Product Service

Technical Report No.: 64.181.22.04458.02 Rev.00

Date: 2023-04-24

Client:	Report holder's name:	SolarEast Heat Pump Ltd.
	Report holder's Address:	No.73 Defu Road, Xingtan Town Shunde District 528325 Foshan City, Guangdong Province, People's Republic of China
	Contact person of applicant:	Lai XiaoPing
	Manufacturer's name:	SolarEast Heat Pump Ltd.
	Manufacturer's address:	No.73 Defu Road, Xingtan Town Shunde District 528325 Foshan City, Guangdong Province, People's Republic of China
Factory:	Factory's name:	SolarEast Heat Pump Ltd.
	Factory's address:	No.73 Defu Road, Xingtan Town Shunde District 528325 Foshan City, Guangdong Province, People's Republic of China
Test object:	Product:	Air Source Heat Pump
	Model:	BLN-006TC1
	Trade name:	-
Test specification:	☑	EN 14825:2022
	☑	EN 12102-1:2022
	☑	EN 14511-3:2022
	☑	EN 14511-4:2022 Clause 4
Purpose of examination:	Test according to the test specification	
	☑	(EU) No 813/2013
	☑	EU 2016/2282:2016-11-30
Test result:	The test results show that the presented product is in compliance with the above listed test specifications.	

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Product Service

1 Description of the test object

1.1 Function

Manufacturer's specification for intended use:
The appliance is air to water heat pump.
Manufacturer's specification for predictive use:
According to user manual

1.2 Consideration of the foreseeable use

☐ Not applicable
☑ Covered through the applied standard
☐ Covered by the following comment
☐ Covered by attached risk analysis

1.3 Technical Data

Model :	BLN-006TC1
Rated Voltage (V) :	220-240V~
Rated Frequency (Hz) :	50
Rated Power (W) :	3500
Rated Current (A) :	15.00
Protection Class :	Class I
Protection Against Moisture :	IPX4
Construction :	Stationary
Supply connection :	☐ Non detachable cord ☑ Permanent connection to fixed wiring
Operation mode:	☑ Continuous operation; ☐ Intermittent operation; ☐ Short time operation;
Refrigerant/charge (kg) :	R290 / 0.55kg
Declared parameters :	☑ Average ☐ Warmer ☐ Colder
Sound power level dB(A) :	N/A
Series No :	8A00221005003010

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2 Order

2.1 Date of Purchase Order, Customer's Reference

2022-10-31, 2023-03-21

SolarEast Heat Pump Ltd.

2.2 Test Sample(s)

- Reception date(s): 2022-11-20, 2023-03-21
- Location(s) of reception:

For Energy test:

Guangzhou Customs District Technology Center

Address: No.3, Desheng East Road, Shunde, Daliang, Foshan, Guangdong, China

For Noise tests:

CVC Testing Technology Co., Ltd.

Address: No.3, Tiantaiyi Road, Kaitai Avenue, Science City, Guangzhou, Guangdong, 510663, P.R.China

- Condition of test sample(s): completed and can be normal operation

2.3 Date(s) of Testing

2022-11-20 to 2022-11-30, 2023-03-21 to 2023-04-10

2.4 Location(s) of Testing

Same as 2.2

2.5 Points of Non-compliance or Exceptions of the Test Procedure

N/A

3 Test Results

3.1 Positive Test Results

See Appendix I

4 Remark

N/A

4.1 The user manual has been examined according to the minimum requirements described in the product standard. The manufacturer is responsible for the accuracy of further par-ticulars as well as of the composition and layout.

4.2 When the product is placed on the market, it must be accompanied with safety Instruc-tions written in official language of the country. The instructions shall give information re-garding safe operation, installation and maintenance.

5 Documentation

- Appendix I Test results
- Appendix II Marking plate
- Appendix III photo documentation
- Appendix IV Construction data form
- Appendix V Test equipment list

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6 Summary

1) The appliance is Air To Water Heat Pump Unit, including a whole compression type refrigerant circuit to heat water in another circuit. The appliance was for cooling and heating water function, this report only for heating capacity test.
2) The main power is supplied by a 3-pole supply cord connecting to fixed wiring.
3) Water enthalpy method was adopted in this report.
4) Standby mode power, off mode power and thermostat-off mode power were tested according to clause 12 of standard EN 14825:2022.
5) The model has two appearances, only the front panel is different between the two appearances, the rest is exactly the same.
6) This test report 64.181.22.04458.02 Rev.00, dated 2023-04-24 supersedes test report 64.181.22.04458.01 Rev.00, dated 2022-12-07 to include the following changes and/or additions, which were considered technical modifications:

   a) Updating standard EN 14511-3 and EN 14825 in the report. Therefore, related testing for model BLN-006TC1 was updated.

   b) Adding EN 12102-1:2022 test for model BLN-006TC1.

   C) Adding EN 14511-4:2022 Clause 4 test for model BLN-006TC1.

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Tested by: William Liang, Project Handler

printed name, function & signature

Approved by: Plum Li, Designated Reviewer

printed name, function & signature

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Appendix I Test results

Table 1.	Heating mode(Low temperature application):						P
Model	BLN-006TC1						
Product type	Air to Water	**Heating season**	☑	Average	☐	Warmer ☐	Colder

1. Test conditions:

Condition	Part Load Ratio in %				Outdoor heat exchanger	Indoor heat exchanger
	Formula	A	W	C	Inlet dry (wet) bulb temperature °C	Inlet/outlet water temperatures (°C)
A	(-7-16)/(Tdesignh-16)	88	N/A	N/A	-7(-8)	a / 34
B	(+2-16)/ (Tdesignh-16)	54	N/A	N/A	2(1)	a / 30
C	(+7-16)/(Tdesignh-16)	35	N/A	N/A	7(6)	a / 27
D	(+12-16)/(Tdesignh-16)	15	N/A	N/A	12(11)	a / 24
E	(TOL-16)/ (Tdesignh-16)				TOL	a / 35.3
F	(Tbivalent-16)/(Tdesignh-16)				Tbiv	a / 34
G	(-15-16)/(Tdesignh-16)	N/A	N/A	N/A	-15	N/A

Remark: a) With the water flow rate as determined at the standard rating conditions given in EN14511-2 at 30/35 conditions, the capacity is 6.071kW, the power is 1.273kW, the COP is 4.77kW/kW.

2.Tested data/correction data(Average):

General test conditions/ Part-Load	Unit	A(-7)/W34 (88%)	A2/W30 (54%)	A7/W27 (35%)	A12/W24 (15%)	A(-10)/W35.3 (100%)	A(-7)/W34 (88%)
	--	A	B	C	D	E	F
Data collection period	hh: min:sec	1:10:00	1:10:00	1:10:00	1:10:00	1:10:00	1:10:00
The heat pump defrosts	--	No	No	No	No	No	No
Complete Cycles	--	0	0	0	0	0	0
Barometric pressure	kPa	101.02	101.01	101.01	101.02	101.01	101.02
Voltage	V	229.8	230.0	230.4	230.4	229.6	229.8
Current input of the unit	A	7.67	4.35	2.41	1.80	9.81	7.67
Power input of the unit	kW	1.756	0.744	0.379	0.272	2.248	1.756
Test conditions **indoor** unit							
Inlet Water temperature, DB	°C	29.54	27.23	25.32	23.32	30.56	29.54
Outlet Water temperature, DB	°C	34.08	30.04	27.16	25.26	35.36	34.08

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Appendix I Test results

Test conditions **outdoor** unit							
Air **inlet** temperature, DB	°C	-7.01	1.99	7.00	12.04	-10.01	-7.01
Air **inlet** temperature, WB	°C	-8.06	0.99	5.99	10.99	-10.98	-8.06
Summary of the results							
Total heating capacity	kW	5.374	3.399	2.236	2.364	6.032	5.374
Effective power input	kW	1.738	0.726	0.360	0.254	2.230	1.738
Coefficient of performance (COP)	--	3.09	4.68	6.20	9.30	2.71	3.09
Compressor frequency	Hz	78	38	22*	20	95	78
Water flow	m³/h	1.02	1.02	1.02	1.02	1.02	1.02
Remark: *In part condition, this compressor frequency is lowest.							

3.Calculation/conclusion for SCOP(Average):			
Tdesignh(°C)	-10	Tbiv(°C)	-7
Pdesignh(kW)	6.075	TOL(°C)	-10

Test result A, B, C, D, E, F conditions:

Condition	Part load	Measured capacity	COP at measured capacity	Cdh	CR	COP at part load
E	6.075	6.032	2.71	0.90	1.00	2.71
F	5.374	5.374	3.09	0.90	1.00	3.09
A	5.374	5.374	3.09	0.90	1.00	3.09
B	3.271	3.399	4.68	0.90	0.96	4.68
C	2.103	2.236	6.20	0.90	0.94	6.20
D	0.935	2.364	9.30	0.90	0.40	8.07
CR: part load divided by capacity;						

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Appendix I Test results

Electric power consumptions	Unit	Value
Thermostat-off mode [P_{TO}]	kW	0.030
Standby mode [P_{SB}]	kW	0.010
Crankcase heater [P_{CK}]	kW	0.042
Off mode [P_{OFF}]	kW	0.010

Conclusions:	Unit	Value
SCOPon:	kWh/kWh	4.85
SCOP:	kWh/kWh	4.83
Q_H:	kWh/year	12552
Q_{HE}:	kWh/year	2599
$\eta_{s,h}$	%	190.2
Seasonal space heating energy efficiency classes: (According (EU) No 811/2013 Table 2)	--	A+++

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Appendix I Test results

Table 2.	Heating mode(Medium temperature application):						P
Model	BLN-006TC1						
Product type	Air to Water	**Heating season**	☑	Average	☐	Warmer ☐	Colder

1. Test conditions:

Condition	Part Load Ratio in %				Outdoor heat exchanger	Indoor heat exchanger
	Formula	A	W	C	Inlet dry (wet) bulb temperature °C	Inlet/outlet water temperatures (°C)
A	(-7-16)/(Tdesignh-16)	88	N/A	N/A	-7(-8)	a / 52
B	(+2-16)/ (Tdesignh-16)	54	N/A	N/A	2(1)	a / 42
C	(+7-16)/(Tdesignh-16)	35	N/A	N/A	7(6)	a / 36
D	(+12-16)/(Tdesignh-16)	15	N/A	N/A	12(11)	a / 30
E	(TOL-16)/ (Tdesignh-16)				TOL	a / 55.3
F	(Tbivalent-16)/(Tdesignh-16)				Tbiv	a / 52
G	(-15-16)/(Tdesignh-16)	N/A	N/A	N/A	-15	N/A

Remark: a) With the water flow rate as determined at the standard rating conditions given in EN14511-2 at 47/55 conditions, the capacity is 6.096kW, the power is 1.954kW, the COP is 3.12kW/kW.

2.Tested data/correction data(Average):

General test conditions/ Part-Load	Unit	A(-7)/W52 (88%)	A2/W42 (54%)	A7/W36 (35%)	A12/W30 (15%)	A(-10)/W55.3 (100%)	A(-7)/W52 (88%)
	--	A	B	C	D	E	F
Data collection period	hh: min:sec	1:10:00	1:10:00	1:10:00	1:10:00	1:10:00	1:10:00
The heat pump defrosts	--	No	No	No	No	No	No
Complete Cycles	--	0	0	0	0	0	0
Barometric pressure	kPa	101.02	101.01	101.01	101.02	101.01	101.02
Voltage	V	229.6	230.0	230.3	230.4	229.5	229.6
Current input of the unit	A	10.06	5.17	2.87	2.13	11.92	10.06
Power input of the unit	kW	2.305	0.913	0.466	0.330	2.733	2.305
Test conditions **indoor** unit							
Inlet Water temperature, DB	°C	44.90	37.91	33.46	28.85	47.88	44.90
Outlet Water temperature, DB	°C	52.03	42.25	36.30	31.90	55.09	52.03

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Appendix I Test results

Test conditions **outdoor** unit							
Air **inlet** temperature, DB	°C	-7.01	2.08	7.00	12.00	-10.00	-7.01
Air **inlet** temperature, WB	°C	-7.97	1.02	5.99	10.99	-11.04	-7.97
Summary of the results							
Total heating capacity	kW	5.360	3.325	2.171	2.283	5.617	5.360
Effective power input	kW	2.300	0.908	0.462	0.326	2.728	2.300
Coefficient of performance (COP)	--	2.33	3.66	4.70	7.01	2.06	2.33
Compressor frequency	Hz	84	40	24*	20	95	84
Water flow	m³/h	0.65	0.65	0.65	0.65	0.65	0.65
Remark: *In part condition, this compressor frequency is lowest.							

3.Calculation/conclusion for SCOP(Average):

Tdesignh(°C)	-10	Tbiv(°C)	-7
Pdesignh(kW)	6.060	TOL(°C)	-10

Test result A, B, C, D, E, F conditions:

Condition	Part load	Measured capacity	COP at measured capacity	Cdh	CR	COP at part load
E	6.060	5.617	2.06	0.90	1.00	2.06
F	5.360	5.360	2.33	0.90	1.00	2.33
A	5.360	5.360	2.33	0.90	1.00	2.33
B	3.263	3.325	3.66	0.90	0.98	3.66
C	2.098	2.171	4.70	0.90	0.97	4.70
D	0.932	2.283	7.01	0.90	0.41	6.12
CR: part load divided by capacity;						

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Appendix I Test results

Electric power consumptions	Unit	Value
Thermostat-off mode [P_{TO}]	kW	0.030
Standby mode [P_{SB}]	kW	0.010
Crankcase heater [P_{CK}]	kW	0.042
Off mode [P_{OFF}]	kW	0.010

Conclusions:	Unit	Value
SCOPon:	kWh/kWh	3.73
SCOP:	kWh/kWh	3.71
Q_H:	kWh/year	12519
Q_{HE}:	kWh/year	3372
$\eta_{s,h}$	%	145.5
Seasonal space heating energy efficiency classes: (According (EU) No 811/2013 Table 1)	--	A++

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Appendix I Test results

Table 3a.	Sound power level measurement(Low temperature application)		P
Model	BLN-006TC1		
	Product type :		Air to Water
	Outdoor heat exchanger, Air temperature DB/WB (°C):		7.0 /6.0
	Indoor heat exchanger, Water inlet/outlet temperature (°C):		30.0 /35.0
	Voltage (V):		230
	Frequency (Hz):		50
	Working condition class :		Class A
	Acoustical environment :		Hemi-anechoic room
	Windshield type :		Sponge
	Measured position amount :		14
	Water flow (m^3/h):		1.02
Measured quantity	**$L_{WA,indoors}$ (dB(A))**	**$L_{WA,outdoors}$ (dB(A))**	**Remark**
Sound pressure level `$L_{p(ST)}$****	--	46	--
Spheres radius d *	--	1.0m	--
Sound power level L_{wA}****	--	60	--

Setting of controls: according to user manual.
Duct connection:--
Rounding to: *) 1 decimal places; **) 2 decimal places; ***) 3 decimal places; ****) nearest integer
Fan speed: 600 r/min, compressor speed: 61Hz.

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Appendix I Test results

Table 3b.	Sound power level measurement(Medium temperature application)	P
Model	BLN-006TC1	
	Product type :	Air to Water
	Outdoor heat exchanger, Air temperature DB/WB (°C):	7.0 /6.0
	Indoor heat exchanger, Water inlet/outlet temperature (°C):	47.0 /55.0
	Voltage (V):	230
	Frequency (Hz):	50
	Working condition class :	Class A
	Acoustical environment :	Hemi-anechoic room
	Windshield type :	Sponge
	Measured position amount :	14
	Water flow (m^3/h):	0.65

Measured quantity	$L_{WA,indoors}$ (dB(A))	$L_{WA,outdoors}$ (dB(A))	Remark
Sound pressure level `$L_{p(ST)}$****	--	46	--
Spheres radius d *	--	1.0m	--
Sound power level L_{wA}****	--	60	--

Setting of controls: according to user manual.
Duct connection:--
Rounding to: *) 1 decimal places; **) 2 decimal places; ***) 3 decimal places; ****) nearest integer
Fan speed: 600 r/min, compressor speed: 65Hz.

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Appendix I Test results

Table 4.	Clause 4 of EN 14511-4:2022				P
Model	**BLN-006TC1**				
Customer Code	Execution Date [dd-mm-yyyy]	Testing item	Standard Reference	Comment	Test Response
TEST 1	25-03-2023	STARTING TEST	EN14511-4:2022, § 4.2.1.2 Table 3	The "lower" starting operating conditions declared by the manufacturer for the heating mode- i.e. Tair=-24.98°C, T out water 9.89° C, Flow rate 0.55m^3/h have been set and obtained. At those conditions, the machine was switched on. It started without any problem and worked for 30 minutes without showing any warning or allarm. During the test the machine operated in automode. No damage was recorded on the machine during and after the test.	Passed
TEST 2	25-03-2023	OPERATIN G TEST	EN14511-4:2022, § 4.2.1.2Table 3	From the machine "lower" starting conditions - i.e. - the machine was brought to the lower operating conditions declared by the manufacturer for the heating mode- i.e. Tair=-25.00°C, T out water 64.98°C, Flow rate 0.55m^3/h. Once these conditions were obtained, the machine was let operate for over 1 hour in automode. During the test, no waring or alarm were showed. No damage was recorded on the machine during and after the test.	Passed
TEST 3	25-03-2023	SHUTTING OFF WATER FLOW	EN14511-4:2022, § 4.5	The water flow rate was shutted off through manual and automatic valves of the test rig. The machine switched off and only the flow switch Protection appeared on the user interface of indoor unit. Perform error reset operation , once the water flow rate was restored, the machine restarted automatically and worked for 30 minutes normally. No damage was recorded on the machine during and after the test.	Passed
TEST 4	25-03-2023	SHUTTING OFF AIR FLOW	EN14511-4:2022, § 4.5	The air flow rate was shutted off through a plastic sheet and a panel. The machine never turned off. It continued to operate with continuous frosting and defrosting cycles. After more than half an hour, the air flow rate was restored and the machine started to operate normally. During the test, no waring or alarm were showed. No damage was recorded on the machine during and after the test.	Passed
TEST 5	25-03-2023	COMPLET E POWER SUPPLY FAILURE	EN14511-4:2022, § 4.6	The power supply was cut off for about 10 seconds.The unit restarted automatically within about 3 minutes after the power supply was reactivated.	Passed

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Appendix II Marking plate

Nameplate

Air Source Heat Pump			
Model			BLN-006TC1
Power Supply			220-240V~ / 50Hz
Heating [1]	Capacity	kW	2.92 - 9.10
	Input Power	kW	0.61 - 2.11
	Input Current	A	2.80 - 9.25
	COP	W/W	4.31-5.66
Heating [2]	Capacity	kW	2.99 - 8.16
	Input Power	kW	1.03 - 2.92
	Input Current	A	4.57 - 12.79
	COP	W/W	2.79 - 3.46
Cooling	Capacity	kW	1.38 - 5.70
	Input Power	kW	0.67 - 2.44
	Input Current	A	3.06 - 10.27
Rated Input Power		kW	3.5
Rated Input Current		A	15.0
Refrigerant Type/Charge/GWP		... / kg	R290 / 0.55 / 3
CO_2 Equivalent		/	0.0017t
Operation Pressure(Low Side)		MPa	0.8
Operation Pressure(High Side)		MPa	3.0
Maximum Allowable Pressure		MPa	3.2
Electrical Shockproof		/	I
IP Class		/	IPX4
Max. Outlet Water Temp.		℃	75
Operating Ambient Temperature		℃	-25 ~ 45
Water Piping Connections		inch	G1
Rated Water Flow		m^3/h	1.0
Water Pressure Drop		kPa	20
Min/Max water pressure		MPa	0.1 / 0.3
Sound pressure level		dB(A)	46
Net Dimensions (L×W×H)		mm	1187×418×805
Net Weight		kg	110

Rated Test Conditions:
Heating [1]:Ambient Temp 7°C/6°C(DB/WB),Water-In/Out Temp 30°C/35°C
Heating [2]:Ambient Temp 7°C/6°C(DB/WB),Water-In/Out Temp 47°C/55°C
Cooling:Ambient Temp 35°C/24°C(DB/WB),Water-In/Out Temp 12°C/7°C
SolarEast Heat Pump Ltd.
No.73 Defu Road, Xingtan Town Shunde District 528325 Foshan City, Guangdong Province, People's Republic of China

Product Service

Appendix III photo documentaiton

Details of:	Overall view
View: ☐ General ☐ Front ☐ Rear ☐ Right ☐ Left ☐ Top ☐ Bottom	

Details of:	Compressor
View: ☐ General ☐ Front ☐ Rear ☐ Right ☐ Left ☐ Top ☐ Bottom	

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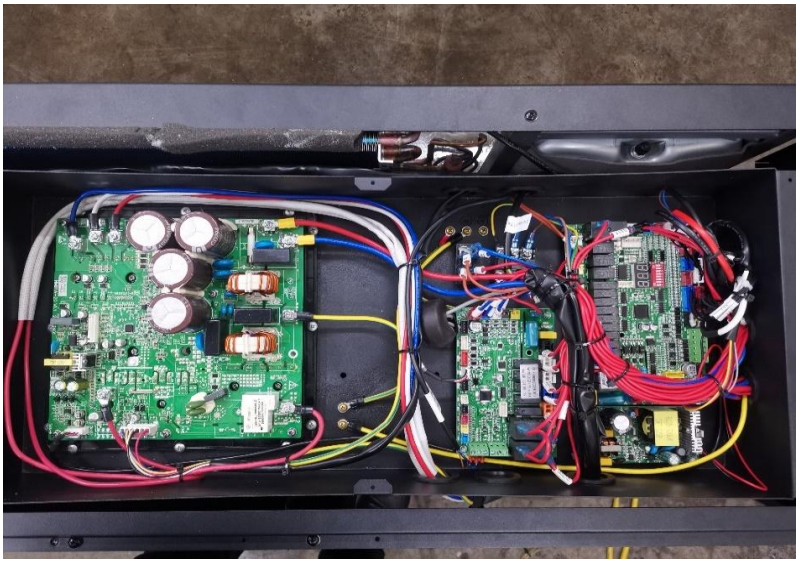
Appendix III photo documentaiton

Details of:	Fan Motor
View: ☐ General ☐ Front ☐ Rear ☐ Right ☐ Left ☐ Top ☐ Bottom	

Details of:	Main Control Board
View: ☐ General ☐ Front ☐ Rear ☐ Right ☐ Left ☐ Top ☐ Bottom	

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Appendix III photo documentaiton

Details of:	Water Pump
View: ☐ General ☐ Front ☐ Rear ☐ Right ☐ Left ☐ Top ☐ Bottom	

Details of:	Overall view (optional)
View: ☐ General ☐ Front ☐ Rear ☐ Right ☐ Left ☐ Top ☐ Bottom	

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Appendix IV Construction data form

Part		Technical data
1. Compressor		
	Manufacture:	SHANGHAI HIGHLY ELECTRICAL APPLIANCES CO., LTD.
	Type:	WHP07600PSDPC9KQ
	Rated capacity:	1580W
	Serial-number:	W5WN5H0623CR
	Specification:	DC143.5V; R290
2. Condenser		
	Manufacture:	Danfoss (Hangzhou) Plate Heat Exchanger Co. , Ltd.
	Type:	C39L-EZ-42
	Heat exchanger:	Plate heat exchanger
	Dimension(mm):	331mm*117mm*62mm
3. Evaporator		
	Manufacture:	Guangzhou AOTAI Refrigeration Equipment Co., LTD.
	Type:	DKLNSC-006PN9A1-LQ-1
	Heat exchanger:	Finned heat exchanger
	Dimension(mm):	800mm*297mm*750mm
4. Fan motor		
	Manufacture:	Jiangmen LT Motor Co.,Ltd.
	Type:	RD85HA
	Fan type:	3 blade
	Specification:	DC310V; 85W; 850r/min
5. Main control board		
	Manufacture:	GUANGDONG REAL-DESIGN INTELLIGENCE TECHNOLOGY CO., LTD.
	Type:	R-SY001-M-V2.0
	Specification:	220-240V; 50Hz
6. Water pump		
	Manufacture:	SHIMGE PUMP INDUSTRY(JIANGSU) CO.,LTD.
	Type:	APM25-9-130 PWM1
	Specification:	inputpower: 95W; L=130mm; G1.5“

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Appendix V Equipment List

No.	Type	Manufacture	Model	Equipment ID	Calibration Due Date
1	Heat pump energy efficiency testing system	PINXIN	10HP	2017J00001	2023-11-24
2	Electromagnetic flowmeter	KROHNE	OPTIFLUX4100 C	H17221264	2023-12-21
3	Anechoic rooms (hemi-anechoic rooms)	Guangzhou Kinte	-	NC-036-2	2023-10-07
4	AC source Supply	YANGHONG	YF-3600	VGDS-0637	2023-11-07
5	6 channel data logger	—	PXI-1033	VGDY-0257	2023-05-20
6	PULSE system	B & K	3660C	VGDY-0184	2023-04-12
7	Calibrator	B & K	4231	HJ-000095	2023-06-30
8	Long steel tape	—	5m	HJ-000150	2024-01-01
9	Temperature measurement system	—	—	NC-036-1	2023-06-07
10	Atmospheric pressure meter	—	—	HJ-000165	2023-11-22
11	Constant temperature water system	B & K	—	VGDS-0448	2023-04-18
12	Windscreen	B & K	WS002-5	—	—

-- End of Report --

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