Technical Report No.: 64.181.23.03037.01 Rev.00

Date: 2023-11-07

Client:	Name:	Guangzhou Sprsun New Energy Technology Development Co., Ltd
	Address:	No.15 Tangxi Road, Yinsha Industrial Park, Xintang, Zengcheng District, Guangzhou, 511338, China
	Contact person:	YE XIN
Manufacturer:	Name:	Guangzhou Sprsun New Energy Technology Development Co., Ltd
	Address:	No.15 Tangxi Road, Yinsha Industrial Park, Xintang, Zengcheng District, Guangzhou, 511338, China
Factory:	Name:	Guangzhou Sprsun New Energy Technology Development Co., Ltd
	Address:	No.15 Tangxi Road, Yinsha Industrial Park, Xintang, Zengcheng District, Guangzhou, 511338, China
Test object:	Product:	DC Inverter Air Source Heat Pumps
	Model:	CGK-030V4P, CGK-040V4P, CGK-050V4P, CGK-060V4P
	Trade mark:	SPRSUN
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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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 :	CGK-030V4P, CGK-040V4P, CGK-050V4P, CGK-060V4P
Rated Voltage (V) :	380-420V ~ 3N~
Rated Frequency (Hz) :	50
Rated Power (W) :	4310 for CGK-030V4P; 5050 for CGK-040V4P; 6800 for CGK-050V4P; 7830 for CGK-060V4P
Rated Current (A) :	9.09 for CGK-030V4P; 10.66 for CGK-040V4P; 14.35 for CGK-050V4P; 16.53 for CGK-060V4P
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 / 0.80 for CGK-030V4P; 1.00 for CGK-040V4P; 1.20 for CGK-050V4P; 1.80 for CGK-060V4P
Declared parameters :	☑ Average ☐ Warmer ☐ Colder
Sound power level dB(A) :	N/A
Series No :	KAL092210600600093 for CGK-030V4P; KAL092210600700014 for CGK-040V4P; KAL092210600800135 for CGK-050V4P; KAL092210600900026 for CGK-060V4P

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2 Order

2.1 Date of Purchase Order, Customer's Reference

Date of Purchase Order: 2023-08-03

Customer's Reference: Guangzhou Sprsun New Energy Technology Development Co., Ltd

2.2 Test Sample(s)

- Reception date(s): 2023-08-07
- 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

2023-08-07 to 2023-10-30

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) These appliances are Air To Water Heat Pump Unit, each one including a whole compression type refrigerant circuit to heat water in another circuit. These appliances were for cooling and heating water function, this report only for heating capacity test.
2) The main power is supplied by a 5-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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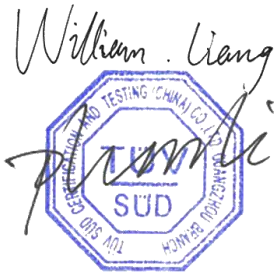
TÜV SÜD Group

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	CGK-030V4P							
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 7.490kW, the power is 1.666kW, the COP is 4.50kW/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	3:00:00	1:10:00	1:10:00	1:10:00	3:00:00	3:00:00
The heat pump defrosts	--	Yes	No	No	No	Yes	Yes
Electrical Properties							
Voltage	V	400.3	400.9	400.9	400.9	400.3	400.3
Current input of the unit	A	3.85	1.64	1.49	1.32	3.86	3.85
Power input of the unit	kW	2.054	0.793	0.705	0.607	2.064	2.054
Compressor frequency	Hz	70	30	30	30	70	70

Appendix I Test results

Test conditions User Side							
Water flow	m³/h	1.31	1.31	1.31	1.31	1.31	1.31
Inlet Water temperature	°C	29.78	27.52	25.50	23.34	31.34	29.78
Outlet Water temperature	°C	33.67*	30.05	28.41	26.63	34.97*	33.67*
Test conditions Source Side							
Barometric pressure	kPa	101.02	101.01	101.01	101.02	101.01	101.02
Air **inlet** temperature, DB	°C	-7.00	2.00	7.00	12.00	-10.00	-7.00
Air **inlet** temperature, WB	°C	-7.99	1.00	6.00	11.00	-11.00	-7.99
Summary of the results							
Total heating capacity	kW	5.871	3.814	4.394	5.020	5.461	5.871
Effective power input	kW	2.024	0.763	0.675	0.577	2.034	2.024
Coefficient of performance (COP)	kW/kW	2.90	5.00	6.51	8.70	2.69	2.90
Remark: * In part condition, outlet temperature data is recorded by the full average complete cycle's data.							

Electric power consumptions	Unit	Value
Thermostat-off mode [P_{TO}]	kW	0.035
Standby mode [P_{SB}]	kW	0.024
Crankcase heater [P_{CK}]	kW	0.042
Off mode [P_{OFF}]	kW	0.024

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Appendix I Test results

3.Calculation/conclusion for SCOP:			
Tdesignh(°C):	-10	Tbiv(°C) :	-7
Pdesignh(kW):	6.636	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	6.636	5.461	2.69	0.90	1.00	2.69
F	5.871	5.871	2.90	0.90	1.00	2.90
A	5.871	5.871	2.90	0.90	1.00	2.90
B	3.573	3.814	5.00	0.90	0.94	5.00
C	2.297	4.394	6.51	0.90	0.52	5.96
D	1.021	5.020	8.70	0.90	0.20	6.25

CR: part load divided by capacity;

Conclusions:	Unit	Value
SCOPon:	kWh/kWh	4.79
SCOP:	kWh/kWh	4.77
Q_H:	kWh/year	13710
Q_{HE}:	kWh/year	2874
$\eta_{s,h}$	%	187.8
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	CGK-030V4P							
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 6.821kW, the power is 2.236kW, the COP is 3.05kW/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	3:00:00	1:10:00	1:10:00	1:10:00	3:00:00	3:00:00
The heat pump defrosts	--	Yes	No	No	No	Yes	Yes
Electrical Properties							
Voltage	V	400.1	400.8	400.9	400.9	400.1	400.1
Current input of the unit	A	4.53	1.92	1.80	1.61	4.52	4.53
Power input of the unit	kW	2.444	0.943	0.869	0.759	2.439	2.444
Compressor frequency	Hz	70	30	30	30	70	70

Appendix I Test results

Test conditions User Side							
Water flow	m³/h	0.75	0.75	0.75	0.75	0.75	0.75
Inlet Water temperature	°C	45.03	37.90	33.42	28.87	48.94	45.03
Outlet Water temperature	°C	51.56*	41.97	38.21	34.41	54.75*	51.56*
Test conditions Source Side							
Barometric pressure	kPa	99.85	99.85	99.85	99.80	99.75	99.85
Air **inlet** temperature, DB	°C	-6.99	2.00	7.01	12.01	-10.00	-6.99
Air **inlet** temperature, WB	°C	-7.99	1.00	6.01	11.00	-10.93	-7.99
Summary of the results							
Total heating capacity	kW	5.617	3.520	4.147	4.800	4.996	5.617
Effective power input	kW	2.441	0.940	0.866	0.756	2.436	2.441
Coefficient of performance (COP)	kW/kW	2.30	3.75	4.79	6.35	2.05	2.30
Remark: * In part condition, outlet temperature data is recorded by the full average complete cycle's data.							

Electric power consumptions	Unit	Value
Thermostat-off mode [P_{TO}]	kW	0.035
Standby mode [P_{SB}]	kW	0.024
Crankcase heater [P_{CK}]	kW	0.042
Off mode [P_{OFF}]	kW	0.024

Appendix I Test results

3.Calculation/conclusion for SCOP:			
Tdesignh(°C):	-10	Tbiv(°C) :	-7
Pdesignh(kW):	6.349	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	6.349	4.996	2.05	0.90	1.00	2.05
F	5.617	5.617	2.30	0.90	1.00	2.30
A	5.617	5.617	2.30	0.90	1.00	2.30
B	3.419	3.520	3.75	0.90	0.97	3.75
C	2.198	4.147	4.79	0.90	0.53	4.40
D	0.977	4.800	6.35	0.90	0.20	4.56

CR: part load divided by capacity;

Conclusions:	Unit	Value
SCOPon:	kWh/kWh	3.61
SCOP:	kWh/kWh	3.60
Q_H:	kWh/year	13118
Q_{HE}:	kWh/year	3642
$\eta_{s,h}$	%	141.1
Seasonal space heating energy efficiency classes: (According (EU) No 811/2013 Table 1)	--	A++

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Appendix I Test results

Table 3.	Heating mode (Low temperature application):							P
Model	CGK-040V4P							
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 8.008kW, the power is 1.737kW, the COP is 4.61kW/kW.

2.Tested data/correction data(Average):

General test conditions/ Part-Load	Unit	A(-7)W34 (88%)	A2W30 (54%)	A7W27 (35%)	A12W24 (15%)	A(-10)/ W35.3 (100%)	A(-7)W34 (88%)
	--	A	B	C	D	E	F
Data collection period	hh: min:sec	3:00:00	1:10:00	1:10:00	1:10:00	3:00:00	3:00:00
The heat pump defrosts	--	Yes	No	No	No	Yes	Yes
Electrical Properties							
Voltage	V	400.3	401.0	401.1	401.1	400.3	400.3
Current input of the unit	A	4.29	1.85	1.50	1.40	4.55	4.29
Power input of the unit	kW	2.298	0.898	0.694	0.622	2.454	2.298
Compressor frequency	Hz	78	35	30	30	83	78

Appendix I Test results

Test conditions User Side							
Water flow	m³/h	1.40	1.40	1.40	1.40	1.40	1.40
Inlet Water temperature	°C	29.32	27.23	25.33	23.27	30.93	29.32
Outlet Water temperature	°C	33.55*	29.94	28.06	26.41	35.02*	33.55*
Test conditions Source Side							
Barometric pressure	kPa	101.02	101.01	101.01	101.02	101.01	101.02
Air **inlet** temperature, DB	°C	-6.98	2.01	7.00	12.00	-9.99	-6.98
Air **inlet** temperature, WB	°C	-7.93	1.03	6.01	10.99	-11.03	-7.93
Summary of the results							
Total heating capacity	kW	6.845	4.394	4.423	5.085	6.613	6.845
Effective power input	kW	2.293	0.892	0.689	0.617	2.449	2.293
Coefficient of performance (COP)	kW/kW	2.99	4.92	6.42	8.24	2.70	2.99
Remark: * In part condition, outlet temperature data is recorded by the full average complete cycle's data.							

Electric power consumptions	Unit	Value
Thermostat-off mode [P_{TO}]	kW	0.030
Standby mode [P_{SB}]	kW	0.024
Crankcase heater [P_{CK}]	kW	0.043
Off mode [P_{OFF}]	kW	0.024

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Appendix I Test results

3.Calculation/conclusion for SCOP:			
Tdesignh(°C):	-10	Tbiv(°C) :	-7
Pdesignh(kW):	7.738	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	7.738	6.613	2.70	0.90	1.00	2.70
F	6.845	6.845	2.99	0.90	1.00	2.99
A	6.845	6.845	2.99	0.90	1.00	2.99
B	4.167	4.394	4.92	0.90	0.95	4.92
C	2.678	4.423	6.42	0.90	0.61	6.03
D	1.190	5.085	8.24	0.90	0.23	6.21

CR: part load divided by capacity;

Conclusions:	Unit	Value
SCOPon:	kWh/kWh	4.80
SCOP:	kWh/kWh	4.78
Q_H:	kWh/year	15986
Q_{HE}:	kWh/year	3345
$\eta_{s,h}$	%	188.2
Seasonal space heating energy efficiency classes: (According (EU) No 811/2013 Table 2)	--	A+++

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Appendix I Test results

Table 4.	Heating mode (Medium temperature application):							P
Model	CGK-040V4P							
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 7.253kW, the power is 2.352kW, the COP is 3.08kW/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	3:00:00	1:10:00	1:10:00	1:10:00	3:00:00	3:00:00
The heat pump defrosts	--	Yes	No	No	No	Yes	Yes
Electrical Properties							
Voltage	V	400.1	400.9	401.0	401.1	400.0	400.1
Current input of the unit	A	5.14	2.23	1.80	1.69	5.41	5.14
Power input of the unit	kW	2.800	1.106	0.856	0.783	2.959	2.800
Compressor frequency	Hz	80	35	30	30	83	80

Appendix I Test results

Test conditions User Side							
Water flow	m³/h	0.79	0.79	0.79	0.79	0.79	0.79
Inlet Water temperature	°C	44.41	37.41	33.26	28.82	47.94	44.41
Outlet Water temperature	°C	51.46	41.91	37.82	34.11	54.67	51.46
Test conditions Source Side							
Barometric pressure	kPa	99.85	99.85	99.85	99.80	99.75	99.85
Air **inlet** temperature, DB	°C	-6.97	2.00	7.00	12.00	-9.99	-6.97
Air **inlet** temperature, WB	°C	-7.96	1.03	6.01	10.99	-11.08	-7.96
Summary of the results							
Total heating capacity	kW	6.391	4.099	4.151	4.829	6.099	6.391
Effective power input	kW	2.797	1.103	0.853	0.780	2.956	2.797
Coefficient of performance (COP)	kW/kW	2.28	3.72	4.87	6.19	2.06	2.28
Remark: * In part condition, outlet temperature data is recorded by the full average complete cycle's data.							

Electric power consumptions	Unit	Value
Thermostat-off mode [P_{TO}]	kW	0.030
Standby mode [P_{SB}]	kW	0.024
Crankcase heater [P_{CK}]	kW	0.043
Off mode [P_{OFF}]	kW	0.024

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Appendix I Test results

3.Calculation/conclusion for SCOP:			
Tdesignh(°C):	-10	Tbiv(°C) :	-7
Pdesignh(kW):	7.225	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	7.225	6.099	2.06	0.90	1.00	2.06
F	6.391	6.391	2.28	0.90	1.00	2.28
A	6.391	6.391	2.28	0.90	1.00	2.28
B	3.890	4.099	3.72	0.90	0.95	3.72
C	2.501	4.151	4.87	0.90	0.60	4.56
D	1.112	4.829	6.19	0.90	0.23	4.64

CR: part load divided by capacity;

Conclusions:	Unit	Value
SCOPon:	kWh/kWh	3.64
SCOP:	kWh/kWh	3.63
Q_H:	kWh/year	14927
Q_{HE}:	kWh/year	4116
$\eta_{s,h}$	%	142.0
Seasonal space heating energy efficiency classes: (According (EU) No 811/2013 Table 1)	--	A++

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Appendix I Test results

Table 5.	Heating mode (Low temperature application):							P
Model	CGK-050V4P							
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 10.725kW, the power is 2.346kW, the COP is 4.57kW/kW.

2.Tested data/correction data(Average):

General test conditions/ Part-Load	Unit	A(-7)W34 (88%)	A2W30 (54%)	A7W27 (35%)	A12W24 (15%)	A(-10)/ W35.3 (100%)	A(-7)W34 (88%)
	--	A	B	C	D	E	F
Data collection period	hh: min:sec	3:00:00	1:10:00	1:10:00	1:10:00	3:00:00	3:00:00
The heat pump defrosts	--	Yes	No	No	No	Yes	Yes
Electrical Properties							
Voltage	V	400.6	401.6	401.8	401.9	400.6	400.6
Current input of the unit	A	6.27	2.37	1.86	1.70	6.75	6.27
Power input of the unit	kW	3.515	1.205	0.906	0.807	3.803	3.515
Compressor frequency	Hz	85	35	30	30	85	85

Appendix I Test results

Test conditions User Side							
Water flow	m³/h	1.82	1.82	1.82	1.82	1.82	1.82
Inlet Water temperature	°C	29.40	27.10	25.19	23.15	30.57	29.40
Outlet Water temperature	°C	33.60*	29.87	28.02	26.36	34.94*	33.60*
Test conditions Source Side							
Barometric pressure	kPa	101.02	101.01	101.01	101.02	101.01	101.02
Air **inlet** temperature, DB	°C	-6.99	2.01	7.03	12.00	-10.00	-6.99
Air **inlet** temperature, WB	°C	-8.00	1.03	6.03	10.99	-11.09	-8.00
Summary of the results							
Total heating capacity	kW	9.361	5.828	5.957	6.755	9.198	9.361
Effective power input	kW	3.508	1.198	0.899	0.800	3.796	3.508
Coefficient of performance (COP)	kW/kW	2.67	4.86	6.62	8.44	2.42	2.67
Remark: * In part condition, outlet temperature data is recorded by the full average complete cycle's data.							

Electric power consumptions	**Unit**	**Value**
Thermostat-off mode [P_{TO}]	kW	0.036
Standby mode [P_{SB}]	kW	0.025
Crankcase heater [P_{CK}]	kW	0.038
Off mode [P_{OFF}]	kW	0.025

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Appendix I Test results

3.Calculation/conclusion for SCOP:			
Tdesignh(°C):	-10	Tbiv(°C) :	-7
Pdesignh(kW):	10.582	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	10.582	9.198	2.42	0.90	1.00	2.42
F	9.361	9.361	2.67	0.90	1.00	2.67
A	9.361	9.361	2.67	0.90	1.00	2.67
B	5.698	5.828	4.86	0.90	0.98	4.86
C	3.663	5.957	6.62	0.90	0.61	6.23
D	1.628	6.755	8.44	0.90	0.24	6.42

CR: part load divided by capacity;

Conclusions:	Unit	Value
SCOPon:	kWh/kWh	4.72
SCOP:	kWh/kWh	4.71
Q_H:	kWh/year	21862
Q_{HE}:	kWh/year	4643
$\eta_{s,h}$	%	185.3
Seasonal space heating energy efficiency classes: (According (EU) No 811/2013 Table 2)	--	A+++

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Appendix I Test results

Table 6.	Heating mode (Medium temperature application):							P
Model	CGK-050V4P							
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 9.631kW, the power is 3.180kW, the COP is 3.03kW/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	3:00:00	1:10:00	1:10:00	1:10:00	1:10:00	3:00:00
The heat pump defrosts	--	Yes	No	No	No	No	Yes
Electrical Properties							
Voltage	V	400.4	401.6	401.7	401.8	400.3	400.4
Current input of the unit	A	6.57	2.87	2.27	2.05	7.81	6.57
Power input of the unit	kW	3.765	1.478	1.124	0.996	4.501	3.765
Compressor frequency	Hz	85	35	30	30	85	85

Appendix I Test results

Test conditions User Side							
Water flow	m³/h	1.04	1.04	1.04	1.04	1.04	1.04
Inlet Water temperature	°C	44.60	37.47	33.22	28.68	47.38	44.60
Outlet Water temperature	°C	51.72*	42.01	37.82	34.00	55.11	51.72*
Test conditions Source Side							
Barometric pressure	kPa	99.85	99.85	99.85	99.80	99.75	99.85
Air **inlet** temperature, DB	°C	-6.99	2.01	7.00	12.00	-9.99	-6.99
Air **inlet** temperature, WB	°C	-7.94	1.03	6.01	10.99	-11.08	-7.94
Summary of the results							
Total heating capacity	kW	8.505	5.429	5.528	6.387	9.222	8.505
Effective power input	kW	3.761	1.474	1.120	0.992	4.496	3.761
Coefficient of performance (COP)	kW/kW	2.26	3.68	4.93	6.44	2.05	2.26
Remark: * In part condition, outlet temperature data is recorded by the full average complete cycle's data.							

Electric power consumptions	Unit	Value
Thermostat-off mode [P_{TO}]	kW	0.036
Standby mode [P_{SB}]	kW	0.025
Crankcase heater [P_{CK}]	kW	0.038
Off mode [P_{OFF}]	kW	0.025

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Appendix I Test results

3.Calculation/conclusion for SCOP:			
Tdesignh(°C):	-10	Tbiv(°C) :	-7
Pdesignh(kW):	9.615	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	9.615	9.222	2.05	0.90	1.00	2.05
F	8.505	8.505	2.26	0.90	1.00	2.26
A	8.505	8.505	2.26	0.90	1.00	2.26
B	5.177	5.429	3.68	0.90	0.95	3.68
C	3.328	5.528	4.93	0.90	0.60	4.63
D	1.479	6.387	6.44	0.90	0.23	4.84

CR: part load divided by capacity;

Conclusions:	Unit	Value
SCOPon:	kWh/kWh	3.65
SCOP:	kWh/kWh	3.64
Q_H:	kWh/year	19864
Q_{HE}:	kWh/year	5458
$\eta_{s,h}$	%	142.6
Seasonal space heating energy efficiency classes: (According (EU) No 811/2013 Table 1)	--	A++

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Appendix I Test results

Table 7.	Heating mode (Low temperature application):							P
Model	CGK-060V4P							
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 12.806kW, the power is 2.697kW, the COP is 4.75kW/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	3:00:00	1:10:00	1:10:00	1:10:00	3:00:00	3:00:00
The heat pump defrosts	--	Yes	No	No	No	Yes	Yes
Electrical Properties							
Voltage	V	400.5	400.0	401.7	401.8	400.5	400.5
Current input of the unit	A	6.81	2.84	2.27	2.02	6.95	6.81
Power input of the unit	kW	3.876	1.410	1.129	0.985	3.965	3.876
Compressor frequency	Hz	85	35	30	30	85	85

Appendix I Test results

Test conditions User Side							
Water flow	m³/h	2.20	2.20	2.20	2.20	2.20	2.20
Inlet Water temperature	°C	29.14	27.18	25.26	23.23	30.55	29.14
Outlet Water temperature	°C	33.56*	29.88	28.06	26.38	34.95*	33.56*
Test conditions Source Side							
Barometric pressure	kPa	101.02	101.01	101.01	101.02	101.01	101.02
Air **inlet** temperature, DB	°C	-6.94	2.01	7.01	12.01	-9.94	-6.94
Air **inlet** temperature, WB	°C	-7.95	1.00	6.01	10.99	-10.96	-7.95
Summary of the results							
Total heating capacity	kW	11.235	6.894	7.113	8.023	11.178	11.235
Effective power input	kW	3.869	1.403	1.122	0.978	3.957	3.869
Coefficient of performance (COP)	kW/kW	2.90	4.92	6.34	8.21	2.82	2.90
Remark: * In part condition, outlet temperature data is recorded by the full average complete cycle's data.							

Electric power consumptions	Unit	Value
Thermostat-off mode [P_{TO}]	kW	0.035
Standby mode [P_{SB}]	kW	0.025
Crankcase heater [P_{CK}]	kW	0.039
Off mode [P_{OFF}]	kW	0.025

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Appendix I Test results

3.Calculation/conclusion for SCOP:			
Tdesignh(°C):	-10	Tbiv(°C) :	-7
Pdesignh(kW):	12.700	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	12.700	11.178	2.82	0.90	1.00	2.82
F	11.235	11.235	2.90	0.90	1.00	2.90
A	11.235	11.235	2.90	0.90	1.00	2.90
B	6.838	6.894	4.92	0.90	0.99	4.92
C	4.396	7.113	6.34	0.90	0.62	5.97
D	1.954	8.023	8.21	0.90	0.24	6.26

CR: part load divided by capacity;

Conclusions:	Unit	Value
SCOPon:	kWh/kWh	4.77
SCOP:	kWh/kWh	4.76
Q_H:	kWh/year	26238
Q_{HE}:	kWh/year	5510
$\eta_{s,h}$	%	187.5
Seasonal space heating energy efficiency classes: (According (EU) No 811/2013 Table 2)	--	A+++

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Appendix I Test results

Table 8.	Heating mode (Medium temperature application):							P
Model	CGK-060V4P							
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 11.489kW, the power is 3.665kW, 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	3:00:00	1:10:00	1:10:00	1:10:00	1:10:00	3:00:00
The heat pump defrosts	--	Yes	No	No	No	No	Yes
Electrical Properties							
Voltage	V	400.0	401.4	401.7	401.7	400.0	400.0
Current input of the unit	A	8.14	3.23	2.58	2.39	8.41	8.14
Power input of the unit	kW	4.743	1.691	1.311	1.184	4.924	4.743
Compressor frequency	Hz	84	35	30	30	85	84

Appendix I Test results

Test conditions User Side							
Water flow	m³/h	1.25	1.25	1.25	1.25	1.25	1.25
Inlet Water temperature	°C	44.27	37.52	33.22	28.58	48.01	44.27
Outlet Water temperature	°C	51.48*	41.98	37.78	33.82	55.10	51.48*
Test conditions Source Side							
Barometric pressure	kPa	99.85	99.85	99.85	99.80	99.75	99.85
Air **inlet** temperature, DB	°C	-6.95	2.00	7.00	12.00	-9.99	-6.95
Air **inlet** temperature, WB	°C	-7.92	1.03	6.01	11.00	-10.92	-7.92
Summary of the results							
Total heating capacity	kW	10.359	6.417	6.567	7.570	10.164	10.359
Effective power input	kW	4.738	1.686	1.306	1.179	4.919	4.738
Coefficient of performance (COP)	kW/kW	2.19	3.81	5.03	6.42	2.07	2.19
Remark: * In part condition, outlet temperature data is recorded by the full average complete cycle's data.							

Electric power consumptions	Unit	Value
Thermostat-off mode [P_{TO}]	kW	0.035
Standby mode [P_{SB}]	kW	0.025
Crankcase heater [P_{CK}]	kW	0.039
Off mode [P_{OFF}]	kW	0.025

Appendix I Test results

3.Calculation/conclusion for SCOP:			
Tdesignh(°C):	-10	Tbiv(°C) :	-7
Pdesignh(kW):	11.710	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	11.710	10.164	2.07	0.90	1.00	2.07
F	10.359	10.359	2.19	0.90	1.00	2.19
A	10.359	10.359	2.19	0.90	1.00	2.19
B	6.305	6.417	3.81	0.90	0.98	3.81
C	4.053	6.567	5.03	0.90	0.62	4.73
D	1.801	7.570	6.42	0.90	0.24	4.86

CR: part load divided by capacity;

Conclusions:	Unit	Value
SCOPon:	kWh/kWh	3.70
SCOP:	kWh/kWh	3.69
Q_H:	kWh/year	24192
Q_{HE}:	kWh/year	6550
$\eta_{s,h}$	%	144.7
Seasonal space heating energy efficiency classes: (According (EU) No 811/2013 Table 1)	--	A++

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Appendix I Test results

Table 9a.	Sound power level measurement (Low temperature application)		P
Model	CGK-030V4P		
	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):		400
	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):		1.31

Measured quantity	$L_{WA,indoors}$ (dB(A))	$L_{WA,outdoors}$ (dB(A))	Remark
Sound pressure level $\bar{L}_{p(ST)}$****	--	46	--
Measurement distance 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: 590 r/min, compressor frequency: 58Hz.

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Appendix I Test results

Table 9b.	Sound power level measurement (Medium temperature application)		P
Model	CGK-030V4P		
	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):		400
	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):		0.75

Measured quantity	$L_{WA,indoors}$ (dB(A))	$L_{WA,outdoors}$ (dB(A))	Remark
Sound pressure level $\bar{L}_{p(ST)}$****	--	47	--
Measurement distance 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: 580 r/min, compressor frequency: 58Hz.

Appendix I Test results

Table 10a.	Sound power level measurement (Low temperature application)		P
Model	CGK-040V4P		
	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):		400
	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):		1.40

Measured quantity	$L_{WA,indoors}$ (dB(A))	$L_{WA,outdoors}$ (dB(A))	Remark
Sound pressure level $\bar{L}_{p(ST)}$****	--	47	--
Measurement distance d *	--	1.0m	--
Sound power level L_{WA}****	--	62	--

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

Fan speed: 590 r/min, compressor frequency: 64Hz.

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Appendix I Test results

Table 10b.	Sound power level measurement (Medium temperature application)		P
Model	CGK-040V4P		
	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):		400
	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):		0.79

Measured quantity	$L_{WA,indoors}$ (dB(A))	$L_{WA,outdoors}$ (dB(A))	Remark
Sound pressure level $\bar{L}_{p(ST)}$****	--	45	--
Measurement distance 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: 530 r/min, compressor frequency: 56Hz.

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Appendix I Test results

Table 11a.	Sound power level measurement (Low temperature application)		P
Model	CGK-050V4P		
	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):		400
	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):		1.82

Measured quantity	$L_{WA,indoors}$ (dB(A))	$L_{WA,outdoors}$ (dB(A))	Remark
Sound pressure level $\bar{L}_{p(ST)}$****	--	46	--
Measurement distance 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: 518 r/min, compressor frequency: 60Hz.

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Appendix I Test results

Table 11b.	Sound power level measurement (Medium temperature application)		P
Model	CGK-050V4P		
	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):		400
	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):		1.04

Measured quantity	$L_{WA,indoors}$ (dB(A))	$L_{WA,outdoors}$ (dB(A))	Remark
Sound pressure level $\bar{L}_{p(ST)}$****	--	47	--
Measurement distance d *	--	1.0m	--
Sound power level L_{WA}****	--	62	--

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

Fan speed: 490 r/min, compressor frequency: 60Hz.

Appendix I Test results

Table 12a.	Sound power level measurement (Low temperature application)		P
Model	CGK-060V4P		
	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):		400
	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):		2.20

Measured quantity	$L_{WA,indoors}$ (dB(A))	$L_{WA,outdoors}$ (dB(A))	Remark
Sound pressure level $\bar{L}_{p(ST)}$****	--	46	--
Measurement distance d *	--	1.0m	--
Sound power level L_{WA}****	--	61	--

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

Fan speed: 490 r/min, compressor frequency: 60Hz.

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Appendix I Test results

Table 12b.	Sound power level measurement (Medium temperature application)		P
Model	CGK-060V4P		
	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):		400
	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):		1.25

Measured quantity	$L_{WA,indoors}$ (dB(A))	$L_{WA,outdoors}$ (dB(A))	Remark
Sound pressure level $\bar{L}_{p(ST)}$****	--	46	--
Measurement distance d *	--	1.0m	--
Sound power level L_{WA}****	--	61	--

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

Fan speed: 480 r/min, compressor frequency: 60Hz.

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Appendix I Test results

Table 13.	Clause 4 of EN 14511-4:2022	P
Model:	CGK-030V4P	
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= -24.76 °C, T in water = 9.97 °C, Flow rate 0.68 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 = 52.00 °C, Flow rate 0.68 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	

Appendix I Test results

Table 14.	Clause 4 of EN 14511-4:2022	P
Model:	CGK-040V4P	
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= -25.07 °C, T in water = 9.27 °C, Flow rate 0.71 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 = 51.13 °C, Flow rate 0.71 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	

Appendix I Test results

Table 15.	Clause 4 of EN 14511-4:2022	P
Model:	CGK-050V4P	
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 = 8.60 °C, Flow rate 0.93 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 = 50.89 °C, Flow rate 0.93 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	

Appendix I Test results

Table 16.	Clause 4 of EN 14511-4:2022	P
Model:	CGK-060V4P	
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= -25.05 °C, T in water = 8.48 °C, Flow rate 1.12 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 = 50.68 °C, Flow rate 1.12 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	

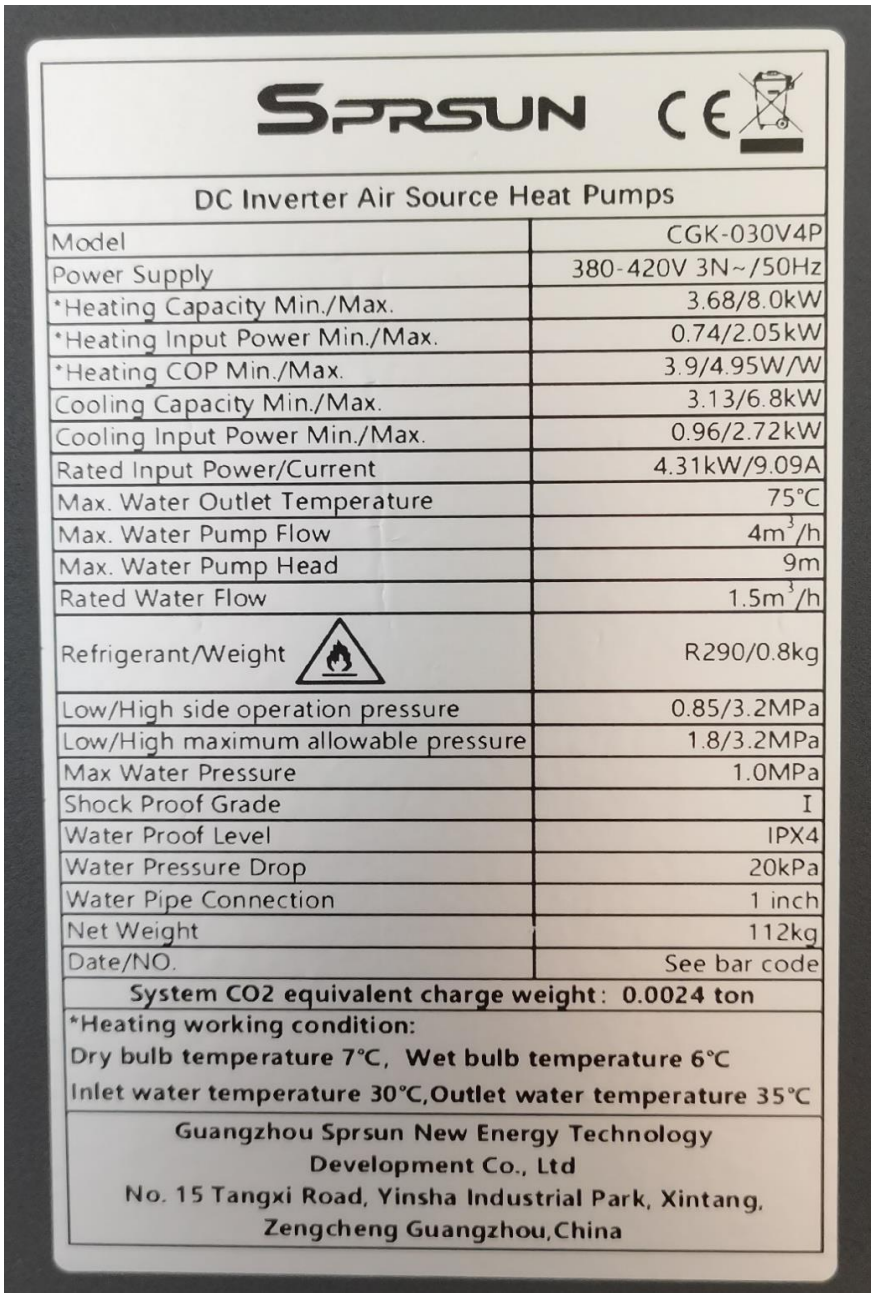
TEST 4	SHUTTING OFF AIR FLOW (§ 4.5)
Requirement: The air flow rate was shutted off through a plastic sheet and a panel. The machine never turned off. It continued to operate with continuous frosting and defrosting cycles. After more than half an hour, the air flow rate was restored and the machine started 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	

Appendix II Marking plate

Nameplate

Model: CGK-030V4P



SPRSUN CE

DC Inverter Air Source Heat Pumps

Model	CGK-030V4P
Power Supply	380-420V 3N~/50Hz
*Heating Capacity Min./Max.	3.68/8.0kW
*Heating Input Power Min./Max.	0.74/2.05kW
*Heating COP Min./Max.	3.9/4.95W/W
Cooling Capacity Min./Max.	3.13/6.8kW
Cooling Input Power Min./Max.	0.96/2.72kW
Rated Input Power/Current	4.31kW/9.09A
Max. Water Outlet Temperature	75°C
Max. Water Pump Flow	4m³/h
Max. Water Pump Head	9m
Rated Water Flow	1.5m³/h
Refrigerant/Weight	R290/0.8kg
Low/High side operation pressure	0.85/3.2MPa
Low/High maximum allowable pressure	1.8/3.2MPa
Max Water Pressure	1.0MPa
Shock Proof Grade	I
Water Proof Level	IPX4
Water Pressure Drop	20kPa
Water Pipe Connection	1 inch
Net Weight	112kg
Date/NO.	See bar code

System CO2 equivalent charge weight: 0.0024 ton

***Heating working condition:**
Dry bulb temperature 7°C, Wet bulb temperature 6°C
Inlet water temperature 30°C,Outlet water temperature 35°C

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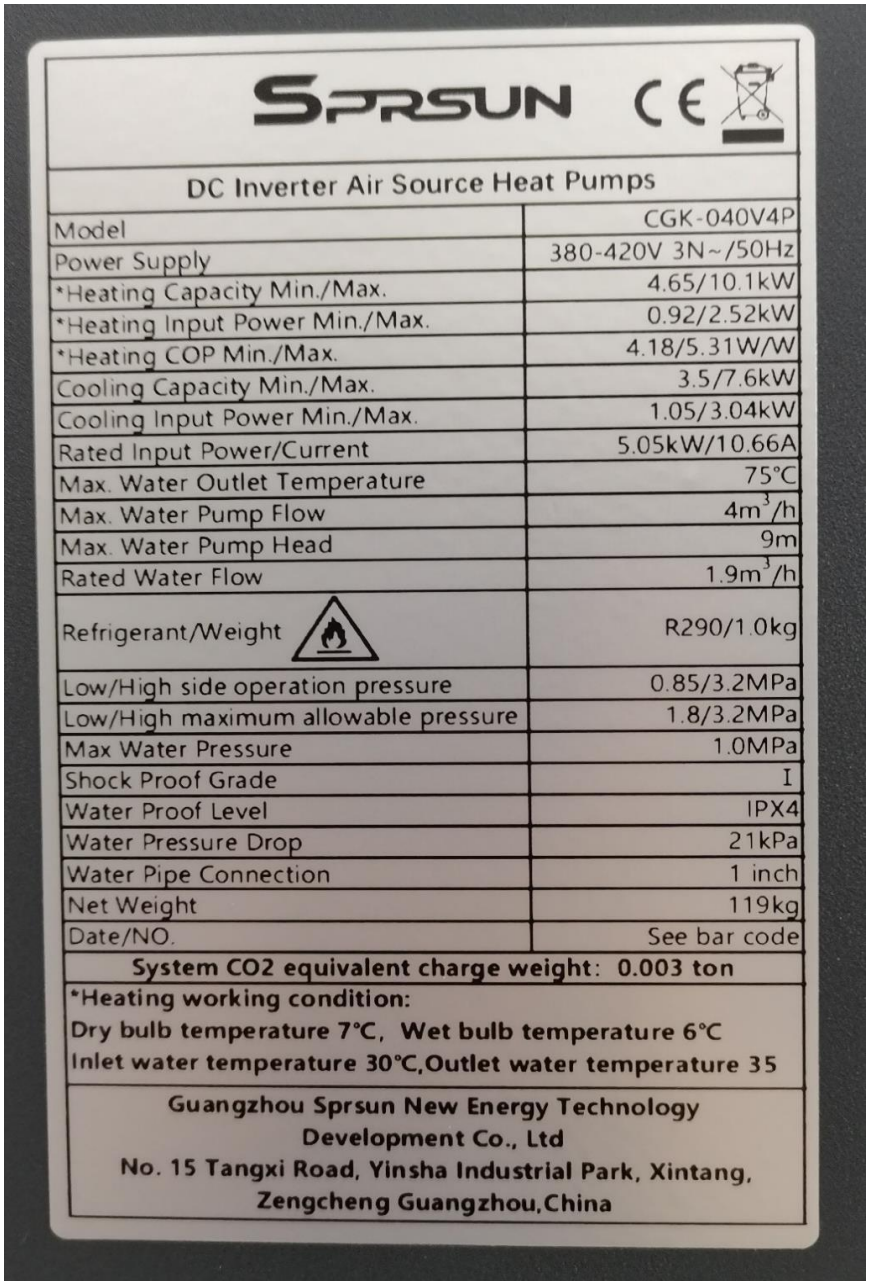
Appendix II Marking plate

Nameplate

Model: CGK-040V4P



SPRSUN CE

DC Inverter Air Source Heat Pumps	
Model	CGK-040V4P
Power Supply	380-420V 3N~/50Hz
*Heating Capacity Min./Max.	4.65/10.1kW
*Heating Input Power Min./Max.	0.92/2.52kW
*Heating COP Min./Max.	4.18/5.31W/W
Cooling Capacity Min./Max.	3.5/7.6kW
Cooling Input Power Min./Max.	1.05/3.04kW
Rated Input Power/Current	5.05kW/10.66A
Max. Water Outlet Temperature	75°C
Max. Water Pump Flow	4m³/h
Max. Water Pump Head	9m
Rated Water Flow	1.9m³/h
Refrigerant/Weight	R290/1.0kg
Low/High side operation pressure	0.85/3.2MPa
Low/High maximum allowable pressure	1.8/3.2MPa
Max Water Pressure	1.0MPa
Shock Proof Grade	I
Water Proof Level	IPX4
Water Pressure Drop	21kPa
Water Pipe Connection	1 inch
Net Weight	119kg
Date/NO.	See bar code

System CO2 equivalent charge weight: 0.003 ton

***Heating working condition:**
Dry bulb temperature 7℃, Wet bulb temperature 6℃
Inlet water temperature 30℃,Outlet water temperature 35

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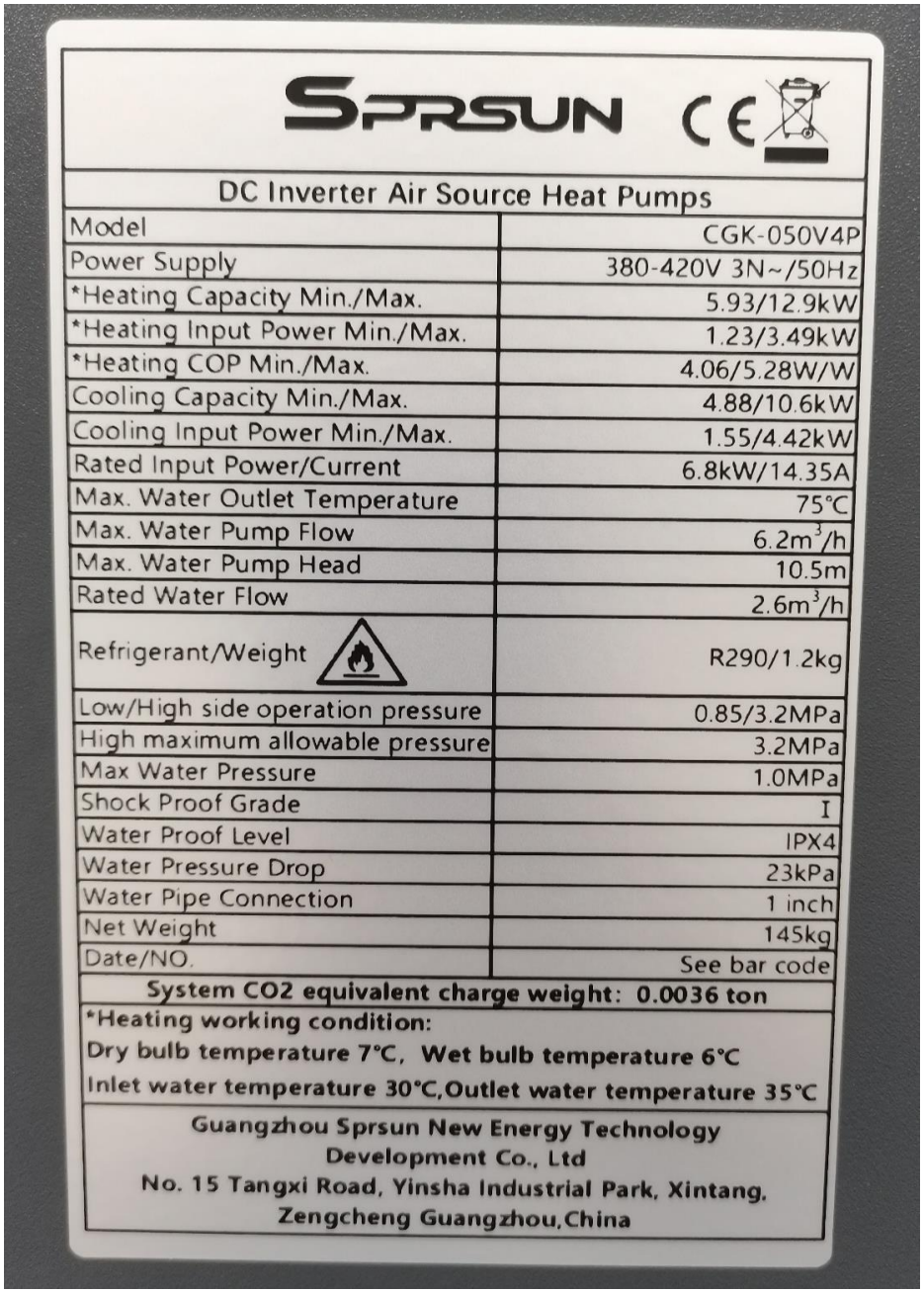
Appendix II Marking plate

Nameplate

Model: CGK-050V4P



SPRSUN CE

DC Inverter Air Source Heat Pumps

Model	CGK-050V4P
Power Supply	380-420V 3N~/50Hz
*Heating Capacity Min./Max.	5.93/12.9kW
*Heating Input Power Min./Max.	1.23/3.49kW
*Heating COP Min./Max.	4.06/5.28W/W
Cooling Capacity Min./Max.	4.88/10.6kW
Cooling Input Power Min./Max.	1.55/4.42kW
Rated Input Power/Current	6.8kW/14.35A
Max. Water Outlet Temperature	75°C
Max. Water Pump Flow	6.2m³/h
Max. Water Pump Head	10.5m
Rated Water Flow	2.6m³/h
Refrigerant/Weight	R290/1.2kg
Low/High side operation pressure	0.85/3.2MPa
High maximum allowable pressure	3.2MPa
Max Water Pressure	1.0MPa
Shock Proof Grade	I
Water Proof Level	IPX4
Water Pressure Drop	23kPa
Water Pipe Connection	1 inch
Net Weight	145kg
Date/NO.	See bar code

System CO2 equivalent charge weight: 0.0036 ton

***Heating working condition:**
Dry bulb temperature 7°C, Wet bulb temperature 6°C
Inlet water temperature 30°C,Outlet water temperature 35°C

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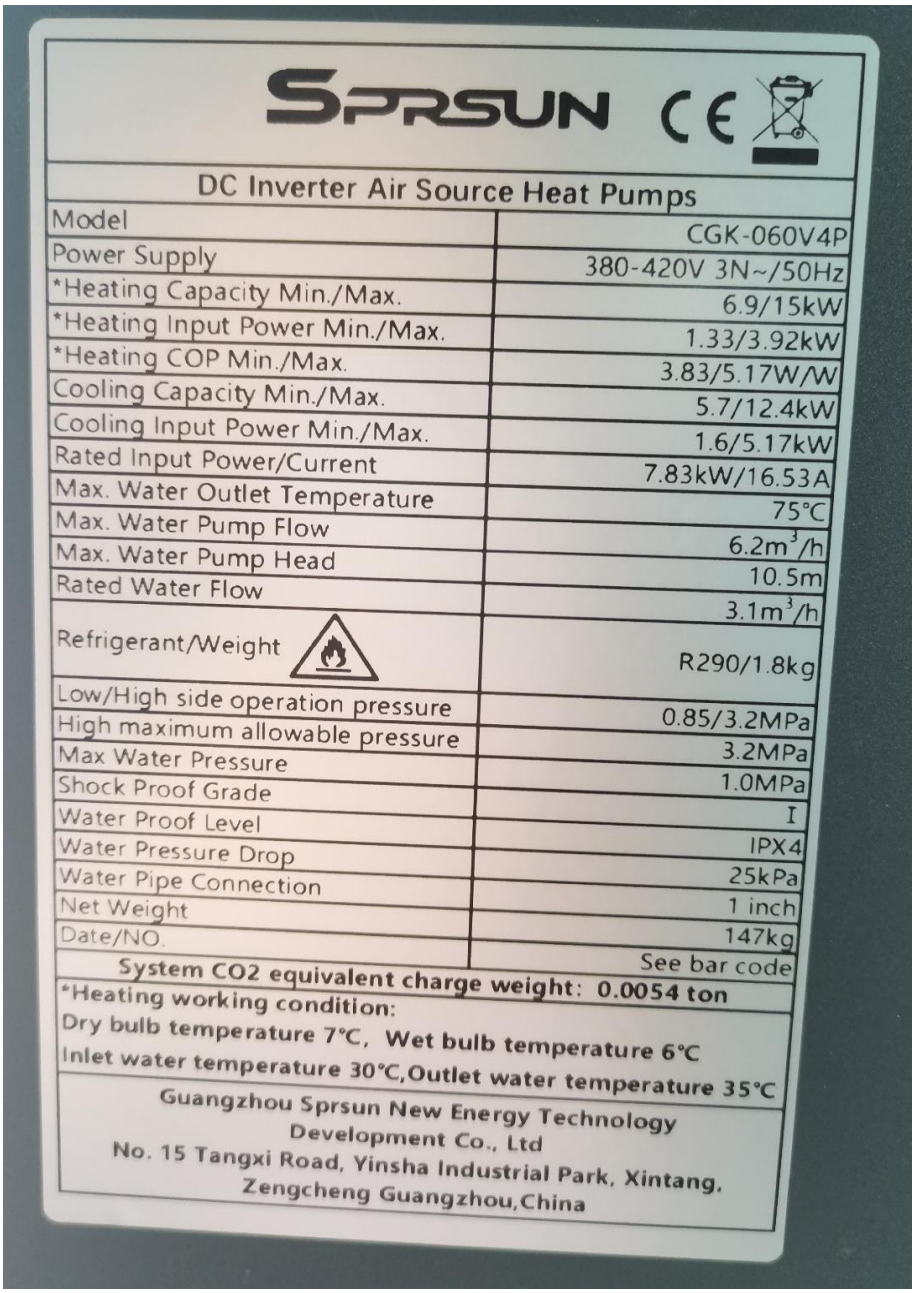
Appendix II Marking plate

Nameplate

Model: CGK-060V4P



Appendix III photo documentation

Details of:	Overall view for CGK-030V4P
View: ☐ General ☐ Front ☐ Rear ☐ Right ☐ Left ☐ Top ☐ Bottom	

Details of:	Compressor for CGK-030V4P
View: ☐ General ☐ Front ☐ Rear ☐ Right ☐ Left ☐ Top ☐ Bottom	

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Appendix III photo documentation

Details of:	Fan Motor for CGK-030V4P
View: ☐ General ☐ Front ☐ Rear ☐ Right ☐ Left ☐ Top ☐ Bottom	

Details of:	Main Control Board for CGK-030V4P
View: ☐ General ☐ Front ☐ Rear ☐ Right ☐ Left ☐ Top ☐ Bottom	

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Appendix III photo documentation

Details of:	Water Pump for CGK-030V4P
View: ☐ General ☐ Front ☐ Rear ☐ Right ☐ Left ☐ Top ☐ Bottom	

Details of:	Overall view for CGK-040V4P
View: ☐ General ☐ Front ☐ Rear ☐ Right ☐ Left ☐ Top ☐ Bottom	

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Appendix III photo documentation

Details of:	Compressor for CGK-040V4P
View: ☐ General ☐ Front ☐ Rear ☐ Right ☐ Left ☐ Top ☐ Bottom	

Details of:	Fan Motor for CGK-040V4P
View: ☐ General ☐ Front ☐ Rear ☐ Right ☐ Left ☐ Top ☐ Bottom	

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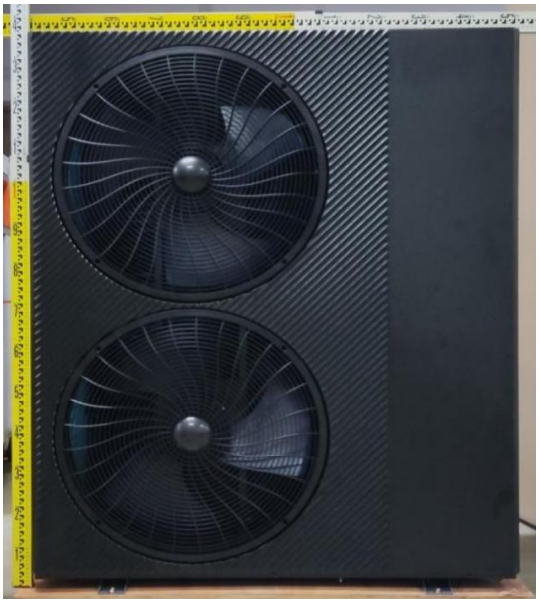
Appendix III photo documentation

Details of:	Main Control Board for CGK-040V4P
View: ☐ General ☐ Front ☐ Rear ☐ Right ☐ Left ☐ Top ☐ Bottom	

Details of:	Water Pump for CGK-040V4P
View: ☐ General ☐ Front ☐ Rear ☐ Right ☐ Left ☐ Top ☐ Bottom	

Appendix III photo documentation

Details of:	Overall view for CGK-050V4P
View: ☐ General ☐ Front ☐ Rear ☐ Right ☐ Left ☐ Top ☐ Bottom	

Details of:	Compressor for CGK-050V4P
View: ☐ General ☐ Front ☐ Rear ☐ Right ☐ Left ☐ Top ☐ Bottom	

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Appendix III photo documentation

Details of:	Fan Motor for CGK-050V4P
View: ☐ General ☐ Front ☐ Rear ☐ Right ☐ Left ☐ Top ☐ Bottom	

Details of:	Main Control Board for CGK-050V4P
View: ☐ General ☐ Front ☐ Rear ☐ Right ☐ Left ☐ Top ☐ Bottom	

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Appendix III photo documentation

Details of:	Water Pump for CGK-050V4P
View: ☐ General ☐ Front ☐ Rear ☐ Right ☐ Left ☐ Top ☐ Bottom	

Details of:	Overall view for CGK-060V4P
View: ☐ General ☐ Front ☐ Rear ☐ Right ☐ Left ☐ Top ☐ Bottom	

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Appendix III photo documentation

Details of:	Compressor for CGK-060V4P
View: ☐ General ☐ Front ☐ Rear ☐ Right ☐ Left ☐ Top ☐ Bottom	

Details of:	Fan Motor for CGK-060V4P
View: ☐ General ☐ Front ☐ Rear ☐ Right ☐ Left ☐ Top ☐ Bottom	

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Appendix III photo documentation

Details of:	Main Control Board for CGK-060V4P
View: ☐ General ☐ Front ☐ Rear ☐ Right ☐ Left ☐ Top ☐ Bottom	

Details of:	Water Pump for CGK-060V4P
View: ☐ General ☐ Front ☐ Rear ☐ Right ☐ Left ☐ Top ☐ Bottom	

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Appendix IV Construction data form

Model : CGK-030V4P		
Part		**Technical data**
1. Compressor		
	Manufacture:	Panasonic Wanbao Appliances Compressor (Guangzhou) Co., Ltd.
	Type:	H420D7KZAAC6
	Rated capacity:	2245W
	Serial-number:	F0000030
	Specification:	DC280V; R290
2. Condenser		
	Manufacture:	Jiangsu Yuanzhuo Equipment Manfactur Co.,Ltd
	Type:	ZL62FA-26AD-CG
	Heat exchanger:	Plate heat exchanger
	Dimension(mm):	526(L)mmX119(H)mmX63(D)mm
3. Evaporator		
	Manufacture:	Guangzhou Aotai Refrigeration Equipment Co.,Ltd.
	Type:	03KH-CP-01
	Heat exchanger:	Finned-coil heat exchanger
	Dimension(mm):	660(L)mmX750(H)mmX356.8(D)mm
4. Fan motor		
	Manufacture:	Wolong Electric Group Co., Ltd
	Type:	ZWB278D04A
	Fan type:	3 blade
	Specification:	DC310V; 102W
5. Main control board		
	Manufacture:	CAREL
	Type:	UP3F00200T3S04
	Specification:	220-240V~; 50Hz
6. Water pump		
	Manufacture:	GRUNDFOS
	Type:	UPM4XL K 25-90 130
	Specification:	230V~; 50/60Hz
*(Alternative)		
	Manufacture:	Shinhoo
	Type:	GPA25-9HW
	Specification:	230V~; 50/60Hz

Remark: * means the test results were not performed on the alternative components.

Appendix IV Construction data form

Model : CGK-040V4P		
Part		**Technical data**
1. Compressor		
	Manufacture:	Panasonic Wanbao Appliances Compressor (Guangzhou) Co., Ltd.
	Type:	H420D7KZAAC6
	Rated capacity:	2245W
	Serial-number:	F0000033
	Specification:	DC280V; R290
2. Condenser		
	Manufacture:	Jiangsu Yuanzhuo Equipment Manfactur Co.,Ltd
	Type:	ZL62FA-30AD-CG
	Heat exchanger:	Plate heat exchanger
	Dimension(mm):	526(L)mmX119(H)mmX71(D)mm
3. Evaporator		
	Manufacture:	Guangzhou Aotai Refrigeration EquipmentCo.,Ltd.
	Type:	04KH-CP-01
	Heat exchanger:	Finned-coil heat exchanger
	Dimension(mm):	660.4(L)mmX900(H)mmX343.3(D)mm
4. Fan motor		
	Manufacture:	Wolong Electric Group Co., Ltd
	Type:	ZWB278D04A
	Fan type:	3 blade
	Specification:	DC310V; 102W
5. Main control board		
	Manufacture:	CAREL
	Type:	UP3F00200T3S04
	Specification:	220-240V~; 50Hz
6. Water pump		
	Manufacture:	GRUNDFOS
	Type:	UPM4XL K 25-90 130
	Specification:	230V~; 50/60Hz
*(Alternative)		
	Manufacture:	Shinhoo
	Type:	GPA25-9HW
	Specification:	230V~; 50/60Hz

Remark: * means the test results were not performed on the alternative components.

Appendix IV Construction data form

Model : CGK-050V4P		
Part		**Technical data**
1. Compressor		
	Manufacture:	Panasonic Wanbao Appliances Compressor (Guangzhou) Co., Ltd.
	Type:	H550D7VZAAC6
	Rated capacity:	3120W
	Serial-number:	F9999997
	Specification:	DC520V; R290
2. Condenser		
	Manufacture:	Jiangsu Yuanzhuo Equipment Manfactur Co.,Ltd
	Type:	ZL62FA-40AD-CG
	Heat exchanger:	Plate heat exchanger
	Dimension(mm):	526(L)mmX119(H)mmX91(D)mm
3. Evaporator		
	Manufacture:	Guangzhou Aotai Refrigeration Equipment Co.,Ltd.
	Type:	05KH-CP-01
	Heat exchanger:	Finned-coil heat exchanger
	Dimension(mm):	660.4(L)mmX1300(H)mmX343.3(D)mm
4. Fan motor		
	Manufacture:	Wolong Electric Group Co., Ltd
	Type:	ZWB278D04A
	Fan type:	3 blade
	Specification:	DC310V; 102W
5. Main control board		
	Manufacture:	CAREL
	Type:	UP3F00200T3S04
	Specification:	220-240V~; 50Hz
6. Water pump		
	Manufacture:	GRUNDFOS
	Type:	UPM10L 25-105 130
	Specification:	230V~; 50/60Hz
*(Alternative)		
	Manufacture:	Shinhoo
	Type:	GPA25-11H
	Specification:	230V~; 50Hz

Remark: * means the test results were not performed on the alternative components.

Appendix IV Construction data form

Model : CGK-060V4P		
Part		**Technical data**
1. Compressor		
	Manufacture:	Panasonic Wanbao Appliances Compressor (Guangzhou) Co., Ltd.
	Type:	H650D7VZAAC6
	Rated capacity:	3640W
	Serial-number:	F9999997
	Specification:	DC520V; R290
2. Condenser		
	Manufacture:	Jiangsu Yuanzhuo Equipment Manfactur Co.,Ltd
	Type:	ZL62FA-40AD-CG
	Heat exchanger:	Plate heat exchanger
	Dimension(mm):	526(L)mmX119(H)mmX91(D)mm
3. Evaporator		
	Manufacture:	Guangzhou Aotai Refrigeration Equipment Co.,Ltd.
	Type:	06KH-CP-01
	Heat exchanger:	Finned-coil heat exchanger
	Dimension(mm):	660.4(L)mmX1300(H)mmX343.3(D)mm
4. Fan motor		
	Manufacture:	Wolong Electric Group Co., Ltd
	Type:	ZWB278D04A
	Fan type:	3 blade
	Specification:	DC310V; 102W
5. Main control board		
	Manufacture:	CAREL
	Type:	UP3F00200T3S04
	Specification:	220-240V~; 50Hz
6. Water pump		
	Manufacture:	GRUNDFOS
	Type:	UPM10L 25-105 130
	Specification:	230V~; 50/60Hz
*(Alternative)		
	Manufacture:	Shinhoo
	Type:	GPA25-11H
	Specification:	230V~; 50Hz

Remark: * means the test results were not performed on the alternative components.

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	OPTIFLUX4100C	H17221264	2023-12-21
3	Anechoic rooms (hemi-anechoic rooms)	Guangzhou Kinte	-	NC-036-2	2024-10-07
4	AC source Supply	YANGHONG	YF-3600	VGDS-0637	2024-11-07
5	6 channel data logger	—	PXI-1033	VGDY-0257	2024-05-20
6	PULSE system	B & K	3660C	VGDY-0184	2024-04-12
7	Calibrator	B & K	4231	HJ-000095	2024-06-30
8	Long steel tape	—	5m	HJ-000150	2024-01-01
9	Temperature measurement system	—	—	NC-036-1	2024-06-07
10	Atmospheric pressure meter	—	—	HJ-000165	2023-11-22
11	Constant temperature water system	B & K	—	VGDS-0448	2024-04-18
12	Windscreen	B & K	WS002-5	—	—

-- End of Report --

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