PRELIMINARY

ARTESYN CSU2400AT SERIES

12.2V Distributed Power System

Advanced Energy's Artesyn CSU front end series is designed to provide a flexible power conversion solution for compute, storage, and networking equipment in the common redundant power supply (CRPS) form factor. This series of AC-DC products is housed in the industry standard 1U x 73.5 mm x 185 mm CRPS form factor. Featuring a power rating of 2400 W, the series can cover power hungry applications where there are space constraints.

AT A GLANCE

Front-end Bulk Power

Total Output Power

2400 W

Input Voltage

180 to 264 VAC
180 to 336 VDC

SPECIAL FEATURES

- Ultra-high density
- 1U power supply
- Active power factor correction
- EN61000-3-2 Harmonic compliance
- Inrush current control
- 80PLUS® Titanium efficiency
- N+N, N+1 redundant
- Hot-pluggable
- Active current sharing
- PMBus® compliant
- Closed loop throttle
- Cold redundancy
- Two-year warranty

COMPLIANCE

- Conducted/Radiated EMI Class A
- IEC 60950
- IEC/EN/UL 62368

SAFETY

- UL/cUL/CSA
- Demko, TUV + CB Report
- CE (LVD + RoHS)
- UKCA Mark
- KC (Safety + EMC)
- EAC
- BIS
- CCC, CQC
- BSMI

TARGET APPLICATIONS

- Server and Storage
- Networking

CSU2400AT SERIES

ELECTRICAL SPECIFICATIONS

Input						
Input range and output power	180 to 264 VAC	2400 W				
	180 to 336 VDC	2400 W				
Frequency	47 to 63 Hz					
Efficiency	96.0% peak at half load with 230 VAC input, titanium efficiency rating					
Max input current	15 A at 180 VAC input					
Inrush current	35 Apk, cold start					
Conducted EMI	Class A, EN 55032, FCC CFR 47 Part 15 Subpart B with 6 dB margin					
Radiated EMI	Class A, EN 55032, FCC CFR 47 Part 15 Subpart B with 6 dB margin					
Power factor	> 0.9 beginning at 10% load, > 0.99 at full load					
Hold-up time	16 ms minimum at 60% load, 11 ms minimum at full load					
Leakage current	< 0.583 mA					
Output						
	Main DC Output			Standby DC Output		
	MIN	NOM	MAX	MIN	NOM	MAX
Nominal setting	-0.2%	12.2 V	+0.2%	-2.5%	12.0 V	+2.5%
Total output regulation range	-5%	-	+5%	-5%	-	+5%
Dynamic load regulation range	-5%	-	+5%	-5%	-	+5%
Output ripple	-	-	1%	-	-	1%
Output current[2]	1.0 A[1]	-	196.7 A	0	-	3.5 A
Current sharing	Within a fixed error of ±3% of the full road rating from 25% load to full load			N/A		
Capacitive loading	2,000 µF[3] 18,000 µF[4]	-	70,000 µF	47 µF	-	3,100 µF

1. Minimum current for transient load response testing only. Unit is designed to operate and be within output regulation range at zero load.
2. Support 224 A peak current for 20 s, 268.6 A peak current for 10 ms, 283 A for 100 µs.
3. Minimum capacitance for cold redundancy and dynamic load tests.
4. Minimum capacitance to support peak current.

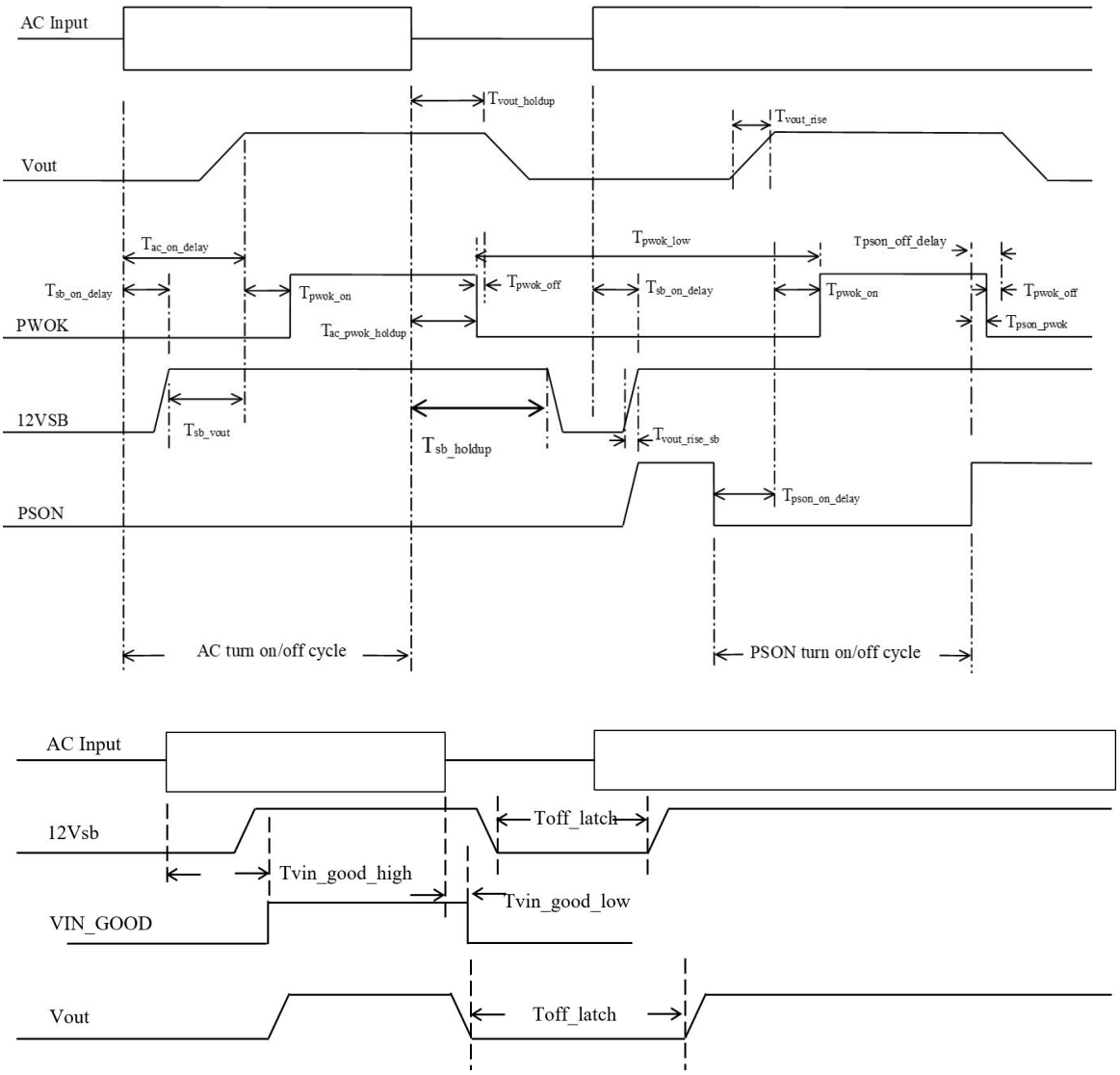
ORDERING INFORMATION

Model Number	Descrption	Outputs		Airflow Direction
CSU2400AT-3-100	1U x 73.5 x 185mm 2400W, Titannium efficiency, C20	12.2 V/196.7 A	12.0 VSB/3.5 A	Forward

ELECTRICAL SPECIFICATIONS

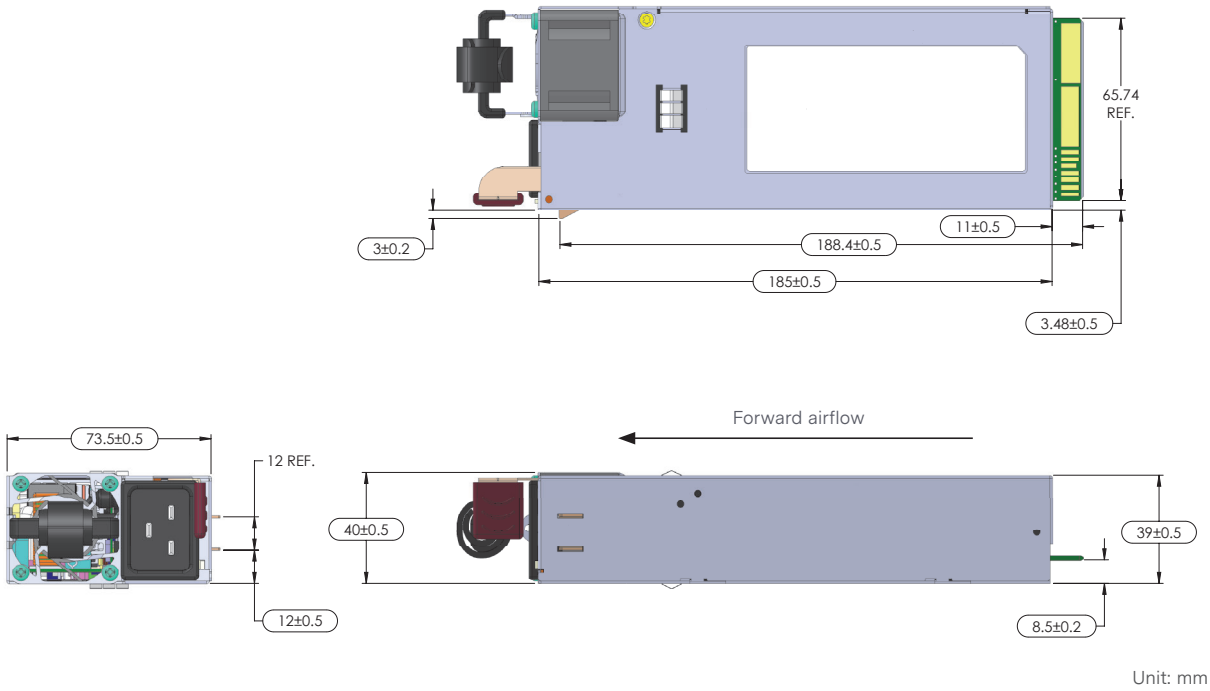
Timing Specification				
Item	Description	Min	Max	Unit
Tvout_rise	Output voltage rise time for 12 V from 10% to within regulation limits. The default is 25 ms, and may be tested with resistive load. The default rise time setting shall correspond to a maximum of 0.5 V/ms.	10	70	ms
Tvout_rise_sb	Output voltage rise time for 12 VSB from 10% to within regulation limits.	10	25	ms
Toff_latch	This is the time the PSU must stay off when being powered off with loss of AC input. Both outputs must meet this OFF time; 1) whenever PWOK is de-asserted for the 12 V main output; 2) whenever the 12 VSB output drops below regulation limits.	500	-	ms
Tsb_on_delay	Delay from AC being applied to 12 VSB being within regulation.	-	1500	ms
Tvin_good_high	Delay from input being applied to VIN_GOOD assertion.	-	1800	ms
Tac_on_delay	Delay from AC being applied to all output voltages being within regulation.	-	3000	ms
Tvout_holdup	Time main output voltage stays within load regulation range after loss of AC.	11	-	ms
Tac_pwok_holdup	Delay from loss of AC to de-assertion of PWOK.	10	-	ms
Tvin_good_low	Delay from loss of AC to de-assertion of VIN_GOOD.	-	3	ms
Tpson_off_delay	Delay from PSON# de-asserted to power supply turning off.	-	5	ms
Tpson_on_delay	Delay from PSON# active to output voltages within regulation limits.	5	400	ms
Tpson_pwok	Delay from PSON# deactivate to PWOK being de-asserted.	-	5	ms
Tpwok_on	Delay from output voltages within regulation limits to PWOK asserted at turn on.	100	500	ms
Tpwok_off	Delay from PWOK de-asserted to output voltages dropping out of regulation limits. This timing is configurable by the system from 1 ms to 4 ms.	1	-	ms
Tpwok_low	Duration of PWOK being in the de-asserted state during an off/on cycle using AC or the PSON signal.	100	-	ms
Tsb_vout	Delay from 12 VSB being in regulation to main output being in regulation at AC turn on.	50	1500	ms
Tvsb_holdup	Time the 12 VSB output voltage stays within regulation after loss of AC. Measured at 100% total power, with the standby output loaded at 1.75 A	70	-	ms

TIMING DIAGRAM



Note: The PSU may be configured to meet Tpwok_off of 2.5 ms at 107 A before the output drops below 10.8 V, with Tvout_hold-up still at a minimum of 11 ms.

MECHANICAL OUTLINE



Unit: mm

ENVIRONMENTAL SPECIFICATIONS

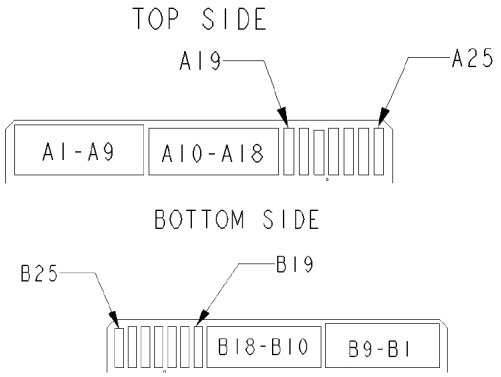
Operating temperature	-5 to 55°C full rated power. Allowable up to 65°C at 60% load for short term operation
Storage temperature	-40 to +70°C
Operating relative humidity	+5% to 95%, non-condensing
Shipping and storage relative humidity	+5% to 95%, non-condensing
Operating altitude	Up to 5,000 m
Storage altitude	Up to 12,100 m
Vibration and shock	Standard operating/non-operating random shock and vibration
RoHS and REACH compliance	Yes
MTBF	500 k hours (Telcordia SR-332 at 55°C ambient, nominal input, full load)
Operating life	Minimum of 5 years at 55°C, 85% load, nominal input, sea level

CONNECTOR DEFINITION

Output connector part number	Card-edge
Recommended mating connector part number	FCI Amphenol HPG12P14SRT153T*

* Use with caution to maintain connector temperature rise and connector temperature.

Output Connector Pin Configuration		
A1-A9	POWER GND	Return path for current
A10-18	+12V	Main output
A19	SDA	I²C data line
A20	SCL	I²C clock line
A21	PSON#	Remote enable signal, pull low to turn on the main output
A22	SMBAlert#	PSU fault interrupt
A23	RETURN_SENSE	Remote sense for ground, 100 mV compensation
A24	+12V_REMOTE_SENSE	100 mV drop compensation for the main output
A25	PWOK	12 V main output status signal
B1-B9	POWER GND	Return path for current
B10-B18	+12V	Main output
B19	A0 (addressing)	I²C address bit
B20	A1 (addressing)	I²C address bit
B21	12VSB	Standby output
B22	CR_BUS	Cold redundancy bus signal
B23	ISHARE	Current sharing bus signal
B24	GND	Signal used for PSU presence detection
B25	VIN_GOOD	PSU input status signal



ADDRESSING

PMBUS		
A1	A0	Adddress
0	0	B0h
0	1	B2h
1	0	B4h
1	1	B6h

EEPROM FRU		
A1	A0	Adddress
0	0	A0h
0	1	A2h
1	0	A4h
1	1	A6h

ABOUT ADVANCED ENERGY

Advanced Energy (AE) has devoted more than three decades to perfecting power for its global customers. AE designs and manufactures highly engineered, precision power conversion, measurement and control solutions for mission-critical applications and processes.

Our products enable customer innovation in complex applications for a wide range of industries including semiconductor equipment, industrial, manufacturing, telecommunications, data center computing, and medical. With deep applications know-how and responsive service and support across the globe, we build collaborative partnerships to meet rapid technological developments, propel growth for our customers, and innovate the future of power.

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