1.0 Reference and Address			
Report Number	210400359TPE-001	Original Issued: 4-Mar-2022	Revised: None
Standard(s)	Supplement SA to UL 1741 - Inverters, Converters, Controllers and Interconnection System Equipment for use with Distributed Energy Resources [UL 1741:2010 Ed.2 (Supplement SA)+R:16Sep2020]		

Applicant	. MPP SOLAR INC	Manufacturer 1	**MPP SOLAR INC** .
Address	No.72~76 Zhouzi Street , Neihu Dist., Taipei Taiwan	Address	NO.72~76 Zhouzi Street, Neihu Dist Taipei, Taiwan
Country	Taiwan	Country	Taiwan
Contact	Fred Wang	Contact	Fred Wang
Phone	886 2 8797 8896	Phone	886 2 8797 8896
FAX	NA	FAX	NA
Email	fred_wang@mppsolar.com	Email	fred wang@mppsolar.com

2.0 Product Description		
Product	MPPT Solar Hybrid Inverter	
Brand name	NA	
Description	The product covered by this report is a hybrid PV inverter, can prodive power to the connected loads by utilizing the PV power, the utility grid power and the battery power. The unit is intended for indoor use.	
Models	LVX 6048WP	
Model Similarity	NA	
Ratings	PV Input	
	Max. DC Voltage	600 Vdc
	MPPT Voltage Range	120 ~ 550 Vdc
	Max. Input Current	15 A×2
	Max. PV Input Power	7500 W
	AC output	
	Grid Nominal Operating Voltage	L-N:120Vac L-L:240Vac (split phase)
	Max. Output Current	27 A
	Nominal Operating Frequency	50/60 Hz
	Power Factor	0.9 lag to 0.9 lead
	Max. Output Power	6000W (pure sine wave)
	AC Input	
	Nominal Operating Voltage	L-N:120Vac L-L:240Vac (split phase)
	Max. Input Current	40A
	Nominal Operating Frequency	50/60Hz
	Battery	
	Nominal voltage	48Vdc
	Max. charge/discharge current	120A/120A
	Environmental rated enclosures	
	Enclosure Rating	Type 1 (indoor use only)
Other Ratings	The firmware/software used for testing are V01.14 Categories related to reactive power capability and voltage regulation performance requirements: Category A/B Categories related to response to Area EPS abnormal conditions: Abnormal operating performance Category II	

3.0 Product Photographs

Photo 1 - External view

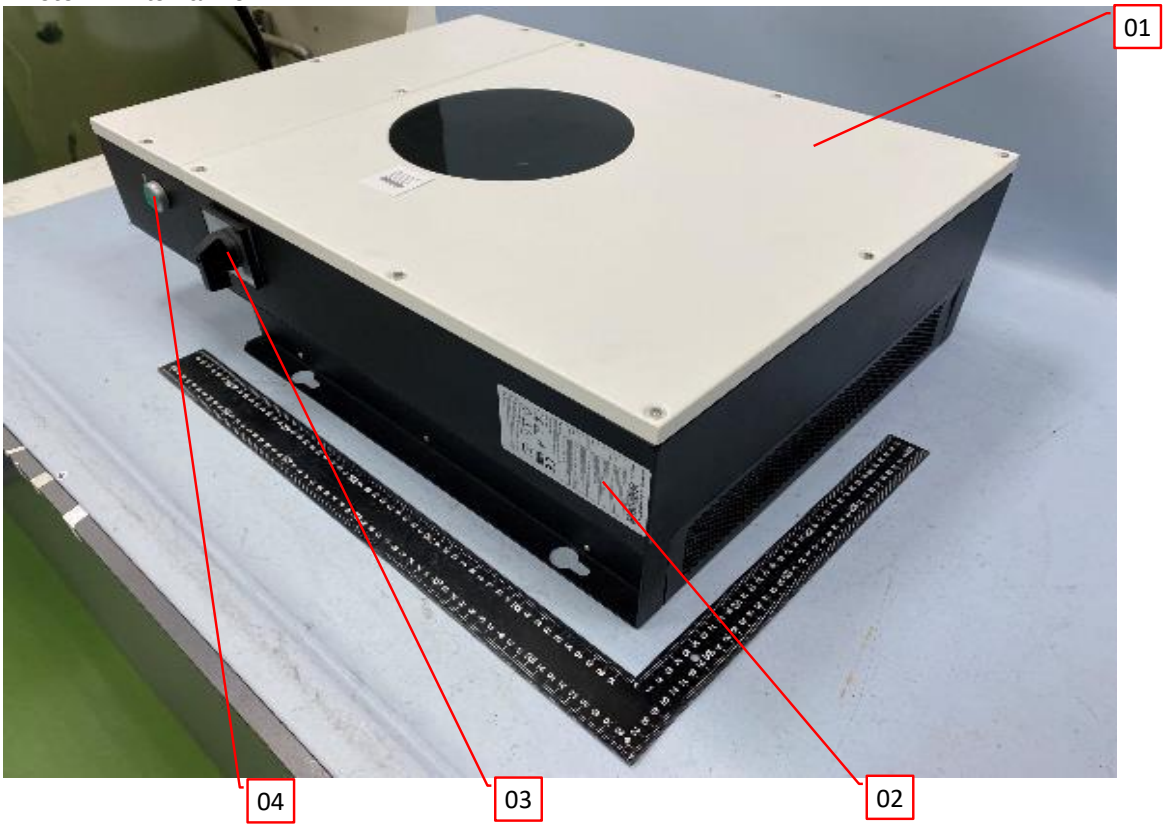
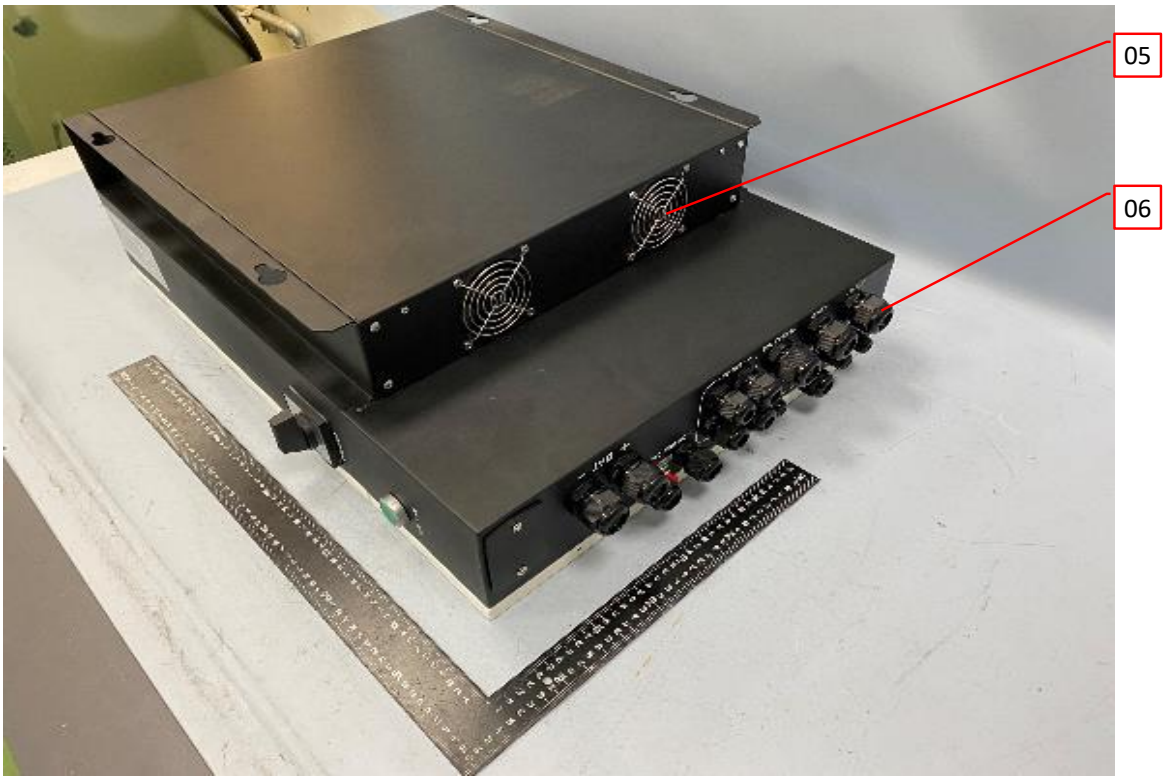


Photo 2 - External view



3.0 Product Photographs

Photo 3 - Internal view

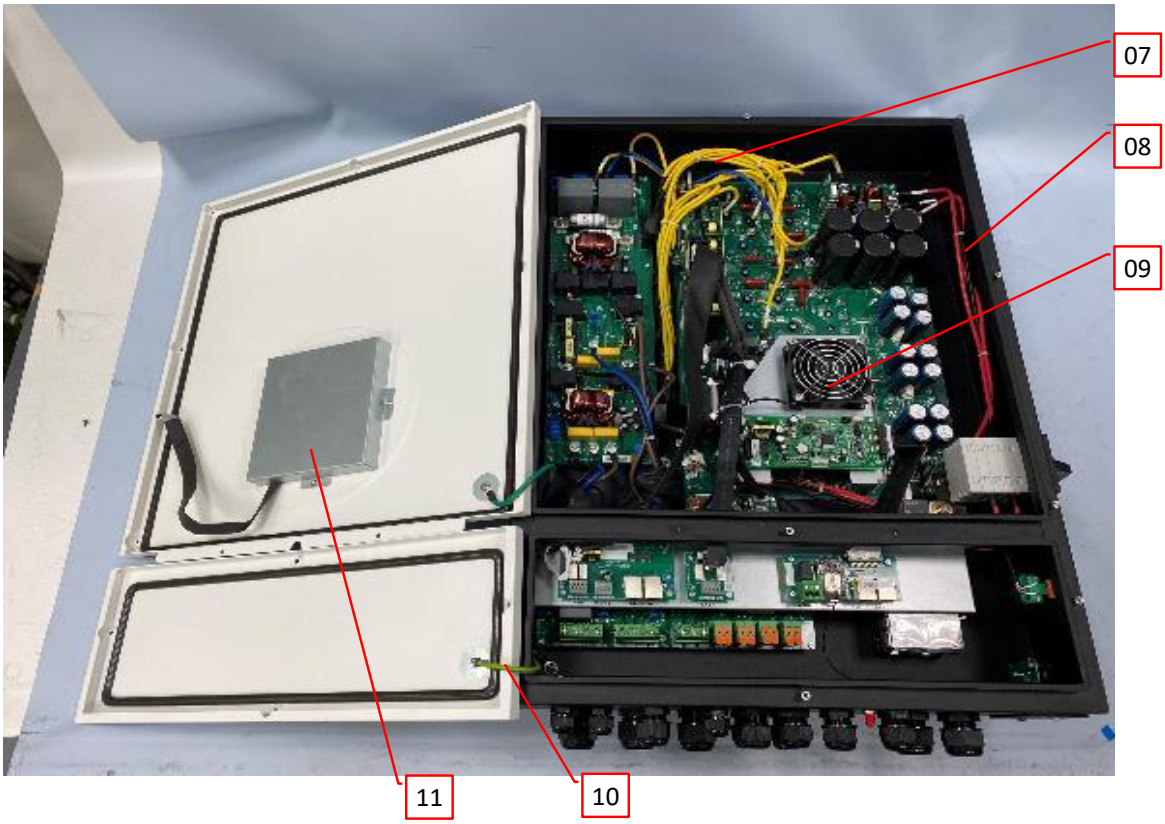


Photo 4 - Internal view

3.0 Product Photographs

Photo 5 - Internal view

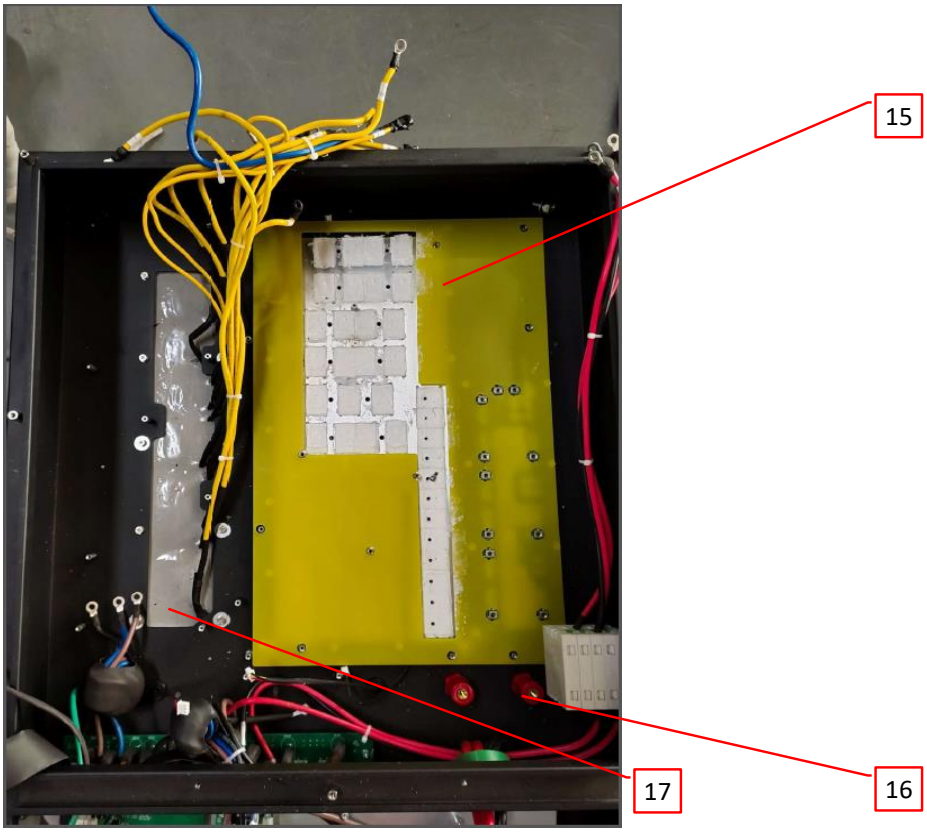
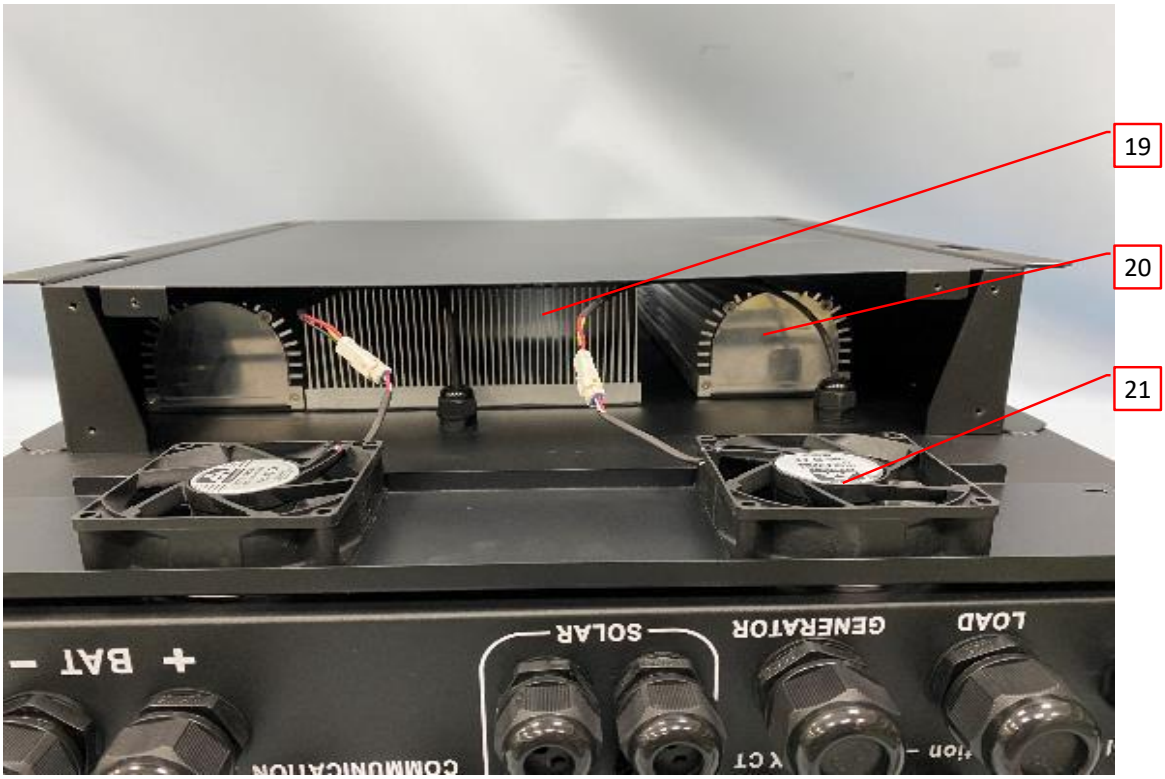


Photo 6 - Internal view



3.0 Product Photographs

Photo 7 - PCB Component Side View - 16-501752-00G(C)

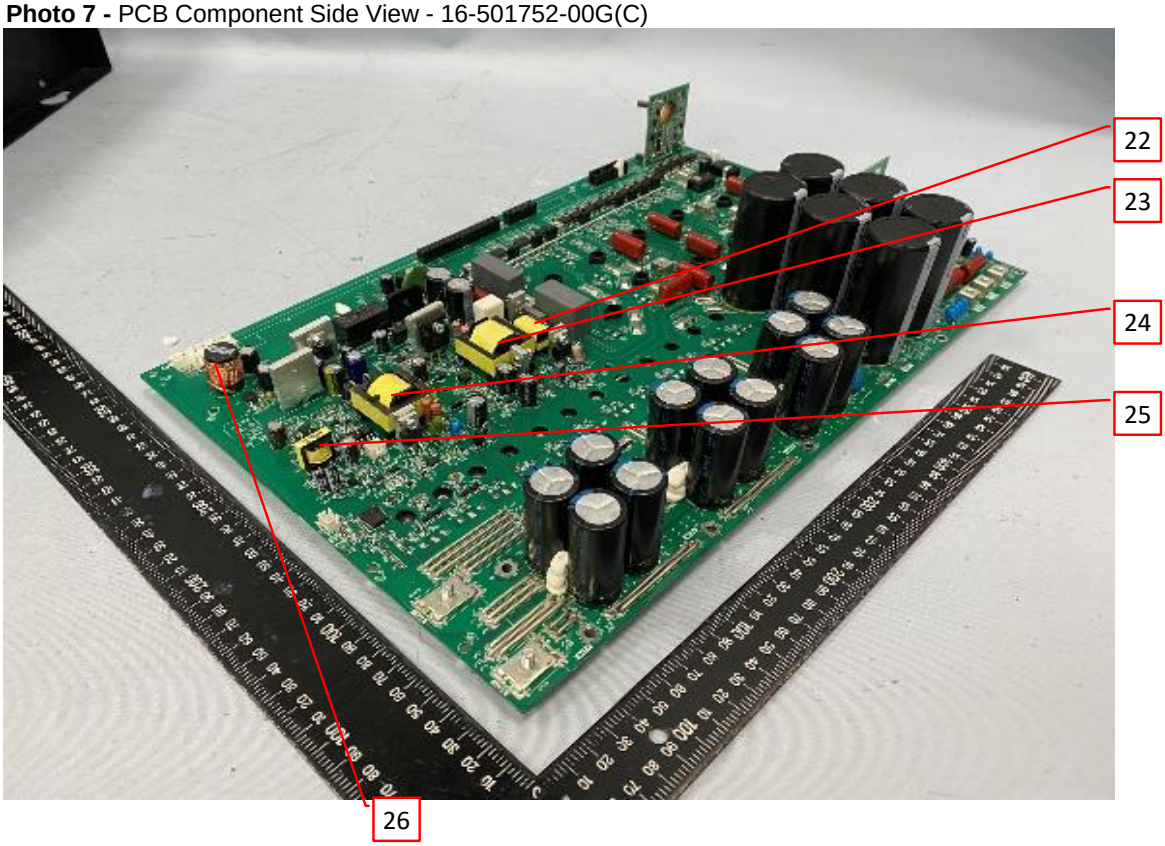
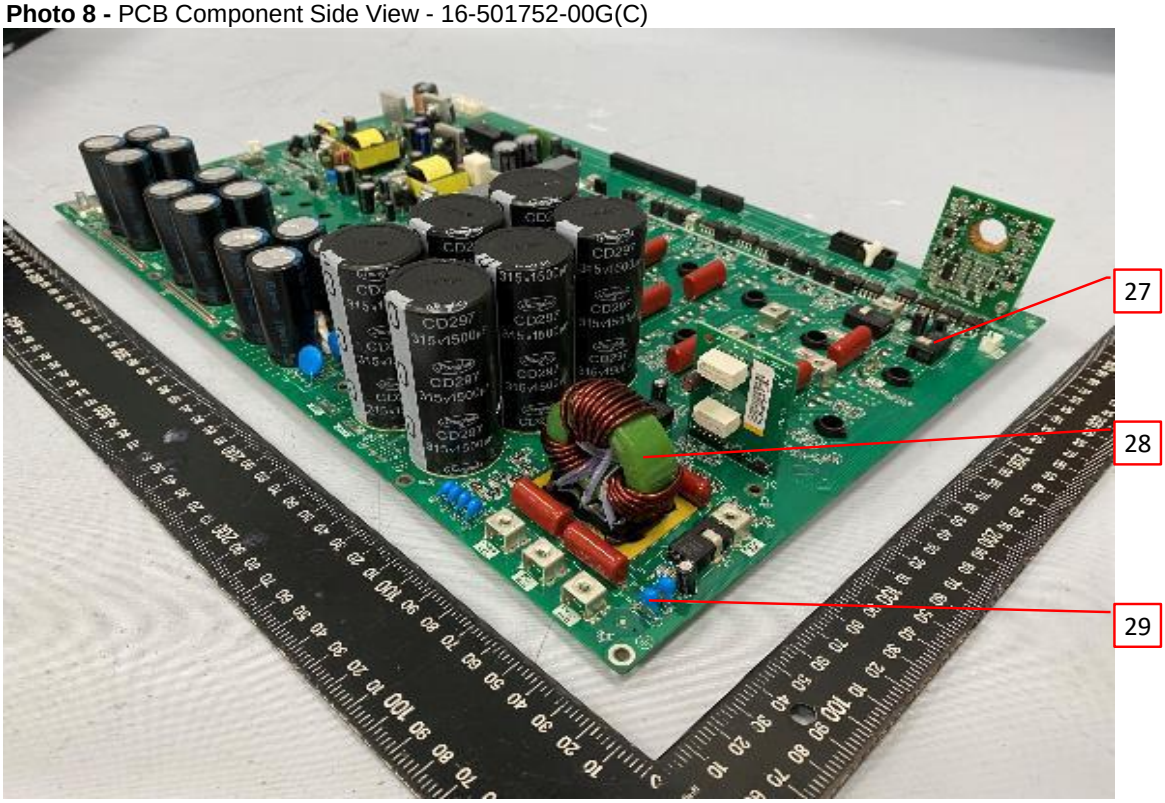


Photo 8 - PCB Component Side View - 16-501752-00G(C)



3.0 Product Photographs

Photo 9 - PCB Component Side View - 16-501752-00G(C)

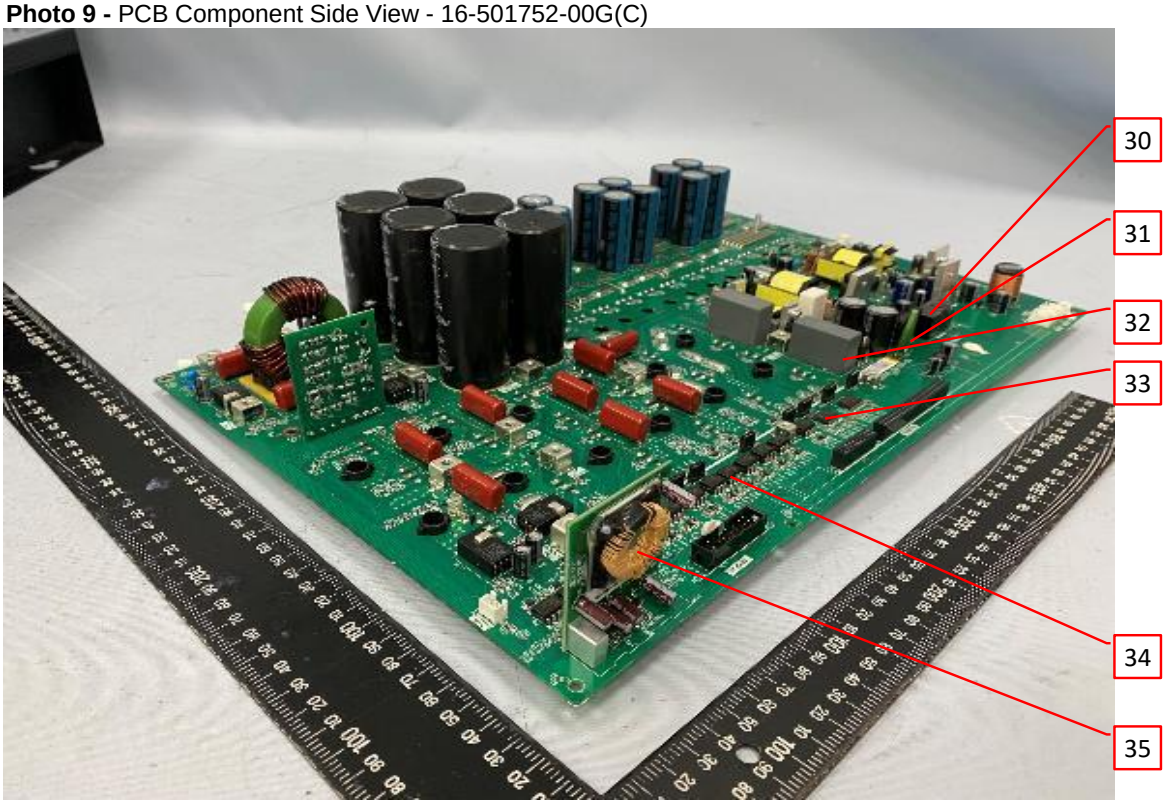
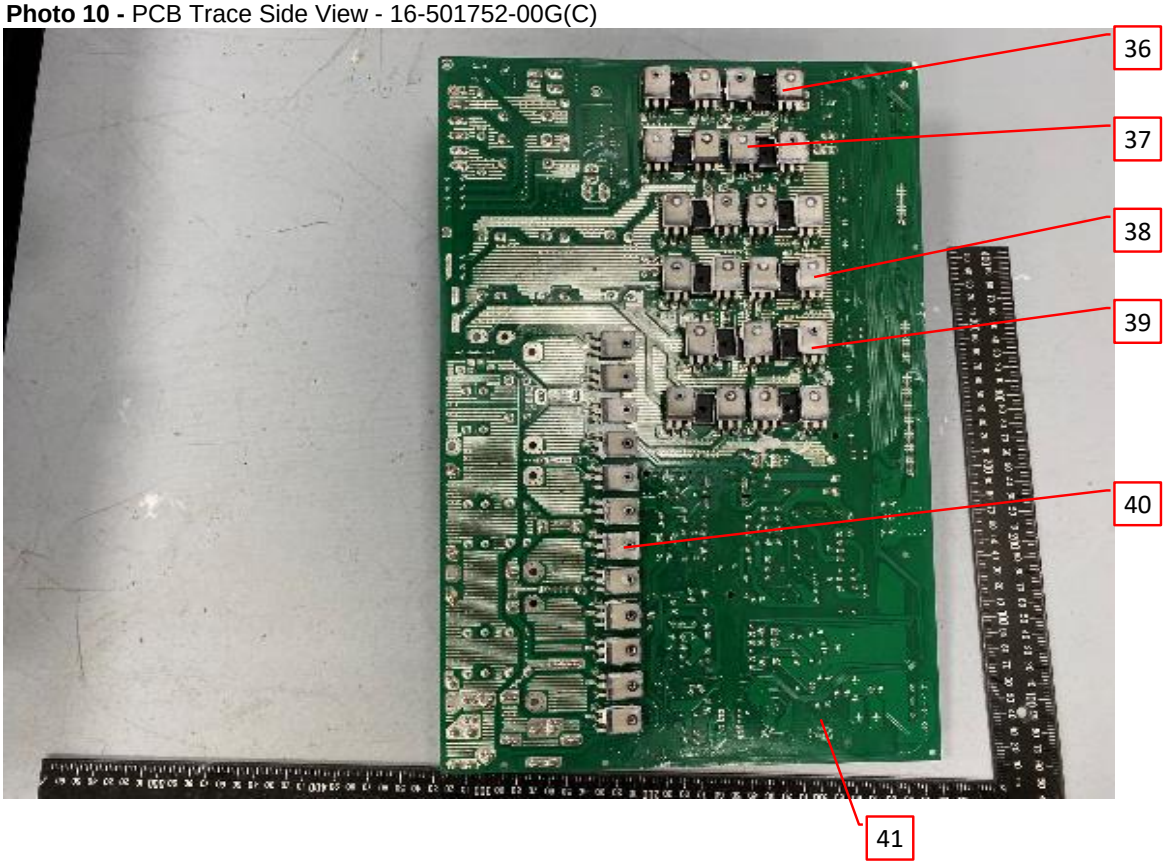


Photo 10 - PCB Trace Side View - 16-501752-00G(C)



3.0 Product Photographs

Photo 11 - PCB Component Side View - 16-501754-00G(B)

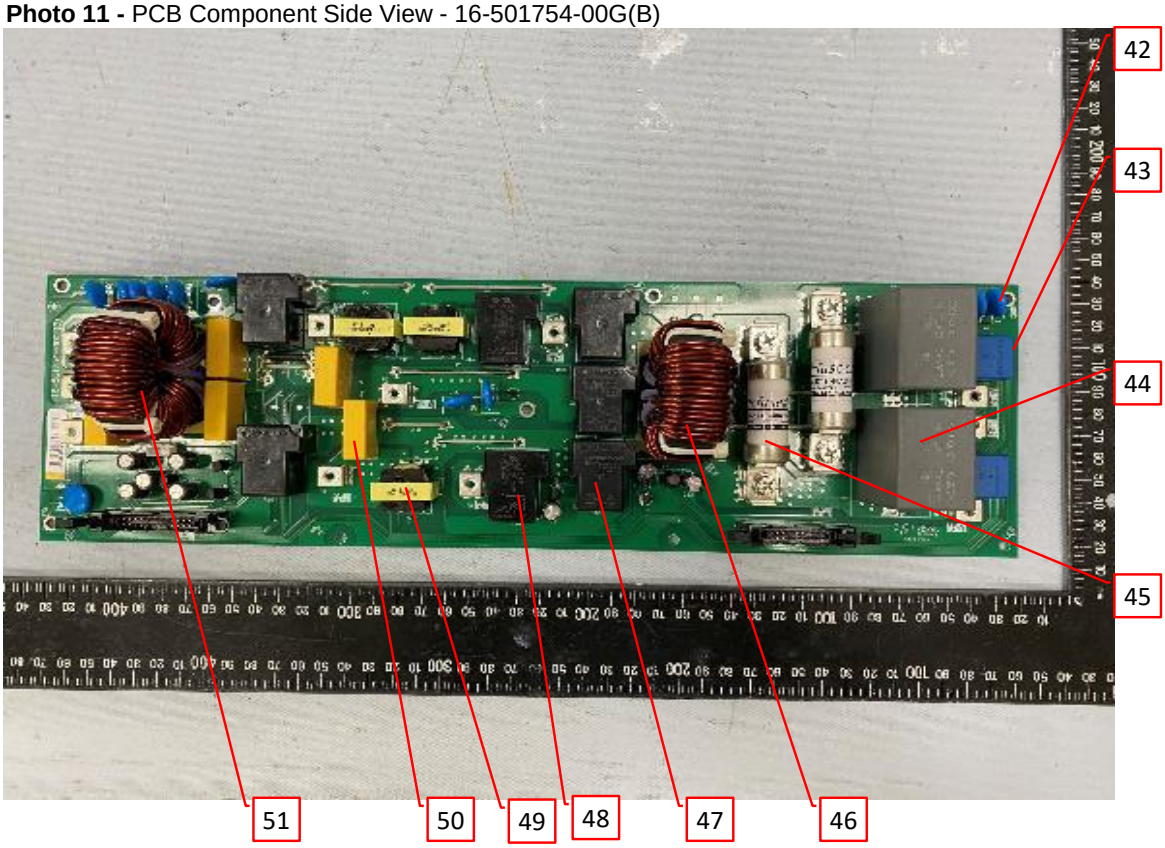
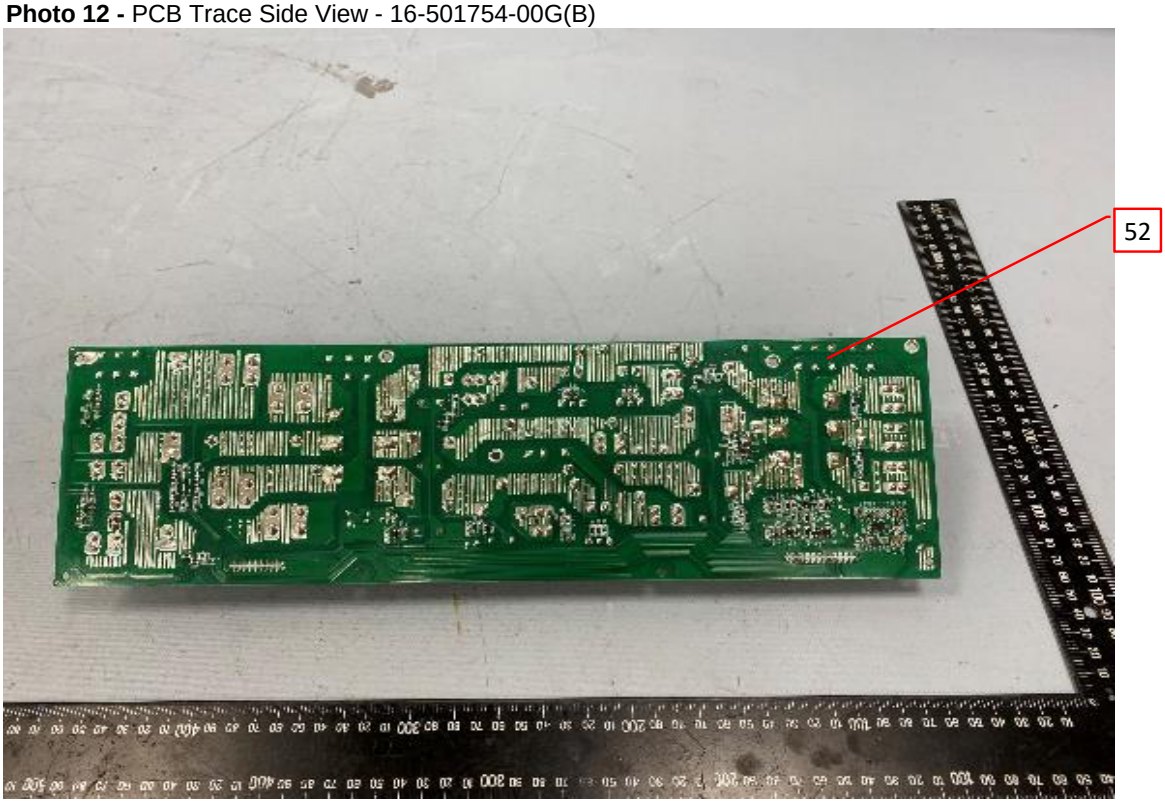


Photo 12 - PCB Trace Side View - 16-501754-00G(B)



3.0 Product Photographs

Photo 13 - PCB Component Side View - 16-501582-00G

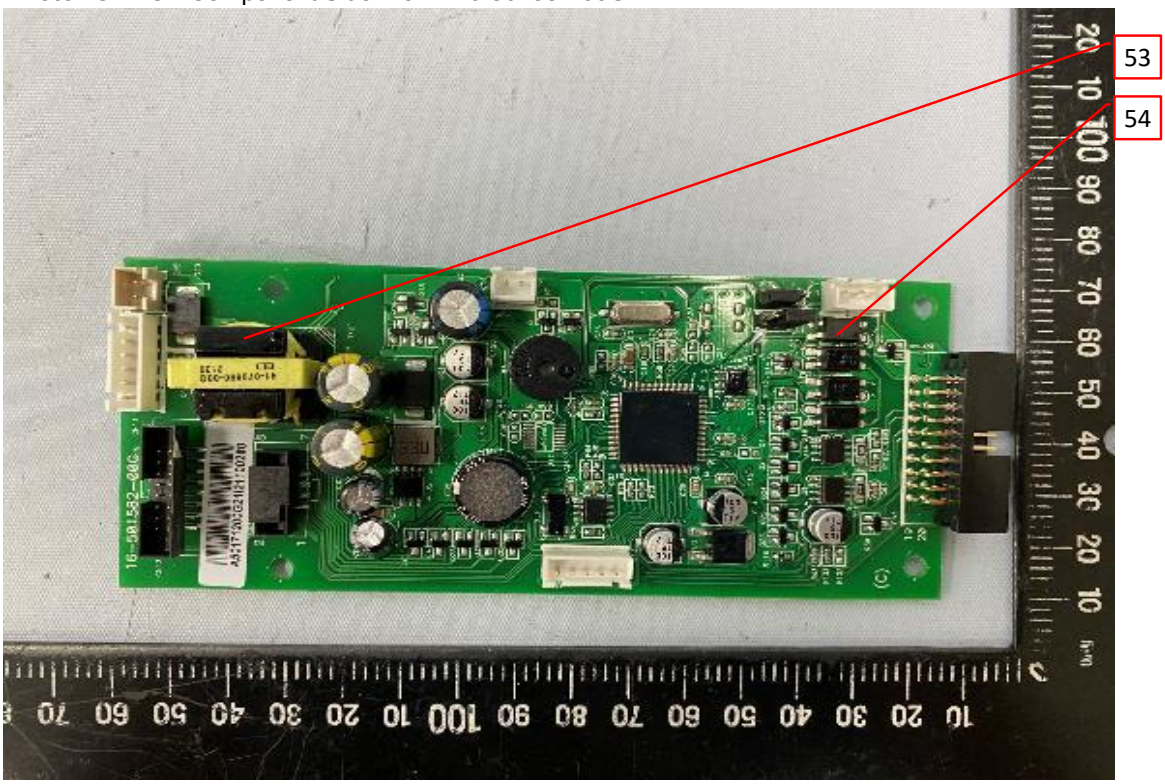
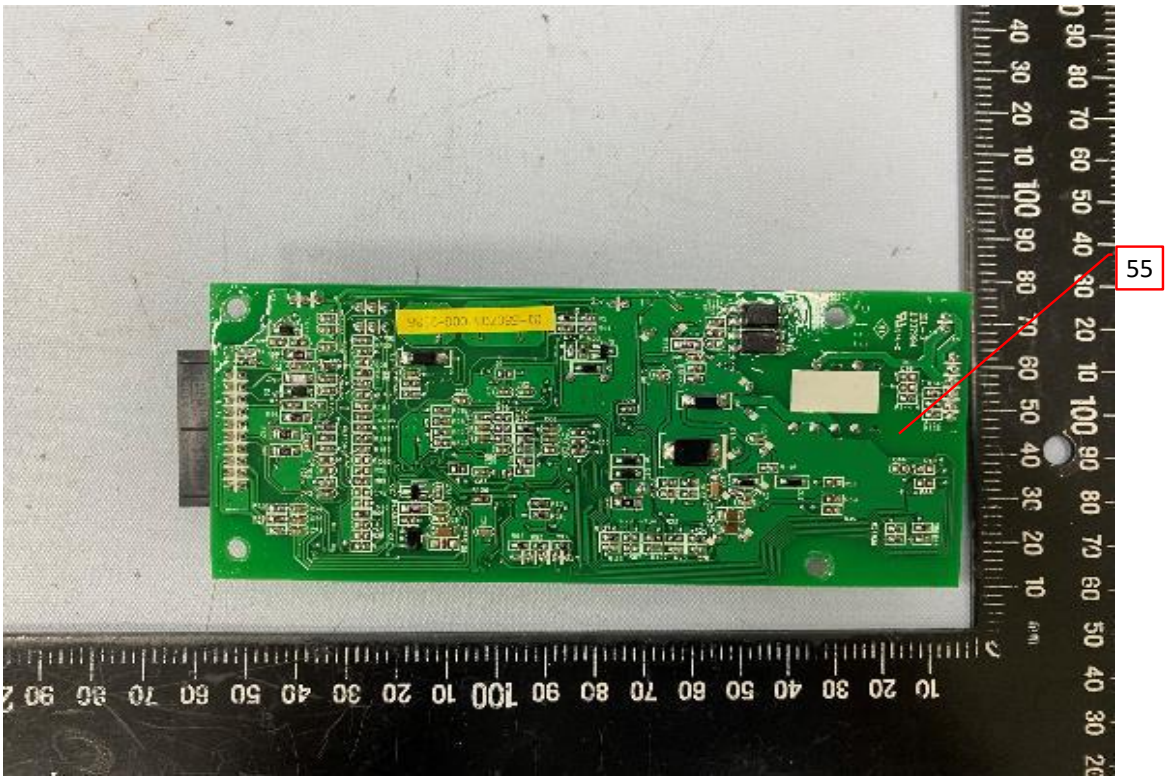


Photo 14 - PCB Trace Side View - 16-501582-00G



3.0 Product Photographs

Photo 15 - PCB Component Side View - 16-501771-00G(B)

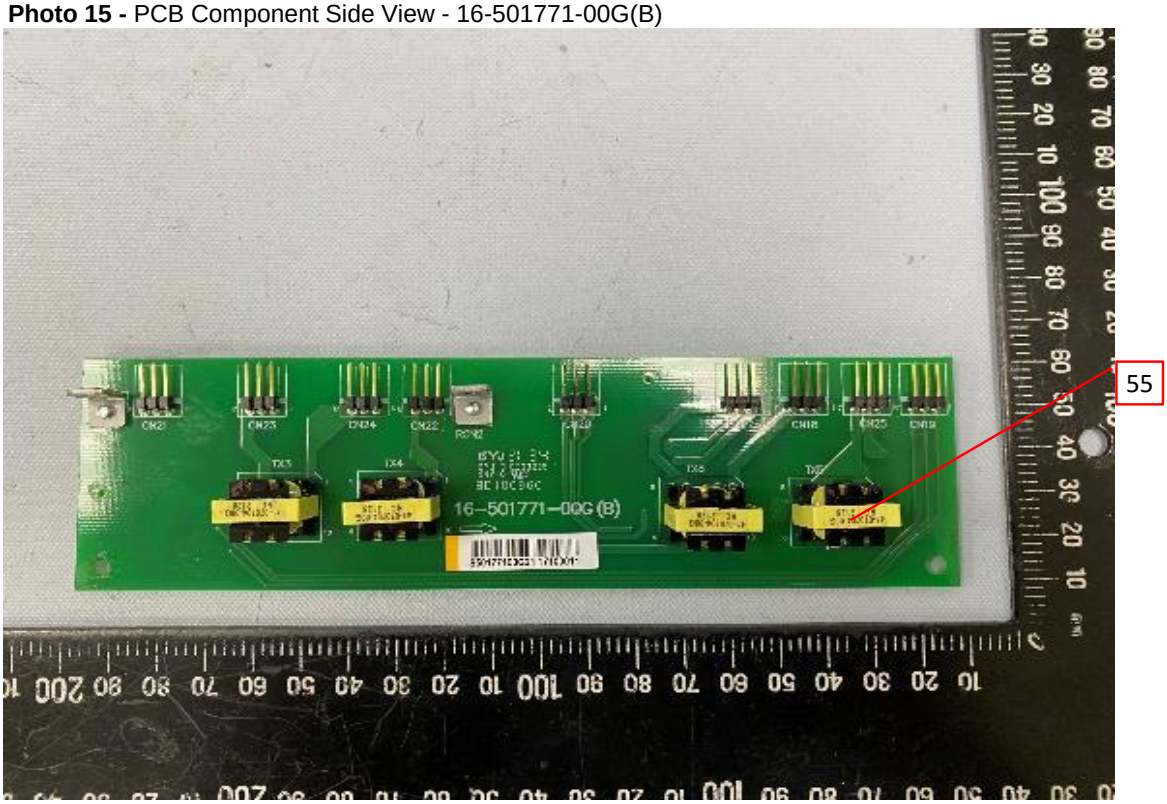
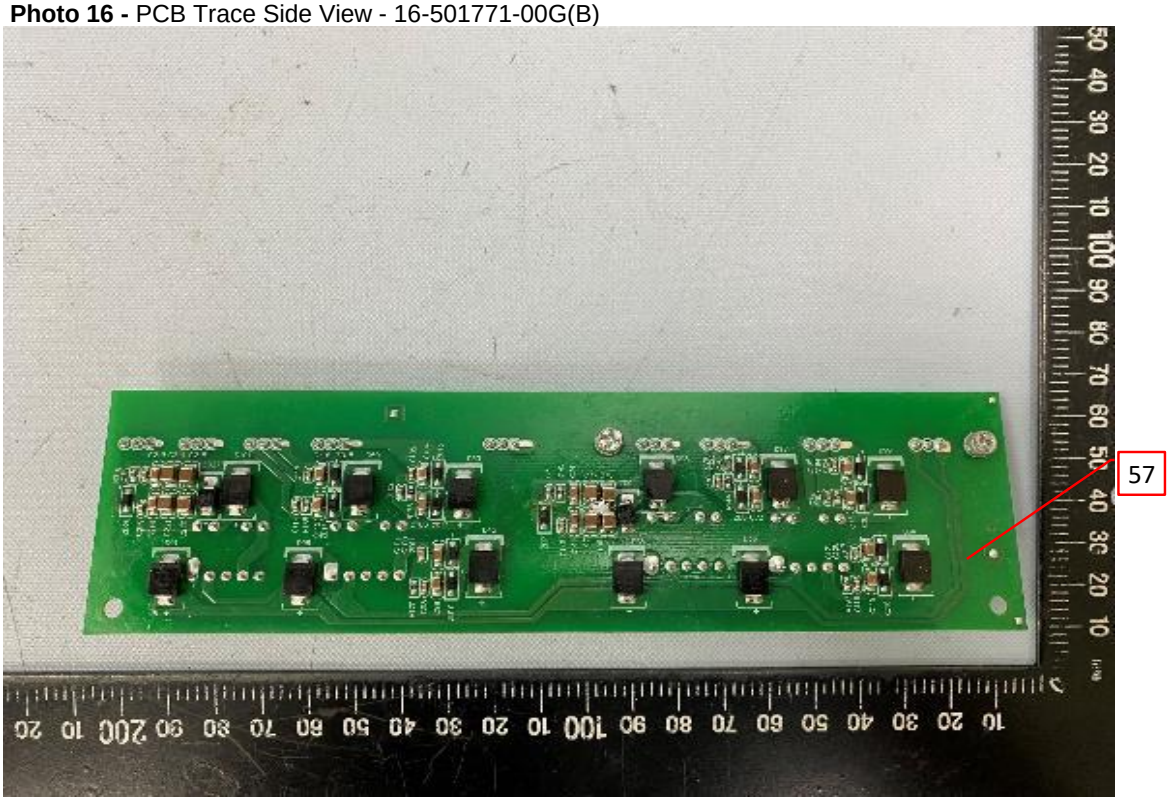


Photo 16 - PCB Trace Side View - 16-501771-00G(B)



3.0 Product Photographs

Photo 17 - PCB Component Side View - 16-501753-00G(B)

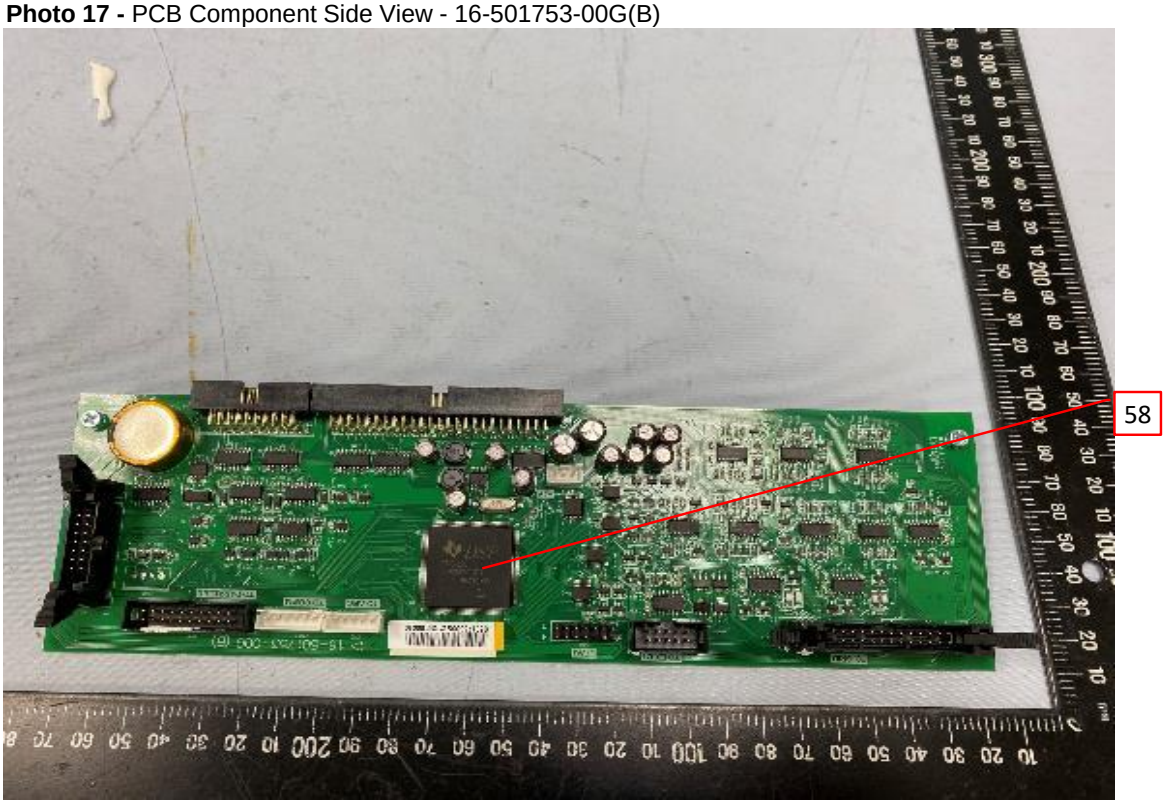
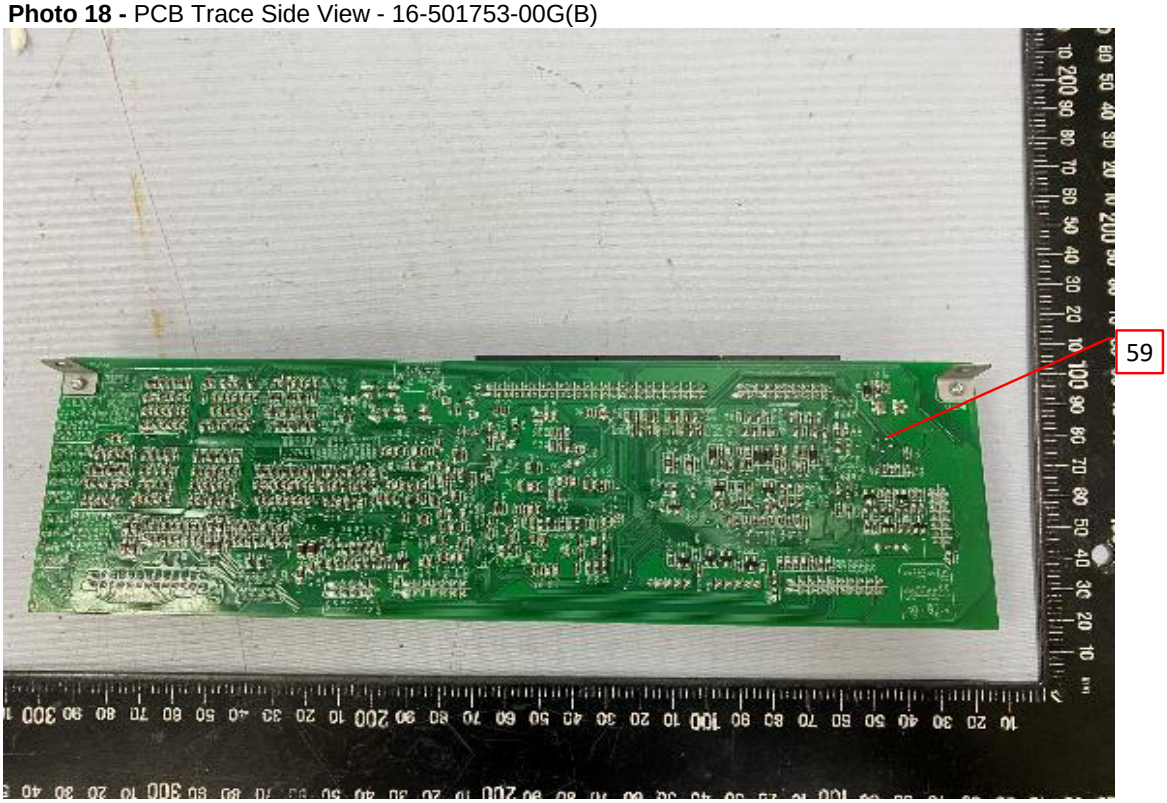


Photo 18 - PCB Trace Side View - 16-501753-00G(B)



3.0 Product Photographs

Photo 19 - PCB Component Side View - 16-501755-00G(C)

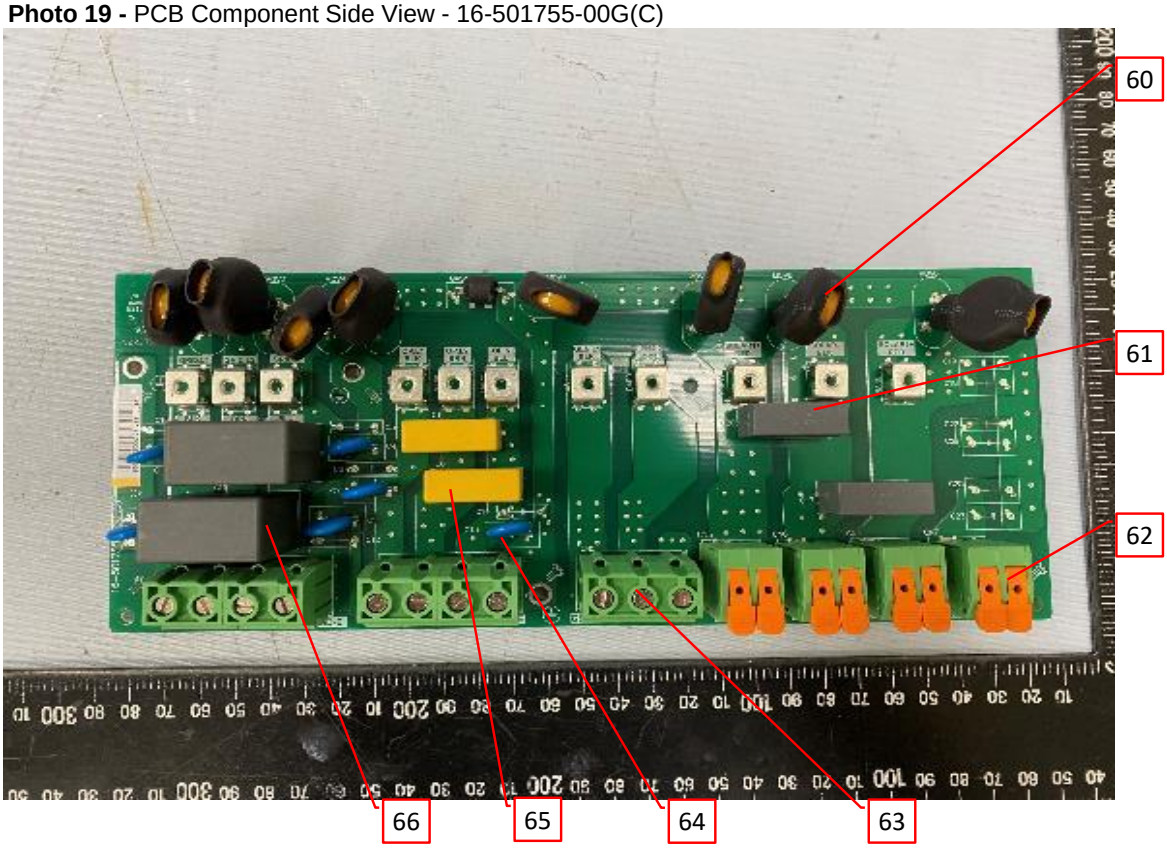
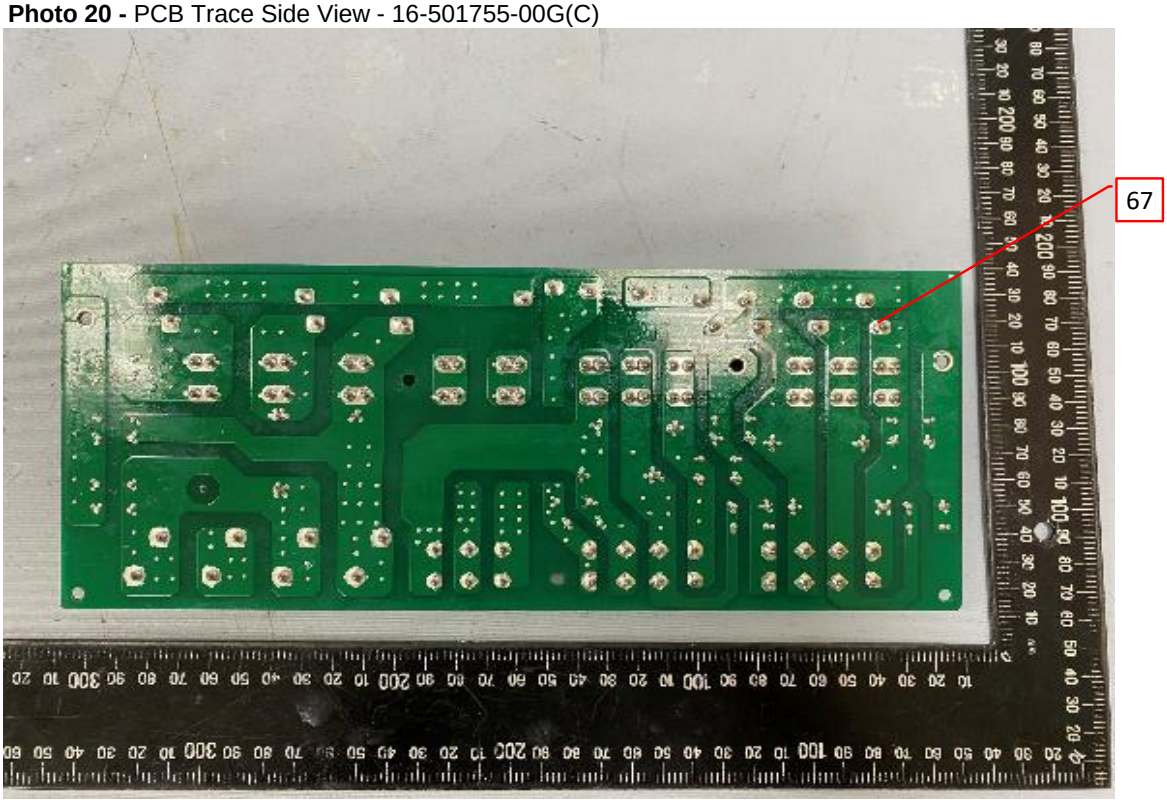


Photo 20 - PCB Trace Side View - 16-501755-00G(C)



3.0 Product Photographs

Photo 21 - PCB Component Side View - 16-501860-00G

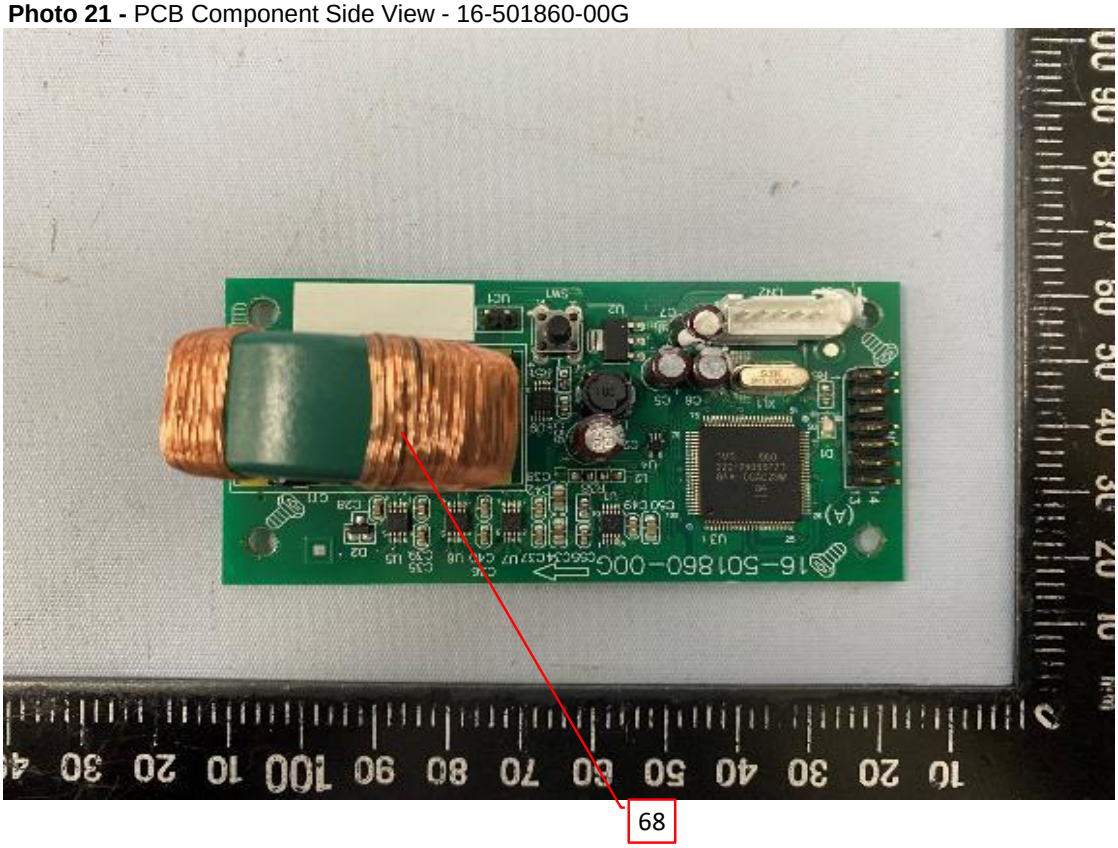
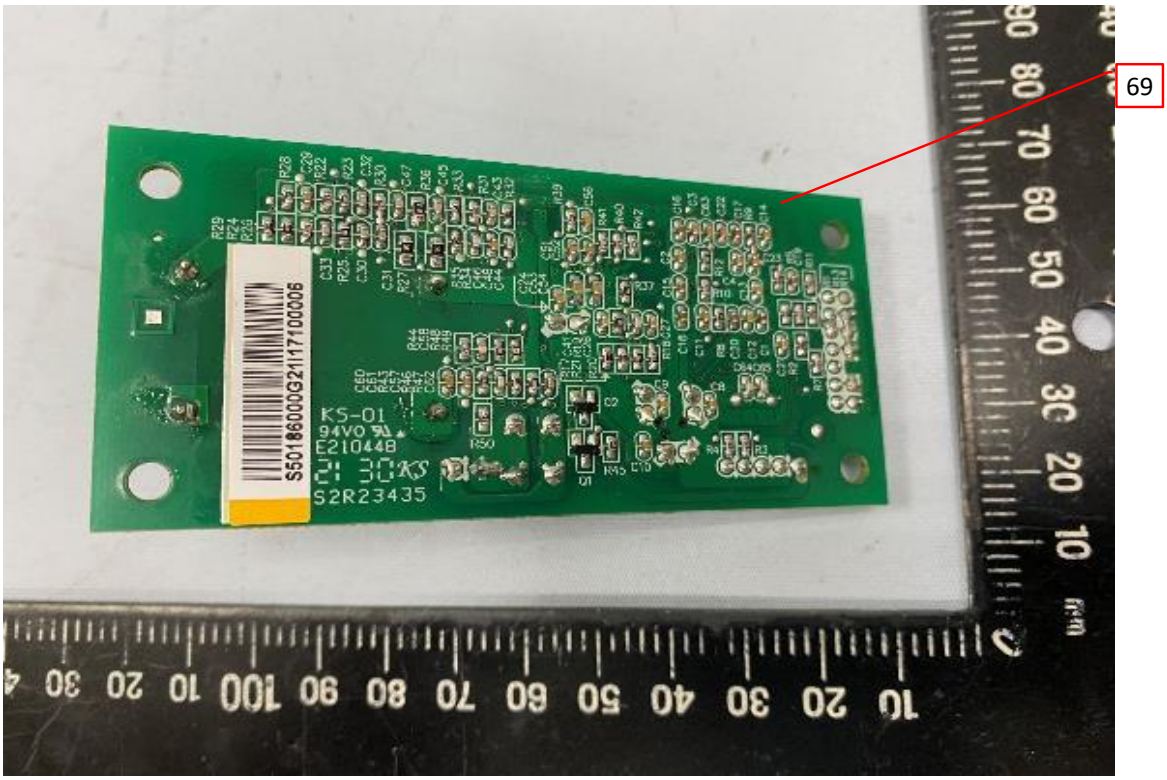


Photo 22 - PCB Trace Side View - 16-501860-00G



4.0 Critical Components						
Photo #	Item no.[1]	Name	Manufacturer/ trademark[2]	Type / model[2]	Technical data and securement means	Mark(s) of conformity [3]
1	1	Enclosure	Various	Various	Sheet metal, 1.6 mm thick min, overall dimension refer to illustration no.1.	NR
1	2	Marking label	CORDIALITY LABEL PRINTING (SHENZHEN) CO LTD	CPPC-1A	Suitable for stainless steel, 150°C max.	cURus
1	3	DC switch	ProJoy Electric Co Ltd	PEDS150-PMXL-Y*	Rated 1000Vdc, 11A, 85°C.	UL
				PEDS150-HMX-Y*		
				PEDS150R-HMX-Y*		
1	4	Cold start switch	TEND TECHNOLOGY CO LTD	TN2BFG-1A	Rated 240V,3A	cURus
2	5	Fan guard	Various	Various	Aluminum with metal mesh, 1.8 mm thick. Overall dimension refer to illustration no. 2.	NR
2	6	Cable gland	KAI SUH SUH ENTERPRISE CO LTD	AG-25S	Secured to enclosure by integral threads and nut. Rated V-2, overall dimension refer to illustration no.3.	URus
				AG-20		
			Zhejiang Bangnai Electric Co Ltd	BN-M12-8		cURus
3	7	Internal wiring	Various	Various	Rated 600V, 105°C, 10AWG.	cURus
3	8	Internal wiring	Various	Various	Rated 600V, 105°C, 10AWG.	cURus
3	9	Fan	SHENZHEN DONGWEIFENG ELECTRONIC TECHNOLOGY CO LTD	EFC-08E12D-EF05	Rated 12Vdc, 0.4A	cURus
			SHENZHEN HUAXIA HENGTAI ELECTRONIC CO LTD	DA06025B12HR	Rated 12Vdc, 0.18A	cURus
3	10	Grounding lead	Various	Various	Rated 600V, 105°C, 10AWG.	cURus
3	11	LCD cover	Various	Various	Sheet metal, 1 mm thick min, overall dimension refer to illustration no. 4.	NR
4	12	Electrolytic capacitor (C123, C124, C125, C129, C130,C131)	Various	Various	Rated 315V, 1500µF, 105°C.	NR
4	13	Electrolytic capacitor (CE1, CE2, CE3, CE4, CE5, CE6, CE7, CE8, CE9, CE10, CE11, CE12)	Various	Various	Rated 80V, 3300µF, 105°C.	NR
4	14	DC battery fuse	SHENZHEN DEER ELECTRONICS CO LTD	DNN-H	Rated 80V, 200A.	cURus

4.0 Critical Components						
Photo #	Item no.[1]	Name	Manufacturer/ trademark[2]	Type / model[2]	Technical data and securement means	Mark(s) of conformity [3]
5	15	Isolation Sheet	SHANGHAI GLOBAL ELECTRONIC MATERIAL LTD	GF532	Rated V-0, 130°C, 1mm thick. Overall dimension refer to illustration no. 5.	URus
5	16	Spacer	JIANGSU BI-GOLD NEW MATERIAL STOCK CO LTD	YD0304(X)	Rated V-0, 130°C. Overall dimension refer to illustration no. 6.	cURus
5	17	Potting compound	SHENZHENSHI HUATIANQI TECHNOLOGY CO LTD	CS-9812	Rated V-0, 105°C.	cURus
5	18	Choke (Not Shown)	TRONIC POWER TECHNOLOGY CORP.	Z41-11A034-01G	Rated 0.5mH. Refer to illustration no. 7 and 7a for details.	NR
6	19	Heatsink	Various	Various	Aluminum, overall dimension refer to illustration no. 8.	NR
6	20	Heatsink	Various	Various	Aluminum, overall dimension refer to illustration no. 9.	NR
6	21	Fan	MinebeaMitsumi Inc.	08025VE-12M-CTD-2	Rated 12Vdc, 0.5A.	cURus
			DONGGUAN PROTECHNIC ELECTRIC CO LTD	MGT8012XB-O25	Rated 12Vdc, 0.39A.	
			KAIMEI ELECTRONIC CORP	SF0825B1SM1 134KWMRPH	Rated 12Vdc, 0.25A.	
7	22	Transformer (TX7)	SHENZHEN CLICK TECHNOLOGY CO., LTD	41-070186-01G	Rated class F, I/P: 120 - 550 Vdc O/P: 240V, 60Hz, consists of 22a. Refer to illustration no. 10 for details.	NR
			Rong Chyuan Technology Corporation			
			Friendship Electronics(Dong Guan) Co., Ltd			
7	22a	Insulation system (Not Shown)	SUMITOMO BAKELITE CO LTD	SBI5.1	Rated Class155(F).	cURus
7	23	Transformer (TX6)	Rong Chyuan Technology Corporation	41-070420-00G	Rated class F, I/P: 120 - 550 Vdc O/P: 240V, 60Hz, consists of 23a. Refer to illustration no. 11 for details.	NR
7	23a	Insulation system (Not Shown)	SUMITOMO BAKELITE CO LTD	SBI5.1	Rated Class155(F).	cURus
7	24	Transformer (TX2)	SHENZHEN CLICK TECHNOLOGY CO., LTD	41-070194-02G	Rated class F, I/P: 120 - 550 Vdc O/P: 240V, 60Hz, consists of 24a. Refer to illustration no. 12 for details.	NR
			Rong Chyuan Technology Corporation			
			Friendship Electronics(Dong Guan) Co., Ltd			

4.0 Critical Components						
Photo #	Item no.[1]	Name	Manufacturer/ trademark[2]	Type / model[2]	Technical data and securement means	Mark(s) of conformity [3]
7	24a	Insulation system (Not Shown)	SUMITOMO BAKELITE CO LTD	SBI5.1	Rated Class155(F).	cURus
7	25	Transformer (TX9)	Rong Chyuan Technology Corporation	41-070704-00G	Rated class F, I/P: 120 - 550 Vdc O/P: 240V, 60Hz, consists of 25a. Refer to illustration no. 13 for details.	NR
7	25a	Insulation system (Not Shown)	SUMITOMO BAKELITE CO LTD	SBI5.1	Rated Class155(F).	cURus
7	26	Inductor (L2)	Dongguan Dingmei Electronics Co., Ltd Rong Chyuan Technology Corporation SHENZHEN CLICK TECHNOLOGY CO., LTD	41-100004-00G	Rated 150±10% μH. Refer to illustration no. 14 for details.	NR
8	27	Current sensor (HCT1, HCT2, HCT3, HCT4)	Sinomags Technology Co., Ltd.	STK-HD	Rated 32A, 105°C.	cURus
8	28	Choke (L4)	Maohong Electronics Co. Ltd	41-110437-00G	Rated 1.4mH. Refer to illustration no. 15 for details.	NR
8	29	Y capacitor (C19, C21, C29, C135, C136, C142, C143, C151, C152)	JUSUN (TAISHAN) ELECTRONICS LTD	JA	Y2 type. Rated 250 V, 10nF, 125° C for C19, C21; 2.2nF for C29; 1nF for C135, C136, C142, C143, C151, C152.	cURus
9	30	Relay (RY1)	XIAMEN HONGFA ELECTROACOUSTIC CO LTD	HF115F	Rated contact: 250Vac, 16A; Coil: DC 12V.	cURus
9	31	Thermistor (NTC1)	THINKING ELECTRONIC INDUSTRIAL CO LTD	NTS(X)153	Rated 15kΩ at 25°C, 100°C.	cURus
9	32	X capacitor (C83, C84)	XIAMEN FARATRONIC CO., LTD.	MMKP82	Rated 630V, 0.68μF, 105°C.	NR
9	33	Isolating devices (U32, U33)	Skyworks Solutions, Inc.	Si823x	Rated up to 5000 Vrms isolation voltage for basic protection.	URus
			Suzhou Novosense Microelectronics Co.,Ltd	NSi6602x-DSWR (a)	Single protection non-optical Isolator, rated 5700 Vac isolation voltage.	cURus
9	34	Optocoupler (U11~U24)	AVAGO TECHNOLOGIES PTE LTD	T350@	Double protection optical isolators, having an isolation voltage of 3750 V rms.	cURus
9	35	CT (TX1)	Dongguan Dingmei Electronics Co. Ltd	41-030000-01G	Rated N1:0.3mm by 72±1 turns. N2:0.3mm by 10±1 turns. Refer to illustration no. 16 for details.	NR
10	36	MOSFET (Q20, Q24)	KEC	KGF40N65KDC	Rated V_{CES}=650V, I_C=80A.	NR
10	37	Diode (D65, D70)	Various	Various	Rated 600V, 30A.	NR

4.0 Critical Components						
Photo #	Item no.[1]	Name	Manufacturer/ trademark[2]	Type / model[2]	Technical data and securement means	Mark(s) of conformity [3]
10	38	IGBT (IGBT1~8, Q21~Q23, Q25~Q28)	Various	Various	Rated 600V, min. 75A.	NR
10	39	IGBT (Q30~Q33)	Various	Various	Rated 650V, 60A.	NR
10	40	MOSFET (Q2~Q13)	Various	Various	Rated 150V, min. 130A	NR
10	41	PCB	Various	Various	Multilayer. Rated V-0, 105°C min, CTI 100 min, 1.6 mm thick. PCB layout refer to illustration no. 17 for details.	cURus
11	42	Y capacitor (C25, C41, C31)	JUSUN (TAISHAN) ELECTRONICS LTD	JA	Y2 type. Rated 250 V, 10nF, 125° C.	cURus
11	43	Current sensor (HCT1, HCT2)	Sinomags Technology Co., Ltd.	STB-50-HA	Rated 50A, 85°C.	cURus
11	44	X capacitor (C30, C22)	XIAMEN FARATRONIC CO LTD	C6A	Rated 250V, 20µF.	cURus
11	45	Fuse (FC1, FC2)	SHENZHEN VICTORS INDUSTRIAL CO LTD	VBS1749	Rated 700V, 40A.	cURus
11	46	Choke (L2)	Dongguan Dingmei Electronics Co. Ltd	41-110609-00G	Rated 4.5mH. Refer to illustration no. 18 for details.	NR
11	47	Relay (RY2, RY3, RY6, RY8, RY9)	HASCO RELAYS AND ELECTRONICS INTERNATIONAL CORP	HATF series	Class F. Rated contact: 277Vac, 40A; Coil: DC 12V.	cURus
11	48	Relay (RY1, RY4)	Taiwan Shori Electric Co Ltd	S12H-PAS-12	Rated contact: 277Vac, 40A; Coil: DC 12V.	cURus
11	49	CT (CT1, CT2, CT3)	Rong Chyuan Technology Corporation	41-020027-00G	Rated 5.369H. Refer to illustration no. 19 for details.	NR
11	50	X capacitor (C5, C6, C7, C9, C13, C14)	FARAD ELECTRONICS CO LTD	PXK	X2 type. Rated 250Vac, 0,47µF, 100°C.	cURus
11	51	Choke (L1)	Dongguan Dingmei Electronics Co. Ltd	41-110609-00G	Rated 4.5mH. Refer to illustration no. 18 for details.	NR
12	52	PCB	Various	Various	Multilayer. Rated V-0, 105°C min, CTI 100 min, 1.6 mm thick. PCB layout refer to illustration no. 20 for details.	cURus
13	53	Transformer (TX2)	SHENZHEN CLICK TECHNOLOGY CO., LTD	41-070890-00G	Rated Class A, I/P: 120 - 550 Vdc O/P: 240V, 60Hz, consists of 53a to 53f. Refer to illustration no. 21 for details.	NR
13	53a	Bobbin (Not Shown)	CHANG CHUN PLASTICS CO LTD	T200HF T375HF	Rated V-0, 150°C.	cURus

4.0 Critical Components						
Photo #	Item no.[1]	Name	Manufacturer/ trademark[2]	Type / model[2]	Technical data and securement means	Mark(s) of conformity [3]
13	53b	Triple Insulation Wire (Not Shown)	SHANGHAI XIANGXIANG ELECTRON CO LTD	TKW-B	Rated 130°C.	URus
			KBI COSMOLINK CO.,LTD.	TIW-M(B)(XX)		
			Furukawa Electric Co., Ltd.	TEX-E		
			TOTOKU ELECTRIC CO LTD	TIW-2		
			WUHU OULY ELECTRONICS CO LTD	OLTIW-B*		
			GREAT LEOFLON INDUSTRIAL CO LTD	TRW(B)*		
			HUIZHOU HUILI INDUSTRIAL CO LTD	MIW-B(x)		
13	53c	Tape (Not Shown)	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	CT (b)(g)	Rated 130°C.	URus
			JINGJIANG JINGYI ADHESIVE PRODUCT CO	JY25-A (b)		
			3M COMPANY	1350F-1(b)		
13	53d	Epoxy (Not Shown)	DONGGUAN EATTO ELECTRONIC MATERIAL CO LTD	E-500 (XX)	Rated V-0, 130°C.	cURus
			DONG GUAN SHI PAI HUA CHUANG MATERIAL FTY	H907-HF-Z		
13	53e	Varnish (Not Shown)	ELANTAS ZHUHAI CO LTD	5183SW	Rated 155°C.	URus
			YUEYANG GREEN TECHNOLOGY CO LTD	JX-1150*		
			GUANGDONG JIANXIN TECHNOLOGY CO LTD	JS-813		
13	53f	Tube (Not Shown)	GREAT HOLDING INDUSTRIAL CO LTD	TFL	Rated 200°C.	URus
			DONGGUAN CITY CHANGJIE METALS & PLASTIC PRODUCTS CO LTD	CJ-TT-L		

4.0 Critical Components						
Photo #	Item no.[1]	Name	Manufacturer/ trademark[2]	Type / model[2]	Technical data and securement means	Mark(s) of conformity [3]
13	54	Optocoupler (U15, U8, U16, U10)	COSMO ELECTRONICS CORP	K1010	Isolation voltage 5000V, 115°C.	cURus
14	55	PCB	Various	Various	Multilayer. Rated V-0, 105°C min, CTI 100 min, 1.6 mm thick. PCB layout refer to illustration no. 22 for details.	cURus
15	56	Transformer (TX3, TX4, TX5, TX8)	Dongguan Rongchyuan Electric Mfg Co Ltd	41-070704-00G	Rated Class A, I/P: 120 - 550 Vdc O/P: 240V, 60Hz, consists of 53a to 53f. Refer to illustration no. 23 for details.	NR
15	56a	Bobbin (Not Shown)	SUMITOMO BAKELITE CO LTD	PM-9820	Rated V-0, 150°C.	cURus
15	56b	Magnet wire (Not Shown)	SHENZHEN DAYANG INDUSTRY CO LTD	xUEW-NY@/130	Rated 130°C.	URus
15	56c	Tape (Not Sjown)	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	CT (b)(g)	Rated 130°C.	URus
15	56d	Margan tape (Not Shown)	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	WF* (c)(h)	Rated 130°C.	URus
15	56e	Varnish (Not Shown)	John C Dolph Co	BC-346A	Rated 155°C.	URus
16	57	PCB	Various	Various	Multilayer. Rated V-0, 105°C min, CTI 100 min, 1.6 mm thick. PCB layout refer to illustration no. 24 for details.	cURus
17	58	CPU (U3)	TI	TMS320 series	Operating voltage: 2 to 3.6 V, Secured to PWB by soldering.	NR
18	59	PCB	Various	Various	Multilayer. Rated V-0, 105°C min, CTI 100 min, 1.6 mm thick. PCB layout refer to illustration no. 25 for details.	cURus
19	60	Varistor (MOV1 ~ MOV8)	THINKING ELECTRONIC INDUSTRIAL CO LTD	TVA25621#	Rated 385Vac, SCCR 10kA, 85° C.	cURus
19	61	X capacitor (C17,C20)	FARAD ELECTRONICS CO LTD	PXK	X2 type. Rated 250Vac, 0,47µF, 100°C.	cURus
			SHENZHEN JINGHAO CAPACITOR CO LTD	CBB62B	X2 type. Rated 250Vac, 0,47µF, 110°C.	cURus
19	62	Terminal block	NINGBO DEGSON ELECTRICAL CO LTD	DG2206R-7.5*gggg	Rated 600V, 41A, wire range is 24-8 AWG.	cURus
19	63	Terminal block	NINGBO DEGSON ELECTRICAL CO LTD	DG136HT-10.16*e(1)	Rated 300V, 60A, wire range is 20-6 AWG.	cURus

4.0 Critical Components						
Photo #	Item no.[1]	Name	Manufacturer/ trademark[2]	Type / model[2]	Technical data and securement means	Mark(s) of conformity [3]
19	64	Y capacitor (C2, C4, C7, C12, C13, C15)	JUSUN (TAISHAN) ELECTRONICS LTD	JA	Y2 type. Rated 250 V, 10nF, 125° C.	cURus
19	65	X capacitor (C1,C6)	FARAD ELECTRONICS CO LTD	PXK	X2 type. Rated 250Vac, 0.47µF, 100°C.	cURus
19	66	X capacitor (C9,C10)	XIAMEN FARATRONIC CO LTD	C42	X2 type. Rated 305Vac, 4.7µF, 110°C.	cURus
			TDK (Zhuhai FTZ) Co., Ltd.	B3292#A/B		
			DONG GUAN HONGFARAD ELECTRONICS CO LTD	HMKP		
20	67	PCB	Various	Various	Multilayer. Rated V-0, 105°C min, CTI 100 min, 1.6 mm thick. PCB layout refer to illustration no. 26 for details.	cURus
21	68	CT (CT1)	SHENZHEN CLICK TECHNOLOGY CO., LTD	41-020085-00G	Rated 15mH. Refer to illustration no. 27 for details.	NR
22	69	PCB	Various	Various	Multilayer. Rated V-0, 105°C min, CTI 100 min, 1.6 mm thick. PCB layout refer to illustration no. 28 for details.	cURus

NOTES:

1) Not all item numbers are indicated (called out) in the photos, as their location is obvious.

2) “Various“ means any type, from any manufacturer that complies with the "Technical data and securement means" and meets the "Mark(s) of conformity" can be used.

3) Indicates specific marks to be verified, which assures the agreed level of surveillance for the component. "NR" - indicates Unlisted and only visual examination is necessary. "See 5.0" indicates Unlisted components or assemblies to be evaluated periodically refer to section 5.0 for details.

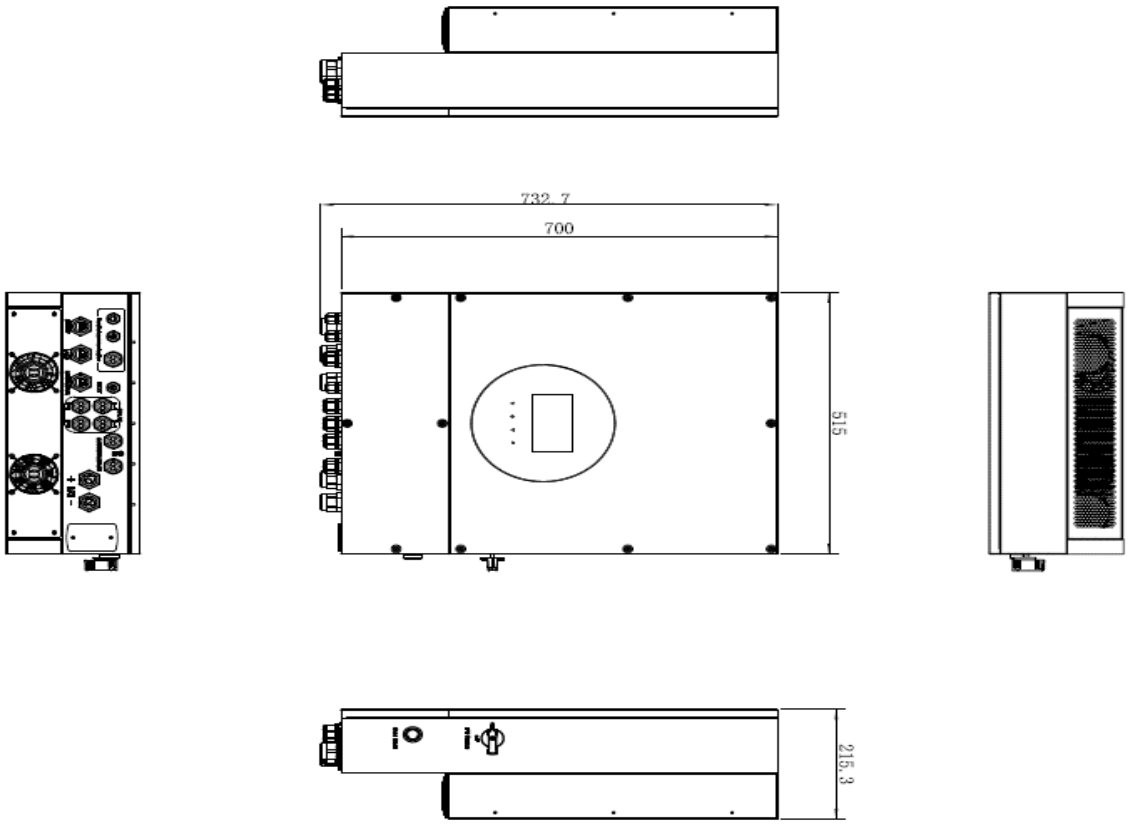
5.0 Critical Unlisted CEC Components

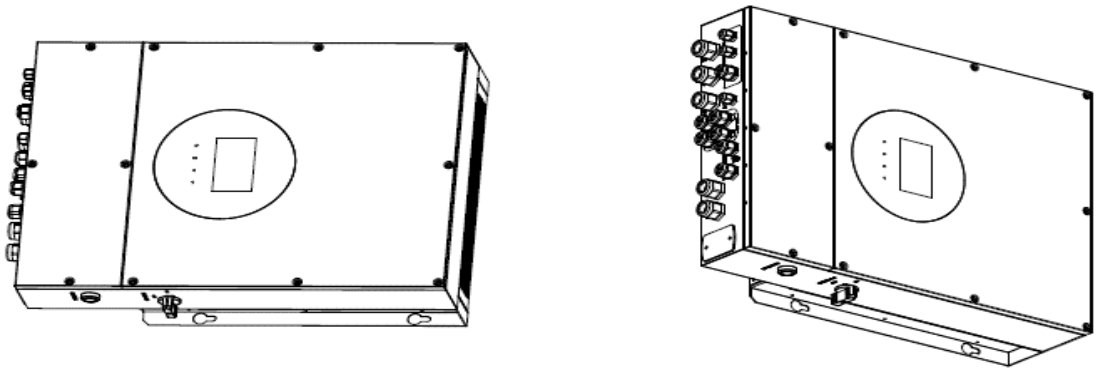
No Unlisted CEC components are used in this report.

6.0 Critical Features
Recognized Component - A component part, which has been previously evaluated by an accredited certification body with restrictions and must be evaluated as part of the basic product considering the restrictions as specified by the Conditions of Acceptability. Listed Component - A component part, which has been previously Listed or Certified by an accredited Certification Organization with no restrictions and is used in the intended application within its ratings. Unlisted Component - A part that has not been previously evaluated to the appropriate designated component standard. It may also be a Listed or Recognized component that is being used outside of its evaluated Listing or component recognition. Critical Features/Components - An essential part, material, subassembly, system, software, or accessory of a product that has a direct bearing on the product's conformance to applicable requirements of the product standard.
Construction Details - For specific construction details, reference should be made to the photographs and descriptions. All dimensions are approximate unless specified as exact or within a tolerance. In addition to the specific construction details described in this Report, the following general requirements also apply.
1. Spacing - In primary circuits, 9.5 mm minimum spacing are maintained through air and over surfaces of insulating material between current-carrying parts of opposite polarity and 12.7 mm minimum between such current-carrying parts and dead-metal parts or low voltage isolated circuits.
2. Mechanical Assembly - The inverter is assembled so that it is not adversely affected by the vibration of normal operation.
3. Corrosion Protection - All metal parts are protected against corrosion.
4. Accessibility of Live Parts - All uninsulated live parts are housed within a metal enclosure constructed with no openings other than those specifically described in Section 4.
5. Grounding - All exposed dead-metal parts and all dead-metal parts within the enclosure that are exposed are connected to the equipment grounding terminal as described in Section 4.
6. Internal Wiring - Internal wiring is routed away from sharp or moving parts. Internal wiring leads terminating in soldered connections are made mechanically secure prior to soldering. Recognized Component separable (quick disconnect) connectors of the positive detent type, closed loop connectors, or other types specifically described in the text of this report are also acceptable as internal wiring terminals. At points where internal wiring passes through metal walls or partitions, the wiring insulation is protected against abrasion or damage by plastic bushings or grommets. For all power wiring is minimum 10 AWG, with a minimum rating of 600V, 105°C. Refer to Section 4.0 for more details.
7. Markings - The product is marked on a labeling system as described in item no. 2 of Section 4.0 or by molding into polymeric enclosure> as follows: applicant's name or brand names, model number, date of manufacturer, electrical ratings
8. Cautionary Markings - The following are required: Refer to Illustration No.29 for details.
9. Installation, Operating and Safety Instructions - Instructions for installation and use of this product are provided by the manufacturer as required by the standard. Refer to Illustration No. 30 to 30a.
10 Transformer - Supplied records must be provided that indicate the received shipment of transformers of section 4, item 22 to 25, 53 and 56 was constructed as indicated in Illustration section 7, no. 10 to 13, 21 and 23. These records must be available at the factory for inspection on every received shipment.

7.0 Illustrations

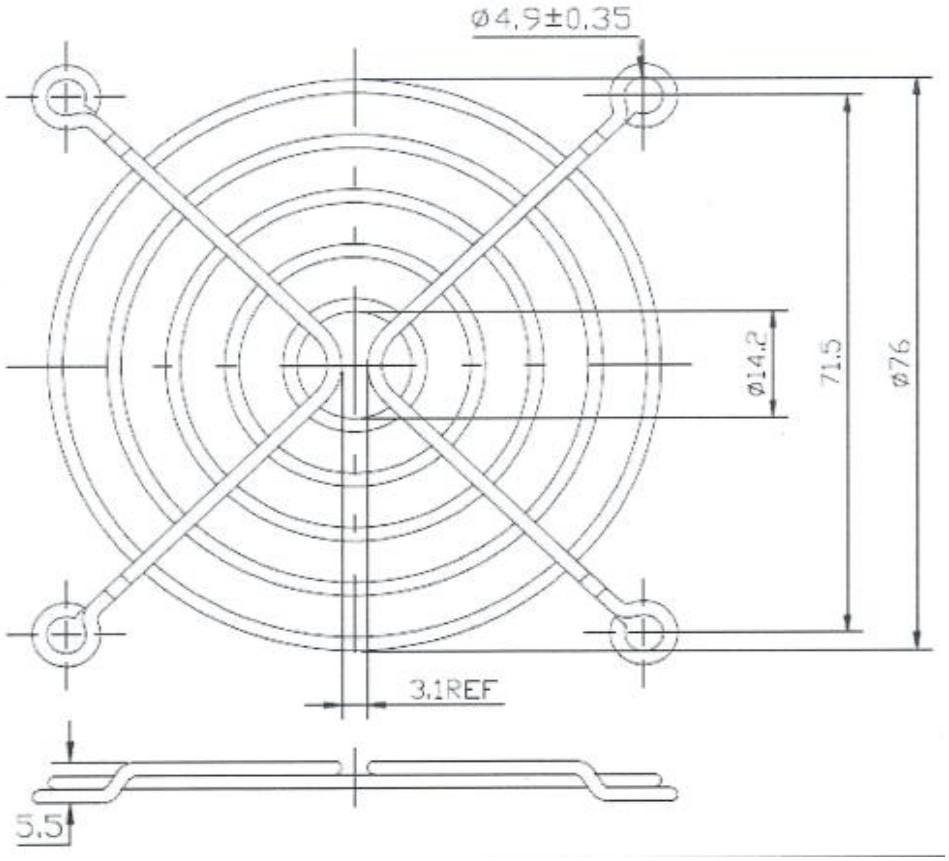
Illustration 1 - Dimension of enclosure (mm)





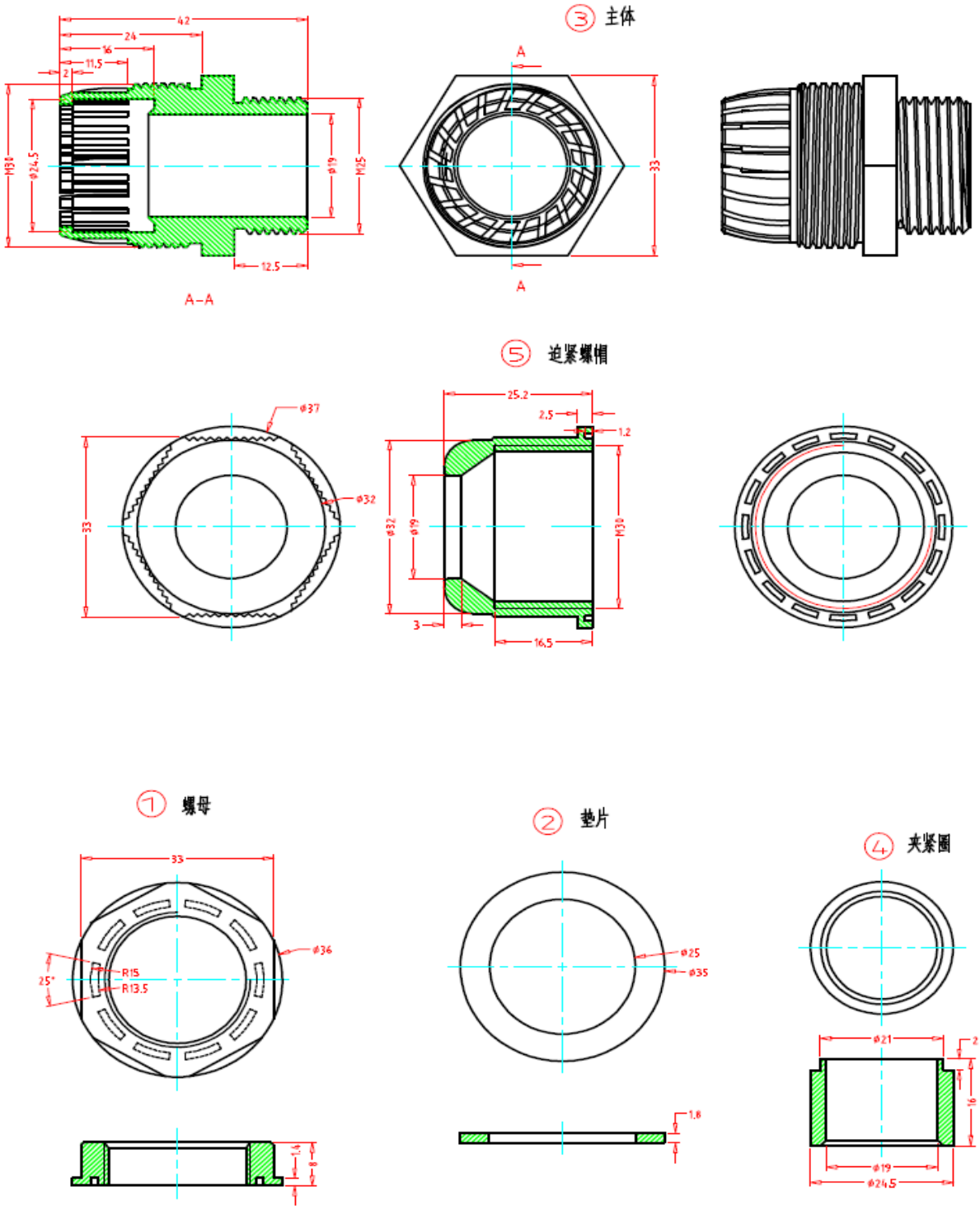
7.0 Illustrations

Illustration 2 - Dimension of fan guard



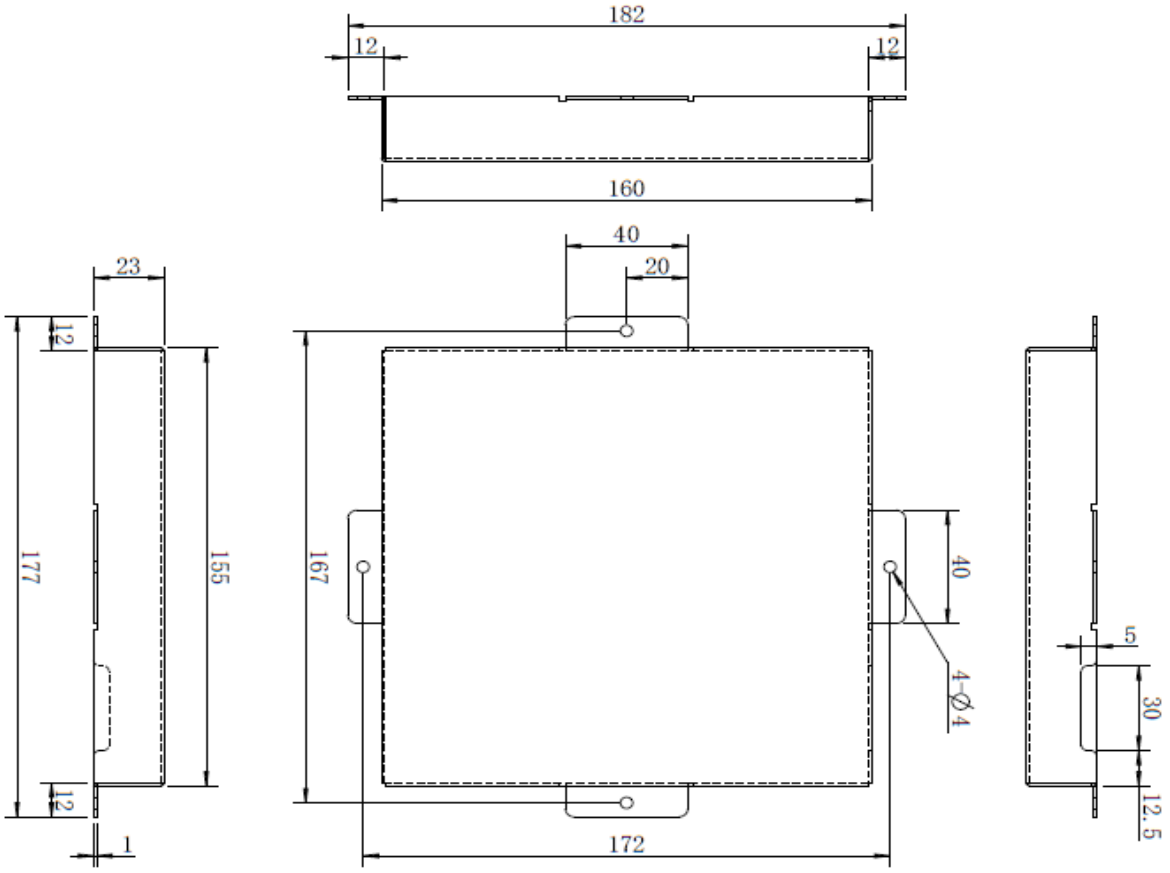
7.0 Illustrations

Illustration 3 - Dimension of cable gland

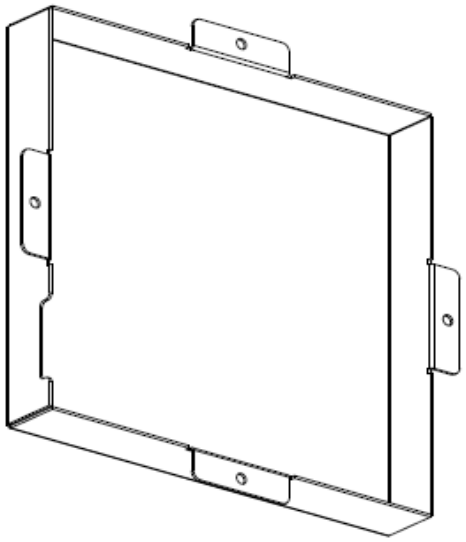


7.0 Illustrations

Illustration 4 - Dimension of LCD cover

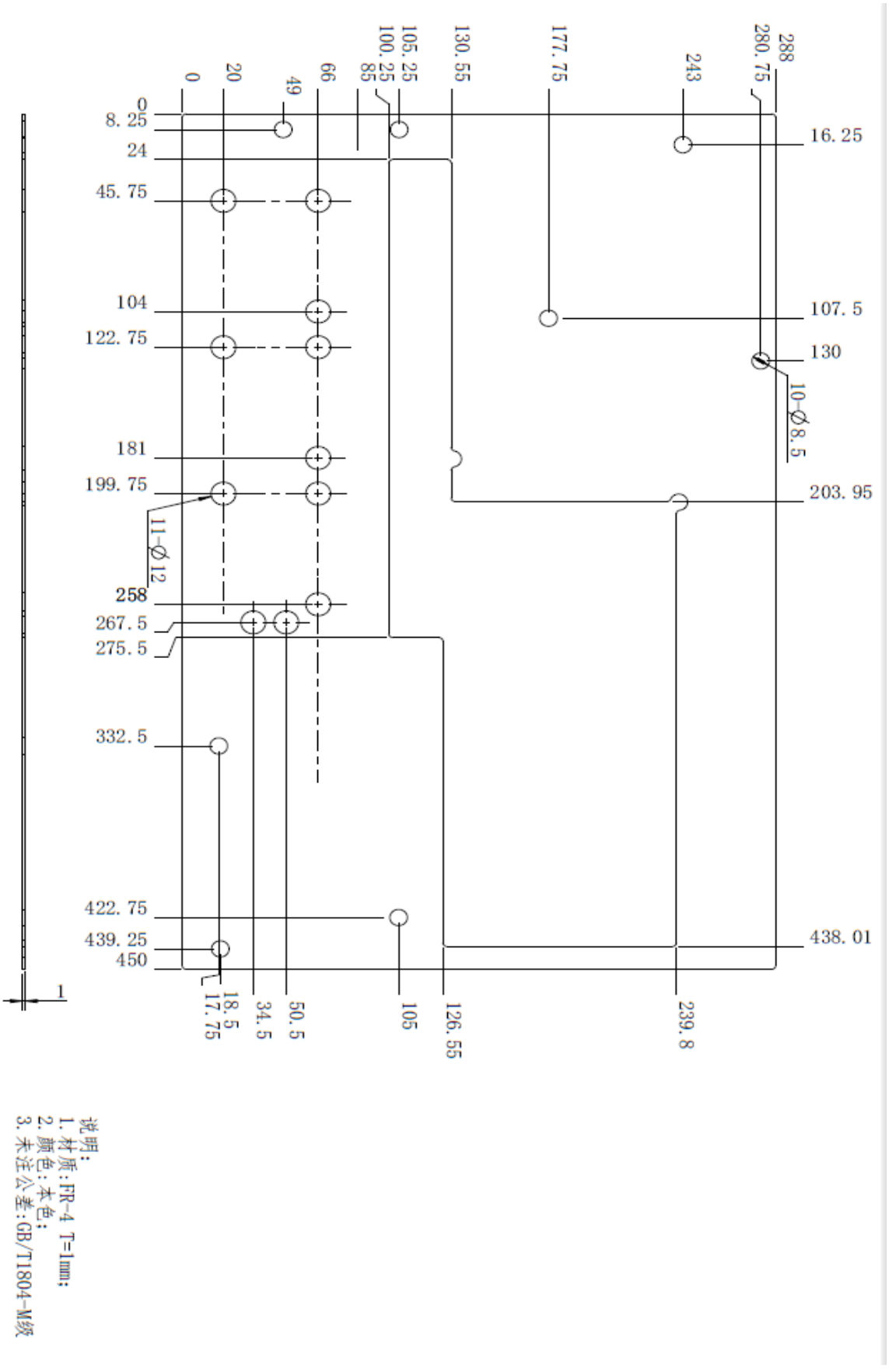


说明：
1、材料SGCC 1.0T；
2、表面处理：无
3、外观变形、脏污、划伤等不可，或参考日月元之限度样品；
4、打样及承认前图面以X1,X2,...版本控制，承认后以00,01...标记；
5、“*”标示为重点检查尺寸.



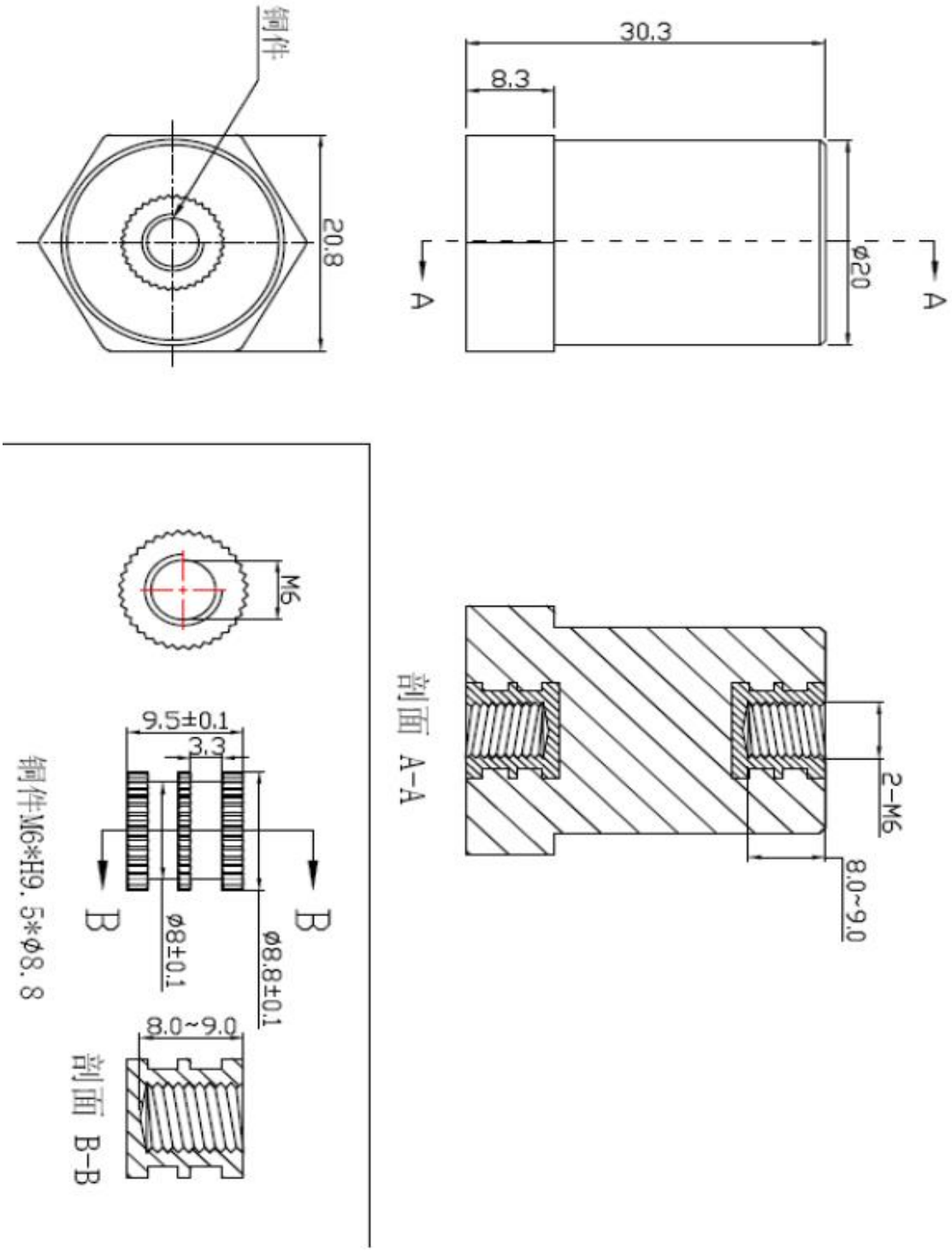
7.0 Illustrations

Illustration 5 - Dimension of isolation sheet



7.0 Illustrations

Illustration 6 - Dimension of Spacer

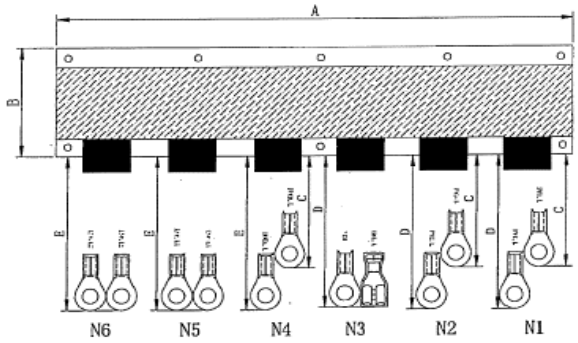


7.0 Illustrations

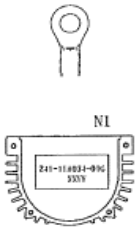
Illustration 7 - Details of choke

1. PHYSICAL DLMENSIONS:

A. 顶视图 (Front View)

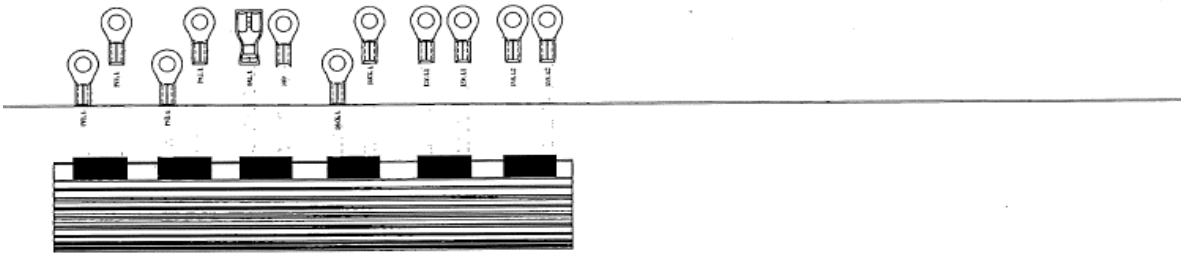


B. 侧视图 (Right View)



单位:(mm)
A:385±1.0
B:88±1.0
C:270±20
D:470±20
E:510±20

C. 正视图 (Front View)

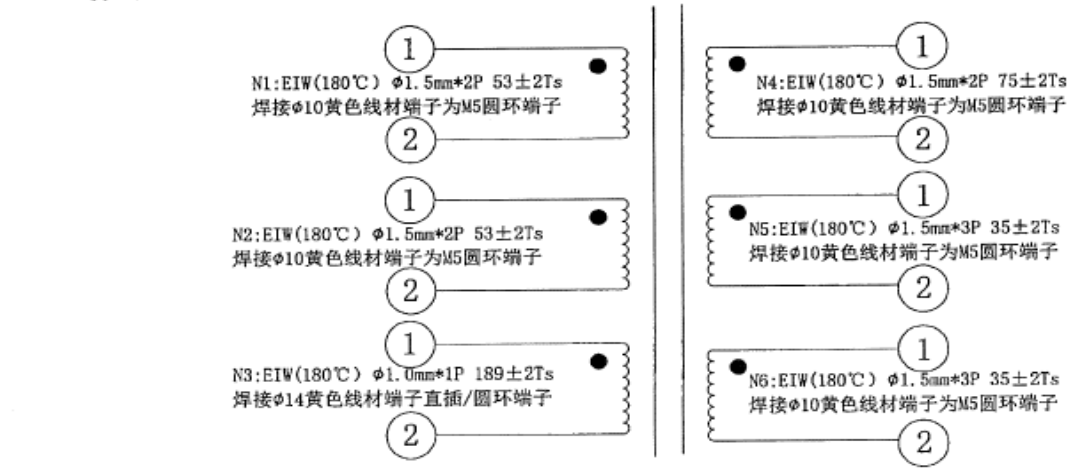


2. ELECTRICAL CHARCTRISTCS:

WDG	TEST CONDUCTION FREQ VOLT AC	INDUCTANCE mH	Q值 (MIN)	DCR AT25℃ (MAX)	WIRE SIZE (EIW)	TURNS ±2Ts
N1(1-2)	10KHz 1.0(内阻100Ω)	1.0±12%	***	60mΩ	φ1.5mm*2P	53Ts(内)
N2(1-2)	10KHz 1.0(内阻100Ω)	1.0±12%	***	60mΩ	φ1.5mm*2P	53Ts(内)
N3(1-2)	1KHz 0.1(内阻100Ω)	1.6±0.2	***	***	φ1.0mm*1P	189Ts(内)
N4(1-2)	20KHz 1.0(内阻100Ω)	1.52±12%	***	60mΩ	φ1.5mm*2P	75Ts(内)
N5(1-2)	50KHz 1.0(内阻100Ω)	0.5±12%	***	50mΩ	φ1.5mm*3P	35Ts(内)
N6(1-2)	50KHz 1.0(内阻100Ω)	0.5±12%	***	50mΩ	φ1.5mm*3P	35Ts(内)

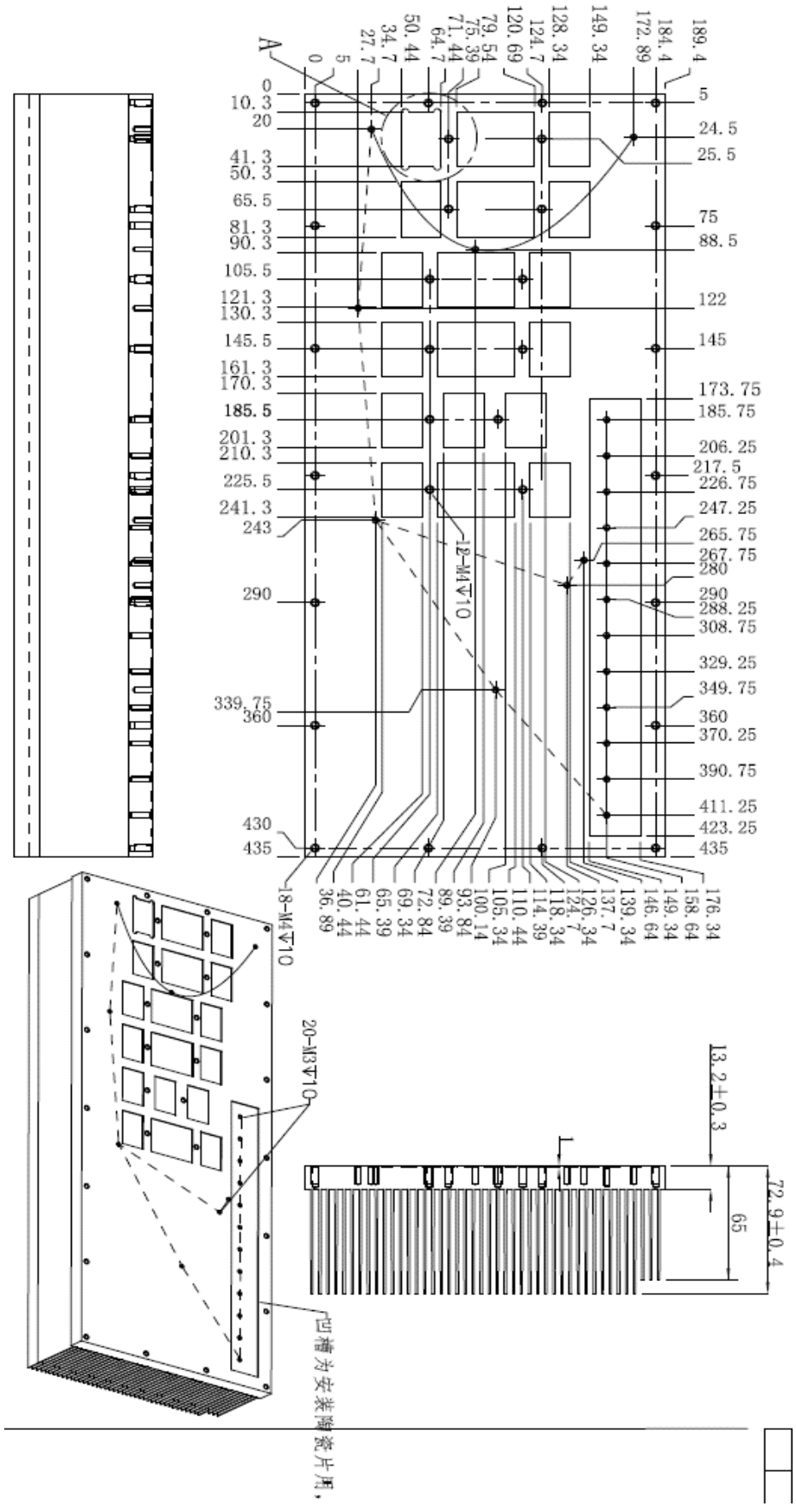
7.0 Illustrations

Illustration 7a - Details of choke



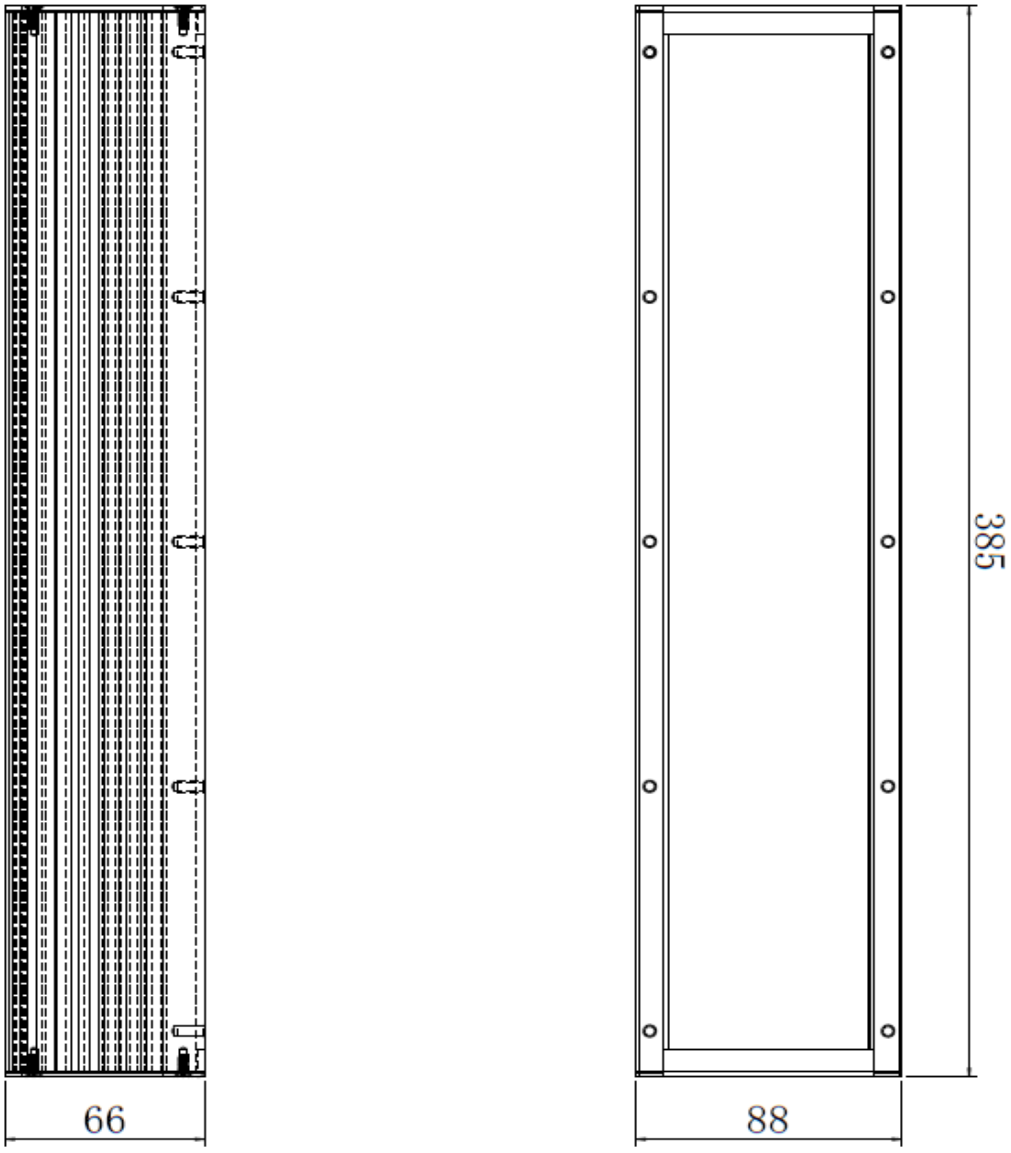
7.0 Illustrations

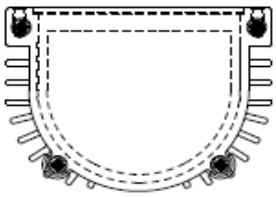
Illustration 8 - Dimension of Heatsink



7.0 Illustrations

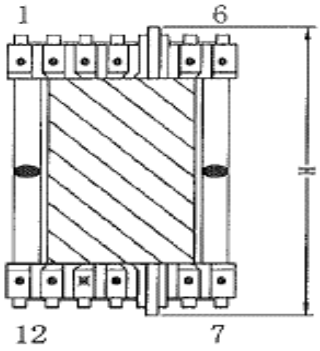
Illustration 9 - Dimension of Heatsink

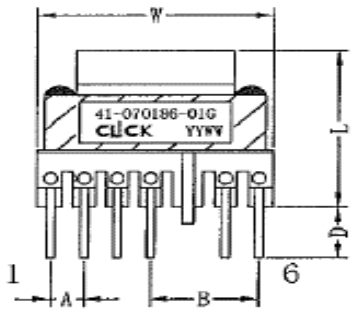


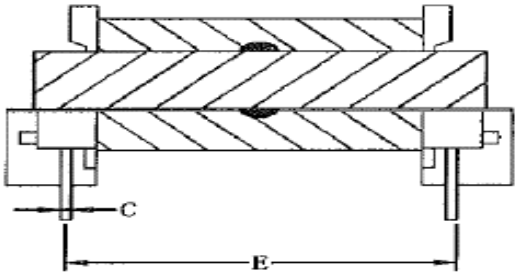


7.0 Illustrations

Illustration 10 - Details of Transformer(TX7)







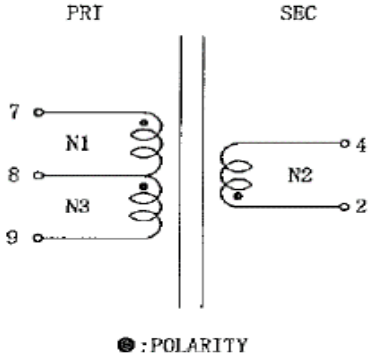
DIMENSION: (mm)

A: 2.4±0.5
B: 7.8±0.5
C: Φ0.6±0.1
D: 3.8±0.5
E: 21.3±0.5
L: 19.0 MAX
W: 18.0 MAX
H: 30.0 MAX

REMARK:

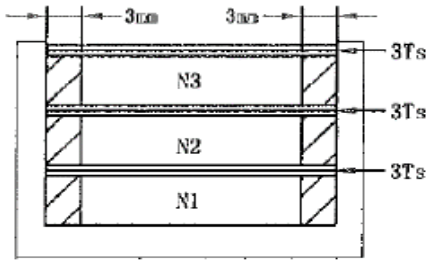
1. 骨架PIN10拔除.
2. 磁芯需开单边气隙，磁芯外包3TS胶带固定.
3. 磁芯接合处需点胶（共四点）.
4. 产品需真空含浸.

2. SCHEMATIC:



●:POLARITY

3. WINDING CONSTRUCTION:



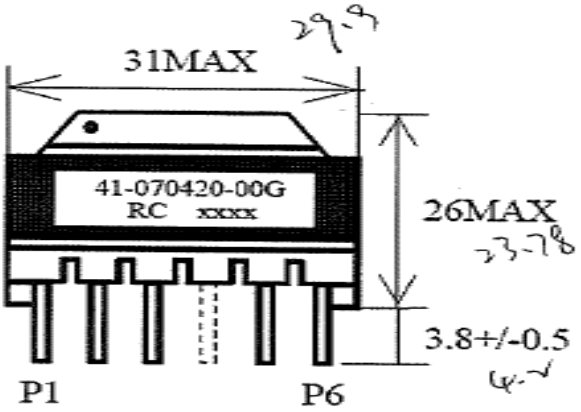
PIN1-6 SIDE PIN7-12 SIDE

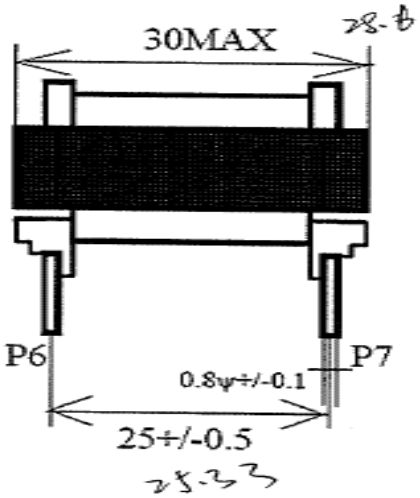
4. WINDING STEP:

WDG	TERMINAL	WIRE GAUGE	TURNS	TAPE	MARGIN TAPE	REMARKS
N1	7-8	Φ0.30mm*2P 2UEW-B	15	3	3.0/3.0mm	均绕
N2	2-4	Φ0.23mm 2UEW-B	200	3	3.0/3.0mm	密绕
N3	8-9	Φ0.30mm*2P 2UEW-B	15	3	3.0/3.0mm	密绕

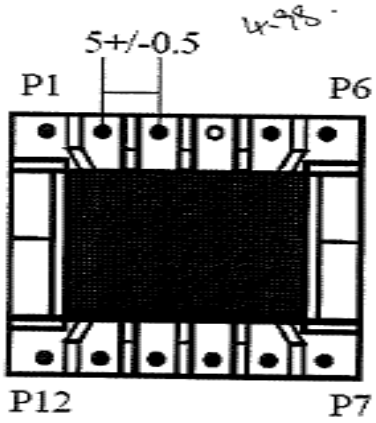
7.0 Illustrations

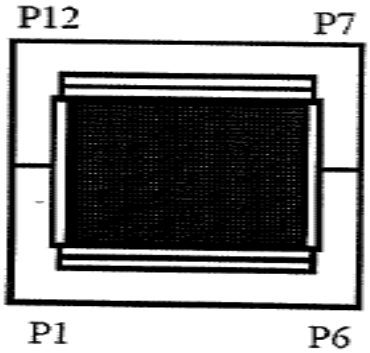
Illustration 11 - Details of Transformer(TX6)

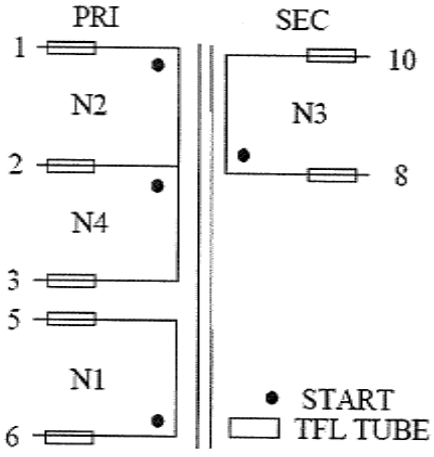


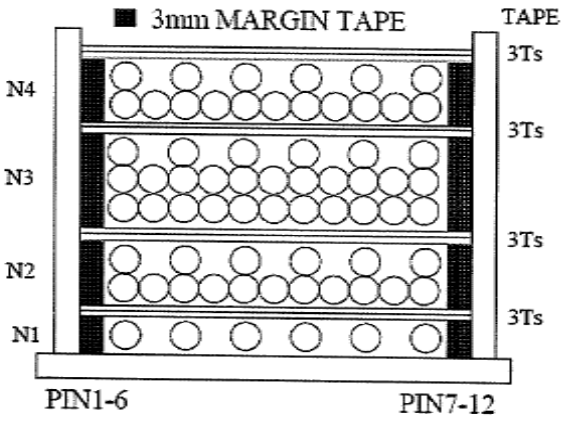


1)PIN4 CUT OFF.
2)CORE TAPE 3Ts.
3)外包裝盒須貼綠色環保標簽.







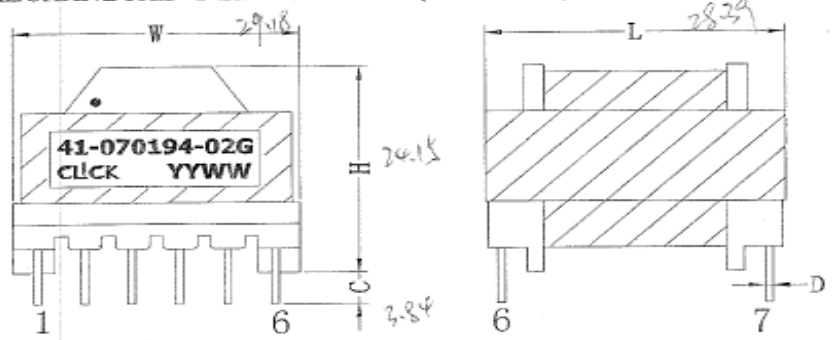


ORDER	WIRE SIZE	START	END	TURNS	LAYER	INSULATION	NOTE
N1	0.3mm*2P	6	5	5Ts	4-76	UL TAPE 3T	疏繞
N2	0.3mm*5P	1	2	14Ts	1ψ	UL TAPE 3T	密繞+疏繞
N3	0.3mm*6P	8	10	20Ts	1.5.5	UL TAPE 3T	密繞+疏繞
N4	0.3mm*5P	2	3	14Ts	13.9✓	UL TAPE 3T	密繞+疏繞

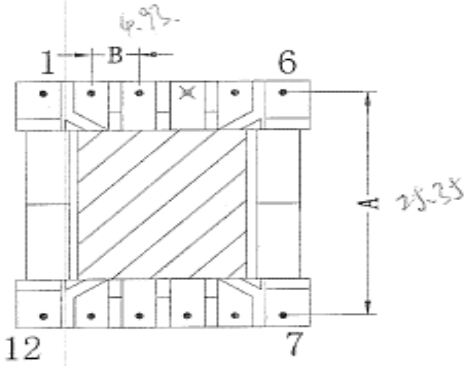
7.0 Illustrations

Illustration 12 - Details of Transformer(TX2)

1. MECHANICAL DIMENSION: (UNIT:mm)

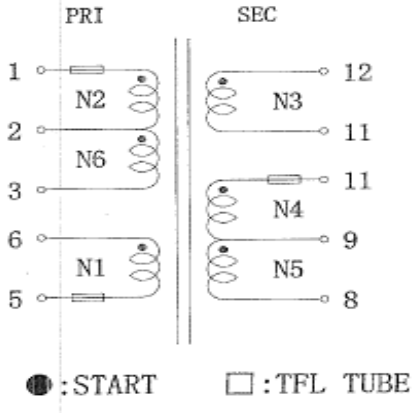


DIMENSION:(mm)
A: 25.0±0.5
B: 5.0±0.5
C: 3.8±0.5
D: Φ0.8±0.1
H: 26.0 MAX
L: 30.0 MAX
W: 31.0 MAX



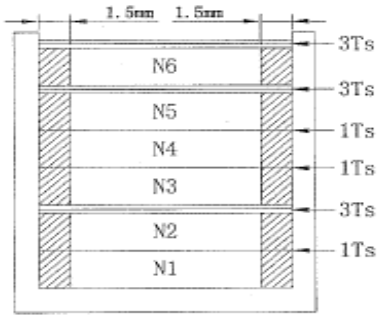
NOTE:
1. 铁芯包3Ts胶带固定.
2. PIN_4 CUT OFF.
3. PIN 1,5,11 加穿套管防短路.

2. SCHEMATIC:



●:START □:TFL TUBE

3. WINDING CONSTRUCTION:



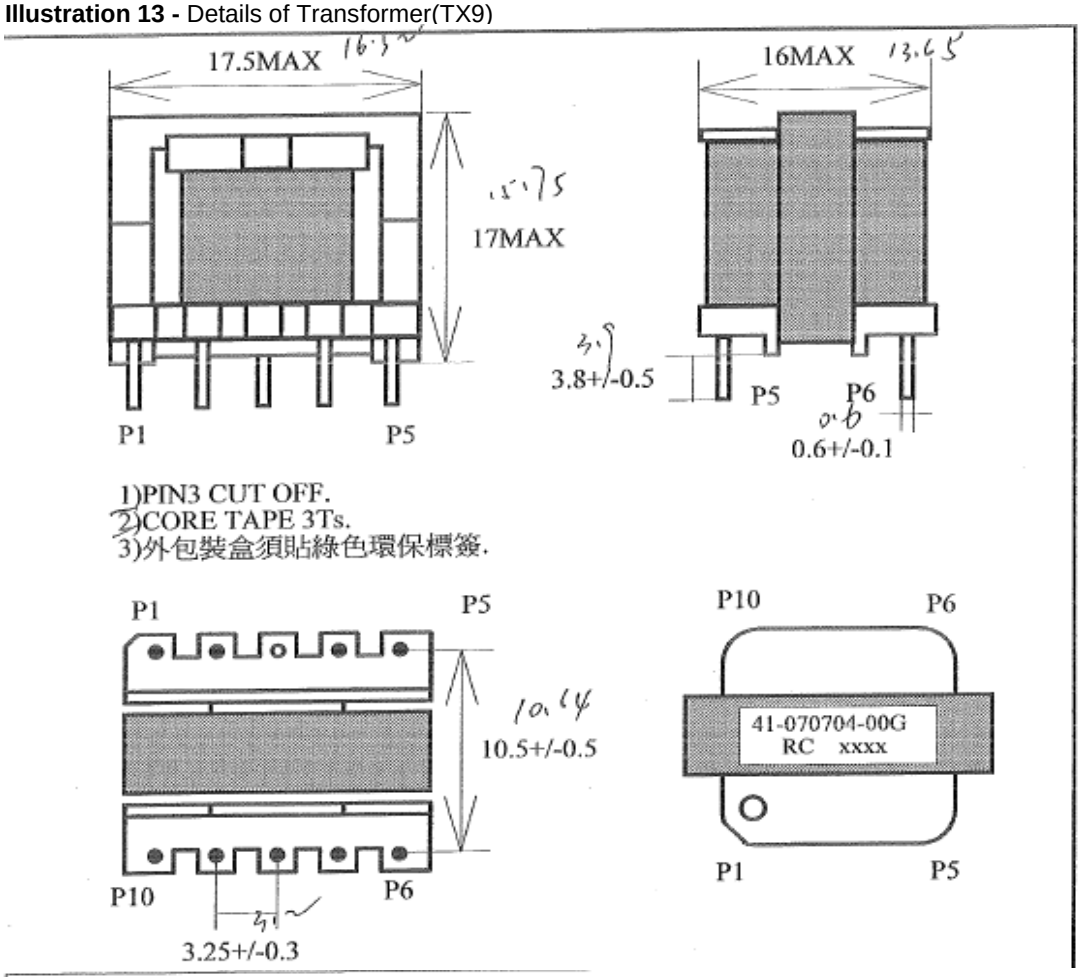
PIN1-6 SIDE PIN7-12 SIDE

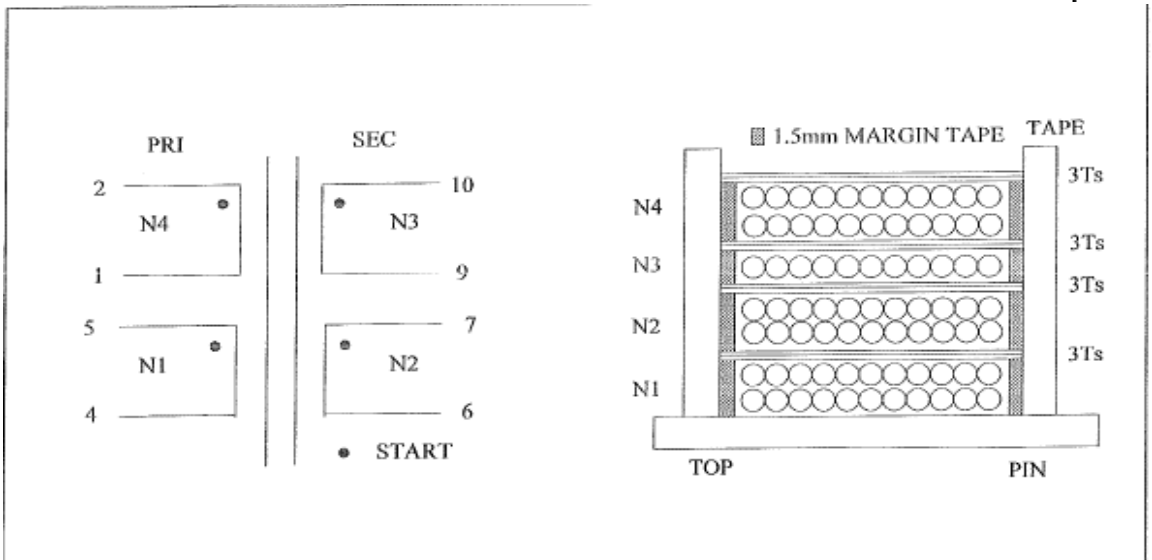
4. WINDING STEP:

WDG	START	FINISH	Wire Gauge	Turns	Margin Tape	Tape	Remarks
N1	6	5	2UEW-B Φ0.30*3P	5	1.5mm/1.5mm	1	均绕
N2	1	2	2UEW-B Φ0.30*8C	5	1.5mm/1.5mm	3	均绕
N3	12	11	2UEW-B Φ0.30*1P	5	1.5mm/1.5mm	1	均绕
N4	11	9	2UEW-B Φ0.30*10C	3	1.5mm/1.5mm	1	均绕
N5	9	8	2UEW-B Φ0.30*10C	1	1.5mm/1.5mm	3	均绕
N6	2	3	2UEW-B Φ0.30*8C	6	1.5mm/1.5mm	3	均绕

7.0 Illustrations

Illustration 13 - Details of Transformer(TX9)





ORDER	WIRE SIZE	START	END	TURNS	LAYER	INSULATION	NOTE
N1	0.2mm	5	4	53Ts	5入7	UL TAPE 3T	密繞
N2	0.2mm	7	6	53Ts	5入9	UL TAPE 3T	密繞
N3	0.2mm	10	9	30Ts	29.9	UL TAPE 3T	密繞
N4	0.2mm	2	1	53Ts	5入9	UL TAPE 3T	密繞

7.0 Illustrations

Illustration 14 - Details of Inductor(L2)

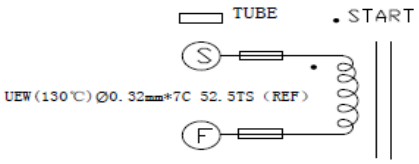
1 ELECTRICAL CHARCTERISTICS:

绕线方法：顶视、逆时针

WINDING	TEST CONDUCTION FREQ VOLT AC	INDUCTANCE uH	D C R AT25℃ MAX	Q值 REF	WIRE SIZE UEW	TURNS REF
S-F	1KHZ 0.3V 仪器内阻100Ω	150±10%	85mΩ	1	Ø0.32mm*7C	52.5TS

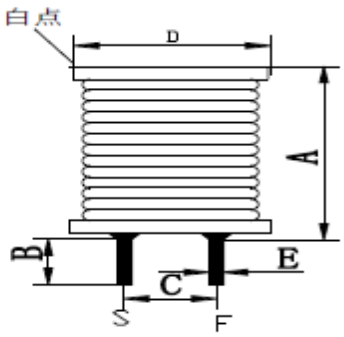
1-1. LAYER INSULATION
DC 1500V

1-2. HI-POT:
CORE-COIL AC 0.5 KV 3mA 3S

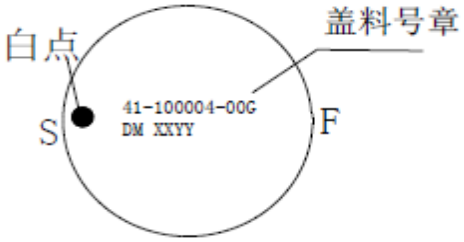


3 PHYSICAL DLMENSIONS:

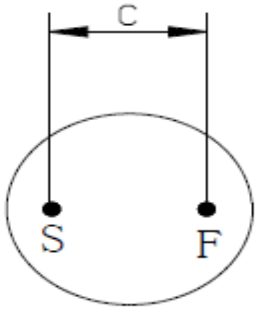
A、正面图（Front View）



B、俯视图(Top view)



C、底视图（BOTTOM VIEW）



单位：mm
A:26.0MAX
B:4.0±0.5
C:10.0±0.5
D:20.0MAX
E:1.0±0.1

7.0 Illustrations

Illustration 15 - Details of Inductor(L4)

1 ELECTRICAL CHARCTERISTICS:

绕线方法:N1、N2、N3往返绕两层

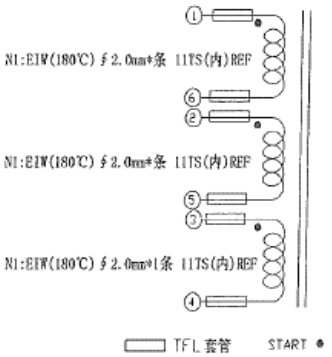
WINDING	TEST CONDUCTION FREQ VOLT	INDUCTANCE mH	Q min	D C R (AT25℃) mΩ	WIRE SIZE EIW	TURNS REF
N1:(1----6)	1KHZ 0.25V (仪器内阻100Ω)	1.4±30%	3	7.5 MAX	φ2.0mm*1条	11TS(内圈)
N2:(2----5)	1KHZ 0.25V (仪器内阻100Ω)	1.4±30%	3	7.5 MAX	φ2.0mm*1条	11TS(内圈)
N3:(3----4)	1KHZ 0.25V (仪器内阻100Ω)	1.4±30%	3	7.5 MAX	φ2.0mm*1条	11TS(内圈)

1-1. Hi-pot:

COIL TO COIL AC 1500V 5mA 50HZ 3S

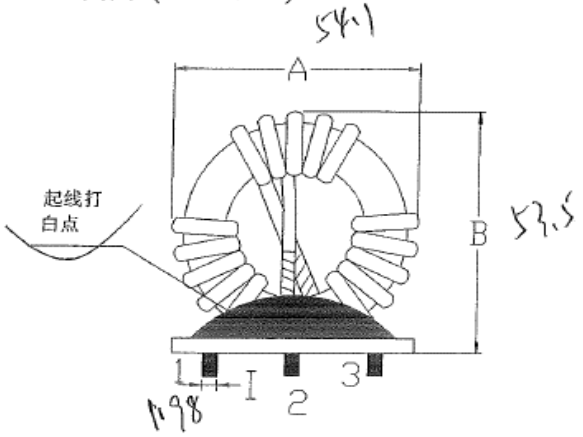
1-2. INSULATION RESISTANCE :

THE INSULATION RESISTANCE BETWEEN COIL TO COIL IS OVER 100M OHM AT DC 500V.

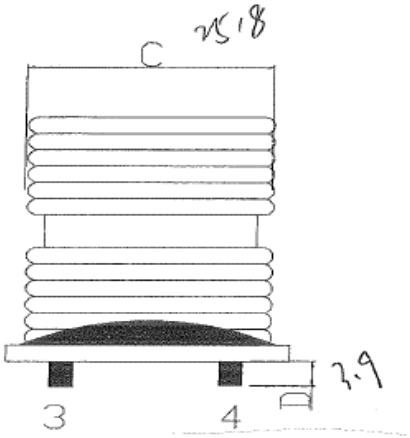


3 PHYSICAL DLMENSIONS:(UNIT:mm.)

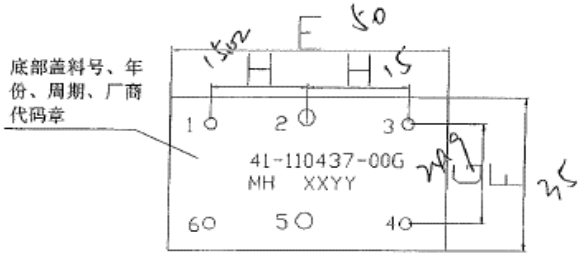
A、正面图 (Front View)



B、侧视图 (Right View)



C、底视图(Bottom View)



A: 58.0 MAX
B: 59.0 MAX
C: 30.0 MAX
D: 3.8±0.5（含锡尖）
E: 50.0±0.5
F: 35.0±0.5
G: 25.0±0.5
H: 15.0±0.5
I: 2.0±0.1

单位:mm

7.0 Illustrations

Illustration 16 - Details of CT(TX1)

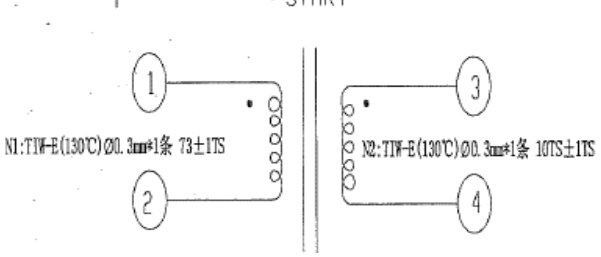
1 ELECTRICAL CHARCTERISTICS:

绕线方法:循环绕, 先绕N1再绕N2

WINDING	TEST CONDUCTION FREQ VOLT AC	INDUCTANCE mH	Q值 (MIN)	D C R AT25℃ MAX	WIRE SIZE TIW-E	TURNS
N1:(1-2)	20KHZ 1.0V (仪器1062A 内阻100Ω)	**	***	480mΩ	Ø0. 3mm* 1条	73±1TS
N2:(3-4)	20KHZ 1.0V (仪器1062A 内阻100Ω)	**	***	100mΩ	Ø0. 3mm* 1条	10TS±1TS

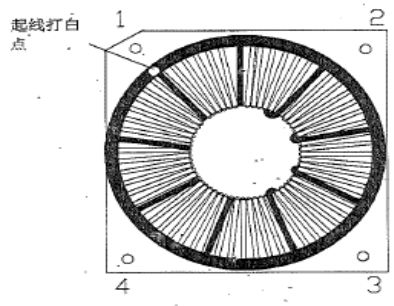
1-1. LAYER INSULATION:
PIN1～PIN2: AC 800V
PIN3～PIN4: AC 800V

1-2. HI-POT:
COIL TO COIL AC 500V 5mA 50HZ 3S

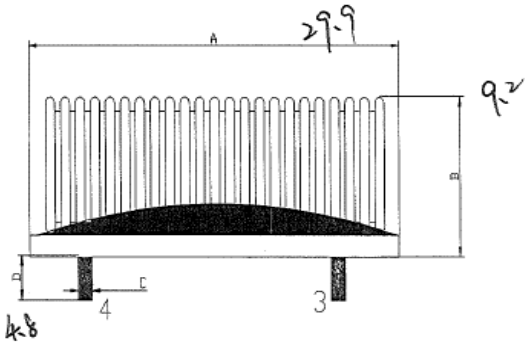


3 PHYSICAL DLMENSIONS:

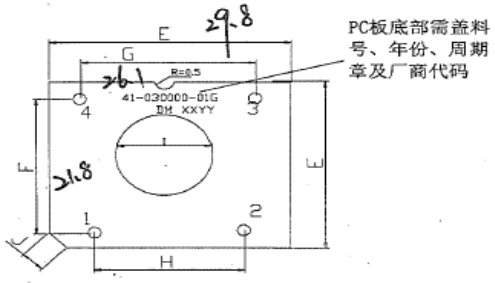
A、俯视图 (Tob View)
单位：mm



B、正面图（Front View)



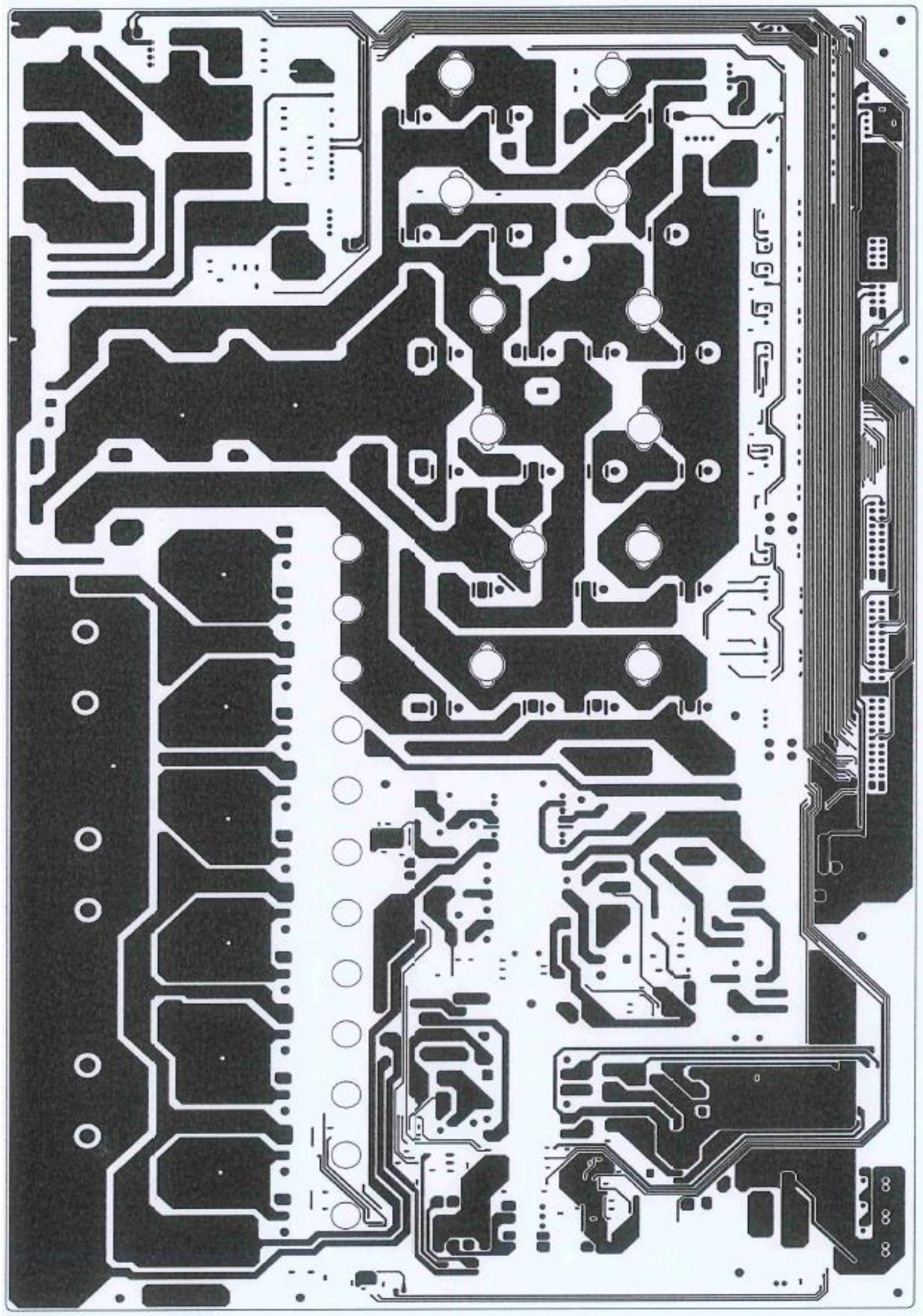
C、底视图 (Bottom View)



单位：mm
A:30.5MAX
B:14.0MAX
C:1.0±0.2
D:5.0±0.5
E:30.0±0.5
F:22.0±0.5
G:26.0±0.5
H:22.0±0.5
I:18.0±0.5
J:5.6±0.5

7.0 Illustrations

Illustration 17 - PCB layout of 16-501752-00G(C)



7.0 Illustrations

Illustration 18 - Details of Inductor(L2)

1 ELECTRICAL CHARCTERISTICS:

绕线方法:N1、N2、N3各绕两层

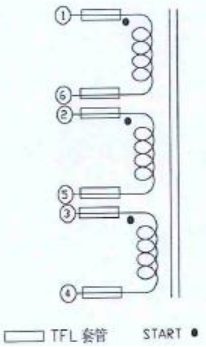
WINDING	TEST CONDUCTION FREQ VOLT	INDUCTANCE mH	D C R (AT25℃) mΩ	WIRE SIZE EIW	TURNS REF
N1:(1----6)	10KHZ 0.1V (仪器内阻100Ω)	4.5 min 7.85mH	5 MAX 2.3mΩ	Ø2.0mm*2P	10TS
N2:(2----5)	10KHZ 0.1V (仪器内阻100Ω)	4.5 min 7.35mH	5 MAX 2.1mΩ	Ø2.0mm*2P	10TS
N3:(3----4)	10KHZ 0.1V (仪器内阻100Ω)	4.5 min 7.37mH	5 MAX 2.1mΩ	Ø2.0mm*2P	10TS

1-1. Hi-pot:

COIL TO COIL AC 1500V 5mA 50HZ 3S 0.03mA

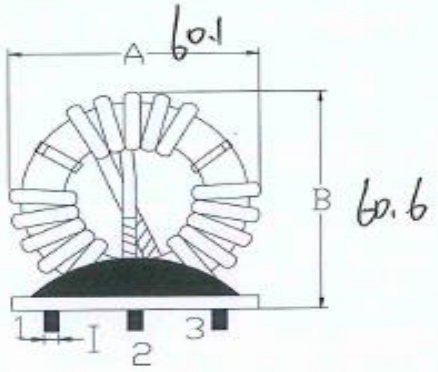
1-2. INSULATION RESISTANCE :

THE INSULATION RESISTANCE BETWEEN COIL TO COIL IS OVER 100M OHM AT DC 500V. 5.786mΩ

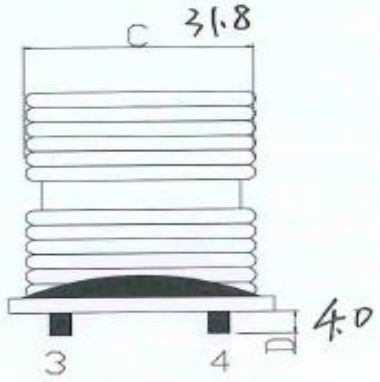


3 PHYSICAL DLMENSIONS:(UNIT:mm.)

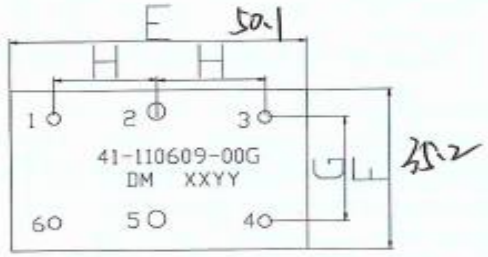
A、正面图 (Front View)



B、侧视图 (Right View)



C、底视图(Bottom View)

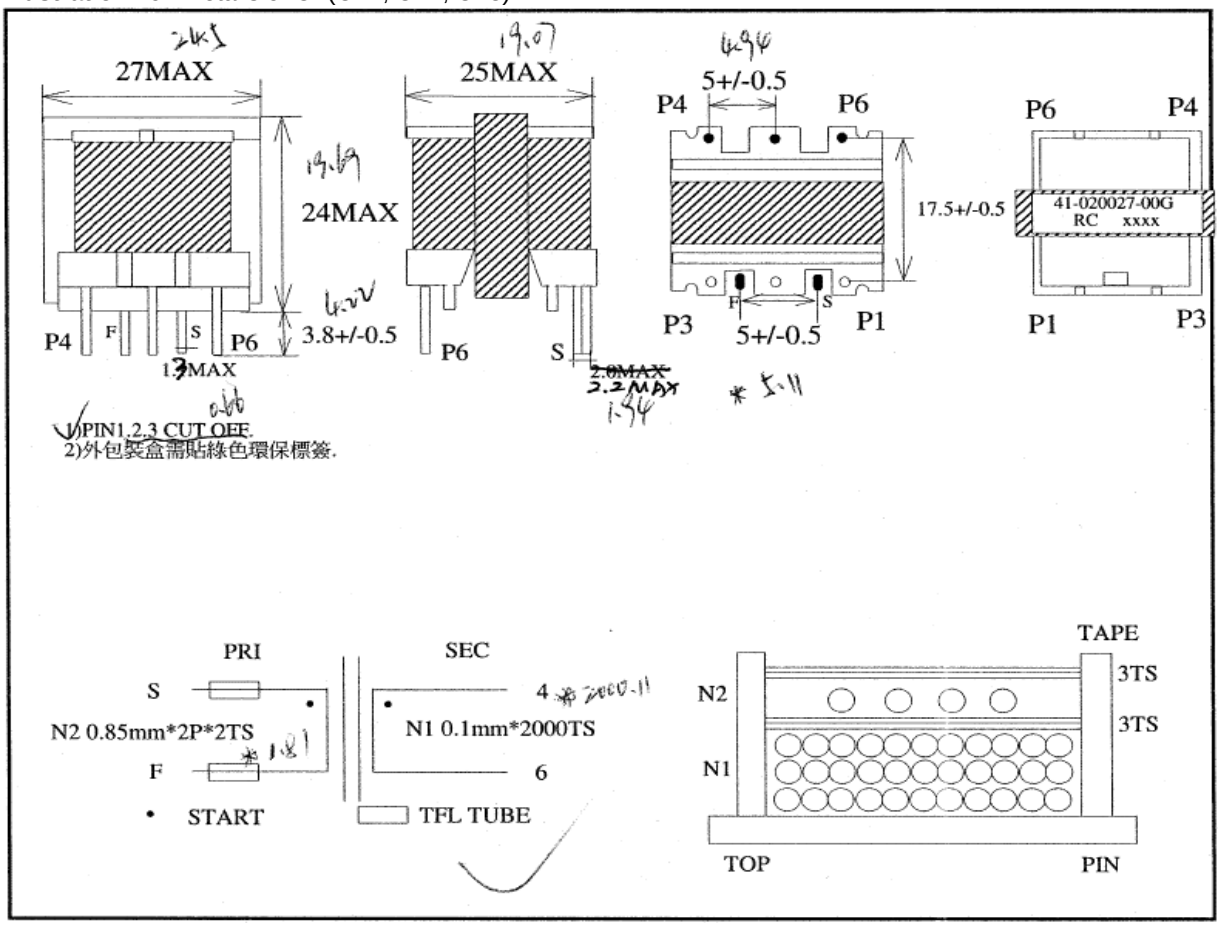


单位:mm
A: 64.0 MAX
B: 65.0 MAX
C: 37.0 MAX
D: 3.8±0.5
E: 50.0±0.5
F: 35.0±0.5
G: 25.0±0.5
H: 15.0±0.5
I: 4.3*2.3MAX

40×1.9

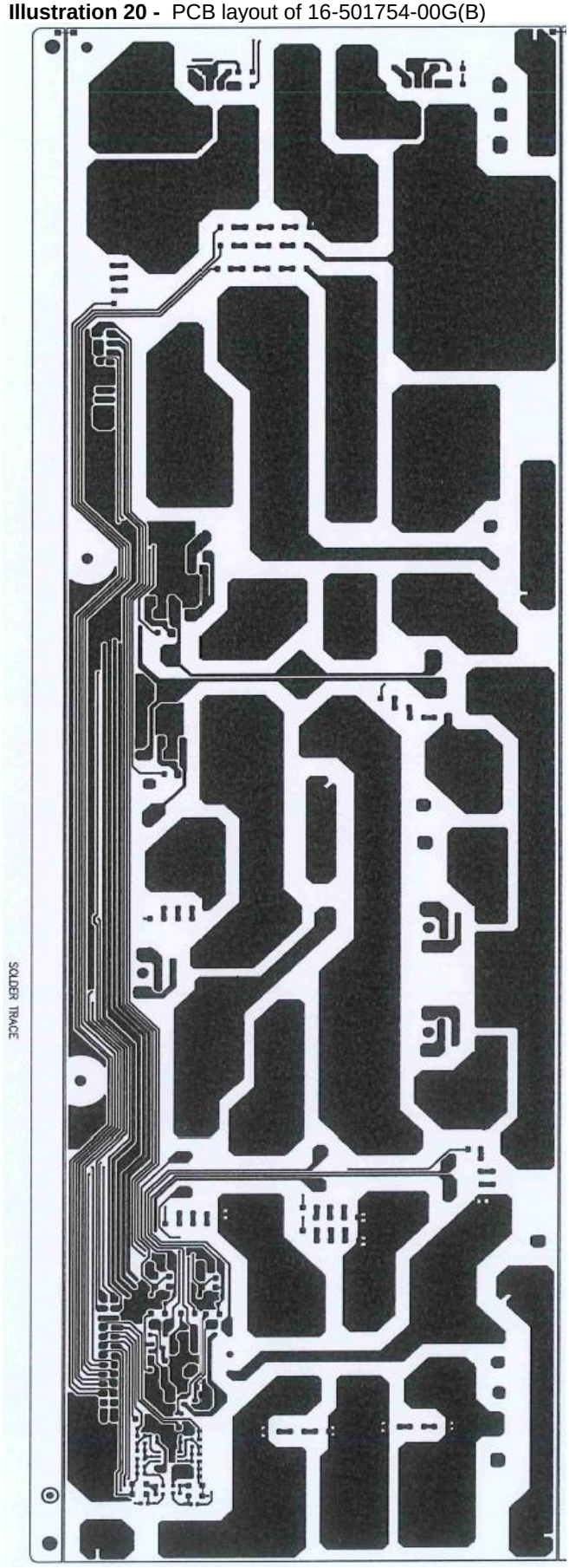
7.0 Illustrations

Illustration 19 - Details of CT(CT1, CT2, CT3)



7.0 Illustrations

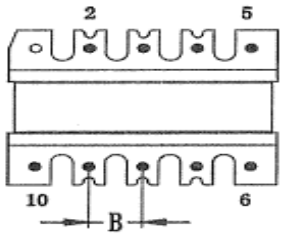
Illustration 20 - PCB layout of 16-501754-00G(B)

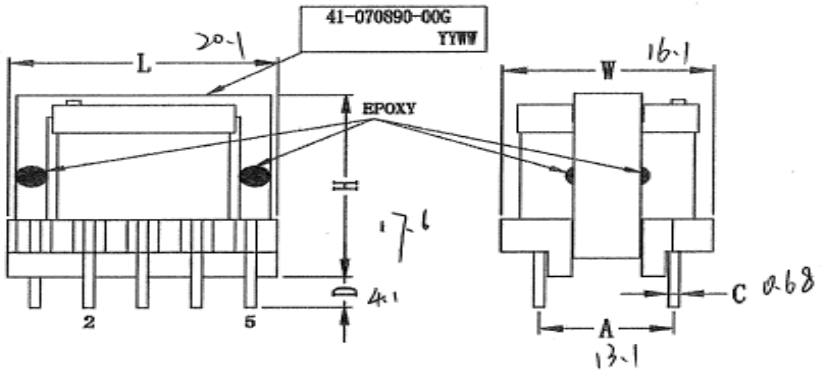


7.0 Illustrations

Illustration 21 - Details of Transformer(TX2)

1. MECHANICAL DIMENSION: (UNIT:mm)

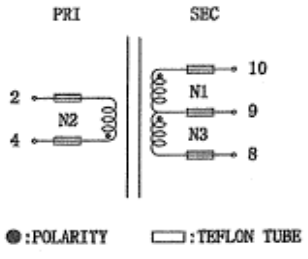




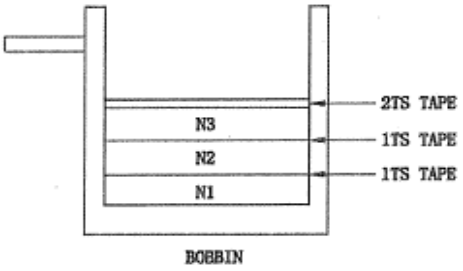
DIMENSION: (mm)
A: 13.0±0.5
B: 3.9±0.5
C: Φ0.7±0.1
D: 3.8±0.5
L: 22.0 MAX
W: 18.0 MAX
H: 18.0 MAX

NOTE:
1. 骨架PIN1拔除.
2. 磁芯不开气隙，磁芯外包3TS胶带.
3. 产品需真空含浸.
4. 磁芯结合处需点胶固定（共四点）.

2. SCHEMATIC:



3. WINDING CONSTRUCTION:

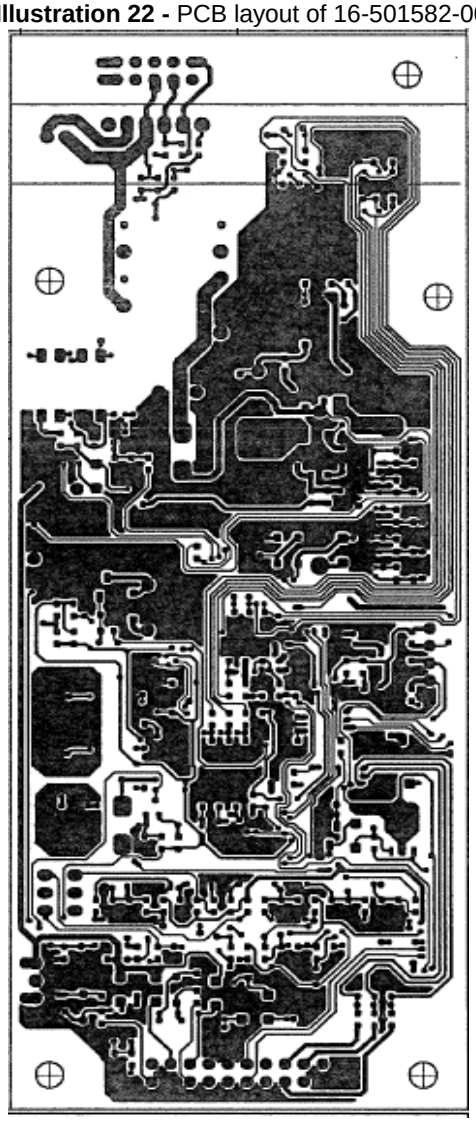


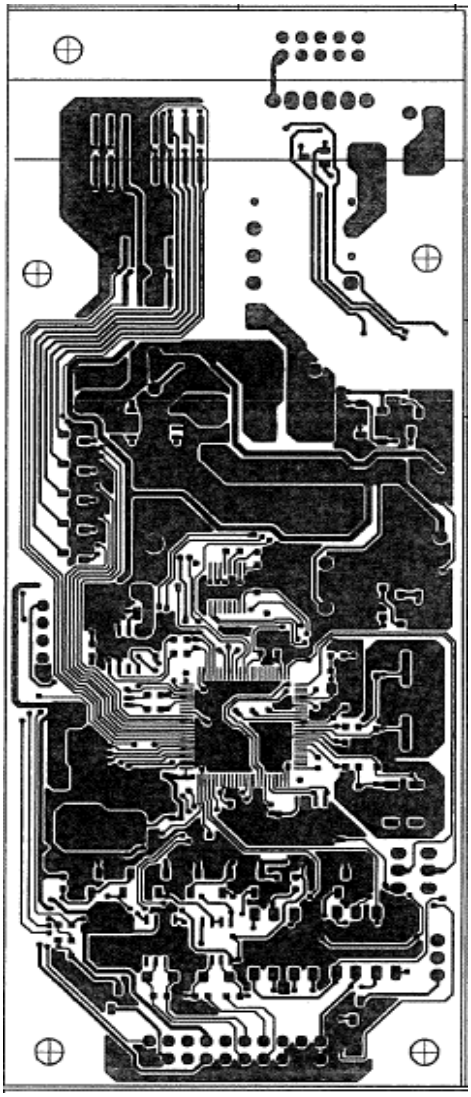
4. WINDING STEP:

WDG	TERMINAL	WIRE GAUGE	TURNS	TAPE	REMARKS
N1	10-9	三层绝缘线 Φ0.40mm*2P	15	1	密绕 15.09
N2	4-2	三层绝缘线 Φ0.45mm*2P	12	1	密绕 11.96
N3	9-8	三层绝缘线 Φ0.40mm	15	2	密绕+均绕 14.96

7.0 Illustrations

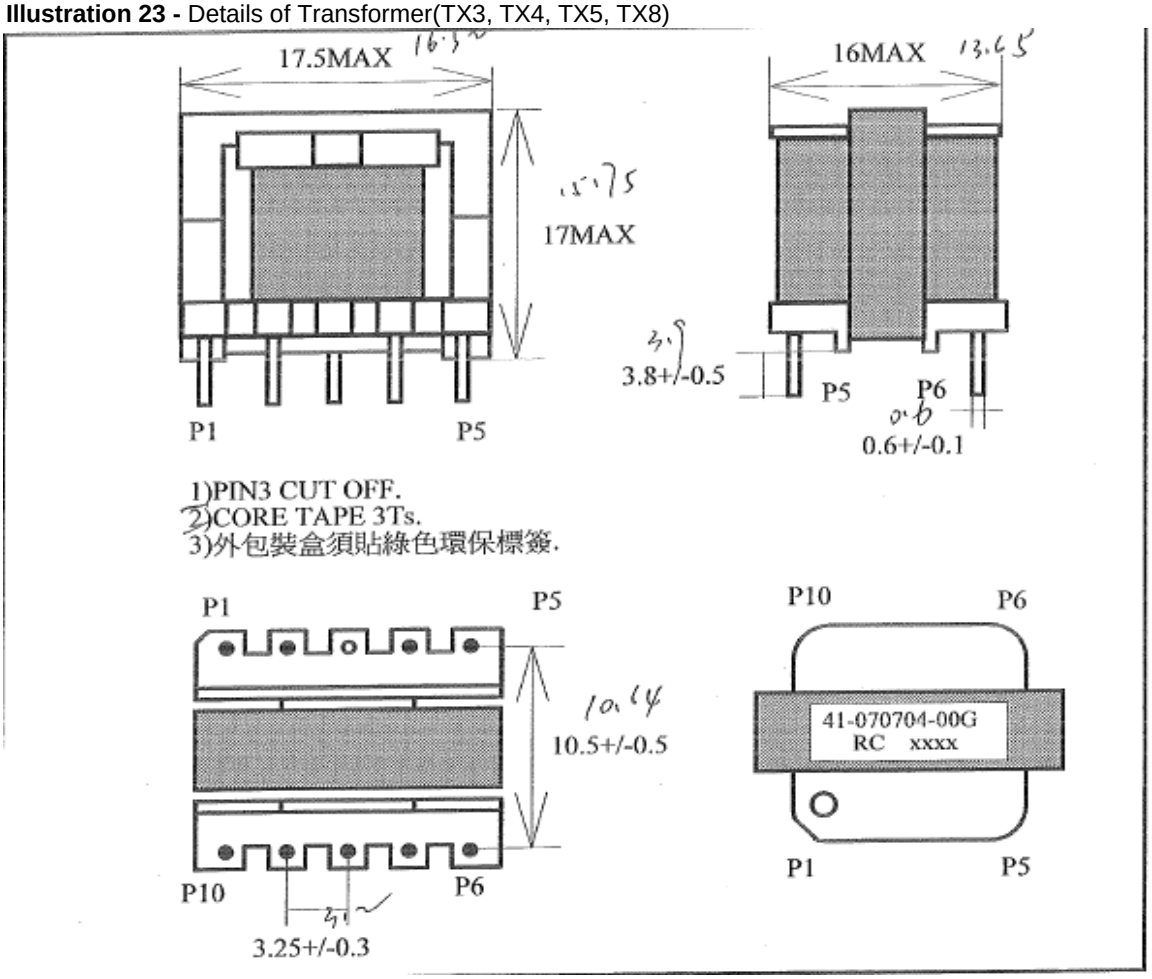
Illustration 22 - PCB layout of 16-501582-00G

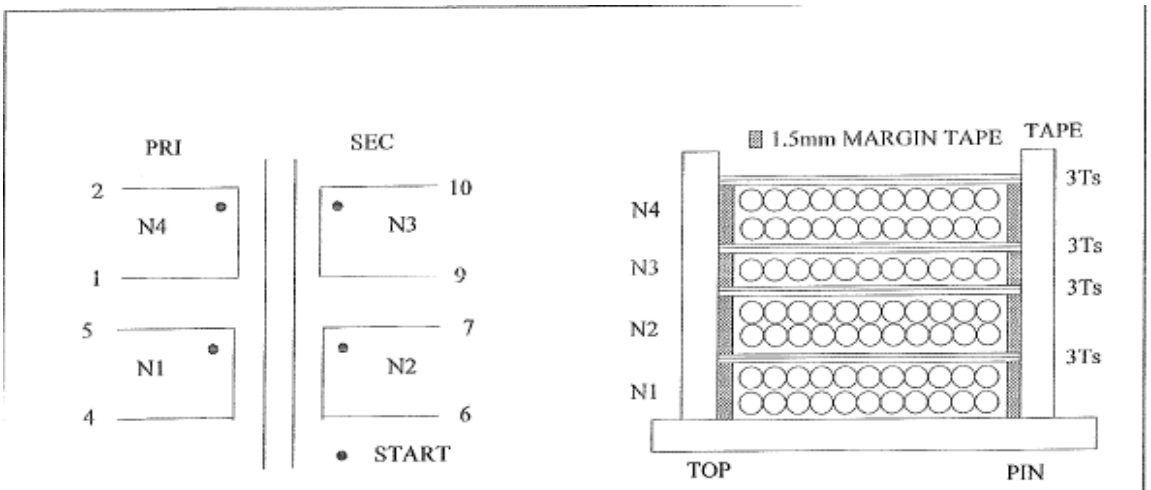




7.0 Illustrations

Illustration 23 - Details of Transformer(TX3, TX4, TX5, TX8)

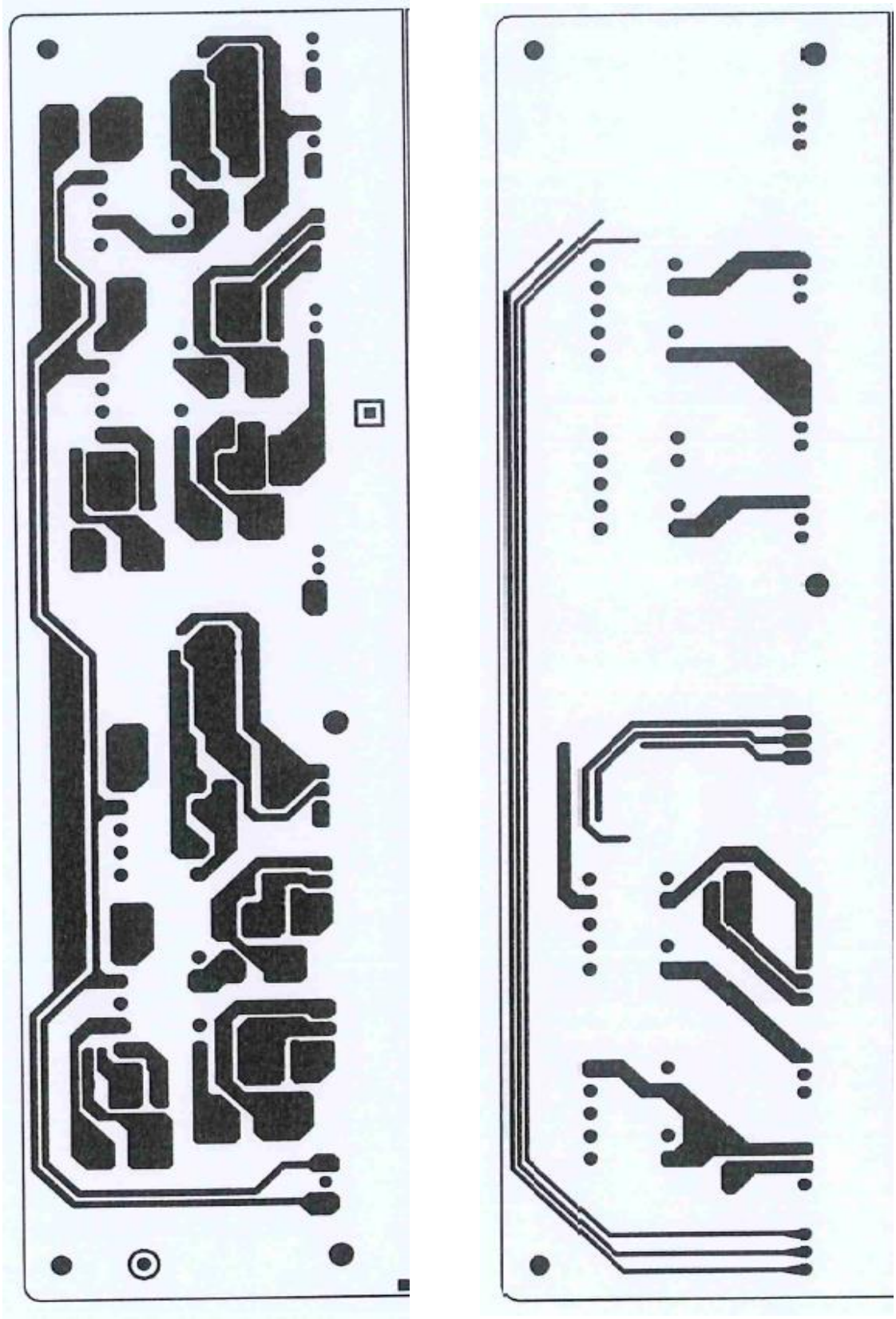




ORDER	WIRE SIZE	START	END	TURNS	LAYER	INSULATION	NOTE
N1	0.2mm	5	4	53Ts	5入7	UL TAPE 3T	密繞
N2	0.2mm	7	6	53Ts	5入9	UL TAPE 3T	密繞
N3	0.2mm	10	9	30Ts	29.9	UL TAPE 3T	密繞
N4	0.2mm	2	1	53Ts	5入9	UL TAPE 3T	密繞

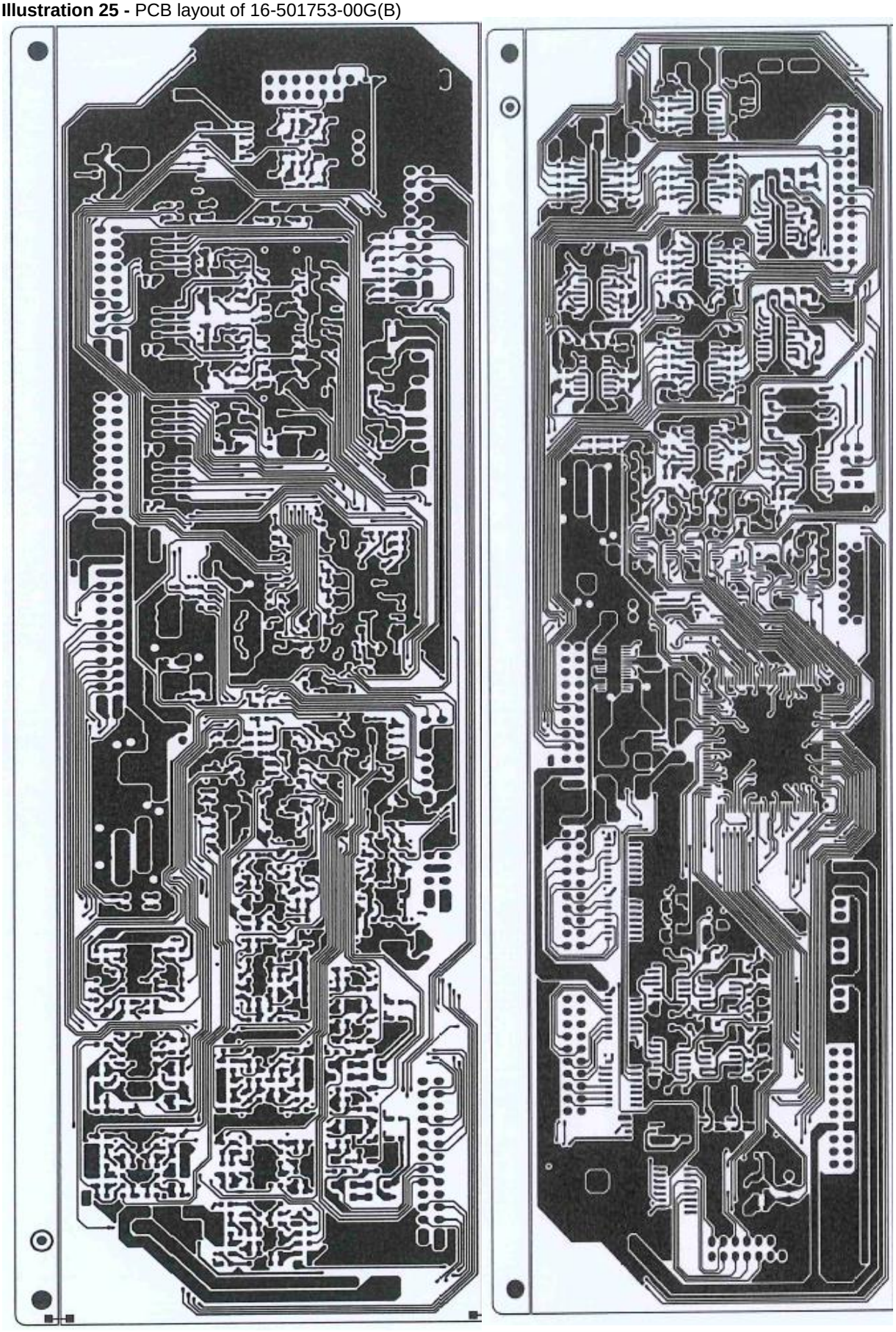
7.0 Illustrations

Illustration 24 - PCB layout of 16-501771-00G(B)



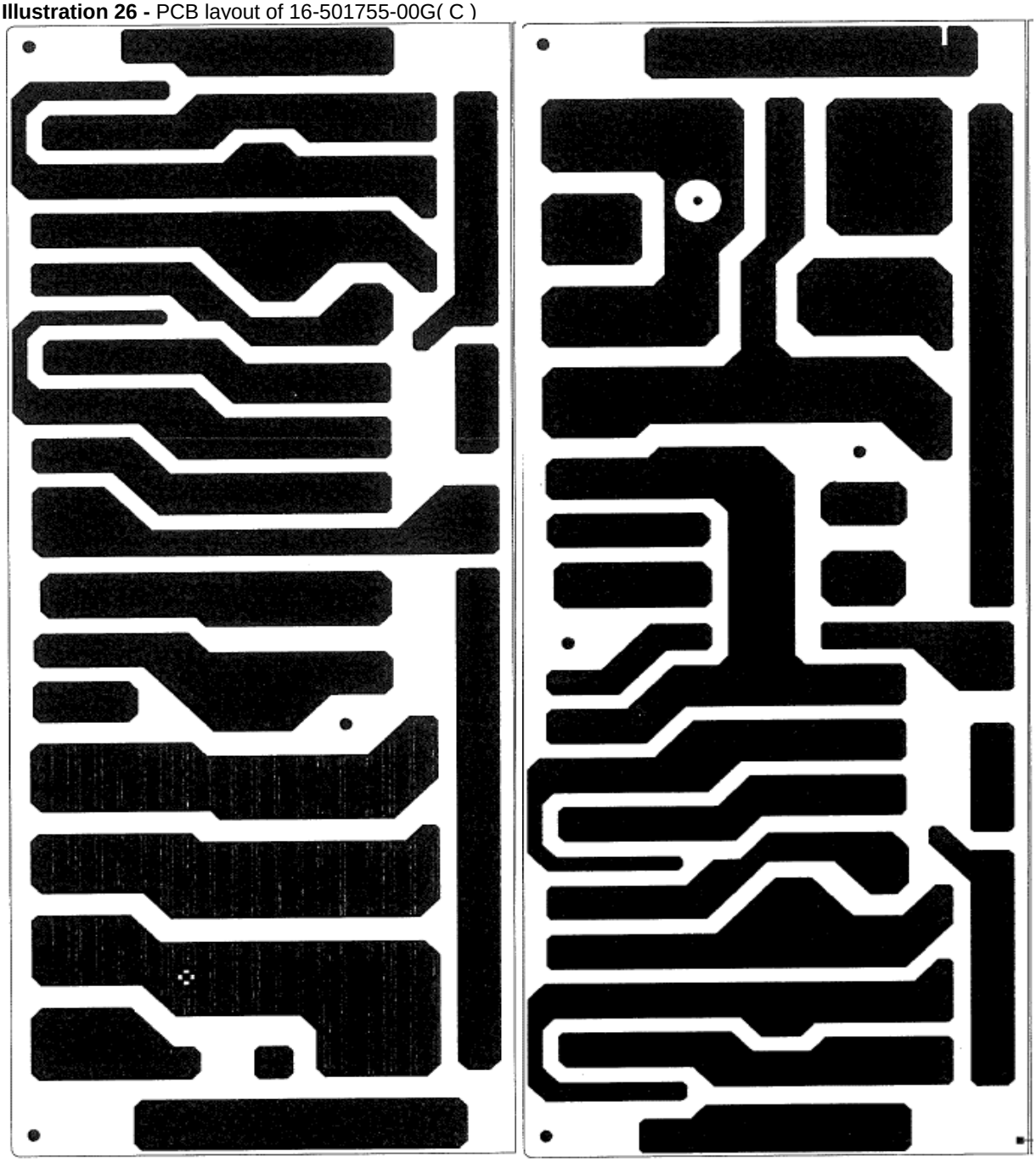
7.0 Illustrations

Illustration 25 - PCB layout of 16-501753-00G(B)



7.0 Illustrations

Illustration 26 - PCB lavout of 16-501755-00G(C)

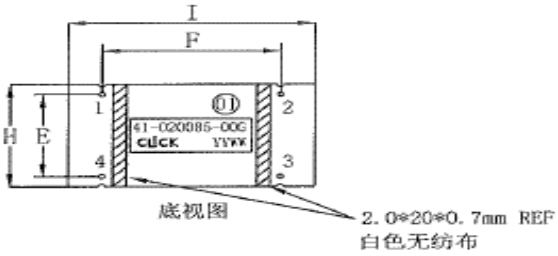


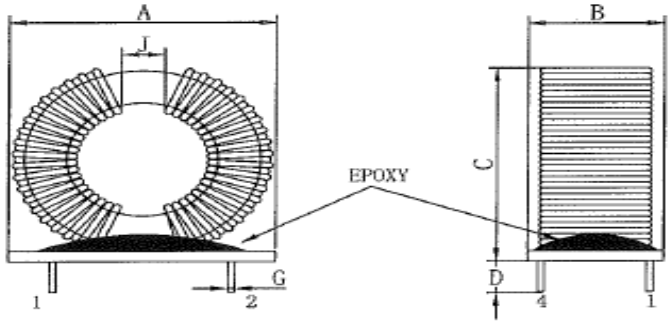
7.0 Illustrations

Illustration 27 - Details of CT(CT1)

1. MECHANICAL DIMENSION: (UNIT:mm)

RoHS Compliant





DIMENSION:

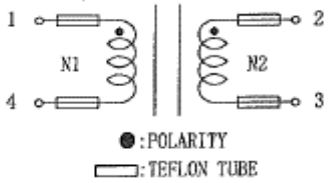
A: 40.0 MAX
B: 22.0 MAX
C: 43.0 MAX
D: 3.8±0.5
E: 16.0±0.5
F: 26.0±0.5
G: φ0.8±0.1
H: 20.0±0.5
I: 36.0±0.5
J: 6.0 MIN

REMARK:

1. 线圈与底板点胶固定
2. 产品底部贴两条透锡板
3. 产品不含浸

2. SCHEMATIC:

Compliant



3. WINDING STEP:

WDG	TERMINAL	WIRE	TURNS	REMARKS
N1	1-4	2UEW-B-NY 0.23 N*1P	180 REF	N1与N2圈数需相等
N2	2-3	2UEW-B-NY 0.23 N*1P	180 REF	

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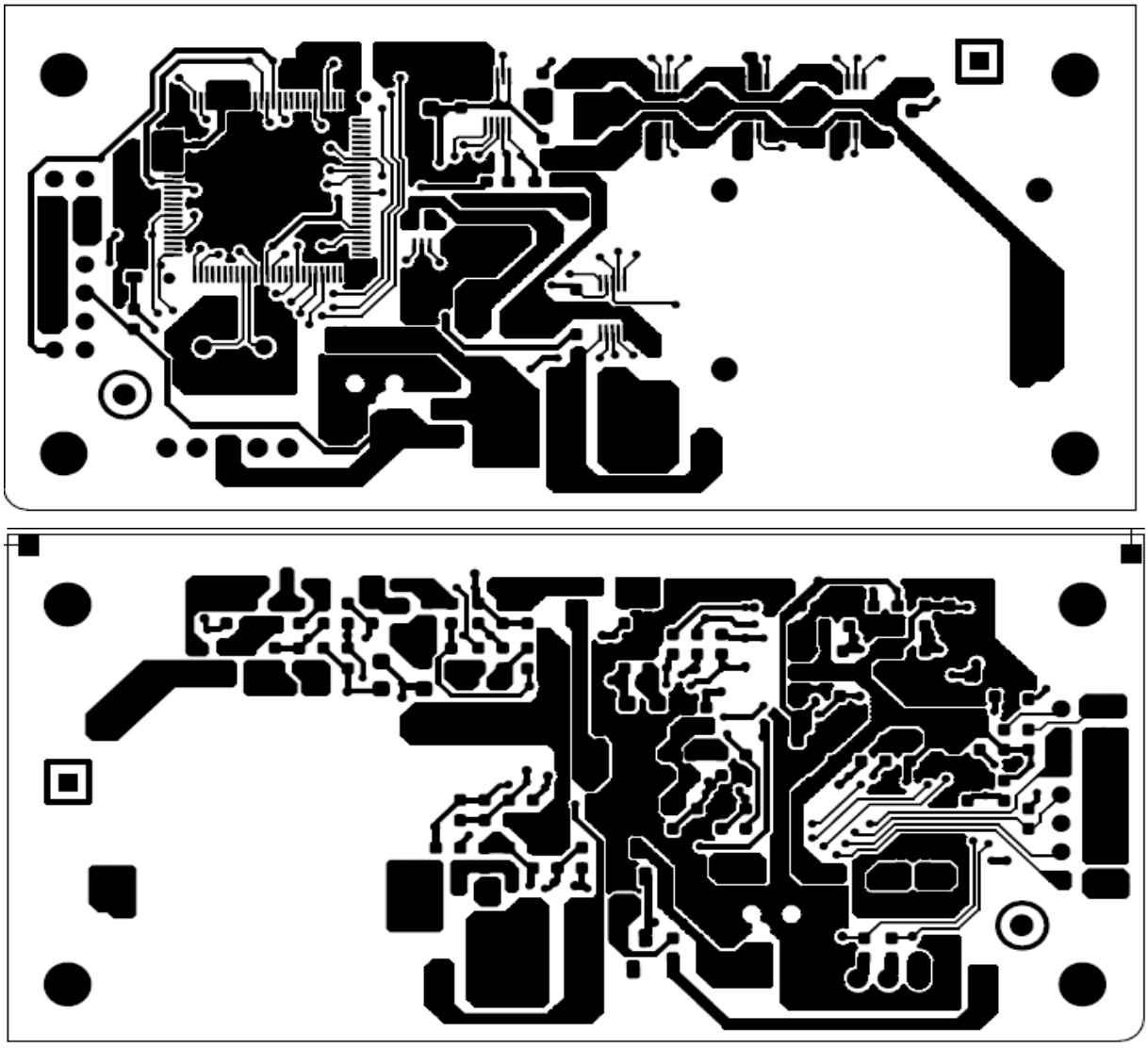
Illustration 28 - PCB layout of 16-501860-00G



7.0 Illustrations

Illustration 29 - Cautionary Markings

Shall be legibly marked externally where readily visible after installation
"CAUTION"- "Hot surfaces - To reduce the risk of burns - Do not touch."

Note: "CAUTION," "WARNING," or "DANGER" in letters not less than 3.2 mm (1/8 inch) high

7.0 Illustrations

Illustration 30 - Instructions

IMPORTANT SAFETY INSTRUCTIONS

SAFETY INSTRUCTIONS

WARNING: This chapter contains important safety and operating instructions. Read and keep this manual for future reference.

1. Before using the unit, read all instructions and cautionary markings on the unit, the batteries and all appropriate sections of this manual.
2. **CAUTION** --To reduce risk of injury, charge only deep-cycle lead acid type rechargeable batteries. Other types of batteries may burst, causing personal injury and damage.
3. Do not disassemble the unit. Take it to a qualified service center when service or repair is required. Incorrect re-assembly may result in a risk of electric shock or fire.
4. To reduce risk of electric shock, disconnect all wirings before attempting any maintenance or cleaning. Turning off the unit will not reduce this risk.
5. **CAUTION** – Only qualified personnel can install this device with battery.
6. **NEVER** charge a frozen battery.
7. For optimum operation of this inverter/charger, please follow required spec to select appropriate cable size. It's very important to correctly operate this inverter/charger.
8. Be very cautious when working with metal tools on or around batteries. A potential risk exists to drop a tool to spark or short circuit batteries or other electrical parts and could cause an explosion.
9. Please strictly follow installation procedure when you want to disconnect AC or DC terminals. Please refer to INSTALLATION section of this manual for the details.
10. Fuses are provided as over-current protection for the battery supply.
11. GROUNDING INSTRUCTIONS -This inverter/charger should be connected to a permanent grounded wiring system. Be sure to comply with local requirements and regulation to install this inverter.
12. NEVER cause AC output and DC input short circuited. Do NOT connect to the mains when DC input short circuits.
13. **Warning!!** Only qualified service persons are able to service this device. If errors still persist after following troubleshooting table, please send this inverter/charger back to local dealer or service center for maintenance.

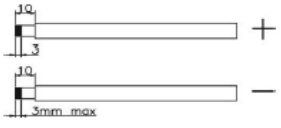
"WARNING" - "This unit is not provided with a GFDI device. This inverter or charge controller must be used with an external GFDI device as required by the Article 690 of the National Electrical Code for the installation location"

Specify that the unit is to be installed so that it is not expected to be contacted by persons.

Battery Connection

CAUTION: For safety operation and regulation compliance, it's requested to install a separate DC over-current protector or disconnect device between battery and inverter. It may not be requested to have a disconnect device in some applications, however, it's still requested to have over-current protection installed. Please refer to typical amperage in below table as required fuse or breaker size.

WARNING! All wiring must be performed by a qualified personnel.
WARNING! It's very important for system safety and efficient operation to use appropriate cable for battery connection. To reduce risk of injury, please use the proper recommended cable and terminal size as below.



Recommended battery cable and terminal size:

Model	Typical Amperage	Battery Capacity	Wire Size	Torque Value
6KW	137A/140A	200AH	1*2AWG	2~3 Nm

7.0 Illustrations

Illustration 30a - Instructions

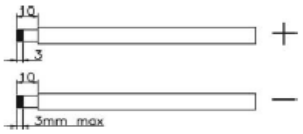
AC Input/Output Connection

CAUTION!! Before connecting to AC input power source, please install a **separate** AC breaker between inverter and AC input power source. This will ensure the inverter can be securely disconnected during maintenance and fully protected from over current of AC input.

CAUTION!! There are two terminal blocks with "IN" and "OUT" markings. Please do NOT mis-connect input and output connectors.

WARNING! All wiring must be performed by a qualified personnel.

WARNING! It's very important for system safety and efficient operation to use appropriate cable for AC input connection. To reduce risk of injury, please use the proper recommended cable size as below.



Suggested cable requirement for AC wires

Model	Gauge	Torque Value
6KW	10 AWG	1.2~ 1.6 Nm

PV Connection

CAUTION: Before connecting to PV modules, please install **separately** a DC circuit breaker between inverter and PV modules.

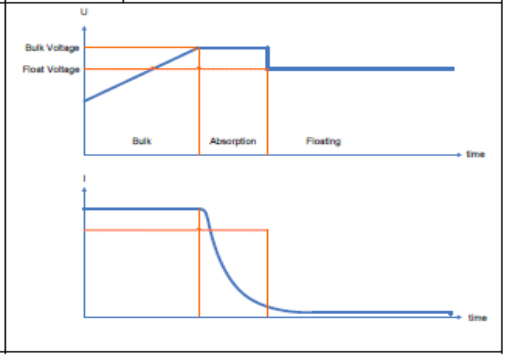
WARNING! All wiring must be performed by a qualified personnel.

WARNING: Please switch off the inverter before you connect PV modules. Otherwise, it will damage the inverter.

WARNING! It's very important for system safety and efficient operation to use appropriate cable for PV module connection. To reduce risk of injury, please use the proper recommended cable size as below.

Model	Typical Amperage	Cable Size	Torque
6KW	27A	8~10AWG	2.0~2.4Nm

Charging Management

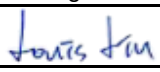
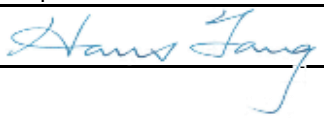
Charging Parameter	Default Value	Note
Charging current	60A	It can be adjusted via software from 10Amp to 200Amp.
Floating charging voltage (default)	54.0 Vdc	It can be adjusted via software from 50Vac to 60Vdc.
Max. absorption charging voltage (default)	56.0 Vdc	It can be adjusted via software from 50Vac to 60Vdc.
Battery overcharge protection	62.0 Vdc	
Charging process based on default setting. 3 stages: First – max. charging voltage increases to 56V; Second- charging voltage will maintain at 56V until charging current is down to 12 Amp; Third- go to floating charging at 54V.		

This inverter can connect to battery types of sealed lead acid battery, vented battery, gel battery and lithium battery. The detail installation and maintenance explanations of the external battery pack are provided in the manufacturer's external battery pack of manual.

8.0 Test Summary					
Evaluation Period	5-Jul-2021 to 24-Jan-2022			Project No.	TWJ21040703
Sample Rec. Date	5-Jul-2021	Condition	Prototype	Sample ID.	P210700035
Test Location	Intertek Testing Services Taiwan Ltd. (Taipei office) 5F, No. 423, Ruiguang Rd., Neihu District, Taipei, Taiwan				
Test Procedure	Testing Lab				
Determination of the result includes consideration of measurement uncertainty from the test equipment and methods. The product was tested as indicated below with results in conformance to the relevant test criteria.					
The following tests were performed:					

Test Description	UL 1741:2010 Ed.2 (Supplement SA)+R:16Sep2020 Clause	IEEE 1547.1-2020 Clause	
Maximum - Voltage Measurements	42	-	
Temperature	43	-	
Dielectric Voltage - Withstand Test	44	-	
Output Power Characteristics - Output Rating	45.2	-	
Output Power Characteristics - DC Input Range	45.3	-	
Abnormal Tests - Output Overload Test	47.2	-	
Abnormal Tests - Short Circuit Test	47.3	-	
Abnormal Tests - DC Input Miswiring Test	47.4	-	
Abnormal Tests - Ventilation Test	47.5	-	
Abnormal Tests - Component Short and Open Circuit	47.6	-	
Grounding Impedance Tests	48	-	
Voltage Surge Test	53	5.8.2	
Capacitor Voltage Determination Test	57	-	
Static Load	59	-	
Rain and Sprinkler - Rain Test	61.2	-	
Anti-islanding Protection - Unintentional Islanding with	SA8	5.10.2	
L/HVRT Low and High Voltage Ride-Through	SA9	5.4.4, 5.4.7	
L/HFRT Low and High Frequency Ride-Through	SA10	5.5.3, 5.5.4	
RR – Normal Ramp Rate and SS – Soft-Start Ramp	SA11	5.6	
SPF – Specified Power Factor	SA12	5.14.3	
Volt/VAr Mode	SA13	5.14.4	
Frequency-Watt (FW) – Optional	SA14	5.15.2	
Volt-Watt (VW) – Optional	SA15	5.14.9	
Temperature stability	-	5.3	
Test for overvoltage trip	-	5.4.2	
Test for undervoltage trip	-	5.4.3	
Test for voltage disturbances within continuous operating region	-	5.4.5	
Test for overfrequency trip	-	5.5.1	
Test for underfrequency trip	-	5.5.2	
Test for rate of change of frequency (ROCOF)	-	5.5.5	
Test for voltage phase-angle change ride-though	-	5.5.6	
Paralleling device tests	-	5.8.3	
Limitation of dc injection for inverters	-	5.9	
Open phase	-	5.11	
Current distortion	-	5.12	
Limit active power	-	5.13	
Test for voltage-reactive power (volt-var) mode (VRef test)	-	5.14.5	
Test for voltage—reactive power (volt-var) mode with an imbalanced grid	-	5.14.6	
Test for active power-reactive power mode (watt-var)	-	5.14.7	
Test for constant reactive power (var) mode	-	5.14.8	
Test for voltage-active power (volt-watt) mode with an imbalanced grid	-	5.14.10	

8.0 Test Summary			
Test for voltage and frequency regulation priority	-	5.16.1	
Ground fault overvoltage (GFOV) test	-	5.17.1	
Load rejection overvoltage (LROV) test	-	5.17.2	
Fault current tests for inverters	-	5.18.1	
Persistence of DER parameter settings	-	5.19	

8.1 Signatures			
A representative sample of the product covered by this report has been evaluated and found to comply with the applicable requirements of the standards indicated in Section 1.0.			
Completed by:	Louis Liu	Reviewed by:	Hans Yang
Title:	Project Engineer	Title:	Group Leader
Signature:		Signature:	

9.0 Correlation Page For Multiple Listings	
The following products, which are identical to those identified in this report except for model number and Listee name, are authorized to bear the ETL label under provisions of the Intertek Multiple Listing Program.	
BASIC LISTEE	MPP SOLAR INC
Address	5F NO 72-76, Zhouzi Street Nei Hu Dist Taipei, City 114 Taiwan
Country	Taiwan
Product	MPPT Solar Hybrid Inverter

MULTIPLE LISTEE 1	MPP SOLAR INC
Address	5F, NO 72-76 Zhouzi Street, Nei Hu Dist , Taipei City 114
Country	Taiwan
Brand Name	MPP SOLAR
ASSOCIATED MANUFACTURER	
Address	
Country	

MULTIPLE LISTEE 1 MODELS	BASIC LISTEE MODELS
LVX 6048 WP	

MULTIPLE LISTEE 2	None
Address	
Country	
Brand Name	
ASSOCIATED MANUFACTURER	
Address	
Country	

MULTIPLE LISTEE 2 MODELS	BASIC LISTEE MODELS

MULTIPLE LISTEE 3	None
Address	
Country	
Brand Name	
ASSOCIATED MANUFACTURER	
Address	
Country	

MULTIPLE LISTEE 3 MODELS	BASIC LISTEE MODELS

10.0 General Information

The Applicant and Manufacturer have agreed to produce, test and label ETL Listed products in accordance with the requirements of this Report. The Manufacturer has also agreed to notify Intertek and to request authorization prior to using alternate parts, components or materials.

COMPONENTS

Components used shall be those itemized in this Intertek report covering the product, including any amendments and/or

LISTING MARK

The ETL Listing mark applied to the products shall either be separable in form, such as labels purchased from Intertek, or on a product nameplate or other media only as specifically authorized by Intertek. Use of the mark is subject to the control of Intertek.

The mark must include the following four items:

1) applicable country identifiers "US" and/or "C" or "US", "C" and "EU"
2) the word "Listed" or "Classified" or "Recognized Component" (whichever is appropriate)
3) a control number issued by Intertek
4) a product descriptor that identifies the standards used for certification. Example:

For US standards, the words, “Conforms to” shall appear with the standard number along with the word, “Standard” or “Std.” Example: “Conforms to ANSI/UL Std. XX.”

For Canadian standards, the words “Certified to CAN/CSA Standard CXX No. XX.” shall be used, or abbreviated, “Cert. to CAN/CSA Std. CXX No. XX.”

Can be used together when both standards are used.

If all standards on the ATM have the same standard title, the shared title or its abbreviation may be used in place of the examples above. Example: "Medical Electrical Equipment" or "MEE"; "Information Technology Equipment" or "ITE"; "Audio/Video Information And Communication Technology Equipment" or "A/V ICTE".

Note: A facsimile must be submitted to Intertek, Attn: Follow-up Services for approval prior to use.
The facsimile need not have a control number. A control number will be issued **after signed Certification Agreements** have been received by the Follow-up Services office, approval of the facsimile of your proposed Listing Mark, satisfactory completion of the Listing Report, and scheduling of a factory assessment in your facility.

MANUFACTURING AND PRODUCTION TESTS

Manufacturing and Production Tests shall be performed as required in this Report.

FOLLOW-UP SERVICE

Periodic unannounced audits of the manufacturing facility (and any locations authorized to apply the mark) shall be scheduled by Intertek. An audit report shall be issued after each visit. Special attention will be given to the following:

1. Conformance of the manufactured product to the descriptions in this Report.
2. Conformance of the use of the ETL mark with the requirements of this Report and the Certification Agreement.
3. Manufacturing changes.
4. Performance of specified Manufacturing and Production Tests.

In the event that the Intertek representative identifies non-conformance(s) to any provision of this Report, the Applicant shall take one or more of the following actions:

1. Correct the non-conformance.
2. Remove the ETL Mark from non-conforming product.
3. Contact the issuing product safety evaluation center for instructions.

10.1 Evaluation of Unlisted Components

Because Unlisted Components are uncontrolled, and they do not fall under a third party follow up program, Intertek may require these components to be tested and/or evaluated at least once annually, more often for certain components, as part of the independent certification process. The Unlisted Components in Section 5.0 require testing and/or evaluation as indicated.

The Applicant will be notified, in writing, via the applicable contact methods, as defined in Section 1.0, when these components must be selected and sent to Component Evaluation Center (CEC) for re-evaluation.

Due to particular testing requirements, some components may be requested to be shipped to specific labs. Thus, specific shipment destination(s) for each sample will be provided in the written notification.

Managing CEC Location:
Intertek Testing Services Taiwan Limited
ETL Component Evaluation Center
5/F., No. 423, Ruiguang Road, Neihu District
Taipei 114, Taiwan
Attn: Sample Room
Sample Disposition: Due to the destructive nature of the testing, all samples will be discarded at the conclusion of testing unless, the manufacturer specifically requests the return of the samples. The request for return must accompany the initial component shipment.

11.0 Manufacturing and Production Tests

The manufacturer agrees to conduct the following Manufacturing and Production Tests as specified:

Required Tests

Dielectric Voltage Withstand Test
Response to abnormal voltage
Response to abnormal frequency

11.1 Dielectric Voltage Withstand Test

Method

One hundred percent of production of the products covered by this Report shall be subjected to a routine production line dielectric withstand test.

The test shall be conducted on products, which are fully assembled. Prior to applying the test potential, all switches, contactors, relays, etc., should be closed so that all primary circuits are energized by the test potential. If all primary circuits cannot be tested at one time, then separate applications of the test potential shall be made.

The test voltage specified below shall be applied between primary circuits and accessible dead-metal parts. The test voltage may be gradually increased to the specified value but must be maintained at the specified value for one second or one minute as required.

Test Equipment

The test equipment shall incorporate a transformer with an essentially sinusoidal output, a means to indicate the applied test potential, and an audible and/or visual indicator of dielectric breakdown.
The test equipment shall incorporate a voltmeter in the output circuit to indicate directly the applied test potential if the rated output of the test equipment is less than 500VA.
If the rated output of the test equipment is 500VA or more, the applied test potential may be indicated by either:
1 - a voltmeter in the primary circuit;
2 - a selector switch marked to indicate the test potential; or
3 - a marking in a readily visible location to indicate the test potential for test equipment having a single test potential output.
In cases 2 and 3, the test equipment shall include a lamp or other visual means to indicate that the test potential is present at the test equipment output. All test equipment shall be maintained in current calibration.

Products Requiring Dielectric Voltage Withstand Test:

Product	**Test Voltage**	**Test Time**
All products covered by this report		
Between DC input terminals and accessible dead metal parts	1776Vac or 2516Vdc	1 s
	or	
	1840Vac or 2600Vdc	60 s
Between AC output terminals and accessible dead metal parts	2544Vac or 3332Vdc	1 s
	or	
	1480Vac or 2072Vdc	60 s
Product - One sample from each shipment of transformer of Section 4, item 22 to 25, 53 and 56	**Test Voltage**	**Test Time**
Between primary circuits and secondary circuits	4000 Vac or 4000 Vdc	1 s
Between primary circuits and core	2500 Vac or 2500 Vdc	1 s
Between secondary circuits and core	2500 Vac or 2500 Vdc	1 s

11.2 Response to abnormal voltage

Method (IEEE 1547.1, Sec. 7.2)

a) Connect the EUT according to the instructions and specifications provided by the manufacturer
b) Verify all ac test source parameters are at nominal operating conditions for the EUT.
c) Set the EUT to the manufacturer's trip voltage and time settings as applicable. Verify that all of the EUT settings are at their factory set points.
d) Record applicable settings.
e) Select one of the undervoltage or overvoltage protective functions for test.
f) Adjust the ac test source voltage to a point beyond the trip setting under test by at least twice the MRA. Record the rms voltage magnitude and clearing time.
g) For multiphase units, perform this test on each phase, adjusting one phase at a time.
h) Repeat steps e) through g) for all of the undervoltage and overvoltage protective functions.

Criteria

The test results are acceptable if the EUT trips in the ranges specified by the manufacturer.

11.3 Response to abnormal frequency

Method (IEEE 1547.1, Sec. 7.3)

a) Connect the EUT according to the instructions and specifications provided by the manufacturer.
b) Verify all ac test source parameters are at nominal operating conditions for the EUT.
c) Set the EUT to the manufacturer's trip frequency and time settings as applicable. Verify that all of the other EUT settings are at their factory set points.
d) Record applicable settings.
e) Select one of the underfrequency or overfrequency protective functions for test.
f) Adjust the ac test source frequency to a point beyond the trip setting under test at least twice the MRA. Record the frequency and clearing time.
g) Repeat steps e) through f) for all of the underfrequency and overfrequency protective functions.

Criteria

The test results are acceptable if the EUT trips in the ranges specified by the manufacturer.

3. Documentation

The production test documentation shall include the production date, manufacturer's model number, serial number, functional software and firmware versions (where applicable), test results and settings. This information shall be made available upon request.

12.0 Revision Summary				
The following changes are in compliance with the declaration of Section 8.1:				
Date/ Proj # Site ID	Project Handler/ Reviewer	Section	Item	Description of Change
				None