

Sistema VMF
Scheda termostato espandibile per ventilconvettori Inverter
VMF system
Expandable thermostat board for Inverter fan coils
Système VMF
Platine thermostat extensible pour ventilo-convecteurs Inverter
VMF-System
Erweiterbare Thermostatplatine für Inverter-Gebläsekonvektoren
Sistema VMF
Tarjeta termostato expansible para fan coils Inverter

Variable Multi Flow

VMF

VMF-E18



Congratulations on your purchase of this “VMF-E18” Aermec kit containing an ELECTRONIC EXPANDABLE THERMOSTAT BOARD.

Made with top quality materials in strict compliance with safety regulations, “VMF-E18” will provide you with outstanding performance for a long time to come.

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WARNING: the VMF boards are designed to be applied to Inverter fan coils installed in indoor environments.

WARNING: Keep separate electrical connections from water connections. Water connections and drain should be on the side opposite of the electrical connections.

WARNING: the fan coil is connected to the power supply and water circuit. Operations performed by unqualified personnel can lead to personal injury to the operator or damage to the unit and surrounding objects.

WARNING: Components sensitive to static electricity may be destroyed by voltages notably lower than those at the human perception threshold. These voltages form when you touch a component or electric contact of a unit, without first discharging accumulated static electricity from your body. The damage caused to the unit by an overvoltage is not immediately evident - it only appears after a certain period of operation.

STATIC ELECTRICITY ACCUMULATION

Any person not connected in a conductive manner with the electronic potential of his surrounding environment can accumulate electrostatic charges.

STANDARD PROTECTION AGAINST ELECTROSTATIC CHARGES

Earthing quality

When working with units sensitive to electrostatic electricity, ensure that people, workplaces and unit casings are correctly earthed. This will prevent the formation of electrostatic charges.

Avoid direct contact

Only touch the element exposed to electrostatic risk when absolutely essential (e.g. for maintenance).

Touch the element without coming into contact with either the contact pins or the wire guides. If you follow this rule, the energy of the electrostatic charges cannot reach or damage the sensitive parts.

Before taking measurements on the unit, it is necessary to discharge

all electrostatic charges from your body: to do this, just touch an earthed metal object. Only use earthed measuring instruments.

POWER WITH A SINGLE-PHASE VOLTAGE OF 230V ONLY

Any other type of power supply could permanently damage the thermostat and fan coil.

MALFUNCTIONS

In case of malfunction, cut off power to the unit, then energise it again and restart the device. If the problem occurs again, call the local After-Sales Service immediately.

DO NOT TUG THE ELECTRIC CABLE

It is highly dangerous to pull, crush or tread on the electric cables, or to fix them with nails or drawing pins. A damaged power cable can cause short circuits and injure people.

PACKAGE

The thermostats are shipped in standard cardboard box packaging.

DESCRIPTION

VMF-E18

KIT containing an ELECTRONIC EXPANDABLE THERMOSTAT BOARD FOR INVERTER FAN COILS

The VMF-E18 accessory is an advanced electronic thermostat kit for use with Inverter fan coils. It requires an interface inside the fan coil (VMF-E2) or on the wall (VMF-E4).

The VMF-E18 kit consists of:

- An E18-type thermostat board inserted in a protective box and easily applied to the side of the fan coil.
 - System with connection cables to the Inverter Command Module. The cables are wired with connectors for quick connection.
- The E18-type thermostat board has a protective fuse, a dip-switch for configuration, and connectors for connection with:
- the power supply,
 - the earthing,
 - the valve control,
 - the Inverter command module power supply,
 - ambient air temperature sensor,
 - water temperature sensor,
 - auxiliary water temperature sensor,
 - the control panel (user interface),
 - presence sensor,
 - the external contact,
 - microswitch contact connected to the fan coil fin,

- the central supervisor system serial (VMF-E5),
- the fan coil network serial (TTL).

With the VMF-E18, you can manage:

- Three fan coil speeds in manual mode
- Continuous ventilation and thermostat control by controlling the valves
- Automatic fan mode with BRUSHLESS motor depending on the load
- Season display
- Display of alarms and ventilation request
- Up to two ON/OFF two or three-way valves
- Ignition of an electric resistor
- Germicidal lamp
- Plasmacluster filter
- A water temperature sensor, with minimum and maximum temperature and changeover functions.
- An additional water sensor (accessory) to control the second coil (4-pipe systems)
- Season change according to the water or air temperature (4-pipe systems).
- Input for "external contact". This is a digital input with the following logic: When open, the thermostat works normally; When closed, the fan coil is switched off.
- Microswitch for fin contact.
- Anti-freeze function.

- Presence sensor to enable the "sleep" function from an external contact (reduction of ambient setpoint by 2 or 5 degrees, depending on the settings, if a room is unoccupied)
- Input for supervision serial. In networks made up of several fan coils subdivided into independent temperature areas, the VMF-E18 area regulator allows communication with a central system supervisor (VMF-E5)
- Input for local serial. Communication with other thermostats, via a dedicated serial based on the TTL logic standards.

Description of the functions

• Operation in TTL network

The E18 thermostat is designed to communicate with other E18 and/or E1 and/or E0 thermostats via a dedicated serial based on the TTL logic standards. This serial communication is essential for the exchange of information within small fan coil networks (up to 6) with a maximum network length of 30 metres. It was designed, in fact, for small areas where the fan coils (more than one) need to be controlled from a single control point.

More specifically, this network always contains a Master (to which a user interface VMF-E2, VMF-E4 is connected) which controls the operation of the Slaves connected to it, according to the settings made on its user interface. You are advised to configure as the Master an Inverter fan coil with an E18-type electronic board (VMF-E18) or fan coils with E18 board as standard). **WARNING:** if the Master is an On-Off fan coil with an E1 (VMF-E1) or E0 (VMF-E0) type board, the Inverter Slave fan coil with the VMF-E18 board will lose the continuous control of the 20 steps in manual mode.

The fan coil acting as Slave (of an Inverter Master fan coil with VMF-E18 thermostat) must be fitted with an E18-type electronic board (VMF-E18), or (if On/Off) with an E1 (VMF-E1) / E0 (VMF-E0) type board.

All the fan coils of the TTL network must have the same type of configuration. Example: all standard, all with purifiers (Plasmacluster and/or germicidal lamps), or all with an additional coil (electric or with water).

On the basis of the settings received from the network and the ambient conditions detected by the probes, the electronic board on each single Slave fan coil acts (independently from the other fan coils) to switch the ventilation on and off in order to create the conditions requested by the user for that specific room.

• Cooling operation

Cooling operation requires a water circuit with chiller.

• Heating operation

Heating operation requires a water circuit with boiler, heat pump or solar system.

• Changeover (seasonal change)

The thermostat automatically selects the operating mode (Heating/Cooling), if that mode is permitted (water probe and settings).

- **Normal band:** Heating at 39°C; Cooling at 17°C.
- **Reduced band:** Heating at 35°C; Cooling at 22°C.
- **Dead band:** can be selected at 5°C or 2°C.

Water side changeover

- Water temperature checks

Enabling of water side ventilation (only active with water temperature probe). The thermostat identifies the ventilation enabling threshold in Heating mode (minimum controlled) and Cooling mode (maximum controlled); with the dip-switches it is possible to choose between two temperature bands.

Air side changeover

If the actual ambient temperature is lower than the set point by a value equal to the Dead Band, there is an automatic swap to Heating operation. If the actual ambient temperature is higher than the set point by a value

equal to the dead band, there is an automatic swap to Cooling operation. In the fan coil networks, the values of the dead band are only those configured on the Master fan coil

- **Pause due to power failure**

After a power failure, the unit restarts with the settings that were active prior to the pause.

- **Delayed start-up**

The unit can begin ventilation some time after start-up - usually up to 2'40" (pre-heating function).

The delay is zero-set in units with an electric heater.

- **Anti-freeze protection**

Controls on OFF position. The fan coil can restart in heating mode (set point 12°C) if the ambient temperature falls below 7°C and the temperature of the water in the system is suitable.

In the fan coil networks, the Slave fan coils can activate the anti-freeze protection regardless of the settings on the Master fan coil.

If the anti-freeze protection is active on the Master fan coil, all the other Slave fan coils will also adopt a set point of 12°C, regardless of their ambient conditions.

- **Ambient temperature probe**

If the ambient temperature probe on the Slave fan coils is faulty, the temperature will be measured by the probe of the Master.

- **Ambient probe correction**

To obtain a better ambient temperature adjustment, the thermostat applies special algorithms to correct the ambient probe installed on the fan coil; the probe is in contact with the housing, and is therefore influenced by it.

The dynamic correction is a correction algorithm of the ambient probe which takes into account the particular operation status of the fan coil in any one moment. More precisely, there are two possible cases of dynamic correction:

- **Dynamic correction A:** in the case of systems without a valve (or with a downstream probe), the correction depends on the water and ambient temperatures.

- **Dynamic correction B:** in the case of systems with a valve and an upstream probe, the correction depends on the Valve and on the Water and Ambient temperatures. Unlike the previous correction, this one uses different time constants to calculate the appropriate correction (because the housing is influenced in a different way).

- **Water probe**

There is a water temperature probe in the heat exchanger of the unit.

The Slave fan coil can work without the water probe: if it is absent or faulty, the temperature will be measured by

the Master probe alone. In this case, ventilation is always enabled on the Slave fan coil.

The water temperature probe can be positioned **downstream** or **upstream** from the shutoff valve, so also the dip-switches on the board must be set. The difference lies in the management of the ventilation of the fan coils with valve.

Setting the dip-switch as a **downstream probe** of the valve, ventilation start-up (changeover) is dependent on the temperature of the air in the room.

Setting the dip-switch as an **upstream probe** of the valve, ventilation start-up is dependent on the temperature of the water in the system. With this setting, the pre-heating function is activated, and there is a ventilation start-up delay of between 0" and 2'40".

To position the bulb on the delivery pipe upstream of the valve, the standard water probe must be replaced with the VMF-SW probe accessory.

- **Ventilation**

3-speed ventilation can be controlled both manually and automatically.

- **Manual**, with the selector in position V1, V2 and V3. The fan is used with ON-OFF cycles at the selected speed. With the VMF-E4 panel, you can select one of the 20 speed steps between 0 and 20 (maximum speed).

- **Automatic**, with the selector on AUTO. The fan speed is managed by the thermostat, on the basis of the ambient conditions and the fan coil configuration.

Thermostat settings:

- **Ventilation management**

Ventilation settings:

- **Continuous ventilation.** Ventilation is always active. The temperature is controlled by intercepting the flow of water to the fan coil. This function requires the presence of a water valve (accessory), and cannot be activated simultaneously with the "modulated output thermostat" option.

- **Thermostat-controlled ventilation.** Ventilation switches off when the set temperature is reached (set point).

- **Valve adjustment logics**

With the **Thermostat-controlled ventilation** or **Modulated output thermostat** setting, the valve is managed with the following logics:

- **Heating** - the valve is managed to exploit the stack effect of the fan coil, and to provide heat even with the fan switched off. These settings also reduce the number of valve openings and closings; with hot water circulating in the fan coil, a request from the thermostat will produce ventilation immediately.

- **Cooling** - to make the best use of the unit's cooling capacity and perform a more accurate check on the ambient temperature, the valve opening does not coincide with ventilation.

- **External contact**

The board offers the possibility of a connection with an external contact. With a closed external contact, the unit is configured as in the thermostat OFF position (except when the thermostat is in the Anti-freeze Protection position or when the ambient probe is absent or faulty). This contact can be used to manage inputs such as a remote ON-OFF controlled, a presence sensor, a window contact, a faulty circulation pump signal, etc.

In fan coil networks, only the external contact of the Master fan coil is enabled. If the master input is closed, all the slave fan coils of the network are switched off.

- **Microswitch contact**

The board offers the possibility of a connection with the Microswitch contact located on the delivery fins. With the fins closed, the fan coil is 100% OFF.

In fan coil networks, when the fin of the Master fan coil is closed, ventilation stops but the electronic thermostat board and the other fan coils in the network carry on working.

- **"Sleep" energy saving function**

Presence sensor to enable the "Sleep" function from an external contact (SP). The Sleep energy saving function involves varying the ambient set-point by 2 or 5 degrees (depending on the settings) when there are no people in the room.

In heating mode, the set point temperature is lowered.

In cooling mode, the set point temperature is raised.

To activate the Sleep function for energy savings, you must connect a presence sensor (with NO logic) to the SP contact.

The function is not active in Anti-freeze protection mode, or if the ambient probe is faulty.

In fan coil networks, only the presence sensor contact of the Master fan coil is enabled. The setting of the Master is sent to all the Slave fan coils in the network.

- **Emergency operation**

In the event of a faulty ambient probe, the electronic board can automatically detect the problem and enable an emergency program to avoid any inconvenience for the user, who is immediately informed of the fault (LED indicator lights).

- **Behaviour with a faulty water temperature probe**

Ventilation is always active.

The season change is made on the basis of the difference between the setting made and the actual ambient temperature.

If the actual ambient temperature exceeds

the Heating set point by a value equal to the dead band, there is an automatic swap to Cooling operation.

If the actual ambient temperature falls below the Cooling set point by a value equal to the dead band, there is an automatic swap to Heating operation. Heater switch-on and switch-off depends solely on the thermostat operation request.

In this case, a fixed correction of the ambient probe is envisaged, and is determined on the basis of the type of thermostat configured.

- **Behaviour with a faulty ambient temperature probe**

- **2-pipe system:**

With the selector in the OFF/Aux position, ventilation switched off and the valve is closed.

With the selector in the AUTO, V1, V2, V3 position, the Heating mode is fixed and the valve is always open. The ventilation makes on-off cycles of variable duration depending on the position of the temperature selector.

- **4-pipe system:**

With the selector in the OFF/Aux position, ventilation switched off and the valve is closed

With the selector in the AUTO, V1, V2, V3 position, the Heating/Cooling mode is decided on the basis of the position of the temperature selector, activating the respective valve. The ventilation makes on-off cycles of variable duration depending on the position of the temperature selector.

- **Behaviour with a faulty ambient temperature probe on a Slave fan coil**

The board automatically assumes the reading of the ambient probe of the Master fan coil.

- **Heating mode with electric heater (if present)**

The electric heater must be enabled by configuring the dip-switches on the thermostat again. Activate the heater-operated heating by positioning the control panel selector on AUX.

Standard operation is of the ON-OFF type.

The electric heater intervenes when there is a thermostat operation request and the water temperature is sufficiently low.

It should be noted that when the thermostat starts up, the heater is OFF, so it will only be activated if the water temperature is below the enabling threshold (35°C with normal band and 31°C with reduced band).

In any case, the activation of the electric heater involves a similar ventilation management to that in Automatic mode. If the fan coil is operated with continuous ventilation, then the electric heater will switch off when the set point is reached. Following the post-ventilation phase (described below), ventilation continues at speed Vmin (Vmin can be selected using Dip.8).

Electric heater operation involves pre-ventilation and post-ventilation phases in relation to its activation and deactivation.

It should be noted that the pre-ventilation phase (20" at Vmin) always corresponds to the activation of the electric heater, while the post-ventilation phase always corresponds to the deactivation of the electric heater (60" at Vmin).

Example: the thermostat requests fan operation with the heater activated (i.e. the water temperature is sufficiently low), so we will have 20" of ventilation at speed Vmin (pre-ventilation) after

which the thermostat will operate at the ventilation speed determined by the microprocessor on the basis of the difference between the actual ambient temperature and the set temperature. Once the set temperature has been reached, if the heater is still active (i.e. the water temperature is sufficiently low), we will have post-ventilation for 1 min at speed Vmin.

It should be noted that when the heater is switched off during operation because the water temperature is sufficiently high, then after reaching the set temperature, ventilation continues at speed Vmin for the remaining time needed to terminate the post-ventilation cycle.

Finally, please note that the heater is never enabled if the thermostat is in anti-freeze or emergency mode, due to the ambient probe.

- **Operation with purifying devices (if present)**

If purifying devices are installed (Plasmacluster or bactericidal lamp), they must be enabled by configuring the dip-switches on the thermostat again.

With the selector on "Aux", the ambient is purified regardless of the thermostat operation requests.

Unlike the electric heater however, this type of accessory is even activated if the operation speed selector is not positioned on "Aux".

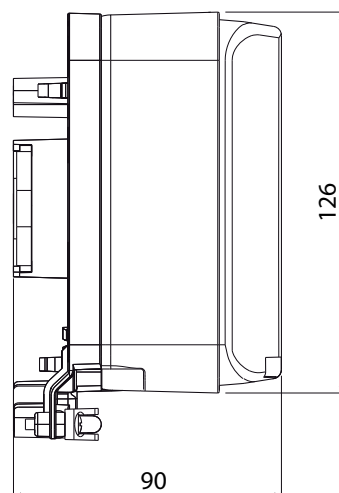
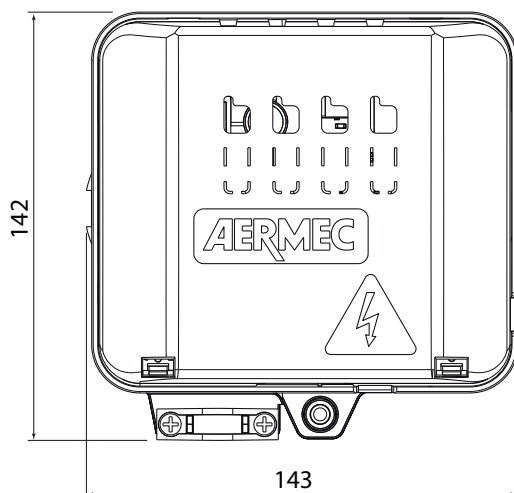
On "Aux", the fan will always operate at minimum speed, closing any shutoff element whose use is recommended with this function and thereby avoiding any ambient alterations (overheating / under-cooling).

Adjusting a 2-pipe system				
	Upstream water probe		Downstream water probe	
	Water probe fitted	Water probe not fitted	Water probe fitted	Water probe not fitted
With Valve	Water side changeover	Air side changeover	Air side changeover	Air side changeover
	Pre-heating delay	Pre-heating delay	No ventilation delay	Pre-heating delay
	Minimum and maximum controls active	No minimum and maximum control	Minimum and maximum controls active	No minimum and maximum control
	Dynamic correction A:	Fixed correction	Dynamic correction B:	Fixed correction
Without valve	Configuration not used		Water side changeover	Air side changeover
			No ventilation delay	No ventilation delay
			Minimum and maximum controls active	No minimum and maximum control
			Dynamic correction B:	Fixed correction

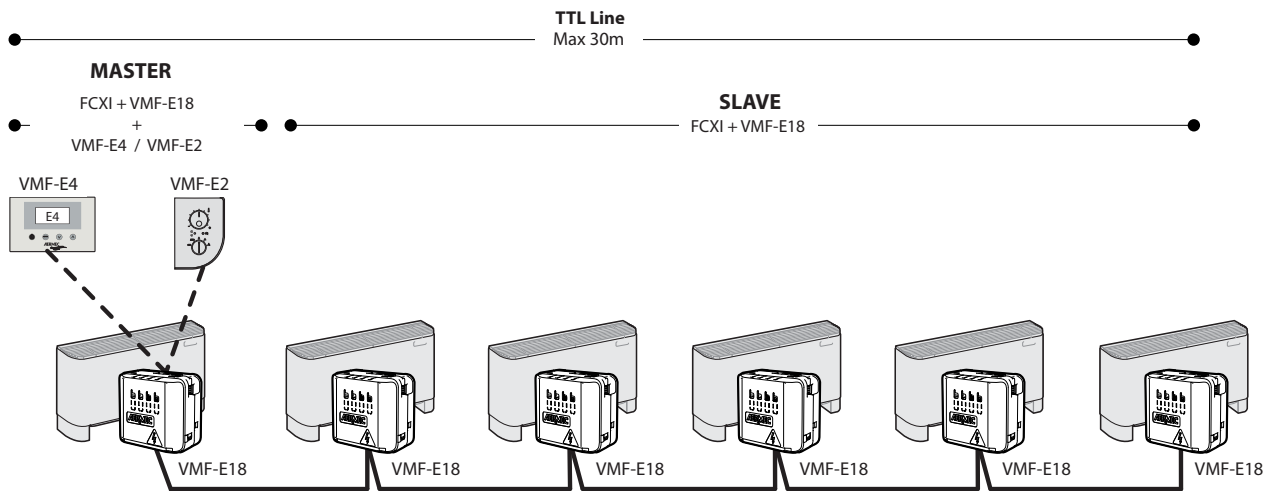
Adjusting a 4-pipe system				
	Upstream water probe (Heating)		Downstream water probe (Heating)	
	Water probe (Heating) fitted	Water probe (Heating) not fitted	Water probe (Heating) fitted	Water probe (Heating) not fitted
With Valve	Delay for pre-heating	Delay for pre-heating	No ventilation delay	Delay for pre-heating
	Minimum temperature check activated (Heating)	Minimum temperature check deactivated (Heating)	Minimum temperature check activated (Heating)	Minimum temperature check deactivated (Heating)
	Maximum check activated if probe is present (Cooling)	Maximum check activated if probe is present (Cooling)	Maximum check activated if probe is present (Cooling)	Maximum check activated if probe is present (Cooling)
	Dynamic correction A: / Fixed correction in Cooling, in absence of Cooling probe	Fixed correction	Dynamic correction B: / Fixed correction in Cooling, in absence of Cooling probe	Fixed correction
Without valve	Configuration not used		No ventilation delay	No ventilation delay
			Minimum temperature check activated (Heating)	Minimum temperature check activated (Heating)
			Maximum check activated if probe is present (Cooling)	Maximum check activated if probe is present (Cooling)
			Dynamic correction B: / Fixed correction in Cooling, in absence of Cooling probe	Fixed correction

WARNING: for the correct operation of the thermostat in systems with centralised control (e.g. VMF-E5), it is necessary to:

- Set Dip1=ON and Dip2=OFF.
- Install the water probe on the coil (even in the presence of a valve). With this setting, the thermostat operates as for the "Downstream hot water probe" configuration.



NETWORK SETTINGS



TTL NETWORK

- Consisting of up to 6 fan coils (one Master and 5 Slaves)
- Maximum TTL line length 30m.

The master fan coils are equipped with a control panel and an electronic board with microprocessor which has outputs in order to be inserted in a TTL network.

The Slave fan coils are equipped with an electronic board with microprocessor (VMF-E18, VMF-E1 or VMF-E0 accessory) which has outputs in order to be inserted in a TTL network.

All the fan coils of the TTL network must have the same type of accessory.

The settings (or set points) of the panel on the main fan coil (Master) are received by the other fan coils (Slaves).

The units connected to the TTL network are automatically recognised (they require no configuration procedure).

ELECTRICAL WIRINGS

Instructions which are essential for the proper installation of the equipment are given here.

The installer's experience will be necessary however, to perfect all the operations in accordance with the specific requirements.

Before beginning the installation, carefully read the information below:

- **WARNING:** check that the power supply is disconnected before carrying out any procedures on the unit.
- **WARNING:** before carrying out any work, put the proper individual protection equipment on.
- **WARNING:** the device must be installed in compliance with national plant engineering rules.
- **WARNING:** the electrical wirings and the installation of the units and their accessories must only be carried out by people possessing the technical/professional skills for system installation, transformation, extension and maintenance, and who are able to check these aspects in terms of safety and good working.

In particular, the electrical wirings require checks relating to:

- Measurement of the electrical system insulation strength.
- Continuity of the protection wires.
- **WARNING:** Install a device, main switch, or electric plug so you can fully disconnect the device from the power supply.
- **WARNING:** the unit is connected to the electrical mains. Any intervention

by unqualified and untrained personnel could cause injury to the worker and damage to the equipment and surrounding environment.

- Check the mains voltage complies with the one requested for the device to be installed.
- The electrical wiring measurements must be carried out according to the regulations in force, taking into account the system load.
- For the power supply, use undamaged cables with a section suitable for the load. You are advised to make the connections using a single cable for each one. Do not make connections on the power supply cable: use a longer cable. Junctions can cause overheating and/or fires.
- Only use the appropriate tools for the electrical wirings.
- Make an earth connection for the indoor unit.
- Use twisted cables for the connections to the wired panel.
- Follow the wiring diagrams supplied with the device and shown in this documentation when making the connections.
- The wiring diagrams are subject to continuous updates, so it is essential to use those on the machine as your reference.
- Do not attempt to repair the unit yourself. An incorrect intervention can cause electric shocks and/or fires, so you are advised to contact your local After Sales Service. For any installation

or technical intervention, please contact your local After Sales Service.

- All the cables must be piped or ducted until they are inside the fan coil. The cables leaving the pipe or raceway must be positioned in such a way that there are not traction or twisting stresses and they are anyway protected from outside agents.
- Stranded cables can only be used with cable terminals. Check the cable strands are well inserted.
- In installations with a 3-way valve, the minimum water temperature probe must be relocated from its standard housing in the coil, to the delivery pipe upstream from the valve. When relocating the water probe, the standard sensor must be replaced with an accessory VMF-SW sensor, fitted with a cable of suitable length.
- The connections must be made to the connectors on the electronic board.
- The electronic board is protected with a plastic box and a cover that can easily be removed with the help of a tool.
- **Warning:** the diagram showing the connections of the electronic board to the control board is printed inside its box cover.
- Make an earth connection for the indoor unit.

BOARD INSTALLATION AND CONNECTIONS

- The VMF-E18 Kit includes the system with connection cables to the Inverter Control Module. The cables are wired with connectors for quick connection.

The installation of the VMF-E18 kit requires that standard control board and connection cables to the Inverter Control Module (Signal and Supply) are removed from the fan coil.

- Mount the thermostat housing to the side of the fan coil units, on the connections that were of the control board.
- Remove the cover of the thermostat housing.

- Connect the inverter control module VMF-E18 to the thermostat using the system with connection cables supplied with the VMF-E18 kit. Check the connection with the wiring diagram.

- WARNING:** make an earth connection for the thermostat board.

DANGER: it is compulsory to tighten the screw on the side of the fan coil, as this is what allows the earth connection of the entire system.

- Connect the power supply cables. Warning: respect the L and N polarities.

- Connect the electric cables of the air temperature sensor (SA).

- Connect the electric cables of the water temperature sensor (SW).

- Connect the electric cables of the secondary water temperature sensor (SW1), in 4-pipe hydronic systems.

- Connect the cables for the external contact (if envisaged).

- Connect the cables for the presence sensor (if envisaged).

- Connect the cables for the microswitch (if envisaged).

- Connect the mains and RS485 power supply cables (if connected to the mains). **DANGER: must be connected to the earth.**

- Connect the TTL mains cables (if connected to the mains).

- Connect the cables of the control panel (if envisaged).

- Check that all the connections and relative cables are well fixed.

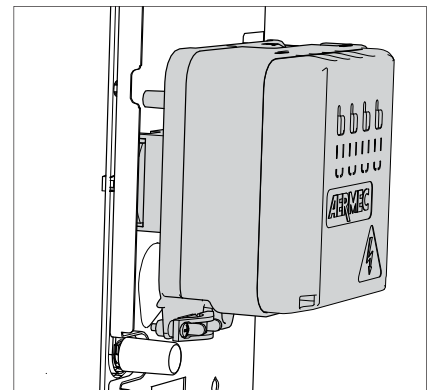
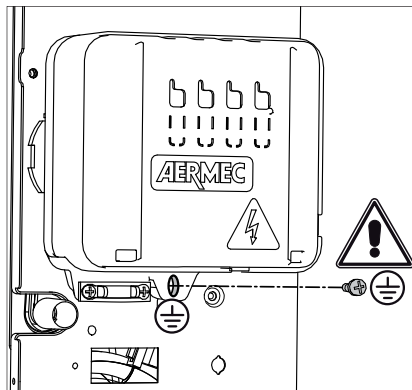
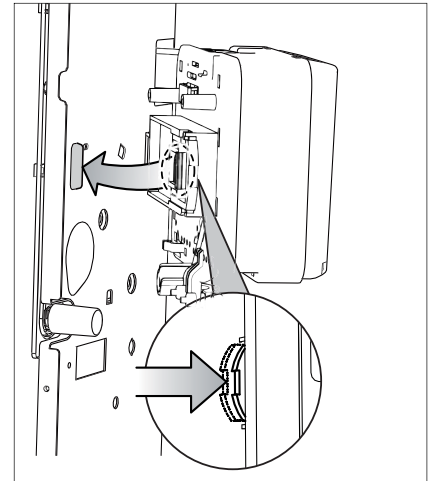
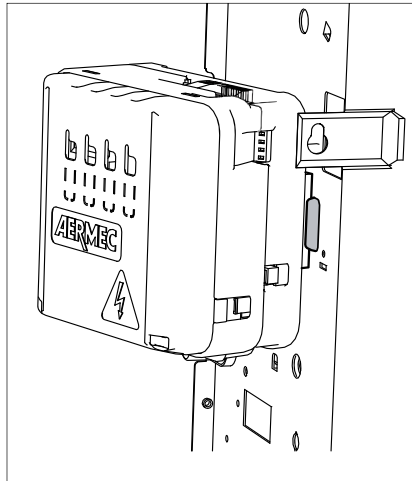
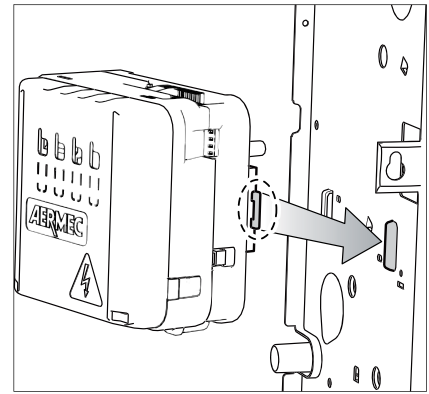
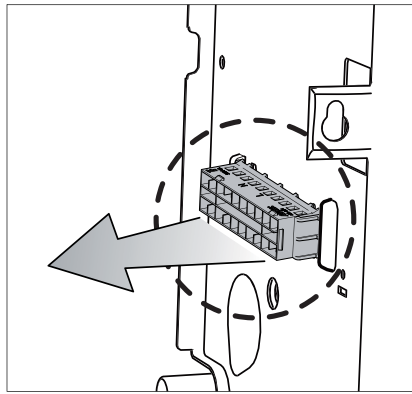
- Arrange the cables so there is no risk of them being cut, crushed, jerked, scraped, or generally damaged.

- Check that the board fuse is undamaged and possesses the necessary features.

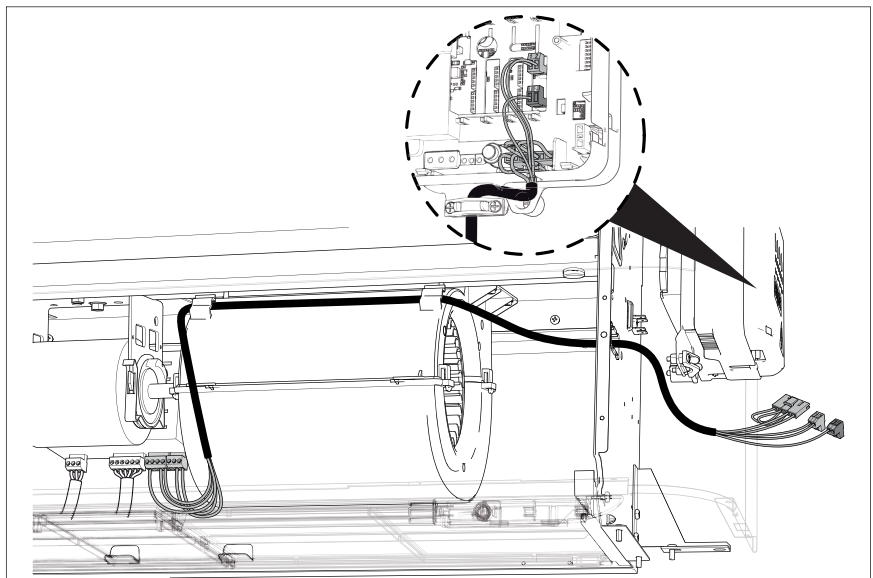
- Close the housing with the cover.

- Fix the power supply cables and valve cables using the cable clamp.

WARNING: Keep separate electrical connections from water connections. Water connections and drain should be on the side opposite of the electrical connections.



DANGER: it is compulsory to tighten the screw on the side of the fan coil, as this is what allows the earth connection of the entire system.



ELECTRONIC BOARD CONNECTIONS

Connections key:

L - N = Power supply

- 230V AC - 50Hz
- Screw clamps
- Minimum cable section = 0.5mm²
- Maximum cable section = 2.0mm²

= EARTH connection

- Screw clamp
- Minimum cable section = 0.5mm²
- Maximum cable section = 2.0mm²

Y1 = VC/VF control

- Screw clamps
- Minimum cable section = 0.5mm²
- Maximum cable section = 1.3mm²
- Maximum cable length = 30m

Y2 = Accessory control

- Screw clamps
- Minimum cable section = 0.5mm²
- Maximum cable section = 1.3mm²
- Maximum cable length = 30m

N = Neutral

- Faston-type connector
- Minimum cable section = 0.5mm²

FUSE = Protection fuse

- Delayed 4A fuse

V3 - V2 - V1 = Inverter module power supply

- Faston-type connector
- Dedicated link

CN24 = 0-10V Inverter command

- Dedicated link

CN26 = Inverter fault reverse

- Dedicated link

SA = Air probe

- Analogue input
- Removable-type connector
- Maximum cable length = 3m

SW = Water probe (2 pipes / 4 pipes on heating exchanger)

- Analogue input
- Faston-type connector
- Maximum cable length = 3m

SW1 = Water probe (4 pipes on cooling exchanger)

- Analogue input
- Removable-type connector
- Maximum cable length = 3m

SP = Presence sensor

- Digital input
- Screw clamps
- Minimum cable section = 0.2mm²
- Maximum cable section = 1.0mm²
- Maximum cable length = 30m

CE = External contact

- Digital input
- Screw clamps
- Minimum cable section = 0.2mm²
- Maximum cable section = 1.0mm²
- Maximum cable length = 100m

MS = Microswitch

- Sliding contact
- Maximum cable length = 3m

RS485 / E5 = Supervision serial + Power supply VMF-E5 (5 Poles)

- Removable-type connector
- Shielded cable size AWG22-5 (0,34 mm² - 5 poles + shield)
- Maximum cable length for the complete network = 30 m

RS485 = Supervision serial

- Removable-type connector
- Shielded cable size AWG22-3 (0,34 mm² - 3 poles + shield)
- Maximum cable length for the complete network = 1000m

E5 = VMF-E5 power supply

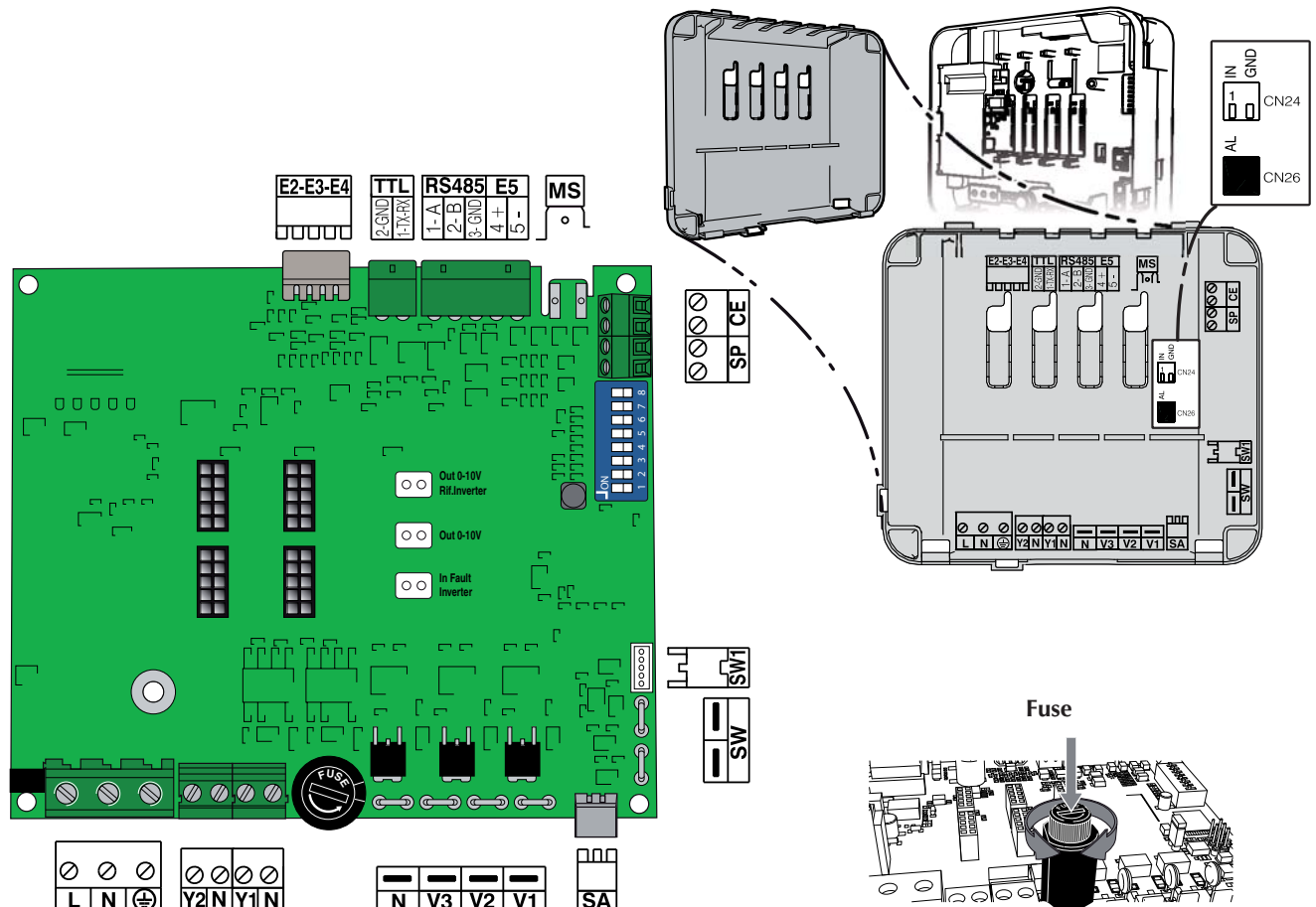
- Removable-type connector
- Shielded cable size AWG22-2 (0,34 mm² - 2 poles + shield)
- Maximum cable length = 30m

TTL = Local serial

- Removable-type connector
- Shielded cable size AWG22-3 (0,34 mm² - 3 poles + shield)
- Total maximum cable length = 30m (see the diagram showing the connections between the units)

E2-E3-E4 = Connection to the control panel

- Dedicated connector
- Shielded Twisted Pair cable (Data transmission cable), size AWG 22-24 (0.33 - 0.20 mm² - 4 poles + shield)



DIP-SWITCH SETTINGS

Turn off the power to the unit. This operation should be carried out in the installation phase, by suitably trained and qualified personnel only.
The dip-switches are on the electronic board.

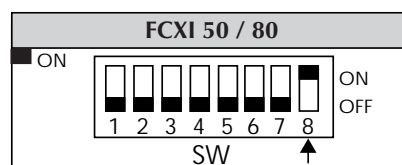
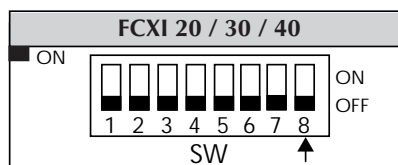
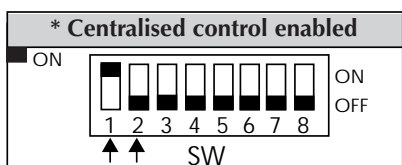
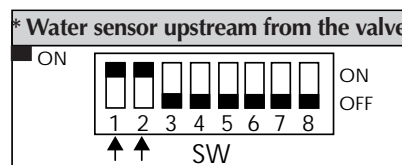
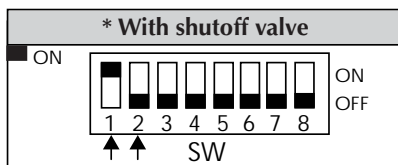
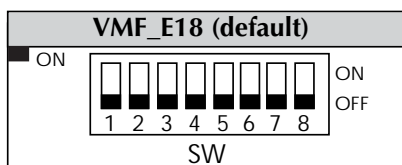
****Warning:** if the thermostats are inserted in systems with Centralised Control or Supervisor (e.g. VMF-E5), it is necessary to set: Dip1=ON and Dip2=OFF. The setting takes priority over the presence of the valve and the position of the sensor.

They can be used to obtain the following functions:

Position	Functions
Dip 1 (Default OFF)	Check water valve / * Thermostat in centralised network(See table):
OFF	No shut-off valve
ON	Shutoff valve present / **Thermostat in centralised network:
Dip 2 (Default OFF)	Position water temperature sensor / * Thermostat in centralised network (See table):
OFF	Water temperature sensor downstream from shutoff valve / *Thermostat in centralised network
ON	Water temperature sensor upstream from shutoff valve
Dip 3 (Default OFF)	Ventilation control:
OFF	Thermostat-controlled ventilation
ON	Continuous ventilation
Dip 4 (Default OFF)	Ventilation enabling:
OFF	Enabling normal band
ON	Enabling reduced band
Dip 5 (Default OFF)	** System type selection (See table)
OFF	Combinations between Dip 5 and Dip 6
ON	
Dip 6 (Default OFF)	** System type selection (See table)
OFF	Combinations between Dip 5 and Dip 6
ON	
Dip 7 (Default OFF)	Dead band:
OFF	Dead band 5°C
ON	Dead band 2°C
Dip 8 (Default OFF)	Special settings for FCXI:
OFF	FCXI 20 / 30 / 40
ON	FCXI 50 / 80

Functions dependent on the combination of 2 Dip		
Dip 1	Dip 2	*Centralised control
ON	OFF	Centralised control enabled
Dip 6	Dip 5	**Type of system
OFF	OFF	Two-pipe system - Two-pipe system with electric heater
OFF	ON	four-pipe system
ON	OFF	Two-pipe system with Plasmacluster / Bactericide lamp
ON	ON	Two-pipe system with bactericide lamp always on

SOME EXAMPLES:



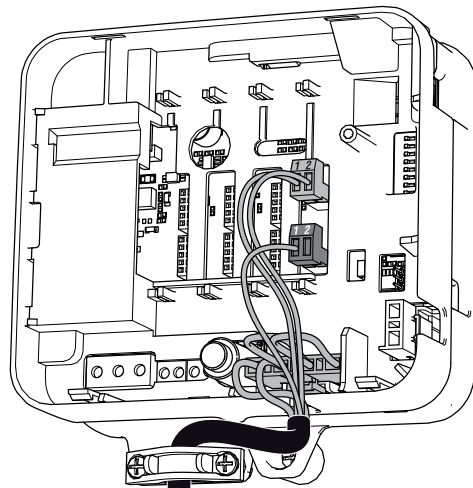
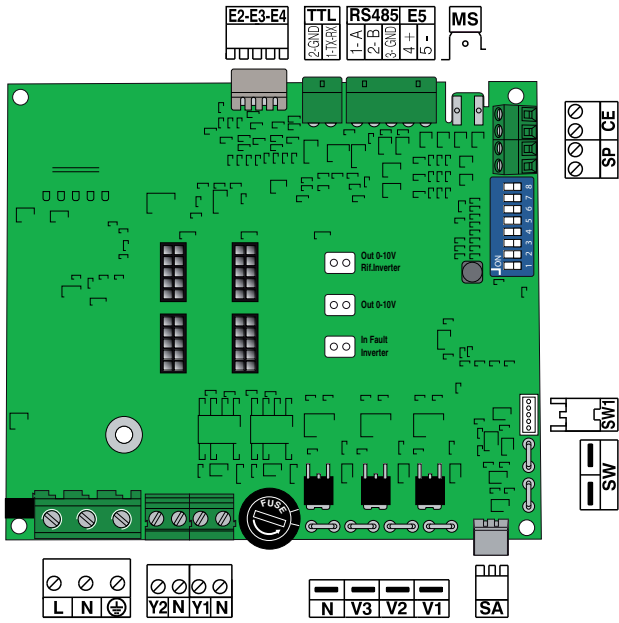
E18 TECHNICAL CHARACTERISTICS	
Power supply	230V AC +/-10%, 50-60 Hz
Max input power (excluding loads controlled by TRIACs)	4.5VA
Digital inputs	4 free contacts
Analogue inputs	3 for reading NTC 10K probes
Analogue outlets	2 (0-10V) for Inverter reference and valve control
Digital outputs	2, 230V AC with Triac
Assembly	On the machine
Protection rating	IP20 (referring to the containment plastic)
Storage conditions	-20T80°C, humidity 80% non-condensing
Operating conditions	0T50°C, humidity 80% non-condensing
Software class	Class A

SPECIAL CONNECTIONS FOR E18	
Power supply	Screw terminals, 5mm pitch
	Cable section - min=0.5mm ² max=2.0mm ²
Accessory command outputs (Valves, Plasmacluster, germicidal lamp, etc.)	Screw terminals, 5mm pitch
	Cable section - min=0.5mm ² max=1.3mm ²
	Maximum cable length = 30m
EC digital input	Screw terminals, 3.81mm pitch
	Cable section - min=0.2mm ² max=1.0mm ²
	Maximum cable length = 100m
MS digital input	Sliding contact
	Maximum cable length = 3m
SP digital input	Screw terminals, 3.81mm pitch
	Cable section - min=0.2mm ² max=1.0mm ²
	Maximum cable length = 100m
Analogue inputs (SA-SW)	Quick plug-in connections
	Maximum cable length = 3m
Analogue input (SC)	Quick plug-in connection
	Maximum cable length = 30m
TTL local serial	Screw terminals, 3.81mm pitch
	Cable section - min=0.2mm ² max=1.0mm ²
	Maximum cable length = 30m
RS485 supervision serial	Screw terminals, 3.81mm pitch
	Cable section - min=0.2mm ² max=1.0mm ²
	Maximum cable length = 1000m
Output power supply 12V DC	Screw terminals, 3.81mm pitch
	Cable section - min=0.2mm ² max=1.0mm ²
	Maximum cable length = 30m
Reference 0-10V for Inverter	2-pole screw terminal, 3.81mm pitch
Outputs 01-10V	2-pole screw terminal, 3.81mm pitch
Inverter fault input	2-pole screw terminal, 3.81mm pitch

COMPLIANCE WITH EC MARK

The following directives are used for reference:

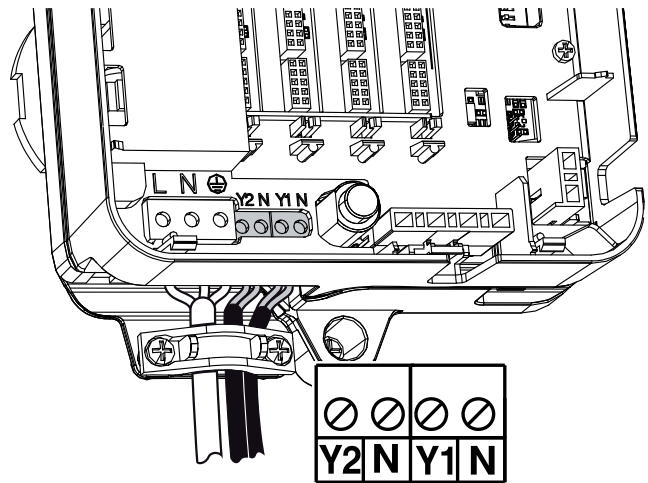
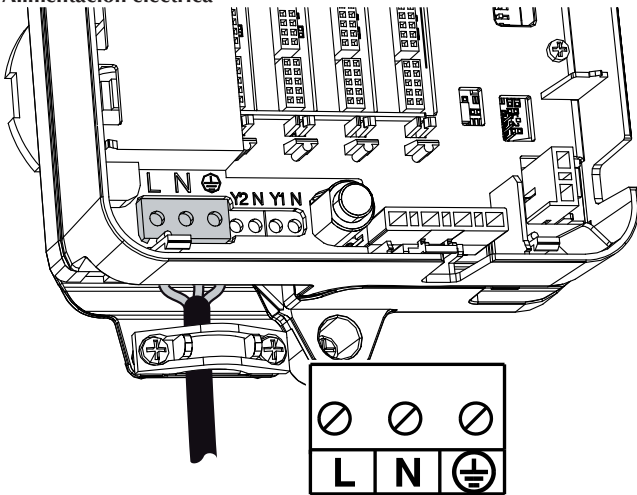
- Low Voltage Directive 2006/95/EC
- Electromagnetic Compatibility Directive 2004/108/EC.



Alimentazione modulo Inverter
 Inverter module power supply
 Alimentation du module Inverter
 Stromversorgung Inverter-Steuermodule
 Alimentación módulo Inverter

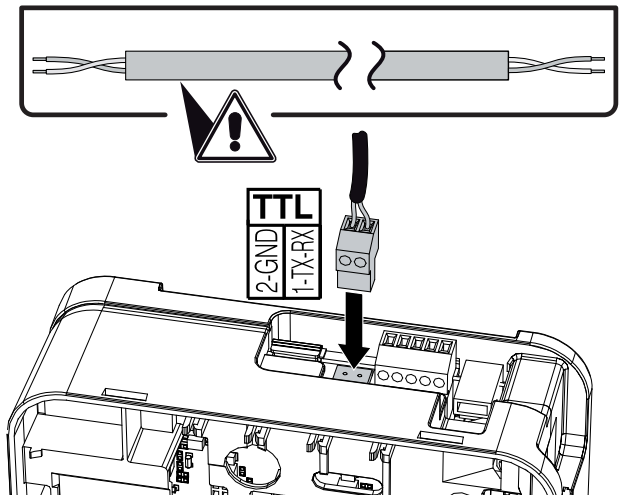
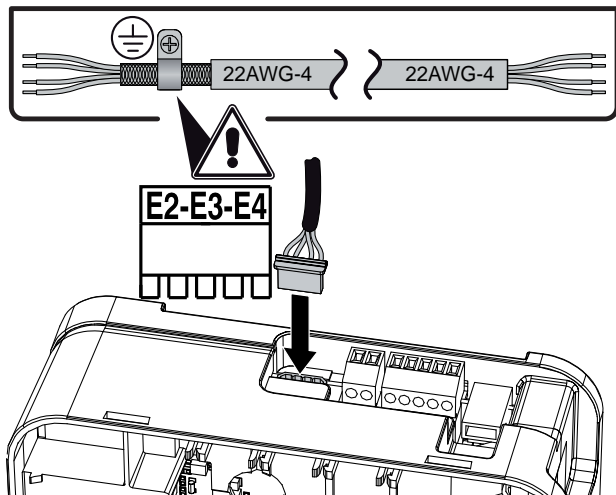
Alimentazione elettrica
 Power supply
 Alimentation électrique
 Stromversorgung
 Alimentación eléctrica

Y1 Comando valvola VC/VF + Y2 Comando accessorio
 Y1 VC/VF control + Y2 Accessory control
 Y1 Commande VC/VF + Y2 Commande accessoire
 Y1 Steuerung VC/VF + Y2 Steuerung des Zubehörteils
 Y1 Mando VC/VF + Y2 Mando Mando accessorio



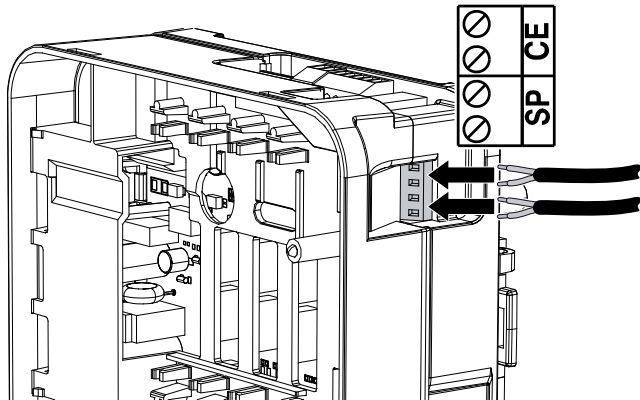
Collegamento al pannello comandi
 Connection to the control panel
 Raccordement au panneau de commande
 Anschluss an die Bedientafel
 Conexión al tablero de mandos

TTL Seriale locale
 TTL Local serial
 TTL Liaison série locale
 TTL Lokale serielle Schnittstelle
 TTL Serial Local

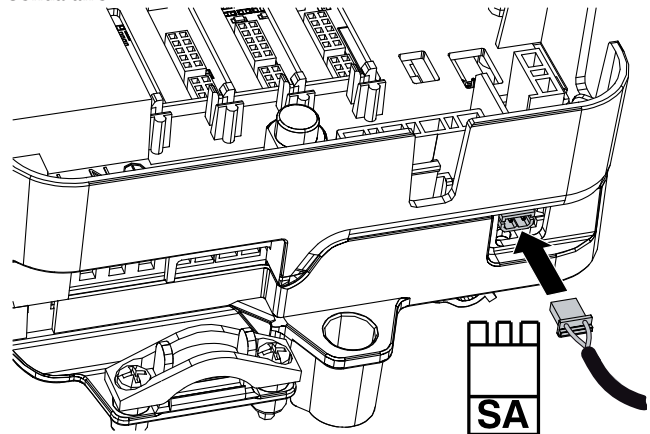


COLLEGAMENTI • CONNECTIONS • RACCORDEMENTS • ANSCHLÜSSE • CONEXIONES

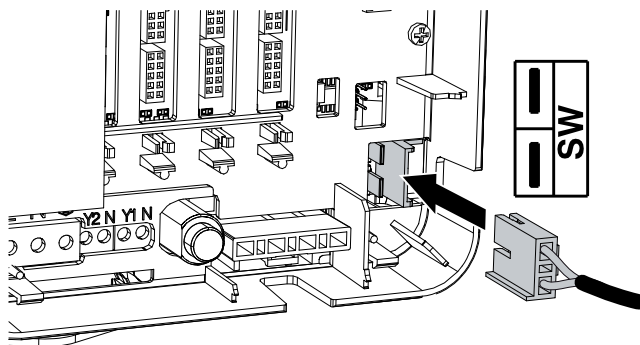
SP Sensore presenza + CE Contatto esterno
 SP Presence sensor + CE External contact
 SP Capteur de présence + CE Contact extérieur
 SP Anwesenheitssensor + CE Außenkontakt
 SP Sensor de presencia + CE Contacto externo



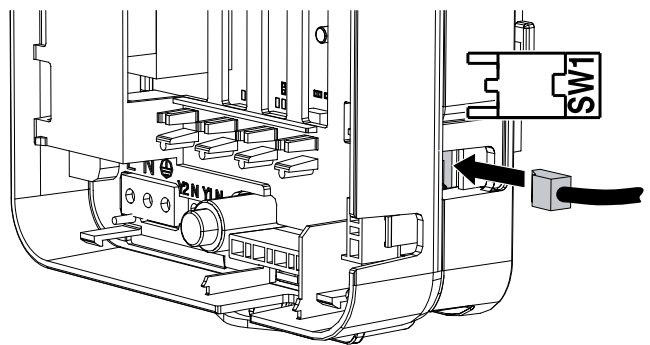
Sonda temperatura aria
 Air probe
 Sonde d'air
 Lufttemperaturfühler
 Sonda aire



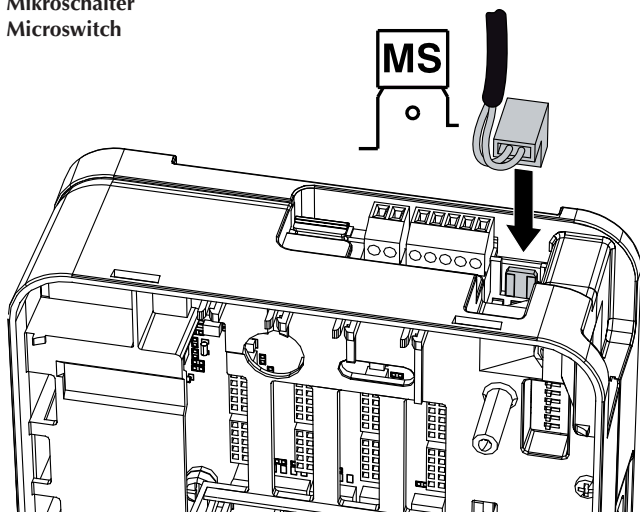
Sonda acqua su scambiatore riscaldamento
 Water probe on heating exchanger
 Sonde d'eau sur échangeur de chauffage
 Wassertemperaturfühler auf Wärmetauscher für Heizbetrieb
 Sonda de agua en intercambiador de calentamiento



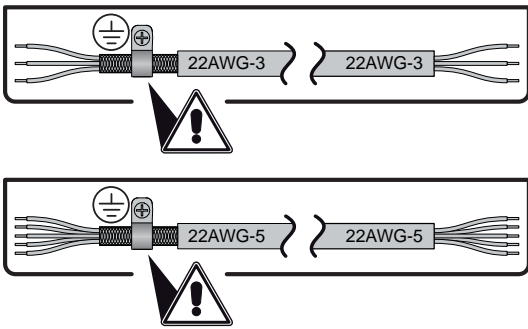
Sonda acqua su scambiatore raffreddamento (4tubi)
 Water probe on cooling exchanger (4 pipes)
 Sonde d'eau sur échangeur de refroidissement 4 tubes
 Wassertemperaturfühler auf Wärmetauscher für Kühlbetrieb
 Sonda de agua en intercambiador de enfriamiento



Microswitch
 Microswitch
 Microrupteur
 Mikroschalter
 Microswitch

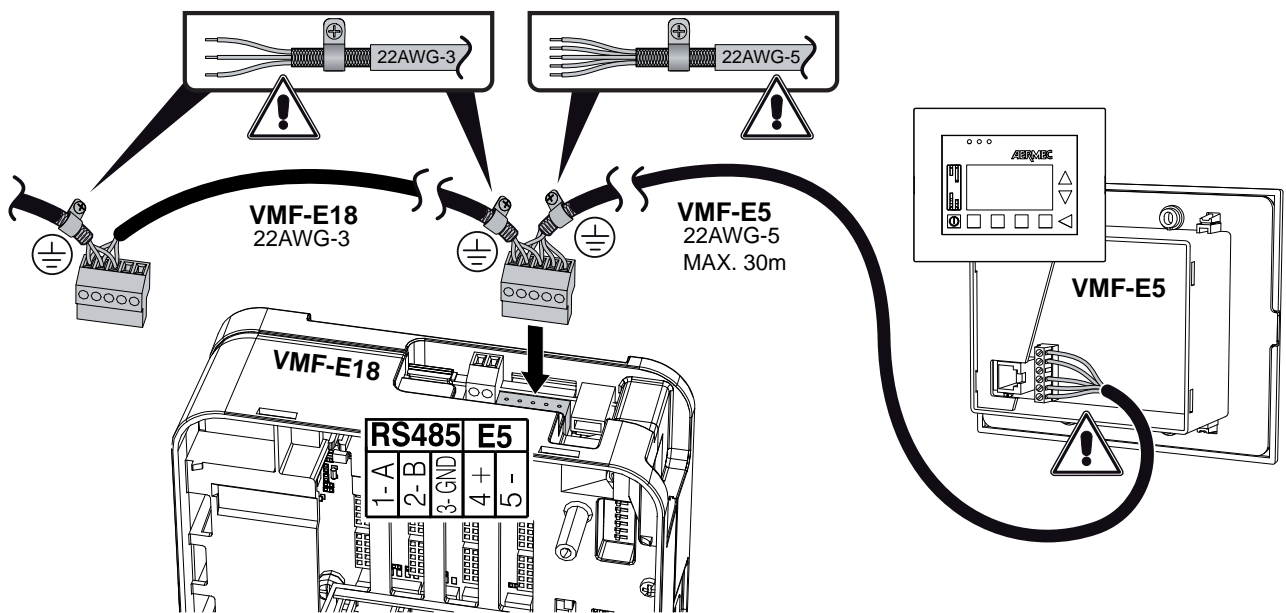


RS485 - COLLEGAMENTI • CONNECTIONS • RACCORDEMENTS • ANSCHLÜSSE • CONEXIONES

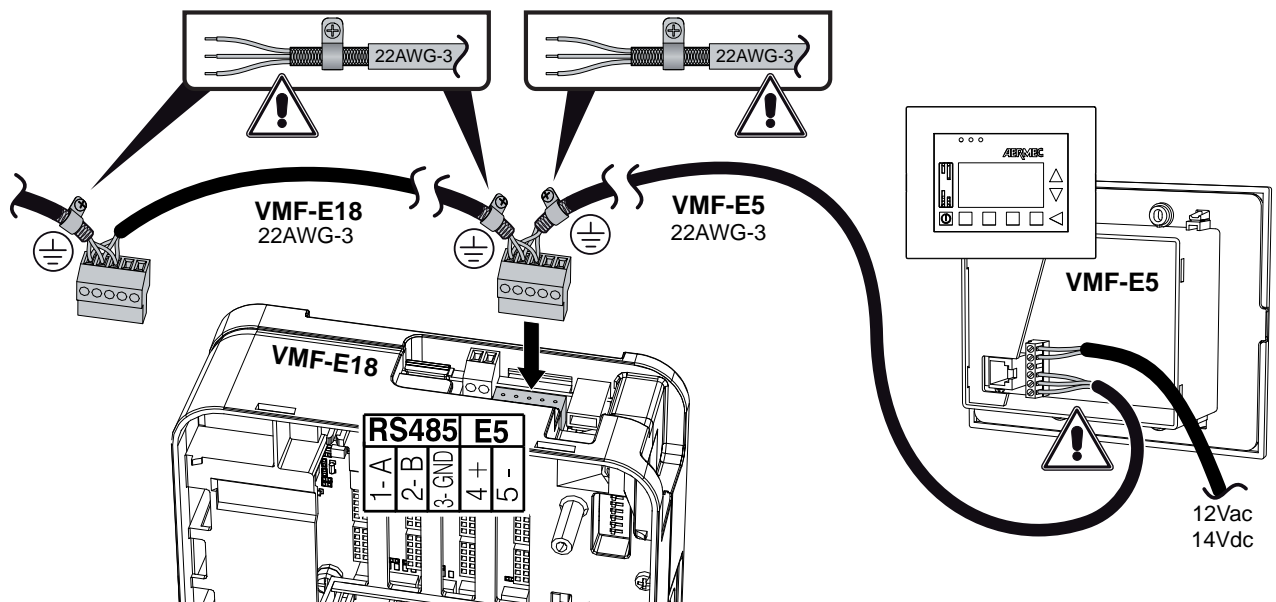


La schermatura di ogni cavo deve essere collegata a terra in un solo punto
 Every shield cable must be connected to the ground cable
 Le blindage de chaque cable doit être branché à la terre en un seul point.
 Der Schirm eines jeden Kables wird nur an einem Erdungspunkt angeschlossen
 La pantalla de cada cable debe ser conectada a tierra en un solo punto

RS485 Seriale supervizione + E5 alimentazione VMF-E5
 RS485 Supervision serial + E5 VMF-E5 power supply
 RS485 Liaison série de supervision + E5 Alimentation VMF-E5
 RS485 Serielle Überwachungsschnittstelle + E5 Versorgung VMF-E5
 RS485 Serial supervisión + E5 Alimentación VMF-E5

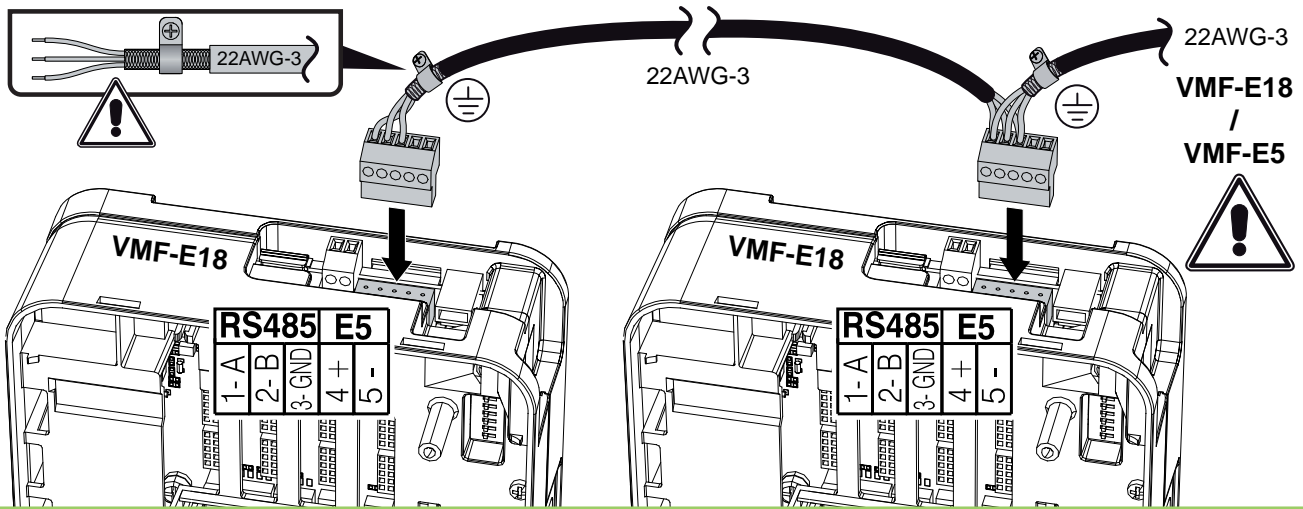


RS485 Seriale supervizione (Alimentazione esterna VMF-E5)
 RS485 Supervision serial (VMF-E5 external power supply)
 RS485 Liaison série de supervision (Alimentation externe VMF-E5)
 RS485 Serielle Überwachungsschnittstelle (Externe Stromversorgung VMF-E5)
 RS485 Serial supervisión (Alimentación externa VMF-E5)

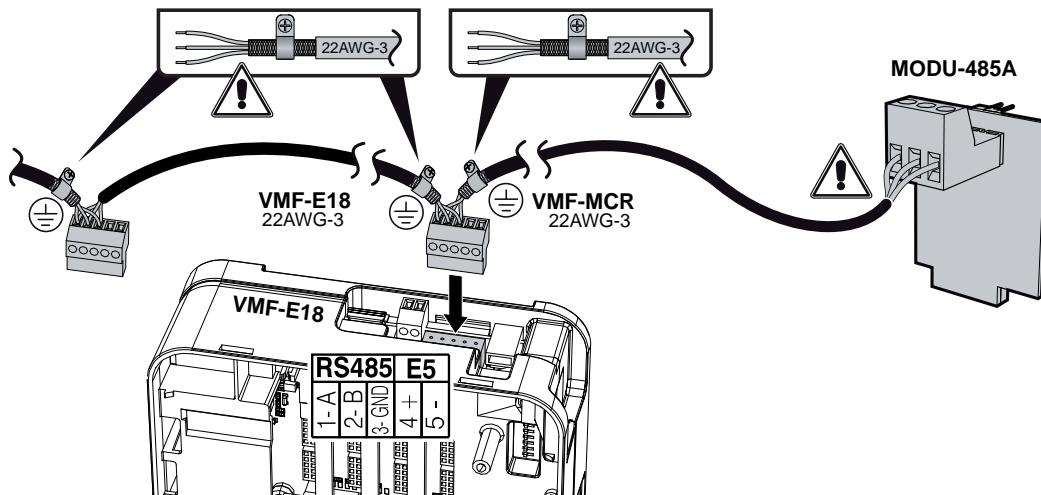


RS485 - COLLEGAMENTI • CONNECTIONS • RACCORDEMENTS • ANSCHLÜSSE • CONEXIONES

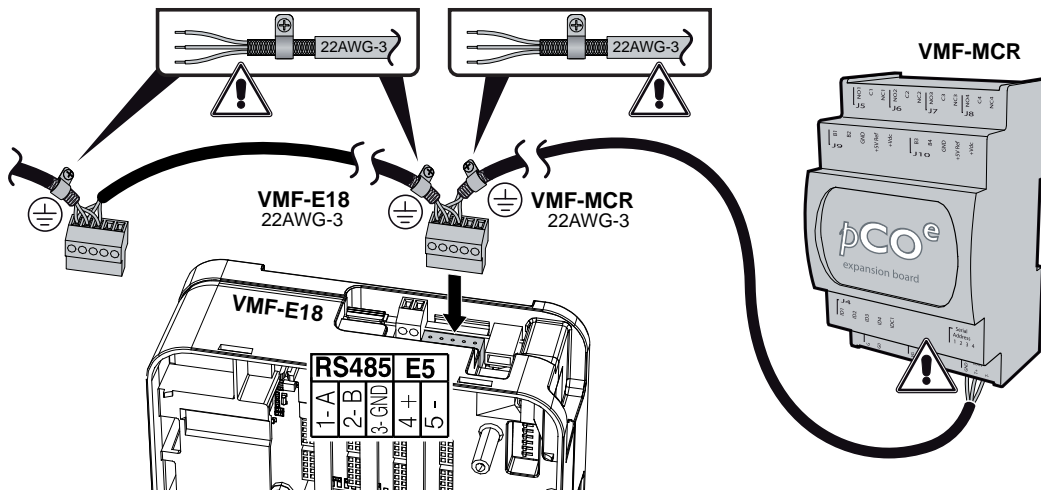
Seriale supervisione RS485 (VMF_E18 - VMF_E18)
 Supervision serial RS485 (VMF_E18 - VMF_E18)
 Liaison série de supervision RS485 (VMF_E18 - VMF_E18)
 Serielle Überwachungsschnittstelle RS485 (VMF_E18 - VMF_E18)
 Serial supervisión RS485 (VMF_E18 - VMF_E18)



Seriale supervisione RS485 (VMF_E18 - MODU_485A)
 Supervision serial RS485 (VMF_E18 - MODU_485A)
 Liaison série de supervision RS485 (VMF_E18 - MODU_485A)
 Serielle Überwachungsschnittstelle E18 - MODU_485A
 Serial supervisión RS485 (VMF_E18 - MODU_485A)



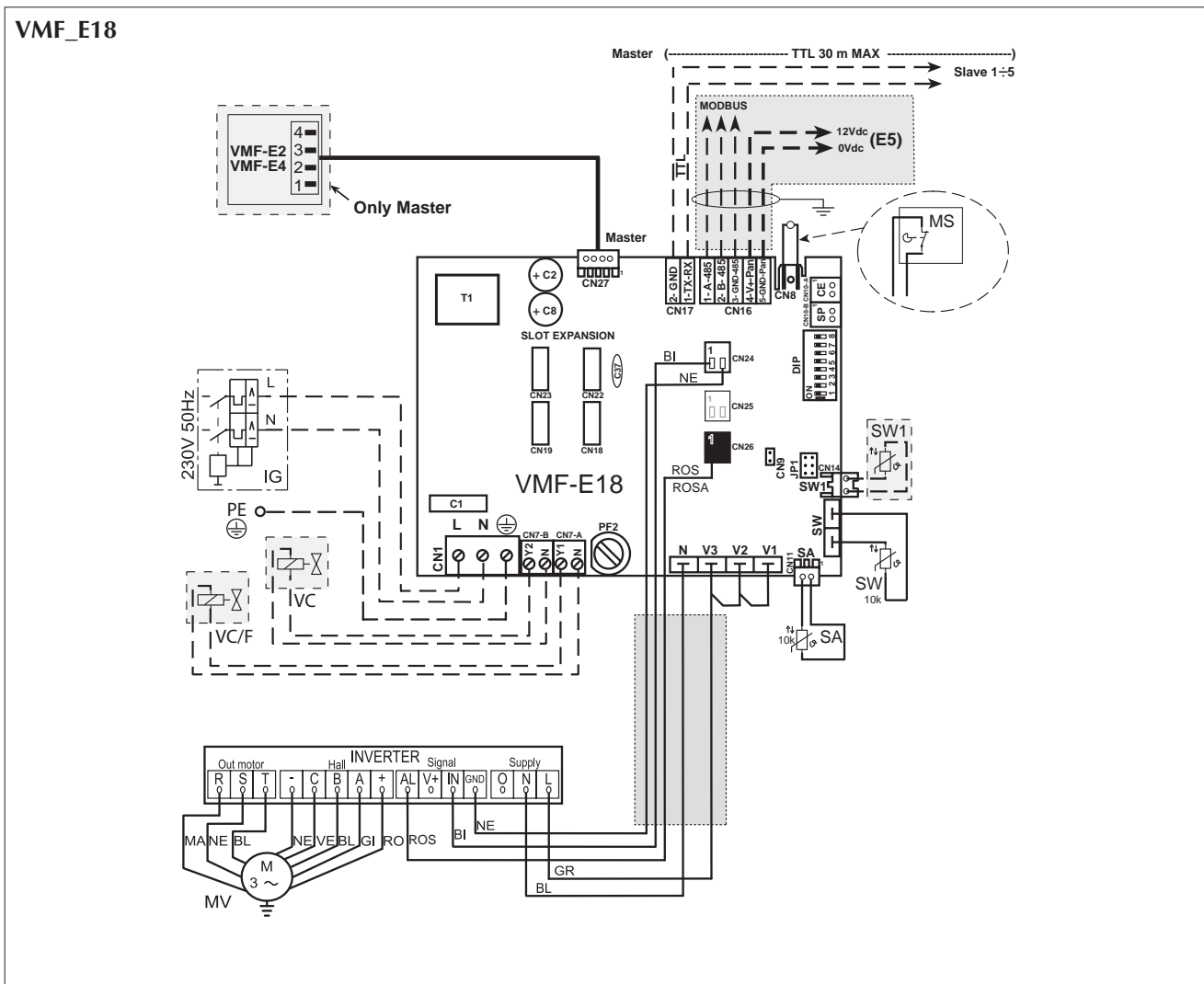
Seriale supervisione RS485 (VMF_E18 - VMF_MCR)
 Supervision serial RS485 (VMF_E18 - VMF_MCR)
 Liaison série de supervision RS485 (VMF_E18 - VMF_MCR)
 Serielle Überwachungsschnittstelle RS485 (VMF_E18 - VMF_MCR)
 Serial supervisión RS485 (VMF_E18 - VMF_MCR)



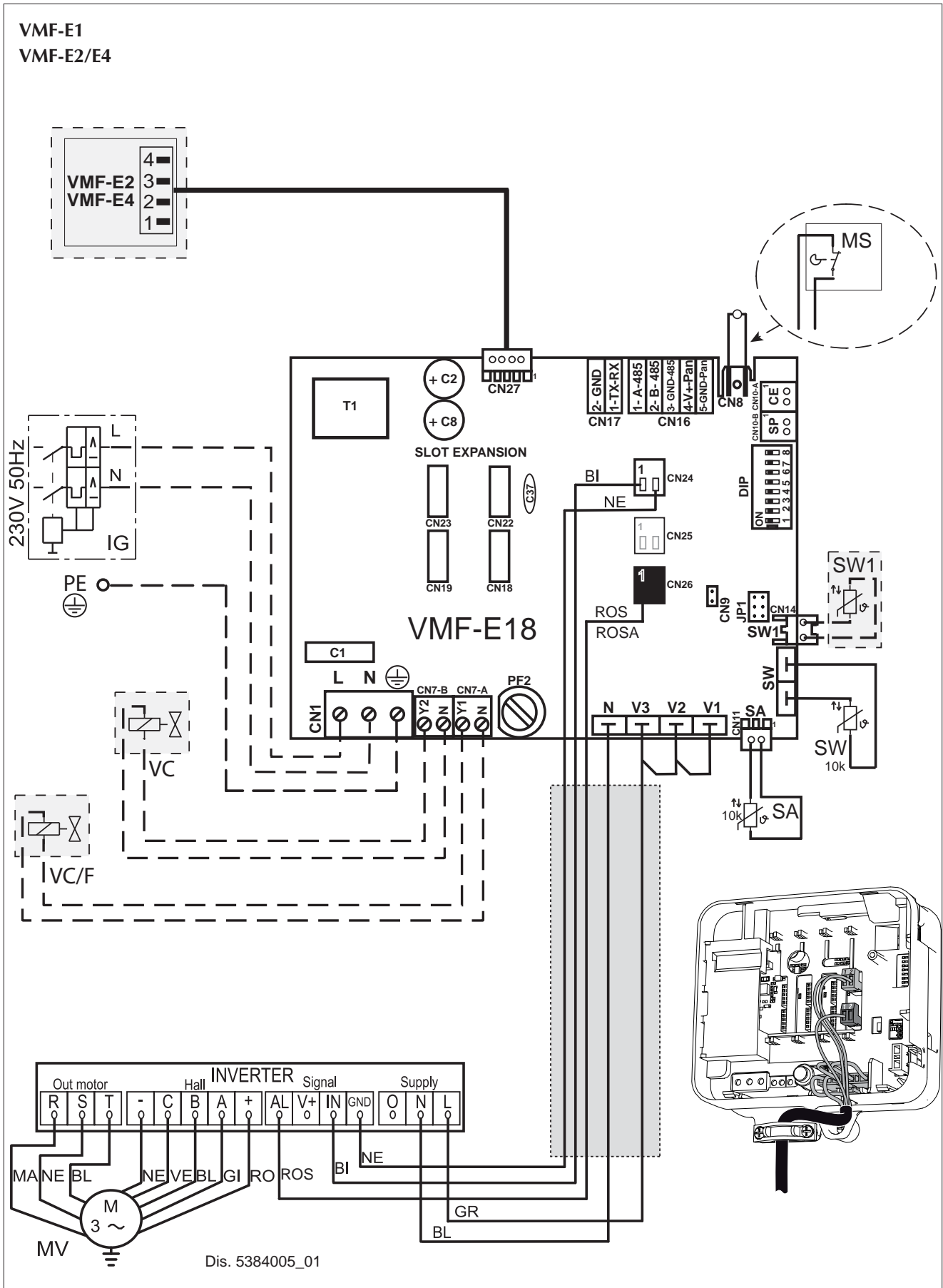
LEGENDA • KEY • LEGENDE • LEGENDE • LEYENDA

- IG** = Interruttore generale • Master switch • Interrupteur général • Hauptschalter • Interruptor general
- M** = Morsetiera • Control board • Bornier • Klemmleiste • Caja de conexiones
- MS** = Microinterruttore • Dip-switch • Microrupteur • Mikroschalter • Microinterruptor
- MV** = Motore ventilatore • Fan motor • Moteur du ventilateur • Ventilatormotor • Motor ventilador
- PE** = Collegamento di terra • Earth connection • Mise à la terre • Erdung • Toma de tierra
- SA** = Sonda ambiente • Ambient probe • Sonde ambiante • Raumtemperaturfühler • Sonda ambiente
- SC** = Sonda ambiente • Control card • carte de contrôle • Steuerplatine • Tarjeta de control
- SW** = Sonda minima temperatura acqua • Minimum water temperature probe • Sonde de température minimale de l'eau
Sonde für Mindest-Wassertemperatur • Sonda mínima temperatura del agua
- VCH** = Valvola solenoide • Solenoid valve • Vanne solénoïde • Magnetventil • Válvula solenoide
- = Componenti forniti optional • Components supplied as optional extras • Composants fournis en option
Als Option lieferbare Teile • Componentes opcionales facilitados
- - - = Collegamenti da eseguire in loco • Connections to be made on site • Branchements à effectuer sur les lieux
Vor Ort auszuführende Anschlüsse • Conexiones que realizar in situ

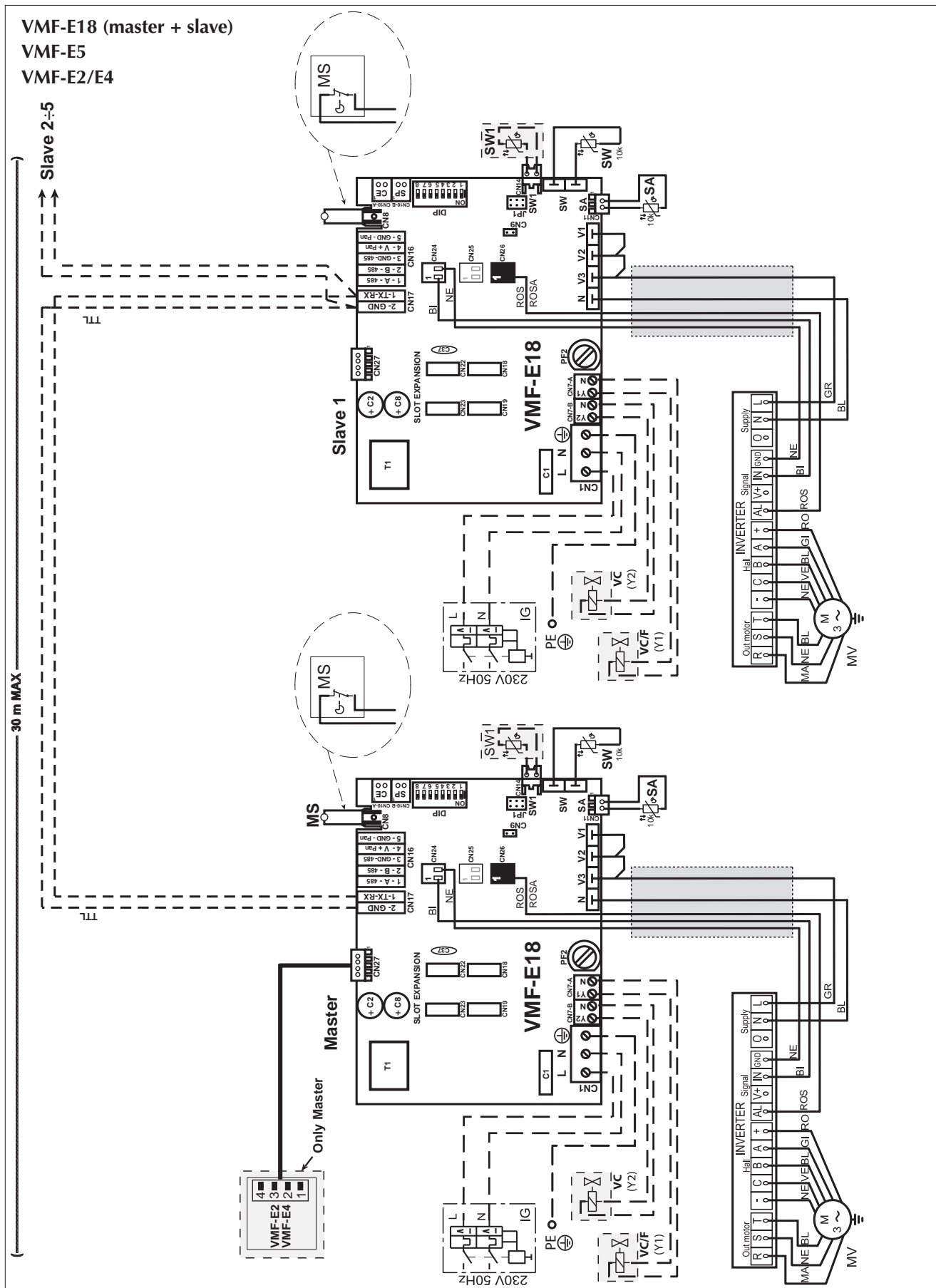
AR = Arancio	AR = Orange	AR = Orange	AR = Orange	AR = Naranja
BI = Bianco	BI = White	BI = Blanc	BI = Weiß	BI = Blanco
BL = Blu	BL = Blue	BL = Bleu	BL = Blau	BL = Azul
GR = Grigio	GR = Grey	GR = Gris	GR = Grau	GR = Gris
GV = Giallo-Verde	GV = Yellow-green	GV = Jaune-vert	GV = Gelb/Grün	GV = Amarillo-Verde
MA = Marrone	MA = Brown	MA = Marron	MA = Braun	MA = Marrón
NE = Nero	NE = Black	NE = Noir	NE = Schwarz	NE = Negro
RO = Rosso	RO = Red	RO = Rouge	RO = Rot	RO = Rojo
ROS = Rosa	ROS = Pink	ROS = Rose	ROS = Rosa	ROS = Rosa



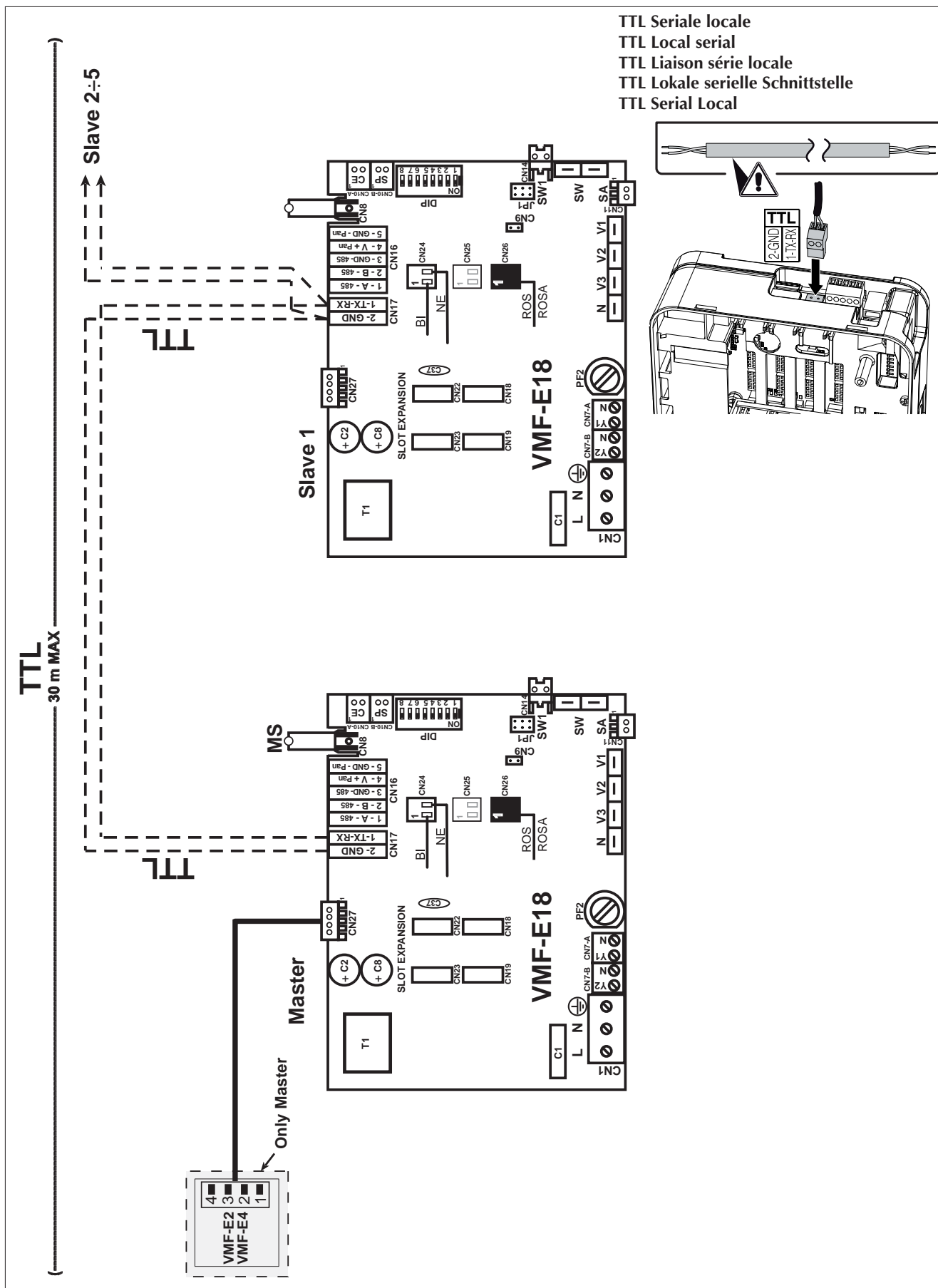
Los esquemas eléctricos están sujetos a modificaciones continuas, por lo tanto es obligatorio tomar la referencia de los que se encuentran a bordo de la máquina. All wiring diagrams are constantly updated. Please refer to the ones supplied with the unit. Nos schémas électriques étant constamment mis à jour, il faut absolument se référer à ceux fournis à bord de nos appareils. Die Schaltpläne werden ständig aktualisiert, deswegen muss man sich stets auf das mit dem Gerät gelieferte Schaltschema beziehen. El cableado de las máquinas es sometido a actualizaciones constantes. Por favor, para cada unidad remitirse a los esquemas suministrados con la misma.



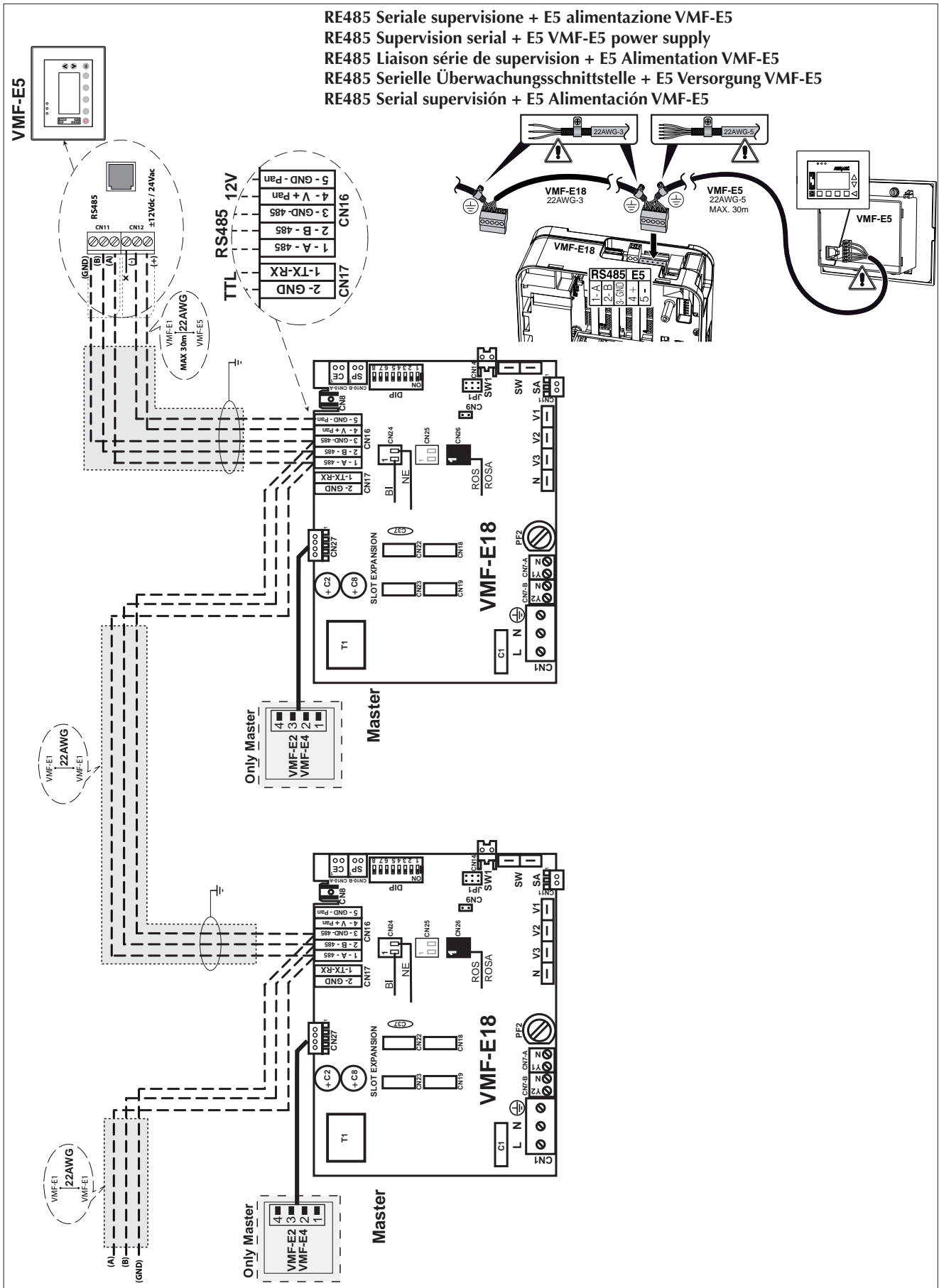
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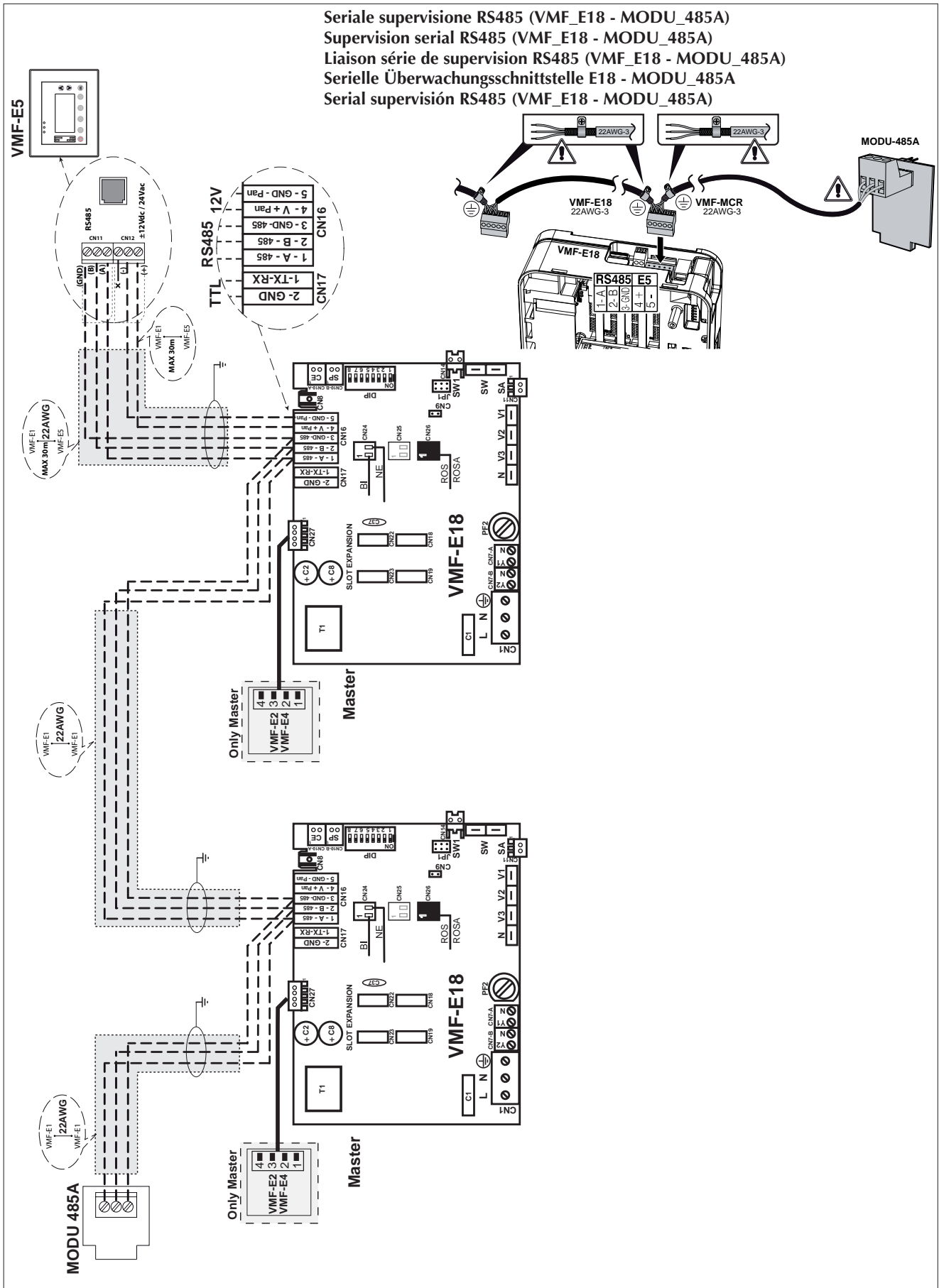
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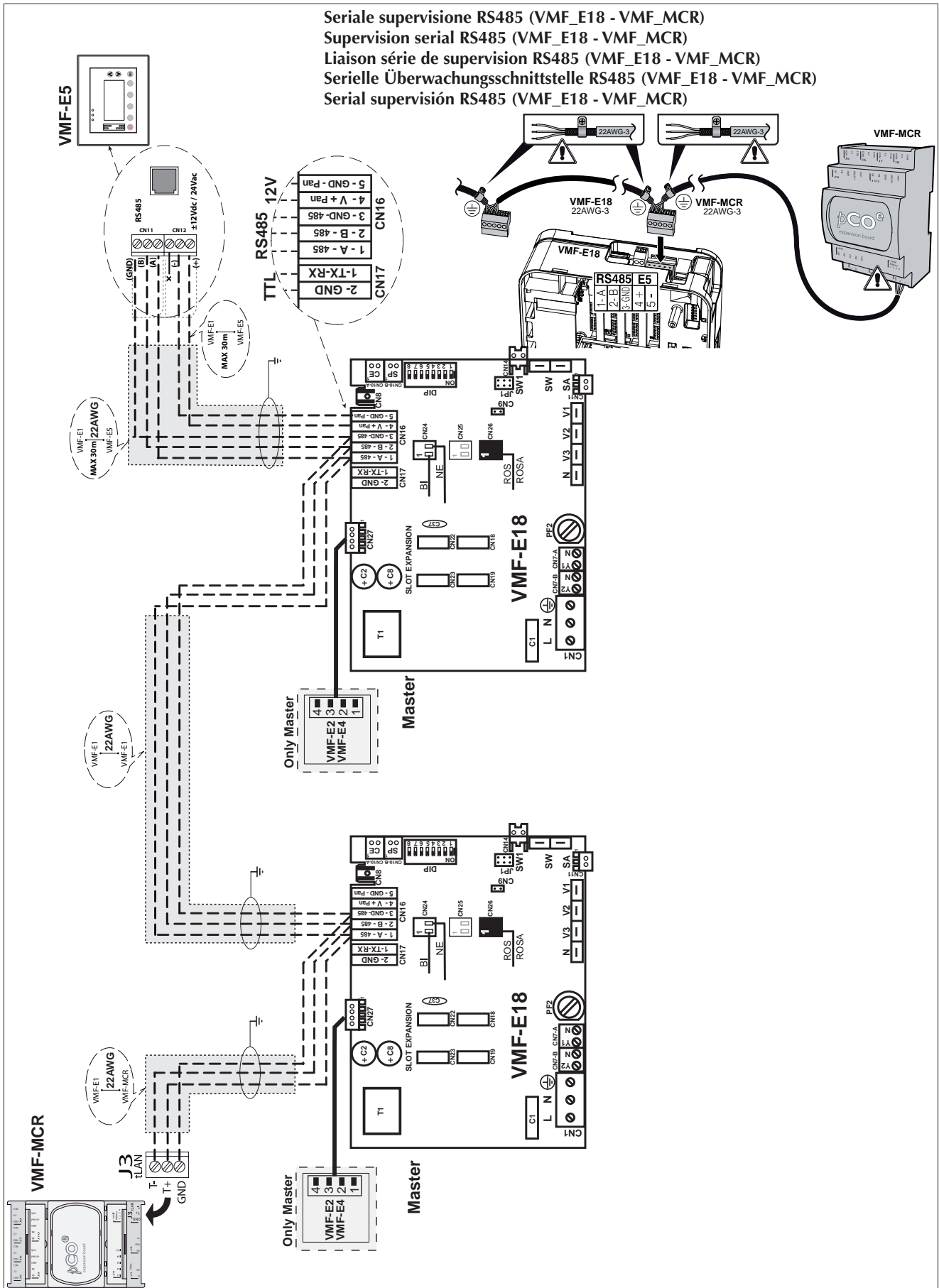
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 El cableado de las máquinas es sometido a actualizaciones constantes. Por favor, para cada unidad remitirse a los esquemas suministrados con la misma.

I dati tecnici riportati nella presente documentazione non sono impegnativi.

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