



Polytron Power Supplies

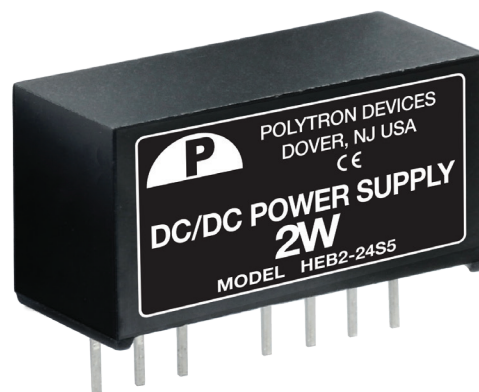
DABURN

DC-DC CONVERTERS

4:1 WIDE INPUT RANGE, UP TO 2 WATTS

INDUSTRIAL APPLICATIONS

HEB2 SERIES



FEATURES

- 4:1 Extra Wide Input Range
- Extra Wide Operating Temp. Range: -40 to +105°C
- 1600Vdc Isolation Voltage
- No Minimum Load Requirement
- High Efficiency Up to 82%
- Remote ON/OFF
- Short Circuit Protection
- Under Voltage Protection
- Meets IEC/UL/EN60950-1
- RoHS and REACH Compliant
- CE Marked

SELECTION GUIDE (SINGLE) All specifications are typical at nominal input, full load and 25°C, unless otherwise noted.

Input Voltage Range Vdc	Output Voltage Vdc	Output Current at Full Load mA	Input Current at No Load mA	Efficiency %	Model Number	Maximum Capacitor Load µF
4.5 - 18	3.3	500	30	75	HEB2-12S33	3300
4.5 - 18	5	400	30	80	HEB2-12S5	1680
4.5 - 18	9	222	35	81	HEB2-12S9	1000
4.5 - 18	12	167	35	81	HEB2-12S12	820
4.5 - 18	15	134	40	82	HEB2-12S15	680
4.5 - 18	24	83	40	82	HEB2-12S24	220
9 - 36	3.3	500	20	76	HEB2-24S33	3300
9 - 36	5	400	20	80	HEB2-24S5	1680
9 - 36	9	222	20	80	HEB2-24S9	1000
9 - 36	12	167	20	82	HEB2-24S12	820
9 - 36	15	134	20	82	HEB2-24S15	680
9 - 36	24	83	20	82	HEB2-24S24	220
18 - 75	3.3	500	10	74	HEB2-48S33	3300
18 - 75	5	400	10	79	HEB2-48S5	1680
18 - 75	9	222	10	81	HEB2-48S9	1000
18 - 75	12	167	10	82	HEB2-48S12	820
18 - 75	15	134	10	81	HEB2-48S15	680
18 - 75	24	83	10	81	HEB2-48S24	220

DABURN

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Ver 1.0

**SELECTION GUIDE (DUAL)** All specifications are typical at nominal input, full load and 25°C, unless otherwise noted.

Input Voltage Range Vdc	Output Voltage Vdc	Output Current at Full Load mA	Input Current at No Load mA	Efficiency %	Model Number	Maximum Capacitor Load μF
4.5 - 18	±5	±200	35	80	HEB2-12-5	±1000
4.5 - 18	±12	±83	40	82	HEB2-12-12	±470
4.5 - 18	±15	±67	45	81	HEB2-12-15	±330
9 - 36	±5	±200	20	79	HEB2-24-5	±1000
9 - 36	±12	±83	20	82	HEB2-24-12	±470
9 - 36	±15	±67	20	80	HEB2-24-15	±330
18 - 75	±5	±200	10	79	HEB2-48-5	±1000
18 - 75	±12	±83	10	81	HEB2-48-12	±470
18 - 75	±15	±67	10	81	HEB2-48-15	±330

Input Specifications			Output Specifications			
Operating input voltage range, Vdc	4.5 Min., 12 Typ., 18 Max.	12Vin(nom)	Voltage accuracy, %	±1		
	9 Min., 24 Typ., 36 Max.	24Vin(nom)				
	18 Min., 48 Typ., 75 Max.	48Vin(nom)	Line regulation, %	±0.2	Low Line to High Line at Full Load	
Start up voltage, Vdc	4.5 Max.	12Vin(nom)		Load regulation, %	±1	No Load to Full Load, Single
	9 Max.	24Vin(nom)	±1		No Load to Full Load, Dual	
	18 Max.	48Vin(nom)			±0.5	10% load to 90% load, Single
Shutdown voltage, Vdc	2 Min., 3 Typ., 4 Max.	12Vin(nom)	±0.8			10% load to 90% load, Dual
	6 Min., 7 Typ., 8 Max.	24Vin(nom)			Cross regulation, %	±5
	13 Min., 15 Typ., 17 Max.	48Vin(nom)	Ripple and noise, mVp-p			75 Typ.
Start up time, ms		Constant resistive load		Temperature coefficient, %/°C	±0.02	
	10 Typ., 20 Max.	Power up	Transient response recovery time, μs		500 Typ.	25% load step change
	10 Typ., 20 Max.	Remote ON/OFF		Over load protection, %	130 Min., 170 Typ., 230 Max.	% of lout rated; Hiccup mode
Input surge voltage, Vdc		1 second, Max.	Short circuit protection		Continuous, automatics recovery	
	25 Max.	12Vin(nom)				
	50 Max.	24Vin(nom)				
100 Max.	48Vin(nom)					
Input filter		Capacitor type				
Remote ON/OFF	Open or high impedance	DC-DC ON				
	2 Min., 3 Typ., 4 Max.	DC-DC OFF, Ctrl pin applied current via 1k Ω				
	2.5 Typ.	Remote off input current				

**General Specifications**

Isolation voltage, Vdc	1 minute	Input to Output	1600 Min.		
Isolation resistance, GΩ	500Vdc		1 Min.		
Isolation capacitance, pF					50 Max.
Switching frequency, kHz	Full load to minimum load		100 Min.		

Environmental Specifications

Operating ambient temperature, °C	With derating	-40 Min.	105 Max.
Maximum case temperature, °C			105 Max.
Storage Temperature Range, °C		-55 Min.	125 Max.
Thermal shock		MIL-STD-810F	
Vibration		MIL-STD-810F	
Relative humidity		5% to 95% RH	

Physical Specifications

Design meet safety standard	IEC/UL/EN60950-1
Case material	Non-conductive black plastic
Potting material	Silicone (UL94 V-0)
Weight	4.5g (0.16oz)
Dimensions	0.86" × 0.16" × 0.36" (21.84 × 4.06 × 9.14 mm)
MTBF	6.621×10 ⁶ hrs, MIL-HDBK-217F

EMC Specifications

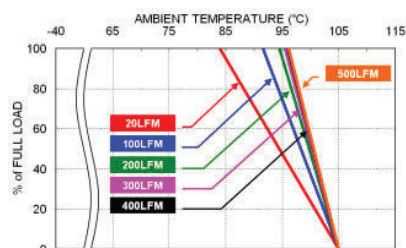
Specifications	Conditions	Level
EMI	EN55032 With external components	Class A, Class B
ESD	EN61000-4-2 Air ±8kV and Contact ±6kV	Perf. Criteria A
Radiated immunity	EN61000-4-3 10V/m	Perf. Criteria A
Fast transient ⁽¹⁾	EN61000-4-4 ±2kV	Perf. Criteria A
Surge ⁽¹⁾	EN61000-4-5 ±1kV	Perf. Criteria A
Conducted immunity	EN61000-4-6 10Vr.m.s	Perf. Criteria A
Power frequency magnetic field	EN61000-4-8 100A/m continuous; 1000A/m 1 second	Perf. Criteria A

Note:

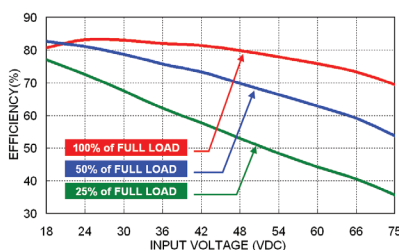
- For the HEB2 Series, it is recommended to use an external filter capacitor (Nippon chemi-con KY series, 220 µF/100 V). For further information, please contact Polytron Devices.

CAUTION: This power module is not internally fused. An input line fuse must always be used.

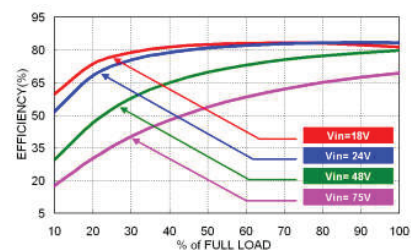
Characteristic Curve



Derating Curve



Efficiency vs. Input Voltage



Efficiency vs. Output Load

Fuse Consideration

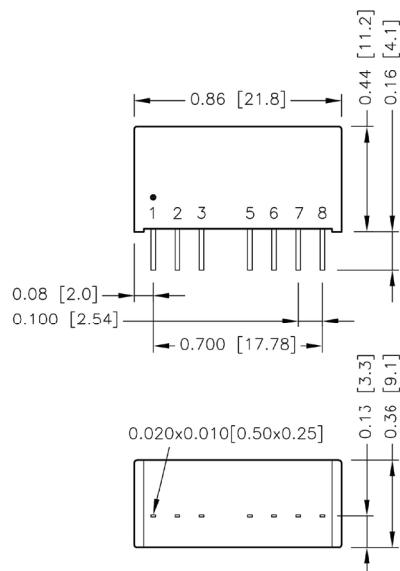
Model	Fuse Rating (A)	Fuse Type
HEB2-12SXX, HEB2-12-XX	1	Slow-Blow
HEB2-24SXX, HEB2-24-XX	0.5	Slow-Blow
HEB2-48SXX, HEB2-48-XX	0.315	Slow-Blow

This encapsulated power module can be used in a wide variety of applications, ranging from simple stand-alone operation to an integrated part of sophisticated power architecture.

For maximum flexibility, internal fusing is not included; however, to achieve maximum safety and system protection, always use an input line fuse.

CAUTION: This power module is not internally fused. An input line fuse must always be used.

Mechanical Drawing



BOTTOM VIEW

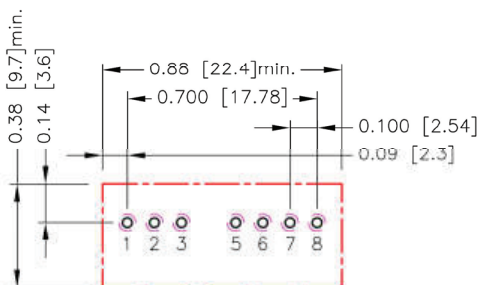
DIP PIN CONNECTION

PIN	SINGLE	DUAL
1	-Vin	-Vin
2	+Vin	+Vin
3	Ctrl	Ctrl
5	NC	NC
6	+Vout	+Vout
7	-Vout	Common
8	NC	-Vout

1. All dimensions in inches (mm)
2. Tolerance: $x.xx \pm 0.02$ ($x.xx \pm 0.5$)
 $x.xxx \pm 0.01$ ($x.xx \pm 0.25$)
3. Pin pitch tolerance ± 0.01 (0.25)
4. Pin dimension tolerance ± 0.004 (0.1)



Recommended Pad Layout



1. All dimensions in inches (mm)
2. Pad Size (lead free recommended)
3. Through hole 1, 2, 3, 5, 6, 7, 8: $\varnothing 0.03(0.8)$
4. Top view pad 1, 2, 3, 5, 6, 7, 8: $\varnothing 0.039(1)$
5. Bottom view pad 1, 2, 3, 5, 6, 7, 8: $\varnothing 0.063(1.6)$

Thermal Considerations

The power module operates in a variety of thermal environments.

However, sufficient cooling should be provided to help ensure reliable operation of the unit.

Heat is removed by conduction, convection and radiation to the surrounding Environment.

Proper cooling can be verified by measuring the point in the figure below.

The temperature at this location should not exceed "Maximum case temperature".

When Operating, adequate cooling must be provided to maintain the test point temperature at or below "Maximum case temperature".

You can limit this Temperature to a lower value for extremely high reliability.

Thermal test condition with vertical direction by natural convection (20LFM)

