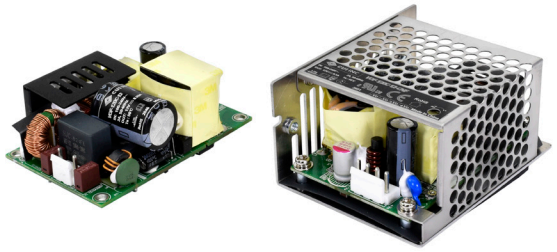
# SERIES: VOF-120C | DESCRIPTION: AC-DC POWER SUPPLY

## FEATURES

- universal input voltage (85 ~ 264 Vac)
- wide operating temperature (-40 to +85C)
- active power factor correction
- certified to 62368, 60335, and 61558 safety standards
- suitable for safety class I or class II installations
- over voltage, over current, over temperature, and short circuit protections
- adjustable output via trim POT
- low leakage current (< 0.1 mA)
- low standby power consumption (0.5 W)

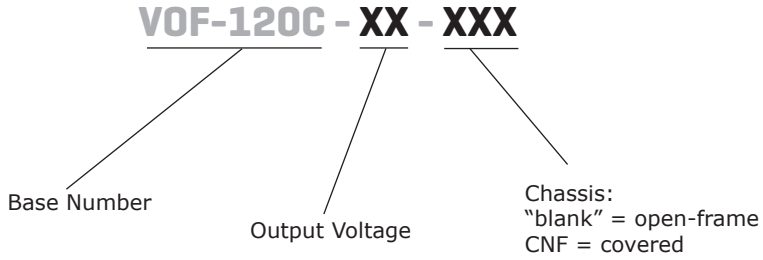


## MODEL

| MODEL | output voltage | | output current | output power | transient[2] output power | ripple and noise[3] | efficiency[4] |
|---|---|---|---|---|---|---|---|
| | (Vdc) | range[1] (Vdc) | max (A) | max (W) | max (W) | max (mVp-p) | typ (%) |
| VOF-120C-12 | 12 | 11.4~12.6 | 9.5 | 114.0 | 141.6 | 120 | 94.0 |
| VOF-120C-15 | 15 | 14.3~15.8 | 7.6 | 114.0 | 142.5 | 120 | 94.0 |
| VOF-120C-24 | 24 | 22.8~25.2 | 5.0 | 120.0 | 150.0 | 150 | 95.0 |
| VOF-120C-27 | 27 | 25.6~28.4 | 4.44 | 119.9 | 149.8 | 150 | 95.0 |
| VOF-120C-36 | 36 | 35.28~37.8 | 3.33 | 120.0 | 149.76 | 200 | 94.0 |
| VOF-120C-48 | 48 | 45.6~50.4 | 2.5 | 120.0 | 150.0 | 200 | 94.5 |

Notes:
1. When the output voltage is increased, the total output power cannot exceed the nominal output power.
2. If the total output power exceeds the nominal output power, it can be maintained for a maximum of 10 seconds, but not repeated for at least 30 minutes. The power supply cannot exceed the transient power.
3. At full load, nominal input, 20 MHz bandwidth oscilloscope, tip & barrel method, output terminated with 47 µF electrolytic and 0.1 µF ceramic capacitors. Under light load conditions (<15%) the measurement may double in an effort to maximize converter efficiency.
4. At 230 Vac.

## PART NUMBER KEY






Please read our datasheet & drawing disclaimer here.

## INPUT

| parameter | conditions/description | min | typ | max | units |
|---|---|---|---|---|---|
| voltage | ac input<br>dc input | 85<br>120 | | 264<br>370 | Vac<br>Vdc |
| frequency | | 47 | | 63 | Hz |
| current | at 115 Vac<br>at 230 Vac | | | 2.0<br>1.0 | A<br>A |
| inrush current | at 115 Vac, cold start<br>at 230 Vac, cold start | | 40<br>75 | | A<br>A |
| leakage current | at 240 Vac | | | 0.1 | mA |
| power factor correction | at 115 Vac, full load<br>at 230 Vac, full load | 0.98<br>0.94 | | | |
| no load power consumption | | | 0.5 | | W |

## OUTPUT

| parameter | conditions/description | min | typ | max | units |
|---|---|---|---|---|---|
| output capacitance | 12 Vdc output model<br>15 Vdc output model<br>24 Vdc output model<br>27 Vdc output model<br>36 Vdc output model<br>48 Vdc output model | | | 6,000<br>5,000<br>3,200<br>2,400<br>2,000<br>1,600 | µF<br>µF<br>µF<br>µF<br>µF<br>µF |
| initial set point accuracy | at full load, 25°C<br>12 Vdc & 15 Vdc output models<br>all other output models | | <br>±2<br>±1 | | <br>%<br>% |
| line regulation | rated load | | ±0.5 | | % |
| load regulation | 0 ~ 100% load | | ±1 | | % |
| hold-up time | at 230 Vac, 25°C | 15 | | | ms |
| temperature coefficient | | | ±0.03 | | %/°C |
| adjustability | via built-in trimpot | | ±5 | | % |

## PROTECTIONS

| parameter | conditions/description | min | typ | max | units |
|---|---|---|---|---|---|
| over voltage protection | output shutdown, latching<br>12 Vdc output model<br>15 Vdc output model<br>24 Vdc output model<br>27 Vdc output model<br>36 Vdc output model<br>48 Vdc output model | | <br>16<br>25<br>32<br>35<br>50<br>60 | | <br>Vdc<br>Vdc<br>Vdc<br>Vdc<br>Vdc<br>Vdc |
| over current protection | hiccup, auto recovery | 130 | | | % |
| short circuit protection | continuous, auto recovery, hiccup | | | | |
| over temperature protection | output shutdown, auto recovery | | | | |

## SAFETY & COMPLIANCE

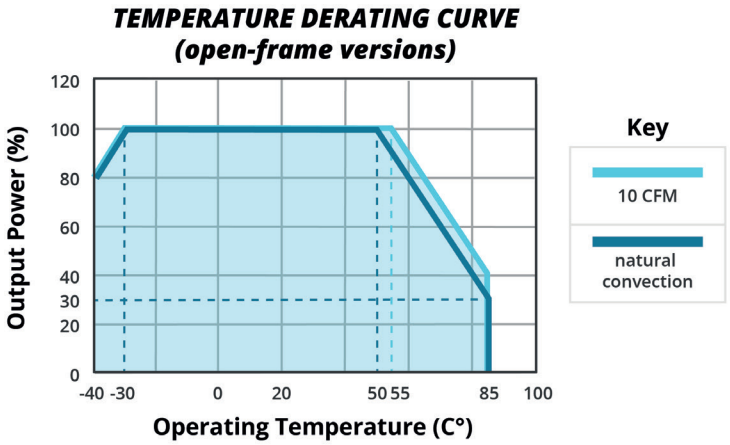
| parameter | conditions/description | min | typ | max | units |
|---|---|---|---|---|---|
| isolation voltage | input to ground for 1 minute, <10 mA<br>input to output for 1 minute, <10 mA<br>output to ground for 1 minute, <10 mA | 1,500<br>4,000<br>1,500 | | | Vac<br>Vac<br>Vac |
| safety approvals | certified to 62368: UL, EN (the VOF-120C-36 model does not have UL certification)<br>certified to 60335: EN<br>certified to 61558: EN | | | | |
| safety class | class I (with PE), class II (without PE) | | | | |
| conducted emissions[1] | CISPR32/EN55032 CLASS B | | | | |
| radiated emissions[1] | CISPR32/EN55032 (Class B for safety class I installations; Class A for safety class II installations) | | | | |
| harmonic current | IEC/EN61000-3-2 CLASS A | | | | |
| ESD | IEC/EN 61000-4-2 Contact ±8KV/Air ±15KV perf. Criteria A | | | | |
| radiated immunity | IEC/EN 61000-4-3 10V/m perf. Criteria A | | | | |
| EFT/burst | IEC/EN 61000-4-4 ±2KV perf. Criteria A | | | | |
| surge | IEC/EN 61000-4-5 line to line ±2KV/line to ground ±4KV perf. Criteria A | | | | |
| conducted immunity | IEC/EN61000-4-6 10 Vr.m.s perf. Criteria A | | | | |
| voltage dips and interruptions | IEC/EN61000-4-11 0%, 70% perf. Criteria B | | | | |
| MTBF | as per MIL-HDBK-217F at 25°C | 300,000 | | | hours |
| RoHS | yes | | | | |

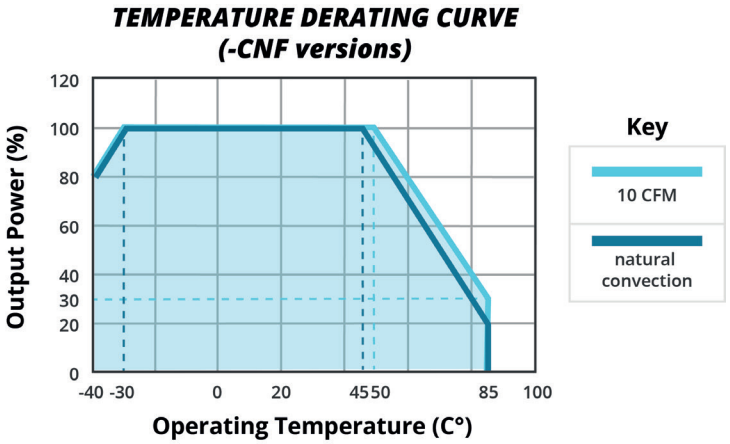
Notes: 1. The power supply is considered a component of the end system. All EMC performance has been tested on a metal plate with the dimensions 360 x 360 x 1 mm. The power supply must be integrated into the end system for proper electromagnetic compatibility testing.

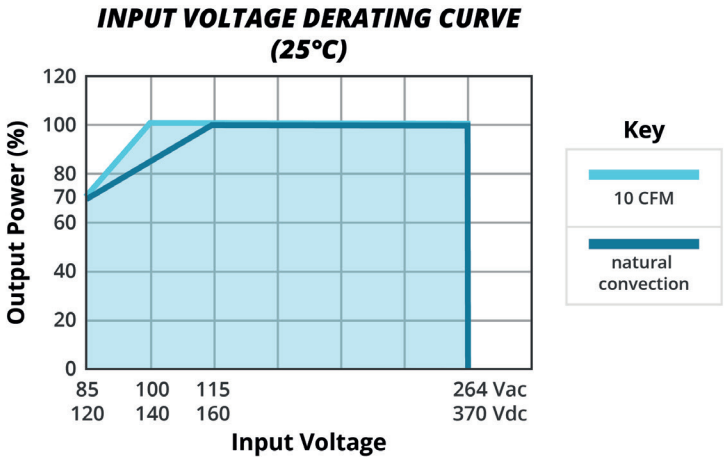
## ENVIRONMENTAL

| parameter | conditions/description | min | typ | max | units |
|---|---|---|---|---|---|
| operating temperature | see derating curves | -40 | | 85 | °C |
| storage temperature | | -40 | | 85 | °C |
| operating humidity | non-condensing | 20 | | 90 | % |
| storage humidity | non-condensing | 10 | | 95 | % |

## DERATING CURVES

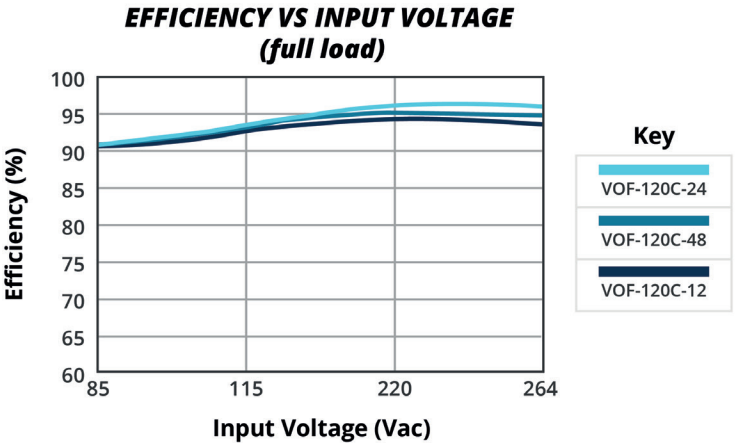


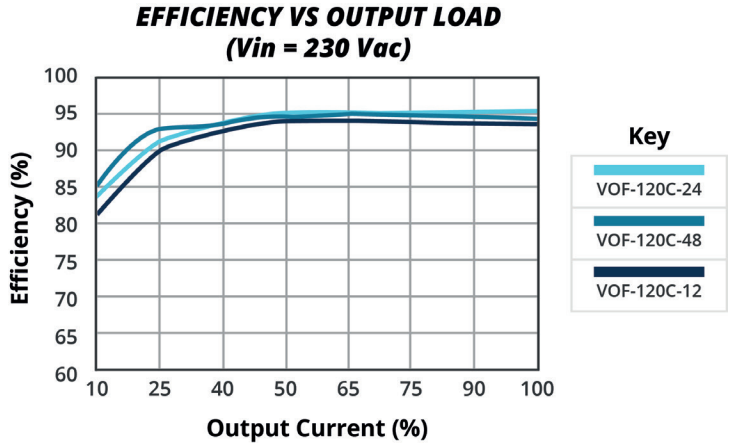




Note: With an AC input voltage between 85 ~ 115 and a DC input between 120 ~ 160 Vdc the output power must be derated as per the temperature derating curve.

## EFFICIENCY CURVES



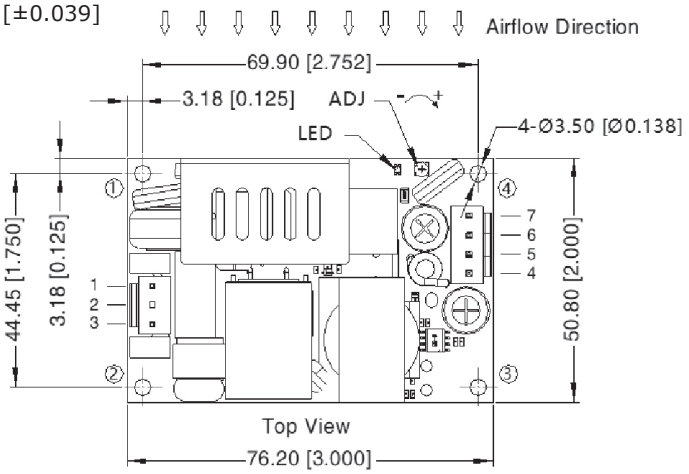
## MECHANICAL

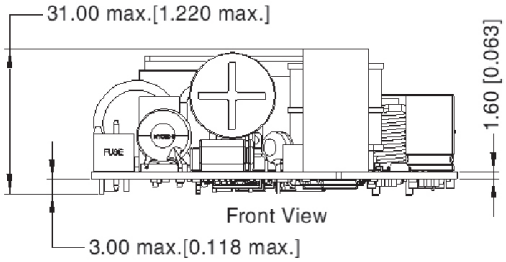
| parameter | conditions/description | min | typ | max | units |
|---|---|---|---|---|---|
| dimensions | open frame models: 76.20 x 50.80 x 31.00 [3.0 x 2.0 x 1.381 inch]<br>covered models: 80.0 × 62.0 × 40.0 [3.149 x 2.440 x 1.574 inch] | | | | mm<br>mm |
| weight | open frame models<br>covered models | | 125<br>180 | | g<br>g |
| cooling | natural convection (no integrated fan) | | | | |

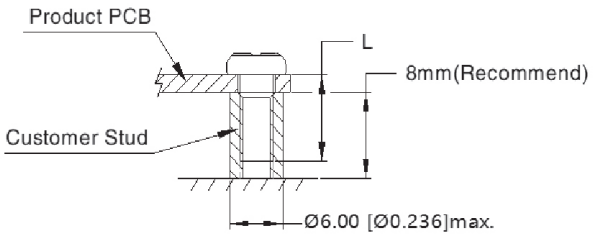
## MECHANICAL DRAWING

**Open-frame**
units: mm [inch]
general tolerance: ±1.00 [±0.039]

| PIN-OUT | |
|---|---|
| PIN | Function |
| 1 | AC (N) |
| 2 | NC |
| 3 | AC (L) |
| 4, 5 | -Vo |
| 6, 7 | +Vo |




| MOUNTING SCREWS | | | |
|---|---|---|---|
| Position | Screw Spec. | L (recommended) | Torque |
| ①~④ | M3 | 6mm | 0.4 N·m |

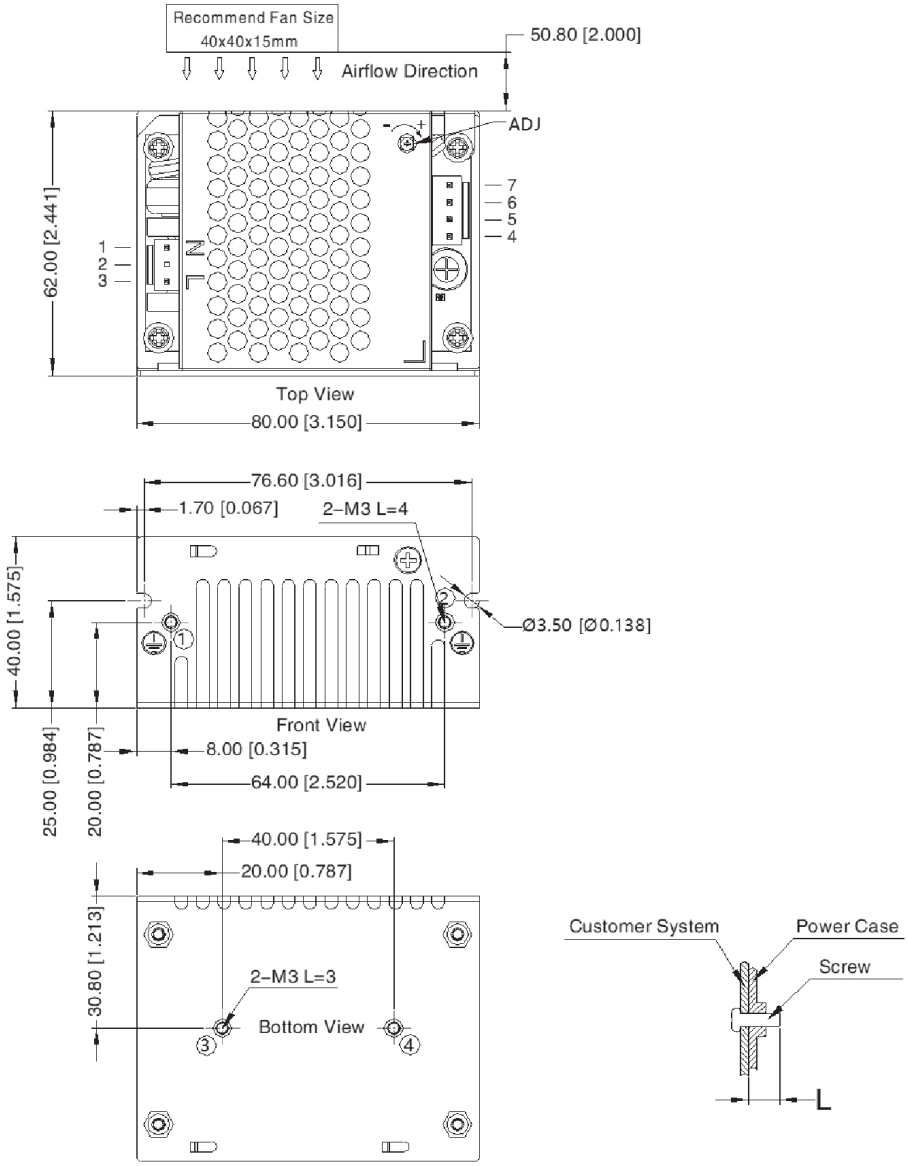
Note: 1. Class I system ①, ④ positions must be connected to the protective earth ground (⏚).
2. Class II system ①, ④ positions must be connected together.
3. It is recommended that a minimum distance of 10mm be placed between the PCB edge and all other components.

| CONNECTORS | | |
|---|---|---|
| Function | Product Connector | Customer Connector |
| AC connector | JST B3P-VH or equivalent | Housing: JST VHR<br>Contact: JST SVH-21T-P1.1 or equivalent |
| DC connector | JST B4P-VH or equivalent | Housing: JST VHR<br>Contact: JST SVH-21T-P1.1 or equivalent |

## MECHANICAL DRAWING (CONTINUED)

**Covered**
units: mm [inch]
general tolerance: ±1.00 [±0.039]

| PIN-OUT | |
|---|---|
| PIN | Function |
| 1 | AC (N) |
| 2 | NC |
| 3 | AC (L) |
| 4, 5 | -Vo |
| 6, 7 | +Vo |




| MOUNTING SCREWS | | | |
|---|---|---|---|
| Position | Screw Spec. | L (recommended) | Torque |
| ①~② | M3 | 4mm | 0.4 N·m |
| ③~④ | M3 | 3mm | 0.4 N·m |

Note: Safety Class I integrations require the metal case to be securely fastened to protective earth ground (⏚).

| CONNECTORS | | |
|---|---|---|
| Function | Product Connector | Customer Connector |
| AC connector | JST B3P-VH or equivalent | Housing: JST VHR<br>Contact: JST SVH-21T-P1.1 or equivalent |
| DC connector | JST B4P-VH or equivalent | Housing: JST VHR<br>Contact: JST SVH-21T-P1.1 or equivalent |

## REVISION HISTORY

| rev. | description | date |
|---|---|---|
| 1.0 | initial release | 06/12/2021 |
| 1.01 | derating curves updated | 02/07/2022 |
| 1.02 | UKCA mark added | 06/13/2022 |

The revision history provided is for informational purposes only and is believed to be accurate.

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