

AC/DC Front End Power Supply



FEATURES

- 1600W (220Vac), 1200W (110Vac) **Output Power**
- 12V Main Output, 3.3V or 5V Standby Output
- 10 height: 4.0" x 14.0" x 1.6"
- 17.9 Watts per cubic inch density
- N+1 redundancy capable, including hot-docking
- Active Current Sharing on main output
- Overvoltage, Overcurrent, Overtemperature protection
- Internal cooling fans
- I²C Bus Interface with Status Indicators
- Optional 1U x 19" Power-Shelf
- RoHS compliant

PRODUCT OVERVIEW

The D1U4-W-1600-12-Hx is a 1600 Watt, power-factor-corrected (PFC) front-end power supply for hot-swapping redundant systems. The main output is 12V with a standby output of either 5V or 3.3V. Packaged in a 1U low-profile enclosure, it is designed to deliver reliable bulk power to servers, workstations, storage systems or any 12V distributed power architecture systems requiring high power density. The highly efficient electrical and thermal design with internal cooling fans supports reliable operation conditions. The D1U4-W-1600-12-Hx is designed to autorecover from overcurrent and overtemperature faults. Status information is provided with front panel LEDs, logic signals and I²C management interface. Four units can be packaged into an optional 19" 1U power shelf to provide up to 6.4kW of power.

ORDERING GUIDE					
Model Number	Power Output High Line AC	Power Output Low Line AC	Main Output	Standby Output	Airflow
D1U4-W-1600-12-HC2C	1600W	1200W	12V	3.3V	Back to front
D1U4-W-1600-12-HA2C	1600W	1200W	12V	5V	Back to front
D1U4-W-1600-12-HC1C	1600W	1200W	12V	3.3V	Front to back
D1U4-W-1600-12-HA1C	1600W	1200W	12V	5V	Front to back

INPUT CHARACTERISTICS					
Parameter	Conditions	Min.	Тур.	Max.	Units
Input Voltage Operating Range		90	115/230	264	Vac
Input Frequency		47	55	63	Hz
Turn-on Input Voltage	Ramp up	78.5		86.5	Vac
Turn-off Input Voltage	Ramp down	70.5		78	vac
Maximum Input Current	Low Line AC 90Vac			15	Arms
	High Line AC 180Vac			10	AIIIIS
Inrush Current	Cold start between 0-1msec			100	Apk
Power Factor	Output load >90%	95%			
Power Factor	Output load >50%	75%			

Dutput							
/oltage	Parameter	Conditions	Min.	Тур.	Max.	Units	
	Voltage Set Point Accuracy			12.12		Vdc	
	Line and Load Regulation		11.75		12.48	vuc	
12V	Ripple Voltage & Noise	20MHz Bandwidth			120	mV p-j	
	Output Current		0		131.6	Α	
	Load Capacitance				40000	μF	
	Voltage Set Point Accuracy			3.3		Vdc	
	Line and Load Regulation		3.2		3.4		
3.3Vsb	Ripple Voltage & Noise	20MHz Bandwidth			33	mV p-	
	Operating Range		0		6	А	
	Load Capacitance				1530	μF	
	Voltage Set Point Accuracy			5		Vdc	
	Line and Load Regulation	20MHz Bandwidth	4.85		5.15	Vuc	
5Vsb	Ripple Voltage & Noise				50	mV p-	
	Operating Range		0		4	А	
	Load Capacitance				1530	μF	

¹ Ripple and noise are measured with 0.1 uF of ceramic capacitance and 2 x 270 uF of OSCON capacitance on each of the power supply outputs. A short coaxial cable with 50ohm scope termination is used. See Ripple Test Setup diagram.







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D1U4-W-1600-12-Hx Series

AC/DC Front End Power Supply

Remote Sense 120 120 Efficiency 220Vac 90.6 90.6 Output Rise Monotonicity Overshoot less than 10% for all outputs, no voltage negative between 10% to 95% during ramp up 15 Startup Time PS_0n activated 15.0 100 Transient Response 3.3Vsb Ramp 1A/ms 10.0 ±600 Stortup Time 3.3Vsb Ramp 1A/ms 10.0 ±250 Current sharing accuracy (up to 6 in parallel) At 100% load 10.0 ±200 Hot Swap Transients All outputs remain in regulation ±10 ±10 Hot Swap Transients All outputs remain in regulation ±10 10.00 Hot Swap Transients All outputs remain in regulation 10.00 50 Operating Temperature Range Ono-condensing -4.0 70 Operating Temperature Range 0.0 50 90 Storage Temperature Range 0.0 50 90 Storage Temperature Range 0.0 50 90 Storage Temperature Range 0.0 50 90 S	OUTPUT CHARACTERISTICS								
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Weight

PROTECTI	PROTECTION CHARACTERISTICS							
Output Voltage	Parameter	Conditions	Min.	Тур.	Max.	Units		
	Overtemperature	Autorestart	55		65	°C		
12V	Overvoltage	Latching	13		14	V		
IZV	Overcurrent	Latching	145		165	А		
3.3Vsb	Overvoltage	Latching	3.57		4.02	V		
3.3750	Overcurrent	Latching	6.5		8	А		
5Vsb	Overvoltage	Latching	5.6		6	V		
SVSD	Overcurrent	Latching	5		7	Α		

4.63lbs (2.1kg)

ISOLATION CHARACTERISTICS							
Parameter	Conditions	Min.	Тур.	Max.	Units		
Inculation Cofety Deting / Test Voltage	Input to Output - Reinforced	3000			Vrms		
Insulation Safety Rating / Test Voltage	Input to Chassis - Basic	1500			Vrms		
le de la companya de	Output to Chassis						
Isolation	Output to Output						
Grounding		Main Output Return and Standby Output Return are connected internally. $100k\Omega$ resistor parallel with 100 capacitor is connected between Return and power supply chassis. Main Output Return should be connected between Return and power supply chassis.					

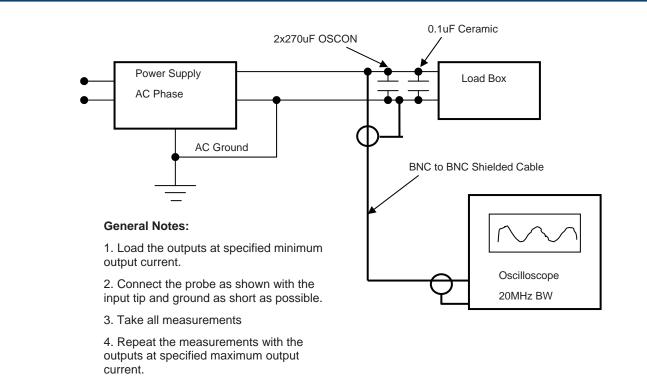


AC/DC Front End Power Supply

STATUS INDICATORS AND CONTROL SIGNALS							
Status	Conditions	Description					
	Off	No AC input to all PS					
LED	Flashing Yellow	Power Supply Failure					
LED	Flashing Green	Main Output Absent					
	Green	Power Supply Good					
	Status	PS-ON, PGOOD, ACOK, PS_BAD, FANFAIL, OT Warning & shutdown, AC Range					
	Output Fault	12V OV, 12V UV, 12V OC, Vsb Fail, Fan1 Fail, Fan2 Fail					
I ² C Registers	12V Output	8 bit scaled output voltage					
	12V	8 bit scaled output current					
	Fan1 Monitor	8 bit scaled output current					
	Fan2 Monitor	8 bit scaled output current					

Characteristic	Standard	Compliance
Input Current Harmonics	IEC/EN 61000-3-2	Complies
Voltage Fluctuation and Flicker	IEC/EN 61000-3-3	Complies
Conducted Emissions	FCC 47 CFR Part 15/CISPR 22/EN55022	Class A, 6dB margin
Radiated Emissions	FCC 47 CFR Part 15/CISPR 22/EN55022	Class A, 6dB margin
		4kV contact discharge
ESD Immunity	IEC/EN 61000-4-2	8kV operational air discharge
		15kV non-operational air discharge
Radiated Field Immunity	IEC/EN 61000-4-3	Complies
Electrical Fast Transients/Burst Immunity	IEC/EN 61000-4-4	Complies
Surge Immunity	IEC/EN 61000-4-5	1kV/2kV, Performance Criteria A
RF Conducted Immunity	IEC/EN 61000-4-6	3 Vac, 80% AM, 1kHz, Performance Criteria A
Magnetic Field Immunity	IEC/EN 61000-4-8	3 A/m
Voltage dips, interruptions	IEC/EN 61000-4-11	Complies

RIPPLE TEST SETUP





AC/DC Front End Power Supply

OUTPUT	CONN	IECTOR AN	ID SIGNAL	SPECIFICAT	TION										
DC and S	Signa	al Connect	or: Tyco Pa	art # 1-648	50132-2, 0	or FCI Powe	erBlade # {	51732-021							
P1	1	P2	P3	P4	P5	P6	P7	P8	x1	x2	x3	x4	-	X6	-
									AC_OK	P_GOOD	V_sb RETURN	V_sb RETURN	V_sb +OUT	V_sb +OUT	D
Vou		Mour	Varu	VRTN	Marri	VRTN	Vour	Vouт	SPARE	SPARE	V_sb RETURN	V_sb Return	V_sb +OUT	V_sb +OUT	С
Vou	UT	Vout	Vrtn	VRTN	Vrtn	VRTN	Vouт	VOUT	I_SHARE	I ² C ADR0	I ² C ADR1	I ² C ADR2	PS_KILL	PS_ PRESENT	В
									SENSE +	SENSE -	I ² C DATA	I ² C CLOCK	SPARE	PS_ON	A
	·							•		•	•		mate-l	ast pins	1
Pin Assign	nment	t	Signal N	lame	[Description					High Leve Low Level		I Max	(
P1, P2, P7,			Vout			Main output	•								
P3, P4, P5,	5, P6		VRTN			Main output	• •								
\1			Sense +			/ou⊤ remote : ⊢ve load poi		ive node inp	out, connecte	ed to the					
12			Sense -			V_{OUT} remote sense, negative node input, connected to the -ve load point									
C5, C6, D5	5, D6		V_sb		5	Standby volt	age output								
C3, C4, D3	3, D4		V_sB Ret	urn	5	Standby volt	age, return,	tied interna	lly to Output	Return					
31			I_Share		ŀ	Active load s	haring bus				0 - 8V		-4 m/	A / +5 mA	
)1			AC_0K			nput AC Volt I 0kΩ to Vsb)		gnal output	(Internal pul	l up is	>2.4V (act <0.4V	ive, OK)	+4 m -2 m/		
)2			P_Good		F	Power good	signal outpu	ut (Internal p	oull up is 10k	Ω to Vsb)	>2.4V (act <0.4V	ive, Good)	+4 m -2 m/		
35	5		PS_Kill		f		ontact for h	ot plugging)	r pin, last-ma . This signal		>2.1V (ope <0.7V (act	en, or Vsb) ive, PS:On)	N/A		
86			PS_Pres	ent	l	nternally tie	d to Vsb ret	urn			0 V				
16	6		PS_On	PS_0n		Internal 1K ohm pull-up to Vsb, (accepts open collector/ drain drive), This signal to be pulled low to turn-on power supply			>2.1V (ope <0.7V (act	en, or Vsb) ive, PS:On)	-4 m -1 m				
3			I ² C Data		ľ	² C serial dat	a bus				Vsb				
4			I ² C Clock	(F	² C serial clo	ck bus				Vsb				
32			I ² C Adr0			Address input 0, internal pull-up to Vsb			>2.1V, < V <0.8V	sb	±1 m	A			
33			I ² C Adr1		ļ	Address input 1, internal pull-up to Vsb				>2.1V, <vs <0.8V</vs 	sb	±1 m	A		
34			I ² C Adr2		ļ	Address inpl	ıt 2, interna	l pull-up to \	/sb		<0.8V	sb	±1 m	A	

D1U4 MATING CONNECTORS

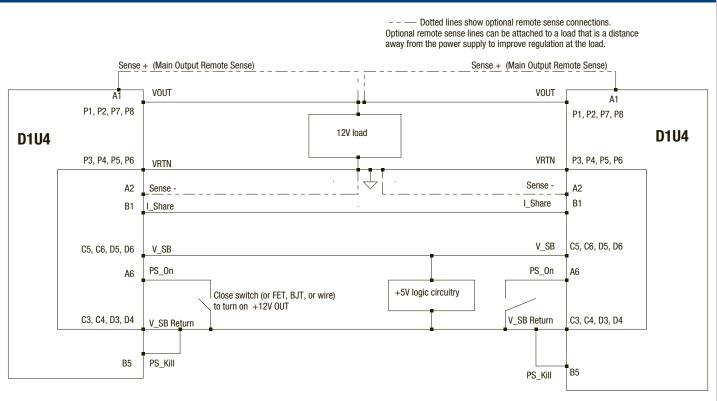
	12V D1U4 mating connector							
	Press Fit Solder ¹							
	Straight	Right Angle	Straight	Right Angle				
Murata-PS	N/A	N/A	N/A	36-0430032-0				
FCI	51742-10802400CALF	51762-10802400CBLF	51742-10802400AALF	51762-10802400ABLF				
Тусо	TBD	TBD	TBD	TBD				

1 Solder connector recommended for board thickness of < 0.090



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CURRENT SHARING NOTES

12V Output: Current sharing is achieved using the active current share method. (See wiring diagram for connection details.)

The total combined load must be below 1600W at startup. Current sharing can be achieved with or without remote sense connected to the common load. V_SB outputs can be tied together for redundancy but total combined output power must not exceed 20W. The V_SB output has internal ORing MOSFET for

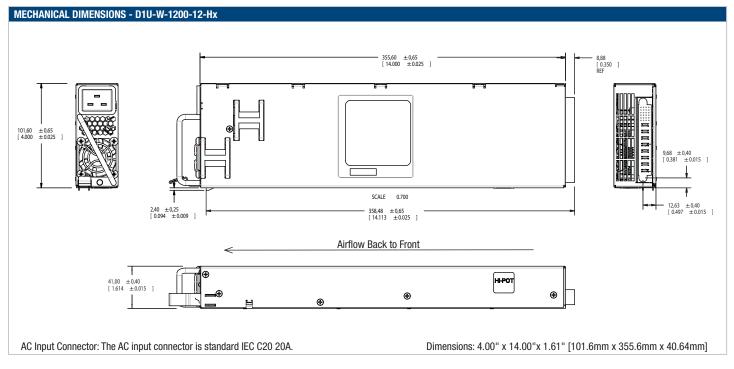
additional redundancy / internal short protection.

The current share pin B1 is a connection between the two units. It is input and/or output as the voltage on the line controls the current share. A power supply will respond to a change in this voltage but a power supply can also change the voltage depending on the load drawn from it. On a single unit this would read 8V at 100% load. For two units sharing load then this should read 4V for perfect current sharing.

Up to 6 units can be paralleled together. Please consult your Murata sales representative if operation with more than six units in parallel is needed.



AC/DC Front End Power Supply



OPTIONAL ACCESSORIES					
Description	Part Number				
12V D1U-12 output connector card	D1U-12-CONC				

APPLICATION NOTES		
Document Number	Description	Link
ACAN-27	D1U-12-CONC Output Connector Card	www.murata-ps.com/data/apnotes/acan-27.pdf
ACAN-31	D1U4 Communications Protocol	www.murata-ps.com/data/apnotes/acan-31.pdf

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This product is subject to the following <u>operating requirements</u> and the <u>Life and Safety Critical Application Sales Policy</u>: Refer to: <u>http://www.murata-ps.com/requirements/</u>

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