

■ Electrical wiring

REMKO WKF series

Smart Heat Pumps

Air/water system for heating and cooling

WKF 70, WKF 120, WKF 180, WKF 70 compact, WKF 120 compact, WKF 180 compact,
WKF 120 Duo, WKF 180 Duo





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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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.



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2.2 System layout WKF/WKF-compact 120

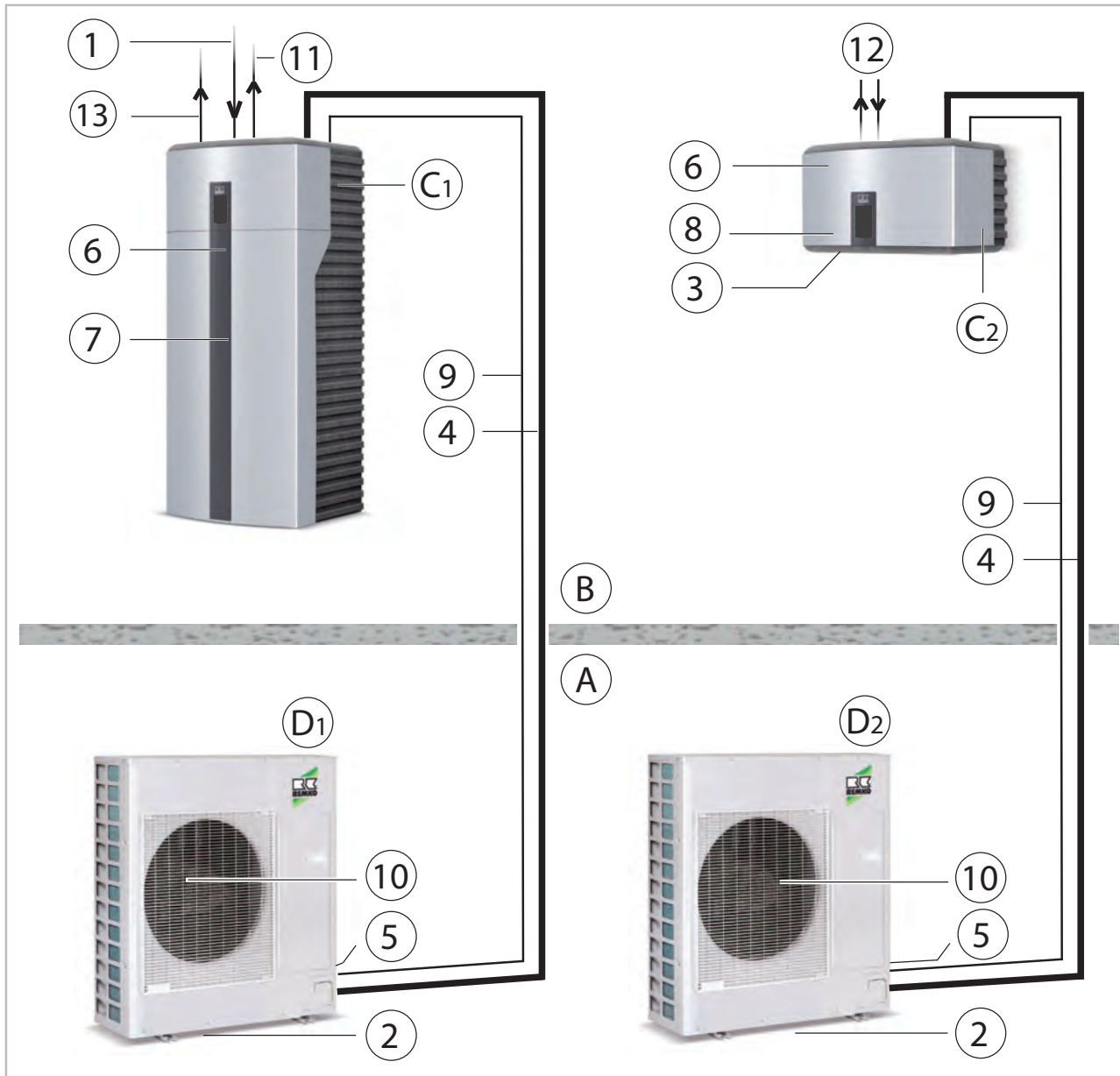


Fig. 2: System layout WKF/WKF-compact 120

- | | | | |
|-----|---|-----|---|
| A: | Outdoor area | 6: | Mains supply indoor module = 230V/1~/50Hz 16A (e.g. 3x1,5 mm ²) |
| B: | Indoor area | 7: | Mains cable electric auxiliary heater (e.g. 5x2,5 mm ²) |
| C1, | Indoor module WKF-compact 120, WKF | 8: | Mains cable electric auxiliary heater (optional), (e.g. 5x2,5 mm ²) |
| C2: | | 9: | Control cable sheathed (e.g. 2x1mm ²) |
| D1, | Outdoor module WKF-compact 120, WKF | 10: | Fan |
| D2: | 120 | 11: | Inlet for heating (DN 32) |
| 1: | Common return pipe (DN 25) | 12: | Hot-water inlet and return pipes (DN 32) |
| 2: | Condensate drain outdoor module (must be designed to be frost proof!) | 13: | Inlet pipe for hot-water tank (DN 32) |
| 3: | Condensate drain indoor module | | |
| 4: | Refrigerant lines 3/8" and 5/8" | | |
| 5: | Mains supply outdoor module = 230V/3~/50Hz 20 A (e.g. 3x2,5 mm ²) | | |

2.3 System layout WKF/WKF-compact 180

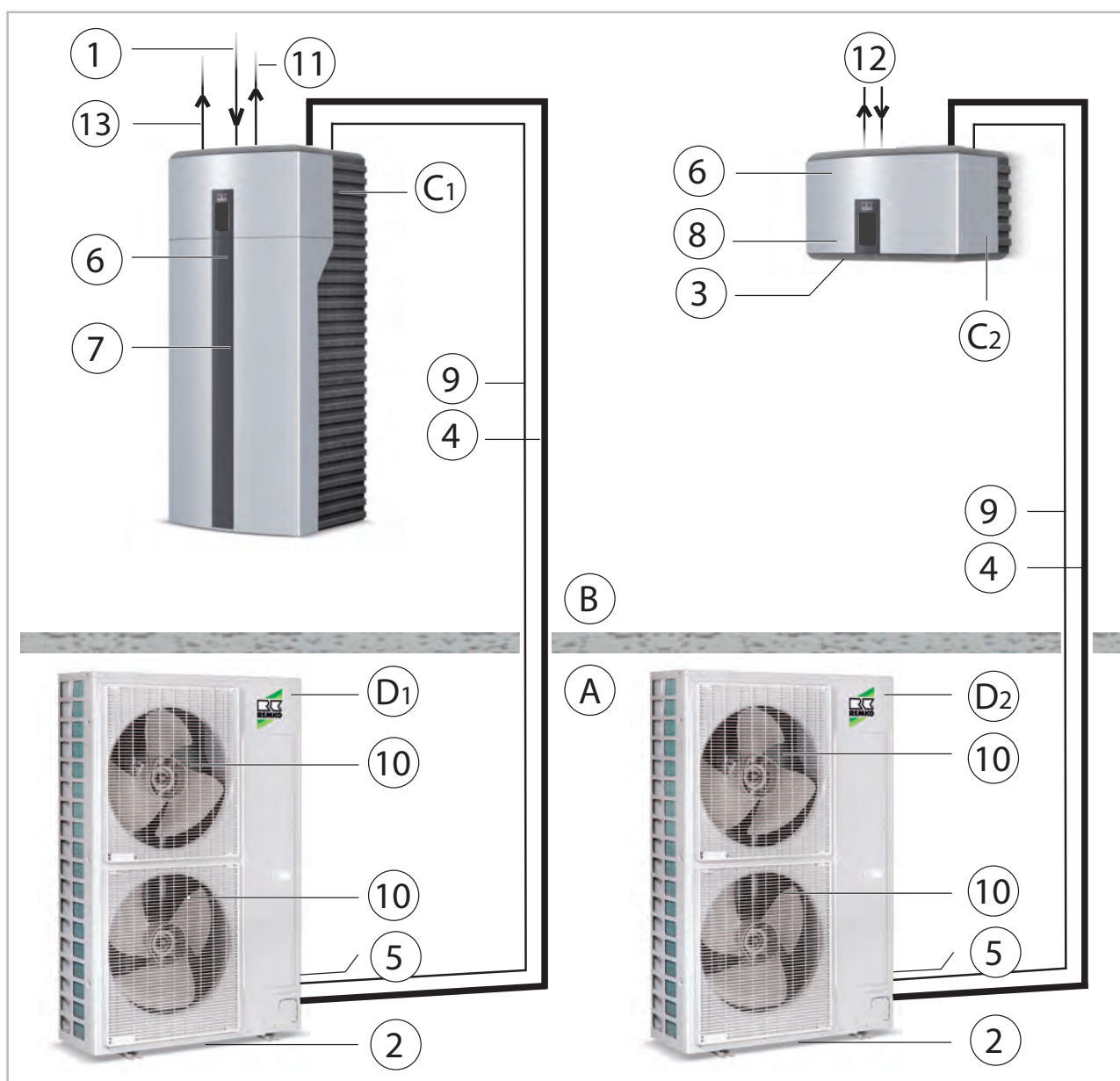


Fig. 3: System layout WKF/WKF-compact 180

- | | | | |
|-----|---|-----|---|
| A: | Outdoor area | 6: | Mains supply indoor module = 230V/1~/50Hz 16A (e.g. 3x1,5 mm ²) |
| B: | Indoor area | 7: | Mains cable electric auxiliary heater (e.g. 5x2,5 mm ²) |
| C1, | Indoor module WKF-compact 180, WKF 180 | 8: | Mains cable electric auxiliary heater (optional), (e.g. 5x2,5 mm ²) |
| C2: | | 9: | Control cable sheathed (e.g. 2x1mm ²) |
| D1, | Outdoor module WKF-compact 180, WKF 180 | 10: | Fan |
| D2: | | 11: | Inlet for heating (DN 32) |
| 1: | Common return pipe (DN 25) | 12: | Hot-water inlet and return pipes (DN 32) |
| 2: | Condensate drain outdoor module (must be designed to be frost proof!) | 13: | Inlet pipe for hot-water tank (DN 32) |
| 3: | Condensate drain indoor module | | |
| 4: | Refrigerant lines $\frac{3}{8}$ " and $\frac{5}{8}$ " | | |
| 5: | Mains supply outdoor module = 400V/3~/50Hz 3x16 A (e.g. 5x1,5 mm ²) | | |

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2.4 Overview of the electrical cables

WKF/WKF-compact 70 and 120

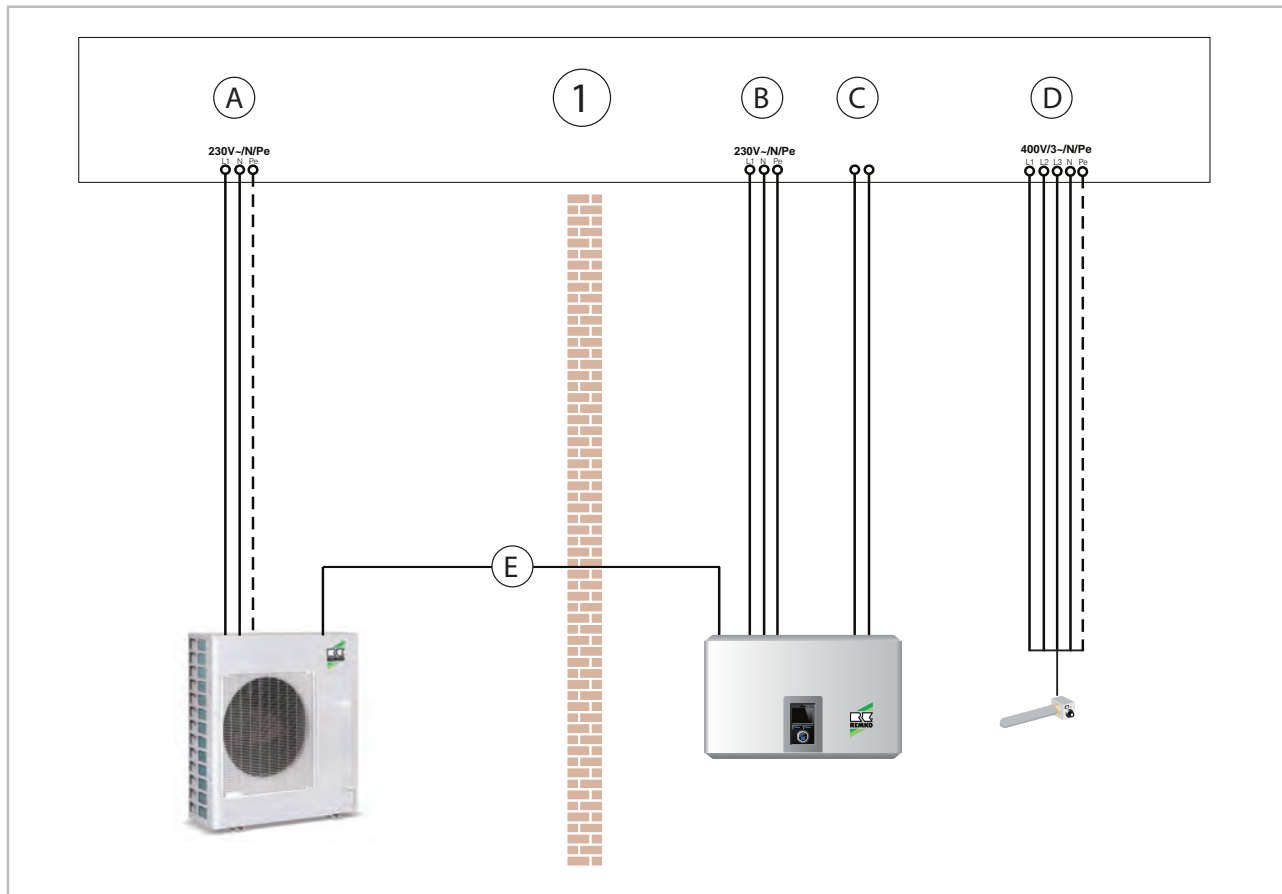


Fig. 4: Overview of the electrical cables WKF/WKF-compact 70 und 120

- | | |
|---|--|
| 1: Main distributor | D: Power supply, 9 kW heating element, indoor unit |
| A: Power supply, outdoor unit | E: Communication F1/F2, Outdoor unit / indoor unit |
| B: Power supply, indoor unit | 2x1 mm ² shielded |
| C: Power company disable signal, potential-free / open = disabled | |

WKF/WKF-compact 180

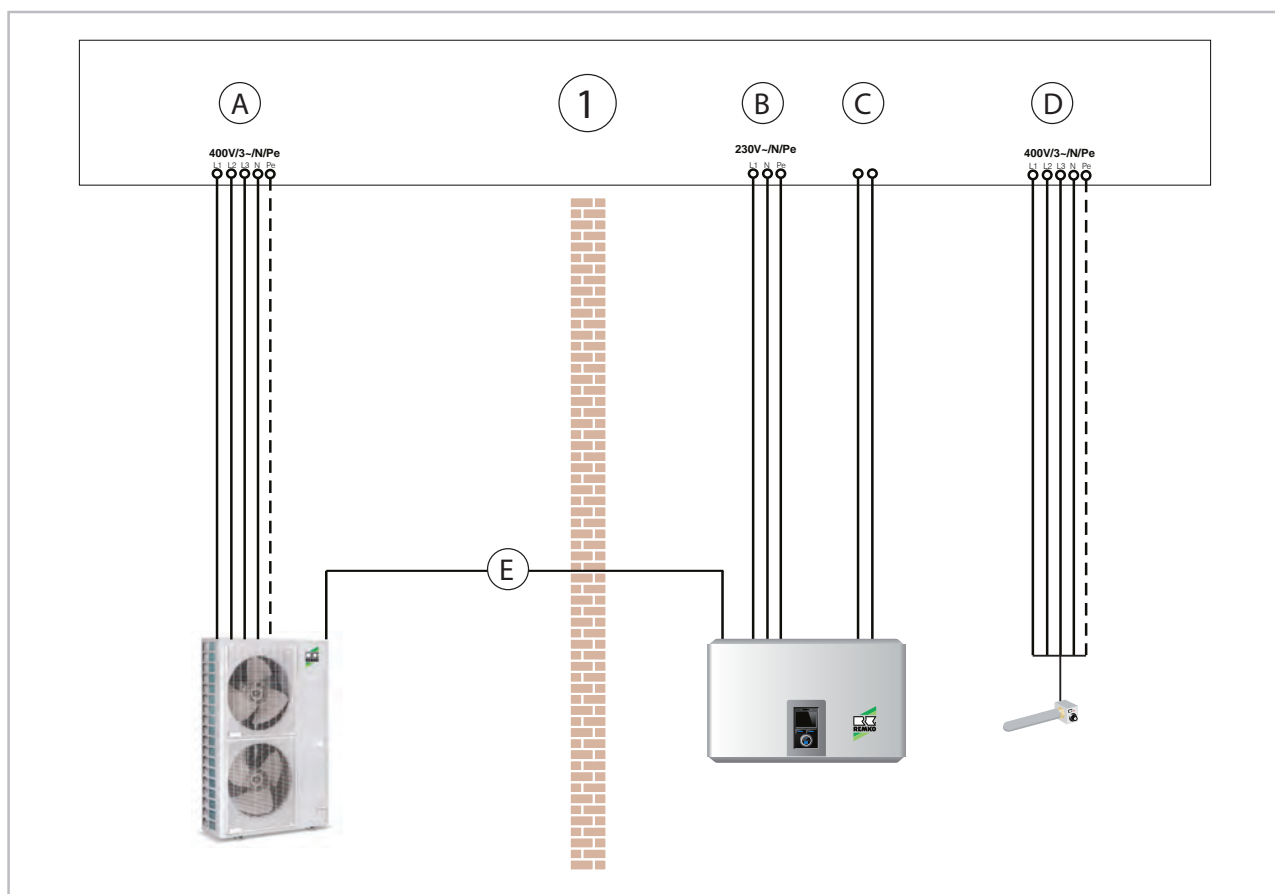


Fig. 5: Overview of the electrical cables WKF/WKF-compact 180

- | | |
|--|--|
| 1: Main distributor | D: Power supply, 9 kW heating element, indoor unit |
| A: Power supply, outdoor unit | E: Communication F1/F2, Outdoor unit / indoor unit |
| B: Power supply, indoor unit | 2x1 mm ² shielded |
| C: Power company disable signal, potential-free / open = OM disabled | |

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2.5 Elektrical connection general notes

- It is necessary to lay a power-supply cable both to the outdoor unit and, separately, to the indoor unit.
- Power to the indoor unit may not be disconnected by the power company (frost protection).
- All indoor units require a single-phase power supply at 230 V / 50 Hz.
The outdoor units series WKF/WKF-compact 70 and 120 require a single-phase power supply at 230 V / 50 Hz and the outdoor units series WKF/WKF-compact 180 require a three-phase power supply at 400 V / 50 Hz.
- The electrical connection between outdoor- and indoor units is made using two-wire control cable.
- Where applicable, a separate three-phase power supply 400 V / 50 Hz shall be provided to the indoor unit for electric booster heating.
- The Smart-Control needs to know whether a power-company release- or off-period is in effect. An electrically-isolated switch must be installed for this purpose (an closed switch signifies power available, an open switch, off-time).
- In the chapter "Structure electrical connection" and "Circuit diagrams" in this manual can be found a connection schematic along with corresponding circuit diagrams.
- Special rates for heat pumps may be offered by the power company (PSC).
- 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.

2.6 Electrical connection - indoor unit

The following instructions describe the electrical connection of the WKF/WKF-compact indoor units.

1. ➤ Remove the cover of the top of keeping it up push and pull forward from the rear groove.
2. ➤ Thread the power cable of the indoor unit - as well as the control cable between the indoor- and outdoor units and the cables for external devices and sensors - through the cable openings into the indoor unit. Note that the cable openings in the WKF/WKF-compact 120 series are located above rather than below.
3. ➤ Connect the power supply of the indoor unit to the terminal blocks.
4. ➤ Connect all the secondary consumers (HGM, HGU, changeover valves etc.) at the I/O module.

! NOTICE!

Attach cables in accordance with the connection schematic and/or the circuit diagram in the control box.

! NOTICE!

Ensure correct polarity when connecting the electrical leads, especially the control cable.



The number of lines and the sensors is dependent on the configuration of the heating system and the components.



Make sure to use enough cable when installing the indoor unit so that the control box can be fully lowered for future maintenance.



At the site, avoid adding cable inlets.

2.7 Electrical connection - outdoor unit

- For the electrical connection loose the right side cover by loosening the screws.



Fig. 6: Series WKF/WKF-compact 70/120 - Remove the cover by loosening the screw

1: screw



Fig. 7: Series WKF/WKF-compact 180 - Remove the cladding sheet by loosening the screws

1: screw

- 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 diagram.
- Connect the two-wire control cable to terminals F1, F2 and the earth terminal.
- When connecting the control cable, 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 a lightning rod or a concrete-footing earth electrode).
- In the series WKF/WKF-compact 180 it must be ensured that only the terminals L1(R), L2(S), L3(T) and N are connected (see Fig. 10).

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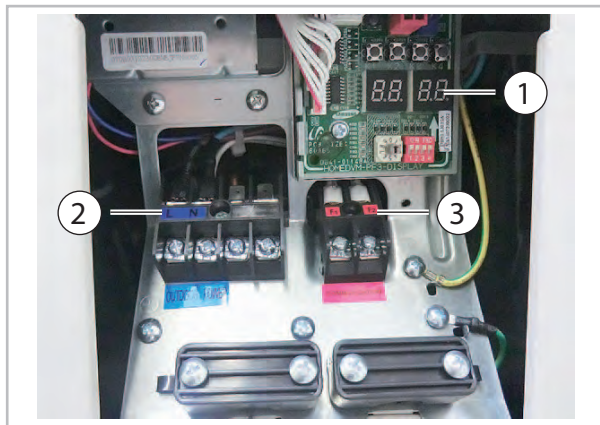


Fig. 8: Connection terminals - outdoor unit WKF/WKF-compact 70

- 1: Display
- 2: Power supply 230V/1~ /50Hz
- 3: Control cable F1/F2

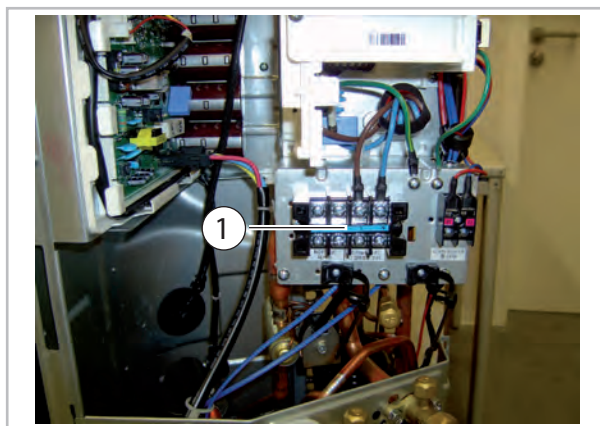


Fig. 9: Connection terminals - outdoor unit WKF/WKF-compact 120

- 1: Power supply 230V/1~ /50Hz

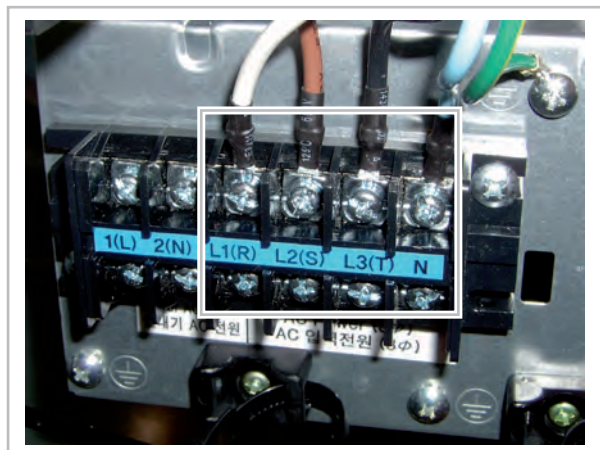


Fig. 10: Connection terminals - outdoor unit WKF/WKF-compact 180

! NOTICE!

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

Temperature sensors

- The number of sensors required can vary with the type of system.
- Observe the pertinent notes for the sensor position found in the hydraulic schematic.
- The standard model includes an external sensor (S10), a submersible sensor (intended for use as a custom hot-water sensor (S08) and a sensor for a total inlet at the indoor unit.
- When connecting solar panels, the PT-1000 sensor (S01) as a collector sensor and a PT-1000 sensor (S02) as a lower storage tank sensor must be used.
- All sensors are to be connected to the indoor-unit switching-cabinet according to the terminal-assignment diagram.

Contact sensor

Contact sensors can be mounted on the pipes, to measure the heating-circuit temperatures, for example.

- The contact sensor is fastened to a pipe with the trapezoidal brackets and retaining strap provided.
- Clean the mounting point on the pipe. Subsequently a thermal compound (A) is applied and the sensor is fixed in position.

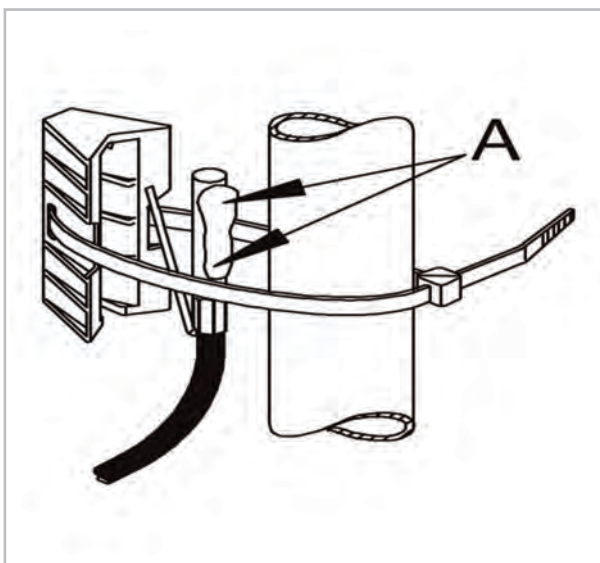


Fig. 11: Fixation of the contact sensor



If the sensor cables are too short, they can be extended up to a maximum of 100m with wire having a cross-section of 1.5 mm².

External sensor

The connection of an outdoor sensor is always required for the heat pump manager.

- Mount the outdoor sensor pointing skyward, in a north-easterly direction, about 2.5 metres above the ground. It may not be subjected to direct sunlight and is to be protected against excessive wind. Installation above windows or air ducts is to be avoided.
- In order to carry out the installation, remove the cover and secure the sensor with the screws provided.
- A cable with wire cross-sections of 0.5 mm² is recommended for connecting the sensor.

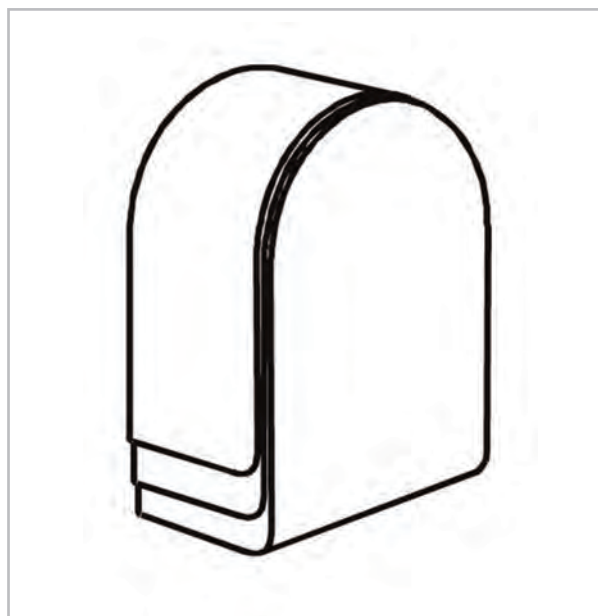
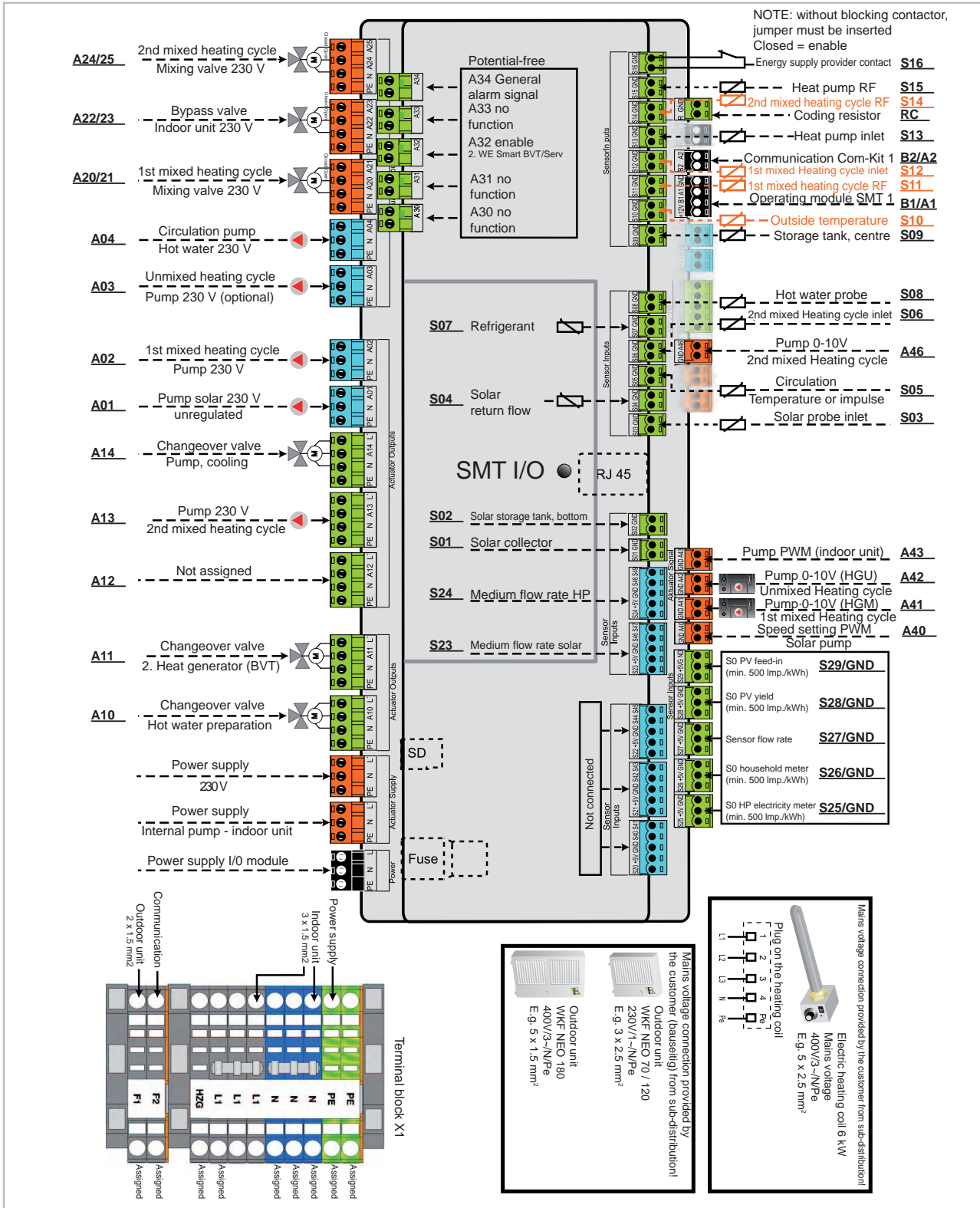


Fig. 12: External sensor

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2.8 Structure electrical connection I/O module - WKF/WKF-compact 70/120/180

Cable cross-sections corresponding to the supplied connection cable!
Place the load lines separately from the measure lines!



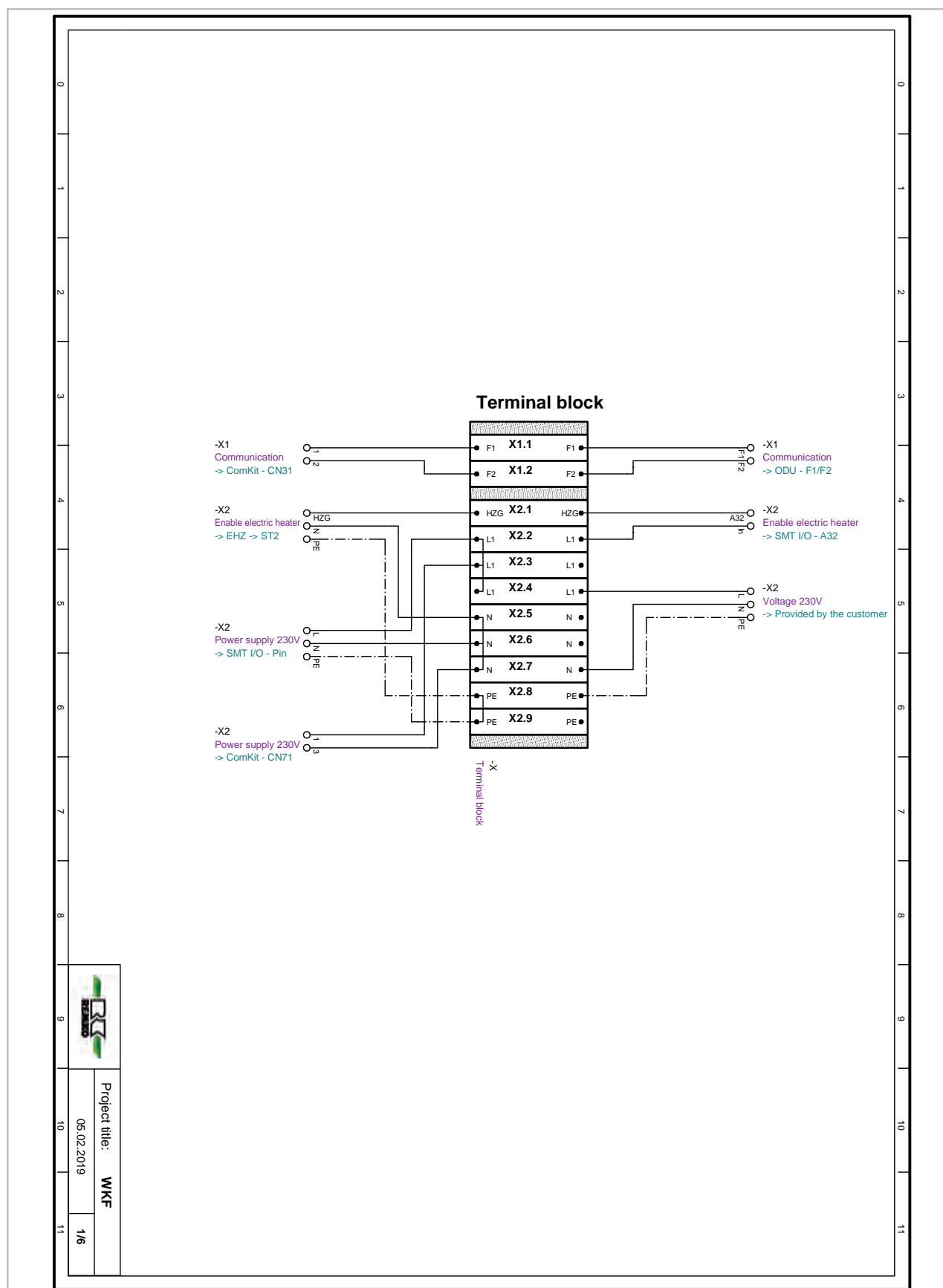
2.9 Terminal assignment / legend - WKF/WKF-compact 70/120/180

Terminal	Input	Output	Signal	Connection layout
PW	X			Power supply I/O 230V
PP		X		Power supply primary pump indoor unit
S01	X			Probe solar collector
S02	X			Probe solar upper storage tank
S03	X			Probe solar inlet, heat meter solar
S04	X			Probe solar return, heat meter solar
S05	X			Circulation return temp./Impuls
S06	X			2nd mixed heating cycle, probe inlet
S07	X			Probr rrefrigerant line
S08	X			Storage tank domestic water
S09	X			Probe storage tank middle
S10	X			External sensor
S11	X			1st mixed heating cycle, probe return
S12	X			1st mixed heating cycle, probe inlet
S13	X			Heat pump inlet
S14	X			2nd mixed heating cycle, probe return
S15	X			Heat pump return
S16	X			EVU contact (opener) / Dew point monitoring (external)
S20	X			Not connected
S21	X			Not connected
S22	X			Not connected
S23	X			Ultrasonic flow rate meter solar, impulse rate
S24	X			Ultrasonic flow rate meter heat pump, impulse rate
S25	X			Heat pump electricity meter S0
S26	X			Household electricity S0
S27	X			Probe flow rate
S28	X			PV yield electricity meter S0
S29	X			PV power supply electricity meter S0
A01		X		Unregulated solar pump (230 V)
A02		X		1st mixed heating cycle, pump (230 V)
A03		X		Unmixed heating cycle, pump (230 V)
A04		X		Circulation pump
A10		X		Changeover valve domestic water
A11		X		Changeover valve 2nd heat generator

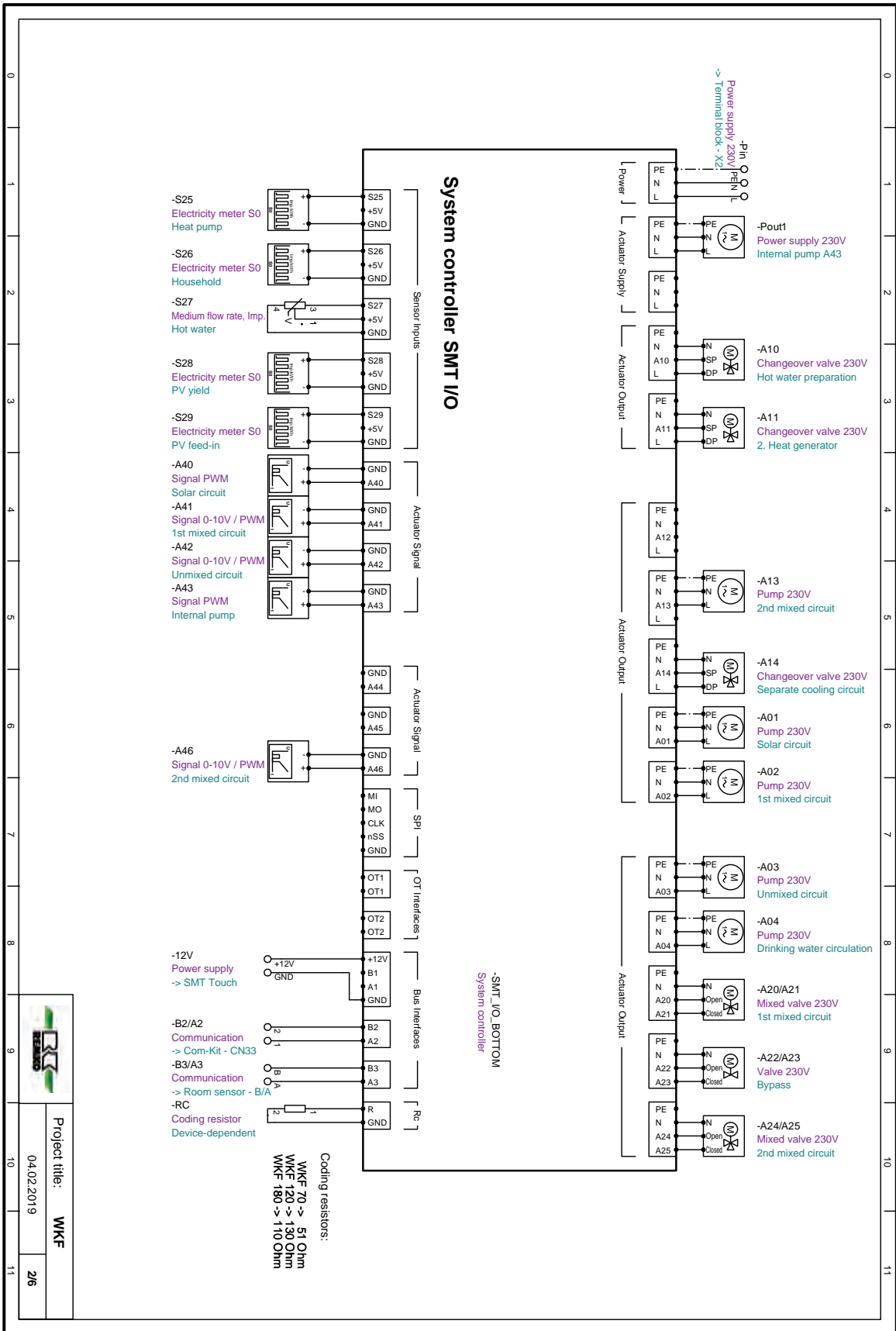
REMKO WKF series

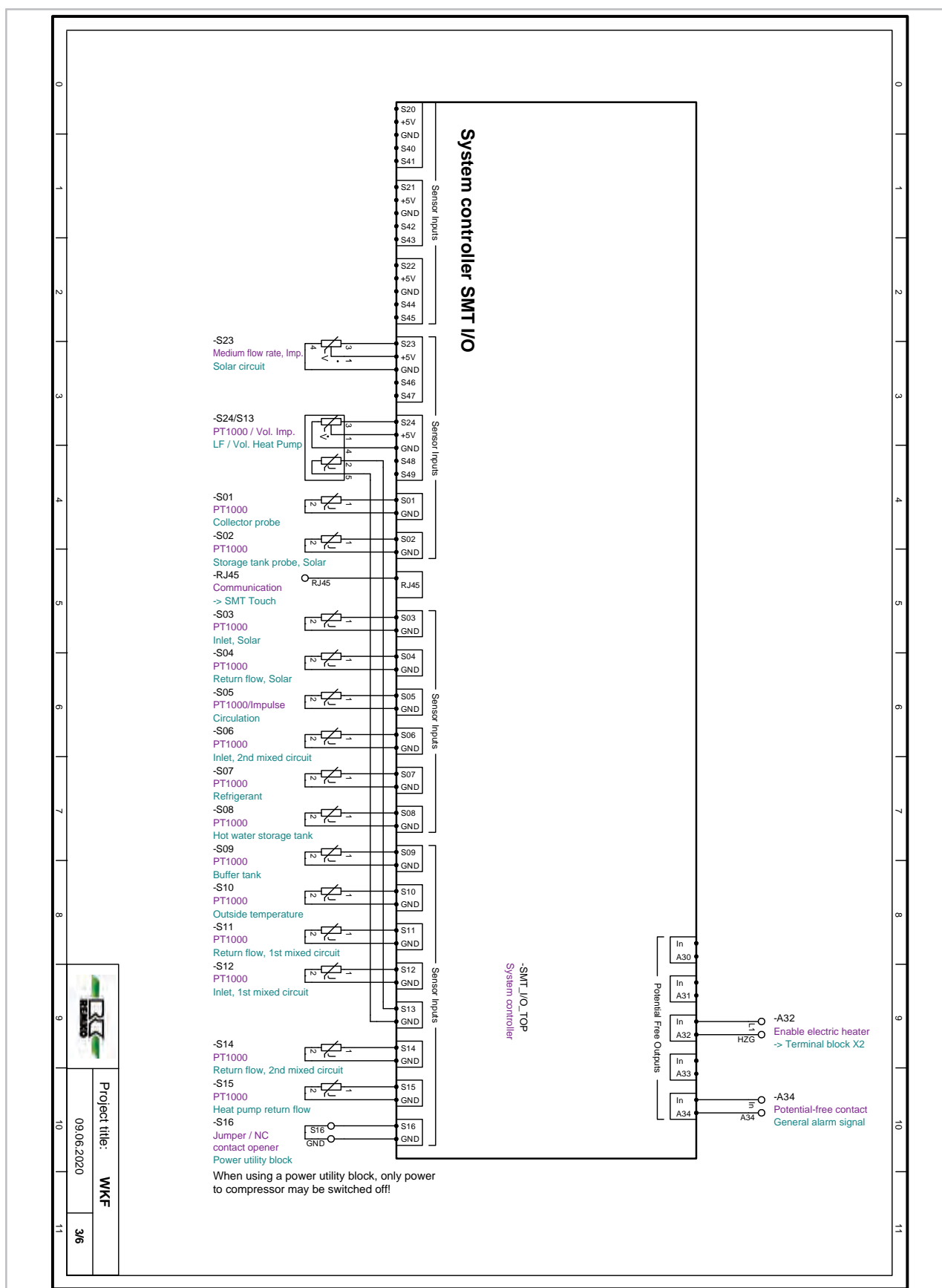
Terminal	Input	Output	Signal	Connection layout
A12		X		Not connected
A13		X		2nd mixed heating cycle, pump (230 V)
A14		X		Changeover valve / pump cooling
A20		X		1st mixed heating cycle, mixer open (230 V)
A21		X		1st mixed heating cycle, mixer closed (230 V)
A22		X		Bypass mixer open
A23		X		Bypass mixer closed
A24		X		2nd mixed heating cycle, mixer open (230 V)
A25		X		2nd mixed heating cycle, mixer closed (230 V)
A30		X		Not connected
A31		X		Not connected
A32		X		Enable 2nd heating generator auxillary heater or vessel
A33		X		Not connected
A34		X		Alarm signal
A40			X	Speed specification solar pump PWM
A41			X	Speed specification 1st mixed heating cycle (0-10V)
A42			X	Speed specification unmixed heating cycle (0-10V)
A43			X	Speed specification primary pump indoor unit (PWM)
A44			X	Not connected
A45			X	Without function
A46			X	Speed specification 2nd mixed heating cycle (0-10V)
MI				Without function
MO				
CLK				
nSS				
GND				
OT 1 (2x)				Not connected
OT 2 (2x)				Without function
B1, A1 +12 Volt, GND				Operating module
B2 / A2				Communication Com-Kit
B3 / A2				RS 485_3
R				RC coding resistor WKF 70/120/180

2.10 Electrical wiring - WKF/WKF-compact 70/120/180

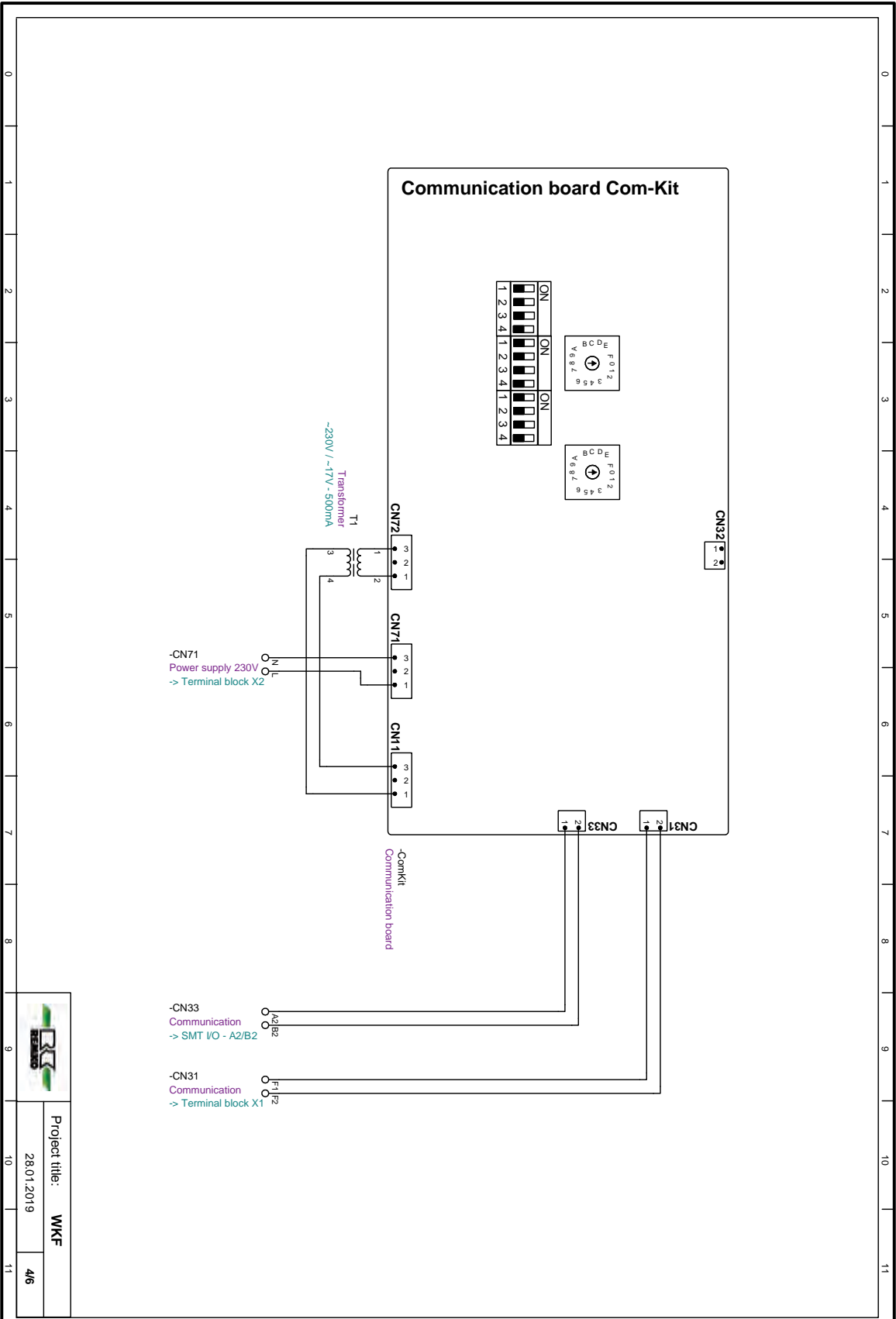


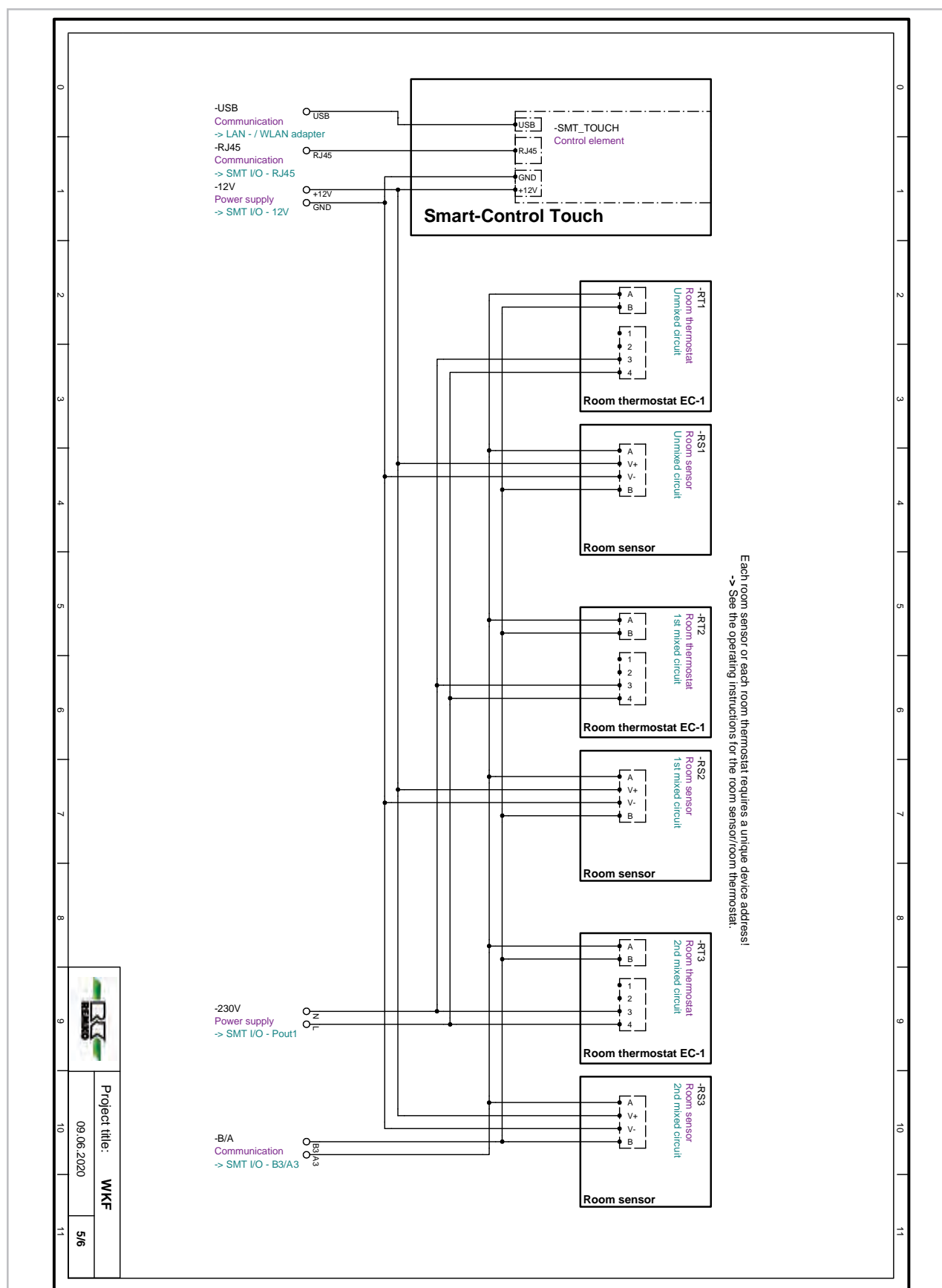
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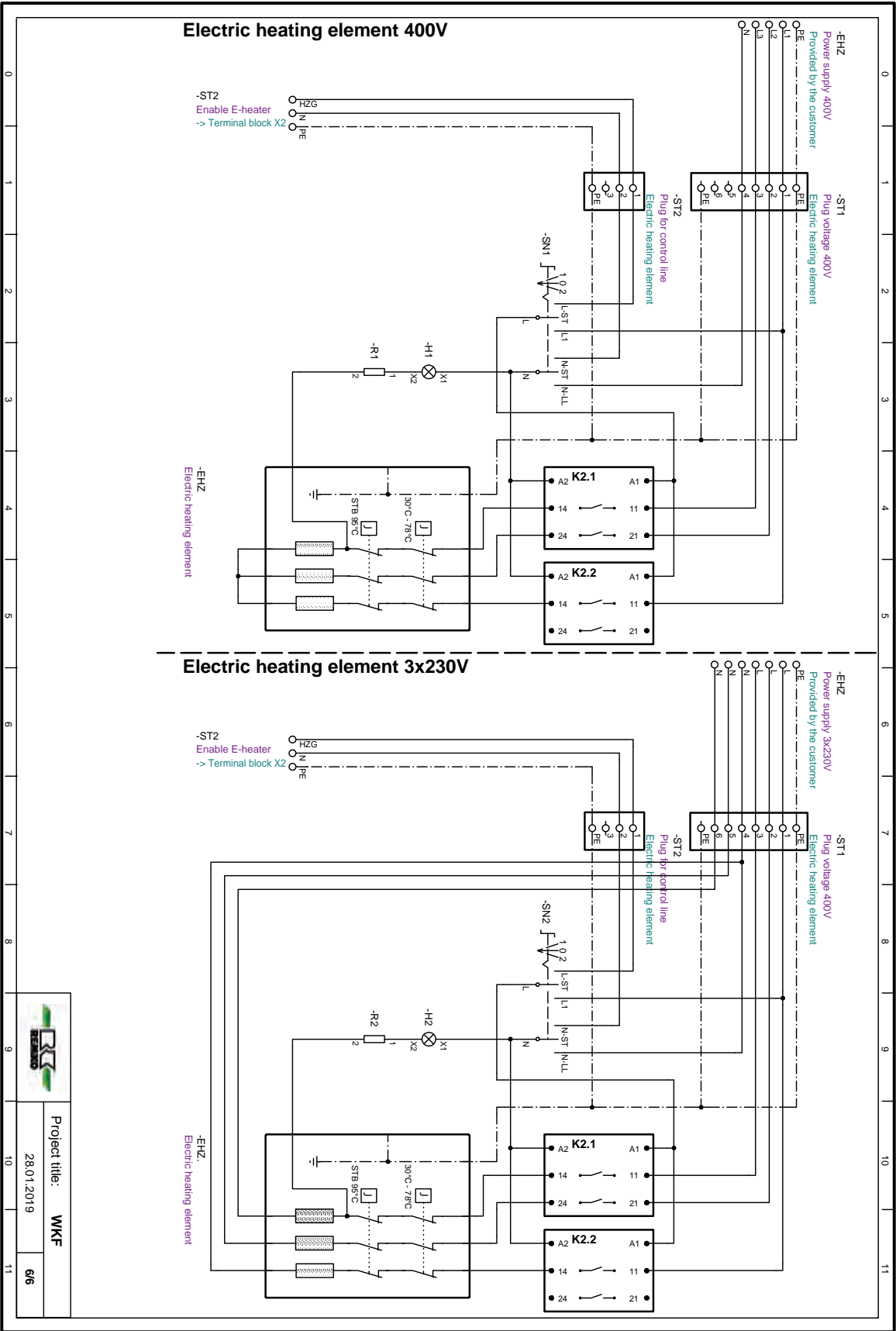


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Legend for circuit diagrams

Abbreviations:

E-Heater:	Elektric heating element
EHZ:	Elektric heating element
Imp.:	Pulse
PV:	Photovoltaics
PWM:	Puls-Width-Modulation
Vol.	Medium flow rate

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3 Electrical wiring WKF 120/180 Duo

3.1 System layout WKF 120 Duo

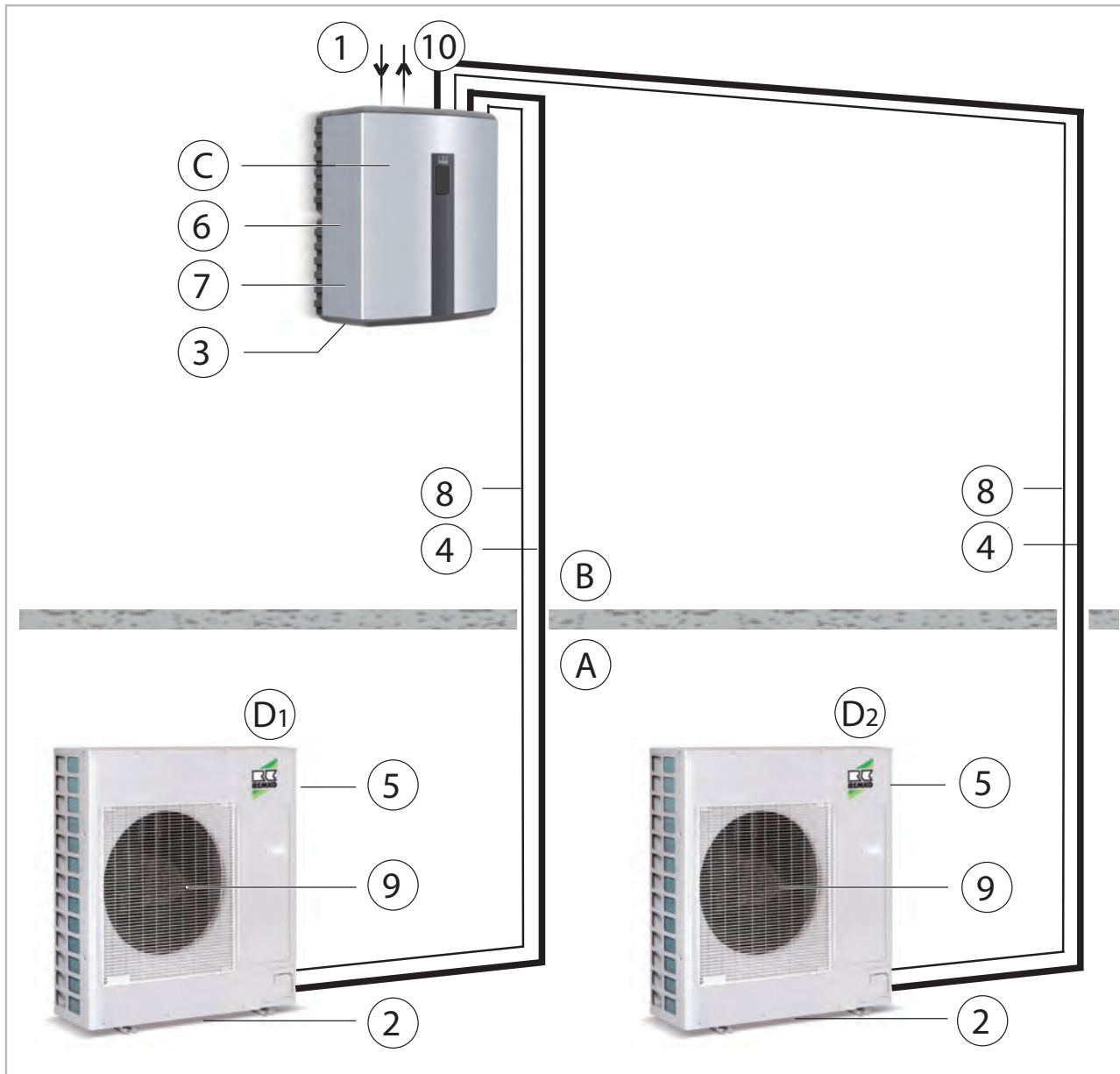


Fig. 13: System layout WKF 120 Duo

A:	Outdoor area	5:	Power supply, outdoor module = 230V/1~/50Hz 20A (e.g. 3x2.5 mm ²)
B:	Indoor area	6:	Power supply, indoor module = 230V/1~/50Hz 16A (e.g. 3x1.5 mm ²)
C:	Indoor module WKF 120 Duo	7:	Power supply for auxiliary heater (optional), (e.g. 5x2.5 mm ²)
D1, D2:	Outdoor module WKF 120 Duo	8:	Control line sheathed (e.g. 2x1 mm ²)
1:	Common return pipe	9:	Fan
2:	Condensate drain, outdoor module (must be designed to be frost proof!)	10:	Inlet for heating
3:	Condensate drain, indoor module		
4:	Refrigerant piping 3/8" and 5/8"		

3.2 System layout WKF 180 Duo

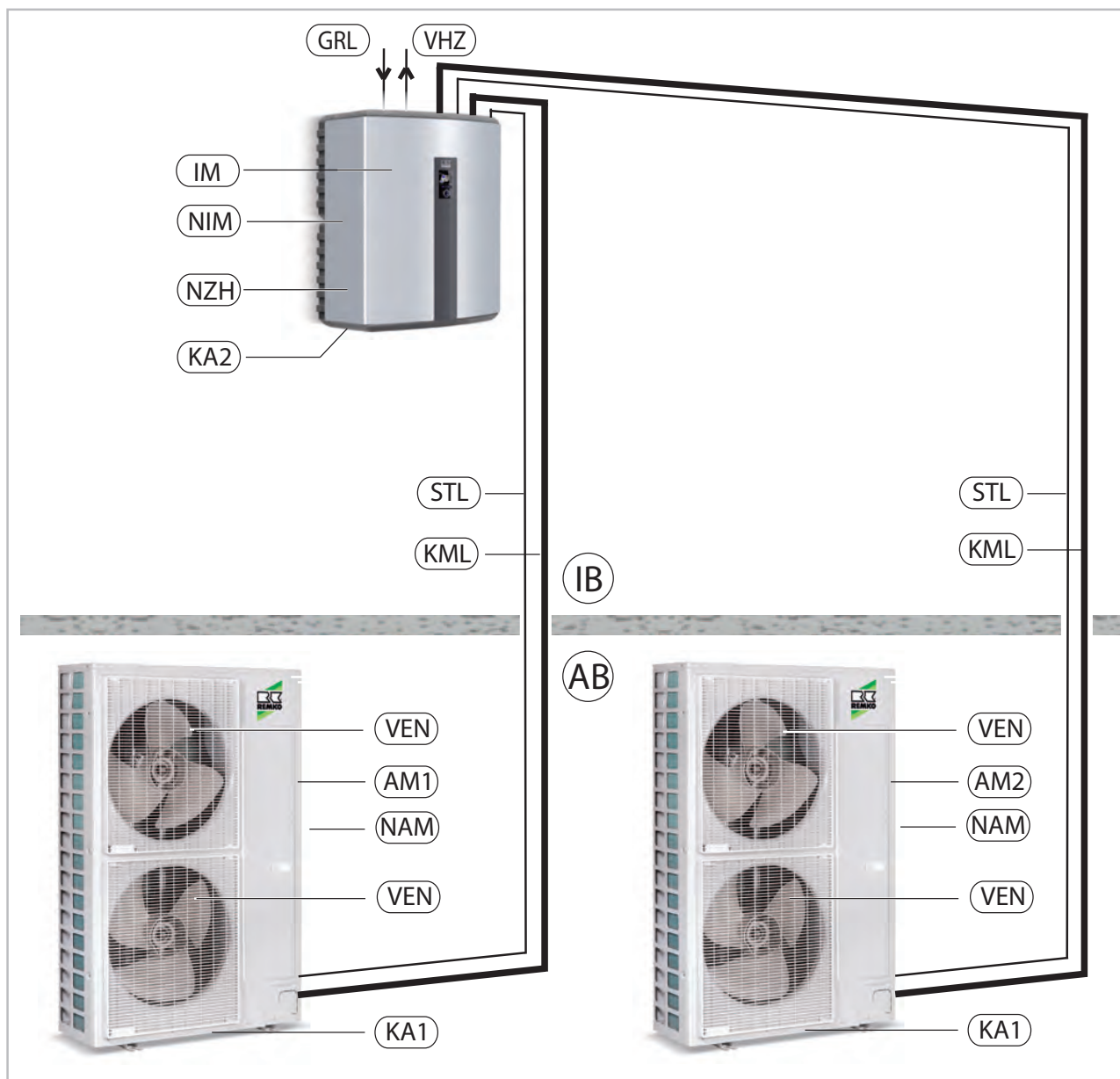


Fig. 14: System layout WKF 180 Duo

AB:	Outdoor area	NAM:	Power supply, OM = 400V / 3~ / 50Hz 3x16A (e.g. 5x1,5 mm ²)
IB:	Indoor area	NIM:	Power supply, IM = 230V / 1~ / 50Hz 16A (e.g. 3x1,5 mm ²)
AM1,2:	Outdoor module WKF 180 Duo	NZH:	Power supply for auxiliary heater (e.g. 5x2,5 mm ²)
IM:	Indoor module WKF 180 Duo	STL:	Control line (e.g. 2x1mm ²)
GRL:	Common return pipe	VEN:	Fan
KA1:	Condensate drain, OM (must be designed to be frost proof!)	VHZ:	Inlet for heating
KA2:	Condensate drain, IM		
KML:	Refrigerant piping $\frac{3}{8}$ " and $\frac{5}{8}$ "		

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3.3 Overview of the electrical cables

WKF 120 Duo

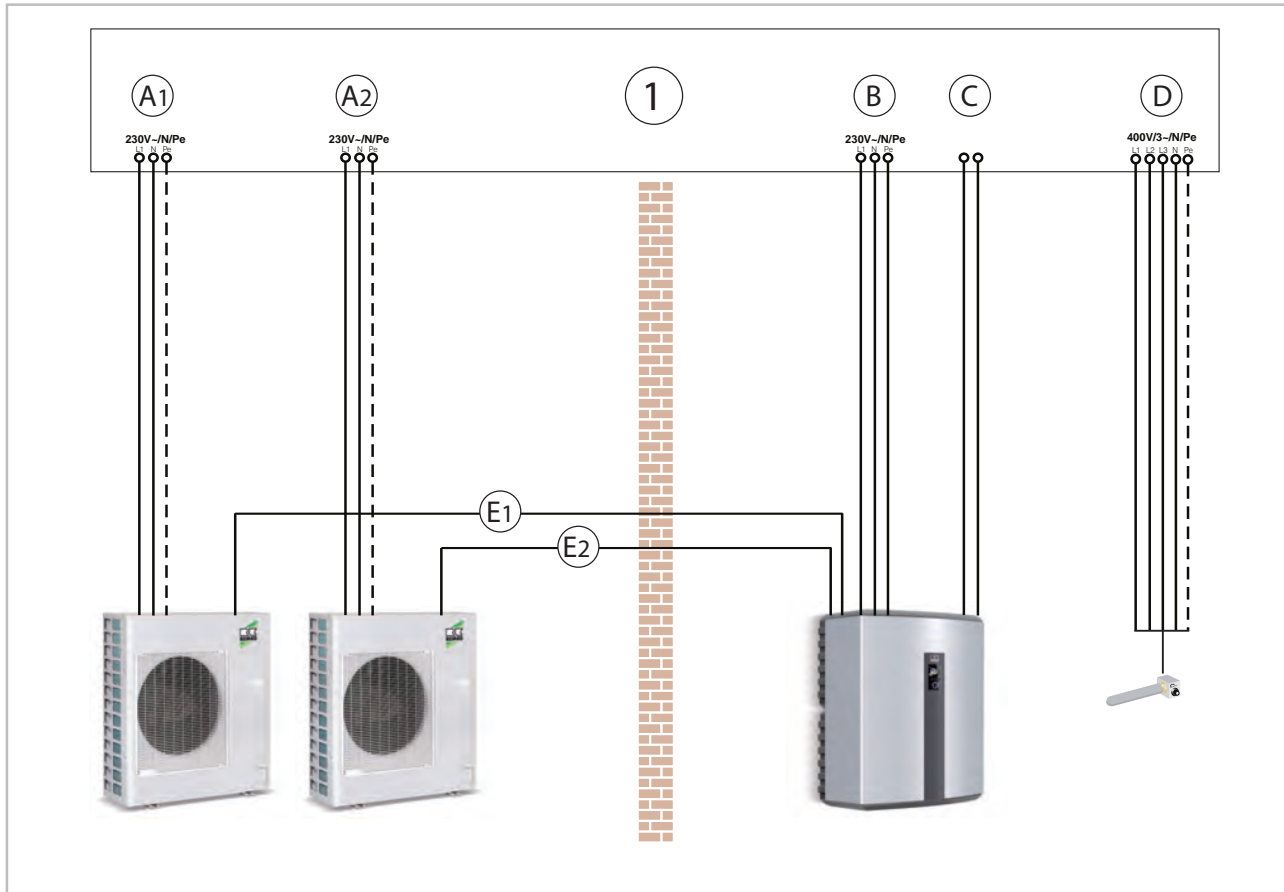


Fig. 15: Overview of the electrical cables WKF 120 Duo

- | | |
|--|--|
| 1: Main distributor | D: Power supply, 9 kW heating element, indoor unit |
| A1: Power supply, outdoor unit 1 | E1: Communication F1/F2, Outdoor unit 1 / indoor unit 2x1 mm ² shielded |
| A2: Power supply, outdoor unit 2 | E2: Communication F1/F2, Outdoor unit 2 / indoor unit 2x1 mm ² shielded |
| B: Power supply indoor unit | |
| C: Power company disable signal, potential-free / open = OU disabled | |

WKF 180 Duo

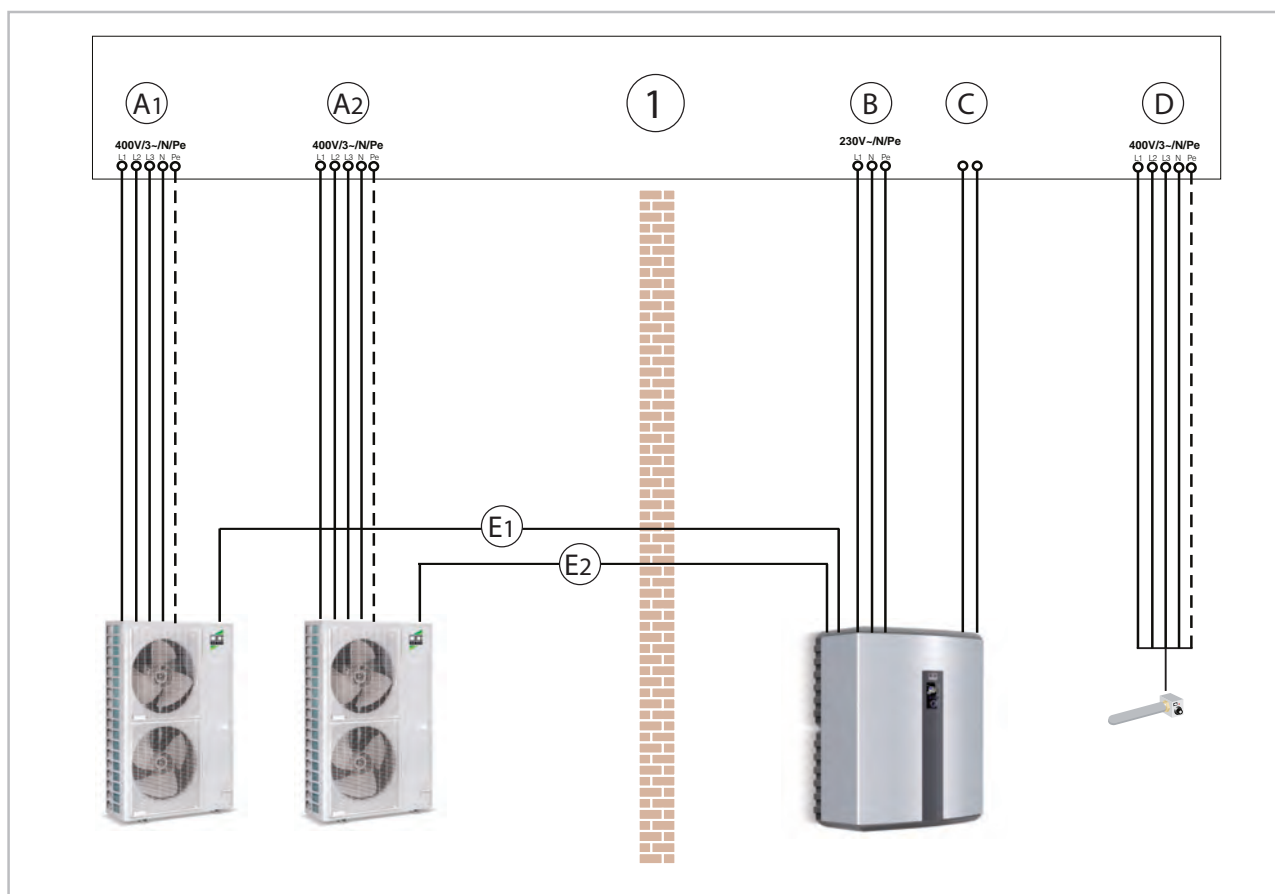


Fig. 16: Overview of the electrical cables WKF 180 Duo

- | | |
|--|--|
| 1: Main distributor | D: Power supply, 9 kW heating element, indoor unit |
| A1: Power supply, outdoor unit 1 | E1: Communication F1/F2, Outdoor unit 1 / indoor unit 2x1 mm ² shielded |
| A2: Power supply, outdoor unit 2 | E2: Communication F1/F2, Outdoor unit 2 / indoor unit 2x1 mm ² shielded |
| B: Power supply indoor unit | |
| C: Power company disable signal, potential-free / open = OU disabled | |

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3.4 Elektrical connection general notes

- It is necessary to lay a power-supply cable both to the outdoor unit and, separately, to the indoor unit.
- Power to the indoor unit may not be disconnected by the power company (frost protection).
- All indoor unit require a single-phase power supply at 230 V / 50 Hz.
The outdoor units series WKF 120 Duo require a single-phase power supply at 230 V / 50 Hz and the outdoor units series WKF 180 Duo require a three-phase power supply at 400 V / 50 Hz.
- The electrical connection between outdoor- and indoor units is made using two-wire control cable.
- Where applicable, a separate power supply shall be provided to the indoor unit for electric booster heating.
- The Smart-Control needs to know whether a power-company release- or off-period is in effect. An electrically-isolated switch must be installed for this purpose (an closed switch signifies power available, an open switch, off-time).
- In the chapter "Structure electrical connection" and "Circuit diagrams" in this manual can be found a connection schematic along with corresponding circuit diagrams.
- Special rates for heat pumps may be offered by the power company (PSC).
- Ask your local power company about the details of any rates that might be available.



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.



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.

3.5 Electrical connection - indoor unit

The following instructions describe the electrical connection of the indoor unit series WKF Duo:

1. ➔ Remove the housing of the upper section by pushing it upwards and pulling it forwards out of the slot at the back.
2. ➔ Feed the supply line for the indoor unit through the cable feedthroughs, as well as the control line between the indoor and outdoor unit, and the cables for the external devices and probes into the indoor unit.
3. ➔ Connect the power supply of the indoor unit to the terminal strips.
4. ➔ Connect all secondary consumers (HGM, HGU, changeover valves, etc.) to the I/O module.

! NOTICE!

Attach cables in accordance with the connection schematic and/or the circuit diagram in the control box.

! NOTICE!

Ensure correct polarity when connecting the electrical leads, especially the control cable.



The number of lines and the sensors is dependent on the configuration of the heating system and the components.



Make sure to use enough cable when installing the indoor unit so that the control box can be fully lowered for future maintenance.



At the site, avoid adding cable inlets.

3.6 Electrical connection - outdoor unit

- In order to establish the electrical connections, the right-hand cover panel must be removed (after undoing the screws).

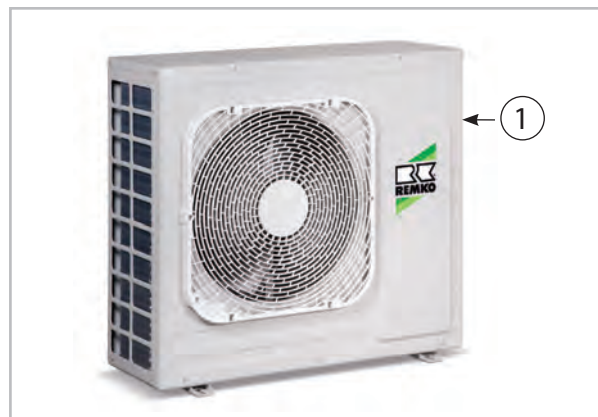


Fig. 17: Series WKF 120 Duo - Removing the plastic cover by undoing the screw

1: Screw



Fig. 18: Series WKF 180 Duo - Removing the cover panel by undoing the screws

1: Screw

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- 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 diagram.
- The two-wire control line is to be connected to terminals F1, F2 and the earth terminal.
- 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 (by connecting them to a lighting conductor or foundation earth electrode).
- With the series WKF 180 Duo, make sure that on terminals L1(R), L2(S), L3(T) and N are connected (see Fig. 20).

! NOTICE!

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

Temperature probes

- The number of probes required can vary with the type of system.
- Observe the pertinent notes for the probe position found in the hydraulic schematic.
- The standard model includes an external probe (S10) and an immersion probe (intended for use as a custom hot-water probe (S08)).
- If a solar plant is connected, a PT-1000 probe (S01) must be used as a collector probe and a PT-1000 probe (S02) as a bottom storage tank probe.
- All probes are to be connected to the indoor unit switching cabinet in accordance with the connection diagram.

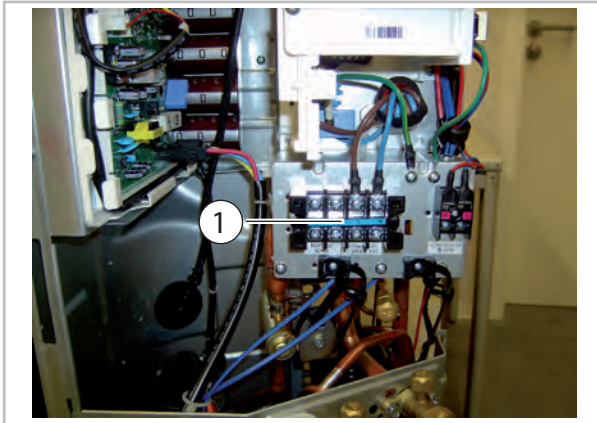


Fig. 19: Connection terminals - outdoor unit WKF 120 Duo

1: Power supply 230V/1~ /50Hz

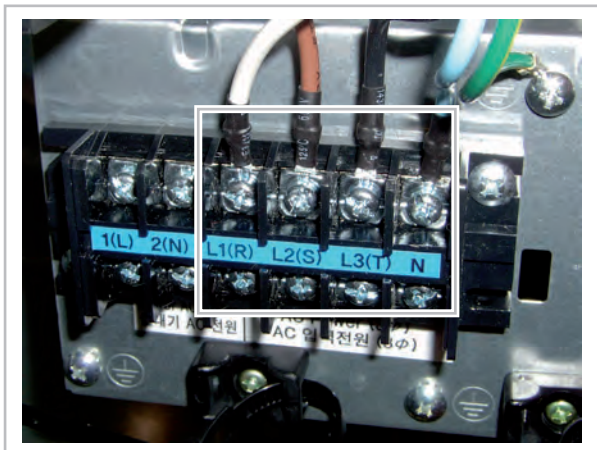


Fig. 20: Connection terminals - outdoor unit WKF 180 Duo

Contact probe

Contact probes can be mounted on the pipes, to measure the heating-circuit temperatures, for example.

- The contact probe is fastened to a pipe with the trapezoidal brackets and retaining strap provided.
- Clean the mounting point on the pipe. Subsequently a thermal compound (A) is applied and the probe is fixed in position.

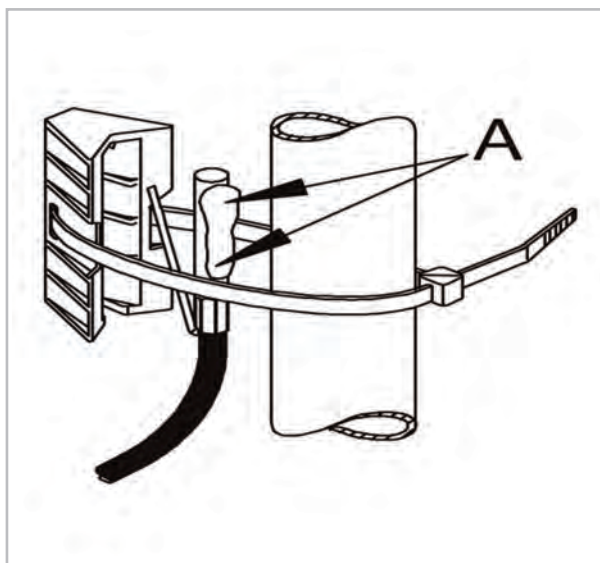


Fig. 21: Fastening the contact probe in place



If the sensor cables are too short, they can be extended up to a maximum of 100m with wire having a cross-section of 1.5 mm².

External probe

The connection of an outdoor probe is always required for the Smart Control.

- Mount the external probe pointing skyward, in a north-easterly direction, about 2.5 metres above the ground. It may not be subjected to direct sunlight and is to be protected against excessive wind. Installation above windows or air ducts is to be avoided.
- In order to carry out the installation, remove the cover and secure the probe with the screws provided.
- The customer is recommended to provide a cable with wire cross-section of 0.5 mm² for connecting the probe.

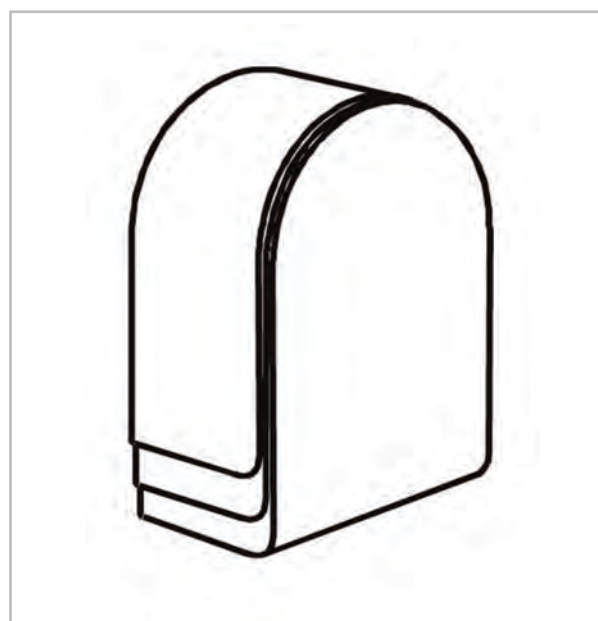
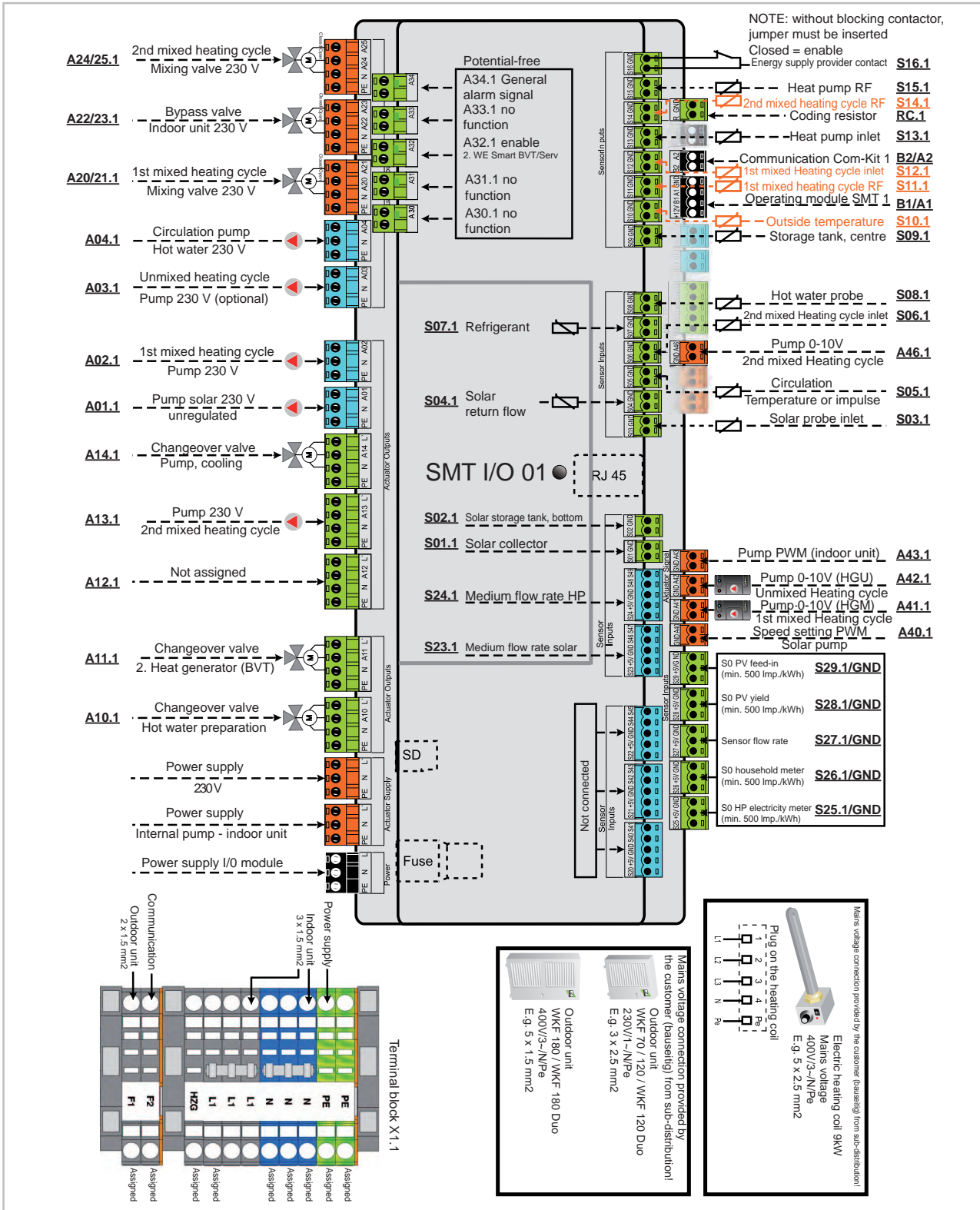


Fig. 22: External probe

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3.7 Structure electrical connection I/O module 01 - WKF 120/180 Duo

Cable cross-sections corresponding to the supplied connection cable!
Place the load lines separatly from the measure lines!



3.8 Terminal assignment / legend - I/O module 01 - WKF 120/180 Duo

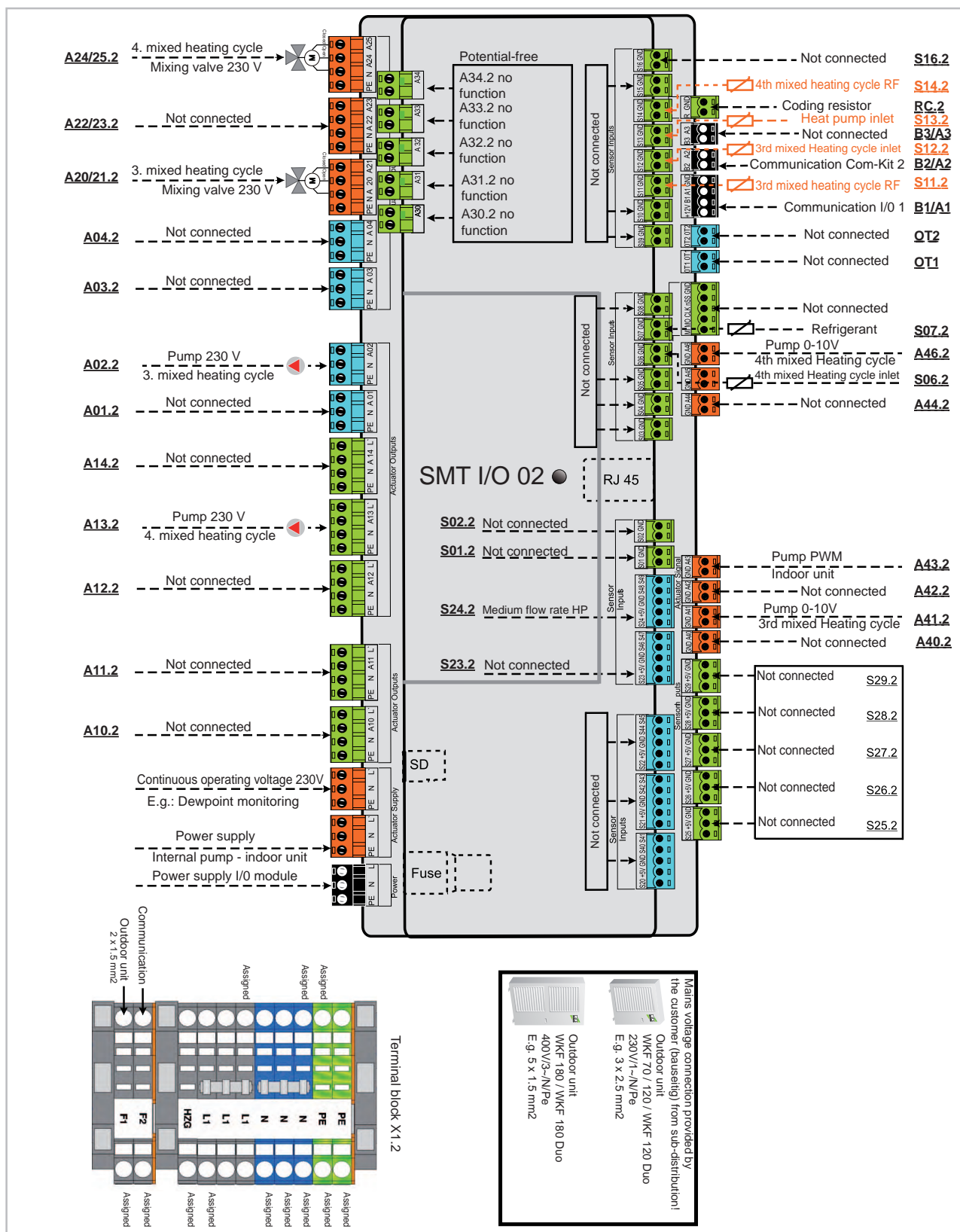
Designation	Input	Output	Signal	Description
Power	X			Power supply I/O 230V
PP		X		Power supply primary pump indoor unit
S01.1	X			Solar probe collector
S02.1	X			Solar probe storage tank, bottom
S03.1	X			Solar probe inlet HM solar
S04.1	X			Solar probe RF HM solar
S05.1	X			Circulation RF temp./impulse
S06.1	X			2nd mixed heating cycle inlet probe
S07.1	X			Probe refrigerant line
S08.1	X			Domestic hot-water tank
S09.1	X			Probe storage tank middle
S10.1	X			External probe
S11.1	X			1st mixed heating cycle RF probe
S12.1	X			1st mixed heating cycle inlet probe
S13.1	X			Heat pump inlet
S14.1	X			2nd mixed heating cycle RF probe
S15.1	X			Heat pump RF
S16.1	X			Energy supplier contact (NC) / dew point monitoring
S20.1	X			Not connected
S21.1	X			Not connected
S22.1	X			Not connected
S23.1	X			Ultrasonic flow rate meter solar, impulse rate
S24.1	X			Ultrasonic flow rate meter HP, impulse rate
S25.1	X			HP electricity meter S0
S26.1	X			Household electricity S0
S27.1	X			Flow probe
S28.1	X			PV yield electricity meter S0
S29.1	X			PV in-feed electricity meter S0
A01.1		X		Solar pump, unregulated (230V)
A02.1		X		1st mixed heating cycle pump (230V) switched
A03.1		X		Unmixed heating cycle pump (230V)
A04.1		X		Circulation pump (230V)
A10.1		X		Changeover valve, hot water preparation
A11.1		X		Changeover valve 2nd heat generator Smart BVT

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Designation	Input	Output	Signal	Description
A12.1		X		Not connected
A13.1		X		2nd mixed heating cycle pump (230V) switched
A14.1		X		Changeover valve / pump cooling (230V)
A20.1		X		1st mixed heating cycle mixer open (230V)
A21.1		X		1st mixed heating cycle mixer closed (230V)
A22.1		X		Bypass valve indoor unit closed (230V)
A23.1		X		Bypass valve indoor unit open (230V)
A24.1		X		2nd mixed heating cycle mixer open (230V)
A25.1		X		2nd mixed heating cycle mixer closed (230V)
A30.1		X		Non functional
A31.1		X		Non functional
A32.1		X		Enable 2nd heat generator booster heating or boiler
A33.1		X		Non functional
A34.1		X		Alarm codes
A40.1			X	Speed setting solar pump PWM
A41.1			X	Speed setting 1st mixed heating cycle (0-10V)
A42.1			X	Speed setting unmixed heating cycle (0-10V)
A43.1			X	Speed setting primary pump indoor unit (PWM)
A44.1			X	Not connected
A45.1			X	Not connected
A46.1			X	Pump second mixed heating cycle
MI				Non functional
MO				
CLK				
nSS				
GND				
OT 1 (2x)				Non functional
OT 2 (2x)				Non functional
B1, A1 +12 Volt, GND				Operat. module SMT 1 and communic. I/O module 2
B2 / A2				Communication Com-Kit 1
B3 / A2				Non functional
RC.1				RC coding resistance WKF 120/180 Duo

3.9 Structure electrical connection I/O module 02 - WKF 120/180 Duo

Cable cross-sections corresponding to the supplied connection cable!
Place the load lines separately from the measure lines!



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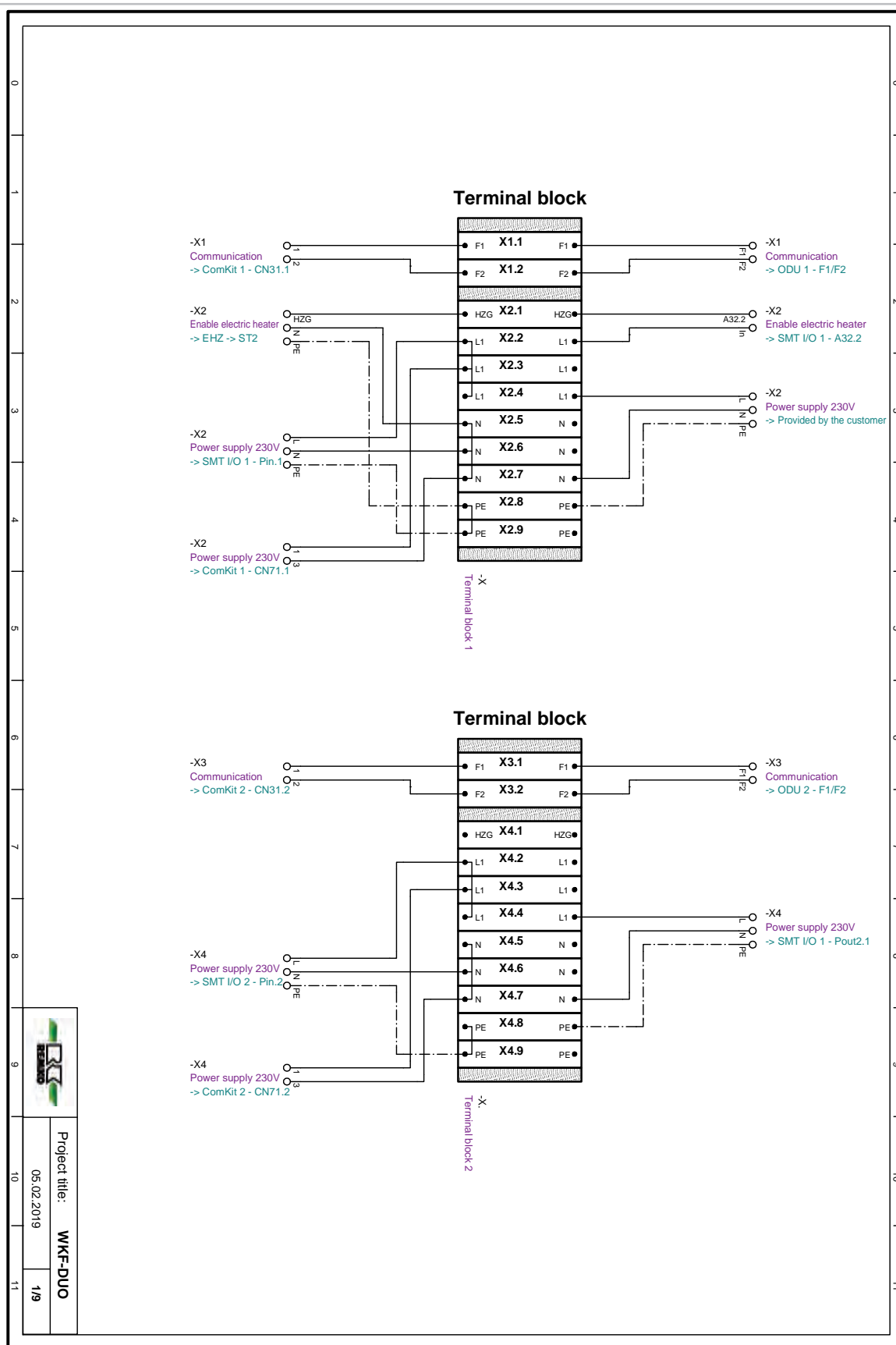
3.10 Terminal assignment / legend - I/O module 02 - WKF 120/180 Duo

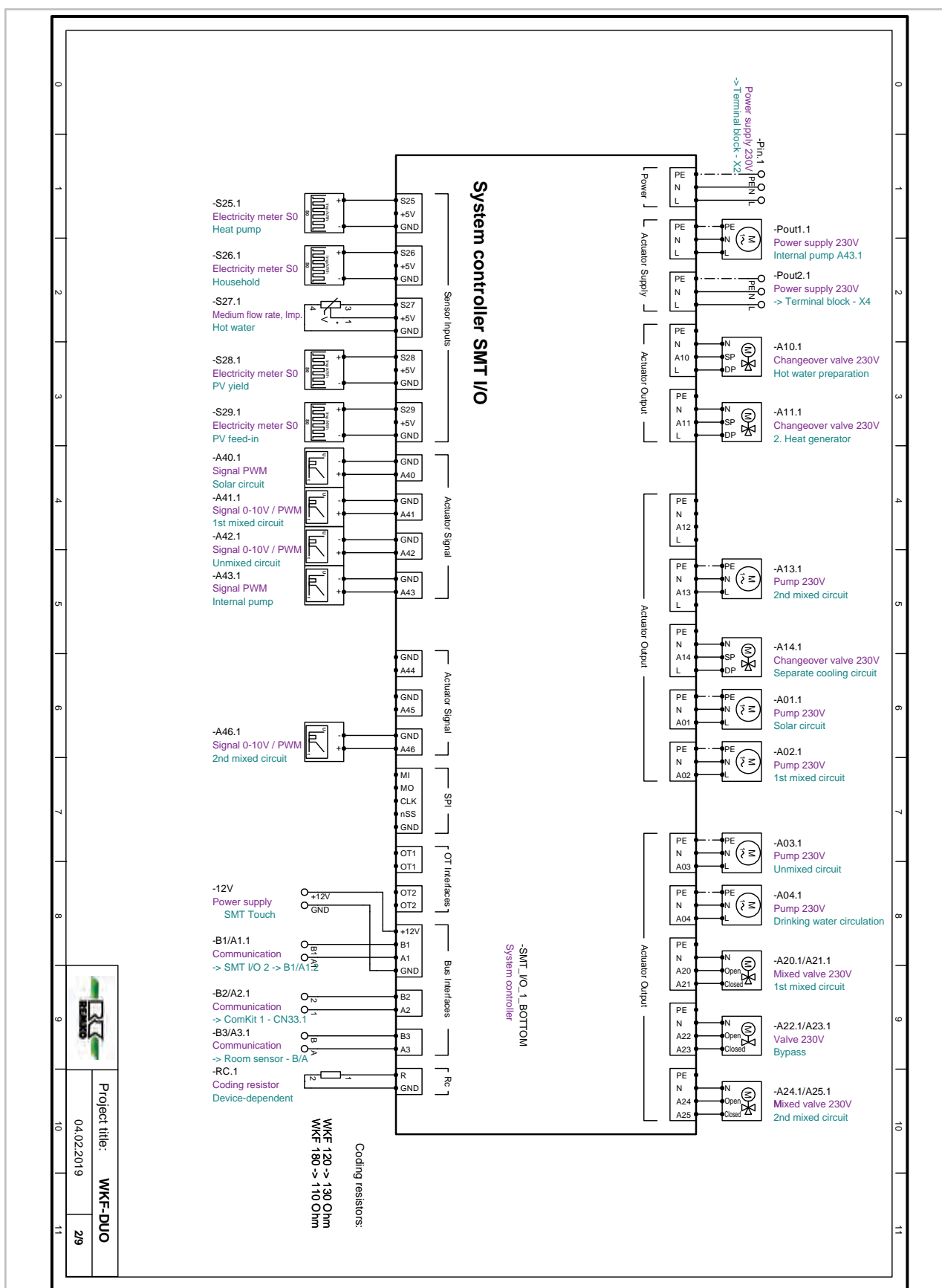
Designation	Input	Output	Signal	Description
Power	X			Power supply I/O 230V
PP		X		Power supply primary pump indoor unit
S01.2	X			Not connected
S02.2	X			Not connected
S03.2	X			Not connected
S04.2	X			Not connected
S05.2	X			Not connected
S06.2	X			4th mixed heating cycle inlet probe
S07.2	X			Probe refrigerant line
S08.2	X			Not connected
S09.2	X			Not connected
S10.2	X			Not connected
S11.2	X			3rd mixed heating cycle RF probe
S12.2	X			3rd mixed heating cycle inlet probe
S13.2	X			Heat pump inlet
S14.2	X			4th mixed heating cycle inlet probe
S15.2	X			Not connected
S16.2	X			Not connected
S20.2	X			Not connected
S21.2	X			Not connected
S22.2	X			Not connected
S23.2	X			Not connected
S24.2	X			Ultrasonic flow rate meter HP, impulse rate
S25.2	X			Not connected
S26.2	X			Not connected
S27.2	X			Not connected
S28.2	X			Not connected
S29.2	X			Not connected
A01.2		X		Not connected
A02.2		X		3rd mixed heating cycle pump (230V) switched
A03.2		X		Not connected
A04.2		X		Not connected
A10.2		X		Not connected
A11.2		X		Not connected

Designation	Input	Output	Signal	Description
A12.2		X		Not connected
A13.2		X		4th mixed heating cycle pump (230V) switched
A14.2		X		Not connected
A20.2		X		3rd mixed heating cycle mixer open (230V)
A21.2		X		3rd mixed heating cycle mixer closed (230V)
A22.2		X		Not connected
A23.2		X		Not connected
A24.2		X		4th mixed heating cycle mixer open (230V)
A25.2		X		4th mixed heating cycle mixer closed (230V)
A30.2		X		Not connected
A31.2		X		Not connected
A32.2		X		Not connected
A33.2		X		Not connected
A34.2		X		Not connected
A40.2			X	Not connected
A41.2			X	3rd mixed heating cycle pump (0-10V)
A42.2			X	Not connected
A43.2			X	Speed setting primary pump indoor unit (PWM) I/O-2
A44.2			X	Not connected
A45.2			X	Not connected
A46.2			X	4th mixed heating cycle pump (0-10V)
MI				Non functional
MO				
CLK				
nSS				
GND				
OT 1 (2x)				Non functional
OT 2 (2x)				Non functional
B1, A1 +12 Volt, GND				Communication I/O module 1
B2 / A2				Communication Com-Kit 2
B3 / A2				Non functional
RC.2				RC coding resistance slave 1

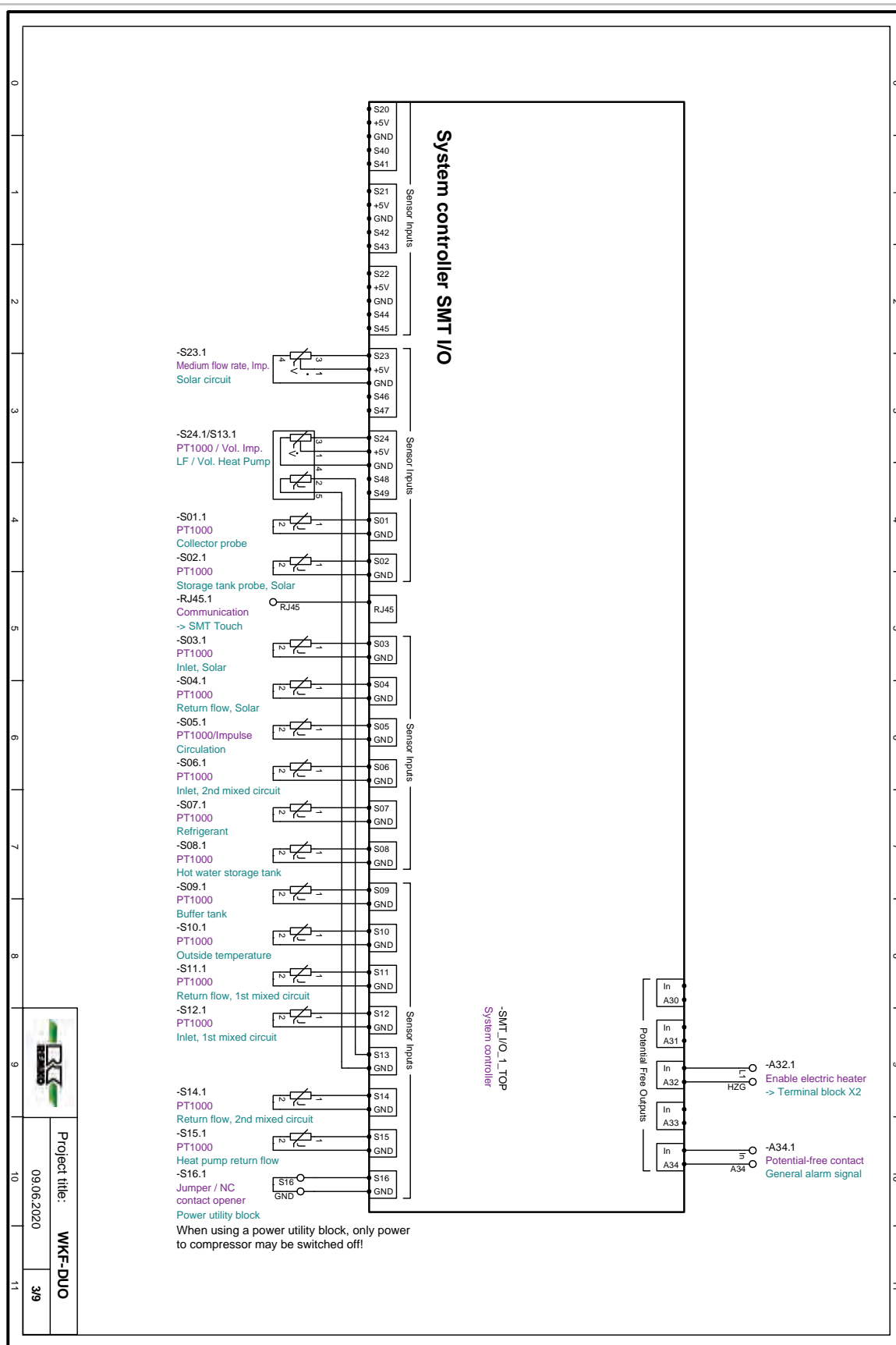
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3.11 Electrical wiring WKF 120/180 Duo

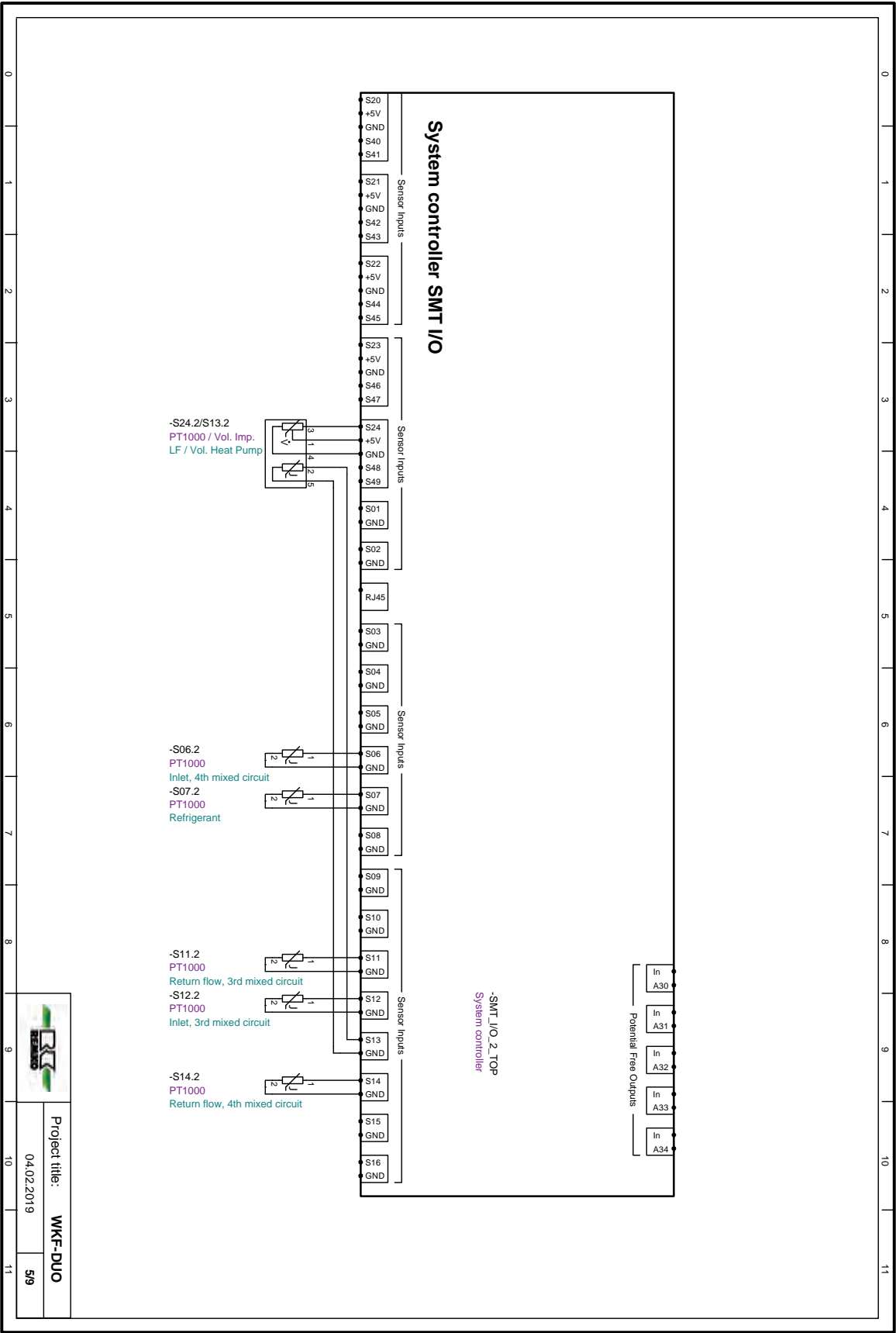


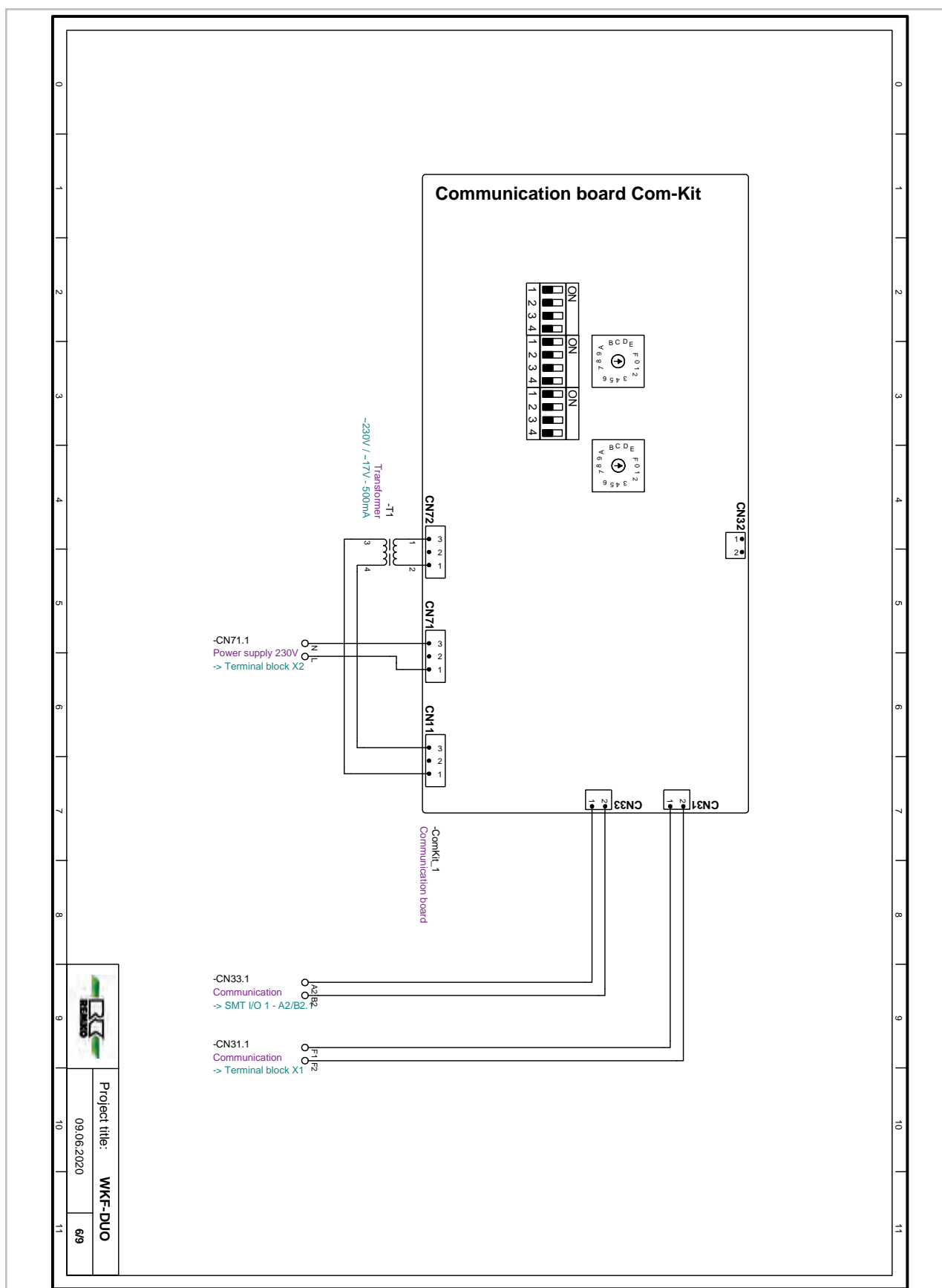


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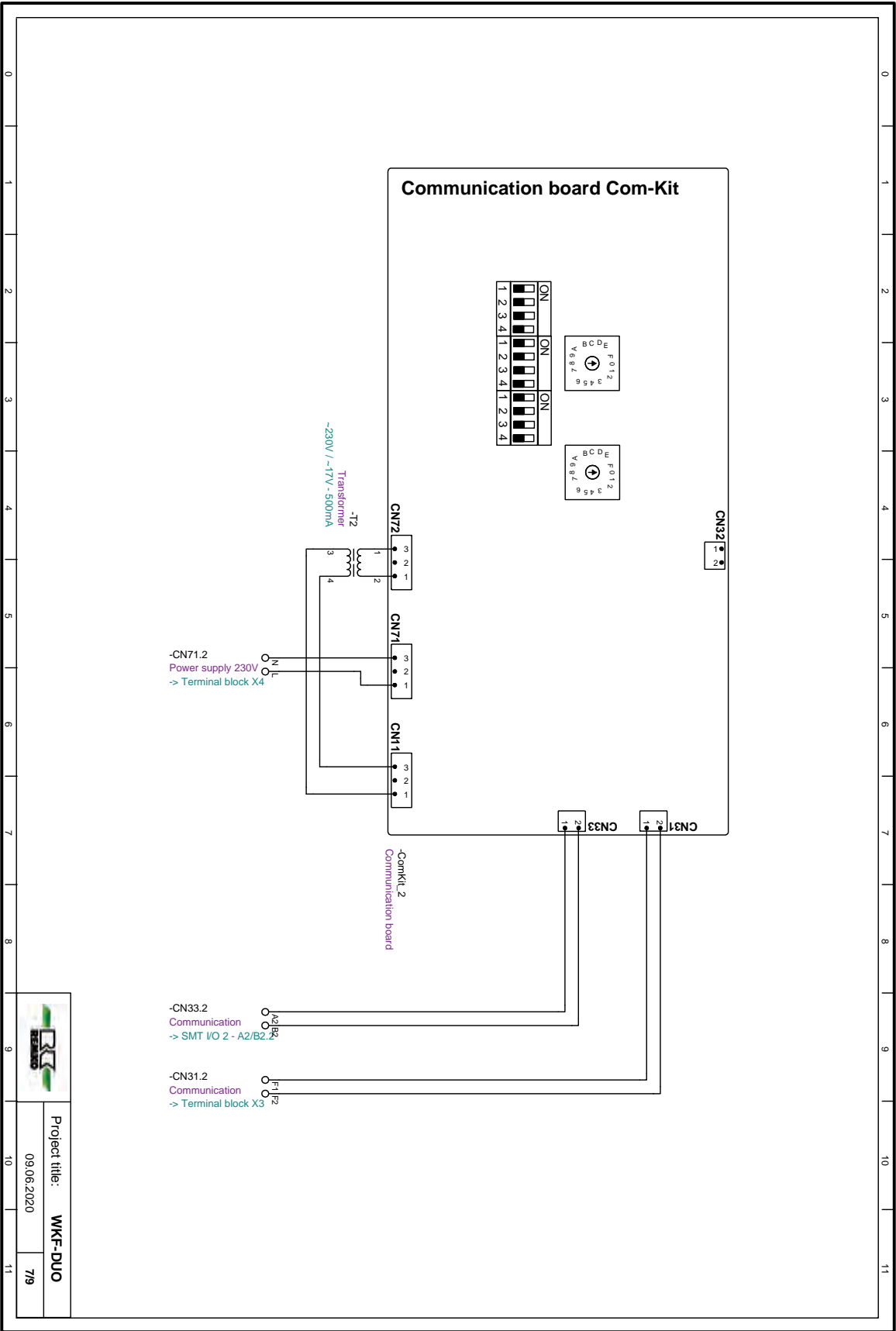


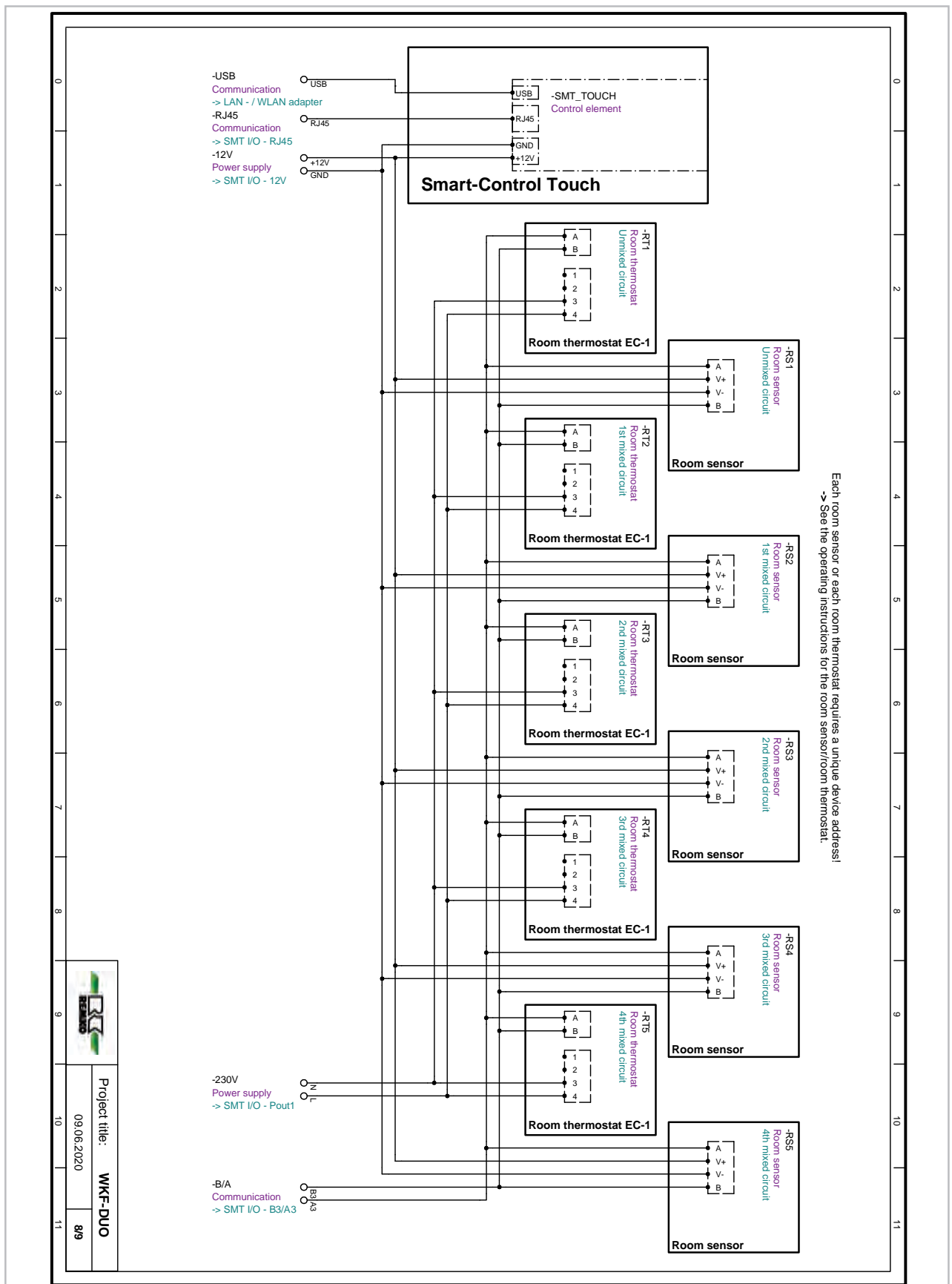
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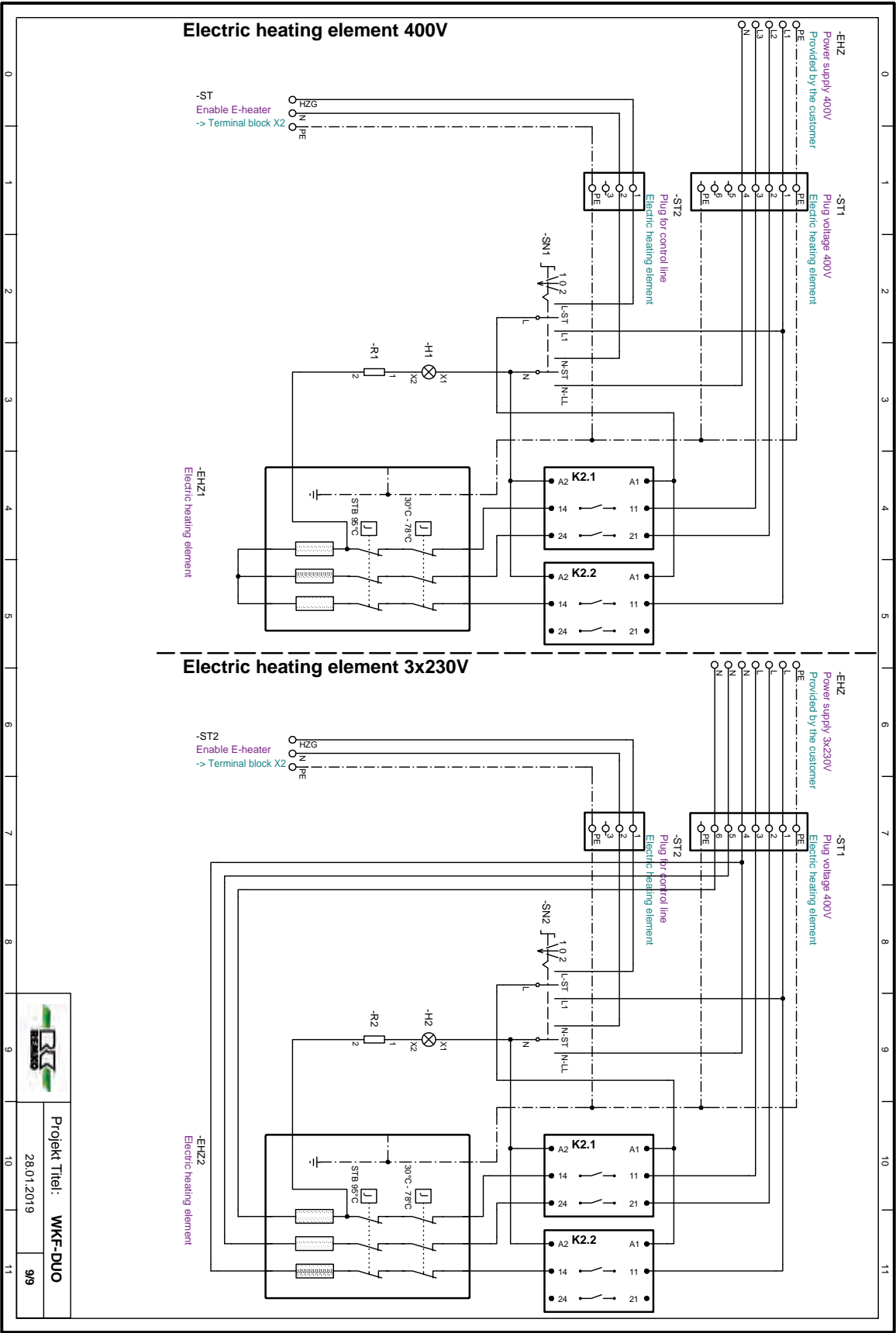


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Projekt Titel: **WKF-DUO**

28.01.2019

9/9

Legend for circuit diagrams

Abbreviations:

E-Heater:	Elektric heating element
EHZ:	Elektric heating element
Imp.:	Pulse
PV:	Photovoltaics
PWM:	Puls-Width-Modulation
Vol.	Medium flow rate

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