Technical presentation

flexoTHERM exclusive
and flexoCOMPACT exclusive

New Vaillant heat pumps

flexoTHERM exclusive

flexoCOMPACT exclusive

Arguments for the installer

– Maximum flexibility

Feature	Functions	Benefit
New (technical) design of the heat pump	One heat pump for all heat sources: Brine, air and water	Always the right choice for every site and installation
	Ideal output ranges of 5-19 kW	Services tailored to meet all the end user's requirements
The scroll compressor	High COP	A suitable solution for customers who think ecologically
Rapid system extension with Vaillant components such as solar, cylinder or recoVAIR	System improvements for increased efficiency Hot water comfort and a pleasant room climate are easy to achieve	Perfect system combinations from a single source
Innovative refrigeration circuit: With intermediate vapour injection and two electronic expansion valves	Provides flow temperatures of up to 65 °C	Also ideal for existing systems: Efficient use of renewable energies even in older residential buildings

Arguments for the installer

– Quick-to-install system

Feature	Functions	Benefit
Same Vaillant user interface as ecoTEC or aroTHERM	Familiar menu guidance	Time savings and error-free start-up and parameter setting
SplitMointingConcept (flexoCOMPACT exclusive)	The heat pump can be split into two parts if required	Access to the installation room via narrow staircases
Separate modules for each desired heat source: aroCOLLECT, fluoCOLLECT	All required modules and accessories fit together without any problems	Unique module system simplifies planning and installation
Safe and simple installation and start-up using brine split concept	No refrigerant-handling certification required	Installation can be carried out without any additional qualifications

Arguments for the installer

– New intelligence integrated

Feature	Functions	Benefit
New multiMATIC 700 system controller (based on VRC 470)	A central control system for all Vaillant units Anti-legionella function (flexoCOMPACT exclusive)	Harmonious coordination of different units for optimum system operation Guaranteed healthy and hygienic hot water
VR 900	Online remote access via LAN or WLAN to the installed systems	Option to conclude maintenance agreements with the customer
profiDIALOG	Advanced service, recording and analysis of parameters from a home PC	Time and cost savings in relation to maintenance and installation
APP to control heating for end customers	Freely available APP for simple setting of the heating installation	Remote control for IOS/Android smartphones/tablets

Arguments for the user

– Premium efficiency

Feature	Functions	Benefit
Vaillant in-house developments, such as the new highly efficient refrigeration circuit	High COP on all heat pumps: x.x L/W; x.x S/W; x.x W/W	Very low energy bill for all heat sources
Future-proof product design	ErP/ELD 2019 mature: Heating mode: A++ (A+++ Label 2019 automatically achieved) For cylinder charging: A	Secure investment, sustainable heating system
System intelligence through new multiMATIC 700 control system	Systems can be easily implemented, for example in conjunction with recoVAIR	Very low energy costs with a very high level of comfort
Scroll compressor with EVI technology	Flow temperatures of up to 65 °C with high power transfer at cold outside temperatures	Efficient use of renewable energies in renovations where conventional radiators are used
Guaranteed hot water comfort with energy efficiency class A and anti-legionella function, suitable for use at an outside temperature of between -22 °C and +40 °C	Heat pump covers nearly the entire hot water demand (99%)	One of the most efficient hot water generation systems on the market → reduced costs for maximum hot water comfort

Arguments for the user

– Sustainable quality

Feature	Functions	Benefit
Made in Germany	State-of-the-art production with 100% production testing and final checks for high-quality products	Best possible quality
High proportion of the materials used can be recycled	Valuable components and raw materials are reused	Efficient use of resources
Sustainable production	Manufacturing in accordance with the highest standards	Environmentally-friendly unit and protection of natural/finite resources
10-year material guarantee for the scroll compressor	Durable and maintenance-free components for reliable operation	Reliable product with high investment security

Arguments for the user

– Up-to-date networking

Feature	Functions	Benefit
VR 900 Internet communication module	Option to have remote access, diagnostics and service carried out by your competent person	Increased system operating reliability and protection against failure Services which save time and, therefore, money
multiMATIC app for iOS and Android	Access to the unit over the Internet via smartphone and tablet	Intuitive operation of the heating and cooling function, even when on the move Increased safety and efficiency (option to shut down the system or preheat it after a holiday) Greater comfort through cost control and savings potential with renewable energy
System intelligence through new VRC 700 control system	Greater comfort is easy to manage, e.g. with the recoVAIR ventilation system	Just one operating unit for hot water generation, heating, cooling and a healthy living environment

Arguments for the user

– Extremely low-noise unit

Feature	Functions	Benefit
Optimum noise insulation: Noise reduction function combines all the features of good noise insulation	Particularly quiet at 42 dB The heat pump works at the same pleasant frequencies as a conventional refrigerator	No annoying noises within the home
Low-noise fan on the aroCOLLECT air/brine collector	Noise emission of only 47 dB with adjustable noise reduction during the day and night in heating and cooling mode	Neighbours are not disturbed.
Integrated active cooling and optional passive cooling	Cooling function	Greater living comfort in the summer

System overview

System overview

Highlights:

- Green iQ Label for Vaillant's most intelligent and sustainable heat pumps
- Sound safe for optimum sound proofing of the compressor within the building
- Ideally suited to high flow temperatures (65 °C)
- On hot days, the heat pump can be used for active or passive cooling of the building, depending on the type of heat source.
- The settings on the heat pump can be made via the appliance interface on the unit in conjunction with the multiMATIC 700 control system
- For remote parameter setting and remote diagnostics, the heat pump comes with the VR 900 Internet communication module
- The important comfort parameters can be set using the multiMATIC App for smartphones.

GREEN iQ – What is behind?

With new technologies at the hand we are on the verge of yet again a new generation of domestic comfort appliances, that deliver an integrated approach of comfortable, sustainable and intelligent solution to the market.

For those products and solutions that fit to our highest standards in connected technology and sustainable thinking we have created the new Green iQ label, an ingredient brand for selected products within the Vaillant portfolio.

In this way we enhance our premium brand position and strengthen our sustainable and innovative profile in the market.

The “Green” stands for circular sustainable thinking in lifecycle design, responsible production, long-life-time, higher efficiency and is made in the EU to ensure premium performance.

The “iQ” represents the connective thinking and the intelligence inside, to make sure to optimise the usage throughout the years and offer remote services and maintenance.

Summarised, Green iQ combines technology and intelligence with emotions.

GREEN iQ features

Green

For home owners looking ahead to the future who want to heat their homes in an environmentally-friendly manner and reduce their heating costs in the long term.

- Increased efficiency – A least ErP Label A++ for heat pumps
- Recyclable materials
- Very low standby energy consumption
- Very high product quality and durability
- Made in Germany

GREEN iQ

Intelligent networking
Sustainable technologies

iQ

Intelligent technology for ensuring the most efficient performance

- Can be controlled remotely using free-of-charge end customer app
- Internet connectivity
- WLAN-enabled
- Energy monitoring
- Simple connection to hybrid system
- Usage data and reporting apps

Heat pump operating modes depending on the heat source

	**Groundwater**	Heating Cylinder charge Passive cooling Active cooling (respect limitations)*
	**Brine**	Heating Cylinder charge Passive cooling Active cooling (respect limitations)*
	**air**	Heating Cylinder charge Active cooling

*** The active cooling with brine/water and water/water heat pump systems depends on the external heat source.**
The local limitations, laws and standards must be taken into account. The groundwater and ground application for W35/W18 or B35/W18 is subject to approval (the groundwater or ground is heated up to 40 °C).

New/old Vaillant heat pumps Product comparison

	flexoTHERM/COMPACT exclusive	geoTHERM
Power:	5, 8, 11, 15, 19	6, 8, 10, 14, 17
COP A2W35	Up to 4.1 (not yet final)	Up to 4.0
COP B0W35	Up to 5.1	Up to 4.9
Energy efficiency label	A++ Heating (A+++ as of 2019) A Hot water	A++ Heating B Hot water
Exp. valve	2 x electronic	1 x thermal
EVI	Yes	No
System controller	Yes	No
Apps	Yes, communication module integrated	No
Max. flow temp	65 °C	62 °C
Unit depth	720	840

Special features 230V flexoTHERM, flexoCOMPACT versions

- Devices with 5, 8,11 kW output available, even with d.h.w. cylinder
- Can not be combined with the heat source air (defroster and licensing reasons)
- Lower efficiency (COP) is about 0.2 fewer
- Reduced heat output, 200-300 W less at 8 kW
- Higher noise level, air compressor is a little bit louder.
- Backup heater power output limited to 5.5 kW (+ 3 kW compressor) star connection at 230 V
- Switch box different because of capacitor wiring

flexoTHERM exclusive, flexoCOMPACT exclusive output ranges

flexoTHERM exclusive	flexoCOMPACT exclusive
Heat pump **without** cylinder with cooling function	Heat pump **with** cylinder with cooling function
VWF 57 /4	VWF 58 /4
VWF 87 /4	VWF 88 /4
VWF 117 /4	VWF 118 /4
VWF 157 /4	
VWF 197 /4	

New Vaillant heat pump unit nomenclature

flexo**THERM** exclusive VWF 87/4

- Product group
- **V**aillant **W**ärmepumpe **F**lexibel (flexible Vaillant heat pump)
- Heating output at B0/W35
- Active cooling function, integrated 3WV
- Unit generation

flexo**COMPACT** exclusive VWF 88/4

- Product group
- **V**aillant **W**ärmepumpe **F**lexibel (flexible Vaillant heat pump)
- Heating output at B0/W35
- Active cooling function, integrated cylinder
- Unit generation

System features – flexoTHERM exclusive, flexoCOMPACT exclusive

- The heat source circuit in the heat pump is always operated with brine.
- The concentration of brine varies depending on the heat source.
- The heat pump unit with coolant circuit is always installed indoors.
- The wide range of hydraulic accessories available makes the whole heat pump system extremely flexible and simple to install.
- Heating, cooling, and d.h.w. operating modes are possible with the heat pump (depending on the system diagram).
- Cooling mode is initiated actively or passively and is started manually or automatically.
- The heat pump system features a noise-reducing function with the aroCOLLECT heat source. This reduces the fan speed, e.g. during set-back mode.
- The multiMATIC 700 system controller must be used to operate the heat pump system.

System features – flexoTHERM exclusive, flexoCOMPACT exclusive

- For heating mode, the control strategy with for the auxiliary heating is implemented either via the triVAI value or via temperature switch points.
- The auxiliary heating for hot water generation in parallel with the compressor is actuated by setting a separate bivalence point.
- The output limits for the auxiliary heating are set individually when starting up the unit.
- The system diagram must always be entered in the multiMATIC 700.
- The multiMATIC 700 is equipped with a moisture sensor, which enables the current dew point to be calculated and displayed. This is particularly important for cooling mode.
- The following d.h.w. cylinders can be used in a system with the flexoTHERM heat pump:

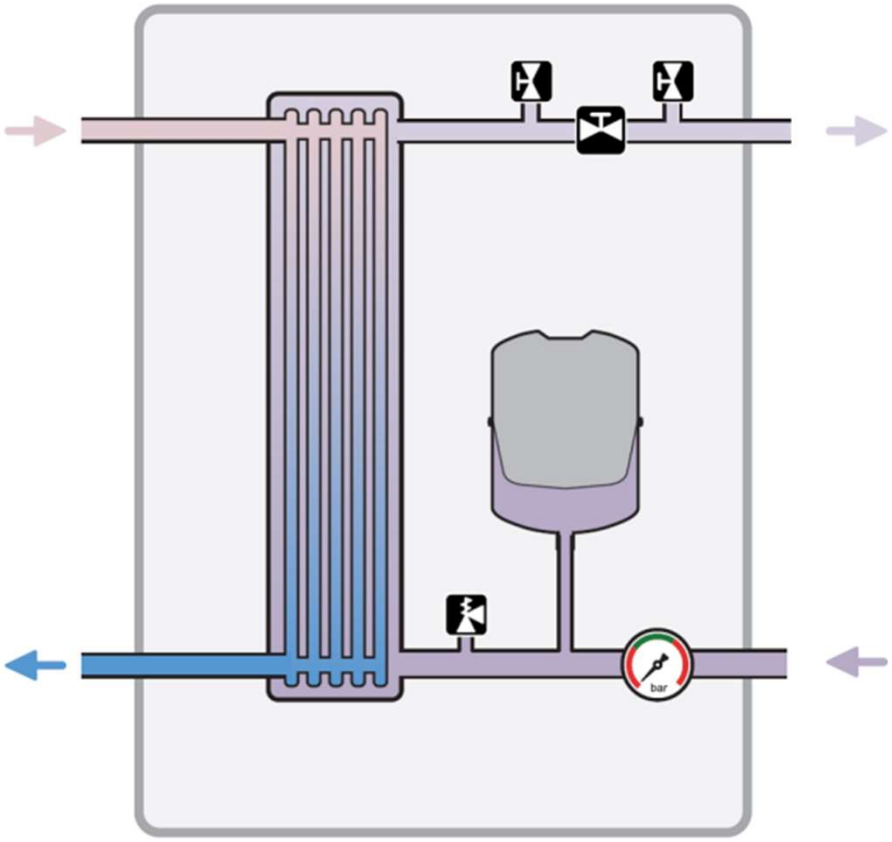
  VIH RW 300 or

  VIH RW 400 B

  VIH S 300

fluoCOLLECT groundwater module

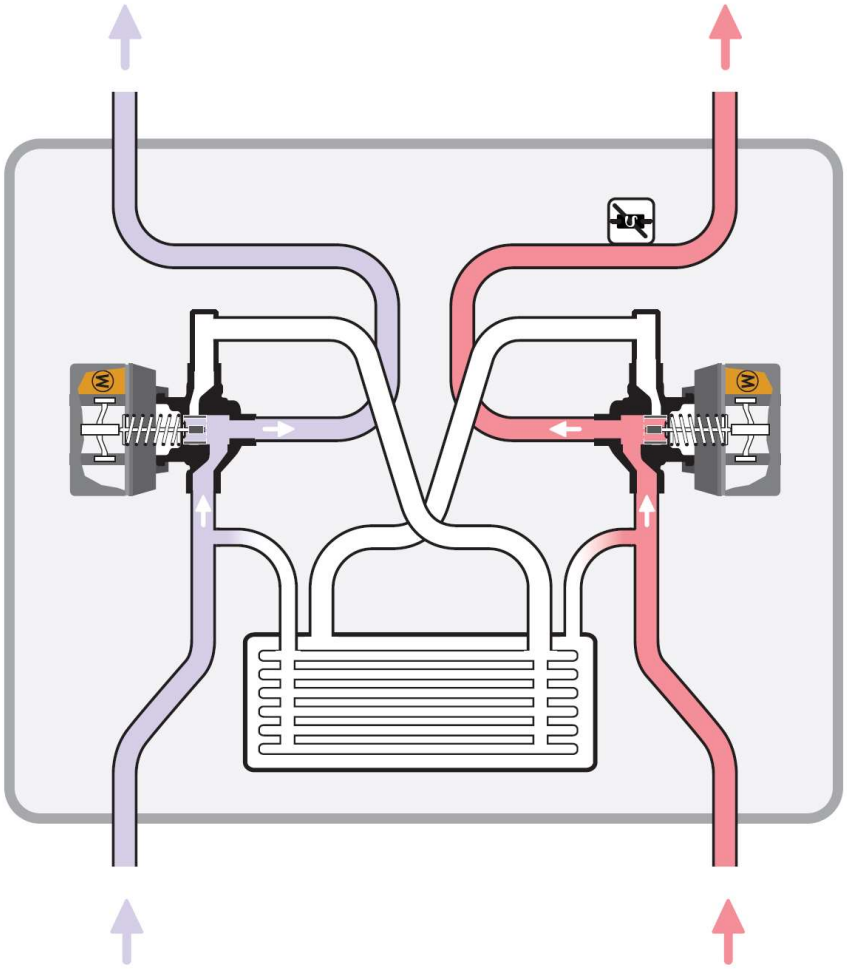
- Two output ranges < 11 kW and > 11 kW up to 19 kW.
- Vapour-diffusion-tight casing
- Easy to assemble
- Valves for easy rinsing and filling of the brine circuit
- Diaphragm expansion tank, pressure gauge and expansion relief valve* integrated into the brine circuit
- Connections: 35 mm diameter copper pipe



* *The expansion relief valve in the scope of delivery for the heat pump must be screwed into the module by a competent person.*

VWZ NC passive cooling module

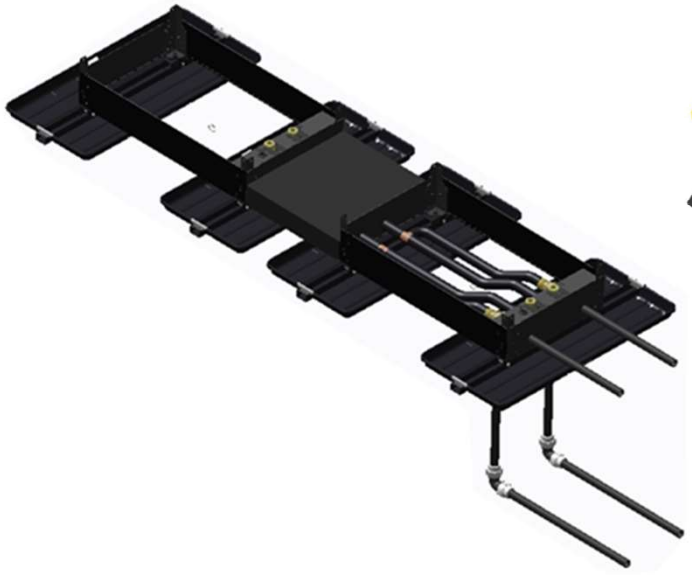
- Plug and play accessories for passive cooling
- Two accessories modules available: One for 5-11 kW heat pumps, the other with a larger heat exchanger for 15-19 kW pumps
- 3-way diverter valve for heating circuit, 3-way mixer for brine circuit, integrated 16/36 plate heat exchanger
- Connections: 28 mm diameter copper pipe

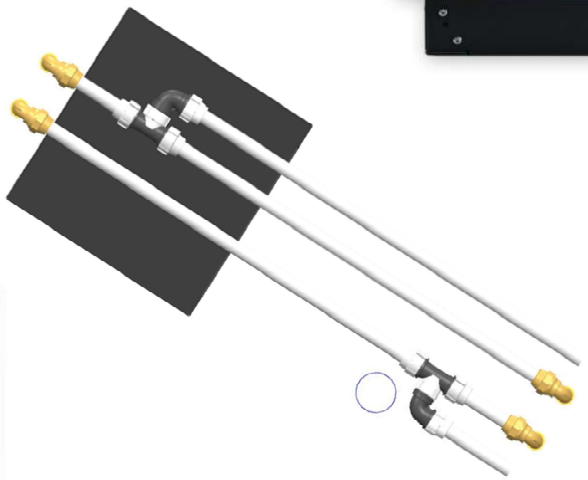


Different space-saving installation types, behind the heat pump or next to it on the wall

aroCOLLECT air/brine collector

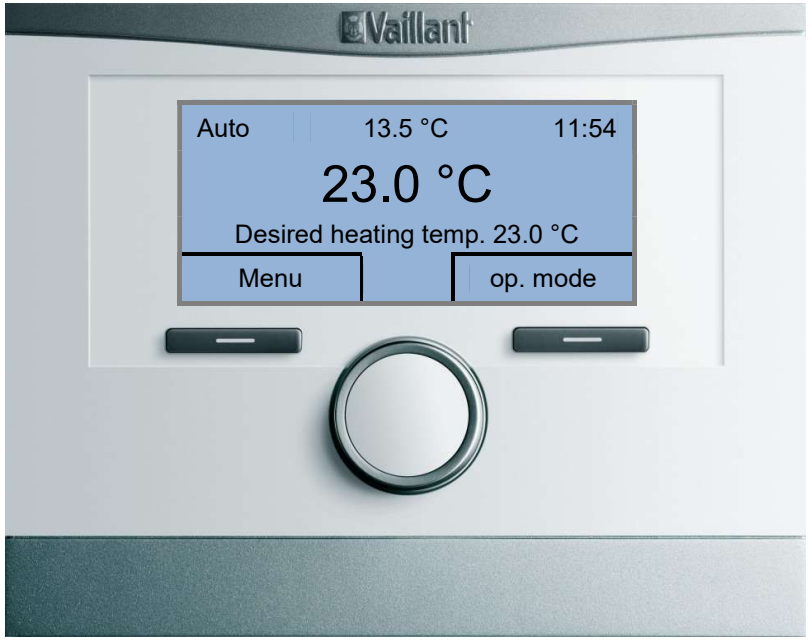
- Suitable for flexoTHERM up to 11 kW
- Two aroCOLLECT units are required for 15 and 19 kW.
- Sockets are now available separately for easy pre-installation (accessories).
- Snow socket for particularly snowy areas, with a suitable design.
- Accessories: Two single sockets + Tichelmann piping set for easy installation.





multiMATIC 700 system controller

- Automatic or manual cooling
- Integrated moisture sensor prevents condensation in cooling mode
- It is possible to actuate another boiler for additional heat generation.
- Different ventilation programmes for recoVAIR and special functions integrated logically into the operating concept



VR 70

The VR 70 module is used to add up to two mixer circuits to a system. (flexoTHERM/flexoCOMPACT can operate a direct heating circuit)

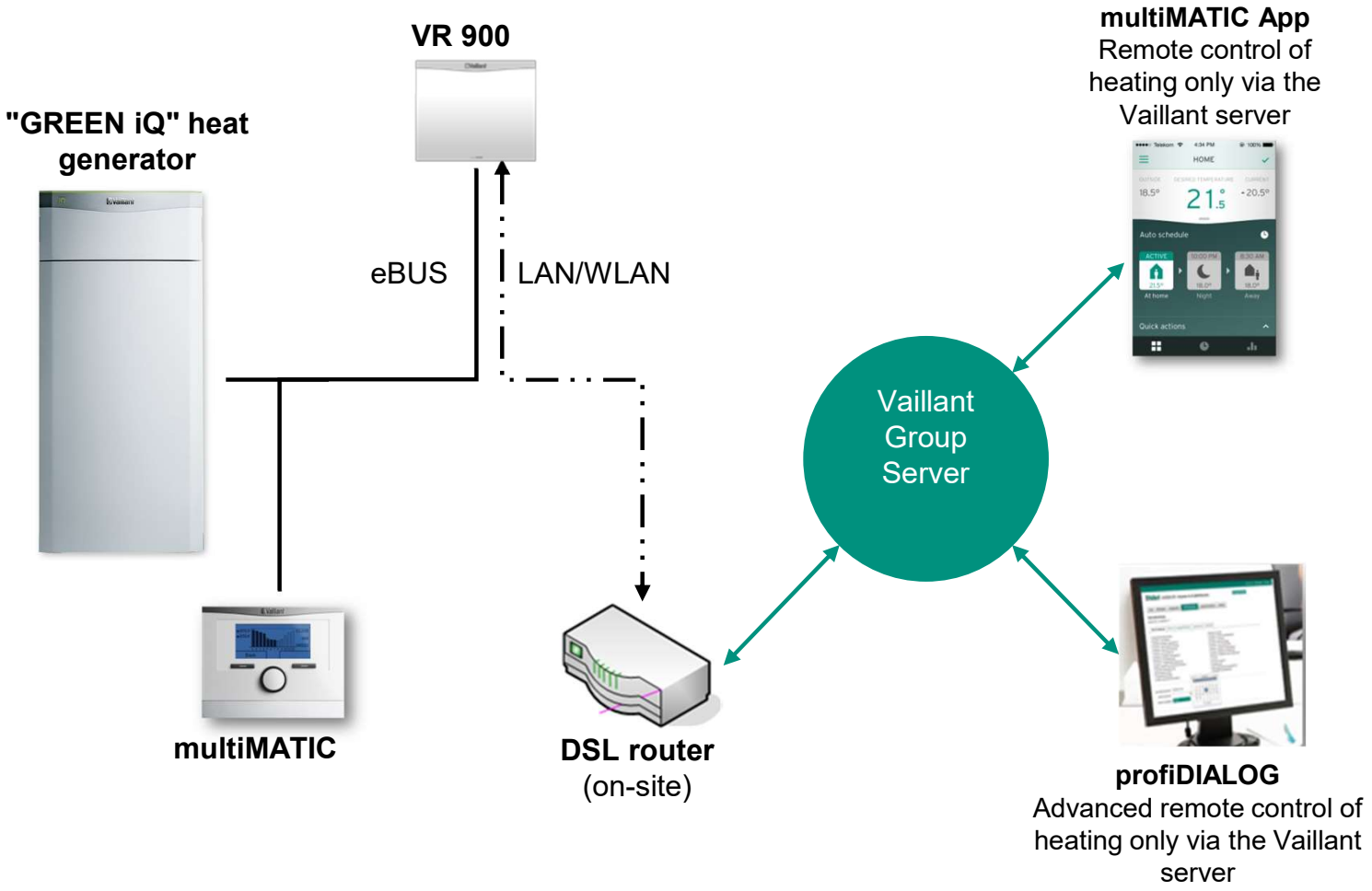
VR 900 Internet communication module

– The VR 900 Internet communication module
is used for remote parameter setting, remote diagnostics and sending alerts to boilers or controllers

– **Requirements:**

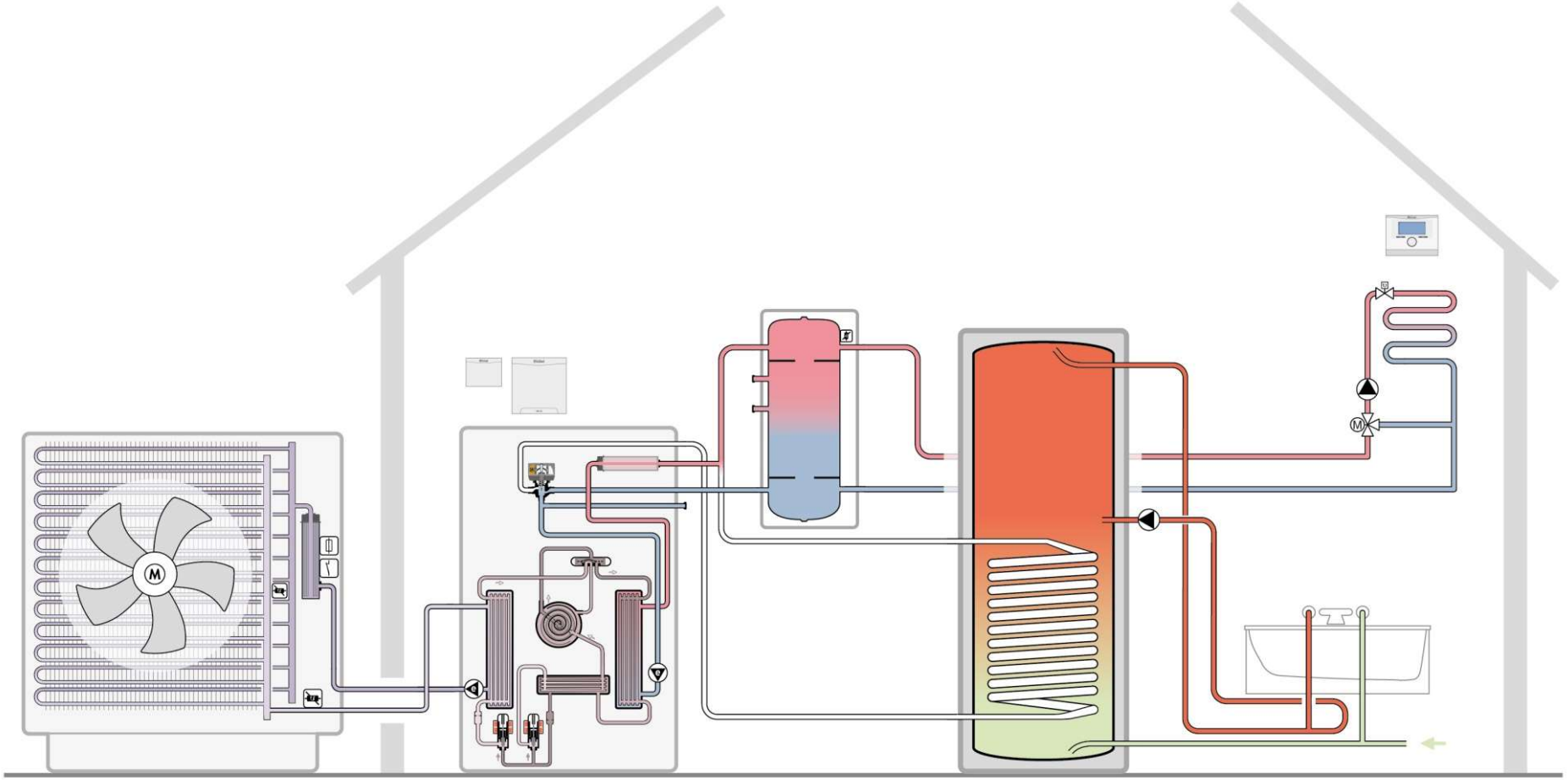
- Vaillant heat generator with eBUS connection only
- Controllers and accessories with eBUS connection only
- Compatible with profiDIALOG, multiMATIC App

System diagram for the VR 900 with a product from the "GREEN iQ" line

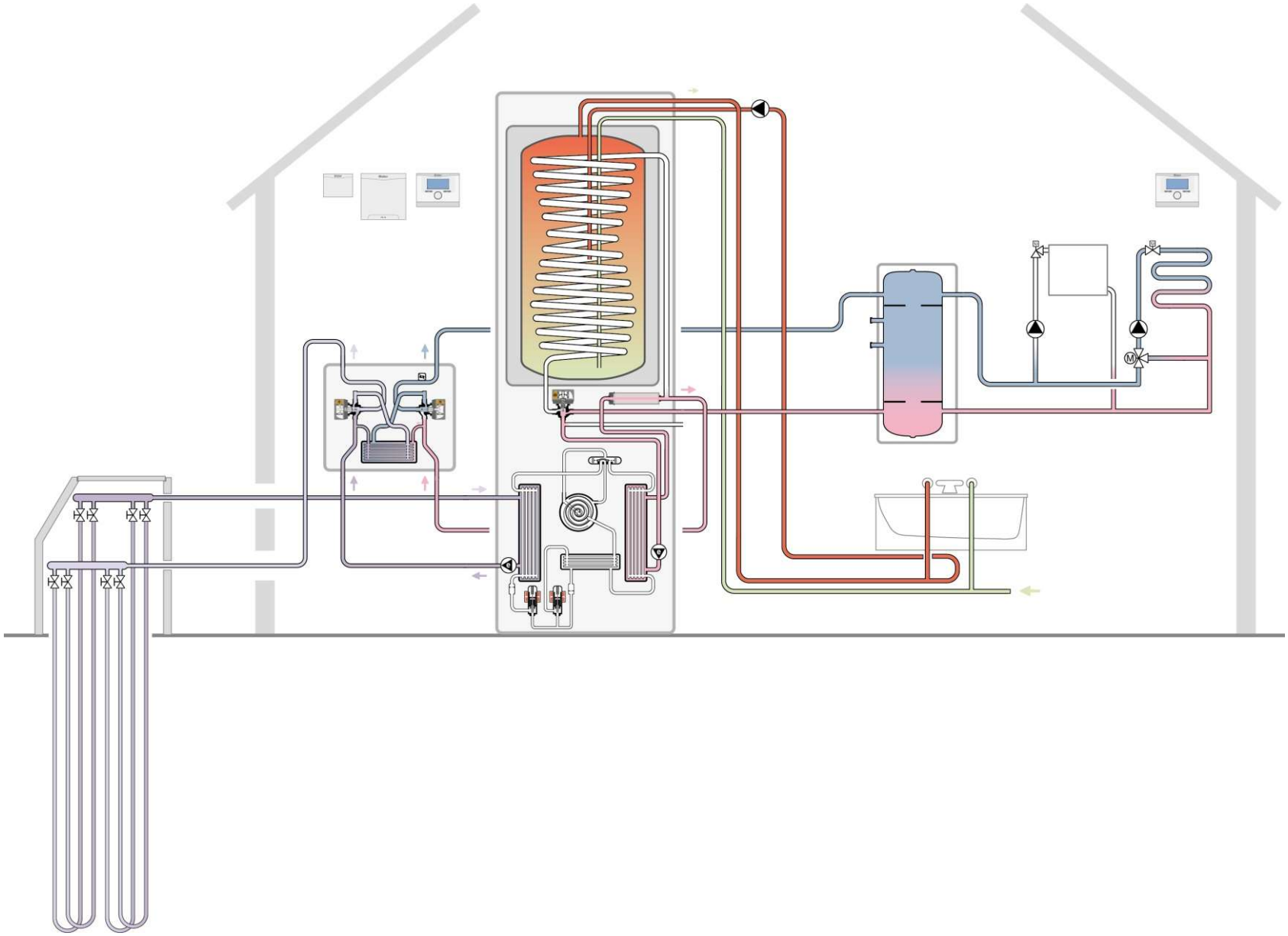


Heat pump system with a heating circuit and external hot water cylinder

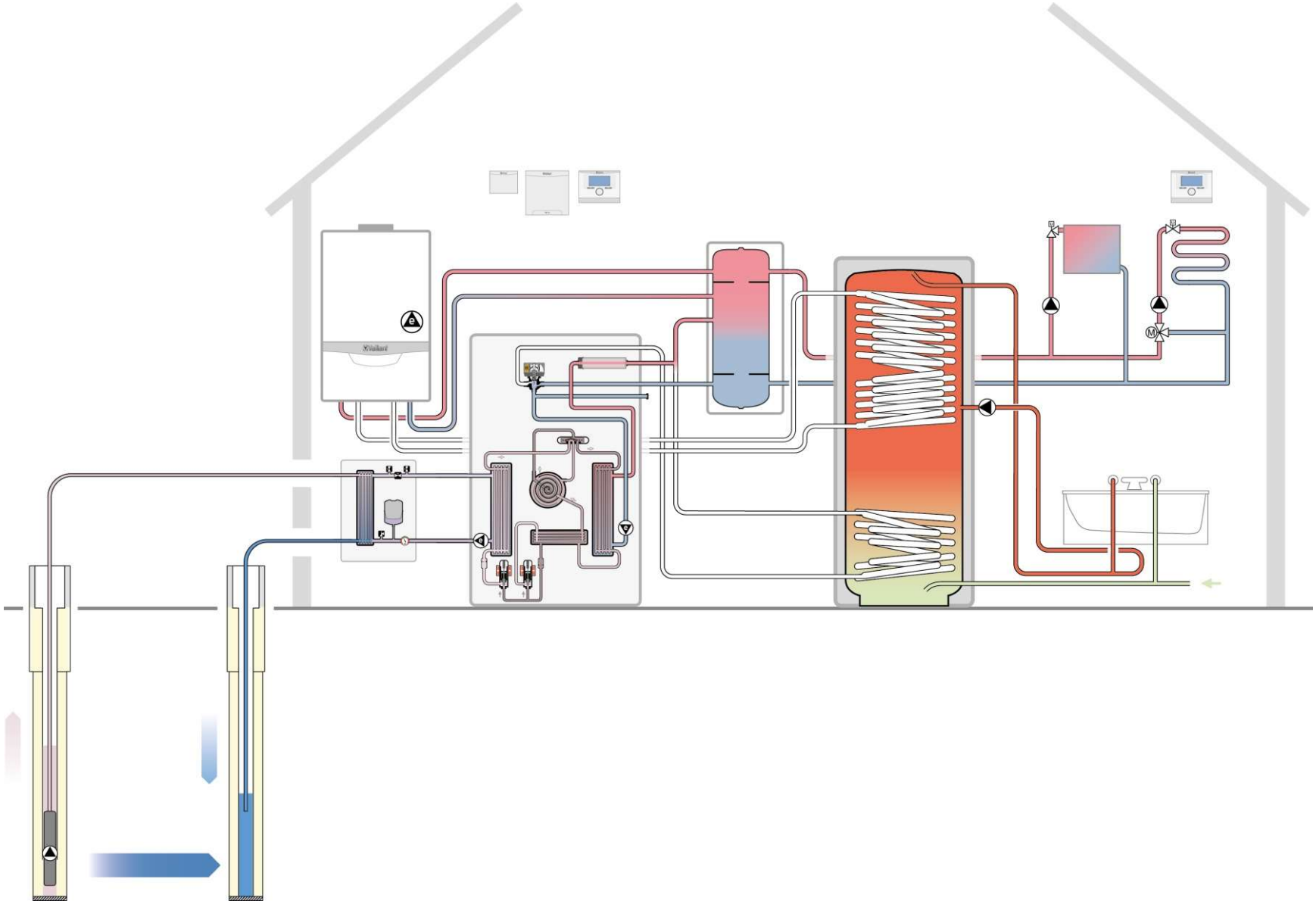
active cooling possible



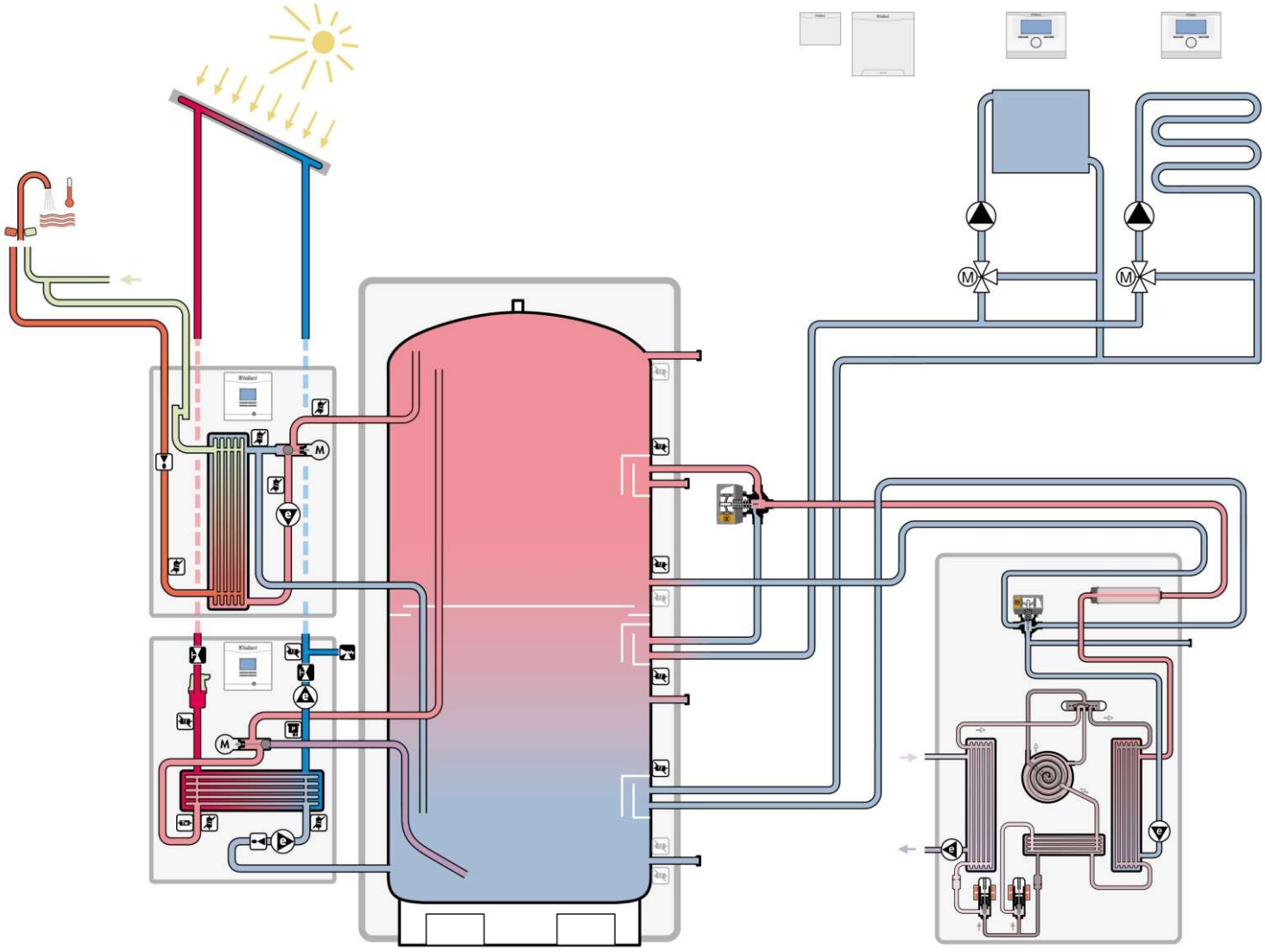
Heat pump system with two heating circuits and passive cooling



Bivalent system with eBUS boiler, heating circuit, bivalent hot water cylinder



flexoTHERM heat pump with multi-function cylinder, solar system, hot water generation via d.h.w. unit and two heating circuits



Product features flexoTHERM exclusive, flexoCOMPACT exclusive

- Fits in perfectly with the new Vaillant design both visually and from a technical point of view
- Standardised operating concept (e.g. ecoTEC exclusive, recoVAIR, ecoCOMPACT)
- Flexible source connection
- Easy installation due to SplitMountingConcept
- Compressor with intermediate vapour injection
- Standard integrated heat meter
- Two EEVs (electronic expansion valve)
- Integrated high-efficiency pumps (efficiency class A)
- Refrigeration circuit in the Soundsafe for noise reduction at the installation site
- Integrated cooling function provides greater living comfort in the summer

Product features flexoTHERM exclusive, flexoCOMPACT exclusive

- Bivalent alternative or parallel operation possible
- triVAI control (always the most cost-effective operation following energy price input)
- Integrated stainless steel cylinder (flexoCOMPACT)
- Hydraulic connection for hot water circulation pump (flexoCOMPACT)
- Hygienic hot water generation in accordance with DIN 1988 at 60 °C in heat pump mode
- Energy efficiency label A++ (A+++ from 2019)
- Green iQ (label stands for connective technologies and sustainable thinking)

Product features aroCOLLECT

- Low-noise EC fan at 47 dB(a) under standard conditions (A7)
- Gentle, harmonious fan start (fan starts up from 0-100% in 1 minute and 40 seconds)
- Adjustable noise reduction operation in heating and cooling mode
- Improved psychoacoustic behaviour thanks to new quiet-running fan motor
- Efficient automatic de-icing with passive/active de-icing function
- Simple installation of the outer unit thanks to a mounting socket
- Flexible positioning of the module = up to a pipe length of 30 m. No insulation of the hydraulic line is necessary
- Low installation costs (PE pipe)
- No heat losses outside the building due to brine being used for heat transfer
- No risk of frost damage in the event of a power cut or at extremely low temperatures

Product features multiMATIC 700

- One concept for all units (gas, oil, heat pumps, etc.)
- Intuitive operation
- Intelligent hybrid management (triVAI parameters or temperature switch points)
- Automatic selection of the most efficient heat generator with triVAI
- Input of energy prices for HT and LT electricity, and tariff for the auxiliary heater
- Noise reduction for the heat pump
- Integrated moisture sensor, e.g. for the cooling function
- Integrated room temperature control (heating and cooling)
- Manual and automatic cooling

Technical data flexoTHERM 1

Technical data	Unit	VWF 57/4	VWF 87/4	VWF 117/4	VWF 157/4	VWF 197/4
Rated voltage control unit		230V/50Hz	230V/50Hz	230V/50Hz	230V/50Hz	230V/50Hz
Rated voltage compressor		400V/50Hz	400V/50Hz	400V/50Hz	400V/50Hz	400V/50Hz
Rated voltage auxiliary heater		400V/50Hz	400V/50Hz	400V/50Hz	400V/50Hz	400V/50Hz
Electrical power consumption: Heating circuit pump at B0/W35	W	16	24	37	44	74
Electrical power consumption: brine pump at B0/W35	W	44	62	64	83	121
Electrical power consumption: auxiliary heater	kW	9	9	9	9	9
Fuse: (Supply compressor, controller and aux. heater)	A	25	25	25	32	32
Fuse: (Supply compressor, controller and)	A	13	13	16	16	25
Fuse: (Supply controller and aux. heater)	A	16	16	16	16	16
Max. operating pressure heating circuit	bar	3	3	3	3	3
Max. operating pressure d.h.w. circuit	bar	10	10	10	10	10
Start-up current (with inrush current limiter)	A	≤ 15	≤ 19	≤ 22	≤ 26	≤ 30
Max. operating current (Supply compressor, controller and aux. heater)	A	20,2	21,2	24,4	26,1	31,2
Max. operating current (Supply compressor, controller)	A	9,0	10,0	13,2	14,9	20,0
Max. operating current (Supply controller and aux. heater)	A	15,2	15,2	15,2	15,2	15,2
Temperature heating (Min / Max)	°C	25 / 65	25 / 65	25 / 65	25 / 65	25 / 65
Volume heating circuit in the heat pump	l	3,2	3,9	4,4	5,8	6,5
Volume heat source circuit in the heat pump	l	2,5	3,1	3,6	4,5	5,3
Dimension without packaging (Height / Width / Depth)	mm	1183 x 595 x 600	1183 x 595 x 600	1183 x 595 x 600	1183 x 595 x 600	1183 x 595 x 600
Wight without packaging	kg	155	170	177	186	198
Hydraulic connection Heating (Flow / return)		G 1 1/2	G 1 1/2	G 1 1/2	G 1 1/2	G 1 1/2
Hydraulic connection Heat source (Flow / return)		G 1 1/2	G 1 1/2	G 1 1/2	G 1 1/2	G 1 1/2

Technical data flexoTHERM 2

Technical data for heat source brine

Technical data (COP measured)	Unit		VWF 57/4	VWF 87/4	VWF 117/4	VWF 157/4	VWF 197/4
Heating output	kW	B0W35	5,3	8,9	11,2	14,4	19,7
Power consumption	kW		1,4	2,0	2,5	3,4	4,7
COP -->EN 14511			**4,6**	**5,1**	**5,0**	**5,0**	**4,7**
Heating output	kW	B0W55	5,3	9,0	11,4	14,7	20,0
Power consumption	kW		2,0	2,9	3,8	5,0	6,6
COP -->EN 14511			**3,0**	**3,3**	**3,2**	**3,3**	**3,2**
Interior noise level	db(A)	B0W35	39,8	42,4	48,5	49,9	48,4
	db(A)	B0W55	40,6	52,1	49,1	48	48,4
ERP Label			A++	A++	A++	A++	A++

Technical data flexoTHERM 3

Technical data for heat source air

Technical data (COP preliminary)	**Einheit**		**VWF 57/4**	**VWF 87/4**	**VWF 117/4**	**VWF 157/4**	**VWF 197/4**
Max. length brine circuit and diameter			Maximum 30m, at DN40 / Maximum 10m at DN32				
Power consumption		A2/ W35	1,3	2,0	2,6	3,4	4,6
COP -->EN 14511			**4,1**	**4,0**	**4,0**	**4,1**	**3,9**
Heating output			5,4	7,7	10,6	13,9	17,9
Power consumption		A2/ W55	2,2	2,9	3,9	4,9	6,8
COP -->EN 14511			**2,8**	**2,8**	**2,8**	**2,9**	**2,8**
Heating output			6,0	8,3	10,8	14,0	18,8
Power consumption		A7/ W35	1,3	2,0	2,8	3,4	4,6
COP -->EN 14511			**3,2**	**3,1**	**3,1**	**3,2**	**3,2**
Heating output			4,1	6,2	8,8	11,1	14,7
Power consumption		A10/ W35	1,3	1,9	2,5	3,2	4,4
COP -->EN 14511			**5,0**	**4,9**	**4,9**	**5,0**	**4,7**
Heating output			6,4	9,0	12,4	16,1	20,7
Cooling output active cooling		A35/ W18	5,9	8,7	12,5	16,1	20,6
Power consumption			1,8	2,7	3,3	4,2	6,5
EER -->EN 14511			**3,3**	**3,3**	**3,5**	**3,9**	**3,2**
Interior noise level	db(A)	A7/ W35	40	43	46	47	42
ERP Label			A++	A++	A++	A++	A++

Technical data flexoTHERM 4

Technical data for heat source groundwater

Technical data (COP preliminary)	Einheit		VWF 57/4	VWF 87/4	VWF 117/4	VWF 157/4	VWF 197/4
			+	+	+	+	+
			VWW 11/4	VWW 11/4	VWW 11/4	VWW 19/4	VWW 19/4
Max. length brine circuit and diameter			Maximum 30m, at DN40 / Maximum 10m at DN32				
Power consumption		W10 W35	1,1	1,8	2,4	3,1	4,4
COP -->EN 14511			**5,5**	**5,5**	**5,6**	**5,6**	**5,3**
Heating output			6,3	9,9	13,5	17,6	23,4
Power consumption		W10 W55	1,7	2,9	4,0	4,9	7,2
COP -->EN 14511			**3,4**	**3,5**	**3,4**	**3,5**	**3,3**
Heating output			5,8	10,2	13,5	17,1	23,8
ERP Label			A++	A++	A++	A++	A++

Technical data flexoCOMPACT 1

Technical data	Unit	VWF 58/4	VWF 88/4	VWF 118/4
Rated voltage control unit		230V/50Hz	230V/50Hz	230V/50Hz
Rated voltage compressor		400V/50Hz	400V/50Hz	400V/50Hz
Rated voltage auxiliary heater		400V/50Hz	400V/50Hz	400V/50Hz
Electrical power consumption: Heating circuit pump at B0/W35	W	16	24	37
Electrical power consumption: brine pump at B0/W35	W	44	62	64
Electrical power consumption: auxiliary heater	kW	9	9	9
Fuse: (Supply compressor, controller and aux. heater)	A	25	25	25
Fuse: (Supply compressor, controller and)	A	13	13	16
Fuse: (Supply controller and aux. heater)	A	16	16	16
Max. operating pressure heating circuit	bar	3	3	3
Max. operating pressure d.h.w. circuit	bar	10	10	10
Start-up current (with inrush current limiter)	A	≤ 15	≤ 19	≤ 22
Max. operating current (Supply compressor, controller and aux. heater)	A	20,2	21,2	24,4
Max. operating current (Supply compressor, controller)	A	9,0	10,0	13,2
Max. operating current (Supply controller and aux. heater)	A	15,2	15,2	15,2

Technical data flexoCOMPACT 2

Technical data	Unit	VWF 58/4	VWF 88/4	VWF 118/4
Temperature heating (Min / Max)	°C	25 / 65	25 / 65	25 / 65
Temperature d.h.w. (Min / Max with aux. heater)	°C	55 / 75	55 / 75	55 / 75
Max. d.h.w. temperature with heat pump at B0	°C	61	60	60
Volume heating circuit in the heat pump	l	15,4	16,1	16,5
Volume heat source circuit in the heat pump	l	2,5	3,1	3,6
Cylinder volume for heat pumps with integrated cylinder	l	185	185	185
Gross cylinder volume - for heat pumps with integrated cylinder	l	184,1	184,1	184,1
Net cylinder volume - for heat pumps with integrated cylinder	l	171,2	171,2	171,2
Dimension without packaging (Height / Width / Depth)	mm	1868 x 595 x 720	1868 x 595 x 720	1868 x 595 x 720
Wight without packaging	kg	223	238	245
Hydraulic connection Heating (Flow / return)		G 1 1/2	G 1 1/2	G 1 1/2
Hydraulic connection Heat source (Flow / return)		G 1 1/2	G 1 1/2	G 1 1/2
Hydraulic connection d.c.w., d.h.w., circulation		G 3/4	G 3/4	G 3/4

Technical data flexoCOMPACT 3

Technical data for heat source brine

Technical data (COP measured)	Unit		VWF 58/4	VWF 88/4	VWF 118/4
Heating output	kW	B0W35	5,3	8,9	11,2
Power consumption	kW		1,4	2,0	2,5
COP -->EN 14511			**4,6**	**5,1**	**5,0**
Heating output	kW	B0W55	5,3	9,0	11,4
Power consumption	kW		2,0	2,9	3,8
COP -->EN 14511			**3,0**	**3,3**	**3,2**
Interior noise level	db(A)	B0W35	40	43	47
	db(A)	B0W55	43	47	48
Permanent d.h.w. flow rate with tapping temperature > 40°C	l/min		2,4	3,83	5,5
Power input during standby period at cylinder set temp. 50°C and 6 K hysteresis acc. to DIN EN 16147	kW		0,026	0,026	0,026
Standby heat loss d.h.w. cylinder at cylinder set temp. 53°C and 5 K hysteresis	kWh/24 h		0,86	0,86	0,86
Tapping profile according to ErP			XL	XL	XL
ErP Label heating			A++	A++	A++
ErP Label D.h.w.			A	A	A
Mixed d.h.w. flow rate 40°C cylinder set temp. 50°C	l		228	228	228
Mixed d.h.w. flow rate 40°C cylinder set temp. 53°C	l		256	256	256
Performance number (B0 / ΔT Heating circuit = 5K)			1,2	1,5	1,7

Technical data flexoCOMPACT 4

Technical data for heat source air

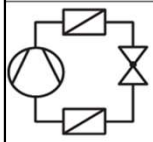
Technical data (COP preliminary)	Units		VWF 58/4	VWF 88/4	VWF 118/4
Max. length brine circuit and diameter			maximal 30m, at DN40 / maximal 10m at DN32		
Power consumption		A2W35	1,3	2,0	2,6
COP -->EN 14511			**4,1**	**4,0**	**4,0**
Heating output			5,4	7,7	10,6
Power consumption		A2W55	2,2	2,9	3,9
COP -->EN 14511			**2,8**	**2,8**	**2,8**
Heating output			6,0	8,3	10,8
Power consumption		A-7W35	1,3	2,0	2,8
COP -->EN 14511			**3,2**	**3,1**	**3,1**
Heating output			4,1	6,2	8,8
Power consumption		A10/W35	1,3	1,9	2,5
COP -->EN 14511			**5,0**	**4,9**	**4,9**
Heating output			6,4	9,0	12,4
Cooling output active cooling		A35W18	5,9	8,7	12,5
Power consumption			1,8	2,7	3,3
EER -->EN 14511			**3,3**	**3,3**	**3,5**
Interior noise level	db(A)	A7W35	41	43	47
	db(A)	A7W55	44	47	48
Tapping profile according to ErP			XL	XL	XL
ERP Label Heating			A++	A++	A++
Mixed d.h.w. flow rate 40°C cylinder set temp. 53°C	l		256	256	256
ERP Label D.h.w.			A	A	A

Technical data flexoCOMPACT 4

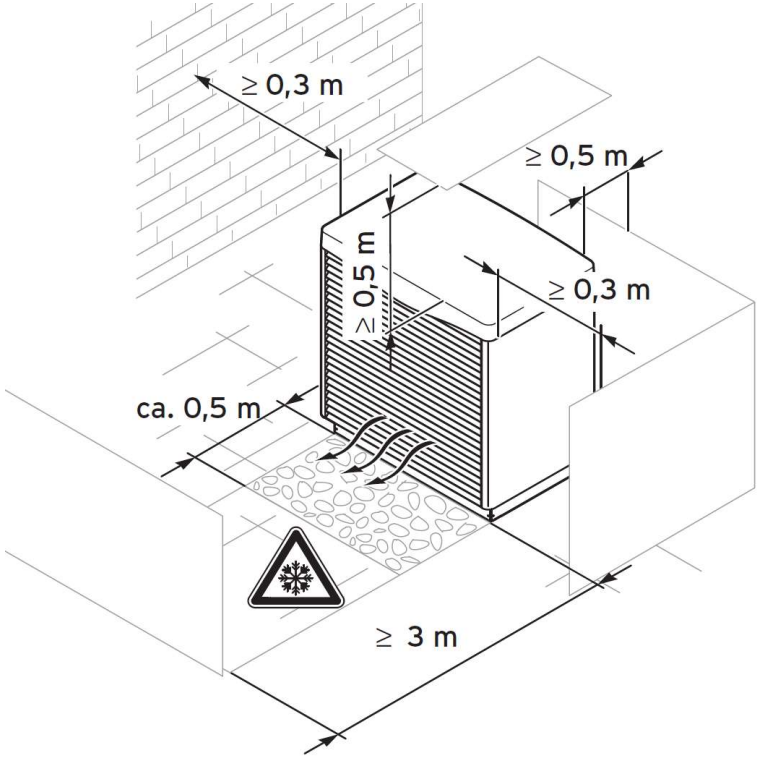
Technical data for heat source groundwater

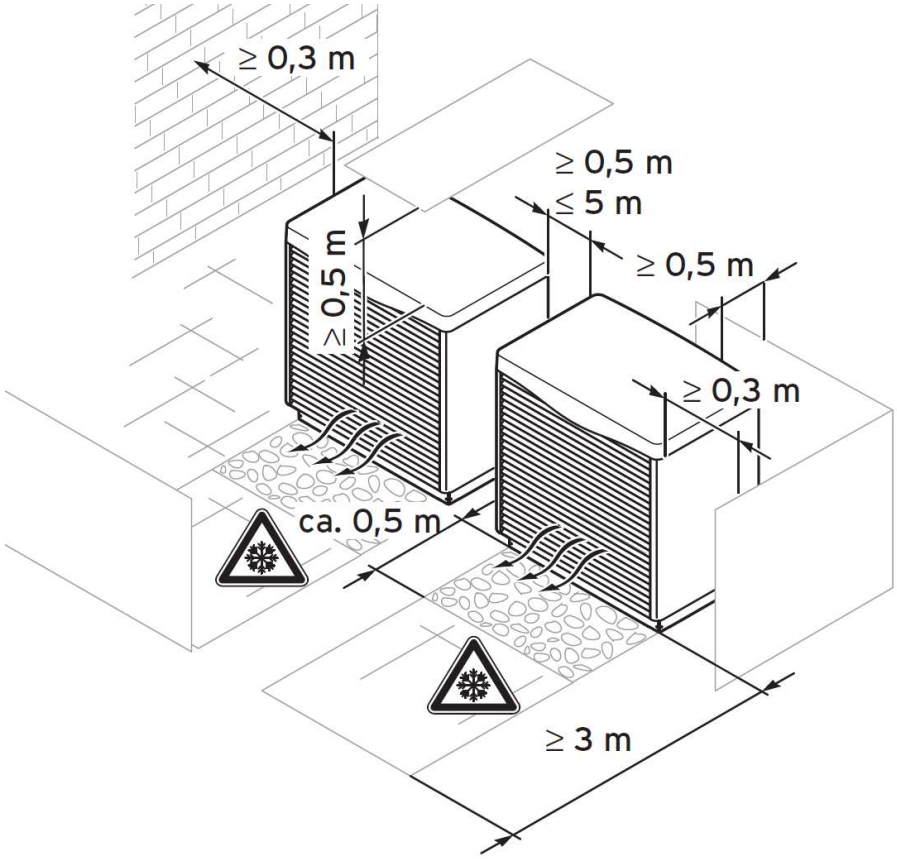
Technical data (COP preliminary)	Unit		VWF 58/4	VWF 88/4	VWF 118/4
Max. length brine circuit and diameter			maximum 30m,to DN40 / maximum10m to DN32		
Power consumption		W10/W35	1,1	1,8	2,4
COP -->EN 14511			**5,5**	**5,5**	**5,6**
Heating output			6,3	9,9	13,5
Power consumption		W10/W55	1,7	2,9	4,0
COP -->EN 14511			**3,4**	**3,5**	**3,4**
Heating output			5,8	10,2	13,5
Tapping profile according to ErP			XL	XL	XL
ERP Label Heating			A++	A++	A++
Mixed d.h.w. flow rate 40°C cylinder set temp. 53°C	l		256	256	256
ERP Label D.h.w.			A	A	A

Identification plate

Information on the identification plate	Meaning
	Measuring voltage of the compressor, pumps and controllers
P 	Measuring voltage of the auxiliary heating
P max	Maximum rated power
I max	Maximum start-up current
	Refrigerant type, fill quantity, permissible rated overpressure
COP B0/W35	Output figure (coefficient of performance) at a brine temperature of 0 °C and heating flow temperature of 35 °C
COP B5/W35	Output figure (coefficient of performance) at a brine temperature of 5 °C and heating flow temperature of 35 °C
 B0/W35	Heating output at a brine temperature of 0 °C and heating flow temperature of 35 °C
 B5/W35	Heating output at a brine temperature of 5 °C and heating flow temperature of 35 °C
Volt	Supply voltage
Hz	Power frequency
W	Power consumption
IP	Protection class
CE label	→ "CE label" section
	Information on disposal
	Barcode with serial number, 7th to 16th digits = product article number
	Read the instructions

Minimum clearances for one and two outer units

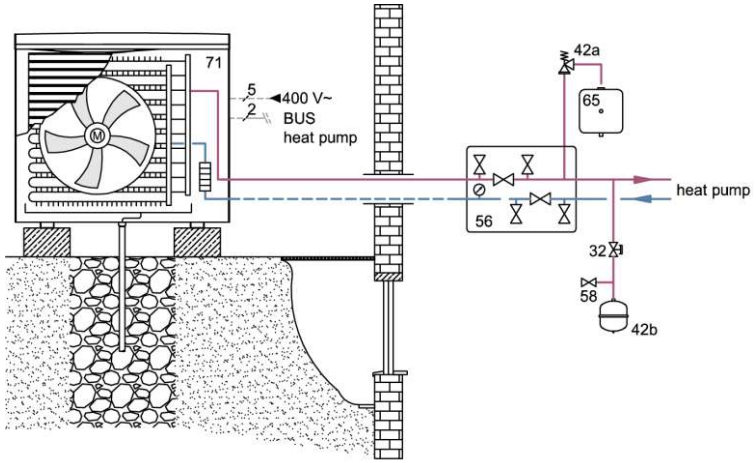




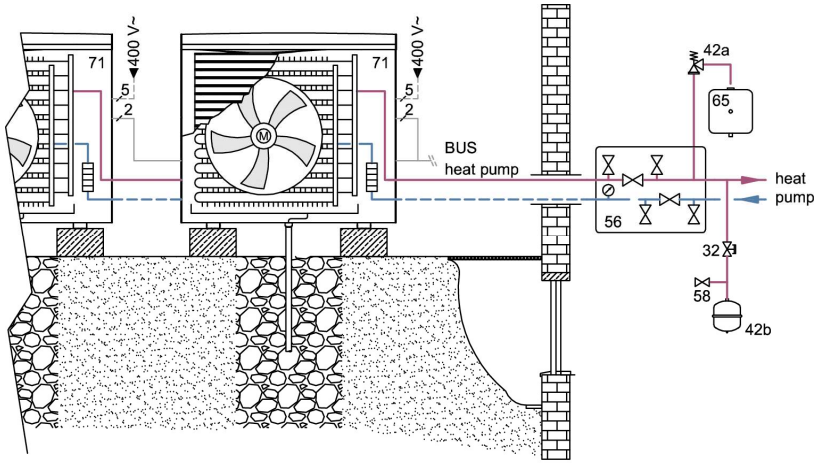
System configuration with multiMATIC 700, VR 70 and heat pump

System diagram for flexoTHERM flexoCOMPACT		No VR 70	VR 70 configuration for flexoTHERM			
			1	3	5	6
			2 heating circuits	allSTOR	2 heating circuits	Solar hot water
		1 direct heating circuit	1 direct and 1 mixed heating circuit	1 direct and 1 mixed heating circuit	2 mixed heating circuits	1 direct heating circuit
8	Standard HP system, AH requires HP, mono-energy (DHW via HP and AH)	☺	☺	☺ Mono-energy only	☺	☺ Mono-energy only
9	Simple hybrid system, AH in the HP not active, DHW only via auxiliary boiler	☹	☺	☹	☺	☹
12	Full hybrid system, AH in the HP not active Heating and DHW via HP and auxiliary boiler	☹	☺	☹	☺	☹

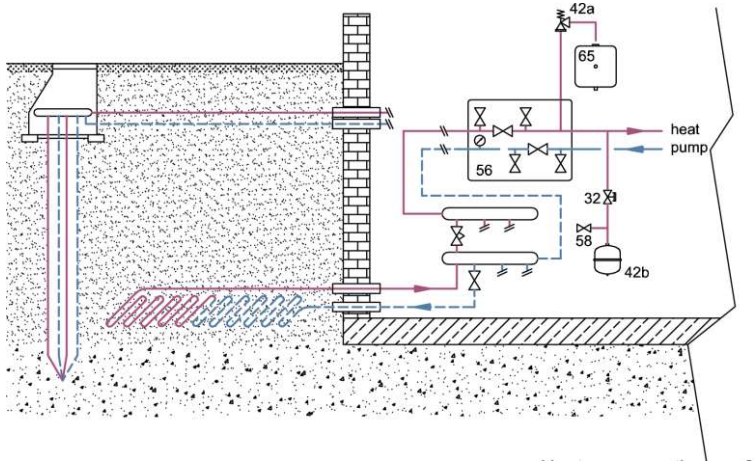
Source plans



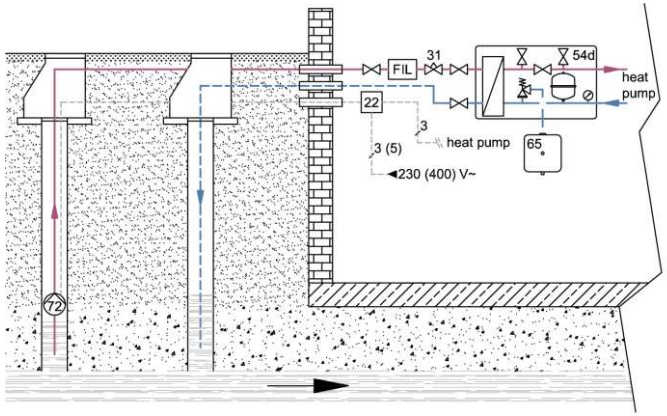
Heat source option 1: Air, 1 outdoor unit



Heat source option 2: Air, 2 outdoor units

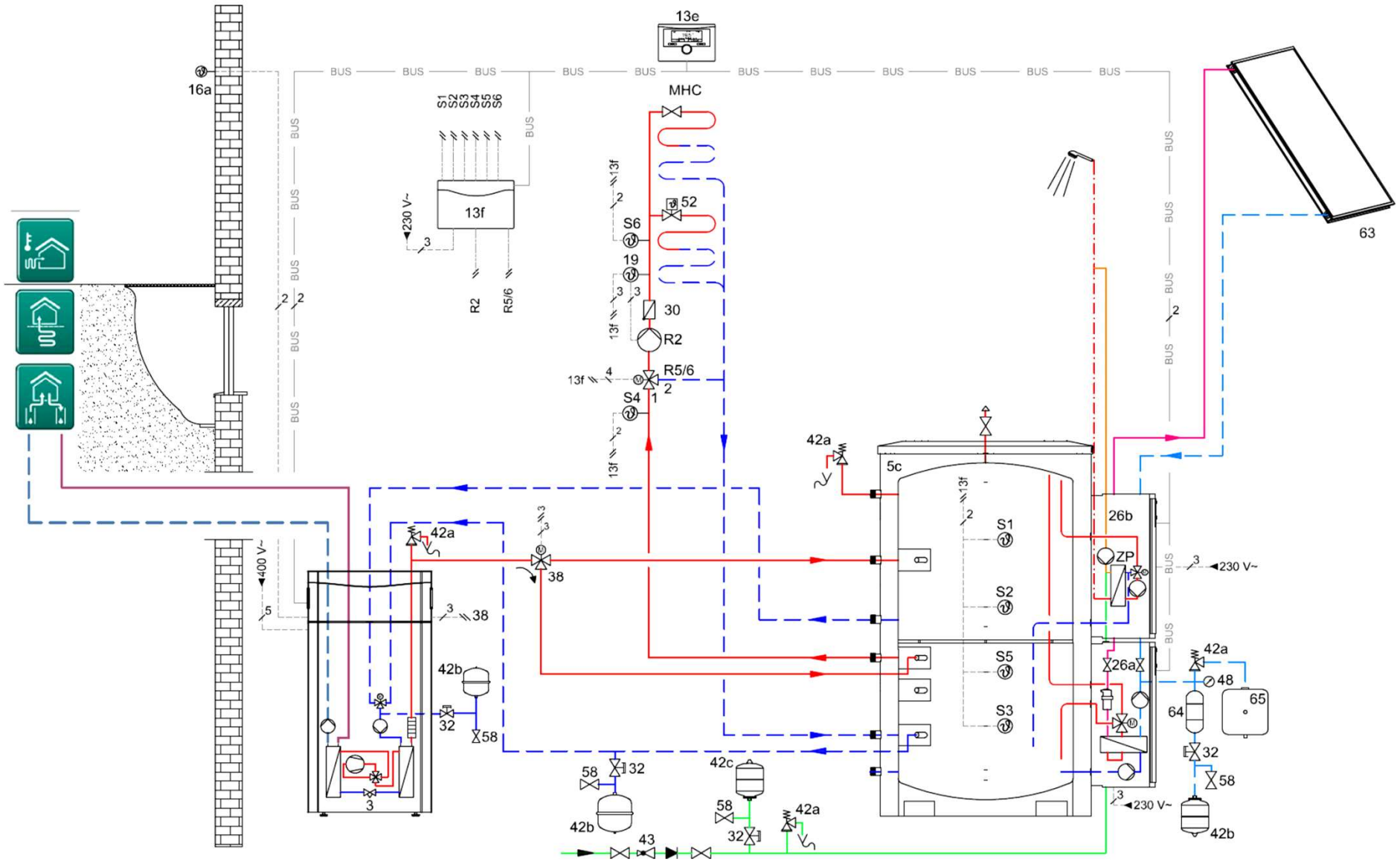


Heat source option 3: Brine borehole, horizontal collector



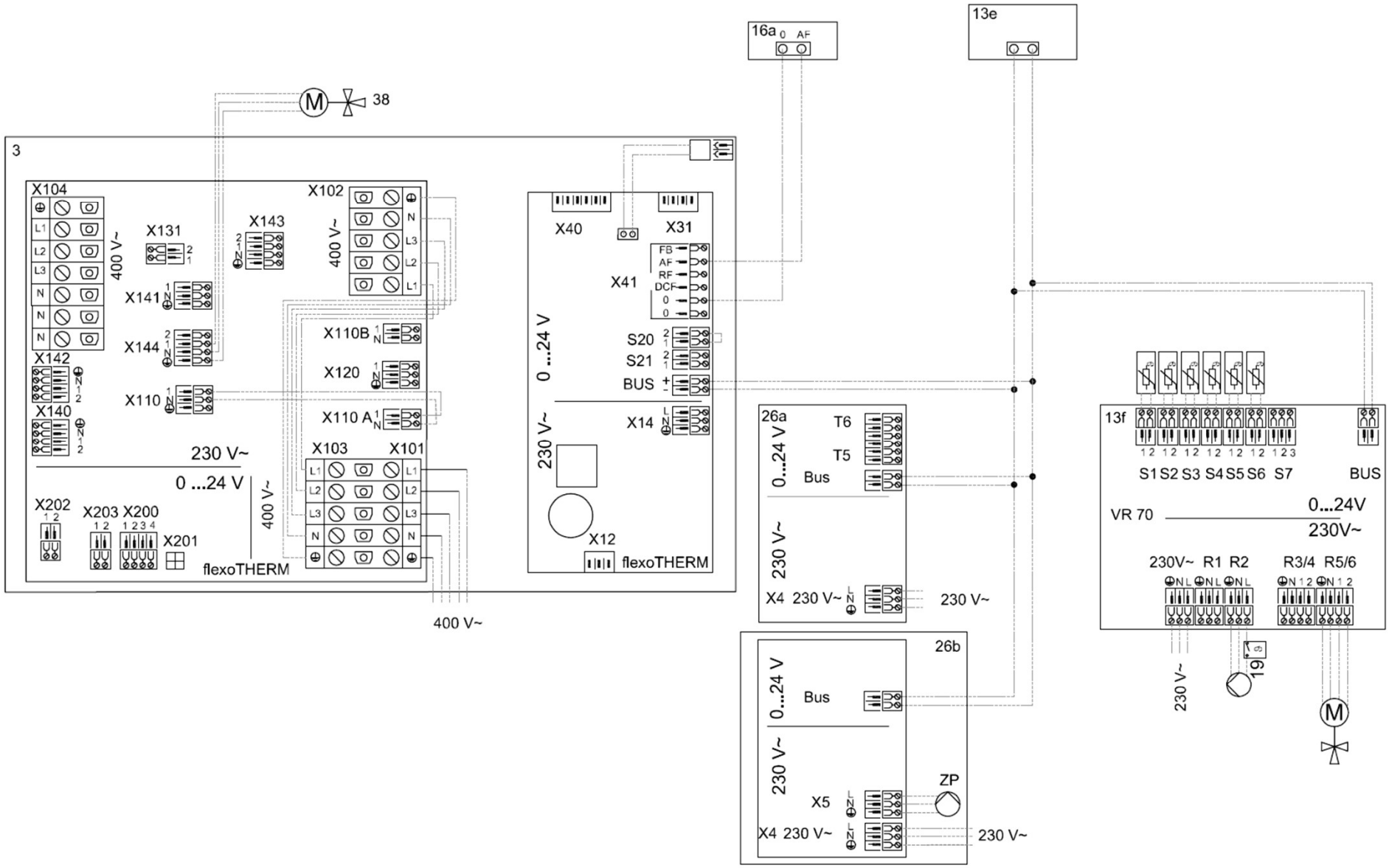
Heat source option 4: Groundwater, fluoCOLLECT required

Example 1: System diagram for flexoTHERM exclusive VWF ..7/4

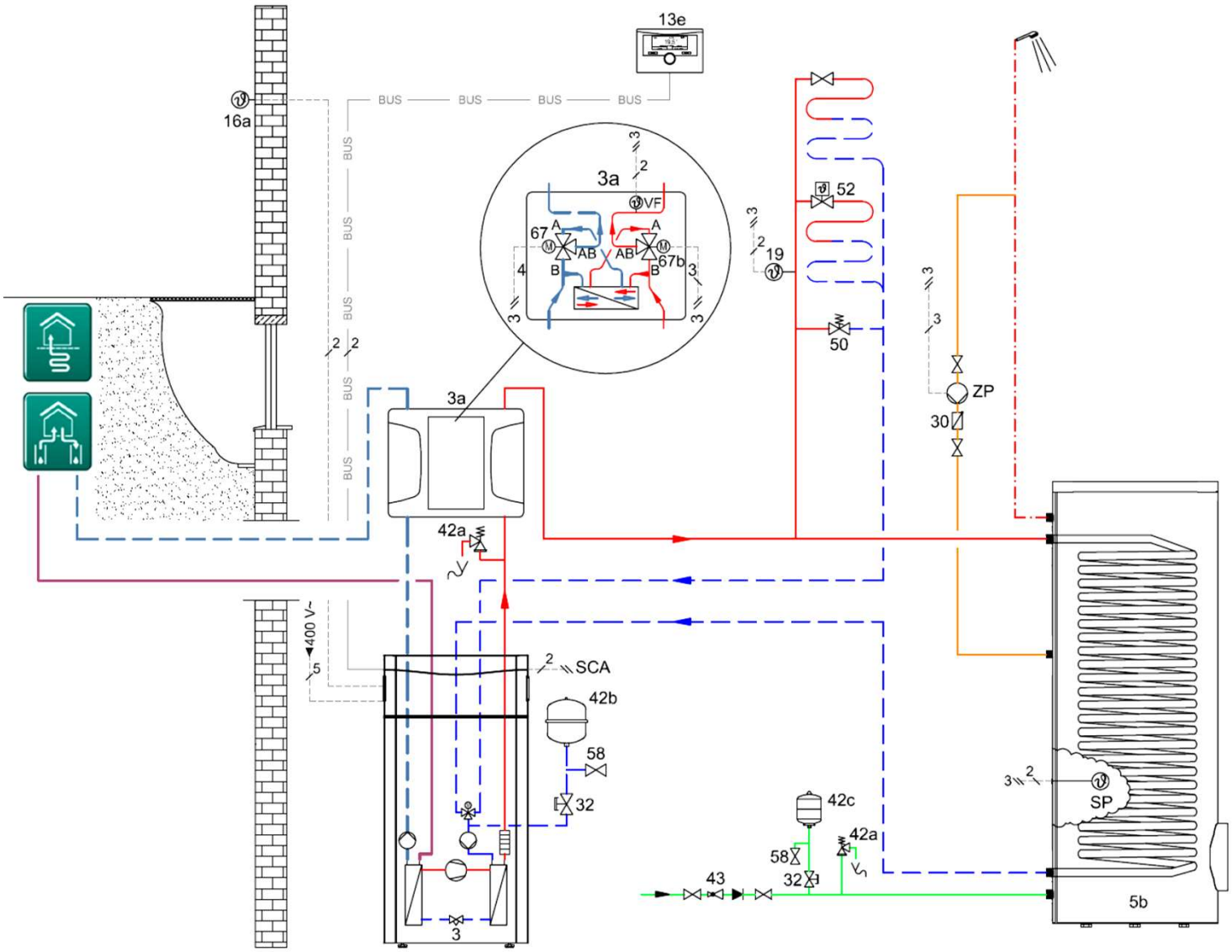


System diagram = 8 Config. VR 70 = 3

Example 1: Connection diagram for flexoTHERM exclusive VWF ..7/4

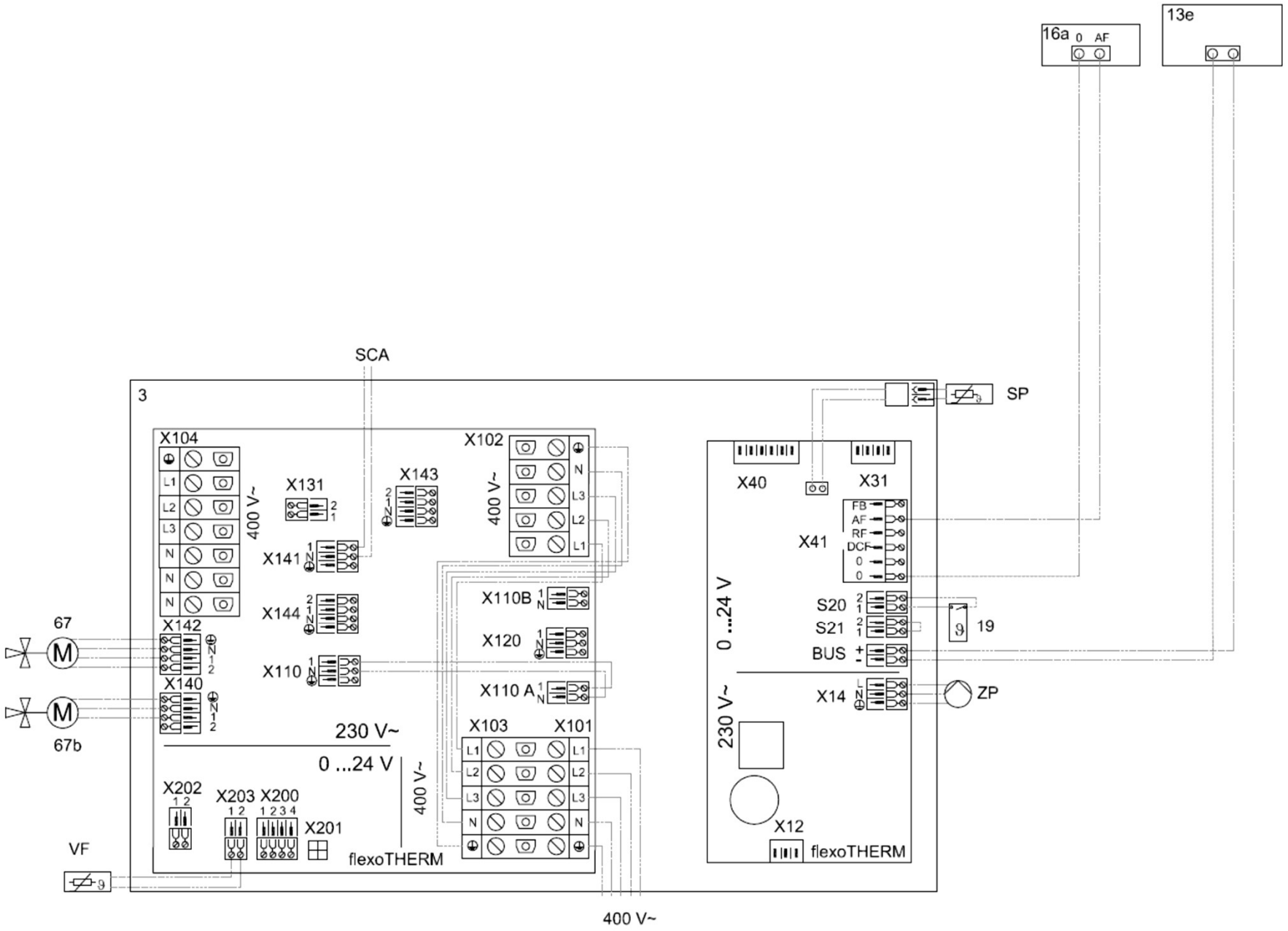


Example 2: System diagram for flexoTHERM exclusive VWF ..7/4

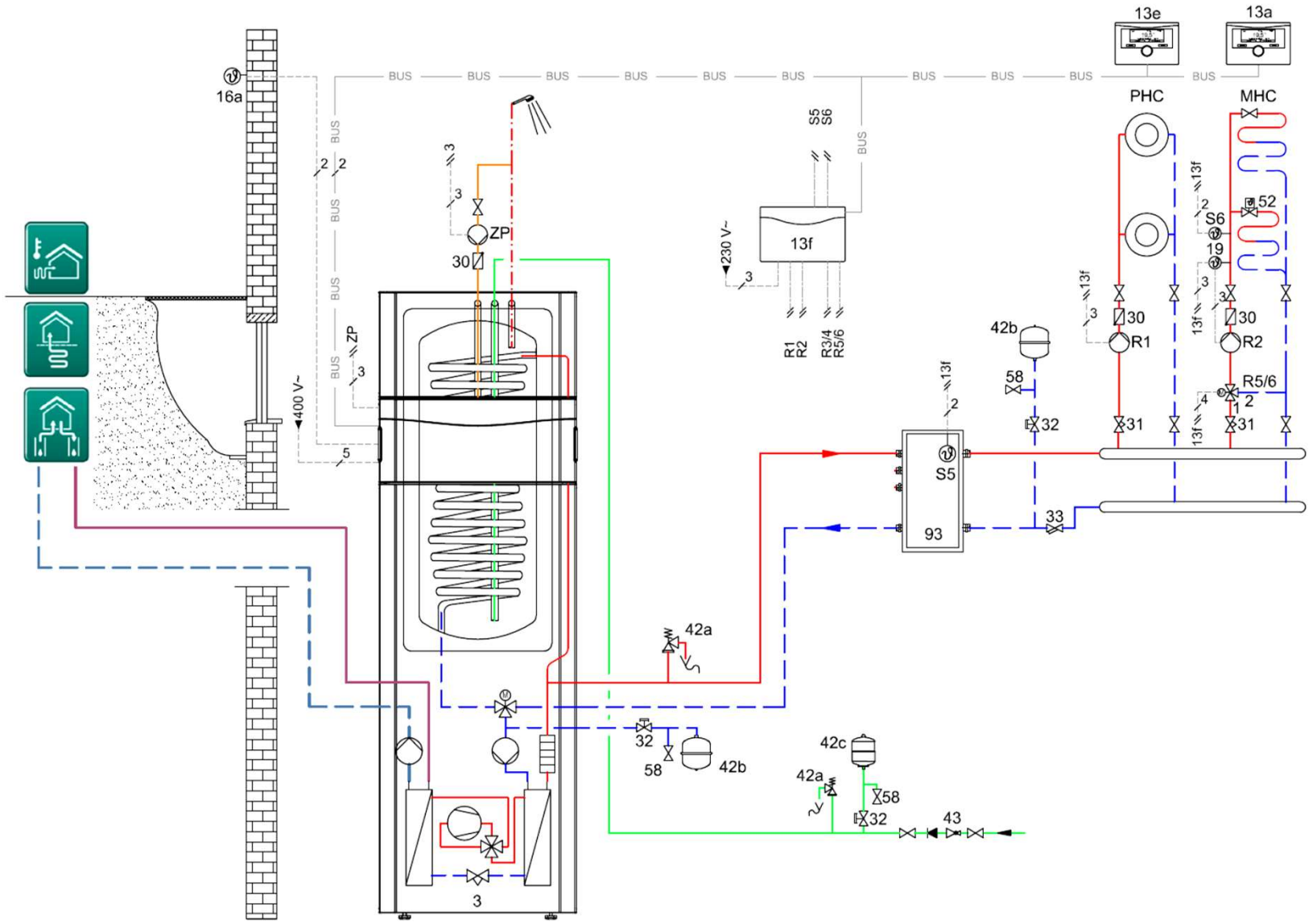


System diagram= 8 No VR 70

Example 2: Connection diagram for flexoTHERM exclusive VWF ..7/4

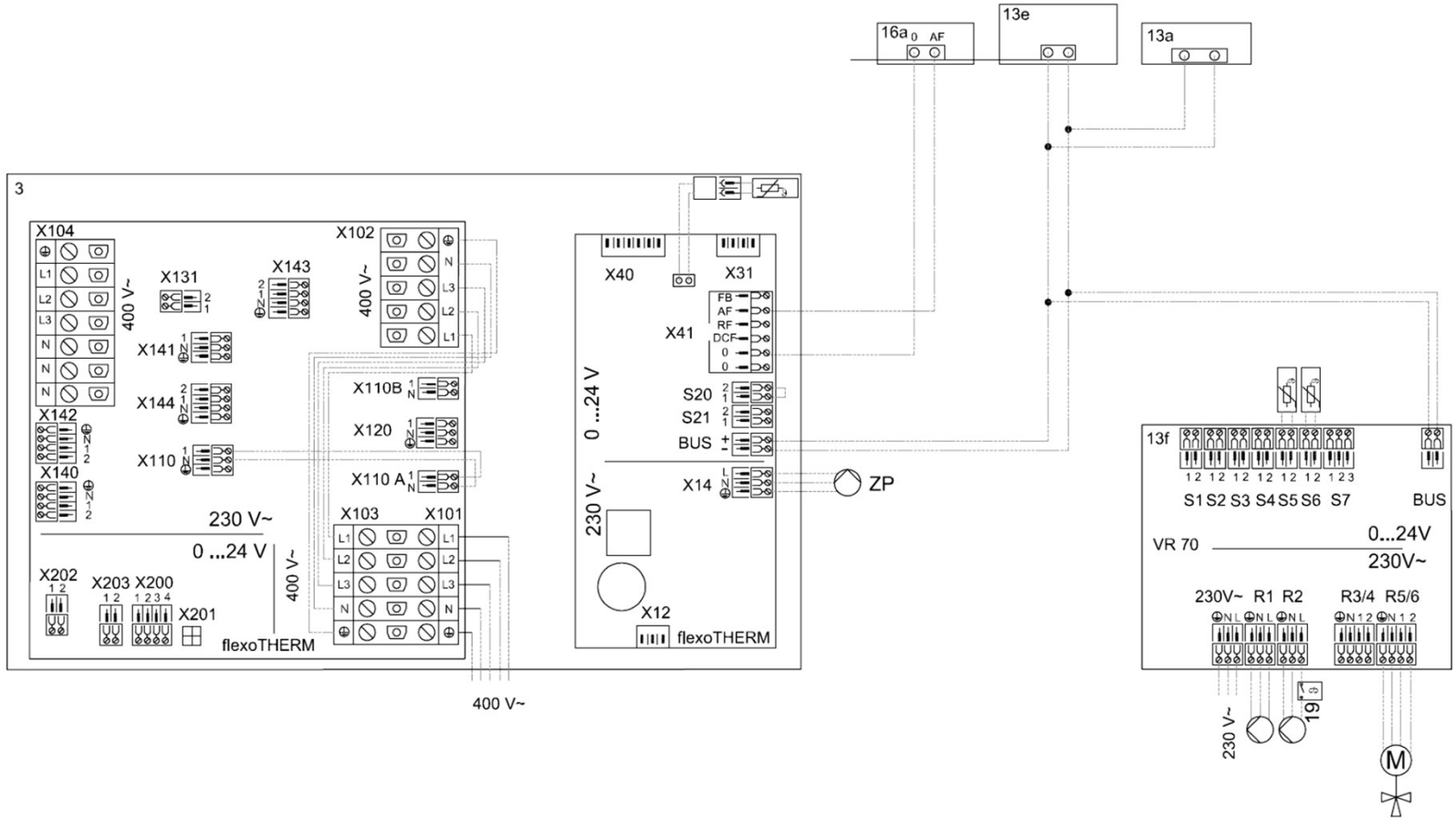


Example 3: System diagram for flexoCOMPACT exclusive VWF ..8/4

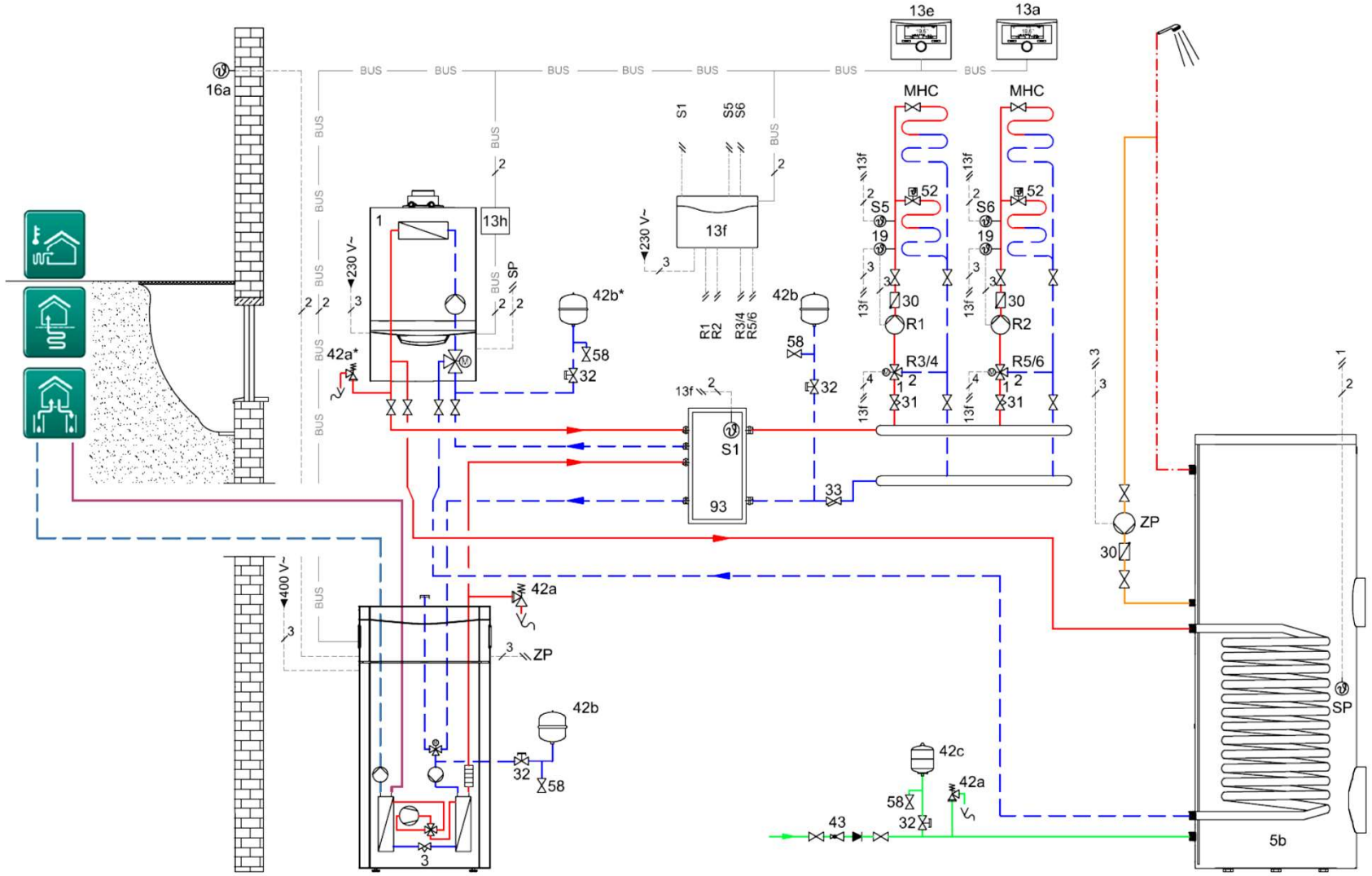


System diagram = 8 Config. VR 70 = 1

Example 3: Connection diagram for flexoTHERM exclusive VWF ..7/4

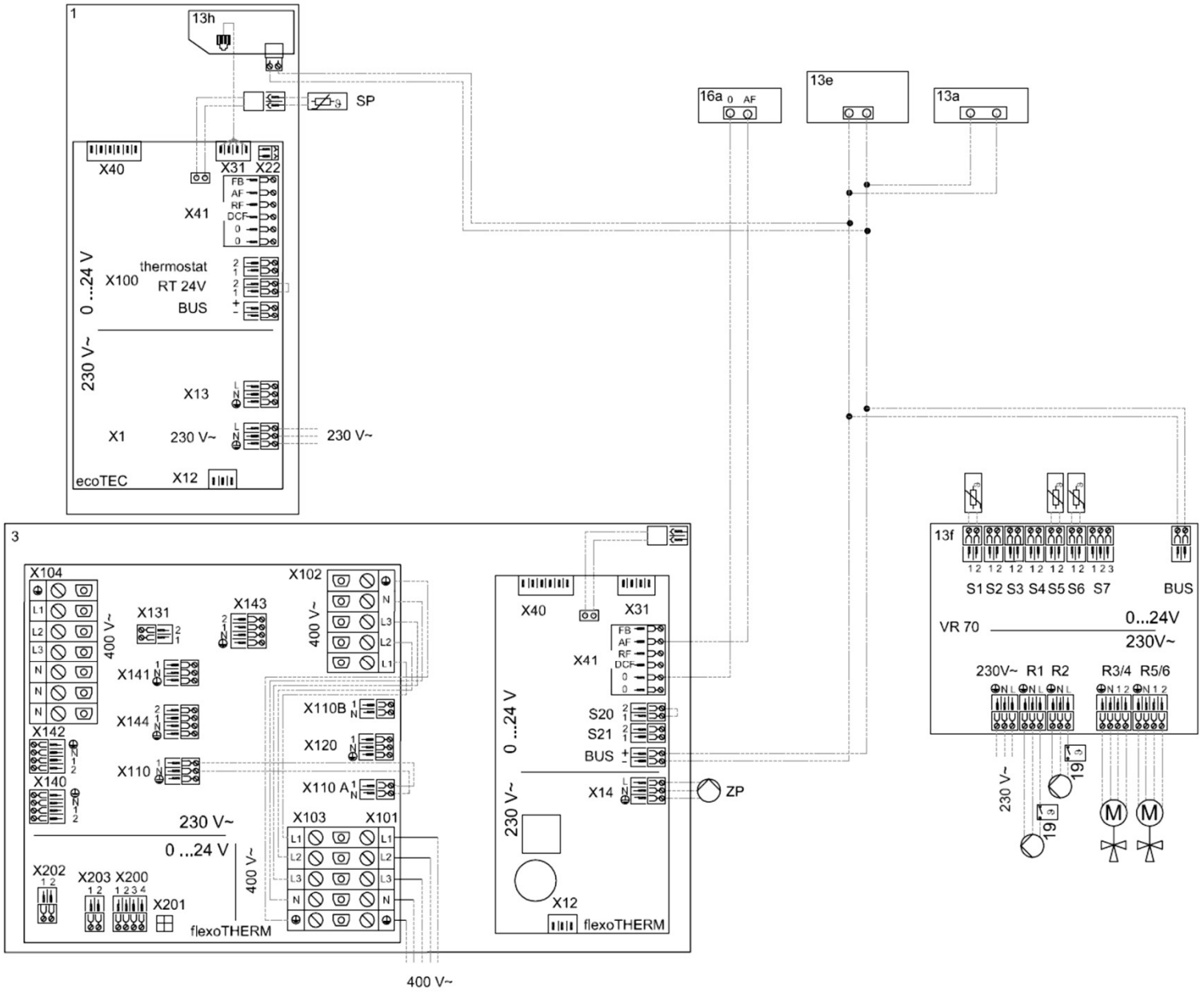


Example 4: System diagram for flexoTHERM exclusive VWF ..7/4

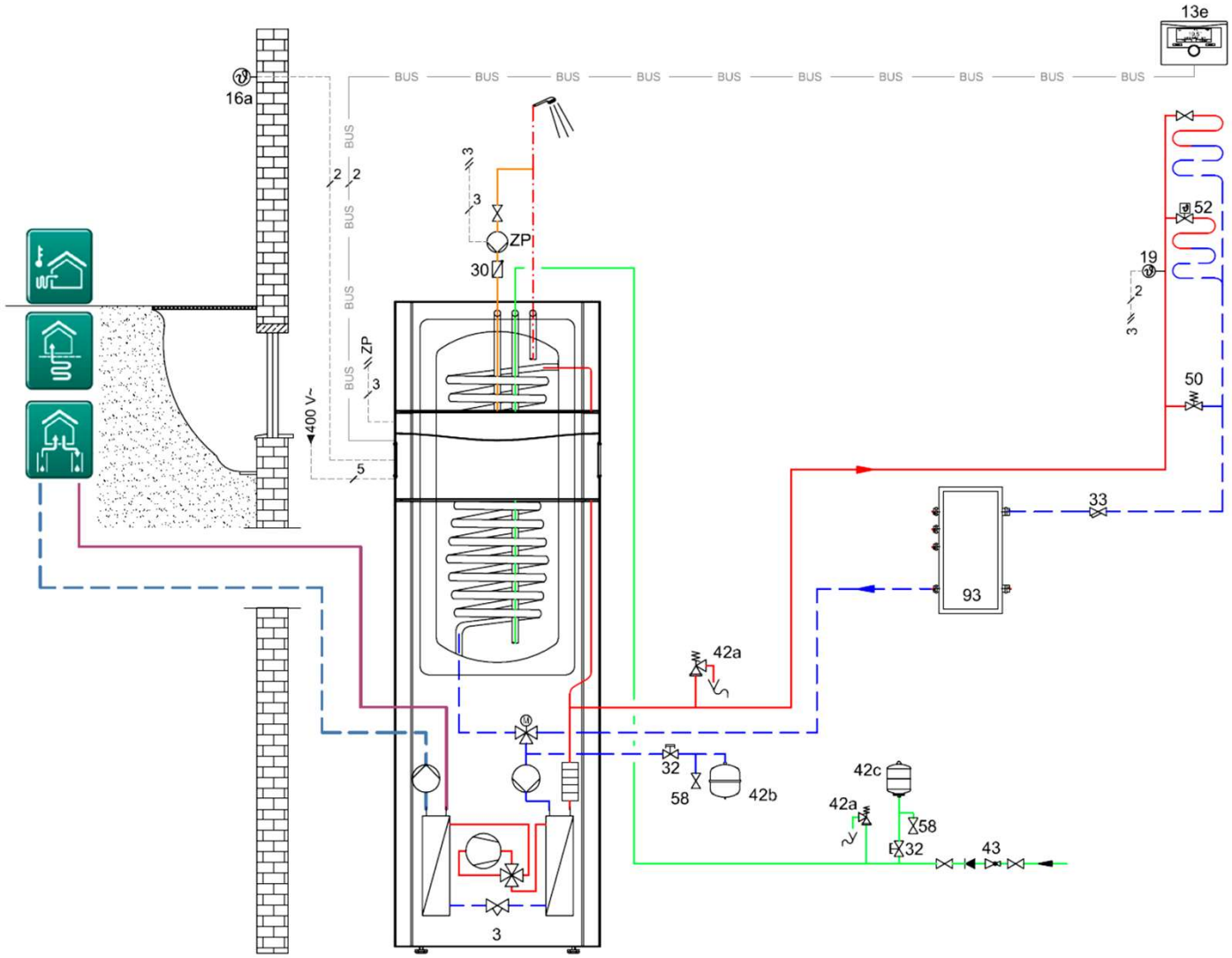


System diagram = 9 Config. VR 70 = 5

Example 4: Connection diagram for flexoTHERM exclusive VWF ..7/4

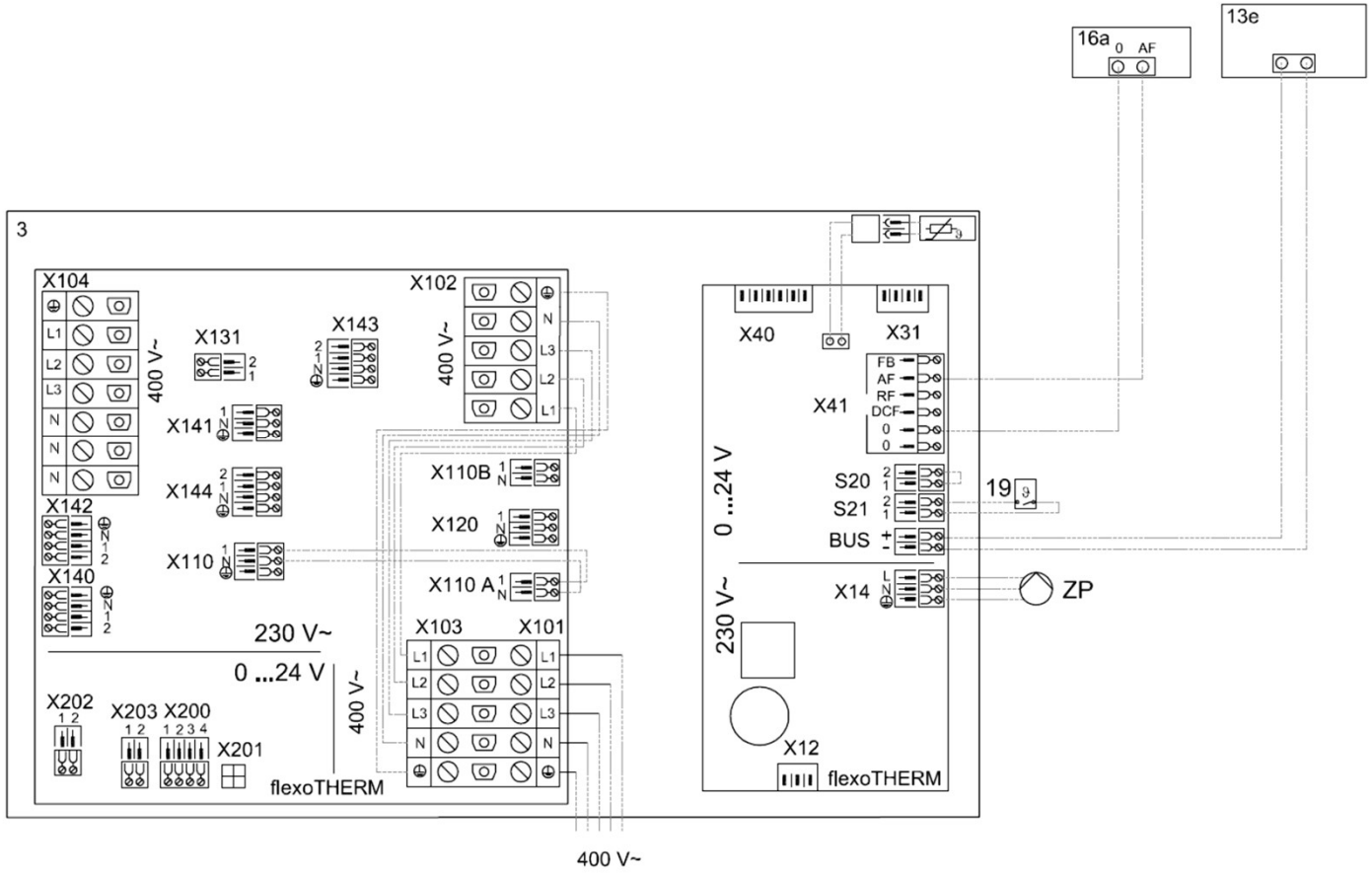


Example 5: System diagram for flexoCOMPACT exclusive VWF ..8/4

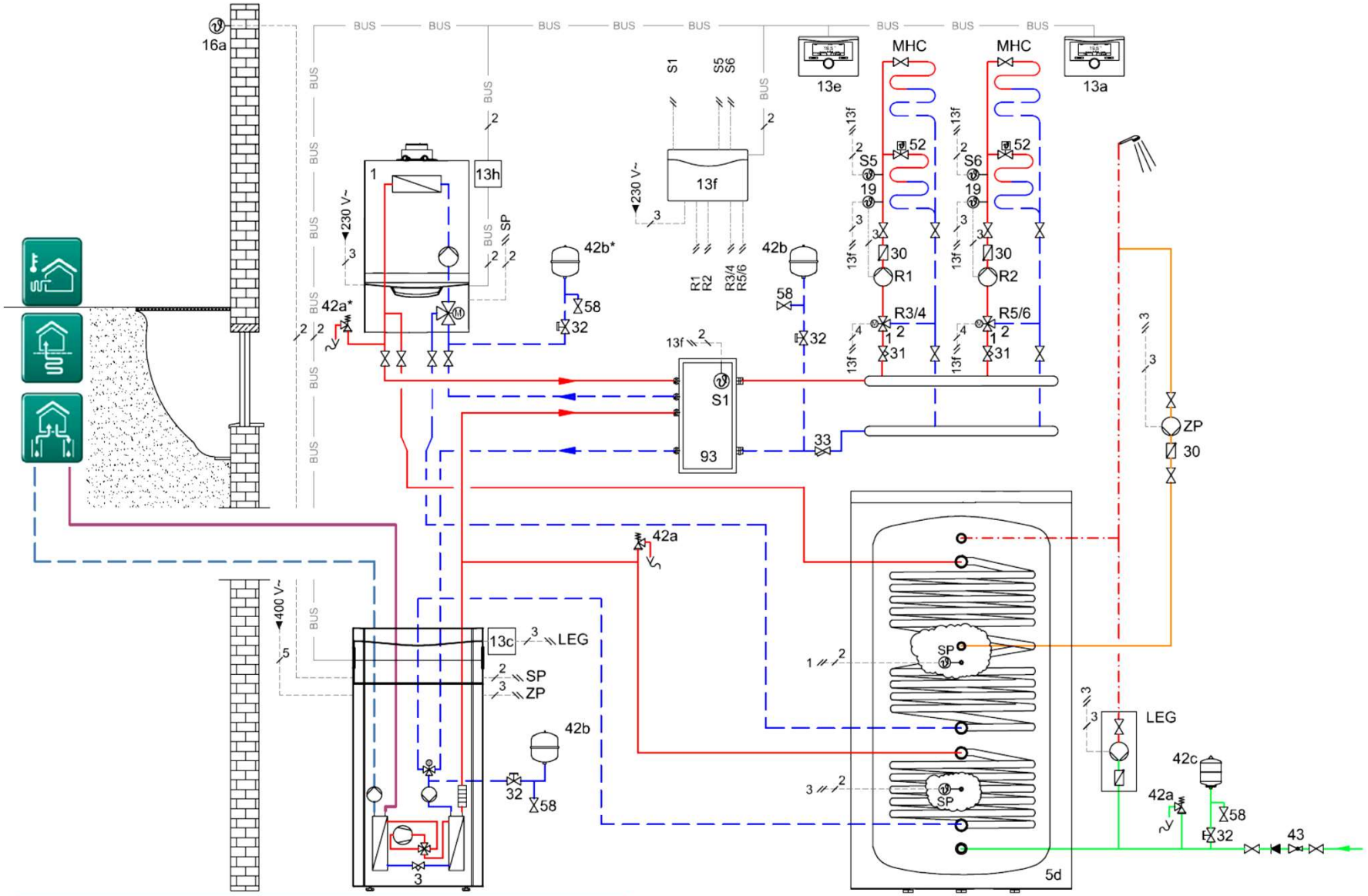


System diagram= 8 No VR 70

Example 5: Connection diagram for flexoCOMPACT exclusive VWF ..8/4

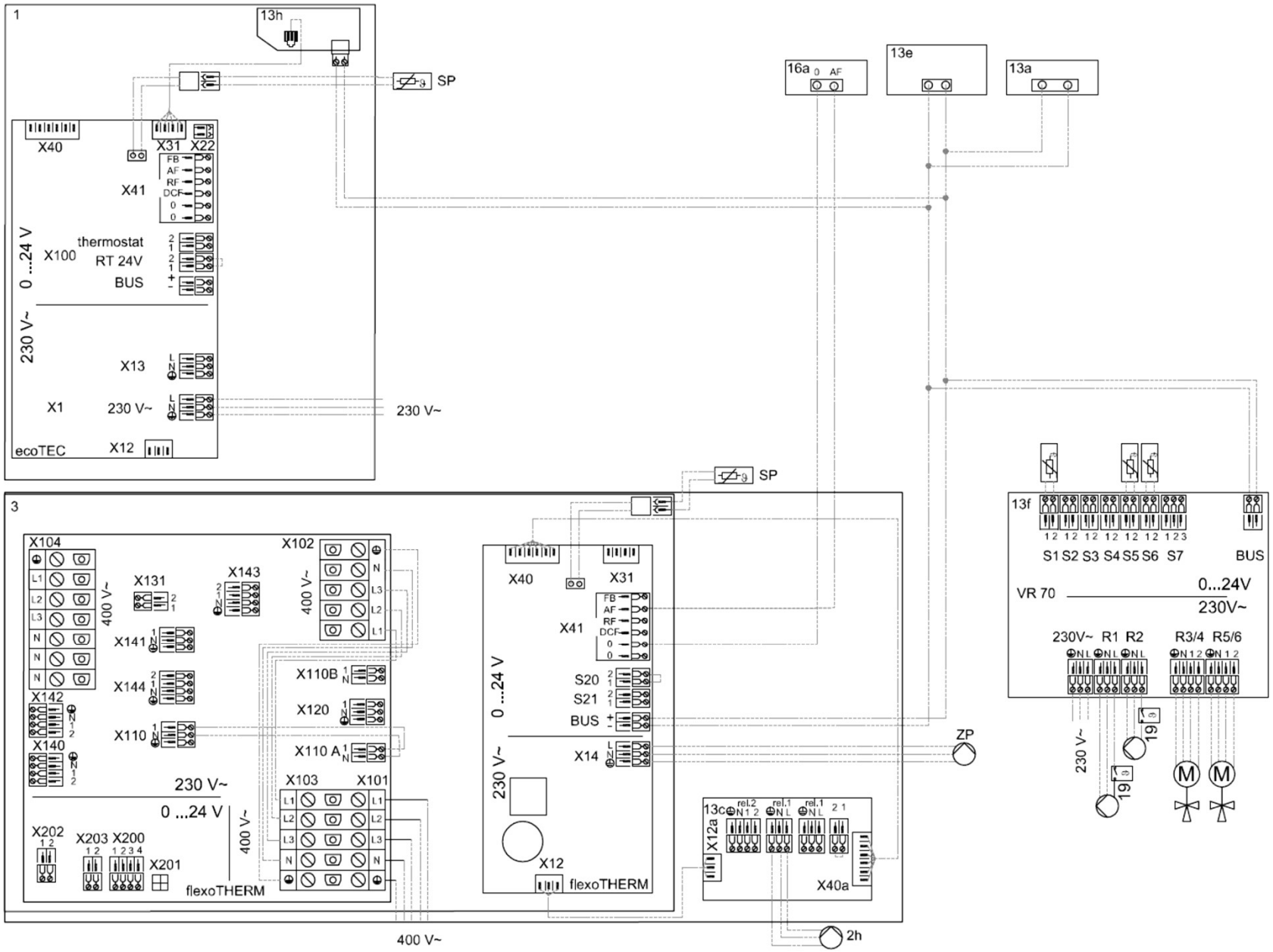


Example 6: System diagram for flexoTHERM exclusive VWF ..7/4

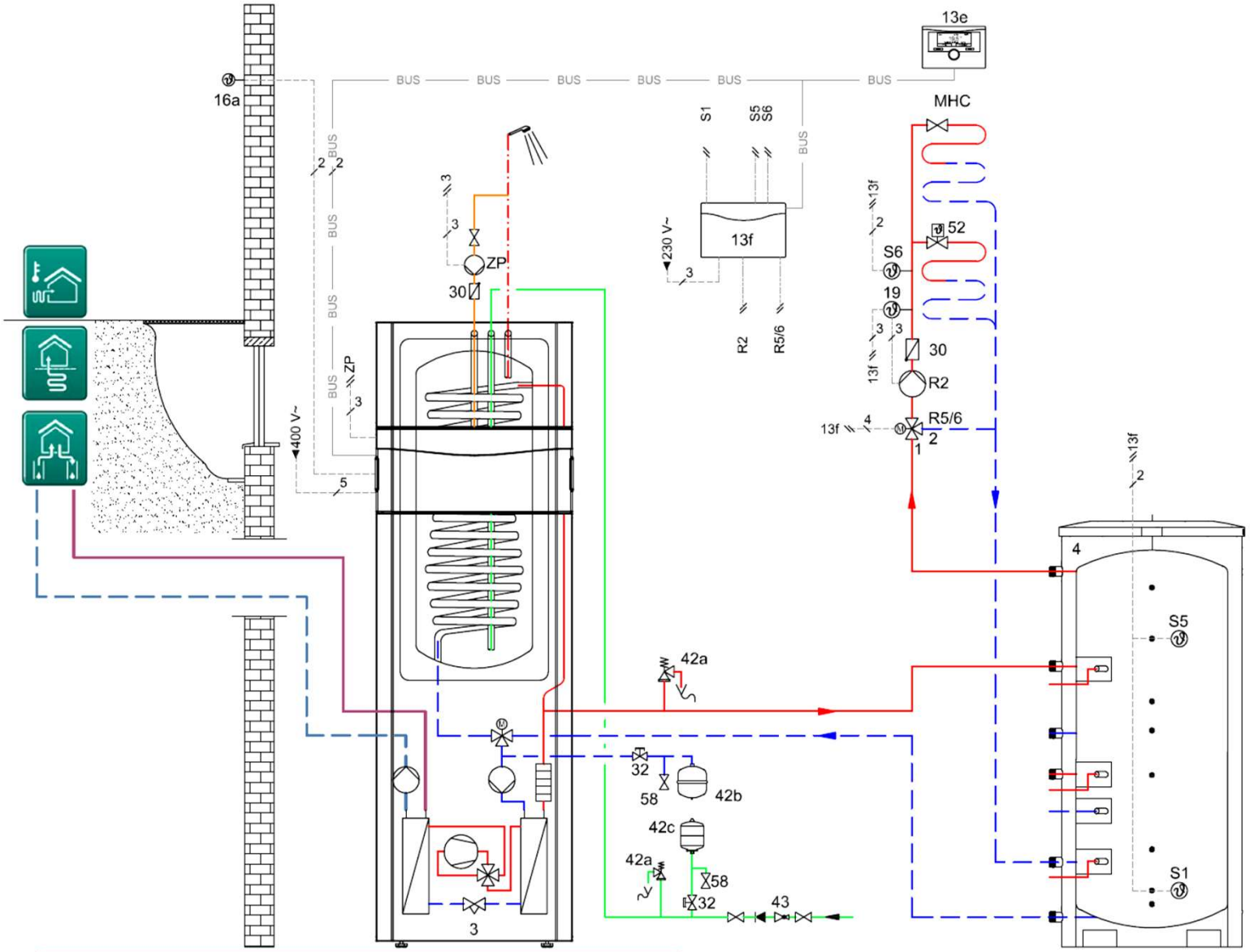


System diagram = 12 Config. VR 70 = 5

Example 6: Connection diagram for flexoTHERM exclusive VWF ..7/4

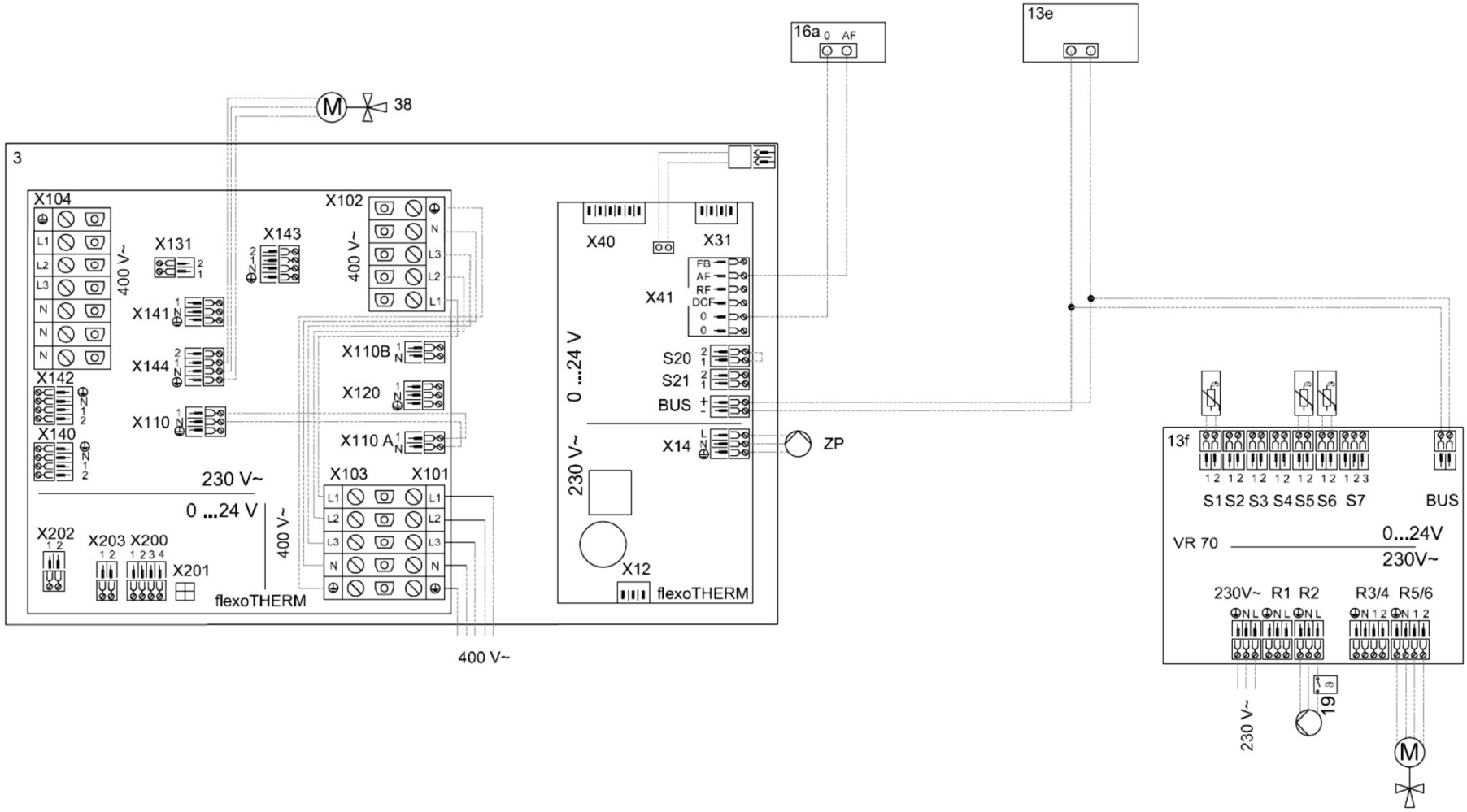


Example 7: System diagram for flexoCOMPACT exclusive VWF ..8/4

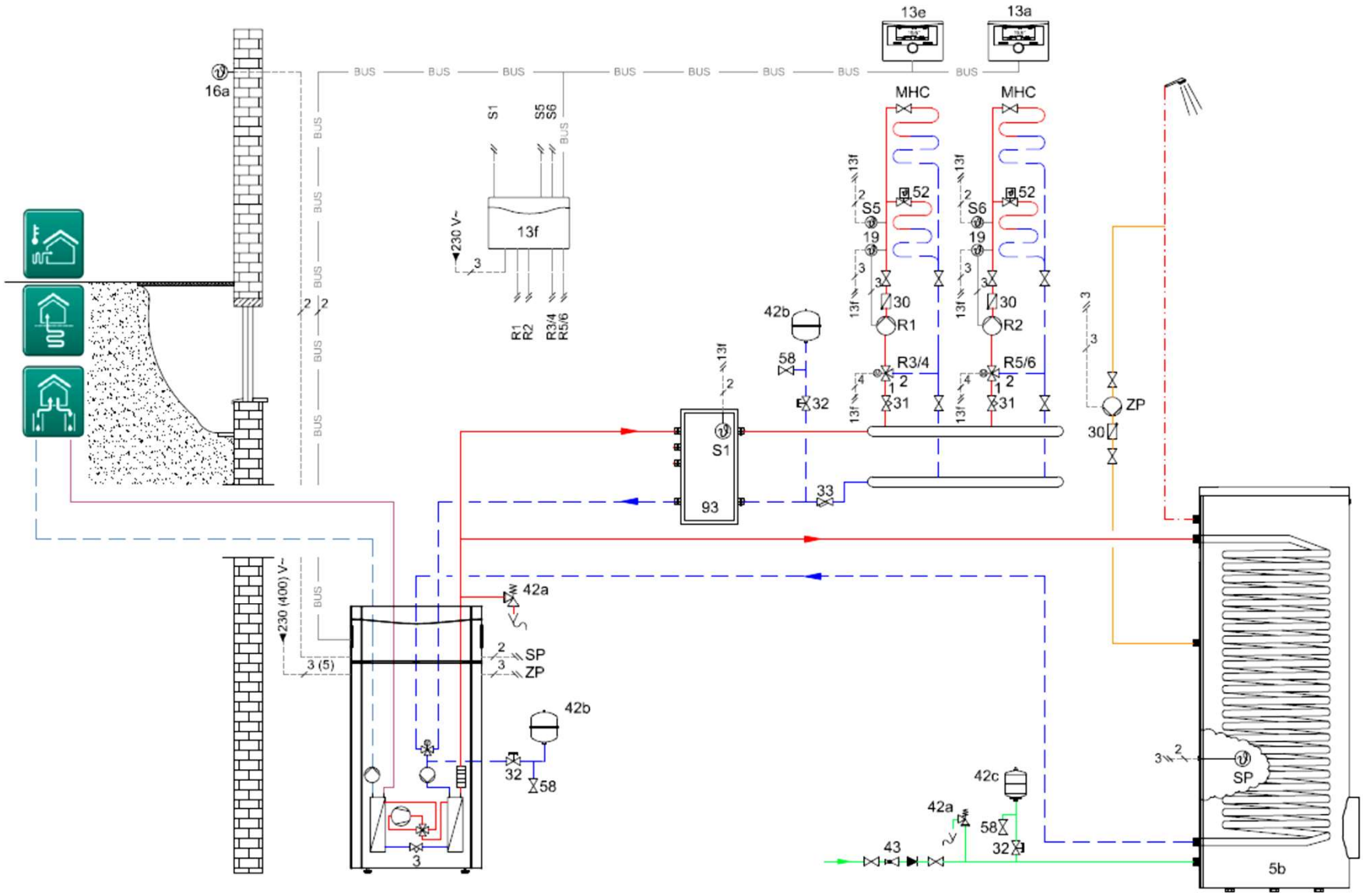


System diagram = 8 Config. VR 70 = 1

Example 7: Connection diagram for flexoCOMPACT exclusive VWF ..8/4

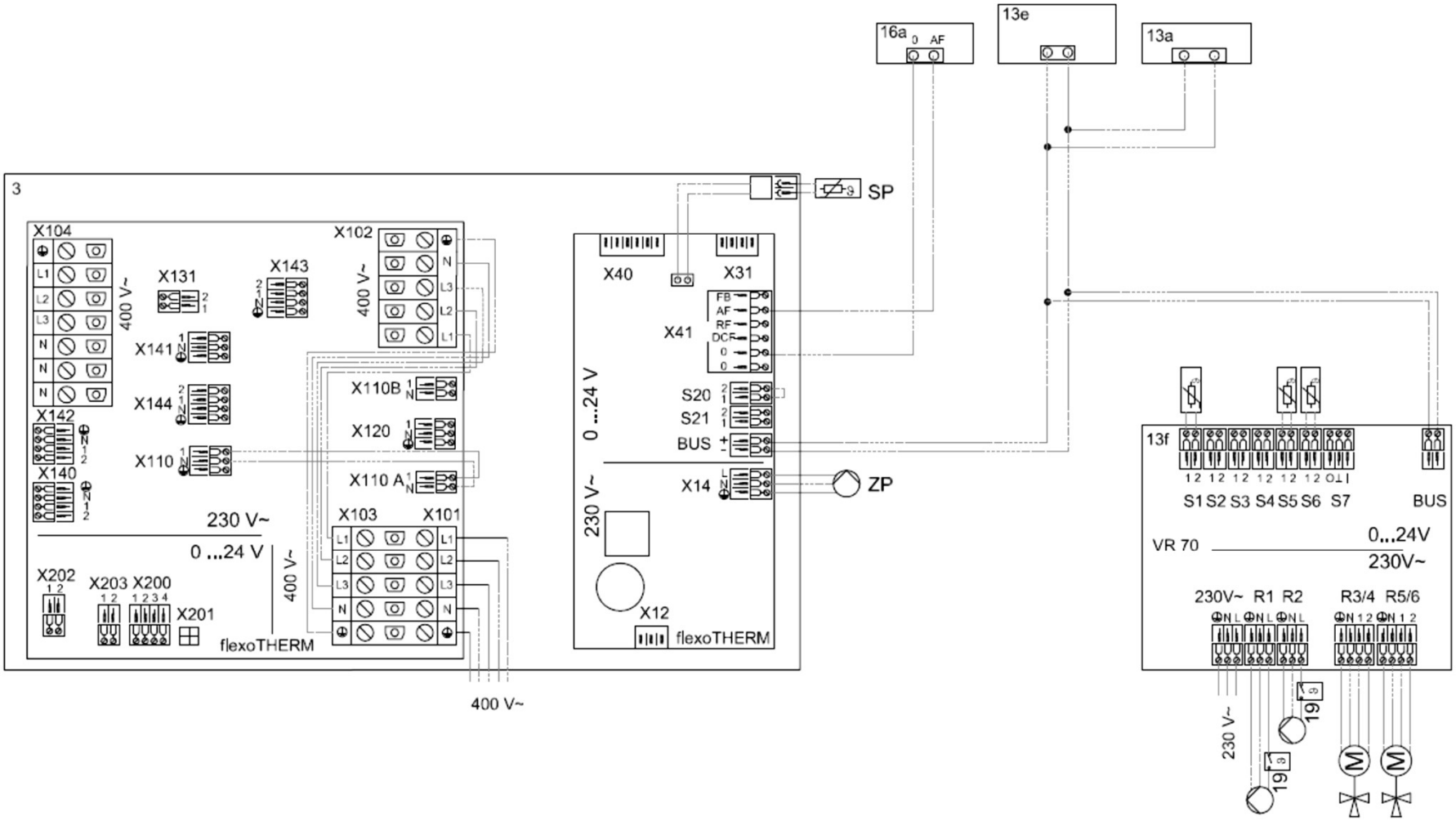


Example 8: System diagram for flexoTHERM exclusive VWF ..8/4

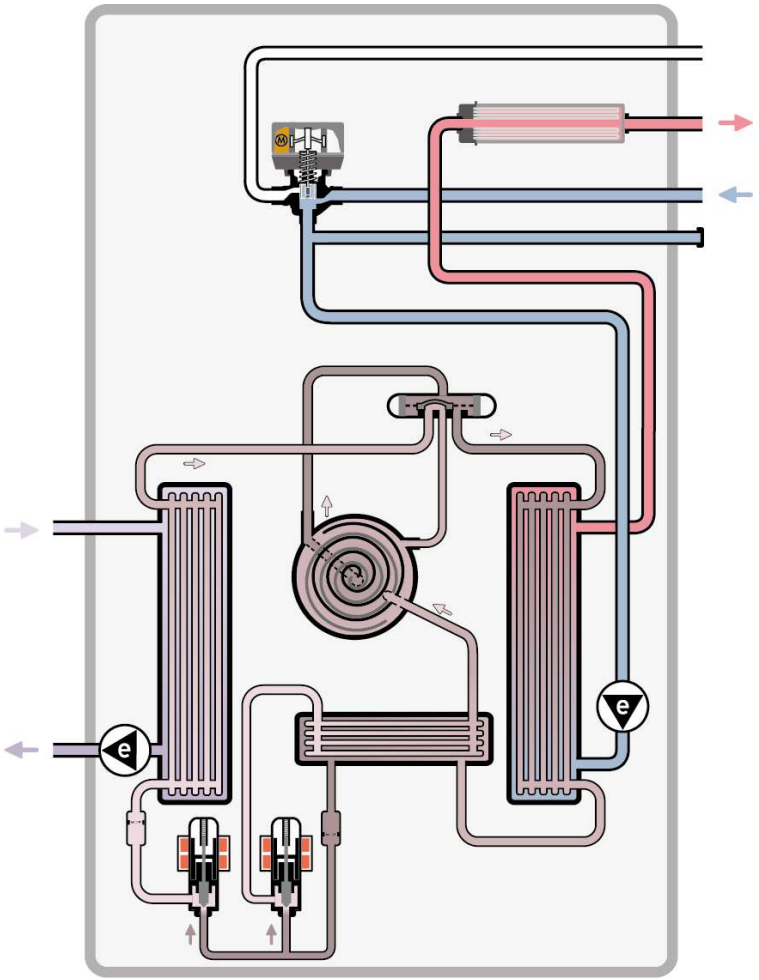


System diagram = 8 Config. VR 70 = 5

Example 8: Connection diagram for flexoTHERM exclusive VWF ..8/4

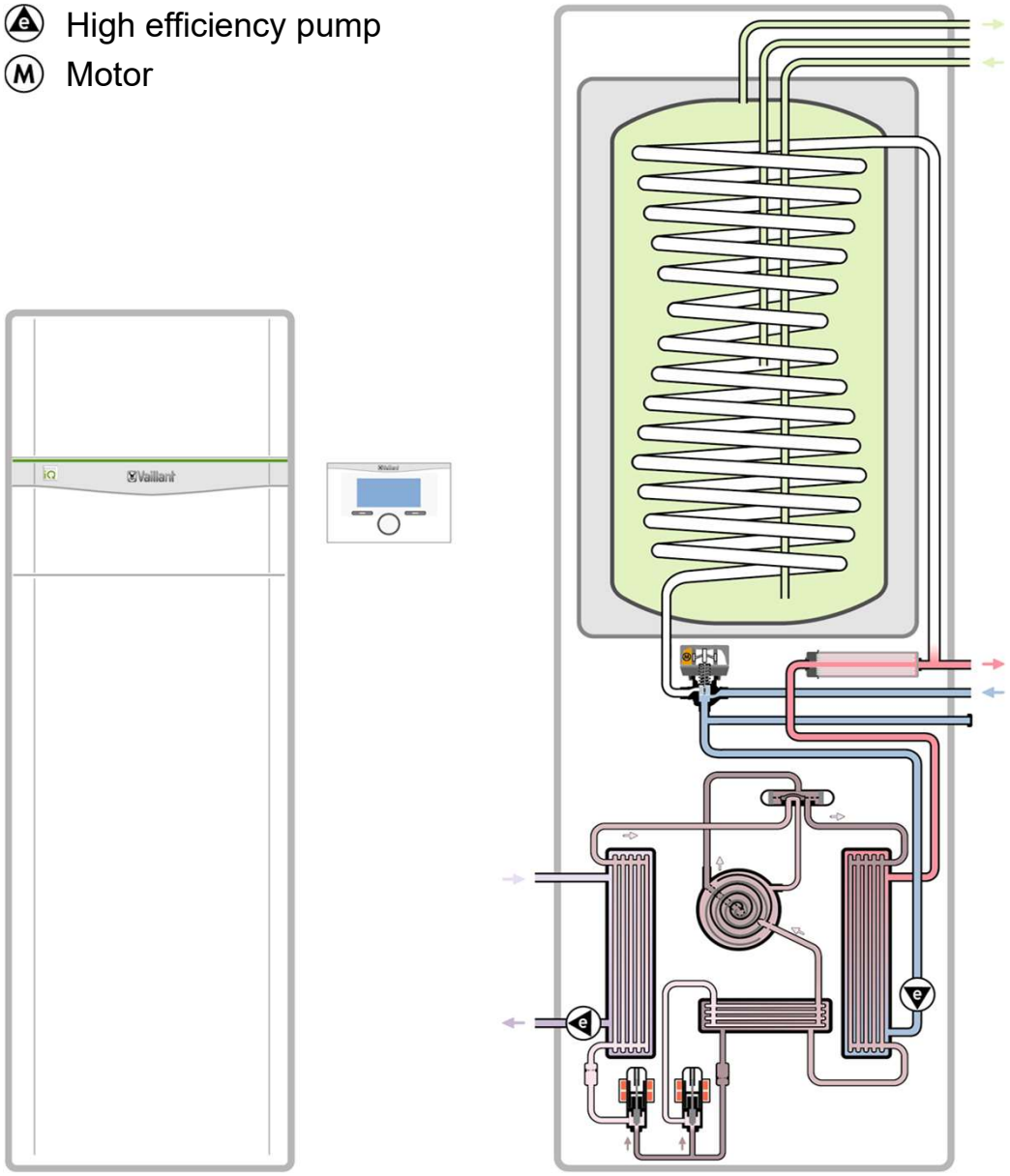


Functional diagram for flexoTHERM

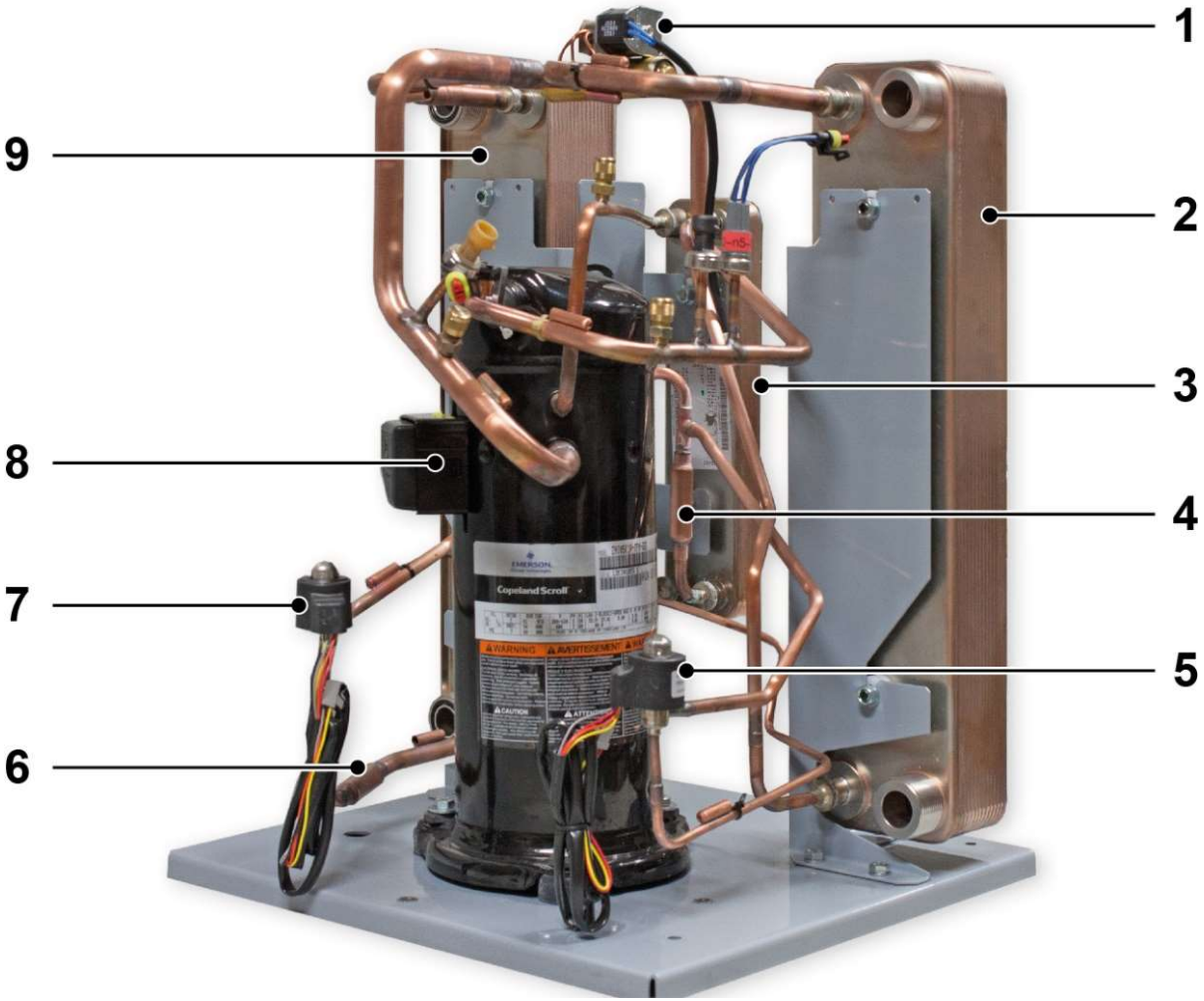


Functional diagram for flexoCOMPACT

- High efficiency pump
- Motor



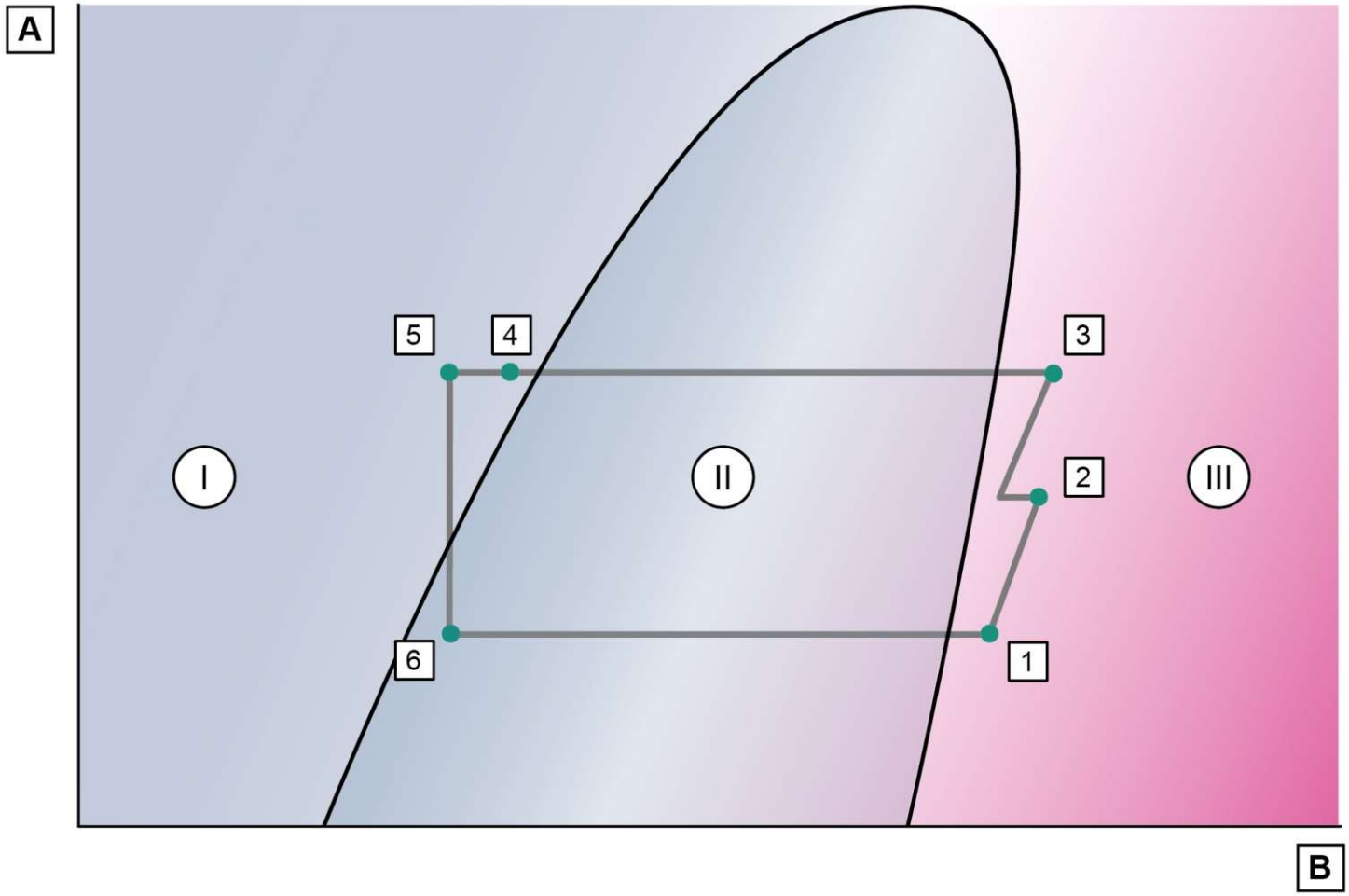
flexoTHERM coolant circuit



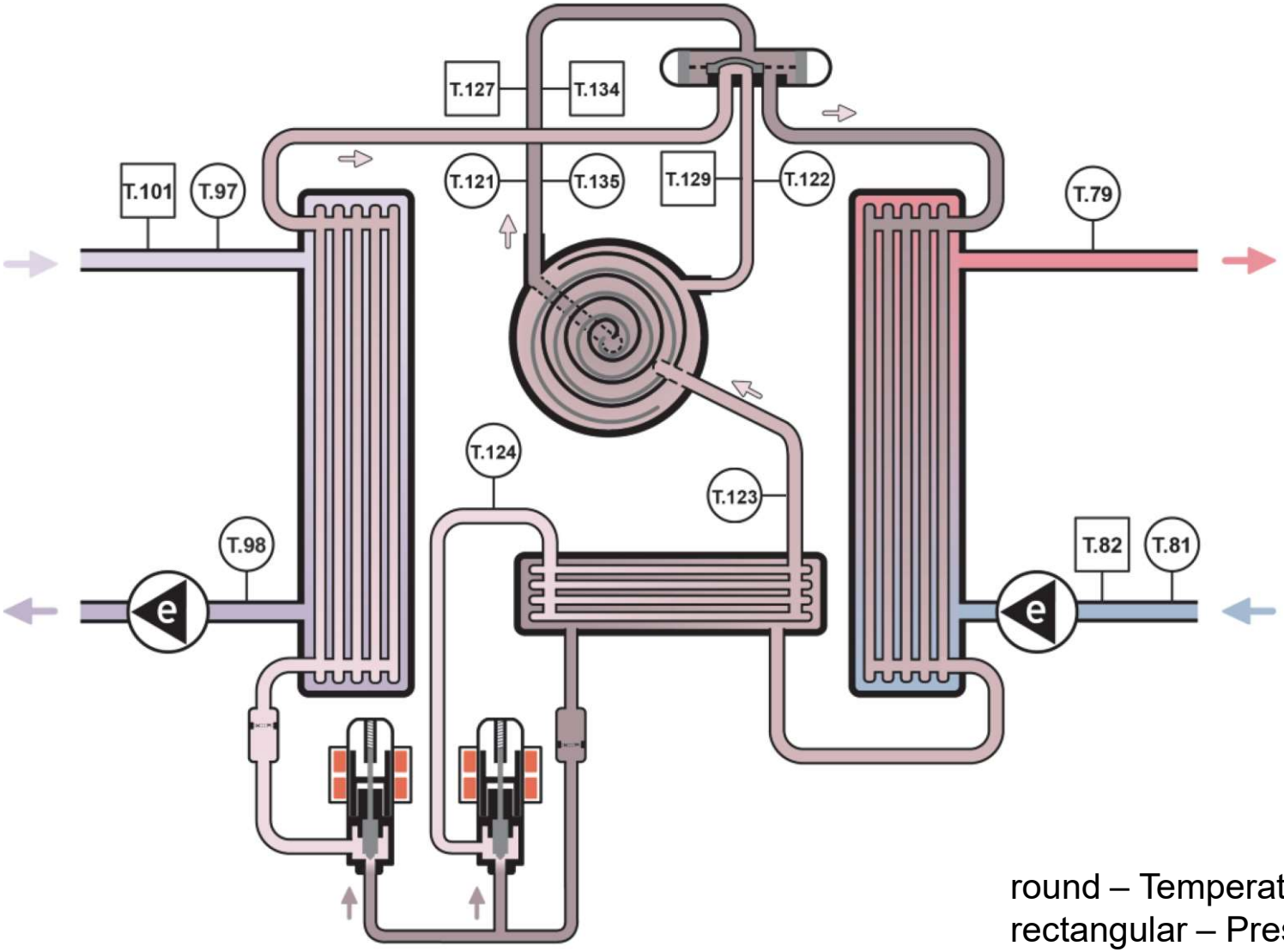
Key

1 4-way diverter valve
2 Condenser
3 Additional evaporator
4, 6 Filter
5, 7 Elect. expansion valve
8 Scroll compressor
9 Evaporator

log p, h diagram, heating mode

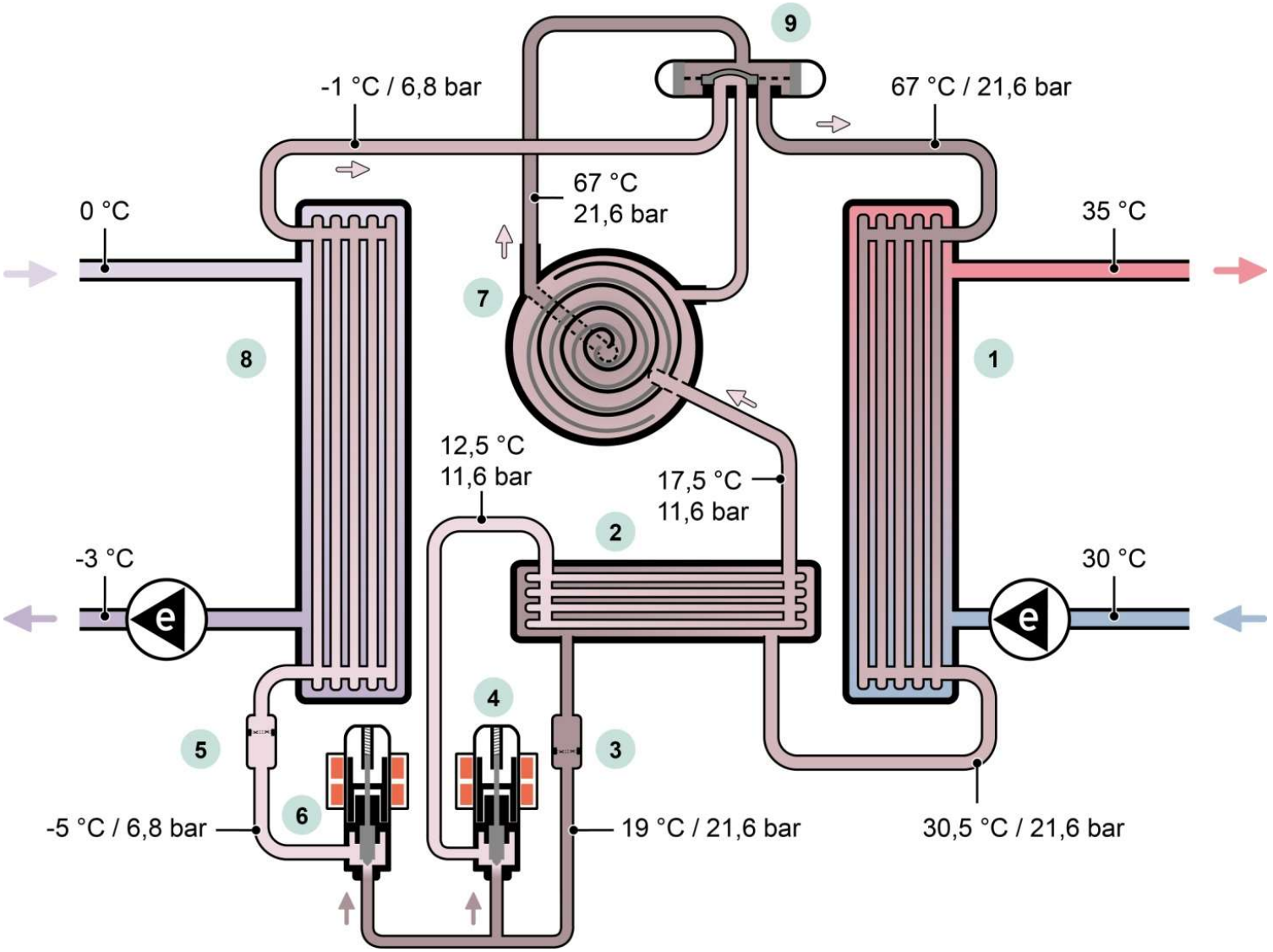


Functional diagram of refrigeration circuit – Pressure and temp. sensors



round – Temperature sensor
rectangular – Pressure sensor

Functional diagram for flexoTHERM/flexoCOMPACT coolant circuit in heating mode



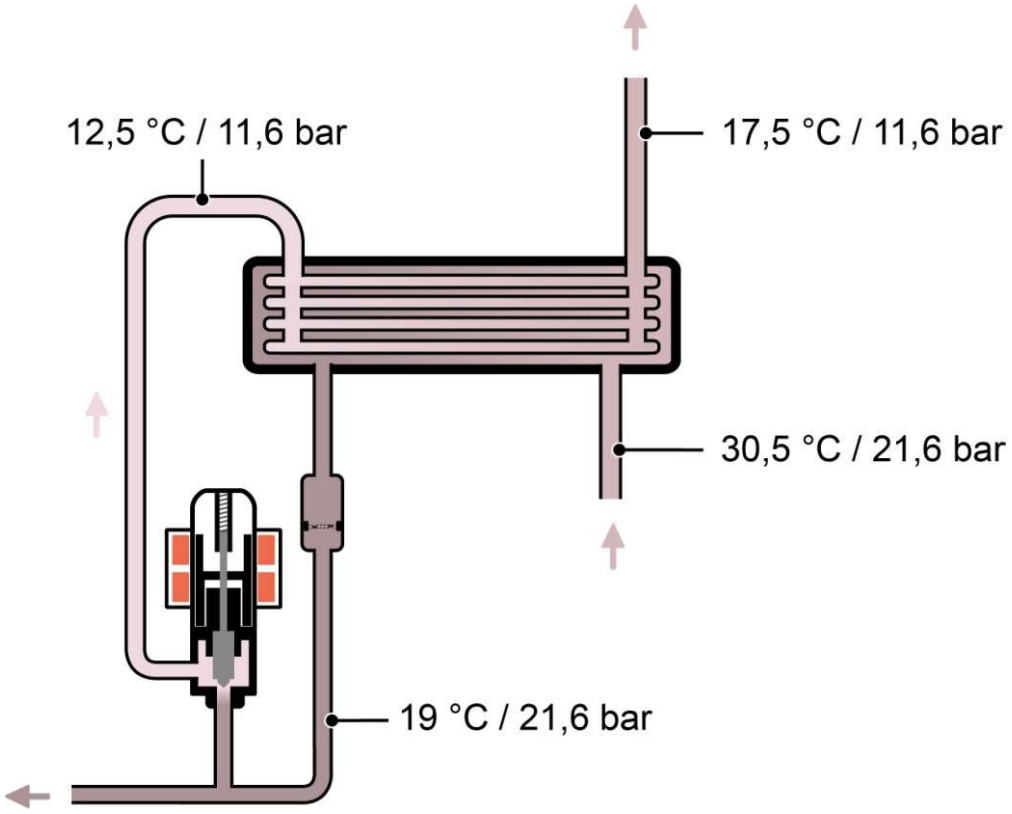
Evaporation / Condensation temperature of R 410 A

Pres-sure	Evaporation temperature	Condensation temperature
1	-37.2	-37.1
1.5	-31.8	-31.7
2	-27.2	-27.2
2.5	-23.3	-23.2
3	-19.7	-19.6
3.5	-16.5	-16.4
4	-13.5	-13.4
4.5	-10.8	-10.7
5	-8.2	-8.2
6	-3.6	-3.5
7	0.5	0.6
8	4.3	4.3
9	7.7	7.8
10	10.9	11
10.5	12.4	12.5

Pres-sure	Evaporator tem-perature	Condensation temperature
11	13.8	13.9
13	19.2	19.3
15	24.1	24.2
17	28.5	28.6
19	32.5	32.6
21	36.3	36.4
23	39.8	39.9
25	43.1	43.2
27	46.2	46.3
29	49.2	49.2
31	52	52
33	54.6	54.7
35	57.2	57.3
37	59.7	59.7
39	62	62.1

Additional evaporator (economiser)

In heating mode and during cylinder charging, the additional evaporator is used to evaporate some of the refrigerant (approx. 10-25% of the total mass flow) in order to then inject it into the compressor on the intake side at a higher temperature/pressure (e.g. 17.5 °C/11.6 bar).

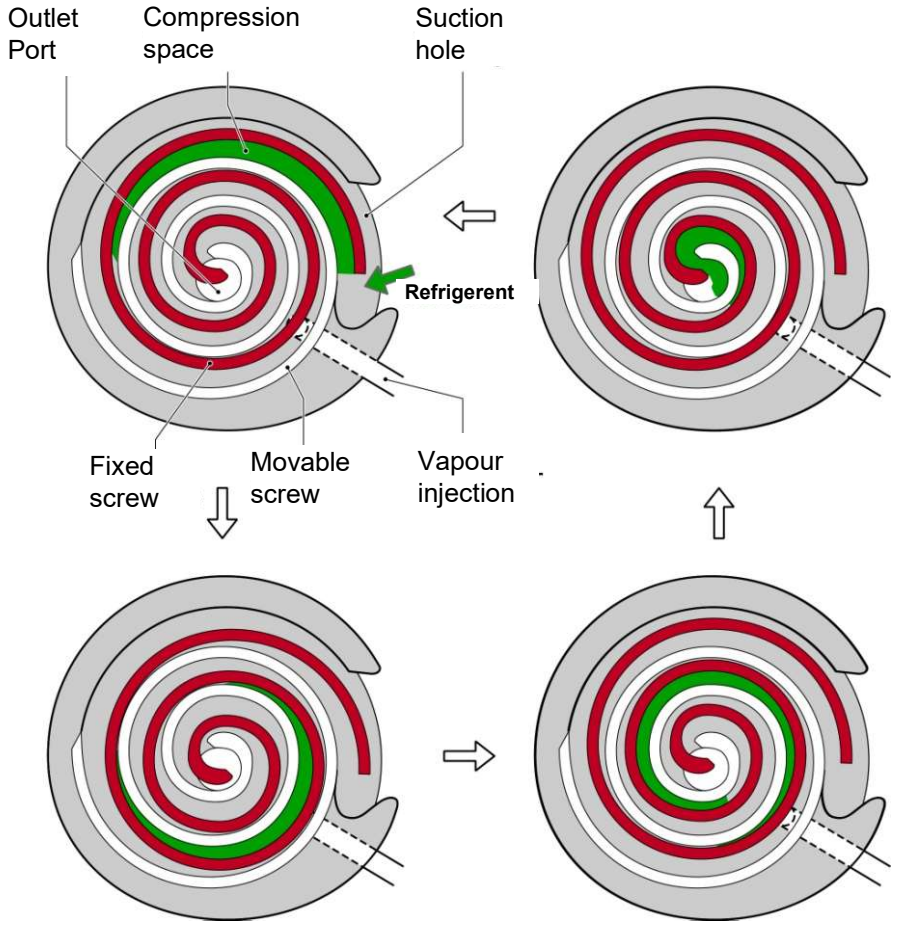


Cross-section of scroll compressor

- Within the two scrolls placed one inside the another, constantly changing gas compartments are created.
- The white scroll is fixed, while the red one moves eccentrically around it.
- The movement causes the refrigerant vapour to be sucked into the open, outer chamber.
- In the case of progressive scroll movement, the refrigerant chamber continuously becomes smaller.

Design of the scroll compressor with intermediate vapour injection

Some of the vapour-forming refrigerant that comes from the economiser is fed to the compressor via a separate connection and distributed by jets roughly in the middle of the compression space.

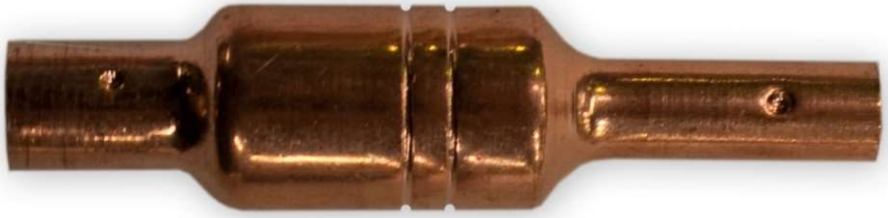


Condenser

– In the condenser, the refrigerant emits its absorbed energy (evaporation energy from the heat source and the supplied energy from the compressor) as usable heat to the heating water through the process of condensation.
– In the lower section of the condenser, the refrigerant is already undercooled to below the condensation temperature.

Filter in the refrigeration circuit

In the refrigeration circuit, one built-in pipe filter is located before the electronic expansion valve and one is located after the electronic expansion valve. The filter consists of finely woven steel screen cloth and protects the EEV against contamination.

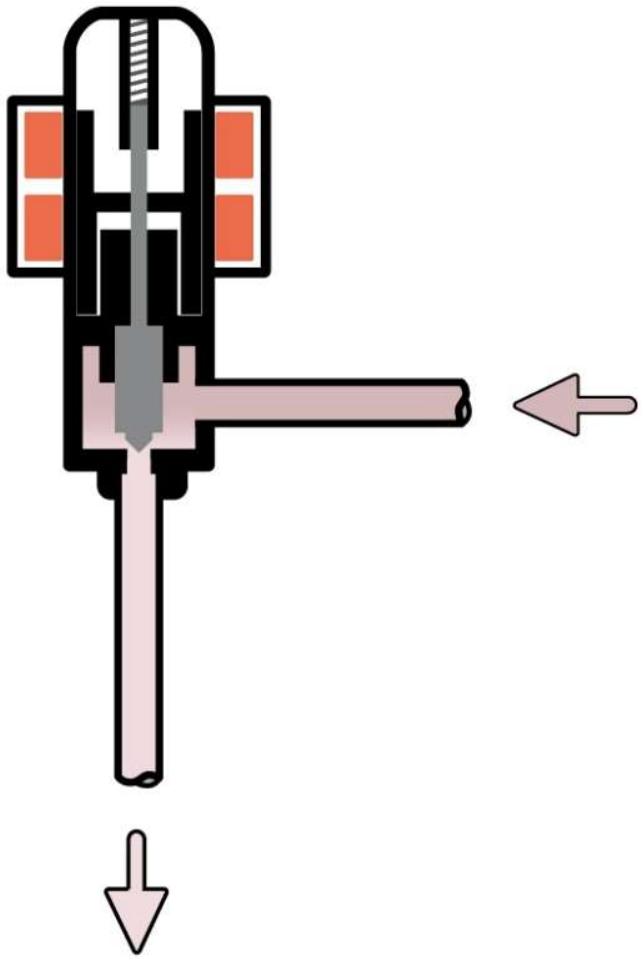


Electronic expansion valve (EEV) with removable magnetic coil

- Optimum adaptation of the coolant circuit to different operating conditions.
- Improved level of efficiency of the evaporator (increased performance)
- Improvement of the COP value
- Optimised dosing of the refrigerant volume to be injected in response to varying demand.
- Bidirectional controls, i.e. an EEV for heating and cooling mode
- No adjustment of the valve required

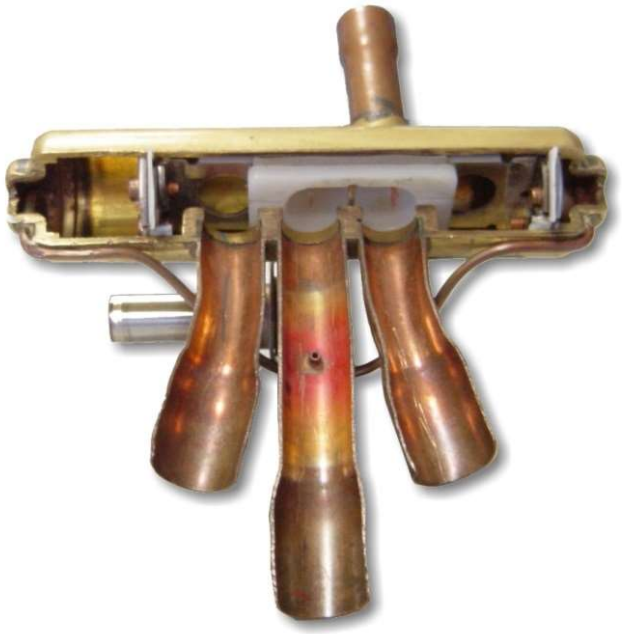
Design and function of the EEV

- The **EEV1** controls the main refrigerant volume and ensures the correct level of overheating.
- The **EEV-VI** controls the refrigerant volume for the intermediate vapour injection via the economiser to the compressor.
- To operate the electronic expansion valve, a needle valve is rotated in increments (by electric signals in the form of pulses) to the coils of the EEV in order to regulate the flow of refrigerant.



4-way diverter valve

- It is necessary to change the direction of the coolant circuit for active cooling on the flexoTHERM.
- The direction of the refrigerant in the circuit is changed by a 230 V solenoid valve that is fitted to the 4-way diverter valve and that loads different pressure lines with the compressor pressure.



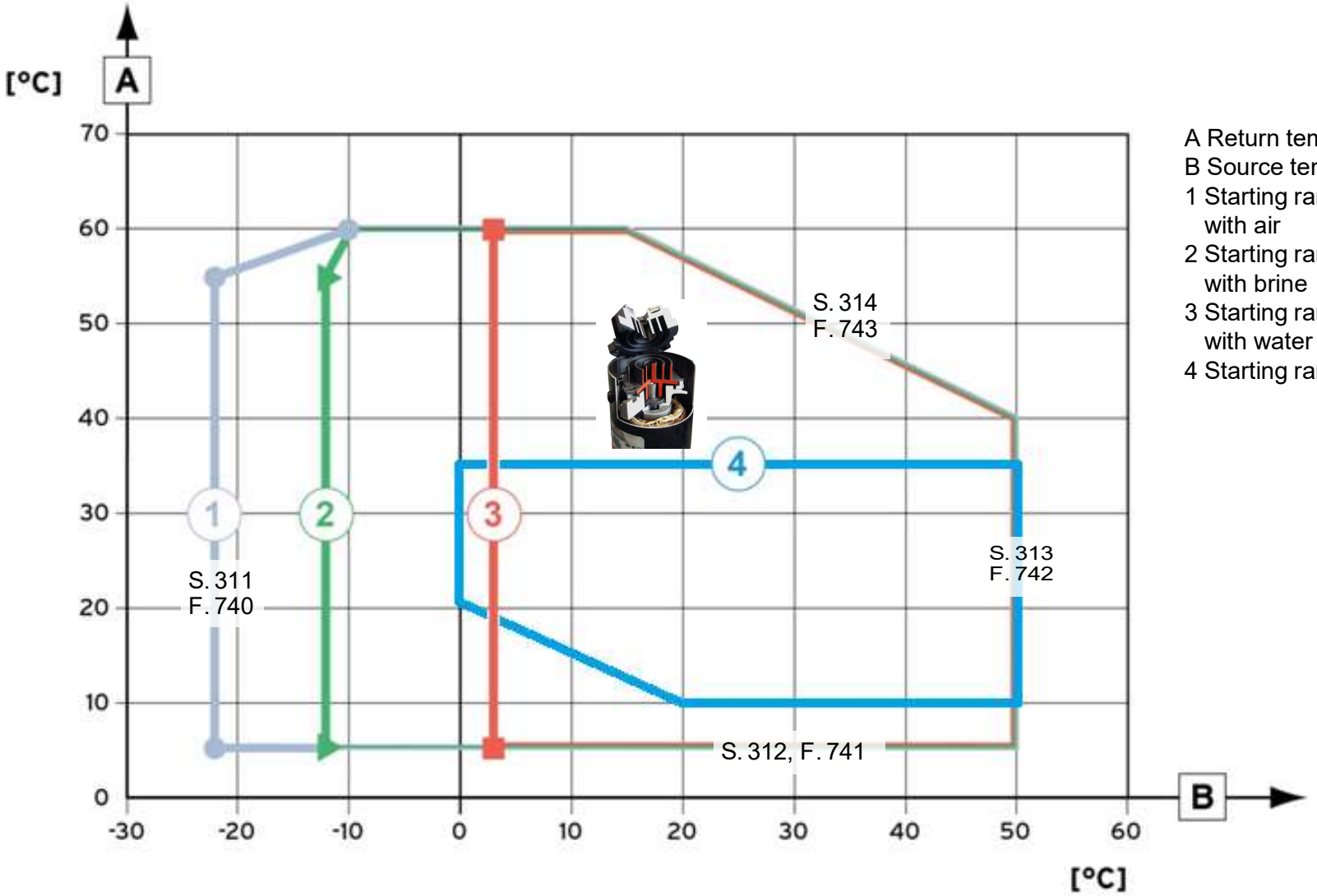
High-pressure pressure switch and pressure sensor in the coolant circuit

– The heat pumps have a **high-pressure pressure switch** which switches off the heat pump when the pressure in the coolant circuit reaches **46 bar**.

– Further attempts to start the heat pump are subsequently possible.

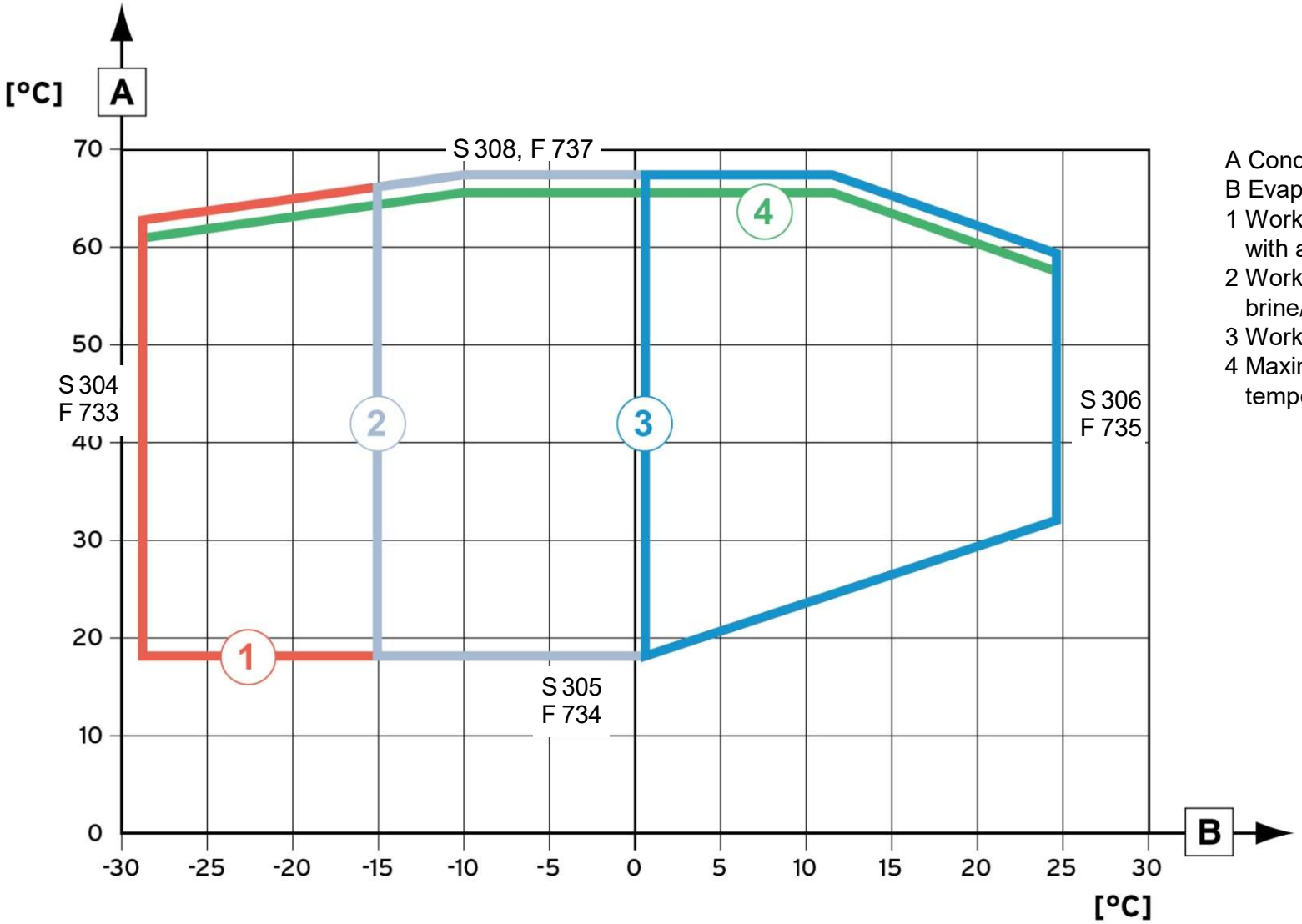
– The heat pump is also equipped with two **pressure sensors**. These record the current pressure on the high-pressure side (outlet pressure downstream of the compressor) and on the low-pressure side (intake pressure upstream of the compressor).

Compressor start conditions



A Return temperature
B Source temperature at inlet
1 Starting range for heating/hot water with air
2 Starting range for heating/hot water with brine
3 Starting range for heating/hot water with water
4 Starting range for active cooling

Working range of the compressor in operation



A Condensation temperature
B Evaporation temperature
1 Working range for heating with air
2 Working range for heating with brine/water
3 Working range for active cooling
4 Maximum achievable flow temperature

Temperature sensors

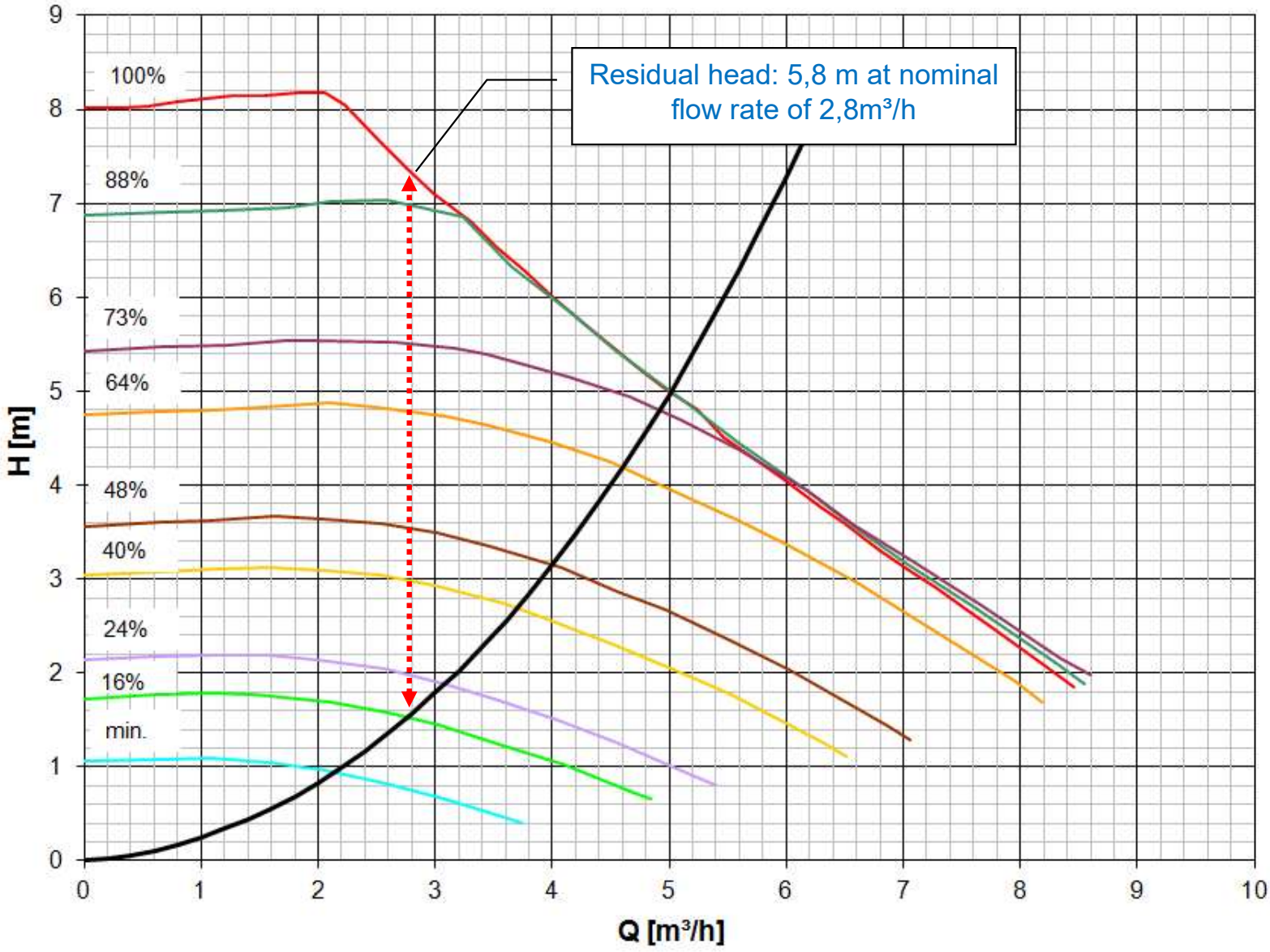
- The heat pump is equipped with temperature sensors at four different points in the coolant circuit.
- The current temperatures at the sensors can be queried in the test menu under "Sensor/Actuator test".
- All sensor connections are sealed in order to prevent problems with condensation and corrosion. Clips hold the sensors in place and ensure a good thermal contact.

Brine pump in the inner unit

- The brine pump has the task of transporting energy from the heat source to the evaporator in the heat pump.
- The brine pumps that are used are speed-regulated high-efficiency pumps.
- If required, the rotational speed of the brine pump can be adapted to the requirements on site.

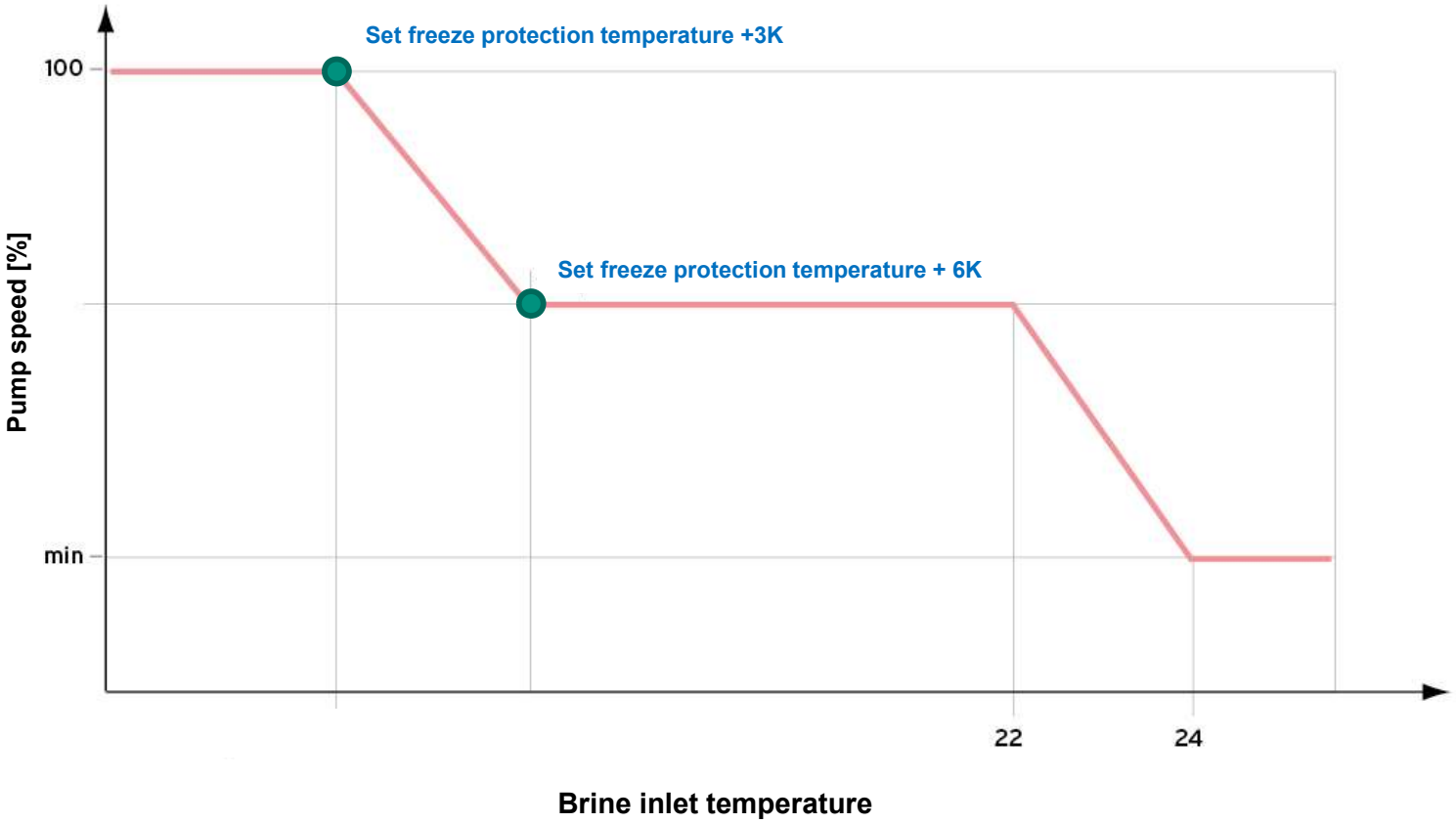
Heat pump	Brine pump
VWF 5../4, VWF 8../4	Wilo Yonos-Para 25/7.5
VWF 11../4	Wilo Stratos-Para 25/1-8
VWF 15../4, VWF 19../4	Wilo Stratos-Para 25/1-12

Characteristic lines of the brine pump (e.g. flexoTHERM 11x/4)



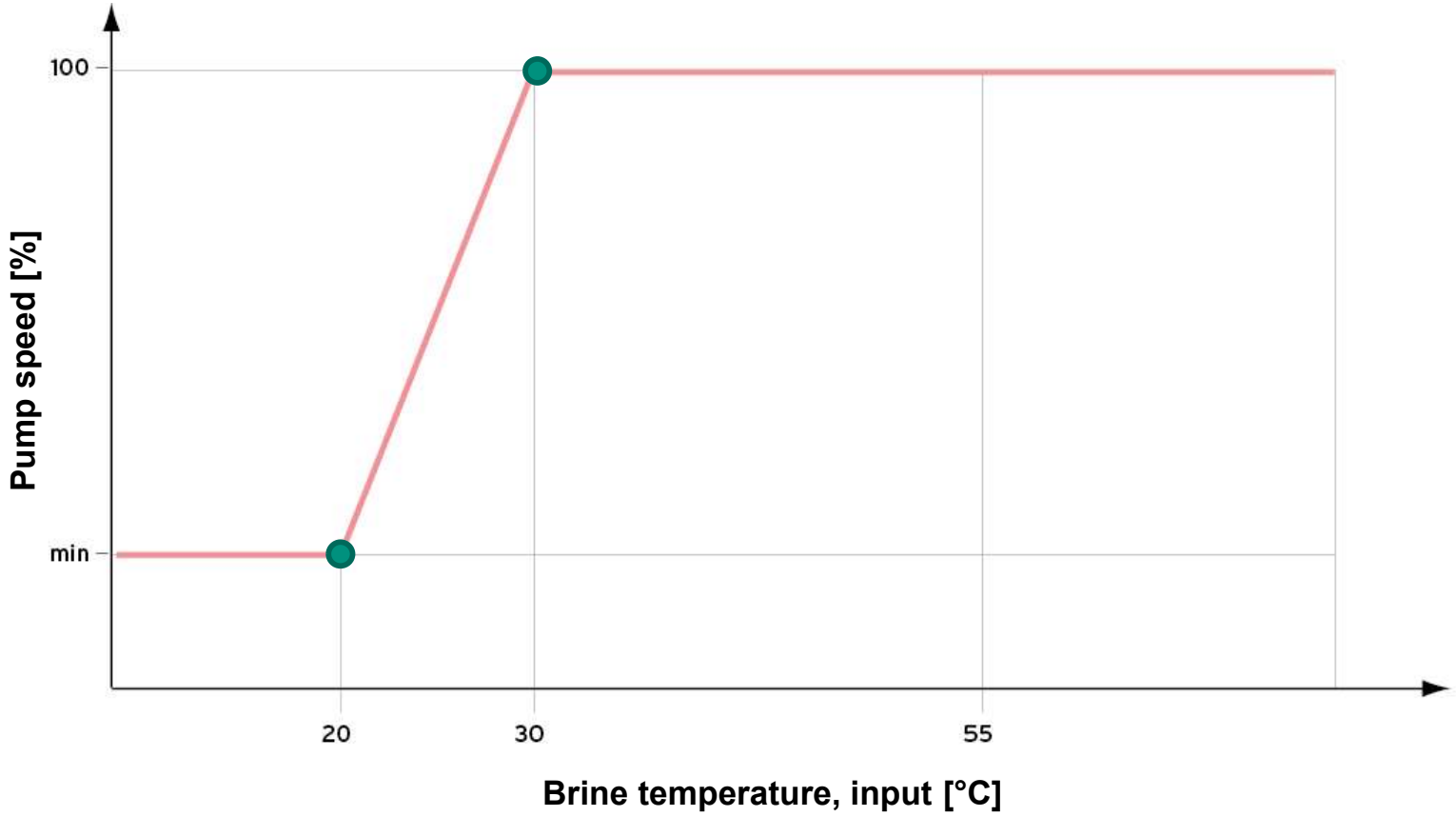
Pump speed – characteristic line of the brine pump in heating mode

The speed of the brine pump is adjusted in heating mode of the heat pump, based on the current measured brine temperature at the input of the heat pump inner unit.

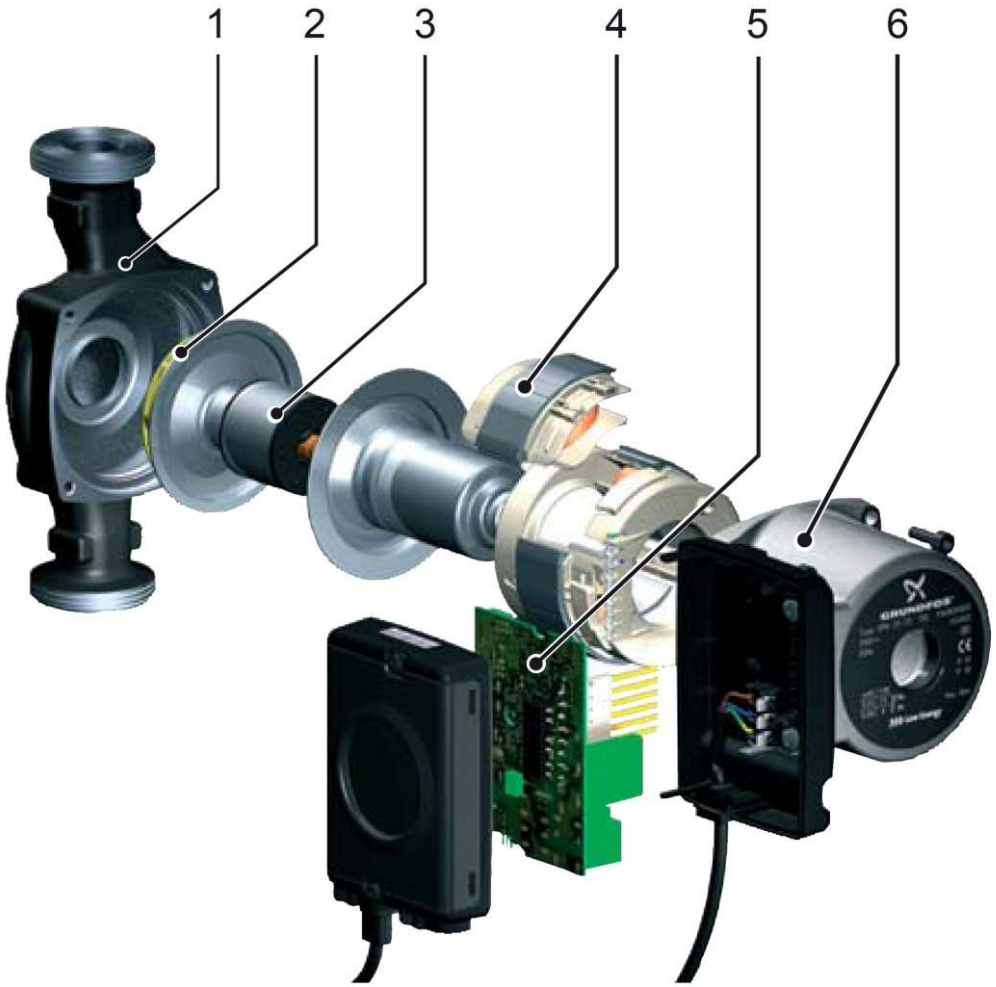


Pump speed – characteristic line of the brine pump in active cooling mode

The speed of the brine pump is automatically adjusted in active cooling mode based on the current measured brine temperature at the input of the inner unit.



High-efficiency pump



Source: Grundfos GmbH

The heating pump that is included in the heat pump has the task of transporting the energy in the refrigerant, via the condenser, to the heat distribution system in heating mode.

Key

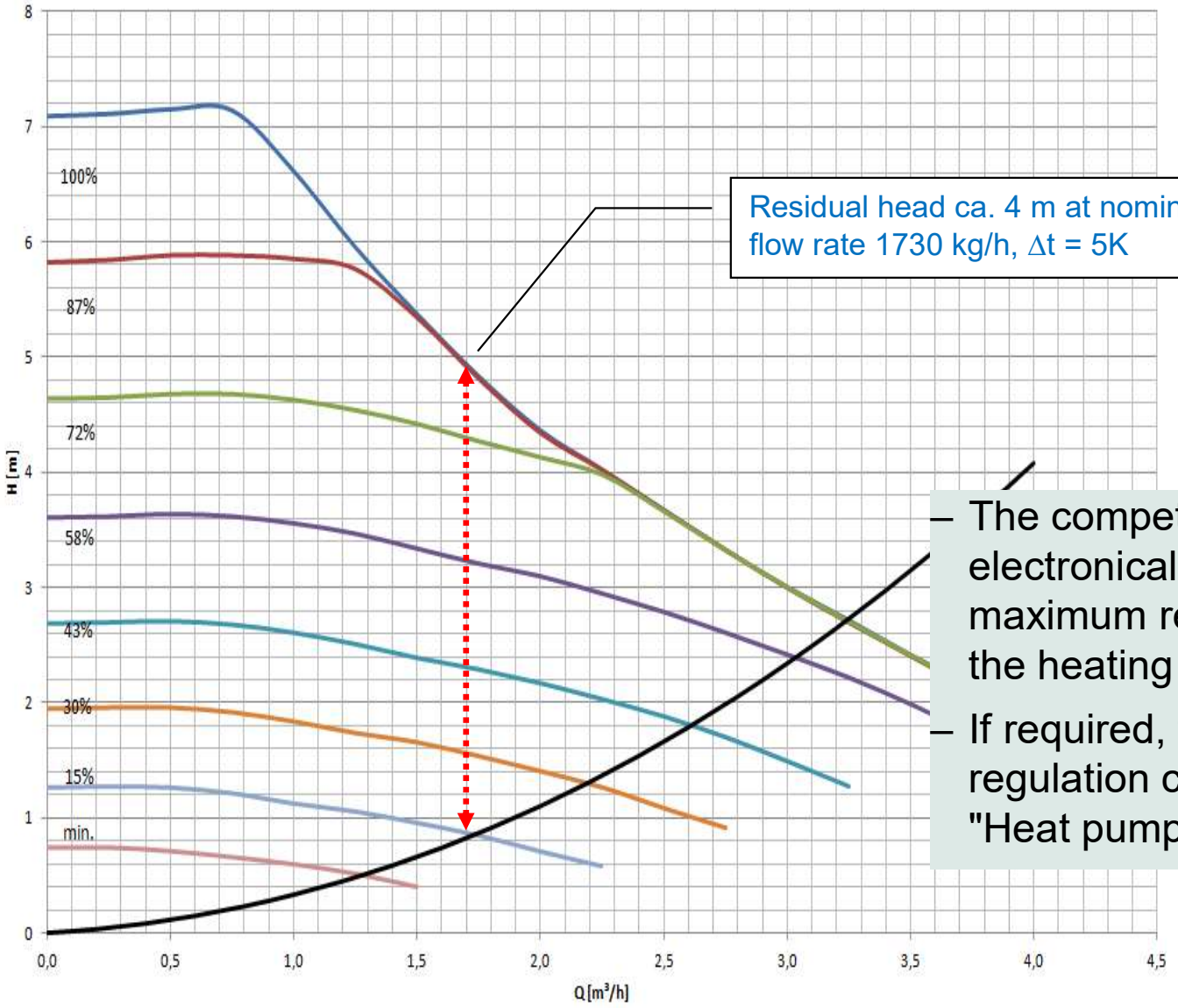
1 Pump casing
2 Impeller
3 Permanent-magnetic rotor
4 Stator
5 Pump electronics
6 Casing/pump head

Volume flow detection by the heating pump

- The pump electronics system calculates the current volume flow from the power consumption and the pump speed.
- The heat pump's electronics system is then able to evaluate the signal determined from both values and display it as a flow rate in l/h.
- The heat is thus distributed according to an automatic volume flow regulation

Heat pump	Heating pump
VWF 5../4 up to VWF 11../4	Grundfos UMP2 25-70
VWF 15../4 and VWF 19../4	Grundfos UPML 25/105

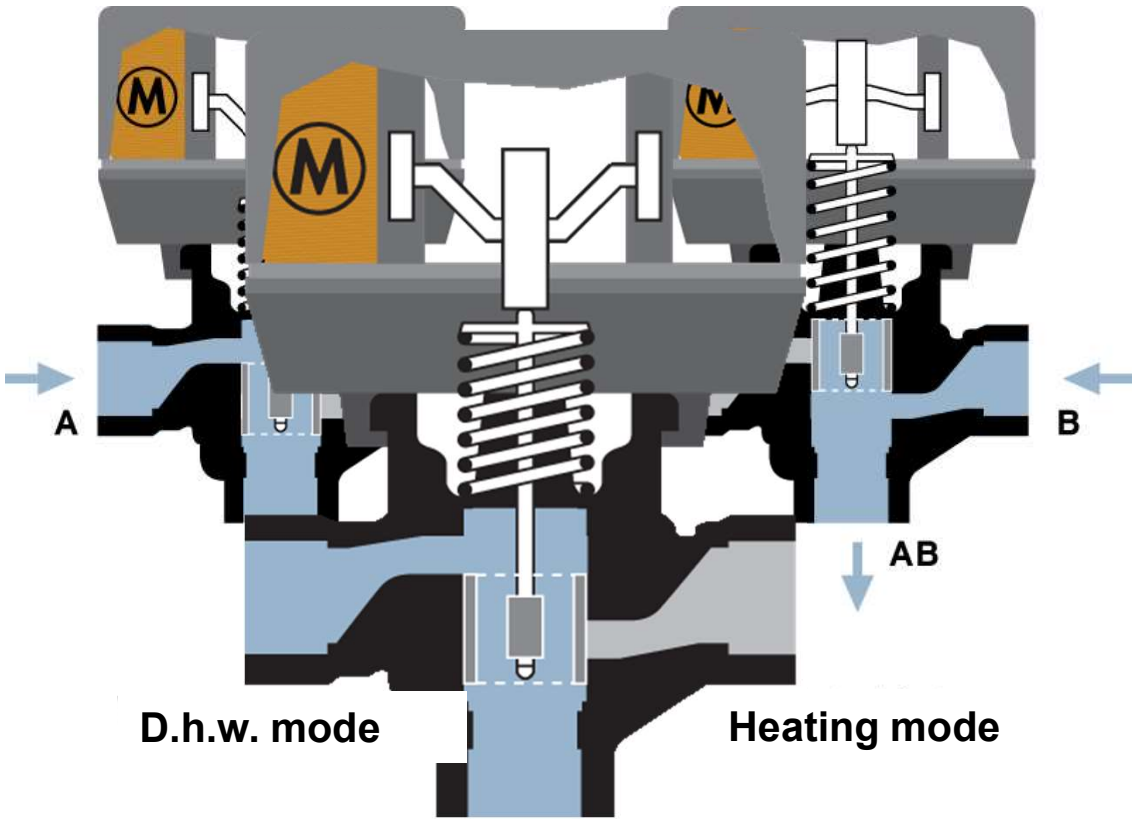
Pump characteristic lines (e.g. flexoTHERM 11x/4)



– The competent person can electronically set a lower limit for the maximum remaining feed head for the heating pump.
– If required, the automatic volume flow regulation can be deactivated in the "Heat pump" menu.

3-way switching valve

- The 3-way diverter valve is located in the heating return
- In heating mode, the valve body is moved up, thus releasing the connection with the heating return (B).
- In hot water handling mode, the valve body is in the lower position, therefore allowing the connection with the cylinder return.



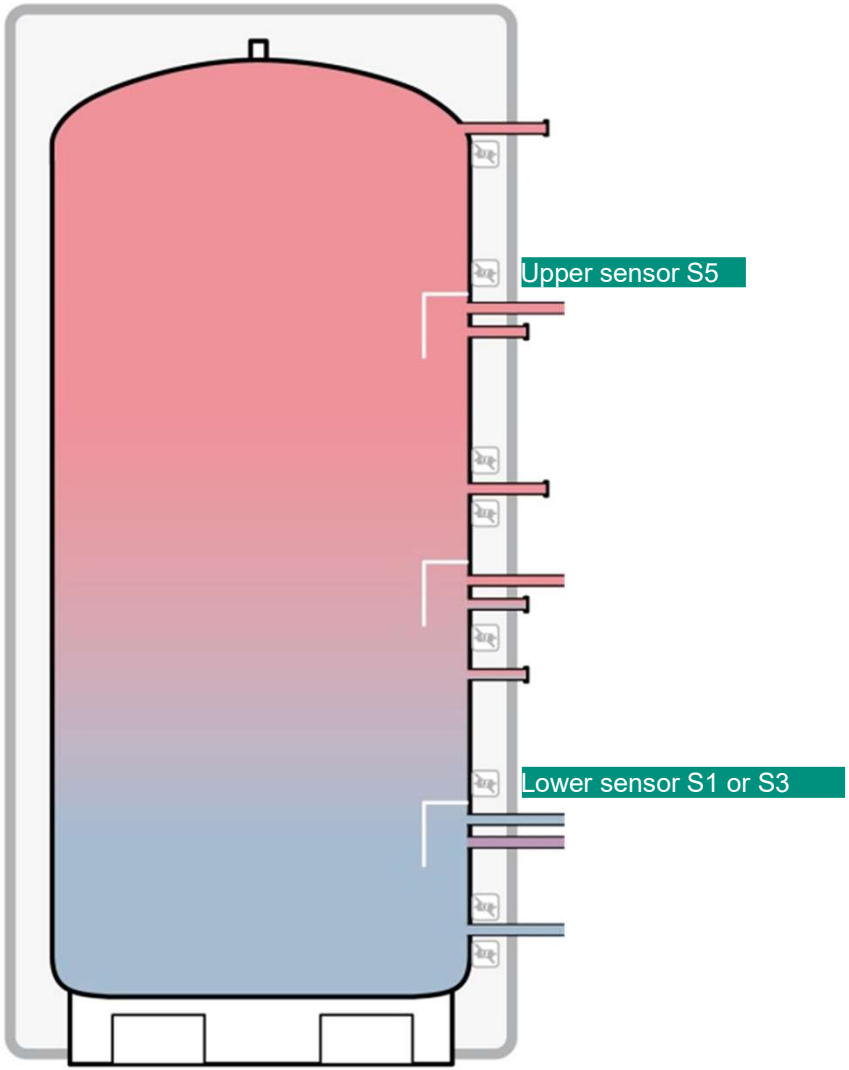
Pressure sensors in the brine circuit/heating circuit

The heat pump has a pressure sensor for the brine circuit and another for the heating circuit. Both constantly monitor the current pressure, which is displayed in the Live Monitor in the heat pump operating unit.

System pressure	Effect
< 0.5 bar	Heat pump is switched off and a maintenance message is displayed
≥ 0.7 bar	Heat pump ready for operation on pressure side

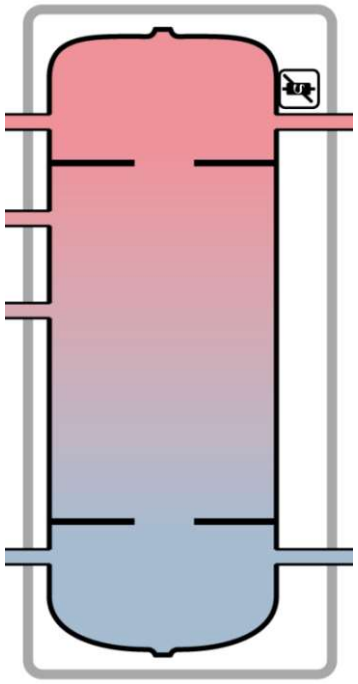
Charging the buffer cylinder

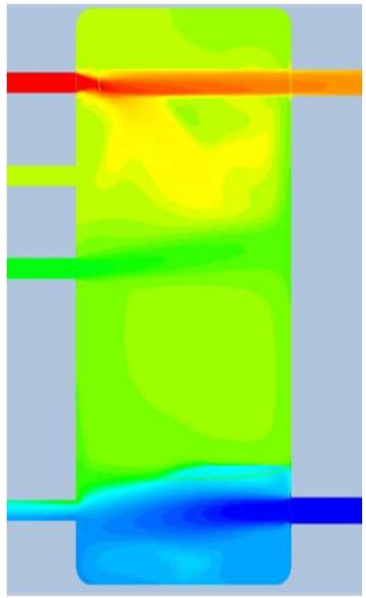
- Charging or recharging begins if the temperature in the upper section of the buffer cylinder (S5) drops below the target charge value.
- Charging ends if the temperature in the lower section of the buffer cylinder (S1 or S3) is 2 K above the required target value
- **or** the upper sensor exceeds the target value plus 10 K.



VWZ MPS 40 buffer module

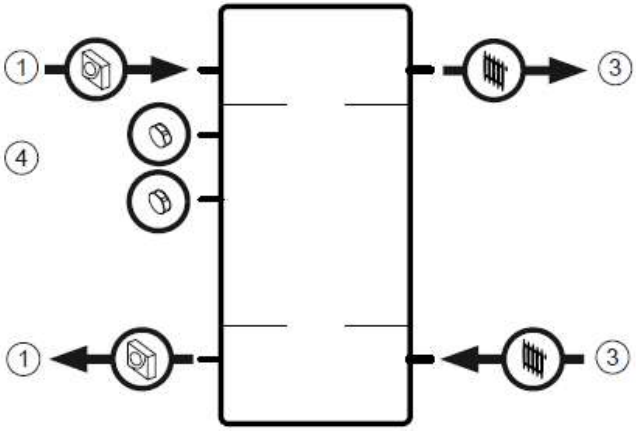
Guide plates are installed in both the upper and lower section of the buffer cylinder. These provide optimum heat transfer in the buffer module. Hardly any mixing of the different volume flows or temperature zones takes place.



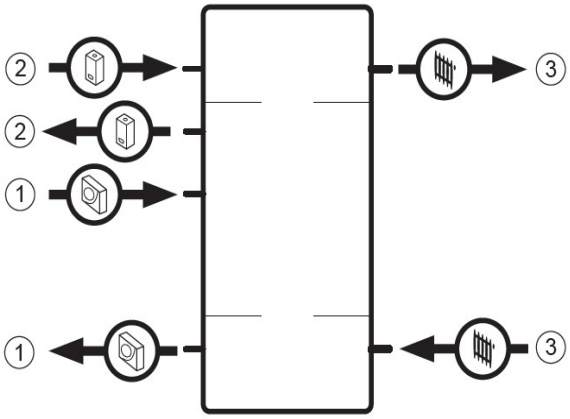


The MPS 40 can be used up to a nominal flow of max. 2600 l/h.

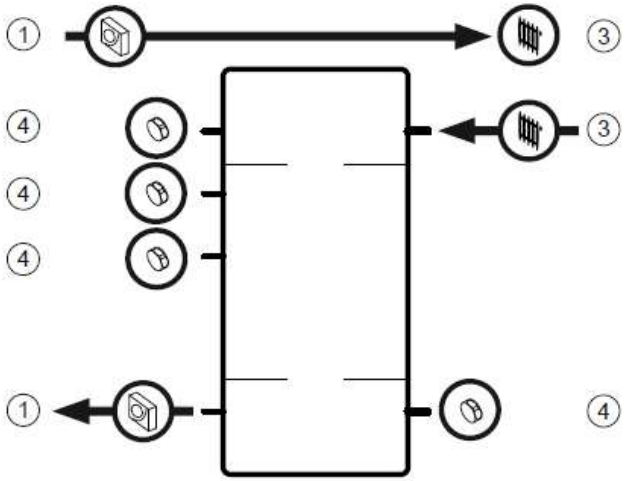
Connection possibilities of compact buffer cylinder



Case 1 (System diagram 8)

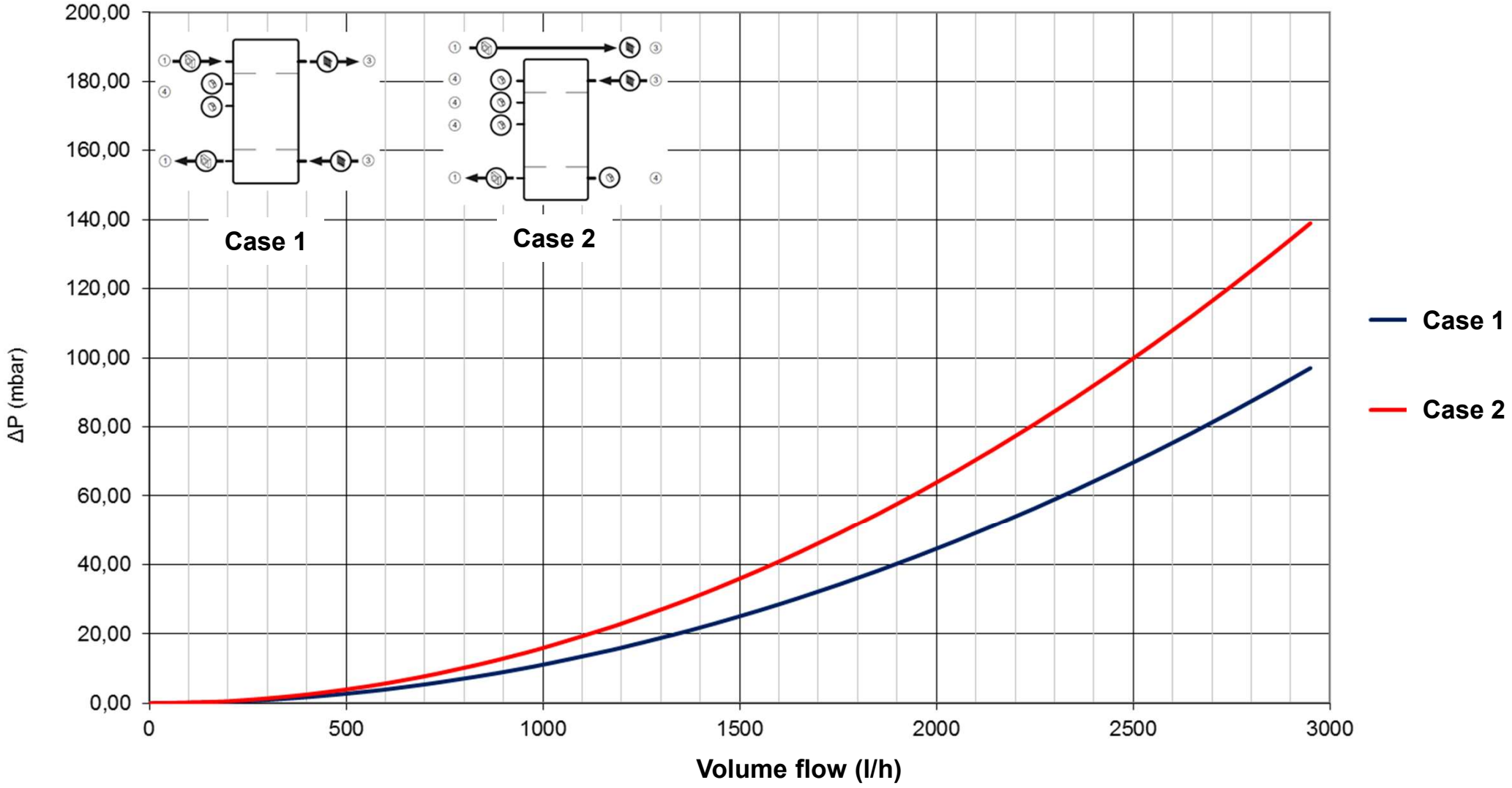


Case 3 (System diagram 9, 12)



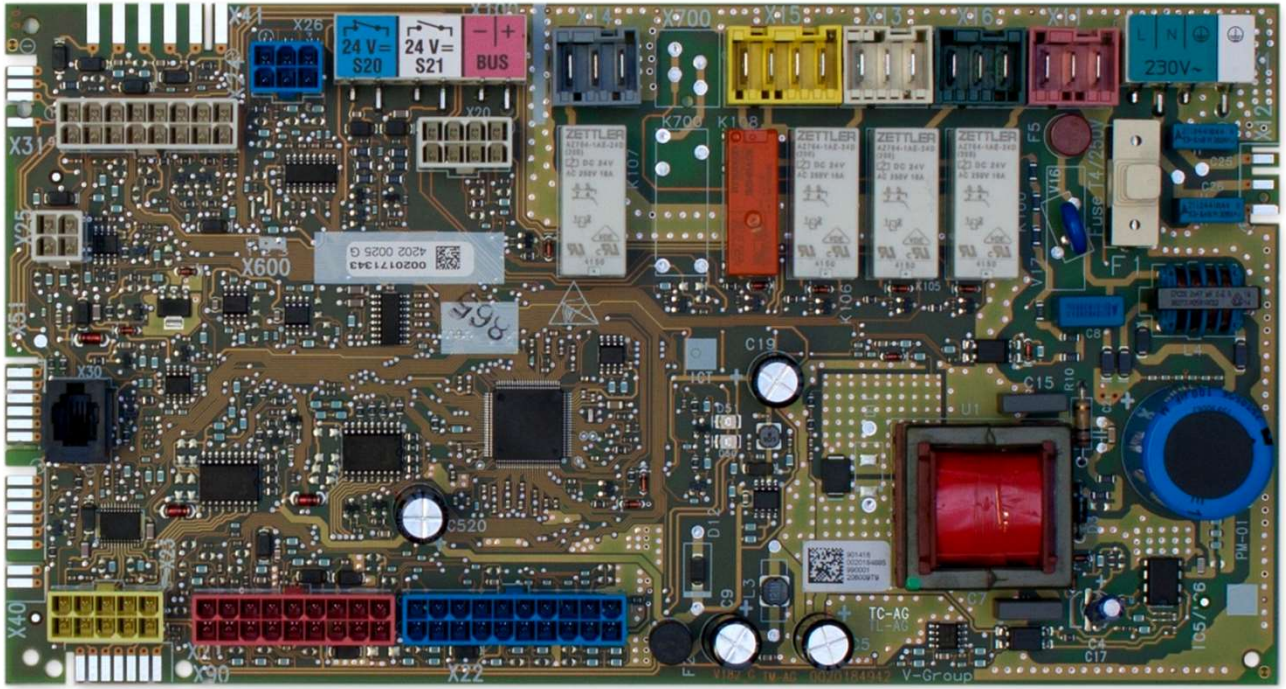
Case 2 (System diagram 8)

Compact buffer cylinder - Pressure loss curves



Controller PCB for the heat pump (HMU)

– The electronics system (HMU = heat pump management unit) can be used to implement the control and regulation functions for the heat pump.
– The unit state is permanently monitored, unit faults analysed and shown on the display (unit status and fault information).
– The controller PCB manages the sensors (temperature sensors, pressure sensors, etc.) and actuators (pumps, 4WV, EEV, diverter valves, etc.) in the heat pump.



Controller PCB for the heat pump (HMU)

– Contact thermostat connected to the blue terminal S 20

  Contact closed:

  Temperature OK

  Contact open:

  Thermostat triggered

– Power supplier (energy supply company) lockout contact connected to the white terminal S21

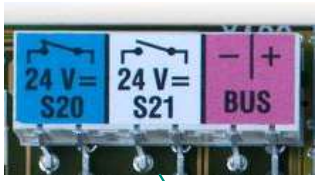
  Contact open:

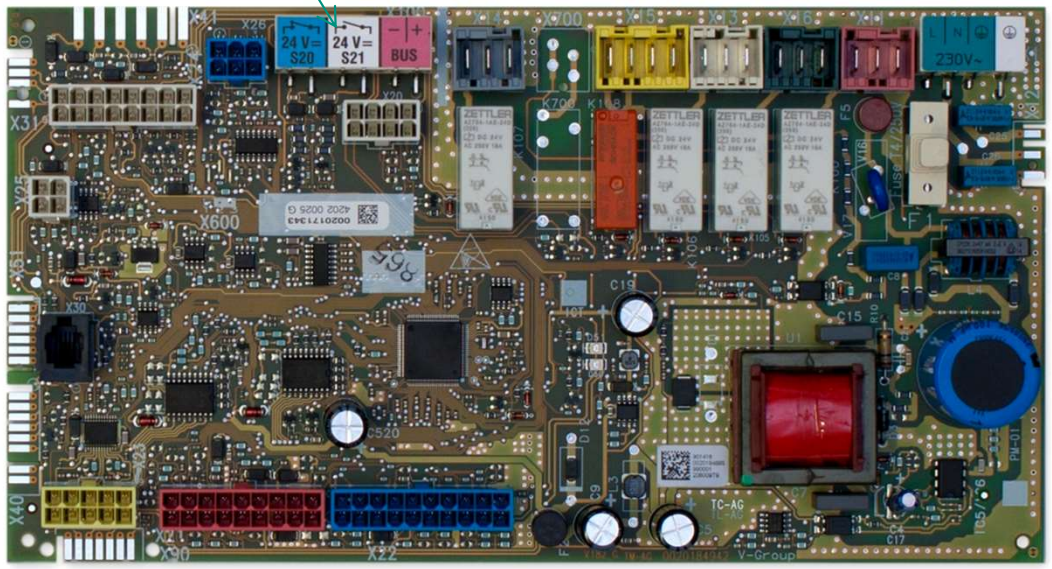
  No anti-cycling time

  Contact closed:

  Idle period

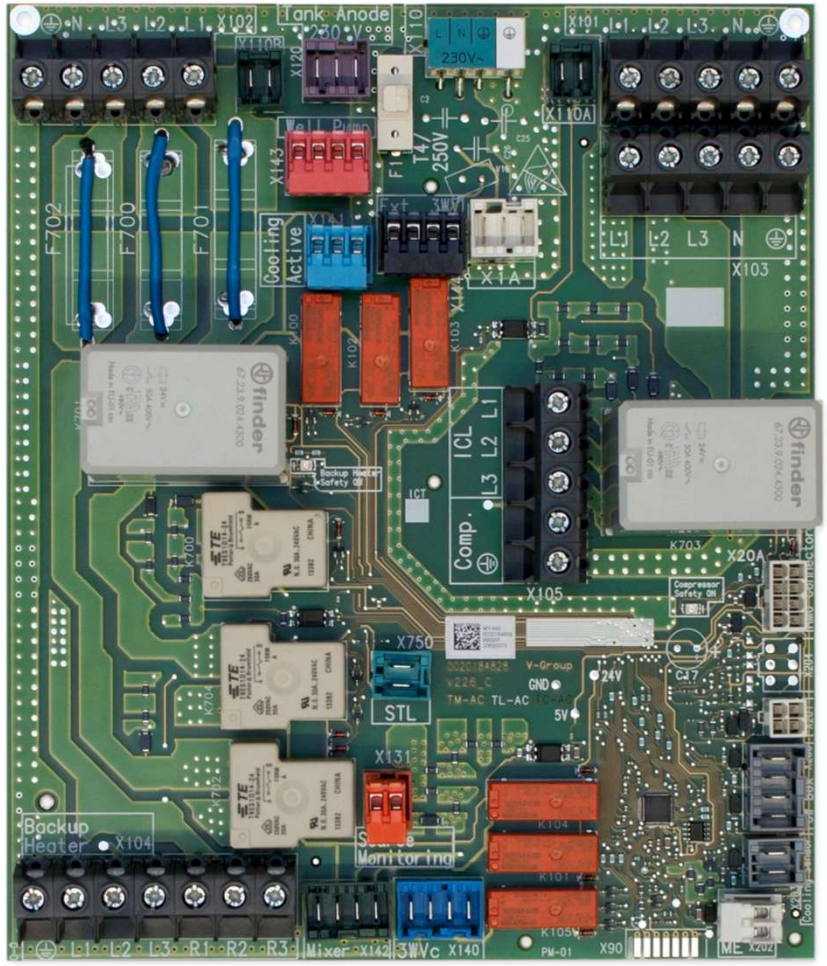
  Status message S.173



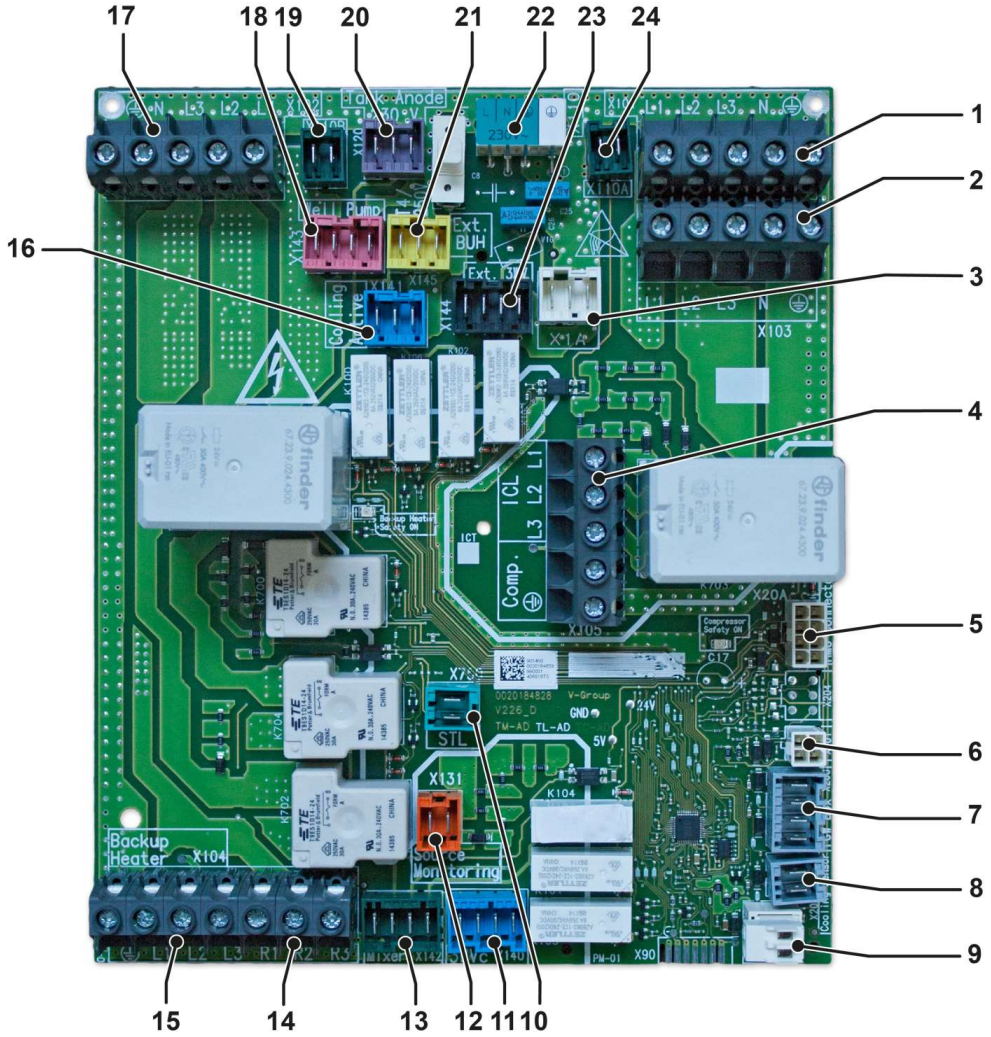


Mains PCB

– The mains power supply for the compressor, for the auxiliary electric heating and for the mains connection for the controller PCB can be found on the mains PCB.
– The other connections include:
An optional brine pressure switch, an external diverter valve and the signal output for active cooling mode.



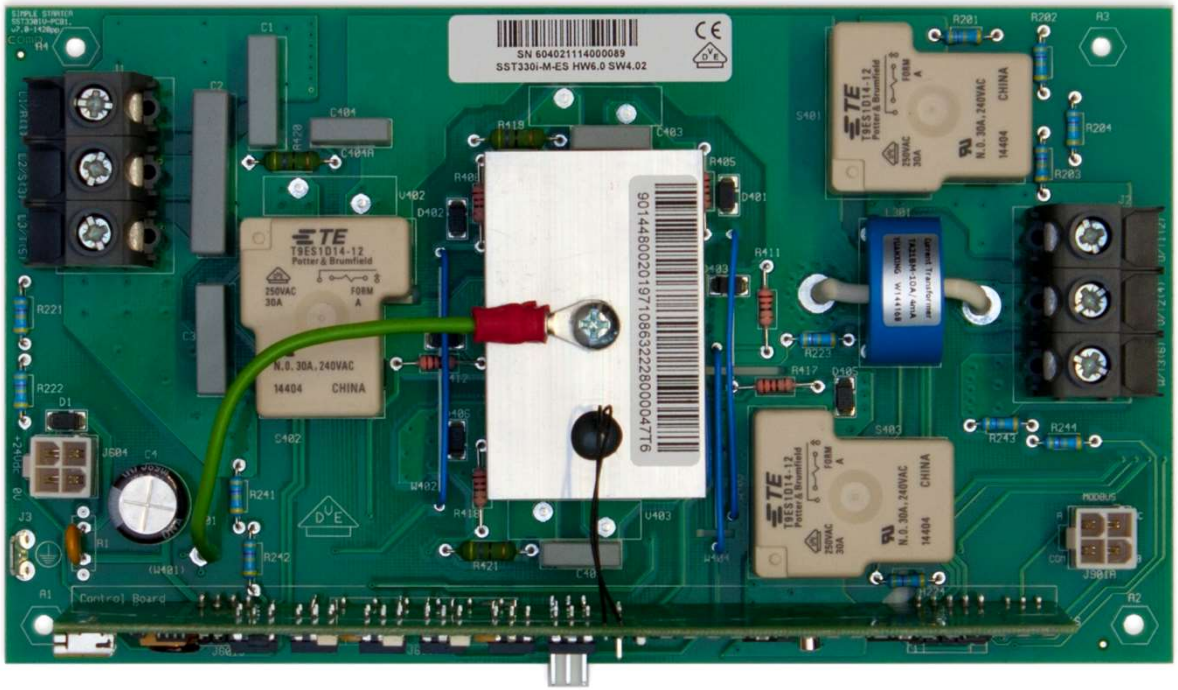
Mains PCB



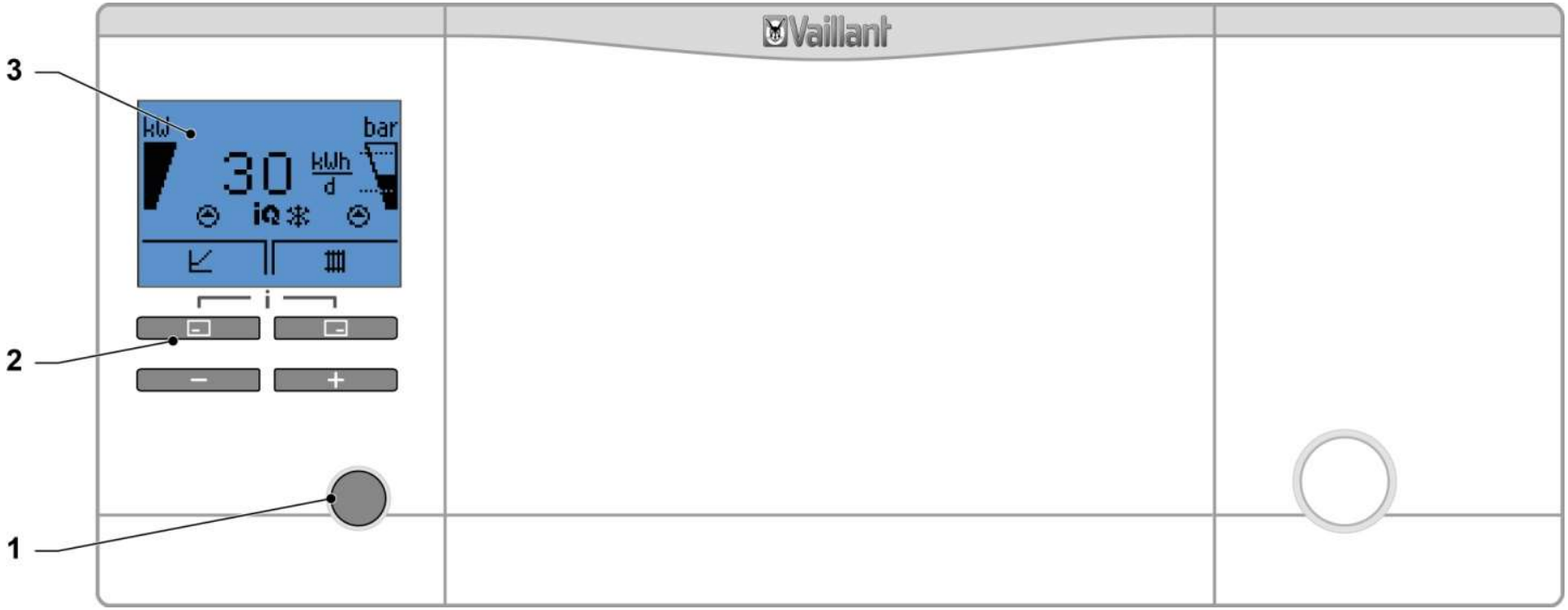
1 Perm. power supply (400V)
2 Opt. power supply to 17 (aux. backup heater)
3 Power supply controller PCB
4 Inrush current limiter
5 Connector communication line controller PCB
6 Not used
7 Opt.Temperature sensors fluoCOLLECT
8 Opt. flow temperature sensor Heating circ.
Pass. cooling modul
9 Without any function
10 STL internal aux. heater
11 Div. valve. pass. cooling HC.
12 Opt. brine press. switch
13 Mixer valve pass. cooling
14+15 Power supply exit internal aux. heater
16 Signal active cooling (230V)
17 Power suppy inlet internal aux. heater (400V)
18 Well pump
19 Opt. connection to 22
20 Power supply protection anode
21 Ext. Backup heater (230V)
22 Power suppy controller PCB
23 Ext. 3 way valve HC / DHW
24 Opt. connection to 22

In-rush current limiter for the compressor

All heat pumps in the flexoTHERM series are equipped with an in-rush current limiter (soft starter) as standard. With the in-rush current limiter, by means of phase control, the start-up current in the start-up phase of the compressor is reduced.



Operating and display elements



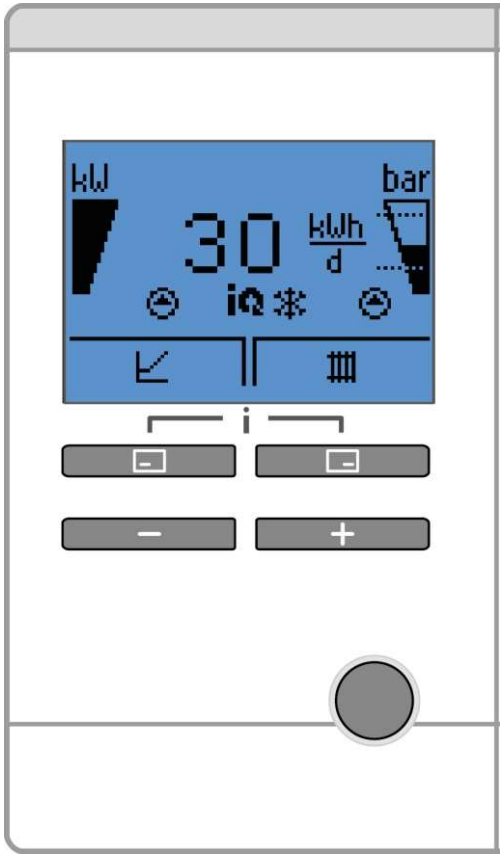
The Digital Information and Analysis System consists of:

1 Fault clearance key to clear faults

2 Operating buttons

3 Display

Operating concept



Operating buttons:

You can use the **left-hand selection button** to:
- directly access the yield query
- cancel the change to a set value
- go one selection level higher in the menu

You can use the **right-hand selection button** to:
- confirm a set value
- go one selection level lower in the menu

You can use the **minus and plus buttons** to:
- switch back and forth between the individual points of the entry list in the menu
- increase or decrease a selected set value

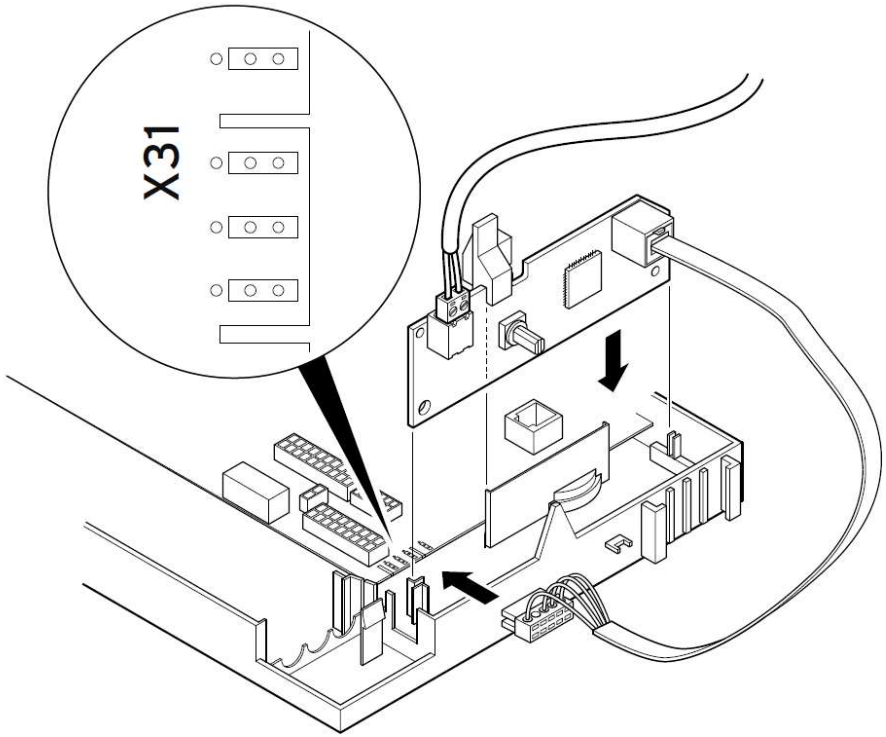
You can use the **fault clearance key** to reset the heat pump from the fault condition to standby (reset).

Explanation of display symbols

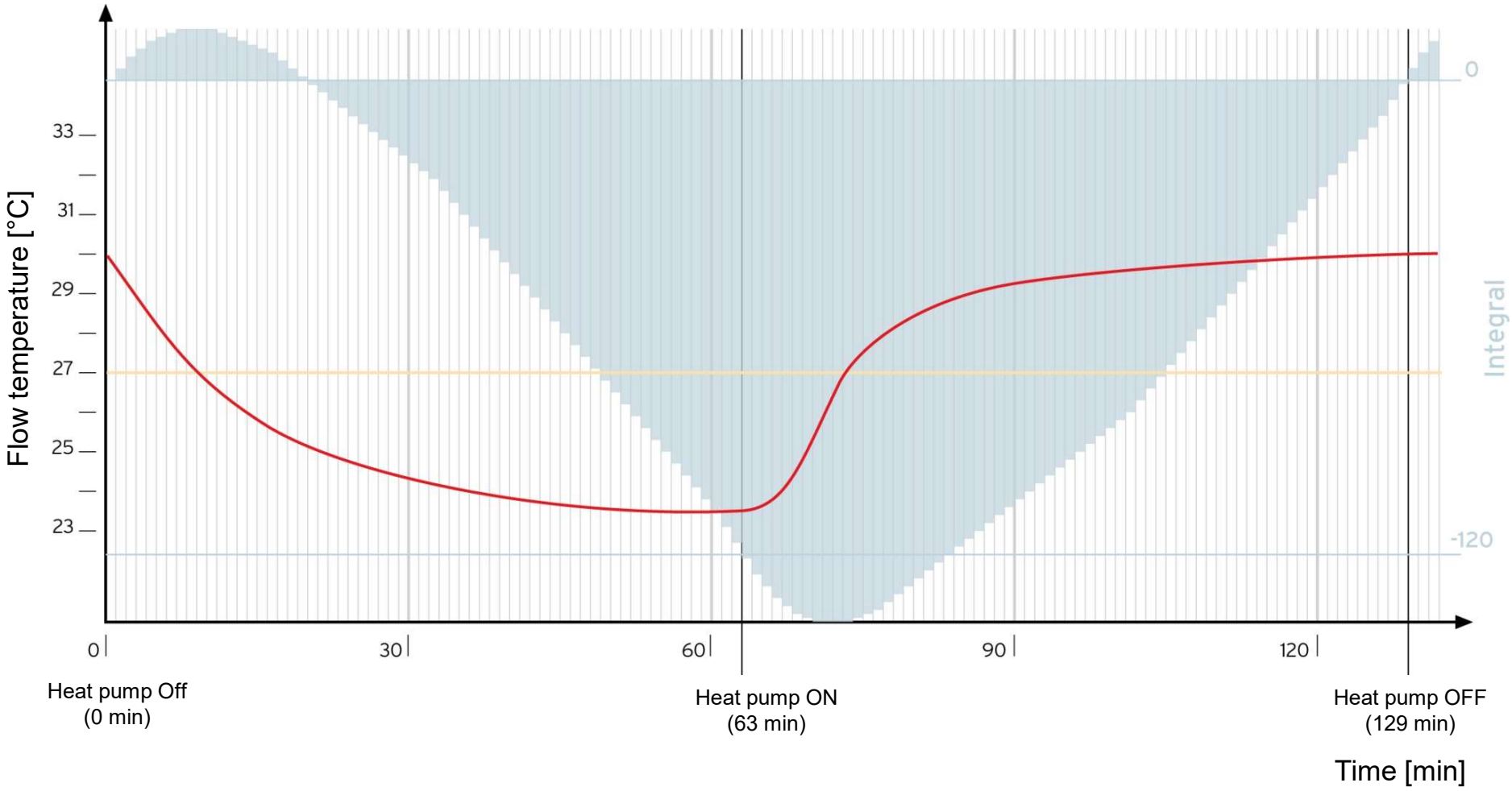
	Displays the heat pump output. If the display is completely full, this means that the heat pump is at maximum output (with the flexoTHERM, it is always completely full when the compressor is running)
	Auxiliary heater in operation , Intern / Extern
bar 	Displays the current filling pressure of the heating system (bar graph display). The filling pressure should be in the mid range between the two dotted lines. Bottom line = 0.8 bar, top line = 3 bar, completely full bars: 4.5 bar **Permanently on:** The filling pressure is within the permitted range. **Flashing:** The filling pressure is outside of the permitted range (≤ 0.8 or ≥ 3.0 bar).
	Heating mode active **Permanently on:** Heat pump in heating mode (with compressor and/or heating rod) **Off:** No request from the controller or internal flow temperature control has switched off
	Cooling active **Permanently on:** Heat pump in cooling mode **Off:** No request from the controller or internal flow temperature control has switched off
	Once the button below the symbol has been pressed, the daily yield is displayed separately for heating mode, hot water handling mode and cooling mode
 F.XX	Fault in the boiler. Appears instead of the basic display; a plain text display explains the displayed fault code.
	Building pump (right pump symbol) / brine circuit pump (left pump symbol) **Permanently on:** Pump in operation
	Hot water generation (cylinder charging) active **Permanently on:** Heat pump in hot water handling mode **Permanently off:** No hot water request from the controller

VR 32/3 modulating bus coupler

– A Vaillant eBUS boiler and the flexoTHERM both have a Vaillant live eBUS interface. To decouple, a VR 32/3 bus coupler is therefore required. This is integrated into the boiler.
– The eBUS address must be set to "2" on the selector switch



Energy balance control



Start/stop conditions for the compressor:

Start (example):– 120 °min (adjustable)

Stop: 0 °min (fixed value)

or

Start: Deviation from calculated flow temperature ≤ -7 K

Stop: Deviation from calculated flow temperature ≥ +7 K

Energy balance control (example)

Time	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Target value	27	27	27	27	27	27	27	27	27	27	27
Actual value	30	30	30	29	29	28	28	28	27	27	27
Integral	0	+3	+6	+8	+10	+11	+12	+13	+13	+13	+13
	Heating pump off										
Time	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**
Target value	27	27	27	27	27	27	27	27	27	27	27
Actual value	26	26	26	26	26	26	25	25	25	25	25
Integral	+12	+11	+10	+9	+8	+7	+5	+3	+1	-1	-3
Time	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**
Target value	27	27	27	27	27	27	27	27	27	27	27
Actual value	25	25	25	25	25	25	25	25	25	25	25
Integral	-5	-7	-9	-11	-13	-15	-17	-19	-21	-23	-25
Time	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**
Target value	27	27	27	27	27	27	27	27	27	27	27
Actual value	24	24	24	24	24	24	24	24	24	24	24
Integral	-28	-31	-34	-37	-40	-43	-46	-49	-52	-55	-58
Time	**44**	**45**	**46**	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**
Target value	27	27	27	27	27	27	27	27	27	27	27
Actual value	24	24	24	24	24	24	24	24	24	24	24
Integral	-61	-64	-67	-70	-73	-76	-79	-82	-85	-88	-91
Time	**55**	**56**	**57**	**58**	**59**	**60**	**61**	**62**	**63**	**64**	**65**
Target value	27	27	27	27	27	27	27	27	**27**	27	27
Actual value	24	24	24	24	24	24	23	23	**23**	23	24
Integral	-94	-97	-100	-103	-106	-109	-113	-117	**-121**	-125	-128
									HP on		

Time	**66**	**67**	**68**	**69**	**70**	**71**	**72**	**73**	**74**	**75**	**76**
Target value	27	27	27	27	27	27	27	27	27	27	27
Actual value	24	25	25	26	26	27	27	27	28	28	28
Integral	-131	-133	-135	-136	-137	-137	-137	-137	-136	-135	-134
Time	**77**	**78**	**79**	**80**	**81**	**82**	**83**	**84**	**85**	**86**	**87**
Target value	27	27	27	27	27	27	27	27	27	27	27
Actual value	29	29	29	29	29	29	29	29	29	29	29
Integral	-132	-130	-128	-126	-124	-122	-120	-118	-116	-114	-112
Time	**88**	**89**	**90**	**91**	**92**	**93**	**94**	**95**	**96**	**97**	**98**
Target value	27	27	27	27	27	27	27	27	27	27	27
Actual value	29	29	29	29	29	29	29	29	29	29	29
Integral	-110	-108	-106	-104	-102	-100	-98	-96	-94	-92	-90
Time	**99**	**100**	**101**	**102**	**103**	**104**	**105**	**106**	**107**	**108**	**109**
Target value	27	27	27	27	27	27	27	27	27	27	27
Actual value	29	29	29	30	30	30	30	30	30	30	30
Integral	-88	-86	-84	-81	-78	-75	-72	-69	-66	-63	-60
Time	**110**	**111**	**112**	**113**	**114**	**115**	**116**	**117**	**118**	**119**	**120**
Target value	27	27	27	27	27	27	27	27	27	27	27
Actual value	30	30	30	30	30	30	30	30	30	30	30
Integral	-57	-54	-51	-48	-45	-42	-39	-36	-33	-30	-27
Time	**121**	**122**	**123**	**124**	**125**	**126**	**127**	**128**	**129**	**130**	**131**
Target value	27	27	27	27	27	27	27	27	27	27	27
Actual value	30	30	30	30	30	30	31	31	31	31	30
Integral	-24	-21	-18	-15	-12	-9	-5	-1	+3	+7	+10
									Heating pump		

Switch-on conditions for the heating mode of the heat pump

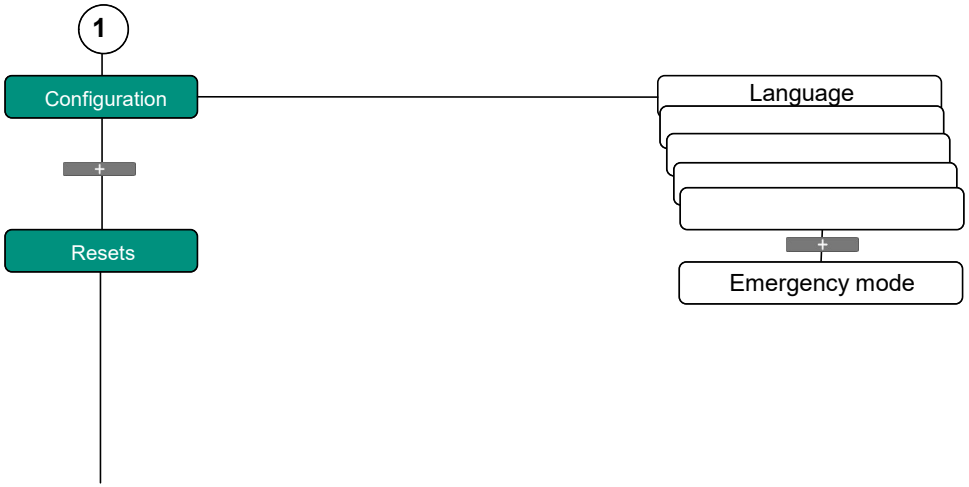
– The multiMATIC 700 requests the heat pump **or**
– The heat requirement from the multiMATIC 700 remains in place **and**
  The heat deficit (integral) of the object is greater than the set integral
  (e.g. – 120 °min) **or**
– The flow temperature falls below the hysteresis (default setting: 7 K) **and**
– It has been longer than 20 minutes since the last compressor start **and**
– The outside temperature is lower than the "outside temperature switch-off threshold" **and**
– The heating return temperature is lower than the set maximum value.

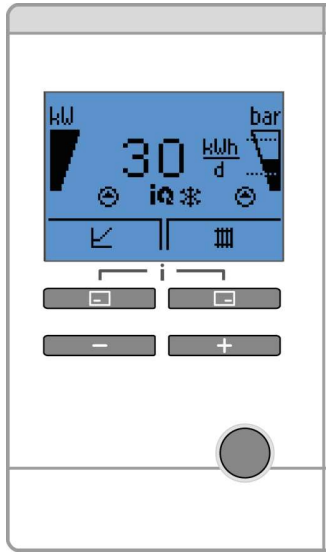
Switch-off conditions for the heating mode of the heat pump

- The multiMATIC 700 switches off the heat pump **or**
- The heat requirement from the multiMATIC 700 remains in place **but** the heat deficit (integral = 0 °min) is compensated for **or**
- The set hysteresis is exceeded (actual flow temperature compared to target value, after the compressor's minimum running time)
- The heat pump remains in a power supplier anti-cycling time
- The outside temperature exceeds the adjustable "outside temperature switch-off threshold"
- The maximum possible temperature on the heat pump is reached (in operation with underfloor heating, this should not happen).

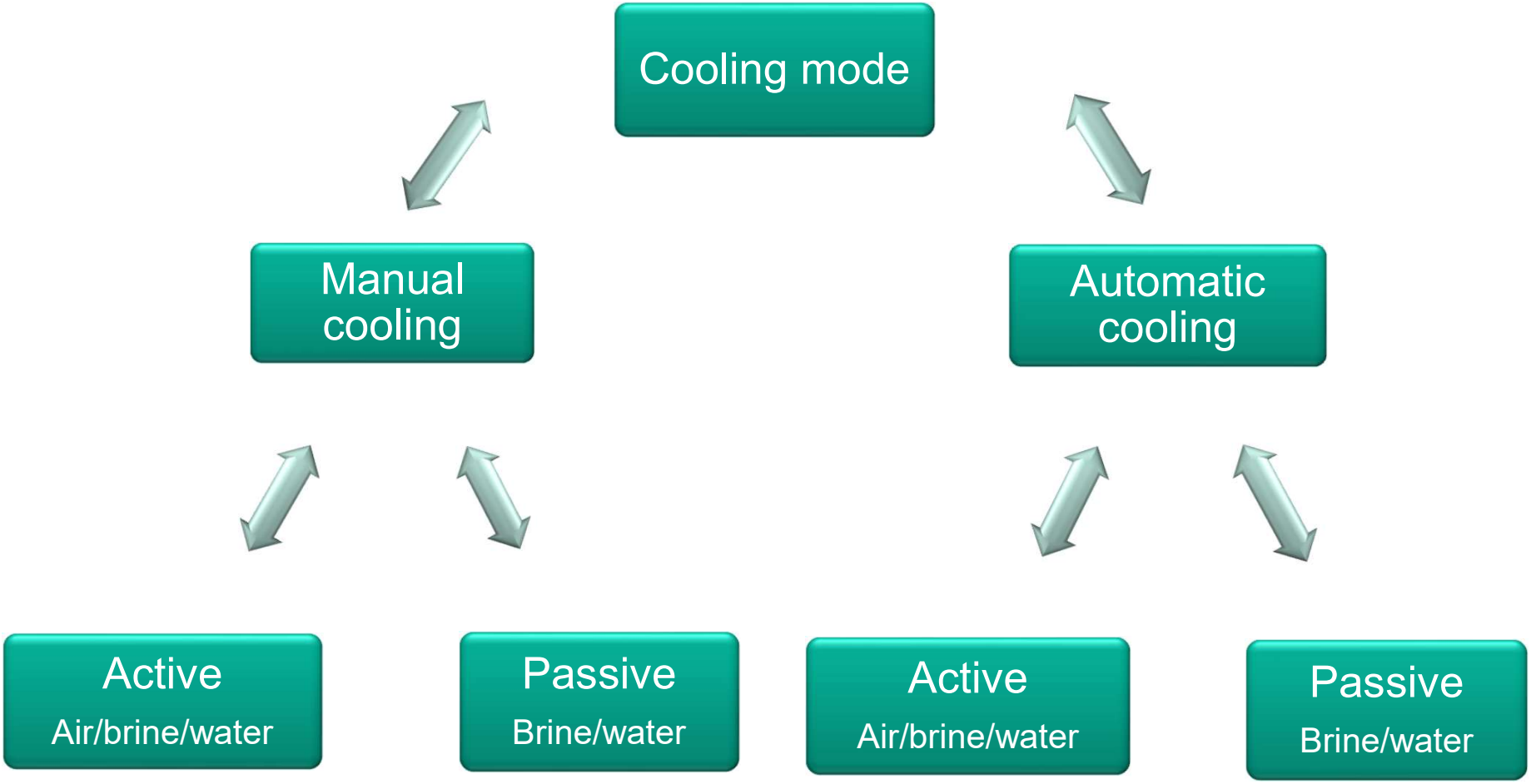
Heat pump emergency mode

– If there is no communication between the heat pump and the multiMATIC 700 system controller via eBUS (e.g. multiMATIC 700 not yet connected or possibly defective), "Emergency mode" can be activated under "Configuration".
– The selection button on the right can then be used as required to specify the various operating modes and the set target temperatures for these for emergency mode.

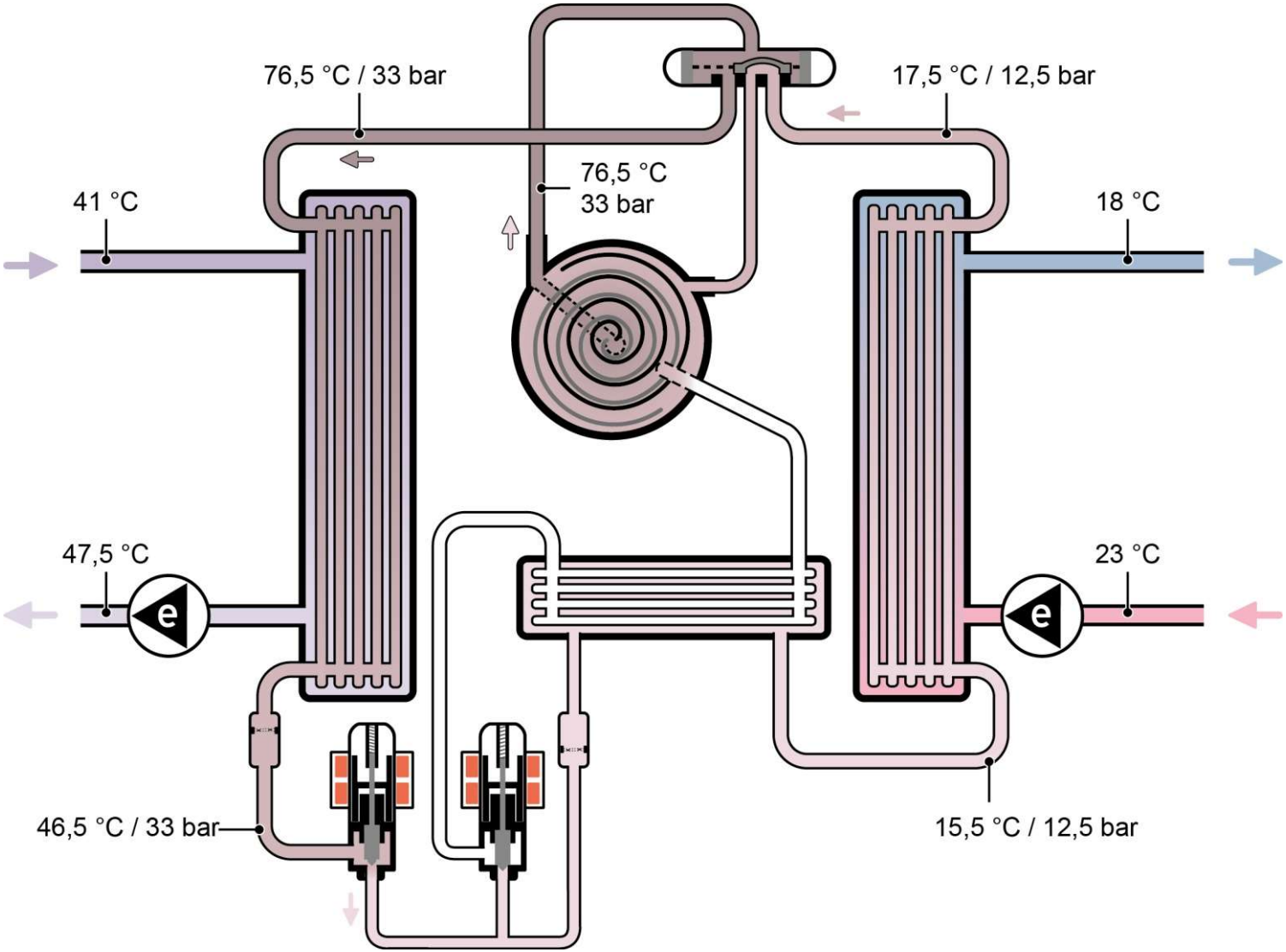




Cooling mode

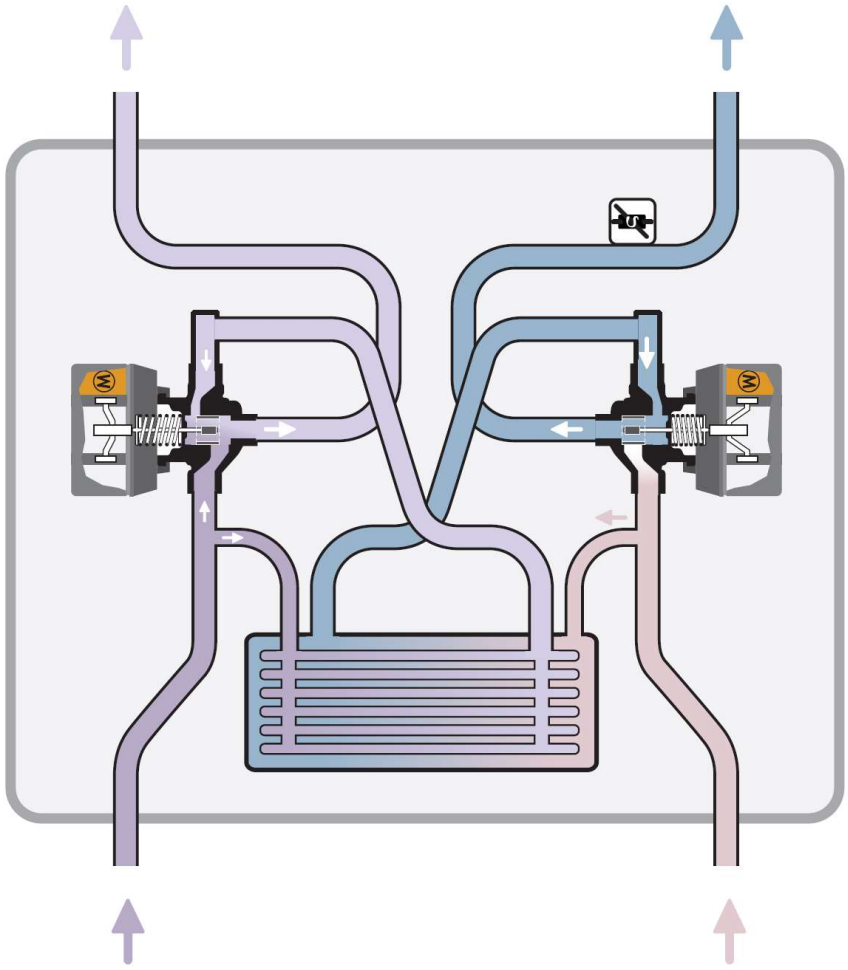


Active cooling mode

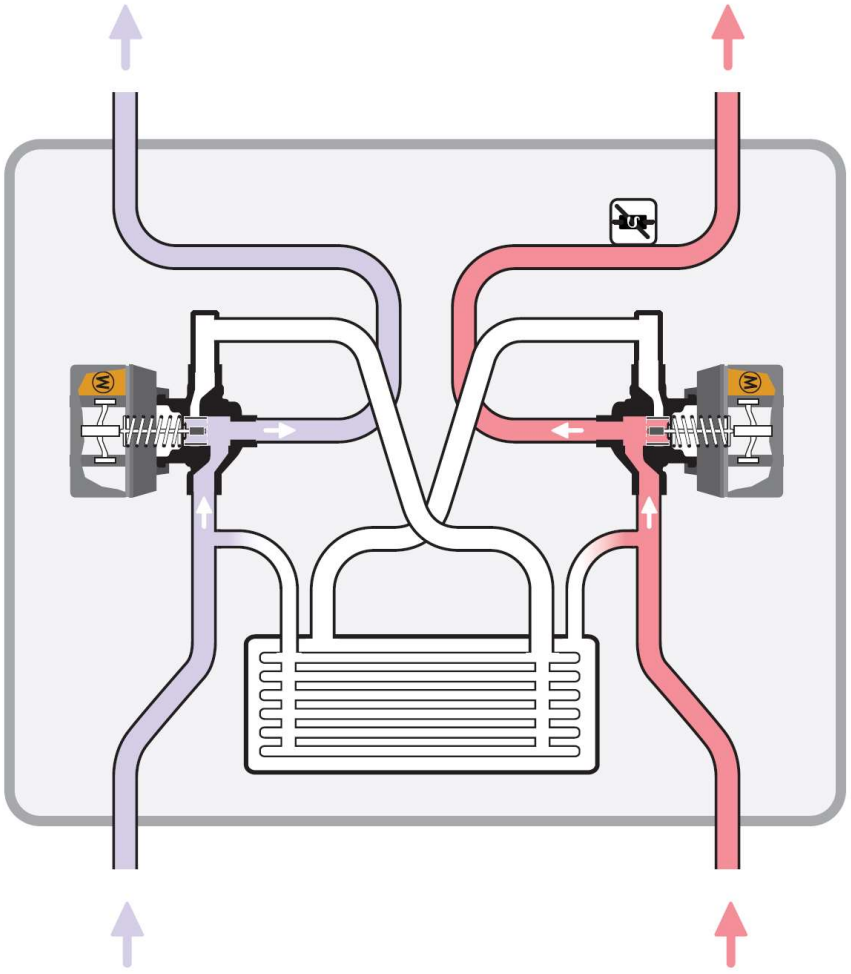


Passive cooling mode with cooling module

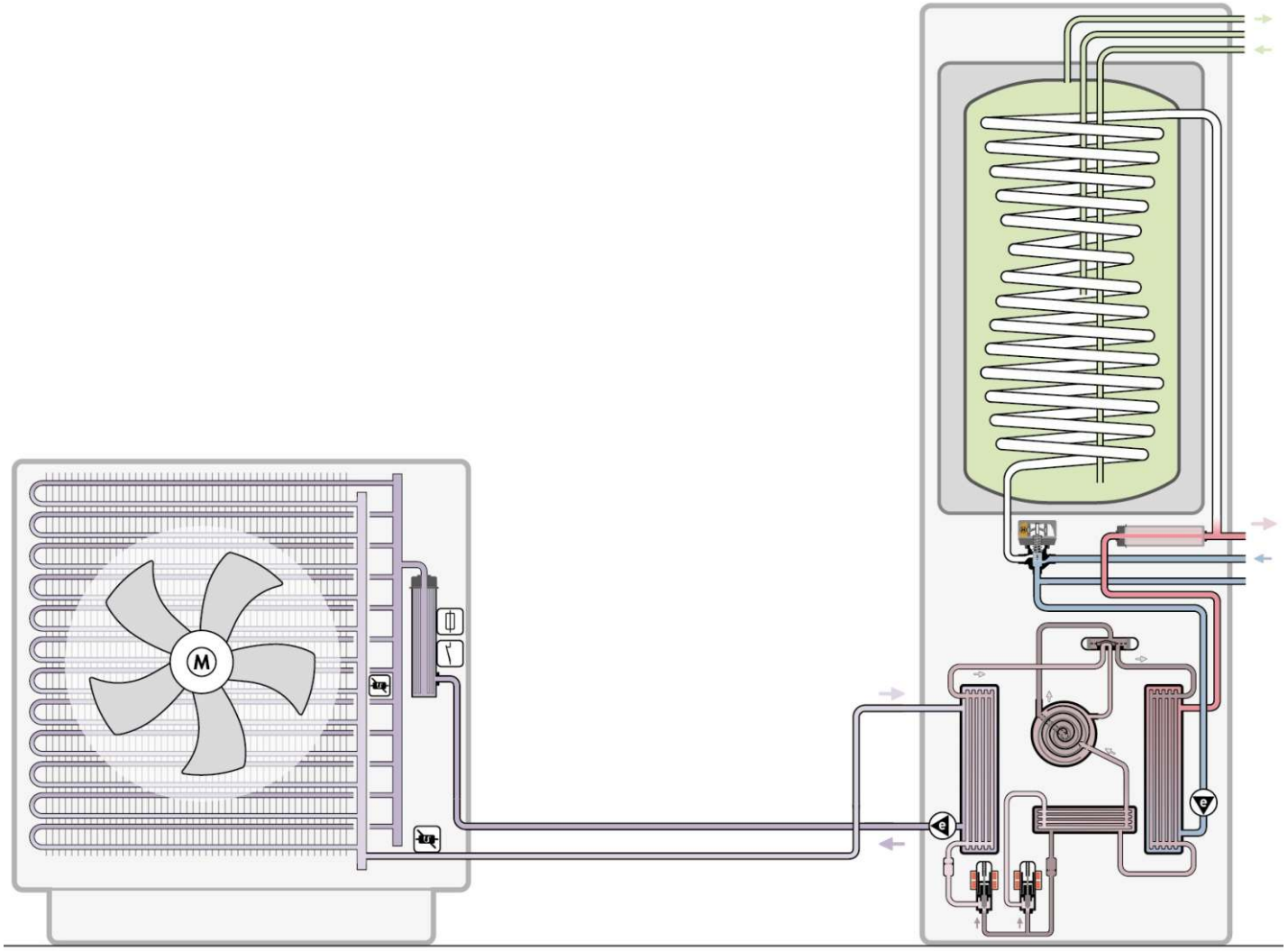
Cooling mode



Heating mode

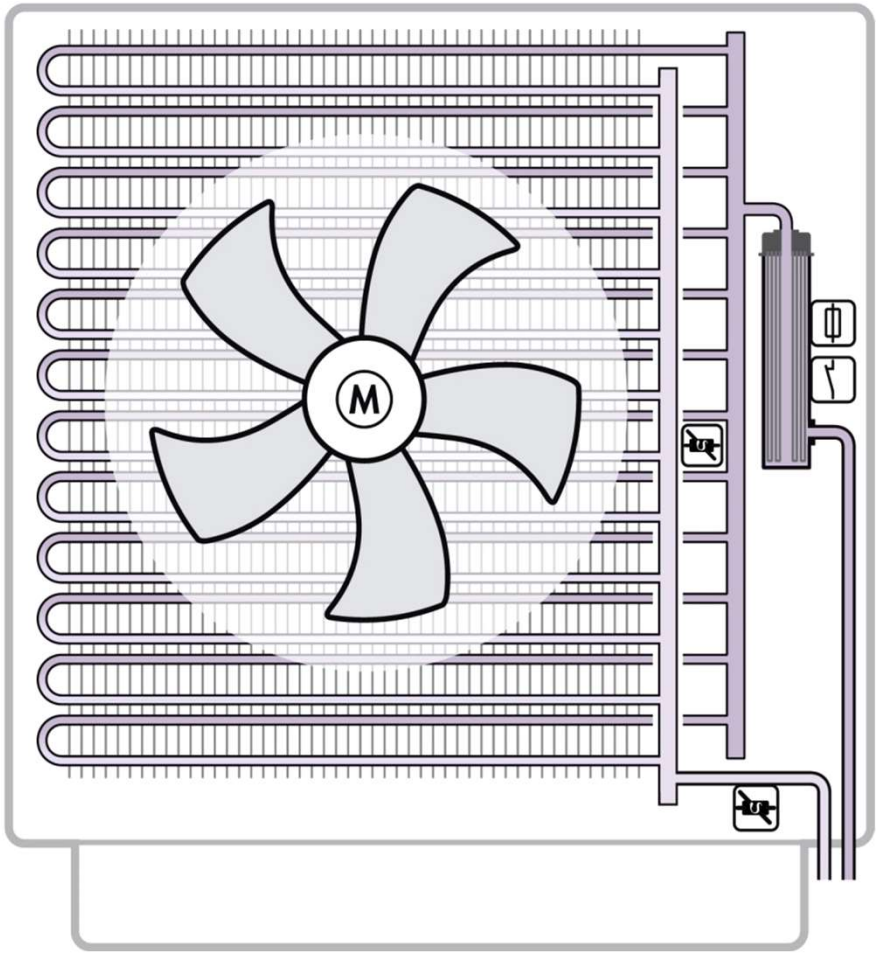


flexoCOMPACT heat pump with aroCOLLECT air/brine collector



aroCOLLECT air/brine collector

- Motor
- NTC-sensor
- Melting fuse
- Temperature limiter



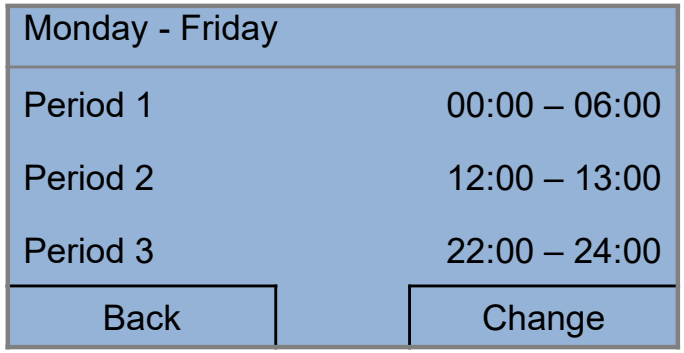
Outdoor unit fan (hybrid fan)

– The fan is used to create negative pressure before the ribbed heat exchanger. As a result, you achieve even air distribution via the entire pipe register of the heat exchanger, which has a positive effect on heat absorption and works to prevent early freezing in certain areas.

– The blades on the fan are made of a high-strength corrosion-resistant aluminium alloy which is surrounded by glass-reinforced plastic.

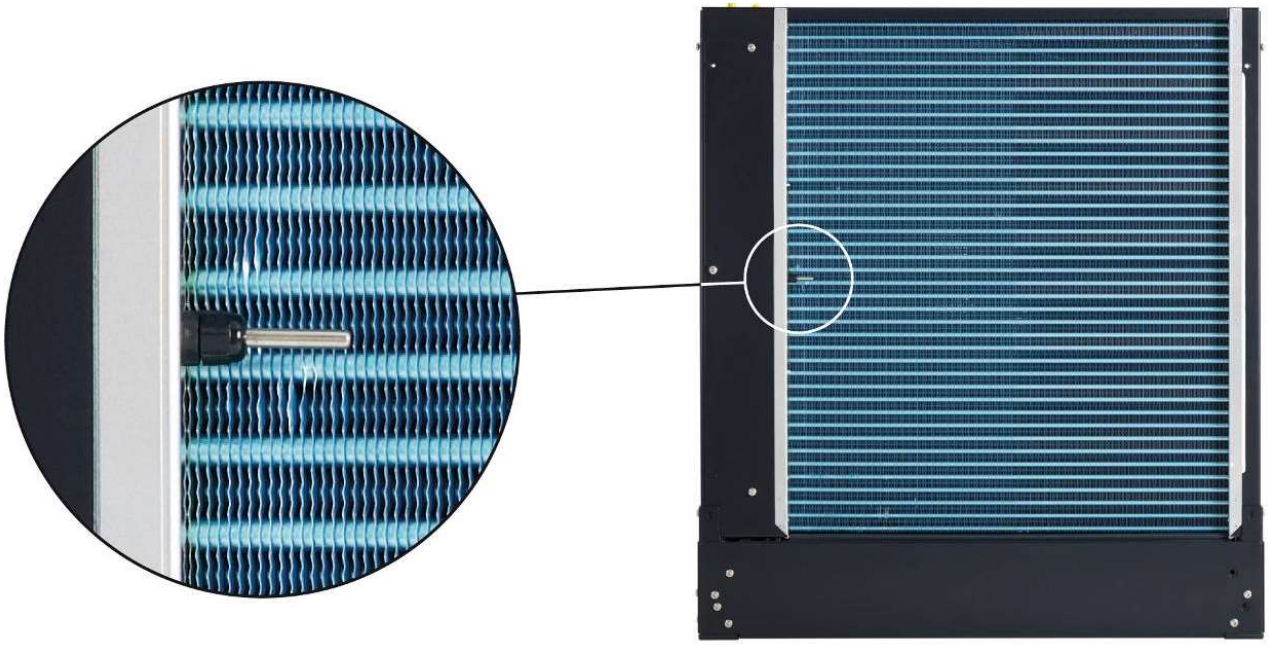
Noise-reducing function

– The fan starts at approximately 40% of its maximum speed and then gradually approaches the preset speed. This gentle fan start ensures minimal noise emissions.
– The multiMATIC 700 can be used to reduce the maximum speed of the fan in three time periods (can be adjusted by the customer) by 0% up to 40%.
– During the seasonal transition period at higher outside temperatures, the noise is also very low because the fan requires lower rotational speeds to transfer the required heat from the source.



Ribbed-pipe heat exchanger with NTC sensor

– The large-area heat exchanger consists of copper pipes equipped with aluminium ribs to increase the heat exchange surface.
– Individual pipe registers are wired in parallel.
– A sensor that is fitted on the intake side of the heat exchanger measures the current air inlet temperature at this point.



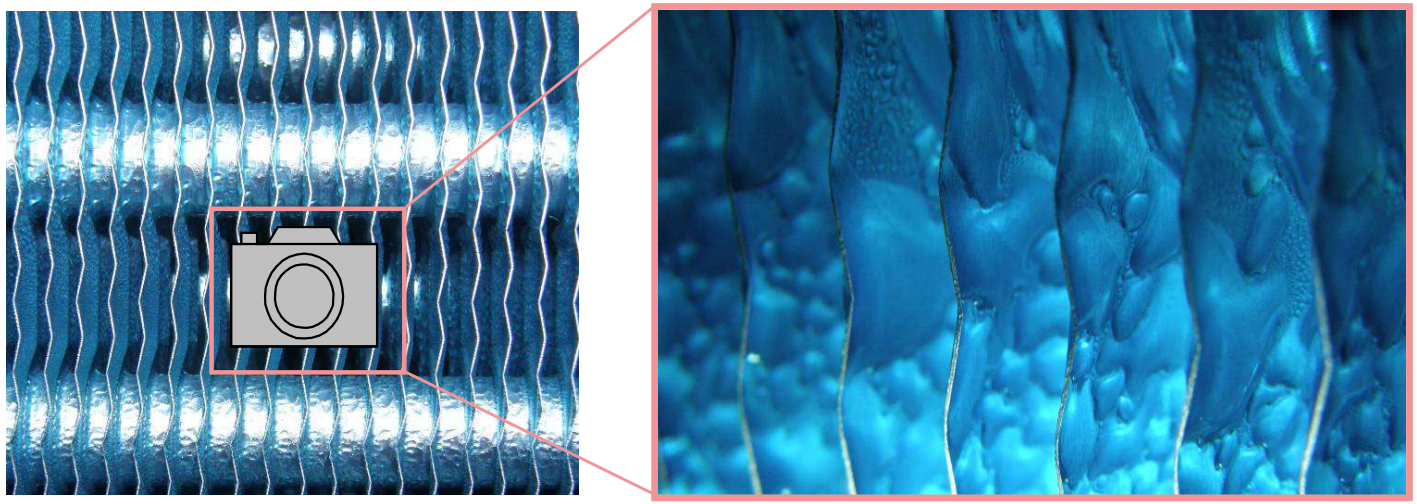
Coating of the heat exchanger with blue paint

The aluminium ribs on the heat exchanger are coated with a special blue paint.
The advantage of this coating:

– The **water drops that arise** through condensation from the outside air are formed **more flatly** thanks to this surface treatment, do not remain in the ribs due to the capillary effect and thus flow better.

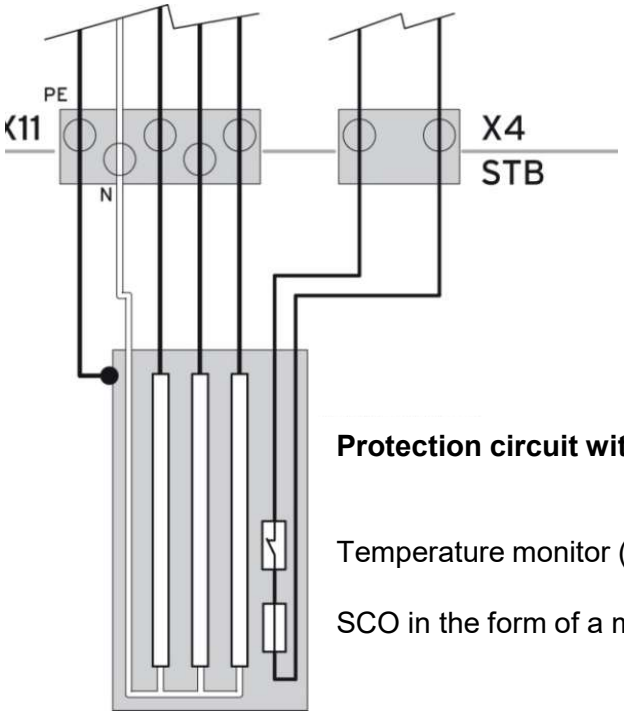
– The air resistance is thus reduced and leads to a lower fan power consumption.

– Furthermore, the blue paint coating provides good corrosion protection.



Auxiliary electric heating (defrost heater)

The air/brine collector is equipped at the factory with an auxiliary electric heater (defrost heater). It is integrated into the brine circuit in the flow direction before the heat exchanger.

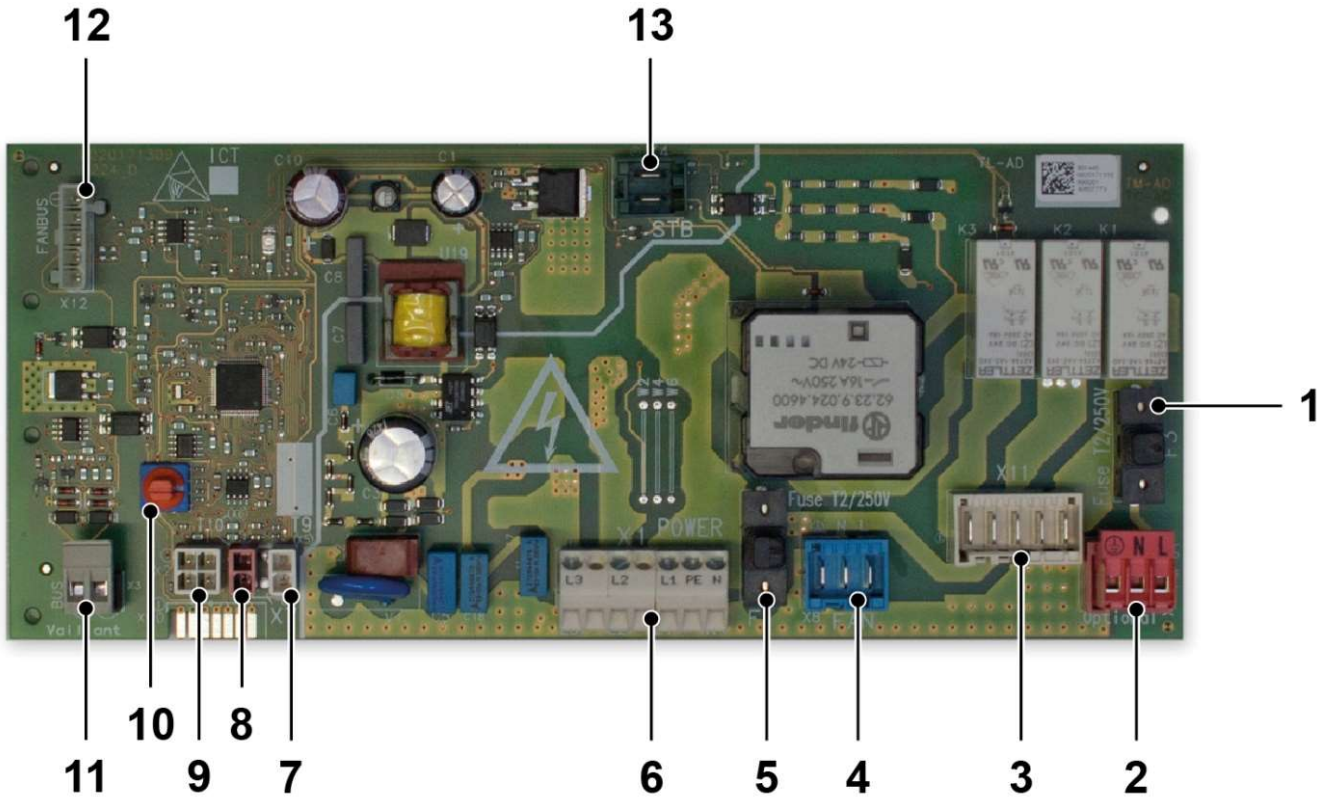


Protection circuit with:

Temperature monitor (OFF AT 70 °C/ON at 50 °C)

SCO in the form of a melting fuse (OFF at 120 °C)

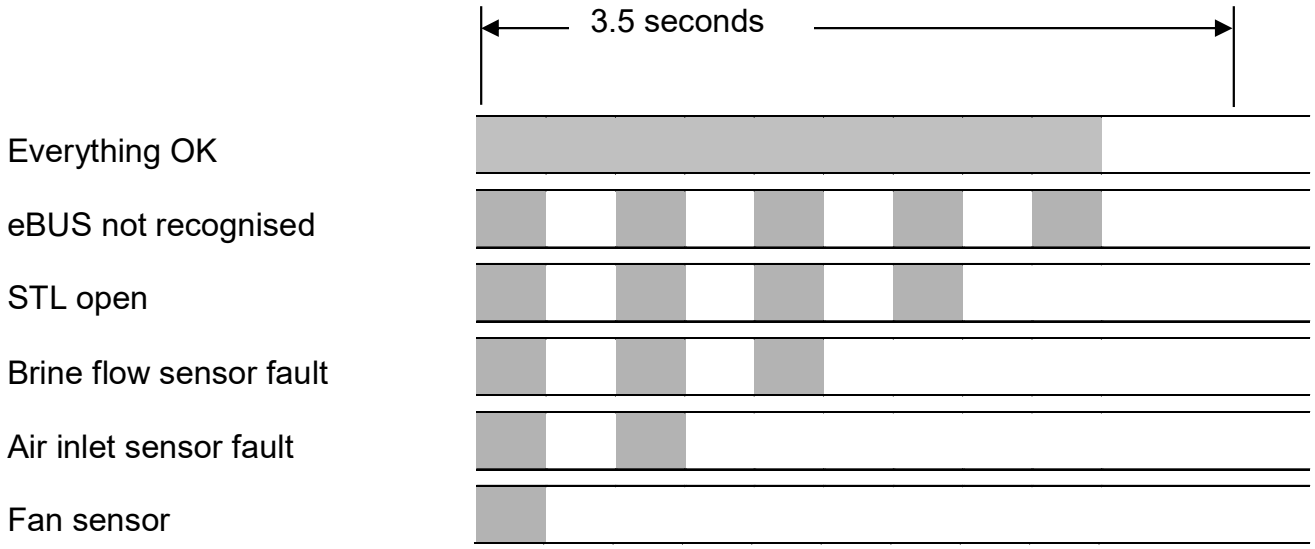
PCB in the air/brine collector



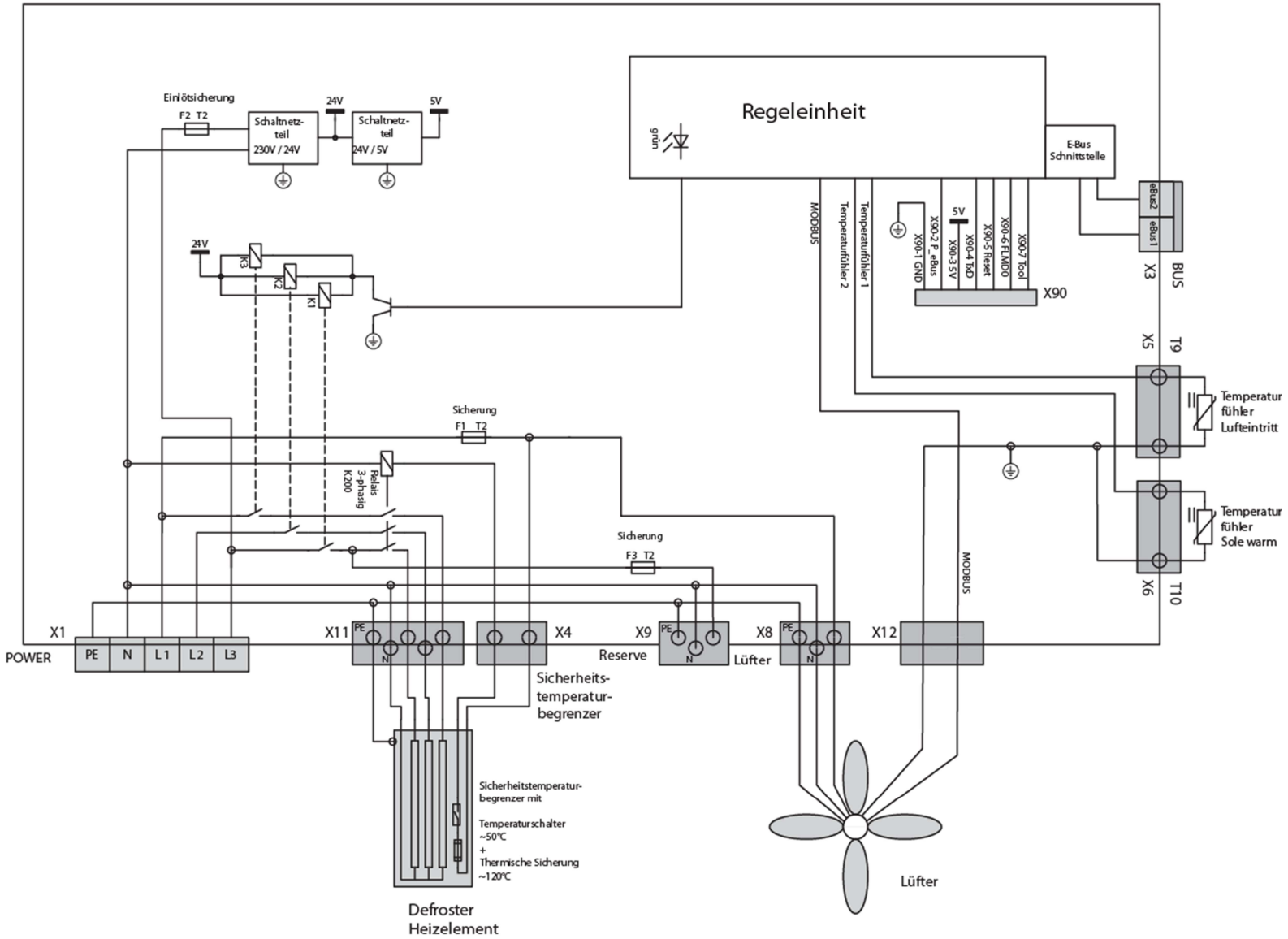
1 F3 fuse for optional accessories
2 Connection (maximum 200 W)
3 Connection for 400 V defrost heater
4 Fan voltage supply
5 F1 extra-low voltage fuse, fan
6 400 V power supply
7 Connection for T9 air inlet sensor (white plug)
8 Connection for brine heat sensor (pink plug)
9 Currently not in use
10 Address switch
11 eBUS connection
12 Speed regulation plug, fan monitoring
13 Defrost heater SCO connection

PCB of the air/brine collector

The PCB of the air/brine collector has a green LED which indicates a fault in the air/brine collector via a flashing code.

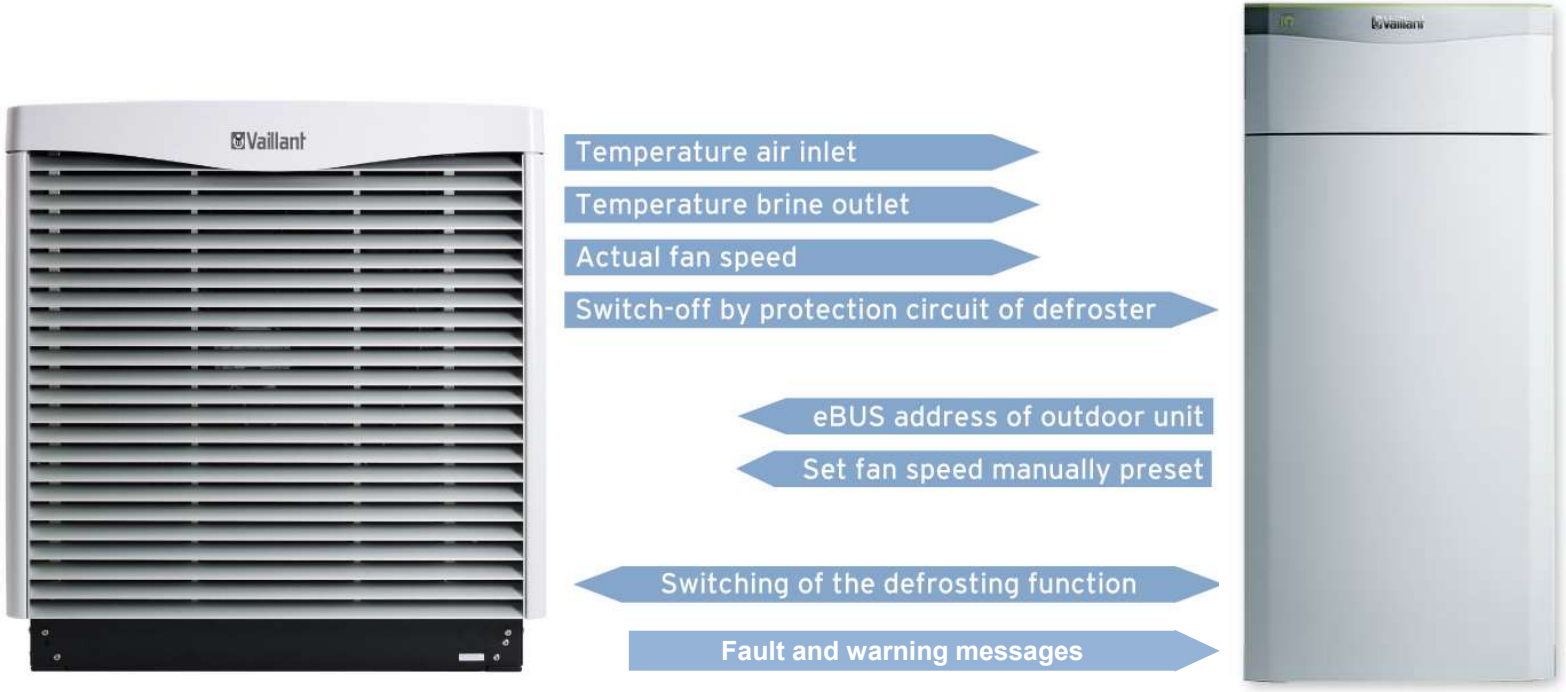


Electrical design of the PCB

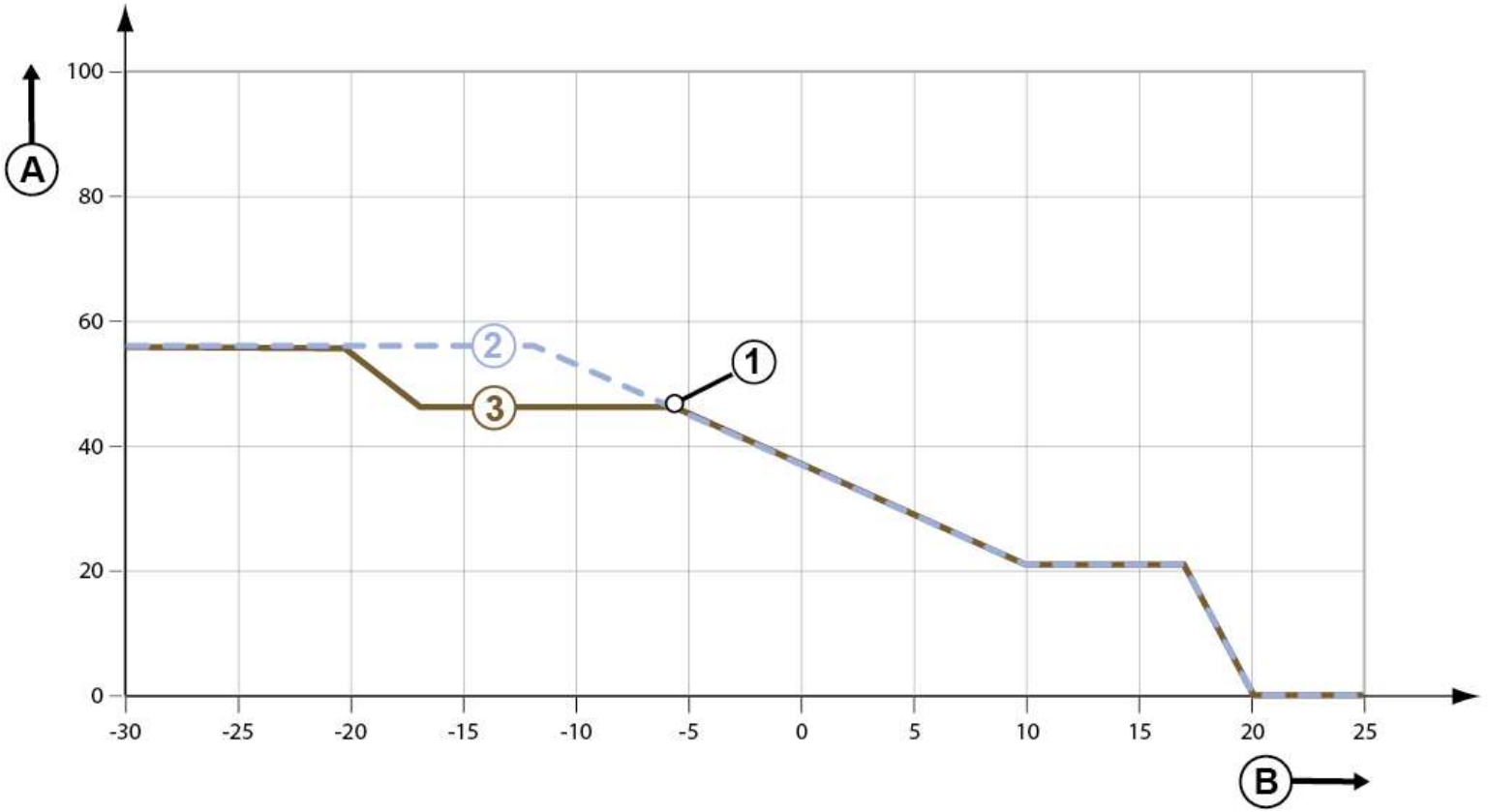


Information exchange via the eBUS connection

Information is exchanged between the inner and outer unit using the familiar eBUS.



Speed regulation of the fan in heating mode



Fan characteristic line for VWL SA

1 - start of noise reduction operation,

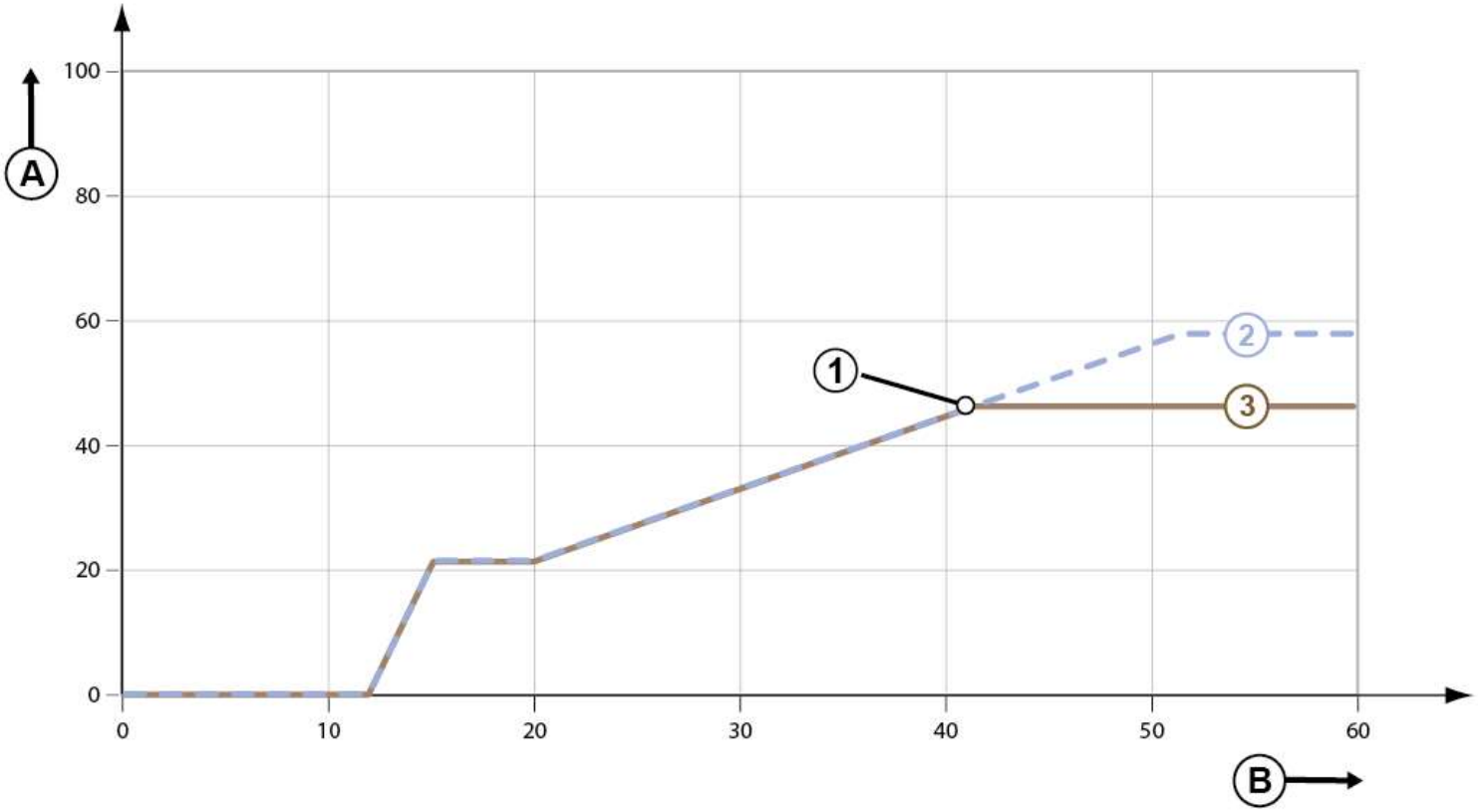
2 - standard characteristic line,

3 - characteristic line in noise reduction operation VWF 57/4,

A = fan speed in %,

B = brine temperature at outlet in °C

Speed regulation of the fan in cooling mode



Fan characteristic line for VWL SA

1 - start of noise reduction operation,

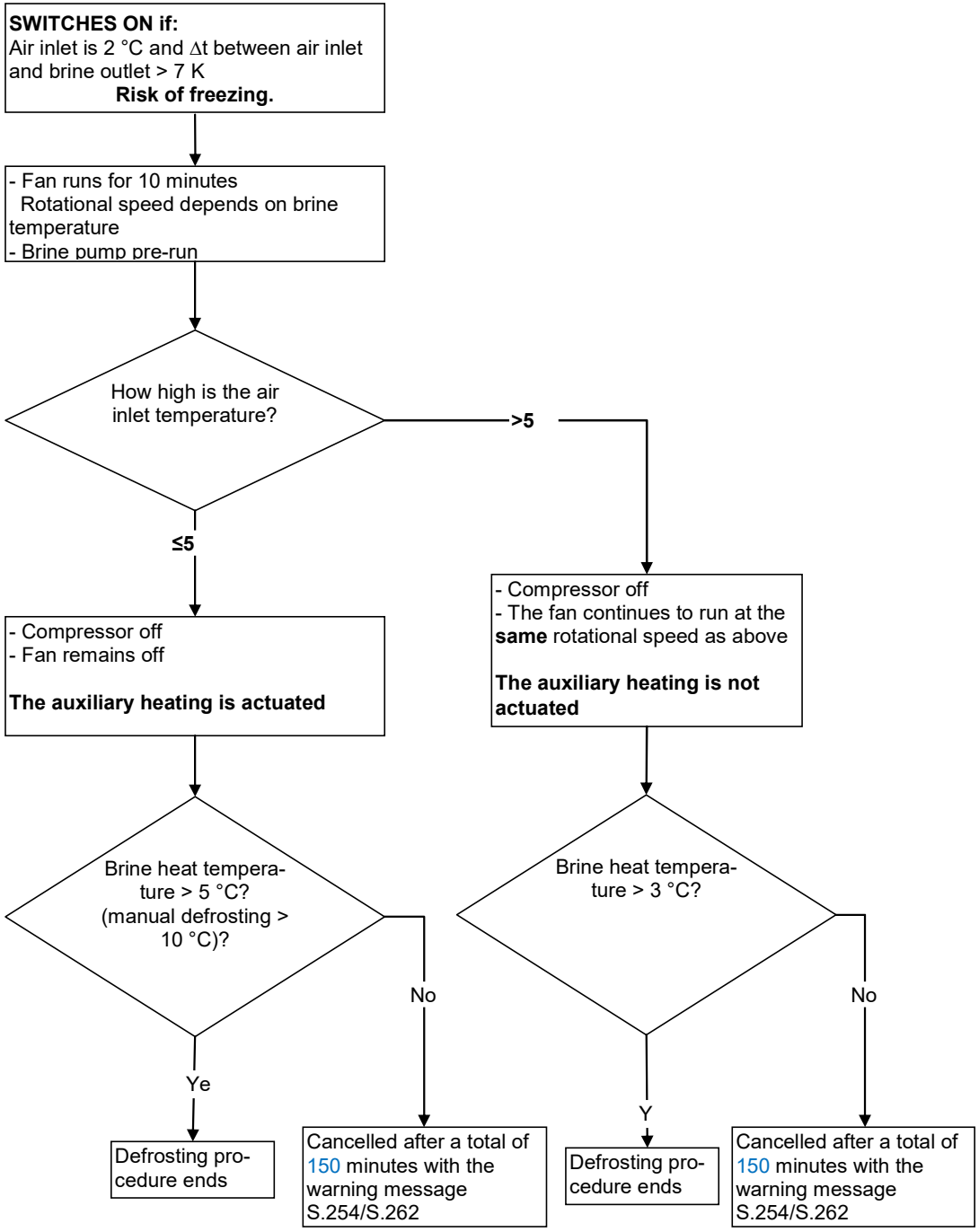
2 - standard characteristic line,

3 - characteristic line in noise reduction operation VWF 57/4,

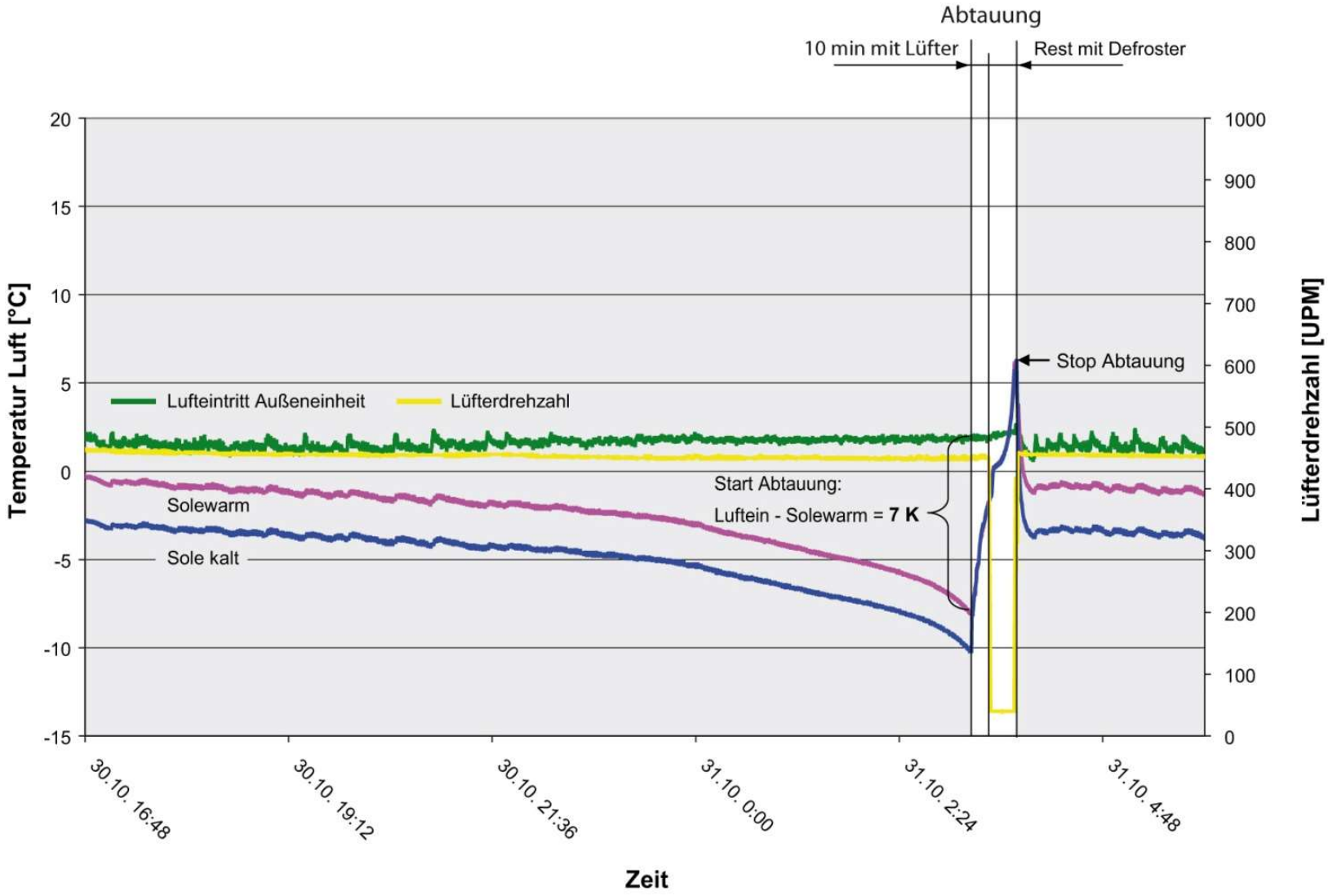
A = fan speed in %,

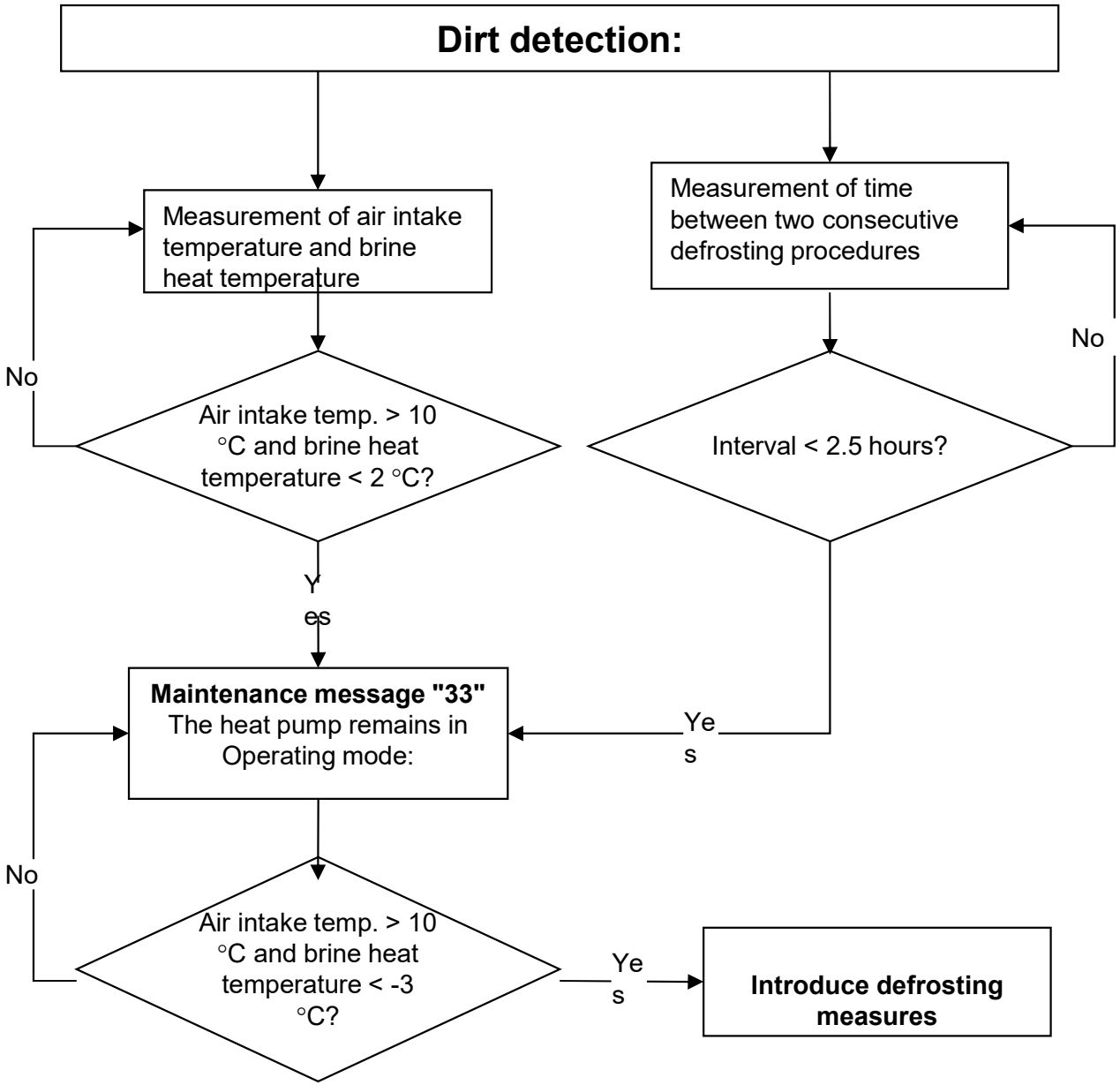
B = brine temperature at outlet in °C

Defrosting procedure sequence

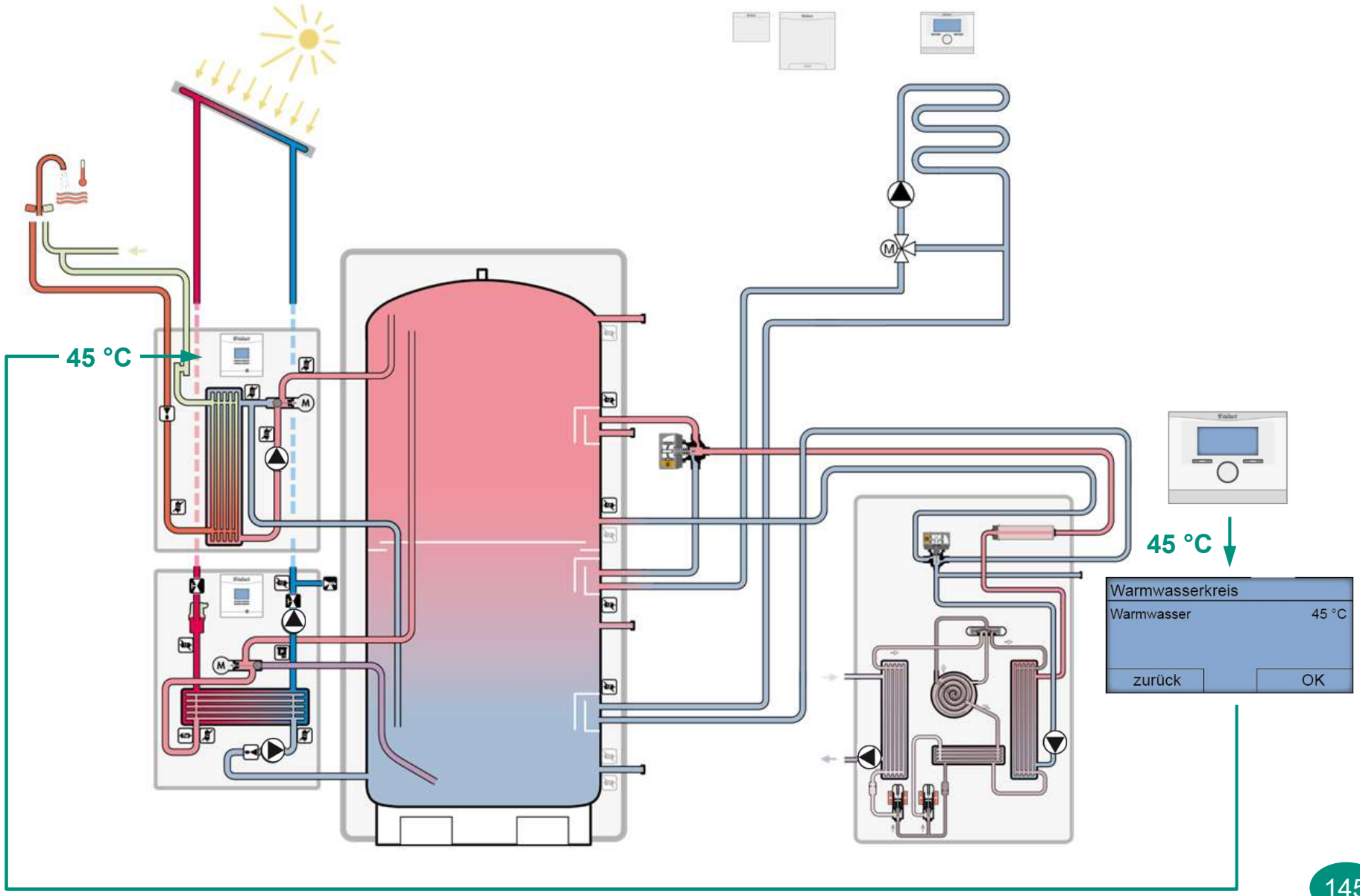


Defrosting routine for VWF 57/4 with aroCOLLECT

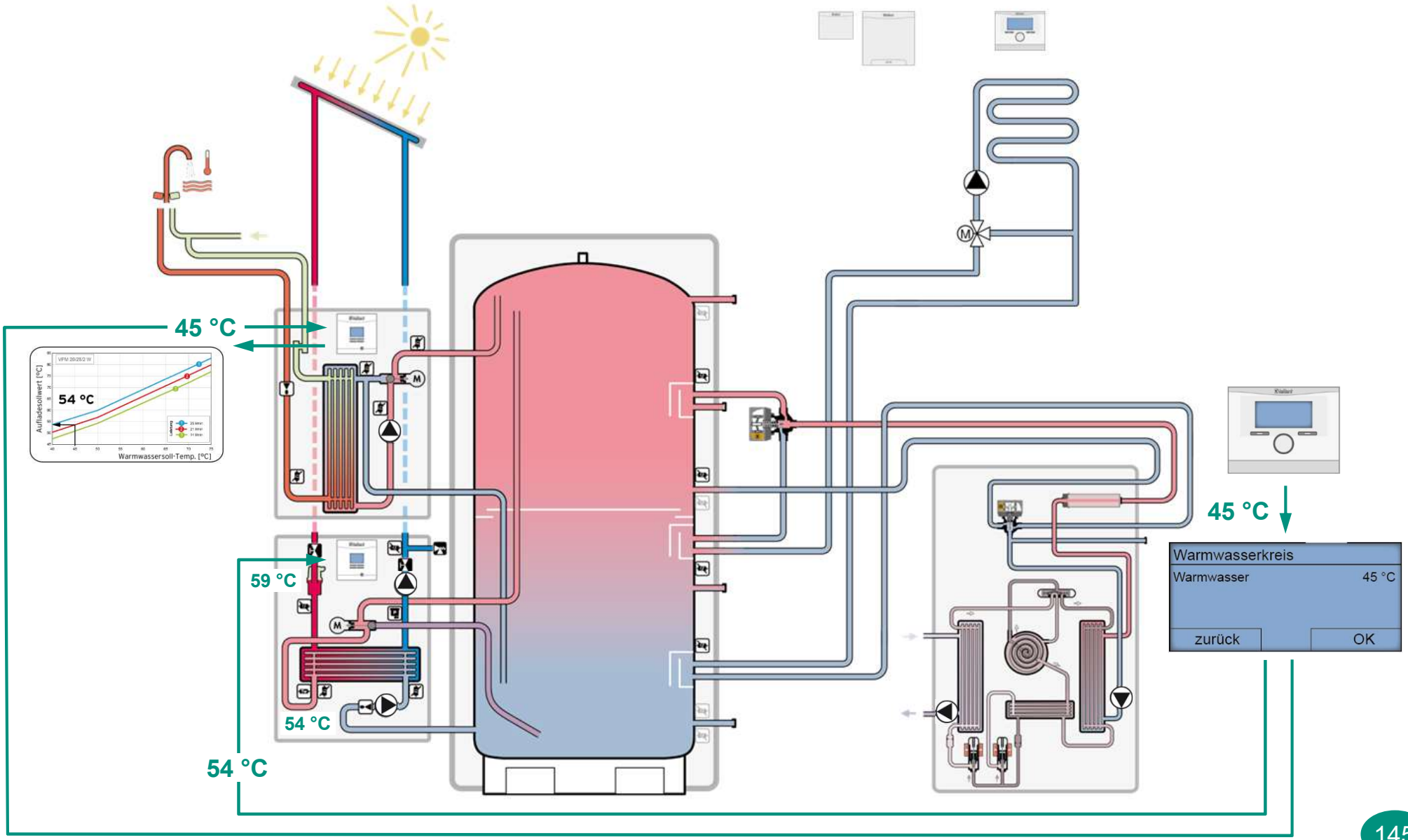



Dirt detection:
Measurement of air intake temperature and brine heat temperature
Measurement of time between two consecutive defrosting procedures
No
Air intake temp. > 10 °C and brine heat temperature < 2 °C?
Interval < 2.5 hours?
No
Yes
Maintenance message "33"
The heat pump remains in Operating mode:
Yes
No
Air intake temp. > 10 °C and brine heat temperature < -3 °C?
Yes
Introduce defrosting measures

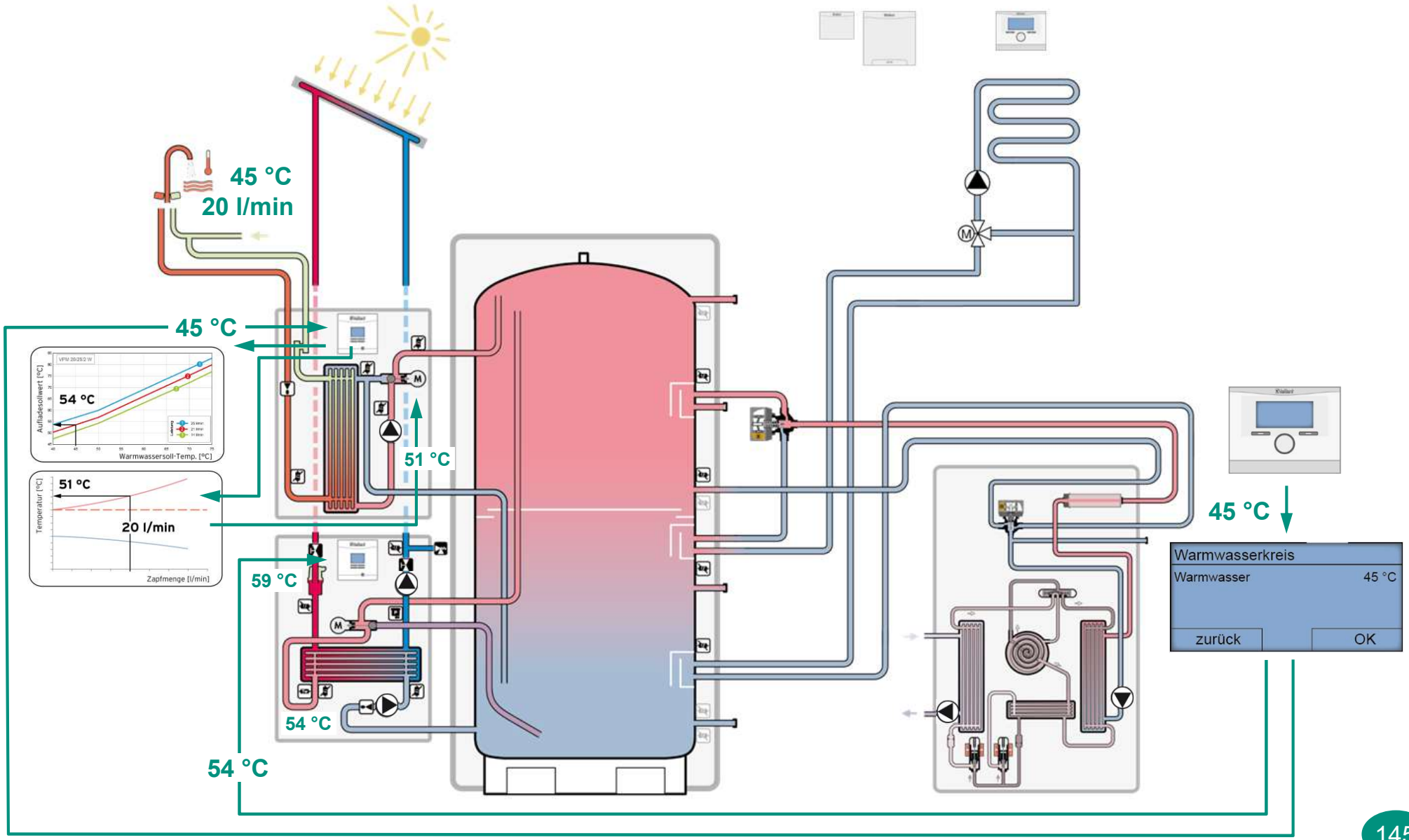
Hot water charging strategy



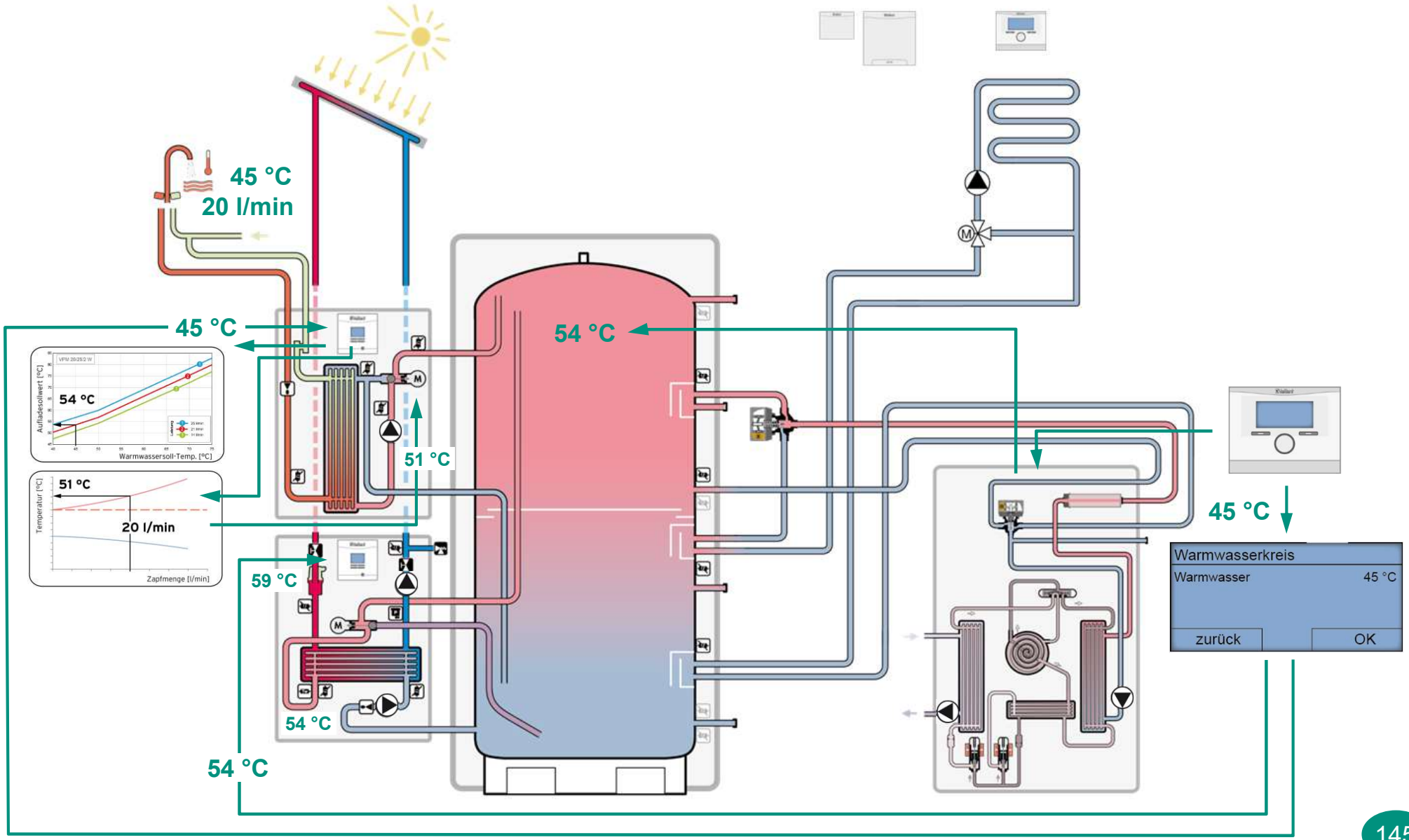
Hot water charging strategy



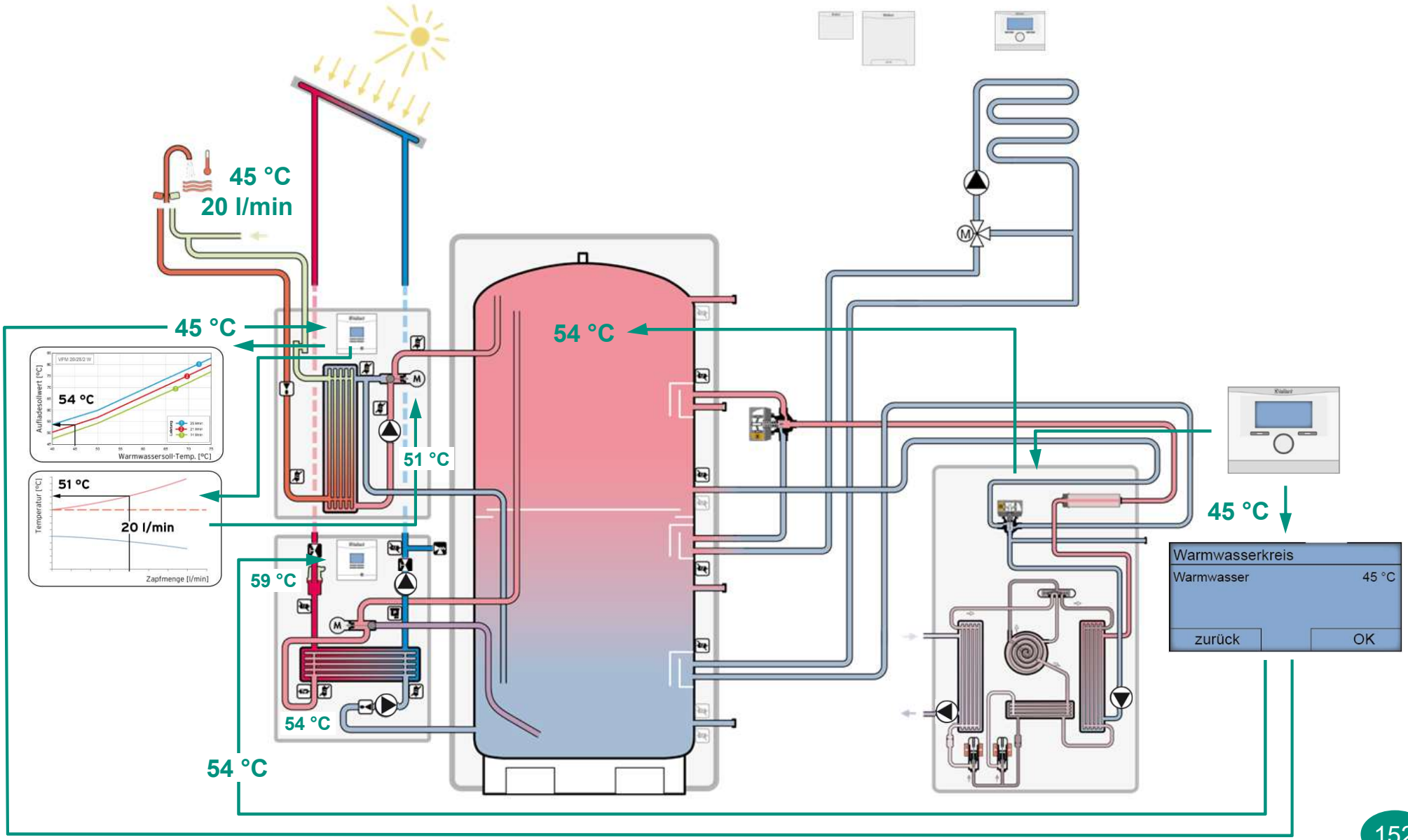
Hot water charging strategy



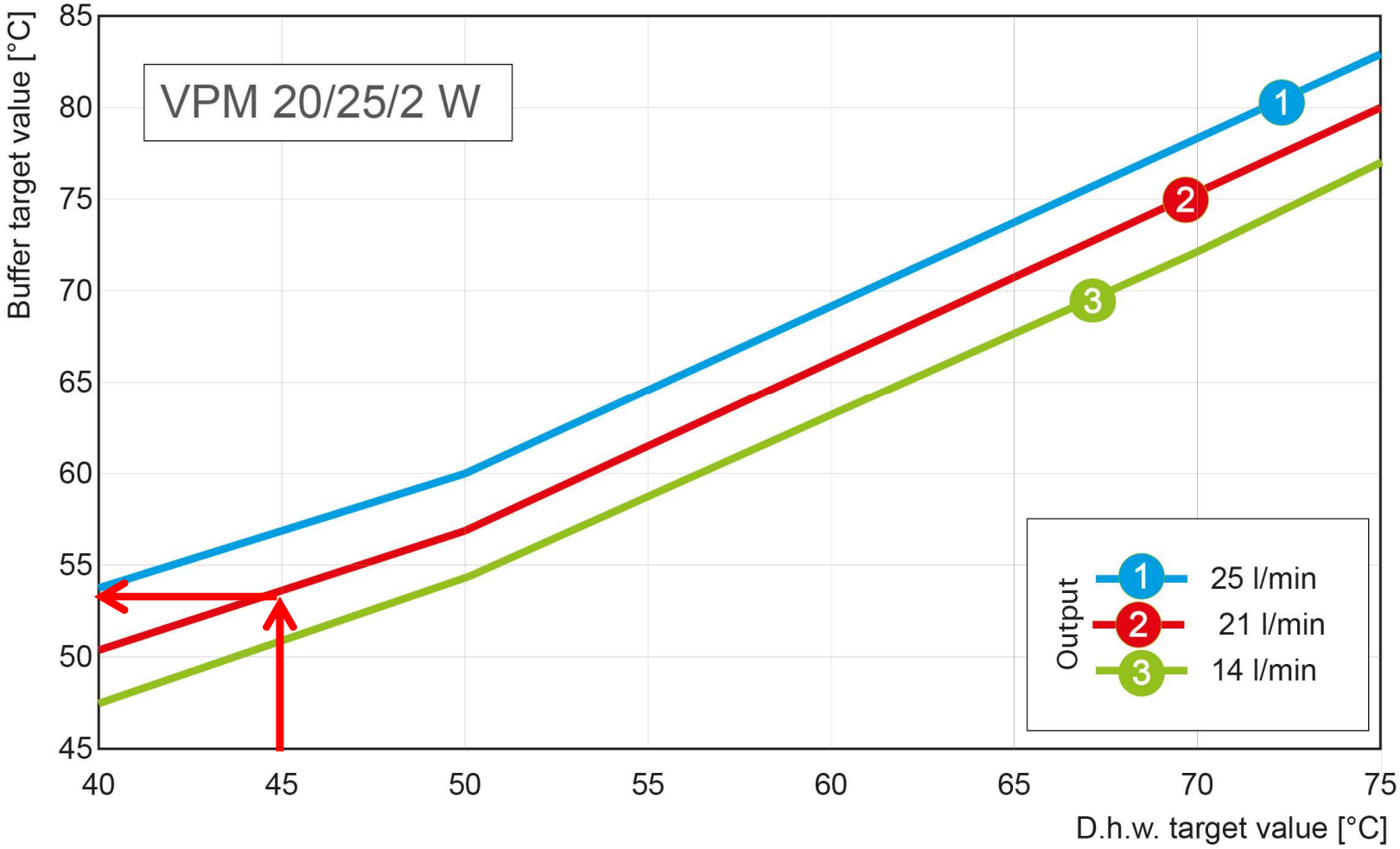
Hot water charging strategy



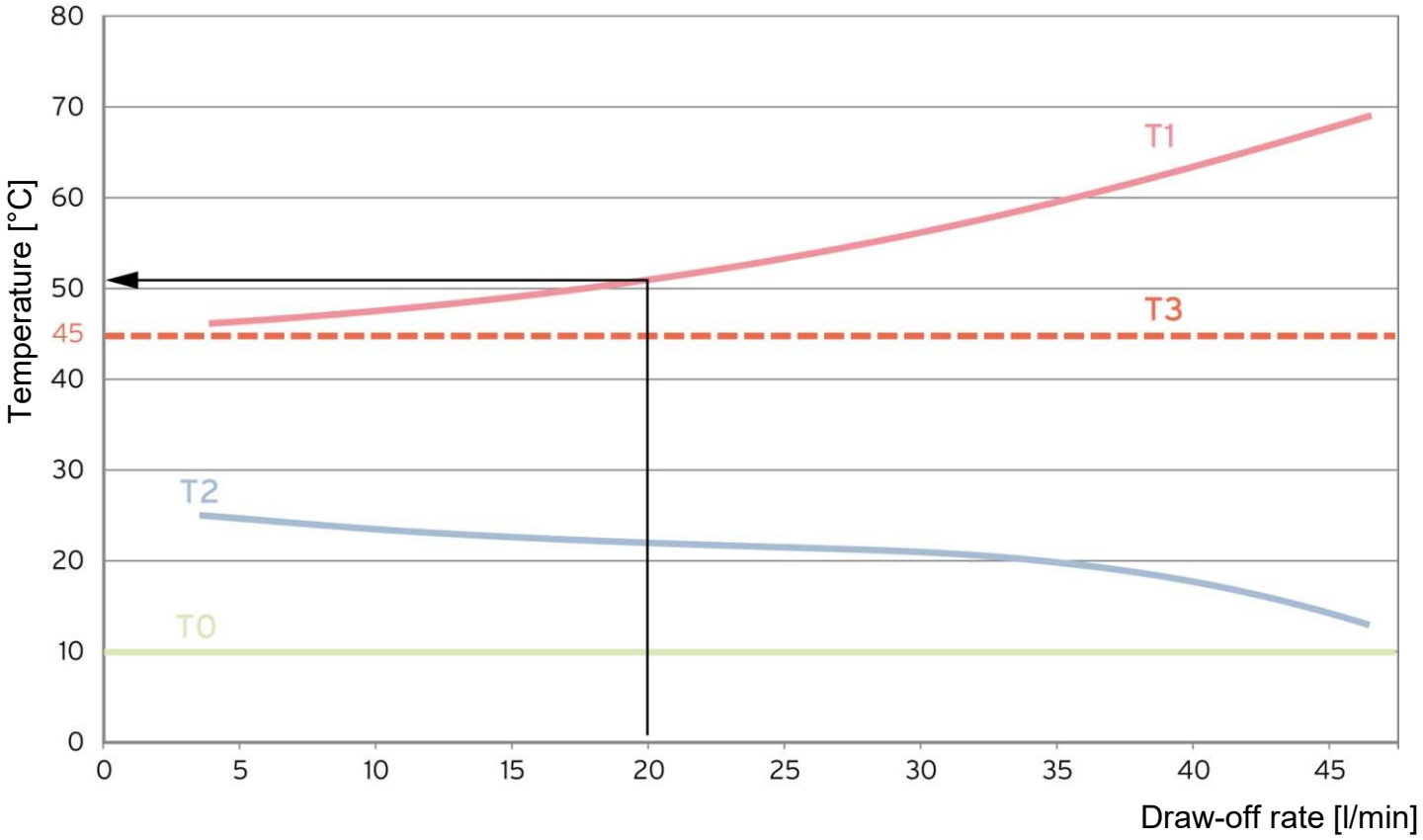
Hot water charging strategy



VPM 20/25/2 W output levels



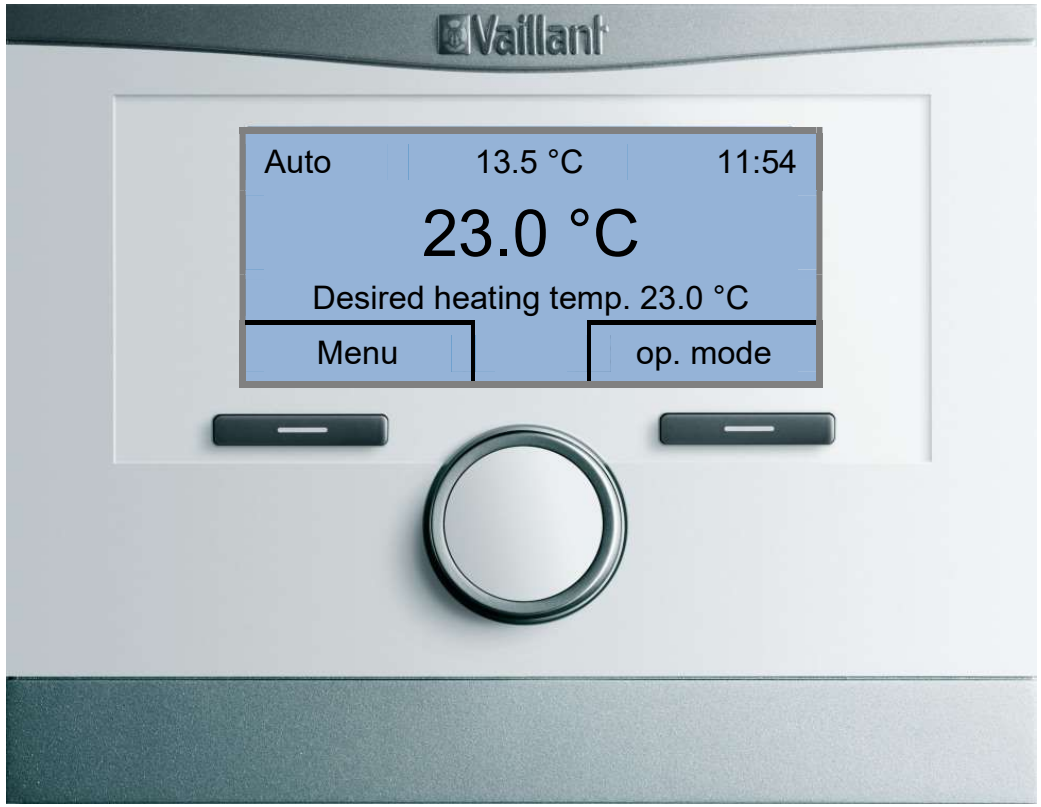
Draw-off rate as a function of the VPM 20/25 W/2 mixing temperature



Solar yield display

The solar yield of the solar charging system is transferred directly to the multiMATIC 700 via eBUS. The yield is shown on the controller as a separate graphic display.

multiMATIC 700 system controller

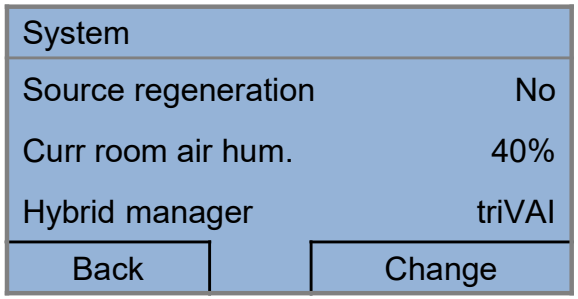


Entering the system diagram

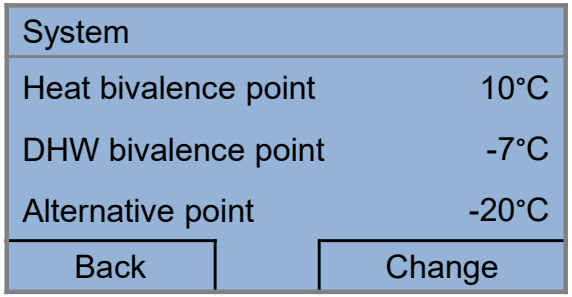
- By entering the system diagram, the multiMATIC 700 is provided with all the necessary information about the entire system installed on site.
- Diagrams 8, 9 and 12, with the various system options, are reserved for the new flexoTHERM and flexoCOMPACT.

Setting parameters

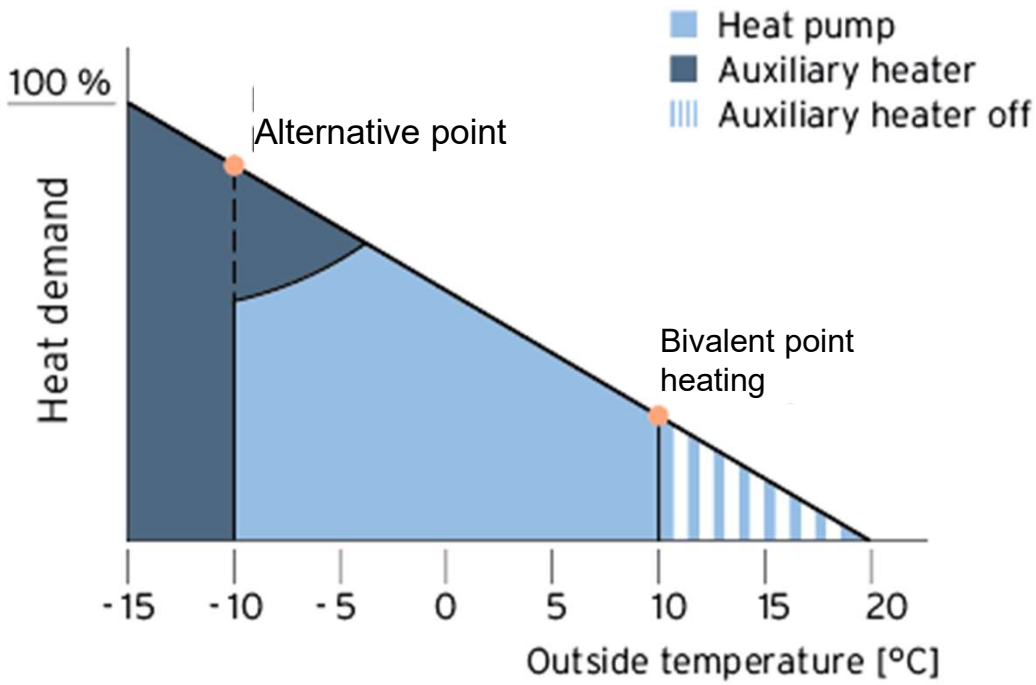
In relation to switching on the auxiliary heater (auxiliary boiler or auxiliary electric heater), the triVAI value or bivalence point are available for selection in the system configuration as the control strategy.



Using both temperature switch points (alternative point + heating bivalence point), the competent person can determine the range within which the heat pump is used in parallel with the auxiliary heating, based on outside temperatures.



Control strategy: Temperature switch points

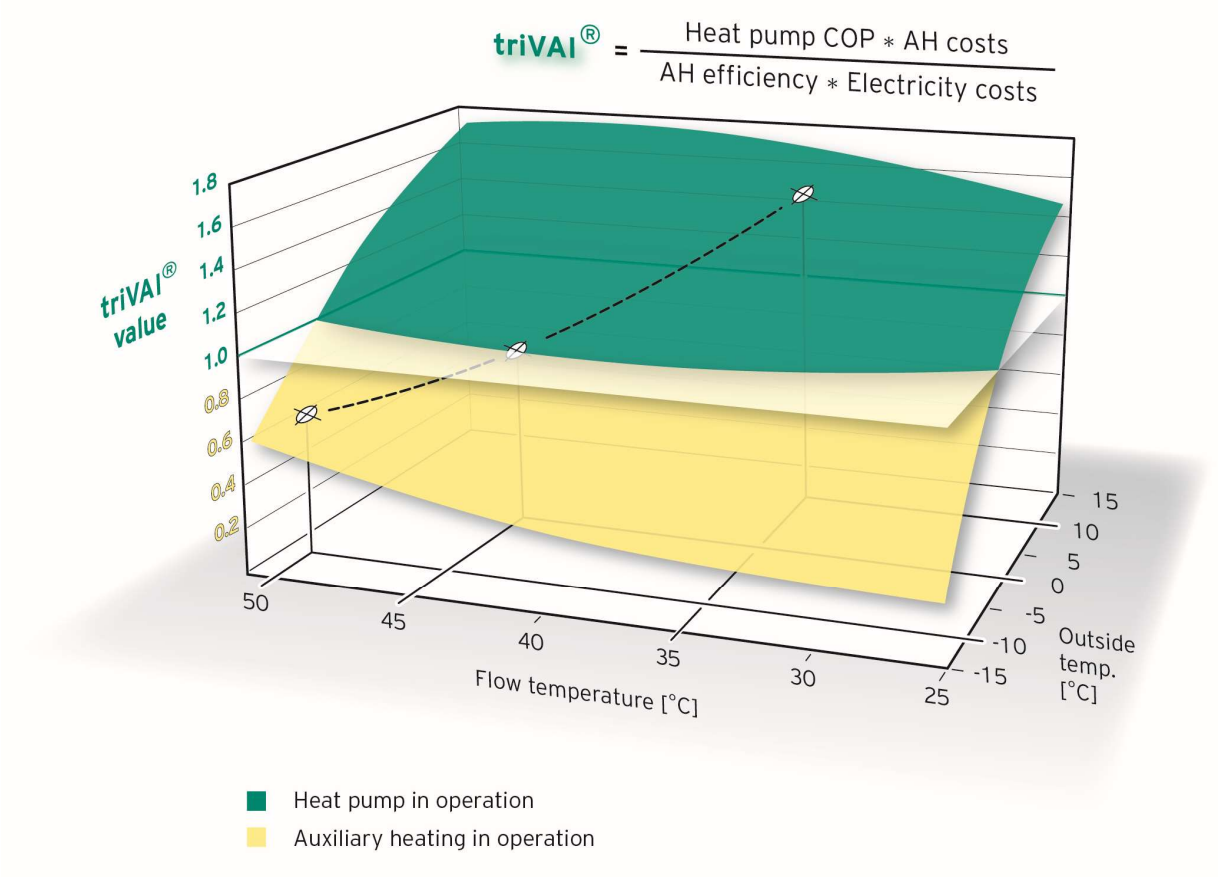


Switching on the auxiliary heating

The point within the range at which the auxiliary heater is switched on depends on the following parameters:

- After the heat pump has been running for 10 minutes, the current flow temperature is still 15 K or more below the target value for the flow temperature.
- After the heat pump has been running for 40 minutes, the current flow temperature is still more than 2 K below the target value for the flow temperature **and**
- If room temperature control is active and the current room temperature is more than 0.5 K below the target value for the room temperature.

triVAI value (trivalence point)

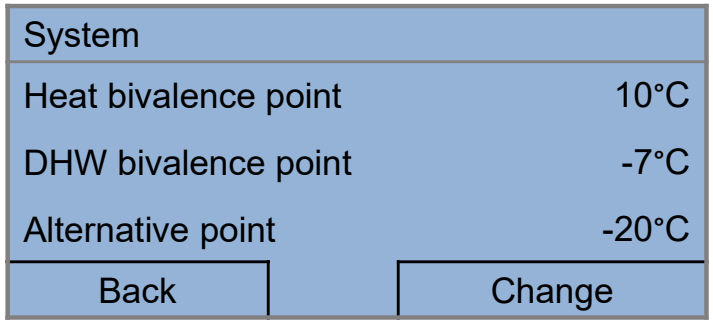


$$triVAI = \frac{4 \text{ x } 6 \text{ cent/kWh}}{0{,}9 \text{ x } 22 \text{ cent/kWh}} = 1{,}2$$

Costs	
Auxilary heater	6
Low tariff electric rate	18
High tariff electric rate	22
Back	Change

Hot water bivalence point

– For hot water generation, the competent person can set an additional bivalence point depending on the outside temperature.
– If the outside temperature falls below the stated bivalence point, the auxiliary heating is activated in parallel with the heat pump. The adjustment range is -20 °C to 0 °C. (default setting: -7 °C).



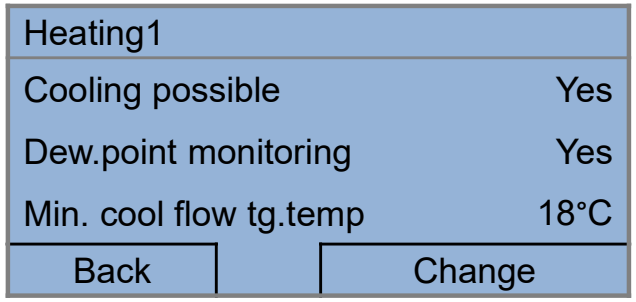
Using a brine / water heat pump with ground probe the hot water bivalence point should be set to -20 °C, otherwise the auxiliary heating switches on too early.

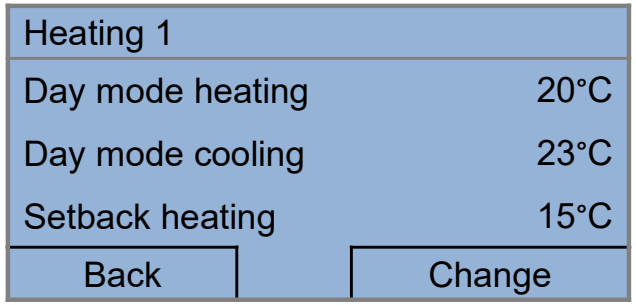
Cooling mode settings

– You can use the "Cooling possible" setting for each heating circuit to switch them on or off separately.
– The competent person can switch off dew point monitoring (activated as the default setting), for example if the system contains fan coils (climate control vectors).

– Furthermore, the end user can enter the desired room temperature under "Desired temperatures" during the cooling function for the relevant heating circuit.

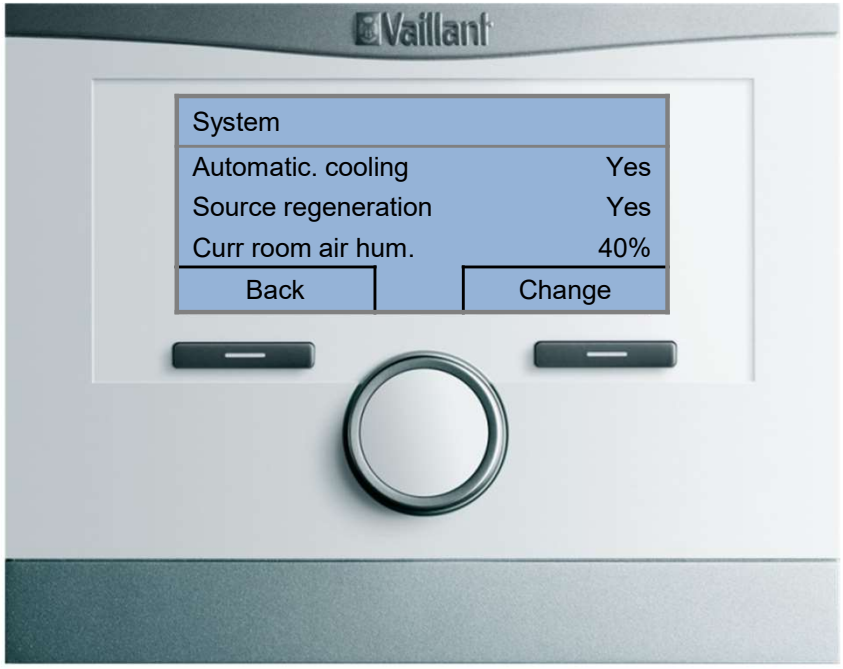
– The desired cooling temperature in the heating flow is entered under the parameter:
"min. Cool flow target temp".





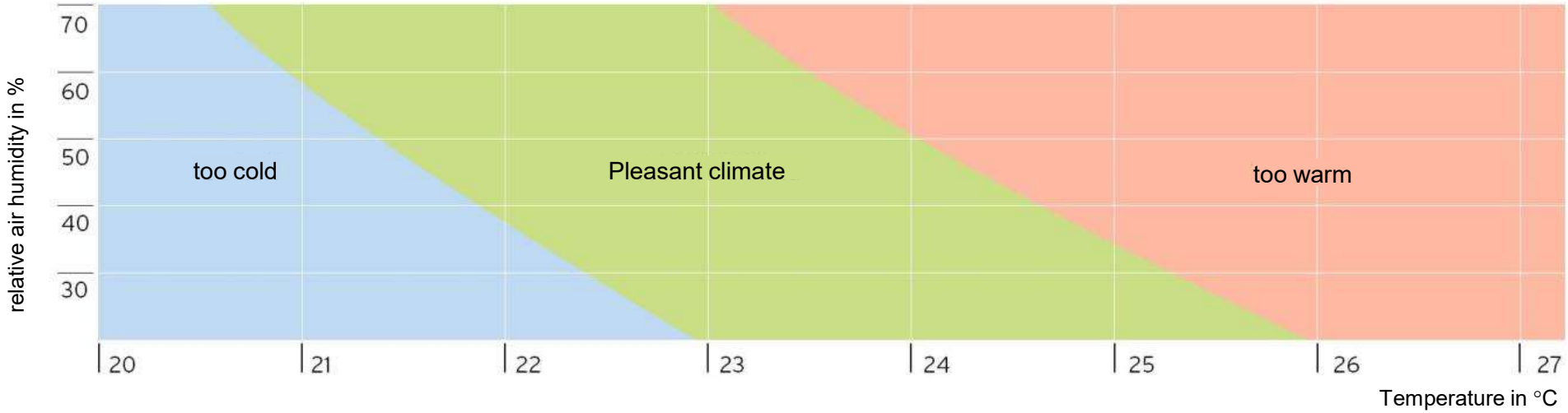
Calculating the dew point

- The multiMATIC 700 has an additional integrated temperature/moisture sensor.
- In connection with the determined room temperature, the controller can determine the current dew point of the surrounding air.



The multiMATIC 700 with integrated temperature/moisture sensor

Comfort based on the temperature and relative air humidity



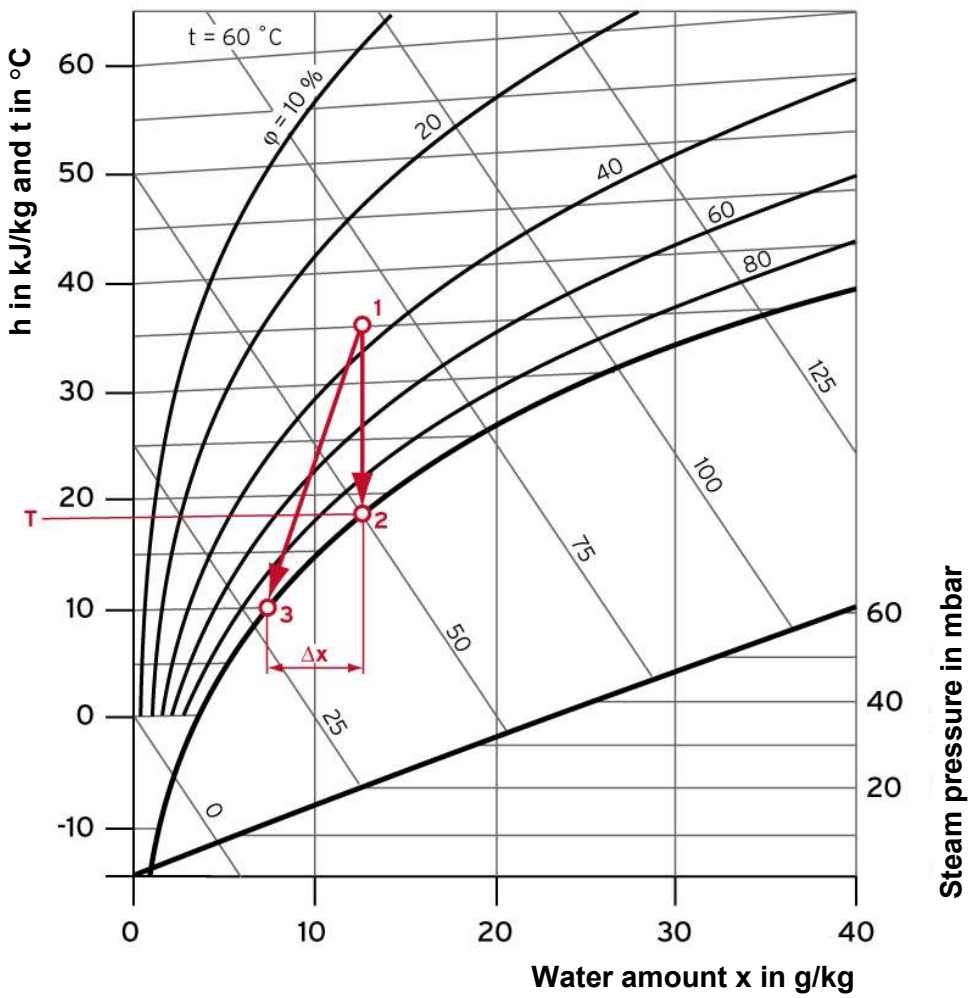
At high outside temperatures of 32 °C to 36 °C, the person perceives room temperatures between 22 °C and 24 °C and a relative air humidity of 40-60% as pleasant.

Hx diagram, air heating

– If moist air at a constant water content is supplied with heat a pure heat transfer takes place.

– During this, the temperature and heat content change, the absolute humidity remains constant, and the relative air humidity decreases.

– This occurs when heating the indoor air during the winter months.

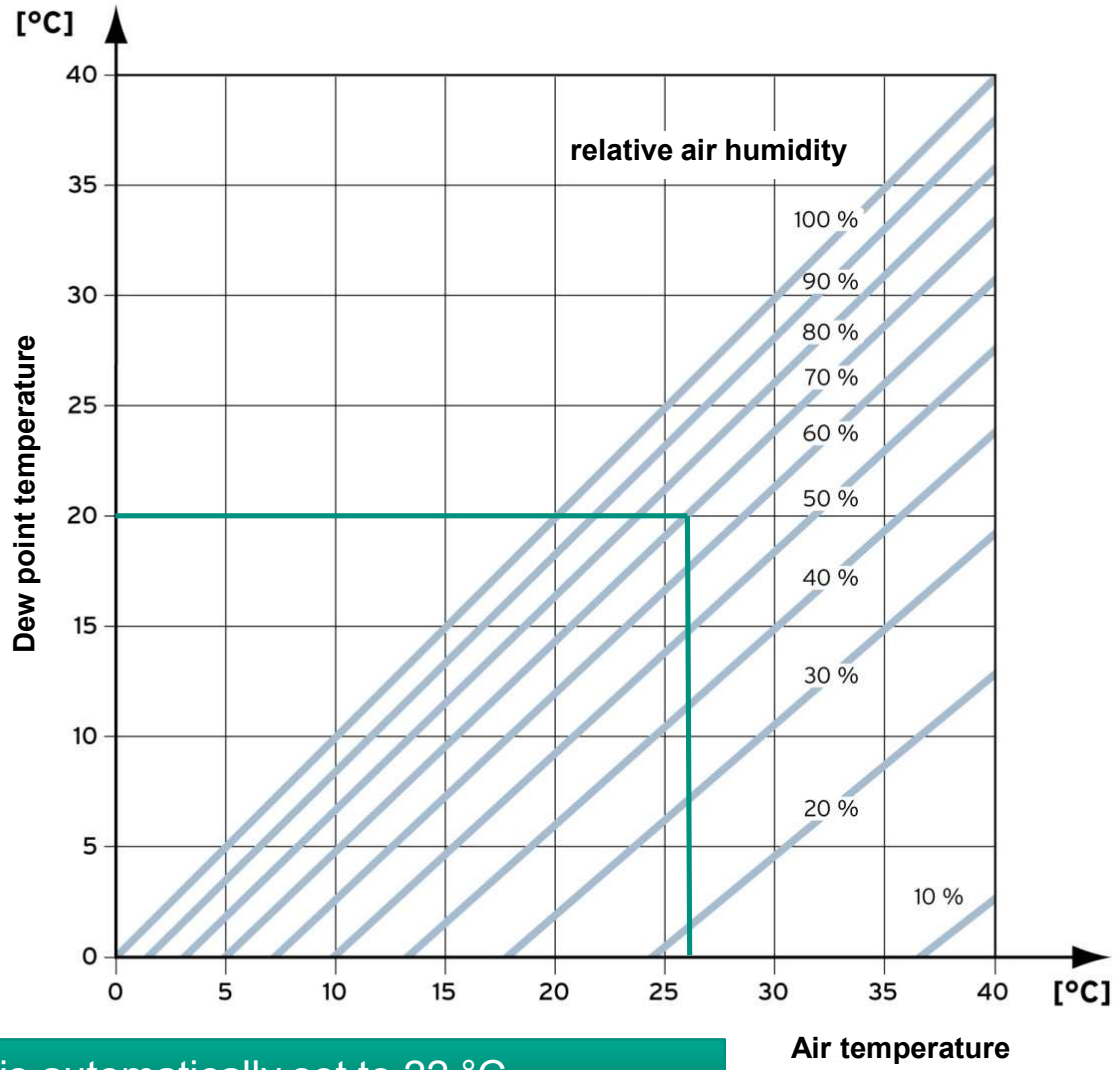


Dew point based on the air temperature and relative humidity

Heating1	
Cooling possible	Yes
Dew.point monitoring	Yes
Min. cool flow tg.temp	18°C
Back	Change

Example: Room temperature = 26 °C
Air humidity = 70%
Current dew point = 20 °C
Offset dew point = 2 K

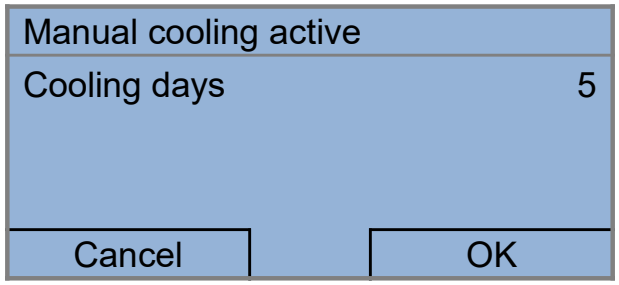
Heating1	
Min. cool flow tg.temp	18°C
Cooling start temp.	21°C
Offset dew point	2K
Back	Change

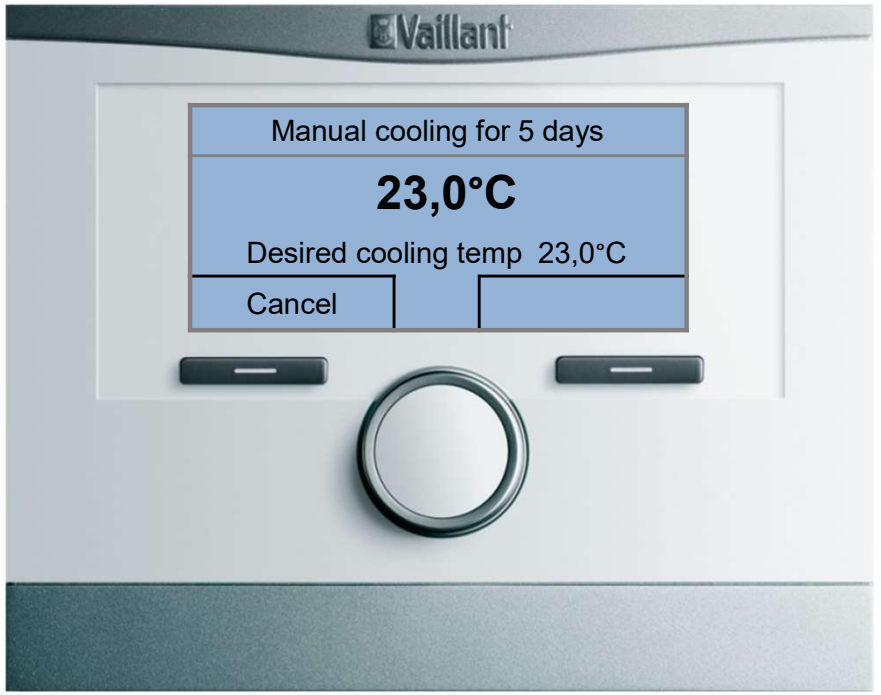


The current cooling target flow value is automatically set to 22 °C

Current operating mode – manual cooling

- The manual cooling function is activated by the end user from the basic display under the "Cooling" operating mode.
- For this, you enter the number of days on which you want the cooling mode to be active

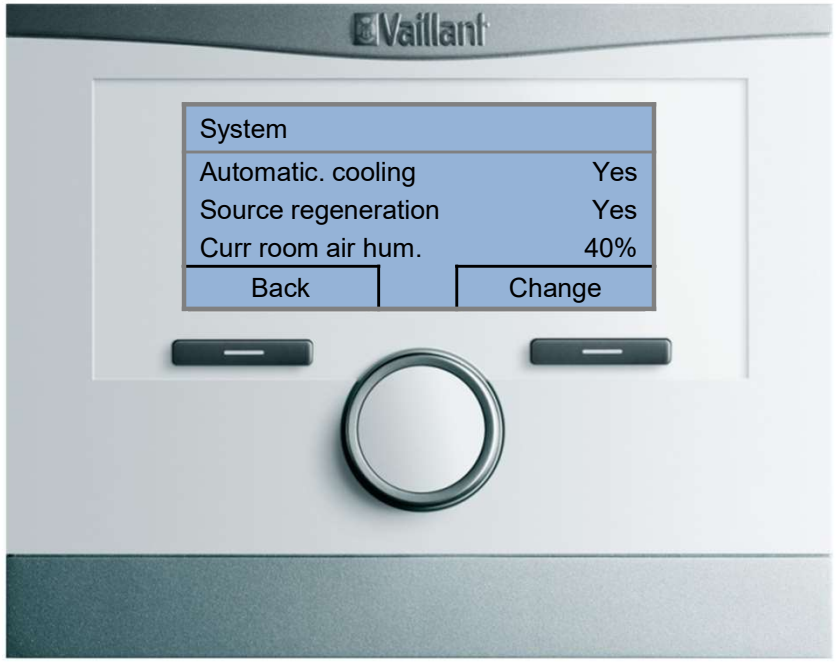




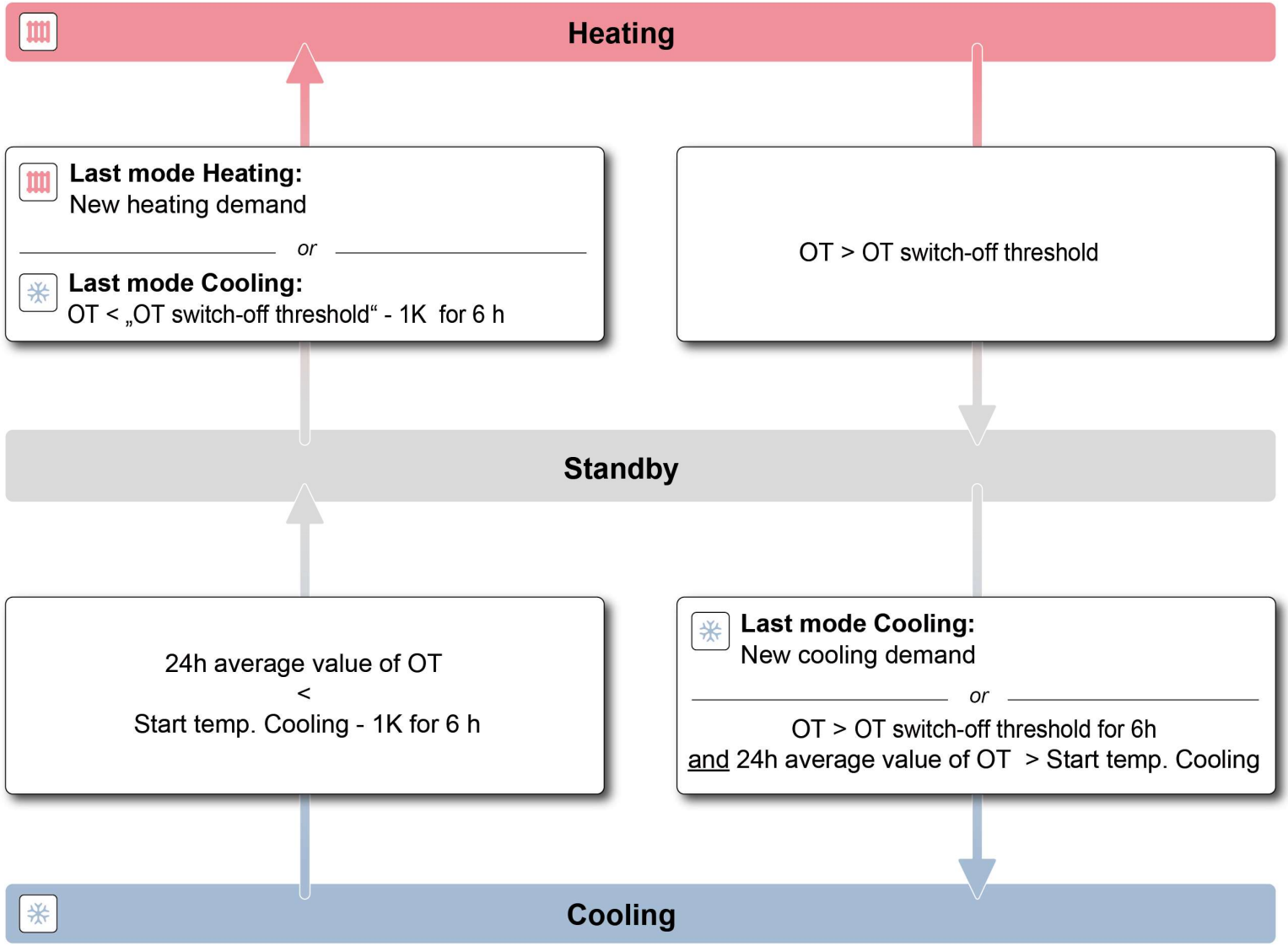
Activating the automatic cooling function

- If the user wants to use automatic cooling, the competent person must enter "Yes" in answer to the query "Autom. cooling" under "System configuration".

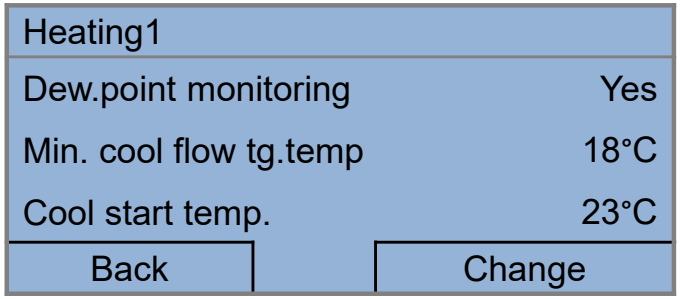
- The competent person can enable cooling even during the programmable "Days away from home". On pure brine heat pumps, this is used for source regeneration by means of energy recovery.



Automatic cooling sequence

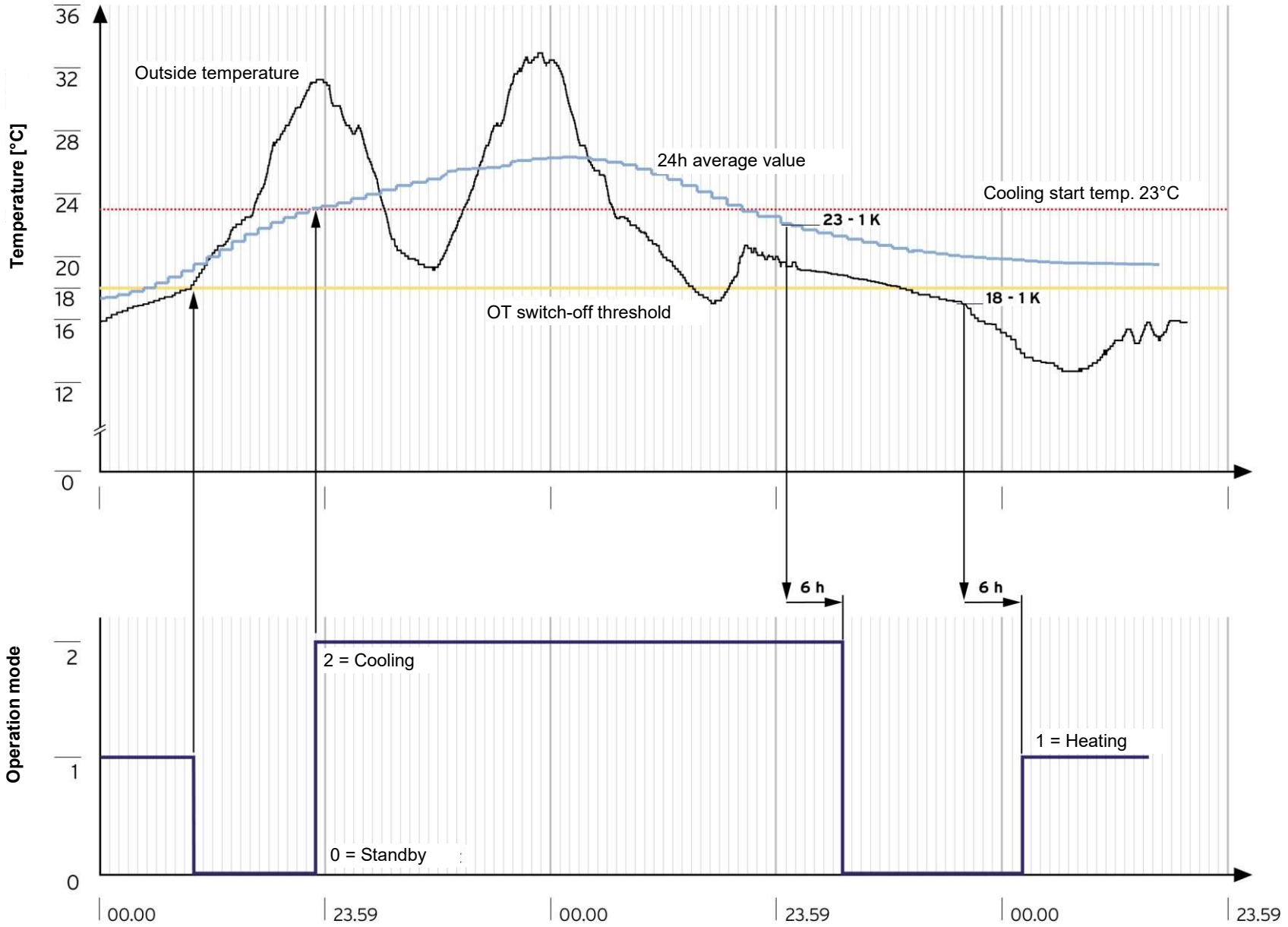


Cooling start temperature



– If the current outside temperature is higher than the outside temperature switch-off threshold set for over six hours **and**
– is the average outside temperature over 24 hours greater than the preset cooling start temperature (adjustment range from 10 °C to 30 °C), the heat pump switches over to cooling mode.

Progression of automatic cooling over time (example)



Summary of the switch-on conditions for cooling mode

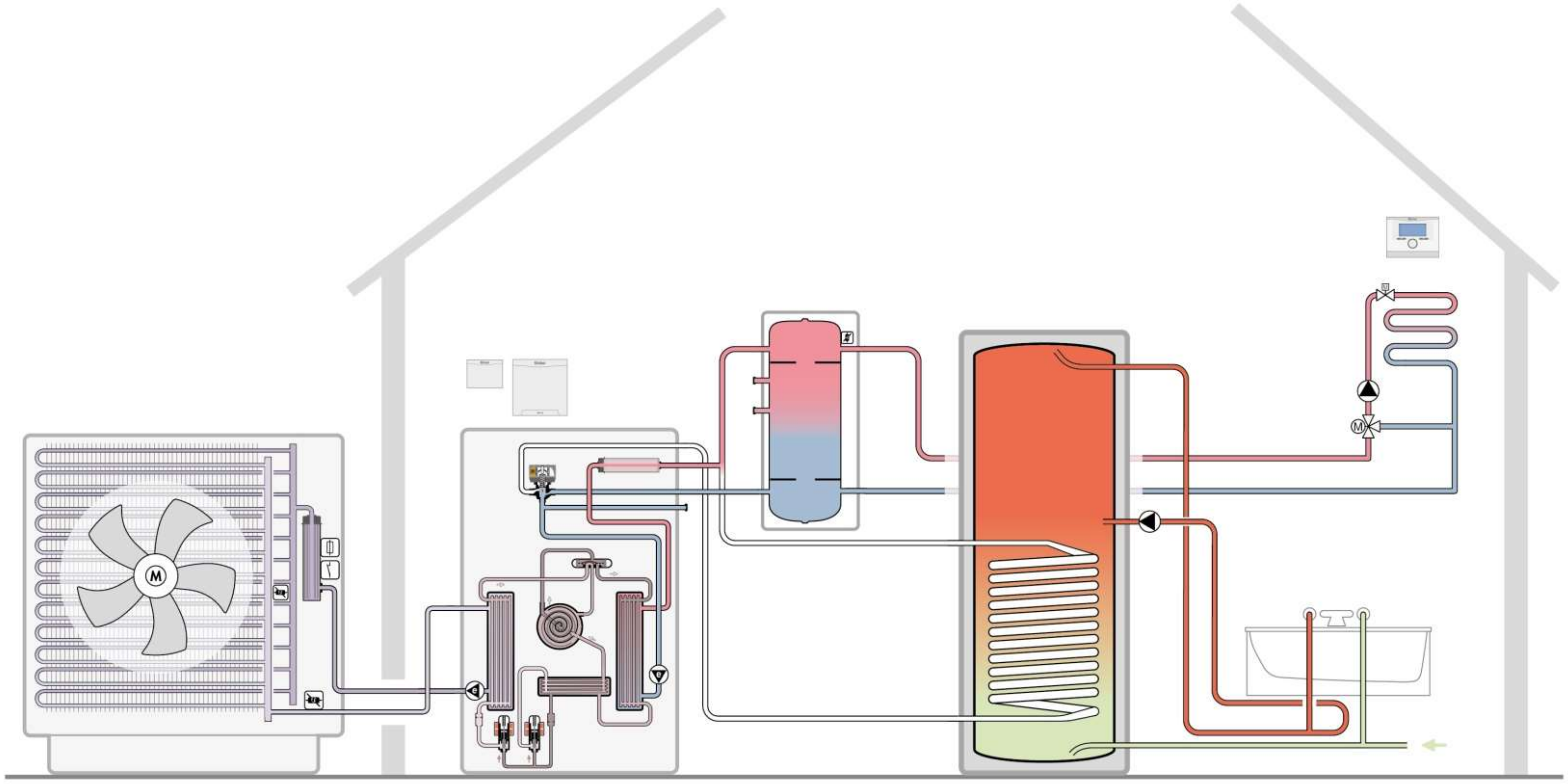
- General requirement using outside temperature (OT > OT switch-off threshold for 6 hours and the average OT over 24 hours > cooling start temperature, with automatic cooling only)
- Number of cooling days set (for manual cooling only)
- Heating circuit enabled for cooling
- With the thermostat function activated. Actual room temperature > desired temperature + 0.2 K (Cooling off: Room temperature < desired temperature - 0.1 K)
- Within a cooling time period
- Outside temperature is above 4 °C (frost protection for heating)
- Energy integral at + 60 °min (with active cooling only)
- Temperature within the working range of the compressor (with active cooling only)

Changing the displayed view on the basic display

– On the multiMATIC 700, you can change the displayed view on the basic display between heating mode and cooling mode as required.
– To do this, go to the menu point "Display"/"Preferred display" in "Basic settings".
– In the controller's basic settings, the user can activate a button lock in order to prevent the parameters from being changed unintentionally.

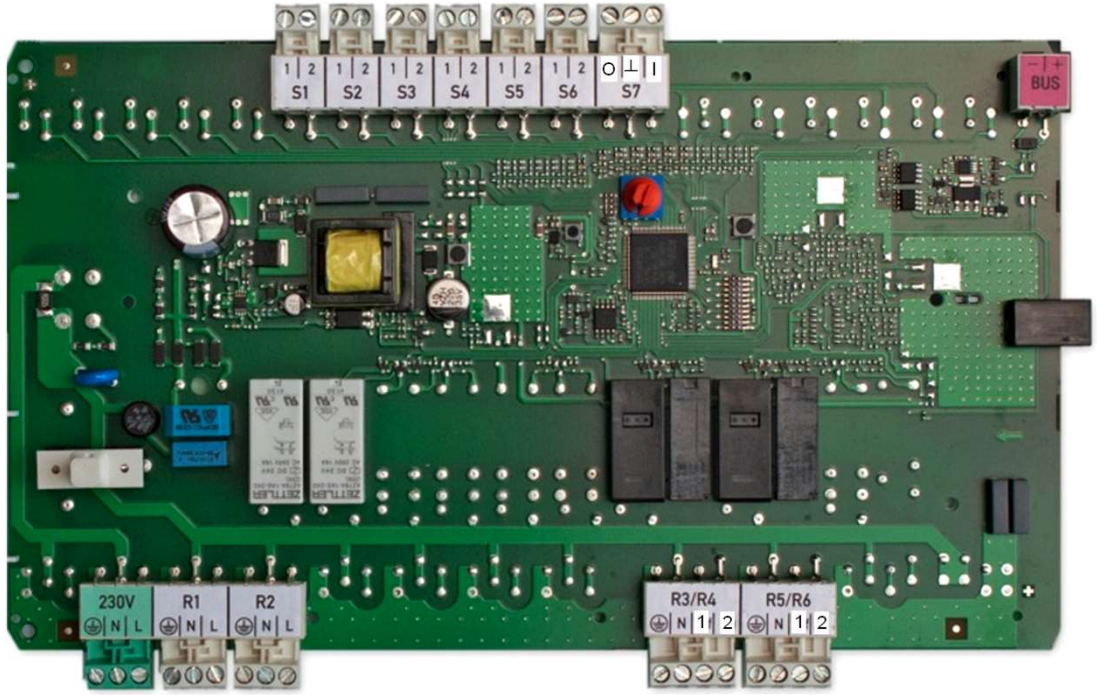
Feedback in the event of heat pump failure (comfort protection)

– If the heat pump fails, the customer can decide in the basic display of the multiMATIC 700 for which operating mode (heating, domestic hot water, heating + DHW, or no auxiliary heating) he wishes to enable auxiliary electric heating.
– If the setting remains set to "Inactive", in this case the temperature for the heating and hot water is adjusted to a fixed set target flow value (default setting: 25 °C, can be set to between 20 °C and 80 °C).



VR 70 extension module

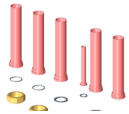
- flexoTHERM heat pumps can control a direct heating circuit (not a mixer circuit).
- The VR 70 module is used to add up to two mixer circuits to a system.
- The assignments for the sensor inputs and the outputs for the actuators (pumps, valves and mixers) are not fixed and depend on the system diagram on site.

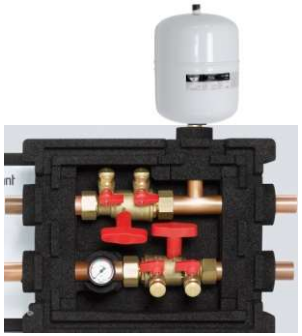


Accessories for flexoTHERM flexoCOMPACT

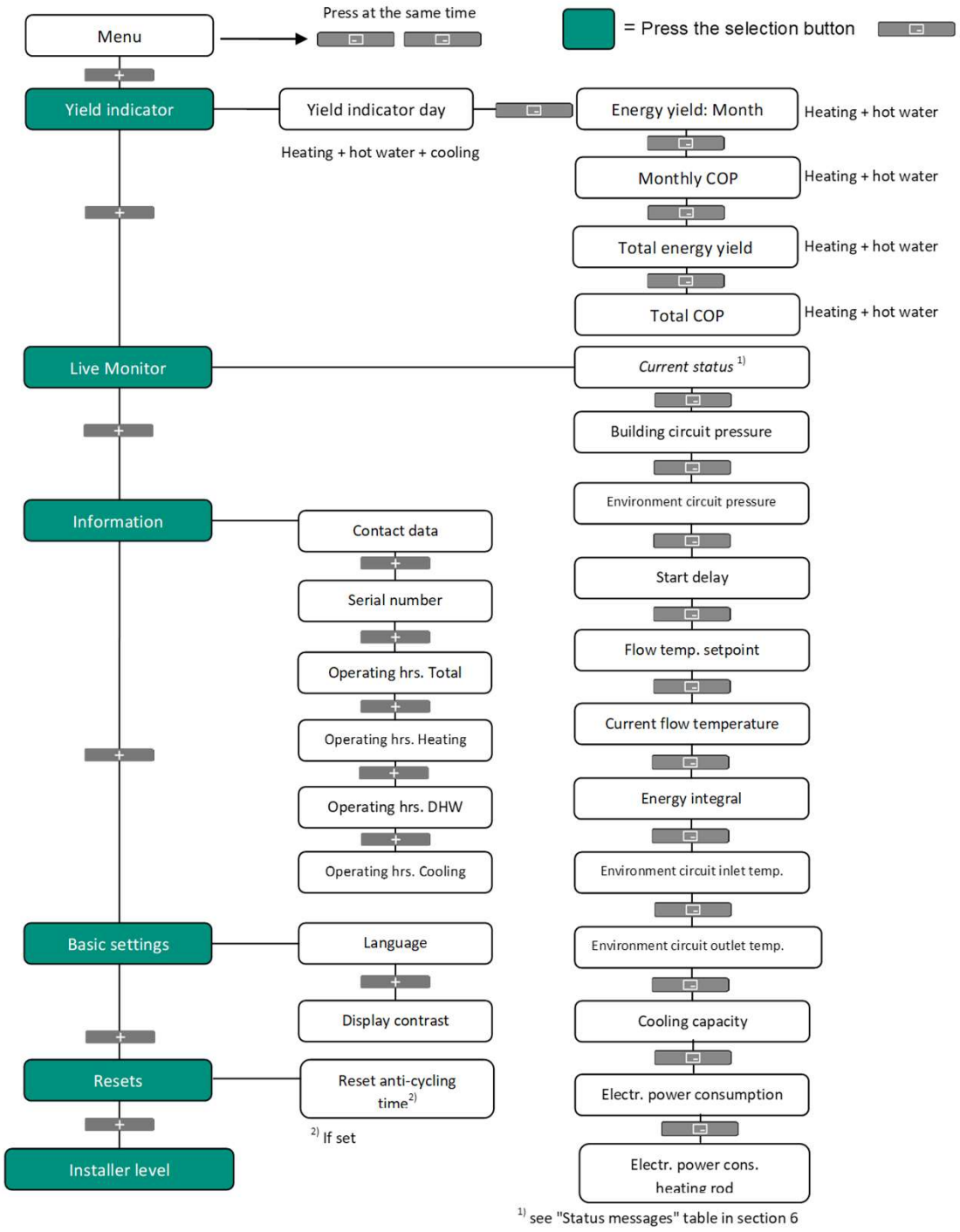


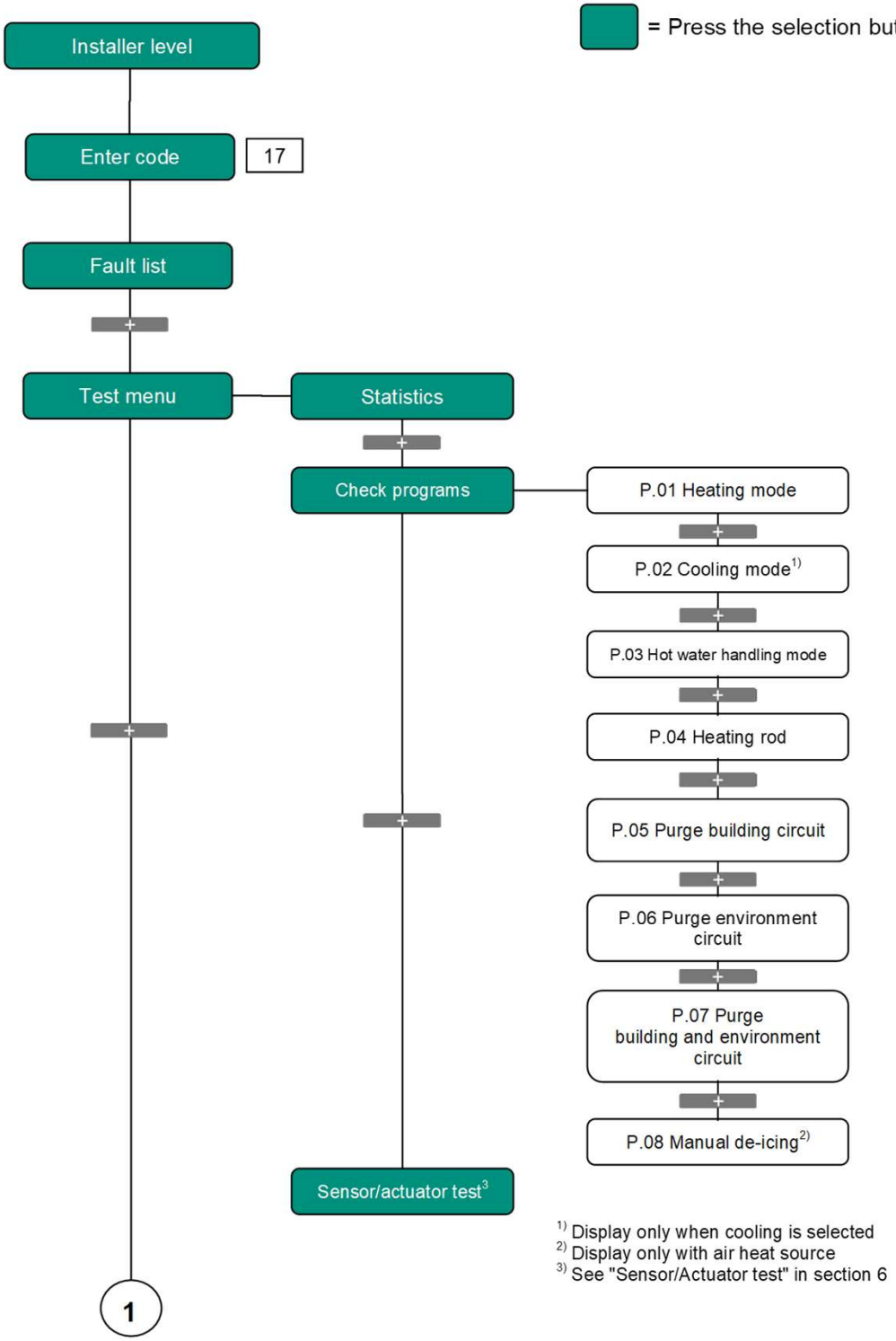


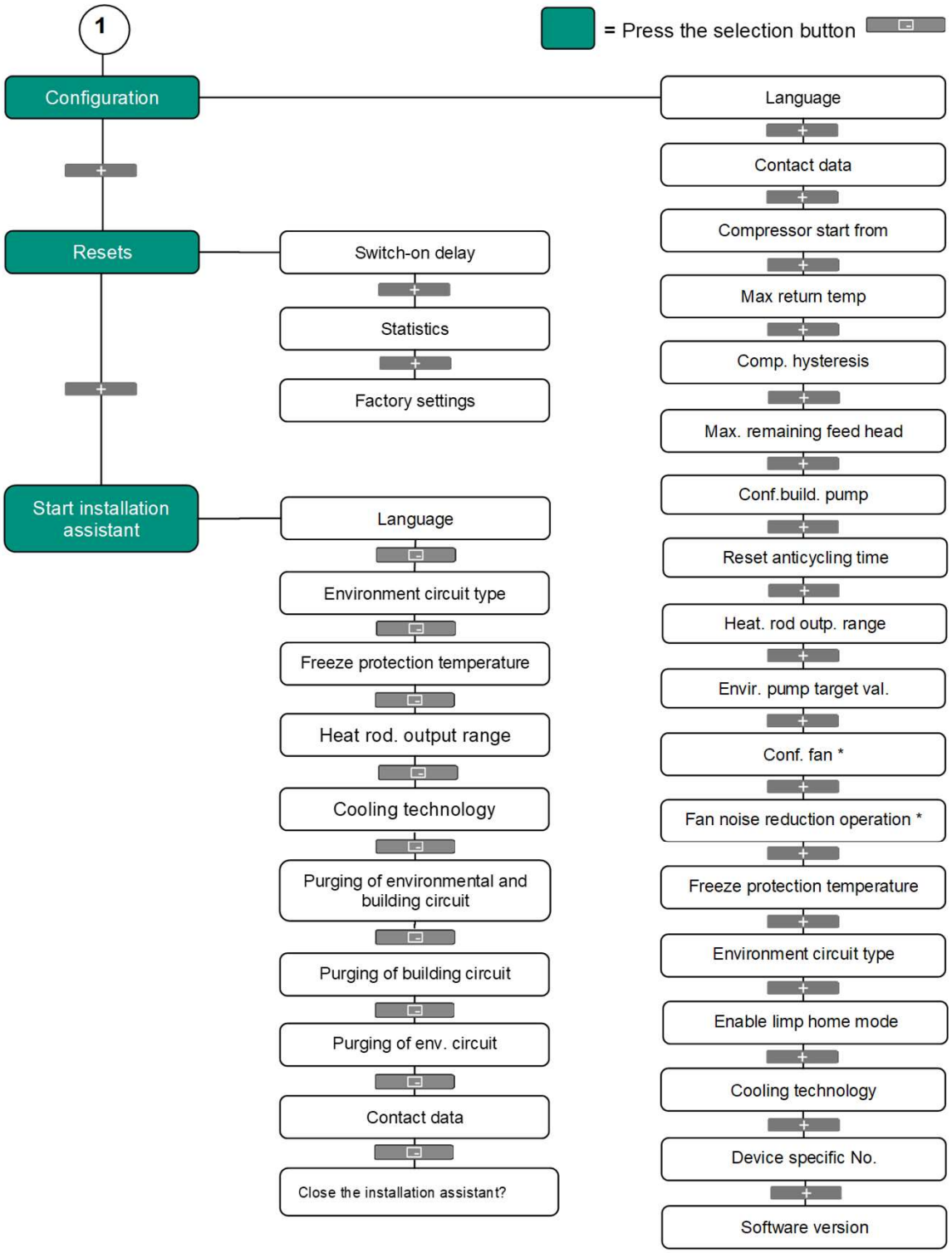









Menu
Press at the same time
= Press the selection button
Yield indicator
Yield indicator day
Heating + hot water + cooling
Energy yield: Month
Heating + hot water
Monthly COP
Heating + hot water
Total energy yield
Heating + hot water
Total COP
Heating + hot water
Live Monitor
Current status 1)
Building circuit pressure
Environment circuit pressure
Start delay
Flow temp. setpoint
Current flow temperature
Energy integral
Environment circuit inlet temp.
Environment circuit outlet temp.
Cooling capacity
Electr. power consumption
Electr. power cons. heating rod
Information
Contact data
Serial number
Operating hrs. Total
Operating hrs. Heating
Operating hrs. DHW
Operating hrs. Cooling
Basic settings
Language
Display contrast
Resets
Reset anti-cycling time 2)
Installer level
2) If set
1) see "Status messages" table in section 6


= Press the selection button
Installer level
Enter code
17
Fault list
Test menu
Statistics
Check programs
P.01 Heating mode
P.02 Cooling mode1)
P.03 Hot water handling mode
P.04 Heating rod
P.05 Purge building circuit
P.06 Purge environment circuit
P.07 Purge building and environment circuit
P.08 Manual de-icing2)
Sensor/actuator test3
1
1) Display only when cooling is selected
2) Display only with air heat source
3) See "Sensor/Actuator test" in section 6


1
= Press the selection button
Configuration
Resets
Start installation assistant
Switch-on delay
Statistics
Factory settings
Language
Environment circuit type
Freeze protection temperature
Heat rod. output range
Cooling technology
Purging of environmental and building circuit
Purging of building circuit
Purging of env. circuit
Contact data
Close the installation assistant?
Language
Contact data
Compressor start from
Max return temp
Comp. hysteresis
Max. remaining feed head
Conf.build. pump
Reset anticycling time
Heat. rod outp. range
Envir. pump target val.
Conf. fan *
Fan noise reduction operation *
Freeze protection temperature
Environment circuit type
Enable limp home mode
Cooling technology
Device specific No.
Software version

Status messages I

Status code	Meaning
Displays relating to the heat pump system	
S.34	Heating mode: Frost protection
S.100	Standby
S.101	Heating: Compressor switched off
S.102	Heating: Compressor blocked
S.103	Heating: Pre-run compressor operation
S.104	Heating: Compressor active
S.107	Heating: Post-run compressor operation
S.111	Cooling: Compressor switched off
S.112	Cooling: Compressor blocked
P.113	Cooling: Flow compressor operation
P.114	Cooling: Compressor active
S.117	Cooling: Post-run compressor operation
S.118	Cooling: Pre-run
S.119	Cooling: Mixer active
S.125	Heating: Heating rod active
S.131	Hot water: Compressor shutdown
S.132	Hot water: Compressor blocked
S.133	Hot water: Flow
S.134	Hot water: Compressor active
S.135	Hot water: Heating rod active
S.137	Hot water: Overrun
S.141	Heating: Heating rod shutdown
S.142	Heating: Heating rod blocked
S.151	Hot water: Heating rod shutdown
S.152	Hot water: Heating rod blocked

Status messages II

Status code	Meaning
General displays	
S.170	Compressor: Phase failure
S.171	Compressor: Incorrect phase seq.
S.172	Compressor: ICL fault
S.173	Anti-cycling time for the energy supply company
S.201	Check program: Purging of env. circuit active
S.202	Check program: Purging of building circuit active
S.203	Actuator test active
Displays relating to communication	
S.211	Connection error: Display not recognised
S.212	Connection fault: Controller not recognised
S.213	Connection error: Fan 1 not recognised
S.214	Connection error: Fan 2 not recognised
S.215	Connection error: TMB not recognised
S.216	Connection error: ICL not recognised

Status messages III

Status code	Meaning
Displays relating to the environment circuit	
S.244	Environment circuit: Flow rate monitor jammed
S.246	Environment circuit: Flow rate too low
S.247	Environment circuit: Fault cont.: Pump open
S.248	Fan unit: De-icing with fan only
S.249	Fan unit: De-icing with de-icer
S.252	Fan unit 1: Fan blocked
S.253	Fan unit 1: Safety cut-out open
S.254	Fan unit 1: De-icing takes too long
S.255	Fan unit 1: Air inlet temp. too high
S.256	Fan unit 1: Air inlet temp. too low
S.260	Fan unit 2: Fan blocked
S.261	Fan unit 2: Safety cut-out open
S.262	Fan unit 2: De-icing takes too long
S.263	Fan unit 2: Air inlet temp. too high
S.264	Fan unit 2: Air inlet temp. too low
S.265	Environment circuit: Pressure monitor open
S.266	Environment circuit: Outlet temperature too high
Displays relating to the building circuit	
S.272	Building circuit: Remaining feed heads limit active
S.273	Building circuit: Flow temperature too low
S.274	Building circuit: Pressure too low
S.275	Building circuit: Flow rate too low
S.276	Building circuit: Lockout contact S20 open
S.277	Building circuit: Pump fault

Status messages IIII

Status code	Meaning
Displays relating to the cooling circuit	
S.302	High-pressure switch open
S.303	Compressor outlet temperature too high
S.304	Evaporator temperature too low
S.305	Condensation temperature too low
S.306	Evaporator temperature too high
S.308	Condensation temperature too high
S.311	Environment circuit: Inlet temperature too low
S.312	Building circuit: Return temperature too low
S.313	Environment circuit: Inlet temperature too high
S.314	Building circuit: Return temperature too high
S.240	Compr. oil temp. too cold, environment too cold
Displays relating to the auxiliary electric heating circuit	
S.350	Heating rod: Safety cut-out open
S.351	Heating rod: Flow temp. too high
S.352	Heating rod: Pressure too low
S.353	Heating rod: Flow rate too low
S.354	Heating rod: Phase failure

Sensor/actuator test

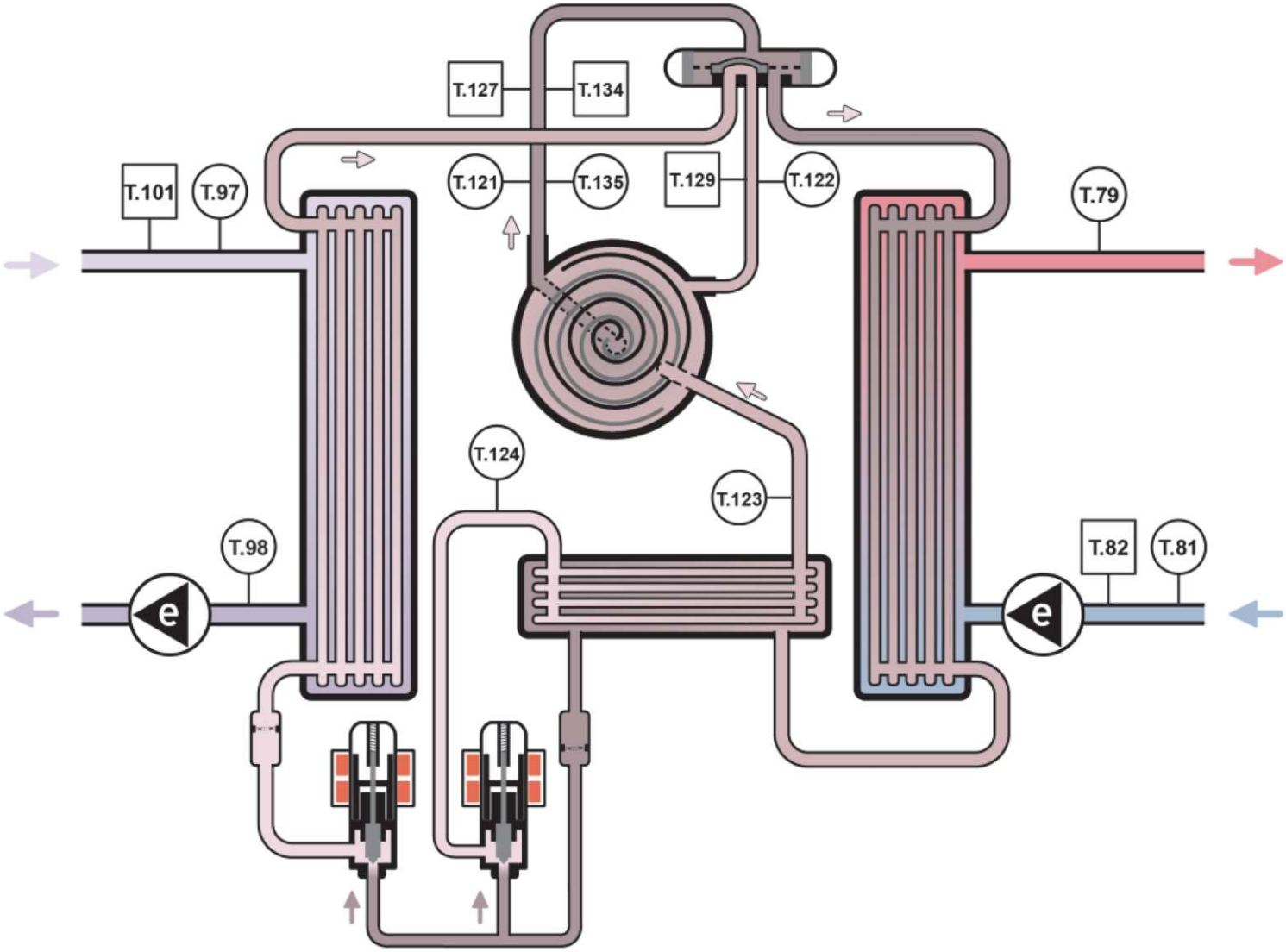
Actuator test	
Building circuit actuators	
T.01	Building circuit pump output
T.02	DHW diverter valve
T.03	Cooling diverter valve (for passive cooling only)
Environment circuit actuators	
T.14	Environment circuit pump output
T.16	Cooling mixer position (for passive cooling only)
T.17	Well pump (for the "Well" environment circuit type only)
T.18	Fan 1 output (for the "Air/Brine" environment circuit type only)
T.19	De-icer 1 (for the "Air/Brine" environment circuit type only)
T.20	Fan 2 output (for the "Air/Brine" environment circuit type and 15/19 kW only)
T.21	De-icer 2 (for the "Air/Brine" environment circuit type and 15/19 kW only)
Cooling circuit actuators	
T.32	4-way valve (for active cooling only)
T.33	Position: EEV
T.34	Position: EVI-VI
Additional actuators	
T.45	Fault outlet
T.46	MPO2 output
T.47	System pump power
T.48	Circulation pump
T.49	Relay: Cooling active (for passive or active cooling only)
Sensor test	
Building circuit sensors	
T.79	Flow temperature
T.80	Cooling flow temperature (for passive cooling only)
T.81	Return temperature
T.82	Building circuit: Pressure
T.83	Building circuit: Flow rate
T.84	S20 blocking contact
T.85	Safety cut-out heating rod
T.86	Cylinder temperature

Sensor/actuator test

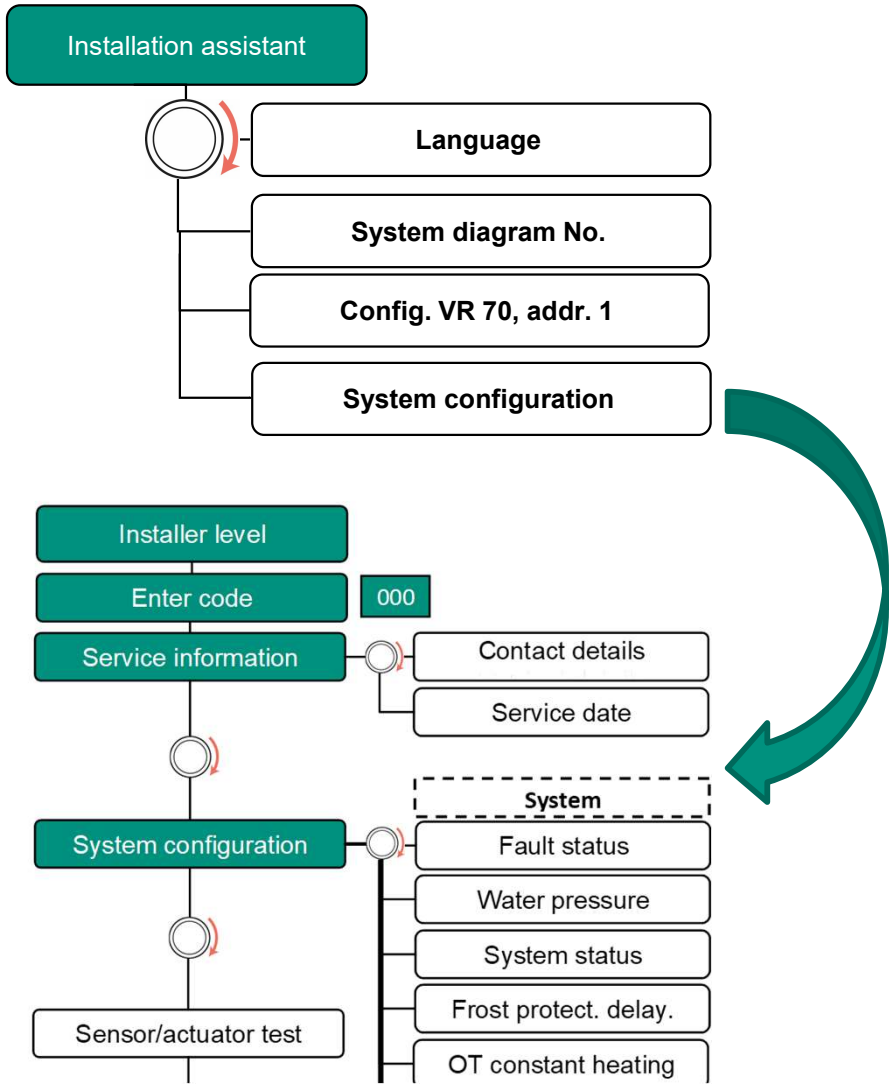
Sensor test	
Environment circuit sensors	
T.97	Environment circuit: Inlet temperature
T.98	Environment circuit: Outlet temperature
T.99	Well inlet temperature (for the "Well" environment circuit type only)
T.100	Well outlet temperature (for the "Well" environment circuit type only)
T.101	Environment circuit: Pressure
T.102	Environment circuit pump fault contact
T.103	Environment circuit: Pressure monitor (for the "Ground/Brine" environment circuit type only)
T.105	Air inlet temperature fan unit 1 (for the "Air/Brine" environment circuit type only)
T.106	Brine outlet temp. fan unit 1 (for the "Air/Brine" environment circuit type only)
T.107	Safety cut-out fan unit 1 (for the "Air/Brine" environment circuit type only)
T.108	Air inlet temperature fan unit 2 (for the "Air/Brine" environment circuit type and 15/19 kW only)
T.109	Brine outlet temp. fan unit 2 (for the "Air/Brine" environment circuit type and 15/19 kW only)
T.110	Safety cut-out fan unit 2 (for the "Air/Brine" environment circuit type and 15/19 kW only)
Cooling circuit sensors	
T.121	Compressor outlet temperature
T.122	Compressor inlet temperature
T.123	VI inlet temperature (Compressor)
T.124	EEV-VI outlet temperature
T.127	High-pressure sensor
T.128	Condensation temperature
T.129	Low-pressure sensor
T.130	Evaporator temperature
T.131	Overheating target value
T.132	Overheating actual value
T.134	**(PR)** High-pressure switch
T.135	**(Safety cut-out)** Temperature switch: Compressor outlet
Other sensors	
T.146	Outside temperature
T.147	DCF status
T.148	System temperature
T.149	MA input

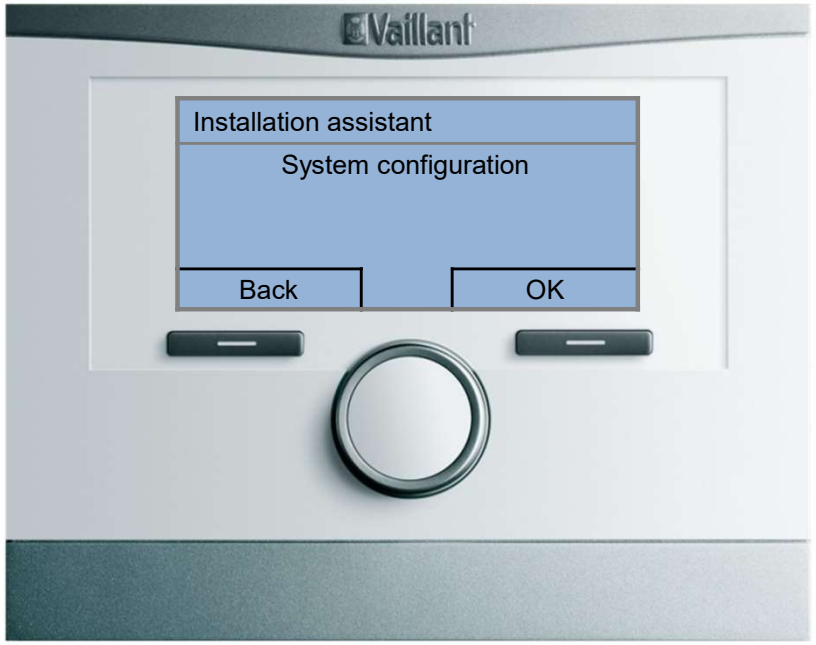
Sensors/actuators

◯ = Temperature sensor, □ = Pressure sensor



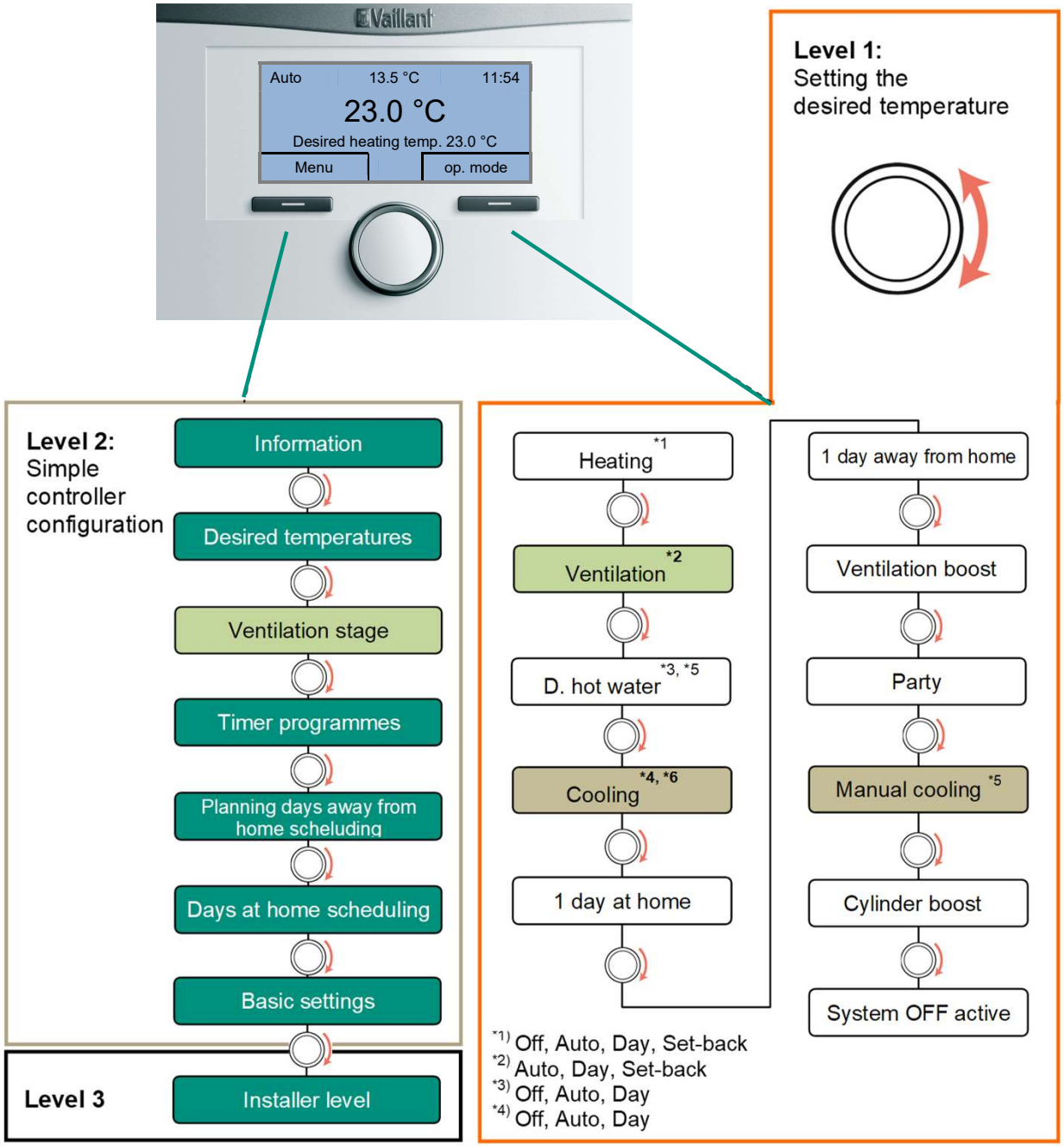
multiMATIC 700 installation assistant



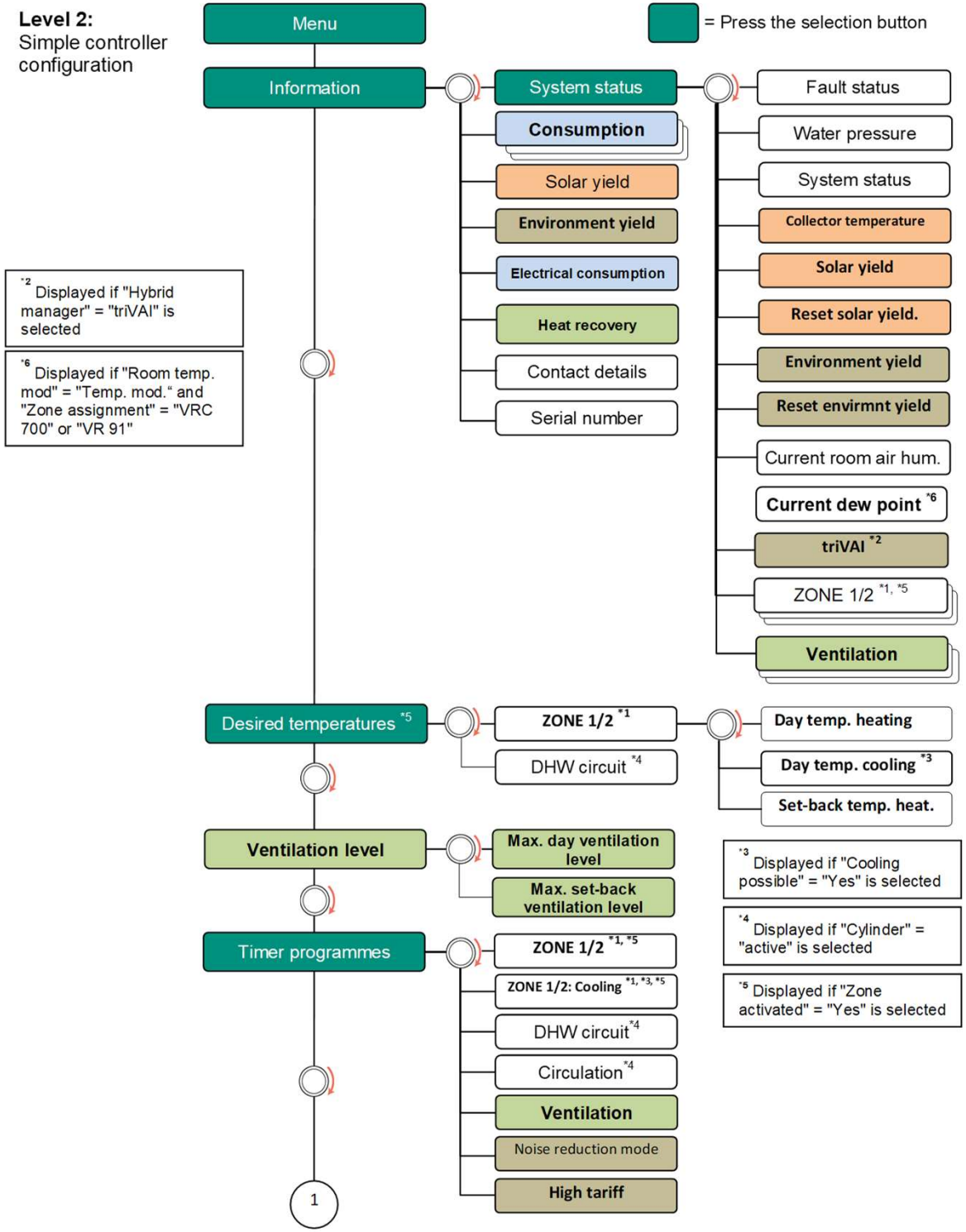


After the language, system diagram and the configuration for the VR 70 (if available) have been entered, the multiMATIC starts in the installation assistant and moves directly to "System configuration".

Summary of level structure



Level 2:
Simple controller configuration



*2 Displayed if "Hybrid manager" = "triVAI" is selected

*6 Displayed if "Room temp. mod" = "Temp. mod." and "Zone assignment" = "VRC 700" or "VR 91"

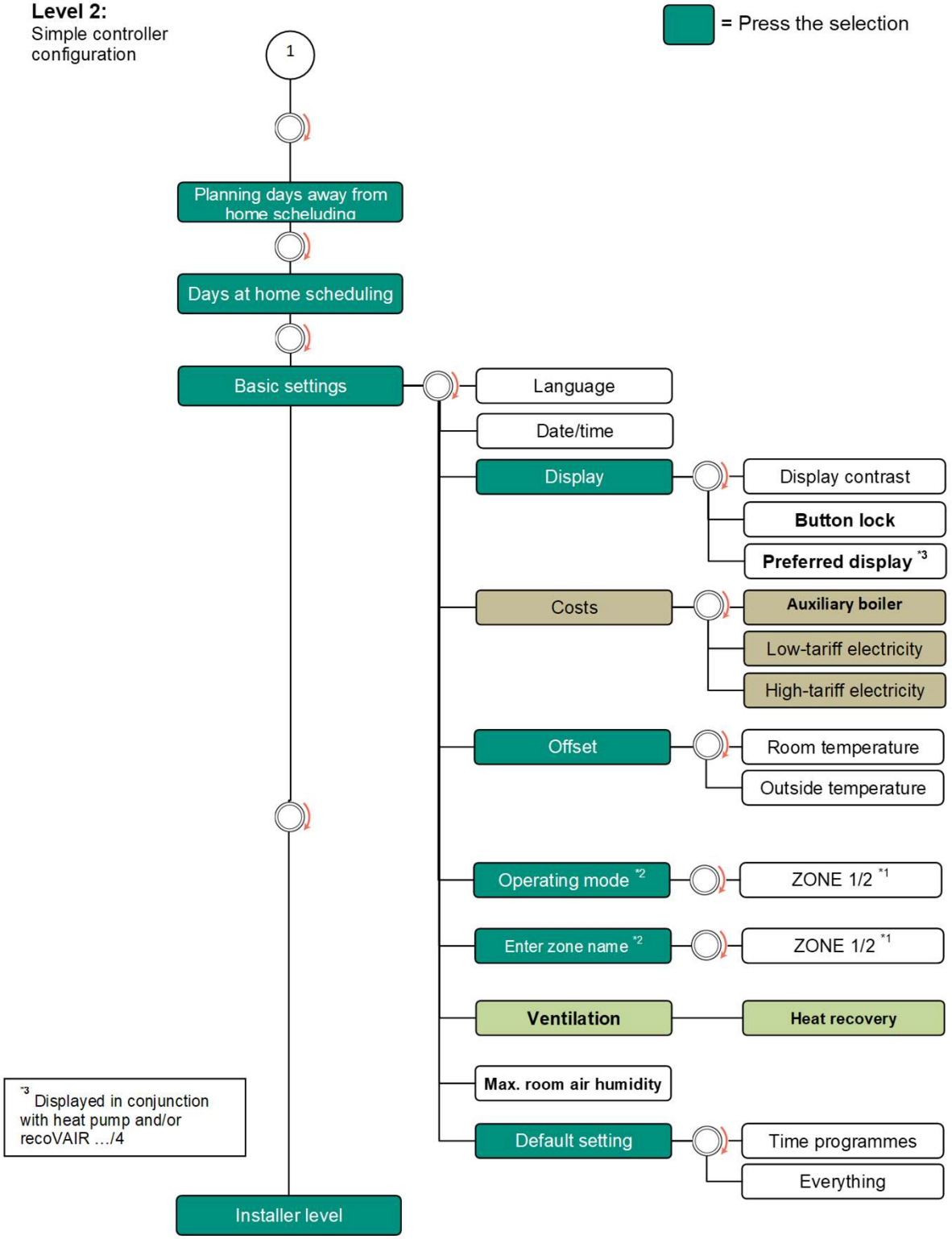
*3 Displayed if "Cooling possible" = "Yes" is selected

*4 Displayed if "Cylinder" = "active" is selected

*5 Displayed if "Zone activated" = "Yes" is selected

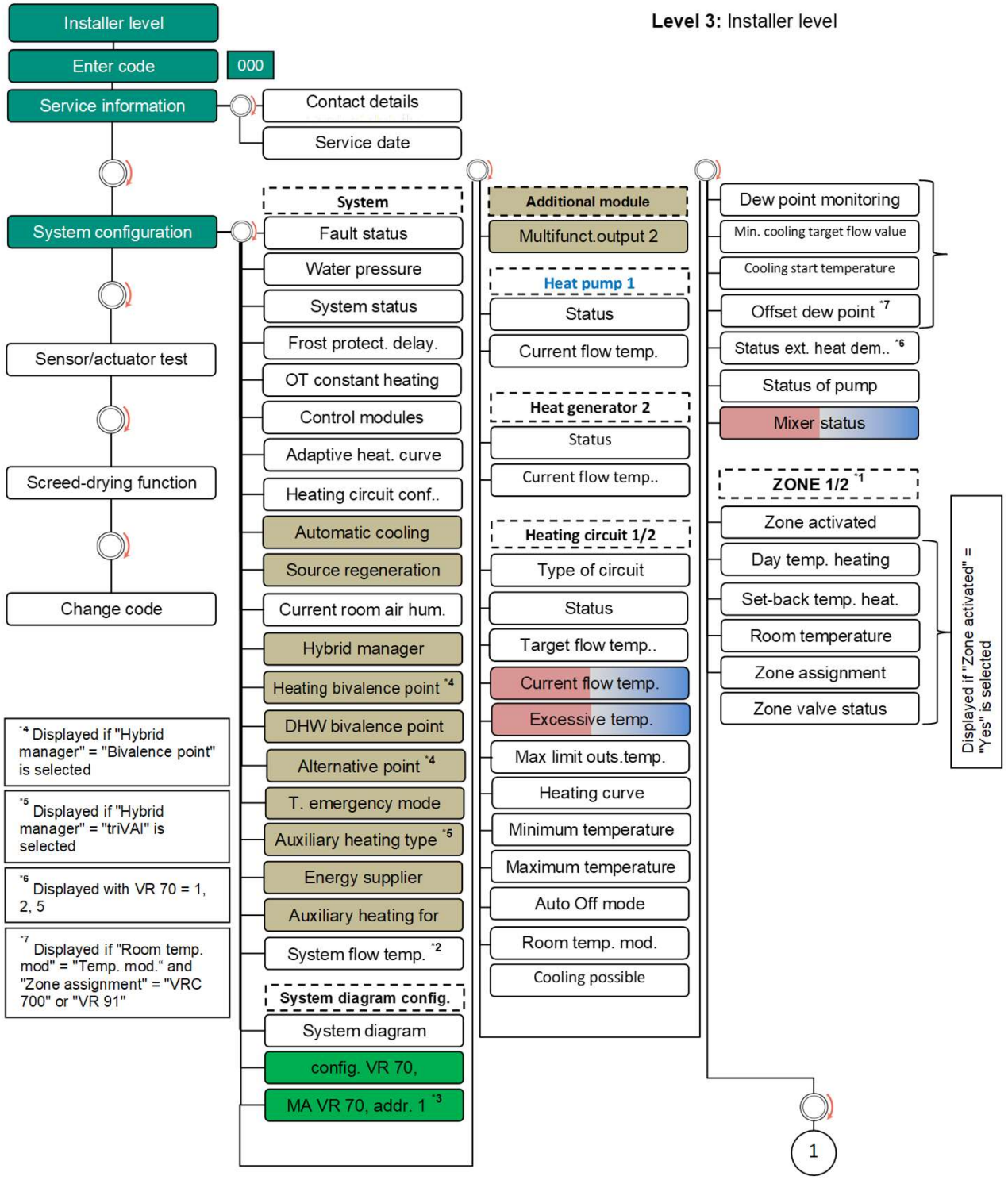
Level 2:
Simple controller configuration

= Press the selection



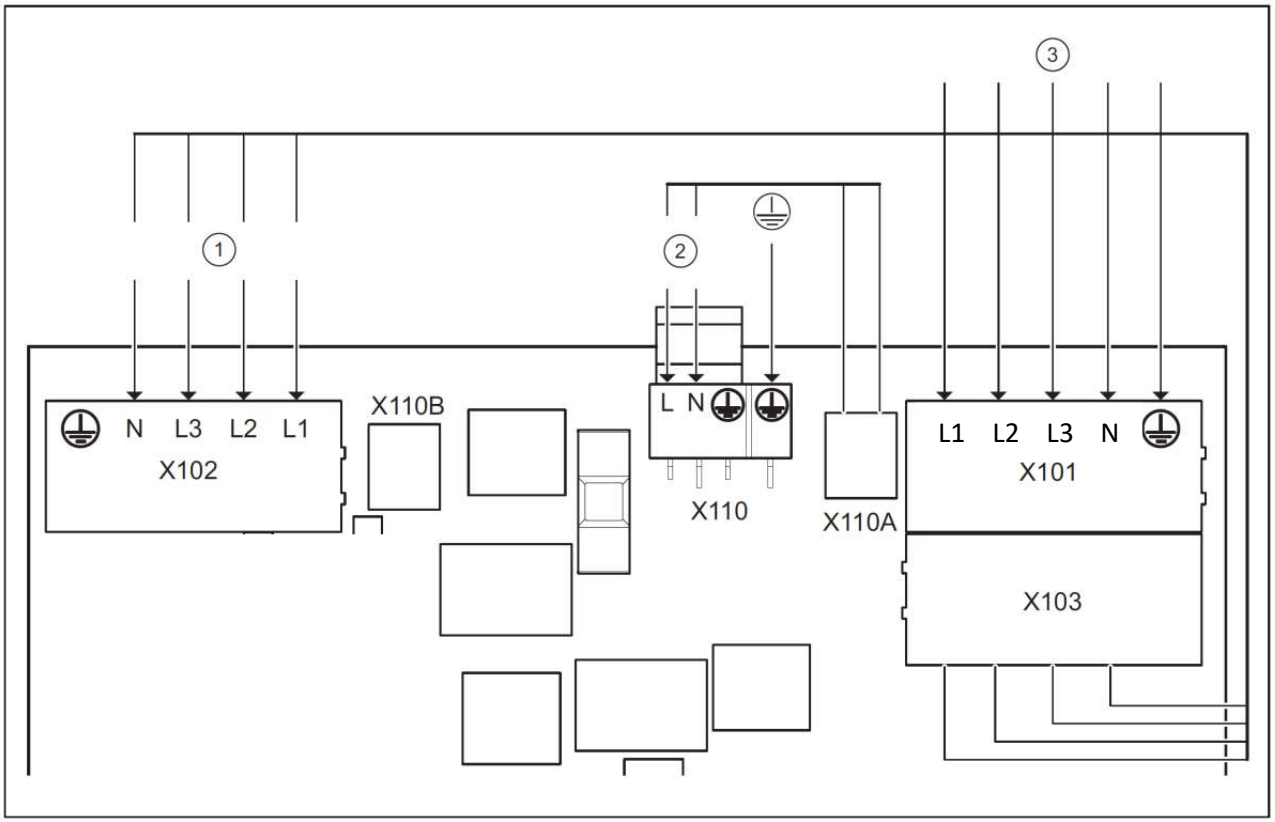
*3 Displayed in conjunction with heat pump and/or recoVAIR .../4

Level 3: Installer level



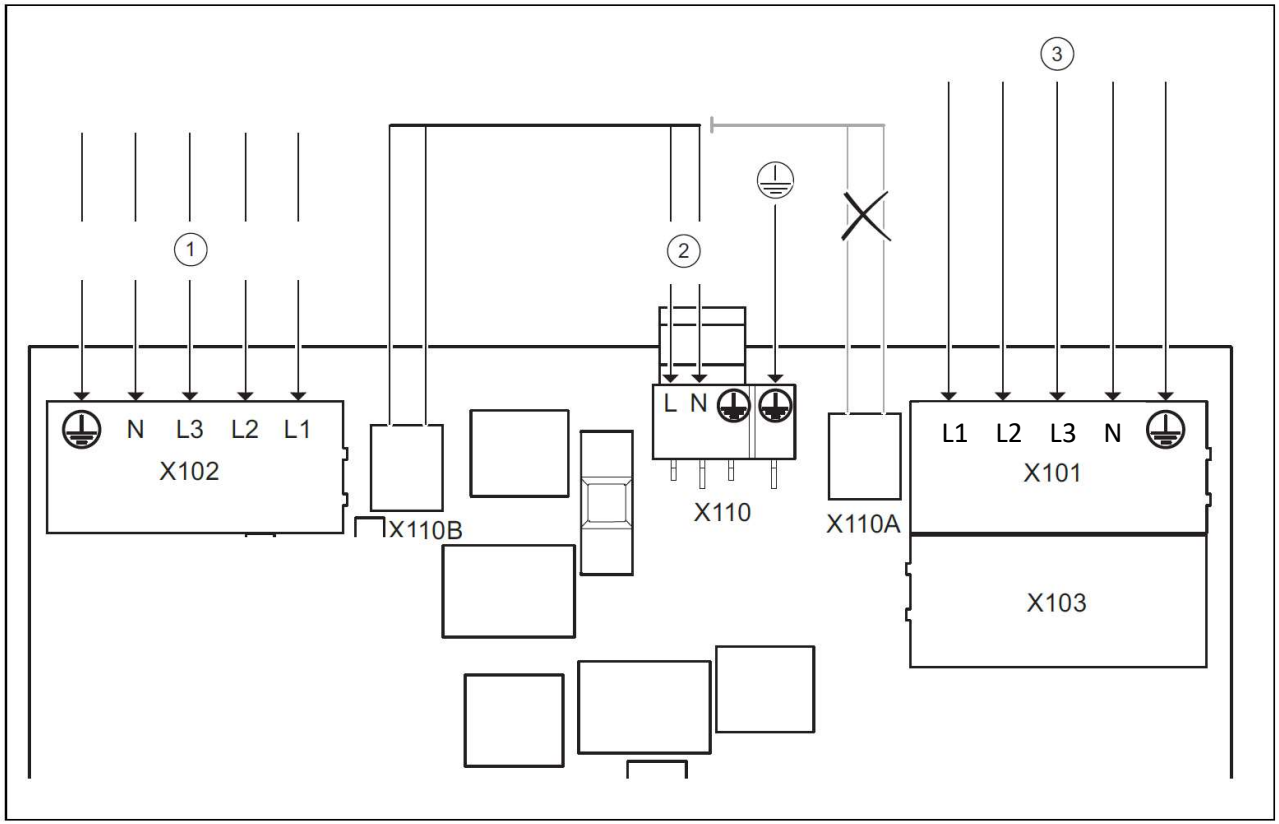
Level 3: Installer level

Unblocked 400 V power supply (connection diagram 1)



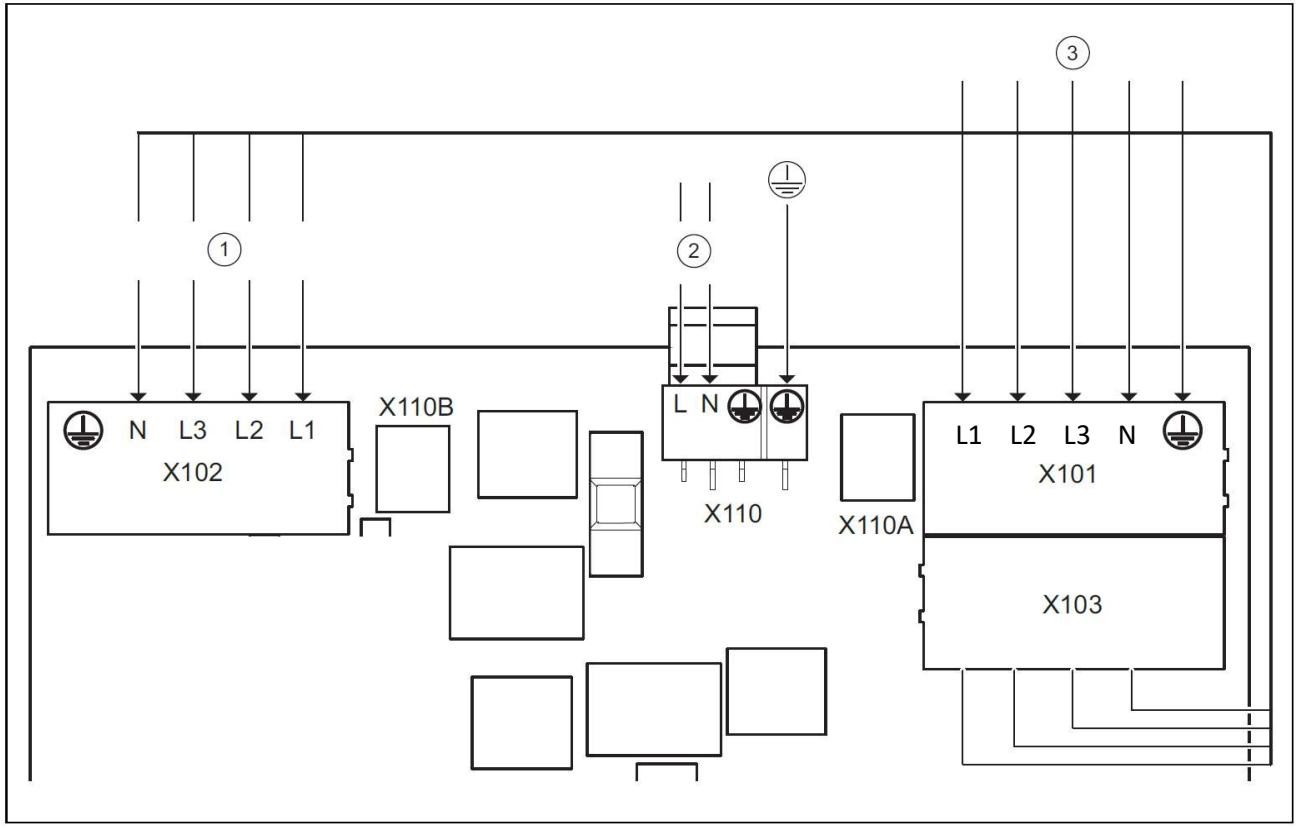
- Compressor power supply (unblocked): Separate power supply on X101
- Auxiliary electric heating power supply (unblocked): Via bridges from X103 to X102 which are installed at the factory
- Controller PCB power supply (unblocked): Via bridges from X110A to X110 which are installed at the factory.

Two-circuit 400 V power supply on special tariff (connection diagram 2)



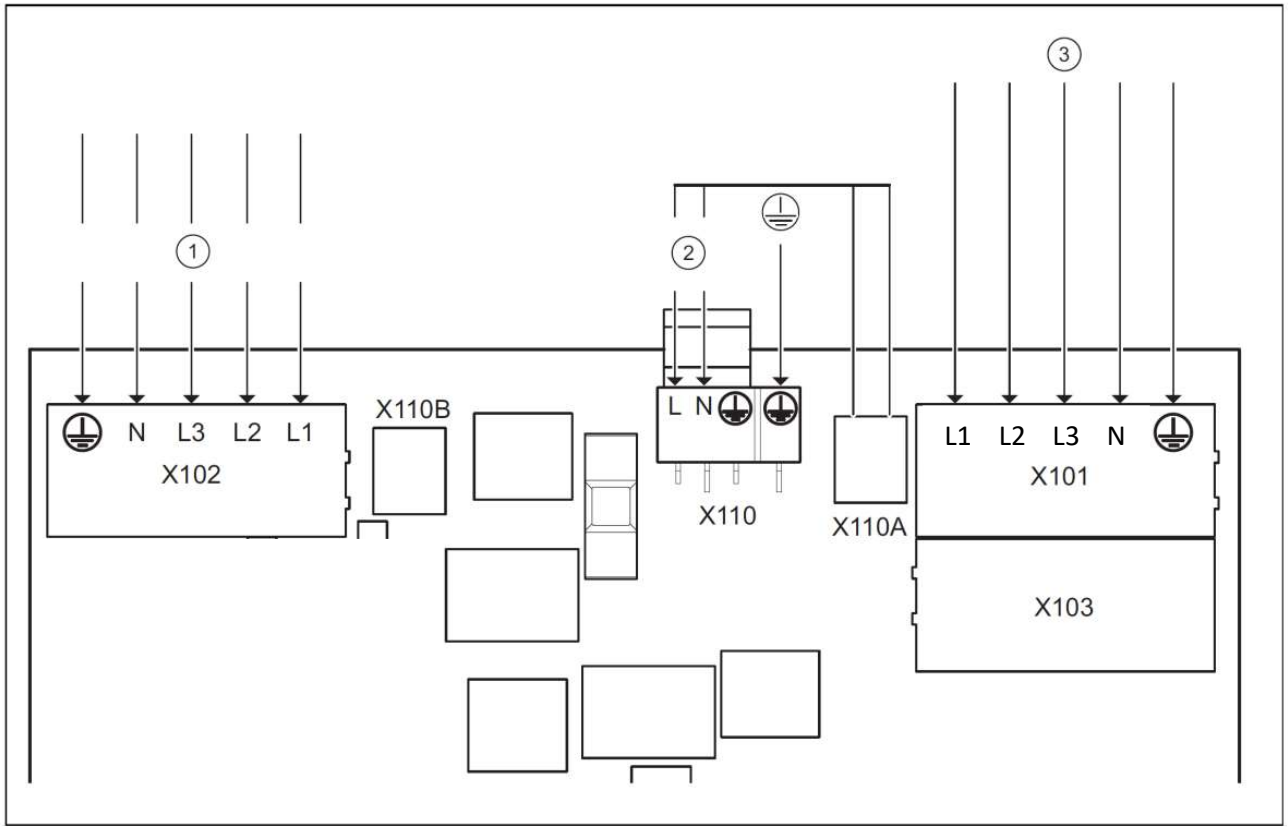
- Compressor power supply (blockable): Separate power supply on X101
- Auxiliary electric heating power supply (unblocked): Via separate power supply to X102
- Controller PCB power supply (unblocked): Via X110B (connection from contact X110A to X110B)

Two-circuit power supply on special tariff – 3 N PE 400 V (connection diagram 3)



- Compressor power supply (blockable): Power supply on X101
- Auxiliary electric heating power supply (blockable): Via bridges from X103 to X102 which are installed at the factory
- Controller PCB power supply (unblocked): Via separate power supply to X110 (remove bridge from X110A to X110).

Two-circuit 400 V power supply for heat pumps – tariff 3 (connection diagram 4)



- Compressor power supply (unblocked): Separate power supply on X101
- Auxiliary electric heating power supply (blocked): Via second electricity meter at X102
- Controller PCB power supply (unblocked): Via bridges from X110A to X110 which are installed at the factory.

Start-up checklist I

Heating circuit checklist	
Were the heating circuits in the system hydraulically balanced?	
Were leakage pressures determined by pipe network calculations?	
Was the nominal volume flow rate of the heat pump taken into consideration?	
Was a dirt filter incorporated in the return (existing system)?	
Was the system provided with all the safety devices described in the manual (expansion relief valve, expansion vessel)?	
Were an overflow funnel and blow-out line incorporated?	
Were the pipes thermally insulated to make them diffusion-tight for cooling mode?	
Was the heating circuit flushed, filled and purged (purging programme)?	
Was the heating circuit checked for leaks?	
Are the heating circuit lines in the whole system connected correctly for the flow (e.g. hydraulic accessories, auxiliary boiler, etc.)?	
Are the heating circuit lines connected to the heat pump in the correct flow direction?	
Heating circuit, underfloor circuit in cooling mode: Do you want to cool individual rooms (bathroom)? Has a lock (valve) been installed for these rooms? Was the 230 V cooling active signal on the mains PCB used for switching the individual room controllers? Has the required cooling technology been set?	

Start-up checklist II

Brine circuit checklist	
Are the brine pipes connected in the correct flow direction?	
Was the correct brine fluid used for filling?	
Was the frost protection temperature checked with a frost-protection tester before the freeze protection temperature was set?	
Was the brine circuit checked for leak tightness?	
Was the brine circuit purged correctly (purging valves, brine purging programme)?	
Was a dirt filter used at the brine side inlet of the heat pump for the filling operation? After completion, was the dirt filter removed? Or was the filter in the Vaillant filling device used to fill the system?	
Was a brine expansion vessel installed, and was the pre-charge pressure of the expansion tank adjusted	
Has the Vaillant brine filling unit or other stop valves been installed?	
Was the brine circuit filled to a pressure of approx. 1.5 bar?	
Were the brine pipes in the building thermally insulated against vapour diffusion?	
Were cold pipe clips used for the installation of the brine circuit lines inside the building?	
Was an expansion relief valve installed?	
Was the condensate connection in the outer unit properly installed in a frost-free area and connected to a gravel bed or to the drainage?	
Do the brine pipes have the required pipe cross-sections and have the maximum lengths to the outer unit been complied with?	
Is the outer unit properly purged when using the automatic air vent (Vaillant accessories)?	

Start-up checklist III

Electrical installation checklist	
Were all electrical connections carried out properly and according to the specified connection diagrams?	
Was the protective earth properly connected?	
Do all lines have the required line cross-sections?	
Do all the poles on the circuit breakers disconnect?	
Were all lines fastened using strain relief clamps?	
Check external sensors (electrical wiring and position)	
Electrical installation, eBUS: Has a VR 32/3 for data communication been installed in an existing eBUS gas-fired boiler or recoVAIR and the correct address (2 or 3) been set? Are all required eBUS components (e.g. VR 91 remote control unit, VR 70 expansion module, etc.) connected?	
If available, was a ripple control signal connected to the heat pump by the power company?	
Check that the eBUS and the Internet connection for the VR 900 communication unit are set correctly (operating LEDs)	
Heat pump installation checklist	
Were all the casing sections fitted?	
Were the installation instructions followed?	
Has the acoustic decoupling been observed?	
Were the required installation clearances complied with?	

Start-up checklist IV

Supplementary information on the start-up	
Set or check the values in the installation assistant of the heat pump (operating unit) and the multiMATIC 700	
Were the basic settings made on the controller? (e.g. timer programmes, heating curve, OT switch-off threshold, etc.)	
Adapt the settings for the auxiliary heating according to customer requirements and/or adapt the system design	
Switch on the heat pump for heating mode.	
Check the current pressures and temperatures in the refrigeration circuit under "Sensor/actuator test" on the heat pump operating unit	
Check the temperature difference between the heating flow and return (for underfloor heating approx. 5-8 K). If applicable, check the volume flow through the heating pump.	
Is the heating heated up to the set target temperature?	
Check the temperature difference between the source intake and outlet side (approx. 3-4 K).	
Domestic hot water supply	
Is the flexoCOMPACT cylinder properly purged when using the automatic air vent (Vaillant accessories)?	
Was the power for the domestic hot water supply considered?	
Does an external heat accumulator absorb the heat energy from the heat pump?	
Was the user's behaviour regarding hot water comfort taken into account? If possible, reduce the hot water temperature of 60 °C set at the factory on the multiMATIC 700	
Is an anti-legionella function desired?	
Is the cylinder heated up to the desired set target temperature?	

Service messages

Code	Meaning	Cause	Remedy
Building circuit status			
32	Building circuit: Pressure low	- Pressure drop in the building circuit due to leaks or air pockets. - Building circuit pressure sensor defective.	- Check the building circuit for leaks, top up with water and purge. - Check the plug contact on the PCB and on the cable harness; check that the pressure sensor works correctly; replace the pressure sensor.
Environment circuit maintenance messages			
33	Fan unit: Cleaning required	- Air inlet or air outlet on the air/brine heat exchanger is dirty	- The fan unit is defrosted more frequently than is required - Loosen and clean any dirt from the fan unit of the air/brine heat exchanger
34	Environment circuit: Pressure low	- Pressure drop in the environment circuit due to leaks or air pockets. - Environment circuit pressure sensor defective.	- Check the environment circuit for leaks, top up the medium (brine/water) and purge. - Check the plug contact on the PCB and on the cable harness; check that the pressure sensor works correctly; replace the pressure sensor.
49	Brine pipes inverted		

Troubleshooting

In practice, the majority of complaints relating to heat pump systems are due to the surroundings. Before carrying out time-consuming expensive repairs to the heat pump, you should first carry out a thorough check of the surroundings.

Code	Meaning	Cause	Remedy
F.086	Building circuit: Lockout contact S20 open	Contact S20 is open at the heat pump's main PCB (HMU) Incorrect setting of the limit thermostat	Adjust the maximum flow temperature for HC2 using the system controller (observe the upper switch-off threshold for
F.514	Sensor fault: Compressor inlet temp.	Sensor not connected or sensor input has short-circuited	Check and, if required, replace the sensor (see sensor characteristics in the appendix) Replace the cable harness
F.517	Sensor fault: Compressor outlet temp.	Sensor not connected or sensor input has short-circuited	Check and, if required, replace the sensor (see sensor characteristics in the appendix) Replace the cable harness
F.519	Sensor fault: Building circuit return temp.	Sensor not connected or sensor input has short-circuited	Check and, if required, replace the sensor (see sensor characteristics in the appendix) Replace the cable harness
F.520	Temp. sensor fault: Building circuit flow	Sensor not connected or sensor input has short-circuited	Check and, if required, replace the sensor (see sensor characteristics in the appendix) Replace the cable harness
F.532	Building circuit: Flow rate too low	Stop cock was not opened Building circuit pump defective All consumers in the heating system are closed	Check the stop cocks and thermostatic radiator valves Guarantee the minimum flow rate (see Techn. data) Check that the building circuit pump works correctly