

# Sorensen ASD FLX Series

10–320 kW

## Programmable Precision High Power DC Power Supply

40–160 Vdc\*

- High Power Density: 30kW in 3U
- Water-Cooled
- Front Loading Modules for Flexible Configuration
  - Configure modules for 40V, 60V or other (as available) easily with rear panel dip switches
- Advanced Digital Features
  - Factory "Flight data" recorder-like function
  - Advanced fault detection



167–8000 Adc



380

400

480

ETHERNET  
(Modbus-TCP)

RS485  
(Modbus-RTU)

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

The ASD FLX gets its name from its modular design with front loading modules for easy access and flexible voltage assignment. ASD FLX chassis houses three 10kW modules which allows user flexibility to scale power requirements by adding additional modules. This configuration provides redundant (n+1) capability as well as significant reduction of Mean Time to Repair (MTTR) which can be accomplished by swapping out a faulty module. The chassis with light weight, removable modules allows for easy one person installation.

Advanced digital controls included in the ASD FLX have the ability to allow you to program slew rates, such as current and voltage without external hardware, as well as program transient response times on the load to emulate specific recovery times. The ASD FLX optional advanced features also allow you to program different "fault levels," enabling detection of output cabling, connections or load problems before they cause critical system problems. The factory flight data recorder feature has the ability to record parameters such as voltage, current, power, load impedance, faults and input voltages, assisting the factory service centers with diagnosis and repair.

The advanced digital monitoring and control features and flexible voltage assignment modules makes the Sorensen ASD FLX the supply of choice for stringent and high value processes and applications.

\* Other voltages available upon request

### Advanced features include:

- Precise programming of voltage and current slew rate for sensitive loads.
- Industrial field bus interface (Modbus-TCP, Modbus-RTU, Ethernet) 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 time-stamping of data logged 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 integrating the ASD FLX with existing systems easily.
- Front panel status LEDs.
- Configure modules for desired voltage (40V, 60V, etc. as available) through convenient rear panel dip switches.
- Field upgradeable firmware.
- Master-slave parallel operation capability.

**AMETEK**  
**Programmable Power**  
9250 Brown Deer Road  
San Diego, CA 92121-2267  
USA

**AMETEK**  
PROGRAMMABLE POWER

# ASD FLX Series : Product Specifications

Input		Type: 3-phase, 3-wire plus ground, neutral not required. Not phase rotation sensitive			
Voltage Ranges	342VAC to 528VAC (model F) Nominal rating is 380/400/480VAC				
Frequency	Rated 47 through 63 Hz				
Efficiency	>89% nominal line, full load.				
Input Current, per phase, typical		400/380Vac		480Vac	
	10kW unit (1 module)	21Arms		17Arms	
	20kW unit (2 modules)	42Arms		33Arms	
	30kW unit (3 modules)	63Arms		50Arms	
Current Inrush	200A Typical				
Power Factor	>0.9 @ Full Load and at nominal line				
Brownout Provisions	Designed to meet SEMI F47-0706, S3, S8, S14 at nominal input voltages				
Output					
Voltage Output	10kW	20kW	30kW	Noise (pk-pk)***	Noise (RMS)***
40Vdc	250A	500A	750A	250mV	60mV
60Vdc	167A	334A	501A	250mV	60mV
(*) Measured at the load terminals, with 1uF in parallel and 6ft of low-inductance load cable with supply operating at full load and nominal input line voltage. (**) RMS noise is measured directly across the output terminal with supply operating at full load and nominal input line voltage. (***) Value is for 30kW, single voltage models. Other variations may increase value by 2x.					
Sense	To compensate load cables voltage drop, units can generate 2% additional voltage at full scale of output voltage.				
Output					
Load Regulation (Specified at No load to Full load change, nominal AC input)					
Voltage	0.1% of maximum output voltage/ current				
Current	0.1% of maximum output voltage/ current				
Line Regulation (Specified at $\pm 10\%$ of nominal AC input, constant load)					
Voltage	0.05% of maximum output voltage/ current				
Current	0.05% of maximum output voltage/ current				
Transient Response	A 50% step load will recover to within 0.75% of original value within 1mSec				
Stability	$\pm 0.05\%$ of set point after 8 hrs. at fixed line, load and temperature. After 30min warm-up.				
Analog Remote Programming for chassis level, three (3) modules installed					
Voltage Accuracy	1% of full scale				
Current Accuracy	1.5% of full scale				
Power Accuracy	2% of full scale				
Voltage Monitoring	1% of full scale				
Current Monitoring	1.5% of full scale				
Power Monitoring	2% of full scale				
Programming range	0-10Vdc, 4-20mA				
Output					
Output Float	Units maybe put in series with the float limit of output terminals must be within $\pm 500V$ of chassis potential				
Parallel	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 supported. All standard and digital calibration can be performed without removing covers.				
Digital Control (Optional)	Ethernet (Modbus-TCP or Ethernet/IP), RS-485 (MODBUS-RTU)				
Analog Control	All control signals are isolated from the outputs				

# ASD FLX Series : Product Specifications

10–320 kW

## Advanced Digital Features (Requires Optional Digital Control):

Graphical User Interface	Graphical User Interface (Windows based) enables remote control and display of the supply operation including the advanced features listed below:
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 (detection of cabling, connection or load problems)

Physical	Chassis	Module	
Width	19.00in (48.3cm)	4.58in (11.6cm)	
Depth	30.00" (76.2 cm)	25.2in (64.0 cm)	
Height	3U - 5.22" rack mount (13.25 cm)	4.57in (11.6cm)	
Weight	65 lbs (29.5 kg)	25 lbs (11.4 kg)	140 lbs (63.6 kg) chassis + 3 modules
Shipping Weight	Contact factory for more product & shipping weights		
Mounting provisions of chassis	EIA rack-mount with slide provisions. Recommended rack slide: Jonathan slide, P/N 370EZ-28		
AC Input Connector	Phoenix Contact terminal block		
Protective Ground	1/4-20 stud		
Chassis Output Connectors	bus bar per module *		
Water Connections	3/8-18 NPTF hex bulkhead		
Ambient Temperature	0 to 50°C		
Humidity	Relative humidity up to 95%, non-condensing		
Module Installation Provision	Front loading , lock mechanism. 30lbs/in Torque		

## Water Cooling Specifications

Flow	1.5 gpm minimal, 1.75gpm nominal. 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 maximum
Maximum pressure	80 PSI for copper tubing, 120 PSI for stainless steel tubing option. Contact factory for higher pressure requirements.
Pressure drop	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.

## Model Number Description

<b>Voltage-Current Combinations:</b> (rounded to whole A)	40X250	40X500	40X750
	60X167	60X334	60X501
	80X125	80X250	80X375
	160X62	160X125	160X187

**ASDF VoltageXCurrent XX YY**

### Option 2 : YY

AA - Standard unit AC Real-time clock (must include advanced digital feature package), copper tubing.  
SS - Stainless Steel Tubing

### Option 1 : XX

2A - Advanced digital feature package including full isolated analog interface and Ethernet (Modbus-TCP).  
2G - Advanced digital feature package including full isolated analog interface and Serial RS485 (Modbus-RTU)  
1A - Basic isolated analog control - no advanced features  
1E - Advanced digital feature package including full isolated analog interface and EtherCAT.

\* External paralleling bus bars are optional

