PEWATRON

FSP TECHNOLOGY INC.

PROTEK POWER

Medical Power Supply Catalog

2016

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PROTEK POWER

30-48 WATT MEDICAL & ITE POWER SUPPLIES

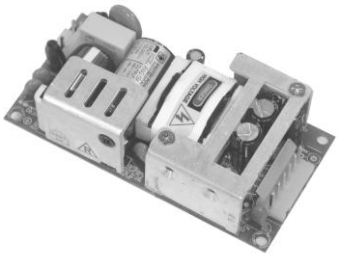
DESCRIPTION

The PM42 series of compact, open PCB constructed, AC-DC switching power supplies are capable of delivering 30-48 watts of continuous output power at convection cooling. They operate at 90-264 VAC input voltage without the need of voltage selection, and are suited for medical, information technology and industrial applications. Approval to both EN60601-1 and EN60950-1 Safety Standards improves design-in time and reduces end equipment compliance costs.

PM42 SERIES

CE

RoHS



FEATURES

- BF Class insulation
- Medical and ITE approvals
- Compact size 2" x4" x1.18"
- Single, dual and triple outputs
- Wide-range input 90-264 VAC
- Low earth leakage current
- Level B emissions
- RoHS compliant

SAFETY STANDARD APPROVALS

c UL us	UL ES 60601-1, CSA C22.2 No. 60601-1 File No. E178020
IEC 60601-1	TÜV EN 60601-1
TÜV Rheinland of North America Inc. c US	UL 60950-1, CSA-C22.2 No. 60950-1
TÜV Rheinland Product Safety BAUART GEPRÜFT TYPE APPROVED	TÜV EN 60950-1

INPUT SPECIFICATIONS

Input voltage:	90-264 VAC
Input frequency:	47-63 Hz
Input current:	0.9 A (rms) for 100 VAC 0.5 A (rms) for 240 VAC
Earth Leakage current:	150 μA max. @ 264 VAC, 63 Hz
Touch current:	100 μA max. @ 264 VAC, 63 Hz

OUTPUT SPECIFICATIONS

Output voltage/current:	See rating chart.
Maximum output power:	See rating chart.
Ripple and noise:	100 mV peak to peak on 3.3 V & 5.0 V models, 1% peak to peak on other models
Overvoltage protection:	Provided on output #1 only; set at 112–132% of its nominal output voltage
Overcurrent protection:	All outputs protected to short circuit conditions
Temperature coefficient:	All outputs ±0.04% /℃ maximum
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

ENVIRONMENTAL SPECIFICATIONS

Operating temperature:	-10℃ to +70℃
Storage temperature:	-40℃ to +85℃
Relative humidity:	5% to 95% non-condensing
Derating:	Derate from 100% at +50℃ linearly to 50% at +70℃

GENERAL SPECIFICATIONS

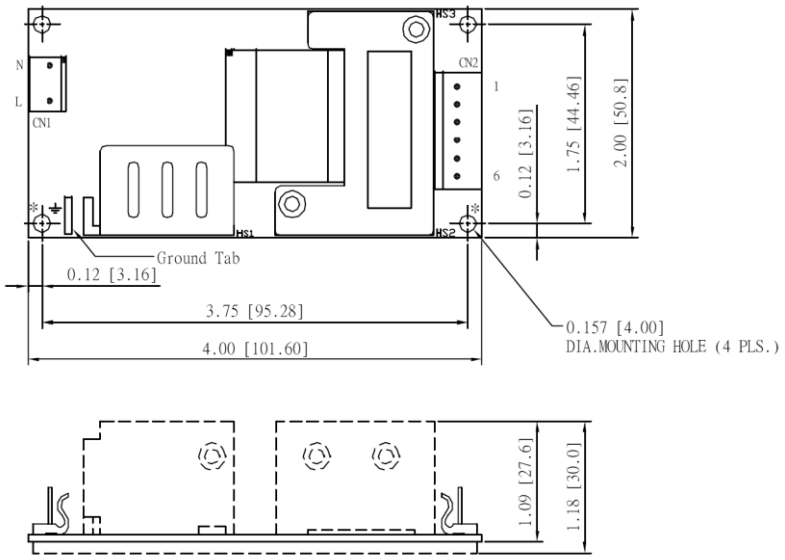
Switching frequency:	62 K±5 KHz
Efficiency:	80-88% typical except PM42-31-3A and PM42-31-5A at 75% typical
Hold-up time:	12 ms minimum at 110 VAC
Line regulation:	±0.5% maximum at full load
Inrush current:	25 A @ 115 VAC, or 50 A @ 230 VAC, at 25℃ cold start
Withstand voltage:	4000 VAC from input to output (2 MOPP) 1500 VAC from input to ground (1 MOPP) 1500 VAC from output to ground
MTBF:	400,000 hours at full load at 25℃ ambient, calculated per MIL-HDBK-217F
EMC Performance	
EN55011/EN55022:	Class B conducted, class B radiated
FCC:	Class B conducted, class B radiated
VCCI:	Class B conducted, class B radiated
EN61000-3-2:	Harmonic distortion, class A and D
EN61000-3-3:	Line flicker
EN61000-4-2:	ESD, ±15 KV air and ±8 KV contact
EN61000-4-3:	Radiated immunity, 10 V/m
EN61000-4-4:	Fast transient/burst, ±2 KV
EN61000-4-5:	Surge, ±1 KV diff., ±2 KV com
EN61000-4-6:	Conducted immunity, 10 Vrms
EN61000-4-8:	Magnetic field immunity, 30 A/m
EN61000-4-11:	Voltage dip immunity, 30% reduction for 500 ms, 100% reduction for 10 ms

OUTPUT VOLTAGE/CURRENT RATING CHART

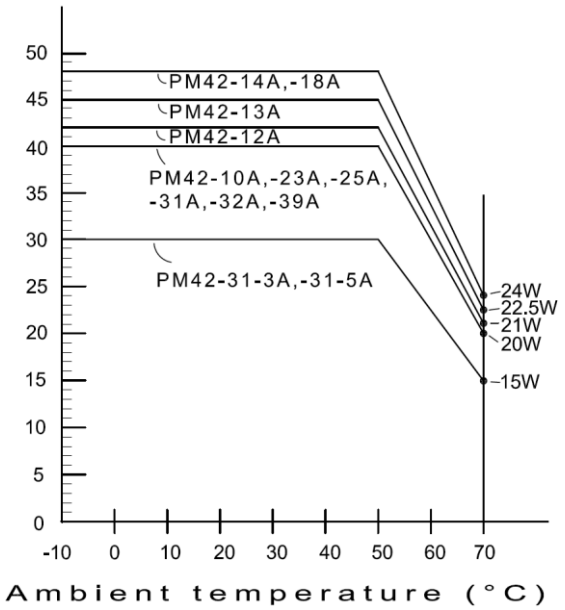
Model (1)	Output #1 V1	Min. Current	Max. Current	Tol.	Output #2 V2	Min. Current	Max. Current	Tol.	Output #3 V3	Min. Current	Max. Current	Tol.	Max. Output Power
PM42-10A	5 V	0 A	8.0 A	±2%	(N/A)				(N/A)				40 W
PM42-12A	12 V	0 A	3.5 A	±2%	(N/A)				(N/A)				42 W
PM42-13A	15 V	0 A	3.0 A	±2%	(N/A)				(N/A)				45 W
PM42-14A	24 V	0 A	2.0 A	±2%	(N/A)				(N/A)				48 W
PM42-18A	48 V	0 A	1.0 A	±2%	(N/A)				(N/A)				48 W
PM42-23A	+5 V	0.5 A	6.0 A	±3%	+12 V	0.1 A	2.0 A	±5%	(N/A)				40 W
PM42-25A	+5 V	0.5 A	6.0 A	±3%	+24 V	0.1 A	1.0 A	±5%	(N/A)				40 W
PM42-31A	+5 V	0.5 A	6.0 A	±3%	+12 V	0.1 A	2.0 A	±5%	-12 V	0 A	0.3 A	±4%	40 W
PM42-31-3A	+3.3 V	0.8 A	6.0 A	±3%	+5 V	0.1 A	2.0 A	±5%	+12 V	0 A	0.3 A	±4%	30 W
PM42-31-5A	+5 V	0.5 A	6.0 A	±3%	+3.3 V	0 A	1.5 A	±5%	+12 V	0 A	0.3 A	±4%	30 W
PM42-32A	+5 V	0.5 A	6.0 A	±3%	+15 V	0.1 A	1.5 A	±5%	-15 V	0 A	0.3 A	±4%	40 W
PM42-39A	+5 V	0.5 A	6.0 A	±3%	+24 V	0.1 A	1.0 A	±5%	-12 V	0 A	0.3 A	±4%	40 W

NOTES:
1. Safety approvals are for PCB form only. To order unit with cover fitted, change suffix “A” to “C”.
2. The output voltages of a multiple output model may go outside of the stated tolerance when an output load current is out of stated limits. All models may be operated at no-load without damage.
3. Ripple and noise is maximum peak to peak voltage value measured at output within 20 MHz bandwidth, at rated line voltage and output load ranges, and with a 10 μF tantalum capacitor in parallel with a 0.1 μF ceramic capacitor across the output.

MECHANICAL SPECIFICATIONS



OUTPUT POWER DERATING CURVE



NOTES:
1. Dimensions shown in inches [mm]
2. Tolerance 0.02 [0.5] maximum
3. Connector CN1: Molex header 09-65-2038 or equivalent, mating with Molex housing 09-50-1031 or equivalent.
4. Connector CN2: Molex header 09-65-2068 or equivalent, mating with Molex housing 09-50-1061 or equivalent.
5. Ground tab is 0.25 [6.35] x 0.032 [0.8]
6. To ensure compliance with level B emissions, connect the two “∗” marked mounting holes with metallic standoffs to chassis.
7. Weight: 205 grams (0.45 lbs.) approx.

PIN CHART

MODEL \ PIN	1	2	3	4	5	6
PM42-10A PM42-13A PM42-18A PM42-12A PM42-14A	+V1		V1 Return		N.C.	
PM42-23A PM42-25A	V1		Common Return		N.C	V2
PM42-31A PM42-32A PM42-39A PM42-31-3A PM42-31-5A	V1		Common Return		V3	V2

37.5-64 WATT MEDICAL & ITE POWER SUPPLIES

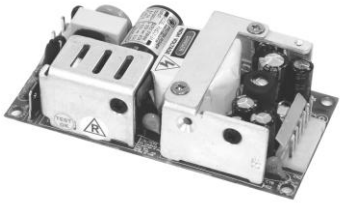
DESCRIPTION

The PM60 series of compact, open PCB constructed, AC-DC switching power supplies are capable of delivering 37.5-64 watts of continuous output power at convection cooling. They operate at 90-264 VAC input voltage without the need of voltage selection, and are suited for medical, information technology and industrial applications. Approval to both EN60601-1 and EN60950-1 safety standards improves design-in time and reduces end equipment compliance costs.

PM60 SERIES

CE

RoHS



FEATURES

- BF Class insulation
- Medical and ITE approvals
- Compact size 2" x 4" x 1.18"
- Single, dual and triple outputs
- Wide-range input 90-264 VAC
- Low earth leakage current
- Level B emissions
- RoHS compliant

SAFETY STANDARD APPROVALS

UL ES 60601-1, CSA C22.2 No. 60601-1
File No. E178020

TÜV EN 60601-1

UL 60950-1, CSA C22.2 No. 60950-1
(except PM60-31-3A by UL)

TÜV EN 60950-1

INPUT SPECIFICATIONS

Input voltage:	90-264 VAC
Input frequency:	47-63 Hz
Input current:	1.3 A (rms) for 100 VAC 0.7 A (rms) for 240 VAC
Earth leakage current:	150 μA max. @ 264 VAC, 63 Hz
Touch current:	100 μA max. @ 264 VAC, 63 Hz

OUTPUT SPECIFICATIONS

Output voltage/current:	See rating chart.
Maximum output power:	See rating chart.
Ripple and noise:	100 mV peak to peak on 3.3 V & 5.0 V models, 1% peak to peak on other models
Overvoltage protection:	Provided on output #1 only; set at 112-132% of its nominal output voltage
Overcurrent protection:	All outputs protected to short circuit conditions
Temperature coefficient:	All outputs ±0.04% /℃ maximum
Transient response:	Maximum excursion of 4% or better on all models, recovering to 1% of final value within 500 μs after a 25% step load change

ENVIRONMENTAL SPECIFICATIONS

Operating temperature:	-10℃ to +70℃
Storage temperature:	-40℃ to +85℃
Relative humidity:	5% to 95% non-condensing
Derating:	Derate from 100% at +50℃ linearly to 50% at +70℃

GENERAL SPECIFICATIONS

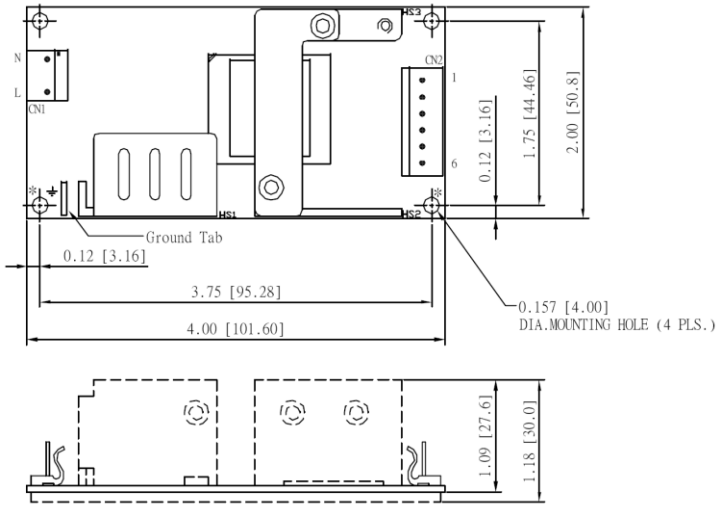
Switching frequency:	62 K ±5 KHz
Efficiency:	80-88% typical except PM60-31-3A and PM60-31-5 A at 75% typical
Hold-up time:	12 ms minimum at 110 VAC
Line regulation:	±0.5% maximum at full load
Inrush current:	30 A @ 115 VAC, or 60 A @ 230 VAC, at 25℃ cold start
Withstand voltage:	4000 VAC from input to output (2 MOPP) 1500 VAC from input to ground (1 MOPP) 1500 VAC from output to ground
MTBF:	400,000 hours at full load at 25℃ ambient, calculated per MIL-HDBK-217F
EMC Performance	
EN55011 /EN55022:	Class B conducted, class B radiated
FCC:	Class B conducted, class B radiated
VCCI:	Class B conducted, class B radiated
EN61000-3-2:	Harmonic distortion, class A and D
EN61000-3-3:	Line flicker
EN61000-4-2:	ESD, ±15 KV air and ±8 KV contact
EN61000-4-3:	Radiated immunity, 10 V/m
EN61000-4-4:	Fast transient/burst, ±2 KV
EN61000-4-5:	Surge, ±1 KV diff., ±2 KV com
EN61000-4-6:	Conducted immunity, 10 Vrms
EN61000-4-8:	Magnetic field immunity, 30 A/m
EN61000-4-11:	Voltage dip immunity, 30% reduction for 500 ms, 100% reduction for 10 ms

OUTPUT VOLTAGE/CURRENT RATING CHART

Model[1]	Output #1 V1	Min. Current	Max. Current at convection	Max. Current at 5 CFM[2]	Tol.	Output #2 V2	Min. Current	Max. Current	Tol.	Output #3 V3	Min. Current	Max. Current	Tol.	Max. Output Power
PM60-10A	5 V	0 A	11.0 A	(N/A)	±2%	(N/A)				(N/A)				55 W
PM60-12A	12 V	0 A	5.0 A	(N/A)	±2%	(N/A)				(N/A)				60 W
PM60-13A	15 V	0 A	4.3 A	(N/A)	±2%	(N/A)				(N/A)				64 W
PM60-14A	24 V	0 A	2.7 A	(N/A)	±2%	(N/A)				(N/A)				64 W
PM60-18A	48 V	0 A	1.35 A	(N/A)	±2%	(N/A)				(N/A)				64 W
PM60-23A	+5 V	0.5 A	6.0 A	8 A	±3%	+12 V	0.1 A	3.0 A	±5%	(N/A)				55 W
PM60-25A	+5 V	0.5 A	6.0 A	8 A	±3%	+24 V	0.1 A	1.5 A	±5%	(N/A)				55 W
PM60-31A	+5 V	0.5 A	6.0 A	8 A	±3%	+12 V	0.1 A	3.0 A	±5%	-12 V	0 A	0.5 A	±4%	55 W
PM60-31-3A	+3.3 V	0.8 A	6.0 A	8 A	±3%	+5.2 V	0.1 A	3.0 A	±5%	+12 V	0 A	0.5 A	±4%	37.5 W
PM60-31-5A	+5 V	0.5 A	6.0 A	8 A	±3%	+3.3 V	0 A	1.5 A	±5%	+12 V	0 A	0.5 A	±4%	37.5 W[3]
PM60-32A	+5 V	0.5 A	6.0 A	8 A	±3%	+15 V	0.1 A	2.4 A	±5%	-15 V	0 A	0.5 A	±4%	55 W
PM60-39A	+5 V	0.5 A	6.0 A	8 A	±3%	+24 V	0.1 A	1.5 A	±5%	-12 V	0 A	0.5 A	±4%	55 W

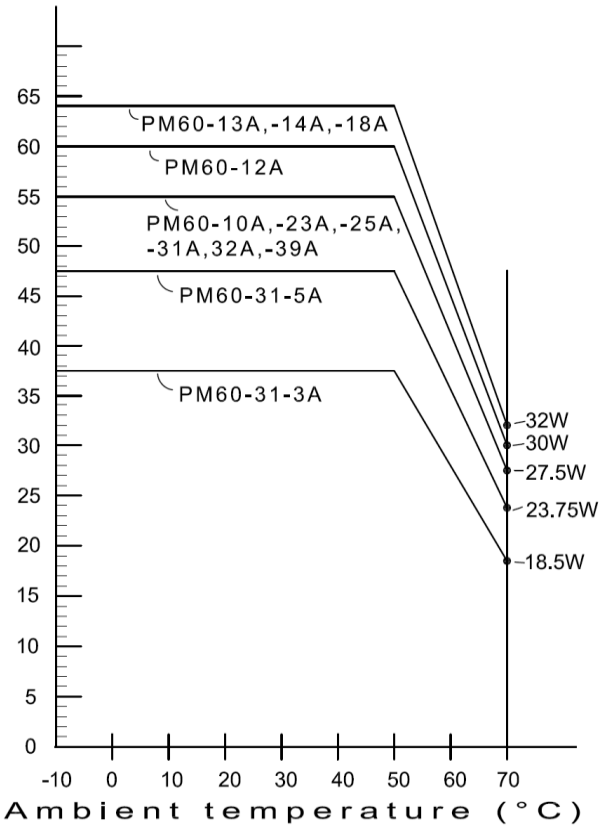
NOTES:
1. Safety approvals are for PCB form only. To order unit with cover fitted, change suffix "A" to "C".
2. Maximum current of output #1 of multi-output models can be 8 A at 5 CFM forced air provided by user.
3. It is rated at 37.5 W maximum at convection cooling or 47.5 W maximum at 5 CFM forced air cooling by user.
4. The output voltages of a multiple output model may go outside of the stated tolerance when an output load current is out of stated limits. All models may be operated at no-load without damage.
5. Ripple and noise is maximum peak to peak voltage value measured at output within 20 MHz bandwidth, at rated line voltage and output load ranges, and with a 10 μF tantalum capacitor in parallel with a 0.1 μF ceramic capacitor across the output.

MECHANICAL SPECIFICATIONS



NOTES:
1. Dimensions shown in inches [mm]
2. Tolerance 0.02 [0.5] maximum
3. Connector CN1: Molex header 09-65-2038 or equivalent, mating with Molex housing 09-50-1031 or equivalent.
4. Connector CN2: Molex header 09-65-2068 or equivalent, mating with Molex housing 09-50-1061 or equivalent.
5. Ground tab is 0.25 [6.35] x 0.032 [0.8] fast-on connector.
6. To ensure compliance with level B emissions, connect the two "⁎" marked mounting holes with metallic standoffs to chassis.
7. Weight: 205 grams (0.45 lbs.) approx.

OUTPUT POWER DERATING CURVE



PIN CHART

MODEL / PIN	1	2	3	4	5	6
PM60-10A PM60-12A PM60-13A PM60-14A PM60-18A	+V1	+V1	V1 Return	V1 Return	N.C.	N.C.
PM60-23A PM60-25A	V1	V1	Common Return		N.C.	V2
PM60-31A PM60-32A PM60-39A	V1	V1	Common Return		V3	V2
PM60-31-3A PM60-31-5A	V1	V1	Common Return		V3	V2

DESCRIPTION

The PM100 series of compact, open PCB constructed, AC-DC switching power supplies are capable of delivering 100 watts of continuous output power at convection cooling. They are suited for medical, information technology and industrial applications. Approval to both EN60601-1 and EN60950-1 safety standards improves design-in time and reduces end equipment compliance costs.

FEATURES

- Medical and ITE approvals
- Compact size 2" × 4" × 1.26"
- High power density 10 W/cubic inch
- 100 W output with convection cooling up to +50℃
- Low earth leakage current
- EN55011 /55022 class B emissions
- RoHS compliant

INPUT SPECIFICATIONS

Input voltage:	90-132 /180-264 VAC (Universal mains supply operation)
Input frequency:	47-63 Hz
Input current:	1.9 A (rms) for 100-120 VAC 1.1 A (rms) for 200-240 VAC
Earth leakage current:	150 μA max. @ 264 VAC, 63 Hz
Touch current:	100 μA max. @ 264 VAC, 63 Hz

OUTPUT SPECIFICATIONS

Output voltage/current:	See rating chart.
Total output power:	100 watts maximum
Ripple and noise:	150 mV peak to peak on 5.0 V model, 1% peak to peak on other models
Overvoltage protection:	Provided on output; set at 110-140% of its nominal output voltage
Overcurrent protection:	All outputs protected to short circuit conditions
Temperature coefficient:	All outputs ±0.04% /℃ maximum
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

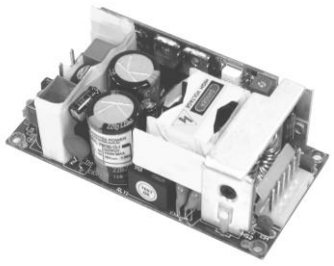
ENVIRONMENTAL SPECIFICATIONS

Operating temperature:	-10℃ to +70℃
Storage temperature:	-40℃ to +85℃
Relative humidity:	5% to 95% non-condensing
Derating:	Derate from 100% at +50℃ linearly to 50% at +70℃
Cooling:	Convection

PM100 SERIES

CE

RoHS



SAFETY STANDARD APPROVALS

UL ES 60601-1, CSA C22.2 No. 60601-1
File No. E178020

TÜV EN 60601-1

UL 60950-1, CSA C22.2 No. 60950-1

TÜV EN 60950-1

GENERAL SPECIFICATIONS

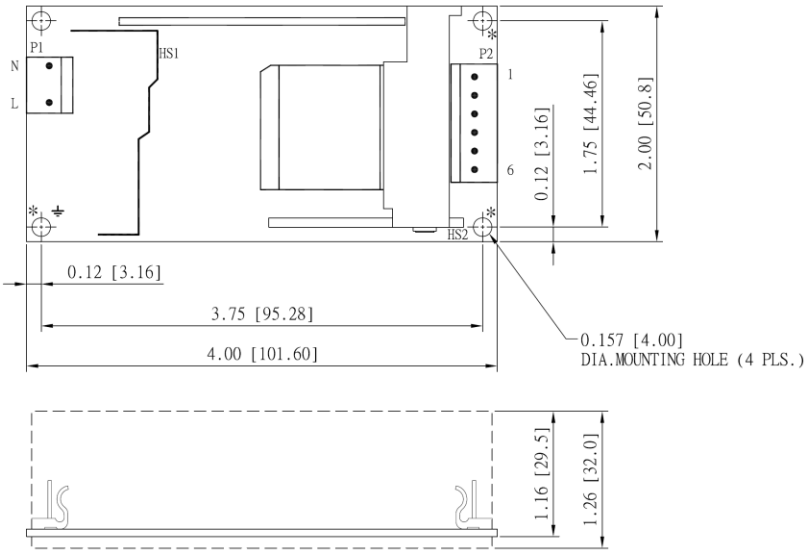
Switching frequency:	100 KHz (typical)
Efficiency:	88-90% @ 230 VAC full load
Hold-up time:	12 ms minimum at 110 VAC
Line regulation:	±0.2% maximum at full load
Inrush current:	40 A @ 115 VAC or 80 A @ 230 VAC, at 25℃ cold start
Withstand voltage:	5600 VDC from input to output (2 MOPP) 2100 VDC from input to ground (1 MOPP) 700 VDC from output to ground (To verify AC strength, get correct test method to avoid power supply damage.)
MTBF:	270,000 hours at full load at 25℃ ambient temperature, calculated per MIL-HDBK-217F
EMC Performance	
EN55011 /EN55022:	Class B conducted, class B radiated
FCC:	Class B conducted, class B radiated
VCCI:	Class B conducted, class B radiated
EN61000-3-2:	Harmonic distortion, class A
EN61000-3-3:	Line flicker
EN61000-4-2:	ESD, ±15 KV air and ±8 KV contact
EN61000-4-3:	Radiated immunity, 10 V/m
EN61000-4-4:	Fast transient/burst, ±2 KV
EN61000-4-5:	Surge, ±1 KV diff., ±2 KV com
EN61000-4-6:	Conducted immunity, 10 Vrms
EN61000-4-8:	Magnetic field immunity, 30 A/m
EN61000-4-11:	Voltage dip immunity, 30% reduction for 500 ms (criteria A @ 230 VAC, criteria B @ 100 VAC), 100% reduction for 10 ms

OUTPUT VOLTAGE/CURRENT RATING CHART

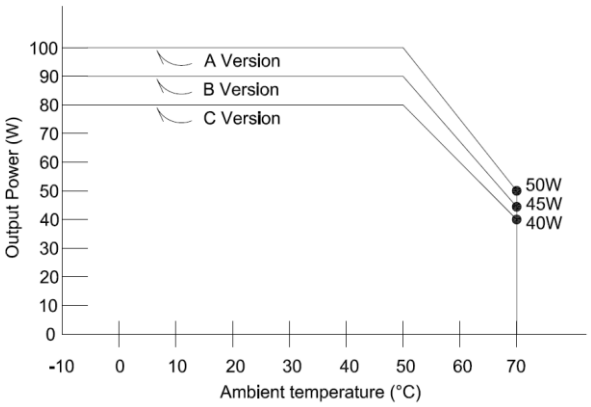
Model[1]	Output						Efficiency (typical) @ 115/230 Vac
	V1	Min. Current	Max. Current	Tol.	Ripple & Noise[2]	Max. Power	
PM100-10A	5 V	0 A	20.00 A	±2 %	150 mV	100 W	87 /88%
PM100-12A	12 V	0 A	8.34 A	±2 %	120 mV	100 W	88 /89%
PM100-13A	15 V	0 A	6.70 A	±2 %	150 mV	100 W	88 /89%
PM100-13-1A	18 V	0 A	5.56 A	±2 %	180 mV	100 W	88 /89%
PM100-14A	24 V	0 A	4.20 A	±2 %	240 mV	100 W	87 /90%
PM100-15A	28 V	0 A	3.58 A	±2 %	280 mV	100 W	87 /90%
PM100-17A	36 V	0 A	2.78 A	±2 %	360 mV	100 W	88 /89%
PM100-18A	48 V	0 A	2.10 A	±2 %	480 mV	100 W	88 /89%

NOTES: 1. Safety approvals are for PCB form only. To order models with metallic L-bracket or box, change suffix “A” to “B” for L-bracket form, to “C” for enclosed form (see Outline Drawing of Cased Internal Switchers), e.g. PM100-14C.
2. Ripple and noise is maximum peak to peak voltage value measured at output within 20 MHz bandwidth, at rated line voltage and output load ranges, and with a 10 µF tantalum capacitor in parallel with a 0.1 µF ceramic capacitor across the output.

MECHANICAL SPECIFICATIONS



OUTPUT POWER DERATING CURVE



NOTES:
1. Dimensions shown in inches [mm]
2. Tolerance 0.02 [0.5] maximum
3. Connector P1: Molex header 09-65-2038 or equivalent, mating with Molex housing 09-50-1031 or equivalent.
4. Connector P2: Molex header 09-65-2068 or equivalent, mating with Molex housing 09-50-1061 or equivalent.
5. To ensure compliance with level B emissions, connect the three “∗ “ marked mounting holes with metallic standoffs to chassis.
6. Weight: 190 grams (0.44 lbs.) approx.

PIN CHART

MODEL \ PIN	1	2	3	4	5	6
PM100-10A PM100-13-1A PM100-17A PM100-12A PM100-14A PM100-18A PM100-13A PM100-15A	V1 Return	V1 Return	V1 Return	+V1	+V1	+V1

DESCRIPTION

The PM110 series of compact, open PCB constructed, AC-DC switching power supplies are specially designed for medical applications. They are capable of delivering 72-110 watts of continuous power at 25 CFM forced air cooling or 60-80 watts at convection cooling. They operate at 85-264 VAC input voltage without the need of a selector strap. All models meet the safety requirements of UL, CSA and IEC for medical equipment.

FEATURES

- Low safety ground leakage current
- Meet EN55011 and FCC Class B
- Small size, light weigh
- 100% burn-in
- Wide input range 85-264 VAC
- Input surge current protection
- Overvoltage protection
- Overcurrent protection
- Compliant with RoHS requirements

INPUT SPECIFICATIONS

Input voltage:	85-264 VAC
Input frequency:	47-63 Hz
Input current:	3.20 A (rms) for 115 VAC 1.80 A (rms) for 230 VAC
Earth leakage current:	220 μA max. @ 264 VAC, 63 Hz
Touch current:	100 μA max. @ 264 VAC, 63 Hz

OUTPUT SPECIFICATIONS

Output voltage/current:	See rating chart.
Maximum output power:	See rating chart.
Ripple and noise:	1% peak to peak maximum
Overvoltage protection:	Provided on output #1 only; set at 112-132% of its nominal output voltage
Overcurrent protection:	All outputs protected to short circuit conditions
Temperature coefficient:	All outputs ±0.04% /℃ maximum
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

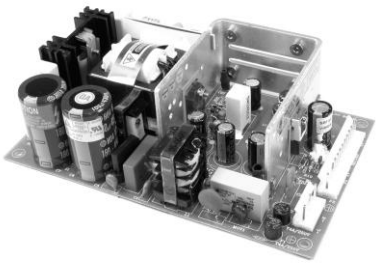
INTERFACE SIGNALS

PFD:	TTL logic high for normal operation and TTL logic low upon loss of input power. This signal appears at least 1 ms prior to V1 output dropping 5% below its nominal value. This signal also provides a minimum delay of 100 ms after V1 is within regulation

PM110 SERIES

CE

RoHS



SAFETY STANDARD APPROVALS

UL ES 60601-1, CSA C22.2 No. 60601-1
File No. E178020

TÜV EN 60601-1

ENVIRONMENTAL SPECIFICATIONS

Operating temperature:	-10℃ to +70℃
Storage temperature:	-40℃ to +85℃
Relative humidity:	5% to 95% non-condensing
Derating:	Derate from 100% at +50℃ linearly to 50% at +70℃
Cooling:	72-110 watts continuous output power at 25 CFM forced air cooling or 60-80 watts at convection cooling

GENERAL SPECIFICATIONS

Switching frequency:	20-250 KHz, varied with load and line
Efficiency:	70% minimum on single output model with Vo ≧12 V, 65% minimum on the others
Hold-up time:	12 ms minimum at 110 VAC
Line regulation:	±0.5% maximum at full load
Inrush current:	15 A @ 115 VAC or 30 A @ 230 VAC, at 25℃ cold start
Withstand voltage:	5600 VDC from input to output (2 MOPP) 2100 VDC from input to ground (1 MOPP) 700 VDC from output to ground (To verify AC strength, get correct test method to avoid power supply damage.)
MTBF:	400,000 hours at full load at 25℃ ambient, calculated per MIL-HDBK-217F
EMC Performance (EN60601-1-2)	
EN55011:	Class B conducted, class B radiated
FCC:	Class B conducted, class B radiated
VCCI:	Class B conducted, class B radiated
EN61000-3-2:	Harmonic distortion, class A
EN61000-3-3:	Line flicker
EN61000-4-2:	ESD, ±15 KV air and ±8 KV contact
EN61000-4-3:	Radiated immunity, 10 V/m
EN61000-4-4:	Fast transient/burst, ±2 KV
EN61000-4-5:	Surge, ±1 KV diff., ±2 KV com
EN61000-4-6:	Conducted immunity, 10 Vrms
EN61000-4-8:	Magnetic field immunity, 30 A/m
EN61000-4-11:	Voltage dip immunity, 30% reduction for 500 ms, 100% reduction for 10 ms

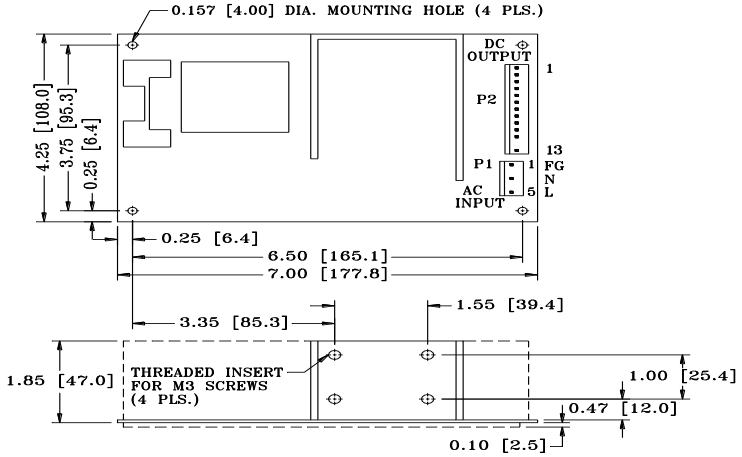
OUTPUT VOLTAGE/CURRENT RATING CHART

Model[1]	Output #1 [2]				Output #2					Output #3				Output #4				Max. Output Power[3]
	V1	Imin.	Imax.	Tol.	V2	Imin.	Imax.	Ipeak[4]	Tol.	V3	Imin.	Imax.	Tol.	V4	Imin.	Imax.	Tol.	
PM110-10-1A	3.3 V	0 A	22 A	±3%	(N/A)					(N/A)				(N/A)				60 W /72 W
PM110-10A	5.0 V	0 A	22 A	±3%	(N/A)					(N/A)				(N/A)				80 W /110 W
PM110-12A	12 V	0 A	9.0 A	±2%	(N/A)					(N/A)				(N/A)				80 W /110 W
PM110-13A	15 V	0 A	7.5 A	±2%	(N/A)					(N/A)				(N/A)				80 W /110 W
PM110-14A	24 V	0 A	4.5 A	±2%	(N/A)					(N/A)				(N/A)				80 W /110 W
PM110-16A	30 V	0 A	3.6 A	±3%	(N/A)					(N/A)				(N/A)				80 W /110 W
PM110-23A	+5.1 V	0 A	10 A	±3%	+12 V	0 A	5 A	9.0 A	±3%	(N/A)				(N/A)				80 W /110 W
PM110-31A	+5.1 V	0 A	10 A	±3%	+12 V	0 A	5 A	9.0 A	±3%	-12 V	0 A	1 A	±4%	(N/A)				80 W /110 W
PM110-32A	+5.1 V	0 A	10 A	±3%	+15 V	0 A	4 A	7.5 A	±3%	-15 V	0 A	1 A	±4%	(N/A)				80 W /110 W
PM110-40A	+5.1 V	0 A	10 A	±3%	+12 V	0 A	5 A	9.0 A	±3%	-12 V	0 A	1 A	±4%	-5 V	0 A	1 A	±4%	80 W /110 W
PM110-41A	+5.1 V	0 A	10 A	±3%	+15 V	0 A	4 A	7.5 A	±3%	-15 V	0 A	1 A	±4%	+24 V	0 A	1 A	±4%	80 W /110 W
PM110-42A	+5.1 V	0 A	10 A	±3%	+12 V	0 A	5 A	9.0 A	±3%	-12 V	0 A	1 A	±4%	+12 V	0 A	1 A	±4%	80 W /110 W
PM110-45A	+5.1 V	0 A	10 A	±3%	+12 V	0 A	5 A	9.0 A	±3%	-12 V	0 A	1 A	±4%	+24 V	0 A	1 A	±4%	80 W /110 W
PM110-45-1A	+5.1 V	2 A	10 A	±3%	+12 V	0 A	5 A	9.0 A	±3%	-12 V	0 A	1 A	±4%	+24 V	1.5 A	3 A	±10%	80 W /110 W
PM110-45-2A	+5.1 V	0 A	10 A	±3%	+24 V	0 A	3 A	5.0 A	±3%	-12 V	0 A	1 A	±4%	+12 V	0 A	1 A	±4%	80 W /110 W
PM110-46A	+5.1 V	0 A	10 A	±3%	+15 V	0 A	4 A	7.5 A	±3%	-15 V	0 A	1 A	±4%	-5 V	0 A	1 A	±4%	80 W /110 W

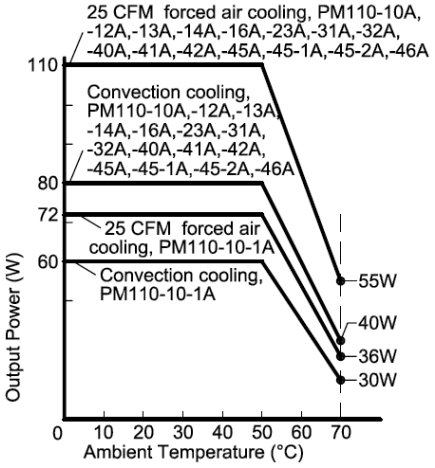
NOTES:

1. Safety agency approvals are for the above listed models in PCB format. To order a model with a metallic L-bracket or box, change suffix “A” to “B” for L-bracket format, to “C” for enclosed form with cover, e.g. PM110-14C. (mechanical details shown in Annex H)
2. The output #1 of model PM110-45-1A needs a minimum current of 2A to support the other outputs at their maximum rated load.
3. 110 watts maximum at 25 CFM forced air cooling or 80 watts maximum at convection cooling, except model PM110-10-1A which is rated at 60 watts maximum at convection cooling or 72 watts maximum at 25 CFM forced air cooling.
4. Peak output current with 10% maximum duty cycle for less than 60 seconds. Total peak power must not exceed 130 watts.
5. All models may be operated at no-load. At no-load, output voltage tolerance increases to ±10%.
6. Ripple and noise is maximum peak to peak voltage value measured at output within 20 MHz bandwidth, at rated line voltage and output load ranges, and with a 10 μF tantalum capacitor in parallel with a 0.1 μF ceramic capacitor across the output.

MECHANICAL SPECIFICATIONS



OUTPUT POWER DERATING CURVE



NOTES:

1. Dimensions shown in inches [mm]
2. Tolerance 0.02 [0.5] maximum
3. Connector P1: Molex header 09-65-2058 or equivalent, mating with Molex housing 09-50-1051 or equivalent.
4. Connector P2 mates with Molex 09-50-3131 or equivalent.
5. The copper pad of the mounting hole near P1 is for system grounding through a metallic stand-off to system chassis.
6. Weight：640 grams (1.408 lbs.)

PIN CHART

MODEL / PIN	1, 2, 3	4, 5	6, 7	8, 9	10	11	12	13
PM110-10-1A PM110-13A PM110-10A PM110-14A PM110-12A PM110-16A	+V1	V1 Return	V1 Return	+V1	PFD	N.C.	KEY	N.C.
PM110-23A	V1	Common Return	Common Return	V2	PFD	N.C.	KEY	N.C.
PM110-31A PM110-32A	V1	Common Return	Common Return	V2	PFD	V3	KEY	N.C.
PM110-40A PM110-45-1A PM110-41A PM110-45-2A PM110-42A PM110-46A PM110-45A	V1	Common Return	Common Return	V2	PFD	V3	KEY	V4

DESCRIPTION

The PM150 series of AC-DC switching power supplies in a package of 2 x 4 x 1.3 inches are capable of delivering 100-150 watts of continuous power at 7.5 CFM forced air cooling or 100 watts at convection cooling. The units are constructed on a printed circuit board. They are specially designed for medical applications. The units are certified also to IEC /EN /UL /CSA 60950-1 and suitable for data networking, industrial and telecommunication applications.

PM150 SERIES

CE

RoHS

FEATURES

- BF Class insulation
- Operation altitude up to 5000 meters
- 2 x 4 inch footprint with 1.3 inch low profile
- Less than 275 μA leakage current
- Wide input range 80-264 VAC
- Meet EN55011 /55022 and FCC Class B
- Power Factor 0.98 typical
- 100% burn-in at full load
- Short-circuit protection
- Over-temperature protection
- Power Fail Detect (PFD) signal (optional)
- Compliant with RoHS requirements
- No load power consumption less than 0.5W without PFD or 1W with PFD

INPUT SPECIFICATIONS

Input voltage:	80-264 VAC
Input frequency:	47-63 Hz
Input current:	1.7 A (rms) for 115 VAC 0.85 A (rms) for 230 VAC
Earth leakage current:	275 μA max. @ 264 VAC, 63 Hz
Touch current:	100 μA max. @ 264 VAC, 63 Hz

OUTPUT SPECIFICATIONS

Output voltage/current:	See rating chart.
Total output power:	See rating chart.
Ripple and noise:	See rating chart.
Remote sense	Compensation for cable losses up to 0.5 V
Overvoltage protection:	set at 112-140% of its nominal output voltage
Overcurrent protection:	Output protected to short circuit conditions
Temperature coefficient:	All outputs ±0.04% /℃ maximum
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
Fan power:	12 V at 0.5 A maximum (isolated)

ENVIRONMENTAL SPECIFICATIONS

Operating temperature:	0℃ to +70℃
Storage temperature:	-40℃ to +85℃
Relative humidity:	5% to 95% non-condensing
Derating:	Derate from 100% at +50℃ linearly to 50% at +70℃, applicable to convection and forced-air cooling conditions

SAFETY STANDARD APPROVAL

c UL us	UL ES 60601-1, CSA C22.2 No. 60601-1 File No. E178020
IEC 60601-1	TÜV EN 60601-1
TÜV Rheinland of North America, Inc. c US	UL 60950-1, CSA C22.2 No. 60950-1
TÜV Rheinland Product Safety BAUART GEPRÜFT TYPE APPROVED	TÜV EN 60950-1

GENERAL SPECIFICATIONS

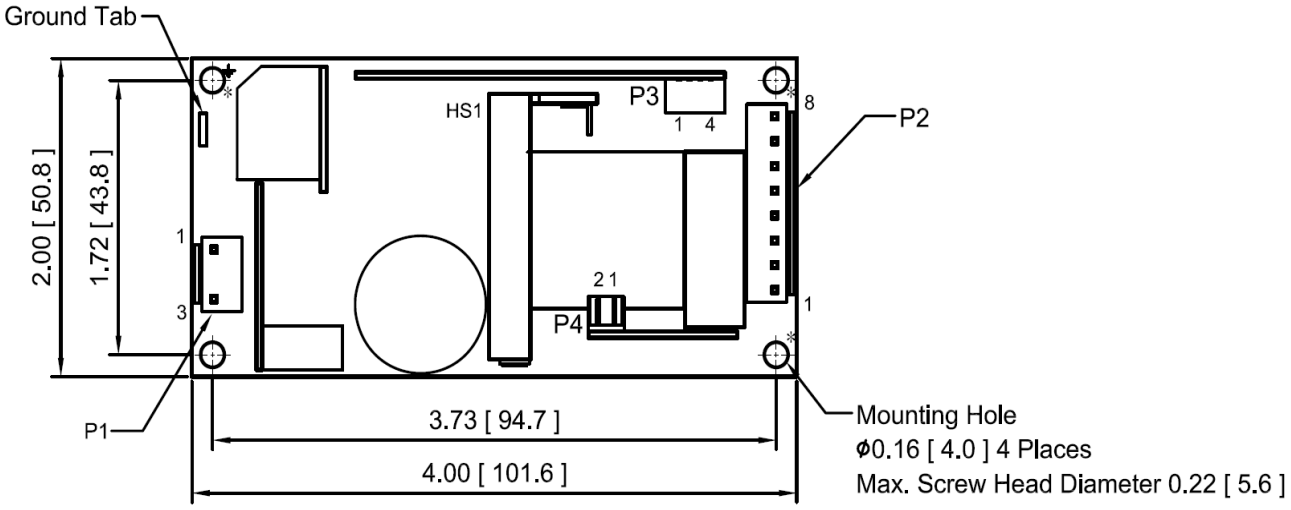
Switching frequency:	133 KHz (typical)
Efficiency:	See rating chart.
Hold-up time:	10 ms minimum at 120 VAC
Line regulation:	±0.5% maximum at full load
Inrush current:	80 A @ 115 VAC or 160 A @ 230 VAC, at 25℃ cold start
Withstand voltage:	4000 VAC from input to output (2 MOPP) 1500 VAC from input to ground (1 MOPP) 1500 VAC from output to ground
MTBF:	250,000 hours at full load at 25℃ ambient, calculated per MIL-HDBK-217F
EMC Performance	
EN55011/EN55022:	Class B conducted, class B radiated
FCC:	Class B conducted, class B radiated
VCCI:	Class B conducted, class B radiated
EN61000-3-2:	Harmonic distortion, class A and D
EN61000-3-3:	Line flicker
EN61000-4-2:	ESD, ±15 KV air and ±8 KV contact
EN61000-4-3:	Radiated immunity, 10 V/m
EN61000-4-4:	Fast transient/burst, ±2 KV
EN61000-4-5:	Surge, ±1 KV diff., ±2 KV com
EN61000-4-6:	Conducted immunity, 10 Vrms
EN61000-4-8:	Magnetic field immunity, 30 A/m
EN61000-4-11:	Voltage dip immunity, 30% reduction for 500 ms, 100% reduction for 10 ms

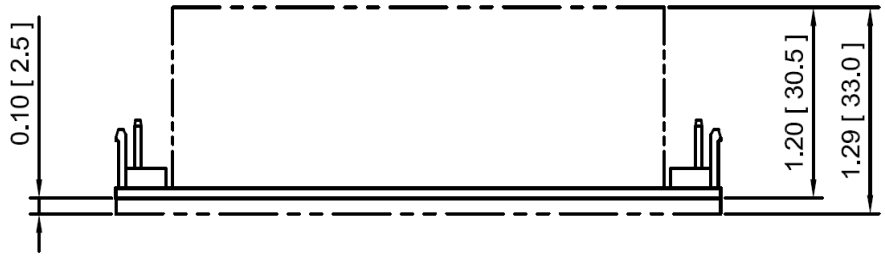
OUTPUT VOLTAGE/CURRENT RATING CHART

Model[1]	Output								Efficiency (typical) 115/230 Vac
	V1	Min. load	Max. Current at convection	Max. Current at 7.5 CFM	Peak[2] Current	Tol.	Ripple & Noise[4]	Max. Power[3]	
PM150-12A	12 V	0 A	8.35 A	12.50 A	14.0 A	±2%	120 mV	100 W /150 W	90 /92%
PM150-13A	15 V	0 A	6.70 A	10.00 A	11.0 A	±2%	150 mV	100 W /150 W	89 /91%
PM150-13-1A	18 V	0 A	5.56 A	8.34 A	9.2 A	±2%	180 mV	100 W /150 W	91 /92%
PM150-14A	24 V	0 A	4.20 A	6.25 A	7.0 A	±2%	240 mV	100 W /150 W	89 /92%
PM150-16A	30 V	0 A	3.34 A	5.00 A	5.6 A	±2%	300 mV	100 W /150 W	89 /92%
PM150-17A	36 V	0 A	2.78 A	4.17 A	4.6 A	±2%	360 mV	100 W /150 W	90 /92%
PM150-18A	48 V	0 A	2.10 A	3.13 A	3.5 A	±2%	480 mV	100 W /150 W	89 /92%

NOTES:
1. To order a model with PFD signal, please consult factory to get an exclusive part number distinguishing it from the standard model without PFD signal.
2. Peak output current with 10% duty cycle maximum for less than 15 seconds, average power not to exceed maximum power rating.
3. The first value of max. power is at convection cooling. The second value is with 7.5 CFM forced air provided by user.
4. Ripple and noise is maximum peak to peak voltage value measured at output within 20 MHz bandwidth, at rated line voltage and output load ranges, and with a 10 µF tantalum (or electrolytic) capacitor in parallel with a 0.1 µF ceramic capacitor across the output except model PM150-12A which is with a 47 µF tantalum (or electrolytic) capacitor in parallel with a 0.1 µF ceramic capacitor across the output.

MECHANICAL SPECIFICATIONS



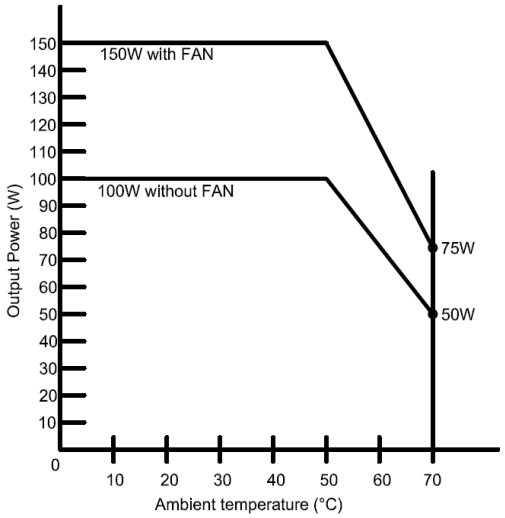


NOTES:
1. Dimensions shown in inches [mm]
2. Tolerance 0.02 [0.5] maximum
3. Input connector P1: JST header P/N B3P-VH, mating with JST housing P/N VHR-3N or equivalent.
4. Output connector P2: JST header P/N B8P-VH, mating with JST housing P/N VHR-8N or equivalent.
5. Connector P3: JST header B4B-PH-K-S (LF) (SN) , mating with JST housing PHR-4 or equivalent.
6. FAN connector P4: JST header B2B-PH-K-S (LF) (SN) , mating with JST housing PHR-2 or equivalent.
7. Ground tab is 0.25 [6.35] × 0.032 [0.8] fast-on connector.
8. To ensure compliance with level B emissions, connect the three "∗" marked mounting holes with metallic standoffs to chassis.
9. Weight: 200 grams (0.44 lbs.) approx.

INTERFACE SIGNALS

PFD: TTL logic high for normal operation and TTL logic low upon loss of input power. This signal appears at least 1ms prior to V1 output dropping 5% below its nominal value. This signal also provides a minimum delay of 100 ms after V1 is within regulation.

OUTPUT POWER DERATING CURVE



PIN CHART

Connector	P1			P2							
PIN NO.	1	2	3	1	2	3	4	5	6	7	8
Polarity	Neutral	Void	Live	Common Return				+V1			

Connector	P3				P4	
PIN NO.	1	2	3	4	1	2
Polarity	Common Return	PFD (Optional)	-Sense	+Sense	Fan Return (Isolated)	+12V Fan

DESCRIPTION

The PM201 series comprising single and multiple output models for 150 to 200 watts of continuous output power is specially designed for medical and ITE applications. They operate at 90 to 264 VAC input voltage without the need of a selector strap. All auxiliary outputs are with magnetic amplifier linear regulator to keep regulation. The units are constructed on a printed circuit board with a U-bracket for mechanical support and heat sinking. A cover and fan assembly can be added during manufacturing.

PM201 SERIES

CE

RoHS

FEATURES

- Low safety ground leakage current
- Meet EN55011, EN55022 and FCC Class B
- Power Factor 0.98 typical
- Short-circuit protection
- Power Fail Detect (PFD) signal
- 100% burn-in at full rated load
- Optional cover and fan assembly
- Remote inhibit - TTL high to disable output
- Compliant with RoHS requirements

INPUT SPECIFICATIONS

Input voltage:	90-264 VAC
Input frequency:	47-63 Hz
Input current:	3.20 A (rms) for 115 VAC 1.60 A (rms) for 230 VAC
Earth leakage current:	220 μA max. @ 264 VAC, 63 Hz
Touch current:	100 μA max. @ 264 VAC, 63 Hz

OUTPUT SPECIFICATIONS

Output voltage/current:	See rating chart.
Maximum output power:	See rating chart.
Ripple and noise:	2% peak to peak maximum on 3.3 V & 5.1 V and 1% peak to peak maximum on other voltage outputs
Overvoltage protection:	Provided on output #1 only; set at 112-132% of its nominal output voltage
Overcurrent protection:	All outputs protected to short circuit conditions
Temperature coefficient:	All outputs ±0.04% /℃ maximum
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
Fan power:	12 V at 200 mA maximum, except 24 V at 200 mA maximum for PM201-25B and PM201-27B, and 5 V at 380 mA maximum for PM201-40-3B

INTERFACE SIGNALS

PFD:	TTL logic high for normal operation and TTL logic low upon loss of input power. This signal appears at least 1ms prior to V1 output dropping 5% below its nominal value. This signal also provides a minimum delay of 100 ms after V1 is within regulation.
Inhibit:	Requires an external TTL high level signal to inhibit outputs for standard models

SAFETY STANDARD APPROVALS

c UL us	UL ES 60601-1, CSA C22.2 No. 60601-1 File No. E178020 UL 60950-1 File No. E137410
IEC 60601-1	TÜV EN60601-1
BAUART GEPRÜFT TYPE APPROVED	TÜV EN60950-1

ENVIRONMENTAL SPECIFICATIONS

Operating temperature:	0℃ to +70℃
Storage temperature:	-40℃ to +85℃
Relative humidity:	5% to 95% non-condensing
Derating:	Derate from 100% at +50℃ linearly to 50% at +70℃
Cooling:	10.8 CFM forced air provided on “C” version; 25 CFM forced air to be provided for “B” version by user.

GENERAL SPECIFICATIONS

Switching frequency:	88-112 KHz
Efficiency:	70% minimum on all models
Hold-up time:	20 ms minimum at 110 VAC
Line regulation:	±0.5% maximum at full load
Inrush current:	20 A @ 115 VAC or 40 A @ 230 VAC, at 25℃ cold start
Withstand voltage:	5600 VDC from input to output (2 MOPP) 2100 VDC from input to ground (1 MOPP) 700 VDC from output to ground (To verify AC strength, get correct test method to avoid power supply damage.)
MTBF:	350,000 hours at full load at 25℃ ambient, calculated per MIL-HDBK-217F
EMC Performance (EN60601-1-2)	
EN55011/EN55022:	Class B conducted, class B radiated
EN61000-3-2:	Harmonic distortion, class A and D
EN61000-3-3:	Line flicker
EN61000-4-2:	ESD, ±15 KV air and ±8 KV contact
EN61000-4-3:	Radiated immunity, 10 V/m
EN61000-4-4:	Fast transient/burst, ±2 KV
EN61000-4-5:	Surge, ±1 KV diff., ±2 KV com
EN61000-4-6:	Conducted immunity, 10 Vrms
EN61000-4-8:	Magnetic field immunity, 30 A/m
EN61000-4-11:	Voltage dip immunity, 30% reduction for 500 ms, 100% reduction for 10 ms

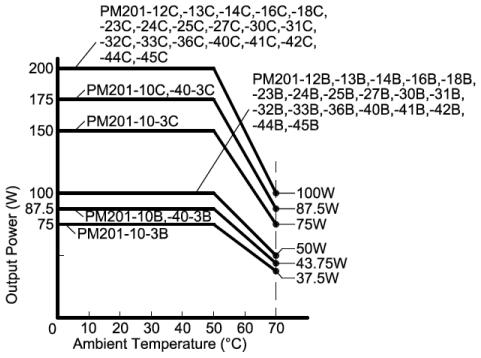
OUTPUT VOLTAGE/CURRENT RATING CHART

Model[1]	Output #1 [4]				Output #2 [2][4]				Output #3				Output #4 [3]				Max. Output Power[4]
	V1	Imin.	Imax.	Tol.	V2	Imin.	Imax.	Tol.	V3	Imin.	Imax.	Tol.	V4	Imin.	Imax.	Tol.	
PM201-10B	5.1 V	3.0 A	35.0 A	±2%	(N/A)				(N/A)				(N/A)				87.5 W /175 W
PM201-10-3B	3.3 V	3.0 A	46.0 A	±3%	(N/A)				(N/A)				(N/A)				75 W /150 W
PM201-12B	12 V	1.2 A	16.7 A	±2%	(N/A)				(N/A)				(N/A)				100 W /200 W
PM201-13B	15 V	1.0 A	13.4 A	±2%	(N/A)				(N/A)				(N/A)				100 W /200 W
PM201-14B	24 V	0.6 A	8.4 A	±2%	(N/A)				(N/A)				(N/A)				100 W /200 W
PM201-16B	30 V	0.5 A	6.7 A	±2%	(N/A)				(N/A)				(N/A)				100 W /200 W
PM201-18B	48 V	0.5 A	4.2 A	±2%	(N/A)				(N/A)				(N/A)				100 W /200 W
PM201-23B	+5.1 V	3.0 A	30.0 A	±2%	+12 V	0 A	8 A	±4%	(N/A)				(N/A)				100 W /200 W
PM201-24B	+5.1 V	3.0 A	30.0 A	±2%	+15 V	0 A	6 A	±4%	(N/A)				(N/A)				100 W /200 W
PM201-25B	+5.1 V	3.0 A	30.0 A	±2%	+24 V	0 A	4 A	±4%	(N/A)				(N/A)				100 W /200 W
PM201-27B	+12 V	1.0 A	8.7 A	±2%	+24 V	0 A	4 A	±4%	(N/A)				(N/A)				100 W /200 W
PM201-30B	+5.1 V	3.0 A	30.0 A	±2%	+12 V	0 A	8 A	±4%	-5 V	0 A	6 A	±4%	(N/A)				100 W /200 W
PM201-31B	+5.1 V	3.0 A	30.0 A	±2%	+12 V	0 A	8 A	±4%	-12 V	0 A	4 A	±4%	(N/A)				100 W /200 W
PM201-32B	+5.1 V	3.0 A	30.0 A	±2%	+15 V	0 A	6 A	±4%	-15 V	0 A	4 A	±4%	(N/A)				100 W /200 W
PM201-33B	+5.1 V	3.0 A	30.0 A	±2%	+15 V	0 A	6 A	±4%	-12 V	0 A	4 A	±4%	(N/A)				100 W /200 W
PM201-36B	+5.1 V	3.0 A	30.0 A	±2%	+12 V	0 A	8 A	±4%	24 V	0 A	4 A	±4%	(N/A)				100 W /200 W
PM201-40B	+5.1 V	3.0 A	30.0 A	±2%	+12 V	0 A	8 A	±4%	-12 V	0 A	4 A	±4%	5 V	0 A	6 A	±4%	100 W /200 W
PM201-41B	+5.1 V	3.0 A	30.0 A	±2%	+15 V	0 A	6 A	±4%	-15 V	0 A	4 A	±4%	24 V	0 A	4 A	±4%	100 W /200 W
PM201-42B	+5.1 V	3.0 A	30.0 A	±2%	+12 V	0 A	8 A	±4%	-12 V	0 A	4 A	±4%	12 V	0 A	4 A	±4%	100 W /200 W
PM201-44B	+5.1 V	3.0 A	30.0 A	±2%	+12 V	0 A	8 A	±4%	-15 V	0 A	4 A	±4%	15 V	0 A	4 A	±4%	100 W /200 W
PM201-45B	+5.1 V	3.0 A	30.0 A	±2%	+12 V	0 A	8 A	±4%	-12 V	0 A	4 A	±4%	24 V	0 A	4 A	±4%	100 W /200 W
PM201-40-3B	+3.3 V	3.0 A	30.0 A	±3%	+5.1 V	0 A	8 A	±4%	-12 V	0 A	4 A	±4%	12 V	0 A	4 A	±4%	87.5 W /175 W

NOTES:

1. Suffix “B” in model numbers denotes U-bracket form. Change “B” to “C” for enclosed form with cover and fan assembly, e.g. PM201-45C.
2. Peak output current is 12 A on +12 V, 9 A on +15 V and 6 A on +24 V.
3. Output #4 is floating. It can be connected externally for positive or negative output.
4. 200 watts for “C” version with a cover and fan assembly. 100 watts for “B” version without moving air (maximum current of output #1 & #2 derated to 50%), or 200 watts with 25 CFM forced air provided by user.
5. When the remote Sense facility is not used, +Sense must be connected to +V, and -Sense to return, on P2 connector.
6. All models may be operated at no-load. At no-load, output voltage tolerance increases to ±10%.
7. Ripple and noise is maximum peak to peak voltage value measured at output within 20 MHz bandwidth, at rated line voltage and output load ranges, and with a 10 µF tantalum capacitor in parallel with a 0.1 µF ceramic capacitor across the output.

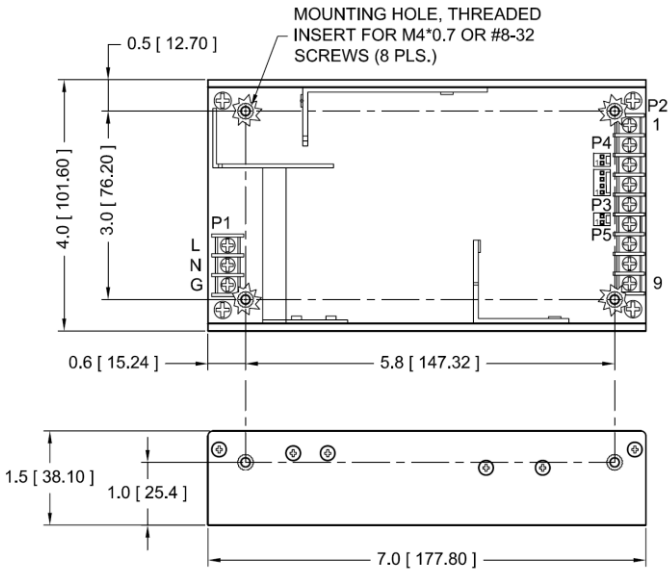
OUTPUT POWER DERATING CURVE



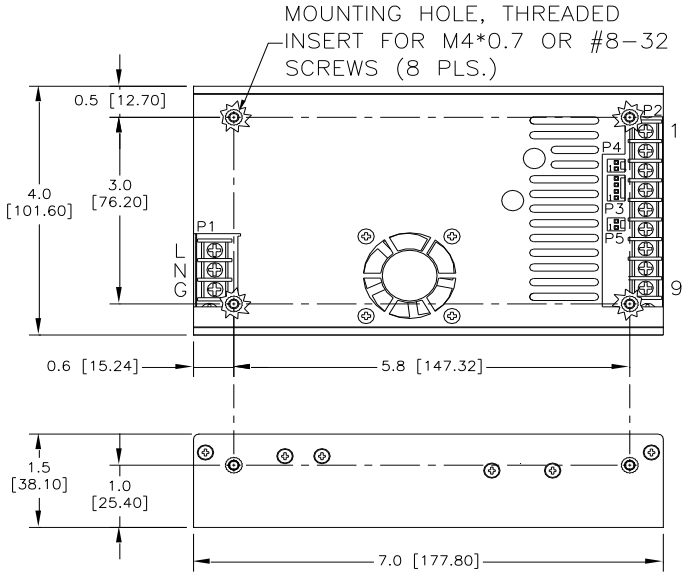
MECHANICAL SPECIFICATIONS

Single Output Models

U-bracket Form



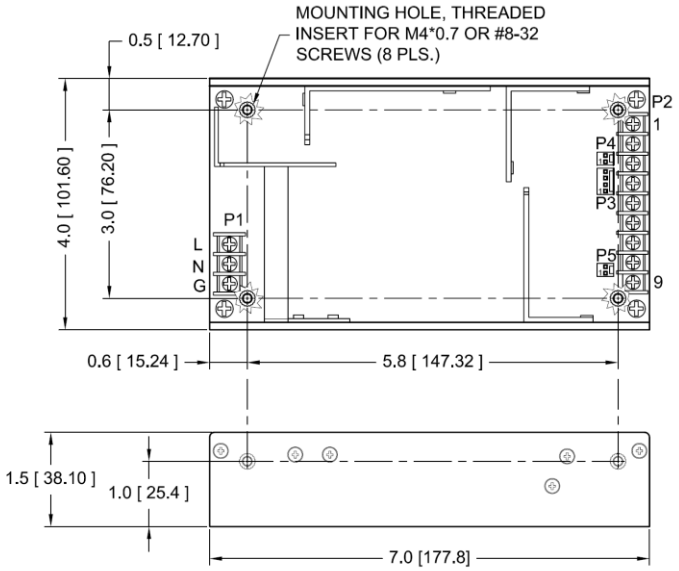
Enclosed Form



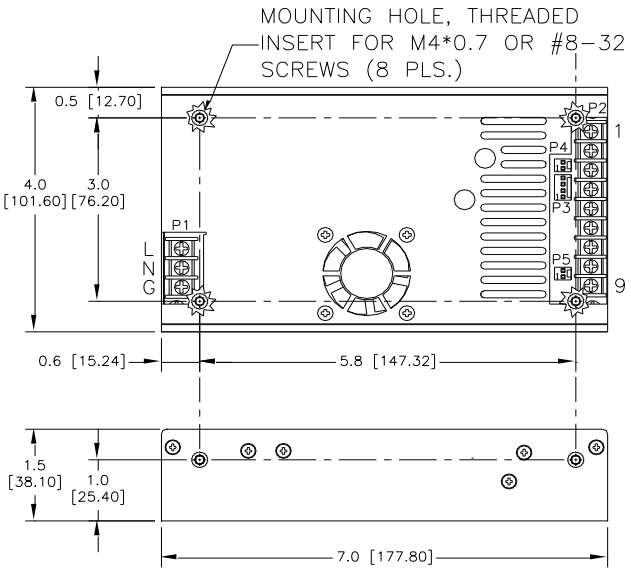
MECHANICAL SPECIFICATIONS

Multiple Output Models

U-bracket Form



Enclosed Form



NOTES:

1. Dimensions shown in inches [mm]
2. Tolerance 0.02 [0.5] maximum
3. Input connector P1 is Dinkle DT-35-B01W-03. Output connector P2 is Dinkle DT-35-B01W-09. Screws are M3, nickel plated.
4. Connector P3 mates with Molex housing 22-01-1043 and Molex 40445 series crimp terminal.
5. Connectors P4 and P5 mate with Molex housing 22-01-1023 and Molex 40445 series crimp terminal.
6. P4 is for DC fan, 12 V/0.2 A rated, Pin 1 +V and Pin 2 -V; except 24 V/0.2 A rated for models PM201-25 and PM201-27, and 5 V/0.38 A rated for models PM201-40-3).
7. Weight: 820 grams (1.8 lbs.) approx. for U-bracket form, 960 grams (2.1 lbs.) approx. for enclosed form.
8. Maximum penetration depth of fixing screws is 4 mm from the outer surface of chassis.

PIN CHART

CONN / PIN / MODEL	P2									P3				P5	
	1	2	3	4	5	6	7	8	9	1	2	3	4	1	2
PM201-10B PM201-14B PM201-10-3B PM201-16B PM201-12B PM201-18B PM201-13B	-Sense	Com. Ret.	Com. Ret.	Com. Ret.	Com. Ret.	+V1	+V1	+V1	+Sense	Fan +V	Com. Ret.	Com. Ret.	PFD	Inhibit +V	Inhibit -V
PM201-23B PM201-25B PM201-24B PM201-27B	V1	V1	Com. Ret.	Com. Ret.	Com. Ret.	V2	N.C.	N.C.	N.C.	Fan +V	Com. Ret.	Com. Ret.	PFD	Inhibit +V	Inhibit -V
PM201-30B PM201-32B PM201-31B PM201-33B	V1	V1	Com. Ret.	Com. Ret.	Com. Ret.	V2	V3	N.C.	N.C.	Fan +V	Com. Ret.	Com. Ret.	PFD	Inhibit +V	Inhibit -V
PM201-36B	V1	V1	Com. Ret.	Com. Ret.	Com. Ret.	V2	N.C.	V3 Return	+V3	Fan +V	Com. Ret.	Com. Ret.	PFD	Inhibit +V	Inhibit -V
PM201-40B PM201-44B PM201-41B PM201-45B PM201-42B PM201-40-3B	V1	V1	Com. Ret.	Com. Ret.	Com. Ret.	V2	V3	V4 Return	+V4	Fan +V	Com. Ret.	Com. Ret.	PFD	Inhibit +V	Inhibit -V

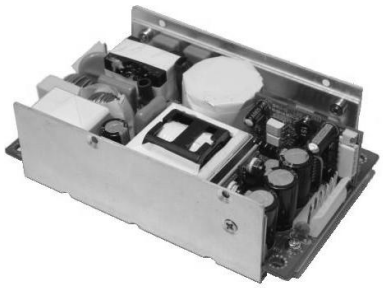
DESCRIPTION

The PM202 series of AC-DC switching power supplies in a package of 3 x 5 x 1.5 inches are capable of delivering 200 watts of continuous power at 5.3 CFM forced air cooling or 150 watts at convection cooling. The units are constructed on a printed circuit board with a U-bracket for mechanical support and heat sinking. A cover-and-fan assembly can be added during manufacturing for 200 watt output. They are specially designed for medical applications. The units are certified also to IEC /EN /UL /CSA 60950-1 and suitable for data networking, industrial and telecommunication applications.

PM202 SERIES

CE

RoHS



FEATURES

- BF Class insulation
- Operation altitude up to 5000 meters
- 3 x 5 inch footprint with 1.5 inch low profile
- Less than 220 μA leakage current
- Meet EN55011 /55022 and FCC Class B
- Power Factor 0.98 typical
- Short-circuit protection
- Power Fail Detect (PFD) signal
- Inhibit - TTL high to disable output
- Compliant with RoHS requirements
- High Efficiency 92% typical

INPUT SPECIFICATIONS

Input voltage:	90-264 VAC
Input frequency:	47-63 Hz
Input current:	2.5 A (rms) for 115 VAC 1.25 A (rms) for 230 VAC
Earth leakage current:	220 μA max. @ 264 VAC, 63 Hz
Touch current:	100 μA max. @ 264 VAC, 63 Hz

OUTPUT SPECIFICATIONS

Output voltage/current:	See rating chart.
Total output power:	See rating chart.
Ripple and noise:	1% peak to peak maximum
Remote sense	Compensation for cable losses up to 0.5 V
Overvoltage protection:	Set at 112-140% of its nominal output voltage
Overcurrent protection:	Output protected to short circuit conditions
Temperature coefficient:	All outputs ±0.04% /℃ maximum
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
Fan power:	12 V at 250 mA maximum

ENVIRONMENTAL SPECIFICATIONS

Operating temperature:	0℃ to +70℃
Storage temperature:	-40℃ to +85℃
Relative humidity:	5% to 95% non-condensing
Derating:	Derate from 100% at +50℃ linearly to 50% at +70℃, applicable to convection and forced-air cooling conditions

SAFETY STANDARD APPROVAL

c UL us	UL ES 60601-1, CSA C22.2 No. 60601-1 File No. E178020
IEC 60601-1	TÜV EN 60601-1
TÜV Rheinland of North America, Inc. US	UL 60950-1, CSA C22.2 No. 60950-1 (except PM202-16-1BN1 and PM202-16-1CN1)
TÜV Rheinland Product Safety; BAUART GEPRÜFT TYPE APPROVED	TÜV EN 60950-1 (except PM202-16-1BN1 and PM202-16-1CN1)

GENERAL SPECIFICATIONS

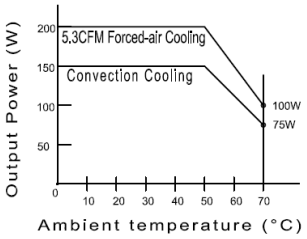
Switching frequency:	100 KHz (typical)
Efficiency:	87% minimum on all models
Hold-up time:	10 ms minimum at 110 VAC
Line regulation:	±0.5% maximum at full load
Inrush current:	20 A @ 115 VAC or 40 A @ 230 VAC, at 25℃ cold start
Withstand voltage:	4000 VAC from input to output (2MOPP) 1500 VAC from input to ground (1MOPP) 1500 VAC from output to ground
MTBF:	300,000 hours at full load at 25℃ ambient, calculated per MIL-HDBK-217F
EMC Performance	
EN55011/EN55022:	Class B conducted, class B radiated
FCC:	Class B conducted, class B radiated
VCCI:	Class B conducted, class B radiated
EN61000-3-2:	Harmonic distortion, class A and D
EN61000-3-3:	Line flicker
EN61000-4-2:	ESD, ±15 KV air and ±8 KV contact
EN61000-4-3:	Radiated immunity, 10 V/m
EN61000-4-4:	Fast transient/burst, ±2 KV
EN61000-4-5:	Surge, ±1 KV diff., ±2 KV com
EN61000-4-6:	Conducted immunity, 10 Vrms
EN61000-4-8:	Magnetic field immunity, 30 A/m
EN61000-4-11:	Voltage dip immunity, 30% reduction for 500 ms, 100% reduction for 10 ms

INTERFACE SIGNALS

PFD: TTL logic high for normal operation and TTL logic low upon loss of input power. This signal appears at least 1ms prior to V1 output dropping 5% below its nominal value. This signal also provides a minimum delay of 100 ms after V1 is within regulation.

Inhibit: Requires an external TTL high level signal to inhibit outputs for standard models

OUTPUT POWER DERATING CURVE



OUTPUT VOLTAGE/CURRENT RATING CHART

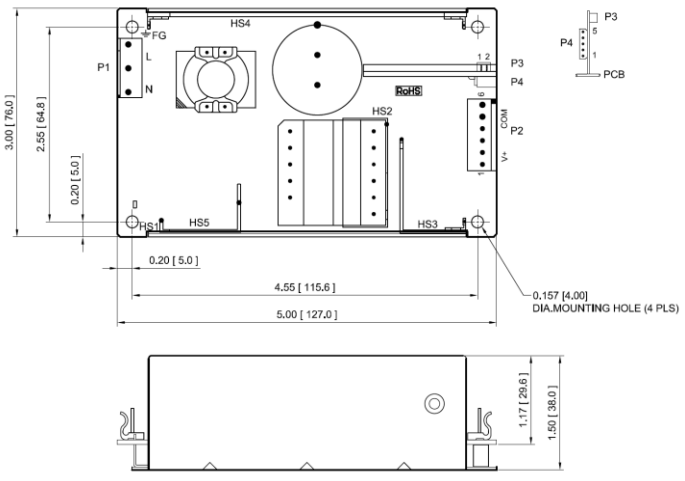
Model[1]	Output V1	Min. Current[4]	Max. Current at convection	Max. Current at 5.3 CFM [2]	Tol.	Ripple & Noise[3]	Max. Power[2]	Efficiency (typical) 115/230 Vac
PM202-12BN1	12 V	0.1 A	12.50 A	16.67 A	±2%	120 mV	150 W /200 W	88 /91%
PM202-13BN1	15 V	0.1 A	10.00 A	13.34 A	±2%	150 mV	150 W /200 W	88 /91%
PM202-13-1BN1	18 V	0.1 A	8.34 A	11.12 A	±2%	180 mV	150 W /200 W	88 /91%
PM202-14BN1	24 V	0.1 A	6.25 A	8.34 A	±2%	240 mV	150 W /200 W	88 /91%
PM202-15BN1	28 V	0.1 A	5.36 A	7.15 A	±2%	280 mV	150 W /200 W	88 /91%
PM202-16-1BN1	32 V	0.1 A	4.69 A	6.25 A	±2%	320 mV	150 W /200 W	88 /91%
PM202-17BN1	36 V	0.1 A	4.17 A	5.56 A	±2%	360 mV	150 W /200 W	88 /92%
PM202-18BN1	48 V	0.1 A	3.13 A	4.17 A	±2%	480 mV	150 W /200 W	89 /92%

NOTES:

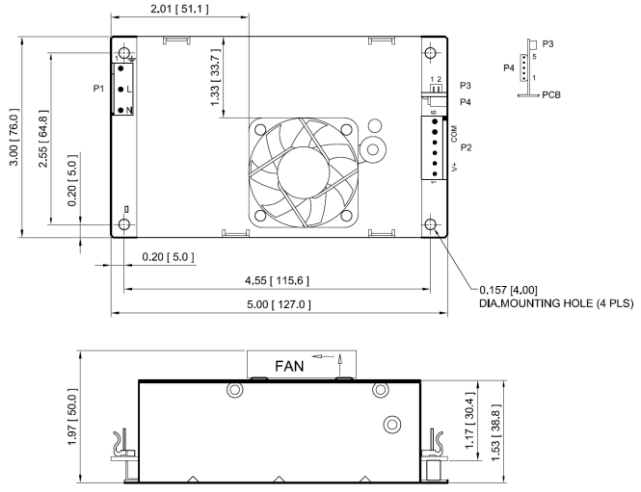
1. Suffix “BN1” in model numbers denotes U-bracket form. Change suffix “BN1” to “CN1” for enclosed form with cover and fan assembly, e.g. PM202-14CN1
2. 150 W without moving air or 200 W with 5.3 CFM forced air provided by user for “BN1” version, 200 W for “CN1” version with cover and fan assembly. The adequacy of cooling air is judged by the measured core temperature of transformer T1 below 75℃ at 25℃ ambient, or below 100℃ at 50℃ ambient.
3. Ripple and noise is maximum peak to peak voltage value measured at output within 20 MHz bandwidth, at rated line voltage and output load ranges, and with a 10 μF tantalum capacitor in parallel with a 0.1 μF ceramic capacitor across the output.
4. All models may be operated at no-load without damage. At no load, output voltage fluctuates beyond 5% due to the burst-mode operation of the control IC in them for energy saving.

MECHANICAL SPECIFICATIONS

U-bracket Form



Enclosed Form



NOTES:

1. Dimensions shown in inches [mm]
2. Tolerance 0.02 [0.5] maximum
3. Input connector P1: Molex header 09-65-2058 or equivalent, mating with Molex housing 09-50-1051 or equivalent.
4. Output connector P2: Molex header 09-65-2068 or equivalent, mating with Molex housing 09-50-1061 or equivalent.
5. Fan connector P3: JST header S2B-ZR-3.4 or equivalent, mating with JST housing ZHR-2 or equivalent.
6. Connectors P4: Molex header 22-05-7055 or equivalent, mating with Molex housing 50-37-5053 or equivalent.
7. Weight: 390 grams (0.86 lbs.) approx. for U-bracket form, 440 grams (0.97 lbs.) for enclosed form
8. Fixing of units to end equipment is through standoffs and the four mounting holes in PCB.
9. Ground tab is 0.25 [6.35] × 0.032 [0.8] fast-on connector.

PIN CHART

Connector	P1					P2					
PIN NO.	1	2	3	4	5	1	2	3	4	5	6
Polarity	Ground	Void	Live	Void	Neutral	+V1			Common Return		

Connector	P3		P4				
PIN NO.	1	2	1	2	3	4	5
Polarity	+12V Fan	Common Return	-Sense	+Sense	PFD	Inhibit	Common Return

DESCRIPTION

The PM300 series comprising single and multiple output models for 200-300 watts of continuous output power is specially designed for medical and ITE applications. They operate at 90-264 VAC input voltage without the need of a selector strap. All auxiliary outputs are with magnetic amplifier to keep regulation. The units are constructed on a printed circuit board with a U-bracket for mechanical support and heat sinking. A cover-and-fan assembly can be added during manufacturing.

FEATURES

- EN61000-3-2 class A and D compliant
- Power Factor 0.98 typical
- Overvoltage protection
- Short-circuit protection
- Power Fail Detect (PFD) signal
- 100% burn-in at full rated load
- Remote sense on output #1 and output #2
- Remote inhibit – TTL high to disable output
- Compliant with RoHS requirements

INPUT SPECIFICATIONS

Input voltage:	90-264 VAC
Input frequency:	47-63 Hz
Input current:	4.7 A (rms) for 115 VAC 2.3 A (rms) for 230 VAC
Earth leakage current:	300 μA max. @ 264 VAC, 63 Hz
Touch current:	100 μA max. @ 264 VAC, 63 Hz

OUTPUT SPECIFICATIONS

Output voltage/current:	See rating chart.
Maximum output power:	See rating chart.
Ripple and noise:	2% peak to peak maximum on 3.3 V & 5.1 V and 1% peak to peak maximum on other voltage outputs
Overvoltage protection:	Provided on output #1 only; set at 115-140% of its nominal output voltage
Overcurrent protection:	All outputs protected to short circuit conditions
Temperature coefficient:	All outputs ±0.04% /℃ maximum
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
Fan power:	12 V at 350 mA maximum for B version, 12 V at 100 mA maximum for C version

INTERFACE SIGNALS

PFD: TTL logic high for normal operation and TTL logic low upon loss of input power. This signal appears at least 1 ms prior to V1 output dropping 5% below its nominal value. This signal also provides a minimum delay of 100 ms after V1 output is within regulation.

Inhibit: Requires an external TTL high level signal to inhibit outputs for standard models

PM300 SERIES

CE

RoHS

SAFETY STANDARD APPROVALS

UL ES 60601-1, CSA C22.2 No. 60601-1
File No. E178020

TÜV EN 60601-1

UL 60950-1, CSA C22.2 No. 60950-1
File No. E137410

TÜV EN 60950-1

ENVIRONMENTAL SPECIFICATIONS

Operating temperature:	0℃ to +70℃
Storage temperature:	-40℃ to +85℃
Relative humidity:	5% to 95% non-condensing
Derating:	Derate from 100% at +50℃, linearly to 50% at +70℃
Cooling:	200 /250 /300 watts continuous output power at 35 CFM forced air cooling or 100 /125 /150 watts at convention cooling

GENERAL SPECIFICATIONS

Switching frequency:	70 KHz ±10 KHz
Power factor:	0.98 typical
Efficiency:	70% minimum on all models
Hold-up time:	12 ms minimum at 110 VAC
Line regulation:	±0.2% maximum at full load
Inrush current:	30 A @ 115 VAC or 60 A @ 230 VAC, at 25℃ cold start
Withstand voltage:	5600 VDC from input to output (2 MOPP) 2100 VDC from input to ground (1 MOPP) 700 VDC from output to ground (To verify AC strength, get correct test method to avoid power supply damage.)
MTBF:	300,000 hours minimum at full load at 25℃ ambient, calculated per MIL-HDBK-217F

EMC Performance (EN60601-1-2)

EN55011:	Class B conducted, Class B radiate
EN61000-3-2:	Harmonic distortion, Class A and D
EN61000-3-3:	Line flicker
EN61000-4-2:	ESD, ±15 KV air and ±8 KV contact
EN61000-4-3:	Radiated immunity, 10 V/m
EN61000-4-4:	Fast transient/burst, ±2 KV
EN61000-4-5:	Surge, ±1 KV diff., ±2 KV com
EN61000-4-6:	Conducted immunity, 10 Vrms
EN61000-4-8:	Magnetic field immunity, 30 A/m
EN61000-4-11:	Voltage dip immunity, 30% reduction for 500 ms, 100% reduction for 10 ms

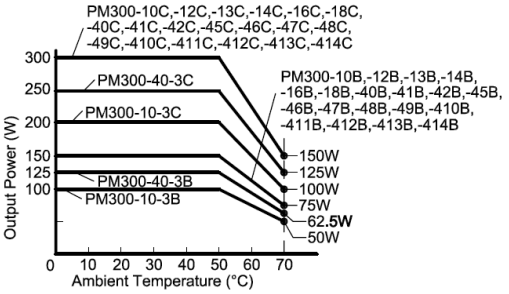
OUTPUT VOLTAGE/CURRENT RATING CHART

Model[1][2][6]	Output #1 [3][5]				Output #2 [3][5]				Output #3 [4]				Output #4 [4]				Max. Output Power[5]
	V1	Imin.	Imax.	Tol.	V2	Imin.	Imax.	Tol.	V3	Imin.	Imax.	Tol.	V4	Imin.	Imax.	Tol.	
PM300-10-3B	3.3 V	3.0 A	60.0 A	±3%	(N/A)				(N/A)				(N/A)				100 W /200 W
PM300-10B	5.1 V	3.0 A	60.0 A	±2%	(N/A)				(N/A)				(N/A)				150 W /300 W
PM300-12B	12 V	1.2 A	25.0 A	±2%	(N/A)				(N/A)				(N/A)				150 W /300 W
PM300-13B	15 V	1.0 A	20.0 A	±2%	(N/A)				(N/A)				(N/A)				150 W /300 W
PM300-14B	24 V	0.6 A	12.5 A	±2%	(N/A)				(N/A)				(N/A)				150 W /300 W
PM300-16B	30 V	0.5 A	10.0 A	±2%	(N/A)				(N/A)				(N/A)				150 W /300 W
PM300-18B	48 V	0.5 A	6.3 A	±2%	(N/A)				(N/A)				(N/A)				150 W /300 W
PM300-40-3B	3.3 V	3.0 A	35.0 A	±3%	5.1 V	2.0 A	22 A	±2%	12 V	0 A	4 A	±4%	12 V	0 A	4 A	±4%	125 W /250 W
PM300-40B	5.1 V	2.0 A	35.0 A	±2%	12 V	1.0 A	10 A	±2%	12 V	0 A	4 A	±4%	5.1 V	0 A	4 A	±4%	150 W /300 W
PM300-41B	5.1 V	2.0 A	35.0 A	±2%	15 V	0.8 A	8 A	±2%	15 V	0 A	4 A	±4%	24 V	0 A	2.5 A	±4%	150 W /300 W
PM300-42B	5.1 V	2.0 A	35.0 A	±2%	12 V	1.0 A	10 A	±2%	12 V	0 A	4 A	±4%	12 V	0 A	4 A	±4%	150 W /300 W
PM300-45B	5.1 V	2.0 A	35.0 A	±2%	12 V	1.0 A	10 A	±2%	12 V	0 A	4 A	±4%	24 V	0 A	2.5 A	±4%	150 W /300 W
PM300-46B	5.1 V	2.0 A	35.0 A	±2%	12 V	1.0 A	10 A	±2%	12 V	0 A	4 A	±4%	15 V	0 A	4 A	±4%	150 W /300 W
PM300-47B	5.1 V	2.0 A	35.0 A	±2%	24 V	0.5 A	5 A	±2%	12 V	0 A	4 A	±4%	12 V	0 A	4 A	±4%	150 W /300 W
PM300-48B	5.1 V	2.0 A	35.0 A	±2%	24 V	0.5 A	5 A	±2%	5.1 V	0 A	4 A	±4%	15 V	0 A	4 A	±4%	150 W /300 W
PM300-49B	5.1 V	2.0 A	35.0 A	±2%	12 V	1.0 A	10 A	±2%	5.1 V	0 A	4 A	±4%	24 V	0 A	2.5 A	±4%	150 W /300 W
PM300-410B	24 V	0.5 A	6.3 A	±2%	12 V	1.0 A	10 A	±2%	5.1 V	0 A	4 A	±4%	12 V	0 A	4 A	±4%	150 W /300 W
PM300-411B	24 V	0.5 A	6.3 A	±2%	12 V	1.0 A	10 A	±2%	5.1 V	0 A	4 A	±4%	24 V	0 A	2.5 A	±4%	150 W /300 W
PM300-412B	24 V	0.5 A	6.3 A	±2%	12 V	1.0 A	10 A	±2%	12 V	0 A	4 A	±4%	12 V	0 A	4 A	±4%	150 W /300 W
PM300-413B	24 V	0.5 A	6.3 A	±2%	24 V	0.5 A	5 A	±2%	5.1 V	0 A	4 A	±4%	15 V	0 A	4 A	±4%	150 W /300 W
PM300-414B	24 V	0.5 A	6.3 A	±2%	24 V	0.5 A	5 A	±2%	12 V	0 A	4 A	±4%	12 V	0 A	4 A	±4%	150 W /300 W

NOTES:

1. Suffix “B” in model numbers denotes U-bracket form. Change “B” to “C” for enclosed form with cover and fan assembly, e.g. PM300-45C.
2. All outputs are floating. They can be connected externally for positive or negative output.
3. Output #1 & #2 can be adjusted within ±5% of their nominal voltage.
4. Output #3 & #4 can be adjusted within ±15% of their nominal voltage.
5. 300 watts for "C" version with cover and fan assembly, 150 watts for "B" version without moving air (maximum current of output #1 & #2 derated to 50%), or 300 watts with 35 CFM forced air provided by user.
6. PM300-10-3B is rated 200 watts with 35 CFM forced air cooling or 100 watts convection cooled. PM300-40-3B is rated 250 watts with 35 CFM forced air cooling (maximum current of output #1 & #2 derated to 50%) or 125 watts convection cooled.
7. Single output models may be operated at no-load. At no-load, output voltage tolerance increases to ±10%.
8. Ripple and noise is maximum peak to peak voltage value measured at output within 20 MHz bandwidth, at rated line voltage and output load ranges, and with a 10 µF tantalum capacitor in parallel with a 0.1 µF ceramic capacitor across the output.

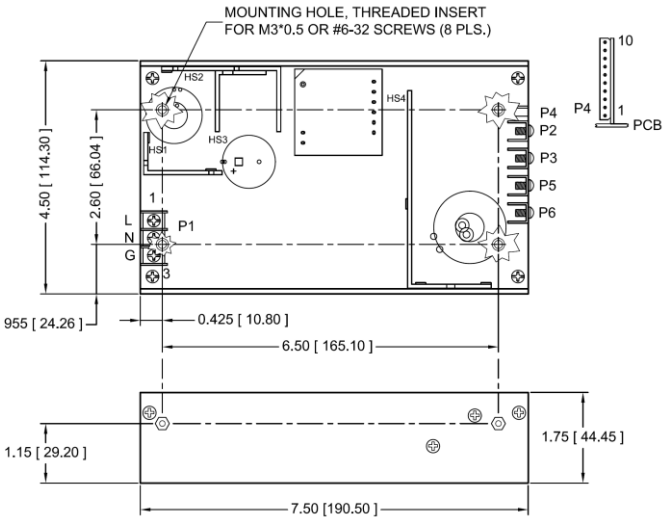
OUTPUT POWER DERATING CURVE



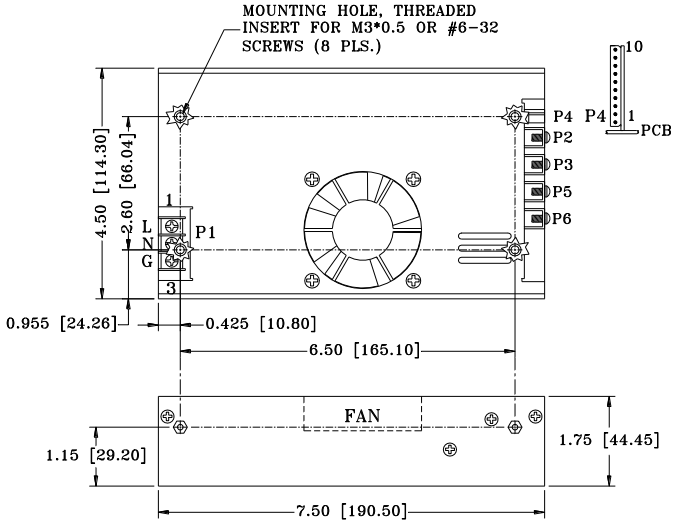
MECHANICAL SPECIFICATIONS

Single Output Models

U-bracket Form

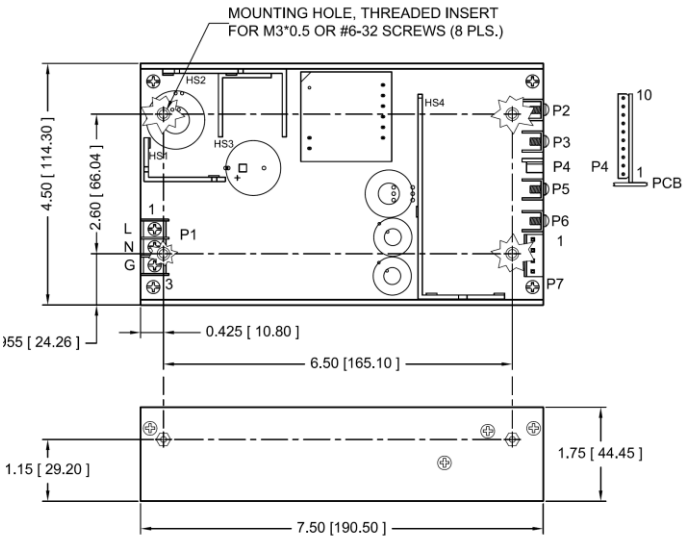


Enclosed Form

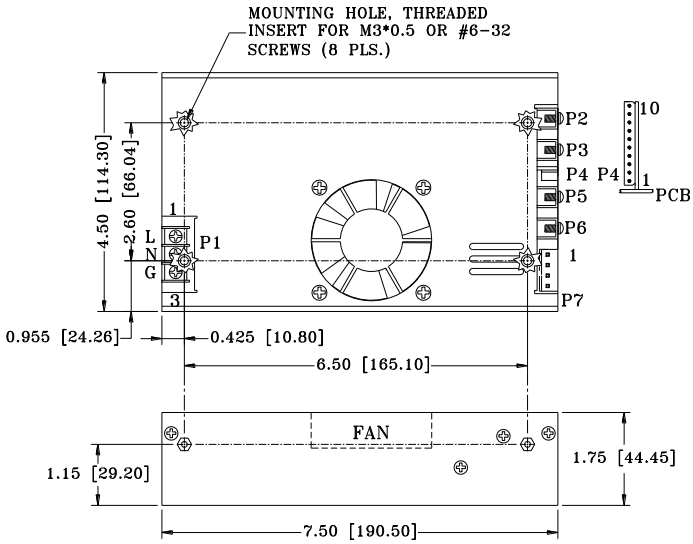


Multiple Output Models

U-bracket Form



Enclosed Form



NOTES:

1. Dimensions shown in inches [mm]
2. Tolerance 0.02 [0.5] maximum
3. Input connector P1 is Dinkle DT-35-B01W-03 with M3, nickel-plated screws.
4. Connector P4 mates with Molex housing 50-37-5103 and pins 5263.
5. Connectors P2, P3, P5 and P6: M3*0.5 screw connections
6. Output connector P7 mates with Molex housing 09-50-3041 and Molex 2878 series crimp terminal.
7. Weight: 1.10 Kgs. (2.42 lbs.) approx. for U-bracket form, 1.24 Kgs. (2.73 lbs.) approx. for Enclosed form.
8. Maximum penetration depth of fixing screws is 4 mm from the outer surface of chassis.

PIN CHART

CONN / MODEL / PIN	P1 (AC)			P2	P3	P5	P6	P7			
	1	2	3					1	2	3	4
PM300-10-3B PM300-14B PM300-10B PM300-16B PM300-12B PM300-18B PM300-13B	Live	Neutral	Ground	+V1		V1 Return		N.A.			
PM300-40-3B PM300-48B PM300-40B PM300-49B PM300-41B PM300-410B PM300-42B PM300-411B PM300-45B PM300-412B PM300-46B PM300-413B PM300-47B PM300-414B	Live	Neutral	Ground	+V1	V1 Return	+V2	V2 Return	+V3	V3 Return	+V4	V4 Return

CONN / MODEL / PIN	P4									
	1	2	3	4	5	6	7	8	9	10
PM300-10-3B PM300-14B PM300-10B PM300-16B PM300-12B PM300-18B PM300-13B	Signal Common Return	+V1 Sense	-V1 Sense	PFD	Inhibit +V	N.C.	N.C.	N.C.	Fan Return	+12V Fan
PM300-40-3B PM300-48B PM300-40B PM300-49B PM300-41B PM300-410B PM300-42B PM300-411B PM300-45B PM300-412B PM300-46B PM300-413B PM300-47B PM300-414B	Signal Common Return	+V1 Sense	-V1 Sense	PFD	Inhibit +V	N.C.	+V2 Sense	-V2 Sense	Fan Return	+12V Fan

DESCRIPTION

The PM301 series of AC-DC switching power supplies in a package of 3 x 6 x 1.5 inches are capable of delivering 300 watts of continuous power at 10 CFM forced air cooling or 200 watts at convection cooling. A L-bracket or cover-and-fan assembly can be added during manufacturing. They are specially certified for IEC /EN /UL /CSA 60601-1 for medical applications. The units are design also to IEC /EN /UL /CSA 60950-1 and suitable for data networking, industrial and telecommunication applications.

FEATURES

- BF Class insulation
- Operation altitude up to 5000 meters
- 3 x 6 inch footprint with 1.5 inch low profile
- Less than 220 μA leakage current
- Meet EN55011 /55022 and FCC Class B
- Power Factor 0.98 typical
- 100% burn-in at full load
- Short-circuit protection (Latch)
- Power Fail Detect (PFD) signal
- Inhibit - TTL high to disable output
- Compliant with RoHS requirements
- High Efficiency 92% typical
- Power consumption in standby mode less than 1 W at standby power 5 V /100 mA

INPUT SPECIFICATIONS

Input voltage:	90-264 VAC
Input frequency:	47-63 Hz
Input current:	4.0 A (rms) for 115 VAC 2.0 A (rms) for 230 VAC
Earth leakage current:	220 μA max. @ 264 VAC, 63 Hz
Touch current:	100 μA max. @ 264 VAC, 63 Hz

OUTPUT SPECIFICATIONS

Output voltage/current:	See rating chart.
Total output power:	See rating chart.
Ripple and noise:	1% peak to peak maximum
Remote sense	Compensation for cable losses up to 0.5 V
Overvoltage protection:	Set at 112-140% of its nominal output voltage
Overcurrent protection:	Output protected to short circuit conditions
Temperature coefficient:	All outputs ±0.04% /℃ maximum
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
Fan power:	12 V at 1.0 A maximum (isolated)
Standby power:	5 V at 2.0 A maximum or 12 V at 1.0 A maximum

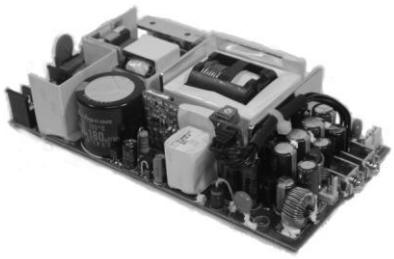
ENVIRONMENTAL SPECIFICATIONS

Operating temperature:	0℃ to +70℃
Storage temperature:	-40℃ to +85℃
Relative humidity:	5% to 95% non-condensing
Derating:	Derate from 100% at +50℃ linearly to 50% at +70℃, applicable to convection and forced-air cooling conditions

PM301 SERIES

CE

RoHS



SAFETY STANDARD APPROVAL

UL ES 60601-1, CSA C22.2 No. 60601-1
File No. E178020

TÜV EN 60601-1

UL 60950-1, CSA C22.2 No. 60950-1

TÜV EN 60950-1

GENERAL SPECIFICATIONS

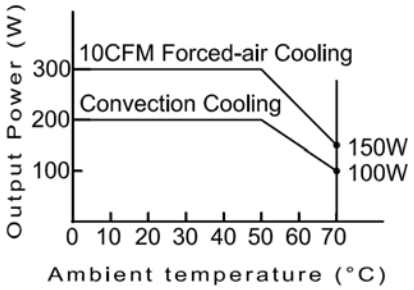
Switching frequency:	100 KHz (typical)
Efficiency:	87% minimum on all models
Turn on delay time	3 s maximum at 100 VAC
Hold-up time:	10 ms minimum at 110 VAC
Line regulation:	±0.5% maximum at full load
Inrush current:	20 A @ 115 VAC or 40 A @ 230 VAC, at 25℃ cold start
Withstand voltage:	4000 VAC from input to output (2MOPP) 1500 VAC from input to ground (1 MOPP) 1500 VAC from output to ground
MTBF:	250,000 hours at full load at 25℃ ambient, calculated per MIL-HDBK-217F
EMC Performance	
EN55011/EN55022:	Class B conducted, class B radiated
FCC:	Class B conducted, class B radiated
VCCI:	Class B conducted, class B radiated
EN61000-3-2:	Harmonic distortion, class A and D
EN61000-3-3:	Line flicker
EN61000-4-2:	ESD, ±15 KV air and ±8 KV contact
EN61000-4-3:	Radiated immunity, 10 V/m
EN61000-4-4:	Fast transient/burst, ±2 KV
EN61000-4-5:	Surge, ±1 KV diff., ±2 KV com
EN61000-4-6:	Conducted immunity, 10 Vrms
EN61000-4-8:	Magnetic field immunity, 30 A/m
EN61000-4-11:	Voltage dip immunity, 30% reduction for 500 ms, 100% reduction for 10 ms

INTERFACE SIGNALS

PFD: TTL logic high for normal operation and TTL logic low upon loss of input power. This signal appears at least 1ms prior to V1 output dropping 5% below its nominal value. This signal also provides a minimum delay of 100 ms after V1 is within regulation.

Inhibit: Requires an external TTL high level signal to inhibit outputs for standard models

OUTPUT POWER DERATING CURVE



OUTPUT VOLTAGE/CURRENT RATING CHART

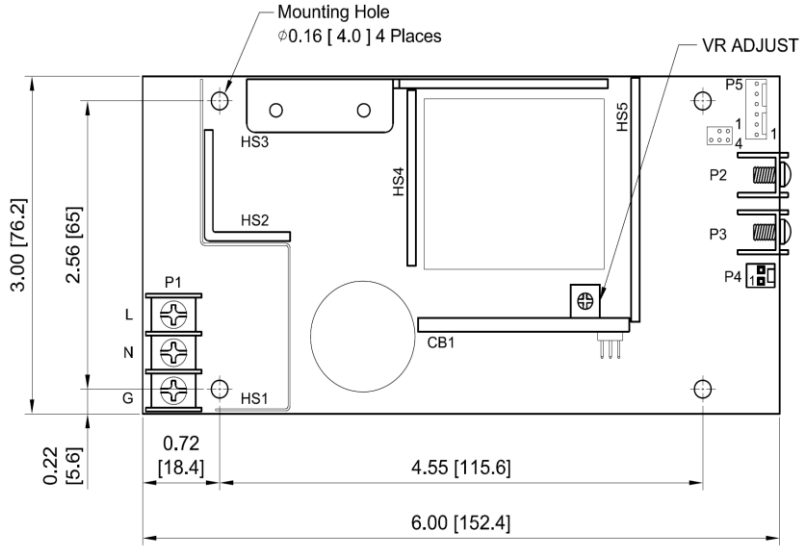
Model[1] [3]	Output								Efficiency (typical) 115/230 Vac
	V1	Min. Current	Max. Current at Convection[2]	Max. Current at 10 CFM [2]	Peak Current[5]	Tol.	Ripple & Noise[4]	Max. Power	
PM301-12A	12 V	0 A	16.67 A	25.00 A	30.0 A	±2%	120 mV	200 /300 W	89 /91%
PM301-13A	15 V	0 A	13.34 A	20.00 A	24.0 A	±2%	150 mV	200 /300 W	89 /92%
PM301-13-2A	19 V	0 A	10.53 A	15.80 A	18.9 A	±2%	190 mV	200 /300 W	89 /91%
PM301-14A	24 V	0 A	8.34 A	12.50 A	14.5 A	±2%	240 mV	200 /300 W	89 /92%
PM301-16A	30 V	0 A	6.67 A	10.00 A	11.0 A	±2%	300 mV	200 /300 W	89 /92%
PM301-17A	36 V	0 A	5.56 A	8.34 A	9.6 A	±2%	360 mV	200 /300 W	89 /92%
PM301-18A	48 V	0 A	4.17 A	6.25 A	7.5 A	±2%	480 mV	200 /300 W	90 /92%

NOTES:

1. Suffix “A” in model numbers denotes PCB constructed form. Change suffix “A” to “B” for L-bracket form, e.g. PM301-14B. Change “A” to “C” for enclosed form with cover and fan assembly, e.g. PM301-14C.
2. 200 W without moving air or 300 W with 10 CFM forced air provided by user for “A” and “B” versions, 300 W for “C” version with cover and fan assembly.
3. Standby power output 5 V at 2 A. Add suffix “-12” for standby power output 12 V at 1.0 A, e.g. PM301-12A-12
4. Ripple and noise is maximum peak to peak voltage value measured at output within 20 MHz bandwidth, at rated line voltage and output load ranges, and with a 10 µF tantalum capacitor in parallel with a 0.1 µF ceramic capacitor across the output.
5. Peak output current with 10% duty cycle maximum for less than 15 seconds, average power not to exceed maximum power rating.

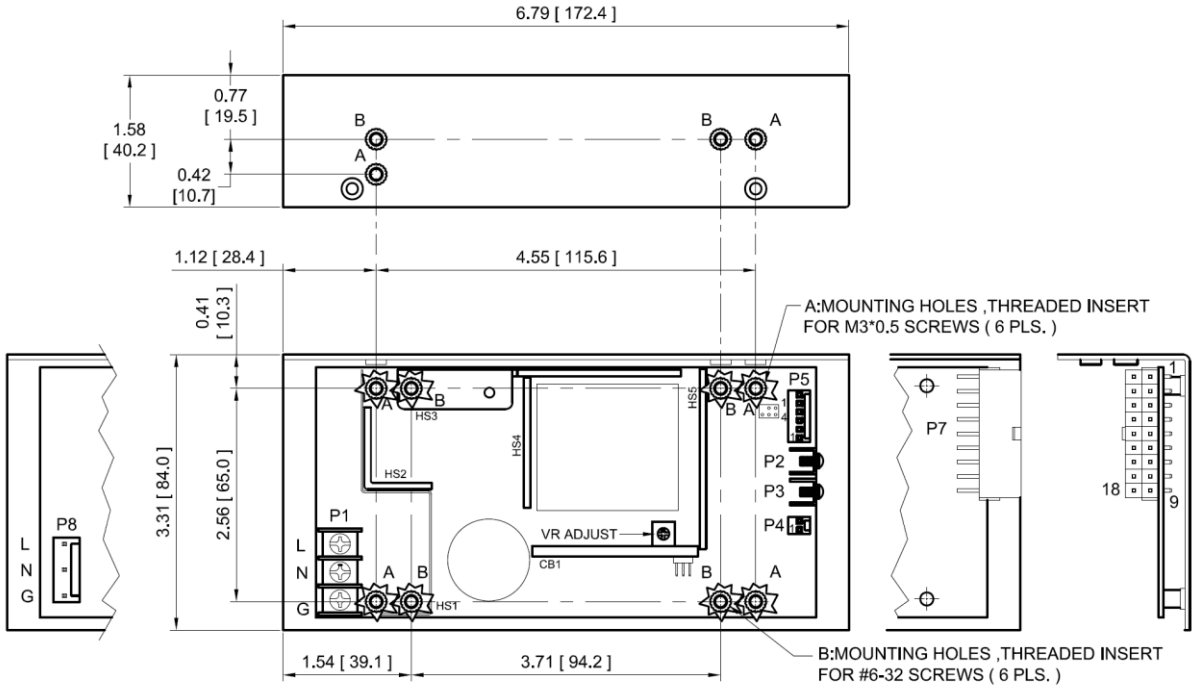
MECHANICAL SPECIFICATIONS

PCB constructed Form

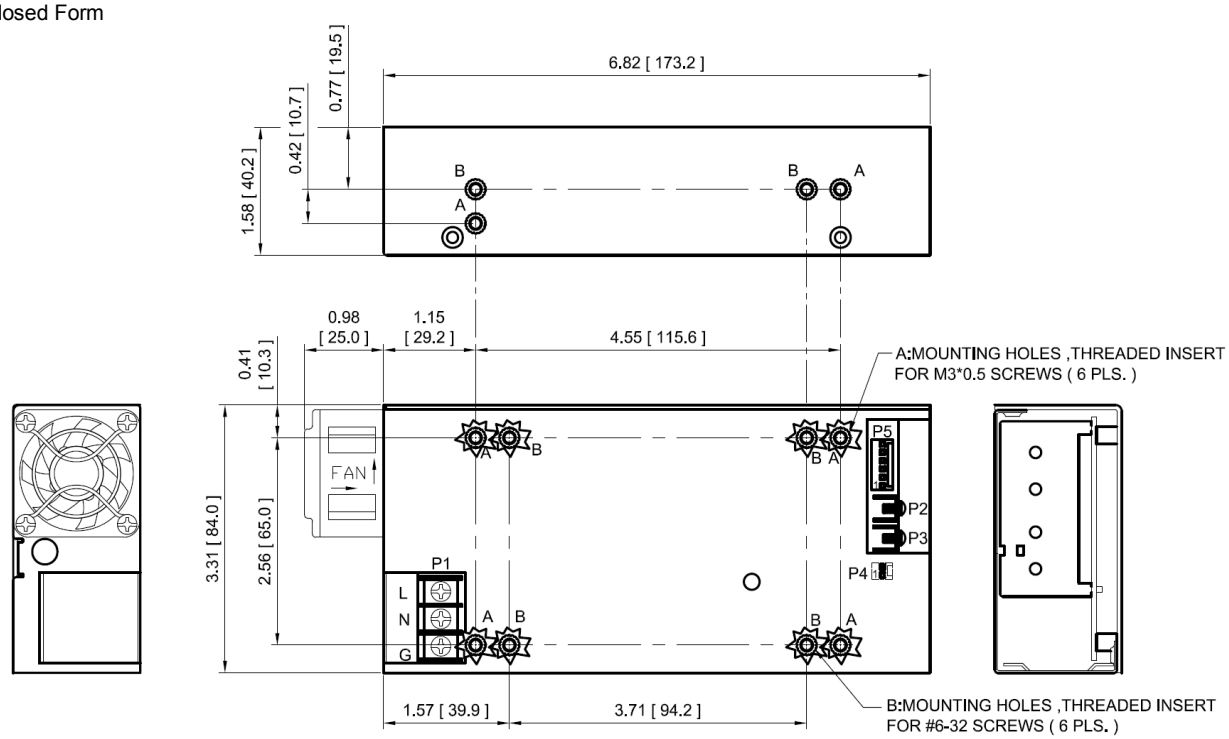


MECHANICAL SPECIFICATIONS

L-bracket Form



Enclosed Form



NOTES:

1. Dimensions shown in inches [mm]
2. Tolerance 0.02 [0.5] maximum
3. Input connector P1 is Dinkle DT-35-B01W-03 with M3, nickel-plated screws.
4. Output connector P2 and P3: M3 x 0.5 screw connections
5. Fan connector P4: Molex header 22-04-1021 or equivalent, mating with Molex housing 22-01-1022 or equivalent.
6. Connectors P5: Molex header 22-04-1061 or equivalent, mating with Molex housing 22-01-1062 or equivalent.
7. Optional output connector P7: Molex header 39-30-1180 or equivalent, mating with Molex housing 39-01-2185 or equivalent.
8. Optional input connector P8: Molex header 26-60-4050 or equivalent, mating with Molex housing 09-50-8050 or equivalent.
9. Weight: 510 grams (1.12 lbs.) approx. for PCB form, 612 grams (1.35 lbs.) approx. for L-bracket form, 744 grams (1.64 lbs.) approx. for enclosed form.
10. Maximum penetration depth of fixing screws is 4 mm from the outer surface of chassis.

PIN CHART

Connector	P1, P8			P2	P3	P4	
PIN NO.	1	2	3			1	2
Polarity	Live	Neutral	Ground	+V1	Common Return	+12V Fan (isolated)	Fan Return (isolated)

Connector	P5					
PIN NO.	1	2	3	4	5	6
Polarity	-Sense	+Sense	PFD	Inhibit	+5V/+12V Standby	Common Return

Connector	P7								
PIN NO.	1	2	3	4	5	6	7	8	9
Polarity	+5V/+12V Standby	Inhibit	+V1	+V1	+V1	+V1	+V1	+V1	Fan Return
PIN NO.	10	11	12	13	14	15	16	17	18
Polarity	Standby Return	PFD	Common Return	Common Return	Common Return	Common Return	Common Return	Common Return	+12V Fan

DESCRIPTION

The PM400 series of AC-DC switching power supplies in a package of 4 x 7 x 1.58 inches are capable of delivering 400 watts of continuous power at 7 CFM forced air cooling or 300 watts at convection cooling. The units are constructed on a printed circuit board with a U-bracket for mechanical support and heat sinking. A cover and fan assembly can be added during manufacturing for 400 watt output without the change of any dimension. They are designed for medical applications. The units are certified also to IEC/EN/UL 60950-1 and suitable for data networking, industrial and telecommunication applications.

FEATURES

- BF Class insulation
- Operation altitude up to 5000 meters
- 100-240 VAC input with active PFC
- Less than 300 µA leakage current
- Standby output 5VDC at 100mA
- EN55011 / 55022 Class B conducted emissions
- Inhibit - TTL low to disable output
- Standard PS Off and DC OK signals
- High Efficiency 92% typical
- Compliant with RoHS requirements

INPUT SPECIFICATIONS

Input voltage:	90-264 VAC
Input frequency:	47-63 Hz
Input current:	4.2 A (rms) @115 VAC, 60 Hz 2.1 A (rms) @ 230 VAC, 50 Hz
Earth leakage current:	300 µA max. @ 264 VAC, 63 Hz
Touch current:	100 µA max. @ 264 VAC, 63 Hz

OUTPUT SPECIFICATIONS

Output voltage/current:	See rating chart.
Maximum output power:	See rating chart.
Ripple and noise:	1% peak to peak maximum
Remote sense	Compensation for cable losses up to 0.5 V
Overvoltage protection:	Set at 115-140% of nominal output voltage
Overcurrent protection:	Protected to output short circuit conditions
Thermal shutdown	Protected to overtemperature conditions
Temperature coefficient:	All outputs ±0.04% /℃ maximum
Transient response:	Maximum excursion of 4%, recovering to 1% of final value within 500 us after a 25% step load change
Standby power	5 V at 100 mA maximum
Fan power	12 V at 250 mA maximum

ENVIRONMENTAL SPECIFICATIONS

Operating temperature:	-10℃ to +70℃
Storage temperature:	-40℃ to +85℃
Relative humidity:	5% to 95% non-condensing
Derating:	Derate from 100% at +50℃ linearly to 50% at +70℃, applicable to convection and forced-air cooling conditions

PM400 SERIES

CE

RoHS

SAFETY STANDARD APPROVALS

c UL us	UL ES 60601-1, CSA C22.2 No. 60601-1 File No. E178020
IEC 60601-1	TÜV EN 60601-1
TÜV Rheinland of North America, Inc. US	UL 60950-1, CSA C22.2 No. 60950-1
TÜV Rheinland Product Safety — BAUART GEPRÜFT TYPE APPROVED	TÜV EN 60950-1

GENERAL SPECIFICATIONS

Switching frequency:	85 KHz (typical)
Efficiency:	Typical 89% @ 115 VAC, 92% @ 230 VAC
Hold-up time:	12 ms minimum at 110 VAC & 400 W
Line regulation:	±0.5% maximum at full load
Inrush current:	20 A @ 115 VAC, or 40 A @ 230 VAC, at 25℃ cold start
Withstand voltage:	4000 VAC from input to output (2 MOPP) 1500 VAC from input to ground (1 MOPP) 1500 VAC from output to ground
MTBF:	350,000 hours at full load at 25℃ ambient, calculated per MIL-HDBK-217F

EMC Performance

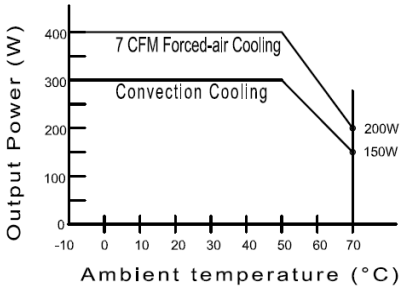
EN55011/EN55022:	Class B conducted, class A radiated
FCC:	Class B conducted, class A radiated
VCCI:	Class B conducted, class A radiated
EN61000-3-2:	Harmonic distortion, class A and D
EN61000-3-3:	Line flicker
EN61000-4-2:	ESD, ±15 KV air and ±8 KV contact
EN61000-4-3:	Radiated immunity, 10 V/m
EN61000-4-4:	Fast transient/burst, ±2 KV
EN61000-4-5:	Surge, ±1 KV diff., ±2 KV com
EN61000-4-6:	Conducted immunity, 10 Vrms
EN61000-4-8:	Magnetic field immunity, 30 A/m
EN61000-4-11:	Voltage dip immunity, 30% reduction for 500 ms, 100% reduction for 10 ms

INTERFACE SIGNALS

PFD: TTL logic high for normal operation and TTL logic low upon loss of input power. This signal appears at least 1 ms prior to master output dropping 5% below its nominal value. This signal also provides a minimum delay of 100 ms after master output is within regulation.

Inhibit: TTL low to turn off output
DC OK: TTL high when output voltage >95%
PS OFF: TTL high to turn off output

OUTPUT POWER DERATING CURVE



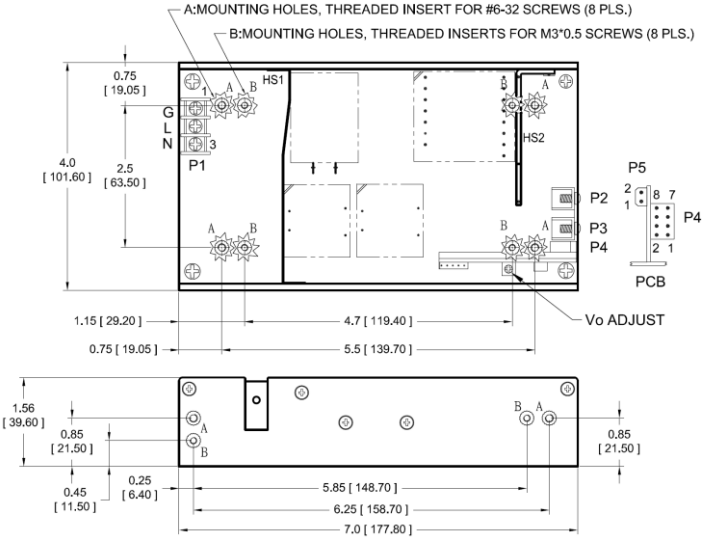
OUTPUT VOLTAGE/CURRENT RATING CHART

Model[1]	Output V1	Min. Current[4]	Max. Current at convection	Max. Current at 7 CFM[2]	Tol.	Ripple & Noise[3]	Max. Output Power	Efficiency (typical) 115/230 Vac
PM400-12B	12 V	0.1 A	25.00 A	33.34 A	±2%	120 mV	300 W /400 W	90 /92%
PM400-13B	15 V	0.1 A	20.00 A	26.67 A	±2%	150 mV	300 W /400 W	90 /92%
PM400-13-1B	18 V	0.1 A	16.67 A	22.23 A	±2%	180 mV	300 W /400 W	91 /92%
PM400-14B	24 V	0.1 A	12.50 A	16.67 A	±2%	240 mV	300 W /400 W	89 /91%
PM400-15B	28 V	0.1 A	10.72 A	14.29 A	±2%	280 mV	300 W /400 W	89 /91%
PM400-17B	36 V	0.1 A	8.34 A	11.12 A	±2%	360 mV	300 W /400 W	90 /92%
PM400-18B	48 V	0.1 A	6.25 A	8.34 A	±2%	480 mV	300 W /400 W	90 /93%

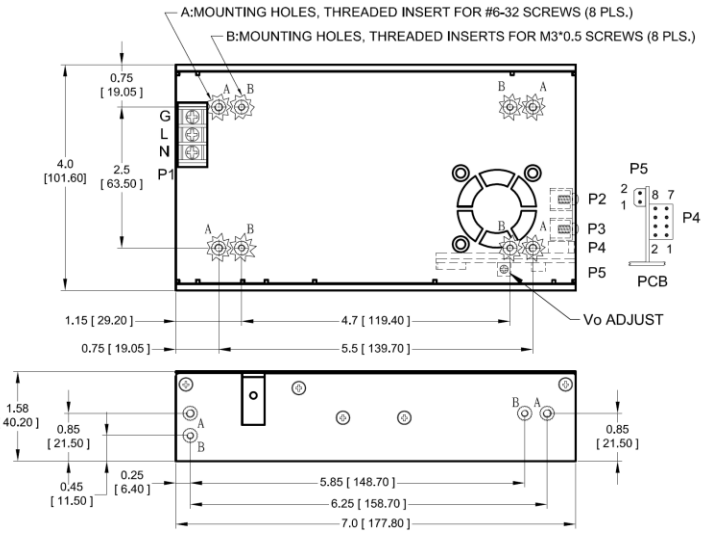
NOTES:
1. Change suffix “B” for U-Bracket form to “C” for enclosed form with cover and fan assembly, e.g. PM400-14C.
2. 300 W without moving air or 400 W with 7 CFM forced air provided by user for “B” version, 400 W for “C” version with cover and fan assembly
3. Ripple and noise is maximum peak to peak voltage value measured at output within 20 MHz bandwidth, at rated line voltage and output load ranges, and with a 10 µF tantalum capacitor in parallel with a 0.1 µF ceramic capacitor across the output.
4. All models may be operated at no-load without damage. At no load, output voltage fluctuates beyond 5% due to the burst-mode operation of the control IC in them for energy saving.

MECHANICAL SPECIFICATIONS

U-bracket Form



Enclosed Form



NOTES:
1. Dimensions shown in inches [mm]
2. Tolerance 0.02 [0.5] maximum
3. Input connector P1 is Dinkle terminal P/N DT-35-B01W-03, with nickel plated M3 screws.
4. P2, P3: M4 x 0.7 screw connectors
5. Connector P4: Molex header 87833-08 or equivalent, mating with Molex housing 51110-0850 or equivalent.
6. Fan connector P5: JST header S2B-ZR-3.4 or equivalent, mating with JST housing ZHR-2 or equivalent.
7. Weight: 1.0 Kg (2.23 lbs.) approx. for U-bracket form, 1.14 Kgs. (2.52 lbs.) approx. for enclosed form
8. Maximum penetration depth of fixing screws is 4 mm from the outer surface of chassis.

PIN CHART

Connector	P1 (AC)			P2	P3	P5	
PIN NO.	1	2	3			1	2
Polarity	Ground	Live	Neutral	+V1	Common Return	+12V Fan	Common Return

Connector	P4							
PIN NO.	1	2	3	4	5	6	7	8
Polarity	Common Return	Inhibit	+V1 Sense	+5V Standby	-V1 Sense	DC OK	PFD	PS OFF

DESCRIPTION

The PM450 series comprising single and multiple output models for 450-480 watts of continuous output power is specially designed for medical and ITE applications. They operate at 90-264 VAC input voltage without the need of a selector strap. The units are constructed on a printed circuit board with a U-bracket for mechanical support and heat sinking. A cover-and-fan assembly can be added during manufacturing.

FEATURES

- EN61000-3-2 class A and D compliant
- Power Factor 0.98 typical
- Overvoltage protection
- Short-circuit protection
- Thermal protection
- Power Fail Detect (PFD) Signal
- 100% burn-in at full rated load
- Remote sense on output #1 and output #2
- Remote inhibit – TTL high to disable output
- Compliant with RoHS requirements

INPUT SPECIFICATIONS

Input voltage:	90-264 VAC
Input frequency:	47-63 Hz
Input current:	7.1 A（rms）for 115 VAC 3.5 A（rms）for 230 VAC
Earth leakage current:	240 μA max.@ 264 VAC, 63 Hz
Touch current:	100 μA max. @ 264 VAC, 63 Hz

OUTPUT SPECIFICATIONS

Output voltage/current:	See rating chart.
Maximum output power:	See rating chart.
Ripple and noise:	2% peak to peak maximum on 3.3 V & 5.1 V and 1% peak to peak maximum on other voltage outputs
Overvoltage protection:	Provided on output #1 only; set at 115-140% of its nominal output voltage
Overcurrent protection:	All outputs protected to short circuit conditions
Temperature coefficient:	All outputs ±0.04% /℃ maximum
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
Fan power:	12 V at 400 mA for B version, 12 V at 100 mA for C version

INTERFACE SIGNALS

PFD:	TTL logic high for normal operation and TTL logic low upon loss of input power. This signal appears at least 1ms prior to V1 output dropping 5% below its nominal value. This signal also provides a minimum delay of 100 ms after V1 output is within regulation.
Inhibit：	Requires an external TTL high level signal to inhibit outputs for standard models.

PM450 SERIES

CE

RoHS

SAFETY STANDARD APPROVALS

UL ES 60601-1, CSA C22.2 No. 60601-1
File No. E178020

TÜV EN 60601-1

UL 60950-1, CSA C22.2 No. 60950-1

TÜV EN 60950-1

ENVIRONMENTAL SPECIFICATIONS

Operating temperature:	0℃ to +70℃
Storage temperature:	-40℃ to +85℃
Relative humidity:	5% to 95% non-condensing
Derating:	Derate from 100% at +50℃ linearly to 50% at +70℃

GENERAL SPECIFICATIONS

Switching frequency:	60 KHz ±10 KHz
Power factor:	0.98 typical
Efficiency:	80% minimum on all models
Hold-up time:	12 ms minimum at 110 VAC
Line regulation:	±0.2% maximum at full load
Inrush current:	40 A @ 115 VAC or 80 A @ 230 VAC, at 25℃ cold start
Withstand voltage:	5600 VDC from input to output (2 MOPP) 2100 VDC from input to ground (1 MOPP) 700 VDC from output to ground (To verify AC strength, get correct test method to avoid power supply damage.)
MTBF:	300,000 hours at full load at 25℃ ambient, calculated per MIL-HDBK-217F

EMC Performance (IEC60601-1-2)

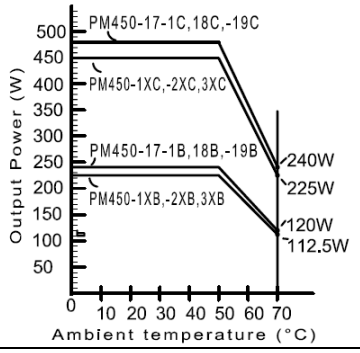
EN55011 / EN55022	Class B conducted, Class A radiated
FCC:	Class B conducted, Class A radiated
VCCI:	Class B conducted, Class A radiated
EN61000-3-2:	Harmonic distortion, Class A and D
EN61000-3-3:	Line flicker
EN61000-4-2:	ESD, ±15 KV air and ±8 KV contact
EN61000-4-3:	Radiated immunity, 10 V/m
EN61000-4-4:	Fast transient/burst, ±2 KV
EN61000-4-5:	Surge, ±1 KV diff., ±2 KV com
EN61000-4-6:	Conducted immunity, 10 Vrms
EN61000-4-8:	Magnetic field immunity, 30 A/m
EN61000-4-11:	Voltage dip immunity, 30% reduction for 500 ms, 100% reduction for 10 ms

OUTPUT VOLTAGE/CURRENT RATING CHART

Model[1]	Output #1[3][5]				Output #2[5]				Output #3[4]				Max. Output Power[5]
	V1	Imin.	Imax.	Tol.	V2	Imin.	Imax.	Tol.	V3	Imin.	Imax.	Tol.	
PM450-12B	12 V	0 A	37.5 A	±2%	(N/A)				(N/A)				225 /450 W
PM450-13B	15 V	0 A	30.0 A	±2%	(N/A)				(N/A)				225 /450 W
PM450-14B	24 V	0 A	18.75 A	±2%	(N/A)				(N/A)				225 /450 W
PM450-15B	27 V	0 A	16.7 A	±2%	(N/A)				(N/A)				225 /450 W
PM450-16B	30 V	0 A	15.0 A	±2%	(N/A)				(N/A)				225 /450 W
PM450-17-1B	40 V	0 A	12.0 A	±2%	(N/A)				(N/A)				240 /480 W
PM450-18B	48 V	0 A	10.0 A	±2%	(N/A)				(N/A)				240 /480 W
PM450-19B	55 V	0 A	8.73 A	±2%	(N/A)				(N/A)				240 /480 W
PM450-20B	24 V	1.0 A	12.0 A	±2%	12 V	1.00 A	17 A	±5%	(N/A)				225 /450 W
PM450-21B	24 V	1.0 A	12.0 A	±2%	15 V	0.75 A	15 A	±5%	(N/A)				225 /450 W
PM450-22B	48 V	0.5 A	6.0 A	±2%	24 V	0.50 A	10 A	±5%	(N/A)				225 /450 W
PM450-23B	48 V	0.5 A	6.0 A	±2%	12 V	1.00 A	17 A	±5%	(N/A)				225 /450 W
PM450-24B	48 V	0.5 A	6.0 A	±2%	15 V	0.75 A	15 A	±5%	(N/A)				225 /450 W
PM450-30B	24 V	1.0 A	12.0 A	±2%	12 V	1.00 A	17 A	±5%	3.3 V	0 A	8 A	±3%	225 /450 W
PM450-31B	24 V	1.0 A	12.0 A	±2%	15 V	0.75 A	15 A	±5%	3.3 V	0 A	8 A	±3%	225 /450 W
PM450-32B	24 V	1.0 A	12.0 A	±2%	12 V	1.00 A	17 A	±5%	5.1 V	0 A	8 A	±3%	225 /450 W
PM450-33B	24 V	1.0 A	12.0 A	±2%	15 V	0.75 A	15 A	±5%	5.1 V	0 A	8 A	±3%	225 /450 W
PM450-34B	48 V	0.5 A	6.0 A	±2%	12 V	1.00 A	17 A	±5%	3.3 V	0 A	8 A	±3%	225 /450 W
PM450-35B	48 V	0.5 A	6.0 A	±2%	15 V	0.75 A	15 A	±5%	3.3 V	0 A	8 A	±3%	225 /450 W
PM450-36B	48 V	0.5 A	6.0 A	±2%	12 V	1.00 A	17 A	±5%	5.1 V	0 A	8 A	±3%	225 /450 W
PM450-37B	48 V	0.5 A	6.0 A	±2%	15 V	0.75 A	15 A	±5%	5.1 V	0 A	8 A	±3%	225 /450 W

NOTES:
1. Suffix “B” in model numbers denotes U-bracket form. Change “B” to “C” for enclosed form with cover and fan assembly, e.g. PM450-14C.
2. All outputs are floating. They can be connected externally for positive or negative output.
3. Output #1 can be adjusted within ±5% of its nominal voltage.
4. Output #3 can be adjusted within ±15% of its nominal voltage.
5. 450-480 watts for “C” version with cover and fan assembly. 225-240 watts for “B” version without moving air (maximum current of output #1 & 2 derated to 50%), or 450 watts with 40 CFM forced air provided by user.
6. All models may be operated at no-load. At no-load, output voltage tolerance increases to ±10%.

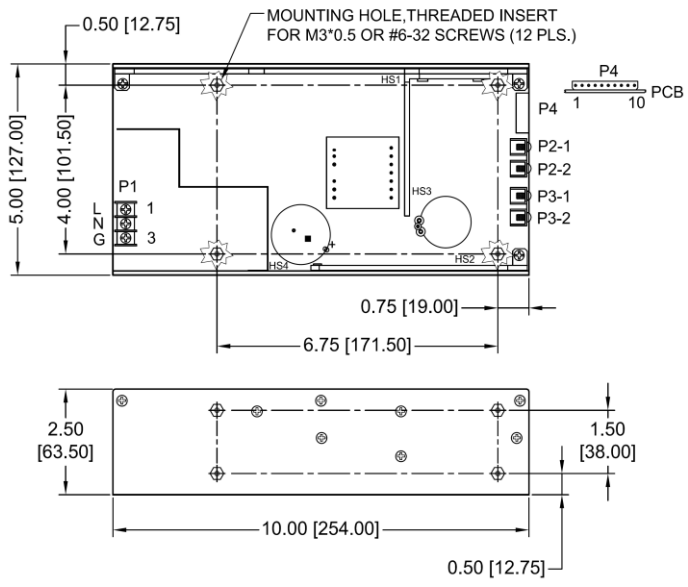
OUTPUT POWER DERATING CURVE



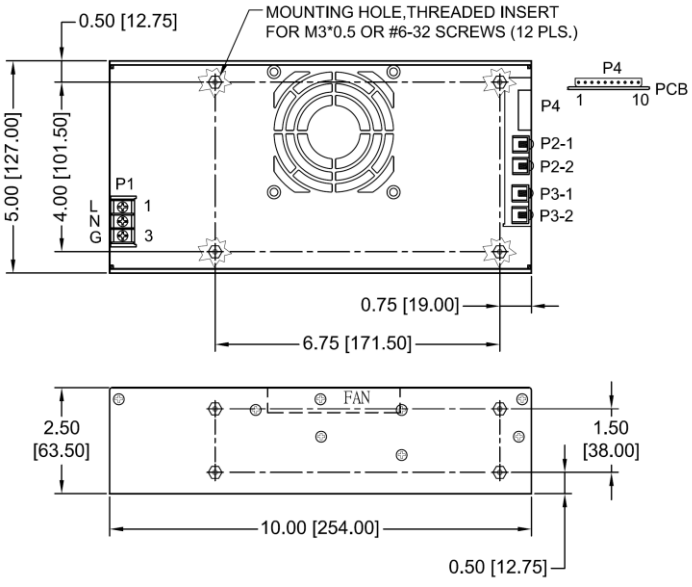
MECHANICAL SPECIFICATIONS

Single Output Models

U-bracket Form

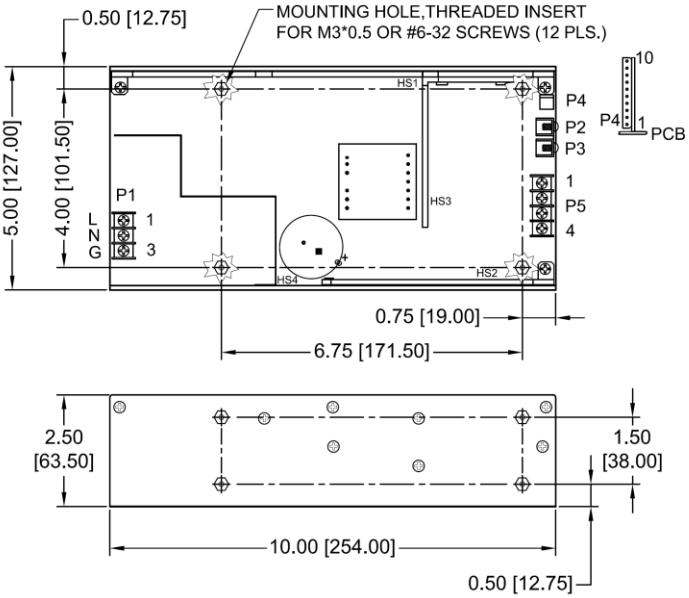


Enclosed Form

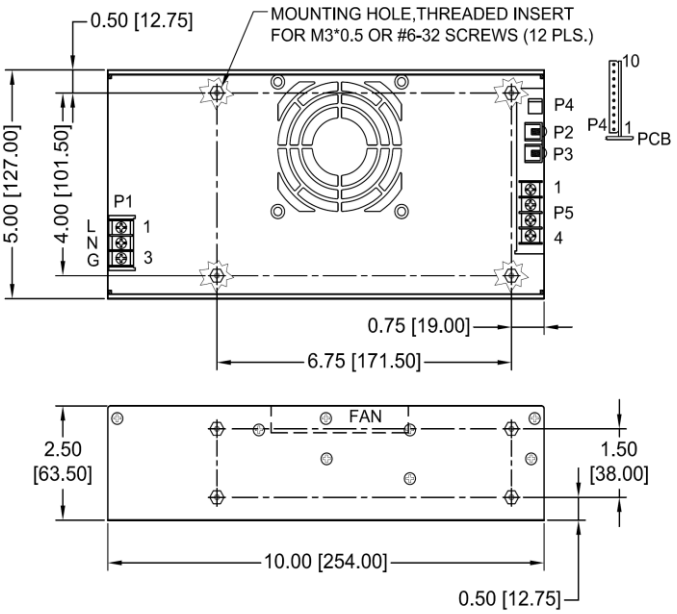


Multiple Output Models

U-bracket Form



Enclosed Form



NOTES:

1. Dimensions shown in inches [mm]
2. Tolerance 0.02 [0.5] maximum
3. Input connector P1 is Dinkle DT-35-B01W-03 with M3, nickel plated screws.
4. Connector P4 mates with Molex housing 50-37-5103 and pins 5263.
5. P2, P2-1, P2-2, P3, P3-1 & P3-2: M3*0.5 screw connections
6. Output connector P5 is Dinkle DT-35-B01W-04 with M3, nickel plated screws.
7. Weight: 1.8 Kgs. (3.96 lbs.) approx. for U-bracket form, 2.0 Kgs. (4.4 lbs.) approx. for enclosed form
8. Maximum penetration depth of fixing screws is 4 mm from the outer surface of chassis.

PIN CHART

CONN / PIN / MODEL		P1 (AC)			P2	P3	P5			
MODEL	PIN	1	2	3			1	2	3	4
PM450-12B PM450-13B PM450-14B PM450-15B	PM450-16B PM450-17-1B PM450-18B PM450-19B	Live	Neutral	Ground	+V1	V1 Return	N.A.			
PM450-20B PM450-21B PM450-22B	PM450-23B PM450-24B	Live	Neutral	Ground	+V1	V1 Return	+V2	V2 Return	N.C.	N.C.
PM450-30B PM450-31B PM450-32B PM450-33B	PM450-34B PM450-35B PM450-36B PM450-37B	Live	Neutral	Ground	+V1	V1 Return	+V2	V2 Return	+V3	V3 Return

CONN / PIN / MODEL		P4									
MODEL	PIN	1	2	3	4	5	6	7	8	9	10
PM450-12B PM450-13B PM450-14B PM450-15B	PM450-16B PM450-17-1B PM450-18B PM450-19B	PFD Return	+V1 Sense	-V1 Sense	PFD	Inhibit +V	Inhibit -V	N.C.	N.C.	Fan Return	+12V Fan
PM450-20B PM450-21B PM450-22B	PM450-23B PM450-24B	PFD Return	+V1 Sense	-V1 Sense	PFD	Inhibit +V	Inhibit -V	+V2 Sense	-V2 Sense	Fan Return	+12V Fan
PM450-30B PM450-31B PM450-32B PM450-33B	PM450-34B PM450-35B PM450-36B PM450-37B	PFD Return	+V1 Sense	-V1 Sense	PFD	Inhibit +V	Inhibit -V	+V2 Sense	-V2 Sense	Fan Return	+12V Fan

DESCRIPTION

The PM500 series of AC-DC switching power supplies in a package of 4 x 7 x 1.7 inches are capable of delivering 450-500 watts of continuous power at 30 CFM forced air cooling or 350-400 watts at convection cooling. The units are constructed on a printed circuit board with a U-bracket for mechanical support and heat sinking. A cover and fan assembly can be added during manufacturing. They are designed for medical applications including those needing BF rated insulation and/or an operation altitude up to 5000 meters.

PM500 SERIES

CE

RoHS

FEATURES

- BF Class insulation
- Operation altitude up to 5000 meters
- 100-240 VAC input with active PFC
- Less than 300 µA leakage current
- EN55011 /55022 Class B conducted emissions
- Inhibit - TTL high to disable output
- Compliant with RoHS requirements
- Power consumption in standby mode less than 1W at standby power 5 V /100 mA

SAFETY STANDARD APPROVALS

INPUT SPECIFICATIONS

Input voltage:	90-264 VAC
Input frequency:	47-63 Hz
Input current:	5.2 A (rms) @115 VAC, 60 Hz 2.6 A (rms) @ 230 VAC, 50 Hz
Earth leakage current:	300 µA max. @ 264 VAC, 63 Hz
Touch current:	100 µA max. @ 264 VAC, 63 Hz

OUTPUT SPECIFICATIONS

Output voltage/current:	See rating chart.
Maximum output power:	See rating chart.
Ripple and noise:	1% peak to peak maximum
Remote sense	Compensation for cable losses up to 0.5V
Overvoltage protection:	Set at 115-140% of nominal output voltage
Overcurrent protection:	Protected to output short circuit conditions
Thermal shutdown	Protected to over temperature conditions
Temperature coefficient:	All outputs ±0.04% /℃ maximum
Transient response:	Maximum excursion of 4%, recovering to 1% of final value within 500 us after a 25% step load change
Standby power	5 V at 500 mA maximum
Fan power	12 V at 300 mA maximum

ENVIRONMENTAL SPECIFICATIONS

Operating temperature:	-10℃ to +70℃
Storage temperature:	-40℃ to +85℃
Relative humidity:	5% to 95% non-condensing
Derating:	Derate from 100% at +50℃ linearly to 50% at +70℃, applicable to convection and forced-air cooling conditions

GENERAL SPECIFICATIONS

Switching frequency:	85 KHz (typical)
Efficiency:	Typical 90%
Hold-up time:	20 ms minimum at 110 VAC & 500 W
Line regulation:	±0.5% maximum at full load
Inrush current:	30 A @ 115 VAC, or 60 A @ 230 VAC, at 25℃ cold start
Withstand voltage:	4000 VAC from input to output (2 MOPP) 1500 VAC from input to ground (1 MOPP) 1500 VAC from output to ground
MTBF:	100,000 hours at full load at 25℃ ambient, calculated per MIL-HDBK-217F

EMC Performance

EN55011/EN55022:	Class B conducted, class B radiated
FCC:	Class B conducted, class B radiated
VCCI:	Class B conducted, class B radiated
EN61000-3-2:	Harmonic distortion, class A and D
EN61000-3-3:	Line flicker
EN61000-4-2:	ESD, ±15 KV air and ±8 KV contact
EN61000-4-3:	Radiated immunity, 10 V/m
EN61000-4-4:	Fast transient/burst, ±2 KV
EN61000-4-5:	Surge, ±1 KV diff., ±2 KV com
EN61000-4-6:	Conducted immunity, 10 Vrms
EN61000-4-8:	Magnetic field immunity, 30 A/m
EN61000-4-11:	Voltage dip immunity, 30% reduction for 500 ms and 100% reduction for 10 ms

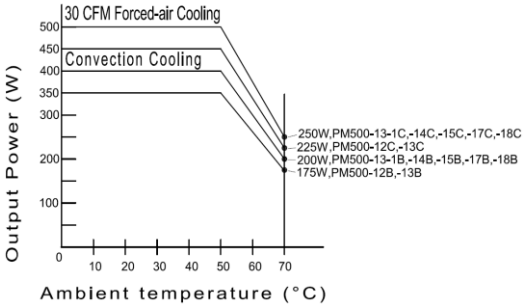
Preliminary

INTERFACE SIGNALS

PFD: TTL high for normal operation, low upon loss of input power, turn-on delay time 100-1000 ms, turn-off delay time 1 ms minimum

Inhibit: Requires an external TTL high level signal to inhibit outputs for standard models

OUTPUT POWER DERATING CURVE



OUTPUT VOLTAGE/CURRENT RATING CHART

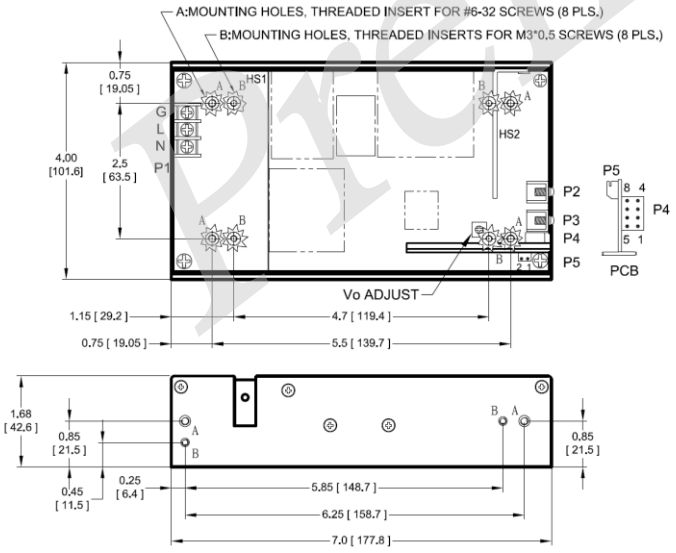
Model[1]	Output V1	Min. Current[4]	Max. Current at convection	Max. Current at 30 CFM	Tol.	Ripple & Noise[3]	Max. Output Power[2]	Efficiency (typical) 115 /230 Vac
PM500-12B	12 V	0.1 A	29.17 A	37.50 A	±2%	120 mV	350 W /450 W	88 /90%
PM500-13B	15 V	0.1 A	23.34 A	30.00 A	±2%	150 mV	350 W /450 W	88 /90%
PM500-13-1B	18 V	0.1 A	22.23 A	27.78 A	±2%	180 mV	400 W /500 W	88 /90%
PM500-14B	24 V	0.1 A	16.67 A	20.84 A	±2%	240 mV	400 W /500 W	89 /91%
PM500-15B	28 V	0.1 A	14.29 A	17.86 A	±2%	280 mV	400 W /500 W	89 /91%
PM500-17B	36 V	0.1 A	11.12 A	13.89 A	±2%	360 mV	400 W /500 W	89 /91%
PM500-18B	48 V	0.1 A	8.34 A	10.42 A	±2%	480 mV	400 W /500 W	89 /91%
PM500-19B	57 V	0.1 A	7.02 A	8.78 A	±2%	570 mV	400 W /500 W	89 /91%

NOTES:

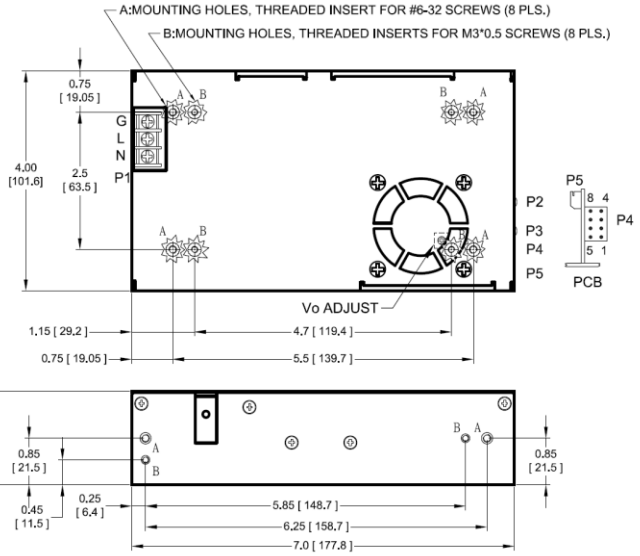
1. Change suffix “B” for U-Bracket form to “C” for enclosed form with cover and fan assembly, e.g. PM500-14C.
2. 350-400 W without moving air or 450-500 W with 30 CFM forced air provided by user for “B” version, 450-500 W for “C” version
3. Ripple and noise is maximum peak-to-peak voltage value measured at output within 20 MHz bandwidth, at rated line voltage and output load ranges, and with a 10 µF tantalum capacitor in parallel with a 0.1 µF ceramic capacitor across the output.
4. All models may be operated at no-load without damage. At no load, output voltage fluctuates beyond 5% due to the burst-mode operation of the control IC in them for energy saving.

MECHANICAL SPECIFICATIONS

U-bracket Form



Enclosed Form



NOTES:

1. Dimensions shown in inches [mm]
2. Tolerance 0.02 [0.5] maximum
3. Input connector P1 is Dinkle terminal P/N DT-35C-B01W-03, with nickel plated M3 screws.
4. Output connectors P2 and P3 are for M4x0.7 screw connections.
5. Output connector P4 is Molex header 87833-08 or equivalent, mating with Molex housing 51110-0850 or equivalent.
6. Fan connector P5 is JST header S2B-ZR-3.4 or equivalent, mating with JST housing ZHR-2 or equivalent.
7. Weight: 1.0 Kg (2.23 lbs.) approx. for U-bracket form, 1.14 Kgs. (2.52 lbs.) approx. for enclosed form
8. Maximum penetration of fixing screws is 4 mm from the outer surface of chassis.

Preliminary

PIN CHART

PIN NO.	P1 (AC)			P2	P3	P5	
	1	2	3			1	2
Polarity	Ground	Live	Neutral	+V1	Common Return	Common Return	+12V Fan

PIN NO.	P4							
	1	2	3	4	5	6	7	8
Polarity	Common Return	+V1 Sense	-V1 Sense	PFD	Inhibit	+5V Standby	NC	NC

Preliminary

DESCRIPTION

The PM650 series comprising single and multiple output models for 650-700 watts of continuous output power is specially designed for medical and ITE applications. They operate at 90-264 VAC input voltage without the need of a selector strap. The units are constructed on a printed circuit board with a U-bracket for mechanical support and heat sinking. A cover and fan assembly can be added during manufacturing.

PM650 SERIES

CE

RoHS

FEATURES

- EN61000-3-2 class A and D compliant
- Power Factor 0.98 typical
- Overvoltage protection
- Short-circuit protection
- Thermal protection
- Power Fail Detect (PFD) signal
- 100% burn-in at full rated load
- Remote sense on output #1 and output #2
- Remote inhibit – TTL high to disable output
- Compliant with RoHS requirements

INPUT SPECIFICATIONS

Input voltage:	90-264 VAC
Input frequency:	47-63 Hz
Input current:	10 A (rms) for 115 VAC 5 A (rms) for 230 VAC
Earth leakage current:	240 µA max. @ 264 VAC, 63 Hz
Touch current:	100 µA max. @ 264 VAC, 63 Hz

OUTPUT SPECIFICATIONS

Output voltage/current:	See rating chart.
Maximum output power:	See rating chart.
Ripple and noise:	2% peak to peak maximum on 3.3 V & 5.1 V and 1% peak to peak maximum on other voltage outputs
Overvoltage protection:	Provided on output #1 only; set at 115-140% of its nominal output voltage
Overcurrent protection:	All outputs protected to short circuit conditions
Temperature coefficient:	All outputs ±0.04% /℃ maximum
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
Fan power:	12 V at 400 mA maximum for B version, 12 V at 100 mA maximum for C version

INTERFACE SIGNALS

PFD:	TTL logic high for normal operation and TTL logic low upon loss of input power. This signal appears at least 1 ms prior to V1 output dropping 5% below its nominal value. This signal also provides a minimum delay of 100 ms after V1 output is within regulation.
Inhibit:	Requires an external TTL high level signal to inhibit outputs for standard models

SAFETY STANDARD APPROVALS

c UL us	UL ES 60601-1, CSA C22.2 No. 60601-1 File No. E178020
IEC 60601-1	TÜV EN 60601-1
TÜV Rheinland of North America, Inc. c US	UL 60950-1, CSA C22.2 No. 60950-1
TÜV Rheinland Product Safety / BAUART GEPRÜFT TYPE APPROVED	TÜV EN 60950-1

ENVIRONMENTAL SPECIFICATIONS

Operating temperature:	0℃ to +70℃
Storage temperature:	-40℃ to +85℃
Relative humidity:	5% to 95% non-condensing
Derating:	Derate from 100% at +50℃, linearly to 50% at +70℃

GENERAL SPECIFICATIONS

Switching frequency:	70 KHz ±10 KHz
Power factor:	0.98 typical
Efficiency:	80% minimum on all models
Hold-up time:	12 ms minimum at 110 VAC
Line regulation:	±0.2% maximum at full load
Inrush current:	50 A @115 VAC or 100 A @ 230 VAC at 25℃ cold start
Withstand voltage:	5600 VDC from input to output (2 MOPP) 2100 VDC from input to ground (1 MOPP) 700 VDC from output to ground (To verify AC strength, get correct test method to avoid power supply damage.)
MTBF:	300,000 hours minimum at full load at 25℃ ambient, calculated per MIL-HDBK-217F

EMC Performance (IEC60601-1-2)

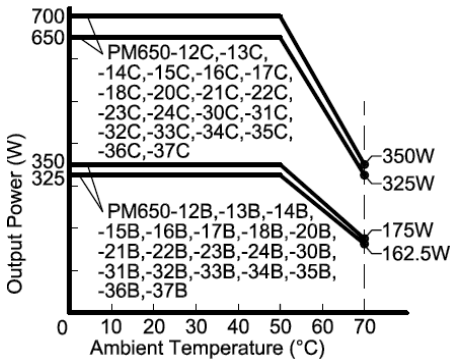
EN55011:	Class B conducted, Class A radiated
EN61000-3-2:	Harmonic distortion, Class A and D
EN61000-3-3:	Line flicker
EN61000-4-2:	ESD, ±15 KV air and ±8 KV contact
EN61000-4-3:	Radiated immunity, 10 V/m
EN61000-4-4:	Fast transient/burst, ±2 KV
EN61000-4-5:	Surge, ±1 KV diff., ±2 KV com
EN61000-4-6:	Conducted immunity, 10 Vrms
EN61000-4-8:	Magnetic field immunity, 30 A/m
EN61000-4-11:	Voltage dip immunity, 30% reduction for 500 ms, 100% reduction for 10 ms

OUTPUT VOLTAGE/CURRENT RATING CHART

Model[1]	Output #1 [3][5]				Output #2[5]				Output #3 [4]				Max. Output Power[5]
	V1	Imin.	Imax.	Tol.	V2	Imin.	Imax.	Tol.	V3	Imin.	Imax.	Tol.	
PM650-12B	12 V	0 A	54.2 A	±2%	(N/A)				(N/A)				325 W /650 W
PM650-13B	15 V	0 A	43.4 A	±2%	(N/A)				(N/A)				325 W /650 W
PM650-14B	24 V	0 A	27.1 A	±2%	(N/A)				(N/A)				325 W /650 W
PM650-15B	27 V	0 A	24.1 A	±2%	(N/A)				(N/A)				325 W /650 W
PM650-16B	30 V	0 A	21.7 A	±2%	(N/A)				(N/A)				325 W /650 W
PM650-17B	36 V	0 A	18.1 A	±2%	(N/A)				(N/A)				325 W /650 W
PM650-18B	48 V	0 A	14.6 A	±2%	(N/A)				(N/A)				350 W /700 W
PM650-20B	24 V	1.50 A	18.0 A	±2%	12 V	1.2 A	22 A	±5%	(N/A)				325 W /650 W
PM650-21B	24 V	1.50 A	18.0 A	±2%	15 V	1.0 A	18 A	±5%	(N/A)				325 W /650 W
PM650-22B	48 V	0.75 A	9.0 A	±2%	24 V	0.6 A	12 A	±5%	(N/A)				325 W /650 W
PM650-23B	48 V	0.75 A	9.0 A	±2%	12 V	1.2 A	22 A	±5%	(N/A)				325 W /650 W
PM650-24B	48 V	0.75 A	9.0 A	±2%	15 V	1.0 A	18 A	±5%	(N/A)				325 W /650 W
PM650-30B	24 V	1.50 A	18.0 A	±2%	12 V	1.2 A	22 A	±5%	3.3 V	0 A	10 A	±3%	325 W /650 W
PM650-31B	24 V	1.50 A	18.0 A	±2%	15 V	1.0 A	18 A	±5%	3.3 V	0 A	10 A	±3%	325 W /650 W
PM650-32B	24 V	1.50 A	18.0 A	±2%	12 V	1.2 A	22 A	±5%	5.1 V	0 A	10 A	±3%	325 W /650 W
PM650-33B	24 V	1.50 A	18.0 A	±2%	15 V	1.0 A	18 A	±5%	5.1 V	0 A	10 A	±3%	325 W /650 W
PM650-34B	48 V	0.75 A	9.0 A	±2%	12 V	1.2 A	22 A	±5%	3.3 V	0 A	10 A	±3%	325 W /650 W
PM650-35B	48 V	0.75 A	9.0 A	±2%	15 V	1.0 A	18 A	±5%	3.3 V	0 A	10 A	±3%	325 W /650 W
PM650-36B	48 V	0.75 A	9.0 A	±2%	12 V	1.2 A	22 A	±5%	5.1 V	0 A	10 A	±3%	325 W /650 W
PM650-37B	48 V	0.75 A	9.0 A	±2%	15 V	1.0 A	18 A	±5%	5.1 V	0 A	10 A	±3%	325 W /650 W

NOTES:
1. Suffix “B” in model numbers denotes U-bracket form. Change “B” to “C” for enclosed form with cover and fan assembly, e.g. PM650-14C.
2. All outputs are floating. They can be connected externally for positive or negative output.
3. Output #1 can be adjusted within +/-5% of their nominal voltage.
4. Output #3 can be adjusted within +/-15% of their nominal voltage.
5. 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 and #2 derated to 70%), or 650-700 watts with 50 CFM forced air provided by user.
6. All models may be operated at no-load. At no-load, output voltage tolerance increases to +/-10%.
7. Ripple and noise is maximum peak to peak voltage value measured at output within 20 MHz bandwidth, at rated line voltage and output load ranges, and with a 10 µF tantalum capacitor in parallel with a 0.1 µF ceramic capacitor across the output.

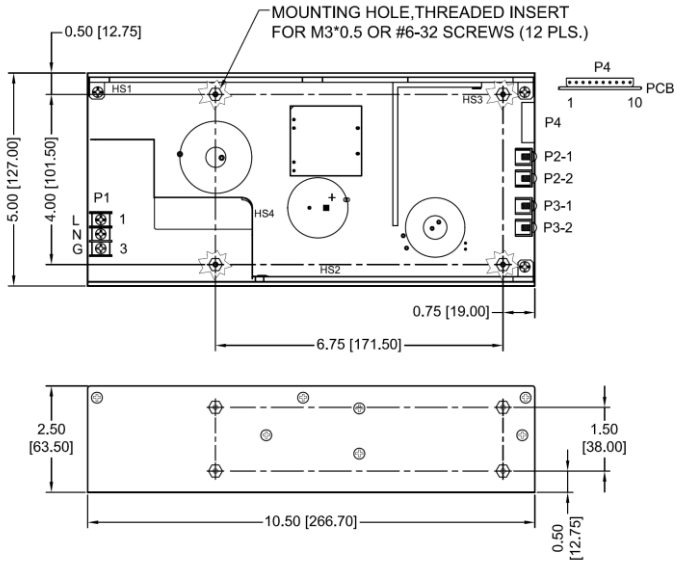
OUTPUT POWER DERATING CURVE



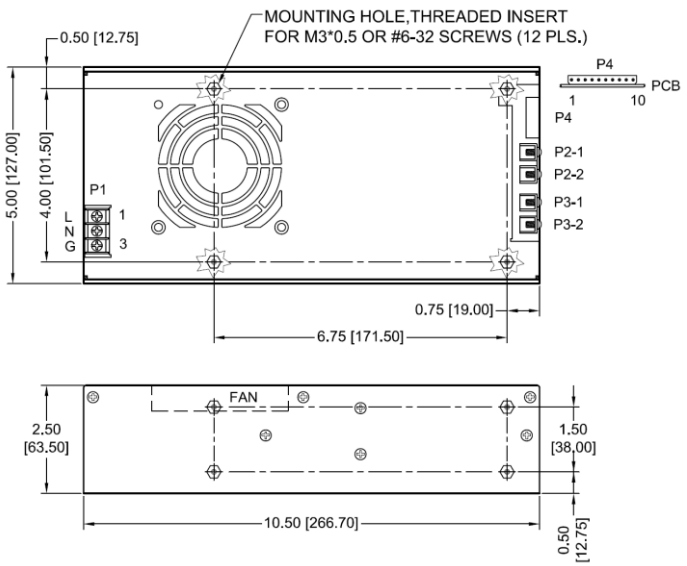
MECHANICAL SPECIFICATIONS

Single Output Models

U-bracket Form



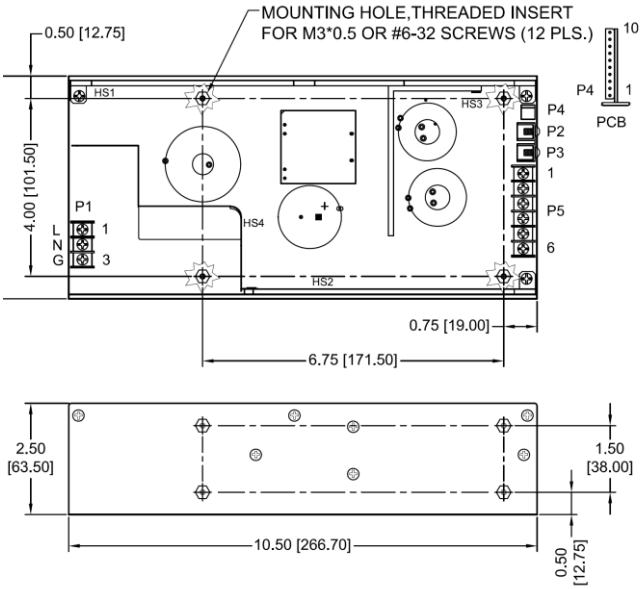
Enclosed Form



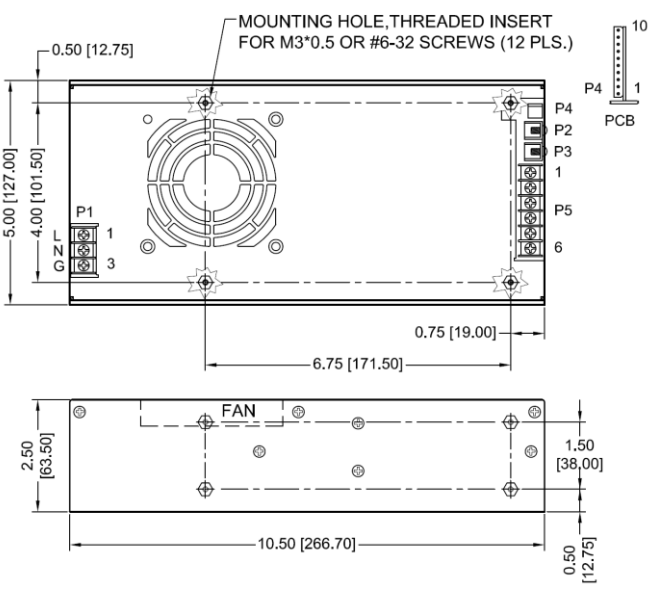
MECHANICAL SPECIFICATIONS

Multiple Output Models

U-bracket Form



Enclosed Form



NOTES:

1. Dimensions shown in inches [mm]
2. Tolerance 0.02 [0.5] maximum
3. Input connector P1 is Dinkle DT-4C-B01W-03 with M3, nickel-plated screws.
4. Connector P4 mates with Molex housing 50-37-5103 and pins 5263.
5. Connector P2-1, P2-2, P3-1 & P3-2: M3*0.5 screw connections.
6. Connectors P2, P3: M3*0.5 screw connections
7. Output connector P5 is Dinkle DT-35-B01W-06. Screws are M3, nickel plated.
8. Weight: 2.0 Kgs. (4.4 lbs.) approx. for U-bracket form, 2.2 Kgs. (4.84 lbs.) approx. for enclosed form.
9. Maximum penetration depth of fixing screws is 4 mm from the outer surface of chassis.

PIN CHART

MODEL / CONN / PIN		P1 (AC)			P2	P3	P5					
		1	2	3			1	2	3	4	5	6
PM650-12B PM650-13B PM650-14B PM650-15B	PM650-16B PM650-17B PM650-18B	Live	Neutral	Ground	+V1	V1 Return	N.A.					
PM650-20B PM650-21B PM650-22B	PM650-23B PM650-24B	Live	Neutral	Ground	+V1	V1 Return	+V2		V2 Return		N.A.	N.A.
PM650-30B PM650-31B PM650-32B PM650-33B	PM650-34B PM650-35B PM650-36B PM650-37B	Live	Neutral	Ground	+V1	V1 Return	+V2		V2 Return		+V3	V3 Return

MODEL / CONN / PIN		P4									
		1	2	3	4	5	6	7	8	9	10
PM650-12B PM650-13B PM650-14B PM650-15B	PM650-16B PM650-17B PM650-18B	PFD Return	+V1 Sense	-V1 Sense	PFD	Inhibit +V	Inhibit -V	N.C.	N.C.	Fan Return	+12V Fan
PM650-20B PM650-21B PM650-22B	PM650-23B PM650-24B	PFD Return	+V1 Sense	-V1 Sense	PFD	Inhibit +V	Inhibit -V	+V2 Sense	-V2 Sense	Fan Return	+12V Fan
PM650-30B PM650-31B PM650-32B PM650-33B	PM650-34B PM650-35B PM650-36B PM650-37B	PFD Return	+V1 Sense	-V1 Sense	PFD	Inhibit +V	Inhibit -V	+V2 Sense	-V2 Sense	Fan Return	+12V Fan

DESCRIPTION

The PM651 series of AC-DC switching power supplies in a package of 4 x 8 x 2.58 inches are capable of delivering 600-650 watts of continuous power at 30 CFM forced air cooling. The units are constructed on a printed circuit board with a U-bracket for mechanical support and heat sinking. A cover and fan assembly can be added during manufacturing. They are designed for medical applications including those needing BF rated insulation and/or an operation altitude up to 5000 meters.

PM651 SERIES

CE

RoHS

FEATURES

- BF Class insulation
- Operation altitude up to 5000 meters
- 100-240 VAC input with active PFC
- Less than 300 µA leakage current
- Standby output 5VDC at 200mA
- EN55011 Class B conducted emissions
- Inhibit - TTL high to disable output
- Compliant with RoHS requirements

SAFETY STANDARD APPROVALS

INPUT SPECIFICATIONS

Input voltage:	90-264 VAC
Input frequency:	47-63 Hz
Input current:	8.4 A (rms) @115 VAC, 60 Hz 4.2 A (rms) @ 230 VAC, 50 Hz
Earth leakage current:	300 µA max. @ 264 VAC, 63 Hz
Touch current:	100 µA max. @ 264 VAC, 63 Hz

OUTPUT SPECIFICATIONS

Output voltage/current:	See rating chart.
Maximum output power:	See rating chart.
Ripple and noise:	1% peak to peak maximum
Remote sense	Compensation for cable losses up to 0.5V
Overvoltage protection:	Set at 115-140% of nominal output voltage
Overcurrent protection:	Protected to output short circuit conditions
Thermal shutdown	Protected to over temperature conditions
Temperature coefficient:	All outputs ±0.04% /℃ maximum
Transient response:	Maximum excursion of 4%, recovering to 1% of final value within 500 us after a 25% step load change
Standby power	5 V at 200 mA maximum
Fan power	12 V at 500 mA maximum

ENVIRONMENTAL SPECIFICATIONS

Operating temperature:	-10℃ to +70℃
Storage temperature:	-40℃ to +85℃
Relative humidity:	5% to 95% non-condensing
Derating:	Derate from 100% at +50℃ linearly to 50% at +70℃, applicable to convection and forced-air cooling conditions

GENERAL SPECIFICATIONS

Switching frequency:	85 KHz (typical)
Efficiency:	Typical 90%
Hold-up time:	12 ms minimum at 110 VAC & 650 W
Line regulation:	±0.5% maximum at full load
Inrush current:	20 A @ 115 VAC, or 40 A @ 230 VAC, at 25℃ cold start
Withstand voltage:	4000 VAC from input to output (2 MOPP) 1500 VAC from input to ground (1 MOPP) 1500 VAC from output to ground
MTBF:	250,000 hours at full load at 25℃ ambient, calculated per MIL-HDBK-217F

EMC Performance

EN55011	Class B conducted, class B radiated
FCC:	Class B conducted, class B radiated
VCCI:	Class B conducted, class B radiated
EN61000-3-2:	Harmonic distortion, class A and D
EN61000-3-3:	Line flicker
EN61000-4-2:	ESD, ±15 KV air and ±8 KV contact
EN61000-4-3:	Radiated immunity, 10 V/m
EN61000-4-4:	Fast transient/burst, ±2 KV
EN61000-4-5:	Surge, ±1 KV diff., ±2 KV com
EN61000-4-6:	Conducted immunity, 10 Vrms
EN61000-4-8:	Magnetic field immunity, 30 A/m
EN61000-4-11:	Voltage dip immunity, 30% reduction for 500 ms, 100% reduction for 10 ms

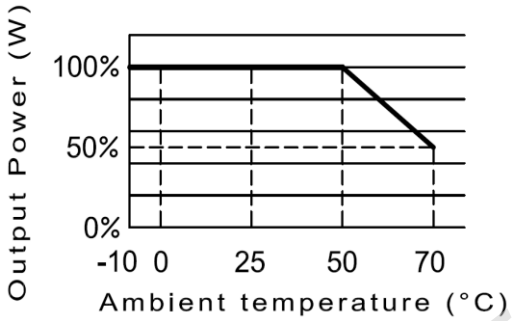
Preliminary

INTERFACE SIGNALS

PFD: TTL high for normal operation, low upon loss of input power, turn-on delay time 100-750 ms, turn-off delay time 1 ms minimum

Inhibit: Requires an external TTL high level signal to inhibit outputs for standard models

OUTPUT POWER DERATING CURVE



OUTPUT VOLTAGE/CURRENT RATING CHART

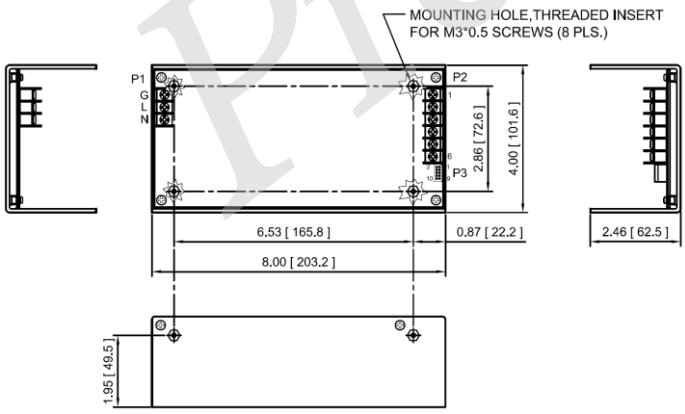
Model[1]	Output V1	Min. Current[2]	Max. Current at 30 CFM[3]	Peak current[5]	Tol.	Ripple & Noise[4]	Max. Output Power[3]	Efficiency (typical) 115/230 Vac
PM651-12B	12 V	0.1 A	50.00 A	55.0 A	±2%	120 mV	600 W	88 /90%
PM651-13B	15 V	0.1 A	40.00 A	44.0 A	±2%	150 mV	600 W	88 /90%
PM651-13-1B	18 V	0.1 A	36.12 A	40.0 A	±2%	180 mV	650 W	88 /90%
PM651-14B	24 V	0.1 A	27.09 A	30.0 A	±2%	240 mV	650 W	88 /90%
PM651-15B	28 V	0.1 A	23.22 A	25.5 A	±2%	280 mV	650 W	89 /91%
PM651-16B	30 V	0.1 A	21.67 A	23.8 A	±2%	300 mV	650 W	89 /91%
PM651-16-1B	32 V	0.1 A	20.32 A	22.4 A	±2%	320 mV	650 W	89 /91%
PM651-17-1B	34 V	0.1 A	19.12 A	21.0 A	±2%	340 mV	650 W	89 /91%
PM651-17B	36 V	0.1 A	18.06 A	20.0 A	±2%	360 mV	650 W	89 /91%
PM651-18B	48 V	0.1 A	13.55 A	15.0 A	±2%	480 mV	650 W	89 /91%
PM651-19B	57 V	0.1 A	11.41 A	12.5 A	±2%	570 mV	650 W	89 /91%
PM651-19-1B	58 V	0.1 A	11.21 A	12.3 A	±2%	580 mV	650 W	89 /91%

NOTES:

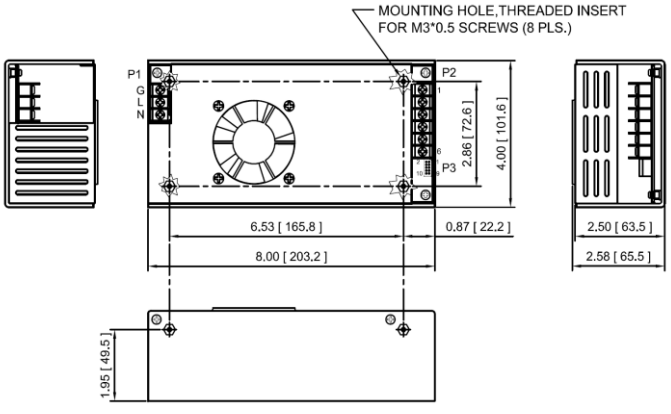
1. Change suffix “B” for U-Bracket form to “C” for enclosed form with cover and fan assembly, e.g. PM651-14C.
2. All models may be operated at no-load without damage. At no load, output voltage fluctuates beyond 5% due to the burst-mode operation of the control IC in them for energy saving.
3. 600-650 W for “C” version, or with 30 CFM forced air provided by user for “B” version
4. Ripple and noise is maximum peak-to-peak voltage value measured at output within 20 MHz bandwidth, at rated line voltage and output load ranges, and with a 10 µF tantalum capacitor in parallel with a 0.1 µF ceramic capacitor across the output.
5. Peak output current with 10% duty cycle maximum for less than 15 seconds, average power not to exceed maximum power rating.

MECHANICAL SPECIFICATIONS

U-bracket Form



Enclosed Form



NOTES:

1. Dimensions shown in inches [mm]
2. Tolerance 0.02 [0.5] maximum
3. Input connector P1 is Dinkle terminal P/N DT-35-B01W-03, with nickel plated M3 screws.
4. Output connector P2 is Dinkle terminal P/N DT-4N-B01W-06, with nickel plated M3.5 screws.
5. Output connector P3 is JST header B10B-PHDSS or equivalent, mating with JST housing PHDR-10VS or equivalent.
6. Fan connector P4 is JST header S2B-ZR-3.4 or equivalent, mating with JST housing ZHR-2 or equivalent.
7. Weight: 1.8 Kgs (3.97 lbs.) approx. for U-bracket form, 2.0 Kgs. (4.41 lbs.) approx. for enclosed form.
8. Maximum penetration of fixing screws is 4 mm from the outer surface of chassis.

Preliminary

PIN CHART

Connector	P1 (AC)			P2						P4	
PIN NO	1	2	3	1	2	3	4	5	6	1	2
Polarity	Ground	Live	Neutral	+V1			Common Return			+12V Fan	Common Return

Connector	P3									
PIN NO	1	2	3	4	5	6	7	8	9	10
Polarity	+V1 Sense	-V1 Sense	PFD	Common Return	N.A.	N.A.	Inhibit	N.A.	+5V Standby	+5V Standby Return

Preliminary

1100 WATT MEDICAL POWER SUPPLIES

DESCRIPTION

The PM1100 series of AC-DC switching power supplies in a package of 5.91 x 9.25 x 2.4 inches are capable of delivering 1100 watts of continuous power. The units are constructed on a printed circuit board with an enclosed format for mechanical support and heat sinking. They are designed for medical applications including those needing BF rated insulation and/or an operation altitude up to 5000 meters.

PM1100 SERIES

CE

RoHS

FEATURES

- BF Class insulation
- Operation altitude up to 5000 meters
- Compact size 5.91" x 9.25" x 2.4"
- Less than 300 µA leakage current
- EN55011 Class B conducted emissions
- Inhibit - TTL low to disable output
- Standard PS Off and DC OK signals
- High Efficiency 89% typical
- Compliant with RoHS requirements
- Standby output 5 VDC at 200 mA
- Variable speed internal fan
- Overvoltage protection
- Overcurrent protection
- Thermal protection

SAFETY STANDARD APPROVALS

c UL us	UL ES 60601-1, CSA C22.2 No. 60601-1 File No. E178020
IEC 60601-1	TÜV EN 60601-1
TÜV Rheinland of North America, Inc. c US	UL 60950-1, CSA C22.2 No. 60950-1
TÜV Rheinland Product Safety BAUART GEPRÜFT TYPE APPROVED	TÜV EN 60950-1

INPUT SPECIFICATIONS

Input voltage:	90-264 VAC
Input frequency:	47-63 Hz
Input current:	16 A (rms) @100 VAC, 60 Hz 8 A (rms) @ 240 VAC, 50 Hz
Earth leakage current:	300 µA max. @ 264 VAC, 63 Hz
Touch current:	100 µA max. @ 264 VAC, 63 Hz

OUTPUT SPECIFICATIONS

Output voltage/current:	See rating chart.
Maximum output power:	See rating chart.
Ripple and noise:	1% peak to peak maximum
Remote sense	Compensation for cable losses up to 0.5 V
Overvoltage protection:	Set at 112-140% of nominal output voltage
Overcurrent protection:	Set at 120-140% of maximum output current
Thermal shutdown	Protected to overtemperature conditions
Temperature coefficient:	All outputs ±0.04% /℃ maximum
Transient response:	Maximum excursion of 4%, recovering to 1% of final value within 500 us after a 25% step load change
Standby power	5 V at 200 mA maximum
Fan power	12 V at 1.0 A maximum

ENVIRONMENTAL SPECIFICATIONS

Operating temperature:	-10℃ to +70℃
Storage temperature:	-40℃ to +85℃
Relative humidity:	5% to 95% non-condensing
Derating:	Derate from 100% at +50℃ linearly to 50% at +70℃, applicable to convection and forced-air cooling conditions

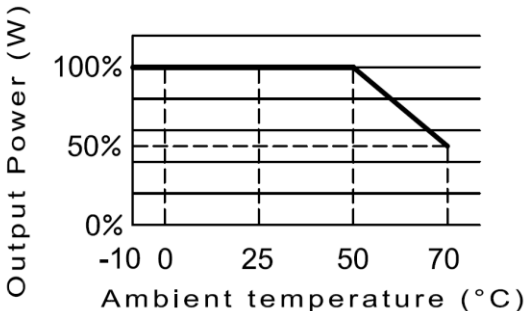
GENERAL SPECIFICATIONS

Switching frequency:	40 KHz to 200 KHz
Efficiency:	See rating chart
Hold-up time:	10 ms minimum at 110 VAC
Line regulation:	±0.5% maximum at full load
Inrush current:	50 A @ 115 VAC, or 100 A @ 230 VAC, at 25℃ cold start
Withstand voltage:	4000 VAC from input to output (2MOPP) 1500 VAC from input to ground (1MOPP) 1500 VAC from output to ground
MTBF:	300,000 hours at full load at 25℃ ambient, calculated per MIL-HDBK-217F
EMC Performance (IEC60601-1-2)	
EN55011:	Class B conducted, class B radiated
FCC:	Class B conducted, class B radiated
VCCI:	Class B conducted, class B radiated
EN61000-3-2:	Harmonic distortion, class A and D
EN61000-3-3:	Line flicker
EN61000-4-2:	ESD, ±15 KV air and ±8 KV contact
EN61000-4-3:	Radiated immunity, 10 V/m
EN61000-4-4:	Fast transient/burst, ±2 KV
EN61000-4-5:	Surge, ±1 KV diff., ±2 KV com
EN61000-4-6:	Conducted immunity, 10 Vrms
EN61000-4-8:	Magnetic field immunity, 30 A/m
EN61000-4-11:	Voltage dip immunity, 30% reduction for 500 ms, 100% reduction for 10 ms

INTERFACE SIGNALS

PFD: TTL high for normal operation, low upon loss of input power, turn-on delay time 100-2500 ms, turn-off delay time 1 ms minimum
Inhibit: TTL low to turn off output
DC OK: TTL high when output voltage >95%
PS OFF: TTL high to turn off output

OUTPUT POWER DERATING CURVE

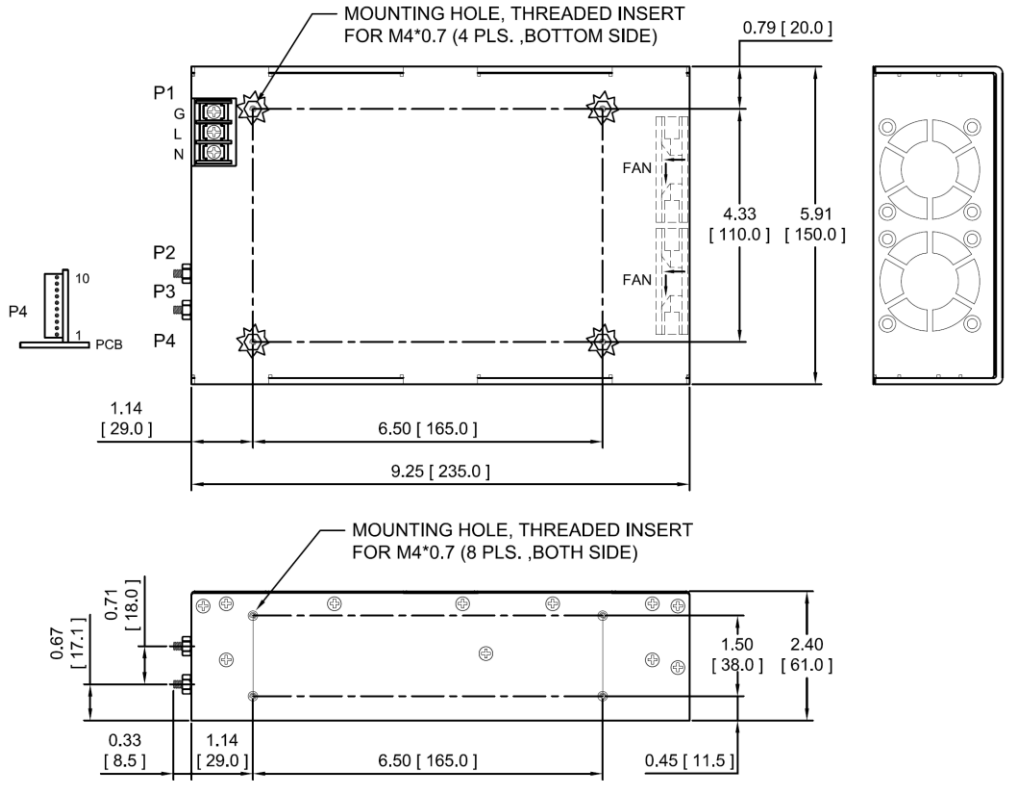


OUTPUT VOLTAGE/CURRENT RATING CHART

Model	Output V1	Min. Current	Max. Current	Peak Current	Tol.	Ripple & Noise(2)	Max. Output Power(1)	Efficiency (typical) 115/230 Vac
PM1100-14C	24 V	0 A	45.84 A	52.10 A	±2%	240 mV	1100 W /1250 W	88 /92%
PM1100-15C	28 V	0 A	39.29 A	44.65 A	±2%	280 mV	1100 W /1250 W	88 /92%
PM1100-16C	32 V	0 A	34.38 A	39.07 A	±2%	320 mV	1100 W /1250 W	90 /93%
PM1100-17-1C	34 V	0 A	32.35 A	36.77 A	±2%	340 mV	1100 W /1250 W	89 /93%
PM1100-17C	36 V	0 A	30.56 A	34.73 A	±2%	360 mV	1100 W /1250 W	90 /93%
PM1100-18-1C	42 V	0 A	26.20 A	29.77 A	±2%	420 mV	1100 W /1250 W	89 /92%
PM1100-18C	48 V	0 A	22.92 A	26.10 A	±2%	480 mV	1100 W /1250 W	89 /92%

NOTES:
1. Peak current and power possible at 170-260 VAC input, 10 seconds, 35% duty cycle.
2. Ripple and noise is maximum peak-to-peak voltage value measured at output within 20 MHz bandwidth, at rated line voltage and output load ranges, and with a 10 µF tantalum capacitor in parallel with a 0.1 µF ceramic capacitor across the output.

MECHANICAL SPECIFICATIONS



NOTES:
1. Dimensions shown in inches [mm]
2. Tolerance 0.02 [0.5] maximum
3. Input connector P1 is Dinkle terminal P/N DT-4C-B01W-03, with nickel plated M3.5 screws or equivalent.
4. Output connectors P2 and P3 are for M5*0.8 screw connections.
5. Output connector P4 is Molex header 22-05-7105 or equivalent, mating with Molex housing 50-37-5103 or equivalent.
6. Weight: 2.884 Kgs (6.35 lbs.) approx. for enclosed form.
7. Maximum penetration depth of fixing screws is 4 mm from the outer surface of chassis.

PIN CHART

Connector	P1 (AC)			P2		P3	
PIN NO.	1	2	3	1	2	1	2
Polarity	Live	Neutral	Ground	+V1		V1 Return	

Connector	P4									
PIN NO.	1	2	3	4	5	6	7	8	9	10
Polarity	FAN Return	+12V FAN	PS OFF	DC OK	+5V Standby	Inhibit	PFD	-V1 Sense	+V1 Sense	common Return

DESCRIPTION

The PMP15 series of AC/DC wall-mount switching power supplies are for 15 watts of continuous output power. They are enclosed in a 94V-0 rated polycarbonate case. The PMP15M models are shipped with a selected interchangeable AC plug, and additional types of AC plug can be purchased from the factory. All models meet EN55011 and FCC class B emission limits, and are designed for medical applications.

PMP15 SERIES

RoHS

FEATURES

- Interchangeable AC plugs
- High efficiency
- Low ripple & noise
- Overvoltage protection
- Over-temperature protection
- Short-circuit protection
- 100% burn-in at full rated load
- Standby consumption less than 0.3 W
- Compliant with CEC and ENERGY STAR efficiency level V requirements
- Compliant with RoHS requirements

SAFETY STANDARD APPROVALS

UL ES 60601-1, CSA C22.2 No. 60601-1
File No. E 211696

TÜV EN 60601-1

INPUT SPECIFICATIONS

Input voltage:	90-264 VAC
Input frequency:	47-63 Hz
Input current:	0.5 A (rms) for 115 VAC 0.3 A (rms) for 230 VAC
Touch current:	100 μA max. @ 264 VAC, 63 Hz

OUTPUT SPECIFICATIONS

Output voltage /current:	See rating chart.
Maximum output power:	See rating chart.
Ripple and noise:	1% peak to peak maximum(except 100 mVp-p max. for lower than output 10 V)
Overvoltage protection:	Set at 116% to 230% of its nominal output voltage
Overcurrent protection:	Protected to short circuit conditions
Temperature coefficient:	±0.04% /℃ maximum
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

ENVIRONMENTAL SPECIFICATIONS

Operating temperature:	0℃ to +40℃
Storage temperature:	-40℃ to +85℃
Relative humidity:	10% to 90% non-condensing
Derating:	Derate from 100% at +40℃ linearly to 50% at +60℃

GENERAL SPECIFICATIONS

Hold-up time:	8 ms minimum at 115 VAC
Turn on delay time:	3 s maximum at 115 VAC
Efficiency:	Compliant with Energy Star efficiency level V requirements (see rating chart)
Line regulation:	±0.5% maximum at full load
Inrush current:	30 A @ 115 VAC or 60 A @ 230 VAC (80 A for PMP15M/D/E-10) at 25℃ cold start
Withstand voltage:	4000 VAC from input to output
MTBF:	300,000 hours at full load at 25℃ ambient, calculated per MIL-HDBK-217F

EMC Performance (IEC60601-1-2)

EN55011:	Class B conducted, Class B radiated
FCC:	Class B conducted, Class B radiated
VCCI:	Class B conducted, Class B radiated
EN61000-3-2:	Harmonic distortion, Class A and D
EN61000-3-3:	Line flicker
EN61000-4-2:	ESD, ±15 KV air and ±8 KV contact
EN61000-4-3:	Radiated immunity, 10 V/m
EN61000-4-4:	Fast transient/burst, ±2 KV
EN61000-4-5:	Surge, ±1 KV diff., ±2 KV com
EN61000-4-6:	Conducted immunity, 10 Vrms
EN61000-4-8:	Magnetic field immunity, 30 A/m
EN61000-4-11:	Voltage dip immunity, 30% reduction for 500 ms, 100% reduction for 10 ms

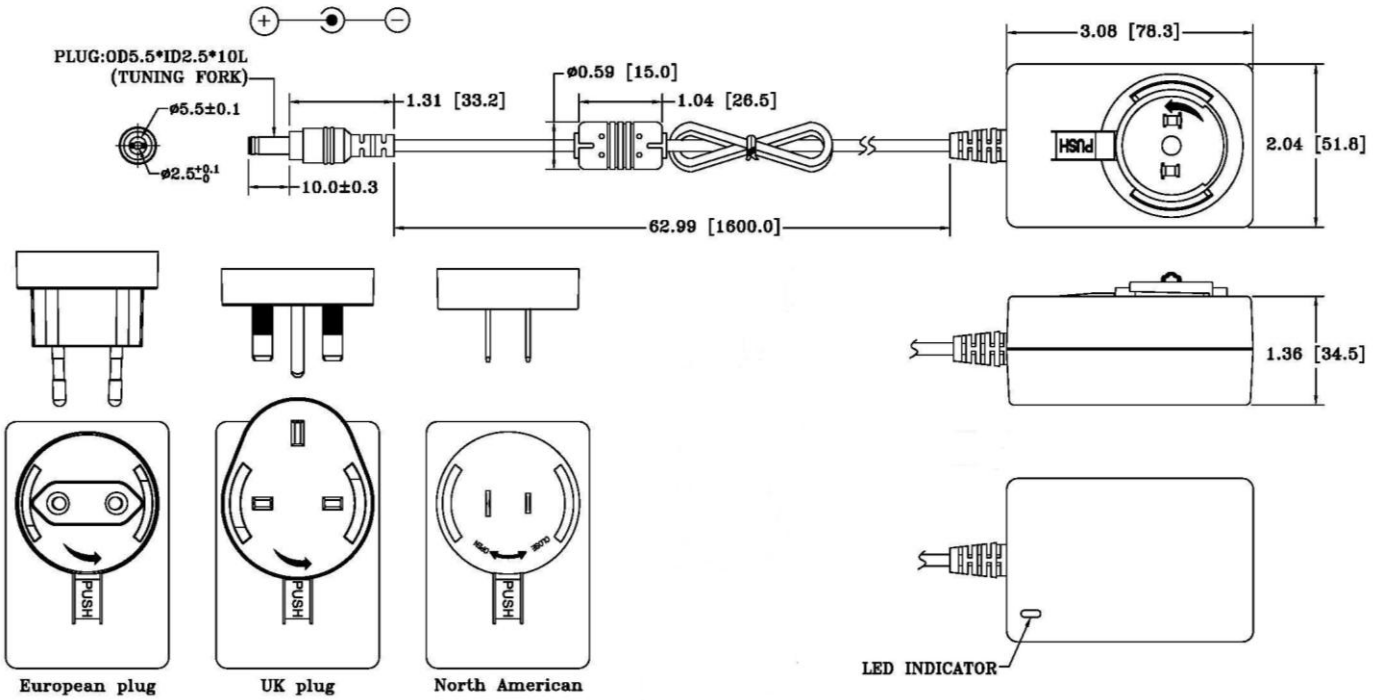
OUTPUT VOLTAGE/CURRENT RATING CHART

Model[1]	Output						Average Active Efficiency (typical) @ 115 / 230 Vac
	V1	Min. Current	Max. Current	Tol.	Ripple & Noise[2]	Max. Output Power	
PMP15M-10	5 V	0 A	3.0 A	±5%	100 mV	15 W	78 /77%
PMP15M-10-1	6 V	0 A	2.5 A	±5%	100 mV	15 W	80 /78%
PMP15M-11	9 V	0 A	1.67 A	±5%	100 mV	15 W	82 /80%
PMP15M-12	12 V	0 A	1.25 A	±5%	120 mV	15 W	82 /80%
PMP15M-13	15 V	0 A	1.0 A	±5%	150 mV	15 W	83 /80%
PMP15M-14	24 V	0 A	0.625 A	±5%	240 mV	15 W	85 /81%
PMP15D-10	5 V	0 A	3.0 A	±5%	100 mV	15 W	78 /77%
PMP15D-11	9 V	0 A	1.67 A	±5%	100 mV	15 W	82 /80%
PMP15D-12	12 V	0 A	1.25 A	±5%	120 mV	15 W	82 /80%
PMP15D-14	24 V	0 A	0.625 A	±5%	240 mV	15 W	85 /81%
PMP15NP-10	5 V	0 A	3.0 A	±5%	100 mV	15 W	78 /77%
PMP15NP-11	9 V	0 A	1.67 A	±5%	100 mV	15 W	82 /80%
PMP15NP-12	12 V	0 A	1.25 A	±5%	120 mV	15 W	82 /80%
PMP15NP-14	24 V	0 A	0.625 A	±5%	240 mV	15 W	85 /81%
PMP15E-10	5 V	0 A	3.0 A	±5%	100 mV	15 W	78 /77%
PMP15E-12	12 V	0 A	1.25 A	±5%	120 mV	15 W	82 /80%
PMP15E-14	24 V	0 A	0.625 A	±5%	240 mV	15 W	85 /81%

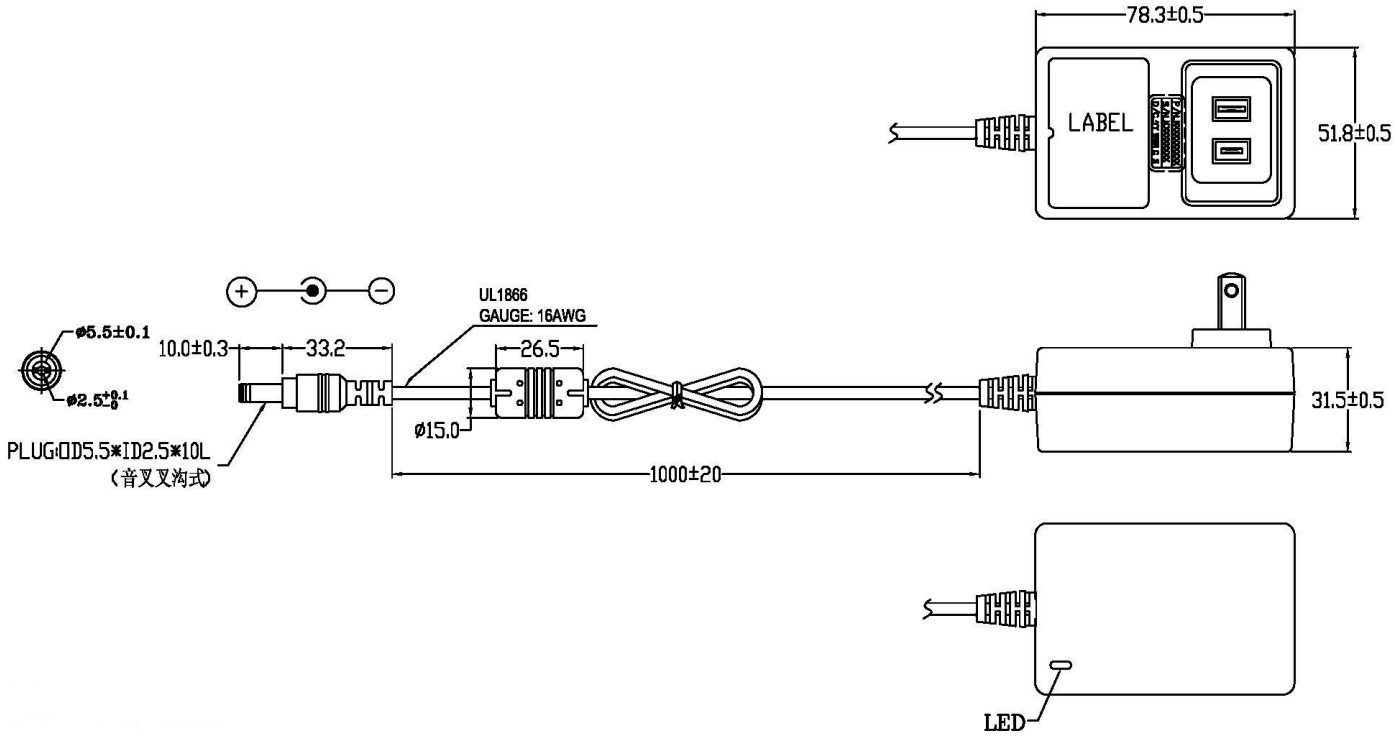
NOTES:
1. PMP15M models are for interchangeable AC plugs which are to be ordered separately. PMP15D and PMP15NP models are with fixed North American AC plug for safety approval cULus only, and PMP15E models with fixed European AC plug for safety approval TÜV only.
2. Ripple and noise is maximum peak to peak voltage value measured at output within 20 MHz bandwidth, at rated line voltage and output load ranges, and with a 47 μF tantalum capacitor in parallel with a 0.1 μF ceramic capacitor across the output.

MECHANICAL SPECIFICATIONS

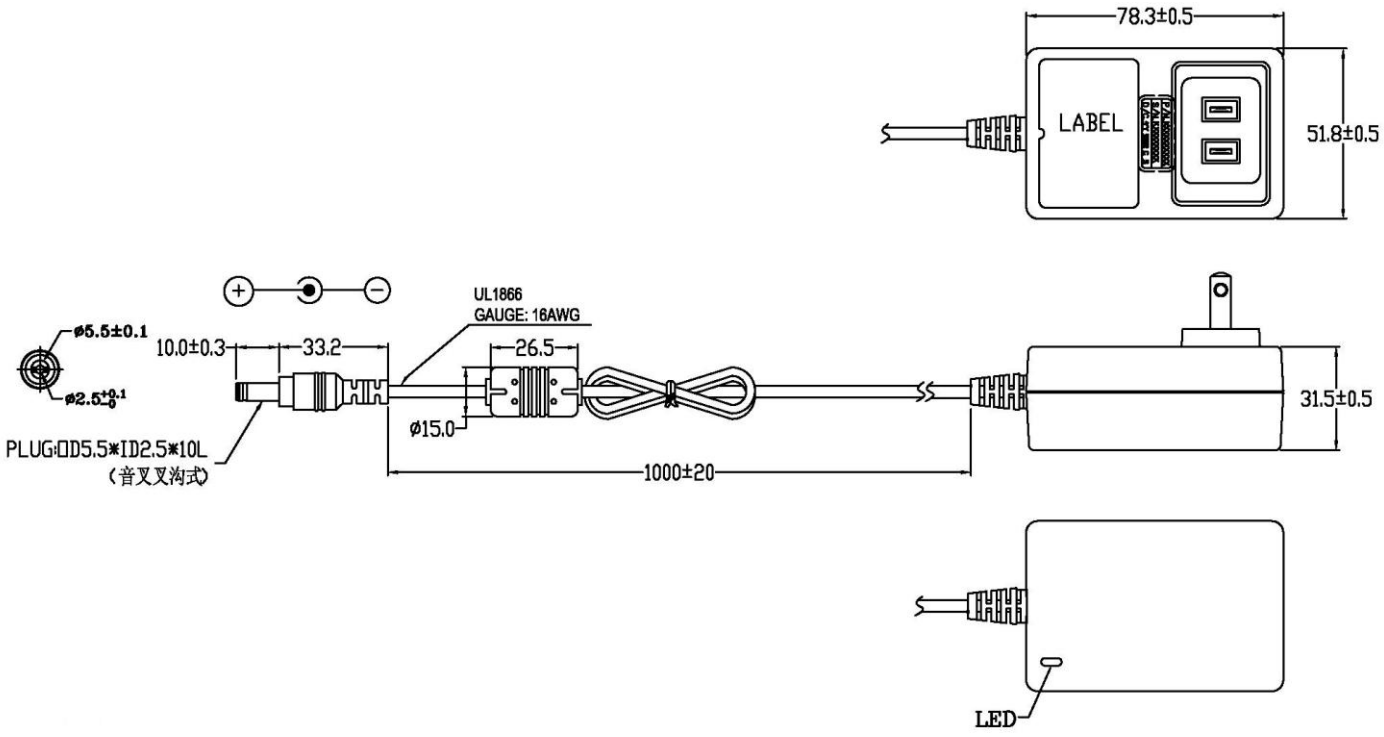
1. PMP15M models (Interchangeable AC Plug)



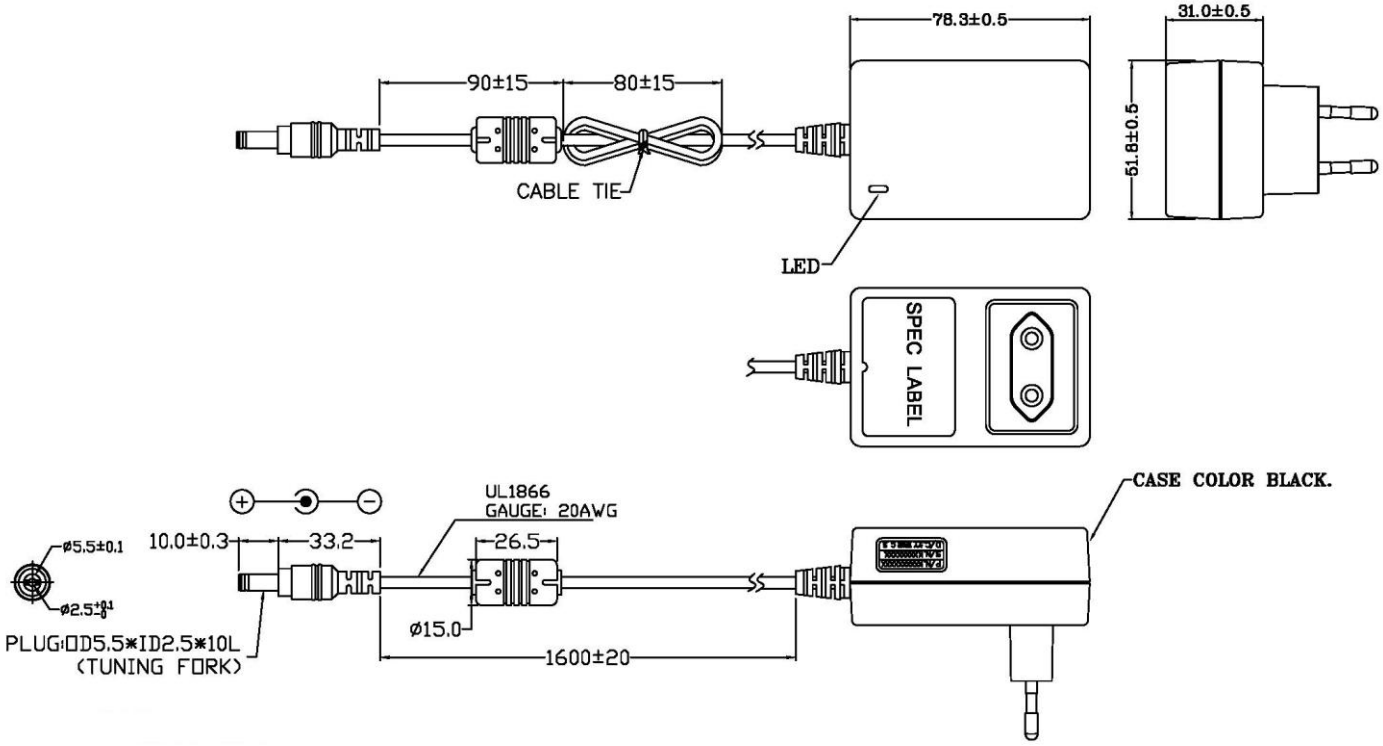
2. PMP15D models (Fixed North American AC Plug, Polarization)



3. PMP15NP models (Fixed North American AC Plug, Non-Polarization)



4. PMP15E models (Fixed European AC Plug)



NOTES:

1. Dimensions shown in inches [mm]
2. Tolerance 0.02 [0.5] maximum
3. Weight: 200 grams (0.44 lbs.) approx.
4. Output cable is 1600 mm 20 AWG except 1000 mm 16 AWG for 5 V and 6 V output models, and 1200 mm 18 AWG for 9 V output model, so as to comply with CEC and Energy Star efficiency level V requirements.
5. Output connector is 5.5 mm O.D., 2.5 mm I.D., 10 mm long barrel female connector, center positive voltage.
6. Interchangeable AC plugs can be ordered by referring to the following ordering number:

Type	Ordering no.
European plug	4AP00043
UK plug	4AP00049
US plug (polarization)	4AP00045
China plug	4AP00069
US plug (non-polarization)	4AP00042
India plug	5OE00006
Australia plug	5OE00008

DESCRIPTION

The PMP31 series of AC/DC switching power supplies are for 25-30 watts of continuous output power. They are enclosed in a 94V-0 rated polyphenylene-oxide case with an inlet of the IEC320/C14 to mate with interchangeable cord for world-wide use. All models meet EN55011 and FCC class B emission limits, and are designed for medical applications.

PMP31 SERIES

FEATURES

- High efficiency
- Low ripple & noise
- Overvoltage protection
- Over-temperature protection
- Short-circuit protection
- 100% burn-in at full rated load
- Standby consumption less than 0.3 W
- Compliant with CEC and ENERGY STAR efficiency level V requirements
- Compliant with RoHS requirements

INPUT SPECIFICATIONS

Input voltage:	90-264 VAC
Input frequency:	47-63 Hz
Input current:	1.0 A (rms) for 115 VAC 0.6 A (rms) for 230 VAC
Earth leakage current:	200 µA max. @ 264 VAC, 63 Hz
Touch current:	100 µA max. @ 264 VAC, 63 Hz

OUTPUT SPECIFICATIONS

Output voltage /current:	See rating chart.
Maximum output power:	See rating chart.
Ripple and noise:	1% peak to peak maximum, except 75 mVp-p max. for PMP31-10
Overvoltage protection:	Set at 116% to 230% of its nominal output voltage
Overcurrent protection:	All models protected to short-circuit conditions
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

ENVIRONMENTAL SPECIFICATIONS

Operating temperature:	0℃ to +60℃
Storage temperature:	-40℃ to +85℃
Relative humidity:	10% to 90% non-condensing
Derating	Derate from 100% at +40℃ linearly to 50% at +60℃

SAFETY STANDARD APPROVALS

UL ES 60601-1, CSA C22.2 No. 60601-1
File No. E211696

TÜV EN 60601-1

GENERAL SPECIFICATIONS

Hold-up time:	8 ms minimum at 115 VAC
Turn on delay time:	3 s maximum at 115 VAC
Efficiency:	Compliant with Energy Star efficiency level V requirements (see rating chart)
Line regulation:	±0.5% maximum at full load
Inrush current:	50 A @ 115 VAC or 100 A @ 230 VAC, at 25℃ cold start
Withstand voltage:	4000 VAC from input to output (2MOPP)
MTBF:	300,000 hours at full load at 25℃ ambient, calculated per MIL-HDBK-217F

EMC Performance (IEC60601-1-2)

EN55011:	Class B conducted, class B radiated
FCC:	Class B conducted, class B radiated
VCCI:	Class B conducted, class B radiated
EN61000-3-2:	Harmonic distortion, class A
EN61000-3-3:	Line flicker
EN61000-4-2:	ESD, ±15 KV air and ±8 KV contact
EN61000-4-3:	Radiated immunity, 10 V/m
EN61000-4-4:	Fast transient/burst, ±2 KV
EN61000-4-5:	Surge, ±1 KV diff., ±2 KV com
EN61000-4-6:	Conducted immunity, 10 Vrms
EN61000-4-8:	Magnetic field immunity, 30 A/m
EN61000-4-11:	Voltage dip immunity, 30% reduction for 500 ms, 100% reduction for 10 ms

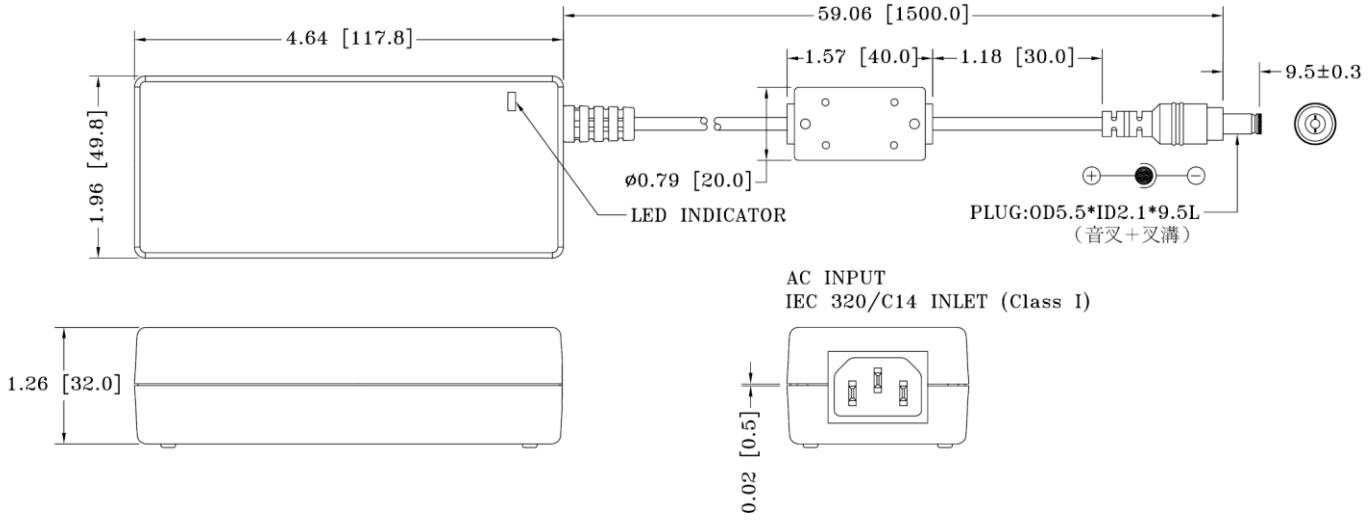
OUTPUT VOLTAGE/CURRENT RATING CHART

Model	Output						Average Active Efficiency (typical) @ 115 / 230 Vac
	V1	Min. Current	Max. Current	Tol.	Ripple & Noise[1]	Max. Output Power	
PMP31-10	5 V	0 A	5.0 A	±5%	75 mV	25 W	83 /81%
PMP31-11	9 V	0 A	3.33 A	±5%	90 mV	30 W	86 /84%
PMP31-12	12 V	0 A	2.5 A	±5%	120 mV	30 W	86 /85%
PMP31-13	15 V	0 A	2.0 A	±5%	150 mV	30 W	88 /86%
PMP31-13-1	18 V	0 A	1.66 A	±5%	180 mV	30 W	88 /86%
PMP31-14	24 V	0 A	1.25 A	±5%	240 mV	30 W	89 /87%
PMP31-18	48 V	0 A	0.625 A	±5%	480 mV	30 W	91 /90%

NOTES:

1. Ripple and noise is maximum peak to peak voltage value measured at output within 20 MHz bandwidth, at rated line voltage and output load ranges, and with a 47 µF tantalum capacitor in parallel with a 0.1 µF ceramic capacitor across the output.

MECHANICAL SPECIFICATIONS



NOTES:

1. Dimensions shown in inches [mm]
2. Tolerance 0.02 [0.5] maximum
3. Weight: 260 grams (0.57 lbs.) approx.
4. Output cable is 1500 mm, 18 AWG, except 1000 mm 16 AWG for 5V and 9V output models, so as to comply with CEC and Energy Star efficiency level V requirements.
5. Output connector is 5.5 mm O.D., 2.1 mm I.D., 9.5 mm long barrel female connector, center positive voltage.

DESCRIPTION

The PMP60 series of AC/DC switching power supplies are for 30-60 watts of continuous output power. They are enclosed in a 94V-1 rated polyphenylene-oxide case with an IEC320/C14 inlet to mate with interchangeable cord for world-wide use. All models meet EN55011 and FCC class B emission limits, and are designed for medical applications.

PMP60 SERIES

CE

RoHS

IV

FEATURES

- 12 standard desktop models
- Single, dual or triple outputs
- Optional output connectors
- Optional on /off switch
- 100% burn-in
- Wide input range 90-264 VAC
- Input surge current protection
- Overvoltage protection
- Over-temperature protection
- Overcurrent protection
- Single output models compliant with CEC and Energy Star Efficiency level IV requirements
  * No load power consumption less than 0.5 W
  * Average active efficiency ≧85%
- Compliant with RoHS requirement

SAFETY STANDARD APPROVALS

c UL us — UL ES 60601-1, CSA C22.2 No. 60601-1
File No. E178020

IEC 60601-1 — TÜV EN 60601-1

INPUT SPECIFICATIONS

Input voltage:	90-264 VAC
Input frequency:	47-63 Hz
Input current:	1.22 A (rms) for 100 VAC
	0.68 A (rms) for 240 VAC
Earth leakage current:	200 μA max. @ 264 VAC, 63 Hz
Touch current:	100 μA max. @ 264 VAC, 63 Hz

OUTPUT SPECIFICATIONS

Output voltage /current:	See rating chart.
Maximum output power:	See rating chart.
Ripple and noise:	66 mVp-p maximum on 3.3 V output, 100 mVp-p maximum on 5 V output and 1% maximum on other voltage outputs (12 V, 15 V ⋯, 48 V etc.)
Overvoltage protection:	Provided on output #1 only, set at 112-140% of its nominal output voltage
Overcurrent protection:	All outputs protected to short circuit conditions
Temperature coefficient:	All outputs ±0.04% /℃ maximum
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

ENVIRONMENTAL SPECIFICATIONS

Operating temperature:	0℃ to +60℃
Storage temperature:	-40℃ to +85℃
Relative humidity:	5% to 95% non-condensing
Derating:	Derate from 100% at +40℃ linearly to 50% at +60℃

GENERAL SPECIFICATIONS

Switching frequency:	40 KHz-130 KHz
Efficiency:	85% minimum on single output models, 68-74% minimum on the others
Hold-up time:	10 ms minimum at 110 VAC
Line regulation:	±0.5% maximum at full load
Inrush current:	50 A @ 115 VAC or 100 A @ 230 VAC, at 25℃ cold start
Withstand voltage:	5600 VDC from input to output (2 MOPP) 2100 VDC from input to ground (1 MOPP) 700 VDC from output to ground (To verify AC strength, get correct test method to avoid power supply damage.)
MTBF:	150,000 hours minimum at full load at 25℃ ambient, calculated per MIL-HDBK-217F

EMC Performance (IEC60601-1-2)

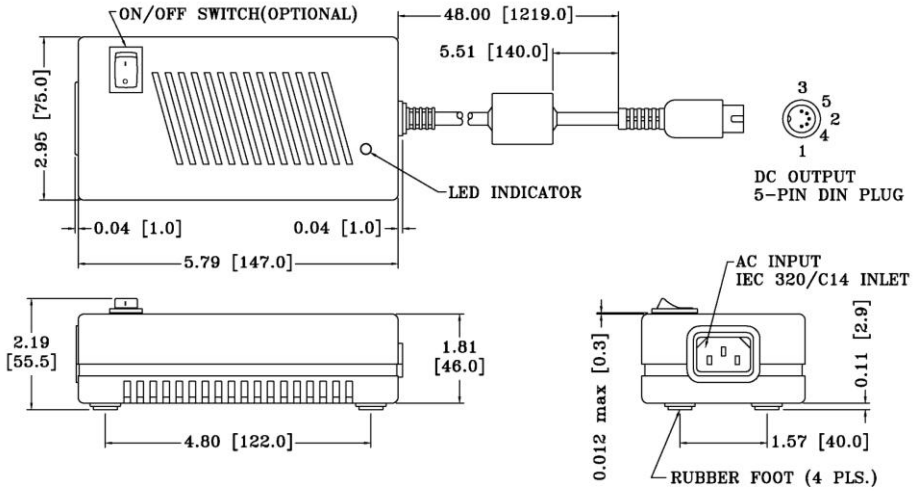
EN55011:	Class B conducted, class B radiated
FCC:	Class B conducted, class B radiated
VCCI:	Class B conducted, class B radiated
EN61000-3-2:	Harmonic distortion, class A and D
EN61000-3-3:	Line flicker
EN61000-4-2:	ESD, ±15 KV air and ±8 KV contact
EN61000-4-3:	Radiated immunity, 10 V/m
EN61000-4-4:	Fast transient/burst, ±2 KV
EN61000-4-5:	Surge, ±1 KV diff., ±2 KV com
EN61000-4-6:	Conducted immunity, 10 Vrms
EN61000-4-8:	Magnetic field immunity, 30 A/m
EN61000-4-11:	Voltage dip immunity, 30% reduction for 500 ms, 100% reduction for 10 ms

OUTPUT VOLTAGE/CURRENT RATING CHART

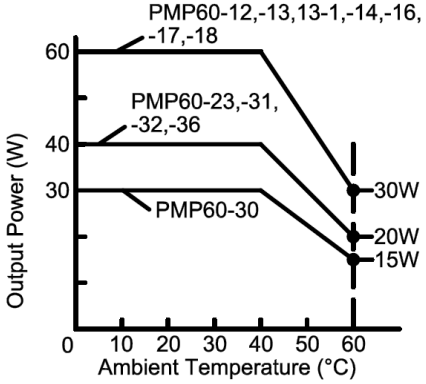
	Output #1				Output #2				Output #3				Max. Output Power
Model	V1	Min. current	Max. current	Tol.	V2	Min. current	Max. current	Tol.	V3	Min. current	Max. current	Tol.	
PMP60-12	11-13 V	0 A	5.46 A	±5%	(N/A)				(N/A)				60 W
PMP60-13	13-17 V	0 A	4.62 A	±5%	(N/A)				(N/A)				60 W
PMP60-13-1	17-21 V	0 A	3.53 A	±5%	(N/A)				(N/A)				60 W
PMP60-14	21-27 V	0 A	2.86 A	±5%	(N/A)				(N/A)				60 W
PMP60-16	27-33 V	0 A	2.23 A	±3%	(N/A)				(N/A)				60 W
PMP60-17	33-39 V	0 A	1.82 A	±3%	(N/A)				(N/A)				60 W
PMP60-18	46-50 V	0 A	1.31 A	±3%	(N/A)				(N/A)				60 W
PMP60-23	+5.0 V	1 A	5.0 A	±5%	+12 V	0.5 A	3.0 A	±5%	(N/A)				40 W
PMP60-30	+3.3 V	1 A	6.0 A	±5%	+5 V	0.5 A	3.0 A	±5%	+12 V	0.1 A	0.7 A	±10%	30 W
PMP60-31	+5.0 V	1 A	5.0 A	±5%	+12 V	0.5 A	3.0 A	±5%	-12 V	0.1 A	0.7 A	±10%	40 W
PMP60-32	+5.0 V	1 A	5.0 A	±5%	+15 V	0.4 A	2.3 A	±5%	-15 V	0.1 A	0.7 A	±10%	40 W
PMP60-36	+5.0 V	1 A	5.0 A	±5%	+24 V	0.3 A	1.5 A	±5%	+12 V	0.1 A	0.7 A	±10%	40 W

NOTES:
1. The output voltages of a multiple output model may go outside of the stated tolerance when an output load current is out of stated limits. All models may be operated at no-load without damage.
2. Ripple and noise is maximum peak to peak voltage value measured at output within 20 MHz bandwidth, at rated line voltage and output load ranges, and with a 10 µF tantalum capacitor in parallel with a 0.1 µF ceramic capacitor across the output.

MECHANICAL SPECIFICATIONS



OUTPUT POWER DERATING CURVE



NOTES:
1. Dimensions shown in inches [mm]
2. Tolerance 0.02 [0.5] maximum
3. Weight: 600 grams (1.33 lbs.) approx.
4. Output connector is 5 pin DIN plug, mating with Switchcraft P/N 57GB5F receptacle or equivalent.
5. Refer to Section titled “OPTIONAL OUPUT CONNECTORS“ for optional output connectors. Add the suffix assigned for a selected connector to a wanted model number, e.g. PMP60-12-B2, for ordering.
6. To order a model with on / off switch, add suffix “ S “ to the model number, e.g. PMP60-12-B2-S

PIN CHART

MODEL \ PIN	1	2	3	4	5
PMP60-12 PMP60-14 PMP60-17 PMP60-13 PMP60-16 PMP60-18 PMP60-13-1	V1 Return	V1 Return	+V1	V1 Return	+V1
PMP60-23	Common Return	Common Return	V1	N.C.	V2
PMP60-30 PMP60-32 PMP60-36 PMP60-31	Common Return	Common Return	V1	V3	V2

DESCRIPTION

The PMP60N1 series of AC/DC switching power supplies are for 60 watts of continuous output power. They are enclosed in a 94V-1 rated polyphenylene-oxide case with an IEC320/C14 inlet to mate with interchangeable cord for world-wide use. All models meet EN55011, EN55022 and FCC class B emission limits, and are designed for medical and ITE applications.

PMP60N1 SERIES

RoHS

VI

FEATURES

- Operation up to 5000 meters
- 7 standard desktop models
- Optional on /off switch
- Optional output connectors
- 100% burn-in
- Wide input range 90-264 VAC
- Input surge current protection
- Overvoltage protection
- Overcurrent protection
- Over-temperature protection
- Compliant with DoE Efficiency level VI requirements
- Compliant with RoHS requirement

SAFETY STANDARD APPROVALS

INPUT SPECIFICATIONS

Input voltage:	90-264 VAC
Input frequency:	47-63 Hz
Input current:	1.22 A (rms) for 100 VAC 0.68 A (rms) for 240 VAC
Earth leakage current:	200 µA max. @ 264 VAC, 63 Hz
Touch current:	100 µA max. @ 264 VAC, 63 Hz

OUTPUT SPECIFICATIONS

Output voltage /current:	See output rating chart.
Maximum output power:	See output rating chart.
Ripple and noise:	1% peak to peak maximum
Overvoltage protection:	Set at 112-140% of its nominal output voltage
Overcurrent protection:	Outputs protected to short circuit conditions
Temperature coefficient:	±0.04% /℃ maximum
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

ENVIRONMENTAL SPECIFICATIONS

Operating temperature:	-20℃ to +60℃
Storage temperature:	-40℃ to +85℃
Relative humidity:	5% to 95% non-condensing
Derating:	Derate from 100% at +40℃ linearly to 50% at +60℃

GENERAL SPECIFICATIONS

Switching frequency:	20 KHz-130 KHz
Efficiency:	See output rating chart
Hold-up time:	20 ms typical at 110 VAC
Line regulation:	±0.5% maximum at full load
Inrush current:	60 A @ 115 VAC or 120 A @ 230 VAC, at 25℃ cold start
Withstand voltage:	4000 VAC from input to output (2 MOPP) 1500 VAC from input to ground (1 MOPP) 500 VAC from output to ground
MTBF:	150,000 hours minimum at full load at 25℃ ambient, calculated per MIL-HDBK-217F

EMC Performance (IEC60601-1-2)

EN55011 / EN55022:	Class B conducted, class B radiated
FCC:	Class B conducted, class B radiated
VCCI:	Class B conducted, class B radiated
EN61000-3-2:	Harmonic distortion, class A and D
EN61000-3-3:	Line flicker
EN61000-4-2:	ESD, ±15 KV air and ±8 KV contact
EN61000-4-3:	Radiated immunity, 10 V/m for 80-2500 MHz
EN61000-4-4:	Fast transient/burst, ±2 KV
EN61000-4-5:	Surge, ±1 KV diff., ±2 KV com
EN61000-4-6:	Conducted immunity, 10 Vrms
EN61000-4-8:	Magnetic field immunity, 30 A/m
EN61000-4-11:	Voltage dip immunity, 30% reduction for 500 ms, 100% reduction for 20 ms

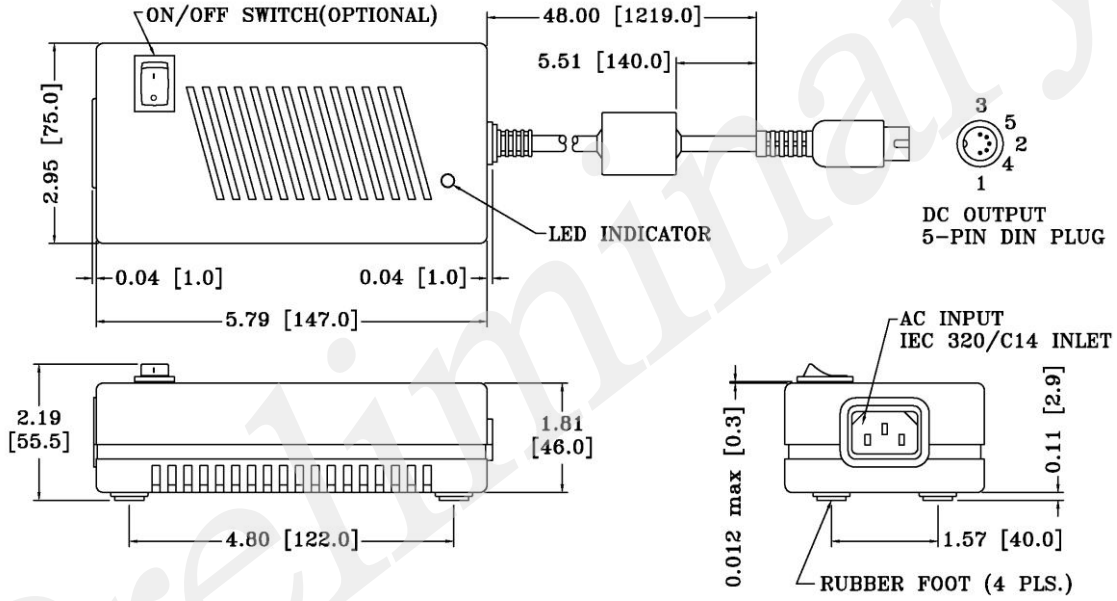
Preliminary

OUTPUT VOLTAGE/CURRENT RATING CHART

Model	Output						Average Active Efficiency (typical) @ 115 / 230 Vac
	V1	Min. current	Max. current	Tol.	Ripple & Noise[1]	Max. Output Power	
PMP60N1-12	11-13 V	0 A	5.46 A	±5%	110-130 mV	60 W	87 /88%
PMP60N1-13	13-17 V	0 A	4.62 A	±5%	130-170 mV	60 W	88 /89%
PMP60N1-13-1	17-21 V	0 A	3.53 A	±5%	170-210 mV	60 W	89 /90%
PMP60N1-14	21-27 V	0 A	2.86 A	±5%	210-270 mV	60 W	88 /89%
PMP60N1-16	27-33 V	0 A	2.23 A	±3%	270-330 mV	60 W	88 /89%
PMP60N1-17	33-39 V	0 A	1.82 A	±3%	330-390 mV	60 W	88 /89%
PMP60N1-18	46-50 V	0 A	1.31 A	±3%	460-500 mV	60 W	89 /89%

NOTES:
1. Ripple and noise is maximum peak to peak voltage value measured at output within 20 MHz bandwidth, at rated line voltage and output load ranges, and with a 10 µF tantalum capacitor in parallel with a 0.1 µF ceramic capacitor across the output.

MECHANICAL SPECIFICATIONS

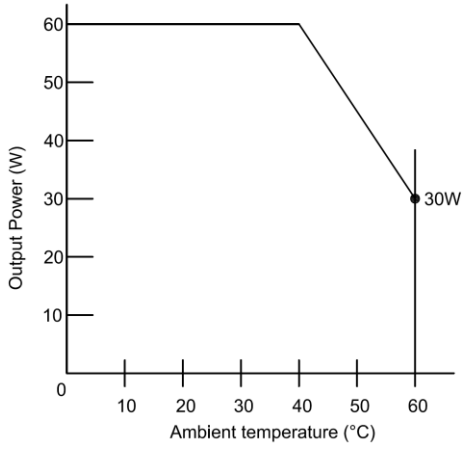


NOTES:
1. Dimensions shown in inches [mm]
2. Tolerance 0.02 [0.5] maximum
3. Weight: 600 grams (1.33 lbs.) approx.
4. Output connector is 5 pin DIN plug, mating with Switchcraft P/N 57GB5F receptacle or equivalent.
5. Refer to Section titled “OPTIONAL OUPUT CONNECTORS“ for optional output connectors. Add the suffix assigned for a selected connector to a wanted model number, e.g. PMP60N1-12-B2, for ordering.
6. To order a model with on / off switch, add suffix “ S “ to the model number, e.g. PMP60N1-12-B2-S
7. The length of output cable for output voltage 12V is 37.4 [950.0].

PIN CHART

PIN 1	V1 Return
PIN 2	V1 Return
PIN 3	+V1
PIN 4	V1 Return
PIN 5	+V1

OUTPUT POWER DERATING CURVE



Preliminary

65 WATT MEDICAL POWER SUPPLIES

DESCRIPTION

The PMP65 series of AC/DC switching power supplies are for 65 watts of continuous output power. They are enclosed in a 94V-0 rated polycarbonate case with an IEC320/C6 or IEC320/C8 inlet to mate with interchangeable cord for world-wide use. All models meet EN55011 and FCC class B emission limits, and are designed for medical applications.

PMP65 SERIES

RoHS

FEATURES

- High efficiency
- Low safety ground leakage current
- Wide input range 85 to 265 VAC
- 100% burn-in
- Overvoltage protection
- Over-temperature protection
- Short-circuit protection
- Compliant with CEC and Energy Star Efficiency level V requirements
  * No load power consumption less than 0.5 W
  * Average active efficiency greater than 87%
- Compliant with RoHS requirements

SAFETY STANDARD APPROVALS

UL ES 60601-1, CSA C22.2 No. 60601-1
File No. E211696

TÜV EN 60601-1

INPUT SPECIFICATIONS

Input voltage:	85-265 VAC
Input frequency:	47-63 Hz
Input current:	2.0 A (rms) for 115 VAC 1.0 A (rms) for 230 VAC
Earth leakage current:	300 μA max. @ 264 VAC, 63 Hz
Touch current:	100 μA max. @ 264 VAC, 63 Hz

OUTPUT SPECIFICATIONS

Output voltage /current:	See rating chart.
Maximum output power:	See rating chart.
Ripple and noise:	1% peak to peak maximum
Overvoltage protection:	Provided and set at 112-140% of its nominal output voltage
Overcurrent protection:	Protected to short circuit conditions
Temperature coefficient:	±0.04% /℃ maximum
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

ENVIRONMENTAL SPECIFICATIONS

Operating temperature:	0℃ to +60℃
Storage temperature:	-40℃ to +85℃
Relative humidity:	5% to 95% non-condensing
Derating:	Derate from 100% at +40℃ linearly to 50% at +60℃

GENERAL SPECIFICATIONS

Switching frequency:	75-100 KHz
Efficiency:	87% min.
Hold-up time:	10 ms minimum at 110 VAC
Line regulation:	±0.5% maximum at full load
Inrush current:	40 A @ 115 VAC or 80 A @ 230 VAC, at 25℃ cold start
Withstand voltage:	4000 VAC from input to output (2MOPP), 1500 VAC from input to ground (1MOPP), For Class II models, 4000 VAC from input to output
MTBF:	150,000 hours at full load at 25℃ ambient , calculated per MIL-HDBK-217F

EMC Performance (IEC60601-1-2)

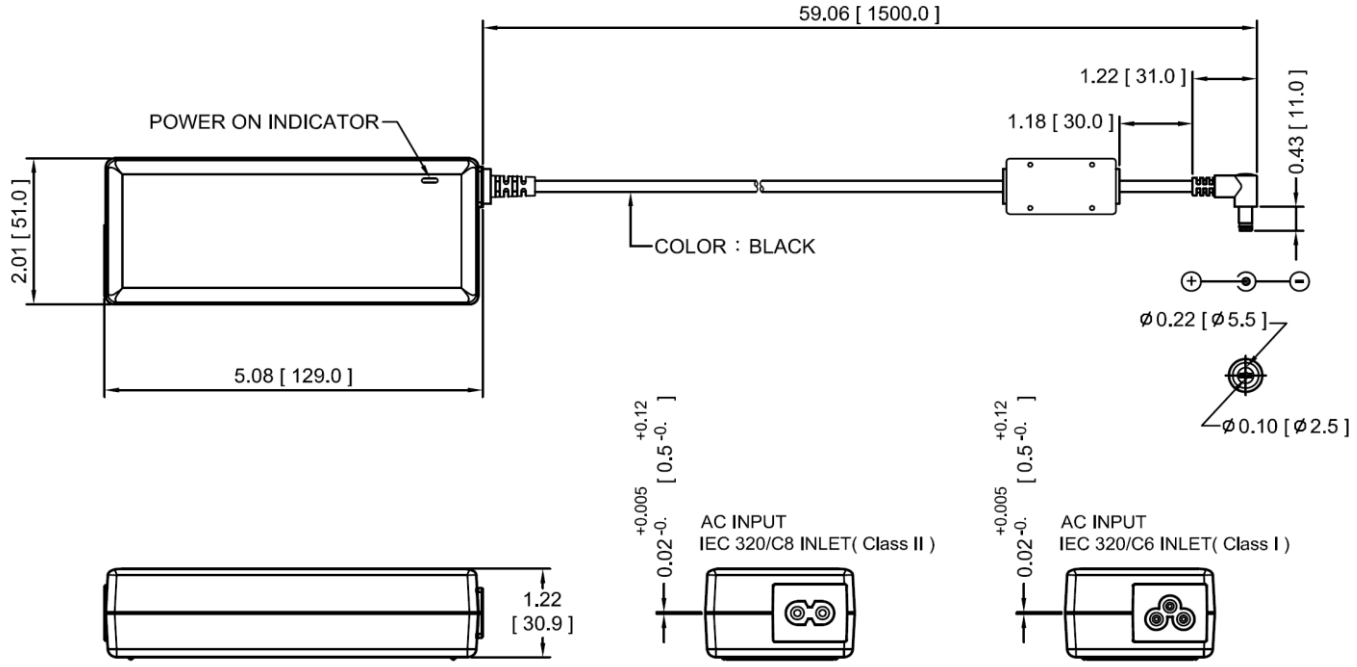
EN55011:	Class B conducted, class B radiated
FCC:	Class B conducted, class B radiated
VCCI:	Class B conducted, class B radiated
EN61000-3-2:	Harmonic distortion, class A
EN61000-3-3:	Line flicker
EN61000-4-2:	ESD, ±15 KV air and ±8 KV contact
EN61000-4-3:	Radiated immunity, 10 V/m
EN61000-4-4:	Fast transient/burst, ±2 KV
EN61000-4-5:	Surge, ±1 KV diff., ±2 KV com
EN61000-4-6:	Conducted immunity, 10 Vrms
EN61000-4-8:	Magnetic field immunity, 30 A/m
EN61000-4-11:	Voltage dip immunity, 30% reduction for 500 ms, 100% reduction for 10 ms

OUTPUT VOLTAGE/CURRENT RATING CHART

Model[1]		Output						Average Active Efficiency (typical) @ 115 / 230 Vac
Class I	Class II	V1	Min. Current	Max. Current	Tol.	Ripple & Noise[2]	Max. Power	
PMP65S-12	PMP65SF-12	12.0 V	0 A	5.42 A	±5%	120 mV	65 W	87 /88%
PMP65S-13	PMP65SF-13	15.0 V	0 A	4.34 A	±5%	150 mV	65 W	89 /89%
PMP65S-13-1	PMP65SF-13-1	18.0 V	0 A	3.62 A	±5%	180 mV	65 W	87 /88%
PMP65S-13-2	PMP65SF-13-2	19.0 V	0 A	3.43 A	±5%	190 mV	65 W	88 /89%
PMP65S-13-3	PMP65SF-13-3	20.0 V	0 A	3.25 A	±5%	200 mV	65 W	88 /89%
PMP65S-14	PMP65SF-14	24.0 V	0 A	2.71 A	±5%	240 mV	65 W	88 /90%

NOTES:
1. Class-I models are equipped with IEC 320/C6 inlet, and Class-II models with IEC 320/C8 inlet
2. Ripple and noise is maximum peak to peak voltage value measured at output within 20 MHz bandwidth, at rated line voltage and output load ranges, and with a 47 µF tantalum capacitor in parallel with a 0.1 µF ceramic capacitor across the output.

MECHANICAL SPECIFICATIONS



NOTES:
1. Dimensions shown in inches [mm]
2. Tolerance 0.02 [0.5] maximum
3. Weight: 340 grams (0.749 lbs.) approx.

DESCRIPTION

The PMP85SF series of AC/DC switching power supplies are for 85 watts of continuous output power. They are enclosed in a 94V-0 rated polycarbonate case with an IEC320/C8 inlet to mate with interchangeable cord for world-wide use. All models meet EN55011 and FCC class B emission limits, and are designed for medical applications.

PMP85SF SERIES

FEATURES

- High efficiency
- Low safety ground leakage current
- Wide input range 90 to 264 VAC
- 100% burn-in
- Short-circuit protection
- Over-temperature protection
- Compliant with CEC and Energy Star Efficiency level V requirements
  * No load power consumption less than 0.5 W
  * Average active efficiency greater than 87%
- Compliant with RoHS requirements
- Compliant with IPX1

SAFETY STANDARD APPROVALS

UL ES 60601-1, CSA C22.2 No. 60601-1
File No. E211696

TÜV EN 60601-1

INPUT SPECIFICATIONS

Input voltage:	90-264 VAC
Input frequency:	47-63 Hz
Input current:	1.70 A (rms) for 115 VAC 0.90 A (rms) for 230 VAC
Touch current:	100 μA max. @ 264 VAC, 63 Hz

OUTPUT SPECIFICATIONS

Output voltage /current:	See rating chart.
Maximum output power:	See rating chart.
Ripple and noise:	1% peak to peak maximum
Overvoltage protection:	Provided and set at 112-140% of its nominal output voltage
Overcurrent protection:	Protected to short circuit conditions
Temperature coefficient:	±0.04% /℃ maximum
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

ENVIRONMENTAL SPECIFICATIONS

Operating temperature:	0℃ to +60℃
Storage temperature:	-40℃ to +85℃
Relative humidity:	5% to 95% non-condensing
Derating:	Derate from 100% at +40℃ linearly to 50% at +60℃

GENERAL SPECIFICATIONS

Switching frequency:	75-100 KHz
Efficiency:	87% min.
Hold-up time:	10 ms minimum at 110 VAC
Line regulation:	±0.5% maximum at full load
Inrush current:	40 A @ 115 VAC or 80 A @ 230 VAC, at 25℃ cold start
Withstand voltage:	4000 VAC from input to output (2 MOPP)
MTBF:	150,000 hours at full load at 25℃ ambient , calculated per MIL-HDBK-217F

EMC Performance (IEC60601-1-2)

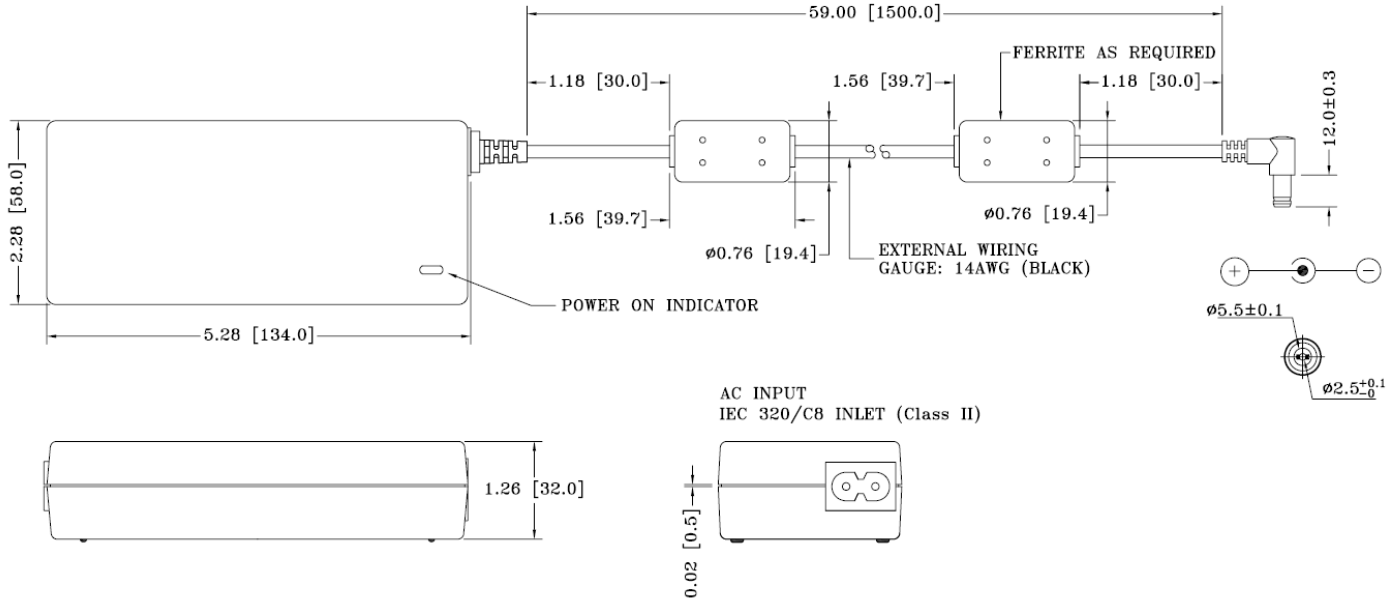
EN55011:	Class B conducted, class B radiated
FCC:	Class B conducted, class B radiated
VCCI:	Class B conducted, class B radiated
EN61000-3-2:	Harmonic distortion, class A
EN61000-3-3:	Line flicker
EN61000-4-2:	ESD, ±15 KV air and ±8 KV contact
EN61000-4-3:	Radiated immunity, 10 V/m
EN61000-4-4:	Fast transient/burst, ±2 KV
EN61000-4-5:	Surge, ±1 KV diff., ±2 KV com
EN61000-4-6:	Conducted immunity, 10 Vrms
EN61000-4-8:	Magnetic field immunity, 30 A/m
EN61000-4-11:	Voltage dip immunity, 30% reduction for 500 ms, 100% reduction for 10 ms

OUTPUT VOLTAGE/CURRENT RATING CHART

Model	Output						Average Active Efficiency (typical) @ 115 / 230 Vac
Class II	V1	Min. Current	Max. Current	Tol.	Ripple & Noise(1)	Max. Power	
PMP85SF-13-1	18.0 V	0 A	4.72 A	±5%	180 mV	85 W	88 /89%
PMP85SF-13-2	19.0 V	0 A	4.47 A	±5%	190 mV	85 W	88 /89%
PMP85SF-14	24.0 V	0 A	3.54 A	±5%	240 mV	85 W	88 /90%

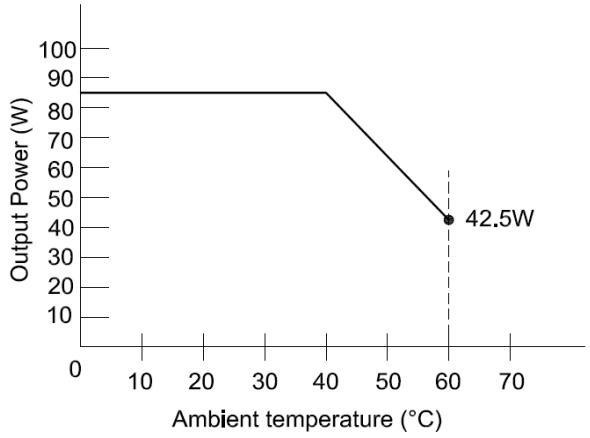
NOTES:
1. Ripple and noise is maximum peak to peak voltage value measured at output within 20 MHz bandwidth, at rated line voltage and output load ranges, and with a 47 µF tantalum capacitor in parallel with a 0.1 µF ceramic capacitor across the output.

MECHANICAL SPECIFICATIONS



NOTES:
1. Dimensions shown in inches [mm]
2. Tolerance 0.02 [0.5] maximum
3. Weight: 410 grams (0.906 lbs.) approx.

OUTPUT POWER DERATING CURVE



DESCRIPTION

The PMP90 series of AC/DC switching power supplies are for 60-90 watts of continuous output power. They are enclosed in a 94V-0 rated polyphenylene-oxide case with an IEC320/C14 or IEC320/C18 inlet to mate with interchangeable cord for world-wide use. All models meet EN55011 and FCC class B emission limits, and are designed for medical applications.

PMP90 SERIES

CE

RoHS

IV

FEATURES

- Low safety ground leakage current
- Wide input range 90 to 264 VAC
- Optional output connectors
- 100% burn-in
- Overvoltage protection
- Over-temperature protection
- Overcurrent protection
- Compliant with CEC and Energy Star Efficiency level IV requirements (except models PMP90-10, PMP90-10-1 and PMP90-11)
  * No load power consumption less than 0.5 W
  * Average active efficiency greater than 85%
- Compliant with RoHS requirements

SAFETY STANDARD APPROVALS

c UL us — UL ES 60601-1, CSA C22.2 No. 60601-1
File No. E178020

IEC 60601-1 — TÜV EN 60601-1

INPUT SPECIFICATIONS

Input voltage:	90-264 VAC
Input frequency:	47-63 Hz
Input current:	1.20 A (rms) for 115 VAC 0.60 A (rms) for 230 VAC
Earth leakage current:	180 μA max. @ 264 VAC, 63 Hz
Touch current:	100 μA max. @ 264 VAC, 63 Hz

OUTPUT SPECIFICATIONS

Output voltage /current:	See rating chart.
Maximum output power:	See rating chart.
Ripple and noise:	100 mVp-p maximum on 5 V, 6 V and 9 V outputs, 1% maximum on other voltage outputs (12 V, 13.5 V ⋯, 48 V etc.)
Overvoltage protection:	Provided and set at 112-140% of its nominal output voltage
Overcurrent protection:	Protected to short circuit conditions
Temperature coefficient:	±0.04% /℃ maximum
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

ENVIRONMENTAL SPECIFICATIONS

Operating temperature:	0℃ to +60℃
Storage temperature:	-40℃ to +85℃
Relative humidity:	5% to 95% non-condensing
Derating:	Derate from 100% at +40℃ linearly to 50% at +60℃

GENERAL SPECIFICATIONS

Switching frequency:	50-110 KHz
Power factor:	0.98 Typical
Efficiency:	85% min. (except 77% min. for PMP90-10, PMP90-10-1, PMP90-11 and PMP90-12)
Hold-up time:	15 ms minimum at 110 VAC
Line regulation:	±0.5% maximum at full load
Inrush current:	50 A @ 115 VAC or 100 A @ 230 VAC, at 25℃ cold start
Withstand voltage:	5600 VDC from input to output (2 MOPP) 2100 VDC from input to ground (1 MOPP) 700 VDC from output to ground (To verify AC strength, get correct test method to avoid power supply damage.) For Class II models, 4000 VAC from input to output
MTBF:	150,000 hours at full load at 25℃ ambient , calculated per MIL-HDBK-217F

EMC Performance (IEC60601-1-2)

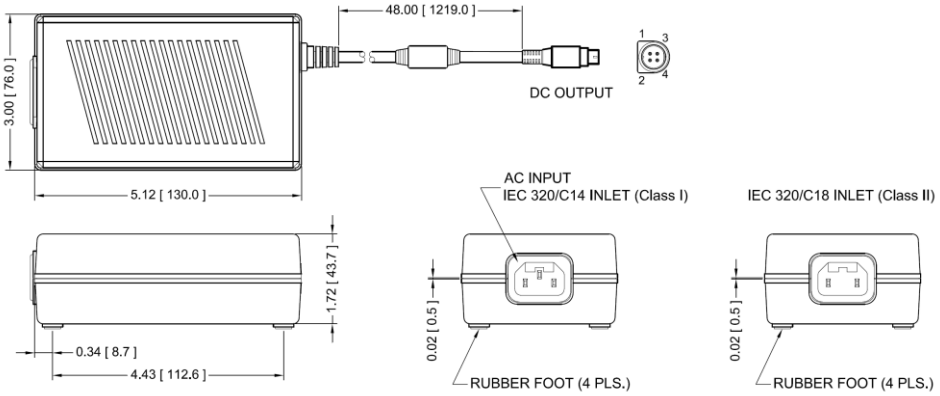
EN55011	Class B conducted, class B radiated
FCC:	Class B conducted, class B radiated
VCCI:	Class B conducted, class B radiated
EN61000-3-2:	Harmonic distortion, class A and D
EN61000-3-3:	Line flicker
EN61000-4-2:	ESD, ±15 KV air and ±8 KV contact
EN61000-4-3:	Radiated immunity, 10 V/m
EN61000-4-4:	Fast transient/burst, ±2 KV
EN61000-4-5:	Surge, ±1 KV diff., ±2 KV com
EN61000-4-6:	Conducted immunity, 10 Vrms
EN61000-4-8:	Magnetic field immunity, 30 A/m
EN61000-4-11:	Voltage dip immunity, 30% reduction for 500 ms, 100% reduction for 10 ms

OUTPUT VOLTAGE/CURRENT RATING CHART

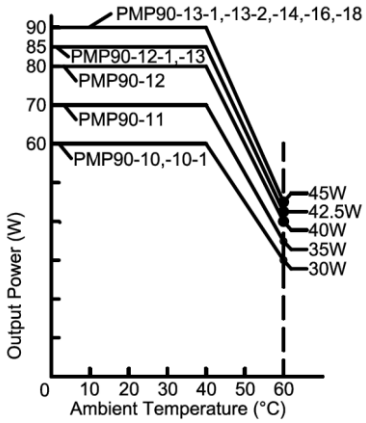
Model[1]		Output						Average Active Efficiency (typical) @ 115 / 230 Vac
Class I	Class II	V1	Min. Current	Max. Current	Tol.	Ripple & Noise[2]	Max. Power	
PMP90-10	PMP90F-10	5.0 V	0 A	12.0 A	±5%	100 mV	60 W	78 /79%
PMP90-10-1	PMP90F-10-1	6.0 V	0 A	10.0 A	±5%	100 mV	60 W	78 /79%
PMP90-11	PMP90F-11	9.0 V	0 A	7.78 A	±5%	100 mV	70 W	81 /82%
PMP90-12	PMP90F-12	12.0 V	0 A	6.67 A	±5%	120 mV	80 W	86 /85%
PMP90-12-1	PMP90F-12-1	13.5 V	0 A	6.30 A	±5%	135 mV	85 W	86 /85%
PMP90-13	PMP90F-13	15.0 V	0 A	5.67 A	±5%	150 mV	85 W	86 /85%
PMP90-13-1	PMP90F-13-1	18.0 V	0 A	5.00 A	±5%	180 mV	90 W	86 /85%
PMP90-13-2	PMP90F-13-2	19.0 V	0 A	4.74 A	±5%	190 mV	90 W	86 /86%
PMP90-14	PMP90F-14	24.0 V	0 A	3.75 A	±5%	240 mV	90 W	87 /86%
PMP90-16	PMP90F-16	30.0 V	0 A	3.00 A	±5%	300 mV	90 W	87 /86%
PMP90-18	PMP90F-18	48.0 V	0 A	1.87 A	±5%	480 mV	90 W	88 /87%

NOTES:
1. Class I models are equipped with IEC320/C14 inlet, and class II models with IEC320/C18 inlet.
2. Ripple and noise is maximum peak to peak voltage value measured at output within 20 MHz bandwidth, at rated line voltage and output load ranges, and with a 10 µF tantalum capacitor in parallel with a 0.1 µF ceramic capacitor across the output.

MECHANICAL SPECIFICATIONS



OUTPUT POWER DERATING CURVE



NOTES:
1. Dimensions shown in inches [mm]
2. Tolerance 0.02 [0.5] maximum
3. Weight: 658 grams (1.45 lbs.) approx.
4. Output connector is 4 pin plug without lock, mating with Kycon P/N KPJX-4S-S socket or equivalent.
5. Refer to Section titled “OPTIONAL OUTPUT CONNECTORS”. Add the suffix assigned for a selected connector to a wanted model number, e.g. PMP90-14-B1, for ordering.

PIN CHART

MODEL / PIN		1	2	3	4
PMP90-10	PMP90F-10	V1 Return	+V1	V1 Return	+V1
PMP90-10-1	PMP90F-10-1				
PMP90-11	PMP90F-11				
PMP90-12	PMP90F-12				
PMP90-12-1	PMP90F-12-1				
PMP90-13	PMP90F-13				
PMP90-13-1	PMP90F-13-1				
PMP90-13-2	PMP90F-13-2				
PMP90-14	PMP90F-14				
PMP90-16	PMP90F-16				
PMP90-18	PMP90F-18				

DESCRIPTION

This series of AC/DC switching power supplies are for 90 watts of continuous output power. They are enclosed in a 94V-0 rated polycarbonate case with an IEC320/C8 or IEC320/C6 inlet to mate with interchangeable cord for world-wide use. All models meet EN55011 and FCC class B emission limits, and are designed for medical applications.

PMP92 SERIES

RoHS

VI

FEATURES

- High efficiency
- Operation up to 5000 meters
- Low safety ground leakage current
- Wide input range 90 to 264 VAC
- 100% burn-in
- Overvoltage protection
- Over-temperature protection
- Short-circuit protection
- Compliant with DOE Efficiency level VI requirement
  * No load power consumption less than 0.21 W
  * Average active efficiency greater than 88%
- Compliant with RoHS requirements

SAFETY STANDARD APPROVALS

UL ES 60601-1, CSA C22.2 No. 60601-1
File No. E211696

TÜV EN 60601-1

INPUT SPECIFICATIONS

Input voltage:	90-264 VAC
Input frequency:	47-63 Hz
Input current:	1.5 A (rms) for 115 VAC 0.6 A (rms) for 230 VAC
Earth leakage current:	220 uA max. @ 264 VAC, 63 Hz
Touch current	100 μA max. @ 264 VAC, 63 Hz

OUTPUT SPECIFICATIONS

Output voltage /current:	See rating chart.
Maximum output power:	See rating chart.
Ripple and noise:	150 mV_{P-P} maximum on 12 V, 1% peak to peak maximum on other voltage outputs (18 V, 19 V and 24 V)
Overvoltage protection:	Provided and set at 112-140% of its nominal output voltage
Overcurrent protection:	Protected to short circuit conditions
Temperature coefficient:	±0.04% /℃ maximum
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

ENVIRONMENTAL SPECIFICATIONS

Operating temperature:	0℃ to +60℃
Storage temperature:	-40℃ to +85℃
Relative humidity:	5% to 95% non-condensing
Derating:	Derate from 100% at +40℃ Linearly to 50% at +60℃

GENERAL SPECIFICATIONS

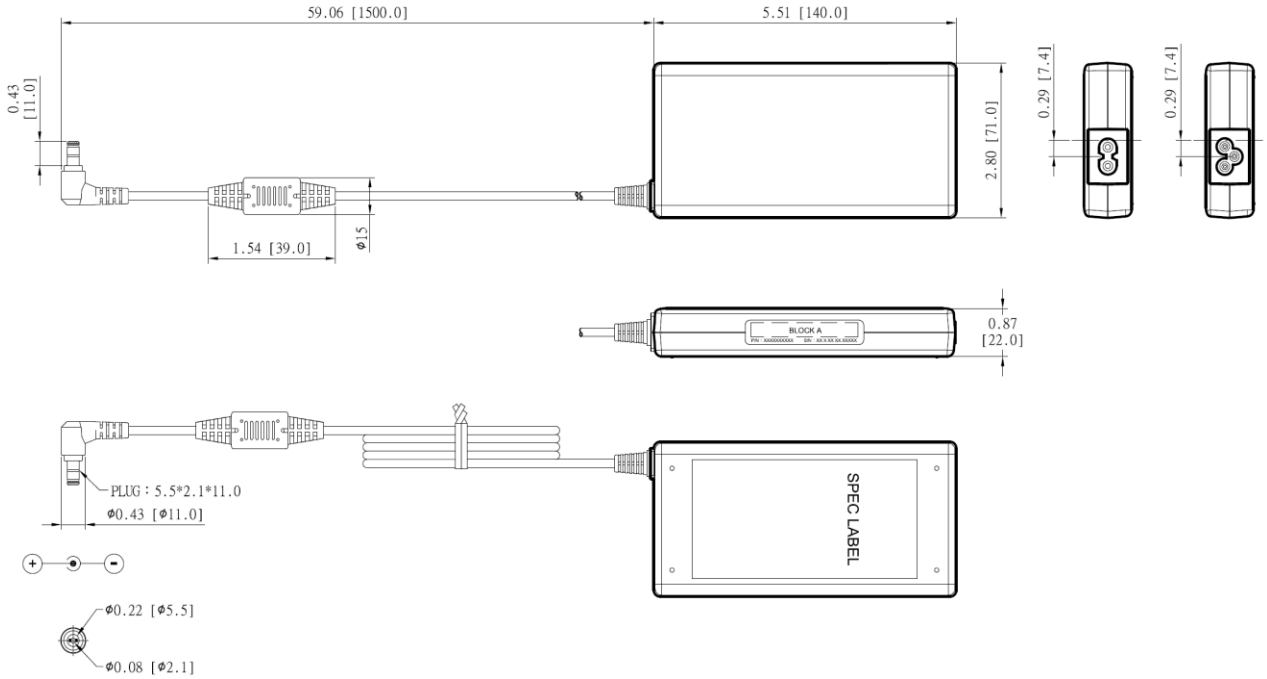
Switching frequency:	75-150 KHz
Power factor:	0.98 typical
Efficiency:	88% minimum.
Hold-up time:	10 ms minimum at 115 VAC
Line regulation:	±0.5% maximum at full load
Inrush current:	50 A @ 115 VAC or 100 A @ 230 VAC, at 25℃ cold start
Withstand voltage:	4000 VAC from input to output (2 MOPP) 1500 VAC from input to ground (1 MOPP)
MTBF:	100,000 hours at full load at 25℃ ambient , calculated per MIL-HDBK-217F
EMC Performance (IEC60601-1-2)	
EN55011:	Class B conducted, class B radiated
FCC:	Class B conducted, class B radiated
VCCI:	Class B conducted, class B radiated
EN61000-3-2:	Harmonic distortion, class A and D
EN61000-3-3:	Line flicker
EN61000-4-2:	ESD, ±15 KV air and ±8 KV contact
EN61000-4-3:	Radiated immunity, 10 V/m
EN61000-4-4:	Fast transient/burst, ±2 KV
EN61000-4-5:	Surge, ±1 KV diff., ±2 KV com
EN61000-4-6:	Conducted immunity, 10 Vrms
EN61000-4-8:	Magnetic field immunity, 30 A/m
EN61000-4-11:	Voltage dip immunity, 30% reduction for 500 ms, 100% reduction for 10 ms

OUTPUT VOLTAGE/CURRENT RATING CHART

Model[1]		Output						Average Active Efficiency (typical) @ 115 / 230 Vac
Class-I	Class-II	V1	Min. Current	Max. Current	Tol.	Ripple & Noise[2]	Max. Power	
PMP92S-12	PMP92SF-12	12.0 V	0 A	7.50 A	±5%	150 mV	90 W	88 /89%
PMP92S-13-1	PMP92SF-13-1	18.0 V	0 A	5.00 A	±5%	180 mV	90 W	88 /89%
PMP92S-13-2	PMP92SF-13-2	19.0 V	0 A	4.74 A	±5%	190 mV	90 W	88 /89%
PMP92S-14	PMP92SF-14	24.0 V	0 A	3.75 A	±5%	240 mV	90 W	88 /89%

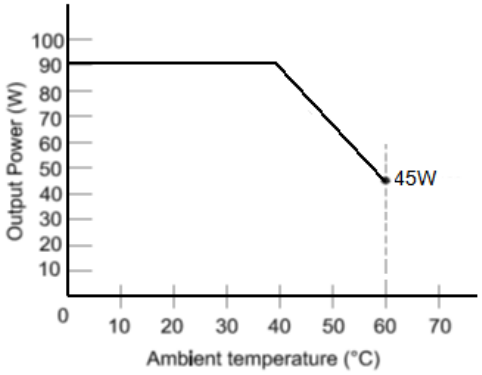
NOTES:
1. Class-I models are equipped with IEC320/C6 inlet, and Class-II models with IEC320/C8 inlet
2. Ripple and noise is maximum peak to peak voltage value measured at output within 20 MHz bandwidth, at rated line voltage and 100% load with a 47 µF tantalum capacitor in parallel with a 0.1 µF ceramic capacitor across the output.

MECHANICAL SPECIFICATIONS



NOTES:
1. Dimensions shown in inches [mm]
2. Tolerance 0.02 [0.5] maximum
3. Weight: 350 grams (0.772 lbs.) approx.

OUTPUT POWER DERATING CURVE



DESCRIPTION

The PMP105 series of AC/DC switching power supplies are for 90-105 watts of continuous output power. They are enclosed in a 94V-0 rated polyphenylene-oxide case with an IEC320/C14, C6, C18 or C8 inlet to mate with interchangeable cord for world-wide use. All models meet EN55011 and FCC class B emission limits, and are designed for medical applications.

PMP105 SERIES

FEATURES

- Low safety ground leakage current
- Wide input range 90 to 264 VAC
- Optional output connectors
- 100% burn-in at full load
- Overvoltage protection
- Over-temperature protection
- Overcurrent protection
- Compliant with CEC and Energy Star Efficiency
  level V requirements
  * No load power consumption less than 0.5 W
  * Average active efficiency greater than 87%
- Compliant with RoHS requirements

SAFETY STANDARD APPROVALS

UL ES 60601-1, CSA C22.2 No. 60601-1
File No. E178020

TÜV EN 60601-1

INPUT SPECIFICATIONS

Input voltage:	90-264 VAC
Input frequency:	47-63 Hz
Input current:	1.4 A (rms) for 115 VAC 0.7 A (rms) for 230 VAC
Earth leakage current:	200 μA max. @ 264 VAC, 63 Hz
Touch current:	100 μA max. @ 264 VAC, 63 Hz

OUTPUT SPECIFICATIONS

Output voltage /current:	See rating chart.
Maximum output power:	See rating chart.
Ripple and noise:	1% peak to peak maximum at the full load
Overvoltage protection:	Provided and set at 115-140% of its nominal output voltage
Overcurrent protection:	Protected to short circuit conditions
Temperature coefficient:	±0.04% /℃ maximum
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

ENVIRONMENTAL SPECIFICATIONS

Operating temperature:	0℃ to +60℃
Storage temperature:	-40℃ to +85℃
Relative humidity:	5% to 95% non-condensing
Derating:	Derate from 100% at +40℃ linearly to 50% at +60℃

GENERAL SPECIFICATIONS

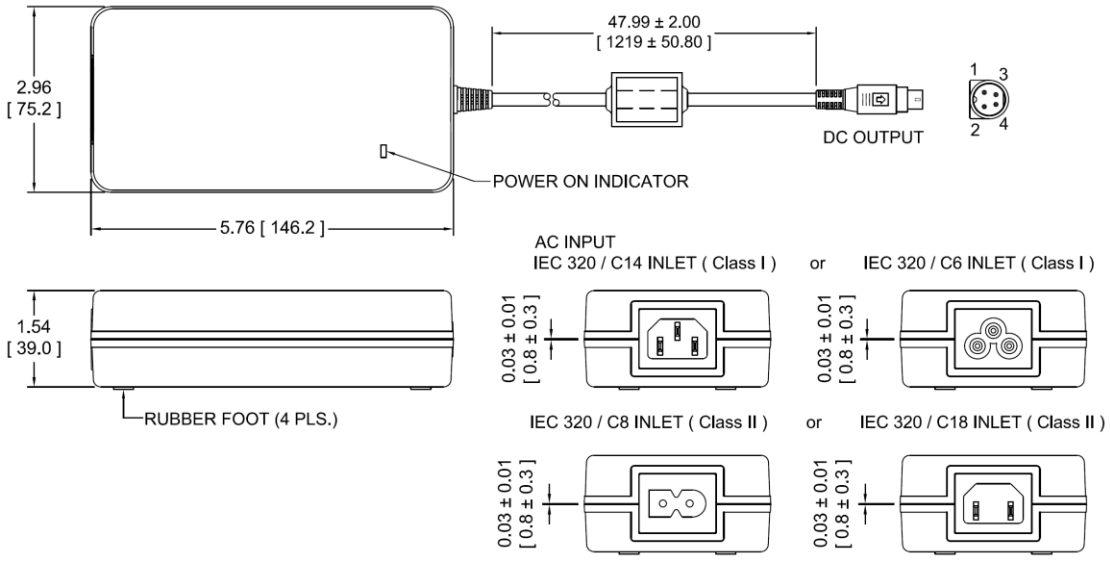
Switching frequency:	70-140 KHz
Power factor:	0.98 Typical at 115 VAC
Efficiency:	87% min. at full load
Hold-up time:	10 ms minimum at 110 VAC
Line regulation:	±0.5% maximum at full load
Inrush current:	80 A @ 115 VAC or 120 A @ 230 VAC, at 25℃ cold start
Withstand voltage:	5600 VDC from input to output (2 MOPP) 2100 VDC from input to ground (1 MOPP) 700 VDC from output to ground (To verify AC strength, get correct test method to avoid power supply damage.) For Class II models, 4000 VAC from input to output
MTBF:	150,000 hours at full load at 25℃ ambient, calculated per MIL-HDBK-217F
EMC Performance (IEC60601-1-2)	
EN55011	Class B conducted, class B radiated
FCC:	Class B conducted, class B radiated
VCCI:	Class B conducted, class B radiated
EN61000-3-2:	Harmonic distortion, class A and D
EN61000-3-3:	Line flicker
EN61000-4-2:	ESD, ±15 KV air and ±8 KV contact
EN61000-4-3:	Radiated immunity, 10 V/m
EN61000-4-4:	Fast transient/burst, ±2 KV
EN61000-4-5:	Surge, ±1 KV diff., ±2 KV com
EN61000-4-6:	Conducted immunity, 10 Vrms
EN61000-4-8:	Magnetic field immunity, 30 A/m
EN61000-4-11:	Voltage dip immunity, 30% reduction for 500 ms, 100% reduction for 10 ms

OUTPUT VOLTAGE/CURRENT RATING CHART

Model[1]		Output							Average Active Efficiency (typical) @ 115 / 230 Vac
Class I[1]	Class II[2]	V1	Imin.	Imax.	Peak Current[3]	Tol.	Ripple & Noise[4]	Max. Power	
PMP105-12	PMP105SF-12	12 V	0 A	7.50 A	15.00 A	±5%	120 mV	90 W	87 /87%
PMP105-12-1	PMP105SF-12-1	13 V	0 A	6.93 A	13.80 A	±5%	130 mV	90 W	87 /87%
PMP105-13	PMP105SF-13	14 -16 V	0 A	6.79 A	13.58 A	±5%	150 mV	95 W	87 /88%
PMP105-13-1	PMP105SF-13-1	18 -19 V	0 A	5.84 A	11.60 A	±5%	180 mV	105 W	88 /88%
PMP105-13-3	PMP105SF-13-3	20 -21 V	0 A	5.25 A	10.50 A	±5%	200 mV	105 W	88 /89%
PMP105-14	PMP105SF-14	24 -25 V	0 A	4.38 A	8.70 A	±5%	240 mV	105 W	88 /89%
PMP105-15	PMP105SF-15	28 -29 V	0 A	3.75 A	4.50 A	±5%	280 mV	105 W	88 /89%
PMP105-16	PMP105SF-16	30 -32 V	0 A	3.50 A	4.20 A	±5%	300 mV	105 W	88 /89%
PMP105-17	PMP105SF-17	36 -38 V	0 A	2.92 A	3.50 A	±5%	360 mV	105 W	89 /90%
PMP105-18	PMP105SF-18	46 -50 V	0 A	2.29 A	2.70 A	±5%	480 mV	105 W	90 /91%

NOTES:
1. Class I models are equipped with IEC320/C14 inlet. To order a model with C6 inlet, add “S” to the prefix, PMP105, of model number, e.g. PMP105**S**-12.
2. Class II models are equipped with IEC320/C8 inlet. To order a model with C18 inlet, change “SF” in the prefix of model number to “F”, e.g. PMP105**F**-12.
3. For 10 seconds maximum, average power not to exceed maximum power rating.
4. Ripple and noise is maximum peak to peak voltage value measured at output within 20 MHz bandwidth, at rated line voltage and output load ranges, and with a 10 µF tantalum capacitor in parallel with a 0.1 µF ceramic capacitor across the output.

MECHANICAL SPECIFICATIONS

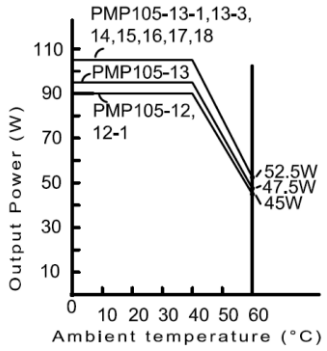


NOTES:
1. Dimensions shown in inches [mm]
2. Tolerance 0.02 [0.5] maximum
3. Weight: 681 grams (1.505 lbs.) approx.
4. Refer to Section titled “OPTIONAL OUTPUT CONNECTORS”. Add the suffix assigned for a selected connector to a wanted model number, e.g. PMP105-14-B1, for ordering.
5. The length of output cable for PMP105-12, PMP105-12-1, and PMP105-13 is 37.4 (950)

PIN CHART

PIN	1	2	3	4
	V1 Return	+V1	V1 Return	+V1

OUTPUT POWER DERATING CURVE



96-120 WATT MEDICAL POWER SUPPLIES

DESCRIPTION

The PMP120 series of AC/DC switching power supplies are for 96-120 watts of continuous output power. They are enclosed in a 94V-0 rated polyphenylene-oxide case with an IEC320/C14 or IEC320/C18 inlet to mate with interchangeable cord for world-wide use. All models meet EN55011 and FCC class B emission limits, and are designed for medical applications.

PMP120 SERIES

CE

RoHS

IV / V

FEATURES

- Low safety ground leakage current
- Wide input range 90 to 264 VAC
- Optional output connectors
- 100% burn-in
- Overvoltage protection
- Over-temperature protection
- Overcurrent protection
- Compliant with CEC and Energy Star Efficiency level V requirements (except PMP120-12, -13, 13-1, -13-2 and -13-3 to level IV)
  * No load power consumption less than 0.5 W
  * Average active efficiency ≧87%
- Compliant with RoHS requirements

SAFETY STANDARD APPROVALS

c UL us — UL ES 60601-1, CSA C22.2 No. 60601-1
File No. E178020

IEC 60601-1 — TÜV EN 60601-1

INPUT SPECIFICATIONS

Input voltage:	90-264 VAC
Input frequency:	47-63 Hz
Input current:	1.60 A (rms) for 115 VAC 0.80 A (rms) for 230 VAC
Earth leakage current:	180 μA max. @ 264 VAC, 63 Hz
Touch current:	100 μA max. @ 264 VAC, 63 Hz

OUTPUT SPECIFICATIONS

Output voltage /current:	See rating chart.
Maximum output power:	See rating chart.
Ripple and noise:	1% peak to peak maximum
Overvoltage protection:	Provided and set at 112-140% of its nominal output voltage
Overcurrent protection:	Protected to short circuit conditions
Temperature coefficient:	±0.04% /℃ maximum
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

ENVIRONMENTAL SPECIFICATIONS

Operating temperature:	0℃ to +60℃
Storage temperature:	-40℃ to +85℃
Relative humidity:	5% to 95% non-condensing
Derating:	Derate from 100% at +40℃ linearly to 50% at +60℃

GENERAL SPECIFICATIONS

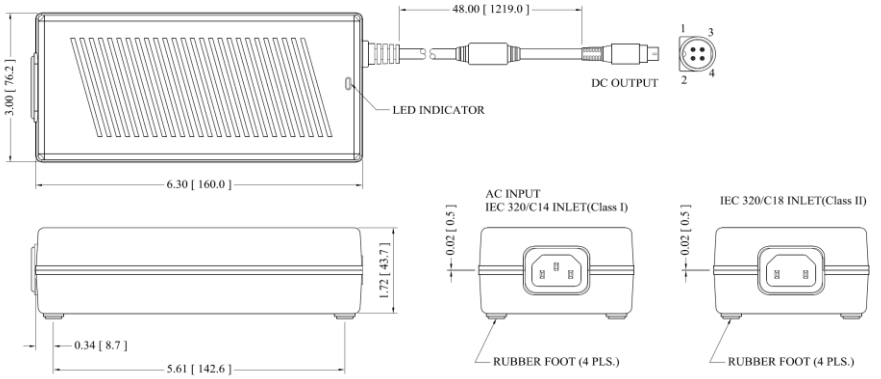
Switching frequency:	50-110 KHz
Power factor:	0.98 Typical at 115 VAC
Efficiency:	85% min. at full load
Hold-up time:	15 ms minimum at 110 VAC
Line regulation:	±0.5% maximum at full load
Inrush current:	60 A @ 115 VAC or 120 A @ 230 VAC, at 25℃ cold start
Withstand voltage:	5600 VDC from input to output (2 MOPP) 2100 VDC from input to ground (1 MOPP) 700 VDC from output to ground (To verify AC strength, get correct test method to avoid power supply damage.) For Class II models, 4000 VAC from input to output
MTBF:	150,000 hours at full load at 25℃ ambient , calculated per MIL-HDBK-217F
EMC Performance (IEC60601-1-2)	
EN55011	Class B conducted, class B radiated
FCC:	Class B conducted, class B radiated
VCCI:	Class B conducted, class B radiated
EN61000-3-2:	Harmonic distortion, class A and D
EN61000-3-3:	Line flicker
EN61000-4-2:	ESD, ±15 KV air and ±8 KV contact
EN61000-4-3:	Radiated immunity, 10 V/m
EN61000-4-4:	Fast transient/burst, ±2 KV
EN61000-4-5:	Surge, ±1 KV diff., ±2 KV com
EN61000-4-6:	Conducted immunity, 10 Vrms
EN61000-4-8:	Magnetic field immunity, 30 A/m
EN61000-4-11:	Voltage dip immunity, 30% reduction for 500 ms, 100% reduction for 10 ms

OUTPUT VOLTAGE/CURRENT RATING CHART

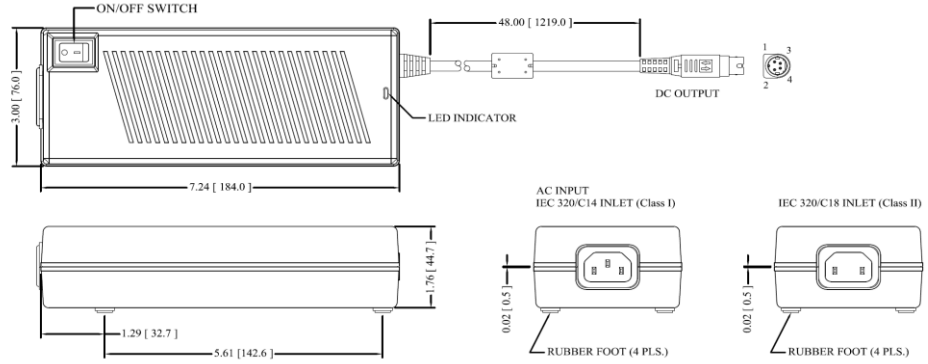
Model[1]		Output						Average Active Efficiency (typical) @ 115 / 230 Vac
Class I	Class II	V1	Min. Current	Max. Current	Tol.	Ripple & Noise[2]	Max. Power	
PMP120-12	PMP120F-12	12 V	0 A	8.00 A	±5%	120 mV	96 W	86 /86%
PMP120-13	PMP120F-13	15 V	0 A	7.00 A	±5%	150 mV	105 W	86 /86%
PMP120-13-1	PMP120F-13-1	18 V	0 A	6.67 A	±5%	180 mV	120 W	87 /86%
PMP120-13-2	PMP120F-13-2	19 V	0 A	6.32 A	±5%	190 mV	120 W	87 /86%
PMP120-13-3	PMP120F-13-3	20 V	0 A	6.00 A	±5%	200 mV	120 W	87 /86%
PMP120-14	PMP120F-14	24 V	0 A	5.00 A	±5%	240 mV	120 W	88 /88%
PMP120-16	PMP120F-16	30 V	0 A	4.00 A	±5%	300 mV	120 W	89 /88%
PMP120-17	PMP120F-17	36 V	0 A	3.34 A	±5%	360 mV	120 W	89 /88%
PMP120-18	PMP120F-18	48 V	0 A	2.50 A	±5%	480 mV	120 W	88 /88%

NOTES:
1. Class I models are equipped with IEC320/C14 inlet, and class II models with IEC320/C18 inlet.
2. Ripple and noise is maximum peak to peak voltage value measured at output within 20 MHz bandwidth, at rated line voltage and output load ranges, and with a 10 µF tantalum capacitor in parallel with a 0.1 µF ceramic capacitor across the output.

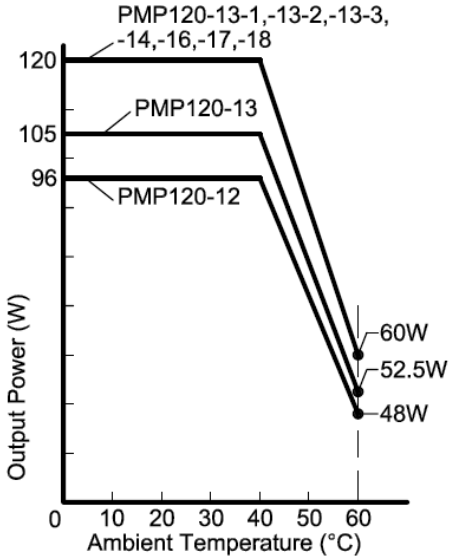
MECHANICAL SPECIFICATIONS



WITH ON/OFF SWITCH



OUTPUT POWER DERATING CURVE



NOTES:
1. Dimensions shown in inches [mm]
2. Tolerance 0.02 [0.5] maximum
3. Weight: 780 grams (1.716 lbs.) approx.
4. Output connector is 4 pin plug without lock, mating with Kycon P/N KPJX-4S-S socket or equivalent.
5. Refer to Section titled “OPTIONAL OUTPUT CONNECTORS”. Add the suffix assigned for a selected connector to a wanted model number, e.g. PMP120-14-B1, for ordering.
6. To order a model with on/off switch, add suffix “ S ” to the model number , e.g. PMP120-14-B1-S

PIN CHART

PIN1	V1 Return
PIN2	+V1
PIN3	V1 Return
PIN4	+V1

DESCRIPTION

The PMP135 series of AC/DC switching power supplies are for 120-135 watts of continuous output power. They are enclosed in a 94V-0 rated polyphenylene-oxide case with an IEC320/C14 or IEC320/C18 inlet to mate with interchangeable cord for world-wide use. All models meet EN55011 and FCC class B emission limits, and are designed for medical applications.

PMP135 SERIES

FEATURES

- Low safety ground leakage current
- Wide input range 90 to 264 VAC
- Power factor corrected
- 200% peak power capability on models below 26 Vdc output
- Optional output connectors
- Overvoltage protection
- Over-temperature protection
- Overcurrent protection
- Compliant with CEC and Energy Star Efficiency level V requirements
  * No load power consumption less than 0.5 W
  * Average active efficiency greater than 87%
- Compliant with RoHS requirements

SAFETY STANDARD APPROVALS

UL ES 60601-1, CSA C22.2 No. 60601-1
File No. E178020

TÜV EN 60601-1

INPUT SPECIFICATIONS

Input voltage:	90-264 VAC
Input frequency:	47-63 Hz
Input current:	1.60 A (rms) for 115 VAC 0.80 A (rms) for 230 VAC
Earth leakage current:	200 μA max. @ 264 VAC, 63 Hz
Touch current:	100 μA max. @ 264 VAC, 63 Hz

OUTPUT SPECIFICATIONS

Output voltage /current:	See rating chart.
Maximum output power:	See rating chart.
Ripple and noise:	1% peak to peak maximum at the full load
Overvoltage protection:	Provided and set at 115-140% of its nominal output voltage
Overcurrent protection:	Protected to short circuit conditions
Temperature coefficient:	±0.04% /℃ maximum
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

ENVIRONMENTAL SPECIFICATIONS

Operating temperature:	0℃ to +60℃
Storage temperature:	-40℃ to +85℃
Relative humidity:	5% to 95% non-condensing
Derating:	Derate from 100% at +40℃ linearly to 50% at +60℃

GENERAL SPECIFICATIONS

Switching frequency:	90-160 KHz
Power factor:	0.98 Typical at 115 VAC
Efficiency:	87% min. at full load
Hold-up time:	15 ms minimum at 110 VAC
Line regulation:	±0.5% maximum at full load
Inrush current:	80 A @ 115 VAC or 160 A @ 230 VAC, at 25℃ cold start
Withstand voltage:	5600 VDC from input to output (2 MOPP) 2100 VDC from input to ground (1 MOPP) 700 VDC from output to ground (To verify AC strength, get correct test method to avoid power supply damage.) For Class II models, 4000 VAC from input to output
MTBF:	150,000 hours at full load at 25℃ ambient , calculated per MIL-HDBK-217F

EMC Performance (IEC60601-1-2)

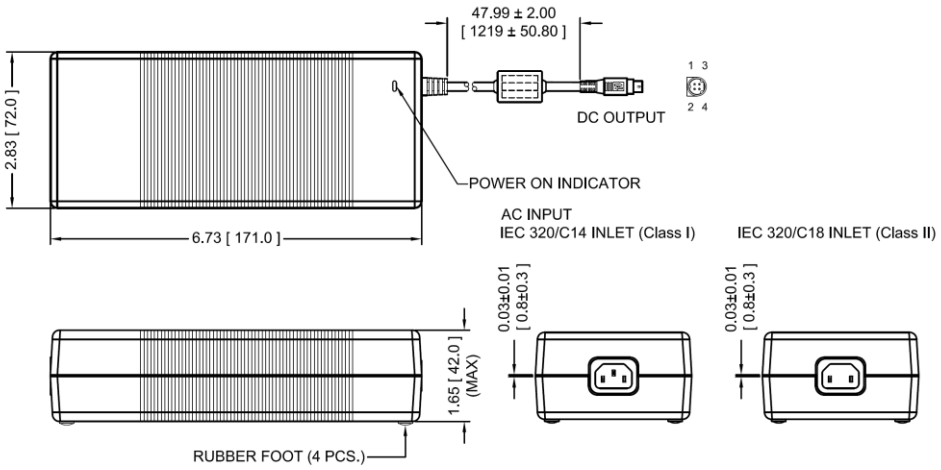
EN55011	Class B conducted, class B radiated
FCC:	Class B conducted, class B radiated
VCCI:	Class B conducted, class B radiated
EN61000-3-2:	Harmonic distortion, class A and D
EN61000-3-3:	Line flicker
EN61000-4-2:	ESD, ±15 KV air and ±8 KV contact
EN61000-4-3:	Radiated immunity, 10 V/m
EN61000-4-4:	Fast transient/burst, ±2 KV
EN61000-4-5:	Surge, ±1 KV diff., ±2 KV com
EN61000-4-6:	Conducted immunity, 10 Vrms
EN61000-4-8:	Magnetic field immunity, 30 A/m
EN61000-4-11:	Voltage dip immunity, 30% reduction for 500 ms, 100% reduction for 10 ms

OUTPUT VOLTAGE/CURRENT RATING CHART

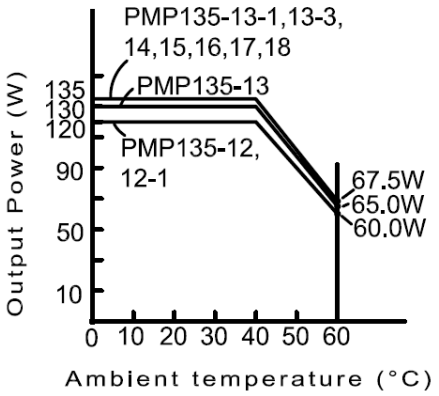
Model[1]		Output							Average Active Efficiency (typical) @ 115 / 230 Vac
Class I	Class II	V1	Minimum Current	Maximum Current	Peak current[2]	Tol.	Ripple & Noise[3]	Max. Power	
PMP135-12	PMP135F-12	12 V	0 A	10.00 A	20.0 A	±5%	120 mV	120 W	87 /89%
PMP135-12-1	PMP135F-12-1	13 V	0 A	9.23 A	18.5 A	±5%	130 mV	120 W	87 /89%
PMP135-13	PMP135F-13	14 V-16 V	0 A	9.29 A	18.6 A	±5%	150 mV	130 W	87 /89%
PMP135-13-1	PMP135F-13-1	18 V-19 V	0 A	7.50 A	15.0 A	±5%	180 mV	135 W	87 /89%
PMP135-13-3	PMP135F-13-3	20 V-21 V	0 A	6.75 A	13.5 A	±5%	200 mV	135 W	87 /89%
PMP135-14	PMP135F-14	24 V-25 V	0 A	5.63 A	11.3 A	±5%	240 mV	135 W	88 /90%
PMP135-15	PMP135F-15	28 V-29 V	0 A	4.83 A	5.8 A	±5%	280 mV	135 W	88 /90%
PMP135-16	PMP135F-16	30 V-32 V	0 A	4.50 A	5.4 A	±5%	300 mV	135 W	89 /90%
PMP135-17	PMP135F-17	36 V-38 V	0 A	3.75 A	4.5 A	±5%	360 mV	135 W	89 /91%
PMP135-18	PMP135F-18	46 V-50 V	0 A	2.94 A	3.5 A	±5%	480 mV	135 W	90 /91%

NOTES:
1. Class I models are equipped with IEC320/C14 inlet, and class II models with IEC320/C18 inlet.
2. For 10 seconds maximum, average power not to exceed maximum power rating.
3. Ripple and noise is maximum peak to peak voltage value measured at output within 20 MHz bandwidth, at rated line voltage and output load ranges, and with a 10 µF tantalum capacitor in parallel with a 0.1 µF ceramic capacitor across the output.

MECHANICAL SPECIFICATIONS



OUTPUT POWER DERATING CURVE



NOTES:
1. Dimensions shown in inches [mm]
2. Tolerance 0.02 [0.5] maximum
3. Weight: 681 grams (1.505 lbs.) approx.
4. Refer to Section titled “OPTIONAL OUTPUT CONNECTORS”. Add the suffix assigned for a selected connector to a wanted model number, e.g. PMP135-14-B1, for ordering.
5. The length of output cable for PMP135-12, PMP135-12-1, PMP135-13, PMP135F-12, PMP135F-12-1, and PMP135F-13 is 37.4 (950)

PIN CHART

MODEL / PIN		1	2	3	4
PMP135-12	PMP135F-12	V1 Return	+V1	V1 Return	+V1
PMP135-12-1	PMP135F-12-1				
PMP135-13	PMP135F-13				
PMP135-13-1	PMP135F-13-1				
PMP135-13-3	PMP135F-13-3				
PMP135-14	PMP135F-14				
PMP135-15	PMP135F-15				
PMP135-16	PMP135F-16				
PMP135-17	PMP135F-17				
PMP135-18	PMP135F-18				

DESCRIPTION

The PMP150 series of AC/DC switching power supplies are for 132-150 watts of continuous output power. They are enclosed in a 94 V-0 rated polyphenylene-oxide case with an IEC320/C14 or IEC320/C18 inlet to mate with interchangeable cord for world-wide use. All models meet EN55011 and FCC class B emission limits, and are designed for medical applications.

PMP150 SERIES

CE

RoHS

IV / V

UL ES 60601-1, CSA C22.2 No. 60601-1
File No. E178020

TÜV EN 60601-1

FEATURES

- Low safety ground leakage current
- Wide input range 90 to 264 VAC
- Optional output connectors
- 100% burn-in
- Overvoltage protection
- Over-temperature protection
- Overcurrent protection
- Compliant with CEC and Energy Star Efficiency level V requirements (except PMP150-12 and PMP150-13 to level IV)
  * No load power consumption less than 0.5 W
  * Average active efficiency ≧87%
- Compliant with RoHS requirements

INPUT SPECIFICATIONS

Input voltage:	90-264 VAC
Input frequency:	47-63 Hz
Input current:	2.0 A (rms) for 115 VAC 1.0 A (rms) for 230 VAC
Earth leakage current:	220 μA max. @ 264 VAC, 63 Hz
Touch current:	100 μA max. @ 264 VAC, 63 Hz

OUTPUT SPECIFICATIONS

Output voltage /current:	See rating chart.
Maximum output power:	See rating chart.
Ripple and noise:	1% peak to peak maximum at full load
Overvoltage protection:	Provided and set at 112-140% of its nominal output voltage
Overcurrent protection:	Protected to short circuit conditions
Temperature coefficient:	±0.04 %/℃ maximum
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

ENVIRONMENTAL SPECIFICATIONS

Operating temperature:	0℃ to +60℃
Storage temperature:	-40℃ to +85℃
Relative humidity:	5% to 95% non-condensing
Derating:	Derate from 100% at +40℃ linearly to 50% at +60℃

GENERAL SPECIFICATIONS

Switching frequency:	30-110 KHz
Power factor:	0.98 Typical at 115 VAC
Efficiency:	Average active 87% min. (except 85% min. for PMP150-12 and PMP150-13)
Hold-up time:	15 ms minimum at 110 VAC
Line regulation:	±0.5% maximum at full load
Inrush current:	60 A @ 115 VAC or 120 A @ 230 VAC, at 25℃ cold start
Withstand voltage:	5600 VDC from input to output (2 MOPP) 2100 VDC from input to ground (1 MOPP) 700 VDC from output to ground (To verify AC strength, get correct test method to avoid power supply damage.) For Class II models, 4000 VAC from input to output
MTBF:	150,000 hours at full load at 25℃ ambient , calculated per MIL-HDBK-217F

EMC Performance (IEC60601-1-2)

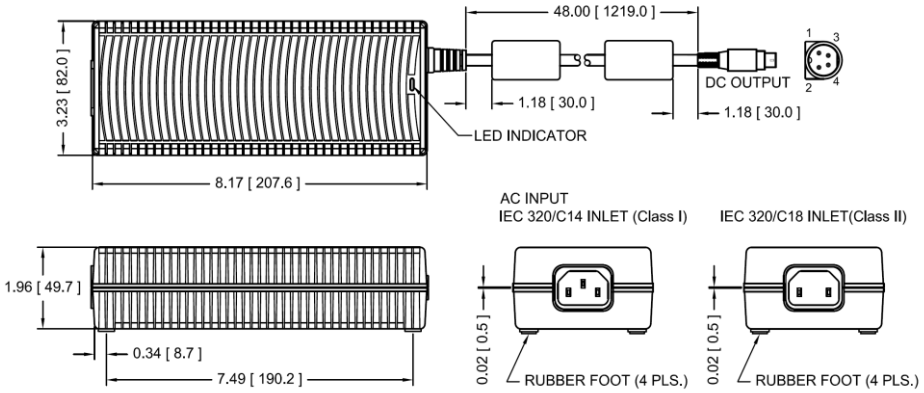
EN55011	Class B conducted, class B radiated
FCC:	Class B conducted, class B radiated
VCCI:	Class B conducted, class B radiated
EN61000-3-2:	Harmonic distortion, class A and D
EN61000-3-3:	Line flicker
EN61000-4-2:	ESD, ±15 KV air and ±8 KV contact
EN61000-4-3:	Radiated immunity, 10 V/m
EN61000-4-4:	Fast transient/burst, ±2 KV
EN61000-4-5:	Surge, ±1 KV diff., ±2 KV com
EN61000-4-6:	Conducted immunity, 10 Vrms
EN61000-4-8:	Magnetic field immunity, 30 A/m
EN61000-4-11:	Voltage dip immunity, 30% reduction for 500 ms, 100% reduction for 10 ms

OUTPUT VOLTAGE/CURRENT RATING CHART

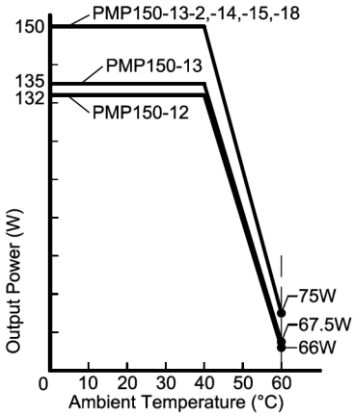
Model[1]		Output						Average Active Efficiency (typical) @ 115 / 230 Vac
Class I	Class II	V1	Min. Current	Max. Current	Tol.	Ripple & Noise [2]	Max. Power	
PMP150-12	PMP150F-12	12.0 V	0 A	11.00 A	±5%	120 mV	132 W	87 /86%
PMP150-13	PMP150F-13	15.0 V	0 A	9.00 A	±5%	150 mV	135 W	87 /86%
PMP150-13-2	PMP150F-13-2	19.0 V	0 A	7.90 A	±5%	190 mV	150 W	88 /88%
PMP150-14	PMP150F-14	24.0 V	0 A	6.25 A	±5%	240 mV	150 W	88 /88%
PMP150-15	PMP150F-15	27.0 V	0 A	5.56 A	±5%	270 mV	150 W	89 /88%
PMP150-18	PMP150F-18	48.0 V	0 A	3.13 A	±5%	480 mV	150 W	88 /88%

NOTES:
1. Class I models are equipped with IEC320/C14 inlet, and class II models with IEC320/C18 inlet.
2. Ripple and noise is maximum peak to peak voltage value measured at output within 20 MHz bandwidth, at rated line voltage and output load ranges, and with a 10 µF tantalum capacitor in parallel with a 0.1 µF ceramic capacitor across the output.

MECHANICAL SPECIFICATIONS



OUTPUT POWER DERATING CURVE



NOTES:
1. Dimensions shown in inches [mm]
2. Tolerance 0.02 [0.5] maximum
3. Weight: 960 grams (2.1 lbs.) approx.
4. Output connector is 4 pin plug without lock, mating with Kycon P/N KPJX-4S-S socket or equivalent.
5. Refer to Section titled “OPTIONAL OUTPUT CONNECTORS”. Add the suffix assigned for a selected connector to a wanted model number, e.g. PMP150-14-B1, for ordering.

PIN CHART

MODEL / PIN		1	2	3	4
PMP150-12	PMP150F-12	V1 Return	+V1	V1 Return	+V1
PMP150-13	PMP150F-13				
PMP150-13-2	PMP150F-13-2				
PMP150-14	PMP150F-14				
PMP150-15	PMP150F-15				
PMP150-18	PMP150F-18				

DESCRIPTION

The PMP180 /PMP180SF series of AC/DC switching power supplies are for 180 watts of continuous output power. They are enclosed in a 94V-0 rated polycarbonate case with an inlet of the IEC320/C14 or IEC320/C8 to mate with interchangeable cord for world-wide use. All models meet EN 55011 and FCC class B emission limits, and are designed for medical applications.

FEATURES

- High efficiency
- Overvoltage protection
- Over-temperature protection
- Short-circuit protection
- 100% burn-in at full rated load
- Standby consumption less than 0.5 W
- Compliant with CEC and ENERGY STAR efficiency level V requirements
- Compliant with RoHS requirements

PMP180 SERIES

SAFETY STANDARD APPROVALS

UL ES 60601-1, CSA C22.2 No. 60601-1
File No. E211696

TÜV EN 60601-1

INPUT SPECIFICATIONS

Input voltage:	90-264 VAC
Input frequency:	50-60 Hz
Input current:	2.4 A (rms) for 115 VAC 1.2 A (rms) for 230 VAC
Earth leakage current:	200 μA max. @ 264 VAC, 63 Hz
Touch current:	100 μA max. @ 264 VAC, 63 Hz

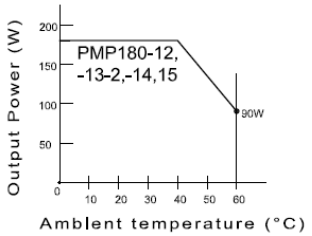
OUTPUT SPECIFICATIONS

Output voltage /current:	See rating chart.
Maximum output power:	See rating chart.
Ripple and noise:	380 mV peak to peak maximum
Overvoltage protection:	Set at 130% to 150% of its nominal output voltage
Overcurrent protection:	All models protected to short-circuit conditions
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

ENVIRONMENTAL SPECIFICATIONS

Operating temperature:	0℃ to +60℃
Storage temperature:	-20℃ to +80℃
Relative humidity:	10% to 90% non-condensing
Derating	Derate from 100% at +40℃ linearly to 50% at +60℃

OUTPUT DERATING CURVE



GENERAL SPECIFICATIONS

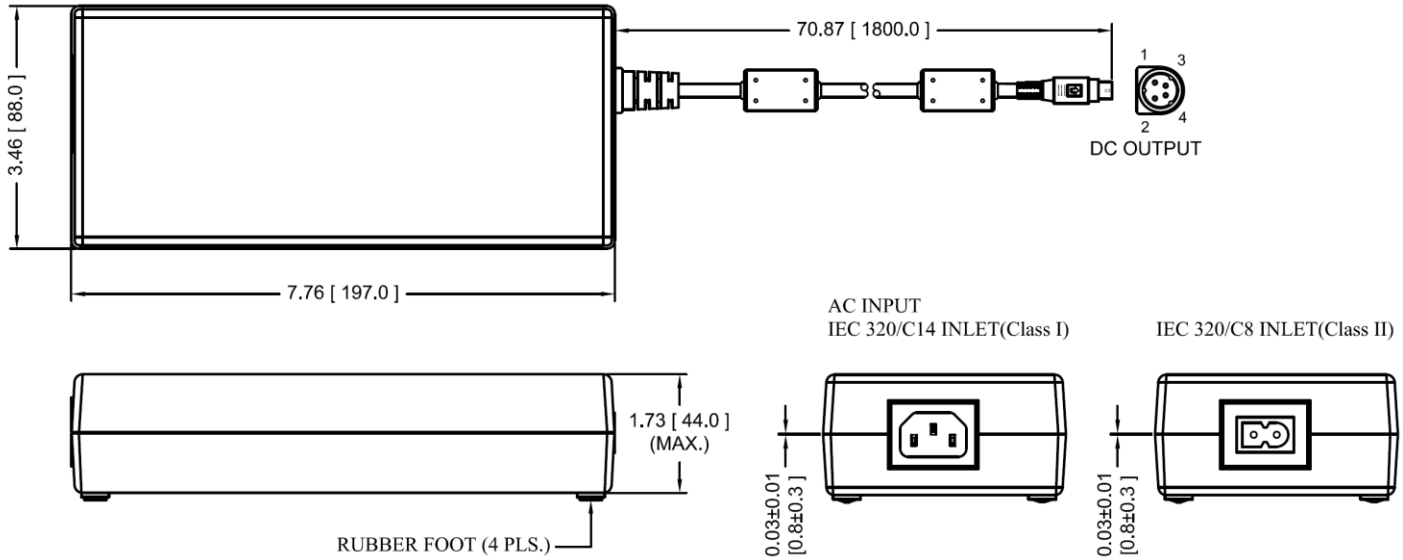
Hold-up time:	5 ms minimum at 100 VAC
Turn on delay time:	3 s maximum at 100 VAC
Power Factor:	0.95 typical
Efficiency:	87% minimum at 100 VAC or 240 VAC
Line regulation:	±0.5% maximum at full load
Inrush current:	45 A @ 115 VAC or 90 A @ 230 VAC at 25℃ cold start
Withstand voltage:	4000 VAC from input to output (2 MOPP)
MTBF:	100,000 hours at full load at 25℃ ambient, calculated per MIL-HDBK-217F
EMC Performance (IEC60601-1-2)	
EN55011:	Class B conducted, class B radiated
FCC:	Class B conducted, class B radiated
VCCI:	Class B conducted, class B radiated
EN61000-3-2:	Harmonic distortion, class A and D
EN61000-3-3:	Line flicker
EN61000-4-2:	ESD, ±15 KV air and ±8 KV contact
EN61000-4-3:	Radiated immunity, 10 V/m
EN61000-4-4:	Fast transient/burst, ±2 KV
EN61000-4-5:	Surge, ±1 KV diff., ±2 KV com
EN61000-4-6:	Conducted immunity, 10 Vrms
EN61000-4-8:	Magnetic field immunity, 30 A/m
EN61000-4-11:	Voltage dip immunity, 30% reduction for 500 ms, 100% reduction for 10 ms

OUTPUT VOLTAGE/CURRENT RATING CHART

Model(1)		Output						Average Active Efficiency (typical) @ 115 / 230 Vac
Class I	Class II	V1	Min. Current(3)	Max. Current	Tol.	Ripple & Noise(2)	Max. Power	
PMP180-12	--	12 V	0.1 A	15.00 A	±5%	380 mV	180 W	87 /89%
PMP180-13-2	--	19 V	0.1 A	9.47 A	±5%	380 mV	180 W	88 /90%
PMP180-14	PMP180SF-14	24 V	0.1 A	7.50 A	±5%	380 mV	180 W	91 /92%
PMP180-15	--	28 V	0.1 A	6.42 A	±5%	380 mV	180 W	91 /92%

NOTES:
1. Class I models are equipped with IEC320/C14 inlet, and class II models with IEC320/C8 inlet.
2. Ripple and noise is maximum peak to peak voltage value measured at output within 20 MHz bandwidth, at rated line voltage and output load ranges, and with a 47 µF electrolytic capacitor in parallel with a 0.1 µF ceramic capacitor across the output.
3. All models may be operated at no-load without damage. At no load, output voltage fluctuates beyond 5% due to the burst-mode operation of the control IC in them for energy saving.

MECHANICAL SPECIFICATIONS



NOTES:
1. Dimensions shown in inches [mm]
2. Tolerance 0.02 [0.5] maximum
3. Weight: 950 grams (2.09 lbs.) approx.
4. Output connector is 4 pin plug without lock, mating with Kycon P/N KPJX-4S-S socket or equivalent.
5. Refer to Section titled “OPTIONAL OUTPUT CONNECTORS”. Add the suffix assigned for a selected connector to a wanted model number, e.g. PMP180-14-B1, for ordering.

PIN CHART

PIN / MODEL	1	2	3	4	Shield
PMP180-12 PMP180-13-2 PMP180-14 PMP180-15	+V1	+V1	V1 Return & AC Ground	V1 Return & AC Ground	V1 Return & AC Ground
PMP180SF-14	+V1	+V1	V1 Return	V1 Return	V1 Return

200-220 WATT MEDICAL POWER SUPPLIES

DESCRIPTION

The PMP220 series of AC/DC switching power supplies are for 200-220 watts of continuous output power. They are enclosed in a 94V-0 rated polycarbonate case with an inlet to mate with interchangeable cord for world-wide use. All models meet EN 55011 and FCC class B emission limits, and are designed for medical applications.

PMP220 SERIES

FEATURES

- High efficiency
- Low ripple & noise
- Overvoltage protection
- Short-circuit protection
- Overcurrent protection
- Over-temperature protection
- 100% burn-in at full rated load
- Standby consumption less than 0.5 W
- Compliant with CEC and ENERGY STAR efficiency level V requirements
- Compliant with RoHS requirements

SAFETY STANDARD APPROVALS

UL ES 60601-1, CSA C22.2 No. 60601-1
File No. E178020

TÜV EN 60601-1

INPUT SPECIFICATIONS

Input voltage:	90-264 VAC
Input frequency:	47-63 Hz
Input current:	2.5 A (rms) for 115 VAC 1.2 A (rms) for 230 VAC
Earth leakage current:	100 μA max. @ 264 VAC, 63 Hz
Touch current:	100 μA max. @ 264 VAC, 63 Hz

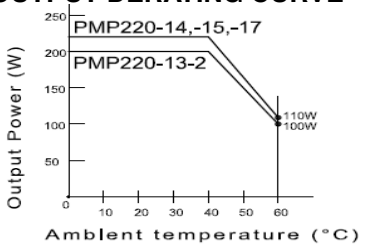
OUTPUT SPECIFICATIONS

Output voltage /current:	See rating chart.
Maximum output power:	See rating chart.
Ripple and noise:	1% peak to peak maximum
Overvoltage protection:	Set at 110% to 130% of its nominal output voltage
Overcurrent protection:	All models protected 110% to 120% of full load conditions
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

ENVIRONMENTAL SPECIFICATIONS

Operating temperature:	0℃ to +60℃
Storage temperature:	-20℃ to +80℃
Relative humidity:	10% to 90% non-condensing
Derating:	Derate from 100% at +40℃ linearly to 50% at +60℃

OUTPUT DERATING CURVE



GENERAL SPECIFICATIONS

Hold-up time:	12 ms minimum at 100 VAC
Turn on delay time:	3 s maximum at 100 VAC
Power Factor:	0.95 typical
Efficiency:	87% minimum at 100 VAC or 240 VAC
Line regulation:	±0.5% maximum at full load
Inrush current:	100 A @ 115 VAC or 200 A @ 230 VAC at 25℃ cold start
Withstand voltage:	5600 VDC from input to output (2 MOPP) 2100 VDC from input to ground (1 MOPP) 700 VDC from output to ground (To verify AC strength, get correct test method to avoid power supply damage.) For Class II models, 4000 VAC from input to output
MTBF:	100,000 hours at full load at 25℃ ambient, calculated per MIL-HDBK-217F

EMC Performance (IEC60601-1-2)

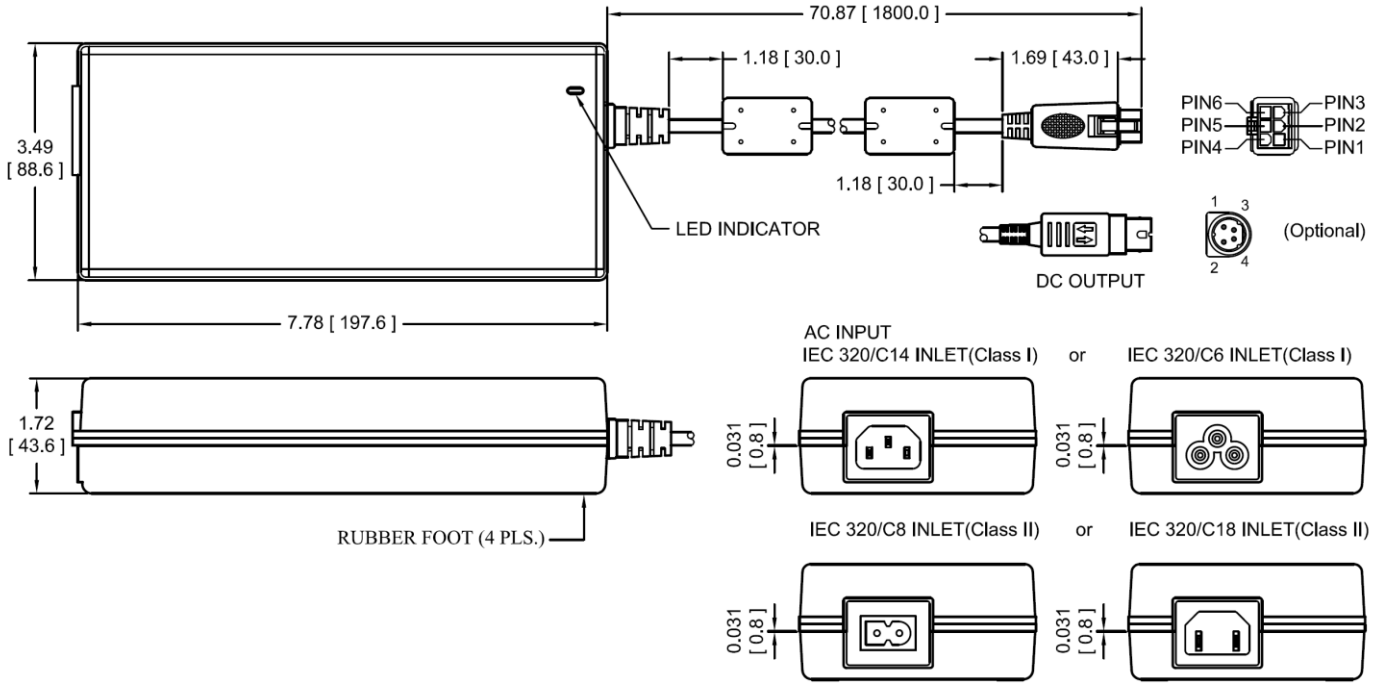
EN55011:	Class B conducted, class B radiated
FCC:	Class B conducted, class B radiated
VCCI:	Class B conducted, class B radiated
EN61000-3-2:	Harmonic distortion, class A and D
EN61000-3-3:	Line flicker
EN61000-4-2:	ESD, ±15 KV air and ±8 KV contact
EN61000-4-3:	Radiated immunity, 10 V/m
EN61000-4-4:	Fast transient/burst, ±2 KV
EN61000-4-5:	Surge, ±1 KV diff., ±2 KV com
EN61000-4-6:	Conducted immunity, 10 Vrms
EN61000-4-8:	Magnetic field immunity, 30 A/m
EN61000-4-11:	Voltage dip immunity, 30% reduction for 500 ms, 100% reduction for 10 ms

OUTPUT VOLTAGE/CURRENT RATING CHART

Model		Output						Average Active Efficiency (typical) @ 115 / 230 Vac
Class I[1]	Class II[2]	V1	Min. Current[3]	Max. Current	Tol.	Ripple & Noise[4]	Max. Power	
PMP220-13-2	PMP220SF-13-2	19 V	0.1 A	10.53 A	±5%	190 mV	200 W	87 /87%
PMP220-14	PMP220SF-14	24 V	0.1 A	9.17 A	±5%	240 mV	220 W	90 /92%
PMP220-15	PMP220SF-15	28 V	0.1 A	7.86 A	±5%	280 mV	220 W	90 /92%
PMP220-17	PMP220SF-17	36 V	0.1 A	6.11 A	±5%	360 mV	220 W	90 /92%

NOTES:
1. Class I models are equipped with IEC320/C14 inlet. To order a model with C6 inlet, add "S" to the prefix, PMP220, of model number, e.g. PMP220**S**-12.
2. Class II models are equipped with IEC320/C8 inlet. To order a model with C18 inlet, change "SF" in the prefix of model number to "F", e.g. PMP220**F**-12.
3. All models may be operated at no-load without damage. At no load, output voltage fluctuates beyond 5% due to the burst-mode operation of the control IC in them for energy saving.
4. Ripple and noise is maximum peak to peak voltage value measured at output within 20 MHz bandwidth, at rated line voltage and output load ranges, and with a 47 µF electrolytic capacitor in parallel with a 0.1 µF ceramic capacitor across the output.

MECHANICAL SPECIFICATIONS



NOTES:
1. Dimensions shown in inches [mm]
2. Tolerance 0.02 [0.5] maximum
3. Weight: 1.0 kg (2.2 lbs.) approx.
4. Output connector is Molex Mini - Fit receptacle, P/N: 39-01-2060 with female terminal #5556 or equivalent, mating with Molex plug 39-01-2066 and male terminal #5558 or equivalent. It also mates with Molex headers #5566, #5569, or equivalent.
5. Optional output connector is 4-pin plug with lock, Kycon P/N KPPX-4P or equivalent, mating with 4-pin socket, Kycon P/N KPJX-4S-S or equivalent, add the suffix assigned for a selected connector to a wanted model number, e.g. PMP220-13-2-HI, for ordering.

PIN CHART

PIN	1	2	3	4	5	6
PIN6 PIN5 PIN4 PIN3 PIN2 PIN1	+V1	V1 Return	V1 Return	+V1	+V1	V1 Return

PIN	1	2	3	4	SHELL OF CONNECTOR	
					Class I	Class II
HI (1 3 / 2 4)	+V1		V1 Return		AC Ground	NC

400 WATT MEDICAL POWER SUPPLIES

DESCRIPTION

The PMP400 series of AC-DC switching power supplies are for 400 watts of continuous output power. They are enclosed in a 94V-0 rated polycarbonate case with an IEC 320/C14 inlet to mate with interchangeable cord for world-wide use. All models meet EN55011 class B emission limits, and are designed for medical applications.

PMP400 SERIES

CE

RoHS

FEATURES

- BF Class insulation
- Operation altitude up to 5000 meters
- Wide input range 90 to 264VAC
- Low safety ground leakage current
- Less than 300 µA leakage current
- Efficiency greater than 85%
- Overvoltage Protection
- Over-temperature Protection
- Short-Circuit Protection
- Compliant with RoHs requirements

UL ES 60601-1, CSA C22.2 No. 60601-1
File No. E178020

TÜV EN 60601-1

INPUT SPECIFICATIONS

Input voltage:	90-264 VAC
Input frequency:	47-63 Hz
Input current:	4.2 A (rms) @115 VAC, 60 Hz 2.1 A (rms) @ 230 VAC, 50 Hz
Earth leakage current:	300 µA max. @ 264 VAC, 63 Hz
Touch current:	100 µA max. @ 264 VAC, 63 Hz

OUTPUT SPECIFICATIONS

Output voltage/current:	See rating chart.
Maximum output power:	See rating chart.
Ripple and noise:	1% peak to peak maximum
Overvoltage protection:	Set at 115-140% of nominal output voltage
Over current protection:	Protected to output short circuit conditions
Thermal shutdown	Protected to over temperature conditions
Temperature coefficient:	All outputs ±0.04% /℃ maximum
Transient response:	Maximum excursion of 4%, recovering to 1% of final value within 500 us after a 25% step load change

ENVIRONMENTAL SPECIFICATIONS

Operating temperature:	-10℃ to +60℃
Storage temperature:	-40℃ to +85℃
Relative humidity:	5% to 95% non-condensing
Derating:	Derate from 100% at +40℃ linearly to 50% at +60℃

GENERAL SPECIFICATIONS

Switching frequency:	85 KHz (typical)
Efficiency:	85% min. at 115 VAC or 230 VAC
Hold-up time:	12 ms minimum at 110 VAC & 400 W
Line regulation:	±0.5% maximum at full load
Inrush current:	20 A @ 115 VAC, or 40 A @ 230 VAC, at 25℃ cold start
Withstand voltage:	4000 VAC from input to output (2 MOPP) 1500 VAC from input to ground (1 MOPP) 1500 VAC from output to ground
MTBF:	350,000 hours at full load at 25℃ ambient, calculated per MIL-HDBK-217F, excluding DC fan

EMC Performance

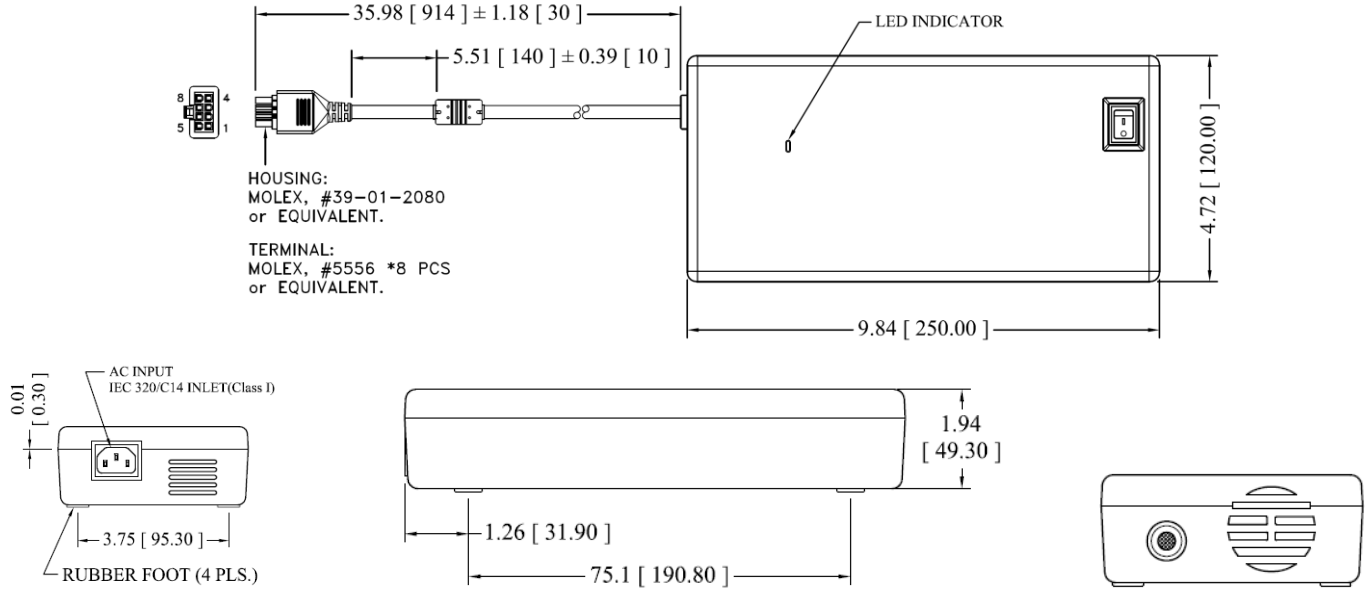
EN55011	Class B conducted, class B radiated
FCC:	Class B conducted, class B radiated
VCCI:	Class B conducted, class B radiated
EN61000-3-2:	Harmonic distortion, class A and D
EN61000-3-3:	Line flicker
EN61000-4-2:	ESD, ±15 KV air and ±8 KV contact
EN61000-4-3:	Radiated immunity, 10 V/m
EN61000-4-4:	Fast transient/burst, ±2 KV
EN61000-4-5:	Surge, ±1 KV diff., ±2 KV com
EN61000-4-6:	Conducted immunity, 10 Vrms
EN61000-4-8:	Magnetic field immunity, 30 A/m
EN61000-4-11:	Voltage dip immunity, 30% reduction for 500 ms, 100% reduction for 10 ms

OUTPUT VOLTAGE/CURRENT RATING CHART

Model[2]	Output						Efficiency (typical) @ 400 W 115/230 Vac
	V1	Min. Current	Max. Current at 13 CFM	Tol.	Ripple & Noise[1]	Max. Output Power	
PMP400-13-1-S	18 V	0 A	22.23 A	±5%	180 mV	400 W	85 /88%
PMP400-14-S	24 V	0 A	16.67 A	±5%	240 mV	400 W	86 /89%
PMP400-15-S	28 V	0 A	14.29 A	±5%	280 mV	400 W	86 /89%
PMP400-17-S	36 V	0 A	11.12 A	±5%	360 mV	400 W	86 /89%
PMP400-18-S	48 V	0 A	8.34 A	±5%	480 mV	400 W	87 /89%

NOTES: 1. Ripple and noise is maximum peak to peak voltage value measured at output within 20 MHz bandwidth, at rated line voltage and output load ranges, and with a 10 µF tantalum capacitor in parallel with a 0.1 µF ceramic capacitor across the output.
2. All models are with built-in fan.

MECHANICAL SPECIFICATIONS

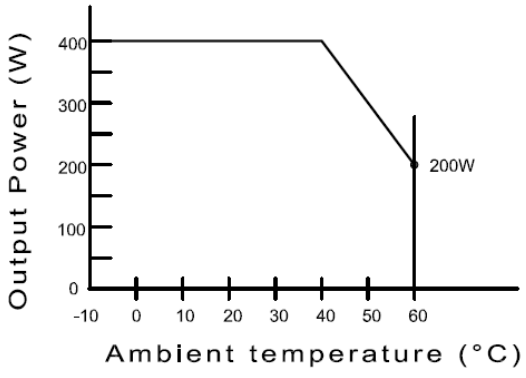


NOTES:
1. Dimensions shown in inches [mm]
2. Tolerance 0.02 [0.5] maximum
3. Weight: 1.5 Kg (3.28 lbs.) approx.
4. Output connector is Molex Mini - Fit receptacle, P/N: 39-01-2080 with female terminal #5556 or equivalent, mating with Molex plug 39-01-2086 and male terminal #5558 or equivalent. It also mates with Molex headers #5566, #5569, or equivalent.

PIN CHART

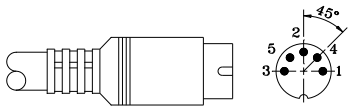
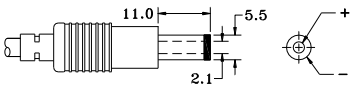
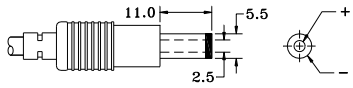
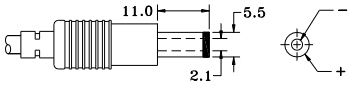
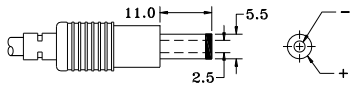
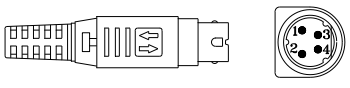
PIN NO.	1	2	3	4	5	6	7	8
Polarity	+V1				V1 Return			

OUTPUT POWER DERATING CURVE

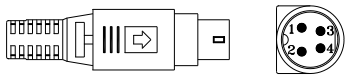
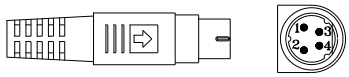
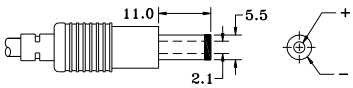
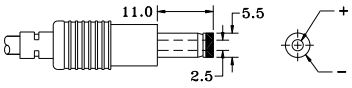
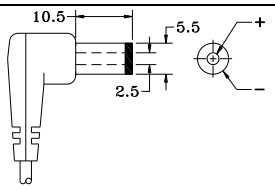
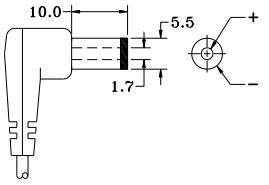
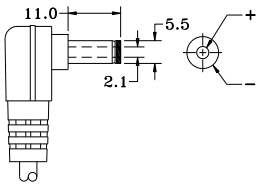
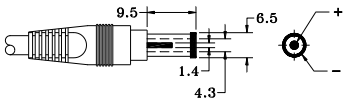


ANNEX A: Optional Output Connectors for PMP60 series

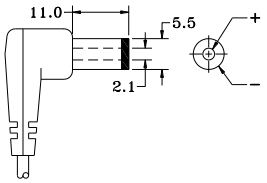
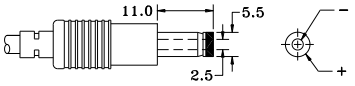
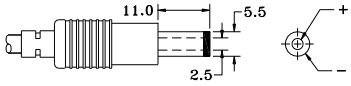
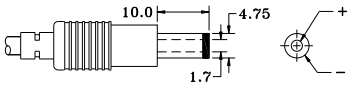
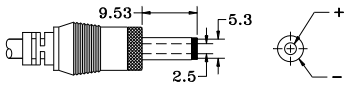
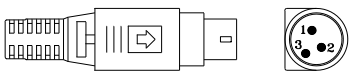
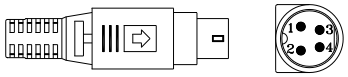
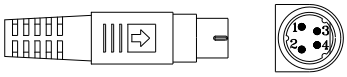
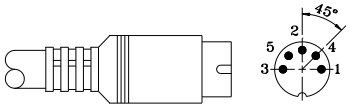
Unit: mm

SUFFIX	PROFILE & DIMENSIONS	PINOUTS	DESCRIPTION	SUGGESTED MATING CONNECTOR
NIL		SINGLE OUTPUT: (1) –V (2) –V (3) +V (4) –V (5) +V DUAL OUTPUTS: (1) COM (2) COM (3) V1 (4) N.C. (5) V2 TRIPLE OUTPUTS: (1) COM (2) COM (3) V1 (4) V3 (5) V2	5 PIN AT 180˚DIN MALE CONNECTOR	5 PIN CONTACTS AT 180˚DIN RECEPTACLE, SWITCHCRAFT, TYPE: 57GB5F OR EQUIVALENT
B1		CENTER: +V SLEEVE: –V	BARREL FEMALE CONNECTOR (FORK TYPE)	SWITCHCRAFT, TYPE: RA722 OR EQUIVALENT
B2		CENTER: +V SLEEVE: –V	BARREL FEMALE CONNECTOR (FORK TYPE)	SWITCHCRAFT, TYPE: RA712 OR EQUIVALENT
B3		CENTER: –V SLEEVE: +V	BARREL FEMALE CONNECTOR (FORK TYPE)	SWITCHCRAFT, TYPE: RA722 OR EQUIVALENT
B4		CENTER: –V SLEEVE: +V	BARREL FEMALE CONNECTOR (FORK TYPE)	SWITCHCRAFT, TYPE: RA712 OR EQUIVALENT
HB		(1) –V (2) +V (3) –V (4) +V	4-PIN PLUG WITH LOCK, KYCON P/N KPPX-4P OR EQUIVALENT	4-PIN SOCKET, KYCON P/N KPJX-4S-S OR EQUIVALENT

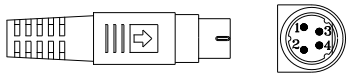
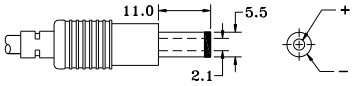
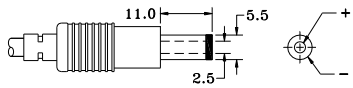
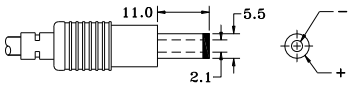
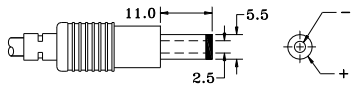
Unit: mm

SUFFIX	PROFILE & DIMENSIONS	PINOUTS	DESCRIPTION	SUGGESTED MATING CONNECTOR
NIL		(1) –V (2) +V (3) –V (4) +V EXCEPT PMP90-10,10-1,12,12-1 PMP120-12,13 PMP150-12,13,13-2	4-PIN PLUG WITH LOCK, KYCON P/N KPPX-4P OR EQUIVALENT	4-PIN SOCKET, KYCON P/N KPJX-4S-S OR EQUIVALENT
NIL		(1) –V (2) +V (3) –V (4) +V PMP90-10,10-1,12,12-1 PMP120-12,13 PMP150-12,13,13-2	4-PIN PLUG WITHOUT LOCK, (MOLDING TYPE)	4-PIN SOCKET, KYCON P/N KPJX-4S-S OR EQUIVALENT
B1		CENTER: +V SLEEVE: –V	BARREL FEMALE CONNECTOR (FORK TYPE)	SWITCHCRAFT, TYPE: RA722 OR EQUIVALENT
B2		CENTER: +V SLEEVE: –V	BARREL FEMALE CONNECTOR (FORK & GROOVE TYPE)	SWITCHCRAFT, TYPE: RA712 OR EQUIVALENT
B3		CENTER: +V SLEEVE: –V	BARREL RIGHT ANGLE FEMALE CONNECTOR (FORK TYPE)	SWITCHCRAFT, TYPE: RA712 OR EQUIVALENT
B4		CENTER: +V SLEEVE: –V	BARREL RIGHT ANGLE FEMALE CONNECTOR (FORK TYPE)	
B5		CENTER: +V SLEEVE: –V	BARREL RIGHT ANGLE FEMALE CONNECTOR (FORK & GROOVE TYPE)	SWITCHCRAFT, TYPE: RA722 OR EQUIVALENT
B6		CENTER: +V SLEEVE: –V	EIAJ-05 PLUG	Lumberg 1613 11 OR Lumberg 1614 05 OR EQUIVALENT

Unit: mm

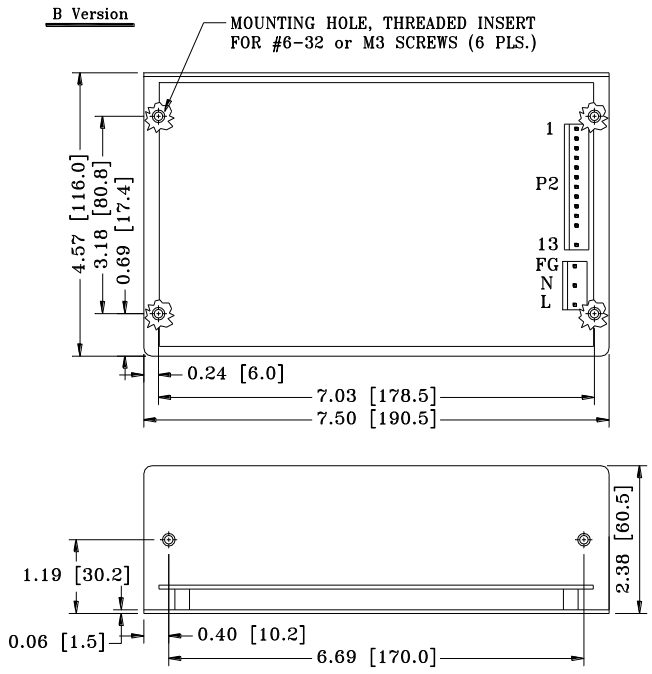
SUFFIX	PROFILE & DIMENSIONS	PINOUTS	DESCRIPTION	SUGGESTED MATING CONNECTOR
B7		CENTER: +V SLEEVE: –V	BARREL RIGHT ANGLE FEMALE CONNECTOR (FORK TYPE)	SWITCHCRAFT, TYPE: RA722 OR EQUIVALENT
B8		CENTER: –V SLEEVE: +V	BARREL FEMALE CONNECTOR (FORK & GROOVE TYPE)	SWITCHCRAFT, TYPE: RA712 OR EQUIVALENT
B10		CENTER: +V SLEEVE: –V	BARREL FEMALE CONNECTOR (FORK TYPE)	SWITCHCRAFT, TYPE: RA712 OR EQUIVALENT
B14		CENTER: +V SLEEVE: –V	BARREL FEMALE CONNECTOR (FORK TYPE)	
B16		CENTER: +V SLEEVE: –V	BARREL FEMALE CONNECTOR (LOCKING FEATURE)	
HF		(1) +V (2) –V (3) N.C.	3-PIN PLUG WITH LOCK, KYCON P/N KPPX-3P OR EQUIVALENT	3-PIN SOCKEY, KYCON P/N KPJX-3S-S OR EQUIVALENT
HI		(1) +V (2) +V (3) –V (4) –V	4-PIN PLUG WITH LOCK, KYCON P/N KPPX-4P OR EQUIVALENT	4-PIN SOCKET, KYCON P/N KPJX-4S-S OR EQUIVALENT
HJ		(1) –V (2) +V (3) –V (4) +V	4-PIN PLUG WITHOUT LOCK, (MOLDING TYPE)	4-PIN SOCKET, KYCON P/N KPJX-4S-S OR EQUIVALENT
Q1		(1) –V (2) –V (3) +V (4) –V (5) +V	5 PIN AT 180°DIN MALE CONNECTOR	5 PIN CONTACTS AT 180°DIN RECEPTACLE, SWITCHCRAFT, TYPE: 57GB5F OR EQUIVALENT

Unit: mm

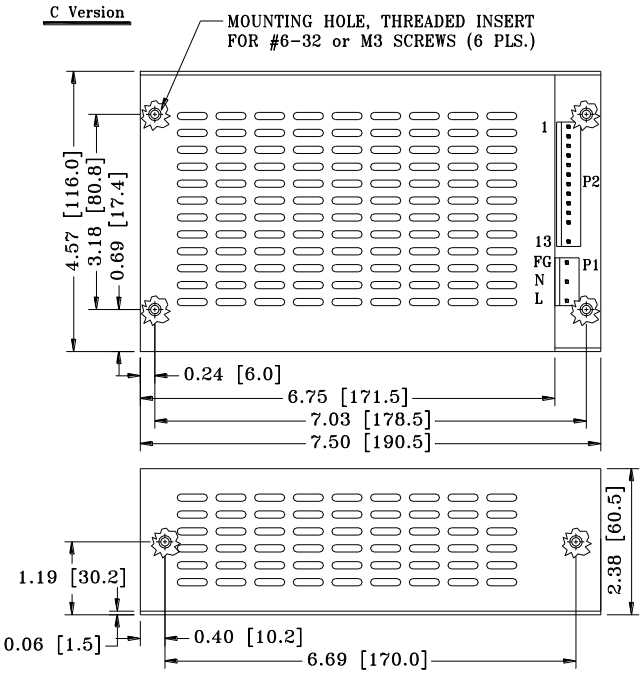
SUFFIX	PROFILE & DIMENSIONS	PINOUTS	DESCRIPTION	SUGGESTED MATING CONNECTOR
NIL		(1) +V (2) +V (3) –V (4) –V (SHELL) –V & AC GROUND	4-PIN PLUG WITHOUT LOCK, (MOLDING TYPE)	4-PIN SOCKET, KYCON P/N KPJX-4S-S OR EQUIVALENT
B1		CENTER: +V SLEEVE: –V	BARREL FEMALE CONNECTOR (FORK TYPE)	SWITCHCRAFT, TYPE: RA722 OR EQUIVALENT
B2		CENTER: +V SLEEVE: –V	BARREL FEMALE CONNECTOR (FORK TYPE)	SWITCHCRAFT, TYPE: RA712 OR EQUIVALENT
B3		CENTER: –V SLEEVE: +V	BARREL FEMALE CONNECTOR (FORK TYPE)	SWITCHCRAFT, TYPE: RA722 OR EQUIVALENT
B4		CENTER: –V SLEEVE: +V	BARREL FEMALE CONNECTOR (FORK TYPE)	SWITCHCRAFT, TYPE: RA712 OR EQUIVALENT

Unit: inch [mm]
Tolerance: 0.02 [0.5]

SERIES: PM110

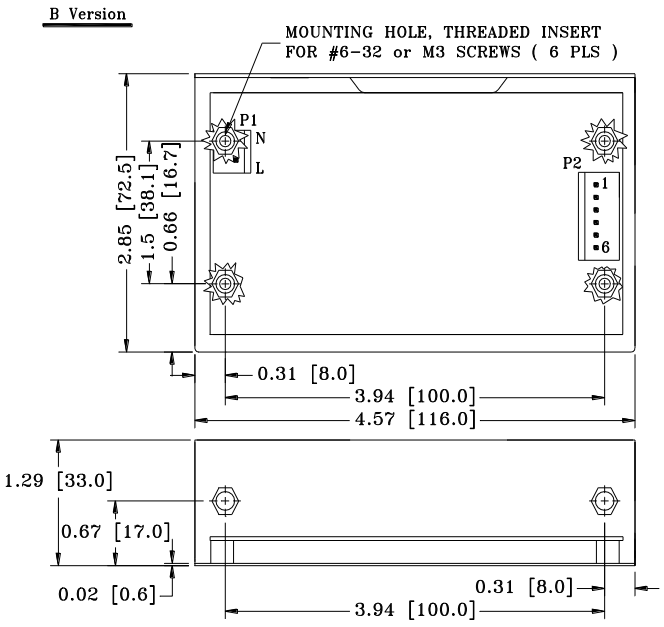


NOTE: Weight: 750 grams approx.

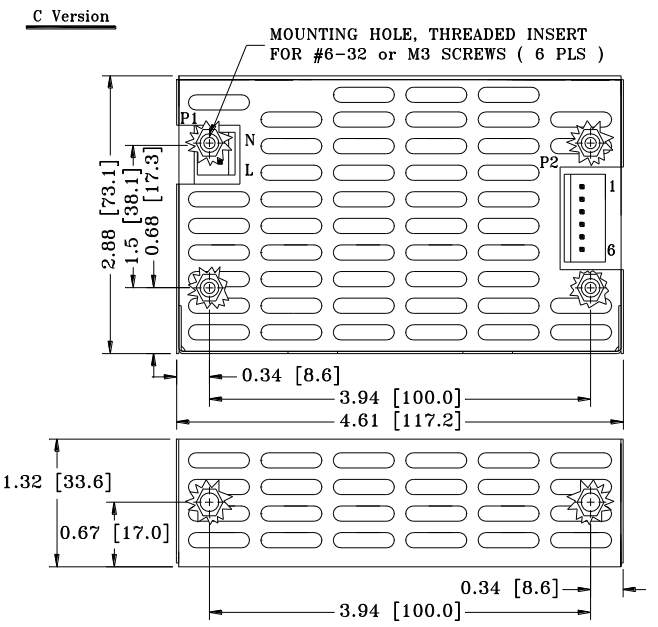


NOTE: Weight: 1050 grams approx.

SERIES: PM25



NOTE: Weight: 267 grams approx.

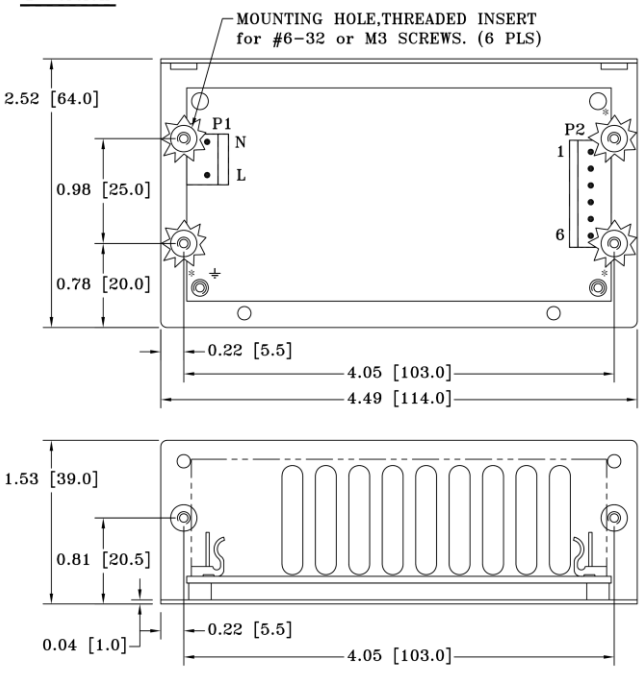


NOTE: Weight: 315 grams approx.

Unit: inch [mm]
Tolerance: 0.02 [0.5]

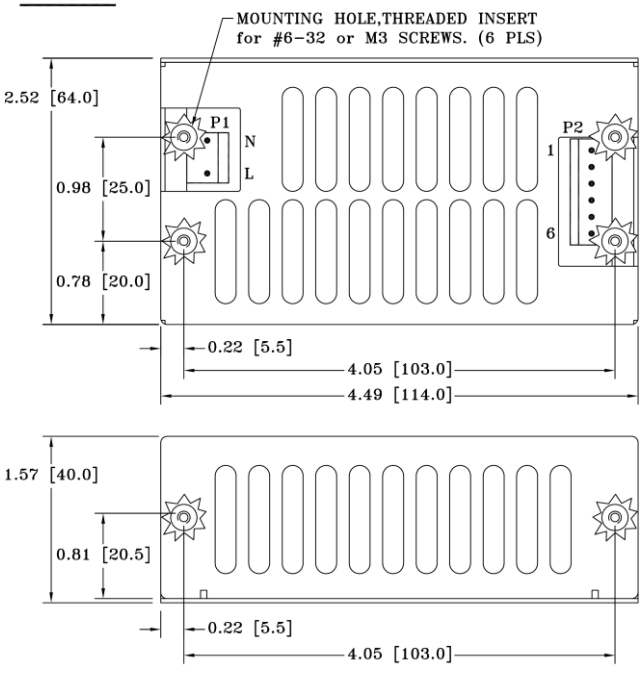
SERIES: PM42, PM60, PM100

B Version



NOTE: Weight: 264.4 grams approx.

C Version



NOTE: Weight: 352 grams approx.

MODIFIED STANDARD/CUSTOM PRODUCT INQUIRY FORM

Date _____ RFQ Number _____

Name _____ Title _____

Company _____

Address _____

Telephone _____ Telefax _____

E-Mail _____

Output	V1	V2	V3	V4	V5	V6
Nominal Voltage						
Tolerance/Adjustment						
Minimum Current						
Maximum Current						
Peak Current						
Peak Duration						
Regulation (Line)						
Regulation (Load)						
Ripple & Noise						
Overvoltage Protection						
Remote Sense						

Input Voltage Range: _____ Input Frequency: _____

Inrush Current (maximum): _____ Input Protection: _____

Hold-up Time: _____ Surge Protection: _____

Total Continuous Output Power: _____ Peak Power: _____

EMI/RFI: FCC A __ FCC B __ EN55022 A __ EN55022 B __ EN55011 A __ EN55011 B ____

Safety: UL _____ CSA _____ TUV _____ Others _____

Cooling: Convection _____ Forced Air _____ CFM Other _____

Operating Temperature: _____℃ Storage Temperature: _____℃

Mechanical: Open PCB ___ Bracket ___ Enclosed ___, Dimensions __ × __ × __ (mm)

Input Connector: _____ Output Connector: _____

Additional Requirements: _____

_____

Projected Quantity: Minimum Maximum Price Objective Per Quantity Breaks:

Year 1 _____ _____ _____/_____

Year 2 _____ _____ _____/_____

Year 3 _____ _____ _____/_____

Requested Prototype Date: _____ Prototype Quantity: _____

First Production Date: _____ First Production Quantity: _____

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