

AC/DC Converter

LD05-20Bxx Series

MORNSUN®

5W, AC/DC converter



LD05-20Bxx series— is a compact size power converter offered by Mornsun. It features universal input voltage, taking both DC and AC input voltage, low power consumption, high efficiency, high reliability, safer isolation. It offers good EMC performance, and is UL & CE certified, and widely used in industrial, electricity, instruments, telecommunication and civil applications.

Note: Please refer to Design Reference when module being used in a bad EMC environment.

FEATURES

- Universal input voltage range: 85~264VAC/100~370VDC
- AC and DC dual-use(input from the same terminal)
- High efficiency, high power density
- Output short circuit, over-current, over-voltage protections
- Meets UL60950, EN60950 standards (Pending)
- Mounting :PCB mounting, Chassis mounting, Din-Rail mounting available

Selection Guide

| Certification | Part No. | Output Power | Nominal Output Voltage and Current(Vo/Io) | Efficiency (230VAC, %/Typ.) | Max. Capacitive Load* (μF) |
|-----------------|------------|--------------|---|-----------------------------|----------------------------|
| UL/CE (Pending) | LD05-20B03 | 4.2W | 3.3V/1250mA | 74 | 4000 |
| | LD05-20B05 | 5W | 5V/1000mA | 78 | 4000 |
| | LD05-20B09 | | 9V/550mA | 78 | 1000 |
| | LD05-20B12 | | 12V/420mA | 80 | 820 |
| | LD05-20B15 | | 15V/333mA | 82 | 820 |
| | LD05-20B24 | 5.5W | 24V/230mA | 83 | 330 |

Note: *Test without external circuit.

Input Specifications

| Item | Operating Conditions | Min. | Typ. | Max. | Unit |
|--|----------------------|---------------------------------|------|------|------|
| Input Voltage Range | AC input | 85 | -- | 264 | VAC |
| | DC input | 100 | -- | 370 | VDC |
| Input Frequency | | 47 | -- | 63 | Hz |
| Input Current | 110VAC | -- | -- | 150 | mA |
| | 230VAC | -- | -- | 70 | |
| Inrush Current | 110VAC | -- | 10 | -- | A |
| | 230VAC | -- | 20 | -- | |
| Recommended External Input Fuse(Special package series include fuse) | | 1A/250V, slow fusing, necessary | | | |
| Hot Plug | | Unavailable | | | |

ГК КристЭл Системс
 тел/факс +7(499) 519-02-80
 www.crystel.ru
 info@crystel.ru



Output Specifications

| Item | Operating Conditions | Min. | Typ. | Max. | Unit |
|----------------------------|--------------------------------------|-----------------------------------|-------|------|------|
| Output Voltage Accuracy | 3.3V output | -- | ±3 | -- | % |
| | Other output | -- | ±2 | -- | |
| Line Regulation | Full load | -- | ±0.5 | -- | |
| Load Regulation | 10%-100% load | -- | ±1 | -- | |
| Ripple & Noise* | 20MHz bandwidth (peak-peak value) | -- | 60 | 120 | mV |
| | 3.3V/5V output Other output | -- | 50 | 100 | |
| Temperature Coefficient | | -- | ±0.02 | -- | %/°C |
| Stand-by Power Consumption | | -- | -- | 0.3 | W |
| Short Circuit Protection | | Hiccup, continuous, self-recovery | | | |
| Over-current Protection | | ≥ 110%Io self-recovery | | | |
| Over-voltage Protection | | Over-voltage shutdown | | | |
| Hold-up Time | 110VAC input | -- | 12 | -- | ms |
| | 230VAC input | -- | 80 | -- | |

Note: * Ripple and noise are measured by "parallel cable" method, please see AC-DC Converter Application Notes for specific operation.

General Specifications

| Item | Operating Conditions | Min. | Typ. | Max. | Unit |
|-----------------------|---------------------------------|--------------------------------|------|------|--------|
| Isolation Voltage | Input-output Test time: 1min | 4000 | -- | -- | VAC |
| Operating Temperature | | -25 | -- | +70 | °C |
| Storage Temperature | | -25 | -- | +105 | |
| Storage Humidity | | -- | -- | 95 | %RH |
| Switching Frequency | | -- | -- | 140 | KHz |
| Power Derating | +55°C~+70°C | 2.0 | -- | -- | % / °C |
| | +0°C~-25°C | 2.0 | -- | -- | |
| Safety Standard | | IEC60950/EN60950/UL60950 | | | |
| Safety Certification | | EN60950/UL60950 (Pending) | | | |
| Safety Class | | CLASS II | | | |
| MTBF | | MIL-HDBK-217F@25°C > 300,000 h | | | |

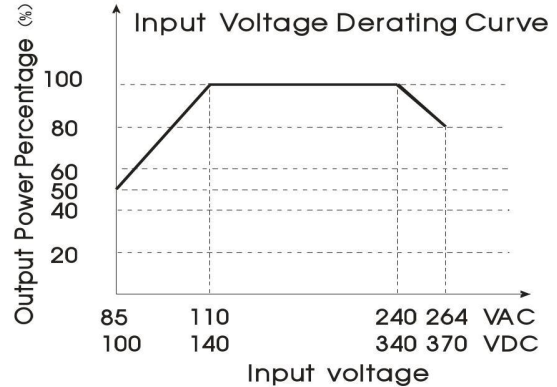
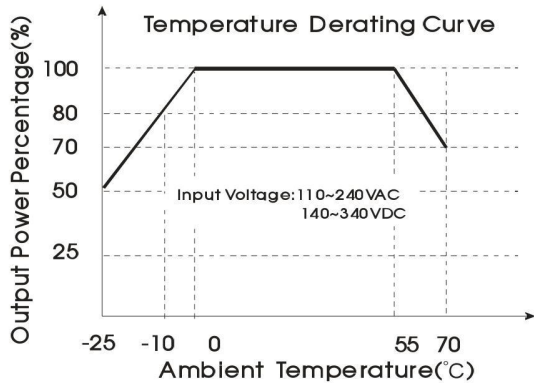
Physical Specifications

| | | |
|-----------------|--|--|
| Casing Material | | Black flame-retardant and heat-resistant plastic (UL94-V0) |
| Dimension | Horizontal package/A2 chassis mounting/A4 Din-Rail mounting / A2S chassis mounting/A4S Din-Rail mounting | Refer to the Dimensions |
| Weight | Horizontal package/A2 chassis mounting/A4 Din-Rail mounting / A2S chassis mounting/A4S Din-Rail mounting | 31g/80g / 121g / 52g / 70g (Typ.) |
| Cooling Method | | Free convection |

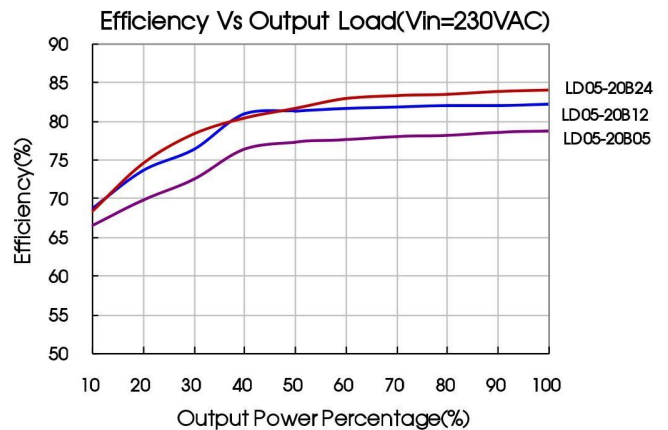
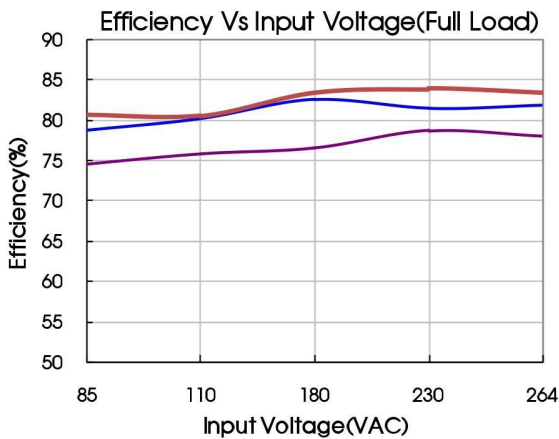
EMC Specifications

| | | |
|---|--|--|
| EMI | CE | CISPR22/EN55022, CLASS B |
| | RE | CISPR22/EN55022, CLASS B |
| EMS | ESD | IEC/EN61000-4-2 ±6KV/8KV perf. Criteria B |
| | RS | IEC/EN61000-4-3 10V/m perf. Criteria A |
| | EFT | IEC/EN 61000-4-4 ±2KV perf. Criteria B |
| | | IEC/EN 61000-4-4 ±4KV (See Fig. 2 for recommended circuit) perf. Criteria B |
| | Surge | IEC/EN 61000-4-5 ±1KV perf. Criteria B |
| | | IEC/EN 61000-4-5 ±2KV/±4KV (See Fig. 2 for recommended circuit) perf. Criteria B |
| | CS | IEC/EN61000-4-6 10Vr.m.s perf. Criteria A |
| | PFM | IEC/EN61000-4-8 10A/m perf. Criteria A |
| Voltage dips, short interruptions and voltage variations immunity | IEC/EN61000-4-11 0%-70% perf. Criteria B | |

Product Characteristic Curve



Note: ① When input 85~110VAC/240~264VAC/100~140VDC/340~370VDC, it need to be voltage derated on basis of temperature derating;
 ② This product is suitable for use in natural air cooling environments, if in a closed environment, please contact our company's FAE.



Design Reference

1. Typical application circuit

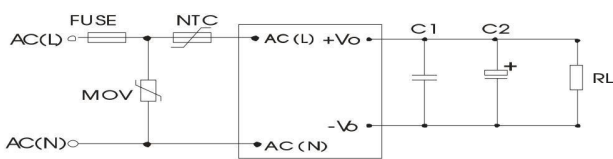


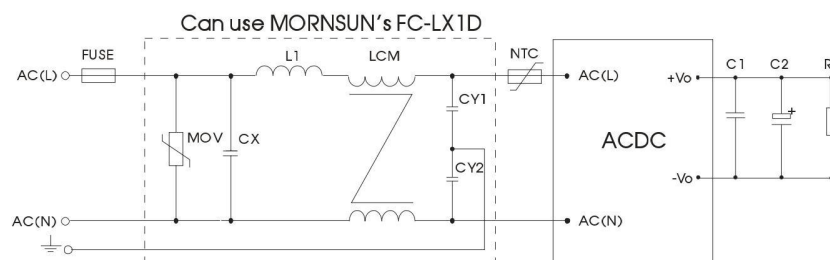
Fig. 1

| Model | C1(μF) | C2(μF) |
|------------|--------|--------|
| LD05-20B03 | 1 | 220 |
| LD05-20B05 | | 220 |
| LD05-20B09 | | 100 |
| LD05-20B12 | | 100 |
| LD05-20B15 | | 100 |
| LD05-20B24 | | 47 |

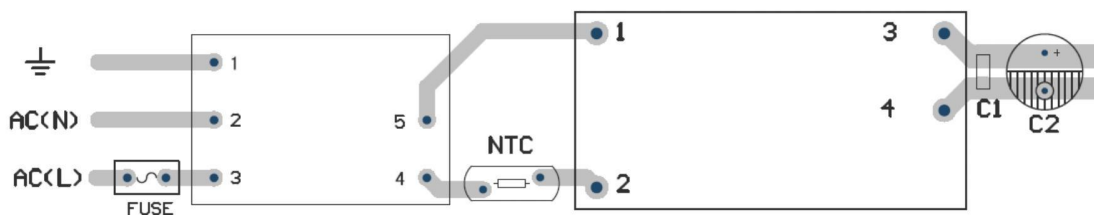
Note:

Output filtering capacitor C2 is a electrolytic capacitor, it is recommended to use high frequency and low impedance electrolytic capacitor. For capacitance and current of capacitor please refer to manufacture's datasheet. Output capacitor withstand voltage derating should be 80% or above. C1 is ceramic capacitor, which is used to filter high-frequency noise. External input NTC is recommended to use T2D-5; External input MOV is recommended to use S14K350.

2. EMC solution-recommended circuit



EMC solution-recommended circuit PCB layout



FC-LX1D

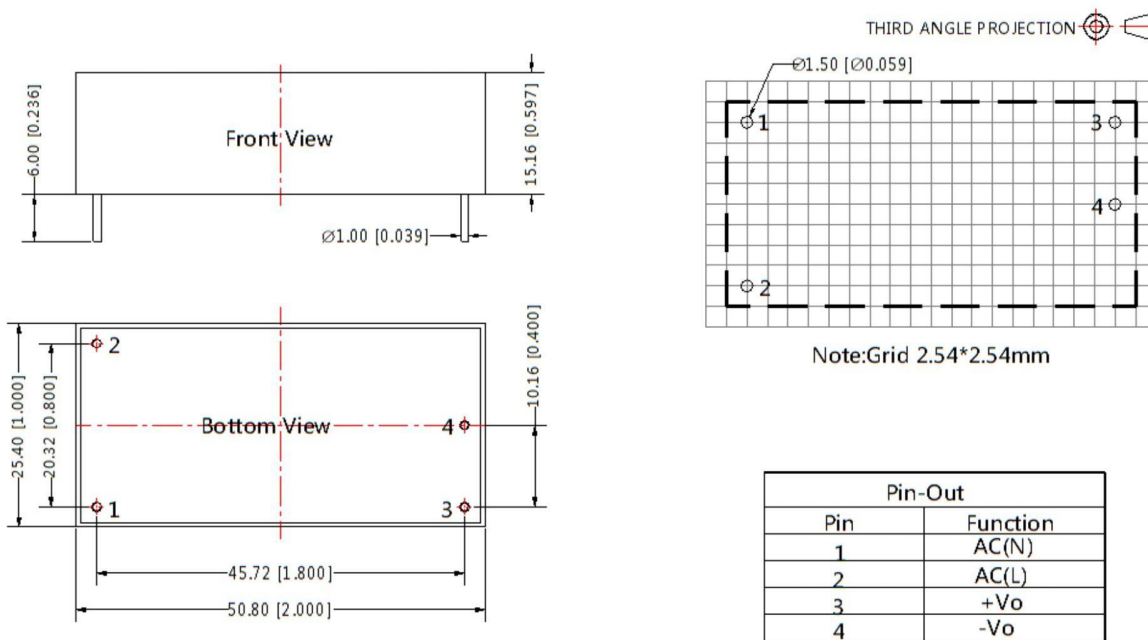
Fig 3

Note: Suggestions for safety regulation and wiring width: wire width $\geq 3\text{mm}$, distance between wires $\geq 6\text{mm}$, and distance between wire and ground $\geq 6\text{mm}$

| Element model | Recommended value |
|---------------|---|
| MOV | S14K350 |
| CX | 0.1 μF /275VAC |
| L1 | 4.7 μH /2.0A |
| CY1 | 1nF/400VAC |
| CY2 | 1nF/400VAC |
| LCM | 2.2mH, recommended to use MORNSUN's FL2D-10-222 |
| FUSE | 1A/250V, slow fusing, necessary |

3. For more information about Mornsun EMC Filter products, please visit www.mornsun-power.com to download the Selection Guide of EMC Filter

Dimensions and Recommended Layout



Note:
 Unit :mm[inch]
 Pin diameter tolerances : $\pm 0.10[\pm 0.004]$
 General tolerances: $\pm 0.50[\pm 0.020]$

| Pin-Out | |
|---------|----------|
| Pin | Function |
| 1 | AC(N) |
| 2 | AC(L) |
| 3 | +Vo |
| 4 | -Vo |

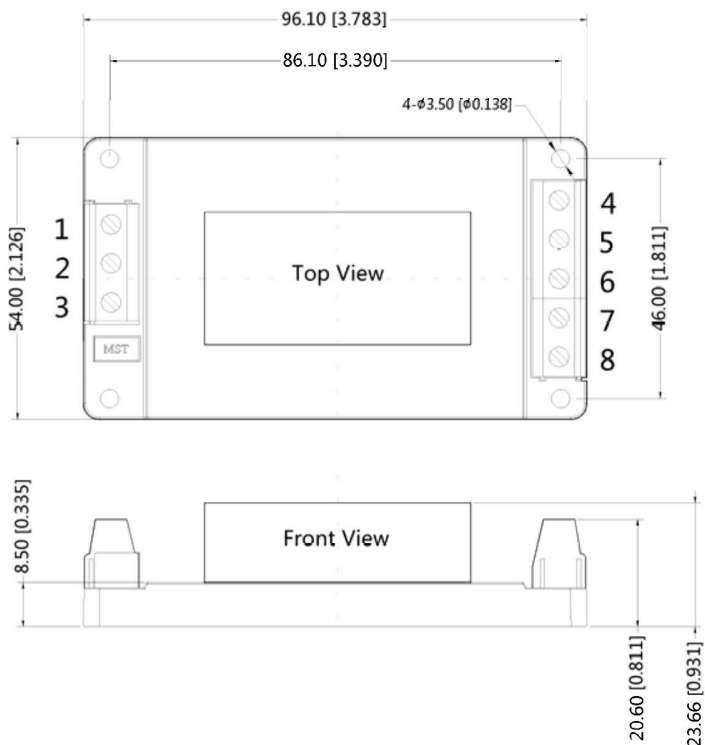
AC/DC Converter

LD05-20Bxx Series

MORNSUN®

LD05-20BxxA2 Chassis mounting Dimensions

THIRD ANGLE PROJECTION ☉ ◀

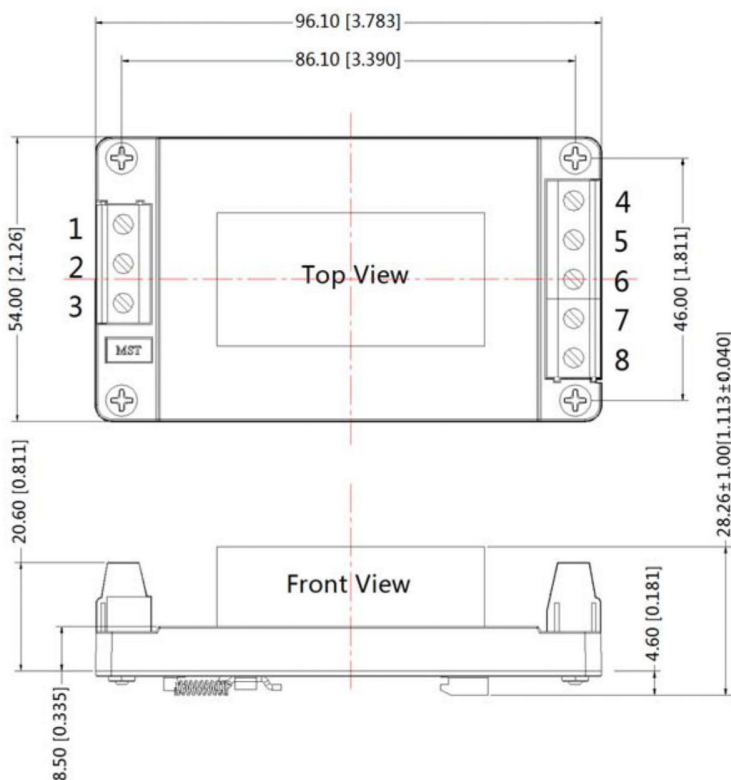


| Pin | Function |
|-----|----------|
| 1 | NC |
| 2 | AC(N) |
| 3 | AC(L) |
| 4 | +Vo |
| 5 | NC |
| 6 | -Vo |
| 7 | NC |
| 8 | NC |

Note:
Unit:mm[inch]
Wire range : 24~12 AWG
General tolerances:±0.50[±0.020]

LD05-20BxxA4 Din-Rail mounting Dimensions

THIRD ANGLE PROJECTION ☉ ◀



| Pin-Out | |
|---------|----------|
| Pin | Function |
| 1 | NC |
| 2 | AC(N) |
| 3 | AC(L) |
| 4 | +Vo |
| 5 | NC |
| 6 | -Vo |
| 7 | NC |
| 8 | NC |

Note:
Unit:mm[inch]
Wire range : 24~12 AWG
Installed on DIN RAIL TS35
General tolerances:±0.50[±0.020]

ГК КристЭл Системс
тел/факс +7(499) 519-02-80
www.crystal.ru
info@crystal.ru



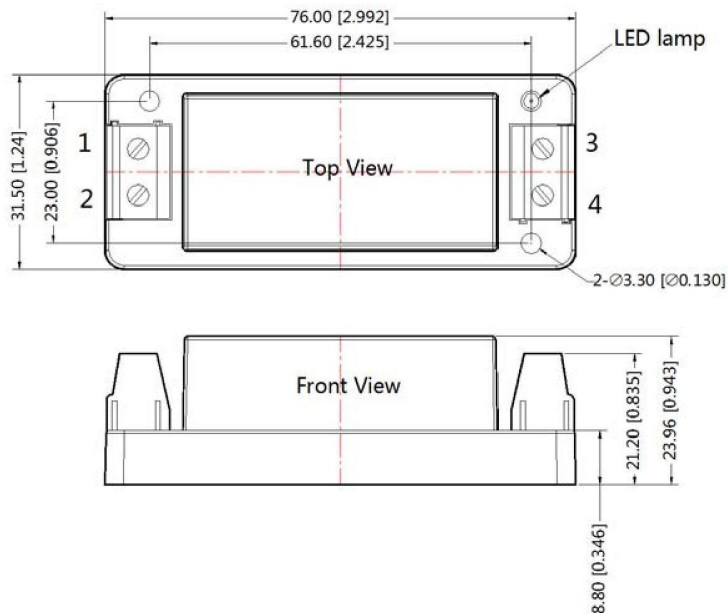
AC/DC Converter

LD05-20Bxx Series

MORNSUN®

LD05-20BxxA2S Chassis mounting Dimensions

THIRD ANGLE PROJECTION 

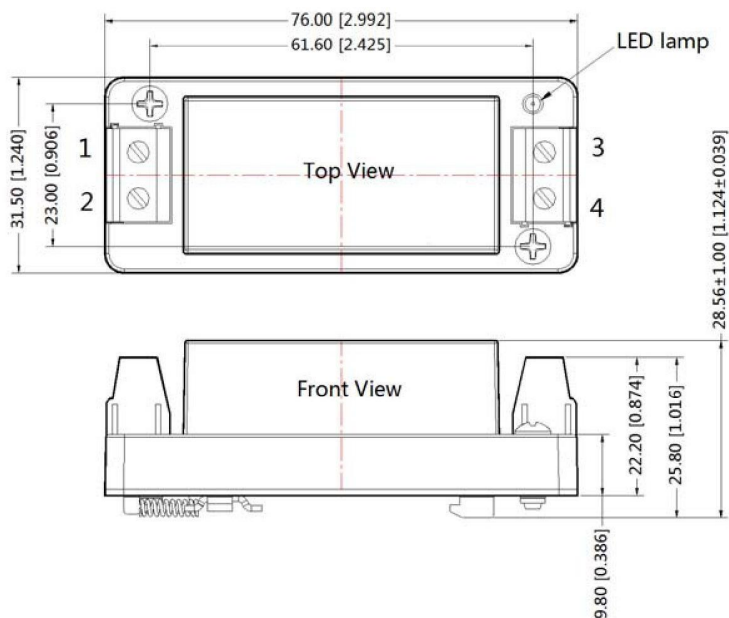


| Pin-Out | |
|---------|----------|
| Pin | Function |
| 1 | AC(N) |
| 2 | AC(L) |
| 3 | +Vo |
| 4 | -Vo |

Note:
Unit:mm[inch]
Wire range : 24~12 AWG
General tolerances:±0.50[±0.020]

LD05-20BxxA4S Din-Rail mounting Dimensions

THIRD ANGLE PROJECTION 



| Pin-Out | |
|---------|----------|
| Pin | Function |
| 1 | AC(N) |
| 2 | AC(L) |
| 3 | +Vo |
| 4 | -Vo |

Note:
Unit:mm[inch]
Wire range : 24~12 AWG
Installed on DIN RAIL TS35
General tolerances:±0.50[±0.020]

Notes:

1. Packing information please refer to Product Packing Information which can be downloaded from www.mornsun-power.com. Packing bag number: 58220003(Horizontal package), 58220022(A2S/A4S package), 58220010(A2/A4 package);
2. If the product is not operated within the required load range, the product performance cannot be guaranteed to comply with all parameters in the datasheet;
3. Unless otherwise specified, parameters in this datasheet were measured under the conditions of $T_a=25\text{ }^\circ\text{C}$, humidity<75% with nominal input voltage and rated output load;
4. All index testing methods in this datasheet are based on our Company's corporate standards;
5. The performance parameters of the product models listed in this manual are as above, but some parameters of non-standard model products may exceed the requirements mentioned above. Please contact our technicians directly for specific information;
6. We can provide product customization service;
7. Specifications are subject to change without prior notice.