

**“ *MULTIFUNCTIONAL* ”**  
**units**

# “Multifunctional” logic

**Simultaneous or independent production  
of chilled and hot water**

**Versions are available for 2 pipe and 4 pipe systems**

**2 pipe** multifunctional units enable to get chilled water for air conditioning and hot water for heating on the same hydraulic circuit while hot water for sanitary uses is got on a separate circuit.

**4 pipe** multifunctional units enable to get simultaneously or independently chilled water for summer air conditioning and hot water for winter heating on two separate circuits.

# 2 pipe units operation combinations



SUMMER

Caso 1



Caso 2



Caso 3



WINTER

Caso 4



Caso 5



Caso 6



## 2pipe units operation combinations



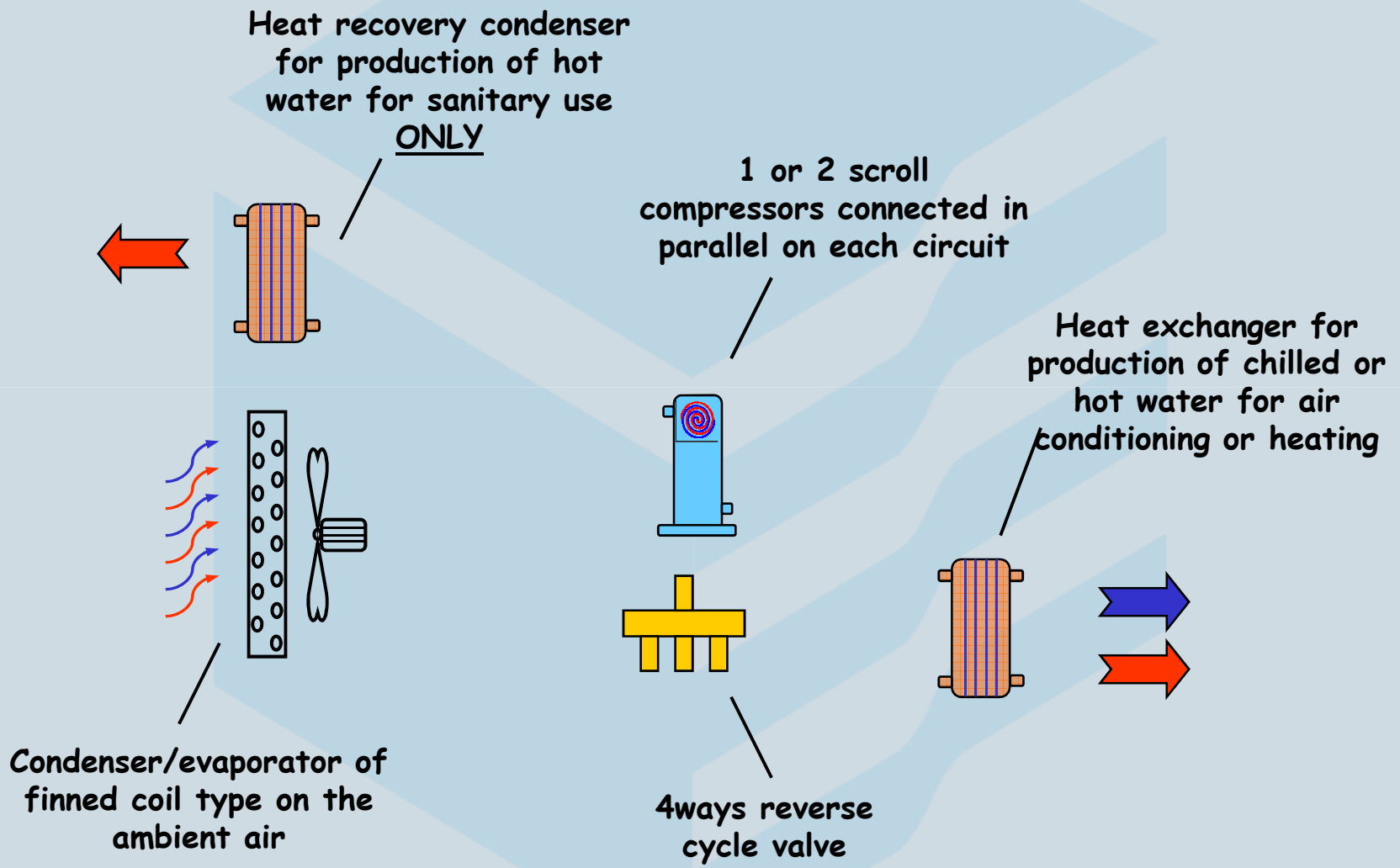
- In the 2pipe system units the simultaneous production of hot water for heating and sanitary use is made:

- > with priority logic on the single circuit units
- > with priority logic or simultaneously in the multicircuit units

WINTER

Case 6

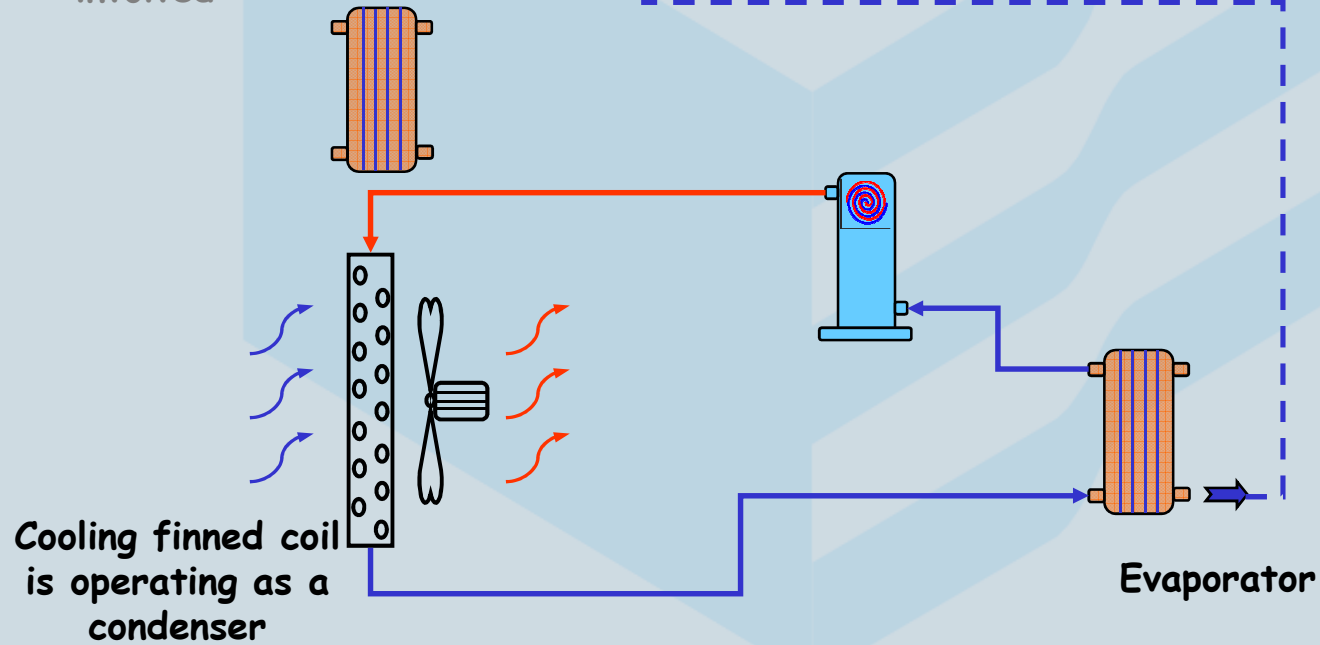
# Refrigerant circuit components in the 2pipe system units



# Case 1: Chilled water production only



Heat recovery  
condenser is not  
involved

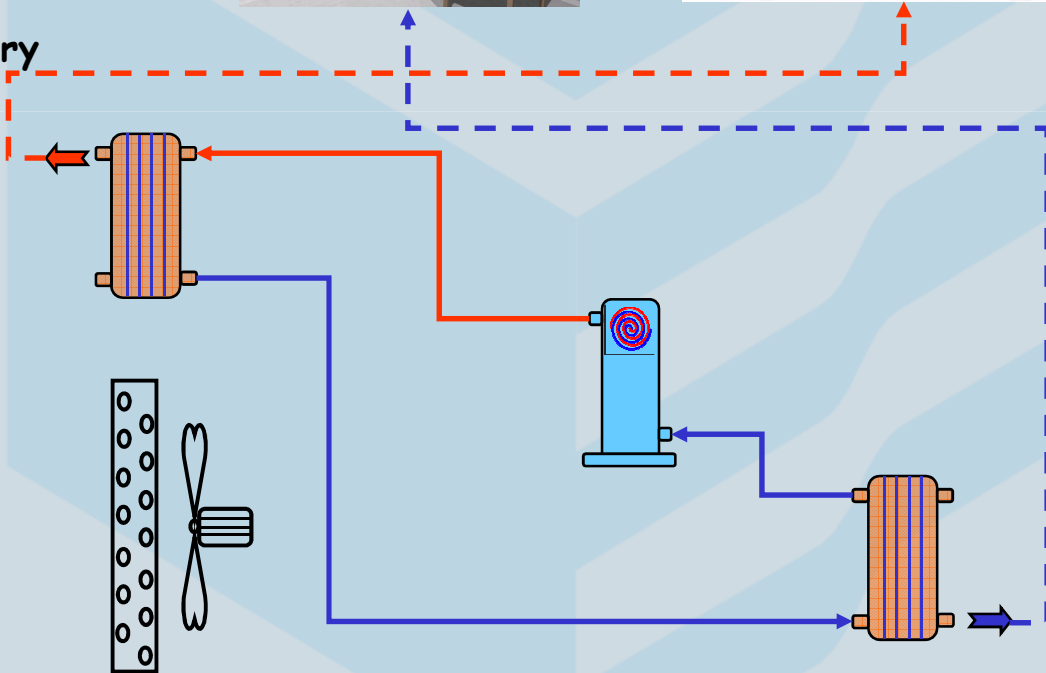


## Case 2: Simultaneous production of chilled water and hot water for sanitary use



Free of charge

Heat recovery  
condenser



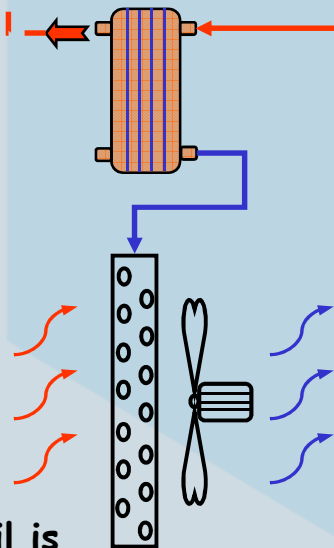
Finned coil is not  
involved

Evaporator

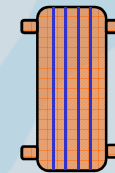
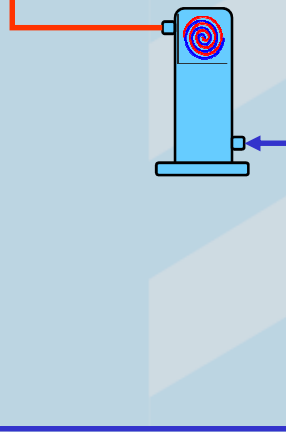
# Case 3: Production of hot water for sanitary use only



Heat recovery  
condenser



Finned coil is  
operating as an  
evaporator

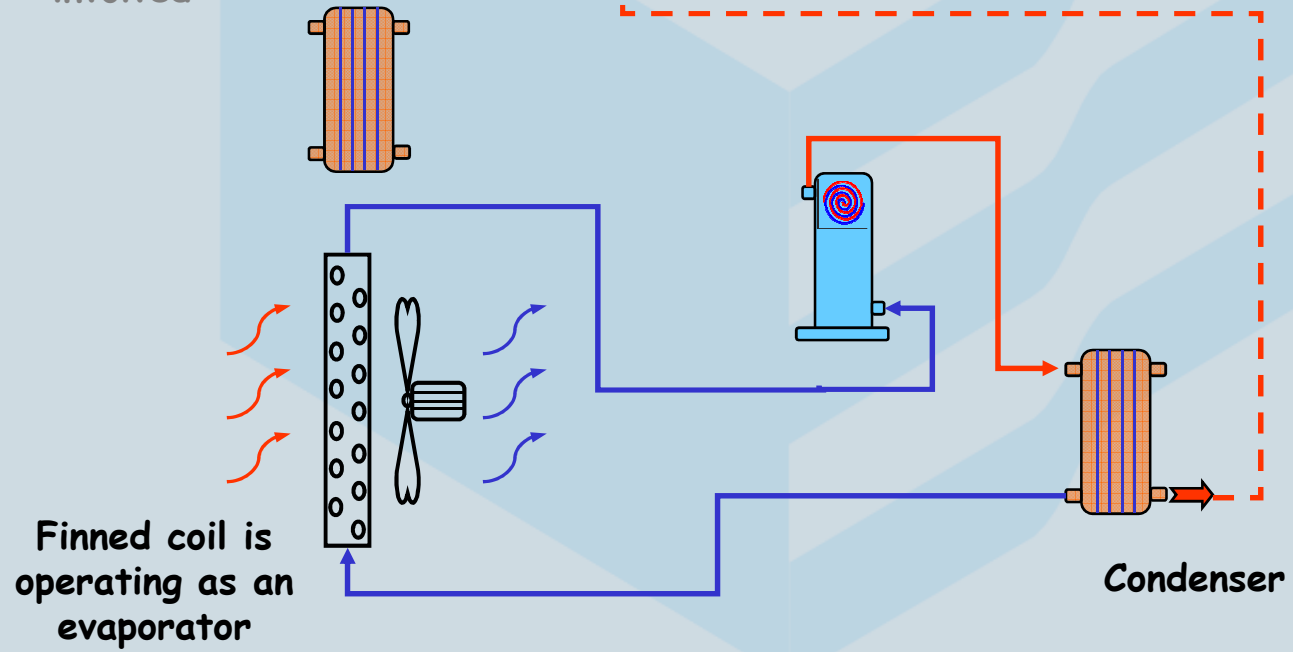


User heat  
exchanger not  
involved

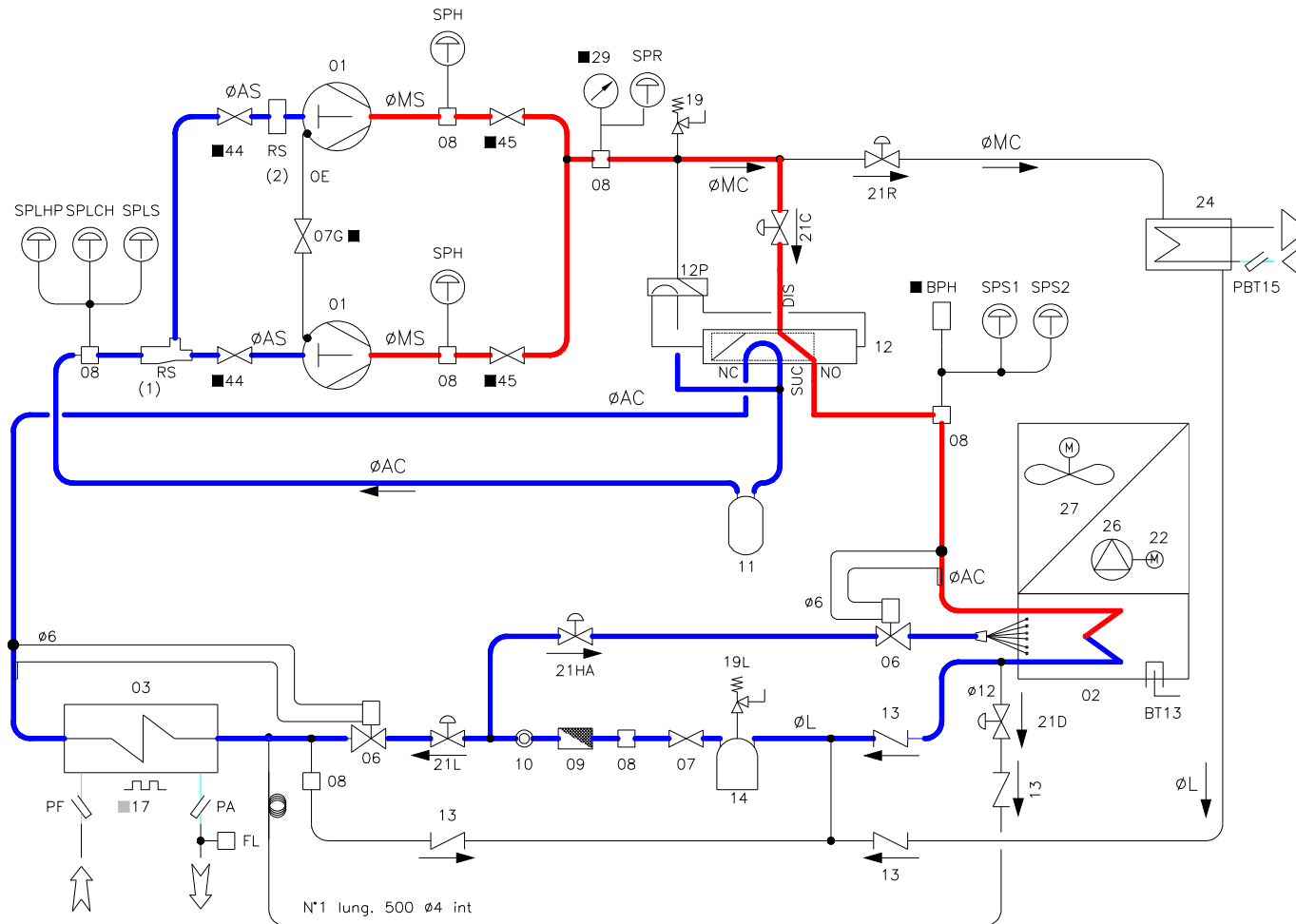
# Case 4: Production of hot water for heating only



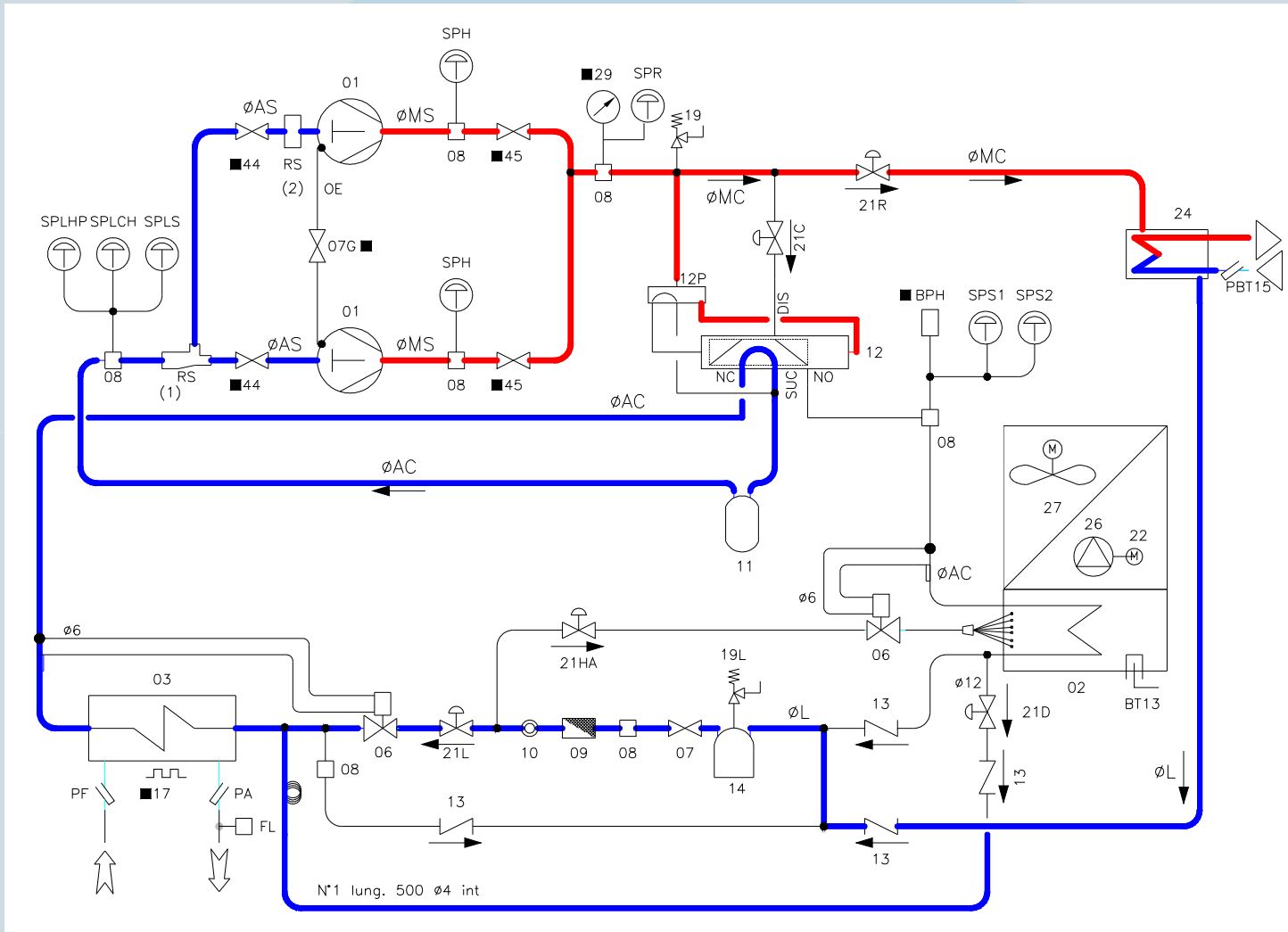
Heat recovery  
condenser not  
involved



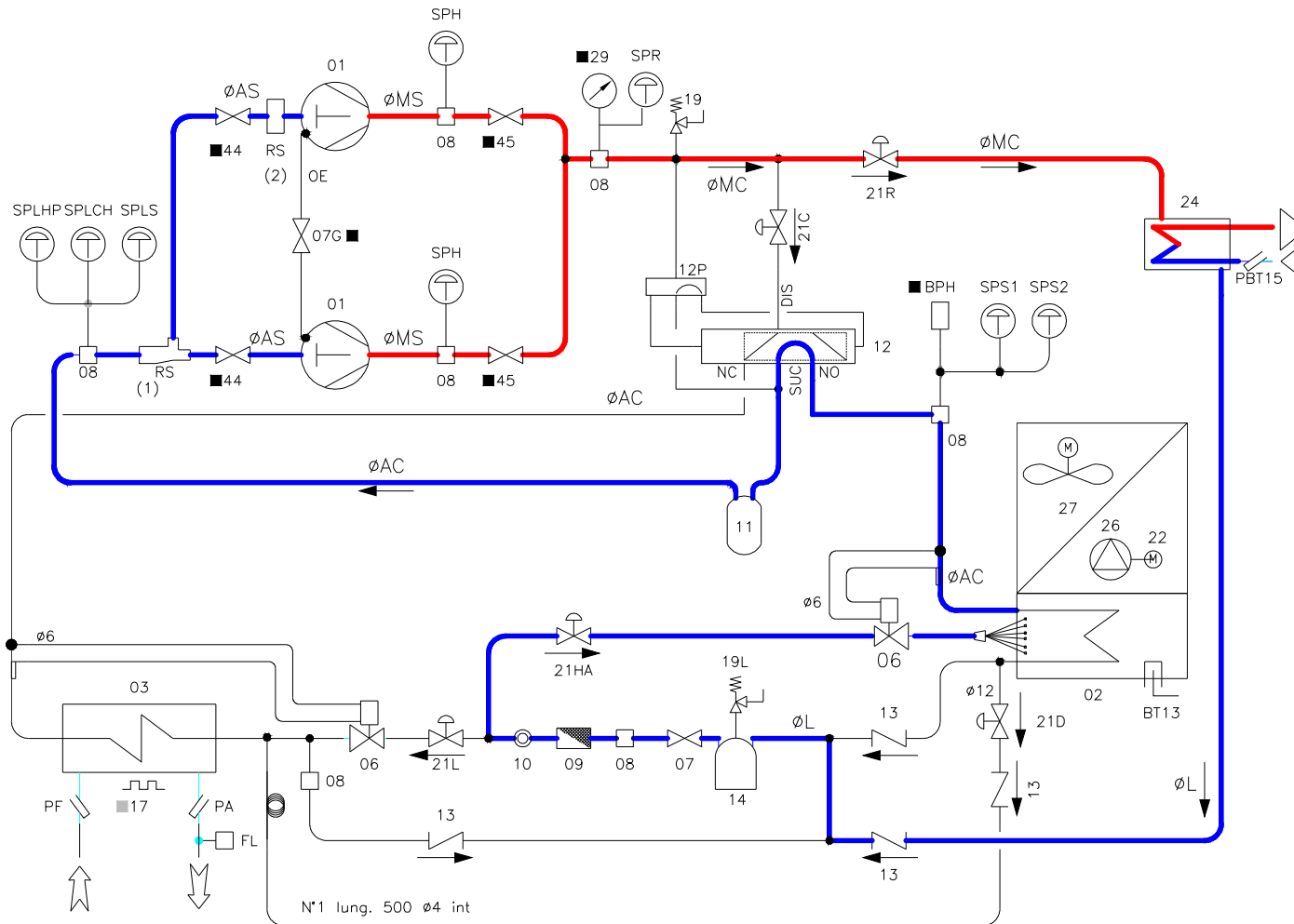
# Case 1: Production of chilled water only and defrosting



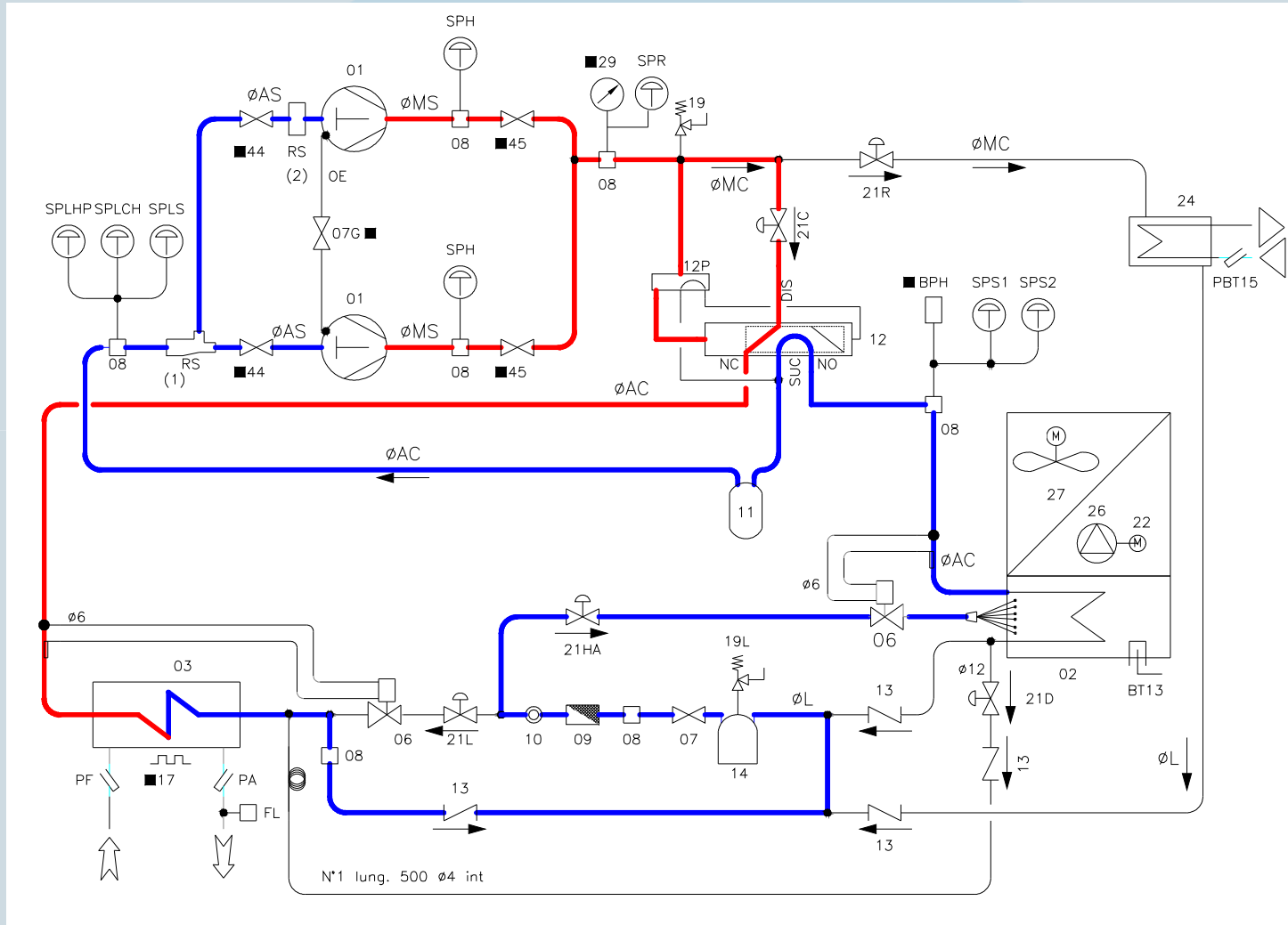
## Case 2: Simultaneous production of chilled water and hot water for sanitary use



# Case 3: Production of hot water for sanitary use only



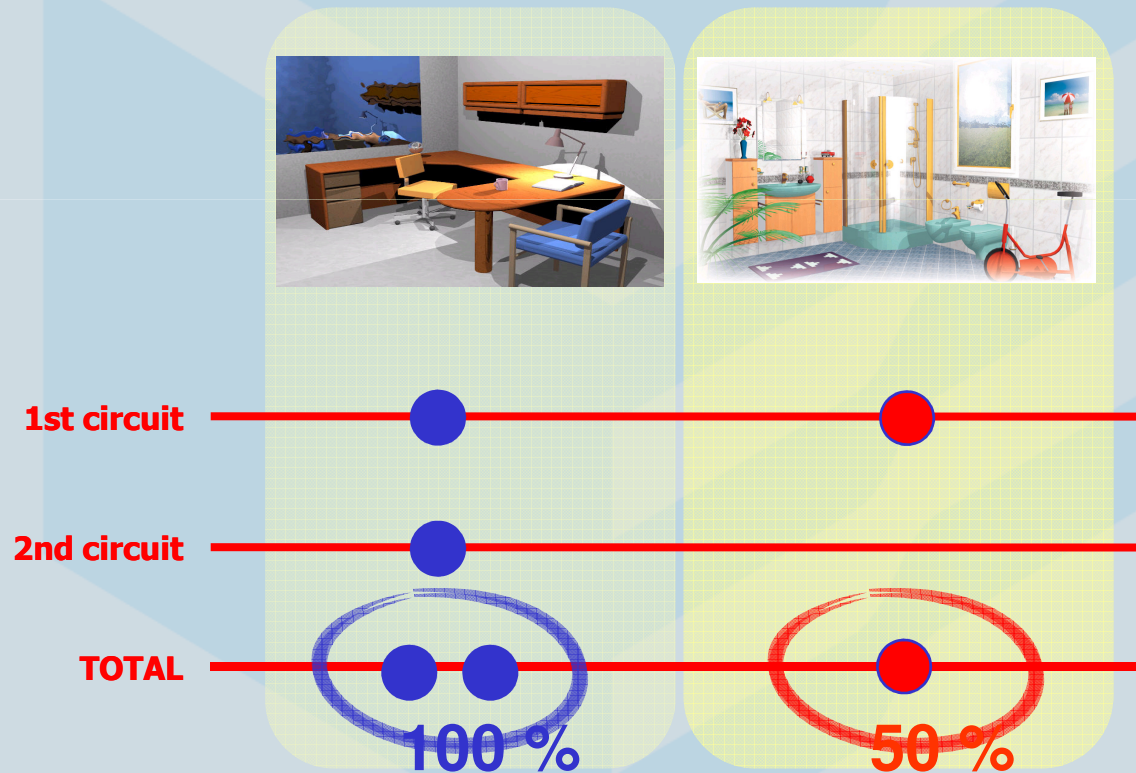
# Case 4: Production of hot water for heating only



# Response to different requirements

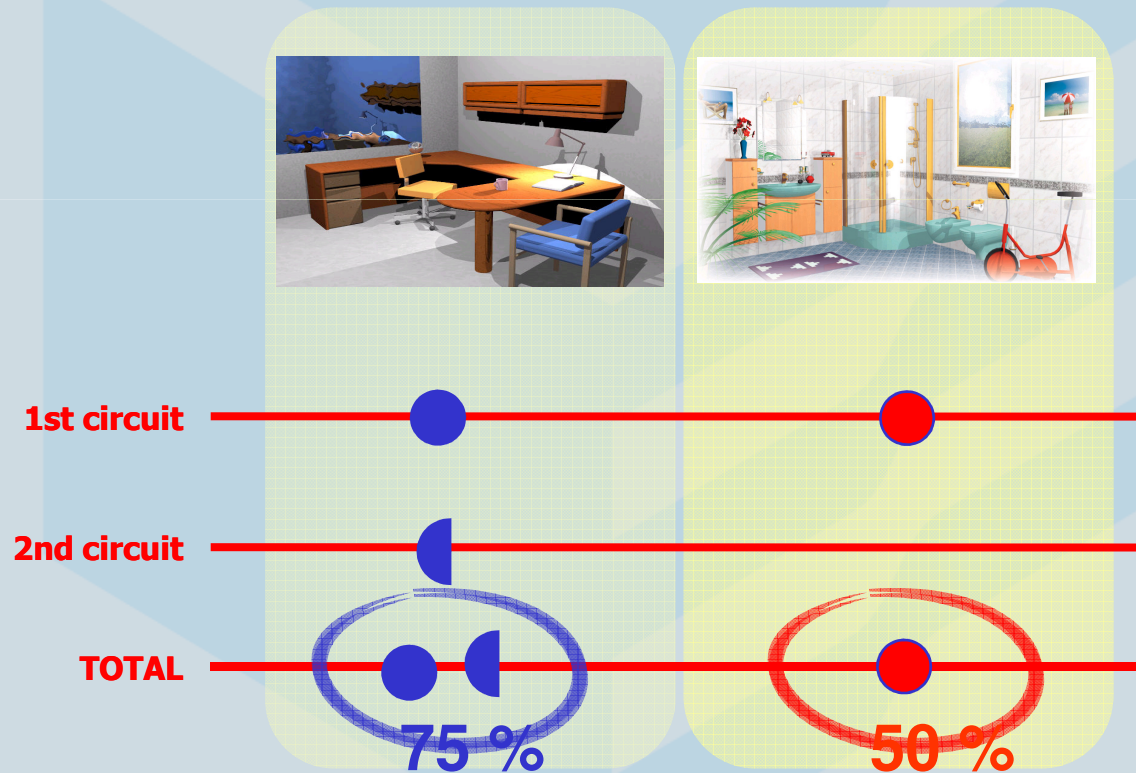
The case of 2pipe system unit fitted with 4 compressors on 2 circuits

4 capacity steps from 0 to 100 % of the maximum cooling and heating capacity, usable in any of the intermediate combination



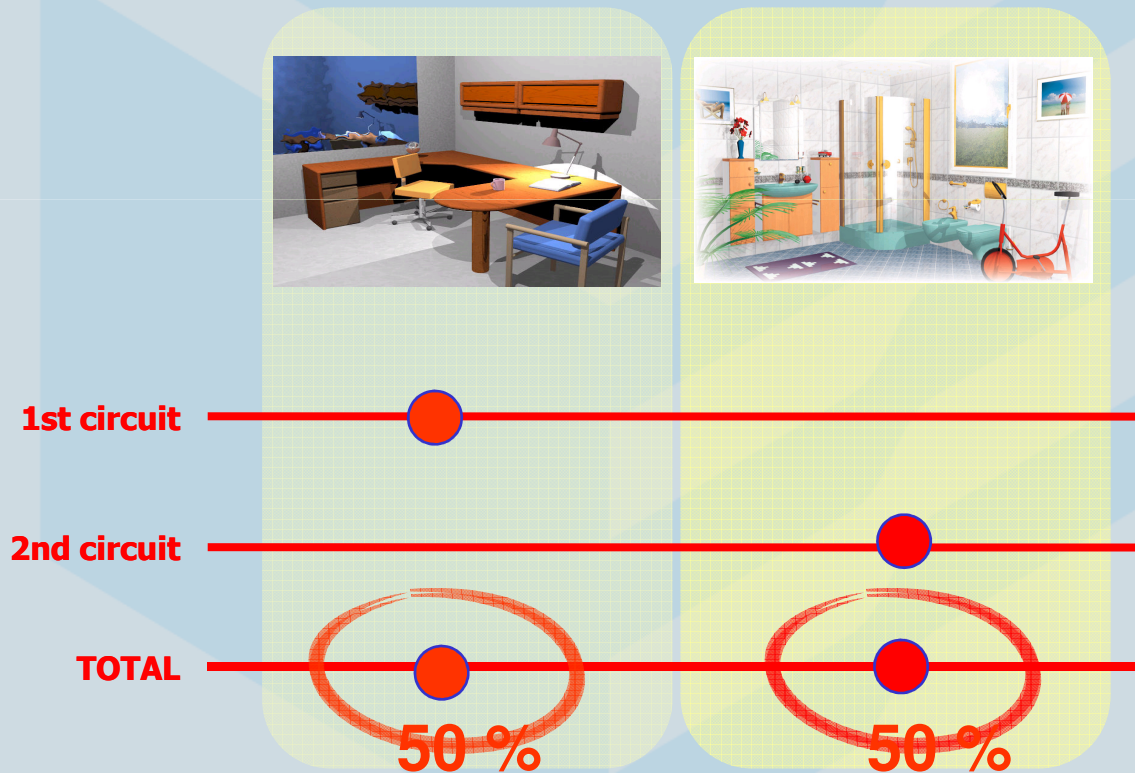
# Response to the different requirements

The case of a 2pipe system unit fitted with 4 compressors on 2 circuits



# Response to the different requirements

The case of 2 pipe system unit fitted with 4 compressors on 2 circuits



## Response to the different requirements: combination in the SUMMER operation

		"Sanitary" load percentage				
		0	25	50	75	100
"cooling" load percentage	0	<u>X</u>	X	<u>X</u>	X	<u>X</u>
	25	X	X	X	X	no
	50	<u>X</u>	X	<u>X</u>	X	X
	75	X	X	X	X	no
	100	<u>X</u>	no	X	no	<u>X</u>

The case of a 2pipe system unit fitted with 4 compressors on 2 circuits

## Response to different requirements: combinations in the SUMMER operation mode

	Totale				circuito 1			circuito 2		
	carico frigorifero %	carico termico %	Carico sanitario	possibile	Carico % evap.	Carico % batteria	Carico % recupero	Carico % evap.	Carico % batteria	Carico % recupero
Regime estivo	100	-	100	si	100	0	100	100	0	100
	100	-	75	no	-	-	-	-	-	-
	100	-	50	si	100	0	100	100	100 cond	0
	100	-	25	no	-	-	-	-	-	-
	100	-	0	si	100	100 cond	0	100	100 cond	0
	75	-	100	no	-	-	-	-	-	-
	75	-	75	si	100	0	100	50	0	50
	75	-	50	si	100	0	100	50	50 cond	0
	75	-	25	si	100	100 cond	0	50	0	50
	75	-	0	si	100	100 cond	0	50	50 cond	0
	50	-	100	si	100	0	100	0	100 evap	100
	50	-	75	si	100	0	100	0	50 evap	50
	50	-	50	si	50	0	50	50	0	50
	50	-	25	si	50	0	50	50	50 cond	0
	50	-	0	si	50	50 cond	0	50	50 cond	0
	25	-	100	no	-	-	-	-	-	-
	25	-	75	si	0	100 evap	100	50	0	50
	25	-	50	si	50	0	50	0	50 evap	50
	25	-	25	si	50	0	50	0	0	0
	25	-	0	si	50	50 cond	0	0	0	0
0	-	100	si	0	100 evap	100	0	100 evap	100	
0	-	75	si	0	100 evap	100	0	50 evap	50	
0	-	50	si	0	50 evap	50	0	50 evap	50	
0	-	25	si	0	50 evap	50	0	0	0	
0	-	0	si	0	0	0	0	0	0	

The case of a 2pipe system unit fitted with 4 compressors on 2 circuits

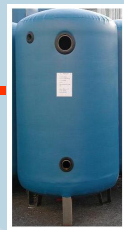
## Response to different requirements: combinations in the WINTER operation mode

		"sanitary" load percentage				
		0	25	50	75	100
"heating" load percentage	0	X	X	X	X	X
	25	X	X	X	no	no
	50	<u>X</u>	X	X	no	no
	75	X	no	no	no	no
	100	<u>X</u>	no	no	no	no

The case of a 2pipe system unit fitted with 4 compressors on 2 circuits

## ZETA and BETA Multifunctional

- Air/water reversible heat pump
- Total recovery of heat rejection
- Outdoor or indoor installation
- Units with 2 or 4 *compressors connected in tandem*
- 16 models ranging from 37 to 260 kW of cooling and heating
- Available for 2 and 4 pipe systems



## Application field - ZETA and BETA

### 2pipe system unit

Summer air conditioning and winter heating with important volumes of hot water for sanitary use all year long

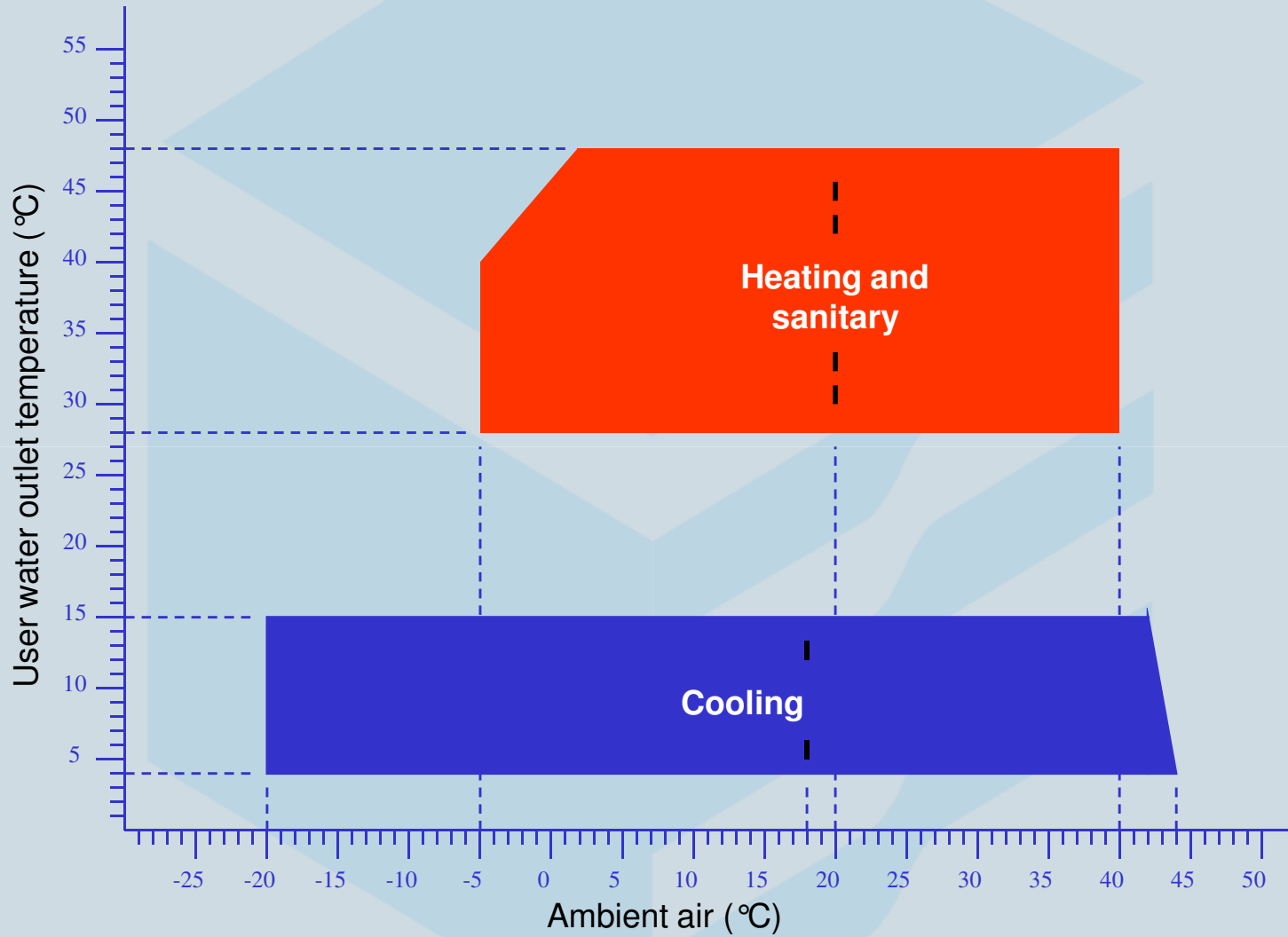
- Hotels
- Hospitals

### 4pipe system unit

Simultaneous or independent cooling and heating of spaces (generally having different thermal loads > i.e.: different sun exposure)

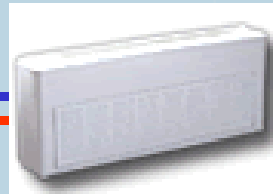
- Office building

## Operation limits ZETA and BETA Multifunctional



## FACTOTUM Multifunctional unit

- Reversible air/water heat pump
- Total recovery of heat rejection
- Outdoor installation
- Single compressor unit specifically designed for HP operation
- Suitable for 2pipe systems



**No need of boiler**

## Application field - FACTOTUM

### 2pipe system unit

Summer air conditioning and winter heating with important volumes of hot water for sanitary use all year long

- Private houses
- Light commercial

## - FACTOTUM - Strenghtness

- It replaces the combination Chiller + Boiler thus offering global and integrated managing features to the user requirements
- Modular solution (Chilled water control on the delivery with Master/Slave logic)
- "Plug and play" system → everything on board and tested (user tank included, pump)
- Wide range of operation limits: from -15 to +45 °C
- High efficiency across the whole operation range thanks to a Cutting Edge compressor and the use of electronic expansion valves
- Energy saving, obtained through the recovery of heat rejection used to warm water for sanitary use
- Water is used in the system as the heat exchanger fluid (differently from the direct expansion systems) → little use of refrigerant gas, less maintenance required, easy installation
- Quiet operation thanks to the use of "specially shaped" blade fans

## Components description

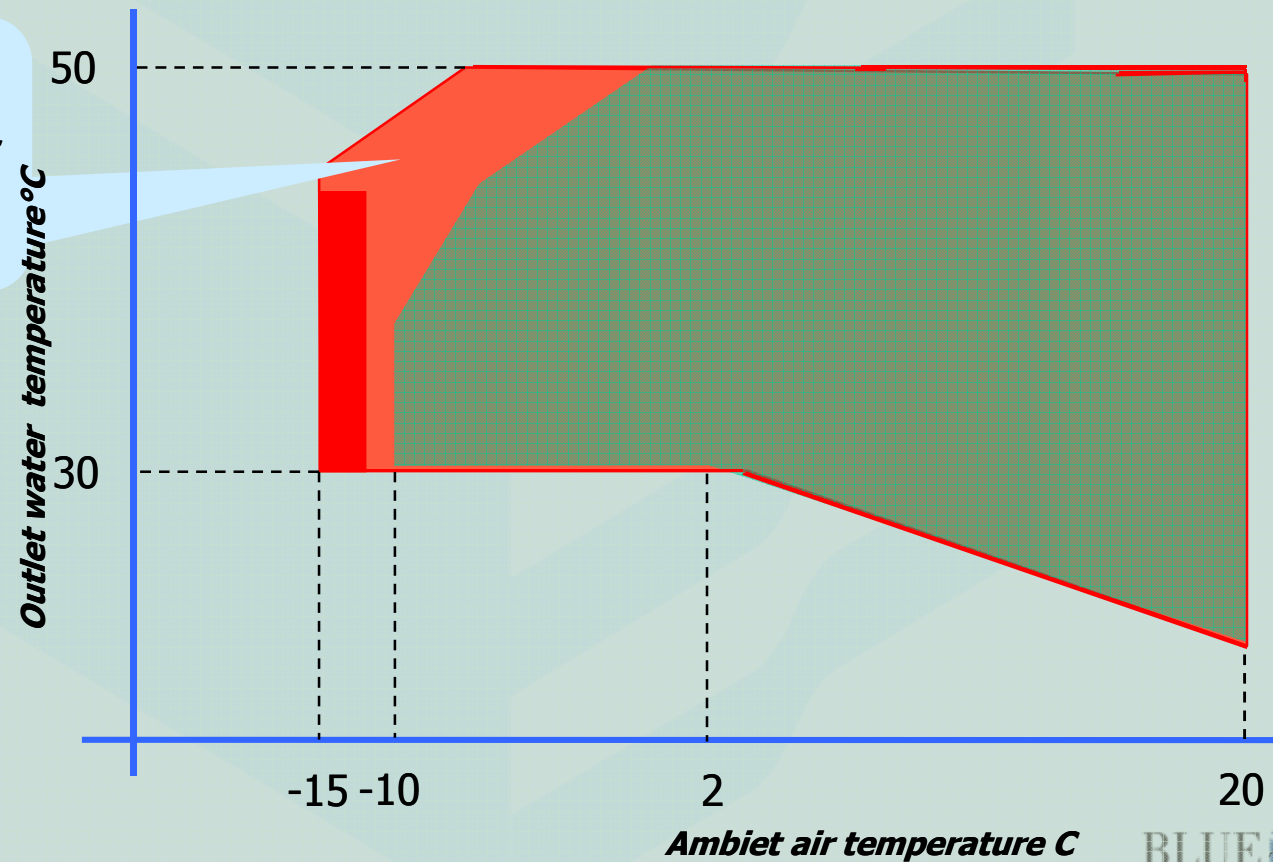
- 2 rows finned coil, with a large front area, oversized fin pitch
- Tube in tube heat exchanger on the user side with buffer tank
- User pump on board
- Sanitary water side plate heat exchanger
- Extremely quiet operation due to the oversized condensing coil
- A buffer tank is demanded on the sanitary water circuit

# FACTOTUM Vs Competitors

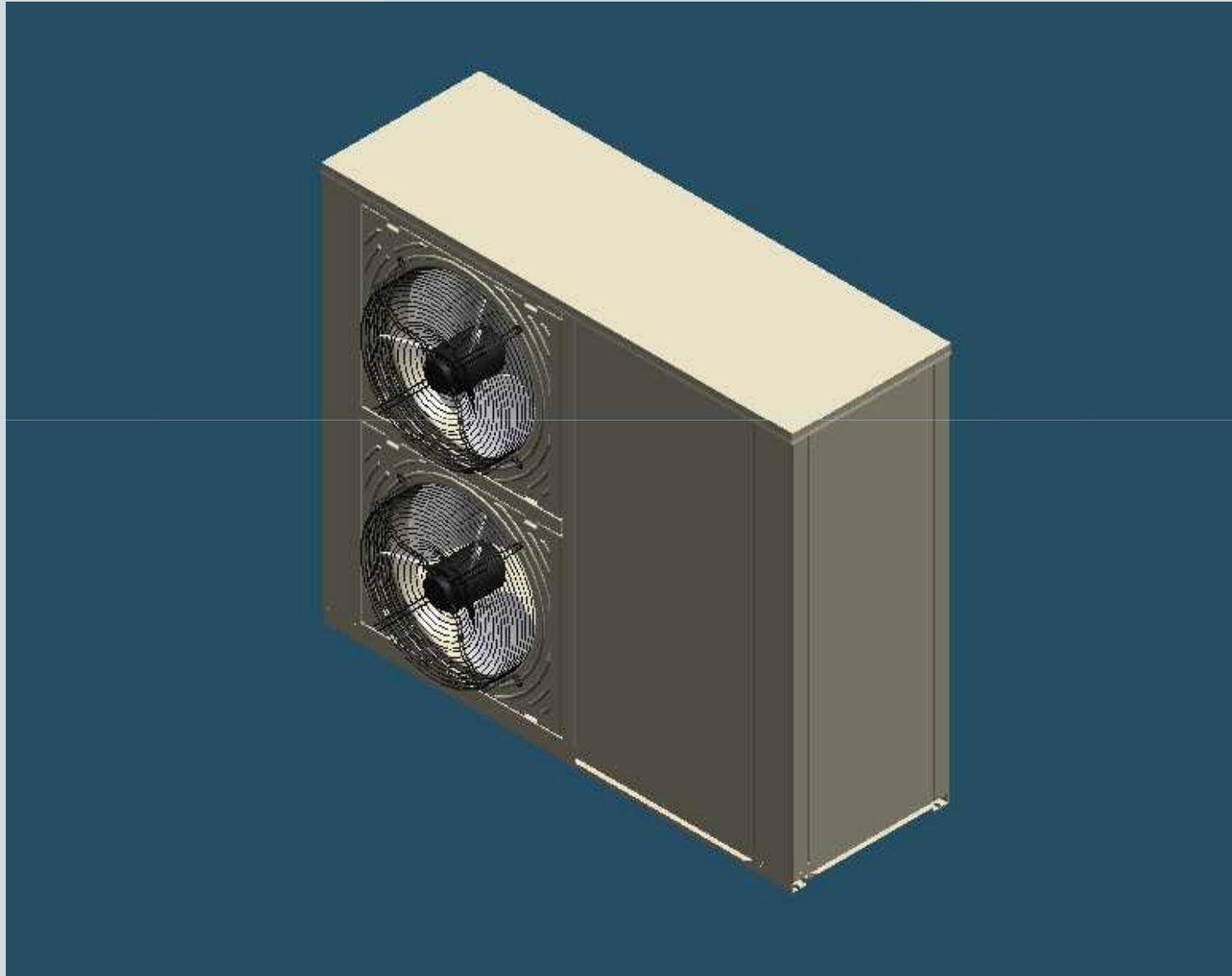
## Operating limits heating

starting water temperature 10 C

**The widest  
operating limits of  
his category**



# *Unit's Layout*



# *Unit's Layout*

