

# SureImage

## Imaging and Treatment Series

### Power Conditioner Model Ultra-K/M 75K(i) – 225K(i)

Power Conditioning for Medical Imaging & Treatment Equipment

## General Specifications

### 1.0 General

This specification defines the electrical and mechanical characteristics of a medical imaging and treatment power conditioning system. The Model Ultra-K/M as specified herein includes all the components required to meet the basic power requirements of medical imaging and treatment equipment. The power conditioning system is 3 phase, constructed using all copper windings, triple-shielded, Category B-3 TVSS, a High Frequency Filter and a K-13 rating. The Ultra-K/M's output impedance is 2% typical and is continuous duty cycle rated and intermittent duty cycle rated, 600 volt class, convection cooled.

### 2.0 Standards

The power conditioning system is designed in accordance with applicable portions of the following standards:

- 2.1 Energy Policy Act of 2005, (NEMA) TP 1-2002 Dry Type Distribution Transformer Efficiency Standards.
- 2.2 American National Standards Institute (ANSI C57.110 & C62.41-1991)
- 2.3 Institute of Electrical and Electronic Engineers (IEEE 519-1992)
- 2.4 National Fire Protection Association (NFPA) 70 National Electrical Code (NEC)
- 2.5 Underwriters Laboratories (UL) 1449
- 2.6 Federal Information Processing Standards Publication 94 (FIPS Pub 94)
- 2.7 UL Listed to Standard 1561
- 2.8 C-UL listed to CSA Standard C22.2, No. 47-M90

### 3.0 Manufactured Units

The power conditioning system is designed to meet IEC 601-1, Medical Electrical Equipment – Part 1: General Requirements for Safety.

#### 3.1 Input Specifications

- 3.1.1 Nominal AC input voltage ratings: 600 VAC, 480 VAC, 240 VAC or 208VAC, 3 phase with sufficient margin to sustain a constant input of +10% without saturation.
- 3.1.2 The nominal operating frequency: 60 hertz  $\pm$  3 hertz.
- 3.1.3 The power conditioning system's primary is configured in a three phase delta with full capacity taps at 2½ % increments, two (2) above and four (4) below the nominal voltage tap.
- 3.1.4 Energizing inrush current does not exceed a maximum of 10 times the full load input current for 1/2 cycle.

3.2 Output Specifications

- 3.2.1 Nominal AC output voltage ratings: 480 VAC or 208 VAC, wye derived, 60 hertz.
- 3.2.2 Output impedance: 2 % typical.
- 3.2.3 Harmonic K-Rating: 13.

3.3 Performance Specifications

- 3.3.1 Dynamic Load Voltage Regulation: < 4% from no load to intermittent rating and < 2% from typical steady state load to intermittent power demand.
- 3.3.2 Intermittent Power Rating Duration: 30 sec at a 20% duty cycle.
- 3.3.3 Overload: 500% for 10 seconds, and 1,000% for one cycle.
- 3.3.4 THD: ≤ 1% added to the output voltage waveform.
- 3.3.5 Harmonic Attenuation: Load generated triplen harmonics are attenuated at the primary.
- 3.3.6 Output voltage: Sinusoidal with no flat topping when high crest factor (3.0:1), non-linear loads are present at the output.
- 3.3.7 Audible noise: 50dBA when measured at one meter distance.
- 3.3.8 Efficiency: 98% typical at full load, continuous rating.
- 3.3.9 Electrostatic Shielding: Incorporates three solid copper foil electrostatic shields which minimizes inner winding capacitance, transient, and noise coupling between primary and secondary windings.
- 3.3.10 Common mode noise attenuation: 146dB.
- 3.3.11 Transverse mode noise attenuation: 3 dB down at 10K Hertz, decaying 40 dB per decade.
- 3.3.12 TVSS: Incorporates a fused (with front panel mounted, blown fuse lamp indicator) 3 phase, secondary connected, 6 mode spike suppression network. The TVSS is comprised of high energy metal oxide varistors with less than a 5 nanosecond response time and a minimum peak current handling capability of 40,000 amps (8x20µsec) per mode. The suppression network system conforms to UL 1449 rating 330 volts when subjected to ANSI/IEEE C62.41 Category B-3 waveform.

3.4 Output Power Ratings, BTU's, Dimensions and Weights

Model	Intermittent kVA	Operational BTU's / hr	Continuous kVA	Full Load BTU's / hr	Dimensions (in)	Weight (lbs)
75K(i)	75	1,705	50	3,410	35"W x 25"D x 40"H	950
112.5K(i)	112.5	2,557	75	5,115	35"W x 25"D x 40"H	970
150K(i)	150	2,557	75	5,115	35"W x 25"D x 40"H	970
225K(i)	225	3,410	100	6,820	42"W x 28"D x 39"H	1,300

4.0 Construction

4.1 Main Transformer

- 4.1.1 Transformer windings: All copper conductor construction, with separate primary and secondary, isolated windings. The transformer conforms to NEC article 250-5D, that specifies a separately derived power source. The neutral conductor is sized for 200% of the ampacity of the phase conductor.

- 4.1.2 Terminals are provided for isolated three phase output conductors, neutral conductor and ground.
- 4.1.3 All leads, wires and terminals are labeled to correspond with circuit wiring diagram.
- 4.1.4 Basic Impulse level: No less than 10,000 Volts.
- 4.1.5 MTBF:  $\geq 200,000$  hours.
- 4.1.6 Transformer Steel: Grain oriented, M6 grade, silicon steel.
- 4.1.7 Flux density:  $\leq 15k$  gauss
- 4.1.8 Core losses:  $\leq 0.6\%$  of the KVA rating.
- 4.1.9 Insulation: Class N, 200°C with a maximum temperature rise of 115°C above ambient.
- 4.1.10 Cooling: Natural convection.

4.2 Cabinet

- 4.2.1 Enclosure: NEMA type 2 general purpose, floor mounted, and indoor enclosure.
- 4.2.2 Construction: Cabinets are manufactured from 14 gauge steel with base sub-structure adequate for fork lifting.
- 4.2.3 Paint: Baked on, powder coat paint finish with proper pre-treatment.
- 4.2.4 Provisions exist to hardwire input and output connections to copper stand off bus located behind the front panel of the transformer cabinet. Input and output landing locations are available on either side of the transformer cabinet.

**5.0 Environment**

- 5.1 Operating Temperature Range: -20°C to +40°C .
- 5.2 Humidity: 0 to 95% non-condensing.
- 5.3 Altitude: Up to 5000 feet above sea level without de-rating.

**6.0 Warranty**

Manufacturer guarantees equipment to be free from defects in material and workmanship for a period of 1 year following delivery from the factory.