

The ALM120 has both medical (2 x MOPP) and ITE safety approvals, available as class I, or class II construction with a smooth wipe clean IP32 sealed case that is ideal for medical applications.

The standard class I version has an IEC320-C14 inlet, the class II version with suffix C2-8 has a polarized IEC320-C8 inlet.



### Features

- ▶ Regulated single outputs 12V to 24VDC
- ▶ Medical & ITE safety approvals
- ▶ Energy efficiency level VI
- ▶ EU CoC tier 2 compliant
- ▶ 4th edition medical EMC
- ▶ IP32 environmental rating
- ▶ Class I & class II versions
- ▶ 0°C to 60°C operation
- ▶ Low earth leakage current
- ▶ 3 year warranty

### Applications



### Dimensions

171.0 x 68.0 x 38.0mm (6.73" x 2.67" x 1.49")

### Models & ratings

| Model number <sup>(1,2,3,4)</sup> | Output voltage | Output current | Total regulation | Output power |
|-----------------------------------|----------------|----------------|------------------|--------------|
| ALM120PS12                        | 12.0VDC        | 10.00A         | ±5%              | 120W         |
| ALM120PS15                        | 15.0VDC        | 8.00A          |                  |              |
| ALM120PS19                        | 19.0VDC        | 6.32A          |                  |              |
| ALM120PS24                        | 24.0VDC        | 5.00A          |                  |              |

#### Notes:

1. For class II versions, add suffix 'C2-8' to the end of the part number e.g. ALM120PS24C2-8.
2. For optional input connector retention clip add suffix '-A' to the model number, e.g. ALM120PS24-A (not available for C2 versions)
3. For optional output connector, DC barrel jack, add suffix '-B5' to the model number, e.g. ALM120PS24-B5 (not available for 12 & 15VDC models)
4. Power de-rated <100VAC for 12 & 15VDC models, refer to input specifications.

## Input

| Characteristic        | Minimum   | Typical | Maximum | Units | Notes & conditions  |
|-----------------------|---|---------|---------|-------|---|
| Input voltage         | 80  |         | 264     | VAC   | 19 & 24VDC models: Derate linearly from 100% load at 90VAC to 80% load at 80VAC, 300VAC/5 s maximum.<br>12 & 15VDC models: Derate linearly from 100% load at 100VAC to 80% load at 80VAC, 300VAC/5 s maximum. |
| Input frequency       | 47  |         | 63      | Hz    |   |
| Input current         |   | 1.2/0.6 |         | A     | Measured at 115/230VAC  |
| Inrush current        |   |         | 60/120  | A     | 115/230VAC, cold start at +25°C   |
| Power factor          |   | >0.9    |         |       | EN61000-3-2 Class A   |
| Earth leakage current |   | 160     | 250     | μA    | 264VAC, 60Hz  |
| No load input power   |   |         | 0.15    | W     |   |
| Input protection      | T3.15A/250 VAC internal fuse in both line & neutral |         |         |       |   |

## Output

| Characteristic           | Minimum                                   | Typical | Maximum | Units   | Notes & conditions  |
|--------------------------|---|---------|---------|---------|---|
| Output voltage           | 12  |         | 24      | VDC     | See models and ratings table  |
| Initial set accuracy     |   |         | ±2      | %       | At 50% load   |
| Minimum load             | No minimum load required                  |         |         |         |   |
| Start up delay           |   | 1       | 2       | s       |   |
| Start up rise time       |   |         | 50      | ms      |   |
| Hold up time             | 20  | 30      |         | ms      | Full load and 115/230VAC  |
| 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 | Measured with 20MHz bandwidth and 10μF electrolytic in parallel with 0.1μF ceramic capacitor. |
| Overshoot                |   | 5       | 10      | %       | At turn on / turn off   |
| Overload protection      | 115                                       |         | 175     | %       |   |
| Overvoltage protection   |   |         | 150     | %       | Recycle mains to reset  |
| Short circuit protection | Trip and restart (hiccup), auto resetting |         |         |         |   |
| Thermal protection       | Measured internally, auto resetting       |         |         |         |   |
| Temperature coefficient  |   | 0.02    |         | %/°C    |   |
| Patent leakage current   |   |         | 95      | μA      | 264VAC, 60Hz  |

## General

| Characteristic            | Minimum | Typical     | Maximum | Units                               | Notes & conditions                       |
|---------------------------|---------|-------------|---------|-------------------------------------|--|
| Efficiency                |         | 93          |         | %                                   | See models and ratings table and curves. |
| Isolation                 |         |             | 4000    | VAC                                 | 2 x MOPP                                 |
|                           |         |             | 1500    | VAC                                 | 1 x MOPP (Class I versions only)         |
|                           |         |             | 500     | VAC                                 | Class I versions only                    |
| Switching frequency       | 45      |             | 140     | kHz                                 | PFC                                      |
|                           | 85      |             | 190     |                                     | Main converter                           |
| Power density             |         | 0.27 (4.45) |         | cm <sup>3</sup> (W/in) <sup>3</sup> |  |
| Mean time between failure |         | >300        |         | khrs                                | MIL-HDBK-217F at 25°C GB                 |
| Weight                    |         | 500 (1.1)   |         | g (lb)                              |  |

## Environmental

| Characteristic        | Minimum   | Typical | Maximum | Units | Notes & conditions                                |
|-----------------------|---|---------|---------|-------|---|
| Operating temperature | 0   |         | +60     | °C    | Derate from 100% load at 40°C to 30% load at 60°C |
| Cooling               | Natural convection  |         |         |       |   |
| Operating humidity    | 5   |         | 95      | %RH   | Non-condensing                                    |
| Storage temperature   | -20   |         | +80     | °C    |   |
| 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 |         |         |       |   |

## Emissions - EMC

| Phenomenon        | Standard         | Test level | Notes & conditions     |
|-------------------|------------------|------------|------------------------|
| Emissions         | EN55011, EN55032 | Level B    | Conducted and radiated |
| Harmonic currents | EN61000-3-2      | Class A    |                        |
| Voltage flicker   | EN61000-3-3      |            |                        |

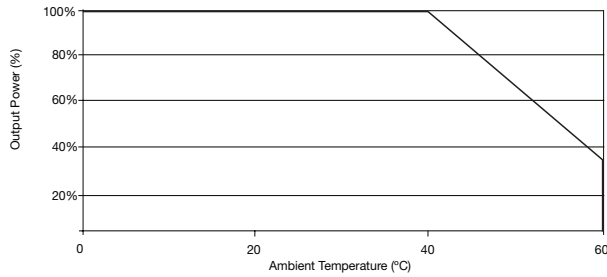
## Emissions - immunity

| Phenomenon             | Standard     | Test level              | Criteria | Notes & conditions                                 |
|------------------------|--------------|-------------------------|----------|--|
| ESD immunity           | EN61000-4-2  | 3                       | A        | ±15kV air/±8kV contact                             |
| Radiated immunity      | EN61000-4-3  | 10V/m                   | A        | 80-2700MHz. IEC60601-1-2 Ed.4 at other frequencies |
| EFT/burst              | EN61000-4-4  | 3                       | A        |  |
| Surge                  | EN61000-4-5  | Installation class 3    | A        |  |
| Conducted              | EN61000-4-6  | 10V                     | A        |  |
| Magnetic fields        | EN61000-4-8  | 4                       | A        |  |
| Dips and interruptions | EN61000-4-11 | Dip: 30% 500ms          | A        | High line/low line                                 |
|                        |              | Dip: 60% 200ms          | A/B      |  |
|                        |              | Dip: 80% 5000ms         | B        |  |
|                        |              | Int: 100% 10ms          | A        |  |
|                        |              | Int: 100% 20ms          | A        |  |
|                        |              | Int: 100% 5000ms        | B        |  |
|                        | EN60601-1-2  | Dip: 30% 25 AC Cycles   | A        | 230VAC 100% load, 100VAC 25% load                  |
|                        |              | Dip: 60% 5 AC Cycles    | A        |  |
|                        |              | Int: 100% 0.5 AC Cycles | A        |  |
|                        |              | Int: 100% 1.0 AC Cycles | A        |  |
|                        |              | Int: 100% 250 AC Cycles | B        |  |

## Safety approvals

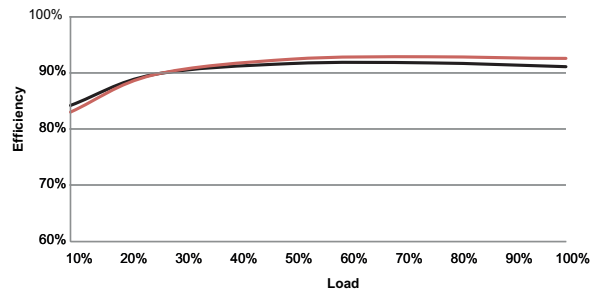
| Safety agency | Standard                                | Notes & conditions                          |
|---------------|---|---|
| UL            | UL62368-1                               | Information technology                      |
| EN            | EN62368-1                               | Information technology                      |
|               | EN60601-1                               | Medical                                     |
| CB            | IEC62368-1, IEC60950-1                  | Information technology                      |
|               | IEC60601-1                              | Medical                                     |
| Others        | CSA C22.2 No. 60601, CCC, PSE, KC & RCM | May require additional importer information |
| CE            | Meets all applicable legislation        |   |
| UKCA          | Meets all applicable legislation        |   |

## Derating curve

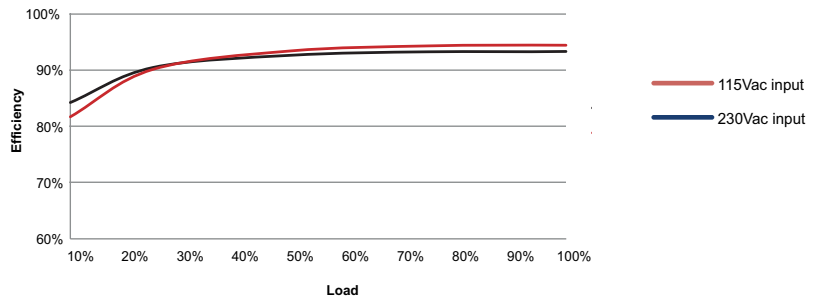


## Efficiency curve

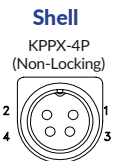
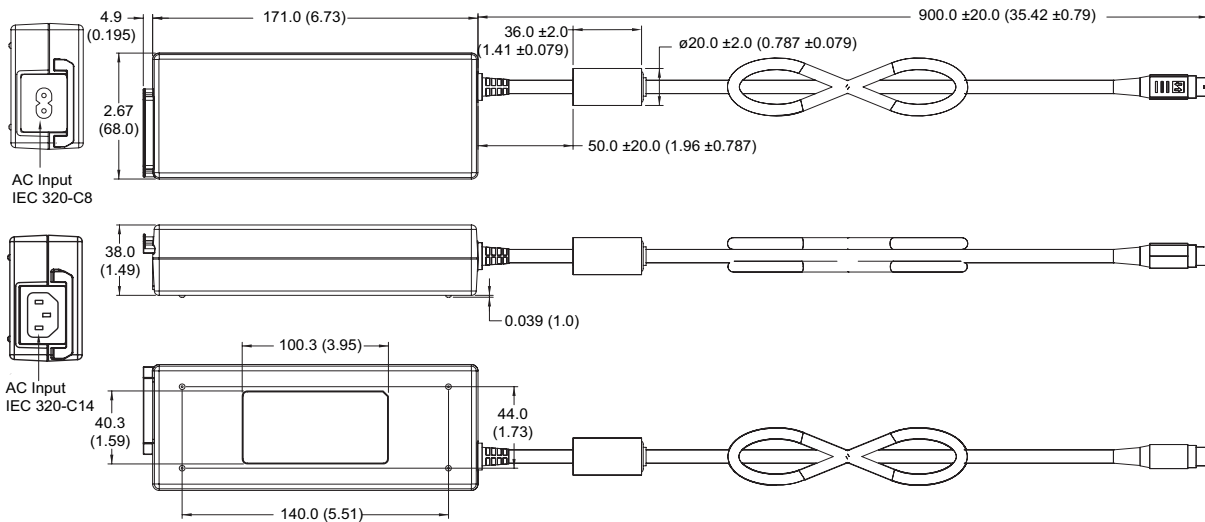
ALM120US12



ALM120US24



## Mechanical details



| Pin   | Connection   |
|-------|--|
| 1     | +Vout  |
| 2     | +Vout  |
| 3     | RTN  |
| 4     | RTN  |
| Shell | Standard Models: Functional Earth<br>C2 Models: Floating |

### Notes:

- All dimensions shown in mm (inches). Tolerance is 0.5 (0.02) maximum, except output cable length.
- Weight: 498.9g (1.1lbs) approx.
- For European mains lead order part EU-MAINS-IEC for C14 versions, or EU-MAINS-8 for C8 versions.
- For UK mains lead order part UK-MAINS-IEC for C14 versions, or UK-MAINS-8 for C8 versions.
- For US mains lead order part US-MAINS-IEC for C14 versions, or US-MAINS-8 for C8 versions.
- Output connector: 4 pin power din with pin 1 & 2 - positive and pin 3 & 4 - return, equivalent to KPPX-4P (non-locking).  
Optional for 19 & 24 models: DC barrel jack; 5.5mm outer diameter, 2.5mm inner diameter with centre positive, and 9.5mm barrel length

Specifications subject to change without notice.