

# ARTESYN DS760SL SERIES

760 Watts Bulk Front End



Advanced Energy's Artesyn DS760SL series bulk front end AC-DC power supply accepts a wide range 90 to 264 VAC input and provides a main 12 V output plus a 5 V standby output. Rated at 760 watts it has a high peak efficiency of 91%. Housed in a slimline 1U high, 2.1 in wide rack-mounting package, the power supply is primarily designed for 'always-on' enterprise servers and similar space-constrained applications. This series comes in two airflow versions – dc-connector to ac-connector and vice versa.

## AT A GLANCE

### Total Output Power

760 Watts +5.0 VDC Standby



## SPECIAL FEATURES

- 760 W output power
- 18.1 W/cu-in
- 1U X 54.5 mm form factor (slimline)
- N + 1 redundant
- Hot-swap
- Internal OR'ing
- 5.0 V housekeeping
- High efficiency 91% @ 230 VAC, 50% load
- Variable speed "smart fans"
- EMI Class A
- EN61000 immunity
- Two years warranty

## SAFETY

- UL/cUL 60950-1
- CSA 60950-1
- VDE 60950-1
- China CCC
- CB Scheme Report/Cert
- UKCA Mark

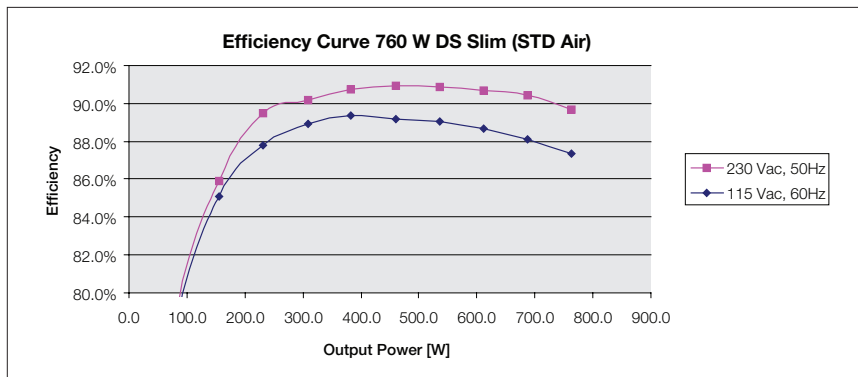
## ELECTRICAL SPECIFICATIONS

Input		
Input range (operating)	90 to 264 VAC	
Input range (nominal)	115 / 230 VAC	Input through IEC connector
Frequency	47 to 63 Hz	
Input fusing	Internal 10 A fuses	Both lines fused
Inrush current	< = 25 A peak	Either hot or cold start
Power factor	0.99 typical	Meets EN61000-3-2
Harmonics	Meets IEC 61000-3-2 requirements	
Input current	8.8 A RMS max input current	At 100 VAC
Holdup time	12 ms minimum for main O/P 20 ms minimum for standby	At full rated load
Undervoltage lockout	85 ± 2.5 VAC 80 ± 2.5 VAC	Turn-on voltage Turn-off voltage
Oversvoltage lockout	N/A	
Leakage current	< 0.8 mA	At 264 VAC
On/Off power switch	N/A	
Power line transient	MOV directly after the fuse	

## ENVIRONMENTAL SPECIFICATIONS

Operating temperature	-10°C to 50°C
Storage temperature	-40°C to 85°C
Cooling	Internal fan (fan speed control)
Operating relative humidity	5% to 95% non-condensing
Altitude	10,000 feet
RoHS compliant	Yes

ENVIRONMENTAL SPECIFICATIONS (CONTINUED)



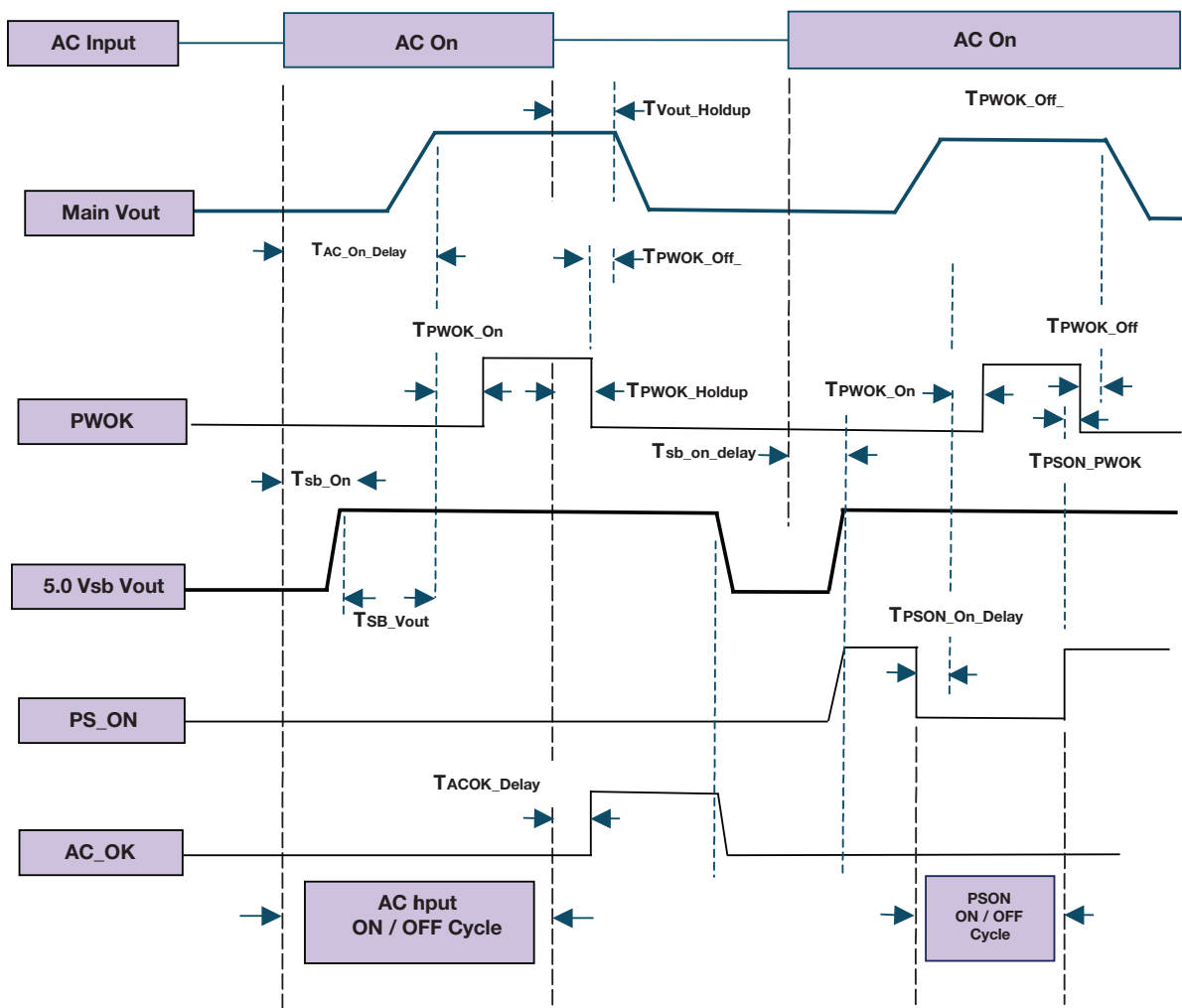
Input		
Output rating	12 V @ 62.3 A; 748 W 5 VSB @ 2.4 A; 12 W	90 to 264 VAC
Setpoint	12 V	
Total regulation range	12 V ± 1% 5 VSB ± 3%	Line/load/transient when measured at output connector
Rated load	760 W maximum	No derating over operating temp range
Minimum load	12 V @ 0.0 A 5 VSB @ 0.0 A	No loss of regulation
Output noise (PARD)	100 mV Max P-P 100 mV Max P-P	12 V output 5 VSB output Measured with a 0.1 uF ceramic and 10 uF tantalum capacitor on any output; 20 MHz
Output voltage overshoot	300 mV; 12 V main 200 mV; 5 V standby	1 A/uSec slew rate
Transient response	< 250 uSec	50% load step @ 1 A/us Step load valid between 10% to 100% of output rating Recovery time to within 1% of set point at onset of transient
Max units in parallel	Up to 4	Output to return
Short circuit protection	To 120% of rated output	
Remote sense	Compensation up to 100 mV	
Output isolation	Standard per Safety Requirements	
Forced load sharing	To within 10% of all shared outputs	Digital sharing control
Overload protection (OCP)	120% to 130% 120% to 170%	12 V output 5 VSB output
Overvoltage protection (OVP)	110% to 120% 110% to 125%	12 V output 5 VSB output
Overtemperature protection	10°C to 15°C above safe operating area	Both PFC and output converter monitored

ORDERING INFORMATION

Model Number	O/P Voltage Set Point	Set Point Tolerance	Total Regulation	Minimum Current	Maximum Current	Output Ripple P/P	Stand-by Voltage	Air Flow
DS760SL-3	12.0 VDC	± 0.2%	± 1%	0 A	62.3 A	120 mV	5.0 V @ 2.4 A	Standard
DS760SL-3-001	12.0 VDC	± 0.2%	± 1%	0 A	50.0 A	120 mV	5.0 V @ 2.4 A	Reverse
DS760SL-3-002	12.0 VDC	± 0.2%	± 1%	0 A	62.3 A	120 mV	3.3 V @ 2.4 A	Standard
DS760SL-3-003	12.0 VDC	± 0.2%	± 1%	0 A	50.0 A	120 mV	3.3 V @ 2.4 A	Reverse

OUTPUTS - ALL MODELS

Timing Diagram



## OUTPUTS - ALL MODELS (CONTINUED)

Turn On/Off Timing				
Item	Description	Min	Max	Units
Tvout_rise	+12 output rise time	10	300	mSec
Tvout_rise	5.0 VSB output rise time	1	50	mSec
Tsb_on_delay	Delay from AC being applied to 5.0 VSB being within regulation.		1500	mSec
Tac_on_delay	Delay from AC being applied to all output voltages being within regulation.		3000	mSec
Tvout_holdup	Time all output voltages, including 5.0 VSB, stay within regulation after loss of AC.	12		mSec
Tpwok_holdup	Delay from loss of AC to de-assertion of PWOK	5		mSec
Tpson_on_delay	Delay from PSON# active to output voltages within regulation limits.	50	2500	mSec
Tpson_pwok	Delay from PSON# de-active to PWOK being de-asserted.		100	mSec
Tacok_delay	Delay from loss of AC input to de-assertion of ACOK#.	10		mSec
Tpwok_on	Delay from output voltages within regulation limits to PWOK asserted at turn on.	100	1000	mSec
Tpwok_off	Delay from PWOK de-asserted to 12 VDC or 5.0 VSB dropping out of regulation limits.	1	1000	mSec
Tpwok_low	Duration of PWOK being in the de-asserted state during an off/on cycle using AC or the PSON# signal.	100		mSec
Tsb_vout	Delay from 5.0 VSB being in regulation to 12 VDC being in regulation at AC turn on.	50	1000	mSec

### PSON #

The PSON# signal is required to remotely turn on/off the power supply. PSON# is an active low signal that turns on the +12 VDC power rail. When this signal is not pulled low by the system, or left open, the +12 VDC output turns off. The 5.0 VSB output remains on. This signal is pulled to a standby voltage by a pull-up resistor internal to the power supply. The power supply fan(s) shall operate at the lowest speed.

PSON Signal Characteristics		
Signal Type	Accepts an open collector/drain input from the system. Pulled-up to the 5.0 VSB located in power supply.	
PSON# = Low	ON	
PSON# = Open	OFF	
	MIN	MAX
Logic level low (power supply ON)	0 V	0.8 V
Logic level high (power supply OFF)	2.0 V	4.125 V
Source current, Vpson = low		4 mA
Power up delay: Tpson_on_delay	5 msec	200 msec

### PWOK# (Power Good)

PWOK is a power good signal and will assert HIGH when the outputs are within the regulation limits. PWOK will be pulled LOW by the power supply to indicate when either output falls below regulation limits or when AC power has been removed for a time sufficiently long so that power supply operation is no longer guaranteed. The start of the PWOK# delay time shall be inhibited as long as the +12 VDC output is in current limit or the 5.0 VSB output is below the regulation limit.

PWOK Signal Characteristics		
Signal Type	Open collector/drain output from power supply. Pullup to 5.0 VSB external to the power supply.	
PWOK = High	Power Good	
PWOK = Low	Power Not Good	
	MIN	MAX
To tLogic level low voltage, Ising = 4 mA	0 V	0.8 V
Logic level high voltage, Isource = 200 $\mu$ A	2.0 V	4.125 V
Sink current, PWOK = low		4 mA
Source current, PWOK = high		2 mA

OUTPUTS - ALL MODELS (CONTINUED)

**PSKILL**

The +12 VDC output only from the power supply shall be disabled if the PSKILL input is high and V Standby will continue to be provided, outputs may be enabled if this signal is low. The power supply includes a pull up to disable all outputs if this signal is open. PSKILL shall not be connected during a hot insertion before all of the other pins are connected.

**STATUS INDICATIONS**

See table below for Summary of Status signals, Ports and Indicators. The condition column assumes 2 or more power supplies present and ON and 5.0 VSB shared for management interface. On the “Fan Blocked” condition, the assumption is that all outputs are within spec and not over temperature. This would be considered a “warning” condition. On the “Standby” condition, the system differentiates this state by knowing PS\_ONL in negated (requesting Standby).

**AC INPUT PRESENT INDICATOR (ACOK#)**

The ACOK# signal is used to indicate presence of AC input to the power supply. This signal shall be connected to 5.0 VSB through a resistor on the host system side. A logic “High” level on this signal shall indicate AC input to the power supply is present. A Logic “Low” on this signal shall indicate a loss of AC input to the power supply.

ACOK# Signal Characteristics		
Signal Type	Pull up to 5.0 VSB through a resistor in the host system.	
PWOK = High	Present	
PWOK = Low	Not Present	
	MIN	MAX
Logic level low voltage, Isink = 4 mA	0 V	0.8 V
Logic level high voltage, Isink = 50 μA	2.0 V	4.125 V
Sink current, PRESENT# = low		4 mA
Sink current, PRESENT# = high		50 μsec

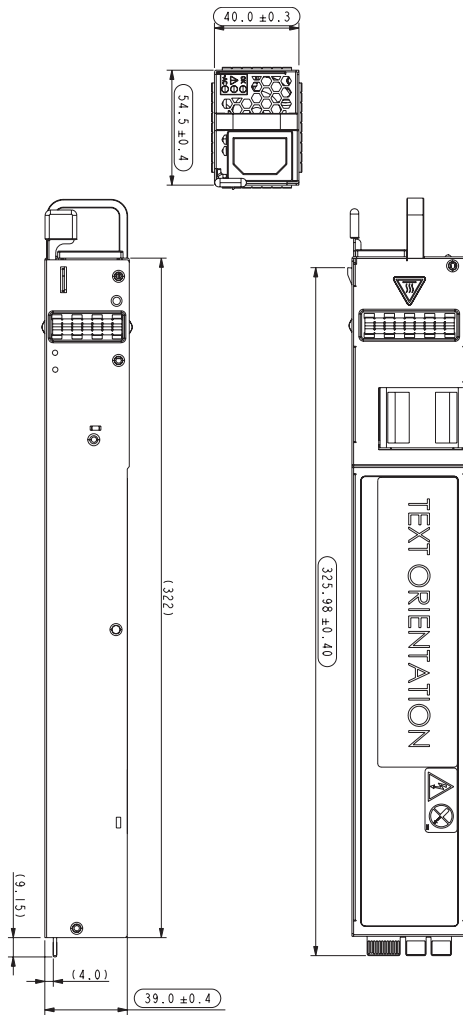
Status Indicators												
Condition	Status Signals		Status Register		Shutdown Register					LED's		
	ACOK/H	PWOK/H	PSON	PWOK	Fan-Fail	AC-Loss	0-Temp	0-Current	Fail	AC	DC	Fail
Normal Operation	1	1	1	1	0	0	0	0	0	On	On	Off
V1 12 V Overcurrent	1	0	1	0	0	0	0	1	1	On	Off	On
AC Input Fail	0	0	1	0	0	1	0	0	1	Off	Off	Off
Fan Blocked or Running Under Speed. O/P's ok	1	1	1	1	0	0	0	0	0	On	On	Off
UV on V1 12 V and PS Has Latched Off	1	0	1	0	0	0	0	0	1	On	Off	On
UV on VSB +5.0 and PS Has Turned Off	1	0	1	0	0	0	0	0	1	On	Off	On
OV on V1 12V or VSB +5.0 & PS Has Latched Off	1	0	1	0	0	0	0	0	1	On	Off	On
Over Temp and PS Has Turned Off	1	0	1	0	0	0	1	0	1	On	Off	On
Fan Below Shutdown Limit	1	0	1	0	1	0	0	0	1	On	Off	On
No Problems But PS is in Standby Mode	1	0	0	0	0	0	0	0	0	On	Off	Off

## PIN OUT TABLE

Pin	Signal Name
Pin 1	+12 V
Pin 2	+12 V
Pin 3	Ground
Pin 4	Ground
S1	+12 V Sense
S2	+12 V RTN Sense
S3	+12 V Current Share
S4	SMB_ALERT/L
S5	SDA
S6	SCL*
S7	PSKILL
S8	PERSON/L
S9	PW_OK
S10	PS_A1
S11	+5.0 V_STBY
S12	+5.0 V_STBY
S13	Reserved
S14	PRESENT/L
S15	PS_A0
S16	Reserved
S17	Reserved for factory use
S18	EEPROM_WP
S19	ACOK/H
S20	Not used
S21	Not used
S22	Reserved for factory use
S23	+5.0 V_STBY
S24	+5.0 V_STBY

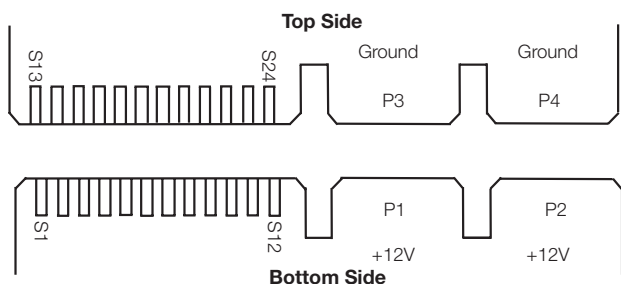
\* Supports I<sup>2</sup>C standard mode (100 kHz) only

MECHANICAL DRAWING

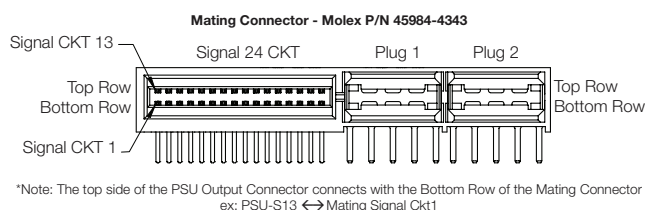




## OUTPUT CONNECTOR



Reference	On Power Supply	Mating Connector or Equivalent
AC Input Connector	IEC60320-C14	IEC60320-C13
Output Connector	MOLEX P/N 4598/4005	MOLEX P/N 45984-4343



\*Note: The top side of the PSU Output Connector connects with the Bottom Row of the Mating Connector  
ex: PSU-S13 ↔ Mating Signal Ckt1

Mating Connector Details	
P/N	Molex 45984-4343
Current Rating	30
Receptacle Header	Upper & Lower Blades
No. of Contacts	4 Power Contacts, 24 Signal Contacts

### BURN-IN

100% burn-in at 45°C, at 80 - 90% load. Duration of burn-in determined by Quality Assurance Procedures.

### MTBF

The power supply has a minimum MTBF of 300K hours using the Bell core 332, issue 6 specification @ 25°C and 40°C, ambient, at full load. With the power supply installed in a system in a 25°C ambient environment and operating at full load, capacitor life shall be 10 years, minimum for ALL electrolytic capacitors contained within this power supply. The power supply shall demonstrate a MTBF level of > 500,000 hours.

### QUALITY ASSURANCE

Full QAV testing shall be conducted in accordance with Artesyn Embedded Power Standards with reports available upon request.

### WARRANTY

Artesyn Embedded Power shall warrant the power supply to be free of defects in materials and workmanship for a minimum period of two years from the date of shipment, when operated within specifications. The warranty shall be fully transferable to the end owner of the equipment powered by the supply.



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## 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.

PRECISION | POWER | PERFORMANCE

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