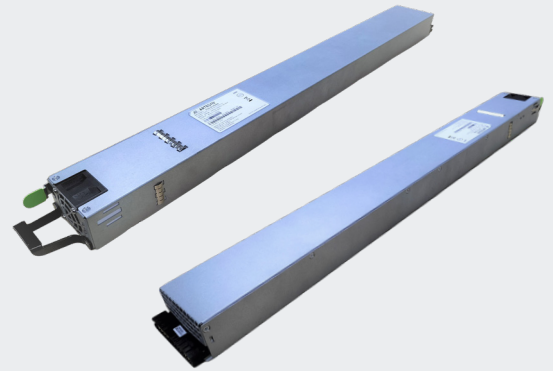


ARTESYN 48 V 3 kW ATS PSU

For 30 kW EIA 19 Inch Power Shelf



Advanced Energy's Artesyn introduces the 48 V 3 kW ATS PSU for use in the 30 kW EIA 19 Inch Power Shelf (10 + 2) redundant. The PSU is a single-phase AC to DC power supply that operates from nominal input voltage from 187 to 264 VAC and produces 48 V, 62 A (3 kW) DC output, hot-swappable, accurate current sharing and self-cooled. Within the EIA 19 Inch Power Shelf, twelve of the PSUs operate in parallel, current sharing mode to produce 30 kW of 10 + 2 redundant power.

KEY FEATURES

- Peak efficiency 97%
- Efficiency greater than 96.5% for 230 VAC to 277 VAC and 30% to 100% load range
- 187 to 264 VAC nominal input voltage range
- Droop+active current sharing
- Hot swappable
- Cooling via internal fan with speed control
- Modbus/PMBus communications
- Interface for monitoring and control

EMC / SAFETY COMPLIANCE

- EN61000 / IEC61000 applicable standards for Emissions & Immunity Requirements
- UL/CSA 62368-1
- UL94/V-0

AT A GLANCE

Total Output Power

3 kW

Input Voltage

187 to 264 VAC

Output Voltage

48 VDC

Mechanical Dimensions

650 x 68 x 40 mm (L x W x H)

Operating Temperature

0°C to 40°C

ELECTRICAL SPECIFICATIONS

Absolute Maximum Ratings					
	Models	Min	Typ	Max	Unit
Input Voltage AC continuous operation	All	187	-	264	VAC
Maximum Output Power	All	-	-	3	kW
Ambient Operating Temperature	All	0	-	40	°C
Storage Temperature	All	-40	-	70	°C
Humidity (non-condensing) Operating Non-operating	All	10 10	- -	85 95	% %
Altitude Operating Non-operating	All	0 0	- -	2000 15200	m m

Input Specifications					
	Conditions	Min	Typ	Max	Unit
Input Voltage	All	187	200/240	264	VAC
Input Current	200 VAC input, 100% load	-	-	16	A
Input AC Frequency	All	45	50/60	65	Hz
Fuse	All	25	-	-	A
Inrush Current	264 VAC input, Tamb = 35°C Cold start	-	-	25	A
Hold Up Time	230 VAC input, 47 to 63 Hz 100% Load	-	25	-	ms
iTHD	240 VAC input, 60 Hz 10% to 50% load 50% to 100% load	- -	- -	10 5	% %
Power Factor	240 VAC input, 60 Hz 10% to 100% load	0.95	-	-	-
Efficiency	230 VAC input 30% load 50% load 90% load	96 97 96	- - -	- - -	% % %
Leakage Current	264 VAC input, 60 Hz	-	-	3.5	mA
System Stability Phase Margin Gain Margin	All	45 -10	- -	- -	∅ dB
Input Overvoltage Protection	All	-	-	290	VAC
ATS Function	Zero voltage transfer. No transfer when AC drop/dip < 6 ms. No transfer if only one source is available. Always switch to default source if available. Need switch to another source when Itic is not met based on the detected normal working voltage (or 230 V simply). When forced to switch to another source, follow the random time initiated in SMC.				

ELECTRICAL SPECIFICATIONS

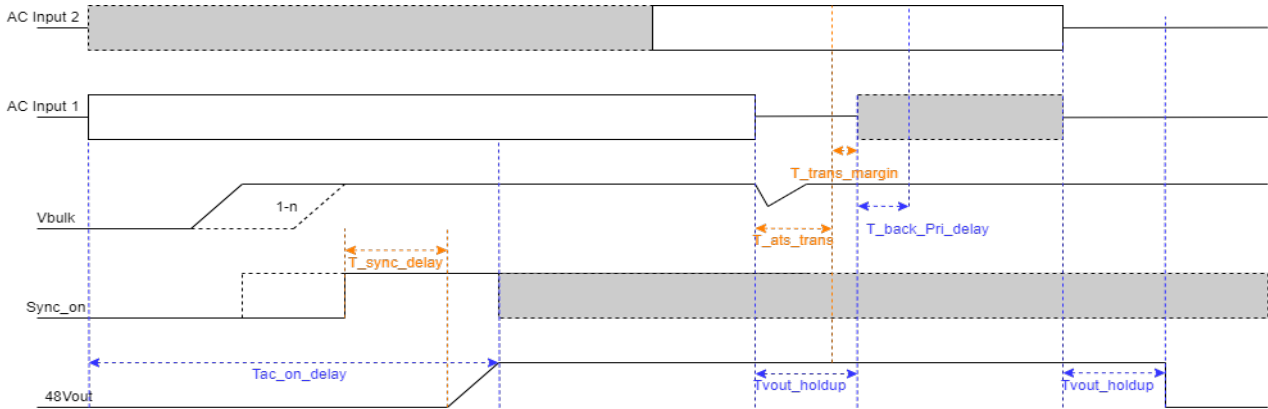
Output Specifications					
	Conditions	Min	Nom	Max	Unit
Set Point	20% Load	49.55	49.60	49.65	VDC
Output Current	Continuous	-	-	62	A
	5 ms Peak	-	-	100	A
	200 μ s Peak	-	-	115	A
Output Power	All	-	-	3000	W
Ripple & Noise	20 MHz bandwidth	-	-	500	mVpp
V _O Dynamic Response	Peak Deviation	Dynamic load: 50 to 10 kHz			
		Duty cycle: 10% to 90%			
		Slew rate: 1 A/ μ s			
		10% to 60% load step	-	-	2
		50% to 100% load step	-	-	2
Load Capacitance	All	-	-	50000	μ F
Droop Share Characteristics	0 to 100% load	-	-1.0	-	V
Current Sharing Accuracy	100% load	-2	-	+2	%
Short Circuit Protection (SCP)	Latch mode				
Overcurrent Protection (OCP)	If the 48V output current is over OCP trigger limits, the OCP must have a short delay and then latch off. The OCP threshold range is: <ul style="list-style-type: none"> · Minimum 74 A latched shutdown with 1 s delay. · Fast OCP: 100 A with 5 ms delay; 115 A with 200 μs delay. 				
Overvoltage Protection (OVP)	The PSU is equipped with OVP circuitry that monitors the outputs and latches off the supply when triggered. The OVP trigger ranges for the 48 VDC output is 54 to 59 VDC. Recovery is AC input power cycling.				

TIMING

Item	Description	Min	Max	Unit
Tvout_rise	Output voltage rise time	-	200	ms
T ac_on_delay	Delay from AC being applied to all output voltages being within regulation	4	10	s
Tvout_holdup	Time 12 V output voltage stay within regulation after loss of AC or drop	25	-	ms
T_sync_delay	Delay from Sync active to Vout start	9.5	10.5	ms
T_trans_margin	Auto-transfer completion to hold up time	4	-	ms
T_back_pri_delay	Delay for transfer back to primary AC source once it come back	2000	8000	ms

Note 1 - The SMC generates a random time and it will be sent to the PSU. The PSU will use this random time when transferring from Source 2 to Source 1.

TIMING (CON'T)



CONTROL AND MONITORING SIGNAL

PWOK (option)

PWOK is a logic signal which will be pulled HIGH by the power supply to indicate that +48V output is within the regulation limits of the power supply. PWOK gets de-asserted to a LOW state whenever the output voltage falls below regulation limits or AC power has been removed for a time longer than specified which would indicate that a reliable operation of the PSU is no longer guaranteed. Refer to table below for the PWOK signal characteristics.

PWOK Signal Characteristics		
PWOK = High	Power OK	
PWOK = Low	Power Not OK	
	Min	Max
Logic level low voltage, Isink = 400 uA	0.0 V	0.4 V
Logic level high voltage, Isource = 2 mA	2.4 V	3.46 V
Source current, PWOK = High 2 mA	-	2 mA
PWOK rise and fall time	-	100 usec

ACOK

ACOK is a logic signal which indicates that the corresponding PSU has good AC input power. Refer to table below for the ACOK signal characteristics.

ACOK Signal Characteristics		
ACOK = High	AC voltage is good	
ACOK = Low	AC voltage is out of acceptable range	
	Min	Max
Logic level low voltage, Isink = 400 uA	0.0 V	0.4 V
Logic level high voltage, Isource = 2 mA	2.4 V	3.46 V
Source current, PWOK = High 2 mA	-	2 mA
ACOK rise and fall time	-	100 usec

CONTROL AND MONITORING SIGNAL (CON'T)

PS_Present

This signal is an active low type signal and is connected to the power supply's output ground internally. The mating pin of this signal in Power Shelf side have a pull-up resistor which limit the maximum current 4 mA to go through from this signal pin to the power supply. A LOW state on this signal indicates the PSU physically presents.

PS_ON (require not to use)

The PS_ON signal is required to remotely turn on/off the power supply. PS_ON signal is an active low signal that turns on the +48 V output. When this signal is not pulled low by the power shelf, or left open, the output will turn off. This signal is pulled to an internal +3.3 V by a 20K pull-up resistor in the power supply. Refer to table below for the PS_ON signal characteristics.

PSON Signal Characteristics		
PSON = Low	PSU is ON	
PSON = High or Open	PSU is Off	
	Min	Max
Logic level low voltage	0.0 V	1.0 V
Logic level high voltage	2.4 V	3.46 V
Sink current, PSON = Low	-	4 mA
PSON rise and fall time	-	100 usec

PS_Kill

The purpose of the PS_Kill pin is to allow for hot swapping of the PSU. When a PSU (working in parallel with other PSUs) is extracted from the power shelf, the PS_Kill pin will quickly turn off the PSU and prevent arcing of its DC output contact. PS_Kill signal pin is short pin to ensure pre-mating.

L_share (Reference)

Current Share bus voltage is a linear slope of zero to 4 V for output load of zero to full load.

Load Percentage	48 V Load	V_Ishare Minimum	V_Ishare Maximum
100%	62 A	3.92 V	4.08 V

PMBus Signal (Reference)

PMBus Data: a 100K pull-up resistor pulled to internal +3.3V in the PSU.

PMBus Clock: a 100K pull-up resistor pulled to internal +3.3V in the PSU.

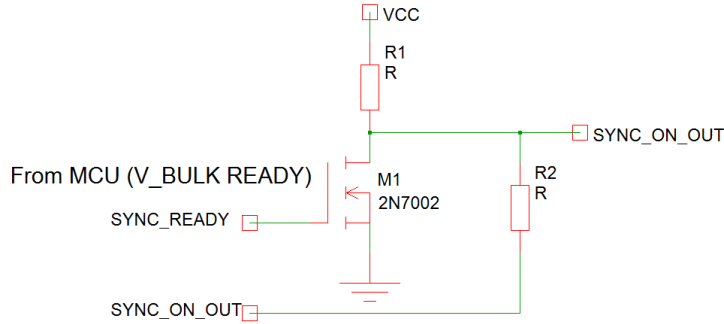
SMBAlert: In the event of a PSU failure and warning (main outputs go out of regulation band, fan failure, over temperature, over current, over voltage, undervoltage AC failure), this signal will be driven LOW by the PSU and the red LED will come on.

SMBAlert Signal Characteristics		
Active Low signal	Open Collector/Drain Output from PSU pull-up to VSB located in the system	
SMBAlert = High	PSU functioning properly	
SMBAlert = Low	PSU has issue and alerts the system	
	Min	Max
Logic Level Low Voltage, Isink = 4 mA	-	0.4 V
Logic Level High Voltage, Isink = 50 uA	2.4 V	3.46 V
Sink Current, Alert# = Low	-	4 mA
Sink Current, Alert# = High	-	50 uA

CONTROL AND MONITORING SIGNAL (CON'T)

Sync_on

This is the synchronization signal to turn on the PSUs in the shelf together ONLY during first turn on. This signal needs to be disabled once power shelf has been turned on.



ENVIRONMENTAL SPECIFICATIONS

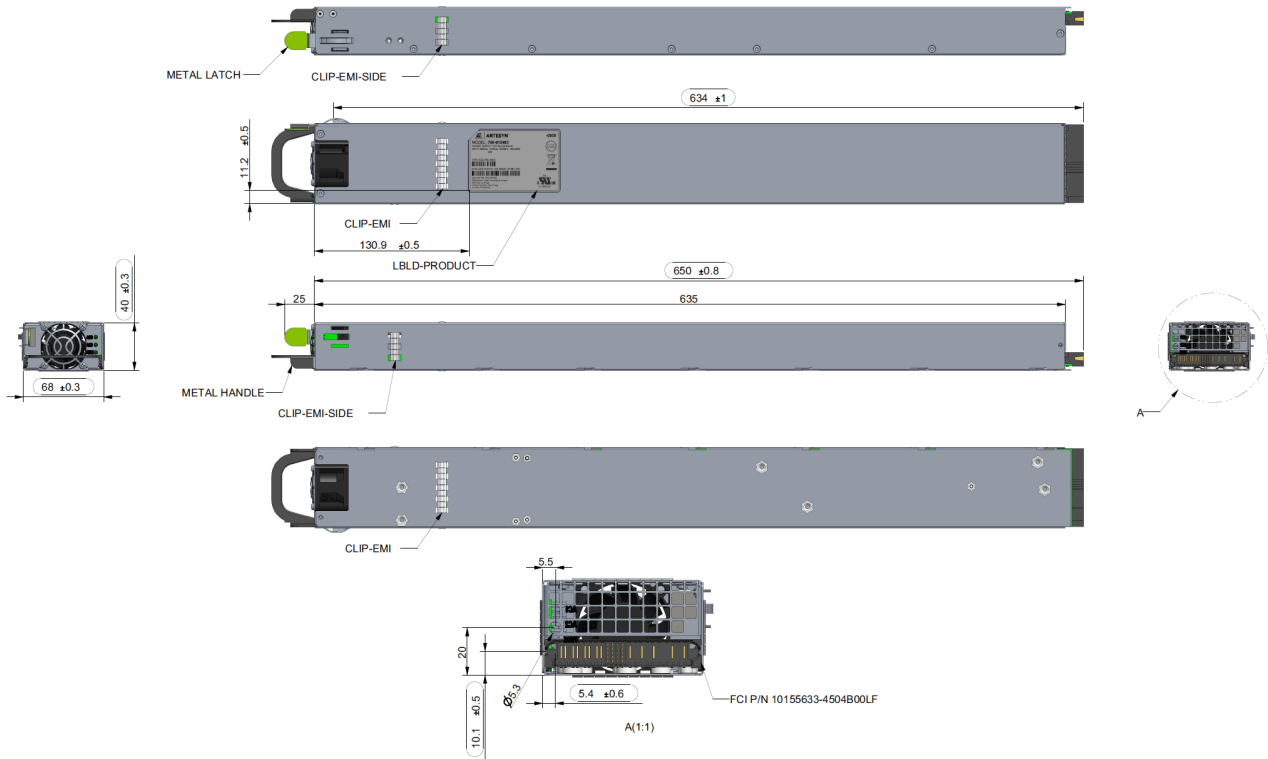
Temperature Range	Operational: 0 to +40°C; Non-operational: -40 to +70°C. PSU is able to start at -10°C of ambient temperature.
Humidity	Operational: 10% to 85% non-condensing; Non-operational: 10% to 95% non-condensing
Altitude	Operational: 2000 m; Non-operational: 15200 m
Shock	Operating: 5 G, 11 ms half sine pulses. 3 pulses in each sense Non-operating: 12 G, 11 ms half sine pulses. 3 pulses in each sense
Vibration	Operating vibration: 0.25 G zero to peak. Frequency is 5 to 500 Hz, 0.25 oct/min in each of three mutually perpendicular axes. 3 sweeps from 5 to 500 to 5 Hz in each axis. Non-operating sine sweep vibrations: 5 to 500Hz @ 0.5 G at 0.5 octave/min; dwell 15 min at each of 3 resonant points. Non-operating random vibration: 5 Hz @ 0.01 g/Hz to 20 Hz @ 0.02 g/Hz (slope up); 20 to 500 Hz @ 0.02 g/Hz (flat); Input acceleration = 3.13 gRMS; 10 minutes per axis for 3 axis.

RELIABILITY

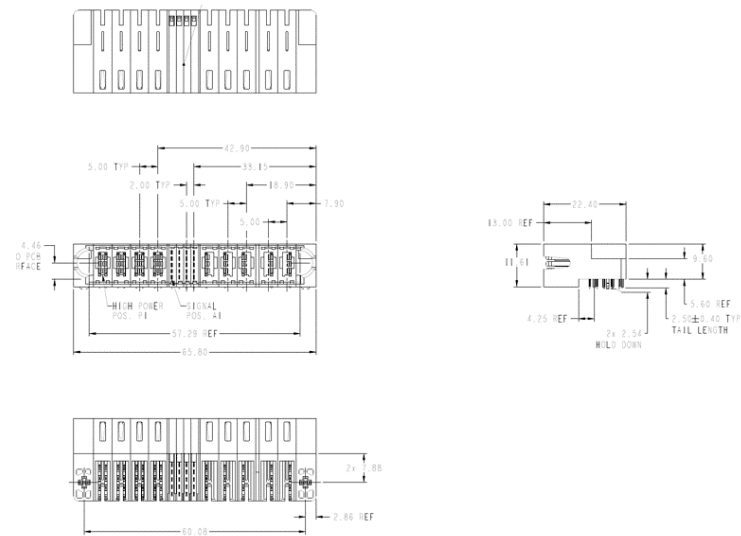
Calculated MTBF	The PSU meet a calculated MTBF of at least 100K hours at 90% confidence level, 40°C of ambient temperature, 230 Vac of input voltage, and 75% load per Belicore RPP. The fan is not included in the calculation.
Demonstrated MTBF	The PSU meet a demonstrated MTBF of minimum 250K hours at 90% confidence level, 40°C of ambient temperature and 75% load.
Life	The PSU have a minimum service life of 5 years (24 hours/day, full load, 230 Vac, 40°C of ambient temperature).

MECHANICAL

PSU Mechanical Drawing:



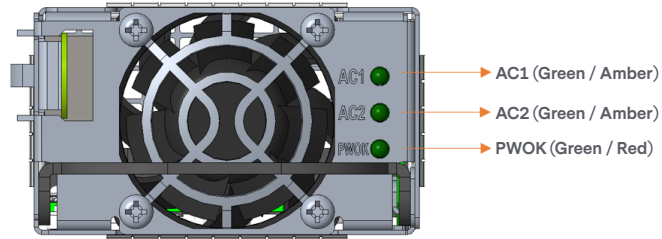
The rear blind-mate connector installed on the PSU is Amphenol FCI 10155633-4504B00LF. This is a R/A plug, PwrBlade ULTRA connector with 4 high power pins, 20 signal pins, and 5 low power pins. Please refer to the drawing below for more details.



48 V 3 kW ATS PSU

LED



The PSU has three LEDs mounted near the PSU handle for accessibility.



Following are power supply LED states:

	AC1 LED	AC2 LED	DCOK LED
AC1, AC2 in range, power from AC1	Green Solid	Green Blinking	-
AC1, AC2 in range, power from AC2	Green Blinking	Green Solid	-
AC1 in the range only	Green Solid	Amber Solid	-
AC2 in the range only	Amber Solid	Green Solid	-
Normal output	-	-	Green Solid
Standby	-	-	Green Blinking (1 Hz)
Bootloader	-	-	Green Blinking (2 Hz)
PSU fail (OVP, OCP, OTP, fan fail)	-	-	Red Solid
Warning	-	-	Red Blinking

ORDERING INFORMATION

Model	Input	Output	Description
700-015485-0000	1 Phase AC, 180 to 305 VAC, 50 to 60 Hz	48 V  62 A	48 V, 3 kW, ATS PSU
700-015496-0000	3 Phase AC, 200/480 V, 50 to 60 Hz	48 V  618 A	48 V, 30 kW, EIA 19 Inch Power Shelf
700-015499-0000			SMC

Note 1 - Shelves are related products (not covered by this data sheet). Refer to power shelf data sheet.



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