



Technical Report No.: 64.181.23.03010.01 Rev.00

Date: 2023-08-09

Client: Report holder's name: Sonnenwärme Direkt GmbH

Report holder's Address: Dammholmer Str. 3, 24873 Havetoft, Germany

Contact person of report holder: Guido Arntz

Manufacturer: Manufacturer's name: Sonnenwärme Direkt GmbH

Manufacturer's address: Dammholmer Str. 3, 24873 Havetoft, Germany

Test object: Product: DC Inverter Heat Pump
Model: SWD WP10 R290, SWD WP15 R290

Trade mark: --

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 :	SWD WP10 R290, SWD WP15 R290
Rated Voltage (V) :	380-415V, 3N~
Rated Frequency (Hz) :	50
Rated Power (W) :	2080W for SWD WP10 R290, 2800W for SWD WP15 R290
Rated Current (A) :	3.72A for SWD WP10 R290, 5.01A for SWD WP15 R290
Protection Class :	Class I
Protection Against Moisture :	IP X4
Construction :	Stationary
Supply connection :	<input type="checkbox"/> Non detachable cord <input checked="" type="checkbox"/> Permanent connection to fixed wiring
Operation mode:	<input checked="" type="checkbox"/> Continuous operation; <input type="checkbox"/> Intermittent operation; <input type="checkbox"/> Short time operation;
Refrigerant/charge (kg) :	R290 / 1.15kg for SWD WP10 R290, 1.40kg for SWD WP15 R290
Declared parameters :	<input checked="" type="checkbox"/> Average <input type="checkbox"/> Warmer <input type="checkbox"/> Colder
Sound power level dB(A) :	N/A
Series No :	PPAL05023041331 for SWD WP10 R290, PPAL06023010054 for SWD WP15 R290

2 Order

2.1 Date of Purchase Order, Customer's Reference

Date of Purchase Order: 2023-01-09, 2023-02-09, 2023-07-27

Customer's Reference: Sonnenwärme Direkt GmbH

2.2 Test Sample(s)

- Reception date(s): 2023-04-01, 2023-06-08

- Location(s) of reception:

For Energy test:

Guangzhou Customs District Technology Center

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

For Noise tests:

CVC Testing Technology Co., Ltd.

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

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

2.3 Date(s) of Testing

2023-04-01 to 2023-04-28, 2023-06-08 to 2023-06-10

2.4 Location(s) of Testing

Same as 2.2

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

N/A

3 Test Results

Decision rule according to ILAC-G8:09/2019 clause 4.2.1 Binary statement for simple acceptance rule or IEC Guide 115:2021, clause 4.4.3, 4.5.1 Accuracy method 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.

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 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.
- 5) This test report 64.181.23.02546.01 Rev.00, dated 2023-08-09 bases on original test report 64.181.23.00458.02 Rev.00, dated 2023-06-20 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 and model name.
 - b) After evaluating, no additional test was needed.

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
TÜV SÜD Group

Tested by: William Liang, Project Handl
printed name, function & signature

William Liang
Plum Li

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	SWD WP10 R290							
Product type	Air to Water	Heating season	<input checked="" type="checkbox"/>	Average	<input type="checkbox"/>	Warmer	<input type="checkbox"/>	Colder
1. Test conditions:								
Condition	Part Load Ratio in %				Outdoor heat exchanger	Indoor heat exchanger		
	Formula	A	W	C	Inlet dry (wet) bulb temperature °C	Inlet/outlet water temperatures (°C)		
A	$(-7-16)/(T_{designh-16})$	88	N/A	N/A	-7(-8)	a / 34		
B	$(+2-16)/(T_{designh-16})$	54	N/A	N/A	2(1)	a / 30		
C	$(+7-16)/(T_{designh-16})$	35	N/A	N/A	7(6)	a / 27		
D	$(+12-16)/(T_{designh-16})$	15	N/A	N/A	12(11)	a / 24		
E	$(TOL-16)/(T_{designh-16})$				TOL	a / 35.3		
F	$(T_{bivalent-16})/(T_{designh-16})$				T _{biv}	a / 34		
G	$(-15-16)/(T_{designh-16})$	N/A	N/A	N/A	-15	N/A		
Remark: a) With the water flow rate as determined at the standard rating conditions given in EN14511-2 at 30/35 conditions, the capacity is 8.715kW, the power is 2.042kW, the COP is 4.27kW/kW.								
2. Tested data/correction data(Average):								
General test conditions/ Part-Load	Unit	A(-7)/W34 (88%)	A2/W30 (54%)	A7/W27 (35%)	A12/W24 (15%)	A(-10)/W35.3 (100%)	A(-7)/W34 (88%)	
	--	A	B	C	D	E	F	
Data collection period	hh: min:sec	1:10:00	1:10:00	1:10:00	1:10:00	1:10:00	1:10:00	
The heat pump defrosts	--	No	No	No	No	No	No	
Complete Cycles	--	0	0	0	0	0	0	
Barometric pressure	kPa	101.02	101.01	101.01	101.02	101.01	101.02	
Voltage	V	398.8	399.5	398.6	398.7	398.4	398.8	
Current input of the unit	A	5.26	2.44	2.24	1.80	6.53	5.26	
Power input of the unit	kW	2.851	1.260	1.128	0.882	3.743	2.851	
Test conditions indoor unit								
Inlet Water temperature, DB	°C	28.92	26.93	25.01	23.11	29.63	28.92	
Outlet Water temperature, DB	°C	33.99	30.00	28.77	26.93	35.30	33.99	

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Appendix I Test results

Test conditions outdoor unit							
Air inlet temperature, DB	°C	-7.00	2.03	7.01	12.00	-10.07	-7.00
Air inlet temperature, WB	°C	-8.01	1.00	6.01	11.00	-11.03	-8.01
Summary of the results							
Total heating capacity	kW	9.080	5.539	6.732	6.852	10.137	9.080
Effective power input	kW	2.816	1.225	1.092	0.847	3.708	2.816
Coefficient of performance (COP)	--	3.23	4.52	6.16	8.09	2.73	3.23
Compressor frequency	Hz	70	35	30	30	90	70
Water flow	m³/h	1.55	1.55	1.55	1.55	1.55	1.55
Remark: -							
3.Calculation/conclusion for SCOP(Average):							
Tdesignh(°C)	-10	Tbiv(°C)		-7			
Pdesignh(kW)	10.265	TOL(°C)		-10			
Test result A, B, C, D, E, F conditions:							
Condition	Part load	Measured capacity	COP at measured capacity	Cdh	CR	COP at part load	
E	10.265	10.137	2.73	0.90	1.00	2.73	
F	9.080	9.080	3.23	0.90	1.00	3.23	
A	9.080	9.080	3.23	0.90	1.00	3.23	
B	5.527	5.539	4.52	0.90	1.00	4.52	
C	3.553	6.732	6.16	0.90	0.53	5.66	
D	1.579	6.852	8.09	0.90	0.23	6.07	
CR: part load divided by capacity;							

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Appendix I Test results

Electric power consumptions	Unit	Value
Thermostat-off mode [P _{TO}]	kW	0.024
Standby mode [P _{SB}]	kW	0.007
Crankcase heater [P _{CK}]	kW	0.043
Off mode [P _{OFF}]	kW	0.007

Conclusions:	Unit	Value
SCOP _{on} :	kWh/kWh	4.61
SCOP:	kWh/kWh	4.60
Q _H :	kWh/year	21207
Q _{HE} :	kWh/year	4614
η _{s,h}	%	180.8
Seasonal space heating energy efficiency classes: (According (EU) No 811/2013 Table 2)	--	A+++

Appendix I Test results

Table 2.	Heating mode(Medium temperature application):						P	
Model	SWD WP10 R290							
Product type	Air to Water	Heating season	<input checked="" type="checkbox"/>	Average	<input type="checkbox"/>	Warmer	<input type="checkbox"/>	Colder
1. Test conditions:								
Condition	Part Load Ratio in %				Outdoor heat exchanger	Indoor heat exchanger		
	Formula	A	W	C	Inlet dry (wet) bulb temperature °C	Inlet/outlet water temperatures (°C)		
A	$(-7-16)/(T_{designh-16})$	88	N/A	N/A	-7(-8)	a / 52		
B	$(+2-16)/(T_{designh-16})$	54	N/A	N/A	2(1)	a / 42		
C	$(+7-16)/(T_{designh-16})$	35	N/A	N/A	7(6)	a / 36		
D	$(+12-16)/(T_{designh-16})$	15	N/A	N/A	12(11)	a / 30		
E	$(TOL-16)/(T_{designh-16})$				TOL	a / 55.3		
F	$(T_{bivalent-16})/(T_{designh-16})$				Tbiv	a / 52		
G	$(-15-16)/(T_{designh-16})$	N/A	N/A	N/A	-15	N/A		
Remark: a) With the water flow rate as determined at the standard rating conditions given in EN14511-2 at 47/55 conditions, the capacity is 8.971kW, the power is 3.143kW, the COP is 2.85kW/kW.								
2. Tested data/correction data(Average):								
General test conditions/ Part-Load	Unit	A(-7)/W52 (88%)	A2/W42 (54%)	A7/W36 (35%)	A12/W30 (15%)	A(-10)/W55.3 (100%)	A(-7)/W52 (88%)	
	--	A	B	C	D	E	F	
Data collection period	hh: min:sec	1:10:00	1:10:00	1:10:00	1:10:00	1:10:00	1:10:00	
The heat pump defrosts	--	No	No	No	No	No	No	
Complete Cycles	--	0	0	0	0	0	0	
Barometric pressure	kPa	99.85	99.85	99.85	99.80	99.75	99.85	
Voltage	V	398.9	399.1	398.6	398.6	398.7	398.9	
Current input of the unit	A	7.49	3.78	2.39	2.12	7.57	7.49	
Power input of the unit	kW	4.508	2.018	1.229	1.064	4.587	4.508	
Test conditions indoor unit								
Inlet Water temperature, DB	°C	42.16	36.14	32.24	28.33	47.41	42.16	
Outlet Water temperature, DB	°C	52.00	42.03	37.12	34.13	55.06	52.00	

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Appendix I Test results

Test conditions outdoor unit							
Air inlet temperature, DB	°C	-7.00	2.02	7.01	12.00	-10.06	-7.00
Air inlet temperature, WB	°C	-8.00	0.99	6.01	11.00	-11.05	-8.00
Summary of the results							
Total heating capacity	kW	10.765	6.691	5.520	6.581	8.726	10.765
Effective power input	kW	4.497	2.007	1.217	1.053	4.576	4.497
Coefficient of performance (COP)	--	2.39	3.33	4.53	6.25	1.91	2.39
Compressor frequency	Hz	74	35	30	30	90	74
Water flow	m³/h	0.98	0.98	0.98	0.98	0.98	0.98
Remark: -							
3.Calculation/conclusion for SCOP(Average):							
Tdesignh(°C)	-10	Tbiv(°C)		-7			
Pdesignh(kW)	12.169	TOL(°C)		-10			
Test result A, B, C, D, E, F conditions:							
Condition	Part load	Measured capacity	COP at measured capacity	Cdh	CR	COP at part load	
E	12.169	8.726	1.91	0.90	1.00	1.91	
F	10.765	10.765	2.39	0.90	1.00	2.39	
A	10.765	10.765	2.39	0.90	1.00	2.39	
B	6.553	6.691	3.33	0.90	0.98	3.33	
C	4.212	5.520	4.53	0.90	0.76	4.40	
D	1.872	6.581	6.25	0.90	0.28	4.99	
CR: part load divided by capacity;							

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Appendix I Test results

Electric power consumptions	Unit	Value
Thermostat-off mode [P_{TO}]	kW	0.024
Standby mode [P_{SB}]	kW	0.007
Crankcase heater [P_{CK}]	kW	0.043
Off mode [P_{OFF}]	kW	0.007

Conclusions:	Unit	Value
SCOPon:	kWh/kWh	3.45
SCOP:	kWh/kWh	3.44
Q_H :	kWh/year	25141
Q_{HE} :	kWh/year	7302
$\eta_{s,h}$	%	134.7
Seasonal space heating energy efficiency classes: (According (EU) No 811/2013 Table 1)	--	A++



Appendix I Test results

Table 3.	Heating mode(Low temperature application):						P	
Model	SWD WP15 R290							
Product type	Air to Water	Heating season	<input checked="" type="checkbox"/>	Average	<input type="checkbox"/>	Warmer	<input type="checkbox"/>	Colder
1. Test conditions:								
Condition	Part Load Ratio in %				Outdoor heat exchanger	Indoor heat exchanger		
	Formula	A	W	C	Inlet dry (wet) bulb temperature °C	Inlet/outlet water temperatures (°C)		
A	$(-7-16)/(T_{designh-16})$	88	N/A	N/A	-7(-8)	a / 34		
B	$(+2-16)/(T_{designh-16})$	54	N/A	N/A	2(1)	a / 30		
C	$(+7-16)/(T_{designh-16})$	35	N/A	N/A	7(6)	a / 27		
D	$(+12-16)/(T_{designh-16})$	15	N/A	N/A	12(11)	a / 24		
E	$(TOL-16)/(T_{designh-16})$				TOL	a / 35.3		
F	$(T_{bivalent-16})/(T_{designh-16})$				T _{biv}	a / 34		
G	$(-15-16)/(T_{designh-16})$	N/A	N/A	N/A	-15	N/A		
Remark: a) With the water flow rate as determined at the standard rating conditions given in EN14511-2 at 30/35 conditions, the capacity is 12.782kW, the power is 2.763kW, the COP is 4.63kW/kW.								
2. Tested data/correction data(Average):								
General test conditions/ Part-Load	Unit	A(-7)/W34 (88%)	A2/W30 (54%)	A7/W27 (35%)	A12/W24 (15%)	A(-10)/W35.3 (100%)	A(-7)/W34 (88%)	
	--	A	B	C	D	E	F	
Data collection period	hh: min:sec	1:10:00	1:10:00	1:10:00	1:10:00	1:10:00	1:10:00	
The heat pump defrosts	--	No	No	No	No	No	No	
Complete Cycles	--	0	0	0	0	0	0	
Barometric pressure	kPa	101.02	101.01	101.01	101.02	101.01	101.02	
Voltage	V	399.6	399.7	398.8	399.1	398.6	399.6	
Current input of the unit	A	6.38	3.19	2.55	2.26	8.33	6.38	
Power input of the unit	kW	3.755	1.711	1.310	1.141	5.103	3.755	
Test conditions indoor unit								
Inlet Water temperature, DB	°C	29.25	27.02	25.13	23.17	29.93	29.25	
Outlet Water temperature, DB	°C	34.04	29.94	28.26	26.63	35.31	34.04	

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Appendix I Test results

Test conditions outdoor unit							
Air inlet temperature, DB	°C	-7.08	2.02	7.01	12.02	-10.00	-7.08
Air inlet temperature, WB	°C	-8.06	1.05	6.01	11.02	-11.04	-8.06
Summary of the results							
Total heating capacity	kW	12.431	7.574	8.142	8.979	14.005	12.431
Effective power input	kW	3.721	1.677	1.276	1.107	5.069	3.721
Coefficient of performance (COP)	--	3.34	4.52	6.38	8.11	2.76	3.34
Compressor frequency	Hz	70	35	30	30	90	70
Water flow	m³/h	2.24	2.24	2.24	2.24	2.24	2.24
Remark: -							
3.Calculation/conclusion for SCOP(Average):							
Tdesignh(°C)	-10	Tbiv(°C)		-7			
Pdesignh(kW)	14.053	TOL(°C)		-10			
Test result A, B, C, D, E, F conditions:							
Condition	Part load	Measured capacity	COP at measured capacity	Cdh	CR	COP at part load	
E	14.053	14.005	2.76	0.90	1.00	2.76	
F	12.431	12.431	3.34	0.90	1.00	3.34	
A	12.431	12.431	3.34	0.90	1.00	3.34	
B	7.567	7.574	4.52	0.90	1.00	4.52	
C	4.864	8.142	6.38	0.90	0.60	5.98	
D	2.162	8.979	8.11	0.90	0.24	6.17	
CR: part load divided by capacity;							

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Appendix I Test results

Electric power consumptions	Unit	Value
Thermostat-off mode [P _{TO}]	kW	0.039
Standby mode [P _{SB}]	kW	0.013
Crankcase heater [P _{CK}]	kW	0.054
Off mode [P _{OFF}]	kW	0.013

Conclusions:	Unit	Value
SCOP _{on} :	kWh/kWh	4.70
SCOP:	kWh/kWh	4.69
Q _H :	kWh/year	29033
Q _{HE} :	kWh/year	6189
η _{s,h}	%	184.6
Seasonal space heating energy efficiency classes: (According (EU) No 811/2013 Table 2)	--	A+++



Appendix I Test results

Table 4.	Heating mode(Medium temperature application):						P	
Model	SWD WP15 R290							
Product type	Air to Water	Heating season	<input checked="" type="checkbox"/>	Average	<input type="checkbox"/>	Warmer	<input type="checkbox"/>	Colder
1. Test conditions:								
Condition	Part Load Ratio in %				Outdoor heat exchanger	Indoor heat exchanger		
	Formula	A	W	C	Inlet dry (wet) bulb temperature °C	Inlet/outlet water temperatures (°C)		
A	$(-7-16)/(T_{designh-16})$	88	N/A	N/A	-7(-8)	a / 52		
B	$(+2-16)/(T_{designh-16})$	54	N/A	N/A	2(1)	a / 42		
C	$(+7-16)/(T_{designh-16})$	35	N/A	N/A	7(6)	a / 36		
D	$(+12-16)/(T_{designh-16})$	15	N/A	N/A	12(11)	a / 30		
E	$(TOL-16)/(T_{designh-16})$				TOL	a / 55.3		
F	$(T_{bivalent-16})/(T_{designh-16})$				T _{biv}	a / 52		
G	$(-15-16)/(T_{designh-16})$	N/A	N/A	N/A	-15	N/A		
Remark: a) With the water flow rate as determined at the standard rating conditions given in EN14511-2 at 47/55 conditions, the capacity is 12.249kW, the power is 3.881kW, the COP is 3.16kW/kW.								
2. Tested data/correction data(Average):								
General test conditions/ Part-Load	Unit	A(-7)/W52 (88%)	A2/W42 (54%)	A7/W36 (35%)	A12/W30 (15%)	A(-10)/W55.3 (100%)	A(-7)/W52 (88%)	
	--	A	B	C	D	E	F	
Data collection period	hh: min:sec	1:10:00	1:10:00	1:10:00	1:10:00	1:10:00	1:10:00	
The heat pump defrosts	--	No	No	No	No	No	No	
Complete Cycles	--	0	0	0	0	0	0	
Barometric pressure	kPa	99.85	99.85	99.85	99.80	99.75	99.85	
Voltage	V	398.7	398.8	398.8	398.9	398.6	398.7	
Current input of the unit	A	8.20	3.88	3.09	2.68	10.28	8.20	
Power input of the unit	kW	5.019	2.101	1.635	1.382	6.394	5.019	
Test conditions indoor unit								
Inlet Water temperature, DB	°C	44.11	37.11	33.03	28.65	46.15	44.11	
Outlet Water temperature, DB	°C	52.06	41.98	38.15	34.59	55.02	52.06	

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Appendix I Test results

Test conditions outdoor unit							
Air inlet temperature, DB	°C	-7.00	2.01	7.01	12.02	-10.00	-7.00
Air inlet temperature, WB	°C	-7.95	1.00	6.00	11.03	-10.96	-7.95
Summary of the results							
Total heating capacity	kW	11.913	7.285	7.662	8.886	13.288	11.913
Effective power input	kW	5.004	2.087	1.621	1.368	6.380	5.004
Coefficient of performance (COP)	--	2.38	3.49	4.73	6.50	2.08	2.38
Compressor frequency	Hz	71	35	30	30	90	71
Water flow	m³/h	1.29	1.29	1.29	1.29	1.29	1.29
Remark: * In part condition, outlet temperature data is recorded by a full average complete cycle's data. **The inlet and outlet temperatures are been determined according to Cl.11.5.1 of EN 14825:2022.							
3.Calculation/conclusion for SCOP(Average):							
Tdesignh(°C)	-10	Tbiv(°C)		-7			
Pdesignh(kW)	13.467	TOL(°C)		-10			
Test result A, B, C, D, E, F conditions:							
Condition	Part load	Measured capacity	COP at measured capacity	Cdh	CR	COP at part load	
E	13.467	13.288	2.08	0.90	1.00	2.08	
F	11.913	11.913	2.38	0.90	1.00	2.38	
A	11.913	11.913	2.38	0.90	1.00	2.38	
B	7.251	7.285	3.49	0.90	1.00	3.49	
C	4.662	7.662	4.73	0.90	0.61	4.44	
D	2.072	8.886	6.50	0.90	0.23	4.89	
CR: part load divided by capacity;							

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Appendix I Test results

Electric power consumptions	Unit	Value
Thermostat-off mode [P _{TO}]	kW	0.039
Standby mode [P _{SB}]	kW	0.013
Crankcase heater [P _{CK}]	kW	0.054
Off mode [P _{OFF}]	kW	0.013

Conclusions:	Unit	Value
SCOP _{on} :	kWh/kWh	3.55
SCOP:	kWh/kWh	3.55
Q _H :	kWh/year	27823
Q _{HE} :	kWh/year	7844
η _{s,h}	%	138.9
Seasonal space heating energy efficiency classes: (According (EU) No 811/2013 Table 1)	--	A++



Appendix I Test results

Table 5a.	Sound power level measurement(Low temperature application)		P
Model	SWD WP10 R290		
	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 (m³/h):	1.55	
	Measured quantity	L_{WA,indoors} (dB(A))	L_{WA,outdoors} (dB(A))
	Sound pressure level $\bar{L}_{p(ST)}$ ****	--	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 Fan speed: 400 r/min, compressor speed: 50Hz.			

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Appendix I Test results

Table 5b.	Sound power level measurement(Medium temperature application)		P
Model	SWD WP10 R290		
	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 (m³/h):	0.98	
	Measured quantity	L_{WA,indoors} (dB(A))	L_{WA,outdoors} (dB(A))
	Sound pressure level $\bar{L}_{p(ST)}$ ****	--	45
	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 Fan speed: 400 r/min, compressor speed: 56Hz.			

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Appendix I Test results

Table 6a.	Sound power level measurement(Low temperature application)		P
Model	SWD WP15 R290		
	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 (m³/h):	2.24	
	Measured quantity	L_{WA,indoors} (dB(A))	L_{WA,outdoors} (dB(A))
	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: 400 r/min, compressor speed: 48Hz.			



Appendix I Test results

Table 6b.	Sound power level measurement(Medium temperature application)		P
Model	SWD WP15 R290		
	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 (m³/h):	1.29	
	Measured quantity	L_{WA,indoors} (dB(A))	L_{WA,outdoors} (dB(A))
	Sound pressure level $\bar{L}_{p(ST)}$ ****	--	46
	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: 400 r/min, compressor speed: 54Hz.			



Appendix I Test results

Table 7.		Clause 4 of EN 14511-4:2022			P
Model		SWD WP10 R290			
Customer Code	Execution Date [dd-mm-yyyy]	Testing item	Standard Reference	Comment	Test Response
TEST 1	08-06-2023	STARTING TEST	EN14511-4:2022, § 4.2.1.2 Table 3	The "lower" starting operating conditions declared by the manufacturer for the heating mode- i.e. T _{air} =-25.12°C, T _{out water} 9.02°C, Flow rate 0.96m ³ /h have been set and obtained. At those conditions, the machine was switched on. It started without any problem and worked for 30 minutes without showing any warning or alarm. During the test the machine operated in automode. No damage was recorded on the machine during and after the test.	Passed
TEST 2	08-06-2023	OPERATING TEST	EN14511-4:2022, § 4.2.1.2 Table 3	From the machine "lower" starting conditions - i.e. - the machine was brought to the lower operating conditions declared by the manufacturer for the heating mode- i.e. T _{air} =-25.33°C, T _{out water} 60.09°C, Flow rate 0.96m ³ /h. Once these conditions were obtained, the machine was let operate for over 1 hour in automode. During the test, no warning or alarm were showed. No damage was recorded on the machine during and after the test.	Passed
TEST 3	08-06-2023	SHUTTING OFF WATER FLOW	EN14511-4:2022, § 4.5	The water flow rate was shutted off through manual and automatic valves of the test rig. The machine switched off and only the flow switch Protection appeared on the user interface of indoor unit. Perform error reset operation , once the water flow rate was restored, the machine restarted automatically and worked for 30 minutes normally. No damage was recorded on the machine during and after the test.	Passed
TEST 4	08-06-2023	SHUTTING OFF AIR FLOW	EN14511-4:2022, § 4.5	The air flow rate was shutted off through a plastic sheet and a panel. The machine never turned off. It continued to operate with continuous frosting and defrosting cycles. After more than half an hour, the air flow rate was restored and the machine started to operate normally. During the test, no warning or alarm were showed. No damage was recorded on the machine during and after the test.	Passed
TEST 5	08-06-2023	COMPLETE POWER SUPPLY FAILURE	EN14511-4:2022, § 4.6	The power supply was cut off for about 10 seconds.The unit restarted automatically within about 3 minutes after the power supply was reactivated.	Passed

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Appendix I Test results

Table 8.		Clause 4 of EN 14511-4:2022			P
Model		SWD WP15 R290			
Customer Code	Execution Date [dd-mm-yyyy]	Testing item	Standard Reference	Comment	Test Response
TEST 1	09-06-2023	STARTING TEST	EN14511-4:2022, § 4.2.1.2 Table 3	The "lower" starting operating conditions declared by the manufacturer for the heating mode- i.e. T _{air} =-25.17°C, T _{out water} 9.11°C, Flow rate 1.28m ³ /h have been set and obtained. At those conditions, the machine was switched on. It started without any problem and worked for 30 minutes without showing any warning or alarm. During the test the machine operated in automode. No damage was recorded on the machine during and after the test.	Passed
TEST 2	09-06-2023	OPERATING TEST	EN14511-4:2022, § 4.2.1.2 Table 3	From the machine "lower" starting conditions - i.e. - the machine was brought to the lower operating conditions declared by the manufacturer for the heating mode- i.e. T _{air} =-25.21°C, T _{out water} 60.03°C, Flow rate 1.28m ³ /h. Once these conditions were obtained, the machine was let operate for over 1 hour in automode. During the test, no warning or alarm were showed. No damage was recorded on the machine during and after the test.	Passed
TEST 3	09-06-2023	SHUTTING OFF WATER FLOW	EN14511-4:2022, § 4.5	The water flow rate was shutted off through manual and automatic valves of the test rig. The machine switched off and only the flow switch Protection appeared on the user interface of indoor unit. Perform error reset operation , once the water flow rate was restored, the machine restarted automatically and worked for 30 minutes normally. No damage was recorded on the machine during and after the test.	Passed
TEST 4	09-06-2023	SHUTTING OFF AIR FLOW	EN14511-4:2022, § 4.5	The air flow rate was shutted off through a plastic sheet and a panel. The machine never turned off. It continued to operate with continuous frosting and defrosting cycles. After more than half an hour, the air flow rate was restored and the machine started to operate normally. During the test, no warning or alarm were showed. No damage was recorded on the machine during and after the test.	Passed
TEST 5	09-06-2023	COMPLETE POWER SUPPLY FAILURE	EN14511-4:2022, § 4.6	The power supply was cut off for about 10 seconds. The unit restarted automatically within about 3 minutes after the power supply was reactivated.	Passed




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Appendix II Marking plate

Nameplate	
Model: <u>SWD WP10 R290</u>	
DC Inverter Heat Pump	
Model	SWD WP10 R290
Power supply	380-415V/3N~/50 Hz
*Heating Capacity Range	5.9~14.8 kW
*Heating input Range	1.13~3.83 kW
**Cooling capacity Range	4.3~10.8 kW
**Cooling input power	1.39~3.99 kW
***Heating capacity Range (DWH)	6.6~13.2 kW
***Heating input Range (DWH)	1.41~3.73 kW
Rated Current	3.72 A
Rated Power Input	2.08 kW
Refrigerant 	R290/1150 g
Max operating pressure (High side)	3.2 MPa
Max operating pressure (Low side)	0.8 MPa
Maximum allowable pressure	3.2 MPa
Climate type	Low Temperature
Operating range	-25~43°C
Water Flow	2.55m ³ /h
Diameter of pipe	DN25
IP Grade	IPX4
Electric shock rating	I
Body size (W×D×H)	1080×480×1060 mm
Net weight/Gross weight	138/150 kg
Production date and code	See unit barcode
Sonnenwärme Direkt GmbH Dammholmer Str. 3, 24873 Havetoft, Germany	
Remark: *Heating working condition: Inlet water temperature 30°C, Outlet water temperature 35°C Dry bulb temperature 7°C, Wet bulb temperature 6°C. **Cooling working condition: Inlet water temperature 12°C, Outlet water temperature 7°C Dry bulb temperature 35°C, Wet bulb temperature 24°C. ***DHW working condition: Inlet water temperature 15°C, Outlet water temperature 55°C Dry bulb temperature 7°C, Wet bulb temperature 6°C.	
 	

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Appendix II Marking plate

Nameplate	
Model: <u>SWD WP15 R290</u>	
DC Inverter Heat Pump	
Model	SWD WP15 R290
Power supply	380-415V/3N~/50 Hz
*Heating Capacity Range	8.8~22.0 kW
*Heating input Range	1.68~5.77 kW
**Cooling capacity Range	6.2~15.3 kW
**Cooling input power	1.99~5.60 kW
***Heating capacity Range (DWH)	7.8~17.6 kW
***Heating input Range (DWH)	1.67~5.01 kW
Rated Current	5.01 A
Rated Power Input	2.80 kW
Refrigerant	 R290/1400 g
Max operating pressure (High side)	3.2 MPa
Max operating pressure (Low side)	0.8 MPa
Maximum allowable pressure	3.2 MPa
Climate type	Low Temperature
Operating range	-25~43°C
Water Flow	3.78m ³ /h
Diameter of pipe	DN25
IP Grade	IPX4
Electric shock rating	I
Body size (W×D×H)	1080×480×1372 mm
Net weight/Gross weight	170/185 kg
Production date and code	See unit barcode
Sonnenwärme Direkt GmbH Dammholmer Str. 3, 24873 Havetoft, Germany	
Remark: *Heating working condition: Inlet water temperature 30°C, Outlet water temperature 35°C Dry bulb temperature 7°C, Wet bulb temperature 6°C. **Cooling working condition: Inlet water temperature 12°C, Outlet water temperature 7°C Dry bulb temperature 35°C, Wet bulb temperature 24°C. ***DHW working condition: Inlet water temperature 15°C, Outlet water temperature 55°C Dry bulb temperature 7°C, Wet bulb temperature 6°C.	
 	

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Appendix III photo documentaiton

Details of:	Overall view for SWD WP10 R290
View:	
<input type="checkbox"/> General	
<input type="checkbox"/> Front	
<input type="checkbox"/> Rear	
<input type="checkbox"/> Right	
<input type="checkbox"/> Left	
<input type="checkbox"/> Top	
<input type="checkbox"/> Bottom	

Details of:	Compressor for SWD WP10 R290
View:	
<input type="checkbox"/> General	
<input type="checkbox"/> Front	
<input type="checkbox"/> Rear	
<input type="checkbox"/> Right	
<input type="checkbox"/> Left	
<input type="checkbox"/> Top	
<input type="checkbox"/> Bottom	

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Appendix III photo documentaiton

Details of:	Fan Motor for SWD WP10 R290
View:	 <p>RD200HC 空气调节器用塑封无刷直流电动机 (FAN MOTOR FOR AIR CONDITIONER) DC310V 200W 0.90A E级(CL) 8极(P) 850r/min 转向 (ROT.) →</p> <p>蓝 BU FG 红 RD Vm 白 WH Vcc 黄 YE Vsp 黑 BK GND</p> <p>江门市力丰电机有限公司 (Jiangmen LT Motor Co., Ltd.)</p> <p>Q.C.Pass RoHS 000287 20230331</p>
<input type="checkbox"/> General	
<input type="checkbox"/> Front	
<input type="checkbox"/> Rear	
<input type="checkbox"/> Right	
<input type="checkbox"/> Left	
<input type="checkbox"/> Top	
<input type="checkbox"/> Bottom	

Details of:	Main Control Board for SWD WP10 R290
View:	
<input type="checkbox"/> General	
<input type="checkbox"/> Front	
<input type="checkbox"/> Rear	
<input type="checkbox"/> Right	
<input type="checkbox"/> Left	
<input type="checkbox"/> Top	
<input type="checkbox"/> Bottom	

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Appendix III photo documentaiton

Details of:	Water Pump for SWD WP10 R290
View:	
<input type="checkbox"/> General	
<input type="checkbox"/> Front	
<input type="checkbox"/> Rear	
<input type="checkbox"/> Right	
<input type="checkbox"/> Left	
<input type="checkbox"/> Top	
<input type="checkbox"/> Bottom	

Details of:	Overall view for SWD WP15 R290
View:	
<input type="checkbox"/> General	
<input type="checkbox"/> Front	
<input type="checkbox"/> Rear	
<input type="checkbox"/> Right	
<input type="checkbox"/> Left	
<input type="checkbox"/> Top	
<input type="checkbox"/> Bottom	

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Appendix III photo documentaiton


Details of:	Compressor for SWD WP15 R290
View:	
<input type="checkbox"/> General	
<input type="checkbox"/> Front	
<input type="checkbox"/> Rear	
<input type="checkbox"/> Right	
<input type="checkbox"/> Left	
<input type="checkbox"/> Top	
<input type="checkbox"/> Bottom	

Details of:	Fan Motor for SWD WP15 R290
View:	
<input type="checkbox"/> General	
<input type="checkbox"/> Front	
<input type="checkbox"/> Rear	
<input type="checkbox"/> Right	
<input type="checkbox"/> Left	
<input type="checkbox"/> Top	
<input type="checkbox"/> Bottom	

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Appendix III photo documentaiton

Details of:	Main Control Board for SWD WP15 R290
View:	
<input type="checkbox"/> General	
<input type="checkbox"/> Front	
<input type="checkbox"/> Rear	
<input type="checkbox"/> Right	
<input type="checkbox"/> Left	
<input type="checkbox"/> Top	
<input type="checkbox"/> Bottom	

Details of:	Water Pump for SWD WP15 R290
View:	
<input type="checkbox"/> General	
<input type="checkbox"/> Front	
<input type="checkbox"/> Rear	
<input type="checkbox"/> Right	
<input type="checkbox"/> Left	
<input type="checkbox"/> Top	
<input type="checkbox"/> Bottom	

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Appendix IV Construction data form

Model: SWD WP10 R290		
Part		Technical data
1. Compressor		
	Manufacture:	Shanghai Highly Electrical Appliance Co., Ltd.
	Type:	WHP13300PSDPC8FQ
	Rated capacity:	2860W
	Serial-number:	W6PN5H06JKMJ
	Specification:	DC143.5V; 900-6600r/min; R290
2. Condenser		
	Manufacture:	Ningbo Hrale Plate Heat Exchanger Co., Ltd.
	Type:	B3-68-34-4.5
	Heat exchanger:	Plate heat exchanger
	Dimension(mm):	119(L)mmX526(H)mmX89.5(D)mm
3. Evaporator		
	Manufacture:	Guangzhou AOTAI Refrigeration Equipment Co.,LTD
	Type:	801002-1154
	Heat exchanger:	Finned heat exchanger
	Dimension(mm):	764*345*990*Φ7.94*3
4. Fan motor		
	Manufacture:	Jiangmen LT Motor Co., Ltd
	Type:	RD200HC
	Fan type:	3 blade
	Specification:	DC310V; 200W
5. Main control board		
	Manufacture:	Guangdong Chico Electronic Inc.
	Type:	PW58341
	Specification:	380V; 50Hz
6. Water pump		
	Manufacture:	SHIMGE PUMP INDUSTRY(JIANGSU)CO.,LTD.
	Type:	APM25-9-130 PWM1
	Specification:	230V; 50/60Hz; 4-95W

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Appendix IV Construction data form

Model: SWD WP15 R290

Part	Technical data	
1. Compressor		
	Manufacture:	Shanghai Highly Electrical Appliance Co., Ltd.
	Type:	WHP32900VSKTQ9JK
	Rated capacity:	4330W
	Serial-number:	W82N1E02QNL8
	Specification:	DC221V; 900-6600r/min; R290
2. Condenser		
	Manufacture:	Danfoss (Jiaxing) Plate Heat Exchanger Co., LTD
	Type:	C39L-EZ-54
	Heat exchanger:	Plate heat exchanger
	Dimension(mm):	118(L)mmX332(H)mmX74(D)mm
3. Evaporator		
	Manufacture:	Guangzhou AOTAI Refrigeration Equipment Co.,LTD
	Type:	801002-1439
	Heat exchanger:	Finned heat exchanger
	Dimension(mm):	760*265*1300*Φ7.94*2
4. Fan motor		
	Manufacture:	Jiangmen LT Motor Co., Ltd
	Type:	RD150HA
	Fan type:	3 blade
	Specification:	DC310V; 150W
5. Main control board		
	Manufacture:	Guangdong Chico Electronic Inc.
	Type:	PW58339
	Specification:	380V; 50Hz
6. Water pump		
	Manufacture:	SHIMGE PUMP INDUSTRY(JIANGSU)CO.,LTD.
	Type:	APF25-12-130E FPWM1
	Specification:	230V; 50/60Hz; 10-180W

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Appendix V Equipment List

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