

# Requirements for THR Components

#### **THR Components**

Components suitable for THR process must withstand higher temperatures than for standard wave soldering. Therefore, WAGO THR components are made from high-temperature-resistant material and designed to provide optimal heat supply to the soldering point. These components have a suction area for automated pick-and-place assembly and are also available in tape-and-reel packaging. Therefore, WAGO THR components can be fully integrated into SMT manufacturing processes for greater cost savings.

#### **Materials**

Plastic material for THR components must resist a maximum peak temperature of 260°C for 10s (temperature profile acc. to DIN EN 61760-1) and match the PCB base material's coefficient of thermal expansion (CTE) to prevent warpage of both component and PCB. WAGO PCB terminal blocks and connectors are molded of glass fiber-reinforced insulation plastic capable of withstanding temperatures up to 260°C. The selected material has the required elasticity and provides high dimensional stability for the entire range of pin spacing. It is therefore ideal for both lead-free and two-time reflow soldering processes.

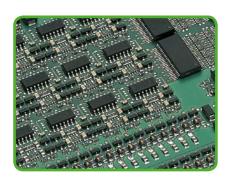
#### Design

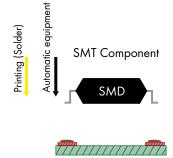
The streamlined design (length) of THR component pins prevents the solder paste from being extruded during assembly. This may impair the ability of the paste to reflow properly. The free space around the solder pins ensures optimal heat flow to the solder joint, providing yielding an excellent bond. Stand-offs or ribs on both left and right sides of the pin prevent the insulation body of the components and the solder paste from coming into contact with each other.

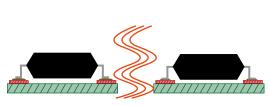
### Surface Mount Technology (SMT)

Surface Mount Technology (SMT) means SMT assembly is performed using fully soldering electronic components directly onto PCB surface pads without drilling holes. The basic SMT process consists of applying solder paste to the PCB via solder dispensing equipment, screen or stencil printing.

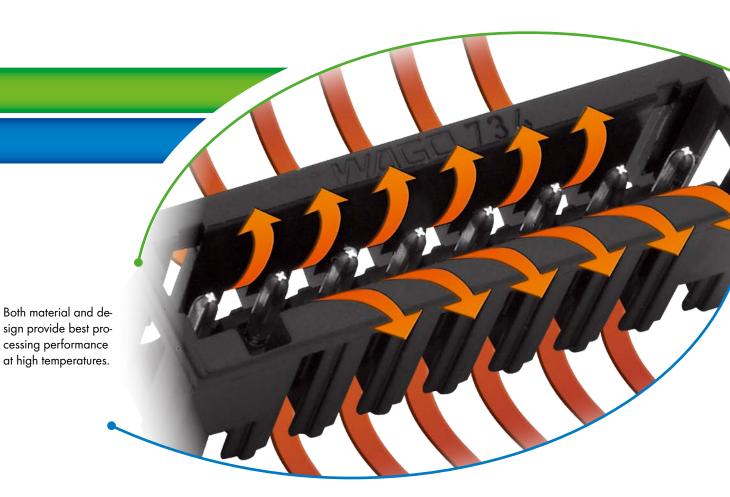
automated placement machines. The SMD components are soldered to the board in infrared (IR), convection or vapor phase ovens.



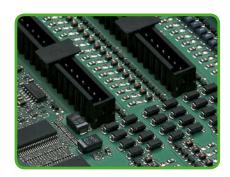






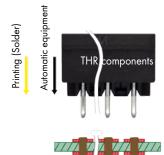


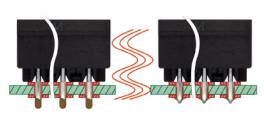
### Through-Hole Reflow (THR)



Mechanically stressed THR components, like PCB terminal blocks and connectors, are placed into metal-plated holes filled with solder paste. They can then be soldered along with SMD components using the time-saving and cost-effective reflow soldering process.

WAGO THR components are specifically designed to allow fully automated assembly and withstand high reflow oven temperatures.





THR

# THR - Male and Female Headers

2.5 mm	3.5	3.81 mm			
Nale headers with straight solder ins	Male headers with straight solder pins	Male headers with angled solder pins	Male headers with straight solder pins		
		3,475			
CS-MICRO, 733 Series 00 V/2.5 kV/2 6 A	MCS-MINI, 734 Series 160 V/2.5 kV/2 10 A	MCS-MINI, 734 Series 160 V/2.5 kV/2 10 A	MCS-MINI, 734 Series 160 V/2.5 kV/2 10 A		
ale headers with angled solder s	Male headers with straight solder pins	Male headers with angled solder pins	Male headers with angled solder pins		
THE PARTY OF THE P	THE PERSON NAMED IN COLUMN TO PE		7.555		
CS-MICRO, 733 Series 0 V/2.5 kV/2 6 A	MCS-MINI HD, 713 Series 160 V/2.5 kV/2 10 A	MCS-MINI HD, 713 Series 160 V/2.5 kV/2 10 A	MCS-MINI, 734 Series 160 V/2.5 kV/2 10 A		
0 1/2.3 10/2 0 A	Male headers with straight solder pins and levers	Male headers with angled solder pins and levers	100 4/2.5 k4/2 10 A		
	111111111				
	MCS-MINI HD, 713 Series 160 V/2.5 kV/2 10 A	MCS-MINI HD, 713 Series 160 V/2.5 kV/2 10 A			
	Male headers with straight solder pins and threaded flanges	Male headers with angled solder pins and threaded flanges			
	MCS-MINI HD, 713 Series 160 V/2.5 kV/2 10 A	MCS-MINI HD, 713 Series 160 V/2.5 kV/2 10 A			
	Male headers with straight solder pins	Male headers with angled solder pins			
	picoMAX®, 2091 Series 160 V/2.5 kV/2 10 A	picoMAX®, 2091 Series 160 V/2.5 kV/2 10 A			
	Male headers with straight solder pins and fixing flanges	Male headers with angled solder pins and fixing flanges			
	picoMAX®, 2091 Series	picoMAX®, 2091 Series			
	160 V/2.5 kV/2 10 A  Female headers with straight solder pins	160 V/2.5 kV/2 10 A  Female headers with angled solder pins			
		******			
	picoMAX®, 2091 Series	picoMAX®, 2091 Series			
	160 V/2.5 kV/2 10 A	160 V/2.5 kV/2 10 A			

Male headers w pins 1 x 1 mm

MCS-MIDI Class 320 V/4 kV/2 Male headers w pins 1.2 x 1.2 m

MCS-MIDI Clas 320 V/4 kV/2

Male headers w

picoMAX®, 200 320 V/4 kV/2 Male headers w pins and fixing fl

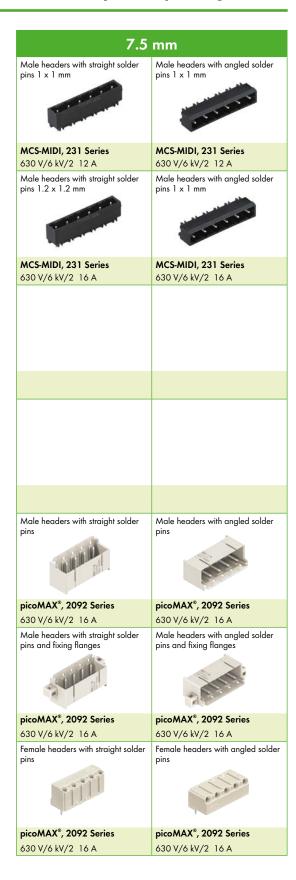
picoMAX®, 200 320 V/4 kV/2 Female headers

picoMAX<sup>®</sup>, 200 320 V/4 kV/2

### - Product Overview Sorted by Pin Spacing -

<b>5</b> n	nm
th straight solder	Male headers with angled solder pins 1 x 1 mm
	1555
sic, <b>231 S</b> eries	MCS-MIDI, 231 Series 320 V/4 kV/2 12 A
th straight solder n	Male headers with angled solder pins 1.2 x 1.2 mm
	1555
sic, <b>231 S</b> eries 12 A	MCS-MIDI, 231 Series 320 V/4 kV/2 12 A
th straight solder	Male headers with angled solder pins
	N. P. S.
<b>2 Series</b> 16 A	picoMAX®, 2092 Series 320 V/4 kV/2 16 A
th straight solder anges	Male headers with angled solder pins and fixing flanges
	A STATE OF
<b>2 Series</b> 16 A	<b>picoMAX®, 2092 Series</b> 320 V/4 kV/2 16 A
with straight solder	Female headers with angled solder pins
	acces.
2 Series	picoMAX®, 2092 Series
16 A	320 V/4 kV/2 16 A

16 A



## THR - Terminal

0.2

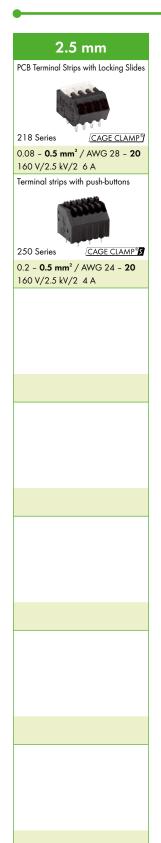
208

0.2

320 anc

0.2

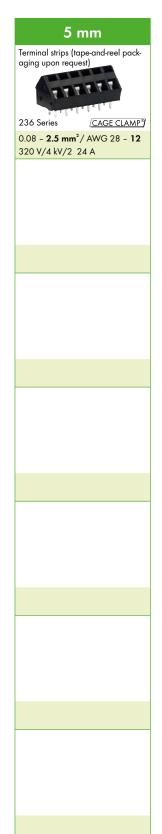
320 803





## Strips

# 3.5 mm ninal strips with push-buttons I straight, staggered solder pins CAGE CLAMP® 31 Series - 1.5 mm<sup>2</sup> / AWG 24 - 16 ) V/4 kV/2 17.5 A ninal strips with push-buttons l angled, staggered solder pins 31 Series CAGE CLAMP®S - 1.5 mm<sup>2</sup> / AWG 24 - 16 V/4 kV/2 17.5 A ninal strips with push-buttons l angled, in-line solder pins 31 Series CAGE CLAMP®S - 1.5 mm<sup>2</sup> / AWG 24 - 16 V/2.5 kV/2 17.5 A ninal strips with push-buttons ) Series CAGE CLAMP®S - 1.5 mm² / AWG 24 - 16 ) V/4 kV/2 8 A Series CAGE CLAMP® - 1.5 mm<sup>2</sup> / AWG 24 - 16 5-306/200-604

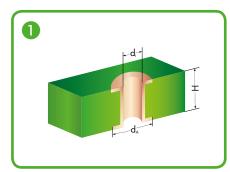


## SMD - Terminal Strips

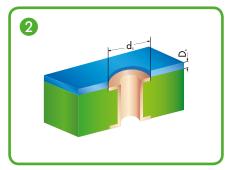
4 mm	8 mm
SMD terminal strips with push-	SMD terminal strips with push-
2060 Series CAGE CLAMP®	buttons  2060 Series  CAGE CLAMP®
0.2 - <b>0.75</b> mm <sup>2</sup> / AWG 24 - <b>18</b> 160 V/2.5 kV/2 9 A	0.2 - <b>0.75 mm²</b> / AWG 24 - <b>18</b> 630 V/6 kV/2 9 A
100 1/2.5 11/2 7 /	030 170 1877 2 7 7



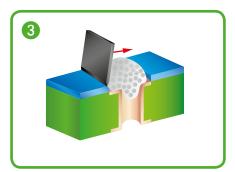
# THR PCB Layout Parameters



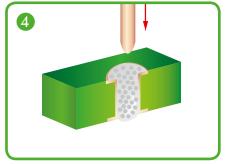
Metal-plated PCB bore hole



SMD positioning pattern



Solder paste application

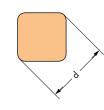


Component assembly, automatic/by hand

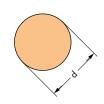
Series	d <sub>i</sub> (mm)	d <sub>A</sub> (mm)	H(mm)	d <sub>s</sub> (mm)	D <sub>s</sub> (μm)	d(mm)	L(mm)
218	1.1+0,1	1.9	< 2	1.8	150	0.9	2.8
231 (1 x 1 mm)	1.4+0,1	2.5	< 2	2.4	150	1.2	2.4
231 (1.2 x 1.2 mm)	1.7+0,1	2.8	< 2	2.7	150	1.5	2.4
236	1.1+0,1	2.2	< 2	2.1	150	0.9	3.6
250	1.1+0,1	2.0	< 2	1.9	150	0.9	3.6
713	1.2+0,1	1.9	< 2	1.8	150	1.0	2.4
733	1.2+0,1	1.9	< 2	1.8	150	1.0	2.4
734	1.4+0,1	2.5	< 2	2.4	150	1.2	2.4
2081	1.1+0,1	2.0	< 2	1.9	150	0.9	3.6
2091 (Male Headers)	1.2+0,1	1.9	< 2	1.8	150	1.0	2.4
2091 (Female Headers)	1.2+0,1	1.9	< 2	1.8	150	0.85	2.4
2092 (Male Headers)	1.6+0,1	2.3	< 2	2.2	150	1.4 🔘	2.4
2092 (Female Headers)	1.5+0,1	2.2	< 2	2.1	150	1.36	2.4

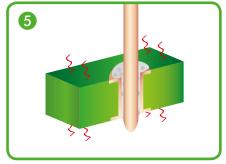
- d<sub>i</sub>: Inner diameter of metal-plated PCB bore hole
- d<sub>A</sub>: Outer diameter of metal-plated PCB hole\*
- H: PCB thickness
- d<sub>s</sub>: Pattern hole diameter
- Ds: Pattern thickness
- d: Pin diagonal/diameter
- L: Pin length
- \*When laying out the metal-plated bore holes, the clearance and creepage distance requirements as specified in the equipment standards must be considered.

Solder pin design:

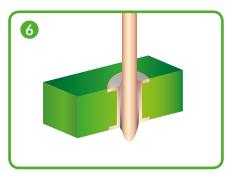








Reflow soldering process



THR soldering joint

THR products in tape-and-reel packaging acc. to IEC 60286-3

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