D1U2-W-400-12-HA4C

54mm 1U Front End AC-DC Power Supply Converter

FEATURES

- 400W output power
- 12V main output
- 5V standby output of 15W
- 1U height: 2.15"x13.67"x1.58"
- 8.6 Watts per cubic inch density
- Efficiency 85% at full load, 100Vac and 50°C
- N+1 redundancy capable, including hot plugging (up to 4 in parallel)
- Active current sharing on 12V main output, ORing FET
- Overvoltage, overcurrent, overtemperature protection
- Internal cooling fan (variable speed)
- PSMI and SMbus / I2C interface with bicolor LED status indicators
- RoHS compliant

PRODUCT OVERVIEW

The D1U2-W-400-12-HA4C is a 400 watt, power factor corrected front end supply with a 12V main output and a 5V (15W) standby. It features active current sharing and up to 4 supplies maybe operated in parallel. The supply may be hot plugged, it recovers from overtemperature faults, and has status LEDs on the front panel in addition to logic and PSMI status signals. The supply comes in a low profile 1U package and has >8W/cubic inch power density, making it ideal for delivering reliable, efficient power to servers, workstations, storage systems and other 12V distributed power systems.

ORDERING GUIDE*

Part Number	Power Output High Line AC	Power Output Low Line AC	Main Output	Standby Output	Airflow
D1U2-W-400-12-HA4C	400W	400W	12V	5V	Back to front

*See www.murata.com/products/power for model-specific availability.

INPUT CHARACTERISTICS

Parameter	Conditions	Min.	Nom.	Max.	Units
Voltage Operating Range		90	115/230	264	Vac
Frequency		47	50/60	63	Hz
Turn-on Voltage	Ramp up	85			Vac
Turn-off Voltage	Ramp down			85	
Maximum current at Vin=100Vac	400W			5	Arms
Inrush Current	Cold start between 0 to 200msec			30	Apk
Power Factor	At 230Vac, full load		0.99		
Efficiency (100Vac) including fan load	35% load	80			%
	50% load	85			
	100% load	85			

OUTPUT VOLTAGE CHARACTERISTICS

Output Voltage	Parameter	Conditions	Min.	Typ.	Max.	Units
12V	Voltage Set Point			12.0		Vdc
	Line and Load Regulation		11.8		12.2	
	Ripple Voltage & Noise[1]	20MHz Bandwidth			120	mV p-p
	Output Current (230Vac)		0		33.3	A
	Load Capacitance		0		15,000	µF
5VSB	Voltage Set Point			5.0		Vdc
	Line and Load Regulation		4.85		5.15	
	Ripple Voltage & Noise[1]	20MHz Bandwidth			50	mV p-p
	Output Current		0		3	A
	Load Capacitance		0		500	µF

[1] Ripple and noise are measured with 0.1 µF of ceramic capacitance and 10 µF of tantalum capacitance on each of the power supply outputs. A short coaxial cable with 50Ω scope termination is used.

Available now at
www.murata-ps.com/en/3d/acdc.html

RoHS COMPLIANT

For full details go to
www.murata-ps.com/rohs

Test Certificate and Test Report

OUTPUT CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Output Rise Monotonicity	No voltage excursion				
Startup Time	AC ramp up		1.5	2.0	s
Transient Response	12V, 30-70% load step, 1A/µs di/dt			3	%
	5VSB, 30-70% load step, 0.1A/µs di/dt			3	
Current sharing accuracy (up to 4 in parallel)	At 100% load			±10	
Hot Swap Transients	All outputs within regulation				
Holdup Time		20			ms

ENVIRONMENTAL CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Storage Temperature Range		-40		70	°C
Operating Temperature Range		0		50	
Operating Humidity	Noncondensing	5		90	%
Storage Humidity		5		95	
Altitude (without derating at 55°C)				3,000	m
Shock	30G non operating				
Operational Vibration	0.5G, 5 – 500 Hz				
MTBF	Per Telcordia SR332M1C1 @25°C	300K			hrs
Safety Approvals	CSA/UL 60950-1-07-2nd Ed. IEC 60950-1:2005 (2nd Edition) w Am. 1:2009 EN 60950-1:2006 +A11:2009 +A1:2010 CE Marking per LVD DIRECTIVE 2006/95/EC				
Input Fuse	Power Supply has internal 10A/250V fast blow fuse on the AC line input				
Switching Frequency	90KHz for Boost PFC Converter 200KHz for Main Output Converter				
Weight	2.28lbs (1.034kg)				

PROTECTION CHARACTERISTICS

Output Voltage	Parameter	Conditions	Min.	Typ.	Max.	Units
	Overtemperature (intake)	Autorestart	65	70	75	°C
12V	Overvoltage	Latching	14.0		14.5	V
	Overcurrent	Hiccup	115		130	%
5VSB	Overvoltage	Latching	5.7		5.9	V
	Overcurrent	Autorecovery	4.4		6.0	A

ISOLATION CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Insulation Safety Rating / Test Voltage	Input to Output - Reinforced	3000			Vrms
	Input to Chassis - Basic	1500			Vrms
Isolation	Output to Chassis	500			Vrms

CONTROL SIGNALS

Condition	LED Status
Standby - ON; Main output - OFF; AC PRESENT	Blinking green
Standby - ON; Main output - ON	Solid green
Main/standby output overcurrent, undervoltage, overvoltage warning	Blinking yellow
FAN_FAULT; overtemperature; main/standby output overcurrent, undervoltage, overvoltage fault	Yellow

EMISSIONS AND IMMUNITY

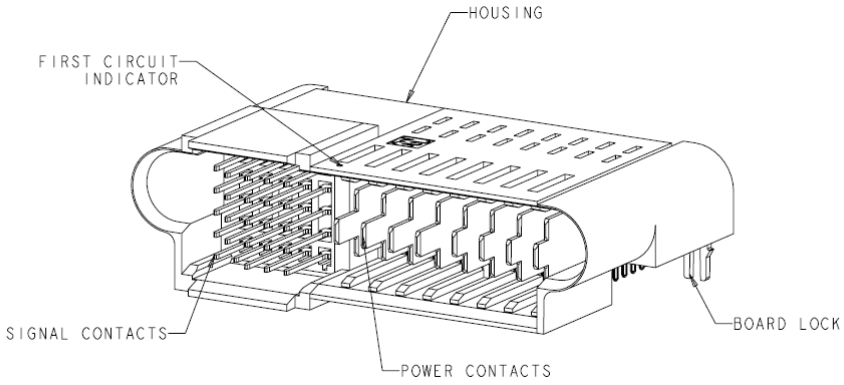
Characteristic	Standard	Compliance
Input Current Harmonics	IEC/EN 61000-3-2	Complies
Voltage Fluctuation and Flicker	IEC/EN 61000-3-3	Complies
Conducted Emissions	FCC 47 CFR Part 15/CISPR 22/EN55022	Class B
ESD Immunity	IEC/EN 61000-4-2	Level 3 criteria A
Radiated Field Immunity	IEC/EN 61000-4-3	Level 3 criteria B
Electrical Fast Transients/Burst Immunity	IEC/EN 61000-4-4	Level 3 criteria A
Surge Immunity	IEC/EN 61000-4-5	Level 3 criteria A
Radiated Field Conducted Immunity	IEC/EN 61000-4-6	Level 3 criteria A
Magnetic Field Immunity	IEC/EN 61000-4-8	3 A/m criteria B
Voltage dips, interruptions	IEC/EN 61000-4-11	230Vin, 100% load, Phase 0°, Dip 100% Duration 10ms (A) 230Vin, 50% load, Phase 0°, Dip 100% Duration 20ms (VSB:A, V1:A) 230Vin, 100% load, Phase 0°, Dip 100% Duration > 20ms (VSB, V1:B)

DC OUTPUT CONNECTOR AND SIGNALS

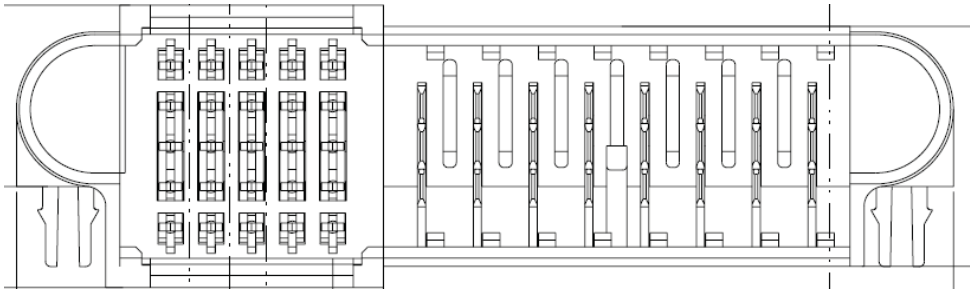
The DC Output Connector is a TYCO MINIPAK HDL Connector **TYCO P/N: 1926734-1**. Mating pin sequencing shall be 12V_RTN first, 12V second, signals third and PSKILL_L signal last. PSKILL_L is the last to mate and first to break and is used as a power supply output enable for the 12V rail.

Mating Part: **TYCO P/N 1-1926739-8**

Power Supply Output Connector Isometric and Front Views

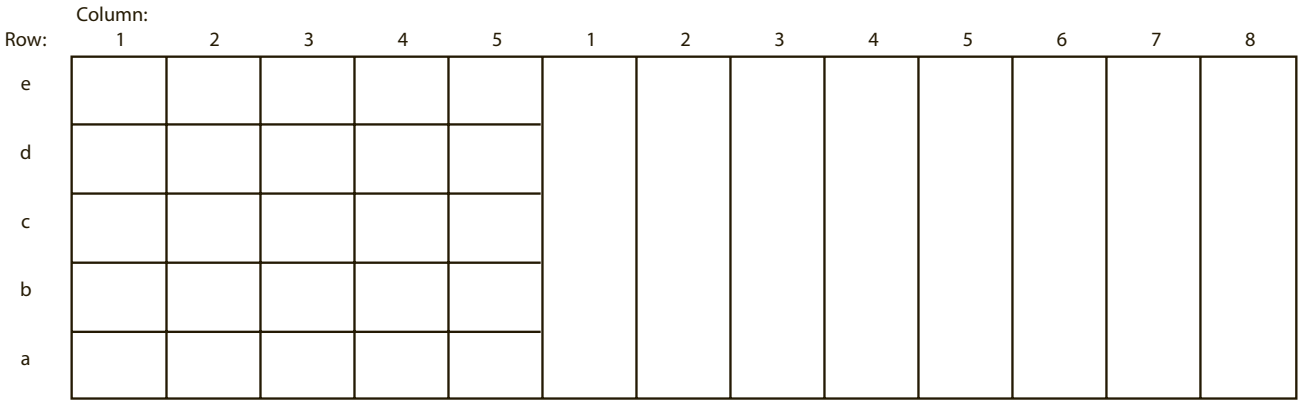


Front Connector View Looking at Blades and Pins (view looking in at rear of power supply)



DC OUTPUT CONNECTOR AND SIGNALS (continued)

View into mating face of 25S8P MINIPAK HDL Plug



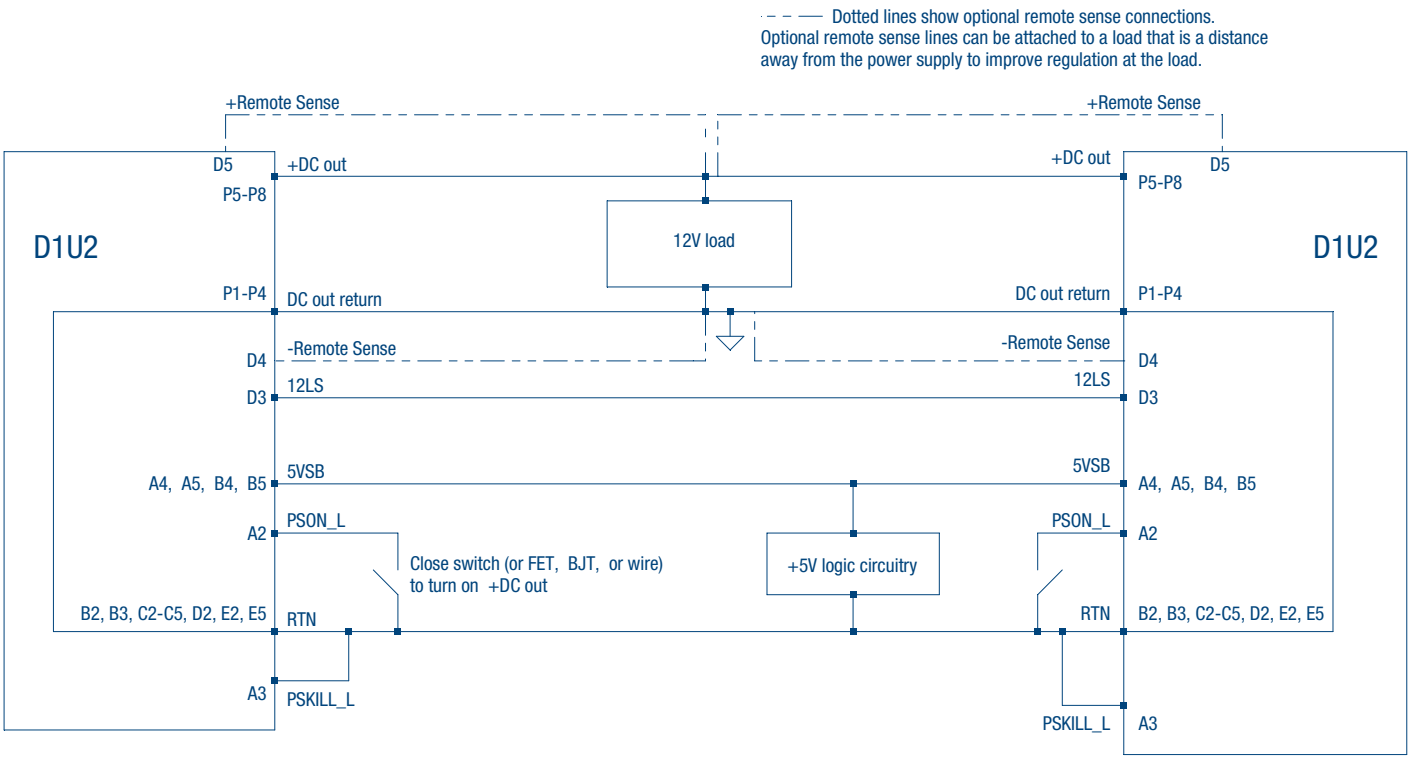
Signal contacts: choice of Level 1 (L1) or Level 2 (L2)

Power contacts: choice of Level 2 (L2) or Level 3 (L3)

POWER SUPPLY OUTPUT CONNECTOR POWER BLADE AND SIGNAL PIN ALLOCATION

Power Blade Number	Signal	Function	Signal Direction	Blade Sequencing
P1, P2, P3, P4	RTN	12V Return	Output	Level 3 UPM PWR
P5, P6, P7, P8	12V	12V Output	Output	Level 2 UPM PWR
A1	SMB_ALERT_L	I2C Serial Bus Interrupt	Output	Level 2 Signal
A2	PSON_L	Power Supply ON	Input	
A3	PSKILL_L	Power Supply Enable	Input	Level 1 Signal
A4, A5	5VSB	5V Standby Voltage	Output	Level 2 Signal
B1	SMB_SCL	I2C Serial Bus Clock	Bi-directional	Level 2 Signal
B2, B3	RTN	Ground	Output	
B4, B5	5VSB	5V Standby Voltage		
C1	SMB_SDA	I2C Serial Bus Data / Address	Bi-directional	Level 2 Signal
C2, C3, C4, C5	RTN	Ground	Output	
D1	SMB_A1	I2C Serial Bus Address Bit A1	Input	Level 2 Signal
D2	RTN	Ground	Output	
D3	12LS	12V Current Share Line	Bi-directional	
D4	12V_RS-	12V Remote Sense Negative	Input	
D5	12V_RS+	12V Remote Sense Positive		
E1	SMB_A0	I2C Serial Bus Address Bit A0	Input	Level 2 Signal
E2	RTN	Ground	Output	
E3	PWOK_H	Power OK Status Bit		
E4	FF1_H	Fan Fail #1 Status Output		
E5	FF2_H	Fan Fail #2 Status Output		

WIRING DIAGRAM



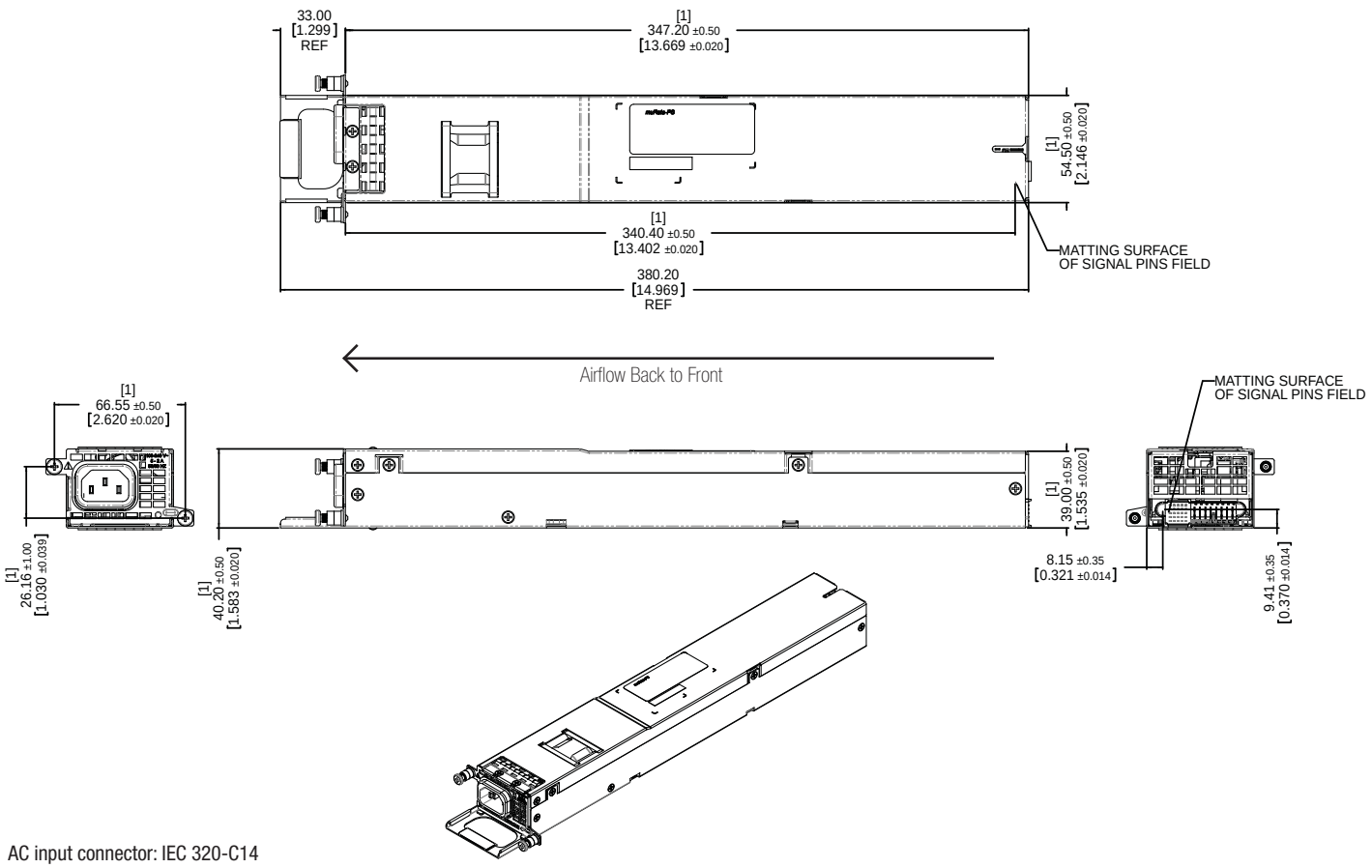
CURRENT SHARING NOTES

12V Output: Current sharing is achieved using the active current share method. (See wiring diagram section for connection details.) The total combined load must be below 400W at startup. Startup of parallel power supplies is not internally synchronized. It is recommended that the paralleled power supplies be turned on at the same time (with their PSON_L signals). Current sharing can be achieved with or without remote sense connected to the common load.

5VSB Output: 5VSB outputs can be tied together for redundancy but total combined output power must not exceed 15W. The 5VSB output has internal ORing MOSFET for additional redundancy / internal short protection.

Up to four units can be paralleled together. Outputs of AC input units (D1U2-W-400) and DC input units (D1U2-D-400) can be paralleled together. Please consult your Murata sales representative if operation with more than four units in parallel is needed.

MECHANICAL DIMENSIONS



AC input connector: IEC 320-C14

Dimensions: 2.15" x 13.67" x 1.58" [54.5mm x 347.2mm x 40.2mm]

OPTIONAL ACCESSORIES

Description	Part Number
12V D1U2 Output Connector Card	D1U2-12-CONC

APPLICATION NOTES

Document Number	Description
TBD	D1U2 Output Connector Card
TBD	D1U2 Communication Protocol

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ISO 9001 and 14001 REGISTERED

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