

JASPER ELECTRONICS

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HAL1500 SERIES

1500 - 1200 WATTS, SINGLE OUTPUT w/Standby

Features:

- Universal input
- Front-end power supply
- 0.99 line power factor
- High density, 16 W/cu in.
- High efficiency
- Hot Swap-Redundancy.
- Internal Oring Diodes
- I²C interface status and control
- Extended operating temperature range
- Status LEDs
- Choice of 3.3V, 5.0V or 12.0V standby voltage
- Single wire current share



General Product Specifications:

-INPUT-

Voltage/Current AC 90-264V, 13.6A/8.4Arms max, 47-63Hz, 1 Phase.
 Fusing AC 15.0A, 250V NB internal line fuse provided, non-user serviceable.
 Power Factor >0.99 line PFC typical at 115VAC, full load.
 Efficiency 90% typical at 230VAC, full load.
 Inrush Current Thermistor soft start (~25°C cold start). 35 Apk @ 115VAC, 70 Apk @ 230VAC.
 Under Voltage Protection Auto DC output shutdown when AC input falls below safe operating limits (~ 80V or 150V AC). Automatic recovery when input rises to within normal operating range.

-OUTPUTS-

Voltage/Current (V/A)	V1 ⁽¹⁾	V2 Standby ⁽²⁾
HAL1201-2*	12.0V @ 100.0A	5.0V @ 2.0A
HAL1501-5	24.0V @ 62.5A/50.0A	5.0V @ 2.0A
HAL1501-6	28.0V @ 53.6A/42.8A	5.0V @ 2.0A
HAL1501-8	48.0V @ 31.2A/25.0A	5.0V @ 2.0A
HAL1501-9	54.0V @ 27.7A/22.2A	5.0V @ 2.0A

- 1) Total loading not to exceed **1500** Watts at high line (180V-264V), and **1200** Watts at low line (90V-132V). ***1200** Watts max for 12.0V output. For all configurations, outputs also derate linearly above 50°C ambient. See Operating Temperature specification.
- 2) Optional 3.3V/2.0A or 12.0V/1.0A standby output available.

Output Voltage Setpoint . Factory preset within ±0.2% of nominal voltage.
 Line/Load Regulation.....±1.0% at the sense point over full AC input range and 0 – 100% output loading, with sense leads connected.
 Minimum Loading None required.
 Stability Output drift <±0.2% after 20 minute warm-up.
 Temp. Coefficient <±0.02%/°C, 0° - 70°C, after 20 minute warm-up.
 Dynamic Response <5.0% deviation with a 25% load change at a slew rate of 1A/µsec, locally sensed. Output recovery time to within 1% less than 500µsec.
 Remote Sense..... V1 output compensates for up to the lessor of 5.0% or 1.0V total line drop in the load cables. Output is internally sensed if leads are opened. ΔVo ≤ 1.0V.
 Ripple and Noise (PARD)..... <1% p-p nominal at a 20 MHz bandwidth limit, measured with a 1.0µF ceramic capacitor in parallel with a 20µF tantalum capacitor connected between the measured output and its return at the connector.
 Current Sharing/ Parallel N+1 Operation... Single wire connection. CS Accuracy is ±10% of rated current between any number of units.
 Redundant/Hot Swap Full power N+1 redundant, hot swap capable.
 Output Turn-on Delay <1.0sec from AC turn-on. <100msec from remote enable.
 Over/Under Shoot <1% at turn-on or turn-off.
 Hold-Up Time Output remains in regulation 16mSec *minimum* following loss of AC power at low line, full load.

Over Current/Short Circuit Protection Standard hiccup mode (cycles on/off) current limit when V1 output current is 110% to 130% of full load. Automatic recovery when fault is removed.
 Over Voltage Protection Non-crowbar type. V1_out exceeding 115% of nominal will cause output to latch off. Remote enable or AC input recycle required to reset.
 Over Temperature Protection Internal temperature sensing. Causes all outputs to shut down. Automatic recovery.

-SIGNALS, INDICATORS and CONTROLS-

Remote Enable..... Enabled by closed circuit or TTL logic 0. Disabled by open circuit or TTL logic 1.
 Remote Inhibit Enabled by open circuit or TTL logic 1. Disabled by closed circuit or TTL logic 0. Standby output remains active.
 Remote Adjust..... External 0-5V DC on remote adjust pin referenced to negative sense equals -5% to +5% change of nominal output voltage.
 Power Good (DC-OK) Signal..... High signal when V-out is above 95% of nominal voltage. Signal goes low when V-out drops below 90% of nominal.
 Power Fail Warning Loss of input AC causes a TTL compatible signal to go high >4msec prior to any output dropping out of regulation. At AC turn-on, signal stays high until outputs are in regulation.
 Fan Fail Warning High TTL compatible signal goes low on fan failure.
 Input Power Indicator LED..... Front mounted, single-color: Green indicates power ON and within tolerance.
 Output Power Indicator LED..... Front mounted, single-color: Green indicates the output is within tolerance
 Hot Swap Indicator LED Single-color Blue front mounted LED illuminates per ATCA standard to indicate Hot Swap condition. Steady state: module powering up or ready for extraction. Blinking: hot swap configuration set-up in process. Off: module functioning normally.

-OPERATING ENVIRONMENT-

Operating Temperature ..-10°C - 50°C ambient at full load. V1 output derates linearly to 50% of full load at 70°C.
 Cooling Dual internal, front end mounted DC ball bearing fans provided. CFM rating **TBD**. Forward airflow direction is front to rear (connector end).
 Audible Noise 45dba at 25°C, 110/220VAC operation. Fan speed adjusts as a function of load and ambient temperature.
 Relative Humidity.....Up to 90% RH, non-condensing.
 Operational Vibration 0.75G peak, 5 – 500Hz along three orthogonal axis at 1 octave/min.
 Storage Temperature.....-40° to 85°C.
 Altitude Operating to 10,000 ft. Storage to 40,000 ft.
 MTBF Designed for 300,000 hrs minimum at 30°C.

-I²C SERIAL COMMUNICATION-

Optional. This power supply can be operated as an I²C slave device capable of operating up to 100kHz.

SCL..... Driven by the system interface controller and defines the clock interface protocol.

SDA..... Single wire data path.

A0 Module address selection. Pulled high or low (GND) dependent on system slot used.

A1 Module address selection. Pulled high or low (GND) dependent on system slot used.

A2 Module address selection. Pulled high or low (GND) dependent on system slot used.

I²C Monitoring Logic:

DC-OK Output voltage within regulation.

AC-OK..... AC input within safe operating limits.

FAN FAIL Monitors fan RPM. Signal goes low if fan speed drops below 35%-55% of nominal.

OVER TEMP Early warning signal. Trigger point approximately 10% lower than output shutdown thermal switch.

OVER CUR Early warning signal. Trigger point approximately 10% lower than I-Lim trip point.

PS PRES..... Signal indicates power supply installed.

I²C Command Logic:

REM ON/OFF... Enable or disable DC output. 2 second disable delay.

REM CYCLE Cycles output OFF/ON. Output OFF 2.0-2.5 seconds.

The EEPROM is programmed to supply the users system with the following information:

- Manufacturers name.
- Manufacturers model description.
- Manufacturers internal part number.
- Construction configuration revision letter code.
- Unit serial number.
- Date code WWYY (shipment week/year).
- Identifies the power supply type as AC.

-SAFETY, REGULATORY and EMC-

Designed to comply with the relevant industry standards of the authorities having jurisdiction. Pending JE engineering evaluation of the final design configuration, this model series may be submitted for certification to U.S. and Canadian Bi-National Standards; and for approval to IEC Standards. CE Mark pending final configuration acceptance.

EMI Filtering..... Meets FCC Level A, and EN 55022 Level A, radiated and conducted.

EN 61000-3-2 Meets limits for harmonic current emissions.

EN 61000-3-3 Meets limits for voltage changes, fluctuations and flicker.

EN 61000-4-2 ESD immunity: +8KV air, +4KV contact discharge, performance criteria B.

EN 61000-4-3 Radiated, radio-frequency and electromagnetic field immunity: 80-1000Mhz 3V/m, AM 80% (1KHz), criteria A.

EN 61000-4-4 Fast transient/burst immunity: 1KV for AC power port, 0.5KV for DC power I/O and signals port, performance criteria B.

EN 61000-4-5 Surge immunity: 2KV common mode and 1KV differential mode.

EN 61000-4-6 Conducted disturbance immunity: 3Vrms, 80% A.M. by 1KHz.

EN 61000-4-8 Power frequency magnetic field immunity: 3A/m at 50Hz, performance criteria A.

EN 61000-4-11 Voltage dips, interruption and variation immunity: 30% reduction for 10mSec, criteria B; 60% for 100mSec, criteria C; 95% for 5000mSec, criteria C.

Touch Current 2.0mA max @ 50/60Hz, 264V AC per UL 60950 test procedures (Sec. 5.0).

Routine Factory Tests..... Di-electric strength (hi-pot) to 2121V DC input-to-chassis and input-to-outputs; MegOhm to 500V output-to-chassis.

-MECHANICAL-

Size 1U high x 114[4.49"] wide x 278[10.95"] deep. Refer to JE Outline Dwg 03586-000 or the Mechanical Outline in this data sheet.

Weight..... 1.6Kg. [3.52 lbs].

Retaining Latches..... Supplied with a single Southco #P7-A-503-11 front mounted lever type latch and dual M3 captive panel fasteners.

-INTERCONNECT-

Output Connector 47 circuit sequential contact, hot pluggable type. 2 AC input, 1 PE contact rated 40.0A. 20 DC output power contacts rated 28.0A each, 24 signal contacts rated 3.0A each. Ratings continuous, all contacts under load. UL94V-0 glass filled thermoplastic material, secured to the main circuit board assembly in the rear of the unit. Positronic Ind. P/N PCIH47M400A1 Mates with PI P/N PCIH47F300A1.

Note: Use of the specified mating connector is required to insure proper "make/break" sequential contact sequence.

Input/Output and Signal Connector Type and Pin Functions:

PIN#	SEQ ⁽¹⁾	FUNCTION
01-06	2	-V1 -V1 Output (Floating).
07-12	2	-V1 Rtn -V1 Return (Floating).
13	2	HA-0 For 13-20, pull-up resistors will be located in the PS card.
14	2	HA-1
15	2	HA-2
16	2	HA-3
17	2	HA-4
18	2	HA-5
19	2	HA-6
20	2	HA-7
21	2	Stby Rtn Standby Return (3.3V, 5V or 12V).
22	2	SCL_A I ² C Bus A.
23	2	SDA_A I ² C Bus A.
24	2	SCL_B I ² C Bus B.
25	2	SDA_B I ² C Bus B.
26	2	Stby Rtn Standby Return (3.3V, 5V or 12V).
27	3	R/EN Remote Enable. Close circuit to GND.
28	2	Stby Rtn Standby Return (3.3V, 5V or 12V)
29	2	GA-0 Geographic Address Bit 0.
30	2	GA-1 Geographic Address Bit 1.
31	2	GA-2 Geographic Address Bit 2.
32	2	+VSB Standby Output (+3.3V, +5V or +12V).
33	2	FAN Fan Fail Signal, High/Open.
34	2	P/S Power Supply Present.
35	2	Alarm Alarm, Hot Swap Switch. High/Open.
36	2	AC-OK Input Power Good. High/Open.
37	2	R/INH Remote Inhibit. Close circuit to GND.
38	2	ISHR-1 V1 Current Share.
39	2	N-S -V1 Remote Sense.
40	2	P-S -V1 Remote Sense Return.
41	2	3.3V .
42	2	Stby Rtn Standby Return (3.3V, 5V or 12V)
43	2	PTC-ADJ Optional External Temp. Sensor.
44	2	5V-PTC Optional External Temp. Sensor.
45	1	PE Protective Earth (chassis) Ground.
46	2	Input Pwr Line (L) AC Power Input.
47	2	Input Pwr Neutral (N) ACC Power Input.

ORDERING INFORMATION:

A multi-character option code is required following the base model description to define the required model configuration. Codes added in the following sequence, 1 from each category:

(1)	(1)	(2)-	(3)	(4)	(5)
Base Model-	V1 Output Voltage Code	Standby Output Voltage.	I ² C Serial Comm.	-MXXXX Custom Configuration.	RoHS Compliant Model

- Configuration Options -

Option: Code:

- (1) Base Model and V1 Output ..HAL1201-2 = 12.0V,
 HAL1501-5 = 24.0V,
 HAL1501-6 = 28.0V,
 HAL1501-8 = 48.0V,
 HAL1501-9 = 54.0V.
- (2) Standby Voltage..... 0 = 3.3V, optional.
 1 = 5.0V, standard.
 2 = 12.0V, optional.
- (3) I²C Serial Comm..... Blank = Not required (standard).
 I = Included (optional).
- (4) Custom Configuration.....MXXXX: Modified, where XXXX is a factory assigned 4-digit number to identify a user specified configuration. Such models may include special or non-standard features and/or options, or be in a configuration differing sufficiently from the design of the approved similar standard model from which it is derived to require re-evaluation of all or part of the design to insure continuing compliance with all safety requirements. The output voltage code and option codes 2,3 may not be present in the model description as this requirement is generally defined in the user specification documentation on file with the factory. Consult the factory for exact requirements.
- (5) RoHS 6 CompliantG: Jasper products that are fully compliant with the requirements of Directive 2002/95/EC Restrictions of Hazardous Substances (RoHS) are identified with the letter code "G" included in the model description on the unit labels and related documents (sales orders, etc). All materials, processes and packaging used in the assembly and shipping of this product comply.
 G5: For user determined applications that require the use of lead based solder for component connections to printed circuit boards, specify "G5" for RoHS 5 compliance.

Examples:

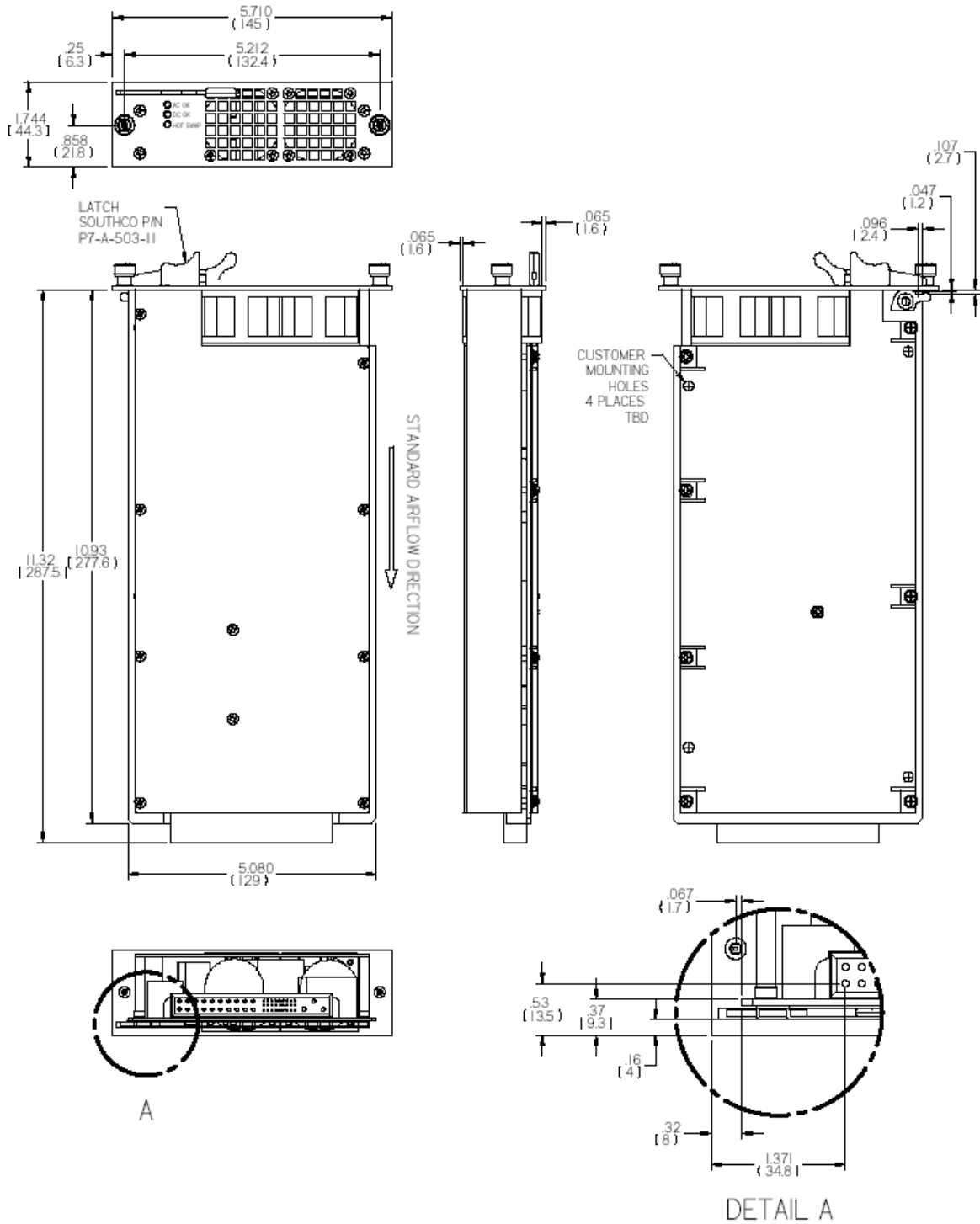
HAL1201-21-G	1200W, 12V o/p, 5V standby, RoHS
HAL1501-82-IG5	1500W, 48V o/p, 12V standby, w/I2C option, RoHS5
HAL1501-6-M6341G	1500W, 28V o/p, user specified configuration.

-LIMITED WARRANTY POLICY-

All Jasper Electronics (JE) standard model power supplies and products are guaranteed to be free of defects in workman-ship and materials for a minimum of two (2) years from the date of original shipment, when operated within specification. This warranty applies only to defects that result in a failure to comply or perform to published specifications. Non-standard (custom) power supplies and products may be warranted on an individual basis. The unused portion of this warranty is fully transferable with the original equipment in which the power supply is installed.

Mechanical Outline

(Dimensions in millimeters [inches])



All statements and technical information contained herein are believed by JE to be reliable as of the publication date of this document, but the accuracy or completeness is not guaranteed, and JE reserves the right to change specifications without prior notification. However, every reasonable effort will be made by JE to inform users of JE products of changes to design form, fit or function that may affect the user's applications. JE manufactures a quality product, equal to any available in the marketplace; however, these products are intended to be used in accordance with the specifications described in this catalog. Any use or application that deviates from the stated operating specifications is not recommended and may be unsafe.