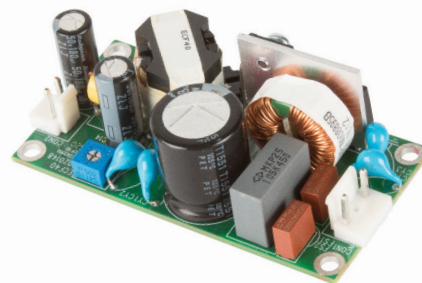


40 Watts

- 40 W Convection Rating
- 1.5" by 3" Footprint
- Low 1.1" Profile
- High Efficiency
- Medical and ITE Approvals
- High Power Density
- Less than 0.15 W No Load Input Power
- 3 Year Warranty



The ECF40 series is designed to minimize the no load power consumption and maximize efficiency to facilitate equipment design to meet the latest environmental legislation. Approved for medical and ITE applications, this range of single output AC-DC power supplies are packaged in a low profile 1.1" height with a foot print of just 1.5" by 3". The ECF40 provides up to 40W convection-cooled over the full 90-264 VAC input range, and operates down to 80 VAC with minimal de-rating. The power supply features two AC line fuses and low leakage currents required by medical applications. The low profile, low noise and safety approvals covering ITE and medical standards allows the versatile ECF40 series to be used in a wide range of applications.

Dimensions:

ECF40:

3.00 x 1.50 x 1.10" (76.2 x 38.1 x 28.0 mm)

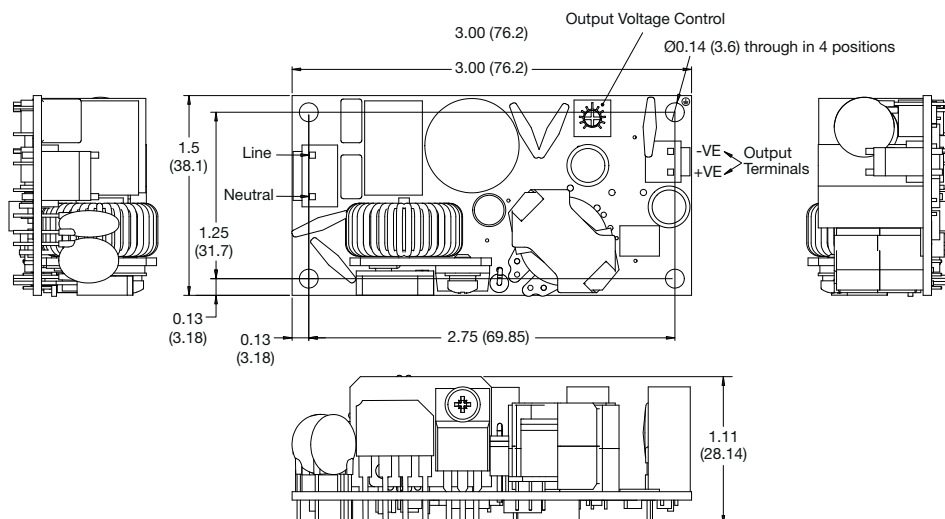
Models & Ratings

| Output Power | Output Voltage | Output Current | Efficiency ⁽¹⁾ | Model Number |
|--------------|----------------|----------------|---------------------------|--------------|
| 40 W | 12.0 V | 3.34 A | 91% | ECF40US12 |
| 40 W | 15.0 V | 2.67 A | 92% | ECF40US15 |
| 40 W | 18.0 V | 2.23 A | 93% | ECF40US18 |
| 40 W | 24.0 V | 1.67 A | 91% | ECF40US24 |
| 40 W | 36.0 V | 1.11 A | 90% | ECF40US36 |
| 40 W | 48.0 V | 0.83 A | 90% | ECF40US48 |

Notes

1. Typical efficiency measured at full load and 230 VAC input.

Mechanical Details



CN1 - Input Connector

| | |
|-------|------------|
| Pin 1 | Neutral |
| Pin 2 | Not Fitted |
| Pin 3 | Line |

Mates with JST housing VHR-3N and JST Series SVH-21T-P1.1 crimp terminals

Mounting hole marked with \oplus must be connected to safety earth for class I applications

CN2 - Output Connector

| | |
|-------|-------|
| Pin 1 | +Vout |
| Pin 2 | -Vout |

Mates with JST housing VHR-2N and JST Series SVH-21T-P1.1 crimp terminals

Notes

1. All dimensions shown in inches (mm).
Tolerance: ± 0.02 (0.5)

2. Weight: 0.15 lbs (69 g) approx.

Summary

| Characteristic | Minimum | Typical | Maximum | Units | Notes & Conditions |
|-----------------------|---------|--|---------|-------|--|
| Input Range | 80 | 115/230 | 264 | VAC | Derate output from 100% at 90 VAC to 90% at 85 VAC and 80% at 80 VAC |
| No Load Input Power | | | 0.15 | W | |
| Efficiency | | 88 | | % | 230 VAC (see fig.1 & 2) |
| Operating Temperature | -40 | | +70 | °C | See derating curve (fig.3) |
| Safety Approvals | ITE | IEC60950, UL60950-1, CSA 22.2 No.60950-1-11 Ed 2, EN60950-1, LVD | | | |
| | Medical | IEC60601-1 Ed 3.1 Including Risk Management, ANSI/AAMI ES60601-1 & CSA C22.2 No.6061-1:08, EN60601-1 | | | |

Input

| Characteristic | Minimum | Typical | Maximum | Units | Notes & Conditions |
|---------------------------|--|----------|---------|-------|--|
| Input Voltage - Operating | 80 | 115/230 | 264 | VAC | Derate output from 100% at 90 VAC to 90% at 85 VAC and 80% at 80 VAC |
| Input Frequency | 47 | 50/60 | 63 | Hz | Agency approval, 47-63 Hz |
| Power Factor | | | | | EN61000-3-2 class A |
| Input Current - Full Load | | 0.85/0.3 | | A | 115/230 VAC |
| Inrush Current | | | 60 | A | 264 VAC cold start, 25 °C |
| Earth Leakage Current | | | 250 | µA | 264 VAC/60 Hz |
| No load Input Power | | | 0.15 | W | |
| Input Protection | T3.15 A/250 A, 250 V Internal fuse fitted in line and neutral. | | | | |

Output - Main Output

| Characteristic | Minimum | Typical | Maximum | Units | Notes & Conditions |
|---------------------------|---------|---------|---------|---------|--|
| Output Voltage | 12 | | 48 | VDC | See Models and Ratings table |
| Initial Set Accuracy | | | ±1 | % | 50% load, 115/230 VAC |
| Output Voltage Adjustment | 10 | | | % | |
| Minimum Load | 0 | | | A | No minimum load required |
| Start Up Delay | | 1 | 2 | s | |
| Output Rise Time | | 50 | | ms | |
| Hold Up Time | 8.3/20 | | | ms | Min at full load 115/230 VAC |
| Line Regulation | | | ±0.5 | % | 90-264 VAC |
| Load Regulation | | | 1 | % | 0-100% load. |
| Transient Response | | | 4 | % | Recovery within 1% in less than 500 µs for a 50-75% and 75-50% load step |
| Over/Undershoot | | | 5 | % | Full load |
| Ripple & Noise | | | 3/2 | % pk-pk | 12 V/15-48 V models |
| Overvoltage Protection | 115 | | 140 | % | Vnom, recycle input to reset |
| Overload Protection | 110 | | 160 | % I nom | |
| Short Circuit Protection | | | | | Continuous trip and restart (hiccup) |
| Temperature Coefficient | | | 0.05 | %/°C | |

General

| Characteristic | Minimum | Typical | Maximum | Units | Notes & Conditions |
|---|---------|-------------|---------|-------------------|---|
| Efficiency | | 90 | | % | Average active mode efficiency at 25%, 50%, 75% and 100% load |
| Isolation: Input to Output Input to Ground Output to Ground | 4000 | | | VAC | 2 MOPP |
| | 1500 | | | VAC | 1 MOPP |
| | 500 | | | VAC | 1 MOPP at output voltage |
| Power Density | | | 8.1 | W/in ³ | |
| Mean Time Between Failure | 500 | | | kHrs | MIL-HDBK-217F, Notice 2 +25 °C GB |
| Weight | | 0.15 (69.0) | | lb(g) | |

Efficiency Vs Load

Figure 1
ECF40PS12

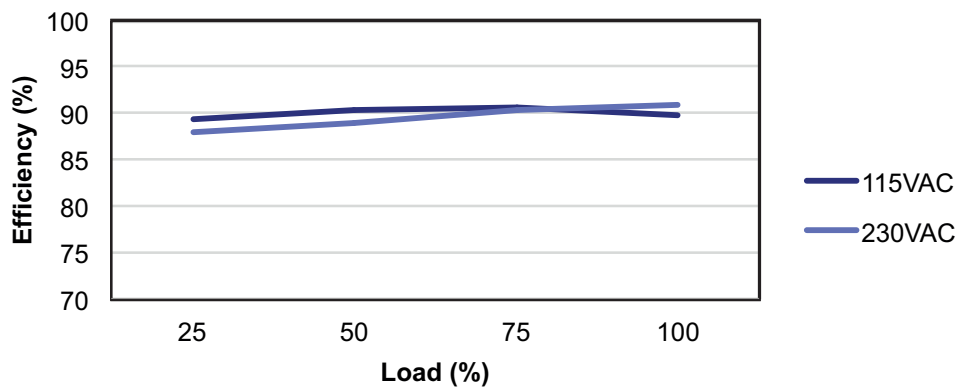
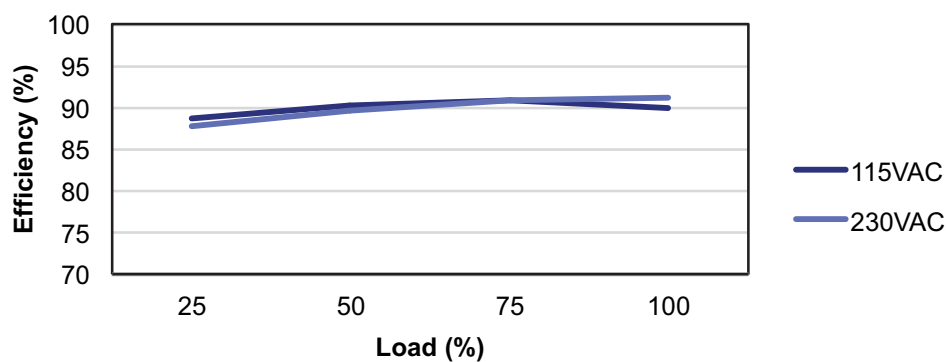


Figure 2
ECF40PS24

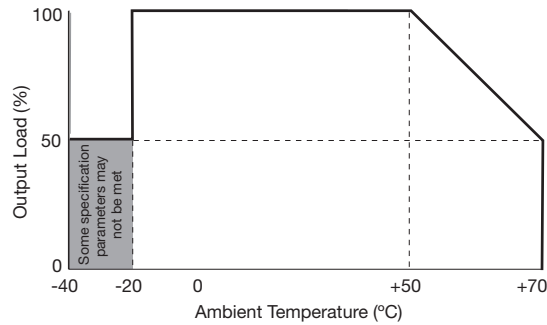


Environmental

| Characteristic | Minimum | Typical | Maximum | Units | Notes & Conditions |
|-----------------------|--|---------|-----------|-------|---------------------------|
| Operating Temperature | -40 | | +70 | °C | See derating curve, fig.3 |
| Storage Temperature | -40 | | +85 | °C | |
| Humidity | 5 | | 95 | %RH | Non-condensing |
| Operating Altitude | | | 5000/4000 | m | ITE/Medical |
| Shock | ±3 x 30g shocks in each plane, total 18 shocks. 30g = 11ms (+/- 0.5msecs), half sine. Conforms to EN60068-2-27 | | | | |
| Vibration | Single axis 10-500 Hz at 2g sweep and endurance at resonance in all 3 planes. Conforms to EN60068-2-6 | | | | |

Temperature Derating Curve

Figure 3



EMC: Emissions

| Phenomenon | Standard | Test Level | Criteria | Notes & Conditions |
|-------------------|-------------|------------|----------|--------------------|
| Conducted | EN55011/22 | Class B | | |
| Radiated | EN55011/22 | Class A | | |
| Harmonic Current | EN61000-3-2 | Class A | | |
| Voltage Functions | EN61000-3-3 | | | |

EMC: Immunity

| Phenomenon | Standard | Test Level | Criteria | Notes & Conditions |
|------------------------|------------------------|----------------------------|----------|--------------------|
| Medical Device EMC | IEC60601-1-2 | Ed.4.0 : 2014 | as below | |
| Low Voltage PSU EMC | EN61204-3 | High severity level | as below | |
| ESD | EN61000-4-2 | ±8kV contact, ±15kV air | A | |
| Radiated | EN61000-4-3 | 3 | A | |
| EFT | EN61000-4-4 | 3 | A | |
| Surge | EN61000-4-5 | Installation class 3 | A | |
| Conducted | EN61000-4-6 | 3 | A | |
| Magnetic Fields | EN61000-4-8 | 4 | A | |
| Dips and Interruptions | EN61000-4-11 (100 VAC) | Dip 100% (0 VAC), 8.4 ms | A | 25% derating |
| | | Dip 100% (0 VAC), 16.7 ms | B | |
| | | Dip 60% (40 VAC), 200 ms | B | |
| | | Dip 30% (70 VAC), 500 ms | B | |
| | | Dip 20% (80 VAC), 5000 ms | B | |
| | | Int 100% (0 VAC), 5000 ms | B | |
| | EN61000-4-11 (115 VAC) | Dip 100% (0 VAC), 8.4 ms | A | |
| | | Dip 100% (0 VAC), 16.7 ms | B | |
| | | Dip 60% (40 VAC), 200 ms | B | |
| | | Dip 30% (70 VAC), 500 ms | B | |
| | | Dip 20% (80 VAC), 5000 ms | B | |
| | | Int 100% (0 VAC), 5000 ms | B | |
| | EN61000-4-11 (240 VAC) | Dip 100% (0 VAC), 10 ms | A | |
| | | Dip 100% (0 VAC), 20 ms | B | |
| | | Dip 60% (96 VAC), 200 ms | B | |
| | | Dip 30% (168 VAC), 500 ms | B | |
| | | Dip 20% (192 VAC), 5000 ms | B | |
| | | Int 100% (0 VAC), 5000 ms | B | |
| | EN60601-1-2 (100 VAC) | Dip 100% (0 VAC), 10 ms | A | 30% derating |
| | | Dip 100% (0 VAC), 20 ms | A | 60% derating |
| | | Dip 60% (40 VAC), 100 ms | A | 75% derating |
| | | Dip 30% (70 VAC), 500 ms | A | |
| | EN60601-1-2 (420 VAC) | Int 100% (0 VAC), 5000 ms | B | |
| | | Dip 100% (0 VAC), 10 ms | A | |
| | | Dip 100% (0 VAC), 20 ms | A | |
| | | Dip 60% (96 VAC), 100 ms | A | |
| | | Dip 30% (168 VAC), 500 ms | A | |
| | | Int 100% (0 VAC), 5000 ms | B | |

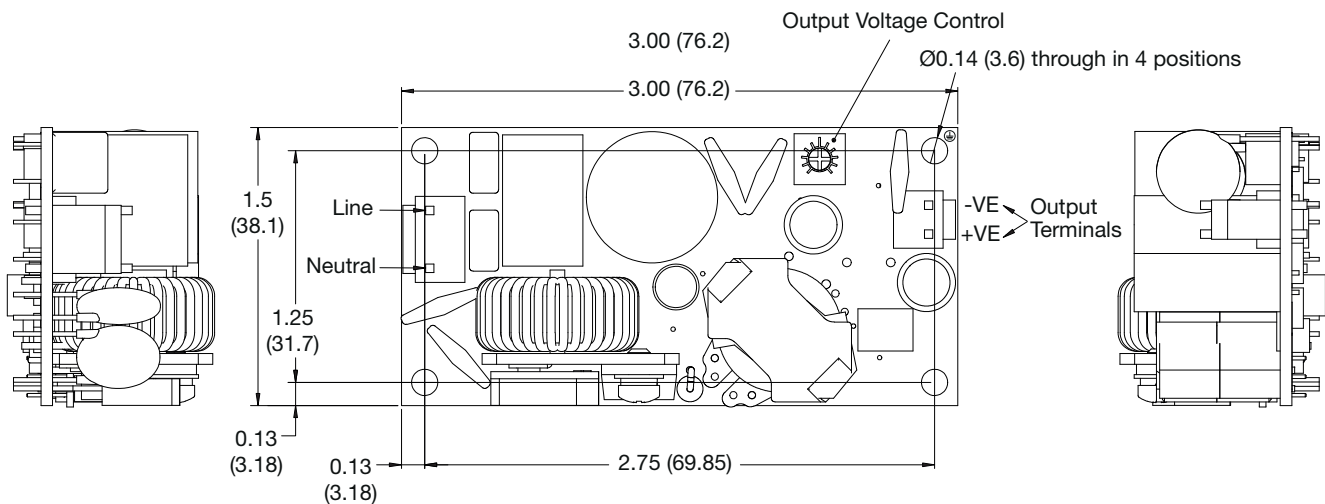
Safety Approvals

| Safety Agency | Safety Standard | Notes & Conditions |
|---------------|--|------------------------|
| CB Report | IEC60950-1:2005 | Information Technology |
| UL | UL60950-1, CSA 22.2 No.60950-1-11 Ed 2 | Information Technology |
| TUV | EN60950-1 | Information Technology |
| CE | LVD | |

| Safety Agency | Safety Standard | Notes & Conditions |
|---------------|---|--------------------|
| CB Report | IEC60601-1 Ed 3.1 Including Risk Management | Medical |
| UL | ANSI/AAMI ES60601-1: & CSA C22.2 No.6061-1:08 | Medical |
| CE | EN60601-1 | Medical |

| Isolation | Safety Standard | Notes & Conditions |
|----------------------|--|--------------------|
| Primary to Secondary | 2 x MOPP (Means of Patient Protection) | IEC60601-1 Ed 3.1 |
| Primary to Earth | 1 x MOPP (Means of Patient Protection) | |
| Secondary to Earth | 1 x MOPP (Means of Patient Protection) at output voltage | |

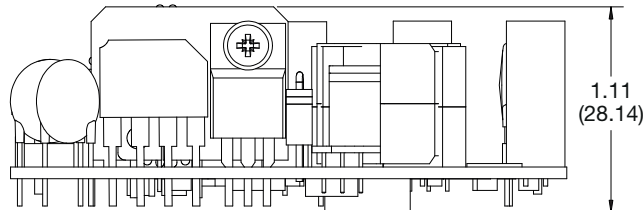
Mechanical Details



| CN1 - Input Connector | |
|-----------------------|------------|
| Pin 1 | Neutral |
| Pin 2 | Not Fitted |
| Pin 3 | Line |

Mates with JST housing VHR-3N and JST Series SVH-21T-P1.1 crimp terminals

Mounting hole marked with ⊕ must be connected to safety earth for class I applications



| CN2 - Output Connector | |
|------------------------|-------|
| Pin 1 | +Vout |
| Pin 2 | -Vout |

Mates with JST housing VHR-2N and JST Series SVH-21T-P1.1 crimp terminals

Notes

1. All dimensions shown in inches (mm).
Tolerance: ±0.02 (0.5)

2. Weight: 0.14 lbs (66 g) approx.