## **Sorensen ASD Series**

10-320 kW

### **Programmable Precision High Power DC Power Supply**

40-60 Vdc

• Highest Power Density: 30kW in 3U

- Water-Cooled
- Full Digital Control Loops
  - Stable operation over wide range of complex load impedances
- Advanced Digital Features
  - "Flight data" recorder-like function
  - Oscilloscope function
  - Output impedance measurement
  - Advanced fault detection
  - PLC feature: close loop on external variable such as temperature

The ASD with DaVinci Power™ technology represents the next generation of precision programmable AC-DC power conversion.

The ASD with its 3U, 30kW water-cooled packaging provides the highest power density available. The ASD is designed for industry leading load transient response with outstanding output ripple and noise. The water-cooling packaging allows for use in environments that normally exclude air-cooled power supplies.

The ASD advanced digital architecture, with realtime digital control and Graphical User Interface (GUI), enables many features to better control and monitor your process or application. The optional advanced features package includes a built-in oscilloscope function for measurement and display of: power, voltage, current, output impedance, output cable impedance and output cable voltage drop. The ASD allows you to program different "fault levels", enabling detection of output cabling, connections or load problems before they cause critical system problems. The ASD can replace your PLC device by closing the loop on an external parameter such as temperature. The ASD's Advanced Diagnostics And Maintenance (ADAMsm) feature includes a flight data recorder feature that lets you access multiple recorded parameters, such as: voltage, current, power, load impedance, faults and input voltage. This allows you to easily determine "why" you had an unexpected outcome.

The advanced digital monitoring and control features combined with industry leading power density and reliability makes the Sorensen ASD the supply of choice for stringent and high value processes and applications.

Advanced features include:



- · Precise programming of voltage and current slew rate for sensitive loads.
- Modules within one chassis can be connected to different loads and controlled independently.
- · Industrial field bus interface (Modbus-TCP, Modbus-RTU, Ethernet/IP (Industrial Protocol)) enable real-time digital control.
- · Built-in energy meter calculates the delivered energy throughout a process or period of time.
- · Optional real time clock enables accurate timestamping of events.
- · Built in power quality monitoring detects and saves input voltage anomalies which can be saved for later diagnostic analysis.
- · Programmable analog interface scaling facilitates incorporating the ASD to existing systems with minimal effort.
- · Load impedance measurement, including rate-ofchange calculations, enable load "state of health" monitoring and implementation of system preventive maintenance algorithms
- · Programmable filter bandwidth of the output voltage, current and power monitors let the user accommodate their response speed to particular needs.
- · Full featured GUI (Graphical User Interface) helps to test and debug the system by communicating with the power supply in real time

167-8000 Adc



380

400

480

ETHERNET (Modbus-TCP) (Modbus-RTU)

**RS485** 

# **ASD Series : Product Specifications**

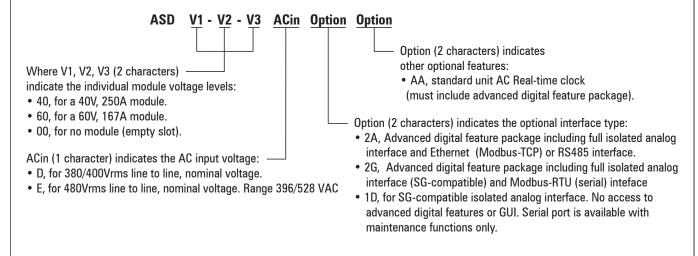
Input	Type: 3-phase, 3-wire	Type: 3-phase, 3-wire plus ground, neutral not required. Not phase rotation sensitive					
Voltage Ranges		342VAC to 440VAC (model D). Nominal rating is 380/400VAC. 432VAC to 528VAC (model E). Nominal rating is 480VAC					
Frequency	Rated 47 through 63 Hz	t i i i i i i i i i i i i i i i i i i i					
Efficiency	>91% (typical), nominal lin	e, full load.					
Max Current, per phase, low line	400/380Vac 480Vac						
	10kW unit (1 module)	21Arms	;	17Arms	17Arms		
	20kW unit (2 modules)	42Arms	;	33Arms	33Arms		
	30kW unit (3 modules)	63Arms	i	50Arms	50Arms		
Current Inrush	200A Typical	200A Typical					
Power Factor	>0.9 @ Full Load and at no	>0.9 @ Full Load and at nominal line					
Brownout Provisions	Designed to meet SEMI F47	7-0706, S3, S8, S14 at nom	inal input voltages				
Output							
Voltage Output	10kW	20kW	30kW	Noise (pk-pk)***	Noise (RMS)***		
40Vdc	250A	500A	750A	150mV	40mV		
60Vdc	167A	334A	501A	150mV	40mV		
(**) RMS noise is measured direct	s, with 1uF in parallel and 6ft of low-i ly across the output terminal with su tage models. Other variations may in	pply operating at full load			oltage.		
Sense	To compensate load cables	To compensate load cables voltage drop, units can generate 2% additional voltage at full scale of output voltage.					
Output							
Load Regulation (Specified at No I	oad to Full load change, nominal AC i	nput)					
Voltage	0.1% of maximum output v	0.1% of maximum output voltage/ current					
Current	0.1% of maximum output v	0.1% of maximum output voltage/ current					
Line Regulation (Specified at ±109	% of nominal AC input, constant load)						
Voltage	0.05% of maximum output	0.05% of maximum output voltage/ current					
Current	0.05% of maximum output	0.05% of maximum output voltage/ current					
Transient Response	A 50% step load will recov	A 50% step load will recover to within 0.75% of original value within 1mSec					
Stability	±0.05% of set point after 8	±0.05% of set point after 8 hrs. at fixed line, load and temperature. After 30min warm-up.					
Analog Remote Programming							
Voltage Accuracy	0.5% of full scale	0.5% of full scale					
Current Accuracy	1% of full scale	1% of full scale					
Power Accuracy	1.5% of full scale	1.5% of full scale					
Voltage Monitoring	0.5% of full scale	0.5% of full scale					
Current Monitoring	1% of full scale	1% of full scale					
Power Monitoring	1.5% of full scale	1.5% of full scale					
Programming range	0-10Vdc, 4-20mA						
Output							
Output Float	Units maybe put in series w	Units maybe put in series with the float limit of output terminals must be within ±150V of chassis potential					
Parallel	power systems have the sa	Multiple units can be paralleled to form higher power systems. Chassis control loops are tied together so that resulting higher power systems have the same transient response as a 30kW system. Control commands are only required to be sent to "master" supply. Parallel supplies require a shielded CAT 5 cable (STP) and appropriate output wiring connections by the user.					
Calibration	End user calibration is supp	End user calibration is supported. All standard and digital calibration can be performed without removing covers.					
Calibration		ortear, in starragia arra ar	3				
Digital Control (Optional)	Ethernet (Modbus-TCP or E		<u> </u>	<u> </u>			

Advanced Digital Features (	Requires Optional Digital Control):						
Graphical User Interface	Graphical User Interface (Windows base dvanced features listed below:	Graphical User Interface (Windows based) enables remote control and display of the supply operation including the a dvanced features listed below:					
Oscilloscope Function (125 Hz)	Up to two parameters; Voltage, current,	Up to two parameters; Voltage, current, output impedance, output cable impedance, output cable voltage drop, power delivered					
Data logging		Programmable update rate of 1 sec to 1000 sec (default 10 sec) with last 1000 points stored. Stored parameters include, output voltage/current, programmed set points, input voltage, output impedance, cable impedance, total power deliver, power meter, internal faults					
System fault reporting	Outside of set point, output impedance	Outside of set point, output impedance (detection of cabling, connection or load problems)					
Physical	30 kW	30 kW 20 kW 10 kW					
Width	19.00in (48.3cm)	19.00in (48.3cm)	19.00in (48.3cm)				
Depth	30.00" (76.2 cm)	30.00" (76.2 cm)	30.00" (76.2 cm)				
Height	3U - 5.22" rack mount (13.25 cm)	3U - 5.22" rack mount (13.25 cm)	3U - 5.22" rack mount (13.25 cm)				
Weight	≤125 lbs (56.69 kg)						
Shipping Weight	Contact factory for more product & ship	Contact factory for more product & shipping weights					
Mounting provisions	EIA rack-mount with slide provisions. R	EIA rack-mount with slide provisions. Recommended rack slide: Jonathan slide, P/N 370EZ-28					
AC Input Connector	Phoenix Contact terminal block	Phoenix Contact terminal block					
Protective Ground	1/4-20 stud	1/4-20 stud					
Output Connectors	bus bars with 3/8-16 inserted PEM nuts	bus bars with 3/8-16 inserted PEM nuts					
Water Connections	3/8-18 NPTF hex bulkhead	3/8-18 NPTF hex bulkhead					
Ambient Temperature	0 to 50°C	0 to 50℃					
Humidity	Relative humidity up to 95%, non-cond	Relative humidity up to 95%, non-condensing					
Water cooling specifications	5						
Flow		1.5 gpm nominal, 1.25gpm minimum, 1.75gpm maximum. Internal condensation must be prevented by ensuring that the temperature of the coolant is sufficiently high compared with the ambient air dew point					
Temperature	25°C nominal, 20°C minimum, 30°C ma	25°C nominal, 20°C minimum, 30°C maximum					
Maximum pressure	80 PSI	80 PSI					
Pressure drop	typical 12 PSI @ 1.5gpm per chassis	typical 12 PSI @ 1.5gpm per chassis					

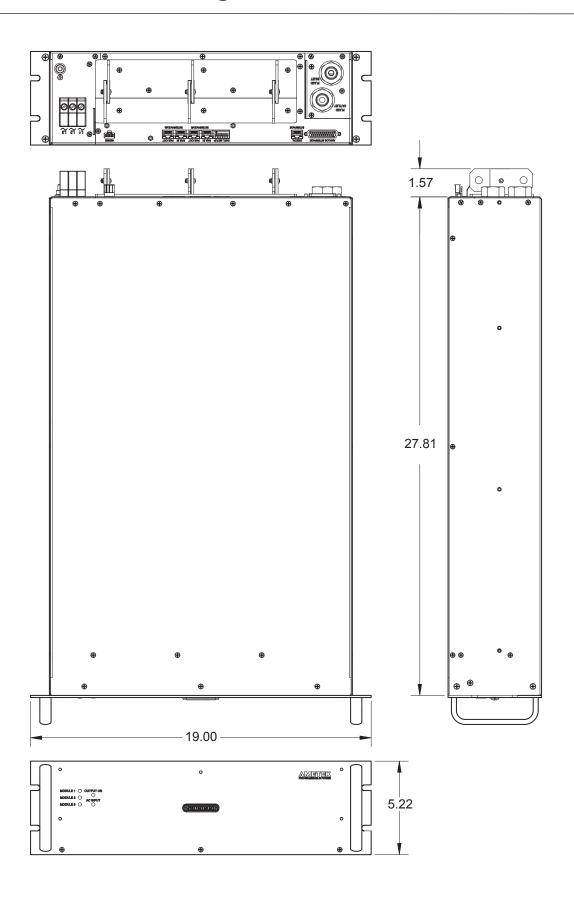
#### Regulatory

Certified to UL/CSA 61010 and IEC/EN 61010-1 by a NRTL, CE Compliant, LVD Categories: Installation Category II: Pollution Degree 2; Class II Equipment: for Indoor Use Only. Rack mount equipment requires proper enclosure provided in end use. EMC Directive, EN 61326:1998

#### **Model Number Description**



## **ASD Series : Product Diagram**





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