

2500 HN series



www.martekpower.com

Single Output DC/DC Converter



DESCRIPTIONS

The 2500HN, single output power modules are 16 to 25 watt DC/DC converters available in a single output configuration providing 3.3 VDC to 15 VDC outputs in a compact, industry standard 2.0" X 1.6" X 0.4" package. These 400kHz, switching converters are available in 12, 24 and 48 VDC inputs making them one of the most versatile product lines in the market with efficiencies up to 87%. Advanced surface mount construction allows these converters to achieve outstanding thermal performance eliminating the need for thermal potting compounds and thereby enhancing manufacturing efficiency to reduce costs.

OUTPUT CHARACTERISTICS

| | Min | Typ | Max | Unit/Comments |
|----------------------------|-----|-------|-----|---|
| Output Voltage Set Point | | ±1 | | % Output voltage at nominal line & FL |
| Total Band Error | -2 | | +2 | % Output voltage including line/load regulation setting |
| Line Regulation | | ±0.5 | | % Output voltage measured from min. input line to maximum |
| Load Regulation | | ±0.5 | | % Output voltage measured from FL to 10% load |
| Temperature Coefficient | | ±0.01 | | % per degree C |
| Ripple/Noise | | 60 | 100 | mV p-p measured at 20 MHz bandwidth with ext. 1 µf cap. |
| Output Voltage and Current | | | | Refer to model selection chart |
| Load Transient Response | | ±2 | | % Deviation of Vout voltage for a 25% load change for 200µs |
| Short Circuit Protection | | | | Indefinite, Automatic Recovery |
| Output Voltage Trim Range | | ±10 | | % Output voltage. Place ext. resistor between pins 8 - 6 to trim down. Between pins 8 - 7 to trim up. |
| Overvoltage Protection | | 125 | | %; Clamp type (5VDC output set at 6.8VDC) |

FEATURES

- Up to 87% Efficiency
- Single Output, 25 watt converter
- Available in 12, 24 and 48 VDC Inputs
- Industry Standard 2" X 1.6" X 0.4" Package
- Output Over Voltage, Input Over Voltage & Short Circuit Protection

INPUT CHARACTERISTICS

| | Min | Typ | Max | Units/Comments |
|----------------------------|------|-----|------|--------------------------------------|
| Input Voltage | | | | |
| 12 VDC Input Models | 9 | 12 | 18 | VDC |
| 24 VDC Input Models | 18 | 24 | 36 | VDC |
| 48 VDC Input Models | 36 | 48 | 75 | VDC |
| Under Voltage Shutdown | | | | |
| 12 VDC Input Models | | 8 | | VDC |
| 24 VDC Input Models | | 17 | | VDC |
| 48 VDC Input Models | | 33 | | VDC |
| Over Voltage Shutdown | | | | |
| 12 VDC Input Models | | 20 | | VDC |
| 24 VDC Input Models | | 40 | | VDC |
| 48 VDC Input Models | | 80 | | VDC |
| Full Load Input Current | | | | |
| 12 VDC Input Models | | | 2.1 | A |
| 24 VDC Input Models | | | 1.26 | A |
| 48 VDC Input Models | | | 0.62 | A |
| Input Fuse Requirements | | | | |
| 12 VDC Input Models | | | 7 | Amps; Slow blow type |
| 24 VDC Input Models | | | 4 | Amps; Slow blow type |
| 48 VDC Input Models | | | 2 | Amps; Slow blow type |
| Efficiency by Model | | | | |
| 2503S12HN | | 78 | | %; FL Nominal Line |
| 2505S12HN | | 80 | | %; FL Nominal Line |
| 2512S12HN | | 82 | | %; FL Nominal Line |
| 2515S12HN | | 84 | | %; FL Nominal Line |
| 2503S24HN | | 79 | | %; FL Nominal Line |
| 2505S24HN | | 83 | | %; FL Nominal Line |
| 2512S24HN | | 86 | | %; FL Nominal Line |
| 2515S24HN | | 87 | | %; FL Nominal Line |
| 2503S48HN | | 80 | | %; FL Nominal Line |
| 2505S48HN | | 84 | | %; FL Nominal Line |
| 2512S48HN | | 86 | | %; FL Nominal Line |
| 2515S48HN | | 87 | | %; FL Nominal Line |
| Switching Frequency | 360 | 400 | 440 | kHz; Factory set |
| Remote Shut Down | Off | 0 | 0.80 | VDC; Referenced to input (-) |
| | On | 3.5 | | VDC or open; Referenced to input (-) |
| Input - Output Capacitance | | | 1000 | pF |
| Input Filter | | | | LC type |
| Isolation Voltage | 1500 | | | VDC |
| Isolation Resistance | 100 | | | MOhms |

Martek Power reserves the right to change specifications without notice.

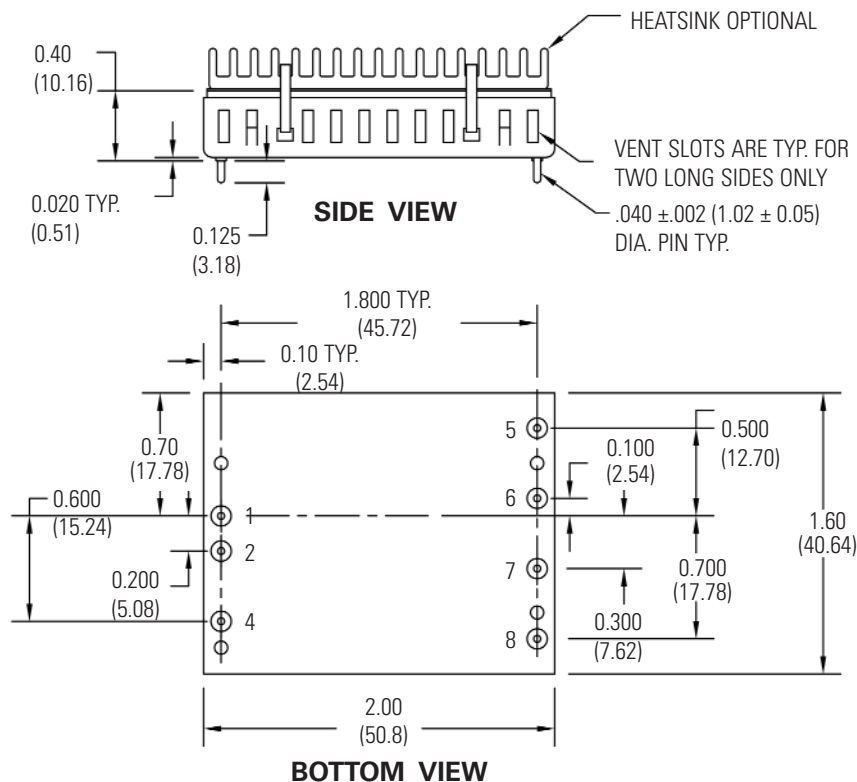
MODEL SELECTION CHART

| | Input Voltage (VDC) | Output Voltage (VDC) | Full Load Output Current (A) |
|-----------|---------------------|----------------------|------------------------------|
| 2503S12HN | 12 | 3.3 | 5.0 |
| 2505S12HN | 12 | 5.0 | 4.0 |
| 2512S12HN | 12 | 12.0 | 1.7 |
| 2515S12HN | 12 | 15.0 | 1.33 |
| 2503S24HN | 24 | 3.3 | 6.0 |
| 2505S24HN | 24 | 5.0 | 5.0 |
| 2512S24HN | 24 | 12.0 | 2.0 |
| 2515S24HN | 24 | 15.0 | 1.66 |
| 2503S48HN | 48 | 3.3 | 6.0 |
| 2505S48HN | 48 | 5.0 | 5.0 |
| 2512S48HN | 48 | 12.0 | 2.0 |
| 2515S48HN | 48 | 15.0 | 1.66 |

GENERAL CHARACTERISTICS

| | Min | Typ | Max | Unit/Comments |
|-----------------------|-----|-----|--------|----------------------------|
| Operating Temp. Range | -40 | | +110 | °C; measured at baseplate |
| Storage Temp. Range | -55 | | +125 | °C; measured at baseplate |
| Material Flammability | | | | UL94V-0 |
| Altitude: Operating | | | 10,000 | Feet |
| Non-Operating | | | 40,000 | Feet |
| Relative Humidity | 5 | | 95 | % Humidity, non-condensing |
| Weight | | | 22 | Grams |
| Size | | | | 2" X1.6" X0.4" |
| Case Material | | | | Black coated aluminum |
| Agency Approvals | | | | UL/CUL1950, TUV, EN60950 |

OUTLINE DRAWING



PIN OUT CHART

| Pins | FUNCTION |
|------|----------|
| 1 | + INPUT |
| 2 | - INPUT |
| 4 | CONTROL |
| 5 | NO PIN |
| 6 | + OUTPUT |
| 7 | - OUTPUT |
| 8 | TRIM |

Notes:

- Unless otherwise specified dimensions are in inches (mm).
- Controlling dimension in inch.
- Tolerances

| | |
|----------------|--------------|
| Inches | mm |
| X.XX = ±0.02 | X.X = ±0.5 |
| X.XXX = ±0.010 | X.XX = ±0.25 |

All specifications are typical at nominal input, nominal load and 25° C unless otherwise specified.
 External, low ESR, 33 microfarad (minimum) capacitor across output is recommended for operation.

How To ORDER

HOW TO ORDER

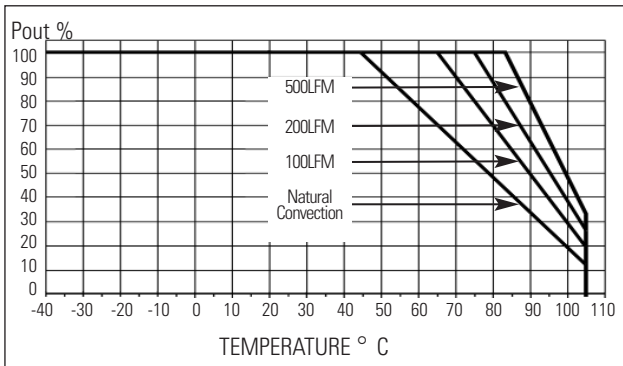
25 XX S XX HN - Y

Wattage ——— 25
 Output Voltage ——— XX
 Single Output ——— S
 Input Voltage ——— XX
 Hi-Density, Non-Encap ——— HN
 ROHS Compliant ——— Y

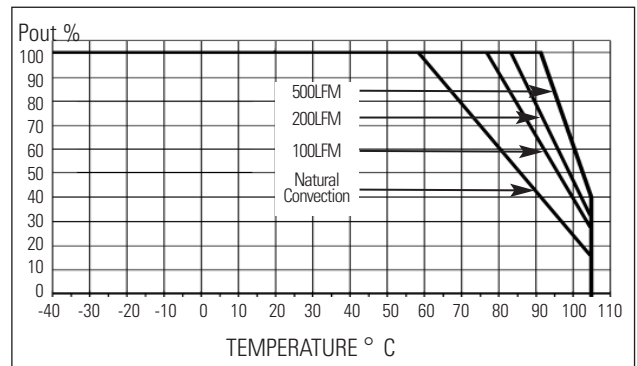
H Options: To add external heatsink mounted on the baseplate of the converter please add a “- H” at the end of the part number. Heatsink is provided to improve thermal performance (see derating curves).

DERATING CURVES

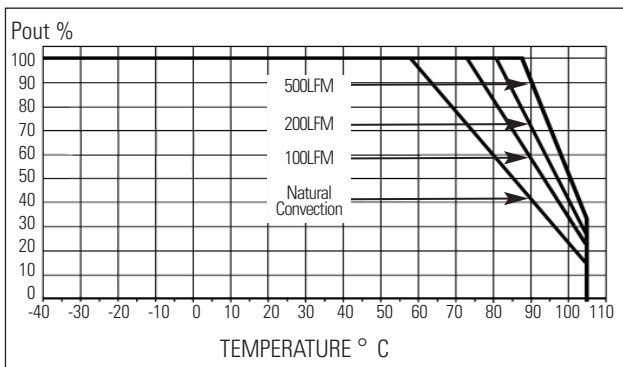
MODEL 2500HN Single 3.3V & 5V (Without heatsink)



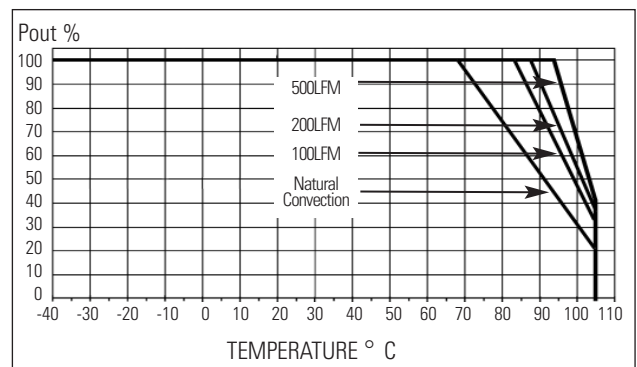
MODEL 2500HN Single 3.3V & 5V (With heatsink)



MODEL 2500HN Single 12V & 15V (Without heatsink)



MODEL 2500HN Single 12V & 15V (With heatsink)



OUTPUT VOLTAGE ADJUSTMENT (2500HN SINGLE SERIES)

The converter's output voltage may be trimmed by up to $\pm 5\%$ of the nominal output voltage.

TRIM UP

Trim output voltage up by connecting an external resistor between Pins 7 and 8. Use the following equation, reference Table 1 for variables A and B.

$$\text{Radj-up} = \frac{A}{\Delta \%} - B \text{ (k}\Omega\text{)}$$

Example:

Trim 5% up for 12V Output units,
where $A = 1.58$, $B = 20$, $\Delta \% = 0.05$

$$\text{Radj-up} = \frac{1.58}{0.05} - 20 = 11.6 \text{ k}\Omega$$

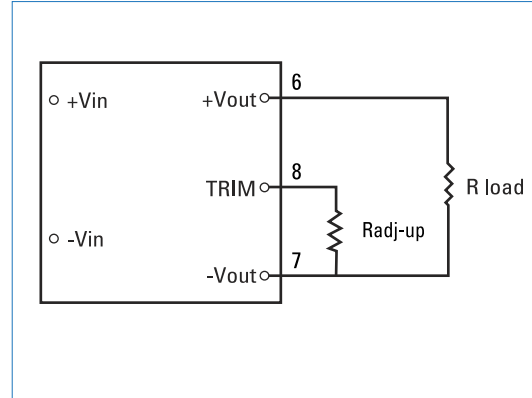


Table 1.

| Output Voltage | A | B |
|----------------|------|-----|
| 3.3V | 1.25 | 4.7 |
| 5V | 1.00 | 10 |
| 12V | 1.58 | 20 |
| 15V | 1.67 | 20 |

TRIM DOWN

Trim output voltage down by connecting an external resistor between Pins 6 and 8. Use the following equation, reference Table 2 for variables C and D.

$$\text{Radj-down} = \frac{C}{\Delta \%} - D \text{ (k}\Omega\text{)}$$

Example:

Trim 5% down for 15V Output units,
where $C = 8.33$, $D = 30$, $\Delta \% = 0.05$

$$\text{Radj-down} = \frac{8.33}{0.05} - 30 = 136.6 \text{ k}\Omega$$

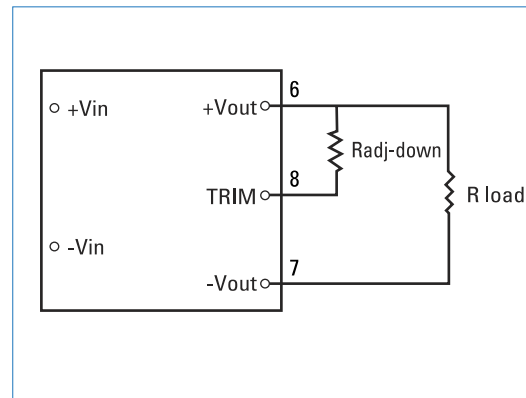


Table 2.

| Output Voltage | C | D |
|----------------|------|------|
| 3.3V | 2.07 | 8.02 |
| 5V | 1.00 | 12 |
| 12V | 6.09 | 27.7 |
| 15V | 8.33 | 30 |