



AUTORANGING INPUT

SM650P SERIES 650-700 WATT MEDICAL SWITCHING POWER SUPPLIES

GENERAL SPECIFICATIONS

Construction	PCB open frame, cover-and-fan option
Connectors / Terminals	PCB header pins
Switching Frequency	60KHz ±10KHz
Efficiency	80% minimum all models
Dielectric Isolation	4000VAC from input to output 1500VAC from input to ground 500VAC from output to ground
MTBF (per MIL-HDBK-217F)	300,000 hours minimum at full load at 25 °C ambient

FEATURES

- ◆ Low safety ground leakage current
- ◆ Power Fail Detect (PFD) signal
- ◆ Remote inhibit input disables DC output. Remote sense (Out-1,-2)
- ◆ Meets EN55011, FCC Class B, EN60601-1-2, EN61000 Class A,D
- ◆ Compact size 4" x 7" PCB x 1.5" height
- ◆ Optional cover-and-fan assembly
- ◆ 100% burn-in at full rated load
- ◆ Wide range input 90 to 264VAC
- ◆ Overcurrent, Short-circuit, Overvoltage, Thermal protections
- ◆ Power Factor 0.98 typical
- ◆ Compliant with RoHS requirements

DESCRIPTION

This series of switching power supplies are specially designed for non-patient contact medical applications. They are capable of delivering 650 to 700 watts of continuous DC output power. Construction is open PCB construction with a U-bracket for mechanical support and heat sinking. They operate at 90 to 264VAC input voltage without the need for voltage selection. All auxiliary outputs are equipped with magnetic amplifiers or linear regulators for keeping regulation. A cover-and-fan assembly can be added during manufacturing.

INPUT SPECIFICATIONS

Input Voltage	90 to 264 VAC (auto select).
Input Frequency	47 to 63 Hz
Input Current	10A rms @ 115VAC 5A rms @ 230 VAC
Inrush Current (at 25°C cold start)	50 amps @ 115VAC 100 amps @ 230VAC
Leakage Current (Touch current)	100µA max @ 115VAC 60Hz 165µA max @ 230VAC 50Hz
Remote Inhibit	TTL 'high' external input to inhibit outputs for standard models.

ENVIRONMENTAL

Operating Temperature	0 °C to +70 °C.
Storage Temperature	-40 °C to +85 °C
Operating Humidity	5% to 95% RH, non-condensing
Cooling	Continuous output 100% rated power for "C" version (cover/fan). 50% rated power version "B" (convection air flow). Refer to Rating Chart notes for details.

OUTPUT SPECIFICATIONS

Total Output Power	Refer to Rating Chart for each model
Derating Output Power	Derate from 100% @ +50 °C linearly to 50% @ +70 °C
Output Voltage / Current, Adjustability, Peak Current	Refer to Rating Chart for each model
Minimum Load	No minimum load required
Hold Up Time	12 mSec min @ 110 VAC
Line Regulation	±0.2% max at full load
Over / Undershoot	None at turn on or turn off
Ripple and Noise	2% peak to peak max
Overvoltage Protection	Only on Output #1. Setting at 115-140% of Vnom output voltage.
Overcurrent / Short Circuit Protection	Continuous protection with automatic recovery.
Temperature Coefficient	±0.04% / °C max for all outputs
Transient Response	Maximum excursion of 4% or better on all models, recovering to 1% of final value within 500 uS after a 25% step load change.
PFD Signal	TTL 'high' for normal or 'low' upon loss of input power. Valid < 1mS before +5V output drops 5% below nominal value. Valid 100 mS delayed after +5V is within regulation.

EMC and SAFETY (1)

EMC Performance Standard	EN60601-1-2: 2001
	EN61000-3-2, -3-3, -4-2, -4-3, -4-4, -4-5, -4-6, -4-8, -4-11
EN55011, FCC-15, VCCI	Class-B Conducted, Radiated
Safety Standards (certified to)	UL508, EN60950-1 (TUV), CE, UL60601-1, CSA C22.2 No 601.1

(1) Products are rated for industrial environments and are not to be used nor are warranted in aerospace or life-support medical applications.



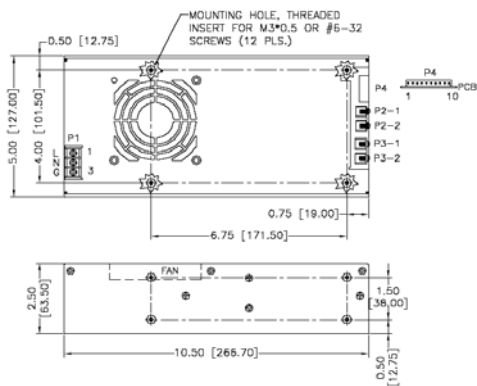
OUTPUT VOLTAGE / CURRENT RATINGS

MODEL	Output # 1				Output # 2				Output # 3				Max Output Power
	Vnom.	Imin.	Imax.	Tol.	Vnom.	Imin.	Imax.	Tol.	Vnom.	Imin.	Imax.	Tol.	
SM650P12	12V	0A	54.2A	2%	-	-	-	-	-	-	-	-	650W
SM650P13	15V	0A	43.4A	2%	-	-	-	-	-	-	-	-	650W
SM650P14	24V	0A	27.1A	2%	-	-	-	-	-	-	-	-	650W
SM650P15	27V	0A	24.1A	2%	-	-	-	-	-	-	-	-	650W
SM650P16	30V	0A	21.7A	2%	-	-	-	-	-	-	-	-	650W
SM650P17	36V	0A	18.1A	2%	-	-	-	-	-	-	-	-	650W
SM650P18	48V	0A	14.6A	2%	-	-	-	-	-	-	-	-	700W
SM650P20	24V	1.5A	18A	2%	12V	1.2A	22A	5%	-	-	-	-	650W
SM650P21	24V	1.5A	18A	2%	15V	1.0A	18A	5%	-	-	-	-	650W
SM650P22	48V	0.75A	9A	2%	24V	0.6A	12A	5%	-	-	-	-	650W
SM650P23	48V	0.75A	9A	2%	12V	1.2A	22A	5%	-	-	-	-	650W
SM650P24	48V	0.75A	9A	2%	15V	1.0A	18A	5%	-	-	-	-	650W
SM650P30	24V	1.5A	18A	2%	12V	1.2A	22A	5%	3.3V	0A	10A	3%	650W
SM650P31	24V	1.5A	18A	2%	15V	1.0A	18A	5%	3.3V	0A	10A	3%	650W
SM650P32	24V	1.5A	18A	2%	12V	1.2A	22A	5%	5.1V	0A	10A	3%	650W
SM650P33	24V	1.5A	18A	2%	15V	1.0A	18A	5%	5.1V	0A	10A	3%	650W
SM650P34	48V	0.75A	9A	2%	12V	1.2A	22A	5%	3.3V	0A	10A	3%	650W
SM650P35	48V	0.75A	9A	2%	15V	1.0A	18A	5%	3.3V	0A	10A	3%	650W
SM650P36	48V	0.75A	9A	2%	12V	1.2A	22A	5%	5.1V	0A	10A	3%	650W
SM650P37	48V	0.75A	9A	2%	15V	1.0A	18A	5%	5.1V	0A	10A	3%	650W

NOTES

1. Add suffix "B" for U-bracket format or "C" for enclosed format with fan control function, e.g. SM650-14C.
2. All outputs are floating. It can be connected externally for positive or negative output.
3. Output #1 can be adjusted within $\pm 5\%$ of their nominal voltage.
4. Output #3 can be adjusted within $\pm 15\%$ of their nominal voltage.
5. Derating:
650~700 watts for "C" version with cover-and-fan assembly.
325~350 watts for "B" version without moving air (maximum current of output #1 & 2 derated to 70%), or
650 watts with 50 CFM forced air provided by user.
6. All models may operate at no-load. At no-load, output voltage tolerance increases to 10%.

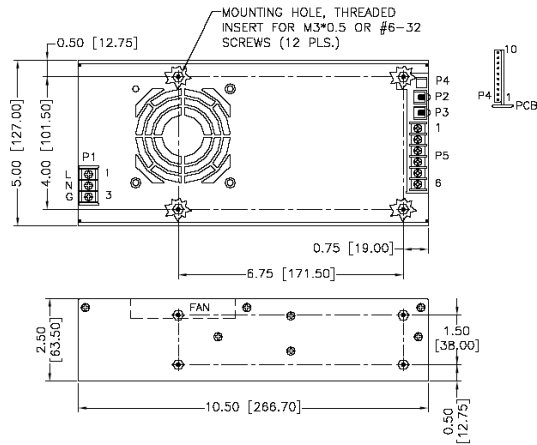
MECHANICAL SPECIFICATIONS (mm / inches)



Single Output Models

NOTES:

1. Dimensions shown in inch [mm].
2. Tolerance 0.02 [0.5] maximum.
3. Input connector P1 is Dinkle DT-4C-B01N-03 screws are M3, Nickel plated.
4. Connector P4 mates with Molex housing 50-37-5103 and pins 5263.
5. P2-1, P2-2, P3-1 & P3-2: M3*0.5 screw connections.
7. 6. Weight: 2,040 grams.



Multiple Output Models

NOTES:

1. Dimensions shown in inch [mm].
2. Tolerance 0.02 [0.5] maximum.
3. Input connector P1 is Dinkle DT-4C-B01N-03 screws are M3, Nickel plated.
4. Connector P4 mates with Molex housing 50-37-5103 and pins 5263.
5. P2, P3: M*0.05 screw connections.
6. Output connector P5 is Dinkle DT-35-B01W-06 screws are M3, Nickel plated.
7. Weight: 2,140 grams.

PIN ASSIGNMENTS

All Models: P1 is AC INPUT: (1) L-Line, (2) N-Neutral, (3) G-Ground.

Single Output Models

MODEL	CONN.:		P 2	P 3	P 4									
	PIN:				1	2	3	4	5	6	7	8	9	10
SM650P12 SM650P13 SM650P14 SM650P15 SM650P16 SM650P17 SM650P18			+V	-V	SIGNAL GND (-V)	+S (V)	-S (V)	PFD	INHIBIT +Ve	INHIBIT +Ve	N.C.	N.C.	0V (FAN)	FAN

Multiple Output Models

MODEL	CONN.:		P 2	P 3	P 4									
	PIN:				1	2	3	4	5	6	7	8	9	10
SM650P20 SM650P21 SM650P22 SM650P23 SM650P24 SM650P30 SM650P31 SM650P32 SM650P33 SM650P34 SM650P35 SM650P36 SM650P37			+V1	-V1	SIGNAL GND (-V)	+S (V1)	-S (V1)	PFD	INHIBIT +Ve	INHIBIT +Ve	+S (V2)	-S (V2)	0V (FAN)	FAN

MODEL	CONN.:		P 5					
	PIN:		1	2	3	4	5	6
SM650P20 SM650P21 SM650P22 SM650P23 SM650P24			+V2	+V2	-V2	-V2	N.C.	N.C.
SM650P30 SM650P31 SM650P32 SM650P33 SM650P34 SM650P35 SM650P36 SM650P37			+V2	+V2	-V2	-V2	+V3	-V3