

SM 800 Series

800 WATTS PROGRAMMABLE DC SUPPLY

FEATURES

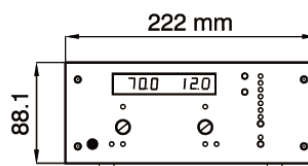
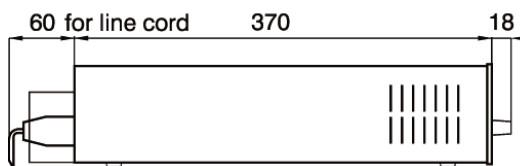
- Very low output ripple and spikes
- Very stable output voltage or current
- Excellent dynamic response to load changes
- Master / Slave parallel and series operation with equal current and voltage sharing
- Designed for long life at full power
- Protected against all over load and short circuit conditions
- V and I control with 10-turn potentiometers, resolution 0.03 %. Optional with digital encoders
- Silent blower, only runs when needed, variable speed
- 0 - 5 V analog programmable on both voltage and current
- Ethernet, RS232 or IEEE488 programming options



SELECTION TABLE

SM 7.5-80		SM 18-50		AUTORANGING SM70-AR-24		AUTORANGING SM400-AR-4	
0 - 7.5 V	0 - 80 A	0 - 18 V	0 - 50 A	0 - 35 V 35 - 70 V	0 - 24 A 0 - 12 A	0 - 200 V 200 - 400 V	0 - 4 A 0 - 2 A

INPUT				
AC single phase, 48 - 62 Hz	90 - 265 V	90 - 265 V	90 - 265 V	90 - 265 V
Power Derating vs input:		Vo = 16 V Vo = 18 V		
90 V : Pout max (W), lin (A)	580, 8.5	725, 10 670, 9.2	740, 10	750, 10
100 V : Pout max (W), lin (A)	600, 7.6	800, 9.9 730, 8.9	830, 10	800, 9.5
110 V : Pout max (W), lin (A)	600, 6.9	800, 8.8 770, 8.4	840, 9	800, 8.5
230 V : Pout max (W), lin (A)	600, 3.2	800, 4.1 900, 4.5	840, 4.2	800, 4
Power factor, 100%, 50% load	0.99, 0.96	0.99, 0.98	0.99, 0.98	0.99, 0.98
internal fuses	12.5 AT	12.5 AT	12.5 AT	12.5 AT
Standby input power (Vo=Io=0)	14 W	14 W	14 W	14 W
Standby input power (Vo=Vmax)	18 W	18 W	20 W	26 W
			35 V / 70 V	200 V / 400 V
EFFICIENCY				
AC 230 V input, full load	82 %	87 %	89 %	89 %
AC 115 V input, max. load	80 %	83 %	85 %	86 %



SM 800 Series

800 WATTS PROGRAMMABLE DC SUPPLY

LABORATORY POWER SUPPLIES

REGULATION					
Load 0 - 100% CV		0.2 mV	0.5 mV	2 mV	10 mV
Line 120 - 265 V AC CV (measured on sense block)		0.2 mV	0.2 mV	0.5 mV	2 mV
Load 0 - 100% CC		4 mA	3 mA	1.5 mA	0.5 mA
Line 120 - 265 V AC CC (internal volt age sense)		1 mA	1 mA	1 mA	0.2 mA
Ripple + noise					
rms (BW=300 kHz)	CV	2.5 mV	2 mV	3 mV	15 mV
p-p (BW=50 MHz)	CV	10 mV	8 mV	15 mV	80 mV
rms (BW=300 kHz)	CC	25 mA	5 mA	3 / 1 mA	0.8 / 0.5 mA
p-p (BW=50 MHz)	CC	120 mA	25 mA	15 / 5 mA	3 / 1.5 mA
CC-ripple at full load					
Front panel connection		Not available	Option 257	Option 258	Option 259
Load Regulation:					
Load 0 - 100%	CV	-	15 mV	40 mV	15 mV
Ripple + noise		-	3 mV	4 mV	18 mV
rms (BW=300 kHz)	CV	-	18 mV	20 mV	150 mV
p-p (BW=50 MHz)	CV				
Temp. coeff., per °C	CV			35.10 ⁻⁶	
	CC			60.10 ⁻⁶	
Stability					
After 1 hr warm-up					
During 8 hrs	CV			6.10 ⁻⁵	
	CC			9.10 ⁻⁵	
tamb = 25 ± 1 °C, Vin = 230 V AC (int. voltage sensing for CC-stab.)					
ANALOG PROGRAMMING		CV	CC		
Programming inputs		0 - 5 V	0 - 5 V		
Input range		± 0.2%	± 0.5%		
Accuracy		- 0.1 ... +1.3 mV (on 5V)	0 ... +2.2 mV (on 5V)		
Offset		10 µV / °C	50 µV / °C		
Temp. coeff. offset		> 1 MOhm	> 1 MOhm		
Input impedance					
Monitoring output		0 - 5 V	0 - 5 V		
Output range		± 0.2%	± 0.5%		
Accuracy		- 1... 0 mV (on 5V)	- 1.1... 0 mV (on 5V)		
Offset		3 µV / °C	60 µV / °C		
Temp. coeff. off set		2 Ohm / max. 4 mA	2 Ohm / max. 4 mA		
Output impedance					
Reference voltage		5.114 V ± 15 mV (Ro = 2 Ohm, max. 4 mA)			
On prog. connector	Vref TC	20 ppm			
+12 V out put	Vo	12 V ± 0.2 V			
on prog. Connector	I _{max} Ro	0.2 A 3 Ohm			
Relay Outputs					
ACF		AC - Fail	both NO and NC contact		
DCF		DC - Fail ¹⁾	both NO and NC contact		¹⁾ output voltage ± 5% beyond set point
Status outputs					
CC - status		CC - operation	5 V = logic 1 (Ro = 500 Ohm)		
LIM	- status	CV- or CC-limit	5 V = logic 1 (Ro = 500 Ohm)		
OT	- status	Over Temperature	5 V = logic 1 (Ro = 500 Ohm)		
PSOL	- status	Power Sink Over load	5 V = logic 1 (Ro = 500 Ohm)		
ACF	- status	AC - Fail	5 V = logic 1 (Ro = 500 Ohm)		
DCF	- status	DC - Fail ²⁾	5 V = logic 1 (Ro = 500 Ohm)		²⁾ output volt age ± 5% be yond set point
Remote shutdown		with + 5V, 1 mA or relay contact			
Interlock		Contact at rear panel			
Indicators (front panel)		Voltage meter, Ampere meter, AC-Fail, Over Temperature, Power Sink Overlead, Remote-Shut Down, Remote-CV, Remote-CC, Output On, CV-limit, CC-limit, CV and CC mode.			
Controls (front panel)		Mains on/off switch, CV and CC potmeter, CV and CC-limit-potmeter, Display Settings button, Display-Limits button, Remote/Local button, Output On/Off button, Front panel Lock buttons.			

SM 800 Series

800 WATTS PROGRAMMABLE DC SUPPLY

PROGRAMMING SPEED STANDARD VERSION	SM 7.5-80	SM 18-50	SM 70-AR-24	SM 400-AR-4
Rise time (10 - 90%)				
Output voltage step	0 → 7.5 V	0 → 16 V	0 → 35 V	0 → 200 V
Time, (100 % load)	6.5 ms	12 ms	6 ms	4 ms
Time, (10 % load)	2.5 ms	5 ms	2.5 ms	2 ms
Output voltage step	-	-	0 → 70 V	0 → 400 V
Time, (100 % load)	-	-	10 ms	8 ms
Time, (10 % load)	-	-	7 ms	5 ms
Fall time (90 - 10%)				
Output voltage step	7.5 → 0 V	16 → 0 V	35 → 0 V	200 → 0 V
Time, (100 % load)	6.5 ms	12 ms	6 ms	4 ms
Time, (10 % load)	62 ms	120 ms	60 ms	42 ms
Output voltage step	-	-	70 → 0 V	400 → 0 V
Time, (100 % load)	-	-	25 ms	15 ms
Time, (10 % load)	-	-	250 ms	155 ms
PROGRAMMING SPEED HIGH SPEED VERSION	SM 7.5-80 OPTION P250	SM 18-50 OPTION P251	SM 70-AR-24 OPTION P252	SM 400-AR-4 OPTION P253
Rise time (10 - 90%)				
Output voltage step	0 → 7.5 V	0 → 16 V	0 → 35 V	0 → 200 V
Time, (100 % load)	0.2 ms	0.22 ms	0.24 ms	0.4 ms
Time, (10 % load)	0.2 ms	0.26 ms	0.24 ms	0.3 ms
Output voltage step	-	-	0 → 70 V	0 → 400 V
Time, (100 % load)	-	-	0.24 ms	0.82 ms
Time, (10 % load)	-	-	0.24 ms	0.55 ms
Fall time (90 - 10%)				
Output voltage step	7.5 → 0 V	16 → 0 V	35 → 0 V	200 → 0 V
Time, (100 % load)	0.2 ms	0.24 ms	0.27 ms	0.42 ms
Time, (10 % load)	1 ms	1.95 ms	3 ms	4.6 ms
Output voltage step	-	-	70 → 0 V	400 → 0 V
Time, (100 % load)	-	-	0.85 ms	1.7 ms
Time, (10 % load)	-	-	9.5 ms	20 ms
Ripple @full load				
(rms/pp)	20 / 80 mV	400 / 120 mV	35 V / 24 A	200 V / 4 A
@full load (rms/pp)			25 / 90 mV	35 / 200 mV
			70 V / 12 A	400 V / 2 A
			30 / 110 mV	30 / 160 mV
Output capacitance	310µF	200µF	80µF	4µF
<i>Notes: All specifications regarding programming speed are typical and measured on a resistive load.</i>				
	SM 7.5-80	SM 18-50	SM 70-AR-24	SM 400-AR-4
Recovery time				
Recovery within				
di/dt of load step	50 mV	60 mV	35 V / 70 V	200 V / 400 V
Output voltage	1.25 A/µs	0.9 A/µs	75 mV	1 / 0.5 V
Time, @ 50 - 100% load step	7 V	15 V	0.4 / 0.2 A/µs	0.1 / 0.05 A/µs
Max.deviation	100 µs	100 µs	30 / 65 V	185 / 370 V
@ 230 VAC input voltage	160 mV	150 mV	100 µs	100 µs
			250 / 200 mV	2 / 1.5 V
Output impedance				
CV, 0-1 kHz	< 1 mΩ	< 2 mΩ	< 7 mΩ	<0.18mΩ
CV, 1-100 kHz	< 30 mΩ	< 30 mΩ	< 30 mΩ	< 2 Ω
Pulsating load				
max.tolerable AC component				
of load current				
f > 1 kHz	15 Arms	15 Arms	10 Arms	0.4 Arms
f < 1 kHz	80 Apeak	50 Apeak	12 / 24 Apeak	2 / 4 Apeak
Insulation				
Input / output		3750 Vrms (1 min.)		
Creepage / clearance		8 mm		
Input / case		2500 Vrms		
Output / case		600 V DC		

SM 800 Series

800 WATTS PROGRAMMABLE DC SUPPLY

Safety	EN 60950 / EN 61010			
EMC	Power Supply Standard	EN 61204-3, Emission: residential, light industrial environment (CISPR22-ClassB)		
	Generic Emission	Immunity: industrial environment		
	Generic Immunity	EN 61000-6-3, residential, light industrial environment (EN55022B)		
		EN 61000-6-2, industrial environment		
Operating Temperature at full load	- 20 to + 50 °C derate output to 75% at 60 °C			
Humidity	max. 95% RH, non condensing, up to 40 °C max. 75% RH, non condensing, up to 50 °C			
Storage temperature	- 40 to + 85 °C			
Thermal protection	Output shuts down in case of insufficient cooling			
MTBF	500 000 hrs			
Hold-Up Time				
V _{out} = 100%, P _{out} = <= 840 W	16ms			
V _{out} = 85%, I _{out} = 100%	20ms			
V _{out} = 100%, I _{out} = 50%	36ms			
@230V AC input	(time till DC-fall = 1)			
Turn on Delay	after mains switch on			
	600 ms @ 230 V AC, 900 ms @ 115 V AC			
Inrush current	24 A@115 V AC, 22 A@230 V AC			
Series Operation				
Max. total voltage	600 V			
Master / Slave Operation	yes			
Parallel Operation				
Max. total voltage	no limit			
Master / Slave Operation	max. 4 units (including master)			
Remote Sensing				
max. volt. drop per load lead	2 V			
Limits	Voltage	adjust range	0 - 102%	
	Current	adjust range	0 - 102%	
Potentiometers & Encoders	Standard			
Front panel control with knobs resolution	0.03 %			
Screwdriver adjustment	Option P001 (at front panel)			
Digital encoders	Option P236			
			SM 7.5-80	SM 18-50
			SM 70-AR-24	SM 400-AR-4
Meters				
Scale	voltage		3.5 digit	3.5 digit
Scale	current		0 - 7.50 V	0 - 18.00 V
A	ccuracy	read output	0 - 80.0 A	0 - 50.0 A
	read limit setting		0 - 24.0 A	0 - 4.00 A
	(d = digit)		0.5% + 2 d	0.5% + 2 d
			2% + 2 d	2% + 2 d
Mounting	Stacking of units allowed, air flow is from rear to the sides.			
Input connector	IEC320/C14, EN 60320/C14			
Output terminals	M5 bolts			
Programming connector	15 pole D-connector at rear panel (FEMALE)			
Cooling	Low noise blower, fan speed adapts to temperature of internal heatsink.			
Audio noise level	ca. 45 dBA at full load, 25 °C ambient temperature, 1 m distance ca. 50 dBA at full load, 50 °C ambient temperature, 1 m distance			
Airflow	from rear sides.			
Enclosure				
Degree of protection	IP20			
Dimensions				
Behind front panel: h x w x d	86 x 221 x 406 mm (feet removed)			
front panel: h x w	88.1 x 222 mm (1/2 19", 2 U)			
Weight	5.4 kg			

SM 800 Series - Options

800 WATTS PROGRAMMABLE DC SUPPLY

Digital Encoders

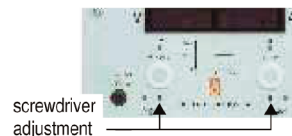
OPTION P236

- CV and CC encoders with a very long life time and intelligent functions (e.g. Keylock).

Screwdriver adjustment standard potentiometers

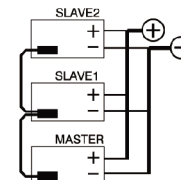
OPTION P001

- CV and CC knobs are moved backwards to avoid accidental adjusting.



Master / Slave operation

- Parallel and Series operation with equal Current and Voltage sharing.
- This way two or more SM-units can be used together as one high power unit.
- Voltage and current of the units is controlled by the master (by potentiometers or by programming).
- Easy to connect in Master / Slave mode, using standard UTP-cables (RJ45).
Standard on all SM800 units, no special option required.



Battery Charging

- The CV / CC regulated power supplies are ideal battery chargers. Once set at the correct output voltage, the battery will charge constantly without overcharging. This can be useful for **emergency power systems**.
- Use a circuit-breaker in series to protect the internal diode from reverse connection of the battery.
- The SM400-AR-4 needs an **external diode set** on the output as extra protection for the internal diode.
- Ordering information for diode set: SM400-AR-4 OPTION P201*



Increased max. output voltage/current

OPTION P069

- The maximum output voltage or current can be increased by approximately 10%. Normally this results in a derating of the maximum ambient temperature or other parameters.
- Always add increased value for voltage or current in ordercode, for example **SM70-AR-24 P069 output 75 V**.
- Note: for the SM18-50 only the current can be increased by 10%, not the voltage.

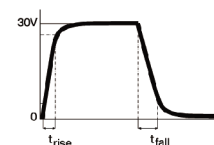
Enforced secondary insulation 1000 V

OPTION P089

- The secondary insulation between output and ground is increased from standard 600 V to 1000 V .

High Speed Programming

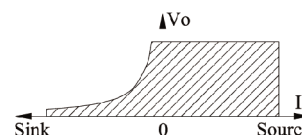
- The speed is **10 - 20 times higher** because of the smaller output capacitors.
- Relatively low current overshoots (if any) in case of sudden voltage variations caused by the load, this is of great advantage for laser diode applications.
- Applications:*
- Laser diode** power supply, continuous or pulsed.
- Test systems requiring a fast settling time to improve throughput of factory.
- A constant current source with a low parallel capacitance: plasma, load sensitive to current overshoots, etc.
- A constant current source on a load with **fast voltage variations**.
- Ordering information:*



	SM 7.5-80	SM 18-50	SM 70-AR-24	SM 400-AR-4
Option	P250	P251	P252	P253

Power Sink for 2 quadrant operation

- Can absorb continuous power of **140 W**.
- Maintains output voltage regardless output power is positive or negative (source & sink).
- Ideal solution for supplying **electric motors** with PWM-speed control.
- Fast down programming at no load conditions.
- Ordering information:*



	SM 7.5-80	SM 18-50	SM 70-AR-24	SM 400-AR-4
Option	P245	P246	P247	P248

Download the special datasheet for more details from '

Built-in Ethernet Power Supply Controller

OPTION P256

Built-in RS232 Power Supply Controller

OPTION P254

Built-in IEEE488 Power Supply Controller

OPTION P255

Built-in ISO AMP CARD for isolated analog programming

OPTION P249

Note: there is only room for one of the interfaces in a unit (P249, P254, P255, P256)

