


SERIES: AE40-EW-T | **DESCRIPTION:** DC-DC CONVERTER

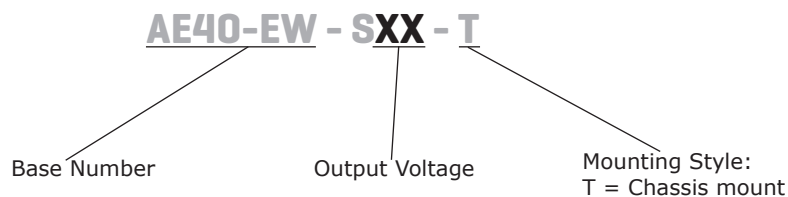
FEATURES

- 40 watts
- -25 to +70°C operating temp
- 4,000 Vdc isolation
- extra wide input voltage 6:1
- input voltage from 200~1,200 Vdc
- OVP protection
- output short circuit protection
- chassis mounted


MODEL

| MODEL | input voltage range (Vdc) | output voltage (Vdc) | output current | | output power max (W) | ripple & noise ¹ max (mVp-p) | efficiency ² typ (%) |
|---------------|---------------------------|----------------------|----------------|---------|----------------------|---|---------------------------------|
| | | | min (A) | max (A) | | | |
| AE40-EW-S12-T | 200~1200 | 12 | 0 | 3.33 | 40 | 200 | 83 |
| AE40-EW-S15-T | 200~1200 | 15 | 0 | 2.67 | 40 | 200 | 84 |
| AE40-EW-S24-T | 200~1200 | 24 | 0 | 1.67 | 40 | 200 | 84 |

Notes: 1. Measured at nominal input, 20 MHz bandwidth oscilloscope, with 10 μ F electrolytic and 1 μ F ceramic capacitors on the output.
 2. Measured at 200 Vdc input voltage, full load.
 3. All specifications are measured at Ta=25°C, humidity < 75%, nominal input voltage, and rated output load unless otherwise specified.

PART NUMBER KEY


INPUT

| parameter | conditions/description | min | typ | max | units |
|-------------------------|-----------------------------|-----|-----|------|-------|
| operating input voltage | | 200 | | 1200 | Vdc |
| under voltage shutdown | shut-down range | 175 | | 185 | Vdc |
| | turn-on range | 185 | | 195 | Vdc |
| current | at 200 Vdc | | | 320 | mA |
| | at 600 Vdc | | | 100 | mA |
| | at 1200 Vdc | | | 55 | mA |
| inrush current | at 600 Vdc | | 60 | | A |
| input fuse | 3.5 A / 1500 Vdc (external) | | | | |

OUTPUT

| parameter | conditions/description | min | typ | max | units |
|-------------------------|---|-----|-------|-------|-------|
| maximum capacitive load | 12 Vdc output model | | | 1,200 | μF |
| | 15 Vdc output model | | | 1,000 | μF |
| | 24 Vdc output model | | | 680 | μF |
| voltage accuracy | | | ±1 | ±2 | % |
| line regulation | from low line to high line, full load | | ±0.5 | ±1 | % |
| load regulation | from 0% to full load | | ±0.5 | ±1 | % |
| delay time | from Vin = 0 V to 90% of rated output voltage | | | 1 | s |
| switching frequency | | | 65 | | kHz |
| temperature coefficient | at full load | | ±0.02 | | %/°C |

PROTECTIONS

| parameter | conditions/description | min | typ | max | units |
|--------------------------|--------------------------------|-----|-----|-----|-------|
| over voltage protection | 12 Vdc, 15 Vdc output models | | | 20 | Vdc |
| | 24 Vdc output model | | | 30 | Vdc |
| over current protection | automatic recovery | 110 | | | % |
| short circuit protection | continuous, automatic recovery | | | | |

SAFETY AND COMPLIANCE

| parameter | conditions/description | min | typ | max | units |
|------------------------------|---|---------|-----|-----|-------|
| isolation voltage | input to output for 1 minute | 4,000 | | | Vdc |
| conducted emissions | CISPR22/EN55022, class A (external circuit required, see Figure 2) | | | | |
| radiated emissions | CISPR22/EN55022, class A (external circuit required, see Figure 2) | | | | |
| ESD | IEC/EN61000-4-2, contact ± 6kV/air ± 8kV, class B | | | | |
| radiated immunity | IEC/EN61000-4-3, 10V/m, class A | | | | |
| EFT/burst | IEC/EN61000-4-4, ± 4kV, class B (external circuit required, see Figure 2) | | | | |
| surge | IEC/EN61000-4-5, ± 2kV, class B (external circuit required, see Figure 2) | | | | |
| conducted immunity | IEC/EN61000-4-6, 10 Vr.m.s, class A | | | | |
| magnetic field immunity | IEC/EN61000-4-8, 10 A/m, class A | | | | |
| voltage dips & interruptions | IEC/EN61000-4-11, 0%-70%, class B | | | | |
| MTBF | as per MIL-HDBK-217F, 25°C | 300,000 | | | hours |
| RoHS | 2011/65/EU | | | | |

ENVIRONMENTAL

| parameter | conditions/description | min | typ | max | units |
|-----------------------|------------------------|-----|-----|------|-------|
| operating temperature | see derating curves | -25 | | 70 | °C |
| storage temperature | | -25 | | 85 | °C |
| storage humidity | non-condensing | | | 95 | % |
| altitude | | | | 2000 | m |

MECHANICAL

| parameter | conditions/description | min | typ | max | units |
|---------------|---|-----|-----|-----|-------|
| dimensions | 135.00 x 70.00 x 33.50 [5.315 x 2.756 x 1.319 inch] | | | | mm |
| case material | black flame-retardant heat-proof plastic (UL94V-0) | | | | |
| weight | | | 295 | | g |

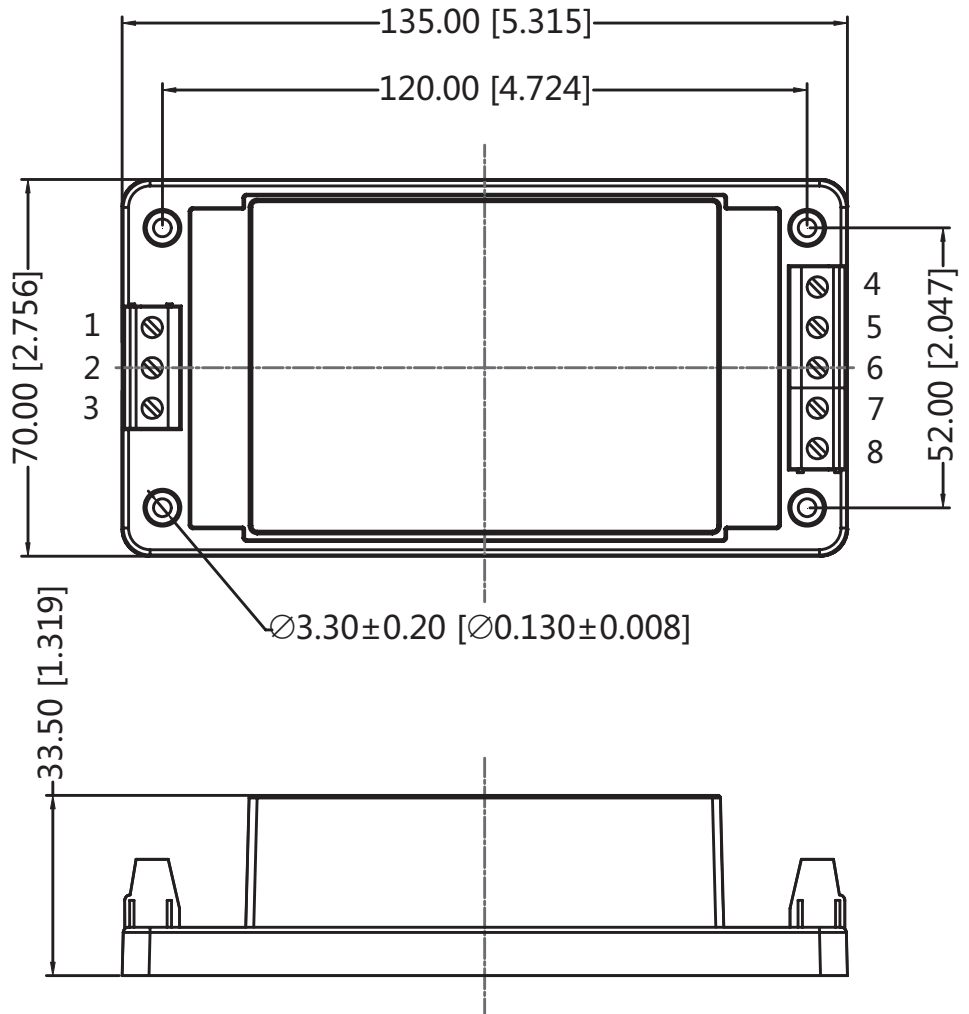
MECHANICAL DRAWING

units: mm [inch]
tolerance: ±1.00[±0.040]

wire range: 24~12 AWG
tightening torque: max 0.4 N*m

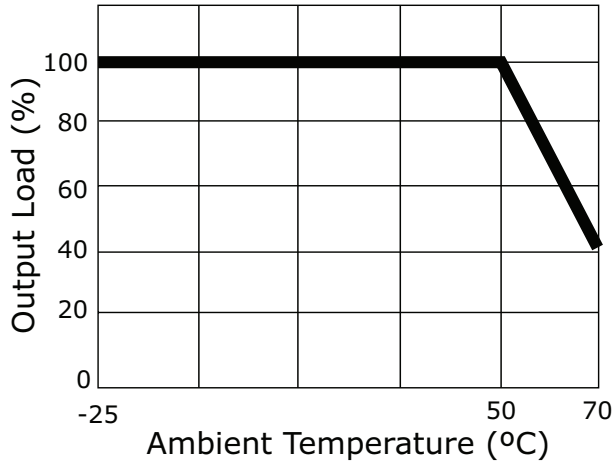
| PIN CONNECTIONS | |
|-----------------|----------|
| PIN | Function |
| 1 | -Vin |
| 2 | NC |
| 3 | +Vin |
| 4 | +Vout |
| 5 | NC |
| 6 | -Vout |
| 7 | NC |
| 8 | NC |

NC=no connection

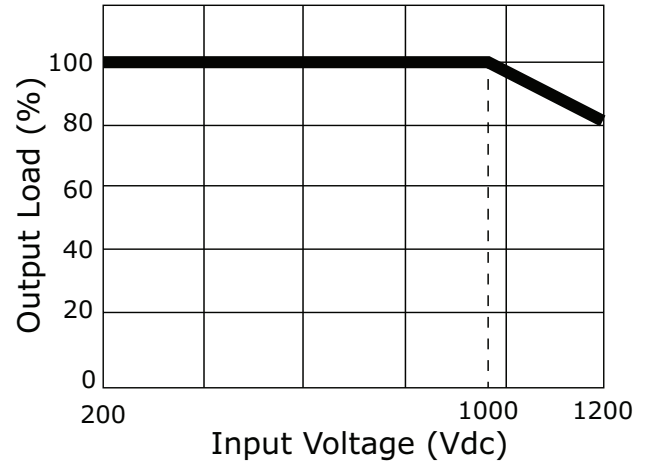


DERATING CURVES

Temperature Derating Curve
(200~1000 Vdc input voltage)

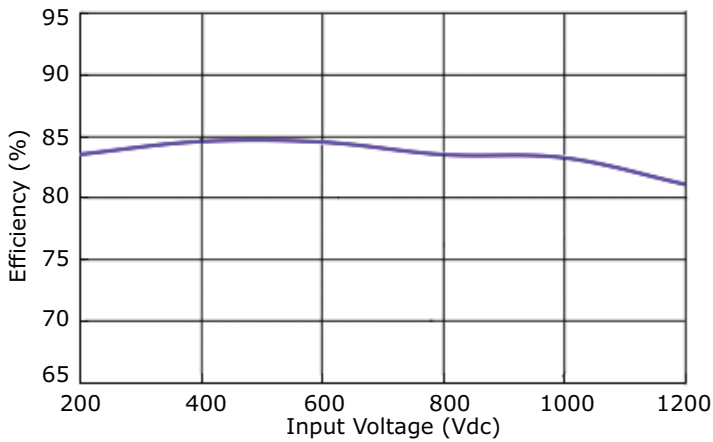


Load vs. Input Voltage Derating Curve
(at 25°C)

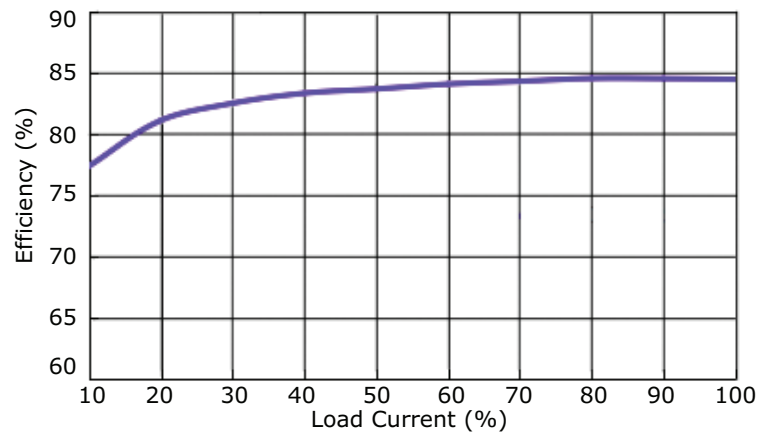


EFFICIENCY CURVES

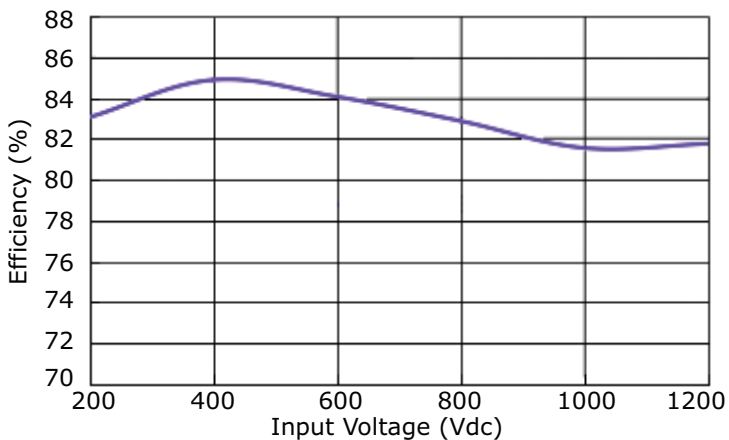
AE40-EW-S12-T Efficiency Curve
Efficiency vs. Input Voltage



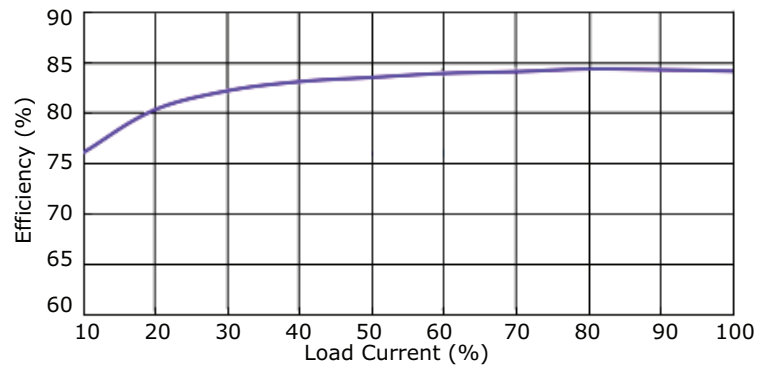
AE40-EW-S12-T Efficiency Curve
Efficiency vs. Load Current



AE40-EW-S15-T Efficiency Curve
Efficiency vs. Input Voltage

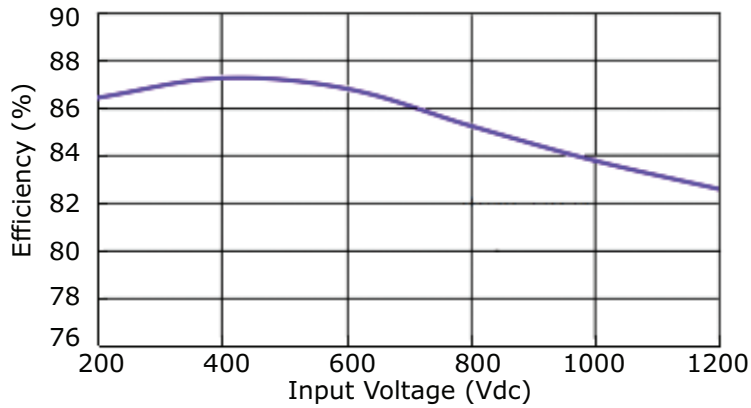


AE40-EW-S15-T Efficiency Curve
Efficiency vs. Load Current

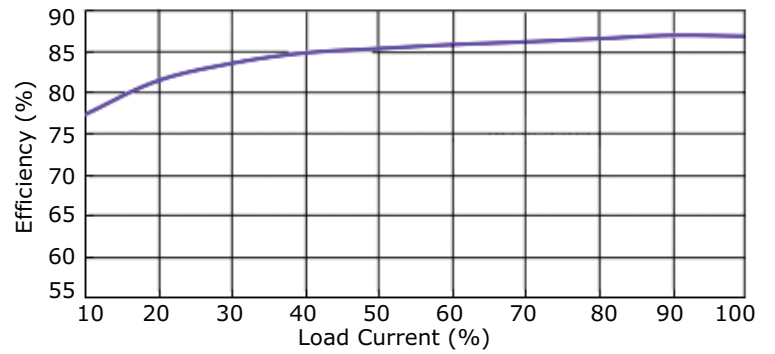


EFFICIENCY CURVES (CONTINUED)

AE40-EW-S24-T Efficiency Curve
Efficiency vs. Input Voltage



AE40-EW-S24-T Efficiency Curve
Efficiency vs. Load Current



APPLICATION CIRCUIT

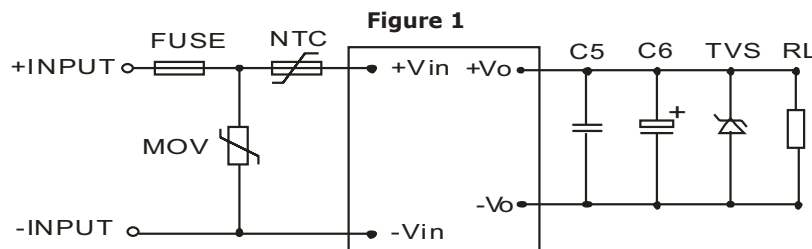


Table 1

| Vout (Vdc) | Fuse | MOV | NTC | C5 (μF) | C6 (μF) | TVS |
|------------|------------------|----------|--------|---------|---------|---------|
| 12 | 3.5 A / 1500 Vdc | S20K1000 | 10D-20 | 1 | 220 | SMBJ20A |
| 15 | 3.5 A / 1500 Vdc | S20K1000 | 10D-20 | 1 | 220 | SMBJ20A |
| 24 | 3.5 A / 1500 Vdc | S20K1000 | 10D-20 | 1 | 120 | SMBJ30A |

EMC RECOMMENDED CIRCUIT

Figure 2

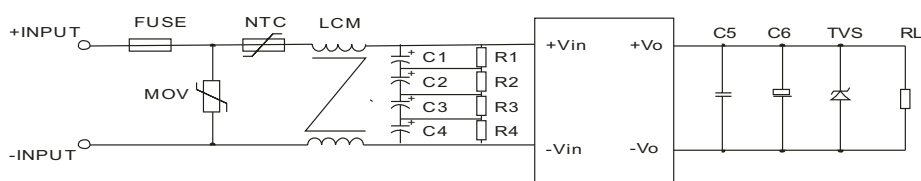


Table 2

| Recommended External Circuit Components | |
|---|------------------|
| FUSE | 3.5 A / 1500 Vdc |
| MOV | S20K1000 |
| NTC | 10D-20 |
| LCM | 10 mH |
| C1, C2, C3, C4 | 47 μF/450 V |
| R1, R2, R3, R4 | 1 MΩ/2 W |

Note: See also Table 1.

- Notes:
1. C5 is a ceramic capacitor used to filter high frequency noise.
 2. C6 is electrolytic and is recommended to be high frequency and low resistance. For capacitance and current of the capacitor, refer to the datasheet provided by the manufacturer. Capacitance withstand voltage derating should be 80% or above.

REVISION HISTORY

| rev. | description | date |
|------|-----------------|------------|
| 1.0 | initial release | 12/19/2017 |

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

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