Specifications

■ Ratings/Characteristics

Item		Power ratings / Type	15 W Standard	30 W Standard
Efficiency (typical)		5-V models	72% min. (76% typ.)	70% min. (76% typ.)
		12-V models	74% min. (79% typ.)	76% min. (83% typ.)
		24-V models	77% min. (81% typ.)	80% min. (85% typ.)
Input	Voltage		100 to 240 VAC (85 to 264 VAC)	
	Frequency		50/60 Hz (47 to 450 Hz)	
	Current	100 V input	0.45 A max.	0.9 A max.
		200 V input	0.25 A max.	0.6 A max.
		230 V input	5 V: (0.14 A typ.), 12 V/24 V (0.19 A typ.)	5 V: (0.27 A typ.), 12 V/24 V (0.37 A typ.)
	Power factor		---	
	Harmonic current emissions		Conforms to EN61000-3-2	
	Leakage current	100 V input	0.5 mA max.	
		200 V input	1.0 mA max.	
		230 V input	5 V/12 V/24 V: (0.30 mA typ.)	5 V/12 V/24 V:(0.32 mA typ.)
	Inrush current (See note 1.)	100 V input	25 A max. (20 A typ.) (for a cold start at 25°C)	
		200 V input	50 A max. (40 A typ.) (for a cold start at 25°C)	
		230 V input	5 V/12 V/24 V: (29 A typ.) (See note 6.)	5 V/12 V/24 V: (40 A typ.) (See note 6.)
Output	Voltage adjustment range (See note 2.)		−10% to 15% (with V.ADJ) (guaranteed)	
	Ripple		2.0% (p-p) max. (at rated input/output voltage)	
		f=20MHz measuring	5 V: (0.70%(p-p) typ.), 12 V:(0.48%(p-p) typ.) , 24 V:(0.25%(p-p) typ.)	5 V: (0.70%(p-p) typ.), 12 V:(0.52%(p-p) typ.) , 24 V:(0.19%(p-p) typ.)
		f=100MHz measuring	5 V: (0.86%(p-p) typ.), 12 V:(0.56%(p-p) typ.) , 24 V:(0.32%(p-p) typ.)	5 V: (0.80%(p-p) typ.), 12 V:(0.58%(p-p) typ.), 24 V:(0.21%(p-p) typ.)
	Input variation influence		0.5% max. (at 85 to 264 VAC input, 100% load)	
	Load variation influence (rated input voltage)		2.0% max. (5 V), 1.5% max. (12 V, 24 V), (with rated input, 0 to 100% load)	
	Temperature variation influence		0.05%/°C max.	
	Start up time (See note 1 and 7.)		100 ms max. (at rated input/output voltage)	1,000 ms max. (at rated input/output voltage)
			5 V: (6 ms typ.), 12 V: (12 ms typ.), 24 V: (18 ms typ.)	5 V/12 V/24 V: (240 ms typ.)
	Hold time (See note 1.)		20 ms min. (at rated input/output voltage)	
		at 100% load	5 V: (328 ms typ.), 12V: (251 ms typ.), 24 V: (243 ms typ.)	5 V: (299 ms typ.), 12 V: (217 ms typ.), 24 V: (210 ms typ.)
Additional functions	Overload protection (See note 1.)		105% to 160% of rated load current, voltage drop, automatic reset	105% to 160% of rated load current, voltage drop, intermittent operation, automatic reset
	Overvoltage protection (See note 1.)		Yes (a zener diode clamp) (See note 3.)	Yes (See note 4.)
	Output voltage indication		No	
	Output current indication		No	
	Peak-hold current indication		No	
	Maintenance forecast monitor indication		No	
	Maintenance forecast monitor output		No	
	Total run time monitor indication		No	
	Total run time monitor output		No	
	Undervoltage alarm indication		Yes (color: red)	
	Undervoltage alarm output		No	
	Parallel operation		No	
	Series operation		Models with 24-V output: Possible for up to 2 Power Supplies (with external diode) Models with 5- or 12-V output: Not possible	
Other	Operating ambient temperature		Refer to the derating curve in *Engineering Data*. (with no icing or condensation)	
	Storage temperature		−25 to 65°C	
	Operating ambient humidity		25% to 85% (Storage humidity: 25% to 90%)	
	Dielectric strength		3.0 kVAC for 1 min. (between all inputs and outputs; detection current: 20 mA) 2.0 kVAC for 1 min. (between all inputs and PE terminals; detection current: 20 mA) 1.0 kVAC for 1 min. (between all outputs and PE terminals; detection current: 20 mA)	
	Insulation resistance		100 MΩ min. (between all outputs and all inputs/ PE terminals) at 500 VDC	
	Vibration resistance		10 to 55 Hz, 0.375-mm single amplitude for 2 h each in X, Y, and Z directions	
			10 to 150 Hz, 0.35-mm single amplitude (5 G max.) for 80 min. each in X, Y, and Z directions	
	Shock resistance		150 m/s^2, 3 times each in ±X, ±Y, and ±Z directions	
	Output indicator		Yes (color: green)	
	EMI	Conducted Emissions	Conforms to EN61204-3 EN55011 Class B and based on FCC Class A	
		Radiated Emissions	Conforms to EN61204-3 EN55011 Class B	
	EMS		Conforms to EN61204-3 Class B	
	Approved standards		UL: UL508 (Listing; Class 2: Per UL1310), UL60950-1, UL1604 (Class I/Division2) cUL: CSA C22.2 No.14 (Class 2), No.60950-1, No.213 (Class I/Division2) EN/VDE: EN50178 (=VDE0160), EN60950-1 (=VDE0805) SELV (EN60950/EN50178/UL60950-1) According to VDE0106/P100, IP20	
	Weight		160 g max.	180 g max.

Note:
1. Refer to the *Engineering Data* section on page 17 for details.
2. If the V.ADJ adjuster is turned, the voltage will increase by more than +15% of the voltage adjustment range. When adjusting the output voltage, confirm the actual output voltage from the Power Supply and be sure that the load is not damaged.
3. The overvoltage protection of the S8VS-015□□ uses a zener diode clamp. If the internal feedback circuit is destroyed by any chance, the load may be destroyed by the clamped output voltage (approx. 140% to 190% of the rated output voltage).
4. To reset the protection, turn OFF the power supply for three minutes or longer and then turn the power supply back ON.
5. The typical values indicate the values for an input condition of 230 VAC. All items are measured at a frequency of 50 Hz.
6. The inrush current circuits do not differ for voltage specifications. Therefore, the typical values are the data values for 24-V models.
7. The circuit forms are different, so the start up time is shorter only when using a 15-W power rating.

Specifications

■ Ratings/Characteristics

Item			Power ratings / Type	60 W			90 W		
				Standard	Maintenance forecast monitor	Total run time monitor	Standard	Maintenance forecast monitor	Total run time monitor
Efficiency (typical)				78% min. (86% typ.)			80% min. (87% typ.)		
Input	**Voltage**			100 to 240 VAC (85 to 264 VAC)					
	Frequency			50/60 Hz (47 to 450 Hz)					
	Current	**100 V input**		1.7 A max.			2.3 A max.		
		200 V input		1.0 A max.			1.4 A max.		
		230 V input		(0.7 A typ.)			(0.9 A typ.)		
	Power factor			---					
	Harmonic current emissions			Conforms to EN61000-3-2					
	Leakage current	**100 V input**		0.5 mA max.					
		200 V input		1.0 mA max.					
		230 V input		(0.40 mA typ.)			(0.35 mA typ.)		
	Inrush current (See note 1.)	**100 V input**		25 A max. (for a cold start at 25°C)					
		200 V input		50 A max. (for a cold start at 25°C)					
		230 V input		(47 A typ.)			(38 A typ.)		
Output	**Voltage adjustment range (See note 2.)**			−10% to 15% (with V.ADJ) (guaranteed)					
	Ripple			2.0% (p-p) max. (at rated input/output voltage)					
		f=20MHz measuring		(0.29% (p-p) typ.)			(0.38% (p-p) typ.)		
		f=100MHz measuring		(0.32% (p-p) typ.)			(0.42% (p-p) typ.)		
	Input variation influence			0.5% max. (at 85 to 264 VAC input, 100% load)					
	Load variation influence (rated input voltage)			1.5% max. (with rated input, 0 to 100% load)					
	Temperature variation influence			0.05%/°C max.					
	Start up time (See note 1.)			1,000 ms max. (at rated input/output voltage)					
				(270 ms typ.)			(260 ms typ.)		
	Hold time (See note 1.)			20 ms min. (at rated input/output voltage)					
		at 100% load		(220 ms typ.)			(190 ms typ.)		
Additional functions	**Overload protection (See note 1.)**			105% to 160% of rated load current, voltage drop, intermittent, automatic reset					
	Overvoltage protection (See notes 1 and 3.)			Yes					
	Output voltage indication (See note 4.)			No	Yes (selectable) (See note 5.)		No	Yes (selectable) (See note 5.)	
	Output current indication (See note 4.)			No	Yes (selectable) (See note 6.)		No	Yes (selectable) (See note 6.)	
	Peak-hold current indication (See note 4.)			No	Yes (selectable) (See note 7.)		No	Yes (selectable) (See note 7.)	
	Maintenance forecast monitor indication (See note 4.)			No	Yes (selectable)	No	No	Yes (selectable)	No
	Maintenance forecast monitor output			No				Yes (open collector output), 30 VDC max., 50 mA max. (See note 8.)	No
	Total run time monitor indication (See note 4.)			No		Yes (selectable)	No		Yes (selectable)
	Total run time monitor output			No					Yes (open collector output), 30 VDC max., 50 mA max. (See note 8.)
	Undervoltage alarm indication (See note 4.)			No	Yes (selectable)		No	Yes (selectable)	
	Undervoltage alarm output terminals			No				Yes (open collector output) 30 VDC max., 50 mA max. (See note 8.)	
	Parallel operation			No					
	Series operation			Yes for up to 2 Power Supplies (with external diode)					
Other	**Operating ambient temperature**			Refer to the derating curve in *Engineering Data*. (with no icing or condensation)					
	Storage temperature			−25 to 65°C					
	Operating ambient humidity			25% to 85% (Storage humidity: 25% to 90%)					
	Dielectric strength			3.0 kVAC for 1 min. (between all inputs and outputs/ alarm outputs; detection current: 20 mA) 2.0 kVAC for 1 min. (between all inputs and PE terminals; detection current: 20 mA) 1.0 kVAC for 1 min. (between all outputs/ alarm outputs and PE terminals; detection current: 20 mA) 500 VAC for 1 min. (between all outputs and alarm outputs; detection current: 20 mA)					
	Insulation resistance			100 MΩ min. (between all outputs/ alarm outputs and all inputs/ PE terminals) at 500 VDC					
	Vibration resistance			10 to 55 Hz, 0.375-mm single amplitude for 2 h each in X, Y, and Z directions					
				10 to 150Hz, 0.35-mm single amplitude (5 G max.) for 80 min each in-X, Y, and Z directions					
	Shock resistance			150 m/s², 3 times each in ±X, ±Y, and ±Z directions					
	Output indicator			Yes (color: green)					
	EMI	**Conducted Emissions**		Conforms to EN61204-3 EN55011 Class A and based on FCC Class A Conforms to EN61204-3 EN55011 Class B (See note 9.)					
		Radiated Emissions		Conforms to EN61204-3 EN55011 Class A Conforms to EN61204-3 EN55011 Class B (See note 9.)					
	EMS			Conforms to EN61204-3 Class B					
	Approved standards			UL: UL508 (Listing; Class 2: Per UL1310), UL60950 cUL: CSA C22.2 No.14 (Class 2), No.60950 EN/VDE: EN50178 (=VDE0160), EN60950 (=VDE0805) SELV (EN60950/EN50178/UL60950-1) According to VDE0106/P100, IP20			UL: UL508 (Listing), UL60950 cUL: CSA C22.2 No.14, No.60950 EN/VDE: EN50178 (=VDE0160), EN60950 (=VDE0805) SELV (EN60950/EN50178/UL60950-1) According to VDE0106/P100, IP20		
	Weight			330 g max.			490 g max.		

Note:
1. Refer to the *Engineering Data* section on page 17 for details.
2. If the V.ADJ adjuster is turned, the voltage will increase by more than +15% of the voltage adjustment range (by more than +10% for 240-W models). When adjusting the output voltage, confirm the actual output voltage from the Power Supply and be sure that the load is not damaged.
3. To reset the protection, turn OFF the power supply for three minutes or longer and then turn the power supply back ON.
4. Displayed on 7-segment LED. (character height: 8 mm)
5. Resolution of output voltage indication: 0.1 V, Precision of output voltage indication: ±2% (percentage of output voltage value, ±1 digit)
6. Resolution of output current indication: 0.1 A; Precision of output current indication: ±5% F.S. ±1 digit max. (specified by rated output voltage)
7. Resolution of peak-hold current indication: 0.1 A; Precision of peak-hold current indication: ±5% F.S. ±1 digit max. (specified by rated output voltage); Signal width required for peak-hold current: 20 ms
8. A Type and B Type: Sinking, AP Type and P Type: Sourcing
9. To ensure the emission rating, a ferrite ring core should be used in all cabling (TDK HF60T, HF70RH or equivalent model).
10. The typical values indicate the values for an input condition of 230 VAC. All items are measured at a frequency of 50 Hz.