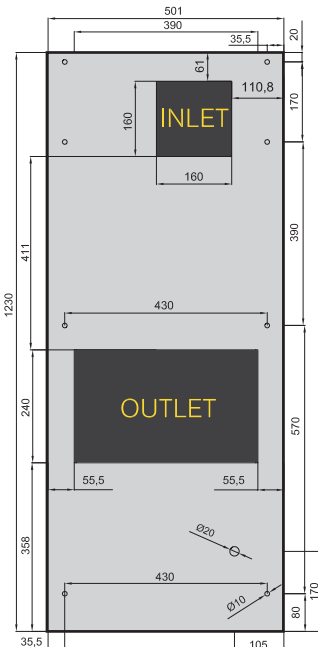


## TECHNICAL SPECIFICATION

MODEL	UNITS	ECMV-4000	ECMV-4000 SUS
Material	-	Steel	SUS304
Supply Voltage	V-Ph-Hz	220-240/1/50Hz	
Cooling Capacity L35L35	W	1400	
Cooling Capacity L35L50	W	1170	
Cooling Capacity	BTU/h	4000	
Dimension (Width/Height/Depth)	mm	412/930/255	
Max Running Current	A	4	
Start Current	A	17	
Start Delay Time (D1)	min.	1-60 (Default 3 minute)	
Sensor Delay Time (D2)	min.	1-60 (Default 1 minute)	
Recovery Time (D3)	min.	1-60 (Default 1 minute)	
Condensor Fan Air Flow	m <sup>3</sup> /h	593	
Evaporation Fan Air Flow	m <sup>3</sup> /h	312	
Condensor Fan Power Consumption/Current	W/A	62/0.28	
Evaporation Fan Power Consumption/Current	W/A	62/0.28	
Internal Temperature Limits	°C	25-45	
Outer Temperature Limits	°C	20-55	
Internal Protection Degree	IP	IP54	
External Protection Degree	IP	IP34	
Protection System	Clot Water Pipe		√
	Compressor		√
Refrigerant Charge	kg	0.65	
Refrigerant	R	134a	
Noise Level	(Max) dB	67.0	
Weight	kg	45	



# ECM-13000 WALL TYPE



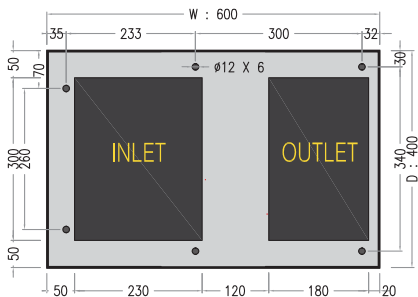
## TECHNICAL SPECIFICATION

MODEL	UNITS	ECM-13000	ECM-13000 SUS
Material	-	Steel	SUS304
Supply Voltage	V-Ph-Hz	220-240/1/(50/60Hz)	
Cooling Capacity L35L35	W	3800	
Cooling Capacity L35L50	W	2700	
Cooling Capacity	BTU/h	13000	
Dimension (Width/Height/Depth)	mm	505/1230/370	
Max Running Current	A	8.8	
Start Current	A	38	
Start Delay Time (D1)	min.	1-60 (Default 3 minute)	
Sensor Delay Time (D2)	min.	1-60 (Default 1 minute)	
Recovery Time (D3)	min.	1-60 (Default 1 minute)	
Condensator Fan Air Flow	m <sup>3</sup> /h	1231	
Evaporation Fan Air Flow	m <sup>3</sup> /h	1891	
Condensator Fan Power Consumption/Current	W/A	189/0.94	
Evaporation Fan Power Consumption/Current	W/A	189/0.94	
Internal Temperature Limits	°C	25-45	
Outter Temperature Limits	°C	20-55	
Internal Protection Degree	IP	IP54	
External Protection Degree	IP	IP34	
Protection System	Clot Water Pipe	√	
	Compressor	√	
Refrigerant Charge	kg	1	
Refrigerant	R	134a	
Noise Level	(Max) dB	75.0	
Weight	kg	92	

# ECM-4000 TOP TYPE

## TECHNICAL SPECIFICATION

MODEL	UNITS	ECM-4000	ECM-4000 SUS
Material	-	Steel	SUS304
Supply Voltage	V-Ph-Hz	220-240/1/50Hz	
Cooling Capacity L35L35	W	1400	
Cooling Capacity L35L50	W	1170	
Cooling Capacity	BTU/h	4000	
Dimension (Width/Height/Depth)	mm	604/360/450	
Max Running Current	A	4	
Start Current	A	17	
Start Delay Time (D1)	min.	1-60 (Default 3 minute)	
Sensor Delay Time (D2)	min.	1-60 (Default 1 minute)	
Recovery Time (D3)	min.	1-60 (Default 1 minute)	
Condensor Fan Air Flow	m <sup>3</sup> /h	367	
Evaporation Fan Air Flow	m <sup>3</sup> /h	675	
Condensor Fan Power Consumption/Current	W/A	87/0.44	
Evaporation Fan Power Consumption/Current	W/A	62/0.28	
Internal Temperature Limits	°C	25-45	
Outter Temperature Limits	°C	20-55	
Internal Protection Degree	IP	IP54	
External Protection Degree	IP	IP34	
Protection System	Clot Water Pipe	√	
	Compressor	√	
Refrigerant Charge	kg	0.6	
Refrigerant	R	134a	
Noise Level	(Max) dB	67.0	
Weight	kg	50	



## Require to read before installation

The detail which should be known before installing are as follows:

1. Control boxes area must be able to install and maintained conveniently both inside and outside boxes.
2. Inside cabinet boxes must be clean.
3. Control box far away from heater or other heat source
4. Cabinet box should be have suitable air circulation.
5. Air Conditioner require be installed in high position as possible.
6. If the user installs an air conditioner on the door, please ensure that cabinet door can carry the weight of a product.
7. The user has to ensure the wires will not be torn or damaged when closing the door or installing.
8. Please ensure the air conditioner should be suitable with load in cabinet box

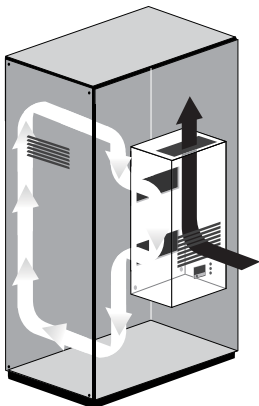
## Installation

1. MUST cut off the electrical system inside the control cabinet before installation and mark the sign following example in product box.

\* Before using the driller and mark cutting sign-on control box, please ensure hole punch, bolt and nut, wires and Air conditioner boxes can install and not block other systems.

2. Attach a rubber seal at the edge behind the Air conditioner for protecting environment airflow into the box.
3. Insert nut to hold with air conditioner box before lift to install with Control Box
4. After put the product on control box use washers and nuts fix from inside.
5. Check the voltage from electrical supply before wiring circuit breaker.
6. Then connect drain tube and check the water flow.
7. Supply voltage to check the current and operating system and temperature.

**ECM-4000/ECM-4000 SUS**



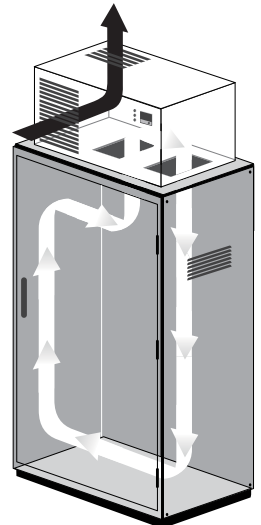
**ECM-1000/ECM-1000 SUS**

**ECM-2700/ECM-2700 SUS**

**ECMV-4000/ECMV-4000 SUS**

**ECM-7000/ECM-7000 SUS**

**ECM-13000/ECM-13000 SUS**





# CMA-003

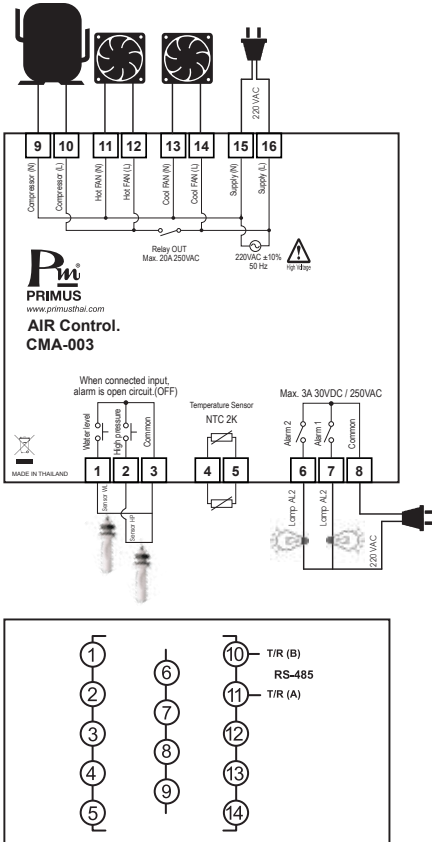
AIR CONTROL UNIT FOR  
AIR CONDITION BOXES  
PE-SERIES



## OPERATION

CMA-003 is an air condition system controller for controlling the temperature in the control box, electrical box, etc. Its use for Air Condition for Control Boxes model PE-Series has 1 Output Relay to control compressor and Hot Fan. The device can receive Input Sensor in High - Pressure type and Water Level for notice the problem and cutting Output operation to prevent damage of Air Condition for Control Boxed model PE-Series from over High Pressure and Water Level.

## WIRING DIAGRAM



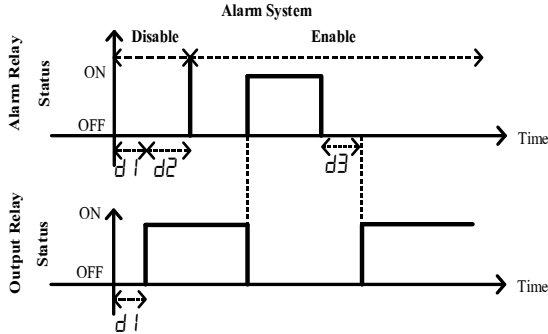
## Controller Operation

CMA-003 control system is ON/OFF Control can choose the operation in Heat/Cooling mode. The user can set Setpoint Value which control variable Sp, variable ON, OFF have °C and can set the time distance between ON and OFF.

CMA-003 can set delay value to start Output Relay when turn on the device. The delay will delay the Alarm operation and delay the Output Relay operation after alarm stop by set variable Start Time (D1), Delay Alarm System (D2) and Delay Time Alarm Event (D3). The process of delay is when turn on the device will start to delay Start Time then temperature control system ON/OFF type will work but Alarm system will not operate until Delay Alarm System will run out and when Alarm has operated. Output Relay will be cut off for protect damage and Alarm (AL2) will operate and CMA-003 will record number of times the alarm occurred.

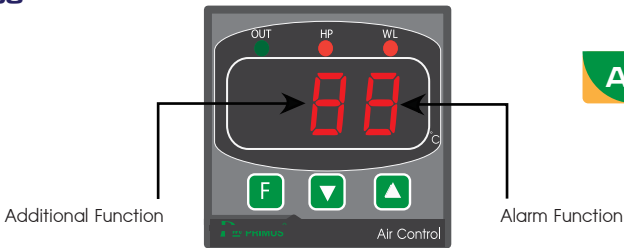
## OPERATION [Continue]

After Alarm is not active, CMA-003 will delay the Delay Time Alarm Event before start to control temperature again. And when Alarm Input Water Level or Alarm Input High Pressure since 3 times will made Alarm keep hold on until the user will clear Status Alarm and turn off and turn down again.



It can control Alarm Relay by Absolute control.

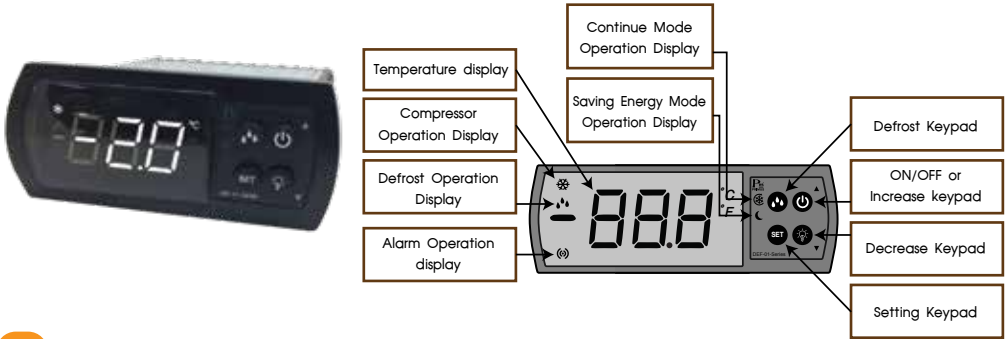
### Choosing Alarm form by set variable ALF there are setting at 2 digits



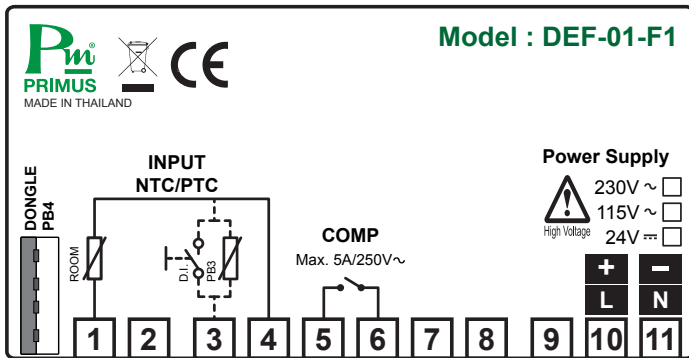
### Additional Alarm Function Additional Alarm Function choose by number at 1st digit Able to set in 3 way

- 1.** None is when PV in condition which made Alarm operate Relay AL1 will operate suddenly and Display will show HL (High Limit Alarm) or show switch between LL (Low Limit Alarm) and Temperature. And when that condition has finished Relay AL1 will stop and Display will return to normal.
- 2.** Alarm output hold is when PV value in condition which made Alarm operate Relay Alarm 1 and Display will operate suddenly and will not stop until Clear by CLr variable by set this variable to 1 or turn off and turn on again.
- 3.** Stand by Sequence is when turn on Alarm will not operate until the value will go to SV and Function Alarm will operate.

# DEF-01-F1 MINI DIGITAL REFRIGERATION TEMPERATURE CONTROLLER



## WIRING DIAGRAM



	<p><b>WARNING</b></p> <ul style="list-style-type: none"> <li>• Make sure the correct wiring connection before turning on electricity. Mis-wiring may cause malfunction of the unit and fire.</li> <li>• Never modify the unit to prevent damage or incident such as malfunction and fire etc.</li> </ul>
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## OPERATION

DEF-01 is digital temperature control with timer for defrosting. The user can choose Cooling or Heating by using sensor Thermistor NTC or PTC. There are Alarm which can notice 8 temperature form and Dongle Terminal which can use with Option Sensor Probe, RS-485 Expansion Module for reading or control operation via Modbus RTU Protocol or use with Dongle Module in case the user requires to copy controller parameter to another device. This product suit to produce freezer or cooler.

## How to press the keypad

### Continue Mode

1. Press UP + DOWN and hold to order or cancel operation.

### Maximum Temperature Mode

1. Press SET+UP and hold until display show "HI".
2. Display will show maximum temperature.
3. Press SET to exist or wait for 5 Second.

### Lowest Temperature Mode

4. Press SET+DOWN and hold until display show "LO".
5. Display will show lowest temperature.
6. Press SET to exist or wait for 5 Second.

### Delete Maximum or Lowest Temperature

1. Press SET and hold while show temperature max or lowest value.
2. Display will show "RST" to show that the value has been deleted successfully.

### How to lock key

1. Press DEF + SET and hold until display show "LOC"

### How to unlock key

1. Press DEF+SET and hold until display show "ULO"

### How to change paragraph

1. Press SET and hold until display show parameter (C or F will flashing)
2. Press UP or Down for choose requested parameter.
3. Press SET for look to parameter.
4. Press UP or Down to change parameter.
5. Press SET to save parameter.

\*Press SET and hold at parameter page or wait for 30 second for exist.

### How to enter to Menu 2

1. Press SET and hold until display show parameter (Menu 1).
2. Press SET + UP and hold until display show "M 2".
3. Display will show parameter in Menu 2.

### How to move parameter between Menu 1 and 2

1. Press SET+DOWN and hold at required parameter in Menu 2

\* See if the parameters were set in menu

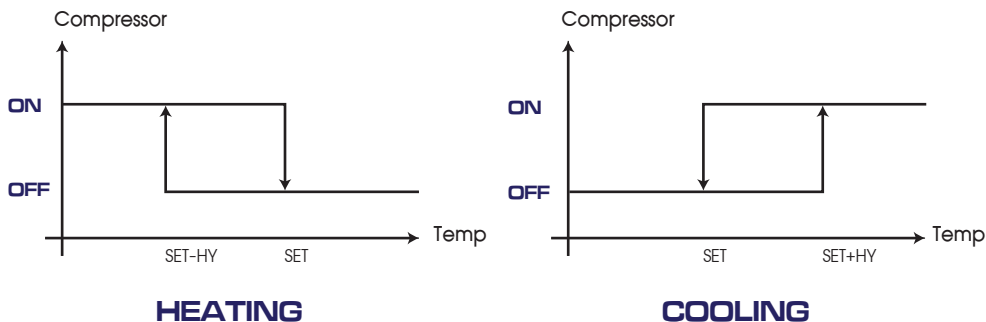
1. it will have "." shows in menu 2.

\* See if the parameters were set in menu

2. it does not have "." shows in menu 2.

## Cooling Control System

DEF-01 will measure room temperature to control COMP. Relay Function and command compressor work until the temperature decrease to a set point. It will operate again when the temperature is higher or equal to SetPoint + Hysteresis. If the user sets function in Heating. COMP. The relay operation will work opposite in picture 1.



Picture 1 Compressor operation

## Notification Message

Message	Cause
P1 <sup>-</sup> , P1 <sub>-</sub>	Room Probe is broken
P3 <sup>-</sup> , P3 <sub>-</sub>	Third Probe is broken
P4 <sup>-</sup> , P4 <sub>-</sub>	Fourth Probe is broken
HA	Room Probe High Temperature Alarm
LA	Room Probe Low Temperature Alarm
HA2	Condenser High Temperature Alarm
LA2	Condenser Low Temperature Alarm
EA	External Alarm
SA	External Serious Alarm
PA	Pressure switch Alarm
DA	Door open Alarm
LOC	Key pad locked
NOP	Selected probe is disabled.

## Maintenance

For long life service and full efficiency. The air conditioner should Maintain regularly. There are methods for users and specialist technicians.

### Preliminary check by observation and voltage meter



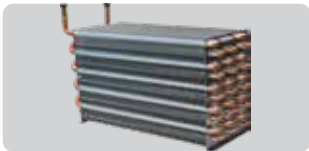
1.

Measure current and see voltage value which match with Name Plate or not



2.

Check and fix insulation in between the Air conditioner and Control box. including Cooling Control such as Cabinet Fan. Cooling Fan is it working or not.



3.

If the installation area is dusty. The product has to blow wind into Condenser Coil once per 3-6 months and clean inside by specialist technician per once a year.



4.

Check and fix insulation in between the Air conditioner and Control box.



5.

Check leaks or opening and closing the control cabinet door for protect air from outside flow into cabinet box for increase load.



6.

Check tube and drain system to looking for clogged.

## Warranty

### Warranty will be under the term from below:

1. Operate follow a user's manual strictly.
2. Look after and maintain continuously.
3. Warranty 1 year since purchase date for a year.

### The warranty terms will end when:

1. The structure or circuit has been modified.
2. The device is broken from acid corrosion in an installation area.
3. The device is broken from vibration, moving device or installing in high temperature over than manual.
4. The damage from accident or misuse, wrong experiment type, demonstration, maintenance, installation, set up or modified and carelessness mistakes from misunderstanding the use process specified in the manual.



“ส่งเสริมสินค้าไทย ใส่ใจบริการ ได้มาตรฐาน ISO”

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