

LMF600-20B Series

600 Watts

- 80-277VAC Active Power Factor Correction
- -40 to 70°C operation
- EN55032 Level B conducted & radiated
- Remote on/off, DC OK, 5V 1A standby, remote sense
- 4000VAC isolation
- Meets EN60335-1 for home appliance
- 3 Year Warranty



Dimensions:

7.996 x 4 x 1.598" (203.1 x 101.6 x 40.6mm)

The LMF600-20B series of industrial enclosed AC-DC power supplies offer up to 600W of convection cooled power accepting an extended input range from 80-277VAC. The series has the latest ITE/AV safety approval EN/IEC 62368-1 and conforms to EMC level B EN55032 conducted and radiated. Outputs are available from 12 to 48V complete with short circuit, over current and over voltage protections. They feature on/off control, 5V standby, DC OK and remote sense I/O.

Models & Ratings

INSTALLATION ADVICE PG5

| Model Number ⁽¹⁾ | Output power | Output voltage | Output voltage adjustable range | Output current | Efficiency ⁽²⁾ | Capacitive load |
|-----------------------------|--------------|----------------|---------------------------------|----------------|---------------------------|-----------------|
| LMF600-20B12 | 600W | 12V | 11.8-12.6V | 50A | 92% | 6000uF |
| LMF60020B15 | | 15V | 14.7-15.8V | 40A | | |
| LMF600-20B24 | | 24V | 23.5-25.2V | 25A | 94% | 4000uF |
| LMF600-20B27 | | 27V | 26.4-28.4V | 22.3A | | |
| LMF600-20B36 | | 36V | 35.3-37.8V | 16.7A | | |
| LMF600-20B48 | | 48V | 47-50.4V | 12.6A | | |

Notes

1. Add suffix '-C' for terminal cover and 'Q' for conformal coating
2. Typical at 100% load 230VAC.
3. Remote sense compensation 500mV.

Key specifications

| Parameter | Minimum | Typical | Maximum | Units | Notes & Conditions |
|-----------------------|---|---------|---------|-------|--------------------------------|
| AC Input range | 80 | | 277 | VAC | See page 3 for de-rating curve |
| Operating temperature | -40 | | 70 | °C | See page 3 for de-rating curve |
| Efficiency | 92 | | 94 | % | See table above |
| Dimensions | 7.996 x 4 x 1.598" (203.1 x 101.6 x 40.6mm) | | | | |
| EMC | EN55032 Level B Conducted and Radiated. EN61000-3 and EN61000-4, harmonics, flicker, Surge, EFT, ESD, conducted and radiated. | | | | |
| Safety | EN/IEC 62368-1, CE, CCC. UL pending | | | | |

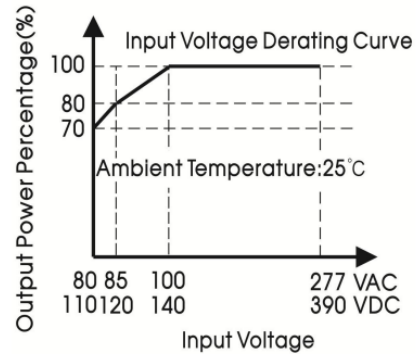
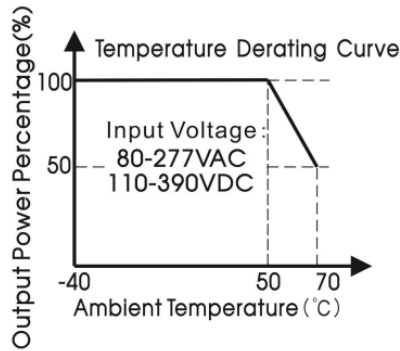
LMF600-20B Series

| Input | | | | | |
|-----------------|---------|---------|---------|-------|---|
| Parameter | Minimum | Typical | Maximum | Units | Notes & Conditions |
| Input voltage | 80 | | 277 | VAC | See page 3 for de-rating curve, 110-390DC |
| Input frequency | 47 | | 63 | Hz | |
| Input current | | | 7.5 | A | 115VAC |
| | | | 3.5 | | 230VAC |
| Inrush current | | 40 | | | 230 VAC cold start at 25°C |
| Power factor | | 0.98 | | | At full load 115VAC |
| | | 0.95 | | | At full load 230VAC |
| Standby power | | 0.5 | | W | 230VAC |
| Leakage current | | | 0.1 | mA | |

| Output | | | | | |
|-------------------------------------|---------|---------|---------|-------|--|
| Parameter | Minimum | Typical | Maximum | Units | Notes & Conditions |
| Output voltage | 12 | | 48 | VDC | See Model & Ratings table |
| Set point accuracy | | ±1 | | % | ±2 for 5V standby |
| Line regulation | | ±0.3 | | % | At rated load. ±0.5 for 5V standby |
| Load regulation | | ±0.5 | | % | 0-100% load 230VAC. ±2 for 5V standby |
| Ripple & Noise | 150 | 200 | 300 | mVpp | 20MHz BW 47uF and 0.1uF cap. 150mV for 12/15V, 200mV for 24/27V, 300mV for others. |
| Hold up time | 15 | | | mS | 230VAC |
| Overload / Short circuit protection | 110 | | 160 | % | Trip & restart <3s |
| Overvoltage protection | | | 16 | VDC | 12V hiccup |
| | | | 20 | | 15V hiccup |
| | | | 32 | | 24V hiccup |
| | | | 35 | | 27V hiccup |
| | | | 47 | | 36V hiccup |
| | | | 60 | | 48V Hiccup |
| Remote on/off | 0 | | 0.8 | | Power on |
| | 4 | | 10 | | Power off |

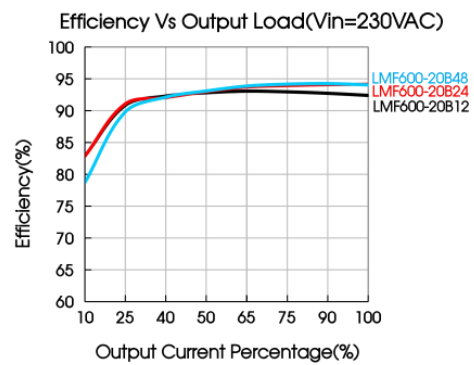
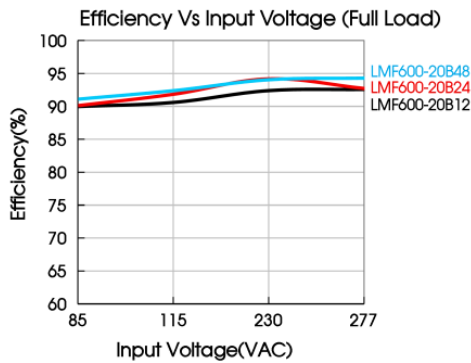
| General | | | | | |
|----------------------------|----------------------|---------|---------|-------------------|---------------------------------|
| Parameter | Minimum | Typical | Maximum | Units | Notes & Conditions |
| Efficiency | 92 | | 94 | % | See models and ratings table |
| Isolation: Input to Output | 4000 | | | VAC | |
| Input to Ground | 1500 | | | VAC | |
| Output to Ground | 1500 | | | VAC | |
| Insulation resistance | 50 | | | MΩ | 500VDC, 25°C and <95RH |
| Power density | | | 11.74 | W/In ³ | |
| MTBF | 300 | | | kHrs | MIL-HDBK-217F, rated load, 25°C |
| Weight | | 1000 | | g | |
| Case material | Metal (AL1100, SGCC) | | | | |

LMF600-20B Series



Note: 1. With an AC input voltage between 80-100VAC and a DC input between 110-140VDC the output power must be derated as per the temperature derating curves;

2. This product is suitable for applications using forced air cooling; for applications in closed environment please consult Mornsun FAE.



Environmental

| Parameter | Minimum | Typical | Maximum | Units | Notes & Conditions |
|-------------------------|---------|---------|---------|-------|----------------------------------|
| Operating temperature | -40 | | 70 | °C | See curve above |
| Storage temperature | -40 | | 85 | °C | |
| Cooling | | | | | Forced cooled |
| Temperature coefficient | | | 0.05 | %/°C | |
| Humidity | 20 | | 95 | %RH | Non-condensing. 10-95%RH storage |
| Operating altitude | | | 5000 | M | 5°C/1000m derating above 2000m |

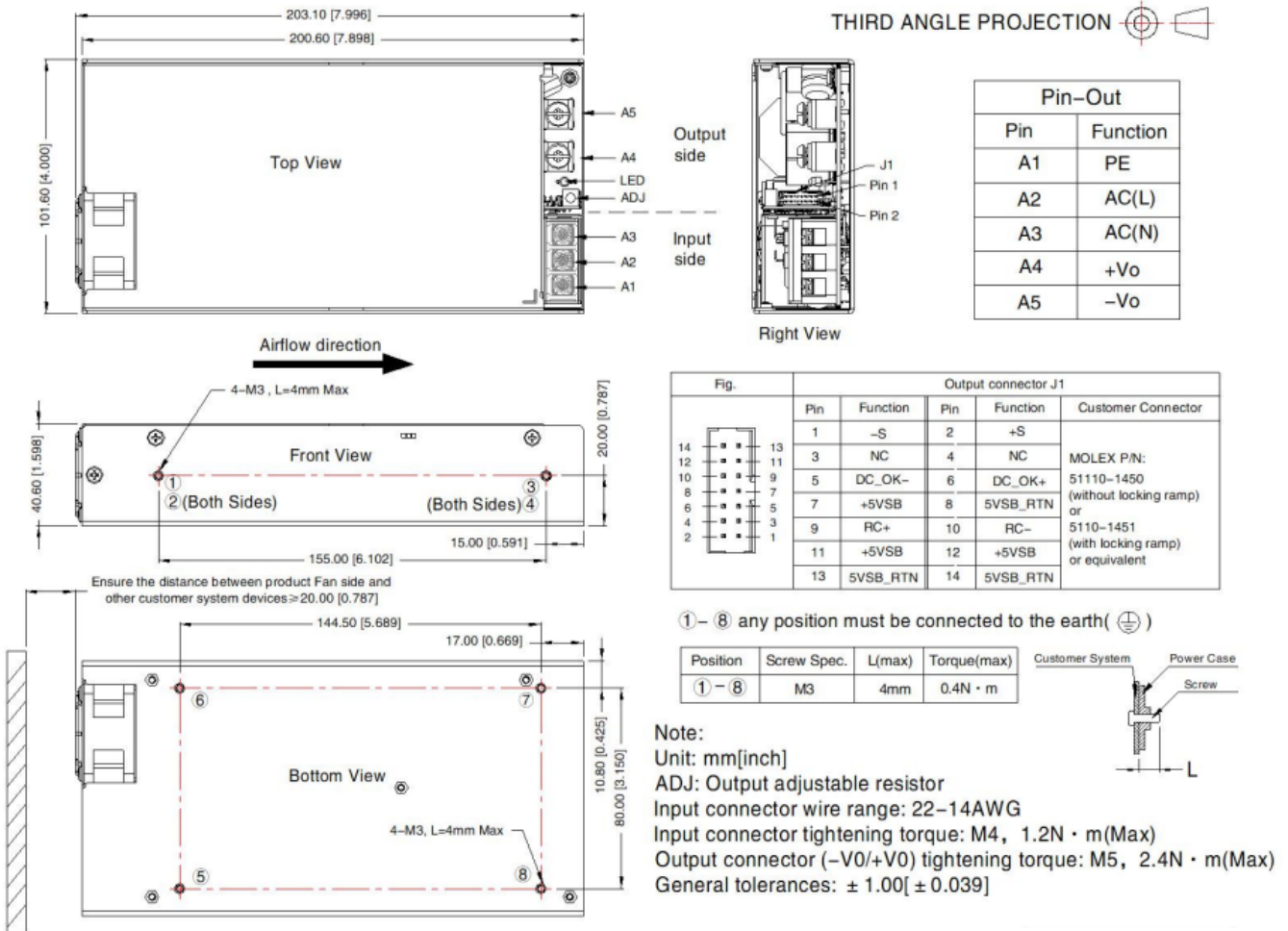
EMC: Emissions

| | Standard | Test level | Criteria | Notes & Conditions |
|------------------|-------------|------------|----------|--------------------|
| Conducted | EN55032 | B | | |
| Radiated | EN55032 | B | | |
| Harmonic current | EN61000-3-2 | | | Class A and D |
| Voltage flicker | EN61000-3-3 | | | Compliant |

EMC: Immunity

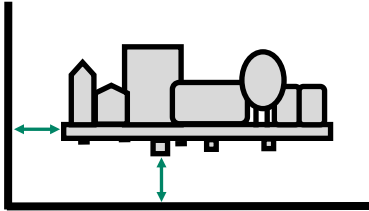
| | Standard | Test level | Criteria | Notes & Conditions |
|------------------------|--------------|------------|----------|--------------------------------|
| ESD | EN61000-4-2 | 4 | A | ±8kV contact, ±15kV air |
| Radiated | EN61000-4-3 | 3 | A | 10V/m |
| EFT | EN61000-4-4 | 4 | A | ±4kV |
| Surges | EN61000-4-5 | | A | Line to line ±2kV, Common ±4kV |
| Conducted | EN61000-4-6 | 3 | A | 10Vrms |
| Dips and interruptions | EN61000-4-11 | 0% 70% | B | |

Mechanical Details



Installation Advice

Safety



On installation customers must consider the required creepage and clearance distances between the PSU and the end-equipment enclosure. These distances vary depending on the installation class and safety standard requirements.

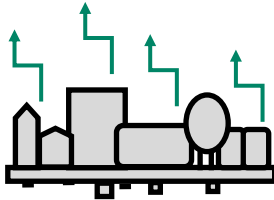
For **Class I** installations there should be 3-4mm between any part of the PSU and any earthed metal part of the enclosure. 3mm is acceptable for IT applications, 4mm required for medical applications. In Class I installations the PSU earth point must be connected to system safety ground.

For **Class II** installations distances may need to be increased if being installed into a surrounding metal enclosure.

Ensure consideration of components on the underside of the PCB or low lying spills when measuring clearance distances between the PSU and the end-equipment. Also top surface especially in tight enclosures such as 1U boxes. An insulation material can be used between PSU and metal if smaller gap required.

FiDUS recommends installing the PSU on 6mm stand offs typically, but check the distances.

EMC

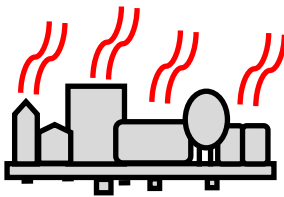


Conducted and radiated emissions compliance is a common application consideration. It is important to remember that even when using a properly filtered PSU, an application may still not achieve compliance if it is not designed to minimise emissions. That being said, there are a number of things that can be done to optimise EMC performance either as best practice, or if you are struggling for compliance:

- 1) Connect all marked EMI ground points to earth. Often these are combined with the safety earth point (in class I installations), but on some power supplies there may be additional earth tags or mounting points.
- 2) Minimise the length of input/output wiring where possible and try to maintain max distance of the conductors from the PSU, to prevent noise pick up. Avoid bundling input and output cables together. A common component to avoid placing wiring near is the PFC inductor in power factor corrected power supplies.
- 3) Apply additional filtering before the PSU input (ensure consideration of which frequencies there are issues with before selecting a filter).
- 4) When using an open frame PSU, mount the supply on a metal plate and connect EMI mounting points.
- 5) In multi circuit systems, decouple the circuits locally.
- 6) Ferrites added between the PSU and system input connector and/or the DC output cables can help in reducing radiated noise issues in systems. If seen, issues are commonly in the 30-150MHz area.

For more detailed assistance, if you still have any concerns with compliance, please get in contact with our Engineering department who are on hand to assist with any queries.

Thermal



Thermal management is an important consideration when thinking about equipment service life. Electrolytic capacitors within the PSU wear with time and are typically the first end-of-life failure. Keeping the operation temperature of key components within the PSU, such as the electrolytic capacitors, as low as possible is paramount. As a general rule, for every 10°C drop in the operating temperature of the electrolytic capacitors you double their lifetime, and thus the lifetime of the power supply. When looking at thermal performance it is helpful to test under a worst-case set of conditions, to ensure component temperatures are in an acceptable range for the required service life. Then consider the impact of operational time, load and temperature profile to estimate a more realistic lifetime for your PSU.

Also, many FiDUS power supplies offer a *Peak Power* rating to provide for customers with pulsing loads. When using a peak power capability customers must consider:

- 1) Peak duration rating: the maximum length of time the peak can be drawn for
- 2) Duty cycle: the frequency with which the peak can be drawn. (e.g. 10% duty cycle, 1 second on:9 seconds off)
- 3) Average power value: datasheets will state the maximum average power acceptable with peak power PSUs. If any of these elements are exceeded the supply may overheat, with performance and lifetime suffering as a result.