Technical Report No.: 64.181.24.00535.01 Rev.00

Date: 2024-10-24

Client:	Name:	Hisense Air Conditioning Co., Ltd.
	Address:	No.1, Hisense Road, Nancun Town, Pingdu, 266000 Qingdao, Shandong Province, PEOPLE'S REPUBLIC OF CHINA
	Contact person:	Ms. Zhou cui
Manufacturer:	Name:	Hisense Air Conditioning Co., Ltd.
	Address:	No.1, Hisense Road, Nancun Town, Pingdu, 266000 Qingdao, Shandong Province, PEOPLE'S REPUBLIC OF CHINA
Factory:	Name:	SolarEast Heat Pump Ltd.
	Address:	No.73 Defu Road, Xingtan Town Shunde District 528325 Foshan City, Guangdong Province, People's Republic of China
Test object:	Product:	Air to water Heat Pump
	Model:	AHZ-040U4GSA00
	Trade mark:	Hisense
Test specification:	☑	EN 14825:2022
	☑	EN 14511-3:2022
	☑	EN 12102-1:2022
	☑	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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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 :	AHZ-040U4GSA00
Rated Voltage (V) :	220-240V~
Rated Frequency (Hz) :	50
Rated Power (W) :	1800
Rated Current (A) :	8.20
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 / 0.60kg
Declared parameters :	☑ Average ☐ Warmer ☐ Colder
Sound power level dB(A) :	N/A
Series No :	8F00240801280292

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2 Order

2.1 Date of Purchase Order, Customer's Reference

Date of Purchase Order: 2024-07-01

Customer's Reference: Hisense Air Conditioning Co., Ltd.

2.2 Test Sample(s)

• Reception date(s): 2024-08-01

• 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

2024-08-01 to 2024-09-06

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 particulars as well as of the composition and layout.

4.2 When the product is placed on the market, it must be accompanied with safety Instructions written in official language of the country. The instructions shall give information regarding 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.

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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	AHZ-040U4GSA00							
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 4.053kW, the power is 0.820kW, the COP is 4.94kW/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	230.4	230.7	230.2	230.2	230.0	230.4
Current input of the unit	A	4.46	2.08	1.22	1.17	5.88	4.46
Power input of the unit	kW	0.984	0.448	0.223	0.202	1.264	0.984
Compressor frequency	Hz	67	31	20	20	85	67

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Appendix I Test results

Test conditions User Side							
Water flow	m³/h	0.700	0.700	0.700	0.700	0.700	0.700
Inlet Water temperature	°C	30.15	27.65	25.56	23.26	30.80	30.15
Outlet Water temperature	°C	34.05	30.06	27.30	25.39	35.28	34.05
Test conditions Source Side							
Barometric pressure	kPa	101.02	101.01	101.01	101.02	101.01	101.02
Air **inlet** temperature, DB	°C	-6.88	2.09	7.01	11.99	-10.04	-6.88
Air **inlet** temperature, WB	°C	-8.04	1.00	5.99	11.02	-11.04	-8.04
Summary of the results							
Total heating capacity	kW	3.174	1.959	1.408	1.731	3.648	3.174
Effective power input	kW	0.979	0.442	0.219	0.198	1.259	0.979
Coefficient of performance (COP)	kW/kW	3.24	4.43	6.42	8.74	2.90	3.24
Remark: -							

Electric power consumptions	Unit	Value
Thermostat-off mode [P_{TO}]	kW	0.022
Standby mode [P_{SB}]	kW	0.010
Crankcase heater [P_{CK}]	kW	0.040
Off mode [P_{OFF}]	kW	0.010

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Appendix I Test results

3.Calculation/conclusion for SCOP:			
Tdesignh(°C):	-10	Tbiv(°C) :	-7
Pdesignh(kW):	3.588	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	3.588	3.648	2.90	0.90	0.98	2.90
F	3.174	3.174	3.24	0.90	1.00	3.24
A	3.174	3.174	3.24	0.90	1.00	3.24
B	1.932	1.959	4.43	0.90	0.99	4.43
C	1.242	1.408	6.42	0.90	0.88	6.34
D	0.552	1.731	8.74	0.90	0.32	7.20

CR: part load divided by capacity;

Conclusions:	Unit	Value
SCOPon:	kWh/kWh	4.75
SCOP:	kWh/kWh	4.72
Q_H:	kWh/year	7413
Q_{HE}:	kWh/year	1571
$\eta_{s,h}$	%	185.8
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	AHZ-040U4GSA00							
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 4.010kW, the power is 1.266kW, the COP is 3.17kW/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	230.3	230.6	230.3	230.1	230.0	230.3
Current input of the unit	A	5.73	2.82	1.50	1.28	7.22	5.73
Power input of the unit	kW	1.301	0.617	0.305	0.241	1.635	1.301
Compressor frequency	Hz	72	35	22	20	87	72

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Appendix I Test results

Test conditions User Side							
Water flow	m³/h	0.430	0.430	0.430	0.430	0.430	0.430
Inlet Water temperature	°C	45.65	38.02	33.61	28.92	48.09	45.65
Outlet Water temperature	°C	51.89	42.05	36.53	32.14	55.16	51.89
Test conditions Source Side							
Barometric pressure	kPa	99.85	99.85	99.85	99.80	99.75	99.85
Air **inlet** temperature, DB	°C	-7.00	2.01	7.04	12.04	-10.05	-7.00
Air **inlet** temperature, WB	°C	-8.15	1.00	6.01	10.99	-11.02	-8.15
Summary of the results							
Total heating capacity	kW	3.122	2.010	1.460	1.612	3.536	3.122
Effective power input	kW	1.299	0.614	0.303	0.239	1.633	1.299
Coefficient of performance (COP)	kW/kW	2.40	3.27	4.82	6.73	2.16	2.40
Remark: -							

Electric power consumptions	Unit	Value
Thermostat-off mode [P_{TO}]	kW	0.022
Standby mode [P_{SB}]	kW	0.010
Crankcase heater [P_{CK}]	kW	0.040
Off mode [P_{OFF}]	kW	0.010

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Appendix I Test results

3.Calculation/conclusion for SCOP:			
Tdesignh(°C):	-10	Tbiv(°C) :	-7
Pdesignh(kW):	3.529	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	3.529	3.536	2.16	0.90	1.00	2.16
F	3.122	3.122	2.40	0.90	1.00	2.40
A	3.122	3.122	2.40	0.90	1.00	2.40
B	1.900	2.010	3.27	0.90	0.95	3.27
C	1.221	1.460	4.82	0.90	0.84	4.72
D	0.543	1.612	6.73	0.90	0.34	5.62

CR: part load divided by capacity;

Conclusions:	Unit	Value
SCOPon:	kWh/kWh	3.53
SCOP:	kWh/kWh	3.52
Q_H:	kWh/year	7290
Q_{HE}:	kWh/year	2074
$\eta_{s,h}$	%	137.6
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	AHZ-040U4GSA00		
	Product type :		Air to Water
	Outdoor heat exchanger, Air temperature DB/WB (°C):		7.0 / 6.0
	Indoor heat exchanger, Water outlet temperature (°C):		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 `$L_{p(ST)}$****	--	36	--
Measurement distance d *	--	1.0m	--
Sound power level L_{WA}****	--	50	--

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	AHZ-040U4GSA00		
	Product type :		Air to Water
	Outdoor heat exchanger, Air temperature DB/WB (°C):		7.0 / 6.0
	Indoor heat exchanger, Water outlet temperature (°C):		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 `$L_{p(ST)}$****	--	38	--
Measurement distance d *	--	1.0m	--
Sound power level L_{wA}****	--	51	--

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

Appendix I Test results

Table 4.	Clause 4 of EN 14511-4:2022	P
Model:	**AHZ-040U4GSA00**	
TEST 1	STARTING TEST (§4.2.1.2 Table 3)	
Requirement: The "lower" starting operating conditions declared by the manufacturer for the heating mode- i.e. Tair= -25.02 °C, T in water = 10.03 °C, Flow rate 0.30 m³/h have been set and obtained. At those conditions, the machine was switched on.		
Observation/ Evaluation: It started without any problem and worked for 30 minutes without showing any warning or alarm. During the test the machine operated in auto mode. No damage was recorded on the machine during and after the test.		
Test Response: Pass		

TEST 2	OPERATING TEST (§4.2.1.2 Table 3)
Requirement: 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 in water = 60.30 °C, Flow rate 0.30 m³/h. Once these conditions were obtained, the machine was let operate for over 1 hour in auto mode.	
Observation/ Evaluation: During the test, no waring or alarm were showed. No damage was recorded on the machine during and after the test.	
Test Response: Pass	

TEST 3	SHUTTING OFF WATER FLOW (§ 4.5)
Requirement: The water flow rate was shuted 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.	
Observation/ Evaluation: 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.	
Test Response: Pass	

TEST 4	SHUTTING OFF AIR FLOW (§ 4.5)
Requirement: 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.	
Observation/ Evaluation: During the test, no waring or alarm were showed. No damage was recorded on the machine during and after the test.	
Test Response: Pass	

TEST 5	COMPLETE POWER SUPPLY FAILURE (§ 4.6)
Requirement: The power supply was cut off for about 5 seconds.	
Observation/ Evaluation: The unit restarted automatically within about 3 minutes after the power supply was reactivated.	
Test Response: Pass	

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Appendix II Marking plate

Nameplate

Model: AHZ-040U4GSA00

Hisense Air to water Heat Pump			
Model			AHZ-040U4GSA00
Power Supply			220-240V~ / 50Hz
Heating[1]	Capacity	kW	4.05
	Input Power	kW	0.82
	Input Current	A	3.68
	COP	W/W	4.94
Heating[2]	Capacity	kW	4.01
	Input Power	kW	1.27
	Input Current	A	5.69
	COP	W/W	3.17
Hot Water	Capacity	kW	4.02
	Input Power	kW	1.02
	Input Current	A	4.57
	COP	W/W	3.96
Cooling	Capacity	kW	3.37
	Input Power	kW	1.05
	Input Current	A	6.23
	EER	W/W	3.21
Rated Input Power		kW	1.80
Rated Input Current		A	8.20
Refrigerant Type/Charge/GWP  A3		.../kg	R290/0.6/3
CO_2 Equivalent		/	0.0018t
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.		˚C	75
Operating Ambient Temperature		˚C	-25 ~ 45
Water Piping Connections		inch	G1
Rated Water Flow		m^3/h	0.7
Water Pressure Drop		kPa	15
Min/Max Water Pressure		MPa	0.1 / 0.3
Sound Pressure Level		dB(A)	38
Net Dimensions (L×W×H)		mm	1064×438×655
Net Weight		kg	73

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
Hot Water: Ambient Temp 7˚C/6˚C(DB/WB), Water-In/Out Temp 15˚C/55˚C
Cooling: Ambient Temp 35˚C/24˚C(DB/WB), Water-In/Out Temp 12˚C/7˚C
Hisense Air conditioning Co., Ltd.
No.1, Hisense Road, Nancun Town, Pingdu City, Qingdao City, Shandong Province, P. R.China



Appendix III photo documentation

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

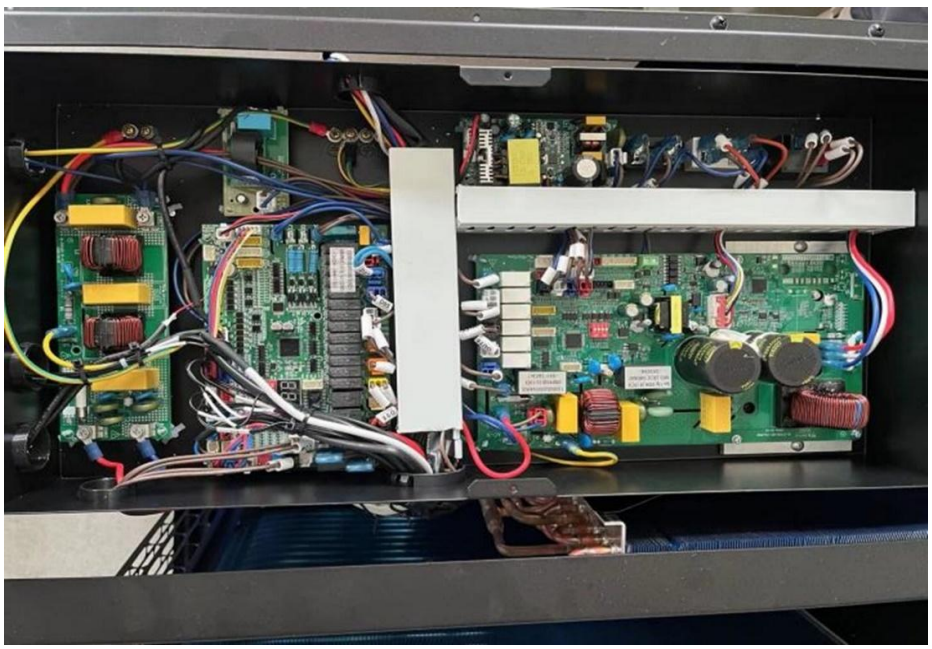
Details of:	Compressor
View: ☐ General ☐ Front ☐ Rear ☐ Right ☐ Left ☐ Top ☐ Bottom	

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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	

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Appendix III photo documentation

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

Appendix IV Construction data form

Part		Technical data
1. Compressor		
	Manufacture:	GMCC
	Type:	EDTN210D32EFZ
	Serial-number:	4020090901
	Specification:	DC190V; R290
2. Condenser		
	Manufacture:	Danfoss (Hangzhou) Plate Heat Exchanger Co.,Ltd.
	Type:	C39L-EZ-28
	Heat exchanger:	Plate heat exchanger
	Dimension(mm):	118×45×332 mm
3. Evaporator		
	Manufacture:	Guangzhou Aotai Refrigeration Equipment Co.,Ltd.
	Type:	KFDC-150XR2PN9A1-LQ-1
	Heat exchanger:	Finned heat exchanger
	Dimension(mm):	640×263×588 mm
4. Fan motor		
	Manufacture:	Jiangmen LT Motor Co.,Ltd.
	Type:	RD50HP
	Fan type:	3 blade
	Specification:	DC310V; 50W
5. Main control board		
	Manufacture:	GUANGDONG S-FINEV TECHNOLOGY CO., LTD
	Type:	R-JY003-BP
	Specification:	220-240V~; 50Hz
6. Water pump		
	Manufacture:	GRUNDFOS
	Type:	UPM3 K 25-75 130 AZA
	Specification:	230V~; 50/60Hz

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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	2024-11-15
2	Electromagnetic flowmeter	KROHNE	OPTIFLUX4100C	H17221264	2024-11-19
3	Hemi-anechoic room(B)	Guangzhou Kinte	5.2m×4.4m×4.6m	NC-036-3	2028-10-06
4	Dynamic signal analysis system	—	HAHI2022	VGDY-2137	2025-01-08
5	Calibrator	B & K	4231	HJ-000095	2025-06-24
6	AC source Supply	YANGHONG	AFC-33030TS	VGDS-0637	2024-11-02
7	Long steel tape	—	5m	HJ-000062	2024-09-11
8	Temperature measurement system	—	Special	NC-036-1	2025-06-03
9	Atmospheric pressure meter	—	—	HJ-000165	2024-11-21
10	Constant temperature water system	B & K	Special	VGDS-0448	2025-04-12
11	Windscreen	B & K	WS002-5	—	—

-- End of Report --

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