

Vertiv™ Liebert® BDC
Bypass Distribution Cabinet for the Vertiv™ Liebert® NX
75kVA, 125kVA & 200kVA
GUIDE SPECIFICATIONS

1.0 GENERAL

1.1 Summary

These specifications describe requirements for a complete bypass and distribution cabinet, supplying power to sensitive electronic loads. The specified center shall provide isolation, distribution, control and monitoring of AC power. It shall include all equipment to properly interface the AC power source to the intended load.

1.2 Standards

The specified system shall be designed, manufactured, tested and installed in compliance with:

- American National Standards Institute (ANSI)
- Federal Information Processing Standards Publication 94 (FIPS Pub 94)
- Institute of Electrical and Electronics Engineers (IEEE)
- ISO 9001
- National Electrical Code (NEC - NFPA 70)
- National Electrical Manufacturers Association (NEMA)
- National Fire Protection Association (NFPA 75)
- Underwriters Laboratories (UL)
- Department of Energy (DOE)

The Liebert® BDC shall be UL and CUL listed as a complete system under UL 60950 Standard for Information Technology Equipment.

The specified center shall comply with the latest FCC Part 15 EMI emission limits for Class A computing devices and the emission and immunity limits of EN50081-2/EN550022 Class A and EN50082-2.

The Vertiv™ Liebert® BDC shall safely withstand without misoperation or damage:

- Transient voltage surges on the AC power input as defined by ANSI/IEEE C62.41 for Category B3 locations (high surge exposure industrial and commercial facilities)
- Electrostatic discharges (ESD) up to 10kV at any point on the exterior of the unit
- Electromagnetic fields from portable transmitters within 3 ft. (1m) of the unit

1.3 System Description

1.3.1 Electrical Requirements

- Output capacity shall be [(75) (125) (200)] kVA.
- Input voltage shall be [(600) (480) (220) (208)] volts AC, 60Hz, three-phase, three-wire-plus-ground.
- Output voltage shall be [(208/120) (220/127) (480/277) (480)] volts AC, three-phase, [(three) (four)]-wire-plus-ground configuration.

1.3.2 Environmental Requirements

1. **Storage temperature range:** -67° to +185°F (-55° to +85°C).
2. **Operating temperature range:** +32° to 104°F (0° to 40°C).
3. **Relative humidity:** 0% to 95% without condensing.
4. **Operating altitude:** Up to 6,600 ft. (2,000m) above Mean Sea Level. Derated for higher altitude applications.
5. **Storage/transport:** Up to 40,000 ft. (12,200m) above Mean Sea Level.
6. **Audible noise:** Under normal operation noise level shall not exceed than the ANSI C89 standard for transformers.

1.4 Documentation

1.4.1 Equipment Manual

The manufacturer shall furnish an installation, operation and maintenance manual with installation, startup, operation and maintenance instructions for the specified system.

1.4.2 Drawings

Submittal drawings shall include:

- One-line wiring diagrams
- Outline drawings including weight, dimensions, heat dissipation and recommended service clearances
- Location and detailed layout of customer power and control connections
- Outline drawings of options if supplied

1.4.3 Spare Parts

A list of recommended spare parts shall be supplied at the customer's request.

1.4.4 User's List

An in-service user's list shall be furnished upon request.

1.5 Warranty

The manufacturer shall provide a one-year warranty against defects in material and workmanship for 12 months after initial startup or 18 months after ship date, whichever occurs first. (Refer to the Warranty Statement for details.)

1.6 Quality Assurance

The specified center shall be factory-tested before shipment. Testing shall include, but shall not be limited to: Quality Control Checks, “Hi-Pot” Test (two times rated voltage plus 1000 volts, per UL requirements) and Metering Calibration Tests. The system shall be designed and manufactured according to world-class quality standards. The manufacturer shall be ISO 9001 certified.

2.0 PRODUCT

2.1 Components

2.1.1 Frame Construction and Enclosure

The frame shall be constructed of galvanized steel and pop-riveted to provide a strong substructure. The enclosure shall be mounted on heavy-duty swivel casters for portability and ease of installation and shall be provided with permanent leveling jacks for final installation. The unit shall have easily removable output cable trays on the top and bottom to allow matching the size and number of cable/conduit openings to the site requirements. All service shall be capable of being performed with access to the [(front, rear) (front)] and top. Retrofitting additional power distribution cables shall require access to the [(front) (rear)] of the unit only. A tool shall be required to remove the exterior panels, which access the hazardous voltage area of the unit.

The unit shall have lockable, removable, hinged front (and rear) door(s) that are 16-gauge perforated sheet metal construction to maximize ventilation. A two-point latch with key lock is provided for security. Doors shall provide access to the main input circuit breaker and to all output circuit breakers. Doors and side panels (if supplied) are finished in powder-coat black.

The unit shall be naturally convection-cooled. No fans for forced-air cooling system shall be used. The convection cooling method shall allow continuous full-load operation without activation of overtemperature circuits. Heat rejection shall be through a screened protective top, which prohibits entry of foreign material.

The unit is designed to attach to the Vertiv™ Liebert® NX UPS to provide bypass, distribution and monitoring.

Dimensions shall be a maximum of ([75-125kVA units] 70.5 in. (1790mm) wide by 78.5 in. (1994mm) high by 39.5 in. (1003mm) deep) / ([200kVA units] 94 in. (2388mm) wide by 78.5 in. (1994mm) high by 39.5 in. (1003mm) deep). The distributed floor weight shall be less than 250 lb./sq.ft. (1225 kg/sq.m).

2.1.2 Input Power Connections

Input power terminal blocks or busbar for 2-hole lugs shall be provided for connection of the input power conductors and a parity-sized insulated ground conductor.

2.1.3 Cable Entry

The Vertiv™ Liebert® BDC shall have provisions for top and bottom cable entry and exit.

2.1.4 Bypass Input Breaker (BIB)

The Liebert® BDC shall be equipped with a bypass input circuit breaker to provide overcurrent protection and a means for disconnecting all power to the input of the Liebert® NX UPS. The bypass input breaker shall be a thermal-magnetic three-pole molded case circuit breaker sized for 125% of the specified full load input current plus recharge current and rated for 600 VAC. The minimum UL-listed interrupting rating for the main input circuit breaker shall be [(35,000 (75kVA)) (65,000 (125-200kVA))] RMS symmetrical amperes at 480 volts AC.

2.1.5 Maintenance Bypass

The Liebert® BDC shall be equipped with a make-before-break maintenance bypass with key interlock system. Thermal-magnetic three-pole molded case circuit breakers shall be provided for maintenance bypass (MBB) and for maintenance isolation (MIB). Each circuit breaker shall have an interrupting rating of [(35,000 (75kVA)) (65,000 (125-200kVA))] RMS symmetrical amperes at 480 volts AC.

2.1.6 Isolation Transformer

The unit shall contain an electrostatically shielded isolation transformer with a rating as described in Section 1.3. The transformer shall be a dry-type, double-shielded, three-phase, common-core, convection air-cooled transformer. The transformer shall conform to UL1561, with 302°F (150°C) maximum temperature rise. All transformer windings shall be copper. The transformer shall be energy efficient and meet DOE standards TP-1 2016. The transformer shall exhibit the following characteristics: percent impedance 3.5 to 4.2%; common mode noise attenuation 120 dB; harmonic voltage distortion 0.5% maximum additive; full-load efficiency 97.6 to 98%.

The isolation transformer shall be provided with six full-capacity compensation taps at 2-1/2% increments to accommodate field adjustment to match the source voltage. These compensation taps shall be easily accessible by removing the front accent panel. Tap changes include: two above nominal voltage (upper range limit of +5%), nominal voltage and four below nominal voltage (lower range limit of -10%).

The unit shall be provided with thermal overload protection for the transformer. An alarm shall notify personnel if the transformer temperature reaches 356°F (180°C). The unit shall automatically shut down if the transformer temperature reaches 392°F (200°C). Temperature sensors shall be located in each coil of the three phase windings.

2.1.7 Computer Grade Ground

The Vertiv™ Liebert® BDC shall include a single-point ground in accordance with sensitive electronic load manufacturer's recommendations, IEEE Std. 1100 and the requirements of the NEC. The transformer output neutral shall be solidly grounded in accordance with NEC article 250-26. Grounding conductors shall be sized in accordance with IEC 364-HD-384 and applicable national and local codes.

2.1.8 Enhanced Monitoring Panel

The enhanced monitoring panel shall consist of a bright, easy-to-read, 12-digit (three lines of four digits each), 3/4-in. high LED display to monitor voltage, current and power parameters. The display shall be accessible without opening the door. The following metering parameters shall be displayed:

• Voltage line-to-neutral for each phase	• Current demand, for each phase and average
• Voltage line-to-line for each phase	• Peak current demand, for each phase and average
• Voltage line-to-neutral average	• Frequency
• Voltage line-to-line average	• Total Power Factor
• Current for each phase	• Total kW
• Neutral current	• Peak kW
• Current average	• kWh

All voltages and currents shall be measured using true RMS techniques for accurate representation of non-sinusoidal waveforms associated with computers and other sensitive electronic loads. The metering parameters shall have a full-scale accuracy of ±0.5%.

For remote monitoring, a RS-485 port that includes Modbus RTU protocol is provided.

2.1.9 Input Transformer (208-220-600V Input only)

The system shall contain an auto transformer. The transformer shall be a dry-type, three-phase and convection air-cooled transformer. The transformer shall conform to UL1561, with 302°F (150°C) maximum temperature rise. All transformer windings shall be copper. The transformer shall exhibit the following characteristics: percent impedance for 208-200V (75-200 Kva) 3.3 TO 4.5% and full-load efficiency 98.35 to 98.9%, for 600V (75-200Kva) 0.5 to 0.9% and full-load efficiency 99.35 to 99.45%.

2.2 Optional Distribution

2.2.1 Output Distribution Panelboards

The specified system shall contain [(two) (four)] vertically mounted Square D® bolt-in output panelboards for distribution to the intended loads. Each output distribution panelboard shall be individually protected by a main panelboard circuit breaker. Each panelboard shall be totally enclosed with a hinged accent panel that provides access to that panelboard without exposing other portions of the unit. The panelboard shall have a rating of 225 amperes, with an overall short-circuit current rating of [(10kA @ 75-125kVA) (22kA @ 200kVA)] RMS symmetrical amperes. The panelboards shall provide a total of [(84) (168)] single-pole branch circuit breaker positions. Each panelboard shall include separate isolated neutral and safety-ground busbars for the neutral and safety-ground connections for at least 42 output circuits. The neutral busbar and wiring shall be sized for at least 1.73 times the panelboard full load rating to accommodate high harmonic neutral currents associated with single-phase nonlinear loads.

2.2.2 Output Breakers

The specified system shall contain [(one) (two) (four)] output breaker(s) for distribution to the intended loads.

The output breaker(s) shall be thermal-magnetic three-pole molded case circuit breaker(s) rated ([two or four output breakers] 225A.) ([one output breaker] (250A @ 75kVA 220V) (300A @ 75kVA 208V) (400A @ 125kVA 220V) (450A @ 125kVA 208V) (700A @ 200kVA).)

3.0 EXECUTION

Factory startup, preventive maintenance and full service for the specified system shall be available and included upon request. The manufacturer shall directly employ a nationwide service organization of factory-trained field service personnel dedicated to the startup, maintenance and repair of the manufacturer's power equipment. The manufacturer shall maintain a national dispatch center 24 hours per day, 365 days per year, to minimize service response time and to maximize availability of qualified service personnel.

NOTE: These Guide Specifications comply with the format outlined by the Construction Specifications Institute per CSI MP-2-1 and CSI MP-2-2. In correspondence, reference Liebert document SL-25249_REVO_09-09.