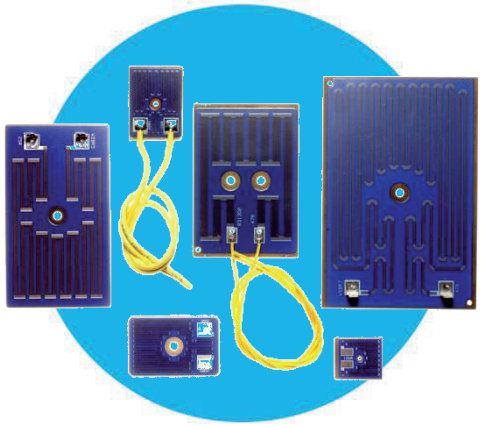
Ultra Low Profile Steel Heaters

WSHR Series

- Ultra low profile conduction heater
- 400°C continuous operating temperature
- Uniform temperature distribution
- Low thermal mass for rapid dynamic response
- Ideal for chemical & food process, sealing & printing, scientific & medical thermal control applications
- Single fixing mountable with three termination options
- RoHS compliant, non-flammable construction



All parts are Pb-free and comply with EU Directive 2011/65/EU amended by (EU) 2015/863 (RoHS3)

Electrical & Thermal Data

Size Code	Approx. Size (mm)	Rating Code	Rated Voltage (Vrms)	Power ±10% (W)	Power Density ±10% (W/cm²)	Nominal Resistance ±10% (Ω)	Dielectric Voltage (V dc or ac peak)
1/2	32 X 28	47RK	120	306	34.2	47	2500
		100RK	120	144	16.1	100	
1	49 x 36	22RK	120	655	37.1	22	
		47RK	120	306	17.4	47	
		100RK	240	576	32.7	100	
		150RK	240	384	21.8	150	
2	61 x 41	22RK	120	655	26.2	22	
		47RK	120	306	12.3	47	
		100RK	240	576	23.0	100	
		150RK	240	384	15.4	150	
3	102 x 70	22RK	120	655	9.2	22	
		47RK	120	306	4.3	47	
		100RK	240	576	8.1	100	
		150RK	240	384	5.4	150	
5	122 x 70	22RK	120	655	7.7	22	
		47RK	120	306	3.6	47	
		100RK	240	576	6.7	100	
		150RK	240	384	4.5	150	
7	152 x 102	47RK	240	1226	7.9	47	
		100RK	240	576	3.7	100	
		150RK	240	384	2.5	150	

The internal thermal impedance between the resistive glaze element and the heatsink-facing surface is <0.15°C/W for all sizes.
The heat capacities and thermal time constants for each size are as follows:

Size Code	Heat Capacity, typical (J/K)	Thermal Time Constant, typical, cooling unmounted in still air (s)
½	2.9	75
1	5.3	125
2	7.3	175
3	22	220
5	44	280
7	80	420

General Note

TT Electronics reserves the right to make changes in product specification without notice or liability.
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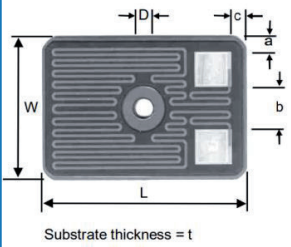
Physical Data

Dimensions in mm, weight without terminations in g								
	L ±0.1	W ±0.1	t ±0.1	ØD nom	a nom	b nom	c nom	Wt. nom
WSHR1/2	31.9	28.1	0.9	2.2	7.5	3.1	4.3	6.5
WSHR1	49.3	35.9		3.2	3.2	11.2	6.2	12.6
WSHR2	61	40.6		5.3	4.7	13.0	5.8	17.1
WSHR3	101.6	70			13.5	22.0	10.2	50.8
WSHR5	122	70	1.5		14.0	23.8	7.4	101.2
WSHR7	152.4	101.6			15.0	51.3	9.2	181.8

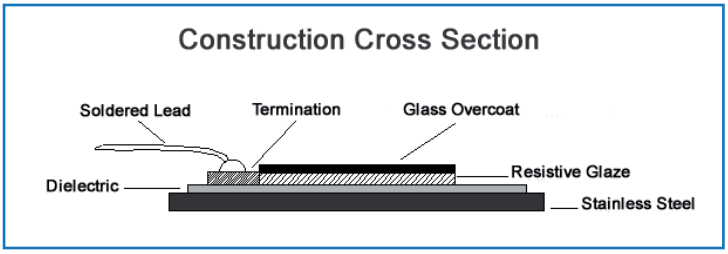


Fixing hole is located centrally except on WSHR1/2 where the dimension from the edge by the terminations to the mounting hole centre is 16.68mm.

In addition to the central fixing hole, WSHR7 has two corner holes. These are present for manufacturing purposes only and should not be used as fixing holes.

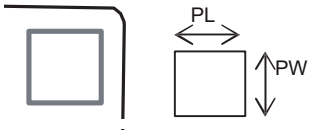
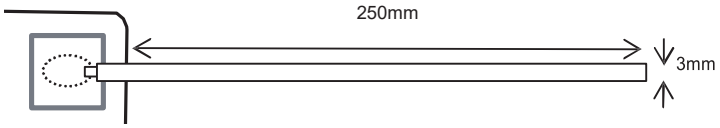
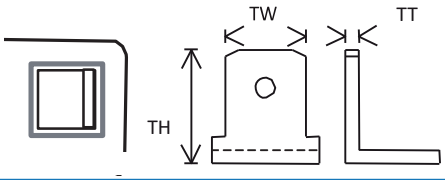
Construction

A high integrity dielectric layer is applied to a machined stainless steel substrate. Thick-film conductor and element patterns are printed and fired, then protected with a high temperature overglaze. The termination pads are tinned with Pb-free solder and optional terminals or leads are soldered on.



Terminations

The following termination options are available

Option	Code	Nominal Dimensions (mm)
Solder pad only	I	
Flying leads UL3134/5 40A, 600V	L	
Push-on connectors	T	

WSHR Size	½	1, 2, 3, 5 & 7
Pad Length, PL	7.5	9.0
Pad Width, PW	4.5	9.0

WSHR Size	½	1, 2, 3, 5 & 7
Terminal Height, TH	7.5	12
Terminal Width, TW	2.8	6.3
Terminal Thickness, TT	0.8	0.8

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Application Notes

For optimum thermal transfer to the heated surface, sufficient thermal grease (e.g. Dow Corning DC340) to give void-free coverage, or a 0.5mm thick compliant thermal pad (e.g. T Global TG-X) should be used. The heated surface should have a finish of <6.3µm with flatness of <0.05mm. The heater should be mounted using an appropriate bolt as listed in the table below. This should be tightened so as to bring the whole area of the steel substrate into intimate contact with the heatsink. The unmounted part is slightly bowed so that the centre is above the edges. Inadequate tightening will leave the centre out of contact with the heatsink, whilst over tightening can cause the edges to rise. The tightening torque required will depend on the fixings and heatsink used, but typical figures are given for guidance.

	Bolt Size	Typical Tightening Torque (Nm)
WSHR1/2	M2	0.6
WSHR1	M3	2
WSHR2	M5	2.5
WSHR3	M5	2.5
WSHR5	M5	3.5
WSHR7	M5	4

WSHR heaters will fail safe (open circuit) under overload fault conditions and still maintain a 1kV dielectric withstand.

WSHR heaters may be customised in various ways including:

- Alternative shapes and dimensions up to 406mm x 406mm
- Non-uniform thermal profiles
- Integration of temperature measurement or regulation elements
- Alternative voltage and power ratings

Ordering Procedure

Example: WSHR2-100RKLW (WSHR in 61 x 41mm size and 576W at 240V rating with flying leads, Pb-free)

W	S	H	R	2			-	1	0	0	R	K	L	W
1				2				3					4	5

1 Series	2 Size	3 Rating	4 Termination		5 Packing		
WSHR	1/2	22RK	I	Solder pad only	W	1/2-I	Bulk	180/box
	1	47RK	L	Flying leads		1/2-T		64/box
	2	100RK	T	Push-on connectors		1/2-L, 1-L, 2-L, 3-I, 3-T, 5-I, 5-T		40/box
	3	150RK				1-I, 2-I		100/box
	5					1-T, 2-T		80/box
	7					3-L, 5-L, 7		20/box

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