

**PRODUCT SPECIFICATION FOR A 15 AND 75 kVA,  
THREE PHASE MODULAR POWER DISTRIBUTION SYSTEM  
WITH REGULATION AND CONDITIONING  
(Varian)**

**1.0 General**

This specification covers the electrical characteristics and general requirements for a modular power distribution system with conditioning and regulation. The Varian Power Conditioner shall include all components and systems required to install, operate and maintain the system. The Varian Power Conditioner shall be tap switching regulator technology.

**2.0 Applicable Documents**

- 2.1 The National Electrical Code NFPA (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 Electrotechnical Commission Recommendation "Safety of Data Processing Equipment".
- 2.5 VDE 0804/3.77 Verbrauch Deutscher Elektotechniker 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 Elektotechniker 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 Varian Power Conditioner shall consist of: main input circuit breaker with 24 volt shunt-trip, caster based cabinet, double-shield computer grade isolation transformer, regulation electronics, internal wiring, single point ground, manual bypass switch, input filters, over current and over temperature protection.

**4.0 System Package and Construction**

- 4.1 Agency approval.  
The CP-18 shall be UL Listed under standard 1950.
- 4.2 Input Main Circuit Breaker (IMCB)  
The Varian Power Conditioner shall be equipped with a main input circuit breaker with a 24V shunt trip provided. The IMCB shall be rated for 125% of full load and be of thermal magnetic molded case construction. The IMCB shall have a minimum of 25,000 AIC rating. Provision for higher interrupting capacity shall be incorporated into the design to accommodate this type of breaker if required. The IMCB shall be UL Listed.

#### 4.3 Cabinet

The Cabinet 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 reduced to the absolute minimum.
3. Access  
Access to the IMCB shall be through a heavy metal door attached with a continuous hinge and held shut with a magnetic strip which shall be attached to the door with screws and nuts. A removable rear access plate shall be provided for access to the transformer. All exposed access screws shall be bright nickel or black oxide plated.
4. Top Cover  
The top cover shall not contain any openings into the interior of the Varian Power Conditioner.

#### 4.4 Isolation Transformer

A double-shield, copper wound, 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 mode 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. The transformer temperature rise shall be 150° C rise. Full load taps shall be provided (2) FCAN and (4) FCBN for connection to the tap switching regulator module. The unit shall be 150° C temperature rise. 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 (26% below nominal) without any adverse effects. The regulation system shall respond to a change in the input voltage within a minimum of 1 cycle.

#### 4.6 Bypass Switch (Regulation Only)

A manually operated bypass switch shall be provided. In the event that the electronic control circuit fails, the switch shall select the 100% tap of the transformer to provide nominal voltage to the load. Access to the bypass shall not require removal of any panels. The bypass switch shall be accessible by the operator by opening the front door. The bypass switch is a "break-before-make" switch.

#### 4.7 Internal Wiring

All internal wiring shall be UL Listed appliance wire or Power wiring of multi stranded construction. Primary & Secondary Power wiring from transformer shall not pass through the same access holes in the transformer shield. When in close proximity, Secondary and Primary wiring shall cross at a 90° angle to minimize the injection of transient electrical noise between the two circuits.

#### 4.8 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" and be silver plated to provide connection of the lowest possible resistance of all ground wires secured to the SPG. The following shall be grounded to the SPG:

1. Equipment grounds.
2. Neutral (star of isolation transformer).
3. Core of the Transformer.
4. Primary and Secondary shields.
5. Frame.
6. Equipment grounding conductor from the branch circuit.
7. System monitoring electronics.
8. All output conduits through the output conduit landing plate.
9. The input conduit through the input conduit landing plate.

#### 4.9 Input Transient Noise Filter

The Input Transient, electrical noise filter consist of a resistor/capacitor network which acts as a large snubber circuit to eliminate high frequency impulses from entering the power conditioner.

#### 4.10 Output Transient Noise Filter

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 generating loads.

#### 4.11 Secondary Surge Suppression

A transient suppression network shall be located on the secondary side of the isolation/regulation transformer. The SSS shall suppress load-induced noise to reduce the sensitivity of one load from another load. The SSS 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 - 160 VAC line to neutral 274 VAC line to line (208Y/120)
5. Peak Pulse Power Rating of 27 kW line to neutral, 13.5 kW 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 SSS is no longer providing protection.

## **5.0 Electrical Characteristics**

- 5.1 60 Hz Frequency units
1. Output Rating KVA: 15 & 75
  2. Input Voltage: 208, 480 or 600VAC
  3. Output Voltage: 208y/120 or 480y/277 VAC
  4. Input Frequency Tolerance: 60 Hz  $\pm$  3 HZ
- 5.2 50 Hz Frequency Units
1. Output Rating, KVA: 15 & 75
  2. Input Voltage: 380 or 415 VAC
  3. Output Voltage: 380y/220 or 415y/240
  4. Input Frequency Tolerance: 50 Hz  $\pm$  3 Hz
- 5.3 Transformer
1. Type: Dry, isolation double-shield (Delta-Wye)
  2. Impedance: 3% to 5% maximum
  3. Efficiency: 96 % @ 100% 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 ( 0.1 Hz to 10 Mhz )  
Normal Mode - 40 dB/decade ( 2KHz )
- 5.4 Audible Noise: <35 dB measured on Response Curve "A"
- 5.5 Input Voltage Regulation: +10 to -26 % of nominal
- 5.6 Output Voltage Regulation:  $\pm$  3% typical;  $\pm$  4% maximum for all load and line conditions
- 5.7 Response time: 1 cycle typical
- 5.8 Output Rating: Continuous regardless of line / load conditions
- 5.9 Overload Inrush Rating: 200% of full load for 10 seconds  
1000% of load for 1 cycle

## **6.0 Physical Characteristics**

6.1 Dimensions:

	Height	Width	Depth
15 kVA	32.0"	25.6"	17.0"
75 kVA *	42.0"	32.0"	27.0"

6.2 Floor Loading Weight: Not to exceed 250 lbs. per sq./ft.

## **7.0 Operating Environment**

- 7.1 Temperature: 32° F to 122° F (0° C to 50° 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 Varian Power Conditioner to be free from defects in both material and workmanship for a period of 24 months from the time of installation or 30 months after shipment, which ever occurs first.

## **10.0 Manufacturer's Qualifications**

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

## **11.0 Qualified Systems.**

The unit shall be a CP-18 manufactured by:

ONLINE POWER, INC.  
5701 Smithway Street  
City of Commerce, CA 90040