Refrigerant R410A

INVERTER

DESIGN & TECHNICAL MANUAL

High power series (3 phase type)

WATERSTAGE™

FUTURE SOLUTION OF DOMESTIC HEATING

Air to Water
Split type

FUJITSU GENERAL LIMITED

CONTENTS

1. OUTDOOR UNIT

3 PHASE TYPE : WO∗K112LAT, WO∗K140LAT, WO∗K160LAT

2. INDOOR UNIT

3 PHASE TYPE : WS∗K160DA9

3. CONTROL SYSTEM

WATERSTAGE ™

1. OUTDOOR UNIT

3 PHASE TYPE :
WO✱K112LAT
WO✱K140LAT
WO✱K160LAT

CONTENTS

1. OUTDOOR UNIT

1. FEATURES

■ MODELS :
WO✳K112LAT, WO✳K140LAT, WO✳K160LAT
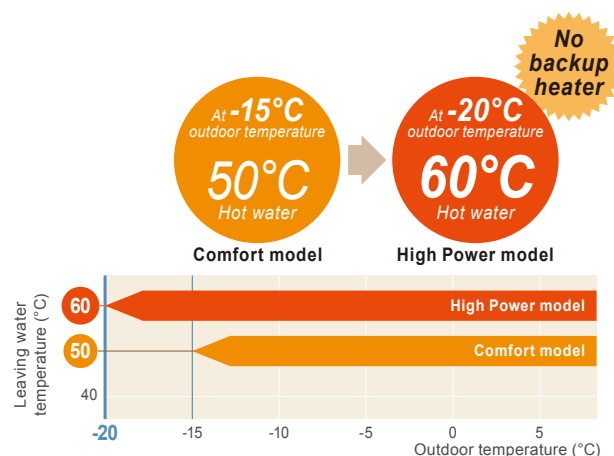
■ FEATURES

● High Performance

Powerful heating

High power models realize high leaving water temperature and high heating capacity even at low ambient temperature by newly developed "Linear Control Injection Technology".
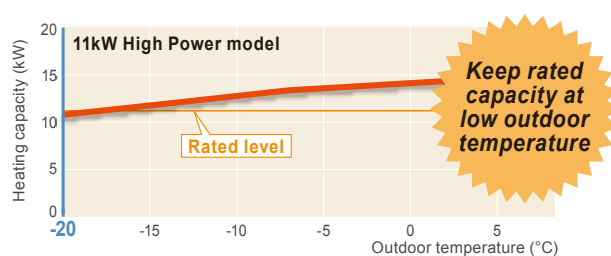It is possible to provide high water temperature and warm rooms immediately in cold region during winter.

• High leaving water temperature

High leaving water temperature of 60°C keeps to -20°C of outdoor temperature without using backup heater.
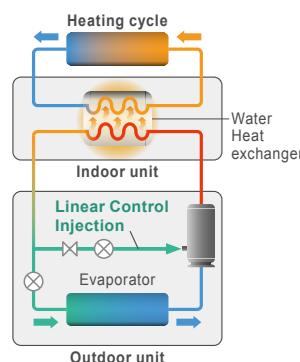
No backup heater

At **-15°C** outdoor temperature
50°C Hot water
Comfort model

At **-20°C** outdoor temperature
60°C Hot water
High Power model

Leaving water temperature (°C)

60 High Power model
50 Comfort model
40

-20 -15 -10 -5 0 5
Outdoor temperature (°C)

• High heating capacity

Keeping the high heating capacity at even low outdoor temperature.

Heating capacity (kW)

20
15
10
5
0

11kW High Power model

Rated level

Keep rated capacity at low outdoor temperature

-20 -15 -10 -5 0 5
Outdoor temperature (°C)

FUJITSU GENERAL's advanced
Linear Control Injection Technology

Injection port

Twin Rotary Compressor with Linear Control Injection port

Heating cycle

Water Heat exchanger

Indoor unit

Linear Control Injection

Evaporator

Outdoor unit
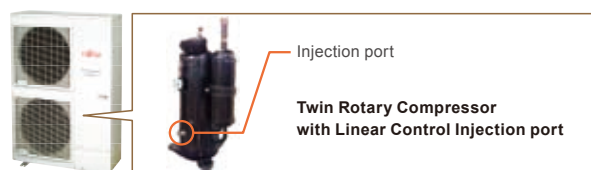
It realizes the high condensing temperature without overheating discharge gas temperature by Linear Control Injection process during compression.
Therefore, the condensing temperature rises up higher than normal circuit.
A higher hot water temperature is realized by controling the injection amount according to the usage state.

High compression

Normal refrigerant circuit

Linear Control Injection

Outdoor unit / 3 phase
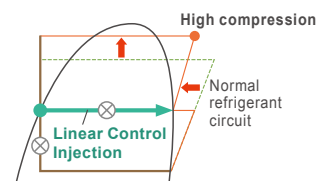
High efficiency

Energy efficiency is improved by the Linear Control Injection Technology and the optimization of refrigerant cycle control. High power model realizes high performance and high efficiency by adopting twin sensors and control technology corresponding to hot water heating.

• High COP

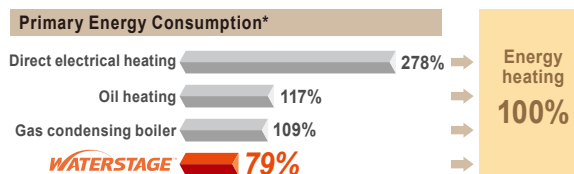|	
High Power model	**4.30**
Comfort model	**3.90**

*The data refer to 16kW type Condition : Outdoor Temp. 7°C   Heating Temp. 35°C.

Proportion of primary energy into heating energy of 100%

Primary Energy Consumption*	
Direct electrical heating	278%
Oil heating	117%
Gas condensing boiler	109%
WATERSTAGE	79%

Energy heating
100%

*Electricity loss is different due to power plant. Efficiency of power plant : 36%

Optimization of refrigerant cycle operation

Outdoor unit   Indoor unit
Temperature sensor
Water heat exchanger
Heating cycle
Refrigerant
Pressure sensor
Hot water
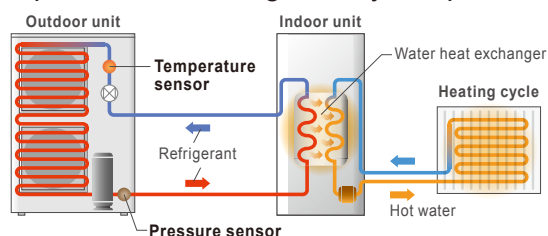
Accurate temperature control by DC inverter technology

High
Temperature
INVERTER   Constant
Time

V-PAM inverter technology
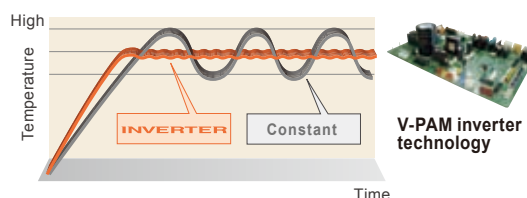
• Wide Operation Range

Improvement operation range depending on the optimization of refrigerant cycle control

High Power model   Comfort model

High Power model	Comfort model
35°C	24°C
0°C	0°C
-20°C	-15°C

Outdoor unit / 3 phase
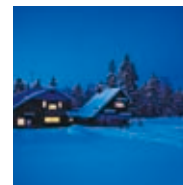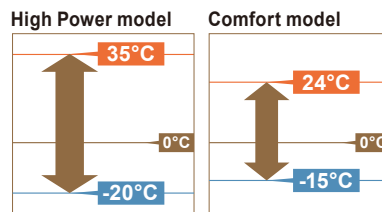
● Wide comfort

Wide comfort by WATERSTAGE

The clean energy produced by WATERSTAGE reliably delivers "comfort" to diverse spaces in the home up to the living room, bedrooms, bath and swimming pool.

Radiator

Domestic hot water

Domestic hot water tank

Floor heating

Hot water supply
Indoor unit

Swimming pool

Take thermal energy from atmosphere
Outdoor unit

• System Configuration

| Basic Unit	System Components (Options)	Controller (Option)	Heating & Hot Water (Field Supplied)	Hot Water (Outdoor)

Indoor unit

High Power model
WS∗K160DA9

Boiler (Field Supplied)

Boiler Connection kit
UTW-KBSXA
& Balancing Vessel
UTW-TEVXA

DHW Tank

UTW-T20XA
UTW-T30XA

Hot water

Shower

Bath

Outdoor unit

High Power model
WO∗K112LAT
WO∗K140LAT
WO∗K160LAT

2nd circuit kit
UTW-KZSXA

Radiator

Fan coil

Swimming Pool

Heat Exchanger
UTW-ESPXA
& Swimming Pool Kit
UTW-KSPXA

Floor heating

Room Thermostat

UTW-C55XA

Remote Control

UTW-C75XA

── Supply hot water	── Gas refrigerant
── Return water	── Liquid refrigerant
--- Control cable	

Outdoor unit / 3 phase

2. SPECIFICATIONS

2-1. NOMINAL CAPACITY AND NOMINAL INPUT

Model name (Outdoor unit)				WO✳K112LAT	WO✳K140LAT	WO✳K160LAT
Model name (Indoor unit)				WS✳K160DA9		
+7°C/+35°C floor heating	Heating capacity	Minimum	kW	7.60		
		Nominal		11.20	14.00	16.00
		Maximum		19.50	21.00	22.00
	Input power	Nominal		2.51	3.22	3.72
	COP	-		4.46	4.35	4.30
+7°C/+45°C radiators	Heating capacity	Minimum	kW	7.10		
		Nominal		10.50	13.10	15.10
		Maximum		16.16	17.61	18.99
	Input power	Nominal		2.90	3.70	4.42
	COP	-		3.62	3.54	3.42
+2°C/+35°C floor heating	Heating capacity	Nominal	kW	11.20	14.00	15.10
	Input power			3.45	4.40	4.87
	COP		-	3.25	3.18	3.10

Outdoor unit / 3 phase

2-2. TECHNICAL SPECIFICATIONS

Model name (Outdoor unit)				WO✳K112LAT	WO✳K140LAT	WO✳K160LAT
Enclosure	Colour			BEIGE (10YR 7.5/1.0)		
	Material			Steel sheet		
Dimensions (H x W x D)	Net		mm	1290 x 900 x 330		
	Gross			1430 x 1050 x 445		
Weight	Net		kg (lb.)	99 (218)		
	Gross			109 (240)		
Heat exchanger type	Dimensions (H x W x D)		mm	1260 x 900 x 36.4		
	Fin pitch			1.3		
	Rows & Stages			2 x 60		
	Pipe type			Copper		
	Fin	Type (Material)		Corrugate (Aliminium)		
		Surface treatment		Corrosion resistance (Blue fin)		
Fan	Airflow rate	Heating	m³/h	6200		
	Type x Q'ty			Propeller x 2		
	Discharge direction			Horizontal		
	Motor Quantity			2		
	Motor output		W	104		
Compressor	Type x Q'ty			DC 2 rotary (Liquid injection) x 1		
	Motor output		W	2,700		
Operation range	Heating	Min	°CDB	-20		
		Max		35		
	Sanitary water	Min		-20		
		Max		35		
Sound pressure level	Heating		dBA	53	54	56
Refrigerant	Type			R410A		
	Charge		g	2,500		
	Control			Expansion valve (electric type)		
	Nr of circuits			1		
Refrigerant oil	Type			FV68S		
	Charged volume		l	1.55		
Connection pipe	Type	Liquid		Flare connection		
		Gas		Flare connection		
	Size (Standard)	Liquid	mm	9.52		
		Gas		15.88		
	Drain	Type x Q'ty		Socket x 2		
		Size	mm	18		
	Method			Flare		
	Max. length		m	20		
	Min. length			5		
	Additional refrigerant charge		g/m	50		
	Max. height difference		m	15		
Defrost method				Reverse cycle		
Defrost control				Outdoor heat exchanger temperature sensor		
Capacity control method				Inverter control		

Outdoor unit / 3 phase

2-3. ELECTRICAL SPECIFICATIONS

Model name (Outdoor unit)			WO∗K112LAT	WO∗K140LAT	WO∗K160LAT
Available voltage range			3N~ 342 - 457V 50Hz		
Power supply	Voltage	V	3N~ 400V		
	Frequency	Hz	50		
*1) Max. operating current	Heating	A	9.0	9.5	10.5
Starting current			4.3	5.5	6.5
*2) Wiring spec.	Main fuse (Circuit breaker) Current		16.0		
	Power cable	mm²	2.5		
Wiring connections	For power supply	Quantity	3		
	For connection with indoor		4		
		Remark	Included earth wiring		

*1) The maximum current is the total current of indoor unit and outdoor unit.
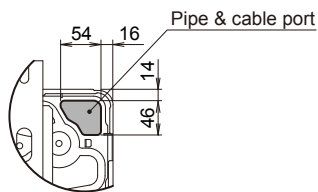
*2) Wiring spec. :
Selected sample
(Selected based on Japan Electrotechnical Standard and Codes Committee E0005)

Outdoor unit / 3 phase

3. DIMENSIONS

3-1. DIMENSIONAL DRAWING

■MODELS : WO∗K112L, WO∗K140L, WO∗K160L

(Unit : mm)

Top view

Front view

Side view

Rear view

Bottom view

Detail A

Pipe & cable port

Terminal blocks

3-way valve (Liquid)

3-way valve (Gas)

Outdoor unit / 3 phase
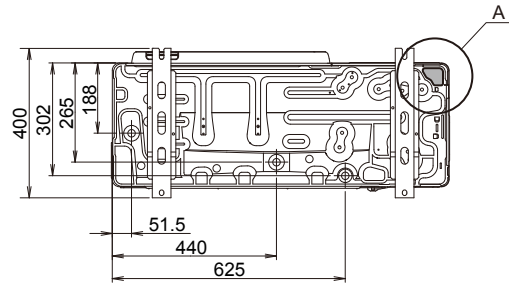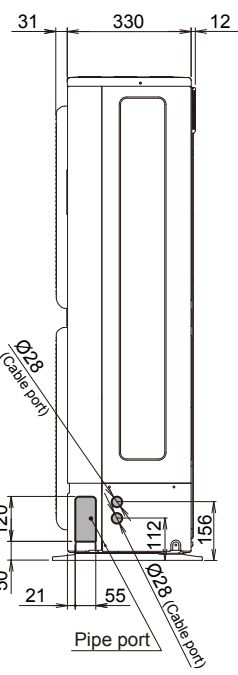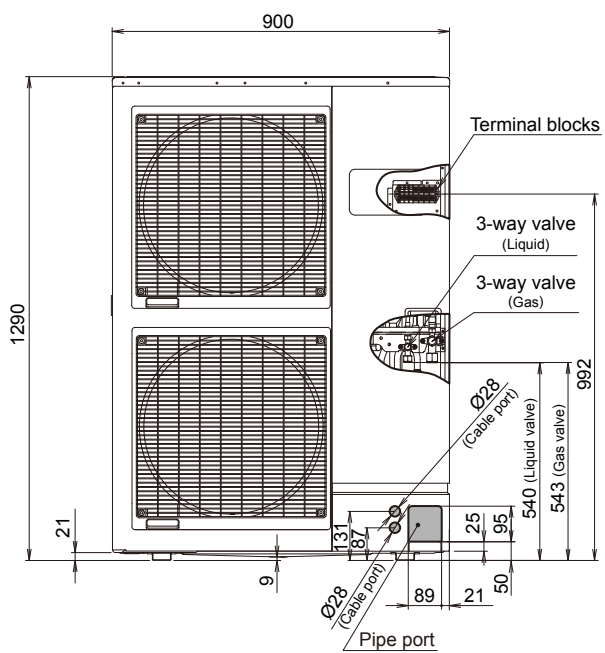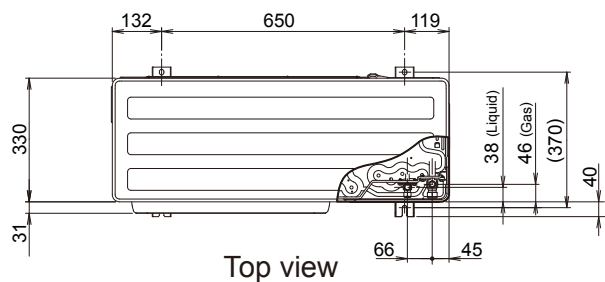
3-2. INSTALLATION PLACE

3-2-1. SINGLE OUTDOOR UNIT INSTALLATION

■ WHEN THE UPWARD AREA IS OPEN

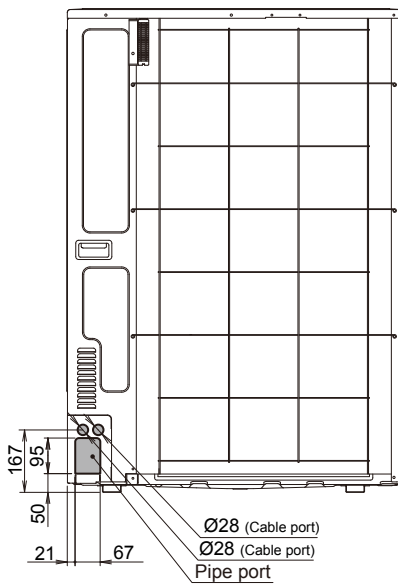Obstacles at rear only
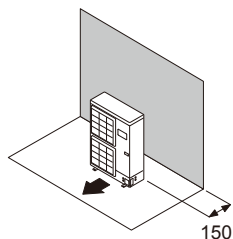
Obstacles at rear and sides only
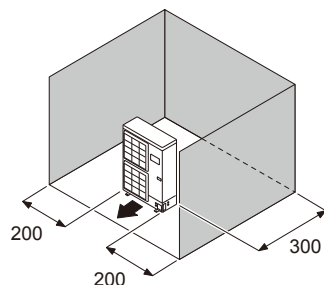
Obstacles at front only
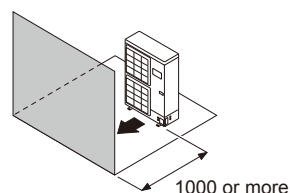
Obstacles at front and rear only

150

200
200
300

1000 or more

150
1000 or more
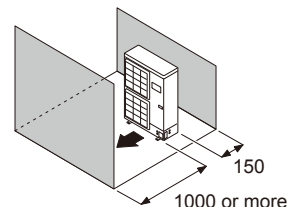
■ WHEN AN OBSTRUCTION IS PRESENT ALSO IN THE UPWARD AREA

Obstacles at rear and above only
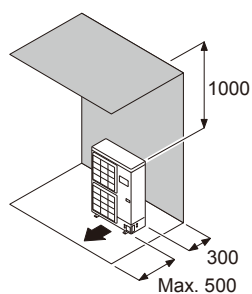
Obstacles at rear, sides, and above only

1000
300
Max. 500

1500
250
250
500
Max. 500

Outdoor unit / 3 phase
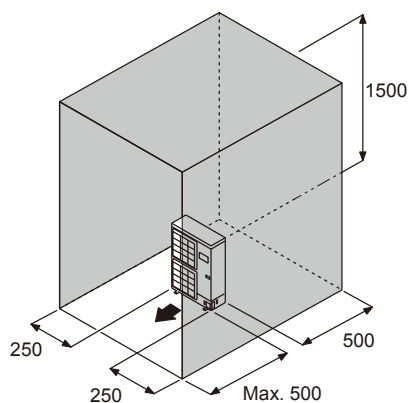
3-2-2. MULTIPLE OUTDOOR UNIT INSTALLATION
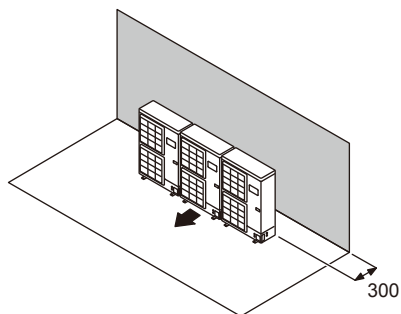
■ WHEN THE UPWARD AREA IS OPEN

Obstacles at rear only

Obstacles at front only

Obstacles at front and rear only

300

1500 or more

500

1500 or more

■ WHEN AN OBSTRUCTION IS PRESENT ALSO IN THE UPWARD AREA

Obstacles at rear and above only

1500

1500

500

Max. 300
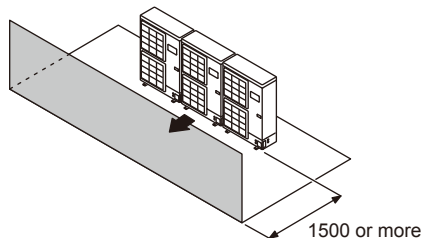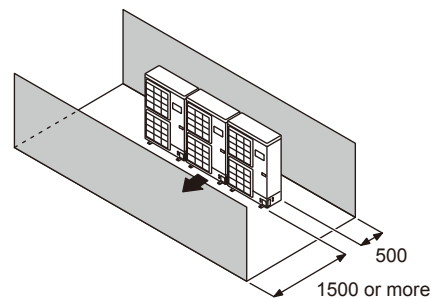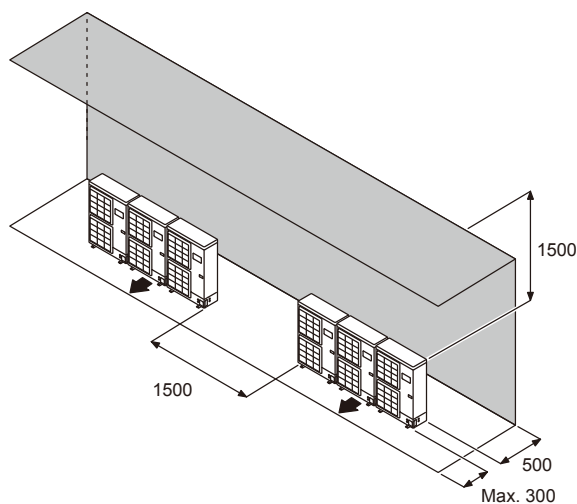
3-2-3. OUTDOOR UNIT INSTALLATION IN MULTI ROW

Single parallel unit arrangement
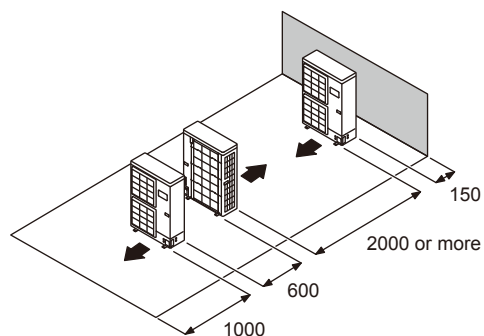
Multiple parallel unit arrangement

150

2000 or more

600

1000

500

3000 or more

600

1500

<u>Outdoor unit / 3 phase</u>

4. PIPING DIAGRAM

■ MODELS : WO∗K112L, WO∗K140L, WO∗K160L

Heating terminal
(Floor heating, radiator)

Indoor unit

Refrigerant –
water heat exchanger

Heat exchange
sensor

Heating cycle direction of flow

Muffler

Dedicated
compressor for
injection port
mounting

Discharge
temperature sensor

Injection amount
adjustment
expansion valve

Injection circuit on-off
solenoid valve

3-way valve

3-way valve

Strainer

Compressor
temperature
sensor

Four-way
valve

Strainer

Pressure sensor

Expansion
valve

Expansion valve
inlet sensor

Sub accumulator

Outdoor
temperature sensor

Heat exchange
intermediate sensor

[Outdoor unit]
Heat exchanger

Heat exchange
inlet sensor

Strainer

Outdoor unit / 3 phase

5. WIRING DIAGRAM

5-1. WIRING DIAGRAM

■ MODELS : WO∗K112L, WO∗K140L, WO∗K160L

Outdoor unit / 3 phase

5-2. EXTERNAL INPUT & OUTPUT

■ MODELS : WO✱K112L, WO✱K140L, WO✱K160L

Input	Output	Connector	Remarks
Low noise mode	—	CN19	See external input/output settings for details.
Peak cut mode	—	CN19	
—	Compressor status	CN18	

☐ EXTERNAL INPUT

ON/OFF of the "Low noise mode" and "Peak cut mode" functions can be specified by external signal.

● Low noise mode

• On-site work like the following also reduces the operating sound of the outdoor unit from the normal sound.
The air conditioner is set to the "Low noise mode" by applying the contact input of a commercial timer or ON/OFF switch to a connector on the outdoor control PC board.

* Performance may drop depending on the outside air temperature condition, etc.

Circuit diagram example

1) Power supply
   ● Voltage (Chart sign=Vcc) : DC 5V to 24V
   ● The current capacity : About 100mA
2) Switch (Chart sign=SW)
   ● Toggle switch or Rocker switch, etc : Switch which maintains the states.
   ● Prepare switches which are enough capable for DC 10mA current or more
3) Resistance (Chart sign=R)
   ● Adjust the resistance for current to about DC 10mA
(Example)
   ● In case of Vcc=DC 5V : Rated resistance value 470Ω 1/4W
   ● In case of Vcc=DC 12V : Rated resistance value 1kΩ 1/4W
   ● In case of Vcc=DC 24V : Rated resistance value 2.2kΩ 1/4W

* Make the distance from the PC board to the connected unit within 10 m.

• Use the following parts and construct a circuit like that shown above.

• Input signal···ON : Low noise mode / OFF : Normal operation

* Set the "Low noise mode" type by "Push switch" on the outdoor control PC board.
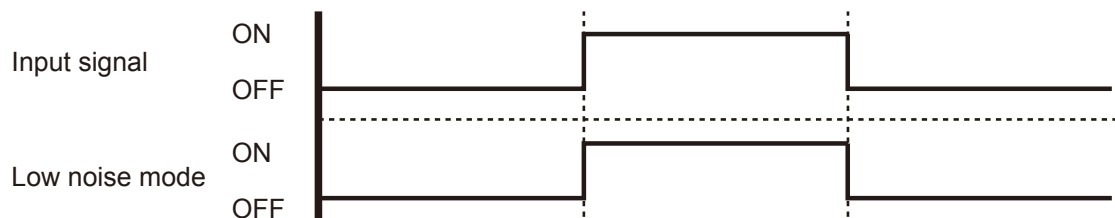
Parts (Optional)

Model name
UTY-XWZXZ2

Wire (External input)) : Red / White / Black

Outdoor unit / 3 phase
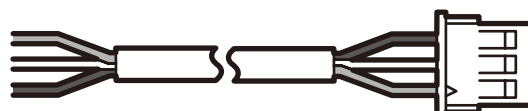
● Peak cut mode

• Operation that suppressed the current value can be performed by means of the following on-site work. The air conditioner is set to the Peak cut mode by applying the contact input of a commercial ON/OFF switch to a connector on the outdoor control PC board.

Circuit diagram example

Outdoor control PC board

Connector

1 Red
2 White
3 Black

*10 m

Surely insulate with insulation tape etc. since this wire is not used.

Connected unit

Vcc Vcc

Power supply

R

SW

Signal

Field supply

1) Power supply
　●Voltage (Chart sign=Vcc) : DC 5V to 24V
　●The current capacity　: About 100mA
2) Switch (Chart sign=SW)
　●Toggle switch or Rocker switch, etc : Switch which maintains the states.
　●Prepare switches which are enough capable for DC 10mA current or more
3) Resistance (Chart sign=R)
　●Adjust the resistance for current to about DC 10mA
(Example)
　●In case of Vcc=DC 5V : Rated resistance value 470Ω 1/4W
　●In case of Vcc=DC 12V : Rated resistance value 1kΩ 1/4W
　●In case of Vcc=DC 24V : Rated resistance value 2.2kΩ 1/4W

* Make the distance from the PC board to the connected unit within 10 m.

• Use the following parts and construct a circuit like that shown above.

• Input signal···ON: Peak cut mode/OFF: Normal operation
  *Set the "Peak cut mode" type by "Push switch" on the outdoor control PC board.

Input signal

ON
OFF

Peak cut mode

ON
OFF
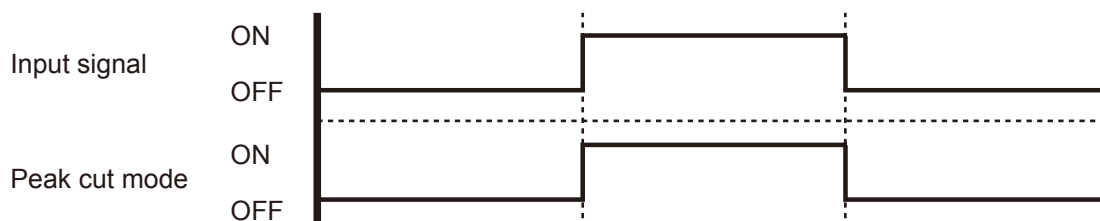
Parts (Optional)

Model name
UTY-XWZXZ2

Wire (External input)) : Red / White / Black

☐ EXTERNAL OUTPUT

● Compressor status output

• Compressor operation status signal can be output by means of the following on-site work.

Circuit diagram example

Outdoor
control PC board

Connected unit

Connector

1 + Red
2   White
3   Black

*10 m

Surely insulate with
insulation tape etc. since
this wire is not used.

Vcc   Vcc

Power
supply

Load

Signal

Field supply

1) Power supply
   ● Voltage (Chart sign=Vcc) : DC 24V or less
2) Load
   ● Load : DC 20mA or less

* Make the distance from the PC board to the connected unit within 10 m.

Compressor status	Operation
	Stop
Output Signal	ON
	OFF

Parts (Optional)

Model name
UTY-XWZXZ2

Wire (External input)) : Red / White / Black

Outdoor unit / 3 phase

6. CAPACITY TABLES

6-1. HEATING CAPACITY

■ MODEL : WO∗K112L

LWC	30°C			35°C			40°C			45°C			50°C			55°C			60°C		
Tamb	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP
-20°C	10.32	4.79	2.15	10.20	4.89	2.09	9.67	4.99	1.94	9.10	4.99	1.82	8.09	5.00	1.62	7.05	5.00	1.41	6.10	5.01	1.22
-19°C	10.60	4.77	2.22	10.42	4.87	2.14	9.94	5.00	1.99	9.40	4.99	1.88	8.39	5.00	1.68	7.36	5.00	1.47	6.40	5.01	1.28
-18°C	10.87	4.75	2.29	10.64	4.85	2.19	10.21	5.00	2.04	9.71	5.00	1.94	8.69	5.00	1.74	7.66	5.00	1.53	6.70	5.01	1.34
-17°C	11.14	4.72	2.36	10.86	4.84	2.24	10.47	5.00	2.09	10.01	5.00	2.00	8.98	5.00	1.80	7.97	5.01	1.59	7.00	5.01	1.40
-16°C	11.40	4.71	2.42	11.08	4.82	2.30	10.74	5.00	2.15	10.32	5.00	2.06	9.28	5.00	1.86	8.27	5.01	1.65	7.30	5.01	1.46
-15°C	11.55	4.63	2.49	11.20	4.77	2.35	10.91	4.99	2.19	10.50	4.99	2.10	9.58	5.00	1.92	8.58	5.00	1.71	7.60	5.01	1.52
-14°C	11.55	4.53	2.55	11.20	4.66	2.40	10.90	4.87	2.24	10.50	4.89	2.15	9.65	4.93	1.96	8.73	4.98	1.75	7.79	5.00	1.56
-13°C	11.55	4.43	2.61	11.20	4.56	2.46	10.90	4.75	2.29	10.50	4.78	2.20	9.72	4.86	2.00	8.88	4.95	1.79	7.98	4.99	1.60
-12°C	11.55	4.33	2.67	11.20	4.45	2.52	10.89	4.63	2.35	10.50	4.68	2.24	9.79	4.78	2.05	9.04	4.92	1.84	8.16	4.98	1.64
-11°C	11.55	4.24	2.72	11.20	4.35	2.57	10.88	4.52	2.41	10.50	4.58	2.29	9.87	4.71	2.10	9.19	4.89	1.88	8.35	4.97	1.68
-10°C	11.55	4.14	2.79	11.20	4.24	2.64	10.87	4.40	2.47	10.50	4.47	2.35	9.94	4.64	2.14	9.34	4.86	1.92	8.54	4.96	1.72
-9°C	11.55	4.04	2.86	11.20	4.13	2.71	10.87	4.28	2.54	10.50	4.37	2.40	10.01	4.57	2.19	9.49	4.83	1.96	8.73	4.95	1.76
-8°C	11.55	3.94	2.93	11.20	4.03	2.78	10.86	4.16	2.61	10.50	4.26	2.46	10.08	4.49	2.24	9.65	4.80	2.01	8.91	4.94	1.80
-7°C	11.55	3.84	3.01	11.20	3.92	2.86	10.85	4.04	2.69	10.50	4.16	2.52	10.15	4.42	2.30	9.80	4.77	2.05	9.10	4.93	1.85
-6°C	11.55	3.79	3.05	11.20	3.87	2.89	10.85	3.98	2.73	10.50	4.12	2.55	10.15	4.37	2.32	9.80	4.70	2.09	9.19	4.87	1.89
-5°C	11.55	3.74	3.09	11.20	3.82	2.93	10.85	3.93	2.76	10.50	4.08	2.57	10.15	4.32	2.35	9.80	4.63	2.12	9.28	4.81	1.93
-4°C	11.55	3.69	3.13	11.20	3.76	2.98	10.85	3.87	2.80	10.50	4.03	2.61	10.15	4.26	2.38	9.80	4.56	2.15	9.36	4.75	1.97
-3°C	11.55	3.64	3.18	11.20	3.71	3.02	10.85	3.82	2.84	10.50	3.99	2.63	10.15	4.21	2.41	9.80	4.49	2.18	9.45	4.69	2.01
-2°C	11.55	3.58	3.23	11.20	3.66	3.06	10.85	3.76	2.89	10.50	3.95	2.66	10.15	4.16	2.44	9.80	4.42	2.22	9.45	4.61	2.05
-1°C	11.55	3.53	3.27	11.20	3.61	3.10	10.85	3.71	2.92	10.50	3.91	2.69	10.15	4.11	2.47	9.80	4.35	2.25	9.45	4.53	2.09
0°C	11.55	3.48	3.32	11.20	3.55	3.15	10.85	3.65	2.97	10.50	3.86	2.72	10.15	4.05	2.51	9.80	4.28	2.29	9.45	4.45	2.12
1°C	11.55	3.43	3.37	11.20	3.50	3.20	10.85	3.60	3.01	10.50	3.82	2.75	10.15	4.00	2.54	9.80	4.21	2.33	9.45	4.37	2.16
2°C	11.55	3.38	3.42	11.20	3.45	3.25	10.85	3.54	3.06	10.50	3.78	2.78	10.15	3.95	2.57	9.80	4.14	2.37	9.45	4.29	2.20
3°C	11.55	3.35	3.45	11.20	3.40	3.29	10.85	3.48	3.12	10.50	3.74	2.81	10.15	3.90	2.60	9.80	4.07	2.41	9.45	4.21	2.24
4°C	11.55	3.32	3.48	11.20	3.34	3.35	10.85	3.43	3.16	10.50	3.69	2.85	10.15	3.84	2.64	9.80	4.00	2.45	9.45	3.98	2.37
5°C	11.55	3.29	3.51	11.20	3.29	3.40	10.85	3.37	3.22	10.50	3.65	2.88	10.15	3.79	2.68	9.80	3.72	2.63	9.45	3.74	2.53
6°C	11.55	2.84	4.07	11.20	2.90	3.86	10.85	3.06	3.55	10.50	3.28	3.20	10.15	3.42	2.97	9.80	3.43	2.86	9.45	3.67	2.57
7°C	11.55	2.39	4.83	11.20	2.51	4.46	10.85	2.74	3.96	10.50	2.90	3.62	10.15	3.05	3.33	9.80	3.37	2.91	9.45	3.60	2.63
8°C	11.55	2.36	4.89	11.20	2.47	4.53	10.85	2.69	4.03	10.50	2.85	3.68	10.15	3.00	3.38	9.80	3.31	2.96	9.45	3.53	2.68
9°C	11.55	2.32	4.98	11.20	2.43	4.61	10.85	2.64	4.11	10.50	2.80	3.75	10.15	2.95	3.44	9.80	3.25	3.02	9.45	3.46	2.73
10°C	11.55	2.29	5.05	11.20	2.39	4.69	10.85	2.59	4.20	10.50	2.74	3.83	10.15	2.89	3.51	9.80	3.19	3.08	9.45	3.39	2.78
11°C	11.55	2.25	5.13	11.20	2.35	4.77	10.85	2.54	4.27	10.50	2.69	3.90	10.15	2.84	3.57	9.80	3.13	3.13	9.45	3.33	2.84
12°C	11.55	2.22	5.20	11.20	2.30	4.87	10.85	2.48	4.38	10.50	2.64	3.98	10.15	2.79	3.64	9.80	3.06	3.20	9.45	3.26	2.90
13°C	11.55	2.18	5.30	11.20	2.26	4.96	10.85	2.43	4.47	10.50	2.59	4.05	10.15	2.74	3.70	9.80	3.00	3.27	9.45	3.19	2.96
14°C	11.55	2.15	5.37	11.20	2.22	5.05	10.85	2.38	4.56	10.50	2.53	4.15	10.15	2.68	3.79	9.80	2.94	3.33	9.45	3.12	3.03
15°C	11.55	2.11	5.47	11.20	2.18	5.14	10.85	2.33	4.66	10.50	2.48	4.23	10.15	2.63	3.86	9.80	2.88	3.40	9.45	3.05	3.10
16°C	11.55	2.08	5.55	11.20	2.15	5.21	10.85	2.30	4.72	10.50	2.45	4.29	10.15	2.61	3.89	9.80	2.86	3.43	9.45	3.05	3.10
17°C	11.55	2.05	5.63	11.20	2.11	5.31	10.85	2.26	4.80	10.50	2.41	4.36	10.15	2.59	3.92	9.80	2.84	3.45	9.45	3.04	3.11
18°C	11.55	2.01	5.75	11.20	2.08	5.38	10.85	2.23	4.87	10.50	2.38	4.41	10.15	2.56	3.96	9.80	2.82	3.48	9.45	3.04	3.11
19°C	11.55	1.98	5.83	11.20	2.04	5.49	10.85	2.19	4.95	10.50	2.34	4.49	10.15	2.54	4.00	9.80	2.80	3.50	9.45	3.03	3.12
20°C	11.55	1.95	5.92	11.20	2.01	5.57	10.85	2.16	5.02	10.50	2.31	4.55	10.15	2.52	4.03	9.80	2.78	3.53	9.45	3.03	3.12
21°C	11.55	1.93	5.98	11.20	1.99	5.63	10.85	2.14	5.07	10.50	2.30	4.57	10.15	2.50	4.06	9.80	2.76	3.55	9.45	3.00	3.15
22°C	11.55	1.91	6.05	11.20	1.97	5.69	10.85	2.13	5.09	10.50	2.28	4.61	10.15	2.49	4.08	9.80	2.74	3.58	9.45	2.97	3.18
23°C	11.55	1.90	6.08	11.20	1.96	5.71	10.85	2.11	5.14	10.50	2.27	4.63	10.15	2.47	4.11	9.80	2.71	3.62	9.45	2.95	3.20
24°C	11.55	1.88	6.14	11.20	1.94	5.77	10.85	2.09	5.19	10.50	2.25	4.67	10.15	2.45	4.14	9.80	2.69	3.64	9.45	2.92	3.24
25°C	11.55	1.86	6.21	11.20	1.92	5.83	10.85	2.08	5.22	10.50	2.24	4.69	10.15	2.43	4.18	9.80	2.67	3.67	9.45	2.89	3.27
26°C	11.55	1.84	6.28	11.20	1.90	5.89	10.85	2.06	5.27	10.50	2.22	4.73	10.15	2.42	4.19	9.80	2.65	3.70	9.45	2.86	3.30
27°C	11.55	1.82	6.35	11.20	1.88	5.96	10.85	2.04	5.32	10.50	2.21	4.75	10.15	2.40	4.23	9.80	2.63	3.73	9.45	2.83	3.34
28°C	11.55	1.81	6.38	11.20	1.87	5.99	10.85	2.03	5.34	10.50	2.19	4.79	10.15	2.38	4.26	9.80	2.60	3.77	9.45	2.81	3.36
29°C	11.55	1.79	6.45	11.20	1.85	6.05	10.85	2.01	5.40	10.50	2.18	4.82	10.15	2.36	4.30	9.80	2.58	3.80	9.45	2.78	3.40
30°C	11.55	1.77	6.53	11.20	1.83	6.12	10.85	1.99	5.45	10.50	2.16	4.86	10.15	2.35	4.32	9.80	2.56	3.83	9.45	2.75	3.44
31°C	11.55	1.75	6.60	11.20	1.81	6.19	10.85	1.98	5.48	10.50	2.15	4.88	10.15	2.33	4.36	9.80	2.54	3.86	9.45	2.72	3.47
32°C	11.55	1.73	6.68	11.20	1.79	6.26	10.85	1.96	5.54	10.50	2.13	4.93	10.15	2.31	4.39	9.80	2.52	3.89	9.45	2.69	3.51
33°C	11.55	1.72	6.72	11.20	1.78	6.29	10.85	1.94	5.59	10.50	2.12	4.95	10.15	2.29	4.43	9.80	2.49	3.94	9.45	2.67	3.54
34°C	11.55	1.70	6.79	11.20	1.76	6.36	10.85	1.93	5.62	10.50	2.10	5.00	10.15	2.28	4.45	9.80	2.47	3.97	9.45	2.64	3.58
35°C	11.55	1.68	6.88	11.20	1.74	6.44	10.85	1.91	5.68	10.50	2.09	5.02	10.15	2.26	4.49	9.80	2.45	4.00	9.45	2.61	3.62

LWC : Leaving water condenser temperature
Tamb : Temperature ambient
HC : Heating capacity (kW)
PI : Power input (kW)
COP : Coefficient of performance

Outdoor unit / 3 phase

■ MODEL : WO∗K140L

LWC	30°C			35°C			40°C			45°C			50°C			55°C			60°C		
Tamb	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP
-20°C	10.32	4.79	2.15	10.30	5.05	2.04	10.14	5.40	1.88	10.00	5.65	1.77	9.05	5.64	1.60	8.12	5.65	1.44	7.20	5.64	1.28
-19°C	10.81	4.90	2.21	10.74	5.13	2.09	10.54	5.46	1.93	10.36	5.66	1.83	9.41	5.65	1.67	8.46	5.66	1.49	7.54	5.65	1.33
-18°C	11.29	5.02	2.25	11.18	5.21	2.15	10.94	5.52	1.98	10.72	5.68	1.89	9.77	5.66	1.73	8.81	5.67	1.55	7.88	5.66	1.39
-17°C	11.78	5.13	2.30	11.62	5.30	2.19	11.35	5.58	2.03	11.08	5.69	1.95	10.13	5.68	1.78	9.15	5.69	1.61	8.22	5.67	1.45
-16°C	12.26	5.25	2.34	12.06	5.38	2.24	11.75	5.64	2.08	11.44	5.71	2.00	10.49	5.69	1.84	9.49	5.70	1.66	8.56	5.68	1.51
-15°C	12.75	5.36	2.38	12.50	5.46	2.29	12.15	5.70	2.13	11.80	5.72	2.06	10.85	5.70	1.90	9.83	5.71	1.72	8.90	5.69	1.56
-14°C	12.96	5.31	2.44	12.69	5.42	2.34	12.33	5.65	2.18	11.96	5.68	2.11	11.05	5.70	1.94	10.04	5.71	1.76	9.14	5.69	1.61
-13°C	13.18	5.27	2.50	12.88	5.38	2.39	12.50	5.59	2.24	12.13	5.64	2.15	11.25	5.70	1.97	10.24	5.70	1.80	9.38	5.69	1.65
-12°C	13.39	5.22	2.57	13.06	5.34	2.45	12.68	5.54	2.29	12.29	5.60	2.19	11.45	5.70	2.01	10.44	5.70	1.83	9.61	5.69	1.69
-11°C	13.60	5.18	2.63	13.25	5.31	2.50	12.85	5.49	2.34	12.45	5.56	2.24	11.65	5.70	2.04	10.64	5.69	1.87	9.85	5.69	1.73
-10°C	13.81	5.13	2.69	13.44	5.27	2.55	13.03	5.43	2.40	12.61	5.51	2.29	11.84	5.69	2.08	10.85	5.69	1.91	10.09	5.68	1.78
-9°C	14.03	5.08	2.76	13.63	5.23	2.61	13.20	5.38	2.45	12.78	5.47	2.34	12.04	5.69	2.12	11.05	5.68	1.95	10.33	5.68	1.82
-8°C	14.24	5.04	2.83	13.81	5.19	2.66	13.38	5.32	2.52	12.94	5.43	2.38	12.24	5.69	2.15	11.25	5.68	1.98	10.56	5.68	1.86
-7°C	14.45	4.99	2.90	14.00	5.15	2.72	13.55	5.27	2.57	13.10	5.39	2.43	12.44	5.69	2.19	11.46	5.67	2.02	10.80	5.68	1.90
-6°C	14.45	4.92	2.94	14.00	5.07	2.76	13.55	5.19	2.61	13.10	5.33	2.46	12.44	5.63	2.21	11.50	5.66	2.03	10.81	5.69	1.90
-5°C	14.45	4.85	2.98	14.00	4.98	2.81	13.55	5.12	2.65	13.10	5.26	2.49	12.44	5.57	2.23	11.54	5.64	2.05	10.83	5.70	1.90
-4°C	14.45	4.78	3.02	14.00	4.90	2.86	13.55	5.04	2.69	13.10	5.20	2.52	12.44	5.51	2.26	11.58	5.63	2.06	10.84	5.70	1.90
-3°C	14.45	4.71	3.07	14.00	4.82	2.91	13.55	4.96	2.73	13.10	5.14	2.55	12.44	5.45	2.28	11.62	5.61	2.07	10.85	5.71	1.90
-2°C	14.45	4.64	3.11	14.00	4.73	2.96	13.55	4.89	2.77	13.10	5.07	2.58	12.48	5.39	2.32	11.74	5.57	2.11	11.03	5.69	1.94
-1°C	14.45	4.57	3.16	14.00	4.65	3.01	13.55	4.81	2.82	13.10	5.01	2.61	12.52	5.33	2.35	11.85	5.53	2.14	11.21	5.68	1.97
0°C	14.45	4.50	3.21	14.00	4.57	3.06	13.55	4.73	2.86	13.10	4.95	2.65	12.57	5.27	2.39	11.97	5.48	2.18	11.39	5.66	2.01
1°C	14.45	4.43	3.26	14.00	4.48	3.13	13.55	4.66	2.91	13.10	4.88	2.68	12.61	5.21	2.42	12.08	5.44	2.22	11.57	5.65	2.05
2°C	14.45	4.36	3.31	14.00	4.40	3.18	13.55	4.58	2.96	13.10	4.82	2.72	12.65	5.15	2.46	12.20	5.40	2.26	11.75	5.63	2.09
3°C	14.45	4.29	3.37	14.00	4.32	3.24	13.55	4.50	3.01	13.10	4.76	2.75	12.65	5.09	2.49	12.32	5.36	2.30	11.93	5.61	2.13
4°C	14.45	4.22	3.42	14.00	4.23	3.31	13.55	4.43	3.06	13.10	4.69	2.79	12.65	5.03	2.51	12.43	5.32	2.34	11.84	5.21	2.27
5°C	14.45	4.15	3.48	14.00	4.15	3.37	13.55	4.35	3.11	13.10	4.63	2.83	12.65	4.97	2.55	12.32	4.86	2.53	11.75	4.81	2.44
6°C	14.45	3.62	3.99	14.00	3.69	3.79	13.55	3.91	3.47	13.10	4.17	3.14	12.65	4.48	2.82	12.20	4.40	2.77	11.75	4.72	2.49
7°C	14.45	3.08	4.69	14.00	3.22	4.35	13.55	3.47	3.90	13.10	3.70	3.54	12.65	3.98	3.18	12.20	4.32	2.82	11.75	4.63	2.54
8°C	14.45	3.03	4.77	14.00	3.17	4.42	13.55	3.41	3.97	13.10	3.63	3.61	12.65	3.91	3.24	12.20	4.24	2.88	11.75	4.54	2.59
9°C	14.45	2.98	4.85	14.00	3.11	4.50	13.55	3.34	4.06	13.10	3.56	3.68	12.65	3.85	3.29	12.20	4.17	2.93	11.75	4.46	2.63
10°C	14.45	2.93	4.93	14.00	3.06	4.58	13.55	3.28	4.13	13.10	3.49	3.75	12.65	3.78	3.35	12.20	4.09	2.98	11.75	4.37	2.69
11°C	14.45	2.88	5.02	14.00	3.01	4.65	13.55	3.22	4.21	13.10	3.42	3.83	12.65	3.72	3.40	12.20	4.02	3.03	11.75	4.28	2.75
12°C	14.45	2.83	5.11	14.00	2.95	4.75	13.55	3.15	4.30	13.10	3.35	3.91	12.65	3.65	3.47	12.20	3.94	3.10	11.75	4.19	2.80
13°C	14.45	2.78	5.20	14.00	2.90	4.83	13.55	3.09	4.39	13.10	3.28	3.99	12.65	3.58	3.53	12.20	3.86	3.16	11.75	4.11	2.86
14°C	14.45	2.73	5.29	14.00	2.84	4.93	13.55	3.02	4.49	13.10	3.21	4.08	12.65	3.52	3.59	12.20	3.79	3.22	11.75	4.02	2.92
15°C	14.45	2.68	5.39	14.00	2.79	5.02	13.55	2.96	4.58	13.10	3.14	4.17	12.65	3.45	3.67	12.20	3.71	3.29	11.75	3.93	2.99
16°C	14.45	2.64	5.47	14.00	2.74	5.11	13.55	2.92	4.64	13.10	3.10	4.23	12.65	3.39	3.73	12.20	3.67	3.32	11.75	3.91	3.01
17°C	14.45	2.60	5.56	14.00	2.69	5.20	13.55	2.88	4.70	13.10	3.06	4.28	12.65	3.33	3.80	12.20	3.63	3.36	11.75	3.90	3.01
18°C	14.45	2.56	5.64	14.00	2.65	5.28	13.55	2.84	4.77	13.10	3.03	4.32	12.65	3.26	3.88	12.20	3.59	3.40	11.75	3.88	3.03
19°C	14.45	2.52	5.73	14.00	2.60	5.38	13.55	2.80	4.84	13.10	2.99	4.38	12.65	3.20	3.95	12.20	3.55	3.44	11.75	3.87	3.04
20°C	14.45	2.48	5.83	14.00	2.55	5.49	13.55	2.76	4.91	13.10	2.95	4.44	12.65	3.14	4.03	12.20	3.51	3.48	11.75	3.85	3.05
21°C	14.45	2.46	5.87	14.00	2.53	5.53	13.55	2.74	4.95	13.10	2.93	4.47	12.65	3.12	4.05	12.20	3.48	3.51	11.75	3.81	3.08
22°C	14.45	2.43	5.95	14.00	2.50	5.60	13.55	2.71	5.00	13.10	2.91	4.50	12.65	3.10	4.08	12.20	3.45	3.54	11.75	3.77	3.12
23°C	14.45	2.41	6.00	14.00	2.48	5.65	13.55	2.69	5.04	13.10	2.89	4.53	12.65	3.08	4.11	12.20	3.42	3.57	11.75	3.73	3.15
24°C	14.45	2.39	6.05	14.00	2.46	5.69	13.55	2.67	5.07	13.10	2.86	4.58	12.65	3.06	4.13	12.20	3.39	3.60	11.75	3.69	3.18
25°C	14.45	2.36	6.12	14.00	2.43	5.76	13.55	2.64	5.13	13.10	2.84	4.61	12.65	3.04	4.16	12.20	3.36	3.63	11.75	3.65	3.22
26°C	14.45	2.34	6.18	14.00	2.41	5.81	13.55	2.62	5.17	13.10	2.82	4.65	12.65	3.02	4.19	12.20	3.33	3.66	11.75	3.61	3.25
27°C	14.45	2.32	6.23	14.00	2.39	5.86	13.55	2.60	5.21	13.10	2.80	4.68	12.65	3.00	4.22	12.20	3.30	3.70	11.75	3.57	3.29
28°C	14.45	2.29	6.31	14.00	2.36	5.93	13.55	2.57	5.27	13.10	2.78	4.71	12.65	2.98	4.24	12.20	3.27	3.73	11.75	3.54	3.32
29°C	14.45	2.27	6.37	14.00	2.34	5.98	13.55	2.55	5.31	13.10	2.76	4.75	12.65	2.96	4.27	12.20	3.24	3.77	11.75	3.50	3.36
30°C	14.45	2.25	6.42	14.00	2.32	6.03	13.55	2.53	5.36	13.10	2.74	4.78	12.65	2.94	4.30	12.20	3.21	3.80	11.75	3.46	3.40
31°C	14.45	2.22	6.51	14.00	2.29	6.11	13.55	2.50	5.42	13.10	2.72	4.82	12.65	2.92	4.33	12.20	3.18	3.84	11.75	3.42	3.44
32°C	14.45	2.20	6.57	14.00	2.27	6.17	13.55	2.48	5.46	13.10	2.69	4.87	12.65	2.90	4.36	12.20	3.15	3.87	11.75	3.38	3.48
33°C	14.45	2.18	6.63	14.00	2.25	6.22	13.55	2.46	5.51	13.10	2.67	4.91	12.65	2.88	4.39	12.20	3.12	3.91	11.75	3.34	3.52
34°C	14.45	2.15	6.72	14.00	2.22	6.31	13.55	2.43	5.58	13.10	2.65	4.94	12.65	2.86	4.42	12.20	3.09	3.95	11.75	3.30	3.56
35°C	14.45	2.13	6.78	14.00	2.20	6.36	13.55	2.41	5.62	13.10	2.63	4.98	12.65	2.84	4.45	12.20	3.06	3.99	11.75	3.26	3.60

LWC : Leaving water condenser temperature
Tamb : Temperature ambient
HC : Heating capacity (kW)
PI : Power input (kW)
COP : Coefficient of performance

Outdoor unit / 3 phase

■ MODEL : WO✱K160L

LWC	30°C			35°C			40°C			45°C			50°C			55°C			60°C		
Tamb	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP
-20°C	10.32	4.79	2.15	10.40	5.17	2.01	10.52	5.55	1.90	10.80	6.06	1.78	10.12	6.38	1.59	9.41	6.38	1.47	8.70	6.39	1.36
-19°C	10.81	4.90	2.21	10.88	5.25	2.07	10.94	5.63	1.94	11.12	6.11	1.82	10.42	6.38	1.63	9.69	6.38	1.52	8.96	6.39	1.40
-18°C	11.29	5.02	2.25	11.36	5.34	2.13	11.35	5.71	1.99	11.44	6.16	1.86	10.72	6.38	1.68	9.96	6.39	1.56	9.22	6.39	1.44
-17°C	11.78	5.13	2.30	11.84	5.42	2.18	11.77	5.79	2.03	11.76	6.20	1.90	11.03	6.39	1.73	10.24	6.39	1.60	9.48	6.39	1.48
-16°C	12.26	5.25	2.34	12.32	5.51	2.24	12.18	5.87	2.07	12.08	6.25	1.93	11.33	6.39	1.77	10.51	6.40	1.64	9.74	6.39	1.52
-15°C	12.75	5.36	2.38	12.80	5.59	2.29	12.60	5.95	2.12	12.40	6.30	1.97	11.63	6.39	1.82	10.79	6.40	1.69	10.00	6.39	1.56
-14°C	13.04	5.36	2.43	13.08	5.59	2.34	12.85	5.95	2.16	12.66	6.31	2.01	11.89	6.39	1.86	11.05	6.41	1.72	10.21	6.41	1.59
-13°C	13.34	5.35	2.49	13.35	5.58	2.39	13.11	5.96	2.20	12.93	6.32	2.05	12.14	6.40	1.90	11.30	6.42	1.76	10.43	6.43	1.62
-12°C	13.63	5.35	2.55	13.63	5.58	2.44	13.36	5.97	2.24	13.19	6.33	2.08	12.40	6.40	1.94	11.56	6.42	1.80	10.64	6.45	1.65
-11°C	13.93	5.35	2.60	13.90	5.57	2.50	13.62	5.98	2.28	13.45	6.34	2.12	12.65	6.41	1.97	11.82	6.43	1.84	10.85	6.47	1.68
-10°C	14.22	5.34	2.66	14.18	5.57	2.55	13.87	5.99	2.32	13.71	6.35	2.16	12.91	6.41	2.01	12.07	6.44	1.87	11.06	6.49	1.70
-9°C	14.51	5.34	2.72	14.45	5.56	2.60	14.12	5.99	2.36	13.98	6.36	2.20	13.16	6.41	2.05	12.33	6.45	1.91	11.28	6.51	1.73
-8°C	14.81	5.33	2.78	14.73	5.56	2.65	14.38	6.00	2.40	14.24	6.37	2.24	13.42	6.42	2.09	12.58	6.45	1.95	11.49	6.53	1.76
-7°C	15.10	5.33	2.83	15.00	5.55	2.70	14.63	6.01	2.43	14.50	6.38	2.27	13.67	6.42	2.13	12.84	6.46	1.99	11.70	6.55	1.79
-6°C	15.02	5.27	2.85	14.90	5.49	2.71	14.51	5.93	2.45	14.35	6.29	2.28	13.56	6.32	2.15	12.77	6.39	2.00	11.75	6.53	1.80
-5°C	14.93	5.22	2.86	14.80	5.43	2.73	14.39	5.85	2.46	14.20	6.20	2.29	13.45	6.23	2.16	12.70	6.33	2.01	11.80	6.50	1.82
-4°C	14.85	5.16	2.88	14.70	5.36	2.74	14.26	5.76	2.48	14.05	6.11	2.30	13.34	6.13	2.18	12.62	6.26	2.02	11.85	6.48	1.83
-3°C	14.76	5.10	2.89	14.60	5.30	2.75	14.14	5.68	2.49	13.90	6.02	2.31	13.23	6.03	2.19	12.55	6.19	2.03	11.90	6.45	1.84
-2°C	14.89	5.05	2.95	14.70	5.21	2.82	14.30	5.59	2.56	14.06	5.95	2.36	13.36	6.00	2.23	12.70	6.19	2.05	12.07	6.45	1.87
-1°C	15.02	5.00	3.00	14.80	5.13	2.88	14.45	5.51	2.62	14.22	5.88	2.42	13.49	5.97	2.26	12.84	6.18	2.08	12.24	6.44	1.90
0°C	15.15	4.94	3.07	14.90	5.04	2.96	14.61	5.42	2.70	14.38	5.80	2.48	13.62	5.94	2.29	12.99	6.18	2.10	12.41	6.44	1.93
1°C	15.28	4.89	3.12	15.00	4.96	3.02	14.76	5.34	2.76	14.54	5.73	2.54	13.75	5.91	2.33	13.13	6.17	2.13	12.58	6.43	1.96
2°C	15.41	4.84	3.18	15.10	4.87	3.10	14.92	5.25	2.84	14.70	5.66	2.60	13.88	5.88	2.36	13.28	6.17	2.15	12.75	6.43	1.98
3°C	15.82	4.84	3.27	15.40	4.91	3.14	15.06	5.21	2.89	14.83	5.62	2.64	13.94	5.86	2.38	13.43	6.17	2.18	12.92	6.43	2.01
4°C	16.24	4.84	3.36	15.70	4.95	3.17	15.21	5.18	2.94	14.97	5.59	2.68	13.99	5.85	2.39	13.57	6.16	2.20	12.75	5.85	2.19
5°C	16.65	4.84	3.44	16.00	4.99	3.21	15.35	5.14	2.99	15.10	5.55	2.72	14.05	5.83	2.41	13.49	5.54	2.44	12.75	5.27	2.42
6°C	16.65	4.24	3.93	16.00	4.36	3.67	15.35	4.58	3.35	15.10	4.99	3.03	14.05	5.25	2.68	13.40	4.91	2.73	12.75	5.18	2.46
7°C	16.65	3.64	4.57	16.00	3.72	4.30	15.35	4.02	3.82	15.10	4.42	3.42	14.05	4.66	3.02	13.40	4.82	2.78	12.75	5.09	2.50
8°C	16.65	3.58	4.65	16.00	3.66	4.37	15.35	3.95	3.89	15.10	4.33	3.49	14.05	4.57	3.07	13.40	4.74	2.83	12.75	5.00	2.55
9°C	16.65	3.52	4.73	16.00	3.61	4.43	15.35	3.88	3.96	15.10	4.24	3.56	14.05	4.48	3.14	13.40	4.65	2.88	12.75	4.91	2.60
10°C	16.65	3.46	4.81	16.00	3.55	4.51	15.35	3.81	4.03	15.10	4.15	3.64	14.05	4.38	3.21	13.40	4.57	2.94	12.75	4.82	2.65
11°C	16.65	3.40	4.90	16.00	3.50	4.57	15.35	3.74	4.10	15.10	4.07	3.71	14.05	4.29	3.28	13.40	4.48	2.99	12.75	4.73	2.70
12°C	16.65	3.34	4.99	16.00	3.44	4.65	15.35	3.67	4.18	15.10	3.98	3.79	14.05	4.20	3.35	13.40	4.40	3.05	12.75	4.64	2.75
13°C	16.65	3.28	5.08	16.00	3.38	4.73	15.35	3.60	4.26	15.10	3.89	3.88	14.05	4.11	3.42	13.40	4.31	3.11	12.75	4.55	2.80
14°C	16.65	3.22	5.17	16.00	3.33	4.80	15.35	3.53	4.35	15.10	3.80	3.97	14.05	4.01	3.50	13.40	4.23	3.17	12.75	4.46	2.86
15°C	16.65	3.16	5.27	16.00	3.27	4.89	15.35	3.46	4.44	15.10	3.71	4.07	14.05	3.92	3.58	13.40	4.14	3.24	12.75	4.37	2.92
16°C	16.65	3.11	5.35	16.00	3.21	4.98	15.35	3.41	4.50	15.10	3.67	4.11	14.05	3.89	3.61	13.40	4.11	3.26	12.75	4.34	2.94
17°C	16.65	3.06	5.44	16.00	3.15	5.08	15.35	3.36	4.57	15.10	3.64	4.15	14.05	3.86	3.64	13.40	4.08	3.28	12.75	4.32	2.95
18°C	16.65	3.00	5.55	16.00	3.08	5.19	15.35	3.32	4.62	15.10	3.60	4.19	14.05	3.83	3.67	13.40	4.04	3.32	12.75	4.29	2.97
19°C	16.65	2.95	5.64	16.00	3.02	5.30	15.35	3.27	4.69	15.10	3.57	4.23	14.05	3.80	3.70	13.40	4.01	3.34	12.75	4.27	2.99
20°C	16.65	2.90	5.74	16.00	2.96	5.41	15.35	3.22	4.77	15.10	3.53	4.28	14.05	3.77	3.73	13.40	3.98	3.37	12.75	4.24	3.01
21°C	16.65	2.87	5.80	16.00	2.93	5.46	15.35	3.19	4.81	15.10	3.50	4.31	14.05	3.73	3.77	13.40	3.94	3.40	12.75	4.19	3.04
22°C	16.65	2.84	5.86	16.00	2.90	5.52	15.35	3.16	4.86	15.10	3.47	4.35	14.05	3.69	3.81	13.40	3.90	3.44	12.75	4.15	3.07
23°C	16.65	2.82	5.90	16.00	2.88	5.56	15.35	3.13	4.90	15.10	3.44	4.39	14.05	3.66	3.84	13.40	3.86	3.47	12.75	4.10	3.11
24°C	16.65	2.79	5.97	16.00	2.85	5.61	15.35	3.09	4.97	15.10	3.40	4.44	14.05	3.62	3.88	13.40	3.82	3.51	12.75	4.06	3.14
25°C	16.65	2.76	6.03	16.00	2.82	5.67	15.35	3.06	5.02	15.10	3.37	4.48	14.05	3.58	3.92	13.40	3.78	3.54	12.75	4.01	3.18
26°C	16.65	2.73	6.10	16.00	2.79	5.73	15.35	3.03	5.07	15.10	3.34	4.52	14.05	3.54	3.97	13.40	3.74	3.58	12.75	3.96	3.22
27°C	16.65	2.70	6.17	16.00	2.76	5.80	15.35	3.00	5.12	15.10	3.31	4.56	14.05	3.50	4.01	13.40	3.70	3.62	12.75	3.92	3.25
28°C	16.65	2.68	6.21	16.00	2.74	5.84	15.35	2.97	5.17	15.10	3.28	4.60	14.05	3.47	4.05	13.40	3.65	3.67	12.75	3.87	3.29
29°C	16.65	2.65	6.28	16.00	2.71	5.90	15.35	2.94	5.22	15.10	3.25	4.65	14.05	3.43	4.10	13.40	3.61	3.71	12.75	3.83	3.33
30°C	16.65	2.62	6.35	16.00	2.68	5.97	15.35	2.91	5.27	15.10	3.22	4.69	14.05	3.39	4.14	13.40	3.57	3.75	12.75	3.78	3.37
31°C	16.65	2.59	6.43	16.00	2.65	6.04	15.35	2.88	5.33	15.10	3.19	4.73	14.05	3.35	4.19	13.40	3.53	3.80	12.75	3.73	3.42
32°C	16.65	2.56	6.50	16.00	2.62	6.11	15.35	2.84	5.40	15.10	3.15	4.79	14.05	3.31	4.24	13.40	3.49	3.84	12.75	3.69	3.46
33°C	16.65	2.54	6.56	16.00	2.60	6.15	15.35	2.81	5.46	15.10	3.12	4.84	14.05	3.28	4.28	13.40	3.45	3.88	12.75	3.64	3.50
34°C	16.65	2.51	6.63	16.00	2.57	6.23	15.35	2.78	5.52	15.10	3.09	4.89	14.05	3.24	4.34	13.40	3.41	3.93	12.75	3.60	3.54
35°C	16.65	2.48	6.71	16.00	2.54	6.30	15.35	2.75	5.58	15.10	3.06	4.93	14.05	3.20	4.39	13.40	3.37	3.98	12.75	3.55	3.59

LWC : Leaving water condenser temperature
Tamb : Temperature ambient
HC : Heating capacity (kW)
PI : Power input (kW)
COP : Coefficient of performance

Outdoor unit / 3 phase

7. OPERATION NOISE

7-1. NOISE LEVEL CURVE

■ MODEL : WO✱K112L

● Heating

■ MODEL : WO✱K140L

● Heating

■ MODEL : WO✱K160L

● Heating

Outdoor unit / 3 phase

7-2. SOUND LEVEL CHECK POINT

Air Flow

Microphone

Microphone

1m

Outdoor unit / 3 phase

8. OPERATION RANGE

Temperature ambient (°CDB)

Cooling mode

43

8

6   35

Leaving water evaporator temperature (°C)

Temperature ambient (°CDB)

Heating mode
Sanitary mode

35

0

-20

8   60

Leaving water condenser temperature (°C)

Outdoor unit / 3 phase

9. SAFETY DEVICES

	Protection from	Model		
		WO∗K112LAT	WO∗K140LAT	WO∗K160LAT
Circuit protection	Current fuse (Main PCB)	5A 250V		
		3.15A 250V		
		10A 250V		
Fan motor protection	Thermal protecter	OFF: 140±20°C ON: 110±20°C		
Compressor protection	Thermal protection program (Compressor temp.)	OFF: 112°C ON: 80°C		
	Thermal protection program (Discharge temp.)	OFF: 115°C ON: After 7 minutes		
High pressure protection	Thermal protection program (Heat exchanger temp.)	OFF: 68°C ON: 63°C		
	Pressure sensor	OFF: 4.2MPa ON: 3.0MPa		
Low pressure protection	Pressure sensor	OFF: 0.12MPa ON: 0.15MPa		

Outdoor unit / 3 phase

10. STANDARD ACCESSORIES

Name and shape	Q'ty	Application
Installation manual	1	
Elbow	1	For draining away the condensates
Plug	2	

Outdoor unit / 3 phase

Refrigerant R410A
INVERTER

WATERSTAGE ™

2. INDOOR UNIT

3 PHASE TYPE :
WS∗K160DA9

CONTENTS

2. INDOOR UNIT

1. FEATURES

■ MODEL : WS∗K160DA9

■ FEATURES

● Intelligent Control

• 2-zone individual control *

Indoor unit

Pump

2nd Circuit Kit

Outdoor unit

Radiator

Over
50°C
possible

~40°C

Valve

Pump

Floor heating
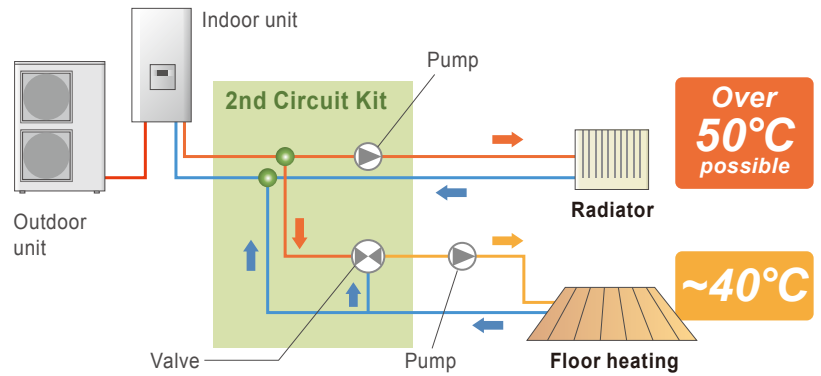
*: Optional parts are required

● High Reliability

• High clean and durability

• Corrosion protected

• No fouling through heat exchanger construction

• Hot water is permanently available

Stainless steel buffer tank

Optimum co-axial heat exchanger

Anti-freeze is unnecessary

Warm refrigerant flow

Heated water

Highly efficient water heat exchanger

Double-pipe water heat exchanger with built-in tank to reduce loss
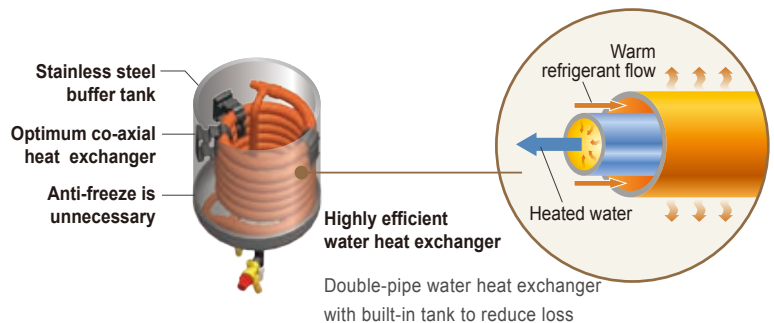
• Easy installation & maintenance

• All hydraulic components built in no problem of selection for water flow required

• Lifting bars for an installation without any difficulty or risk

• Easy access for maintenance operations

• Pump down operation

• Emergency operation

System can be continuously supplied hot water by built in back up heater operation, even if an error is occurred as emergency.

Backup heater

Boiler*

Radiator

Floor heating

Outdoor unit   Indoor unit
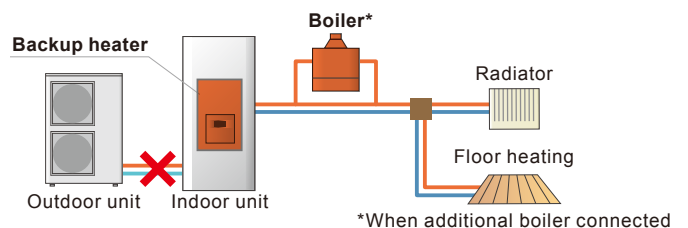
*When additional boiler connected

Indoor unit / 3 phase

●Others

• Automatic temperature regulation in accordance with heating curve.
 (Depends on terminal and outdoor temperature)

• Cooling operation is possible*

• Anti-Legionella function

 The growth of Legionella in DHW Tank is suppressed and safe and clean hot water is supplied at all times.

• Additional electric heater control for backup

• 2 stage Low noise mode*

• Peak cut function*

*Optional parts are required.

Indoor unit / 3 phase

2. SPECIFICATIONS

2-1. TECHNICAL SPECIFICATIONS

Model name (Indoor unit)				WS∗K160DA9		
Model name (Outdoor unit)				WO∗K112LAT	WO∗K140LAT	WO∗K160LAT
Input power Enclosure	Heating	Rated	kW	0.17		
		Max. *1		9		
Casing	Colour			WHITE		
	Material			8/10mm DC01 + EZ (5µ)		
Dimensions (H x W x D)	Net		mm	1034 x 450 x 480		
	Gross			1120 x 570 x 700		
Weight	Net		kg	53		
	Gross			65		
Main components	Pump	Type		Water cooled		
		Nr. of speed		3		
	Input power		W	135 *2		
	Water side Heat exchanger	Type		DOUBLE-TUBE		
		Q'ty		1		
		Water volume	l	25		
		Water flow rate Min.	l/min	25		
	Water flow rate Nom.	Heating	l/min	32.1	40.1	45.9
		Cooling		32.1	40.1	45.9
		Insulation material		polyurethane		
	Expansion vessel	Volume	l	8		
		Max. water pressure	bar	4.5		
		Pre pressure		1 bar (+/-20%)		
Water circuit	Piping connections diameter		inch	1		
	Piping			1		
	Safety valve		bar	3		
	Manometer			Yes		
	Drain valve / Fill valve			Yes		
	Shut off valve			Yes		
	Air purge valve			Yes		
Connection pipe (Refrigerant circuit)	Liquid side diameter		mm	9.52		
	Gas side diameter			15.88		
	Method			Flare		
Sound pressure level	Heating		dBA	43.3		
Operation range	Waterside	Heating	°C	8 to 60		

*1: With electric back-up heater.
*2: The value is at Full speed and full flow.

Indoor unit / 3 phase

2-2. ELECTRICAL SPECIFICATIONS

Model name (Indoor unit)				WS∗K160DA9		
Model name (Outdoor unit)				WO∗K112LAT	WO∗K140LAT	WO∗K160LAT
Electric heater	Type			Stainless steel 304L 9,5W/cm²		
	Power supply	Phase		3		
		Frequency	Hz	50		
		Voltage	V	400		
	Current	Running current	A	7.9		
		Max. operating current (Indoor unit)		10A + 10%		
Wiring specification (Indoor unit to outdoor unit)		Connection cable	mm²	1,5 x 4		
		Limited wiring length	m	Not available		

Indoor unit / 3 phase

3. DIMENSIONS

3-1. DIMENSIONAL DRAWING

■ MODEL : WS∗K160DA9

(Unit : mm)

450

1000

1034

235

Heating flow
ø M 26x34

Front view

Heating return
ø M 26x34

88

480

Side view
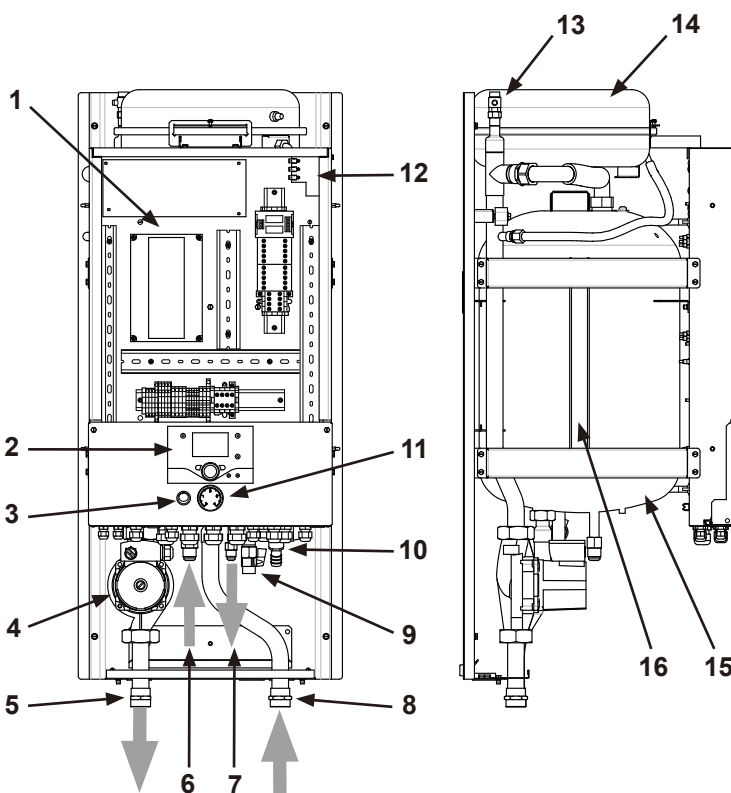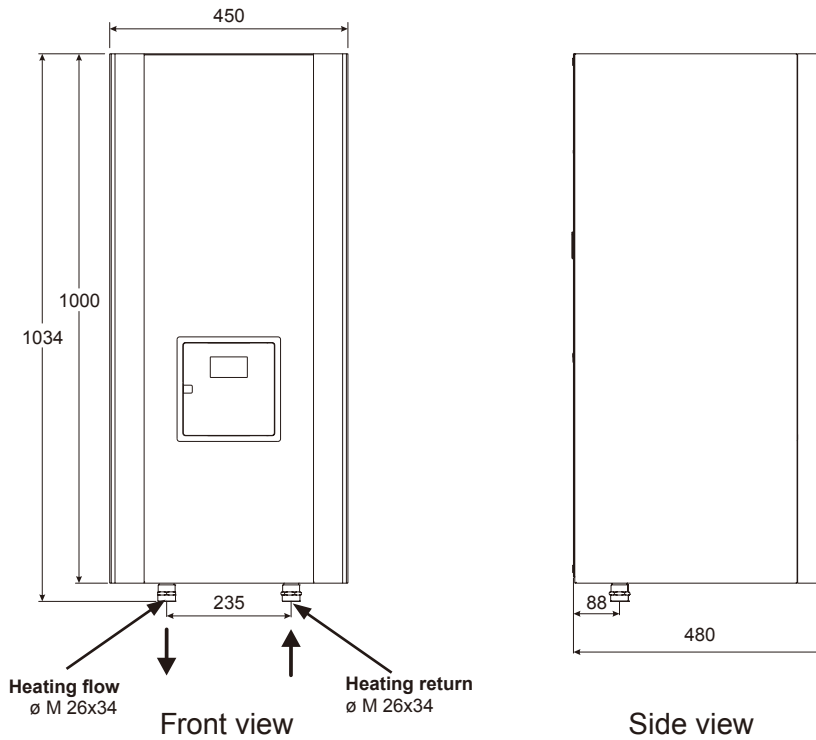
Legend

1 - Electric box
2 - Regulator / User interface
3 - Start/stop switch
4 - Heating circulation pump
5 - Initial heating
6 - Gas refrigeration connection
7 - Fluid refrigeration connection
8 - Heating return
9 - Drain valve
10 - Safety valve
11 - Manometer
12 - Safety thermostat
13 - Manual drainer
14 - Expansion vessel
15 - Condenser
16 - Electric back-ups

Indoor unit / 3 phase

3-2. INSTALLATION PLACE

150 mm
200 mm
150 mm
1000 mm
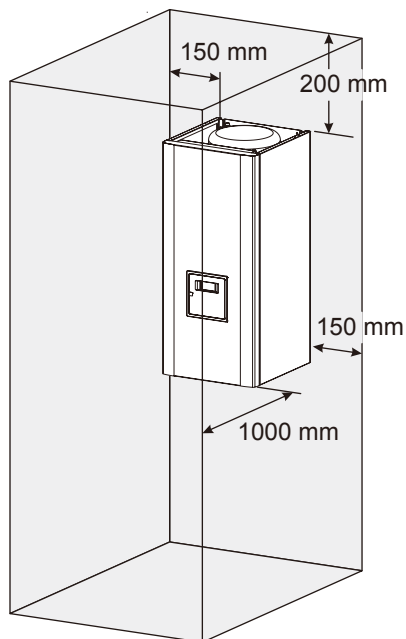
■ INSTALLATION PRECAUTIONS

- The room in which the appliance operates must comply with the prevailing regulations.
- To facilitate maintenance and to allow access to the various components, we recommend that you provide sufficient space all around the hydraulic module.
- Be careful not to bring inflammable gas near to the heat pump during its installation, in particular when it requires brazing. The appliances are not fireproof and should not therefore be installed in a potentially explosive atmosphere.

Indoor unit / 3 phase

4. PIPING DIAGRAM

■ MODEL : WS＊K160DA9

Hot water heater: OEM purchase

Air bleeding valve

Expansion tank

Hot water column sensor

Circulation pump

Auxiliary heater

Outdoor unit in common use with air conditioner (made by FG)

Buffer tank

Heating terminal (Floor heating, radiator, etc.)

Refrigerant

Hot water

Water heat exchanger

Pressure gauge

Hot water return sensor

Pressure safety valve

Supply/drain port

Indoor unit / 3 phase

5. WIRING DIAGRAM

5-1. WIRING DIAGRAM

■ MODEL : WS✱K160DA9

Condensation sensor

Return sensor

Flow sensor

Timed fuse
3,15 A - 250V

QX7
QX6
QX5

Heating
circulation
pump

K triangle

K étoile

K1

Safety thermostat

Start/stop
switch

Rp ECS

Resistance

Indoor unit / 3 phase
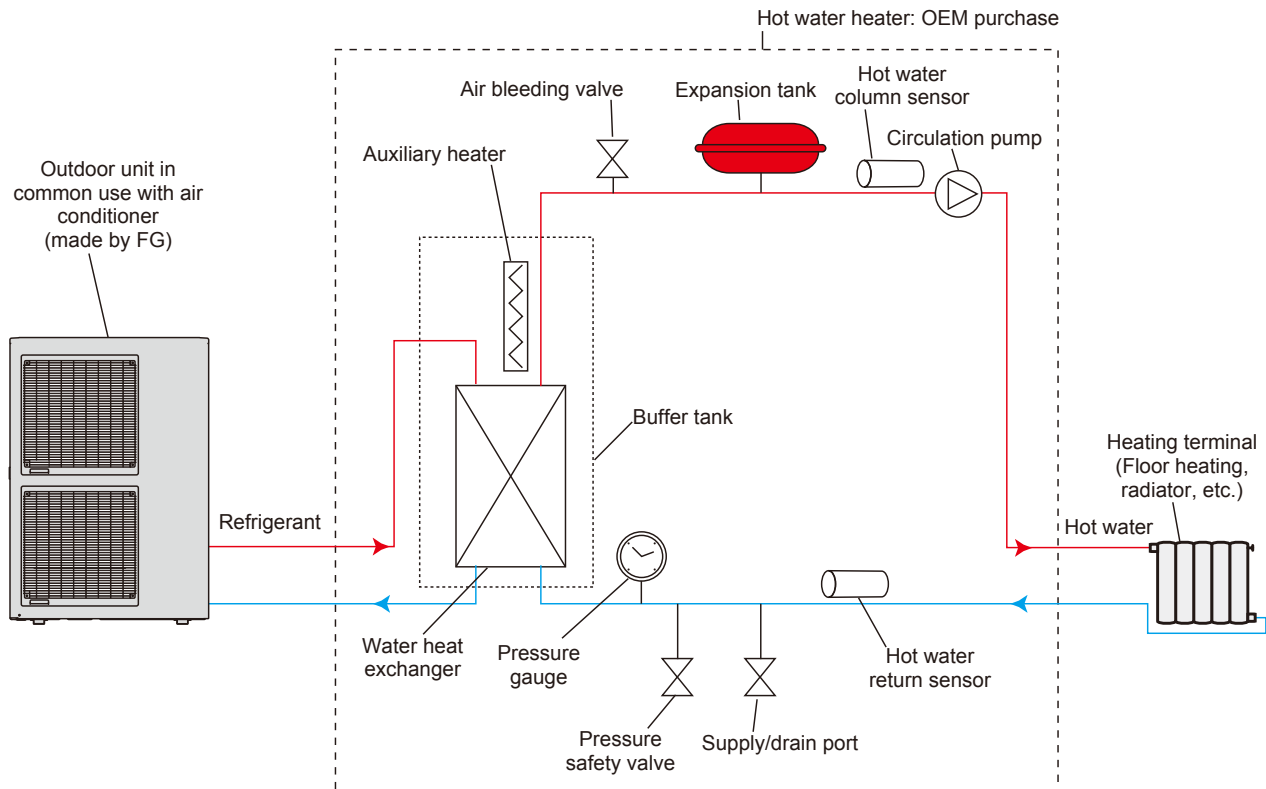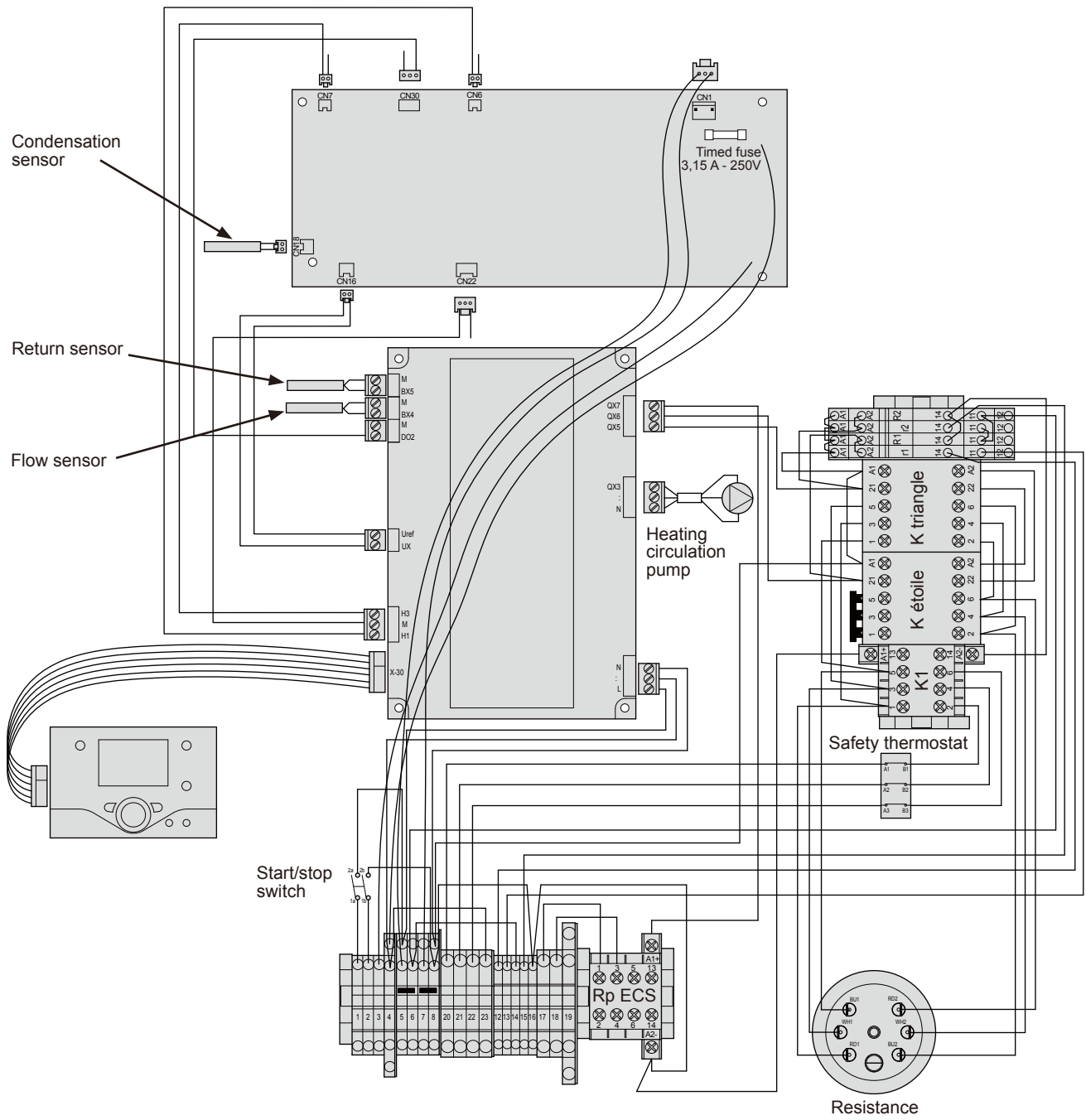
5-2. EXTERNAL CONNECTION DIAGRAM

■ MODEL : WS∗K160DA9

Outdoor sensor

M
B9

Room thermostat
circuit 1

| 2 |
| 1 |

CL-
CL+
CL-
CL+

EX6 — External fault

EX5 — Tariffs, day / night,
peak times/off-peak times

EX4 — Power shedding
or EJP (peak day removal)

Room thermostat
circuit 2

| 2 |
| 1 |

or

Remote control

3	G+
2	CL-
1	CL+

5 7

External component contact*
(faults, load shedder, power meter)

* If the control component does not provide a spare potential contact, the contact must be relayed to create equivalent wiring.
In all cases, please refer to the instruction manuals for the external components (load limiting device, power meters) to create the wiring.

Connections to the heat pump regulator (accessories and options)

Outside unit

Hydraulic module

| 1 | 2 | 3 | L1 | L2 | L3 | N |

L1 L2 L3 N ⏚

Electricity supply
3 phase 400V

red
blue
brown
green/yellow

Interconnection between
the outside unit and the
hydraulic module

1	2	3	4	5	6	7	8	20	21	22	23	12	13	14	15	16	17	18	19
L	N	COM	⏚	L	L	N	N	L1	L2	L3	N			L	N	L	N	⏚
OUTDOOR UNIT				SECOND CIRCUIT				ELECTRIC BACK UP SUPPLY				BOILER CONNECT	BOILER VALVE			DHW BACK UP SUPPLY		

RP ECS

| | 1 | 3 | 5 | 13 | A1+ |
| | 2 | 4 | 6 | 14 | A2- |

⏚ L   N

L1 L2 L3

L N

L N   ⏚   ⏚ L   N

Power supply
for 2nd circuit kit (option)

Power supply 400v to
the electrical back-ups

Boiler room
thermostat terminals

3 way distribution valve
(deviation boiler)

Power supply 230v to
the electrical back-ups

Connexion to the
DHW tank resistance

**HP and
electric back-ups**

**HP and
boiler connection**

DHW

Connection to terminal block and power relays

Indoor unit / 3 phase

6. HYDRAULIC PERFORMANCE

6-1. STATIC PRESSURE DROP UNIT

1mbar = 10 mmCE = 100 Pa

①: Pump speed-1 (Low)

②: Pump speed-2 (Middle)

③: Pump speed-3 (High)

Indoor unit / 3 phase

7. SAFETY DEVICES

	Protection form	Model
		WS✳K160DA9
Circuit protection	Current fuse (Main PCB)	20 A
High pressure protection	Safety valve	3 bar or more

Indoor unit / 3 phase

8. STANDARD ACCESSORIES

Name and shape	Q'ty	Application
Installation manual	1	
Bracket	1	To secure the hydraulic model
Outdoor sensor	1	To monitor the outside temp

Indoor unit / 3 phase

WATERSTAGE™

3. CONTROL SYSTEM

WS∗K160DA9

UTW-C75XA (Remote control)

UTW-C55XA (Room thermostat)

CONTENTS

3. CONTROL SYSTEM

1. FEATURES

● Smart & comfort control

The outdoor temperature is detected by sensor and the heating water temperature is controlled automatically.
The setting of room temperature and operation mode can be easily set. A wide range of control from heating to hot water supply and swimming pool is possible by combining with various optional parts.

Simple operation mode setting
•Selecting the heating mode

Large LCD display
•Operation status display
•Error display / Error history

Navigation and setting
•Selecting the heating menu
•Setting program timer
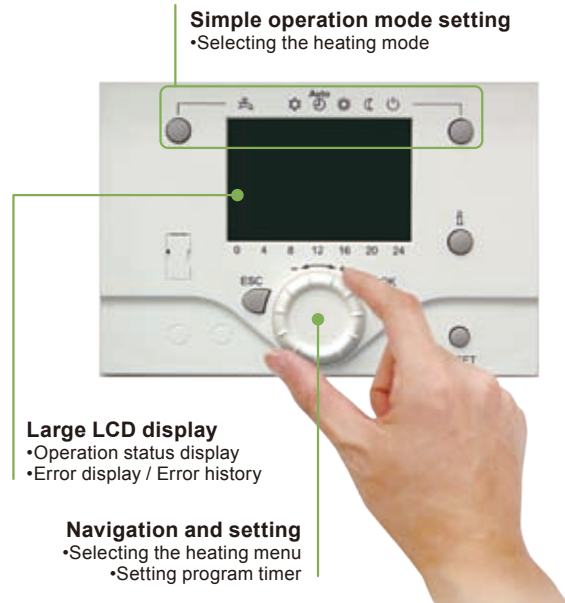
Comfort

• Flexible heating circuit

Automatic hot water temperature control matched to the application can be set.
In addition, set temperature coefficient offset can be adjusted easily high or low side matched to the usage conditions.

High

Leaving water temperature (°C)

+4.5°C

-4.5°C

Setting heating curve

Low

Low ——— Outdoor temperature (°C) ——— High
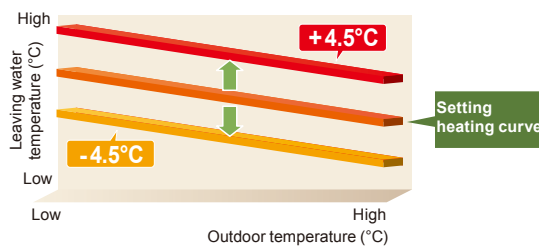
Convenience

• Programmed operation

- The setting of programmed operation can be easily set.
- Changing the heating mode linked with time is possible.

Heating mode	
Auto ⏱ Automatic mode Comfort/Reduce mode switching automatically according to outdoor temperature	**☀ Comfort mode** Constant comfort temperature
☾ Reduce mode Constant reduce temperature	**⟳ Protection mode** Stand-by mode with anti-frost protection

• Day-Weekly timer setting

- The day-weekly timer can be set up for up to 3 times per day.
- Allows separate settings for each day of the week.

Monday-Friday

☀
☾
6 9 12 15 18 21 24 Time

Saturday-Sunday

☀
☾
6 9 12 15 18 21 24 Time
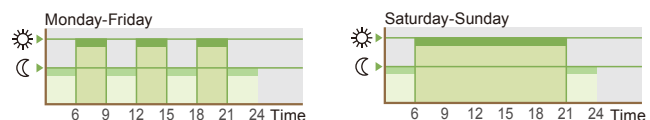
• Holiday timer setting

- The holiday timer can be set up for up to 8 periods.
- If you are absent for a long time in the winter, freezing of room can be prevented.

Auto ⏱
Holiday timer   Day-Weekly timer
⟳
11 12 1 2 3 Date

Control system / 3 phase
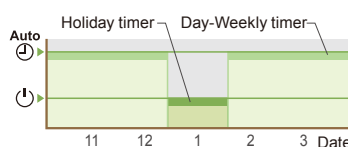
Extendibility

• Diverse operation control

Meets diverse needs by combining with optional parts.

2-temperature simultaneous heating
Floor heating + Radiator heating
(Split type only)

Operation together with boiler
at low outdoor temperature

Temperature control of swimming
pool (Controlled at 35°C)
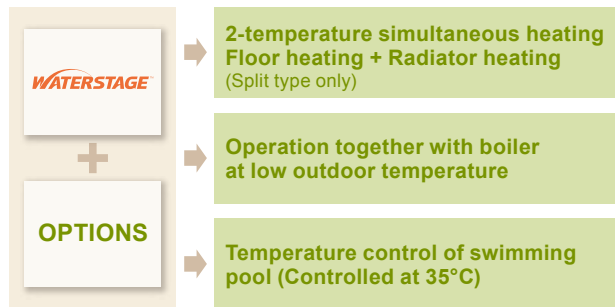
• Remote controller - Extension

Optional remote controller allows controls of hot water depending on room temperature.

(Split type)

Control system / 3 phase
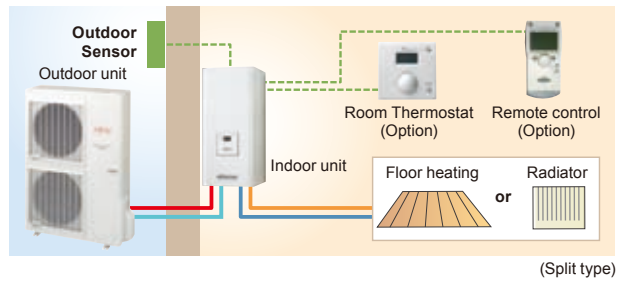
2. FUNCTIONS

2-1. USER INTERFACE AND REMOTE CONTROL (Optional parts)

Ref .	Functions	- Definitions
1	Selecting DHW mode (Domestic Hot Water) 🚰 On ━ 🚰 Off	- If the installation is fitted with a DHW tank. - On : Production of DHW according to the time program. - Off : Preparing the domestic hot water for stopping with the anti-frost function active. - Manual start button : Hold down the DHW key for 3 seconds. Switch from "reduced" to "comfort" until the next time the DHW timer switches over.
2	Digital display	- Operating control. Readout of the current temperature, the heating mode and any faults 🔔. - View the settings
3	Exit "ESC"	- Quit the menu.
4	Navigation and setting	- Selecting the menu. - Setting parameters. - Adjusting the ambient temperature setpoint.
5	Selecting heating mode	- ⏱ Heating operation according to the heating program (Summer/Winter mode switchover is automatic). - ☀ Constant comfort temperature. - ☾ Constant reduced temperature. - ⏻ Stand-by mode with anti-frost protection (Provided that the heat pump's electrical power supply is not interrupted).

Control system / 3 phase

Ref .	Functions	- Definitions
6	Information display	- Various data.

Designation	Line
Floor drying current setpoint	-
Current drying day	-
Terminated drying days	-
State heat pump	8006
State supplementary source	8022
State DHW	8003
State swimming pool	8011
State heating circuit 1	8000
State heating circuit 2	8001
State cooling circuit 1	8004
Outside temp	8700
Room temp 1	8740
Room setpoint 1	
Flow temp 1	8743
Flow temp setpoint 1	
Room temp 2	8770
Room setpoint 2	
Flow temp 2	8773
Flow temp setpoint 2	
DHW temp	8830
DHW temp setpoint	
Return temp HP	8410
Setpoint (return) HP	
Flow temp HP	8412
Setpoint (flow) HP	
Swimming pool temp	8900
Swimming pool setpoint	

Note:
Ensure that the general electrical power supply has been cut off before starting any repair work.
When the HP is not under tension, protection frost-free is not assured.

Ref .	Functions		- Definitions	

- 🔔 Reading error codes

Indoor unit : Fault visible on the digital display.

Error number	Error contents	Error location	Heat pump operation despite the error
-	No connection	Failure to comply with room thermostat's polarity	No
10	Outdoor sensor	B9	Yes with OT = 0 °C
33	Flow sensor HP	B21	Yes
44	Return sensor HP	B71	Yes
50	DHW sensor	B3	Yes
60	Room sensor 1		Yes
65	Room sensor 2		Yes
105	Maintenance message		Yes
121	Flow temp HC1 not reached		Yes
122	Flow temp HC2 not reached		Yes
127	Anti-legionella temp not reached		Yes
369	External fault (safety component)		No
370	Outdoor unit error	See the next page	No

Indoor unit : Flashing of the diode visible on the interface card.

Diodes display		Error contents
LED 2 (green)	LED 1 (red)	
1 Flash	1 Flash	Communication error between Indoor unit and Outdoor unit.
4 Flashes	1 Flash	Heat pump capacity signal error (Open or short).
4 Flashes	2 Flashes	Indoor unit heat-exchange thermister error.
6 Flashes	3 Flashes	Inverter error.
6 Flashes	4 Flashes	Active filter error / PFC error.
7 Flashes	1 Flash	Discharge thermister error.
7 Flashes	2 Flashes	Compressor thermister error.
7 Flashes	3 Flashes	Heat-exchange thermistor (outlet) error. Heat-exchange thermistor (intermediate) error.
7 Flashes	4 Flashes	Outdoor thermistor error.
7 Flashes	7 Flashes	Heat sink thermistor (inverter) error. Heat sink thermistor (P.F.C.) error.
7 Flashes	8 Flashes	Expansion valve thermistor error.
8 Flashes	4 Flashes	Current sensor error.
8 Flashes	6 Flashes	Pressure sensor error./ Pressure switch error.
9 Flashes	4 Flashes	Current trip.
9 Flashes	5 Flashes	Detection of compressor position error. / Compressor start up error.
9 Flashes	7 Flashes	Outdoor unit fan motor error.
10 Flashes	1 Flashes	Discharge temperature protection.
10 Flashes	3 Flashes	Compressor temperature protection.
10 Flashes	5 Flashes	Low pressure abnormal.
Continuous flashing (1 sec On / 1 sec Off)		Pump down operation.
Continuous lighting	Off	Defrosting.

- 🔧 Information concerning maintenance, special mode.

Ref .	Functions	- Definitions

Outdoor unit : To access the electronic board, you must remove the front (right-hand) facing from the outdoor unit. Faults are coded by diode flashes.
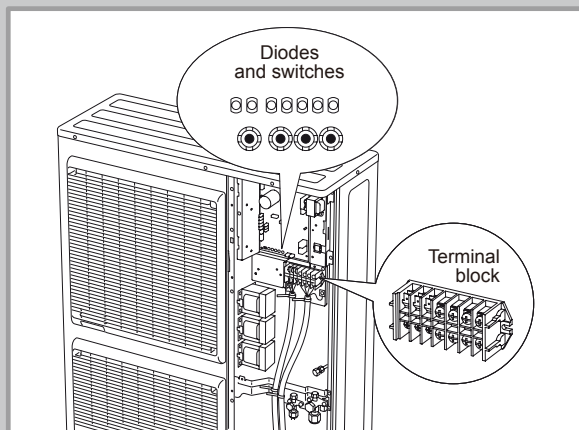
Location of switches and diodes on outdoor unit
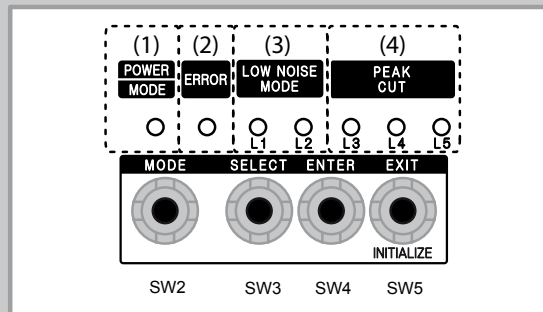
LED display on the outdoor unit

When an error occurs :
-The diode "ERROR" (2) blinks.
• Press once on the switch "ENTER" (SW4).
-The "ERROR" (2) diode blinks several times depending on the error's type (see below).

Diodes display	Error contents
1 Flash	Serial forward transfer error.
2 Flashes	Discharge thermistor error.
3 Flashes	Pressure sensor error.
4 Flashes	Heat-exchange thermistor (outlet) error.
5 Flashes	Heat-exchange thermistor (intermediate) error.
6 Flashes	Expansion valve thermistor error.
7 Flashes	Outdoor temperature thermistor error.
8 Flashes	Compressor thermistor error.
9 Flashes	Heat sink thermistor (inverter) error.
10 Flashes	Heat sink thermistor (P.F.C.) error.
11 Flashes	Discharge temperature protection (permanent stoppage).
12 Flashes	Compressor temperature protection (permanent stoppage).
13 Flashes	Current trip (permanent stoppage).
14 Flashes	Detection of compressor position error (permanent stoppage).
15 Flashes	Compressor start up error (permanent stoppage).
16 Flashes	Fan motor (1) error (permanent stoppage).
17 Flashes	Fan motor (2) error (permanent stoppage).
18 Flashes	Inverter error.
19 Flashes	P.F.C. error.
20 Flashes	Low pressure abnormal.
21 Flashes	Connection with indoor unit error.
22 Flashes	Indoor unit abnormality condition.

CONTROL SYSTEM

Control system / 3 phase

Ref .	Functions	- Definitions
7	Confirm "OK"	- Input into the selected menu. - Confirmation of the parameter settings. - Confirmation of the adjustment to the comfort temp. setting.
8	Selecting cooling mode	- If the installation is fitted with the cooling kit : - ☼ Cooling operating according to the heating program (Summer/Winter mode switchover is automatic).
9	RESET button (Hold down the "RESET" key for less than 3 sec).	- Reinitialising the parameters and cancelling error messages. - **Do not use during normal operation .**
12	Occupancy key	- Comfort / Reduced switchover.

Control system / 3 phase

2-2. ROOM THERMOSTAT (Optional parts)

Ref .	Functions	- Definitions
5	Selecting heating mode	- ⏲ᴬᵘᵗᵒ Heating operating according to the heating program (Summer/Winter mode switchover is automatic). - ☼ Constant comfort temperature. - ☾ Constant reduced temperature. - ⏻ Stand-by mode with anti-frost protection (Provided that the heat pump's electrical power supply is not interrupted).
10	Digital display	- Operating control. Readout of the current temperature, of the heating mode and of any faults ♩ .
11	Control knob	- Adjusting room temperature setpoint.
12	Occupancy key	- Comfort / Reduced switchover.

2-3. CONTROL SETTING

■ GENERAL

The settings described below are those which can be modified by the user.
We wish to remind you that changing the settings below may cause the heat pump to behave in an undesirable way. A testing period should be conducted before the permanent settings of the heat pump are confirmed. This may require a number of changes to be made by the installer.

There are 3 access levels:
    U: end-user level
    I: commissioning level (installer start-up)
    S: engineer level (specialist)

■ SETTING PARAMETERS

    -Choose the desired level.
    -Scroll the menu list.
    -Choose the desired menu.
    -Scroll the function lines.
    -Choose the desired line.
    -Adjust the parameter.
    -Check the setting by pressing OK.
    -To return the menu, press ESC.

If no setting is made for 8 minutes, the screen returns automatically to the basic display.

Control system / 3 phase
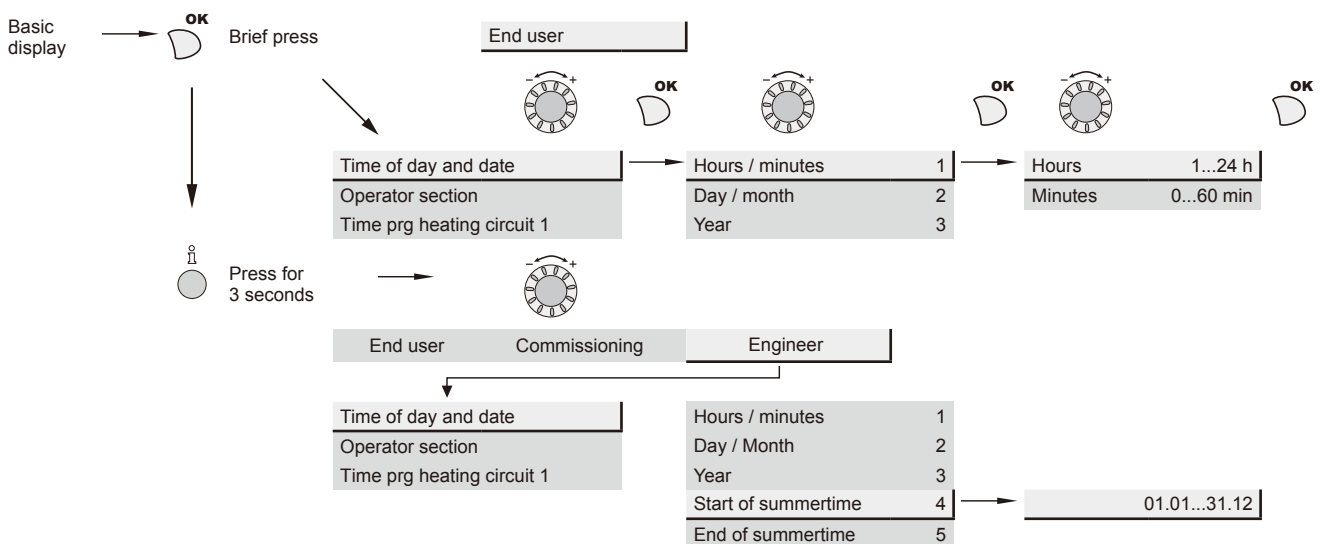
■ FUNCTION TABLE

LINE	ACCESS LEVEL	FUNCTION	SETTING RANGE OR DISPLAY	FACTORY SETTING
Time of day and date				
1	U	Hours/minutes	00:00…23:59	
2	U	Day/month	01.01…31.12	
3	U	Year	1900…2099	
5	S	Start of summertime	01.01…31.12	25.03
6	S	End of summertime	01.01…31.12	25.10
Operator section				
20	U	Language	9 Languages	English
22	S	Info	Temporarily / Permanently	Temporarily
26	S	Operation lock	Off/On	Off
27	S	Programming lock	Off/On	Off
28	I	Direct adjustment	Storage with confirmation / Autmatic storage	Storage with confirmation
40 *1	I	Used as	Room unit 1 Room unit 2 Room unit P Operator unit 1 Operator unit 2 Operator unit P Service unit	Room unit 1
42 *1	I	Assignement device 1	Heating circuit 1 Heating circuit 1 and 2 Heating circuit 1 and P All Heating circuits	Heating circuit 1
44	I	Operation HC2	Commonly with HC1 / Independently	Commonly with HC1
46	I	Operation HC3/P	Commonly with HC1 / Independently	Commonly with HC1
48 *1	I	Operator occupancy button	None Heating circuit 1 Heating circuit 2 Commonly	None
54 *1	I	Readjustment room sensor	-3.0…3.0°C	0.0°C
70	S	Software version (user interface)		
Time program heating circuit 1				
500	U	Preselection	Mo-Su / Mo-Fr / Sa - Su / Mo / Tu / We / Th / Fr / Sa / Su	Mo-Su
501	U	1st phase on	00:00…23:50, --:--	06:00
502	U	1st phase off	--:--, 00:10…24:00	22:00
503	U	2nd phase on	00:00…23:50, --:--	--:--
504	U	2nd phase off	--:--, 00:10…24:00	--:--
505	U	3rd phase on	00:00…23:50, --:--	--:--
506	U	3rd phase off	--:--, 00:10…24:00	--:--
516	U	Default values	No/Yes	No

CONTROL SYSTEM

CONTROL SYSTEM

Control system / 3 phase

LINE	ACCESS LEVEL	FUNCTION	SETTING RANGE OR DISPLAY	FACTORY SETTING
Time program heating circuit 2				
520	U	Preselection	Mo-Su / Mo-Fr / Sa - Su / Mo / Tu / We / Th / Fr / Sa / Su	Mo-Su
521	U	1st phase on	00:00…23:50, --:--	06:00
522	U	1st phase off	--:--, 00:10…24:00	22:00
523	U	2nd phase on	00:00…23:50, --:--	--:--
524	U	2nd phase off	--:--, 00:10…24:00	--:--
525	U	3rd phase on	00:00…23:50, --:--	--:--
526	U	3rd phase off	--:--, 00:10…24:00	--:--
536	U	Default values	No/Yes	No
Time program 3 / HCP				
540	U	Preselection	Mo-Su / Mo-Fr / Sa - Su / Mo / Tu / We / Th / Fr / Sa / Su	Mo-Su
541	U	1st phase on	00:00…23:50, --:--	06:00
542	U	1st phase off	--:--, 00:10…24:00	22:00
543	U	2nd phase on	00:00…23:50, --:--	--:--
544	U	2nd phase off	--:--, 00:10…24:00	--:--
545	U	3rd phase on	00:00…23:50, --:--	--:--
546	U	3rd phase off	--:--, 00:10…24:00	--:--
556	U	Default values	No/Yes	No
Time program 4 / DHW				
560	U	Preselection	Mo-Su / Mo-Fr / Sa - Su / Mo / Tu / We / Th / Fr / Sa / Su	Mo-Su
561	U	1st phase on	00:00…23:50, --:--	00:00
562	U	1st phase off	--:--, 00:10…24:00	05:00
563	U	2nd phase on	00:00…23:50, --:--	--:--
564	U	2nd phase off	--:--, 00:10…24:00	--:--
565	U	3rd phase on	00:00…23:50, --:--	--:--
566	U	3rd phase off	--:--, 00:10…24:00	--:--
576	U	Default values	No/Yes	No
Time program 5				
600	U	Preselection	Mo-Su / Mo-Fr / Sa - Su / Mo / Tu / We / Th / Fr / Sa / Su	Mo-Su
601	U	1st phase on	00:00…23:50, --:--	08:00
602	U	1st phase off	--:--, 00:10…24:00	20:00
603	U	2nd phase on	00:00…23:50, --:--	--:--
604	U	2nd phase off	--:--, 00:10…24:00	--:--
605	U	3rd phase on	00:00…23:50, --:--	--:--
606	U	3rd phase off	--:--, 00:10…24:00	--:--
616	U	Default values	No/Yes	No

Control system / 3 phase

LINE	ACCESS LEVEL	FUNCTION	SETTING RANGE OR DISPLAY	FACTORY SETTING
Holidays heating circuit 1				
641	U	Preselection	Period 1…8	Period 1
642	U	Start	--:--, 01.01…31.12	--:--
643	U	End	--:--, 01.01…31.12	--:--
648	U	Operation level	Frost protection / Reduced	Frost protection
Holidays heating circuit 2				
651	U	Preselection	Period 1…8	Period 1
652	U	Start	--:--, 01.01…31.12	--:--
653	U	End	--:--, 01.01…31.12	--:--
658	U	Operation level	Frost protection / Reduced	Frost protection
Heating circuit 1				
710	U	Comfort setpoint	from reduced setpoint to 35.0°C	20.0°C
712	U	Reduced setpoint	from frost protection setpoint to comfort setpoint	18.0°C
714	U	Frost protection setpoint	from 4.0°C to reduced setpoint	8.0°C
716	S	Comfort setpoint max	20.0…35.0°C	28.0°C
720	I	Heating curve slope	0.10…4.00	0.50
721	I	Heating curve displacement	-4.5…4.5°C	0.0°C
726	I	Heating curve adaption	Off/On	Off
730	I	Summer/winter heating limit	---, 8.0…30.0°C	18.0°C
732	S	24-hour heating limit	---, -10…10°C	-3°C
740	S	Flow temp setpoint min	8...95°C	8°C
741	S	Flow temp setpoint max	8...95°C	55°C
750	S	Room influence	---, 1...100%	20%
790	S	Optimum start control max	0…360min	120 min
791	S	Optimum stop control max	0…360min	120 min
800	S	Reduced setpoint increase start	---, -5…10°C	---°C
801	S	Reduced setpoint increase end	-30…0°C	-5°C
830	S	Mixing valve boost	0…50°C	0°C
834	S	Actuator running time	30…873sec	240sec
850	I	Floor curing function	Off Functional heating Curing heating Functional/Curing heating Curing/Functional heating Manually	Off
851	I	Floor curing setpoint manually	0…95°C	25°C
856	I	Floor curing day current	0...32	0
857	I	Floor curing days completed	0...32	0
900	S	Operating mode changeover	None / Protection / Reduced / Comfort / Automatic	Protection

CONTROL SYSTEM

LINE	ACCESS LEVEL	FUNCTION	SETTING RANGE OR DISPLAY	FACTORY SETTING
**Cooling circuit 1**				
901	U	Operating mode	Off / Automatic	Off
902	U	Comfort setpoint	17.0…40.0°C	24.0°C
907	U	Release	24h/day Time program HC Time program 5	Time program 5
908	I	Flow temp setpoint at OT 25°C	6.0…35.0°C	20.0°C
909	I	Flow temp setpoint at OT 35°C	6.0…35.0°C	16.0°C
912	I	Cooling limit at OT	---, 8.0…35.0°C	24.0°C
913	S	Lock time at end of heating	---, 8…100h	24h
918	S	Summer compensation start at OT	20…50°C	26°C
919	S	Summer compensation end at OT	20…50°C	40°C
920	S	Summer compensation setpoint increase	---, 1.0…10.0°C	4.0°C
923	S	Flow temp setpoint min OT 25°C	6.0…35.0°C	18.0°C
924	S	Flow temp setpoint min OT 35°C	6.0…35.0°C	18.0°C
928	S	Room influence	---, 1…100%	80%
932	S	Room temp limitation	---, 0.5…4.0°C	0.5°C
938	S	Mixing valve decrease	0…20°C	0°C
941	S	Actuator running time	30…873sec	240sec
945	S	Mixing valve heating mode	Control / Open	Control
946	S	Lock time dewpoint limiter	---, 10…600min	60min
947	S	Flow temp setpoint increase hygrostat	---, 1…20°C	10°C
948	S	Flow setpoint increase start at relative humidity	0…100%	60%
950	S	Flow temp differential dewpoint	--, 0…5°C	2°C
963	S	With primary controller/system pump	No/Yes	No
969	S	Operating mode changeover	None / Off / Automatic	Off

LINE	ACCESS LEVEL	FUNCTION	SETTING RANGE OR DISPLAY	FACTORY SETTING
Heating circuit 2				
1010	U	Comfort setpoint	from reduced setpoint to 35.0°C	20.0°C
1012	U	Reduced setpoint	from frost protection setpoint to comfort setpoint	18.0°C
1014	U	Frost protection setpoint	from 4.0°C to reduced setpoint	8.0°C
1016	S	Comfort setpoint max	20.0…35.0°C	28.0°C
1020	I	Heating curve slope	0.10…4.00	0.50
1021	I	Heating curve displacement	-4.5…4.5°C	0.0°C
1026	I	Heating curve adaption	Off/On	Off
1030	I	Summer/winter heating limit	---, 8.0…30.0°C	18.0°C
1032	S	24-hour heating limit	---, -10…10°C	-3°C
1040	S	Flow temp setpoint min	8…95°C	8°C
1041	S	Flow temp setpoint max	8…95°C	55°C
1050	S	Room influence	---, 1...100%	20%
1090	S	Optimum start control max	0…360min	120 min
1091	S	Optimum stop control max	0…360min	120 min
1100	S	Reduced setpoint increase start	---, -5…10°C	---°C
1101	S	Reduced setpoint increase end	-30…10°C	-5°C
1130	S	Mixing valve boost	0…50°C	0°C
1134	S	Actuator running time	30…873sec	240sec
1150	I	Floor curing function	Off Functional heating Curing heating Functional/Curing heating Curing/Functional heating Manually	Off
1151	I	Floor curing setpoint manually	0…95°C	25°C
1156	I	Floor curing day current	0…32°C	---°C
1157	I	Floor curing days completed	0…32	0
1200	S	Operating mode changeover	None / Protection / Reduced / Comfort / Automatic	Protection

CONTROL SYSTEM

CONTROL SYSTEM

Control system / 3 phase

LINE	ACCESS LEVEL	FUNCTION	SETTING RANGE OR DISPLAY	FACTORY SETTING
Domestic hot water				
1610	U	Nominal setpoint	from reduced setpoint to 65°C	50°C
1612	U	Reduced setpoint	from 8°C to nominal setpoint	25°C
1620	I	Release	24h/day Time programs HCs Time program 4/DHW Low-tariff Time program 4/DHW or low-tariff	Time program 4/DHW
1640	I	Legionella function	Off Periodically Fixed weekday	Off
1641	I	Legionella function periodically	1…7	7
1642	I	Legionella function weekday	Monday…Sunday	Saturday
1644	I	Legionella function time	--:--, 00:00…23:50	--:--
1645	I	Legionella function setpoint	55…95°C	65°C
1646	I	Legionella function duration	--:--, 10…360min	30min
1647	I	Legionella function circulation pump	Off / On	On
1660	I	Circulating pump release	Time program 3/HCP DHW release Time program 4/DHW	DHW release
Swimming pool				
2056	U	Setpoint source heating	8.0…35.0°C	22.0°C
Heat pump				
2844	S	Switch-off temp max	8…100°C	55°C
2882	S	Release integral electric flow	0…500°Cmin	100°Cmin
2884	S	Release electric flow below OT	---, -30…30°C	2°C
2910	S	Release above outside temp	---, -30...30°C	---°C
2920	S	With electrical utility lock	Locked / Release	Released
Supplementary source				
3700	S	Release below outside temp	---, -50…50°C	2.0°C
3705	S	Overrun time	0...120min	20min
3720	S	Switching integral	0...500°Cmin	100°Cmin
DHW storage tank				
5020	S	Flow setpoint boost	0…30°C	5°C
5024	S	Switching differential	0…20°C	7°C
5030	S	Charging time limitation	---, 10…600min	90min
5060	S	Electric immersion heater operating mode	Substitute Summer Always Cooling mode	Substitute
5061	S	Electric immersion heater release	24h/day DHW release Time program 4/DHW	DHW release

CONTROL SYSTEM

CONTROL SYSTEM

Control system / 3 phase

LINE	ACCESS LEVEL	FUNCTION	SETTING RANGE OR DISPLAY	FACTORY SETTING
Configuration				
5700	I	Presetting	---, 1…12	1
5711	S	Cooling circuit 1	Off 4-pipe system 2-pipe system	Off
5870	S	Combination storage tank	No/Yes	No
5987	S	Contact type input EX4	NC (Normally-closed contact) NO (Normally-opened contact)	NO
5989	S	Contact type input EX5	NC (Normally-closed contact) NO (Normally-opened contact)	NC
6046	I	Function input H2	Operating mode change HCs+DHW Operating mode changeover HCs Operating mode changeover HC1 Operating mode changeover HC2 Error/alarm message Dewpoint monitor Release swimming pool	Dewpoint monitor
6047	I	Contact type H2	NC (Normally-closed contact) NO (Normally-opened contact)	NO
6048	S	Function value contact H2	0…130°C	45°C
6100	S	Readjustm outside sensor	-3.0…3.0°C	0.0°C
6120	S	Frost protection plant	Off / On	On
6205	S	Reset to default parameters	No/Yes	No
6220	S	Software version (heat pump regulator)		
Fault				
6711	U	Reset HP	No/Yes	No
6740	S	Flow temp 1 alarm	---, 10…240min	---min
6741	S	Flow temp 2 alarm	---, 10…240min	---min
6745	S	DHW charging alarm	---, 1…48h	---h
6746	S	Flow temp cooling 1 alarm	---, 10…240min	---min
6800	S	History 1	Date/Time/Code	
6802	S	History 2	Date/Time/Code	
6804	S	History 3	Date/Time/Code	
6806	S	History 4	Date/Time/Code	
6808	S	History 5	Date/Time/Code	
6810	S	History 6	Date/Time/Code	
6812	S	History 7	Date/Time/Code	
6814	S	History 8	Date/Time/Code	
6816	S	History 9	Date/Time/Code	
6818	S	History 10	Date/Time/Code	

Control system / 3 phase

LINE	ACCESS LEVEL	FUNCTION	SETTING RANGE OR DISPLAY	FACTORY SETTING
Service / special operation				
7070	S	HP interval	---, 1..240 months	---months
7071	S	HP time since maintenance	0...240months	0months
		Reset?	Yes / No	Yes
7072	S	Max starts compressor 1/hrs run	---, 0.1…12.0	---
7073	S	Cur starts compressor 1/hrs run	0.0...12.0	0
		Reset?	Yes / No	Yes
7076	S	Differential condenser max/week	---, 1…250	---
7077	S	Cur differential condenser max/week	0...250	0
		Reset?	Yes / No	Yes
7078	S	Differential condenser min/week	---, 1…250	---
7079	S	Cur differential condenser min/week	0...250	0
		Reset?	Yes / No	Yes
7090	S	DHW storage tank interval	---, 1…240months	---months
7091	S	DHW storage tank since maintenance	0...240months	0months
		Reset?	Yes / No	Yes
7141	U	Emergency operation	Off / On	Off
7142	S	Emergency operation function type	Manually / Automatically	Manually
7150	I	Simulation outdoor temp	---, -50…50°C	---°C
7181	I	Phone no. responsibility 1		-
7183	I	Phone no. responsibility 2		-

CONTROL SYSTEM

CONTROL SYSTEM

LINE	ACCESS LEVEL	FUNCTION	SETTING RANGE OR DISPLAY	FACTORY SETTING
		Input/output test		
7700	I	Relay test	No test Everything off Relay output QX23 module 1 Relay output QX21 module 1 Relay output QX22 module 1 Relay output QX1 Relay output QX2 Relay output QX3 Relay output QX4 Relay output QX5 Relay output QX6 Relay output QX23 module 2 Relay output QX21 module 2 Relay output QX22 module 2 Relay output QX7	No test
7710	I	Output test UX	---, 0…100%	---%
7711	I	Voltage value UX	0.0…10.0V	---V
7720	I	Output test digital	No test Everything off Digital output DO1 Digital output DO2	No test
7721	I	Digital output DO1	Cooling mode Heating mode	Heating mode
7722	I	Digital output DO2	Off / On	Off
7730	I	Outdoor temp B9	-50…50°C	---°C
7820	I	Sensor temp BX1	-28…350°C	---°C
7823	I	Sensor temp BX4	-28…350°C	---°C
7824	I	Sensor temp BX5	-28…350°C	---°C
7830	I	Sensor temp BX21 module 1	-28…350°C	---°C
7831	I	Sensor temp BX22 module 1	-28…350°C	---°C
7832	I	Sensor temp BX21 module 2	-28…350°C	---°C
7833	I	Sensor temp BX22 module 2	-28…350°C	---°C
7841	I	Contact state H1	Open/Closed	Open
7846	I	Contact state H2	Open/Closed	Open
7855	I	Contact state H3	Open/Closed	Open
7914	I	Input EX4	0/230V	0V
7915	I	Input EX5	0/230V	0V
7916	I	Input EX6	0/230V	0V

Control system / 3 phase

LINE	ACCESS LEVEL	FUNCTION	SETTING RANGE OR DISPLAY	FACTORY SETTING
State				
8000	I	State heating circuit 1		---
8001	I	State heating circuit 2		---
8003	I	State DHW		---
8004	I	State cooling circuit 1		---
8006	I	State heat pump		---
8011	I	State swimming pool		---
8022	I	State supplementary source		---
8050	I	History 1	Date/Time/Code	
8052	I	History 2	Date/Time/Code	
8054	I	History 3	Date/Time/Code	
8056	I	History 4	Date/Time/Code	
8058	I	History 5	Date/Time/Code	
8060	I	History 6	Date/Time/Code	
8062	I	History 7	Date/Time/Code	
8064	I	History 8	Date/Time/Code	
8066	I	History 9	Date/Time/Code	
8068	I	History 10	Date/Time/Code	
Diagnostics heat generation				
8402	I	Electric immersion heater 1 flow	Off/On	Off
8403	I	Electric immersion heater 2 flow	Off/On	Off
8406	I	Condenser pump	Off/On	Off
8410	U	Return temp HP	0.0…140.0°C	0.0°C
		Setpoint HP	0.0…140.0°C	0.0°C
8412	U	Flow temp HP	0.0…140.0°C	0.0°C
		Setpoint HP	0.0…140.0°C	0.0°C
8413	U	Compressor modulation	0…100%	0%
8425	I	Temp differential condenser	-50…140°C	0°C
8454	S	Locking time HP		
		Reset?	Yes / No	Yes
8455	S	Counter number of locks HP		
		Reset?	Yes / No	Yes
8456	S	Hours run electric flow		
		Reset?	Yes / No	Yes
8457	S	Start counter electric flow		
		Reset?	Yes / No	Yes

CONTROL SYSTEM

CONTROL SYSTEM

Control system / 3 phase

LINE	ACCESS LEVEL	FUNCTION	SETTING RANGE OR DISPLAY	FACTORY SETTING
Diagnostics consumers				
8700	U	Outside temp	-50…50°C	0°C
8701	U	Outside temp min	-50…50°C	50°C
		Reset?	Yes / No	Yes
8702	U	Outside temp max	-50…50°C	-50°C
		Reset?	Yes / No	Yes
8703	I	Outside temp attenuated *2	-50…50°C	0°C
		Reset?	Yes / No	Yes
8704	I	Outside temp composite *3	-50…50°C	0°C
8730	I	Heating circuit pump 1	Off / On	Off
8731	I	Heating circuit mix valve 1 open	Off / On	Off
8732	I	Heating circuit mix valve 1 close	Off / On	Off
8740	U	Room temp 1	0.0…50.0°C	20.0°C
		Room setpoint 1	4.0…35.0°C	20.0°C
8743	U	Flow temp 1	0.0…140.0°C	50.0°C
		Flow temp setpoint 1	0.0…140.0°C	50.0°C
8756	U	Flow temp cooling 1	0.0…140.0°C	0.0°C
		Flow temp setpoint cooling 1	0.0…140.0°C	0.0°C
8760	I	Heating circuit pump 2	Off / On	Off
8761	I	Heating circuit mix valve 2 open	Off / On	Off
8762	I	Heating circuit mix valve 2 close	Off / On	Off
8770	U	Room temp 2	0.0…50.0°C	20.0°C
		Room setpoint 2	4.0…35.0°C	20.0°C
8773	U	Flow temp 2	0.0…140.0°C	50.0°C
		Flow temp setpoint 2	0.0…140.0°C	50.0°C
8820	I	DHW pump	Off / On	Off
8821	I	Electric immersion heater DHW	Off / On	Off
8830	U	DHW temp	0.0…140.0°C	0.0°C
		DHW temp setpoint	8.0…80.0°C	55.0°C
8840	S	Hours run DHW pump		
		Reset?	Yes / No	Yes
8841	S	Start counter DHW pump		
		Reset?	Yes / No	Yes
8842	S	Hours run electric heater DHW		
		Reset?	Yes / No	Yes
8843	S	Start counter electric heater DHW		
		Reset?	Yes / No	Yes
8900	U	Swimming pool temp	0.0…140.0°C	0.0°C
		Swimming pool setpoint	8.0…80.0°C	24.0°C
8950	I	Common flow temp	0.0…140.0°C	0.0°C
		Common flow temp setpoint	0.0…140.0°C	0.0°C
8957	I	Common flow setpoint refrig	0.0…140.0°C	0.0°C

LINE	ACCESS LEVEL	FUNCTION	SETTING RANGE OR DISPLAY	FACTORY SETTING
9031	I	Relay output QX1	Off / On	Off
9032	I	Relay output QX2	Off / On	Off
9033	I	Relay output QX3	Off / On	Off
9034	I	Relay output QX4	Off / On	Off
9035	I	Relay output QX5	Off / On	Off
9036	I	Relay output QX6	Off / On	Off
9037	I	Relay output QX7	Off / On	Off
9050	I	Relay output QX21 module 1	Off / On	Off
9051	I	Relay output QX22 module 1	Off / On	Off
9052	I	Relay output QX23 module 1	Off / On	Off
9053	I	Relay output QX21 module 2	Off / On	Off
9054	I	Relay output QX22 module 2	Off / On	Off
9055	I	Relay output QX23 module 2	Off / On	Off

Description of abbreviations :
HC = Heating circuit
OT = Outside temperature
HP = Heat pump
DHW = Domestic hot water
B9, BX1, BX4, BX5, BX21, BX22, DO1, DO2, EX4, EX5, EX6, H1, H2, H3, QX1, QX2, QX3, QX4, QX5, QX6, QX7, QX21, QX22, QX23, UX = Terminal number

*1: Applied only to Remote control C75

*2: " Attenuated outside temperature " is calculated by means of filtered outdoor temperature and the building time constant (building's thermal inertia).

*3: " Composite outside temperature " is calculated by means of the filtered outdoor temperature, the building time constant and the actual outside temperature.

Control system / 3 phase

■ ADJUSTMENT FUNCTION DETAILS

● Time of day and date functions

The controller has an annual clock which contains the time, the day of the week and the date.

In order for the function to operate, the time and date must be set properly on the clock.

LINE	FUNCTION
1	Hours / minutes
2	Day / month
3	Year
5	Start of summertime
6	End of summertime

Note:
Summer time/winter time change
Dates have been set for changing to summer time or to winter time. The time changes automatically from 2am (winter time) to 3am (summer time) or from 3am (summer time) to 2am (winter time) on the first Sunday following the respective date.

● Operator section functions

LINE	FUNCTION
20	Language
22	Info
26	Operation lock
27	Programming lock
28	Direct adjustment

Info

• Temporarily
After pressing the Info key, the information display returns "predefined" basic display after 8 minutes or when pressing the operating mode key.

• Permanently
After pressing the Info key, the information display returns to "new" basic display after a maximum of 8 minutes. The last selected information value is shown in the new basic display.

Operation lock

If the operating lock is activated, the following control elements can no longer be adjusted: Heating circuit mode, DHW mode, room temp comfort setpoint (knob), occupancy key.

Programming lock

If the programming lock is activated, the setting values are displayed but may no longer be changed.

Temporary suspension of programming:
The programming lock can be temporarily deactivated at programming level. To do this, simultaneously press OK and ESC keys for at least 3 seconds. The temporary suspension of the programming lock remains in effect until you exit the programming.

Permanent suspension of programming:
First perform a temporary suspension, then cancel "Programming lock" on line 27.

Direct adjustment

• Storage with confirmation
Correction of the setpoint with the knob will be adopted only after pressing OK key.

• Automatic storage
Correction of the setpoint with the knob is adopted without a particular confirmation (timeout) or by pressing OK key.

LINE	FUNCTION
40*	Used as (Room unit 1 / Room unit 2 / Room unit P / Operator unit 1 / Operator unit 2 / Operator unit P / Service unit)

* applies only to Remote control C75

Used as

This line allows adjusting a use of the user interface. According to the use, other settings will be required under "Heating circuit assignment". If several user interfaces are used, operation of each device can be defined respectively.
- If several user interfaces are used, each device address may be used only once.
- The user interface mounted to the indoor units is set in the factory as operating device 1 (line 40)

which has an effect on all heating circuits (line 42) and can be configured only on lines 44, 46, 48.

Depending on how the device is used line 40, the following adjustments can be made for assignment to the heating circuits with the following effects:

FUNCTION					
40	**42**	**44**	**46**	**48**	**54**
Room unit 1	Heating circuit 1				X
	Heating circuits 1 and 2	X		X	X
	Heating circuits 1 and P		X	X	X
	All HCs				
Room unit 2					
Room unit P					
Operator unit 1	Heating circuit 1				
	Heating circuits 1 and 2	X		X	
	Heating circuits 1 and P		X	X	
	All HCs	X	X	X	
Operator unit 2					
Operator unit P					
Service unit					

• **Room unit 1**

The user interface controls the heating circuits which are authorized on line 42 "Room unit 1 assignment" and which have been activated accordingly in the base unit.

• **Room unit 2**

The user interface only controls heating circuit 2.

• **Operator unit**

The user interface controls the heating circuits that have been activated in the base unit.

Note:
With this setting, no room temperature is saved or transmitted by the user interface.

Heating Circuit Assignment

LINE	FUNCTION
42*	Assignment device 1
44	Operation HC2
46	Operation HC3/P
48*	Operator occupancy button
54*	Readjustment room sensor
70	Software version (user interface)

* applies only to Remote control C75

Assignment device 1

As device 1 (line 40), action of the respective user interface can be assigned either to heating circuit 1 or to both heating circuits. The second option is necessary particularly when there are 2 heating circuits and only one room unit.

Operation HC2

Depending on the setting of line 40, the operating action (operating mode key or knob) can be defined either on room unit 1, on the user interface or on the operating unit for heating circuit 2.

• **Commonly with HC1**

The control for heating circuits 1 and 2 is shared.

• **Independently**

Action of the control is called on the display whenever use is made of the operating key or the knob.

Operation HC3/P

Depending on the setting of line 40, the operating action (operating mode key or knob) can be defined either on room unit 1, on the user interface, or on the operating unit for heating circuit P.

• **Commonly with HC1**

The control for heating circuits 1 and 2 is shared.

• **Independently**

Changes in the operating mode or adjustment of the nominal temperature setpoint must be made in the programming.

Readjustment room sensor

The room sensor display can be corrected.

Software version (user interface)

The display shows the current version of the user interface.

● Time program functions (Heating circuit 1 & 2, DHW, Cooling)

Several control programs are available for the heating circuits and the production of DHW. They are initiated in "Automatic" mode and control the change in temperature levels (and therefore the associated setpoints, reduced and comfort) via the adjusted changeover times.

Enter changeover times:
Changeover times can be adjusted in a combined way, i.e., identical times for several days or distinct times for certain days. Preselecting groups of days (e.g., Mon...Fri and Sat...Sun) having the same changeover times make adjustment of the changeover program considerably shorter.

Changeover Points

LINE				FUNCTION
HC1	**HC2**	**4/DHW**	**5**	
500	520	560	600	Preselection (Mo-Su / Mo-Fr / Sa – Su / Mo...Su)
501	521	561	601	1st phase on
502	522	562	602	1st phase off
503	523	563	603	2nd phase on
504	524	564	604	2nd phase off
505	525	565	605	3rd phase on
506	526	566	606	3rd phase off

Standard Program

LINE	FUNCTION
516, 536, 576, 616	Default values (No /Yes)

All time programs can be reset to factory settings. Each time program has its own programming line for this reset action.

In this case, individual settings will be lost!

Holidays

LINE		FUNCTION
HC1	**HC2**	
641	651	Preselection
642	652	Start
643	653	End
648	658	Operation level

The holiday program enables changing the heating circuits over to a selected operating level according to the date (calendar).

Important:
The holiday program can be used only in the automatic mode.

● Heading circuit 1 & 2 functions

Operating Mode

For heating circuits there are several functions available which can be individually adjusted for each heating circuit.

The programming lines for the 2nd heating circuit are displayed only if the extension module has been connected to the controller.
Operation of heating circuits 1 and 2 is directly controlled via the operating mode key.

Setpoint Values

LINE		FUNCTION
HC1	HC2	
710	1010	Comfort setpoint
712	1012	Reduced setpoint
714	1014	Frost protection setpoint
716	1016	Comfort setpoint max

Room temperature:
Room temperature can be set according to different setpoint values. Depending on the selected mode, these setpoints are activated and provide different temperature levels in the rooms.

The ranges of configurable setpoints are defined by their interdependencies, as shown in the graph below.
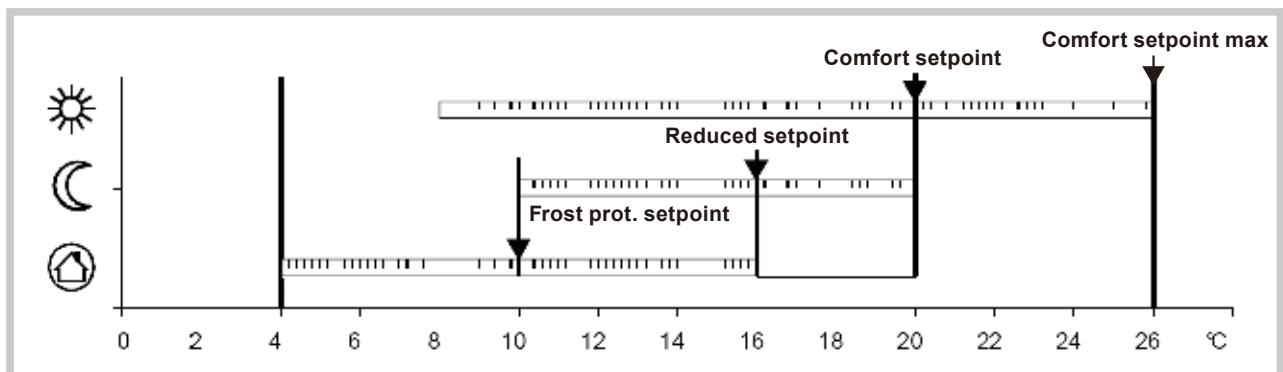
Frost protection:
The protection mode automatically prevents an excessively sharp drop in room temperature.

In this case the control adopts the frost protection room setpoint.

Heating Curve

LINE		FUNCTION
HC1	HC2	
720	1020	Heating curve slope
721	1021	Heating curve displacement
726	1026	Heating curve adaption

Heating curve slope

Based on the heating characteristic, the controller computes the flow temperature setpoint which will be used for controlling the flow temperature in consideration of atmospheric conditions. Different settings can be used to adapt the heating characteristic so that the heating capacity, and therefore the room temperature, will match the individual needs.

The colder the outdoor temperature, the greater the extent to which the slope will modify the flow temperature. In other words, the slope should be corrected if the room temperature shows a difference when the outdoor temperature is low, but not when it is high.

- Increase the setting:
  The flow temperature is increased mainly when the outdoor temperatures are low.
- Decrease the setting:
  The flow temperature is lowered mainly when the outdoor temperatures are low.

Warning:
The heating curve is adjusted in relation to a room temperature setpoint of 20°C. If the room temperature setpoint is modified, the flow temperature setpoint is automatically recomputed. This will not modify the setting and amounts to automatically adapting the curve.
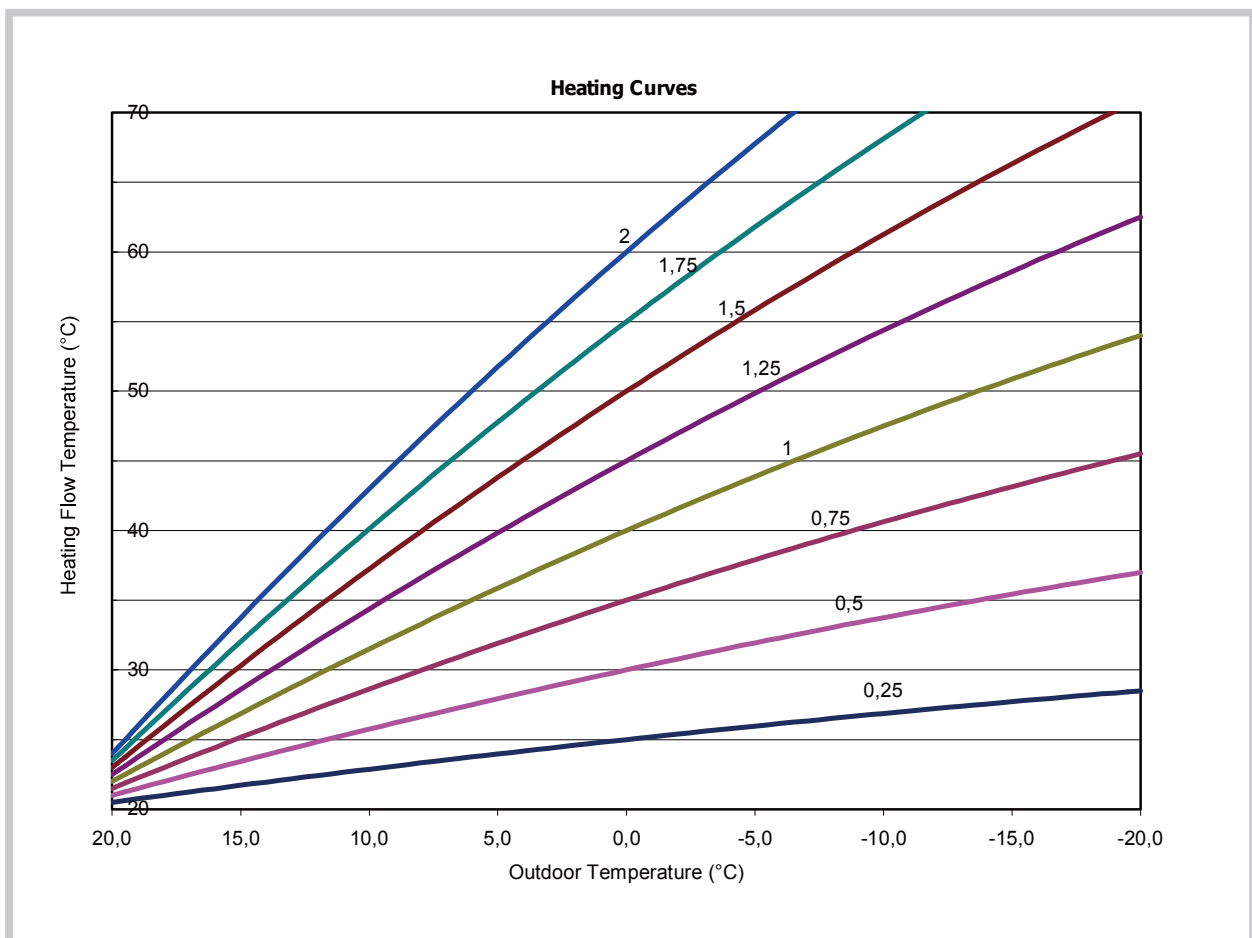
Heating Curves

Heating curve displacement

The curve displacement (offset) modifies the flow temperature in a general and even manner over the full range of outdoor temperature. In other words, the displacement should be corrected when the room temperature is generally too high or too low.

Heating curve adaption

Adaptation enables the controller to automatically adapt the heating curve to the present conditions. This correction may only be activated or deactivated.
In the latter case, there is no need to correct the slope and displacement.

Information:
To ensure operation, the following requirements must be met:
- A room sensor must be connected.
- The "room influence" parameter must be set between 1 and 99.
- The reference room (where the room sensor is installed) must not contain adjusted thermostatic valves. If present in the room, these valves must be fully open.
- Operation of this function requires an adaptation period which can take more or less time (approx. 1 week) depending on weather condiions and on the stability of the room temperature setpoint.

Eco Functions

LINE		FUNCTION
HC1	**HC2**	
730	1030	Summer/winter heating limit
732	1032	24-hour heating limit

Summer/winter heating limit

The summer/winter heating limit switches the heating on or off through the year according to the temperature ratio. Changeover is performed automatically when in automatic mode and thus avoids the user having to turn the heating on or off. Changing the input value makes the respective annual periods (summer/winter) shorter or longer.
- If the value is increased:
  Changing to winter operating mode is advanced, changing to summer mode is delayed.

- If the value is decreased:
  Changing to winter mode is delayed; changing to summer mode is advanced.

Information:
This function does not work in "Continuous comfort temperature" mode. (Sunlight)
The controller displays "ECO".
The outdoor temperature is attenuated to take the building's dynamics into account.

Example:
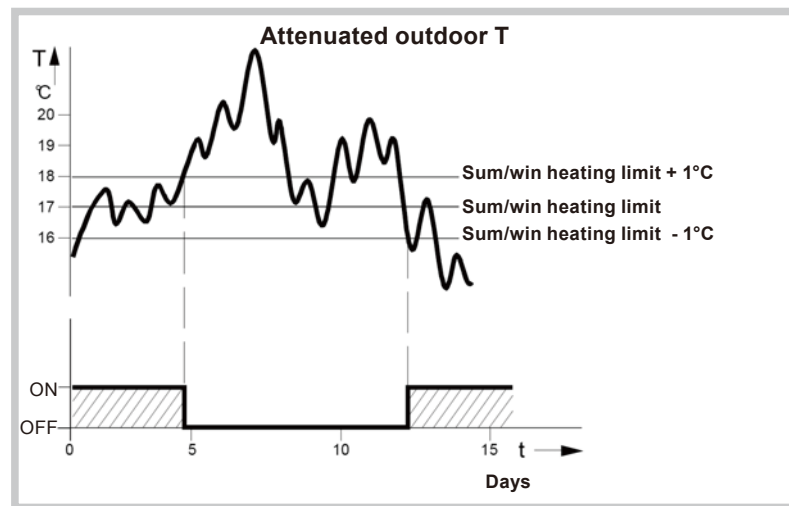
24-hour heating limit

The 24-hour heating limit is used to switch the heating on and off in the course of the day, depending on the outdoor temperature.
This function is used mainly during intermediate seasons (spring and fall) to react rapidly in case of fluctuating temperatures.

Thus, in the following example the changeover temperature will be 18°C, computed as follows:

Comfort setpoint (line 710)	22°C
24-hour heating limit (line 732)	-3°C
Changeover temperature (line 710 – 732) Heating off	=19°C
Differential (Fixed)	-1°C
Changeover temperature Heating on	=18°C

Changing the input value makes the respective heating periods shorter or longer.
- If the value is increased: changeover to heating mode is advanced; changeover to ECO is delayed.
- If the value is decreased: changeover to heating mode is delayed; changeover to ECO is advanced.

Information:
This function will not work in "Continuous Comfort temperature" mode.
The display will show "ECO".
The outdoor temperature is attenuated to take the building's thermal dynamics into account.

Flow temperature setpoint

LINE		FUNCTION
HC1	**HC2**	
740	1040	Flow temp setpoint min
741	1041	Flow temp setpoint max

This limitation allows to define a range for the flow temperature setpoint. When flow temperature setpoint demanded by the heating circuit reaches the threshold, the setpoint remains permanently at the maximum or minimum, even if the heat demand continues to increase or decrease.

Example (line 741 and 1041):
Floor heating system = 50 °C
Higher temperature radiator = 65 °C

Room Influence

LINE		FUNCTION
HC1	**HC2**	
750	1050	Room influence

Control types:
When using a room temperature sensor there are 3 different types of control to choose from.

SETTING	CONTROL TYPE
- - - %	Simple control according to outdoor conditions *
1...99 %	Control according to outdoor conditions with room influence *
100 %	Control according to room temperature only

* Requires the connection of an outdoor sensor

Simple control according to outdoor conditions

The flow temperature is computed via the heating curve according to the composite outdoor temperature. This type of control requires proper adjustment of the heating curve, as the control does not take the room temperature into account for this adjustment.

Control according to outdoor conditions with room influence

The difference between the room temperature and the setpoint value is measured and taken into account for temperature control. This enables taking into account possible heat inputs and ensures a more accurate room temperature control. The influence of the difference is defined as a percentage. The better the installation in the reference room (accurate room temperature, correct installation location, etc.) the higher will be the value that can be set.
Example:
Approx 60%: the reference room is appropriate
Approx 20%: the reference room is inappropriate

Information:
Activation of the function requires taking into account the following requirements:
- A room sensor must be connected.
- The "room influence" parameter must be set between 1 and 99.
- The reference room (where the room sensor is installed) must not contain adjusted thermostatic valves. If present in the room, these valves must be fully open.

Control according to room temperature only

The flow temperature is adjusted according to the room temperature setpoint, the current room temperature and its evolution. A slight increase in room temperature, for example, causes an immediate drop in the flow temperature.
Information:
Activation of the function requires taking into account the following requirements:
- A room sensor must be connected.
- The "room influence" parameter must be set to 100%.
The reference room (where the room sensor is installed) must not contain adjusted thermostatic valves. If present in the room, these valves must be fully open.

Optimisation at switch-on and switch-off

LINE		FUNCTION
HC1	**HC2**	
790	1090	Optimum start control max
791	1091	Optimum stop control max

Optimum start control max

The change in temperature levels is optimised in such a way as to reach the comfort setpoint during changeover times.

Optimum stop control max

The change in temperature levels is optimised in such a way as to reach the comfort setpoint -1/4 °C during changeover times.

Reduced Setpoint Increase

LINE		FUNCTION
HC1	**HC2**	
800	1100	Reduced setpoint increase start
801	1101	Reduced setpoint increase end

This function is used mainly in heating installations that do not have high supplies of power (e.g. low power use homes). When outdoor temperatures are low, adjusting the temperature would take too long. Increasing the reduced setpoint prevents excessive cooling of the rooms in order to shorten the temperature adjustment period when changing over to the comfort setpoint.
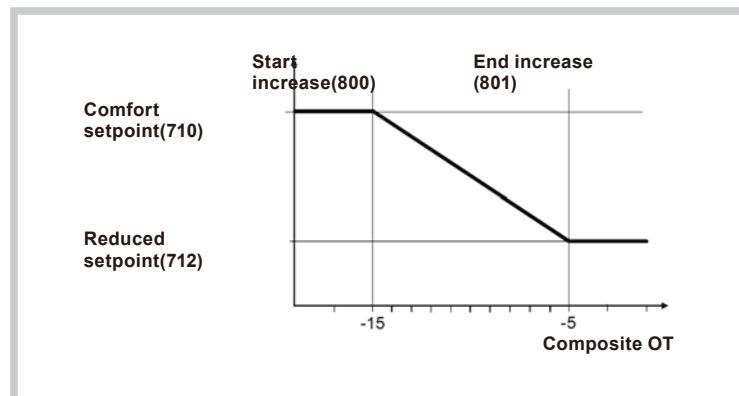
Mixing Valve Control

LINE		FUNCTION
HC1	**HC2**	
830	1130	Mixing valve boost
834	1134	Actuator running time

Mixing valve boost

The controller adds the increase set here to the current flow setpoint and uses the result as the temperature setpoint for the heat generator.

Actuator running time

For the 3-position servomotor, the travel time can be adjusted. With a 2-position servomotor, the adjusted travel time is inoperative.

Controlled floor drying function

LINE		FUNCTION
HC1	**HC2**	
850	1150	Floor curing function
851	1151	Floor curing setpoint manually
856	1156	Floor curing day current
857	1157	Floor curing days completed

This function is used in the controlled drying of floors. It adjusts the flow temperature to a temperature profile. Drying is performed by floor heating via the heating circuit with a mixing valve or with a pump.

Floor curing function

• Off
The function is deactivated.
• Functional heating (Fh)
The first part of the temperature profile is automatically completed.
• Curing heating (Bh)
The second part of the temperature profile is handled automatically.
• Functional/Curing heating
The full temperature profile (1st and 2nd part) is performed automatically.

• Manually
No temperature profile is performed, but the control is performed according to the "manual controlled drying setpoint". The function is automatically terminated after 25 days

Important:
- The standards and directions of the building contractor must be followed!
- This function will not work properly unless the installation has been adequately made (hydraulics, electricity, settings). Otherwise, the floors to be dried may be damaged!
- The function may be prematurely interrupted by setting it to Off.
- The maximum flow temperature limitation remains active.
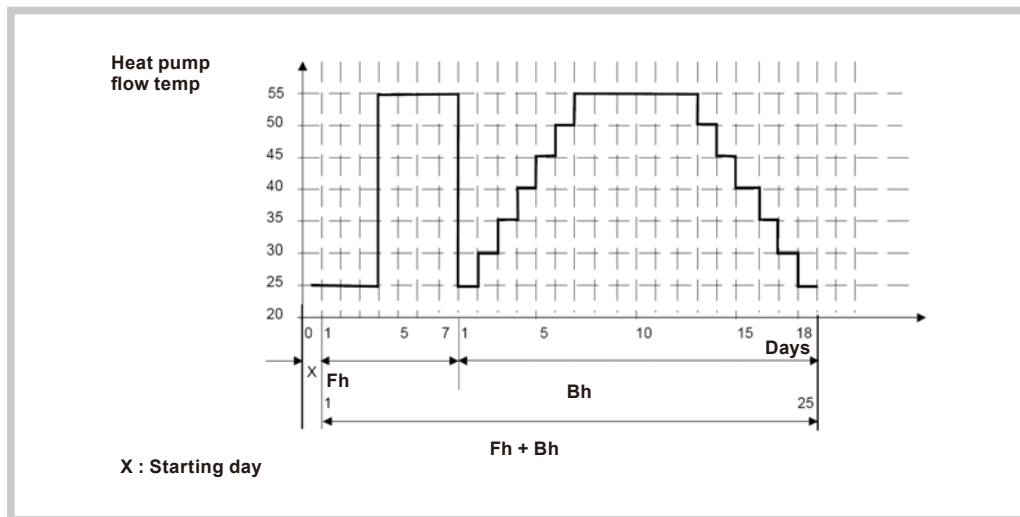
Floor curing setpoint manually
The flow temperature setpoint for the "Manually" controlled floor drying function can be adjusted respectively for each heating circuit.

Floor curing day current
Displays the current flow temperature setpoint for the controlled floor drying function.

Floor curing days completed
Displays the current day of the controlled floor drying function.

Important:
After a power outage, the installation resumes the controlled drying function as it was when the outage occurred.

CONTROL SYSTEM

Operating Mode Changeover

LINE		FUNCTION
HC1	**HC2**	
900	1200	Operating mode changeover (None / Protection / Reduced / Comfort / Automatic)

In case of an external changeover via input H2 (on the extension module only) the operating mode to which the changeover will be performed must be previously defined.

Heating Circuit Frost Protection

Informations:
The heating circuit frost protection is continuously activated (protection mode ⏻) and is not adjustable.

- Heating circuit frost protection in heating mode:
  If the flow temperature is below 5°C, the controller initiates the production of heat and starts the heating pumps, regardless of the current heating mode.
  If the flow temperature rises again above 7°C, the controller waits another 5 minutes, and then stops the production of heat and the heating pumps.

- Heating circuit frost protection in cooling mode:
  See Cooling mode.

● Cooling circuit 1 functions

The cooling sequence is automatically started when the room temperature is higher than the comfort setpoint in cooling mode (line 902). The cooling function must be activated (line 901 = Auto) and is triggered by the programming clock (line 907). The cooling sequence is interrupted as soon as heating circuit 1 indicates a need for heat or in the presence of a heat demand signal from a DHW circuit or other heating circuit (only if cooling is active).

The controller measures the current room temperature and compares it with the room temperature setpoint to compute the flow temperature setpoint. If the temperature is not low enough the heat pump is started to provide cooling (reversed control of the mixing valve).

The following settings apply to the hydraulic circuit in zone 1 (HC1). If there is a second zone, this zone can be cooled with the setting (line 963) which will connect the pump directly to zone 2. This will require setting the "Mixing valve sub-cooling" parameter (line 938) to a suitable value in order for both zones to be adequately cooled according to the available emitters.

Warning:
Cooling mode is prohibited on all radiators, heating only floors, or any emitters not intended for this purpose.

Operating Mode

LINE	FUNCTION
901	Operating mode (Off / Automatic)

The cooling key on the user interface enables switching between operating modes.
• **Off**
The cooling function is deactivated.

• **Automatic**
The cooling function is automatically activated by the time program (line 907), the holiday program, the occupancy key, or according to the need.

Comfort cooling setpoint

LINE	FUNCTION
902	Comfort setpoint

In cooling mode the room temperature control follows the comfort setpoint adjusted under this setting. The cooling comfort setpoint can be displayed with a knob on the room unit.

In summer the comfort setpoint is gradually increased in relation to the outdoor temperature (see lines 918-920).

Release

LINE	FUNCTION
907	Release (24h/day / Time program HC / Time program 5)

The "Release" setting determines the time program according to which cooling is released.

• **24h/day**
Cooling is continuously activated (24h/Day).

• **Time program HC**
Cooling is activated according to the heating circuit time program.
• **Time program 5**
Cooling is released according to time program 5.

CONTROL SYSTEM

Cooling Characteristic

LINE	FUNCTION
908	Flow temp setpoint at OT 25°C
909	Flow temp setpoint at OT 35°C

The controller computes the flow temperature required for a given composite outdoor temperature based on the cooling characteristic. This is defined by two reference points (flow setpoint at 25°C and at 35°C).

Flow temp setpoint at OT 25°C

This is the cooling flow temperature required when the composite outdoor temperature is 25°C, without summer compensation.

Flow temp setpoint at OT 35°C

This is the cooling flow temperature required when the composite outdoor temperature is 35°C, without summer compensation.
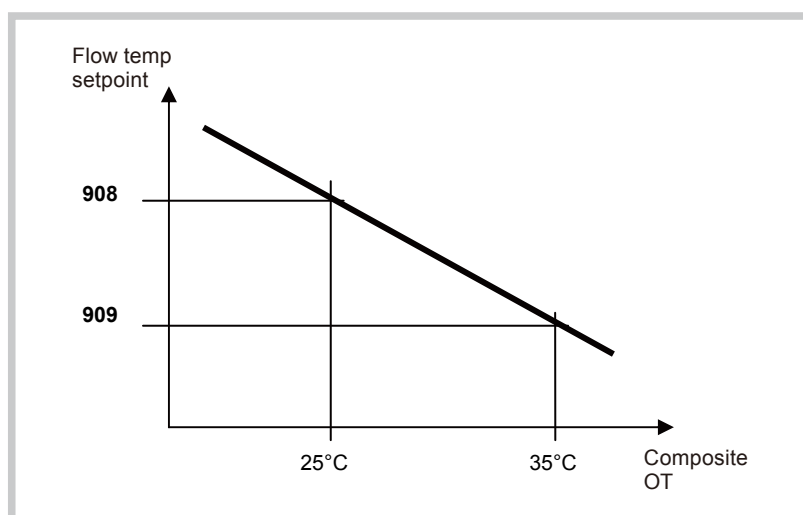
The cooling characteristic is adjusted for a 25°C room temperature setpoint. If the room temperature setpoint is changed the curve will automatically adapt.

Eco

LINE	FUNCTION
912	Cooling limit at OT
913	Lock time at end of heating

Cooling limit at OT

If the composite outdoor temperature is higher than the cooling limit, cooling is released. If the composite outdoor temperature falls at least 0.5°C below the cooling limit, cooling is locked.

Lock time at end of heating

To avoid a quick start of cooling after termination of heating, the cooling function is locked for a time period which can be adjusted with this setting.

The lock time starts when there is no valid heating demand from heating circuit 1. Heating demands from heating circuits 2 or P are ignored.

Information:
Switching off and switching on again the mode selection key causes the lock time to be interrupted.

Summer Compensation

LINE	FUNCTION
918	Summer compensation start at OT
919	Summer compensation end at OT
920	Summer compensation setpoint increase

In summer the "cooling comfort setpoint" (line 902) is gradually increased according to the outdoor temperature. This saves on cooling power and prevents the differences between the ambient temperature of the room and the outdoor temperature being too high.

The resulting "room temperature setpoint" can be viewed in the Info section.

Summer compensation start at OT

Summer compensation starts to be active from the outdoor temperature defined here. If the outdoor temperature continues to rise, the comfort setpoint will be gradually increased.

Summer compensation end at OT

At this outdoor temperature the summer compensation reaches its peak efficiency (line 920). If the outdoor temperature continues to rise, it will no longer influence the comfort setpoint.

Summer compensation setpoint increase

This setting defines the highest value to which the comfort setpoint can be increased.
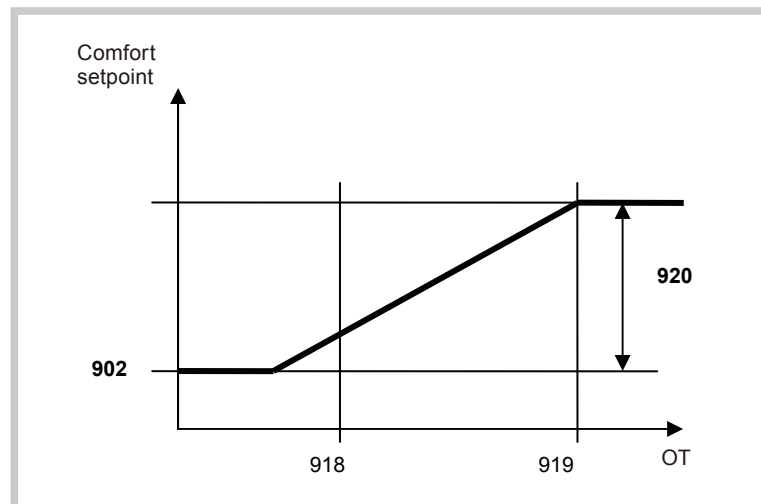
Flow Setpoint Limitation

LINE	FUNCTION
923	Flow temp setpoint min at OT 25°C
924	Flow temp setpoint min at OT 35°C

It is possible to assign a lower limit to the cooling flow temperature.
The limitation line will be defined by two reference points. In addition the resulting flow setpoint will have a lowerlimit and may not be less than 5 °C.

Flow temp setpoint min at OT 25°C

Determines the lowest flow temperature for a composite outdoor temperature of 25°C.

Flow temp setpoint min at OT 35°C

Determines the lowest flow temperature for a composite outdoor temperature of 35°C.

Warning:
If no outdoor temperature is available, the controller will use the "Min. flow setpoint at OT= 35°C" parameter.
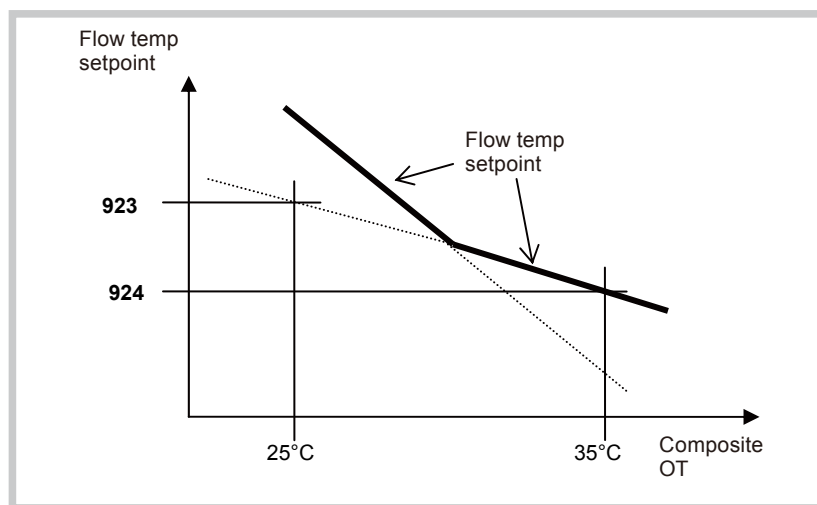
Room Influence

LINE	FUNCTION
928	Room influence

When using a room temperature sensor there are 3 different types of control to choose from.

SETTING	CONTROL TYPE
- - - %	Simple control according to outdoor conditions *
1...99 %	Control according to outdoor conditions with room influence *
100 %	Control according to room temperature only

* Requires the connection of an outdoor sensor

Simple control according to outdoor conditions

The flow temperature is obtained from the composite outdoor temperature on the basis of the cooling characteristic.

This type of control requires the cooling curve to be properly adjusted, as the control does not take the room temperature into account for this adjustment.

CONTROL SYSTEM

Control according to outdoor conditions with room influence

The difference between the room temperature and the setpoint value is measured and taken into account for temperature control. This enables taking into account possible heat inputs and ensures a more accurate room temperature control. Thus the differences with the room temperature are taken into account and the room temperature becomes more stable. The influence of the difference is defined as a percentage.
The better the installation in the reference room (accurate room temperature, correct installation location, etc.) the higher will be the value that can be set.

Example:
- Approx 60%: the reference room is appropriate
- Approx 20%: the reference room is inappropriate

Activation of the function requires taking into account the following requirements:
- A room sensor must imperatively be connected.
- The "room influence" parameter must be set between 1 and 99.
- The reference room (where the room sensor is installed) must not contain adjusted thermostatic valves. Any thermostatic valves present in the rooms must be fully open.

Control according to room temperature only

The flow temperature is adjusted according to the room temperature setpoint, the current room temperature and its evolution. A slight increase in room temperature, for example, causes an immediate drop in the flow temperature.

Activation of the function requires taking into account the following requirements:
- A room sensor must imperatively be connected.
- The "room influence" parameter must be set to 100%.
- The reference room (where the room sensor is installed) must not contain adjusted thermostatic valves. Any thermostatic valves present in the rooms must be fully open.

Room Temperature Limitation

LINE	FUNCTION
932	Room temp limitation

The "room temperature limitation" function enables shutting off the cooling circuit pump if the room temperature falls below the adjusted room temperature setpoint (with summer compensation line 920) by more than the adjusted differential.

The cooling circuit pump is reinitiated as soon as the room temperature rises again above the current room temperature setpoint.

If the room temperature limitation function is active, no cooling demand will be transmitted to production.

The function is deactivated if:
- no room temperature sensor is available
- "Room influence limit." = ---
- "Room influence" (line 928) = --- (simple control according to outdoor conditions)

Mixing Valve Control

LINE	FUNCTION
938	Mixing valve decrease
941	Actuator running time
945	Mixing valve heating mode

Mixing valve decrease

The cooling demand issued by cooling circuit 1 to production is reduced by the adjusted value.

If there is a second zone, this reduction should enable the second zone to be cooled. To achieve this result, the sub-cooling must be determined in accordance with the type of emitter and "With primary controller/system pump" (line 963) must be set to "yes" to switch on the pump for the second zone.

Example:

	Configuration	How the configuration affects control
Zone 1: Heating/ cooling floor **Zone 2:** Fan coils	938 = 10°C, with 924 = 18°C 963 = yes	with a 35°C outdoor temperature the flow setpoint will be 18°C – 10°C i.e. 8°C while in the first zone (HCF) it will be 18°C through action of the mixing valve
Zone 1: Heating/ cooling floor **Zone 2:** HCF	938 = 0°C, with 924 = 18°C 963 = yes	with a 35°C outdoor temperature the flow setpoint will be 18°C in both zones

Warning:
If these settings are not chosen properly the heat pump may stop automatically due to the flow temperature being too low. A safety mechanism is triggered at 6°C to protect the exchanger from freezing.

Actuator running time

For the 3-position servomotor used, it is possible to adjust the travel time. With a 2-position servomotor, the adjusted travel time is inoperative.

Mixing valve heating mode

Determines the position of mixing valve 1 during heating operation is activated.
This parameter is inoperative in installations where heating and cooling circuits are hydraulically separate.
• **Control**
The valve controls in heating and cooling mode.
• **Open**
The valve controls in cooling mode, and is open in heating mode.

Dewpoint Monitoring

LINE	FUNCTION
946	Lock time dewpoint limiter
947	Flow temp setpoint increase hygrostat
948	Flow setpoint increase start at relative humidity.
950	Flow temp differential dewpoint

These settings are useful only when a dewpoint sensor (hygrostat). is used.

Lock time dewpoint limiter

As soon as the dewpoint monitor detects condensation, it closes its contact and switches off the cooling process. When the contact reopens the "dewpoint monitor lock time" period begins. Cooling will resume only after this time period has elapsed. The dewpoint monitor must be assigned to input H2 as "Dewpoint monitor".

Flow temp setpoint increase hygrostat

To avoid condensation due to an excessively high humidity level in the room, a fixed increase in flow temperature can be obtained by means of a hygrostat. As soon as the humidity exceeds the value set on the hygrostat, the hygrostat closes its contact and activates the flow temperature increase defined here.

The hygrostat must be assigned to an Hx input as "Flow temp setpoint increase by hygrostat".

Flow setpoint increase start at relative humidity

To avoid condensation caused by an excessively high humidity level in the room, a gradual increase in flow temperature can be performed by means of a humidity measurement 0... 10 V.
If the room's relative humidity exceeds the value "Beginning of flow temp increase at relative humidity", the flow setpoint is gradually increased. The increase beginning (line 948) and the maximum increase (line 947) can be adjusted. The humidity sensor must be assigned to an H2 input as "Room relative humidity 10V".
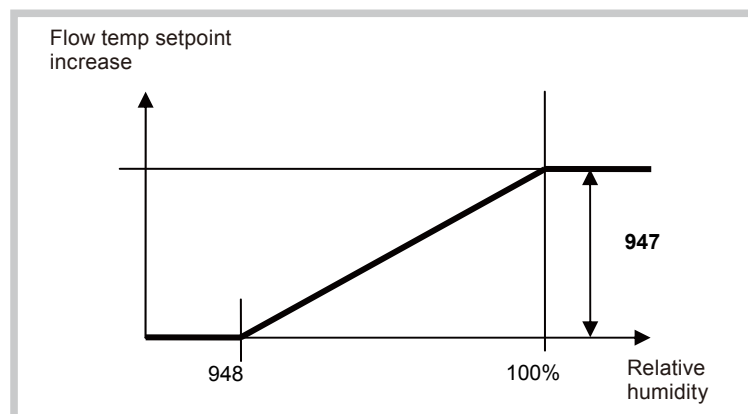
Flow temp differential dewpoint

The relative humidity of the ambient air and the corresponding room temperature are used to compute the dewpoint temperature.
To prevent condensation forming on the surfaces, the value adjustable on line 950 determines the lower limit of the flow temperature above the dewpoint temperature. This function can be deactivated with the setting - - - .
The humidity sensor must be assigned to an H2 input as "Room relative humidity 10V" and a room temperature sensor is required (input H2 as "Room temperature 10V" or "room unit").

With primary controller/system pump

LINE	FUNCTION
963	With primary controller/system pump (No / Yes)

This setting specifies whether the cooling circuit is supplied from the primary controller or from the primary pump (depending on the installation). It can also be used to provide cooling to the second zone.

Warning:
In the case of a radiator or any other emitter which does not support the cooling mode in zone 2, this setting must remain on "No".

Operating mode changeover

LINE	FUNCTION
969	Operating mode changeover (None / Off / Automatic)

In case of an external change via inputs H2 the operating mode to which the changeover will be performed must be previously defined.

● Domestic hot water functions

The control sets the DHW temperature, according to the time program or continuously, to the desired setpoint. The priority of DHW charging over room heating is adjustable in this case

The controller has a configurable legionella function designed for protection against legionella in the storage tank and the pipes. The circulation pump is controlled according to the current time program and operating mode.

Setpoint value

LINE	FUNCTION
1610	Nominal setpoint
1612	Reduced setpoint

The DHW is heated to various setpoint values. These setpoints are active according to the selected operating mode and allow the desired temperatures to be reached in the DHW storage tank.
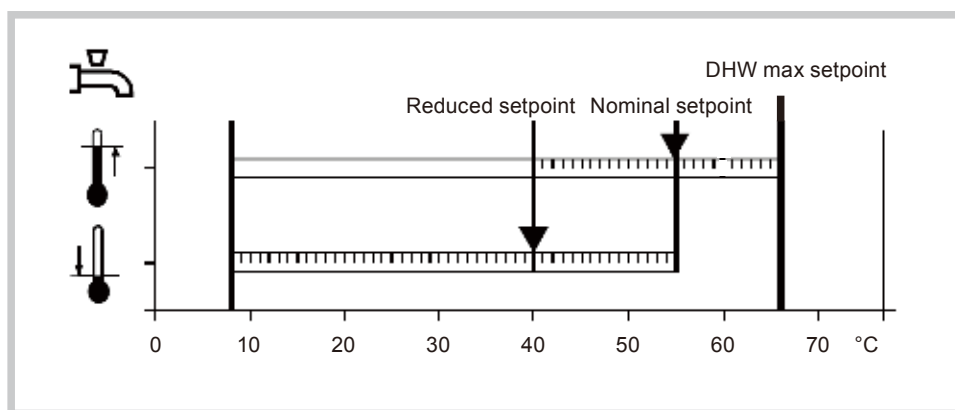
Important:
For optimal operation we recommend reducing the setpoints to the lowest value.
Setpoints which are too high may interfere with heating and cause some discomfort. In this case DHW/Heating changeover cycles may successively occur

If DHW charge boosting is not desired during the day, we recommend adjusting the reduced temperature setpoint to 15°C. Full charging will occur during the night at the nominal temperature..

LINE	FUNCTION
1620	Release (24h/day / Time programs HCs / Time program 4/DHW / Low-tariff / Time program 4/DHW or low-tariff)

24h/day

(Not recommended)

Regardless of the time programs, the temperature of the domestic hot water is continuously maintained at the DHW nominal setpoint temperature.

Example:
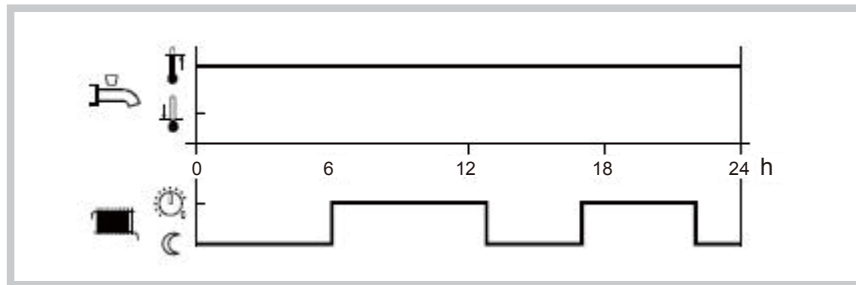
Time program HCs

(Not recommended)

Depending on the heating circuit time programs, the DHW setpoint is changed between the DHW temperature nominal setpoint and the DHW temperature reduced setpoint. The first switch-on point of each phase is advanced by one hour each time.

Example:
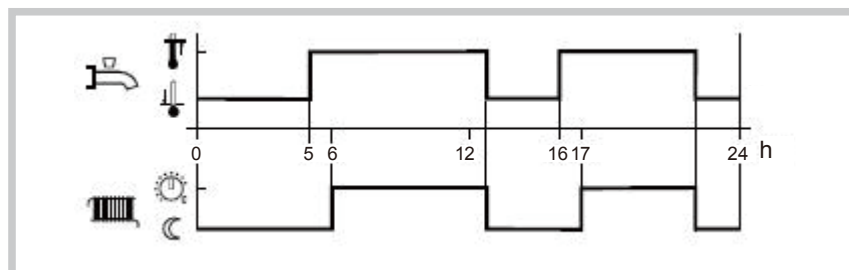
Time program 4 / DHW

(Recommended)

Time program 4 of the local controller is taken into account for the DHW mode. The changeover between DHW nominal setpoint and DHW reduced setpoint occurs on the changeover times of this program. Thus, domestic hot water charging takes place independently from the heating circuits.
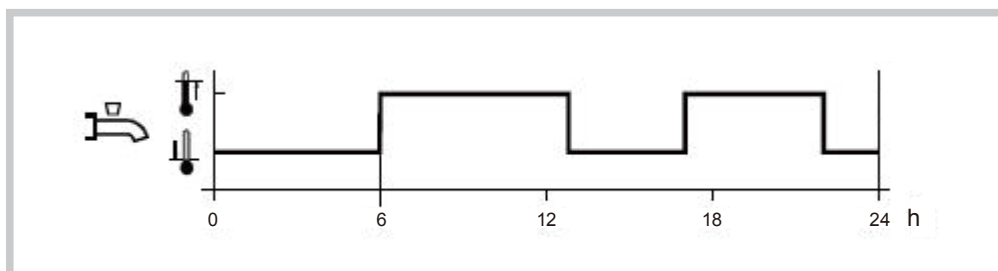
Low-tariff

Released when the low tariff input is active (Input EX5)

Time program 4/DHW or low-tariff

Released when DHW program is set to "Nominal" or if the low tariff input is active.

Control system / 3 phase

DHW mode	Holiday status	Release (line 1620)	Time program status (Program 4)	Low-tariff status (EX5)	DHW mode level
Off	x	x	x	x	Frost protection
On	Yes	x	x	x	Frost protection
On	No	…	…	x	…
On	No	Low-tariff (OPK)	x	Inactive	Reduced
On	No	Low-tariff (OPK)	x	Active	Nominal
On	No	Time program 4 or OPK	Nominal	Inactive	Nominal
On	No	Time program 4 or OPK	Reduced	Inactive	Reduced
On	No	Time program 4 or OPK	Nominal	Active	Nominal
On	No	Time program 4 or OPK	Reduced	Active	Nominal

x = N/A

Information:

Release by low tariff input always triggers forced DHW charging.

If the low tariff input EX5 has not been configured and release via OPK has nevertheless been set, the DHW level will either continuously remain on reduced or will follow time program 4.

Legionella Function

LINE	FUNCTION
1640	Legionella function
1641	Legionella function periodically
1642	Legionella function weekday
1644	Legionella function time
1645	Legionella function setpoint
1646	Legionella function duration
1647	Legionella function circulation pump

Legionella function

• periodically

The legionella function occurs repeatedly according to the adjusted periodicity (line 1641).

• Fixed weekday

The legionella function can be activated on a fixed day of the week (line 1642). With this setting, heating up to the legionella setpoint occurs on the scheduled day of the week, regardless of the storage tank temperatures during the previous period.

Legionella function circulation pump

The DHW circulation pump can be activated during the period of time the legionella function is performed.

Important:

During the period of time legionella function is carried out, there is a risk of scalding when opening the taps.

Circulating Pump

LINE	FUNCTION
1660	Circulating pump release

Circulating pump release

The "DHW release" setting switches on the
circulation pump when DHW production is released.

LINE	FUNCTION
1660	Circulating pump release

Circulating pump release

● Swimming pool functions

LINE	FUNCTION
2056	Setpoint source heating

The controller enables a swimming pool to be heated by the heat pump. An individual setpoint can be set by means of line 2056, which appears when the swimming pool function is activated by "Function input H2" (line 6046) being set to "Release swimming pool".

Use of input H2 requires an extension module to be connected to the control. If an extension module already exists (e.g. for a second zone) then the pool extension module switches must be addressed as "module1" and the second zone must be addressed as "module 2".

● Heat pump functions

LINE	FUNCTION
2844	Switch-off temp max
2882	Release integral electric flow
2884	Release electric flow below OT
2910	Release above OT
2920	With electrical utility lock

Switch-off temp max

If the flow or the return temperature exceeds the maximum switch off temperature, the compressor will be switched off.

Example (line 2844):
Floor heating system = 55 °C
Higher temperature radiator = 65 °C

Release integral electric flow

After the release of the 1st stage (heater 1: on, heater 2: off), the controller compares the temperature measured with the point of engagement and forms an integral and includes a possible deficit of heat. Once the value of the integral reaches the maximum value (line 2882), the 2nd stage is engaged (heater 1: off, heater 2: on). The controller continuously compares the temperature measured at the point of engagement and new features to the deficit of heat in the full release. When the full release reaches the value set (line 2882), the 3rd stage of the heater is triggered (heater 1: on, heater 2: on).

Release electric flow below OT

The heater will be activated only if the attenuated outdoor temperature is below the temperature set here.

Warning:
This setting is too low, there may be a feeling of discomfort due to the fact that the heat pump is unable to meet the heating requirements alone at low outdoor temperatures, and heaters are not switched on.

Release above OT
The heat pump is released only when the composite outdoor temperature lies above the value set here. Below this outdoor temperature level, the amount of heat required must be delivered by some other heat source.

With electrical utility lock
This setting relates to input EX4 (load-shedding or peak day clearing) and allows the electric heaters to be locked as follows:

• Locked
The heat pump and all electric heaters are locked, both heat pump stages and the DHW tank electric heater.
Only the boiler backup, if installed, continues to operate.

• Released
The heat pump operates and all electric heaters are locked, both heat pump stages and the DHW tank electric heater.
The boiler backup, if installed, continues to operate.

● DHW storage tank functions

DHW charging at the nominal setpoint temperature (line 1610) always takes place in two stages. In the first stage, only the heating pump heats the DHW tank.
The power supplied during this time is at its peak.
Then, when the heat pump is no longer able to

supply enough heat to reach the setpoint value, it switches on the DHW tank heater if authorised. The heater will be cut off when charging is complete. While the DHW tank charging process via the electric heater is finishing, the heat pump resumes heating.

Charging Control

LINE	FUNCTION
5020	Flow setpoint boost
5024	Switching differential
5030	Charging time limitation

Flow setpoint boost
The DHW demand to the generator is comprised of the current DHW setpoint plus the adjustable setpoint boost.

Switching differential
If the DHW temperature is lower than the current setpoint minus the differential set here, the DHW charging process is launched.
It ends when the temperature reaches the current setpoint.

Information:
Forced charging is triggered on the first DHW release of the day.
Charging is also launched when the DHW temperature is within the differential, and as long as it is not less than 1K above the setpoint.

Charging time limitation
During charging, the room heating (depending on the charging priority defined on (line 1630) and on the hydraulic circuit) may be stopped or insufficient. Therefore it is often advisable to limit the charging process timewise to enable heating.

If "- - -" has been selected the charging time limitation will be deactivated. The DHW will be heated to the nominal setpoint, even if the room heating has not received enough power in the meantime.

If a value between 10 and 600 is selected, charging will be suspended after the time period set in minutes, and will remain suspended over that time before resuming. The generator power remains available in the meantime to heat the room. This cycle is repeated until the DHW nominal setpoint has been reached.

Information:
When the room heating is stopped (summer mode, economy function, etc.), DHW charging remains active, regardless of the setting.

Heater

LINE	FUNCTION
5060	Electric immersion heater operating mode
5061	Electric immersion heater release

Electric immersion heater operating mode

• Substitute

The heater performs DHW charging as soon as the heat pump is stopped or becomes inoperative, or if the heat pump has finished charging without reaching the setpoint.
The DHW tank heater switch-on point is calculated so as to optimize the changeover level.
If the DHW temperature falls below the current setpoint (line 1610 or 1612) minus the differential (line 5024) the heat pump will resume operation.

• Summer

When all heating circuits change to summer mode, the heater performs DHW charging starting on the next day. The heat pump therefore stays off in summer mode.
Production of DHW by the heat pump will resume only if at least one heating circuit changes over to heating mode. In that case, the heater operating mode is the same as described in the "Substitute" setting.

• Always

DHW charging is always carried out by means of the heater.

• Cooling mode

When the heat pump operates in cooling mode, it is possible to specify whether a DHW charging is to be carried out via the heater, without cooling being interrupted.
The DHW is prepared by the heater, if the heat pump is in cooling mode or is not available (e.g. out of order).

Information:
The DHW mode selection key also acts on the heater. In order for DHW charging to take place, the DHW key must be on.

Electric immersion heater release

• 24h/day

The heater is continuously active regardless of time programs.
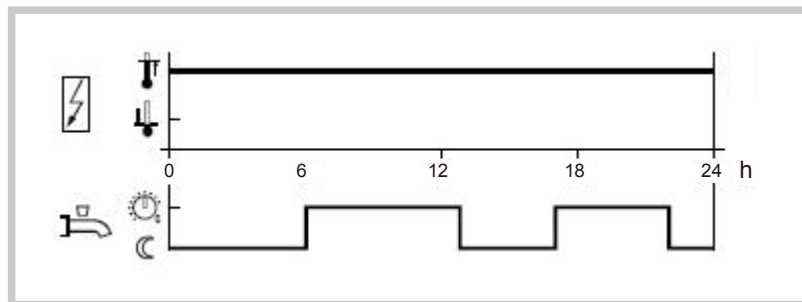
• DHW release

The heater is controlled according to "DHW release".
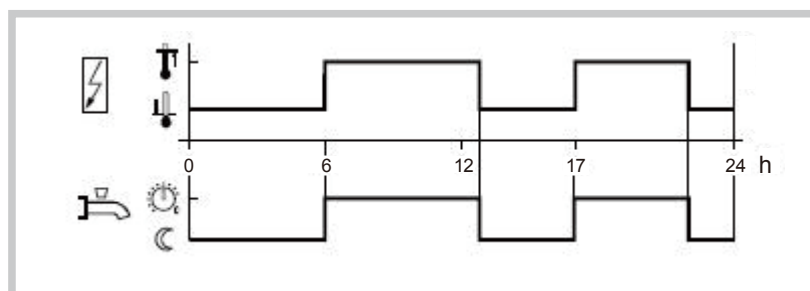
• Time program 4/DHW

Time program 4/DHW of the local controller is
taken into account for the heater.
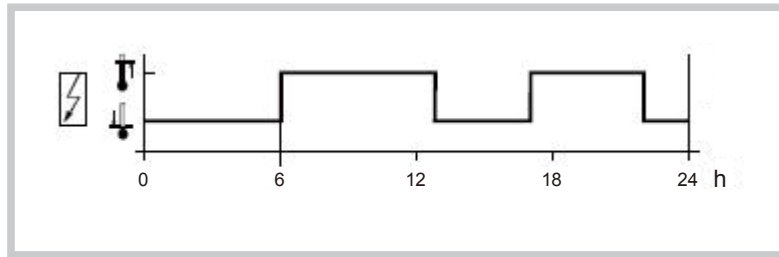
Information:

Switch-on will actually be in effect only if the
heater is able to operate according to the "heater
operating mode" setting.

Control system / 3 phase

● Configuration functions

When an installation is started up, the Indoor unit diagram presetting for that installation must be entered.

Presettings

LINE	FUNCTION
5700	Presetting

Cooling Circuit 1

LINE	FUNCTION
5711	Cooling circuit 1 (Off / 4-pipe system / 2-pipe system)

• **Off**
The cooling circuit is deactivated.

• **4-pipe system**
Not compatible with the this system.
This setting relates to passive cooling.

• **2-pipe system**
Activates the heat pump cooling mode. However, the cooling kit must have been previously connected.

Warning:
If the cooling kit has not been connected and the cooling mode is activated the heat pump will behave abnormally and might cause some unwanted discomfort.
Information:
Switching on the cooling mode causes the menu '"Cooling circuit 1" to appear.

Combination storage tank

LINE	FUNCTION
5870	Combination storage tank

Contact type input EX

LINE	FUNCTION
5987	Contact type input EX4
5989	Contact type input EX5

Input H2 Function

Input H2 is available only on the control extension module. No more than two extension modules can be fitted into an installation. In this case the settings on contact H2 will be assigned to the module with address 1. Only one function can be assigned to input H2 even if there are two modules.

LINE	FUNCTION
6046	Function input H2
6047	Contact type H2
6048	Function value contact H2

Function input H2

• Operating mode changes

- Heating circuits:
  The operating mode for the heating circuit(s) is changed via terminal H2 (e.g. telephone contact) to protection mode.

- Domestic hot water:
  Domestic hot water charging lock is active only with setting 1 (heating circuits + DHW). All temperature demands from heating circuits and DHW are ignored.
  Frost protection is active during this time.

• Error/alarm message

The closing of input H2 causes an internal error message from the controller.

• Dewpoint monitor

A dewpoint monitor can be connected to input H2 to detect condensation.
If it responds, the cooling circuit is immediately switched off.
The cooling circuit is reactivated only if the sensor goes off after the adjustable lock time (line 946) has elapsed.

• Release swimming pool

This function enables the swimming pool to be directly heated with the boiler and pump H2 via an external device (e.g. manual switch).
Direct charging always requires release on input H2. For configuration: set input H2 to "Swimming pool release" and wire the contact.
Warning:
If there are two extension modules (e.g.: 2nd zone + pool) the second zone module have the address 2 and the pool module must have the address 1 because contact H2 enabling the swimming pool mode must be wired to the address 1.

Contact type H2

• Normally-closed

The contact is normally closed and must be open to activate the selected H2 function.

• Normally-opend

The contact is normally open and must be closed to activate the selected H2 function.

Function value Contact H2

The function value contact H2 is operated only when the parameter 6046 is setting on "release swimming pool". This function allows to set the temperature of the water which goes on the swimming pool heat exchanger.

Sensor Corrections

LINE	FUNCTION
6100	Readjustm outside sensor

The outdoor temperature measuring value can be corrected within a range of +/- 3 K.

Installation Frost Protection

LINE	FUNCTION
6120	Frost protection plant

According to the outdoor temperature, the heating circuit pump and the condenser pump are switched on although there is no demand for heat.
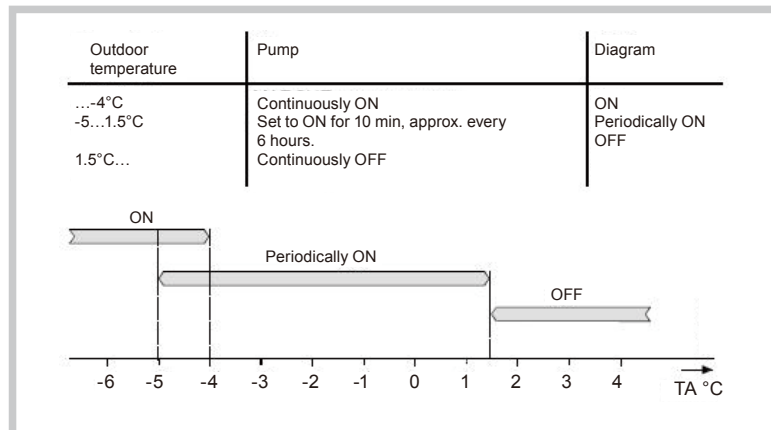
Miscellaneous

LINE	FUNCTION
6205	Reset to default parameters
6220	Software version (heat pump regulator)

Reset to default parameters

All parameters can be reset to factory settings, except followings: Time and date, User interface, and all time programs, as well as the operating hours and the various counters.

Software version (heat pump regulator)

The software version represents the controller software status at the time the unit is being produced. It is printed on the back of the unit. The first two digits represent the software version, and the third is the revision number (e.g. 01.0)

● Fault functions

When a fault occurs, the symbol 🔔 appears and it is possible to display an error message in the Info section by pressing the Info key. The display shows what caused the fault.

Reset (unlock) Heat Pump

LINE	FUNCTION
6711	Reset HP

This line is used to clear the heat pump error messages. The predetermined switch-on delay in case of a failure is therefore ignored, which avoids waiting periods during servicing / troubleshooting.

This option should not be used in normal operating conditions.

Fault Indication Function

LINE	FUNCTION
6740	Flow temp 1 alarm
6741	Flow temp 2 alarm
6745	DHW charging alarm
6746	Flow temp cooling 1 alarm

The difference between the setpoint value and the current temperature value is monitored.

Any difference which continues after the set time period has elapsed will trigger an error message.

Fault History

LINE	FUNCTION
6800 to 6818	Time stamp and history of faults 1 -10

The controller saves the last 10 faults which have occurred to a non volatile memory. Any new entry will delete the oldest entry from the memory. A fault code and a time are saved for each fault.

Error Code List:
- Designation of error:
  The error designations in the table below are displayed in plain text on the user interface.
- Location:
  The sensor or contact associated to the error message.
- Reset:
  Reset is either automatic or manual, depending on the type of error (see table below with error messages).
  - Manual reset:
    Errors which are displayed in the Info section and accompanied by the "Reset " question can be manually reset. Press the "OK" key once, "yes" flashes on the display. Press the "OK" key again to confirm the "yes" and the error will be reset.
  - Automatic reset:
    Automatic clearing occurs after a previously set time (OEM setting) has elapsed. After this time out (6 hours by default) has elapsed, the controller will attempt to reset the error.
    If "Number" appears in the table, it is possible to define how many times the fault can be reset before the heat pump is declared out of order.

- Heat pump operation:
  Shows whether or not the heat pump can continue to operate when the error occurs.
  - Yes:
    The heat pump continues to operate despite the error message.
  - No:
    The error interrupts operation of the heat pump.
  - No with glycol water:
    This error stops glycol water heat pumps, but does not prevent operation of water or air heat pumps.
  - No with water:
    This error stops water heat pumps, but does not prevent operation of glycol water heat pumps.
  - No with air:
    This error stops air heat pumps, but does not prevent operation of water heat pumps or glycol water heat pumps.
  - Per diagram:
    The heat pump will be stopped according to the current installation diagram.
- Priority:
  Errors are ranked by priority. From priority 5 onward (i.e. priority levels 5 - 9) the alarm messages used in remote control are sent. In addition, the alarm relay is switched on.

Control system / 3 phase

Table of error messages which can be displayed:

No. Designation of error	Location	Reset		HP operation	Priority
		Manual	**Automatic**		
0: No fault					
10: Outdoor sensor	B9	No	No	Yes	6
30: Flow sensor 1	B1	No	No	Yes	6
31: Cooling flow sensor 1	B16	No	No	Yes	6
32: Flow sensor 2	B12	No	No	Yes	6
33: Heat pump flow temp sensor error	B21	No	No	Yes	6
44: Heat pump return temp sensor error	B71	No	No	Per diagram	6
50: DHW temp sensor 1	B3	No	No	Yes	6
60: Room sensor 1		No	No	Yes	6
65: Room sensor 2		No	No	Yes	6
76: Special sensor 1	BX	No	No	Yes	3
83: BSB wire short-circuit		No	No	Yes	8
84: BSB, address collision		No	No	Yes	3
85: Radio communication error		No	No	Yes	8
98: Extension module 1		No	No	Yes	8
99: Extension module 2		No	No	Yes	8
100: 2 master clocks on bus		No	No	Yes	3
102: Clock without running supply		No	No	Yes	3
105: Maintenance message		No	No	Yes	5
121: HC1 flow temp too low		No	No	Yes	6
122: HC2 flow temp too low		No	No	Yes	6
126: DHW charge monitoring		No	No	Yes	6
127: Anti-legionella temperature		No	No	Yes	6
134: Heat pump alarm summary	E20	Yes	Number*	No	9
138: No heat pump control sensor		No	Yes	No	1
146: Sensor / Control device configuration		No	No	Yes	3
171: Alarm contact 1 activated		No	No	Yes	6
172: Alarm contact 2 activated	H2	No	No	Yes	6
176: Hydraulic pressure 2 too high	H2	No	No	Yes	6
177: Hydraulic pressure 2 too low	H2	No	No	No	6
178: HC1 safety thermostat		No	No	Yes	3
179: HC2 safety thermostat		No	No	Yes	3
201: Frost alarm	B21/71	Yes	No	No	9
243: Swimming pool sensor	B13	No	No	Yes	6
325: BX/Ext unit: same sensors		No	No	Yes	3
327: Ext modules: same functions		No	No	Yes	3
329: Ext modules/Mixing grp: same functions		No	No	Yes	3
330: BX1 no function		No	No	Yes	3
331: BX2 no function		No	No	Yes	3
332: BX3 no function		No	No	Yes	3
333: BX4 no function		No	No	Yes	3
334: BX5 no function		No	No	Yes	3
335: BX21 no function		No	No	Yes	3
336: BX22 no function		No	No	Yes	3

Control system / 3 phase

No. Designation of error	Location	Reset		HP operation	Priority
		Manual	Automatic		
357: cooling circuit flow temp not reached		No	No	Yes	6
359: no cooling valve Y21		No	No	Yes	3
360: no process reversing valve Y22		No	No	Yes	3
364: Heat pump cooling system error		No	No	Yes	3
369: External fault				No	
370: Outdoor unit fault				No	

*: If such statuses or events occur for the first time,
they will not directly generate a fault message,
but only a status message.

Only if the anomaly occurs repeatedly over a
predefined time period and at a given frequency
(number) will an error message be generated.

Control system / 3 phase

● Service / special operation functions

Maintenance

Maintenance functions can be used as a preventive step for periodically monitoring the installation. All maintenance functions can be individually activated / deactivated.

The controller automatically generates maintenance messages if the settings defined are either exceeded or fail to be reached.

LINE	FUNCTION
7070	HP interval
7071	HP time since maintenance
7072	Max starts compressor 1/hrs run
7073	Cur starts compressor 1/hrs run
7076	Differential condenser max/week
7077	Cur differential condenser max/week
7078	Differential condenser min/week
7079	Cur differential condenser min/week
7090	DHW storage tank interval
7091	DHW storage tank since maintenance

HP interval

Defines the maintenance frequency (in months) for the heat pump.

HP time since maintenance

Displays the time (in months) elapsed since the last maintenance. If the value exceeds the "heat pump interval" (line 7070), the symbol 🔧 will be displayed and a maintenance message will appear in the Info section:
17: Heat pump maintenance Interval (Priority 6)

This setting can be reset with the associated rights of access.

Max starts compressor 1/hrs run

Defines the maximum number of compressor 1 startups per hour of operation.

Cur starts compressor 1/hrs run

The average number of compressor startups per hour of operation, obtained over a period of 6 weeks.
If the value exceeds the "Comp1 max startups/hr op" adjusted setting, the symbol 🔧 will be displayed and a maintenance message will appear in the Info section:
8: Too many compressor 1 startups (Priority 9)

This setting can be reset with the associated rights of access.

Differential condenser max/week

Indicates how many times over 7 days the maximum temperature difference on the condenser can be exceeded.

Cur differential condenser max/week

Number of times the maximum temperature difference on the condenser has been exceeded during a 7-day period. If the value exceeds the setting "Max cond diff/week" (line 7076), the symbol will be displayed and a maintenance message will appear in the Info section:
13: Max cond diff (Priority 3)

This setting can be reset with the associated rights of access.

Differential condenser min/week

Indicates how many times over 7 days the minimum temperature difference on the condenser may fail to be reached.

Cur differential condenser min/week

The number of times the minimum temperature difference on the condenser has not been reached over a 7 period. If the value is higher than the setting "Min cond diff/wk" the symbol 🔧 will be displayed and a maintenance message will appear in the Info section:
14: Min cond diff (Priority 3)
This setting can be reset with the associated rights of access.

DHW storage tank interval

Defines the maintenance frequency (in months) for the DHW tank.

DHW storage tank since maintenance

Displays the time (in month) elapsed since the last maintenance. If the value exceeds the "DHW tank interval" (line 7090), this symbol 🔧 will be displayed and a maintenance message will appear in the Info section:
11: DHW tank period (Priority 6)

Emergency mode

If the heat pump is not operating properly, an emergency operation can be maintained. The emergency operation enables the installation to be run with the available heaters (flow, DHW tank). In this case the compressor will remain off.

LINE	FUNCTION
7141	Emergency operation
7142	Emergency operation function type

Emergency operation

Emergency operation can be activated and deactivated manually.

• **Off**

Emergency operation is deactivated.

• **On**

Emergency operation is activated.

Emergency operation function type

• **Manually**

Emergency operation can be activated/deactivated only through the Emergency operation setting on line 7141.

• **Automatically**

As soon as a fault occurs on the heat pump, emergency operation is automatically switched on. It stops when the fault is removed and, if necessary, cleared (reset). Emergency operation may however be activated / deactivated manually via the "Emergency operation" setting on line 7141.

Simulation

LINE	FUNCTION
7150	Simulation outside temp

Simulation outside temp

To make the starting-up and troubleshooting processes easier, it is possible to simulate an outdoor temperature in the range of -50...+50°C. During simulation, the current, composite and attenuated outdoor temperatures are ignored and substituted with the adjusted simulation temperature.

Computation of the three outdoor temperatures based on the actual outdoor temperature continues to be performed during the simulation, and these temperatures are available again when the simulation is over.

This function can be deactivated by selecting -.- on this line or automatically, after a 5 hour waiting period.

Person in charge

LINE	FUNCTION
7181	Phone no. responsibility 1
7183	Phone no. responsibility 2

These lines are used to specify the telephone numbers associated with the corresponding alarms.

● Input / output test functions

Input/output testing is used to ensure that the connected components are in working order.

Relay Output Testing

Selection of a setting from relay testing closes the corresponding relay and therefore switches on the connected component. This makes it possible to check that the relays are in working order and that the wiring has been performed correctly.

LINE	FUNCTION
7700	Relay test (No test / Everything off / Relay output QX23 module 1 / Relay output QX21 module 1 / Relay output QX22 module 1 / Relay output QX1 / Relay output QX2 / Relay output QX3 / Relay output QX4 / Relay output QX5 / Relay output QX6 / Relay output QX23 module 2 / Relay output QX21 module 2 / Relay output QX22 module 2 / Relay output QX7)

Warning:

During testing of an output, the heat pump is stopped, all outputs are "off" and only the controlled output is on.

Analog Input/Output Testing

LINE	FUNCTION
7710	Output test UX
7711	Voltage valve UX
7720	Output test digital
7721	Digital output DO1
7722	Digital output DO2

Output test UX

Enables testing the outdoor unit control.

Voltage valve UX

Displays the voltage value at the UX output.

Output test digital

Enables testing outputs DO1 and DO2

Digital output DOx

Shows the output status.

Sensor Input Testing

LINE	FUNCTION
7730	Outside temp B9
7820	Sensor temp BX1
7823	Sensor temp BX4
7824	Sensor temp BX5
7830	Sensor temp BX21 module 1
7831	Sensor temp BX22 module 1
7832	Sensor temp BX21 module 2
7833	Sensor temp BX22 module 2

Displays the temperature of each sensor.

H1, H2, H3 Input Testing

LINE	FUNCTION
7841	Contact state H1
7846	Contact state H2
7855	Contact state H3

Displays the current status of contact Hx.

Input Testing

LINE	FUNCTION
7914	Input EX4
7915	Input EX5
7916	Input EX6

If a test setting is selected, the associated input is displayed and can thus be checked.
The "0 V" display means that there is no voltage and that the respective input is currently inactive. The

"230 V" display indicates that a 230 V voltage is present on the associated input and therefore, that the input is active.

● State functions

The current operating status of the installation can be viewed by means of status displays.

Messages

LINE	FUNCTION
8000	State heating circuit 1
8001	State heating circuit 2
8003	State DHW
8004	State cooling circuit 1
8006	State heat pump
8011	State swimming pool
8022	State supplementary source

State heating circuit

End user (Info level)	Commissioning, Engineer
Thermostat response	Thermostat response
Manual action active	Manual action active
Controlled drying active	Controlled drying active
Heating mode restriction	Overeating protection active Restriction, boiler protection Restriction, DHW priority Restriction, storage tank
Forced draft	Forced draft, storage tank Forced draft, DHW Forced draft generator Forced draft Switch-off delay active
Comfort heating mode	Optimis. at switch-on + accelerated heating Optimization at switch-on Accelerated heating Comfort heating mode
Reduced heating mode	Optimization at switch-off Reduced heating mode
Frost protection active	Room frost protection Flow frost protection active Install. frost protection active
Summer mode	Summer mode
Off	Eco day active Reduced decrease Frost protection decrease Room temperature limitation Off

State DHW

End user (Info level)	Commissioning, Engineer
Thermostat response	Thermostat response
Manual action active	Manual action active
Draw-off mode	Draw-off mode
Adiabatic cooling active	Adiabatic cooling by collector Adiabatic cooling via gen/HC
Charging lock active	Discharge protection active Charging duration limit. active Charging locked
Forced charging active	Forcing, DHW tank max temp Forcing, max charging temp Forcing, anti-legion. setpoint Forcing, comfort setpoint
Charging by heater	Charging by heater, anti-legion. setpoint Charging by heater, comfort setpoint Charging by heater, reduced setpoint Charging by heater, frost protection setpoint Heater released
Accelerated charging active	Flow active Anti-legion. accelerated charging
Charging active	Charging, anti-legion. setpoint Charging, comfort setpoint Charging, reduced setpoint
Frost protection active	Frost protection active
Switch-off delay active	Switch-off delay active
Charging on standby	Charging on standby
Charged	Charged, max tank temp Charged, max charging temp Charged, anti-legionella temp Charged, nominal temp Charged, reduced temp
Off	Off
Ready	Ready

State cooling circuit 1

End user (Info level)	Commissioning, Engineer
Dewpoint sensor activated	Dewpoint sensor activated
Manual action active	Manual action active
Fault	Fault
Frost protection active	Flow frost protection active
Cooling mode locked	Locked, heating mode Lock time after heating Locked, generator Locked, storage tank
Cooling mode restricted	Flow temp setpoint increase by hygrostat Dewpoint flow min limit Outdoor temp flow min limit
Comfort cooling mode	Comfort cooling mode Switch-off delay active
Cooling protection mode	Cooling protection mode
Frost protection active	Frost protection active
OT cooling limit activated	OT cooling limit activated
Off	Off Room temperature limitation Flow limit reached
Cooling mode off	Cooling mode deactivated

State heat pump

End user (Info level)	Commissioning, Engineer
Emergency mode	Emergency mode
Fault	Fault
Locked	Locked, outdoor temperature Locked, external Locked, economy mode
Lim. time active	Consumer flow rate controller Min outdoor temp use limit Max outdoor temp use limit Max switch off temp lim Max OT limit cooling Min switch off temp limit Comp min switch off time active Excess heat compensation
Frost protection active	Heat pump frost protection
Defrosting activated	Defrosting activated
Cooling mode active	Comp min ON time active Comp 1 ON
Heating	Comp min ON time active Heat deficiency compensation Max cond diff limit Min cond diff limit Comp.1 and heater ON Comp 1 ON Heater ON
Frost protection active	Install. frost protection active
Off	Flow active Switch-off delay active No demand

State swimming pool

End user (Info level)	Commissioning, Engineer
Manual action active	Manual action active
Fault	Fault
Heating mode restriction	Heating mode restriction
Forced draft	Forced draft
Heating	Generator heating mode
Heated, max pool temp Heated	Heated, max pool temp Heated, generator setpoint
Heating off	Solar heating mode OFF Generator heating mode OFF
Cooling	Cooling

State supplementary source

End user (Info level)	Commissioning, Engineer
Locked	Locked, solid fuel boiler Locked, outside temperature Locked, economy mode
In operation for HC, DHW	In operation for HC, DHW
Released for HC, DHW	Released for HC, DHW
In operation for DHW	In operation for DHW
Released for DHW	Released for DHW
In operation for heating circuit	In operation for heating circuit
In operation for HC, DHW	In operation for HC, DHW
Released for HC, DHW	Released for HC, DHW
In operation for DHW	In operation for DHW
Released for DHW	Released for DHW
In operation for heating circuit	In operation for heating circuit
Released for HC	Released for HC
Overrun active	Overrun active
Off.	Off.

History

LINE	FUNCTION
8050 to 8068	Timestamping and history status coding of faults 1-10

The last 10 status messages are saved and displayed with the associated codes. The most recent message is saved to History 1, the oldest to History 10.

Information:
Status displays for the end user can be viewed directly in the Info section on the room unit.

● Diagnostics heat generation functions

Various setpoints and actual values, relay switch status data can be displayed for purposes of diagnosis.

Heat Pump

LINE	FUNCTION
8402	Electric immersion heater 1 flow
8403	Electric immersion heater 2 flow
8406	Condenser pump

These lines are used to check the operating mode of the components controlled by the heat pump relays. The display "0" means that the associated components are currently disconnected. The display "1" means that the associated components are currently switched on.

Information:
This information applies to relays defined as normally open contacts. For normally closed contacts, the action is reversed.

Setpoints and Measured Values

LINE	FUNCTION
8410	Return temp HP
8412	Flow temp HP
8413	Compressor modulation
8425	Temp differential condenser

These lines allow the various setpoints and measured values for the heat pump to be viewed.

Hour / Startup Counter

LINE	FUNCTION
8454	Locking time HP
8455	Counter number of locks HP
8456	Hours run electric flow
8457	Start counter electric flow

Locking time HP

Displays the cumulative locking time since start-up by the electrical services (via EX6).

Counter number of locks HP

Displays the cumulative locks since start-up by the electrical services (via EX6).

Hours run electric flow, Start counter electric flow

These lines are used to view the hours of operation and the number of start-up of electric heater.

● Diagnostics consumers functions

Various setpoints and actual values, relay switch status and timing status data can be displayed for purposes of diagnosis.

Outside Temperatures

LINE	FUNCTION
8700	Outside temp
8701	Outside temp min
8702	Outside temp max
8703	Outside temp attenuated
8704	Outside temp composite

The current, minimum, maximum, attenuated and composite outdoor temperatures are displayed.

Heating Circuits

LINE	FUNCTION
8730 and 8760	heating circuit pump 1 and 2
8731 and 8761	Heating circuit mix valve 1 and 2 open
8732 and 8762	Heating circuit mix valve 1 and 2 close
8740 and 8770	Room temp 1 and 2
8743 and 8773	Flow temp 1 and 2

The display "Off" means that the associated components are currently disconnected.
The display "On" means that the associated components are currently switched on.

Cooling Circuit

LINE	FUNCTION
8756	Flow temp cooling 1

The actual value of the cooling mode are displayed.

The cooling mode room setpoint is displayed on programming line 8741.

Domestic Hot Water

LINE	FUNCTION
8820	DHW pump
8821	Electric immersion heater DHW
8830	DHW temp 1
8840	Hours run DHW pump
8841	Start counter DHW pump
8842	Hours run electric heater DHW
8843	Start counter electric heater DHW

The measured values, the DHW circulation pump and charging temperature, operating hour and start-up counters are displayed, as well as temperatures of the primary controllers and DHW heater.

Swimming Pool

LINE	FUNCTION
8900	Swimming pool temp

The current temperature of the swimming pool is displayed.

Line

LINE	FUNCTION
8950	Common flow temp

Multifunction Relay Status

LINE	FUNCTION
9031	Relay output QX1
9032	Relay output QX2
9033	Relay output QX3
9034	Relay output QX4
9035	Relay output QX5
9036	Relay output QX6
9037	Relay output QX7

The switching status of multifunction relays 1 - 6 can be viewed individually on these lines. The display "Off" means that the components assigned to this output are currently disconnected. The display "On" means that the associated components are currently switched on.

Status of Relays for Extension Modules 1 and 2

LINE	FUNCTION
9050	Relay output QX21 module 1
9051	Relay output QX22 module 1
9052	Relay output QX23 module 1
9053	Relay output QX21 module 2
9054	Relay output QX22 module 2
9055	Relay output QX23 module 2

The switching status of the relays connected to extension modules 1 and 2 can be viewed on these lines.

The display "Off" means that the components assigned to this output are currently disconnected. The display "On" means that the associated components are currently switched on.

3. ELECTRICAL CONNECTIONS

3-1. OVERVIEW OF ALL THE ELECTRICAL CONNECTIONS

The wiring diagram for the indoor unit is shown in detail on electrical wiring diagrams (Chapter 1 for outdoor unit and Chapter 2 for indoor unit).

Outdoor sensor :
cable 2 x 0,75 mm²

Remote control (option) :
cable 3 x 0,5 mm²

Interconnection between the external unit and the indoor unit
Phase, neutral, earth, communication
cable 4 x 1,5 mm²

Room thermostat (option) :
cable 2 x 0,5 mm²

Power supply to the electrical back-ups :
(3 phases, earth)
cable 4 x 2,5 mm²

Electric panel

General electrical supply :
(3 phases, neutral, earth)
cable 5 x 2,5 mm²

Overall layout of the electrical connections for a simple installation (1 heating circuit)

Control system / 3 phase

3-2. ELECTRICAL CONNECTIONS ON THE INDOOR UNIT

• **Remove the front panel (2 screws A)**
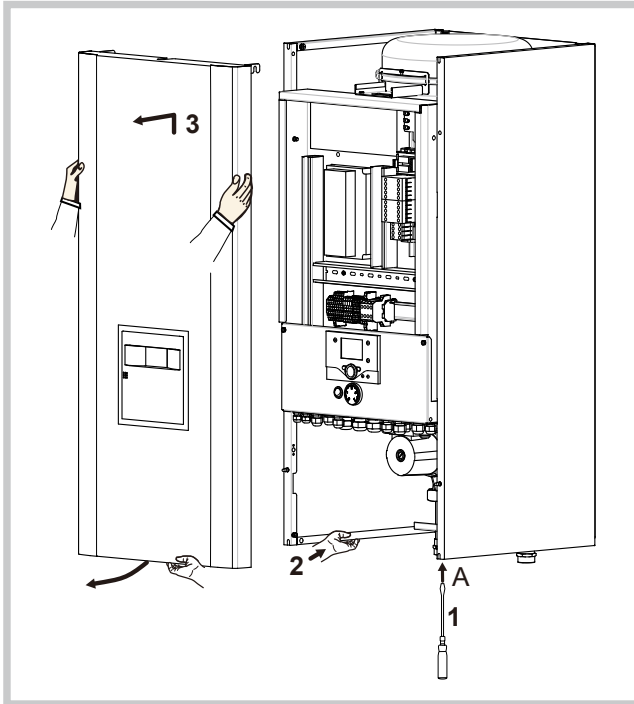
Removing the front panel

• **Remove the cover of the electric box.**
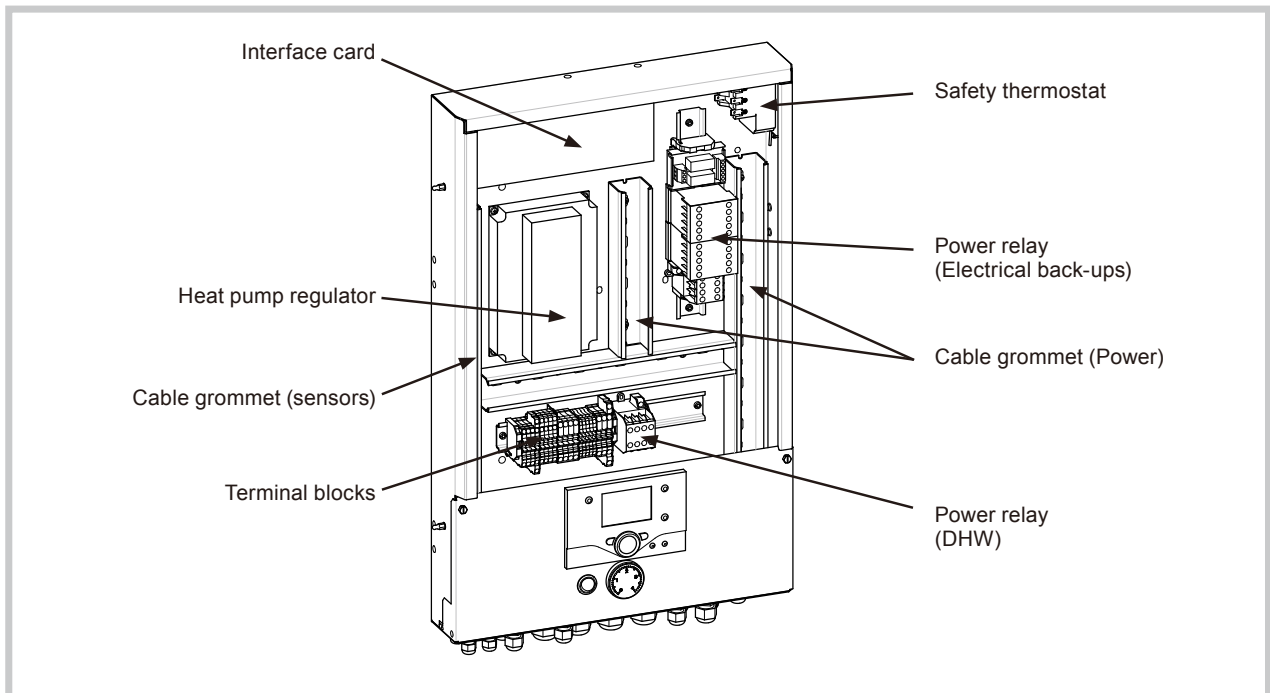
Access to indoor unit electric box and description

Note:
Ensure that the general electrical power supply has been cut off before starting any repair work .
The rearmament of safety thermostat should be done by a professional .
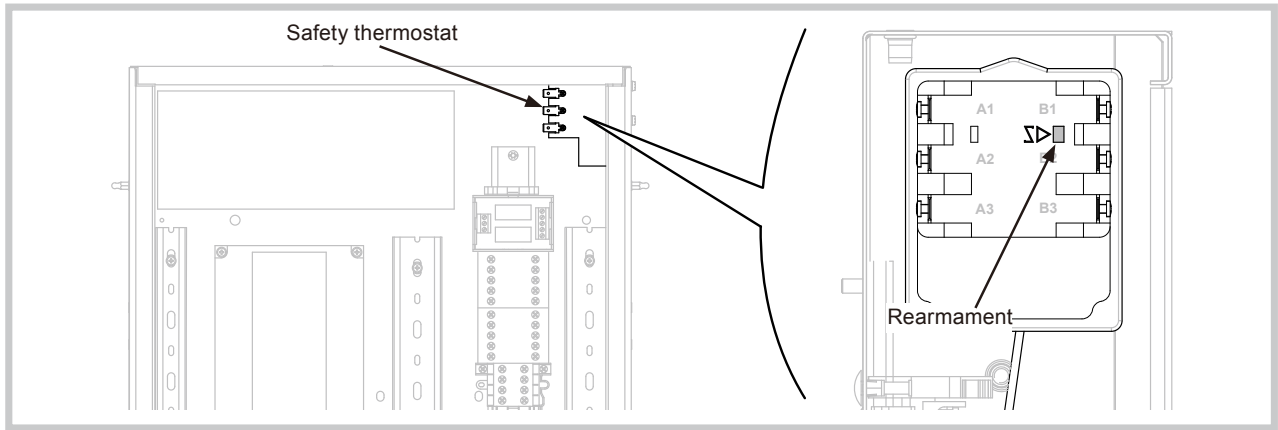
Access to reset the safety thermostat

• Make the connections in accordance with the diagram(s).

Do not place the sensor lines and the sector supply lines in parallel in order to avoid causing inadvertent interference due to voltage points in the sector supply.

Ensure that all the electrical cables are housed in the spaces provided for this purpose inside the lifting handles.
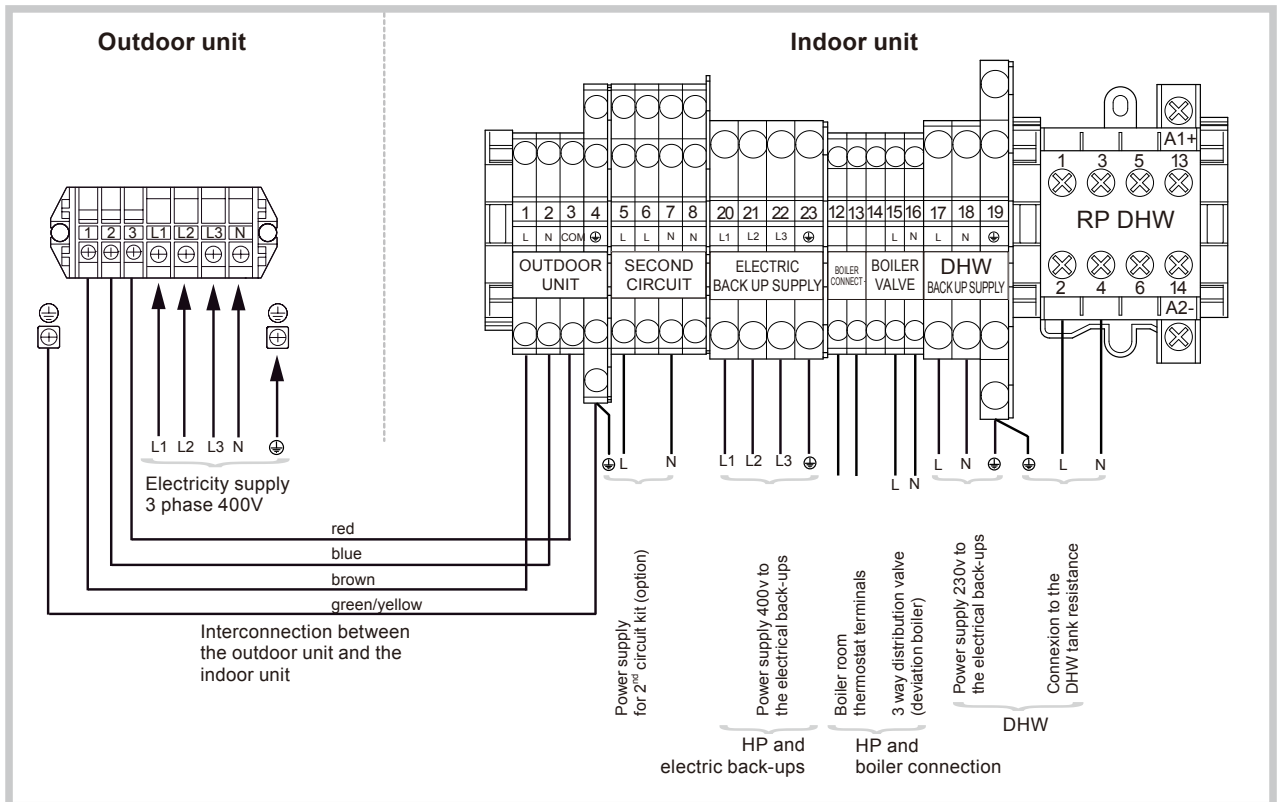
Connection to terminal block and power relays

Note:

Ensure that the general electrical power supply has been cut off before starting any repair work .
The rearmament of safety thermostat should be done by a professional .

CONTROL SYSTEM

- **Interconnection between the outdoor unit and the indoor unit**

Comply with the correspondence between the markings on the indoor unit's terminals and those on the outdoor unit when connecting the interconnection cables.

A connection error could cause the destruction of one or other of the units.

- **Electric back-ups**

If the heat pump is not installed with a boiler connection:
- Connect the electrical supply for the back-ups (terminals 20, 21, 22 and 23) to the electrical panel.

- **Boiler connection**

- Please refer to the instructions supplied with the boiler connection kit.
- Please refer to the instructions supplied with the boiler.

- **Domectic hot water tank**

If the installation is fitted with a DHW tank with electrical back-up heating:
- Please refer to the instructions supplied with the DHW kit.
- Please refer to the instructions supplied with the DHW tank.

- **Second heating circuit**

- Please refer to the instructions supplied with the second circuit kit.

- **Contract with the power provider**

The heat pump's operation can be controlled to suit special contracts (e.g. off-peak, day/night).

In particular, domestic hot water (DHW) at Nominal temperature will be produced during the off-peak hours when electricity is cheaper.
- Connect the "Power Provider" contact to input EX5.
- Set the parameter line 1620 to "Off-peak hours".
- 230V on input EX5 = "Peak hours" information activated.
  (Basic setting / Modification possible line 5989, menu Configuration)

- **Power limitation or EJP (peak day removal)**

Power limitation is intended to reduce electrical consumption when this is too high compared to the contract with the power provider.
- Connect the power limiting device to input EX4, the back-ups for the heat pump and the DHW stop in the event of over-consumption by the dwelling.
- 230 V on input EX4 = power limitation in progress. (Basic setting / Modification possible line 5987, menu Configuration and line 2920, menu Heat pump)

- **External faults the heat pump**

Any component of carryforward of information (thermostat, pressure switch, etc.) may signal an external problem and stop the heat pump.
- Connect the external component to input EX6.
- 230 V on input EX6 = stoppage of heat pump (the system displays Error 369).
- In the case of a heated floor, connect the floor heating safety device into the connector of the floor heating pump.

Control system / 3 phase

3-3. CONNECTIONS TO THE HEAT PUMP REGULATOR (Accessories and options)
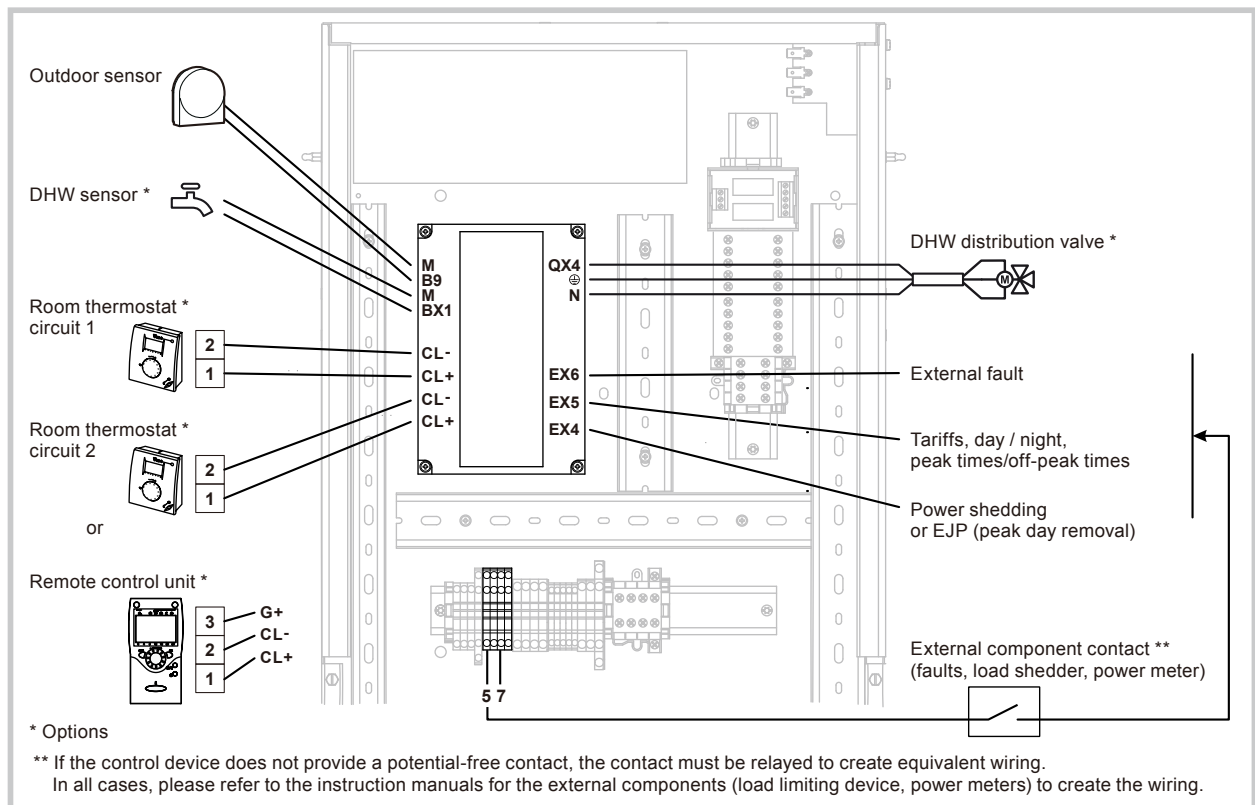
Connections to the heat pump regulator (accessories and options)

■ OUTDOOR SENSOR

The outdoor sensor is required for the heat pump to operate correctly.
Consult the fitting instructions on the sensor's packaging.
Place the sensor on the coldest part, generally the northern or north-eastern side.
In any case, it must not be exposed to the morning sun.
It must be installed so as to be easily accessible but at least 2,5 m from the floor.
It is essential that it avoid any sources of heat such as flues, the upper parts of doors and windows, proximity to extraction vents, the underneath of balconies and under-eave areas which would isolate the sensor from variations in the outdoor air temperature.
- Connect the outdoor sensor to the M and B9 terminals on the heat pump control board.

■ ROOM THERMOSTAT AND / OR REMOTE CONTROL

The room thermostat (remote control) is optional.
Consult the fitting instructions on the sensor's packaging.
The sensor must be installed in the living room area on a very uncluttered wall, 1,5 m above the floor.
Avoid direct sources of heat (chimney/flue, television, cooking hobs), draughty areas (ventilation, door, etc.).
Air leaks in the seals in the constructions are often translated into cold air blowing through the electrical conduits. Lag the electrical conduits if there is a cold draught on the back of the IR sensor.
- Installation equipped with two room thermostats:
  - Connect each of the sensors to one of the CL+ or CL- terminals on the heat pump control board using the connector supplied.
- Installation equipped with a room thermostat and a remote control:
  - Connect the sensor to one of the CL+ or CL- terminals on the heat pump control board.
  - Connect the remote control to the other CL+, CL- terminals and to G+.

■ DHW SENSOR

If the installation is equipped with a DHW tank (with electric back-up):
- Place the domestic hot water sensor in the housing for the cylinder sensors.
- Connect the domestic hot water sensor to terminal BX1 and M.

CONTROL SYSTEM

■ START-UP

- Make sure that ALL DIP SW on the interface card are OFF before starting up. DIP SW shuold be set OFF for normal operation. Power supply to the indoor unit must be turned off while toching DIP SW.
- Close the installation's main circuit breaker.
    > On first commissioning (or in winter), in order to allow the compressor to pre-heat, engage the installation's main circuit breaker (power supply to the outdoor unit) some hours before starting up the tests.
- Engage the start/stop switch.
    > To ensure that inputs EX4, EX5 and EX6 operate correctly : Check that the live-neutral polarity of the electrical supply is correct.
    > When the power is switched on and every time that the ON/OFF button is switched off and then switched on again, the outdoor unit will take approximately 4 minutes to start up, even if the setting is requesting heating.
    > The display can show error 370 when the appliance (re)starts. Do not be concerned, the communication between the outdoor and indoor unit will re-establish itself in a few moments.

During the regulator initialisation phase, the display shows all the symbols and then "Data update" and then "State heat pump".

- Make all the specific adjustments to the setting (configuring the installation).

- Press the key $\overset{OK}{\text{⬭}}$

- Hold down the key $\overset{å}{\text{◯}}$ for 3s and select the level of access used with the aid of the knob ⬭ .

- Confirm with the key $\overset{OK}{\text{⬭}}$

Parameter the heat pump's setting (See "■ FUNCTION TABLE of 2-3 CONTROL SETTING".).
On commissioning (or the case of error 10), the electrical backup heaters may start up even if the outdoor temperature at the time is above the heaters' trigger temperature.
The regulating system uses an average initial outdoor temperature of 0°C and requires some time to update this temperature.
To mitigate this situation, the sensor must be connected correctly.
Re-initialise line 8703 (commissioning level, Consumer diagnostic menu).

■ CONFIGURING THE ROOM THERMOSTAT

Configure the room thermostat and connect it to the appropriate heating zone:
- Hold down the occupancy key for more than 3 seconds. The room thermostat displays RU and a number flashes.
- Turn the wheel to choose the zone (1, 2).
    > ☞ **If the installation is fitted with 2 room thermostats,**
    > **- First connect one room thermostat and configure it in zone 2.**
    > **- Then connect the other room thermostat and configure it as default in zone 1.**
- Press the occupancy key; the room thermostat displays P1 and a flashing number.
    1: Automatic recording : a correction of the setting with the button is adopted without any particular confirmation (timeout) or by pressing the regime key.
    2: Recording with confirmation: a correction of the setting with the button is not adopted until the regime key is pressed.
- Press the occupancy key again; the room thermostat displays P2 and a flashing number.
    0: OFF : all the operating elements are engaged.
    1: ON : the following operating elements are locked:
        Switching over the heating circuit's operating mode
        Adjusting the comfort setpoint
        Changing the operating level (Heating mode key)
The room thermostat displays OFF for 3 seconds when a locked button is pressed.

■ CONFIGURING THE REMOTE CONTROL

During commissioning, after an initialisation period of approx. 3 minutes, the user's language must be set:
- Press the key $\overset{OK}{\text{⬭}}$
- Choose menu "Operator section".
- Choose "Language".
- Select the language menu (**English**, Français, Nederlands, Español, etc).

4. INSTALLATION

4-1. OUTDOOR SENSOR

■ MODEL : QAC34

● **Installation**

Field supply

H
Minimum 2.5 m (1/2 H)
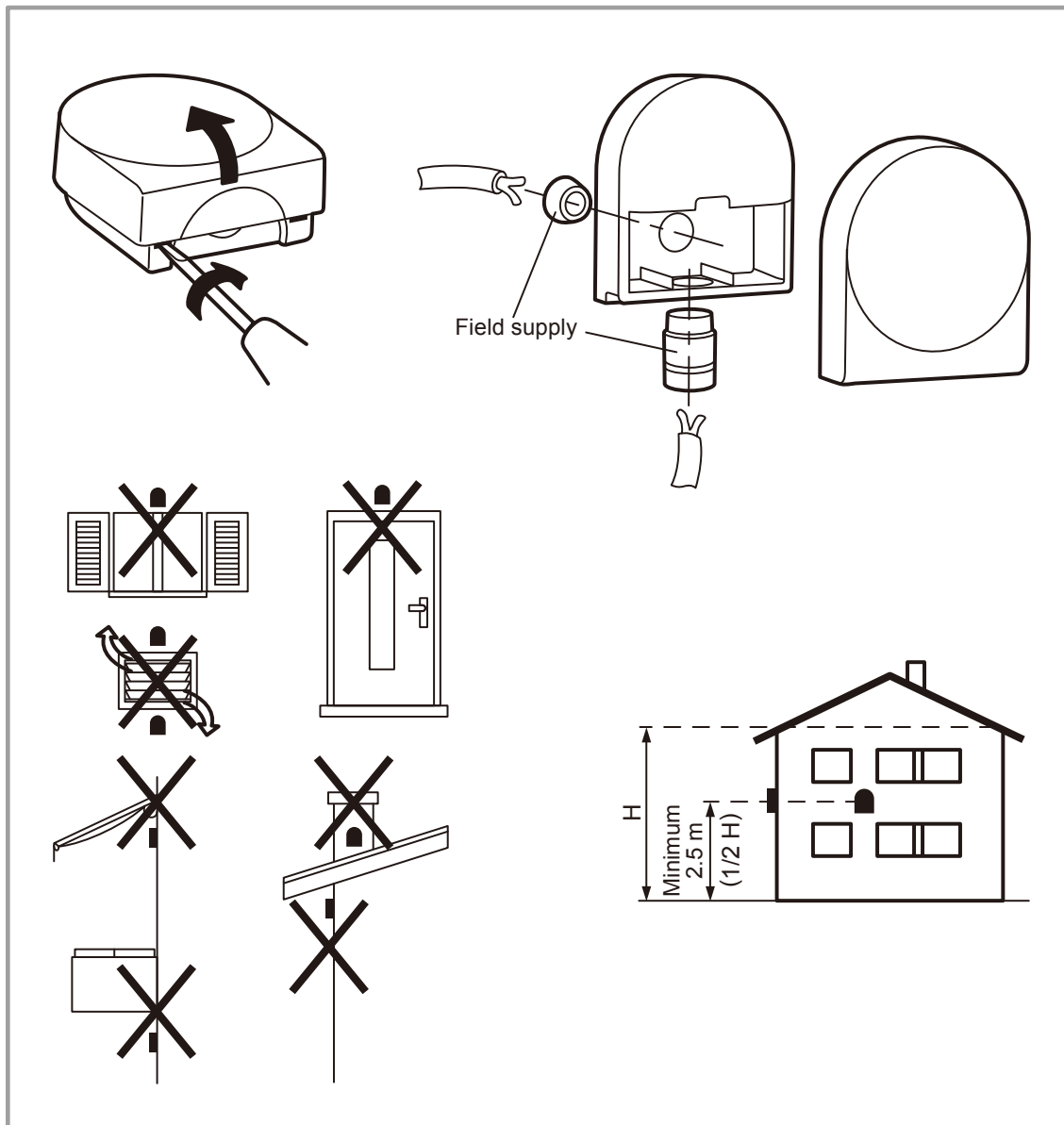
Control system / 3 phase

CONTROL SYSTEM

4-2. REMOTE CONTROL (Optional parts)

■ MODEL : UTW-C75XA

The remote control includes the functions of the room unit together with those of the user interface mounted in series on the indoor unit.
It can be used, therefore, not only to measure the room temperature, but also to view the operating status of the heat pump, to enter the heat pump settings.

● **Installation**

Control system / 3 phase
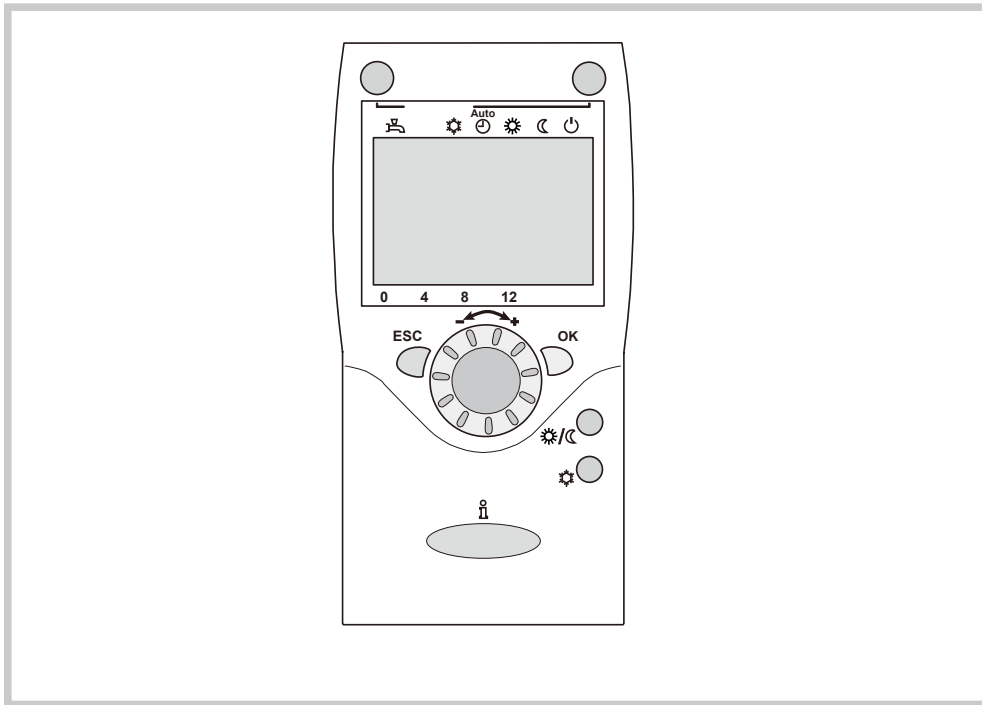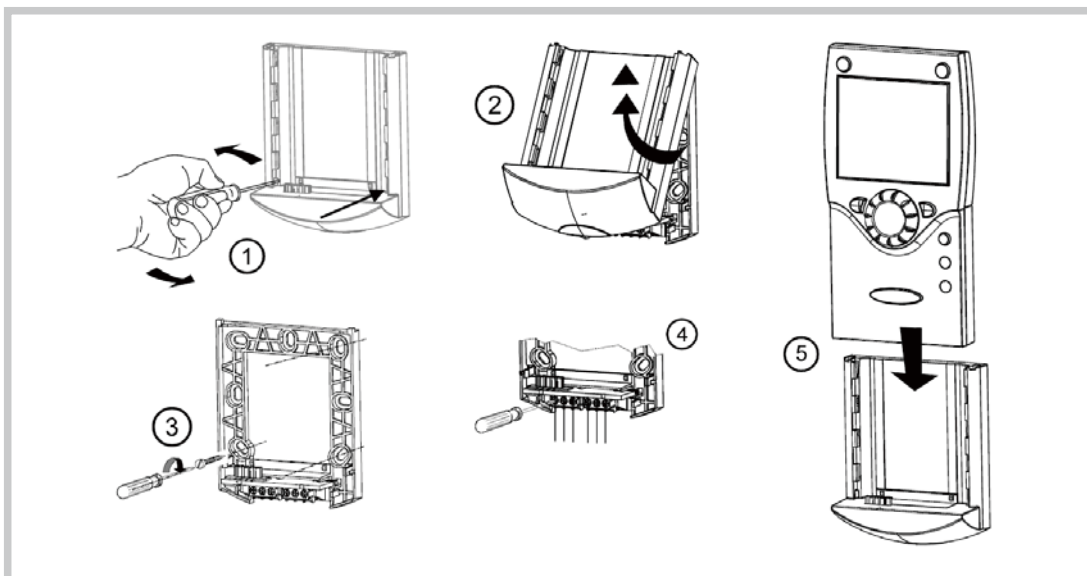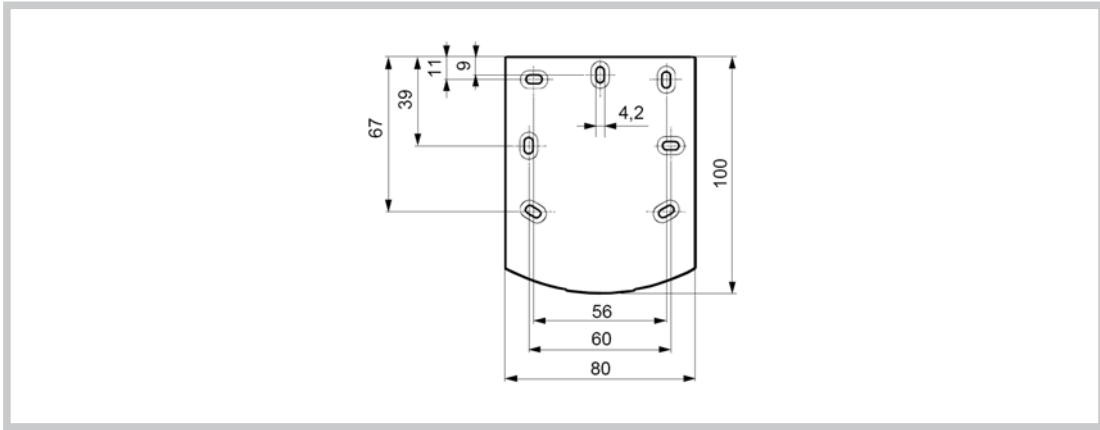
● Connections

The remote control must be connected to terminal b (CL+, CL-, G+) of the heat pump controller board. To do this, you can use a 0.5mm² cable of the two-pair telephone cable type.

If the cable is shielded, the shielding can be connected to the controller CL- terminal. It may under no circumstances be connected on both sides, i.e. heat pump regulator side and room unit side.

Terminal C75	Control terminal	Function
1	CL+	BSB data
2	CL-	BSB ground
3	G+	Power supply DC12V

Control system / 3 phase

4-3. ROOM THERMOSTAT (Optional parts)

■ MODEL : UTW-C55XA

The room thermostat is optional. Select an appropriate place for the room thermostat by following these rules:

● Central room
● Installation height, approx. 1.5 m
● Inner wall
● Away from drafts
● Away from direct sunlight
● Do not install the thermostat behind a door or in any other place where it may receive shocks.
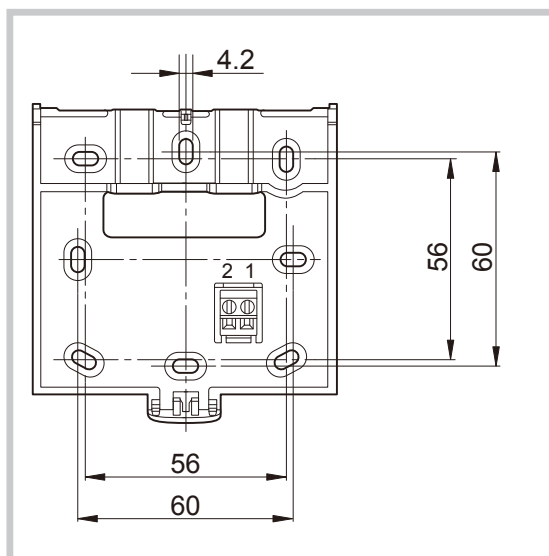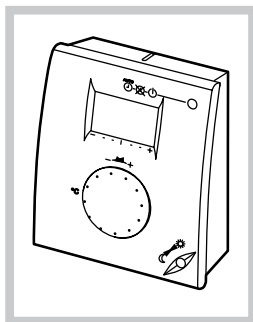
Air tightness faults in buildings often result in cold air being blown through the electrical sheathing.

Do not hesitate to seal them off if a cold air draft comes into the back of the thermostat.
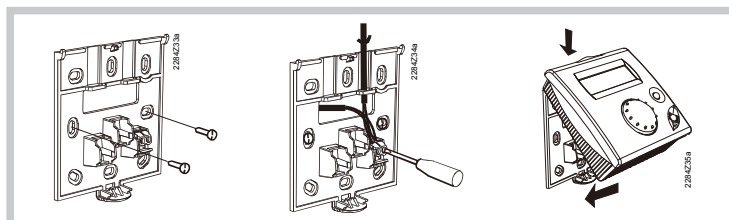
● Connections

The room thermostat must be connected to one of the terminals b (CL+, CL-) of the heat pump controller board. To do this, you can use a 0.5mm² cable of the two-pair telephone cable type.

If the cable is shielded, the shielding can be connected to the controller CL- terminal. It may under no circumstances be connected on both sides, i.e. heat pump regulator side and room unit side.
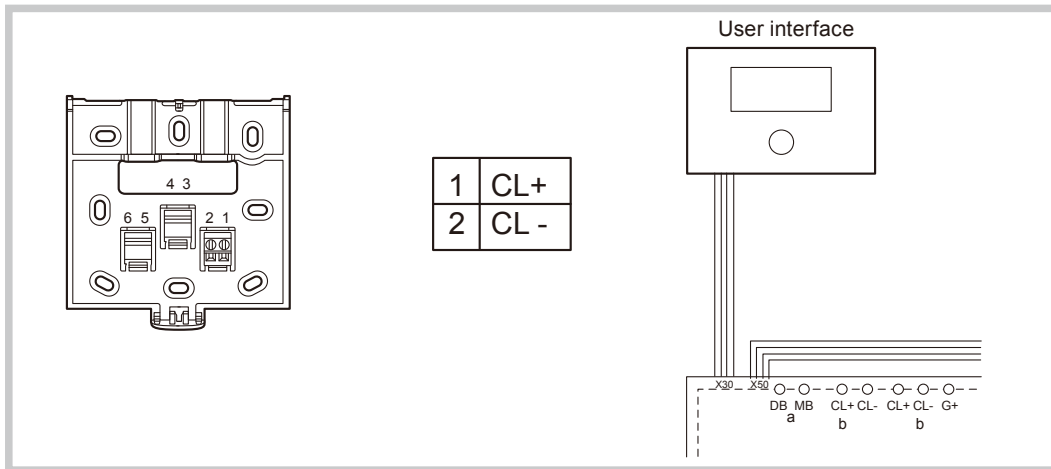
If the installation is equipped with 2 room thermostats, the second thermostat must be connected to the second terminal block b.

CONTROL SYSTEM

5. DIMENSIONS

5-1. OUTDOOR SENSOR

■ MODEL : QAC34

(Unit : mm)
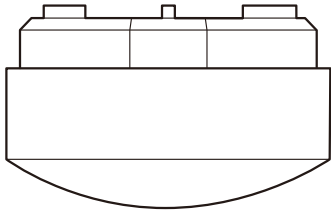
Top view
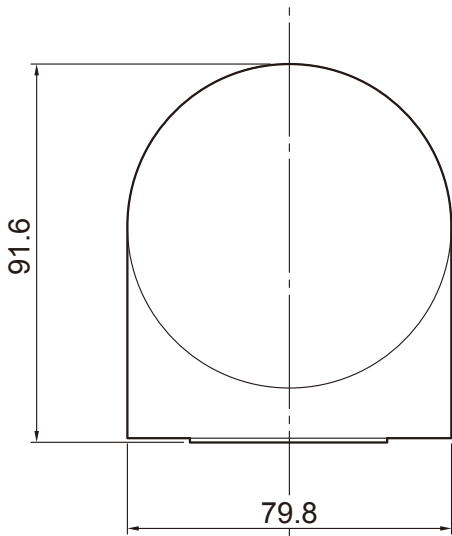
91.6

79.8

Front view

49.7

Side view

8.6

5.5

9.6

6

24.5

25
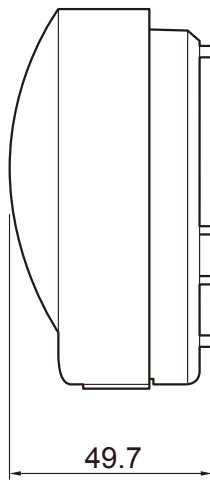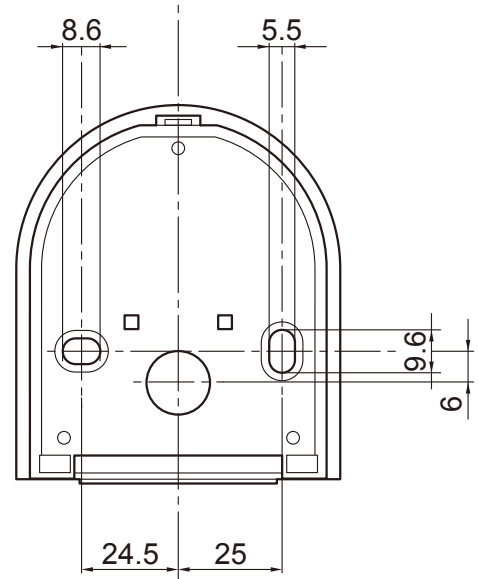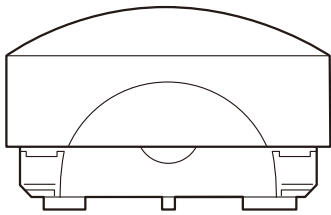
Rear view

Bottom view

Control system / 3 phase

5-2. REMOTE CONTROL (Optional parts)

■ MODEL : UTW-C75XA

(Unit : mm)

● Controller

Top view

159

82

Front view

37
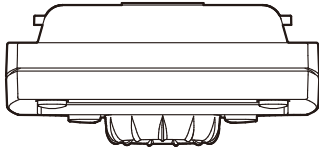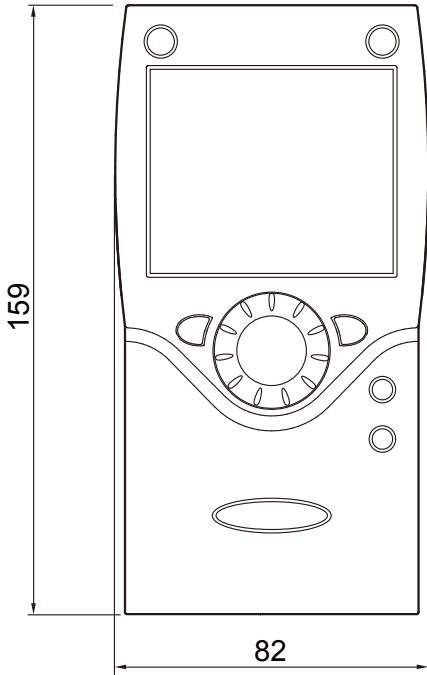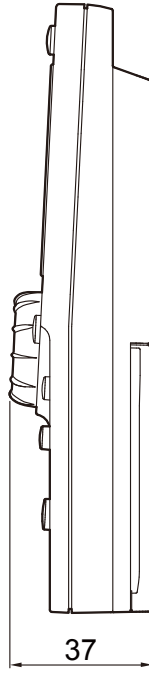
Side view

Rear view

● Holder

100

80

Front view

32.5

Side view

4.2

11

9

39

67

56

60
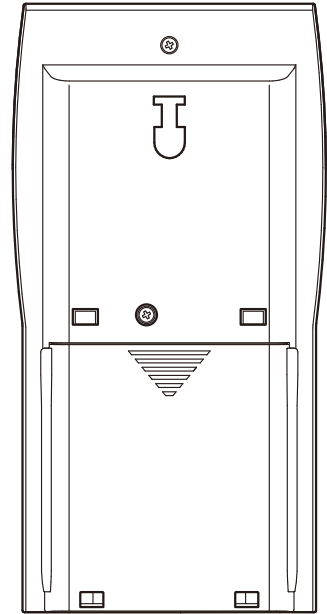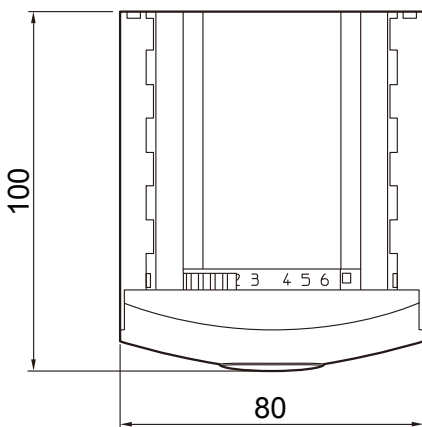
Rear view
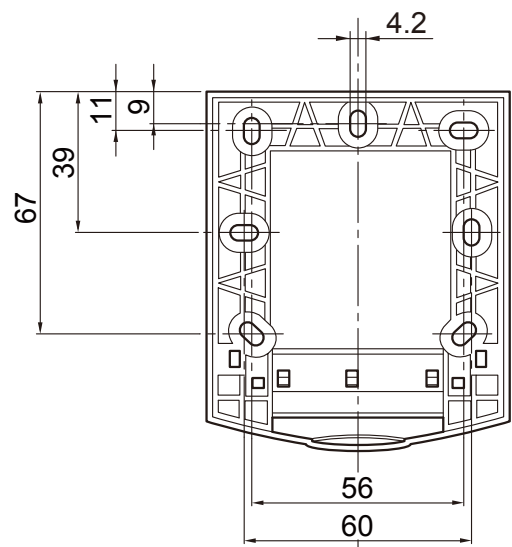
Bottom view
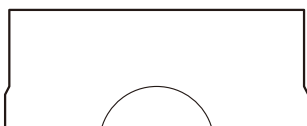
Control system / 3 phase

5-3. ROOM THERMOSTAT (Optional parts)

■ MODEL : UTW-C55XA

● Unit

(Unit : mm)
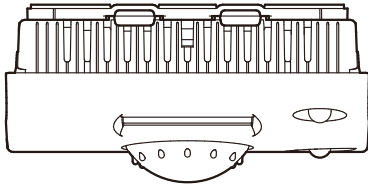
Top view
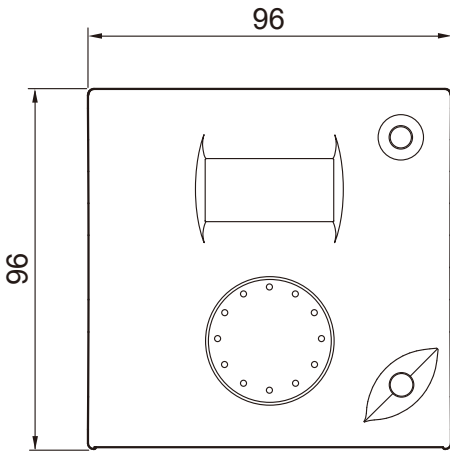
96

96

Front view

47

Side view

4.2

56

60

56

60

>ASA+PC<
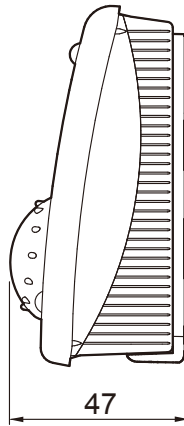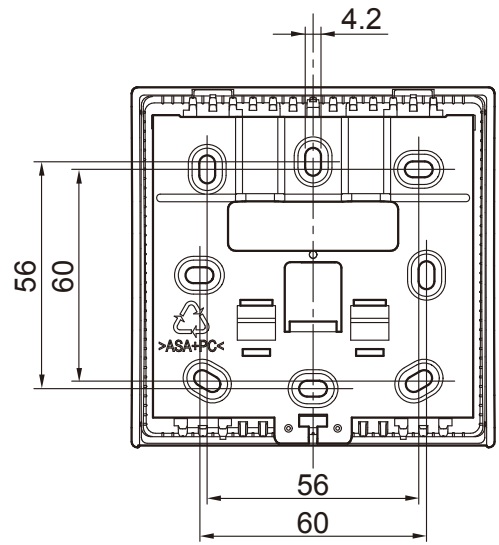
Rear view
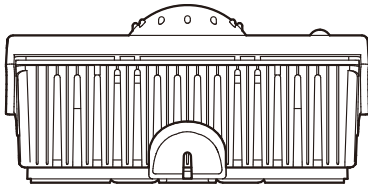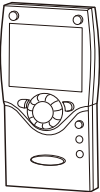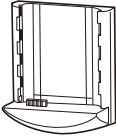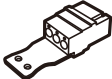
Bottom view

Control system / 3 phase
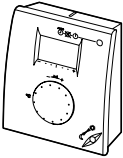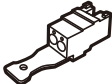
6. PACKING LIST (Accessories)
6-1. REMOTE CONTROL (Optional parts)

Name and shape	Quantity	Application
Remote control	1	Use for ATW operation
Remote control holder	1	Use as remote control holder
Remote control connector	1	For remote control connection
Operating instructions	1	

* : If necessary , use shielded cable and tapping screw (Field supplied) in accordance with the standard of the country.

6-2. ROOM THERMOSTAT (Optional parts)

Name and shape	Quantity	Application
Room thermostat	1	
Room thermostat connector	1	For room thermostat connection
Operating instructions	1	

* : If necessary , use shielded cable (Field supplied) in accordance with the standard of the country.

Control system / 3 phase

7. WIRING SPECIFICATIONS
7-1. OUTDOOR SENSOR

Use	Size	Wire type	Remarks
Outdoor sensor cable	0.75 mm²	2 wires connection Max. cable length: 60 m	Use shield cable in accordance with local rules for cable

7-2. REMOTE CONTROL (Optional parts)

Use	Size	Wire type	Remarks
Remote control cable	0.5 mm²	3 wires connection Max. cable length: 200 m	Use shield cable in accordance with local rules for cable

7-3. ROOM THERMOSTAT (Optional parts)

Use	Size	Wire type	Remarks
Room thermostat cable	0.5 mm²	2 wires connection Max. cable length: 200 m	Use shield cable in accordance with local rules for cable

Control system / 3 phase

8. SPECIFICATIONS

8-1. OUTDOOR SENSOR

SIZE (H x W x D mm)	91.6 x 79.8 x 49.7
WEIGHT (g)	73
CABLE LENGTH (m)	60

8-2. REMOTE CONTROL (Optional parts)

SIZE (H x W x D mm)	185 x 82 x 42
WEIGHT (g)	170
CABLE LENGTH (m)	200
POWER (V)	12

8-3. ROOM THERMOSTAT (Optional parts)

SIZE (H x W x D mm)	96 x 96 x 47
WEIGHT (g)	115
CABLE LENGTH (m)	Max. 200
POWER (V)	12

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