

# VENTMATIKA

## ELECTRICAL RECTANGULAR DUCT HEATERS

### EKS



Technical data  
Mounting  
Maintenance

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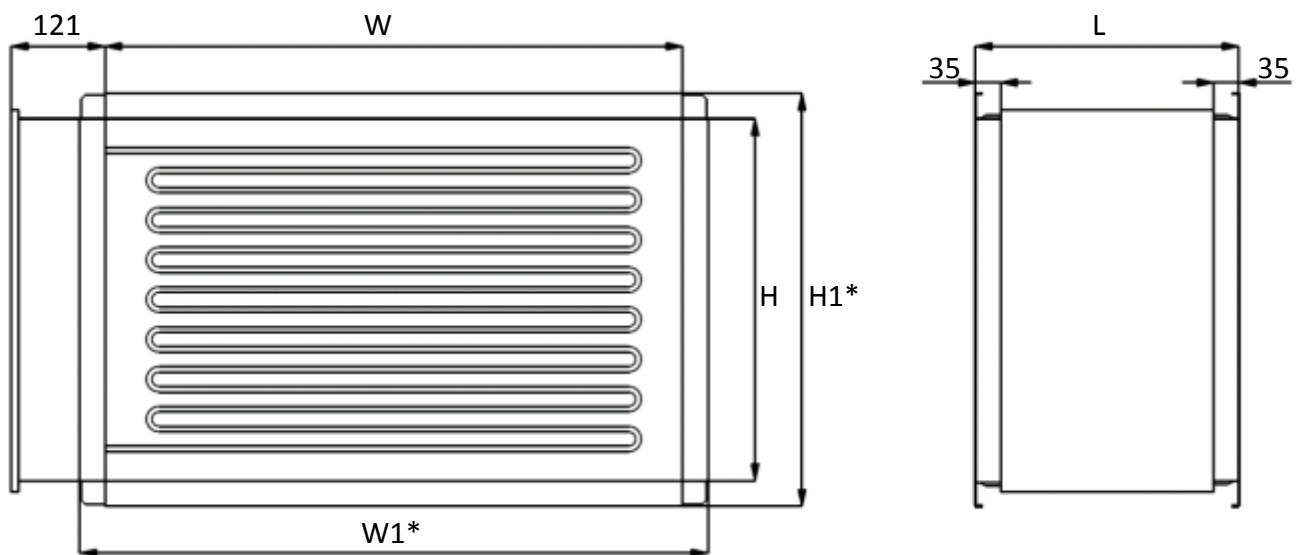
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## Description

Electrical duct heaters EKS are designed to heat fresh air in ventilation systems. Casing (*EKS protection class IP 44, except EKS Type NV which protection class IP 30*) is made from Aluzinc coated steel which is high temperature proof and with rubber seals for duct connection. Heating elements tube is made from stainless steel AISI 304. There are 2 protection thermostats (*or more, depending on the heater power*) and screw terminals for easy connection installed in the heaters.

Heaters can be installed horizontally with the electrical connection box facing upwards or sideways and vertically (*only if the air flow direction upwards*). The air velocity in the duct of the heater must be 1,5 m/s minimum. The maximum temperature of the output is 50 °C.

## Dimensions



$$H1^* = H + 70; W1^* = W + 70 \text{ (Type EKS)}$$

$$H1^* = H + 40; W1^* = W + 40 \text{ (Type EKS PG)}$$

<i>Heater type</i>	<i>W(mm)</i>	<i>W1(mm)</i>	<i>H(mm)</i>	<i>H1(mm)</i>	<i>L(mm)</i>
EKS 400x200	400	470	200	270	370/420/520
EKS 500x250	500	570	250	320	370/420/520/ 600/670/820/970
EKS 500x300	500	570	300	370	370/440/520/600
EKS 600x300	600	670	300	370	370/440/520/600
EKS 600x350	600	670	350	420	370/420/520
EKS 700x400	700	770	400	470	370/420/440
EKS 800x500	800	870	500	570	370/420/440
EKS 1000x500	1000	1070	500	570	370/420/440/600
EKS PG 400x200	400	440	200	240	370/420/520
EKS PG 500x250	500	540	250	290	370/420/520/ 600/670/820/970
EKS PG 500x300	500	540	300	340	370/440/520/600
EKS PG 600x300	600	640	300	340	370/440/520/600
EKS PG 600x350	600	640	350	390	370/420/520
EKS PG 700x400	700	740	400	440	370/420/440
EKS PG 800x500	800	840	500	540	370/420/440
EKS PG 1000x500	1000	1040	500	540	370/420/440/600

### Technical data

<i>Heater type</i>	<i>Length (mm)</i>	<i>Power (kW)</i>	<i>Available heating elements (kW)</i>	<i>Min. airflow (m<sup>3</sup>/h)</i>	<i>Power supply (VAC/50Hz)</i>
EKS (PG) 400x200	370	3...12	1/1,5	435	3~400
	420	15...18			
	520	21			
EKS (PG) 500x250	370	3...12	1/1,5	675	3~400
	420	15...18			
	520	21			
	600	24			
	670	27			
	820	36			
EKS (PG) 500x300	370	6...24	2/3	810	3~400
	440	27...33			
	520	36...42			
	600	45...48			
EKS (PG) 600x300	370	6...24	2/3	975	3~400
	440	27...33			
	520	36...42			
	600	45...48			

EKS (PG) 600x350	370	6...30	2/3	1135	3~400
	420	33...39			
	520	42...48			
EKS (PG) 700x400	370	6...48	2/3	1515	3~400
	420	51...54			
	440	57...66			
EKS (PG) 800x500	370	6...48	2/3	2160	3~400
	420	51...54			
	440	57...66			
EKS (PG) 1000x500	370	6...48	2/3	2700	3~400
	420	51...54			
	440	57...66			
	600	69...90			

\* – different power and dimensions on request

#### Heaters conforms to requirements of standards:

LST EN 60335-2-30:2003+A1:2005+A2:2007

LST EN 60335-2-30:2010+AC:2010+A11:2012 (EN 60335-2-30:2009+AC:2010+A11:2012)

and therefore complies with the essential requirements and provisions of the 2006/95/EC and 2004/108/EC Directives.

The CE mark is affixed.

### Model marking

**EKS 400x200/3kWPS** without integrated control

1      2      3      4

#### 1 – Duct width (mm)

**400** – 400 mm

**700** – 700 mm

**500** – 500 mm

**800** – 800 mm

**600** – 600 mm

**1000** – 1000 mm

#### 2 – Duct height (mm)

**200** – 200 mm

**350** – 350 mm

**250** – 250 mm

**400** – 400 mm

**300** – 300 mm

**500** – 500 mm

#### 3 – Heating power (kW)

**3** – 3 kW ... **90** – 90 kW

#### 4 – Additional accessories:

**PS** – Differential pressure switch for air flow detection

**EKS NV 400x200/3kW PTC/2NTC** with integrated controller  
 1 2 3 4 5

### 1 – Control type:

**NV** – Potentiometer on the top of the heater casing for temperature control

**NI** – External wired remote setpoint knob (*TR5K*) for temperature control

**NIS** – External wired remote (*0...10*) VDC signal for temperature control (*analog input*)

**ESKM** – External wired remote PWM (*ON/OFF: ON (6...24) VDC*) signal for temperature control

**MB** – External wired remote temperature control via Modbus RTU protocol (*RS485*)

### 2 – Duct width (mm)

**400** – 400 mm

**700** – 700 mm

**500** – 500 mm

**800** – 800 mm

**600** – 600 mm

**1000** – 1000 mm

### 3 – Duct height (mm)

**200** – 200 mm

**350** – 350 mm

**250** – 250 mm

**400** – 400 mm

**300** – 300 mm

**500** – 500 mm

### 4 – Heating power (kW)

**3** – 3 kW ... **90** – 90 kW (*NV, NI, NIS, MB*) >15 kW with mounted additional steps

**3** – 3 kW ... **15** – 15 kW (*ESKM*)

### 5 – Additional accessories:

**PS** – Differential pressure switch for air flow detection

**PTC** – Sensor for minimum air velocity detection

**PTC/PS** – Sensor for minimum air velocity detection and diff. pressure switch for air flow detection

**PTC/K** – Sensor for minimum air velocity detection and contactor for overheating protection

**PH** – Sensor for minimum air velocity detection and diff. pressure switch for air flow detection

**2NTC** – 2 sensors for the air temperature measuring

**PTC/2NTC** – Sensor for min. air velocity detection and 2 sensors for the air temperature measuring

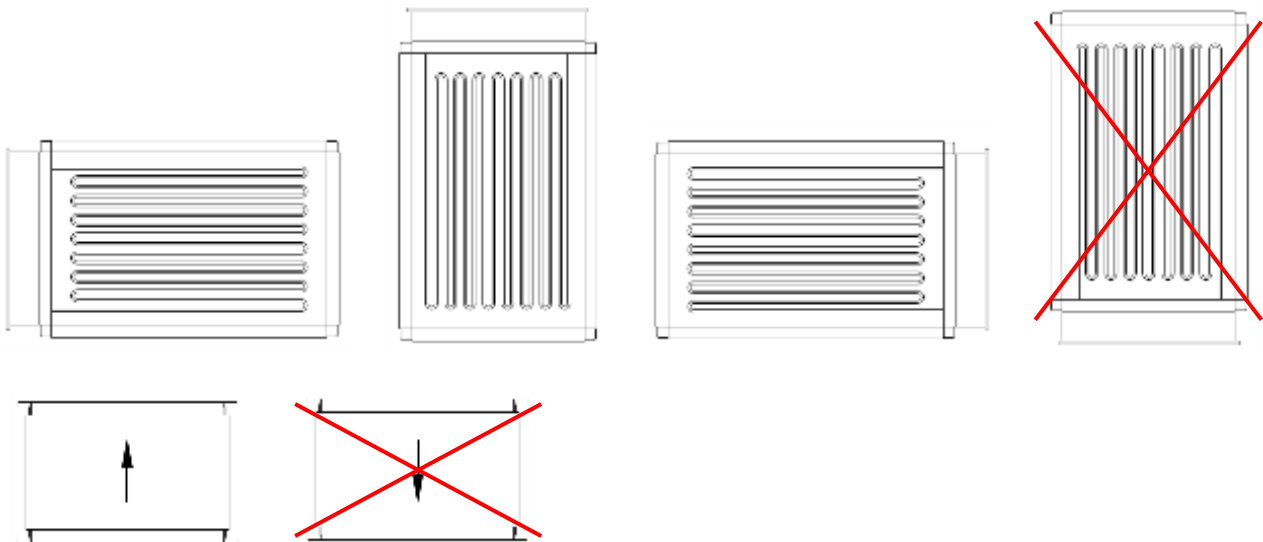
## Overheating protection

In the electrical duct heaters EKS are installed two thermostats (*or more, depending on the heater power*) for overheating protection. The first one with automatic reset, turns off the heating when the temperature reaches 50 °C and turns on when the temperature drops below 50 °C. The second with manual reset, turns off the heating when the temperature reaches 100 °C. Only way to reset it, push the reset button on the top of the casing (*see mounting examples*) when the temperature drops below 100 °C.

In the heaters EKS ESKM are installed additional thermostat (*with automatic reset*) for controller ESKM overheating protection. This thermostat turns off the heating when the temperature reaches 70 °C and turns on when the temperature drops below 70 °C.

## Installation and electrical connection

Electrical duct heaters EKS can be installed horizontally with the electrical connection box facing upwards or sideways and vertically (*only if the air flow direction upwards*) (see Fig. 1).



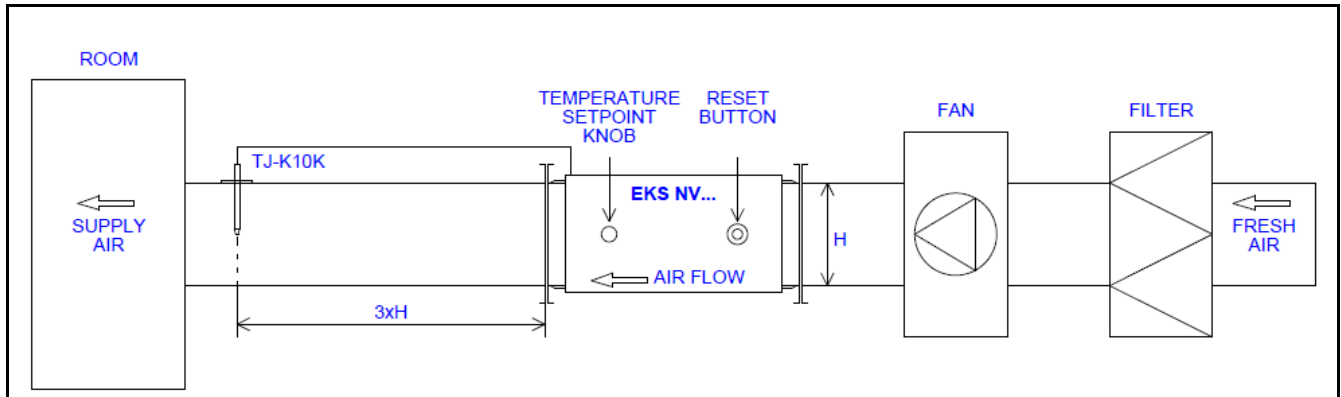
**Fig. 1. Heaters installation positions**

Heaters can't be installed in explosive and aggressive substances environment. Heaters can be used only for the clean air heating or preheating. Heaters intended only for inside installation. If heater is installed in such way that can be accidental contact with heating elements, protective grill must be installed. The air velocity in the duct of the heater must be 1,5 m/s minimum.

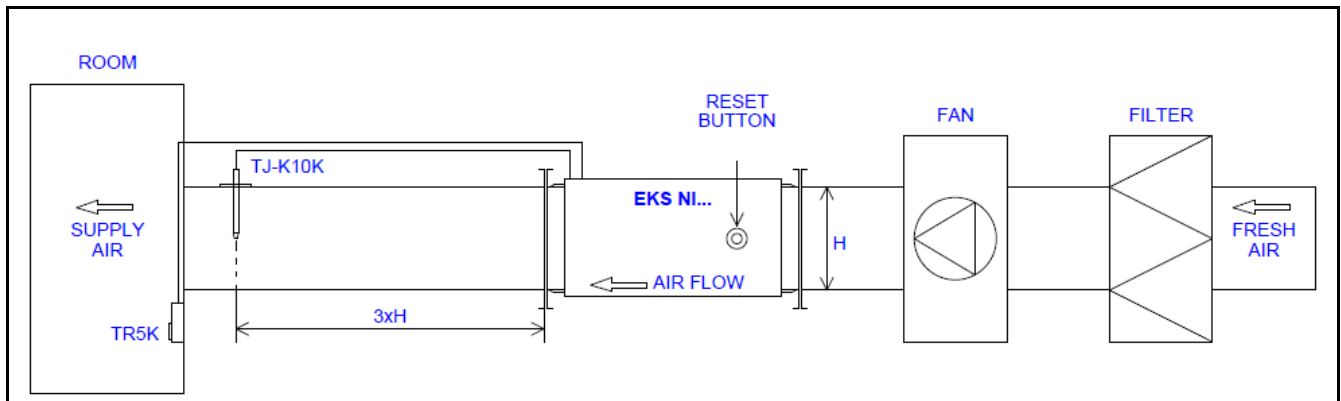
### **IMPORTANT:**

*The installation to the mains power supply may only be wired by a competent electrician. The power supply cable must be selected in the ratio with power of the heater. When installing these heaters, the standards and regulations in force in your country must be followed strictly adhered to. Within the installation an electrical isolation automatic circuit breaker (not included) must be present, to enable the installer to cut all power supply lines. Automatic circuit breaker must be selected regarding power and nominal current (see the electrical rating plate on the heater casing top) of the heater and should have characteristic B. Connect the heater to the mains power supply, check that the voltage, frequency, power and current are the same as those indicated on the electrical rating plate. The heater must be earthed.*

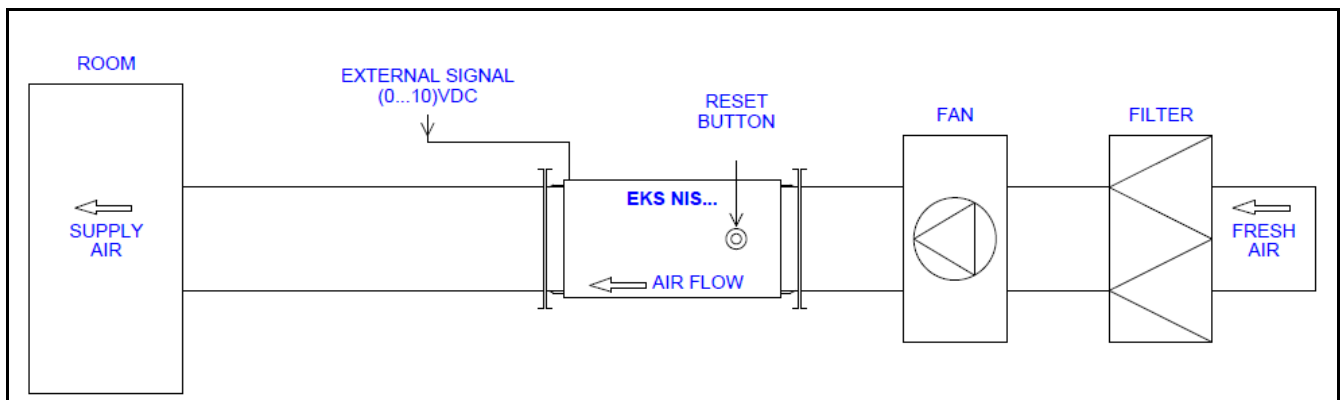
We recommend install supply air temperature sensor in distance multiplied by the heater's duct height ( $3 \times H$ ). For example: heater EKS duct height 200 mm, sensor's installation distance will be:  $3 \times 200 = 600$  mm.



**Fig. 2. Mounting example EKS NV...**



**Fig. 3. Mounting example EKS NI...**



**Fig. 4. Mounting example EKS NIS...**



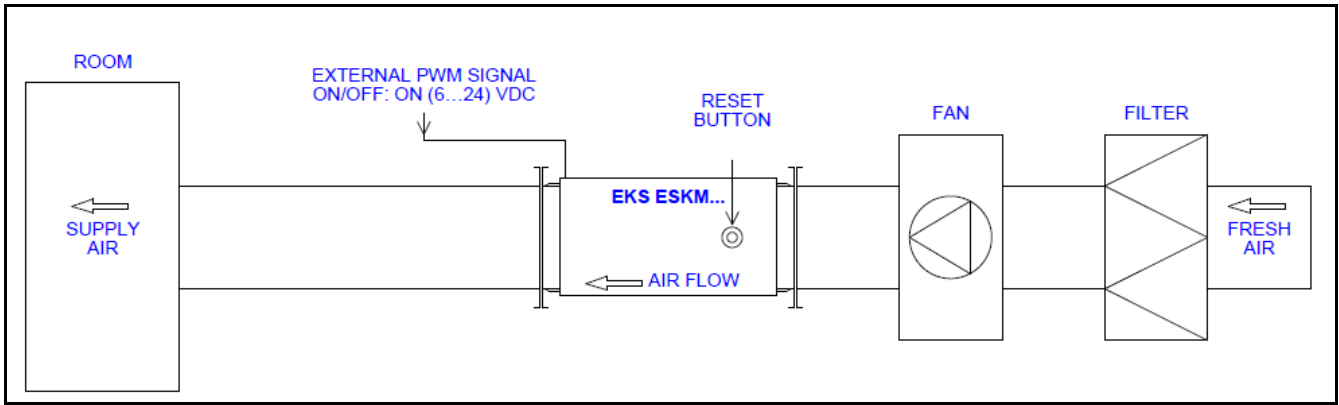


Fig. 5. Mounting example EKS ESKM...

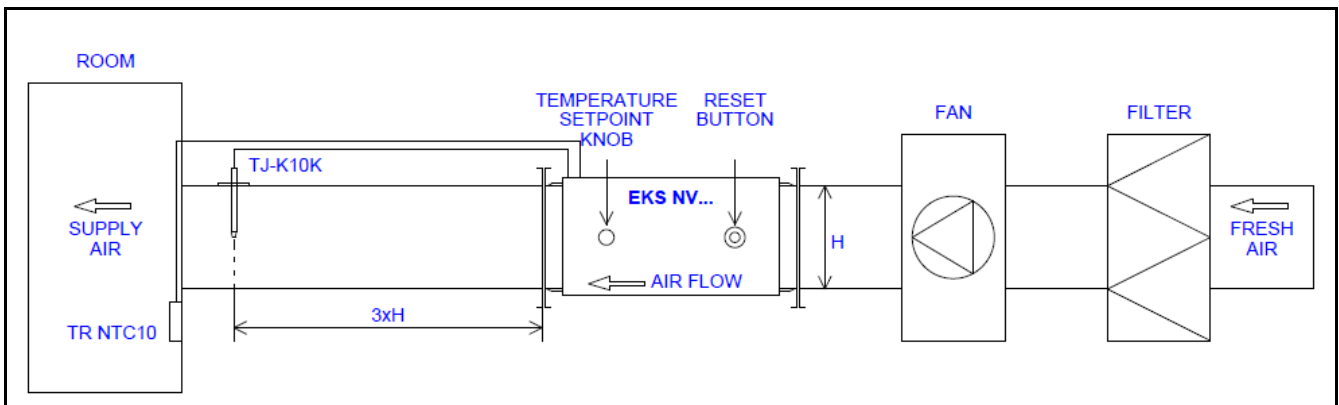


Fig. 6. Mounting example EKS NV...2NTC...

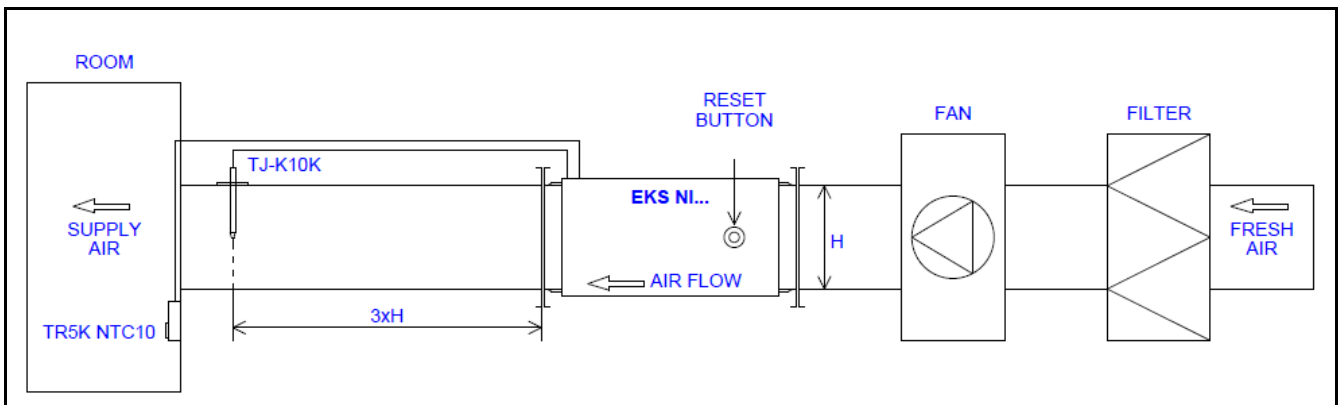


Fig. 7. Mounting example EKS NI...2NTC...

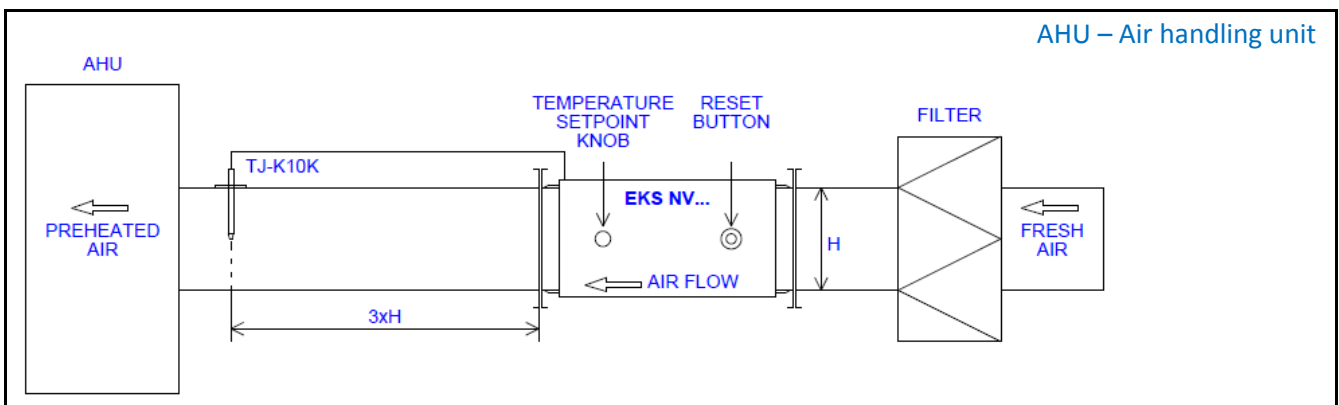
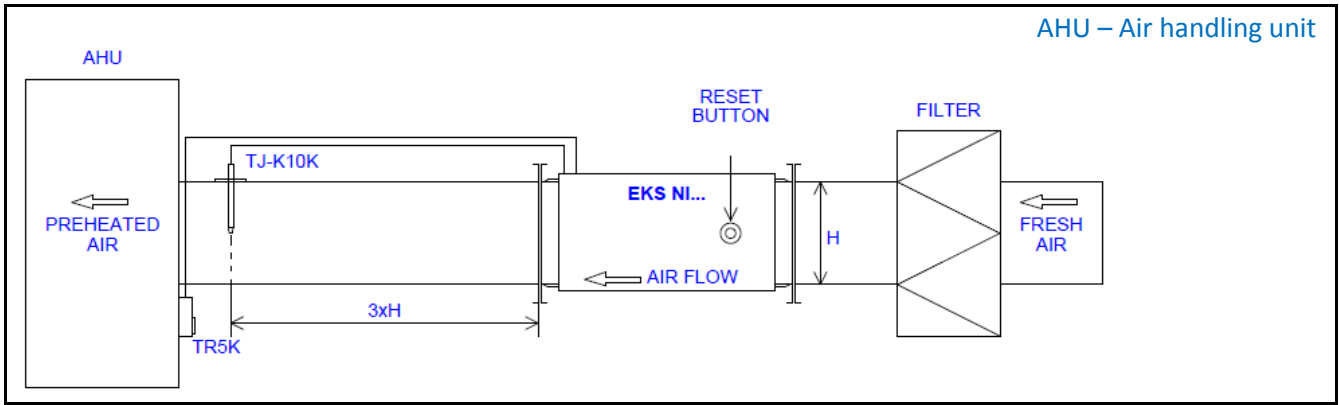
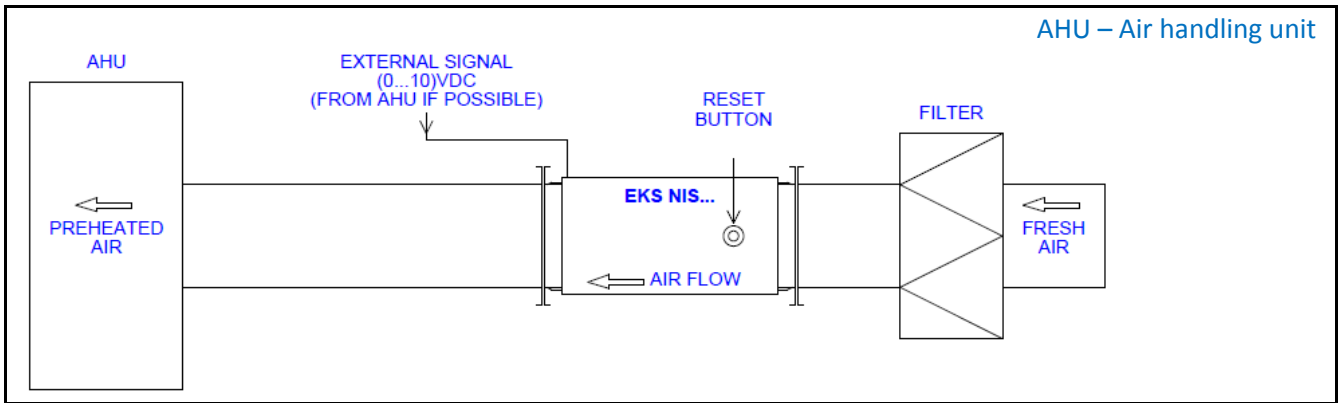


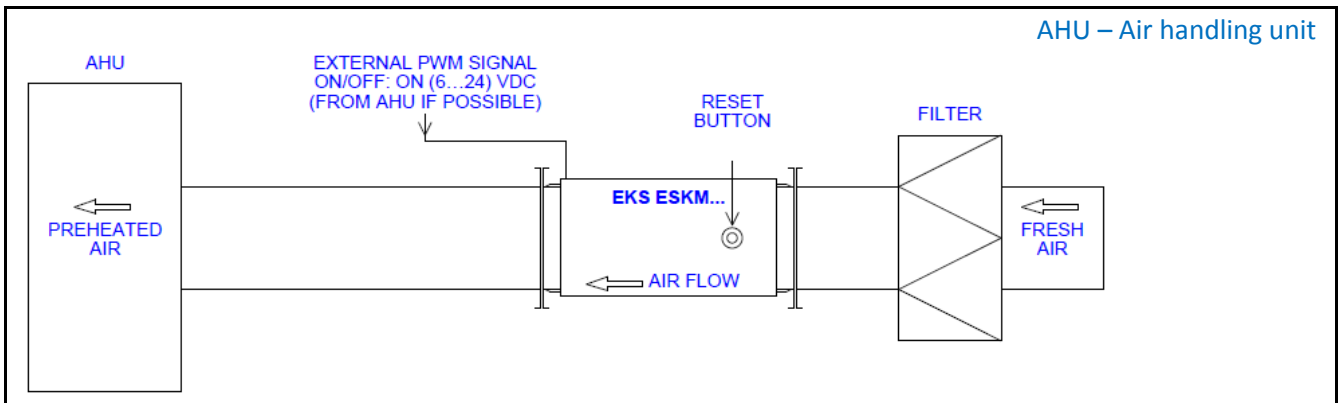
Fig. 8. Mounting example EKS NV... (Preheater)



**Fig. 9. Mounting example EKS NI... (Preheater)**



**Fig. 10. Mounting example EKS NIS... (Preheater)**



**Fig. 11. Mounting example EKS ESKM... (Preheater)**

## Heaters EKS with integrated controller

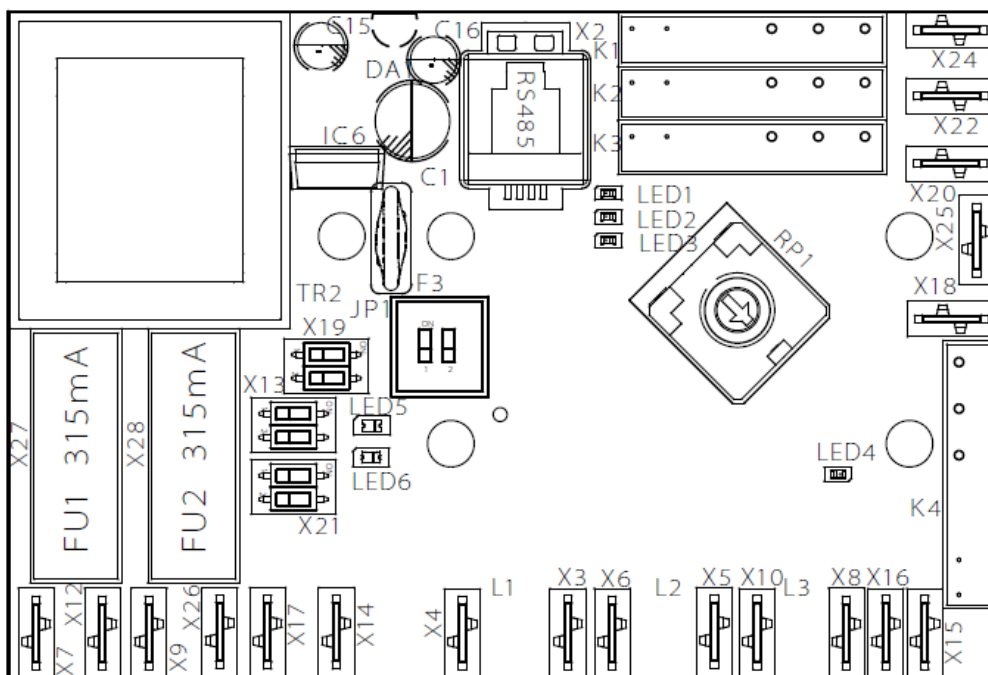
Heaters EKS with integrated temperature controller EKR-KN... (See Fig. 12) can be controlled in five different ways depending on control type:

- Type **EKS NV** – potentiometer on the top of the heater casing for temperature control
- Type **EKS NI** – external wired remote setpoint knob (TR5K) for temperature control
- Type **EKS NIS** – external wired remote 0...10V signal for temperature control
- Type **EKS ESKM** – external wired remote PWM (ON/OFF: ON(6...24)VDC) signal for temp. control
- Type **EKS MB** – external wired remote temperature control via Modbus RTU protocol (RS485)

Electrical duct heaters EKS with integrated temperature controller EKR-KN... works by PID regulator. That enable fine temperature control. Controller EKR-KN... controls load by Triacs without moving parts, which causes no-noise commutation and by contactors (Max. 4 additional steps).

**Table 1. Technical characteristics of controller EKR-KN...**

Power supply	3 - phase 400V
Power consumption in standby mode	0,1VA
Ambient temperature	0...50 °C
Relative humidity	Max. 90 % RH (non-condensing)



**Fig. 12. Print circuit board (PCB) of temperature controller EKR-KN...**  
(View may vary depending on type EKR-KN)

### External controllers for the heaters EKS





Heaters EKS without integrated control can be controlled with external controllers (*listed below*) with one or two air temperature sensors (*ordered separately*), depending on operating mode.

Type	Voltage Input/Output	Controlled Max. load (kW)	Additional Steps*/Max. load (kW)	Total load (kW)	Controlled Max. current (A)
 EKR 6.1	1~230/1~230	3,6	-	3,6	16
	2~400/2~400	6,4	-	6,4	
 EKR 15.1	3~230/3~230	9	1/9	18	25
	3~400/3~400	15	1/15	30	
 EKR 15.1P	3~230/3~230	9	4/135	144	25
	3~400/3~400	15	4/225	240	
 EKR 30	3~230/3~230	15	1/15	30	45
	3~400/3~400	30	1/30	60	
 EKR 30P	3~230/3~230	15	4/225	240	45
	3~400/3~400	30	4/450	480	

\* – relay outputs (5A/230V) intended for contactors control. For more information read controllers user guide.

### Additional accessories for the controllers

Additional accessories (*ordered separately*) intended for use with external and integrated controllers are listed below:

Type	Description	Measurement range (°C)	Setpoint range (°C)
 TJ-K10K	Duct temperature sensor	-30...105	-
 TR NTC10	Room temperature sensor panel	-30...105	-
 TR5K NTC10	Room temperature sensor panel with setpoint knob	-30...105	0...30
 TR5K	External remote panel with setpoint knob	-	0...30

*For more information read accessories user guide.*

### Description of control type

Heater type	Temperature control type	Setpoint range
EKS NV...	Potentiometer on the top of the heater casing	(0...30) °C*
EKS NI...	External wired remote panel with setpoint knob (TR5K)	(0...30) °C
EKS NIS...	External wired remote (0...10) VDC signal (analog input)	P**x(0...100) %
EKS ESKM...	External wired remote PWM (ON/OFF: ON (6...24) VDC) signal	P**x(0...100) %
EKS MB...	External wired remote control via Modbus RTU protocol (RS485)	(0...30) °C or P**x(0...100) %

\* – other setpoint range on request

\*\* – power of the heater (kW)

### Description of operating EKS NV ...

Electrical duct heaters EKS NV ... are designed with integrated temperature control (Max. 4 additional steps), one temperature sensor, potentiometer on the top of the heater casing for temperature setpoint.

When the heater power supply is switched on, LED 6 on the controller (EKR-KN...) PCB (see Fig. 12) flashes once every 8 seconds if setpoint is 0 °C and every second if setpoint is higher than 0 °C. If controller turns on the heating depending on the demand, LED 5 (STEP 1), LED 1 (STEP 2), LED 2 (STEP 3), LED 3 (STEP 4), LED 4 (STEP 5) lights, when in the heater are mounted 4 additional steps (see Fig. 12).

Heaters EKS NV ... operates by the supply (TJ-K10K) air temperature sensor. Setpoint temperature (0...30) °C.

There can be set the different desired (setpoint) air temperature by potentiometer on the top of the heater casing.

If LED 6 lights continuously it means that there is a failure of: supply (TJ-K10K) air temperature sensor or potentiometer on the top of the heater casing.

**IMPORTANT:** If failure appears, power supply must be switched off and only then performed fault elimination works.

### Description of operating EKS NI ...

Electrical duct heaters EKS NI ... are designed with integrated temperature control (Max. 4 additional steps), one temperature sensor, wired remote control panel (TR5K) for temperature setpoint.

When the heater power supply is switched on, LED 6 on the controller (EKR-KN...) PCB (see Fig. 12) flashes once every 8 seconds if setpoint is 0 °C and every second if setpoint is higher than 0 °C. If controller turns on the heating depending on the demand, LED 5 (STEP 1), LED 1 (STEP 2), LED 2 (STEP 3), LED 3 (STEP 4), LED 4 (STEP 5) lights, when in the heater are mounted 4 additional steps (see Fig. 12).

Heaters EKS NI ... operates by the supply (TJ-K10K) air temperature sensor. Setpoint temperature (0...30) °C.

There can be set the different desired (*setpoint*) air temperature by wired remote control panel.

If LED 6 lights continuously it means that there is a failure of: supply (TJ-K10K) air temperature sensor or wired remote control panel TR5K.

**IMPORTANT:** *If failure appears, power supply must be switched off and only then performed fault elimination works.*

### Description of operating EKS NIS ...

Electrical duct heaters EKS NIS ... are designed for the heaters power (0...100) % control (Max. 4 additional steps) by analog signal input (0...10) VDC.

When the heater power supply is switched on, LED 6 on the controller (EKR-KN...) PCB (see Fig. 12) flashes every second. If controller turns on the heating depending on analog signal, LED 5 (STEP 1), LED 1 (STEP 2), LED 2 (STEP 3), LED 3 (STEP 4), LED 4 (STEP 5) lights, when in the heater are mounted 4 additional steps (see Fig. 12).

### Description of operating EKS NV ... PTC ... (PH)

Electrical duct heaters EKS NV ... PTC ... (PH) are designed with integrated temperature control (Max. 2 additional steps), PTC (air velocity) and temperature sensors, potentiometer on the top of the heater casing for temperature setpoint.

When the heater power supply is switched on, controller (EKR-KN...) is in preparing mode for 30 seconds, LED 1 (on the heater case) flashes once every 5 seconds. If there is air velocity (Min. 1,5 m/s) in the duct heater after preparing mode, LED 1 flashes once per second and controller turns on the heating depending on the demand, LED 2 ((on the heater case) STEP1), LED 1 ((on PCB) STEP 2), LED 2 ((on PCB) STEP 3) lights, when in the heater are mounted 2 additional steps. If there is no air velocity, controller don't turns on the heating till air velocity appears.

Heaters EKS NV ... PTC ... (PH) operates by the supply (TJ-K10K) air temperature sensor.

EKS NV ... PTC ... setpoint temperature (0...30) °C

EKS NV ... PTC/PS setpoint temperature (-10...50) °C

EKS NV ... PH setpoint temperature (-20...-5) °C

There can be set the different desired (*setpoint*) air temperature by potentiometer on the top of the heater casing.

If LED 1 (on the heater case) lights continuously it means that there is a failure of: PTC (air velocity) sensor, supply (TJ-K10K) air temperature sensor, potentiometer on the top of the heater casing.

When the heater power supply is switched on, after power supply interruption or after any failure, controller is in preparing mode for 30 seconds.

**IMPORTANT:** *If failure appears, power supply must be switched off and only then performed fault elimination works.*

### Description of operating EKS NI ... PTC ... (PH)

Electrical duct heaters EKS NI ... PTC ... (PH) are designed with integrated temperature control (*Max. 2 additional steps*), PTC (air velocity) and temperature sensors, wired remote control panel (TR5K) for temperature setpoint.

When the heater power supply is switched on, controller (EKR-KN...) is in preparing mode for 30 seconds, LED 1 (*on the heater case*) flashes once every 5 seconds. If there is air velocity (*Min. 1,5 m/s*) in the duct heater after preparing mode, LED 1 flashes once per second and controller turns on the heating depending on the demand, LED 2 (*on the heater case*) STEP1), LED 1 (*on PCB*) STEP 2), LED 2 (*on PCB*) STEP 3) lights, when in the heater are mounted 2 additional steps. If there is no air velocity, controller don't turns on the heating till air velocity appears.

Heaters EKS NI ... PTC ... (PH) operates by the supply (TJ-K10K) air temperature sensor.

EKS NI ... PTC ... setpoint temperature (0...30) °C

EKS NI ... PTC/PS setpoint temperature (-10...50) °C

EKS NI ... PH setpoint temperature (-20...-5) °C

There can be set the different desired (*setpoint*) air temperature by wired remote control panel.

If LED 1 (*on the heater case*) lights continuously it means that there is a failure of: PTC (*air velocity*) sensor, supply (TJ-K10K) air temperature sensor, wired remote control panel TR5K.

When the heater power supply is switched on, after power supply interruption or after any failure, controller in preparing mode for 30 seconds.

**IMPORTANT:** *If failure appears, power supply must be switched off and only then performed fault elimination works.*

### Description of operating EKS NIS ... PTC ... (PH)

Electrical duct heaters EKS NIS ... PTC ... (PH) are designed for the heaters power (0...100) % control (*Max. 2 additional steps*) by analog signal input (0...10) VDC and with integrated PTC (air velocity) sensor.

When the heater power supply is switched on, controller (EKR-KN...) is in preparing mode for 30 seconds, LED 1 (*on the heater case*) flashes once every 5 seconds. If there is air velocity (*Min. 1,5 m/s*) in the duct heater after preparing mode, LED 1 flashes once per second and controller turns on the heating depending on analog signal, LED 2 (*on the heater case*) STEP1), LED 1 (*on PCB*) STEP 2), LED 2 (*on PCB*) STEP 3) lights, when in the heater are mounted 2 additional steps. If there is no air velocity, controller don't turns on the heating till air velocity appears.

If LED 1 (*on the heater case*) lights continuously it means that there is a failure of PTC (*air velocity*) sensor.

When the heater power supply is switched on, after power supply interruption or after any failure, controller is in preparing mode for 30 seconds.

**IMPORTANT:** *If failure appears, power supply must be switched off and only then performed fault elimination works.*



### Description of operating EKS NV ... 2NTC

Electrical duct heaters EKS NV ... 2NTC are designed with integrated temperature control (*Max. 4 additional steps*), two temperature sensors, potentiometer on the top of the heater casing for temperature setpoint.

When the heater power supply is switched on, LED 6 on the controller (*EKR-KN...*) PCB (see Fig. 12) flashes once every 8 seconds if setpoint is 0 °C and every second if setpoint is higher than 0 °C. If controller turns on the heating depending on the demand, LED 5 (*STEP 1*), LED 1 (*STEP 2*), LED 2 (*STEP 3*), LED 3 (*STEP 4*), LED 4 (*STEP 5*) lights, when in the heater are mounted 4 additional steps (see Fig. 12).

Heaters EKS NV ... 2NTC operates by the supply (*TJ-K10K*) and by the room (*NTC10*) air temperature sensor. Setpoint temperature (*15...30*) °C. In this mode is preprogrammed the minimum (*15°C*) and the maximum (*45°C*) temperatures of supply air. The room air temperature sensor is mounted in the wired panel TR NTC10.

There can be set the different desired (*setpoint*) air temperature by potentiometer on the top of the heater casing.

If LED 6 lights continuously it means that there is a failure of: supply (*TJ-K10K*) or room (*NTC10*) air temperature sensor, potentiometer on the top of the heater casing.

**IMPORTANT:** *If failure appears, power supply must be switched off and only then performed fault elimination works.*

### Description of operating EKS NI ... 2NTC

Electrical duct heaters EKS NI ... 2NTC are designed with integrated temperature control (*Max. 4 additional steps*), two temperature sensors, wired remote control panel (*TR5K NTC10*) for temperature setpoint.

When the heater power supply is switched on, LED 6 on the controller (*EKR-KN...*) PCB (see Fig. 12) flashes once every 8 seconds if setpoint is 0 °C and every second if setpoint is higher than 0 °C. If controller turns on the heating depending on the demand, LED 5 (*STEP 1*), LED 1 (*STEP 2*), LED 2 (*STEP 3*), LED 3 (*STEP 4*), LED 4 (*STEP 5*) lights, when in the heater are mounted 4 additional steps (see Fig. 12).

Heaters EKS NI ... 2NTC operates by the supply (*TJ-K10K*) and by the room (*NTC10*) air temperature sensor. Setpoint temperature (*15...30*) °C. In this mode is preprogrammed the minimum (*15°C*) and the maximum (*45°C*) temperatures of supply air. The room air temperature sensor is mounted in the wired remote control panel TR5K NTC10.

There can be set the different desired (*setpoint*) air temperature by wired remote control panel TR5K NTC10.

If LED 6 lights continuously it means that there is a failure of: supply (*TJ-K10K*) or room (*NTC10*) air temperature sensor, wired remote control panel TR5K NTC10.

**IMPORTANT:** *If failure appears, power supply must be switched off and only then performed fault elimination works.*

### Description of operating EKS NV ... PTC/2NTC

Electrical duct heaters EKS NV ... PTC/2NTC are designed with integrated temperature control (*Max. 2 additional steps*), PTC (*air velocity*) and two temperature sensors, potentiometer on the top of the heater casing for temperature setpoint.

When the heater power supply is switched on, controller (*EKR-KN...*) is in preparing mode for 30 seconds, LED 1 (*on the heater case*) flashes once every 5 seconds. If there is air velocity (*Min. 1,5 m/s*) in the duct heater after preparing mode, controller turns on the heating depending on the demand, LED 2 (*on the heater case*) STEP1), LED 1 (*on PCB*) STEP 2), LED 2 (*on PCB*) STEP 3) lights, when in the heater are mounted 2 additional steps. If there is no air velocity, controller don't turns on the heating till air velocity appears.

Heaters EKS NV ... PTC/2NTC can operate in two modes:

1. Control by the supply air temperature sensor (*TJ-K10K*), when the first (1) switch of JP1 (*see Fig. 12*) is in position OFF. LED 1 (*on the heater case*) flashes once per second. Setpoint temperature (*0...30*) °C.
2. Control by the supply (*TJ-K10K*) and by the room (*NTC10*) air temperature sensor, when the first (1) switch of JP1 (*see Fig. 12*) is in position ON. LED 1 (*on the heater case*) flashes twice per second. Setpoint temperature (*15...30*) °C. In this mode is preprogrammed the minimum (*15°C*) and the maximum (*40°C*) temperatures of supply air. The room air temperature sensor is mounted in the wired panel TR NTC10.

Depending on the operating mode there can be set the different desired (*setpoint*) air temperature by potentiometer on the top of the heater casing.

If LED 1 (*on the heater case*) lights continuously it means that there is a failure of: PTC (*air velocity*) sensor, supply (*TJ-K10K*) or room (*NTC10*) air temperature sensor, potentiometer on the top of the heater casing.

When the heater power supply is switched on, after power supply interruption or after any failure, controller is in preparing mode for 30 seconds.

**IMPORTANT:** *If failure appears, power supply must be switched off and only then performed fault elimination works.*

### Description of operating EKS NI ... PTC/2NTC

Electrical duct heaters EKS NI ... PTC/2NTC are designed with integrated temperature control (*Max. 2 additional steps*), PTC (*air velocity*) and two temperature sensors, wired remote control panel (*TR5K NTC10*) for temperature setpoint.

When the heater power supply is switched on, controller (*EKR-KN...*) is in preparing mode for 30 seconds, LED 1 (*on the heater case*) flashes once every 5 seconds. If there is air velocity (*Min. 1,5 m/s*) in the duct heater after preparing mode, controller turns on the heating depending on the demand, LED 2 (*on the heater case*) STEP1), LED 1 (*on PCB*) STEP 2), LED 2 (*on PCB*) STEP 3) lights, when in the heater are mounted 2 additional steps. If there is no air velocity, controller don't turns on the heating till air velocity appears.

Heaters EKS NI ... PTC/2NTC can operate in two modes:

1. Control by the supply air temperature sensor (*TJ-K10K*), when the first (1) switch of JP1 (see Fig. 12) is in position OFF. LED 1 (on the heater case) flashes once per second. Set point temperature (0...30) °C.
2. Control by the supply (*TJ-K10K*) and by the room (*NTC10*) air temperature sensor, when the first (1) switch of JP1 (see Fig. 12) is in position ON. LED 1 (on the heater case) flashes twice per second. Setpoint temperature (15...30) °C. In this mode is preprogrammed the minimum (15°C) and the maximum (40°C) temperatures of supply air. The room air temperature sensor is mounted in the wired remote control panel TR5K NTC10.

Depending on the operating mode there can be set the different desired (*setpoint*) air temperature by wired remote control panel TR5K NTC10.

If LED 1 (on the heater case) lights continuously it means that there is a failure of: PTC (*air velocity*) sensor, supply (*TJ-K10K*) or room (*NTC10*) air temperature sensor, wired remote control panel TR5K NTC10.

When the heater power supply is switched on, after power supply interruption or after any failure, controller is in preparing mode for 30 seconds.

**IMPORTANT:** If failure appears, power supply must be switched off and only then performed fault elimination works.

### Description of operating EKS MB ...

Electrical duct heaters EKS MB ... can communicate via Modbus RTU. Connected to the system EKS MB ... is a Slave device. Modbus settings are shown in table 2.

**Table 2. Modbus settings**

Setting	Possible values	Default value
Device address	1...247	10
Baud rate	2400, 4800, 9600, 19200, 38400	9600
Parity	None, Even, Odd	None
Stop bit	None, 1, 2	1

There is connection provided on the PCB for Modbus (see Fig. 12). Connector pin layout and meanings are shown in Fig. 13.

**Fig. 13. Connector for Modbus control**



1. +12VDC
2. B-
3. A+
4. GND

*For detailed information about control via Modbus please contact manufacturer.*

## Electrical wiring diagrams

**S, S1...S5** – Automatic circuit breakers

**J** – Switch

**T** – Timer

**EKR-KN...** – PCB of temperature controller

**V1, V2** – Triacs

**A** – Overheat thermostat with manual reset

**B** – Overheat thermostat with automatic reset

**C** – Heating elements

**K, K1...K5** – Contactors (relays)

**PTC** – Sensor for minimum air velocity detection

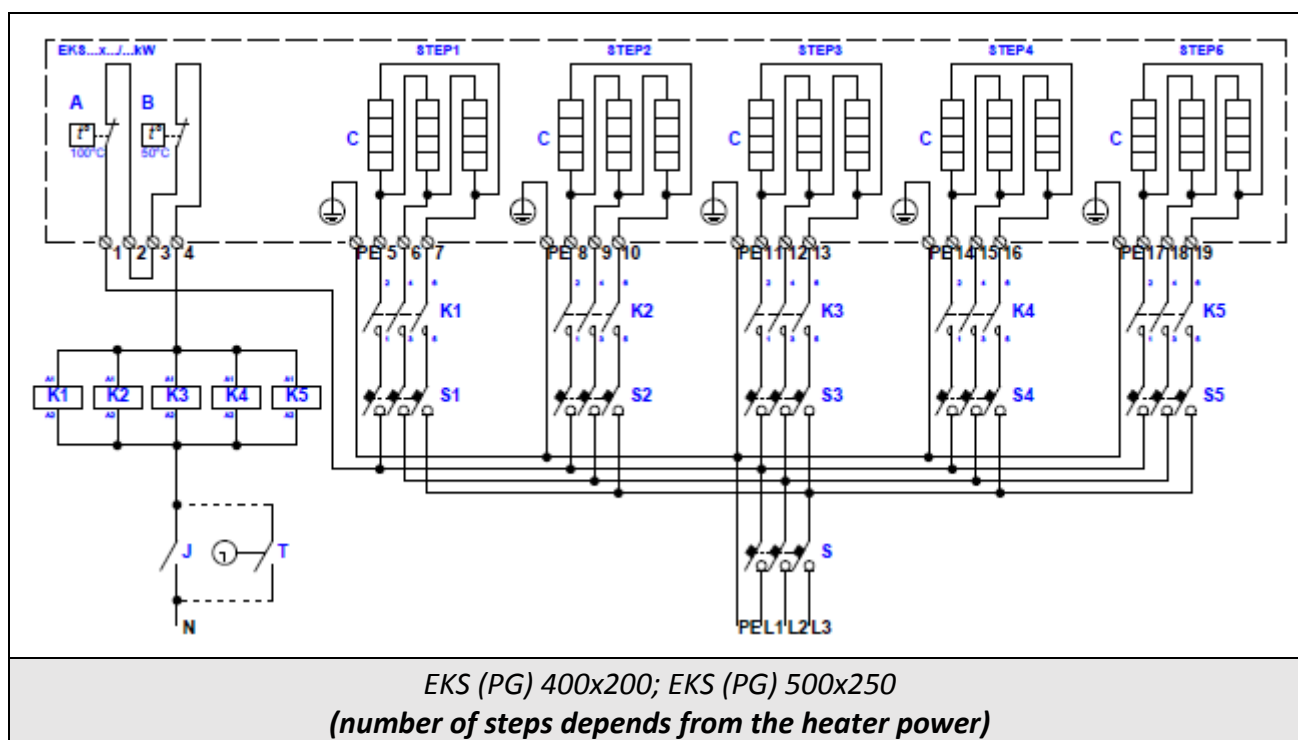
**PS** – Differential pressure switch for air flow detection

**TJ-K10K** – Supply air temperature sensor

**TR NTC10** – Room temperature sensor panel

**TR5K NTC10** – Room temperature sensor panel with remote setpoint knob

**TR5K** – External remote setpoint knob panel



**Fig. 13. Electrical wiring diagrams of the heater EKS (PG) ...x.../...kW**

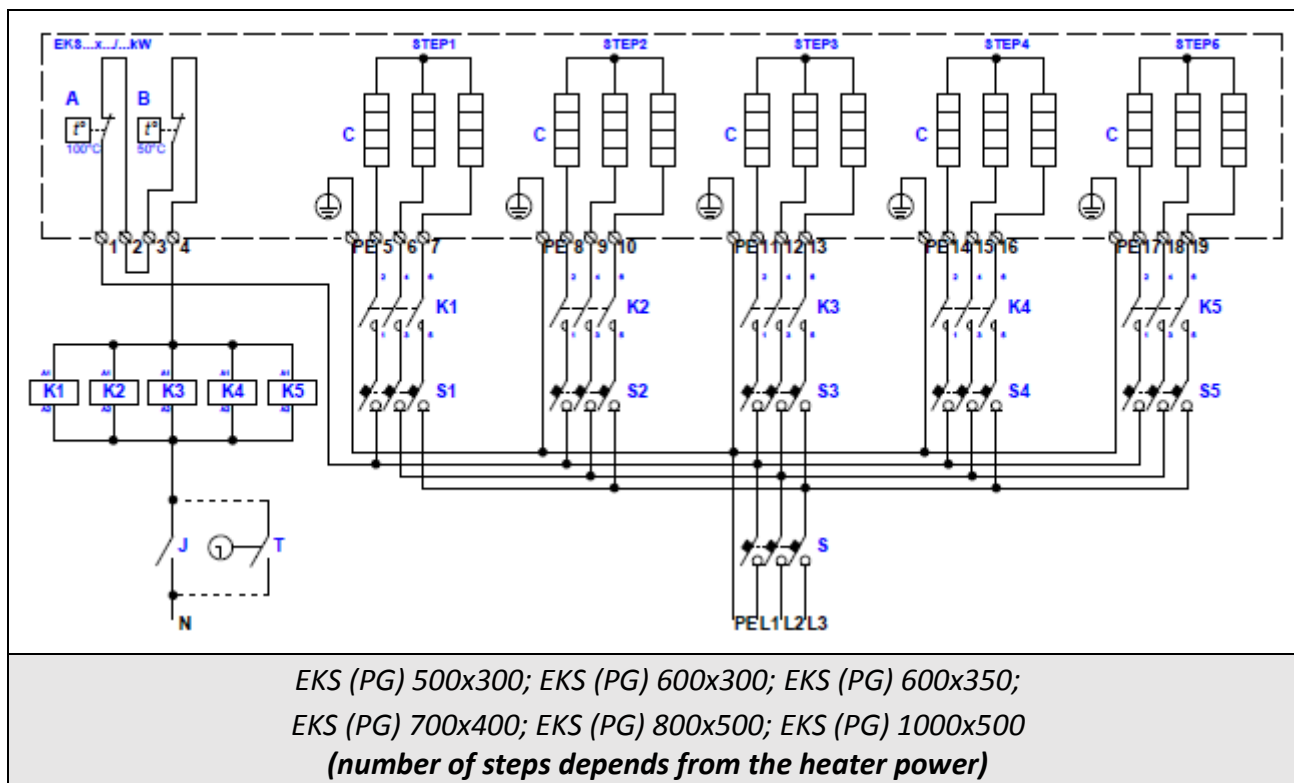


Fig. 14. Electrical wiring diagrams of the heater EKS (PG) ...x.../...kW

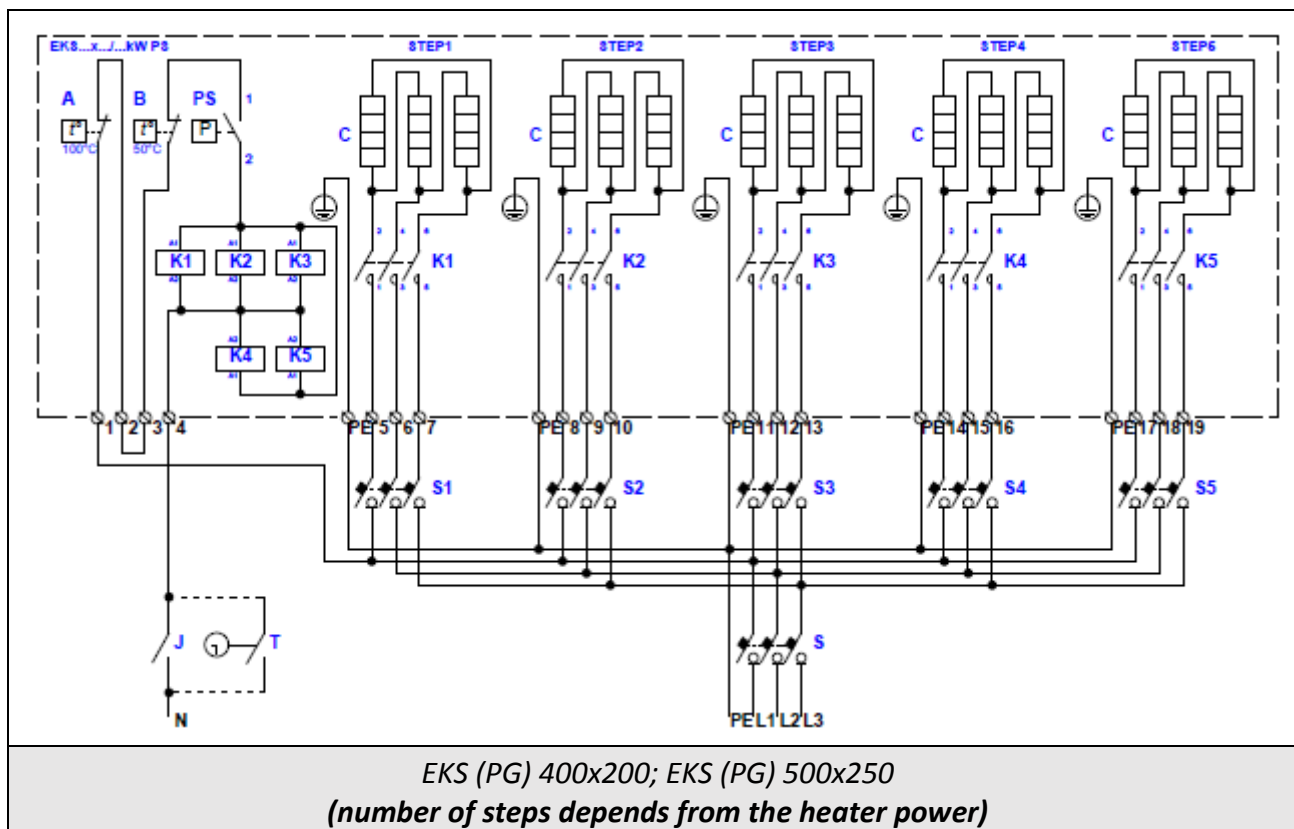
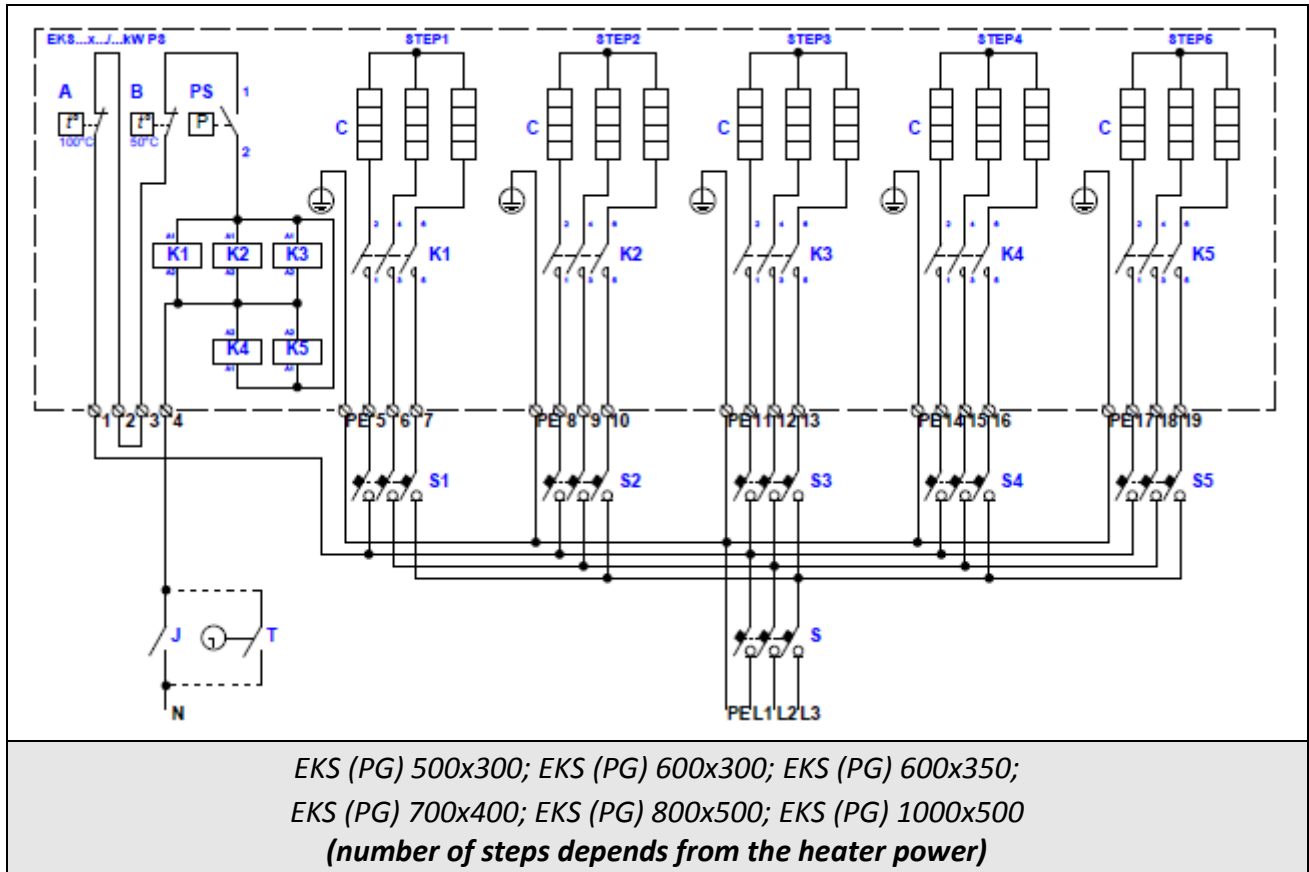
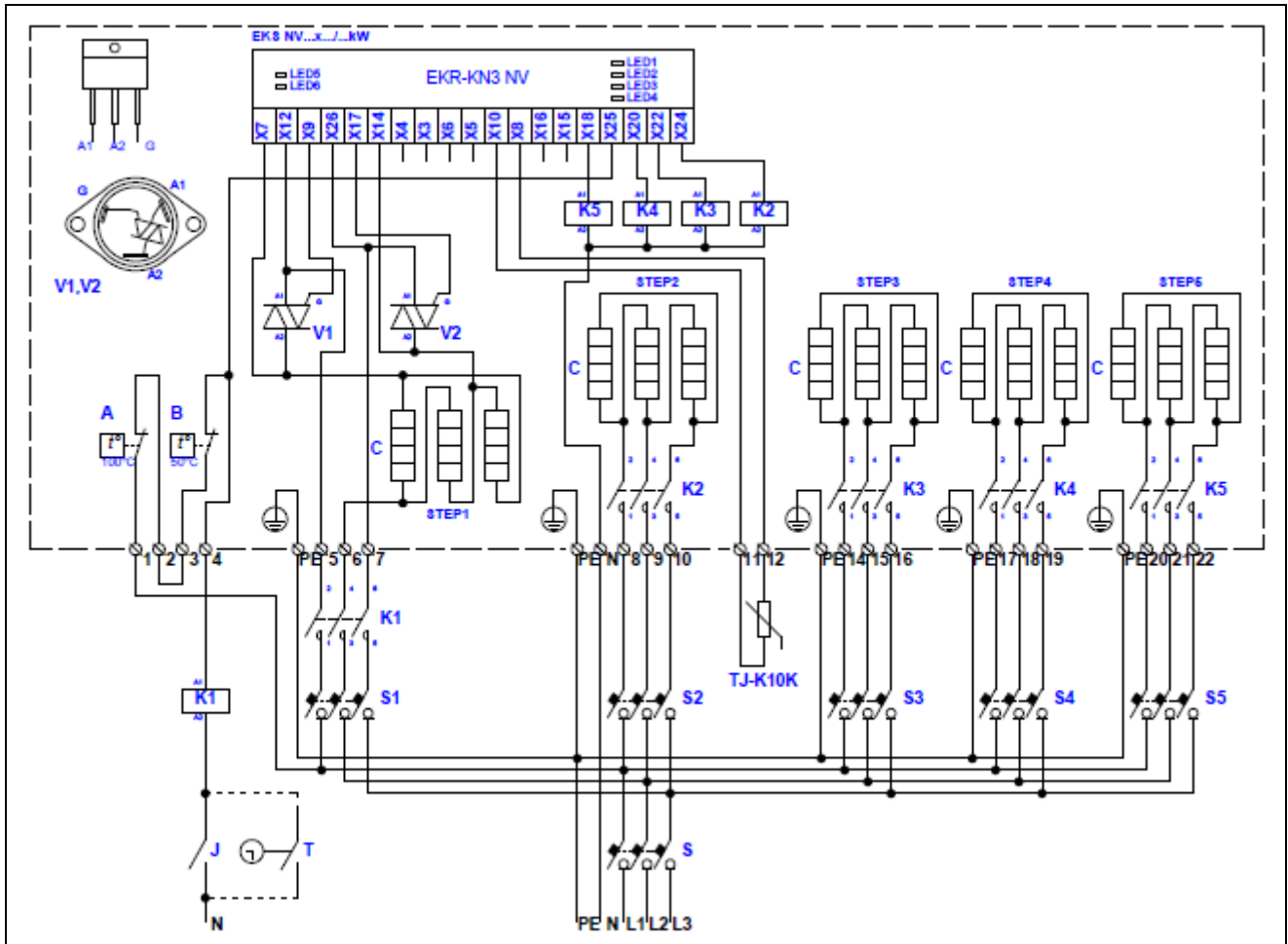


Fig. 15. Electrical wiring diagrams of the heater EKS (PG) ...x.../...kW PS

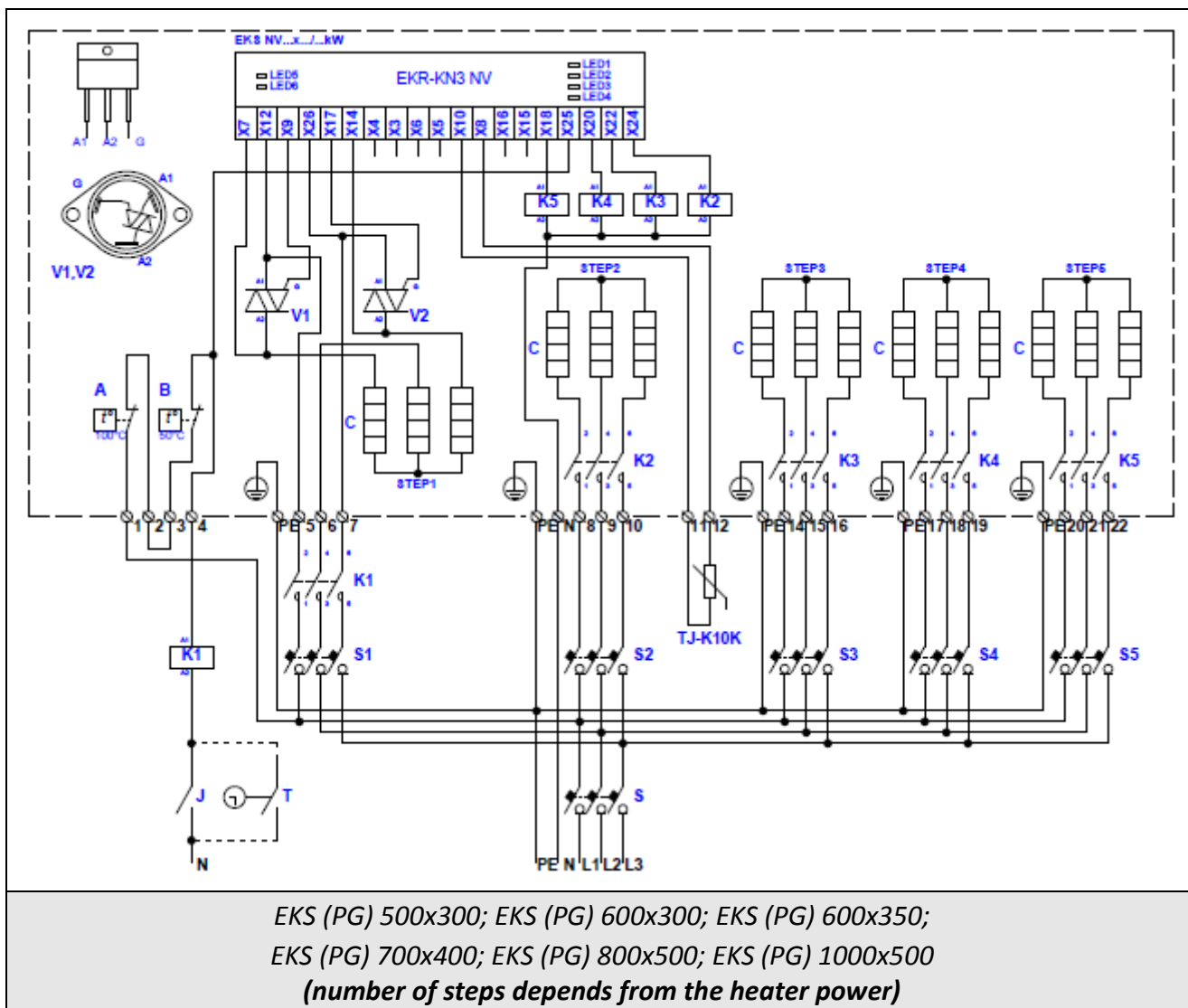


**Fig. 16. Electrical wiring diagrams of the heater EKS (PG) ...x.../...kW PS**



EKS (PG) 400x200; EKS (PG) 500x250  
 (number of steps depends from the heater power)

Fig. 17. Electrical wiring diagrams of the heater EKS (PG) NV ...x.../...kW



**Fig. 18. Electrical wiring diagrams of the heater EKS (PG) NV ...x.../...kW**



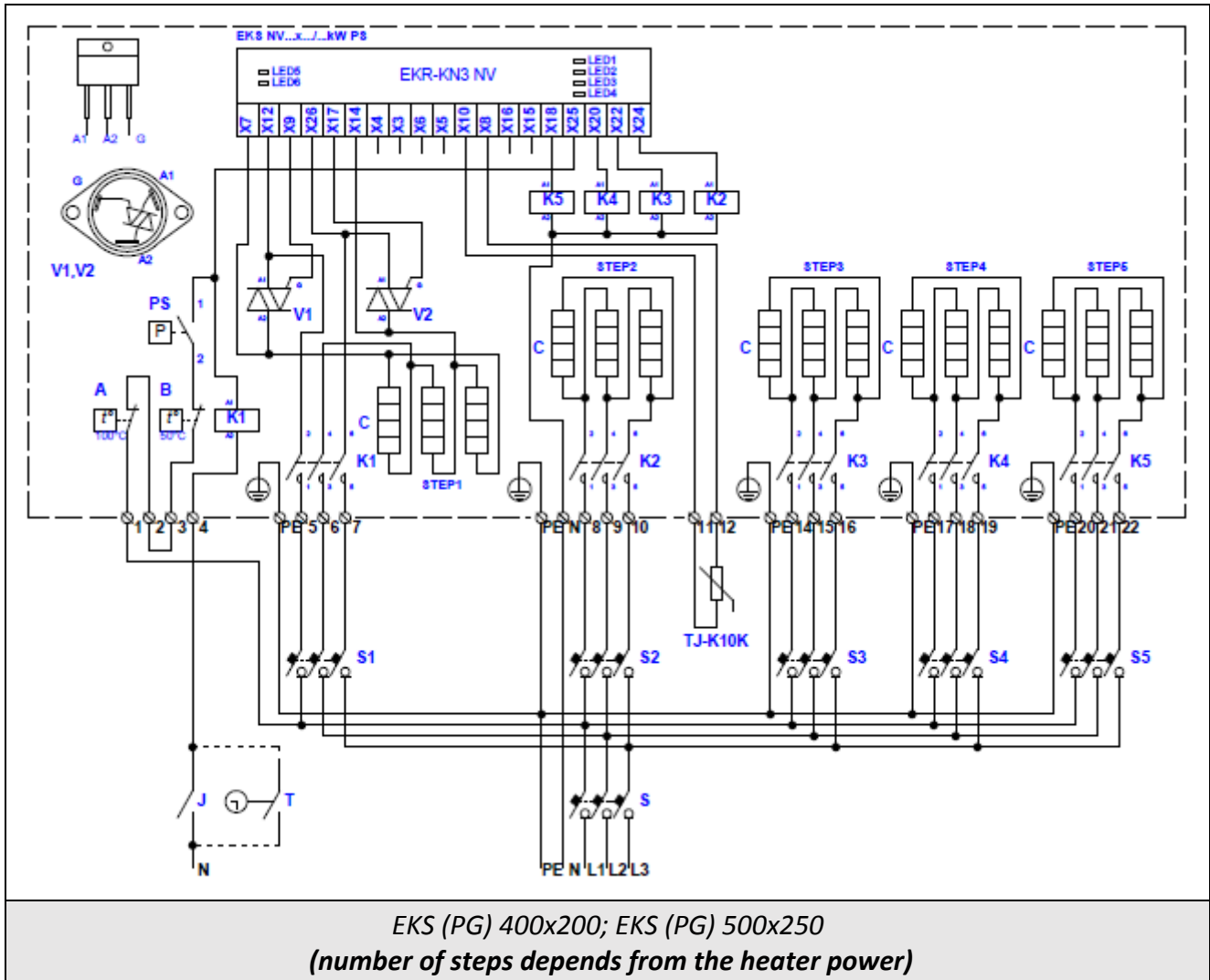
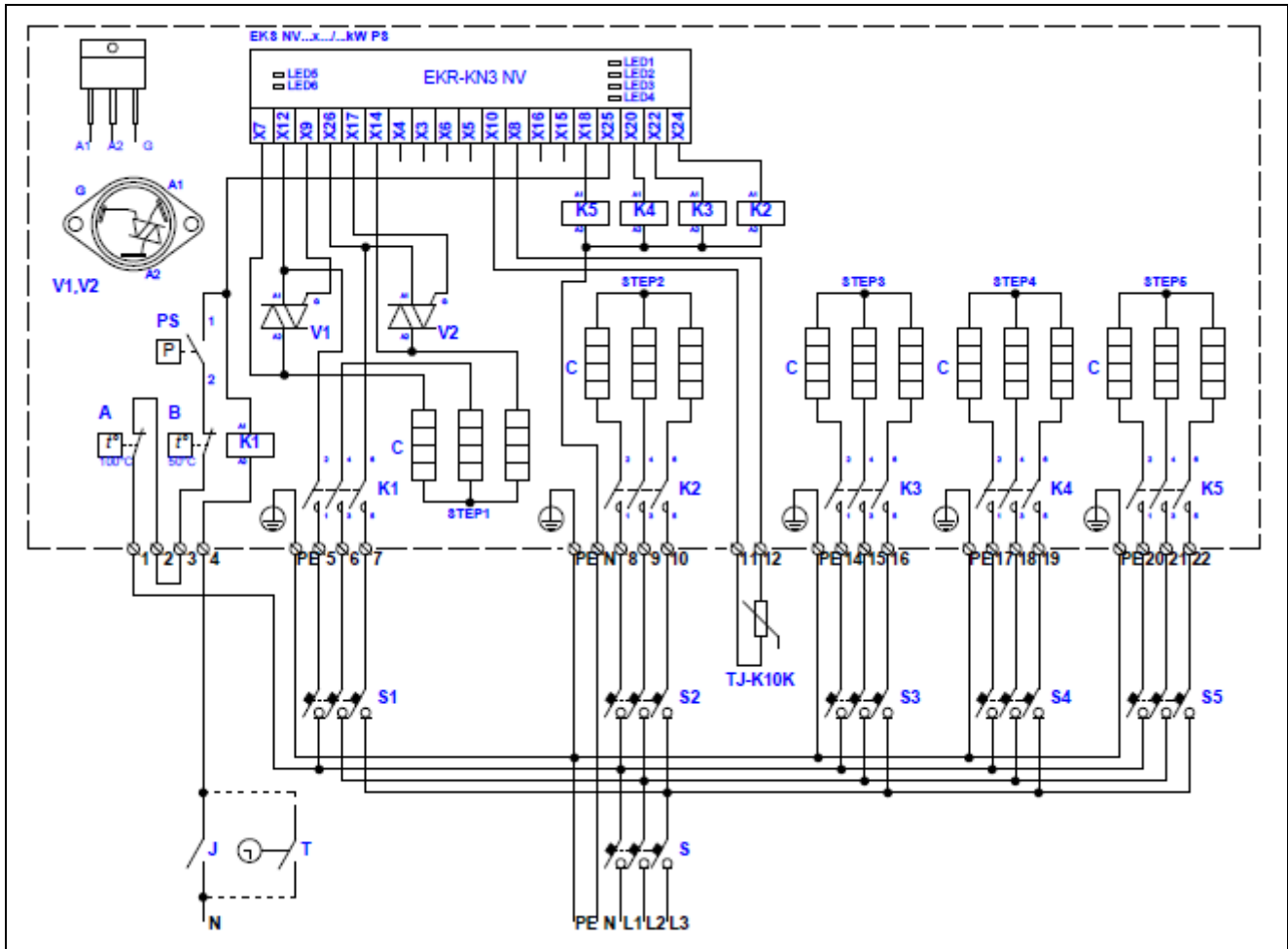
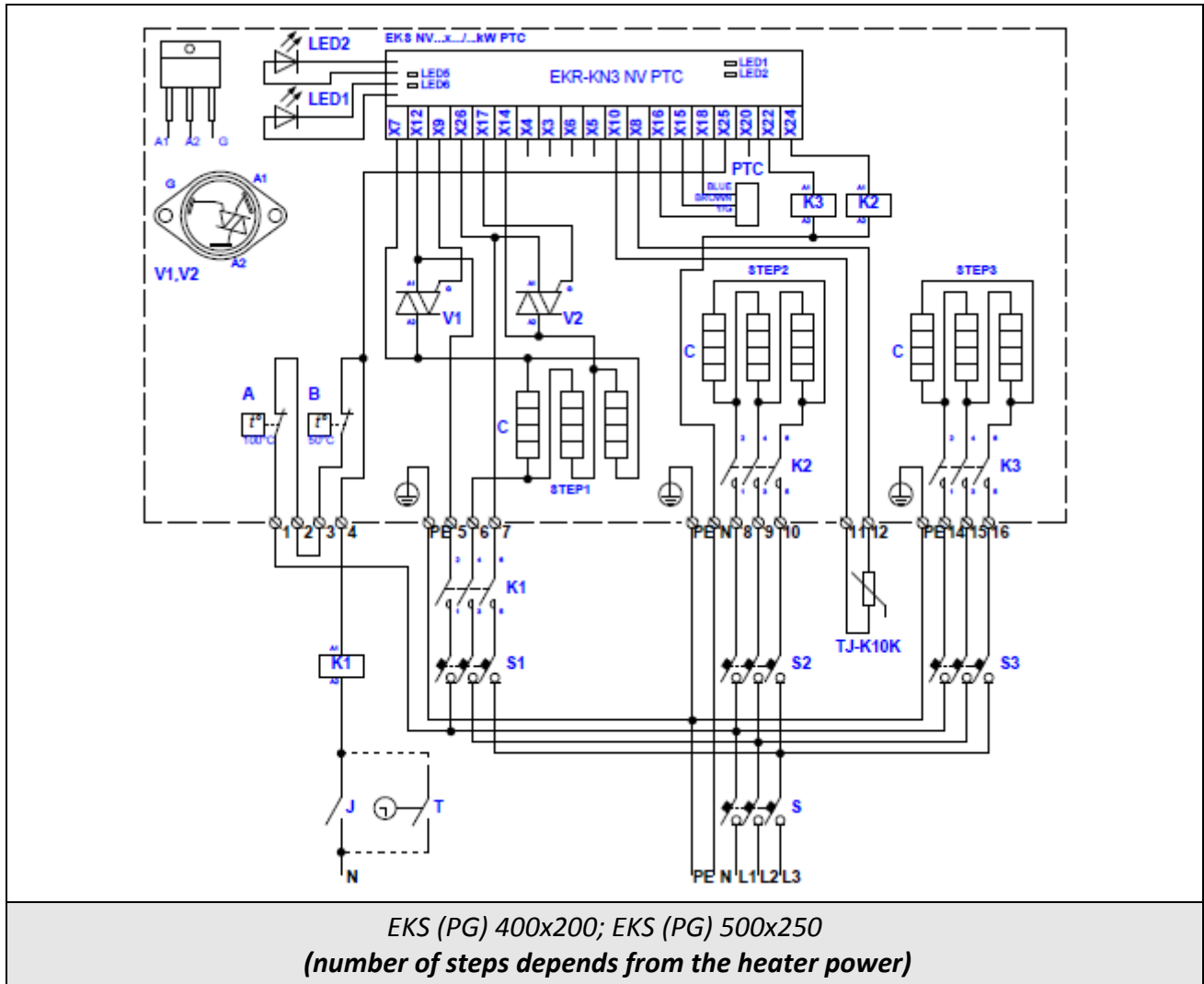


Fig. 19. Electrical wiring diagrams of the heater EKS (PG) NV ...x.../...kW PS

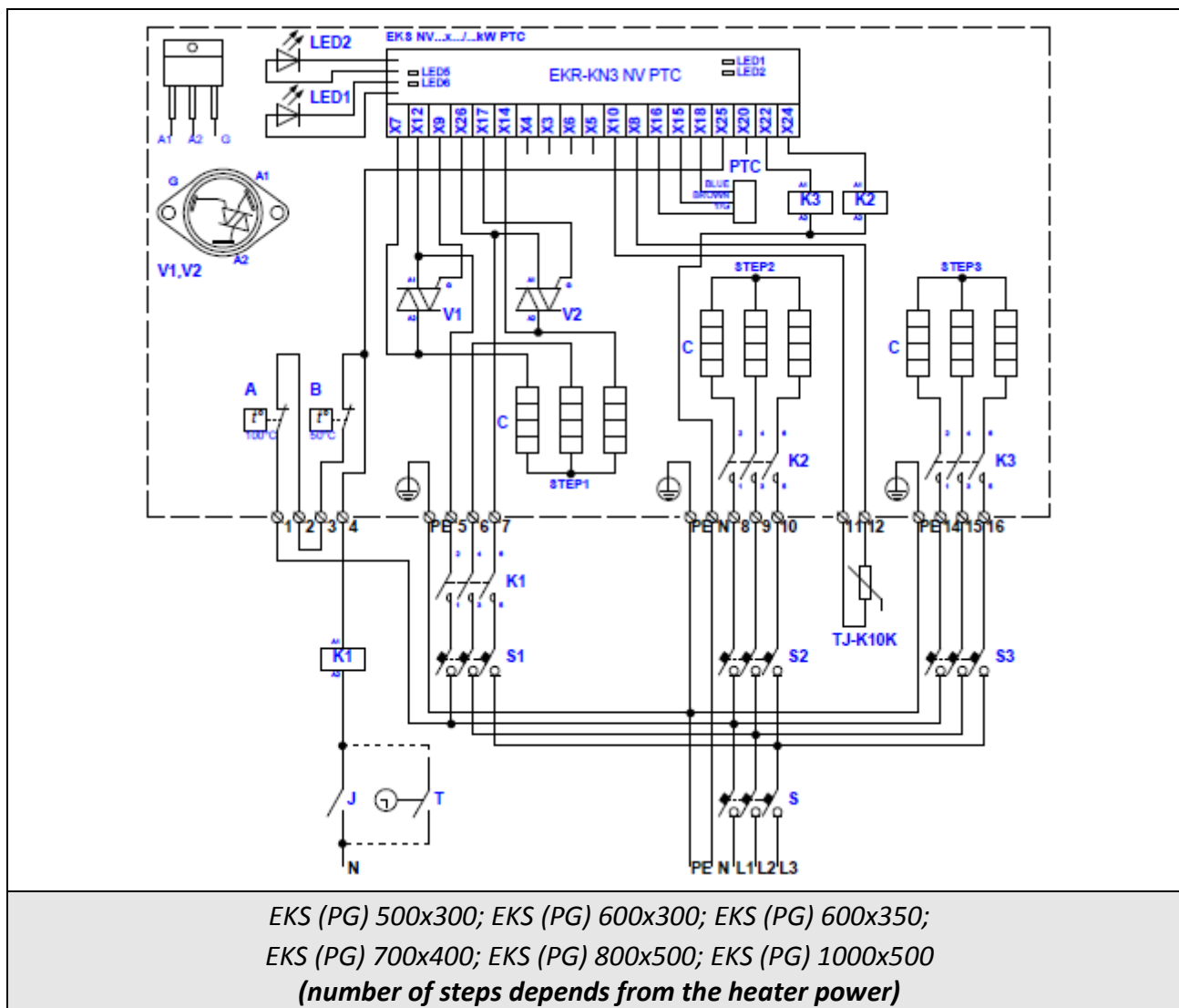


EKS (PG) 500x300; EKS (PG) 600x300; EKS (PG) 600x350;  
 EKS (PG) 700x400; EKS (PG) 800x500; EKS (PG) 1000x500  
 (number of steps depends from the heater power)

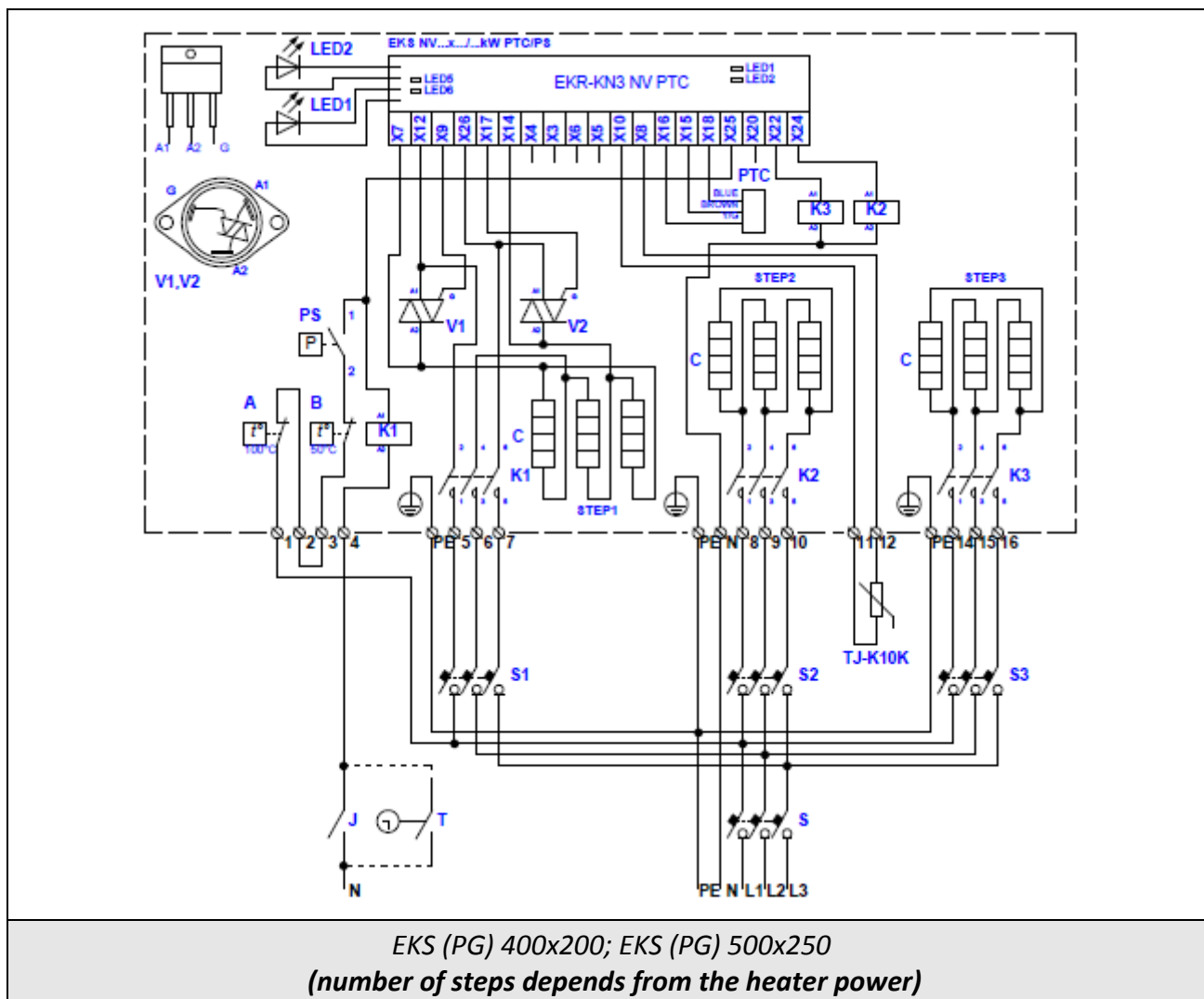
**Fig. 20. Electrical wiring diagrams of the heater EKS (PG) NV ...x.../...kW PS**



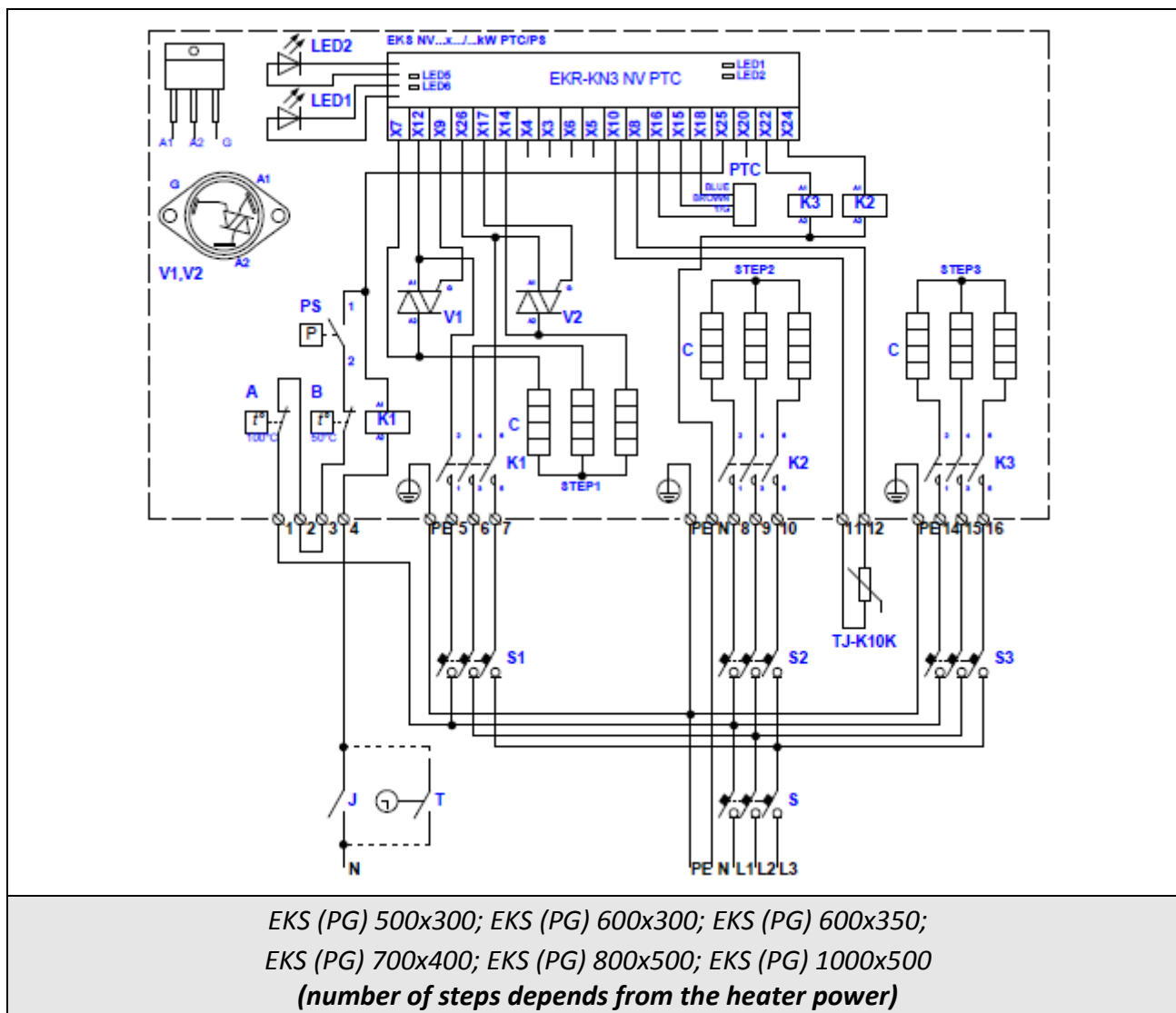
**Fig. 21. Electrical wiring diagrams of the heater EKS (PG) NV ...x.../...kW PTC**



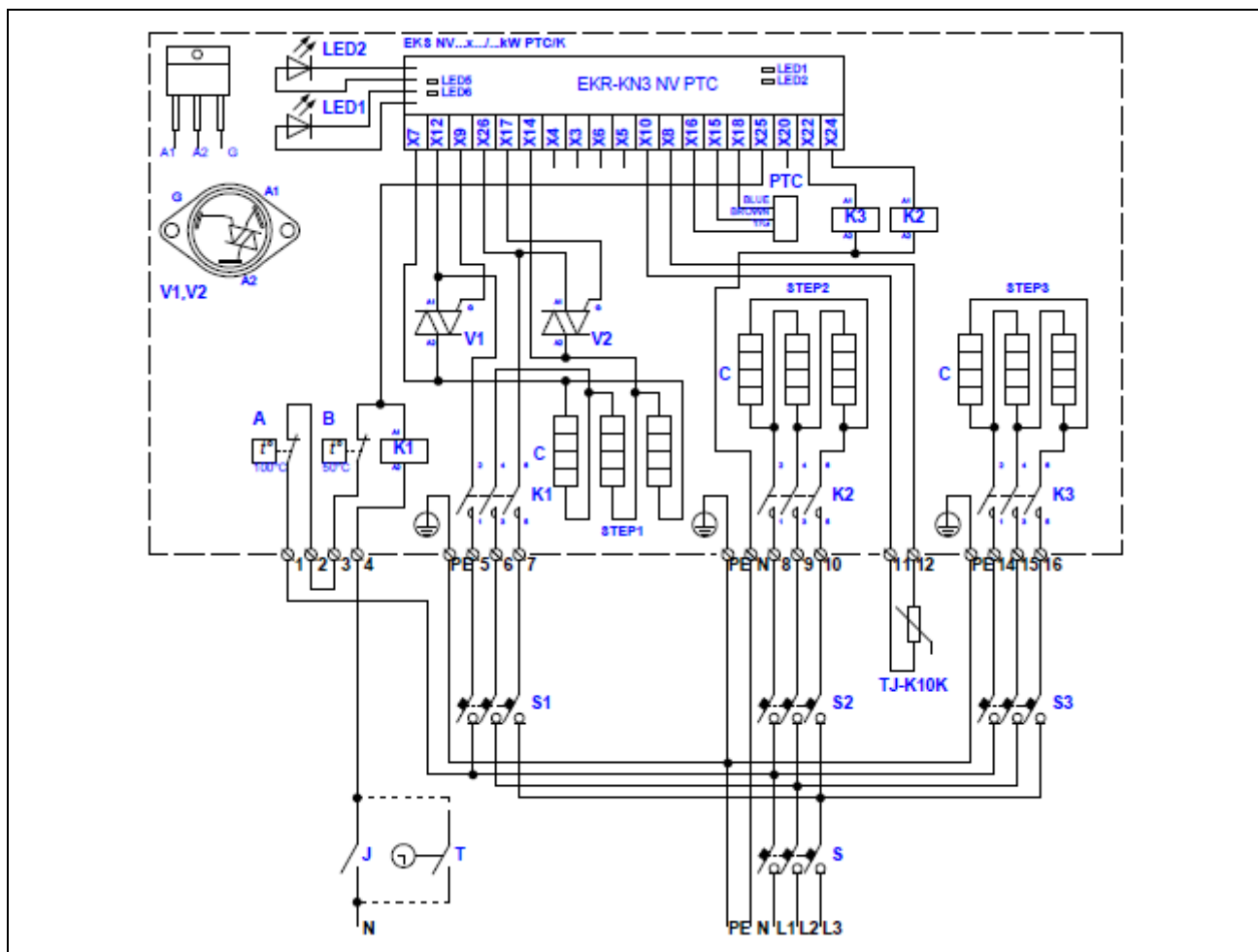
**Fig. 22. Electrical wiring diagrams of the heater EKS (PG) NV ...x.../...kW PTC**



**Fig. 23. Electrical wiring diagrams of the heater EKS (PG) NV ...x.../...kW PTC/PS**

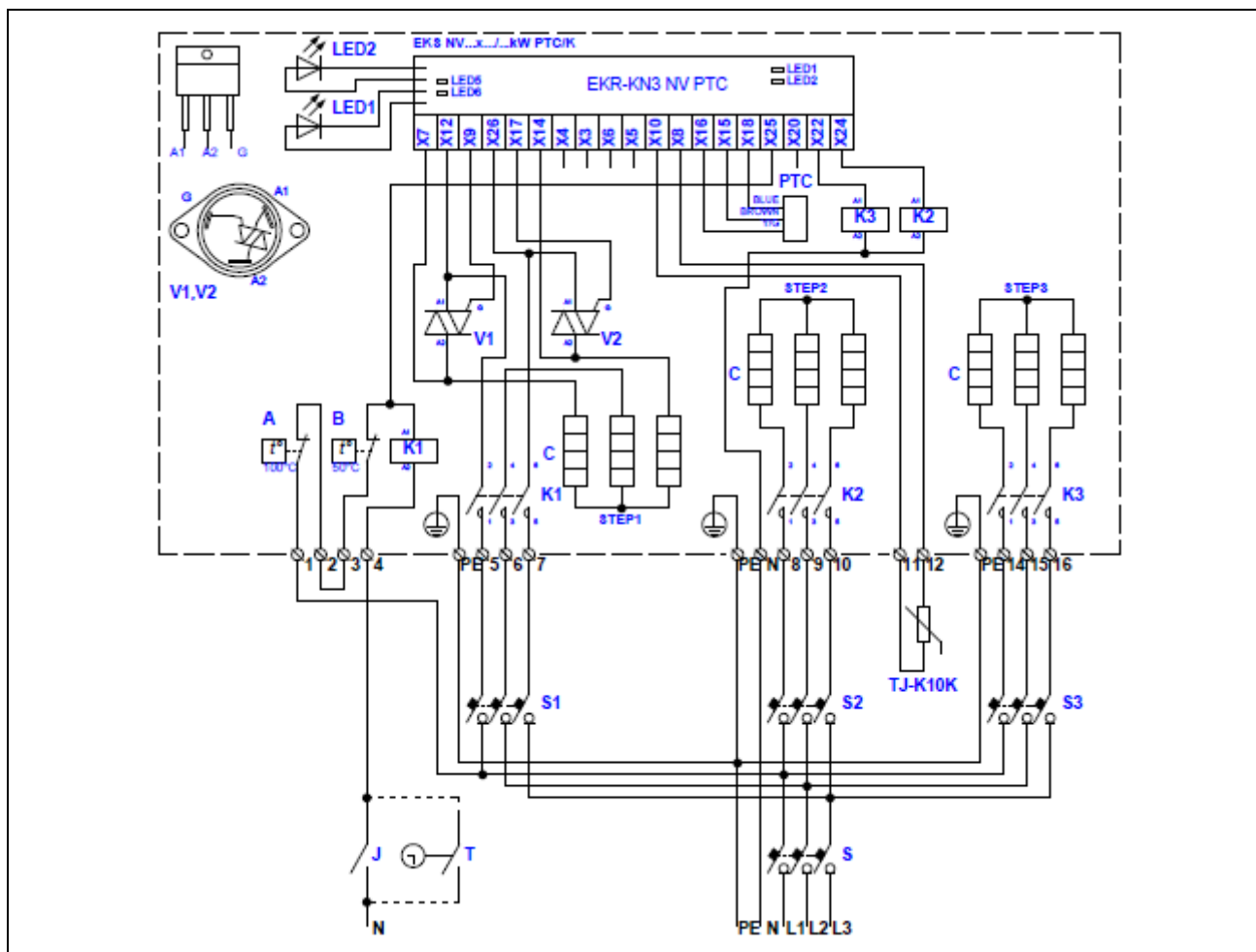


**Fig. 24. Electrical wiring diagrams of the heater EKS (PG) NV ...x.../...kW PTC/PS**



EKS (PG) 400x200; EKS (PG) 500x250  
 (number of steps depends from the heater power)

Fig. 25. Electrical wiring diagrams of the heater EKS (PG) NV ...x.../...kW PTC/K



EKS (PG) 500x300; EKS (PG) 600x300; EKS (PG) 600x350;  
 EKS (PG) 700x400; EKS (PG) 800x500; EKS (PG) 1000x500  
 (number of steps depends from the heater power)

Fig. 26. Electrical wiring diagrams of the heater EKS (PG) NV ...x.../...kW PTC/K



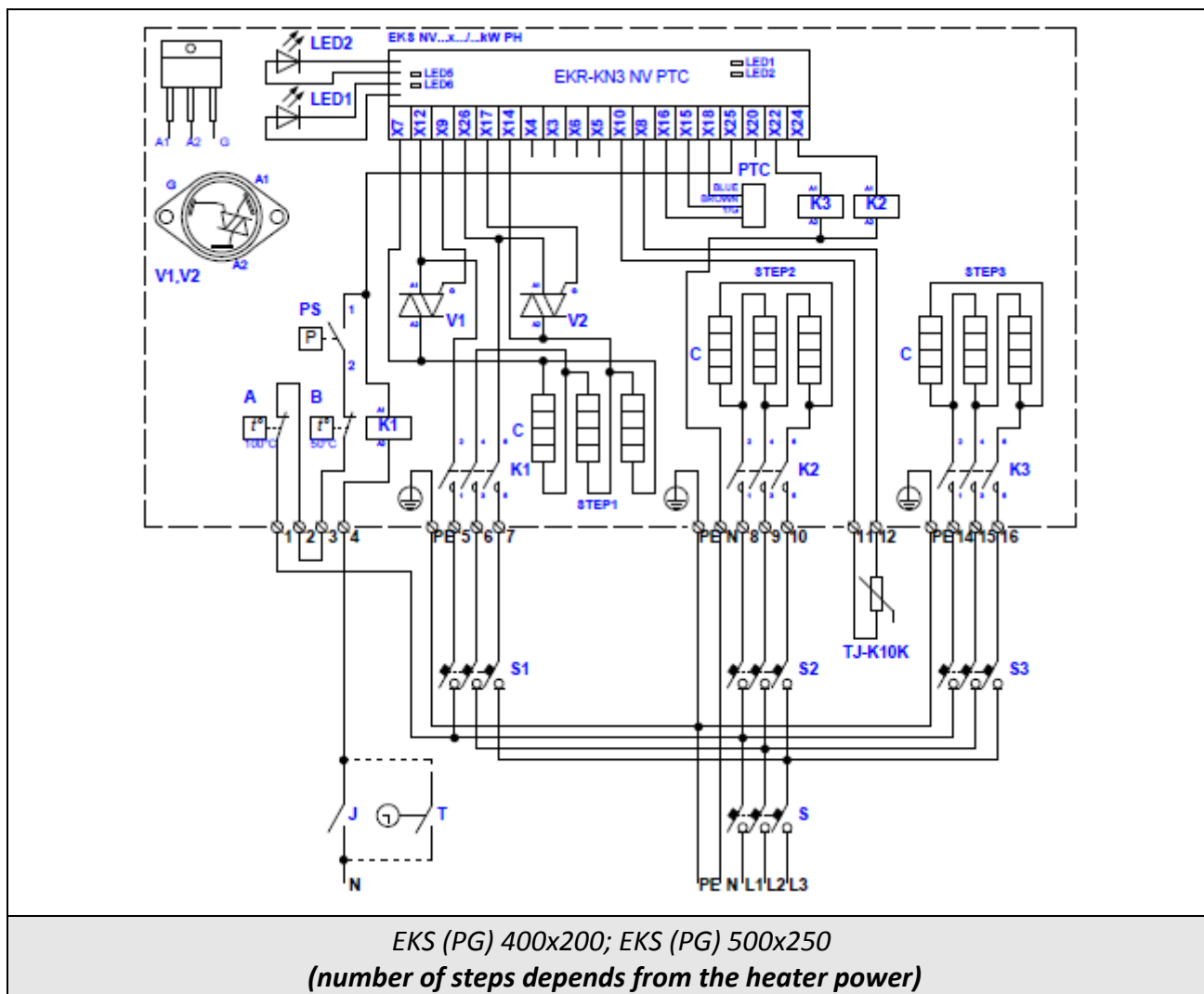
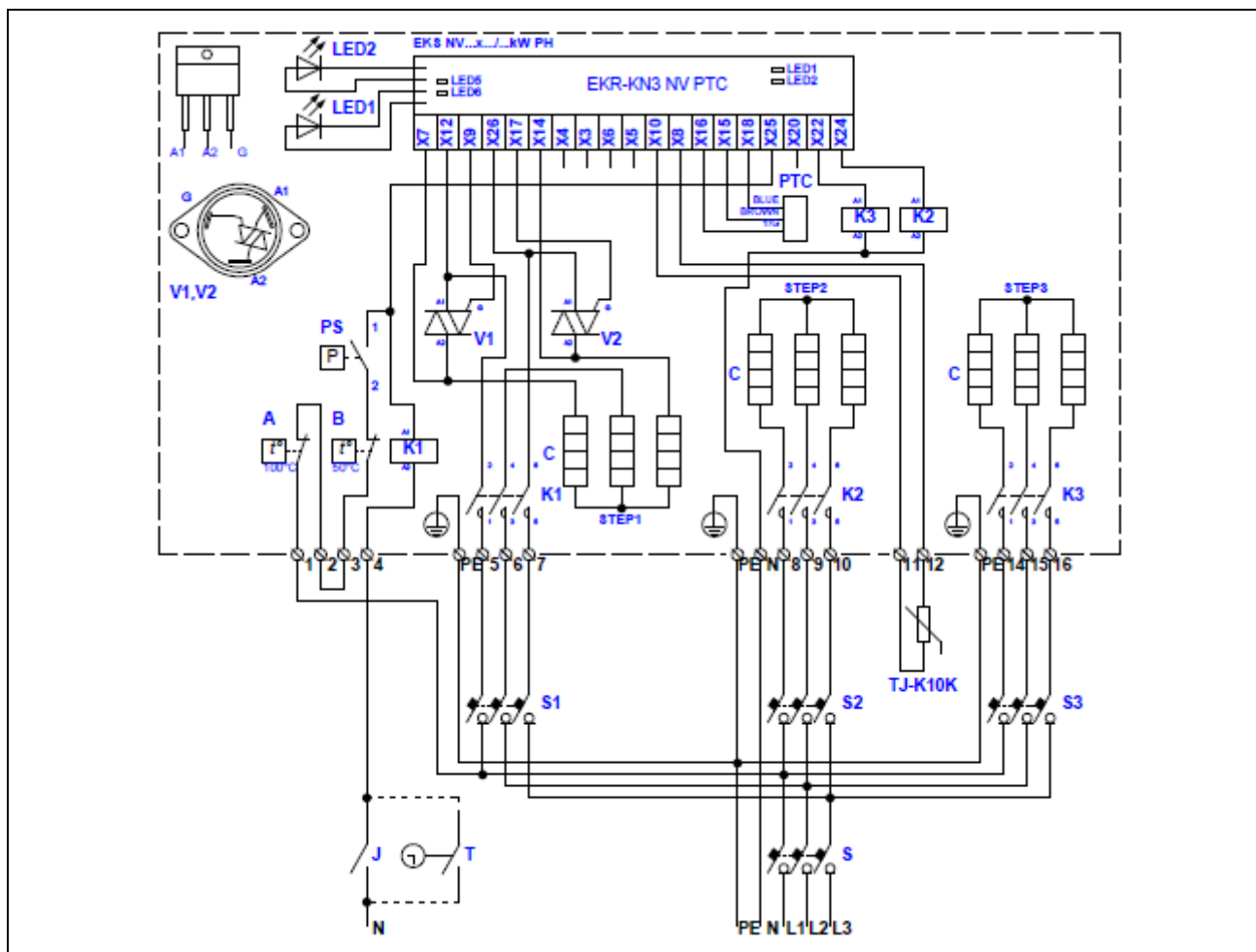
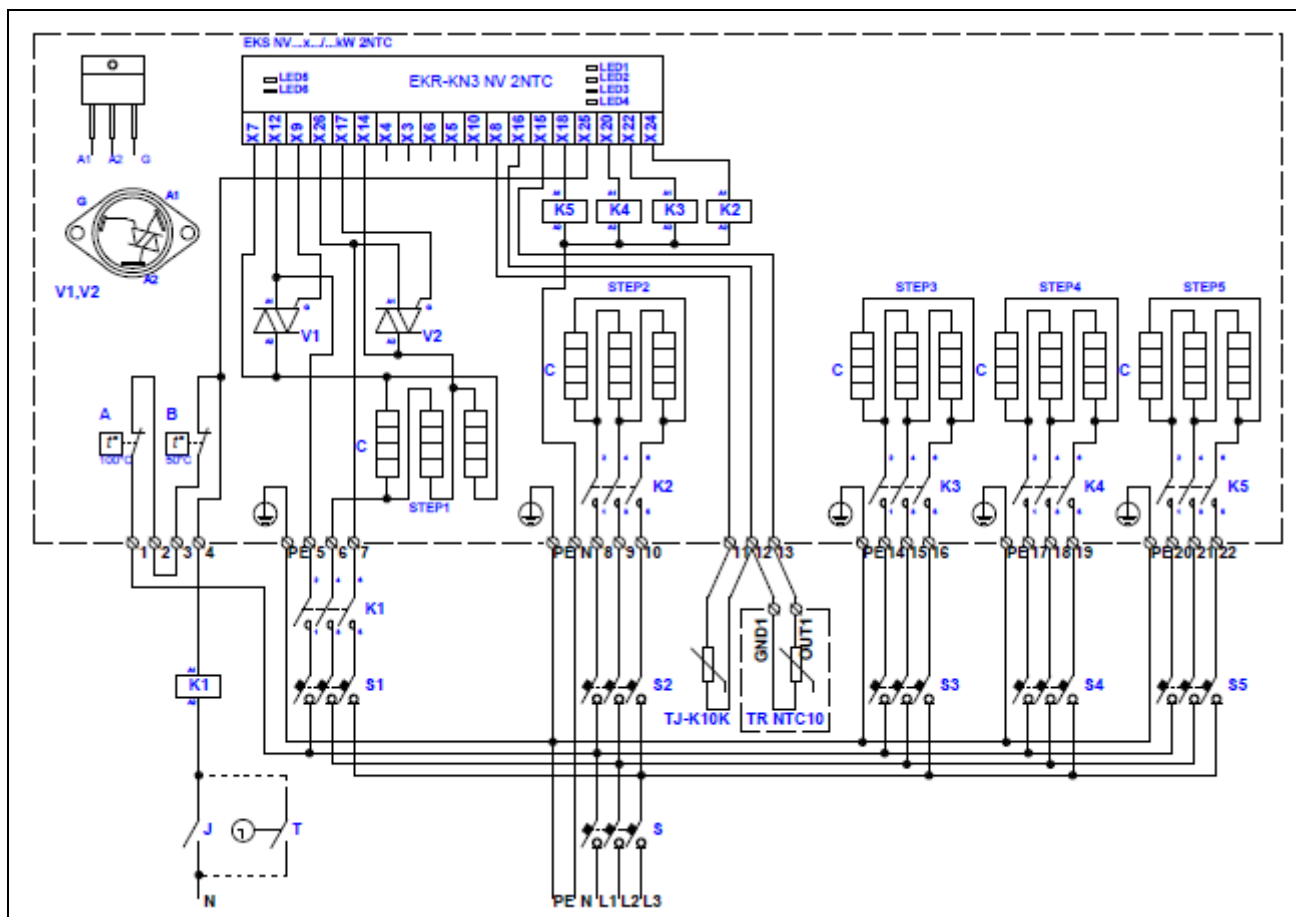


Fig. 27. Electrical wiring diagrams of the heater EKS (PG) NV ...x.../...kW PH



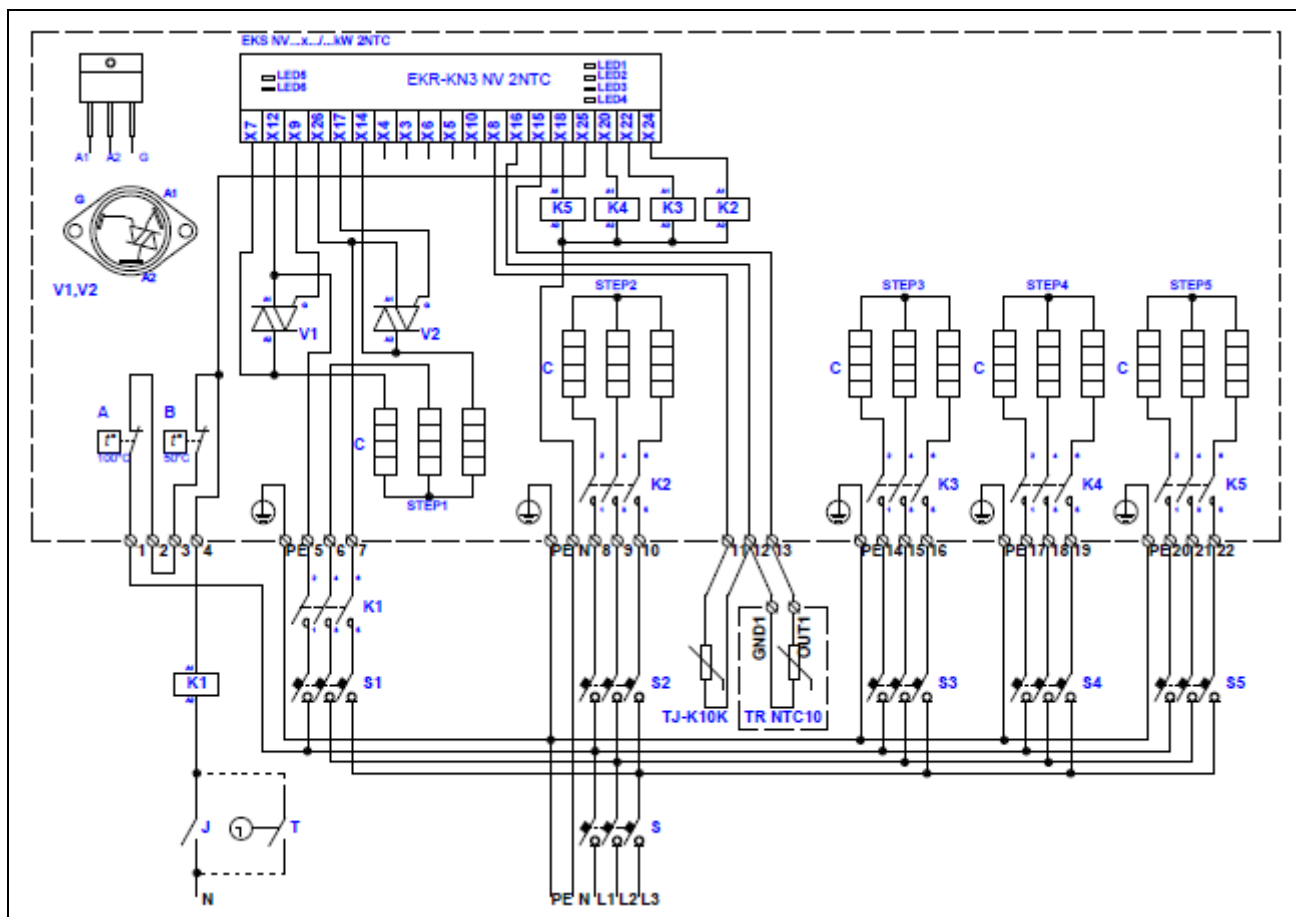
EKS (PG) 500x300; EKS (PG) 600x300; EKS (PG) 600x350;  
 EKS (PG) 700x400; EKS (PG) 800x500; EKS (PG) 1000x500  
 (number of steps depends from the heater power)

**Fig. 28. Electrical wiring diagrams of the heater EKS (PG) NV ...x.../...kW PH**



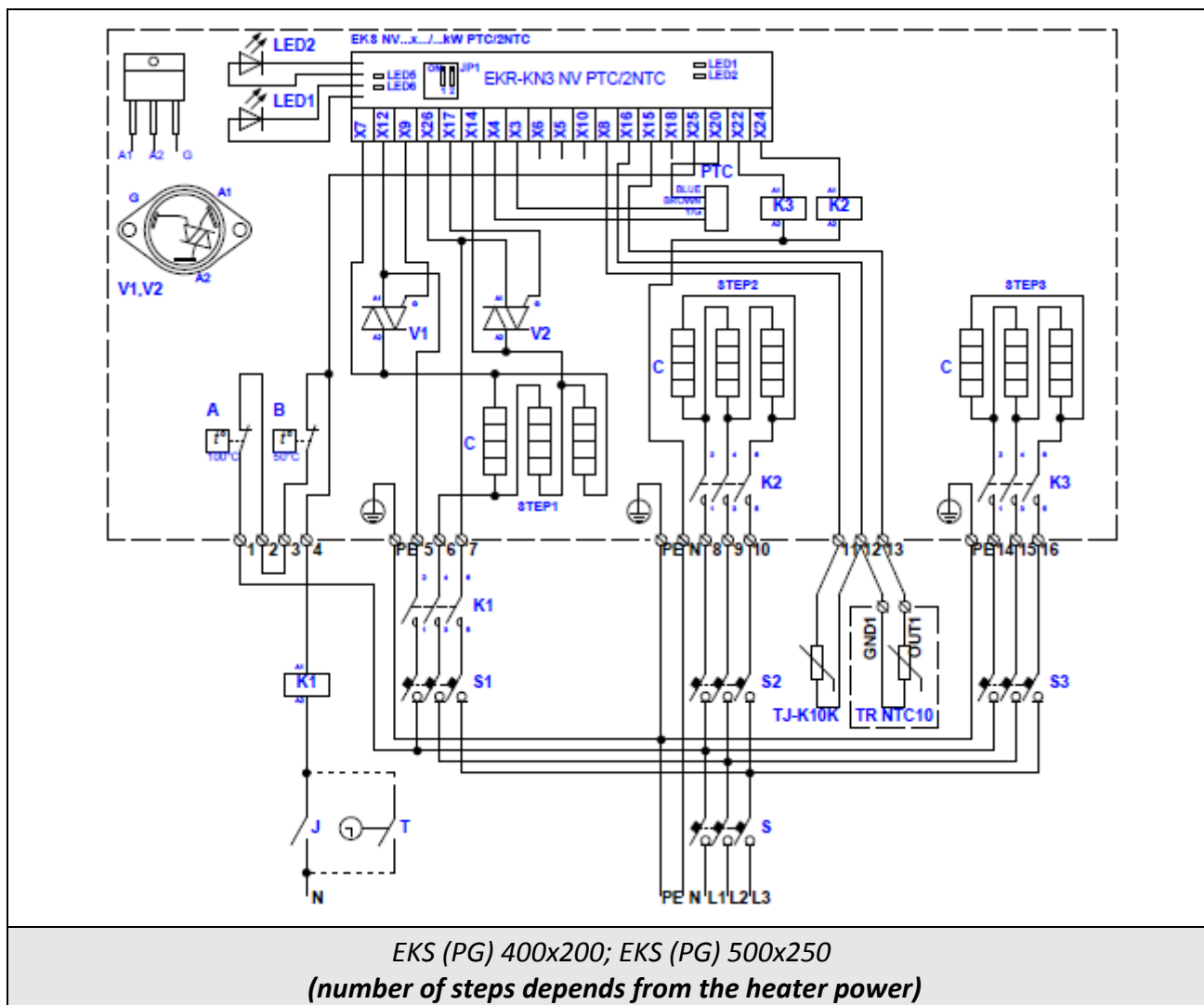
EKS (PG) 400x200; EKS (PG) 500x250  
 (number of steps depends from the heater power)

**Fig. 29. Electrical wiring diagrams of the heater EKS (PG) NV ...x.../...kW 2NTC**



EKS (PG) 500x300; EKS (PG) 600x300; EKS (PG) 600x350;  
 EKS (PG) 700x400; EKS (PG) 800x500; EKS (PG) 1000x500  
 (number of steps depends from the heater power)

Fig. 30. Electrical wiring diagrams of the heater EKS (PG) NV ...x.../...kW 2NTC



**Fig. 31. Electrical wiring diagrams of the heater EKS (PG) NV ...x.../...kW PTC/2NTC**

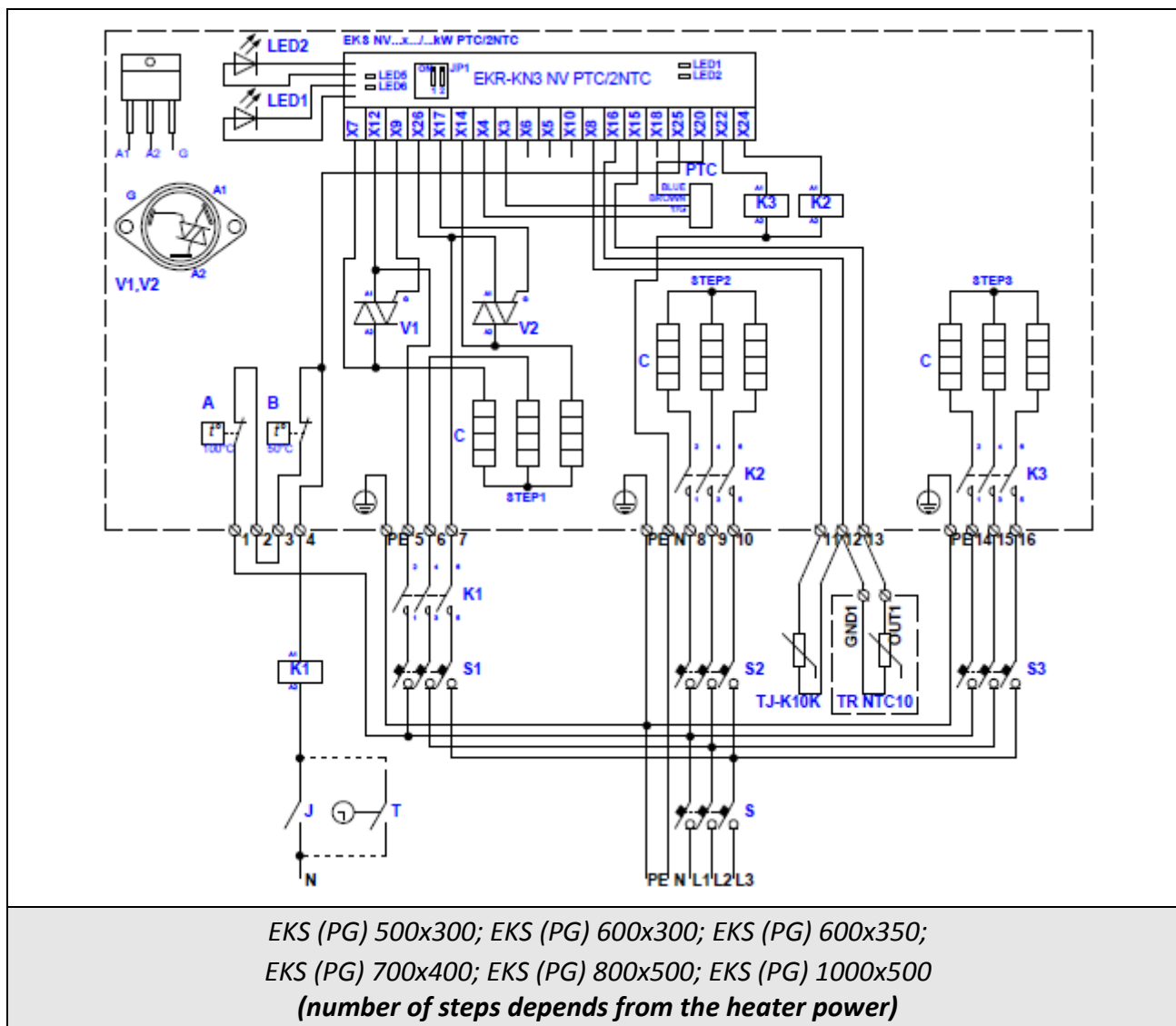
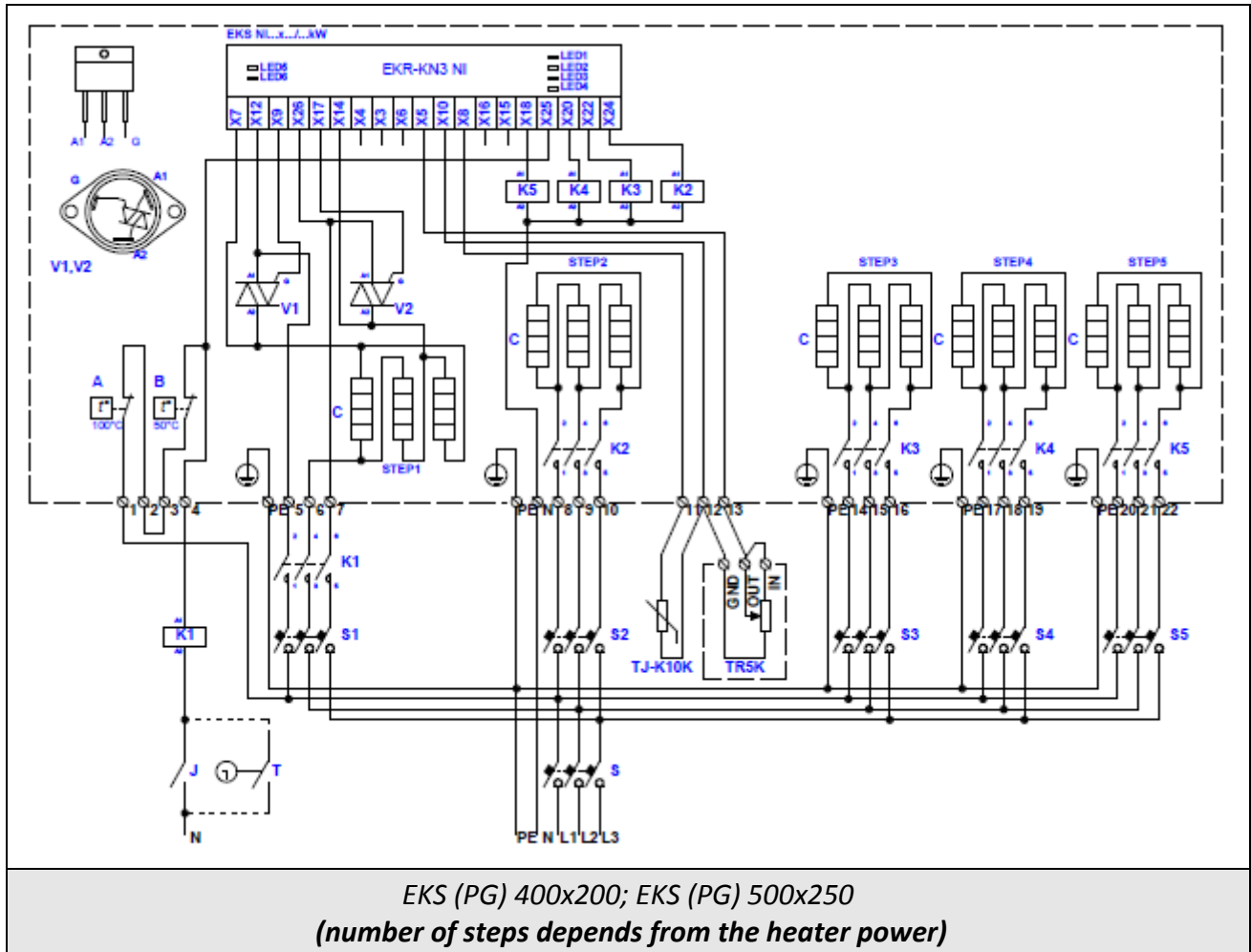
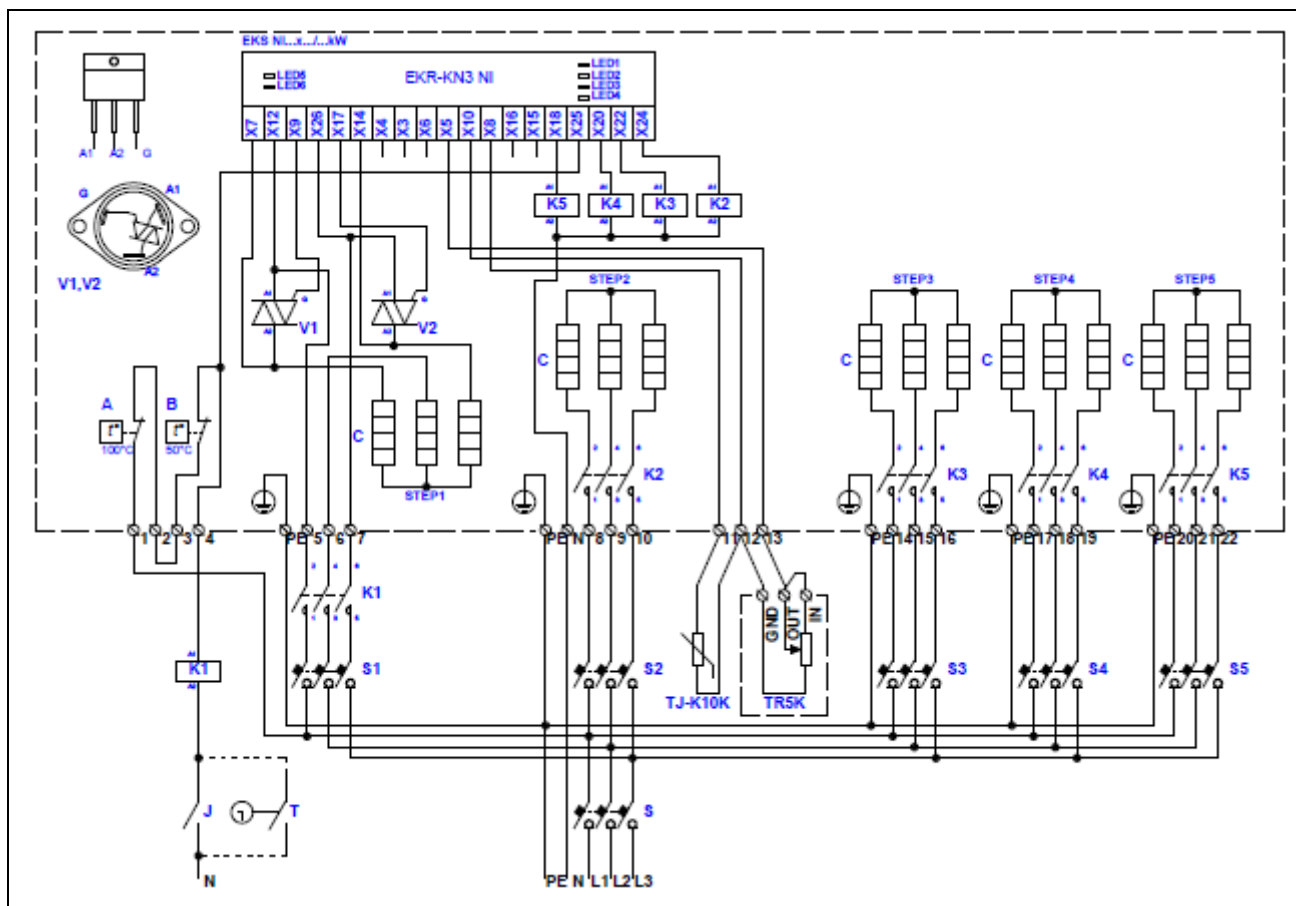


Fig. 32. Electrical wiring diagrams of the heater EKS (PG) NV ...x.../...kW PTC/2NTC



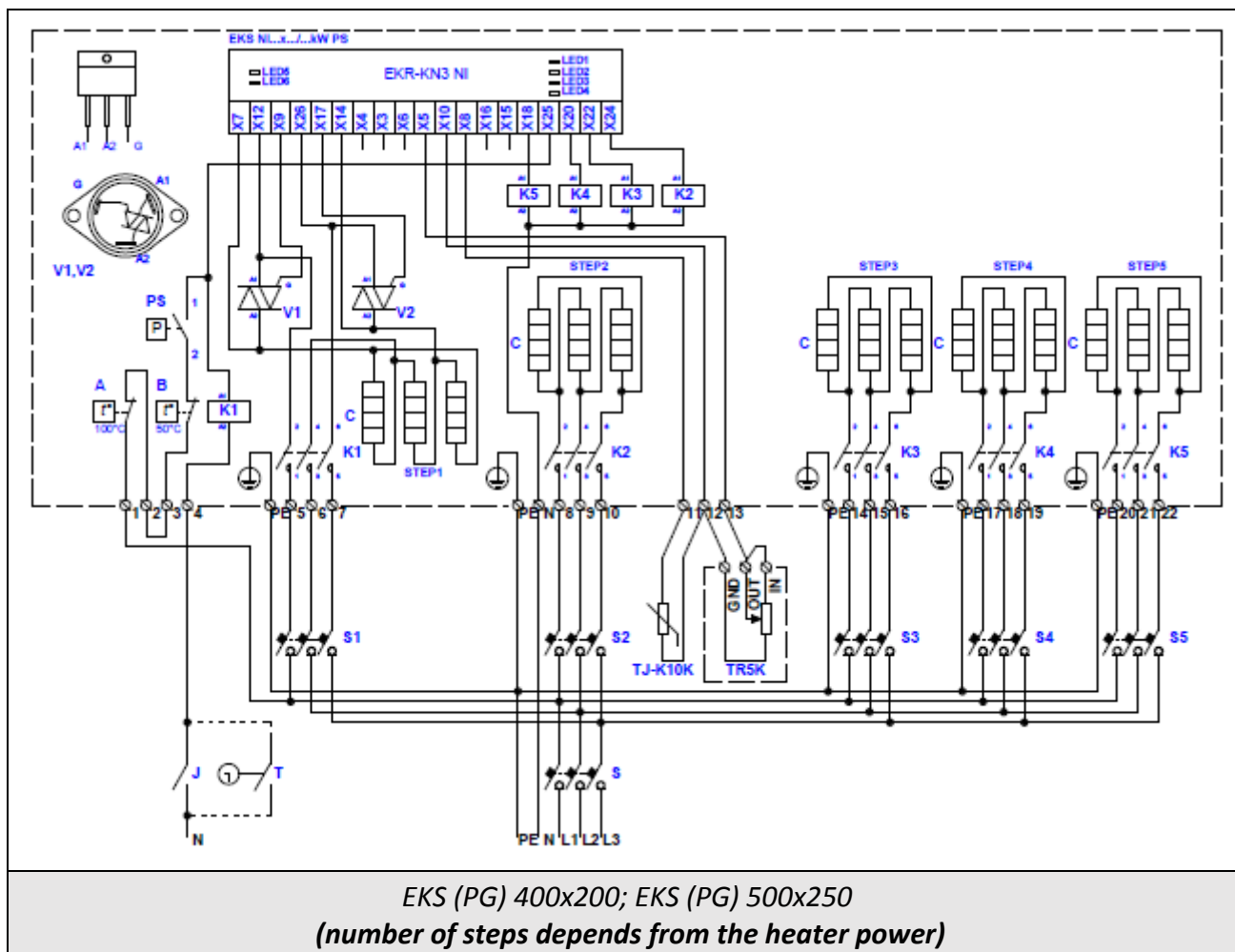
**Fig. 33. Electrical wiring diagrams of the heater EKS (PG) NI ...x.../...kW**



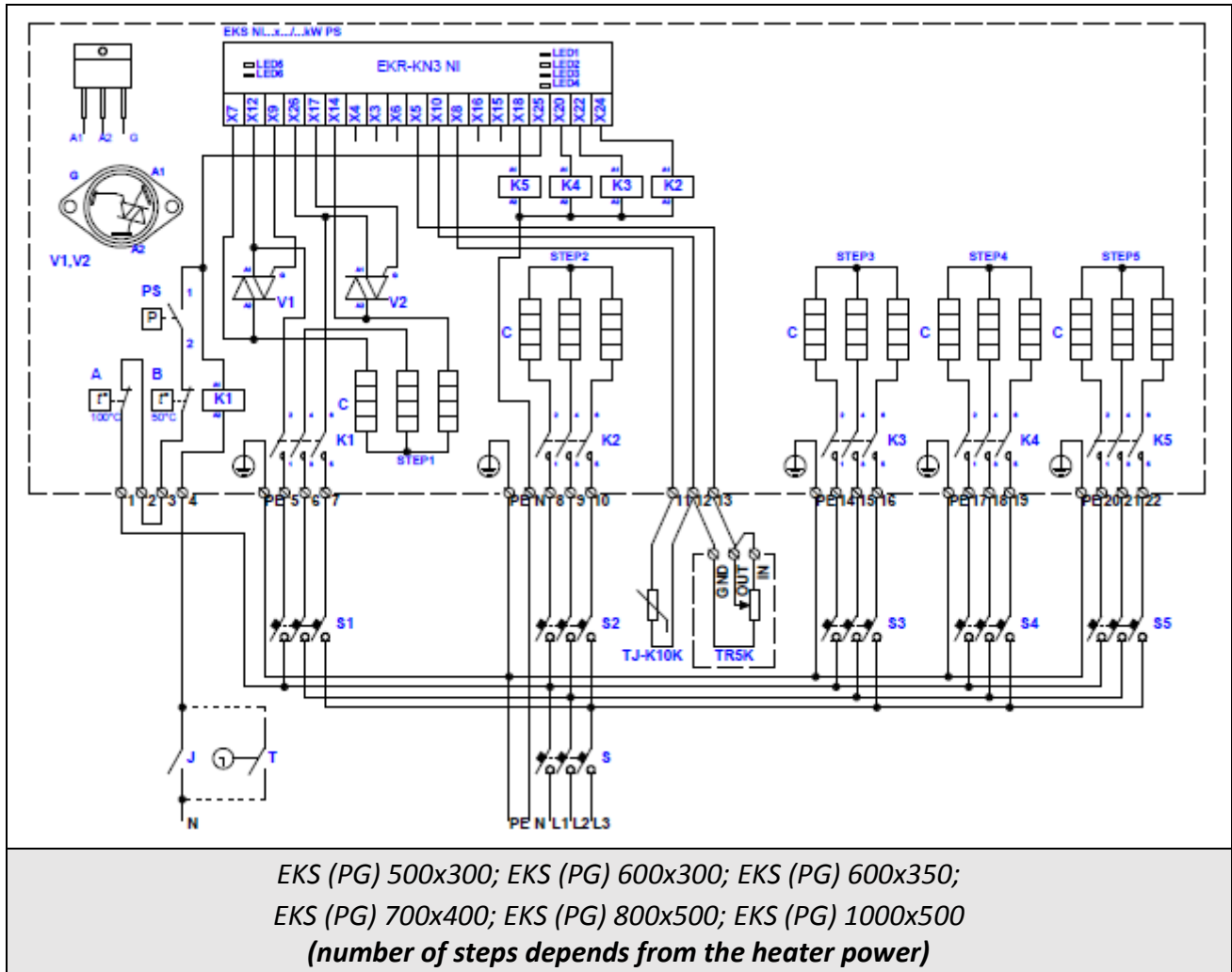
EKS (PG) 500x300; EKS (PG) 600x300; EKS (PG) 600x350;  
 EKS (PG) 700x400; EKS (PG) 800x500; EKS (PG) 1000x500  
 (number of steps depends from the heater power)

Fig. 34. Electrical wiring diagrams of the heater EKS (PG) NI ...x.../...kW

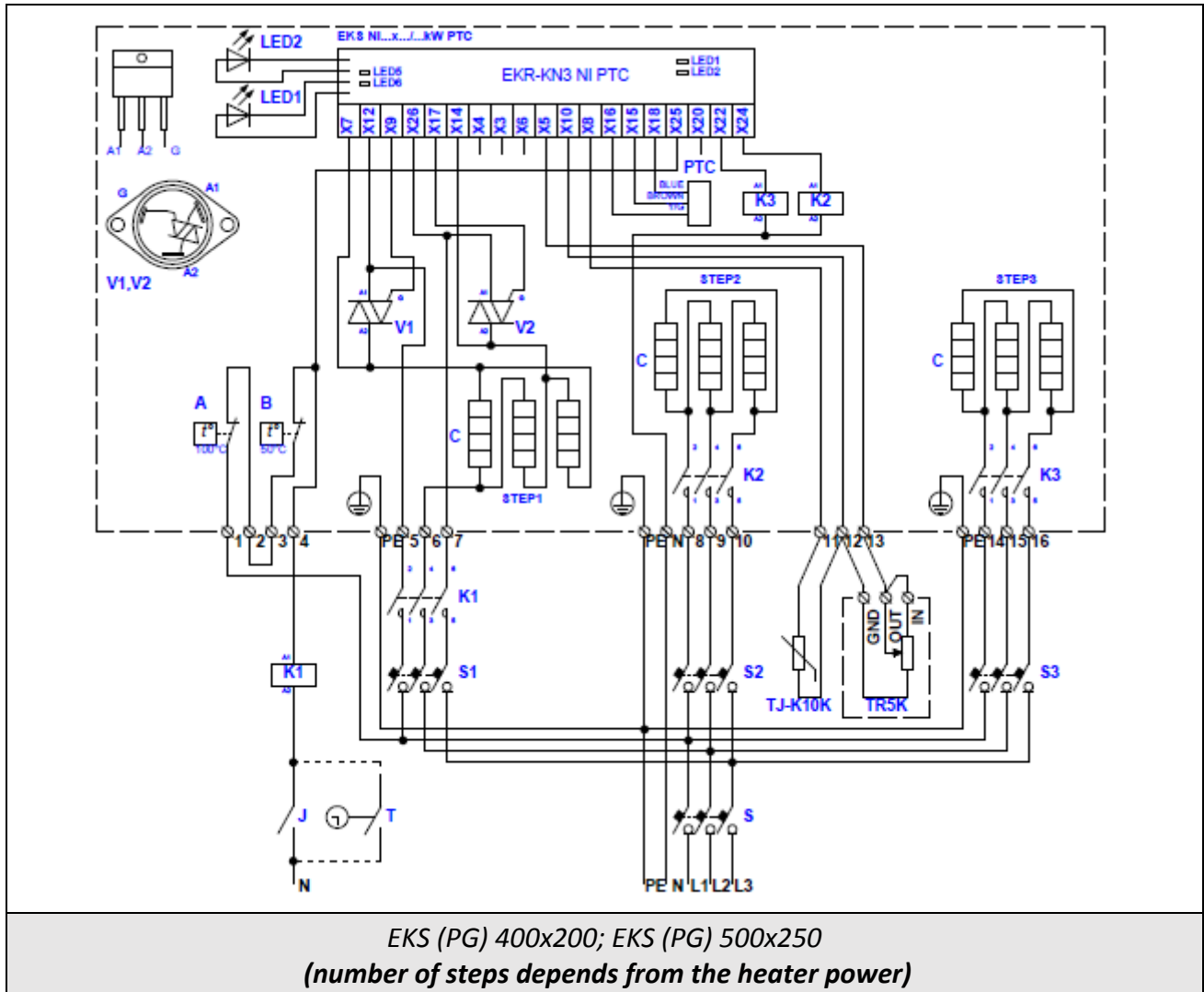




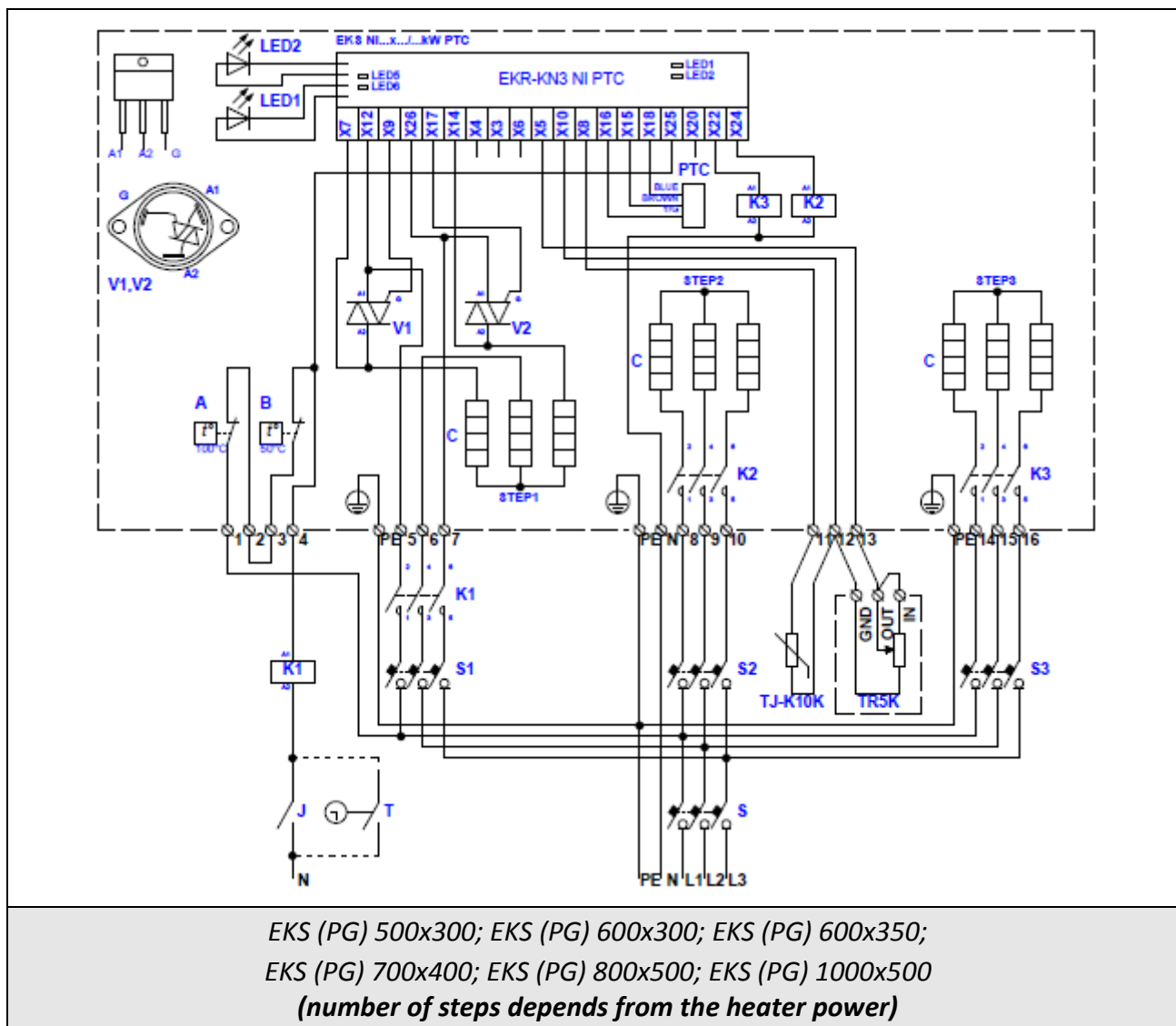
**Fig. 35. Electrical wiring diagrams of the heater EKS (PG) NI ...x.../...kW PS**



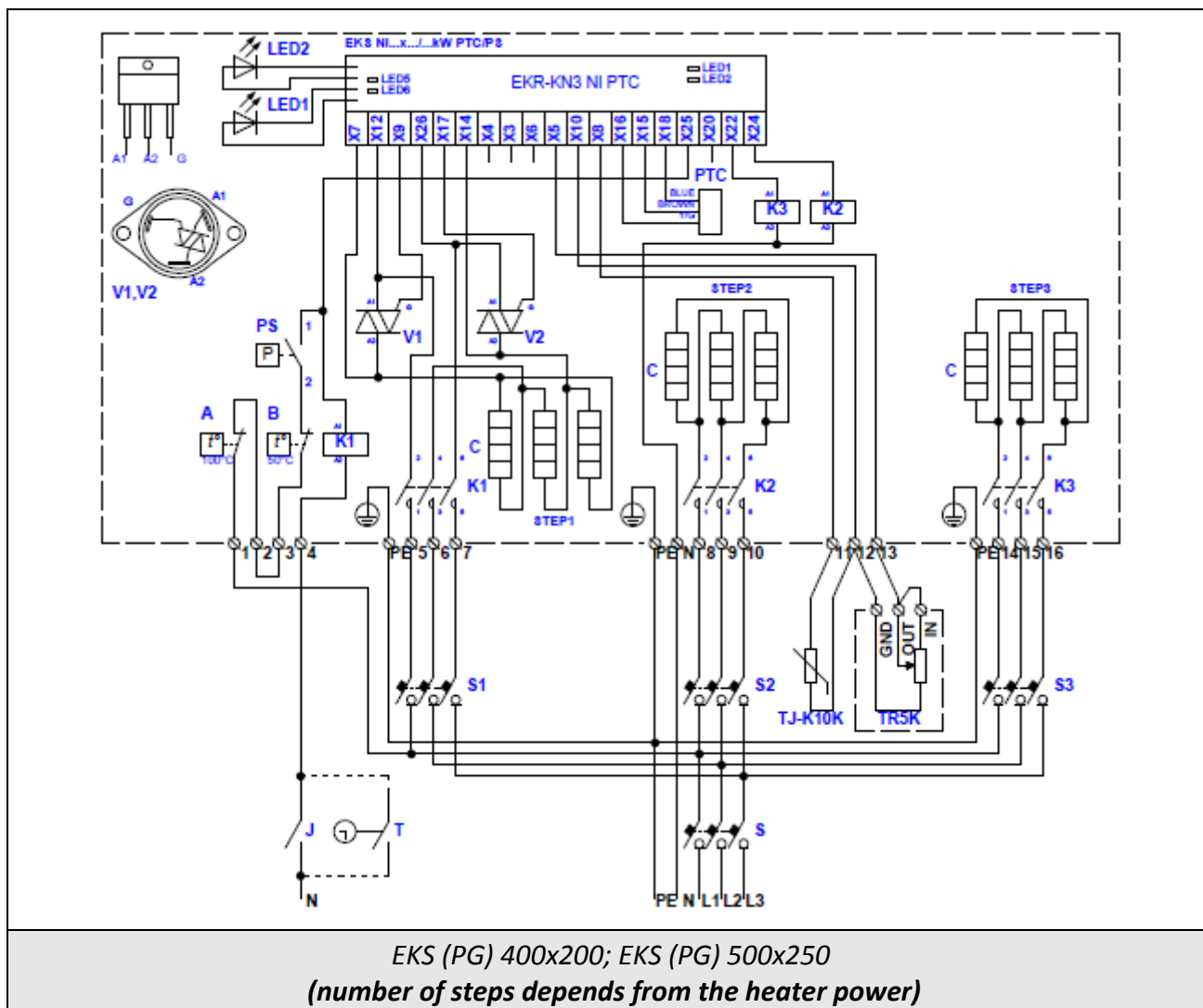
**Fig. 36. Electrical wiring diagrams of the heater EKS (PG) NI ...x.../...kW PS**



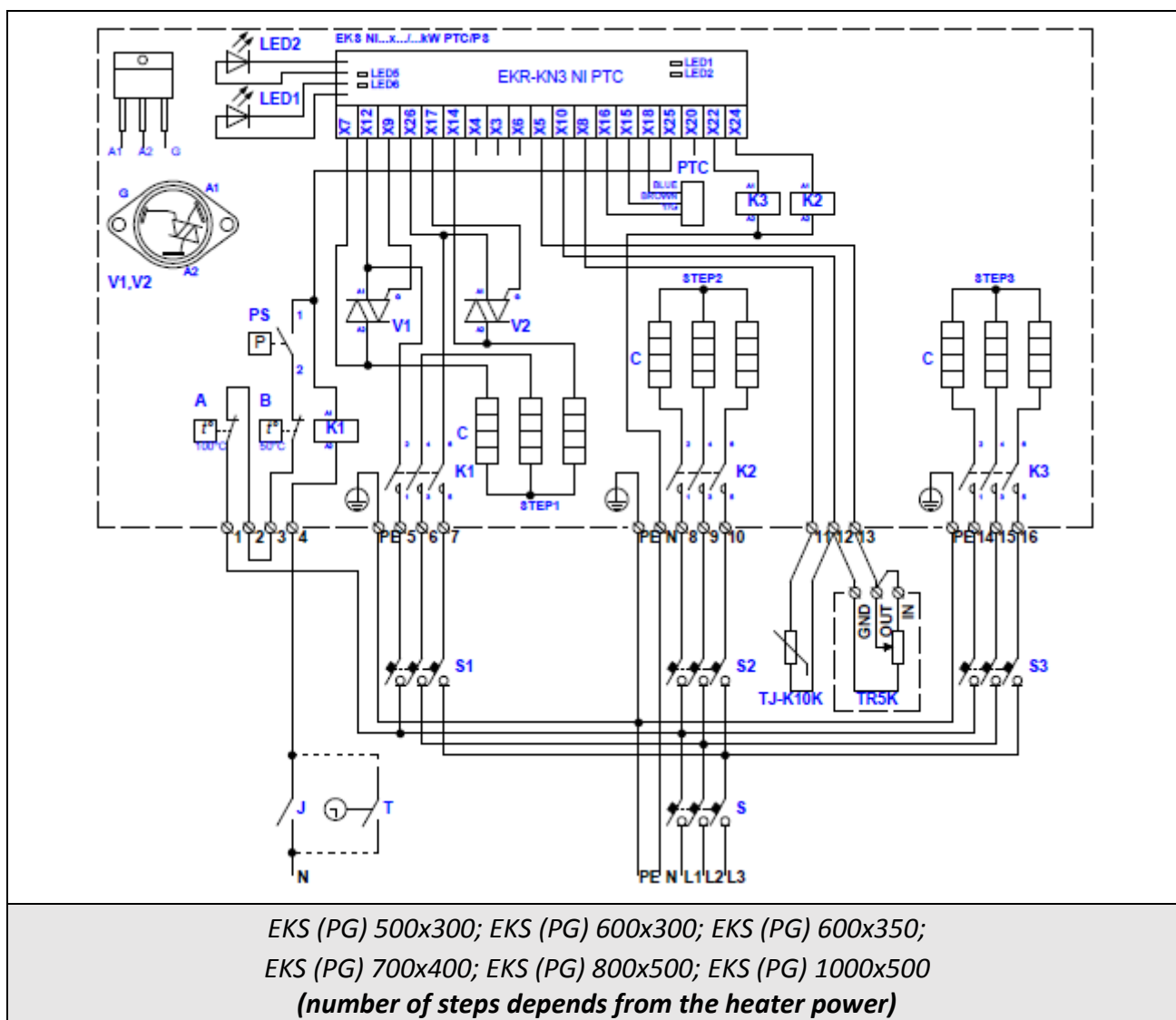
**Fig. 35. Electrical wiring diagrams of the heater EKS (PG) NI ...x.../...kW PTC**



**Fig. 36. Electrical wiring diagrams of the heater EKS (PG) NI ...x.../...kW PTC**



**Fig. 37. Electrical wiring diagrams of the heater EKS (PG) NI ...x.../...kW PTC/PS**



**Fig. 38. Electrical wiring diagrams of the heater EKS (PG) NI ...x.../...kW PTC/PS**

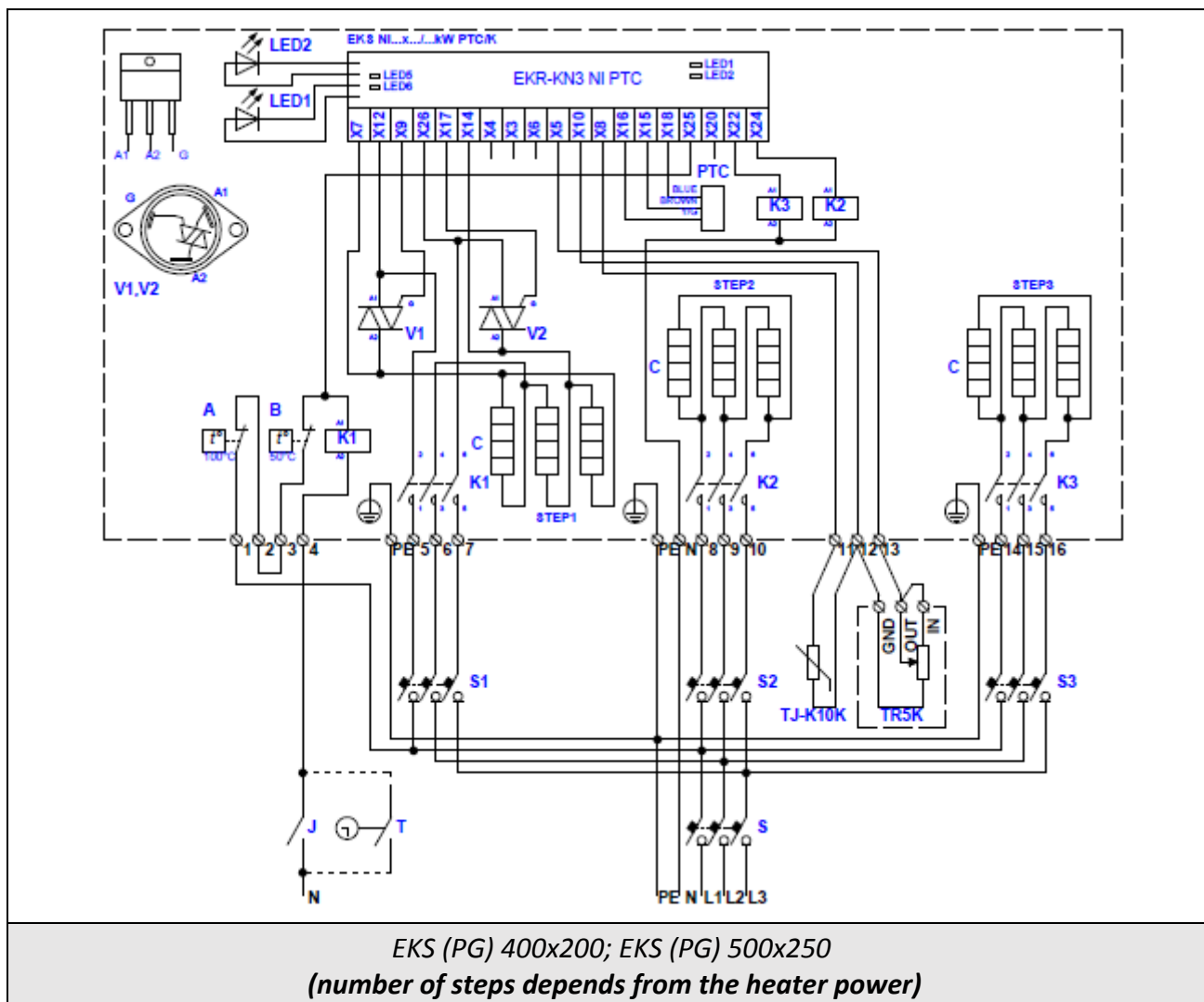
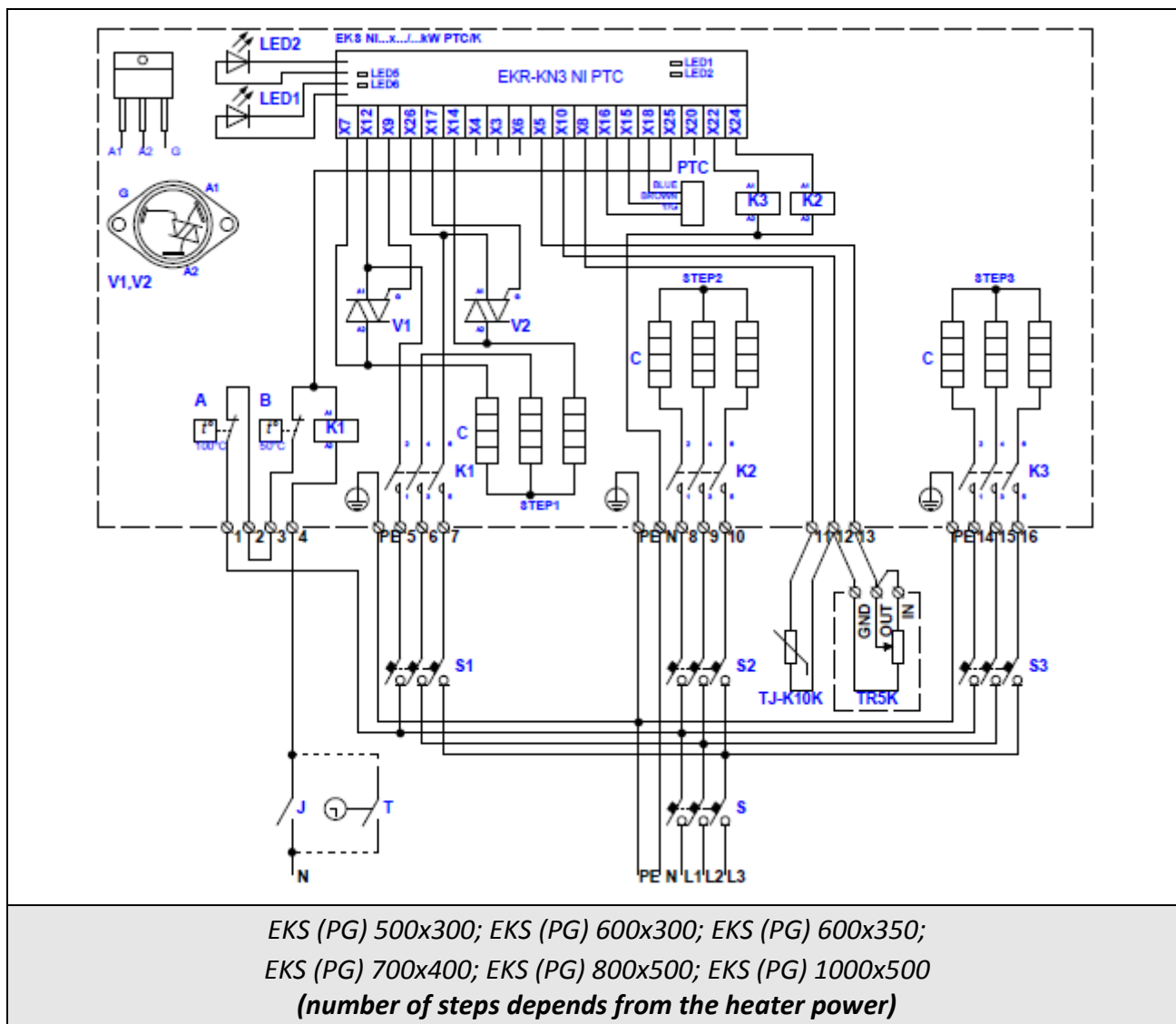
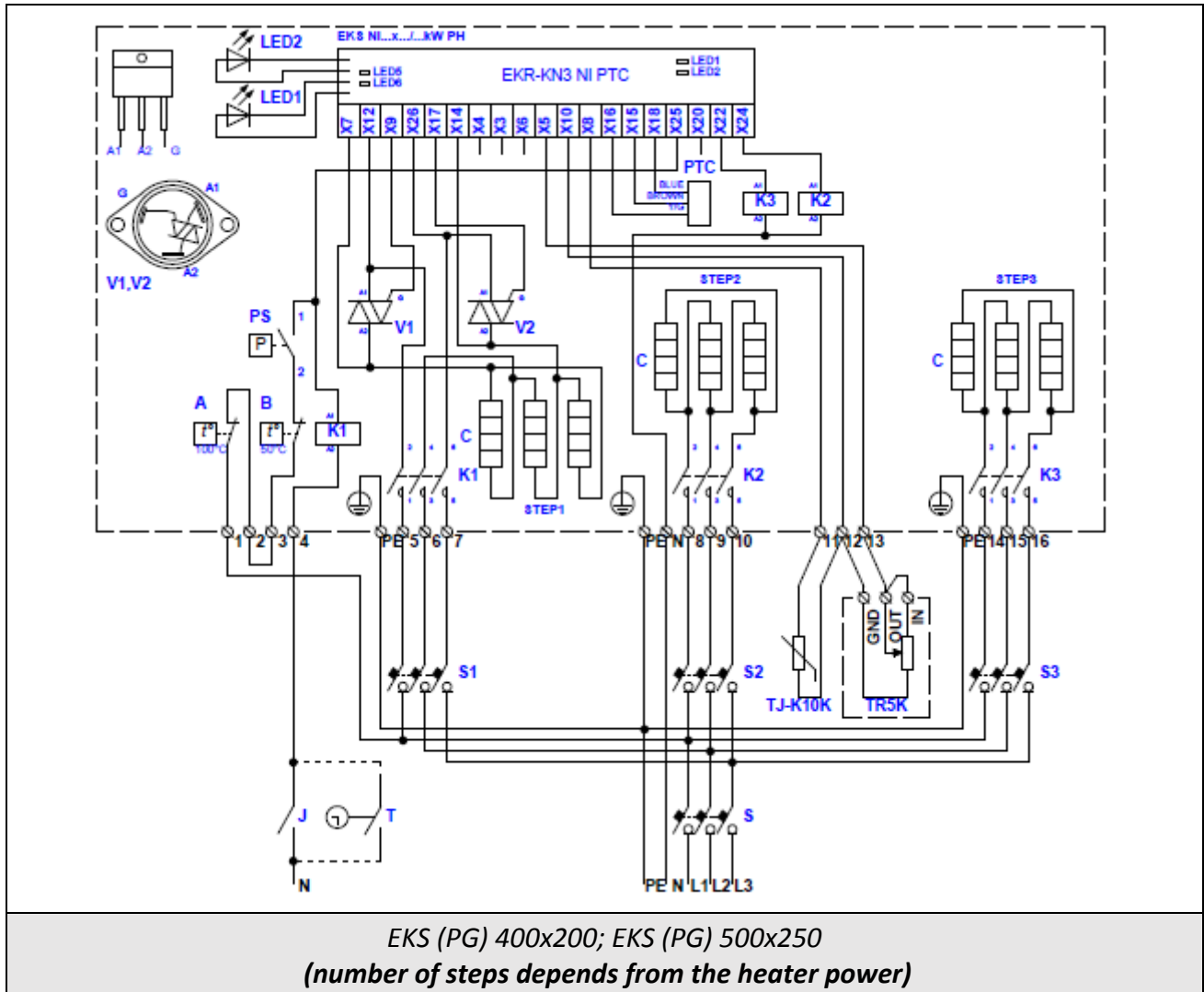


Fig. 39. Electrical wiring diagrams of the heater EKS (PG) NI ...x.../...kW PTC/K

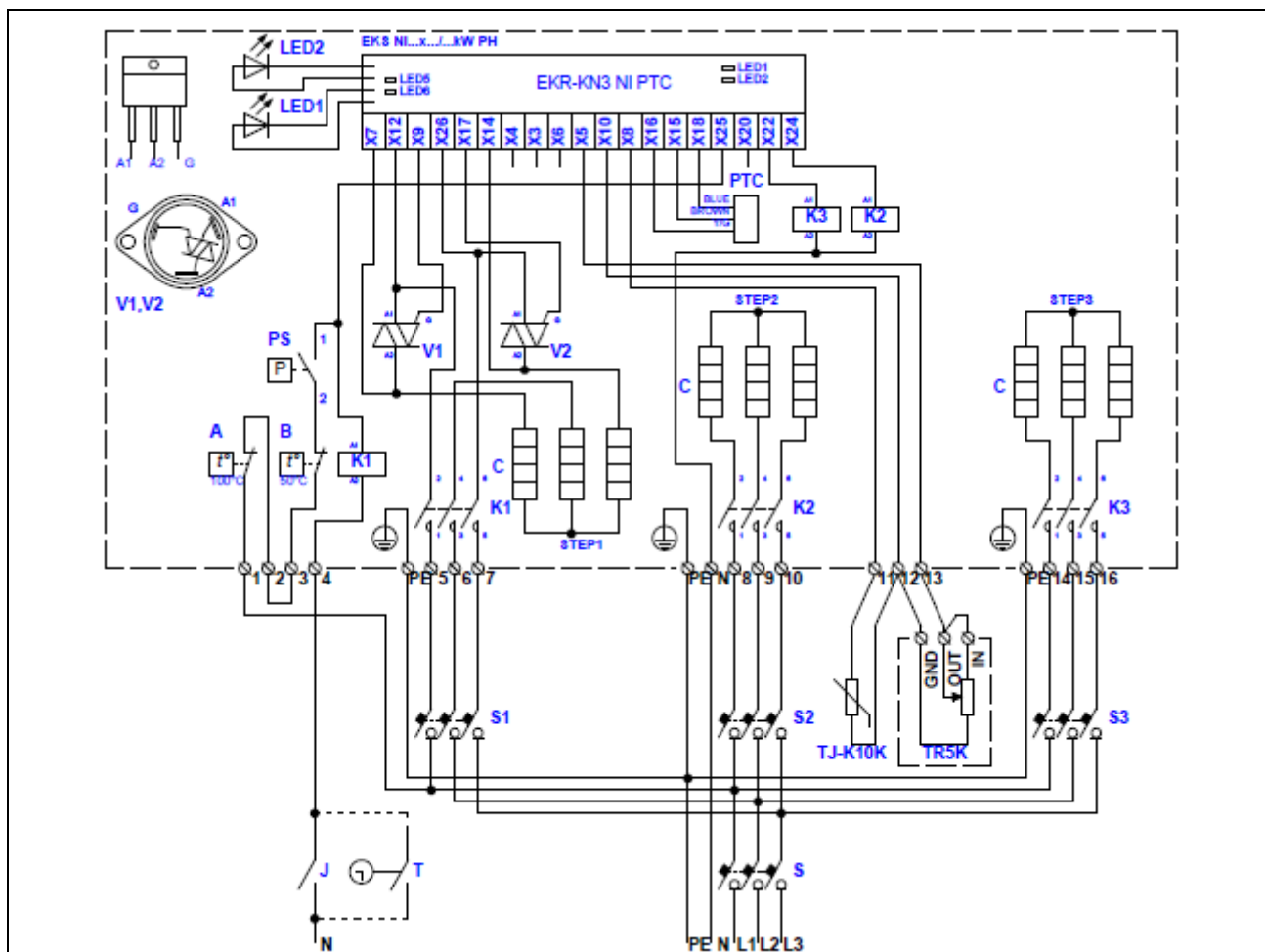


**Fig. 40. Electrical wiring diagrams of the heater EKS (PG) NI ...x.../...kW PTC/K**



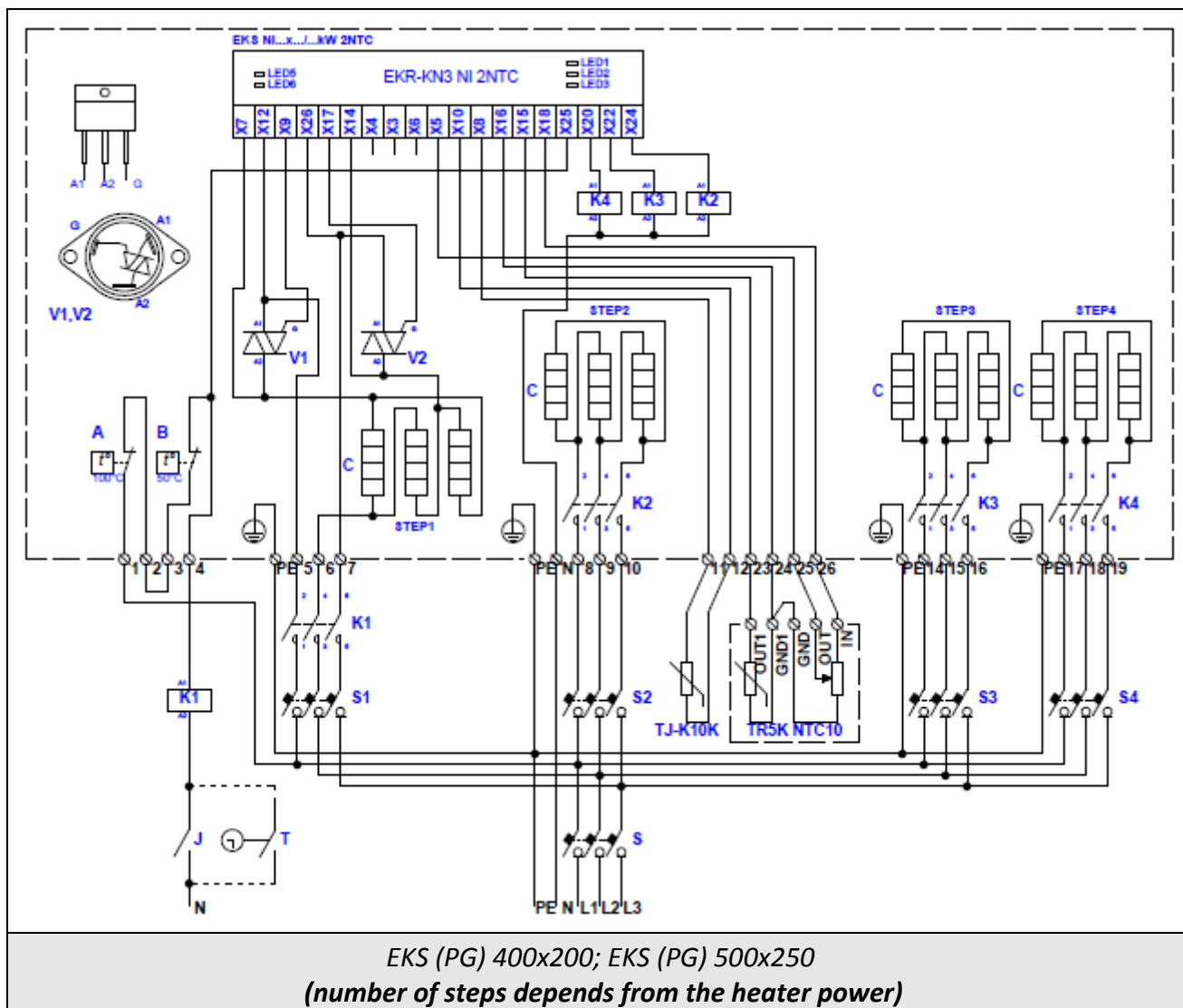


**Fig. 41. Electrical wiring diagrams of the heater EKS (PG) NI ...x.../...kW PH**

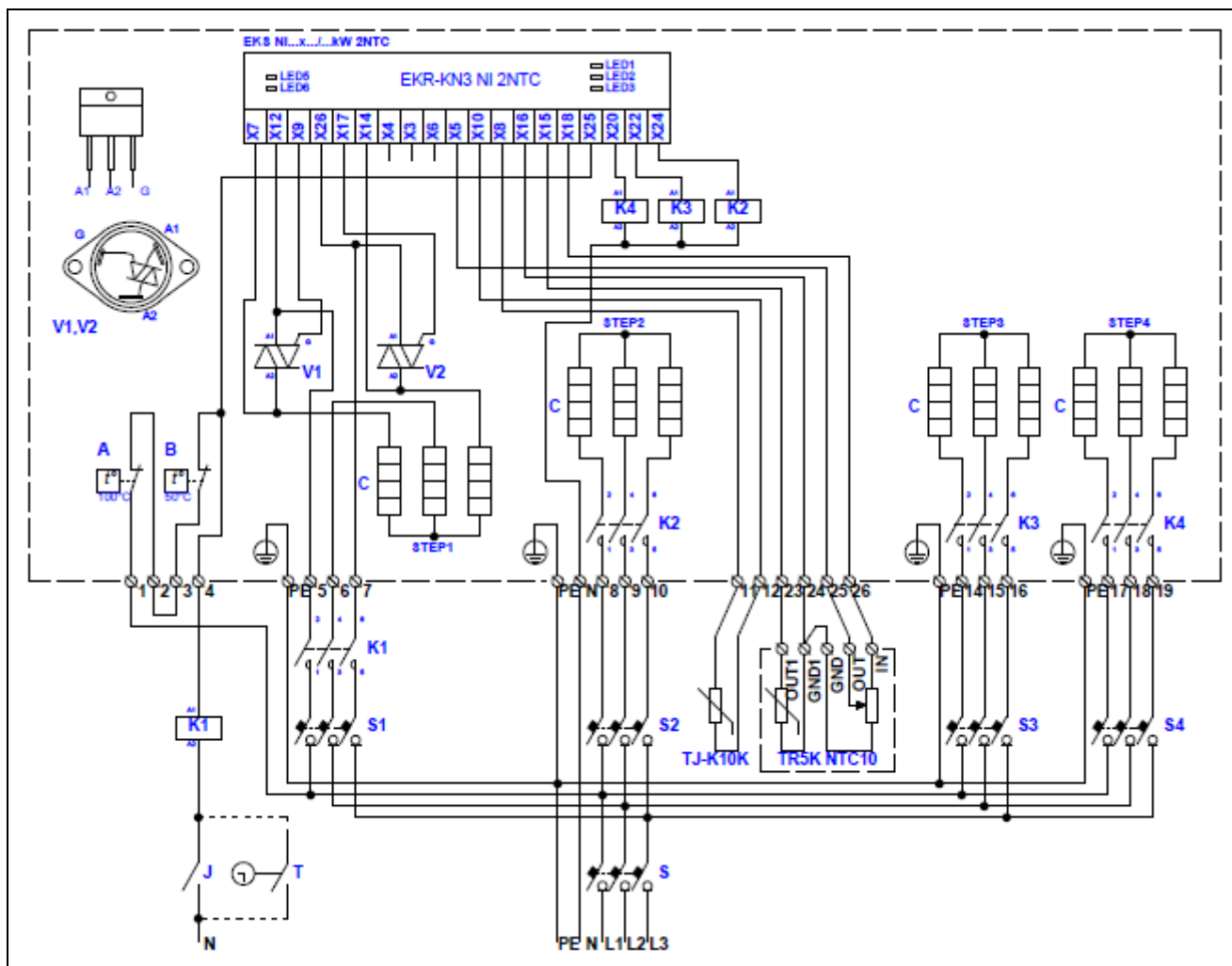


EKS (PG) 500x300; EKS (PG) 600x300; EKS (PG) 600x350;  
 EKS (PG) 700x400; EKS (PG) 800x500; EKS (PG) 1000x500  
 (number of steps depends from the heater power)

Fig. 42. Electrical wiring diagrams of the heater EKS (PG) NI ...x.../...kW PH

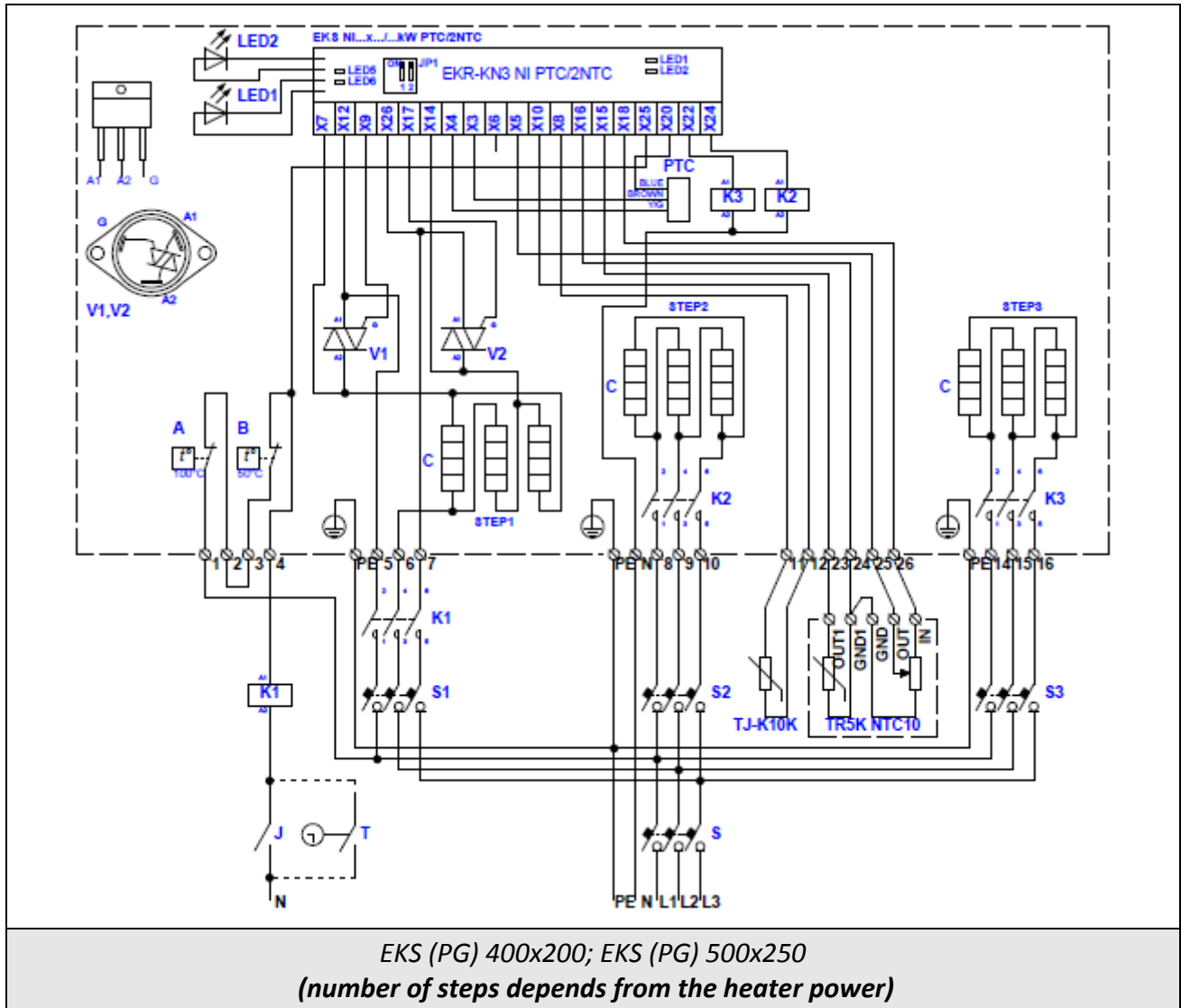


**Fig. 43. Electrical wiring diagrams of the heater EKS (PG) NI ...x.../...kW 2NTC**

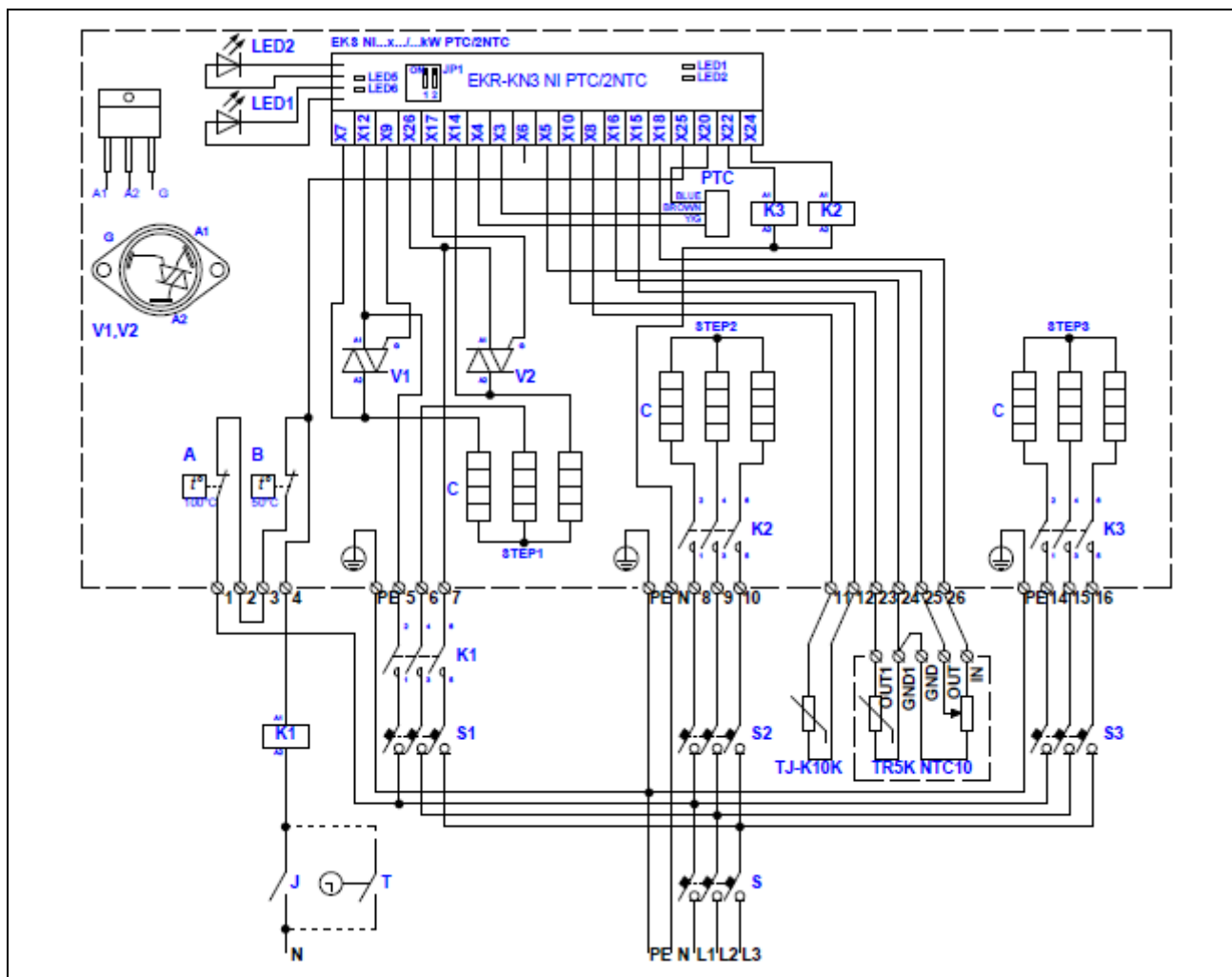


EKS (PG) 500x300; EKS (PG) 600x300; EKS (PG) 600x350;  
 EKS (PG) 700x400; EKS (PG) 800x500; EKS (PG) 1000x500  
 (number of steps depends from the heater power)

Fig. 44. Electrical wiring diagrams of the heater EKS (PG) NI ...x.../...kW 2NTC

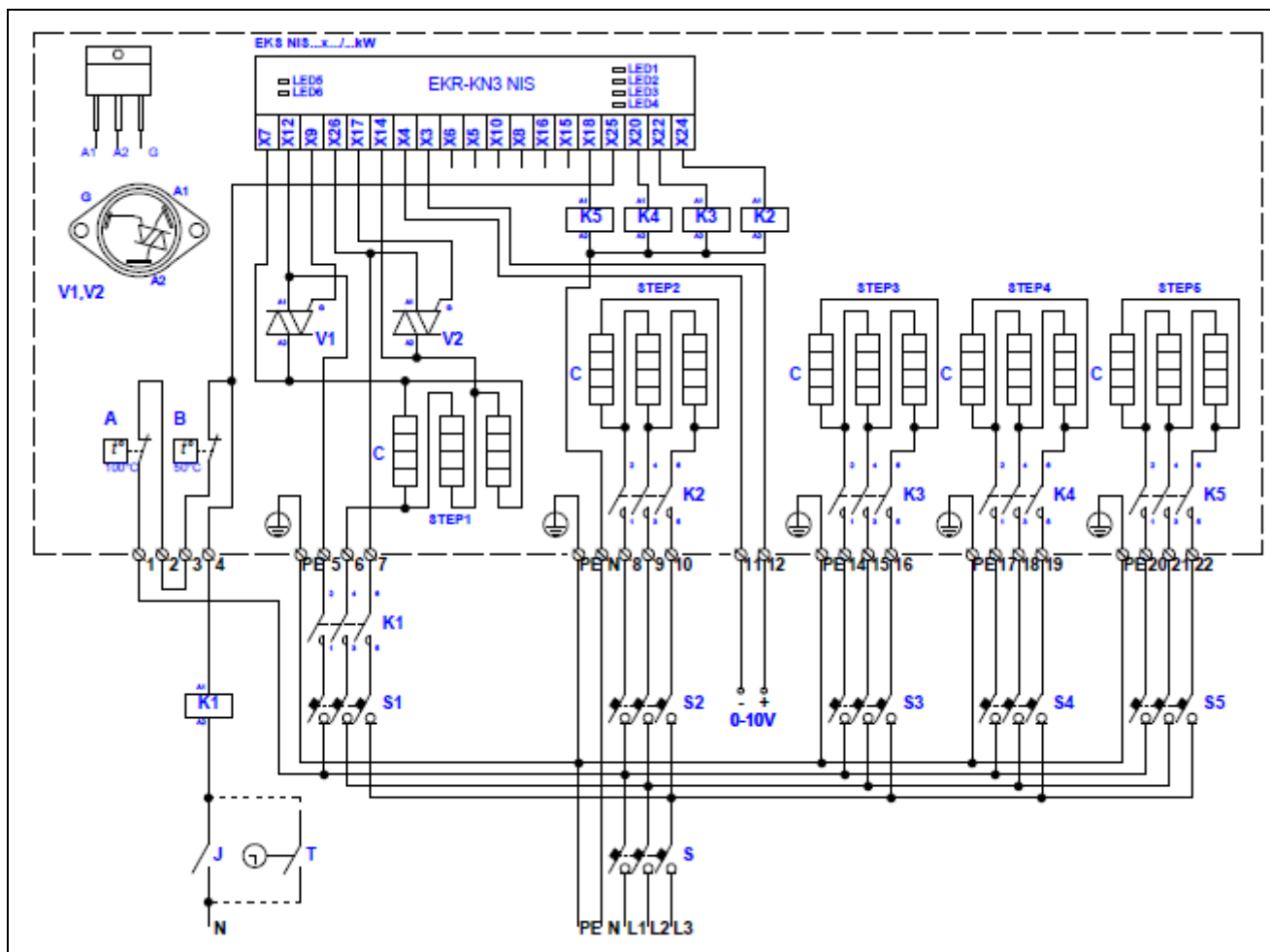


**Fig. 45. Electrical wiring diagrams of the heater EKS (PG) NI ...x.../...kW PTC/2NTC**



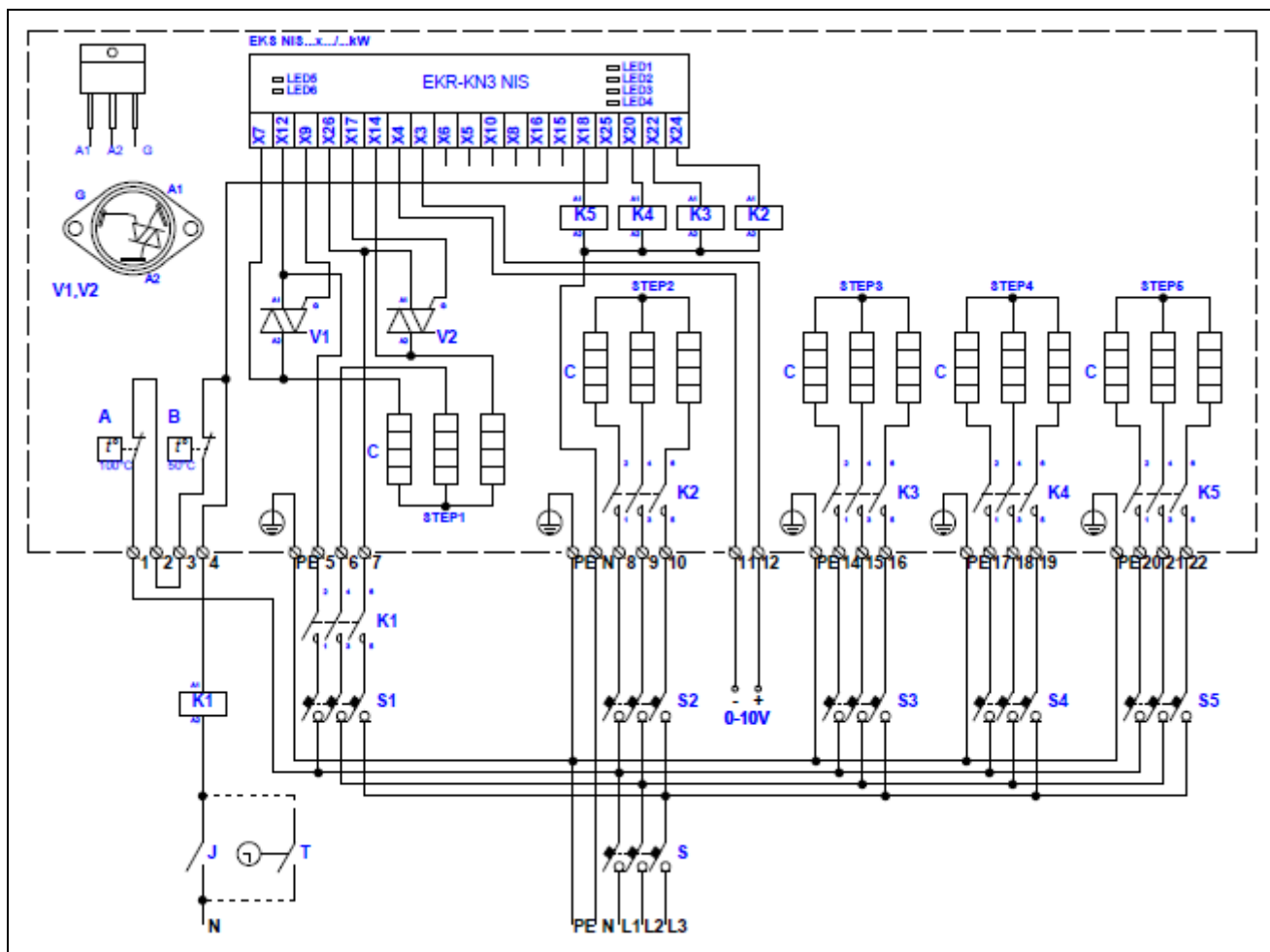
EKS (PG) 500x300; EKS (PG) 600x300; EKS (PG) 600x350;  
 EKS (PG) 700x400; EKS (PG) 800x500; EKS (PG) 1000x500  
 (number of steps depends from the heater power)

Fig. 46. Electrical wiring diagrams of the heater EKS (PG) NI ...x.../...kW PTC/2NTC



EKS (PG) 400x200; EKS (PG) 500x250  
 (number of steps depends from the heater power)

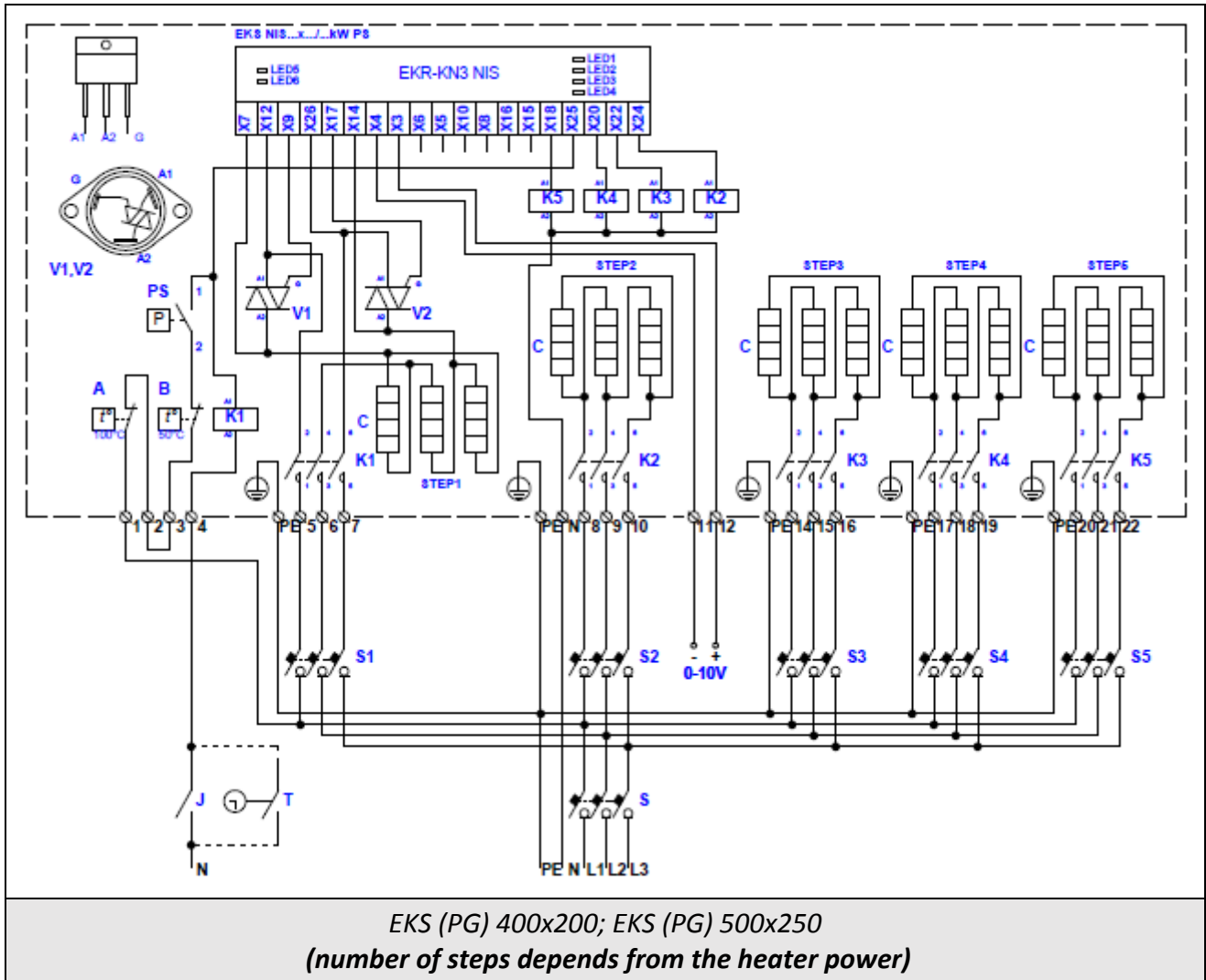
Fig. 47. Electrical wiring diagrams of the heater EKS (PG) NIS ...x.../...kW



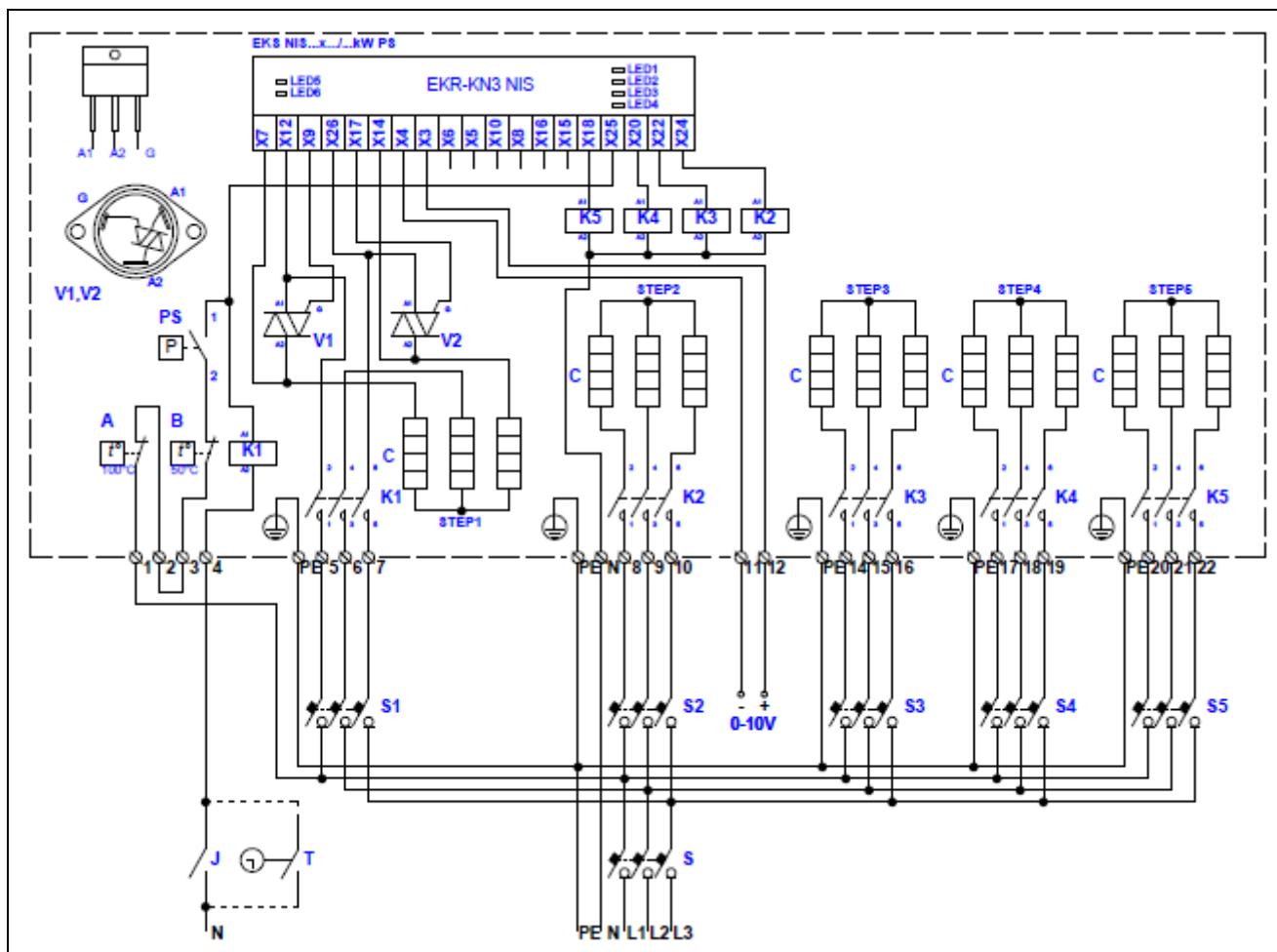
EKS (PG) 500x300; EKS (PG) 600x300; EKS (PG) 600x350;  
 EKS (PG) 700x400; EKS (PG) 800x500; EKS (PG) 1000x500  
 (number of steps depends from the heater power)

Fig. 48. Electrical wiring diagrams of the heater EKS (PG) NIS ...x.../...kW



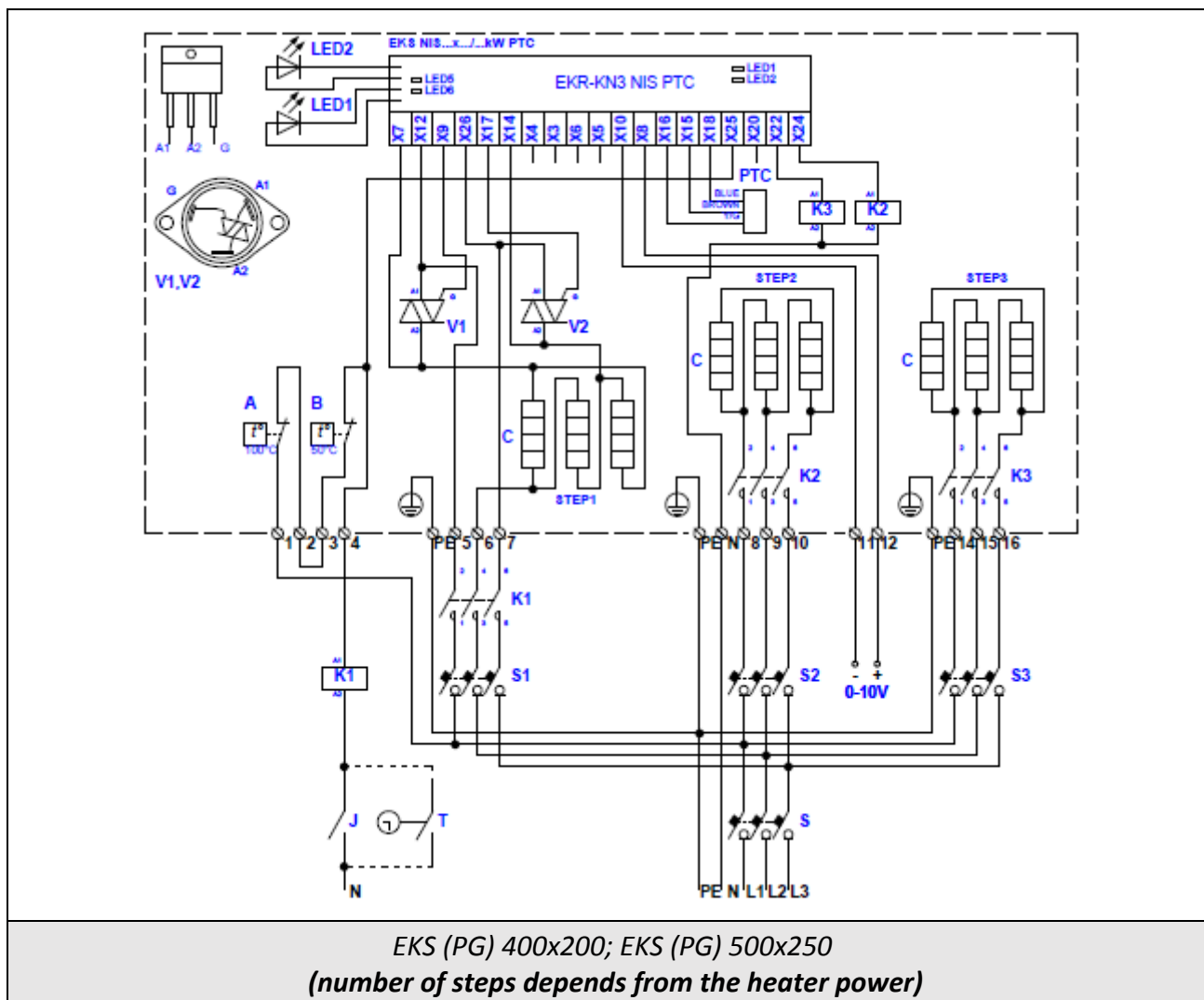


**Fig. 49. Electrical wiring diagrams of the heater EKS (PG) NIS ...x.../...kW PS**

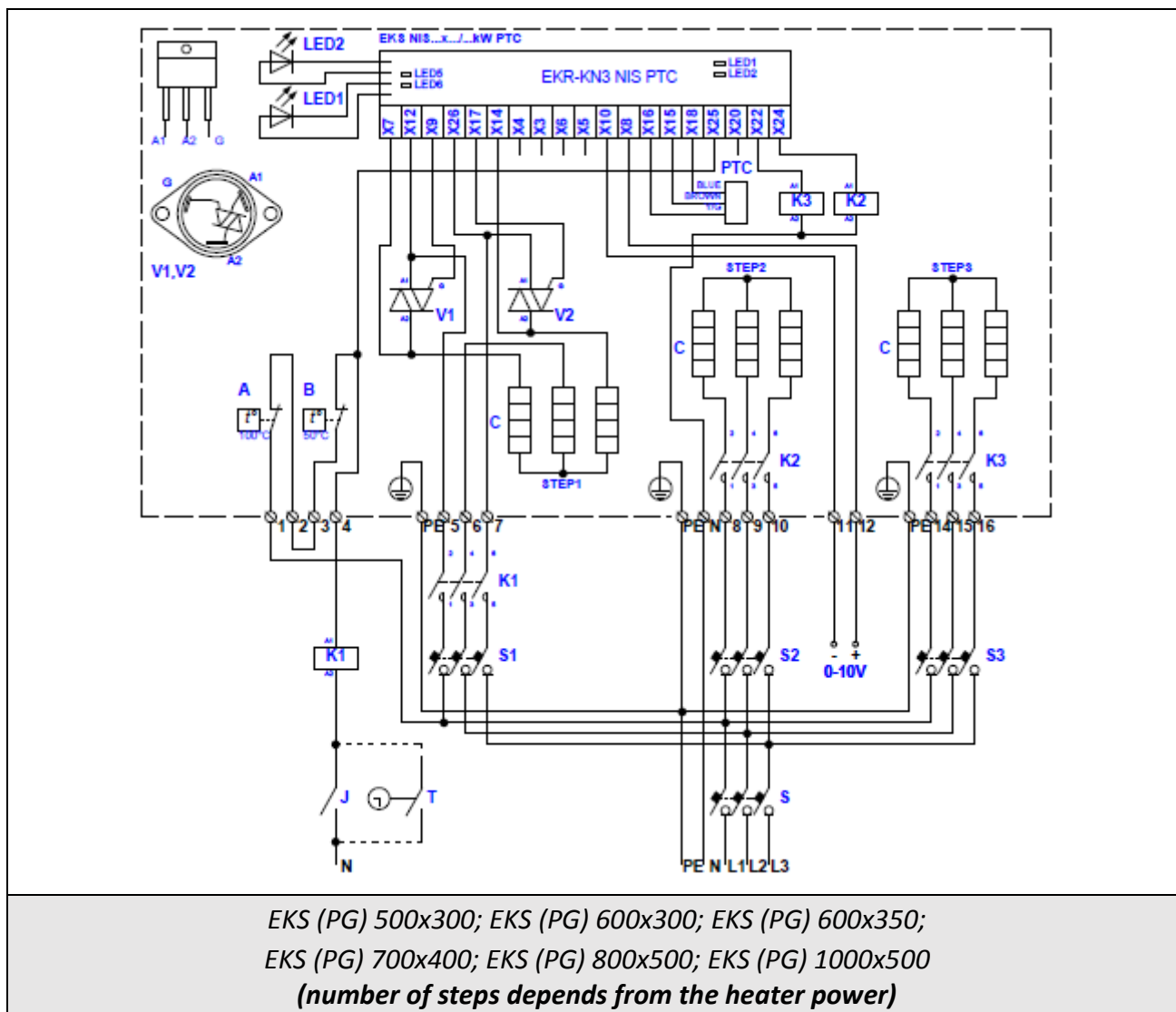


EKS (PG) 500x300; EKS (PG) 600x300; EKS (PG) 600x350;  
 EKS (PG) 700x400; EKS (PG) 800x500; EKS (PG) 1000x500  
 (number of steps depends from the heater power)

**Fig. 50. Electrical wiring diagrams of the heater EKS (PG) NIS ...x.../...kW PS**



**Fig. 51. Electrical wiring diagrams of the heater EKS (PG) NIS ...x.../...kW PTC**



**Fig. 52. Electrical wiring diagrams of the heater EKS (PG) NIS ...x.../...kW PTC**

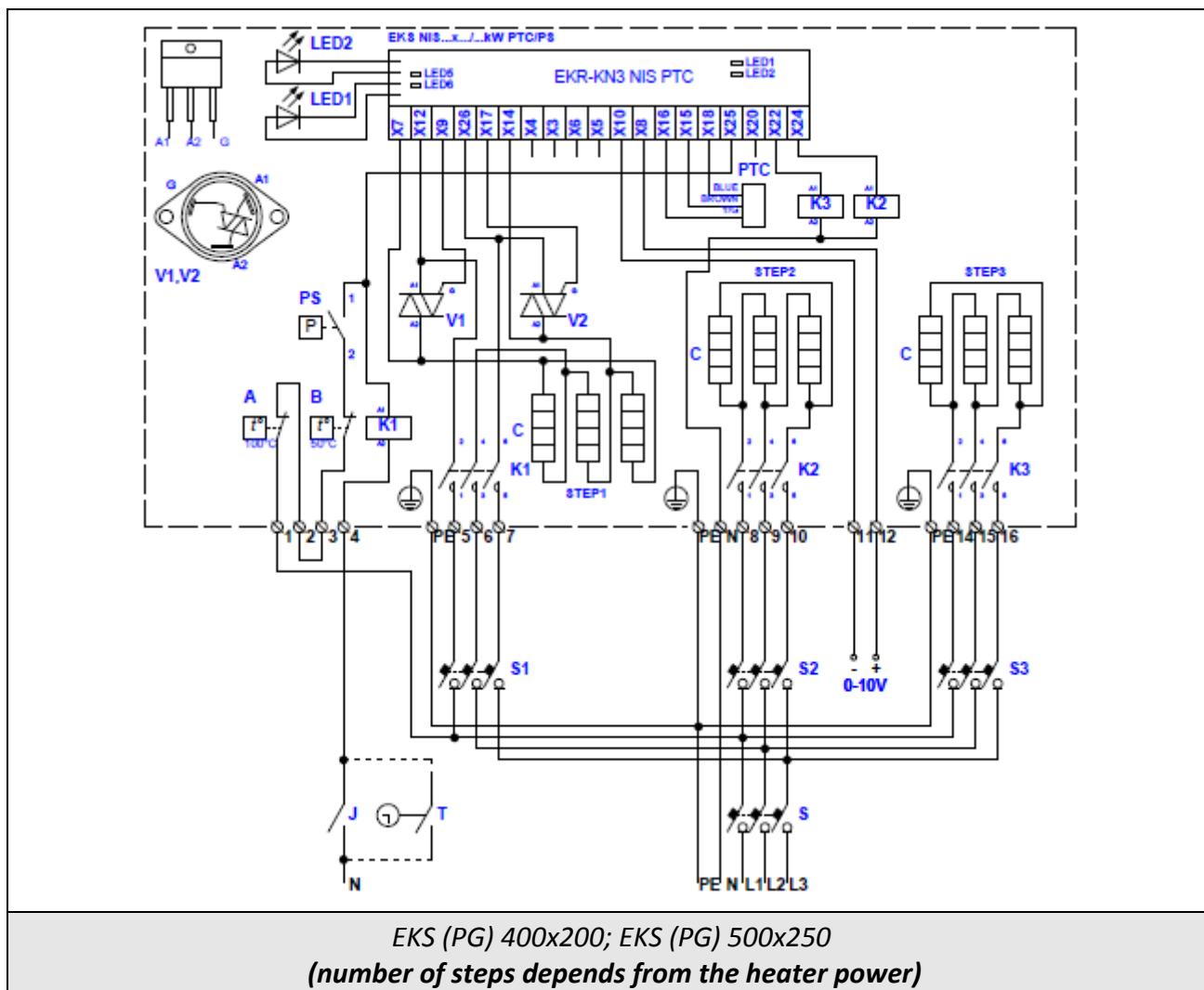


Fig. 53. Electrical wiring diagrams of the heater EKS (PG) NIS ...x.../...kW PTC/PS

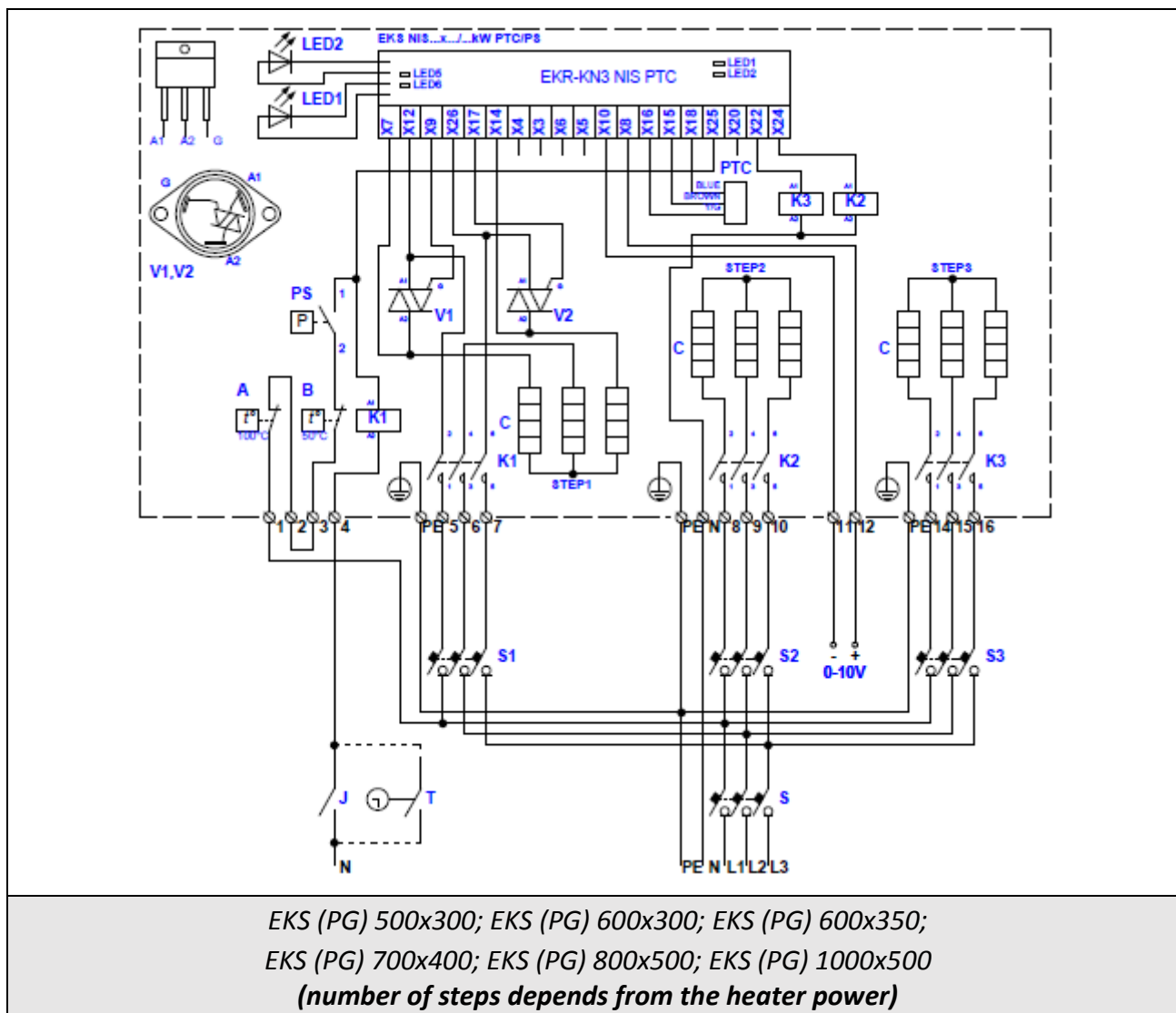
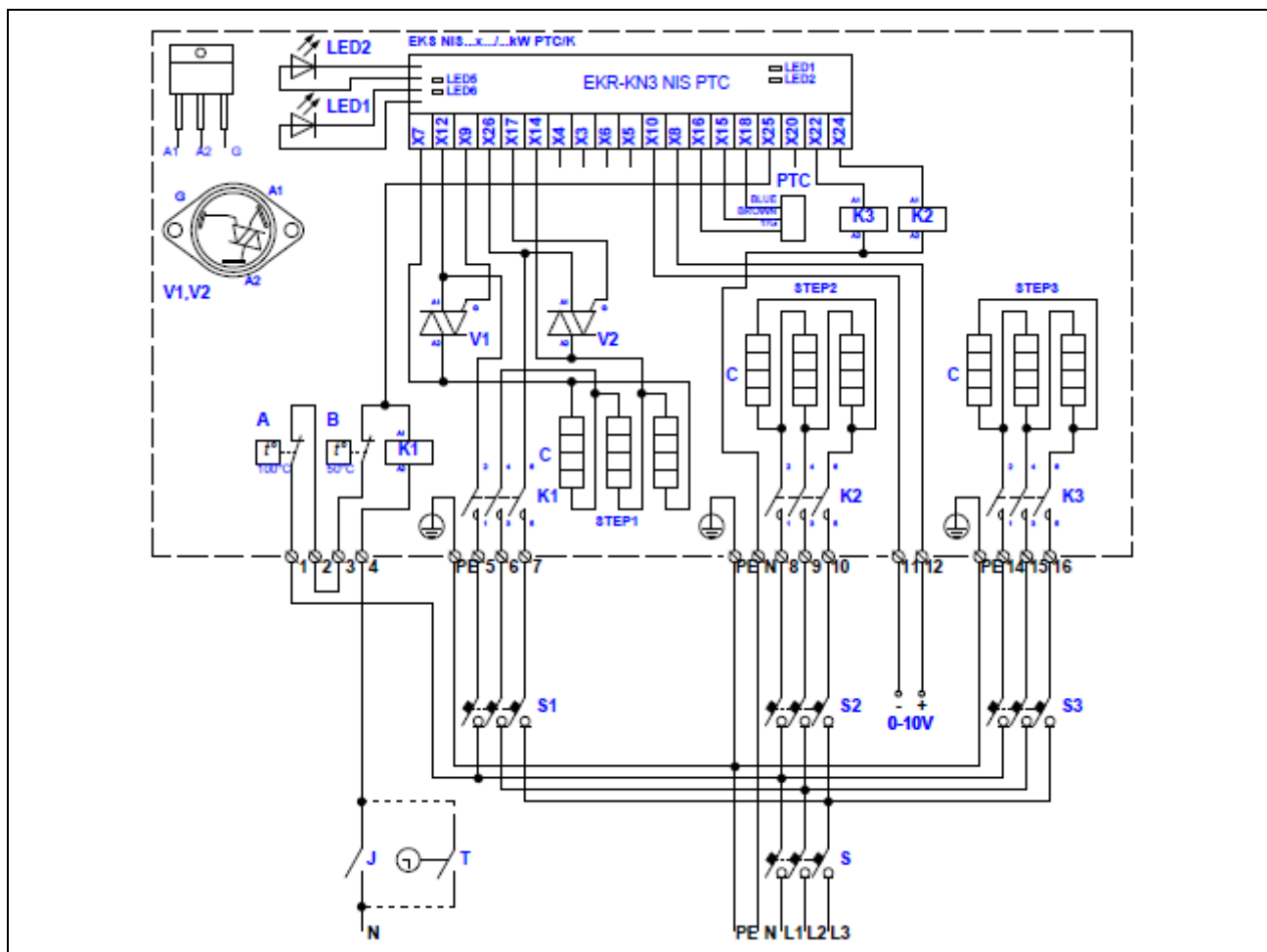


Fig. 54. Electrical wiring diagrams of the heater EKS (PG) NIS ...x.../...kW PTC/PS



EKS (PG) 400x200; EKS (PG) 500x250  
 (number of steps depends from the heater power)

Fig. 55. Electrical wiring diagrams of the heater EKS (PG) NIS ...x.../...kW PTC/K

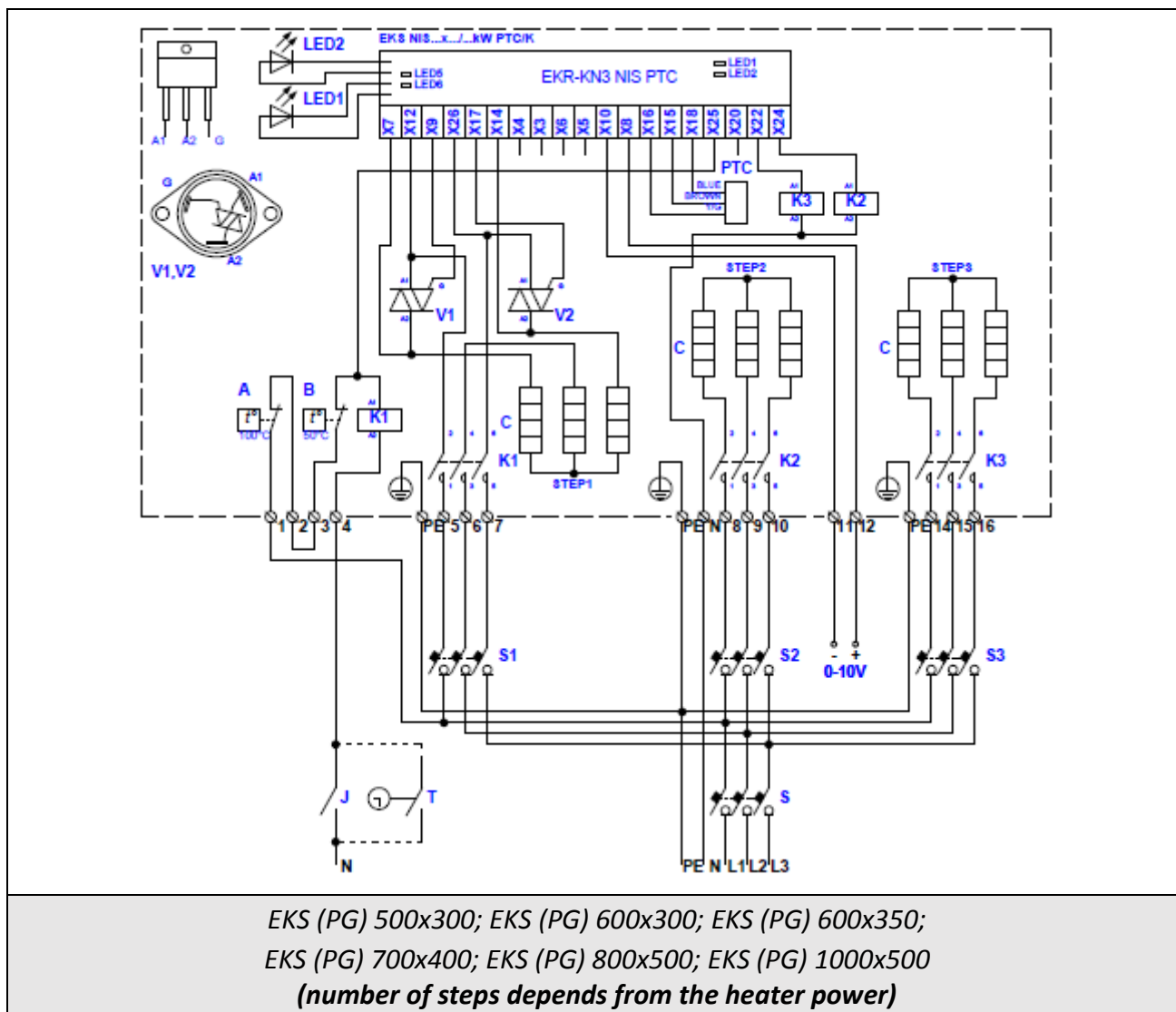
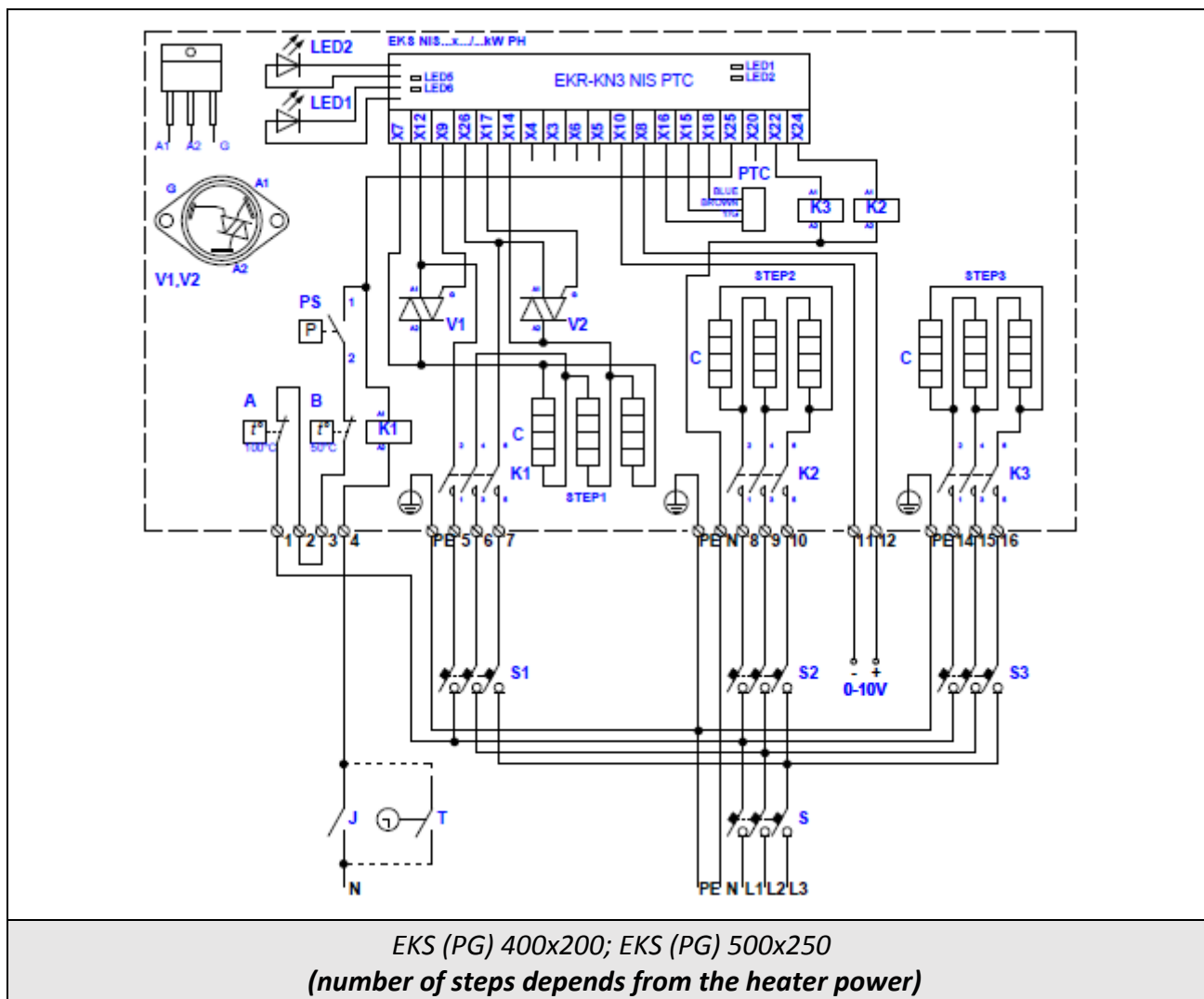
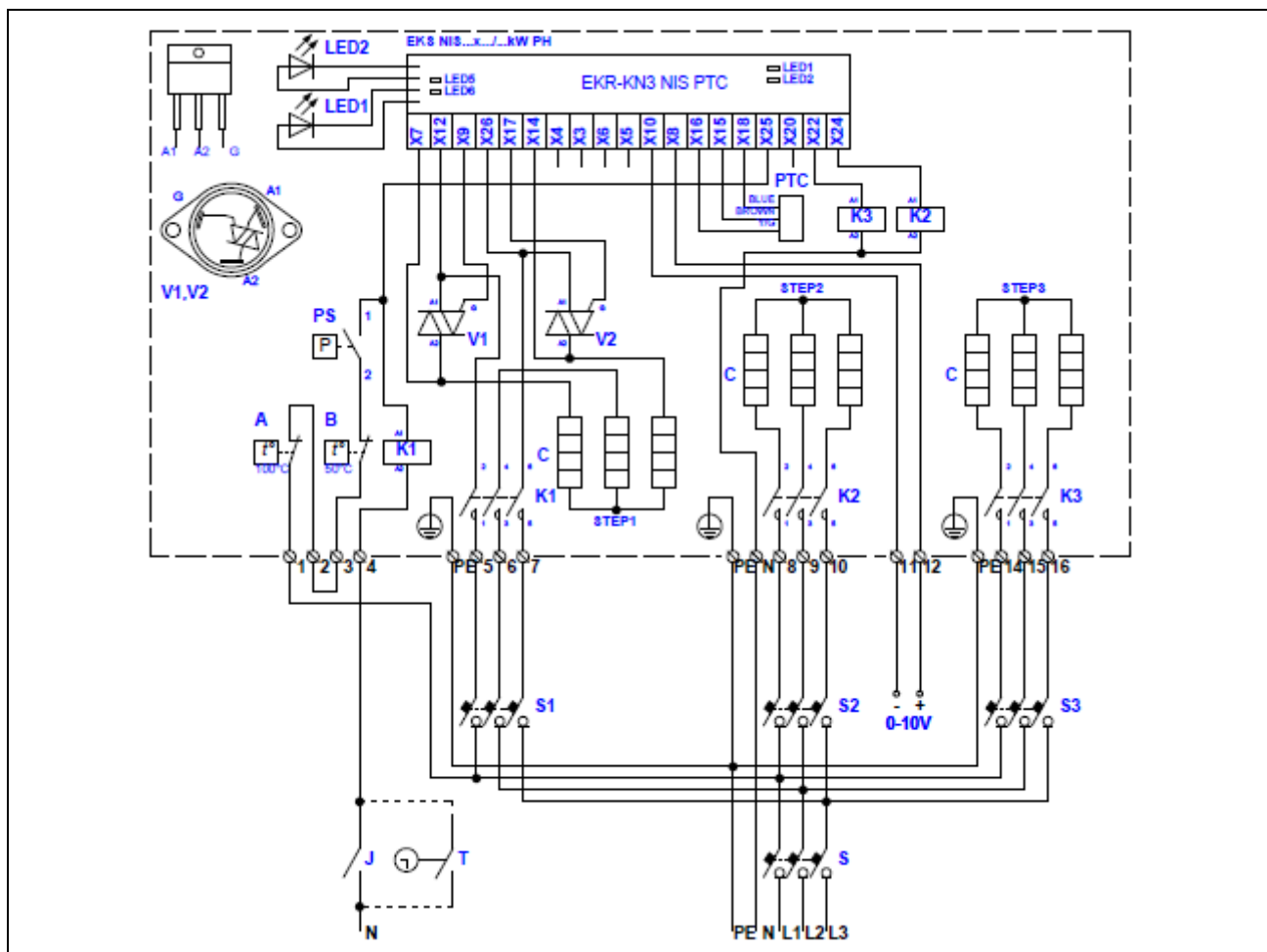


Fig. 56. Electrical wiring diagrams of the heater EKS (PG) NIS ...x.../...kW PTC/K



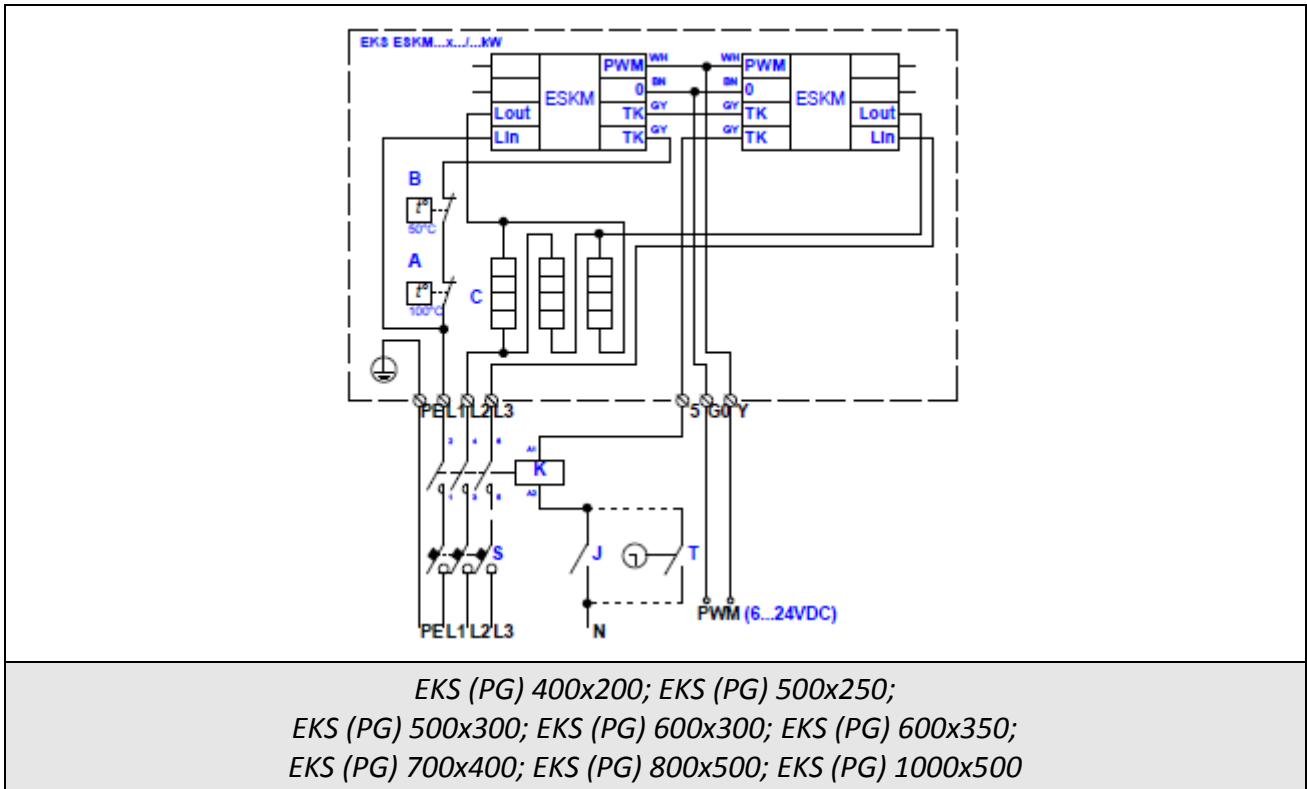


**Fig. 57. Electrical wiring diagrams of the heater EKS (PG) NIS ...x.../...kW PH**



EKS (PG) 500x300; EKS (PG) 600x300; EKS (PG) 600x350;  
 EKS (PG) 700x400; EKS (PG) 800x500; EKS (PG) 1000x500  
 (number of steps depends from the heater power)

**Fig. 58. Electrical wiring diagrams of the heater EKS (PG) NIS ...x.../...kW PH**



**Fig. 59. Electrical wiring diagram of the heater EKS ESKM ...x.../...kW**

## Product warranty

Fill in this warranty information form and keep this page for future reference or when warranty service may be required.

Model name		EKS .....-.....f .....
Warranty period		
Date of invoice		
Customer info	Name (company)	
	Address	
	Contact info	
Retailer info	Name (company)	
	Address	
	Contact info	
Fault description		

The product warranty covers product malfunctions, under normal operating conditions for 24 months from the date of manufacturer's invoice. Please note that the product warranty terms may vary depending on purchase or installation contracts.

During the product warranty period, warranty service (free of charge) is provided for product malfunctions caused under normal operating conditions. For warranty service, contact an official "Ventmatika" dealer. Any manipulation of the appliance by personnel not appointed by "Ventmatika" will cancel the guarantee. "Ventmatika" reserves the right to modify the product without prior notice.

