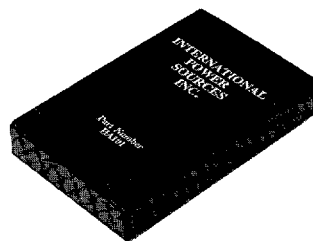
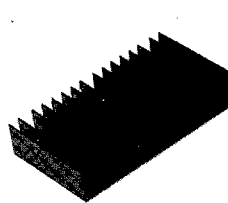


**International
Power Sources, Inc.**

200 Butterfield Drive
Ashland, Massachusetts 01721
Tel. (508) 881-7434 Fax (800) 226-2100

DC/DC Converters



HA Series: 60 WATT High Density

FEATURES

- 2:1 Input Range
- Isolated Outputs
- Efficiency to 84%
- 100KHz Switching Frequency
- External Output Trim
- Remote Disable
- 1 to 4 Outputs
- PCB Mountable

MODELS CHART

MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	INPUT CURRENT		% EFF
				NO LOAD	FULL LOAD	
HA101	9-18VDC	5VDC	10.0A	25mA	5.2A	80
HA102	9-18VDC	12VDC	5.0A	25mA	6.1A	82
HA103	9-18VDC	15VDC	4.0A	25mA	6.1A	82
HA104	9-18VDC	5/5VDC	5/5A	25mA	5.2A	80
HA105	9-18VDC	12/12VDC	2.5/2.5A	30mA	6.1A	82
HA106	9-18VDC	15/15VDC	2.0/2.0A	30mA	6.1A	82
HA107	9-18VDC	+5/±12VDC	5.0/±1.25A	70mA	5.7A	80
HA108	9-18VDC	+5/±15VDC	5.0/±1.00A	85mA	5.7A	80
HA109	9-18VDC	±5/±12VDC	+5/-0.5/±1.25A	145mA	6.0A	80
HA110	9-18VDC	±5/±15VDC	+5/-0.5/±1.0A	165mA	6.0A	80
HA201	18-36VDC	5VDC	10.0A	20mA	2.6A	81
HA202	18-36VDC	12VDC	5.0A	20mA	3.0A	83
HA203	18-36VDC	15VDC	4.0A	20mA	3.0A	84
HA204	18-36VDC	5/5VDC	5/5A	20mA	2.6A	81
HA205	18-36VDC	12/12VDC	2.5/2.5A	25mA	3.0A	82
HA206	18-36VDC	15/15VDC	2.0/2.0A	25mA	3.0A	84
HA207	18-36VDC	+5/±12VDC	5.0/±1.25A	45mA	2.9A	82
HA208	18-36VDC	+5/±15VDC	5.0/±1.0A	55mA	2.9A	82
HA209	18-36VDC	±5/±12VDC	+5/-0.5/±1.25A	85mA	3.0A	81
HA210	18-36VDC	±5/±15VDC	+5/-0.5/±1.0A	95mA	3.0A	81
HA301	36-72VDC	5VDC	10.0A	20mA	1.3A	82
HA302	36-72VDC	12VDC	5.0A	20mA	1.5A	84
HA303	36-72VDC	15VDC	4.0A	20mA	1.5A	84
HA304	36-72VDC	5/5VDC	5/5A	20mA	1.3A	82
HA305	36-72VDC	12/12VDC	2.5/2.5A	20mA	1.5A	84
HA306	36-72VDC	15/15VDC	2.0/2.0A	20mA	1.5A	84
HA307	36-72VDC	+5/±12VDC	5.0/±1.25A	35mA	1.4A	82
HA308	36-72VDC	+5/±15VDC	5.0/±1.0A	35mA	1.4A	82
HA309	36-72VDC	±5/±12VDC	+5/-0.5/±1.25A	50mA	1.4A	83
HA310	36-72VDC	±5/±15VDC	+5/-0.5/±1.0A	60mA	1.4A	83

NOTE: NOMINAL INPUT VOLTAGE 12, 24 OR 48 VDC.

ELECTRICAL SPECIFICATIONS

All specifications typical at nominal line, full load and 25°C

OUTPUT SPECIFICATIONS

Voltage Accuracy	Primary Outputs.....	±1% max.
	-5V Output.....	±3% max.
Voltage Balance ¹		±2% max.
Output Adjustment ²		±10% max.
Line Regulation (HL to LL)		±1% max.
Load Regulation (FL to 1/4FL)		±2% max.
Ripple & Noise, 20MHz BW		75mv P-P max.
Temperature Coefficient		±0.02%/°C max.
Transient Response, 25% Step load change	500 usec.	max.
Short Circuit Protection, All Outputs		Indefinite
Overvoltage Protection, All Outputs		OVP Clamp

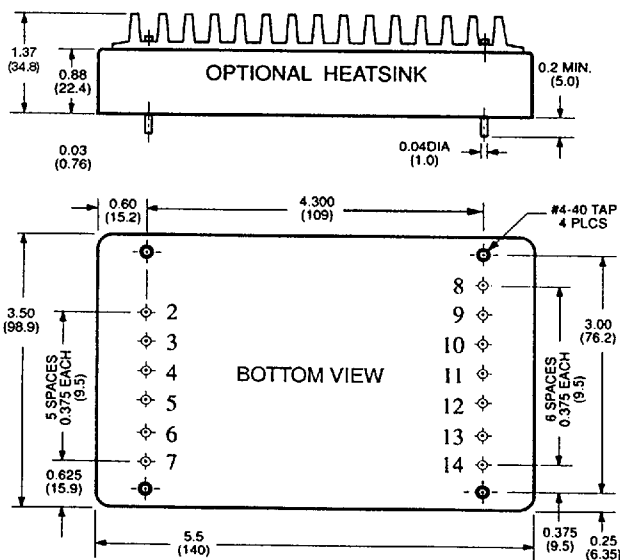
INPUT SPECIFICATIONS

Input Voltage Range.....	See Table
Input Filter.....	Pi Network
Surge Protection	Transient Clamp
Reverse Voltage Protection	Internal Shunt Diode
	Use External Fuse

GENERAL SPECIFICATIONS

Efficiency	See Table
Isolation Voltage, Input to Output	500 VDC min.
Input to Case.....	250 VDC min.
Isolation Resistance, Input to Output	10 ⁹ ohms min.
Input to Case	10 ⁸ ohms min.
Switching Frequency	100KHz
Operating Temperature Range	-25°C to 55°C
with optional heat sink	-25°C to 71°C
Case ³	-25°C to 100°C
Storage Temperature Range	-55°C to 105°C
Case Material.....	Back Coated Aluminum with Non-Conductive Base

DIMENSIONS AND CONNECTIONS



NOTES:

1. Voltage difference between outputs 2 & 3 for triples and outputs 3 & 4 for quads.
2. Not available on triple output units.
3. Derate linearly from 100% load at 85°C to 0% load at 100°C.
4. OUTPUT ISOLATION ON DUAL OUTPUTS: Outputs are isolated from each other and can be referenced as positive or negative. Load sharing is not possible.
5. REMOTE SENSE: Will compensate for up to 1 Volt drop between converter and load. If remote sense is not utilized, output sense pins must be jumpered to their respective output power pins.
6. Add suffix "H" to part number to order optional heat sink.

Dimensions in inches (mm).
Specifications subject to change.

PIN CONNECTIONS

PIN	SINGLE	DUAL	TRIPLE	QUAD
1	No Pin	No Pin	No Pin	No Pin
2	- Input	- Input	- Input	- Input
3	- Input	- Input	- Input	- Input
4	+ Input	+ Input	+ Input	+ Input
5	+ Input	+ Input	+ Input	+ Input
6	Disable	Disable	Disable	Disable
7	Case	Case	Case	Case
8	- Output	- Sense 1	- Sense 1	- Output 1
9	- Output	- Output 1	- Output 1	Com. 1,2
10	+ Output	+ Output 1	+ Output 1	+ Output 2
11	+ Output	+ Sense 1	+ Sense 1	Trim 2
12	- Sense	- Output 2	- Output 2	- Output 3
13	Trim	Trim 2	Com. 2,3	Com. 3,4
14	+ Sense	+ Output 2	+ Output 3	+ Output 4

REMOTE ON/OFF CONTROL

Logic Compatibility	CMOS or Open Collector TTL
E _c -ON,	>+5.5 VDC or Open Circuit
E _c -OFF,	<1.8 VDC
Shutdown Idle Current.....	10 mA
Input Resistance.....(E _{in} 0 VDC to 9 VDC)	100 KΩ
Control Common.....	Referenced to input Minus

EXTERNAL OUTPUT-TRIMMING

SINGLE & DUAL OUTPUT	QUAD OUTPUT
Output may optionally be externally trimmed (±10%) with a fixed resistor or an external trimpot as shown.	Output may optionally be externally trimmed (±10%) with a fixed resistor.

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