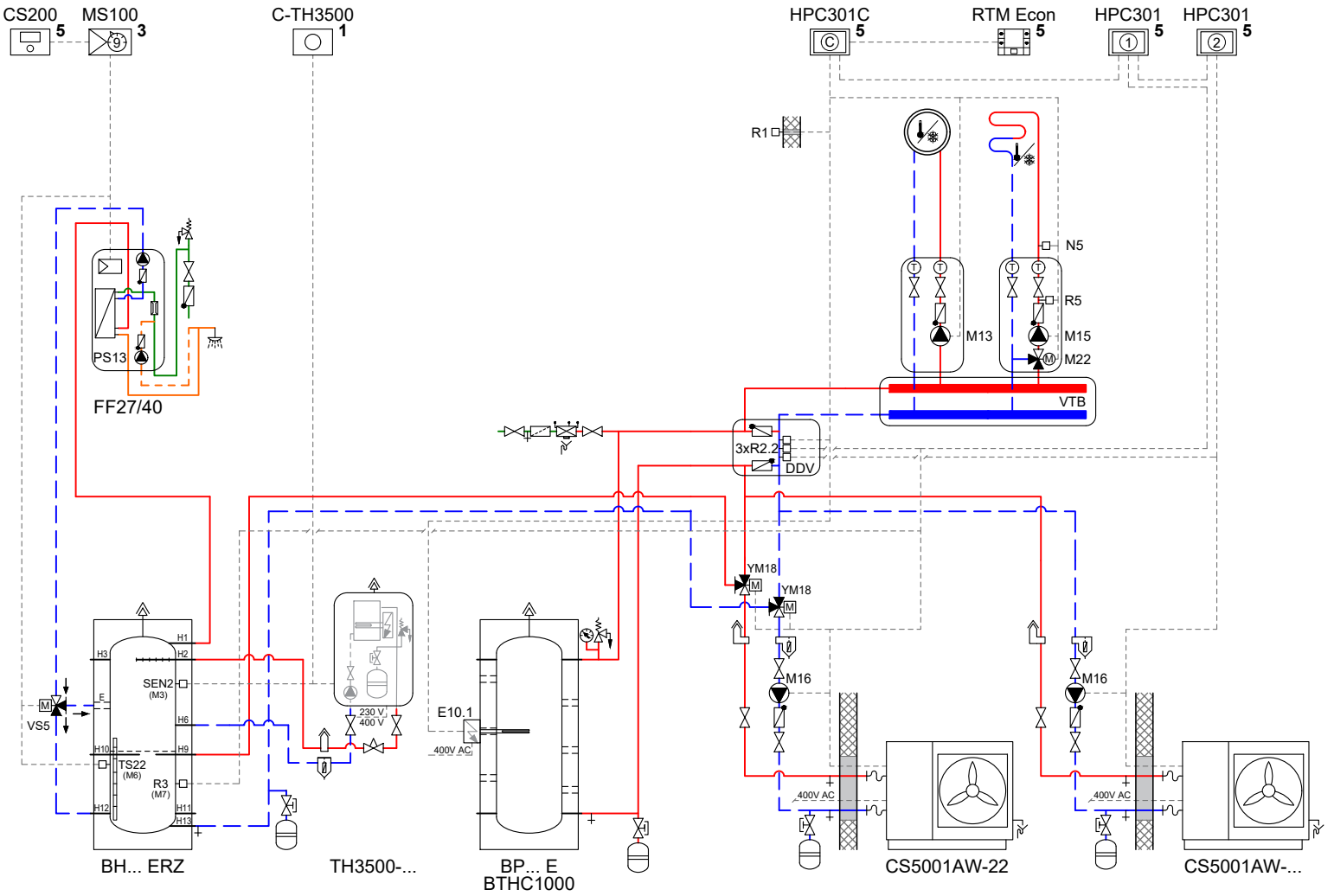
System schematic

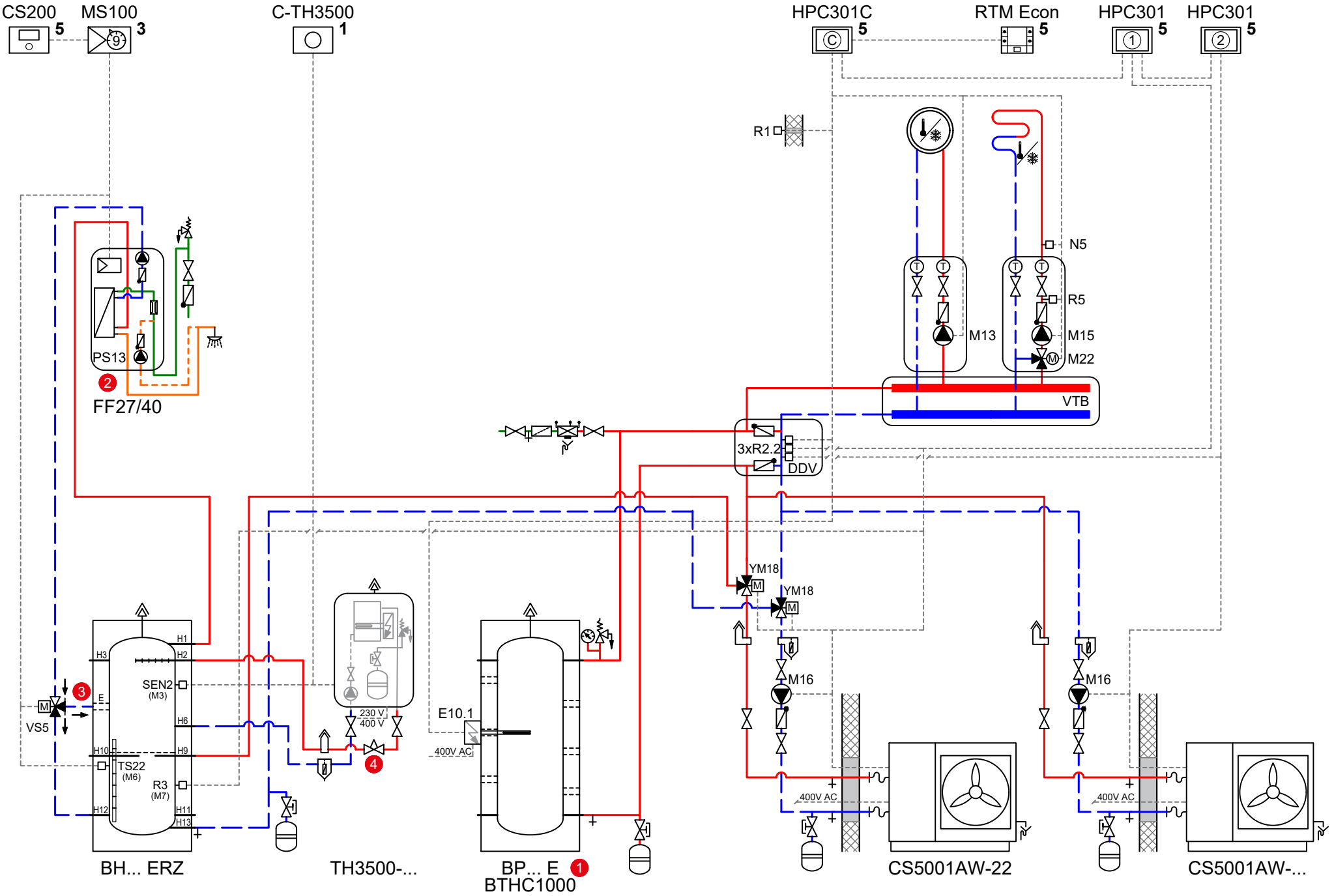
2x Compress CS5001 AW- ... (Cascade)

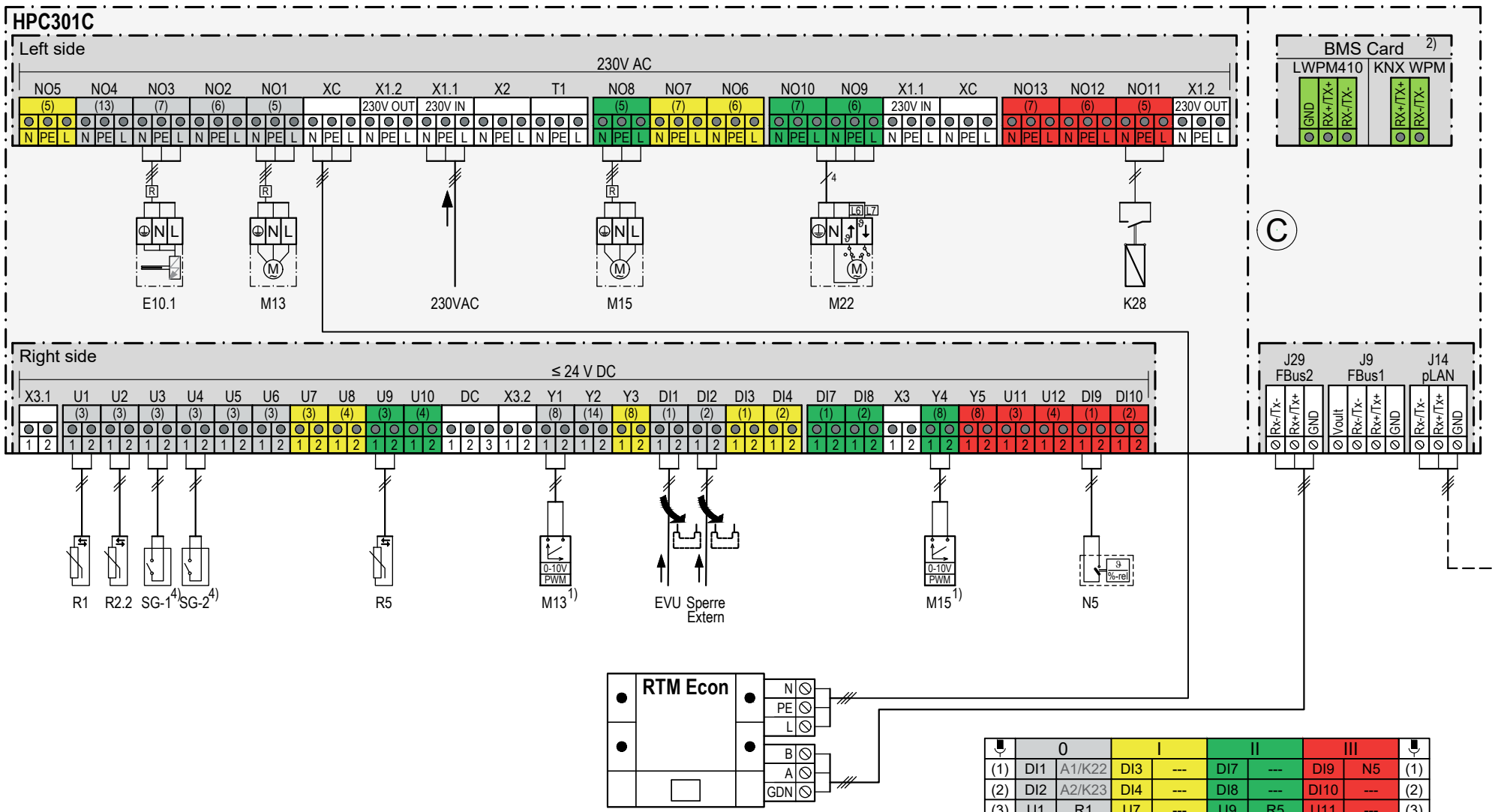
System example for qualified contractors



Hydraulic components:

- Air-to-water heat pump (Cascade)
- Electric heater
- Buffer tank
- Fresh water station
- Heating/cooling circuits

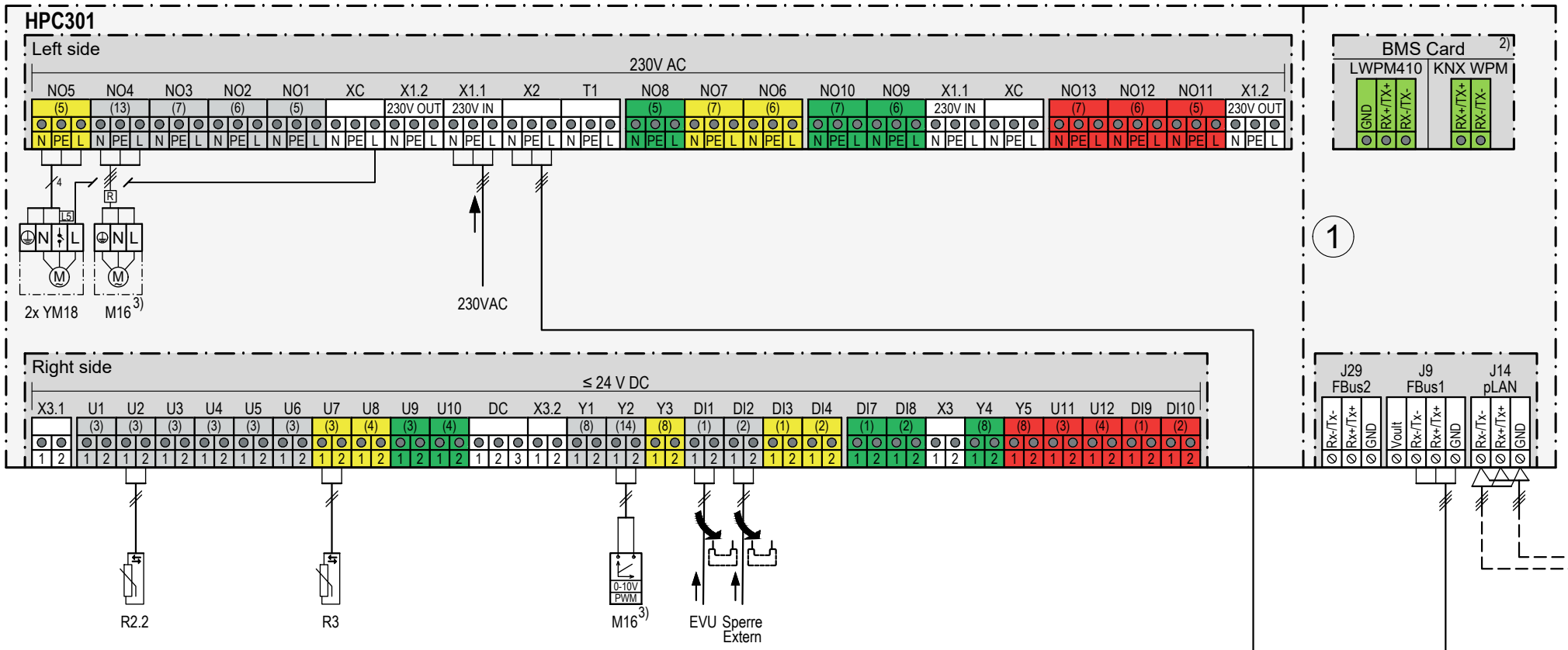

CS200
5
MS100
3
C-TH3500
1
HPC301C
5
RTM Econ
5
HPC301
5
HPC301
5
R1
N5
R5
M13
M15
M22
VTB
PS13
2
FF27/40
3xR2.2
DDV
YM18
YM18
M16
M16
3
VS5
SEN2
(M3)
TS22
(M6)
R3
(M7)
H1
H2
H3
H6
H9
H10
H11
H12
H13
E
230 V
400 V
4
E10.1
400V AC
400V AC
400V AC
BH... ERZ
TH3500-...
BP... E
BTHC1000
1
CS5001AW-22
CS5001AW-...

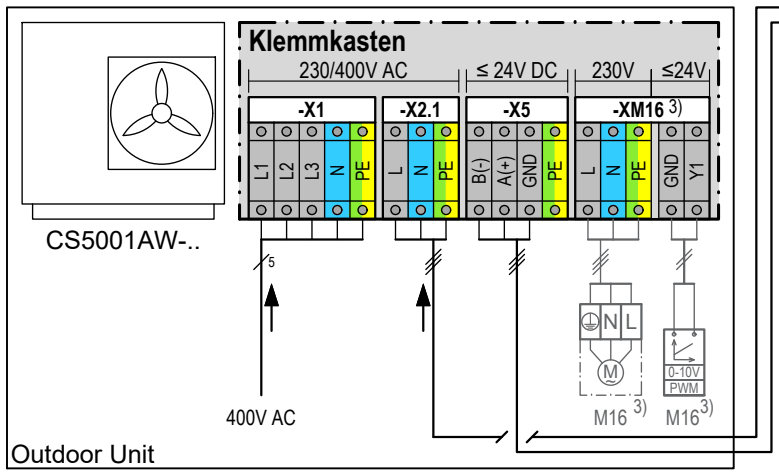


	0		I		II		III		
(1)	DI1	A1/K22	DI3	---	DI7	---	DI9	N5	(1)
(2)	DI2	A2/K23	DI4	---	DI8	---	DI10	---	(2)
(3)	U1	R1	U7	---	U9	R5	U11	---	(3)
(4)	U2	R2.2	U8	---	U10	---	U12	---	(4)
(5)	NO1	M13	NO5	---	NO8	M15	NO11	K28	(5)
(6)	NO2	H5	NO6	---	NO9	M22↑	NO12	---	(6)
(7)	NO3	E10.1	NO7	---	NO10	M22↓	NO13	---	(7)
(8)	Y1	M13 1)	Y3	---	Y4	M15 1)	Y5	---	(8)
(9)	U3	N27.1			2. Kreis: gemischt		Kühlen aktiv		(9)
(10)	U4	N27.2			2. circuit: mixed		cooling activ		(10)
(11)	U5	---							(11)
(12)	U6	---			2. circuit: mélangé		réfrigérer actif		(12)
(13)	NO4	M16 3)							(13)
(14)	Y2	M16 3)			+A411		+A451		(14)

1) Speed control optional
2) Additional equipment - only one card can be installed (LWPM410 or KNX WPM).
3) Alternative connection option for M16: to XM16 in the outdoor unit (voltage and speed control)
4) Optional

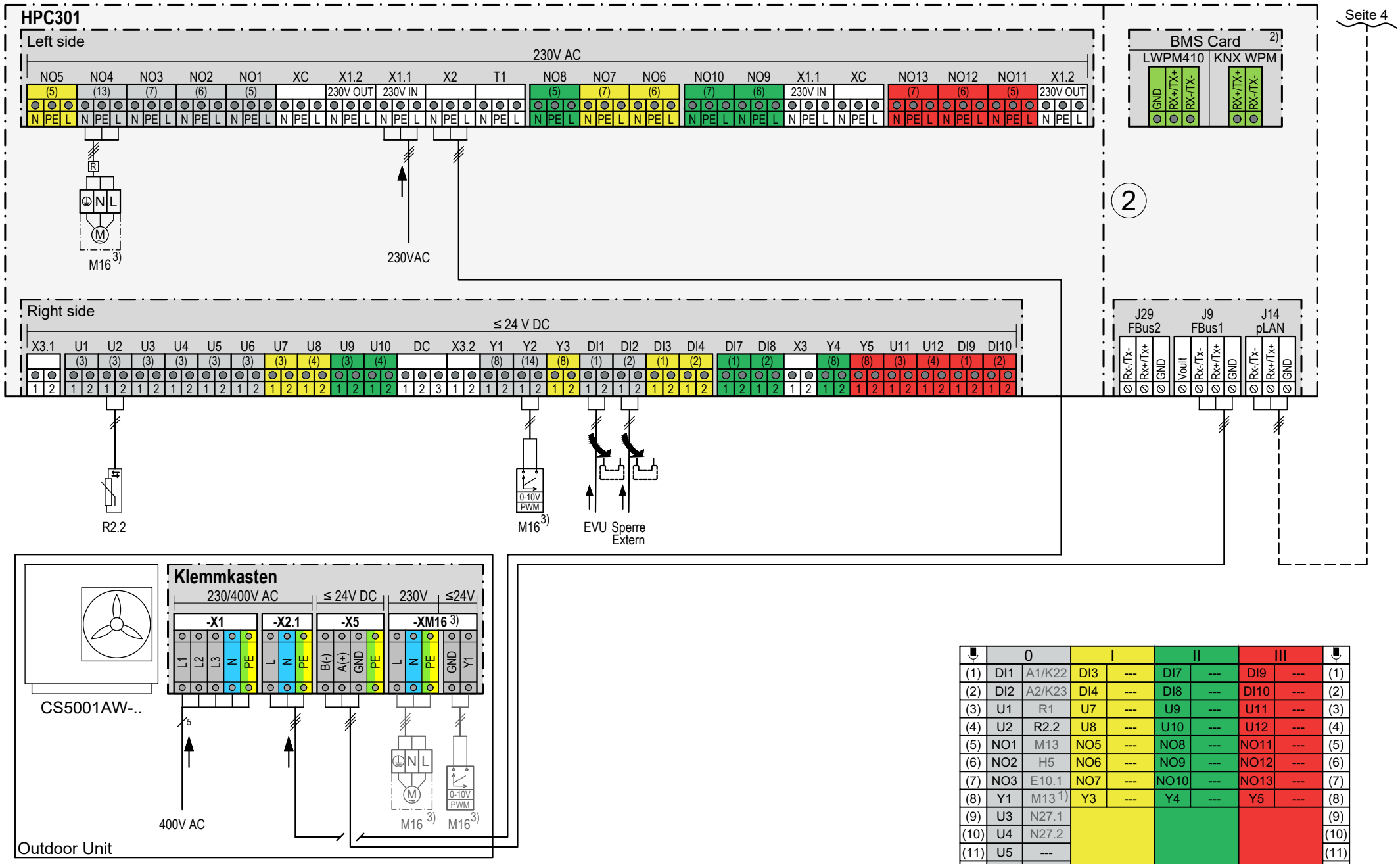
Page 4





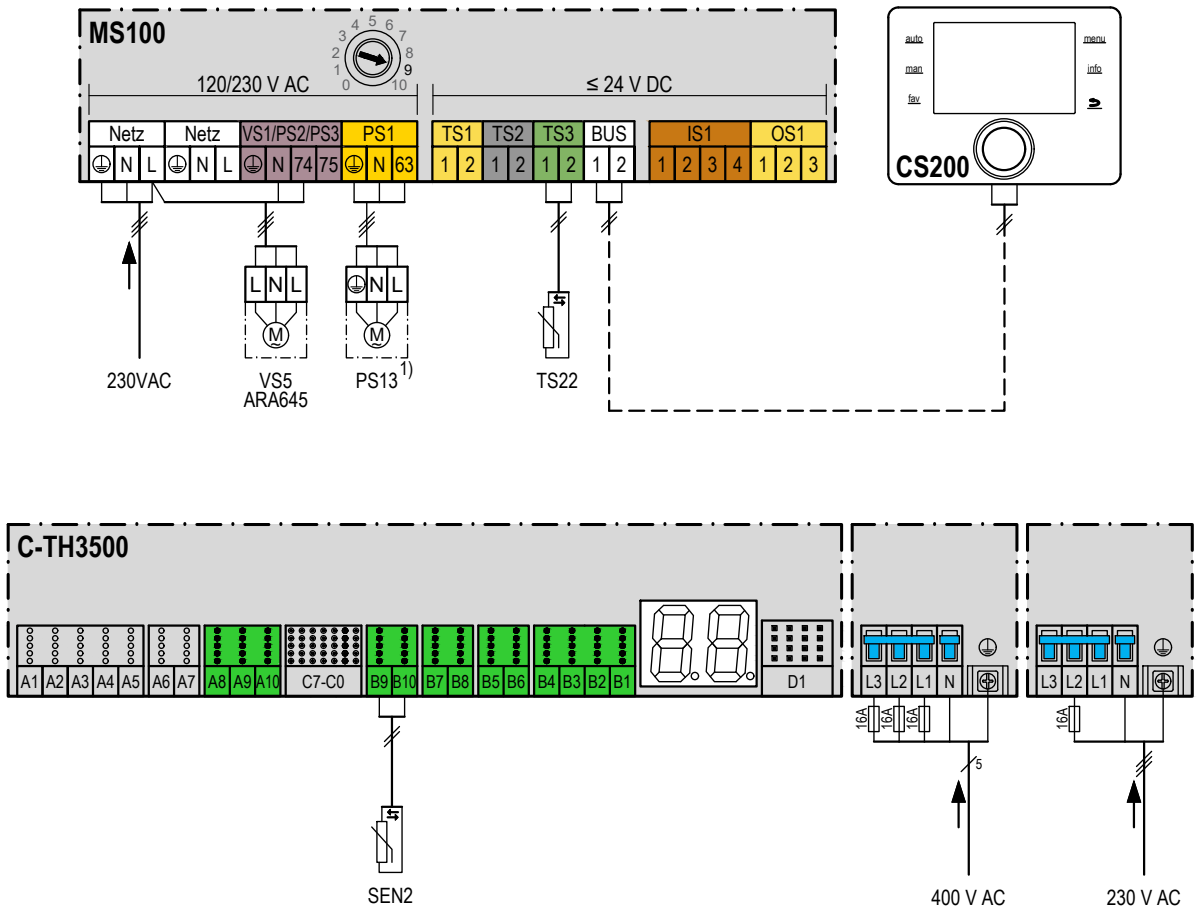
	0		I		II		III		
(1)	DI1	A1/K22	DI3	---	DI7	---	DI9	---	(1)
(2)	DI2	A2/K23	DI4	---	DI8	---	DI10	---	(2)
(3)	U1	R1	U7	R3	U9	---	U11	---	(3)
(4)	U2	R2.2	U8	---	U10	---	U12	---	(4)
(5)	NO1	M13	NO5	YM18	NO8	---	NO11	---	(5)
(6)	NO2	H5	NO6	---	NO9	---	NO12	---	(6)
(7)	NO3	E10.1	NO7	---	NO10	---	NO13	---	(7)
(8)	Y1	M13 1)	Y3	---	Y4	---	Y5	---	(8)
(9)	U3	N27.1	Warmwasser						(9)
(10)	U4	N27.2							(10)
(11)	U5	---	domestic hot water						(11)
(12)	U6	---	eau chaude sanitaire						(12)
(13)	NO4	M16 3)							(13)
(14)	Y2	M16 3)	+A420						(14)

1) Speed control optional
2) Additional equipment - only one card can be installed (LWPM410 or KNX WPM)..
3) Alternative connection option for M16: to XM16 in the outdoor unit (voltage and speed control)



	0		I		II		III		
(1)	DI1	A1/K22	DI3	---	DI7	---	DI9	---	(1)
(2)	DI2	A2/K23	DI4	---	DI8	---	DI10	---	(2)
(3)	U1	R1	U7	---	U9	---	U11	---	(3)
(4)	U2	R2.2	U8	---	U10	---	U12	---	(4)
(5)	NO1	M13	NO5	---	NO8	---	NO11	---	(5)
(6)	NO2	H5	NO6	---	NO9	---	NO12	---	(6)
(7)	NO3	E10.1	NO7	---	NO10	---	NO13	---	(7)
(8)	Y1	M13 1)	Y3	---	Y4	---	Y5	---	(8)
(9)	U3	N27.1							(9)
(10)	U4	N27.2							(10)
(11)	U5	---							(11)
(12)	U6	---							(12)
(13)	NO4	M16 3)							(13)
(14)	Y2	M16 3)							(14)

1) Speed control optional
2) Additional equipment - only one card can be installed (LWPM410 or KNX WPM)..
3) Alternative connection option for M16: to XM16 in the outdoor unit (voltage and speed control)



1) Zirkulationspumpe PS13 optional (Zubehör)
2) 230-V-Anschluss nur bei Elektro-Heizgeräten mit einer Leistungsgröße von 4...12 kW

General information

- To cover larger heat demands, two heat pumps are cascaded.
- This configuration is suitable for applications with heating and cooling requirements.
- In monoenergetic operation, the heat pump covers the heating and hot water demand.
- A general connection of pumps by means of a coupling relay is recommended.
- The components of the hydraulic system, such as DDV, PW...E, MMH and the pipelines, must be dimensioned according to the required outputs/volume flows.
- The correct size and connection of the buffer tank must be ensured. If necessary, a four-way connection or several buffer tanks connected in parallel should be provided.
- An additional heat source must be provided in the hydraulics to ensure the frost protection of the heat pump in all operating conditions.

Fresh water station Flow Fresh FF27/FF40

- The FF.. fresh water stations with stainless steel brazed plate heat exchangers are characterized by their particularly hygienic instantaneous domestic hot water production.
- The FF.. fresh water stations are available with a tapping capacity of 27...160 l/min.
- The temperature-sensitive return feed function is carried out via the 3-way changeover valve VS5 (Catalog accessory: ESBE VRG with ARA645 actuator).
2. • The circulation pump PS13 is an optional accessory.

3. **Electrical connection of the 3-way changeover valve at the MS100 function module**

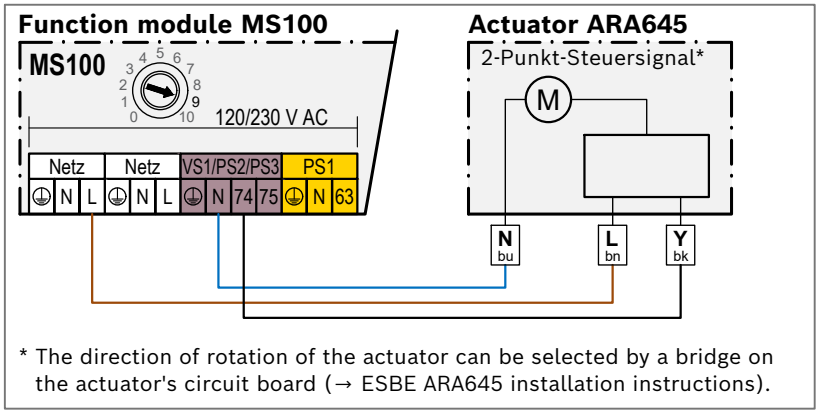


Figure 1: Electrical connection of the ARA645 actuator to the MS100

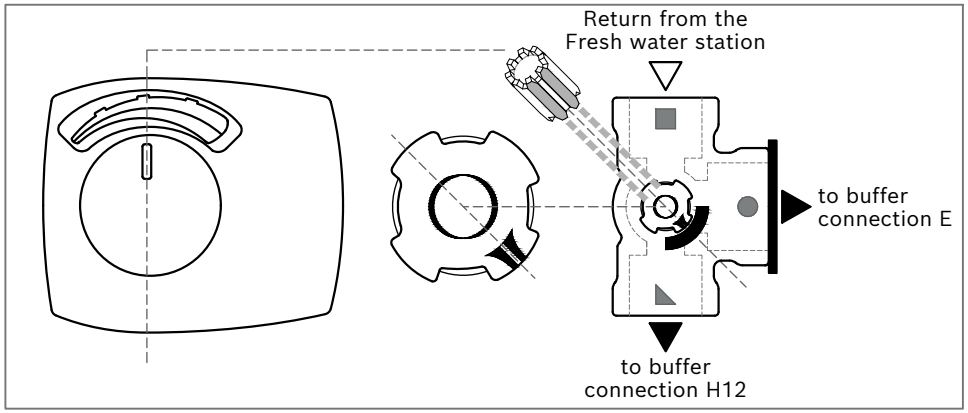


Figure 2: Installation position of the 3-way changeover valve VRG.../ARA645

- Terminal L = permanent live supply to the MS100 function module and ESBE ARA645 actuator
- Terminal 74 de-energized = return to the BH... ERZ buffer tank bottom (H12)
- Terminal 74 energized = return to the BH... ERZ buffer tank middle (E)
- Terminal 75 is not assigned and can be used as a fault message output (230V).

Hot water preparation

- In order to keep the share of the electric auxiliary heater as low as possible, the heat pump operates with priority.
- For buildings in which a permanent hot water temperature of ≥ 60°C must be ensured, a switch-on value for the electric boiler of > 60°C must be selected.
- The electric boiler in the head of the hot water tank BH... ERZ is set to a fixed value.
- Due to the limited volume of the hot water tank BH... ERZ, a heat pump for hot water preparation can only be selected with a power of ≤ 22 kW in this configuration.

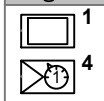
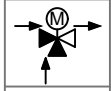
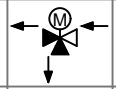
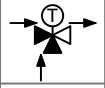
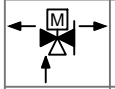
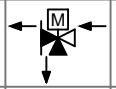
Electric heater Tronic Heat TH 3500:

- The Tronic Heat TH 3500 electric heater is offered with different power ranges from 4...24 kW.
- The electric heater TH 3500 is used exclusively for hot water preparation and is operated as an electric auxiliary heater (no BUS connection to the heating system control).
- The connection on the BH... ERZ buffer tank is made above the separating plate at connections H2 and H6.
- 4 Volume flow via TH3500 must be limited to 1,000 l/h to ensure outlet temperature > 60°C.
- For buildings, For buildings in which a permanent hot water temperature of ≥ 60°C must be ensured, the switch-on value for the electric heater TH 3500 must be set accordingly. Recommendation for setpoint temperature 61°C.
- A cable for the power supply is already connected to terminal A1 on the TH 3500 electric heater.
- **Caution:** The electric appliance is only used for hot water preparation. Therefore, the heating mode must be deactivated and the hot water mode activated.
- Deactivate heating mode:
  - Press the button. The symbol flashes.
  - Use the button to lower the target temperature until the symbol appears. (The symbol appears immediately after the lowest adjustable value 20°C).
- Activate hot water mode:
  - To access the settings level, press and hold the and buttons simultaneously for 10 seconds.
  - In the settings level, select parameter SE09 using the or button and confirm with the button.
  - Use the or button to select the value 1 = DHW and confirm with the button.
  - To exit the settings mode, scroll using the or button until the -- symbol appears, and confirm with the button. The modified settings are saved.
- Set the domestic hot water setpoint:
  - Press the button twice. The hot water symbol flashes.
  - Set the desired target temperature using the or button and confirm with the button.

Cooling

- The relay K28 can be used externally as a signal for switching between heating and cooling.
- With silent cooling, the water temperature must always be kept above the dew point temperature. For this purpose, at least one room controller (RTM Econ) must be installed in a reference room in order to regulate the min. permissible flow temperature depending on the measured room temperature and humidity. To avoid condensation at critical points in the cooling system, up to 5 dew point sensors (TPF341) in conjunction with a dew point monitor (TPW WPM) can interrupt the cooling operation if necessary.
- With dynamic cooling, all pipes and the buffer tank must be provided with vapor diffusion-proof insulation. The heat pump is switched on and off via the set return temperature. The room temperature control must be taken over by the temperature controllers of the fan convectors.
- (1) If cooling below the dew point is desired, a storage tank with vapor diffusion-proof insulation should also be selected (e.g. BTHC1000). Otherwise, only cooling above the dew point is possible and the system must be monitored by using dew point sensors (TPF314 - N5).

This schematic diagram is a non-binding representation of a possible hydraulic circuit.
The dimensions and the location of the connections can be found in the respective installation instructions.
The electrical wiring is shown in detail in the wiring diagrams.
Safety devices must be installed in accordance with currently applicable standards and local regulations.

Symbol	Description	Symbol	Description	Symbol	Description	Symbol	Description	Symbol	Description
Regulators and modules position									
	1 at the heat/cooling generator 2 at the heat/cooling generator or on the wall 3 in the station 4 in the station or on the wall 5 on the wall 6 in the control unit								
Piping/Electrical wiring									
	Flow - Heating/Solar		Flow Brine		Domestic hot water		Domestic cold water		Electrical wiring
	Return - Heating/Solar		Return Brine		Domestic hot water circulation		Refrigeration system		Electrical wiring with a break
Actuators/Valves/Temperature Sensors/Pumps									
	Ventil		Revisionsbypass		Balancing valve		Overflow valve		Shout-off valve with dirt trap (with or without magnet)
	Kappenventil		Shut-off valve with actuator		Shut-off valve with therm. thermostatic actuator or anti-freeze valve		Absperrventil, magnetically controlled		Differential pressure regulator
	3-way valve with actuator (mixing)		3-way valve with actuator (distributing)		3-way valve with thermostatic actuator		Pumpe		Check valve
	3-way valve with actuator (switching)		3-way valve with actuator (switching, adjustable)		4-way valve with actuator		Safety valve		Safety group
	Temperature sensor		Safety temperature limiter		Flue gas temperature sensor		Flue gas temperature limiter		Outdoor temperature sensor
Miscellaneous									
	Radio (e.g., Controller, Sensor)		Thermometer		Manometer		Drain funnel with odor trap		Filling/draining valve
	Relay		Automatic/manual air vent		Air separator		Dirt trap		Magnetite/Sludge separator
	Compensator		Domestic hot water outlet		Heat meter		Volumetric flow meter		Collection tank
	Low loss header with sensor		Heat exchanger		System separation according to EN1717		Expansion vessel with cape valve		Immersion heater
	Heating circuit		Underfloor heating circuit		Ventilation heating circuit		Swimming pool heating circuit		Circuit function (Heating/Cooling)