

**JASPER
ELECTRONICS**

*Innovative Specialty
DC Power Systems*



CONTACT

1580 No. Kellogg Dr.
Anaheim, California, 92807

(714) 917-0749

www.jasperelectronics.com
sales@jasperelectronics.com

HML Series Hot Swap Power Supplies

600 Watt Single Output



HML-SERIES POWER SUPPLIES

GENERAL OVERVIEW

Jasper's Ultra-Reliable HML-Series Power Supplies are most commonly used in redundant systems in applications such as nuclear plants, server rooms, security systems, and communication systems. Units in this series are available at 600W and universal AC input with single output from 24V-54V.

FEATURES ON SELECT MODELS INCLUDE:

- Front End Power Supplies – 24V through 54V.
- >0.99 line Power Factor Corrected typical at AC 115V.
- High Density.
- Hot Swap-Redundancy.
- Module for 19 Inch Rack (1U High).
- Optional Extended Operating Temperature Range.
- TUV, CE, and cULus Marked.
- AC/Power Good LED Display.
- Internal Oring Diodes Provided.
- Custom Performance & Mechanical Modifications Readily Available
- Models can be ruggedized against high shock, vibration, and humidity to meet MIL-STD-810 requirements



ISO9001:2015

Rev A-January-26-2023

TECHNICAL SPECIFICATIONS

| AC INPUT | |
|--|---|
| Voltage/ Current | AC 90-264V, 47-63Hz, 9.0A max, 1 Phase |
| Fusing | AC 15.0A, 250V internal line fuse provided, non-user serviceable |
| Power Factor | >0.99 line PFC typical at AC 115V, full load |
| Inrush Current | Thermistor soft start (~25°C cold start). 30Apk @ AC 115V, 60Apk @ AC 230V |
| Transient Protection | MOV. Withstands transients as specified by EN61000-4-5 (differential and common mode) |
| Under Voltage Protection | Auto DC output shutdown when AC input falls below safe operating limits ($\approx 80V$ AC). Automatic recovery |
| EMI Filtering | Meets FCC Level A, and EN 55022 Level A |
| Efficiency | 75% typical at AC 115V, full load |
| Redundant/ Hot Swap Capable | Full power N+1 redundant, hot swap capable |
| DC OUTPUTS | |
| Voltage/ Current (V/A) | V1 |
| HML601-5 | 24.0V, 25.0A |
| HML601-6 | 28.0V, 21.4A |
| HML601-8 | 48.0V, 12.5A |
| HML601-9 | 54.0V, 11.1A |
| Total loading not to exceed 600 Watts | |
| Output Voltage Setpoint | Factory preset within $\pm 0.5\%$ of nominal voltage |
| Line/ Load Regulation | $\leq \pm 1\%$ at the sense point over full AC input range and 0 – 100% output loading, with sense leads connected |
| Minimum Loading | None required |
| Output Turn-on Delay | <1sec from AC turn-on. <100msec from remote enable |
| Over/ Under Shoot | None at turn-on or turn-off |
| Stability | Output drift $< \pm 0.2\%$ after 20 minute warm-up |
| Temperature Coefficient | $\leq \pm 0.02\%/^{\circ}C$, $0^{\circ} - 50^{\circ}C$, after 20 minute warm-up |
| Dynamic Response | Less than 3% deviation with a 25% load change at $1A/\mu sec$. Output recovers to within 1% in less than 300 μsec |
| Ripple and Noise (PARD) | <1% nominal with a 20 MHz bandwidth limit, measured with a $0.1\mu F$ ceramic capacitor in parallel with a $20\mu F$ tantalum capacitor connected between the measured output and its return at the connector |
| Current Sharing/ Parallel N+1 Operation | Single wire connection for $\pm 10\%$ current sharing between any number of units |
| Remote Sense | Output compensates for up to 0.25V total line drop in the load cables. Output is internally sensed if leads are opened |
| Over Temperature Protection | Internal temperature sensing. Causes output to shut down. Automatic recovery |
| Hold-Up Time | Output remains in regulation >15msec minimum following loss of AC power at low line, full load |
| Over Current/ Short Circuit Protection | Standard hiccup (cycles on/off) current limit when output current is 105% to 120% of full load |
| Over Voltage Protection | Non-crowbar type. V-out exceeding $25\% \pm 10\%$ of nominal will cause output to latch off. Remote enable or AC input recycle required to reset |
| SIGNALS, INDICATORS AND CONTROLS | |
| Remote Enable | Enabled by closed circuit or TTL logic 0. Disabled by open circuit or TTL logic 1 |
| 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 within $\pm 3\%$ of nominal voltage. Signal goes low when V-out drops below 95% of nominal |
| Power Fail Warning | Loss of input AC causes a TTL compatible signal to go low >4msec prior to any output dropping out of regulation. At AC turn-on, signal stays low until output is in regulation |

**Specifications subject to change without notice.*

| | |
|---|---|
| Under Voltage Warning | Output dropping below 95% of nominal triggers the power fail warning signal |
| LED Indicator | Front panel mounted, single-color LED. Green indicates AC power ON and output within regulation. Off indicates an input and/or output fault |
| AC On/ Off Switch | Optional. Single pole, rocker type, on the front panel. Rocker face marked "I O". See option "O" in model configuration codes below. Not available in combination with optional IEC AC inlet |
| OPERATING ENVIRONMENT | |
| Operating Temperature | 0° – 50°C ambient at full load, with specified airflow |
| Cooling | Front panel mounted, dual DC ball bearing fans provided, rated 13 cfm minimum each. Forward airflow direction is front to rear |
| Relative Humidity | Up to 90% RH, non-condensing |
| Operational Vibration | 0.75G peak, 5 – 500Hz along three orthogonal axis |
| Storage Temperature | -40° to 85°C |
| Altitude | Operating to 10,000 ft. Storage to 30,000 ft. |
| MTBF | Designed for 150,000 hrs at 25°C |
| EXTENDED OP. ENVIRONMENT | |
| Operating Temperature | Optional: -40° – +50°C ambient at full load, with specified airflow. Full load start-up @-40°. Above 50°C, output derates linearly to 50% at 75°C. See option "T" in model configuration codes below |
| INTERCONNECT | |
| Input/ Output Connector | 18-circuit (3X6), sequential contact, hot pluggable type, located on the rear panel. Positronic Ind. P/N PLC18M4BN0A2-164.10. Mates with PI P/N PLC18F300A1 or equivalent. Note: Use of the specified mating connector is required to insure proper "make/break" sequential contact sequence. |
| AC Inlet Connector | Optional. Recessed 3-circuit, IEC 320/C14 type. User accessible on the front panel. See option "I" in the model configuration codes below. Not available in combination with optional On/Off switch, or with AC input via the "hot plug" |
| SAFETY | |
| Standard Models | Recognized to U.S. and Canadian Bi-National Standard CSA C22.2 No. 60950 / UL 60950, Third (3rd) Edition (cULus); TUV approved to TUV EN60950/A1-A4/A11. CE Marked |
| Optional Configurations | Models with option "O" switch, and option "T" for use in extended operating environments not currently approved. Consult factory for status. |
| MECHANICAL | |
| (Refer to JE Outline Configuration Dwg, P/N 02673-000.) | |
| Weight | 1.8kg [≈ 4.0lb] |
| Retaining Latch | Adjustable grip latch. User accessible on the front panel. Rotation of latch knob extends an arm down then forward into a user provided opening in the equipment to secure |
| Mounting Orientation | Add "H" at end of model code to designate horizontal (5.20"w x 1.60"h) or "V" for vertical (5.20"h x 1.60"w) installation |

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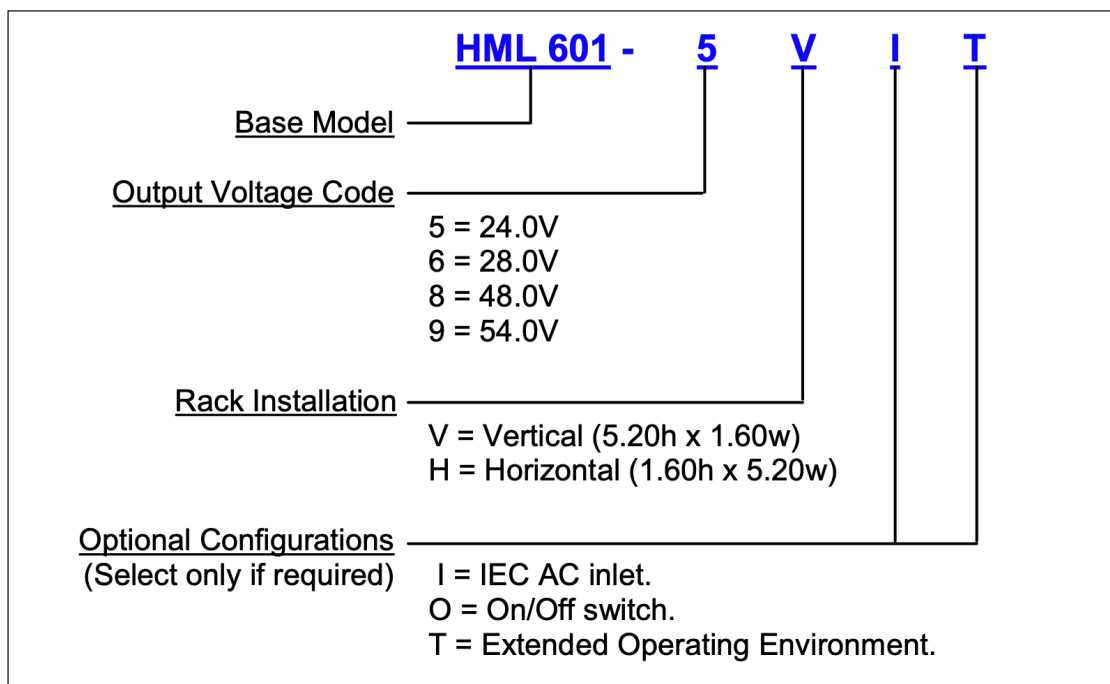
INPUT/OUTPUT AND SIGNAL CONNECTOR TYPE AND PIN FUNCTIONS

Positronics Ind. P/N PLC18M4BN0. 18 circuit (3x6) hot plug- able type, with 16ga contact pin terminals. Glass filled polyester insulator material, rated 94V-0. Secured in the unit rear. Use of Positronic PLC18F series mating connector is required to ensure correct mating contact sequence and current capacity

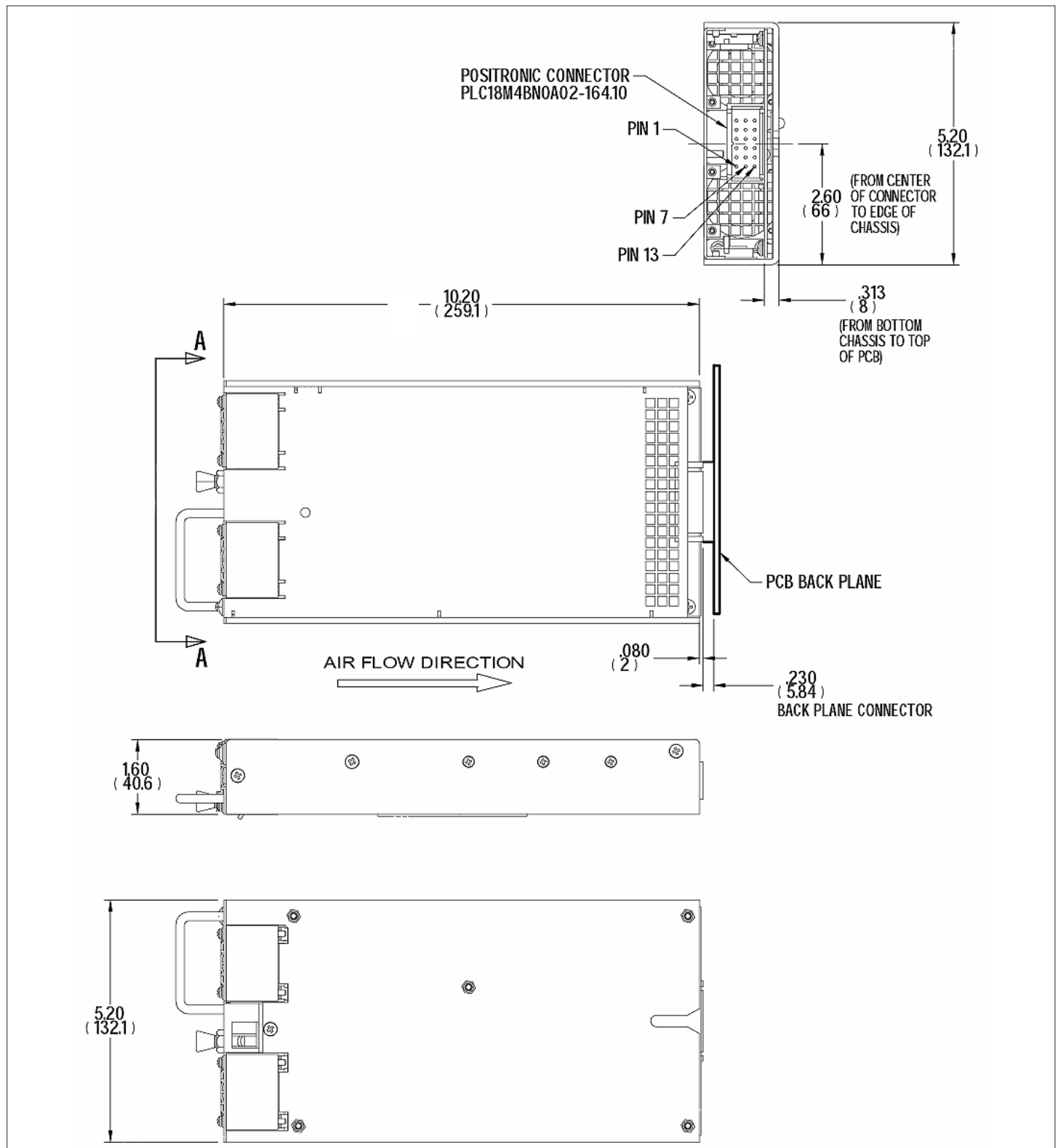
| PIN# | SEQUENCE | FUNCTION |
|-------|--------------|---|
| 1 | (2) Standard | Remote Voltage Adjust |
| 2 | (2) Standard | Power Fail Warning |
| 3 | (1) Postmate | Current Share Signal |
| 4 | (2) Standard | No Connection |
| 5 | Blank | Not Used |
| 6 | (2) Standard | L – Line (AC) Input. No connection on models with optional IEC AC input connector |
| 7 | (2) Standard | +S1 (+V1) Remote Sense |
| 8 | (2) Standard | DC-OK Signal |
| 9 | (2) Standard | –S1 (–V1) Remote Sense |
| 10 | (3) Postmate | Remote DC Enable TTL Low/Closed= ON |
| 11 | (1) Premate | Primary Earth (PE) chassis ground |
| 12 | Blank | Not Used |
| 13,14 | (2) Standard | +V1 (DC power output) |
| 15 | (1) Premate | –V1 (Rtn) |
| 16 | (2) Standard | –V1 (Rtn) |
| 17 | Blank | Not Used |
| 18 | (2) Standard | N – Neutral (ACC) Input. No connection on models with optional IEC AC input connector |

CONFIGURATION OPTIONS

How to Use the Table: A two, three or four character code is required following the base model description to define the desired model configuration. The codes are added in this sequence. Please choose one from each of the categories. User selection of options I, O and/or T will incur a slight additional unit cost. Please consult the factory for additional information.



HML MECHANICAL DRAWING



INNOVATIVE SPECIALTY DC POWER SYSTEMS

Standard and Custom Power Supplies from 5W to 10KW

TRAFFIC CONTROL POWER SUPPLIES



- 70-400+ Watts / 120 and 220 VAC Models Available
- CALTRANS TEES, NYSDOT, CDOT, GDOT Compliant for 332, 334, 336, 342, 344, and 346 Series cabinets
- RoHS and NEMA Compliant
- Custom labeling and barcoding available
- Ruggedization against shock / vibration / humidity available

CUSTOM POWER DISTRIBUTION ASSEMBLIES (PDAs)



- Compliant with TEES 2020
- 1U smaller than the PDA2-LX and PDA3-LX
- User accessible slots as specified
- Custom labeling and barcoding available
- Ruggedization against shock / vibration / humidity available

COMPACT PCI



- AC or DC input, 175W - 500W DC output, active PFC
- 3U x 8HP, 6U x 8HP sizes
- PICMG 2.11 compliant, UL/CSA, NEMKO/TUV/CE certified, ROHS compliant
- Ruggedization against shock/ vibration/ humidity optional

Primary Applications: Industrial Computing, Military, Satellite Comm, Test, Transportation, Telecom, Aerospace

SPECIALTY HOT-SWAPPABLE POWER SUPPLIES



- 200-1500W, Universal Input, 5-54VDC Output
- Hot Swap. N+1, 90+% Efficiency
- 1U Form Factors
- 30+ Variations for Various Applications Including Nuclear
- Ruggedization against shock/ vibration/ humidity optional

Primary Applications: Medical Equipment, Military, Test, Automotive, Computing, Audio, Sensitive Electronics

RACK POWER SYSTEMS



- 200W-1500W, 2-8 slots, single or mixed output voltages, up to 10KW total
- Single, dual, or individual unit AC or DC input
- Internally or externally redundant DC outputs
- Standard 19" and 23" size or user-specified configurations also available
- Ruggedization against shock/ vibration/ humidity optional

Primary Applications: Medical Equipment, Military, Test, Automotive, Computing, Audio, Sensitive Electronics

CUSTOMS & MODIFIED STANDARDS



- 75W-2KW
- Single to 7 outputs
- Designed and built to custom or semi-custom specifications
- Ruggedization against shock/ vibration/ humidity optional
- Custom electrical specs, chassis, paint, labeling, connectors, interface all available

Primary Applications: Medical Equipment, Military, Test, Automotive, Computing, Audio, Sensitive Electronics

LOW NOISE CONVECTION / CONDUCTION COOLED POWER SUPPLIES



- 200W-500W, 90—264VAC full range input with 12-54 VDC Output
- Wide operating temperature range / high efficiency
- Small form factors
- Ruggedization against shock/ vibration/ humidity optional

Primary Applications: Medical Equipment, Military, IT, Sensitive Electronics

MEDICAL ADAPTERS



- 6W-250W, Efficiency levels V & VI
- Desktop, Wall-mount, and Interchangeable AC plug types
- Large selection of output connectors – additional cable lengths available
- UL60601 (medical) approved adapters available
- Ruggedization against shock/ vibration/ humidity optional

