

# SUNON

## SPECIFICATION FOR APPROVAL

**CUSTOMER** : PHI-CM-D99H110  
**MODEL NO** : SM203-13002  
**DESCRIPTION** : Thermal Module  
**DIMENSIONS** : D99X110mm  
**SUNON SPEC. NO.** : C02003060F-00  
**CUSTOMER APPROVAL NO.** :  
**APPROVED BY CUSTOMER** :  
(AUTHORIZED)

<b>DRAWN</b>  Qian 08/07	<b>CHECKED</b>  Cloud	<b>APPROVED</b>  Amy	<b>SPEC. NO</b>	C02003060F-00
			<b>ISSUED DATE</b>	04. 24. 2014
			<b>EDITION</b>	1
			<b>REVISION DATE</b>	08. 07. 2014

建準電機工業股份有限公司

SUNONWEALTH ELECTRIC MACHINE INDUSTRY CO., LTD.

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# SPECIFICATION FOR APPROVAL

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**MODEL : SM203-13002****1.SPECIFICATIONS**

1. Application	Input chipset CPU=24W
2. Heat Sink Dimension	80*60*21 HF
3. Heat Sink Material	ADC10
4. Cooling Method	N/A
5. Thermal Grease / PAD	N/A
6. Fan Dimension	N/A
7. Fan Speed (with Heat Sink)	N/A
8. Fan Airflow ( with Heat Sink )	N/A
9. Fan Rating Voltage	N/A
10. Fan Rating Current ( with Heat Sink )	N/A
11. Fan Power Consumption ( with Heat Sink )	N/A
12. Fan Bearing Type	N/A
13. Fan Connector	N/A
14. Cooling Module Noise	N/A
15. Fan Operating Voltage Range	N/A
16. Operating Temperature	-10 to + 70 deg. C
17. Storage Temperature	-40 to + 70 deg. C
18. Weight	210g
19. Life Expectance	N/A

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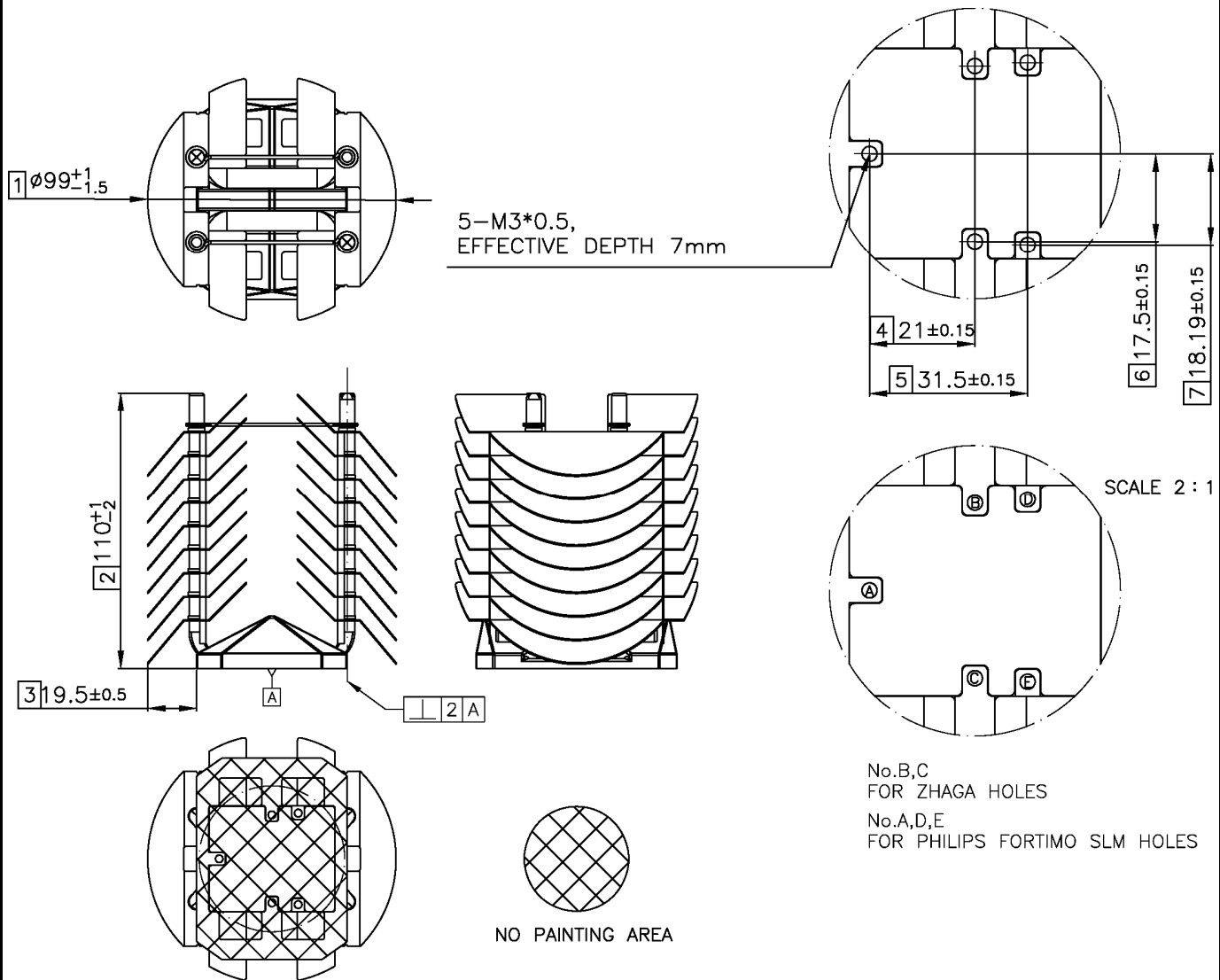
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2.DIMENSION



UNIT: mm

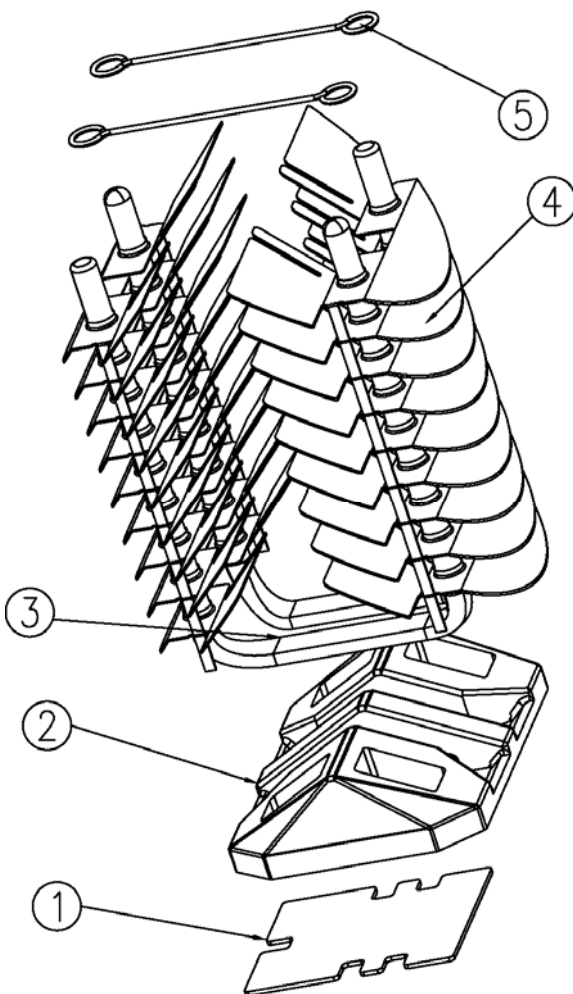
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2.DIMENSION



5	CLIP	A206015470F	68.6*8.6*ø1.2 HF	2
4	FIN	A212024920F	D99*109 HF	1
3	HEAT PIPE	A208012390F	D6*268.5*3.0t HF	2
2	DIE CASTING	A212024630F	80*60*21 HF	1
1	COPPER PLATE	A213003220F	50*42*1.0t HF	1
ITEM	NAME	PART No.	SPECIFICATION	QTY

PART DETAIL LIST

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# 3.FAI & CPK TEST

## 1.FAI TEST

FAI DATA SHEET

Part Number :	PHI-CH_099H110	Supplier :		Date:	2014/4/22	New:	
Part Description :		ISR No :		Cavity / Tool # :		Revised:	
Revision :		Material Spec:		Inspector:		Resubmission:	

MDI -Method of inspection abbreviation: HG = Height gauge, MIC = Micrometer, DC = Dial Caliper, P = Protractor, OC = Optical Comparator, CG = Checking Gauge, CMM = Coordinate Measuring Machine,

OEM = Optical Coordinate Measuring Machine, HT = Hardness Tester, TG = Thickness Gauge, VIS = Visual, PG = Plug Gauge,

ITEM	DRAWING LOCATION	NOMINAL	+TOL	-TOL	Sample Number				Deviation from Nominal				Mean	% Tolerance		Accept/Reject		Inspection Method	Supplier Remarks
					1	2	3	4	1	2	3	4		UPPER	LOWER	HIGH	LOW		
					1	99.000	1.000	1.500	98.585	98.492	98.385	98.325		-0.415	-0.508	-0.615	-0.675		
2	110.000	1.000	2.000	110.218	110.251	110.154	110.028	0.218	0.251	0.154	0.028	110.208	25%	0%	Accept	Accept	CMM		
3	19.500	0.500	0.500	19.512	19.546	19.628	19.635	0.012	0.046	0.128	0.135	19.562	26%	0%	Accept	Accept	CMM		
4	21.000	0.150	0.150	21.024	21.035	21.012	21.052	0.024	0.035	0.012	0.052	21.024	23%	0%	Accept	Accept	CMM		
5	31.500	0.150	0.150	31.521	31.546	31.535	31.542	0.021	0.046	0.035	0.042	31.534	31%	0%	Accept	Accept	CMM		
6	17.500	0.150	0.150	17.512	17.564	17.523	17.542	0.012	0.064	0.023	0.042	17.532	43%	0%	Accept	Accept	CMM		
7	18.190	0.150	0.150	18.165	18.198	18.232	18.210	-0.025	0.008	0.042	0.020	18.198	28%	17%	Accept	Accept	CMM		

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### 3.FAI & CPK TEST

#### 2.CPK TEST

Model: SM203-13002 (PHI-CM\_D99H110)

Trial production date: 2014/3/27

No	1	2	3
(Item)	The distance between copper sheet and tail end of heat pipe	The distance between copper sheet and the edge of fins	CPU thermal resistance
Central value	110.000	19.500	
USL	111.000	20.000	0.47
LSL	108.000	19.000	
UNIT	mm	mm	°C/W
ave	109.562	19.508	0.451
max	109.850	19.580	0.470
min	109.400	19.420	0.420
1	109.630	19.560	0.460
2	109.520	19.520	0.440
3	109.430	19.570	0.440
4	109.850	19.480	0.470
5	109.440	19.420	0.440
6	109.420	19.560	0.430
7	109.400	19.520	0.440
8	109.580	19.460	0.460
9	109.680	19.480	0.420
10	109.660	19.500	0.430
11	109.720	19.570	0.440
12	109.700	19.510	0.420
13	109.630	19.460	0.430
14	109.510	19.490	0.470
15	109.550	19.480	0.470
16	109.580	19.550	0.470
17	109.480	19.430	0.470
18	109.460	19.580	0.460
19	109.520	19.440	0.470
20	109.570	19.500	0.430
21	109.620	19.570	0.440
22	109.530	19.450	0.440
23	109.520	19.480	0.470
24	109.460	19.430	0.450
25	109.530	19.510	0.450
26	109.490	19.560	0.460
27	109.630	19.580	0.450
28	109.460	19.570	0.460
29	109.410	19.460	0.470
30	109.460	19.450	0.440
31	109.590	19.530	0.440
32	109.580	19.530	0.460
33	109.680	19.550	0.460
34	109.780	19.550	0.470
35	109.610	19.490	0.450

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## 3.FAI &amp; CPK TEST

Quality comprehensive confirmation  
DATA SHEET

Model: SM203-13002 ( PHI-CM\_D99H110 )

No.	Item	Specification	avg	Standard deviation $\sigma$	max	min	Quantity	Process capability		Remarks
								cp	cpk	
1	The distance between copper sheet and tail end of heat pipe	108~111mm	109.562	0.108	109.850	109.400	35	4.617	4.425	
2	The distance between copper sheet and the edge of fins	19~20mm	19.508	0.049	19.580	19.420	35	3.384	3.327	
3	CPU thermal resistance	$\leq 0.47^{\circ}\text{C}/\text{W}$	0.451	0.016	0.470	0.420	35	4.929	0.407	

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## Notes

### I. SPECIFICATION MODIFICATION

1. SUNON offers engineering assistance on module installation and cooling system design.
2. All changes, modifications and/or revisions to the specifications, if any, are incorporated in the attached specifications.
3. No changes, modifications and/or revisions to these specifications are effective absent agreement, by both SUNON and the customer, in writing.
4. This module will be shipped in accordance with the attached specification unless SUNON and the customer have agreed otherwise, in writing, as specified in Paragraph 3, above.

### II. OTHER

1. DO NOT operate this module in proximity to hazardous materials such as organic silicon, cyanogens, formalin, phenol, or corrosive gas environments including, but not limited to, H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, or Cl<sub>2</sub>.
2. Unless otherwise noted, all testing of this module is conducted at 25°C ambient temperature and sixty-five percent (65%) relative humidity.
3. DO NOT store this module in an environment with high humidity. This module must be stored in accordance with the attached specifications regarding storage temperature. If this module is stored for more than 6 months, SUNON recommends functional testing before using.
4. SUNON reserves the right to use components from multiple sources at its discretion. The use of components from other sources will not affect the specifications as described herein.

### III. WARRANTY

This module is warranted against all defects which are proved to be fault in our workmanship and material for one year from the date of our delivery. The sole responsibility under the warranty shall be limited to the repair of the module or the replacement thereof, at SUNON's sole discretion. SUNON will not be responsible for the failures of its module due to improper handing, misuse or the failure to follow specifications or instructions for use. In the event of warranty claim, the customer shall immediately notify SUNON for verification. SUNON will not be responsible for any consequential damage to the customer's equipment as a result of any module proven to be defective.

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## Declaration of Restricted Materials

### Control declaration of environment- related substances/ materials

1. In accordance with the Restriction of Hazardous Substances (RoHS) Directive 2011/65/EU and specific market requirements, SUNON Halogen-Free Product have complied with law and discipline not to employ the forbidden substances, and restrict the allowable concentration of some limited substances deliberately in our components.

No	Substance		Criteria
1	CFCs & HCFCs (ozone depleting substances)		Forbidden
2	Chlorinated Organic Solvent		Forbidden
3	Lead and its compounds	Plastic (Frame, Impeller, wire harness, etc.)	<100ppm
		Solder	<1000ppm
		Steel alloy	<3500ppm
		Aluminium alloy	<4000ppm
		Copper alloy	<4wt%
4	Cadmium and its compounds	Solder	<20ppm
		Parts composed of metals containing zinc (e.g. brass, zinc for die casting)	<100ppm
		Plastic	<5ppm
5	PBBs and PBDEs		Forbidden
6	PCB and PCT		Forbidden
7	CP, Short-chain Chlorinated paraffins C10-13, Cl $\geq$ 48 wt%		Forbidden
8	Mirex		Forbidden
9	PCN		Forbidden
10	Hexavalent Chromium compounds		<100ppm
11	Mercury and its compounds		Forbidden
12	Asbestos		Forbidden
13	Organic Tin compounds		Forbidden
14	Azo compounds		Forbidden
15	TBBP-A in external case plastic parts of products (PCB is exempted)		<1000ppm
16	Nickel in external case parts, which are likely to result in prolonged skin exposure		<1000ppm
17	Hexabromocyclododecane (HBCDD)		<1000ppm
18	Di-butyl Phthalate (DBP)		<1000ppm
19	Benzyl butyl Phthalate (BBP)		<1000ppm
20	Di-ethylhexyl Phthalate (DEHP)		<1000ppm
21	Di-isobutyl Phthalate (DIBP)		<1000ppm
22	Brominated/chlorinated flame retardants (other than PBBs or PBDEs), applicable item: frame, bobbin, impeller, lear wire, connector, mylar insulator.		Br<900ppm Cl<900ppm Br+Cl<1500ppm
23	PAHs and its 16 compounds in unusual contact material		BaP < 20ppm Total <200ppm
24	PCB and electroplating material, PFOS content complied with 2006/122/EC		PFOS $\leq$ 1000ppm; coating material PFOS $\leq$ 1 $\mu$ g/m <sup>2</sup>

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