Samsung Heat Pump Controls

Serial No: **0TYXPAFR600100K**

1: Service Mode

Service Timer

a) Service Call Number	**not set**
b) Last Inspected	**01-08-2022**
c) Installation Date	**01-08-2022**

Quiet Mode

Automatic-Time

a) Enable *

10 pm … 6am

b) Disable

Indoor Zone Option	**Options (* selected)**
Cool/Heat	**a) Heat (Only)**
	b) Cool and Heat *

Standard Temperature	**a) Water Outlet**	*****

The Standard Temperature selects the temperature sensor controlling the Heat Pump.

The Heat Pump can be controlled by

a)The Water Temperature output by the heat Pump, Essential for Weather compensation.

b) The Room Temperature of the room where the Heat Pump controller is situated.

c) The Temperature of an external Sensor.

The Heat Pump can operate in two modes.

a) Weather Compensation.

b) Room Temperature control.

Weather Compensation requires that the Standard Temperature be set to the Water Outlet option.

Main/Sub	**a) Main (only)** **b) Sub**	*****
Temperature Units	**+/- 0.1 C**	*****
Temperature Sensor	**a) External**	
	b) Wired Remote	*****

When Weather compensation is NOT required the Heat Pump can be controlled by either

a) The Indoor sensor located at the rear of the control panel.

b) An External sensor located in another room.
If NO external sensor is connected and the External option selected the Heat pump will produce the error E121.

The Temperature Sensor option selects the Temperature displayed on the front screen.

Since NO External sensor is used the Temperature Sensor option should be set to Wired Remote.
The Wired remote sensor is located behind the Front panel of the control screen.

Room Temperature Calibration @ 25 C
Calibrated @ 25 C

Indoor Zone	*Indoor Zone Status*
Central:	*OFF/ON*

Normal Power	*OFF/ON*
Mode	*Heat/Cool and Heat*
DHW Power	*OFF/ON*
Water Pump	*OFF/ON*
BUH:	*OFF/ON*
Flow Sensor	*~14 →20 Litres per minute*
Inverter Pump:	*0 →100%*
DHW	*Economic*
Water Pump:	*OFF/ON*
BUH:	*OFF/ON*
BSH:	*OFF/ON*
Flow Sensor	*~14 → 20 Lpm*
EEV Step	*0 Step*
Thermostat 1:	*OFF*
Thermostat 2:	*ON*
DHW Thermostat :	*OFF/ON*

Connection Information

Number of Connections	**1 ea**
View Master Indoor Unit	*200000*

Master Indoor Zone Information
Serial No: 0TYXPAFR600100K

Device Information

a) Micom	*DB91-02150A*
b) Program Version	*2020.10.27*
c) Touch Code	*DB91-02076A*
d) Touch code Program version	*2018-11-07*

e) Graphical Image	*DB91-02 077D*
f) Graph Image Program Version	*2020.10.28*

Reset All Service Modifications

Power Master Reset

ODU K2 Reset

Self Test Mode

Self Test Display	
Water Pump	***On/OFF***
Immerser	***On/OFF***
Hot Water Valve	***On/OFF***
	Off = Open
Radiator Valve	***On/OFF***
	On =Open

Backup Boiler	*On/OFF*
Zone 2 Valve	*On/OFF*

Indoor Unit Option

Address

Main Address	**2000000**
RMC Address	**2000000**

Field Setting Values

Remote Controller

101	**Water Out Temp for Cooling** **Max 21 C** **Min 16 C**
102	**Room Temperature for Cooling** **Max 28 C** **Min 18 C**

103	**Water out Temperature for Heating**	*****
	Max 55 C	
	Min 16 C	
104	**Room Temperature for Heating**	*****
	Max 23 C	
	Min 16 C	
105	**DHW Tank Temperature**	*****
	Max 55 C	
	Min 40 C	

Serial No: 0TYXPAFR600100K

*** indicates selected option**

Water Laws

The Water Laws provide a straight line graph of the FCU Output Water Temperature against the outside ambient Temperature.

Each Water law graph is defined by the Water Temperature required at an Ambient outdoor Temperature.

First Water Law ,WL1

e.g. 201* Low is paired with 202* Low

201* High is paired with 202* High

Second Water Law WL2
e.g. 201* Low is paired with 203* Low
201* High is paired with 203* High

Here ONLY Water Law 2 , WL2-FCU is used

Heating Mode

201*	**Outdoor Air Temp Water Law**	
	Low 15 C	*****
	High -5 C	*****
202*	Water Out Temp for Water Law 1 Heat	
	Low 30 C	
	High 40 C	
203*	**Water Out Temp for Water Law 2 Heat**	*****
	Low 30 C	*****
	High 40 C	*****

Auto Mode

use WL2 for FCU

2041	**Heat Water Law for Auto mode**	
	a) WL2-FCU	
	b) WL1-Floor	*****

Cooling Mode

Cooling use WL2 for FCU

2081	**Cooling Water Law Auto Mode**	

a) WL2-FCU *****
b) WL1-Floor

205* **Ambient Temp for Water Law** *****
Low 40 C
High 30 C

206* Water Out Temp For WL1 Cooling
Low 18 C
High 25 C

207* **Water Out Temp for WL2 Cooling**
Low 5 C *****
High 18 C *****

Calling for Compressor Run

No External Thermostat used

2091 **External Thermostat Application #1**

Options:
0: not use. Auto and Heat made available.

1: Use(Signal only ON/OFF)

Use External Thermostat

2: Use(Signal ON/OFF OR WL Interlink OFF(Water pump 1) *****

Use External Thermostat

	OR **Turn Water Pump OFF when Water Temperature = Water Law Thermostat Setting.**
	3: Use(Signal ON/OFF OR WL Interlink OFF(Water pump 2) **Use External Thermostat** **OR** **Turn Water Pump OFF when Water Temperature = Water Law Thermostat Setting + 1 C.**
2091	**4: Use(Signal ON/OFF OR WL Interlink OFF(Water pump 3) ***
	Trigger a Motor Run : **When External Thermostat sets** **OR** **When Water Law Thermostat reaches 2 C above the Set Water Law Thermostat temperature.** **a) Delay by 3 mins** **Then** **b) Turn Water Pump OFF for 7 mins.** **Then** **c) Turn Water Pump ON for 3 mins.** **Then** **d) Turn Water Pump OFF for 7 mins.**

Calling for Compressor Run when using a *Thermostat* in a Zone 2 room using Water Law 2.

2092 **External Thermostat Application #2 for Zone 2**

Options:
0: not use. No Thermostat on Zone2 *

1: Use(Signal only ON/OFF)
Use Thermostat

2: Use(Signal ON/OFF OR WL Interlink OFF(Water pump 1)
Turn Water Pump OFF when Water Law Thermostat turns OFF.

3: Use(Signal ON/OFF OR WL Interlink
OFF(Water pump 2)
Turn Water Pump ON when Water Law Thermostat turns OFF.

4: Use(Signal ON/OFF OR WL Interlink
OFF(Water pump 3)
When Water Law Thermostat switches OFF
a) Delay by 3 mins
Then
b) Turn Water Pump OFF for 7 mins.
Then
c) Turn Water Pump ON for 3 mins.
Then
d) Turn Water Pump OFF for 7 mins.

Calling for a Compressor from the *Room Thermostat OR Weather Sensor Water Law 2*

2093 **Control Panel Thermistor**
Options:

1: Use(Signal only ON/OFF)
Use Room Thermostat ON/OFF

2: Use(Signal ON/OFF OR WL Interlink OFF(Water pump 1)
Turn Water Pump OFF when Water Law Thermostat turns OFF.

3: Use(Signal ON/OFF OR WL Interlink OFF(Water pump 2)
Turn Water Pump ON when Water Law Thermostat turns OFF.

4: Use(Signal ON/OFF OR WL Interlink OFF(Water pump 3)

When Water Law Thermostat switches OFF
a) Delay by 3 mins
Then
b) Turn Water Pump OFF for 7 mins.
Then
c) Turn Water Pump ON for 3 mins.
Then
d) Turn Water Pump OFF for 7 mins.

Hot Water

3011 Hot Water Tank
Used
Not Used
Hysteresis ON/OFF *****

Hot Water Temperature at which the Heat Pump is called to Heat Hot Water..

Used:

The Heat Pump is called the Hot Water Temperature is Less than the Heat Pump ON Temperature .

Hysteresis:

a) Falling Tank Temperature:
The Heat Pump is called when the Hot Water Temp falls below the Heat Pump ON Temperature.

b) Increasing Tank Temperature:

The Heat Pump is Stopped when the Hot Water Temp raises above the Heat Pump OFF Temperature.

Heat Pump OFF Temperature = 3021 – 3022

Heat Pump ON Temperature = 3021 - 3022 – 3023

3021	**Heat Pump Max Temperature** **Max 52 C**	*****
3022	**Stop Heat Pump** **2.0 C**	*****
	Stop Temperature = 52 - 3022(2.0) = 50 C	
3023	**Start Heat Pump** **8.0 C**	*****
	Start Heat Pump = 52 – 2.0 – 8 = 42 C	

When Hysteresis is selected the heat pump will supply heat if the Hot Water Temperature falls below 42 C.

When the Hot Water Temperature falls below 42 C the Hot Water Temperature will increase until 48 C is reached.

When BOTH Hot Water AND Radiators are simultaneously demanded, options 3024,3025&3026:

1: Set the time that the Hot Water get access to the Heat Pump.
2: Set the Time that the Radiators get access to the Heat Pump.

3024	**Min Time of Radiator Operation** **15 Mins**	*****
3025	**Max Time allowed for Hot Water Operation** **60 Mins 60 mins for 200 l tank**	*****
3026	**Max Space Heater Operating Time** **3 Hours**	*****

Immerser

The Immerser is switched ON Immediately in Power/Forced Mode.

In Standard mode the Immerser is switched on after a delay set by 3032.

In Economy Mode the Immerser is not used.

The Immerser is Switched OFF when the Hot Water Temperature reaches the Heat Pump OFF Temperature (3021 -3022) + the Immerser off Temperature, 3033

The Immerser is here Switched OFF at a Temperature of Immerser Switch OFF Temp = 55 - 2 + 0 = 53 C

3031-3033

3031	**Water Heater Application Used**	*****
3032	**Water Heater Delay Time 30 Mins**	*****
3033	**Water Heater overshoot 0 C**	*****

Legionella Disinfection

Legionella disinfection uses the Immerser .

3041	**Legionella Disinfection**	
	Used	*
3042	**Disinfection Day**	
	Wednesday	*
3043	**Hour of Disinfection**	
	23 Hours	*
3044	**Disinfection Temperature**	
	55 C	*
3045	**Min Time for Disinfection**	
	10 Mins	
3046	**Maximum time for disinfection**	
	40 min	*

Forced Hot Water Operation

3050	**Forced DHW Operation**	
	Used	*
	Not Used	
3051	**Forced Hot Water Duration**	
	60 Mins	*

Solar Panel

3061	**a) Not used** **b) DHW Thermostat (EHS Only)** **c) Solar Panel**	*****

3 Way Valve Setting (NO/NC)

3071	**Direction of 3 Way valve** **Room/Normally Closed (Normally closed)**	*****

3080-3083 Energy Metering

3081	**Backup Heater** **3 Kw**
3082	**Backup Heater Steps** **1 Kw**
3083	**Backup Heater Capacity** **3Kw**

4000-4061 **Heat Pump Priority**

4011 **Heat pump / DHW Priority**
DHW *

4012 **In Freezing Weather** *
(Radiators get Priority when Freezing)
0 C

4013 **Heater Not Needed when > 20)**
20 C

Backup Heater/Boiler

4021 **Number of Backup Heaters**
Not used. No Backup Heater *

4023 **Cold Weather Compensation**
Not used

4024 **Threshold Temperature**
5 C

4025 **Defrost Backup Temperature**
10 C

Mixing Valve

4041 **Not Used . (No Mixing Required)** *

4042 **Target for Heating**
10 C

4043 **Target for Cooling**
10 C

4044 **Control Factor**
2

4030-4033 Backup Boiler

4031 **Not used** *

4032 **Heat Pump**

4033 **Threshold Temp**
-15 C

4050-4061 Inverter Pump (Modulation)

4051 **Inverter Pump**
The Inverter Pump is the Grundfoss PWM motor pumping the water in the primary water loop.

Three options are offered:

a) Not used. The Inverter pump supply has electrically failed. The Inverter pump should NOT be used.

b) 100% Modulation.

c) 70 % modulation

4052 **Delta T**
2 C *

4053 **Control Factor**
2 *

The PWM Inverter output from the control board having failed the Pwm signal is produced by an Arduino.

406* **Zone Control**

4061 **Not used** *

Other controls

When Out Mode is selected when leaving the house the Water and room Temperatures are set to :

When Cooling Selected

5011 **Set Water out Cooling to**
18 C *

5012 **Room Temp for cooling to**
20 C *

When Heating Selected

5013 **Set Water out Temp to**
25 C *

5014 **Set Room Temp to**
16 C *

When Auto Selected

When Cooling

5015 **Set Water Temp in WL1 to**
25 C *

5016 **Set Water Temp in WL2 to**
25 C *

When Heating

5017	**Set Water Temp in WL1 to 15 C**	*****
5018	**Set Water Temp in WL2 to 15 C**	*****

Outing & Hot Water Energy Saving Mode

Energy saving when when leaving the house

5021	**Set Hot Water Temperature when leaving the house when in ECO DHW mode** **Reduces Hot Water Temperature when leaving the house by between 5 and 30 C** **30 C**	*****
5022	**Select Additional Saving Mode (Off/On = 0/1)** **1**	*****
5023	**When Additional savings , 5022 selected start DWH heating at Temperature of:** **25 C**	*****

TDM Variable

5031	**Priority Max Operating Time** **Not Supported**
5032	**Non Priority Min Operation Time** **Not Supported**
5033	**A2A/DHW Priority** **Not Supported**

Limiting Power Consumption

Remove Mains Electrical power when Consumption exceeds a fixed limit set by either:

1) A DC voltage on Peak Power control on socket CNS046:
0 Volts = 50%
10 Volts = 150%

OR
2) A Mod bus , RS485 input on Peak Power control on socket CNS046

5041	**Use Consumption limitation**	
	used	
	not used	*****
5042	**When Consumption limitation 5041 used switch OFF either**	

0 Back up Heater
**1 Heat Pump *
2 Booster Heater
3 Nothing is available**

5043 Logic level used to switch ON/OFF power

a) High Logic Level *
b) Low

Frequency Ratio Control

Set the Compressor Maximum Frequency using either

1) A DC voltage on FR Control socket CNS003

0 Volts = limit Frequency to 50%
10 Volts = increase Frequency by 150%

OR

2) A RS485 , Mod Bus signal on socket CNS003

5051 Frequency Ratio Control
used
not used *

5061 Heat/DHW Control Ratio
not Supported

PV Control

5081	**Application** **not Used**	*****
5082	**Setting Temp.shift Value(cool)** **2C**	
5083	**Setting Temp.shift Value(Heat)** **2 C**	

Smart Grid Control

5091	**Application** **Not Used**	*****
5092	**Setting Temp.shift Value (Heat)** **2 C**	
5093	**Setting Temp.shift Value(DHW)** **5 C**	
5094	**a) Standard Mode (Target Temp 50C)** **b) Power Mode (Target Temp 70 C)**	*****

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