TECHNICAL SPECIFICATIONS for
Three Phase, 15 to 1,250 KVA
Medical Power Conditioner with Conditioning and Regulation

Phase-Stabilizer

PPA6517A
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1.0 General

This specification covers the physical, electrical and environmental characteristics and general requirements for a Phase Stabilizer Power Regulating / Conditioning System. The specified equipment herein shall be referred to as a PHASE STABILIZER. The PHASE STABILIZER includes all components required to operate and maintain the system.

2.0 Applicable Documents

2.1 The National Electrical Code, NFPA 1970 (Latest Edition)

2.2 American National Standards Institute Corp. and its Applicable standards C39.1, C80.1, C89, C84.1.

2.3 FCC Part 15, Sub-Part J, Class A.

2.4 IEC 435 International Electro-technical Commission Recommendation "Safety of Data Processing Equipment".

2.5 VDE 0804/3.77 Verbauch Deulscher Elektotechiker standard. Telecommunication and Electronic Data Processing Unit and Systems".

2.6 UL 1950 Underwriters Laboratories Inc .Standard for Safety. Electronic Data Processing and Office Equipment Systems.

2.7 VDE 0806 Verbond Deutscher Electrtechniker Standard "Safety Design".

2.8 CSA 22.1 Canadian Standards Association, "Data Processing Equipment".

2.9 NEMA National Electrical Manufactures Association and its applicable standards.

2.10 Local Inspection Authorities having jurisdiction over electrical equipment and its installation.

2.11 MIL-T-27B Dry Transformer Insulation.

3.0 Major Components

The Basic components of the PHASE STABILIZER shall consist of base, case, transformer, regulating electronics, bypass switch, internal wiring, indicators, single point ground, input and output filters, EMI shielding, and optional output circuit protection.

4.0 System Package and Construction

4.1 Agency approval.

The PHASE-STABILIZER shall be UL Listed under standard 1950.

4.2 Input Main Circuit Breaker (Optional)
The Phase-Stabilizer shall be equipped with an input main circuit breaker with a 24 vdc shunt-trip. The IMCB shall be rated for 125 % of the full load amps and be of thermal magnetic molded case construction. The IMCB shall have a

minimum of 25,000 AIC rating. Provisions for higher interrupting capacity shall be incorporated into the design to accommodate this rating breaker, if required. The IMCB shall be UL listed.

4.3 Cabinet

The unit shall consist of the following:

1. **Frame:** The Frame shall be of tubular construction of heavy gage metal and welded for maximum strength. Each frame shall be treated before paint is applied and be of textured, baked enamel. The base shall be supported by (6) movable casters.

2. **Internal Sheet Metal:** Internal sheet metal not welded to the frame shall be plated with Gold Zinc Wash to ensure RFI, EMI susceptibility is reduced to the absolute minimum.

3. **Removable Access Panels:** Removable front and rear panels shall be provided. Access to the IMCB shall be through a heavy metal door attached with a continuos hinge and held shut with a magnetic strip which shall be attached to the door with screws and nuts.

4. **Cover:** The top cover shall not contain any openings into the interior of the Phase-Stabilizer.

5. **Conduit entry:** Input and output conduit entry shall be provided in the right and left lower side panels as well as provision for bottom entry.

4.4 a) 15 to 300 kVA: Isolation Transformer

A multi-shield, convection cooled, 3 phase, isolation transformer shall be provided. Construction of the transformer should separate the primary connections and the secondary connections by placing them on opposite sides of the core. In addition, the output terminals of the secondary shall be at opposite ends of the coil for the input terminals of the primary to minimize the possibility of transverse node injection. A copper foil shield shall be provided to allow a large surface area for shunting RFI signals of the core to ground. The isolation transformer shall be mounted on rubber isolation pads to prevent 60 Hz hum of the core from being transmitted to the frame. The transformer core clamp shall be grounded to the frame through a 1" copper strap. The Transformer insulation system shall be 220° C. Full load taps shall be provided (2) FCAN and (4) FCBN for connection to the tap switching regulator module. Two (2) temperature monitor connections shall be provided: 140° C (alarm) and 160° C (shut-down).

b) 400 to 1250 kVA: Buck-Boost Transformer

A multi-shield, convection cooled, 3 phase, buck-boost transformer shall be provided. Construction of the transformer should separate the primary connections and the secondary connections by placing them on opposite sides of the core. In addition, the output terminals of the secondary shall be at opposite ends of the coil for the input terminals of the primary to minimize the possibility of transverse node injection. A copper foil shield shall be provided to allow a large surface area for shunting RFI signals of the core to ground. The transformer shall be mounted on rubber isolation pads to prevent 60 Hz hum of the core from being transmitted to the frame. The transformer core clamp shall be grounded to the frame through a 1" copper strap. The transformer's insulation system shall be 220° C. Full load taps shall be provided (2) FLAN and (4) FLBN for connection to the tap switching regulator module. Two (2) temperature monitors shall be provided: 140° C (alarm) and 160° C (shut-down).

4.5 Regulation Electronics

A solid state, electronic, zero current crossing tap switching regulation system shall be provided. This technology shall use SCR's (Silicon Control Rectifier) technology in its construction and shall be rated at 100% above worst case current ratings (10% below nominal) without any adverse effects. The regulation system shall respond to a change in the input voltage within a minimum of 1 cycle. The electronics shall be separated form the transformer area by a heat shield of sheet metal. This barrier shall be zinc plated for maximum conductivity.

4.6 Phase Imbalance

The maximum phase imbalance shall be 2%. The electronics and the transformer characteristics shall be of such construction that will provide for the 2% regulation band under all load and line conditions.

4.7 Neutral to Ground Potential

The Maximum resistance of the neutral and ground connections shall be less than 0.5 volts maximum potential.

4.8 Bypass Switch

A manually operated bypass switch shall be provided, in the event that the regulation circuit malfunctions, it shall select the 100% tap of the transformer and provide unregulated nominal power to the output circuit. Access to the bypass switch shall not require removal of any panels.

4.9 Internal Wiring

All internal wiring shall be UL Listed appliance wire or Power wiring of multi stranded construction. Secondary and Primary Power wiring from the transformer shall not be in close proximity of each other.

4.10 Indicators

The following indicators shall be provided:

1. Power On:
There shall be one indicator for each phase which has primary power being supplied to it.

2. Service Required:
Indicators shall be provided to indicate the status of the Secondary Surge Suppression Network fuses. The indicator shall be illuminated any time any of these fuses are open.

4.11 Single Point Ground (SPG)

A single point ground bus shall be provided and shall be of copper construction. Minimum thickness shall be 1/4" X 1/4" and be silver plated to provide connection of the lowest possible resistance to all ground wires secured to the SPG. The following shall be grounded to the SPG:

1. Equipment Grounds.
2. Neutral of Isolation Transformer.
3. Core of the Transformer.
4. Primary and Secondary Shields.
5. Base.
6. Equipment grounding conductor from the branch circuit.
7. Case.
8. Regulation Electronics.

4.12 Input/Output Transient Noise Filter

The input transient noise filter consist of a resister/capacitor network which acts as a large snubber circuit to eliminate high frequency impulses from entering the power conditioner. The output transient noise filter consist of a capacitor network installed on the secondary. This capacitor network, when coupled with the primary filter, virtually eliminates most electronic noise from reaching the applied load or being fed back to the unit from noise generation loads.

4.13 Secondary Surge Suppression Network (SSSN)

A transient suppression network shall be located on the secondary side of the isolation transformer. The SSSN shall suppress load induced noise to reduce the sensitivity of one load from another load. The SSSN shall have the following characteristics:

1. Parallel (Shunt) Protection
2. Response time of < 5 ns
3. Repetitive transients up to 5000/sec
4. Clamping Voltage: 160VAC line to neutral
   274VAC line to line
5. Peak Pulse Power Rating: 25KW line to neutral
   13.5KW line to line
6. Each device shall be fused for circuit protection. Visual service indicators (one for each phase) shall be provided to indicate that the SSSN is no longer providing protection.

5.0 Electrical Characteristics

5.1 60 HZ Frequency

1. Rating KVA:	15,30,50,75,100,125,150,175,200,225,250,300,400,500,625,750,875,1000,1250
2. Input Voltage:	208 or 480 VAC
3. Output Voltage:	208Y/120 or 480Y/277 VAC
4. Input Frequency Tolerance:	60 Hz ± 3 Hz

5.2 Transformer

1. Type:	Dry, multi-shield
2. Impedance:	Less than 3%
3. Efficiency:	> 96% @ 80% load
4. Load Power Factor:	Unity to 0.3 lead or lagging
5. Harmonic Distortion:	< 1% maximum added
6. Waveform Distortion at Tap Switching:	< 1% Added
7. Noise rejection (typical):	Common mode - 120 dB (15 to 300 kVA only) Normal Mode -60 dB/decade

5.3 Audible Noise: Meets or exceeds NEMA standards

5.4 Input Voltage Regulation: **+ 8% to -10% of nominal**

5.5 Input Voltage Surges: 20% Maximum above nominal line voltage, 50 Ms. maximum duration

5.6 Input Voltage Sags: 30% Maximum below nominal line voltage, 20 Ms. Maximum duration

5.7 Line Transients: 20% above nominal voltage for 1/hr max.

5.8 Output Voltage Regulation: **± 1.5% Typical, ± 2% maximum for all load / line conditions.**

5.9 Correction Times: 1 cycle typical

5.10 Load Rating: Continuous regardless of line / load conditions.

5.11 Overload Inrush Rating: 200% of full load for 10 seconds.
1000% of full load for 1 cycle.

6.0 Physical Characteristics

6.1 Dimensions:

208 VAC INPUT

kVA	15-50	75	100-300	400-500	625-1250
Height:	42"	42”	66”	73”	73”
Width:	32”	32”	50.5”	67”	100”
Depth:	22”	27”	32”	35”	35”

480 VAC INPUT

kVA	15-50	75-100	125-150	175-300	400-875	1000-1250
Height:	42"	42”	51.5”	66”	73”	73”
Width:	32”	32”	40.5”	50.5”	67”	100”
Depth:	22”	27”	26.5”	32”	35”	35”

7.0 Operating Environment

7.1	Temperature:	32° F to 104° F (0° C to 40° C)
7.2	Humidity:	10% to 90% relative humidity, non-condensing
7.3	Altitude:	0 to 7000 Ft.

8.0 Storage Environment

8.1	Temperature:	-4° F to 140° F (-20° C to 60° C)
8.2	Humidity:	0% to 95% relative humidity, non-condensing

9.0 Warranty

The manufacturer shall warrant the PHASE-STABILIZER to be free from defects in both material and workmanship for a period of 24 months from the time of installation or 30 months shipment, whichever occurs first.

10.0 Manufacturer's Qualifications

The PHASE-STABILIZER shall be furnished by a manufacturer who specializes in the manufacturing of Medical Power Distribution Systems with power regulation / conditioning and has been in business for at least 15 documented years, and with a nation wide service organization. The manufacturer shall be an ISO9001 certified company.

11.0 Qualified Systems.

The unit shall be a PHASE STABILIZER manufactured by:

OnLine Power, Inc.
Los Angeles, CA