

MESSRS :

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PRODUCT DRAWING

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CUSTOMER'S PRODUCT NAME:

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TDK PRODUCT NAME: DC-AC INVERTER UNIT  
CXA-0494

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***TDK·Lambda***

**TDK Corporation**

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DWG.No.	CTR-2965-X
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## Precautionary Notes Regarding the Use of This Inverter

When using this product, give due consideration to the precautionary notes described below and ensure a safe design. Inappropriate use may result in electric shock, injury or fire.

### **Warning**



- This product is subject to high voltage. Do not touch it while the power is on. Failing to do so may result in electric shock.

### **Caution**

- This product is designed for the lighting of a Cold Cathode Fluorescent Lamp. Do not use it with any other load.
- Store this product under the conditions defined in the specification document.
- Do not store this product in an environment where dust, dirt or corrosive gas (salt, acid, base, etc.) is present.
- This product is subject to high voltage. If there is a possibility that the user may touch the product, provide a proper indication in order to draw the user's attention.
- This product is designed for use with general electronic equipment. If it is to be used with medical equipment that directly affects human life or for the control of transportation equipment to which passengers entrust their lives, provide thorough fail-safe measures.
- Avoid using this product under high temperatures or high humidity or in an environment in which dust, dirt or any corrosive gas (salt, acid, base, etc.) is present. Also, be careful not to allow the formation of dew condensation. It may result in damage or electric shock.
- If the product does not have a built-in protective circuit (circuit breaker, fuse, etc.), it is recommended that a fuse be used at the input stage to prevent the generation of smoke or fire in the event of a malfunction. Even when the product has a built-in protective circuit (circuit breaker, fuse, etc.), the circuit may not function properly due to inappropriate operating conditions or power-supply capacity. It is recommended that an appropriate protective circuit (circuit breaker, fuse, etc.) be provided separately from the built-in circuit.
- Use the product only within the specified input voltage, output power, output voltage and operating temperature ranges. Exceeding these values may result in damage, etc.
- Provide a measure for the prevention of surge voltage due to lightning, etc. Abnormal voltage may result in damage, etc.
- To prevent problems arising from short-circuiting of the high-voltage section, provide appropriate measures to prevent the entry of foreign substances following installation.
- This product is not designed to provide resistance to radiation.
- Ripples could be superimposed on the voltage and the current in the input source connected to the inverter, depending on the impedance in the input source, wiring, etc. When you select an input source, please check waveforms, etc on the final set.

### **Handling Precautions**

- This product uses thin wires. Observe the following precautions and handle it with care so as not to cause wire breakage. Broken wire may result in damage, etc.
  - ❖ Do not stack multiple products on top of one another.
  - ❖ Do not allow the product to come in contact with tools, etc.
- Do not apply excessive stress during installation. It may cause chipping and cracking, resulting in damage, etc.
- Provide clearance between the high-voltage section of this product and the frame body on which the product is installed and also the conductor section as per listed on page 2, [1] "Outline".
- Please do not use the product, when dropping it, since there is a possibility of the parts damage. Please confirm abnormality is not found in the product enough when using it by any chance.

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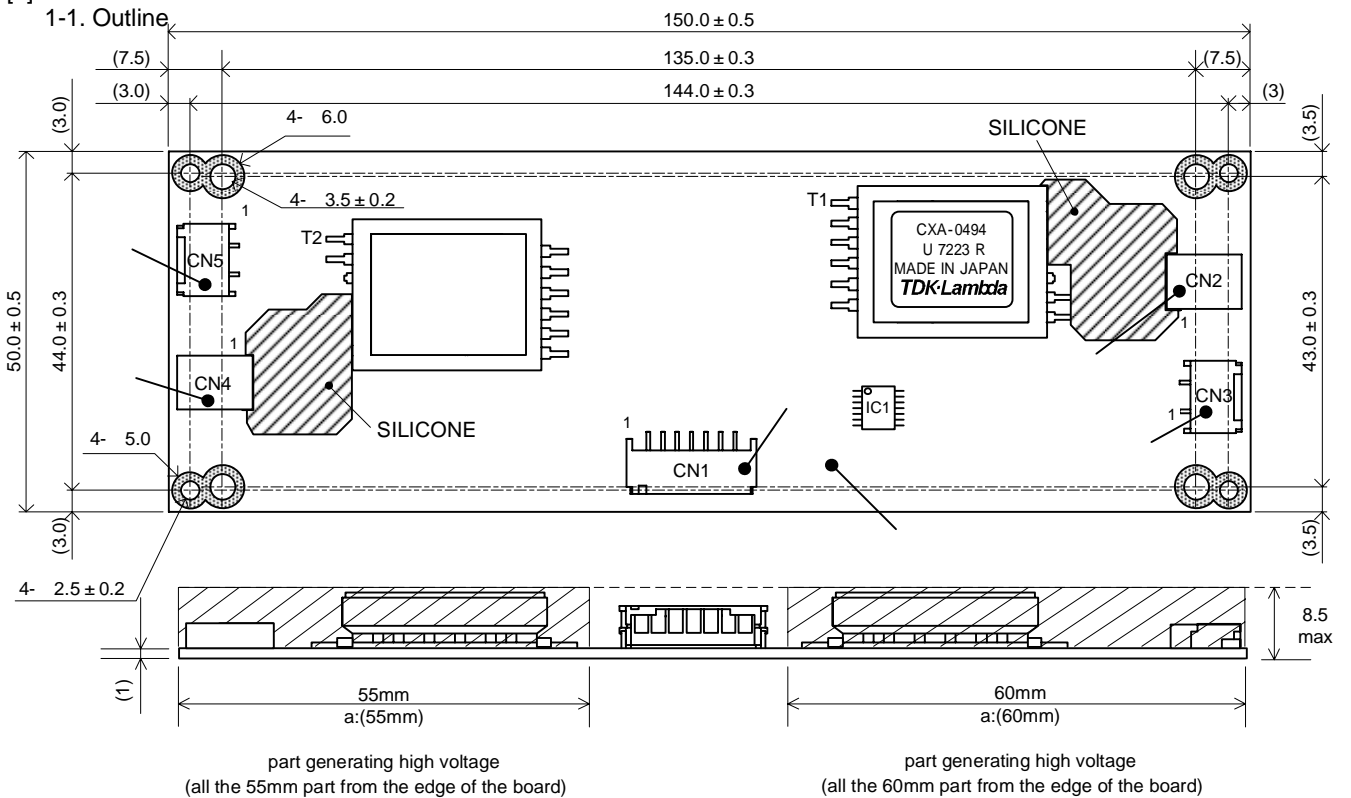
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- The specifications may be changed without any notice.
- When placing orders, please confirm "Specifications" or "Product Drawing" through TDK sales or distributors.

Features

- This inverter is for four lamps. It has Dimming function(PWM System) and Remote function.  
(The lamp is controlled in PWM by an external operation (Refer to clause 3 SW2).
- This product has shutdown function.  
It prevents from keeping generating the high voltage when the lamps open.(Refer Note.3-4.)
- With lamp failure detector.  
Normal Operation : CN1-6=0V  
Some Lamps Open : CN1-6=5V
- The high-voltage area (terminals and patterns) is coated with silicone so as to avoid the defects caused by dust.
- This product is conformity to RoHS directive. ( )  
( ) Conformity to RoHS Directive: This means that, in conformity with EU Directive 2002/95/EC, lead, cadmium, hexavalent chromium, and specific bromine-based flame retardants, PBB and PBDE, have not been used, except for exempted applications.

[1] Outline



The dimensional deviation not instructed is assumed to be ± 0.3mm

Please secure 3mm or longer space distance from the high voltage generating area in all directions. Please see Note 1-3 for the details.



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No.	Part Description	Material	QU	REMARK	Recommended conforming connector
	PCB	Composite (CEM-3)	1	UL94V-0 t=1.0	-
	Input Connector CN1	S7B-PH-SM4-TB(LF)(SN)	1	JST	PHR-7
	Output Connector CN2,CN4	SM02B-BHSS-1-TB(LF)(SN)	2	JST	BHSR-02VS-1
	Output Connector CN3,CN5	SM02(4.0)B-BHS-1-TB(LF)(SN)	2	JST	BHR-02VS-1

## 1-2. Connector Configuration

### Input side CN1

Pin No.	Symbols	Ratings	Notes
CN1-1 CN1-2	Vin	10.8-13.2V	Input Voltage
CN1-3 CN1-4	GND	0V	GND
CN1-5	Vbr/Rbr	0-2.5V/0-50k	Control/VR
CN1-6 (OUT PUT)	Vst	0V/5V	The warning output 5V in abnormal circumstances
CN1-7	Vrmt	0V/2.5V-Vin	0-0.4V:OFF 2.5-Vin V:ON

### Output side CN2

Pin No.	Symbols	Ratings	Notes
CN2-1	VHIGH1	800Vrms5.0mArms	Output1
CN2-2	VHIGH2	800Vrms5.0mArms	Output2

### Output side CN3

Pin No.	Symbols	Ratings	Notes
CN3-1	VLOW1	(3V)	Output1 Return
CN3-2	VLOW2	(3V)	Output2 Return

### Output side CN4

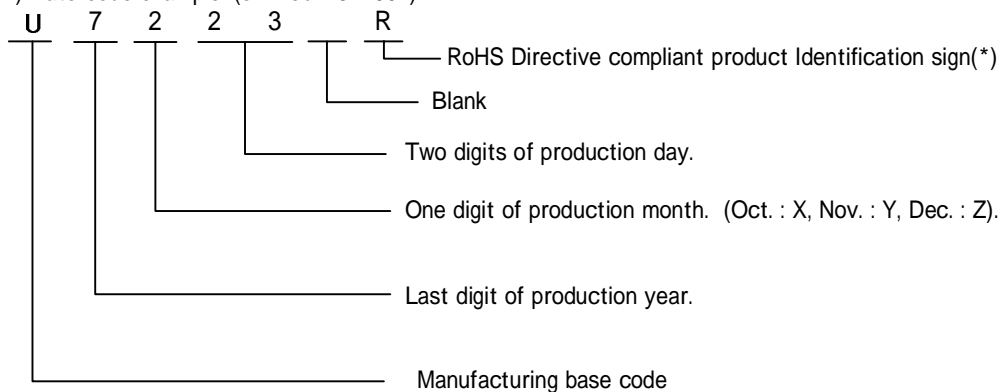
Pin No.	Symbols	Ratings	Notes
CN4-1	VHIGH1	800Vrms5.0mArms	Output3
CN4-2	VHIGH2	800Vrms5.0mArms	Output4

### Output side CN5

Pin No.	Symbols	Ratings	Notes
CN5-1	VLOW1	(3V)	Output3 Return
CN5-2	VLOW2	(3V)	Output4 Return

Note1-1. Marking of TDK part No, Date code, Country of origin.

- 1) TDK part No., Date code, Country of origin, is marked on the transformer.
- 2) Date code example. (ex. Feb. 23. 2007)



- 3) Country of origin code example. (ex. MADE IN JAPAN. MADE IN CHINA,MADE IN MALAYSIA).

\* : Conformity to RoHS Directive:This means that, in conformity with EU Directive 2002/95/EC, lead, cadmium, hexavalent chromium, and specific bromine-based flame retardants, PBB and PBDE, have not been used,except for exempted applications.

Note1-2. For circuit connection, please prefer to test circuit diagram [3].

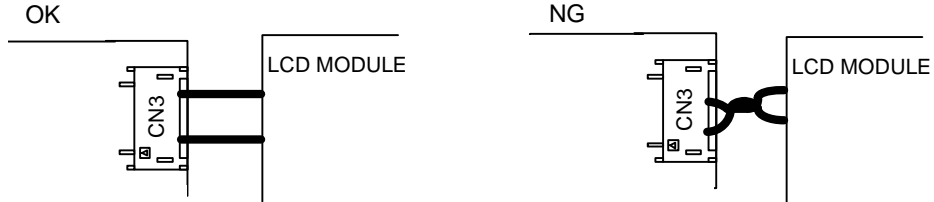
Note1-3. Please use minimum of 3mm clearance (all directions) between inverter high voltage area and any conductors. Please refer to mechanical drawing for marking of high voltage area.

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Note1-4. Open voltage (strike voltage) is measured across the transformer secondary winding at no load as the reading at the output connector would be less than the actual value.

Note1-5. If the start up voltage falls below Cold Cathode Tube strike voltage, the CCFL will not light up easily specially at lower ambient temperature. Please review mounting instruction to avoid any abnormal operation due to coupling/leakage capacitance of inverter high voltage area to any surrounding conductor.

Fig1.High Voltage Code



Note1-6. Please check your lamp characteristic for minimum operational current and set the limit point in your design to avoid flickering and/or abnormal operation.

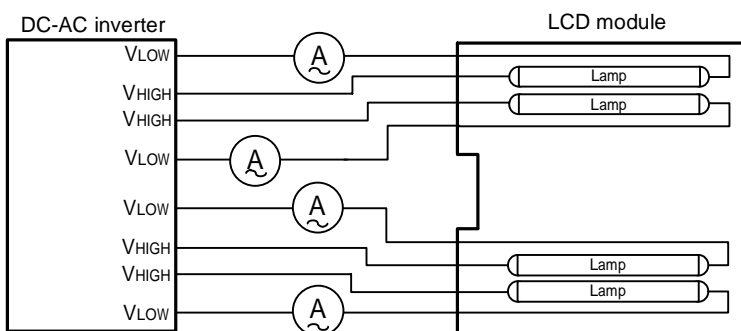
Note1-7. For proper operation of circuit protection (fuse or IC PROTECTOR),Please use minimum of 5.0A capacity for input power supply.

Note1-8. Impedence from the wire connection can cause a ripple in the input. The product has an internal fuse of 2.5A. Please check that input current peak wave form does not exceed 2.5A.

[2]Absolute maximum ratings

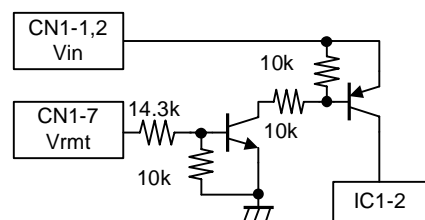
Items	Symbols	Specification	Unit	Notes
Input Voltage	Vin	0 ~ 15	V	
	Vrmt	0 ~ Vin		
	Vbr	0 ~ 16		
Load Resistance	RL1,2,3,4 // CL1,2,3,4	171//4	k //pF	
Operating Temp. range	Ta	-20 ~ 70		
Storage Temp. range	Ts	-30 ~ 85		
Humidity range	RH	95	%RH	A maximum wet ball temperature is 38°C No dew.

Connection diagram of LCD module (Reference)



\*Connect the High Frequency Current Meter to the Low-Voltage (VLow) side.

Vrmt Terminal circuit (Reference)



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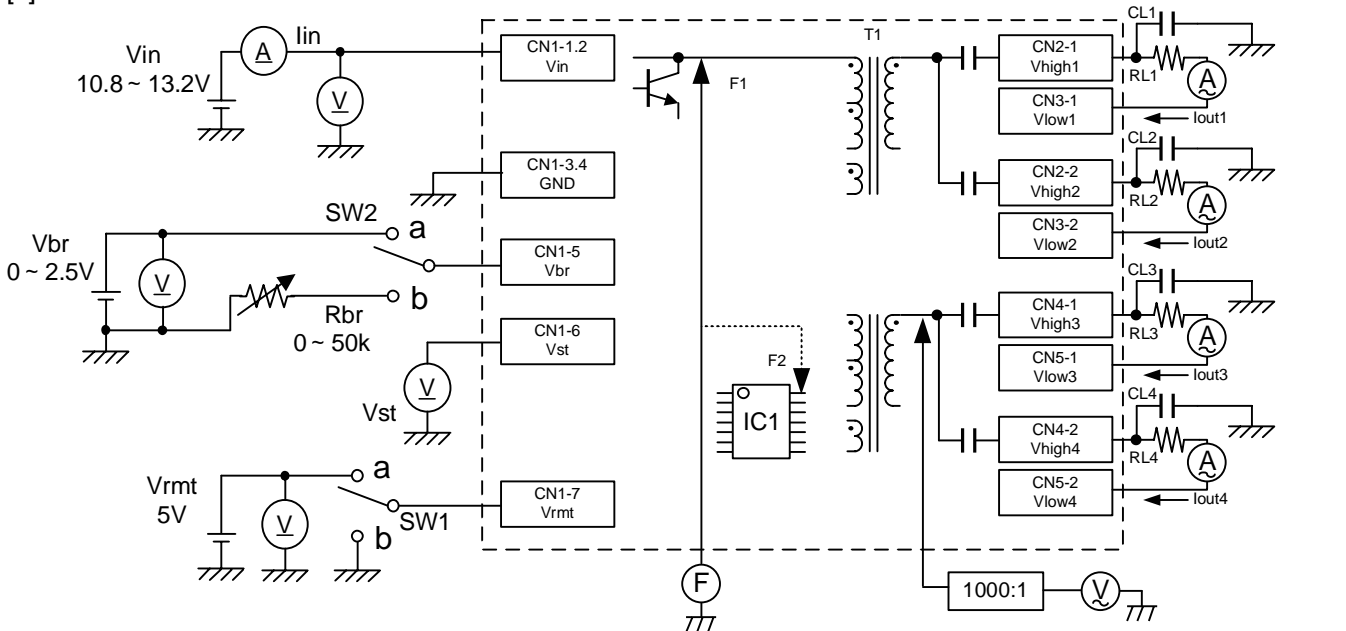
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[3] Measurement circuit



\*For the number of the component's position, please refer to Outline diagram 1-1.

RL1 ~ 4: Load resistance(10W or more)  
CL1 ~ 4: Distribution capacity capacitor(3kV or more)

Note.3-1.SW1(ON/OFF) Operation is as following;

SW1	Operation of unit
a	Operation
b	Non operation
Open	Non operation

Note.3-2.SW2(ON/OFF) Operation is as following;

SW2	Operation of unit
a	*Voltage dimming Vbr=0~2.5V
b	*Variable resistance dimming VR=0~50kΩ

\*Vbr=0V:brightness MAX.  
Rbr=0Ω:brightness MAX.

Note3-3.Test Equipments

- Digital Multiple Meter(ADVANTEST R6452A or equivalent)
- DC Current Meter(ADVANTEST R6452A or equivalent)
- Frequency Countor(ADVANTEST R6452A or equivalent)
- True RMS Meter(NF Circuit M2170or equivalent)
- High Frequency Current Meter(FLUKE187or equivalent)

High Voltage Probe(Tektronix P6015A or equivalent)

Note3-4.Safety Function

Load condition	Alarm signal 1 (CN1-6)	Shutdown function 2
Load (lamp) At normal times	0.5V max.	Does not shut down
One load(lamp) open One or more	4.5 ~ 5.5V	Shuts down (In about three seconds. )

1. 5V alarm output is generated when either one of the loads or more loads turn open.
2. This inverter includes a protection circuit that stops the operation in about 3 seconds when all the lamps turn open.

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[4] Electrical specifications

Item	Symbol	Conditions					Specifications			Unit
		Vin(V)	Vrmt(V)	Rbr(k )/ Vbr(V)	Ta( )	RL1(k )//CL1(pF) RL2(k )//CL2(pF) RL3(k )//CL3(pF) RL4(k )//CL4(pF)	MIN.	TYP.	MAX.	
Output Current (max.)	Iout1,2,3,4	12 ± 1.2	5 ± 0.25	0 / 0	-20 ~ 70	155//4	4.3	5.0	5.7	mArms
		12 ± 0.6	5 ± 0.25	0 / 0	23 ± 5	155//4	4.5	5.0	5.5	mArms
Output Current (min.)	Iout1,2,3,4	12 ± 1.2	5 ± 0.25	50 / 2.5	-20 ~ 70	155//4	3.5	4.3	5.1	mArms
Input Current1	Iin1	12 ± 0.6	5 ± 0.25	0 / 0	-20 ~ 70	155//4	-	1.6	2.5	A
Input Current2	Iin2	12 ± 0.6	0 ± 0.25	0 / 0	-20 ~ 70	155//4	-	-	1	mA
Input Current3	Iin3	12 ± 0.6	5 ± 0.25	0 / 0	-20 ~ 70	Note3-4 2	-	15	30	mA
Frequency1	F1	12 ± 0.6	5 ± 0.25	0 / 0	-20 ~ 70	155//4	40	45	50	kHz
Frequency2 (duty)	F2	12 ± 0.6	5 ± 0.25	50 / 2.5	-20 ~ 70	155//4	117	137	157	Hz
Open Circuit Voltage	Vopen	10.8 ± 0.05	5 ± 0.25	0 / 0	-20 ~ 70		1950	2150	-	Vrms
Warning Signal	Vst	12 ± 1.2	5 ± 0.25	0 / 0	-20 ~ 70	155//4 Note3-4 1	4.5	5.0	5.5	V
		12 ± 1.2	5 ± 0.25	0 / 0	-20 ~ 70	155//4	-	0	0.5	V

[5] Reliability test

Following test items are assured.

Items	Conditions	Judgement
Low Temp.Non operational	-30°C 500h	Electrical and apperance should be in the spec.
Low Temp.operational	-20°C 500h Load cond.:TYP	
High Temp.Non operational	85°C 500h	
High Temp.operational	70°C 500h Load cond.:TYP	
Heat shock	-20°C to 75°C 30min.Each 100 Cycles	
Humidity (Non operational)	60°C 90~95%RH 500h	
Humidity Operation	40°C 90~95%RH 500h Load cond.:TYP	
Vibration	10~57Hz Amplitude 0.75mm 58~500Hz 9.8m/s <sup>2</sup> Sweep:11min 60min each axis X,Y,Z	
Shock	980m/s <sup>2</sup> 11ms Harf-sine pulse 1 time each axis ±X,Y,Z	

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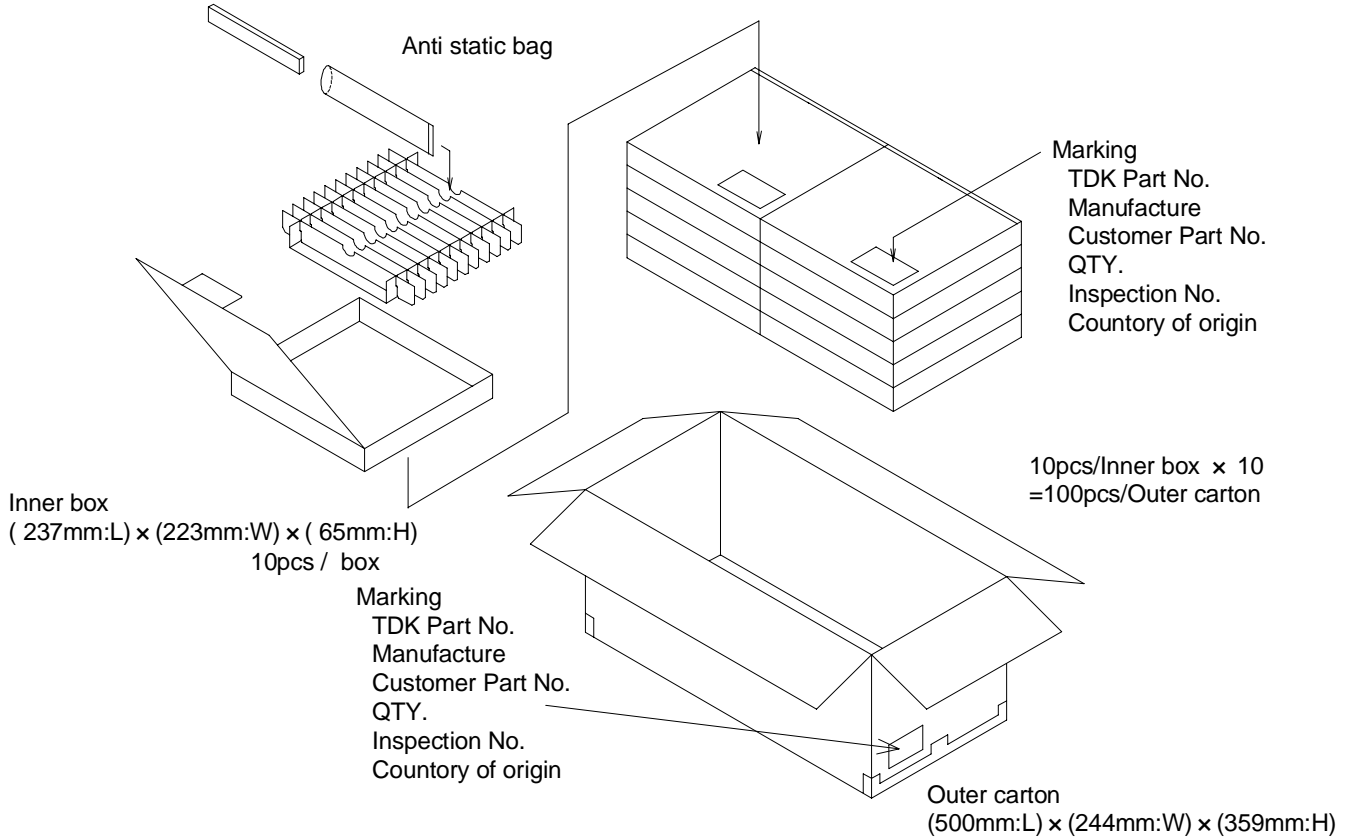
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[6] Packing and Marking

A shipping box is packaged to avoid from damage. Following items are printed on the box.

- 6-1. TDK part No. CXA-0494
- 6-2. Manufacture TDK
- 6-3. Customer part No.
- 6-4. QTY.
- 6-5. Inspection No.
- 6-6. Country of origin



[ 7 ] Others

7-1. Test conditions

Unless otherwise specified, the temperature to be (20 ± 15) and humidity to be (65 ± 20) %RH.

7-2. Warranty

Warranty shall be for one year after delivery, and those products causing failure during the warranty period and which failures are attributed to the manufacturer's responsibility shall be replaced at no charge.

7-3. Disposition for non-conforming lots

Non-conforming lots, when occurred, shall be discussed and decided upon between both parties.

7-4. Others

When any doubt arises about this specification, it shall be discussed and decided upon between both parties.

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