

# POWER

## DS500SDC

500 Watts

Distributed Power System

### Data Sheet

#### Front-end Bulk Power

Total Output Power: 500 W  
continuous

Wide Input Voltage: -36 to -72 Vdc

### SPECIAL FEATURES

- 500 W output power
- High power and short form factor
- 1U power supply
- High-density design: 12 W/in<sup>3</sup>
- Inrush current control
- N+1 or N+N redundant
- Active current sharing
- Full digital control
- PMBus compliant
- Compatible with Artesyn's Universal PMBus GUI
- Reverse airflow available
- Two-year warranty

### COMPLIANCE

- EMI Conducted/Radiated Class A Limits

### SAFETY

- UL/cUL 60950 (UL Recognized)
- DEMKO+ CB Report EN60950
- EN60950
- CE Mark
- China CCC



### Electrical Specifications

#### Input

Input range	-36 to -72 Vdc
Efficiency	90.0% peak
Max input current	17.5 Arms
Inrush current	55 Apk
Conducted EMI	Class A
Radiated EMI	Class A
Hold-up time	1 ms at full load

#### Output

	Main DC Output			Standby DC Output		
	MIN	NOM	MAX	MIN	NOM	MAX
Nominal setting	-0.20%	12	0.20%	-1%	12	1%
Total output regulation range	11.4 V		12.6 V	11.4 V		12.6 V
Dynamic load regulation range	11.4 V		12.6 V	11.4 V		12.6 V
Output ripple			120 mVp-p			120 mVp-p
Output current	2 A <sup>1</sup>		41.67 A	0.1A		3.0A
Current sharing	Within ±5% of full load rating			N/A		
Capacitive loading	2000 µF		40,000 µF	47 µF		680 µF
Startup from AC to output			2200 ms			1700 ms
Output rise time	5 ms		50 ms	2 ms		60 ms

<sup>1</sup> Minimum current for transient load response testing only. Unit is designed to operate and be within output regulation range at zero load.

## Electrical Specifications

### Protections

Main Output	MIN	NOM	MAX
Overcurrent protection <sup>2</sup>	120%		150%
Overvoltage protection <sup>1</sup>	13.5 V		15.0 V
Undervoltage protection	10.5 V		11.0 V
Overtemperature protection		Yes	
Fan fault protection		Yes	

### Standby Output

Overcurrent protection <sup>3</sup>	120%		150%
Overvoltage protection <sup>3</sup>	13.5 V		15.0 V
Undervoltage protection	10.0 V		11.0 V

### LED Indicators

A single bi-color LED is used to indicate the power supply status.

	Status LED
No DC input to PSU	Off
Main output ON	Solid GREEN
Standby mode or Power supply failure (OCP, OVP, OTP, FAN FAULT:)	Blinking AMBER

### Firmware Reporting And Monitoring

	Accuracy Range		
Output loading	5 to 20%	20 to 50%	50 to 100%
Input voltage	±2%		
Input current	±0.55 A fixed error	±4%	
Input power	±1.25 W at < 125 W input	±1.25%	
Output voltage	±2%		
Output current	0.3 A fixed error	±2%	
Temperature	±5 °C on the operating range		
$E_{IN}$	±15% from 10% to 20% load	±5%	
Fan speed	Actual RPM ±250 RPM		
PMBus	YES		
Remote ON/OFF	YES		

<sup>1</sup> Latch mode

<sup>2</sup> Autorecovery if the overcurrent is less than 120% and last only for <500 ms

<sup>3</sup> Standby protection is auto-recovery

## Electrical Specifications

Timing Specifications				
	Description	Min	Max	Unit
$T_{sb\_On}$	Delay from DC input being applied to standby output being within regulation	20	1700	ms
$T_{sb\_INPUT\_OK}$	Delay from standby output to INPUT_OK assertion	See note below	20	ms
$T_{sb\_Vout}$	Delay from standby output to main output voltage being within regulation		300	ms
$T_{INPUT\_On\_Delay}$	Delay from DC input being applied to main output being within regulation		2200	ms
$T_{PWR\_GOOD\_On}$	Delay from output voltages within regulation limits to PWOK asserted	100	1000	ms
$T_{INPUT\_OK\_Delay}$	Delay from loss of DC input to assertion of INPUT_OK		6	ms
$T_{PWR\_GOOD\_Hold-up}$	Delay from loss of DC input to deassertion of PWOK	0.1	0.2	ms
$T_{Vout\_Hold-up}$	Delay from loss of DC input to main output being within regulation	1		ms
$T_{sb\_Hold-up}$	Delay from loss of DC input to standby output being within regulation	150		ms
$T_{PWR\_GOOD\_Off}$	Delay from deassertion of PWOK to output falling out of regulation	1		ms
$T_{PSON\_On\_Delay}$	Delay from PSON assertion to output being within regulation		350	ms
$T_{PWOK\_Low}$	Duration of PWOK being in deasserted state during an ON/OFF cycle of PSU	N/A	N/A	

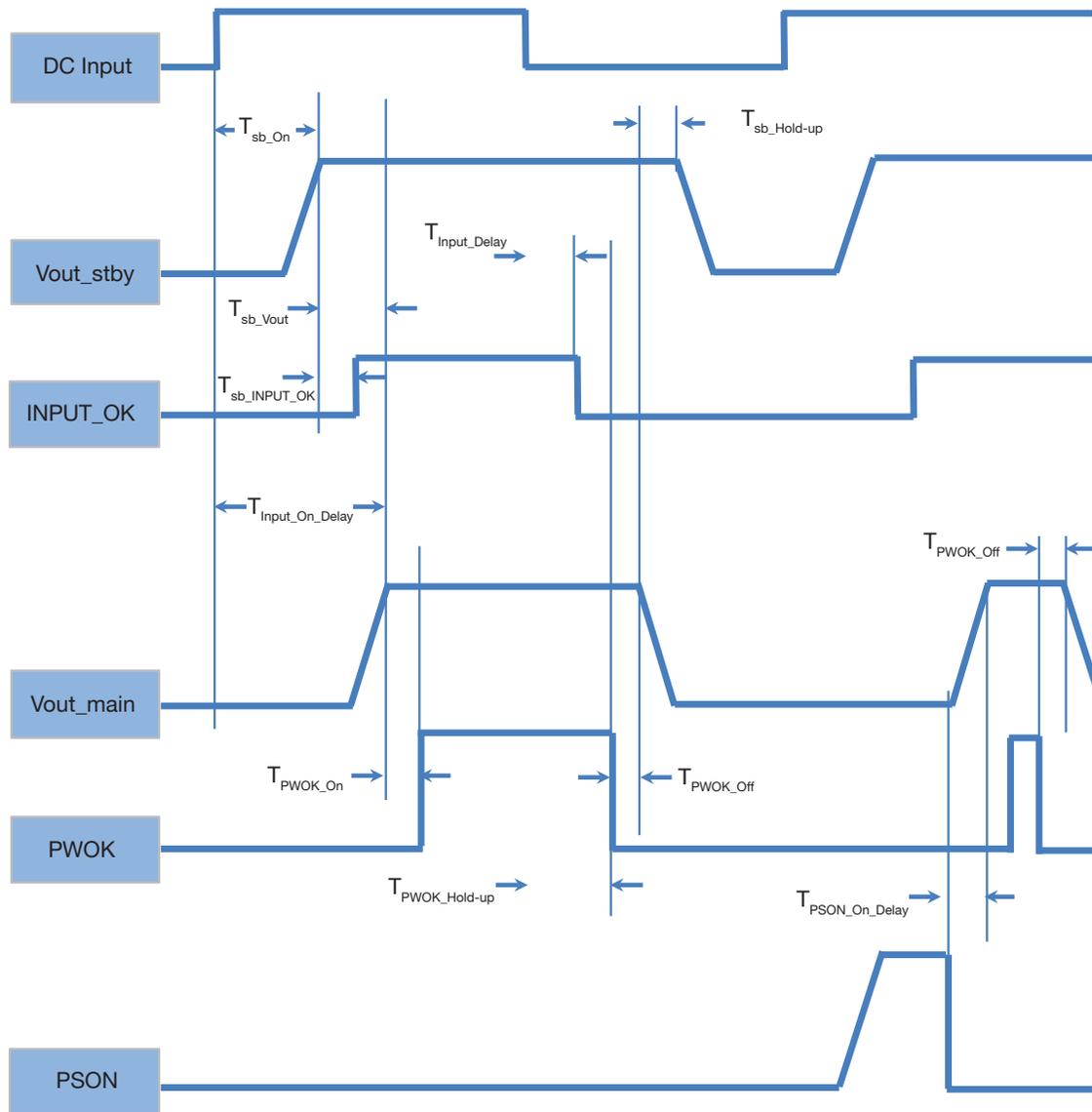
Note:  $T_{sb\_hold-up}$ : tested at 1A load on standby output, and 0A load on main output.

$T_{sb\_INPUT\_OK}$ : INPUT\_OK can assert earlier than the standby output

## Environmental Specifications

<b>Operating temperature</b>	DS500SDC-3: 500 W from 0 °C to 50 °C DS500SDC-3-001: 500 W from 0 °C to 40°C
<b>Operating altitude</b>	up to 10,000 feet with derating
<b>Operating relative humidity</b>	10% to 80% non-condensing
<b>Non-operating temperature</b>	-40 °C to +70 °C
<b>Non-operating relative humidity</b>	10% to 95% non-condensing
<b>Non-operating altitude</b>	up to 50,000 feet
<b>Vibration and shock</b>	Standard operating/non-operating shock/vibration
<b>ROHS compliance</b>	YES
<b>MTBF</b>	1,000,000 hours per Telcordia Issue 3, Method 1, Case 3 at 50 °C at full load.
<b>Operating life</b>	Minimum of 5 years
<b>Reliability</b>	All electronic component derating analysis is done at maximum ambient, 80% of maximum rated load, nominal input line voltage.

Timing Diagram



## Control and Status Signals

### Input Signals

#### PSON\_L

Active LOW signal which enables/disables the main output. Pulling this signal LOW will turn-on the main output. Recommended pull-up resistor to 12 VSB is 8.2 k with a 3.0 k pull-down to ground. A 100 pF decoupling capacitor is also recommended.

		MIN	MAX
$V_{IL}$	Input logic level LOW		0.8 V
$V_{IH}$	Input logic level HIGH	2.0 V	5.0 V
$I_{SOURCE}$	Current that may be sourced by this pin		2 mA
$I_{SINK}$	Current that may be sunk by this pin at low state		0.5 mA

#### PSKILL\_L

First break/last mate active LOW signal which enables/disables the main output. This signal will have to be pulled to ground at the system side with a 220 ohm resistor. A 100 pF decoupling capacitor is also recommended.

		MIN	MAX
$V_{IL}$	Input logic level LOW		0.8 V
$V_{IH}$	Input logic level HIGH	2.0 V	5.0 V
$I_{SOURCE}$	Current that may be sourced by this pin		2 mA
$I_{SINK}$	Current that may be sunk by this pin at low state		0.5 mA

### Output Signals

#### INPUT\_OK

Signal used to indicate the presence of DC input to the power supply. A logic level HIGH will indicate that the DC input to the power supply is within the operating range while a logic level LOW will indicate that DC input has been lost.

This is an open collector/drain output. This pin is pulled high by a 1.0 kohm resistor connected to 3.3 V inside the power supply. It is recommended that this pin be connected to a 100 pF decoupling capacitor and pulled down by a 100 kohm resistor.

		MIN	MAX
$V_{IL}$	Input logic level LOW		0.6 V
$V_{IH}$	Input logic level HIGH	2.0 V	5.0 V
$I_{SOURCE}$	Current that may be sourced by this pin		3.3 mA
$I_{SINK}$	Current that may be sunk by this pin at low state		0.7 mA

#### PWR\_GOOD / PWOK

Signal used to indicate that main output voltage is within regulation range. The PWR\_GOOD signal will be driven HIGH when the output voltage is valid and will be driven LOW when the output falls below the under-voltage threshold.

This signal also gives an advance warning when there is an impending power loss due to loss of DC input or system shutdown request. More details in the Timing Section.

This is an open collector/drain output. This pin is pulled high by a 1.0 kohm resistor connected to 3.3 V inside the power supply. It is recommended that this pin be connected to a 100 pF decoupling capacitor and pulled down by a 10 kohm resistor.

		MIN	MAX
$V_{IL}$	Input logic level LOW		0.8 V
$V_{IH}$	Input logic level HIGH	2.0 V	5.0 V
$I_{SOURCE}$	Current that may be sourced by this pin		3.3 mA
$I_{SINK}$	Current that may be sunk by this pin at low state		0.7 mA

## Control and Status Signals

### Output Signals

#### PS\_PRESENT\_L

Signal used to indicate to the system that a power supply is inserted in the power bay. This pin is shorted to the standby return in the power supply. Recommended pull-up resistor to 12 VSB is 8.2 k with a 3.0 k pull-down to ground. A 100 pF decoupling capacitor is also recommended.

#### PS\_INTERRUPT\_L

Active low signal used by the power supply to indicate to the system that a change in power supply status has occurred. This event can be triggered by faults such as OVP, OCP, OTP, and fan fault. This signal can be cleared by a CLEAR\_FAULT command. Recommended pull-up resistor to 12 VSB is 8.2 k with a 3.0 k pull-down to ground. A 100 pF decoupling capacitor is also recommended.

		MIN	MAX
$V_{IL}$	Input logic level LOW		0.8 V
$V_{IH}$	Input logic level HIGH	2.0 V	5.0 V
$I_{SOURCE}$	Current that may be sourced by this pin		4 mA
$I_{SINK}$	Current that may be sunk by this pin at low state		4 mA

### BUS Signals

#### ISHARE

Bus signal used by the power supply for active current sharing. All power supplies configured in the system for n+n sharing will refer to this bus voltage in order to load share.

Voltage Range The range of this signal for active sharing will be up to 8.0 V, which corresponds to the maximum output current.

		MIN	MAX
$I_{SHARE}$ Voltage	Input logic level LOW	7.75	8.25
	Voltage at 50% load, stand-alone unit	3.85	4.15
	Voltage at 0% load, stand-alone unit	0	0.3
$I_{SOURCE}$	Current that may be sourced by this pin		160 mA

#### SCL, SDA

Clock and data signals defined as per I<sup>2</sup>C requirements. It is recommended that these pins be pulled-up to a 2.2 kohm resistor to 3.3 V and a 100 pF decoupling capacitor at the system side.

		MIN	MAX
VL	Input logic level LOW		0.8 V
VH	Input logic level HIGH	2.0 V	5.0 V

Note: All signal noise levels are below 400 mVpk-pk from 0 - 100 MHz.

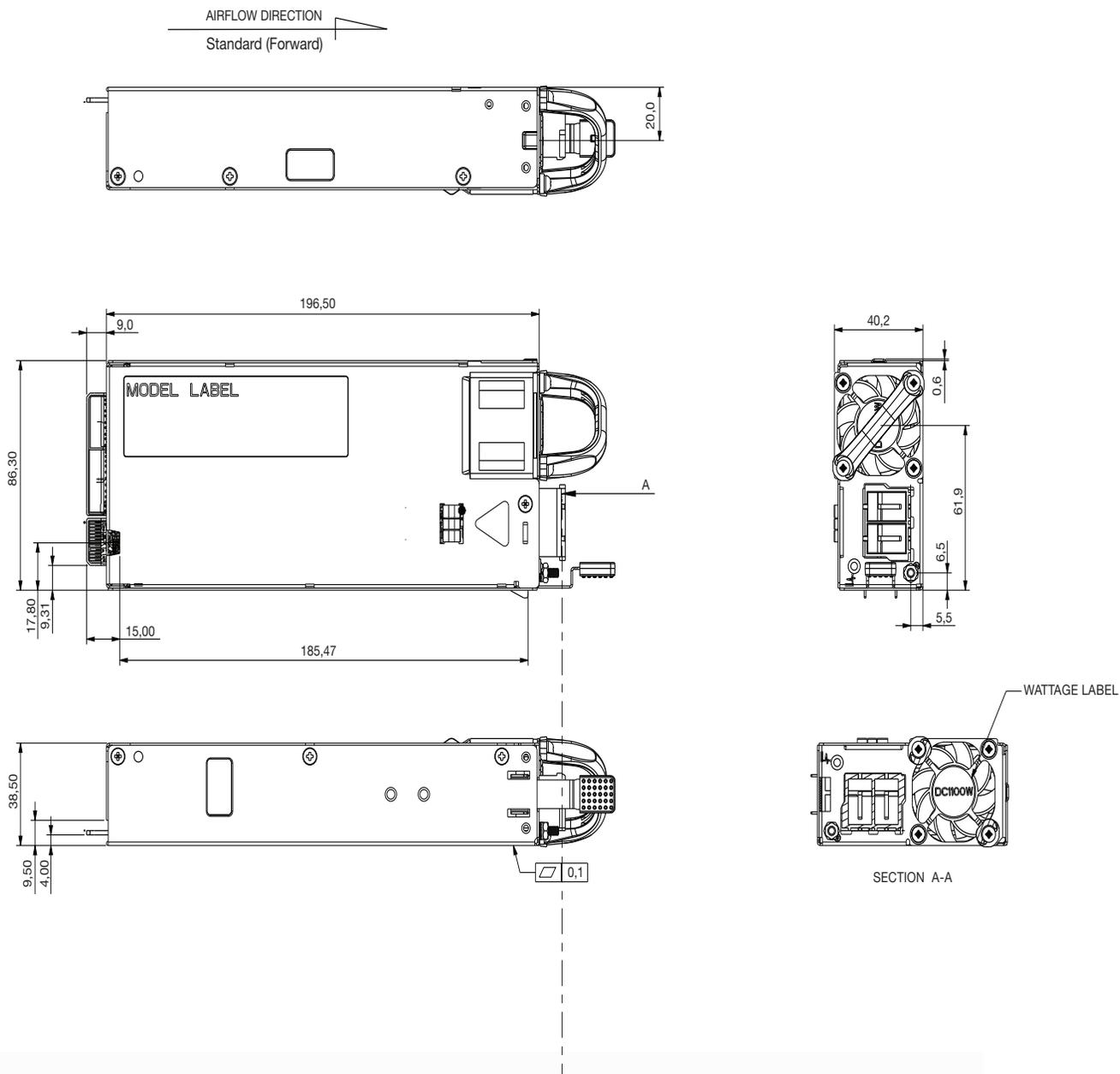
I<sup>2</sup>C Addressing Table: Not applicable. This power supply has a fixed I<sup>2</sup>C address. In order to support multiple addresses, the system will have to utilize a switcher or an I<sup>2</sup>C expander.

## Ordering Information

Model Number	Nominal Main Output	Standby Output	Airflow Direction
DS500SDC-3	12 V	12 V @ 3A	Std (forward)
DS500SDC-3-001	12 V	12 V @ 3A	Reverse <sup>1</sup>

<sup>1</sup> Derating may apply

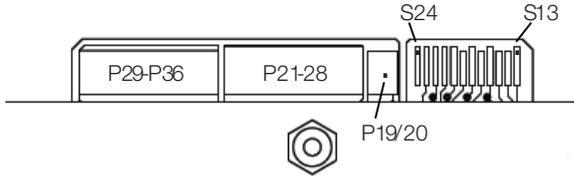
Mechanical Drawing



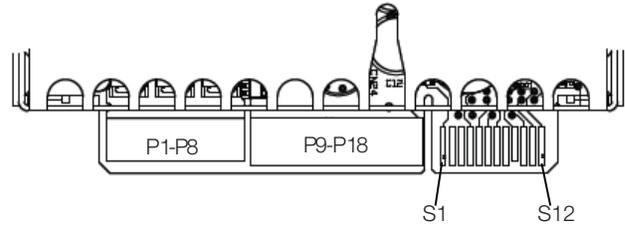
### Connector Definitions

Output Connector Part Number	Card-edge
Mating Connector Part Number	FCI 10107844-002LF or equivalent

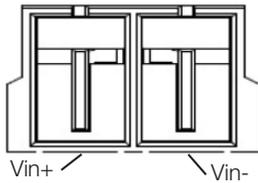
Power Supply Output Card Edge (Bottom Side)



Power Supply Output Card Edge (Top Side)



Input Connector (System Side)	Molex 394210002
PSU Side Connector Part Number	Molex 394250002



### Output Connector Pin Configuration

S1	PS PRESENT	S13	PS_ON
S2	Reserved	S14	PS_KILL
S3	Reserved	S15	Reserved
S4	Pwr_Good	S16	RTN
S5	ACOK (AC Input Present)	S17	SDA
S6	RTN	S18	RTN
S7	I-SHARE	S19	SCL
S8	RESERVE	S20	RTN
S9	PS INTERRUPT_L	S21	REMOTE SENSE-
S10	RTN	S22	RTN
S11	Reserved	S23	REMOTE SENSE+
S12	Reserved	S24	RESERVE
P1-P8	Vo	P19-P20	VSB
P9-P18	RTN	P21-P28	RTN
		P29-P36	Vo

### WORLDWIDE OFFICES

#### Americas

2900 South Diablo Way  
Suite B100  
Tempe, AZ 85282, USA  
+1 888 412 7832

#### Europe (UK)

Ground Floor Offices, Barbary House  
4 Harbour Buildings, Waterfront West  
Brierley Hill, West Midlands  
DY5 1LN, UK  
+44 (0) 1384 842 211

#### Asia (HK)

14/F, Lu Plaza  
2 Wing Yip Street  
Kwun Tong, Kowloon  
Hong Kong  
+852 2176 3333

**ARTESYN™**  
An Advanced Energy Company

[www.artesyn.com](http://www.artesyn.com)

Artesyn Embedded Technologies, Artesyn Embedded Power, Artesyn, and all Artesyn related logos are trademarks and service marks of Artesyn Embedded Technologies, Inc. All other names and logos referred to are trade names, trademarks, or registered trademarks of their respective owners. Specifications are subject to change without notice. © 2020 Artesyn Embedded Technologies, Inc. All rights reserved. For full legal terms and conditions, please visit [www.artesyn.com/legal](http://www.artesyn.com/legal).

For more information: [www.artesyn.com](http://www.artesyn.com)  
For support: [productsupport.ep@artesyn.com](mailto:productsupport.ep@artesyn.com)

DS500SDC 06Mar2020