Liebert® Maintenance Bypass Cabinet

Installer/User Guide

Technical Support Site

If you encounter any installation or operational issues with your product, check the pertinent section of this manual to see if the issue can be resolved by following outlined procedures. For additional assistance, visit https://www.VertivCo.com/en-us/support/

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1 IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS

This manual contains important instructions that should be closely followed during installation and maintenance of this Maintenance Bypass Cabinet.

This product is designed for commercial/industrial use only. This product is not intended for use with life support and other designated “critical” devices. Maximum load must not exceed that shown on the UPS and the Maintenance Bypass Cabinet rating label.

WARNING! Lethal voltages may be present within this unit even when it is apparently not operating. Observe all cautions and warnings in this manual. Failure to do so may result in serious injury or death. Never work alone.

The Liebert Maintenance Bypass Cabinet is designed for use on properly grounded (earthed) 208/240VAC, 60Hz supply, for installation by qualified personnel. This UPS equipment is intended to be installed by a qualified / certified electrician who must review and approve customer supplied wiring, circuit breakers, intended loads and verify correct input, output and grounded (earthed) connections to ensure compliance with technical standards and national and local electrical codes. Installation instructions and warning notices are located in the Installation section of this manual.

WARNING! To reduce the risk of fire:
The NMB1x and NMB4x models must be connected to a circuit provided with 100 amperes maximum branch circuit overcurrent protection in accordance with applicable national and local electrical codes.
The NMB5x and NMB8x models must be connected to a circuit provided with 125 amperes maximum branch circuit overcurrent protection in accordance with applicable national and local electrical codes.

Operate the UPS equipment in an indoor environment only in an ambient temperature range of 32°F to 104°F (0°C to 40°C). Install it in a clean environment, free from conductive contaminants, moisture, flammable liquids, gases, or corrosive substances.

Never block or insert any object into the ventilation holes or other openings.

Table 1.1 Glossary of Symbols

SYMBOL	DESCRIPTION
	Risk of Electrical Shock
	Indicates Warning or Caution Followed by Important Instructions
	AC Input
	AC Output

Table 1.1 Glossary of Symbols (continued)

SYMBOL	DESCRIPTION
	Requests the user to consult the manual
	Equipment Grounding Conductor
	On/Off

2 GENERAL DESCRIPTION

Congratulations on your purchase of Liebert's Maintenance Bypass Cabinet with Configurable Output Distribution. As with every Vertiv™ product, we stand behind our quality. If you have any questions concerning this Maintenance Bypass Cabinet, please feel free to contact your local dealer, Vertiv™ representative, or call Technical Support at 1-800-222-5877.

To ensure proper installation and operation of this unit, please read this manual thoroughly.

Installation must be done by a qualified/certified electrician, but general operation may be performed without special training.

2.1 System Description

The Liebert Maintenance Bypass Cabinet is intended for use with the Liebert UPS units. Typical applications include supporting workstations, servers, network, telecom or other sensitive electronic equipment.

The Maintenance Bypass Cabinet was designed to provide maximum system availability to business critical equipment. The Maintenance Bypass Cabinet allows for transfer of connected loads to an alternate power path allowing full isolation of the UPS. The UPS can then be turned "OFF" and removed from service with no interruption of power to connected loads.

2.1.1 Features

- Supports up to 20 kVA loads
- High speed transfer switch
- Compact design
- Highly configurable
- Multiple power path indicators

2.1.2 Standard Components

- Casters and leveling feet
- Easily accessible terminal blocks
- Supports Lockout/Tagout Program
- Support/mounting brackets for additional stability
- Provisions for hardwire output
- Dual-source compatible for increased availability

2.1.3 Options

- Output transformer for isolation
- Field-installable output distribution

Figure 2.1 Front view

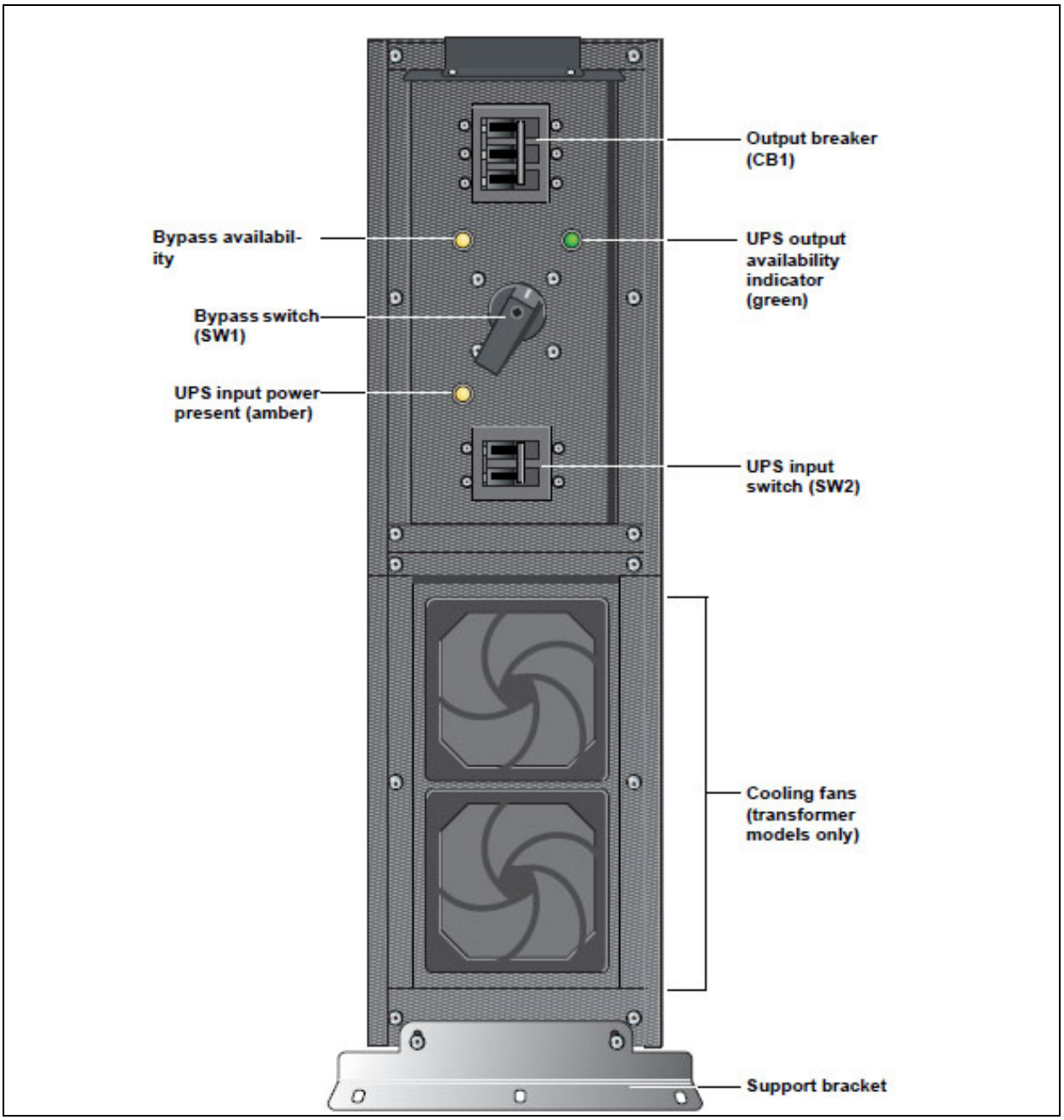


Figure 2.2 Rear view (without transformer)

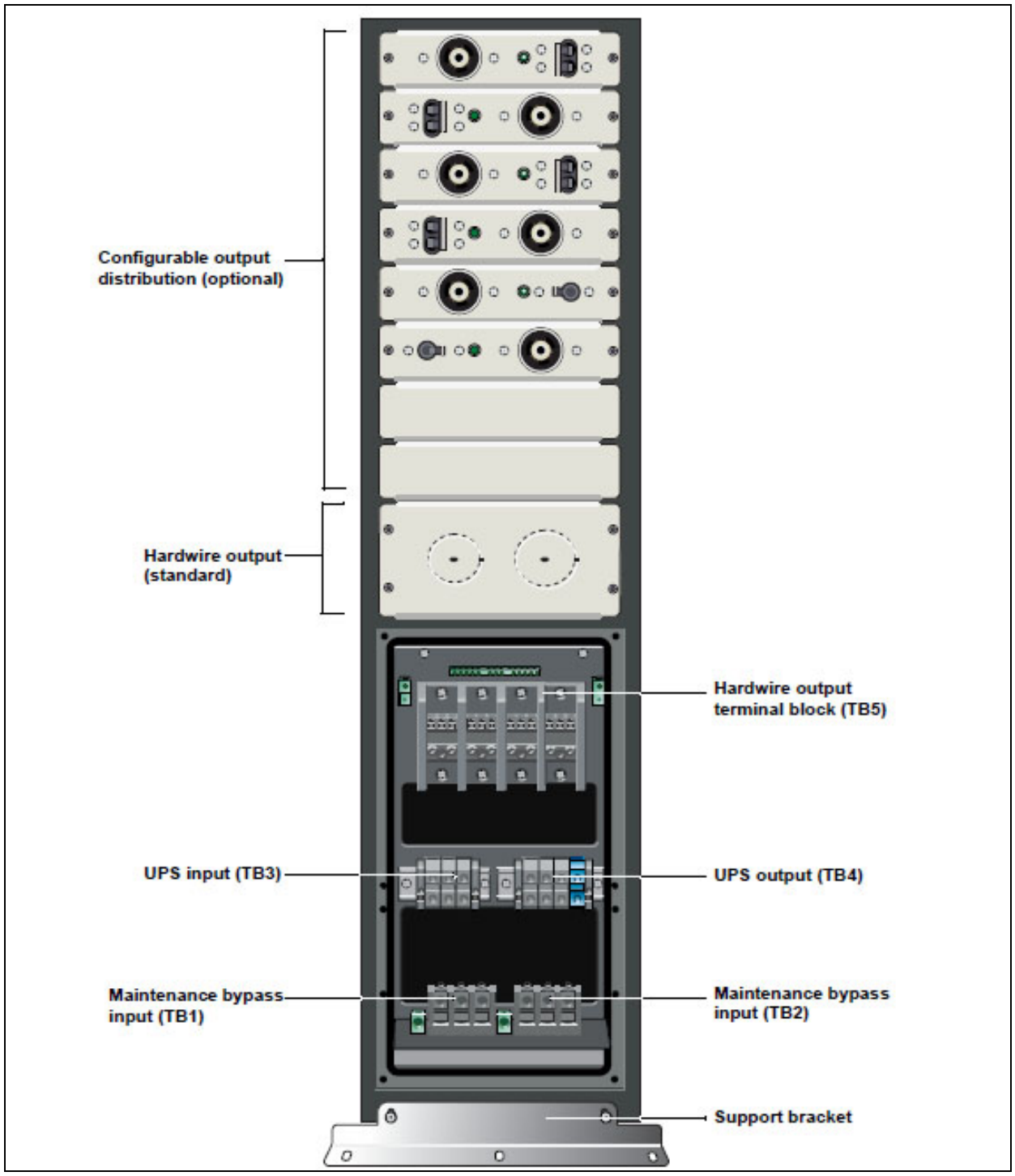
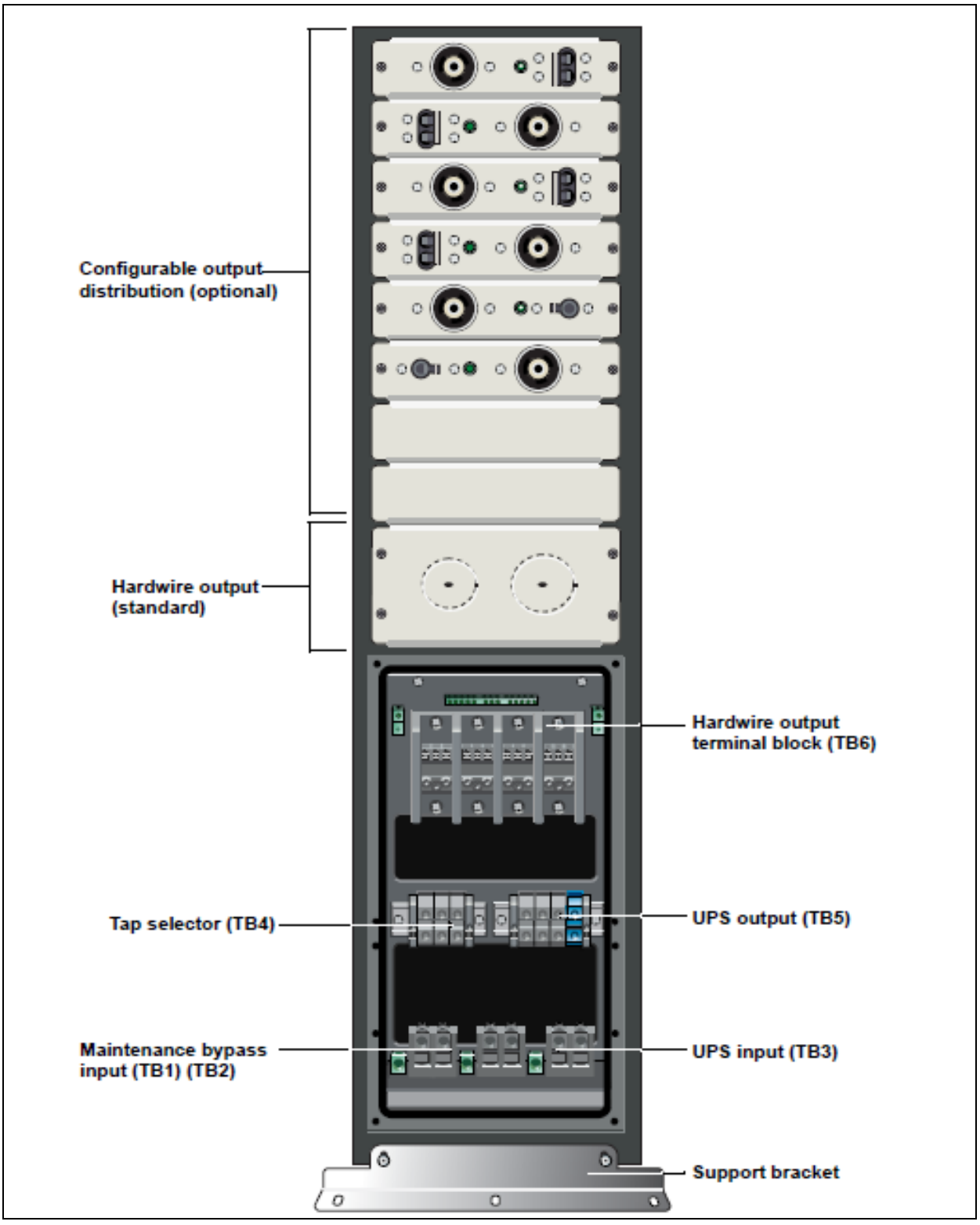


Figure 2.3 Rear view (with transformer)



3 MODES OF OPERATION

The Maintenance Bypass Cabinet is designed to operate in two modes: UPS Mode and Bypass Mode.

3.1 UPS Mode

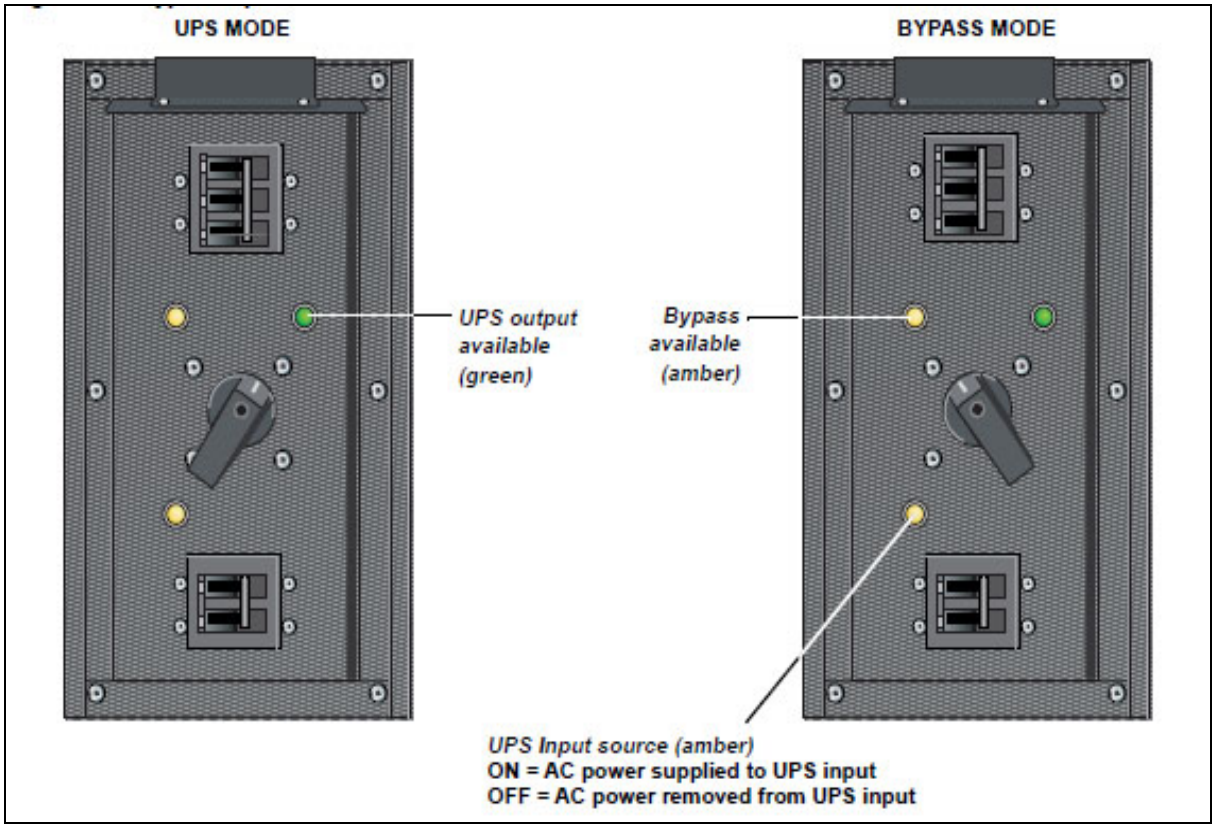
While the Maintenance Bypass Cabinet is in UPS Mode, the UPS is supplying the connected load with continuous, high quality AC power. In this mode of operation, the load is protected by the UPS. The Bypass Switch rotated toward the green lamp indicates this mode.

3.2 Bypass Mode

When the Maintenance Bypass Cabinet is in the Bypass Mode, it provides an alternate path for power to the connected equipment. Should the UPS need to be taken out of service for limited maintenance or repair, manual activation of the bypass will cause an immediate transfer of the equipment from the UPS inverter to the bypass source.

The amber lamp illuminated in the Maintenance Bypass Switch compartment indicates bypass is available. In this mode of operation the load is NOT protected by the UPS. The Bypass Switch rotated toward the amber lamp indicates this mode. See Operation on page 29 for instructions on use.

Figure 3.1 Bypass operation modes



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4 MAJOR COMPONENTS

The following is a general description of each component and its functions. Please review this section carefully, as it will give you a better understanding as to how the Maintenance Bypass Cabinet operates.

4.1 Bypass Switch

The Bypass Switch allows easy and rapid transfer of connected loads between the UPS and Bypass source.

4.2 User Selectable Output Distribution

Several receptacle and hardwire options are available as user selectable output distribution. These are factory configured when ordered and also allow for field upgrades.

Table 4.1 Common receptacle and hardwire options

15 AMP OPTIONS	20 AMP OPTIONS	30 AMP OPTIONS
5-15R2	5-20R2 (T-slot)	L5-30R
L5-15R2	L5-20R	L6-30R-208
6-15R2-208	L6-20R-208	L6-30R-240
6-15R2-240	L6-20R-240	L14-30R-240
L6-15R2-208	L14-20R-240	30A,120V, 1 pole breaker w/ 1/2" & 3/4" knockouts
L6-15R2-240	20A,120V, 1 pole breaker w/ 1/2" & 3/4" knockouts	30A,208V, 2 pole breaker w/ 1/2" & 3/4" knockouts
15A,120V, 1 pole breaker w/ 1/2" & 3/4" knockouts	20A,208V, 2 pole breaker w/ 1/2" & 3/4" knockouts	30A,240V, 2 pole breaker w/ 1/2" & 3/4" knockouts
15A,208V, 2 pole breaker w/ 1/2" & 3/4" knockouts	20A,240V, 2 pole breaker w/ 1/2" & 3/4" knockouts	
15A,240V, 2 pole breaker w/ 1/2" & 3/4" knockouts		

Other Options

- Single Position Blanking Plate
- Hardwire Option

4.2.1 Optional Transformer

Models offering a transformer are designed to accept the same input voltage as the UPS and provide 240 / 208 / 120 / 120 output. Models with transformers are provided with redundant cooling fans and user serviceable fan filters. The fans operate only when the system is in Bypass mode.

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5 PREPARATION

These installation instructions provide all the information needed for positioning the Maintenance Bypass Cabinet (including environmental requirements) and for connecting the input and output power cables.

5.1 Inspection

Upon receiving the Maintenance Bypass Cabinet, examine the packaging for any signs of mishandling or damage. If any damage is noted, contact your local dealer or Vertiv™ representative and notify your carrier.

5.2 Environment

The Maintenance Bypass Cabinet environment must be free of conductive contaminants and excessive moisture (water condensation), flammable vapors, chemical fumes, or corrosive gases and liquids.

5.3 Required Setup Equipment

The tools below are required in order to properly set up your Maintenance Bypass Cabinet:

- pallet jack
- 1/2" (13 mm) wrench
- torque wrench
- flat-head screwdriver
- #2 Phillips screwdriver
- 3/16" (5 mm) Allen wrench

5.4 Site Preparation

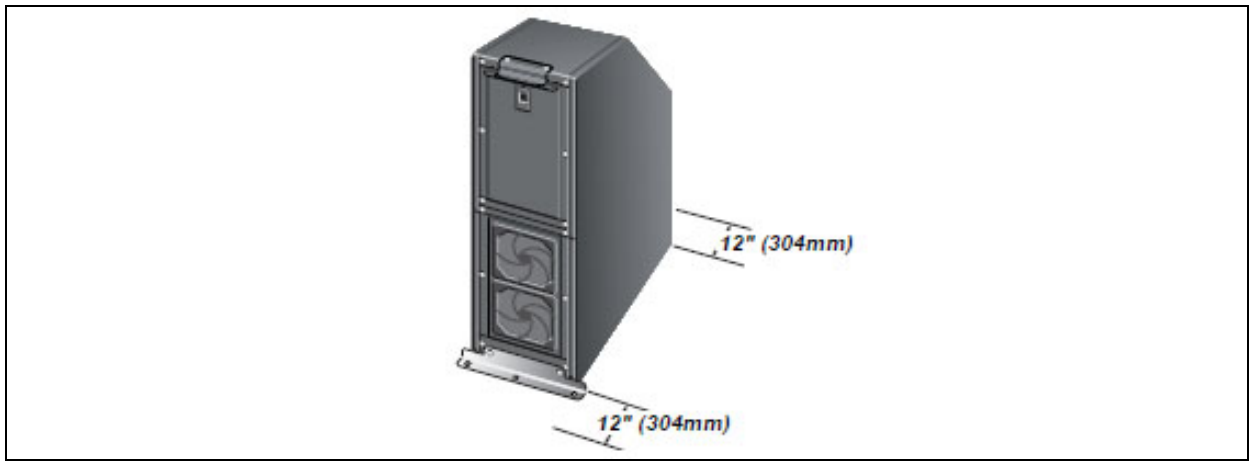
When deciding where to locate your Maintenance Bypass Cabinet, consider the weight and size of the unit. Make sure that the structural integrity of the floor can withstand the weight. Refer to the table below for dimensional considerations:

Table 5.1 Maintenance Bypass Cabinet physical data

DIMENSIONS		
Model	With Transformer	Without Transformer
W x D x H In (mm)	9.5 x 26.5 x 30.4 (241.3 x 673.1 x 772.16)	
Weight	287 lb (130 kg)	85 lb (38 kg)

Check to make sure that your Maintenance Bypass Cabinet will be located in a well-ventilated area with at least 12 inches (304mm) in front of and behind it. Transformer based models are forced air cooled with the aid of two internal cooling fans.

Figure 5.1 Clearances



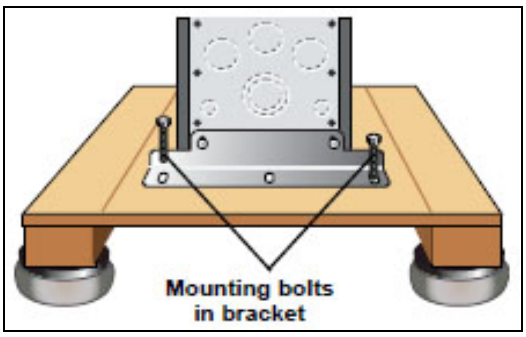
6 UNLOADING

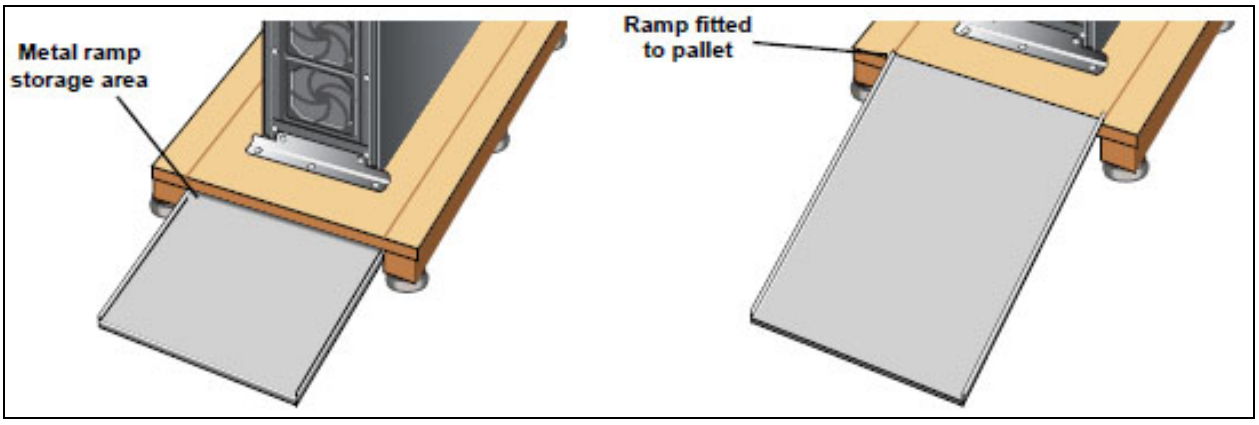
The unit frame is bolted to the shipping pallet to ensure safety. We recommend using a pallet jack to transport the unit to its operating location prior to unbolting the unit.

6.1 Unloading the Maintenance Bypass Cabinet

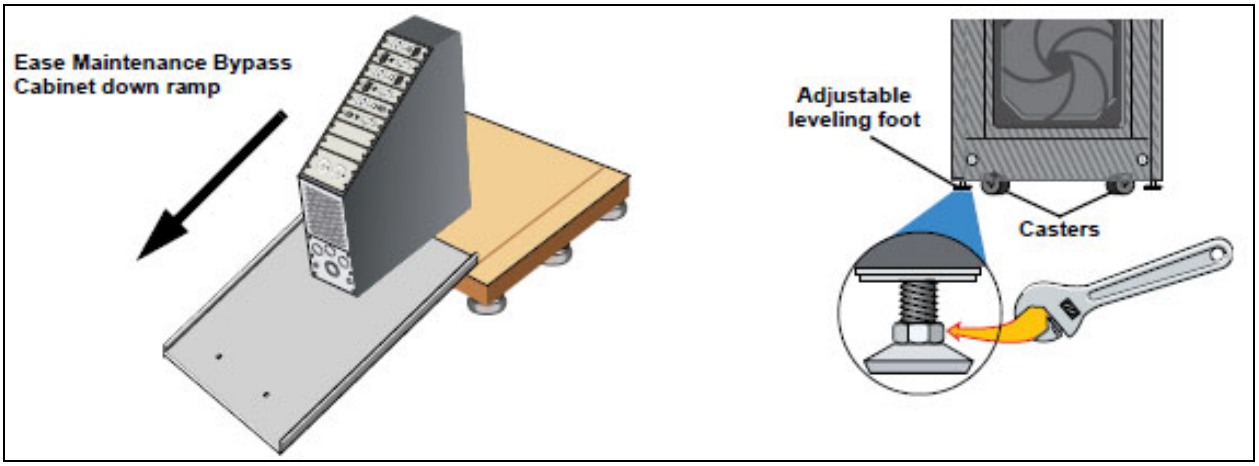
CAUTION: This Maintenance Bypass Cabinet is heavy (see weight in Table 5.1 on page 15). At least two people should assist to unload it from the pallet.

1. Once the Maintenance Bypass Cabinet is near the desired operating location, remove the cardboard cover.
2. Use a 1/2" (13mm) wrench to remove the eight mounting bolts (four per bracket) from the pallet brackets. Remove mounting brackets from the pallet and Maintenance Bypass Cabinet. Keep brackets and bolts for future transportation of the cabinet or for securing the cabinet to the floor.
3. Remove the metal ramp from the bottom of the pallet, rotating it 180°. Fit ramp onto opposite side of pallet (in slot) as shown below.



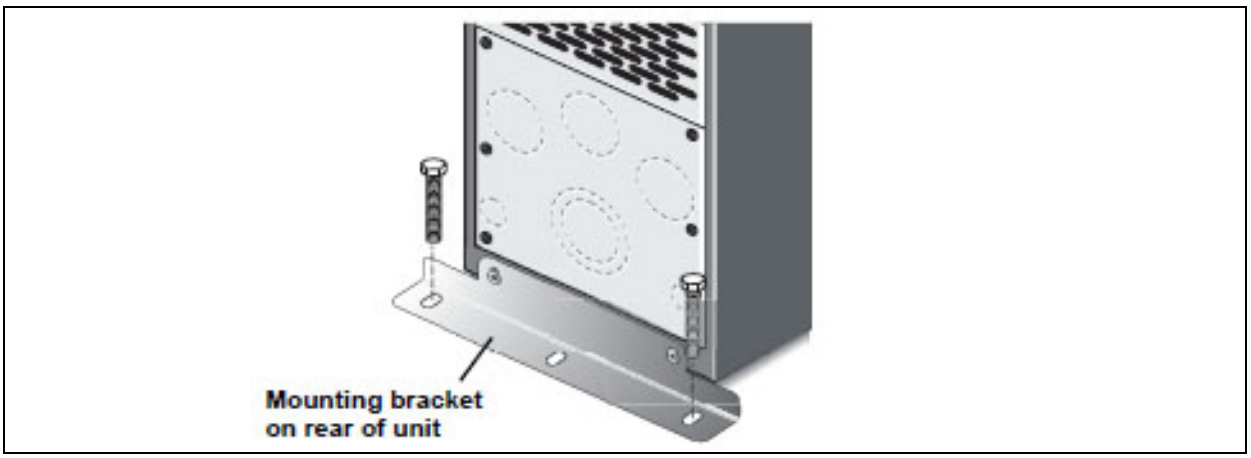


4. Using two people, slowly roll the cabinet down the ramp until the unit is on a level surface (see below, left).
5. Once the cabinet is in the desired location, adjust the leveling feet to secure its position (see below, right).

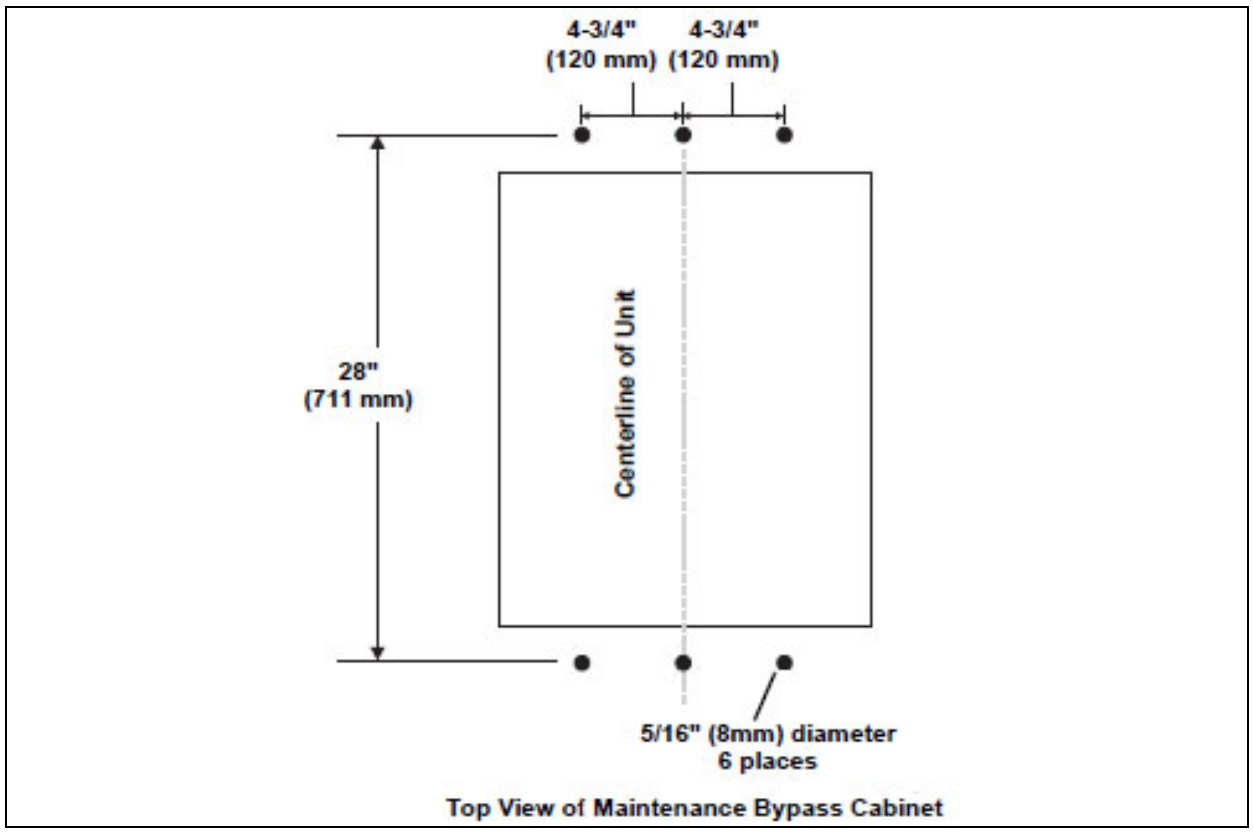


6.2 Stationary Mounting

Additional stability can be added by bolting the mounting brackets (used in shipping) to the floor.



For greater stability, use a higher-grade bolt. Refer to the dimensions below when drilling holes for stationary mounting.



Top View of Maintenance Bypass Cabinet

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7 CABLE INSTALLATION

7.1 Wiring Preparation

WARNING! Please read this section thoroughly before attempting to install wiring to this unit.

Be sure that the unit is not connected to any AC mains power source or UPS before installing any wiring to this unit. This Maintenance Bypass Cabinet should be installed by a qualified / certified electrician.

7.2 Preparing Internal Wiring

The Maintenance Bypass Cabinet is factory-configured for single-source installations. If your installation requires dual-source capabilities, the cabinet's wiring must be modified.

7.3 Dual Source Configuration

Modifying the wiring consists of removing the jumpers between TB1 and TB2 as described below:

1. Remove cover plates.
2. Identify TB1 and TB2.
3. Using a 3/16" Allen wrench, loosen terminal mounting jumpers between TB1 and TB2.
4. Remove jumpers and retighten terminals to 50 in-lb.
5. Connect primary source to TB2 and secondary source to TB1.

Figure 7.1 Jumper removal—transformer models and non-transformer models

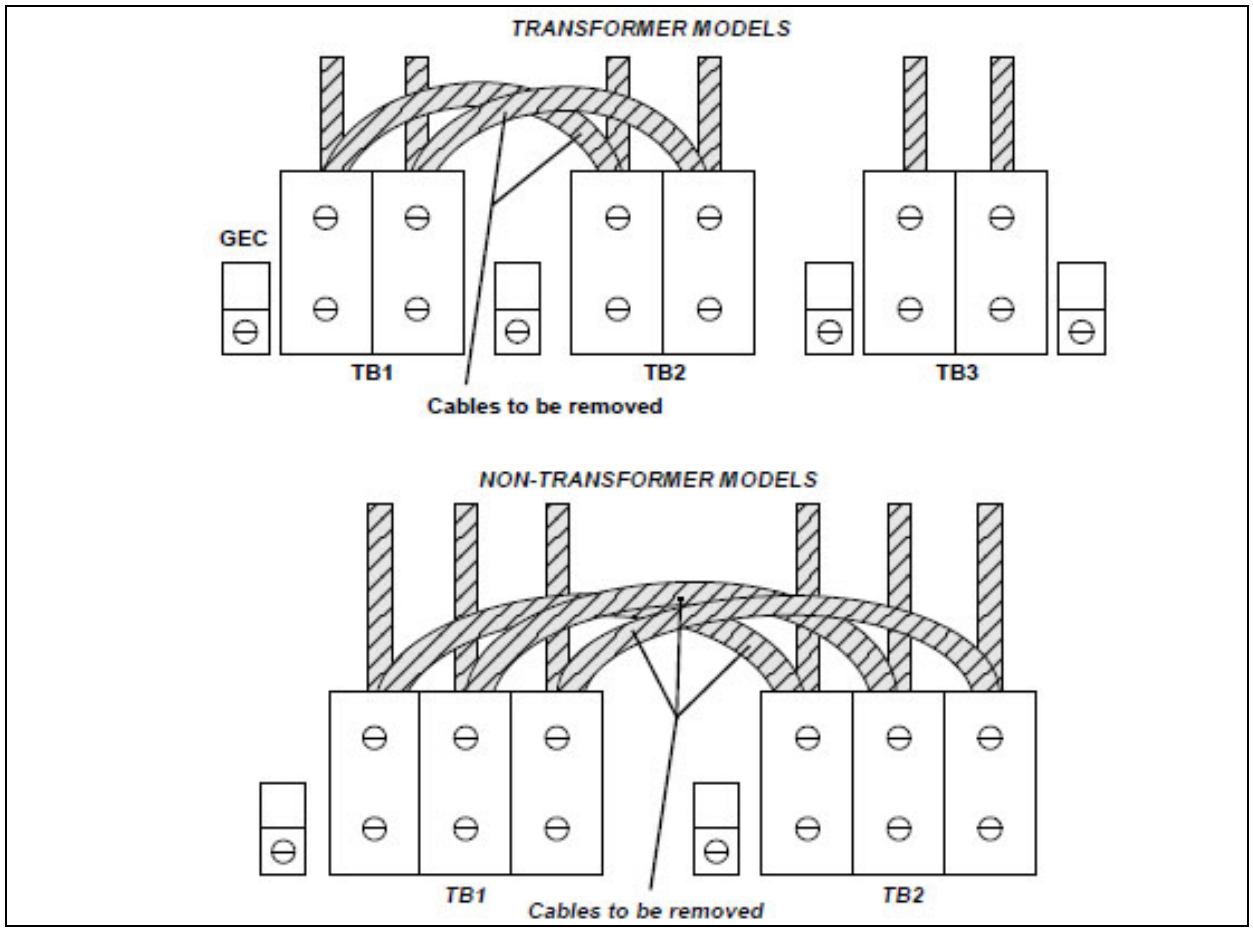


Figure 7.2 Maintenance Bypass Cabinet with transformer

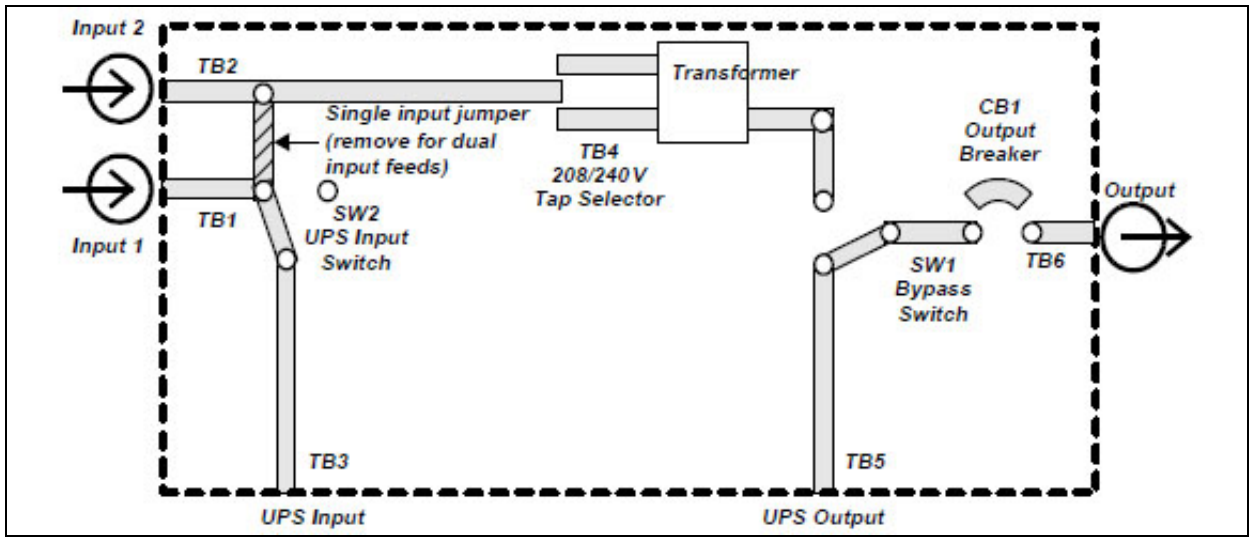
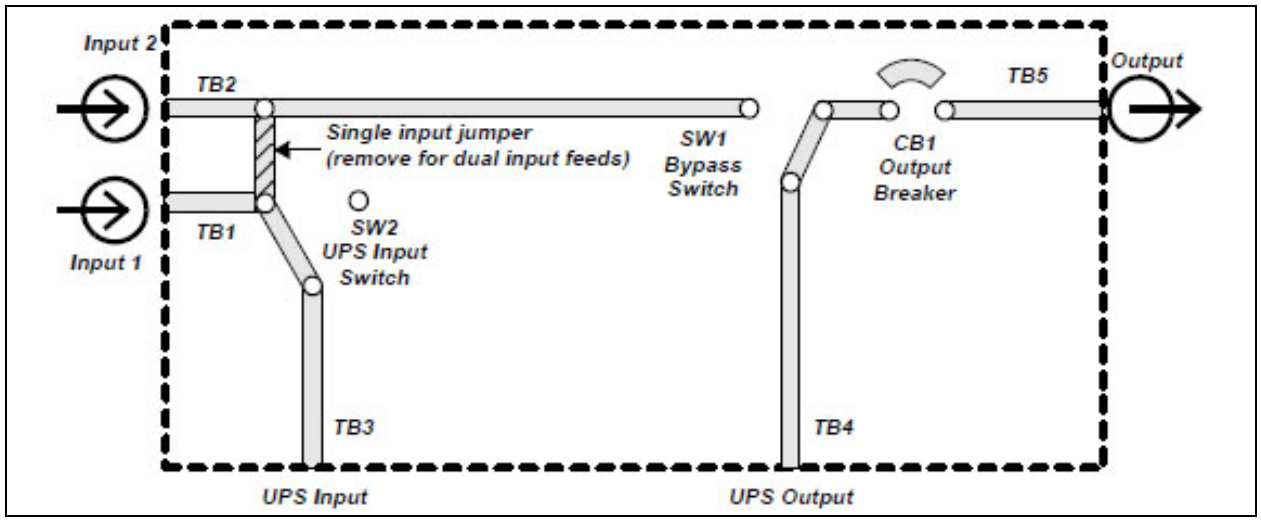


Figure 7.3 Maintenance Bypass Cabinet without transformer



7.4 Removing the Cover Plates

On the back of the Maintenance Bypass Cabinet, cover plates are over the input and output terminals (see illustration below). Remove these using a phillips screwdriver. Keep screws and plates to one side.

7.5 REPO Connection

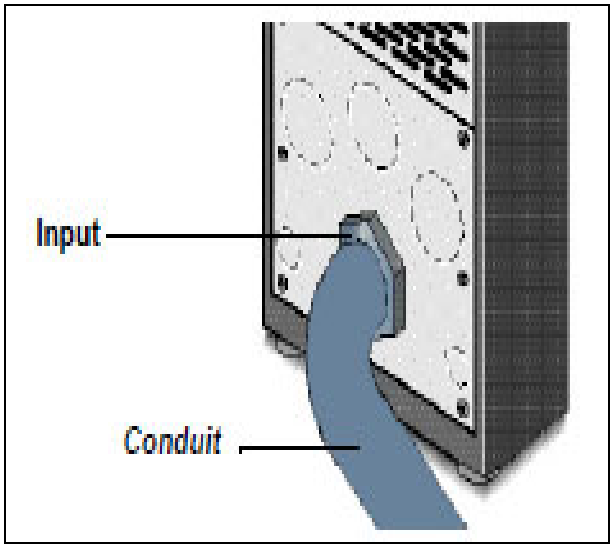
Refer to the Installer/User Guide for you Liebert UPS unit for information on connecting the REPO.

7.6 Input and Output Wiring

NOTE: Input wiring must be installed using conduit. 208 input voltage jumper—if only the connections for 208VAC are made between the UPS and the Maintenance Bypass, the 208 input voltage jumper must be installed for proper operation. To install this jumper, place the jumper wire provided in the accessory kit between Pin 1 and Pin 2 on TB4.

To connect the input wiring:

1. Locate the input wiring access (see illustration at right).
2. Remove the knockout and pull the three/four input wires through it, allowing some slack for installation.
3. Secure the conduit to the rear panel of the Maintenance Bypass Cabinet.
4. Input power cables connect to hex terminals on the input terminal block.
5. Insert the ground (earth) wire through the earth lug and tighten it to the proper torque value (120 in-lb). Then connect the wires to the block connections as shown at right. Using a torque wrench, turn the screws clockwise until tightened to the proper torque value (50 in-lb).



NOTE: The Liebert UPS and Maintenance Bypass Cabinet with transformer contain an isolation transformer that generates a neutral conductor for the connected equipment. The UPS and Maintenance Bypass with transformer are a separately derived source and contain a neutral-to-ground bonding jumper. A grounding electrode conductor (GEC) must be installed in accordance with national and local wiring codes and regulations.

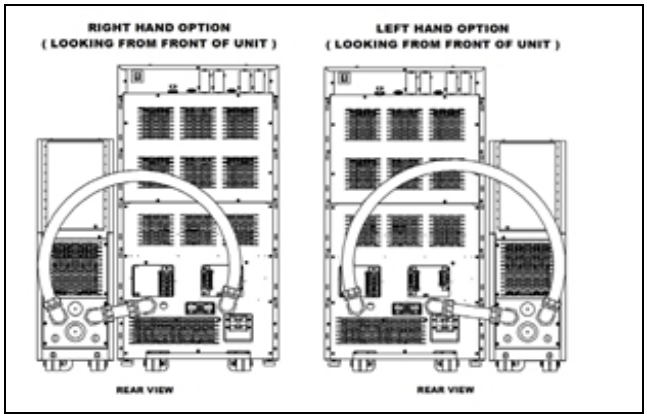


Figure 7.4 Electrical connections—transformer model MBC

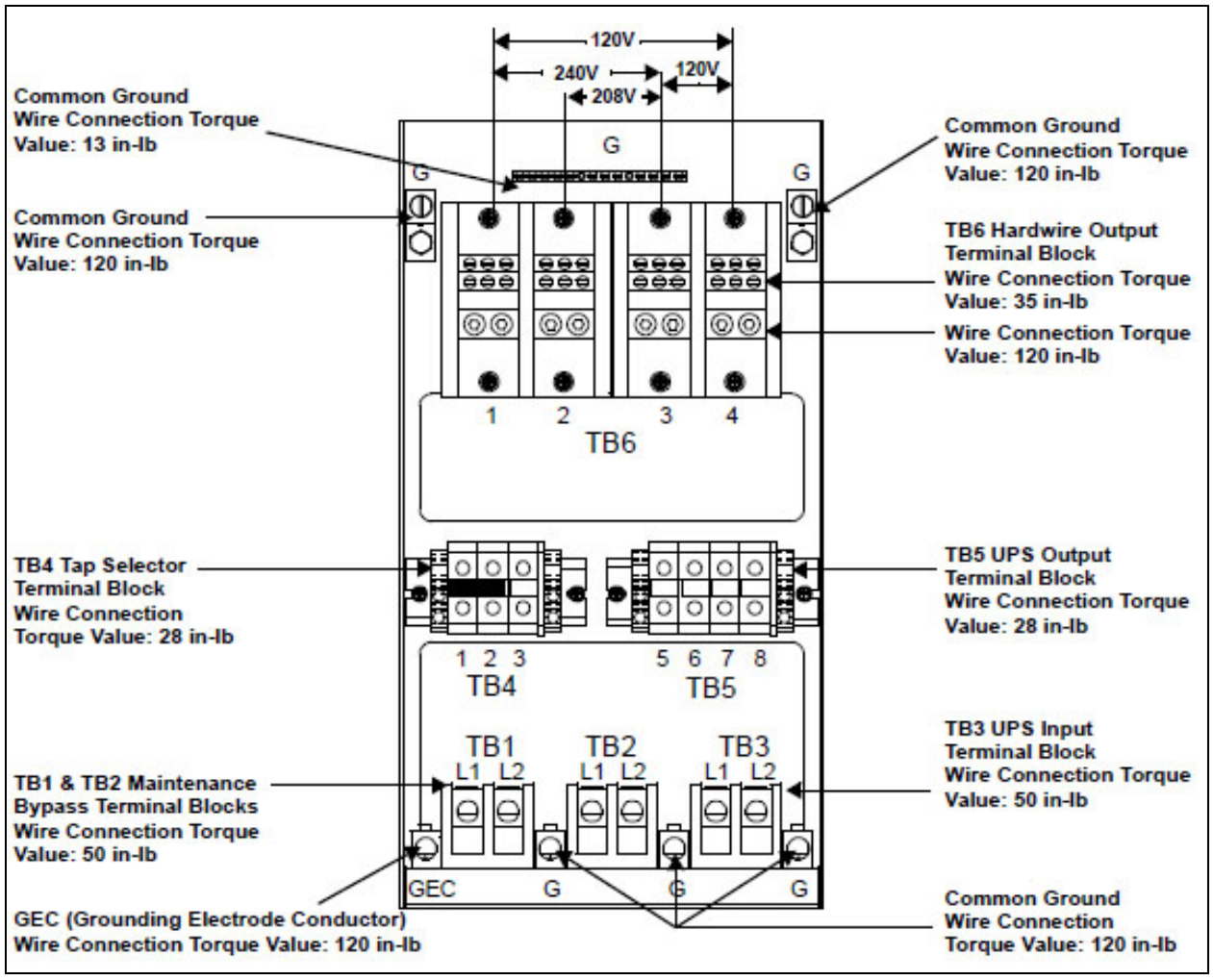


Figure 7.5 Electrical connections—non-transformer model MBC

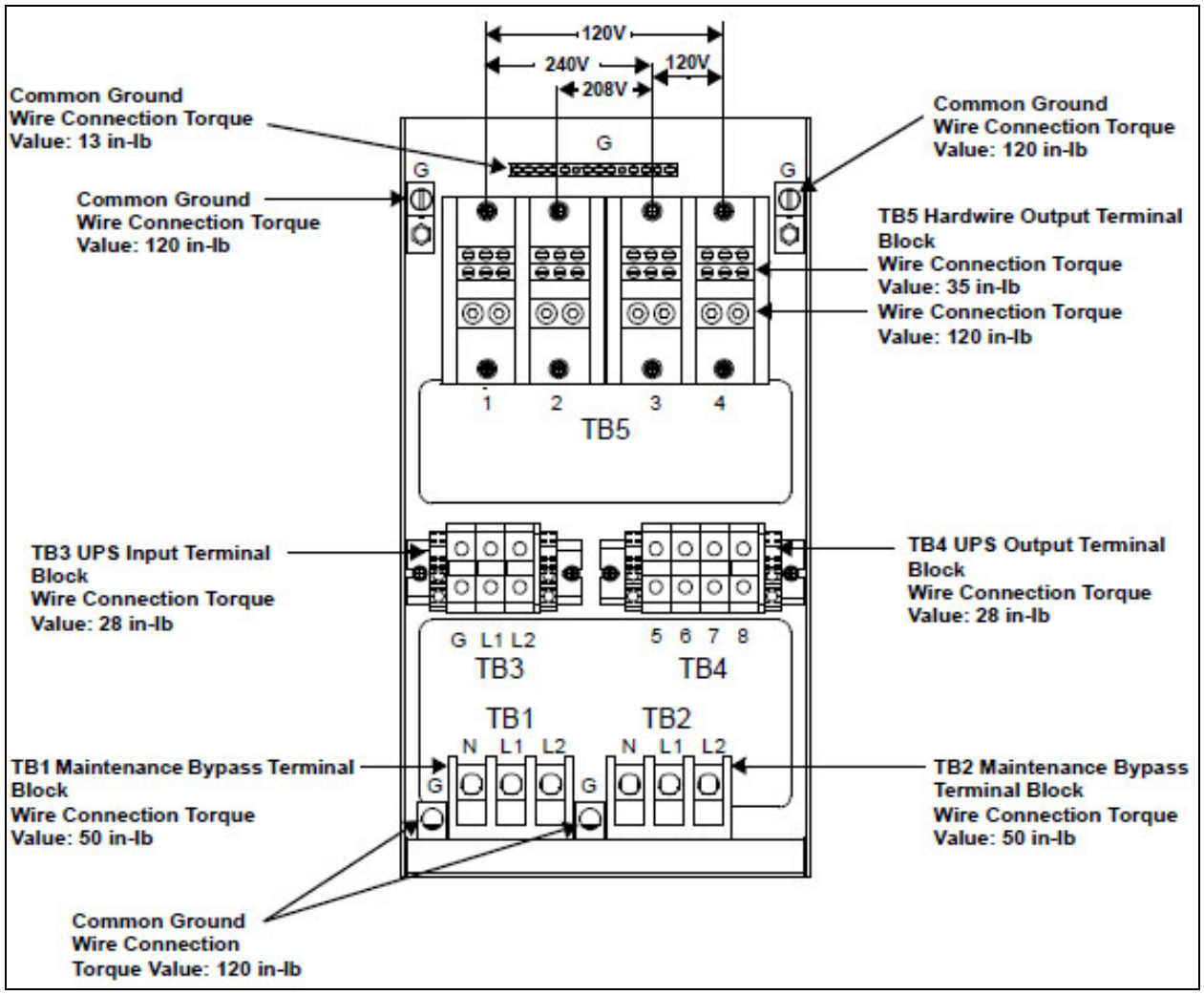
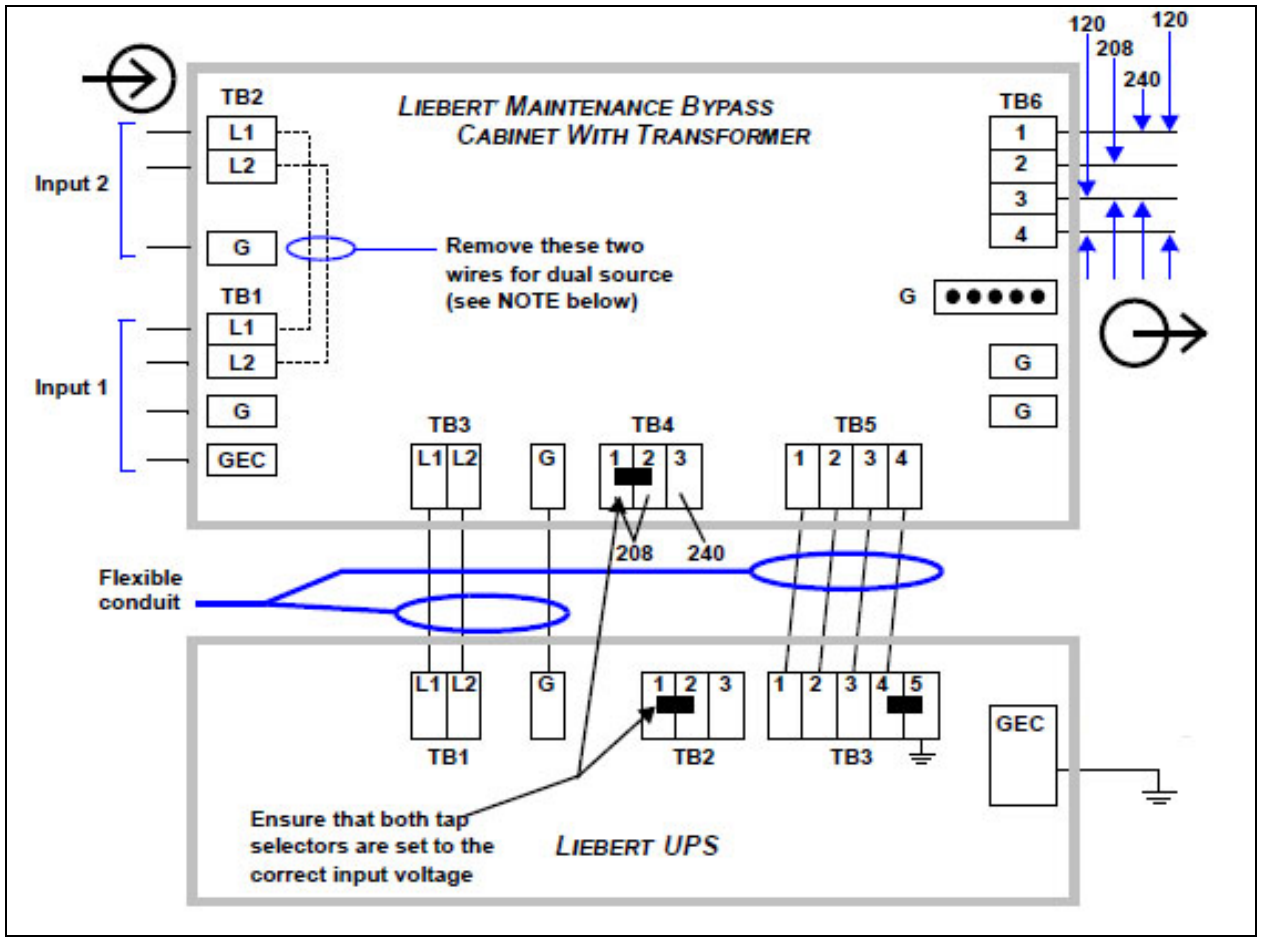


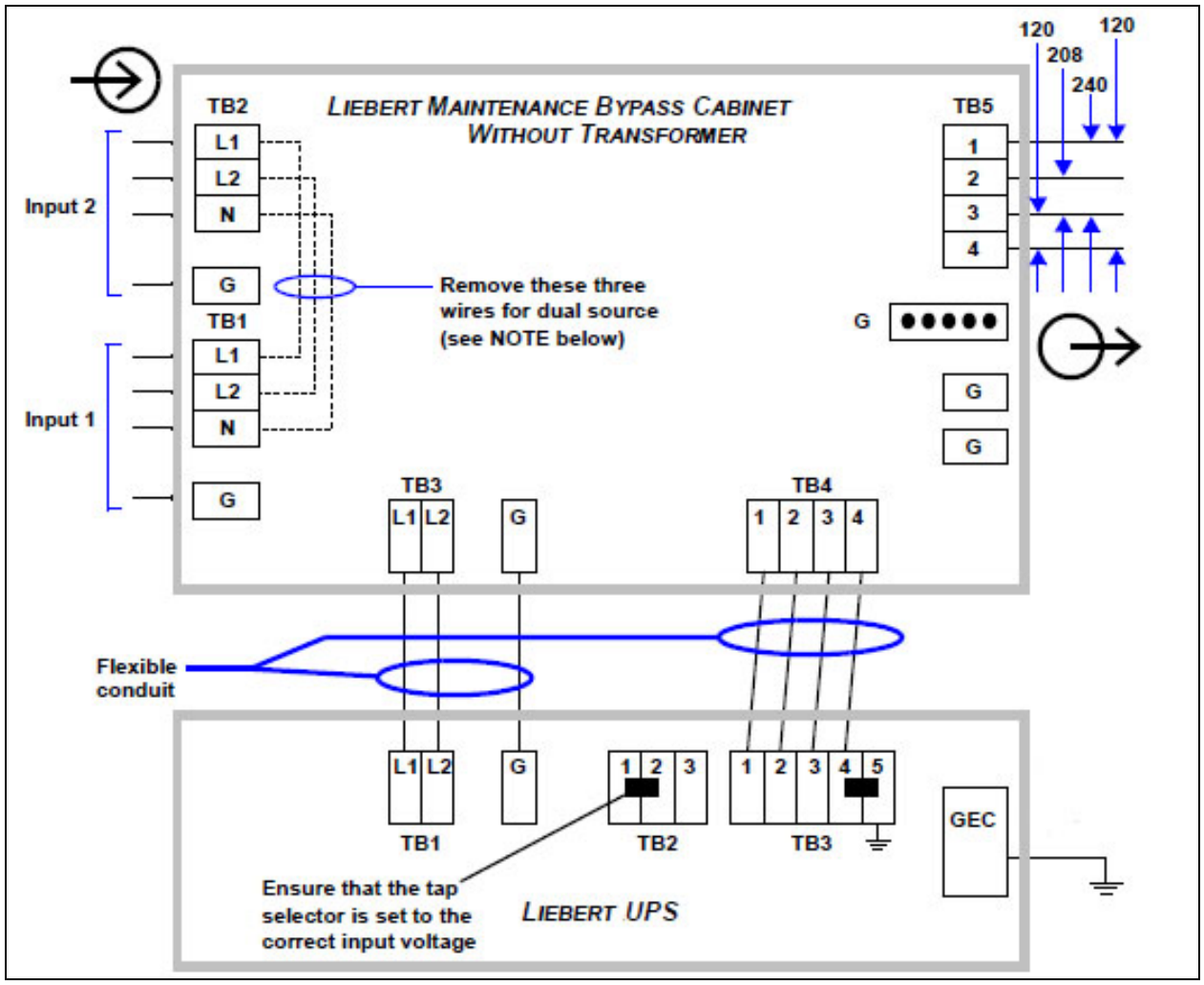
Figure 7.6 Connecting Liebert UPS to Maintenance Bypass Cabinet with transformer



NOTE:

1. SINGLE-SOURCE FEED—If feeding the Maintenance Bypass Cabinet from a single source, the input connection may be made to either TB1 or TB2.
2. DUAL-SOURCE FEED—If feeding the Maintenance Bypass Cabinet from a dual source, the UPS input supply connection must be made to TB1 and the bypass input supply connection must be made to TB2. The jumpers between TB1 and TB2 must be removed.
3. If connected equipment is a combination of 208 VAC and 120 VAC, use a three-phase panel board connected to the output terminal TB6.

Figure 7.7 Connecting Liebert UPS to a Maintenance Bypass Cabinet without transformer



NOTE:

1. SINGLE-SOURCE FEED—If feeding the Maintenance Bypass Cabinet from a single source, the input connection may be made to either TB1 or TB2.
2. DUAL-SOURCE FEED—If feeding the Maintenance Bypass Cabinet from a dual source, the UPS input supply connection must be made to TB1 and the bypass input supply connection must be made to TB2. The jumpers between TB1 and TB2 must be removed.
3. If connected equipment is a combination of 208 VAC and 120 VAC, use a three-phase panel board connected to the output terminal TB5.

8 OPERATION

8.1 Start-Up and Initialization

To start up the UPS while it is connected to the Maintenance Bypass:

1. Set the Maintenance Bypass switch (SW1) to the UPS position on the Maintenance Bypass Cabinet.
2. Close the UPS Source Switch (SW2).
3. Close the output circuit breaker (CB1).
4. Close the UPS input circuit breaker (CB1).
5. On Liebert GXT2 & Liebert GXT3 UPS models:
   - Close the UPS output circuit breaker.
   - Press the ON/OFF button.

   On Liebert GXT4 UPS models:

   - Close the UPS output circuit breaker.
   - Press the UP or DOWN button, then press Enter to confirm action.

   On Liebert Nfinity UPS models:

   - Close the control enable switch.
   - After the UPS has initialized, turn the UPS output on by pushing the standby button.
   - Close the UPS output circuit breaker.

   On Liebert APS UPS models:

   - Close the control enable switch.
   - After the UPS has initialized, turn the UPS output on by pushing the ON/OFF button then press the Enter (F5) button to confirm action when prompted on the LCD display.
   - Close the UPS output circuit breaker.

8.2 Shutting Down the UPS

To power down the entire system including connected equipment:

1. On Liebert GXT2 & Liebert GXT3 UPS models:
   - Open the UPS output circuit breaker.
   - Press the ON/OFF button twice in 3 seconds.

   On Liebert GXT4 UPS models:

   - Open the UPS output circuit breaker.
   - Navigate to the Control menu and select Turn OFF UPS and then press Enter to confirm action.

   On Liebert Nfinity UPS models:

   - Open the UPS output circuit breaker.
   - Turn the UPS output off through the User Interface display.
   - Open the control enable switch.

On Liebert **APS UPS** models:

- Open the UPS output circuit breaker.
- Open the control enable switch.

2. Open the UPS input circuit breaker.
3. Open the UPS Source Switch (SW2) on the Maintenance Bypass Cabinet.
4. Open the output circuit breaker (CB1) on the Maintenance Bypass Cabinet.

8.3 Transferring the System from UPS to Maintenance Bypass Operation

1. Verify that the amber Bypass lamp is illuminated (located near the rotary-bypass switch on the Maintenance Bypass Cabinet).
2. Turn the Bypass Switch (SW1) to the bypass position on the Maintenance Bypass Cabinet. The connected equipment is now powered from the bypass source and **is not protected** by the UPS.
3. If you are servicing or replacing the UPS, follow steps 1, 2, and 3 in Shutting Down the UPS on the previous page to shut down the UPS.

NOTE: Do not perform Step **4 because this will remove power from the connected equipment.**

8.4 Transferring the System from Maintenance Bypass to UPS Operation

If the UPS was shut down for service or was replaced:

1. Close the UPS Source Switch (SW2) on the Maintenance Bypass Cabinet.
2. Close the UPS input circuit breaker.
3. On Liebert **GXT2** & Liebert **GXT3 UPS** models:
   - Close the UPS output circuit breaker.
   - Press the ON/OFF button.

   On Liebert **GXT4 UPS** models:

   - Close the UPS output circuit breaker.
   - Press the UP or DOWN button, then press Enter to confirm action.

   On Liebert **Nfinity UPS** models:

   - Close the control enable switch.
   - After the UPS has initialized, turn the UPS output on by pushing the standby button.
   - Close the UPS output circuit breaker.

   On Liebert **APS UPS** models:

   - Close the control enable switch.
   - After the UPS has initialized, turn the UPS output on by pushing the ON/OFF button then press the Enter (F5) button to confirm action when prompted on the LCD display.
   - Close the UPS output circuit breaker.
4. Verify that the green UPS lamp is illuminated (located near the rotary-bypass switch on the Maintenance Bypass Cabinet.
5. Turn the Bypass switch (SW1) to the UPS position on the Maintenance Bypass Cabinet. The connected equipment is now powered and is protected by the UPS.

9 MAINTENANCE

9.1 Proper Care

Keeping your Liebert Maintenance Bypass Cabinet operating properly is imperative to optimal performance and life of the unit. It is recommended that a certified technician perform preventive and corrective maintenance. Vertiv™ Services is dedicated to ensuring the highest level of performance and unmatched support for your Maintenance Bypass Cabinet . Contact a Vertiv™ representative for services to guarantee maximum reliability and system availability.

9.2 Scheduled Maintenance

We recommend performing the following maintenance at least monthly:

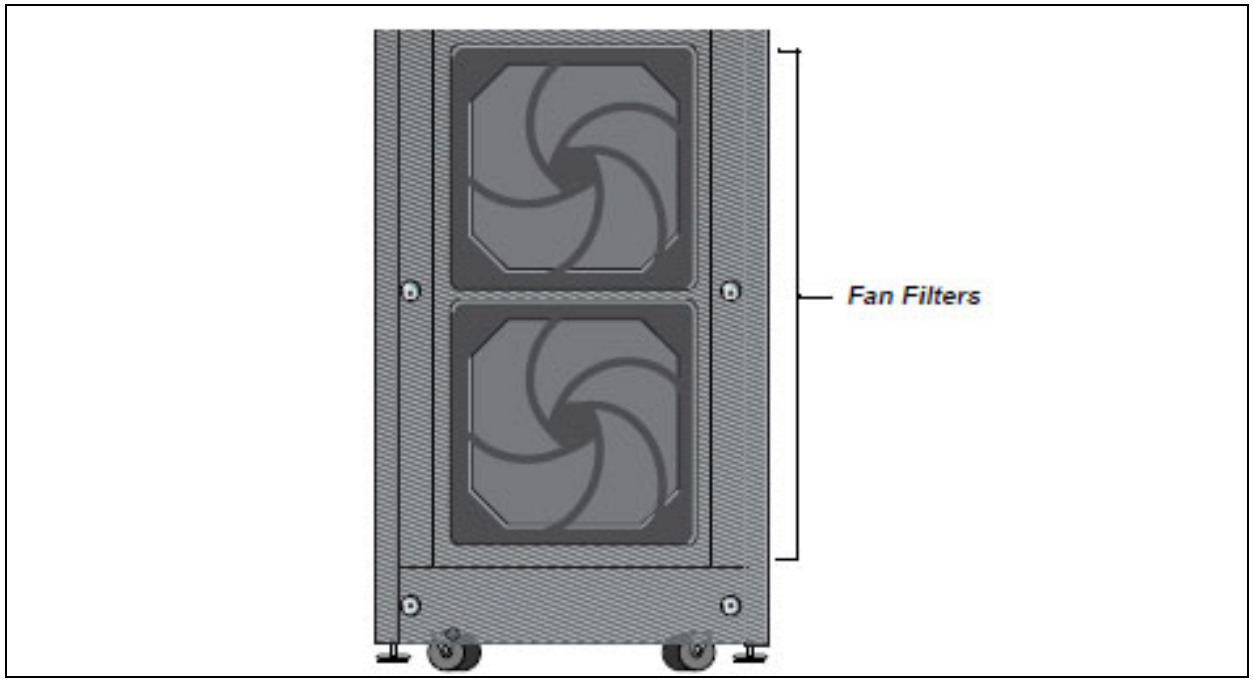
- Check, clean and replace filters.
- Verify that airflow is not obstructed.

We recommend performing the following maintenance annually:

- Verify all power connections.
- Verify that all output distribution modules are operating properly.

9.2.1 Replacing Fan Filters—Transformer Models Only

The Maintenance Bypass Cabinet intake fans contain filters that will need to be replaced or cleaned periodically, depending on the surrounding environment. Check by noting the condition of the two filters. If filters are dirty, replace or wash them. The filters may be taken out of the UPS for replacement or cleaning by removing the plastic cover over the filter frame. Use caution when replacing filters when fans are running.



The fan filters are washable and may be reused. To wash these filters, place them under a running faucet (with the dirty side down) to remove dirt and dust. Blot dry with a towel and allow to air-dry before reusing it.

10 SPECIFICATIONS

GENERAL & ENVIRONMENTAL		RATING			
Unit Rating		kVA	Models NMB1x and NMB4x = 18		
			Models NMB5x and NMB8x = 20		
		Amps	Models NMB1x and NMB4x = 100 max		
			Models NMB5x and NMB8x = 125 max		
Safety Standards			UL 1778, c-UL		
Mechanical					
Dimensions	Width	In (mm)	9.5 (241)		
	Depth		26.5 (700)		
	Height		30.4 (775)		
	Weight	lb (kg)	287 (130) transformer model	85 (39) transformerless model	
Environmental					
Operating Temperature (max)		F (C)	32° - 104° (0° - 40°)		
Relative Humidity		%	0-95% non-condensing		
Maximum Operating Altitude		Ft (M)	10,000 (3000)		
Input Data					
Nominal Input Voltage		VAC	208 or 240		
Input Frequency (nominal)		Hz	60		
Input Frequency Range		Hz	55-65		
Output Data			208/240	240	208
Output Voltage		VAC	120/120/208/240	120/120/240*	120/120/208*
Transfer Time		msec	<4 msec typical		
Output Frequency		Hz	60		
* Transformerless model requires neutral input					

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