AERMEC

AERMEC
SOLUTIONS FOR HYDRONIC SYSTEMS IN RESIDENTIAL APPLICATIONS

INDEX

1 ABOUT AERMEC

Plan view of the company and main entrance

Aermec was founded 1961 with a mission that was quite ambitious at the time: provide well-being and comfort in all areas where people live and work.
Since then, Aermec has expanded its activities, dedicating itself to a multitude of applications within markets as diverse as residential environments, with a complete portfolio of commercial applications, including stores, hotels, data centres, large systems including sports and leisure facilities, public buildings, healthcare centres and transport infrastructure, as well as numerous specific industrial applications.
Within this broad scenario, Aermec continues to base its activities on its constant attention to research and quality in order to develop technical solutions that ensure maximum satisfaction among its users. Aermec's competitive advantage results from the company's ability to meet the technological challenges posed by innovation, investing in processes and logistics and understanding the needs of individual customers.
Experience, ideas and innovative solutions, competency and flexibility satisfy market needs, guaranteeing a level of well-being that also makes it possible to design the environment, respecting the precise values on which Giordano Riello has relied since 1961 when he established Aermec. Respect for these values, which represent the technical principles of a brand, is fundamental for Aermec's international success. When designing and producing its products and systems, Aermec focuses on every single detail in order to respect the environment, reduce pollution, save energy, preserve health and improve well-being.

Aermec recognises the value of every individual, and for this reason it places maximum importance on health and the improvement of well-being.

Aermec respects different cultures and customs of populations around the world, without every forgetting the territory where it was established and where it has developed, and which has offered the support and resources for obtaining success.

> 750
Employees

145,000 square metre facility, 61,000 of which are covered

57
Exclusive sales outlets in Italy

> 70
Distributors in Europe and world-wide

6
Distributors in France, Germany, Poland, the United Kingdom, Russia and South America

81
Service centres in Italy

Advanced logistics

Strongly automatic production lines, together with the most advanced technologies in logistics, including the Enterprise Resource Planning (ERP) system, make it possible to obtain fast delivery times able to satisfy all customer requests, ensuring high levels of quality. In fact, before being placed on the market, each single unit is subjected to scrupulous checks concerning safety and technical performance.

Supporting efficiency

Aermec is ISO14001 certified and is strongly committed to minimising its environmental impact in all its activities: not only in its production facilities, but also in the solutions it offers to its customers. Thanks to cutting edge development, technologies that permit the use of free cooling and advanced control algorithms, Aermec products guarantee minimum consumption and significant energy savings both at a full load as well as at partial loads.

Technology and reliability

Aermec's quality is guaranteed by important certifications, such as Eurovent in Europe, AHRI in North America and many others. Every year, many customers visit our laboratories at our headquarters to observe customised aeraulic, enthalpy and noise control tests. Aermec currently has the largest climatic test chamber in Europe in its research centre for plant machinery. It is Eurovent and AHRI certified and able to test power units up to 2 MW. Here tests are performed with a level of precision up to ± 0.2 °C that are able to simulate room temperature conditions that vary from -20 to +55 °C.
Rigorous procedures during the design phase, the careful selection of suppliers, in-depth prototype testing, numerous field tests and vibrational analyses guarantee that all Aermec products are resistant and guarantee operation even in the most difficult operating conditions.

Fancoil production line

Medium power equipment assembly line

Testing chamber

2.0 ENERGY LABELLING AND MINIMUM EFFICIENCY AND NOISE REQUIREMENTS

26 September 2015 was a milestone for the world of heating and the production of domestic hot water: this was the date TIER 1 of European Regulation 813/2013 entered into force. This regulation establishes the methods for the application of European Directive 2009/125/EC (ERP Directive) as regards the specifications for the eco-compatible design of room heating equipment and for mixed room and domestic hot water heating with a design heating capacity Pdes* ≤ 400 Kw; it defines the average seasonal efficiency indicators (SCOP and seasonal performance η_S) and requires the minimum values of these indicators in order to sell the machines in the European market.

For heat pumps dedicated to room heating, the thresholds to respect with TIER 1 were as follows:

- Low temperature applications (35°C): η_S ≥ 115%
- Medium temperature applications (55°C): η_S ≥ 100%

TIER 1 was replaced by TIER 2 (26 September 2017), which increased the seasonal efficiency thresholds for placing heat pumps with Pdes ≤ 400 Kw on the European market:

- Low temperature applications (35°C): η_S ≥ 125%
- Medium temperature applications (55°C): η_S ≥ 110%

The energy efficiency values must be declared in the relevant sections of the technical documentation and the website.

European Regulation 813/2013 also introduced sound power limits for heat pumps for room heating and mixed room and DHW heating with Pdes ≤ 70 Kw; they are supplied based on their design heating capacity. These limits must be respected as of 26 September 2015.

Nominal heating capacity ≤ 6 kW		**Nominal heating capacity > 6 kW and ≤ 12kW**		**Nominal heating capacity > 12 kW and ≤ 30 kW**		**Nominal heating capacity > 30 kW and ≤ 70 kW**	
Sound power level L_{WA} (indoor)	Sound power level L_{WA} (outdoor)	Sound power level L_{WA} (indoor)	Sound power level L_{WA} (outdoor)	Sound power level L_{WA} (indoor)	Sound power level L_{WA} (outdoor)	Sound power level L_{WA} (indoor)	Sound power level L_{WA} (outdoor)
60 dB	65 dB	65 dB	70 dB	70 dB	78 dB	80 dB	88 dB

For heat pumps designed for mixed room and DHW heating, the manufacturer is required to declare the seasonal efficiency connected to the production of domestic hot water. The technical documentation must indicate the machine's declared load profile (from 3XS to 4XL); each load profile is associated with a time and a duration, the useful and minimum water draw-off temperature, the water flow rate and the thermal energy drawn off.

Starting from 26 September 2017, the heating energy efficiency for the production of DHW may not be lower than the values indicated below based on the load profile:

Declared load profile	**3XS**	**XXS**	**XS**	**S**	**M**	**L**	**XL**	**XXL**	**3XL**	**4XL**
Water heating energy efficiency	32%	32%	32%	32%	36%	37%	38%	60%	64%	64%

The

mixed-use heat pumps are classified for DHW following a test whose result can change by varying the features of the storage tank associated with the machine. For this reason, a heat pump for the mixed room and DHW heating is certified in association with a domestic hot water storage tank with well defined features.

For heat pumps designed exclusively for room heating, if it is technically feasible to connect a DHW storage tank for mixed use, there is a possibility from a regulatory point of view to realise the system with the obligation to label the system according to the procedure declared in European Regulation 811/2013.

European Regulation 811/2013 regulates energy labelling for products used for room heating or mixed room and DHW heating. This regulation requires providing heating equipment with Pdes ≤ 70 Kw with an energy label, for the purpose of demonstrating compliance with the minimum seasonal energy performance (energetic eco-compatibility) and sound power (acoustic eco-compatibility) requirements; it introduced a new seasonal energy efficiency scale for heat pumps (from A++ to G with TIER 1 from 26 September 2015, from A+++ to D with TIER 2 from 26 September 2019) based on the seasonal efficiency parameter η_S.Energy classification (TIER 1 and TIER 2) of heat pumps for room heating for low temperature applications (water produced at 35°C).

Room heating seasonal energy efficiency class	Room heating seasonal energy efficiency class
A^{+++}	$\eta_s \geq 175$
A^{++}	$150 \leq \eta_s < 175$
A^{+}	$123 \leq \eta_s < 150$
A	$115 \leq \eta_s < 123$
B	$107 \leq \eta_s < 115$
C	$100 \leq \eta_s < 107$
D	$61 \leq \eta_s < 100$
E	$59 \leq \eta_s < 61$
F	$55 \leq \eta_s < 59$
G	$\eta_s < 55$

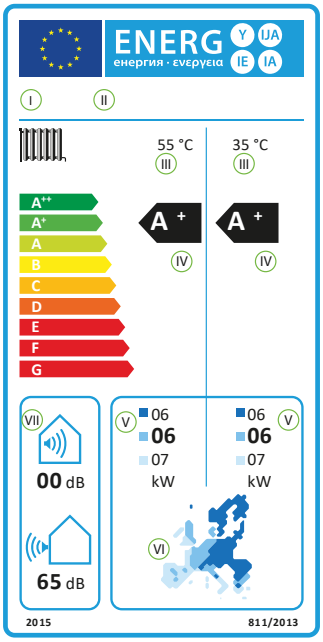
Energy classification (TIER 1 and TIER 2) of heat pumps for room heating for medium temperature applications (water produced at 55°C).

Room heating seasonal energy efficiency class	Room heating seasonal energy efficiency class
A^{+++}	$\eta \geq 150$
A^{++}	$125 \leq \eta_s < 150$
A^{+}	$98 \leq \eta_s < 125$
A	$90 \leq \eta_s < 98$
B	$82 \leq \eta_s < 90$
C	$75 \leq \eta_s < 82$
D	$36 \leq \eta_s < 75$
E	$34 \leq \eta_s < 36$
F	$30 \leq \eta_s < 34$
G	$\eta_s < 30$

If the heat pump is certified for medium temperature applications, the seasonal energy efficiency class and the Pdes must be indicated for both low temperature (35°C) and medium temperature (55°C) applications for the produced water.

Energy classification (TIER 1 and TIER 2) of heat pumps for mixed heating (DHW profile).

	3XS	XXS	XS	S	M	L	XL	XXL
A+++	$\eta_{wh} \geq 62$	$\eta_{wh} \geq 62$	$\eta_{wh} \geq 69$	$\eta_{wh} \geq 90$	$\eta_{wh} \geq 163$	$\eta_{wh} \geq 188$	$\eta_{wh} \geq 200$	$\eta_{wh} \geq 213$
A++	$53 \leq \eta_{wh} < 62$	$53 \leq \eta_{wh} < 62$	$61 \leq \eta_{wh} < 69$	$72 \leq \eta_{wh} < 90$	$130 \leq \eta_{wh} < 163$	$150 \leq \eta_{wh} < 188$	$160 \leq \eta_{wh} < 200$	$170 \leq \eta_{wh} < 213$
A+	$44 \leq \eta_{wh} < 53$	$44 \leq \eta_{wh} < 53$	$53 \leq \eta_{wh} < 61$	$55 \leq \eta_{wh} < 72$	$100 \leq \eta_{wh} < 130$	$115 \leq \eta_{wh} < 150$	$123 \leq \eta_{wh} < 160$	$131 \leq \eta_{wh} < 170$
A	$35 \leq \eta_{wh} < 44$	$35 \leq \eta_{wh} < 44$	$38 \leq \eta_{wh} < 53$	$38 \leq \eta_{wh} < 55$	$65 \leq \eta_{wh} < 100$	$75 \leq \eta_{wh} < 115$	$80 \leq \eta_{wh} < 123$	$85 \leq \eta_{wh} < 131$
B	$32 \leq \eta_{wh} < 35$	$32 \leq \eta_{wh} < 35$	$32 \leq \eta_{wh} < 38$	$32 \leq \eta_{wh} < 38$	$39 \leq \eta_{wh} < 65$	$50 \leq \eta_{wh} < 75$	$55 \leq \eta_{wh} < 80$	$60 \leq \eta_{wh} < 85$
C	$29 \leq \eta_{wh} < 32$	$29 \leq \eta_{wh} < 32$	$32 \leq \eta_{wh} < 35$	$32 \leq \eta_{wh} < 35$	$36 \leq \eta_{wh} < 39$	$37 \leq \eta_{wh} < 50$	$38 \leq \eta_{wh} < 55$	$40 \leq \eta_{wh} < 60$
D	$26 \leq \eta_{wh} < 29$	$26 \leq \eta_{wh} < 29$	$29 \leq \eta_{wh} < 32$	$29 \leq \eta_{wh} < 32$	$33 \leq \eta_{wh} < 36$	$34 \leq \eta_{wh} < 37$	$35 \leq \eta_{wh} < 38$	$36 \leq \eta_{wh} < 40$
E	$22 \leq \eta_{wh} < 26$	$23 \leq \eta_{wh} < 26$	$26 \leq \eta_{wh} < 29$	$26 \leq \eta_{wh} < 29$	$30 \leq \eta_{wh} < 33$	$30 \leq \eta_{wh} < 34$	$30 \leq \eta_{wh} < 35$	$32 \leq \eta_{wh} < 36$
F	$19 \leq \eta_{wh} < 22$	$20 \leq \eta_{wh} < 23$	$23 \leq \eta_{wh} < 26$	$23 \leq \eta_{wh} < 26$	$27 \leq \eta_{wh} < 30$	$27 \leq \eta_{wh} < 30$	$27 \leq \eta_{wh} < 30$	$28 \leq \eta_{wh} < 32$
G	$\eta_{wh} < 19$	$\eta_{wh} < 20$	$\eta_{wh} < 23$	$\eta_{wh} < 23$	$\eta_{wh} < 27$	$\eta_{wh} < 27$	$\eta_{wh} < 27$	$\eta_{wh} < 28$



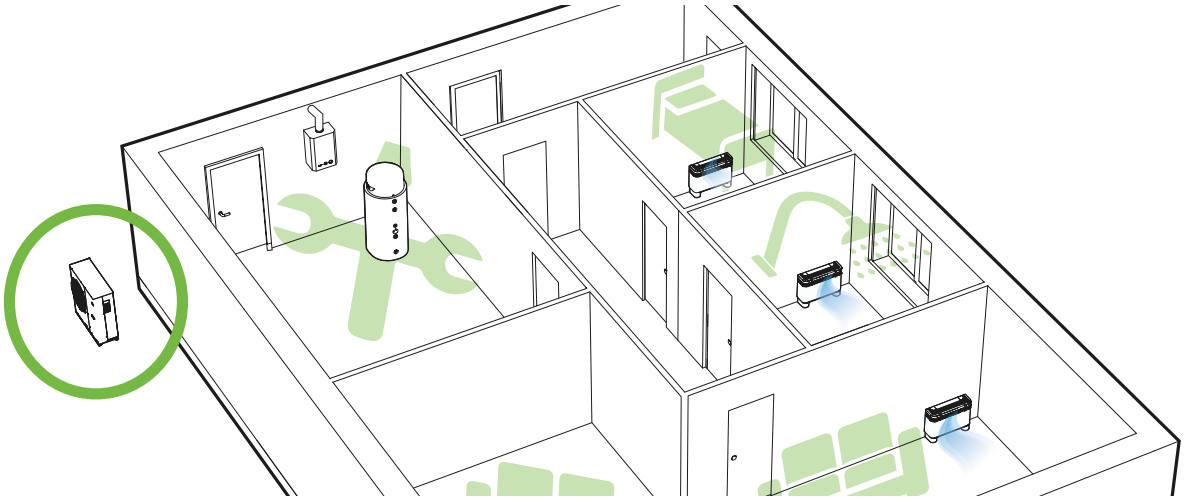
I	Manufacturer's name or brand;
II	Supplier model's ID code;
III	Room heating function for medium and low temperature applications;
IV	Seasonal energy efficiency class for room heating in average climatic conditions for medium and low temperature applications;
V	Nominal heating capacity in average climate conditions, colder and hotter for medium and low temperature applications, rounded to the nearest full digit;
VI	Temperature map for Europe with the three reference temperature zones;
VII	Indoor (if the device is for indoor applications) and outdoor sound power level in dB, rounded to the nearest full digit;

This label is applied to the packaging of the actual product by the manufacturer or the importer.

FOR MORE INFORMATION ABOUT THE ENERGY CLASSIFICATION OF THE AERMEC UNITS, VISIT OUR SITE USING THE RELATIVE QR CODE !

3 AERMEC PRODUCTS FOR RESIDENTIAL APPLICATIONS

HEAT PUMPS :



ANKI 020H-080H

Cooling capacity: 5,9 – 18,7 kW (0 5 10 15 20 25 30 35)

Thermal power: 6,1 – 20,2 kW (0 5 10 15 20 25 30 35)

R410A · INVERTER · INVERTER · ModBus · VMF

Inverter reversible air-water heat pump for outdoor installation. Designed for air conditioning/heating and the production of domestic hot water. Heating operation with external air down to -20°C and producing water as hot as 60°C. Can be combined with SAF heat storage tanks for the production of domestic hot water.

ANK 020H-150H

Cooling capacity: 6,8 – 29,2 kW (0 5 10 15 20 25 30 35)

Heating capacity: 8 – 33,5 kW (0 5 10 15 20 25 30 35)

ehpa · ModBus · VMF

Reversible air-water heat pump for outdoor installation. Designed for air conditioning/heating and the production of domestic hot water. Heating operation with external air down to -20°C and producing water as hot as 60°C. Can be combined with SAF heat storage tanks via the VMF system for the production of domestic hot water.

ANL 021H-203H

Cooling capacity: 5,7 – 43 kW (0 10 20 30 40 50 60 70)

Thermal power: 6,2 – 46 kW (0 10 20 30 40 50 60 70)

R410A · ModBus · VMF

Reversible air-water heat pump for outdoor installation. Designed for air conditioning/heating and the production of domestic hot water. Can be combined with SAF heat storage tanks via the VMF system for the production of domestic hot water.

NRK 0090H-0150H

Cooling capacity: 18 – 148 kW (0 30 60 90 120 150 180 210)

Heating capacity: 21 – 175 kW (0 30 60 90 120 150 180 210)

ModBus

Reversible air-water heat pump for outdoor installation. Designed for air conditioning/heating and the production of domestic hot water. Heating operation with external air down to -20°C and producing water as hot as 65°C. Can be combined with SAF heat storage tanks via the VMF system for the production of domestic hot water.

CL 025H-200H

Cooling capacity: 5,5 – 39,3 kW (0 10 20 30 40 50 60 70)

Heating capacity: 8,2 – 42,7 kW (0 10 20 30 40 50 60 70)

R410A · ModBus · VMF

Reversible air-water heat pump with Plug Fan fans for indoor installation. Designed for air conditioning/heating and the production of domestic hot water. Heating operation with external air as low as -15°C and producing water as hot as 60°C. Can be combined with SAF heat storage tanks via the VMF system for the production of domestic hot water.

HMI 040-160

Cooling capacity: 3 – 14,5 kW (0 3 6 9 12 15 18 20)

Heating capacity 4 – 15,5 kW (0 3 6 9 12 15 18 20)

R32 · INVERTER · VMF · WI FI

Reversible air/water heat pump inverter for air conditioning systems with cold water production for cooling rooms and hot water for heating and/or domestic hot water services by means of DHWT300S storage tank. Outdoor Installation.

BHP

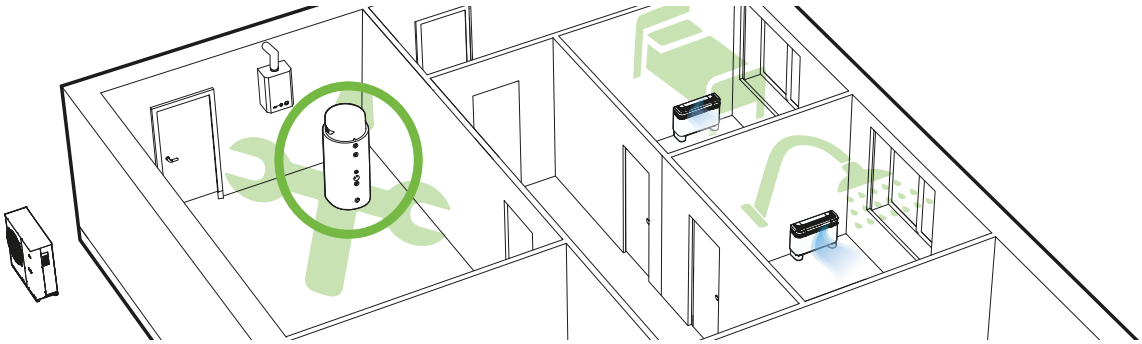
Cooling capacity: 3,2 – 8,5 kW (0 3 6 9 12 15 18 20)

Heating capacity: 4,0 – 9,5 kW (0 3 6 9 12 15 18 20)

R32 · INVERTER · VMF · WI FI · ModBus

Reversible air/water heat pump inverter split for air conditioning/heating and the production of DHW. The indoor unit can be an all-in-one version, with integrated DHW storage tank, or a wall system, which can be paired with the DHWT300S storage system for the production of DHW.

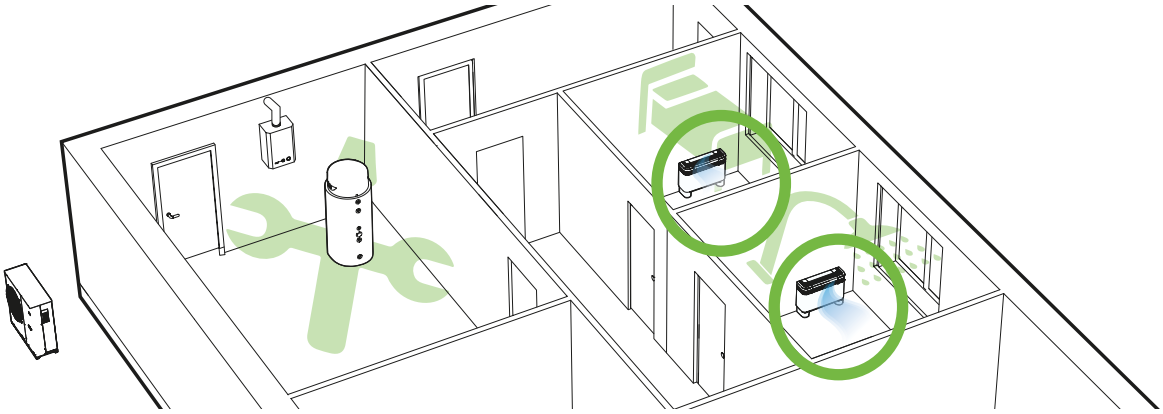
HEAT STORAGE TANKS AND HEAT PUMPS FOR THE PRODUCTION OF DHW:



SAF

Single-block thermo-accumulator for the production of instant domestic hot water, equipped with inverter circulator, electronic adjustment card and stainless steel plate heat exchanger, which ensures maximum hygiene by separating the drinking water circuit from the technical water circuit. This device was designed to be combined with heat pumps, but can also be paired with traditional or biomass boilers or solar thermal systems. The storage tank can be fitted with an additional coil to integrate an additional heat source, as well as a dedicated circulator with control software included.

FAN COILS:



FCZ

Cooling capacity: 1 – 6,8 kW (0 1 2 3 4 5 6 7)

Heating capacity: 2,4 – 15,5 kW (0 3 6 9 12 15 18 20)

VMF 2 4

On-off fan coils that can be installed in any type of 2/4 pipe system and in combination with any heat generator. Thanks to the availability of various versions and configurations, it is easy to select the optimal solution for all system requirements. Also available in a flush-mounted FCZ-P and duct type FCZ-PO version.

FCZI

Cooling capacity: 3,7 – 15,5 kW (0 3 6 9 12 15 18 20)

Heating capacity: 3,7 – 15,5 kW (0 3 6 9 12 15 18 20)

INVERTER VMF 2 4

Inverter fan coils that can be installed in any type of 2/4 pipe system or in combination with any heat generator. Thanks to the availability of various versions and configurations, it is easy to select the optimal solution for all system requirements. Also available in a recessed FCZ-P and duct type FCZI-P version.

FCZ_DS Dualjet

Cooling capacity: 1 – 6,8 kW (0 1 2 3 4 5 6 7)

Heating capacity: 2,4 – 15,5 kW (0 3 6 9 12 15 18 20)

VMF 2 4

FCZ series on-off fan coils that can be installed on the floor in 2/4 pipe systems and in combination with any heat generator. They are able to offer a pleasant sensation of comfort by directing the air in a way that evenly distributes the temperature in the room: in the winter, the hot air is directed down towards the floor, whereas during summer the fresh air is directed towards the ceiling.

OMNIA HL

Cooling capacity: 0,84 – 2,83 kW (0 1 2 3 4 5 6 7)

Heating capacity: 2,00 – 5,90 kW (0 1 2 3 4 5 6 7)

VMF 2 4

On-of fan coils (Giugiaro Design) for universal installation for residential use. They can be installed in 2/4 pipe systems and in combination with any heat generator.

Omnia ULS

Cooling capacity: 0,3 – 3,0 (0 0,5 1 2,5 3 3,5 4 4,5 kW)

Heating capacity: 0,3 – 3,6 (0 0,5 1 2,5 3 3,5 4 4,5 kW)

Small fan coils for exposed vertical installation used in residential settings for heating, cooling and dehumidifying, can be paired with any heat generator.

OMNIA UL

Cooling capacity: 0,8 – 2,8 (0 0,5 1 2,5 3 3,5 4 4,5 kW)

Heating capacity: 2 – 5,9 (0 1 2 3 4 5 6 7 kW)

On-of fan coils for universal installation for residential use. They can be installed in any type of 2/4 pipe system or in combination with any heat generator. Also available in the inverter version (Omnia-ULI).

OMNIA Radiant

Cooling capacity: 2 – 2,8 (0 0,5 1 2,5 3 3,5 4 4,5 kW)

Heating capacity: 4,6 – 5,9 (0 1 2 3 4 5 6 7 kW)

On-off fan coils with radiant panel for floor installation for residential use. They can be installed in 2 pipe systems and in combination with any heat generator. During the heating season, in addition to a contribution related to forced convection, there is also the radiant effect as well as the natural convection related to the presence of the radiant panel. Also available in the inverter version (Omnia ULRI).

FCWI

Cooling capacity: 1,9 – 4 (0 1 2 3 4 5 6 7 kW)

Heating capacity: 2,40 – 5,10 (0 1 2 3 4 5 6 7 kW)

Wall-mounted fan coils for air treatment with inverter modulation, for residential or commercial use, can be combined with any heat generator.

FCW

Cooling capacity: 1,9 – 4 (0 1 2 3 4 5 6 7 kW)

Heating capacity: 2,40 – 5,10 (0 1 2 3 4 5 6 7 kW)

Wall-mounted fan coils for on/off type air treatment, for residential or commercial use, which can be combined with any heat generator.

ACCESSORY FOR DUCT TYPE APPLICATIONS

MZC

Multi-zone plenum with motorised dampers to control the air flow rate and the channelling of the fan coils, offering both optimal ambient comfort and assured energy savings. The closing and opening of the dampers is connected to the request for air conditioning by the master and slave MZCUI room thermostats. MZC can be combined both with the ON-OFF fan coils and with the inverter fan coils, via the mandatory MZCAC (on-off) or MZCBC (inverter) electrical systems.

4 VMF. VARIABLE MULTI-FLOW SYSTEM

The Variable Multi Flow system is a system for the management and control of hydronic systems for air conditioning and the production of domestic hot water developed by AERMEC, which uses the RS485 Modbus protocol.

VMF permits the complete control of each component in a hydronic system, either locally or centrally, in order to guarantee the level of comfort required by the end user; this takes place based on communication between the various components of the system. The system manages machine performance to guarantee high system efficiency at every moment in order to obtain considerable energy savings.

As the VMF system is able to control heat pumps, circulators and fan coil, it is able to implement the concept of "VARIABLE MULTI FLOW" by managing the flow rate of the REFRIGERANT (via the compressors), the WATER (via the circulators) and the AIR (via the fans): the management of these three fluids makes it possible to obtain the conditions of comfort desired by the end user in the shortest amount of time possible and to maintain it as efficiently as possible.

The VMF system is extremely flexible, and even permits selecting different levels of control and management, which can be expanded at different moments:

Control of a fan coil zone (from 1 to 6)	Control of a network of fan coils comprised of multiple independent zones	Control of the network of fan coils + heat pumps	Control of the network of fan coils + heat pumps + DHW production(*)	Control of the network of fan coils + heat pumps + DHW production(*) + boiler + circulators	Control of the network of fan coils + heat pumps + DHW production(*) + boiler + heat recovery units + circulators	Control of the network of fan coils + heat pumps + DHW production(*) + boiler + heat recovery units + radiant floors and/or radiators + circulators

VMF-E5

VMF-E6

MINIMUM CONTROL LEVEL

(*) Domestic Hot Water

MAXIMUM CONTROL LEVEL

To allow the VMF system to supervise the heat pumps (VMF-E5 + MULTICONTROL or VMF-E6), the accessories for interfacing with the RS485 Modbus protocol must be provided for the heat pumps (MOD485K, MODU-485BL and AER485P1), depending on the machine model. For more information, refer to the technical documentation.

VMF SYSTEM: THERMOSTATS - FAN COIL CONTROL PANEL

VMF-E19

Thermostat accessory to be secured to the side of the ON-OFF master and slave fan coil. Fitted as standard with an air probe and water probe, controls systems with 2 pipes, 4 pipes, 2 pipes + Cold Plasma, 2 pipes + UV lamps, 2 pipes + electric heater.

VMF-E19I

Thermostat accessory to be secured to the side of the inverter master and slave fan coil. Fitted as standard with an air probe and water probe, controls systems with 2 pipes, 4 pipes, 2 pipes + Cold Plasma, 2 pipes + UV lamps, 2 pipes + electric heater.

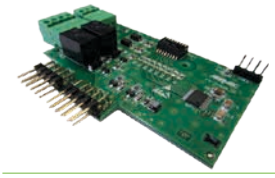
VMF E4X

Wall-mounted user interface. The VMF E4X, combined with the VMF-E10 or VMF-E19I accessory, allows you to control the fan coil functions via a capacitive keyboard.

VMF-E2

User interface on the machine, to be combined with the VMF-E19 or VMF-E19I accessory. The VMF-E2 has 2 selector switches, one for temperature and the other for speed control.

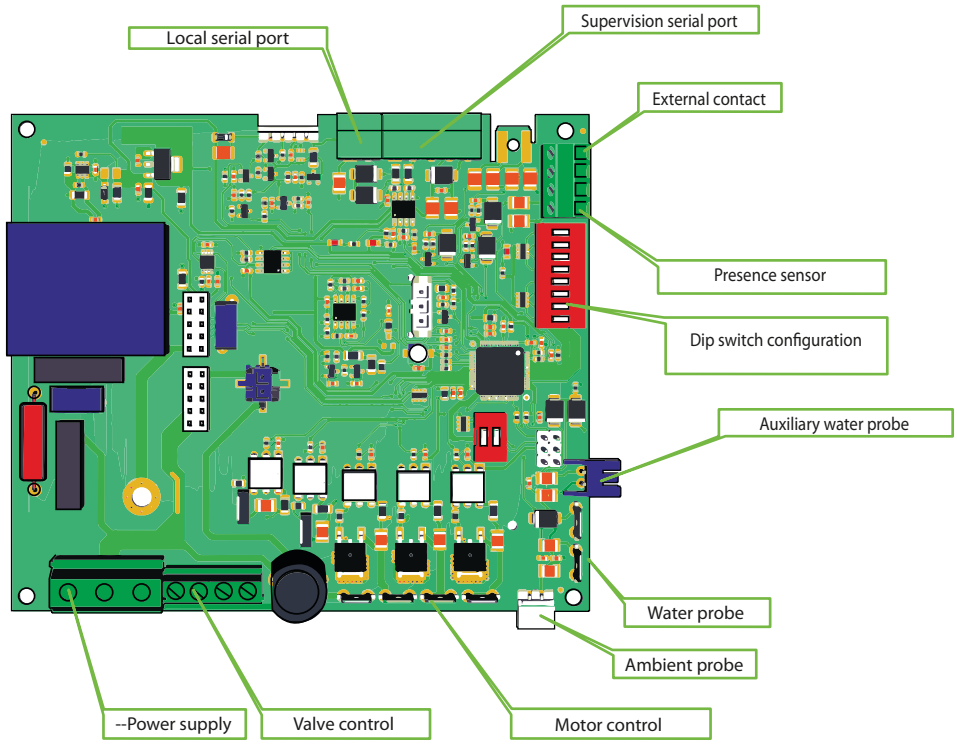
- E2D: Omnia UL
- E2H: Omnia HL
- E2S: Omnia Slim
- E2Z: FCZ/FCZI



VMF IO

Expansion board that extends the number of digital inputs and outputs - configurable via dip switches - making it possible to control the thermostat via VMF-E5/E6 or an external BMS without using a local user interface (e.g. VMF-E2 or VMF-E4X).

VMF-E19 board



N.B. : The two VMF-E19 and VMF-E19I thermostats have the same electronic board, but they have a different electrical system depending on whether they are combined with fan coils with asynchronous motor or inverter motor.

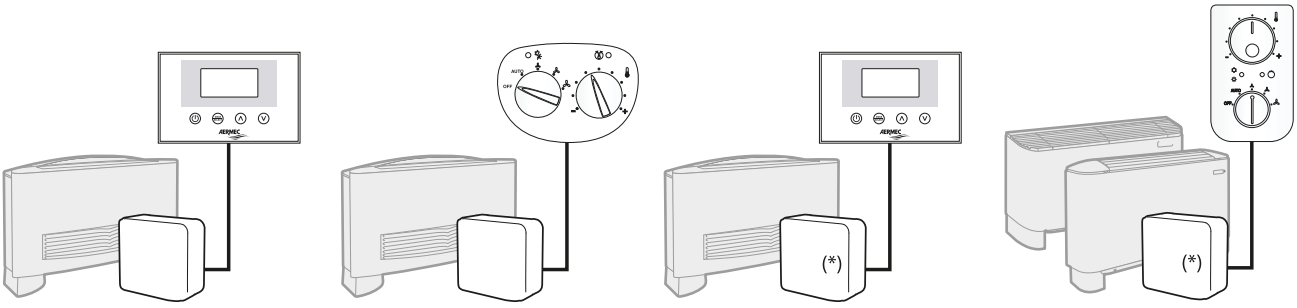
WITH THE VMF-E19, YOU CAN MANAGE:

- Three fan speeds in manual mode;
- Continuous ventilation and thermostat control, by controlling the valves;
- Automatic fan mode according to the load;
- Season visualisation;
- Visualisation of alarms and ventilation request;
- Up to two ON/OFF 2- or 3-way valves;
- Electric heater activation;
- Germicidal lamp;
- Cold Plasma filter;
- An air temperature probe;
- A water temperature probe with min. & max. temperature and change-over functions;
- Season change based on the water or air temperature (for 4-pipe systems);
- Digital input for 'external contact';
- Microswitch for the fin contact;
- Antifreeze function;
- Communication with other thermostats in the same fan coil zone via a dedicated serial port based on TTL logic standards;
- Input for the wall-mounted VMF-E4X or fan coil mounted VMF-E2 control panel;
- An additional water probe (accessory) for controlling the second coil (4-pipe systems);
- Presence sensor;
- Serial port input for supervision; In the case of networks with multiple fan coils sub-divided into independent climatic zones, the VMF-E19 zone regulator permits communication with a central system supervisor (VMF-E6 or VMF-E5);
- The electrical loads protection (asynchronous motor/inverter and valves) is provided by an extractable fuse;
- Possibility to manage the fan coils with radiant plate;
- Possibility to manage the electric heater in substitution/integration/substitution-integration mode.
- Possibility, in conjunction with the VMF-E4X interface and with supervision systems installed, of:
- Viewing the configured set point and not just the deviation from the set point;
- Changing and displaying on the user interface the forced operation mode from supervision;
- Release the thermostat - for a set time - from the time band block set by the supervisor

"Stand alone" system: control of the single terminal


VMF-E19 thermostat for fan coil on-off

VMF-E19I thermostat for inverter fan coil

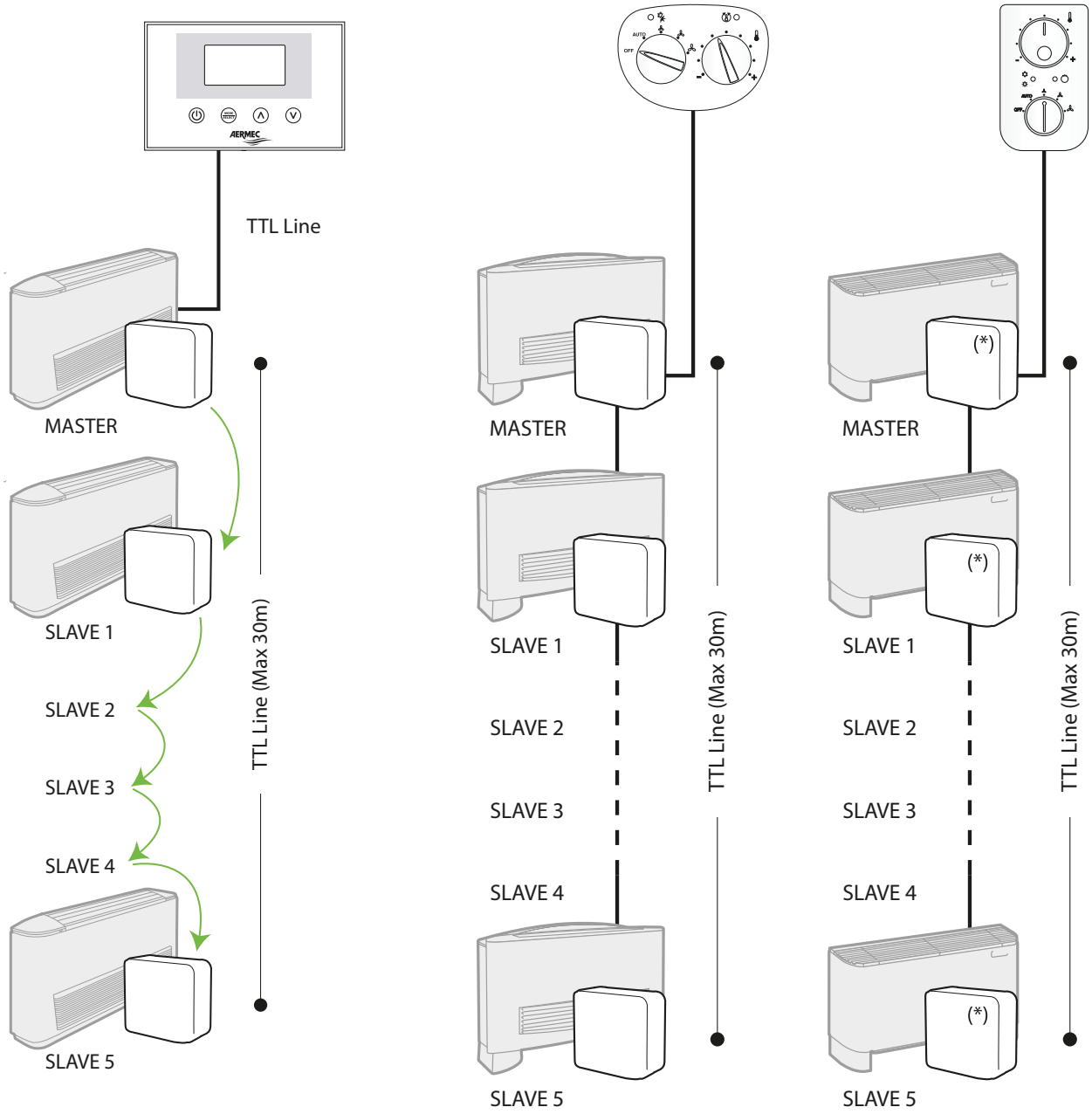


For systems with FCL/FCLI type terminals, refer to the dedicated product data sheets to verify compatibility between the various types of distribution grids available and the VMF system.

Zone structure (microzone)

"Zone controller" system with BUS connection.
Each terminal has a thermostat on board (VMF-E19 or VMF-E19I) fitted with an air probe and water probe.

VMF-E19 thermostat for fan coil on-off	VMF-E19I thermostat for inverter fan coil



5 CENTRALISED VMF-E5 CONTROL PANEL

VMF-E5

Recessed wall-mounted panel allowing control of functions of a complete hydronic system via a capacitive keyboard.
The VMF-E5 panel can control:

- 64 fan coil zones
- 1 heat pump:
  ANL/ANLI/ANK/ANKI/CL/HMI/BHP;
  NRL/NRK/NLC/NRB/NYB/NRV/NRG/NRGI;
- 1 VMF DHW or SAF with MOD485K (as an alternative to Multicontrol);
- 1 VMF-CRP for managing the boiler in substitution mode and 3 heat recovery units;
- 3 VMF-CRPs for managing the circulators (max. 12).

VMF-485LINK

The VMF-485Link expansion allows the communication and interaction of the VMF-E5/E6 supervisors with the heat pumps of the HMI and BHP series (with the addition of the IC-2P accessory cable) and with the fan coils of the FCWI series. This accessory can also be used with the Multicontrol controller for the management of HMI and BHP heat pumps.

VMF-CRP

Expansion for activating up to 4 pumps for water circulation in the secondary loop in a hydronic system managed by E5. The board associates each fan coil with a pump, which activates when the first fan coil associated with it turns on, and turns off when the last fan coil associated with it reaches the set-point or when there is no longer a load demand from the system. There can be a maximum of 3 CRP pump boards for managing up to 12 pumps in the same hydronic system managed by VMF-E5.

Expansion that enables the boiler to operate instead of the heat pump when the temperature of the external air drops below a certain value, set via E5. This board also controls the on/off function of a maximum of 3 heat recovery units. There can be a maximum of one boiler and heat recovery unit CRP board in the same hydronic system managed by VMF-E5.

VMF-DHW

Electrical panel for the production of DHW, manages:

- System storage tank probe;
- DHW probe;
- Three-way valve or domestic hot water pump;
- Electric heater;
- Boiler or three-way valve or system pump;
- Multifunction output.

Multicontrol

User interface that allows for the simultaneous management of multiple chillers or heat pumps (up to 4 of the following ANL/ANLI/ANK/ANKI/CL/HMI/BHP) installed in the same system. For complete system control, 3 CRP accessories may be required:

- CRP 1: management of four 3-way diverting valves, water probes for delivery and return (SIW and SUW), DHW storage tank water probe (SAS) external air probe (SAE);
- CRP 2: control of the supplementary electric heater in the domestic hot water storage tank
- CRP 3: remote control of the on/off function, season change, alarms, system status, season status;

NB: If Multicontrol is integrated in a system controlled via the VMF system, the production of DHW must be controlled by the Multicontrol, as VMF-DHW and SAF are not compatible with the Multicontrol accessory.

***: Option of having Multicontrol manage 4 heat pumps in parallel and DHW production.**

ACCESSORIES FOR SYSTEM EXPANSION AND VMF-E5 SUPERVISION:

VMF-485EXP

Accessory to be mounted on the centralised VMF-E5 panel, making it possible to add an RS485 serial communication port towards external supervision (VMF-Monitoring, Aerlink, external BMS).

VMF-Monitoring

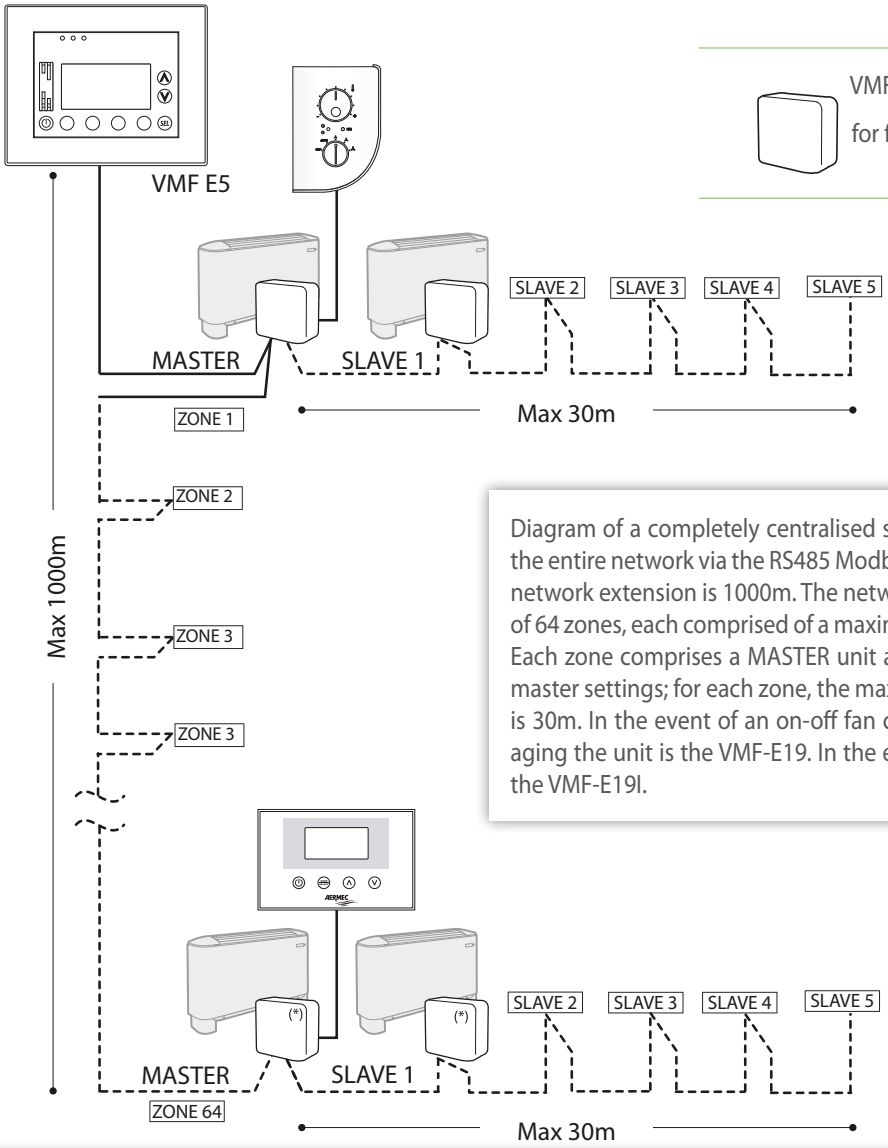
PC* software to monitor the operation of one or several systems (up to 10) equipped with the VMF system. For the supervision, a USB-RS485 or Ethernet-RS485 accessory kit is needed, as well as a number of VMF-485EXPs equal to the number of VMF-E5s to be supervised minus one.

AERLINK

Gateway Wi-Fi* with RS485 serial port. The module permits the simultaneous activation of the AP WIFI (Access Point) and the WIFI station, which makes it possible to connect to the home or business LAN. The system is managed via the AerApp application, enabling you to manage up to 5 systems with VMF-E5 and VMF-485EXP, each consisting of a maximum of 30 fan coil zones.

*: AerLink and VMF-Monitoring manage systems with a single heat pump, so they are incompatible with the use of Multicontrol.

VMF-E5: network structure consisting of multiple independent fan coil zones



VMF-E19 thermostat for fan coil on-off

VMF-E19I thermostat for inverter fan coil

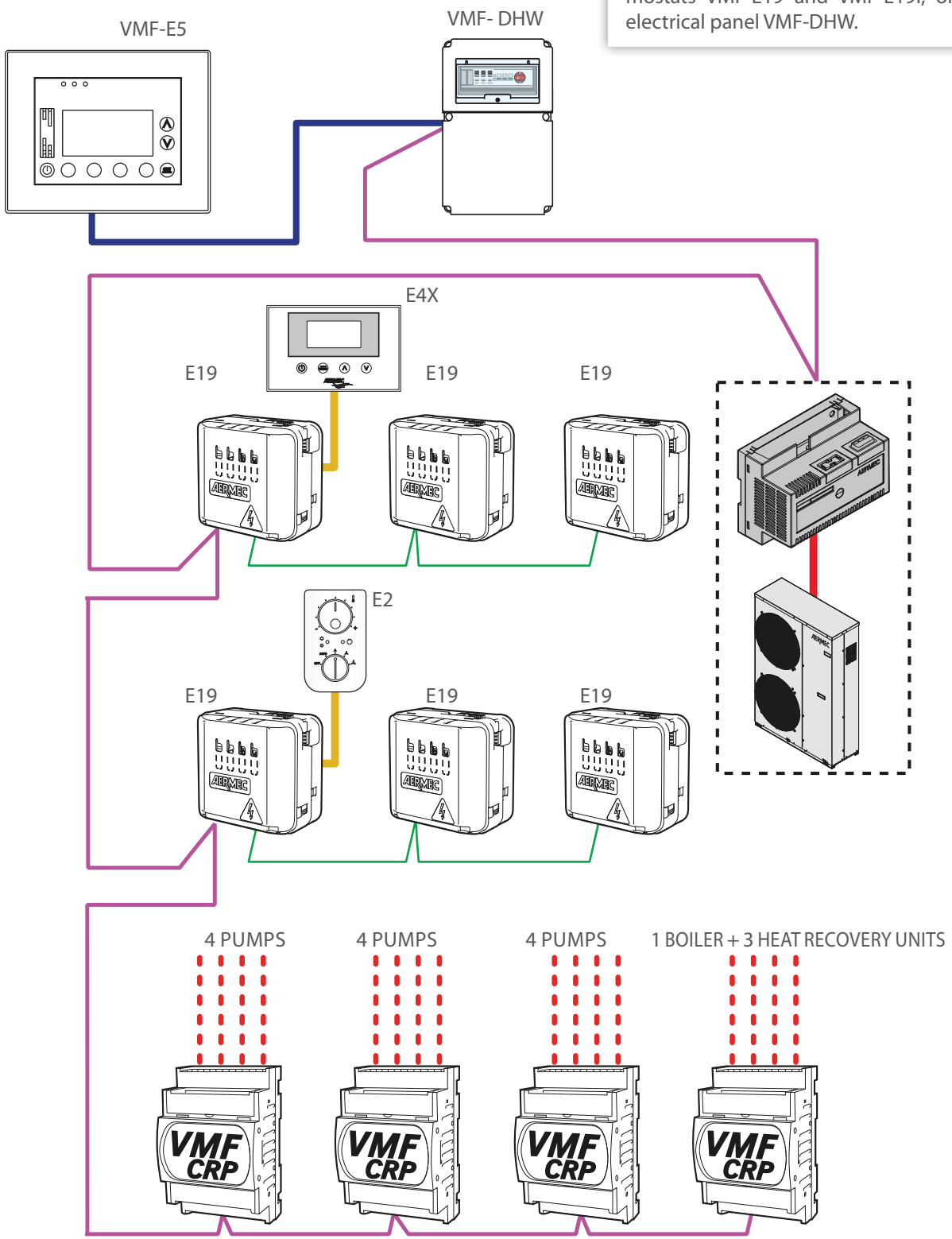
Diagram of a completely centralised system. The VMF-E5 interface supervises the entire network via the RS485 Modbus connection; the maximum permitted network extension is 1000m. The network can be structured up to a maximum of 64 zones, each comprised of a maximum of 6 units, for a total of 384 fan coils. Each zone comprises a MASTER unit and 5 SLAVE units that will replicate the master settings; for each zone, the maximum length permitted by the network is 30m. In the event of an on-off fan coil, the thermostat to be used for managing the unit is the VMF-E19. In the event of an inverter fan coil, instead, it is the VMF-E19I.

In a network complete with fan coils with supervisor (VMF-E5), it is always necessary to have one controller for each zone (VMF-E2 or VMF-E4X). Alternatively, VMF-IO expansion boards can be provided to replace the user interfaces; the VMF-IO cannot manage a local TTL serial port, therefore it is necessary to create zones comprised of a single fan coil.

VMF-E5: Complete network structure

Serial connection diagram.

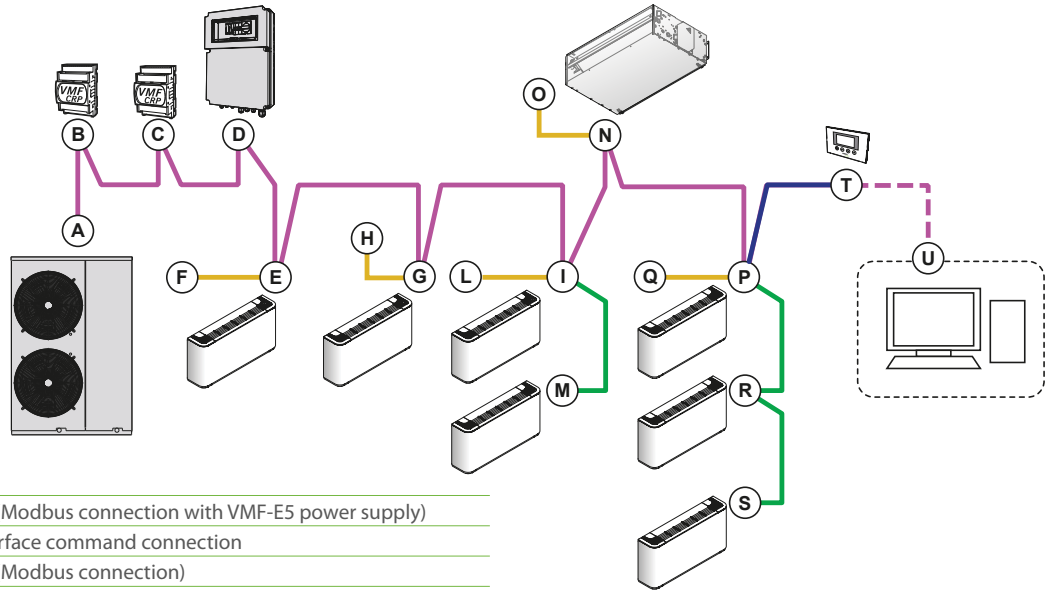
The VMF-E5 power supply can be provided directly from the mains supply or via the thermostats VMF-E19 and VMF-E19I, or via the electrical panel VMF-DHW.



Key

- 5-pin + shield
- 4-pin + shield
- 3-pin + shield
- 2-pin
- Electric contact

VMF-E5: Characteristics of the electrical connections



Key

- BUS RS485 (Modbus connection with VMF-E5 power supply)
- Master/interface command connection
- BUS RS485 (Modbus connection)
- Master/Slave TTL BUS
- Supervisor RS485 Bus (Modbus connection)

CONNECTION FROM		CONNECTION A		TYPE OF CABLE	NOTES REGARDING THE CONNECTION
A	MODU-485A	B	VMF CRP (1)	3-pole cable + shield 0.34mm² (AWG22)	
B	VMF CRP (1)	C	VMF-CRP (2)	3-pole cable + shield 0.34mm² (AWG22)	
C	VMF-CRP (2)	D	VMF-DHW	3-pole cable + shield 0.34mm² (AWG22)	
D	VMF-DHW	E	VMF-E19	3-pole cable + shield 0.34mm² (AWG22)	The connector for the RS485 connection of the VMF-E19 thermostat has 5 pins. In this example, the two terminals for the VMF-E5 power supply are not used
E	VMF-E19	F	VMF-E2H	4-pin shielded user interface connection cable (AWG22-AWG16, 0.34mm^2 - 1.5mm^2)	
E	VMF-E19	G	VMF-E19	3-pole cable + shield 0.34mm² (AWG22)	The connector for the RS485 connection of the VMF-E19 thermostat has 5 pins. In this example, the two terminals for the VMF-E5 power supply are not used
G	VMF-E19	H	VMF-E4X	4-pin shielded user interface connection cable (AWG22-AWG16, 0.34mm^2 - 1.5mm^2)	
G	VMF-E19	I	VMF-E1	3-pole cable + shield 0.34mm² (AWG22)	The connector for the RS485 connection of the VMF-E19 thermostat has 5 pins. In this example, the two terminals for the VMF-E5 power supply are not used
I	VMF-E19	L	VMF-E2	4-pin shielded user interface connection cable (AWG22-AWG16, 0.34mm^2 - 1.5mm^2)	
I	VMF-E19	M	VMF-E19	2-pin cable + shield 0.34mm² (AWG22)	TTL local serial line
I	VMF-E19	N	VMF-E19I	3-pole cable + shield 0.34mm² (AWG22)	The connector for the RS485 connection of the VMF-E19 thermostat has 5 pins. In this example, the two terminals for the VMF-E5 power supply are not used
N	VMF-E19I	O	VMF-E4X	4-pin shielded user interface connection cable (AWG22-AWG16, 0.34mm^2 - 1.5mm^2)	
N	VMF-E19I	P	VMF-E19	3-pole cable + shield 0.34mm² (AWG22)	The connector for the RS485 connection of the VMF-E19 thermostat has 5 pins. In this example, the two terminals for the VMF-E5 power supply are not used
P	VMF-E19	Q	VMF-E2	4-pin shielded user interface connection cable (AWG22-AWG16, 0.34mm^2 - 1.5mm^2)	
P	VMF-E19	R	VMF-E19	2-pin cable 0.34mm² (AWG22)	TTL local serial line
R	VMF-E19	S	VMF-E19	2-pin cable 0.34mm² (AWG22)	TTL local serial line
P	VMF-E19	T	VMF-E5	5-pin cable + shield 0.34mm² (AWG22)	The connector for the RS485 connection of the VMF-E19 thermostat has 5 pins: three for the signal and two for the power supply
T	VMF-485EXP (Accessory)	U	VMF-MONITORING AERLINK	3-pole cable + shield 0.34mm² (AWG22)	To make the connection to a remote supervisor, the accessory VMF-485EXP is required

6 CENTRALISED VMF-RCC CONTROL PANEL

VMF-RCC

Recessed wall-mounted panel allowing control of functions of a complete hydronic system via a capacitive keyboard. The VMF-RCC panel can control:

- 10 fan coil zones
- 1 heat pump:
  ANL/ANLI/ANK/ANKI/CL/HMI/BHP/HMG*;
  NRL/NRK/NLC/NRB/NYB/NRV/NRG/NRGI;
- 1 VMF DHW or SAF with MOD485K (as an alternative to Multicontrol);
- 1 VMF-CRP for managing the boiler in substitution mode and 3 heat recovery units
- 3 VMF-CRPs for managing circulators (max 12)
- 3 MZCs (a total of 18 zones);
- 3 VMF-REBs (1 for fan coil zones and 2 for MZC zones).

VMF-485LINK

The VMF-485Link expansion allows the communication and interaction of the VMF-E5/E6 supervisors with the heat pumps of the HMI and BHP series (with the addition of the IC-2P accessory cable) and with the fan coils of the FCWI series. This accessory can also be used with the Multicontrol controller for the management of HMI and BHP heat pumps.

VMF-CRP

Expansion for activating up to 4 pumps for water circulation in the secondary loop in a hydronic system managed by VMF-RCC. The board associates each fan coil with a pump, which activates when the first fan coil associated with it turns on, and turns off when the last fan coil associated with it reaches the set-point or when there is no longer a load demand from the system. There can be a maximum of 3 CRP pump boards for managing up to 12 pumps in the same hydronic system managed by VMF-RCC.

Expansion that enables the boiler to operate instead of the heat pump when the temperature of the external air drops below a certain value, set via VMF-RCC. This board also controls the on/off function of a maximum of 3 heat recovery units. There can be a maximum of one boiler and heat recovery unit CRP board in the same hydronic system managed by VMF-RCC.

VMF-DHW

Electrical panel for the production of DHW, manages:

- System storage tank probe;
- DHW probe;
- Three-way valve or domestic hot water pump;
- Electric heater;
- Boiler or three-way valve or system pump;
- Multifunction output.

VMF-REB

Expansion board for controlling the electrical loads, which manages:

- 8 radiant circuit heads via triac outputs (230V AC max 0.1A); you are advised to use a relay to decouple the load from the triac output;
- 1 clean contact output (230V AC max 6A) for the circulating pump dedicated to the radiant circuits managed by the VMF-REB board, to be used via a relay;
- Load demand from the external thermostats via 3 digital inputs (e.g. bathroom radiators); digital outputs 230V AC max 0.7A;

8 VMF-REBs are dedicated to the fan coil areas (64 areas), and 4 are dedicated to the MZC areas (30 areas);
The control logic is as follows:
COOLING: Fan coil only
HEATING: Selection of the operating terminal by VMF-E6:
(V) – FAN COIL ONLY (R) – RADIANT ONLY (V+R) – Automatic control:
• If T.AMBIENT < T.SET - 2°C set FANCOIL+RADIANT (BOOST);
• If T.AMBIENT > T.SET - 2°C < T.SET ONLY RADIANT.

***: Option of having Multicontrol manage 4 heat pumps in parallel and DHW production.**

Multicontrol

User interface that allows for the simultaneous management of multiple chillers or heat pumps (up to 4 of the following ANL/ANLI/ANK/ANKI/CL/HMI/BHP) installed in the same system. For complete system control, 3 CRP accessories may be required:

- CRP 1: management of four 3-way diverting valves, water probes for delivery and return (SIW and SUW), DHW storage tank water probe (SAS) external air probe (SAE);
- CRP 2: control of the supplementary electric heater in the domestic hot water storage tank;
- CRP 3: remote control of the on/off function, season change, alarms, system status, season status;

NB: If Multicontrol is integrated in a system controlled via the VMF system, the production of DHW must be controlled by the Multicontrol, as VMF-DHW and SAF are not compatible with the Multicontrol accessory.

ACCESSORIES FOR SYSTEM EXPANSION AND VMF RCC SUPERVISION:

VMF-485EXP

Accessory to be mounted on the centralised VMF-RCC panel, making it possible to add an RS485 serial communication port towards external supervision (VMF-Monitoring, Aerlink, external BMS).

VMF-Monitoring

PC* software to monitor the operation of one or several systems (up to 10) equipped with the VMF system. For the supervision, a USB-RS485 or Ethernet-RS485 accessory kit is needed, as well as a number of VMF-485EXPs equal to the number of VMF-E5s to be supervised minus one.

AERLINK

Gateway Wi-Fi* with RS485 serial port. The module permits the simultaneous activation of the AP WIFI (Access Point) and the WIFI station, which makes it possible to connect to the home or business LAN. The system is managed via the AerApp application, enabling you to manage up to 5 systems with VMF-E5 and VMF-485EXP, each consisting of a maximum of 30 fan coil zones.

*: AerLink and VMF-Monitoring manage systems with a single heat pump, so they are incompatible with the use of Multicontrol.

7 CENTRALISED VMF-E6 CONTROL PANEL

VMF-E6

Recessed wall-mounted panel allowing control of functions of a complete hydronic system via a touch keyboard.
The VMF-E6 panel can control:

- 64 fan coil zones;
- 5 MZCs (a total of 30 zones);
- 4 heat pumps:
  ANL/ANLI/ANK/ANKI/CL/HMI/BHP;
  NRL/NRK/NLC/NRB/NYB/NRV/NRG/NRGI;
  NXW/WRK/WWM/WWB;
- 1 VMF-CRP for domestic hot water (four 3-way valves, SDHW storage tank probe) and the management in parallel of the heat pumps for DT (water probes for return SIW and delivery SUW);
- 1 VMF-CRP for the DHW supplementary heater and the auxiliary system boiler;
- 8 VMF-REBs for fan coil zones;
- 4 VMF-REBs for MZC zones
- 1 VMF-CRP for managing 4 heat recovery units
- 3 VMF-CRPs for managing the circulators (max. 12)
- 1 VMF-CRP for managing digital/analogue I/Os

VMF-485LINK

The VMF-485Link expansion allows the communication and interaction of the VMF-E5/E6 supervisors with the heat pumps of the HMI and BHP series (with the addition of the IC-2P accessory cable) and with the fan coils of the FCWI series. This accessory can also be used with the Multicontrol controller for the management of HMI and BHP heat pumps.

VMF-CRP

Panel for managing:

- Up to 4 pumps for water circulation on the secondary ring of a hydronic system. The board associates each fan coil with a pump, which activates when the first fan coil associated with it turns on, and turns off when the last fan coil associated with it, reaches the set-point or when there is no longer a load demand from the system. There can be a maximum of 3 CRP pump boards for managing up to 12 pumps in the same hydronic system managed by VMF-E5.
- The on/off for time band of max. 4 heat recovery units. There can be a maximum of one CRP board in the same hydronic system managed by VMF-E6.
- The production of DHW via the SSAN probe of the DHW storage tank and the commutation of the three-way valves. In addition, this expansion allows the parallel operation of the heat pumps of a system (up to 4) via the reading of the SUW delivery probes and SIW recovery probes to be installed downstream the storage tank. There can be a maximum of one CRP board for the DHW management and 4 heat pumps in the same hydronic system managed by VMF-E6.
- Enabling the boiler as a replacement for the heat pump when the temperature of the external air drops below a certain value, set via E6. This expansion allows the management of the electric heater/boiler in addition to the production of DHW. There can be a maximum of one CRP board for the management of the auxiliary boiler on the system and of the integrated heater for DHW in the same hydronic system managed by VMF-E6.
- 4 digital inputs/outputs:
  -Inputs: system enabling, hot thermostat, cold thermostat, Force ON
  -Outputs: summer season, heat request, cold request, system alarm
  A single hydronic system managed by VMF-E6 can contain only 1 CRP board for managing the above digital inputs/outputs.

VMF-REB

Expansion board for controlling the electrical loads, which manages:

- 8 radiant circuit heads via triac outputs (230V AC max 0.1A); you are advised to use a relay to decouple the load from the triac output;
- 1 clean contact output (230V AC max 6A) for the circulating pump dedicated to the radiant circuits managed by the VMF-REB board, to be used via a relay;
- Load demand from the external thermostats via 3 digital inputs (e.g. bathroom radiators); digital outputs 230V AC max 0.7A;

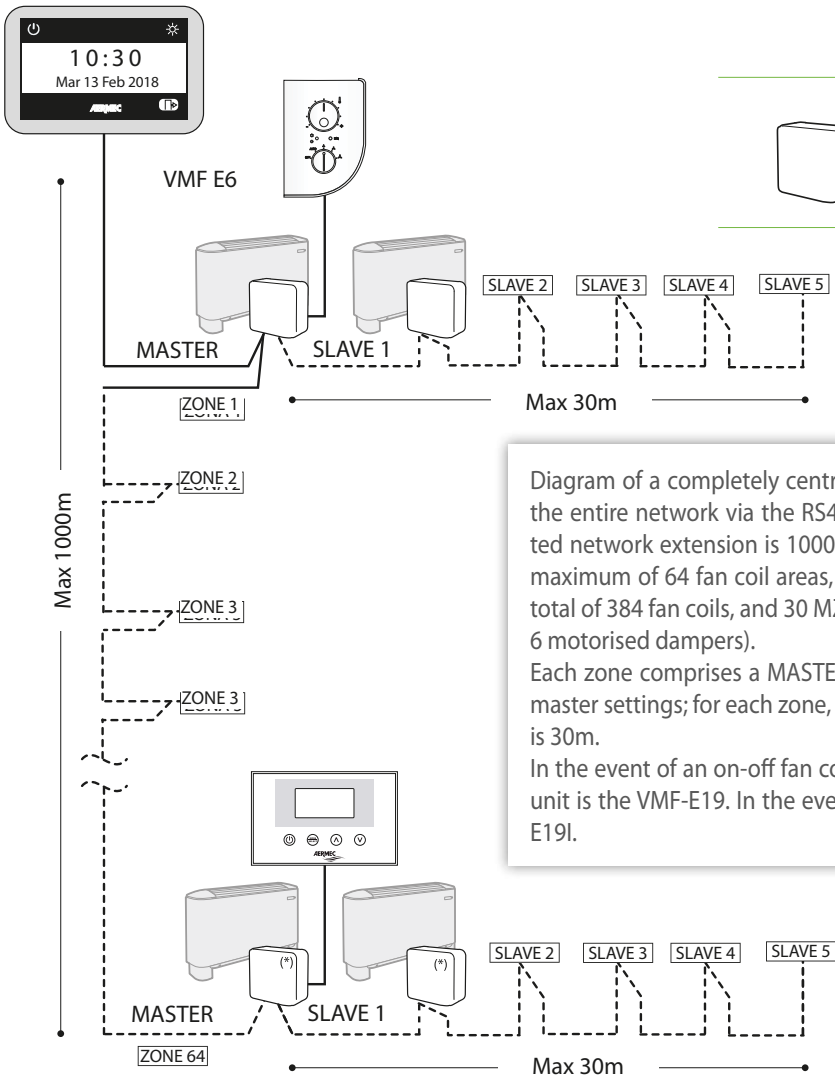
8 VMF-REBs are dedicated to the fan coil areas (64 areas), and 4 are dedicated to the MZC areas (30 areas);
The control logic is as follows:
COOLING: Fan coil only
HEATING: Selection of the operating terminal by VMF-E6:
(V) – FAN COIL ONLY (R) – RADIANT ONLY (V+R) – Automatic control:
• If T.AMBIENT < T.SET - 2°C set FANCOIL+RADIANT (BOOST);
• If T.AMBIENT > T.SET - 2°C < T.SET ONLY RADIANT.

ACCESSORIES FOR SYSTEM EXPANSION AND VMF-E6 SUPERVISION:

AERCONNECT

Module that allows for the control of up to 6 systems managed by VMF-E6 either by means of a PC or remotely by means of the DYN-DNS service.

VMF-E6: network structure consisting of multiple independent fan coil zones



VMF-E19 thermostat

(*) VMF-E19I thermostat for inverter fan coil

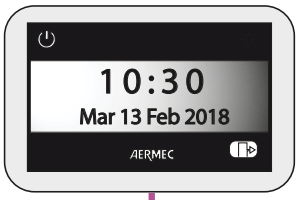
Diagram of a completely centralised system. The VMF-E6 interface supervises the entire network via the RS485 Modbus connection; the maximum permitted network extension is 1000m. The network can be structured with up to a maximum of 64 fan coil areas, each consisting of a maximum of 6 units, for a total of 384 fan coils, and 30 MZC areas (5 total MZCs, each with a maximum of 6 motorised dampers).
Each zone comprises a MASTER unit and 5 SLAVE units that will replicate the master settings; for each zone, the maximum length permitted by the network is 30m.
In the event of an on-off fan coil, the thermostat to be used for managing the unit is the VMF-E19. In the event of an inverter fan coil, instead, it is the VMF-E19I.

In a network complete with fan coils with supervisor (VMF-E6), it is always necessary to have one controller for each zone (VMF-E2 or VMF-E4X). Alternatively, VMF-IO expansion boards can be provided to replace the user interfaces; the VMF-IO cannot manage a local TTL serial port, therefore it is necessary to create zones comprised of a single fan coil.

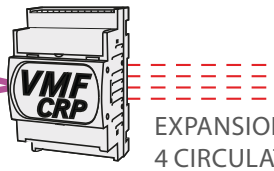
VMF-E6: Complete network structure

Serial connection diagram.

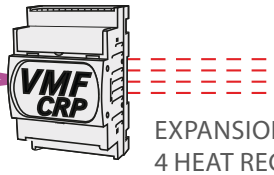
The VMF-E6 supply can be configured directly from the power supply and from the VMF-E19 and VMF-E19I thermostats (5-pole shielded electrical connection).



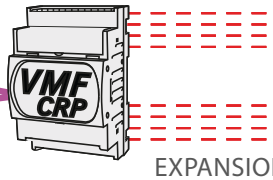
VMF-E6 PANEL



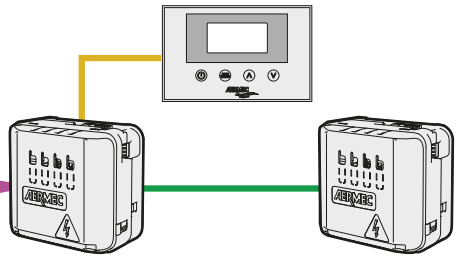
EXPANSION - CONTROL OF 4 CIRCULATORS



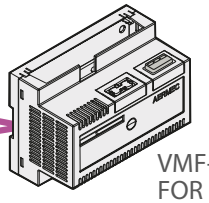
EXPANSION - CONTROL OF 4 HEAT RECOVERY UNITS



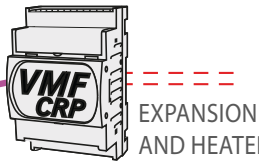
EXPANSION - I/O MANAGEMENT



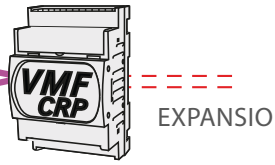
FAN COIL ZONES (MAX 64)



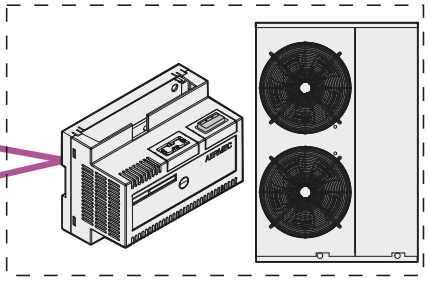
VMF-REB (MAX 8) FOR CONTROLLING THE RADIANT HEADS OF ZONES WITH FAN COILS



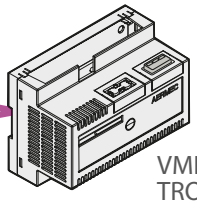
EXPANSION - CONTROL OF BOILER AND HEATER



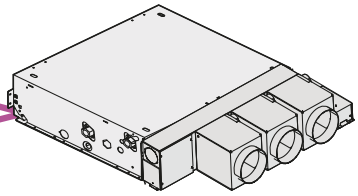
EXPANSION - DHW MANAGEMENT



OUTDOOR UNITS (MAX 4)



VMF-REB (MAX 4) FOR CONTROLLING THE RADIANT HEADS OF ZONES WITH MZC

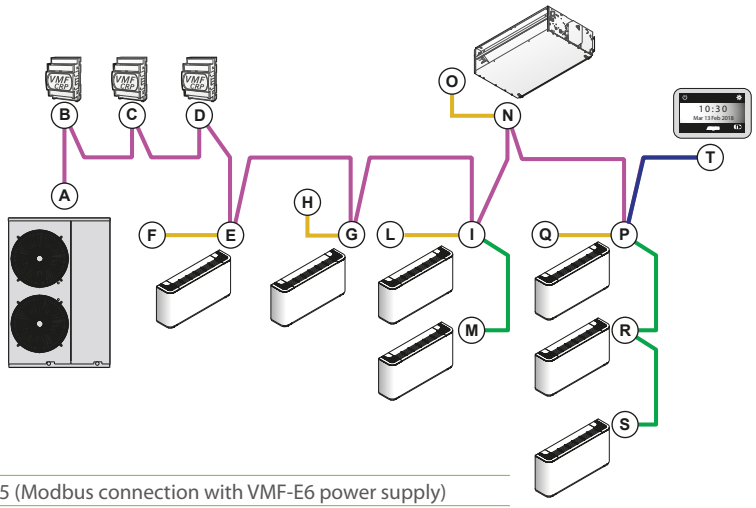


MZC (MAX 5)

Key

- 4-pin + shield
- 3-pin + shield
- 2-pin
- Electric contact

VMF-E6: Characteristics of the electrical connections



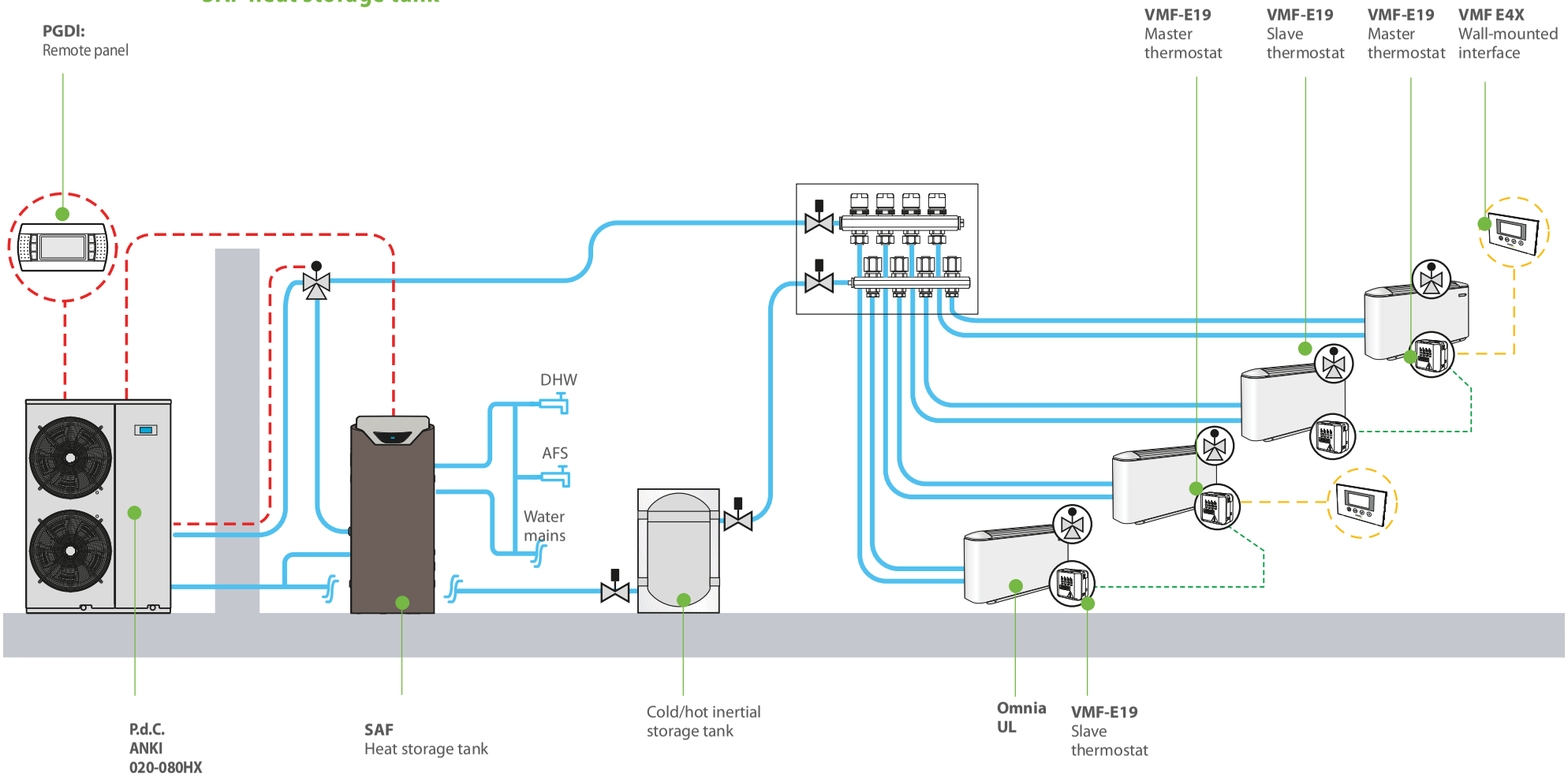
KEY:

- BUS RS485 (Modbus connection with VMF-E6 power supply)
- Master/interface command connection
- BUS RS485 (Modbus connection)
- Master/Slave TTL BUS
- Supervisor RS485 Bus (Modbus connection)

CONNECTION FROM		CONNECTION A		TYPE OF CABLE	NOTES REGARDING THE CONNECTION
A	MODU-485BL	B	VMF CRP (1)	3-pole cable + shield 0.34mm² (AWG22)	
B	VMF CRP (1)	C	VMF-CRP (2)	3-pole cable + shield 0.34mm² (AWG22)	
C	VMF-CRP (2)	D	VMF-CRP (3)	3-pole cable + shield 0.34mm² (AWG22)	
D	VMF-CRP (3)	E	VMF-E19	3-pole cable + shield 0.34mm² (AWG22)	
E	VMF-E19	F	VMF-E2	4-pin user interface connection cable (AWG22)	Supplied as standard with the VMF-E2 thermostat
E	VMF-E19	G	VMF-E19	3-pole cable + shield 0.34mm² (AWG22)	The connector for the RS485 connection of the VMF-E19 thermostat has 5 pins. In this example, the two terminals for the VMF-E6 power supply are not used
G	VMF-E19	H	VMF-E4X	Shielded twisted pair cable for data transmission 0.33_0.20mm² (AWG22_24)	
G	VMF-E19	I	VMF-E19	3-pole cable + shield 0.34mm² (AWG22)	The connector for the RS485 connection of the VMF-E19 thermostat has 5 pins. In this example, the two terminals for the VMF-E6 power supply are not used
I	VMF-E19	L	VMF-E2	4-pin user interface connection cable (AWG22)	Supplied as standard with the VMF-E2 thermostat
I	VMF-E19	M	VMF-E19	2-pin cable + shield 0.34mm² (AWG22)	TTL local serial line
I	VMF-E19	N	VMF-E19I	3-pole cable + shield 0.34mm² (AWG22)	The connector for the RS485 connection of the VMF-E19 thermostat has 5 pins. In this example, the two terminals for the VMF-E6 power supply are not used
N	VMF-E19I	O	VMF-E4X	Shielded twisted pair cable for data transmission 0.33_0.20mm² (AWG22_24)	
N	VMF-E19I	P	VMF-E19	3-pole cable + shield 0.34mm² (AWG22)	The connector for the RS485 connection of the VMF-E19 thermostat has 5 pins. In this example, the two terminals for the VMF-E6 power supply are not used
P	VMF-E19	Q	VMF-E2	4-pin user interface connection cable (AWG22)	Supplied as standard with the VMF-E2 thermostat
P	VMF-E19	R	VMF-E19	2-pin cable 0.34mm² (AWG22)	TTL local serial line
R	VMF-E19	S	VMF-E19	2-pin cable 0.34mm² (AWG22)	TTL local serial line
P	VMF-E19	T	VMF-E6	5-pin cable + shield 0.34mm² (AWG22)	The connector for the RS485 connection of the VMF-E19 thermostat has 5 pins: three for the signal and two for the VMF-E6 power supply
T	VMF-E6	U	AerConnect	3-pole cable + shield 0.34mm² (AWG22)	To make the connection to a remote supervisor, the accessory VMF-485EXP is required

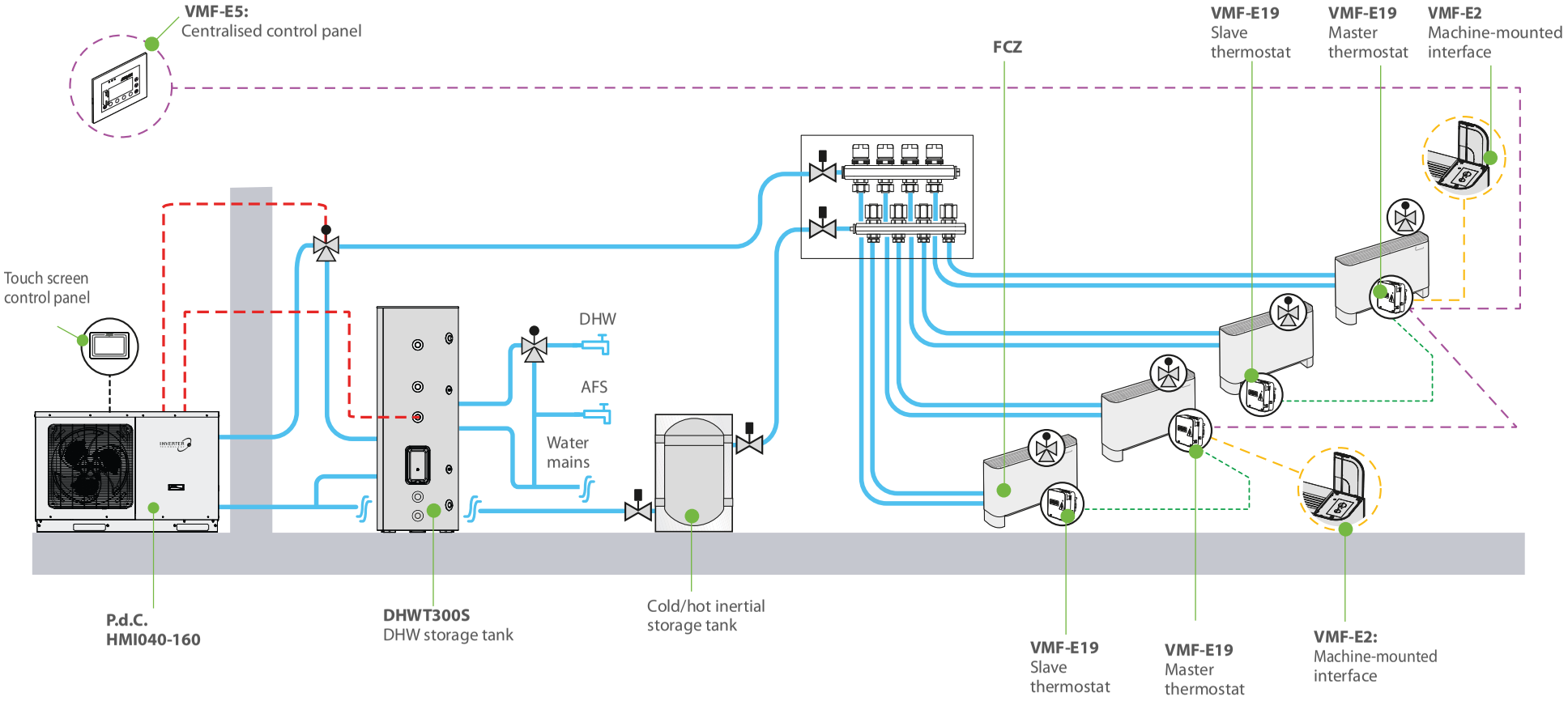
8.0 VMF-E5 SYSTEM DIAGRAMS

8.1 ANKI heat pump with integrated pumping assembly for heating/cooling with a fan coil system – Production of DHW by an SAF heat storage tank



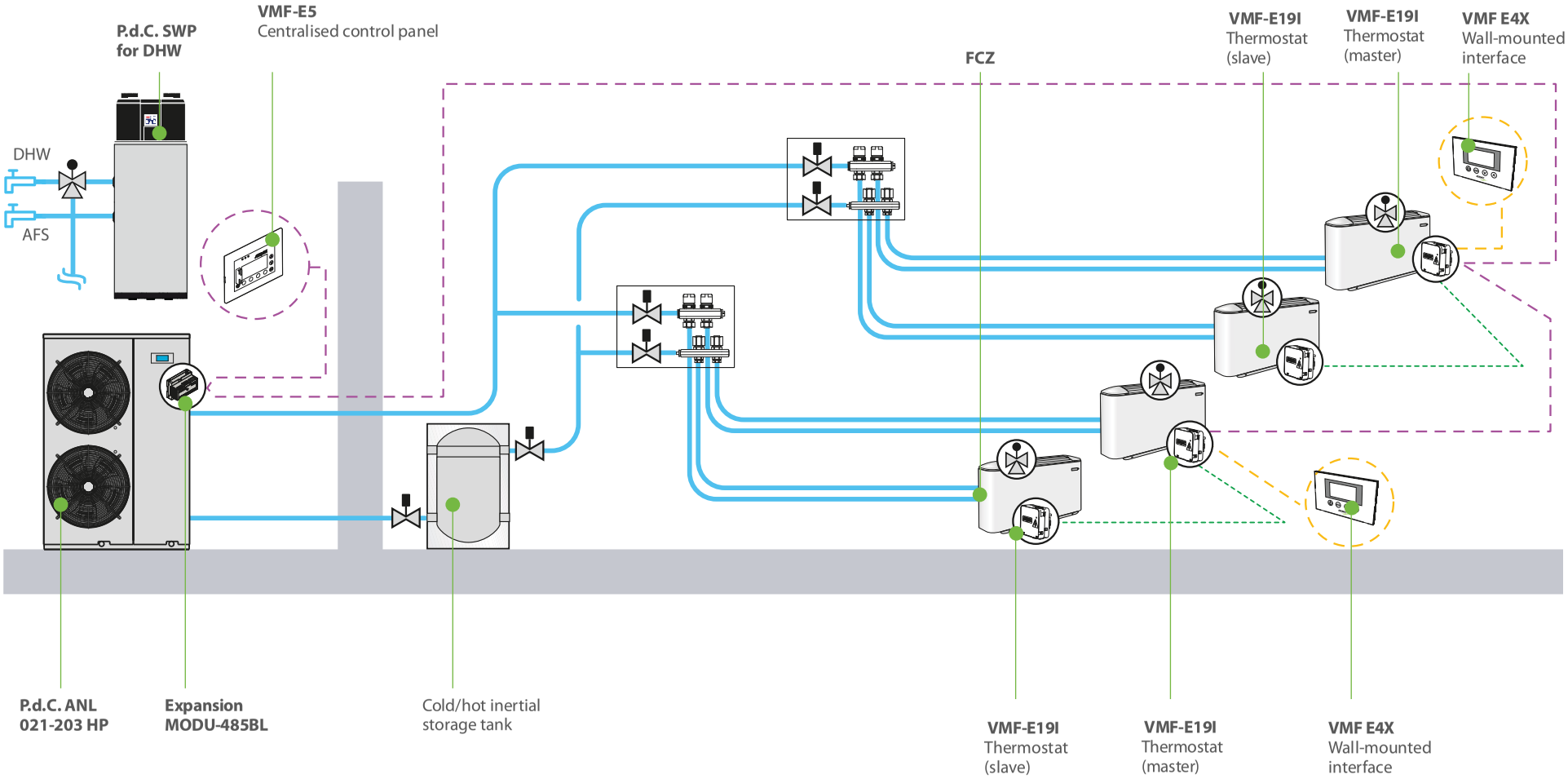
Single loop system for summer cooling and winter heating by an ANKI inverter air-water heat pump with integrated pumping assembly and on-off Omnia UL fan coils. ANKI management is stand-alone. The terminals are grouped into different zones, each managed by a wall-mounted VMF-E4X control panel, which is used to set the zone fan coil parameters. The VMF-E4X panel is connected to the E19 thermostat of the master fan coil. The domestic hot water is produced by the SAF heat storage tank: when the temperature in the storage tank drops below the value set by the ANKI panel, the DHW request signal is sent to the heat pump; the ANKI first goes into hot mode and sets the DHW production set-point, and secondly enables the switching of the 3-way diverting valve.

8.2 HMI heat pump with integrated pumping assembly for heating and cooling with a fan coil system – Production of DHW by a DHWT300S boiler



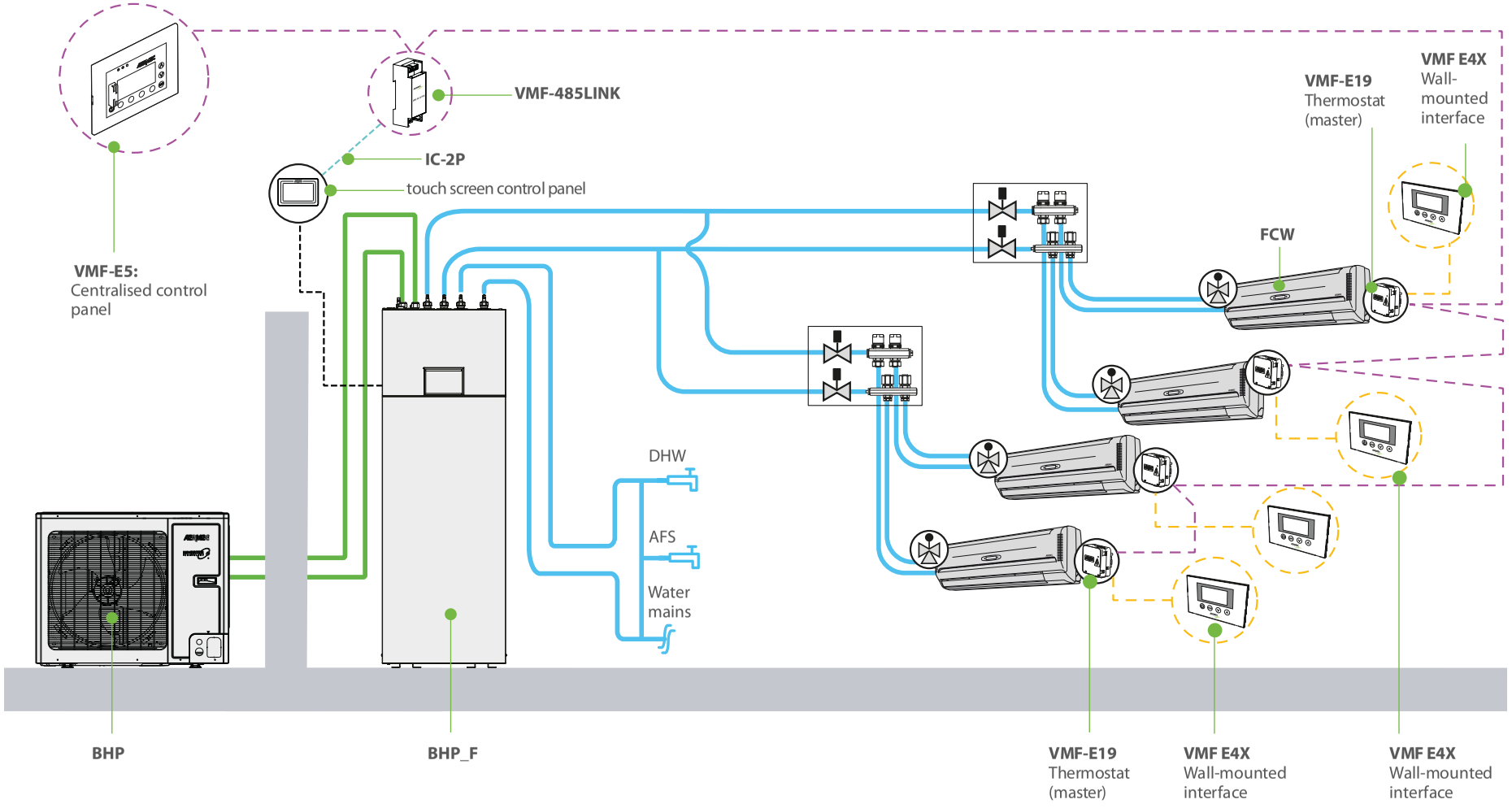
Single loop system for summer cooling and winter heating by an HMI inverter air-water heat pump with integrated pumping assembly and on-off FCZ fan coils. HMI management is stand-alone. The terminals are grouped into different zones, each managed by VMF-E2Z machine-mounted control panels, which are used to set the zone fan coil parameters. The VMF-E2Z panel is connected to the E19 thermostat of the zone master fan coil, from which the TTL network starts and to which the E19 thermostats of the slave fan coils are connected. The domestic hot water is produced by the DHW DHWT300S heat storage tank: when the temperature in the storage tank drops below the value set by the HMI panel, the water probe sends the DHW request signal to the heat pump; the HMI first goes into hot mode and sets the DHW production set-point, and secondly enables the switching of the 3-way diverting valve.

8.3 ANL-H heat pump with integrated pumping assembly for heating and cooling with fan coil system – Production of DHW by means of SWP heat pump water heater



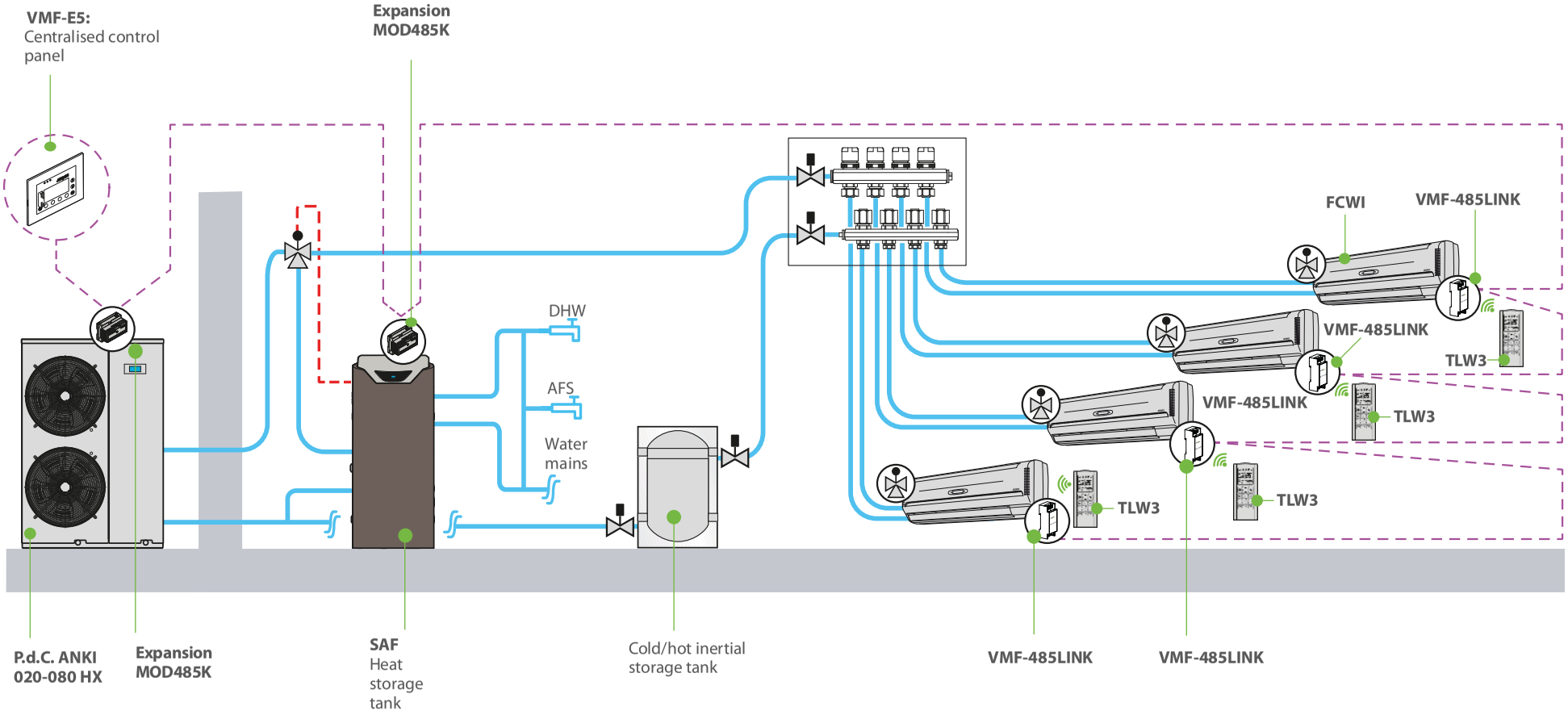
Single loop system for summer cooling and winter heating by an ANL-H air-water heat pump with integrated pumping assembly and Omnia-ULI inverter fan coils. The ANL-H is managed within the RS485 Modbus serial port via the MODU-485BL interface card. The terminals are grouped into different zones, each managed by a wall-mounted VMF-E4X control panel, which is used to set the zone fan coil parameters. The VMF-E4X panel is connected to the E19I thermostat of the zone master fan coil, from which the TTL network starts and to which the E19I thermostats of the slave fan coils are connected. The production of domestic hot water is carried out by the SWP heat pump water heater.

8.4 BHP split heat pump with integrated pumping assembly for heating and cooling with fan coil system – Production of DHW via boiler integrated in the BHP_F indoor unit



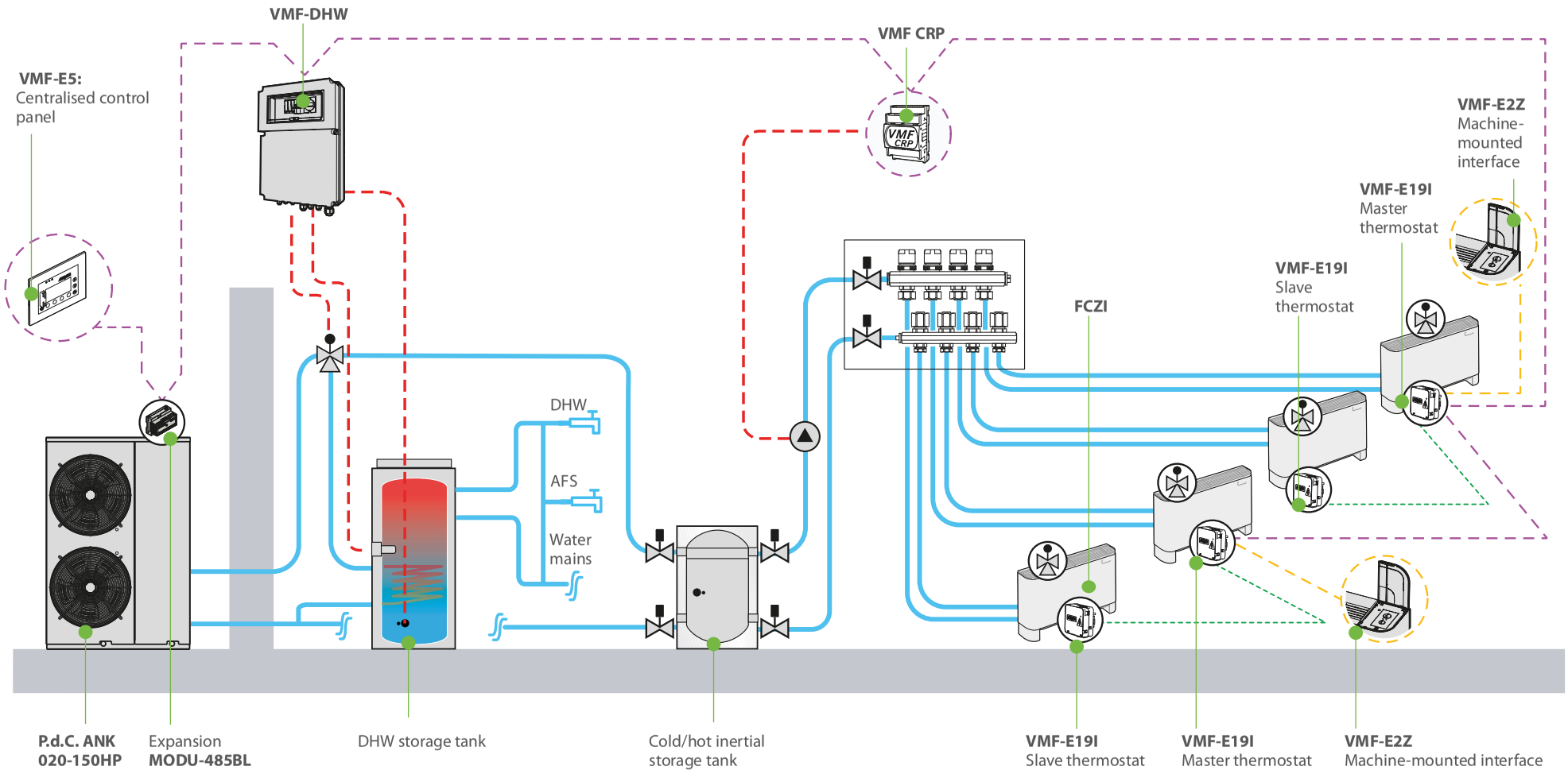
Single loop system for summer cooling and winter heating by split BHP air-water inverter heat pump in configuration F (all-in-one) with integrated pumping assembly and FCW wall-mounted on-off fan coils. The BHP-F is managed within the Modbus RS485 serial through the VMF-485LINK interface card and control panel IC-2P connection cable. The terminals are grouped into different zones, each managed by a wall-mounted VMF-E4X control panel, which is used to set the zone fan coil parameters. The VMF-E4X panel is connected to the E19 thermostat of the master fan coil. The production of domestic hot water is integrated in the logic of the BHP-F, within which the 3-way diverting valve and DHW storage tank are positioned.

8.5 ANKI heat pump with integrated pumping assembly for heating and cooling with fan coil system – Production of DHW via the SAF thermal storage tank



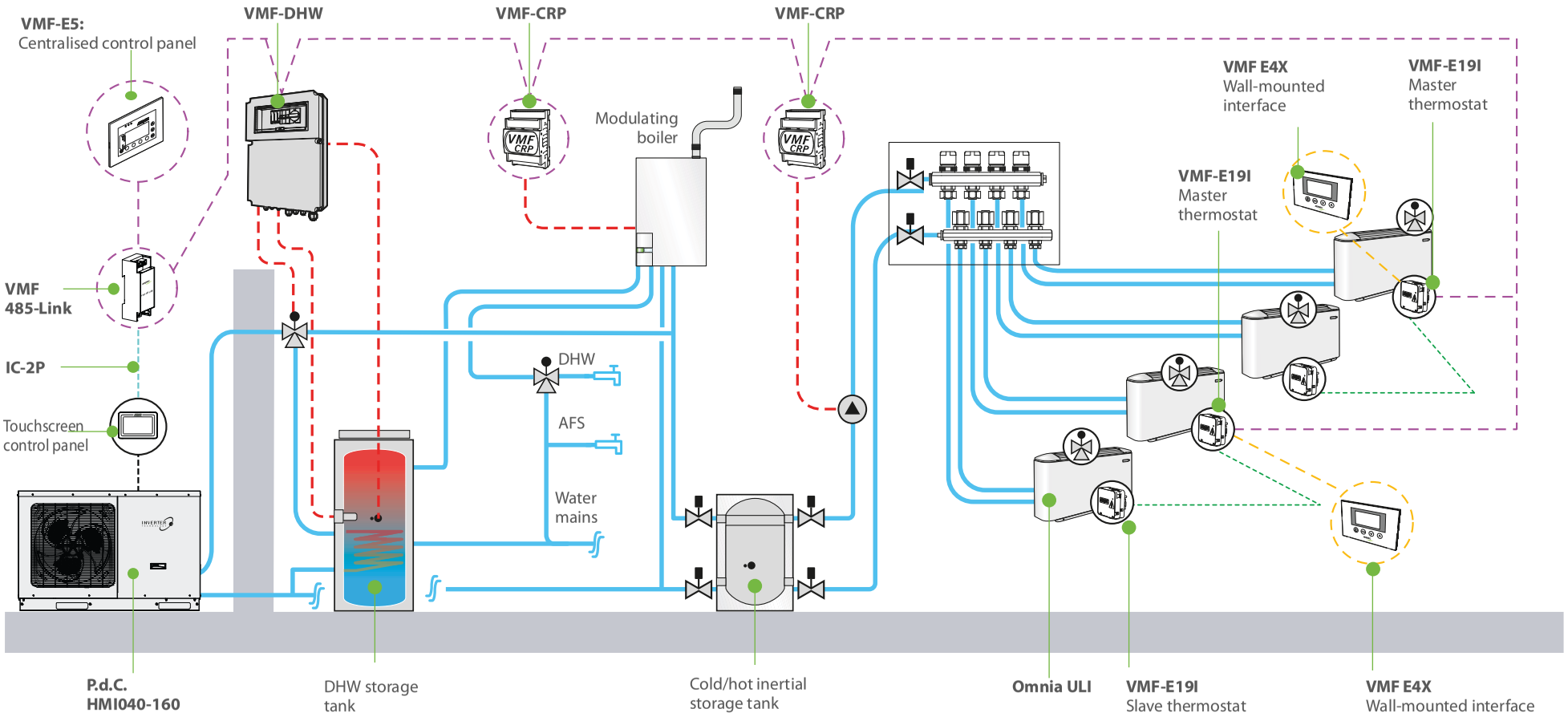
Single loop system for summer cooling and winter heating by an ANKI inverter air-water heat pump with integrated pumping assembly and wall-mounted FCWI inverter fan coils. ANKI is managed within the RS485 Modbus serial port via the MOD485K interface card. The terminals are grouped into different zones, each consisting of a single fan coil managed by a PFW3 wall-mounted control panel or TLW3 remote control, from which the parameters for the fan coil can be set. The FCWIs are connected to the VMF system by means of a VMF-485LINK RS485 Modbus interface card. Domestic hot water is produced by the SAF heat storage tank, equipped with a MOD485K expansion board: when the temperature in the storage tank drops below the value set by the VMF-E5, the DHW request signal is sent to the centralised control panel by Modbus; the E5 first activates hot mode and sets the DHW production set-point for the heat pump and secondly authorises the SAF for the switching of the 3-way diverting valve.

8.6 ANK heat pump with integrated pumping assembly for heating and cooling with fan coil system – Production of DHW using VMF-ACS electrical panel via third-party boiler



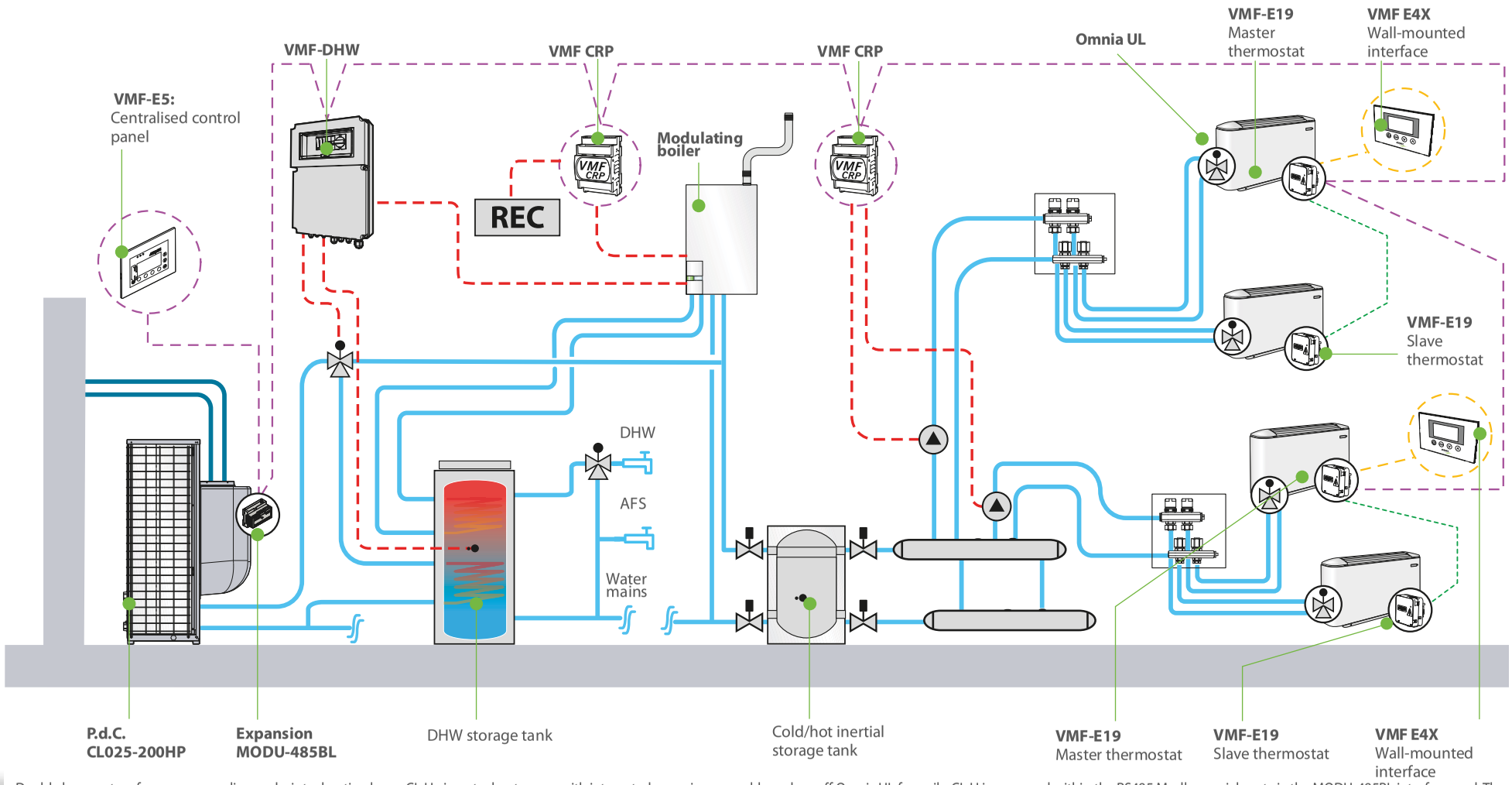
Double loop system for summer cooling and winter heating by an ANK air-water heat pump with integrated pumping assembly and ON-OFF FCZI fan coils. ANK is managed within the RS485 Modbus serial port via the MODU-485BL interface card. The terminals are grouped into different zones, each managed by VMF-E2Z machine-mounted control panels, which are used to set the zone fan coil parameters. The VMF-E2Z panel is connected to the E19I thermostat of the zone master fan coil, from which the TTL network starts and to which the E19I thermostats of the slave fan coils are connected. The VMF-CRP expansion board makes it possible to associate each pump in the secondary loop with reference terminals: when the first terminal in the fan coil group associated with the pump activates, the pump is turned on, whereas when the last fan coil associated with the pump reaches the set-point, or if there is no thermal load demand, the pump turns off. The domestic hot water is produced by a third-party boiler managed by the VMF-DHW electrical panel: when the temperature in the storage tank drops below the value set by the VMF-E5, the DHW request signal is sent to the centralised control panel by Modbus; the E5 first activates hot mode and sets the DHW production set-point for the heat pump and secondly authorises the VMF-DHW for the switching of the 3-way diverting valve. VMF-DHW also permits controlling an electric resistor in the integrated DHW storage tank and/or for the programmed anti-legionella function.

8.7 HMI heat pump with integrated pumping assembly and modulating substitution boiler for heating/cooling with a fan coil system – Production of DHW via the VMF-DHW electrical panel via a third party boiler and modulating boiler provided as standard



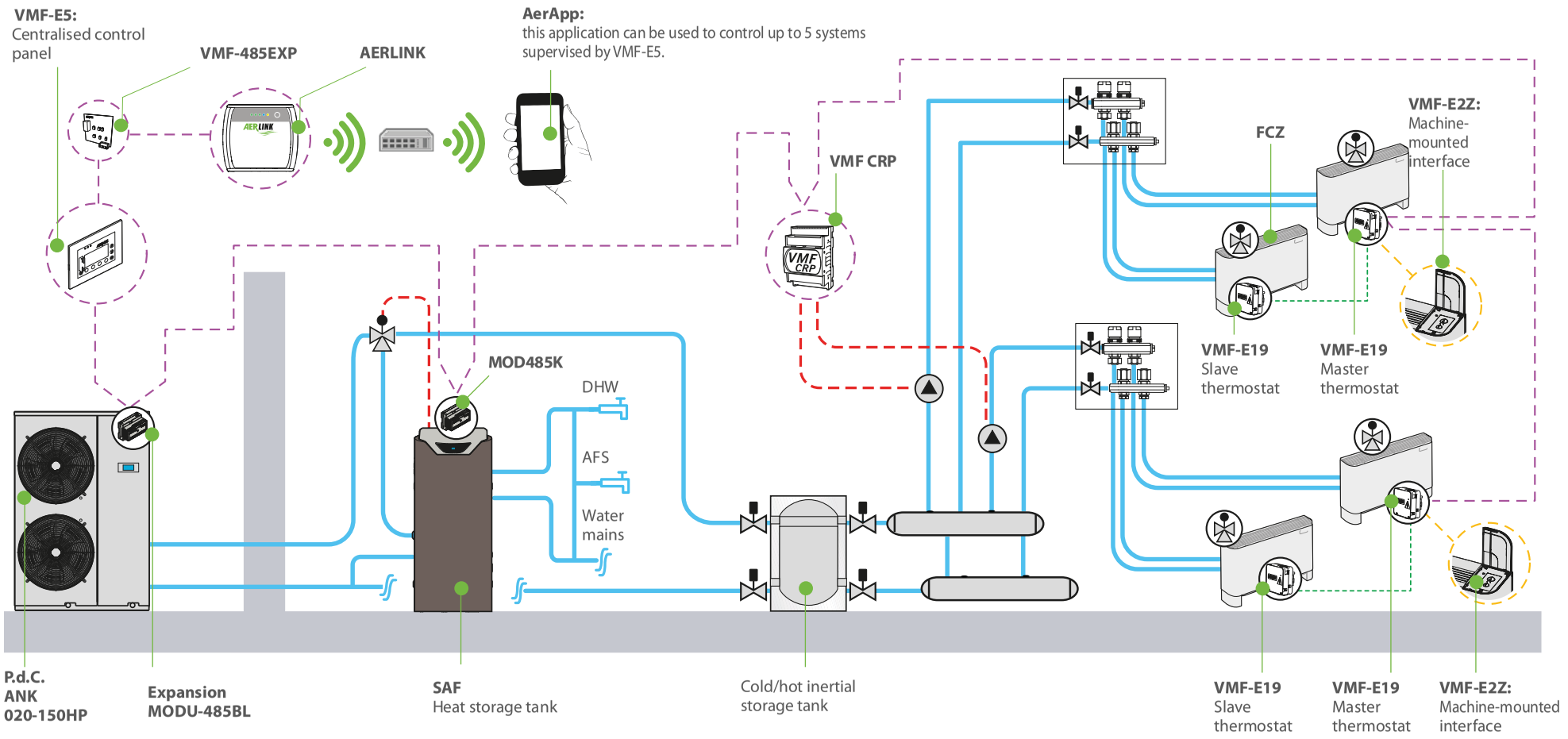
Double loop system for summer cooling and winter heating by an HMI inverter air-water heat pump with integrated pumping assembly and Omnia ULI inverter fan coils. The HMI is managed within the Modbus RS485 serial through the VMF-485LINK interface card and control panel IC-2P connection cable. The terminals are grouped into different zones, each managed by a wall-mounted VMF-E4X control panel, which is used to set the zone fan coil parameters. The VMF-E4X panel is connected to the E19I thermostat of the zone master fan coil, from which the TTL network starts and to which the E19I thermostats of the slave fan coils are connected. The first VMF-CRP expansion board allows for the heat pump to be replaced by the modulating boiler for heating during the winter season when the external air temperature drops below the value that was set using the centralised VMF-E5 control panel. The second VMF-CRP expansion board allows for each pump on the secondary loop to be associated with the reference terminals: when the first terminal in the fan coil group associated with the pump activates, the pump is turned on, whereas when the last fan coil associated with the pump reaches the set-point, or if there is no thermal load demand, the pump turns off. The domestic hot water is produced by a third-party boiler managed by the VMF-DHW electrical panel: when the temperature in the storage tank drops below the value set by the VMF-E5, the DHW request signal is sent to the centralised control panel by Modbus; the E5 first activates hot mode and sets the DHW production set-point for the heat pump and secondly authorises the VMF-DHW for the switching of the 3-way diverting valve. VMF-DHW also permits controlling an electric resistor in the integrated DHW storage tank and/or for the programmed anti-legionella function. If the temperature of the DHW produced does not reach the delivery set point, the downstream modulating boiler intervenes independently.

8.8 Indoor CL-H heat pump with integrated pumping assembly and substitute boiler for heating and cooling with fan coil system – Production of DHW by means of a VMF-DHW electrical panel using a third party boiler and integrated modulating boiler – Recovery unit for air renewal activated by VMF-CRP expansion board



Double loop system for summer cooling and winter heating by an CL-H air-water heat pump with integrated pumping assembly and on-off Omnia UL fan coils. CL-H is managed within the RS485 Modbus serial port via the MODU-485BL interface card. The terminals are grouped into different zones, each managed by a wall-mounted VMF-E4X control panel, which is used to set the zone fan coil parameters. The VMF-E4X panel is connected to the E19 thermostat of the zone master fan coil, from which the TTL network starts and to which the E19 thermostats of the slave fan coils are connected. The first VMF-CRP expansion board allows for the heat pump to be replaced by the modulating boiler for heating during the winter season when the external air temperature drops below the value that was set using the centralised VMF-E5 control panel. In addition, it permits activation of the recovery unit for air renewal on the basis of the time of day set via VMF-E5 and/or on the basis of the reading obtained from the VOC VMF-VOC probe. The second VMF-CRP expansion board allows for each pump on the secondary loop to be associated with the reference terminals: when the first terminal in the fan coil group associated with the pump activates, the pump is turned on, whereas when the last fan coil associated with the pump reaches the set-point, or if there is no thermal load demand, the pump turns off. The domestic hot water is produced by a third-party boiler managed by the VMF-DHW electrical panel: when the temperature in the storage tank drops below the value set by the VMF-E5, the DHW request signal is sent to the centralised control panel by Modbus; the E5 first activates hot mode and sets the DHW production set-point for the heat pump and secondly authorises the VMF-DHW for the switching of the 3-way diverting valve. VMF-DHW also permits the activation of the branch of the modulating boiler in the integrated DHW storage tank and/or for the programmed anti-legionella function.

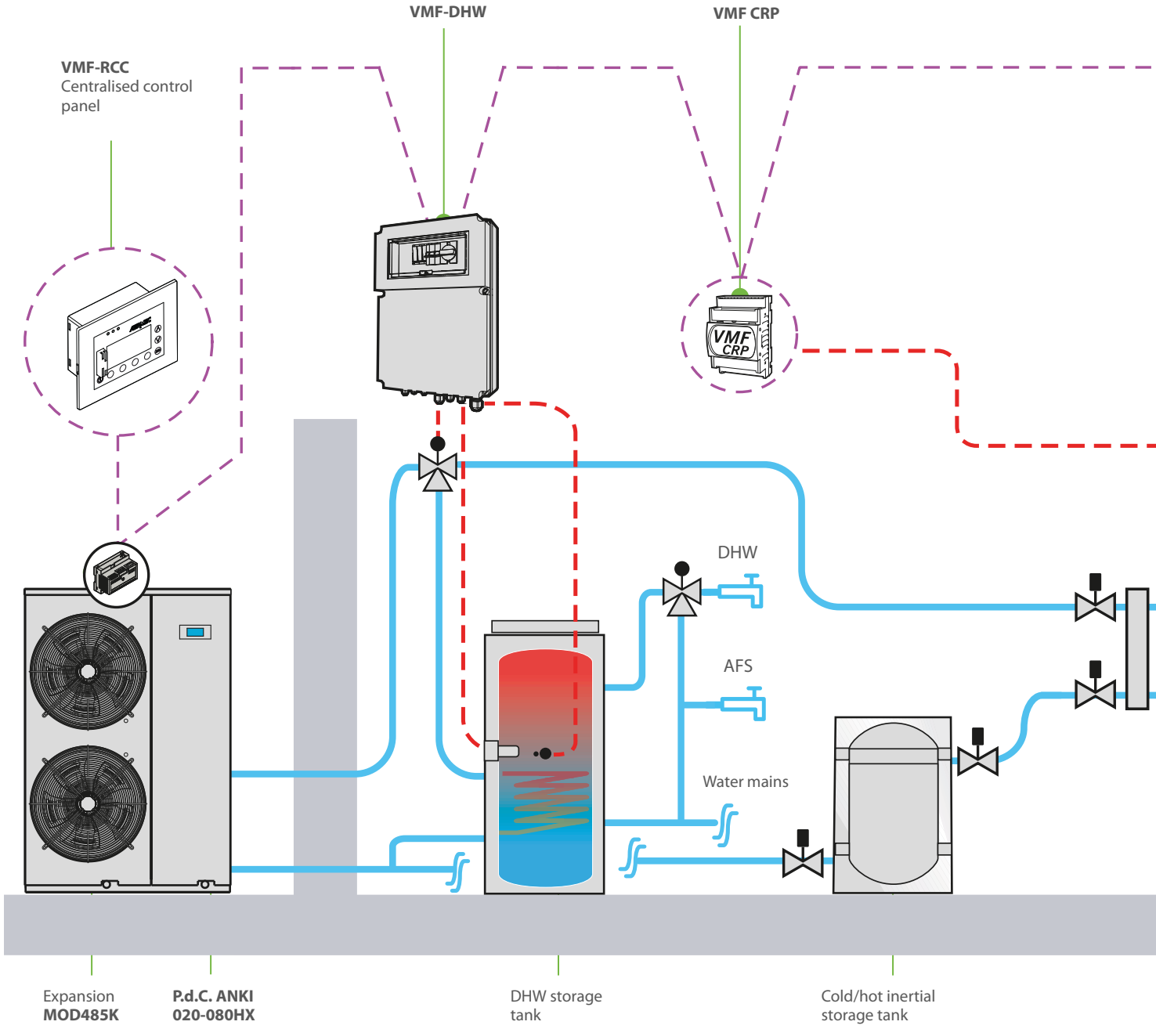
8.9 ANK heat pump with integrated pumping assembly for heating/cooling with a fan coil system – Production of DHW by an SAF heat storage tank – Supervision by AerApp through Aerlink Wi-Fi module



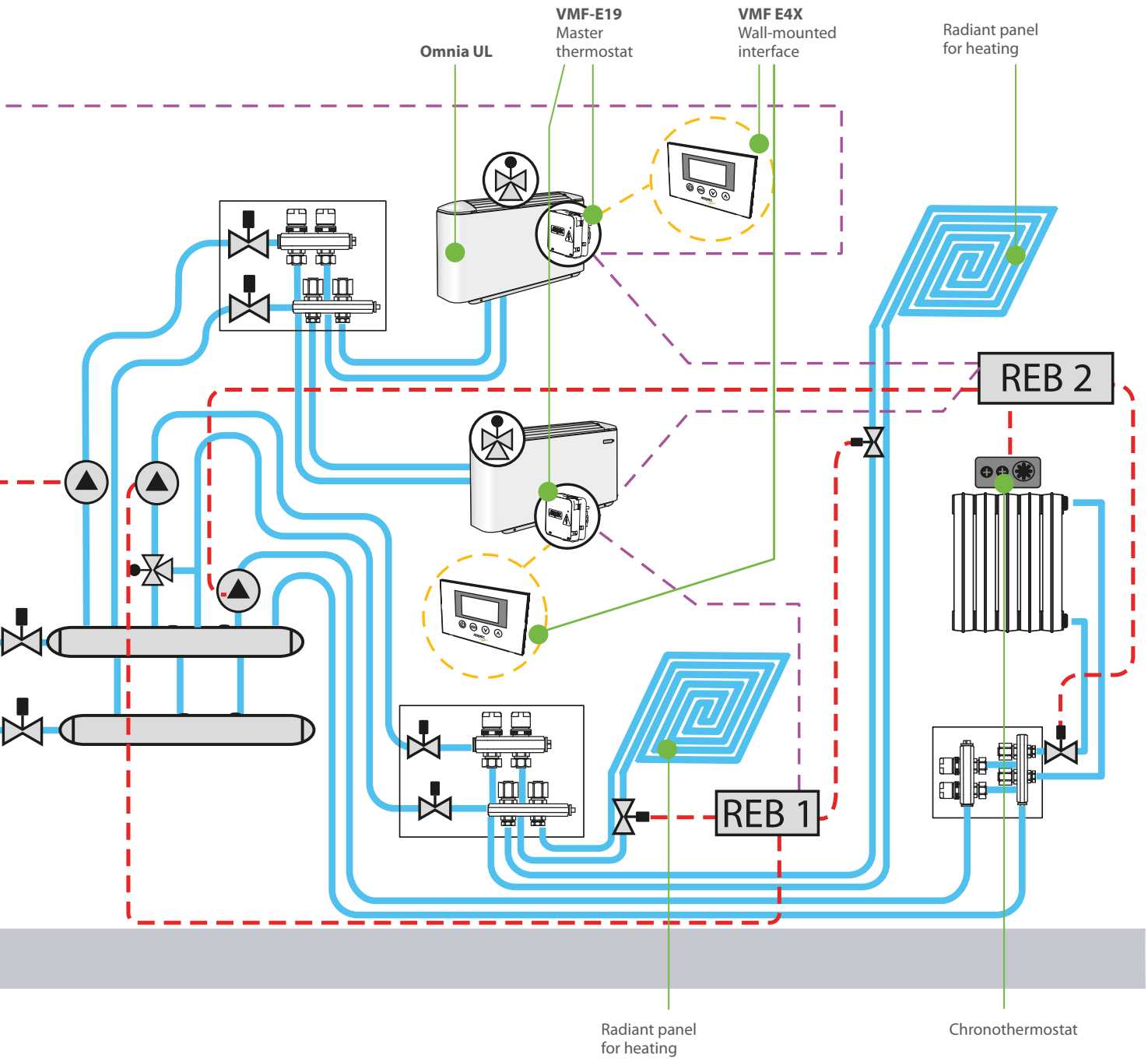
Double loop system for summer cooling and winter heating by an ANK air-water heat pump with integrated pumping assembly and on-off FCZ fan coils. ANK is managed within the RS485 Modbus serial port via the MODU-485BL interface card. The terminals are grouped into different zones, each managed by VMF-E2Z machine-mounted control panels, which are used to set the zone fan coil parameters. The VMF-E2Z panel is connected to the E19 thermostat of the zone master fan coil, from which the TTL network starts and to which the E19 thermostats of the slave fan coils are connected. The VMF-CRP expansion board makes it possible to associate each pump in the secondary loop with reference terminals: when the first terminal in the fan coil group associated with the pump activates, the pump is turned on, whereas when the last fan coil associated with the pump reaches the set-point, or if there is no thermal load demand, the pump turns off. Domestic hot water is produced by the SAF heat storage tank, equipped with a MOD485K expansion board: when the temperature in the storage tank drops below the value set by the VMF-E5, the DHW request signal is sent to the centralised control panel by Modbus; the E5 first activates hot mode and sets the DHW production set-point for the heat pump and secondly authorises the SAF for the switching of the 3-way diverting valve. The AerLink Wi-Fi module, connected to the VMF-E5 via Modbus by means of the VMF-485EXP expansion board and connected to the domestic Wi-Fi network, allows for the VMF-E5 data to be uploaded to the cloud and permits the remote management of the system through the AerApp application (Android and iOS operating systems).

9.0 VMF-RCC SYSTEM DIAGRAMS

9.1 ANKI heat pump with integrated pumping assembly for heating with fan coil system, radiant floor and bathroom radiators and for cooling with fan coil system – Production of DHW using VMF-ACS electrical panel via third-party boiler.

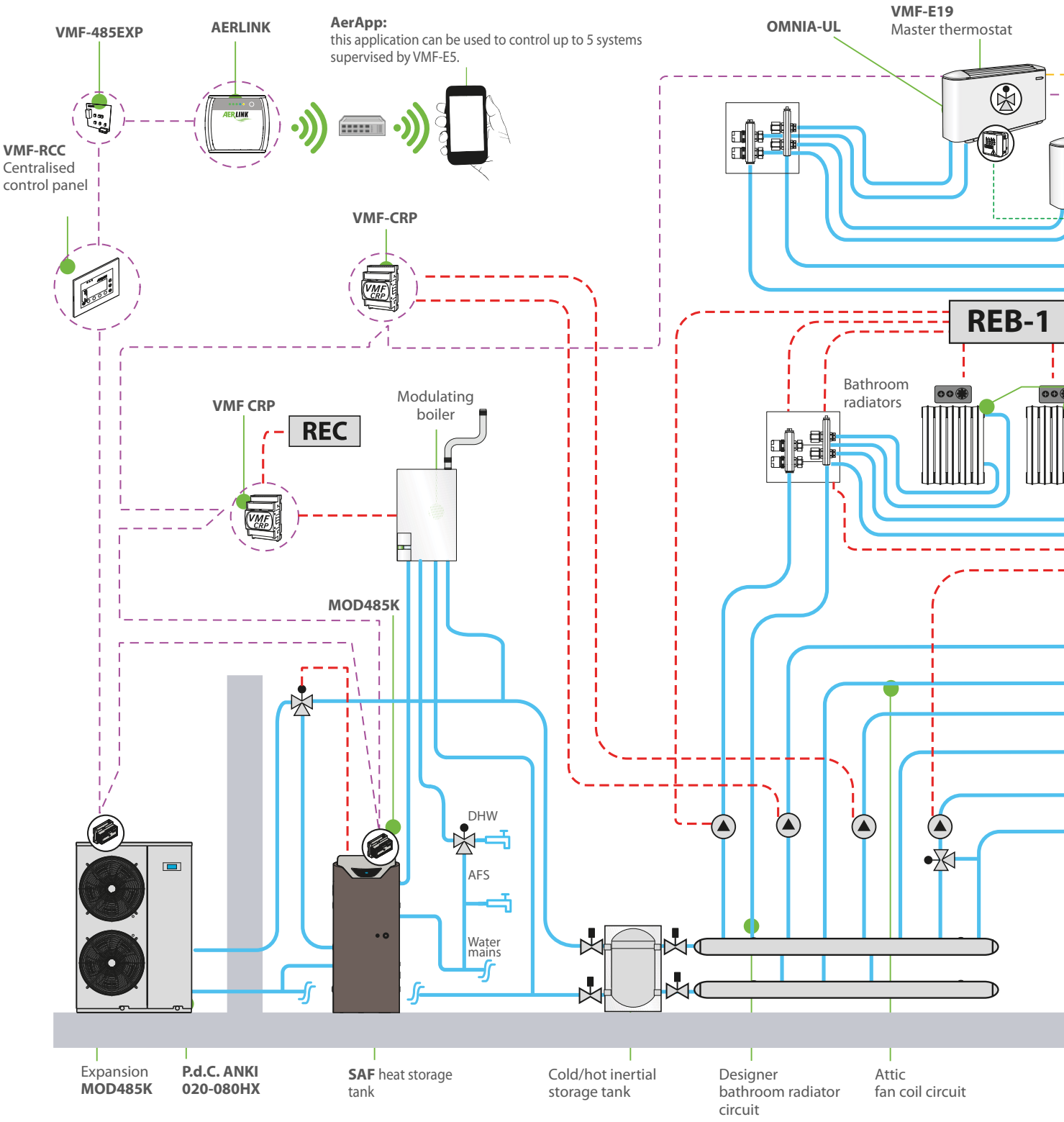


Double loop system for summer cooling and winter heating by an ANKI inverter air-water heat pump with integrated pumping assembly, Omnia UL on-off fan coils, radiant floor panels and bathroom radiators. ANKI is managed within the RS485 Modbus serial port via the MOD485K interface card. The fan coils are grouped into different zones, each managed by a wall-mounted VMF-E4X control panel, which is used to set the parameters for the zone terminals. The VMF-E4X panel is connected to the E19 thermostat of the zone master fan coil, from which the TTL network starts and to which the E19 thermostats of the slave fan coils are connected. In hot mode, the VMF-REB 1 expansion board – upon receiving a request from the VMF-RCC centralised panel – controls the opening and closing of the electro-thermal head of the radiant panels depending on the request of the VMF-E19 thermostats for the master fan coils installed in the same thermal zone; in addition, this expansion also manages the on-off function of the hydraulic circuit pump for the radiant panels. The VMF-REB 2 expansion board, upon receiving a request from the chronothermostat installed in the bathroom radiator area, manages the opening and closing of the electrothermal head and the on-off function of the pump for the dedicated hydraulic circuit.

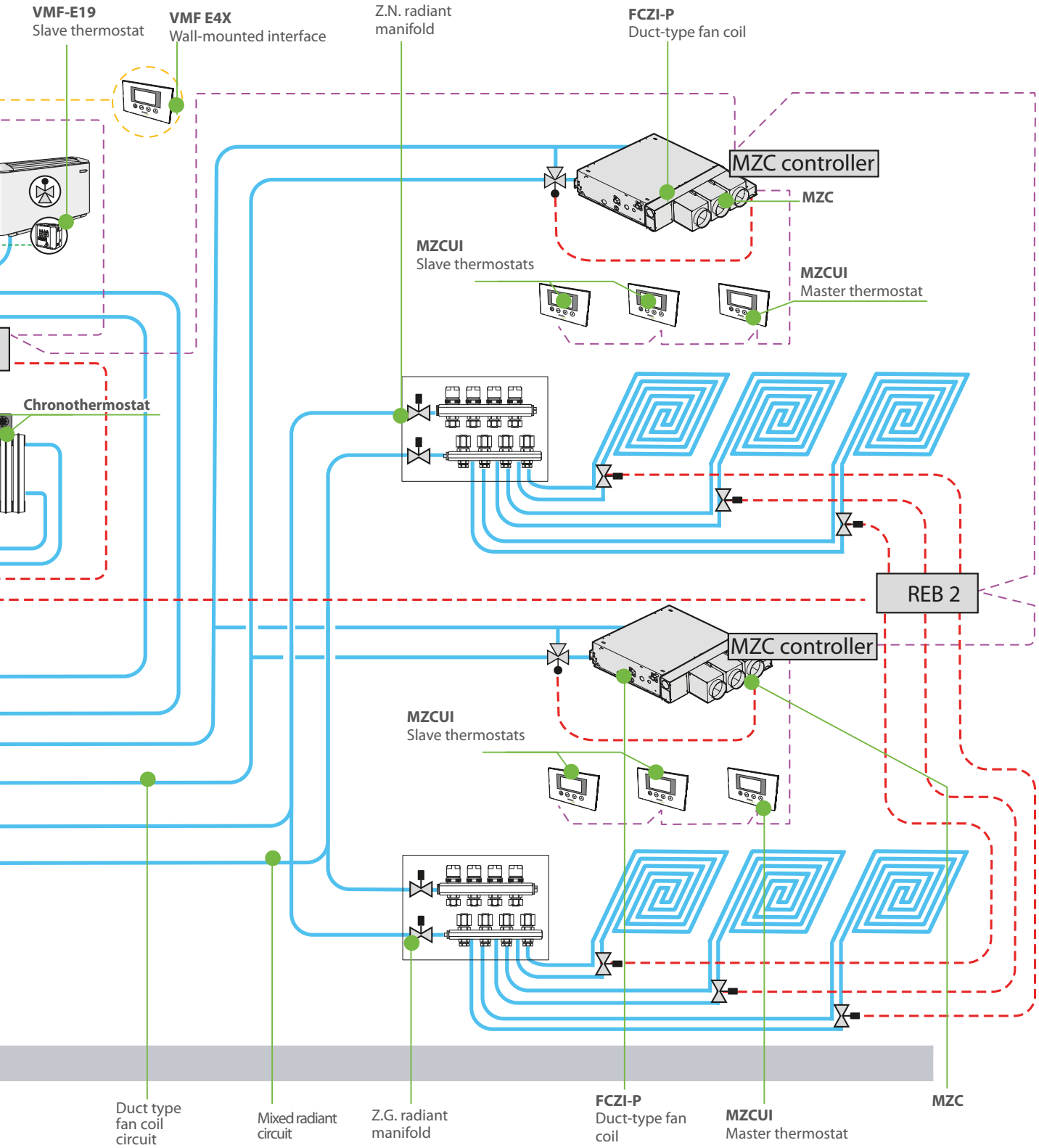


The VMF-CRP expansion board makes it possible to associate each pump in the secondary loop with the reference fan coils: when the first terminal in the fan coil group associated with the pump activates, the pump is turned on, whereas when the last fan coil associated with the pump reaches the set-point, or if there is no thermal load demand, the pump turns off. The domestic hot water is produced by a third-party boiler managed by the VMF-DHW electrical panel: when the temperature in the storage tank drops below the value set by the VMF-RCC, the DHW request signal is sent to the centralised control panel by Modbus; the RCC first activates hot mode and sets the DHW production set-point for the heat pump and secondly authorises the VMF-DHW for the switching of the 3-way diverting valve. VMF-DHW also permits controlling an electric resistor in the integrated DHW storage tank and/or for the programmed anti-legionella function.

9.2 ANKI heat pump with integrated pumping assembly and auxiliary boiler for heating and cooling with floor and duct type fan coil system, plenum with MZC motorised dampers, radiant floor and bathroom radiators – Production of DHW via the SAF thermal storage tank and modulating boiler provided standard – Supervision by AerApp through Aerlink Wi-Fi module



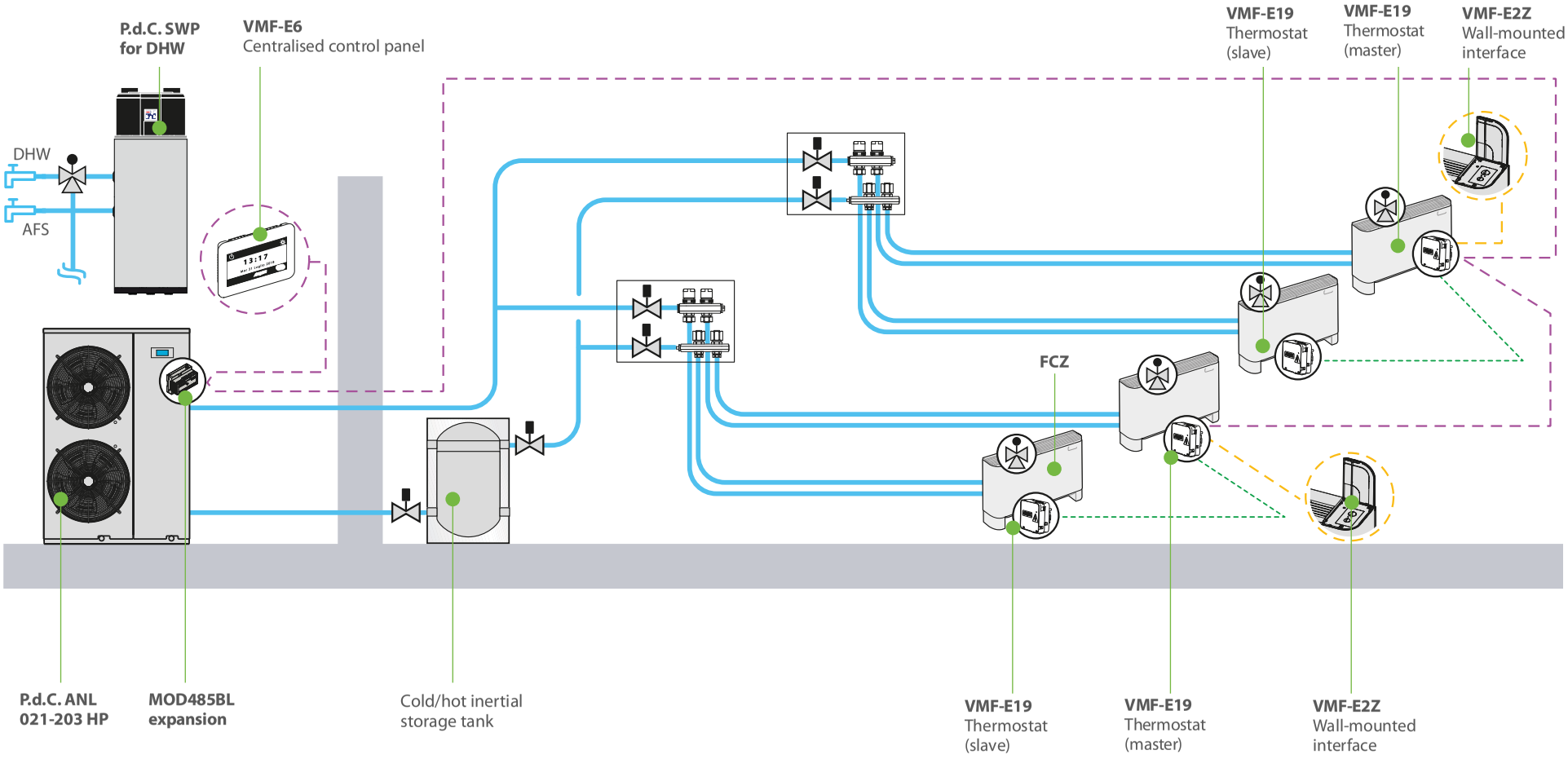
Double loop system for summer cooling and winter heating by means of an ANKI inverter air-water heat pump with integrated pumping assembly, Omnia UL on-off fan coils, duct-type inverter FCZI-P fan coils with MZC motorised plenum, radiant floor panels and radiators. ANKI is managed within the RS485 Modbus serial port via the MOD485K interface card. The fan coils of the attic are grouped into a single thermal zone, managed by a wall-mounted VMF-E4X control panel connected to the VMF-E19 thermostat of the master fan coil, the starting point for the TTL network to which the E19 thermostat of the slave fan coil is connected. The bathroom radiators are managed by the VMF-REB 1 board, which, upon receiving a request from the chronothermostat installed in the given bathroom, manages the opening and closing of the electrothermal head and the on-off function of the pump for the dedicated hydraulic circuit. In winter, the VMF-REB 2 board – upon receiving a request from the VMF-RCC centralised control panel – manages the opening and closing of the electrothermal head of the radiant panels on the basis of the demands of the MZCUI thermostats installed in the given zone; REB2 also manages the on/off function of the hydraulic circuit pump of the radiant panels. Based on the thermal and cooling load demanded in winter and in summer perceived by the MZCUI master and slave thermostats, the MZC controller manages the opening of the motorised dampers for the introduction of



air, treated by two FCZI-P inverter fan coils, into the 3 rooms of the day zone and the night zone respectively. The first VMF-CRP expansion board allows for the heat pump to be replaced by the modulating boiler for heating during the winter season when the external air temperature drops below the value that was set using the centralised VMF-RCC control panel. In addition, it permits activation of the recovery unit for air renewal on the basis of the time of day set via VMF-RCC and/or on the basis of the reading obtained from the VOC VMF-VOC probe. The second VMF-CRP expansion board makes it possible to associate each pump in the secondary loop with the reference fan coils: when the first terminal in the fan coil group associated with the pump activates, the pump is turned on, whereas when the last fan coil associated with the pump reaches the set-point, or if there is no thermal load demand, the pump turns off. Domestic hot water is produced by the SAF heat storage tank, equipped with a MOD485K expansion board: when the temperature in the storage tank drops below the value set by the VMF-RCC, the DHW request signal is sent to the centralised control panel by Modbus; the RCC first activates hot mode and sets the DHW production set-point for the heat pump and secondly authorises the SAF for the switching of the 3-way diverting valve. If the temperature of the DHW produced does not reach the delivery set point, the downstream modulating boiler intervenes independently.

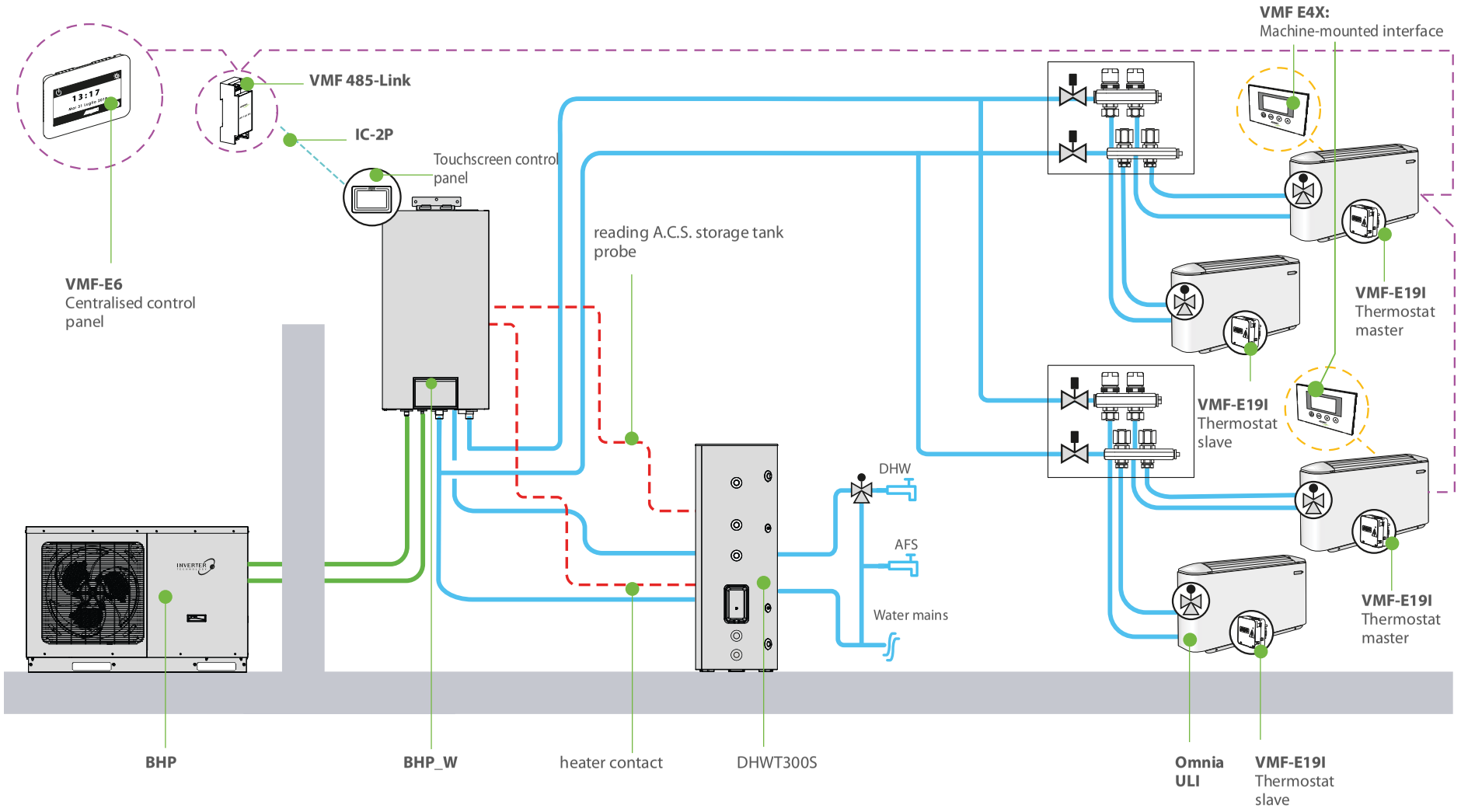
10.0 VMF-E6 SYSTEM DIAGRAMS

10.1 ANL-H heat pump with integrated pumping assembly for heating and cooling with fan coil system – Production of DHW by means of SWP heat pump water heater



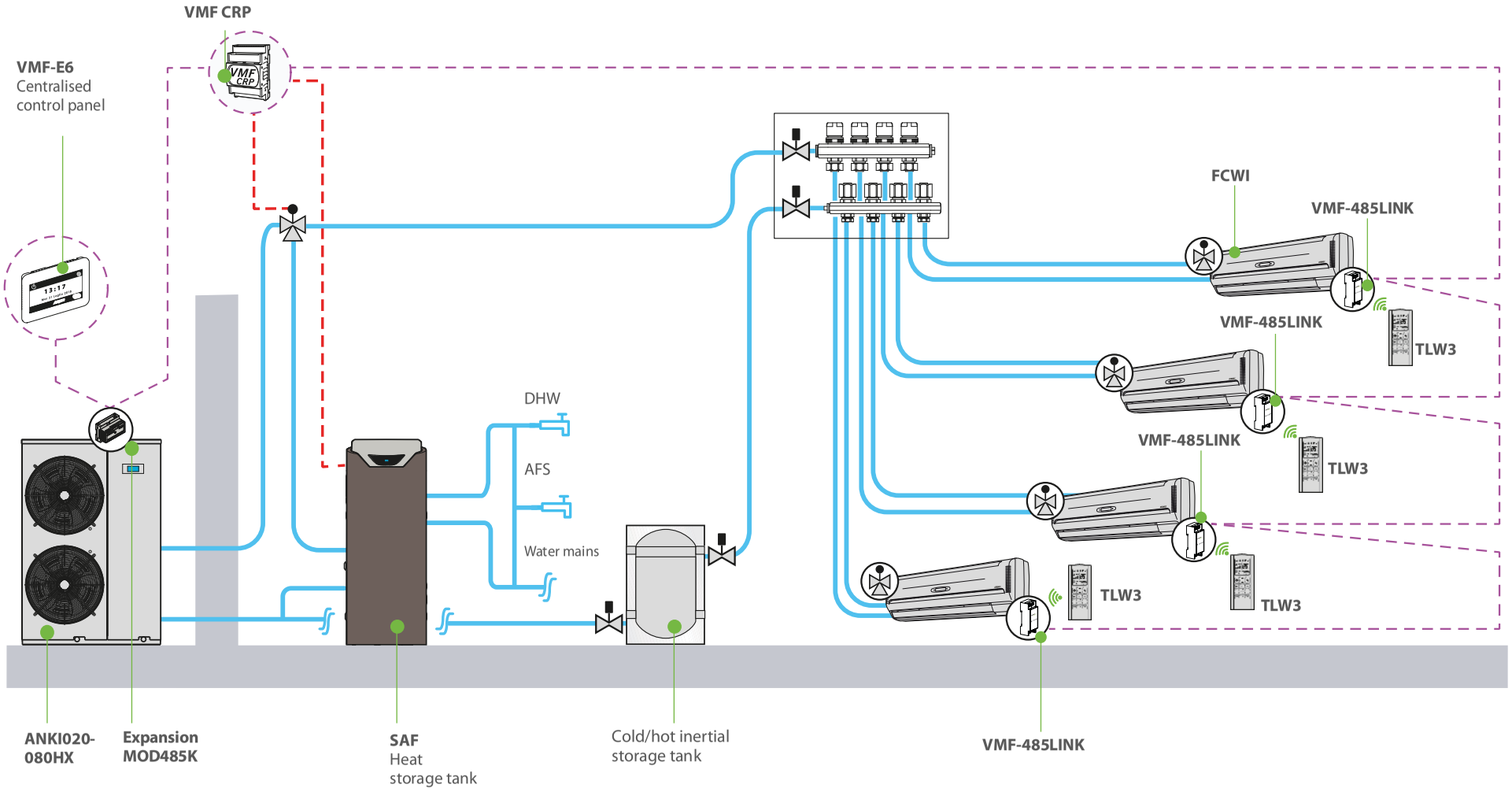
Single loop system for summer cooling and winter heating by an ANL-H air-water heat pump with integrated pumping assembly and on-off FCZ fan coils. The ANL-H is managed within the RS485 Modbus serial port via the MODU-485BL interface card. The terminals are grouped into different zones, each managed by VMF-E2Z machine-mounted control panels, which are used to set the zone fan coil parameters. The VMF-E2Z panel is connected to the E19 thermostat of the zone master fan coil, from which the TTL network starts and to which the E19 thermostats of the slave fan coils are connected.
The production of domestic hot water is carried out by the SWP heat pump water heater.

10.2 Split BHP heat pump with integrated pumping assembly for heating and cooling with fan coil system – Production of DHW via DHWT300S boiler



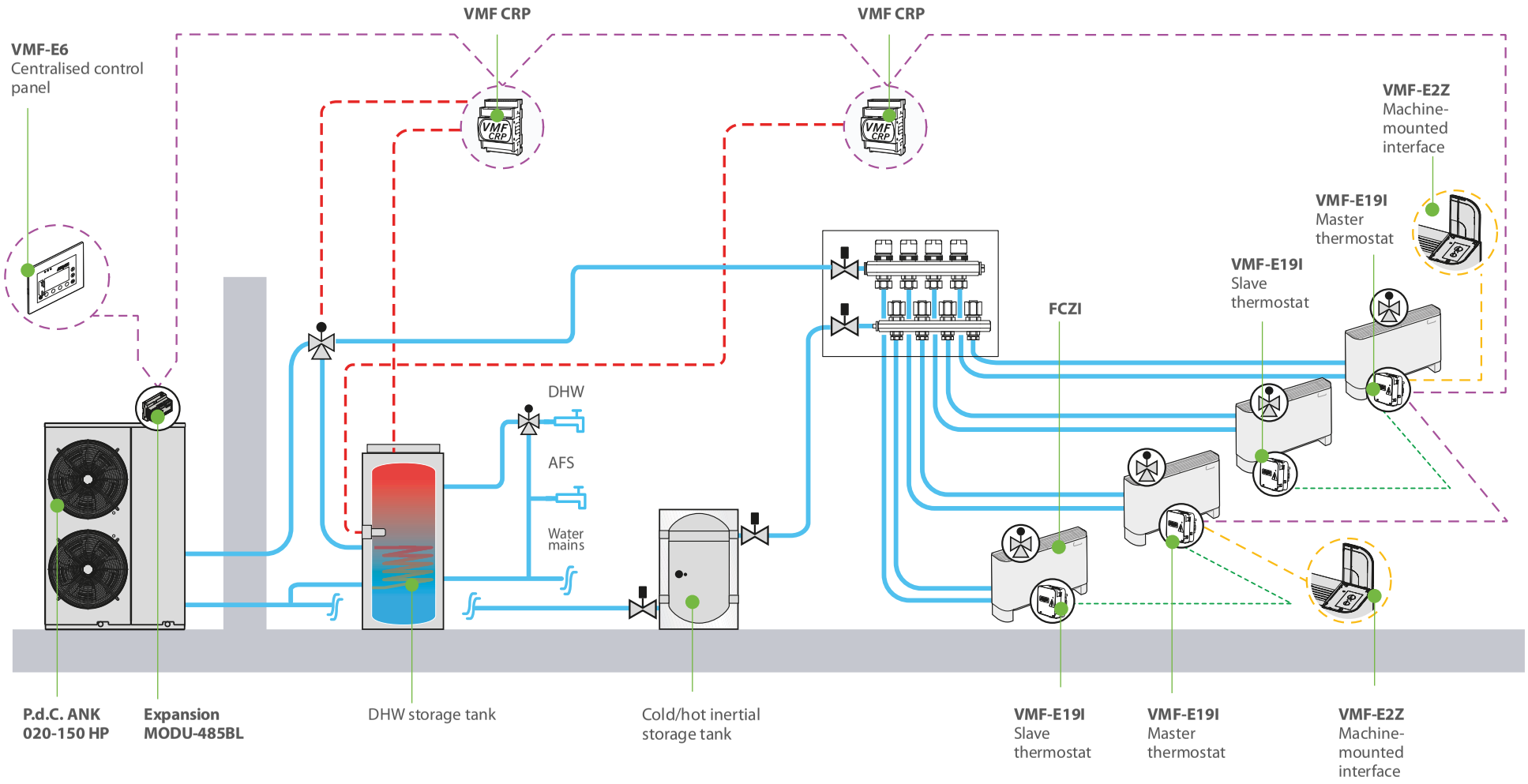
Single loop system for summer cooling and winter heating by split BHP inverter air-water heat pump in configuration W (wall) with integrated pumping assembly and Omnia-ULI inverter fan coils. The BHP-W is managed within the Modbus RS485 serial through the VMF-485LINK interface card and control panel IC-2P connection cable. The terminals are grouped into different zones, each managed by a wall-mounted VMF-E4X control panel, which is used to set the zone fan coil parameters. The VMF-E4X panel is connected to the E19I thermostat of the zone master fan coil, from which the TTL network starts and to which the E19I thermostats of the slave fan coils are connected. The domestic hot water is produced by the DHW DHWT300S heat storage tank: when the temperature in the storage tank drops below the value set by the BHP-W panel, the water probe sends the DHW request signal to the heat pump; the BHP-W first goes into hot mode and sets the DHW production set-point, and secondly enables the switching of the 3-way diverting valve located inside the BHP-W.

10.3 ANKI heat pump with integrated pumping assembly for heating/cooling with a fan coil system – Production of DHW via VMF-CRP expansion board by means of SAF heat storage tank



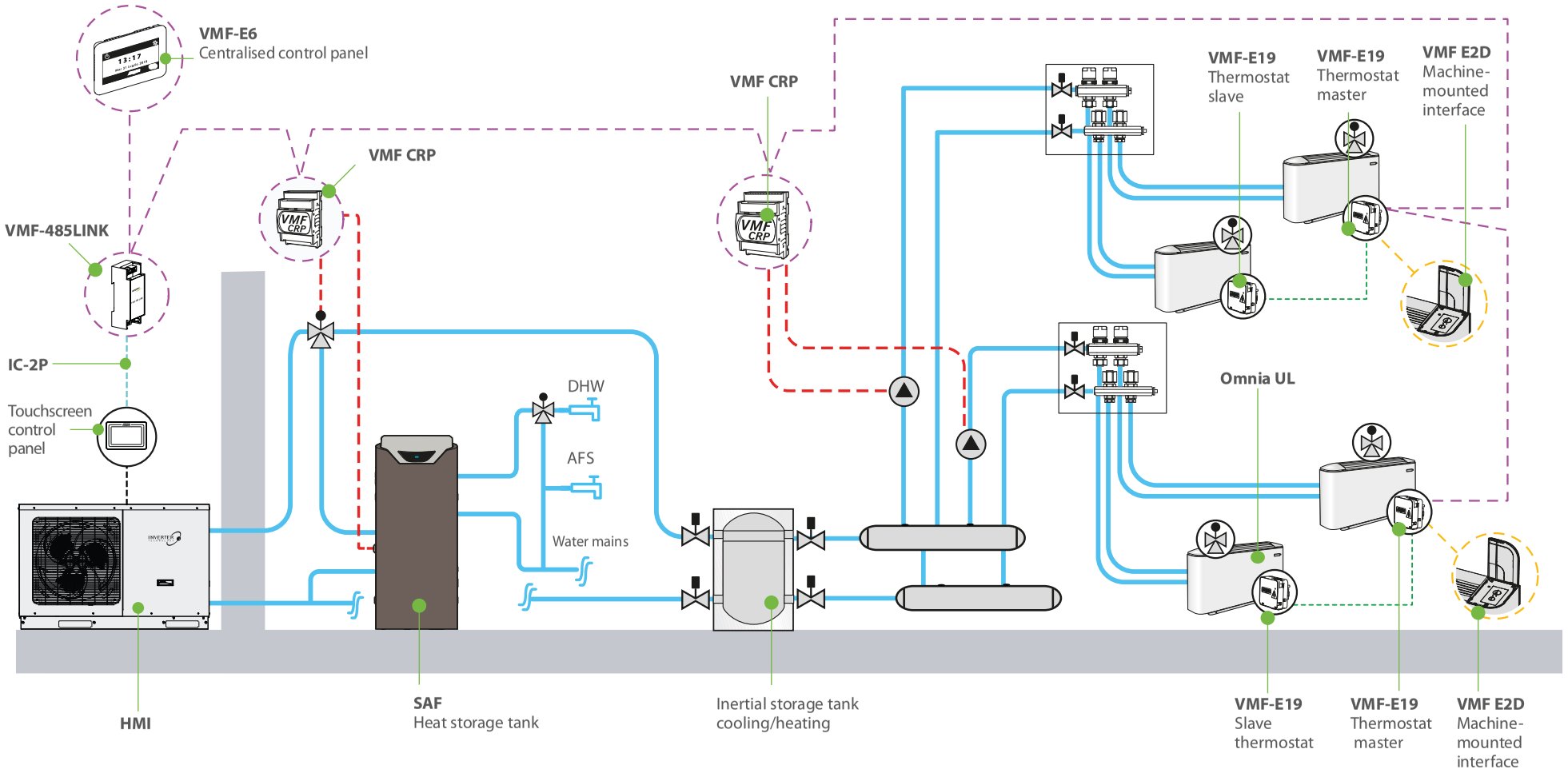
Single loop system for summer cooling and winter heating by an ANKI inverter air-water heat pump with integrated pumping assembly and wall-mounted FCWI inverter fan coils. ANKI is managed within the RS485 Modbus serial port via the MOD485K interface card. The terminals are grouped into different zones, each consisting of a single fan coil managed by a PFW3 wall-mounted control panel or TLW3 remote control, from which the parameters for the fan coil can be set. The FCWIs are connected to the VMF system by means of a VMF-485LINK RS485 Modbus interface card. The VMF-CRP expansion board permits the production of domestic hot water by means of the SAF heat storage tank: when the temperature in the storage tank drops below the value set by the VMF-E6, the DHW request signal is sent to the centralised control panel by Modbus; the E6 first activates hot mode and sets the DHW production set-point for the heat pump and secondly authorises the CRP for the switching of the 3-way diverting valve.

10.4 ANK heat pump with integrated pumping assembly for heating/cooling with a fan coil system – Production of DHW via VMF-CRP expansion board by means of a third party boiler



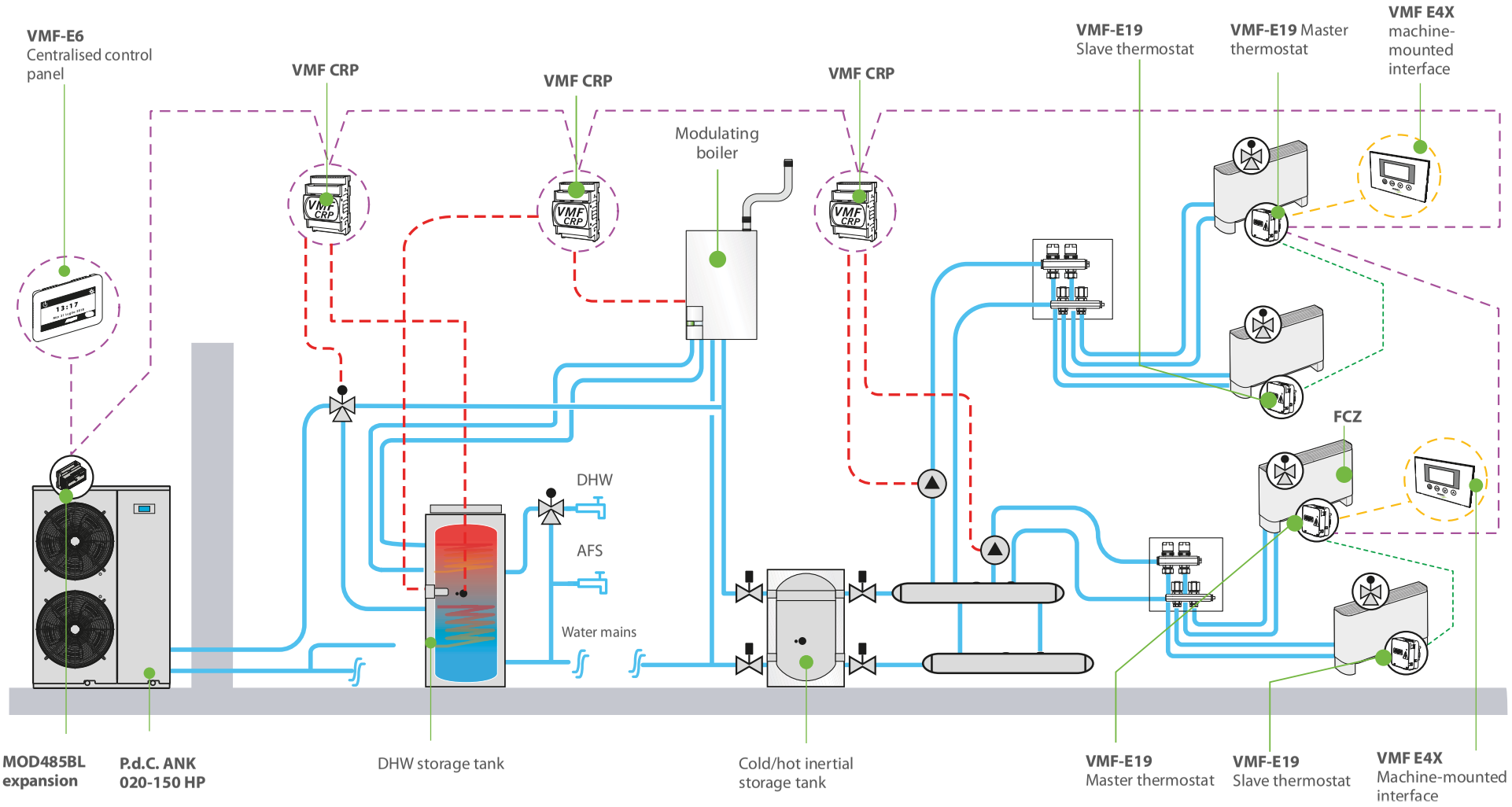
Single loop system for summer cooling and winter heating by an ANK air-water heat pump with integrated pumping assembly and FCZI inverter fan coils. ANK is managed within the RS485 Modbus serial port via the MODU-485BL interface card. The terminals are grouped into different zones, each managed by VMF-E2Z machine-mounted control panels, which are used to set the zone fan coil parameters. The VMF-E2Z panel is connected to the E19I thermostat of the master fan coil. The first VMF-CRP expansion board permits the production of domestic hot water by means of a third party storage tank: when the temperature in the storage tank drops below the value set by the VMF-E6, the DHW request signal is sent to the centralised control panel by Modbus; the E6 first activates hot mode and sets the DHW production set-point for the heat pump and secondly authorises the CRP for the switching of the 3-way diverting valve. The second VMF-CRP expansion board enables the management of an electric heater in the integrated DHW storage tank and/or for the programmed anti-legionella function.

10.5 HMI heat pump with integrated pumping assembly for heating and cooling with fan coil system – Production of DHW the VMF-CRP expansion board via SAF storage tank



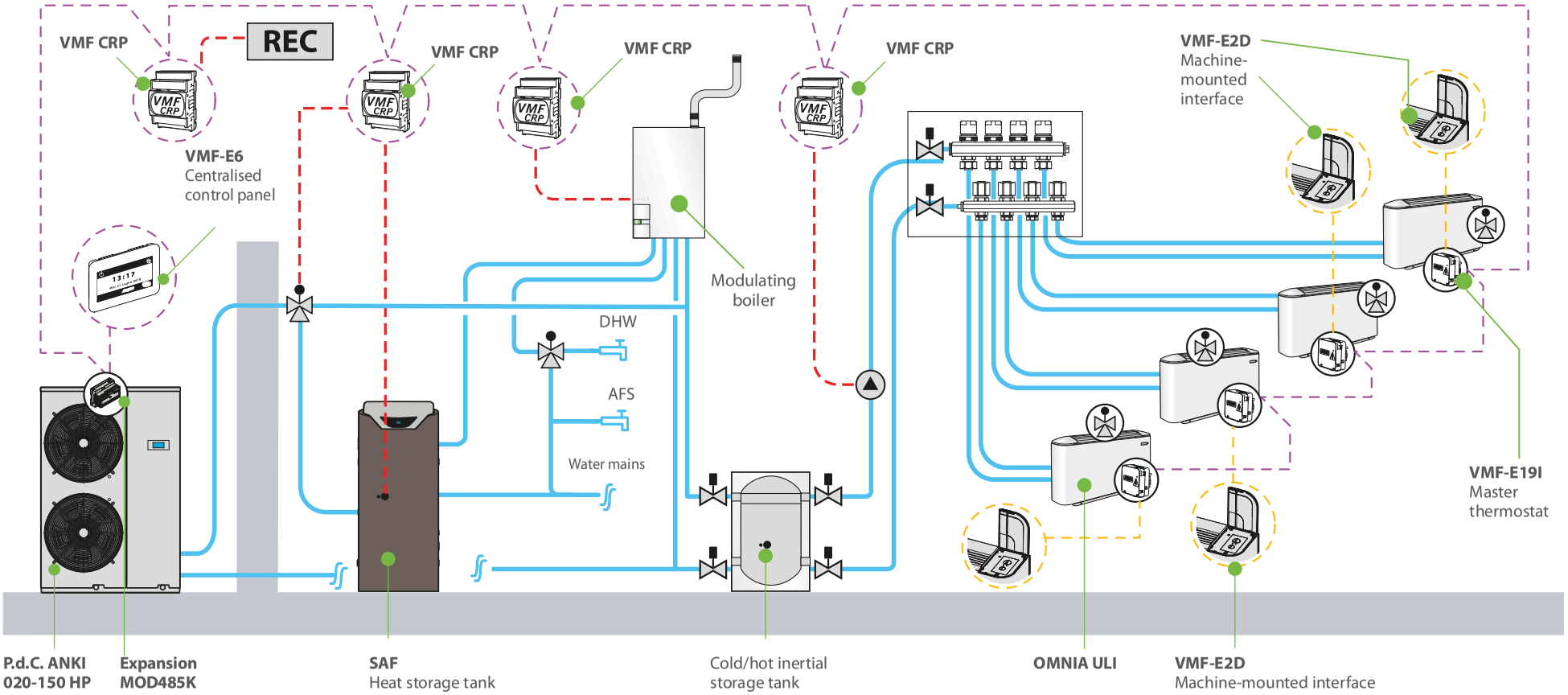
Double loop system for summer cooling and winter heating by an HMI inverter air-water heat pump with integrated pumping assembly and on-off Omnia UL fan coils. The HMI is managed within the Modbus RS485 serial through the VMF-485LINK interface card and control panel IC-2P connection cable. The terminals are grouped into different zones, each managed by VMF-E2D machine-mounted control panels, which are used to set the zone fan coil parameters. The VMF-E2D panel is connected to the E19 thermostat of the zone master fan coil, from which the TTL network starts and to which the E19 thermostats of the slave fan coils are connected. The first VMF-CRP expansion board permits the production of domestic hot water by means of the SAF heat storage tank: when the temperature in the storage tank drops below the value set by the VMF-E6, the DHW request signal is sent to the centralised control panel by Modbus; the E6 first activates hot mode and sets the DHW production set-point for the heat pump and secondly authorises the CRP for the switching of the 3-way diverting valve. The second VMF-CRP expansion board allows for each pump on the secondary loop to be associated with the reference terminals: when the first terminal in the fan coil group associated with the pump activates, the pump is turned on, whereas when the last fan coil associated with the pump reaches the set-point, or if there is no thermal load demand, the pump turns off.

10.6 ANK heat pump with integrated pumping assembly and auxiliary boiler for heating and cooling with fan coil system - Production of DHW via the VMF-CRP expansion board through third-party boiler and integrated modulating boiler



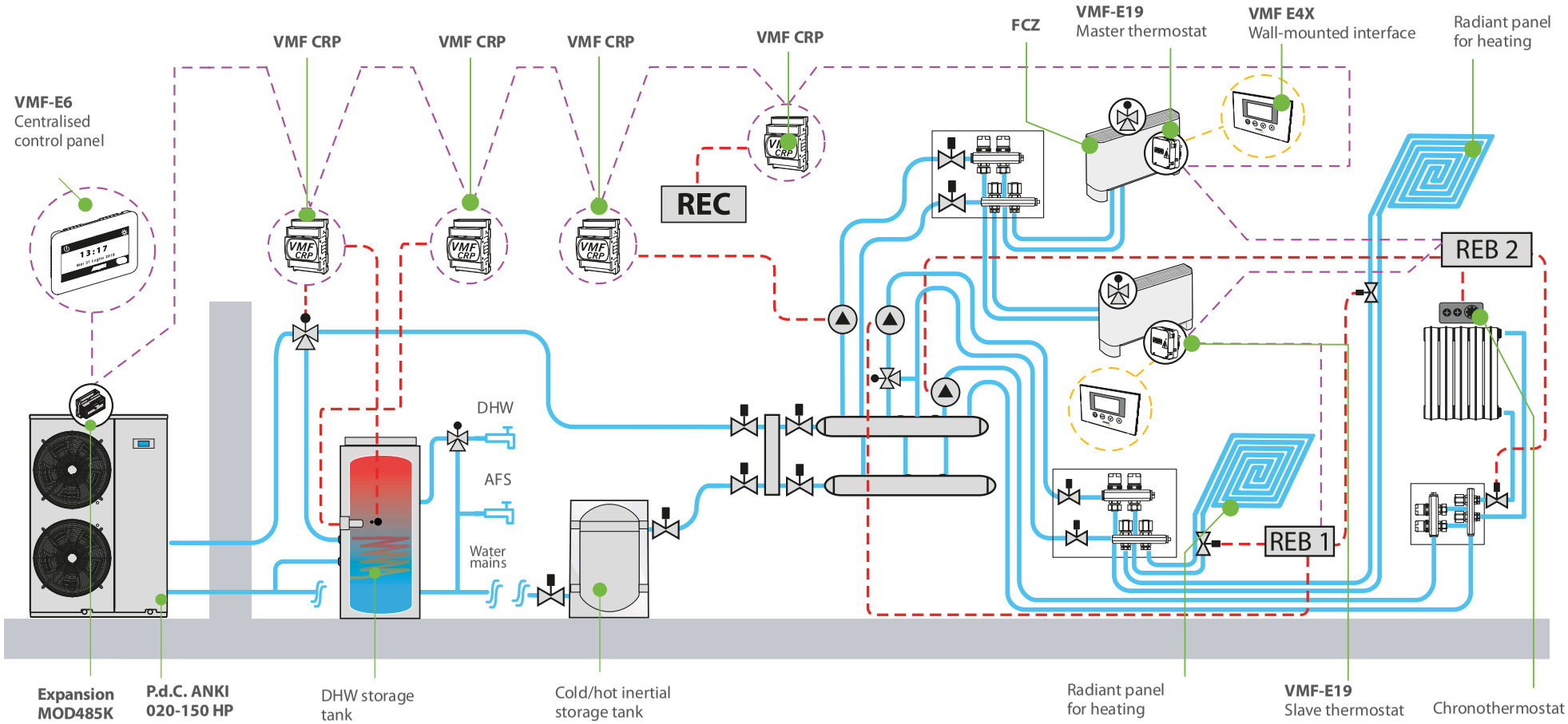
Double loop system for summer cooling and winter heating by an ANK air-water heat pump with integrated pumping assembly and on-off FCZ fan coils. ANK is managed within the RS485 Modbus serial port via the MODU-485BL interface card. The terminals are grouped into different zones, each managed by VMF-E2Z machine-mounted control panels, which are used to set the zone fan coil parameters. The VMF-E2Z panel is connected to the E19I thermostat of the zone master fan coil, from which the TTL network starts and to which the E19 thermostats of the slave fan coils are connected. The first VMF-CRP expansion board permits the production of domestic hot water by means of a third party storage tank: when the temperature in the storage tank drops below the value set by the VMF-E6, the DHW request signal is sent to the centralised control panel by Modbus; the E6 first activates hot mode and sets the DHW production set-point for the heat pump and secondly authorises the CRP for the switching of the 3-way diverting valve. The second VMF-CRP expansion board allows for the heat pump to be replaced by the modulating boiler for heating during the winter season when the external air temperature drops below the value that was set using the centralised VMF-E6 control panel. Furthermore, this expansion allows for the management of the boiler integrated in the DHW storage tank and/or for the programmed anti-legionella function. The third VMF-CRP expansion board allows for each pump on the secondary loop to be associated with the reference terminals: when the first terminal in the fan coil group associated with the pump activates, the pump is turned on, whereas when the last fan coil associated with the pump reaches the set-point, or if there is no thermal load demand, the pump turns off.

10.7 ANKI heat pump with integrated pumping assembly and auxiliary boiler for heating and cooling with fan coil system – Production of DHW using a VMF-CRP expansion board by means of an SAF storage tank – Recovery unit for air renewal activated by means of VMF-CRP expansion board



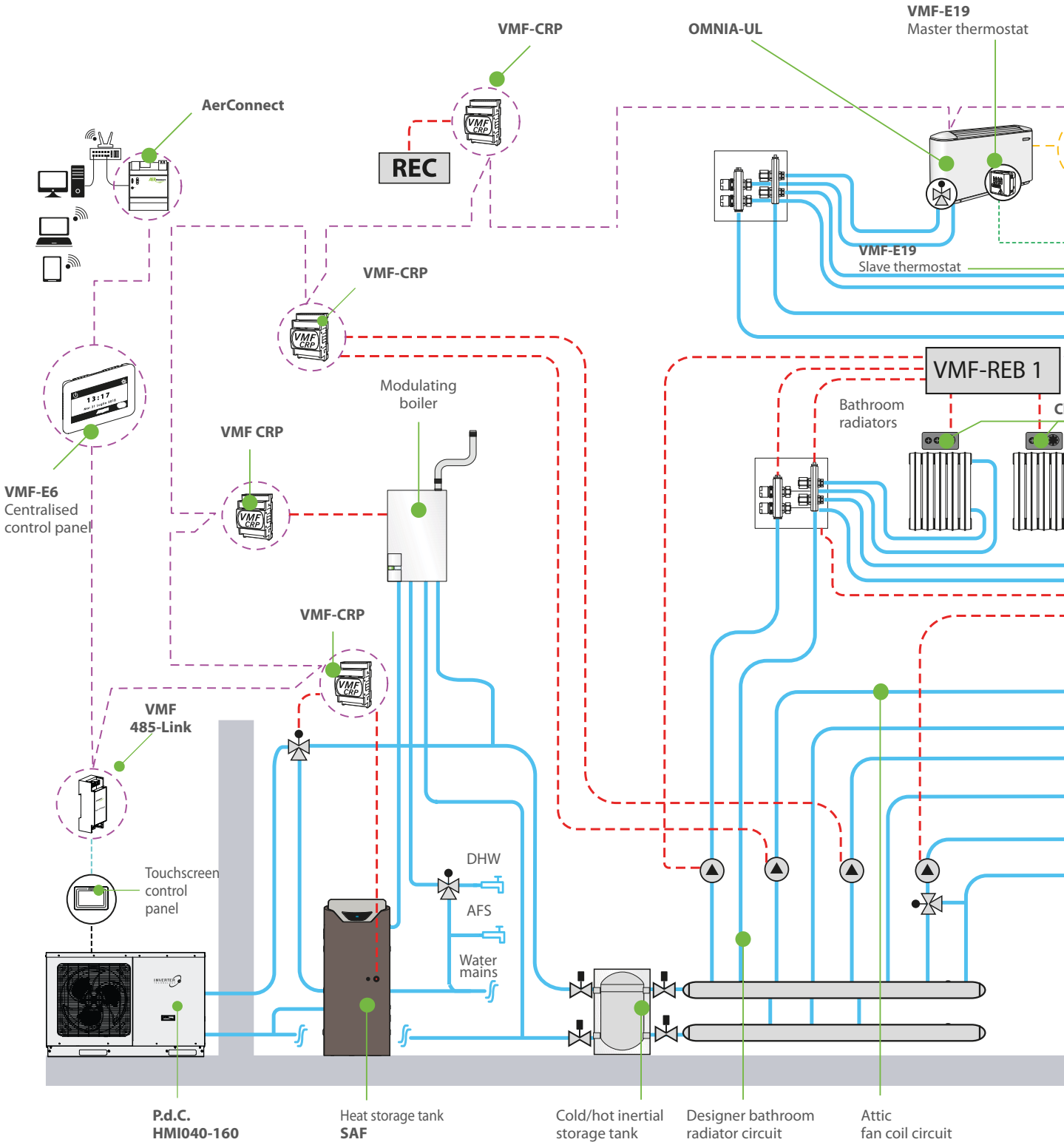
Double loop system for summer cooling and winter heating by an ANKI inverter air-water heat pump with integrated pumping assembly and Omnia ULI inverter fan coils. ANKI is managed within the RS485 Modbus serial port via the MOD485K interface card. The terminals are grouped into different zones, each managed by VMF-E2D machine-mounted control panels, which are used to set the zone fan coil parameters. The VMF-E2D panel is connected to the E19I thermostat of the master fan coil. The first VMF-CRP expansion board permits activation of the recovery unit for air renewal on the basis of the time of day set via VMF-E6 and/or on the basis of the reading obtained from the VOC VMF-VOC probe. The second VMF-CRP expansion board permits the production of domestic hot water by means of the SAF heat storage tank: when the temperature in the storage tank drops below the value set by the VMF-E6, the DHW request signal is sent to the centralised control panel by Modbus; the E6 first activates hot mode and sets the DHW production set-point for the heat pump and secondly authorises the CRP for the switching of the 3-way diverting valve. If the temperature of the DHW produced does not reach the delivery set point, the downstream modulating boiler intervenes independently. The third VMF-CRP expansion board allows for the heat pump to be replaced by the modulating boiler for heating during the winter season when the external air temperature drops below the value that was set using the centralised VMF-E6 control panel. The fourth VMF-CRP expansion board makes it possible to associate each pump in the secondary loop with reference terminals: when the first terminal in the fan coil group associated with the pump activates, the pump is turned on, whereas when the last fan coil associated with the pump reaches the set-point or if there is no thermal load demand, the pump turns off.

10.8 ANKI heat pump with integrated pumping assembly for heating with fan coil system, radiant floor and bathroom radiators and for cooling with fan coil system – Production of DHW using VMF-CRP expansion board via third party boiler – Recovery unit for air renewal activated by means of VMF-CRP expansion board

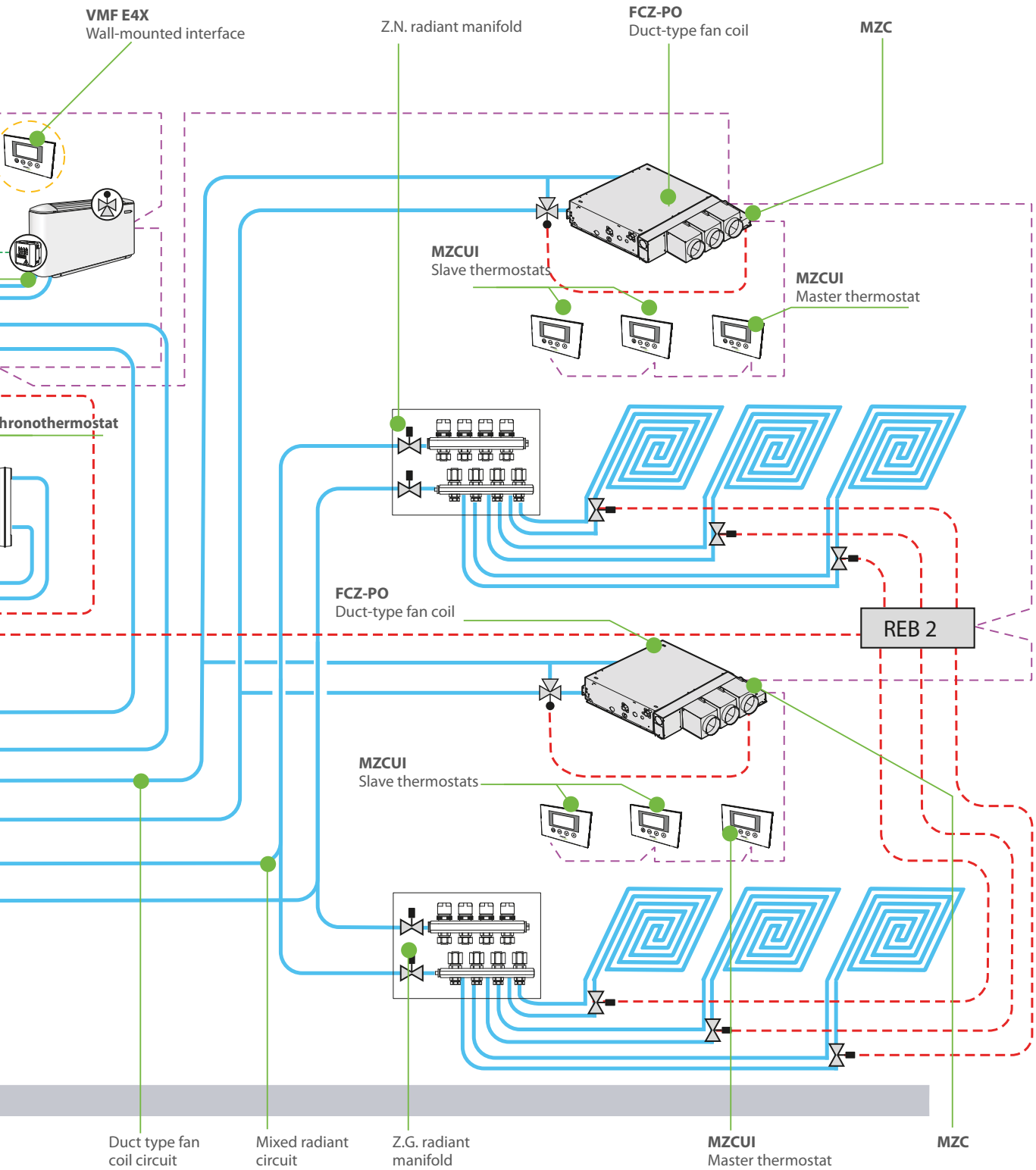


Double loop system for summer cooling and winter heating by an ANKI inverter air-water heat pump with integrated pumping assembly, FCZ on-off fan coils, radiant floor panels and bathroom radiators. ANKI is managed within the RS485 Modbus serial port via the MOD485K interface card. The fan coils are grouped into different zones, each managed by a wall-mounted VMF-E4X control panel, which is used to set the parameters for the zone terminals. The VMF-E4X panel is connected to the E19 thermostat of the zone master fan coil, from which the TTL network starts and to which the E19 thermostats of the slave fan coils are connected. In hot mode, the VMF-REB 1 expansion board – upon receiving a request from the VMF-E6 centralised panel – controls the opening and closing of the electro-thermal head of the radiant panels depending on the request of the VMF-E19 thermostats for the master fan coils installed in the same thermal zone; in addition, this expansion also manages the on-off function of the hydraulic circuit pump for the radiant panels. The VMF-REB 2 expansion board, upon receiving a request from the chronothermostat installed in the bathroom radiator area, manages the opening and closing of the electrothermal head and the on-off function of the pump for the dedicated hydraulic circuit. The first VMF-CRP expansion board permits the production of domestic hot water by means of a third party storage tank: when the temperature in the storage tank drops below the value set by the VMF-E6, the DHW request signal is sent to the centralised control panel by Modbus; the E6 first activates hot mode and sets the DHW production set-point for the heat pump and secondly authorises the CRP for the switching of the 3-way diverting valve. The second VMF-CRP expansion board enables the management of an electric heater in the integrated DHW storage tank and/or for the programmed anti-legionella function. The third VMF-CRP expansion board makes it possible to associate each pump in the secondary loop with the reference fan coils: when the first terminal in the fan coil group associated with the pump activates, the pump is turned on, whereas when the last fan coil associated with the pump reaches the set-point, or if there is no thermal load demand, the pump turns off. The fourth VMF-CRP expansion board permits activation of the recovery unit for air renewal on the basis of the time of day set via VMF-E6 and/or on the basis of the reading obtained from the VOC VMF-VOC probe.

10.9 HMI heat pump with integrated pumping assembly and auxiliary boiler for heating with floor and duct type fan coil system, MZC motorised plenum, radiant floor and bathroom radiators and cooling with floor and duct type fan coil system, MZC motorised plenum – Production of DHW with VMF-CRP expansion board through SAF thermal storage tank and modulating boiler provided as standard – Recovery unit for air renewal activated by means of VMF-CRP expansion board – Supervision through WebApp by means of Aerconnect webserver

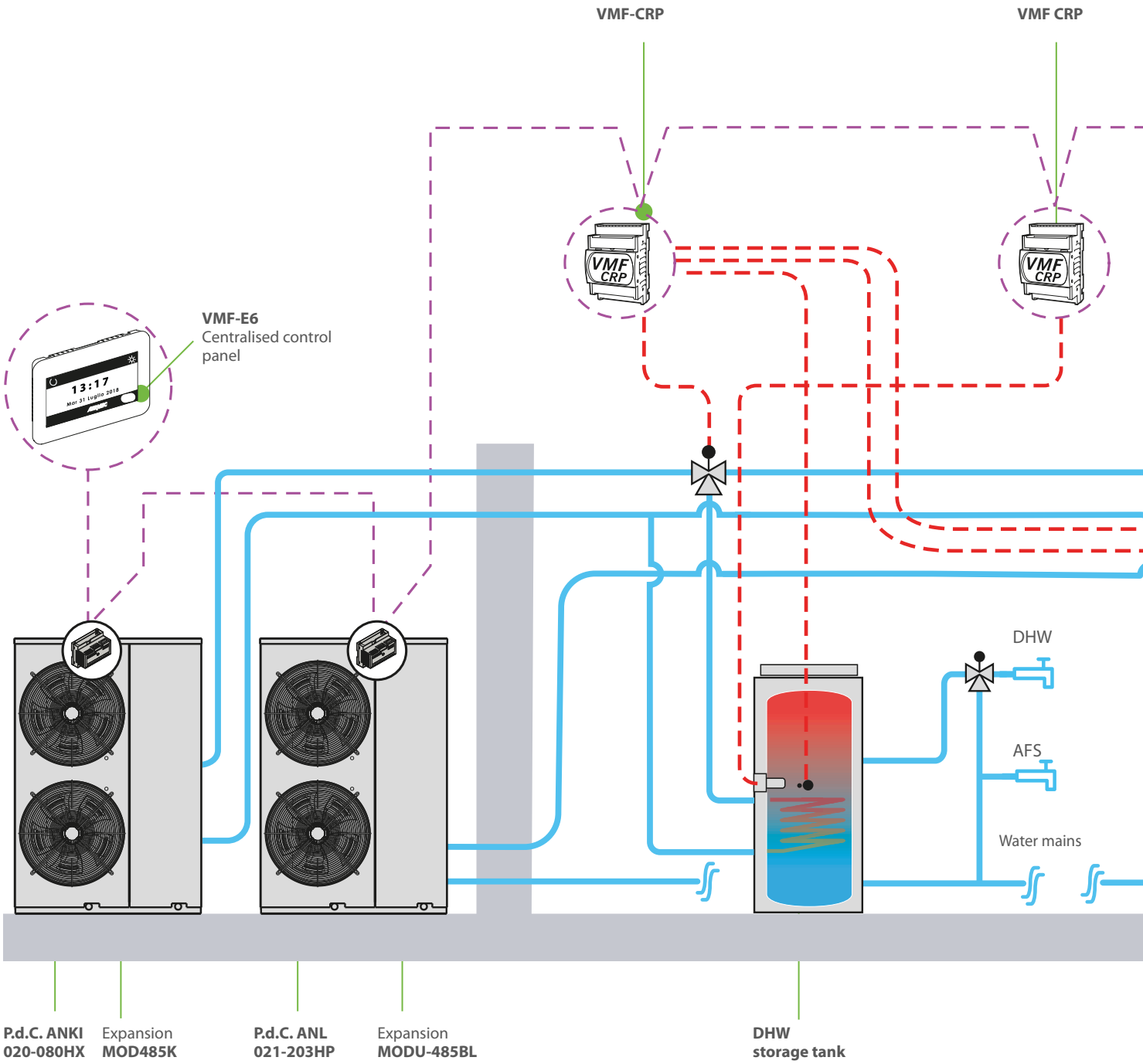


Double loop system for summer cooling and winter heating by means of HMI inverter air-water heat pump with integrated pumping assembly, Omnia UL on-off fan coils, duct-type FCZ-PO on-off fan coils with MZC motorised plenum, radiant floor panels and radiators. The HMI is managed within the Modbus RS485 serial through the VMF-485LINK interface card and control panel IC-2P connection cable. The fan coils of the attic are grouped into a single thermal zone, managed by a wall-mounted VMF-E4X control panel connected to the VMF-E19 thermostat of the master fan coil, the starting point for the TTL network to which the E19 thermostat of the slave fan coil is connected. The bathroom radiators are managed by the VMF-REB 1 board, which, upon receiving a request from the chronothermostat installed in the given bathroom, manages the opening and closing of the electrothermal head and the on-off function of the pump for the dedicated hydraulic circuit. In winter, the VMF-REB 2 board – upon receiving a request from the VMF-E6 centralised control panel – manages the opening and closing of the electrothermal head of the radiant panels on the basis of the demands of the MZCUI thermostats installed in the given zone; the REB 2 also manages the on/off function of the hydraulic circuit pump for the radiant panels. Based on the thermal and cooling load demanded in winter and in summer perceived by the MZCUI master and slave thermostats, the MZC controller manages the opening of the motorised dampers for the introduction of air treated by

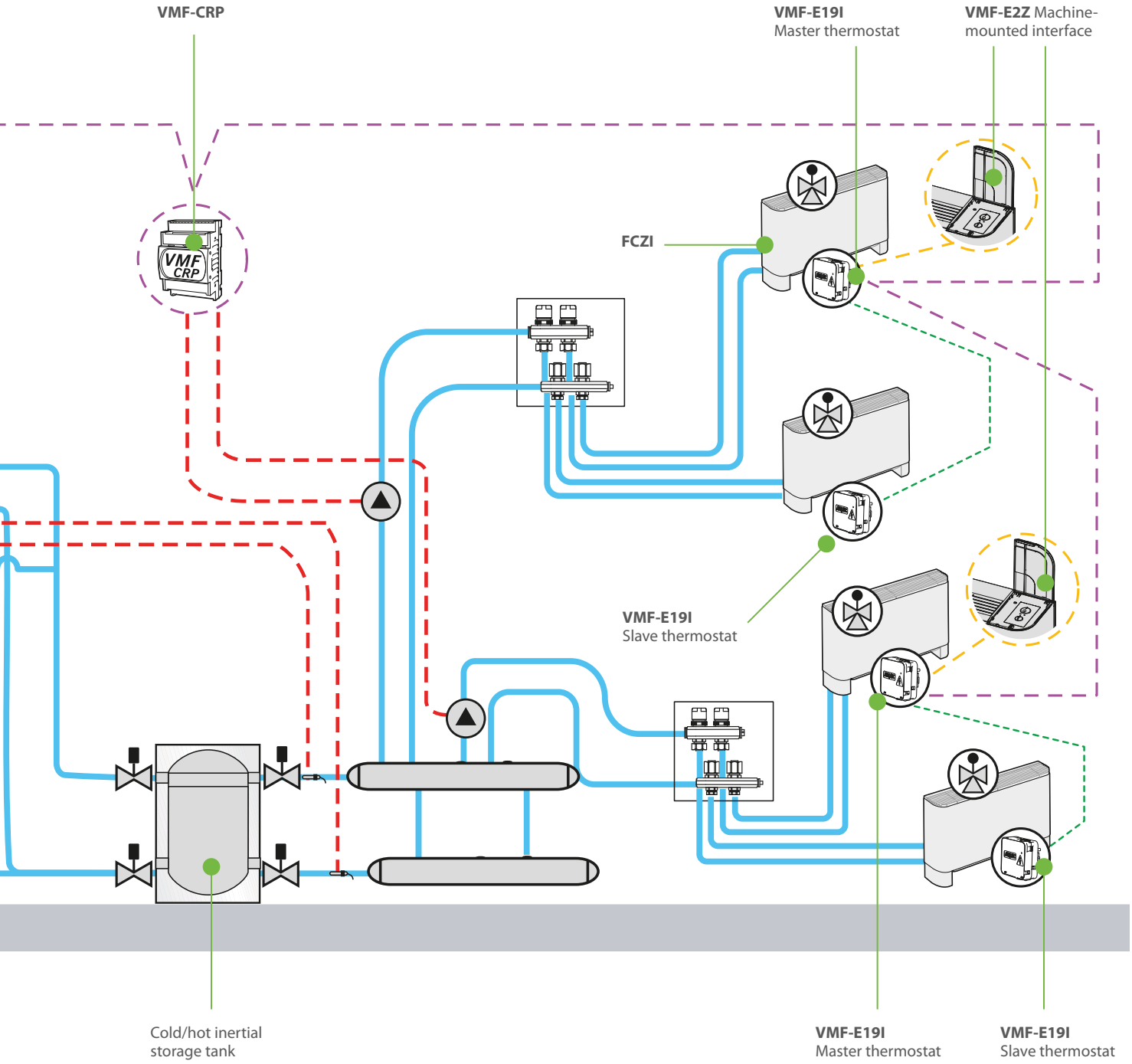


two FCZ-PO on-off fan coils into the 3 rooms of the day zone and the night zone respectively. The first VMF-CRP expansion board permits the production of domestic hot water by means of a third party storage tank: when the temperature in the storage tank drops below the value set by the VMF-E6, the DHW request signal is sent to the centralised control panel by Modbus; the E6 first activates hot mode and sets the DHW production set-point for the heat pump and secondly authorises the CRP for the switching of the 3-way diverting valve. If the temperature of the DHW produced does not reach the delivery set point, the downstream modulating boiler intervenes independently. The second VMF-CRP expansion board allows for the heat pump to be replaced by the modulating boiler for heating during the winter season when the external air temperature drops below the value that was set using the centralised VMF-E6 control panel. The third VMF-CRP expansion board makes it possible to associate each pump in the secondary loop with the reference fan coils: when the first terminal in the fan coil group associated with the pump activates, the pump is turned on, whereas when the last fan coil associated with the pump reaches the set-point, or if there is no thermal load demand, the pump turns off. The fourth VMF-CRP expansion board permits activation of the recovery unit for air renewal on the basis of the time of day set via VMF-E6 and/or on the basis of the reading obtained from the VOC VMF-VOC probe. The AerConnect webserver module, connected to the VMF-E6 via Modbus and connected to the domestic LAN network, allows for the VMF-E6 data to be uploaded to the net and for the system to be managed remotely through the dedicated WebApp.

10.10 ANKI and ANL heat pumps with parallel-integrated pumping assembly for heating and cooling with a fan coil system – Production of DHW via the VMF-CRP expansion board using a third party boiler.



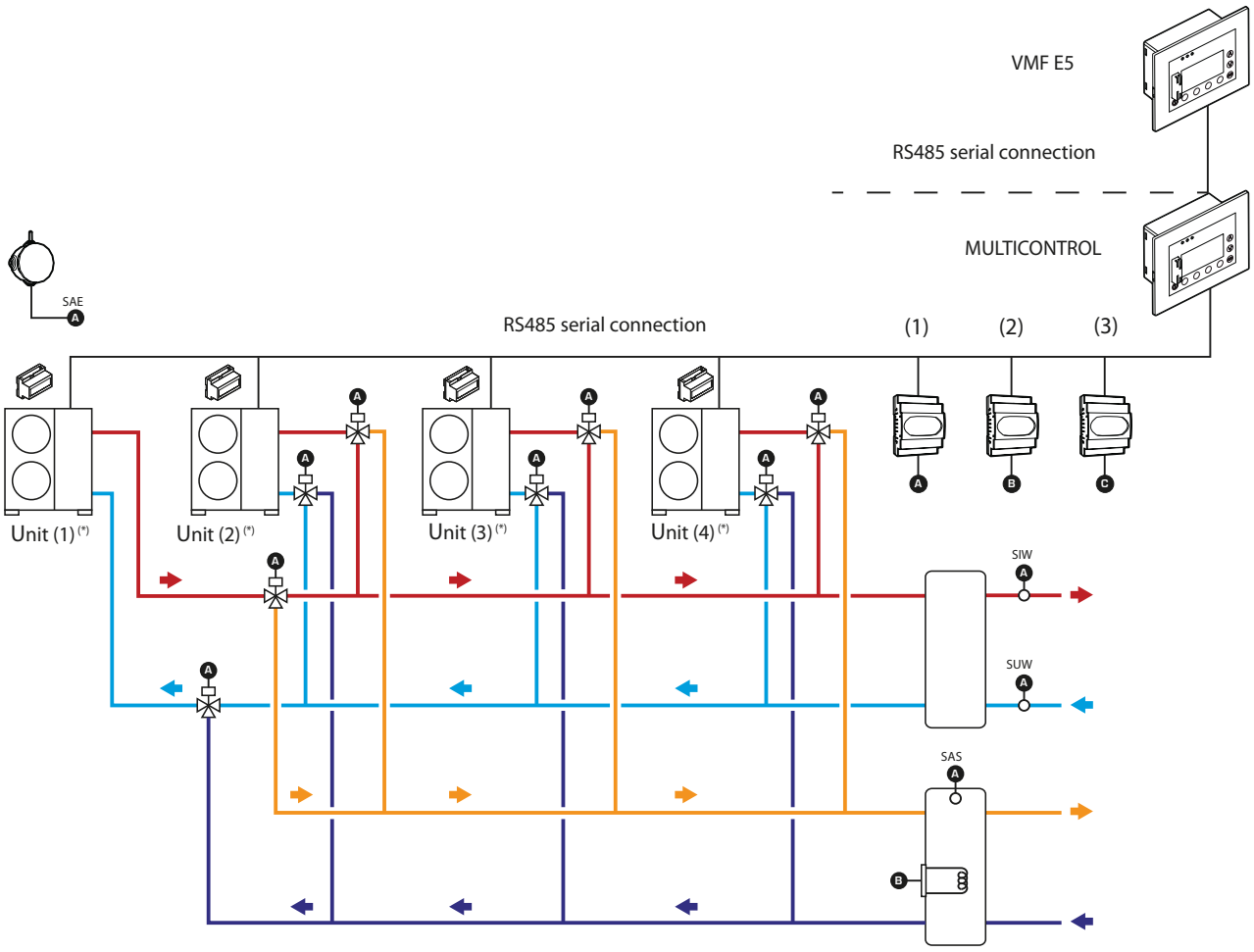
Double loop system for summer cooling and winter heating by 2 ANKI and ANL-H inverter air-water heat pumps with integrated pumping assembly and FCZI inverter fan coils. The ANKI and ANL-H are managed inside the Modbus RS485 serial via interface boards, MOD485K and MODU-485BL respectively. The fan coils are grouped into different zones, each managed by VMF-E2Z machine-mounted control panels, which are used to set the parameters for the zone terminals. The VMF-E4X panel is connected to the E19I thermostat of the zone master fan coil, from which the TTL network starts and to which the E19I thermostats of the slave fan coils are connected. The first VMF-CRP expansion board permits the production of domestic hot water by means of a third party storage tank: when the temperature in the storage tank drops below the value set by the VMF-E6, the DHW request signal is sent to the centralised control panel by Modbus; the E6 first activates hot mode and sets the DHW produc-



tion set-point for the ANKI and secondly authorises the CRP for the switching of the 3-way diverting valve. In addition, it allows for the optimised operation of the 2 heat pumps in parallel by reading the shared SPLW system delivery and return probes. The second VMF-CRP expansion board enables the management of an electric heater in the integrated DHW storage tank and/or for the programmed anti-legionella function. The third VMF-CRP expansion board makes it possible to associate each pump in the secondary loop with the reference fan coils: when the first terminal in the fan coil group associated with the pump activates, the pump is turned on, whereas when the last fan coil associated with the pump reaches the set-point, or if there is no thermal load demand, the pump turns off.

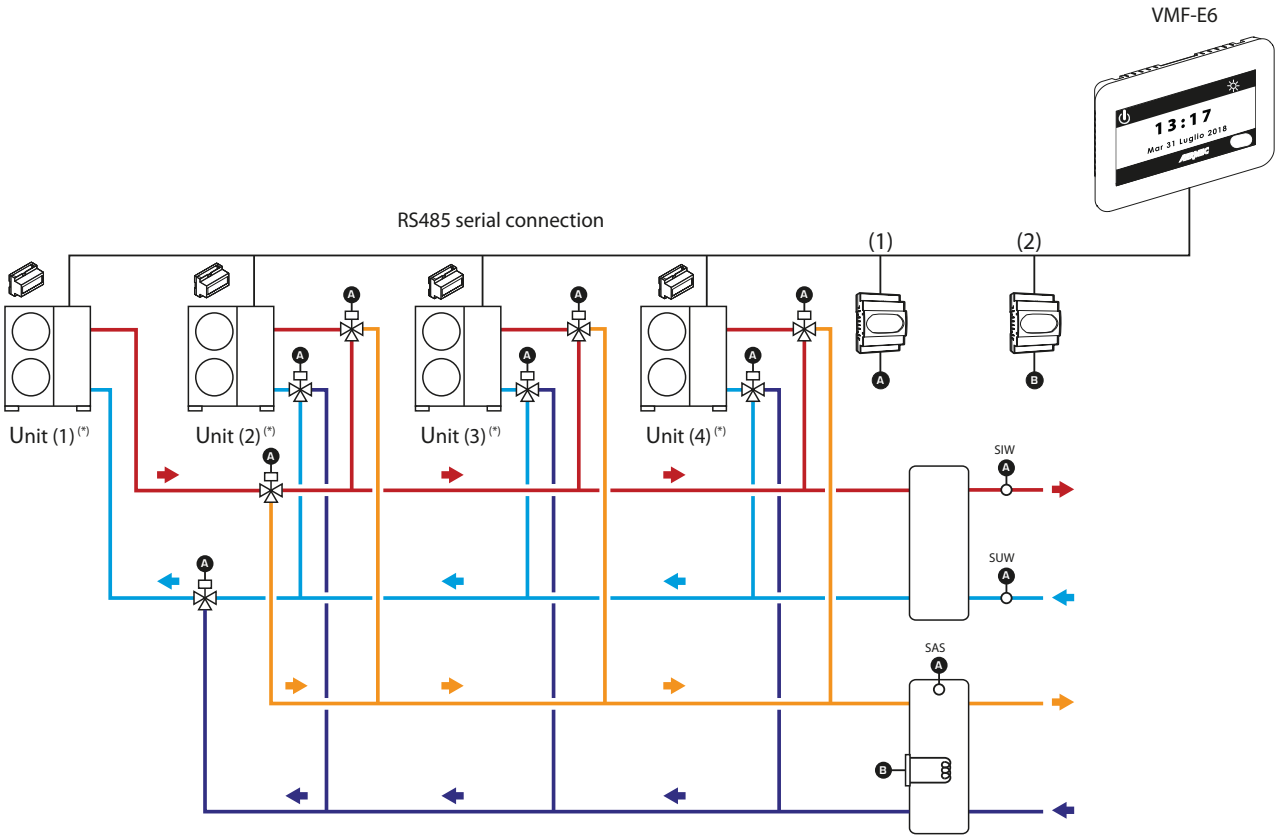
11.0 MANAGING THE HEAT PUMPS IN PARALLEL

VMF E5 + MULTICONTROL



Component	Function
VMF CRP (1)	Accessory module for managing: - 3-way deviating valves - system input/output water probe (SIW, SUW) - domestic hot water storage tank water probe (SAS) - KSAE accessory for outside air temperature (SAE)
VMF CRP (2)	Accessory module for managing the electric integration heater in the domestic hot water storage tank
VMF CRP (3)	Accessory module for the remote control of certain functions: - system On/Off, alarm reset, season change (via inputs) - alarm log, alarm presence, system status (ON/OFF), season status (HEATING/COOLING), season change (via outputs)

VMF E6

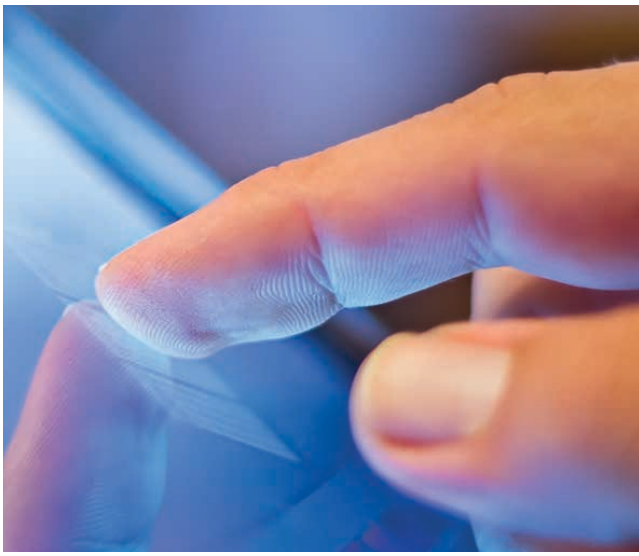


Component	Function
(1) VMF-CRP DHW	Accessory module for managing: - 3-way deviating valves - system input/output water probe (SIW, SUW) - domestic hot water storage tank water probe (SAS)
(2) VMF-CRP RAS/boiler	Accessory module for managing the system auxiliary module and the electric heater integrated in the domestic hot water storage tank.

Type of logic for unit rotation

FIXED SEQUENCE: this logic allows the activation of the units according to a fixed sequence (Unit 1, Unit 2, Unit 3, Unit 4), and their deactivation according to a fixed sequence (Unit 4, Unit 3, Unit 2, Unit 1).

BALANCED SEQUENCE: this logic allows the activation and deactivation of the units in accordance with the actual hours of operation; first the unit with the least hours of operation will be activated, then the same logic will be used for the remaining units, whereas the first unit to be deactivated will be the one with the greater number of hours of operation, and the same logic will be applied during the subsequent switch offs; this rotation mode ensures that al units are activated and deactivated in order to balance the operating hours.



Unit management logic

FREE:
In the "FREE" mode, the machines are managed independently, and for each of them the following is determined:

- activation in relation to the system
- operation set-point
- machine diagnostics

This mode allows the machines not to be subject to any forced activation/deactivation depending on the load; they self-adjust in accordance with their own thermostat.

LOAD:
In "LOAD" mode, the machines are managed in accordance with the operating season and to the actual load request, which is determined through the analysis of the thermostats of the machines that are actually switched on; for each of them the following is determined:

- activation in relation to the system
- activation in accordance with the operation season
- switch-on according to the load requests and to the sequence required by the type of rotation
- operation set-point
- machine diagnostics

DELTA T:
"DELTA T" mode allows the management of the machines in accordance with the operation season and with the unit output/input temperature. To use this control mode, the VMF-CRP (1) expansion board must be inserted. In this mode, for each machine the following is determined:

- activation in relation to the system
- activation in accordance with the operation season
- switch-on according to the temperature performance of the water produced by the unit and according to the sequence required by the type of rotation
- operation set-point
- machine diagnostics

As mentioned before, with this control mode the installer must configure the system properly (single/double loop), as this parameter is essential for the correct adjustment of the outdoor units. Indeed for double loop systems (and more specifically for all systems in which the water in the secondary circuit is circulated by an independent pump), this ensures that the SUW probe reads correctly the temperature of the liquid, providing thus the correct operation of the regulation (units activation); with these type of installations, with the correct loading, it is possible to switch off all machines (including their circulators); for single loop systems, instead, the water flow (with consequent reading of the SUW probe) must be ensured by the units' circulators; in these types of installations, also with correct loading, at least one unit must always be in operation.

12.0 REFERENCES


O2 Dome. London.


Centre Pompidou. Metz. France.


Bombardier Aerospace. Belfast. Northern Ireland.


Redhill Data Centre. Redhill. Great Britain.

British Museum. London.


Bolshoi Theatre. Moscow.


Guggenheim Collection. Venice.


Villa Barbara. Juršići. Croatia.


Sinergium Biotech. Buenos Aires.


Wimbledon Centre Court. London.

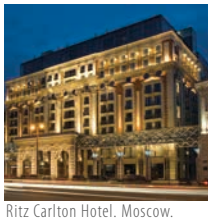

Yas Mall. Abu Dhabi.


Cheval Blanc Winery. Saint Emilion. France.


Canary Wharf. London.


Groote Schuur Hospital. Cape Town.


Hotel Danieli. Venice.


Ritz Carlton Hotel. Moscow.

Residenziale / Residential

- Art House Residential Complex - Moscow (Russia)
- Villa Barbara - Juršići (Croatia)
- Olympic Village - Athens (Greece)

Hotel / Hotels

- Ritz Carlton Hotel - Moscow (Russia)
- Marriot Grand Hotel - Moscow (Russia)
- Beverly Hilton Hotel - Beverly Hills (USA)
- Hotel Danieli - Venice (Italy)
- Palais de la Mediterranee - Nice (France)
- Dorchester Hotel - London (Great Britain)

Uffici / Offices

- Aeroflot Headquarters - Moscow (Russia)
- Siemens - Budapest (Hungary)
- World Trade Center - Brussels (Belgium)
- American Express - Burgess Hill (Great Britain)
- Canary Wharf, 50 Bank Street - London (Great Britain)
- Coeur Défense - Paris (France)
- Daily Express - London (Great Britain)
- Isozaki Towers - Bilbao (Spain)

Retail / Retail

- Mercedes Dealer Center - Kazan (Russia)
- Yas Mall - Abu Dhabi (United Arab Emirates)
- Primark - Reading (Great Britain)
- Porsche Center - Lugano (Switzerland)

Data center / Data centres

- Unitel - Luanda (Angola)
- Redhill Data Centre - Redhill (Great Britain)
- Infinity Slough 1 - Slough (Great Britain)
- BBC TV studios 1-3 - London (Great Britain)
- Monte Paschi di Siena - Siena (Italy)

Sport e leisure / Sport & leisure facilities

- Sochi Olympics Organizing Committee - Sochi (Russia)
- Twickenham Stadium - Twickenham (Great Britain)
- Richmond Golf Course - London (Great Britain)
- O2 Dome - London (Great Britain)
- Olympic Stadium - Rome (Italy)
- Wimbledon Centre Court - London (Great Britain)

Infrastrutture di trasporto Transportation infrastructures

- Oxford Circus Tube Station - London (Great Britain)
- Enfidha Airport - Enfidha (Tunisia)
- Cairo Metro Line 3 - Cairo (Egypt)
- Farnborough Aerospace - Farnborough (Great Britain)

Industriale / Industrial

- Colgate Palmolive - San Luis (Argentina)
- Johnson & Johnson - Buenos Aires (Argentina)
- Sinergium Biotech S.A. - Buenos Aires (Argentina)
- Heinz - St. Petersburg (Russia)
- Bosch - Samara (Russia)
- European Space Agency - Kourou (French Guiana)
- Bombardier Aerospace - Belfast (Northern Ireland)
- BorgWarner Poland Sp. z o.o. - Jasionka (Poland)

Cinema e teatri / Cinemas & theatres

- Novo Cinemas Dragon Mart - Dubai (United Arab Emirates)
- Bolshoi Theatre - Moscow (Russia)
- La Fenice - Venice (Italy)

Strutture sanitarie / Hospitals & healthcare

- Ospedale Maggiore - Milan (Italy)
- Groote Schuur Hospital - Cape Town (South Africa)
- Diana Princess of Wales Hospital - Grimsby (Great Britain)

Musei e spazi espositivi / Museums & exhibition centres

- Hermitage, staff building - St. Petersburg (Russia)
- Waterloo Memorial - Waterloo (Belgium)
- British Museum - London (Great Britain)
- Imperial War Museum - Manchester (Great Britain)
- Centre Pompidou - Metz (France)
- Guggenheim Collection - Venice (Italy)

Edifici pubblici e storici Public & historical buildings

- Presidential Residence - Minsk (Belarus)
- Russian Foreign Ministry - Ekaterinburg (Russia)
- Basilica of St. Francis, Crypt - Assisi (Italy)
- Senate Building - Tashkent (Uzbekistan)
- Palazzo Te - Mantua (Italy)
- Santa Maria delle Grazie Refectory - Milan (Italy)
- San Francisco Conservatory - San Francisco (USA)
- Ex City Hall - Moscow (Russia)

Scuole e università / Schools & universities

- Wuppertal University - Wuppertal (Germany)
- Skolkovo - Moscow (Russia)
- National School of Cinema - Rome (Italy)

Alimentare e enologia / Food, beverages & wine

- Nestlé - Santa Fe (Argentina)
- Cheval Blanc Winery - Saint Emilion (France)
- Château Smith Haut Lafitte Winery - Martillac (France)
- Feudo Principi Butera Winery - Caltanissetta (Italy)
- Ornellaia Winery - Castagneto Carducci (Italy)
- Pepsi Cola - St. John's (Canada)

The information provided in this document may not be used for installation, but is provided as an example. For technical information, refer exclusively to the installation and user manual.

The system diagrams in this diagram are basic diagrams. For proper system operation, it is necessary to provide all the necessary state of the art functional elements not supplied by AERMEC.

The technical specifications provided in this document are not binding. AERMEC S.p.A. reserves the right to make changes at any time deemed necessary for the improvement of the product.

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