

PRODUCTION SELECTION GUIDE

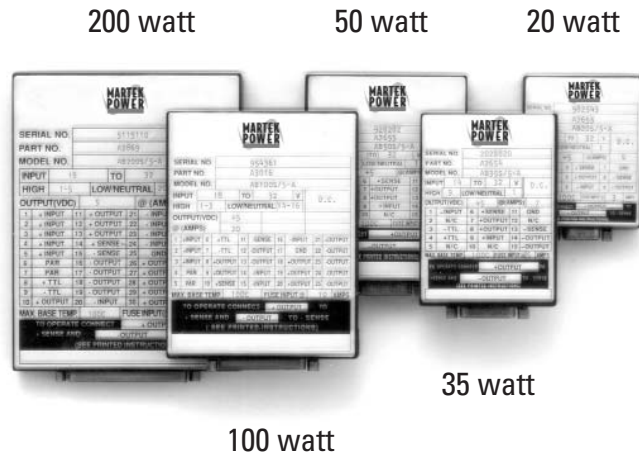
	<i>Input Range</i>	<i>Output Power</i>	<i># of Output</i>	<i>Output Voltages</i>	<i>Model Series</i>	<i>Page</i>
AC-DC	90-130 Vac; 47-440 Hz Single phase, Three Phase (Delta or WYE)	50 watt	single triple	5, 5.2, 12, 15, 24, 28 (5, ±12) (5,±15)	AM, RM	11 - 17
AC-DC	103-107 Vac; 47-440 Hz Single Phase	100 watt	single	5, 5.2, 12, 15, 24, 28	AM, RM	11 - 17
AC-DC	103-107 Vac; 47-440 Hz Single Phase	20 watt 35 watt 50 watt 100 watt 200 watt	single single dual single dual single single	5, 5.2, 12, 15, 24, 28 5, 5.2, 12, 15, 24, 28 ±5, ±12, ±15 5, 5.2, 12, 15, 24, 28 ±5, ±12, ±15 2, 3.3, 5, 5.2, 12, 15, 24, 28 2, 3.3, 5, 5.2, 12, 15, 24, 28	AW, RW	18 - 24
AC-DC	180-260 Vac; 47-440 Hz Single Phase, Three Phase (Delta)	50 watt	single triple	5, 5.2, 12, 15, 24, 28 (5, ±12) (5,±15)	AM, RM	11 - 17
	206-254 Vac, 47-440 Hz Single Phase	100 watt	single	5, 5.2, 12, 15, 24, 28	AM, RM	9 - 15
DC-DC	14 - 32 Vdc	20 watt 35 watt 50 watt	single single dual single dual	5, 5.2, 12, 15, 24, 28 5, 5.2, 12, 15, 24, 28 ±5, ±12, ±15 5, 5.2, 12, 15, 24, 28 ±5, ±12, ±15	AB, RB	2 - 10
DC-DC	18 - 32 Vdc	100 watt 200 watt	single single	5, 5.2, 12, 15, 24, 28 5, 5.2, 12, 15, 24, 28	AB, RB	2 - 10
DC-DC	90 - 160 Vdc	20 watt 35 watt 50 watt 100 watt 200 watt	single single dual single dual single single	5, 5.2, 12, 15, 24, 28 5, 5.2, 12, 15, 24, 28 ±5, ±12, ±15 5, 5.2, 12, 15, 24, 28 ±5, ±12, ±15 2, 3.3, 5, 5.2, 12, 15, 24, 28 2, 3.3, 5, 5.2, 12, 15, 24, 28	AW, RW	18 - 24
DC-DC	100 - 300 Vdc	50 watt	single triple	5, 5.2, 12, 15, 24, 28 (5, ±12) (5,±15)	AM, RM	11 - 17
DC-DC	200 - 300 Vdc	100 watt	single	5, 5.2, 12, 15, 24, 28	AM, RM	11 - 17
Application notes					All Models	25 - 29

*Other output voltages available, contact factory.

Updated on June 3, 2008

Series AB

DC/DC Converters



A comprehensive line of full military DC-DC converters ideally suited for ground mobile systems or any distributed power network. The AB models have been qualified for a wide range of military specifications including environmental and EMI conformance.

- Current Mode Control
- Stand Current Limiting

- Wireless Submodular Construction for High Reliability

- NAVAT Guidelines

Specifications

Input:

20 - 50 watts units: 14 to 32 Vdc.
100 and 200 watt units: 18 to 32 Vdc.

Efficiency:

65% minimum. Typically 70 - 80% (nominal input, full load, room ambient). For dual 5 Vdc output modules efficiency will be 50 - 60% typical.

Line Regulation:

10 mV or 0.1%, whichever is greater, over entire input range with load held constant.

Load Regulation:

10 mV or 0.1%, whichever is greater from no load to full load with line held constant.

PARD (Noise and Ripple):

25 mV rms, 100 mV P-P at 25 MHz bandwidth, measured over temperature range.

Isolation Voltage:

500 Vdc, input to output; 400 Vdc, input to case; 100 Vdc, output to case.

Insulation Resistance:

50 megohms between input and output, input and case, output and case, when measured at 50 Vdc.

Temperature Range:

Operating: -55°C to +100°C maximum, at center of the baseplate.
Storage: -55°C to +125°C, ambient.

Parallelability:

The 100 watt and 200 watt units allow for multiple unit current sharing without the need for external components, via a single pin connection on each unit.

Temperature Coefficient:

0.01%/°C maximum over entire temperature range.

Input Transient Protection:

Unit will provide normal regulated output and withstand 50 Vdc for 0.1 second, in accordance with MIL-STD-704D. Compliance to MIL-STD-704A (80 Vdc for 0.1 second) can be achieved with optional transient suppressor. Consult factory for details.

Load Transient Recovery:

Output voltage returns to regulation limits with 0.5 ms after 50% change in load current.

Load Transient Overshoot:

0.5 V from nominal voltage set point.

Short Circuit Protection:

Completely protected against a short circuit of any duration. Output automatically restores to normal when overload is removed.

Remote Sensing:

Compensates for up to 0.5 volt drop in leads. Sense pins must be tied local (at connector) or remote (at load) for proper operation.

Remote Inhibit:

Provides for remote turn on/off with TTL logical signal. Application of TTL Signal (logic 1) will inhibit the outputs. 10 mA required current (@5 Vdc).

Electromagnetic Interference:

Units, when tested in accordance with MIL-STD-462, meet the majority of the requirements of MIL-STD-462C for conducted and radiated, emission and susceptibility, for Class A1, A2, and A3 equipment for input power leads. For further details regarding levels and extend of compliance on each class, or requirement, consult factory. Certified test reports available upon request.

Switching Frequency:

160 to 200 kHz fixed.

Reliability:

The Mean Time Between Failure (MTBF) is calculated per MIL-HDBK-217E at 50°C baseplate temperature with maximum operating input voltage and maximum rated output power. The MTBF for AB20S at ground benign environment is 446,000 hours. With the -ER option, MTBF was calculated to be 1,672,000 hours of ground benign. The standard AB200S MTBF at ground benign and naval sheltered is 294,500 and 58,000 respectively. Please consult factory for additional environments and models.

Environment:

Units meet MIL-STD-810C, altitude, shock, acceleration, vibration and MIL-S-901C high-impact shock requirements. For information, please consult factory. Certified test reports available upon request

Hook up:

Via D-Subminiature Connectors, M24308/24 type.

Options

-883 Screening

Unit undergoes environmental screening based upon the parameters outlined in MIL-STD-883 and NAVMAT 4855-1. The screening consists of :

- 1.) Stabilization Bake: +125°C for 24 hours per MII-STD-883, M1108 Condition B.
- 2.) Temperature Cycling (non-operational): 10 cycles min., at -55°C to +125°C, 36 minute transition with 1 hour dwell at each temperature extreme. Procedure reference MII-STD-883, M1010, Condition B and NAVMAT P4855-1.
- 3.) Long Term Operational Burn In: 160 hours of powered operation under load. Modules are continuously cycled from +85°C to thermal shut down point (+105°C) during the 160 hours.

Ruggedized

COTS readily available components are utilized. Contact factory for details.

Environmental Stress Screening

Environmental Stress Screening (ESS) including random vibration and thermal cycling (per the NAVMAT guidelines) is available. Consult factory for details.

Enhanced Reliability

ER Options provides increased reliability by using higher levels of military grade components (to order, add "-ER" after model number, i.e., AB200S/15-A-ER). (Not recommended for new designs.)

Single Output

Nominal Output Voltage	Output Current (Amps)	Weight ¹ (oz.)	Weight ¹ (Grams)	Model Number
5	4	7	200	AB20S/5-A
	7	9	255	AB35S/5-A
	10	12	325	AB50S/5-A
	20	18	510	AB100S/5-A
	40	26	720	AB200S/5-A
5.2	3.85	7	200	AB20S/5.2-A
	6.73	9	255	AB35S/5.2-A
	9.62	12	325	AB50S/5.2-A
	19.23	18	510	AB100S/5.2-A
	38.46	26	720	AB200S/5.2-A
12	1.66	7	200	AB20S/12-A
	2.91	9	255	AB35S/12-A
	4.16	12	325	AB50S/12-A
	8.33	18	510	AB100S/12-A
	16.67	26	720	AB200S/12-A

Nominal Output Voltage	Output Current (Amps)	Weight ¹ (oz.)	Weight ¹ (Grams)	Model Number
15	1.33	7	200	AB20S/15-A
	2.33	9	255	AB35S/15-A
	3.33	12	325	AB50S/15-A
	6.66	18	510	AB100S/15-A
	13.33	26	720	AB200S/15-A
24	0.83	7	200	AB20S/24-A
	1.45	9	255	AB35S/24-A
	2.08	12	325	AB50S/24-A
	4.16	18	510	AB100S/24-A
	8.33	26	720	AB200S/24-A
28	0.71	7	200	AB20S/28-A
	1.25	9	255	AB35S/28-A
	1.78	12	325	AB50S/28-A
	3.57	18	510	AB100S/28-A
	7.14	26	720	AB200S/28-A

Set Point Accuracy: 50 mV or 0.5%, whichever is greater

Dual Output*

Nominal Output Voltage	Output Current (Amps)	Weight ¹ (oz.)	Weight ¹ (Grams)	Model Number
±5 ²	1.5	9.25	260	AB35D/5-A
	2.1	11.75	330	AB50D/5-A
±12	1.46	9.25	260	AB35D/12-A
	2.08	11.75	330	AB50D/12-A
±15	1.17	9.25	260	AB35D/15-A
	1.67	11.75	330	AB50D/15-A

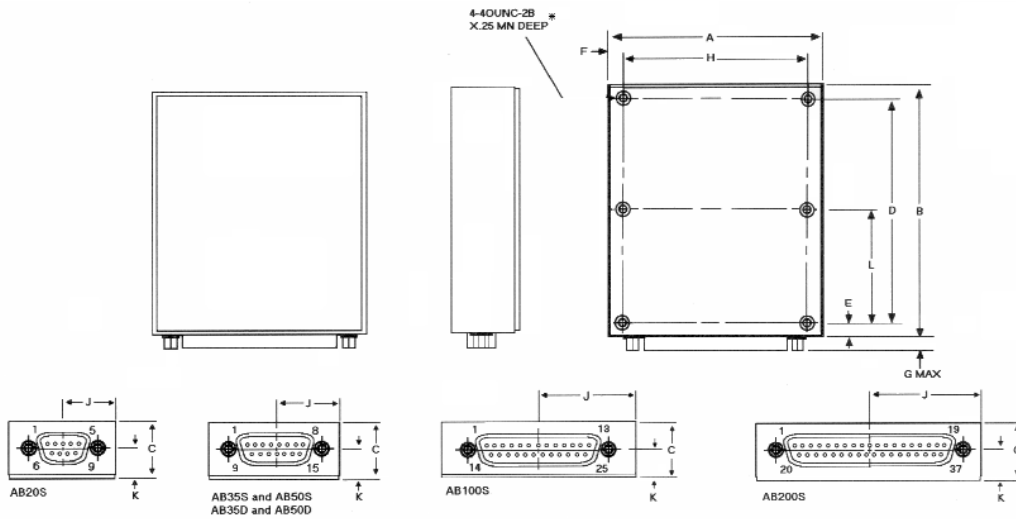
Set Point Accuracy: 50 mV or 0.5%, whichever is greater

* Each output is independent and isolated; outputs may be connected in a positive or negative configuration. Both outputs can be used as positive or negative. These also can be used in ± dual output configuration. Lastly these outputs can be tied in series for higher output voltages.

¹ Maximum weight

² Maximum output power is 21 watts or 10.5 watts per channel

Case Drawings



Dimensions (in/mm)

Models	A	B	C	D	E	F	G	H	J	K	L
AB20S	2.20	2.80	.85	2.450	.18	.18	.25	1.850	1.10	.46	N/A
	55.9	71.1	21.6	62.13	4.6	4.6	6.4	46.99	27.9	11.7	N/A
AB35S	2.50	3.50	.85	3.100	.20	.20	.25	2.100	1.25	.46	N/A
AB35D	63.5	88.9	21.6	78.74	5.1	5.1	6.4	53.34	31.8	11.7	N/A
AB50S	3.00	3.85	.85	3.450	.20	.20	.25	2.600	1.50	.46	N/A
AB50D	76.2	97.8	21.6	87.63	5.1	5.1	6.4	66.04	38.1	11.7	N/A
AB100S	3.50	4.50	.85	4.100	.20	.20	.25	3.100	1.75	.46	N/A
	88.9	114.3	21.6	104.14	5.1	5.1	6.4	78.74	44.5	11.7	N/A
AB200S	4.25	5.50	.85	5.100	.20	.20	.25	3.850	2.13	.46	2.550
	108.0	139.7	21.6	129.54	5.1	5.1	6.4	97.79	54.1	11.7	64.77

Tolerances: inches - X.XXX = ± 0.015
 X.XX = ± 0.03
 mm - X.XX = ± 0.4
 X.X = ± 0.8

Mounting: Standard: 4-40 THD inserts 1/4" min. depth are provided in baseplate. Steel 4-40 bolts American Standard, unified national coarse series, slotted studs are supplied with each unit.

Material: Base - Aluminum 5052-H32
 Case- 26 Gauge Steel (cold rolled)
 Case Finish - Nickel Plating

Metric: M2.5 inserts. To order insert an "I" after the "A" in the model number, i.e. AB35D/I2-AI.

* Number of mounting holes: 6 places for the 200 watt model, 4 places for all other models.

Pin Designations

Model:	AB20S		
Connector:	DEMME9PF		
Mate:	DEMM9S		
1. - Input	4. + Sense ²	7. Ground	
2. - TTL	5. + Output	8. - Sense ²	
3. + TTL	6. + Input	9. - Output	

Model:	AB35S and AB50S		
Connector:	DAMME15PF		
Mate:	DAMM15S		
1. - Input	6. + Sense ²	11. Ground	
2. N/C	7. + Output	12. N/C	
3. - TTL	8. + Output	14. - Sense ²	
4. + TTL	9. + Input	15. - Output	
5. N/C	10. N/C	16. - Output	

Model:	AB35D and AB50D		
Connector:	DAMME15PF		
Mate:	DAMM15S		
1. - Input	6. + Output 1	11. Ground	
2. N/C	7. + Sense 2 ²	12. - Sense 1 ²	
3. - TTL	8. + Output 2	13. - Output 1	
4. + TTL	9. + Input	14. - Sense 2 ²	
5. + Sense 1 ²	10. N/C	15. - Output	

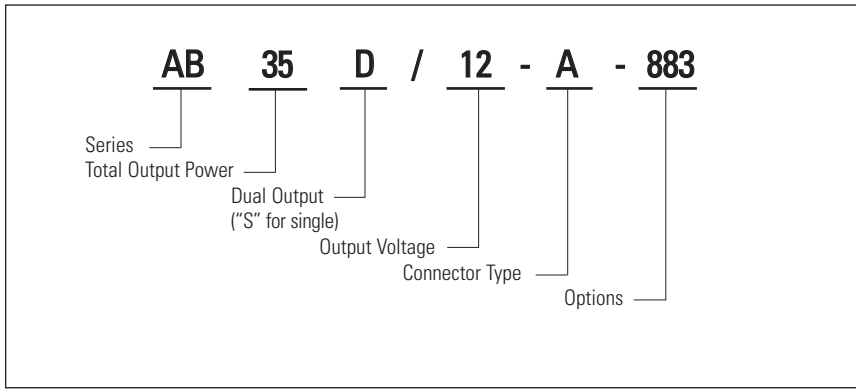
Model:	AB100S		
Connector:	DBMME25PF		
Mate:	DBMM25S		
1. + Input	10. + Sense ²	18. + Output	
2. + Input	11. - Sense ²	19. + Output	
3. + Input	12. - Output	20. + Output	
4. Parallel ¹	13. - Output	21. + Output	
5. Parallel ¹	14. - Input	22. - Output	
6. + TTL	15. - Input	23. - Output	
7. - TTL	16. - Input	24. - Output	
8. + Output	17. Ground	25. - Output	
9. + Output			

Model:	AB200S					
Connector:	DCMME37PF					
Mate:	DCMM37S					
1. + Input	8. + TTL	14. + Sense ²	20. - Input	26. + Output	32. - Output	
2. + Input	9. - TTL	15. - Sense ²	21. - Input	27. + Output	33. - Output	
3. + Input	10. + Output	16. - Output	22. - Input	28. + Output	34. - Output	
4. + Input	11. + Output	17. - Output	23. - Input	29. + Output	35. - Output	
5. + Input	12. + Output	18. - Output	24. - Input	30. + Output	36. - Output	
6. Parallel ¹	13. + Output	19. - Output	25. Ground	31. + Output	37. - Output	
7. Parallel ¹						

¹ Parallel pins are internally connected and redundant. Either pin can be used for single pin parallelability or either pin can be left open and unused.

² Sense pins must be tied either locally (at connector) or remote (at load) for proper operation.

How to order



Input Current

(Typical Amps)

Model	Output Load	Low Line	High Line
AB20S	50%	1.2	0.45
	100%	2.2	0.93
AB35S	50%	2.1	0.78
	100%	3.8	1.6
AB35D	50%	2.1	0.84
	100%	3.8	1.6
AB50S	50%	3.0	0.88
	100%	5.5	1.97
AB50D	50%	3.0	0.9
	100%	5.5	2
AB100S	50%	4.6	2.5
	100%	8.6	4.8
AB200S	50%	9.3	4.9
	100%	17.7	9.8

Input Fuse: To protect your power supply source and the Martek Power Abbott converter always insert a fuse between the source and the module's "high" input pin(s). Bus fuse type MDX or equivalent slow blow is recommended. Fuse value is indicated on label of module; typically 2 times low line input current value at full load (100%).

AB1275 DC Input Transient Suppression Module

The Martek Power Abbott AB1275 filter module was designed to operate as an input spike and transient suppression unit for use with any DC to DC converter. The AB1275 filter module, with 28 volts nominal input, can supply up to 300 watts of output power with under 1.0 volt DC insertion loss.

The unit incorporates a passive network to eliminate positive spike voltages of 100µS or less in duration. Transients greater than 100µS and equal to or less than 100 mS in duration are clamped to a maximum output of 50 Vdc. Any positive transients longer than 100 mS will activate an input voltage shutdown protection circuit and turn the AB 1275's output off. The output will automatically be restored upon the removal of the overvoltage condition.

Negative spikes are clamped by input shunt diodes; an input fuse is required to protect the unit in case of a sustained negative voltage in excess of the limits of MIL-STD-1275, or permanent damage will occur.

The AB1275 module is optimally suited for use with Martek Power Abbott's AB series, SM series and BC series but can be utilized with any high reliability DC to DC converter that meets the input requirements of MIL-STD-704D (50 Vdc input spike "ride-through" operation).

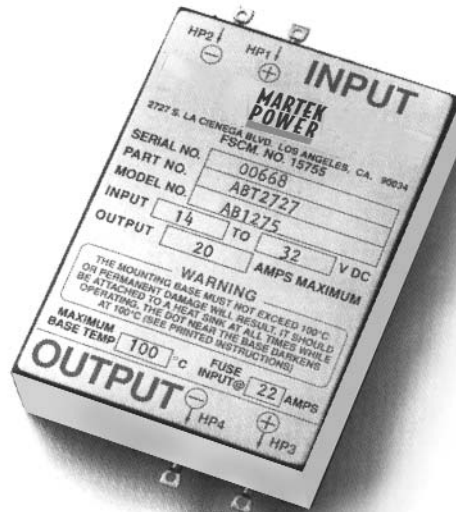
Martek Power AB1275 module is the ideal solution for transient suppression when retrofitting advanced electronics into existing platforms.

Meets DC input Transient Limits for MIL-STD-704A

- Transient: 80 Vdc for 0.1 second
- Spike: 600 Vdc for 10µs

Meets DC input Transient for MIL-STD-1275A

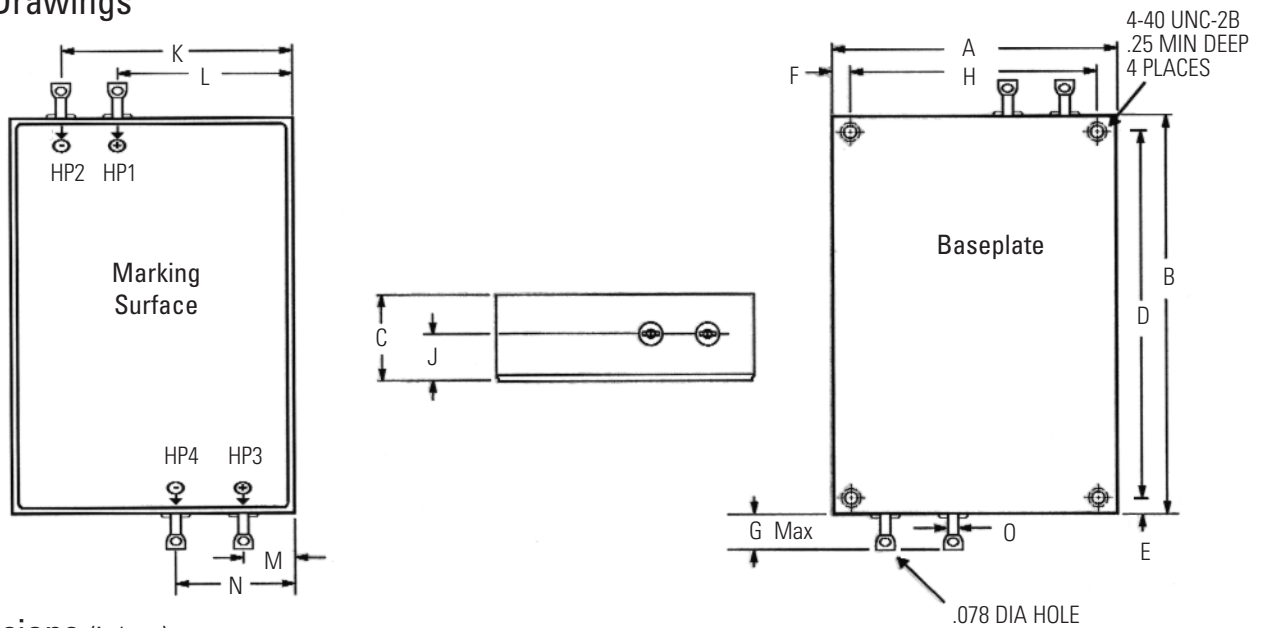
- Transient: 100Vdc for 100mS
- Spike: ±250 Vdc for 50 µs



Specifications

Steady State Input:	14 to Vdc
Maximum Output Current:	20 amps
Maximum Output Voltage (Clamp):	50 Vdc
Current Limit:	Delayed Latching Type, 20 amps or 300 watt min.
Fuse (recommended):	22 Adc, Slow Blow Type
Insertion Loss:	1.0 Vdc Max. @ 20 amps °C
Input Surge Limit:	100 Vdc, 0.1 sec., 0.5 Ω per MIL-STD-1275A
Input Surge Limit:	±250 Vdc, 50μS, 15mJ, per MIL-STD-1275A
	±650 Vdc, 10μS, 50 Ω, per MIL-STD-704A
Reverse Parity Protection:	Shunt Diode (Input Fuse Required)
No Load power Dissipation:	2.5 watts maximum
Efficiency:	90% to 97% from 14 to 36 Input Volts DC
Overvoltage Shutdown (Auto Recovery):	41 Vdc to 100 Vdc for > 100mS
Temperature:	
Operating:	-55°C to +100°C, baseplate
Storage:	-55°C to +125°C, ambient
Isolation - Input/Output to Case:	500 Vdc
Case Size:	2.5 X 3.5 X .85 inches
	63.5 X 88.9 X 21.6 mm
Weight:	9.6 oz, 270 grams
Environmental:	MIL-STD-810C
Insulation Resistance:	50 megohm min. @ 50V Input/Output to Case

Case Drawings



Dimensions (in/mm)

	A	B	C	D	E	F	H	J	J	K	L	M	N	O
in	2.50	3.50	0.85	3.100	0.20	0.20	0.4	2.100	0.46	2.05	1.55	0.45	1.05	0.093
mm	63.5	88.9	21.6	78.74	5.1	5.1	10.2	53.34	11.7	52.1	39.4	11.4	26.7	2.36

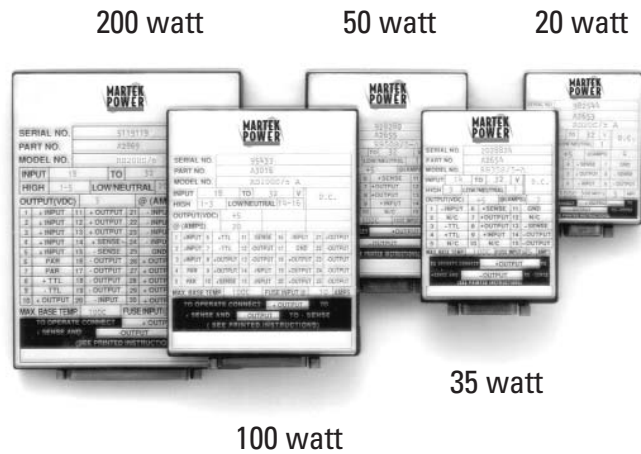
Tolerances: inches - X.XXX = ±0.015
 X.XX = ±0.03
 mm - X.XX = ±0.4
 X.X = ±0.8

Mounting: Standard: 4-40 THD inserts are provided in baseplate.
 Metric: M3 inserts

Material: Baseplate - Aluminum 6061-T6
 Case- Steel
 Case Finish - Nickel Plating per QQ-N-290
 Class 1 0.0006 THK Bright

Series RB

DC/DC Converters



The **“-R” (Ruggedized) version** of the A series is the same as the Standard version except it uses industrial grade plastic cased TO-220 type diodes and transistors in place of metal ones for cost savings. All other components including the control IC and the input capacitors are identical. The **“-R” version** has MTBF numbers 5 - 10% lower than the Standard version (per MIL-HDBK-217). No dimensions or electrical specifications will be changed. The operating temperature range remains at -55 to 100°C. The internal EMI filter is optional.

Refer to AB Series manual for detail specifications.

Series AM

AC-DC / DC-DC Converters

50 watt
triple output

50 watt
single output



100 watt

The AM series AC-DC/DC-DC power supplies can accept a wide range of input powers making them true multiple input power supplies. The AM models are uniquely qualified for a variety of military applications where various international input powers may be encountered.

AC/DC

- Customer Selectable, Multiple inputs
- NAVMAT Guidelines
- Wireless Submodular Construction for High Reliability
- Current Mode Control
- Standard Current Limiting

Specifications

Input:

Inputs for 50 watt models:
 103 - 127 Vac, 47 - 440 Hz. Single Phase or Three Phase (Delta, WYE) or 180 - 260 Vac, 47 - 440 Hz, Single Phase or Three Phase (Delta); 200 - 300 Vdc.
 "S" version input ranges: 100 - 200 Vdc. For this input range, add (S) to model number: AM50S/5-A(S).
 Input for 100 watt models:
 103 - 127 Vac, 47 - 440 Hz, 1 ϕ ;
 206 - 254 Vac, 47 - 440 Hz, 1 ϕ ;
 200 - 300 Vdc.

Efficiency:

65% minimum. Typically 75%. (Full load, room ambient).

Power Factor:

Single Phase, 115 Vac, 60 Hz: 0.61
 Single Phase, 115 Vac, 400 Hz: 0.61
 Single Phase, 220 Vac, 60Hz: 0.56
 Single Phase, 220 Vac, 400 Hz: 0.66
 Three Phase, 115 Vac, 60 Hz: 0.48
 Three Phase, 115 Vac, 400 Hz: 0.53
 Three Phase, 220 Vac, 60 Hz: 0.48
 Three Phase, 220 Vac, 400 Hz: 0.53

Line Regulation:

Single or main: 0.1% or 10 mV, whichever is greater.
 Auxiliaries: \pm 15V: 100 mV maximum;
 \pm 12V: 60 mV maximum.

Load Regulation:

Single or Main: 10 mV or 0.1%, whichever is greater.
 Auxiliary outputs: 150 mV maximum.

PARD (Noise and Ripple):

25 mV rms, 100 mV P-P for 5 Vdc output and 50 mV rms, 200 mV P-P for other voltages; measured at 25 MHz bandwidth over temperature range.

Isolation Voltage:

1,000 Vdc, input to output;
 1,000 Vdc, input to case;
 200 Vdc, output to case for 50 watt unit and 500 Vdc, output to case for 100 watt unit.

Parallelability:

The 100 watt units allow for multiple

unit current sharing without the need for external components, via a single pin connection on each unit.

Insulation Resistance:

50 megohms between input and output, input and case, output and case, when measured at 50 Vdc.

Temperature Range:

Operating: -55°C to +100°C maximum, at center of the baseplate.
 Storage: -55°C to +125°C, ambient.

Temperature Coefficient:

0.01%/°C maximum over entire temperature range.

Input Transient Protection:

Unit will not be damaged or exhibit degradation of performance when subjected to input transients in accordance with MIL-STD-704A, MIL-STD-704D and MIL-STD-1399, as applicable to corresponding input configurations. Consult your nearest sales office if further details are needed.

Load Transient Recovery:

Main output voltage returns to regulation limits within 0.5 ms after 50% change in load current.

Load Transient Overshoot:

0.5 V from nominal voltage set point, single and triple outputs.

Short Circuit Protection:

All outputs are completely protected against a short circuit of any duration. Outputs automatically restore to normal when overload is removed.

Remote Sensing:

Compensates for up to 0.5 volt drop in leads. (Single and main output only). Sense pins must be tied local (at connector) or remote (at load) for proper operation.

Preload Requirements: *(Triple output only)*

A one amp minimum load is required on the main or full load capabilities on the

auxiliaries.

Remote Inhibit:

Provides for remote turn on/off with TTL logical signal. Application of TTL Signal (logic 1) will inhibit the outputs. 10 mA required current (@5 Vdc).

Electromagnetic Interference:

Units, when tested in accordance with MIL-STD-462, meets or minimizes the majority of the requirements of MIL-STD-461C for conducted and radiated, emission and susceptibility, for Part 2, Class A1b equipment for input power leads, with different levels of compliance under each input configuration. For further details regarding levels and extend of compliance in each class, input configuration, or requirement, consult factory. Certified test reports available upon request.

Switching Frequency:

160 to 200 kHz fixed.

Reliability:

The Mean Time Between Failure (MTBF) is calculated per MIL-HDBK-217E at 50°C baseplate temperature with maximum operating input voltage and maximum rated output power. The MTBF for AM50S at ground benign environment is 160,300 hours and 20,200 for naval sheltered environment. With the -ER option, MTBF was calculated to be 240,000 hours at ground benign and 25,000 for naval sheltered. Please consult factory for additional environments and models.

Environment:

Units meet MIL-STD-810D altitude, shock, acceleration, vibration and MIL-STD-901C high-impact shock requirements. For information, please consult factory. Certified test reports available upon request.

Hook up:

Via D-Subminiature Connectors, M24308/24 type.

Options

-883 Screening

Unit undergoes environmental screening based upon the parameters outlined in MIL-STD-883 and NAVMAT 4855-1. The screening consists of :

- 1.) Stabilization Bake: +125°C for 24 hours per MII-STD-883, M1108 Condition B.
- 2.) Temperature Cycling (non-operational): 10 cycles min., at -55°C to +125°C, 36 minute transition with 1 hour dwell at each temperature extreme. Procedure reference MII-STD-883, M1010, Condition B and NAVMAT P4855-1.
- 3.) Long Term Operational Burn In: 160 hours of powered operation under load. Modules are continuously cycled from +85°C to thermal shut down point (+105°C) during the 160 hours.

Ruggedized

COTS readily available components are utilized. Contact factory for details.

Environmental Stress Screening

Environmental Stress Screening (ESS) including random vibration and thermal cycling (per the NAVMAT guidelines) is available. Consult factory for details.

Enhanced Reliability

ER Options provides increased reliability by using higher levels of military grade components (to order, add "-ER" after model number, i.e., AM100S/15-A-ER). (Not recommended for new designs.)

Single Output

Nominal Output Voltage	Output Current (Amps)	Weight ¹ (oz.)	Weight ¹ (Grams)	Model Number
5	10	12	340	AM50S/5-A
	20	28	775	AM100S/5-A
5.2	9.62	12	340	AM50S/5.2-A
	19.23	28	775	AM100S/5.2-A
12	4.17	12	340	AM50S/12-A
	8.33	28	775	AM100S/12-A
15	3.33	12	340	AM50S/15-A
	6.67	28	775	AM100S/15-A
24	2.08	12	340	AM50S/24-A
	4.16	28	775	AM100S/24-A
28	1.79	12	340	AM50S/28-A
	3.57	28	775	AM100S/28-A

Set Point Accuracy: 50 mV or 0.5%, whichever is greater

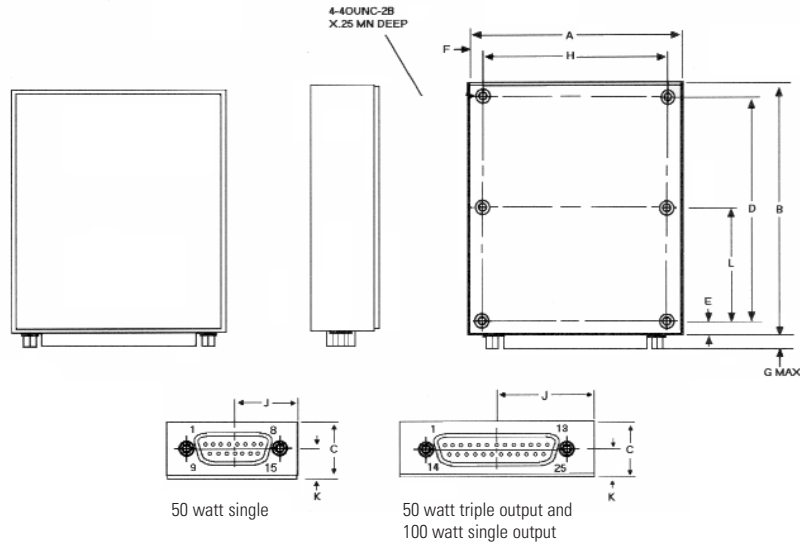
Triple Output

Nominal Output Voltage	Output Current (Amps)	Output Voltage (Aux)	Output Current (Aux)	Weight ¹ (oz.)	Weight ¹ (Grams)	Model Number
5	7.0	± 12	0.63	15	410	AM50T/5/12-A
	7.0	± 15	0.5	15	410	AM50T/5/15-A

Set Point Accuracy: Main ±50 mV
Aux ±500 mV

¹ Maximum weight

Case Drawings



Dimensions (in/mm)

Models	A	B	C	D	E	F	G	H	J	K	L
AM50S	3.25	4.25	.85	3.850	.20	.20	.25	2.850	1.63	.46	N/A
	82.6	108.0	21.6	97.79	5.1	5.1	6.4	72.39	41.4	11.7	N/A
AM50T	3.50	4.50	.85	4.100	.20	.20	.25	3.100	1.75	.46	N/A
	88.9	114.3	21.6	104.14	5.1	5.1	6.4	78.74	44.5	11.7	N/A
AM100S	4.25	6.00	.85	5.600	.20	.20	.25	3.850	2.13	.46	2.800
	108.0	152.4	21.6	142.24	5.1	5.1	6.4	97.79	54.0	11.7	71.12

Tolerances: inches - X.XXX = ±0.015
 X.XX = ±0.03
 mm - X.XX = ±0.4
 X.X = ±0.8

Material: Base - Aluminum 5052-H32
 Case- 26 Gauge Steel (cold rolled)
 Case Finish - Nickel Plating

Mounting: Standard: 4-40 THD inserts 1/4" min. depth are provided in baseplate. Steel 4-40 bolts American Standard, unified national coarse series, slotted studs are supplied with each unit.

Metric: M2.5 inserts. To order insert an "I" after the "A" in the model number, i.e. AM50S/12-AI.

* Number of mounting holes: 6 places for the 50 watt model, 6 places for the 100 watt models

Pin Designations

Single Output

Model:	AM50S			
Connector:	DAMME15PF			
Mate:	DAMM15S			

1. + Input	4. + TTL	7. + Output	10. - Input	13. - Output
2. Input (N)	5. + Sense ²	8. + Output	11. Ground	14. - Output
3. - TTL	6. + Output	9. - Input	12. - Sense ²	15. - Output

Triple Output

Model:	AM50T			
Connector:	DBMME15PF			
Mate:	DBMM15S			

1. + Input	6. + AUX	11. + Output	16. N/C	21. N/C
2. Input (N)	7. AUX COM	12. + Output	17. Ground	22. - Sense ²
3. NC	8. AUX COM	13. + Output	18. N/C	23. - Output
4. - TTL	9. - AUX	14. - Input	19. N/C	24. - Output
5. + TTL	10. + Sense ²	15. - Input	20. N/C	25. - Output

Single Output

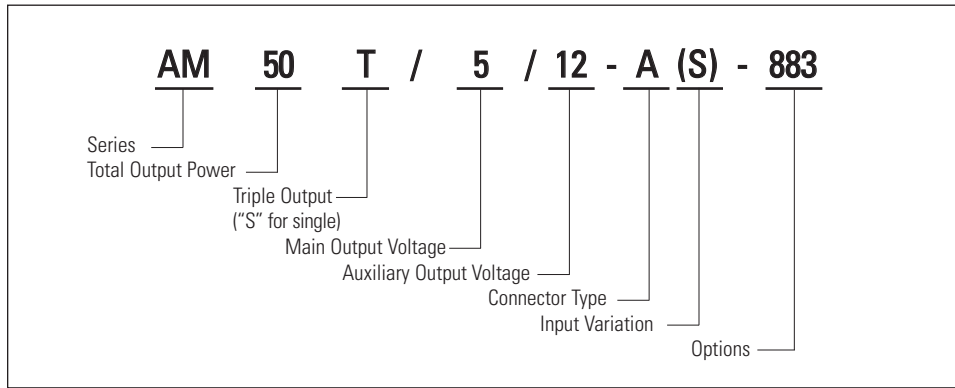
Model:	AM100S			
Connector:	DBMME25PF			
Mate:	DBMM25S			

1. + Input	6. + TTL	11. - Sense ²	16. - Input	21. + Output
2. + Input	7. - TTL	12. - Output	17. Ground	22. - Output
3. - Input	8. + Output	13. - Output	18. + Output	23. - Output
4. Parallel ¹	9. + Output	14. Input	19. + Output	24. - Output
5. Parallel ¹	10. + Sense ²	15. Input	20. + Output	25. - Output

¹ Parallel pins are internally connected and redundant. Either pin can be used for single pin parallelability or either pin can be left open and unused.

² Sense pins must be tied either locally (at connector) or remote (at load) for proper operation.

How to order



Input Current

(Typical Amps)

Model	Output Load	Low Line	High Line
AM50S/270 Vdc	50%	0.42	0.14
	100%	0.76	0.26
AM50T/270 Vdc	50%	0.50	0.16
	100%	0.76	0.26
AM50S/115 Vac	50%	0.75	0.50
	100%	1.25	1.00
AM50T/115 Vac	50%	0.79	0.54
	100%	1.30	1.10
AM100S/115 Vac	50%	1.35	1.10
	100%	2.50	2.00

Input Fuse: To protect your power supply source and the Martek Power Abbott converter always insert a fuse between the source and the module's "high" input pin(s). Bus fuse type MDX or equivalent slow blow is recommended. Fuse value is indicated on label of module; typically 2 times low line input current value at full load (100%).

Series RM

AC-DC / DC-DC Converters

50 watt
triple output

50 watt
single output



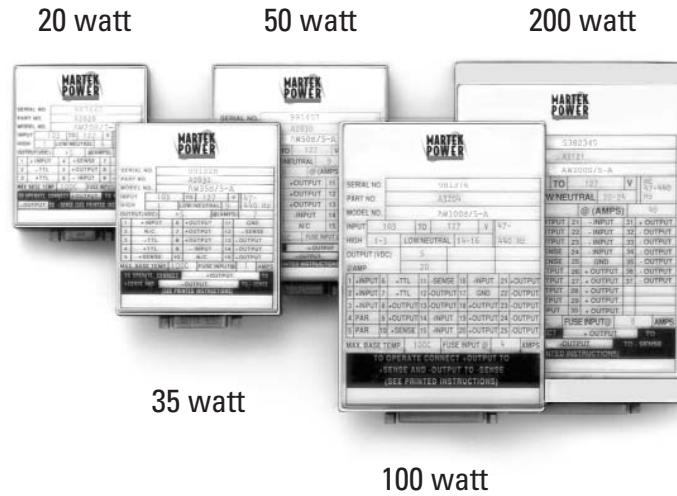
100 watt

The **“-R” (Ruggedized) version** of the A series is the same as the Standard version except it uses industrial grade plastic cased TO-220 type diodes and transistors in place of metal ones for cost savings. All other components including the control IC and the input capacitors are identical. The **“-R”** version has MTBF numbers 5 - 10% lower than the Standard version (per MIL-HDBK-217). No dimensions or electrical specifications will be changed. The operating temperature range remains at -55 to 100°C. The internal EMI filter is optional.

Refer to AM Series manual for detail specifications.

Series AW

AC-DC Converters



The AW series offers a comprehensive line of full military AC-DC / DC-DC power supplies designed for use in airborne, ground fixed and surface ship applications. The AW models employ field proven technology and meet a variety of military specifications for input transient, environmental and EMI compliance.

AC/DC

-
- | | | |
|-------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> ■ NAVMAT Guidelines ■ Current Mode Control | <ul style="list-style-type: none"> ■ Wireless Submodular Construction for High Reliability | <ul style="list-style-type: none"> ■ Standard Current Limiting ■ AC-DC or High Voltage DC-DC |
|-------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
-

Specifications

Input:

103 to 127 Vac; 47 - 440 Hz Single Phase and 90 to 160 Vdc.

Efficiency:

65% minimum. Typically 70 - 80%. (nominal input, full load, room ambient). For dual 5 Vdc, 3.3 and 2.0 Vdc output modules efficiency will be 50 - 60%.

Power Factor:

115 Vac, 60 Hz: 0.59 Typical
115 Vac, 400 Hz: 0.58 Typical

Line Regulation:

0.1% or 10 mV, whichever is greater, for each output with input change from low line to high line at constant load.

Load Regulation:

10 mV or 0.1%, whichever is greater. (each output from no load to full load at constant line).

PARD (Noise and Ripple):

25 mV rms, 100 mV P-P for 5 Vdc output and 50 mV rms, 200 mV P-P for other voltages; measured at 25 MHz bandwidth over temperature range.

Isolation Voltage:

700 Vdc, input to output;
500 Vdc, input to case;
200 Vdc, output to case.

Insulation Resistance:

50 megohms between input and output, input and case, output and case, when measured at 50 Vdc.

Temperature Range:

Operating: -55°C to +100°C maximum, at center of the baseplate.
Storage: -55°C to +125°C, ambient.

Temperature Coefficient:

0.01%/°C maximum over entire temperature range.

Input Transient Protection:

Unit will provide normal regulated output and withstand 180 Vac for 0.1 second, in accordance with MIL-STD-704A (under AC input operating model).

Load Transient Recovery:

Output voltage returns to regulation limits within 0.5 mS after 50% change in load current.

Load Transient Overshoot:

0.5 V from nominal voltage set point.

Short Circuit Protection:

All outputs are completely protected against a short circuit of any duration. Outputs automatically restore to normal when overload is removed.

Remote Inhibit:

Provides for remote turn on/off with TTL logic signal. Application of TTL Signal (logic 1) will inhibit the output. 10 mA required current (@ 5 Vdc).

Parallelability:

The 100 watt and 200 watt units allow for multiple unit current sharing without the need for external components, via a single pin connection on each unit.

Electromagnetic Interference:

Units, when tested in accordance with MIL-STD-462, meet the majority of the requirements of MIL-STD-462C for conducted and radiated, emission and susceptibility, for Class A1, A2, and A3 equipment for input power leads. For further details regarding levels and extend of compliance on each class, or requirement, consult factory. Certified test reports available upon request

Switching Frequency:

160 to 200 kHz fixed.

Reliability:

The Mean Time Between Failure (MTBF) is calculated per MIL-HDBK-217E at 50°C baseplate temperature with maximum operating input voltage and maximum rated output power. The MTBF for AW20S at ground benign environment is 199,209 hours. With the -ER option, MTBF was calculated to be 288,278 hours of ground benign. The standard AW200S MTBF at ground benign and naval sheltered is 100,000 and 15,000 hours respectively. Please consult factory for additional environments and models.

Environment:

Units meet MIL-STD-810D altitude, shock, acceleration, vibration and MIL-STD-901C high-impact shock requirements. For information, please consult factory. Certified test reports available upon request.

Hook up:

Via D-Subminiature Connectors, M24308/24 type.

Options

-883 Screening

Unit undergoes environmental screening based upon the parameters outlined in MIL-STD-883 and NAVMAT 4855-1. The screening consists of :

- 1.) Stabilization Bake: +125°C for 24 hours per MIL-STD-883, M1108 Condition B.
- 2.) Temperature Cycling (non-operational): 10 cycles min., at -55°C to +125°C, 36 minute transition with 1 hour dwell at each temperature extreme. Procedure reference MIL-STD-883, M1010, Condition B and NAVMAT P4855-1.
- 3.) Long Term Operational Burn In: 160 hours of powered operation under load. Modules are continuously cycled from +85°C to thermal shut down point (+105°C) during the 160 hours.

Ruggedized

COTS readily available components are utilized. Contact factory for details.

Environmental Stress Screening

Environmental Stress Screening (ESS) including random vibration and thermal cycling (per the NAVMAT guidelines) is available. Consult factory for details.

Enhanced Reliability

ER Options provides increased reliability by using higher levels of military grade components (to order, add "-ER" after model number, i.e., AW200S/15-A-ER). (Not recommended for new designs.)

Single Output

Nominal Output Voltage	Output Current (Amps)	Weight ¹ (oz.)	Weight ¹ (Grams)	Model Number
2	20.00	21	600	AW100S/2-A
	40.00	32	900	AW200S/2-A
3.3	20.00	21	600	AW100S/3.3-A
	40.00	32	900	AW200S/3.3-A
5	4.00	7	200	AW20S/5-A
	7.00	9	255	AW35S/5-A
	10.00	12	325	AW50S/5-A
	20.00	21	600	AW100S/5-A
	40.00	32	900	AW200S/5-A
5.2	3.85	7	200	AW20S/5.2-A
	6.73	9	255	AW35S/5.2-A
	9.62	12	325	AW50S/5.2-A
	19.23	21	600	AW100S/5.2-A
	38.46	32	900	AW200S/5.2-A
12	1.66	7	200	AW20S/12-A
	2.91	9	255	AW35S/12-A
	4.16	12	325	AW50S/12-A
	8.33	21	600	AW100S/12-A
	16.67	32	900	AW200S/12-A
15	1.33	7	200	AW20S/15-A
	2.33	9	255	AW35S/15-A
	3.33	12	325	AW50S/15-A
	6.66	21	600	AW100S/15-A
	13.33	32	900	AW200S/15-A
24	.83	7	200	AW20S/24-A
	1.45	9	255	AW35S/24-A
	2.08	12	325	AW50S/24-A
	4.16	21	600	AW100S/24-A
	8.33	32	900	AW200S/24-A
28	.71	7	200	AW20S/28-A
	1.25	9	255	AW35S/28-A
	1.78	12	325	AW50S/28-A
	3.57	21	600	AW100S/28-A
	7.14	32	900	AW200S/28-A

Set Point Accuracy: 50 mV or 0.5%, whichever is greater

Dual Output*

Nominal Output Voltage	Output Current (Amps)	Weight ¹ (oz.)	Weight ¹ (Grams)	Model Number
± 5 ²	1.46	9.25	260	AW35D/5-A
	2.08	11.75	330	AW50D/5-A
± 12	1.46	9.25	260	AW35D/12-A
	2.08	11.75	330	AW50D/12-A
± 15	1.17	9.25	260	AW35D/15-A
	1.67	11.75	330	AW50D/15-A

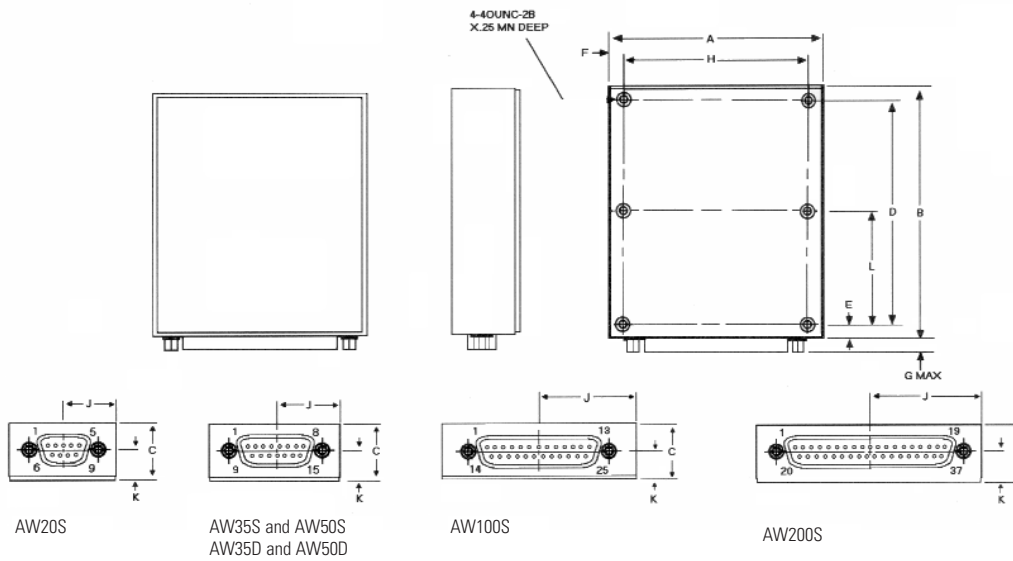
Set Point Accuracy: 50 mV or 0.5%, whichever is greater

* Each output is independent and isolated; outputs may be connected in a positive or negative configuration. Both outputs can be used as positive or negative. These also can be used in ± dual output configuration. Lastly these outputs can be tied in series for higher output voltages.

¹ Maximum weight

² Maximum output power for the AW Dual ±5 is 21 watts or 10.5 watts per channel

Case Drawings



Dimensions (in/mm)

Models	A	B	C	D	E	F	G	H	J	K	L
AW20S	2.50	3.00	.85	2.600	.20	.20	.25	2.100	1.25	.46	N/A
	63.5	76.2	21.6	66.04	5.1	5.1	6.4	53.34	31.8	11.7	N/A
AW35S	3.00	3.50	.85	3.100	.20	.20	.25	2.600	1.50	.46	N/A
AW35D	76.2	88.9	21.6	78.74	5.1	5.1	6.4	66.04	38.1	11.7	N/A
AW50S	3.25	4.00	.85	3.600	.20	.20	.25	2.850	1.63	.46	N/A
AW50D	82.6	101.6	21.6	91.44	5.1	5.1	6.4	72.39	41.4	11.7	N/A
AW100S	3.75	5.25	.85	4.850	.20	.20	.25	3.350	1.87	.46	2.425
	95.3	133.4	21.6	123.19	5.1	5.1	6.4	85.09	47.5	11.7	61.60
AW200S	4.50	6.50	.85	6.100	.20	.20	.25	4.100	2.25	.46	3.050
	114.3	165.1	21.6	154.94	5.1	5.1	6.4	104.14	57.2	11.7	77.47

Tolerances: inches - X.XXX = ± 0.015
 X.XX = ± 0.03
 mm - X.XX = ± 0.4
 X.X = ± 0.8

Mounting: Standard: 4-40 THD inserts 1/4" min. depth are provided in baseplate. Steel 4-40 bolts American Standard, unified national coarse series, slotted studs are supplied with each unit.

Material: Base - Aluminum 5052-H32
 Case- 26 Gauge Steel (cold rolled)
 Case Finish - Nickel Plating

Metric: M2.5 inserts. To order insert an "I" after the "A" in the model number, i.e. AW50S/12-AI.

* Number of mounting holes: 6 places for the 100 watt model, 4 places for all other models.

Pin Designations

Model:	AW20S		
Connector:	DEMME9PF		
Mate:	DEMMS9S		
1. + Input	4. + Sense ²	7. Ground	
2. - TTL	5. + Output	8. - Sense ²	
3. + TTL	6. - Input	9. - Output	

Model:	AW35S and AW50S		
Connector:	DAMME15PF		
Mate:	DAMM15S		
1. + Input	6. + Output	11. Ground	
2. N/C	7. + Output	12. - Sense ²	
3. - TTL	8. + Output	13. - Output	
4. + TTL	9. - Input	14. - Output	
5. + Sense ²	10. N/C	15. - Output	

Model:	AW35D and AW50D		
Connector:	DAMME15PF		
Mate:	DAMM15S		
1. + Input	6. + Output 1	11. Ground	
2. N/C	7. + Sense 2 ²	12. - Sense 1	
3. - TTL	8. + Output 2	13. - Output 1	
4. + TTL	9. - Input	14. - Sense 2 ²	
5. + Sense 1 ²	10. N/C	15. - Output 2	

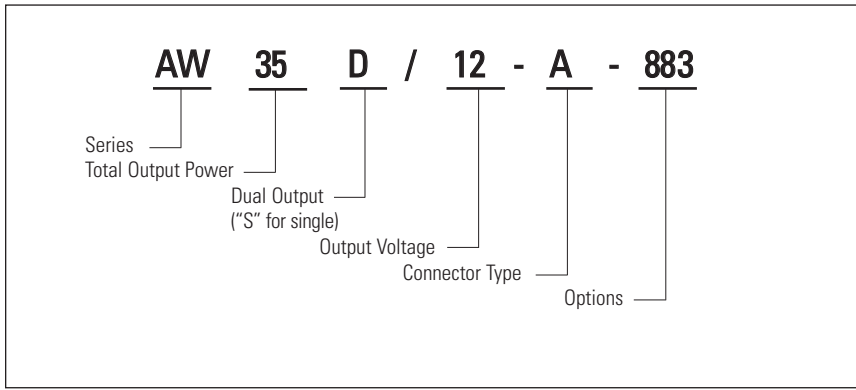
Model:	AW100S		
Connector:	DBMME25PF		
Mate:	DBMM25S		
1. + Input	10. + Sense ²	18. + Output	
2. + Input	11. - Sense ²	19. + Output	
3. + Input	12. - Output	20. + Output	
4. Parallel ¹	13. - Output	21. + Output	
5. Parallel ¹	14. - Input	22. - Output	
6. + TTL	15. - Input	23. - Output	
7. - TTL	16. - Input	24. - Output	
8. + Output	17. Ground	25. - Output	
9. + Output			

Model:	AW200S					
Connector:	DCMME37PF					
Mate:	DCMM37S					
1. + Input	8. + TTL	14. + Sense ²	20. - Input	26. + Output	32. - Output	
2. + Input	9. - TTL	15. - Sense ²	21. - Input	27. + Output	33. - Output	
3. + Input	10. + Output	16. - Output	22. - Input	28. + Output	34. - Output	
4. + Input	11. + Output	17. - Output	23. - Input	29. + Output	35. - Output	
5. + Input	12. + Output	18. - Output	24. - Input	30. + Output	36. - Output	
6. Parallel ¹	13. + Output	19. - Output	25. Ground	31. + Output	37. - Output	
7. Parallel ¹						

¹ Parallel pins are internally connected and redundant. Either pin can be used for single pin parallelability or either pin can be left open and unused.

² Sense pins must be tied either locally (at connector) or remote (at load) for proper operation.

How to order



Input Current

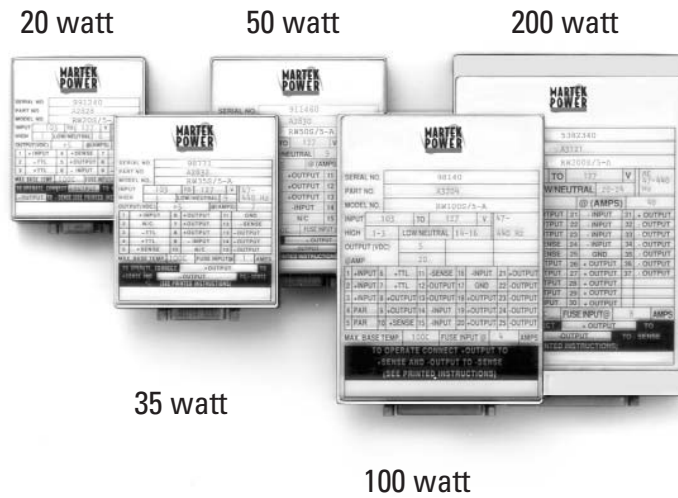
(Typical Amps)

Model	Output Load	Low Line	High Line
AW20S	50%	0.27	0.22
	100%	0.50	0.40
AW35S	50%	0.47	0.38
	100%	0.87	0.71
AW35D	50%	0.50	0.40
	100%	0.90	0.75
AW50S	50%	0.67	0.55
	100%	1.24	1.00
AW50D	50%	0.70	0.60
	100%	1.30	1.05
AW100S	50%	1.35	1.10
	100%	2.50	2.00
AW200S	50%	2.70	2.19
	100%	5.00	4.00

Input Fuse: To protect your power supply source and the Martek Power Abbott converter always insert a fuse between the source and the module's "high" input pin(s). Bus fuse type MDX or equivalent slow blow is recommended. Fuse value is indicated on label of module; typically 2 times low line input current value at full load (100%).

Series RW

DC/DC Converters



The “-R” (Ruggedized) version of the A series is the same as the Standard version except it uses industrial grade plastic cased TO-220 type diodes and transistors in place of metal ones for cost savings. All other components including the control IC and the input capacitors are identical. The “-R” version has MTBF numbers 5 - 10% lower than the Standard version (per MIL-HDBK-217). No dimensions or electrical specifications will be changed. The operating temperature range remains at -55 to 100°C. The internal EMI filter is optional.

Refer to AW Series manual for detail specifications.

The AB, AW and AM series of power supplies were designed as military grade, stand alone devices requiring no external components for operation. The entire series are 160 to 200 kHz, fixed frequency, switching power supplies. The series utilizes either push-pull forward or single ended forward converter topologies. Control is accomplished via pulse width modulation in a current mode control scheme.

These models are all encased in five sided steel enclosures to minimize radiated noise. All models in these series contain internal EMI filters for compliance to MIL-STD-461 for conducted emissions on the input leads. Certified tests reports characterizing EMI performance are available upon request. The AB, AW and AM series comply with the NAVMAT guidelines for component derating. Environmental Stress Screening (ESS) per the NAVMAT guidelines is also available as an option.

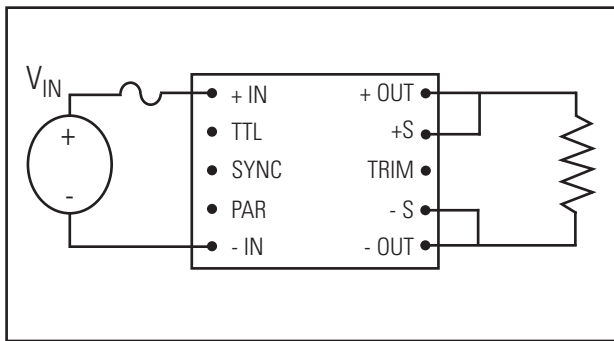


Figure 1

The most basic use of the power converter is shown in Figure 1. An input fuse is always recommended to protect both the source and the power supply in the event of failures. Bus fuse type MDX or equivalent slow-blow is recommended with a current rating approximately 200% of the full load input current to the converter. Having a slow-blow type fuse will allow for the converter's inrush charge at turn-on. The sense pins of the converter must be connected to their corresponding output bus. Inherently, power converters will have some internal energy loss, which is dissipated in the form of heat through an aluminum mounting surface. This surface must be cooled to maintain a temperature below the maximum operating temperature.

Wire Gauge and Distance to Load

If the resistance of the wire, printed circuit board runs or connectors used to connect a converter to system components is too high, excessive voltage drop will result between the converter and system components, degrading overall system performance.

For example, if the DC/DC converter in Figure 1a is a 50W unit (5 Vdc @ 10 Amps) with output load regulation specified at 0.2%; the connection as shown will degrade load regulation by a factor of 10. In this example, the 4 feet of #14 AWG wire used to connect the converter output to the load, has a total line resistance of 10mW (ignoring any contact resistance). For a 50W, 5 Vdc output converter, the drop across the lead resistance will be 100mV (10 A X 0.010W) or 2% of the output. Thus, the converter is selected for 0.2% regulation, but the power system layout achieves only 2.2%.

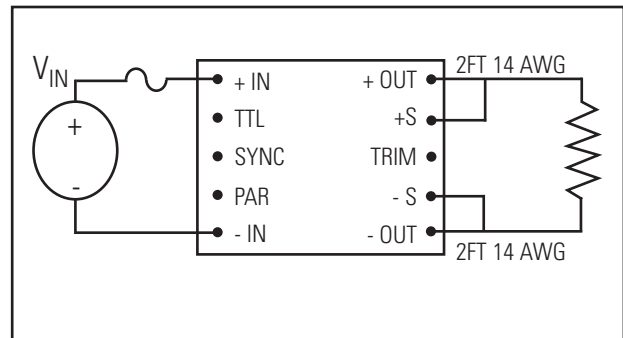


Figure 1a

This can be corrected by decreasing the distance between the converter output and load. If that is not possible, using larger diameter wire (see Table 1) or PCB runs that have a larger cross sectional area and shorter length will also reduce conductor resistance. The use of the converter's remote sense capability will also work (see remote sense for more information on this option).

Note: High IR drops between the converter and load may cause converter parameters (such as output voltage accuracy, remote sensing supplies, etc. to appear to be out of specification. High IR drops on input lines may cause start up problems (voltage at the input pins below the input range of the converter).

Obviously, any connections made to the power distribution bus present a similar problem. Poor connections (such as microcracking around solder joints) can cause serious problems such as arcing. Contact resistance must be minimized. Proper workmanship standards must be followed to insure reliable solder joints for board mount converters. Terminal strips, spade lugs and edge connectors must be free of any corrosion, dust or dirt. If parallel lines or connections are available for routing converter output currents, they should be utilized.

# AWG	Current Resistance (mΩ/Foot)	#AWG	Current Resistance (mΩ/Foot)
9	0.792	21	12.77
10	0.998	22	16.20
11	1.261	23	20.30
12	1.588	24	25.67
13	2.001	25	32.37
14	2.524	26	41.02
15	3.181	27	51.44
16	4.020	28	65.31
17	5.054	29	81.21
18	6.386	30	103.7
19	8.046	31	130.9
20	10.13	32	162.0

Table 1

Ripple and Noise

Output ripple and noise (sometimes referred to as PARD or "Periodic and Random Deviations") can be defined as unwanted variations in the output voltage of a power supply. In switching power supplies this output noise is seen as a series of pulses with a high frequency content and is therefore measured as peak value (i.e., specified as "peak-to-peak".)

The AB, AW, and AM series power supplies are specified and tested in our factory with a 25 MHz bandwidth oscilloscope. Measurements taken by a scope set a higher frequencies (i.e., 300 MHz) may produce significantly different results due to noise coupling on to the probe from sources other than the power supply.

The length of all measurements leads (especially the ground lead) should be minimized and the sense pins should be tied to their respective outputs (+Sense to +Vout). We recommend measurement as close to the power supply as possible. This can be accomplished by connecting a short bus wire (generally 0.5 inch or less, making a loop at the end to place at the probe) to the negative and positive outputs on the back side of the connector mate, then place the tip of the probe on the +output and the ground ring (or ground band) on the - output for a true ripple measurement. This is displayed in Figure 1b below.

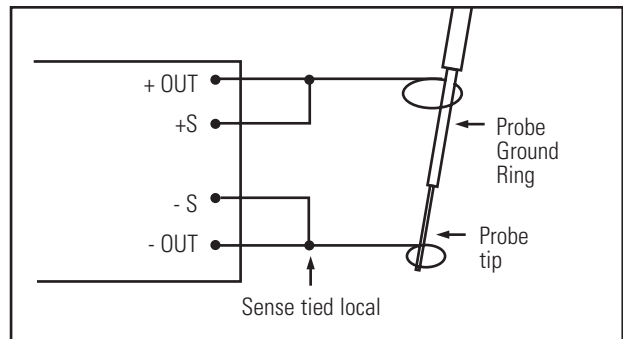


Figure 1b

Utilizing the probe ground ring (as opposed to a ground wire) will minimize the chance of noise coupling from sources other than the power supply. If this is not practical or possible then attached a 6 to 8 inches twisted pair wire to the outputs of the power supply and place a 10 to 20 μF tantalum capacitor (low ESR type, with an appropriate voltage rating) across the load. This test method is shown on Figure 1c.

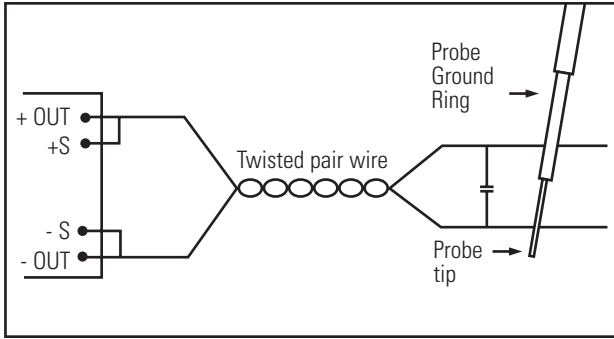


Figure 1c

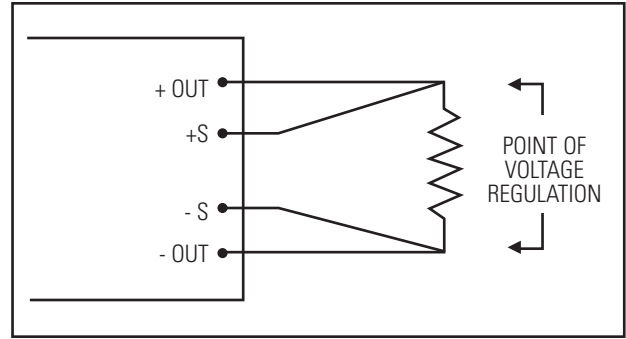


Figure 2: Remote Sense - Single Output

This test method will enable a remote measurement and eliminate any noise that may couple on to the extended leads coming off the converter.

Remote Sense

Remote sense pins, +S and -S have been provided on the AB, AW and AM Series for applications where precise load regulation is required a distance from where the converter is physically located. If remote sensing is NOT required, these pins **MUST BE tied** to their respective output pins (+S to +OUT, -S to -OUT). If one or more of these sense pins are not connected to their respective output pins, the output(s) of the unit will not regulate to within specification and may cause a high output voltage condition.

DO NOT connect sense pins to any pin other than their respective output pins or permanent damage will occur.

DO NOT disconnect the output pins while the sense pins are still tied to the load and powered or permanent damage will occur.

DO NOT connect sense pins to any load other than the same load the output pins are connected to or permanent damage may occur.

The internal remote sense circuit is designed to compensate for a maximum of 0.5 V difference (0.25 V in each output lead) in voltage between the load and the power converter. Longer output leads or traces are required to be of sufficient gauge or width to maintain the voltage drop across them of 0.5 V maximum at rated load current.

Parallel Operation

(100 and 200 Watt Modules only)

The AB, AW and AM Series have the capability of being paralleled to drive loads of higher power than a single unit can handle. The PAR pin is supplied on the unit for this function. If parallel operation of two or more units is required, the following precautions must be followed.

- Corresponding input and output leads or traces on each unit should be as equal in length and size as practical. The more equivalent the leads are the closer the current sharing.
- The leads connecting the PAR, +S and -S pins may need to be shielded to avoid high frequency noise interference in very high power applications.
- The PAR pins of all units should be tied together.

Or'ing diodes may be included in the positive output leads for true N+1 redundant systems, but are not necessary. Local sensing should be used whenever possible to minimize noise on +S and -S pins in parallel applications. Though this feature is available only on 100 and 200 watt modules, parallel operation can be between either (i.e. 100 watt unit tied to a 200 watt for 300 watts).

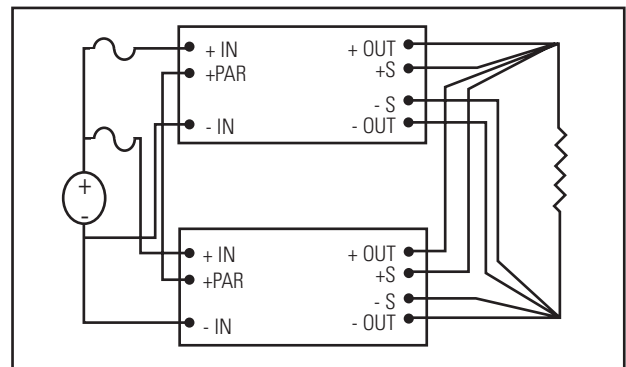


Figure 1c: Parallel Operation

Series Operation

The AB, AW and AM Series of power supplies may be arranged in a series operating mode to supply higher output voltages when required (see Figure 4). In this configuration D1 and D2 are added to protect against the application of a negative across the outputs of the power converters during power up and power down. The two (or more) units need not have the same output voltage, but the output current supplied in this configuration will be limited to the lowest maximum output current of the modules used.

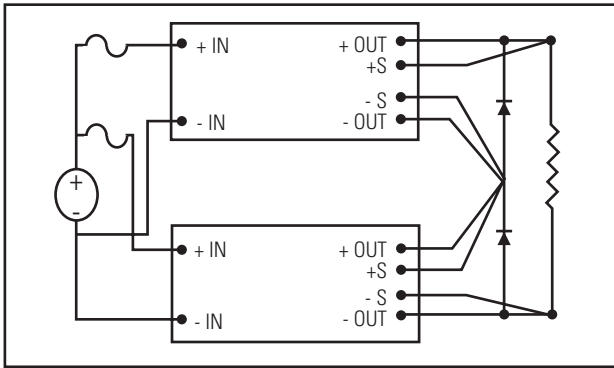


Figure 4: Series Operation

Dual Output (+/-) Operation (35 and 50 Watt Dual Outputs only)

The AB, AW and AM are available as dual (two channel) configurations for 35 and 50 watt modules (only). The two channels are completely independent and can be operated as either positive channels, negative channels or both (i.e., standard +/- configurations).

To operate the modules in the standard +/- configuration tie the positive rail of the first channel to the negative rail of the second channel and use this point as the reference ground as shown in Figure 5.

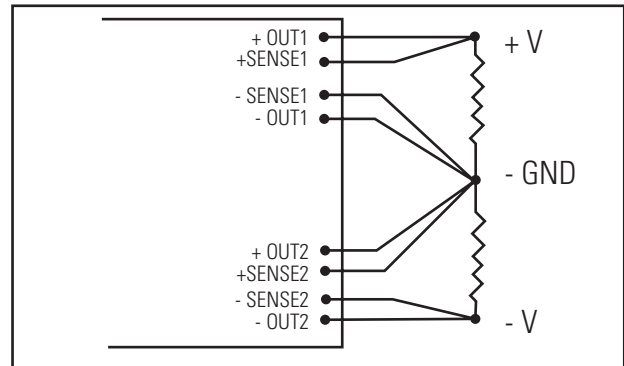


Figure 5: Dual Output (+/-) Operation

Additionally, since the modules offer two independent, isolated outputs it is possible to offer any combination of output voltages between 5 and 15 Vdc in one module i.e., a 5 Vdc and 5.2 Vdc in one common box. Consult factory for detail.

Remote On/Off

The AB/AW/AM Series contains a remote on/off (TTL) feature. This allows control of the output power using a TTL level signal. The AB/AW/AM series +TTL and -TTL pins are isolated from all other signals, allowing them to be referenced to either input or output grounds. The TTL pins are tied to the input of an optocoupler that is limited to 10 mA maximum at logic level 1 (or 5 volts) inputs.

The unit will be on if the TTL pins are left floating (untied) or if they are shorted together. The output remains on if a logic level 0 (less than 0.8 volts) is applied at the +TTL pin with respect to the - TTL pin. Application of a logic level 1 at the +TTL pin with respect to the - TTL pin will inhibit the output.

-ER Option

The “-ER” (Enhanced Reliability) option for the AB, AW and AM series upgrades the component parts from hermetic/Mil-grade to full military grade. Active devices upgrade to JAN, JANTX or MIL-STD-883 (wherever possible) and passive components upgrade to “M” level or better (wherever possible). The net result is typically a 2 to 3 times improvement in Mean Time Between Failure (MTBF) calculations per MIL-HDBK-217. No dimensions or electrical specifications will be changed. Exact calculations can be obtained displaying the impact of this option on the MTBF for a specific model. This option is not recommended for new designs. Please contact factory for details.

Military Specifications; Environmental Qualifications

Specification	Condition	Method	Procedure	Test Condition
MIL-STD-704D	Input Transient			Transients up to 50Vdc for 0.1 sec (28 Vdc input) Transients up to 180 Vac for 0.1 sec (115 Vac input)
MIL-STD-810C	Vibration	514.2	1	Up to +/- 15gs, each axis for 3 hours +E23
MIL-STD-810C	Humidity	507.3	1	95% humidity, non-condensing for 10 days
MIL-STD-810C	Temp/Altitude	504.1	1	-55°C to +71°C @ 70,000 feet (category 6)
MIL-STD-810C	Acceleration	513.2	2	14 gs each axis
MIL-STD-810C	Mechanical Shock	516.2	1	Up to 40gs, each axis for 11ms
MIL-S-901C	High Impact Shock			5 feet hammer drop, each axis

Certified test reports are available upon request.

STANDARD TERMS AND CONDITIONS

Martek Power Abbott's converters and power supplies are built to exacting standards to assure customer satisfaction. Should you ever experience a problem with one of our products please contact your local sales representative to assist in a solution. The terms of the warranty and the length of warranty period* will vary between product lines. Please consult your local sales representative for terms and length of the warranty for any specific model or purchase.

The Company warrants that all of its Products will be free from defects in material and workmanship for twelve months. The Company shall, at its option, and as the Customer's and user's sole and exclusive remedy, issue a credit in the amount of the then-applicable price of such Product, or repair or replace any such Product which is defective under the terms of the foregoing warranty, free of charge.

ALL OTHER EXPRESS, STATUTORY AND IMPLIED WARRANTIES, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE HEREBY DISCLAIMED. IN NO EVENT WILL THE COMPANY BE LIABLE FOR ANY INDIRECT, PUNITIVE, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGE IN CONNECTION WITH OR RELATED TO THE SALE OF PRODUCTS.

The information and specifications contained in this catalogue are, to the best of our knowledge, correct at time of publication. However, Martek Power Abbott accepts no responsibility for consequences arising from errors or inaccuracies. No liability, implied or otherwise, is accepted for costs or inconvenience incurred as a result of these changes. Neither does the manufacturer undertake any commitment to guarantee continuity of supply in the event of product obsolescence. In addition, Martek Power Abbott reserves the right to change its standard product range of the specification of any model subsequently without prior notice. No liability as a result of any of the above occurrences can be accepted.

Warranty Period*

- I. A, B, C, M, NW, PFC, W and LV Series: One (1) year warranty.
- II. CB, HM, NB, NL and SM Series: Three (3) years warranty.

***Repairs**

- I. A, B, C, M, NW, PFC, W and LV Series: Martek Power Abbott will repair products covered by our warranty. To return products a Return Material Authorization Number is required. Products beyond the warranty will be repaired only after the customer has authorized quoted repair charges. Any Martek Power Abbott product over seven(7) years old from the date of original shipment will not be serviced or repaired.
- II. CB, HM, NB, NL and SM Series: During warranty period, Martek Power Abbott will repair or replace (at Martek Power Abbott's discretion) products found to be defective. Martek Power Abbott will not repair products that are out of warranty.

***After Repair Warranty**

- I. A, B, C, M, NW, PFC, W and LV Series: Upon completion of repair, the products will be under warranty for a period of one year. Regardless of the date of repair, no product will be serviced or warranted beyond seven (7) years from the date of original shipment.
- II. CB, NL, NB and SM Series: Upon completion of repair, the products will be under warranty for a period of one year. Regardless of the date of repair, no product from the CB, NL, NH, NB and SM Series will be serviced or warranted beyond three (3) years from the date of original shipment.

Return Material Authorization Numbers

All returning goods must be accompanied by a Return Material Authorization (RMA) number. The RMA number must be clearly marked on the outside of the shipping carton. To receive and RMA number contact Martek Power Abbott at (310) 202-8820, extension 276. Please be prepared with the correct model and serial number of the product to be returned. For out of warranty products a company purchase order will be required for processing.

Evaluation Charges

All out of warranty products returned to Martek Power Abbott are subject to a \$50.00 evaluation charge. If the returned product is found to be in need of repair, and these repairs are authorized, the \$50.00 evaluation fee will be waived.

Repair Charges

Repair charges for all models are quoted per Martek Power Abbott published repair price list RPL97-07D. The repair charges do not include any additional processing or testing fees (i.e. ESS testing).

Shipping Instructions

All returning goods must have a RMA number marked on the carton. The number should be marked on a minimum of 2 sides of the carton, 3 inches (76mm) high, 6 inches (152mm) long. All goods must be shipped prepaid. Martek Power Abbott reserves the right to refuse all shipments received without a RMA number.