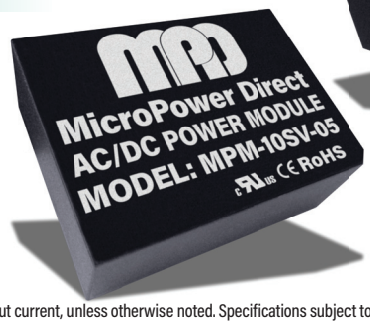
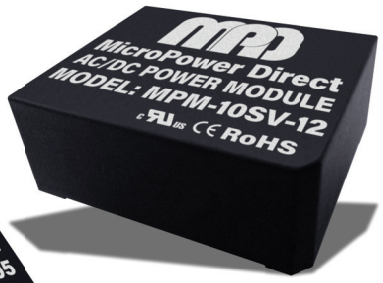
# MPM-10SV Series

## Wide 85 - 305 VAC Input, 10W, High Performance, AC/DC Power Supplies




### Key Features:

- 10W Output Power
- Universal 85-305 VAC Input
- UL Approved
- 3,000 VAC I/O Isolation
- -40°C to 70°C Temp Range
- Industry Standard Pin-Out
- Meets EN 55032 Class B
- >300 kHour MTBF
- Chassis Mount Available
- DIN Rail Mount Available
- ***Low Cost***

### Electrical Specifications

Specifications typical @ +25°C, 230 VAC input voltage & rated output current, unless otherwise noted. Specifications subject to change without notice.

**Input**

| Parameter | Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|
| Input Voltage Range | | 85 | | 305 | VAC |
| | | 100 | | 430 | VDC |
| Input Frequency | | 47 | | 63 | Hz |
| Input Current | See Model Selection Guide | | | | |
| Leakage Current | 230VAC/ 50 Hz | | 0.3 | | mA rms |
| Inrush Current | 115 VAC | | 10.0 | | A Pk |
| | 230 VAC | | 15.0 | | |

**Output**

| Parameter | Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|
| Output Voltage | See Model Selection Guide | | | | |
| Output Current | See Model Selection Guide | | | | |
| Minimum Load | See Note 1 | 0 | | | % |
| Output Voltage Accuracy | | | ±2.0 | | % |
| Line Regulation | See Note 2 | | ±0.5 | | % |
| Load Regulation | $I_{OUT}$ = 0% to 100% | | ±1.0 | | % |
| Ripple & Noise (20 MHz) | See Note 3 | | 50 | 100 | mV Pk - Pk |
| Hold-Up Time | 115 VAC | | 15 | | mSec |
| | 230 VAC | | 80 | | |
| Temperature Coefficient | | | ±0.02 | | %/°C |
| Overload Protection | Autorecovery | 110 | | | %$I_{OUT}$ |
| Short Circuit Protection, See Note 4 | Continuous (Autorecovery) | | | | |

**General**

| Parameter | Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|
| Isolation Voltage, See Note 5 | Input to Output | 3,000 | | | VAC |
| | Input to PE | 2,000 | | | |
| Switching Frequency | | | 100 | | kHz |

**Environmental**

| Parameter | Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|
| Operating Temperature Range | Ambient | -40 | +25 | +70 | °C |
| Storage Temperature Range | | -40 | | +105 | °C |
| Lead Temperature, See Note 6 | Wave Solder | | | 260 | °C |
| | Hand Solder | | | 360 | |
| Cooling | Free Air Convection (See Derating Curve) | | | | |
| Humidity | RH, Non-condensing | | | 95 | % |

**Physical**

| | |
|---|---|
| Case Size | See Mechanical Diagrams (Page 4, 5) |
| Case Material | Non-Conductive Black Plastic (UL94-V0) |
| Weight | See Mechanical Diagrams (Page 4, 5) |

**Reliability Specifications**

| Parameter | Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|
| MTBF | MIL HDBK 217F, 25°C, Gnd Benign | 300 | | | kHours |
| Safety Standards | UL/cUL 60950 recognition (UL certificate) | | | | |
| Safety Class | Class I | | | | |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## Model Selection Guide



| Model Number | Input | | Output | | | Over Voltage Protection (VDC) | Capacitive Load (µF, Max) | Efficiency (230 VAC, %, Typ) | Fuse Rating Slow-Blow |
|---|---|---|---|---|---|---|---|---|---|
| | Current (A) | | Voltage (VDC) | Current (A Max) | Power (W) | | | | |
| | 115 VAC | 230 VAC | | | | | | | |
| MPM-10SV-03 | 0.26 | 0.16 | 3.3 | 2.000 | 6.6 | 7.50 | 26,000 | 70 | 2.0A/300V |
| MPM-10SV-05 | 0.26 | 0.16 | 5.0 | 2.000 | 10.0 | 7.50 | 9,400 | 76 | 2.0A/300V |
| MPM-10SV-09 | 0.26 | 0.16 | 9.0 | 1.100 | 10.0 | 12.0 | 3,600 | 78 | 2.0A/300V |
| MPM-10SV-12 | 0.26 | 0.16 | 12.0 | 0.900 | 10.0 | 20.0 | 2,400 | 80 | 2.0A/300V |
| MPM-10SV-15 | 0.26 | 0.16 | 15.0 | 0.700 | 10.0 | 20.0 | 1,200 | 81 | 2.0A/300V |
| MPM-10SV-24 | 0.26 | 0.16 | 24.0 | 0.450 | 10.0 | 30.0 | 370 | 82 | 2.0A/300V |

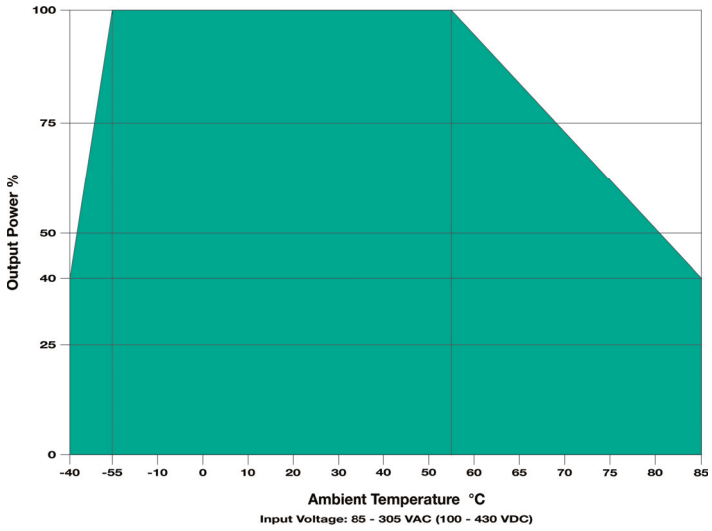
**Notes:**

1. Operation at no load will not damage the units, however, they may not meet all specifications.
2. Line regulation is measured with the unit at full load while the input is varied from 85 VAC to 305 VAC.
3. When measuring output ripple, it is recommended that an external 0.1 µF high frequency ceramic capacitor be placed in parallel with a 47 µF high frequency electrolytic capacitor from the +VOUT pin to the -VOUT pin.
4. Output short circuit protection is provided by a "hiccup mode" circuit. The unit recovers automatically when the fault condition is removed.
5. Input-output isolation is tested for 60 sec with a leakage current of <5 mA.
6. Lead temperature for wave soldering is specified for 5 to 10 seconds with a tolerance of ±5°C. For manual soldering it is specified for 3 to 5 seconds with a tolerance of ±10°C.
7. It is recommended that a fuse be used on the input of a power supply for protection. For the **MPM-10SV** series, a 2.0A/300 VAC slow blow should be used.

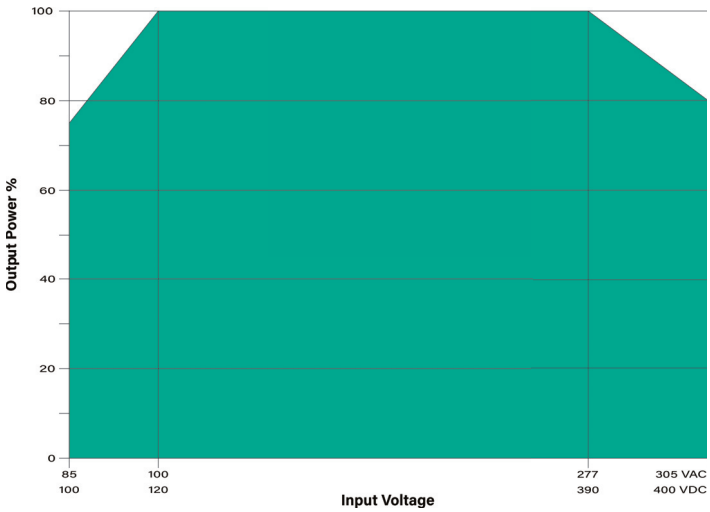
For the A2S adapter board option, add the suffix "-A2S" to the model number (i.e. **MPM-10SV-15-A2S**) See Page 4

For the A4S adapter board option, add the suffix "-A4S" to the model number (i.e. **MPM-10SV-24-A4S**) See Page 5

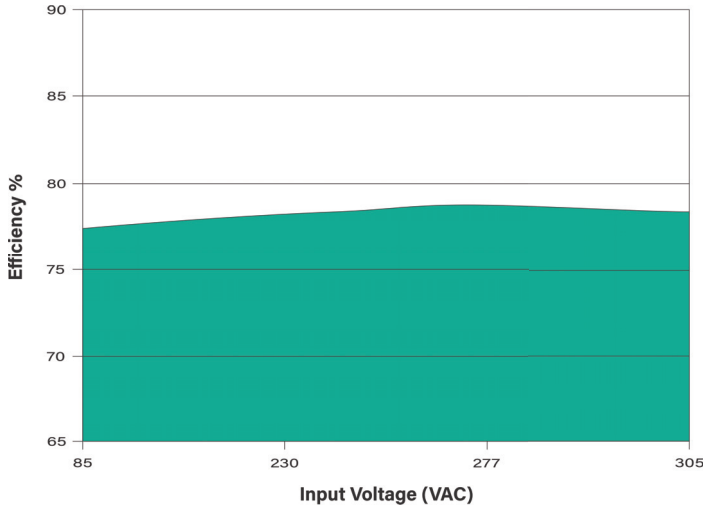
## Temperature Derating



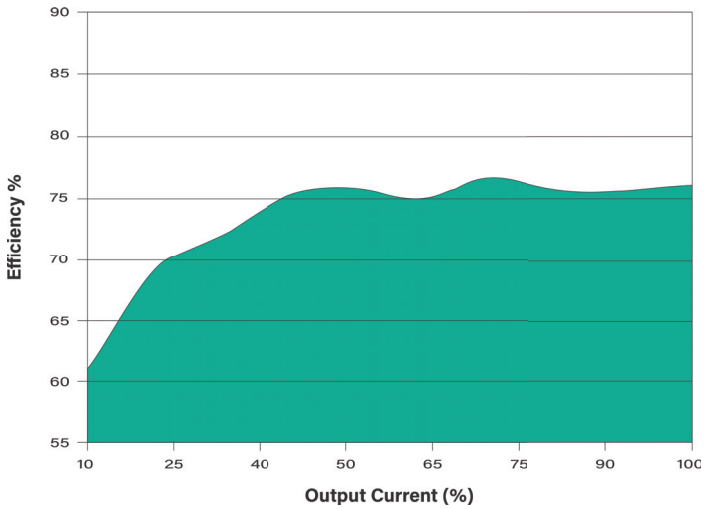

## Input Voltage Derating: -25°C to +70°C




## Efficiency vs Input Voltage: 5 VOUT Models

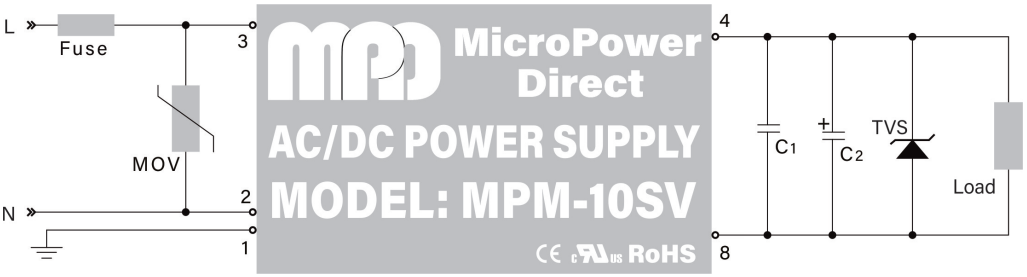



## Efficiency vs Output Load: 5 VOUT Models



## Simple Connection

The diagram at right illustrates a typical application connection of the **MPM-10SV** series. Notes on this circuit (starting with the input circuit) are:




1. It is recommended that an external fuse be used. The suggested fuse is a 2.0A/300 VAC slow blow.
2. All units are rated for EN 55032 (CE/RE) class B without external components.
3. The MOV connected across the input protects the unit from possible line surges.
4. If output noise levels lower than the specified limits are required, the addition of $C_1$ and $C_2$ should be sufficient for most applications. The recommended values are shown in the table at right. The output filtering capacitor $C_2$ is a high frequency, low resistance electrolytic capacitor. Capacitor $C_1$ is ceramic. Voltage derating of capacitors should be 80% or above.
5. The TVS is added to protect circuits being powered from damage if the module fails.

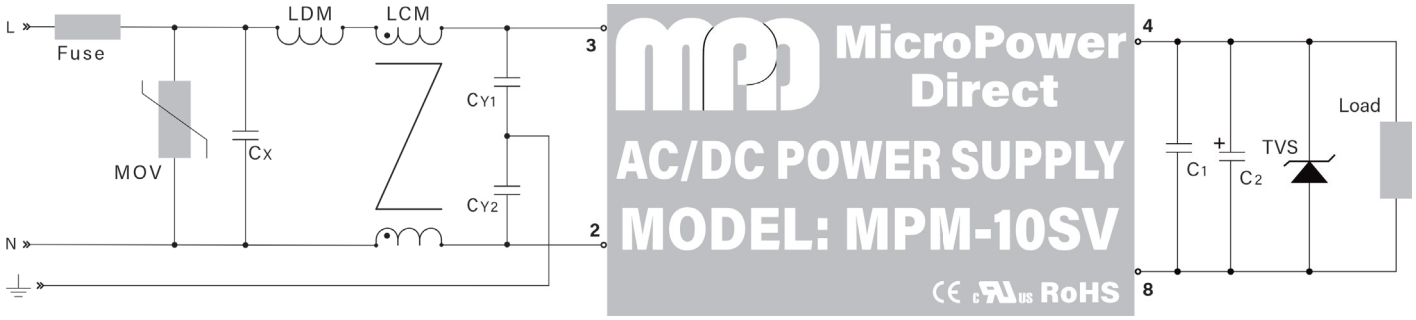
| Model | MOV | $C_1$ | $C_2$ | TVS |
|---|---|---|---|---|
| **MPM-10SV-03** | S14K350 | 1.0 µF/50V | 470 µF/16V | SMBJ7.0A |
| **MPM-10SV-05** | | | 330 µF/16V | SMBJ7.0A |
| **MPM-10SV-09** | | | 120 µF/25V | SMBJ12A |
| **MPM-10SV-12** | | | 120 µF/25V | SMBJ20A |
| **MPM-10SV-15** | | | 120 µF/25V | SMBJ20A |
| **MPM-10SV-24** | | | 68 µF/35V | SMBJ30A |

## EMI Characteristics

| Parameter | Conditions | Criteria | Level |
|---|---|---|---|
| Radiated Emissions | EN 55032 | | Class B |
| Conducted Emissions | EN 55032 | | Class B |
| ESD | EN 61000-4-2 | B | ±8 kV Air |
| | | | ±6 kV Contact |
| RS | EN 61000-4-3 | A | 10V/m |
| EFT, See Note 1 At Right | EN 61000-4-4 | B | ±2 kV |
| | | | ±4 kV |
| Surge, See Note 2 At Right | EN 61000-4-5 | B | ±1 kV Line to Line |
| | | | ±2 kV Line to Grnd |
| Surge, See Note 3 At Right | EN 61000-4-5 | B | ±2 kV Line to Line |
| | | B | ±4 kV Line to Grnd |
| CS | EN 61000-4-6 | A | 10V rms |
| PFM | EN 61000-4-8 | A | 10 A/m |
| Voltage Dips, Short, Interruptions | EN 61000-4-11 | B | 0% - 70% |

**Notes:**
1. To meet the requirements of EN 61000-4-4 (±2 kV), use the "Simple Connection" as shown above. To meet EN 61000-4-4 (±4 kV) use the "Typical Connection" as shown below. Contact the factory for more information.
2. To meet the requirements of EN 61000-4-5 (±1 kV line to line, ±2 kV line to Grnd), use the "Simple Connection" as shown above. Contact the factory for more information.
3. To meet the requirements of EN 61000-4-5 (±2 kV line to line, ±4 kV line to Grnd), use the "Typical Connection" as shown below. Contact the factory for more information.

## Typical Connection: With Input Protection/Filtering Components

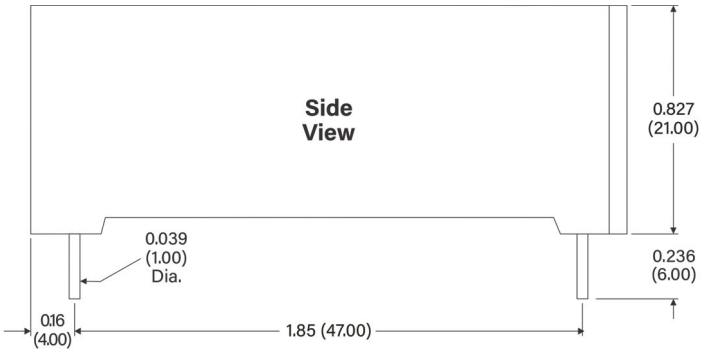


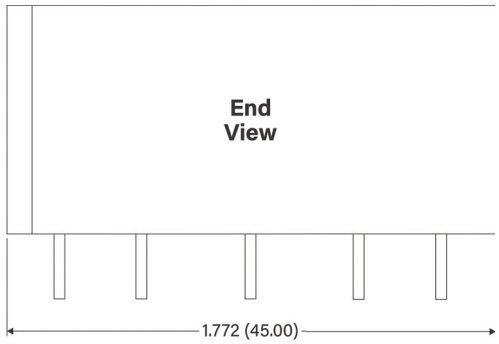

The diagram above illustrates a typical connection of the **MPM-10SV** series. The input components are required to meet the more stringent EFT/Surge levels of EN 61000-4 (see notes for EMC Characteristics table above). Some notes on these components are:
1. It's recommended that an external fuse be used. The suggested fuse size is a 2.0A/300 VAC slow blow.
2. All units are rated for EN 61000-4-4 (±2 kV) with the addition of the MOV shown in both connection diagrams above. They will meet EN 61000-4-4 (±4 kV) with the additional input components shown in the Typical Connection diagram shown above. All component values are given in the table at right.
3. All units are rated for EN 61000-4-5 (±1 kV LL/ ±2 kV LG) with the addition of the MOV shown in both connection diagrams above. They will meet EN 61000-4-5 (±2 kV LL/±4 kV LG) with the additional input components shown in the Typical Connection diagram shown above. All component values are given in the table at right.
4. The output filtering capacitors ($C_1$ & $C_2$) and TVS are discussed in the notes for the simple connection diagram at the top of the page. Recommended values are given in the table with that diagram.
5. Suggested component values are:

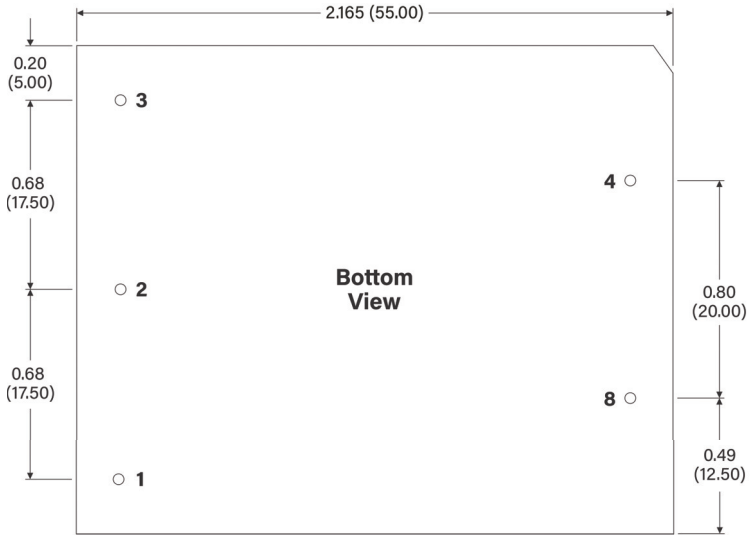
| Component | 3.3 VOUT | 5.0 VOUT | 9.0 VOUT | 12 VOUT | 15 VOUT | 24 VOUT |
|---|---|---|---|---|---|---|
| Fuse | 2.0A/300 VAC | | | | | |
| MOV | S14K350 | | | | | |
| $C_X$ | 0.1 µF/310 VAC | | | | | |
| LDM | 4.7 µH/2A | | | | | |
| LCM | 10 mH | | | | | |
| $C_{Y1}$ | 1000 pF/400 VAC | | | | | |
| $C_{Y2}$ | 1000 pF/400 VAC | | | | | |

6. Input protection and filtering modules are available for a number of **MPD** AC/DC power supplies. For pricing or full technical information please contact the factory.

## Mechanical Dimensions



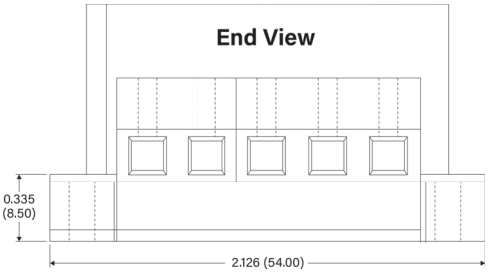



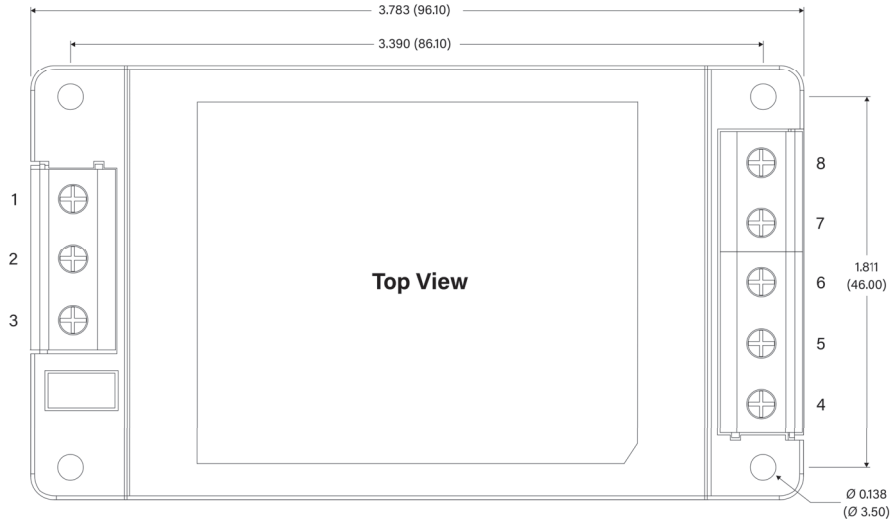

## Pin Connections

| Pin | Function |
|---|---|
| 1 | AC-Ground |
| 2 | AC-Neutral |
| 3 | AC-Line |
| 4 | +Vout |
| 8 | -Vout |

**Notes:**
- All dimensions are typical in inches (mm)
- General Tolerance = ±0.02 (±0.50)
- Pin Tolerance = ±0.004 (±0.10)
- Recommended pin hole size (on the application PC Board) is Ø 0.059 (Ø1.50)
- Weight (Typ) = 2.64 Oz (75g)

## Mechanical Dimensions: A2S Chassis Mount Adapter


## Pin Connections

| Pin | Function |
|---|---|
| 1 | AC-Ground |
| 2 | AC-Neutral |
| 3 | AC-Line |
| 4 | +Vout |
| 5 | No Connection |
| 6 | No Connection |
| 7 | No Connection |
| 8 | -Vout |

**Notes:**
- All dimensions are typical in inches (mm)
- General Tolerance x.xx = ±0.039 (±1.00)
- Weight (Typ) = 4.40 Oz (125g)
- Wire Range: 24 - 12 AWG
- Tightening Torque: Max 0.4 N·m

## Mechanical Dimensions: A4S DIN Rail Mount Adapter

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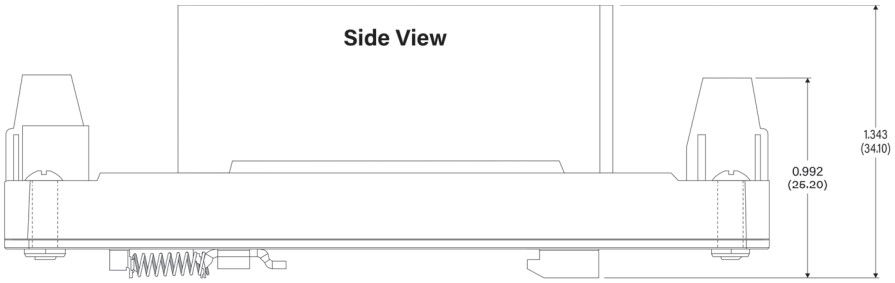


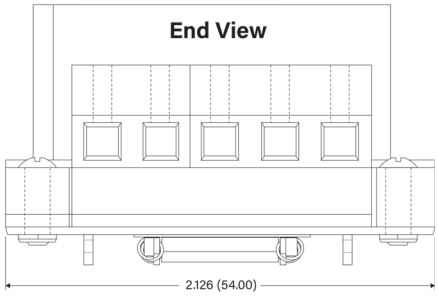



## Pin Connections

| Pin | Function |
|---|---|
| 1 | AC-Ground |
| 2 | AC-Neutral |
| 3 | AC-Line |
| 4 | +VOUT |
| 5 | No Connection |
| 6 | No Connection |
| 7 | No Connection |
| 8 | -VOUT |

**Notes:**

- All dimensions are typical in inches (mm)
- General Tolerance x.xx = ±0.039 (±1.00)
- Weight (Typ) = 5.82 Oz (165g)
- Wire Range: 24 - 12 AWG
- Tightening Torque: Max 0.4 N·m
- Mounting Rail: TS 35 Rail must be connected to safety ground

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**MPD** offers a very wide range of high performance AC/DC power supplies ranging from 600W UChannel units to 1W units in miniature Single-In-Line (SIP) packages. All are designed and certified to international safety and EMC/EMI standards.
We also offer AC/DC supplies approved for use in medical equipment, DIN rail supplies, "Green" energy supplies and constant power supplies.
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