

POWER DELEGATOR

SERIES 7700A POWER DISTRIBUTION UNIT WITH POWER CONDITIONING AND REGULATION

GENERAL SPECIFICATIONS

1.0 SCOPE

The following specification describes the features, design, and application of the Series 7700A Regulated and Conditioned Power Distribution Unit. All systems are designed and manufactured to assure maximum reliability, flexibility, serviceability and performance. The overall function of the Series 7700A is to receive electrical building power, regulate the voltage, remove transients and noise from that power, and distribute the power through flexible cable and/or receptacles to peripheral equipment and components of the data processing facility.

2.0 GENERAL

The Series 7700A Regulated and Conditioned Power Distribution Unit provides the following:

- 2.1 Voltage regulation, transformation and isolation of the input power to compute room power requirements.
- 2.2 Complete power conditioning, including transient and noise attenuation, of the power to the computer room from the main building electrical systems.
- 2.3 Single point silver plated ground for all computer room equipment.
- 2.4 Protection from overload conditions.
- 2.5 Distribution and protection of electrical power to each computer and peripheral device.
- 2.6 Monitoring of the electrical power to the computer room.
- 2.7 Annunciate computer room status (optional).
- 2.8 Quick installation with junction box interface to building power and flexible cable and/or receptacle interface to the computer system.

3.0 DYNAMIC ELECTRICAL CHARACTERISTICS

3.1 INPUT VOLTAGE RANGE

+10%, -20% of Nominal Input.

3.2 LINE VOLTAGE REGULATION

Output maintained to $\pm 3\%$ of nominal.

3.3 LOAD REGULATION

3% or less from no load to full load.

3.4 HARMONIC DISTORTION

The system will add no more than 1% harmonic distortion to the input waveform under any dynamic power supply loading conditions presented to the power distribution unit by the load (computer).

3.5 OUTPUT VOLTAGE CORRECTION TIME

The output voltage will correct, one step, to the proper output voltage in 1 1/2 cycles i.e., if the input voltage rises to +10% from nominal, the output voltage will be within the $\pm 3\%$ output band within 1 1/2 cycles. The correction will be to the precalculated tap for the proper output voltage without stopping at intermediate taps.

3.6 TURN-ON CHARACTERISTICS

On turn on, there will be no more than +5% of nominal voltage overshoot lasting for no more than 25 milliseconds.

3.7 POWER INTERRUPTION

In the event of power interruption of up to three (3) cycles and reapplication of power, the output voltage will not overshoot by any more than 120% of nominal and for a duration not to exceed 25 milliseconds (1 1/2 cycles).

3.8 LOAD PICK UP

When the system is taken from no load to full load, the output voltage will drop no greater than 5% below nominal for a period of no greater than 25 milliseconds (1 1/2 cycles) before the voltage is within the $\pm 3\%$ regulation band.

3.0 DYNAMIC ELECTRICAL CHARACTERISTICS (continued)

3.9 LOAD DUMPING

When the system is unloaded from full load to no load, the output voltage will deviate by no more than +5% of nominal and be within the $\pm 3\%$ regulation band within 1 1/2 cycles.

3.10 FULL LOAD EFFICIENCY

3.10.1 Overall efficiency is 95%

3.10.2 Transformer Efficiency 97%

3.10.3 Regulator Efficiency 98%

3.11 PERCENT OUTPUT IMPEDANCE

2% to 5% depending on size.

3.12 PERCENT REACTANCE

1.5% to 4% depending on size.

3.13 HARMONIC DISTORTION

Less than 1% THD added.

3.14 AUDIBLE NOISE

45 dB at full rated load.

3.15 COMMON MODE NOISE ATTENUATION

120 dB or greater

3.16 TRANSVERSE MODE NOISE ATTENUATION

Transverse Mode noise attenuation is 3 dB down at 1000 Hz, 40 dB down per decade to below 50 dB with a resistive load.

4.0 MAJOR COMPONENTS

The power conditioning and distribution unit as described herein consists of a junction box, lightning arrestor (optional), flexible input cable, main circuit breaker, triple shielded isolation transformer, output voltage regulator with filter, main output circuit breaker(s), (optional), branch circuit breakers, (optional) power monitor and alarm system (optional).

4.1 JUNCTION BOX

- 4.1.2 The junction box is an all steel electrical enclosures for installation under the computer room raised floor.
- 4.1.3 The power section contains the main power terminal block for each hot line and the service ground and neutral.
- 4.1.4 A low voltage junction box is furnished with optional monitoring systems and contains terminals, for low voltage control, to interface with the Remote Emergency Power Off (REPO) push button, air conditioning, water detectors, Halon, smoke and/or fire detectors, etc.
- 4.1.5 The junction box can be furnished mounted on an optional nine (9) square foot radio frequency (R.F.) suppression plate. The R.F. suppression plate will be of a highly capacitive construction consisting of two copper plates separated by a dielectric material.
- 4.1.6 An optional, quick disconnect, power plug (Main power entry) is available on most power sizes.

4.2 MAIN INPUT POWER CABLE

- 4.2.1 The junction box and the Power Distribution Center will be interconnected by a flexible, water-proof, steel raceway, 12 feet long, having a copper shield grounding conductor wound between the raceway walls.
- 4.2.2 The flexible raceway will house four (4) conductors on three phase systems and are sized for 125% of the full load current rating.
- 4.2.3 One copper conductor shall be provided for each hot line, and one service ground, and one neutral. A parity sized ground and isolated ground shall be used when applicable.

4.0 MAJOR COMPONENTS (continued)

4.3 MAIN CIRCUIT BREAKER

- 4.3.1 The main input circuit breaker with a rating of no less than 125% of the full load current will be used.
- 4.3.2 The main circuit breaker will incorporate a low voltage shunt trip mechanism to interface with the units protection circuitry including the Emergency Power Off (EPO) and optional Remote Emergency Power Off (REPO) circuits.
- 4.3.3 The main circuit breaker is mounted vertically in the main distribution center and has an interrupting capacity of not less than 10,000 A.I.C.

4.4 MAIN TRANSFORMER

- 4.4.1 The transformer windings are all copper conductor construction.
- 4.4.2 Grain oriented, M6 grade, stress relieved transformer steel is utilized for minimum losses and maximum efficiency.
- 4.4.3 Class H (Class 220) insulation is utilized throughout with operating temperatures well below the insulation class.
- 4.4.4 The transformer has a multiple (triple) copper shield to minimize interwinding capacitance and transient and noise coupling between primary and secondary windings.
- 4.4.5 All transformers are designed to operate at safe temperatures of less than 150° C (hot spot) above ambient.
- 4.4.6 Transformer over temperature shut down is provided at 200 ° C

4.5 REGULATOR

Two input voltage ranges are available.

- 4.5.1 Standard input range of +10% to -20% of nominal input provides an output range $\pm 3\%$ of nominal.
- 4.5.2 An optional extended range of +10% to -40% of nominal input provides an output range of +5% to -6% of nominal.

4.0 MAJOR COMPONENTS (continued)

4.6 OPERATING FREQUENCY

57-63 Hertz (60 Hertz Models)

4.7 REGULATOR CIRCUIT

The regulator is microprocessor controlled and utilizes solid state tap switching circuitry with a variable ratio autotransformer to obtain the required voltage regulation.

4.8 CONTROL CIRCUIT CARD

The microprocessor control circuit card is interchangeable between phases and between single phase and three phase units. One card per phase and is capable of quick disconnect and plug in.

4.9 BY-PASS SWITCH (optional)

An optional rotary By-Pass switch is available which will By-Pass the regulator portion of the Power Distribution Center. The regulator can be either on line or bypassed with one turn of the switch.

4.10 FILTER NETWORK

A transient filter is provided at the output of the regulator.

4.11 OVER CURRENT PROTECTION

4.11.1 Main input circuit breaker protected.

4.11.2 Optional single phase protection can be provided to shut down on a single phase condition.

4.12 MANUAL RESTART AND LOSS OF VOLTAGE TRIP

An optional loss of voltage trip and manual restart can be incorporated to shunt trip the main input breaker in the event of low output voltage. The trip point is factory adjusted at approximately 108 Volts line to neutral.

5.0 INTERNAL BUS AND GROUND SYSTEM

5.1 NEUTRAL BUS

On three Phase Systems the transformer neutral on the secondary wye of the transformer will be connected to the service ground from the building service and to the chassis of the Power Distribution Unit. The transformer neutral will also be connected to a bus for neutral (white) branch circuits. The ground pad is silver plated.

5.2 GROUNDING SYSTEM

The service ground shall be connected to the Power Distribution Unit's chassis, the electrostatic shield of the isolation transformer, the neutral lug of the isolation transformer and terminals at the isolated computer ground bus. The ground pad will be silver plated.

6.0 DISTRIBUTION

6.1 MAIN OUTPUT CIRCUIT BREAKERS (Optional on 50 KVA & lower)

6.1.1 Each 120/208 VAC panel board section can be protected by an optional main circuit breaker installed between the regulator/filter and the output distribution panel per the National Electric Code.

6.1.2 The circuit breaker is rated at not more than 125% of the transformer/regulator full-load output current but not greater than the panel board bus rating and it is protecting. The interconnecting cables are sized in accordance with this rating.

6.1.3 The circuit breaker shall have a thermal-magnetic trip device and a minimum of 10,000 amperes interrupting capacity.

6.2 DISTRIBUTION PANEL

6.2.1 The output circuit breaker panel will be vertically mounted and easily accessible through an optional glass door or a sheet metal door.

6.2.2 Additional circuit breakers and flexible cables can be easily added in the field by swinging the hinged door panel away from the output breakers and inserting the circuit breakers and additional flexible output cables from the front of the Power Distribution Center.

6.2.3 Each distribution sub-panel will be factory wired and will have no fewer than forty two (42) single pole circuit breaker positions.

6.0 DISTRIBUTION (continued)

6.2.5 The Cabinet is capable of accepting two additional 42 pole panels for a total of 126 poles.

6.2.6 Distribution sub-panel will be capable of accepting any combination of single pole (120V), two pole (208V, 1 phase) and three pole (208V, 3 Phase) circuit breakers with ratings up to and including 100 amperes.

6.3 BRANCH OUTPUT BREAKERS (Optional)

6.3.1 The output circuit breakers will be thermal magnetic and rated a 10,000 AIC.

6.3.2 The circuit breakers will have three positions to indicate if the breaker is on, off or in the tripped position.

6.3.3 Output circuit breakers will be manually operated and provide a switching position for each output.

6.3.4 All breakers will be clearly marked and identified with the associated output cable.

6.4 OUTPUT DISTRIBUTION CABLES (Optional)

6.4.1 Each cable assembly will be factory assembled and tested.

6.4.2 Cable raceways will be, multi-wall, flexible steel conduit with a plastic waterproof jacket. A copper shielding-grounding conductor will be wound between the steel walls of the flexible conduct.

6.4.3 Conductors in the flexible conduit will be all copper with nylon insulation.

6.4.4 Each cable will contain a parity sized grounding conductor.

6.4.5 Cables shall have a terminal or receptacle for proper interface with each computer component.

7.0 CABINET

- 7.1 Cable and circuit breaker access will be through the front for ease of adding additional cables and circuit breakers.
- 7.2 The cabinet is furnished with casters with leveling jacks to fix the unit in position upon installation.
- 7.3 Cabinet layout is such that the input and output wiring are separated to minimize coupling between the two.
- 7.4 The cabinet is built out of at least 14 gauge steel.
- 7.5 Cabinet temperature is minimized at no more than 20 ° F above ambient with exhaust fans.
- 7.6 Swinging access doors will have lift off hinges and special fasteners.
- 7.7 The cabinet has the following separate compartments to optimize safety, Isolation and serviceability.
 - 7.7.1 Breaker panel compartment.
 - 7.7.2 Transformer and Regulator compartment.
 - 7.7.3 Control and monitor compartments.
- 7.8 Silver plated ground bus is provided.
- 7.9 Texture baked on paint finish with proper pretreatment is provided.