Product Service

Technical Report No.: 64.181.21.01929.01 Rev.00

Date: 2021-05-13

Client:	Name:	FOSHAN SUOHER ELECTRICAL APPLIANCE CO., LTD
	Address:	Building 8, No.2 ,Nanyi Road, Guangzhu Road, Daliang street, shunde, Foshan, Guangdong, China
	Contact person:	QI LI HUA
Manufacturing place:	Manufacturer's name:	FOSHAN SUOHER ELECTRICAL APPLIANCE CO., LTD
	Address:	Building 8, No.2 ,Nanyi Road, Guangzhu Road, Daliang street, shunde, Foshan, Guangdong, China
	Factory's name:	FOSHAN SUOHER ELECTRICAL APPLIANCE CO., LTD
	Address:	Building 8, No.2 ,Nanyi Road, Guangzhu Road, Daliang street, shunde, Foshan, Guangdong, China
Test subject:	Product:	DC Inverter Air to Water Heat Pump
	Type:	SHAW-11DM1, SHAW-11DS1
	Trade name:	-
Test specification:	☑	EN 14825:2018
	☑	(EU) No 813/2013
Purpose of examination:	Test according to the test specification	
	☑	EU 2016/2282:2016-11-30

Test result: The test results show that the presented product is in compliance with the specified requirements

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1 Description of the test subject

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 :	SHAW-11DM1, SHAW-11DS1
Rated Voltage (V) :	220-240V~
Rated Frequency (Hz) :	50
Rated Power (W) :	4800
Rated Current (A) :	22.00
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 (g) :	R410A /2200g
Declared parameters :	☑ Average ☐ Warmer ☐ Colder
Sound power level dB(A) :	N/A
Series No :	P210305082

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2 Order

2.1 Date of Purchase Order, Customer's Reference

2021-04-15, QI LI HUA

2.2 Receipt of Test Sample, Condition, Location

2021-04-15

For Energy test:

GZ-Lans Experimental Technology Co., Ltd. Laboratory

Address: No.16, Juncheng Road, Huangpu district,Guangzhou, China

2.3 Date of Testing

2021-04-16 to 2021-04-22

2.4 Location of Testing

Same as 2.2

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

N/A

3 Test Results

3.1 Positive Test Results

See Appendix I

4 Remark

N/A

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

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

5 Documentation

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

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6 Summary

1) The appliance is Intelligent Inverter Heat Pump, including a whole compression type refrigerant circuit to heat water in another circuit. The appliance was for cooling and heating water function, this report only for heating capacity test.
2) The main power is supplied by a 3-pole supply cable not with plug which not supply by manufactory.
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 14825:2018.
5) The model SHAW-11DM1 is same as SHAW-11DS1 except for model's name and appearance difference. And the test are carried out at models SHAW-11DM1.

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Tested by: William Liang, Project Handler

printed name, function & signature

Approved by: Tony Xie, Designated Reviewer

printed name, function & signature

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Appendix I Test results

Table 1.	Heating mode(Low temperature application):							P
Model	SHAW-11DM1							
Product type	Air to Water	**Heating season**	☑	Average	☐	Warmer	☐	Colder

1. Test conditions:

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

Remark: a) With the water flow rate as determined at the standard rating conditions given in EN14511-2 at 30/35 conditions.

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	4:00:00	4:00:00	2:00:00	2:00:00	4:00:00	4:00:00
The heat pump defrosts	--	Yes	Yes	No	No	Yes	Yes
Complete Cycles	--	3	1	0	0	2	3
Barometric pressure	kPa	101.02	101.02	101.02	101.02	101.02	101.02
Voltage	V	230.3	220.4	220.0	219.8	230.3	230.3
Current input of the unit	A	12.49	4.86	4.36	3.77	13.78	12.49
Power input of the unit	kW	2.428	0.874	0.857	0.737	2.906	2.428
Test conditions **indoor** unit							
Inlet Water temperature, DB	°C	29.95	27.65	24.31	20.78	31.41	29.95
Outlet Water temperature, DB	°C	33.44	29.80	27.04	24.00	34.92	33.44

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Appendix I Test results

Test conditions **outdoor** unit							
Air **inlet** temperature, DB	°C	-6.71	2.03	7.01	12.11	-9.73	-6.71
Air **inlet** temperature, WB	°C	-7.81	1.02	6.00	11.01	-10.68	-7.81
Summary of the results							
Total heating capacity	kW	6.509	4.024	5.105	5.999	6.546	6.509
Effective power input	kW	2.450	0.896	0.879	0.760	2.928	2.450
Coefficient of performance (COP)	--	2.66	4.49	5.81	7.90	2.24	2.66
Compressor frequency	Hz	75	30	30	30	80	75
Water flow	m³/h	1.60	1.60	1.60	1.60	1.60	1.60
Remark: * In part condition, outlet temperature data is recorded by a full average complete cycle's data.							

3.Calculation/conclusion for SCOP(Average):

Tdesignh(°C)	-10	Tbiv(°C)	-7
Pdesignh(kW)	7.358	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	7.358	6.546	2.24	0.00	1.00	2.24
F	6.509	6.509	2.66	0.00	1.00	2.66
A	6.509	6.509	2.66	0.00	1.00	2.66
B	3.962	4.024	4.49	0.00	0.98	4.49
C	2.547	5.105	5.81	0.99	0.50	5.75
D	1.132	5.999	7.90	0.99	0.19	7.57
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	0.047
Standby mode [P_{SB}]	kW	0.047
Crankcase heater [P_{CK}]	kW	0.000
Off mode [P_{OFF}]	kW	0.047

Conclusions:	Unit	Value
SCOPon:	kWh/kWh	4.49
SCOP:	kWh/kWh	4.48
Q_H:	kWh/year	15202
Q_{HE}:	kWh/year	3391
$\eta_{s,h}$	%	176.3
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	SHAW-11DM1							
Product type	Air to Water	**Heating season**	☑	Average	☐	Warmer	☐	Colder

1. Test conditions:

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

Remark: a) With the water flow rate as determined at the standard rating conditions given in EN14511-2 at 47/55 conditions.

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	4:00:00	2:00:00	2:00:00	2:00:00	4:00:00	4:00:00
The heat pump defrosts	--	Yes	No	No	No	Yes	Yes
Complete Cycles	--	3	0	0	0	1	3
Barometric pressure	kPa	101.02	101.02	101.02	101.02	101.02	101.02
Voltage	V	230.3	229.2	229.2	229.2	230.4	230.3
Current input of the unit	A	16.56	6.02	5.00	4.25	16.90	16.56
Power input of the unit	kW	3.715	1.274	1.045	0.876	3.795	3.715
Test conditions **indoor** unit							
Inlet Water temperature, DB	°C	44.94	38.26	31.63	25.00	48.58	44.94
Outlet Water temperature, DB	°C	50.99	42.02	36.02	30.06	54.09	50.99

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Appendix I Test results

Test conditions **outdoor** unit							
Air **inlet** temperature, DB	°C	-6.55	2.01	7.01	12.17	-9.77	-6.55
Air **inlet** temperature, WB	°C	-7.81	1.01	6.00	11.03	-10.62	-7.81
Summary of the results							
Total heating capacity	kW	7.041	4.374	5.109	5.891	6.410	7.041
Effective power input	kW	3.720	1.279	1.049	0.880	3.800	3.720
Coefficient of performance (COP)	--	1.89	3.42	4.87	6.69	1.69	1.89
Compressor frequency	Hz	80	30	30	30	80	80
Water flow	m³/h	1.00	1.00	1.00	1.00	1.00	1.00
Remark: * In part condition, outlet temperature data is recorded by a full average complete cycle's data.							

3.Calculation/conclusion for SCOP(Average):			
Tdesignh(°C)	-10	Tbiv(°C)	-7
Pdesignh(kW)	7.959	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	7.959	6.410	1.69	0.00	1.00	1.69
F	7.041	7.041	1.89	0.00	1.00	1.89
A	7.041	7.041	1.89	0.00	1.00	1.89
B	4.286	4.374	3.42	0.00	0.98	3.42
C	2.755	5.109	4.87	0.99	0.54	4.83
D	1.224	5.891	6.69	0.99	0.21	6.45
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	0.047
Standby mode [P_{SB}]	kW	0.047
Crankcase heater [P_{CK}]	kW	0.000
Off mode [P_{OFF}]	kW	0.047

Conclusions:	Unit	Value
SCOPon:	kWh/kWh	3.48
SCOP:	kWh/kWh	3.47
Q_H:	kWh/year	16443
Q_{HE}:	kWh/year	4733
$\eta_{s,h}$	%	136.0
Seasonal space heating energy efficiency classes: (According (EU) No 811/2013 Table 1)	--	A++

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Appendix II Marking plate

Nameplate

Model: SHAW-11DM1

DC Inverter Air to Water Heat Pump	
Model	SHAW-11DM1
Power Supply	220 - 240V~/50Hz
WaterProof Level	IPX4
Electric Shock Proof Grade	I
Heating Capacity (A7/W35)	4.5/11.5kW
Heating Power Input (A7)	1.25/2.92kW
Cooling Capacity (A35/W7)	4.4/10.8kW
Cooling Power Input (A35)	1.59/3.6kW
Water Flow	2.0m^3/h
Water connection	DN25
Noise Level	49dB(A)
Operation pressure(low side)	1.2MPa
Operation pressure(high side)	4.0MPa
Maximum allowable pressure	4.2MPa
Rated Power Input	4.8kW
Rated Current Input	22A
Refigerant/Weight	R410A/2200g
Net Weight	110kg
Net size(W*D*H)	1110*460*850mm
Foshan Suoher Electrical Appliance Co., Ltd **Building 8, No.2 ,Nanyi Road, Guangzhu Road, Daliang street, shunde, Foshan, Guangdong, China**	CE

Remark: The model SHAW-11DM1 is same as SHAW-11DS1 except for model's name and appearance difference.

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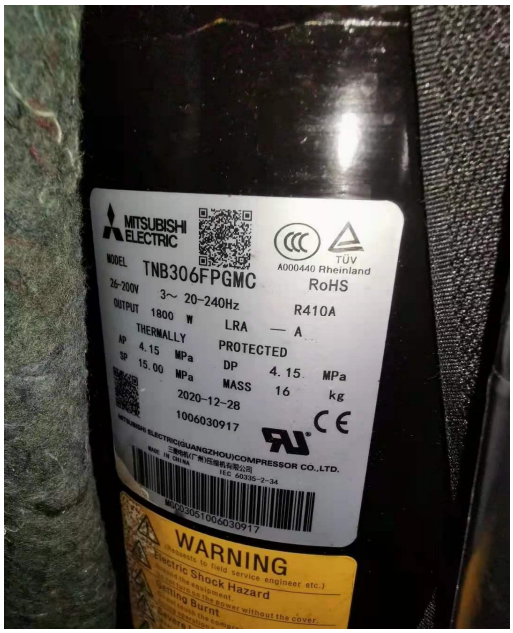
Appendix III photo documentaiton

Details of:	Overall view for SHAW-11DM1
View: ☐ General ☐ Front ☐ Rear ☐ Right ☐ Left ☐ Top ☐ Bottom	

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

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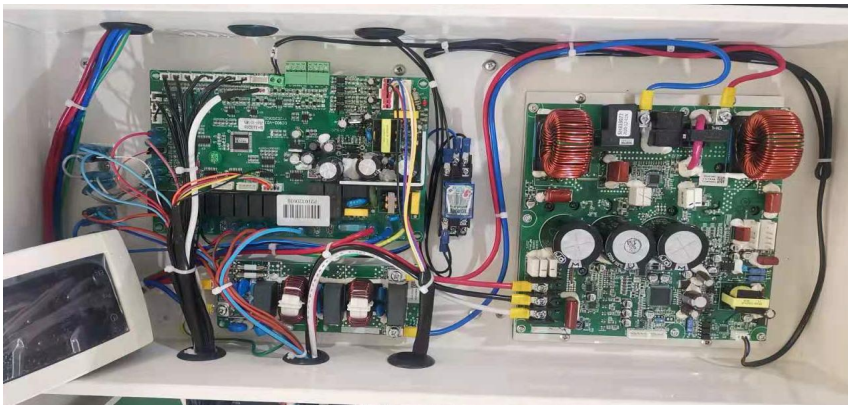
Appendix III photo documentaiton

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

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

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Appendix III photo documentaiton

Details of:	Overall view for SHAW--11DS1
View: ☐ General ☐ Front ☐ Rear ☐ Right ☐ Left ☐ Top ☐ Bottom	

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Appendix IV Construction data form

Model: SHAW-11DM1, SHAW-11DS1		
Part		**Technical data**
1. Compressor		
	Manufacture:	MITSUBISHI ELECTRIC (GUANGZHOU) COMPRESSOR CO., LTD.
	Type:	TNB306FPGMC
	Rated capacity:	1800W; R410A
	Serial-number:	MGC03051006030917
2. Condenser		
	Manufacture:	SWEP Technology (Suzhou) Co., Ltd.
	Type:	F85H*30/1P-NSC-M 9.65+16+2*28.75
	Heat exchanger:	Plate heat exchanger
	Dimension (mm):	119mm*526mm*65mm
3. Evaporator		
	Manufacture:	Foshan Hanlin Refrigeration Equipment Co., Ltd
	Type:	310204018
	Heat exchanger:	Finned heat exchanger
	Dimension (mm):	1026mm*44mm*800mm
4. Fan motor		
	Manufacture:	Jiangmen LT Motor Co., Ltd.
	Type:	RD80HA4
	Fan type:	4 blade
5. Main control board		
	Manufacture:	Guangdong Chico Electronic Inc.
	Type:	SH333046
	Specification:	220-240V; 50Hz

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Appendix V Equipment List

No.	Type	Manufacture	Model	Equipment ID	Calibration Due Date
1	R&A performance measuring system	GEI	20kW	-	2021-08-02
2	Temperature and humidity meter	VAISALA	HMD42	H5110021	2021-08-02
3	Platinum resistance	YINUO	Pt100	7430F	2021-05-21
4	Platinum resistance	YINUO	Pt100	7434F	2021-05-21
5	Flowmeter	YOKOGAWA	AXF015G	S5M201965	2021-05-21
6	Flowmeter	YOKOGAWA	AXF040G	S5M805005	2021-05-21
7	Pressure transmitter	MICRO	MPM489	240502	2021-08-03
8	Pressure transmitter	MICRO	MPM489	240503	2021-08-03
9	Water pressure difference transmitter	MICRO	MDM3051	291459	2021-08-03
10	AC source Supply	YANGHONG	YF-3600	-	2022-01-01
11	Water pressure difference transmitter	MICRO	MDM3051	291459	2021-08-03
12	AC source Supply	YANGHONG	YF-3600	-	2022-01-01
13	Temperature and humidity meter	H5110021	HMD42	VAISALA	2021-08-03

-- End of Report --

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