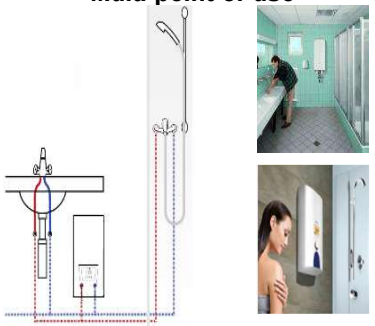
ELECTRIC WATER INSTANTANEOUS

BOSCH

PRODUCT PORTFOLIO

EWI - Electric Water Instantaneous
Installation type

Immediate hot water…

…at one sink	…at several points/sinks	… in the shower
Residential: e.g. in the kitchen, in the bathroom or in the garage **Light commercial:** e.g. in restrooms, break rooms, hair dressers or small commercial kitchens	**Residencial:** central supply of hot water at the same time **Commercial:** small restaurants, restrooms, retailers **Heavy commercial** (≤144kW): e.g. gym, sport clubs, laundries, building container.	**Residencial:** direct installed in the shower
Single point-of-use 	**Multi point-of-use** 	**Electric shower** 

EWI provides immediately hot water and plays an important role in terms of energy and water saving

EWI - Electric Water Instantaneous
Product portfolio – made in AvP

TR1000 6 T

Safety

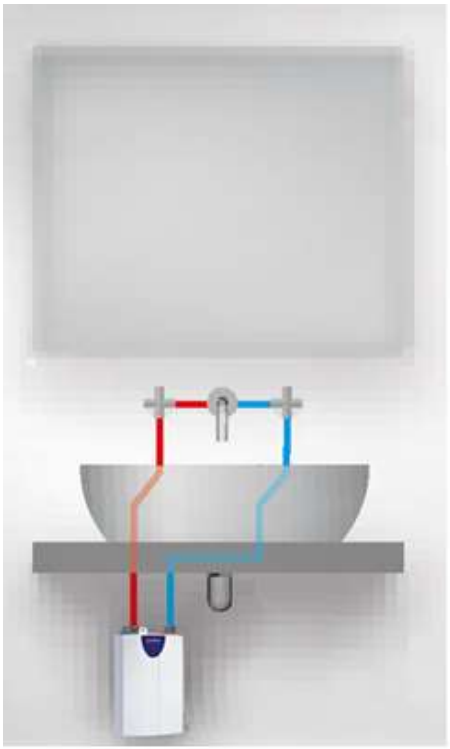
IP24

Robust

Robust

TR1100
18/21/24 B

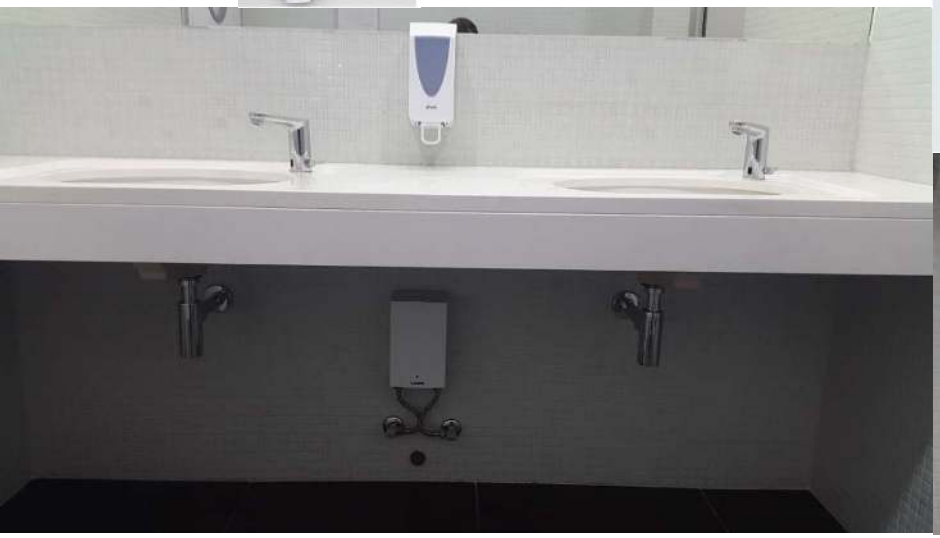
EWI - Electric Water Instantaneous
Installation type



Below sink

EWI - Electric Water Instantaneous
Product Portfolio – Water Heater Examples

Under sink



Single Supply

Multiple Supply

EWI - Electric Water Instantaneous
Installation areas

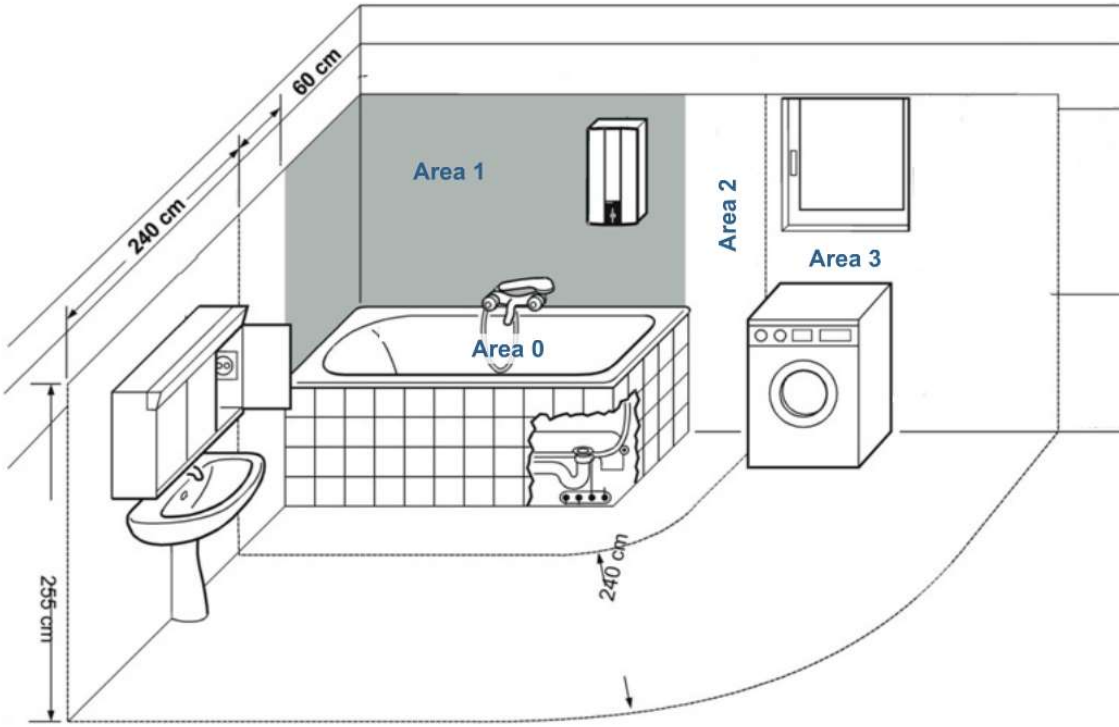
- **Area 0**

  Appliances for bathtubs/shower trays only
- **Area 1**

  Permanently installed hot water appliances above and below the tub/tray
- **Area 2**

  In addition in Area 2: Sockets and washing machine connections – within 60 com of the tub/tray
- **Area 3**

  No restrictions



EWI - Electric Water Instantaneous
Supply type

Single supply

Multiple supply

EWI - Electric Water Instantaneous
Load profiles

Load profile	Equivalent hot water volume	Appliance	Application example
XXS		Small instantaneous water heaters	Guest toilet
		Small storage water heaters	Kitchen sink
XS		11 / 13 kW Instantaneous water heater	Kitchen sink
S		Instantaneous water heater	Bathroom
		30-litre wall-mounted storage water heater	
M		50 & 80-litre wall-mounted storage water heater	Bathroom and kitchen
L		100, 120, & 150-litre wall-mounted storage water heater	Bathroom and kitchen
XL		200-litre floor-standing storage water heater	Single family home
XXL		300 & 400-litre floor-standing storage water heater	Single family home

EWI - Electric Water Instantaneous
International protection

IP protection rating codes in accordance with DIN EN 60529 (VDE 0470 Part 1) for electrical equipment

Sample code characters	IP	2	4	D	H
International protection					
First apportionment number					
Second apportionment number					
Additional letter					
Further letter					

The first apportionment number represents protection against the penetration of solid foreign bodies, e.g.
0 no protection
2 solid foreign bodies ≥ 12.5 mm
6 dust-proof

The second apportionment number represents protection against the penetration of water, e.g.
0 no protection
4 spray water
5 water jet
8 constant submersion

The additional letter represents access to dangerous parts, e.g. by
A back of the hand
B finger
D wire

Further letters and information are for special circumstances, e.g.
H high-voltage appliances
W weather conditions

- The IP25 protection type is required for use in Area 1.
- The IPX5 protection means that the area of use is not defined.

Example:
Appliance
Continuous flow-heater DE... / DH...
Protection type
IP25
Area
1

**The country-specific regulations always have priority*

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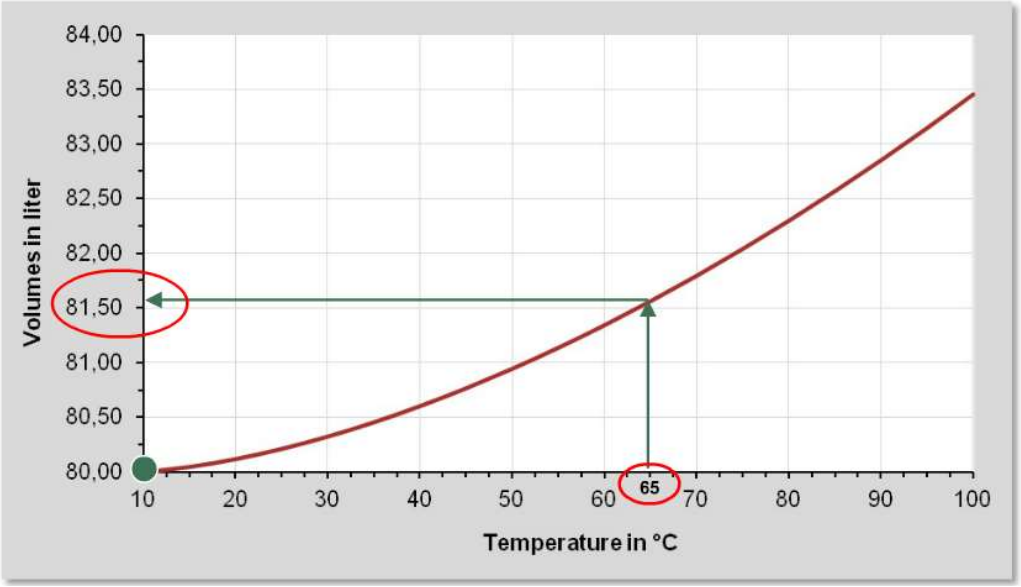
Change in water volume when heated

Example:
Appliance
80 l wall-mounted water heater
Heating
From 10° C to 65° C
Volume expansion
From 1.6 l to 81.6 l

- Water expands when is heated resulting in a change in volume
- Storage water heaters must be installed in a way that enables changes in volume to be accommodated



EWI - Electric Water Instantaneous

Heating element types

Tubular heating unit

Bare-wire heating unit

EWI - Electric Water Instantaneous

Heating element types

Tubular heating unit

Bare-wire heating unit

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EWI - Electric Water Instantaneous
Heating element types

Tubular heating unit	Bare-wire heating unit
Not sensitive to air bubble in the water	Air bubble in the water may damage the heating unit
Resilient against the most ambient conditions	The conductivity of the water must not exceed specified limit values
System-related heat losses	Maximum efficiency
Temperature limiters only prevent the overheating of the heating unit	Temperature limiters prevent the overheating of the water

EWI - Electric Water Instantaneous
Tubular heating element

- Each heating element has one dedicated overheating sensor

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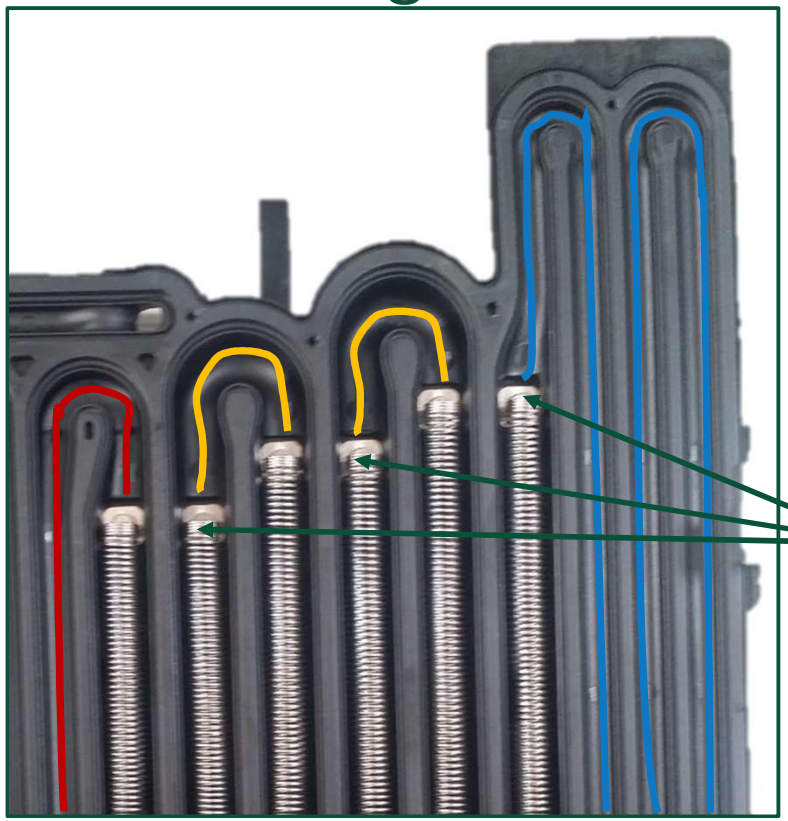
Bare-wire heating element



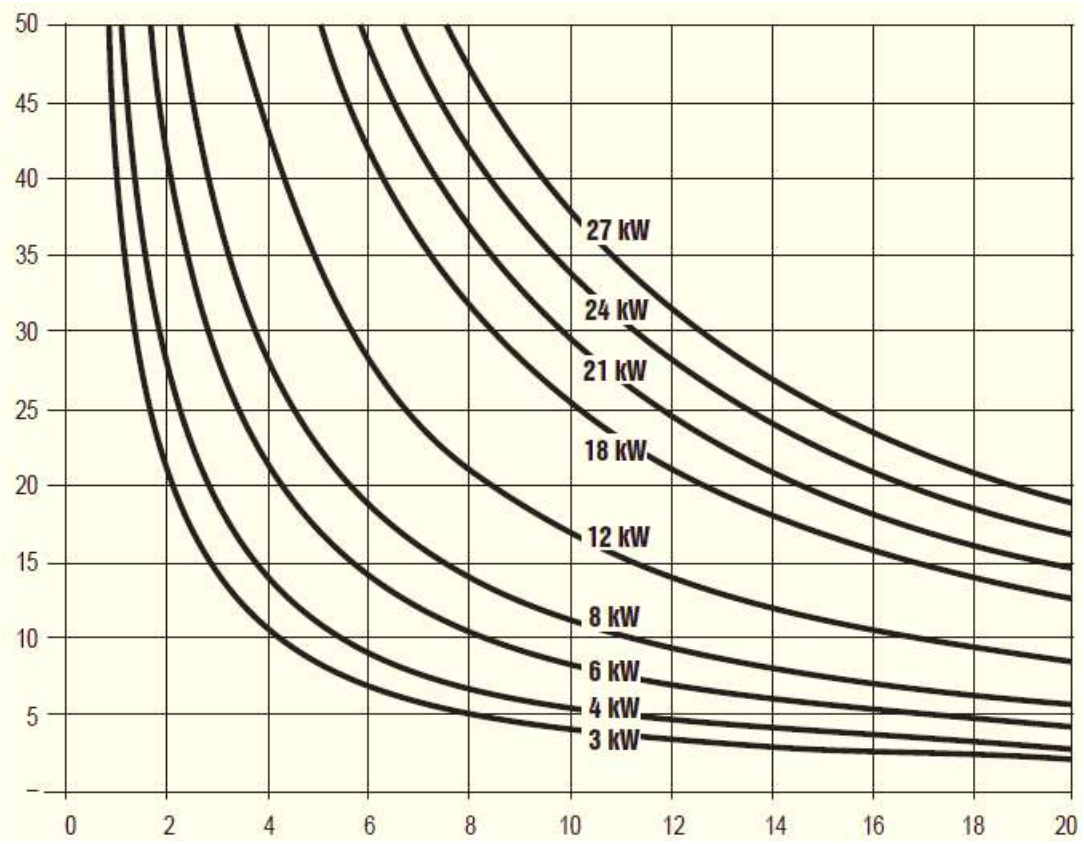
- Each heating element in activated independently (by contactor in hydraulic control models and by software in electronic control models)

EWI - Electric Water Instantaneous

Components and functions

DeltaT

(increase of temperature)



Flow rate (l/min)

SINGLE POINT OF USE

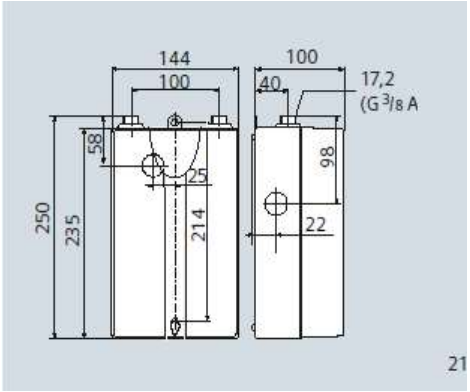
TR1000

Single point of use – hydraulic control

230 V / 50 Hz

TR1000 6 T

TR 1000 T



EWI - Electric Water Instantaneous
Installation requirements



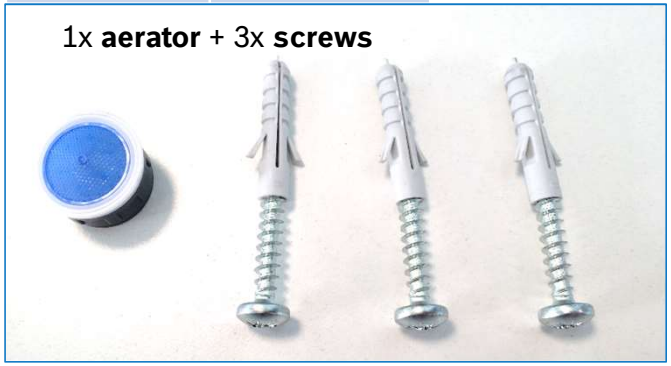


TR1000 series	6 kW Undersink
Voltage (V) / Frequency (Hz)	230 / 50
Plug type	Fixed connection
International protection	IP 24 D
Fitting connections (inches)	1/2
	3/8
Dimensions HxWxT (mm)	235 x 144 x 110
Weight (kg)	1.8

EWI - Electric Water Instantaneous
Accessories

- In order to assure that the water flow is not too high, is recommended to install also and aerator on the tapping. The aerator is included.

Aerator color	Flow restrictor
Light-green	1.7 l/min
Green	2.5 l/min
Lilac	3.0 l/min



EWI - Electric Water Instantaneous
Components and functions

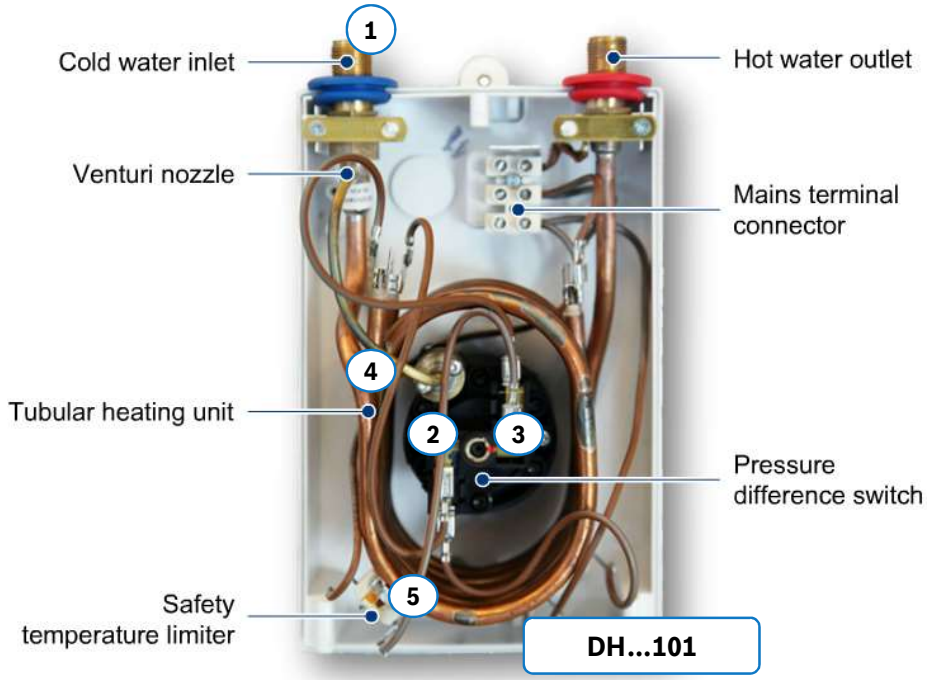
1. Cold water flows to the venturi nozzle

2. A pressure difference is generated on the pressure difference switch

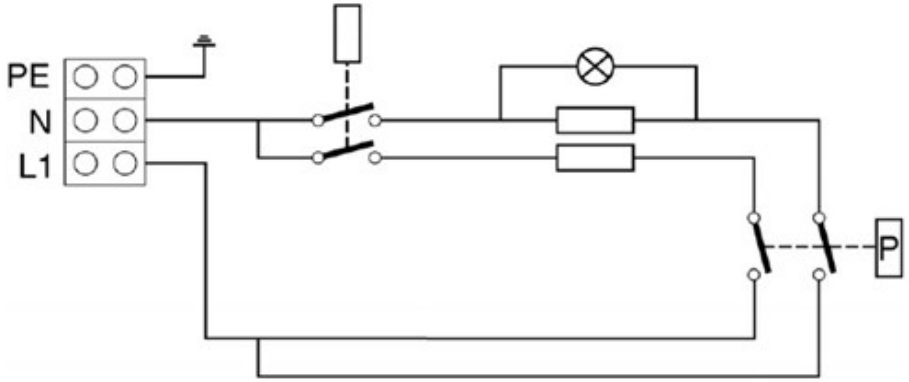
3. The switch set is switched above a specific flow rate

4. Tubular heating unit is activated

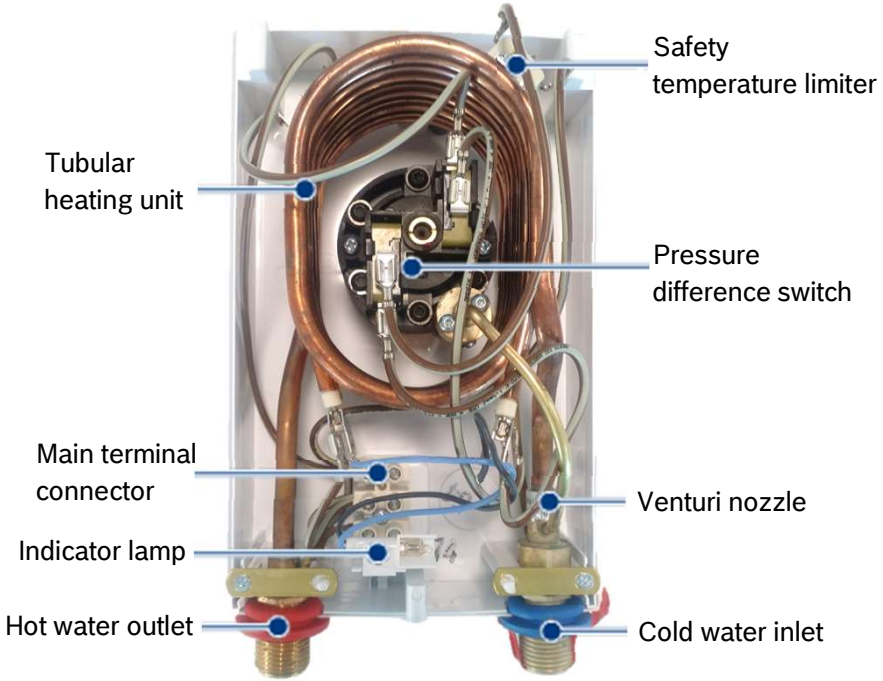
5. The safety temperature limiter prevents the water from overheating and thus damaging the appliance or the installations



EWI - Electric Water Instantaneous
Components and functions



6 kW model



EWI - Electric Water Instantaneous

Differential pressure switch and venture nozzle

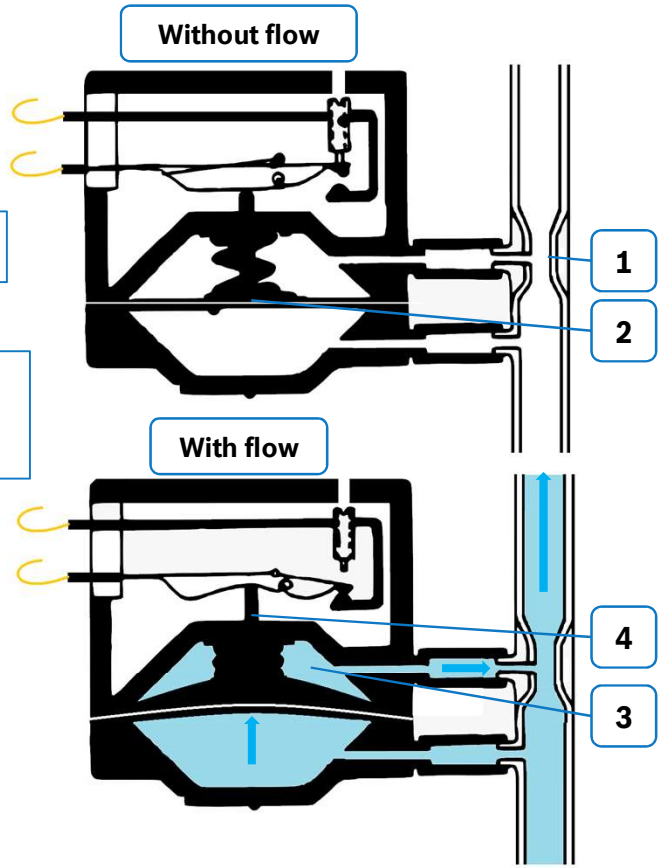
The switch-on process is initiated by the differential pressure system when water flows through the Venturi nozzle in the heating block **(1)**.

Different static pressures (pressure difference) occur in the inlet duct and at the narrowest point of the Venturi nozzle **(2)**.

As the water reaches the greatest flow rate (also greatest dynamic pressure and lowest static pressure at constant total pressure) at the narrow point of the Venturi nozzle, a low pressure occurs which is transferred into the upper chamber **(3)**.

The static pressure occurring in the inlet duct is transferred into the lower chamber and presses the diaphragm upwards and actuates the differential pressure switch screwed to the heating block via the plunger **(4)**.

When the hot water tap is turned off, the pressure equalizes and the counter pressure of the differential pressure switch moves the plunger back towards the rest position.

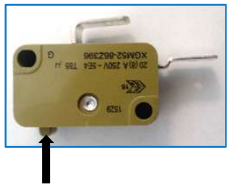


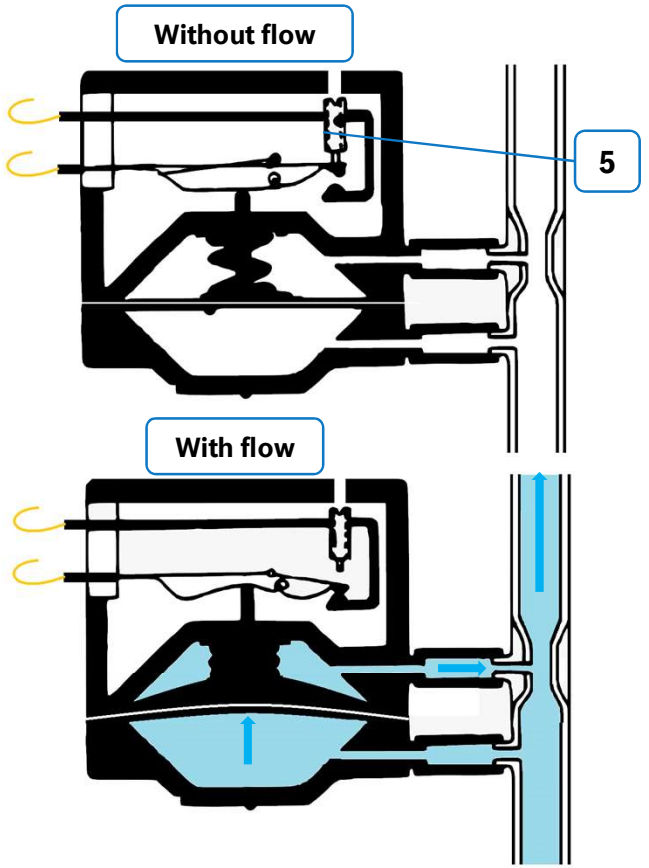
EWI - Electric Water Instantaneous

Differential pressure switch and venture nozzle

- The differential pressure switch is actuated via a plunger of the differential pressure system in the heating element. In the idle state all electrical components – except the mains connection and the flow paths of the safety pressure limiter – are isolated from the power supply (5).

Tronic 1000 series	6 kW Undersink
Nominal Power (kW)	6.0
Switch-on flow (l/min)	2.3
Switch-off flow (l/min)	1.8
How water output 12°C to 38°C (l/min)	3.0
Temperature inlet water (°C)	4 to 20

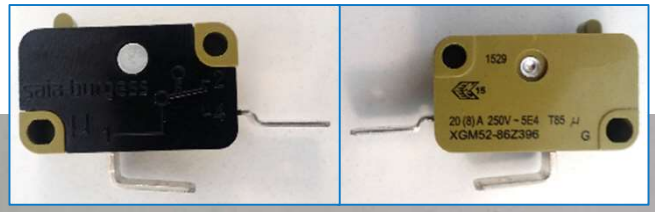


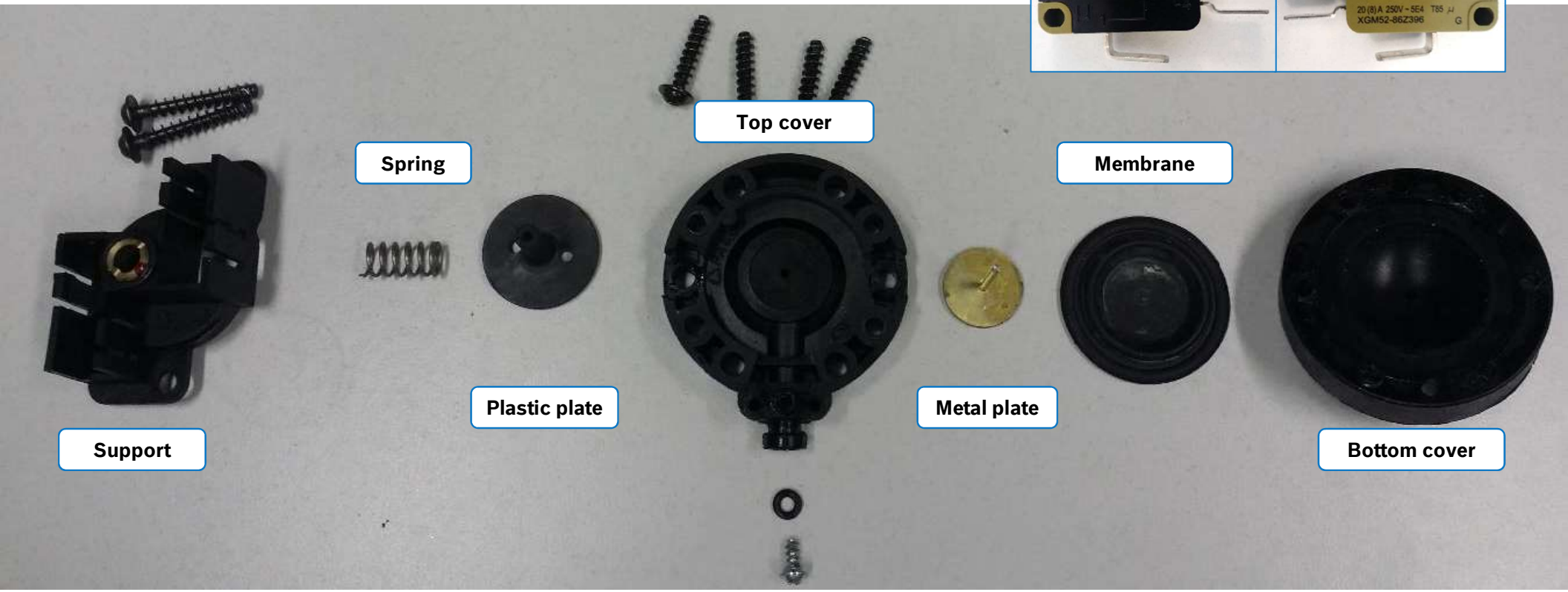


EWI - Electric Water Instantaneous
Differential pressure switch and micro switch

- The differential pressure switch (6) is actuated via a plunger of the differential pressure system in the heating element. In the idle state all electrical components – except the mains connection and the flow paths of the safety pressure limiter – are isolated from the power supply

EWI - Electric Water Instantaneous
Differential pressure switch





EWI - Electric Water Instantaneous
Safety temperature limiter

- Type: bimetallic (contacts normally closed)
- Location: heating unit (1 per heating element)
- Function: Prevents the appliance and surrounding area from being damaged due to overheating. Deactivates the element in an emergency

Attention:

If the safety temperature limiter has been triggered:

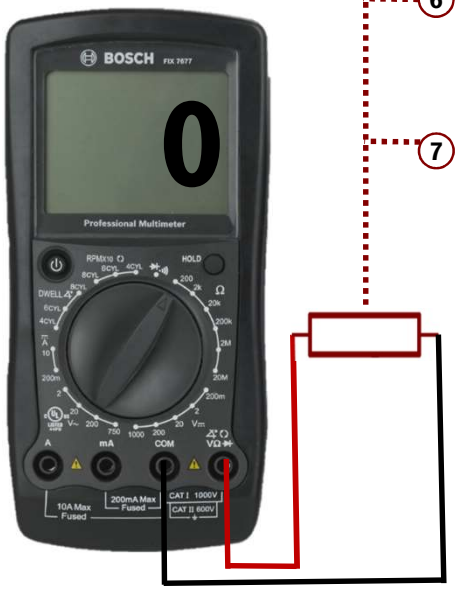
- Inspect and check the cause
- The switch-on is automatic once the temperature on the heating element reach a normal level

Tronic 1000 series	6 kW Undersink
Temperature limiter – activation temperature	150°C

EWI - Electric Water Instantaneous

Continuity values

- Water flow: **OFF**
- Energy supply: **OFF**

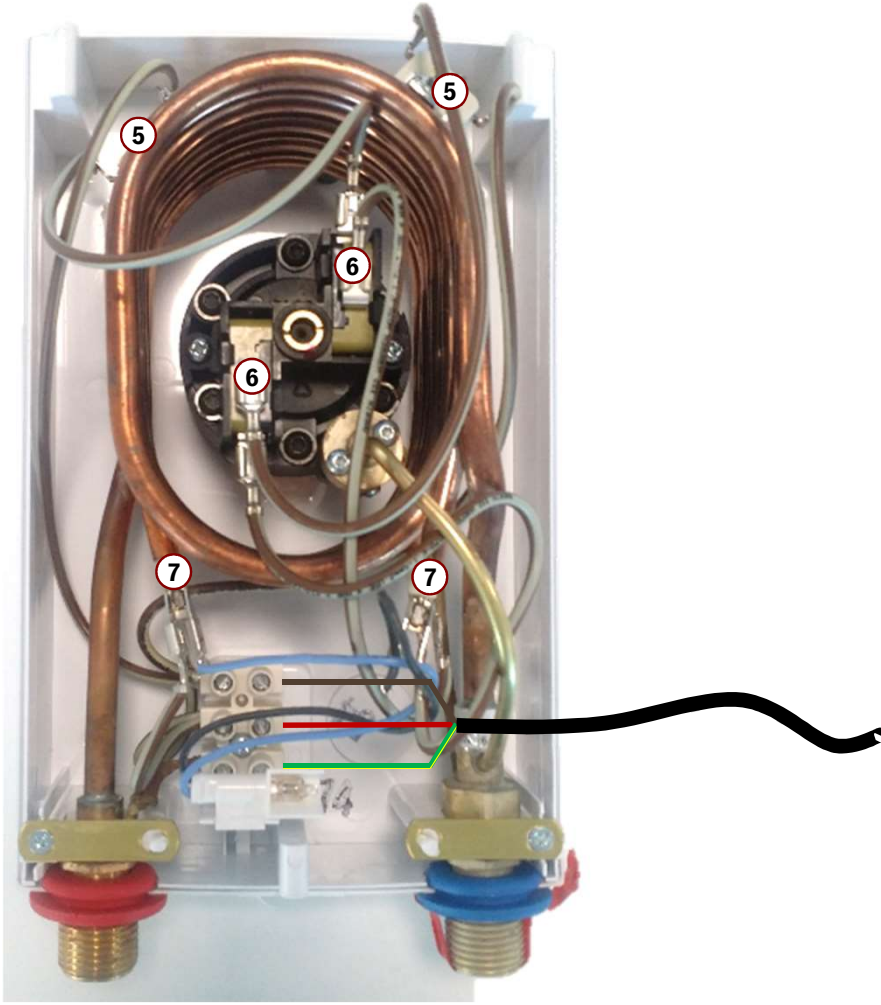


5 **Temperature sensor**
If continuity = **0** = contacts normally closed = continuity ok.
If continuity = 1 = contact open = no continuity.

6 Micro switch (without water flow)
If continuity = **0** = contacts normally closed = not ok if no water flow
If continuity = 1 = contact open = no continuity = no water flow

7 Heating element
If continuity = **0** = heating element ok (not interrupted)
* Measure ohmic value (Ω)
If continuity = 1 = contact open = no continuity (heating element damaged)

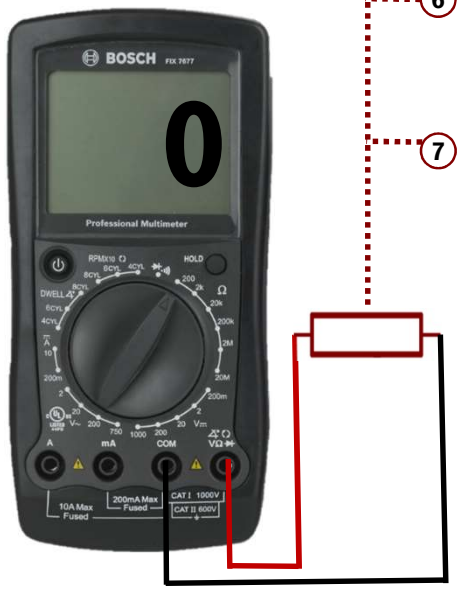
Green: component is ok
Red : component not ok



EWI - Electric Water Instantaneous

Continuity values

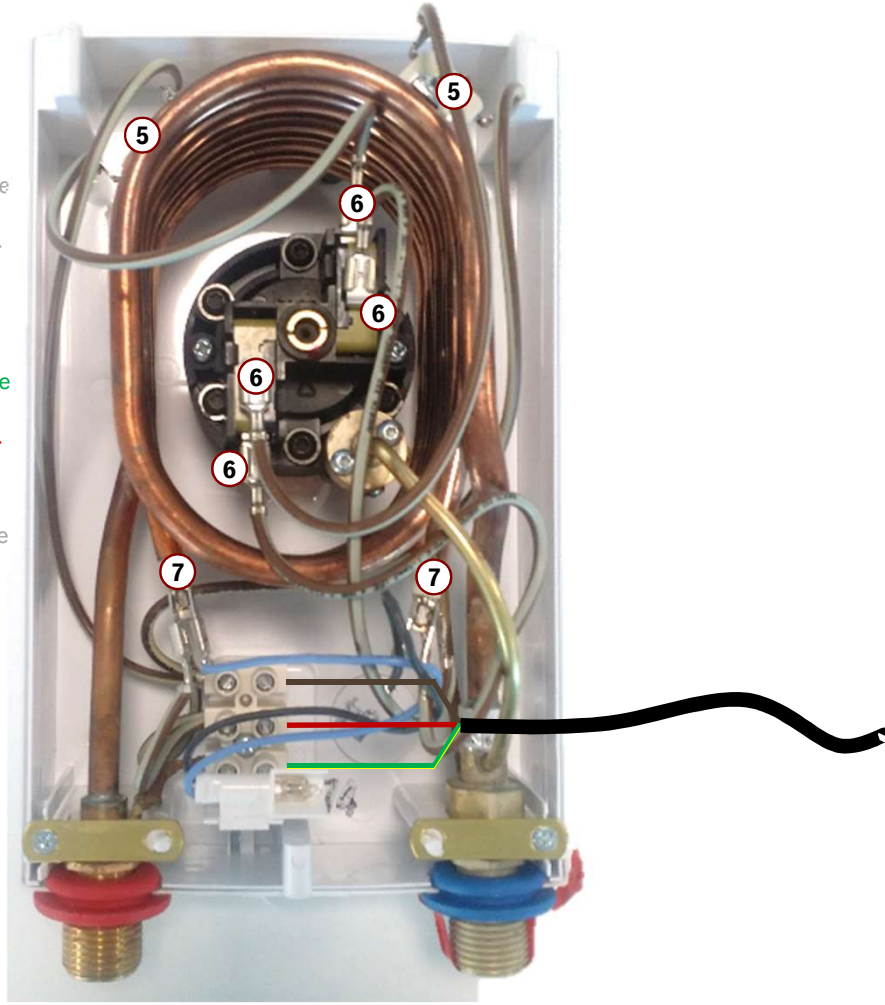
- Water flow: **ON**
- Energy supply: **OFF**



5 **Temperature sensor**
If continuity = **0** , there is continuity. The component is in good conditions.
If continuity = 1 , there is not continuity. The temperature limiter is in overheating or damaged

6 Micro switch (with water flow)
If continuity = **0** , there is continuity. The component is in good conditions.
If continuity = 1 , there is not continuity. The micro switch is damaged.

7 Heating element
If continuity = **0** , there is continuity. The component is in good conditions.
If continuity = 1 , there is not continuity. The heating element is damaged.



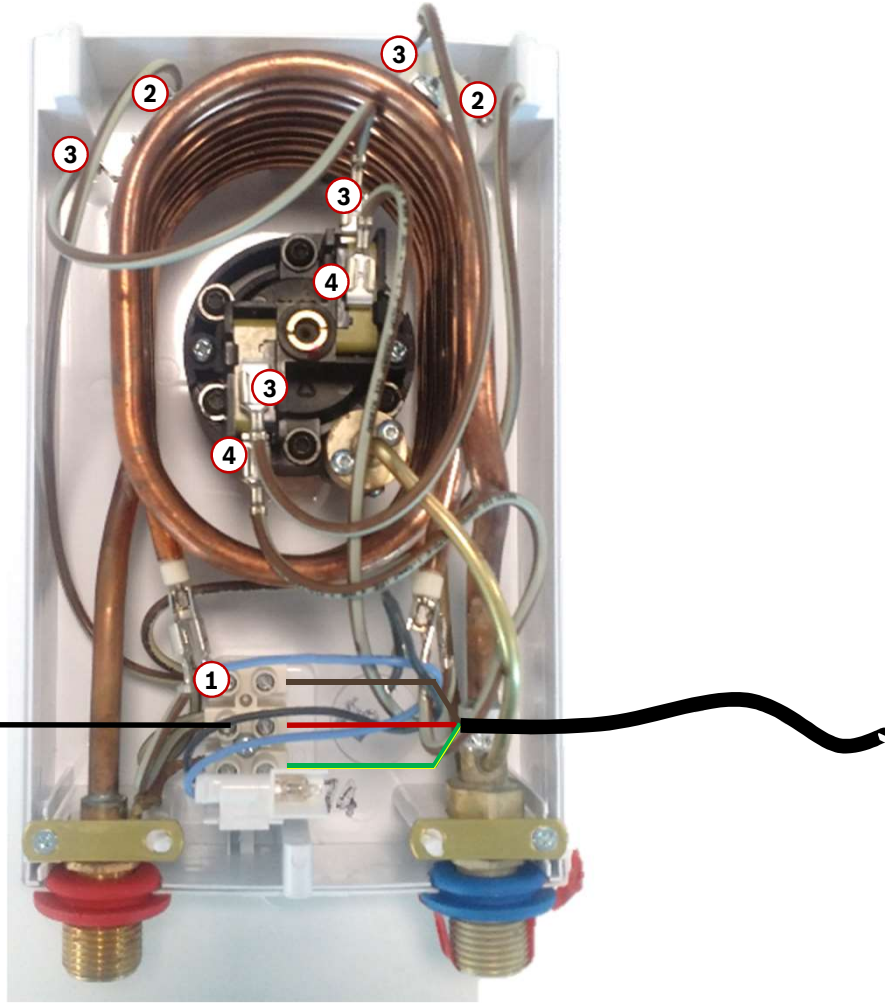
EWI - Electric Water Instantaneous

Voltage values

- Water flow: **OFF**
- Energy supply: **ON**
- Checking the tension in each point, will confirm the energy reaches every point and that the components are in good conditions

V ac

1. 230V, always
2. 230V, always
3. 230V, without overheating
4. 230V, just with flow

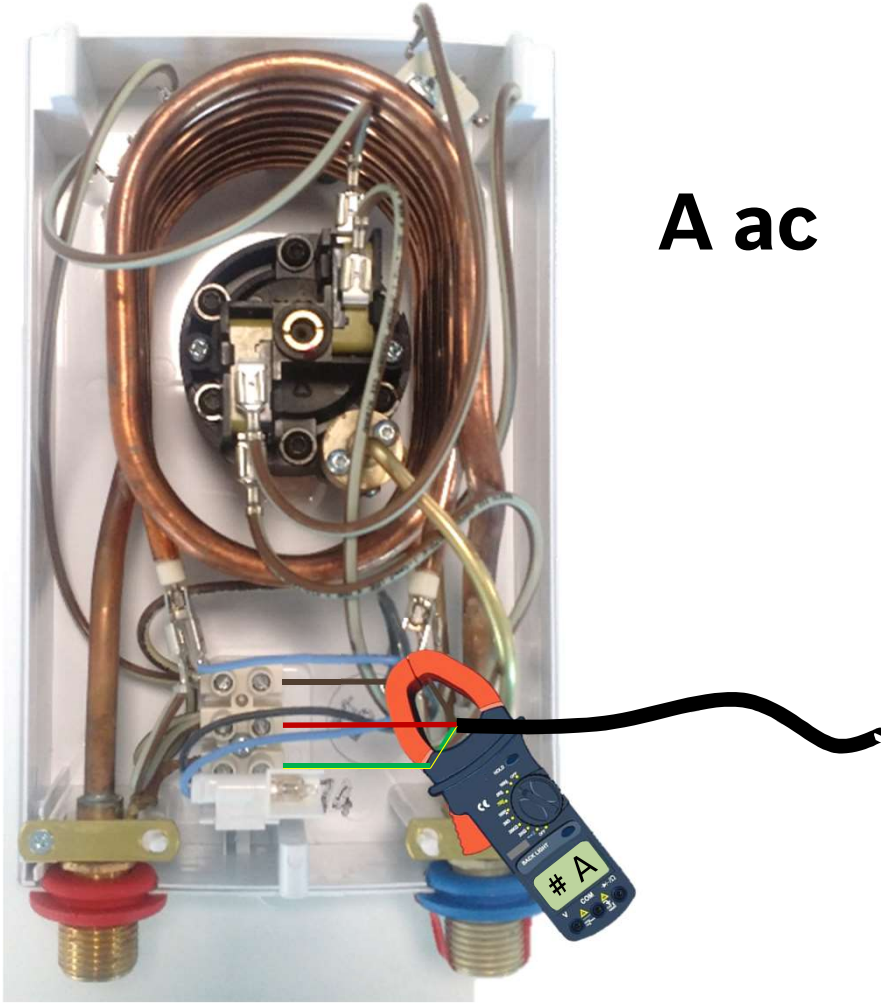


EWI - Electric Water Instantaneous
Electric consumption

✓ Use a clamp meter on the phase cable

- Keep the water turned off:
  - If value = 0, there is no consumption. The appliance is turn off.
- Turn ON the water:
  - If value = 0, there is no consumption. The appliance is turn off. Something is not working.
  - If value = (see table) , the value represents the electric consumption in Amperes.

Tronic 1000 series	6 kW Undersink
Nominal Power (kW)	6.0
Voltage (V)	230
Frequency (Hz)	50
Amperage (A)	26



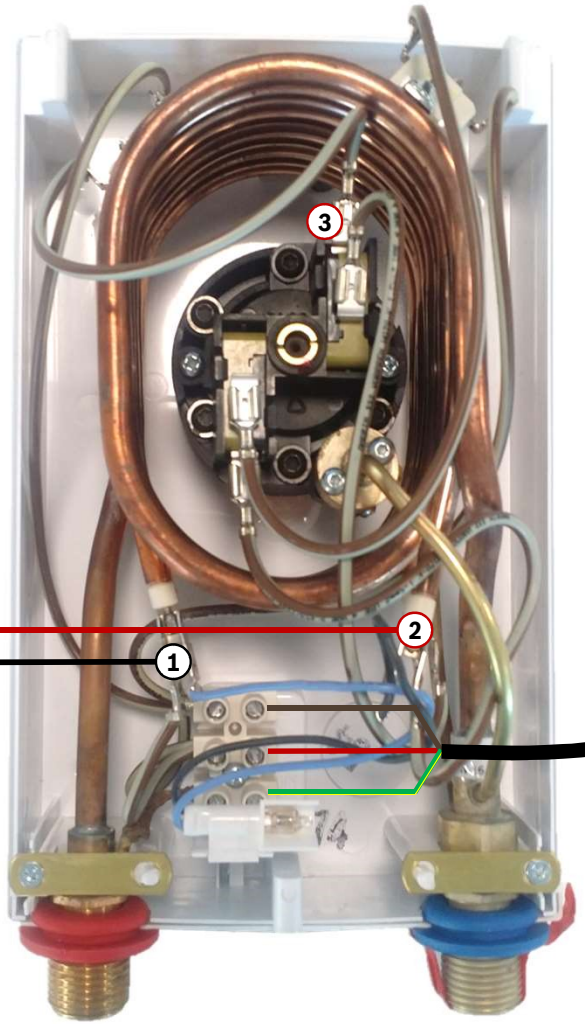
EWI - Electric Water Instantaneous

Ohmic values

Ω

- Water flow: **OFF**
- Energy supply: **OFF**
- Checking the voltage in each heating element we have confirmation of component integrity

Tronic 1000 series	6 kW Undersink
Cold resistance	16.9 - 19.1 Ω
Heating elements	2



MULTIPLE POINT OF USE

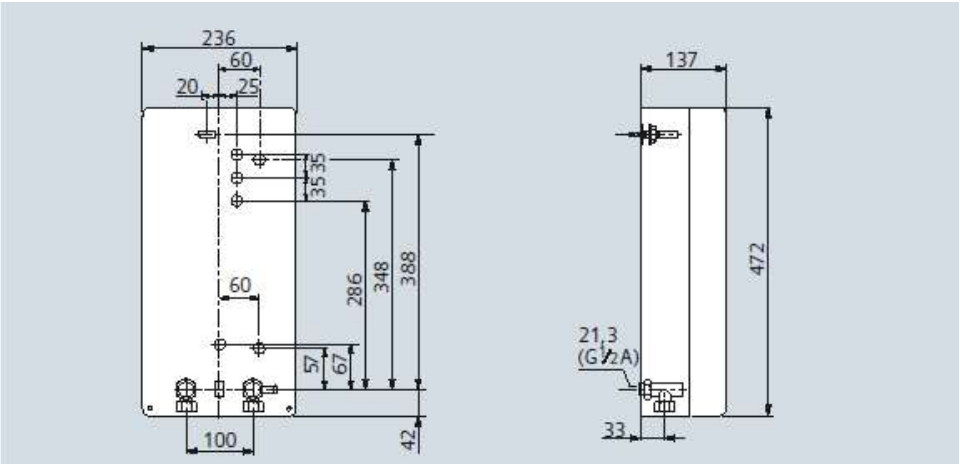
TRONIC 1100

EWI - Electric Water Instantaneous
Multiple point of use

TR1100
21/24 B

EWI - Electric Water Instantaneous
Mechanical range Dimensions

TR 1100 B



EWI - Electric Water Instantaneous

Multiple point of use – tubular heating element version

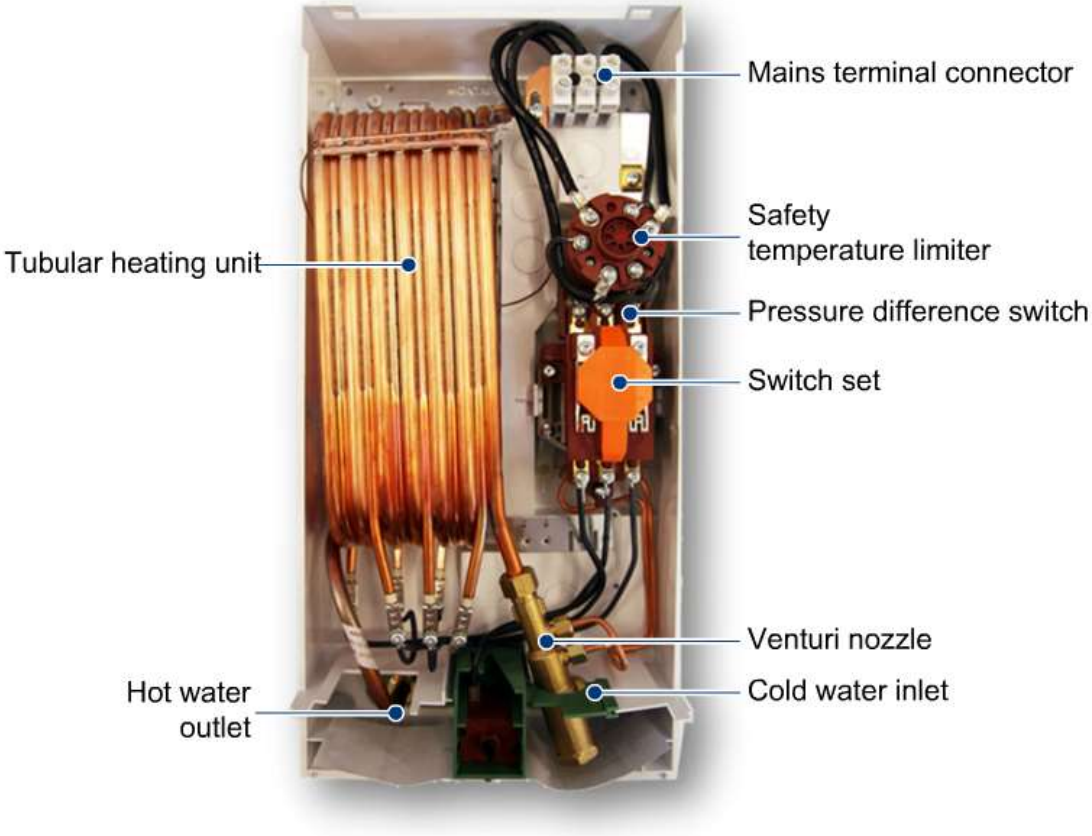
TR1100 18 B
TR1100 21 B

TR1000/1100 series	*18 kW*	*21 kW*
Nominal power (kW)	18	21
Voltage (V)/Frequency (Hz)	400	400
Power (A)	32	32
Plug type	Fixed connection	Fixed connection
International protection	IP 25	IP 25
Fitting connections (inches)	1/2	1/2
Dimensions H x W x T (mm)	472 x 236 x 137	472 x 236 x 137
Weight (kg)	5.0	5.0

EWI - Electric Water Instantaneous

Multiple point of use

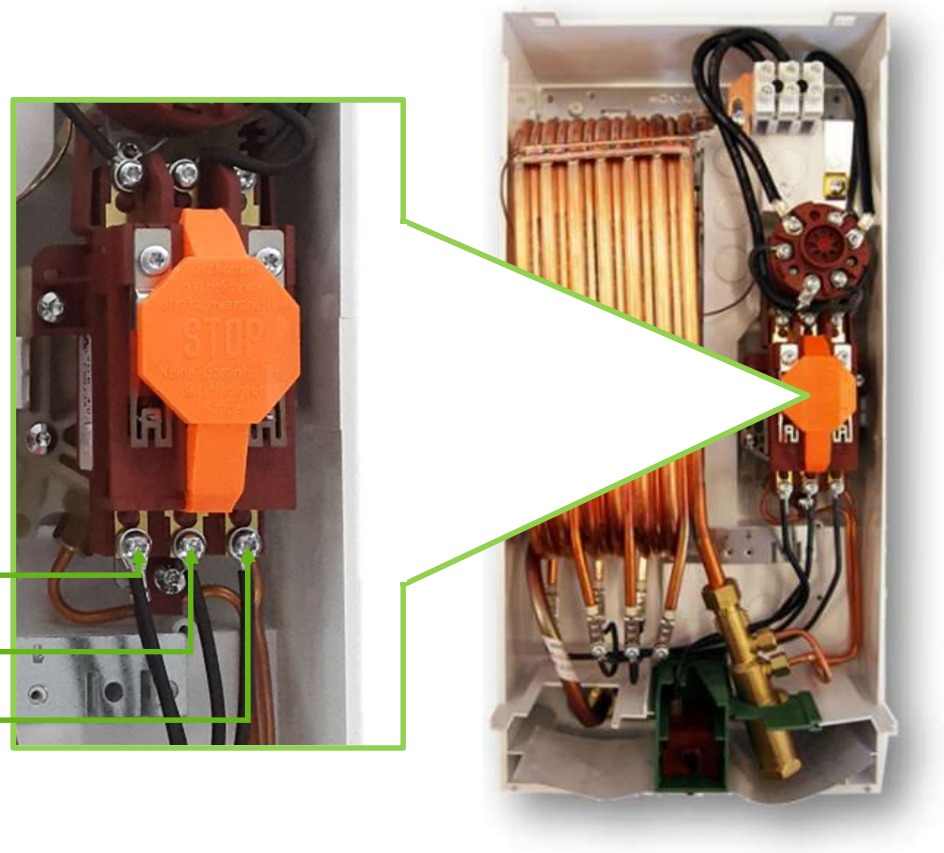
- Cold water flows via the cold water inlet through the venturi nozzle
- Venturi nozzle generates a pressure difference in the pressure differential switch, which activates the switch set
- Depending on the flow rate, the switch set to level 1 or 2
- Water is heated in the tubular heating unit and flows to the valve via the hot water outlet
- Safety temperature limiter prevents the water from overheating and thus damaging the appliance it the installation
- Mains terminal connector for connecting the appliance to the mains electricity supply



EWI - Electric Water Instantaneous
Multiple point of use

- Tri-phase connection

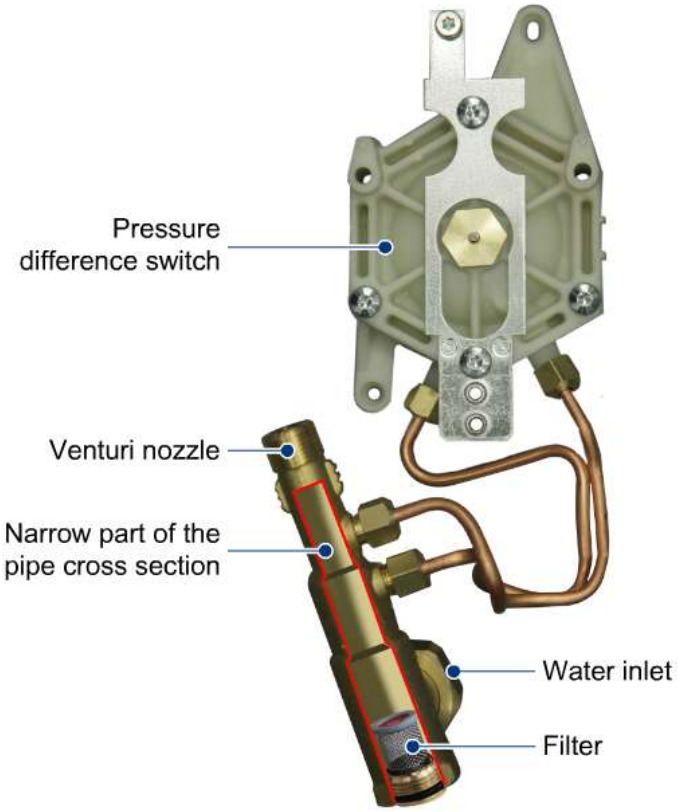
Cable	Voltage
1	400 V
2	400 V
3	400 V



EWI - Electric Water Instantaneous
Multiple point of use

- Heating is activated via venturi nozzle, pressure difference switch and switch set
- Venturi nozzle: Pipe with a section which has a narrow section
    - Higher flow speed at the narrow section
    - Different static pressures before and directly at the narrow section
- Different static pressures are detected by the pressure difference switch

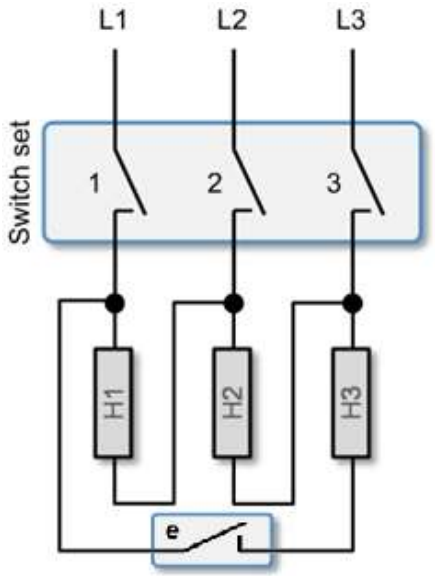
TR 1000 & 1100 series	*18 kW*	*21 kW*
Nominal Power (kW)	18	21
Switch-on flow (l/min)	4.0	4.5
How water output 12°C to 38°C (l/min)	9.9	11.6
How water output 12°C to 60°C (l/min)	5.4	6.3
Temperature inlet water (°C)	4 to 25	4 to 25

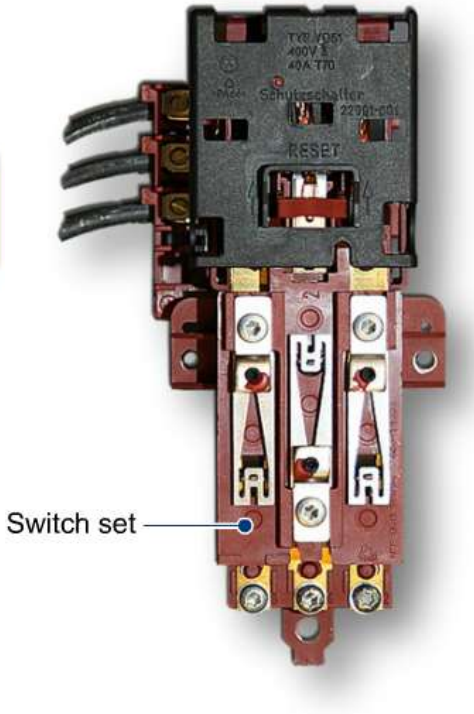


EWI - Electric Water Instantaneous
Multiple point of use

- The switch set activates or deactivates the heating elements H1 to H3 of the heating unit in two levels

Model	*18 kW*	*21 kW*
Level 1 (eco mode)	6+1.5 = **7.5 kW**	7+ 1.75 = **8.75 kW**
Level 2 (eco mode)	6 + 6 = **12 kW**	7 + 7 = **14 kW**
Level 1 (full mode)	6+1.5+1.5 = **9 kW**	7+1.75+1.75= **10.5 kW**
Level 2 (full mode)	6 + 6 + 6 = **18 kW**	7 + 7 + 7 = **21 kW**



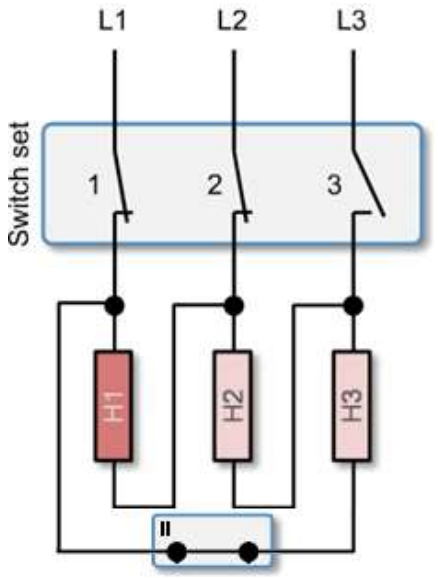


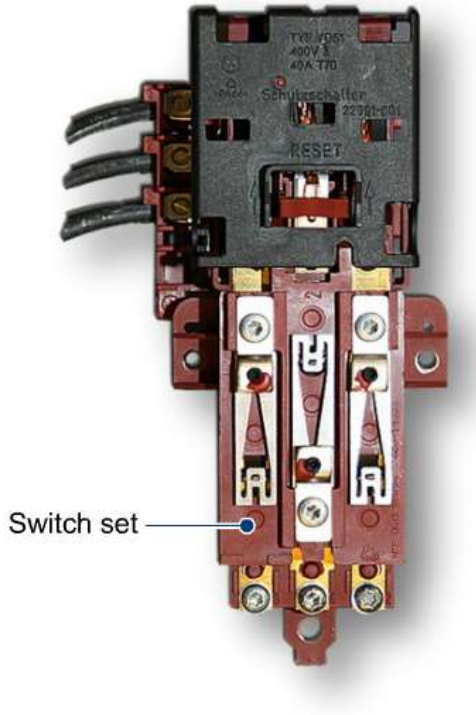
EWI - Electric Water Instantaneous
Multiple point of use

- Example: an appliance of 24 kW has 3 heating elements, each with and output of 8 kW at 400 V~

- **Turning to Level 1** (full mode), switches path 1 and 2, resulting:
  - Heating element 1: 8 kW (100%)
  - Heating element 2: 2 kW (25%)
  - Heating element 3: 2 kW (25%)

    → Appliance output: **12kW = 50%**





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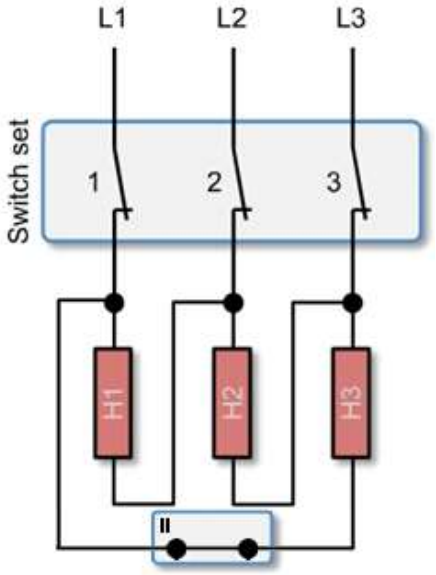
- Example: an appliance of 24 kW has 3 heating elements, each with and output of 8 kW at 400 V~

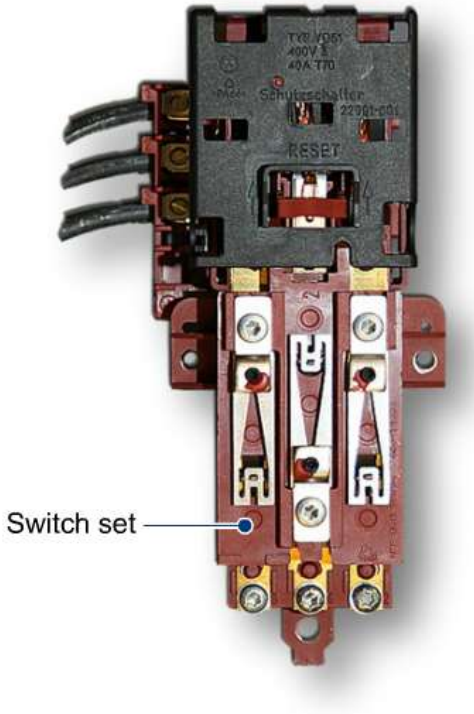
- **Turning to Level 1** (full mode), switches path 1 and 2, resulting:
  - Heating element 1: 8 kW (100%)
  - Heating element 2: 2 kW (25%)
  - Heating element 3: 2 kW (25%)

    → Appliance output: **12kW = 50%**

- **Turning to Level 2** (full mode), switches al the paths, resulting:
  - Heating element 1: 8 kW (100%)
  - Heating element 2: 8 kW (100%)
  - Heating element 3: 8 kW (100%)

    → Appliance output: **24kW = 100%**

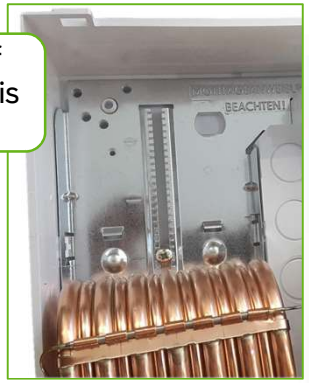


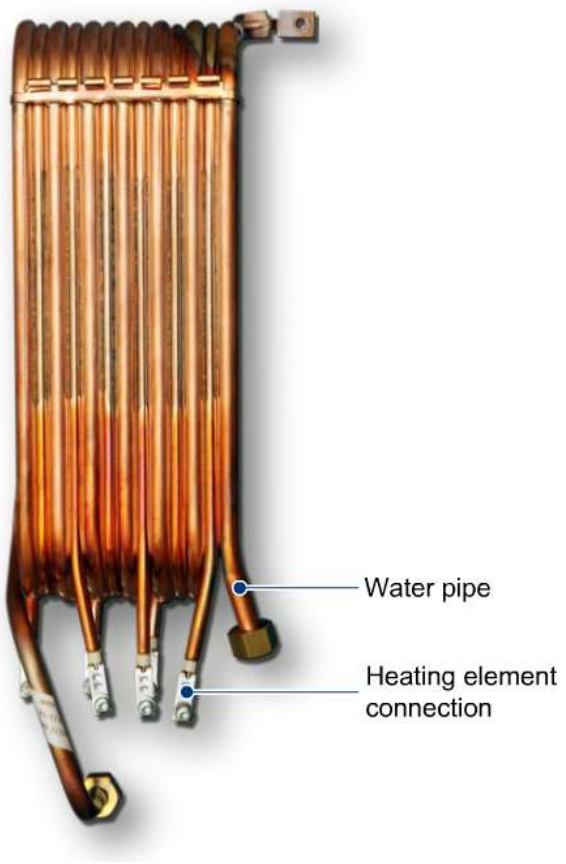


EWI - Electric Water Instantaneous
Multiple point of use

- Copper tubular heating unit
- One heating unit comprises up to three heating elements
- Heating elements are soldered onto water-carrying pipe and insulated against water
- The copper body need to be heated before the water can be heated
- Copper has a high thermal conductivity and rapidly transfers the heat to the water
- Heating elements are operated at 400V~, with the exception of appliances with a 230V~ main connection

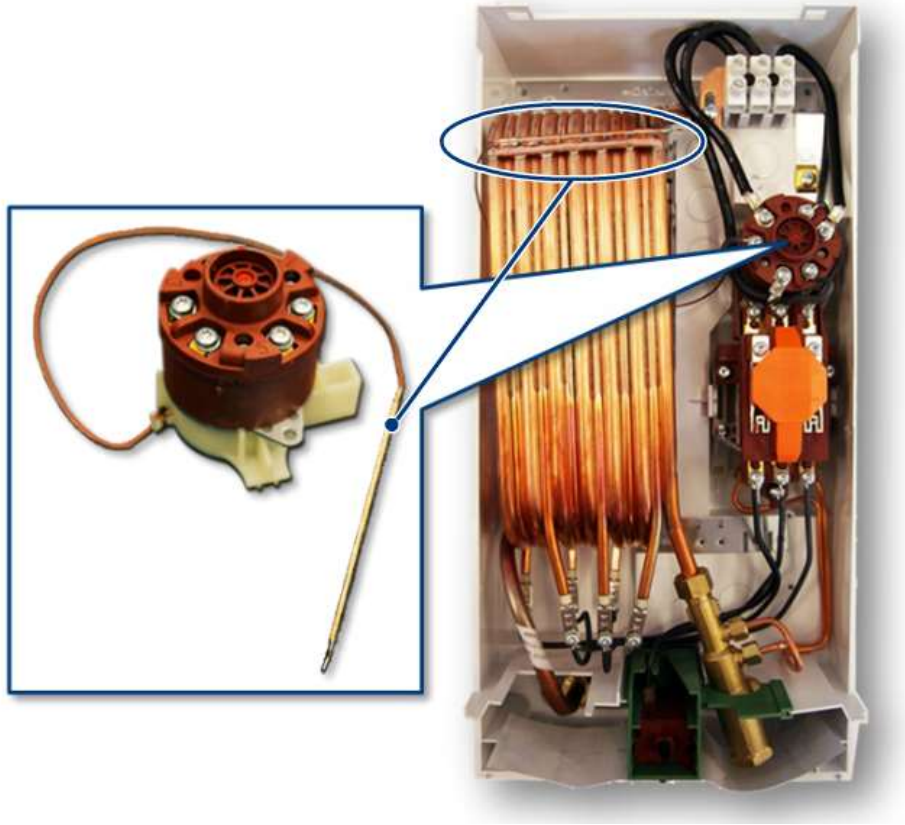
The position of the heating unit is adjustable





EWI - Electric Water Instantaneous
Multiple point of use

- Safety temperature limiter (140 °C) with temperature sensor soldered to the heatin
- Prevents the appliance and surrounding area from being damaged due to overhea
- Deactivates the elements in an emergency



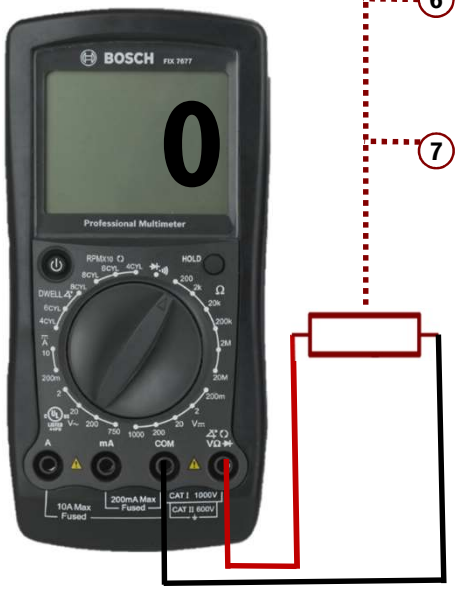
Caution:

If the safety temperature limiter has been triggered:

- Clear the cause
- De-energise the appliance and switch-on the safety temperature limiter manually

EWI - Electric Water Instantaneous
Continuity values

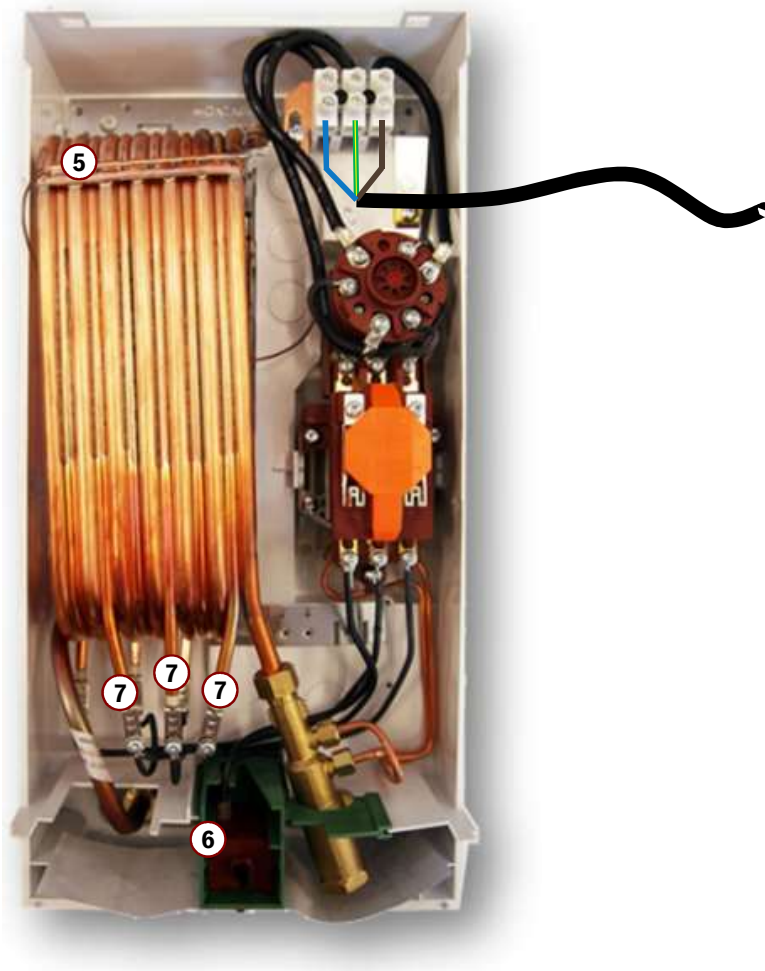
Green: component is ok
Red : component not ok



5 Temperature sensor
If continuity = **0** = contacts normally closed = continuity ok.
If continuity = 1 = contact open = no continuity.

6 Power switch
If continuity = **1** = contacts normally open = no continuity.
If continuity = 0 = contact closed = there is continuity.

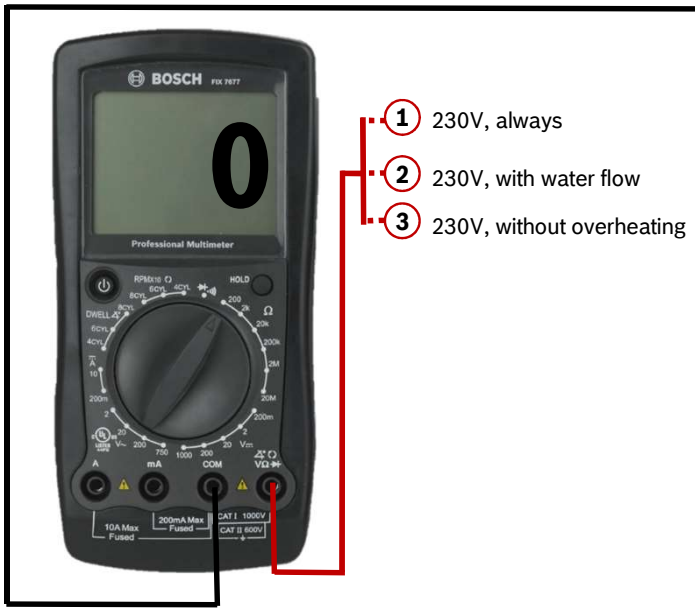
7 Heating element
If continuity = **0** = heating element ok (not interrupted)
* Measure ohmic value (Ω)
If continuity = 1 = contact open = no continuity (heating element damaged)

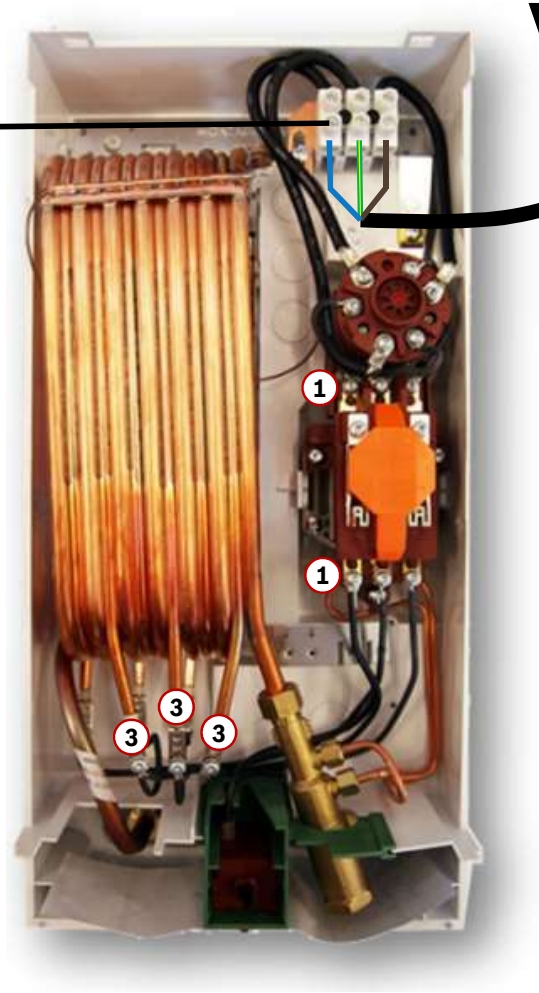


EWI - Electric Water Instantaneous

Voltage values

- Water flow: **ON/OFF**
- Energy supply: **ON**



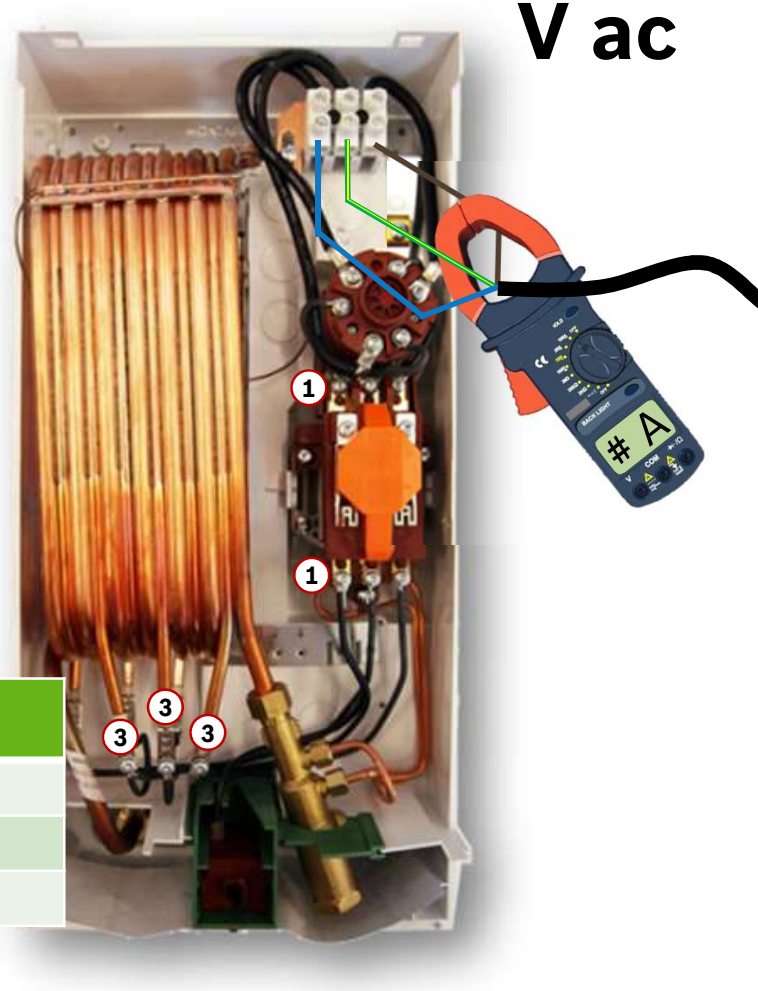


EWI - Electric Water Instantaneous
Consumption values

- Water flow: **ON**
- Energy supply: **ON**

✓ Use a clamp ammeter on the phase cable

- Keep the water turned off:
  - If value = 0, there is no consumption. The appliance is turn off.
  - If value = # , the value represents the electric consumption in Amperes. There is a problem.
- Turn ON the water:
  - If value = 0, there is no consumption. The appliance is turn off. Something is not working.
  - If value = # , the value represents the electric consumption in Amperes.



DHR series	*DH12103*	*DH18100*	*DH21100*	*DH24100*
Voltage (V)	12	18	21	24
Frequency (Hz)	380-400	400	400	400
Power (A)	20	32	32	40