

CS-Centre

Johnson Controls - Hitachi Air Conditioning Spain, S.A.U.

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I. Commercial Information

Cooling & Heating

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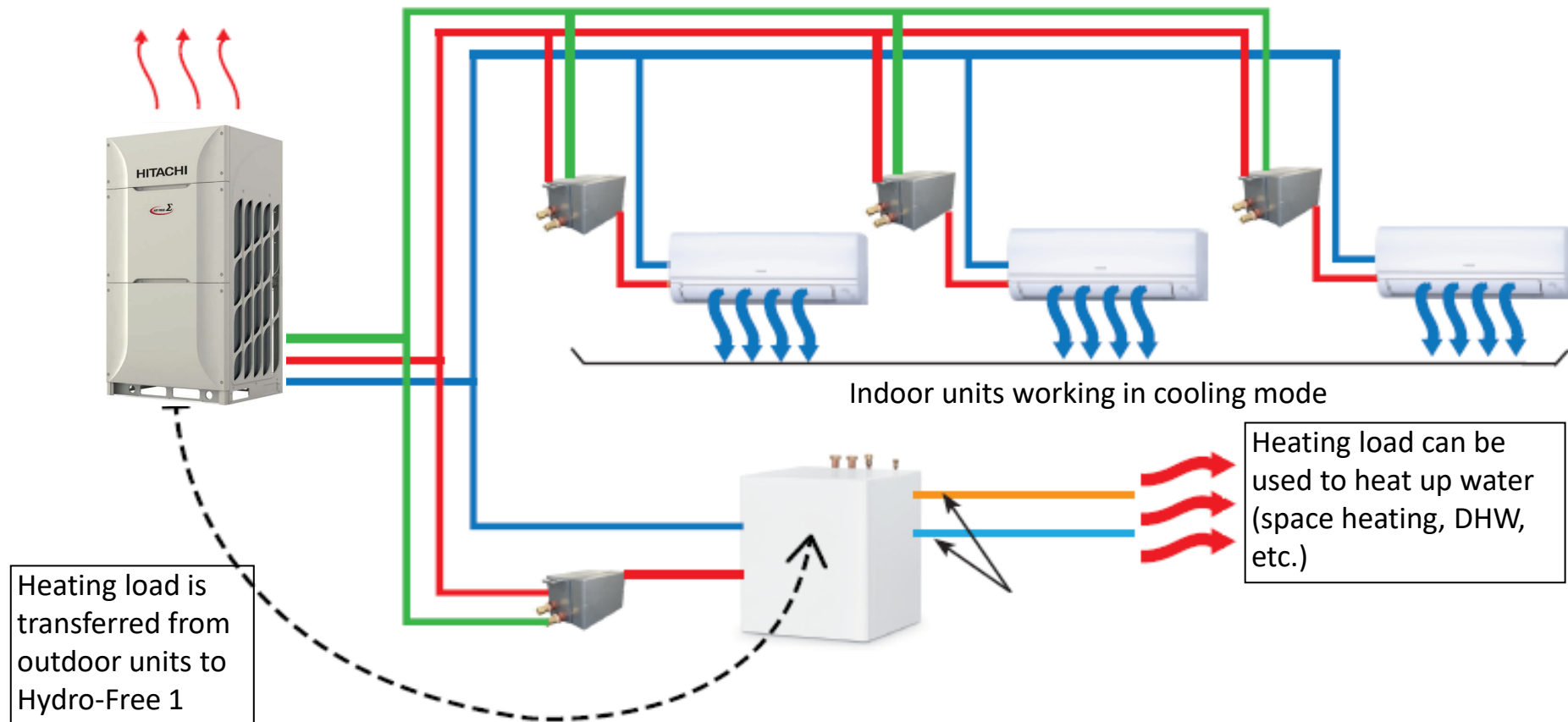
01

— General Information

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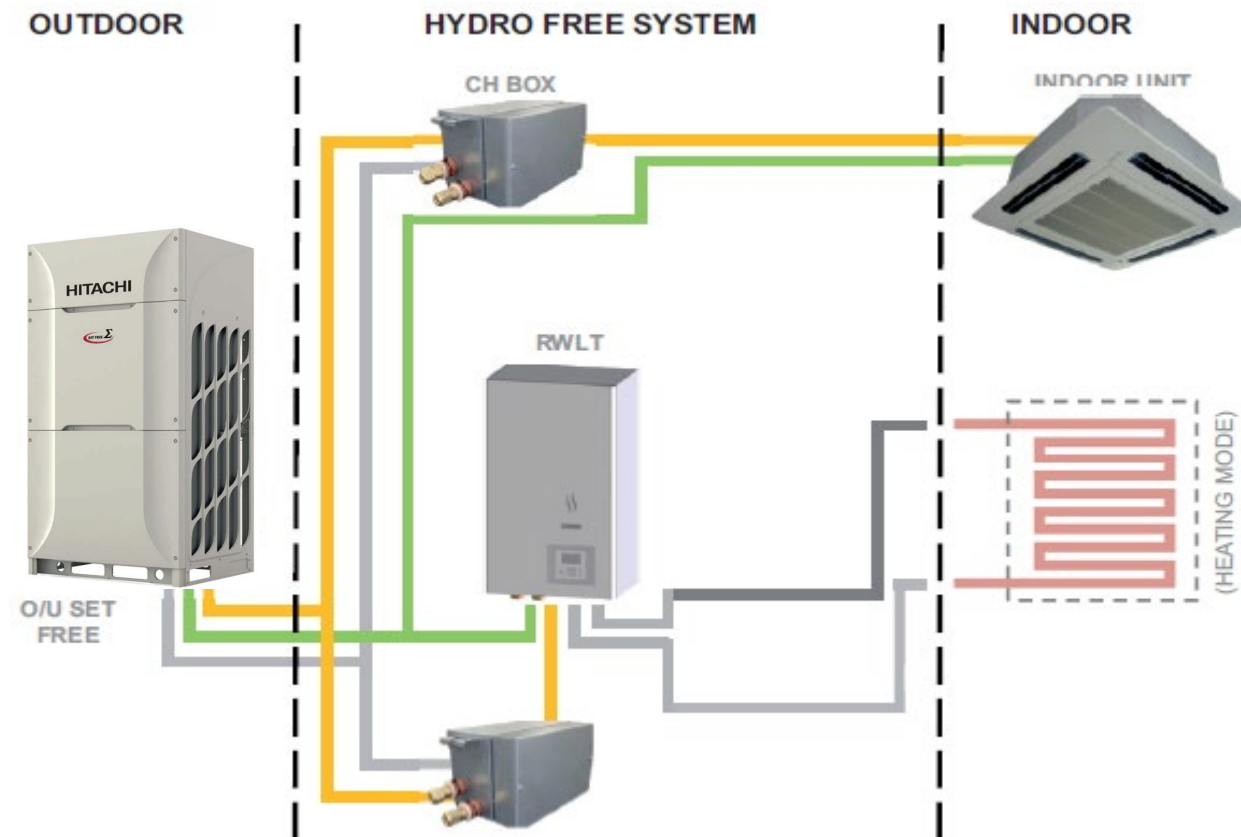
1-1 Application

- The new Hydro-Free 1 is the integration of Yutaki technology into Set-Free Sigma and Mini systems to provide the best of both worlds
- Exhaust heat of the outdoor unit can be used to heat up water



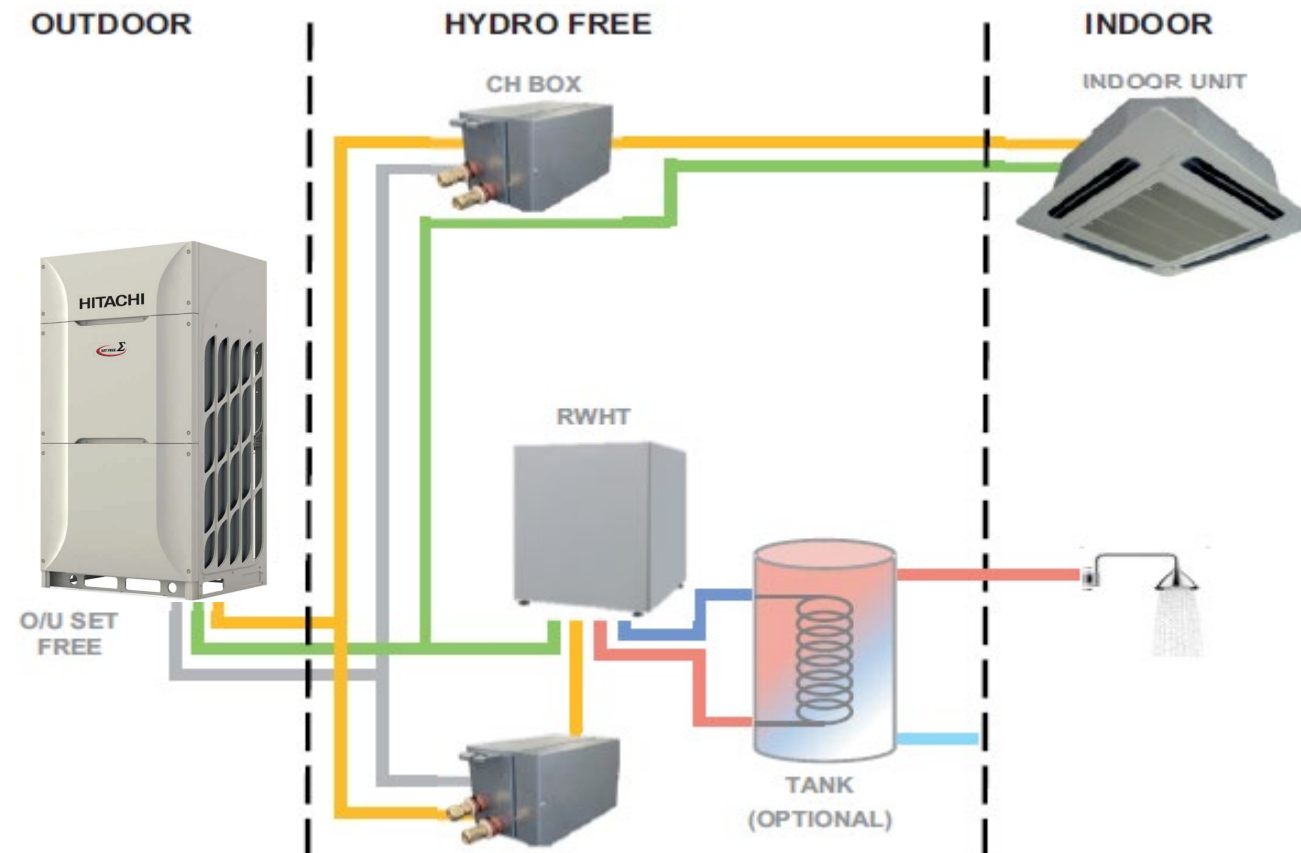
1-1 Application

- LT: Low temperature series
 - Heating mode range: 20°C~45°C



1-1 Application

- HT: High temperature series
 - Heating mode range: 20°C~80°C



1-2 Hydro-Free 1 line-up

LT: Low Temperature



3HP



5HP



10HP

HT: High Temperature



5HP

1-3 Unit model names

Models	Names	Comments
Low Temperature	RWLT-3.0VN1E RWLT-5.0VN1E RWLT-10.0VN1E	RW → Refrigerant to water LT → Low Temperature V → 1 phase N → R410A refrigerant 1 → rev. 1 for Set-Free Sigma E → Made in Europe
High Temperature	RWHT-5.0VNF1E	RW → Refrigerant to water HT → High Temperature V → 1 phase N → R410A refrigerant F → R134a refrigerant 1 → rev. 1 for Set-Free Sigma E → Made in Europe







02

Features & Benefits

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2-1 Compatibilities

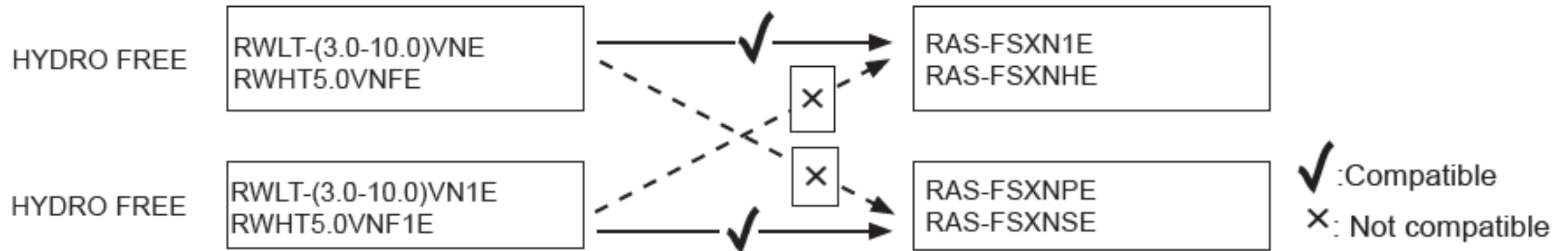
- Hydro-Free 1 are compatible with the following Set-Free Sigma series

HYDRO FREE	Outdoor Units	
	Heat Recovery (3 pipes system)	Heat Pump (2 pipes system)
	RAS-(8-12)FSXNME RAS-(8-12)FSXNME1 RAS-(8-54)FSXNSE RAS-(5-54)FSXNPE RAS-(8-54)FSXNSE1 RAS-(5-54)FSXNPE1	RAS-(8-12)FSXNME RAS-(8-12)FSXNME1 RAS-(8-96)FSXNSE RAS-(5-72)FSXNPE RAS-(8-96)FSNSE1 RAS-(5-72)FSNPE1
Low temperature		
High temperature		

Mini Set-Free RAS-(8/12)FSXNME(1) compatible from software version H-204

2-1 Compatibilities

- New RWLT-(3.0-10.0)VN1E and RWHT5.0VNF1E are compatible with RAS-FSXN(M/S/P)E only
- Previous RWLT-(3.0-10.0)VNE and RWHT5.0VNFE are compatible with RAS-FSXN(1/H)E only



2-1 Compatibilities

- Operation compatibilities

		Heat Pump system (2 pipes system)		Heat Recovery system (3 pipes sytem)
		In cooling mode	In Heating Mode	Simultaneous
HYDRO FREE Low temperature	Heating operation	✗	✓	✓
HYDRO FREE High temperature	Heating operation	✗	✓	✓
Indoor Unit (DX)	Heating operation	✗	✓	✓

For Heat Recovery System (3 pipes system) it is necessary the Set-Free CH-Box accessory

2-1 Compatibilities

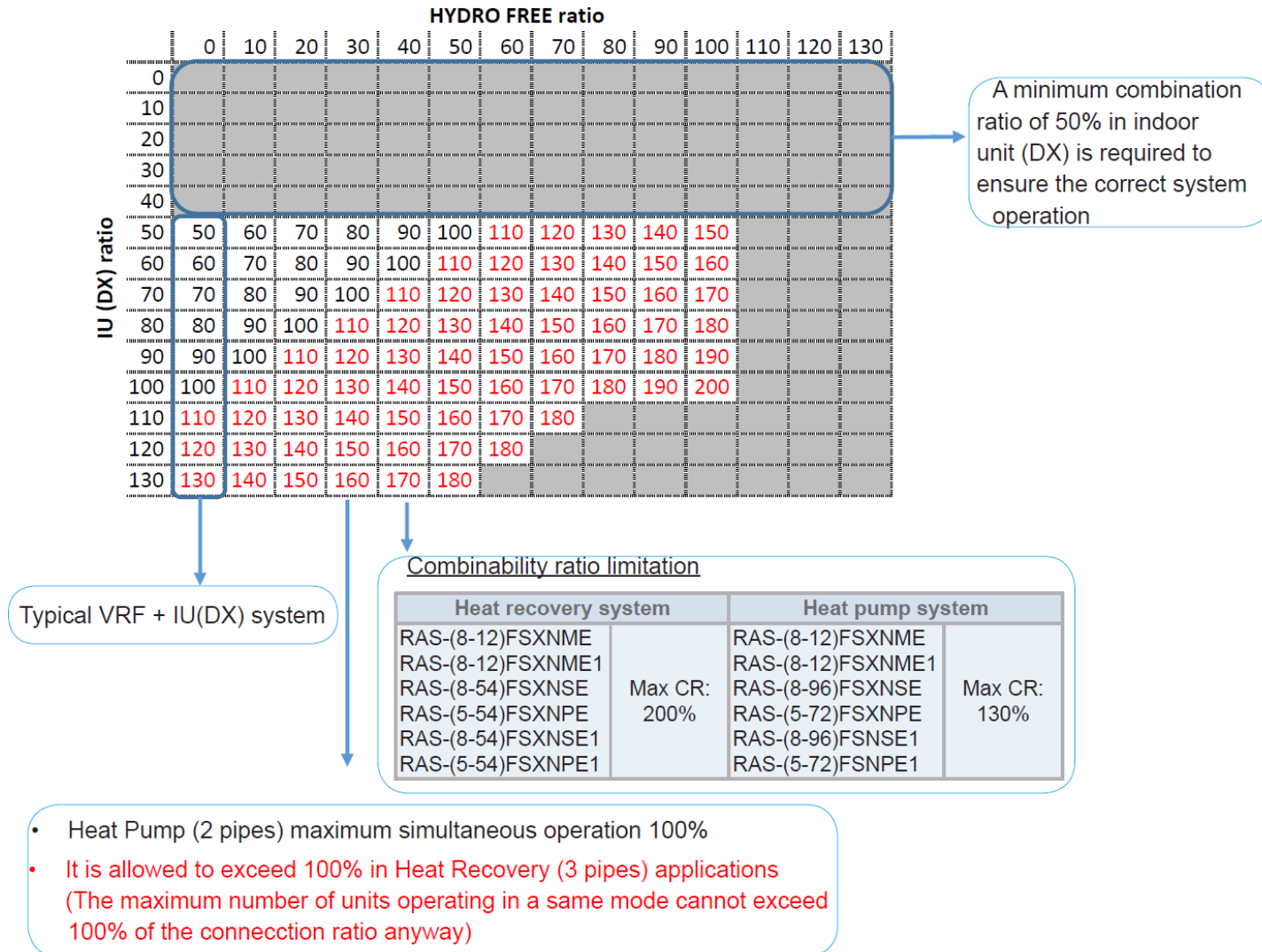
- Combinability ratio

	Heat recovery system		Heat pump system	
TOTAL ratio HYDRO FREE + IU(DX)	RAS-(8-12)FSXNME RAS-(8-12)FSXNME1 RAS-(8-54)FSXNSE RAS-(5-54)FSXNPE RAS-(8-54)FSXNSE1 RAS-(5-54)FSXNPE1	50% ~ 200% (*2)	RAS-(8-12)FSXNME RAS-(8-12)FSXNME1 RAS-(8-96)FSXNSE RAS-(5-72)FSXNPE RAS-(8-96)FSNSE1 RAS-(5-72)FSNPE1	50% ~ 130%
Maximum number of IU when HYDRO FREE is installed (IU (DX) + HYDRO FREE) (1*)	38 (Depending on the outdoor unit model)			
Total ratio of IU (DX) when HYDRO FREE is installed	50% ~ 130%			
Total ratio of HYDRO FREE	0% ~ 100%			
Only HYDRO FREE allowed	No			
Minimum IU (DX) total ratio	50%			

- Simultaneous operation can never be over 100% for a heat pump system
- Simultaneous operation in the same working mode can never be over 100% for a heat recovery system
- (1*) The maximum number of IU corresponds to the recommended quantity of IU for each OU size. Please refer to OU technical catalogue for further information
- (*2) See the chapter “9.5.2.2 Function of DIP switches and rotary switches” for details about DSW8 pin3 when the connection ratio is > 180%.

2-1 Compatibilities

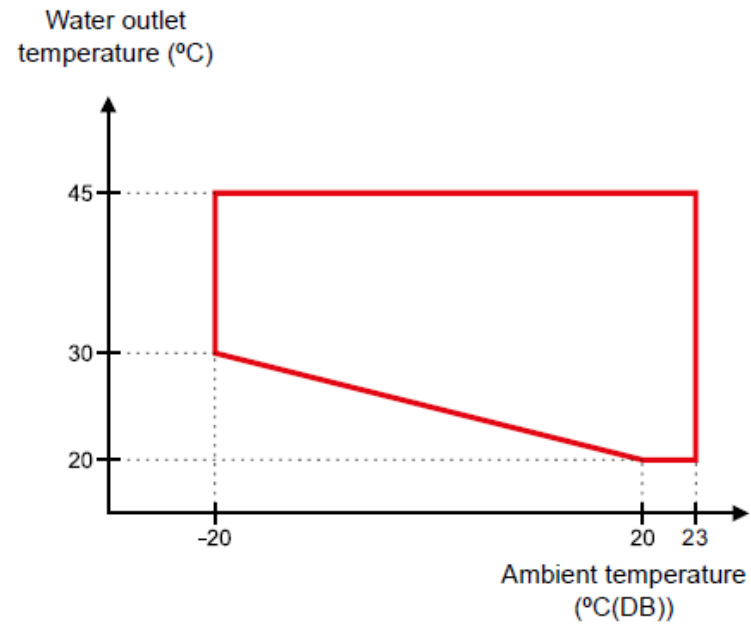
- Combinability ratio



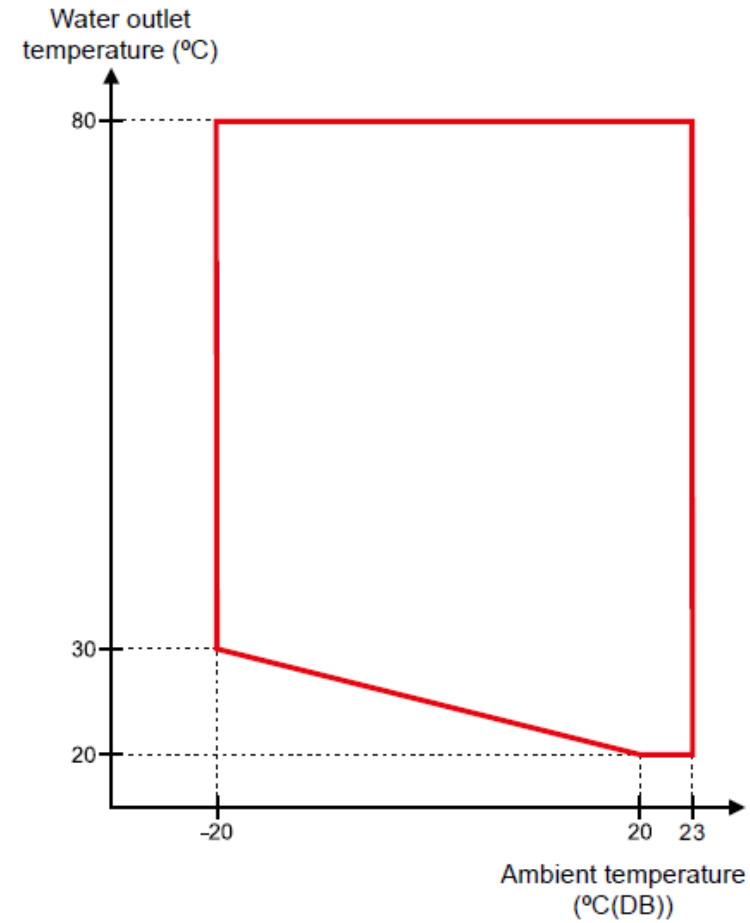
2-2 Extended operation range

- Space Heating

RWLT-(3.0-10.0)VN1E



RWHT-5.0VNF1E

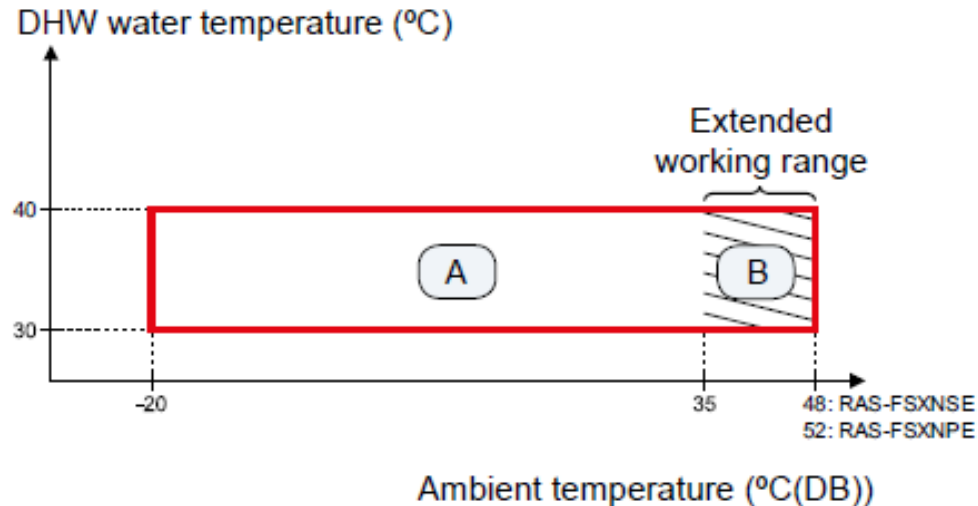


- For ambient temperature above 23 °C, the optional function GS = 1 must be set on the outdoor unit (factory setting GS=0)

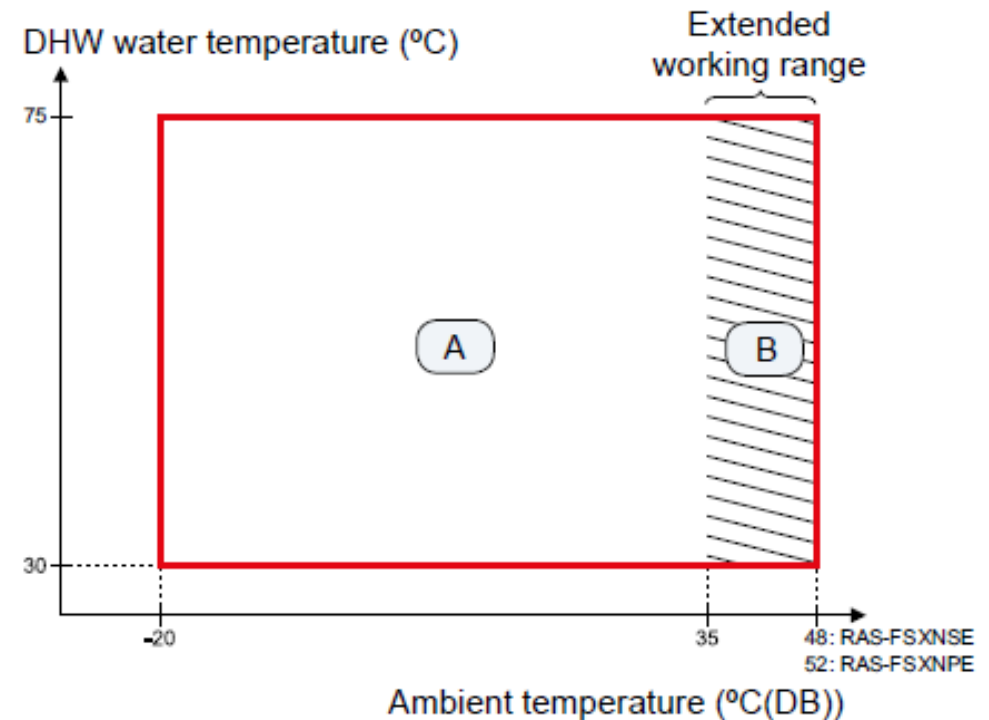
2-2 Extended operation range

- DHW

RWLT-(3.0-10.0)VN1E



RWHT-5.0VNF1E

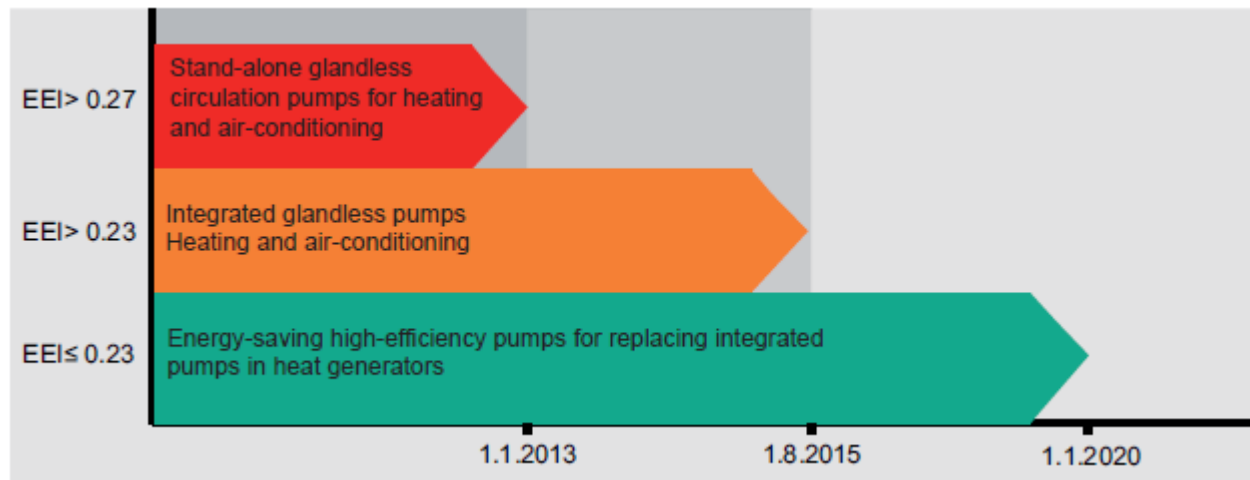


- For ambient temperature above 23 °C, the optional function GS = 1 must be set on the outdoor unit (factory setting GS=0)

- A** The working range of Ambient temperature reaches up to 35°C for those systems that are working in Heat Pump mode or in a Heat Recovery installation with all units of the system working in the heating mode
- B** The working range of Ambient temperature has been extended from 35°C to 48/52°C for those systems that are working in Heat Recovery mode (there are indoor units working in cooling mode and indoor units working in heating mode)

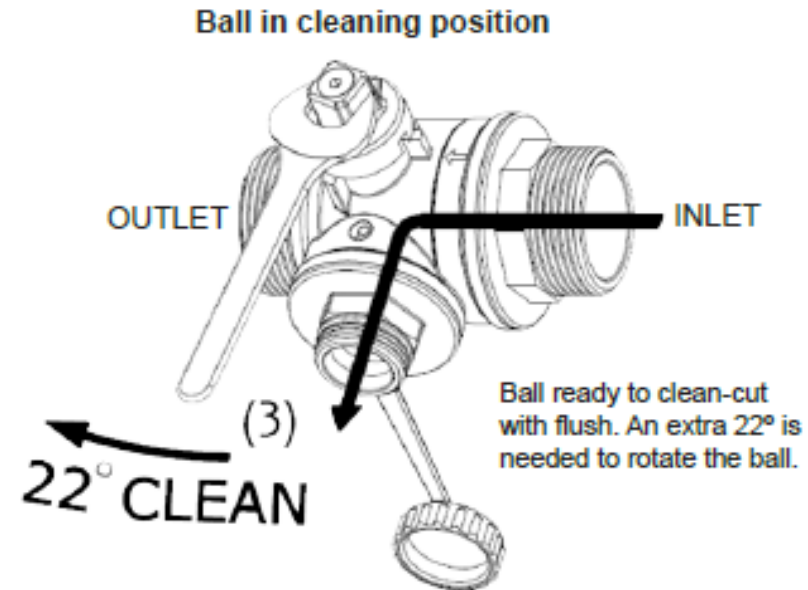
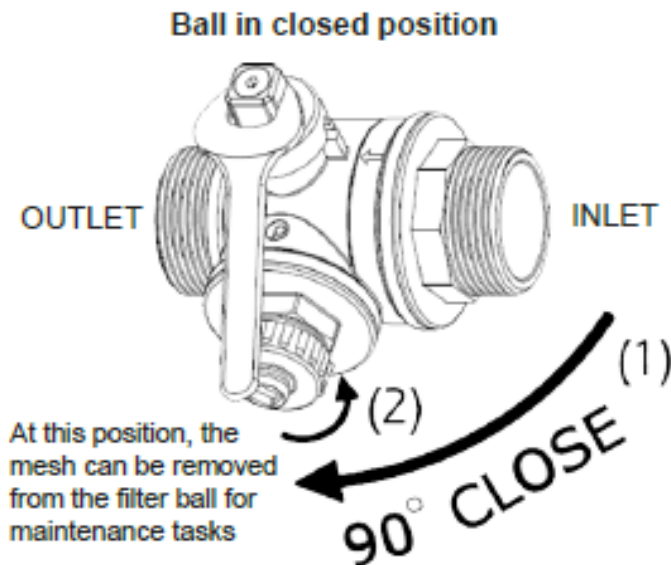
2-3 Pump (ErP compliant)

- ErP compliant
 - Hidro-Free 1 pump have a reduced $EEl \leq 0.23$ as defined by the ErP Directive, which allows to classify these pumps as low water consumption pumps, resulting in a higher performance of the unit.
 - Pump speed controlled by the unit
- Pump speed is adjusted from the unit's control
 - Different pump speed can be set for different uses: space heating, DHW...
- Pump flow meter
 - Pump is providing water flow so flow meter is now not necessary



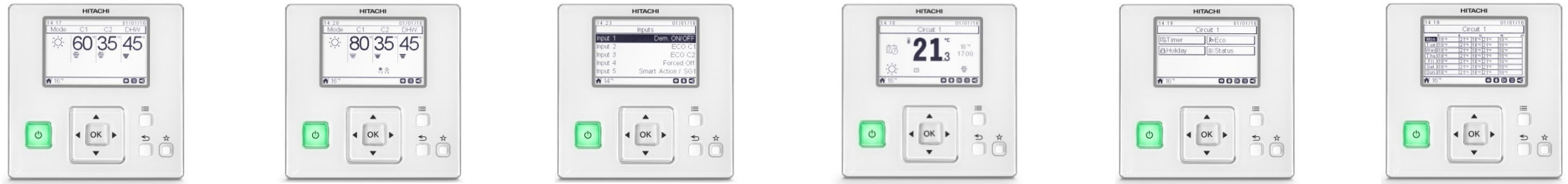
2-4 Ball valve strainer

- It is possible to clean the strainer without draining out the water or to flush it using cycle water



2-5 Control features

- New multifunction controller: PC-ARFWE



2-5 Control features

- New multifunction controller: PC-ARFWE
 - Yutaki type menu and functions
 - Advanced Configuration at start-up: It makes easier the initial setting of the unit
 - 7 languages available as standard: EN/ES/DE/FR/IT/SL/PT
 - Quick actions menu for more comprehensive view: Functions Timer, ECO, Status, Schedule and OTC
 - Boost action: It allows an immediate heating of the domestic hot water
 - Daily & Schedule timers
 - Air purge function for the test run
 - Many other improvements like: possibility to modify the name of the circuits, configuration of phone contact, etc.



2-5 Control features

- New wired thermostat: PC-ARFWE
 - Same device as unit control but set for Room thermostat use
 - Fast and easy setting by the Advanced Configuration menu
 - Dedicated view for end user: Simplified use
- Wireless On/Off thermostat: ATW-RTU-04
 - Easy to fit, simple to use
 - Schedule timer set from the master control
- Room remote sensor: ATW-ITS-01
 - Easy to fit, simple to use
 - It is allowing room thermostat control from the Hydro-Free panel itself



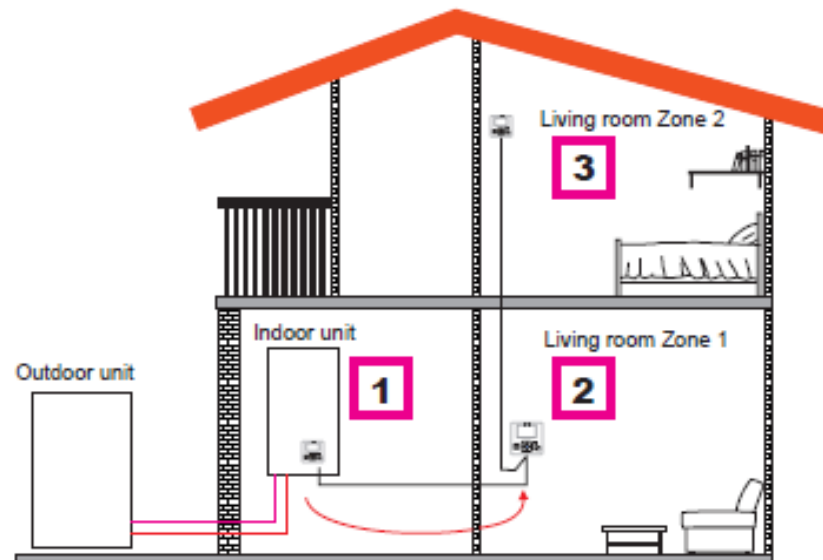
2-6 More room thermostat options

- Up to 3 unit controller devices
 - Unit controller can be removed from the front panel and placed everywhere; it can be used as a Master unit control and room thermostat at the same time
- Up to 2 additional PC-ARFWE can be wired as thermostat for 2 different areas

OPTION 1

Use wired Unit controller + 2 thermostat option

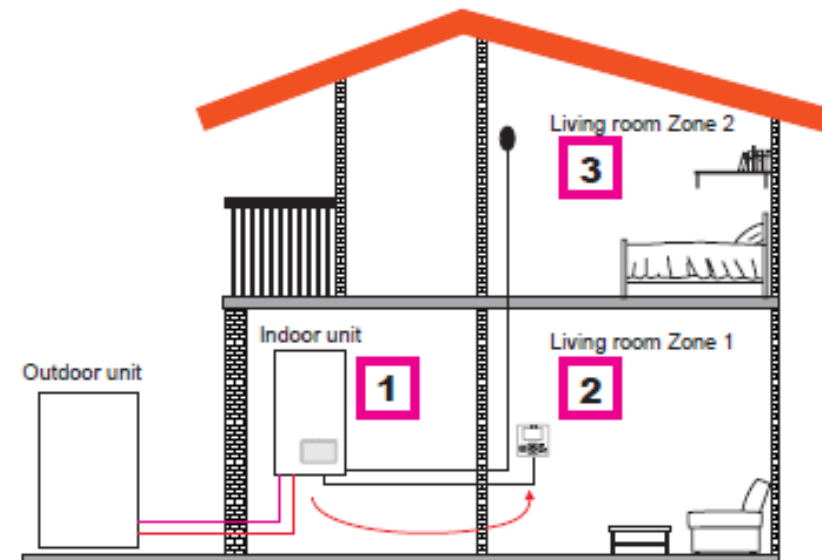
- 1- Master unit controller as unit configuration with possibility to move to a living room.
- 2- Slave Unit controller as a room thermostat for Zone 1, as accessory
- 3- Slave Unit controller as a room thermostat for Zone 2, as accessory



OPTION 2

Use wired Unit controller + 1 wired room sensors

- 1- No unit controller in the unit
- 2- Master Unit controller moved to living room Zone 1
- 3- Wired room sensor for Zone 2



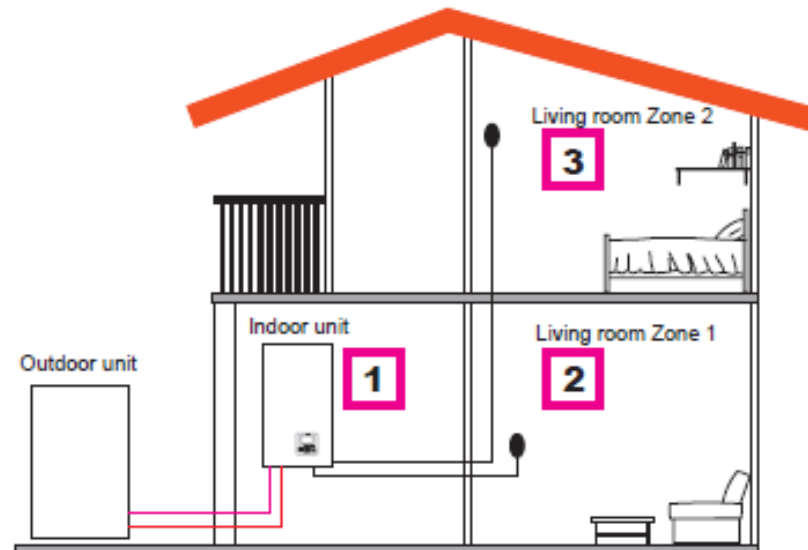
2-6 More room thermostat options

- Up to 3 unit controller devices
 - Room Remote Sensor is also available
 - Apart of this examples, other type of configurations are possible

OPTION 3

Use wired Unit controller + 2 wired room sensor

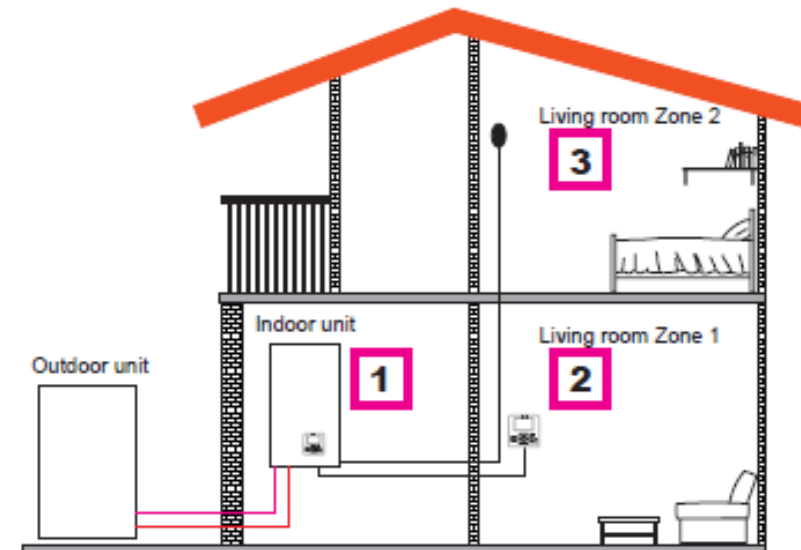
- 1- Master unit controller as unit configuration.
- 2- Wired room sensor for Zone 1
- 3- Wired room sensor for Zone 2



OPTION 4

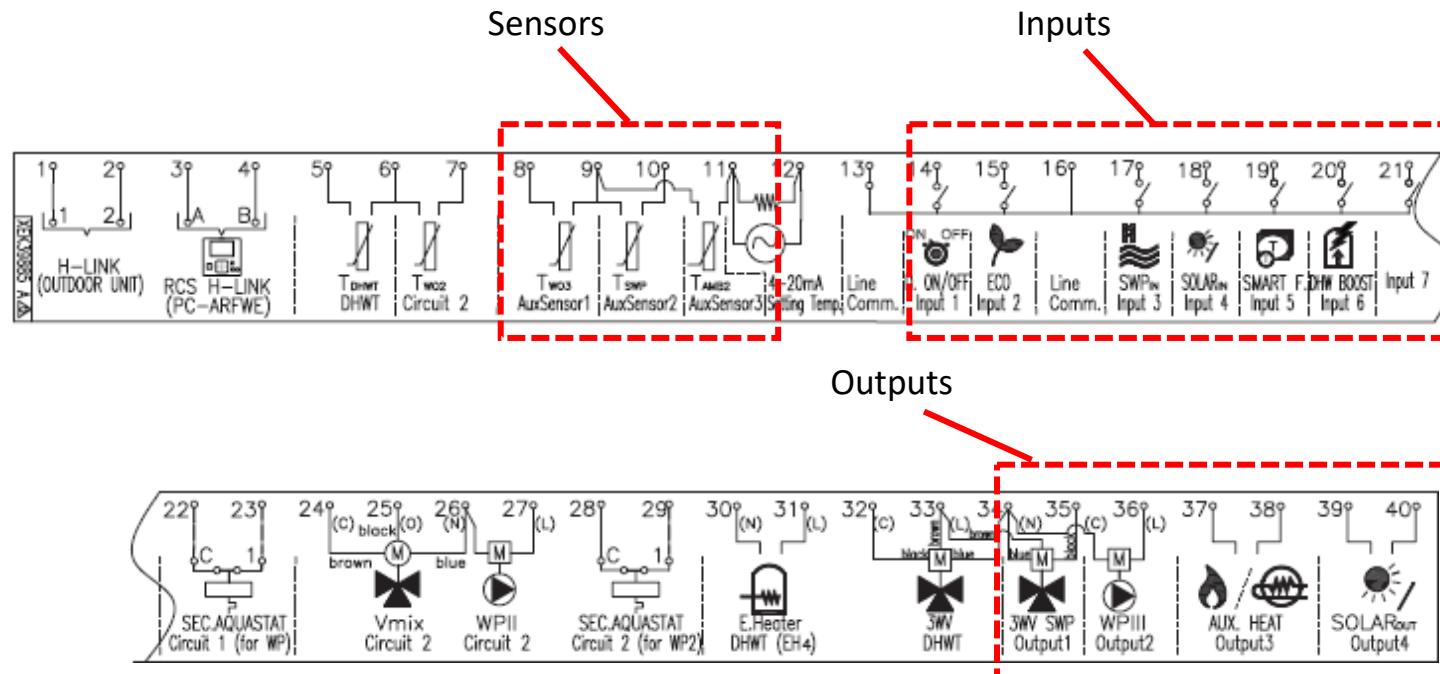
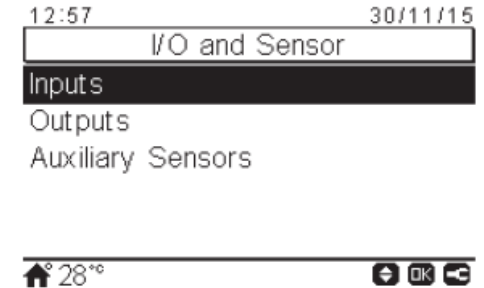
Use wired Unit controller + 1 unit controller as room thermostat + 1 wired room sensor

- 1- Master unit controller as unit configuration.
- 2- Wired unit controller a room thermostat for Zone 1
- 3- Wired room sensor for Zone 2



2-7 Expanded terminal board

- Configurable I/O & Sensor functions
 - Same terminal board concept than Yutaki
 - Wide range of configurations possible from the controller:
 - 7 configurable inputs = 15 different types of input signal
 - 4 configurable outputs = 15 different types of output signal
 - 3 configurable sensor inputs = 7 sensor possibilities

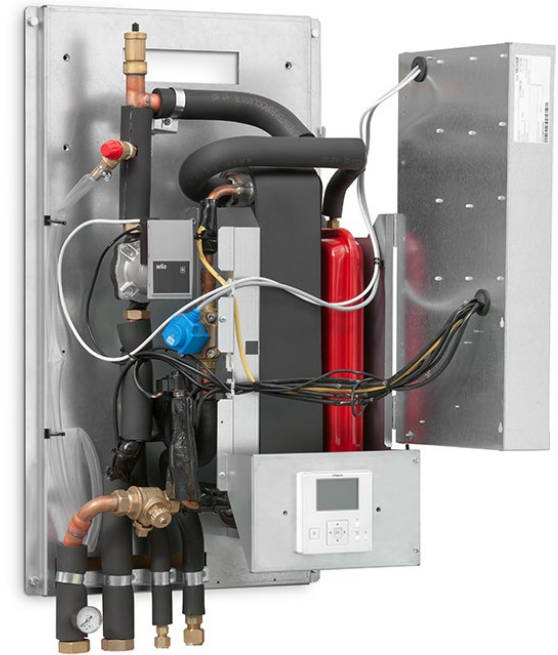


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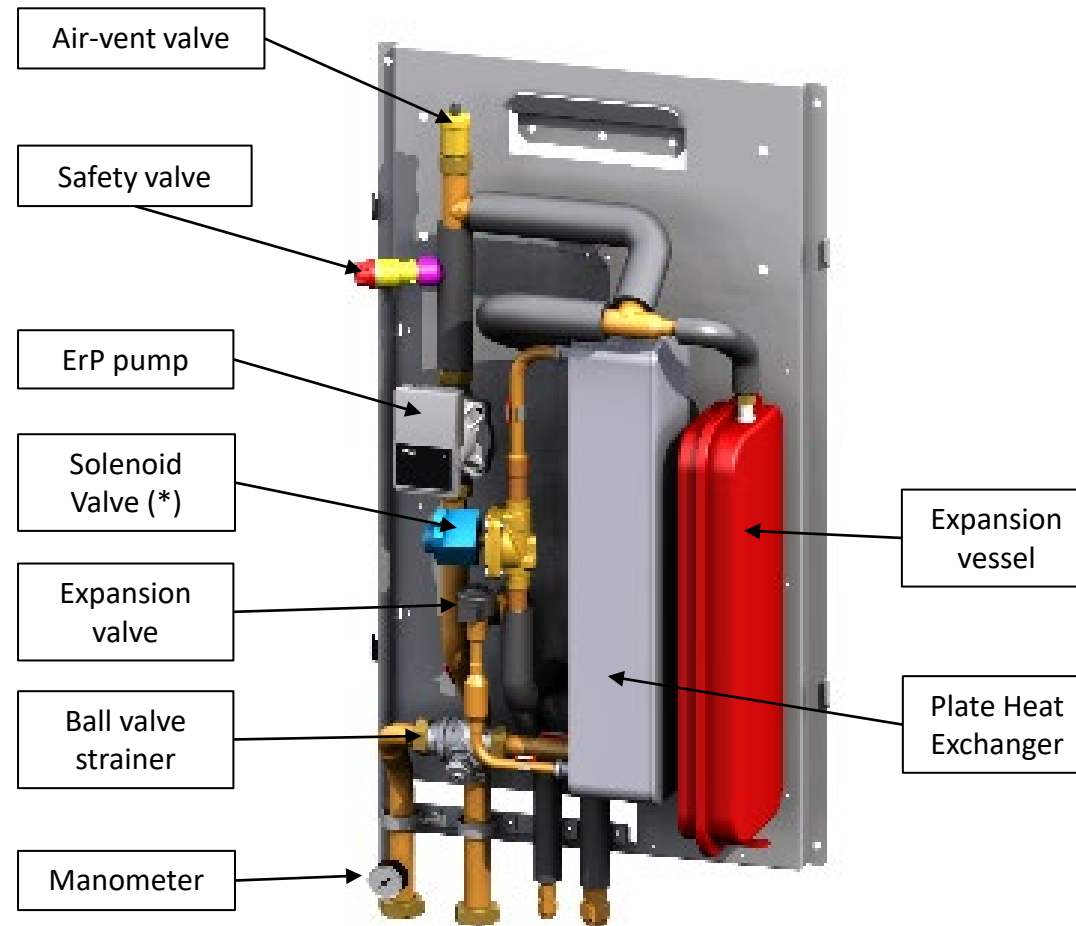
— Hydro-Free 1 LT

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3-1 Components view



3-1 Components view



() The solenoid valve will close during defrost or stopped water module condition to prevent freezing of the plate heat exchanger (when expansion valve ≤ 40 pulse)*

3-2 Capacity data

Indoor unit model			RWLT-3.0VN1E	RWLT-5.0VN1E	RWLT-10.0VN1E
OAT (DB/WB)	WIT / WOT	Unit	Heating operation		
7 / 6 °C	30 / 35 °C	kW	9.0	16.0	27.0
2 / 1 °C	30 / 35 °C	kW	7.3	13.3	18.3
-7 / -8 °C	30 / 35 °C	kW	5.5	11.5	17.7

04

Hydro-Free 1 HT

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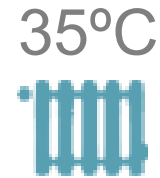
4-1 Smart Cascade System



ON



OFF



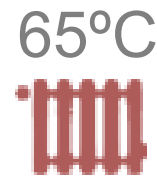
35°C



ON



ON



65°C

The benefits of Smart Cascade now combined with waste heat recovery !!!!

By mild ambient temp. (Ex: 7°C) heat load is low and OTC adjust water to low temperature: Only R410A compressor is used. COP is very high.

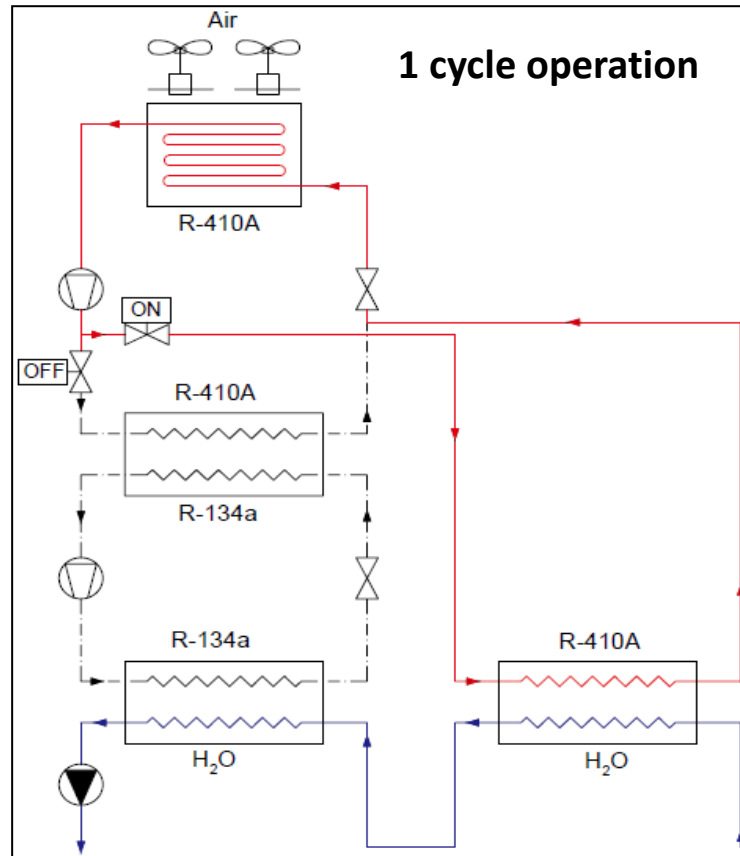
By warm ambient temp., waste heat from cooling DX units can be recovered and stored at an ultra high COP.

By cold ambient temperature (Ex: -7°C) heat load is high and OTC adjust water to higher temperature: Second compressor start, capacity and water temperature are very high (up to 80°C at -20°C).

By warm ambient waste heat from cooling DX units can be used for DHW at an extra high COP.

4-1 Smart Cascade System

- Standard cascade cycles work always using two single-stage cycles.
- Hitachi Smart Cascade cycle allows to take advantage of the best possible performance depending on the water outlet temperature required



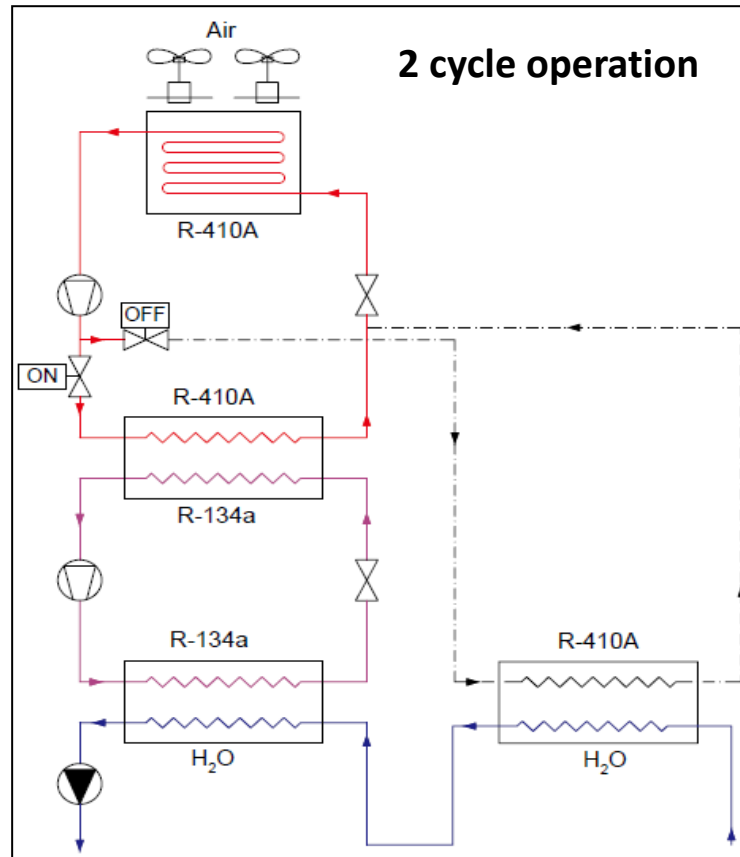
Low water outlet temperatures required



Only one cycle will work (R410A - H₂O)

4-1 Smart Cascade System

- Standard cascade cycles work always using two single-stage cycles.
- Hitachi Smart Cascade cycle allows to take advantage of the best possible performance depending on the water outlet temperature required



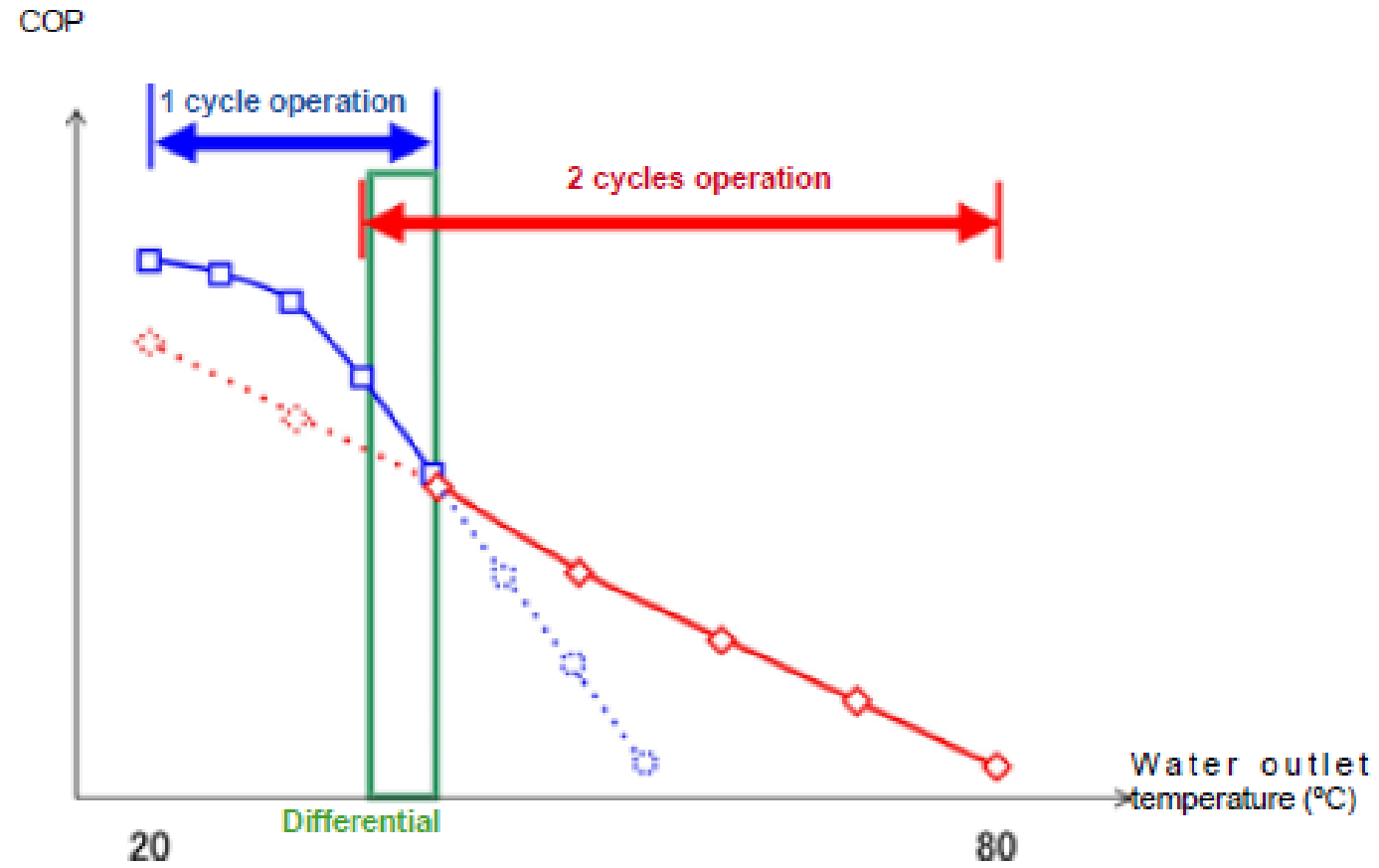
High water outlet temperatures required



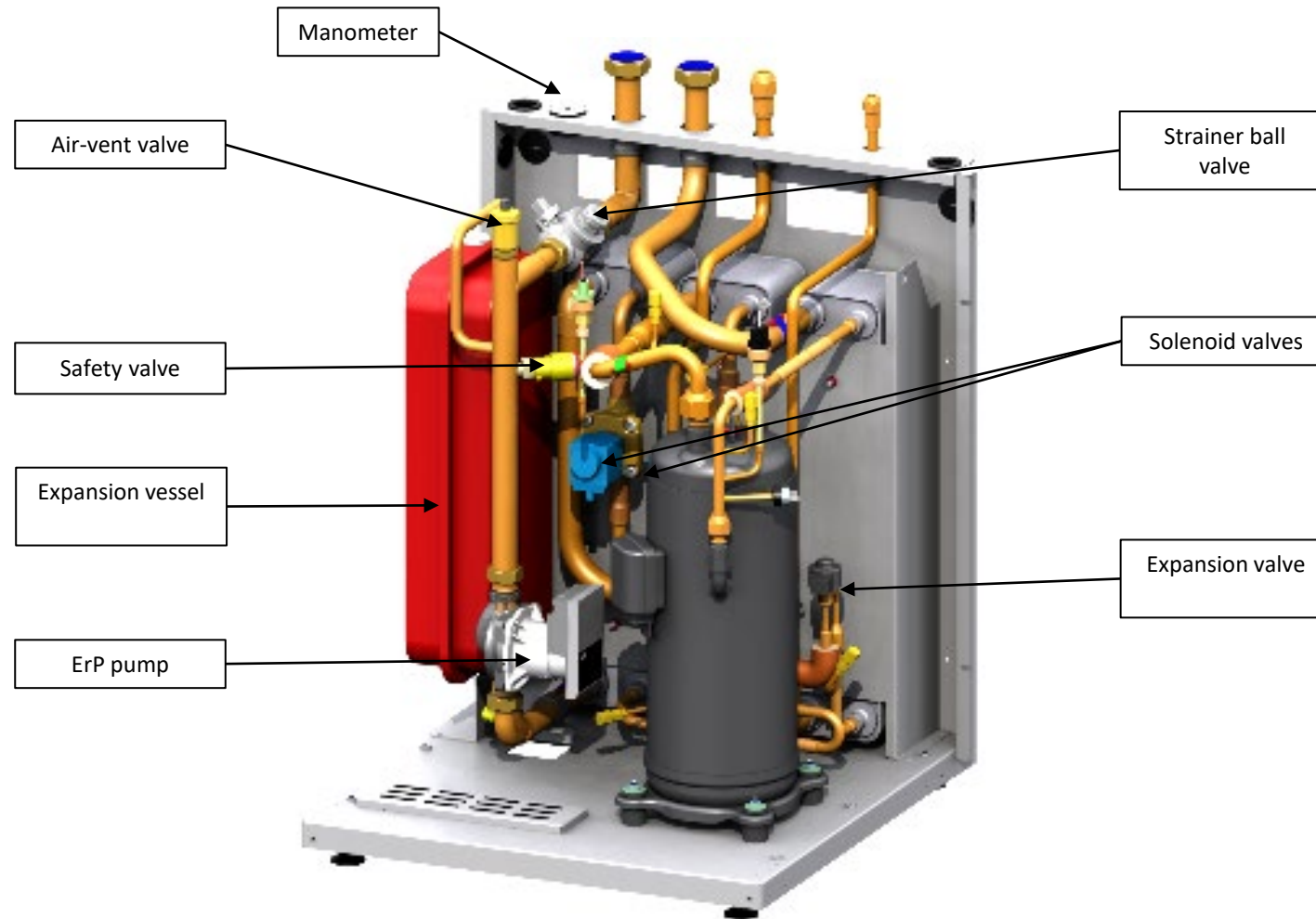
The two cycles will be activated
(R410A - R134a & R134a - H₂O)

4-1 Smart Cascade System

- Smart Cascade System allows to operate at the most efficient combination



4-2 Components view



4-3 Capacity data

Indoor unit model			RWHT-5.0VNF1E
OAT (DB/WB)	WIT / WOT	Unit	Heating operation
7 / 6 °C	30 / 35 °C	kW	16.0
	40 / 45 °C	kW	16.3
	60 / 65 °C	kW	16.3
-7 / -8 °C	30 / 35 °C	kW	11.7
	40 / 45 °C	kW	13.9
	60 / 65 °C	kW	13.9





05

— Accessories line-up

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5-1 Control accessories





- Room Thermostat models

Accessory	Name	Code	Figure
PC-ARFWE	Unit controller wired room thermostat (*) (Languages EN/ES/DE/FR/IT/SL/PT)	7E543007	
ATW-RTU-04	Wireless ON/OFF thermostat (Receiver + Room thermostat)	7E543003	
ATW-MAK-01	Kit for 4-20 mA application	7E549933	
ATW-FCP-01	Unit controller cover	7E549938	

(*) Hydro-Free LT is factory supplied with PC-ARFWE installed in the front panel. Hydro-Free HT require PC-ARFWE to be ordered as accessory






5-1 Control accessories

- Centralised remote controls (Hydro-Free: only On/Off is possible)

Name	Description	Code	Figure
PSC-A64GT	Touch screen central station	60291730	
PSC-A32MN	Touch screen central station mini	60291966	
PSC-A64S	Centralised remote control	60291479	
PSC-A16RS	Centralised ON/OFF control	60291484	





5-1 Control accessories

- Building air-conditioning controls (Hydro-Free: only On/Off is possible)

Name	Description	Code	Figure
CSNET Manager 2 T10	Centralised control with a touch interface of 10 inches which runs CSNET Manager 2 software to control the indoor units.	7E512203	
CSNET Manager 2 T15	Centralised control with a touch interface of 15 inches which runs CSNET Manager 2 software to control the indoor units.	7E512206	
CSNET Manager SL	Centralised control interface screen-less which runs CSNET Manager 2 software to control the indoor units.	7E512204	
CSNET Lite	Centralised control which runs CSNET Lite software to control the indoor units in a small installations.	7E512205	
HC-A64NET	H-LINK gateway used by CSNET Manager 2 to communicate with indoor units (Max. 64 indoor units)	7E512200	




5-1 Control accessories

- BMS controls (Hydro-Free: only On/Off is possible)
- **New ModBus HC-A16MB and software update for HC-A64MB provide full Hydro-Free control**


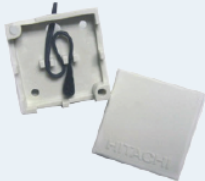

Name	Description	Code	Figure
HC-A16MB	Integration with installation with intelligent control (Building Management System) Gateway Interface to MODBUS systems (Maximum 16 indoor units).	7E513210	
HC-A64MB	Integration with installation with intelligent control (Building Management System) Gateway Interface to MODBUS systems (Maximum 64 indoor units).	7E513205	
KNX001	Integration with installations with intelligent control (BMS) through CSNET WEB. Gateway Interface to KNX systems.	7E512100	
HARC-BX E (A)	Integration with installation with intelligent control (Building Management System) Gateway Interface to LONWORKS systems. (H-LINK I communication) (Maximum 64 units with 8 parameters)	60290874	
HARC-BX E (B)	Integration with installation with intelligent control (Building Management System) Gateway Interface to LONWORKS systems. (H-LINK I communication) (Maximum 32 units with 16 parameters)	60290875	

5-1 Control accessories

- Building air-conditioning controls (Hydro-Free: only On/Off is possible)

Name	Description	Code	Figure
BAC002	BACnet gateway connectable to HC-A64MB, CSNET Manager 2 / CSNET Lite.	7E512104	
HI-AC-KNX-16	Integration with installations with intelligent control (BMS). Gateway Interface to KNX systems.	70513303	
HI-AC-KNX-64	Integration with installations with intelligent control (BMS). Gateway Interface to KNX systems.	70513304	
HI-AC-BAC-16	Integration with installations with intelligent control (BMS). Gateway Interface to BACnet systems.	70513100	
HI-AC-BAC-64	Integration with installations with intelligent control (BMS). Gateway Interface to BACnet systems.	70513101	

5-2 Temperature sensor accessories

Accessory	Name	Code	Figure
ATW-2OS-02	2nd outdoor temperature sensor	9E500017	
ATW-ITS-01	Indoor wired room temperature sensor	7E549932	
ATW-WTS-02Y	Universal water temperature sensor	9E500004	

5-3 Water circuit accessories

Accessory	Name	Code	Figure
ATW-2TK-07	2nd zone mixing kit (Wall mounted model)	7E549952	
DHWT-200S-3.0H2E	Domestic hot water tank (200 L)	70544002	
DHWT-300S-3.0H2E	Domestic hot water tank (300 L)	70544003	
ATW-HSK-01	Hydraulic separator	7E549905	

5-3 Water circuit accessories

Accessory	Name	Code	Figure
ATW-AQT-01	Aquastat security	7E549907	
ATW-3WV-01	3-way valve (Internal thread and spring return)	7E549906	
ATW-WCV-01	Water check valve	9E500014	
WEH-6E	Water electric heater	90500002	
ATW-DPOV-01	Differential pressure overflow valve	7E549916	

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Thank you for your attention

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