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AME60-277VZ



Encapsulated

The new AME60-277VZ is an AC/DC converter that offers much greater cost effectiveness due to material normalization and production automation also leading to improved reliability and performance. Offering a commercial input voltage range of 85-305VAC and an output voltage range from 5-48V, this series will offer many benefits to your new system design.

This new series offers great operating temperatures, from -40°C to 70°C and features isolation of 4000VAC for improved reliability and system safety. Furthermore, a high MTBF of 300,000h, output short circuit protection (OSCP), output over-current protection (OCP) and an output over-voltage protection (OVP) come standard with the series.

The AME60-277VZ is perfect for street lighting controls, grid power, LED, instrumentation, industrial controls, communication and civil applications.

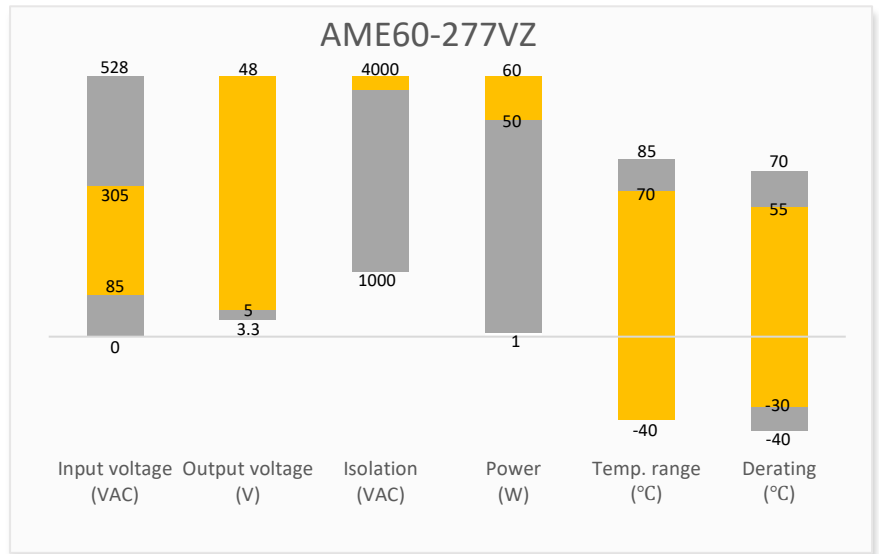
Features



Summary



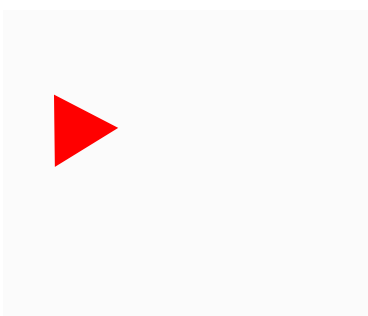
- Universal Input: 85 - 305VAC/100 - 430VDC
- Operating Temp: -40 °C to +70 °C
- High isolation voltage: 4000VAC
- Low ripple & noise, 150mV(p-p), Max.
- Output short circuit, over-current, over-voltage protection
- Regulated Output



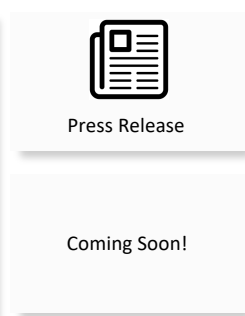
Training



Applications



Product Training Video
(click to open)



Application Notes



Power Grid



Industrial



Telecom



Instrumentation

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 (%) |
| AME60-5S277VZ | 85-305/47-63 | 100-430 | 50 | 5 | 10 | 50000 | 82 |
| AME60-12S277VZ | 85-305/47-63 | 100-430 | 60 | 12 | 5 | 10000 | 86 |
| AME60-15S277VZ | 85-305/47-63 | 100-430 | 60 | 15 | 4 | 8000 | 86 |
| AME60-24S277VZ | 85-305/47-63 | 100-430 | 60 | 24 | 2.5 | 2700 | 86 |
| AME60-48S277VZ | 85-305/47-63 | 100-430 | 60 | 48 | 1.25 | 680 | 86 |

Note: Use suffix "ST" for chassis and suffix "STD" for DIN-Rail mounting (ex. AME60-5S277VZ-ST is chassis mounting and AME60-5S277VZ-STD is DIN-Rail mounting version).

| Input Specifications | | | | |
|----------------------|---------------------|---------|---------|---------|
| Parameters | Conditions | Typical | Maximum | Units |
| Current | 115VAC | | 1.4 | A |
| | 230VAC | | 0.8 | A |
| Inrush current | 115VAC | 45 | | A |
| | 230VAC | 90 | | A |
| Leakage current | 277VAC/50Hz | | 0.25 | mA(RMS) |
| External fuse | slow blow type,300V | 3.15 | | A |

| Output Specifications | | | | |
|--------------------------|-----------------|---------|---------|--------|
| Parameters | Conditions | Typical | Maximum | Units |
| Voltage accuracy | | ±2 | | % |
| Line regulation | Full load | ±0.5 | | % |
| Load regulation | 0-100% load | ±1 | | % |
| Ripple & Noise* | 20MHz bandwidth | | 150 | mV p-p |
| Hold up time | 115VAC | 8 | | ms |
| | 230VAC | 65 | | ms |
| Voltage adjustable range | | | 10 | % |

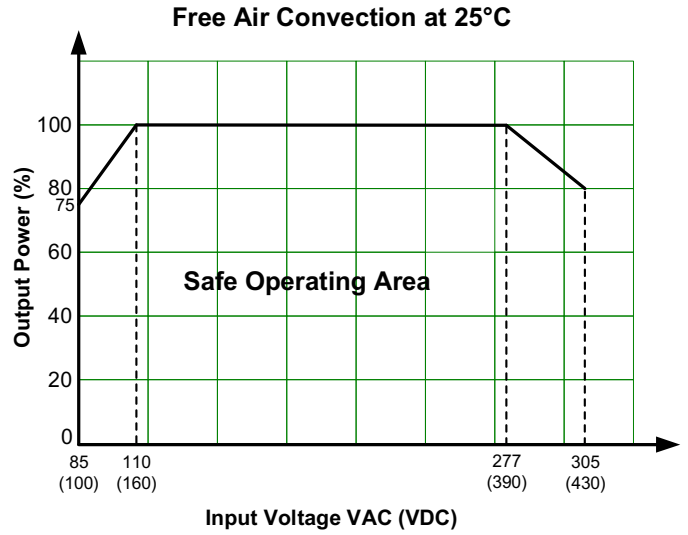
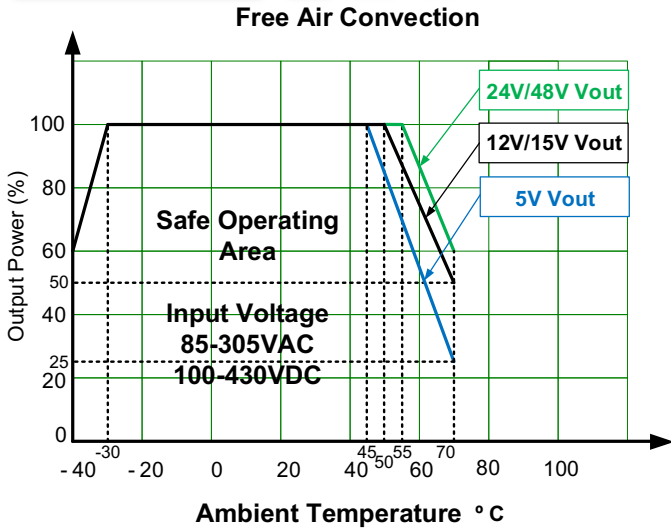
* Ripple and Noise are measured at 20MHz bandwidth by using the referenced Application circuit.

| Isolation Specifications | | | | |
|-----------------------------|-------------------------------|---------|-------|-------|
| Parameters | Conditions | Typical | Rated | Units |
| Tested I/O voltage | 60 sec, leakage current < 5mA | | 4000 | VAC |
| Tested input to PE voltage | | | 2000 | |
| Tested output to PE voltage | | | 500 | |

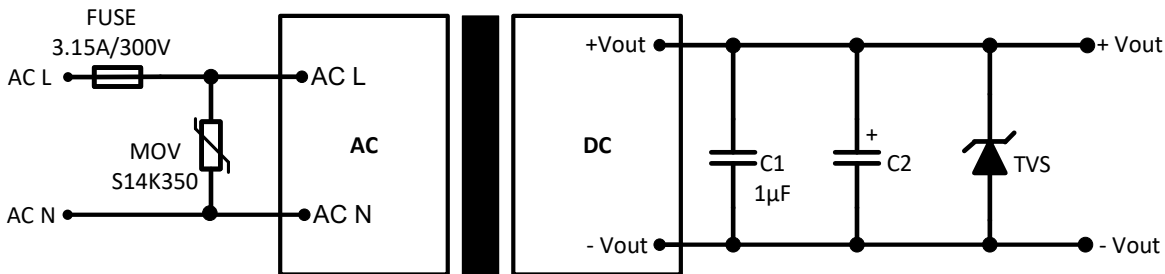
| General Specifications | | | | |
|---|---|---|---------|-----------|
| Parameters | Conditions | Typical | Maximum | Units |
| Safety class | Class II | | | |
| Switching frequency | | 65 | | KHz |
| Over Current protection | Auto recovery | ≥ 110 | | % of Iout |
| Over voltage protection | 5V Vout, Voltage clamp or shut off | | 9 | VDC |
| | 12V Vout, Voltage clamp or shut off | | 16 | VDC |
| | 15V Vout, Voltage clamp or shut off | | 24 | VDC |
| | 24V Vout, Voltage clamp or shut off | | 35 | VDC |
| | 48V Vout, Voltage clamp or shut off | | 56 | VDC |
| Short circuit protection | Hiccup, Continuous, Auto recovery | | | |
| Operating temperature | See derating graph | -40 to +70 | | °C |
| Storage temperature | | -40 to +85 | | °C |
| Lead temperature | Wave soldering | 260 ± 5 °C; Maximum duration 5 - 10s | | |
| | Hand soldering | 360 ± 10 °C; Maximum duration 3 - 5s | | |
| No-load power consumption | 48V Vout | | 0.65 | W |
| | Others | | 0.5 | W |
| Power derating | -40 °C ~ -30 °C | 4 | | % / °C |
| | 45 °C ~ 70 °C, 5V Vout | 3 | | % / °C |
| | 50 °C ~ 70 °C, 12V / 15V Vout | 2.5 | | % / °C |
| | 55 °C ~ 70 °C, 24V / 48V Vout | 2.5 | | % / °C |
| | 85VAC ~ 110VAC | 1 | | % / VAC |
| | 277VAC ~ 305VAC | 0.72 | | % / VAC |
| Temperature coefficient | | ±0.02 | | % / °C |
| Cooling | Free air convection | | | |
| Humidity | Non-condensing | 95 | | % RH |
| Case material | Heat resistant black Plastic (flammability to UL 94V-0) | | | |
| Weight | PCB mountable models | 300 | | g |
| | With optional -ST mounting plate | 390 | | |
| | With optional -STD mounting plate | 460 | | |
| Dimensions (L x W x H) | PCB mountable models | 4.29 x 2.30 x 1.18 inches (109.0 x 58.5 x 30.0mm) | | |
| | With optional -ST mounting plate | 5.32 x 2.76 x 1.52 inches (135.0 x 70.0 x 38.5mm) | | |
| | With optional -STD mounting plate | 5.39 x 2.76 x 1.73 inches (137.0 x 70.0 x 44.0mm) | | |
| MTBF | > 300 000 hrs (MIL-HDBK -217F, t=+25°C)/Full Load | | | |
| NOTE: All specifications in this datasheet are measured at an ambient temperature of 25°C, humidity<75%, nominal input voltage and at rated output load unless otherwise specified. | | | | |

| Safety Specifications | | |
|-----------------------|--|---|
| Parameters | | |
| Standards | Design to meet IEC/EN/UL 62368 | |
| | EMC - Conducted and radiated emission | CISPR32 / EN55032, class B |
| | Electrostatic Discharge Immunity | IEC 61000-4-2 Contact ±6KV / Air ±8KV, Criteria B |
| | RF, Electromagnetic Field Immunity | IEC 61000-4-3 10V/m, Criteria A |
| | Electrical Fast Transient/Burst Immunity | IEC 61000-4-4 ±4KV, Criteria B |
| | Surge Immunity | IEC 61000-4-5 L-L ±2KV/L-G ±4KV, Criteria B |
| | | IEC 61000-4-5 L-L ±4KV/L-G ±6KV, with EMC recommended circuit, Criteria B |
| | RF, Conducted Disturbance Immunity | IEC 61000-4-6 10Vr.m.s, Criteria A |
| | Voltage dips, Short Interruptions Immunity | IEC 61000-4-11 0%, 70%, Criteria B |

Derating



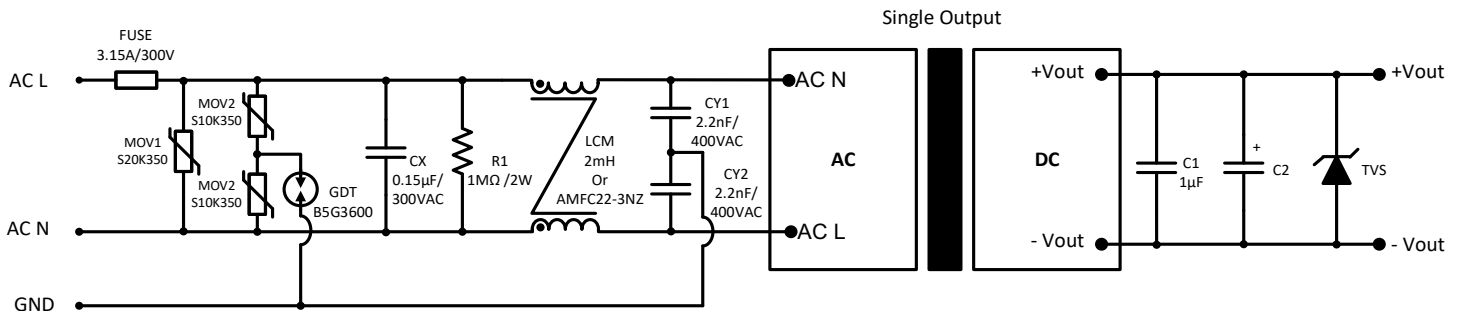
Typical Application Circuit



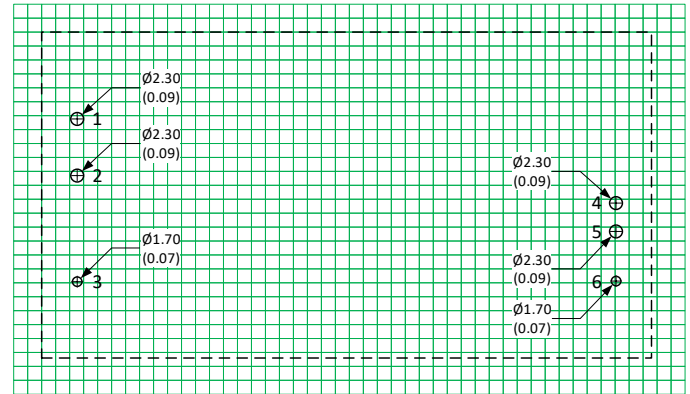
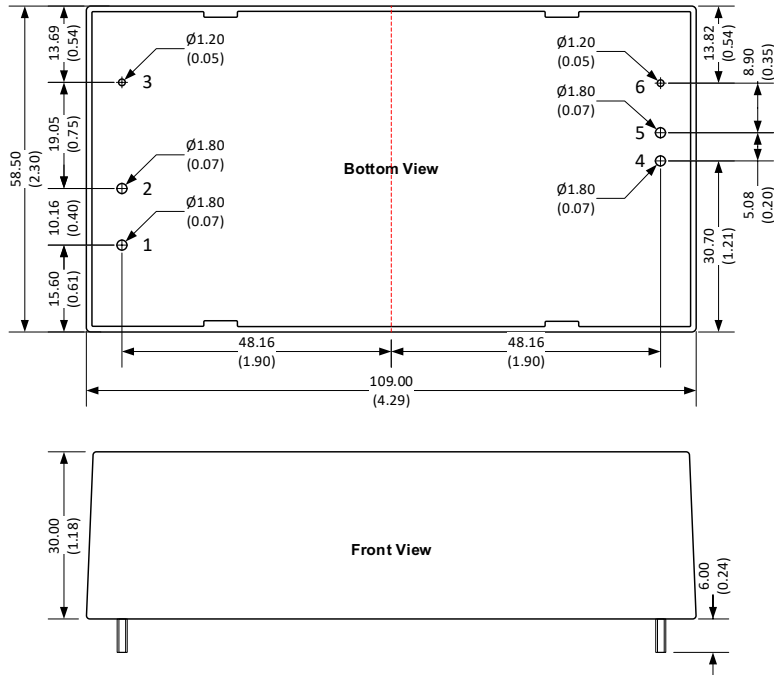
| Model | C2 | TVS |
|--------------|--------|----------|
| 5 Vout | 680 µF | SMBJ7.0A |
| 12 / 15 Vout | 330 µF | SMBJ20A |
| 24 Vout | 200 µF | SMBJ30A |
| 48 Vout | 100 µF | SMBJ64A |

Note: Choose capacitors with at least 20% voltage margin.

EMC Recommended Circuit



Dimensions



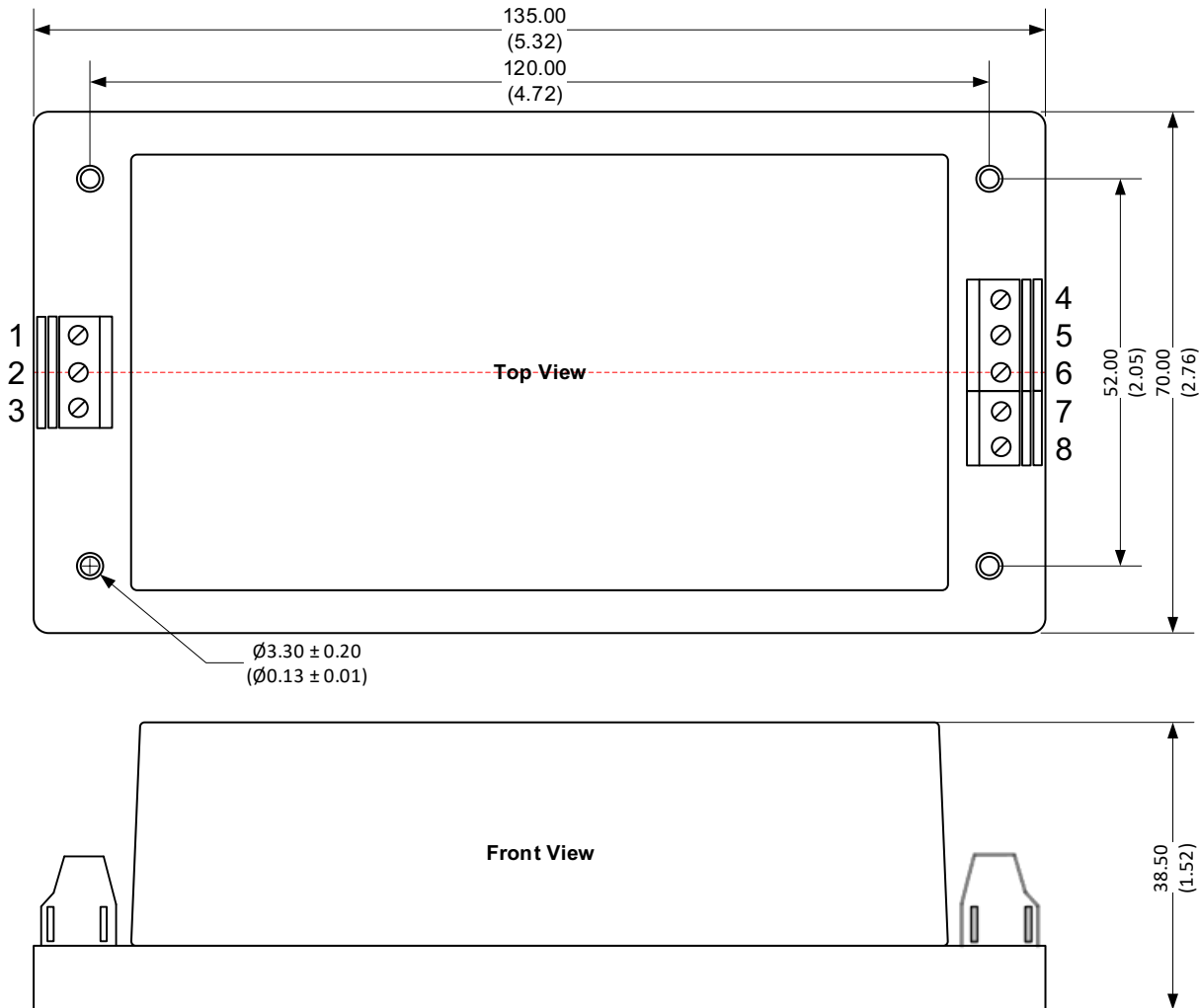
Note : Grid 2.54*2.54 mm

Notes:
 All dimensions are typical in millimeters (inches).
 Pin diameter tolerances : ± 0.10 (± 0.004)
 Pin length tolerances : ± 1.50 (± 0.06)
 General tolerance : ± 0.50 (± 0.02)

Pin Output Specifications

| Pin | Single | Pin | Single |
|-----|--------------|-----|-----------|
| 1 | AC Input (N) | 5 | -V Output |
| 2 | AC Input (L) | 6 | Trim |
| 3 | GND | | |
| 4 | +V Output | | |

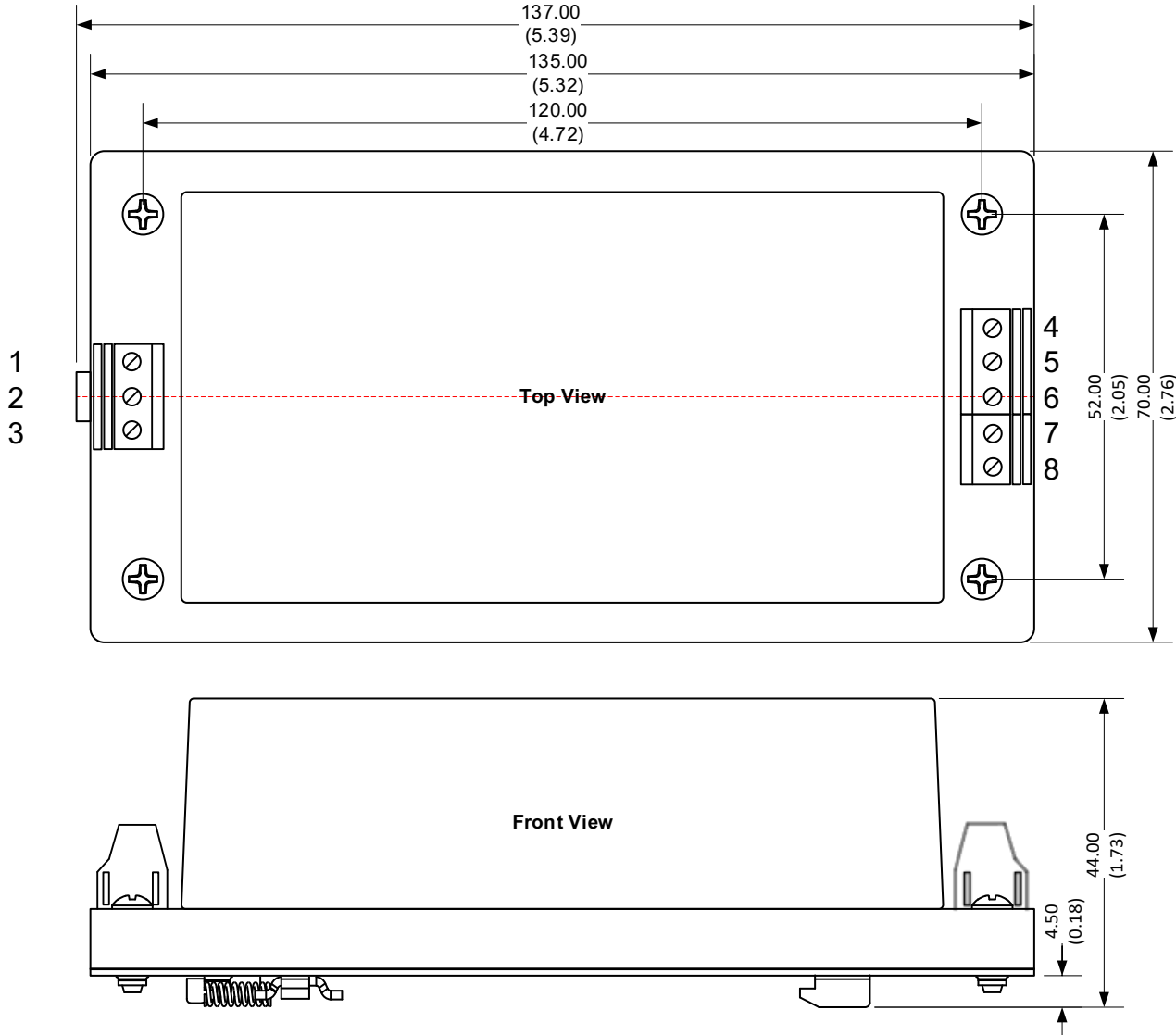
Dimensions with ST Optional



Notes:
 All dimensions are typical in millimeters (inches).
 Wire range : 24-12 AWG
 Tightening torque : Max 0.4 N.m
 General tolerance ± 1.00 : (± 0.04)

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

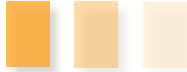
Dimensions with STD Optional



Notes:
 All dimensions are typical in millimeters (inches).
 Mounting rail : TS35, rail need to connect safety ground
 Wire range : 24-12 AWG
 Tightening torque : Max 0.4 N.m
 General tolerance ± 1.00 : (± 0.04)

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

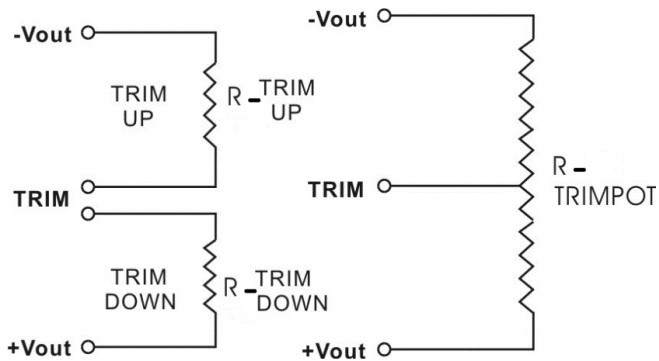
Trimming



Output voltage can be externally trimmed by utilizing the methods as shown below

Fixed Resistor

Variable Potentiometer



Leave open if not used.

AME60-5S277VZ

| Trim down % | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|--------------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Vout (VDC) | 4.950 | 4.900 | 4.850 | 4.800 | 4.750 | 4.700 | 4.650 | 4.600 | 4.550 | 4.500 |
| Rt down (KΩ) | 160.700 | 78.200 | 50.700 | 36.950 | 28.700 | 23.200 | 19.271 | 16.325 | 14.033 | 12.200 |
| Trim up % | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Vout (VDC) | 5.050 | 5.100 | 5.150 | 5.200 | 5.250 | 5.300 | 5.350 | 5.400 | 5.450 | 5.500 |
| Rt up (KΩ) | 164.000 | 81.500 | 54.000 | 40.250 | 32.000 | 26.500 | 22.571 | 19.625 | 17.333 | 15.500 |

AME60-12S277VZ

| Trim down % | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|--------------|---------|---------|--------|--------|--------|--------|--------|--------|--------|--------|
| Vout (VDC) | 11.880 | 11.760 | 11.640 | 11.520 | 11.400 | 11.280 | 11.160 | 11.040 | 10.920 | 10.800 |
| Rt down (KΩ) | 183.233 | 111.590 | 79.474 | 61.246 | 49.499 | 41.299 | 35.249 | 30.602 | 26.921 | 23.933 |
| Trim up % | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Vout (VDC) | 12.120 | 12.240 | 12.360 | 12.480 | 12.600 | 12.720 | 12.840 | 12.960 | 13.080 | 13.200 |
| Rt up (KΩ) | 211.778 | 57.030 | 32.596 | 22.642 | 17.238 | 13.845 | 11.516 | 9.819 | 8.527 | 7.511 |

AME60-15S277VZ

| Trim down % | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|--------------|---------|---------|---------|---------|---------|--------|--------|--------|--------|--------|
| Vout (VDC) | 14.850 | 14.700 | 14.550 | 14.400 | 14.250 | 14.100 | 13.950 | 13.800 | 13.650 | 13.500 |
| Rt down (KΩ) | 616.500 | 304.000 | 199.833 | 147.750 | 116.500 | 95.667 | 80.786 | 69.625 | 60.944 | 54.000 |
| Trim up % | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Vout (VDC) | 15.150 | 15.300 | 15.450 | 15.600 | 15.750 | 15.900 | 16.050 | 16.200 | 16.350 | 16.500 |
| Rt up (KΩ) | 124.000 | 61.500 | 40.667 | 30.250 | 24.000 | 19.833 | 16.857 | 14.625 | 12.889 | 11.500 |

AME60-24S277VZ

| Trim down % | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|--------------|---------|---------|---------|---------|---------|---------|--------|--------|--------|--------|
| Vout (VDC) | 23.760 | 23.520 | 23.280 | 23.040 | 22.800 | 22.560 | 22.320 | 22.080 | 21.840 | 21.600 |
| Rt down (KΩ) | 471.081 | 287.942 | 205.845 | 159.249 | 129.221 | 108.258 | 92.793 | 80.914 | 71.504 | 63.865 |
| Trim up % | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Vout (VDC) | 24.240 | 24.480 | 24.720 | 24.960 | 25.200 | 25.440 | 25.680 | 25.920 | 26.160 | 26.400 |
| Rt up (KΩ) | 239.556 | 64.606 | 36.982 | 25.728 | 19.619 | 15.783 | 13.150 | 11.232 | 9.771 | 8.622 |

AME60-48S277VZ

| Trim down % | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|--------------|----------|----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Vout (VDC) | 47.520 | 47.040 | 46.560 | 46.080 | 45.600 | 45.120 | 44.640 | 44.160 | 43.680 | 43.200 |
| Rt down (KΩ) | 1825.631 | 1135.459 | 818.914 | 637.228 | 519.354 | 436.695 | 375.522 | 328.420 | 291.036 | 260.643 |
| Trim up % | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Vout (VDC) | 48.480 | 48.960 | 49.440 | 49.920 | 50.400 | 50.880 | 51.360 | 51.840 | 52.320 | 52.800 |
| Rt up (KΩ) | 561.500 | 130.649 | 73.548 | 50.996 | 38.919 | 31.395 | 26.258 | 22.527 | 19.694 | 17.470 |

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