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HDL3000 Series

AC-DC Power Supplies

XP Power

3000 Watts

- High Efficiency up to 93%
- High Power Density
- Programmable Output Voltage (0-105%)
- Programmable Output Current (0-105%)
- Parallel Operation
- Fully Featured Signals & Controls
- 3 Year Warranty



The HDL3000 series offers users both output voltage and output current programming (0 – 105%) via resistance, voltage or I²C bus in a very high efficiency, high power density 3 kW chassis mount package. Measuring just 6.69" x 2.52" x 11.02", the HDL3000 also features active current sharing, remote on/off, remote sense and a power OK signal. The standby output is available whenever the mains supply is present and can be user selected as either 5 V at 0.5 A or 9V at 0.3 A.

Dimensions:

HDL3000:
6.69 x 2.52 x 12.48" (170.0 x 64.0 x 317.0 mm)
including connectors

Models & Ratings

Output Power		Output Voltage V1	Output Current		Ripple & Noise	Efficiency[1]	Model Number
High Line	Low Line		High Line	Low Line			
2400 W	1600 W	12.0 VDC	200 A	166.6 A	150 mV	88%	HDL3000PS12
2400 W	1600 W	15.0 VDC	160 A	133.3 A	150 mV	89%	HDL3000PS15
3000 W	2000 W	24.0 VDC	125 A	83.3 A	240 mV	91%	HDL3000PS24
3000 W	2000 W	30.0 VDC	100 A	66.6 A	300 mV	91%	HDL3000PS30
3000 W	2000 W	36.0 VDC	83.5 A	55.5 A	360 mV	92%	HDL3000PS36
3000 W	2000 W	48.0 VDC	62.5 A	41.6 A	480 mV	92%	HDL3000PS48
3000 W	2000 W	60.0 VDC	50 A	33.3 A	600 mV	93%	HDL3000PS60

Notes

1. Measured with 230 VAC input and full load.

Input

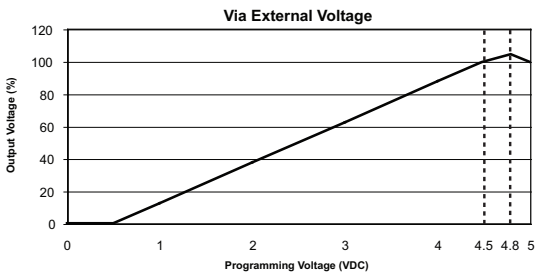
Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Input Voltage	90		264	VAC	See derating curve
Input Frequency	47		63	Hz	
Power Factor		0.98/0.95			115/230 VAC full load
Input Current			19.7/15.0	A	115 VAC at 2000 W/230 VAC at 3000 W
Inrush Current			45/110	A	115/230 VAC
Earth Leakage Current			3	mA	264 VAC/60 Hz

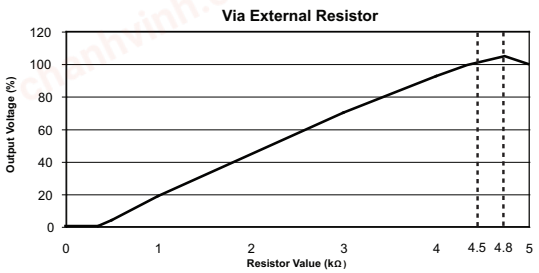
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Output

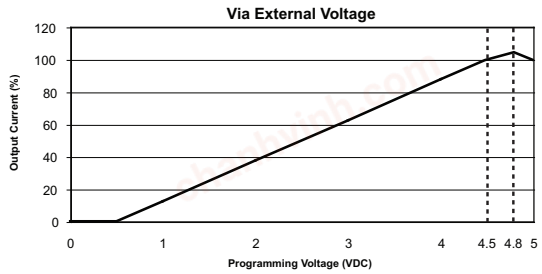
Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Output Voltage	12		60	VDC	See Models and Ratings table
Output Trim		±5.0		%	By potentionmeter
Output Voltage Program	0		105	%	Of rated output
Output Current Program	0		105	%	Of rated output
Initial Set Accuracy			±1	%	At 50% Load
Minimum Load	0			A	
Start Up Delay			1	s	
Start Up Rise Time			120	ms	At full load
Hold Up Time	10	11		ms	At 230 VAC and full load
Line Regulation			±1.0	%	
Load Regulation			±1 (V1)/±3	%	V1 / 5 V Standby. 0-100% load
Transient Response		<1		%	For a 25% step load change
Ripple & Noise	150		600	mV pk-pk	See models and ratings table. Measured with 20 MHz bandwidth and using 12" twisted pair wire terminated with 0.1 µF ceramic capacitor and 47 µF electrolytic at 25 °C ambient.
Overvoltage Protection					Tracks output voltage, see application notes Recycle AC to reset
Overtemperature Protection					Primary and secondary heatsinks, monitored Output shuts down, auto recovers
Overload Protection		105		%	Rated power, constant current
Short Circuit Protection					Auto recovery
Temperature Coefficient		±0.02		%/°C	0-50 °C
Remote Sense	Compensates for 0.5 V max voltage drop, if remote sense is not required, local sense must be used				
Enable	Output must be enabled, see application notes, power supply is shipped with enable links fitted				
Current Share	5 supplies can share within 5%				
Standby Output	5 V at 0.5 A, present whenever AC is applied (9 V at 0.3 A, user selectable, by connecting 'VSET', Pin 18 of CN2 to GND)				

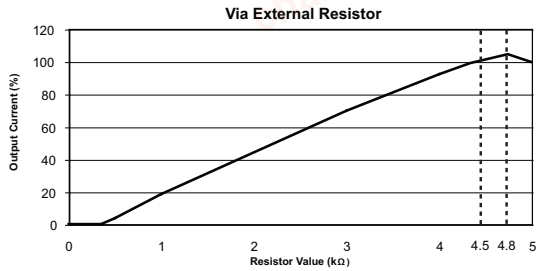
Output Voltage Programming





Output Current Programming





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General

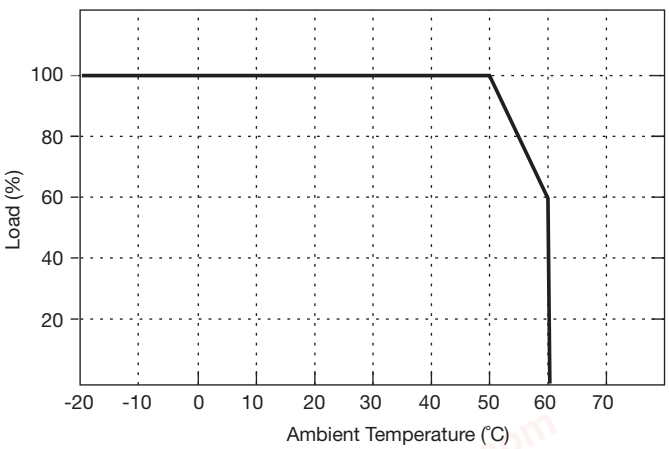
Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Efficiency	88		93	%	See Models and Ratings table
Isolation: Input to Output	3000			VAC	
Input to Ground	1500			VAC	
Output to Ground	500			VAC	
Switching Frequency		65		kHz	PFC
	40		200	kHz	PWM, variable
Power Density			14.4	W/in³	
Signals and Controls					Enable, Current Share, V Program, I Program, 5 V Standby, Power OK
Mean Time Between Failure		90		kHrs	MIL-HDBK-217F, 25 °C GB
Weight		7.94 (3.6)		lb (kg)	

Environmental

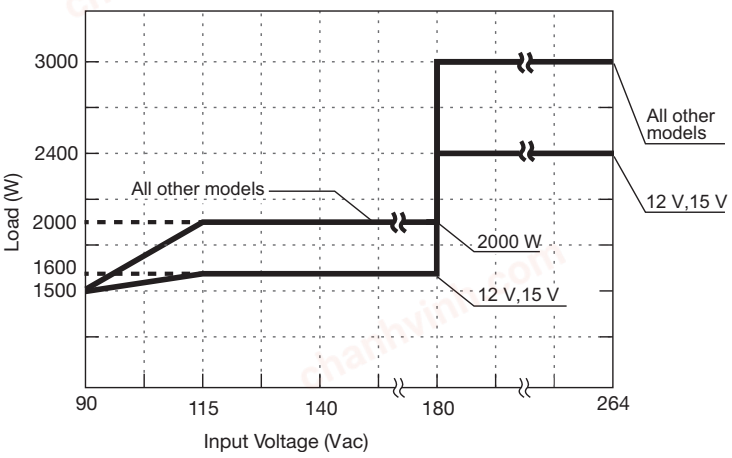
Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Operating Temperature	-20		60	°C	Derate linearly from 100% load at 50 °C to 60% load at 60 °C
Storage Temperature	-40		+85	°C	
Cooling					Internal fan fitted, speed increases with load and internal temperature
Humidity	20		90	%RH	
Operating Altitude			3100	m	
Vibration			2	g	10-500 Hz, 10 min/cycle, 60 min period for each axis, compliant to IEC68-2-16, IEC 68-2-64

Derating Curve

Thermal Derating Curve



Input Derating Curve

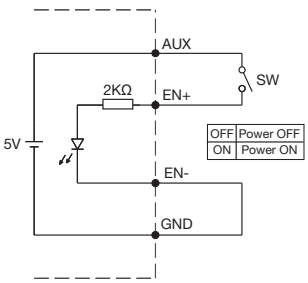


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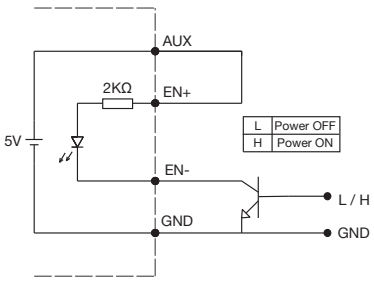
Signals & Controls

LED Status	Output Status
Solid (Green)	DC Output OK
Solid (Orange)	DC Output OK in remote control mode
Slow Blink (Green)	Output Not Enabled
Fast Blink (Red)	Over Voltage
Solid (Red)	Over Loaded
Slow Blink (Red)	Over Temperature
Intermittent Blink (Red)	Fan Fail
Short & Long Blink (Red)	AUX Standby Failure

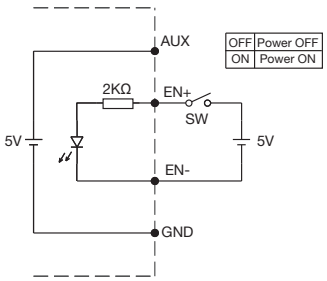
Remote Enable



(A) Using internal 5 V standby



(B) Using external transistor



(C) Using external voltage source

EMC: Emissions

Phenomenon	Standard	Test Level	Notes & Conditions
Conducted	EN55022	Class A	
Radiated	EN55022	Class A	
Harmonic Currents	EN61000-3-2	Class A	
Voltage Flicker	EN61000-3-3		

EMC: Immunity

Phenomenon	Standard	Test Level	Criteria	Notes & Conditions
ESD Immunity	EN61000-4-2	2 / 3	A	±4 kV contact / ±8 kV air discharge
Radiated Immunity	EN61000-4-3	3	A	
EFT/Burst	EN61000-4-4	3	A	10 V/m
Surge	EN61000-4-5	Installation class 3	A	
Conducted	EN61000-4-6	3	A	10 V
Magnetic Field	EN61000-4-8	3	A	30 A/m
Dips and Interruptions	EN55024	DIP: 30% 500 ms	A	
		INT: >95% 10 ms	A	
		INT: >95% 5000 ms	B	

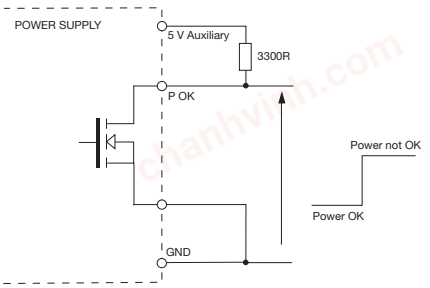
Safety Approvals

Safety Agency	Safety Standard	Notes & Conditions
CB Report	IEC62368-1: 2014	Audio/Video, Information and Communication Technology Equipment
UL	UL62368-1, CAN/CSA C22.2 No.62368-1-14	
TUV	EN62368-1: 2014/A11: 2017	

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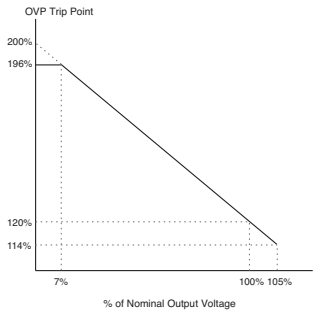
Application Notes

Power OK Signal

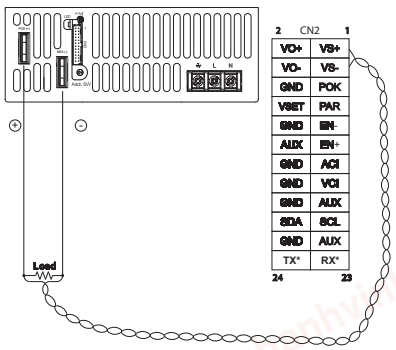


Open drain signal, low when PSU turns on. Maximum sink current: 20 mA
Maximum drain voltage: 40 V

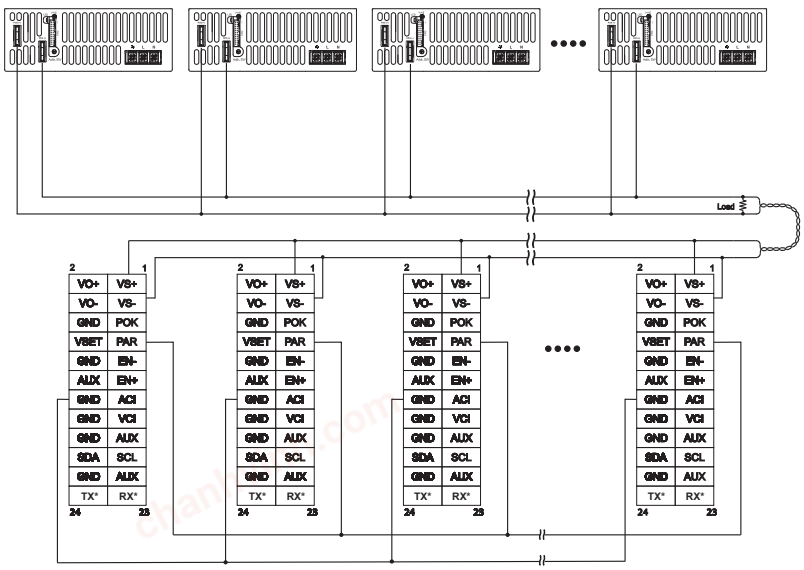
OVP Setting



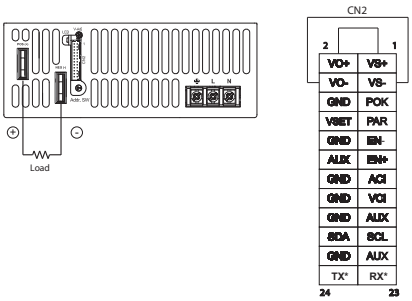
Remote Sense



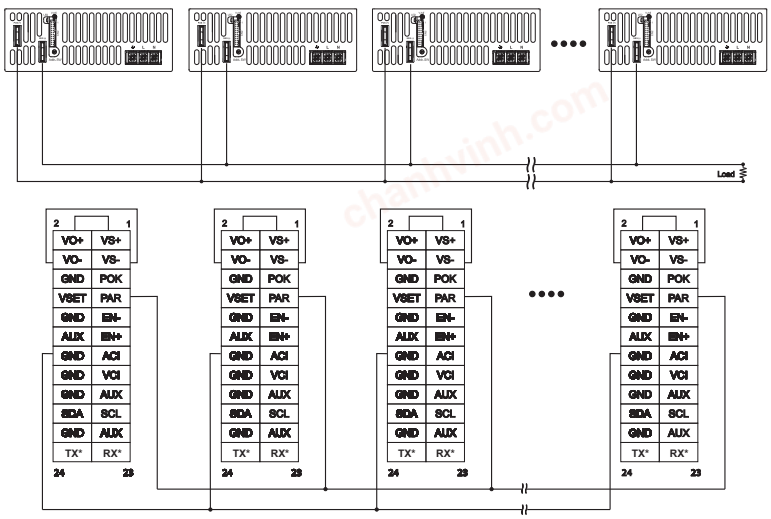
Current Sharing with Remote Sense



Local Sense



Current Sharing with Local Sense



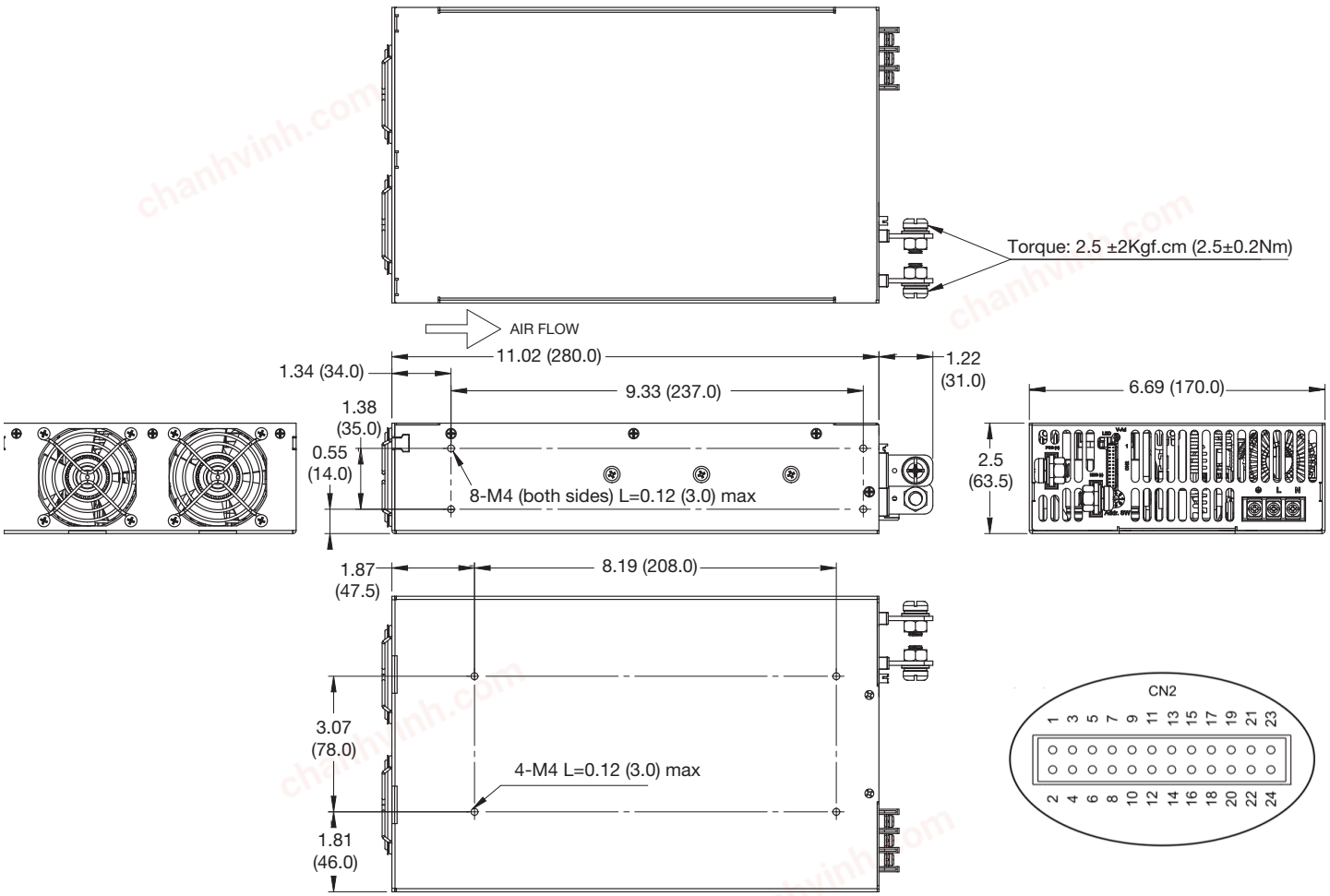
Notes

In parallel operation, it is possible that only one unit will operate if the load is less than 5% of the combined rated output load. It is possible to have more than five units in parallel, contact sales for details.

*Pin 23 and 24, Only usable with driver board “KIT-RS232-X” or “KIT-RS485-1”

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Mechanical Details



CN2 Control Pin Connections								
Pin	Function	Description	Pin	Function	Description	Pin	Function	Description
1	VS+	Remote sense (+)	9	EN-	Inhibit On/Off(-)	17	AUX	+5V/0.5 A or +9V/0.3 A Standby power
2	VO+	Positive Output Voltage	10	GND	Ground	18	GND	Ground
3	VS-	Remote Sense (-)	11	EN+	Inhibit On/Off (+)	19	SCL	I²C Serial Clock
4	VO-	Negative Output Voltage	12	AUX	+5V/0.5 A or +9V/0.3 A Standby power	20	SDA	I²C Serial Data
5	POK	Power OK	13	ACI	I Program	21	AUX	+5V/0.5 A or +9V/0.3 A power
6	GND	Ground	14	GND	Ground	22	GND	Standby Ground
7	PAR	Parallel Operation Current Share	15	VCI	V Program	23	RX*	Receive
8	VSET	Aux Output Setting	16	GND	Ground	24	TX*	Transmit

Pin	Function
1	⏚
2	ACL
3	ACN

Notes

1. Dimensions shown in inches (mm).
2. Weight: 7.94 lb (3.6 kg)
3. Mating Connector: CN2 JST PHDR-24VS Housing, SPHD-002T-P0.5 Contact
4. Torque of mounting M4 screw: 1.27 Nm (13.0 kgf.cm)

*Only usable with driver board “KIT-RS232-X” or “KIT-RS485-1”