

Date: September 20, 2020

Dear Sir/Madam,

Re: Letter of Similarity

We, T&R BIOFAB CO.,LTD declare the differences for between original model and variant models.

-Product: THERMOCARE

-Model name: MT-3000

-Variant Model name: MT-4000

1. Temperature sensor by model

Model	Temperature Sensor
MT-3000	Tempus TU04
MT-4000	Winsen MRT 311

2. Differences by sensor

Characteristic	Tempus TU04	Winsen MRT 311
Chip Size	1.1 x 1.1 (mm ²)	
Sensitive Area	0.35 x 0.35 (mm ²)	
Thermopile resistance	Min. : 70kΩ Typ. : 95kΩ Max. : 120kΩ (at 25°C)	90±30 KΩ (at 25°C)
Noise Voltage	38 nV/Hz ^{1/2} (at 25°C)	
Noise equivalent power	0.23 nW/Hz ^{1/2} (Blackbody=500k, 1Hz@25°C)	
Responsivity	Min. : 120 V/W Typ. : 164 V/W Max. : 210 V/W (Blackbody=500k, 1Hz@25°C)	160±40 V/W (Blackbody=500k, 1Hz@25°C)
Temperature coefficient of resistance	0.06 %/°C (25°C~75°C)	
Time constant	≤13 ms	
Specific Detectivity	1.51 x 10 ⁸ cmHz ^{1/2} /W (Blackbody=500k, 1Hz@25°C)	
Thermistor resistance	100 ± 3% KΩ (at 25°C)	100 ± 1% KΩ (at 25°C)
Thermistor BETA-value	3950 ± 1% K (25°C/50°C)	

3. Conclusion

Tempus TU04 and Winsen MRT311 have similar main characteristics of temperature sensor, and slight differences are corrected through temperature correction software, so the same performance can be expected.

Sincerely Yours,



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