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. An integral output voltage surge suppression device (SPD) 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

Seismic-rated units with an input nominal voltage of 208VAC, 240VAC, or 480VAC are designed and tested in accordance with applicable portions of the following standards:

2.10 OSHPD Special Seismic Certification Preapproval (OSP)
2.11 ICC - AC156: “Acceptance Criteria for Seismic Certification by Shake-Table Testing of Non-structural Components and Systems”
2.12 California Building Code – CBC 2013
2.13 International Building Code – IBC 2015

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 on 60K(i) through 160K(i) models; and 480 VAC, wye derived on 210K(i) and 260K(i) models.
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 Standard output voltage SPD with high frequency filter: Integral, fused, 3 phase, secondary connected, 6 mode surge protection device (SPD). The SPD is a transient voltage suppression network comprised of high energy metal oxide varistors with less than a 5 nanosecond response time and a maximum peak current handling capability of 40kA amps (8x20μsec) per mode. The suppression network will remain functional when subjected to ANSI/IEEE C62.41 Category B-3 waveforms. The SPD includes a high frequency noise filter that increases the transverse mode noise attenuation to 3dB down at 10kHz, decaying 40dB per decade. A single status indicator light is provided to show that the SPD and filter are fully operational and functioning properly.
3.3.15 Optional output voltage SPD: Integral, fused, 3 phase, secondary connected surge protection device (SPD), with a peak surge current capacity rating of 100kA per phase. The SPD has a nominal discharge current rating of 20kA, and a short circuit current rating (SCCR) of 100kA. The SPD includes LED monitoring of each phase, and is UL 1449 Listed. This SPD may be selected as an alternative to the standard SPD described in 3.3.14.
3.3.16 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.

An optional shunt trip is available to interface with an optional Remote Emergency Power Off Station.

As an alternative, the input breaker is available with an optional 24VDC or 120VAC under voltage trip relay to interface with the customer's emergency power off circuit. An external 24VDC or 120VAC power source is supplied by others and is required to energize the breaker.

3.5 Bypass Switch

A manually operated rotary switch bypasses the regulator portion of the system. The transformer and electrical noise suppression remain 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, PF (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 24"D x 59"H	890
75K(i)	75	2557	50	5115	29"W x 36"D x 66"H	1176
100K(i)	100	2557	50	5115	29"W x 36"D x 66"H	1176
160K(i)	160	3836	75	7673	34.5"W x 36"D x 76"H	1575
210K(i)	210	5115	100	10,230	34.5"W x 36"D x 76"H	2014
260K(i)	260	6394	125	12,788	34.5"W x 36"D x 76"H	2398

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.

There are a 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.

4.2.7 Floor mounting channels are standard and constructed using 10 gauge steel.

4.2.8 In lieu of floor mounting channels, optional lockable casters (4) are available with floor mounting brackets.

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.