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AMEL30-277HAVZ



The AMEL30-277HAVZ series is an efficient 30W AC-DC power supply module. Offering a commercial input voltage range of 85-305VAC, output voltage ranges from 3.3-48V, low power consumption up to 0.1W, high efficiency, high reliability and safer isolation.

This new series offers great operating temperatures, from -40°C to 85°C with full power up to 50°C and features an isolation of 4200VAC with OVCIII rating for improved reliability and system safety. Furthermore, a high MTBF of 500,000h, output short circuit protection (OSCP), output over-current protection (OCP) and an output over-voltage protection (OVP) come standard with the series.

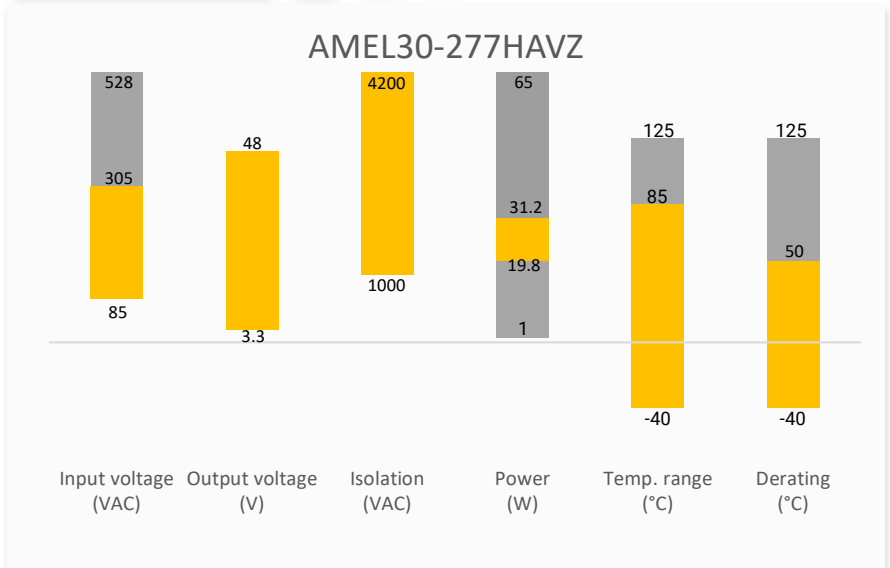
The AMEL30-277HAVZ is great for grid power, industrial instrumentation and controls, communication, and civil applications.

Features



- Universal Input: 85 - 305VAC/120 - 430VDC
- Operating Temp: -40 °C to +85 °C
- High isolation voltage: 4200VAC
- Low ripple & noise, 150mV(p-p), max.
- Output short circuit, over-current, over-voltage protection
- Low no-load power consumption of 0.1W
- Efficiency up to 90%
- Certified : EN/UL62368-1, EN61558-1:2019, EN61558-2-16:2009+A1:2013
- Designed to meet : IEC62368-1, EN60335-1

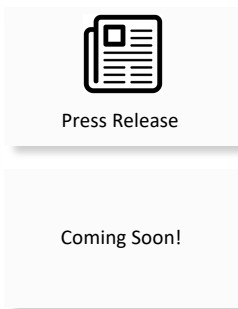
Summary



Training



Product Training Video
(click to open)



Application Notes

Applications



Power Grid







Industrial



Telecom

Models & Specifications


| Single Output | | | | | | | |
|---|------------------------|---------------------|------------------------|--------------------|------------------------|------------------------------|------------------------------|
| Model | Input Voltage (VAC/Hz) | Input Voltage (VDC) | Max Output wattage (W) | Output Voltage (V) | Output Current max (A) | Maximum capacitive load (μF) | Efficiency @ 230VAC Typ. (%) |
| AMEL30-3S277HAVZ | 85-305/47-440 | 100-430 | 19.8 | 3.3 | 6 | 6600 | 85 |
| AMEL30-5S277HAVZ  | 85-305/47-440 | 100-430 | 30 | 5 | 6 | 6600 | 86 |
| AMEL30-9S277HAVZ | 85-305/47-440 | 100-430 | 30.6 | 9 | 3.4 | 4400 | 88 |
| AMEL30-12S277HAVZ  | 85-305/47-440 | 100-430 | 30 | 12 | 2.5 | 4400 | 90 |
| AMEL30-15S277HAVZ | 85-305/47-440 | 100-430 | 30 | 15 | 2 | 3300 | 90 |
| AMEL30-24S277HAVZ  | 85-305/47-440 | 100-430 | 31.2 | 24 | 1.3 | 1000 | 88 |
| AMEL30-48S277HAVZ | 85-305/47-440 | 120-430 | 30.2 | 48 | 0.63 | 470 | 90 |

- Note:**
- Use suffix "ST" for chassis and suffix "STD" for DIN-Rail mounting (ex. AMEL30-3S277HAVZ -ST is chassis mounting and AMEL30-3S277HAVZ -STD is DIN-Rail mounting version).
 - Note: Add suffix "B" for single unit packaging or "-60" for volume packaging (ex. AMEL30-3S277HAVZ-B is single unit packaging and AMEL30-3S277HAVZ-60 is volume packaging).
 - Packaging information is not printed on the product label and is only used for ordering the product.
 - Models marked with  that have an alternate options with higher ripple noise and power consumption. Use suffix "-002" for the shorter lead time option. (ex. AMEL30-5S277HAVZ-002 is the shorter lead time version).

Input Specifications

| Parameters | Conditions | Typical | Maximum | Units |
|----------------|--------------------|---------|---------|--------|
| Input current | 115VAC | | 750 | mA |
| | 230VAC | | 500 | mA |
| Inrush current | 115VAC | 25 | | A |
| | 230VAC | 50 | | A |
| Leakage | 277VAC, 50Hz | | 0.1 | mA RMS |
| Built-in Fuse | 2A/300V, Slow blow | | | |

Output Specifications

| Parameters | Conditions | Typical | Maximum | Units |
|------------------|-------------------|---|---------|--------|
| Voltage accuracy | 3.3V output model | ±3 | | % |
| | Others | ±2 | | |
| Line regulation | Full load | ±0.5 | | % |
| Load regulation | 0 to 100% load | 3.3V output | ±2 | % |
| | | 5V output | ±1.5 | |
| | | Others | ±1 | |
| Ripple & Noise* | 20MHz bandwidth | Standard 3.3V/5V/9V/12V/15V | 100 | mV p-p |
| | | Standard Others | 100 | |
| | |  Models with suffix -002 | 150 | |
| Start-up time | 5V output | 2 | | S |
| | Others | 1 | | S |
| Hold up time | 115VAC | 10 | | ms |
| | 230VAC | 50 | | ms |

* Ripple and Noise are measured at 20MHz bandwidth with a 10 μ F electrolytic capacitor and a 1 μ F ceramic capacitor. Please refer to the application note for specific details.

Isolation Specification

| Parameters | Conditions | Typical | Maximum | Units |
|--------------------|----------------------------|---------|---------|------------|
| Tested I/O voltage | 60 sec, leakage \leq 5mA | 4200 | | VAC |
| Resistance | 500VDC | >100 | | M Ω |

General Specifications

| Parameters | Conditions | Typical | Maximum | Units |
|------------------------------|--|--|---------|-----------------|
| Protection class | Class II | | | |
| Overvoltage category | OVC III | | | |
| Over current protection | Auto recovery | \geq 110 | | % of Iout |
| Over voltage protection | 3.3Vout, voltage clamp, hiccup | | 6.3 | VDC |
| | 5V, 9V, 12Vout, voltage clamp, hiccup | | 16 | VDC |
| | 15Vout, voltage clamp, hiccup | | 25 | VDC |
| | 24Vout, voltage clamp, hiccup | | 35 | VDC |
| | 48Vout, voltage clamp, hiccup | | 60 | VDC |
| Short circuit protection | Hiccup, Continuous, Auto recovery | | | |
| Switching Frequency | | 65 | | KHz |
| Operating altitude | | | 5000 | m |
| Operating temperature | See derating graph | -40 to +85 | | $^{\circ}$ C |
| Storage temperature | | -40 to +85 | | $^{\circ}$ C |
| Wave soldering temperature | Duration 5 - 10s | 260 \pm 5 | | $^{\circ}$ C |
| Manual soldering temperature | Duration 3 - 5s | 360 \pm 10 | | $^{\circ}$ C |
| No-load power consumption | ⊙ 230VAC, models with suffix -002 | | 0.3 | W |
| | 230VAC, 48Vout | 0.15 | 0.2 | W |
| | 230VAC, others | 0.1 | 0.12 | W |
| Power Derating | -40 $^{\circ}$ C to -25 $^{\circ}$ C, 85VAC to 115VAC, 5V output | 2.67 | | %/ $^{\circ}$ C |
| | -40 $^{\circ}$ C to -25 $^{\circ}$ C, 85VAC to 115VAC, Others | 1.33 | | %/ $^{\circ}$ C |
| | +50 $^{\circ}$ C to +70 $^{\circ}$ C | 2.5 | | %/ $^{\circ}$ C |
| | +70 $^{\circ}$ C to +85 $^{\circ}$ C | 0.67 | | %/ $^{\circ}$ C |
| | 85VAC to 100VAC | 1.33 | | %/VAC |
| | 277VAC to 305VAC | 0.72 | | %/VAC |
| | 2000 - 5000m | 6.7 | | %/km |
| Temperature coefficient | | \pm 0.02 | | %/ $^{\circ}$ C |
| Cooling | Free air convection | | | |
| Humidity | Non-condensing | | 95 | % RH |
| Vibration | 10-500Hz, 5G, 10 minutes per cycle, 6 cycles, along all axis | | | |
| Case material | Plastic (flammability to UL 94V-0) | | | |
| Weight | PCB mountable models | 100 | | g |
| | With optional -ST mounting plate | 147 | | g |
| | With optional -STD mounting plate | 190 | | g |
| Dimensions (L x W x H) | PCB mountable models | 2.74 x 1.54 x 0.95 inches (69.50 x 39.00 x 24.00 mm) | | |
| | With optional -ST mounting plate | 3.78 x 2.13 x 1.28 inches (96.10 x 54.00 x 32.50 mm) | | |
| | With optional -STD mounting plate | 3.78 x 2.13 x 1.46 inches (96.10 x 54.00 x 37.10 mm) | | |
| MTBF | > 500 000 hrs (MIL-HDBK -217F, t= $+25^{\circ}$ C) | | | |

NOTE: All specifications in this datasheet are measured at an ambient temperature of 25 $^{\circ}$ C, humidity<75%, nominal input voltage and at rated output load unless otherwise specified.

Safety Specifications

Parameters

Agency approvals cULus UL62368-1, EN62368-1:2020+A11:2020, EN61558-1:2019, EN61558-2-16:2009+A1:2013

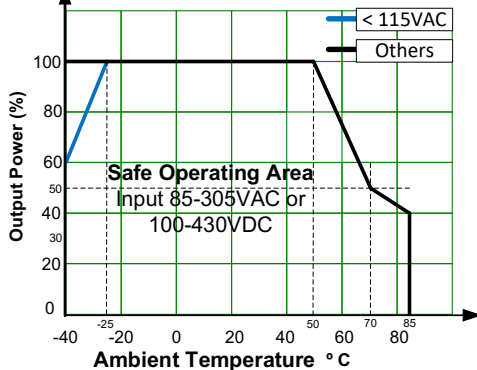
| | | |
|-----------|--|--|
| Standards | Designed to meet IEC 62368-1, EN60335-1 | |
| | EMC - Conducted and radiated emission | CISPR32 / EN55032, class B CISPR32 / EN55032, class B with the recommended EMC circuit 2 EN55014-1 |
| | Electrostatic Discharge Immunity | IEC 61000-4-2 Contact $\pm 8\text{KV}$, Air $\pm 15\text{KV}$, Criteria A EN55014-2, Criteria A |
| | RF, Electromagnetic Field Immunity | IEC 61000-4-3 10V/m , Criteria A EN55014-2, Criteria A |
| | Electrical Fast Transient/Burst Immunity* | IEC 61000-4-4 $\pm 2\text{KV}$, Criteria A IEC 61000-4-4 $\pm 4\text{KV}$, Criteria A with the recommended EMC circuit 1 or 2 EN55014-2, Criteria A |
| | Surge Immunity* | IEC 61000-4-5 L-L $\pm 2\text{KV}$, Criteria A IEC 61000-4-5 L-L $\pm 2\text{KV}$, L-GND $\pm 4\text{KV}$, Criteria A with the recommended EMC circuit 1 or 2 EN55014-2, Criteria A |
| | RF, Conducted Disturbance Immunity | IEC 61000-4-6 10Vr.m.s. , Criteria A EN55014-2, Criteria A |
| | Voltage dips, Short Interruptions Immunity | IEC 61000-4-11 0%, 70%, Criteria B EN55014-2, Criteria B |

*NOTE: If PE connection is required for the output of the converter or the converter is installed near the metal enclosure, please refer to the recommended EMC circuit 2.

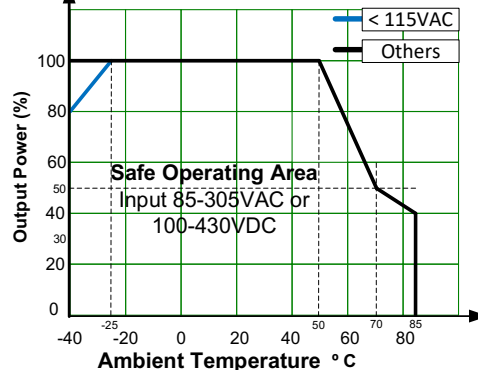
Derating



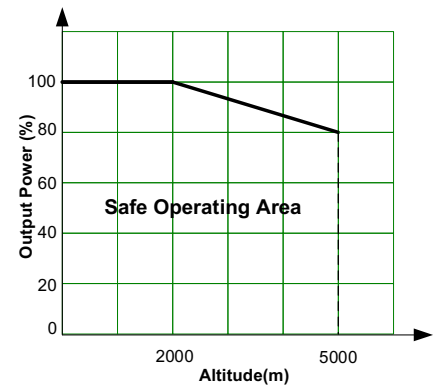
Thermal derating for 5V output model
Free Air Convection

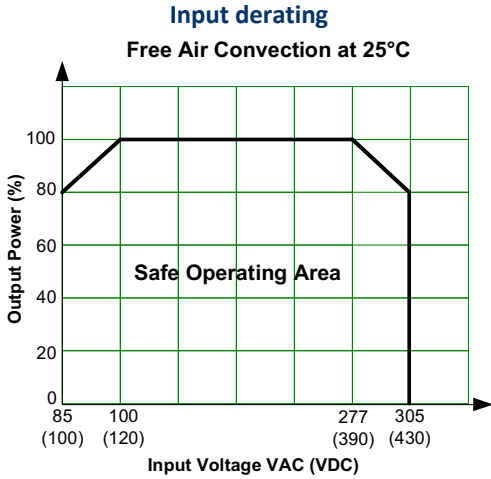


Thermal derating for other models
Free Air Convection



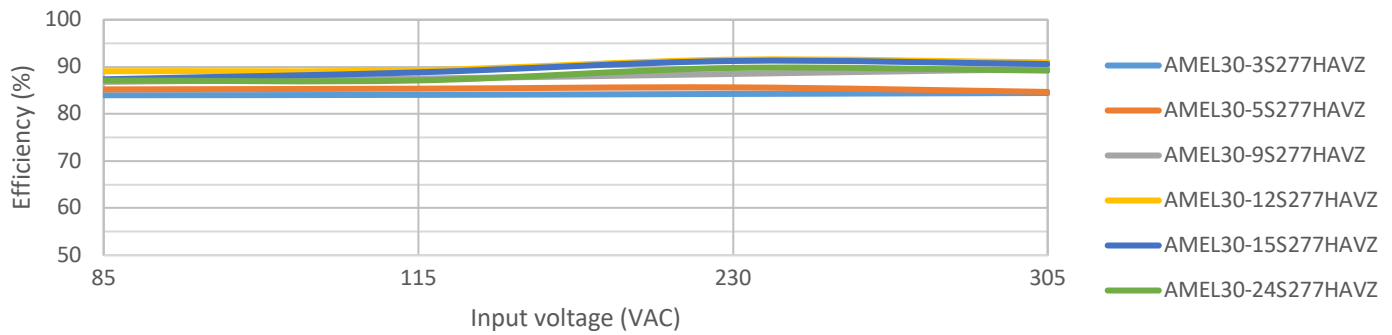
Altitude derating for all models



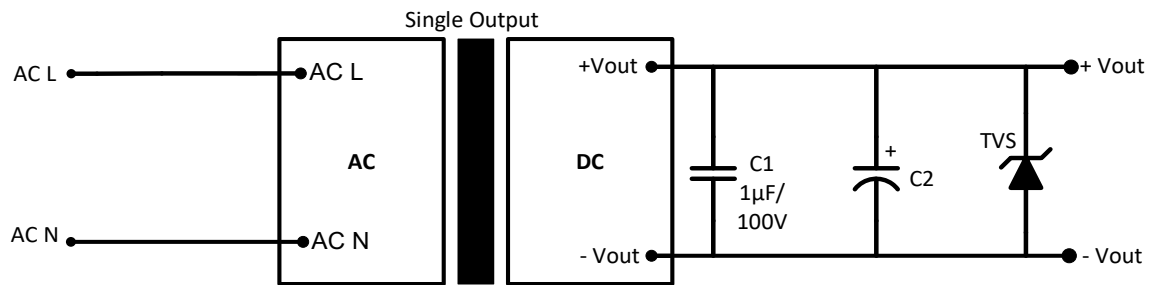


Efficiency vs input voltage

Efficiency vs input voltage (Full load)



Typical Application Circuit

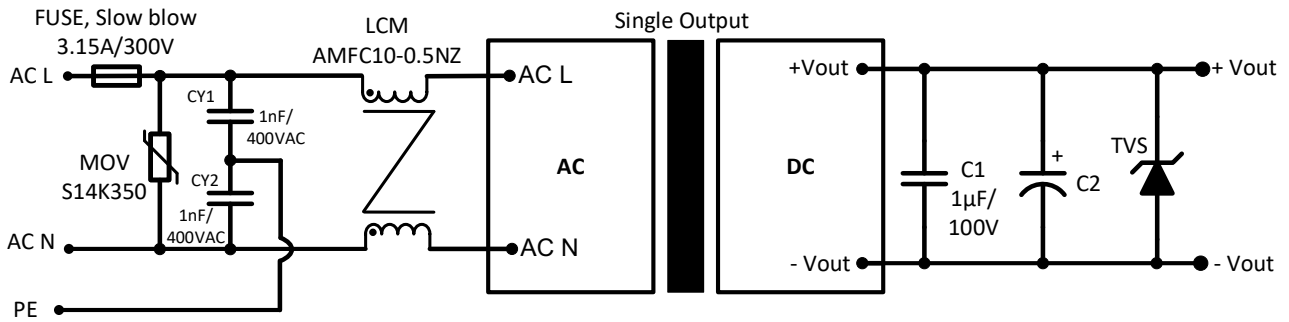


| Model | C2 | TVS |
|------------|----------|-----|
| 3.3, 5Vout | 10µF/50V | 7V |
| 9Vout | 10µF/50V | 12V |
| 12, 15Vout | 10µF/50V | 20V |
| 24Vout | 10µF/50V | 30V |
| 48Vout | 10µF/63V | 60V |

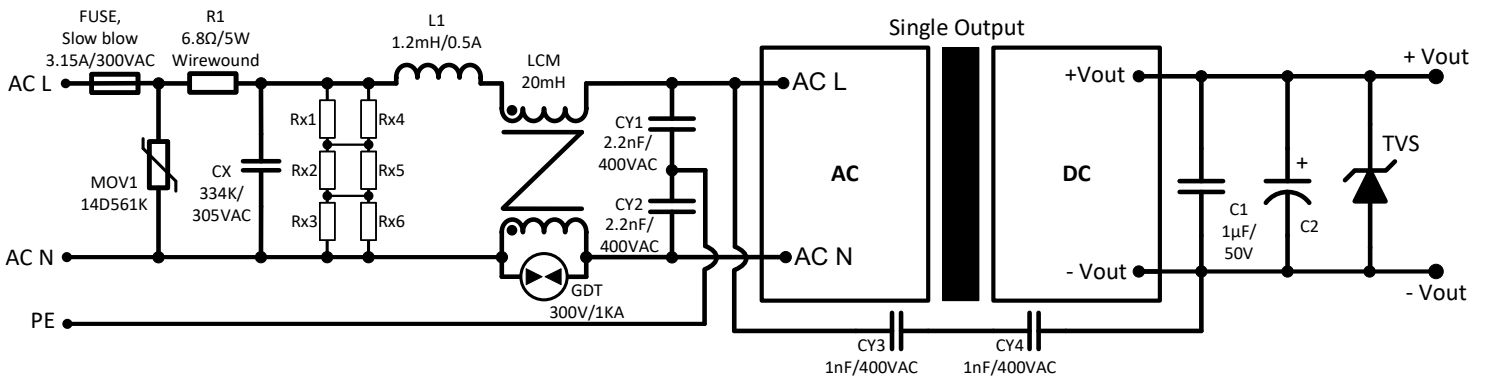
For filtering components:

The C2 capacitor is recommended to use electrolytic type with high frequency and low ESR rating. The C1 capacitor is recommended to use ceramic type for filtering high-frequency noise.

Recommended EMC Circuit 1

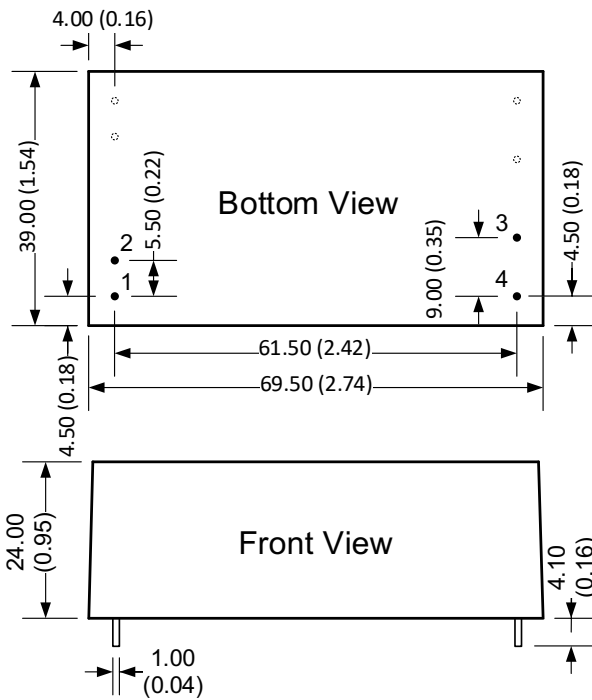


Recommended EMC Circuit 2



Rx1, Rx2, Rx3, Rx4, Rx5, Rx6
1.5MΩ/150VDC

Dimensions

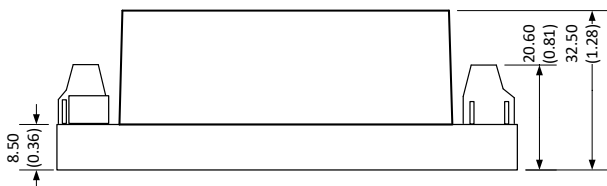
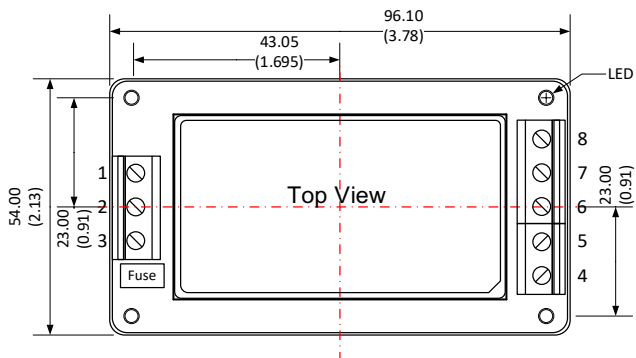


Dimensions mm (inch).
 Pin diameter tolerance ± 0.1 (± 0.004)
 General tolerance ± 0.5 (± 0.02)

Pin Output Specifications

| Pin | Function |
|-----|--------------|
| 1 | AC Input (L) |
| 2 | AC Input (N) |
| 3 | +V Output |
| 4 | -V Output |

Dimensions with ST Optional

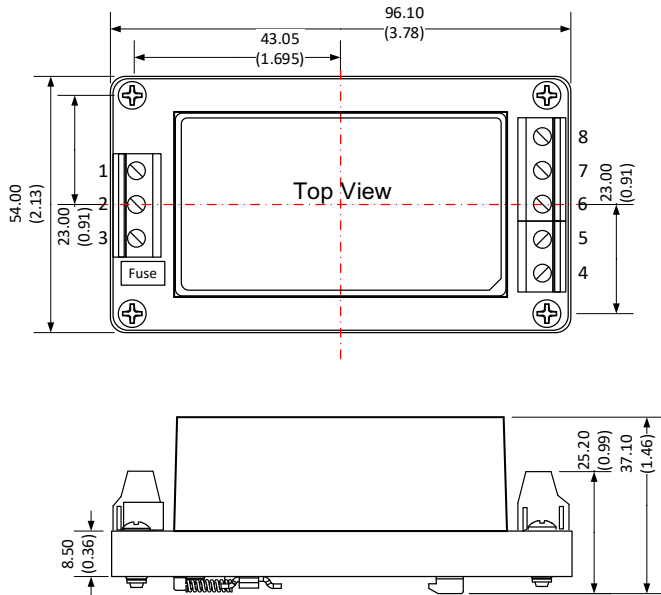


Note:
 Unit: mm(inch)
 Wire range : 24-12 AWG
 Tightening torque : Max 0.4 N.m
 General tolerance ± 1.00 (± 0.04)

Pin Output Specifications

| Pin | Function |
|-----|--------------|
| 1 | NC |
| 2 | AC Input (N) |
| 3 | AC Input (L) |
| 4 | +V Output |
| 5 | NC |
| 6 | NC |
| 7 | NC |
| 8 | -V Output |

Dimensions with STD Optional



| Pin Output Specifications | |
|---------------------------|--------------|
| Pin | Function |
| 1 | NC |
| 2 | AC Input (N) |
| 3 | AC Input (L) |
| 4 | +V Output |
| 5 | NC |
| 6 | NC |
| 7 | NC |
| 8 | -V Output |

Note:
 Unit: mm(inch)
 Wire range : 24-12 AWG
 Mounting rail: TS35
 Tightening torque : Max 0.4 N.m
 General tolerance ± 1.00 : (± 0.04)
 Mounting rail must be grounded.

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