

# 参考规格书

## SPECIFICATION FOR REFERENCE

<b>CUSTOMER:</b> 客 户:	平台
<b>CUSTOMER P.N.:</b> 客户料号:	
<b>MODEL NO.:</b> 产品型号:	MS-V2000R160-032B0-DE
<b>PRODUCT NO.:</b> 产品编号:	
<b>SAMPLE DATE:</b> 送样日期:	2026-03-27

<b>CUSTOMER AUTHORIZED SIGNATURE</b> 客户承认签核		

Please return to us one copy of "SPECIFICATION FOR APPROVAL"  
with you approved signature.  
客户确认签字, 盖章后请回传一份承认书给我司。

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<b>MANUFACTURER AUTOGRAPH</b> 制造商签名			
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## 1. SCOPE

The document detail the electrical, mechanical and environmental specifications of a SMPS, the power supply provide 32W continuous output power.

资料详细描述了一款 **32W(连续输出功率)**开关电源的电气性,结构性及环境等要求.

The power supply shall meet the HSF requirement.

此款电源符合 **HSF** 要求.

### 1.1. Description /类型

- SMPS Adaptor(Wall mount)/插墙式适配器       SMPS Adaptor(Desk-top)/桌面型适配器  
 Open Frame/开放式结构       SMPS Unit (With Case)/带铁壳型  
 Others/其他

### 1.2. Green Requirements/环保要求

- RoHS:2011/65/EU & (EU) 2015/863;  
 REACH:1907/2006/EC;  
 Halogen-free:IEC 61249-2-21;  
 CA Prop 65;  
 POPs:(EU)2023/1608;  
 PAHs: 2005/69/EC;  
 Packaging Directive:94/62/EC;  
 US EPA Toxic Substances Control Act (TSCA);  
 MOSO Environmental standards: WI-QM006-G;  
 Others

## 2. Input Characteristics/输入特性

### 2.1. Input Voltage & Frequency/输入电压与频率

The range of input voltage is from 180Vac to 264Vac single phase.

输入电压范围: 从 **180Vac** 到 **264Vac**, 单相输入.

	Minimum/最小	Nominal/额定值	Maximum/最大
Input Voltage/输入电压	180Vac	100Vac~240Vac	264Vac
Input Frequency/输入频率	47Hz	60Hz/50Hz	63Hz

### 2.2. Input AC Current/AC 输入电流

1.0A max. @ 200-240Vac input & Full load.

输入电压 **200-240Vac** 满载时, 输入电流不超过 **1.0A**。

### 2.3. Inrush Current (cold start)/浪涌电流(冷启动)

100A max. @ 264Vac/50Hz input

输入电压 **264Vac/50Hz** 时, 浪涌电流不超过 **100A**。

#### 2.4. Average Efficiency 平均效率

92.5% min. @230V/50Hz input (@25%, 50%, 75% and 100% of max load).

90% min. @230V/50Hz input @10% of max load.

输入电压 230V/50Hz 时, 25%、50%、75%和 100%载时的平均效率不低于 92.5%。

输入电压 230V/50Hz 时, 10%载时的平均效率不低于 90%

#### 2.5. Energy Consumption /空载功耗

No load Consumption  $\leq 0.075W$ (230Vac/50Hz).

输入电压 230Vac/50Hz 时,空载功耗均小于 0.075W。

### 3. Output Characteristics/输出特性

#### 3.1. Static Output Characteristics <Vo & R+N>/静态输出特性

Output	Rated Load/额定负载		Output Range	R+N	Remark
Rate	Min. Load	Max. Load	输出电压范围	纹波与噪声	备注
+16V	0.0A	2A	15.20~16.80V	<100mVp-p	200-240V

Ripple & Noise: Measurement is done by 20MHz bandwidth oscilloscope and the output paralleled a 0.1uF ceramic capacitor and a 47uF electrolytic capacitor. (test under the condition of rated input and rated output)

纹波与噪声: 量测时示波器选用 20MHz 带宽限制,输出端要并联一颗 0.1uF 的陶瓷电容和一颗 47uF 的电解电容。(在额定输入及输出的条件下检测)

#### 3.2. Line/ Load Regulation/线性/负载调整率

Output	Load Condition/负载条件		Line Regulation	Load Regulation	Remark
Rate	Min. Load	Max. Load	线性调整率	负载调整率	备注
+16V	0.0A	2A	$\pm 3\%$	$\pm 5\%$	

#### 3.3. Turn - on Delay Time/开机延迟时间

3S max. @ 200-240Vac input & Full load.

输入电压 200-240Vac 满载时, 开机延迟时间不超过 3S。

#### 3.4. Hold-up Time/关机维持时间

20mS min. @ Full load &230Vac/50Hz input turn off at the worst case.

输入电压 230Vac/50Hz 满载时, 关机时间最差情况不小于 20 毫秒。

#### 3.5. Rise Time/上升时间

50mS max. @ Rated load.

额定负载时, 上升时间不超过 50 毫秒。

#### 3.6. Fall Time/下降时间

50mS max. @ Rated load.

额定负载时, 下降时间不超过 50 毫秒。

#### 3.7. Output Overshoot / Undershoot/输出过冲/欠冲

10% max. When the power on or off, when it is the full input voltage and full load.

开关机时, 输出过冲/欠冲均不大于 10%。

### 3.8. Output Load Transient Response/输出负载瞬态响应

Output voltage within 15.20-16.80V for load step from 20% to 80%, R/S: 0.5A/uS, Frequency: 100Hz duration and 8mS at 80%.

输出电压在 15.20-16.80V 时, 负载从 20%到 80%, 斜率 0.5A/uS,频率: 100Hz. 80%负载持续时间为 8mS

## 4. Protection Requirements/保护要求

### 4.1. Over Current Protection/过流保护

Over Current Point Limited/过流点限制:  $I > 2.4A$  (200-240Vac)

The output shall hiccup when the over currents applied to the output rail, and shall be self-recovery when the fault condition is removed.

当过电流时,输出将进入打嗝模式,当过流情况解除后,产品将会自动恢复正常。

### 4.2. Short Circuit Protection/短路保护

The input power shall decrease when the output rail short, the power supply shall no damage, and shall be self-recovery when the fault condition is removed.

当输出短路时,产品输入功率降低且不会损伤,当短路情况解除后,产品将会自动恢复正常。

### 4.3. Over Voltage Protection/过压保护

The power supply has to be protected against over voltage conditions. No damage allowed. The power supply must come back to nominal working without on/off powering after removal of the over voltage condition.

当过压保护时,产品输出功率不会损伤,当过压情况解除后,产品恢复正常。

## 5. Environment Requirements/环境要求

### 5.1. Operating Temperature and Relative Humidity/操作温/湿度要求

0°C to +40°C

10%RH to 90%RH

### 5.2. Storage Temperature and Relative Humidity/存储温/湿度要求

-40°C to +70°C

5%RH to 95%RH non-condensing

### 5.3. Altitude 5,000 meters/海拔 5,000 米

### 5.4. Vibration/振动

10 to 300Hz sweep at a constant acceleration of 1.0G(Breadth: 3.5mm) for 1Hour for each of the perpendicular axes X, Y, Z.

扫描频率: 10 to 300Hz, 恒定加速度: 1.0G(位移: 3.5mm), X, Y, Z 三垂直坐标轴向各振动 1 小时。

### 5.5. Drop in/跌落

Height: 1m; the product should be fell off on the hardwood with the thickness of 20mm, and the hardwood should be put on the base of the cement or on the ground without flexibility. Apply one times on all surfaces, total 6 times. The electric

performance and Hi-Pot test must be OK after the drop tests.

跌落高度:1 米, 并跌落到厚度为 20mm 的硬木上,且硬木应放在水泥基座或等同的无弹性地面上,6 个面, 每面各 1 次, 在跌落后电气性能及高压测试 OK.

## 6. Reliability Requirements/可靠性要求

### 6.1. Burn-in/老化

The power supply shall be burn-in for 4 Hours under normal input and 80% rated load at  $40^{\circ}\text{C} \pm 5^{\circ}\text{C}$ , the electric performance and Hi-Pot test must be OK.

$40^{\circ}\text{C} \pm 5^{\circ}\text{C}$ , 电源在正常输入电压和 80%额定负载条件下老化 4 小时后, 电气性能及高压测试 OK.

### 6.2. MTBF Qualification/平均间隔故障时间估算

The MTBF of power supply shall be over than 50,000 Hours @  $25^{\circ}\text{C}$  100%Load.

平均故障间隔时间: 在  $25^{\circ}\text{C}$ , 额定输入与 100%负载条件下, 至少工作 50,000 小时.

### 6.3. E-caps lifetime/电容寿命

The E-caps used in this PSU must be with lifetime of 3 years @ $25^{\circ}\text{C}$ @100% load@ 230Vac/50Hz input.

$25^{\circ}\text{C}$ 下, 在 100%负载和 230VAC 输入条件, 电解电容寿命必须有 3 年.

## 7. EMI/EMS Standards/EMI/EMS 标准

### 7.1. EMI Standards/EMI 标准

EN55032 EN55035

### 7.2. EMS Standards/EMS 标准

7-2-1 EN 61000-4-2,electrostatic discharge(ESD) requirement/静电抗扰度要求

Discharge characteristic/静电规格	Test level/测试条件	Test criteria/测试标准
Air discharge/空气放电	+/-15KV	A
Contact discharge/接触放电	+/-8KV	A

7-2-2 EN 61000-4-3,radiated electromagnetic field susceptibility(rs)/辐射骚扰场强

Test level/测试条件	Test criteria/测试标准
3V/m (r.m.s)	A
80-1000MHz,80%AM(1KHz) sine-wave	

7-2-3 EN 61000-4-4,electric fast transients(burst) immunity requirement/电快速瞬变脉冲群

Coupling/测试端口	Test level/测试条件	Test criteria/测试标准
AC-input/交流输入	1KV	B
AC-input/交流输入	2KV	B

7-2-4 K.21+, surge capability requirement/浪涌抗扰度要求

Surge voltage/雷击电压	judgment criteria/评定标准
Common mode/共模 +/-4KV	B
Differential mode/差模 +/-2KV	

7-2-5 EN 61000-4-6, Induced radio frequency fields conducted disturbances immunity requirement/电源端子传导骚扰实验

Test level/测试条件	Test criteria/测试标准
3V	A
0.15-80 MHz,80%AM(1KHz)	

7-2-6 Assessment criteria /评估标准

Acceptance criteria 可接受标准	Performance 性能
A	Agreed operational behavior within the specified limits 性能不允许变化; 如果性能会发生变化, 则变化的范围在产品规格书规定的范围内.
B	Time limited functional diminishment or malfunction during the tests is permitted . The function is self-reactivated by the unit following completion of the tests . 设备在测试过程中, 性能降低允许在产品规格书要求范围内, 干扰消除后, 设备能恢复正常, 不允许出现复位和任何方式的人工干预.
C	Malfunction is permitted .The function can be reactivated either by reconnection to the mains or by operator intervention . 在测试过程中, 设备允许出现业务中断, 测试完毕后允许自行恢复或者人工干预恢复(包括硬件上干预); 测试中只允许初级防护器件损坏, 并且更换损坏的初级防护器件后, 设备能恢复正常

## 8. Safety Standards/安规标准

### 8.1. Dielectric Strength(Hi-pot)/介电耐压强度(高压)

Primary to Secondary: 3000Vac / 10Ma Max / 60 second (when safety testing)

初级对次级: 3000Vac / 10mA Max / 60 秒 (安规试验)

Primary to Secondary: 3300Vac / 5mA Max /3S (when production)

初级对次级: 3300Vac / 5mA Max / 3S (生产作业)

### 8.2. Leakage Current/漏电流

0.25mA max. at 264Vac / 60Hz.

### 8.3. Insulation Resistance/绝缘阻抗

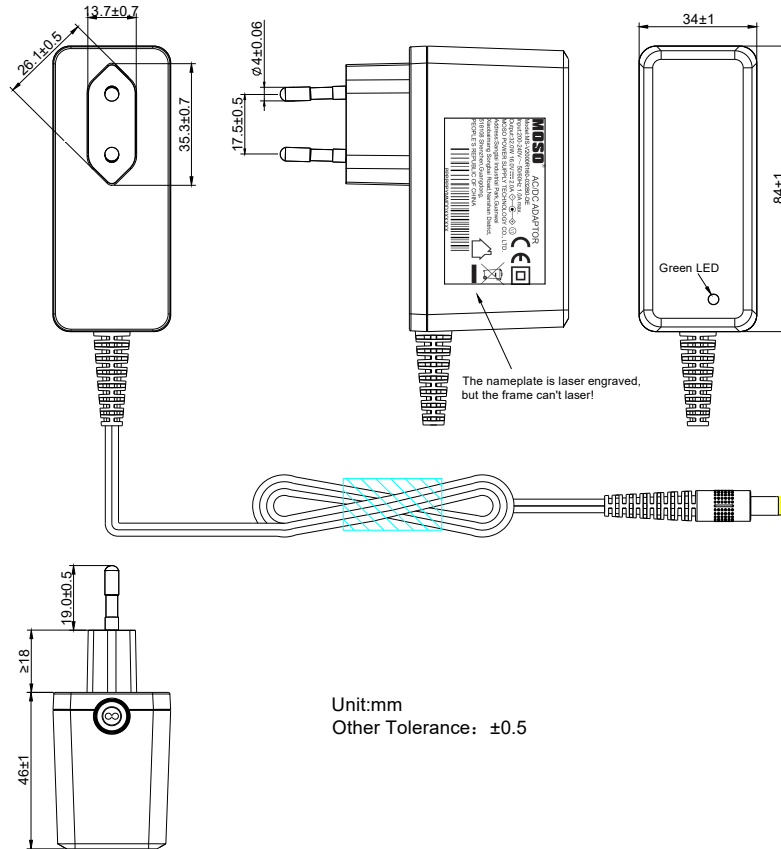
50MΩ min. at primary to secondary add 500Vdc test voltage

在初级与次级间加 500Vdc 进行测试

### 8.4. Regulatory Standards/安规标准

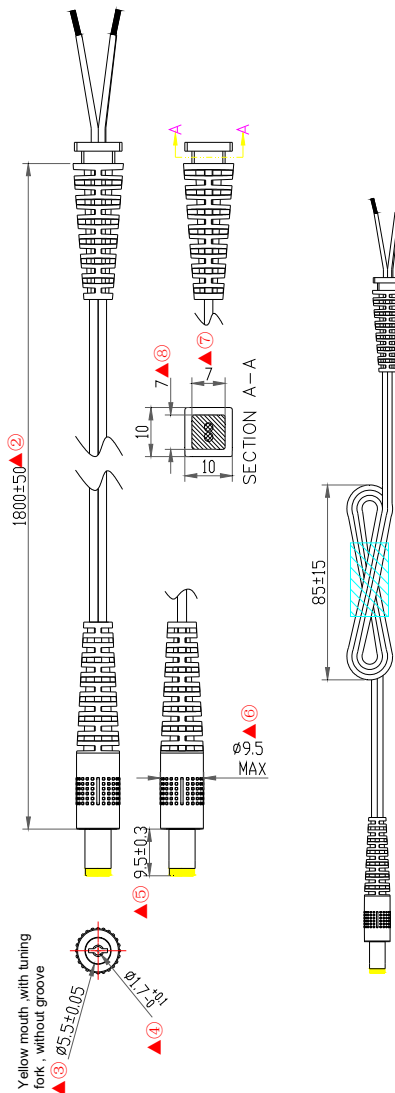
Type/安规	Country/国家	Standard/标准	State/状况	
CE	Europe	EN62368-1	APPROVAL	

## 9. Mechanical Outline Drawing/外观示意图



- 外壳材质:  PC 耐温: 120°C  
 PC+ABS 耐温: 95°C  
 备注: 1)PC 材质符合球压测试要求;  
 2)外壳与 DC 线为黑色.

## 10. DC Cord Drawing/DC 示意图



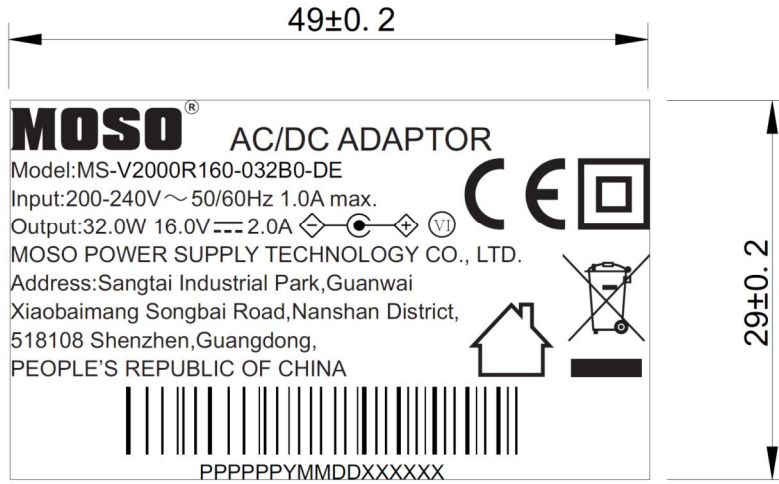
### Technology requirement:

1. Tensile test requirements:
    - 1) SR and DC plug and wire body tension  $\geq 5\text{KG}$  (1 minute), displacement  $\leq 2\text{MM}$ ;
    - 2) The tension of the whole line is  $\geq 10\text{KG}$  (no broken core in 1 minute and elongation  $\leq 10\%$  of the total length);
  2. Swing test requirements:
    - SR : 500g, 180° (90° on left and right), 30 times/min, at least 1000 times;
    - DC : 500g, 180° (90° on left and right), 30 times/min, at least 1000 times;
- Determination: The conducting resistance has not changed by more than 10% compared to the initial value, and the wire is intact and undamaged. (Single core wire breakage rate  $\leq 10\%$ , conductivity OK)
3. Appearance requirements:
    - 1) The outer skin of the wire shall not exceed 3 small bumps per meter;
    - 2) The surface of the wire must not have any bad appearance such as damage, crushing, or dirt;
    - 3) The surface of the SR/DC plug should not have defects such as deformation, shrinkage, flaring, air lines, lack of glue, etc.;
    - 4) The hardware DC plug must not be oxidized or scratched;
    - 5) The wire end must be completely immersed in tin;
    - 6) There should be no pressure line phenomenon at the head and tail of SR/DC;
  4. DC plug insertion force: 0.3-3kgf, 20 times/min, the appearance is allowed to be damaged after 5,000 times of plugging and unplugging, and the DC plug connection function is normal;
  5. Temperature resistance requirements: heat distortion temperature  $\geq 80^\circ\text{C}$ , after 3H test, no defects such as deformation or cracking;

### ▲ Key dimension

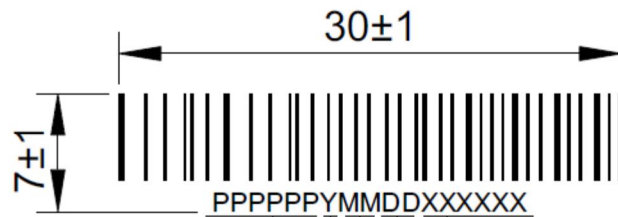
6. Wire specifications: Flat cable, 20AWG;
7. Printing requirements: With a valid UL certification number and company name, regardless of the printing order; The printed content must be clear, and the characters must be uniform in thickness, and there must be no printing defects such as blurred, skewed, double-image, and missing printing;
8. Material requirements: The DC, SR plug and the wire body requires PVC material;
9. Wiring mode: The striped line is connected to the inside of the copper nail (connected to V+), and the printing line is connected to the outside of the copper nail (connected to V-), with positive inside and negative outside;
10. Salt spray test: in a closed environment of  $40^\circ\text{C} \pm 2^\circ\text{C}$ , humidity  $\geq 95\%$ , PH value in the range of 6.5-7.2 After 48 hours of continuous salt spraying with  $5\% \pm 0.1\%$  NaCl solution, check that the product surface is free of rust, peeling off and other defects, and the function is normal;
11. Color requirements: black (110 IM);
12. Environmental Protection Request: Red phosphorus and yellow, white phosphorus are forbidden, pass RoHS2.0, REACH, California 65, PAHS, o-benzene 6P, NP standards and meet Moso environmental protection requirements;

### 11. I/O Marking Drawing/铭牌示意图



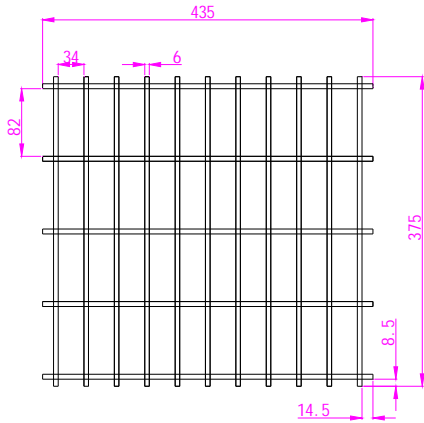
**Remark:**

1. Above label is laser engraved.
2. The dimension of double insulation mark and CE mark can NOT less than 5mm.
3. The dimension of garbage bin mark can NOT less than 7mm.



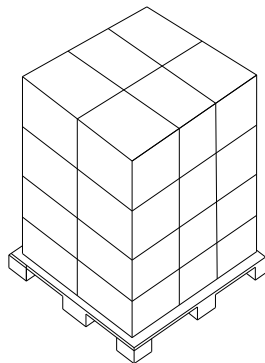
- product code(产品编码:实际S编码后六位, 如SD119-U0, 取D119U0)
- producing year(产品实际生产年份,年份最后一位, 如2025年, 取5)
- producing month(产品实际生产月份, 如2月, 取02)
- producing date(产品实际生产日期, 如12日, 取12)
- product listing number(产品序列号, 000001-999999)

## 12. Package Drawing/包装示意图

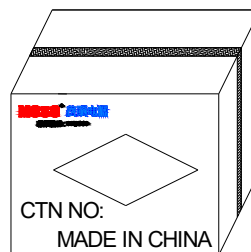
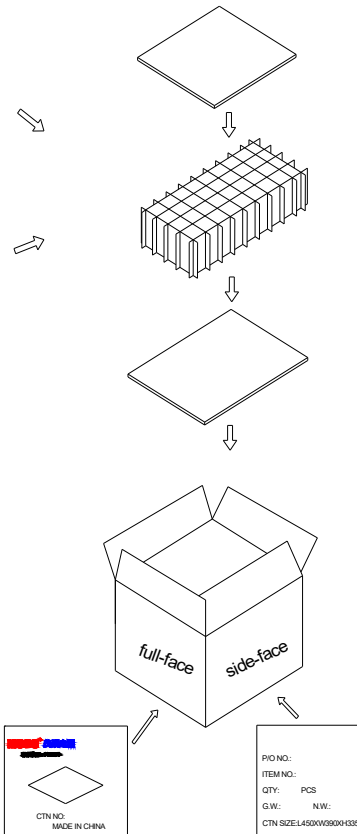


**包装说明:**

- 一、将产品每PCS装入150\*120 (mm)PE袋中包好, 再将包装的产品放入刀卡槽中, 每层装40PCS, 共装3层, 每箱装120PCS  
即: 40pcs/层\*3层=120PCS/箱
- 二、包装材料使用说明为:
  - 1、刀卡435\*375\*100用量: 3PCS
  - 3、PE袋150\*120用量: 120CS
  - 4、平卡435\*375用量: 4PCS
  - 5、纸箱450\*390\*335: 1PCS
- 三、栈板堆放说明为:
  - 1、栈板尺寸为: L1200\*W950\*H135mm
  - 2、每层放2行\*3列=6箱
  - 3、竖直堆放4层\*6箱共24箱



栈板堆放示意图

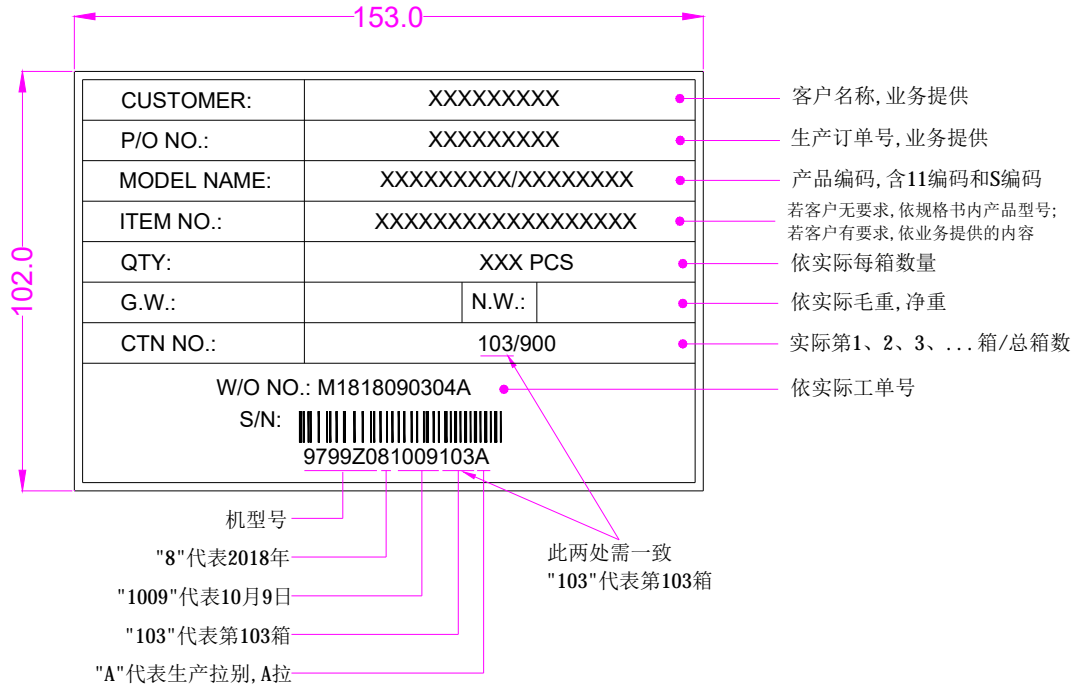


产品装入包装箱用胶袋封箱, 位置参考图中所示.

- PE 袋包装要求:  PE 袋不用胶带封口;  
 PE 袋用胶带封口;  
 其它要求;

备注: 若客户未进行选择 PE 袋包装要求或备注时, 我司默认采用 PE 袋不用胶带封口包装方式.

Carton label



备注:

1. 材质: 80P铜版纸(来料为空白标签)
2. 颜色: 白底黑字, 公司内部打印
3. 背附胶, 粘贴在纸箱上后, 无翘边等不良;
4. 符合ROHS标准及茂硕环保要求
5. 使用空白料号3230200011