



## Engineering specification sheet for approval

This specification document represents the design criteria of the product identified herein, for the approval of the designated recipient (customer). Prior to production and delivery of this, the customer shall endorse its approval of this specification document, with review of the detailed information provided herein. The customer's endorsement (approval) verifies that the product description is determined to be fully compliant to the customer's previous requirements.

If one or more samples are included with this specification, the customer's endorsement (approval) further verifies that the product has been tested by the customer, for which the product satisfactorily meets all aesthetic, mechanical, electrical, and operating requirements for its intended usage with the customer's suitable indoor equipments or applications.

If any question, please let TCB knows within 2 days after receiving this specification. This specification shall be automatically recorded as a customer approval.

|                     |                                |            |  |
|---------------------|--------------------------------|------------|--|
| Version:<br>Updated | Specification No.:<br>20220914 | Model name | TCB-D120-240500KE                        |
|                     |                                | Output     | 24.0V5.0A, 120W                          |
|                     |                                | Type       | Non detachable power cord (Cord to cord) |
|                     |                                | AC cable   | 1,000mmxKC 3-prongs                      |
|                     |                                | DC cable   | 1,500mmxPlug (5.5x2.5x11, straight/hook) |

Ningbo TCB Technology Co., Ltd.

18 Shaobei Road, Fengshan Street, Yuyao City, Ningbo, Zhejiang, China

TCB GROUP OVERSEAS SALES DEPARTMENT TEL.021-57892035 WECHAT:2877619762

[www.tcb-corp.com](http://www.tcb-corp.com)





### Table of Contents

- 1 SCOPE ..... 5**
- 2 ELECTRICAL SPECIFICATION ..... 5**
  - 2.1 INPUT REQUIREMENT ..... 5
    - 2.1.1 *Input voltage range* ..... 5
    - 2.1.2 *Input frequency range*..... 5
    - 2.1.3 *AC inrush current*..... 5
    - 2.1.4 *Input current* ..... 5
    - 2.1.5 *Leakage current* ..... 5
    - 2.1.6 *Insulation resistance*..... 5
    - 2.1.7 *Low power consumption*..... 6
  - 2.2 OUTPUT REQUIREMENT..... 6
    - 2.2.1 *Output power* ..... 6
    - 2.2.2 *Output voltage and current*..... 6
    - 2.2.3 *Ripple and noise*..... 6
    - 2.2.4 *Over voltage protection* ..... 6
    - 2.2.5 *Over current protection* ..... 7
    - 2.2.6 *Overshoot*..... 7
    - 2.2.7 *Short circuit Protection*..... 7
  - 2.3 PERFORMANCE REQUIREMENT ..... 7
    - 2.3.1 *Efficiency* ..... 7
    - 2.3.2 *Turn on delay time*..... 7
    - 2.3.3 *Hold-up time* ..... 7
    - 2.3.4 *Dynamic load*..... 7
- 3 ENVIRONMENTAL SPECIFICATION..... 8**
  - 3.1 *TEMPERATURE* ..... 8
  - 3.2 *HUMIDITY* ..... 8



3.3 *VIBRATION AND SHOCK* ..... 8

3.4 *ALTITUDE*..... 8

3.5 *CALCULATED MEAN TIME BETWEEN FAILURES (MTBF)* ..... 8

3.6 *TEMPERATURE ELEVATION* ..... 8

**4 RELATED SPECIFICATION**..... 9

4.1 *EMC* ..... 9

4.2 *Dielectric strength—(Hi-pot)*..... 9

4.3 *Surge*..... 9

4.4 *Electrostatic discharge ESD*..... 9

4.5 *Environment standards*..... 9

4.6 *Electrical Fast Transients (EFT)* ..... 9

**5 SAFETY CERTIFICATION** ..... 9

**6 MECHANICAL** .....10

5.1 *REQUIREMENTS*..... 10

5.2 *ADAPTER CASE OF RESIN MATERIALS*..... 10

5.3 *ELECTRIC AND MAGNETIC FIELDS*.....10

5.4 *ADAPTER EXTERNAL APPEARANCES* ..... 10

**7 PACKING** .....10



## 1 SCOPE

This document describes basic electrical characteristics and mechanical characteristic of [120W](#) power adapters.

## 2 ELECTRICAL SPECIFICATION

### 2.1 INPUT REQUIREMENT

#### 2.1.1 INPUT VOLTAGE RANGE

The power supply shall operate within input specification from [180Vac to 264Vac](#) or provide automatic switching between high line and low line input ranges. The table below shows common input voltage range.

| Input Range | Minimum                 | Nominal(Rated)                 | Maximum                |
|-------------|-------------------------|--------------------------------|------------------------|
|             | <a href="#">180 Vac</a> | <a href="#">200Vac- 240Vac</a> | <a href="#">264Vac</a> |

#### 2.1.2 INPUT FREQUENCY RANGE

The power supply shall operate within specification from [47 to 63 Hz](#).

#### 2.1.3 AC INRUSH CURRENT

Peak inrush current should not exceed [50](#) A at [230Vac](#), cold start. It should not interrupt line fuse or cause damage to the power adapters either at cold or warm start.

Peak inrush current should not exceed [n/a](#) A at [100Vac](#), cold start. It should not interrupt line fuse or cause damage to the power adapters either at cold or warm start.

#### 2.1.4 INPUT CURRENT

Maximum steady state input current shall not exceed [2.5](#) A for any line voltage specified in 2.1.1.

#### 2.1.5 LEAKAGE CURRENT

0.75mA maximum at nominal AC input and frequency.

#### 2.1.6 INSULATION RESISTANCE

Insulation resistance shall be more than 100M ohm at 25 degrees C after DC 500V between Input plug and DC plug.

**2.1.7 LOW POWER CONSUMPTION**

| Voltage range | Load | Power consumption |
|---------------|------|-------------------|
| 200Vac-240Vac | 0A   | ≤ 0.5 W           |

**2.2 OUTPUT REQUIREMENT****2.2.1 OUTPUT POWER**

The total output power, under steady state conditions, shall not exceed 120 W.

**2.2.2 OUTPUT VOLTAGE AND CURRENT**

Under any combination of line and load variation and environmental conditions, all outputs shall remain within tolerance as defined in Table 2. Output voltage(s) shall be measured at the load side of output connector.

| Output Voltage | Voltage Range ±3% |             | Current Range |                 |         |
|----------------|-------------------|-------------|---------------|-----------------|---------|
|                | Lower Limit       | Upper Limit | Minimum Load  | Full rated load | PK Load |
| +24.0V         | 22.8V             | 25.2V       | 0.0A          | 5.0A            | --      |

**2.2.3 RIPPLE AND NOISE**

Measurements shall be made with an oscilloscope with minimum of 20MHz bandwidth and 1:1 scope Probe, Output shall be bypassed at the connector with a 0.1μF ceramic disk capacitor and a 10μF electrolytic capacitor for general testing purpose.

| Output Voltage | Maximum Ripple & Noise (Vp-p) |
|----------------|-------------------------------|
| +24.0V         | 250mV                         |

**2.2.4 OVER VOLTAGE PROTECTION**

The power supply shall provide with over voltage protection such that under any single component failure.

The power supply provides output over voltage protected in latch off by zener diode, and no damage to customer device.



**2.2.5 OVER CURRENT PROTECTION**

The power supply shall be protected when operating any output in overload condition. The power supply shall be shut down and no any damage when the over current condition occurs on the output, and It will be auto-recovered when the failure is removed.

| Output Voltage | Over current protection |             | Test condition       |
|----------------|-------------------------|-------------|----------------------|
|                | Lower Limit             | Upper Limit | Input voltage:240Vac |
| +24.0V         | 6.0A                    | 8.0A        |                      |

**2.2.6 OVERSHOOT**

During turn on or turn off, the output overshoot shall not exceed nominal output voltage by more than 5%.

**2.2.7 SHORT CIRCUIT POTECTION**

The power supply shall have self-limiting protection to protect against short circuit or overload conditions. No damage to the power supply shall result from a continuous or intermittent short circuit condition. It will be auto-recovered when the failure is removed.

**2.3 PERFORMANCE REQUIREMENT**

**2.3.1 EFFICIENCY**

Active average mode Efficiency (watt out / watt in) shall be a minimum of 90 % at 220vac.

Active average mode Efficiency (watt out / watt in) shall be a minimum of n/a % at 115vac.

**2.3.2 TURN ON DELAY TIME**

Output shall reach steady state within n/a seconds of turn on at 100Vac or greater.

Output shall reach steady state within 2.5 seconds of turn on at 240Vac or greater.

**2.3.3 HOLD-UP TIME**

Hold-up time shall be a minimum of 20 mS at 220Vac input.

**2.3.4 DYNAMIC LOAD**

Power supply output voltage tolerance shall be complied with  $\pm 5\%$ .

Dynamic response and recovery time is equal or less than 200US.



Model: TCB-D120-D240500KE (24V.0V/5.0A)

## Engineering specification sheet

### 3 ENVIRONMENTAL SPECIFICATION

#### 3.1 TEMPERATURE

Operation within specification: -10 to 35 degrees C.

Storage: -30 to 70 degrees C

#### 3.2 HUMIDITY

Operation: **5% to 90%** relative humidity, non-condensation.

Storage: **5% to 95%** relative humidity, including condensation.

#### 3.3 VIBRATION AND SHOCK

The power supply shall be designed to withstand normal transportation vibration per MIL-STD-810F, method 514 and procedures X, as it is mounted in the chassis assembly and packed for shipping.

#### 3.4 ALTITUDE

The power supply shall operate properly at any altitude between 0 ~ 16,404 feet (**5000 meter**) above sea level.

#### 3.5 CALCULATED MEAN TIME BETWEEN FAILURES (MTBF)

The MTBF for the power adapter shall equal or exceed **30,000** hours when operated at full rated load in an ambient temperature of 25 degree C.

#### 3.6 TEMPERATUE ELEVATION

Test condition: **200Vac, with 5.0A load at 40°C** ambient temperature.

Test criteria: during this conditioning the power supply output normal and no damage or hazardous condition will occur, its surface will be less than or equal to **75°C**.

### 4 RELATED SPECIFICATION

#### 4.1 EMC STANDARD

Meet EN55022; EN55024, EN55020; FCC Part 15 Class B, GB9254, GB17625.1 ect.





Model: TCB-D120-240500KE (24V.0V/5.0A)

Engineering specification sheet

**4.2 DIELECTRIC STRENGTH—(HI-POT)**

Primary to secondary: 3000VAC.

Test time: 60 second

Cut-off current: 5mA max

**4.3 SURGE**

It is referring to EN61000-4-5 IEC61000-4-5:2001 Level 4.

Differential mode surge immunity: 2KV

Common-mode Surge Immunity: 4KV

**4.4 ELECTROSTATIC DISCHARGE ESD**

Contact electrostatic discharge: ±6KV

Air electrostatic discharge: ±10KV.

**4.5 ENVIRONMENT STANDARDS**

RoHS Regulation

**4.6 ELECTRICAL FAST TRANSIENTS (EFT)**

It is referring to IEC61000-4-4, Level 2: 1KV

**5 SAFETY CERTIFICATION**

The power supply of adapter meets the following safety certification.

| CERTIFICATION MARK | STANDARDS                     |
|--------------------|-------------------------------|
| KC                 | 62368-1(2021-08)              |
| KCC                | KS C 9832:2019/KS C 9835:2019 |
| CB                 | 62368-1(2018, VERSION III)    |

## 6 MECHANICAL

### 6.1 REQUIREMENTS

Meet the requirements of Bending test, Tensile strength test, Dropping test and Plug in & out test.

### 6.2 ADAPTER CASE OF RESIN MATERIALS

Flame retardant-grade: meet UL94 V-0

### 6.3 ELECTRIC AND MAGNETIC FIELDS

Meet the customer standard.

.Electric fields figures(E): 002, Magnetic fields figures (M): 007, Testing apparatus: ME 3030B (German)

### 6.4 ADAPTER EXTERNAL APPEARANCES / STANDARD

.Adapter type: Non detachable power cord\_ grounded ( cord to cord )

.Adapter size: 73.5(L)x73.5(W)x32(H) mm

.DC cable length(standard): 1,500 mm with noise filter

.DC plug(optional): 5.5(Outer)x2.5(Inner)x11(Length) mm(angle/hook)

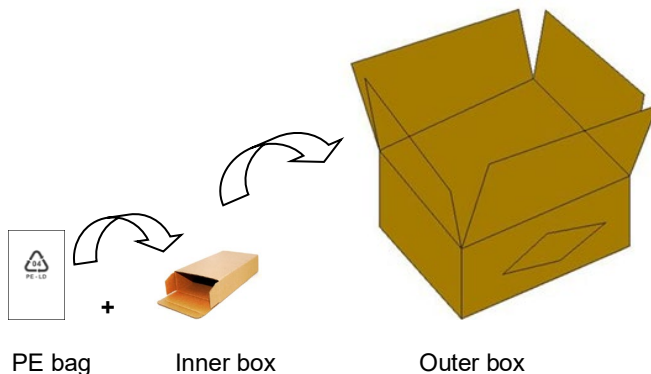
.AC cable length(standard): 1,000 mm, AC plug: KC standard\_ grounded(3 prongs)

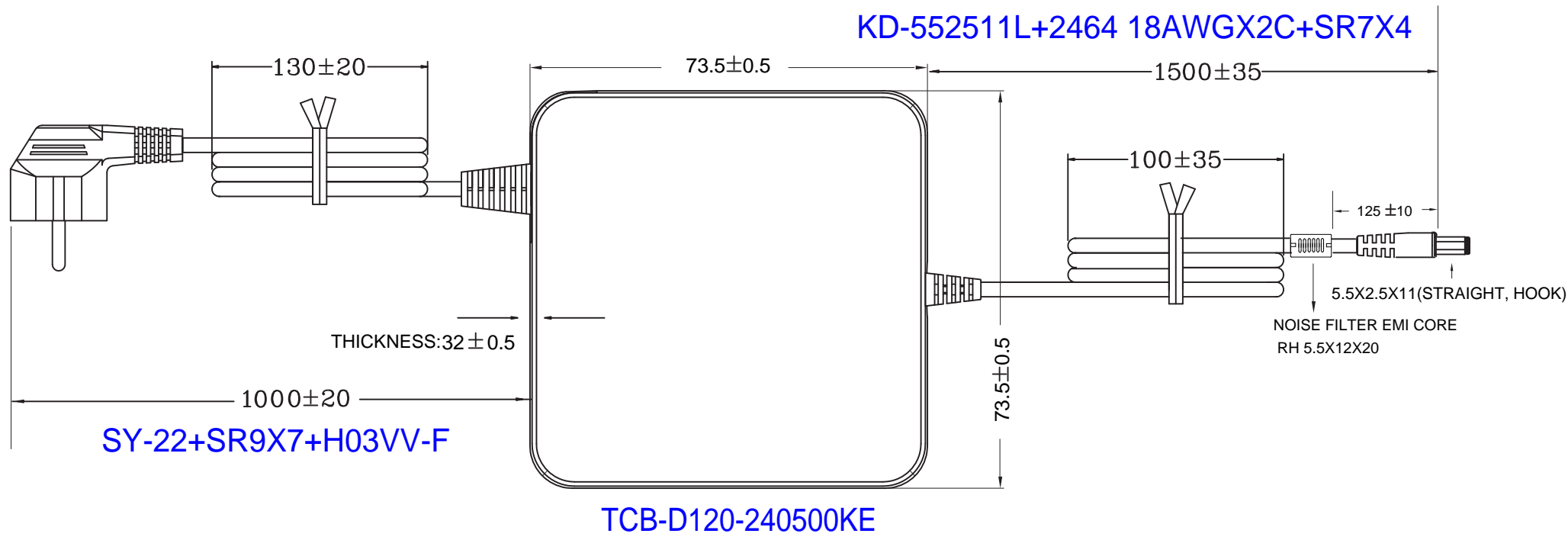
Pls refer to the attached for the details.

## 7 PACKING

.Inner box: 1750(L)x110(W)x50(H) mm .Outer box: 540(L)x370(W)x280(H) mm

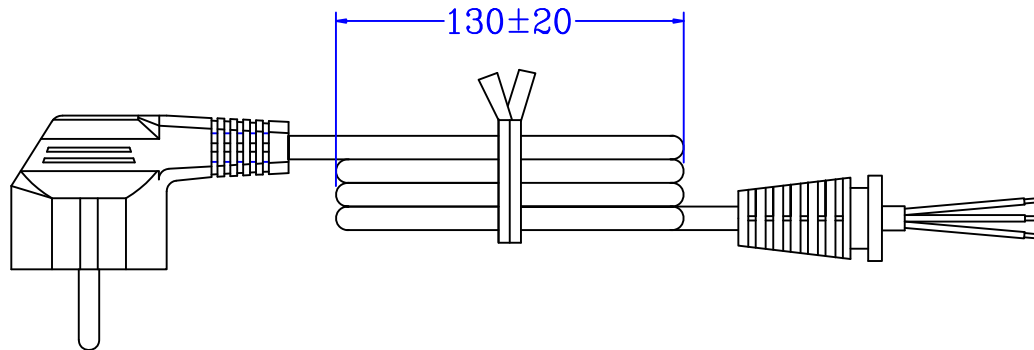
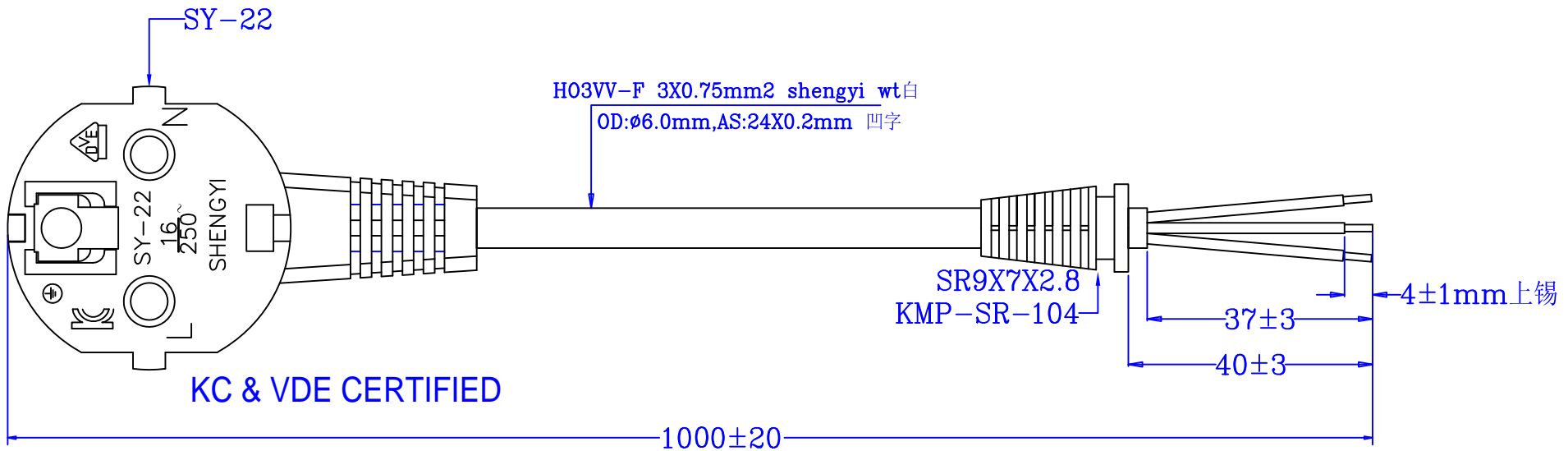
.Adapter q'ty per outer box: 50 pcs with each inner box and PE bag.





COLOR(ADAPTER BODY+AC AND DC CABLE) : BLACK  
 LABEL : TCB STANDARD

|                    |                                   |          |                  |
|--------------------|-----------------------------------|----------|------------------|
| DRAWING No.:       | <b>ADAPTER EXTERNAL APPERANCE</b> |          |                  |
| 20241201           | <b>SPECIFICATIONS</b>             |          |                  |
| CUSTOMER PART NO.: | <b>STANDARD FOR CUSTOMER</b>      |          |                  |
| CUSTOMER APPROVED: | <b>TITLE: TCB-D120-240500KE</b>   |          |                  |
|                    | UNIT : mm                         | REV. : A | SCALE : NONE     |
|                    | DRAW BY: ✓                        |          | DATE: 2024-12-01 |
|                    | CHECKED:                          |          | DATE:            |
|                    |                                   |          |                  |



CABLE MARKING:

H03VV-F 3G0.75mm² VDE TUV16168EA KTL SU01064-7001 BR1710 CABO FLEXIVEL CCC A060957 60227 IEC 52(RVV) 300/300V 3X0.75mm² SHENG YI

| 型号<br>CAT No.     | 规格<br>TYPE                | 使用五金<br>HARDWARE  | PVC 材料<br>PVC MATL | 颜色<br>COLOUR   | DRAWING No.:<br>SY-22+H03-075-SR9X7-1000 | POWER CORD FOR TCB-D120-240500KE |                  |              |  |
|-------------------|---------------------------|-------------------|--------------------|----------------|--|----------------------------------|------------------|--------------|--|
| 1 插头<br>PLUG      | SY-22                     | 韩国三插              | 韩国头五金              | PVC 50P        |  | wt                               | SPECIFICATIONS   |              |  |
| 2 尾插<br>CONNECTOR |                           |                   |                    |                |  | STANDARD FOR CUSTOMER            |                  |              |  |
| 3 尾卡<br>SR        | KMP-SR-104                | SR9X7X2.8         |                    | PVC 50P        | wt                                       | TITLE: SY-22+SR9X7+H03VV-F       |                  |              |  |
|                   | 电线规格<br>CABLE TYPE        | 铜线规格<br>CONDUCTOR | 完成外径<br>JACKET O.D | 外被颜色<br>COLOUR | CUSTOMER APPROVED:                       | UNIT : mm                        | REV. : A         | SCALE : NONE |  |
| 4 电线<br>CABLE     | H03VV-F 3X0.75mm² shengyi | 24x0.2mm          | ø6.0mm             | wt             |  | DRAW BY: <i>ZENG KA9</i>         | DATE: 2024-12-01 |              |  |
|                   |                           |                   |                    |                | CHECKED:                                 | DATE:                            |                  |              |  |