

# OPERATING AND INSTALLATION MANUAL

## SCREW-MOUNTED ELECTRICAL HEATING UNIT

**TJ 6/4" E – 3,3 kW**

**TJ 6/4" E – 3,75 kW**

**TJ 6/4" E – 4,5 kW**

**TJ 6/4" E – 6 kW**



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**DRAŽICE**  
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## CAREFULLY READ THIS MANUAL BEFORE INSTALLING THE PRODUCT ACCESSORIES!

Dear customer,

Družstevní závody Dražice - strojírna s.r.o., would like to thank you for your decision to use a product of our brand.

The product is not intended to be controlled by

- a) people (including children) with reduced physical, sensual, or mental capacities, or
- b) people with insufficient knowledge and experiences unless supervised by responsible person, or unless properly instructed by such responsible person.

The manufacturer reserves the right for engineering modification of the product.

It is recommended to use the product in indoor environment with air temperatures from +2 °C to +45 °C and a relative humidity up to 80 %.

Product's reliability and safety is proven by tests implemented by the Engineering Test Institute in Brno.

Made in the Czech Republic.

### Meaning of pictograms used in the Manual



**Important information for heater users.**



**Abiding by the recommendations of the manufacturer serves to ensure trouble-free operation and the long service life of the product.**



**Caution!**  
**Important notice to be observed.**

# 1 PRODUCT TECHNICAL SPECIFICATION

## 1.1 FUNCTION DESCRIPTION

The screw-mounted electrical heating unit (heating unit) is designed exclusively for water heating. It is designed as an additional heating source in water heaters connected in a system with solar collectors. It can also be used as an additional source of heating in accumulation tanks. If the installation requirements are obeyed, it can be used as the main source of heating by a heater, or for other purposes.

Water is heated by tubular heating element. The well includes the sensor of safety thermostat. Water temperature is controlled by an external controller, which controls the heating. Heating can be carried out in three power steps. In the event of a heating failure, the safety thermostat switches off the power supply at all poles.

## 1.2 DESCRIPTION OF ACTIVITY

The operation is controlled by an external voltage of 230 VAC from a parent external controller connected to terminals RS1, RS2, RS3. Heating can be carried out in three power steps. For example, for TJ 6/4" E 6 kW: 6 kW, 4 kW, 2 kW. Heating of the individual power steps is indicated by a green translucent colour on the housing cover (Figure 2, Figure 9).

## 1.3 VOLTAGE



Before interfering with the wiring, it is essential to switch off the power supply!  
And wait for at least one minute.



The voltage of phase L1 is the supply voltage for the PCB (printed circuit board). Unless there is voltage L1 = the controller does not start the heating.

## 1.4 SIGNALLING

The PCB contains 7 LEDs (Figure 5, Figure 8)

Green colour indicating supply voltage "heating on": LED L1, LED L2, LED L3.

Green colour indicating "switching present": LED PWR

Red colour indicating controlling external "voltage present": RS1, LED RS2, LED RS3

## 1.5 ADVICE FOR CUSTOMERS



Prior to putting the heating element into operation, re-measuring of insulation resistance is recommended. The insulation resistance in cold must not be below 50 MΩ. If the insulation resistance is lower, we recommend drying the heating element.

Both the electric and water installation must follow and meet the requirements and regulations applicable in the country of use!

## 1.6 DESIGN AND GENERAL HEATER DIMENSIONS

The heating unit consists of an electrical heating element with a connecting thread G 6/4" and a cover. (Figure 1). Underneath the wiring cover there is a printed circuit board (PCB) of the control with connection terminals and signals and a safety thermostat. The cover can be removed by removing the cover screw (Figure 2).

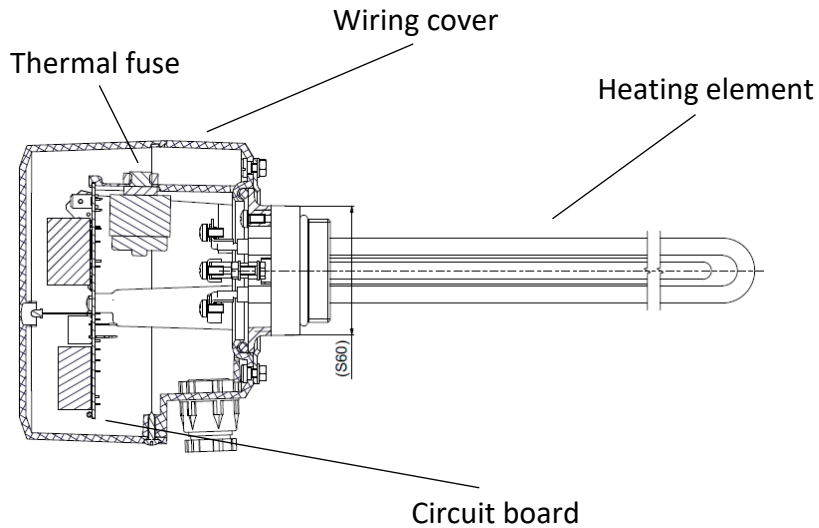


Figure 1

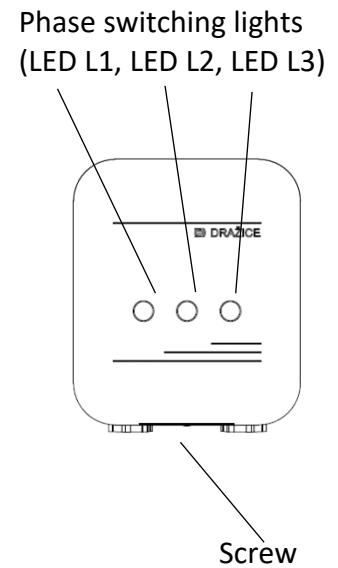


Figure 2

TYPE	NUMBER OF SWITCHED	POWER	WIRING	HEATING TIME FROM 10 °C TO 60 °C (APPROX.150 L)	RECOMMENDED CIRCUIT BREAKER VALUE	ELECTR. PROTECTION	TEMPERATURE SET POINT RANGE	HOUSING LENGTH (L1)	WEIGHT
		kW		hrs	A		°C	mm	kg
TJ 6/4" E – 3,3 kW	3	3,3	3 PE-N AC 400 V/50Hz	2,6	3 x 10	IP 44	5 - 74	325	2
	2	2,2	2 PE-N AC	4					
	1	1,1	1 PE-N AC	8					
TJ 6/4" E – 3,75 kW	3	3,75	3 PE-N AC 400 V/50Hz	2,4	3 x 10	IP 44	5 - 74	450	2
	2	2,5	2 PE-N AC	3,5					
	1	1,25	1 PE-N AC	7					
TJ 6/4" E – 4,5 kW	3	4,5	3 PE-N AC 400 V/50Hz	2	3 x 10	IP 44	5 - 74	500	2
	2	3	2 PE-N AC	3					
	1	1,5	1 PE-N AC	6					
TJ 6/4" E – 6 kW	3	6	3 PE-N AC 400 V/50Hz	1,5	3 x 16	IP 44	5 - 74	520	2
	2	4	2 PE-N AC	2					
	1	2	1 PE-N AC	4,5					

Housing lengths are within a tolerance of  $\pm 10$  mm.

L1 Screw-mounted electrical heating unit of TJ series with an extended cooling compartment

Table 1

## 2 OPERATION AND FITTING INSTRUCTIONS

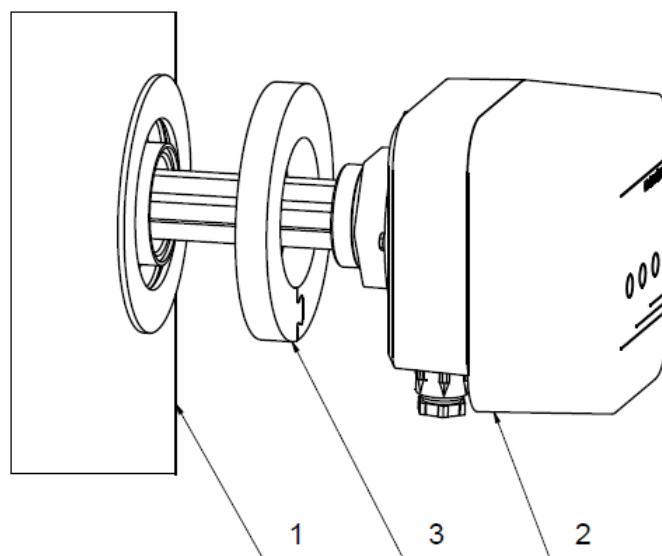
### 2.1 ASSEMBLY



The heating unit shall be mounted in the heater's neck. The end of the thread is provided with a rubber seal. To ensure better tightness we recommend the screw joint being additionally sealed with cannabis, a Teflon sealing tape or a mastic sealant (be careful – choose a mastic sealant suitable for demountable joints). Tighten the element properly. If the cable bushing is not directed upright down, loosen the 4 screws on the plastic cover bottom. Turn the cover (not more than by 180°) to the desired position and re-tighten the screws. Check whether the live parts of the wiring do not touch. The sealing ring is mounted last on the metal body

**The space in front of the connection fitting equal to the installation length + 50 mm must be left free for the installation, etc.**

A sealing ring is part of the heating unit package.



- 1) Water heater
- 2) Electrical heating unit TJ
- 3) Sealing ring

Figure 3

## 2.2 ELECTRICAL INSTALLATION

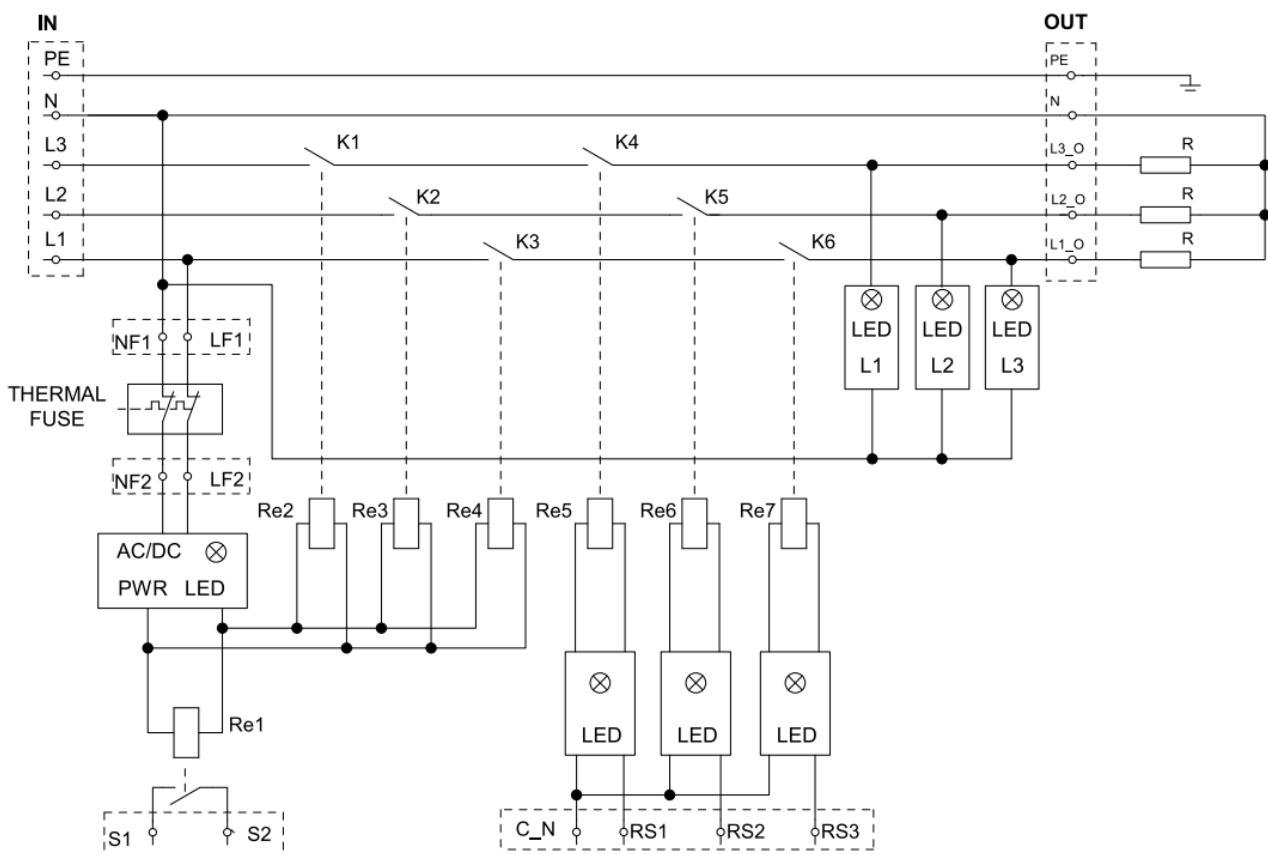
### 2.2.1 BASIC INFORMATION FOR ELECTRICAL INSTALLATION



Run the supply cord through the bushing and connect accordingly with the scheme for the heating unit. Run the control cable through the gland and connect according to the diagram (Figure 4). The heating unit is connected to the 400 V (230 V)/50 Hz mains by a fixed connection with a conductor of the appropriate cross-section and the appropriate fuse for the power rating of the heating element.

**Notice:** Perform the installation in compliance with applicable standards.

### 2.2.2 WIRING DIAGRAM



**CAUTION UNDER VOLTAGE EVEN  
WHEN THE MAIN  
SWITCH IS OFF!**

Figure 4



## 2.2.3 APPLICATION DIAGRAM:

Model design of possible control

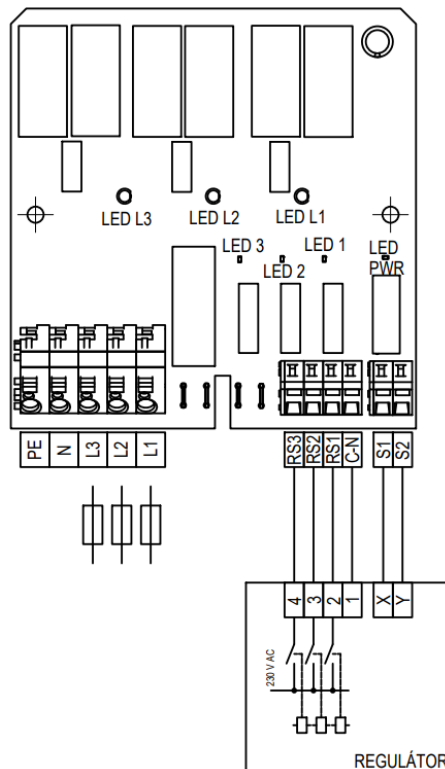


Figure 5

## 2.2.4 WIRING DESCRIPTION

### Terminals on PCB

#### 1) Power supply 400 VAC

PE – earth (yellow/green wire)

N – working zero (blue wire)

L1 – phase 1. (brown wire)

L2 – phase 2. (black wire)

L3 – phase 3 (grey wire)

Conductor max.  $S = 4 \text{ mm}^2$

#### 2) Control, external 230 VAC

RS1 – control switching L1, switches on heating stage I

RS2 – control switching L2, switches on heating stage II.

RS3 – control switching L3, switches on heating stage III.

C\_N – working zero

Conductor max.  $S = 2,5 \text{ mm}^2$

#### 3) Fault signalling (fuse opening), 1 contact

S1  Contact (potential-free)

S2

Conductor max.  $S = 2,5 \text{ mm}^2$

### Power supply

The heater is connected to the 3x 230 V (400 V)/50 Hz power grid using a fixed moving cable in which a circuit breaker (and possibly a current protector) is fitted. The 5 x 2.5 mm<sup>2</sup> cable must be tripped with a circuit breaker of appropriate parameters listed in the table (Table 1).

### Control power supply

Control inputs RS1, RS2, RS3 are connected to the mains 1 x 230 V/50 Hz with a cable.

Power supply to the inputs via one identical L phase.

It is recommended to trip the control voltage with a 500 mA (0.5 A) fuse.

### Fault signaling (fuse blowing)

The contact of the S1/S2 terminal is rated at 5 A/250 VAC.

Switching contact (NO), potential-free.

It is recommended to trip with fuse 1A.

### Instructions for connecting wires to terminals:

Wires are connected to the Wago terminals on the PCB. The tool to use is a flat head screwdriver of the appropriate width. The wires are connected from the side (Figure 6). Use appropriate clamping force.

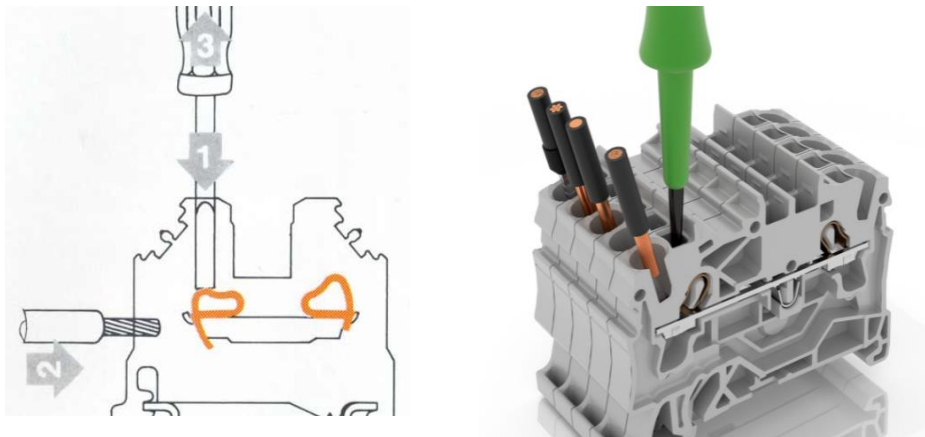


Figure 6

## 2.3 HEATING UNIT OPERATION

Water temperature control is operated (performed) automatically by an external controller which controls the heating.

## 2.4 INSPECTION, MAINTENANCE

Maintenance involves decalcification of the heating element in certain time intervals selected by water hardness at the place of use. **Damage to the heating element due to calcareous sediments is not accepted by the manufacturer as a reason for complaint.**



**Notice:** If the heating unit is used in an accumulation heater, the wear of the anode rod of the heater may deteriorate. We recommend checking it more frequently. Consider the instructions of the manufacturer regarding the exchange of the anode rod.

## 2.5 MOST COMMON FAULTS


FAILURE SYMPTOM	SOLUTION
 <p>The indicator light of the unit operation does not light up.</p>	<p>The safety thermostat (Thermal fuse) is not self-reversing, it is triggered <u>when the heater water has cooled down to room temperature</u>. The fuse can then be manually triggered (Figure 7) in a voltage-free state by pressing the button on the thermostat body.</p>
<p>Failure of the heating element is not indicated, and the indicator light remains on even when the thermostat is switched on.</p>	<p>Have the heating unit repaired by an authorized company.</p>

Table 2



Thermal fuse

Figure 7



Do not attempt to repair the failure yourselves. Seek either expert or service help. It does not take much for an expert to remove the defect. When making a repair appointment, report the type and serial number you find on the performance plate of your water heater.

## 3 IMPORTANT NOTICES

The following cases do not entitle the Customer to exercise the right from defective performance:

- damage caused by dry operation
- damage caused by lime scale deposits
- damage caused by chemical or electrochemical influences
- damage due to incorrect voltage, lightning strike, or voltage surges

## 3.1 INSTALLATION REGULATIONS

- When active, both the element and the termowell have to be surrounded with a sufficient amount of water from all sides.
- Thermo water flow must not be prevented.
- Mounting positions – horizontal or vertical from under.
- The length of the 6/4" neck shall not exceed 70 mm. If longer, the variant with an extended cooling circuit has to be used.
- If the length of the neck is within 100 mm, it has to be extended on the water side, or undercut in a minimum length of 40 mm to the minimal diameter of 50 mm.
- The maximum pressure in the vessel is 10 bar.



Both the electric and water installation must follow and meet the requirements and regulations relevant in the country of use!

### 3.1.1 OPERATIONAL STATUS

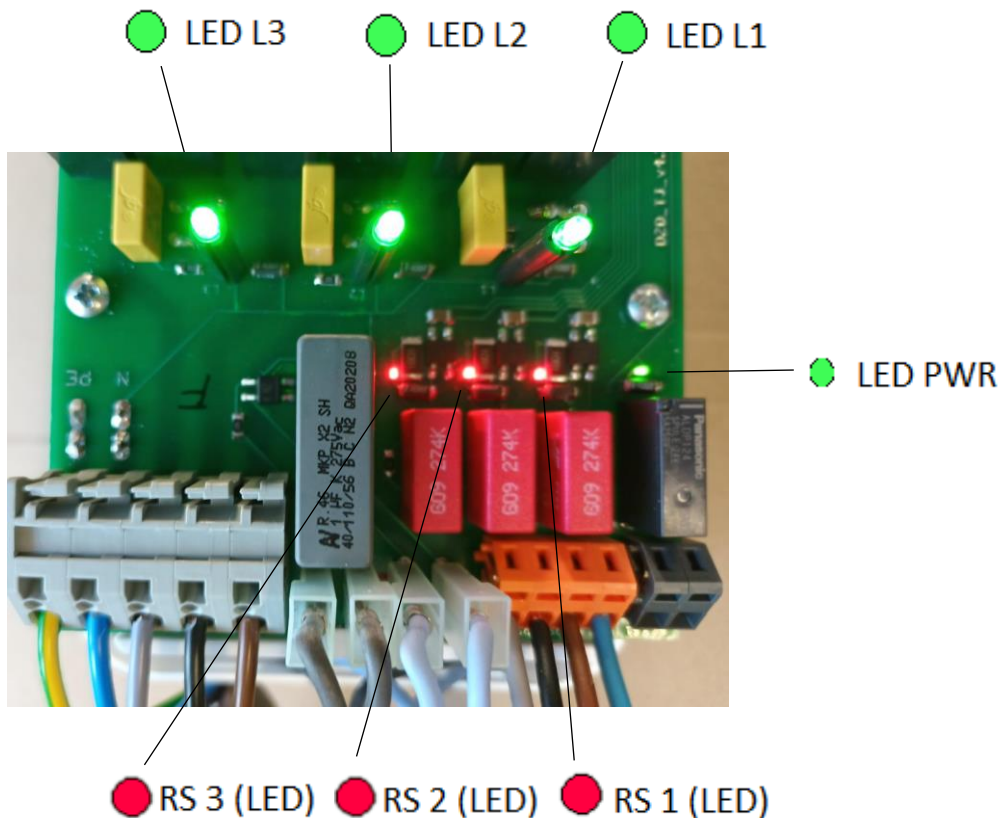


Figure 8



Figure 9

### 3.1.2 OPERATING AND FAULT CONDITIONS, LED SIGNALLING ON PCB

Heating level, Output on, LED on (on cover)	Input on RS1 LED on (on cover)	Input on RS2 LED on (on cover)	Input on RS3 LED on (on cover)	PWR LED on (on cover)	Contact terminal S1+S2 on
<b>Heating</b>			<b>Operation</b>		
L1+L2+L3	●	●	●	●	YES
L1	●	●	-	-	YES
L2	●	-	●	-	YES
L3	●	-	-	●	YES
L1+L2	●	●	●	-	YES
L1+L3	●	●	-	●	YES
L2+L3	●	-	●	●	YES
<b>Fault</b>			<b>Possible statuses, not heating.</b>		
No power L1+L2+L3	●	●	●	-	NO
No power L1	●	●	●	-	NO
Powered L1+L2+L3	●	●	●	-	NO
<b>Overheated, opened by emergency thermostat!</b>					

Table 3

### 3.1.3 FAULTY EXTERNAL CONTACT

Is used to signal possible tripping of the emergency thermal fuse.

Non-potential contact (open at rest).



**CAUTION!**

Interrupting L1 will open the contact and possibly activate a fault.



**CAUTION!**

By de-energizing the power supply, the unit may not be de-energized. Make sure that the external control voltage is switched off!

## 3.2 SPARE PARTS

Always state the type of the heating unit and the name of the spare part when placing an order.

- Safety thermostat
- Printed circuit board
- Wires
- Packing ring

## 3.3 DISPOSAL OF PACKAGING MATERIAL AND NON-FUNCTIONING PRODUCT

A service fee for providing return and recovery of packaging material has been paid for the packaging in which the product was delivered. The service fee was paid pursuant to Act No 477/2001 Coll., as amended, at EKO-KOM a.s. The client number of the company is F06020274. Take the water heater packages to a waste disposal place determined by the town. When the operation terminates, disassemble, and transport the discarded and unserviceable heater to a waste recycling center (collecting yard), or contact the manufacturer.



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