Liebert®
Keeping Business In Business®

POWER AVAILABILITY

Maintenance Bypass Cabinet for Nfinity

USER MANUAL

EMERSON™
Network Power

TABLE OF CONTENTS

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 Nfinity Maintenance Bypass Cabinet is designed for use on properly grounded (earthed) 208/240 VAC 60 Hz 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.

CAUTION

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.**

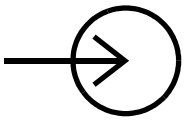
Operate the UPS equipment in an indoor environment only in an ambient temperature range of 32°F to 104°F (0°C to 40°C). Install it in a clean environment, free from conductive contaminants, moisture, flammable liquids, gases, or corrosive substances.

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

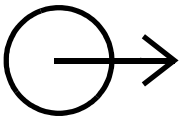
GLOSSARY OF SYMBOLS

Risk of Electrical Shock

Indicates Warning or Caution Followed by Important Instructions



AC Input



AC Output

Requests the user to consult the manual

Equipment Grounding Conductor

ON

OFF

GENERAL DESCRIPTION

Congratulations on your purchase of Liebert's Nfinity™ Maintenance Bypass Cabinet with Configurable Output Distribution. As with every Liebert product, we stand behind our quality. If you have any questions concerning this Maintenance Bypass Cabinet, please feel free to contact your local dealer, Liebert representative, or call the appropriate Technical Support number listed on the back of this manual.

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.

System Description

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

The Nfinity Maintenance Bypass Cabinet was designed to provide maximum system availability to business critical equipment. The Nfinity 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.

Features

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

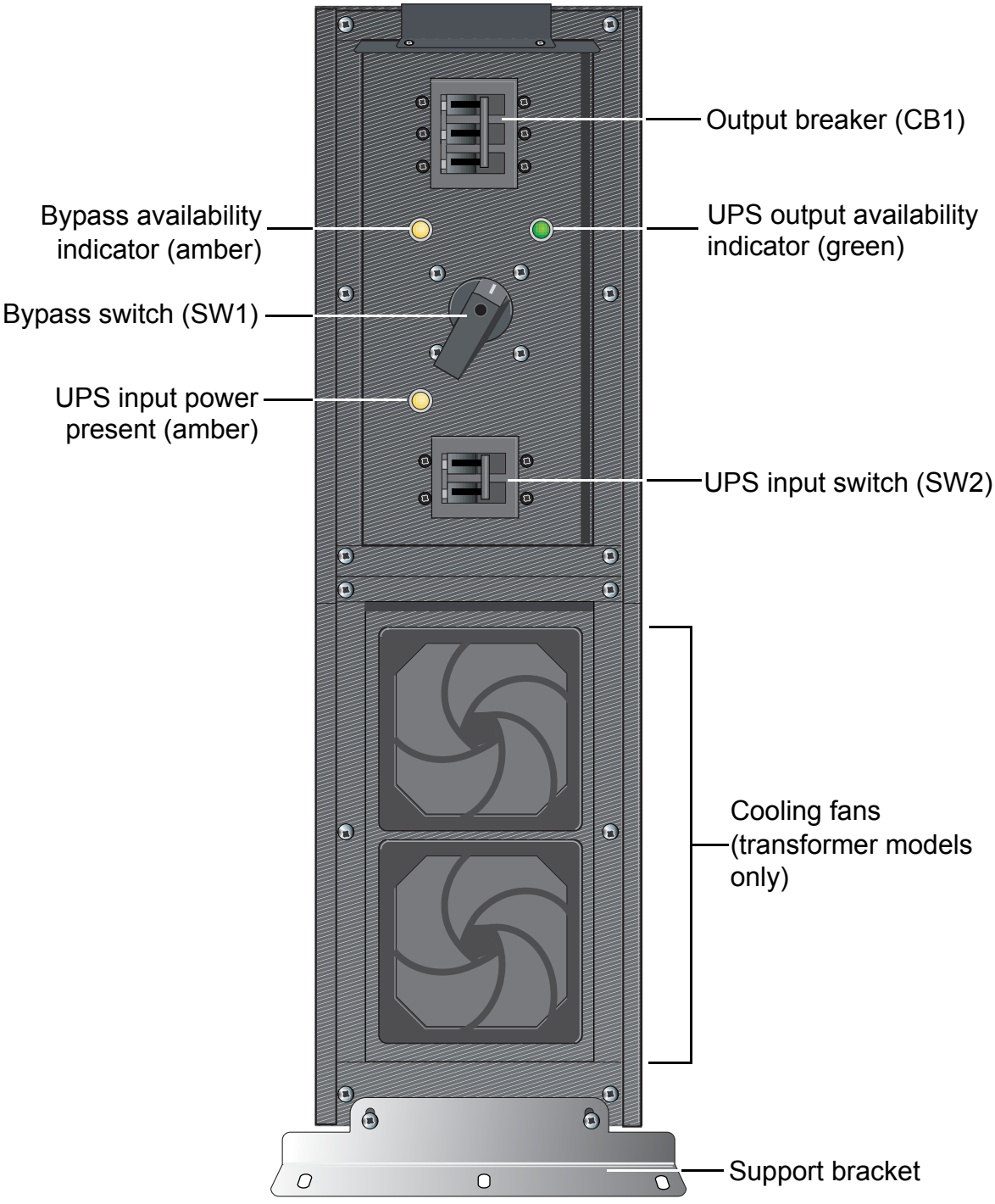
Standard Components

- 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

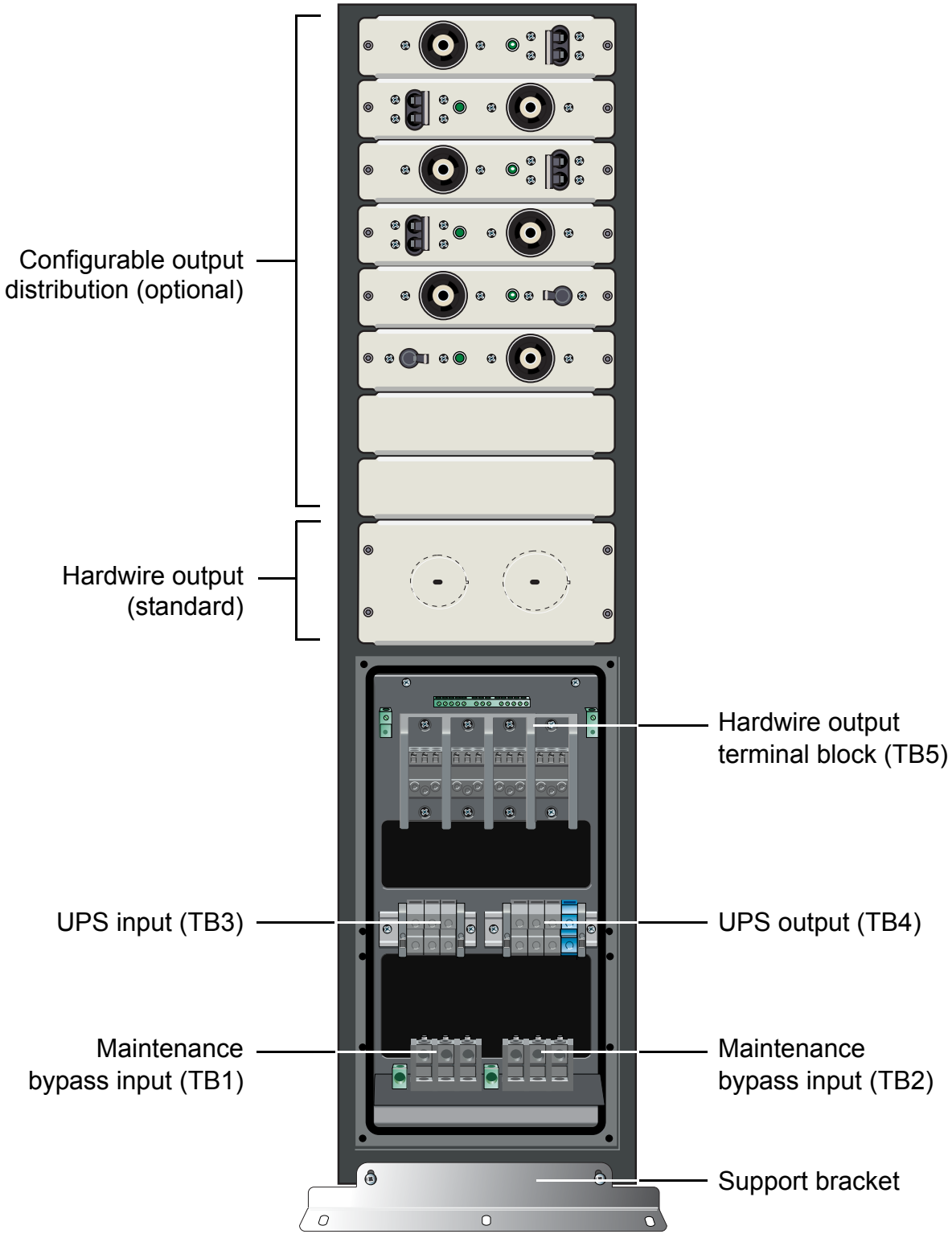
Options

- Output transformer for isolation
- Field installable output distribution

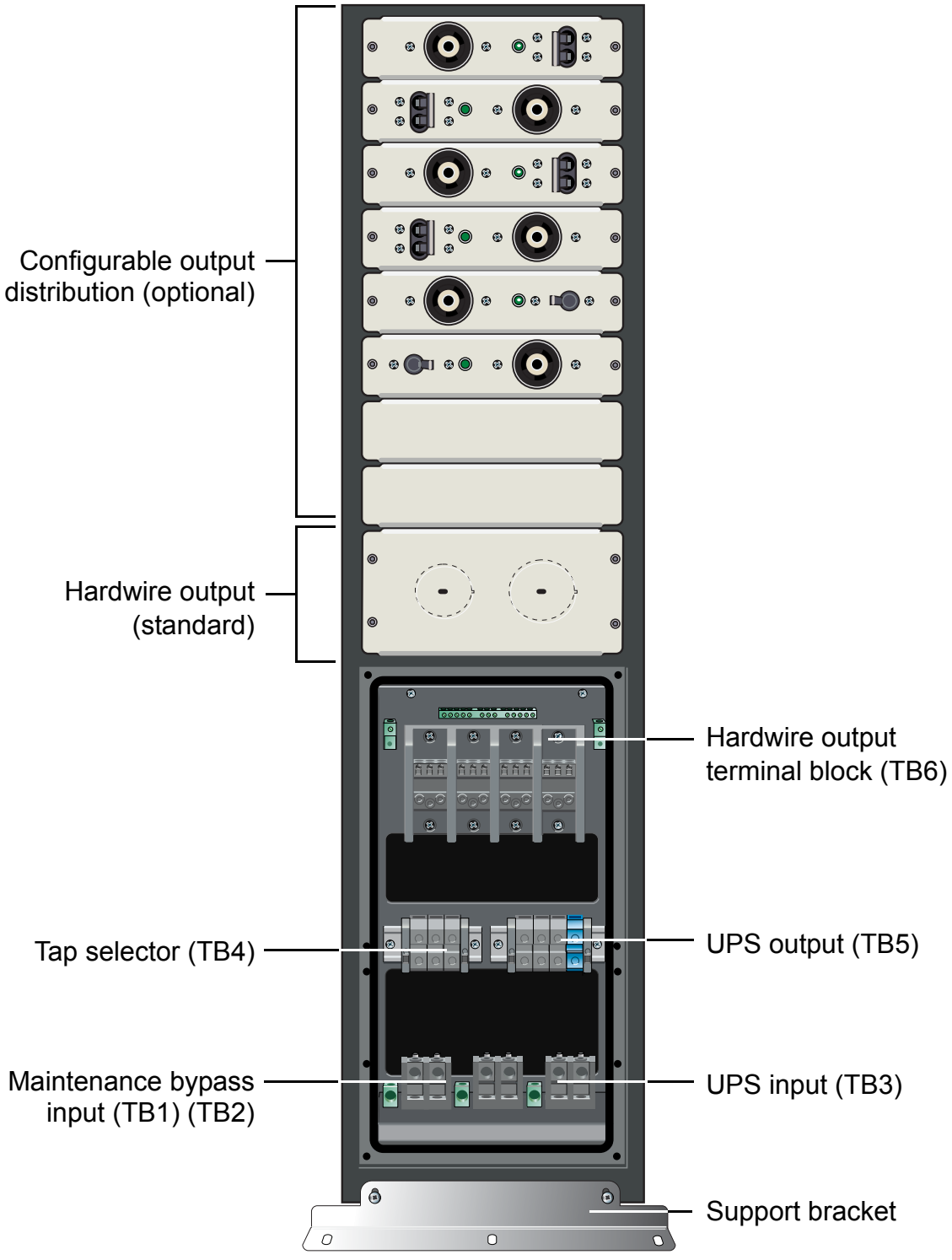
FRONT VIEW


Output breaker (CB1)
Bypass availability indicator (amber)
UPS output availability indicator (green)
Bypass switch (SW1)
UPS input power present (amber)
UPS input switch (SW2)
Cooling fans (transformer models only)
Support bracket

REAR VIEW (WITHOUT TRANSFORMER)



REAR VIEW (WITH TRANSFORMER)

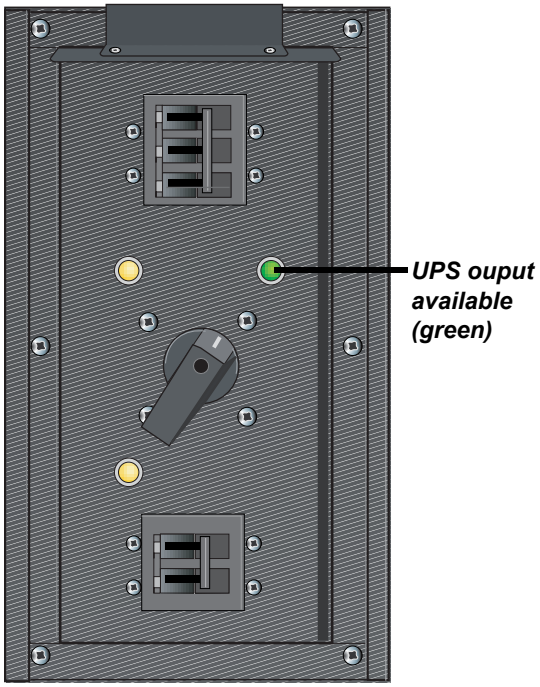


MODES OF OPERATION

The Nfinity Maintenance Bypass Cabinet is designed to operate in the following modes:

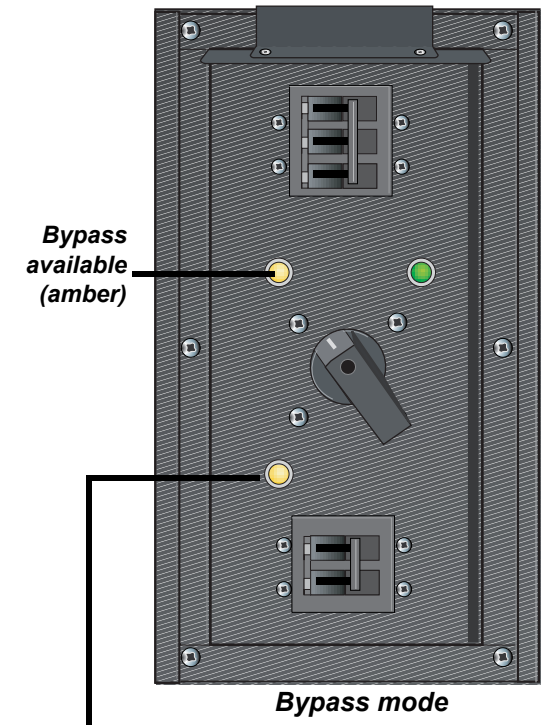
UPS Mode

While the Nfinity Maintenance Bypass Cabinet is in the 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.



Bypass Mode

When the Nfinity 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 **OPERATING PROCEDURES** on page 18 for instructions on use.



Bypass mode

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 Nfinity Maintenance Bypass Cabinet operates.

Bypass Switch

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

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. Common receptacle and hardwire options include:

15 Amp Options

- 5-15R2
- L5-15R2
- 6-15R2-208
- 6-15R2-240
- L6-15R2-208
- L6-15R2-240
- 15A,120V, 1 pole breaker w/ 1/2" & 3/4" knockouts
- 15A,208V, 2 pole breaker w/ 1/2" & 3/4" knockouts
- 15A,240V, 2 pole breaker w/ 1/2" & 3/4" knockouts

20 Amp Options

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

30 Amp Options

- L5-30R
- L6-30R-208
- L6-30R-240
- L14-30R-240
- 30A,120V, 1 pole breaker w/ 1/2" & 3/4" knockouts
- 30A,208V, 2 pole breaker w/ 1/2" & 3/4" knockouts
- 30A,240V, 2 pole breaker w/ 1/2" & 3/4" knockouts

Other Options

- Single Position Blanking Plate
- Hardwire Option

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 only operate when in Bypass mode.

PREPARATION

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

Inspection

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

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.

Required Setup Equipment

The tools below are required in order to properly setup your maintenance bypass cabinet:

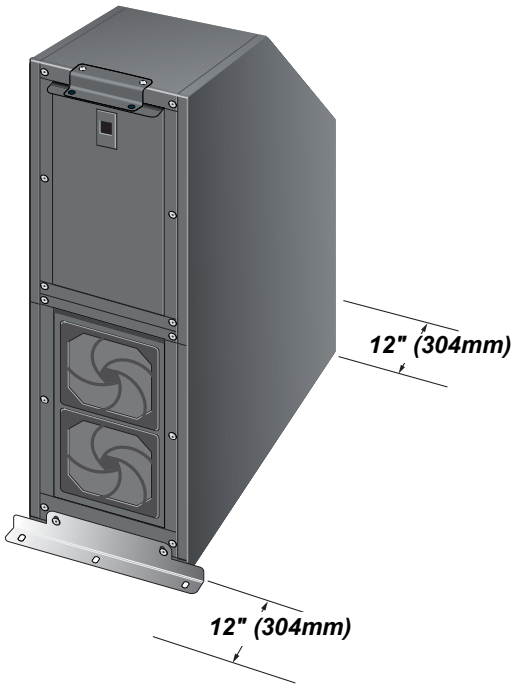
- pallet jack
- 1/2" (13 mm) wrench
- torque wrench
- flat-head screwdriver
- #2 Phillips screwdriver
- 3/16" (5 mm) Allen wrench

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:

Dimensions		
Model	w/Transformer	w/oTransformer
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 lbs (130 kg)	85 lbs (38 kg)

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



The unit frame is bolted to the shipping pallet to ensure safety. It is recommended that a pallet jack be used to transport the unit to its operating location (prior to unbolting the unit).

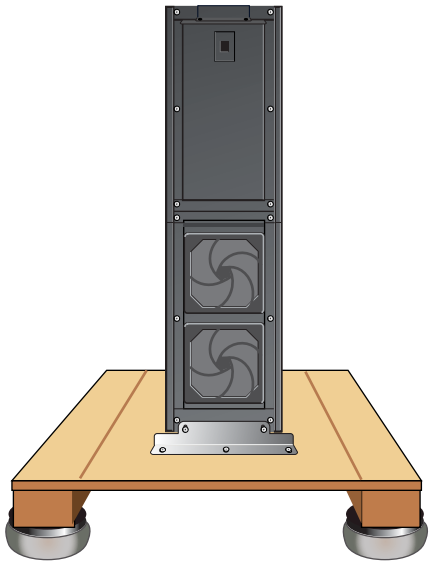
UNLOADING

UNLOADING THE MAINTENANCE BYPASS CABINET

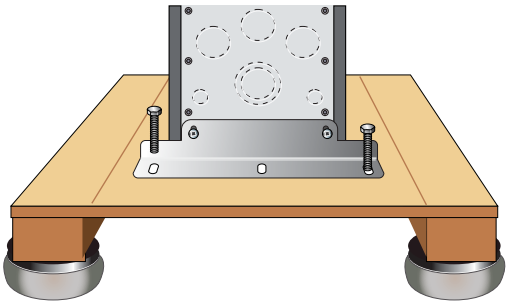
CAUTION

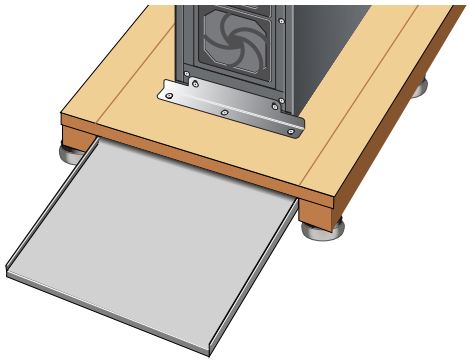
This Maintenance Bypass Cabinet is heavy (see weight in Dimensions table on page 9). At least two people should assist to unload it from the pallet.

1. Once the Maintenance Bypass Cabinet is near the desired operating location, remove the cardboard cover.

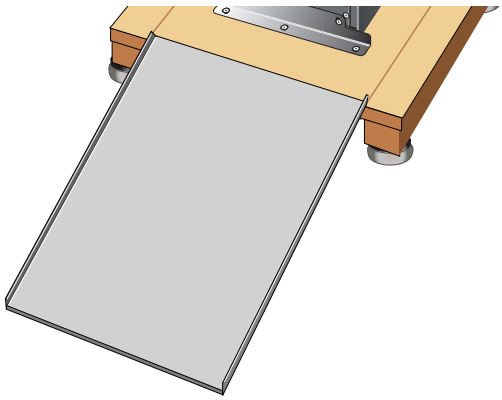


2. Use a 1/2" (13mm) wrench to remove the eight mounting bolts (four per bracket) from the pallet brackets. Remove mounting brackets from the pallet and Maintenance Bypass Cabinet. Keep brackets and bolts for future transportation of the Maintenance Bypass Cabinet or for securing the cabinet to the floor.

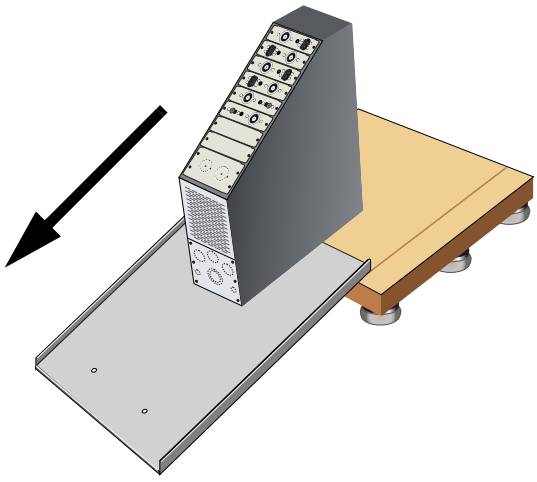




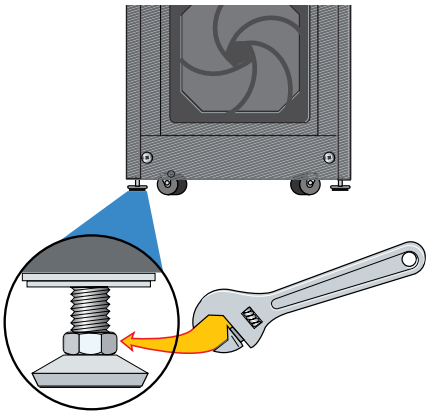
3. Remove the metal ramp from the bottom of the pallet, rotating it 180°. Fit ramp onto opposite side of pallet (in slot) as shown below.



4. Using two people, slowly roll the Maintenance Bypass Cabinet down the ramp until the Maintenance Bypass Cabinet is on a level surface.

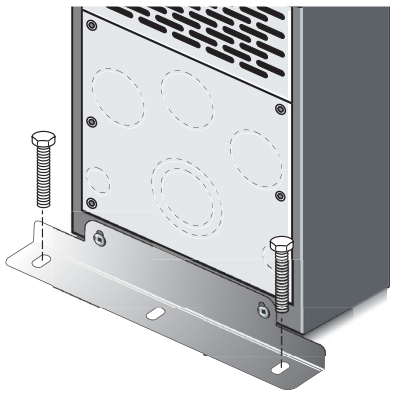


5. Once the Maintenance Bypass Cabinet is in the desired location, adjust the leveling feet to secure its position.

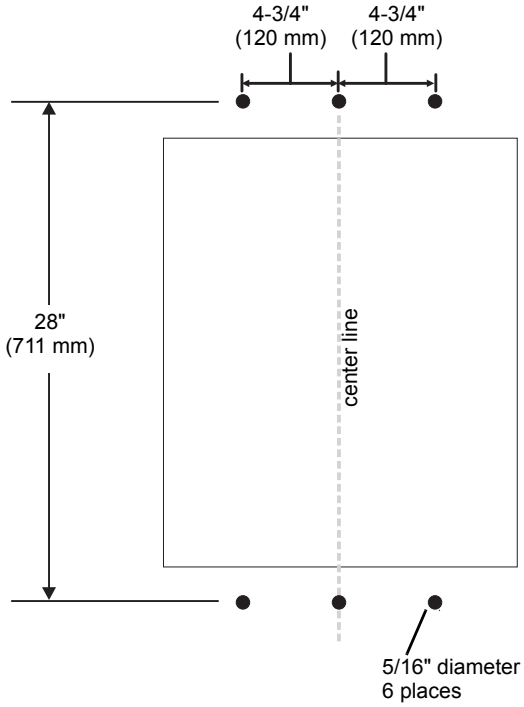


STATIONARY MOUNTING

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.



CABLE INSTALLATION

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.

Preparing Internal Wiring

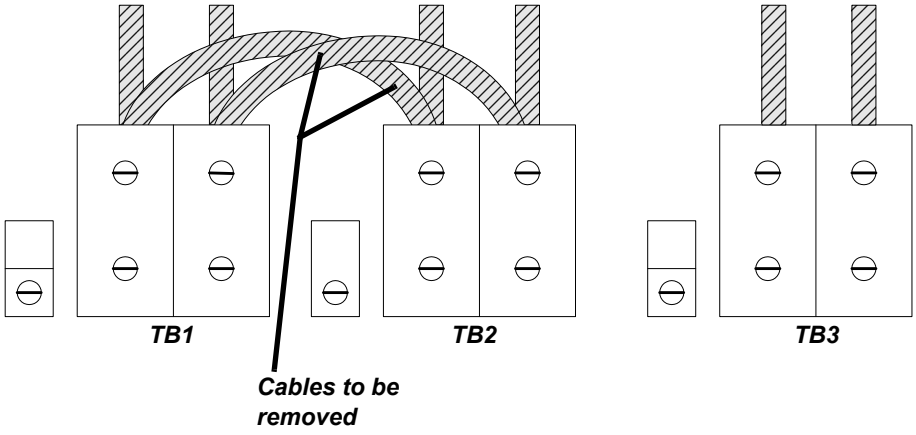
The Maintenance Bypass Cabinet is factory-configured for single-source installations. If your installation requires dual-source capabilities, the Maintenance Bypass Cabinet's wiring must be modified.

Dual Source Configuration

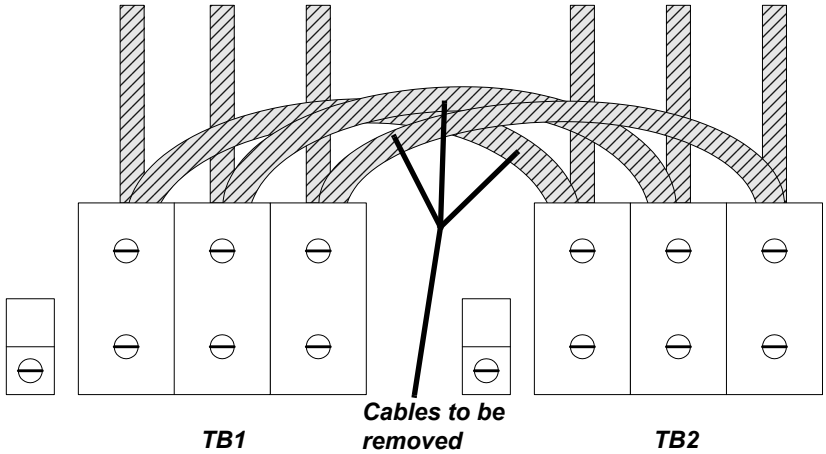
Modifying the wiring consists of removing the jumpers between TB1 and TB2 as described below:

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 22-26 in-lb (2.5 to 3.0 Nm).
5. Connect primary source to TB2 and secondary source to TB1.

TRANSFORMER MODELS

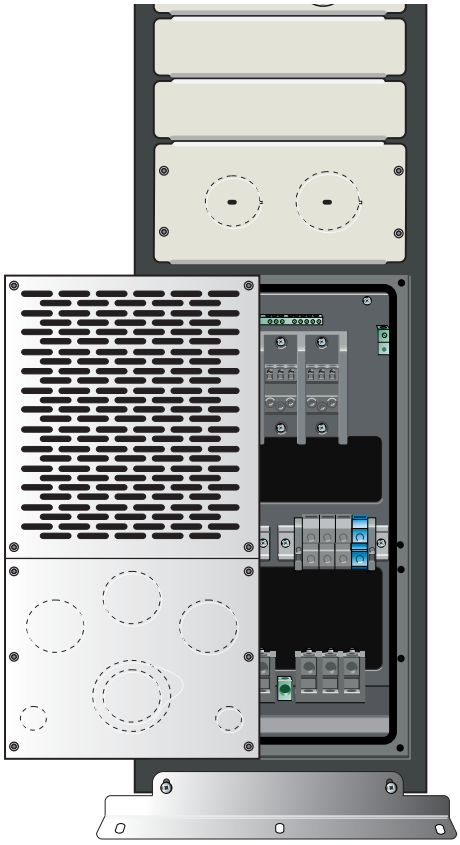


NON-TRANSFORMER MODELS



Removing the Cover Plates

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



Power Cable Installation

Refer to the chart below when selecting cables:

Power Cable and Protection Ratings	
Models NMB1x & NMB4x	
Max Input Current	100 A
Input Protection	100 A
Max Output Current	100 A
Input/ Output Terminal Details	Max: 2/0 (70 mm^2) Min: 6 AWG (16 mm^2)
Models NMB5x & NMB8x	
Max Input Current	125 A
Input Protection	125 A
Max Output Current	125 A
Input/ Output Terminal Details	Max: 2/0 (70 mm^2) Min: 6 AWG (16 mm^2)

NOTES: If an output transformer is fitted, the Nfinity Maintenance Bypass has a five-cycle inrush current that is 10 times the rated output current. This must be taken into account when selecting the overload protection device at the AC input supply distribution point. To avoid random tripping on start up, it is recommended that the AC input supply be protected with a circuit breaker capable of withstanding this initial inrush.

Transient and steady state earth leakage currents may occur when starting the equipment. This should be taken into account when selecting ground current detection devices, as these will carry the earth leakage currents of both the UPS equipment and the load.

REPO Connection

Refer to the Nfinity user manual for connection details.

INPUT WIRING (TB1)

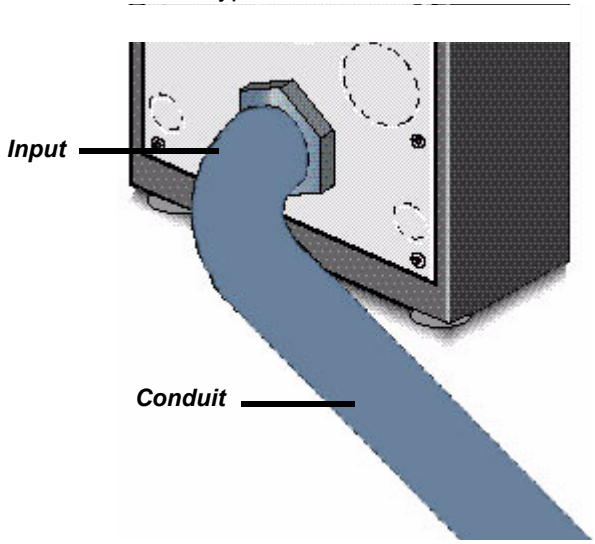
Connect the input wiring as stated in the following steps:

NOTE

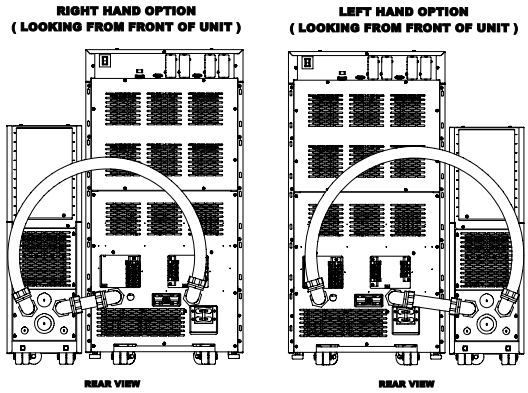
Input wiring must be installed using conduit.

208 input voltage jumper—if only the connections for 208 VAC are made between the UPS and theNfinity 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.

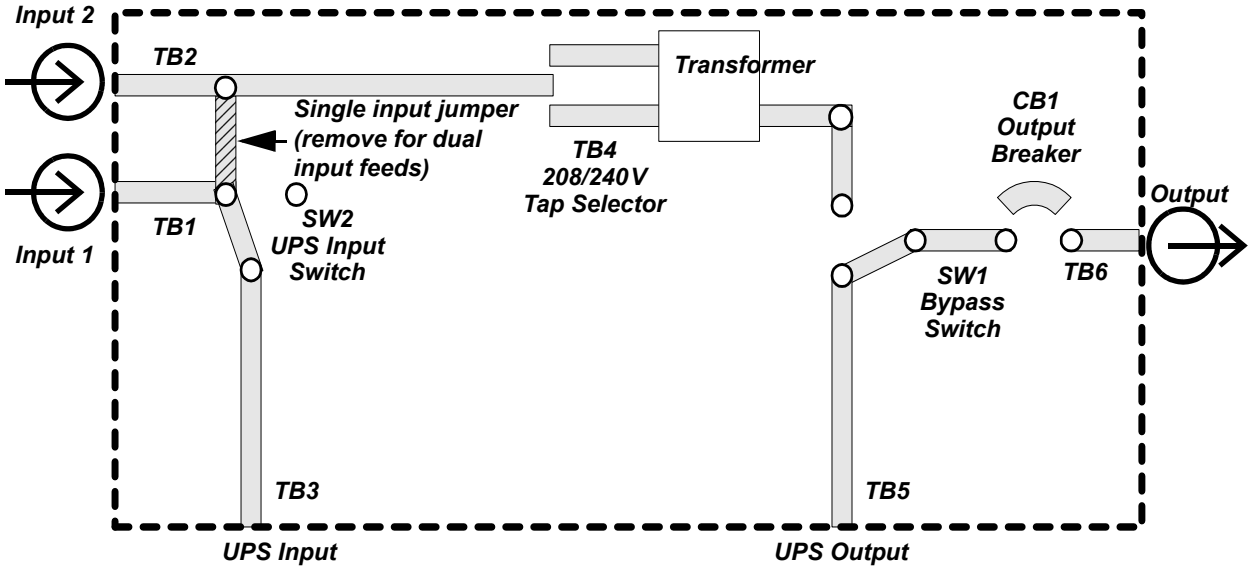
1. Locate the input wiring access, remove the knockout and pull the three/four input wires through it, allowing some slack for installation.
2. Secure the conduit to the rear panel of the Maintenance Bypass Cabinet.



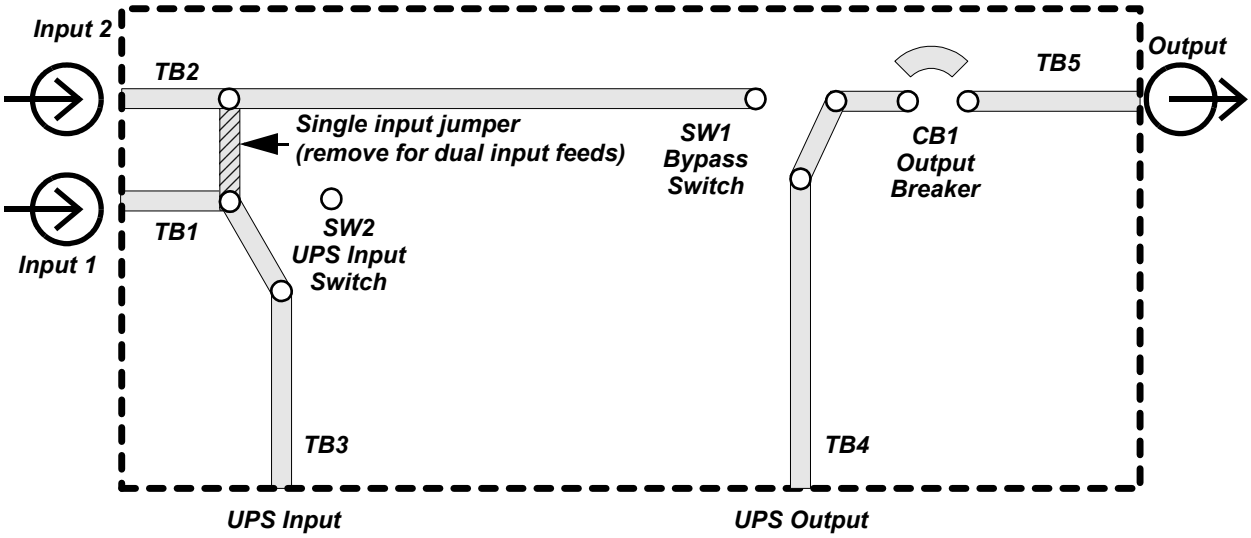
3. Input power cables connect to hex terminals on the input terminal block.
4. Insert the ground (earth) wire through the earth lug and tighten it to the proper torque value (22-26 in-lb). Then connect the wires to the block connections as shown below. Using a torque wrench, turn the screws clockwise until tightened to the proper torque value (22-26 in-lb).



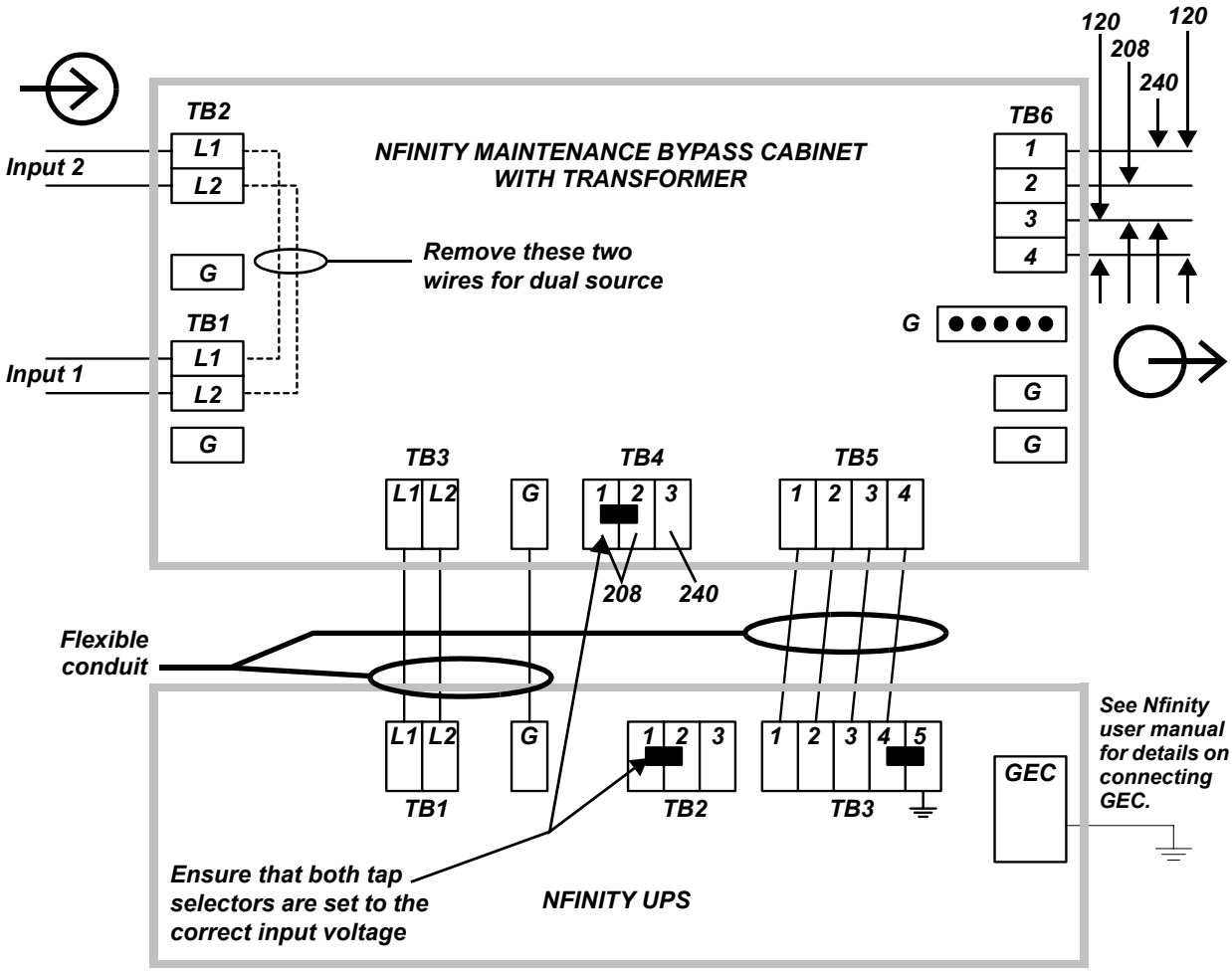
Maintenance Bypass Cabinet With Transformer



Maintenance Bypass Cabinet Without Transformer



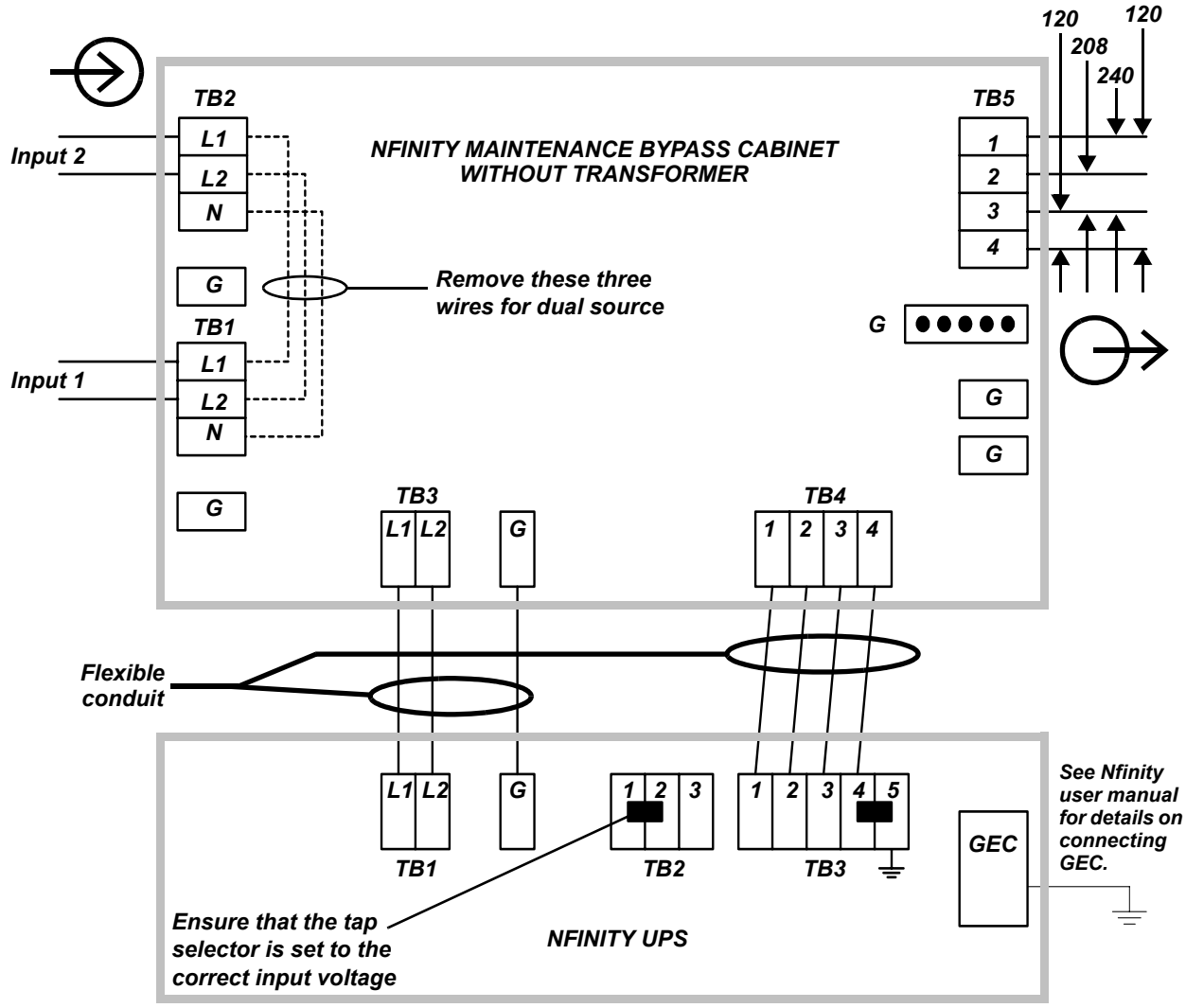
UPS to Maintenance Bypass With Transformer



NOTES

1. If feeding the Maintenance Bypass Cabinet from a single source, the input connection may be made to either TB1 or TB2.
2. 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 link between TB1 and TB2 must be removed.

UPS to Maintenance Bypass Without Transformer



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OPERATING PROCEDURES

START-UP AND INITIALIZATION

Follow these steps in order to start up the Nfinity UPS while connected to the Nfinity Maintenance Bypass.

1. Set Maintenance Bypass switch (SW1) to UPS position on Maintenance Bypass Cabinet.
2. Close UPS source switch (SW2).
3. Close output circuit breaker (CB1).
4. Close input circuit breaker (CB1).
5. On UPS, close control enable switch (SW2).
6. After UPS has initialized, turn UPS output on by pushing the standby button.

SHUTTING DOWN THE UPS

Use the following procedure to power down the system.

1. Turn UPS output off by pushing the Standby button.
2. Open the control enable switch (SW2) on the UPS.
3. Open the input circuit breaker (CB1) on the UPS.
4. Open the UPS source switch (SW2) on the Maintenance Bypass Cabinet.
5. Open the output circuit breaker (CB1) on the Maintenance Bypass Cabinet.

TRANSFERRING SYSTEM FROM UPS TO MAINTENANCE BYPASS OPERATION

1. Verify that the amber bypass lamp is illuminated
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.

TRANSFER OF THE SYSTEM FROM MAINTENANCE BYPASS TO UPS OPERATION

1. Close the UPS source switch (SW2) on the Maintenance Bypass Cabinet.
2. Close the input circuit breaker (CB1) on the UPS.
3. Close the control enable switch (SW2) on the UPS.
4. Turn the UPS output on by pushing the standby button on the UPS. Verify the Green UPS lamp is illuminated.
5. Turn the bypass switch to the bypass position on the Maintenance Bypass Cabinet.

MAINTENANCE

Proper Care

Keeping your Liebert Nfinity 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. Liebert Global Services (LGS) is dedicated to ensuring the highest level of performance and unmatched support for your Nfinity Maintenance Bypass Cabinet. Contact an LGS representative for services to guarantee maximum reliability and system availability.

Scheduled Maintenance

It is recommended that the following maintenance be performed at least monthly:

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

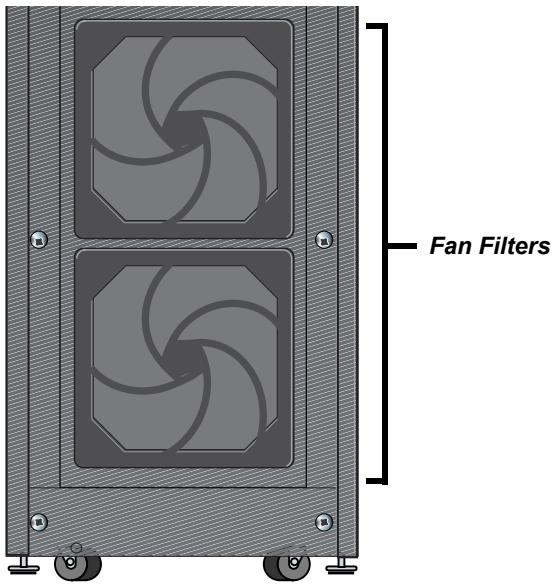
It is recommended that the following maintenance be performed annually:

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

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 can be reused. To wash these filters, place them under a running faucet (with the dirt side down) to remove dirt and dust. Blot dry with a towel and allow air-drying before reusing.

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		
Compliant 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)	32º - 104º (0º - 40º)		
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

Liebert®
Keeping Business In Business®

POWER AVAILABILITY

Maintenance Bypass Cabinet for Nfinity

USER MANUAL

The Company Behind the Products

With over a million installations around the globe, Liebert is the world leader in computer protection systems. Since its founding in 1965, Liebert has developed a complete range of support and protection systems for sensitive electronics:

- Environmental systems—close-control air conditioning from 1 to 60 tons
- Power conditioning and UPS with power ranges from 300 VA to more than 1000 kVA
- Integrated systems that provide both environmental and power protection in a single, flexible package
- Monitoring and control—from systems of any size or location, on-site or remote
- Service and support through more than 100 service centers around the world and a 24/7 Customer Response Center

While every precaution has been taken to ensure the accuracy and completeness of this literature, Liebert Corporation assumes no responsibility and disclaims all liability for damages resulting from use of this information or for any errors or omissions.

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Outside the US: 614-841-6755

Three-Phase UPS
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powertech@liebert.com

Environmental Systems
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