

Connection and wiring diagram for contractors

VIESMANN

Vitocal 222-G
Type BWT-M 221.B06 to B10

Heat pump compact appliance with integral DHW cylinder, 230 V~



VITOCAL 222-G



Safety instructions

 Please follow these safety instructions closely to prevent accidents and material losses.

Safety instructions explained

 **Danger**
This symbol warns against the risk of injury.

 **Please note**
This symbol warns against the risk of material losses and environmental pollution.

Note
Details identified by the word "Note" contain additional information.

Target group

These instructions are exclusively intended for authorised contractors.

- Work on the refrigerant circuit may only be carried out by authorised refrigeration engineers.
- Work on electrical equipment must only be carried out by a qualified electrician.
- The system must be commissioned by the system installer or a qualified person authorised by the installer.

Regulations to be observed

- National installation regulations
- Statutory regulations for the prevention of accidents
- Statutory regulations for environmental protection
- Codes of practice of the relevant trade associations
- Relevant country-specific safety regulations

Safety instructions (cont.)**Safety instructions for working on the system****Working on the system**

- Isolate the system from the power supply, e.g. by removing the separate fuse or by means of a mains isolator, and check that it is no longer live.

Note

In addition to the control circuit there may be several power circuits.

 **Danger**

Contact with live components can result in severe injuries. Some components on PCBs remain live even after the power supply has been switched off.

Prior to removing covers from the appliances, wait at least 4 minutes until the voltage has completely dropped out.

- Safeguard the system against reconnection.
- Wear suitable personal protective equipment when carrying out any work.

 **Danger**

Hot surfaces and fluids can lead to burns or scalding.

- Before maintenance and service work, switch OFF the appliance and let it cool down.
- Never touch hot surfaces on the appliance, fittings or pipework.

 **Danger**

Risk of fire: Electrostatic discharge can cause sparks which may be ignited by escaping, flammable refrigerant (R32).

Before beginning work, touch earthed objects, such as heating or water pipes, to discharge any static.

 **Please note**

Electronic assemblies can be damaged by electrostatic discharge. Prior to commencing work, touch earthed objects such as heating or water pipes to discharge static loads.

Work on the refrigerant circuit

Refrigerants are air displacing, colourless, odourless gases.

- R32 forms flammable mixtures with air.
- R410A is not flammable.

 **Danger**

Direct contact with liquid and gaseous refrigerant can cause serious damage to health.

- Avoid direct contact with liquid and gaseous refrigerant.
- Wear personal protective equipment when handling liquid and gaseous refrigerant.

 **Danger**

Unregulated escape of refrigerant in enclosed spaces can lead to breathing difficulties and suffocation.

- Never breathe in refrigerant vapours.
- Ensure adequate ventilation in enclosed spaces.

Perform the following measures before beginning work on the refrigerant circuit:

- Check the refrigerant circuit for leaks.
- Ensure very good ventilation especially in the floor area and sustain this for the duration of the work.

Safety instructions (cont.)

- Inform all persons in the vicinity of the system about the type of work to be carried out.
- Secure the area surrounding the work area.

Further measures before starting work on the refrigerant circuit with flammable refrigerants (R32):

- Remove all flammable materials and ignition sources from the immediate vicinity of the heat pump.
- Before, during and after the work, check the surrounding area for escaping refrigerant using a suitable refrigerant detector.
This refrigerant detector must not generate any sparks and must be suitably sealed.
- A CO₂ or powder extinguisher must be to hand in the following cases:
 - Refrigerant is being topped up.
 - Soldering or welding work is being carried out.
- Display signs prohibiting smoking.



Danger

Damage to the refrigerant circuit can cause refrigerant to enter the hydraulic system. This can cause serious damage to health.

After completion of the work, professionally vent the hydraulic system on the primary and secondary sides.

Repair work



Please note

Repairing components that fulfil a safety function can compromise the safe operation of the system. Replace faulty components only with genuine Viessmann spare parts.

Auxiliary components, spare and wearing parts



Please note

Spare and wearing parts that have not been tested together with the system can compromise its function. Installing non-authorised components and making non-approved modifications or conversions can compromise safety and may invalidate our warranty. For replacements, use only original spare parts supplied or approved by Viessmann.

Safety instructions for operating the system

What to do if water escapes from the appliance



Danger

If water escapes from the appliance there is a risk of electrocution. Switch OFF the heating system at the external isolator (e.g. fuse box, domestic distribution board).



Danger

If water escapes from the appliance there is a risk of scalding. Never touch hot heating water.

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Notes

- Observe the information on electrical connections in the installation and service instructions.
- In the case of a power supply with power-OFF facility, the power to the control circuit (heat pump control unit) must be supplied without interruption by the power supply utility.
- Identification of electrical equipment (in accordance with IEC 81346-2):
Example: /7.5
/ = cross-reference
7. = sheet number
5 = current path

Electrical equipment

B	Pressure switch, temperature switch, thermal relay
E	Instantaneous heating water heater
F	Fuse, thermal relay
J	Plug-in connector
K	Contactors, relays
M	Motor, circulation pump, motorised valve, compressor
N	Controller
Q	Mains isolator, power contactor, output relay
R	Start-up resistor
S	Control switch
X	Terminals, plugs
Y	3-way diverter valve

Sheet 1a: Compressor 230 V~

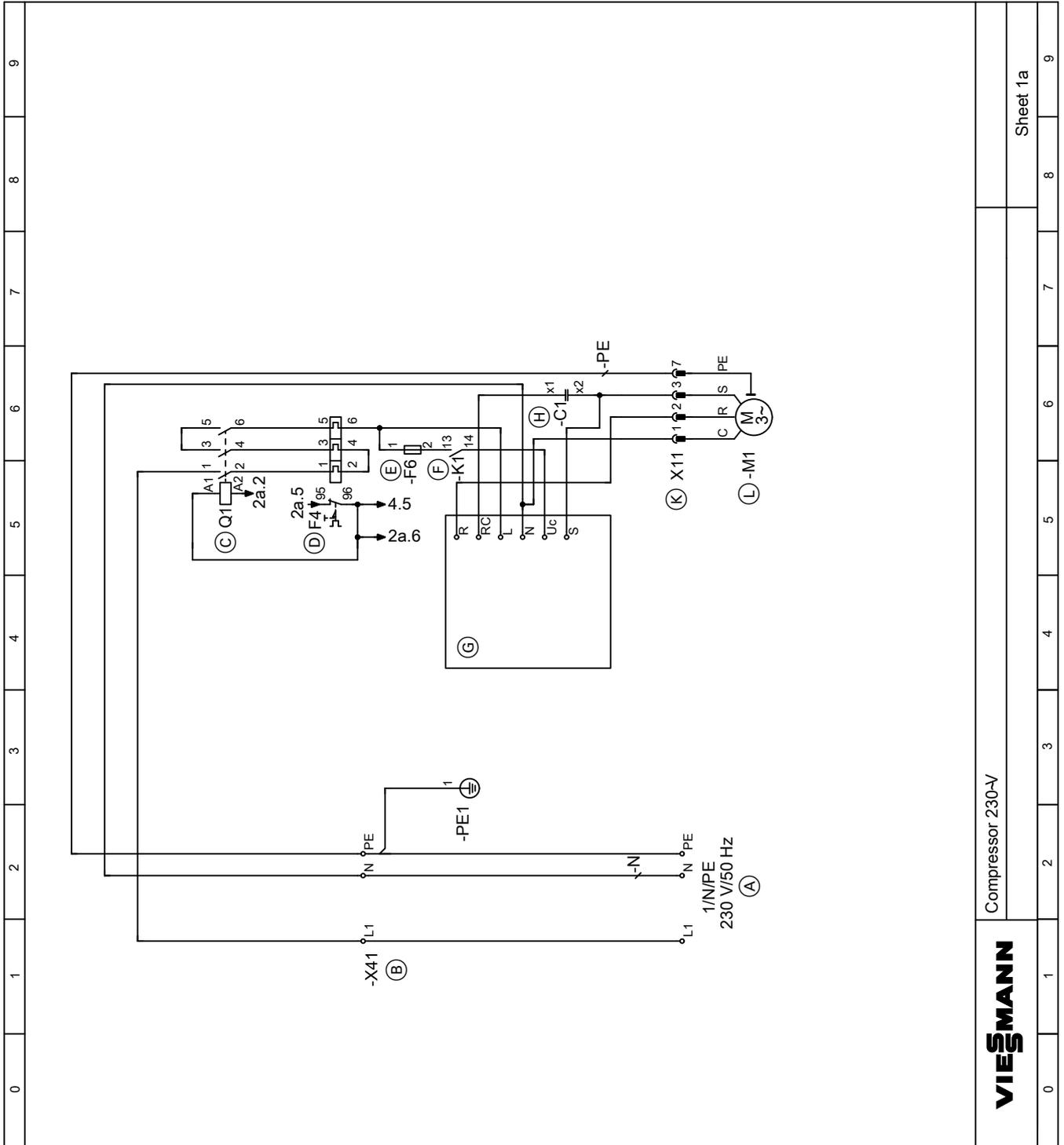


Fig. 1

- (A) Compressor power supply
- (B) Mains terminals, compressor
- (C) Compressor contactor
- (D) Thermal relay, compressor
- (E) Fuse, control circuit of full wave soft starter
- (F) Relay, control circuit of full wave soft starter
- (G) Full wave soft starter
- (H) Run capacitor
- (K) Male jack, compressor
- (L) Compressor motor

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Compressor 230-V

Sheet 1a

Service

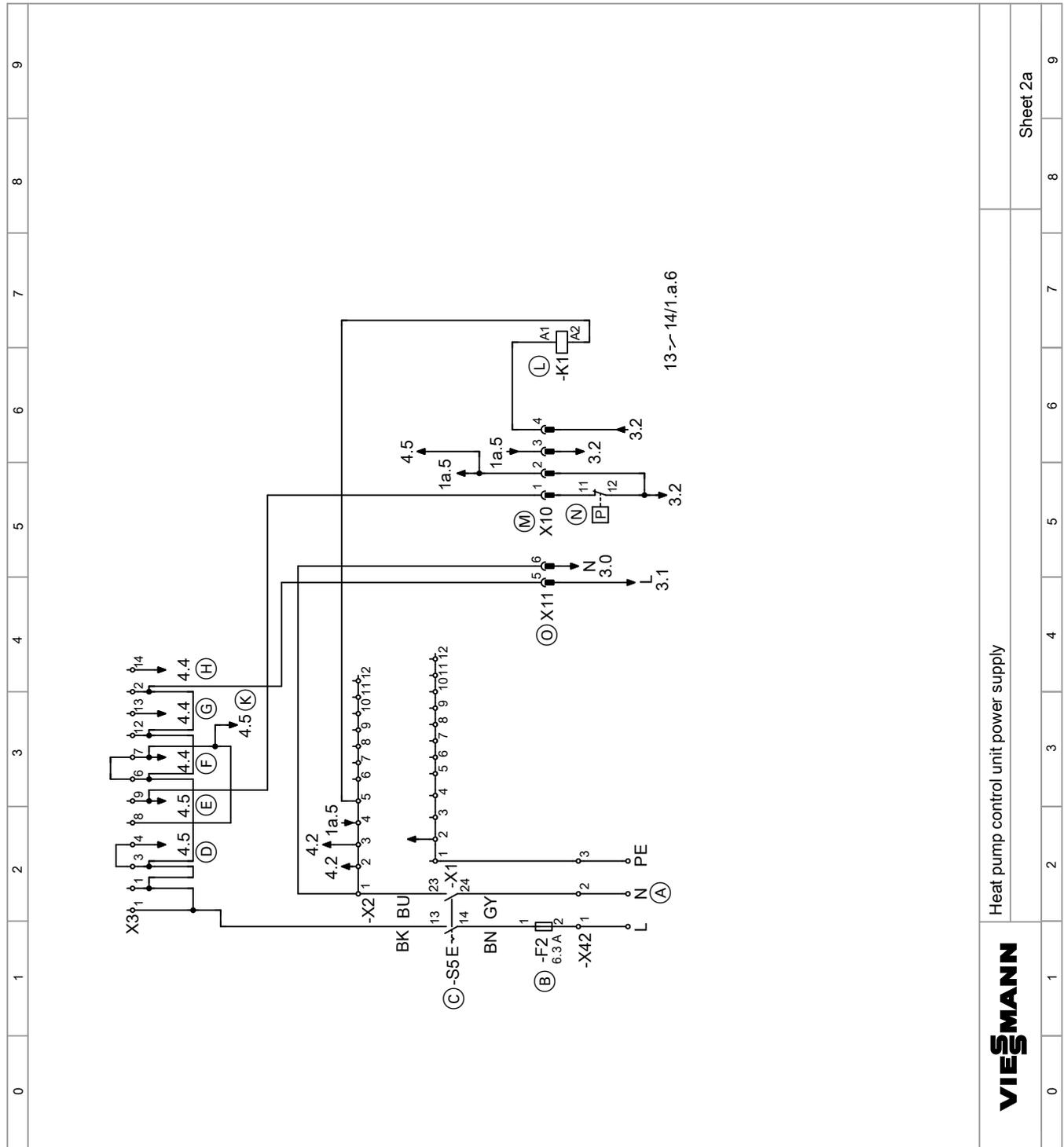


Fig. 2

- (A) Mains terminals, heat pump control unit
- (B) Heat pump control unit fuse 6.3 A (slow)
- (C) Heat pump control unit ON/OFF switch
- (D) Primary circuit flow switch
- (E) Primary circuit pressure switch and/or frost stat
- (F) Power-OFF
- (G) External demand
- (H) External blocking
- (K) Jumper
- (L) Relay, control circuit of full wave soft starter
- (M) Plug, safety chain
- (N) Safety high pressure switch
- (O) Male jack, compressor

Heat pump control unit power supply

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Sheet 2a

Sheet 3: EEV PCB (refrigerant circuit controller [4-7])

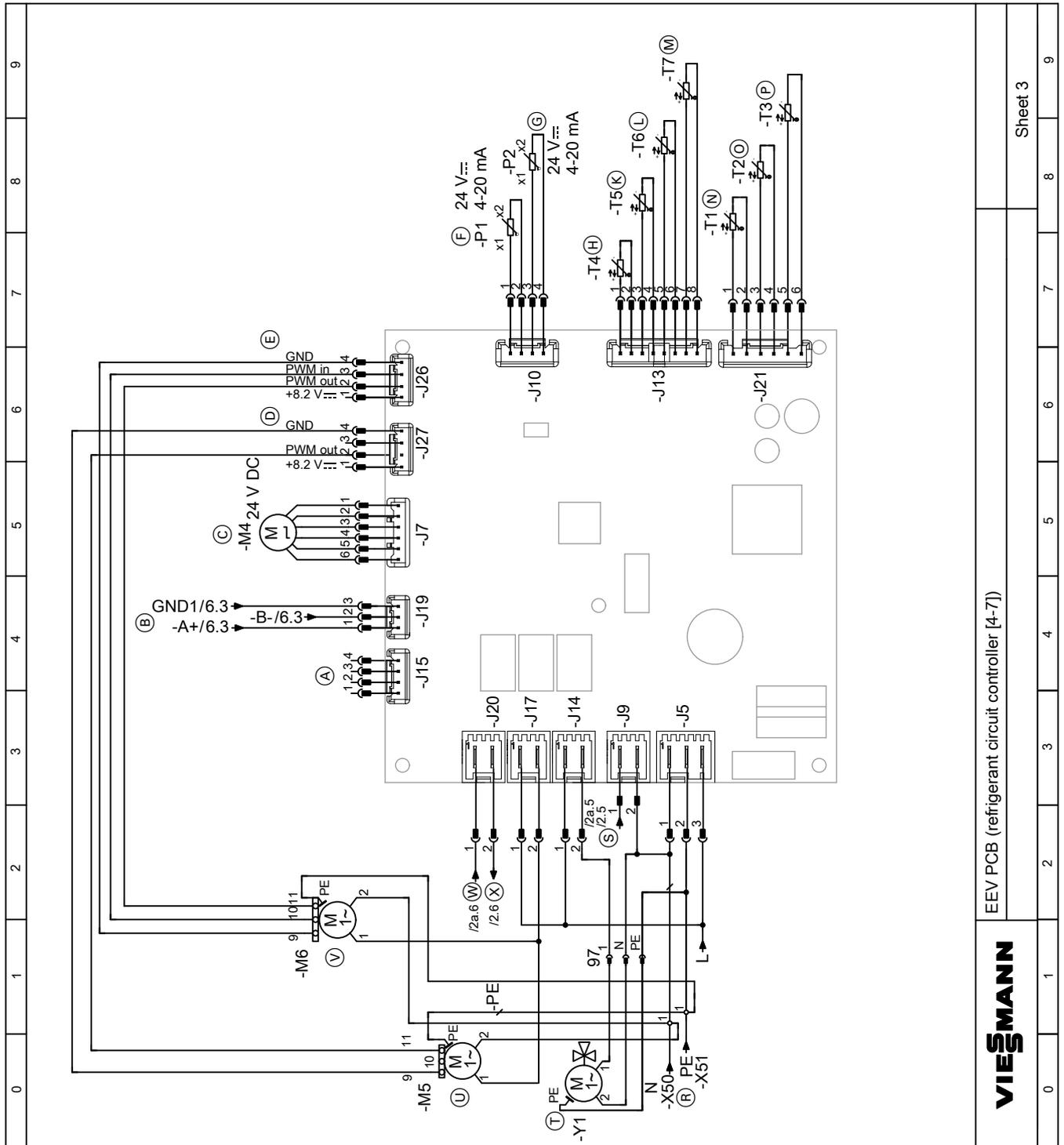


Fig. 3

- (A) Never connect anything here.
- (B) Modbus: Connecting cable to the controller and sensor PCB, terminal X18
- (C) Electronic expansion valve
- (D) PWM signal, primary pump
- (E) PWM signal, secondary pump
- (F) Low pressure sensor
- (G) High pressure sensor
- (H) Suction gas temperature sensor (NTC 10 kΩ)
- (K) Primary circuit flow temperature sensor (NTC 10 kΩ)
- (L) Hot gas temperature sensor (NTC 10 kΩ)
- (M) Liquid gas temperature sensor (NTC 10 kΩ)
- (N) Secondary circuit flow temperature sensor (NTC 10 kΩ)
- (O) Secondary circuit flow temperature sensor downstream of instantaneous heating water heater (NTC 10 kΩ)
- (P) Secondary circuit flow temperature sensor (NTC 10 kΩ)
- (R) Internal power supply (factory connection)
- (S) Safety high pressure switch
- (T) 3-way diverter valve "central heating/DHW heating"

Sheet 3: EEV PCB (refrigerant circuit... (cont.)

- Ⓚ Primary pump
- Ⓥ Secondary pump

- Ⓜ Compressor relay (230 V~)
- ⓧ Enable compressor switching

Service

Sheet 4: Main PCB

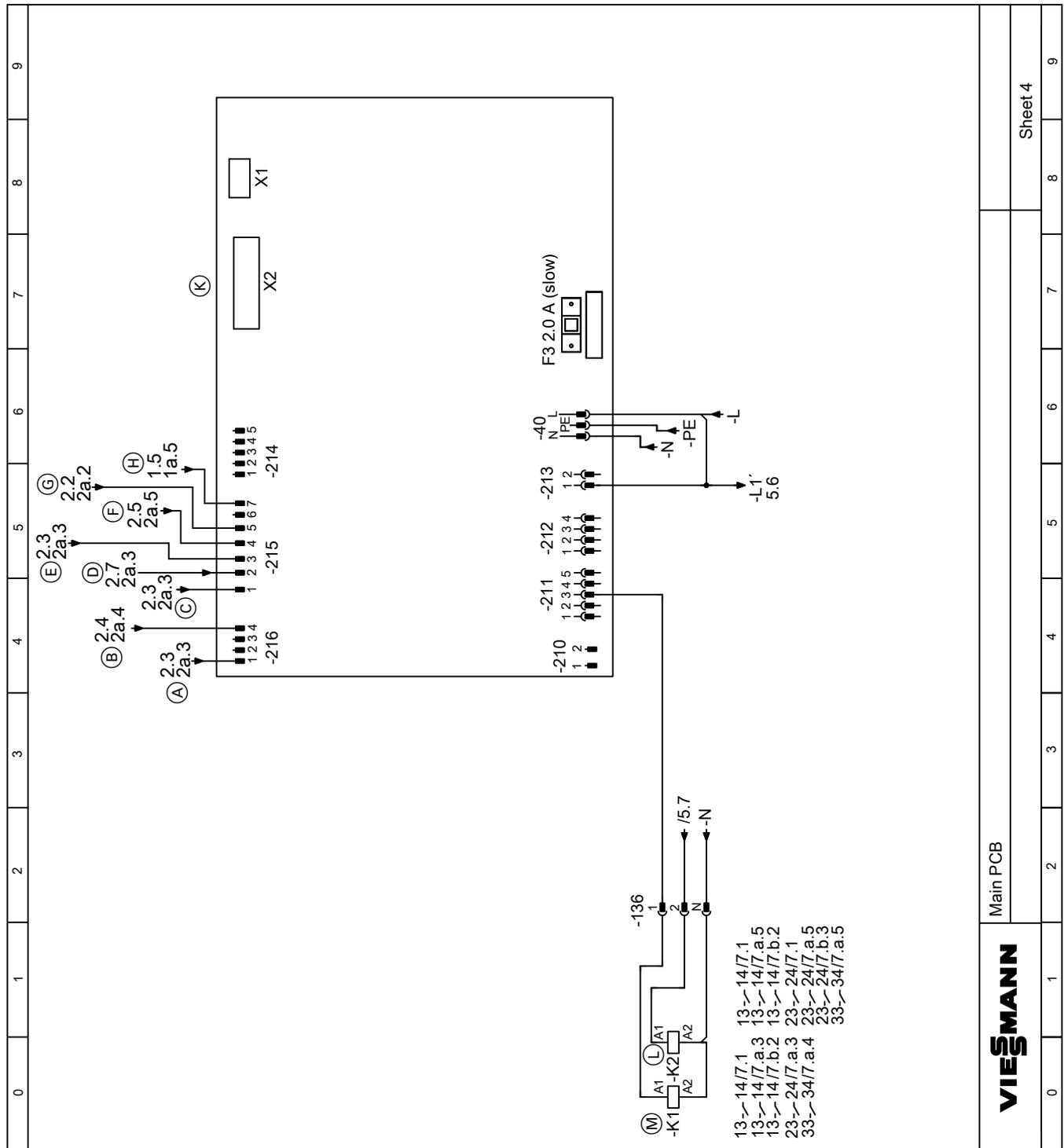


Fig. 4

- Ⓐ External demand
- Ⓑ External blocking
- Ⓒ Power-OFF
- Ⓓ Phase monitor (if installed) or jumper
- Ⓔ Primary circuit pressure switch and/or frost stat

- Ⓕ Safety high pressure switch
- Ⓖ Primary circuit flow switch
- Ⓗ Thermal relay
- Ⓚ Ribbon cable to the controller and sensor PCB

Sheet 4: Main PCB (cont.)

- Ⓐ Output relay for instantaneous heating water heater, stage 2
- Ⓜ Output relay for instantaneous heating water heater, stage 1

Sheet 5: Expansion PCB

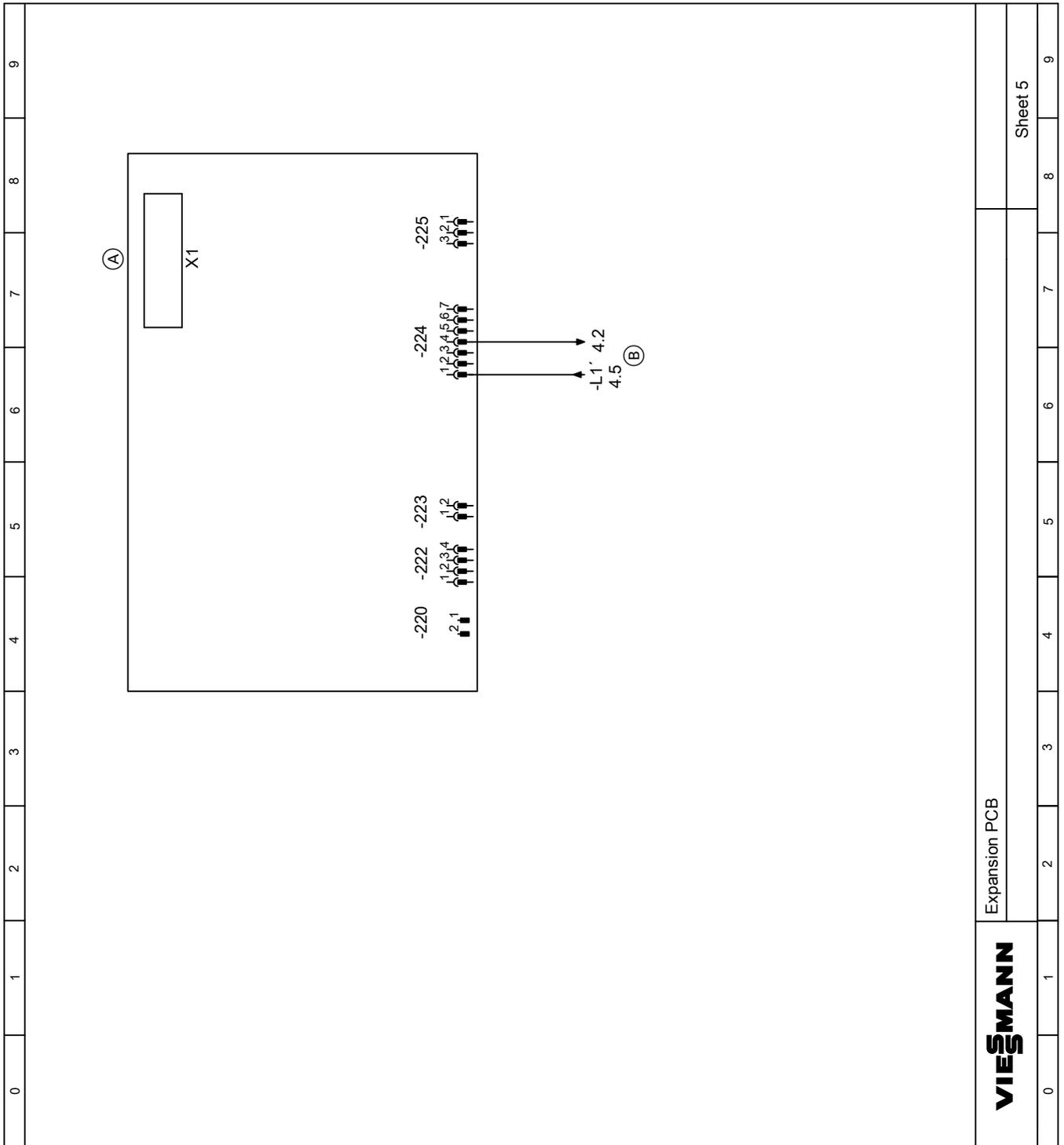


Fig. 5

- Ⓐ Ribbon cable to the controller and sensor PCB
- Ⓜ Output relay for instantaneous heating water heater, stage 2

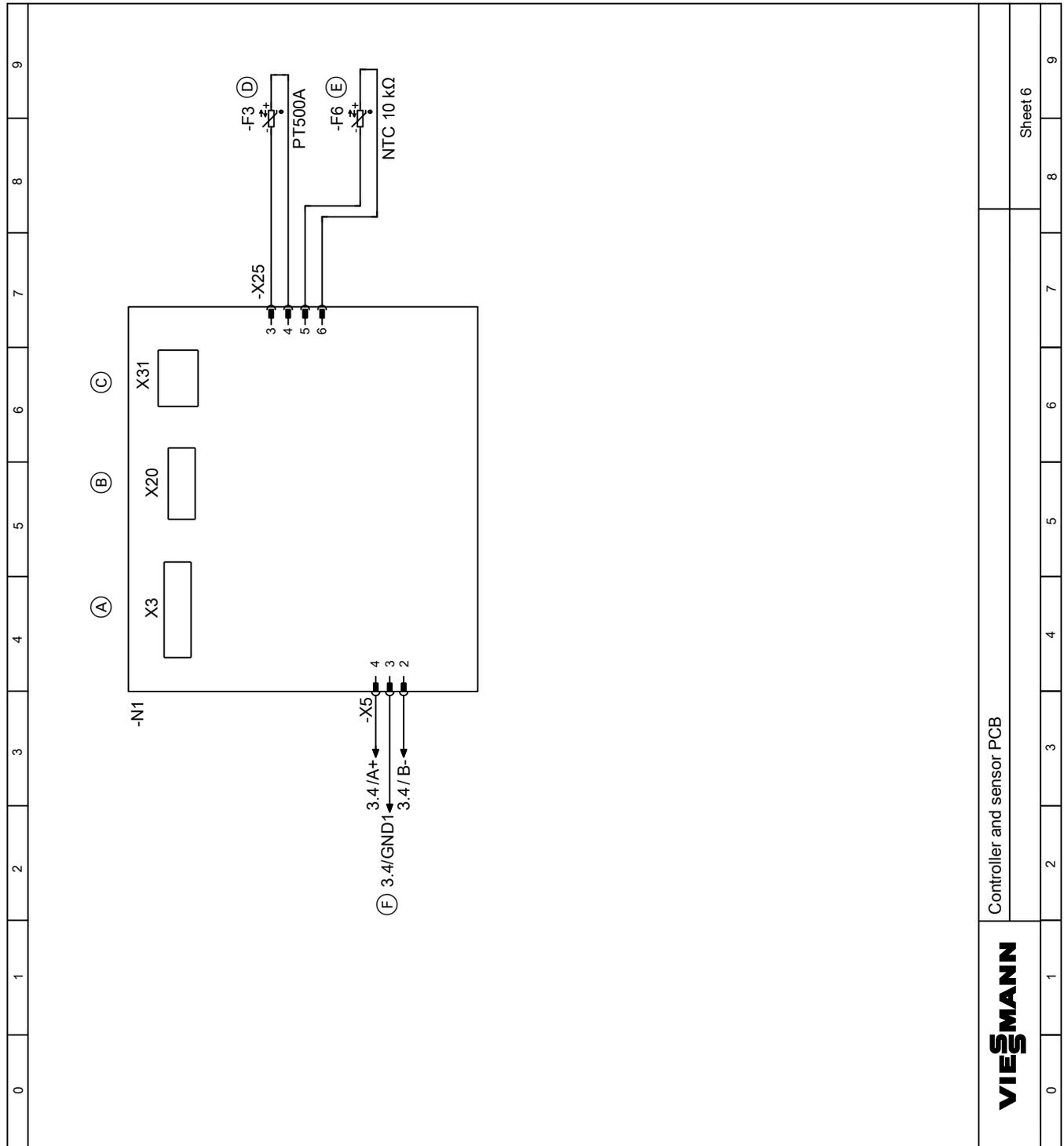


Fig. 6

- (A) Ribbon cable to the main PCB and expansion PCB
- (B) Ribbon cable to the programming unit
- (C) Coding card
- (D) Primary circuit return temperature sensor (heat pump brine outlet)
- (E) Top cylinder temperature sensor
- (F) Modbus: Connecting cable to EEV PCB

Sheet 7b: Instantaneous heating water heater

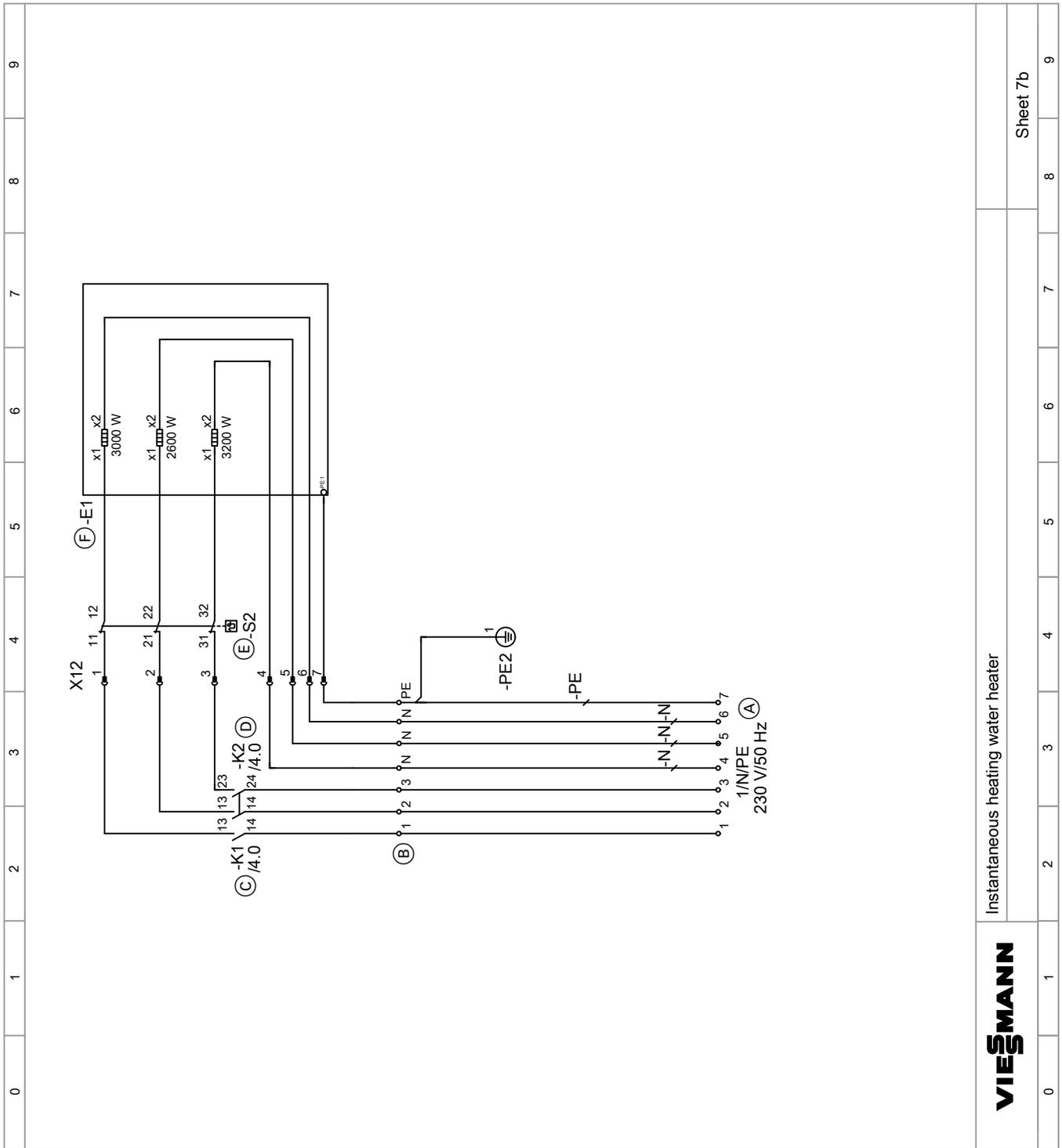


Fig. 7

- (A) Instantaneous heating water heater power supply
- (B) Mains terminals, instantaneous heating water heater
- (C) Output relay for instantaneous heating water heater, stage 1
- (D) Output relay for instantaneous heating water heater, stage 2
- (E) High limit safety cut-out for instantaneous heating water heater
- (F) Instantaneous heating water heater

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Instantaneous heating water heater

Sheet 7b

Service

Overview of internal components

Service

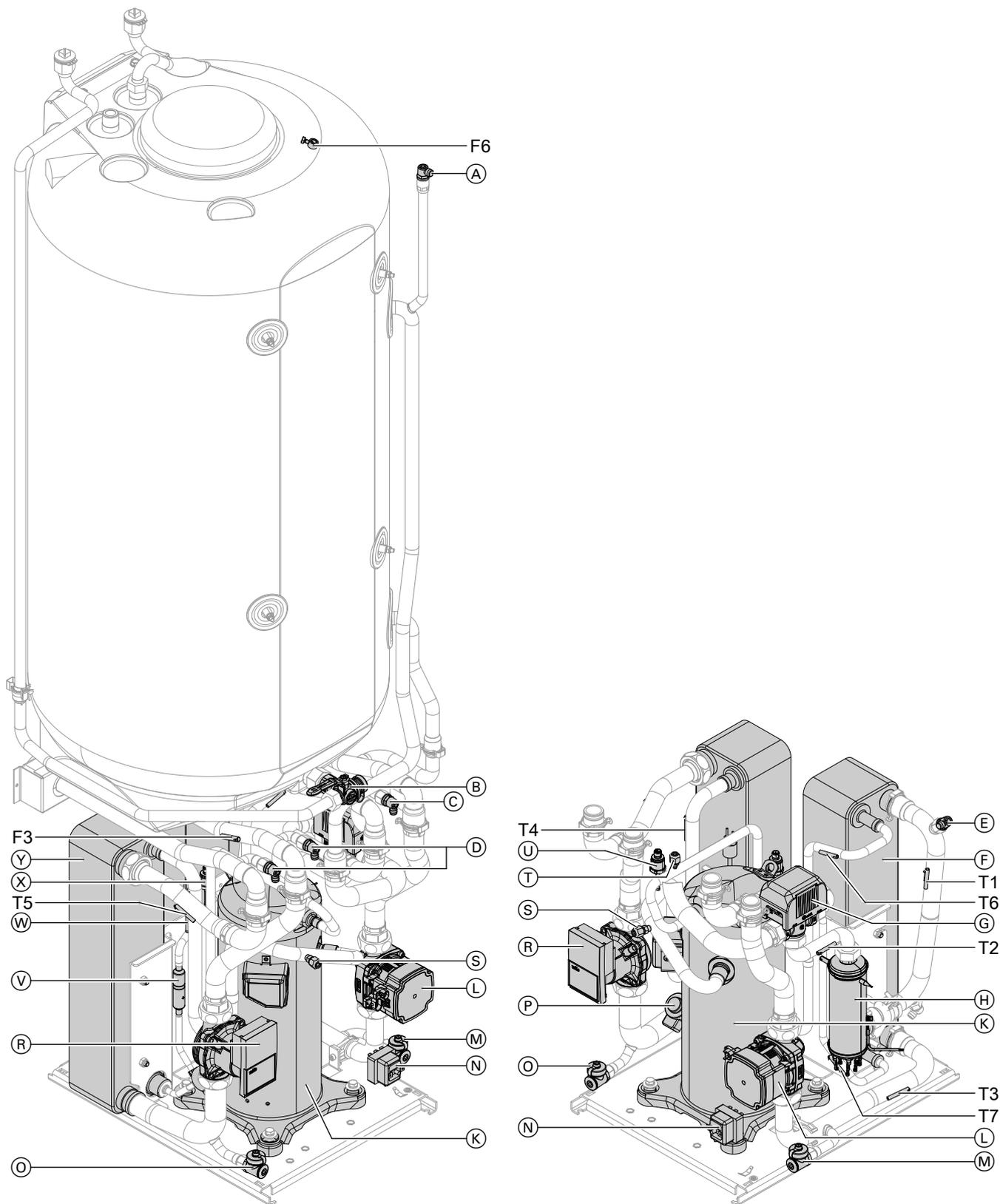


Fig. 8

- (A) Air vent valve, secondary circuit
- (B) Drain & fill valve, DHW cylinder
- (C) Air vent valve, secondary circuit
- (D) Air vent valve, primary circuit
- (E) Air vent valve, condenser on secondary side
- (F) Condenser

- (G) 3-way diverter valve "central heating/DHW heating"
- (H) Instantaneous heating water heater
- (K) Compressor
- (L) Secondary pump
- (M) Drain & fill valve, secondary circuit

Overview of internal components (cont.)

- Ⓝ High limit safety cut-out for instantaneous heating water heater
- Ⓞ Drain & fill valve, primary circuit
- Ⓟ Electronic expansion valve
- Ⓠ Primary pump
- Ⓡ Low pressure Schrader valve
- Ⓢ High pressure Schrader valve
- Ⓣ Low pressure sensor
- Ⓤ Filter
- Ⓥ Safety high pressure switch
- Ⓦ High pressure sensor
- Ⓧ Evaporator
- F3 Primary circuit flow temperature sensor (Viessmann Pt500A)
- F6 Cylinder temperature sensor (Viessmann NTC 10 kΩ)
- T1 Secondary circuit flow temperature sensor (NTC 10 kΩ)
- T2 Secondary circuit flow temperature sensor downstream of instantaneous heating water heater (NTC 10 kΩ)
- T3 Secondary circuit flow temperature sensor (NTC 10 kΩ)
- T4 Suction gas temperature sensor (NTC 10 kΩ)
- T5 Primary circuit flow temperature sensor (NTC 10 kΩ)
- T6 Hot gas temperature sensor (NTC 10 kΩ)
- T7 Liquid gas temperature sensor (NTC 10 kΩ)

Note on the temperature sensors

F.. Temperature sensor is connected to controller and sensor PCB.

D.. Temperature sensor is connected to EEV PCB.



"Vitotronic 200" service instructions

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6170481 Subject to technical modifications.