

45W, AC-DC converter



CE Report  
EN60601-1  
EN62368-1

UK  
CA

RoHS



## FEATURES

- Universal 85-264VAC or 100-370VDC input voltage
- High power density, compact size:  
3" x 2" x 1.03" (LO45-20BxxMU)  
3.6" x 2.4" x 1.3" (LO45-20BxxMU-C)
- Operating ambient temperature range: -40°C to +70°C
- High I/O isolation voltage up to 4000VAC
- Meets 5000m altitude requirements
- Extremely low leakage current <75uA
- Stand-by power consumption <0.3W
- Output short circuit, over-current, over-voltage protection
- Efficiency up to 90%
- Meets 2 x MOPP safety class
- Suitable for BF application
- OVC III (EN61558-1 standards)

LO45-20BxxMU(-C) series is one of Mornsun's AC-DC miniaturize open frame power supply and suitable for all kinds of BF type (be accessible to patients) medical system equipment. It features universal AC input and at the same time accepts DC input voltage, cost-effective, high efficiency, high reliability and double or reinforced insulation. These converters offer excellent EMC and safety performance, which meet UL/IEC/EN/ES60601, UL/EN/IEC62368, IEC/EN60335, IEC/EN61558, GB4943 standards and they are widely used in areas of industrial, LED, street light control, electricity, security, telecommunications, smart home, medical, etc.

## Selection Guide

| Certification | Part No.*        | Output Power | Nominal Output Voltage and Current (Vo/Io) | Output Voltage Adjustable Range ADJ (V) | Efficiency at 230VAC (%) Typ. | Capacitive Load (μF) Max. |
|---------------|------------------|--------------|--------------------------------------------|-----------------------------------------|-------------------------------|---------------------------|
| EN            | LO45-20B03MU(-C) | 26.4W        | 3.3V/8.00A                                 | 2.97-3.63                               | 82                            | 20000                     |
|               | LO45-20B05MU(-C) | 40W          | 5V/8.00A                                   | 4.5-5.5                                 | 84                            | 20000                     |
|               | LO45-20B12MU(-C) | 45W          | 12V/3.75A                                  | 10.2-13.8                               | 86                            | 4000                      |
|               | LO45-20B15MU(-C) |              | 15V/3.00A                                  | 13.5-18                                 | 86                            | 3500                      |
|               | LO45-20B24MU(-C) |              | 24V/1.875A                                 | 21.6-28.5                               | 90                            | 1000                      |
|               | LO45-20B30MU(-C) |              | 30V/1.50A                                  | /                                       | 89                            | 900                       |
|               | LO45-20B36MU(-C) |              | 36V/1.25A                                  | 32.4-39.6                               | 90                            | 820                       |
|               | LO45-20B48MU(-C) |              | 48V/0.94A                                  | 43.2-52.8                               | 90                            | 330                       |

Note: \*Use suffix "-C" for enclosed version.

## 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       | 115VAC               | --          | --   | 1100 | mA   |
|                     | 230VAC               | --          | --   | 700  |      |
| Inrush Current      | 115VAC               | --          | --   | 40   | A    |
|                     | 230VAC               | --          | --   | 60   |      |
| Leakage Current     | 240VAC               | 75uA Max.   |      |      |      |
| Hot Plug            |                      | Unavailable |      |      |      |

### Output Specifications

| Item                       | Operating Conditions                    |                        | Min.                             | Typ.                  | Max. | Unit |
|----------------------------|-----------------------------------------|------------------------|----------------------------------|-----------------------|------|------|
| Output Voltage Accuracy    | 0% - 100% load                          | 3.3V/5V output         | --                               | ±2                    | --   | %    |
|                            |                                         | Other output           | --                               | ±1                    | --   |      |
| Line Regulation            | Rated load                              | 3.3V/5V output         | --                               | ±0.8                  | --   |      |
|                            |                                         | Other output           | --                               | ±0.5                  | --   |      |
| Load Regulation            | 230VAC                                  |                        | --                               | ±1                    | --   |      |
| Ripple & Noise*            | 20MHz bandwidth<br>(peak-to-peak value) | 3.3V/5V/12V/15V output | --                               | 75                    | 100  | mV   |
|                            |                                         | 24V output             | --                               | 80                    | 120  |      |
|                            |                                         | 30V/36V/48V output     | --                               | 100                   | 150  |      |
| Stand-by Power Consumption | 30V output                              |                        | --                               | 0.3                   | 0.4  | W    |
|                            | Other output                            |                        | --                               | 0.2                   | 0.3  |      |
| Temperature Coefficient    |                                         |                        | --                               | ±0.02                 | --   | %/°C |
| Short Circuit Protection   |                                         |                        | Hiccup, continuous, self-recover |                       |      |      |
| Over-current Protection    |                                         |                        | ≥120%Io, self-recover            |                       |      |      |
| Over-voltage Protection    | 3.3VDC output                           |                        | ≤5.25V                           | Output voltage hiccup |      |      |
|                            | 5VDC output                             |                        | ≤7V                              |                       |      |      |
|                            | 12VDC output                            |                        | ≤16V                             |                       |      |      |
|                            | 15VDC output                            |                        | ≤22V                             |                       |      |      |
|                            | 24VDC output                            |                        | ≤32.4V                           |                       |      |      |
|                            | 30VDC output                            |                        | ≤37V                             |                       |      |      |
|                            | 36VDC output                            |                        | ≤42.4V                           |                       |      |      |
|                            | 48VDC output                            |                        | ≤57V                             |                       |      |      |
| Minimum Load               |                                         |                        | 0                                | --                    | --   | %    |
| Hold-up Time               | 115VAC input                            |                        | 13                               | 22                    | --   | ms   |
|                            | 230VAC input                            |                        | 65                               | 100                   | --   |      |

Note: \*The "Tip and barrel method" is used for ripple and noise test, 3.3V, 5V, 12V, 15V with a 10uf ceramic capacitor, 24V with a 1uf ceramic capacitor, 30V, 36V, 48V with a 0.1uf ceramic capacitor, please refer to AC-DC Converter Application Notes for specific information.

### General Specifications

| Item                  | Operating Conditions |                | Min.   | Typ. | Max. | Unit   |
|-----------------------|----------------------|----------------|--------|------|------|--------|
| Isolation             | Input - output       |                | 4000   | --   | --   | VAC    |
|                       | Input - shell        | LO45-20BxxMU-C | 2500   | --   | --   |        |
|                       | Output - shell       | LO45-20BxxMU-C | 2500   | --   | --   |        |
| Insulation Resistance | Input - output       |                | 500VDC | 100  | --   | MΩ     |
| Operating Temperature |                      |                | -40    | --   | +70  | °C     |
| Storage Temperature   |                      |                | -40    | --   | +70  |        |
| Storage Humidity      |                      |                | --     | --   | 90   | %RH    |
| Altitude              |                      |                | --     | --   | 5000 | m      |
| Power Derating        | -40°C to -25°C       |                | 1.2    | --   | --   | % / °C |
|                       | +50°C to +70°C       |                | 2.5    | --   | --   |        |
|                       | 85VAC - 100VAC       |                | 1.0    | --   | --   | %/VAC  |
|                       | 2000m-5000m          |                | 5.0    | --   | --   | %/Km   |
| Safety Distance       | Clearance            |                | 7.6    | --   | --   | mm     |
|                       | Creepage             |                | 8      | --   | --   |        |

|                 |  |                                                                                                                                                                                                                                    |
|-----------------|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Safety Standard |  | Design refer to ES60601-1 &<br>EN62368-1, EN60601-1, BS EN60601-1<br>IEC60601-1<br>ES60601-1 (3.1 version)<br>CAN/CSA 22.2 No.60601-1:14-Edition 3<br>EN60601-1-2 Edition 4<br>UL/IEC62368-1<br>EN60335-1<br>EN61558-1<br>GB4943.1 |
| Safety Class    |  | CLASS II                                                                                                                                                                                                                           |
| MTBF            |  | MIL-HDBK-217F@25°C >300,000 h                                                                                                                                                                                                      |

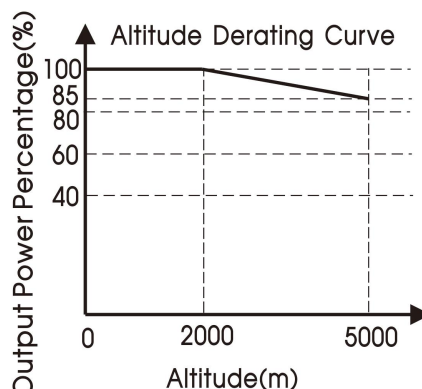
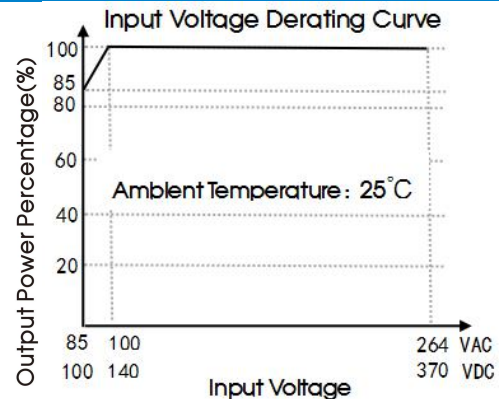
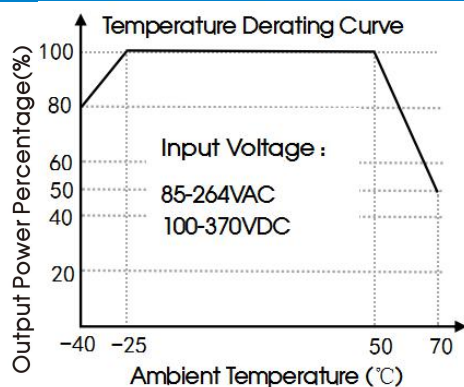
### Mechanical Specifications

|                |                |                         |
|----------------|----------------|-------------------------|
| Dimension      | LO45-20BxxMU   | 76.20 x 50.80 x 26.50mm |
|                | LO45-20BxxMU-C | 91.40 x 60.50 x 33.30mm |
| Weight         | LO45-20BxxMU   | 95g (Typ.)              |
|                | LO45-20BxxMU-C | 150g (Typ.)             |
| Cooling Method |                | Free air convection     |

### Electromagnetic Compatibility (EMC)

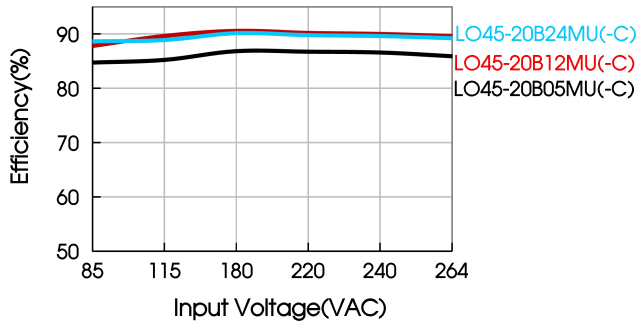
|           |                                                         |                         |                                                                                            |
|-----------|---------------------------------------------------------|-------------------------|--------------------------------------------------------------------------------------------|
| Emissions | CE                                                      | CISPR32/EN55032/EN55011 | CLASS B                                                                                    |
|           | RE                                                      | CISPR32/EN55032/EN55011 | CLASS B                                                                                    |
| Immunity  | ESD                                                     | IEC/EN61000-4-2         | Contact ±8KV/Air ±15KV<br>Perf. Criteria A                                                 |
|           | RS                                                      | IEC/EN61000-4-3         | 20V/m<br>Perf. Criteria A                                                                  |
|           | EFT                                                     | IEC/EN61000-4-4         | ±2KV<br>Perf. Criteria A                                                                   |
|           | Surge                                                   | IEC/EN61000-4-5         | Line to line ±2KV<br>Perf. Criteria A                                                      |
|           | CS                                                      | IEC/EN61000-4-6         | 20Vr.m.s<br>Perf. Criteria A                                                               |
|           | Voltage dips, short interruption and voltage variations | IEC/EN61000-4-11        | 100% dip 1 periods, 30% dip 25 periods, 100% interruptions 250 periods<br>Perf. Criteria B |

### Product Characteristic Curve

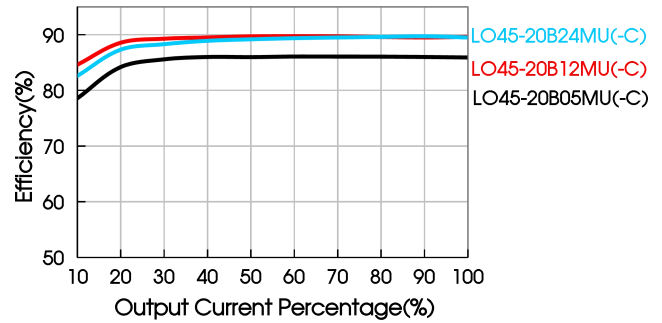


Note: ① With an AC input between 85-100VAC and a DC input between 100-140VDC, the output power must be derated as per temperature derating curves;  
 ② This product is suitable for applications using natural air cooling; for applications in closed environment please consult Mornsun FAE.

Efficiency Vs Input Voltage (Full Load)

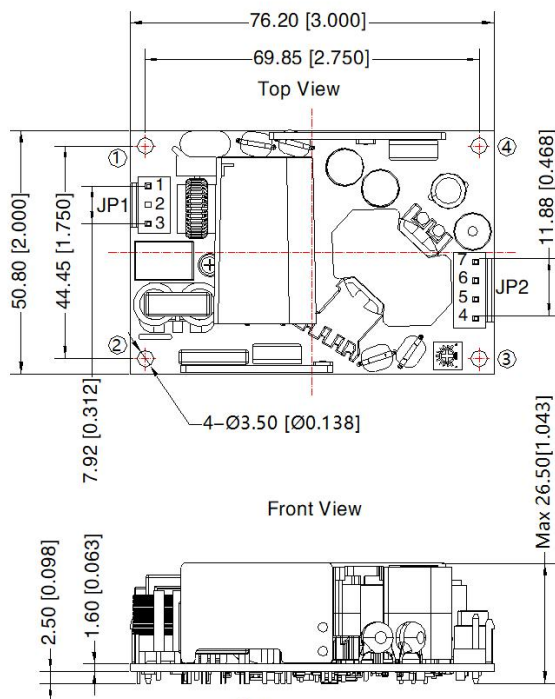


Efficiency Vs Output Load (Vin=230VAC)



## Dimensions and Recommended Layout (LO45-20BxxMU)

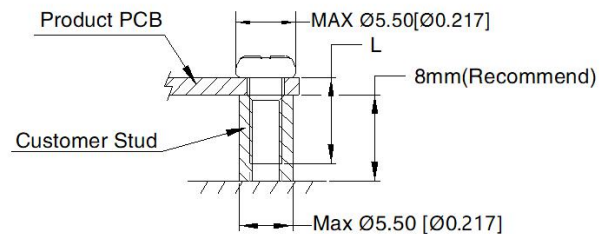
THIRD ANGLE PROJECTION



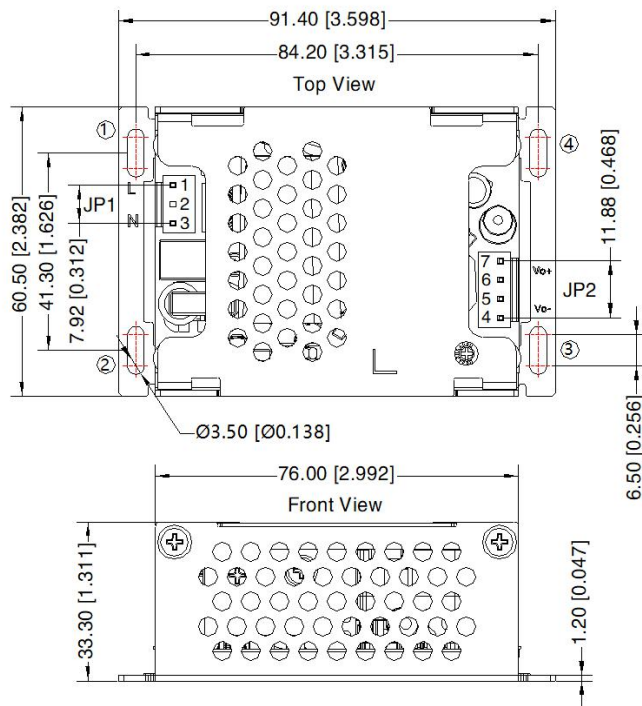
Note:  
 Unit: mm[inch]  
 General tolerances:  $\pm 0.50$  [ $\pm 0.020$ ]  
 The layout of the device is for reference only, please refer to the actual product

| Pin-Out    |     |       |                                                               |
|------------|-----|-------|---------------------------------------------------------------|
| Connectors | Pin | Mark  | Client Connectors                                             |
| JP1        | 1   | AC(L) | Housing: JST VHR<br>Contact: JSTSVH-21T-P1.1<br>or equivalent |
|            | 2   | NoPin |                                                               |
|            | 3   | AC(N) |                                                               |
| JP2        | 4   | -Vo   | Housing: JST VHR<br>Contact: JSTSVH-21T-P1.1<br>or equivalent |
|            | 5   | -Vo   |                                                               |
|            | 6   | +Vo   |                                                               |
|            | 7   | +Vo   |                                                               |

| Position | Screw Spec. | L(Recommend) | Torque(max) |
|----------|-------------|--------------|-------------|
| ① - ④    | M3          | 6mm          | 0.4N · m    |



Dimensions and Recommended Layout (LO45-20BxxMU-C)

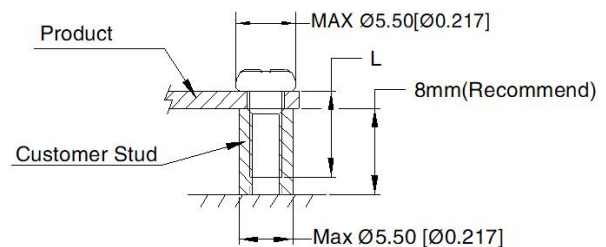


Note:  
Unit: mm[inch]  
General tolerances:  $\pm 0.50$  [ $\pm 0.020$ ]  
The layout of the device is for reference only, please refer to the actual product

THIRD ANGLE PROJECTION

| Pin-Out    |     |       |                                                               |
|------------|-----|-------|---------------------------------------------------------------|
| Connectors | Pin | Mark  | Client Connectors                                             |
| JP1        | 1   | AC(L) | Housing: JST VHR<br>Contact: JSTSVH-21T-P1.1<br>or equivalent |
|            | 2   | NoPin |                                                               |
|            | 3   | AC(N) |                                                               |
| JP2        | 4   | -Vo   | Housing: JST VHR<br>Contact: JSTSVH-21T-P1.1<br>or equivalent |
|            | 5   | -Vo   |                                                               |
|            | 6   | +Vo   |                                                               |
|            | 7   | +Vo   |                                                               |

| Position | Screw Spec. | L(Recommend) | Torque(max) |
|----------|-------------|--------------|-------------|
| ① - ④    | M3          | 6mm          | 0.4N · m    |



Note:

- For additional information on Product Packaging please refer to [www.mornsun-power.com](http://www.mornsun-power.com). Packaging bag number: 58220060 (LO45-20BxxMU), 58220222 (LO45-20BxxMU-C);
- Unless otherwise specified, parameters in this datasheet were measured under the conditions of  $T_a=25^{\circ}\text{C}$ , humidity<75% with nominal input voltage and rated output load;
- All index testing methods in this datasheet are based on our company corporate standards;
- We can provide product customization service, please contact our technicians directly for specific information;
- Products are related to laws and regulations: see "Features" and "EMC";
- Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

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