

65W CONVECTION COOLED

AC-DC POWER SUPPLIES

The ALM65 series of medical external power supplies is fully approved to international medical safety standards. It has been designed with very high efficiency and low standby power, enabling it to meet the latest environmental legislation. The unit has a fully sealed enclosure complying with IP32 and a smooth surface finish making it easier to wipe down in a clinical setting.



Features

- Medical and IT safety approvals
- Energy efficiency level VI
- 4th edition medical EMC
- IP32 environmental rating
- Class I and class II versions
- <0.21W standby power
- 0°C to 60°C operation
- Low earth leakage current
- 3 year warranty

Applications



Healthcare



Home Healthcare



Industrial Electronics



Instrumentation



Laboratory



Medical Diagnostic

Dimensions

125.5 x 55.5 x 33.5mm (4.94" x 2.19" x 1.32")

Models & Ratings

| Model Number ⁽³⁾⁽⁴⁾ | Output Power | Output Voltage | Output Current | Total Regulation ⁽¹⁾ | Efficiency ⁽²⁾ |
|--------------------------------|--------------|----------------|----------------|---------------------------------|---------------------------|
| ALM65US12 | 65W | 12.0V | 5.40A | ±5% | 88% |
| ALM65US15 | | 15.0V | 4.30A | | |
| ALM65US19 | | 19.0V | 3.40A | | |
| ALM65US24 | | 24.0V | 2.70A | | |
| ALM65US48 | | 48.0V | 1.35A | | |

Notes:

1. Typical average of efficiencies measured at 25%, 50%, 75% and 100% load and 115VAC input.
2. For class II versions, add suffix 'C2-8' to the end of the part number e.g. ALM65US24C2-8.
3. For optional input connector retention clip add suffix '-A' to the model number, e.g. ALM65US24-A (not available for C2 versions)
4. 5.5 x 2.1mm output connector add suffix B1 to the part number, e.g. ALM65US24-B1, ALM65US24C2-8B1, ALM65US24-AB1.

Input

| Characteristic | Minimum | Typical | Maximum | Units | Notes & Conditions |
|-----------------------|--|---------|---------|-------|--------------------------------|
| Input Voltage | 80 | | 264 | VAC | |
| Input Frequency | 47 | | 63 | Hz | |
| Input Current | | 1.2/0.6 | | A | 115/230VAC |
| Inrush Current | | | 60/120 | A | 115/230VAC, cold start at 25°C |
| Power Factor | | | | | EN61000-3-2 Class A |
| Earth Leakage Current | | | 250 | μA | 264VAC, 60Hz |
| No Load Input Power | | | 210 | mW | |
| Input Protection | T3.15A/250VAC internal fuse in both line | | | | |

Output

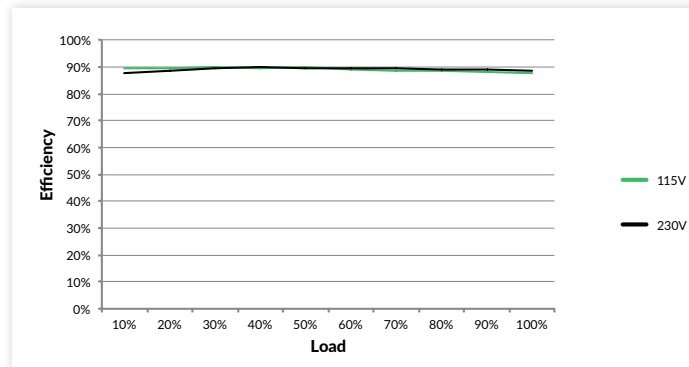
| Characteristic | Minimum | Typical | Maximum | Units | Notes & Conditions |
|--------------------------|---|---------|---------|---------|---|
| Output Voltage | 12 | | 48 | V | See Models and Ratings table |
| Initial Set Accuracy | | | ±2 | % | At 50% load |
| Minimum Load | 0 | | | A | No minimum load required |
| Start Up Delay | | | 2 | s | |
| Start Up Rise Time | | | 40 | ms | |
| Hold Up Time | 20 | | | ms | Full load and 230VAC |
| Line Regulation | | | ±0.5 | % | |
| Total Regulation | | | ±5 | % | |
| Transient Response | | | 4 | % | Maximum deviation, recovering to less than 1% within 500μs for 25% step load |
| Ripple and Noise | | | 1.5 | % pk-pk | 20MHz bandwidth, measured with 20MHz bandwidth and 10μF electrolytic in parallel with 0.1μF ceramic capacitor |
| Overshoot | | | 10 | % | At turn on/turn off |
| Overload Protection | 115 | | 175 | % | |
| Overvoltage Protection | 145 | | 170 | % | Recycle mains to reset |
| Short Circuit Protection | Trip and restart (hiccup), auto resetting | | | | |
| Thermal Protection | Measured internally, auto resetting | | | | |
| Temperature Coefficient | | 0.05 | | %/°C | |
| Patient Leakage Current | | | 100 | μA | 264VAC, 60Hz |

General

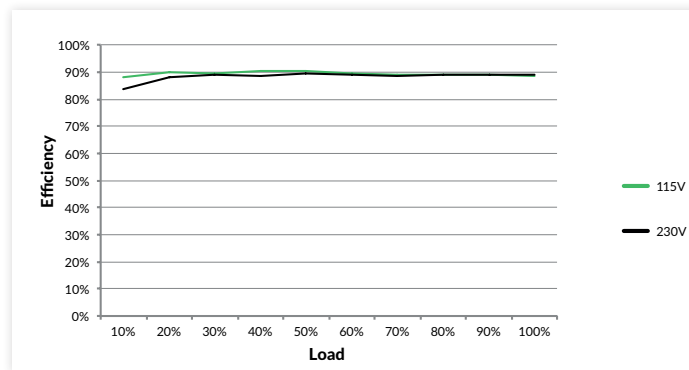
| Characteristic | Minimum | Typical | Maximum | Units | Notes & Conditions |
|----------------------------|---------|------------|---------|--------|----------------------------------|
| Efficiency | 88 | | | % | See Models & Ratings and curves |
| Isolation: Input to Output | | | 4000 | VAC | 2 x MOPP |
| Input to Ground | | | 1500 | | 1 x MOPP (Class I versions only) |
| Output to Ground | | | 500 | | Class I versions only |
| Switching Frequency | | 65 | | kHz | PWM |
| Mean Time Between Failure | | >300 | | khrs | MIL-HDBK-217F at 25°C GB |
| Weight | | 308 (0.68) | | g (lb) | |

Efficiency Curves

ALM65US12



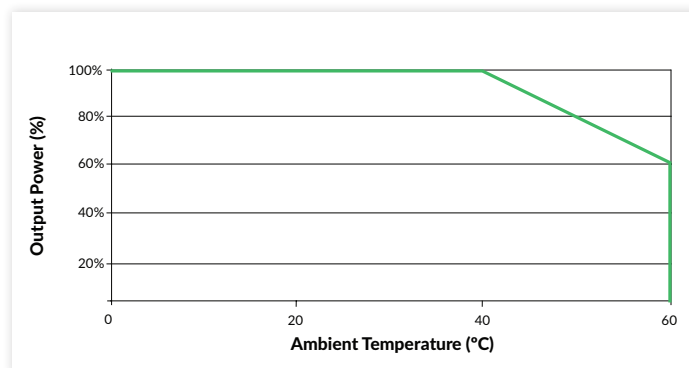
ALM65US24



Environmental

| Characteristic | Minimum | Typical | Maximum | Units | Notes & Conditions |
|-----------------------|---|---------|---------|-------|---|
| Operating Temperature | 0 | | +60 | °C | Derate from 100% load at 40°C to 60% load at 60°C |
| Storage Temperature | -40 | | +80 | °C | |
| Cooling | Natural convection | | | | |
| Operating Humidity | 5 | | 90 | %RH | Non-condensing |
| Operating Altitude | | | 5000 | m | |
| Shock | IEC68-2-27, 30g, 11ms half sine, 3 times in each of 6 axes | | | | |
| Vibration | IEC68-2-6, 10-500Hz, 2g 10 mins/sweep, 60 mins for each of 3 axes | | | | |

Derating Curve



EMC: Emissions

| Phenomenon | Standard | Test Level | Notes & Conditions |
|------------------|------------------|------------|--------------------|
| Conducted | EN55032, EN55011 | Level B | |
| Radiated | EN55032, EN55011 | Level B | |
| Harmonic Current | EN61000-3-2 | Class A | |
| Voltage Flicker | EN61000-3-3 | | |

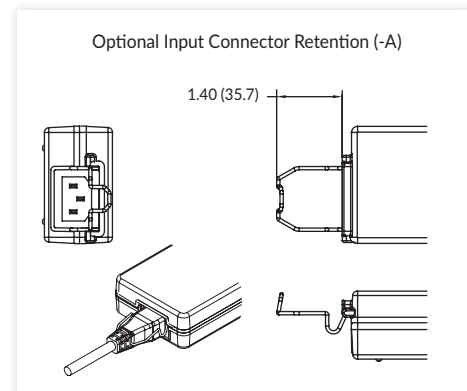
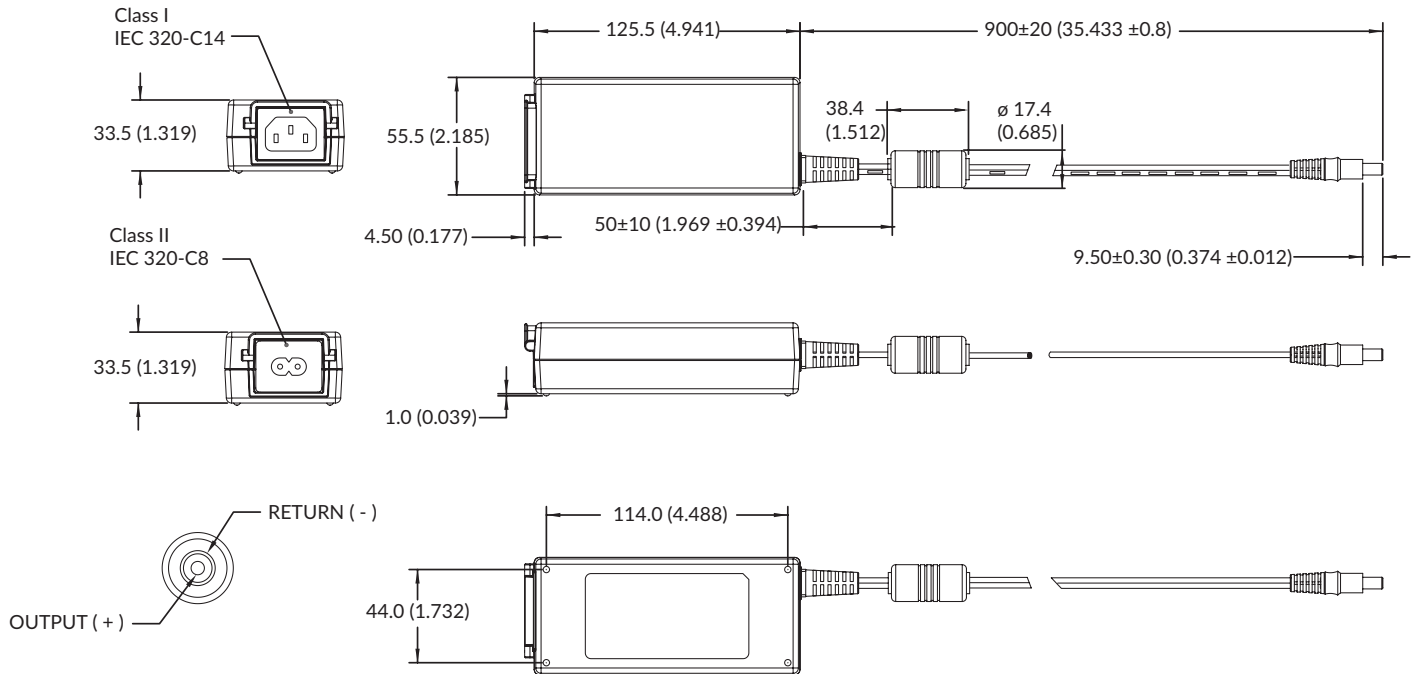
EMC: Immunity

| Phenomenon | Standard | Test Level | Criteria | Notes & Conditions |
|------------------------|--------------|-------------------------|----------|-----------------------------------|
| ESD Immunity | EN61000-4-2 | 4 | A | ±8kV contact, ±15kV air |
| Radiated Immunity | EN61000-4-3 | 10V/m | A | |
| EFT/Burst | EN61000-4-4 | 3 | A | |
| Surge | EN61000-4-5 | Installation Class 3 | A | |
| Conducted Immunity | EN61000-4-6 | 10V | A | |
| Magnetic Fields | EN61000-4-8 | 4 | A | |
| Dips and Interruptions | EN61000-4-11 | Dip: 30% 500ms | A/B | High Line/Low Line |
| | | Dip: 60% 200ms | A/B | High Line/Low Line |
| | | Dip: 80% 5000ms | B | |
| | | Dip: 100% 5000ms | B | |
| | EN60601-1-2 | Dip: 30% 25 AC cycles | A | 230VAC 100% load, 100VAC 75% load |
| | | Dip: 60% 5 AC cycles | A | 230VAC 100% load, 100VAC 20% load |
| | | Dip: 100% 0.5 AC cycles | A | At 8 angles |
| | | Int.: >95% 5000ms | B | |

Safety Approvals

| Certification | Safety Standard | Notes & Conditions |
|---------------|----------------------------------|---|
| UL | UL62368-1 | Information Technology |
| | ANSI/AAMI ES 60601-1 | Medical |
| TUV | EN62368-1 | Information Technology |
| | EN60601-1 | Medical |
| CB | IEC60950-1, IEC62368-1 | Information Technology |
| | IEC60601-1 | Medical |
| CSA | CSA C22.2 No. 60601 | Medical |
| Others | CCC, KC & RCM | May require additional importer information |
| CE | Meets all applicable directives | |
| UKCA | Meets all applicable legislation | |

Mechanical Details



Notes:

1. All dimensions shown in mm (inches). Tolerance is 0.5 (0.02) maximum, except output cable length.
2. Output connector: 5.5 outer diameter, 2.5mm inner diameter with centre positive.
3. Weight: 308g (0.68lbs) approx.
4. For European mains lead order part EU-MAINS-IEC for C14 versions, or EU-MAINS-8 for C8 versions.
5. For UK mains lead order part UK-MAINS-IEC for C14 versions, or UK-MAINS-8 for C8 versions.
6. For US mains lead order part US-MAINS-IEC for C14 versions, or US-MAINS-8 for C8 versions.