FEATURES

- Efficiency up to 80%
- Low Leakage Current
- Single & Dual Outputs
- 5600VDC I/O Isolation
- Short Circuit Protection
- MTBF > 700,000 Hours
- Low Isolation Capacitance
- 2:1 Wide Input Voltage Range
- Operating Temperature: -40°C to +55°C
- Medical Safety Approval UL/cUL 60601-1
- All I/O Clearance and Creepage Distance 2.0mm min.
- Complies with EN55022 Class A with External Coupling Capacitor Cio=1nF < Class B

DESCRIPTION

The ME series of medical approved (UL/cUL 60601-1) dc/dc converters are specially designed to provide ultra high levels of isolation (5600VDC) in a 24-pin DIP package. These converters operate over input voltage ranges of 9-18VDC, 18-36VDC, and 36-75VDC. This series also provides regulated single and dual output voltages of 5, 12, ±12, and ±15VDC. The -40°C to +55°C operating temperature makes this series of dc/dc converters ideal for data communication equipment, mobile battery driven equipment, distributed power systems, process/machine control equipment, telecommunications equipment, mixed analog/digital subsystems, computer peripheral systems, and industrial robot systems. These converters have a power rating of 6W and a typical full load efficiency of 80%. This series complies with EN55022 Class A conducted noise and radiated emissions with an external coupling capacitor Cio=1nF < Class B. The EN55022 Class A conducted noise compliance minimizes design time, cost, and eliminates the need for external filter components. All models are over load and short circuit protected.

SPECIFICATIONS: *ME Series*

All specifications are based on 25°C, Nominal Input Voltage, and Maximum Output Current unless otherwise noted.
We reserve the right to change specifications based on technological advances.

SPECIFICATION	TEST CONDITIONS	Min	Nom	Max	Unit
INPUT (V_{in})					
Input Voltage Range	12V nominal input models	9	12	18	VDC
	24V nominal input models	18	24	36	
	48V nominal input models	36	48	75	
Start Voltage	12V nominal input models	7	8	9	VDC
	24V nominal input models	13	15	18	
	48V nominal input models	30	33	36	
Under Voltage Shutdown	12V nominal input models			8.5	VDC
	24V nominal input models			16	
	48V nominal input models			34	
Short Circuit Input Power	All models			3000	mW
Input Surge Voltage (1000ms)	12V nominal input models	-0.7		25	VDC
	24V nominal input models	-0.7		50	
	48V nominal input models	-0.7		100	
Input Filter			Pi Filter		
Leakage Current	240VAC, 60Hz			2	µA
OUTPUT (V_o)					
Output Voltage			See Table		
Output Voltage Accuracy			±0.5	±1.0	%
Output Voltage Balance	Dual Output, Balanced Loads		±0.5	±2.0	%
Load Regulation	Io = 25% to 100%		±0.5	±1.0	%
Line Regulation	Vin = min. to max.		±0.3	±0.5	%
Output Power			See Table		
Output Current Range			See Table		
Ripple & Noise (20MHz)	5V output models		75	100	mV_{pk-pk}
	Other output models		100	150	
Ripple & Noise (20MHz)	Over Line, Over Load, and Over Temperature			180	mV_{pk-pk}
Ripple & Noise (20MHz)				25	mVrms
Transient Recovery Time	25% load step change		300	500	µs
Transient Response Deviation	25% load step change		±3	±6	%
PROTECTION					
Over Load Protection		120			%
Short Circuit Protection			Continuous		
Input Fuse Recommendation	12V nominal input models		1200mA slow-blow type		
	24V nominal input models		600mA slow-blow type		
	48V nominal input models		300mA slow-blow type		
GENERAL					
Efficiency			See Table		
Switching Frequency			150		KHz
Isolation Voltage Rated	60 seconds	5600			VDC
Isolation Voltage Test	Flash Test for 1 second	6000			VDC
Isolation Resistance	500VDC	1000			MΩ
Isolation Capacitance	100KHz, 1V		7	13	pF
Internal Power Dissipation				2500	mW
Max. Capacitive Load			See Table		

SPECIFICATIONS (CONTINUED)

All specifications are based on 25°C, Nominal Input Voltage, and Maximum Output Current unless otherwise noted.
We reserve the right to change specifications based on technological advances.

SPECIFICATION	TEST CONDITIONS	Min	Nom	Max	Unit
ENVIRONMENTAL					
Operating Temperature (Ambient)	Ambient	-40		+55	°C
Operating Temperature (Case)	Case	-40		+95	°C
Storage Temperature		-40		+125	°C
Over Temperature Protection	Case Temperature, automatic	107	112	117	°C
Lead Temperature	1.5mm from case for 10 seconds			260	°C
Humidity				95	%
Cooling		Free air convection			
Temperature Coefficient			±0.02	±0.05	%/°C
MTBF	MIL-HDBK-217F @ 25°C, Ground Benign	700,000 hours			
Conducted EMI		EN55022 Class A			
PHYSICAL					
Weight		18 grams			
Dimensions (L x W x H)		1.25 x 0.8 x 0.47 inches 31.8 x 20.3 x 12.0 mm			
Case Material		non-conductive black plastic			
Flammability		UL94V-0			

MODEL SELECTION GUIDES

SINGLE OUTPUT MODELS

Model Number	Input Voltage	Output Voltage	Output Current		Input Current		Reflected Ripple Current	Output Power	Efficiency (Typ)	Maximum Capacitive Load
			Min	Max	No Load	Max Load				
ME12S5-1000W	12 VDC (9 ~ 18 VDC)	5 VDC	200 mA	1000 mA	30 mA	570 mA	60 mA	5W	75%	1000 µF
ME12S12-500W		12 VDC	100 mA	500 mA		641 mA		6W	78%	470 µF
ME24S5-1000W	24 VDC (18 ~ 36 VDC)	5 VDC	200 mA	1000 mA	20 mA	278 mA	30 mA	5W	77%	1000 µF
ME24S12-500W		12 VDC	100 mA	500 mA		313 mA		6W	80%	470 µF
ME48S5-1000W	48 VDC (36 ~ 75 VDC)	5 VDC	200 mA	1000 mA	10 mA	139 mA	15 mA	5W	77%	1000 µF
ME48S12-500W		12 VDC	100 mA	500 mA		156 mA		6W	80%	470 µF

DUAL OUTPUT MODELS

Model Number	Input Voltage	Output Voltage	Output Current		Input Current		Reflected Ripple Current	Output Power	Efficiency (Typ)	Maximum Capacitive Load
			Min	Max	No Load	Max Load				
ME12D12-250W	12 VDC (9 ~ 18 VDC)	±12 VDC	±50 mA	±250 mA	30 mA	641 mA	100mA	6W	78%	220 µF #
ME12D15-200W		±15 VDC	±40 mA	±200 mA	30 mA	641 mA		6W	78%	220 µF #
ME24D12-250W	24 VDC (18 ~ 36 VDC)	±12 VDC	±50 mA	±250 mA	20 mA	313 mA	50mA	6W	80%	220 µF #
ME24D15-200W		±15 VDC	±40 mA	±200 mA	20 mA	313 mA		6W	80%	220 µF #
ME48D12-250W	48 VDC (36 ~ 75 VDC)	±12 VDC	±50 mA	±250 mA	10 mA	156 mA	25mA	6W	80%	220 µF #
ME48D15-200W		±15 VDC	±40 mA	±200 mA	10 mA	156 mA		6W	80%	220 µF #

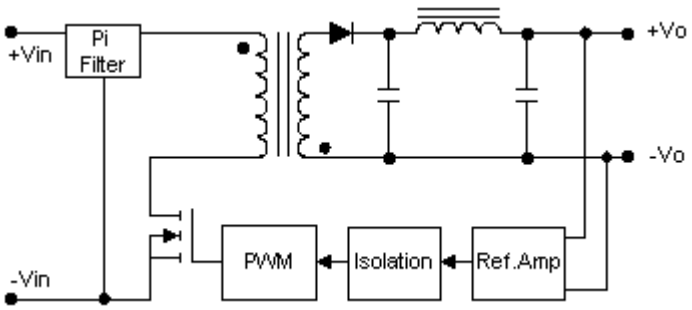
 # For each output

NOTES

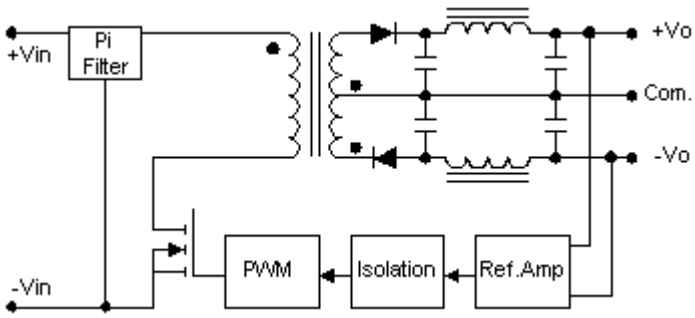
1. Transient recovery time is measured to within 1% error band for a step change in output load of 75% to 100%.
2. The ME series requires a minimum output loading to maintain specified regulations. Operation under no-load conditions will not damage these devices, however they may not meet all listed specifications.
3. All DC/DC converters should be externally fused at the front end for protection.
4. Other input and output voltages may be available, please contact factory.

BLOCK DIAGRAMS

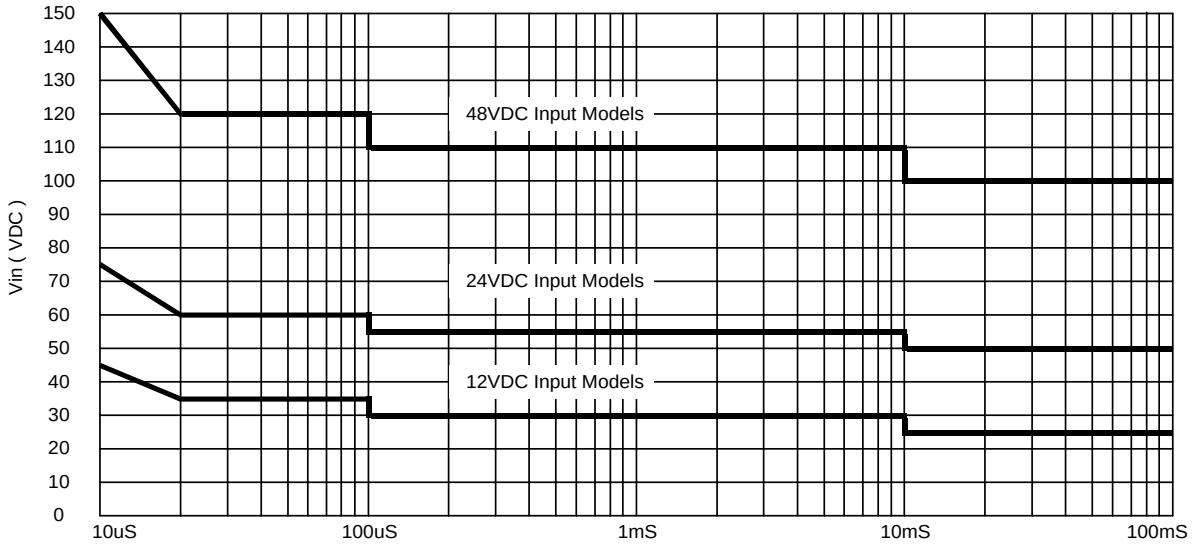
Single Output



Dual Output

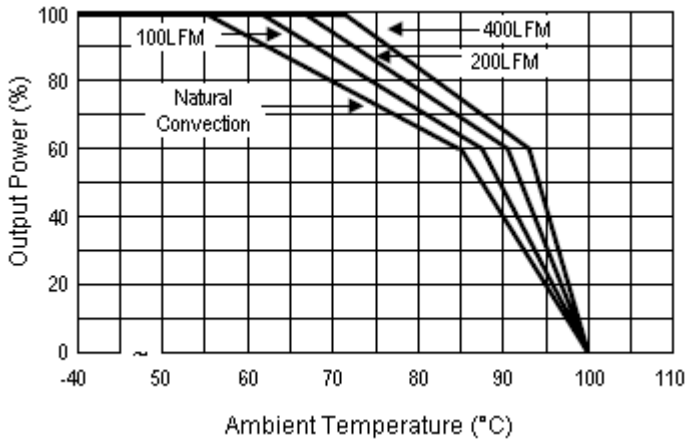


INPUT VOLTAGE TRANSIENT RATING

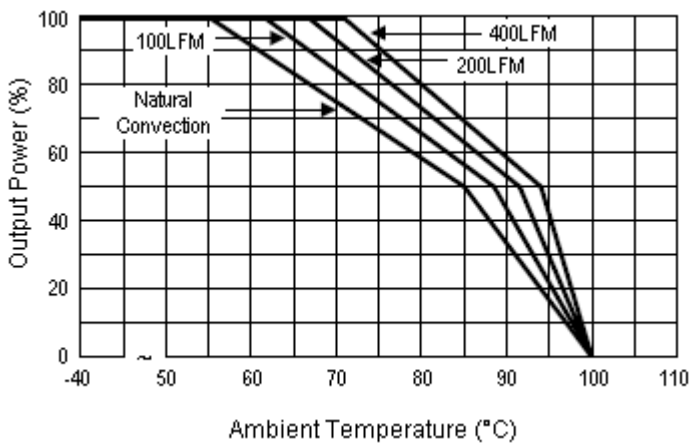


DERATING CURVES

Derating Curve (5V Output Models Only)

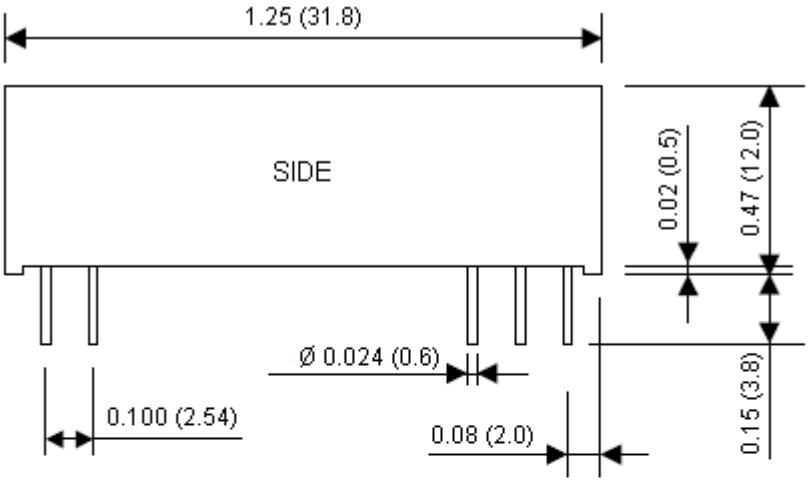


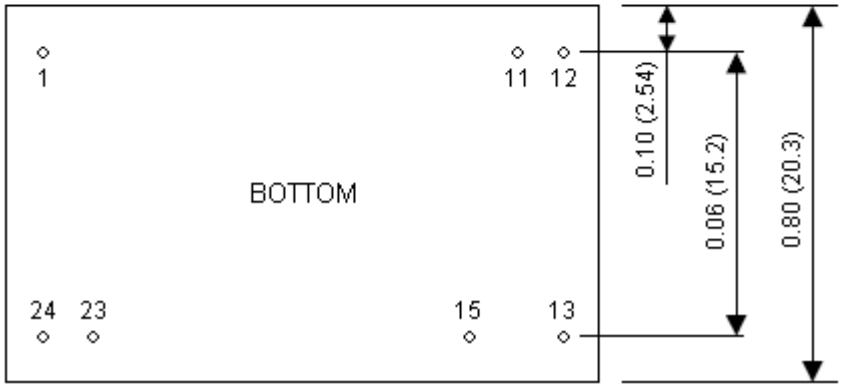
Derating Curve (For All Other Models)



MECHANICAL DRAWING

Unit: inches (mm)





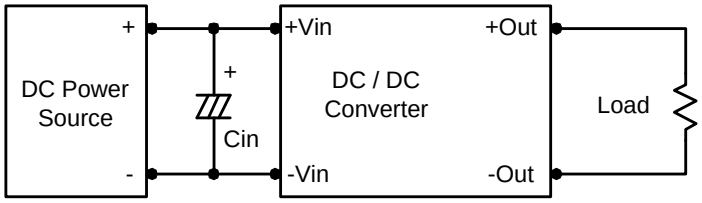
PIN CONNECTIONS		
Pin	**Single Output**	**Dual Output**
1	+Vin	+Vin
11	No Pin	Common
12	-Vout	No Pin
13	+Vout	-Vout
15	No Pin	+Vout
23	-Vin	-Vin
24	-Vin	-Vin

1. Tolerance: X.X±0.25 (X.XX±0.01)
   X.XX±0.13 (X.XXX±0.005)
2. Pin: ±0.05 (±0.002)

DESIGN & FEATURE CONSIDERATONS

Input Source Impedance

The power module should be connected to a low ac-impedance input source. Highly inductive source impedances can affect the stability of the power module. In applications where power is supplied over long lines and output loading is high, it may be necessary to use a capacitor at the input to ensure startup. A capacitor mounted close to the power module helps ensure stability of the unit. It is recommended to use a good quality low Equivalent Series Resistance (ESR < 1.0Ω at 100KHz) capacitor of 10μF for the 12V input models, 4.7μF for the 24V input models, and a 2.2μF for the 48V input models.



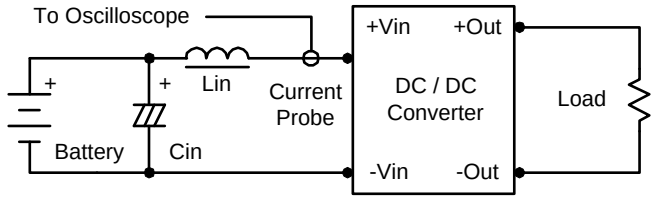
Maximum Capacitive Load

The ME Series has a limit of connected capacitance at the output. The power module may operate in current limiting mode during start-up, which affects the ramp-up and the startup time. Connect capacitors at the point of load for best performance. The maximum capacitive load can be found in the "Output Voltage / Current Rating Chart" on page 2.

TEST CONFIGURATIONS

Input Reflected-Ripple Current Test Setup

Input reflected-ripple current is measured with an inductor Lin (4.7μH) and Cin (220μF, ESR < 1.0Ω at 100KHz) to simulate source impedance.



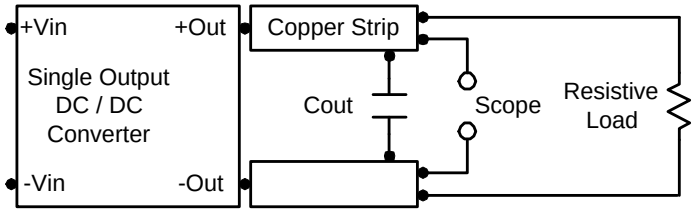
Capacitor Cin offsets possible battery impedance.

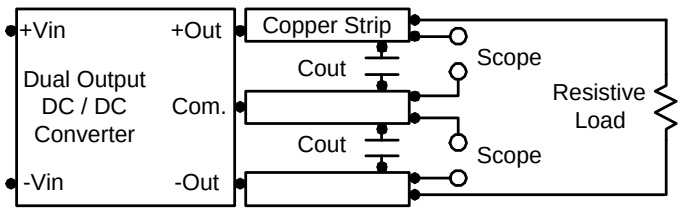
Current ripple is measured at the input terminals of the module. Measurement bandwidth is 0 ~ 500KHz.

Peak-to-Peak Output Noise Measurement Test

Use a Cout 0.47μF ceramic capacitor.

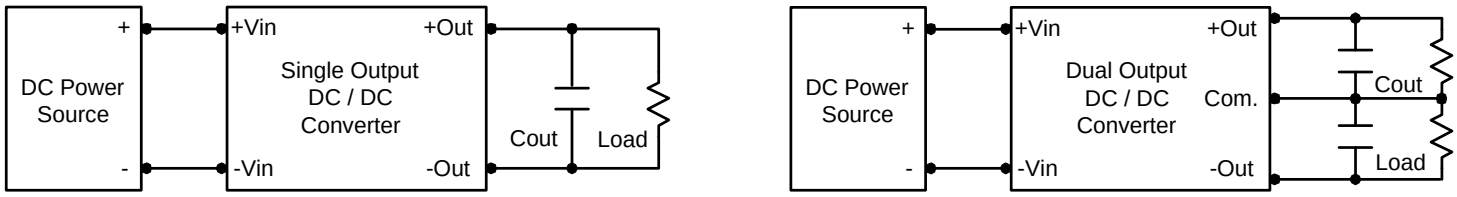
Scope measurement should be made by using a BNC socket; measurement bandwidth is 0 ~ 20MHz. Position the load between 50mm and 75mm from the DC/DC Converter.





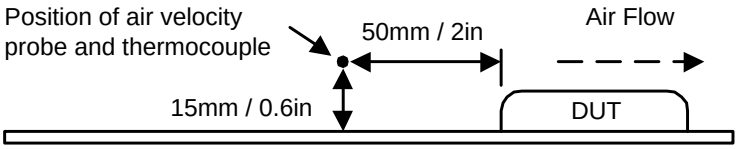
Output Ripple Reduction

A good quality low ESR capacitor placed as close as possible across the load will give the best ripple and noise performance. To reduce output ripple it is recommended to use a 3.3µF capacitor at the output.



Thermal Considerations

Many conditions affect the thermal performance of the power module, such as orientation, airflow over the module, and board spacing. To avoid exceeding the maximum temperature rating of the components inside the power module, the case temperature must be kept below 95°C. The derating curves are determined from measurements obtained in an experimental apparatus.



Electromagnetic Emission EN 55022 < A

Conducted and radiated emissions < A with external coupling capacitor Cio=1nF < B

COMPANY INFORMATION:

Wall Industries, Inc. has created custom and modified units for over 40 years. Our in-house research and development engineers will provide a solution that exceeds your performance requirements on time and on budget. Our ISO9001-2000 certification is just one example of our commitment to producing a high quality, well documented product for our customers.

Our past projects demonstrate our commitment to you, our customer. Wall Industries, Inc. has a reputation for working closely with its customers to ensure each solution meets or exceeds form, fit and function requirements. We will continue to provide ongoing support for your project above and beyond the design and production phases. Give us a call today to discuss your future projects.

Contact **Wall Industries** for further information:

Phone: ☎(603)778-2300
Toll Free: ☎(888)587-9255
Fax: ☎(603)778-9797
E-mail: sales@wallindustries.com
Web: www.wallindustries.com
Address: 5 Watson Brook Rd.
Exeter, NH 03833