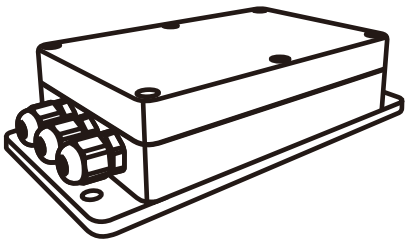
Installation and Operation manual

Control Module AHU kit

KA8142 - FRIAHUKZ-LCAC-03



V2.1

1. PRECAUTIONS

To avoid personal injury and damage to other people and property, carefully read and follow the instructions. This appliance is not intended for use by infants, small children, or persons with reduced physical. **Failure to follow the instructions may lead to bodily injury or damage to the equipment.**

1.1 When installing

- The installation, disassembly, handling and repair of this equipment must be performed by specialist personnel who have the appropriate training, qualifications and licenses for this type of work. Incorrect assembly, disassembly, relocation and repair can cause a fire, electrical shock, injury or damage due to electric shock, falling objects, leaks or explosions etc.
- The surface where the equipment is installed and secured and the mounting of the equipment must be designed for the weight of the equipment.
- Use power and signal cables with suitable size in accordance with the equipment specifications, manuals, and national regulations and standards.
- Do not plug more than one piece of equipment into the same power supply. Do not modify the power cord. If the power cord or plug is damaged, contact customer service for replacement.
- The fuse or circuit breaker should be sized for the capacity of the equipment. The equipment must be properly grounded.
- The power supply should have leakage current protection. Failure to provide leakage current protection may result in electric shock.
- Do not turn on the power until installation work is complete.
- Do not install or use the equipment in areas with a potentially explosive atmosphere. Use or storage of flammable materials, liquids or gases in the vicinity of the equipment may result in fire.
- Ventilate the room thoroughly during installation.
- Be sure the drain piping is properly installed and connected. An

incorrect connection may result in leakage and property damage.

- Do not install the equipment above computers, office equipment, or other electrical equipment. Condensation may result in damage to the equipment in the event of a condensate leak.

1.2 During Operation

- If the equipment is not in operation, check to be sure that the air filter is properly installed before operating the equipment.
- If the equipment has not been in operation for an extended period of time, it is recommended that it be inspected and repaired before operating the equipment.
- If air filter have been inoperative for a long time, it is recommended that the filter be cleaned before use.
- Do not turn the equipment on or off by plugging in or unplugging it.
- Do not pull the power cord when unplugging it from the wall outlet. Doing so may damage the cable.
- Do not use the equipment for purposes other than those for which it is intended. This equipment is not designed to store precision instruments, food, or artifacts, or the housing of animals or plants.
- Do not expose yourself to cold air flow. Do not expose pets or plants to hot air for long periods of time.
- Do not put your hands or other body parts or objects into the air inlet or outlet.
- The fan blades rotate at high speed, a caught object can cause injury or damage the equipment.
- Watch out for small children and keep an eye on the air inlet and outlet.
- Pay close attention to small children and keep them from playing near the equipment.
- If there is any sign of malfunction (smell of burning, loud noise, etc.), please turn off the equipment immediately. Use of such equipment may result in fire, malfunction, etc.

- If the equipment does not operate normally, turn off and unplug the power at once, and turn off the power at the mains supply. Consult the service center if the equipment appears to be malfunctioning.
- Do not operate the equipment in high humid conditions for a long time. If the equipment is operated in such an environment, there is a condensation may leak and cause property damage.
- If the equipment is used in the same room as a with a stove or other heating equipment, please ventilate the room and do not blow the air flow directly at them.
- Do not place computers, office equipment, or other electrical appliances directly underneath the equipment. These appliances can fail if condensation leaks.
- Disconnect the vicinity of the equipment for any length of time if you do not plan to use it for an extended period of time. Unplug the power cable, or turn off the Auto-Safety-Mate and disconnect the AC mains plug from the wall outlet.
- Do not touch the switches with wet hands. Do not touch switches with wet hands when servicing.
- Disconnect the equipment from the power supply before cleaning or servicing.
- When caring for the equipment, stand on a stable structure, such as a folding ladder.
- When changing the air filter, do not touch any metal parts inside the equipment. Doing so may cause injury.
- Do not wash the equipment with water or with aggressive or abrasive cleaning agents. Aggressive or abrasive cleaning agents may get into the equipment and damage the insulation, which can cause electric shock.

1.3 Check before you start

- Check that the grounding is secure. Do not turn on the equipment if the grounding is disconnected.
- Check that the filter is properly installed.
- Clean the filter before starting after long periods of non-use (see operating instructions).

- Clean the filter (see operating instructions) before starting up the unit.
- Make sure there is nothing obstructing the inlet and outlet air flow.

1.4 Optimum operation

Pay attention to the following points to ensure proper operation:

- The outlet air flow must be directed away from the occupants.
- The set temperature is suitable for the comfort of the occupants. Do not set temperatures too low or too high.
- Do not expose the equipment to direct sunlight.
- Do not leave the windows and doors open when the equipment is in cooling mode. Open windows and doors may impair cooling performance.
- Do not cover any openings in the equipment for air inlet and outlet. Do not obstruct the direct air flow.
- The air conditioner may shut off before it has cooled down the room.
- Clean filters regularly. Clogged air filters reduce the efficiency of the equipment.
- The air conditioner is designed to operate at humidity up to 80%. If this humidity level is exceeded, condensation may form on the inside and outside of the air conditioner. If the humidity level rises to 80% or above, immediately disconnect the air conditioner from the power outlet.

1.5 Electrical safety instructions

- All electrical wiring must be performed by qualified personnel.
- All connections must be carried out in accordance with all safety regulations.
- The main circuit breaker must be equipped with a current leakage.
- Do not use the equipment with damaged wire. If damage is found, replace the wire immediately.
- The power supply characteristics must conform to the specifications for this equipment.

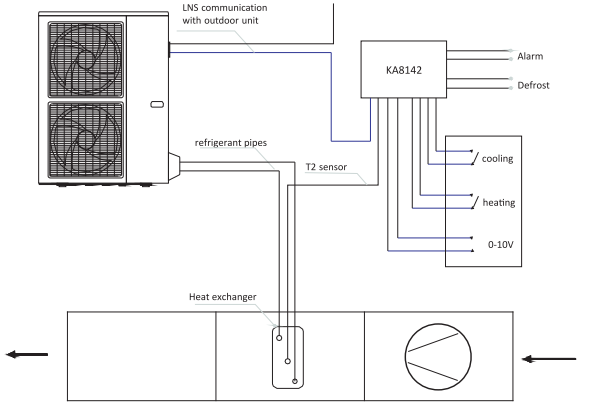
2. Product introduction

The AHU kit KA8142 control module allows you to control inverter type outdoor unit without using the indoor unit. This makes it possible to connect to evaporators of air handling units. Control module AHU kit KA8142 allows you to control the capacity of the outdoor unit in the range of 0-10% ~ 100% by the signal 0 ~10 VDC. Dry contacts are used to control of the outdoor unit to operate in cooling or heating operation.

3. Specification and packing list

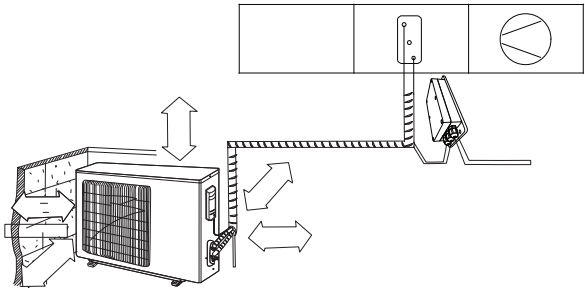
Model		KA8142 / FRIAHUKZ-LCAC-03
Casing		Plastic
Dimension (h x w x d)		61 x 100 x 191mm
Weight		0.4kg
Operation Temperature Range		-25~+45C
Operation Humidity Range		40-90%
Power Supply		230VAC, 1 Phase, 50/60Hz
Voltage Range		208-240V
Fuse		15A, 250V
Resistance class		IP54
Packing list	Box body	1
	Box cover	1
	Anti-water seal between box body and box cover	1
	Temperature sensor	1
	Gland	3
	Manual	1

4.System design



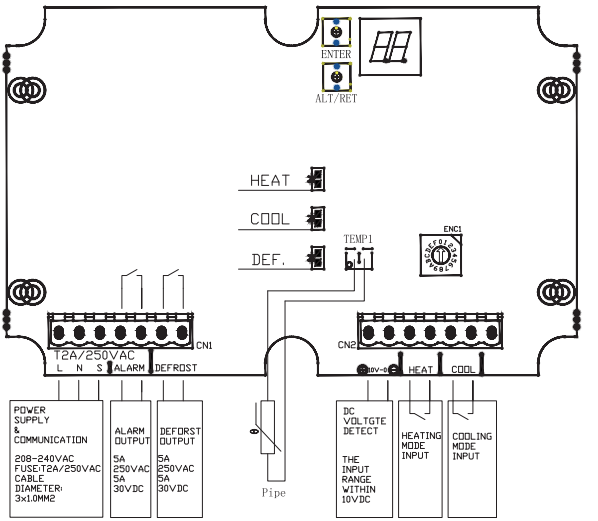
5.1 Selecting an installation location

- Install the module away from heating devices.
- Do not install the unit above an entrance to a room or above a window.
- Check the distance to the right and left of the module - it must be at least 12 cm. The distance to the ceiling at least 15 cm. This is a prerequisite for unobstructed access.
- Identify areas with concealed wiring so that they are not damaged during installation.



5.2 Electrical connections

- Electrical safety rules for making electrical connections.
- If there are problems with the power supply at the site (overvoltage, undervoltage), it is necessary to stop work on the power supply to the air conditioner until correct all the problems.
- The power supply should be in the 90-110% range of that specified in the equipment specifications.
- Make sure the ground is securely connected.
- Connect the wires as shown on the wiring diagrams in the instructions or on the cover of the outdoor unit.
- The power supply cable and all connections must comply with national, state, regional and industry requirements.
- Wiring must be performed by highly qualified and certified personnel.
- The equipment must be connected to individual power supply line. Do not connect more than one device to one circuit breaker.



Connection Terminal Introduction:

L, N, S--Power Supply and communication with outdoor unit 230V,1-phase, 50Hz. Cable dimension 3×1.0 mm^2.

ALARM--digital output 5A-250VAC or 5A-30VDC. When outdoor unit has malfunction output signal is activated.

DEFROST--digital output 5A-250VAC or 5A-30VDC. When outdoor unit is in defrost mode output signal is activated.

TEMP1-- T2 temp sensor (evaporator coil temperature sensor) terminal. Temp sensor must be placed at the middle of the evaporator coil.

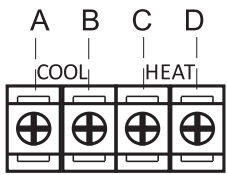
0-10V--Analog input terminal to control outdoor unit capacity.

Analog input	Capacity output	LED display
0-0.5V	0%	None(Unit stopped)
0.5-1.5V	10%	digit 1
1.5-2.5V	20%	digit 2
2.5-3.5V	30%	digit 3
3.5-4.5V	40%	digit 4
4.5-5.5V	50%	digit 5
5.5-6.5V	60%	digit 6
6.5-7.5V	70%	digit 7
7.5-8.5V	80%	digit 8
8.5-9.5V	90%	digit 9
9.5-10.5V	100%	digit 10

Warning: Negative (0/ -) and Positive(10/+) terminals can not be mixed, otherwise it may destroy this control module. Signal input can not exceed 10.5VDC, otherwise it may destroy this control module.

COOL---Digital input . When terminals are closed, the unit will run in cooling mode and "COOL" LED will be on. Terminal A is Positive(+) and terminal B is Negative(-)

HEAT-–Digital input. When terminals are closed, the unit will run in heating mode and "HEAT" LED will be on. Terminal C is Positive(+) and terminal D is Negative(-)



Note: Terminals B and D are combined into one negative (-) input, therefore it is possible to connect a 3-wire cable for controlling cooling/heating control.

ENC1 - ENC1 is a selector for selecting the evaporator capacity. Set the position of the ENC1 selector to position that corresponds to the cooling capacity of the evaporator of the ventilation section.

Knob selection	Evaporator capacity	Knob selection	Evaporator capacity
0	2,0 kW unit	6	7,1 kW unit
1	2,6 kW unit	7	9,0 kW unit
2	3,2kW unit	8	10,5 kW unit
3	3,5 kW unit	9	14,0 kW unit
4	5,3 kW unit	A-F	16,0 kW unit
5	7,1 kW unit		

ENTER--For engineering mode and Error Code checking. Please refer to following content.

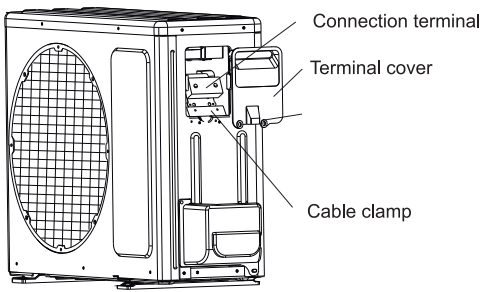
ALT/RET--For engineering mode and Error Code checking. Please refer to following content.

LED lamps introduction:

HEAT LED is lightened when the unit is operating in heating mode.

COOL LED is lightened when the unit is operating in cooling mode.

DEF LED is lightened when unit is in defrost mode.



Please follow outdoor unit installation instruction.

6. Engineer mode, Malfunction Error Code

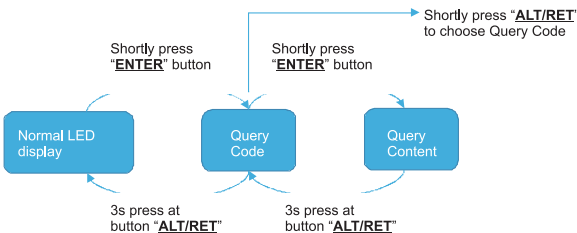
To enter engineer mode, in power-on or standby mode, and in non-locked state, press the button " **ENTER**" shortly and then LED display will show "**N.**"

After entering the engineer mode, the LED display will show the numeric code of the current engineer mode (for the initial engineer mode, the numeric code displayed is 0), and all other icons are inactive**.**

In engineer mode, the value of the current numeric code can be adjusted circularly through the button "**ALT/RET**" by short press, with the setting range of 0 to 20**.**

After Query Code is chosen in engineer mode, press the key " **ENTER**" shortly, LED display will show Query Content**.**

Exit of engineer mode:
1) In engineer mode, press the key "**ALT/RET**" for 3s**.**



6.1 Query Code and Content

Query Code	Query Content
0.	There is system protection or malfunction. Please refer to next list of error code.
nA	There is not system protection or malfunction. System works normally.
1.	nA. Reserved
2.	T2. Indoor coil temperature (accuracy: 0.5°C, display ranges: -19.5~70°C)
3.	T3. Outdoor coil temperature (accuracy: 0.5°C, display ranges: -19.5~70°C)
4.	T4. Ambient temperature (accuracy: 0.5°C, display ranges: -19.5~70°C)
5.	TP. Discharge temperature (accuracy: 1°C)
6.	Ft. Outdoor unit targeted frequency (accuracy: 1Hz)
7.	Fr. Actual frequency (accuracy: 1Hz)
8.	DL. Outdoor unit operation current (accuracy: 1A)
9.	Uo. Outdoor unit AC voltage (accuracy: 1V)
10.	Sn. reserved
11.	Od. Actual operation mode (0-turn off; 1-cooling; 2-heating; 3-fan; 4-dehumidifying; 5-auto; 6-forced cooling; 7-defrozing)
12.	Pr. Outdoor fan speed (Outdoor fan speed=value*8)
13.	Lr. EXV opening angle (EXV opening angle-value*8)
14.	nA. Reserved
15.	nA. Reserved
16.	TT. Adjusted setting temperature (accuracy: 1°C)
17.	nA. Reserved
18.	nA. Reserved
19.	nA. Reserved
20.	oT. algorithm frequency (accuracy: 1Hz)

6.2 Error code

		Display in different operation mode		
ERROR CODE	Error Information	Power on or standby mode	Engineer mode	Switch off mode
EL01	Indoor / outdoor unit communication error	Yes	Yes	No
EC51	Outdoor unit EEPROM parameter error	Yes	Yes	No
EC52	Condenser coil temperature sensor T3 is in open circuit or has short circuited	Yes	Yes	No
EC53	Outdoor room temperature sensor T4 is in open circuit or has short circuited	Yes	Yes	No
EC54	Compressor discharge temperature sensor TP is in open circuit or has short circuited	Yes	Yes	No
EC55	IGBT temperature sensor TH is in open circuit or has short circuited	No	Yes	No
EH61	Evaporator coil temperature sensor T2 is in open circuit or has short circuited	Yes	Yes	No
EC71	Outdoor external fan overcurrent fault	No	Yes	No
EC72	Outdoor external fan phase failure	No	Yes	No
EC73	Zero speed failure of outdoor unit DC fan	No	Yes	No
EC70	The outdoor fan speed is operating outside of the normal ran9e	Yes	Yes	No
PC00	IPM malfunction or IGBT over-strong current protection	Yes	Yes	No
PC10	Outdoor over low voltage protection	No	Yes	No
PC11	Outdoor over voltage protection	No	Yes	No
PC12	DC voltage protection	No	Yes	No
PC01	Outdoor voltage protection	Yes	No	No
PC02	Top temperature protection of compressor or High temperature protection of IPM module	Yes	Yes	No
PC40	Communication error between outdoor main chip and compressor driven chip	No	Yes	No
PC41	Current Input detection protection	No	Yes	No
PC42	Compressor start error	No	Yes	No

PC43	Lack of phase (3 phase) protection	No	Yes	No
PC44	Outdoor unit zero speed protection	No	Yes	No
PC45	341PWM error	No	Yes	No
PC46	Compressor speed malfunction	No	Yes	No
PC49	Compressor over current protection	No	Yes	No
PC06	Compressor discharge temperature protection	No	Yes	No
PC08	Outdoor current protection	No	Yes	No
PC0F	PFC or IGBT module malfunction	No	Yes	No
PC30	System overpressure protection	No	Yes	No
PC31	System pressure is too low protection	No	Yes	No
PC03	Pressure protection	Yes	Yes	No
PC0L	Outdoor low ambient temperature protection	Yes	Yes	No
PH90	Evaporator coil temperature over high protection	No	Yes	No
PH91	Evaporator coil temperature over low Protection	No	Yes	No
PC0R	Condenser high temperature protection	No	Yes	No
LH00	Frequency limit caused by T2	No	Yes	No
LC01	Frequency limit caused by T3	No	Yes	No
LC02	Frequency limit caused by TP	No	Yes	No
LC05	Frequency limit caused by voltage	No	Yes	No
LC03	Frequency limit caused by current	No	Yes	No
LC06	Frequency limit caused by PFC or IPM	No	Yes	No
LC30	Frequency limit caused by high pressure	No	Yes	No
LC31	Frequency limit caused by low pressure	No	Yes	No
--	Indoor units mode conflict(match with multi outdoor unit)	Yes	Yes	No

For troubleshooting, please refer to outdoor unit factory technical manual and solution.

Appendix 1 Temperature Sensor Resistance Value Table (°C–K)

°C	K Ohm	°C	K Ohm	°C	K Ohm	°C	K Ohm
20	115.266	20	12.6431	60	2.35774	100	0.62973
-19	108.146	21	12.0561	61	2.27249	101	0.61148
-18	101.517	22	11.5000	62	2.19073	102	0.59386
-17	96.3423	23	10.9731	63	2.11241	103	0.57683
-16	89.5865	24	10.4736	64	2.03732	104	0.56038
-15	84.2190	25	10.000	65	1.96532	105	0.54448
-14	79.3110	26	9.55074	66	1.89627	106	0.52912
-13	74.5360	27	9.12445	67	1.83003	107	0.51426
-12	70.1698	28	8.71983	68	1.76647	108	0.49989
-11	66.0898	29	8.33566	69	1.70547	109	0.48600
-10	62.2756	30	7.97078	70	1.64691	110	0.47256
-9	58.7079	31	7.62411	71	1.59068	111	0.45957
-8	56.3694	32	7.29464	72	1.53668	112	0.44699
-7	52.2438	33	6.98142	73	1.48481	113	0.43482
-6	49.3161	34	6.68355	74	1.43498	114	0.42304
-5	46.5725	35	6.40021	75	1.38703	115	0.41164
-4	44.0000	36	6.13059	76	1.34105	116	0.40060
-3	41.5878	37	5.87359	77	1.29078	117	0.38991
-2	39.8239	38	5.62961	78	1.25423	118	0.37956
-1	37.1988	39	5.39689	79	1.21330	119	0.36954
0	35.2024	40	5.17519	80	1.17393	120	0.35982
1	33.3269	41	4.96392	81	1.13604	121	0.35042
2	31.5635	42	4.76253	82	1.09958	122	0.3413
3	29.9058	43	4.57050	83	1.06448	123	0.33246
4	28.3459	44	4.38736	84	1.03069	124	0.32390
5	26.8778	45	4.21263	85	0.99815	125	0.31559
6	25.4954	46	4.04589	86	0.96681	126	0.30754
7	24.1932	47	3.88673	87	0.93662	127	0.29974
8	22.5662	48	3.73476	88	0.90753	128	0.29216
9	21.8094	49	3.58962	89	0.87950	129	0.28482
10	20.7184	50	3.45097	90	0.85248	130	0.27770
11	19.6891	51	3.31847	91	0.82643	131	0.27078
12	18.7177	52	3.19183	92	0.80132	132	0.26408
13	17.8005	53	3.07075	93	0.77709	133	0.25757
14	16.9341	54	2.95896	94	0.75373	134	0.25125
15	16.1156	55	2.84421	95	0.73119	135	0.24512
16	15.3418	56	2.73823	96	0.70944	136	0.23916
17	14.6181	57	2.63682	97	0.68844	137	0.23338
18	13.9180	58	2.53973	98	0.66818	138	0.22776
19	13.2631	59	2.44677	99	0.64862	139	0.22231