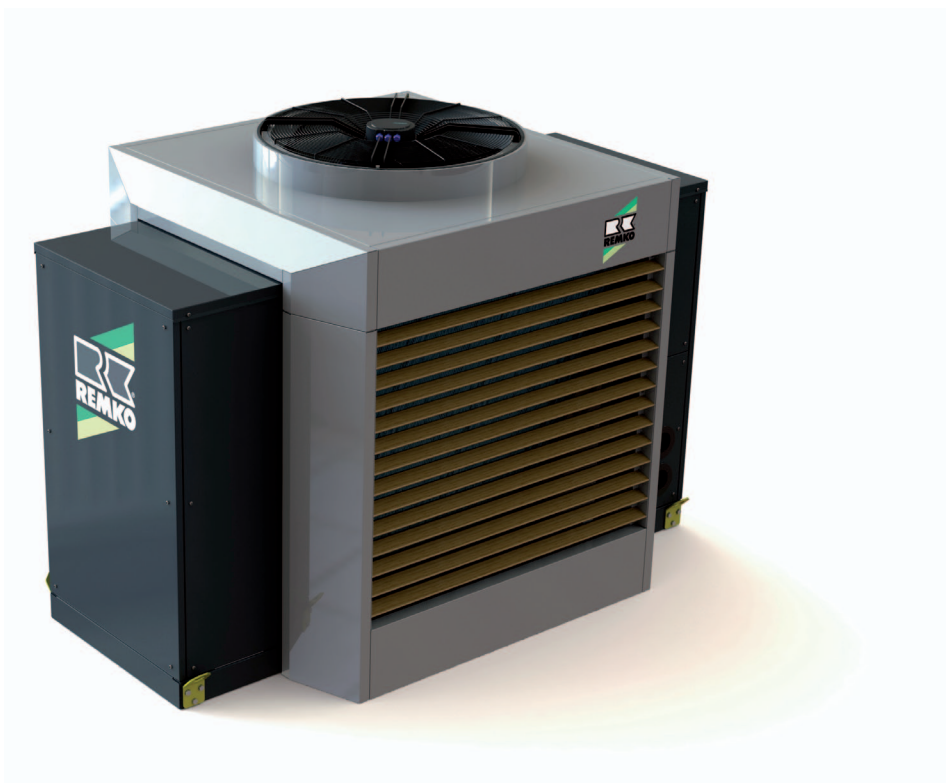


Electrical wiring

REMKO modular energy control centre Air/water system - Heating and cooling

SQW 400 (Single, Duo, Triple, Quattro)



Instructions for Technicians



Read these operating instructions carefully before commissioning / using this device!

These instructions are an integral part of the system and must always be kept near or on the device.

Subject to modifications; No liability accepted for errors or misprints!

Translation of the original

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REMKO modular energy control centre

1 Safety and usage instructions

1.1 General safety notes

Carefully read the operating manual before commissioning the units for the first time. It contains useful tips and notes such as hazard warnings to prevent personal injury and material damage. Failure to follow the directions in this manual not only presents a danger to people, the environment and the system itself, but will void any claims for liability.

Keep this operating manual and the refrigerant data sheet near to the units.

1.2 Identification of notes

This section provides an overview of all important safety aspects for proper protection of people and safe and fault-free operation. The instructions and safety notes contained within this manual must be observed in order to prevent accidents, personal injury and material damage.

Notes attached directly to the units must be observed in their entirety and be kept in a fully legible condition.

Safety notes in this manual are indicated by symbols. Safety notes are introduced with signal words which help to highlight the magnitude of the danger in question.

DANGER!

Contact with live parts poses an immediate danger of death due to electric shock. Damage to the insulation or individual components may pose a danger of death.

DANGER!

This combination of symbol and signal word warns of a situation in which there is immediate danger, which if not avoided may be fatal or cause serious injury.

WARNING!

This combination of symbol and signal word warns of a potentially hazardous situation, which if not avoided may be fatal or cause serious injury.

CAUTION!

This combination of symbol and signal word warns of a potentially hazardous situation, which if not avoided may cause injury or material and environmental damage.

NOTICE!

This combination of symbol and signal word warns of a potentially hazardous situation, which if not avoided may cause material and environmental damage.



This symbol highlights useful tips and recommendations as well as information for efficient and fault-free operation.

1.3 Personnel qualifications

Personnel responsible for commissioning, operation, maintenance, inspection and installation must be able to demonstrate that they hold a qualification which proves their ability to undertake the work.

1.4 Dangers of failure to observe the safety notes

Failure to observe the safety notes may pose a risk to people, the environment and the units. Failure to observe the safety notes may void any claims for damages.

In particular, failure to observe the safety notes may pose the following risks:

- The failure of important unit functions.
- The failure of prescribed methods of maintenance and repair.
- Danger to people on account of electrical and mechanical effects.

1.5 Safety-conscious working

The safety notes contained in this manual, the existing national regulations concerning accident prevention as well as any internal company working, operating and safety regulations must be observed.

1.6 Safety notes for the operator

The operational safety of the units and components is only assured providing they are used as intended and in a fully assembled state.

- The units and components may only be set up, installed and maintained by qualified personnel.
- Protective covers (grille) over moving parts must not be removed from units that are in operation.
- Do not operate units or components with obvious defects or signs of damage.
- Contact with certain unit parts or components may lead to burns or injury.
- The units and components must not be exposed to any mechanical load, extreme levels of humidity or extreme temperature.
- Spaces in which refrigerant can leak sufficient to load and vent. Otherwise there is danger of suffocation.
- All housing parts and device openings, e.g. air inlets and outlets, must be free from foreign objects, fluids or gases.
- The units must be inspected by a service technician at least once annually. Visual inspections and cleaning may be performed by the operator when the units are disconnected from the mains.

1.7 Safety notes for installation, maintenance and inspection

- Appropriate hazard prevention measures must be taken to prevent risks to people when performing installation, repair, maintenance or cleaning work on the units.
- The setup, connection and operation of the units and its components must be undertaken in accordance with the usage and operating conditions stipulated in this manual and comply with all applicable regional regulations.
- Local regulations and laws such as Water Ecology Act must be observed.
- The power supply should be adapted to the requirements of the units.
- Units may only be mounted at the points provided for this purpose at the factory. The units may only be secured or mounted on stable structures, walls or floors.
- Mobile units must be set up securely on suitable surfaces and in an upright position. Stationary units must be permanently installed for operation.
- The units and components should not be operated in areas where there is a heightened risk of damage. Observe the minimum clearances.

- The units and components must be kept at an adequate distance from flammable, explosive, combustible, abrasive and dirty areas or atmospheres.
- Safety devices must not be altered or bypassed.

1.8 Unauthorised modification and changes

Modifications or changes to units and components are not permitted and may cause malfunctions. Safety devices may not be modified or bypassed. Original replacement parts and accessories authorised by the manufacturer ensure safety. The use of other parts may invalidate liability for resulting consequences.

1.9 Intended use

Depending on the model, the equipment and the additional fittings with which it is equipped is only intended to be used as an air-conditioner for the purpose of cooling or heating the air in an enclosed room.

Any different or additional use shall be classed as non-intended use. The manufacturer/supplier assumes no liability for damages arising from such use. The user bears the sole risk in such cases. Intended use also includes working in accordance with the operating and installation instructions and complying with the maintenance requirements.

Under no circumstances should the threshold values specified in the technical data be exceeded.

1.10 Warranty

For warranty claims to be considered, it is essential that the ordering party or its representative complete and return the "certificate of warranty" to REMKO GmbH & Co. KG at the time when the units are purchased and commissioned.

The warranty conditions are detailed in the "General business and delivery conditions". Furthermore, only the parties to a contract can conclude special agreements beyond these conditions. In this case, contact your contractual partner in the first instance.

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1.11 Transport and packaging

The devices are supplied in a sturdy shipping container. Please check the equipment immediately upon delivery and note any damage or missing parts on the delivery and inform the shipper and your contractual partner. For later complaints can not be guaranteed.



WARNING!

Plastic films and bags etc. are dangerous toys for children!

Why:

- Leave packaging material are not around.
- Packaging material may not be accessible to children!

1.12 Environmental protection and recycling

Disposal of packaging

All products are packed for transport in environmentally friendly materials. Make a valuable contribution to reducing waste and sustaining raw materials. Only dispose of packaging at approved collection points.



Disposal of equipment and components

Only recyclable materials are used in the manufacture of the devices and components. Help protect the environment by ensuring that the devices or components (for example batteries) are not disposed in household waste, but only in accordance with local regulations and in an environmentally safe manner, e.g. using certified firms and recycling specialists or at collection points.



2 Electrical wiring

2.1 System layout

The heat pump SQW 400 can be used both as a single unit (monoblock) and also as a cascade.

Single system layout SQW 400



Fig. 1: System layout for single unit

Cascade system layout SQW 400



Fig. 2: System layout as cascade (here in triple version)

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2.2 Electrical wiring general notes

- A power supply cable must be laid to both to the outdoor unit and, separately, to the Smart Control.
- Power to the smart control may not be disconnected by the power company when fitted with an off-period circuit (anti-freeze protection).
- All Smart Controls require a single-phase 230V/50Hz power supply.
The outdoor units require a single-phase 400V/50Hz power supply.
- The electrical connection between outdoor and indoor units is made using a sheathed dual control line.
- If necessary, another three-phase 400V/50Hz power supply to the outside unit for electrical auxiliary heater / Smart-Serv must be provided.
- The Smart-Control needs to know from the power-company whether the power supply is enabled or a blocking period is in effect. A potential-free switch must be installed by the customer for this purpose. (Contact closed signifies enabled, while contact open signifies a blocking period).
- A connection schematic along with corresponding circuit diagrams can be found in the "Electrical layout" and "Circuit plans" chapters of this manual.
- Special rates for the operation of heat pumps may be offered by the power-company (utility).
- Ask your local power company about the details of any rates that might be available.

DANGER!

All electrical installation work must be done by an electrician.

WARNING!

Always note the currently applicable VDE guidelines and the notes in TAB 2007. The size and type of the fuse are to be taken from the technical data.

WARNING!

All cable sizes are to be selected according to VDE 0100. Special attention should be given to cable lengths, cable type and the kind of installation. The information in the connection diagram and in the system overview are to be seen as an acceptable installation possibility only in a standard case!

NOTICE!

Make sure to connect the outdoor unit neutral connector properly, otherwise the varistors on the line-filter circuit board will be destroyed.

NOTICE!

The electrical connection for the units must be made at a separate feedpoint with a residual current device in accordance with local regulations and should be laid out by an electrician.



Check all plugged and clamped terminals to verify that they are seated correctly and make permanent contact. Tighten as required.

2.3 Electrical wiring

- To connect up the electrics, remove the right cladding panel after unfastening the screws.

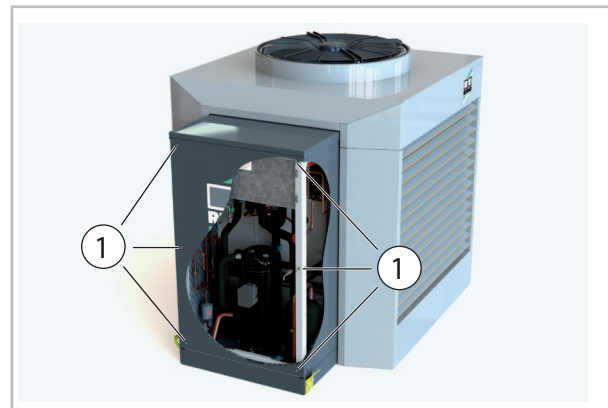


Fig. 3: Remove the cover by unfastening the screws

1: Screws

- Electrical protection for the system is implemented in accordance with the information in the Technical Data. Observe the required conductor cross-sections!
- All cables must be connected with the correct polarity and strain relief.
- Follow the connection schematic and the circuit diagrams.
- When connecting the control line, make sure that polarity is correct.
- If the outdoor unit is installed on a roof, it and the supporting structure must be earthed separately (connection to lightning conductors or foundation earth/ground feature).

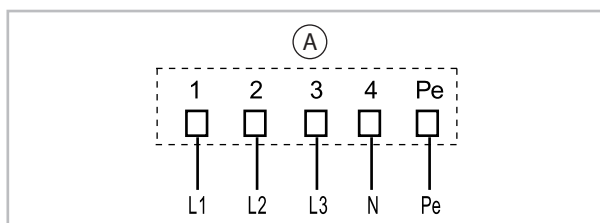
! NOTICE!

Make sure to connect the outdoor unit neutral connector properly, otherwise the varistors on the line-filter circuit board will be destroyed.

Electrical connection e-heating coil

Mains voltage connection takes place on site from Sub-distribution.

E-heating coil 9kW, power supply 400V/3~/N/PE
e.g. 5 x 2,5 mm²



A: Plug on the electric heating coil

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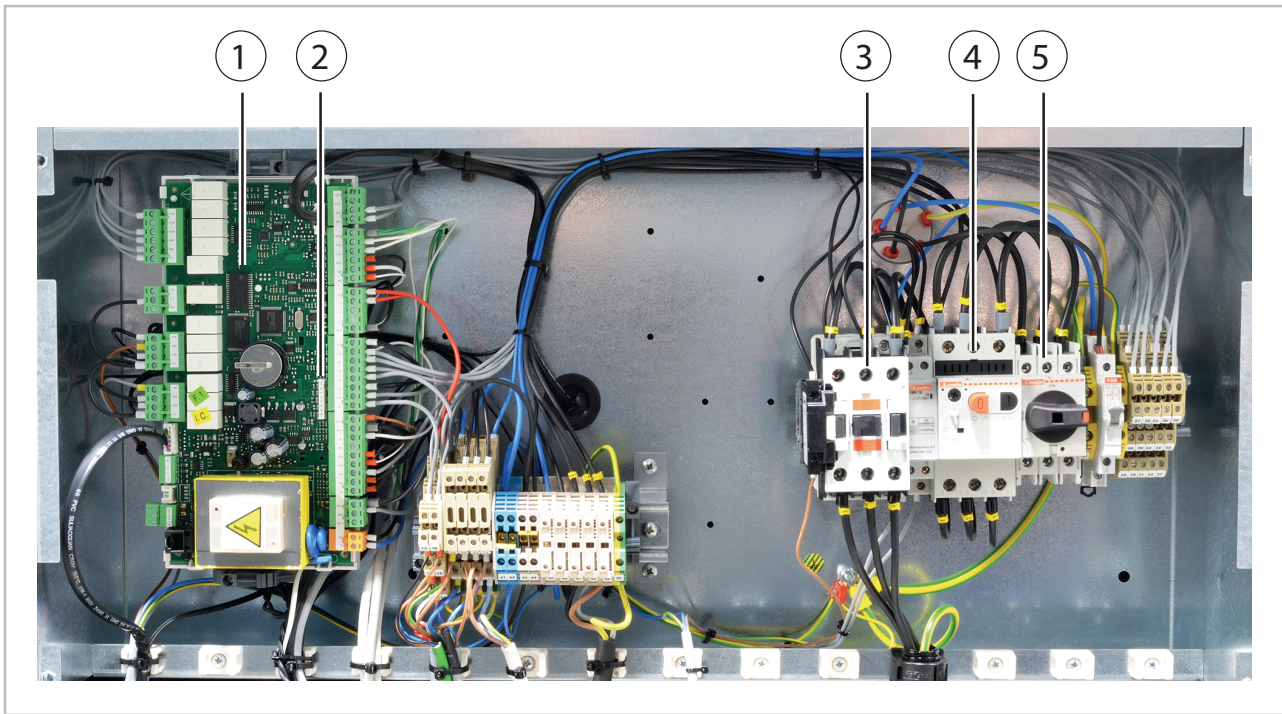


Fig. 4: Terminal assignment in the terminal box

- | | |
|------------------------|-------------------------------------|
| 1: Carel control board | 4: Motor overload protection switch |
| 2: Smart-Control plug | 5: Power supply 400V/3~/N/Pe |
| 3: Compressor contact | |

Cable inlets

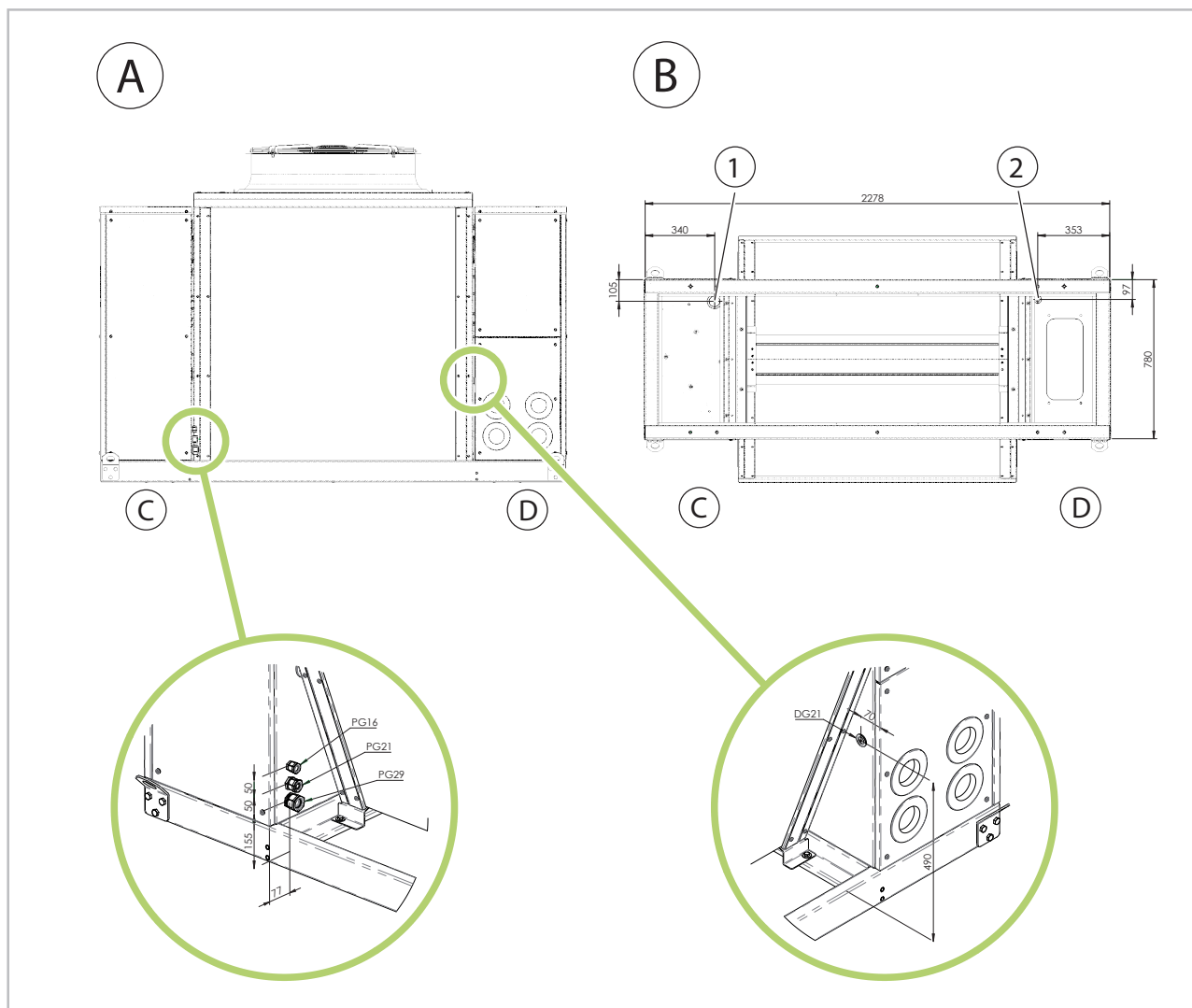


Fig. 5: Cable inlets

A: Side view

B: View from below

C: Compressor side

D: Water connection side

1: Mains inlet and auxiliary ports

2: Mains cable inlet electrical auxiliary heater

3: Mains cable inlet from underneath Ø DG53

4: Mains cable inlet electrical auxiliary heater from underneath Ø DG21

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2.4 Overview of electrical cables

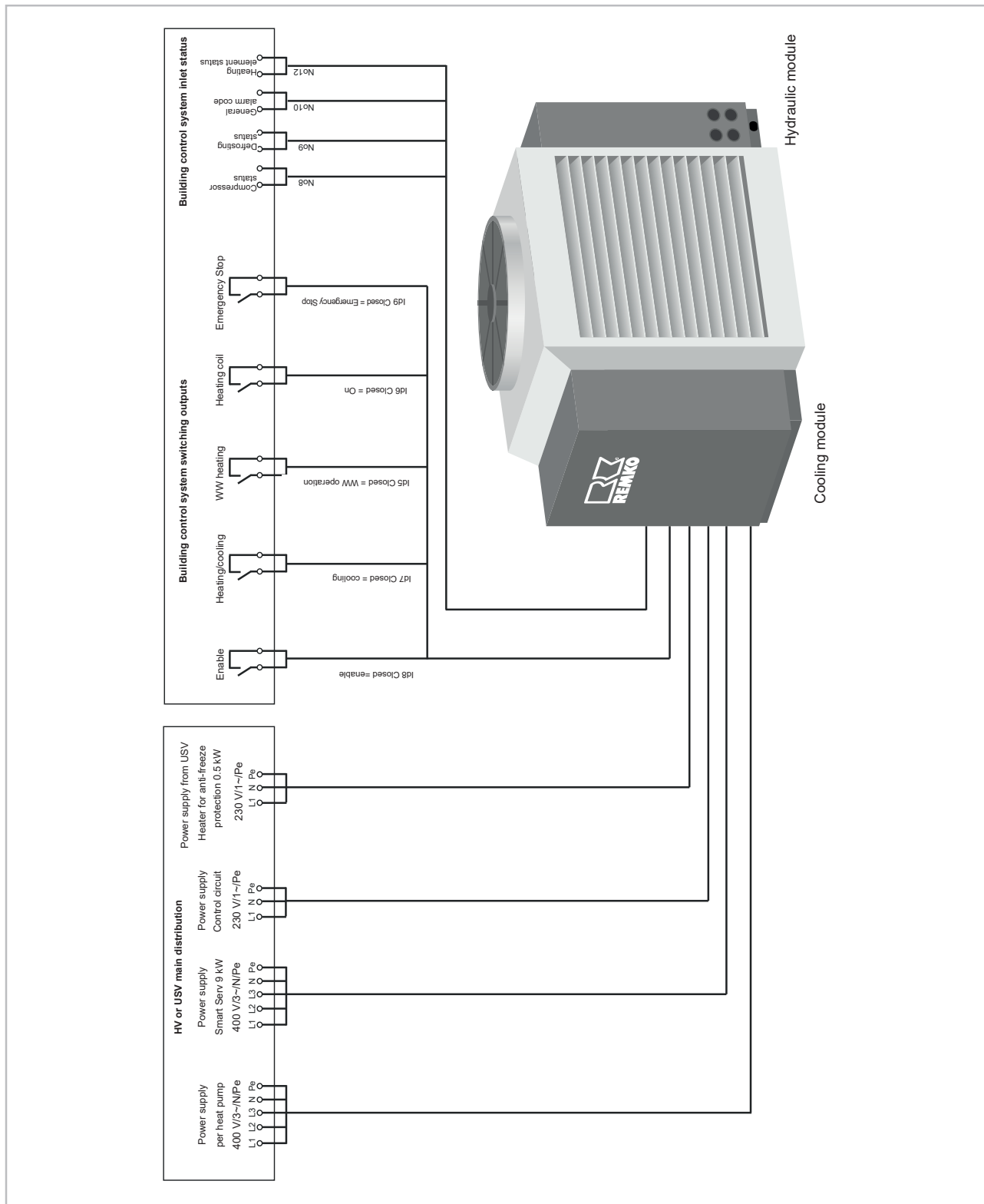


Fig. 6: Heat pump without Smart Control

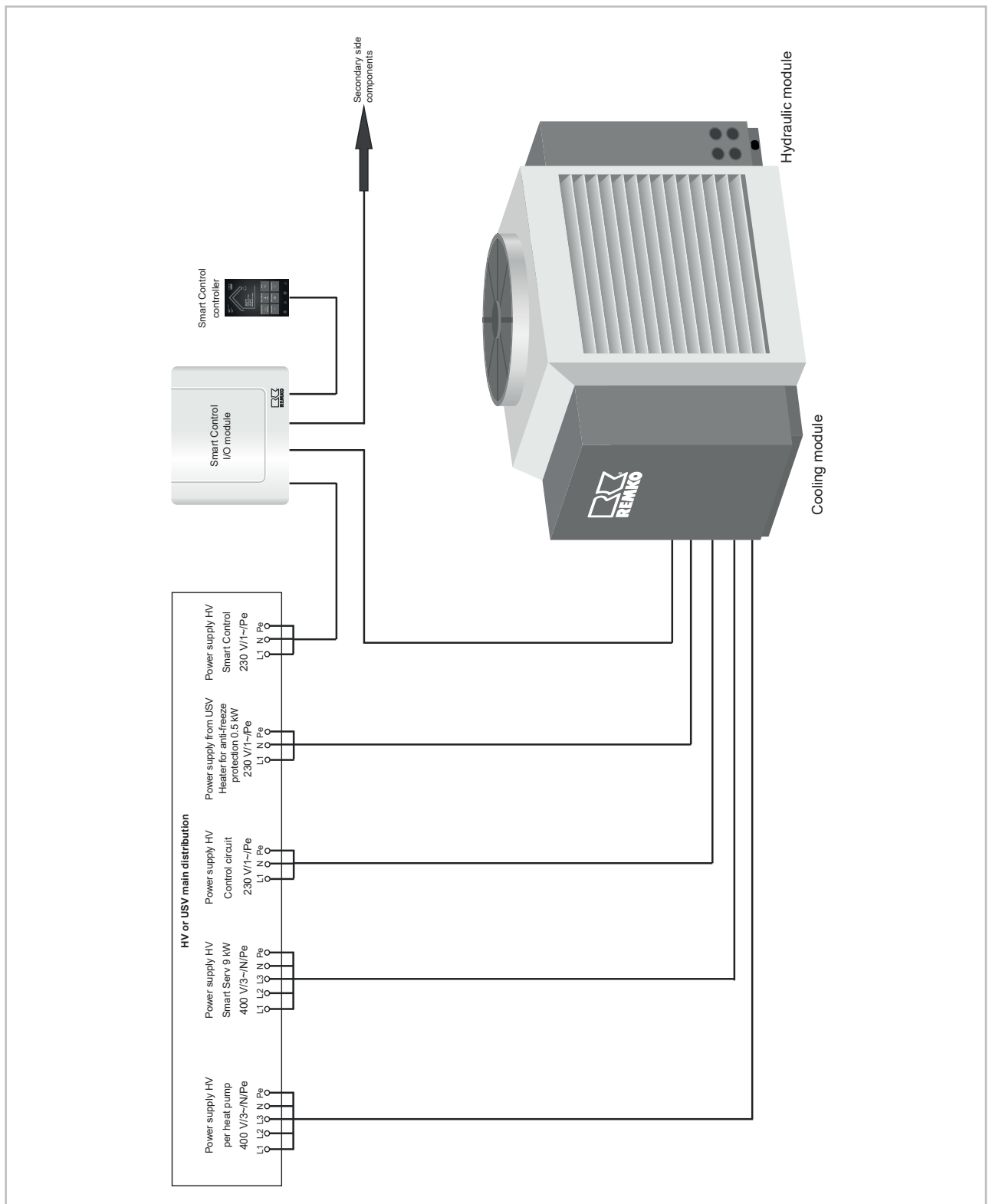
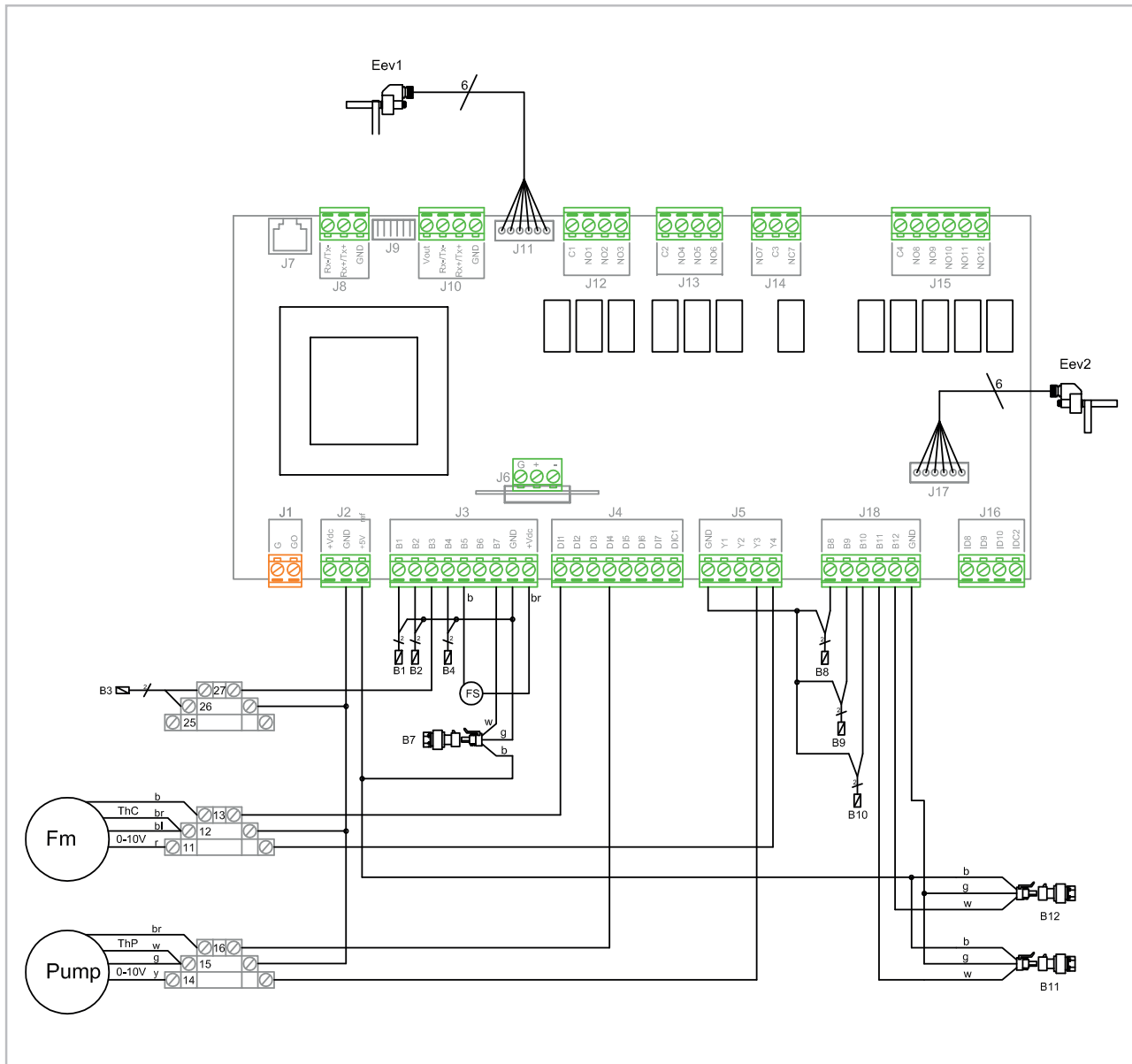


Fig. 7: Heat pump with Smart Control

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2.5 Electrical wiring diagram

Signal circuit wiring diagram

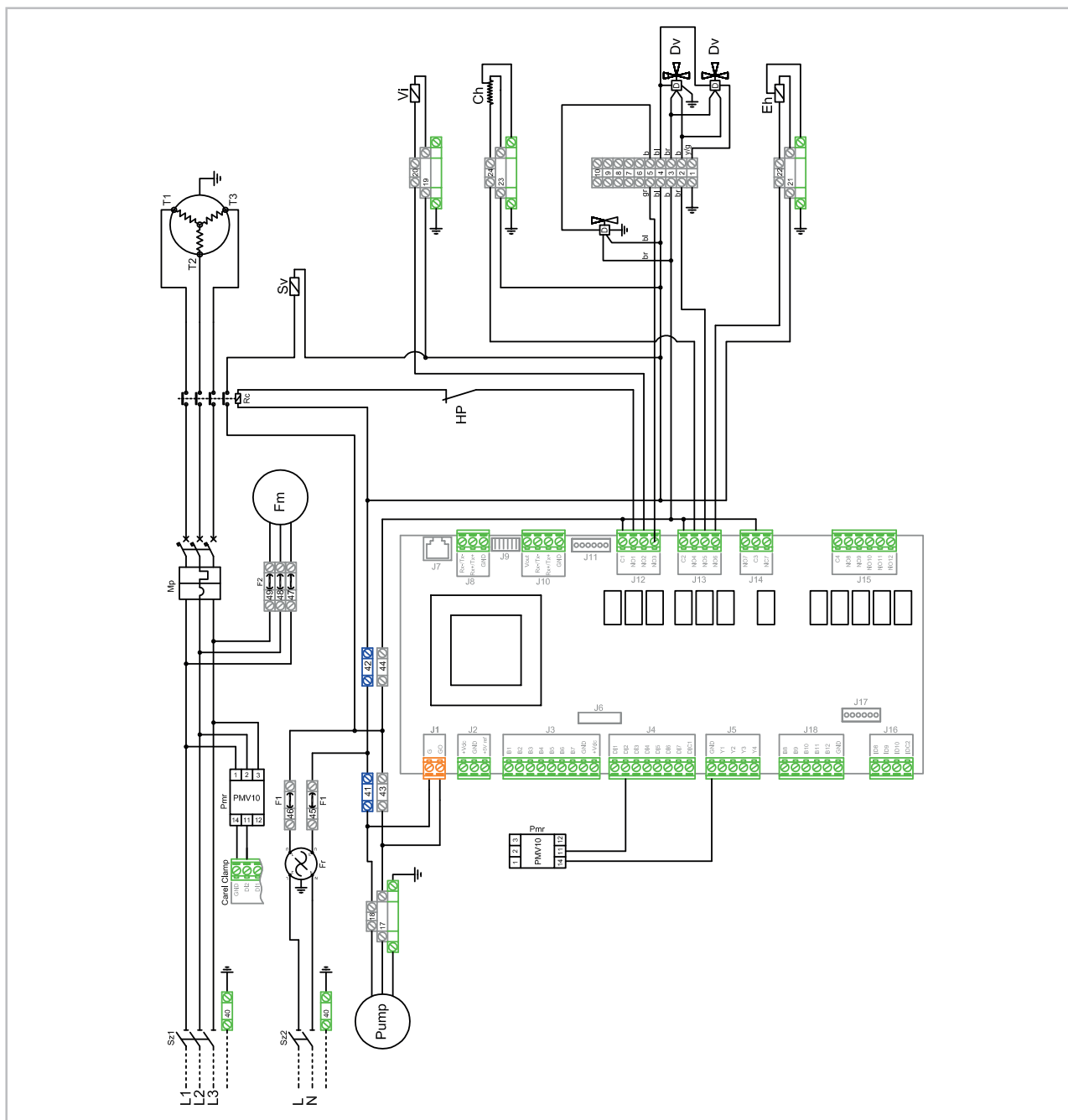


Legend:

B1: Heat dissipation sensor
 B2: Outside temperature
 B3: Drinking water sensor
 B4: Infeed water temperature (RL)
 B5: Steam temperature from EVI circuit
 B7: Transformer
 B8: Outfeed water temperature (VL)
 B9: Compressor outlet temperature
 B10: Suction temperature
 B11: High pressure converter
 B12: Low pressure converter
 DHP: Heat gas heat recovery
 Eev1: Elec. expansion valve main circuit

Eev2: Elec. expansion valve EVI circuit
 Fm: Fan motor
 FS: Flow probe
 Pump: Primary pump
 ThC: Overtemperature alarm for fan
 ThP: Overtemperature alarm for pump
 Colours:
 b: black
 blu: blue
 bro: brown
 g: green
 r: rose pink
 y: yellow
 w: white

Power circuit wiring diagram



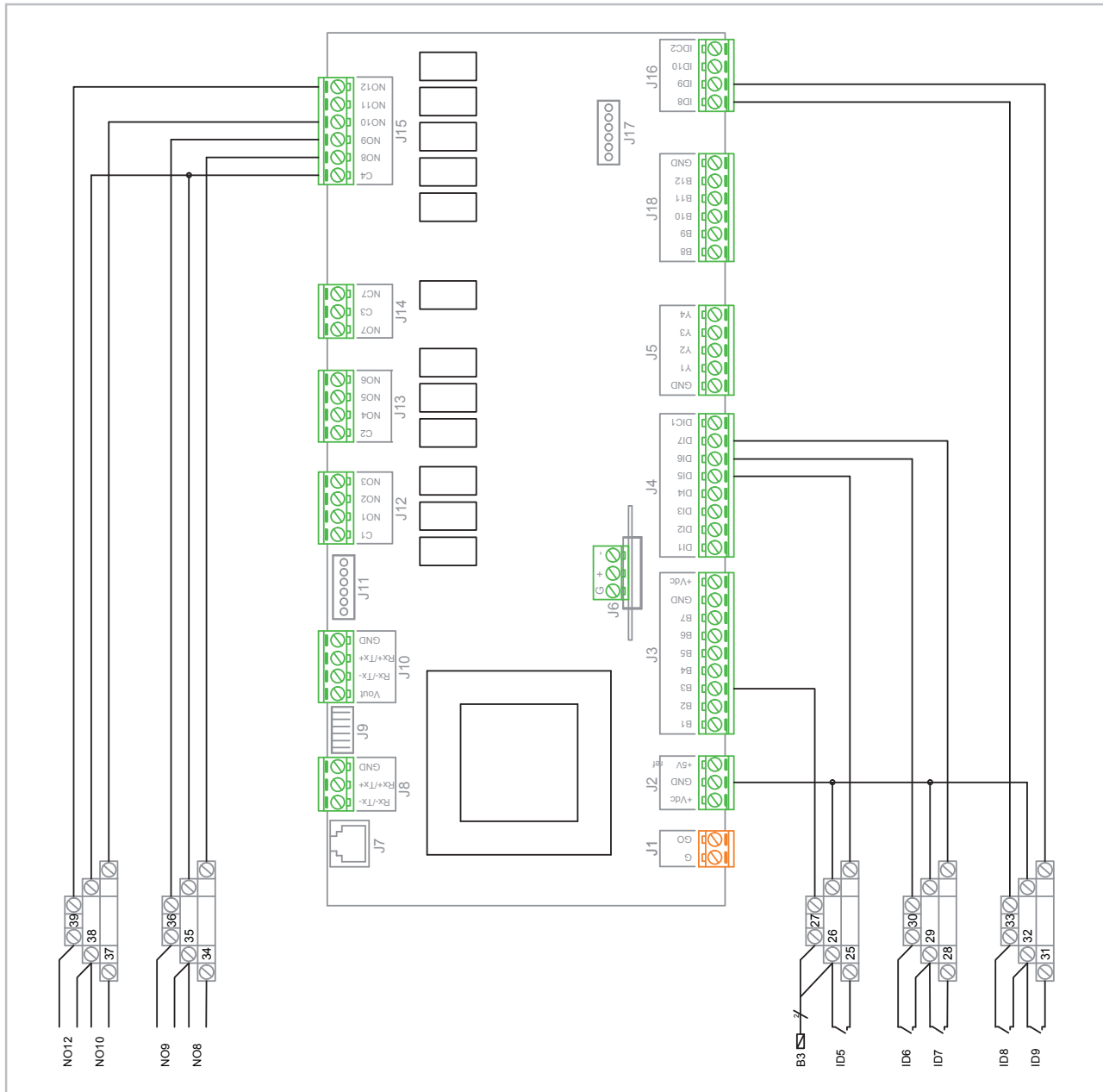
Legend:

Ch:	Compressor trace heating
Comp:	Compressor
Dv:	3-way valve
Eh:	Control command e-heating element 9 kW
F1:	Fuse 16 A
F2:	Fuse 6 A
Fm:	Fan motor
Fr:	Interference filter
Hd:	Condensate discharge heating
Hp:	High pressure switch
Mp:	Compressor motor protection
Ph:	Capacitor
Pmr:	Phase monitoring relay

Pump:	Primary pump
Rc:	Compressor contact
Sv:	Solenoid valve
Sz1:	Main power supply isolator switch for 3-phase power supply
Sz2:	Main power supply isolator switch for 1-phase power supply
Vi:	4-way valve
Colours:	
b:	black
blu:	blue
bro:	brown
y/g:	yellow/green

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Electrical connection diagrams control board via building control technology



Legend:

B3: Hot water probe
 ID5: Inlet hot water operation potential-free
 ID6: Inlet Smart-Serv operation potential-free
 ID7: Switching heating/cooling potential-free
 ID8: Enable heat pump potential-free

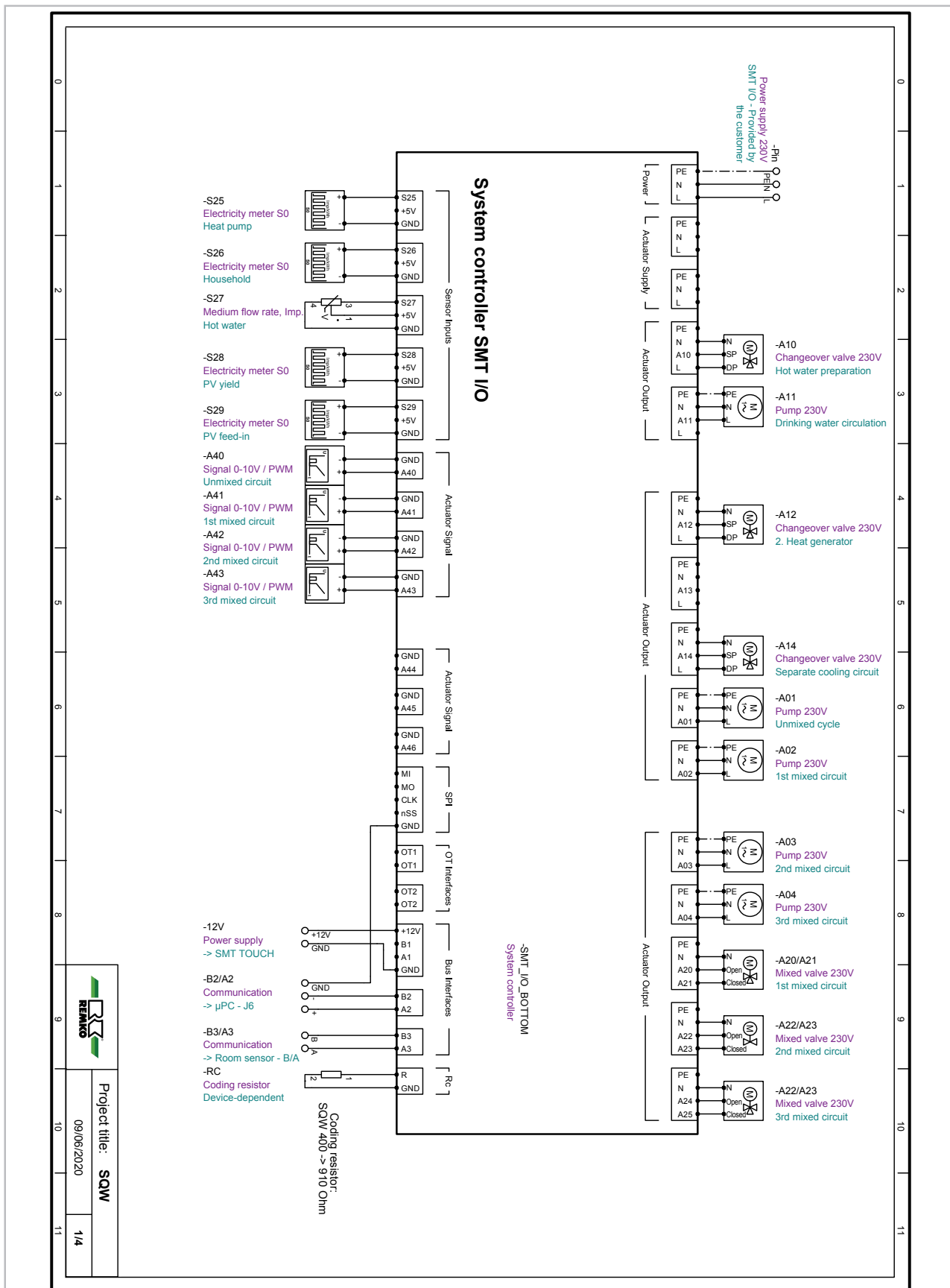
ID9: Emergency stop potential-free
 NO8: Compressor status potential-free
 NO9: Defrost status potential-free
 N10: Output general alarm signal potential-free
 N12: Output auxiliary heat generator potential-free (e.g. gas or oil)

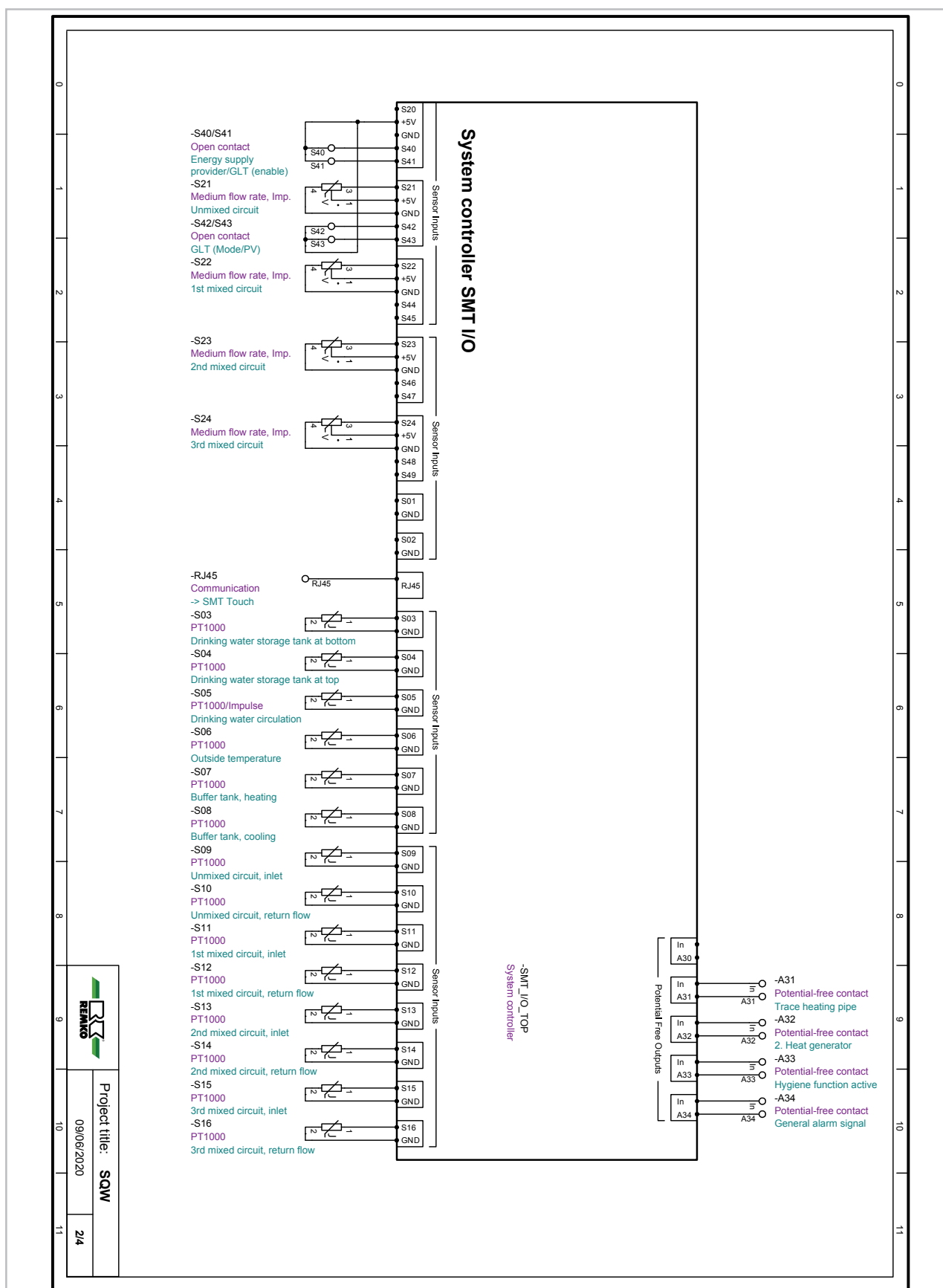
! NOTICE!

All connections on plug J15 must have the same voltage level (max. 230V).

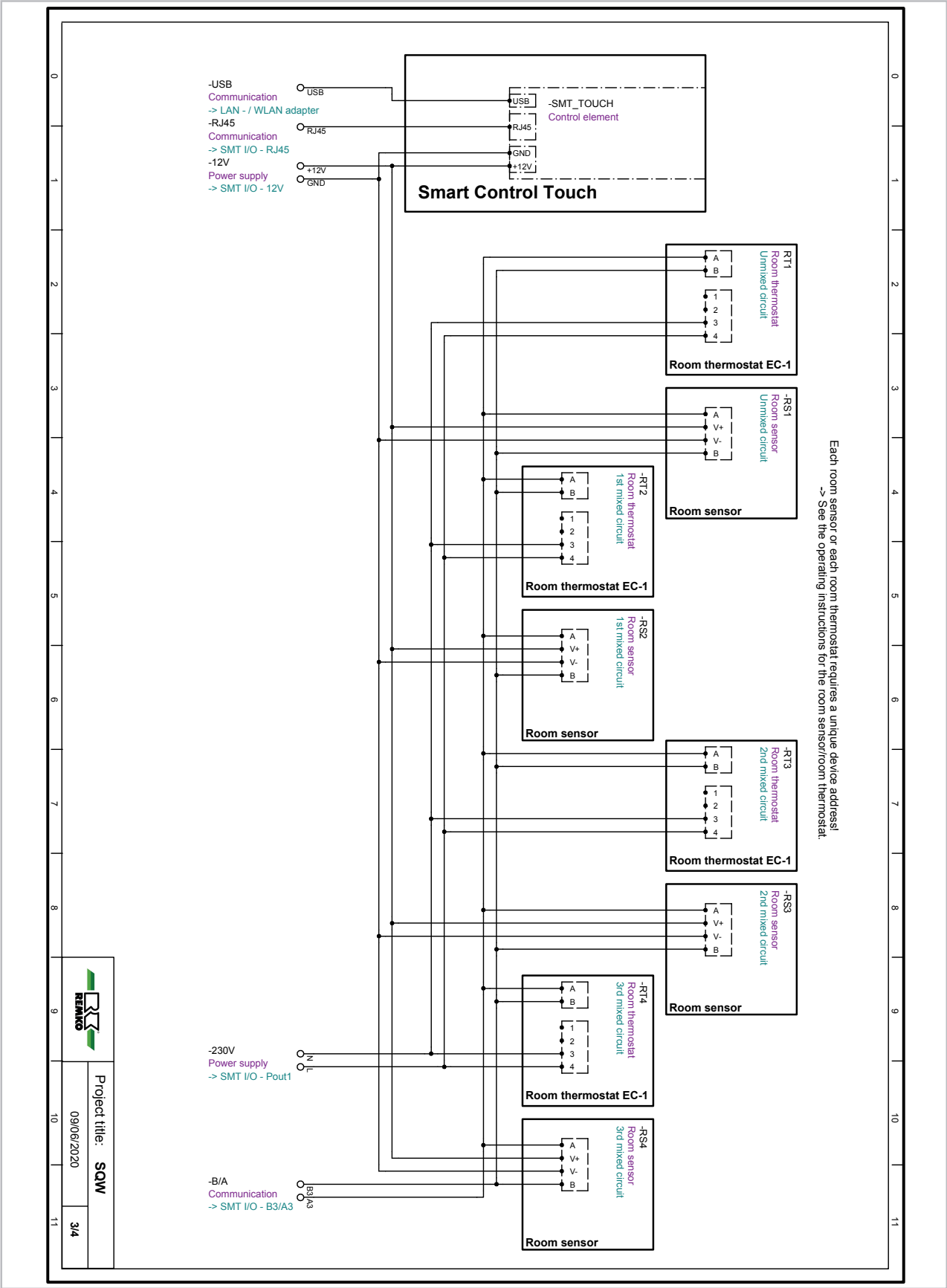
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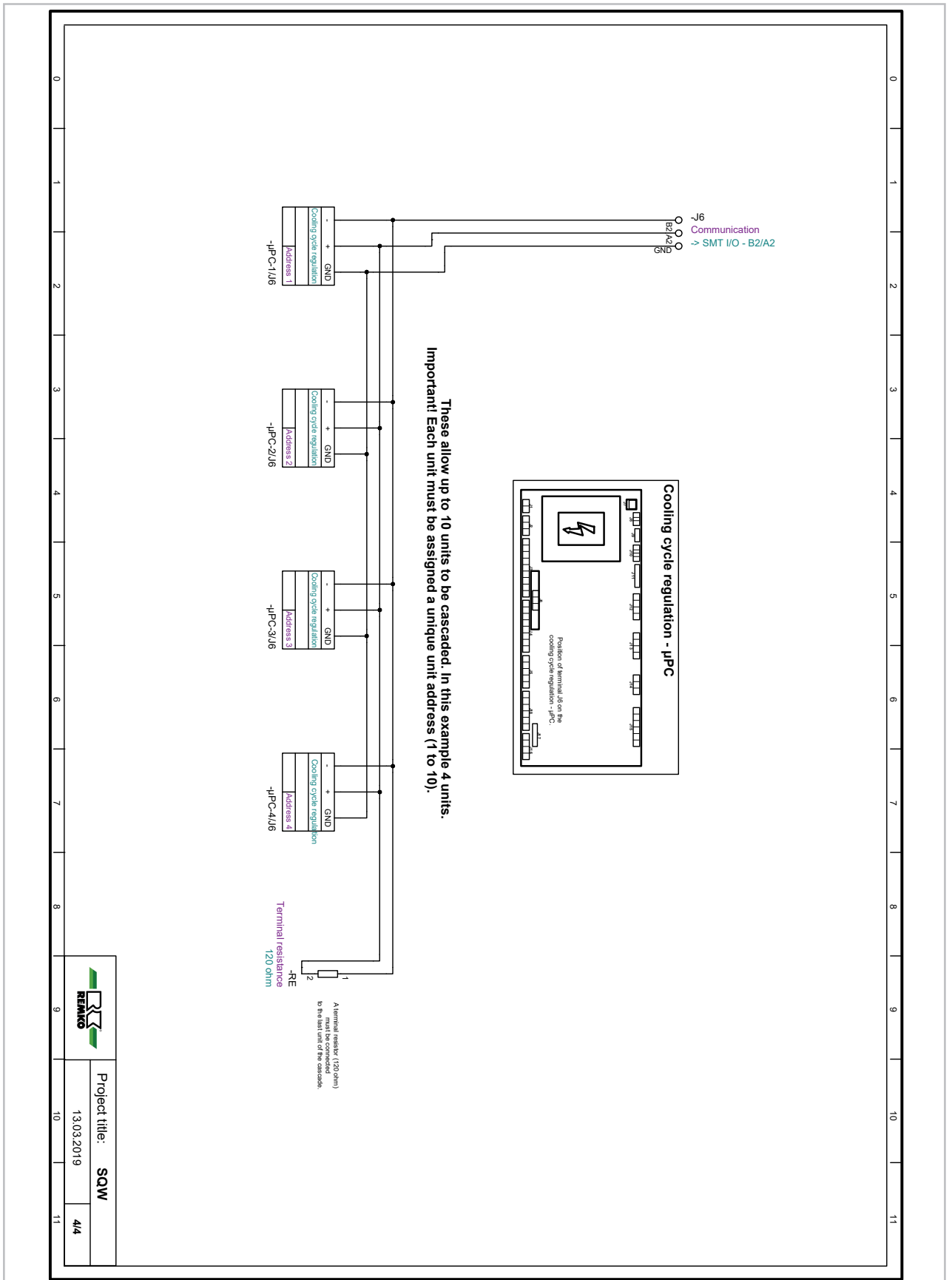
3 Circuit diagrams





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Legend for the circuit diagrams

mix.:	mixed
PWM:	Pulse width modulation
Power supp.:	Power supply
unmix.:	unmixed

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