SPECIFICATION FOR APPROVAL AC/DC ADAPTOR

CUSTOMER:	TPS Elektronik	INPUT: 100-240V AC 50/60Hz
CUSTOMER SPEC:		OUTPUT: 12V 1,5A
CUSTOMER DWG./PART NO.		
PART NO	KSAS0181200150HE	TQ20160919-3537
SAMPLE NO	S81921	
PRODUCT NO.:	KS052788	COLOR: BLK
REV.:	B	DATE: 2016-10-12

Approval Signatures		
APPROVED BY	CHECKED BY	TESTED BY

Manufacturer		
SALES	APPROVED BY	DESIGNED BY
Birgit Dunker	Yan Jiyuan	Chenjin

Factory:

Kuantech Beihai Company Limited
No 8th Beihai Avenue Beihai Industrial Area
Beihai Guangxi 536000
China
北海冠德地址:中国广西省北海市北海大道工业园 8 号

Project Modify List

Item	Content	Rev.	Date	Designed By	Checked By
1	First REV.	A	2016-9-22	Chenjin	Yan jiyuan
2	Update DC cable to add DC core	B	2016-10-12	Chenjin	Yan jiyuan
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1 GENERAL

1.1 Description

This specification defines the performance characteristics for a class adapter, single-phase 18 watts. Single output level power supply.

- Simple design philosophy.
- Reliability level of 50K hours MTBF @ 25° C(rated input voltage, and using the BELLCORE SR-332 method).
- DC output voltage must be Safe Extra Low Voltage (SELV) & Limited Power as defined by IEC60950-1
- The maximum room ambient temperature (T_{mra}), as mentioned in clause 1.4.12 of IEC 60950-1, for the external power supply is 40°C.
- Cooling: natural convection.

1.2 DC Output Requirements

The power supply shall have one regulated DC output of +12V.
The table below defines the total regulation band for the output, which includes line regulation, load regulation, and effects due to environmental conditions and aging. Voltage shall be measured at the power supply output connector.

Output	Output Current Range		Output Voltage Range		Ripple & Noise
	Min.	Max.	Min.	Max.	Max.
+12V	0.0A	1.5A	11.4V	12.6V	150mV

Ripple & Noise Test: Add 0.1uF/50V ceramic capacitor and 10uF/50V aluminum electrolytic capacitor across the output terminal. Measured with 20MHz Bandwidth Oscilloscope.

2 INPUT REQUIREMENTS

2.1 Input Conditions

The Supply shall operate over the voltage ranges as follows:

Rated Input Voltage	100-240Vac
Operating Range	90-264Vac
Rated Input current	0.5A Max.
Rated Input Frequency	50/60Hz +/- 3Hz
Maximum input power	22.17W
Input current(No Loading)	≤20mA
Power Consumption (No Loading)	Max. 0.075W

2.2 AC Inrush Current

No damage shall be occurred and the input fuse shall not be blown up nominal input voltage full load 25°C cold start.

2.3 Brownout and Brownout Recovery

The supply shall be subjected to the following tests while under maximum rated load No component damage is permitted.

2.3.1 Brownout

108 Vac 60 Hz to 0 Vac @ 60 Hz in 1 volt decrements in 30 Sec. (North American)
180 Vac 50 Hz to 0 Vac @ 50 Hz in 1 volt decrements in 30 Sec. (Continental Europe. United Kingdom and Australian
108 Vac 50 Hz to 0 Vac @ 50 Hz in 1 volt decrements in 30 Sec. (Universal)

2.3.2 Brownout Recovery

0 Vac 60 Hz to 108 Vac @ 60 Hz in 1 volt increments in 30 Sec. (North America)
0 Vac 50 Hz to 180 Vac @ 50 Hz in 1 volt increments in 30 Sec.(continental Europe United Kingdom and Australian)

0 Vac 50 Hz to 108 Vac @ 50 Hz in 1 volt increments in 30 Sec. (Universal)
After completion of the test, power will be reapplied within the rated line voltage ranges and normal operation is expected.

2.3.3 Efficiency

The efficiency of the Supply shall meet the following requirements:

Supply:	Load:	Input voltage	Average Efficiency
Universal	25%,50%,75%,100% rated load	115V/60Hz&230V/50Hz	≥85.45%
	10% load	115V/60Hz&230V/50Hz	≥75.45%

2.4 On/Off and On/Standby Cycling

The Supply shall be subjected to the following test to ensure proper turn on and reliability.

The four conditions are:

105 Vac 60 Hz (North American)

175 Vac 50 Hz (Continental Europe, United Kingdom and Australian)

88 Vac 60 Hz & 270 Vac 50 Hz (Universal)

The Supply shall be cycled between:

“On” and “Off” using an external switching device which interrupts the current into the Supply.

The cycle profile shall use the following sequence:

Step Number	***Procedure Step***	***Repetitions***	***Output Load***
1	0.5 seconds ON, 0.5 seconds Off	4	Rated Output Current
2	1.0 seconds ON, 1.0 seconds Off	4	Rated Output Current
3	2.0 seconds ON, 2.0 seconds Off	4	Rated Output Current
4	4.0 seconds ON, 4.0 seconds Off	4	Rated Output Current
5	8.0 seconds ON, 8.0 seconds Off	4	Rated Output Current
6	16 seconds ON, 16 seconds Off	4	Rated Output Current
7	32 seconds ON, 32 seconds Off	4	Rated Output Current

3 OUTPUT REQUIREMENTS

3.1 Output Voltage, Current

Output#	Voltage	Minimum load	Max load	Peak load
1	+12V	0A	1.5A	

3.1.1 Load/Line Regulation

The output voltage shall be statically regulated for all combinations of load, line and environment including cross regulation as shown.

Output#	Normal Voltage	Min. Voltage	Max. Voltage	Tolerance
	+12V	+11.4V	+12.6V	+/-5%

3.1.2 Light Load Output Voltage

The output voltage shall be within the specified limits shown when subjected to the following conditions:

Line voltage: 90 Vac – 264 Vac 50 & 60 Hz (Universal)

Load: Io ≤ 10mA dc

Ambient temperature: 0° C – 40° C

Output voltage: 12Vdc +/-5%

No damage or hazardous condition will occur with the DC output connector disconnected from the load under all input line conditions.

3.2 Over voltage Protection

The output voltage shall be clamped by internal protection.

3.3 Over Current Protection

The output shall be protected against the over current conditions.

3.4 Short Circuit Protection

The adapter shall not be damaged by short the DC output to Ground. The adapter shall resume normal operation when a short circuited fault condition is removed.

3.5 Rise Time

The Supply shall have a start-up rise time of less than 20 msec to rise to within regulation limits for all DC outputs.

3.6 Hold Up Time

When power off, DC output +12V must be maintain 10 msec in regulation limit at 115Vac and full load.

3.7 Turn On Delay Time

3000 msec @ Full load at rated voltage

3.8 Output Ripple

Maximum Ripple must be less than150mVpp when subjected to the following conditions:

Bandwidth: Limited 1Hz to 20MHz (PARD)

Line voltage: 100Vac-240Vac 50 & 60 Hz (Universal)

Output Load: Full Load

3.9 Overshoot

During either Turn-On or Turn-Off (AC voltage absent) of the power supply, the output voltage shall not exceed 13.2Vdc. No voltage of opposite polarity shall be present on the output during turn-on or turn-off.

3.10 Dynamic Response

The power supply output voltage shall not undershoot or overshoot beyond the specified limits shown after applying load changes with a 0.15A/μsec slew rate on the output. The load change will be applied with a 50% duty cycle.

Voltage Limits		Load Change
Minimum	Maximum	
11.4Vdc	12.6Vdc	20% to 80% load and back to 20%

3.11 Components Thermal Derating

Under nominal output load conditions and any input operating conditions, all components shall not exceed 85% thermal derating. All magnetic components shall not exceed their designed safety rated temperatures for the insulation.

4 MECHANICAL

4.1 Enclosure and Layout

Casing Mechanical layout and material acc. To EN60950-1, UL94V-1(housing)
Weight : /g (Max.)
Dimensions: 85.5X43.8X31.7mm
Colour : Black

4.2 Input and Output Configuration

Input Pin: Europe PIN
Output Connector : DC Plug Type: 5.5*2.5*11mm(Fork and Groove) "L"
Polarity: Center:"+"
Cable: 1.5M VW-1 80℃ 300V 2468 20AWG 2C BLACK+WHITE(PAHS+REACH+ROHS)

4.2.1 Strain Relief Pull Test

Put the DC cable connector in fixture and apply 30N force on the cable 25 times at 1 time per second. The cable shall not disengage. Long term stretch test is made with 30N for 1 hour.

4.2.2 Strain Relief Bend Test

Put the DC cable connector in appropriate fixture and apply 500g/f load to the cable. Then swing the DC cable connector1,000 times from 60°to -60°at a rate of 40 cycles per minute .Any crack in the strain relief is not allowed, the strain relief shall not detach form DC cable connector, and the conduction resistance shall not change by more than 10% from initial.

4.3 Label or Marking

◎ Marking shall be legible and locate within specified area.
◎ Attachment test : stick 3 M 600 scotch tape on test area for 30 seconds. Then remove tape in vertical direction. no removal of marking is allowed.
◎ Durability test: test according to IEC60950 paragraph 1.7.11. The rubbing shall be to and fro 5 times on test area. After the test , the marking shall be legible without fading.
◎ Compliance is checked by inspection and by rubbing the marking by hand for 15s with a piece of cloth soaked with petroleum spirit. after this test, the marking shall be legible; it shall not be possible to remove marking plates easily and they shall show no curling.
◎ The petroleum spirit to be used for the test is aliphatic solvent hexane having a maximum aromatics content of 0.1% by volume, a kauributenol value of 29, an initial boiling point of approximately 65 ℃, a dry point of approximately 69℃ and a mass per unit volume of approximately 0.7kg/L

5 REGULATORY COMPLIANCE

5.1 EMC Specifications

The external power supply must meet all specification in this section. it is required that the external power supply work closely with the customer's equipment in order to get the best EMC solution.

5.1.1 Radiated and Conducted Emission

The power supply shall comply to:
FCC part 15: Class B for radiated and conducted emissions.
EN55022, Class B for radiated and conducted emissions.

5.1.2 Immunity

5.1.2.1 Electrostatic Discharge Immunity

EN 55024, EN 61000-4-2
- Air Discharge: ±8kV
- Contact Discharge: ±4kV
- Performance Criteria B

Electrostatic-discharge test by contract or air should be conducted with Static-discharge tester, energy storage capacitance of 150pF, and discharge resistance of 330Ω, 8KV air discharge, 4KV contact discharge.

5.1.2.2 Radiated Field Immunity

EN 55024 EN 61000-4-3
- Frequency Range: 80-1000MHz
- Field Strength: 3 V/m with 80% amplitude modulation of 1kHz
- Performance Criteria A

Radio-frequency electromagnetic field susceptibility test, RS 80-1000MHz, 3V/m, 80%AM(1KHz).

5.1.2.3 Fast Transient Immunity

EN 55024, EN 61000-4-4
- Power line: 1kV
- Signal line: 0.5kV
- Performance Criteria B

5.1.2.4 Surge Immunity

EN 55024, EN 61000-4-5
- 1.2/50 usec Open Circuit voltage
- 8/20 usec Short Circuit current
- Power line: 1kV
- Line to Earth: 2kV

Lighting Surge Voltage of differential and common modes shall be applies across AC input lines and across input and frame ground.

5.2 Safety Requirements and Certification

5.2.1 Regulatory Standard

The power supply shall complied the following international regulatory standards

	Country	Certified Status	Standard
GS	Europe	Certified	EN60950-1
CE	Europe	Certified	Declared& CE Mark

5.2.2 Additional Safety Requirements

◎ Dielectric Withstand Voltage, Primary-to-Secondary: 3000 Vac. 5mA. 1 Minute.
◎ Insulation Resistance, Input to output: 10MΩ((Min.) at 500 VDC.
◎ Reinforced insulation system, Primary-to-Ground and Primary-to-Secondary.
◎ The leakage current shall not exceed 0.25mA.

6 PRODUCT ENVIRONMENTAL REQUIREMENTS

6.1 Temperature

◎ Operating: 0 ºC- +40 ºC
◎ Non-Operating -20 ºC- +80 ºC

6.2 Humidity

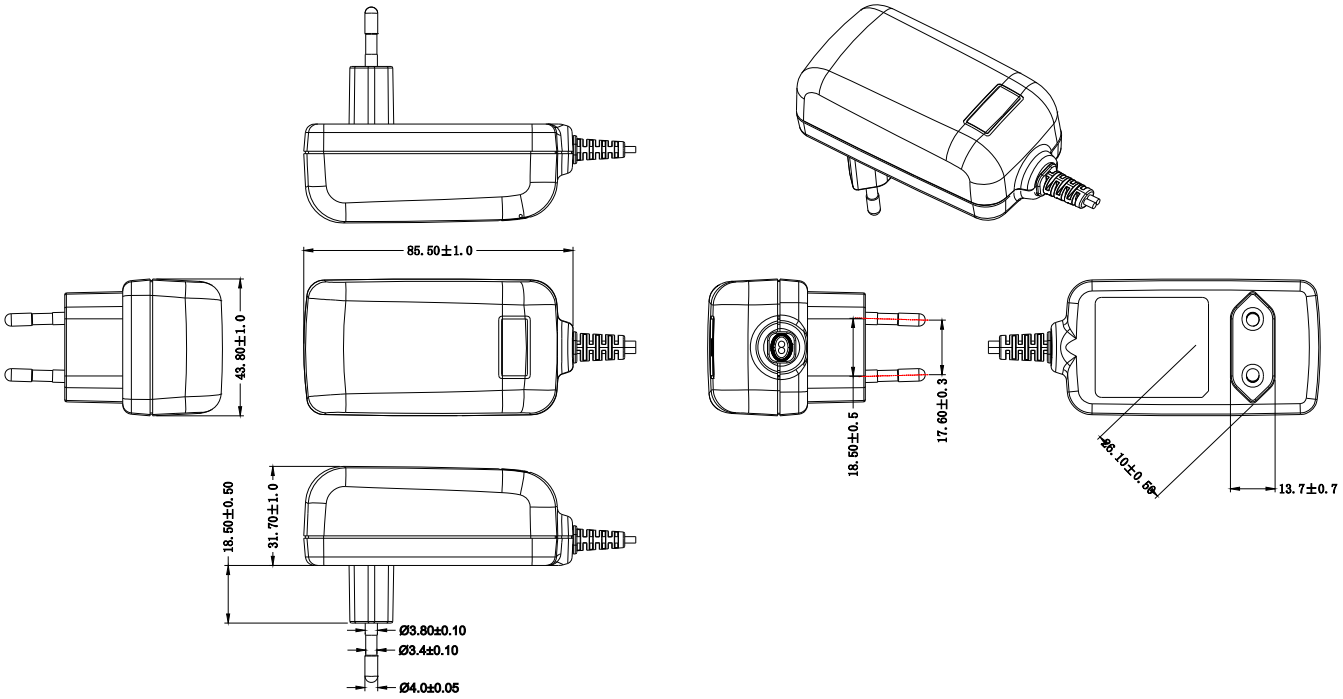
◎ Operating: 5% - 90% (Non Condensing)

6.3 Vibration

	Frequency	Slope	Power Spectra Density
Random	3 to 100 Hz	0	0.015 g2 /Hz
	100 to 137 Hz	-6dB/octave	--
	137 to 357 Hz	0	0.0080 g2 /Hz
	350 to 500 Hz	-6dB/octave	--
	500Hz (~2.41Grms)	--	0.0039 g2 /Hz

15 minutes/axis along all three axes

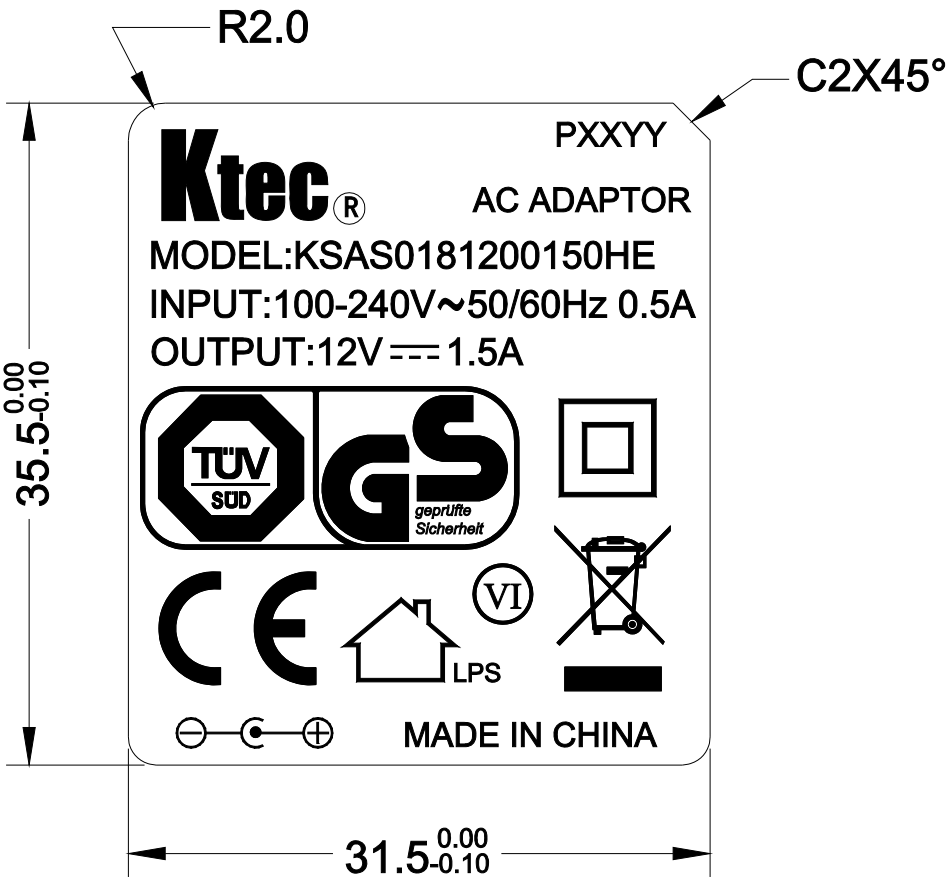
7 Appearance Drawing: (Unit: mm):



NOTE: 1. Case cover & chassis material:
SE-1: BLACK (NO KTEC)
2. AC PIN MATERIAL: BRASS (NI PLATED)
3. PAHS+REACH+ROHS

8 NAME PLATE:

8. 1 Dimension of name plate (Unit: mm)

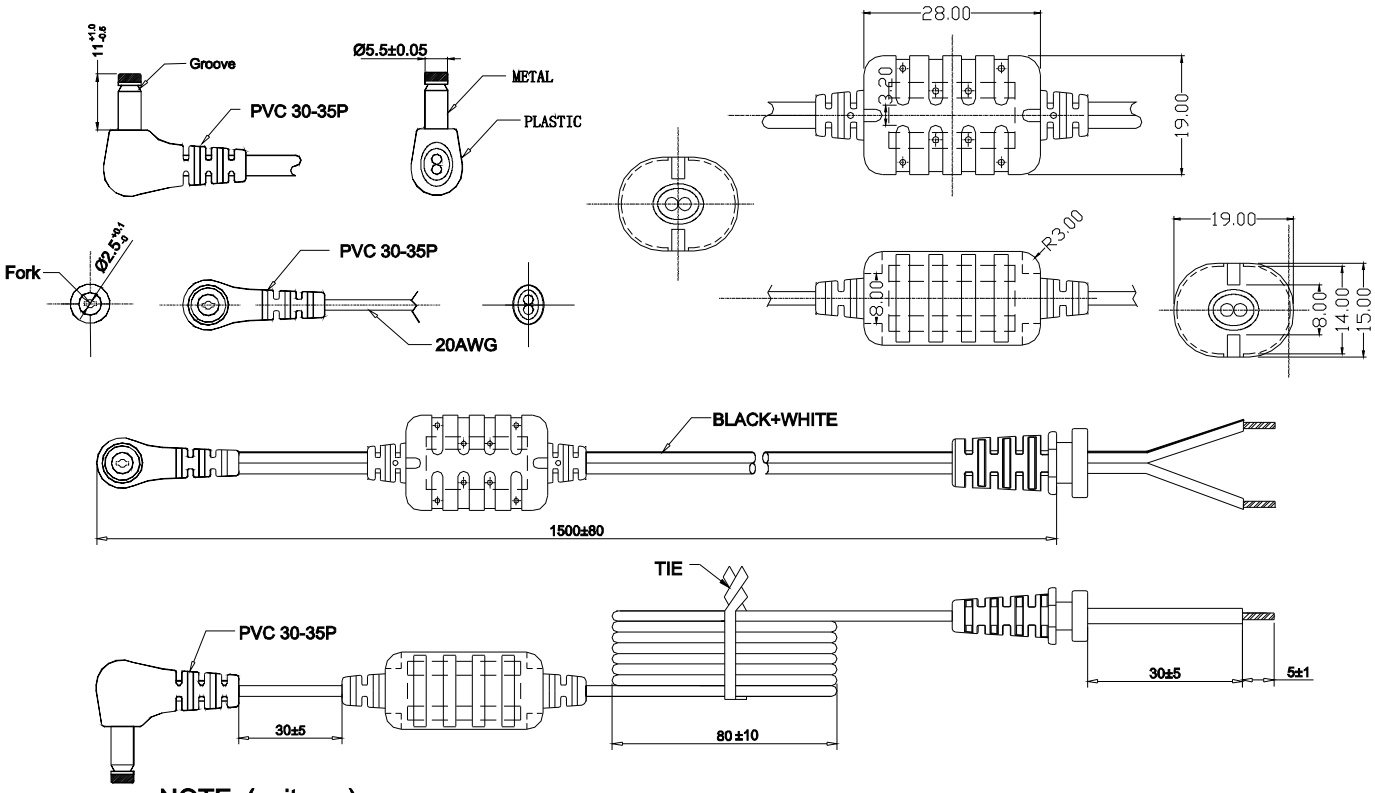


Note: ☐ **1. MATERIAL: POLYESTER+PVC; COATING:0.25+-0.05mm**
White characters Black background
PAHS+REACH+ROHS

☑ **2.Laser(镭射)**

DATE CODE(PXXYY P=PAHS XX=WEEK YY=YEAR) 按实际生产日期

9 Dimension of output plug & DC cord (Unit: mm):



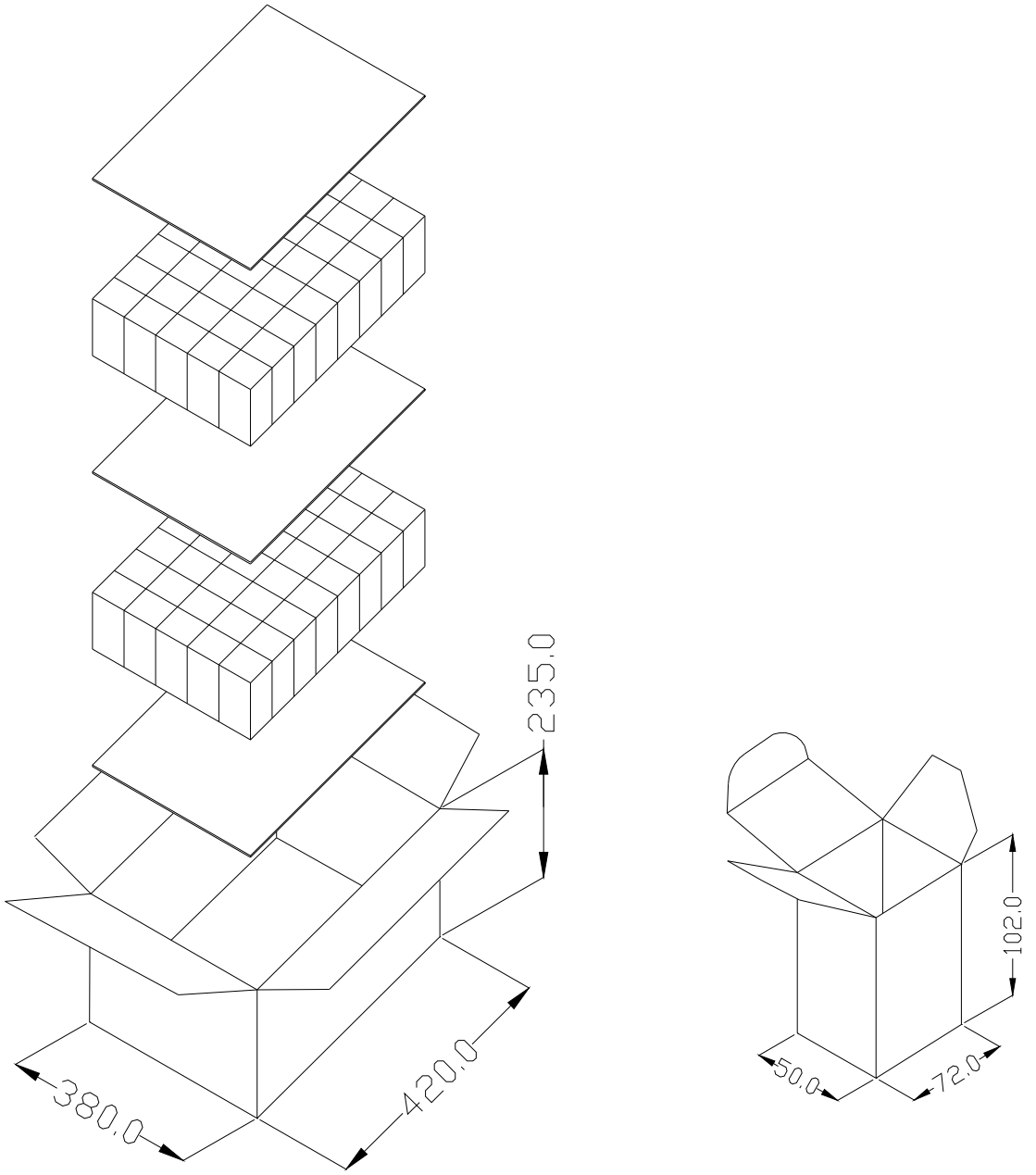
NOTE: (unit:mm)

1).WIRE TYPE:VW-1 80°C 300V L=1500mm 2468 20AWG 2C BLACK+WHITE(ADD CORE)
BLACK and WHITE----Positive BLACK----Negative

2).THE POLARITY: ⊖—C—⊕

3).PAHS+REACH+ROHS

10 PACKING (Unit: mm)



*此包装为公司标准品包装，与样品包装可能不同，请确认！

Note：This is the standard package, it is more or less different compare to the sample package, Please be confirmed