

## DESCRIPTION

The TM650 series comprising single and multiple output models for 650-700 watts of continuous output power is specially designed for medical applications not for life support. They operate at 90 to 264VAC 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)
- 100% burn-in at full rated load
- Remote sense on output #1 and output #2
- Remote inhibit – TTL high disables output
- Compliant with RoHS requirements

## INPUT SPECIFICATIONS

Input voltage :	90 to 264VAC
Input frequency :	47 to 63Hz
Input current :	10A ( rms ) for 115VAC 5A ( rms ) for 230VAC
Earth leakage current :	100µA max. @ 115VAC, 60Hz 165µA max. @ 230VAC, 50Hz

## OUTPUT SPECIFICATIONS

Output voltage/current :	See rating chart
Total output power :	See rating chart
Ripple and noise :	2% peak to peak maximum
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%/°C maximum
Transient response :	Maximum excursion of 4% or better on all models, recovering to 1% of final value within 500µs after a 25% step load change
PFD signal :	TTL logic high for normal operation and TTL logic low upon loss of input power. This signal appears at least 1ms 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.
Remote inhibit :	Requires an external TTL high level signal to inhibit outputs for standard models.

## TM650 SERIES



RoHS



## Safety Standard Approvals :



UL 60601-1  
CSA C22.2 No. 601.1



TÜV EN60601-1

## ENVIRONMENTAL SPECIFICATIONS

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

## GENERAL SPECIFICATIONS

Switching frequency :	70KHz ±10KHz
Power factor :	0.98 typical
Efficiency :	80% minimum on all models
Hold-up time :	12 msec minimum at 110VAC
Line regulation :	±0.2% maximum at full load
Inrush current :	50amps @115VAC or 100 amps @ 230VAC at 25°C cold start
Withstand voltage :	4000VAC from input to output 1500VAC from input to ground 500VAC from output to ground
MTBF :	300,000 hours minimum at full load at 25°C ambient, calculated per MIL-HDBK- 217F
EMC Performance (EN60601-1-2)	
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, ±8KV air and ±6KV contact
EN61000-4-3:	Radiated immunity, 3V/m
EN61000-4-4:	Fast transient/burst, ±2KV
EN61000-4-5:	Surge, ±1KV diff, ±2KV com.
EN61000-4-6:	Conducted immunity, 3Vrms
EN61000-4-8:	Magnetic field immunity, 3A/m
EN61000-4-11:	Voltage dips, 30% reduction for 500ms, 60% reduction for 100ms and >95% reduction for 10ms

## OUTPUT VOLTAGE/CURRENT RATING CHART

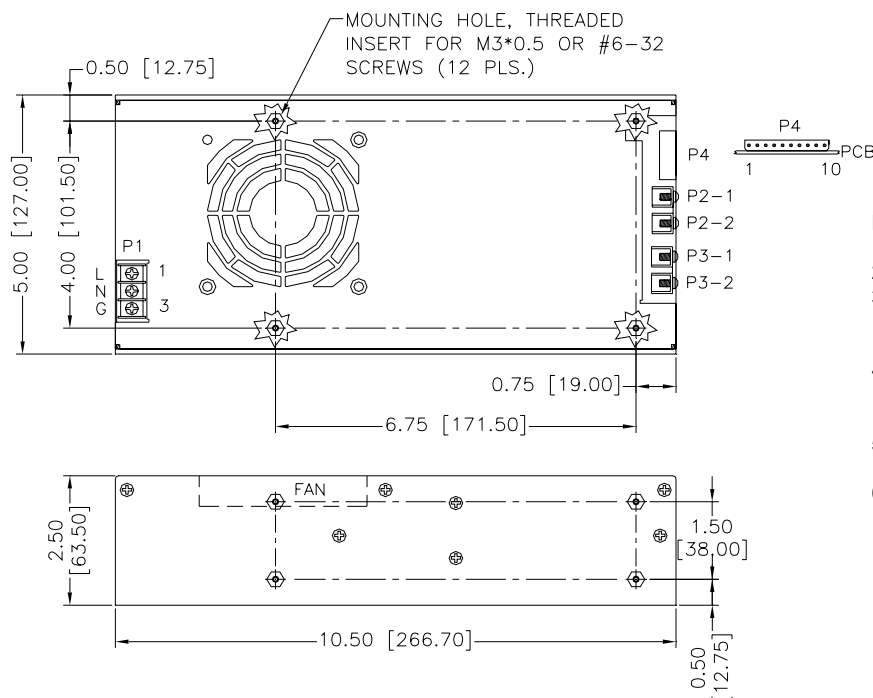
Product No.	Output # 1				Output # 2				Output # 3				Maximum Output Power
	Vnom.	Imin.	I <sub>max.</sub>	Tol.	Vnom.	Imin.	I <sub>max.</sub>	Tol.	Vnom.	Imin.	I <sub>max.</sub>	Tol.	
TM650-S12	12V	0A	54.2A	2%									650W
TM650-S15	15V	0A	43.4A	2%									650W
TM650-S24	24V	0A	27.1A	2%									650W
TM650-S27	27V	0A	24.1A	2%									650W
TM650-S30	30V	0A	21.7A	2%									650W
TM650-S36	36V	0A	18.1A	2%									650W
TM650-S48	48V	0A	14.6A	2%									700W
TM650-D20	24V	1.5A	18A	2%	12V	1.2A	22A	5%					650W
TM650-D21	24V	1.5A	18A	2%	15V	1.0A	18A	5%					650W
TM650-D22	48V	0.75A	9A	2%	24V	0.6A	12A	5%					650W
TM650-D23	48V	0.75A	9A	2%	12V	1.2A	22A	5%					650W
TM650-D24	48V	0.75A	9A	2%	15V	1.0A	18A	5%					650W
TM650-T30	24V	1.5A	18A	2%	12V	1.2A	22A	5%	3.3V	0A	10A	3%	650W
TM650-T31	24V	1.5A	18A	2%	15V	1.0A	18A	5%	3.3V	0A	10A	3%	650W
TM650-T32	24V	1.5A	18A	2%	12V	1.2A	22A	5%	5.1V	0A	10A	3%	650W
TM650-T33	24V	1.5A	18A	2%	15V	1.0A	18A	5%	5.1V	0A	10A	3%	650W
TM650-T34	48V	0.75A	9A	2%	12V	1.2A	22A	5%	3.3V	0A	10A	3%	650W
TM650-T35	48V	0.75A	9A	2%	15V	1.0A	18A	5%	3.3V	0A	10A	3%	650W
TM650-T36	48V	0.75A	9A	2%	12V	1.2A	22A	5%	5.1V	0A	10A	3%	650W
TM650-T37	48V	0.75A	9A	2%	15V	1.0A	18A	5%	5.1V	0A	10A	3%	650W

### NOTES:

1. Add suffix "C" for enclosed format with fan control function, e.g. TM650-S24C.
2. All outputs are floating. It 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 U-bracket version without moving air (maximum current of output #1 and #2 derated to 70%), or 650 watts with 50 CFM forced air provided by user.
6. All models may operated at no-load. At no-load, output voltage tolerance increases to 10%.

## MECHANICAL SPECIFICATIONS

### Single Output Models



### NOTES:

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

