SureImage

Imaging and Treatment Series

Power Processor Model 700F/M
60K(i) to 260K(i)

Power Conditioning and Regulation for Medical Imaging & Treatment Equipment

General Specifications

1.0 General

This specification defines the electrical and mechanical characteristics of a medical grade power conditioning system with line voltage regulation. The system defined herein includes all the components necessary to provide the electrical power quality needed for the improved operation, performance and reliability of medical imaging and treatment equipment. The power conditioning/regulating system maintains voltage stability, to within specified tolerances, when the facility voltage level is outside the specified range and during the high momentary current demand of medical imaging and treatment equipment.

Power conditioning is accomplished through use of an integral 3 phase, copper wound, triple shielded, low output impedance isolation transformer. Integral transient voltage surge suppression (TVSS) is included to meet and exceed ANSI/IEEE recommendations for surge voltages in AC power circuits. Line voltage correction is accomplished within 1 cycle, preventing dangerous under and over voltage conditions. The regulator incorporates microprocessor control, digital processing and independent phase regulation to provide the specified voltage, without any voltage over or undershoots.

2.0 Standards

Systems are designed in accordance with applicable portions of the following standards:

2.1 American National Standards Institute (ANSI)
2.2 Institute of Electrical and Electronic Engineers (IEEE)
2.3 National Electric Code (NEC)
2.4 National Fire Protection Association (NFPA Article 70)
2.5 Underwriters Laboratories (U/L) 1449, 1012
2.6 FCC Article 15, Section J, Class A
2.7 ANSI C62.41 Category B-3
2.8 UL Listed to Standard 1012
2.9 C-UL listed to CSA Standard C22.2, No. 107.7

3.0 Manufactured Units

3.1 Input Specifications

3.1.1 Nominal AC input voltage ratings: 600 VAC, 480VAC, 240 VAC or 208 VAC, 3 Phase.
3.1.2 Nominal operating frequency: 60 hertz, +/- 3 hertz.

3.2 Output Specifications

3.2.1 Nominal AC output voltages: 480 VAC or 208 VAC, wye derived.
3.2.2 Output impedance: 2% (typical).
3.2.3 The secondary includes seven (7) full capacity taps per phase, allowing for the tight output voltage regulation specified.

3.3 Performance Specifications

3.3.1 Input voltage range: +10 / -15% from nominal.
3.3.2 Output voltage regulation: +/- 2% typical.
3.3.3 An extended input voltage range of +15 / -23% will result in a usable, regulated, output voltage.
3.3.4 Response time: ½ cycle .
3.3.5 Correction time: 1 cycle typical.
3.3.6 Output load regulation: < 2%, from typical steady state load to intermittent power demand.
3.3.7 <1% THD added to the output waveform under any dynamic linear loading conditions presented to the system.
3.3.8 Input power factor: >.99 with a resistive load with no reflection of triplen harmonics to the utility under non-linear loads.
3.3.9 Overload rating: 200% continuous for 30 seconds, 1,000% for 1 cycle.
3.3.10 Common mode noise attenuation: 146db minimum.
3.3.11 Transverse mode noise attenuation: 3 db down at 1,000 hertz, 40db down per decade, below 50 db with a resistive load.
3.3.12 Efficiency: 97% typical at full load, core excitation losses are less than 1.5% of kVA rating.
3.3.13 Phase Imbalance: <2% typical.
3.3.14 TVSS: A 3 phase, secondary connected, 6 mode spike suppression network and a 3 phase, 3 mode primary connected spike suppression network. The suppressors are comprised of high energy metal oxide varistors with less than 5 nano-second response time and a minimum peak current handling capability of 25,000 amps (8x20µ sec) per mode. TVSS protection meets UL 1449 let through limits. Systems remain operable when subjected to ANSI/IEEE C62.41 category B-3 waveform and level.
3.3.15 MTBF: > 100,000 hours.

3.4 Main Input Circuit Breaker

A main input molded case, thermal magnetic circuit breaker, rated at 125 % of the full continuous load input current, is furnished as an integral part of the unit.

3.5 Bypass Switch

A manually operated rotary bypass switch bypasses the regulator portion of the system. The transformer and suppression circuitry remains in the circuit when in the bypass mode.

3.6 Monitoring

3.6.1 ALERT LIGHT
An indicator light indicates if the output has been disabled by one of the following conditions:
(1) Transformer over-temperature
(2) SCR thermal over-temperature

3.6.2 INDICATING LAMPS
Output ON indicating lamps are provided for each phase.

3.7 Digital Metering (Optional)

3.7.1 The Power Processor is available with either a basic or advanced digital meter on the input and/or output of the conditioner.

3.7.2 Both meters measure voltage (L-L, L-N), current, watts, VA, %THD, kVAR, kVA hour, watt hour, Fp (power factor), frequency and %load of all three phases.

3.7.3 Both meters have minimum and maximum alarms available for voltage, current, watts, VA, VAR, power factor, frequency and %THD. Communications are provided via MODBUS RS485 and DNP 3.0.

3.7.4 Both meters feature an IrDA infrared port for monitoring and programming from a PDA or computer with IrDA communications.

3.7.5 The advanced meter (V6 option) features real-time waveform viewing, optional 512 samples/cycle power quality analysis, optional extended event logging with waveform capture, historical trending, optional Ethernet, MODBUS TCP, TCP/IP, HTTP communications, optional relay contact outputs and status inputs, plus optional fiber optic communications.

3.8 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)
60K(i)	**60**	**1534**	**30**	**3069**	**29"W x 22"D x 56"H**	**792**
75K(i)	**75**	**2557**	**50**	**5115**	**29"W x 36"D x 66"H**	**1067**
100K(i)	**100**	**2557**	**50**	**5115**	**29"W x 36"D x 66"H**	**1067**
160K(i)	**160**	**3836**	**75**	**7673**	**34.5"W x 36"D x 76"H**	**1210**
210K(i)	**210**	**5115**	**100**	**10,230**	**34.5"W x 36"D x 76"H**	**1826**
260K(i)	**260**	**6394**	**125**	**12,788**	**34.5"W x 36"D x 76"H**	**2178**

4.0 Construction

4.1 Main Transformer

4.1.1 The transformer windings are of all copper conductor construction with separate primary and secondary isolated windings.

4.1.2 Fully processed, low carbon, silicon-iron transformer steel is utilized to minimize losses and provide high efficiency. Flux density does not exceed 14k gauss.

4.1.3 Class N, 200°C insulation system is utilized with a maximum temperature rise above ambient of 115°C.

4.1.4 The transformer has multiple (three) copper shields to minimize inner winding capacitance, and transient and noise coupling between primary and secondary windings. Inner winding capacitance is limited to .001 pf or less.

4.1.5 The transformer is designed for natural convection cooling.

4.2 Cabinet

4.2.1 Design: Front Access only including circuit breakers, status lights, bypass switch and metering. No side or rear access required for system operation or service.

4.2.2 Input and output terminations are front access. Input terminations are made directly to the main input circuit breaker and the input ground terminal provided. Output terminations are made to either the 3 phase copper bus connections or output circuit breaker(s) provided and the neutral and ground copper bus connections.

4.2.2.1 There are maximum of 2 output circuit breakers available with a maximum rating of 250A, 3 pole or 1 output circuit breaker if it is greater than 250A, 3 pole.

4.2.3 Conduit landing plates are provided to permit top and/or bottom entry for input and output power connections.

4.2.4 Ventilation: Originates from the front of the cabinet and exhausts through the top of the cabinet.

4.2.5 Layout: Electronic control section is isolated from transformer section and power terminations.

4.2.6 Construction: All steel constructed NEMA1 enclosure with power-coat finish.

5.0 Environment

5.1 Operational Temperature Range: -20°C to +40°C

5.2 Humidity: 0-95% non-condensing.

5.3 Altitude: Up to 5,000 feet above sea level without de-rating.

5.4 Audible noise: 50 db at 1 meter distance.

6.0 Warranty

The manufacturer guarantees all systems to be free from defects in material and workmanship for a period of 1 year following shipment from the factory.