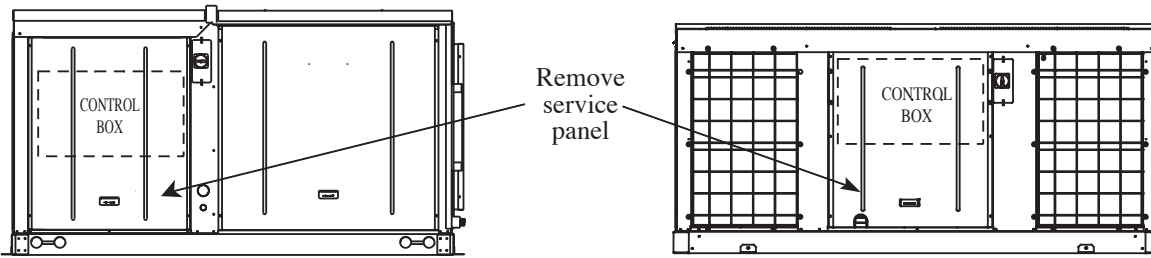


## ROOFTOP PACKAGE UNIT CONTROL OPERATION GUIDE

The unit is equipped with a controller main board, and a wired remote controller is connected to the controller main board. All the setting in the unit is preset by the manufacturer. It is not recommended to change the setting unless necessary.

### a) Remote Controller Location

The remote controller is located on a metal bracket behind the service panel. It is packed together with installation manual.



### b) LED Display (Controller Main Board)

The LED will blink when power up the unit.

### c) LCD Display (Remote Controller)

During normal operations, the LCD displays compressor on/off status, mode, set temperature and so on. Refer to Operating Manual for the details of operation guide. The LCD will display the main screen upon power-up. When malfunctioning occur, a pop-up message will appear on the LCD with backlight blinking and 'beep' sound.

### d) Optional Configurations

The controller main board can be used as the interface for thermostat control and BMS system.

#### (i) Thermostat control (TB\_THM-I)

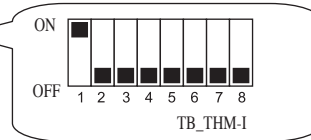
- To use this control, set Dip Switch Setting: SW1-ON (default is OFF).
- Follow the method below for thermostat control inputs:

G	Y1	Y2	W1	W2	Mode	Operation
0	0	0	0	0	-	Unit off
1	0	0	0	0	Fan Only	Indoor fan on
X	1	0	X	X	Cool	1 stage compressor
X	1	1	X	X	Cool	2 stage compressor
X	0	X	1	0	Heatpump/Heater	1 stage compressor
X	0	X	1	1	Heatpump/Heater	2 stage compressor

**Remark:** X = Don't care.

- Refer table below for installation recommendations:

Input	Rated voltage	Rated current	Wire size
G	24V AC	5mA	AWG22~18
Y1			
Y2			
W1			
W2			



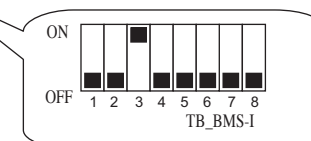
#### Note:

- When the controller main board is configured as thermostat control, the remote controller is used for monitoring purpose only.
- Unit needs to be restarted (power off and on) whenever dip switch setting is changed.

#### (ii) BMS control (TB\_BMS-I)

- To use this control, set Dip Switch Setting: SW3 - ON (default is OFF) and panel parameter G8 to '1'.
- For TB\_BMS-I, there are 3 control inputs: unit on/off; operating mode (cool-0/heat-1); and set point (4~20mA).
- Refer below table for installation recommendations:

Input TB_BMS-I	Rated voltage	Rated current	Wire size
On/Off	24V AC	5mA	AWG22~18
Operating mode	24V AC	5mA	
Cool/Heat set point	-	4~20mA	



#### Note:

- When the controller main board is configured as BMS control, the remote controller is used for monitoring purpose only.
- Unit needs to be restarted (power off and on) whenever dip switch setting is changed.

(iii) Dry contact output (TB\_BMS-O)

- For TB\_BMS-O, there are 4 monitoring outputs: error alarm; output1; output2; and defrost signal.
- Refer table below for installation recommendations:

Input TB_BMS-O	Rated voltage	Rated current (A)	Wire size
Alarm output (AL)	230V AC/125V AC/30V DC	1/3/3	AWG22~18
Output1 (O1)	230V AC/125V AC/30V DC	2/3/3	
Output2 (O2)	230V AC/125V AC/30V DC	3/3/3	
Defrost signal (DFRT)	230V AC/125V AC/30V DC	4/3/3	

- The output signals will vary depending on the configuration of controller main board, whether it is thermostat control or BMS control.

(1) For thermostat control, the outputs are indicated as shown in the table below.

Thermostat input (SW1-ON)					ERROR	DEFROST	Alarm output	Output1	Output2	Defrost signal
G	Y1	Y2	W1	W2			(AL)	(O1)	(O2)	(DFRT)
0	0	0	0	0	X	X	X	0	0	X
1	0	0	0	0	X	X	X	0	1	X
X	1	0	X	X	X	X	X	1	0	X
X	1	1	X	X	X	X	X	1	0	X
X	0	X	1	0	X	X	X	1	1	X
X	0	X	1	1	X	X	X	1	1	X
X	X	X	X	X	1	X	1	X	X	X
X	X	X	X	X	X	1	X	X	X	1

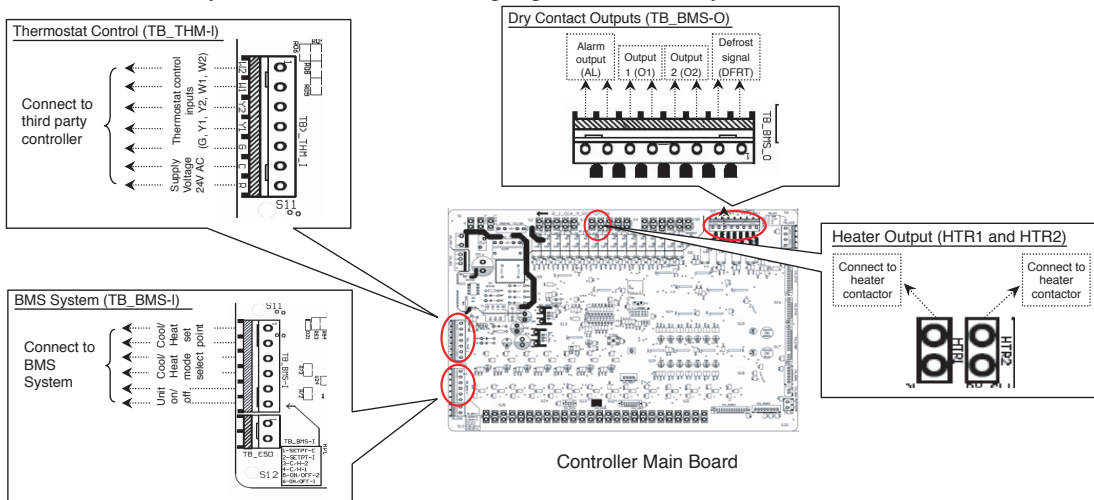
**Remark:** X = Don't care.

(2) For BMS control, the outputs are indicated as shown in the table below.

BMS input (SW3-ON)			ERROR	DEFROST	Alarm output	Output1	Output2	Defrost signal
ON/OFF	OPERATING MODE	COOL/HEAT SET POINT			(AL)	(O1)	(O2)	(DFRT)
0	0	X	X	X	X	0	0	X
0	1	X	X	X	X	0	1	X
1	0	X	X	X	X	1	0	X
1	1	X	X	X	X	1	1	X
X	X	X	1	X	1	X	X	X
X	X	X	X	1	X	X	X	1

**Remark:** X = Don't care.

The diagram below shows the position for terminal blocks in the controller board which are used for thermostat control and BMS system. Beside that, the output pins for auxilliary electrical heater are shown as well.



(3) Auxilliary Electrical Heater Output (HTR1 and HTR2)

- There are two output pins (HTR1 and HTR2) on controller main board, which are used to energize the heater contactor. The contactor must be selected accordingly to avoid any safety issue(s).
- The heater shall be installed in accordance with local and national legislation. It must comply with EN60335-2-40.
- Thermal fuse(s) shall be installed on the heater to eliminate any danger or damage on the heater/unit. This is especially critical when there is any malfunction happen to controller main board or blower.
- The heater shall be in a safe location, whereby no risk of damage could be happen on the unit.
- Use non-flammable duct for the unit that is installed with heater
- Use different power supply for electrical heater and install a circuit breaker for each of the heater.
- Maximum temperature in the unit must not exceed 60°C. Temperature measurement shall be taken during the installation or commisioning in order to ensure the temperature not exceed this value. Select the proper safety device or thermal protector accordingly.
- The heater shall never be installed inside the unit. The recommended location for the heater is inside the supply duct, whereby the distance of the heater is sufficient to ensure the temperature inside the unit does not exceed 60°C.