

Liebert Computer Isolation Transformer System

GUIDE SPECIFICATIONS

1.0 System Considerations

This specification covers the electrical characteristics and general requirements for a computer isolation transformer system. The equipment specified shall provide electrical isolation, noise and transient suppression to supply computer grade power to data processing equipment of other sensitive electronic loads.

2.0 Applicable Standards

The UPS shall be designed in accordance with the applicable sections of the current revision of the following documents. Where a conflict arises between these documents and statements made herein, the statements in this specification shall govern.

- ANSI C62.41-1980 (IEEE 587 A)
- ASME
- CSA 22.2, No. 107.1
- FCC Part 15, Sub Part J, Class A
- National Electrical Code (NFPA 70)
- NEMA PE-1
- OSHA
- UL Standard 1561

3.0 Environmental Requirements

The system shall be designed to with stand storage temperatures of -67 TO +185° F (-55 to +85° C) and operate within ambient temperatures of +32 to 104° F (0 to 40° C). The system shall be designed to operate up to 3300 feet above sea level without derating. The operating relative humidity range shall be 0 to 95% non-condensing.

4.0 General Requirements

The output capacity shall be [(15)(20)(30)(50)(75)(100)(125)(150)(175)(200)(225)(300)(____)] kVA. The input shall be [(208)(480)(____)] volts AC at 60 Hz, 3 phase, 3 wire plus ground. The output shall be [208/120)(480/277)(____)] volts AC, 3 phase 4 wire plus ground. The system shall be designed to operate with output neutral currents up to 175% of the phase currents, typical of single phase computer power supplies.

4.1 Transformer

The transformer shall be designed and manufactured in accordance with the latest revisions of UL 1561. It shall be a dry-type, three-phase, common core, computer grade, dual electrostatically shielded, isolation transformer designed to provide a separately derived power source for computer applications and to help protect computer and associated peripheral equipment from electrical noise and transients in the common modes. No direct electrical connection shall exist between the primary and secondary windings within the transformer.

The transformer coils shall be wound with continuous copper conductor. The coils shall be constructed with materials listed in UL, "Recognized Electrical Insulation System, Class 220° C." The transformer shall be designed for a maximum temperature rise of 150° C above a 40° C ambient, as measured by resistance method. The transformer shall be convection cooled.

The transformer shall have multiple electrostatic copper shields that extend the full height of the windings to provide minimum interwinding capacitance. The input and output coils leads and terminal strips shall be on opposite sides of the core in order to provide the maximum distance between input and output wires, thereby reducing the coupling capacitance.

The transformer core shall be constructed of high-grade, non-aging, grain-oriented, cold-rolled silicon steel that is coated with insulation, corresponding to ANSI C-5 insulation, to produce minimum exciting currents, minimum no-load losses, and minimum interlaminar vibrations. The core and coils assembly shall be immersed in a varnish and thoroughly baked to provide high dielectric strength, low audible noise and corrosion protection.

The isolation transformer of the unit shall be provided with 6 full capacity compensation taps at 2-1/2% increments to accommodate field adjustment to match the source voltage. Compensation taps shall be easily accessible by removal of the front panel. Tap changes include two, 2-1/2% full capacity, above nominal (maximum, 5% above nominal) and four, 2-2-1/2% full capacity, below nominal (maximum, 10% below nominal). The transformer output neutral shall be solidly grounded in accordance with the NEC, FIPS PUB 94 and computer vendors' recommendations to form a single-point computer-grade ground.

4.2 Spike suppression network

The unit shall be equipped with a fused 3 phase spike suppression network designed to attenuate high-speed, high-energy transients and to filter high frequency noise in the normal mode. The suppressor shall utilize high-energy metal oxide varistors with less than a 5 nanosecond response time, a peak current handling capacity of at least 15,000 amps, and an energy absorption capacity of at least 200 joules per phase. AC capacitors shall be utilized as part of the suppression network and act with the transformer impedance to effectively filter normal mode noise. Blown-fuse indicators shall be provided.

4.3 Typical System characteristics

The following are typical characteristics to be exhibited by the transformer system:

Output impedance: 3.0 to 5.5%

Regulation: 2 to 4% at full resistive load

Common mode noise attenuation: 140dB

Normal mode noise attenuation: 90dB

Output voltage harmonic distortion: 0.5% with a linear load, 5.0% max with a load of switched mode power supplies.

Full load efficiency: 96 to 98%

Magnetic Field Strength: Less than 0.1 gauss at 1.5 feet

Audible Noise: Less than 45 dBA at 5 feet

The system shall exceed the ANSI/IEEE standard C62.41-1980 guidelines for surge voltages.

4.4 Enclosure requirements

The complete transformer system shall be enclosed in a single, free-standing NEMA 1, general purpose enclosure. The enclosure shall be sized according to applicable UL and NEMA requirements. The enclosure shall be constructed of code-gauge minimum steel or larger. All metal enclosure surfaces shall be treated by acid priming and baked enamel painting or other suitable means to protect against corrosion.

4.5 K-factor rating (optional)

The transformer shall be designed and constructed to minimize the additional losses due to non-linear loads. The neutral terminal and conductors shall be sized for at least two times the rated full load output current. The transformer shall be listed under UL 1561 as suitable for use with non-linear loads having a harmonic current K-factor up to at least K-20.

5.0 Factory Testing

The transformer system shall be completely factory tested before shipment. Testing shall include, but shall not be restricted to: quality control checks, "Hi-pot" tests at two times rated voltage plus 1000 volts per UL requirements, turns ratio, and full load tests.

6.0 Unit records

The manufacturer shall furnish an outline drawing with unit weight, dimensions and heat output, installation information, wiring diagram, and a spare parts list for the transformer system.

7.0 Warranty

The system shall be provided with a one-year warranty against defects in material and workmanship.