Technical Report No.: 64.181.24.00375.01 Rev.00

Date: 2024-03-20

Client:	Name:	EcoFlow Inc.
	Address:	RM 401, Plant #1, Runheng Industrial Zone, Fuyuanyi Road, Zhancheng Community, Fuhai Street, Bao'an District, Shenzhen City, Guangdong Province, P.R.China
	Contact person:	Molly Li
Manufacturer:	Name:	EcoFlow Inc.
	Address:	RM 401, Plant #1, Runheng Industrial Zone, Fuyuanyi Road, Zhancheng Community, Fuhai Street, Bao'an District, Shenzhen City, Guangdong Province, P.R.China
Factory:	Name:	Guangdong New Energy Technology Co., Ltd
	Address:	NO.125, Chuangyou Road, Xintang Town, Zengcheng, 511340 Guangzhou, Guangdong, PEOPLE'S REPUBLIC OF CHINA
Test object:	Product:	AIR TO WATER HEAT PUMP
	Model:	EF AD-P1-9K0-S1
	Trade mark:	ECOFLOW
Test specification:	☑	EN 14825:2022
	☑	EN 14511-3:2022
	☑	EN 12102-1:2022
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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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 :	EF AD-P1-9K0-S1
Rated Voltage (V) :	220-240V~
Rated Frequency (Hz) :	50
Rated Power (W) :	see the nameplate
Rated Current (A) :	see the nameplate
Protection Class :	Class I
Protection Against Moisture :	IP X4
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 / 0.78kg
Declared parameters :	☑ Average ☐ Warmer ☐ Colder
Sound power level dB(A) :	N/A
Series No :	212301020164030030010

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2 Order

2.1 Date of Purchase Order, Customer's Reference

Date of Purchase Order: 2024-01-15, 2024-03-20

Customer's Reference: EcoFlow Inc.

2.2 Test Sample(s)

- Reception date(s): 2024-01-15
- Location(s) of reception:

For Energy test:

Guangzhou Customs District Technology Center
(CNAS accredited laboratory with Registration No.CNAS L2322)

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

For Noise tests:

CVC Testing Technology Co., Ltd.
(CNAS accredited laboratory with Registration No.CNAS L0095)

Address: No.3, Tiantai Yilu, Kaitai Avenue, Science City, Guangzhou, Guangdong, China

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

2.3 Date(s) of Testing

2024-01-15 to 2024-03-04

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

☒ Decision rule according to ILAC-G8:09/2019 clause 4.2.1 Binary statement for simple acceptance rule or IEC Guide 115:2023, clause 4.3 Simple acceptance was applied.
☐ Decision rule according to customer's requirements was applied. It is:
☐ Decision rule according to ILAC-G8:09/2019 clause 4.2.2 Binary statement with guard band - guard band length = 95 % extended measurement uncertainty, was applied.
☐ Decision rule (based on ILAC-G8:09/2019 clause 4.2.3 Non-binary statement with guard band, guard band length = 95 % extended measurement uncertainty) for an upper specification limit (A lower limit or specification with an up-per and a lower limit is treated similarly.):
•Compliance with the requirement: If a specification limit is not breached by a measurement result plus the expanded uncertainty with a 95% coverage probability, then compliance with the specification will be stated (e. g. Pass).
•Non-compliance with the requirement: If a specification limit is exceeded by the measurement result minus the expanded uncertainty with a 95% coverage probability, then non-compliance with the specification will be stated (e. g. Fail).
•Inconclusive result: If a measurement result plus/minus the expanded uncertainty with a 95 % coverage probability overlaps the limit it will be stated that it is not possible to state compliance or non-compliance.
☐ There are no statements to conformity or no results with measurand stated in this report, no decision rule has been applied.

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3.1 Positive Test Results

See Appendix I

4 Remarks

4.1 General

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

6 Test History

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) This test report 64.181.24.00375.01 Rev.00, dated 2024-03-20 bases on original test report 64.181.24.00341.01 Rev.00, dated 2024-03-07 to include the following changes and/or additions, which were considered technical modifications:

   a) Changing report holder name and address, manufacturer name and address, trademark, model name and appearance,.

   b) After evaluating, no additional test was needed.

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TÜV SÜD Group

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	EF AD-P1-9K0-S1							
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	Average climates	Inlet dry (wet) bulb temperature (°C)	Inlet/outlet water temperatures (°C)
A	(-7-16)/(Tdesignh-16)	88	-7(-8)	a / 34
B	(+2-16)/ (Tdesignh-16)	54	2(1)	a / 30
C	(+7-16)/(Tdesignh-16)	35	7(6)	a / 27
D	(+12-16)/(Tdesignh-16)	15	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	-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 5.174kW, the power is 1.080kW, the COP is 4.79kW/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
Electrical Properties							
Voltage	V	231.7	231.3	231.4	231.4	232.0	231.7
Current input of the unit	A	8.08	3.42	2.03	1.71	10.11	8.08
Power input of the unit	kW	1.847	0.760	0.433	0.363	2.166	1.847
Compressor frequency	Hz	81	37	23	23	90	81

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Appendix I Test results

Test conditions User Side							
Water flow	m³/h	0.88	0.88	0.88	0.88	0.88	0.88
Inlet Water temperature	°C	28.57	26.58	24.88	23.04	29.48	28.57
Outlet Water temperature	°C	34.01	29.96	27.30	25.77	35.29	34.01
Test conditions Source Side							
Barometric pressure	kPa	101.02	101.01	101.01	101.02	101.01	101.02
Air **inlet** temperature, DB	°C	-6.93	2.14	7.06	12.02	-9.95	-6.93
Air **inlet** temperature, WB	°C	-7.93	1.03	6.06	11.06	-10.97	-7.93
Summary of the results							
Total heating capacity	kW	5.560	3.446	2.452	2.778	5.919	5.560
Effective power input	kW	1.827	0.740	0.413	0.343	2.147	1.827
Coefficient of performance (COP)	kW/kW	3.04	4.66	5.93	8.11	2.76	3.04
Remark: -							

Electric power consumptions	Unit	Value
Thermostat-off mode [P_{TO}]	kW	0.012
Standby mode [P_{SB}]	kW	0.011
Crankcase heater [P_{CK}]	kW	0.042
Off mode [P_{OFF}]	kW	0.011

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Appendix I Test results

3.Calculation/conclusion for SCOP:						
Tdesignh(°C):	-10		Tbiv(°C) :	-7		
Pdesignh(kW):	6.286		TOL(°C) :	-10		
Test result A, B, C, D, E, F conditions:						
Condition	Part load	Measured capacity	Measured COP	Cdh	CR	COP at part load
E	6.286	5.919	2.76	0.90	1.00	2.76
F	5.560	5.560	3.04	0.90	1.00	3.04
A	5.560	5.560	3.04	0.90	1.00	3.04
B	3.385	3.446	4.66	0.90	0.98	4.66
C	2.176	2.452	5.93	0.90	0.89	5.86
D	0.967	2.778	8.11	0.90	0.35	6.83
CR: part load divided by capacity;						

Conclusions:	Unit	Value
SCOPon:	kWh/kWh	4.70
SCOP:	kWh/kWh	4.68
Q_H:	kWh/year	12986
Q_{HE}:	kWh/year	2772
$\eta_{s,h}$	%	184.4
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	EF AD-P1-9K0-S1							
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	Average climates	Inlet dry (wet) bulb temperature (°C)	Inlet/outlet water temperatures (°C)
A	(-7-16)/(Tdesignh-16)	88	-7(-8)	a / 52
B	(+2-16)/ (Tdesignh-16)	54	2(1)	a / 42
C	(+7-16)/(Tdesignh-16)	35	7(6)	a / 36
D	(+12-16)/(Tdesignh-16)	15	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	-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 5.163kW, the power is 1.650kW, the COP is 3.13kW/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
Electrical Properties							
Voltage	V	232.1	231.0	231.3	231.0	232.0	232.1
Current input of the unit	A	9.53	3.89	2.29	1.99	11.81	9.53
Power input of the unit	kW	2.186	0.909	0.522	0.434	2.683	2.186
Compressor frequency	Hz	82	37	23	23	90	82

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Appendix I Test results

Test conditions User Side							
Water flow	m³/h	0.55	0.55	0.55	0.55	0.55	0.55
Inlet Water temperature	°C	43.80	36.94	32.78	28.49	46.30	43.80
Outlet Water temperature	°C	51.96	41.99	36.32	32.74	55.04	51.96
Test conditions Source Side							
Barometric pressure	kPa	99.85	99.85	99.85	99.80	99.75	99.85
Air **inlet** temperature, DB	°C	-6.94	2.02	7.04	12.05	-9.96	-6.94
Air **inlet** temperature, WB	°C	-7.95	1.01	6.06	11.05	-10.94	-7.95
Summary of the results							
Total heating capacity	kW	5.219	3.214	2.273	2.687	5.593	5.219
Effective power input	kW	2.180	0.904	0.516	0.429	2.677	2.180
Coefficient of performance (COP)	kW/kW	2.39	3.56	4.40	6.26	2.09	2.39
Remark: -							

Electric power consumptions	Unit	Value
Thermostat-off mode [P_{TO}]	kW	0.012
Standby mode [P_{SB}]	kW	0.011
Crankcase heater [P_{CK}]	kW	0.042
Off mode [P_{OFF}]	kW	0.011

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Appendix I Test results

3.Calculation/conclusion for SCOP:						
Tdesignh(°C):	-10		Tbiv(°C) :	-7		
Pdesignh(kW):	5.899		TOL(°C) :	-10		
Test result A, B, C, D, E, F conditions:						
Condition	Part load	Measured capacity	Measured COP	Cdh	CR	COP at part load
E	5.899	5.593	2.09	0.90	1.00	2.09
F	5.219	5.219	2.39	0.90	1.00	2.39
A	5.219	5.219	2.39	0.90	1.00	2.39
B	3.177	3.214	3.56	0.90	0.99	3.56
C	2.042	2.273	4.40	0.90	0.90	4.35
D	0.908	2.687	6.26	0.90	0.34	5.24
CR: part load divided by capacity;						

Conclusions:	Unit	Value
SCOPon:	kWh/kWh	3.59
SCOP:	kWh/kWh	3.58
Q_H:	kWh/year	12188
Q_{HE}:	kWh/year	3406
$\eta_{s,h}$	%	140.1
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	EF AD-P1-9K0-S1		
	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

Measured quantity	$L_{WA,indoors}$ (dB(A))	$L_{WA,outdoors}$ (dB(A))	Remark
Sound pressure level `$L_{p(ST)}$****	--	44	--
Measurement distance d *	--	1.0m	--
Sound power level L_{wA}****	--	59	--

Setting of controls: according to user manual.
Duct connection:--
Rounding to: *) 1 decimal places; **) 2 decimal places; ***) 3 decimal places; ****) nearest integer

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Appendix I Test results

Table 3b.	Sound power level measurement (Medium temperature application)		P
Model	EF AD-P1-9K0-S1		
	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
Measured quantity	**$L_{WA,indoors}$ (dB(A))**	**$L_{WA,outdoors}$ (dB(A))**	**Remark**
Sound pressure level `$L_{p(ST)}$****	--	43	--
Measurement distance d *	--	1.0m	--
Sound power level L_{wA}****	--	57	--
Setting of controls: according to user manual. Duct connection:-- Rounding to: *) 1 decimal places; **) 2 decimal places; ***) 3 decimal places; ****) nearest integer			

Appendix II Marking plate

Nameplate

Model: EF AD-P1-9K0-S1

EcoFlow PowerHeat Air-to-water Heat Pump	
Model/Modell	EF AD-P1-9K0-S1
Power Supply/Spannungsversorgung	220-240V~ / 50Hz
Heating Capacity[1] (kW)/Heizleistung[1] (kW)	3.50-8.81
Input Power[1] (kW)/Eingangsleistung[1] (kW)	0.58-1.89
Cooling Capacity[2] (kW)/Kühlleistung[2] (kW)	1.53-5.96
Input Power[2] (kW)/Eingangsleistung[2] (kW)	0.33-2.11
Rated Input Power (kW)/Nenneingangsleistung (kW)	4
Rated Running Current (A)/Nennbetriebsstrom (A)	18.3
Rated Water Flow (m^3/h)/Nenn-Wasserdurchflussrate (m^3/h)	1.5
Refrigerant Type/Filling Weight (kg) / Kältemitteltyp/Füllgewicht (kg)	R290 / 0.78
Net Weight (kg)/Nettgewicht (kg)	115
Net Dimensions (L x W x H) (mm)/Abmessungen (L x B x M) (mm)	1263 x 440 x 875
Water Proof Class/IP-Schutzklasse	IPX4
Protection Class against Electric Shock/Schutzklasse gegen elektrischen Schlag	I
Max./Min. Refrigerant Pressure (MPa) / Max./Min. Kältemitteldruck (MPa)	3.0 / 0.9
Storage Refrigerant Pressure Range (Mpa)/Druckbereich des Kältemittels bei der Lagerung (Mpa)	3.5

1. [Space Heating] Ambient Temp. (DB / WB):7°C / 6°C; Water Temp. (Inlet / Outlet):30°C / 35°C
2. [Space Cooling] Ambient Temp. (DB / WB):35°C / -; Water Temp.(Inlet / Outlet):12°C / 7°C

1. [Raumheizung] Umgebungstemp. (DB / WB):7°C / 6°C; Wassertemp. (Eintritt / Austritt):30°C / 35°C
2. [Raumkühlung] Umgebungstemp. (DB / WB):35°C / -; Wassertemp. (Eintritt / Austritt):12°C / 7°C

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EcoFlow Innovation UK Limited
41 Devonshire Street Ground Floor Office 1London United Kingdom W1G 7Aj

Manufacturer: EcoFlow Inc.
RM 401, Plant #1, Runheng Industrial Zone, Fuyuanyi Road, Zhancheng Community, Fuhai Street, Bao'an District, Shenzhen City, Guangdong Province, P.R. China

Hotline Number/Hotline Nummer: -DE: 0800 0002566
-AT: 0800 018 036
-UK: 0808 8126 006

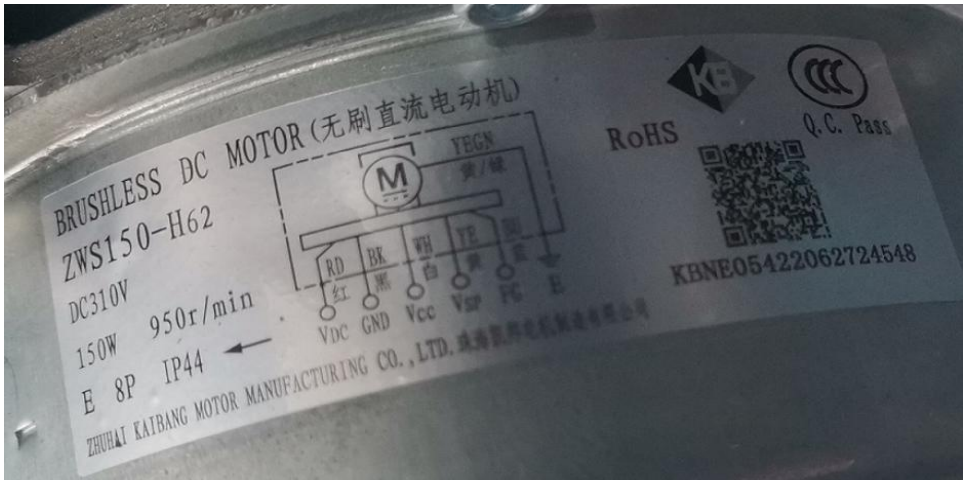
Raccolta plastica

Appendix III photo documentation

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

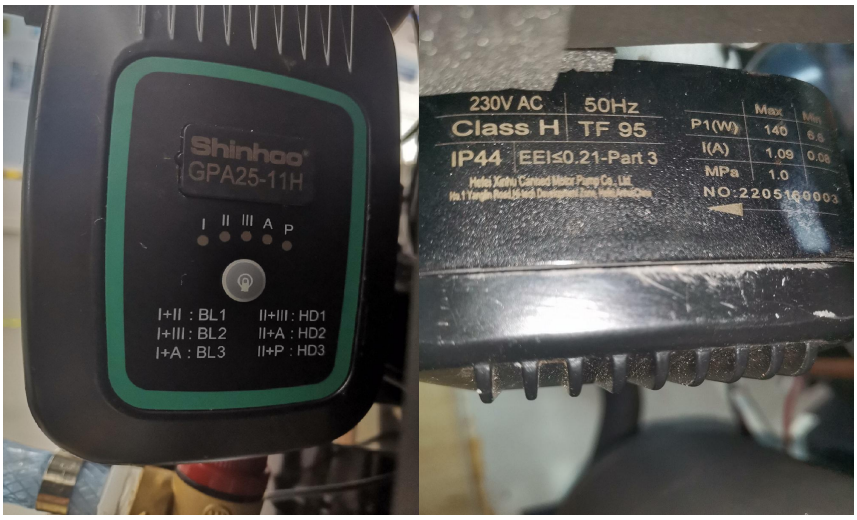
Details of:	Compressor
View: ☐ General ☐ Front ☐ Rear ☐ Right ☐ Left ☐ Top ☐ Bottom	

Appendix III photo documentation

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	

Appendix III photo documentation

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

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Appendix IV Construction data form

Model：EF AD-P1-9K0-S1		
Part		**Technical data**
1. Compressor		
	Manufacture:	Shanghai Highly Electrical Appliances Co., Ltd
	Type:	WHP07600PSDPC9KQ
	Rated capacity:	1480W
	Serial-number:	W5WN5H066UXD
	Specification:	DC143.5V; R290
2. Condenser		
	Manufacture:	Jiangsu Yuan Zhuo Equipment Manufacturing Co., Ltd
	Type:	HZL42A-34AD
	Heat exchanger:	Plate heat exchanger
	Dimension(mm):	333mm×122mm×64mm
3. Evaporator		
	Manufacture:	Guangzhou Aotai Refrigeration Equipment Co., Ltd.
	Type:	EF AD-P1-9K0-S1-SD
	Heat exchanger:	Fin heat exchanger
	Dimension(mm):	25mm×21.65mm×1.5mm×1.5
4. Fan motor		
	Manufacture:	Zhuhai Kaibang Motor Manufacturing Co., Ltd.
	Type:	ZWS150-H62
	Fan type:	3 blade
	Specification:	DC310V; 150W
5. Main control board		
	Manufacture:	Guangzhou Punp Electronic Co., Ltd.
	Type:	K.LK050085A.01
	Specification:	220-240V~/50Hz
6. Water pump		
	Manufacture:	Hefei Xinhu Canned Motor Pump Co., Ltd.
	Type:	GPA25-11H
	Specification:	230VAC; 50Hz; 140W

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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	2024-11-24
2	Electromagnetic flowmeter	KROHNE	OPTIFLUX4100C	H17221264	2024-12-21
3	Anechoic rooms (hemi-anechoic rooms)	Guangzhou Kinte	-	NC-036-2	2028-10-06
4	AC source Supply	YANGHONG	YF-3600	VGDS-0637	2024-11-07
5	6 channel data logger	—	PXI-1033	VGDY-0257	2024-05-17
6	PULSE system	B & K	3660C	VGDY-0184	2024-03-15
7	Calibrator	B & K	4231	HJ-000095	2024-07-06
8	Long steel tape	—	5m	HJ-000150	2024-09-11
9	Temperature measurement system	—	—	NC-036-1	2024-06-04
10	Atmospheric pressure meter	—	—	HJ-000165	2024-11-21
11	Constant temperature water system	B & K	—	VGDS-0448	2024-04-13
12	Windscreen	B & K	WS002-5	—	—

-- End of Report --

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