

Technical Report No.: 64.181.22.01872.01 Rev.00

Date: 2022-07-09

Client: Report holder's name: ThermoFLUX d.o.o

Report holder's Address: Bage 3, 70101 Jajce, Bosnia and Herzegovina

Contact person of report holder: Amel Kopic

Manufacturer's name: ThermoFLUX d.o.o

Manufacturer's address: Bage 3, 70101 Jajce, Bosnia and Herzegovina

Test object: Product: DC Inverter Air Source Heat Pumps
Model: TF13DC

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 above listed test specifications.

Any use for advertising purposes must be granted in writing. This technical report may only be quoted in full. This report is the result of a single examination of the object in question. It does not imply a general statement regarding the quality of products from regular production. For further details please see testing and certification regulation, chapter A-3.4.

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 :	TF13DC
Rated Voltage (V) :	220-240V~
Rated Frequency (Hz) :	50
Rated Power (W) :	1330
Rated Current (A) :	6.20
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 (g) :	R410A /2200g
Declared parameters :	<input checked="" type="checkbox"/> Average <input type="checkbox"/> Warmer <input type="checkbox"/> Colder
Sound power level dB(A) :	N/A
Series No :	KRZH11A10400400081

2 Order

2.1 Date of Purchase Order, Customer's Reference

2020-11-09, 2021-11-10 ThermoFLUX d.o.o

2.2 Test Sample(s)

• Reception date(s): 2020-11-11

• Location(s) of reception:

For Energy test:

GZ-Lans Experimental Technology Co., Ltd. Laboratory

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

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

2.3 Date(s) of Testing

2020-11-13 to 2020-11-21

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

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 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 Summary

- 1) The appliance is DC Inverter Type Air To Water Unit , including a whole compression type refrigerant circuit to heat water in another circuit. The appliance was for cooling and heating water function, this report only for heating capacity test.
- 2) The main power is supplied by a 3-pole supply cord connecting to fixed wiring.
- 3) Water enthalpy method was adopted in this report.
- 4) Standby mode power, off mode power and thermostat-off mode power were tested according to clause 12 of standard EN 14825:2018.
- 5) This test report 64.181.22.01872.01 Rev.00, dated 2022-07-09 is base on original test report 64.181.20.05247.01 Rev.00, dated 2020-12-10 to include the following changes and/or additions:
 - a) Changing report holder name, address of report holder, manufacture name, address of manufacture, trade name, model name and exterior.
 - 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 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	TF13DC						
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		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	$(T_{bivalent}-16)/(T_{designh}-16)$				Tbiv	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.							
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	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	--	1	0	0	0	2	1
Barometric pressure	kPa	101.02	101.02	101.02	101.02	101.02	101.02
Voltage	V	221.2	232.0	228.4	231.3	226.1	221.2
Current input of the unit	A	12.93	4.76	4.12	377.00	12.39	12.93
Power input of the unit	kW	2.821	1.077	0.935	0.816	2.759	2.821
Test conditions indoor unit							
Inlet Water temperature, DB	°C	28.24	26.37	22.72	18.61	29.05	28.24
Outlet Water temperature, DB	°C	33.93	29.97	26.97	23.96	34.12*	33.93

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Appendix I Test results

Test conditions outdoor unit							
Air inlet temperature, DB	°C	-6.91	2.01	7.01	12.00	-9.75	-6.91
Air inlet temperature, WB	°C	-7.91	1.00	6.00	11.00	-10.73	-7.91
Summary of the results							
Total heating capacity	kW	7.997	5.020	5.871	7.337	7.116	7.997
Effective power input	kW	2.848	1.104	0.962	0.843	2.786	2.848
Coefficient of performance (COP)	--	2.81	4.55	6.10	8.71	2.55	2.81
Compressor frequency	Hz	75	30	30	30	75	75
Water flow	m³/h	1.21	1.21	1.21	1.21	1.21	1.21
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)	9.040		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	9.040	7.116	2.55	0.00	1.00	2.55	
F	7.997	7.997	2.81	0.00	1.00	2.81	
A	7.997	7.997	2.81	0.00	1.00	2.81	
B	4.868	5.020	4.55	0.00	0.97	4.55	
C	3.129	5.871	6.10	0.99	0.53	6.05	
D	1.391	7.337	8.71	0.99	0.19	8.35	
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	0.009
Standby mode [P_{SB}]	kW	0.009
Crankcase heater [P_{CK}]	kW	0.039
Off mode [P_{OFF}]	kW	0.009

Conclusions:	Unit	Value
SCOP _{on} :	kWh/kWh	4.64
SCOP:	kWh/kWh	4.63
Q_H :	kWh/year	18677
Q_{HE} :	kWh/year	4030
$\eta_{s,h}$	%	182.4
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	TF13DC							
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.								
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	--	1	0	0	0	1	1	
Barometric pressure	kPa	101.02	101.02	101.02	101.02	101.02	101.02	
Voltage	V	225.2	231.9	232.8	231.6	228.4	225.2	
Current input of the unit	A	16.28	5.93	4.98	4.09	16.50	16.28	
Power input of the unit	kW	3.626	1.319	1.106	0.894	3.730	3.626	
Test conditions indoor unit								
Inlet Water temperature, DB	°C	44.28	37.93	31.07	24.38	47.70	44.28	
Outlet Water temperature, DB	°C	51.07*	42.00	35.94	30.07	54.2*	51.07*	

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Appendix I Test results

Test conditions outdoor unit							
Air inlet temperature, DB	°C	-6.70	2.00	7.01	12.01	-9.92	-6.70
Air inlet temperature, WB	°C	-7.69	1.00	6.00	11.01	-10.89	-7.69
Summary of the results							
Total heating capacity	kW	7.895	4.627	5.578	6.465	7.492	7.895
Effective power input	kW	3.644	1.338	1.124	0.912	3.748	3.644
Coefficient of performance (COP)	--	2.17	3.46	4.96	7.09	2.00	2.17
Compressor frequency	Hz	75	30	30	30	75	75
Water flow	m³/h	0.99	0.99	0.99	0.99	0.99	0.99
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)	8.925		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	8.925	7.492	2.00	0.00	1.00	2.00	
F	7.895	7.895	2.17	0.00	1.00	2.17	
A	7.895	7.895	2.17	0.00	1.00	2.17	
B	4.806	4.627	3.46	0.00	1.00	3.46	
C	3.089	5.578	4.96	0.99	0.55	4.92	
D	1.373	6.465	7.09	0.99	0.21	6.84	
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	0.009
Standby mode [P_{SB}]	kW	0.009
Crankcase heater [P_{CK}]	kW	0.039
Off mode [P_{OFF}]	kW	0.009


Conclusions:	Unit	Value
SCOP _{on} :	kWh/kWh	3.54
SCOP:	kWh/kWh	3.53
Q_H :	kWh/year	18438
Q_{HE} :	kWh/year	5219
$\eta_{s,h}$	%	138.3
Seasonal space heating energy efficiency classes: (According (EU) No 811/2013 Table 1)	--	A++

Appendix II Marking plate

Nameplate	
Model: <u>TF13DC</u>	
  	
DC Inverter Air Source Heat Pumps	
Model	TF13DC
Heating Capacity Min./Max.	5.75/12.5kW
Heating Input Power Min./Max.	1.03/2.81kW
Cooling Capacity Min./Max.	4.05/8.81kW
Cooling Input Power Min./Max.	1.11/3.51kW
Power Supply	220-240V~/50Hz
Shock Proof Grade	I
WaterProof Level	IPX4
Rated Input Power	1.33kW
Rated Input Current	6.2A
Max. Input Power	4.1kW
Max. Input Current	13.4A
Max. Water Outlet Temperature	55°C
Water Flow	2.1m ³ /h
Refrigerant/Weight	R410A/2200g
Water Pressure Drop	22kPa
Water Pipe Connection	1 inch
Max Water Pressure	1.0MPa
Net Weight	98kg
Date	See bar code
NO.	See bar code
ThermoFLUX d.o.o Bage 3, 70101 Jajce, Bosnia and Herzegovina www.thermoflux.ba	

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Appendix III photo documentaiton


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

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

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Appendix III photo documentaiton

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

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

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Appendix IV Construction data form

Model: TF13DC		
Part		Technical data
1. Compressor		
	Manufacture:	Panasonic Wanbao Appliances Compressor (Guangzhou) Co., Ltd.
	Type:	5VD330ZAA21
	Rated capacity:	3185W; R410A
	Serial-number:	N/A
2. Condenser		
	Manufacture:	East -Alliance Thermal Equipment
	Type:	EATB61-D-30-2M-2L
	Heat exchanger:	Plate heat exchanger
	Dimension (mm):	542(L)mmX126(H)mmX83(D)mm
3. Evaporator		
	Manufacture:	Guangzhou Aotai Refrigeration Equipment Co., Ltd.
	Type:	A104004-CP-01
	Heat exchanger:	Finned-coil heat exchanger
	Dimension (mm):	660(L)mmX910(H)mmX345(D)mm
4. Fan motor		
	Manufacture:	Wolong Electric Group Co., Ltd
	Type:	ZWB278D04A
	Fan type:	3 blade
5. Main control board		
	Manufacture:	CAREL
	Type:	UP3CON0S00
	Specification:	220-240V; 50Hz

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	-	2021-01-01
11	Water pressure difference transmitter	MICRO	MDM3051	291459	2021-08-03
12	AC source Supply	YANGHONG	YF-3600	-	2021-01-01
13	Temperature and humidity meter	H5110021	HMD42	VAISALA	2021-08-03

-- End of Report --