



Liebert® NXL™ UPS

Installation Manual — 625-1100kVA, 1.0PF, 60Hz, Three-Phase, Single-Module & Multi-Module

CONTACTING VERTIV FOR SUPPORT

To contact Vertiv Liebert Services for information or repair service in the United States, call 800-543-2378. Liebert Services offers a complete range of start-up services, repair services, preventive maintenance plans and service contracts.

For repair or maintenance service outside the 48 contiguous United States, contact Liebert Services, if available in your area. For areas not covered by Liebert Services, the authorized distributor is responsible for providing qualified, factory-authorized service.

For Liebert Services to assist you promptly, please have the following information available:

Part numbers: _____

Serial numbers: _____

Rating: _____

Date purchased: _____

Date installed: _____

Location: _____

Input voltage/frequency: _____

Output voltage/frequency: _____

Battery reserve time: _____

Product Warranty Registration

To register for warranty protection, visit the Service and Support section of our Web site at:

www.liebert.com

Click on Product Registration and fill out the form.

©2016 Vertiv Co. All rights reserved throughout the world.

This document may contain confidential and/or proprietary information of Liebert Corporation, and its receipt or possession does not convey any right to reproduce, disclose its contents, or to manufacture or sell anything that it may describe. Reproduction, disclosure, or use without specific authorization from Liebert Corporation is strictly prohibited.

TABLE OF CONTENTS

IMPORTANT SAFETY INSTRUCTIONS	1
1.0 MECHANICAL INSTALLATION	3
1.1 Introduction	3
1.2 Preliminary Checks	3
1.3 Environmental Considerations	3
1.3.1 UPS Room	3
1.3.2 Storing the UPS and Batteries for Delayed Installation	4
1.4 Positioning	4
1.4.1 Moving the Cabinets	4
1.4.2 Clearances	5
1.4.3 Raised-Floor Installations	5
1.4.4 Kick Plate Installation	5
1.4.5 Special Considerations for 1+N Parallel Systems	5
1.5 System Composition	5
1.6 Cable Entry	6
2.0 UPS ELECTRICAL INSTALLATION	7
2.1 External Protective Devices	7
2.2 Power Cables	7
2.3 Sizing the Input Breaker feeding a Liebert NXL UPS	8
2.3.1 Power Cable Connection Procedure	8
2.4 Control Cable and Communication	10
2.4.1 Dry Contacts	10
2.4.2 Multi-Module Communication	12
2.4.3 Remote Input Breaker (RIB)	13
2.4.4 Inverter Output Breaker	14
2.5 Digital LBS	16
2.6 Configuring Neutral and Ground Connections	17
2.6.1 Four-Wire Input connections	17
2.6.2 Three-Wire Input connections	18
2.6.3 Preferred Grounding Configuration, Battery Systems	20
2.6.4 Multi-Module Systems	20
2.6.5 High-Resistance Ground Systems	20
3.0 OPTIONAL EQUIPMENT	21
3.1 Single-Module System Options	21
3.1.1 Battery Temperature Sensor	21
3.1.2 Matching Liebert NXL Battery Cabinet	21
3.1.3 Load Bus Synch	21
3.1.4 Remote Alarm Status Panel	21
3.2 Communication and Monitoring	21
3.2.1 Alber Monitoring System	21
4.0 INSTALLATION DRAWINGS	22
5.0 SPECIFICATIONS	78

FIGURES

Figure 1	Cabinet arrangement—Liebert NXL, battery cabinets, maintenance bypass cabinet	6
Figure 2	Cabinet grounding plates.	9
Figure 3	Kick plate and filter locations	9
Figure 4	Low-voltage cable installation—Top entry.	9
Figure 5	External Interface Board connections layout	10
Figure 6	Inter-Module Communication Board wiring diagram—Multi-modules	13
Figure 7	Remote Input Breaker diagram.	13
Figure 8	Remote Output Breaker diagram.	15
Figure 9	Inter-Module Communication Board wiring diagram—Digital LBS	16
Figure 10	Grounding diagram—Four-wire single-module systems	17
Figure 11	Grounding diagram—Four-wire multi-module systems	18
Figure 12	Grounding diagram—Three-wire single-module systems	19
Figure 13	Grounding diagram—Three-wire multi-module systems	19
Figure 14	Main components, 625kVA Liebert NXL, N+1 multi-module unit without static bypass	22
Figure 15	Main components, 625kVA Liebert NXL UPS, SMS and 1+N multi-module unit with static bypass.	23
Figure 16	Outline drawing, 625kVA Liebert NXL, N+1 multi-module unit without static bypass	24
Figure 17	Outline Drawing, 625kVA Liebert NXL, SMS and 1+N multi-module unit with static bypass	25
Figure 18	Base detail drawing, 625kVA Liebert NXL, N+1 multi-module unit without static bypass	26
Figure 19	Base Drawing, 625kVA Liebert NXL, SMS and 1+N multi-module unit with static bypass	27
Figure 20	Input terminal detail, 625kVA Liebert NXL, N+1 multi-module unit without static bypass	28
Figure 21	Input terminal detail, 625kVA Liebert NXL, SMS and 1+N multi-module unit with static bypass.	29
Figure 22	Output terminal detail, 625kVA Liebert NXL, N+1 multi-module unit without static bypass (continued)	30
Figure 23	Output terminal detail, 625kVA Liebert NXL, SMS and 1+N multi-module unit with static bypass, (continued)31	
Figure 24	Shipping split 625kVA Liebert NXL without static bypass	32
Figure 25	Shipping split 625kVA Liebert NXL without static bypass (continued)	34
Figure 26	Shipping Split, 625kVA Liebert NXL, SMS and 1+N multi-module unit with static bypass	36
Figure 27	Shipping Split, 625kVA Liebert NXL, SMS and 1+N multi-module unit with static bypass, (continued)	38
Figure 28	02-806710- Fan Interface Board 1	39
Figure 29	Main components Liebert NXL 800kVA UPS 1+N multi-module or SMS with static bypass	39
Figure 30	Outline Drawing Liebert NXL 800kVA UPS 1+N multi-module or SMS with static bypass	40
Figure 31	Outline drawing Liebert NXL 800kVA UPS 1+N multi-module or SMS with static bypass (continued)	41
Figure 32	Outline drawing Liebert NXL 800kVA UPS N+1 multi-module without static bypass	42
Figure 33	Outline drawing Liebert NXL 800kVA UPS N+1 multi-module without static bypass (continued)	43
Figure 34	Input terminal details Liebert NXL 800 kVA UPS, 1+N multi-module or SMS with static bypass	44
Figure 35	Input terminal details Liebert NXL 800 kVA UPS, 1+N Multi-Module or SMS with static bypass (continued)	45
Figure 36	Power wiring—Liebert NXL 800kVA, single module system or 1+N, shipping split	46

Figure 37	Interconnections between inverter and bypass—Liebert NXL 800kVA, single module system or 1+N, shipping split	47
Figure 38	Control wiring—Liebert NXL 800kVA, single module or 1+N system, shipping split	48
Figure 39	Power wiring—Liebert NXL 800kVA, N+1 system, shipping split	50
Figure 40	Interconnections between inverter and bypass—Liebert NXL 800kVA, N+1, shipping split	51
Figure 41	Control wiring—Liebert NXL N+1 800kVA, N+1 system, shipping split.....	52
Figure 42	Liebert NXL 1100kVA conduit entry points—Input layout	54
Figure 43	Liebert NXL 1100kVA conduit entry points—DC layout.....	54
Figure 44	Liebert NXL 1100kVA conduit entry points—N+1 output layout	55
Figure 45	Liebert NXL 1100kVA conduit entry points—SMS/1+N output layout	56
Figure 46	Main components, 1+N multi-module or SMS with static bypass, 1100kVA UPS	57
Figure 47	Conduit landing, 1100kVA UPS 1+N multi-module or SMS with static bypass.....	58
Figure 48	Main components, 1100kVA UPS N+1 multi-module without static bypass	59
Figure 49	Outline drawing 1100kVA UPS N+1 multi-module without static bypass.....	60
Figure 50	Liebert 1100kVA, multi-module system, shipping split—Power wiring.....	61
Figure 51	Liebert NXL 1100kVA, multi-module system, shipping split—Interconnections between inverter and bypass	62
Figure 52	Liebert NXL 1100kVA, multi-module system, shipping split—Control wiring.....	63
Figure 53	Liebert NXL 1100kVA, single module system, shipping split—Power wiring	66
Figure 54	Liebert NXL 1100kVA, single module system, shipping split—Interconnections between inverter and bypass	67
Figure 55	Control wiring—Liebert NXL 1100kVA, single module system, shipping split	68
Figure 56	Conduit landing drawing 1100kVA UPS N+1 multi-module without static bypass	70
Figure 57	Terminal details 1100kVA UPS, N+1 multi-module without static bypass	70
Figure 58	Busbar terminal details, 1100kVA UPS, N+1 multi-module without static bypass.....	71
Figure 59	Terminal details, 1100kVA UPS, 1+N multi-module or SMS with static bypass	71
Figure 60	Busbar terminal details, 1100kVA UPS, 1+N multi-module or SMS with static bypass	72
Figure 61	Base detail drawing 1100kVA UPS 1+ N multi-module or SMS with static bypass.....	73
Figure 62	Base detail drawing 1100kVA UPS N+1 multi-module without static bypass.....	74
Figure 63	Auxiliary wiring cabinet— 625kVA only	75
Figure 64	Optional Input Contact Isolator Board.....	76
Figure 65	Control wiring, Programmable Relay Board	77
Figure 66	Inverter overload data.....	81
Figure 67	Rectifier overload data	82
Figure 68	Bypass overload data	83

TABLES

Table 1	UPS input dry contacts.....	10
Table 2	UPS control contacts with global maintenance bypass.....	11
Table 3	UPS control contacts to remote status panel.....	11
Table 4	UPS control contacts with battery cabinet or module battery disconnect.....	11
Table 5	Parallel from UPS module Inter-Module Communication Board to other Inter-Module Communication Board in system.....	12
Table 6	RIB UV coil, aux. contacts from UPS RIB CB interface board to remote CB1.....	14
Table 7	Remote IOB contacts from remote breaker to UPS IOB CB interface board.....	15
Table 8	Wire size, length for digital LBS connection of UPS Inter-Module Communication Boards.....	16
Table 9	Interconnects for 800kVA UPS single or 1+N module unit.....	49
Table 10	Interconnects for 800KVA UPS multi-module unit.....	52
Table 11	Interconnects for 1100kVA UPS multi-module unit.....	64
Table 12	Interconnects for 1100KVA UPS single module unit.....	69
Table 13	Input Contact Isolator Board control wiring connections.....	76
Table 14	Programmable Relay Board pin out.....	77
Table 15	Liebert NXL UPS specifications.....	78
Table 16	Current ratings—rectifier input.....	80
Table 17	Current ratings—bypass input.....	80
Table 18	Current ratings—output.....	80
Table 19	Current ratings—battery.....	80
Table 20	Recommended conduit and cable sizes.....	84
Table 21	Recommended lug sizes.....	85
Table 22	Recommended torque values.....	85

IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS

This manual contains important instructions that should be followed during installation of your Liebert NXL UPS. Read this manual thoroughly, paying special attention to the sections that apply to your installation, before working with the UPS. Retain this manual for use by installing personnel.

WARNING

Risk of electrical shock. Can cause personal injury or death.

This UPS has several circuits that are energized with high DC as well as AC voltages. Check for voltage with both AC and DC voltmeters before working within the UPS. Check for voltage with both AC and DC voltmeters before making contact.

Only properly trained and qualified personnel wearing appropriate safety headgear, gloves, shoes and glasses should be involved in installing the UPS or preparing the UPS for installation. When performing maintenance with any part of the equipment under power, service personnel and test equipment should be standing on rubber mats.

In case of fire involving electrical equipment, use only carbon dioxide fire extinguishers or those approved for use in fighting electrical fires.


Extreme caution is required when performing installation and maintenance.

Special safety precautions are required for procedures involving handling, installation and maintenance of the UPS system. Observe all safety precautions in this manual before handling or installing the UPS system. Observe all precautions in the Operation and Maintenance Manual, SL-25425, before as well as during performance of all maintenance procedures. Observe all DC safety precautions before working on or near the DC system.

WARNING

Risk of heavy unit falling over. Improper handling can cause equipment damage, injury or death.

Exercise extreme care when handling UPS cabinets to avoid equipment damage or injury to personnel. The UPS module weight is up to 23,000lb. (10,433kg).

Locate center of gravity symbols  and determine unit weight before handling each cabinet. Test lift and balance the cabinets before transporting. Maintain minimum tilt from vertical at all times.

Slots at the base of the module cabinets are intended for forklift use. Base slots will support the unit only if the forks are completely beneath the unit.

Read all of the following instructions before attempting to move, lift, or remove packaging from unit, or prepare unit for installation.

WARNING

Risk of electrical shock and fire. Can cause equipment damage, personal injury or death.

Under typical operation and with all UPS doors closed, only normal safety precautions are necessary. The area around the UPS system should be kept free of puddles of water, excess moisture and debris.

Only test equipment designed for troubleshooting should be used. This is particularly true for oscilloscopes. Always check with an AC and DC voltmeter to ensure safety before making contact or using tools. Even when the power is turned Off, dangerously high potential electric charges may exist at the capacitor banks and at the DC connections.

All wiring must be installed by a properly trained and qualified electrician. All power and control wiring must comply with all applicable national, state and local codes.

One person should never work alone, even if all power is disconnected from the equipment. A second person should be standing by to assist and to summon help in case of an accident.



NOTE

Materials sold hereunder cannot be used in the patient vicinity (e.g., use where UL, cUL or IEC 60601-1 is required). Medical applications such as invasive procedures and electrical life support equipment are subject to additional terms and conditions.

NOTICE

This unit complies with the limits for a Class A digital device, pursuant to Part 15 Subpart J of the FCC rules. These limits provide reasonable protection against harmful interference in a commercial environment. This unit generates, uses and radiates radio frequency energy and, if not installed and used in accordance with this instruction manual, may cause harmful interference to radio communications. Operation of this unit in a residential area may cause harmful interference that the user must correct at his own expense.

1.0 MECHANICAL INSTALLATION

1.1 INTRODUCTION

This section describes the requirements that must be taken into account when planning the positioning and cabling of the Liebert NXL uninterruptible power supply and related equipment.

This chapter is a guide to general procedures and practices that should be observed by the installing personnel. The particular conditions of each site will determine the applicability of such procedures.

WARNING

Risk of electrical shock. Can cause injury or death.

Special care must be taken when working with the batteries associated with this equipment. When they are connected together, the battery terminal voltage will exceed 400VDC and is potentially lethal.



NOTE

All equipment not referred to in this manual is shipped with details of its own mechanical and electrical installation.

NOTICE

Three-phase input supply required.

The standard Liebert NXL UPS is suitable for connection to three-phase, four-wire (+ Earth) TN-C, TN-S, IT-G or IT-IG, or three-phase, three-wire plus ground IT-UG.

If the unit is used with an IT power system, a 4-pole disconnect device must be included as part of building installation.

NOTICE

Do not apply electrical power to the UPS equipment before the arrival of the commissioning engineer.

1.2 PRELIMINARY CHECKS

Before installing the UPS, please carry out the following preliminary checks:

- Visually examine the UPS equipment for transit damage, both internally and externally. Report any damage to the shipper immediately.
- Verify that the correct equipment is being installed. The equipment supplied has an identification tag on the interior doors reporting the type, size and main calibration parameters of the UPS.
- Verify that the UPS room satisfies the environmental conditions stipulated in the equipment specification, paying particular attention to the ambient temperature and air exchange system.

1.3 ENVIRONMENTAL CONSIDERATIONS

1.3.1 UPS Room

The UPS module is intended for indoor installation and should be located in a cool, dry, clean-air environment with adequate ventilation to keep the ambient temperature within the specified operating range (see **Environmental Parameters** in **Table 15**).

The Liebert NXL UPS is cooled with the aid of internal fans. To permit air to enter and exit and prevent overheating or malfunctioning, do not cover the ventilation openings.



NOTE

To ensure proper airflow, the unit must be installed only on a solid surface made of a non-combustible material, such as concrete.

The Liebert NXL UPS is equipped with air filters located behind the front doors. A schedule for inspection of the air filters is required. The period between inspections will depend upon environmental conditions.

When bottom entry is used, the conduit plate must be installed.



NOTE

The UPS is suitable for mounting on concrete or other non-combustible surface only.

1.3.2 Storing the UPS and Batteries for Delayed Installation

If the Liebert NXL system will not be installed immediately, it must be stored indoors in a clean, dry and cool location (see **Environmental Parameters** in **Table 15**). If the UPS includes batteries, either internally or in a battery cabinet, the batteries' requirements will dictate the storage conditions. Batteries should be unpacked, installed and charged as soon as possible after delivery.

NOTICE

Risk of failure to properly charge batteries. Can cause permanent damage to batteries and void the warranty. Batteries will self-discharge during storage. Batteries must be recharged as recommended by the battery manufacturer. A notice of "Charge Before Date" is affixed to each unit that has batteries inside. The "Charge Before Date" is calculated based on the batteries being stored at 77°F (25°C). Storage at a higher temperature will increase the rate of self-discharge, requiring earlier recharge. Consult the battery manufacturer on how to determine when the batteries need to be recharged.

1.4 POSITIONING

The cabinet is structurally designed to handle lifting from the base.

Access to the power terminals, auxiliary terminal blocks and power switches is from the front.

The door can be opened to give access to the power connection bars, auxiliary terminal blocks and power isolators. Front door can be opened at 180 degrees, and interior doors can be removed for more flexibility in installations.



NOTE

The UPS must be placed a solid surface. There must be no openings in the surface except those required for conduit landing areas. All provided kick plates must be installed.

1.4.1 Moving the Cabinets

The route to be travelled between the point of arrival and the unit's position must be planned to make sure that all passages are wide enough for the unit and that floors are capable of supporting its weight (for instance, check that doorways, lifts, ramps, etc. are adequate and that there are no impassable corners or changes in the level of corridors).

Ensure that the UPS weight is within the designated surface weight loading (kg/cm²) of any handling equipment. For weight details, see **Table 15**.

The UPS can be handled with a forklift or similar equipment. Ensure any lifting equipment used in moving the UPS cabinet has sufficient lifting capacity. When moving the unit by forklift, care must be taken to protect the panels. Do not exceed a 15-degree tilt with the forklift. Bottom structure will support the unit only if the forks are completely beneath the unit.


Handling with straps is not authorized.



WARNING

Risk of heavy unit falling over. Improper handling can cause equipment damage, injury or death. Because the weight distribution in the cabinet is uneven, use extreme care while handling and transporting. Take extreme care when handling UPS cabinets to avoid equipment damage or injury to personnel.

The UPS module weight is up to 23,000lb (10,433kg).

Locate center of gravity symbols  and determine unit weight before handling each cabinet. Test lift and balance the cabinets before transporting. Maintain minimum tilt from vertical at all times.

NOTICE

Risk of improper lifting. Can cause damage to front and rear panels.

Remove the front and rear panels before lifting the 1100kVA Liebert NXL unit. Failure to remove these panels may cause them to be damaged when the UPS is lifted.

1.4.2 Clearances

The Liebert NXL has no ventilation grilles at either side or at the rear of the UPS. Clearance around the front of the equipment should be sufficient to enable free passage of personnel with the doors fully opened. It is important to leave a distance of 24in (610mm) between the top of the UPS and any overhead obstacles to allow the module to be serviced and to permit adequate circulation of air coming out of the unit.

1.4.3 Raised-Floor Installations

If the equipment is to be located on a raised floor, it should be mounted on a pedestal suitably designed to accept the equipment point loading. Refer to the base view to design this pedestal. The top of the pedestal must be solid.



NOTE

The UPS must be placed on a solid surface. There must be no openings in the surface except those required for conduit landing areas. All provided kick plates must be installed.

1.4.4 Kick Plate Installation

Kick plates must be installed. If the unit is to be installed in a position that does not permit access to rear kick plates, then the kick plates must be installed before the unit is placed in its final position.

1.4.5 Special Considerations for 1+N Parallel Systems

Consider the grounding configuration of your system before finalizing module placement See **2.6 - Configuring Neutral and Ground Connections**.

Vertiv recommends matching the impedance in the bypass path of paralleled systems as closely as possible.

The impedance mismatch can be minimized by controlling the wiring length of each unit. The design and the layout of the UPS system and associated panels and cabling should be examined closely to ensure that cable lengths and impedances are closely matched. The Liebert 1+N UPS module is supplied with a sharing reactor to minimize the impact of cable impedance mismatch.

The cabling impedance must be carefully controlled to ensure good bypass current sharing.

For Liebert NXL Systems, the cabling impedances must be within 10% from maximum to minimum. If the cabling impedances need to be greater than 10%, contact your Vertiv representative to calculate whether the system will result in an overload condition when operating on bypass.

When bringing the 1+N system online for the first time or after removing one unit, Vertiv recommends checking the bypass current mismatch. To check the bypass current mismatch:

1. Place a load on the bypass of each UPS module.
2. View the output current of each unit.

The accuracy of the currents displayed on the UPS module is sufficient for this check. If the mismatch is greater than 10%, the bypass impedances must be balanced or the load must be limited to less than the maximum rating.

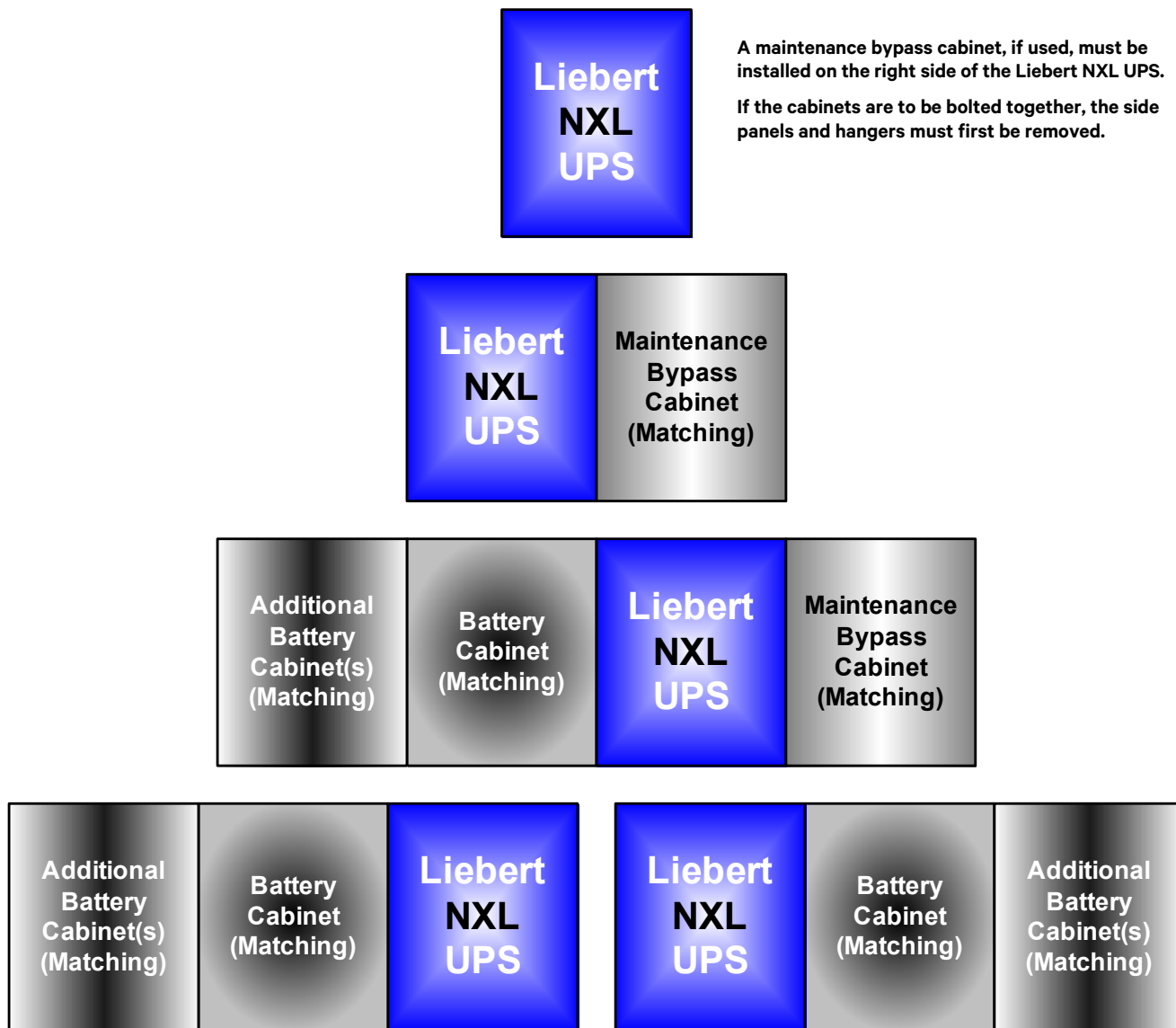
1.5 SYSTEM COMPOSITION

A UPS system can comprise a number of equipment cabinets, depending on the individual system design requirements: e.g., UPS cabinet, battery cabinet, maintenance bypass cabinet. In general, all the cabinets used in a particular installation are of the same height. Refer to the drawings provided in **4.0 - Installation Drawings** for the positioning of the cabinets as shown in **Figure 1**.

1.6 CABLE ENTRY

Cables can enter the UPS cabinet from bottom or top into the Input/Output (I/O) section of the unit; see the figures in **4.0 - Installation Drawings**.

Figure 1 Cabinet arrangement—Liebert NXL, battery cabinets, maintenance bypass cabinet



625kVA INSTALLATIONS

The battery cabinets can mount to left of UPS and cabling be routed internally.

800-1100kVA INSTALLATIONS

The battery cabinets cannot be bolted to the module. The power cables must be routed externally to the DC input section.

2.0 UPS ELECTRICAL INSTALLATION

This chapter provides guidelines for qualified installers who must have knowledge of local wiring practices pertaining to the equipment to be installed.

WARNING

Risk of electrical shock. Can cause injury or death.

The UPS contains high DC as well as AC voltages. Check for voltage with both AC and DC voltmeters before working within the UPS.

Only properly trained and qualified personnel wearing appropriate safety headgear, gloves, shoes and glasses should be involved in installing the UPS or preparing the UPS for installation.

2.1 EXTERNAL PROTECTIVE DEVICES

For safety, it is necessary to install circuit breakers in the input AC supply and external battery system. Given that every installation has its own characteristics, this section provides guidelines for qualified installation personnel with knowledge of operating practices, regulatory standards and the equipment to be installed.

External overcurrent protection must be provided. See **Figures 66, 67** and **68** for overload capacity.

2.2 POWER CABLES

The UPS requires both power and control cabling. All control cables, whether shielded or not, should be run separately from the power cables in metal conduits or metal ducts that are electrically bonded to the metalwork of the cabinets to which they are connected.

The cable design must comply with the voltages and currents in **Tables 16** through **19**, follow local wiring practices and take into consideration the environmental conditions (temperature and physical support media), room temperature and conditions of installation of the cable and system's overload capacity (see **5.0 - Specifications**).

WARNING

Risk of electrical shock. Can cause injury or death.

Before cabling the UPS, ensure that you are aware of the location and operation of the external isolators that connect the UPS input/bypass supply to the power distribution panel.

Check that these supplies are electrically isolated, and post any necessary warning signs to prevent their inadvertent operation.

When sizing battery cables, a maximum volt drop of 2VDC is permissible at the current ratings given in **Table 19**.

The following are guidelines only and are superseded by local regulations and codes of practice where applicable:

- Take special care when determining the size of the neutral cable (grounded conductor), because current circulating on the neutral cable may be greater than nominal current in the case of non-linear loads. Refer to the values in **Table 15**.
- The grounding conductor should be sized according to the fault rating, cable lengths, type of protection, etc. The grounding cable connecting the UPS to the main ground system must follow the most direct route possible.
- Consideration should be given to the use of paralleled smaller cables for heavy currents, as this can ease installation considerably.
- AC and DC cables must be run in conduits according to local codes, national codes and standard best practices. This will prevent creation of excess EMI fields.

2.3 SIZING THE INPUT BREAKER FEEDING A LIEBERT NXL UPS

Nominal input current (considered continuous) is based on full-rated output load. Maximum current includes nominal input current and maximum battery recharge current (considered noncontinuous). Continuous and noncontinuous current are defined in the NEC. The Rectifier Input Feed Breaker must be set to withstand the Liebert NXL transformer inrush of up to eight times the nominal current.

Maximum input current is controlled by the current limit setting, which is adjustable. Values shown are for maximum current limit. If a smaller input feed breaker is used, the input current limit can be adjusted; see your Vertiv representative for more information. The input current limit should not be set less than 105% of the current needed to support the inverter at full load for normal operation. This results in sufficient power to recharge the battery in a reasonable time and to operate over the published input voltage range.

2.3.1 Power Cable Connection Procedure

The rectifier input, bypass, output and battery power cables (all require lug-type terminations) are connected to busbars in the I/O sections (refer to **4.0 - Installation Drawings**).

Equipment Ground

The equipment ground busbar is in the I/O sections as shown in (refer to **4.0 - Installation Drawings**). The grounding conductor must be connected to the ground busbar. Grounding plates must be installed to bond the cabinets together (see **Figure 2**). In addition, the cabinets must be bolted together for both grounding continuity and to meet EMI emission limitations.

All cabinets and cabling should be grounded in accordance with local regulations.



NOTE

Proper grounding reduces problems in systems caused by electromagnetic interference.



WARNING

Failure to follow adequate grounding procedures can result in electric shock hazard to personnel, or the risk of fire, should a ground fault occur.

All operations described in this section must be performed by properly trained and qualified electricians or technical personnel. If any difficulties are encountered, contact Vertiv. See the back page of this manual for contact information.

The grounding and neutral bonding arrangement must be in accordance with local and national codes of practice.

Once the equipment has been positioned and secured, connect the power cables as described below (refer to the appropriate cable connection drawing in **4.0 - Installation Drawings**):

1. Verify that the UPS equipment is isolated from its external power source and all the UPS power isolators are open. Check that these supplies are electrically isolated and post any necessary warning signs to prevent their inadvertent operation.
2. Open exterior and interior panels on the front of the I/O sections.
3. Connect the ground and any necessary main bonding jumper to the equipment ground busbar located in the I/O sections.
4. Make power connections and tighten the connections to the proper torque.

Ensure correct phase rotation.



WARNING

Risk of electrical shock. Can cause injury or death.

If the load equipment will not be ready to accept power on the arrival of the commissioning engineer, ensure that the system output cables are safely isolated at their termination.



WARNING

Risk of electrical shock. Can cause injury or death.

When connecting the cables between the battery extremities to the circuit breaker, always connect the circuit breaker end of the cable first.

- For control connection details, see **2.4 - Control Cable and Communication**.



NOTE

If fault bracing brackets were removed during installation, they MUST be replaced.

- Close and secure the interior and exterior doors.
- 625-800kVA Only—Attach the cabinet grounding plates to the top of the UPS at each shipping split. See **Figure 2**.
- Attach the kick plates and filters to the bottom of the unit. See **Figure 3**.

Figure 2 Cabinet grounding plates

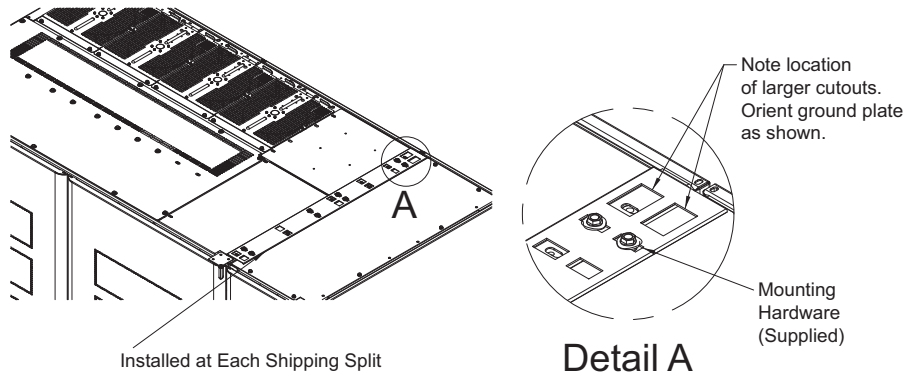
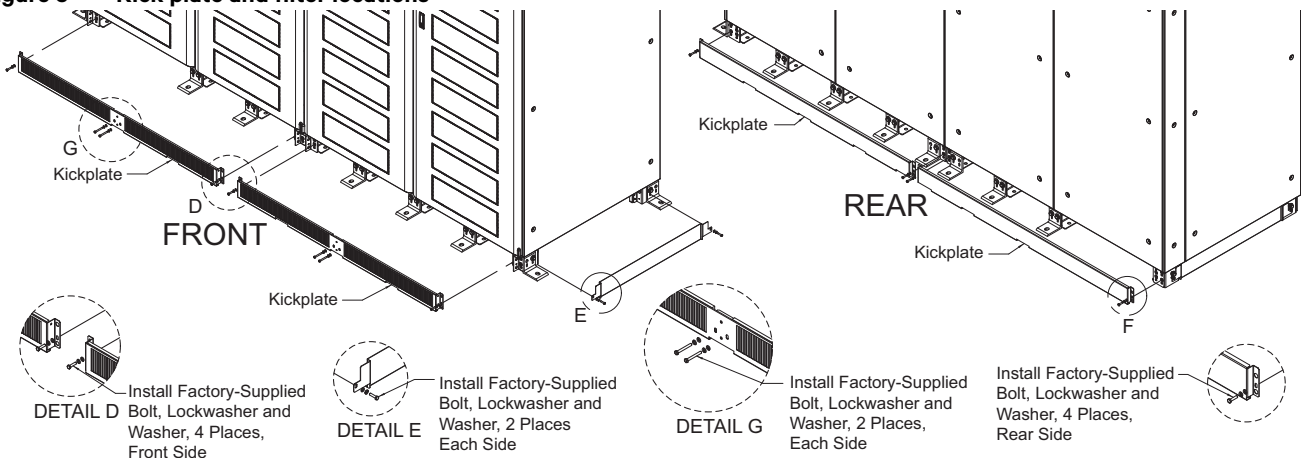


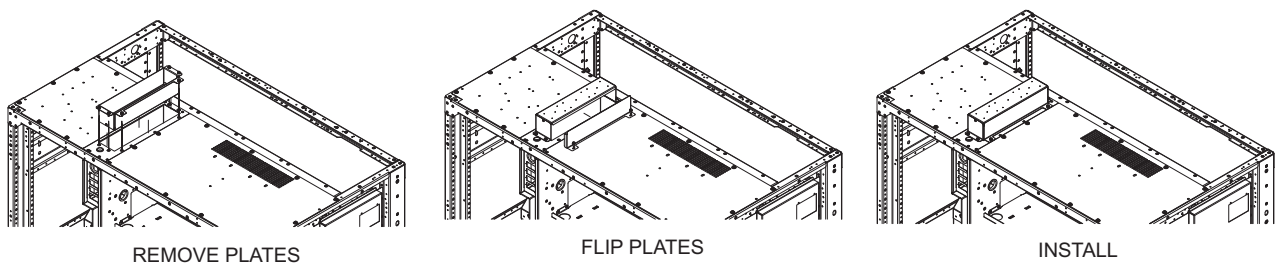
Figure 3 Kick plate and filter locations



NOTE

Kick plates must be installed. If the unit is to be installed in a position that does not permit access to rear kick plates, then the kick plates must be installed before the unit is placed in its final position.

Figure 4 Low-voltage cable installation—Top entry

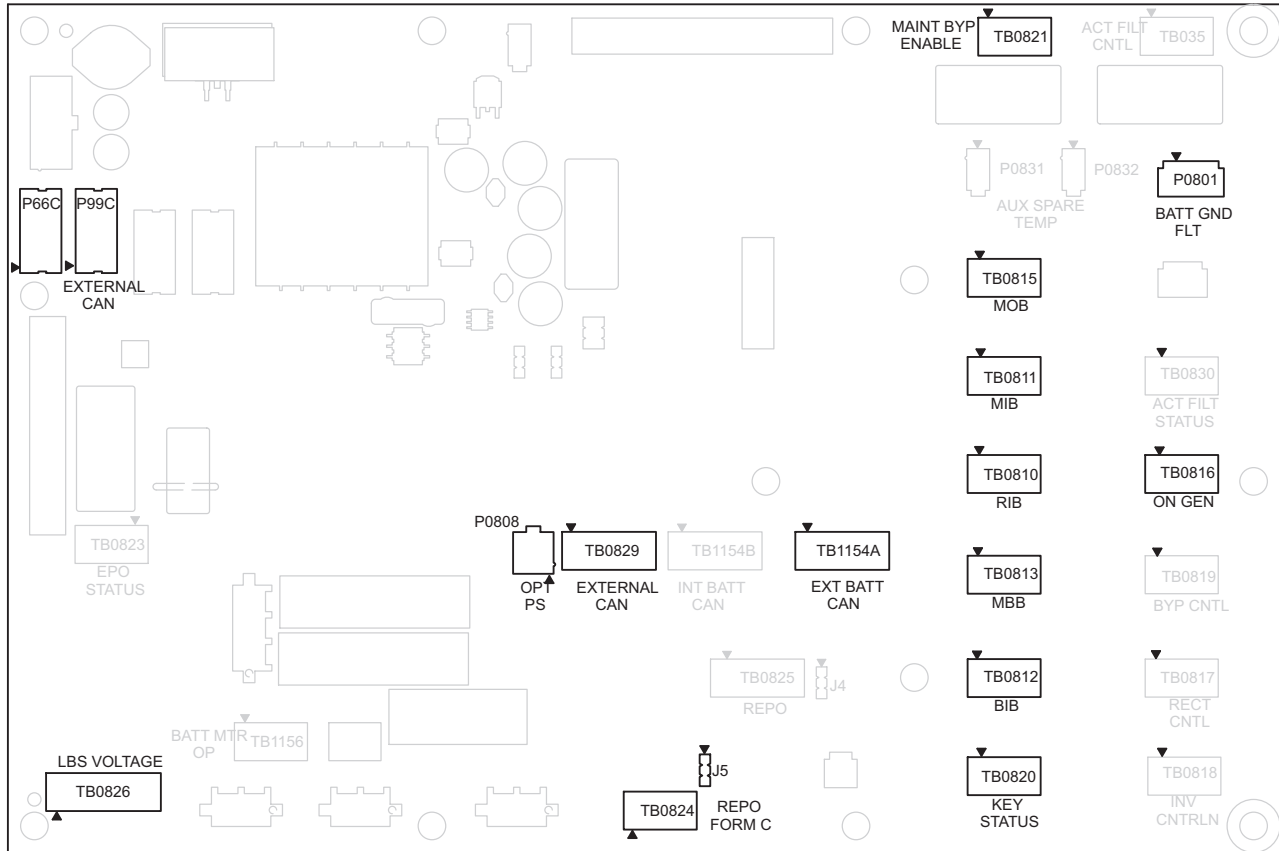


Low-voltage cables can be installed through the top of each unit. The entry conduit landing plate is shipped inverted. To install, remove conduit plate, flip and reinstall. Removal of side plate is for access to pull wires.

2.4 CONTROL CABLE AND COMMUNICATION

Based on your site's specific needs, the UPS may require auxiliary connections to manage the battery system (external battery circuit breaker), communicate with a personal computer or provide alarm signaling to external devices, or for Remote Emergency Power Off (REPO). The External Interface Board, arranged for this purpose, is next to the option box in the Rectifier section (refer to **4.0 - Installation Drawings**). The contacts are rated for 250VAC @ 2A.

Figure 5 External Interface Board connections layout



2.4.1 Dry Contacts



NOTE

If connection to more than one module is required, use a separate, isolated contact for each module.

Table 1 UPS input dry contacts

Item	Terminal Block	Pin	Connects to (Description of External Item)	Wire Size/ Max Length
Remote EPO Input Form C	TB0824	1	REPO Switch, normally open contact	14AWG/ 500ft. (150m)
		2	REPO Switch, common contact	
		3	REPO Switch, normally closed contact, set jumper J5: 1-2 to enable, 2-3 to disable	
On Generator Input Form C	TB0816	1	On Generator switch, closed = On Generator	
		2	On Generator switch, common	
		3	On Generator switch, closed = Not On Generator	

Table 2 UPS control contacts with battery cabinet or module battery disconnect

Item	Terminal Block	Pin	Connects to (Description of External Item)	Wire Size/ Max Length
CAN Bus and 24V Power Supply	TB1154A	1	Battery Interface Board TB1154-1	18 AWG 1000ft. (300m)
		2	Battery Interface Board TB1154-2	
		3	Battery Interface Board TB1154-3	
		4	Battery Interface Board TB1154-4	

Table 3 UPS control contacts with global maintenance bypass

Item	Terminal Block	Pin	Connects to (Description of External Item)	Wire Size/ Max Length
Maintenance Isolation Breaker (MIB) Form C ¹	TB0811	1	CB aux. contact, closed = CB is closed	14AWG/500ft. (150m)
		2	CB aux. contact, common	
		3	CB aux. contact, closed = CB is open	
Maintenance Bypass Breaker (MBB) Form C ¹	TB0813	1	CB aux. contact, closed = CB is closed	14AWG/500ft. (150m)
		2	CB aux. contact, common	
		3	CB aux. contact, closed = CB is open	
Maintenance Bypass Enable Form C ¹	TB0821	1	Maintenance Bypass Cabinet, closed = load not on inverter	14AWG/500ft. (150m)
		2	Maintenance Bypass Cabinet, common	
		3	Maintenance Bypass Cabinet, closed = load on inverter	
Remote EPO Input ¹	TB0825	1	REPO Switch, normally open contact	14AWG/500ft. (150m)
		2	REPO Switch, common contact	
Key Status Input Form C ^{1,3}	TB0820	1	Key status switch, closed = key removed	14AWG/500ft. (150m)
		2	Key status switch, common	
		3	Key status switch, closed = key inserted	
Module Output Breaker (MOB) Form C ²	TB0815	1	CB aux. contact, closed = CB is closed	14AWG/500ft. (150m)
		2	CB aux. contact, common	
		3	CB aux. contact, closed = CB is open	

1. For 1+N systems with a maintenance Bypass, these auxiliary contacts must be run to each module from an isolated source.
2. For 1+N systems, these breaker Aux contacts go to the UPS that they are associated with.
3. Key Status Input can be either Form-C, N.O. or N.C. contact

Table 4 UPS control contacts to remote status panel

Item	Terminal Block	Pin	Connects to (Description of External Item)	Wire Size/ Max Length
CAN Bus and 24V Power Supply	TB0829	1	Remote Status Panel TB-2	18AWG/1000ft. (300m)
		2	Remote Status Panel TB-1	
		3	Remote Status Panel TB-3	
		4	Remote Status Panel TB-4	

2.4.2 Multi-Module Communication

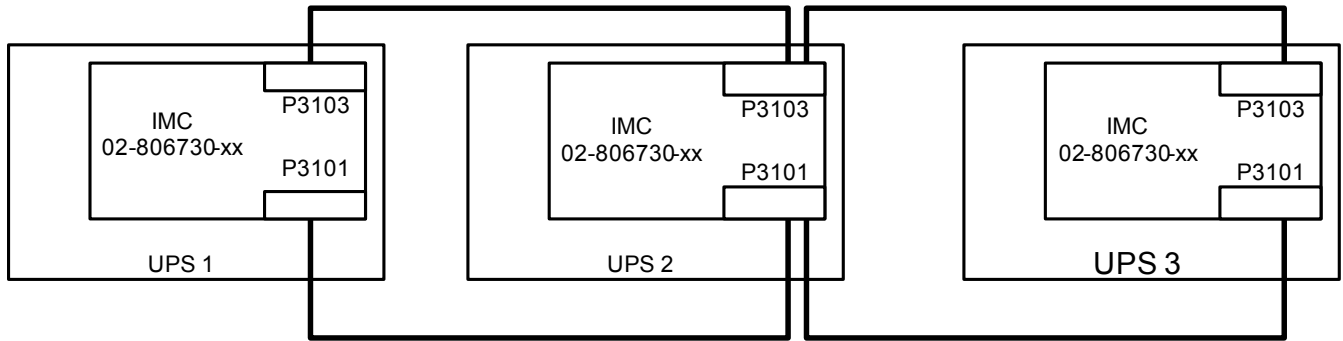
Paralleling cables that connect the module to the system are connected to terminals P3101 and P3103 on the Inter-Module Communication (IMC) board (refer to **4.0 - Installation Drawings**).

Table 5 Parallel from UPS module Inter-Module Communication Board to other Inter-Module Communication Board in system

Terminal Designation		Signal Name	Max Length
From	To		
Primary Connections			
P3101-1	P3101-1	Share CAN +24V	1000ft. (300m)
P3101-2	P3101-2	Share CAN common	
P3101-3	P3101-3	System CAN +24V	
P3101-4	P3101-4	System CAN common	
P3101-5	P3101-5	SER synch CAN+24V	
P3101-6	P3101-6	SER synch CAN common	
P3101-7	P3101-7	Ground - Drain Wire	
P3101-14	P3101-14	Ground	
P3101-8	P3101-8	PWM synch CAN +24V	
P3101-9	P3101-9	PWM synch CAN common	
P3101-10	P3101-10	MMS synch CAN +24V	
P3101-11	P3101-11	MMS synch CAN common	
Redundant Connections			
P3103-1	P3103-1	Redundant share CAN +24V	1000ft. (300m)
P3103-2	P3103-2	Redundant share CAN common	
P3103-3	P3103-3	Redundant system CAN +24V	
P3103-4	P3103-4	Redundant system CAN common	
P3103-5	P3103-5	Redundant SER synch CAN +24V	
P3103-6	P3103-6	Redundant SER synch CAN common	
P3103-7	P3103-7	Ground - Drain Wire	
P3103-14	P3103-14	Ground	
P3103-8	P3103-8	Redundant PWM synch CAN +24V	
P3103-9	P3103-9	Redundant PWM synch CAN common	
P3103-10	P3103-10	Redundant MMS synch CAN +24V	
P3103-11	P3103-11	Redundant MMS synch CAN common	

1. Belden 810x or Belden 89901 cables are the only approved cables.
2. Belden 89901 cable can be used for underground installations.
3. If using multiple parallel cables for each run, all cables must be run in the same conduit.
4. Each cable group should be run in a separate grounded conduit to ensure redundancy.
5. The maximum lengths must include all the parallel cables from the first module to the last module. The primary and redundant cable lengths can be counted separately.
6. The ground pins on the Inter-Module Communication Board (Pins 7 and 14) are connected together on the board. If using cable with only one (1) drain wire, then connect to the ground to Pin 7.
7. Care must be taken so drain wire does not touch any other component in module.
8. Attach control wires to side of control door where Inter-Module Board (IMC) is attached. Do not run wires across IMC board.

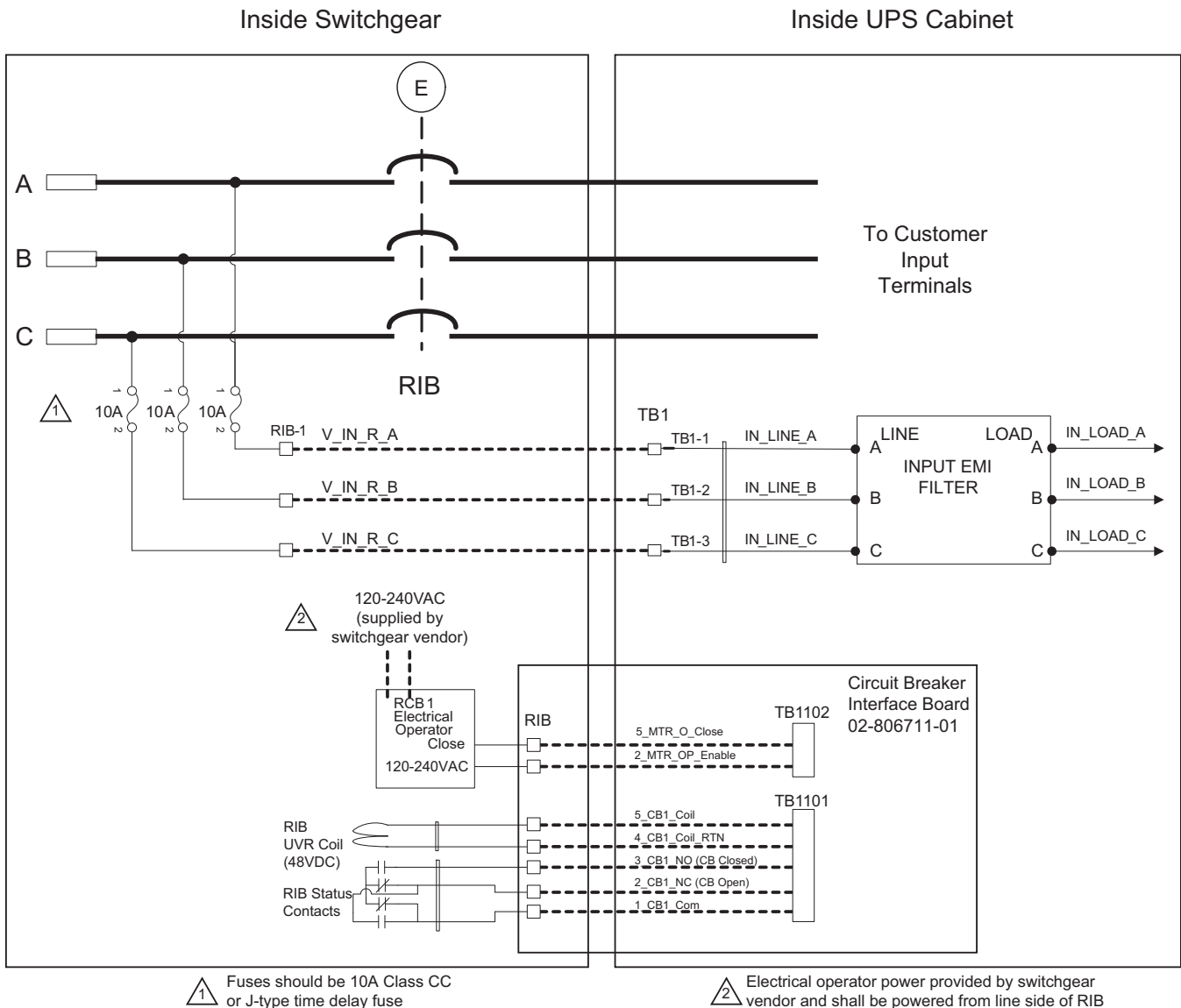
Figure 6 Inter-Module Communication Board wiring diagram—Multi-modules



2.4.3 Remote Input Breaker (RIB)

For systems that use Remote Input Breakers (RIB), the controls for the auxiliary contacts, UVR, Motor Operator (optional) and voltage sense will go between the Remote breaker and the UPS Input I/O section. See **Figure 7**.

Figure 7 Remote Input Breaker diagram



RIB must be Listed UL 489 (Molded Case Circuit Breaker) or UL 1066 (Low Voltage AC Power Circuit Breaker) that are required to be used in UL-listed switchgear or switchboards. The circuit breaker for 1100kVA systems must have a short-time rating not exceeding 600V at 200K amperes for 5 cycles; for systems below 1100kVA: 600V at 150K amperes for 5 cycles.

See **Table 16** for required current ratings.

Table 6 RIB UV coil, aux. contacts from UPS RIB CB interface board to remote CB1

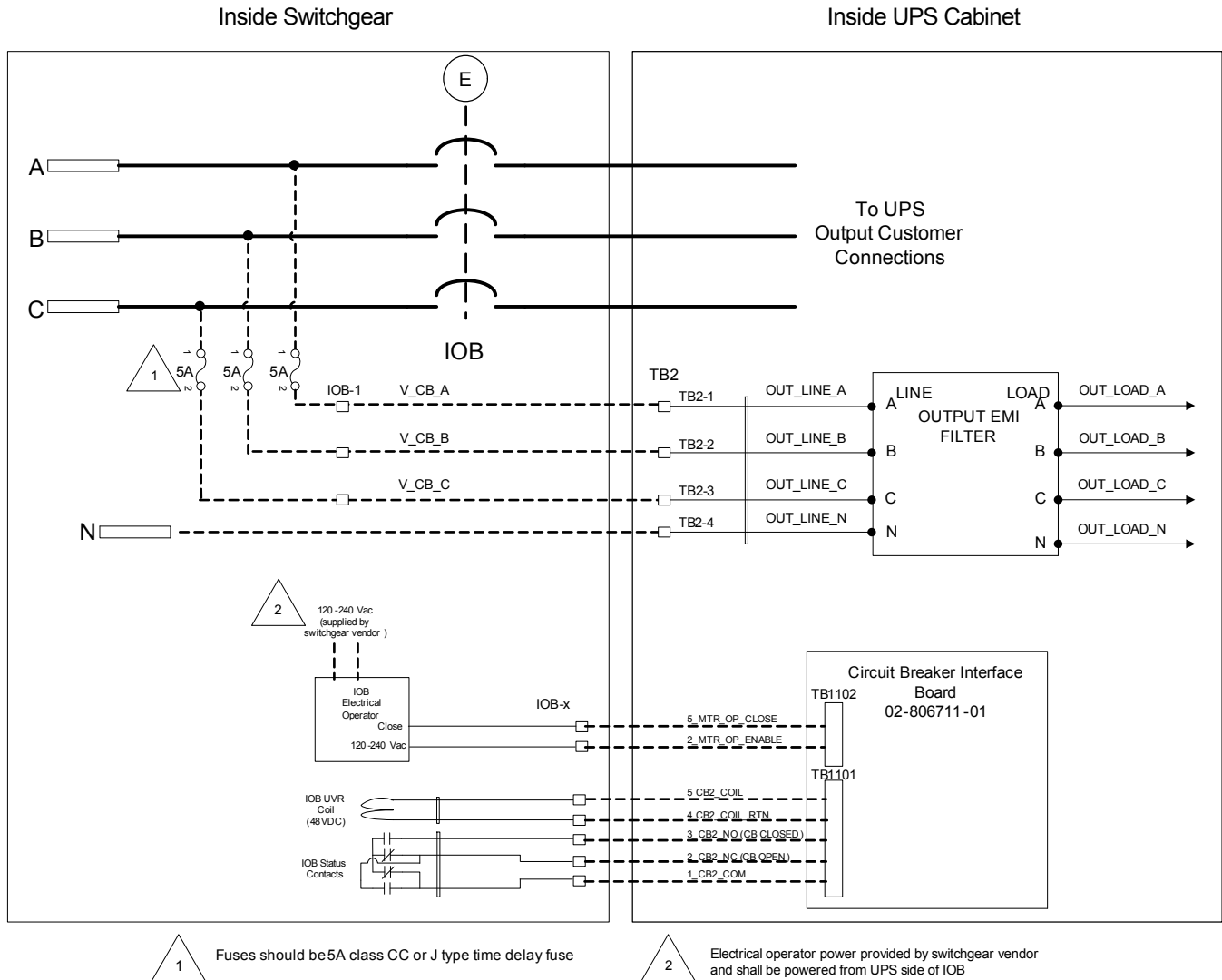
Terminal Designation		Signal Name	Wire Size/ Max Length
From	To		
Remote Breaker Contacts	TB1101-1	RIB aux. common	#14AWG/ 500ft. (150m)
	TB1101-2	RIB aux. N.C. (closed = CB is open)	
	TB1101-3	RIB aux. N.O. (closed = CB is closed)	
	TB1101-4	RIB trip coil (-)	
	TB1101-5	RIB trip coil (+)	
Remote RIB motor operator control contacts from remote breaker to UPS RIB CB interface board (optional)			
Remote Breaker Motor Operator Contacts	TB1102-2	AC line	#14AWG/ 500ft. (150m)
	TB1102-5	Motor operator close	
Remote RIB voltage sense from remote breaker to UPS			
Remote Breaker Voltage Sense	TB1-1	Voltage sense PH A	#14AWG/ 500ft. (150m)
	TB1-2	Voltage sense PH B	
	TB1-3	Voltage sense PH C	

2.4.4 Inverter Output Breaker

For systems that use Inverter Output Breakers (IOB), the controls for the auxiliary contacts, UVR, Motor Operator (optional) and voltage sense will go between the remote breaker and the UPS output I/O section (see **Figure 8**).

The IOB must be Listed UL 489 (Molded Case Circuit Breaker) or UL 1066 (Low Voltage AC Power Circuit Breaker) that are required to be used in UL-listed switchgear or switchboards. The circuit breaker for 1100kVA systems must have a short-time rating not exceeding 600V at 200K amperes for 5 cycles; for systems below 1100kVA: 600V at 150K amperes for 5 cycles.

Figure 8 Remote Output Breaker diagram



See Table 17 for required current ratings.

Table 7 Remote IOB contacts from remote breaker to UPS IOB CB interface board

Terminal Designation		Signal Name	Wire Size/ Max Length
From	To		
Remote Breaker Contacts	TB1101-1	IOB aux. common	#14AWG/ 500ft. (300m)
	TB1101-2	IOB aux. N.C. (closed = CB is open)	
	TB1101-3	IOB aux. N.O. (closed = CB is closed)	
	TB1101-4	IOB trip coil (-)	
	TB1101-5	IOB trip coil (+)	
Remote IOB contacts from remote breaker to UPS IOB CB interface board			
Remote Breaker Motor Operator Contacts	TB1102-2	AC line	#14AWG/ 500ft. (300m)
	TB1102-5	Motor operator close	
Remote IOB contacts from remote breaker to UPS IOB CB interface board			
Remote Breaker Voltage Sense	TB1-1	Voltage sense PH A	#14AWG/ 500ft. (300m)
	TB1-2	Voltage sense PH B	
	TB1-3	Voltage sense PH C	

2.5 DIGITAL LBS

The Load Bus Sync interface enables independent UPS units to remain in sync when operating on battery or when supplied by unsynchronized input sources.

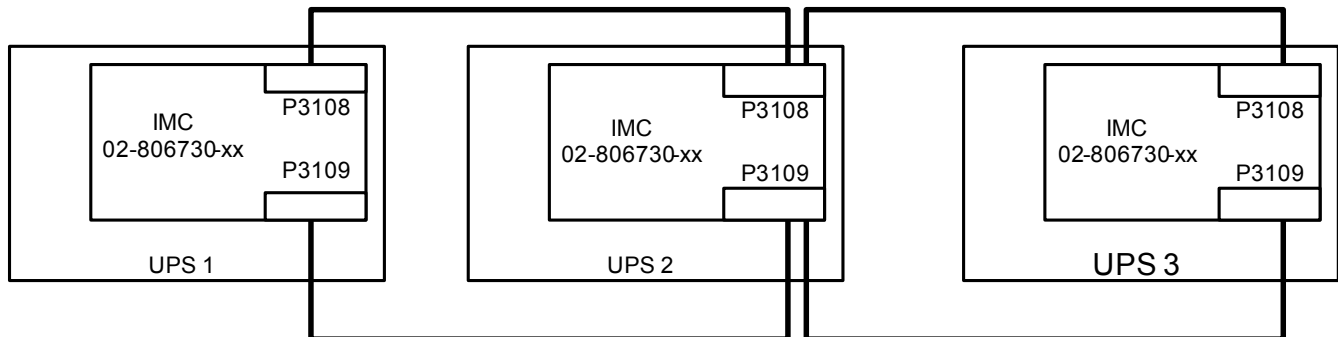
Digital LBS cables that connect the module to the system are connected to terminals P3108 and P3109 on the Inter-Module Communication (IMC) board. See **Figure 9**.

Table 8 Wire size, length for digital LBS connection of UPS Inter-Module Communication Boards

Terminal Designation		Signal Name	Wire Size/ Max Length
From	To		
Digital LBS from UPS Inter-Module Communication Board to other UPS Inter-Module Communication Board			
P3108-1	P3108-1	LBS SYNCH CANH	3000ft (900m)
P3108-2	P3108-2	LBS SYNCH CANL	
P3108-3	P3108-3	GROUND - DRAIN WIRE	
Redundant Digital LBS from UPS Inter-Module Communication Board to Other UPS Inter-Module Communication Board			
P3109-1	P3109-1	REDUNDANT LBS SYNCH CANH	3000ft (900m)
P3109-2	P3109-2	REDUNDANT LBS SYNCH CANL	
P3109-3	P3109-3	GROUND - DRAIN WIRE	

1. Belden 810x or Belden 89901 cables are the only approved cables
2. Each cable group should be run in a separate, grounded conduit to ensure redundancy.
3. The maximum lengths must include all the LBS cables from the first module to the last module.
4. The primary and redundant cable lengths can be counted separately.
5. Belden 89901 cable can be used for underground installations.
6. Attach the control wire to the side of control door where the Inter-Module Board (IMC) is attached. Do not run the wire across IMC board.

Figure 9 Inter-Module Communication Board wiring diagram—Digital LBS



2.6 CONFIGURING NEUTRAL AND GROUND CONNECTIONS

Improper grounding is the largest single cause of UPS installation and startup problems. Grounding techniques vary significantly from site to site, depending on several factors.

Proper grounding should be based on the appropriate NEC sections, but safe and proper equipment operation requires further enhancements. The following pages detail recommendations for grounding various system configurations to ensure optimal UPS system performance.



NOTE

These UPS modules are equipped with input isolation transformers. However, these transformers have no effect upon any system grounding considerations. These modules will be grounded exactly as shown in **Figures 10 through 13**.



CAUTION

The UPS ground lug must be solidly connected to the service entrance ground by an appropriately sized wire conductor per the NEC. Each conduit or raceway containing phase conductors must also contain a ground wire, both for UPS input and output, which are solidly connected to the ground terminal at each termination point. Conduit-based grounding systems tend to degrade over time. Therefore, using conduit as a grounding conductor for UPS applications may degrade UPS performance and cause improper UPS operation.

2.6.1 Four-Wire Input connections

The UPS module bypass input is connected to a solidly grounded source. In this configuration, the UPS module is not considered a separately derived source. The UPS module output neutral is solidly connected to the bypass source neutral, which is bonded to the grounding conductor at the source equipment.

Figure 10 Grounding diagram—Four-wire single-module systems

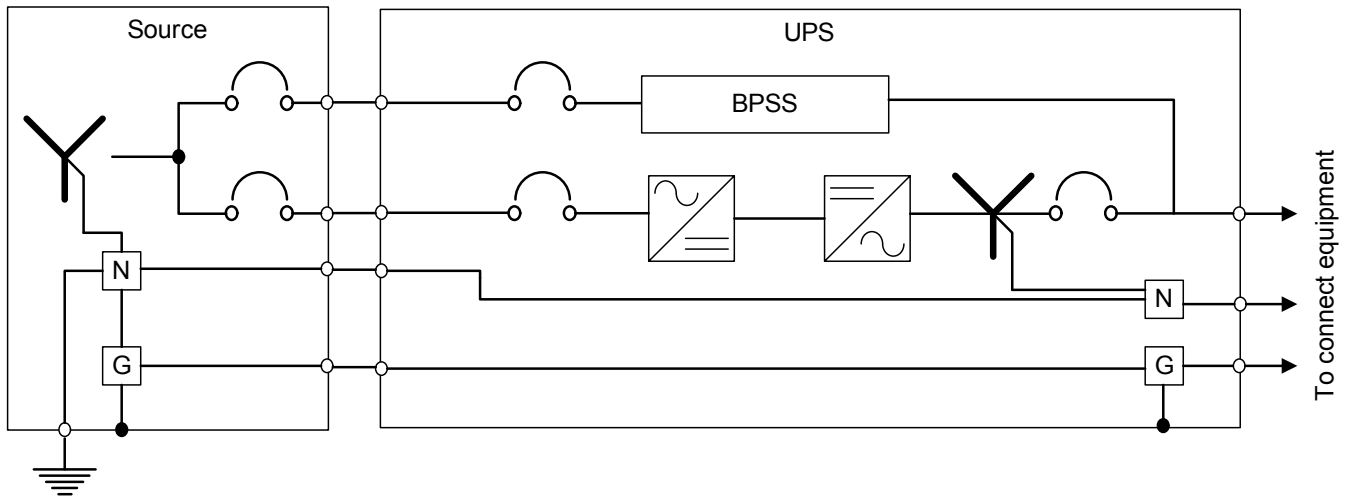
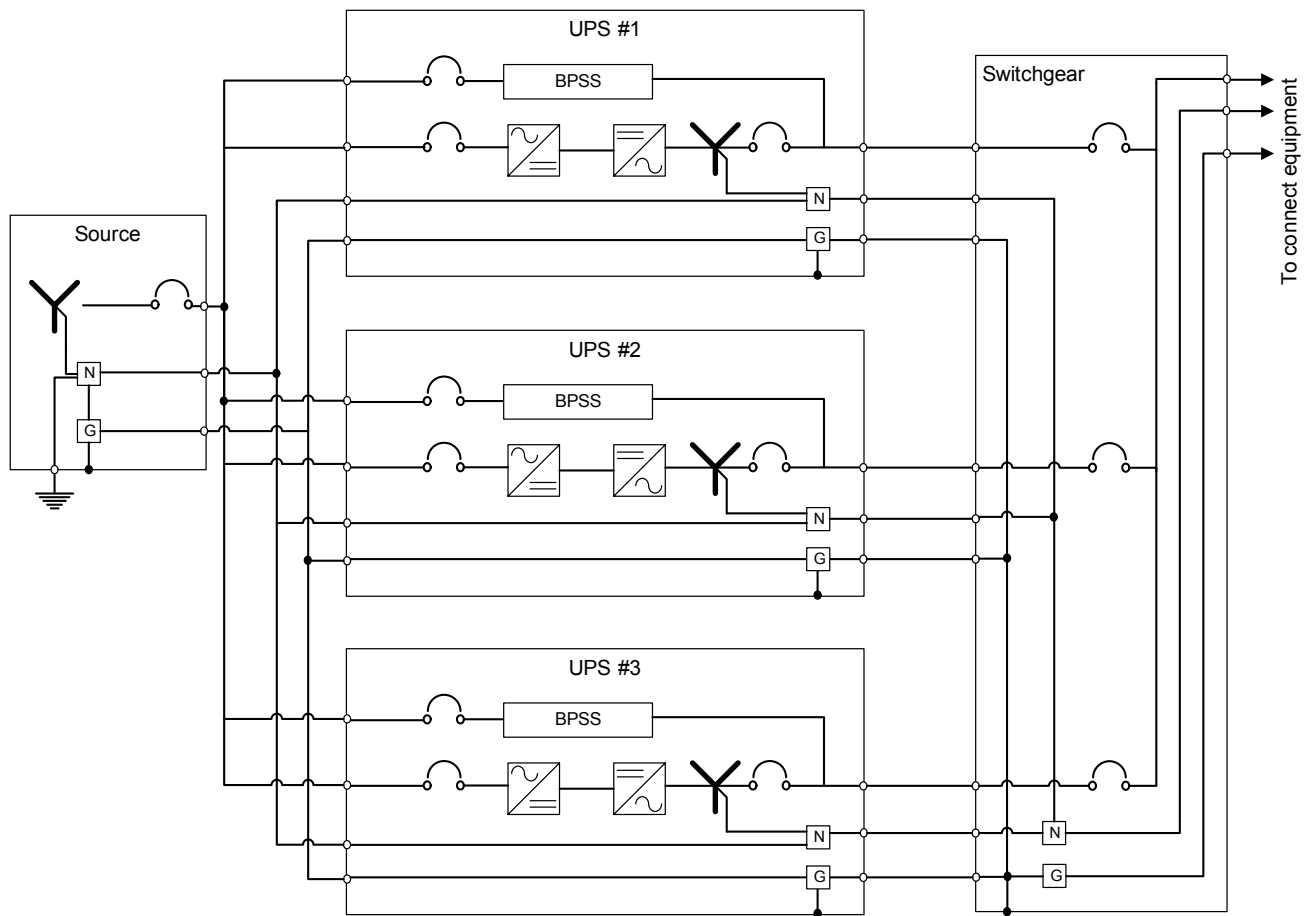


Figure 11 Grounding diagram—Four-wire multi-module systems



2.6.2 Three-Wire Input connections

This configuration must NOT be used when single-phase loads are directly connected to the UPS. The UPS output is considered a separately derived source. The UPS module neutral is bonded to the UPS ground and connected to a local grounding electrode in accordance with the NEC. Please note that whenever the UPS module transfers to or from bypass, two AC sources (UPS output and bypass) are briefly connected together and circulating current must flow. In this configuration, the current flows through the ground path, possibly tripping ground fault interrupters (GFIs) and distorting the output voltage waveform. Proper adjustment of ground fault interrupters is necessary to avoid unwanted tripping. The time delay should be set to at least 0.2 seconds to prevent tripping when the UPS performs a transfer or retransfer operation.



CAUTION

Failure to set the ground fault interrupters properly could cause loss of power to the critical load.

Figure 12 Grounding diagram—Three-wire single-module systems

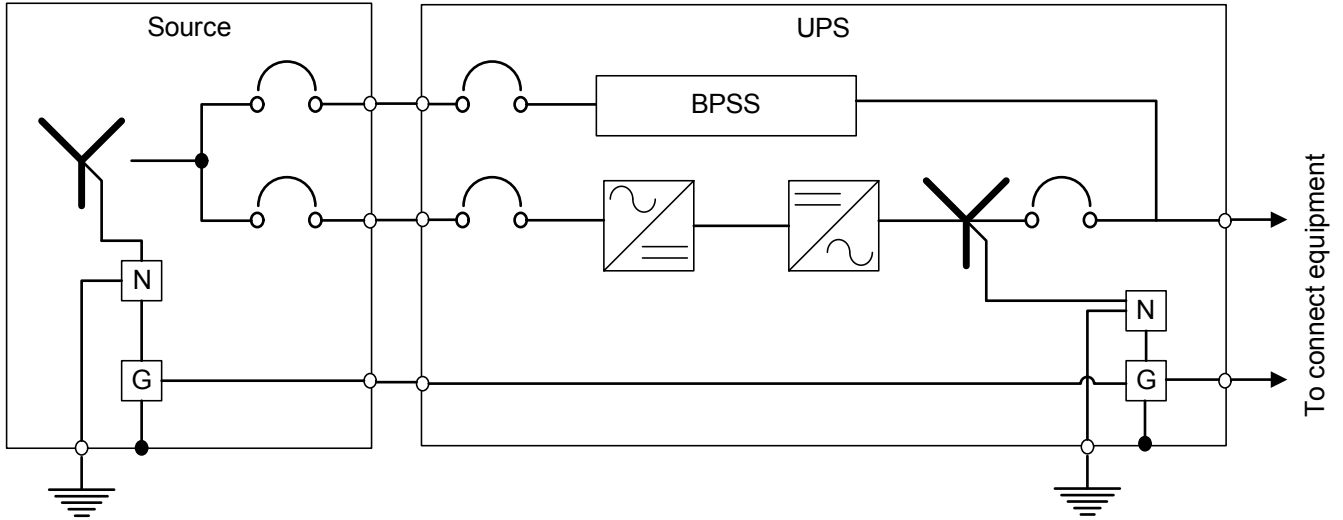
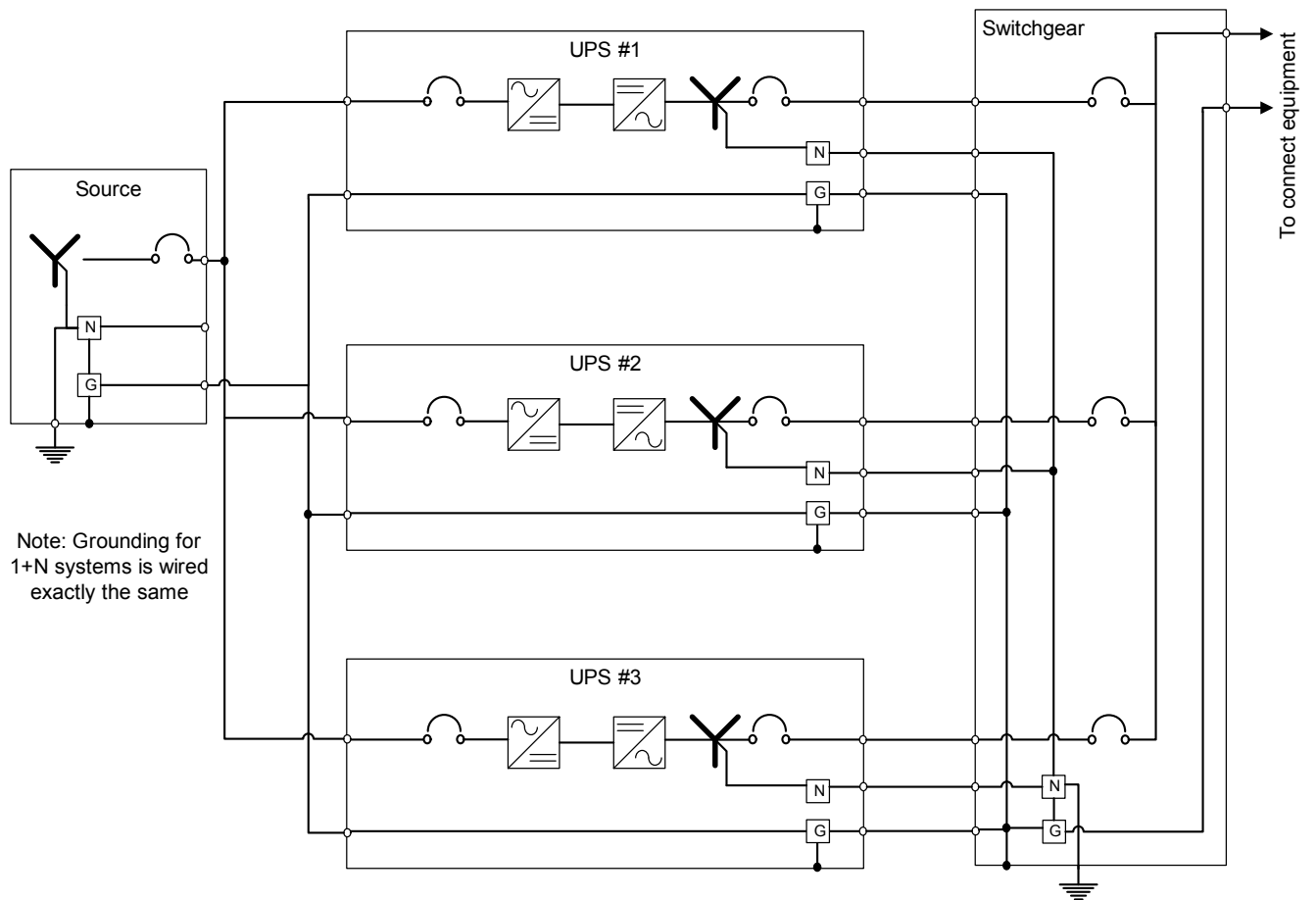


Figure 13 Grounding diagram—Three-wire multi-module systems



2.6.3 Preferred Grounding Configuration, Battery Systems

Open-rack battery systems, depending on local code requirements and customer preference, are normally:

- Floating (ungrounded)
- OR
- Center-tapped and floating

Battery cabinet systems must be connected as floating (ungrounded) systems.

Center-tapped or grounded battery systems are not possible with battery cabinet systems.

Whether the battery system is open-rack or cabinet, the metal rack parts or cabinet must be grounded to the UPS module ground bus.

2.6.4 Multi-Module Systems

For both N+1 and 1+N systems, the neutrals of all UPS modules in the system must be connected together inside the switchgear or parallel cabinet. The neutral conductors must be rated for 20% of phase conductor current minimum. Site and load conditions will determine if larger neutrals are required.

For Multi-Module systems using a 3-wire bypass, the Neutral-Ground bond must be made at the common neutral connection point in the switchgear or parallel cabinet.

2.6.5 High-Resistance Ground Systems

The Liebert NXL is compatible with high-resistance ground systems. See your local Vertiv representative for details.

3.0 OPTIONAL EQUIPMENT

3.1 SINGLE-MODULE SYSTEM OPTIONS

3.1.1 Battery Temperature Sensor

The optional external battery temperature sensor kit, supplied separately from the battery circuit breaker, contains one probe and one temperature transport board.

3.1.2 Matching Liebert NXL Battery Cabinet

The optional matching Liebert NXL Battery Cabinet can be used to obtain the desired autonomy time. The battery cabinets are designed to be either attached to the UPS or separate from the UPS (for details, see the Liebert NXL Battery Cabinet installation manual, SL-25430, available at Liebert Web site: www.liebert.com).

3.1.3 Load Bus Synch

An optional Load Bus Synch (LBS) system can be used to synchronize two Liebert NXL UPS units or a Liebert NXL UPS to a Liebert Series 610 UPS.

3.1.4 Remote Alarm Status Panel

The remote alarm status panel has LED alarm lights. An audible alarm sounds upon any alarm condition. The surface- or flush-mounted NEMA 1 enclosed panel indicates: Load on UPS, Load on Bypass, Battery Discharging, Low Battery Warning, Overload Warning, Ambient Overtemp Warning, UPS Alarm Condition, New Alarm Condition (For a Second UPS Alarm Condition).

3.2 COMMUNICATION AND MONITORING

- Liebert IntelliSlot™ Web Card - SNMP/HTTP Network Interface Card
- Liebert IntelliSlot 485 Web Card - Modbus, J-bus, IGM Net
- Remote Monitoring Services IntelliSlot Card
- RS485/422 Protocol Converter IntelliSlot Card
- Programmable Relay Board
- Input Contact Isolator Board

3.2.1 Alber Monitoring System

The matching Liebert NXL Battery Cabinet allows installing an optional Alber Battery monitoring system in the cabinet. The Alber Battery Monitoring by Liebert continuously checks all critical battery parameters, such as cell voltage, overall string voltage, current and temperature. Automatic periodic tests of internal resistance of each battery will verify the battery's operating integrity. Additional capabilities include automatic internal DC resistance tests and trend analysis, providing the ability to analyze performance and aid in troubleshooting.

4.0 INSTALLATION DRAWINGS

Figure 14 Main components, 625kVA Liebert NXL, N+1 multi-module unit without static bypass

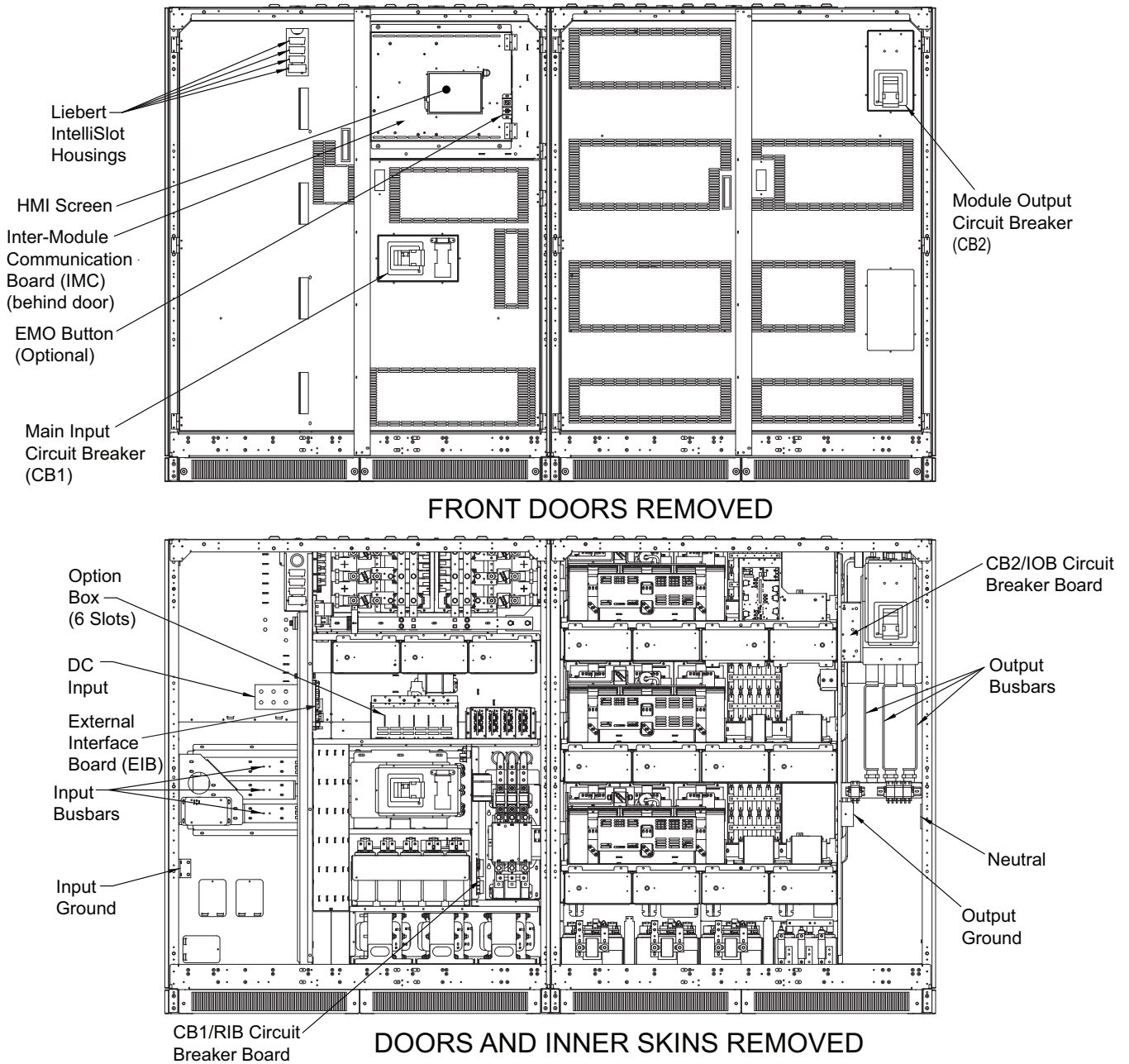


Figure 15 Main components, 625kVA Liebert NXL UPS, SMS and 1+N multi-module unit with static bypass

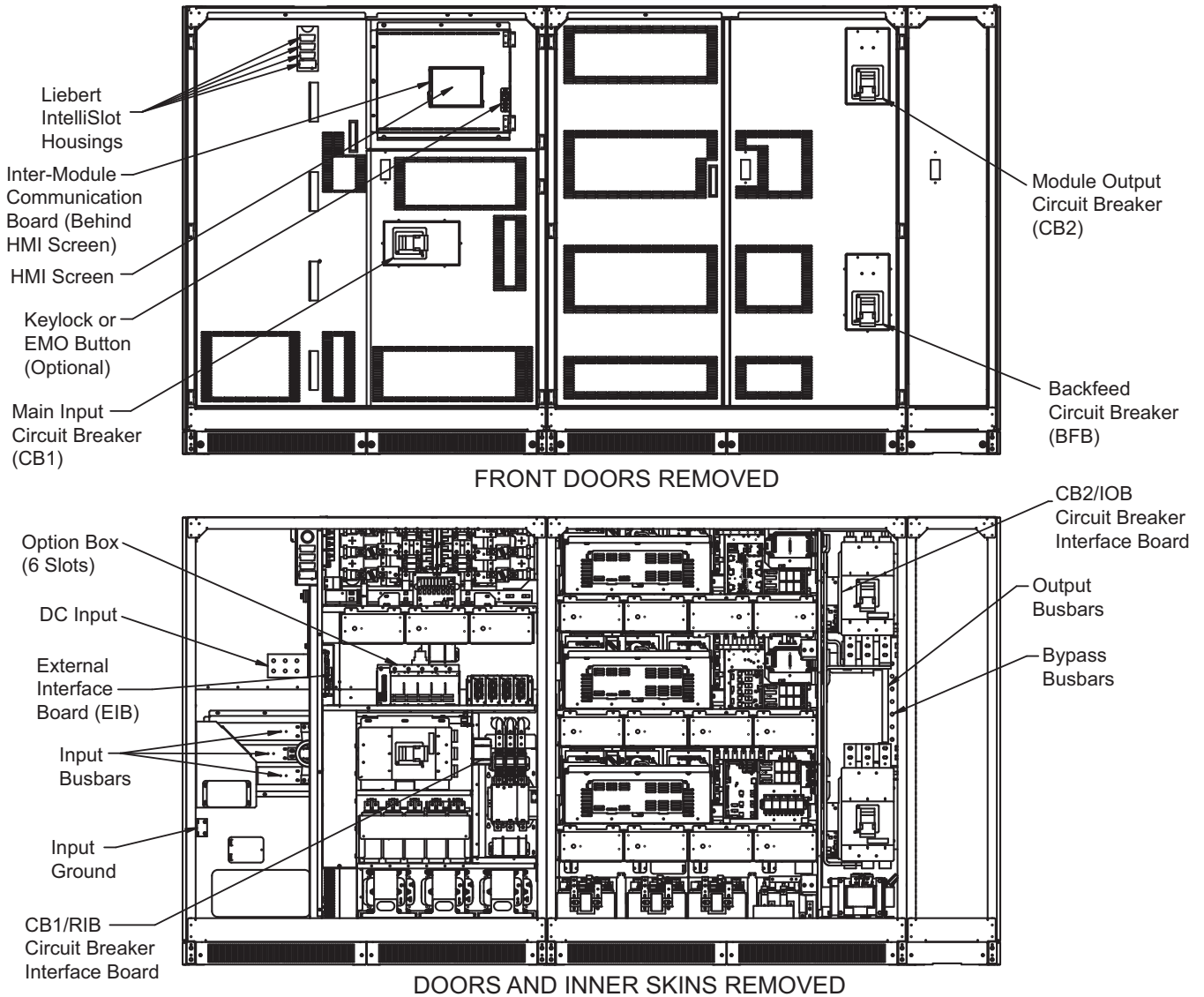
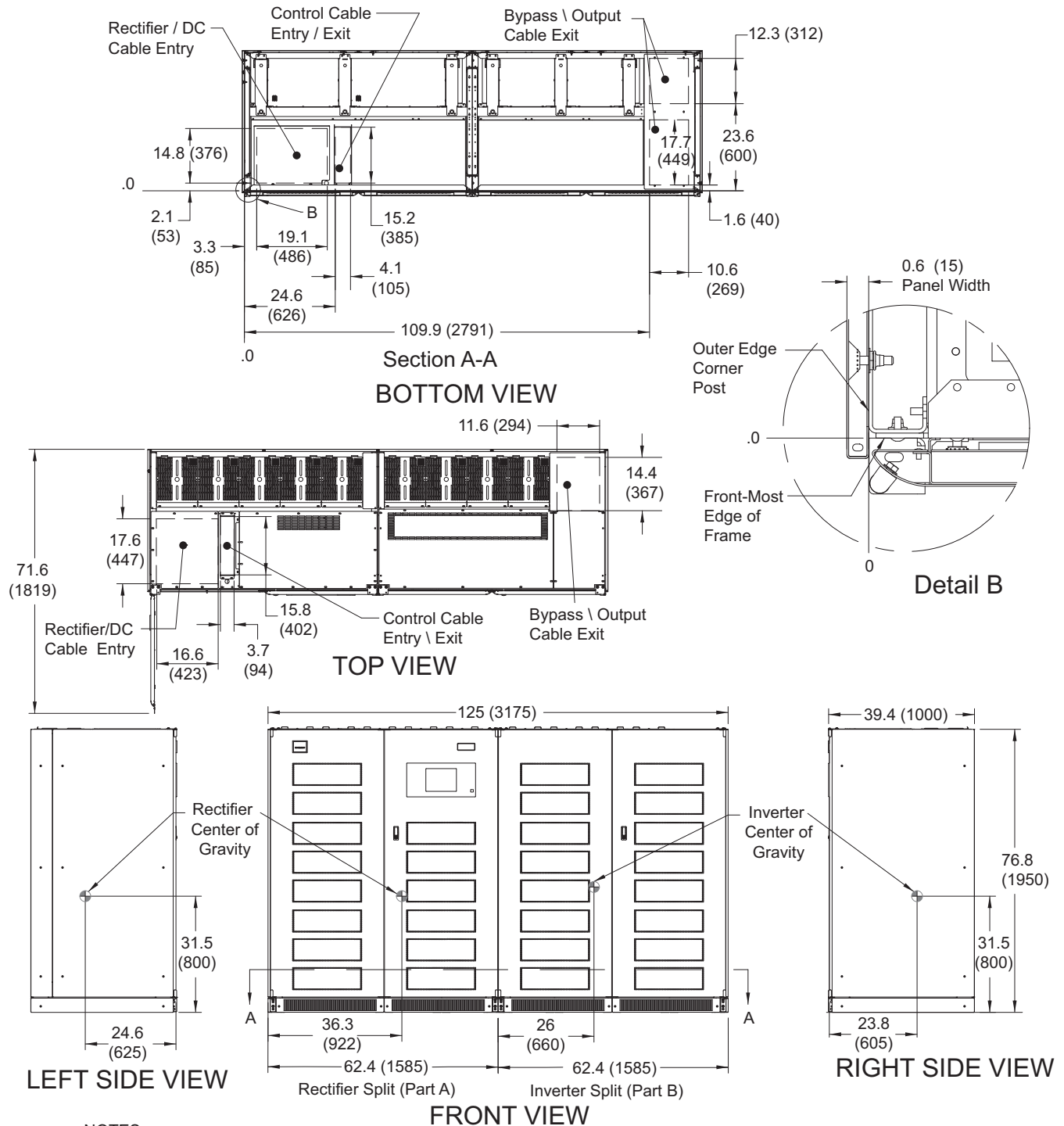


Figure 16 Outline drawing, 625kVA Liebert NXL, N+1 multi-module unit without static bypass



NOTES

1. All dimensions are in inches (mm).
2. 24" (610) minimum clearance above unit required for air exhaust and maintenance.
3. Keep cabinet within 15 degrees of vertical.
4. Top and bottom cable entry available through removable access plates. Remove, punch to suit conduit size and replace.
5. Unit bottom is structurally adequate for forklift handling.
6. Depth dimension includes front door and rear panel.
7. Width dimensions include side panels. Subtract 1.4" (35mm) when removing both side panels.

Figure 18 Base detail drawing, 625kVA Liebert NXL, N+1 multi-module unit without static bypass

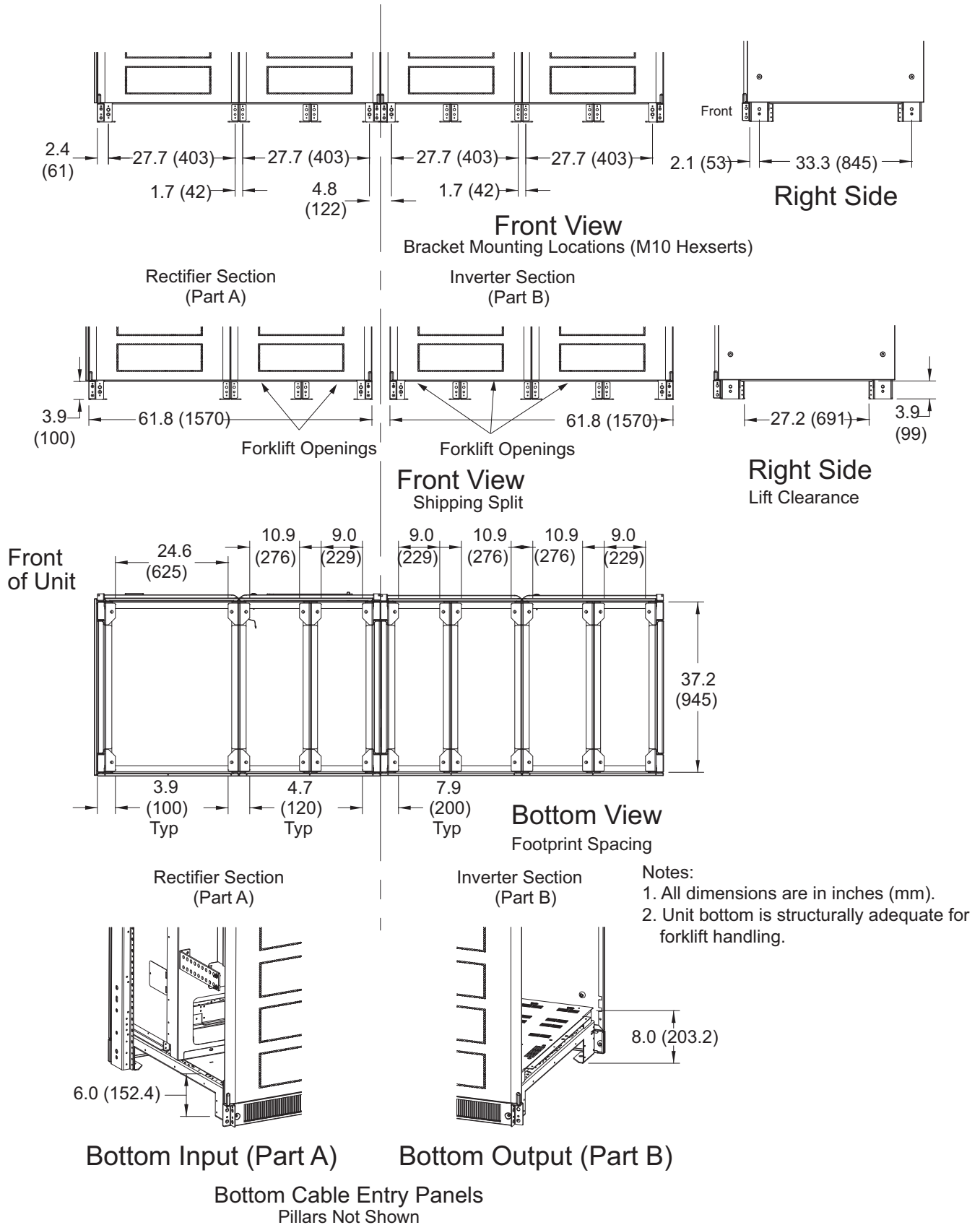
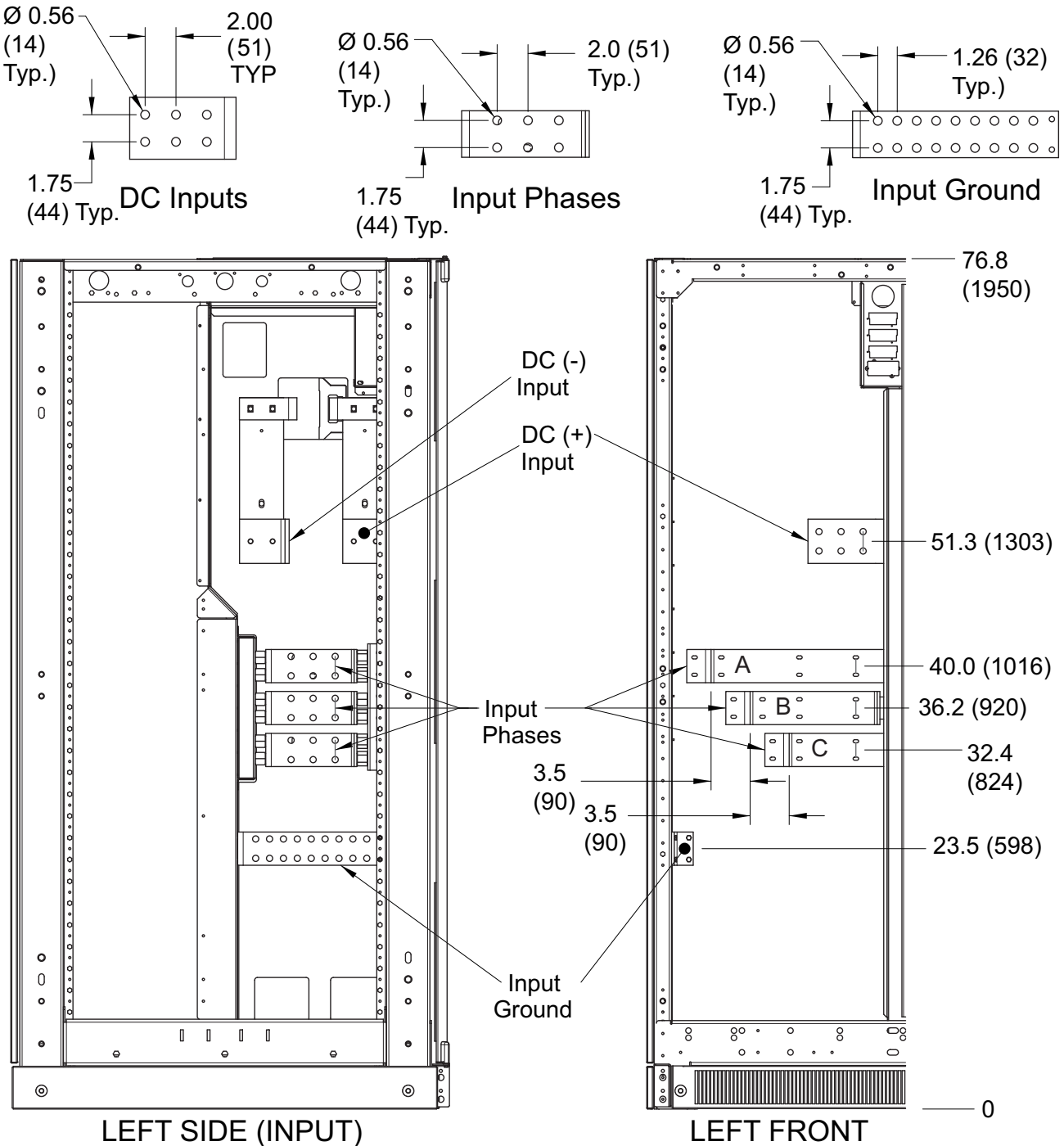
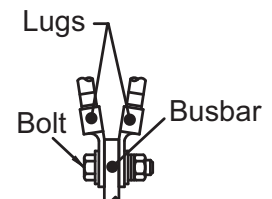
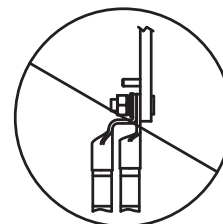


Figure 20 Input terminal detail, 625kVA Liebert NXL, N+1 multi-module unit without static bypass



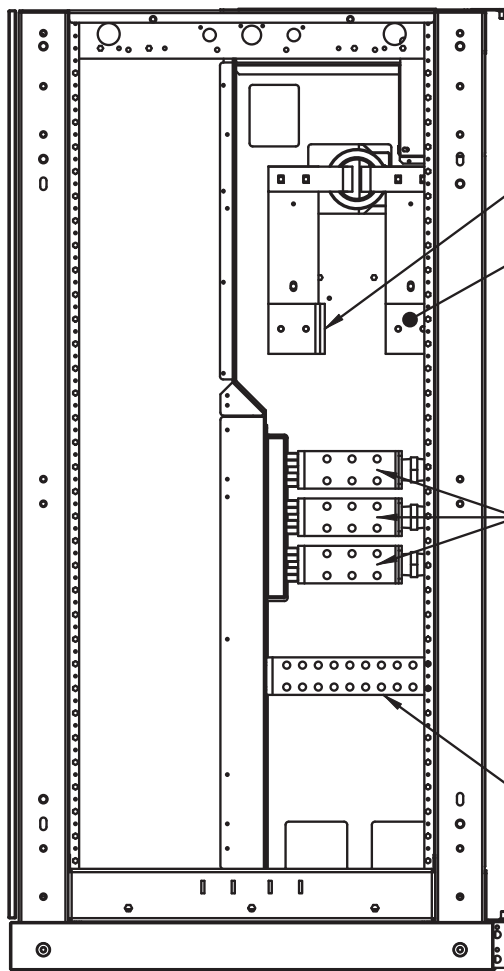
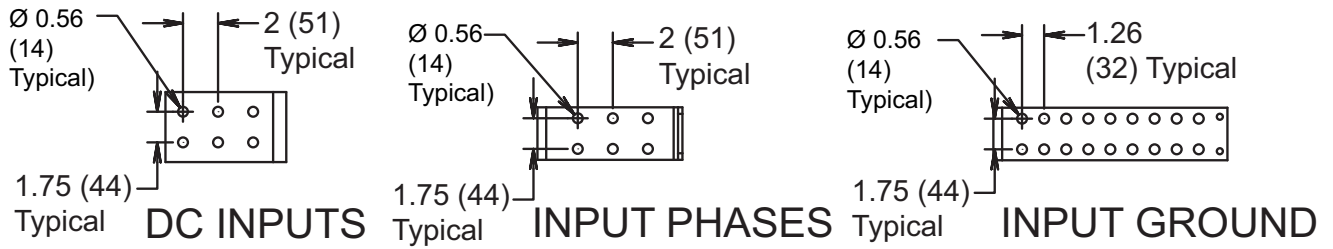
Notes

1. All dimensions are in inches (mm).
2. Control wiring and power wiring must be run in separate conduits.
3. Unless otherwise noted, use copper or aluminum conductors suitable for at least 75°C.
4. All wiring is to be in accordance with national and local electrical codes.

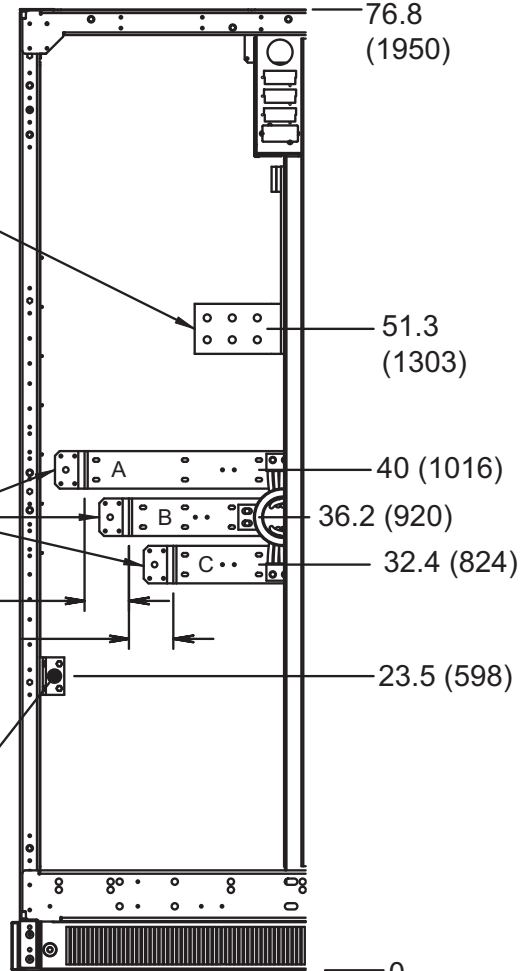


DUAL LUG CONNECTION DETAIL
Do not double-stack lugs (two lugs on same side of busbar). This is to prevent the cables from coming into contact with other busbars.

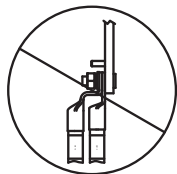
Figure 21 Input terminal detail, 625kVA Liebert NXL, SMS and 1+N multi-module unit with static bypass



LEFT SIDE (Part A)



LEFT FRONT (Part A)

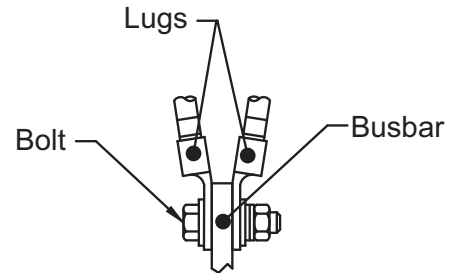


DO NOT DOUBLE STACK LUGS

Do not double stack lugs (two lugs on same side of busbar). This is to prevent the cables from coming into contact with other busbars.

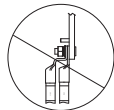
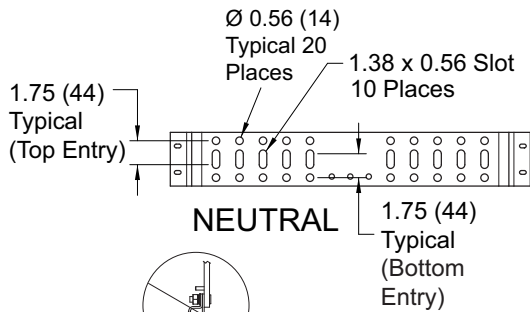
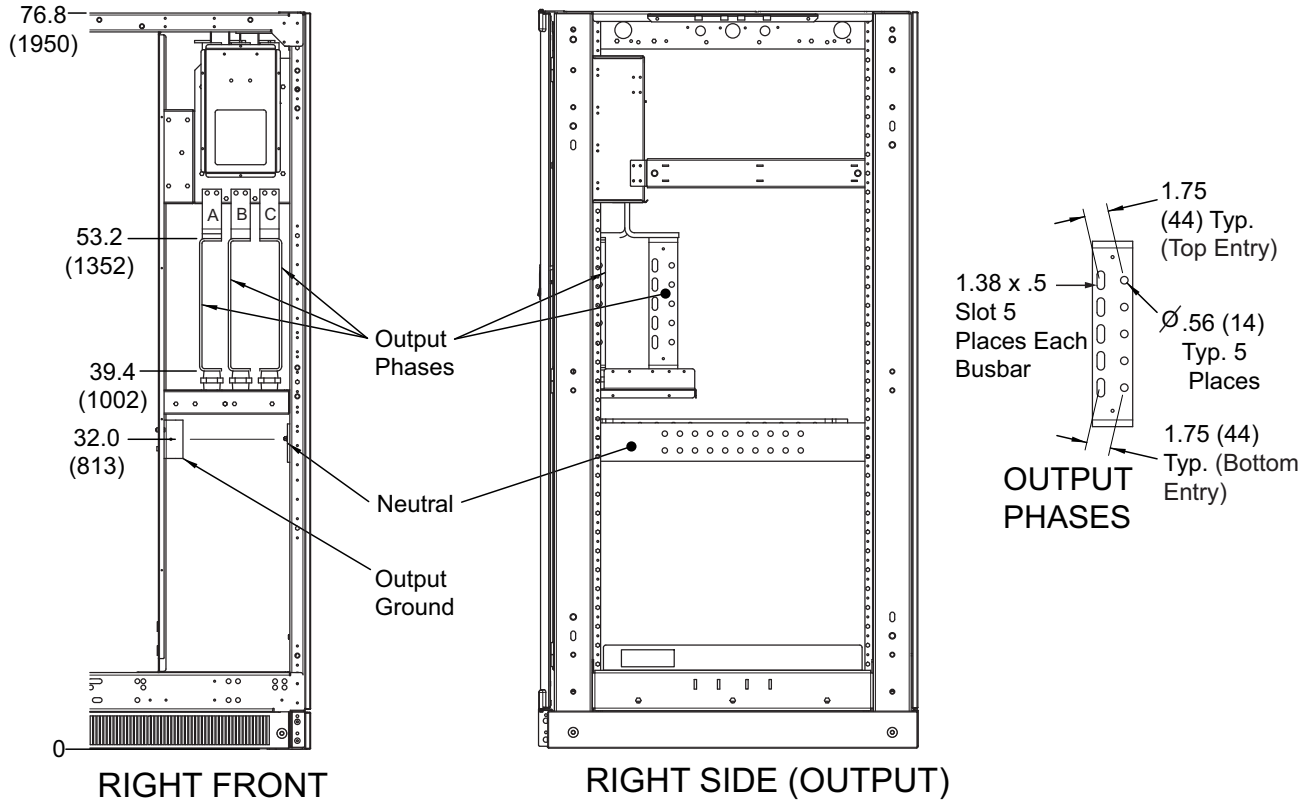
NOTES:

1. All dimensions are in inches (mm).
2. Control wiring and power wiring must be run in separate conduits.
3. Unless otherwise noted, use copper or aluminum conductors suitable for at least 75°C.
4. All wiring is to be in accordance with national and local electrical codes.

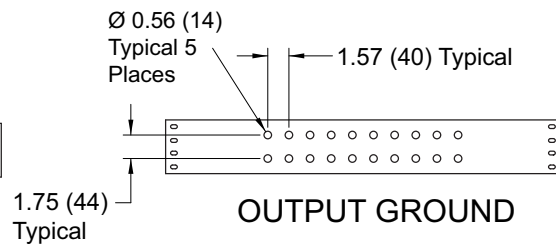


DUAL LUG CONNECTION DETAIL

Figure 22 Output terminal detail, 625kVA Liebert NXL, N+1 multi-module unit without static bypass (continued)



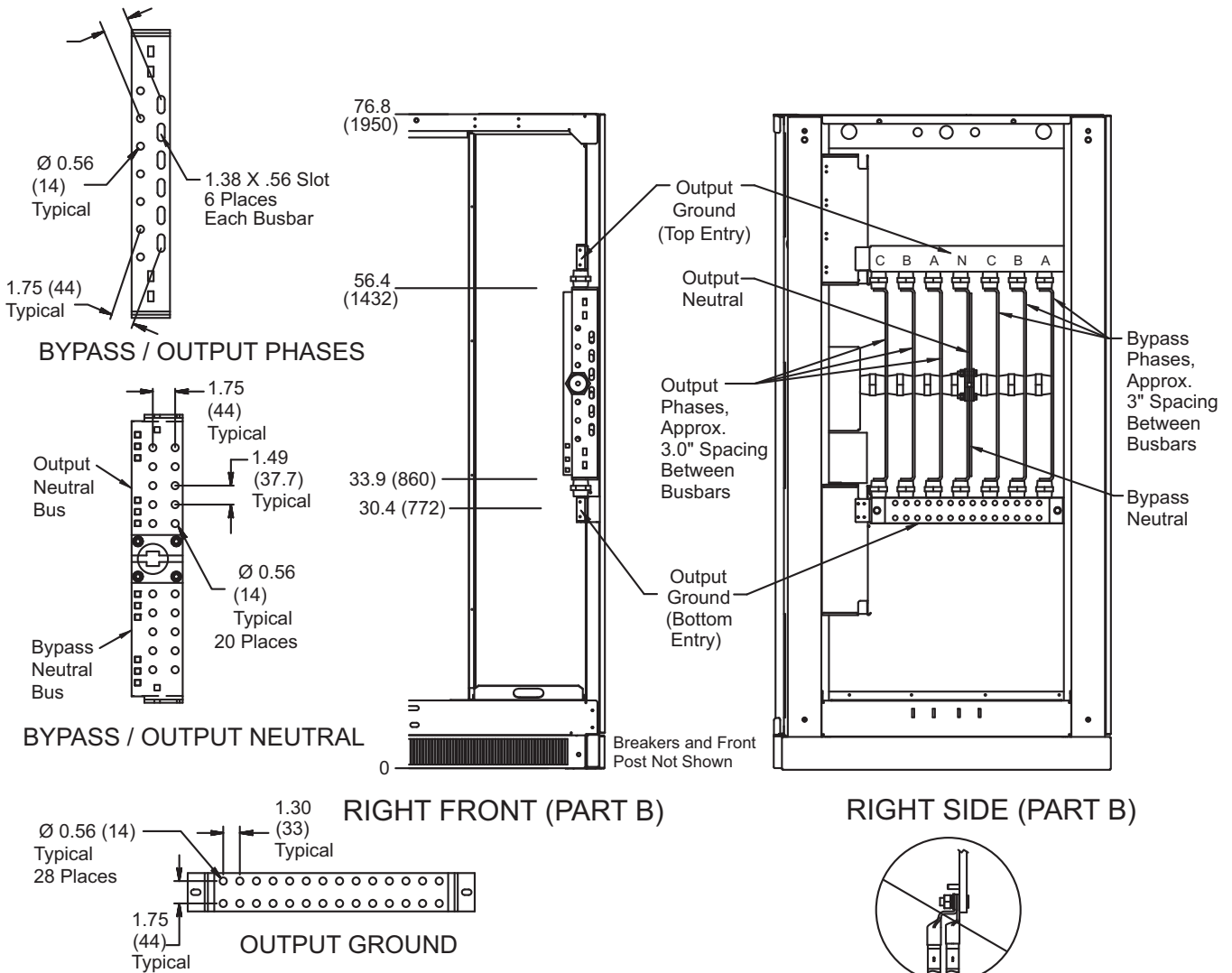
DO NOT DOUBLE-STACK LUGS
Do not double stack lugs (two lugs on same side of busbar). This is to prevent the cables from coming into contact with other busbars.



NOTES:

1. All dimensions are in inches (mm)
2. Control wiring and power wiring must be run in separate conduits.
3. Unless otherwise noted, use copper or aluminum conductors suitable for at least 75°C.
4. All wiring is to be in accordance with national and local electrical codes.

Figure 23 Output terminal detail, 625kVA Liebert NXL, SMS and 1+N multi-module unit with static bypass, (continued)

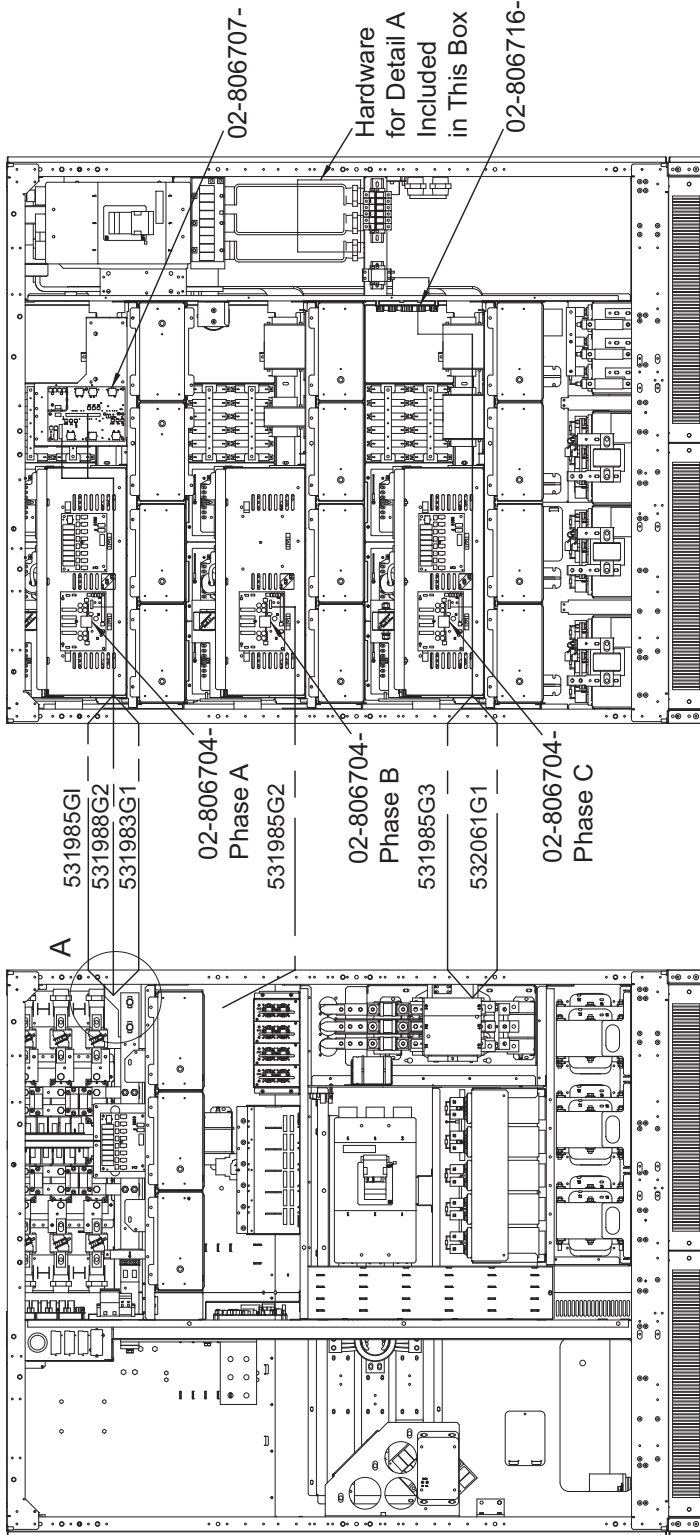


NOTES

1. All dimensions are in inches (mm).
2. Control wiring and power wiring must be run in separate conduits.
3. Unless otherwise noted, use copper or aluminum conductors suitable for at least 75°C.
4. All wiring is to be in accordance with national and local electrical codes.

DO NOT DOUBLE-STACK LUGS
 Do not double stack lugs (two lugs on same side of busbar). This is to prevent the cables from coming into contact with other busbars.

Figure 24 Shipping split 625kVA Liebert NXL without static bypass



Part A (Rectifier) - Wire Starting Point

Low-Voltage Wire Connections

Between Part A and Part B

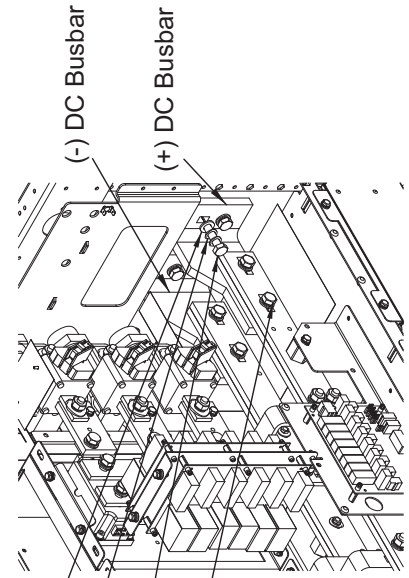
Wires are coiled and tied in Part A. Uncoil, route and connect wires in finish part as shown. Use wire label as guide for "to" component, connection ID and wire part number. Tie wires away from sharp edges, busbar and electronic components.

Part B (Inverter) - Wire Finishing Point

Detail A

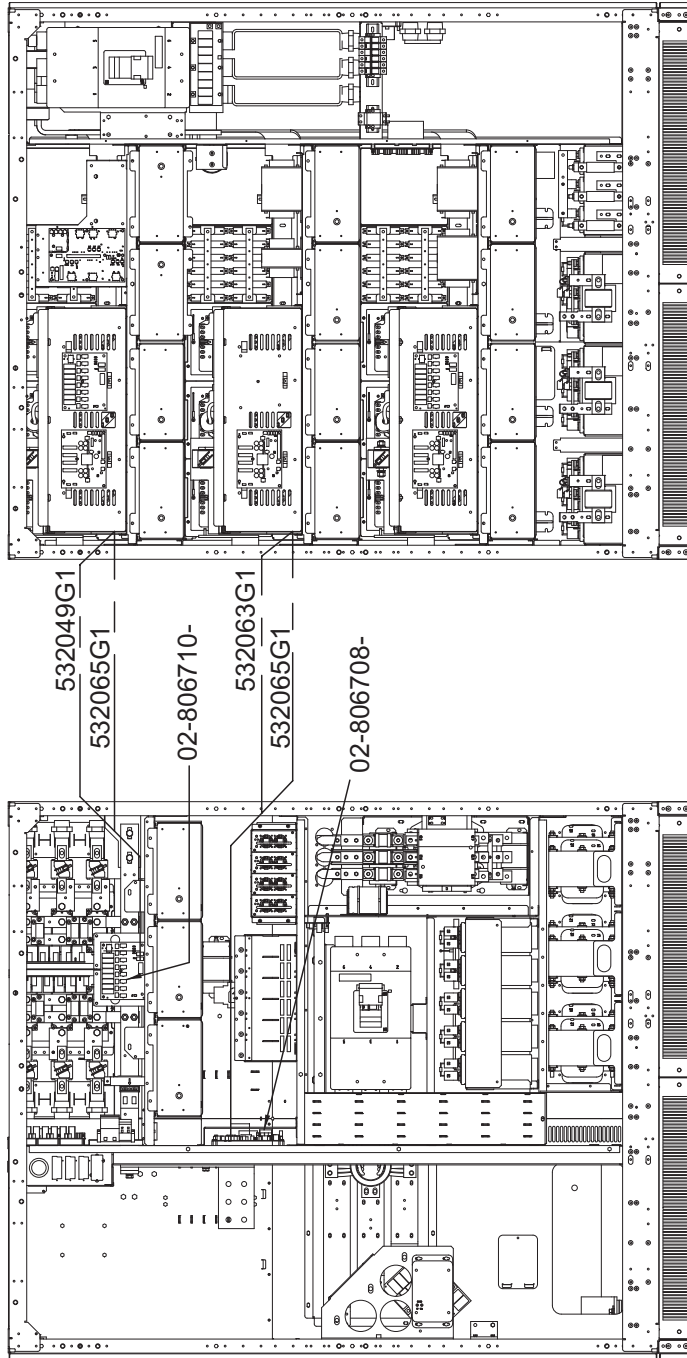
DC Power Connection Between Part A and Part B

Hardware Provided With Part B: 4 Bolts Total
Torque Connection To 27 N-m (240 In-lbs)



WH P/N	START (Part A - Rectifier Cabinet)	FINISH (Part B - Inverter Cabinet)	LABEL
531985G1	UPSC (Control Door)	02-806704 - Inverter Gate Drive A	To: 02-806704- Phase A ID: P0400A
531988G2	UPSC (Control Door)	02-806707 - Load VI	To: 02-806707- ID: P0700
531983G1	UPSC (Control Door)	02-806707- Load VI	To: 02-806707- ID: P0701
531985G2	UPSC (Control Door)	02-806704 - Inverter Gate Drive B	To: 02-806704- Phase B ID: P0400B
531985G3	UPSC (Control Door)	02-806704 - Inverter Gate Drive C	To: 02-806704- Phase C ID: P0400C
532061G1	Power Supply	02-806716 - AC Distribution Board	To: 02-806716-__ Connection ID: P1305 WH P/N: 532061G1

Figure 25 Shipping split 625kVA Liebert NXL without static bypass (continued)



Part A (Rectifier) - Wire Finishing Point

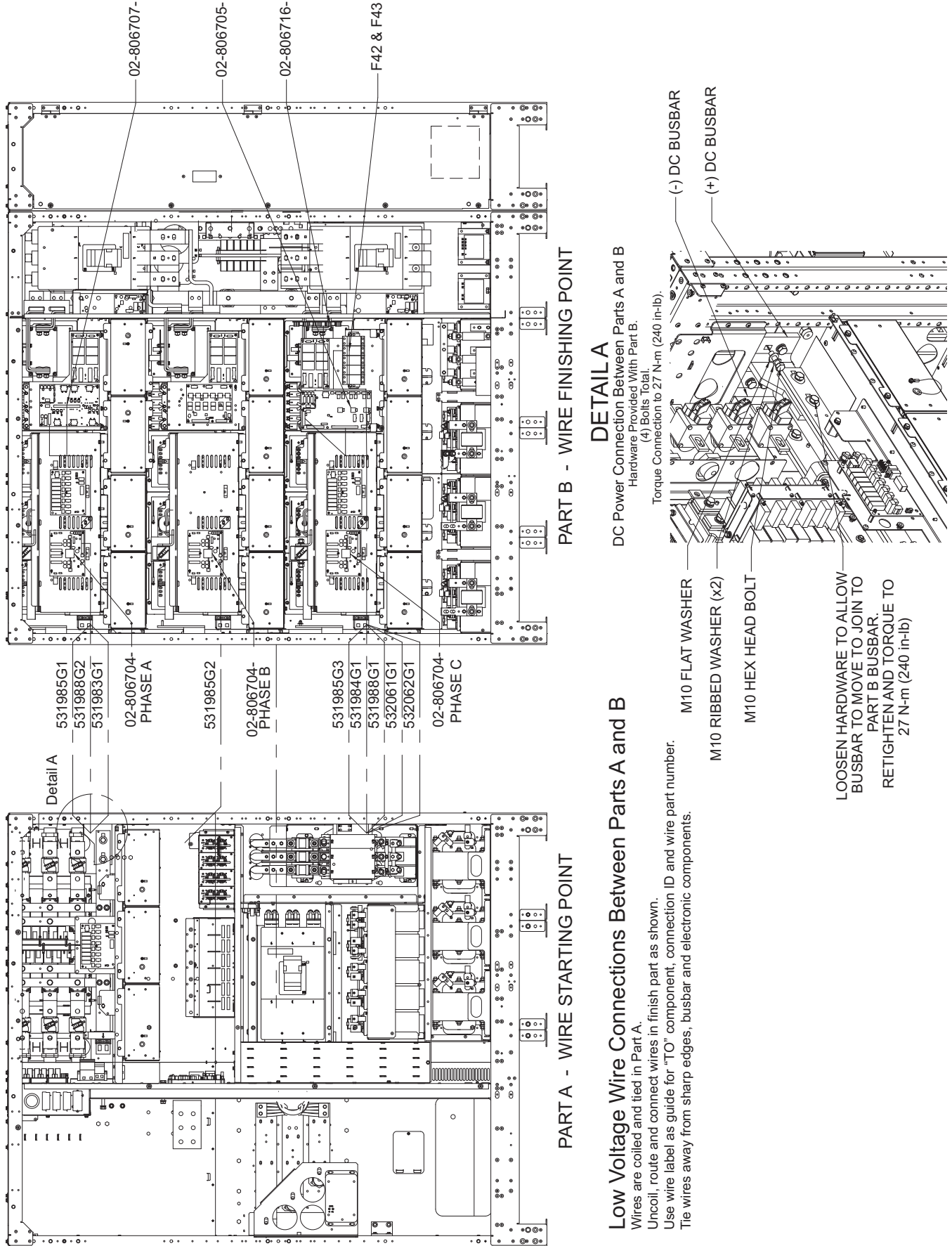
Low Voltage Wire Connections Between Part B and Part A

Wires are coiled and tied in Part B.
Uncoil, route and connect wires in finish part as shown.
Use wire label as guide for "to" component, connection ID and wire part number.
Tie wires away from sharp edges, busbar and electronic components.

Part B (Inverter) - Wire Starting Point

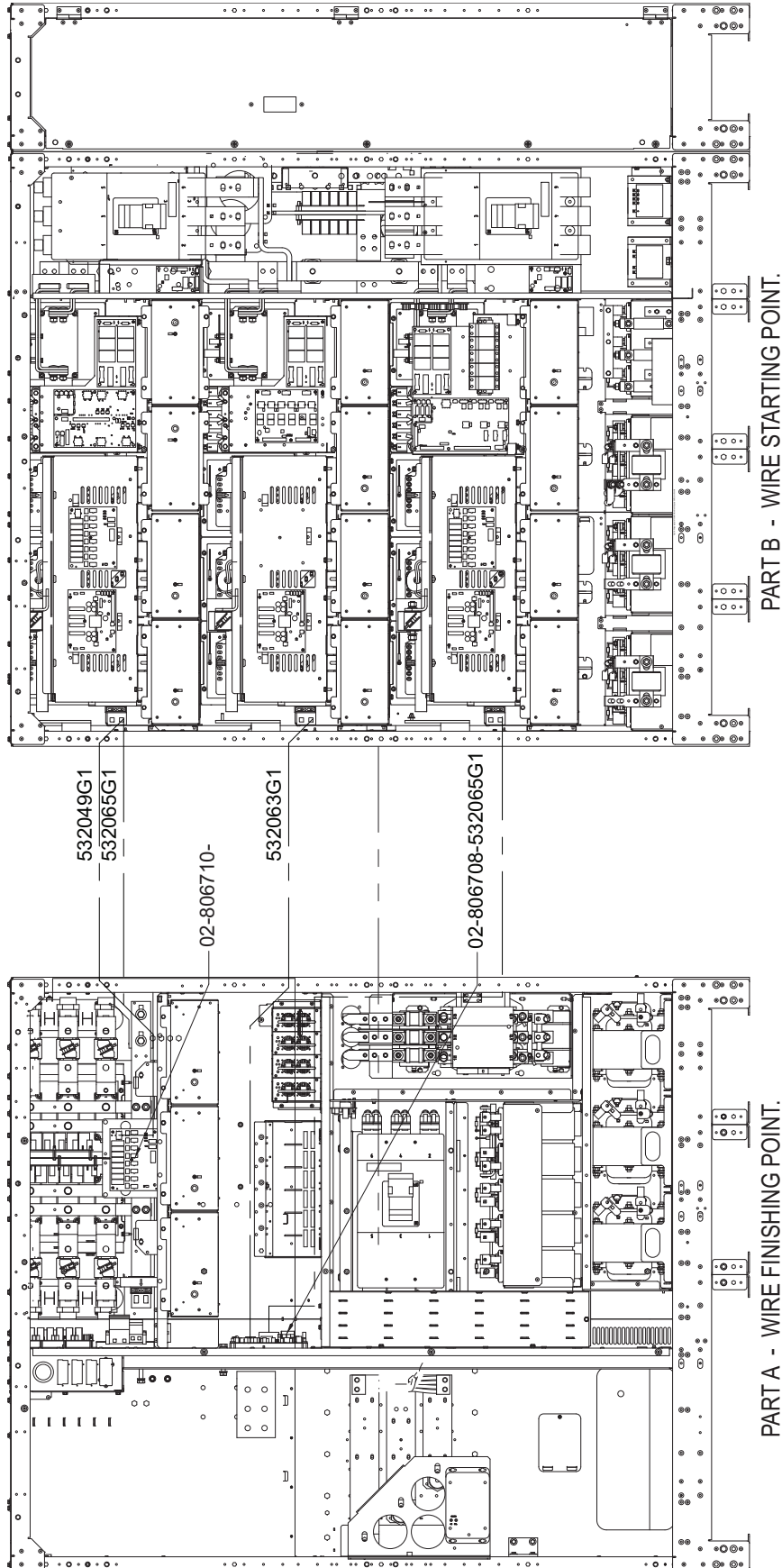
WH P/N	START (Part B - Inverter Cabinet)	FINISH (Part A - Rectifier Cabinet)	LABEL
532049G1	02-806716- AC Distribution Board	02-806710- Fan Interface Board 1	To: 02-806710-__ Connection ID: P1011 WH P/N: 532049G1
532065G1	02-806710- Fan Interface Board 2	02-806710- Fan Interface Board 1	To: 02-806710-__ Connection ID: P66 WH P/N: 532065G1
532063G1	DC Fuse	02-806708- External Interface Board	To: 02-806708-__ Connection ID: P0814 WH P/N: 532063G1
532065G1	02-806710- Fan Interface Board 3	02-806708- External Interface Board	TO: 02-806708-__ Connection ID: P99B WH P/N: 532065G1

Figure 26 Shipping Split, 625kVA Liebert NXL, SMS and 1+N multi-module unit with static bypass



WH P/N	START (Part A - Rectifier Cabinet)	FINISH (Part B - Inverter Cabinet)	LABEL
531985G1	UPSC (Control Door)	02-806704-Inverter Gate Drive A	To: 02-806704- Phase A ID: P0400A
531988G2	UPSC (Control Door)	02-806707-Load Vi	To: 02-806707-ID: P0700
531983G1	UPSC (Control Door)	02-806707-Load Vi	To: 02-806707- ID: P0701
531985G2	UPSC (Control Door)	02-806704-inverter Gate Drive B	To: 02-806704- Phase B ID: P0400B
531985G3	UPSC (Control Door)	02-806704-Inverter Gate Drive C	To: 02-806704- Phase C ID: P0400C
531984G1	UPSC (Control Door)	02-806705-Bypass Control Board	To: 02-806705-ID: P0500
531988G1	UPSC (Control Door)	02-806705-Bypass Control Board	To: 02-806705-ID: P0501
532061G1	Power Supply	02-806716-AC Distribution Board	To: 02-806716-__ Connection ID: P1305 WH P/N: 532061G1
532062G1	Power Supply	02-806705- Bypass Control Board	To: 02-806705-__ Connection ID: P44 WH P/N: 532062G1
532062G1	Power Supply	F42-2 & F43-2 Bypass PS Fuse Block	To: F42-2 and F43-2 WH P/N: 532062G1

Figure 27 Shipping Split, 625kVA Liebert NXL, SMS and 1+N multi-module unit with static bypass, (continued)



Low Voltage Wire Connections Between Parts B and A

- Wires are coiled and tied in Part B.
- Uncoil, route and connect wires in finish part as shown.
- Use wire label as guide for "TO" component, connection ID and wire part number.
- Tie wires away from sharp edges, busbar and electronic components.

WH P/N	Start (Part B - Inverter Cabinet)	Finish (Part A - Rectifier Cabinet)	Label
532049G1	02-806716-AC Distribution Board	Figure 28 02-806710- Fan Interface Board 1	To: 02-806710-__ Connection ID: P1011 WH P/N: 532049G1
532065G1	02-806710-Fan Interface Board 2	02-806710- Fan Interface Board 1	To: 02-806710-__ Connection ID: P66 WH P/N: 532065G1
532063G1	DC Fuse	02-806708- External Interface Board	To: 02-806708-__ Connection ID: P0814 WH P/N: 532063G1
532065G1	02-806710-Fan Interface Board 3	02-806708- External Interface Board	To: 02-806708-__ Connection ID: P99B WH P/N: 532065G1

Figure 29 Main components Liebert NXL 800kVA UPS 1+N multi-module or SMS with static bypass

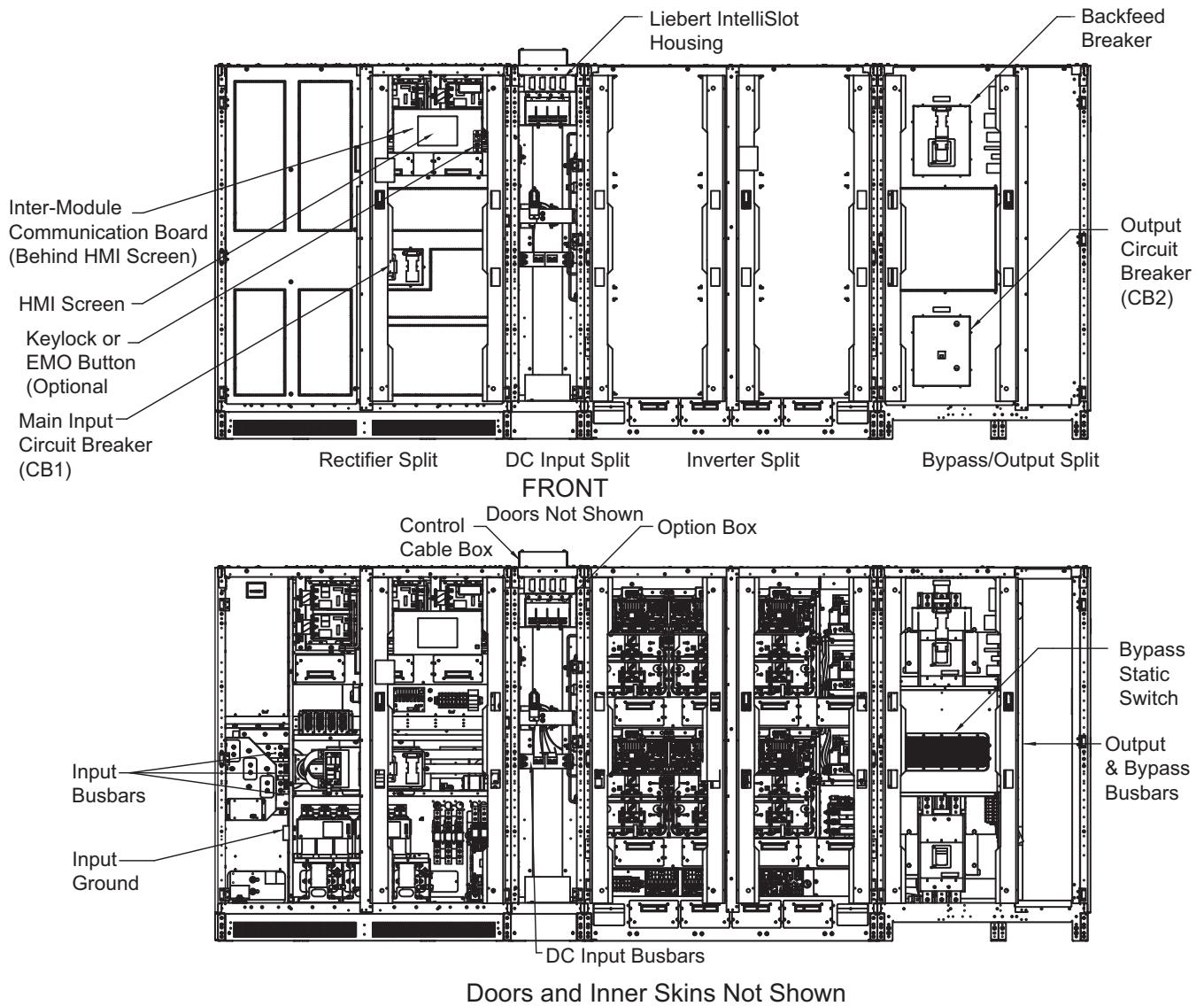
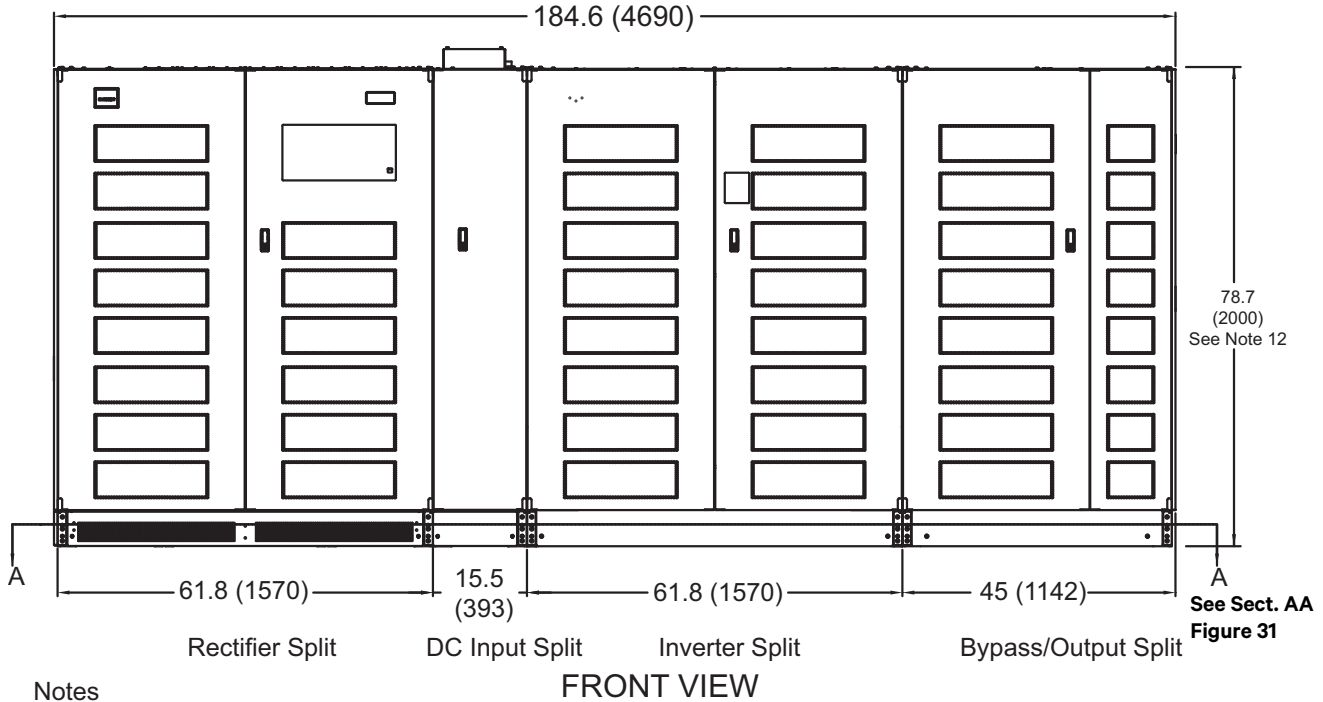
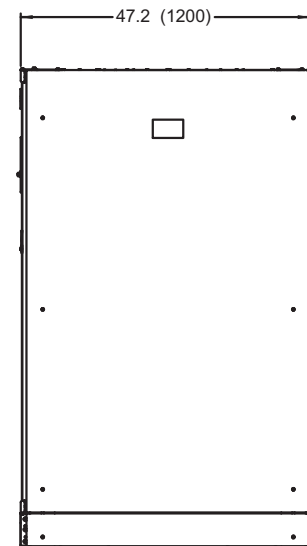


Figure 30 Outline Drawing Liebert NXL 800kVA UPS 1+N multi-module or SMS with static bypass



Notes

1. All dimensions are in inches (mm).
2. 24" (610) minimum clearance above unit required for air exhaust, and 36" (914) front access required for service.
3. Keep cabinet within 15 degrees of vertical.
4. Top and bottom cable entry available through removable access plates. Remove, punch to suit conduit size and replace.
5. Unit bottom is structurally adequate for forklift handling.
6. Control wiring and power wiring must be run in separate conduits.
7. Unless otherwise noted, use copper or aluminum conductors suitable for at least 75°C.
8. All wiring is to be in accordance with national and local electrical codes.
9. Depth dimension includes front door and rear panel.
10. Width dimensions include side panels. Subtract 1.2" (30mm) when removing both side panels.
11. The height increases to 81.9" (2080) when the control cable box is installed on top of the DCinput cabinet. The control cable box is 14" W x 11.5" D x 3.2" H.



RIGHT SIDE VIEW

Figure 31 Outline drawing Liebert NXL 800kVA UPS 1+N multi-module or SMS with static bypass (continued)

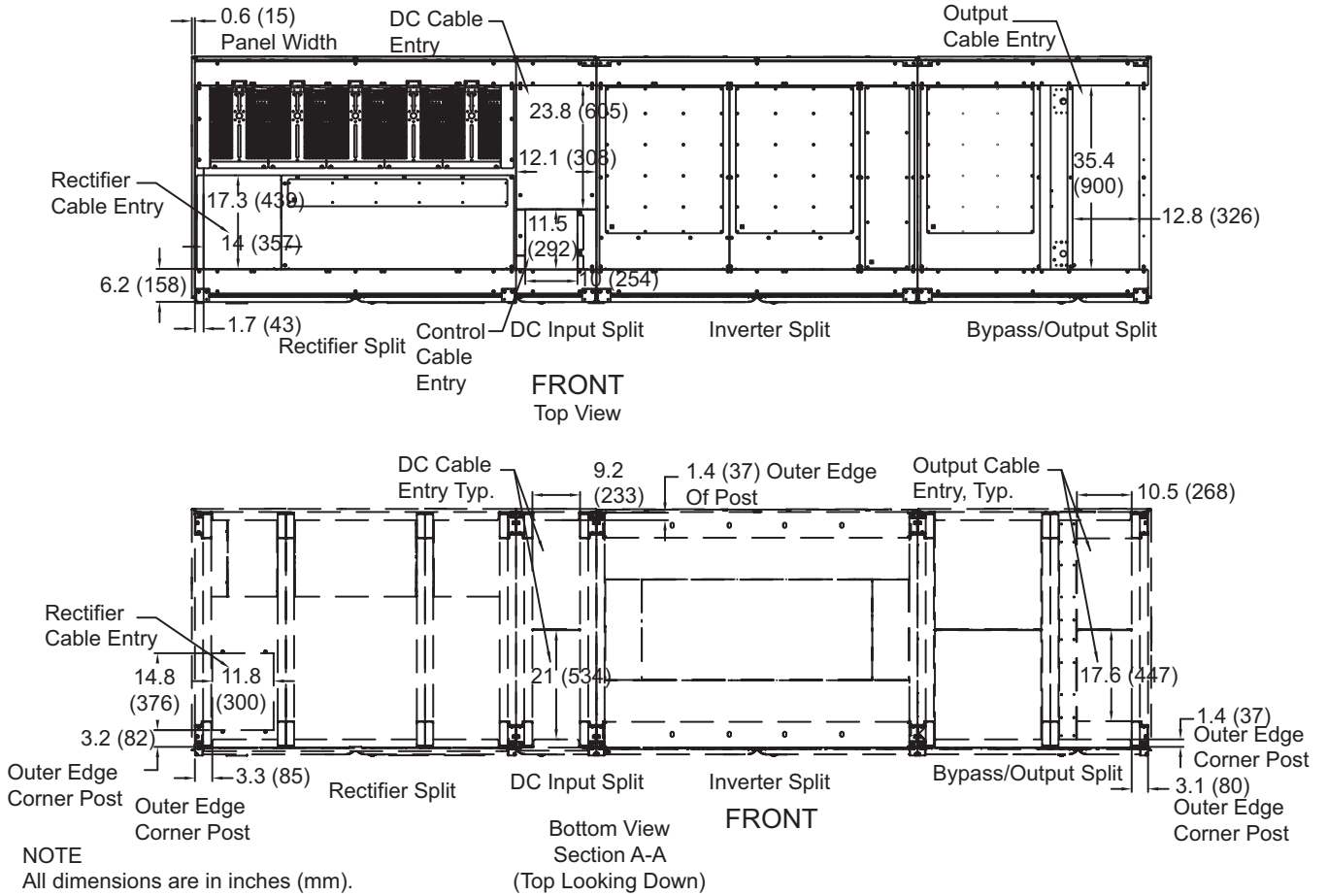
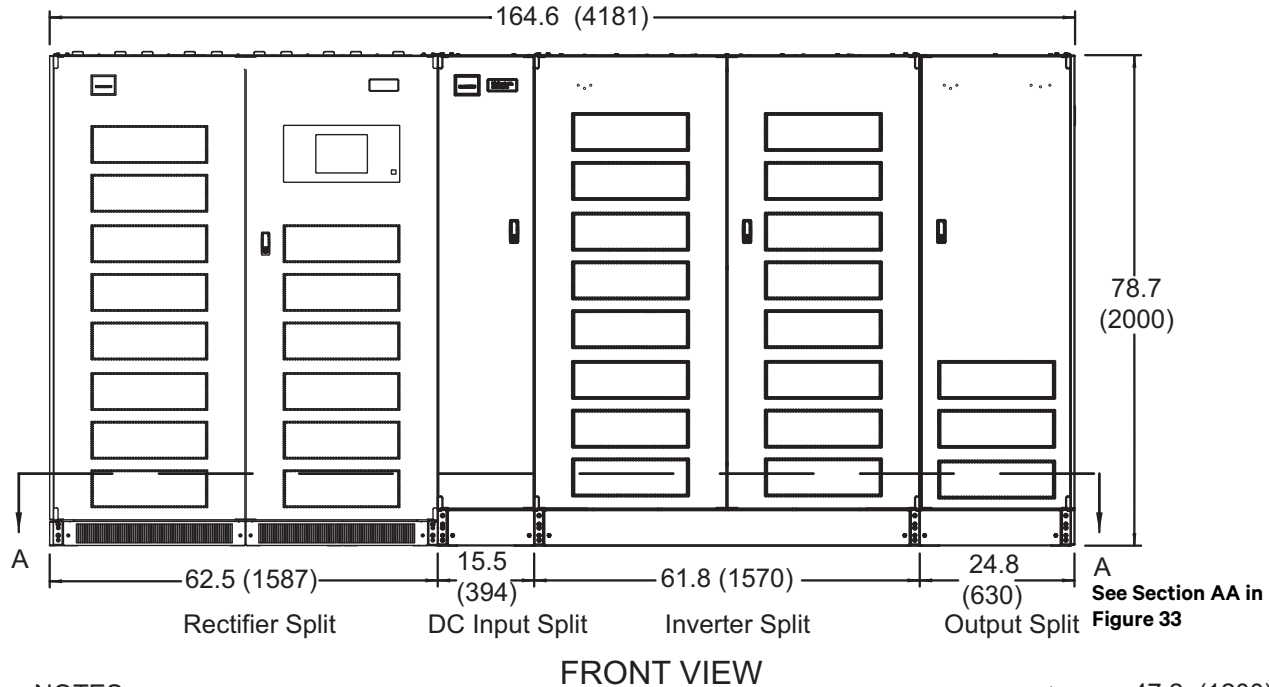
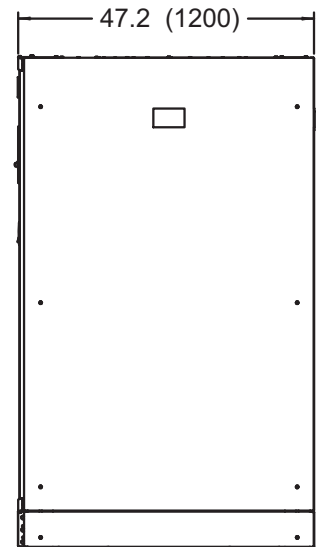


Figure 32 Outline drawing Liebert NXL 800kVA UPS N+1 multi-module without static bypass



NOTES

1. All dimensions are in inches (mm).
2. 24" (610) minimum clearance above unit required for air exhaust, and 36" (914) front access required for service.
3. Keep cabinet within 15 degrees of vertical.
4. Top and bottom cable entry available through removable access plates. Remove, punch to suit conduit size and replace.
5. Unit bottom is structurally adequate for forklift handling.
6. Control wiring and power wiring must be run in separate conduits.
7. Unless otherwise noted, use copper or aluminum conductors suitable for at least 75°C.
8. All wiring is to be in accordance with national and local electrical codes.
9. Depth dimension includes front door and rear panel.
10. Width dimensions include side panels. Subtract 1.2" (30mm) when removing both side panels.
11. The height increases to 81.9" (2080) when the control cable box is installed on top of the DC input cabinet. The control cable box is 14" W x 11.5" D x 3.2" H.



RIGHT SIDE VIEW

Figure 33 Outline drawing Liebert NXL 800kVA UPS N+1 multi-module without static bypass (continued)

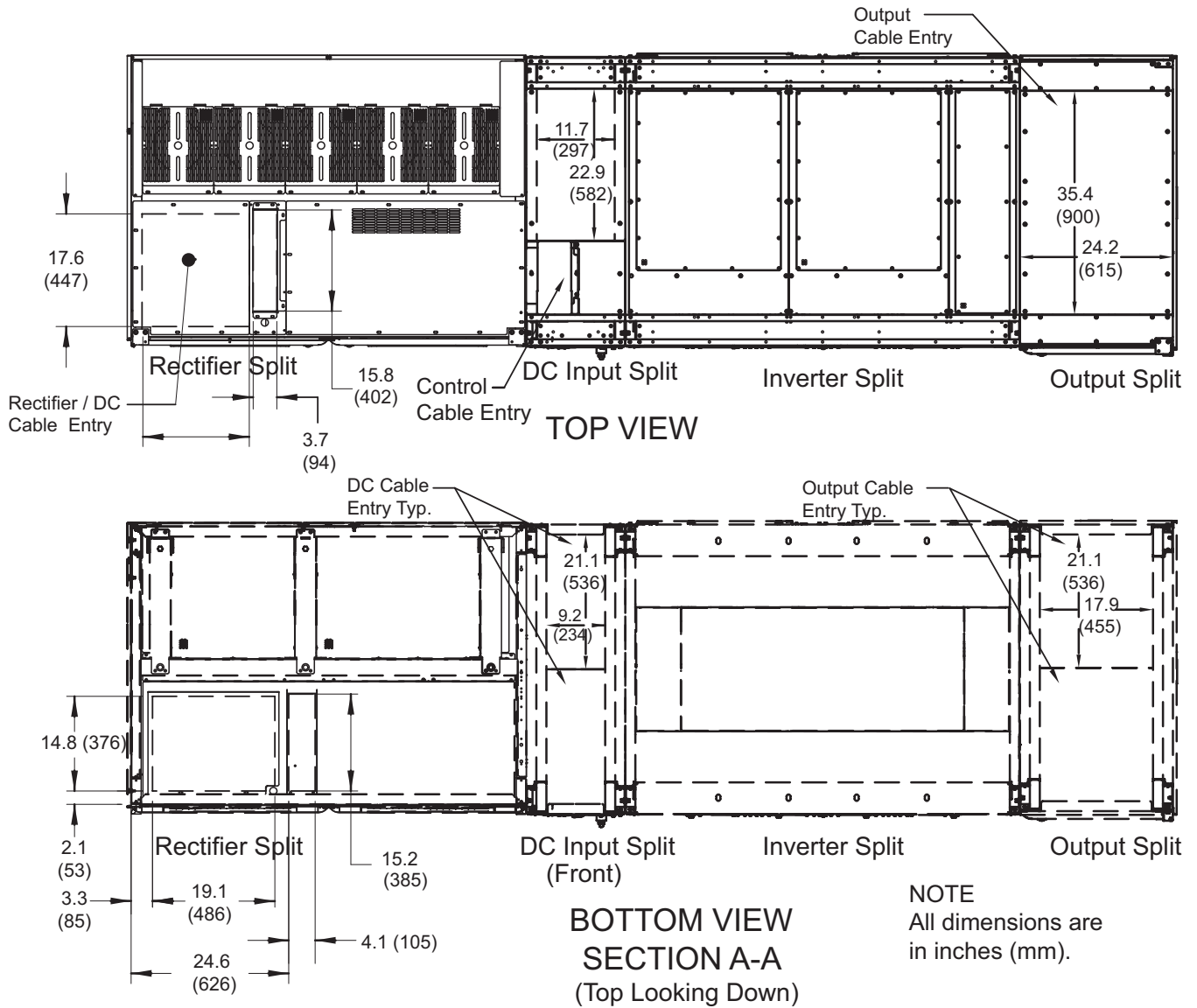
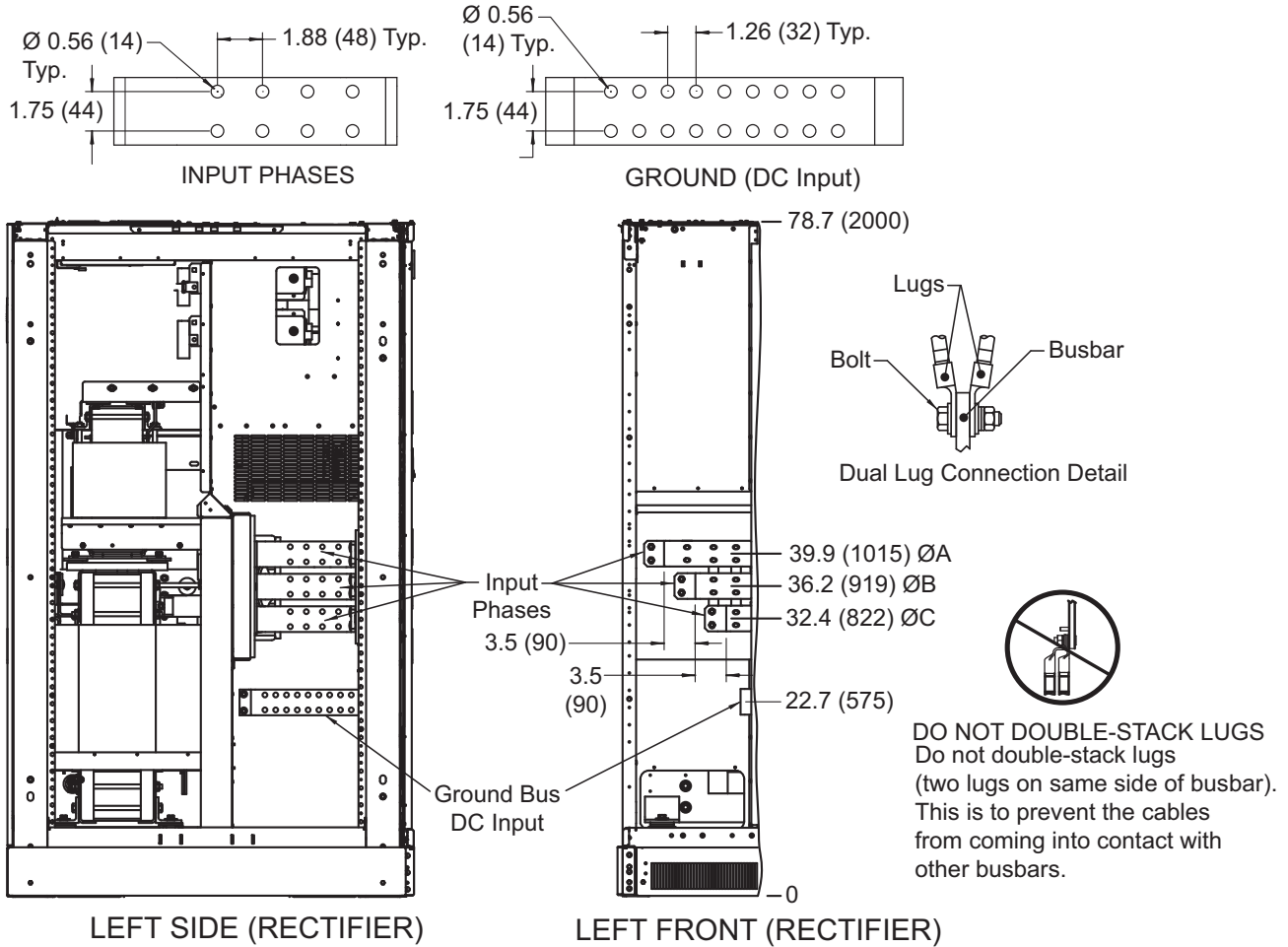
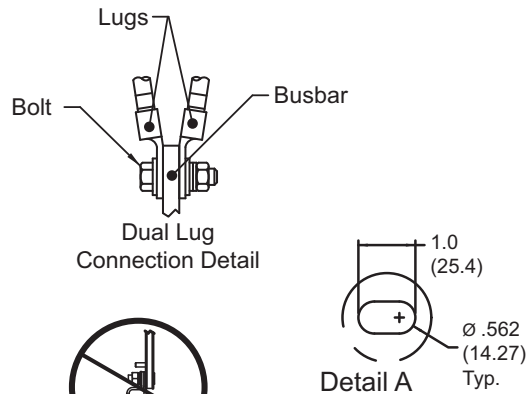
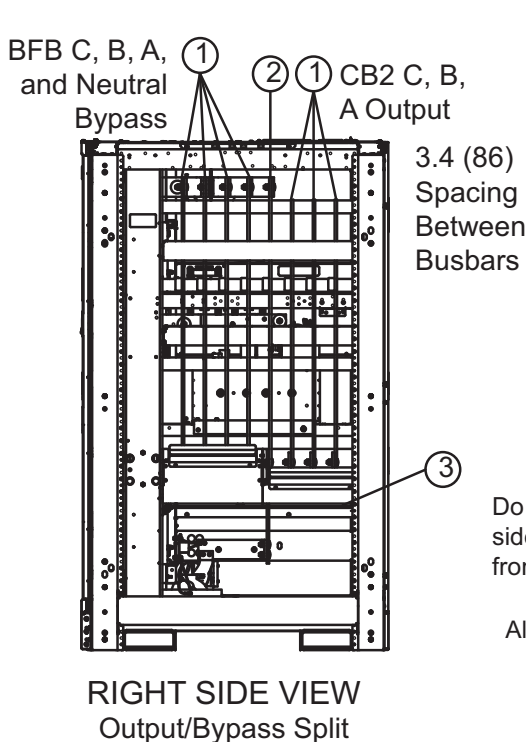
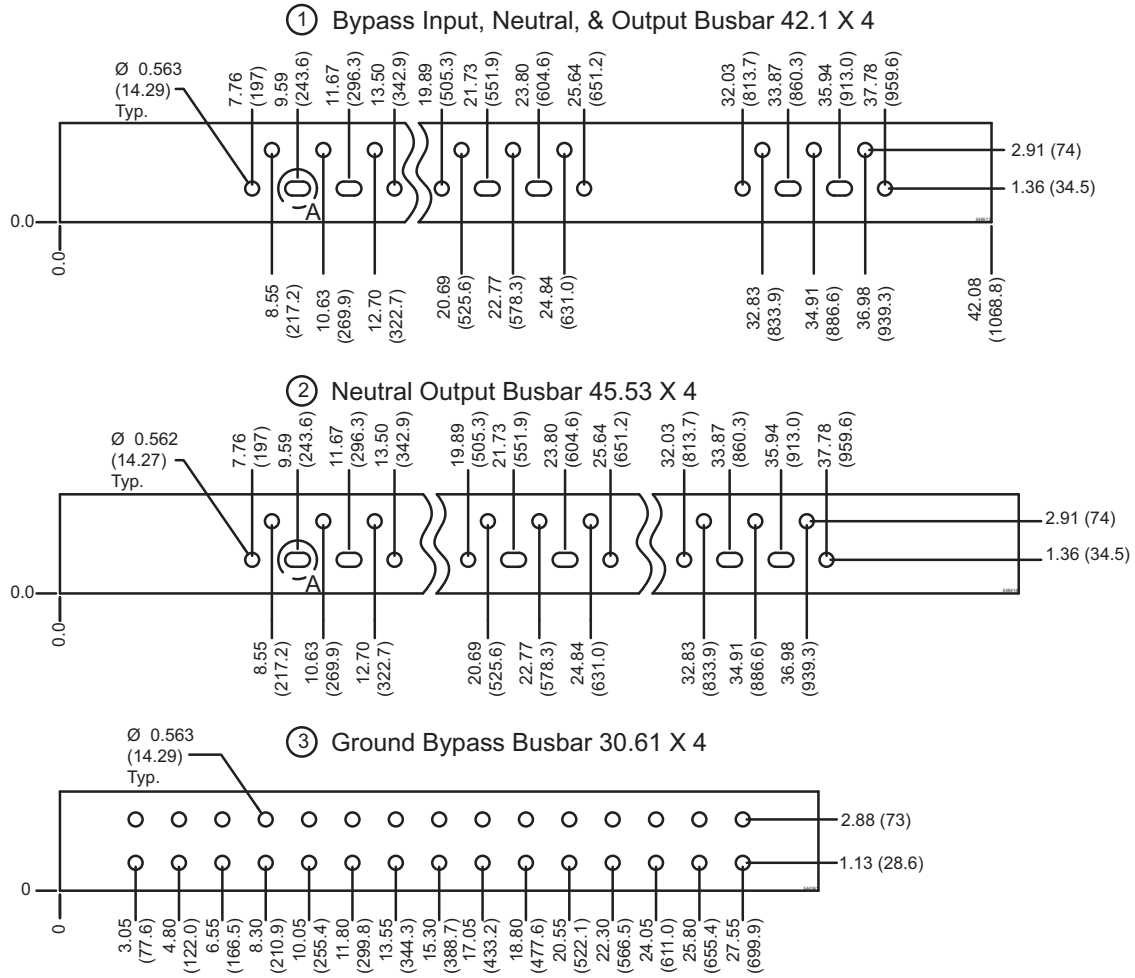


Figure 34 Input terminal details Liebert NXL 800 kVA UPS, 1+N multi-module or SMS with static bypass



1. All dimensions are in inches (mm).
2. Control wiring and power wiring must be run in separate conduits.
3. Unless otherwise noted, use copper or aluminum conductors suitable for at least 75°C.
4. All wiring is to be in accordance with national and local electrical codes.

Figure 35 Input terminal details Liebert NXL 800 kVA UPS, 1+N Multi-Module or SMS with static bypass (continued)



DO NOT DOUBLE-STACK LUGS
Do not double stack lugs (two lugs on same side of busbar). This is to prevent the cables from coming into contact with other busbars.

All dimensions are in inches (mm).

Figure 36 Power wiring—Liebert NXL 800kVA, single module system or 1+N, shipping split

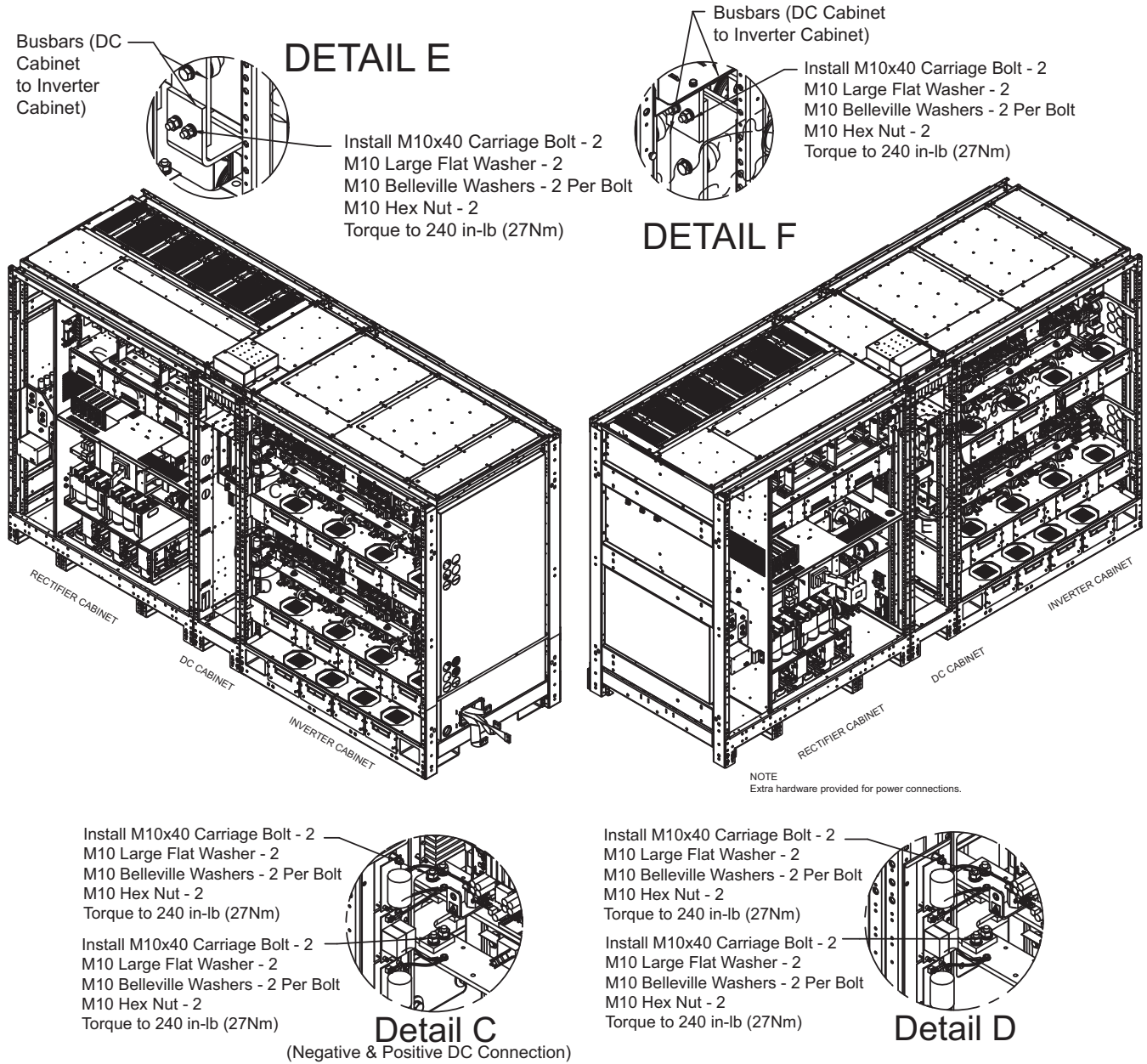


Figure 37 Interconnections between inverter and bypass—Liebert NXL 800kVA, single module system or 1+N, shipping split

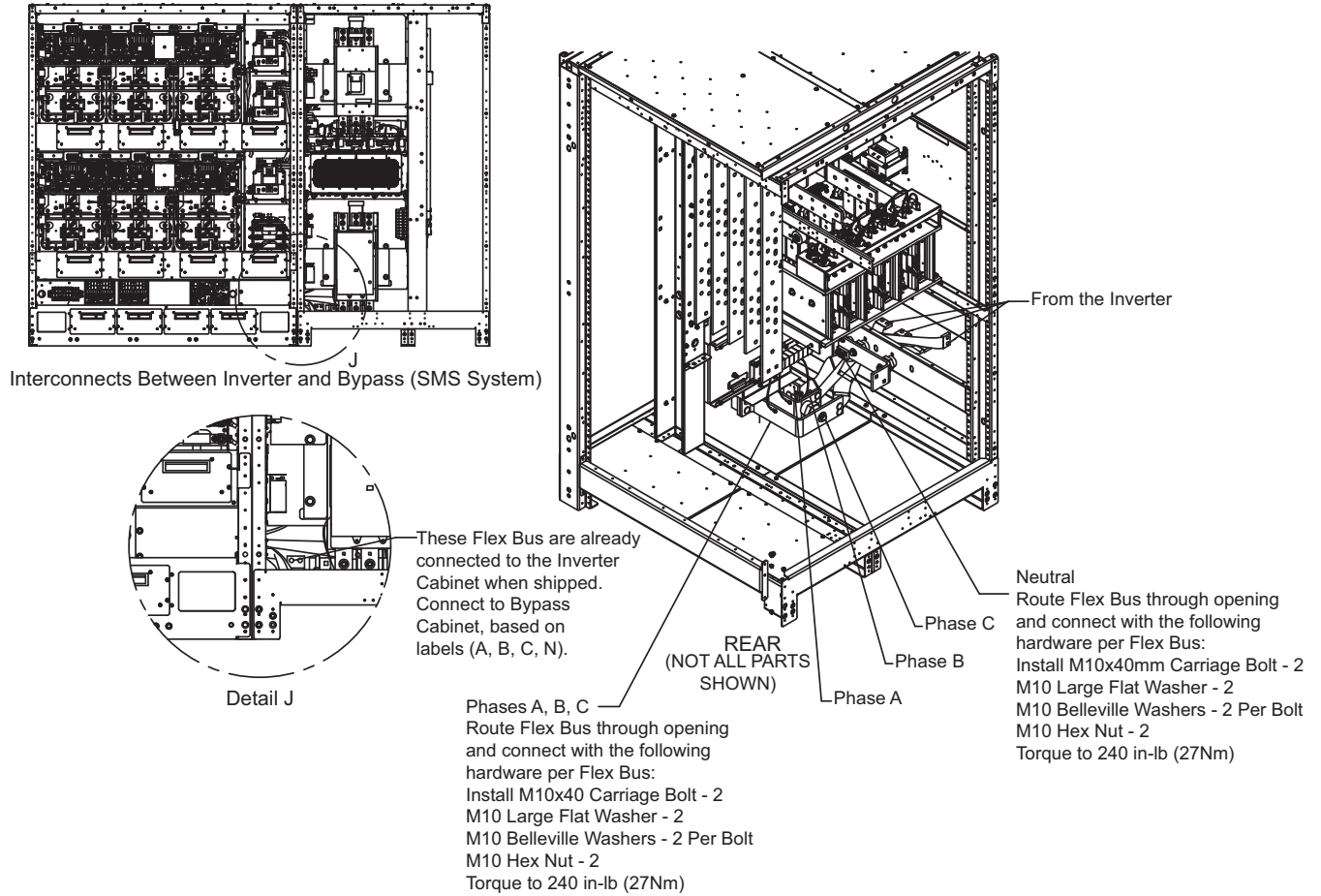


Figure 38 Control wiring—Liebert NXL 800kVA, single module or 1+N system, shipping split

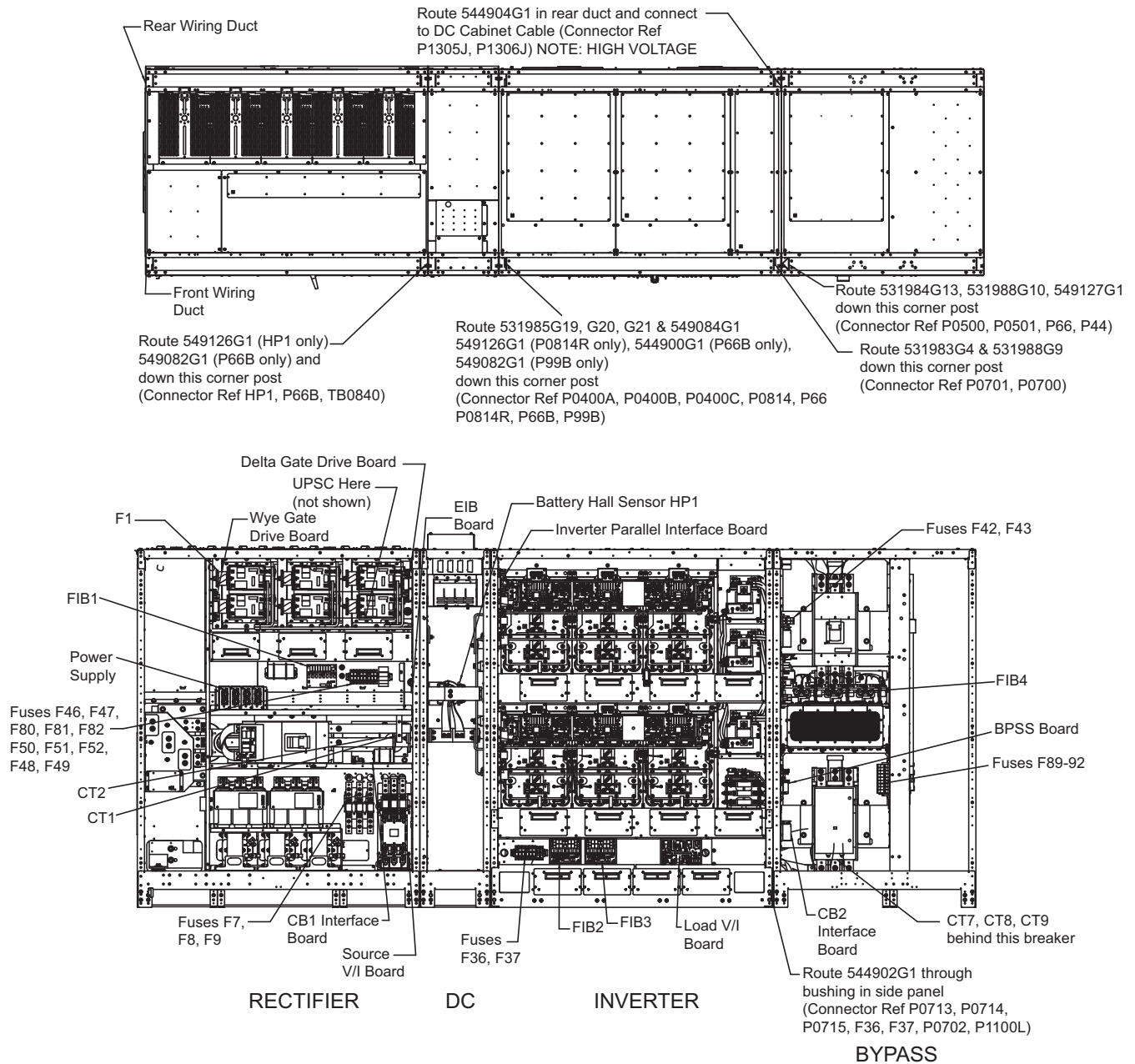


Table 9 Interconnects for 800kVA UPS single or 1+N module unit

Cable Part No.	Cabinet Start	Connector Label	Cabinet Finish	Connector Label	Notes
531983G4	Rectifier - UPSC Board	P0701	Inverter - Load V/I Board	P0701	Route in Front Duct
531988G9	Rectifier - UPSC Board	P0700	Inverter - Load V/I Board	P0700	Route in Front Duct
531985G19	Rectifier - UPSC Board	P0400A	Inverter - Parallel Interface Board	P0400A	Route in Front Duct
531985G20	Rectifier - UPSC Board	P0400B	Inverter - Parallel Interface Board	P0400B	Route in Front Duct
531985G21	Rectifier - UPSC Board	P0400C	Inverter - Parallel Interface Board	P0400C	Route in Front Duct
549054G1	Rectifier - UPSC Board	P0814	Inverter - Parallel Interface Board	P814	Route in Front Duct
531987G4	Rectifier - UPSC Board	P0600	Rectifier - Source V/I Board	P0600	Route in Front Duct
531984G14	Rectifier - UPSC Board	P0601	Rectifier - Source V/I Board	P0601	Route in Front Duct
531986G11	Rectifier - UPSC Board	P0300SS	BYPSS - Bypass	P0300SS	Route in Front Duct
549126G1	Rectifier - Fuses F1, F6	F1NC2, F6COM1	Inverter - Parallel Interface Board	P0814R	Route in Front Duct
549082G1	Rectifier - FIB1	P99	Rectifier - EIB Board	P66B	Route in Front Duct
	Rectifier - FIB1	P66	Inverter - Parallel Interface Board	P99B	
531984G13	Rectifier - UPSC Board	P0500	Bypass - BPSS Board	P0500	Route in Front Duct
531988G10	Rectifier - UPSC Board	P0501	Bypass - BPSS Board	P0501	Route in Front Duct
544900G1	Bypass - FIB4	P99	Inverter - Parallel Interface Board	P66B	Route in Front Duct
549127G1	Rectifier - Power Supply	P99	Bypass - FIB4	P66	Route in Front Duct
	Rectifier - Power Supply	P44	Bypass - BPSS Board	P44	
544902G1	Bypass - CT7	X1, X2	Inverter - Load V/I Board	P0713	Route Through Bushing in Right Side of Inverter Cabinet
	Bypass - CT8	X1, X2	Inverter - Load V/I Board	P0714	
	Bypass - CT9	X1, X2	Inverter - Load V/I Board	P0715	
	Bypass - CB2 Interface Board	P1103	Inverter -Fuses F36, F37	F36-2, F37-2	
	Bypass - Fuses F89-F92	F89-2, F90-2, F91-2, F92-2	Inverter - Load V/I Board	P0702	
	Bypass - CB2 Interface Board	P1100	Inverter - Load V/I Board	P1100L	
544904G1	Bypass - PS Service	PS Service	Rectifier - P1305 (Connect to Connector in Rear Duct Labeled P1305J)	P1305J	Route in Rear Duct
	Bypass - FUSES F42, F43	F42-2, F43-2	Rectifier - P1306 (Connect to Connector in Rear Duct Labeled P1306J)	P1306J	

Figure 39 Power wiring—Liebert NXL 800kVA, N+1 system, shipping split

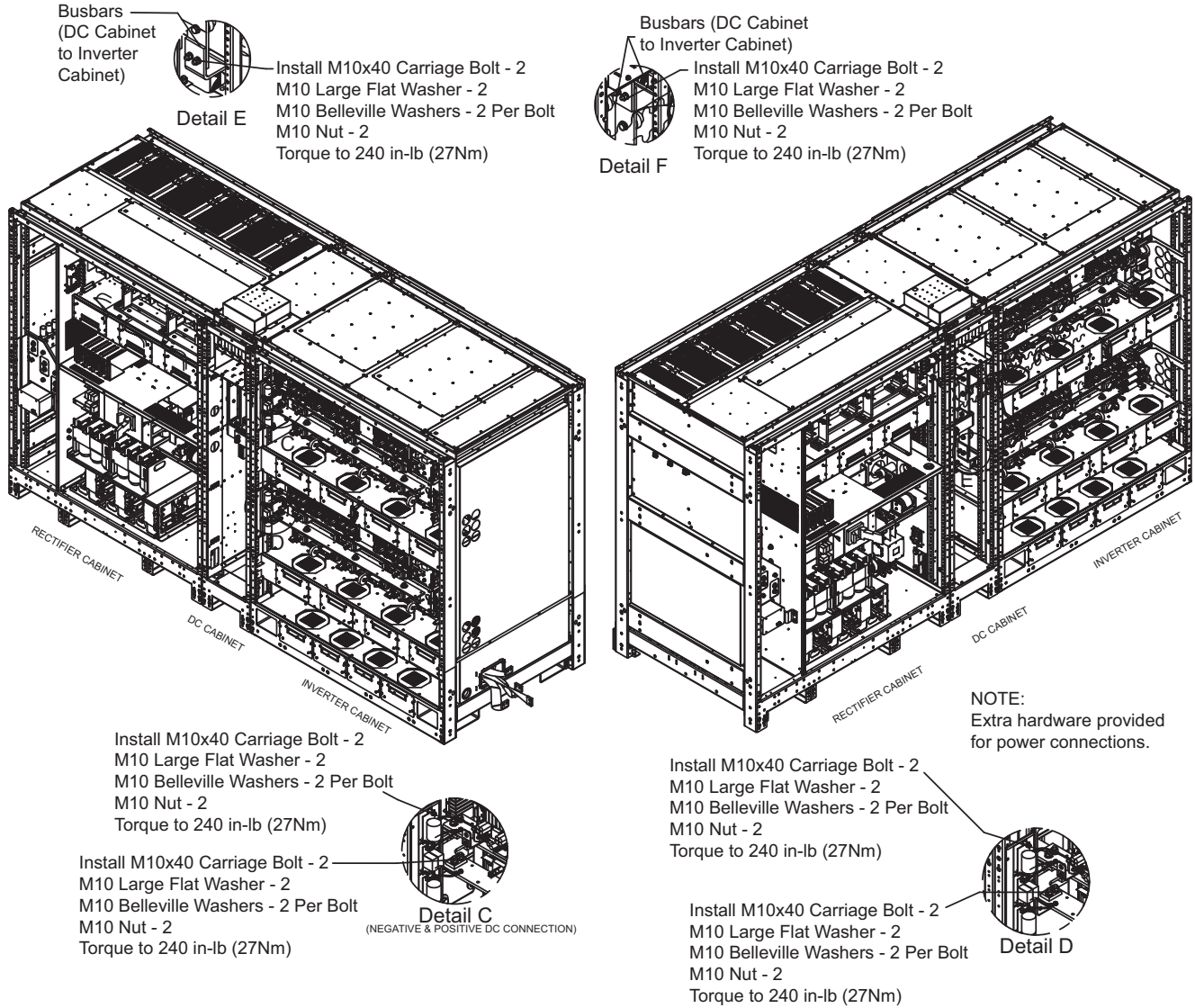


Figure 40 Interconnections between inverter and bypass—Liebert NXL 800kVA, N+1, shipping split

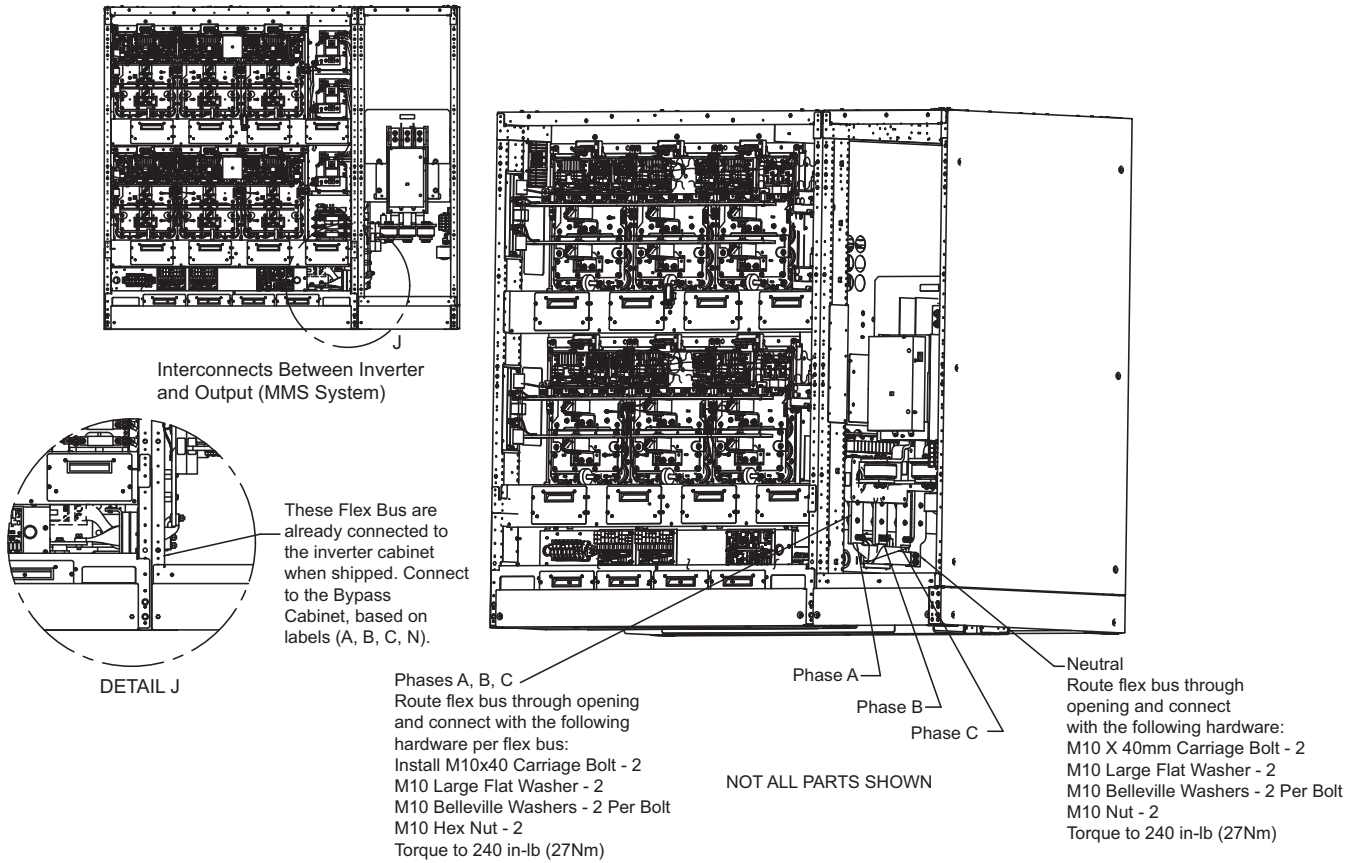


Figure 41 Control wiring—Liebert NXL N+1 800kVA, N+1 system, shipping split

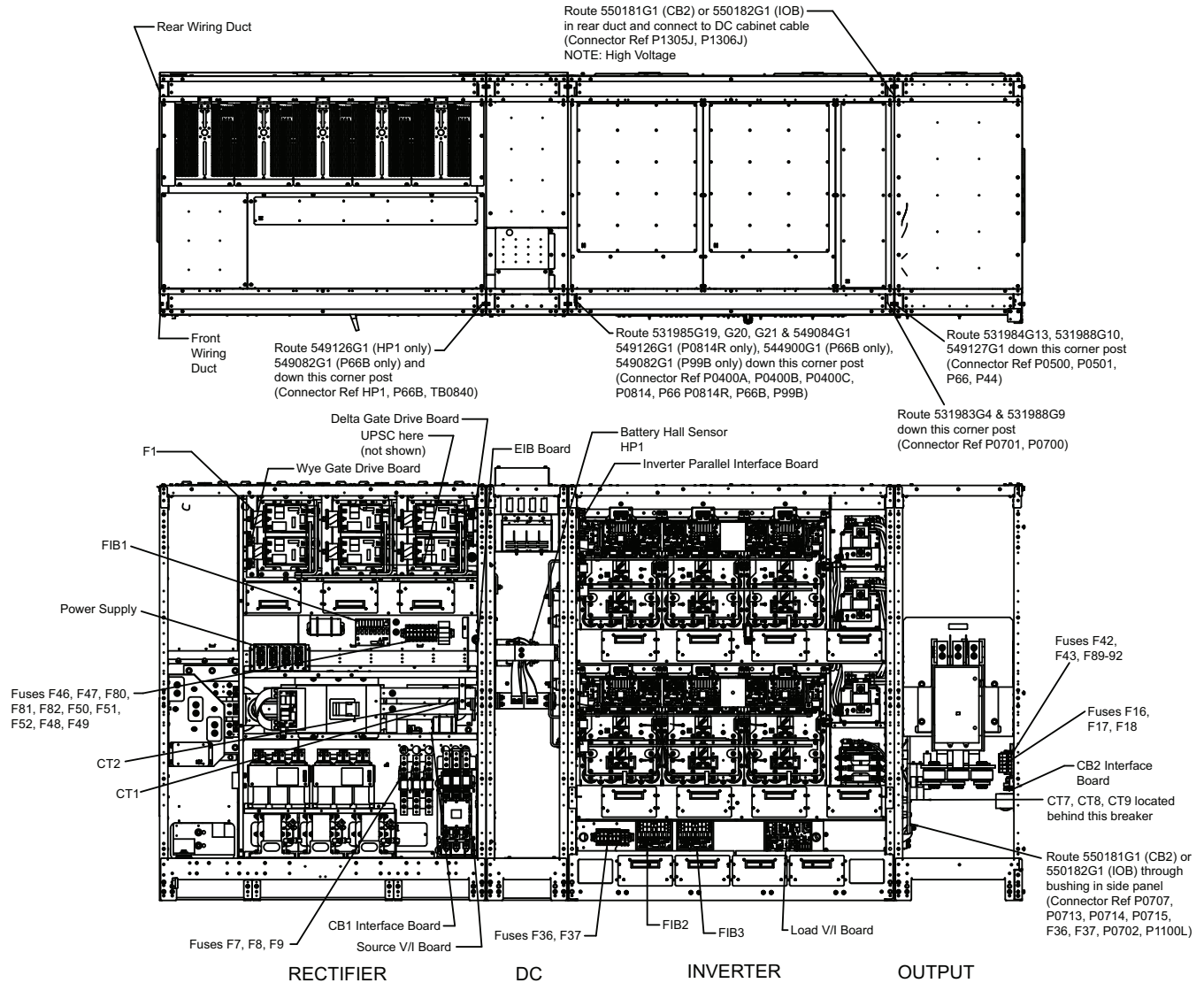


Table 10 Interconnects for 800KVA UPS multi-module unit

Cable Part No.	Cabinet Start	Connector Label	Cabinet Finish	Connector Label	Notes
531983G4	Rectifier - UPSC Board	P0701	Inverter - Load V/I Board	P0701	Route In Front Duct
531988G9	Rectifier - UPSC Board	P0700	Inverter - Load V/I Board	P0700	Route In Front Duct
531985G19	Rectifier - UPSC Board	P0400A	Inverter - Parallel Interface Board	P0400A	Route In Front Duct
531985G20	Rectifier - UPSC Board	P0400B	Inverter - Parallel Interface Board	P0400B	Route In Front Duct
531985G21	Rectifier - UPSC Board	P0400C	Inverter - Parallel Interface Board	P0400C	Route In Front Duct
549054G1	Rectifier - UPSC Board	P0814	Inverter - Parallel Interface Board	P814	Route In Front Duct
531987G4	Rectifier - UPSC Board	P0600	Rectifier - Source V/I Board	P0600	Route In Front Duct
531984G14	Rectifier - UPSC Board	P0601	Rectifier - Source V/I Board	P0601	Route In Front Duct
531986G11	Rectifier - UPSC Board	P0300SS	Bypass - Bypass	P0300SS	Route In Front Duct

Table 10 Interconnects for 800KVA UPS multi-module unit (continued)

Cable Part No.	Cabinet Start	Connector Label	Cabinet Finish	Connector Label	Notes
549126G1	Rectifier - Fuses F1, F6	F1NC2, F6COM1	Inverter - Parallel Interface Board	P0814R	Route In Front Duct
549082G1	Rectifier - FIB1	P99	Rectifier - EIB Board	P66B	Route In Front Duct
	Rectifier - FIB1	P66	Inverter - Parallel Interface Board	P99B	
531984G13	Rectifier - UPSC Board	P0500	Bypass - BPSS Board	P0500	Route In Front Duct
531988G10	Rectifier - UPSC Board	P0501	Bypass - BPSS Board	P0501	Route In Front Duct
544900G1	Bypass - FIB4	P99	Inverter - Parallel Interface Board	P66B	Route In Front Duct
549127G1	Rectifier - Power Supply	P99	Bypass - FIB4	P66	Route In Front Duct
	Rectifier - Power Supply	P44	Bypass - BPSS Board	P44	
550181G1 (CB2) CB2 ONLY	Output - PS Service	PS Service	Rectifier - P1305 (Connect To Connector In Rear Duct Labeled P1305j)	P1305J	Route in Rear Duct
	Output - Fuses F42, F43	F42-2, F43-2	Rectifier - P1306 (Connect To Connector In Rear Duct Labeled P1306j)	P1306J	
	Output - Fuses	VOF-A, VOF-B, VOF-C	Inverter - Load V/I Board	P707	Route Through Bushing in Right Side of Inverter Cabinet
	Output - CT7	X1, X2	Inverter - Load V/I Board	P0713	
	Output - CT8	X1, X2	Inverter - Load V/I Board	P0714	
	Output - CT9	X1, X2	Inverter - Load V/I Board	P0715	
	Output - CB2 Interface Board	P1103	Inverter - Fuses F36, F37	F36-2, F37-2	
	Output - CB2 Interface Board	P1100	Inverter - Load V/I Board	P1100L	
	Output - Fuses F89-F92	F89-2, F90-2, F91-2, F92-2	Inverter - Load V/I Board	P0702	
550182G1 (IOB) IOB ONLY	Output - PS Service	PS Service	Rectifier - P1305 (Connect to Connector in Rear Duct Labeled P1305j)	P1305J	Route in Rear Duct
	Output - Fuses F42, F43	F42-2, F43-2	Rectifier - P1306 (Connect to Connector in Rear Duct Labeled P1306j)	P1306J	
	Output - Fuses	VOF-A, VOF-B, VOF-C	Inverter - Load V/I Board	P707	Route Through Bushing in Right Side of Inverter Cabinet
	Output - CT7	X1, X2	Inverter - Load V/I Board	P0713	
	Output - CT8	X1, X2	Inverter - Load V/I Board	P0714	
	Output - CTt9	X1, X2	Inverter - Load V/I Board	P0715	
	Output - CB2 Interface Board	P1103	Inverter - Fuses F36, F37	F36-2, F37-2	
	Output - CB2 Interface Board	P1100	Inverter - Load V/I Board	P1100L	
	Output - EMI Filter	Out-load A,B,C, V-CB-N	Inverter - Load V/I Board	P0702	

Figure 42 Liebert NXL 1100kVA conduit entry points—Input layout

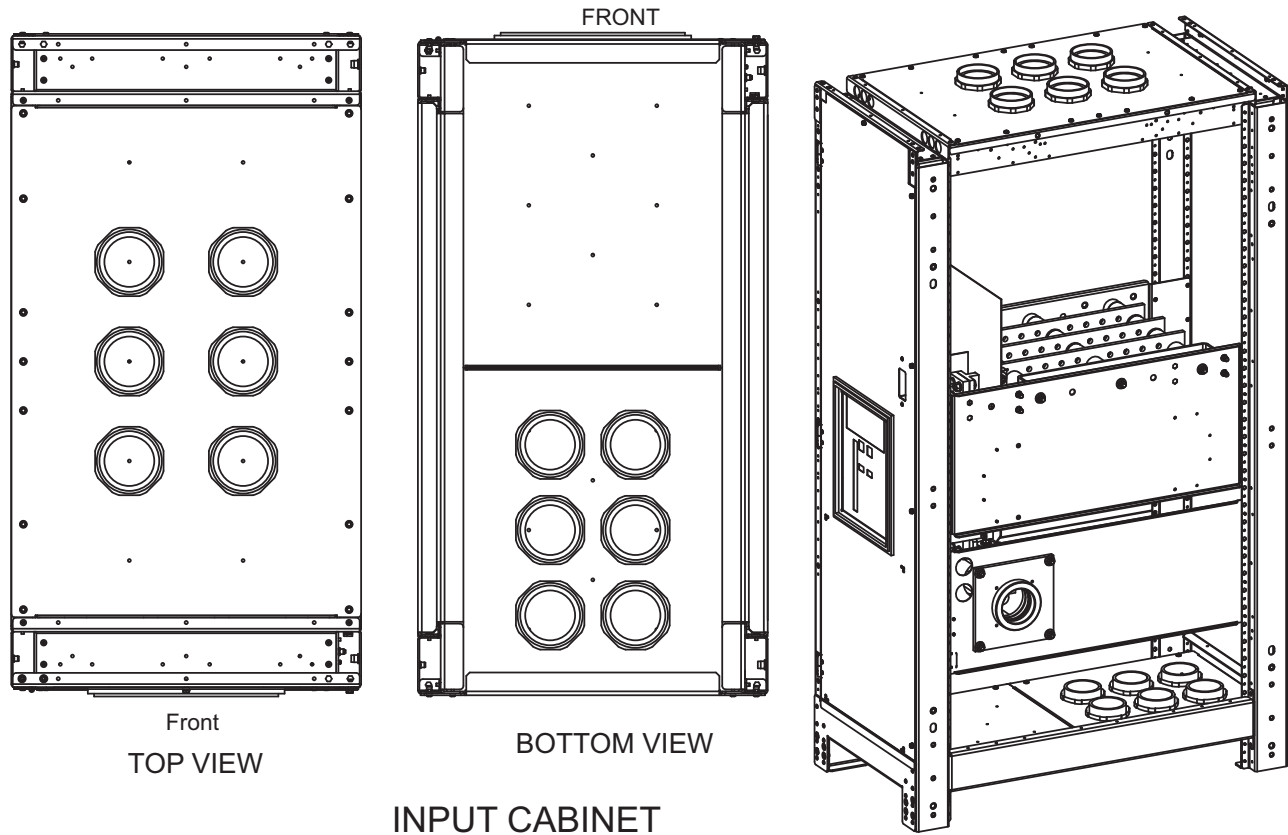


Figure 43 Liebert NXL 1100kVA conduit entry points—DC layout

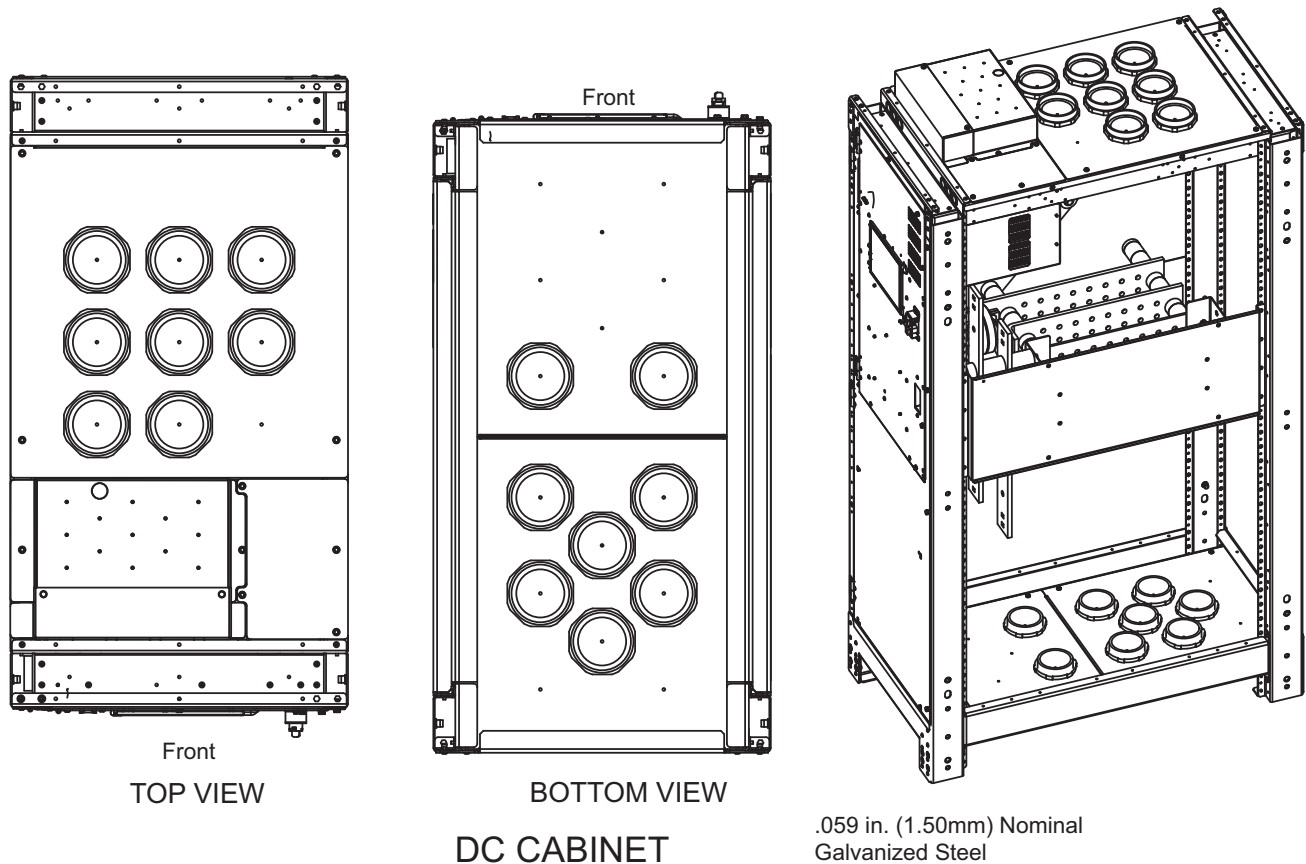


Figure 44 Liebert NXL 1100kVA conduit entry points—N+1 output layout

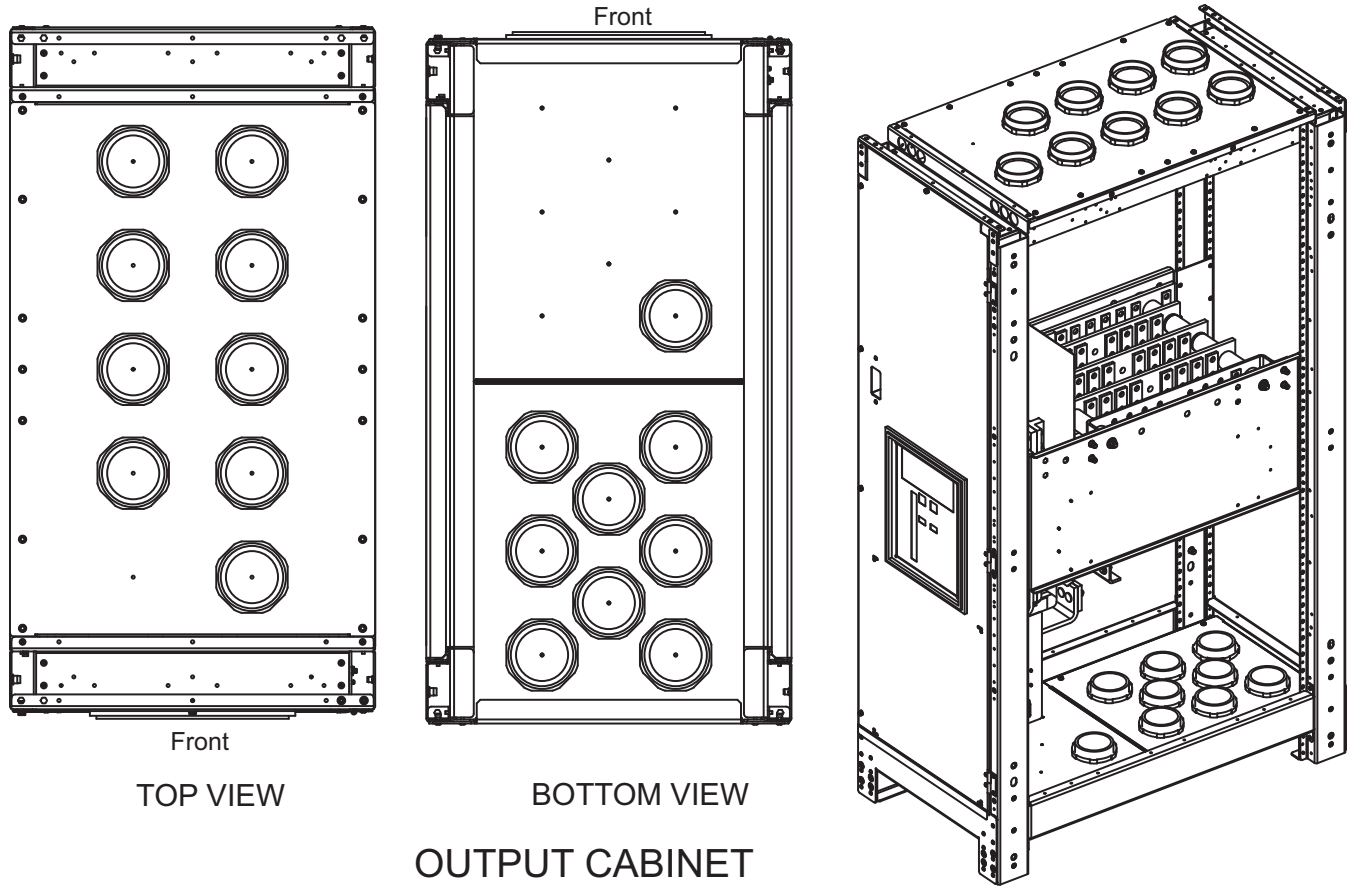


Figure 45 Liebert NXL 1100kVA conduit entry points—SMS/1+N output layout

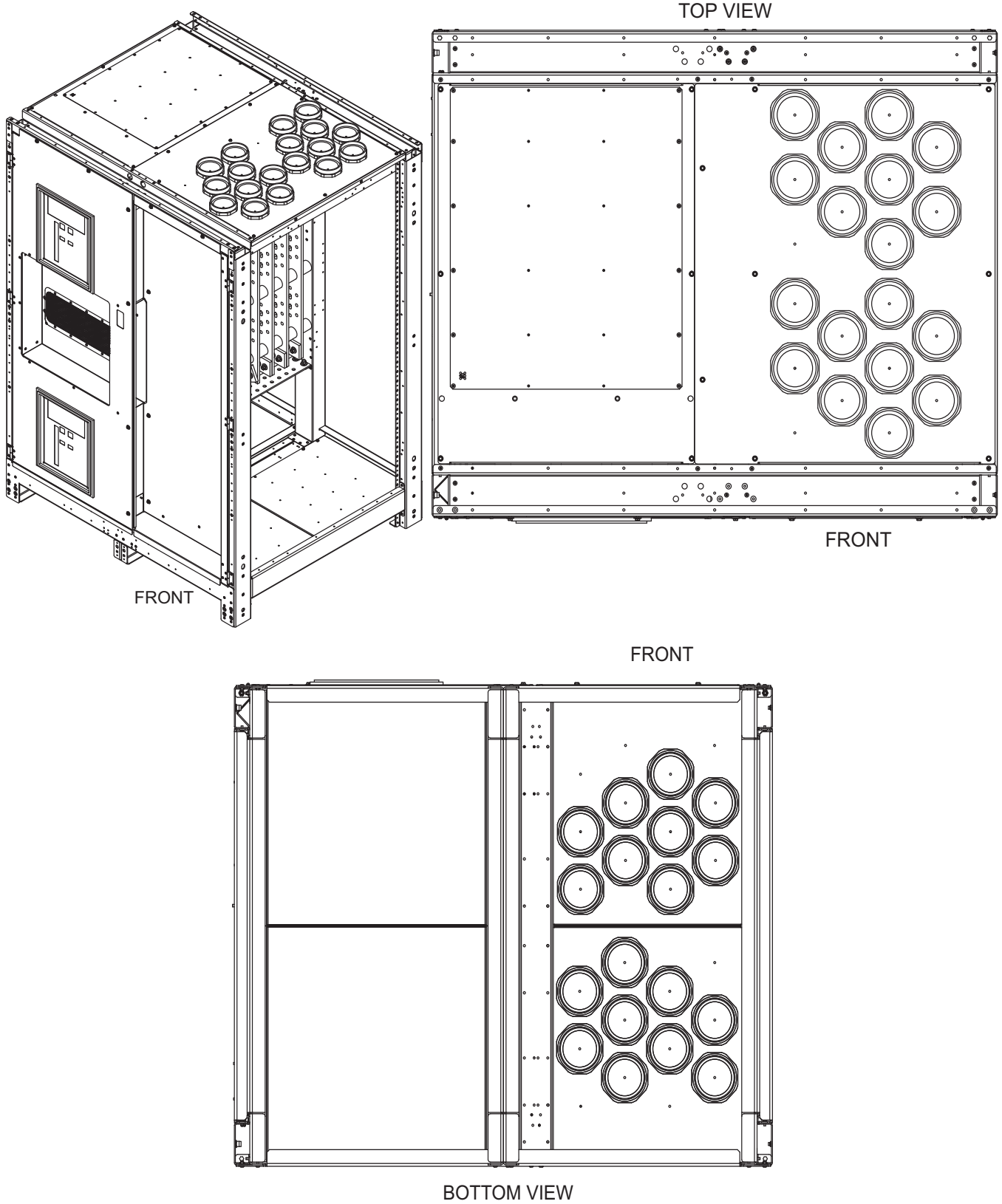


Figure 46 Main components, 1+N multi-module or SMS with static bypass, 1100kVA UPS

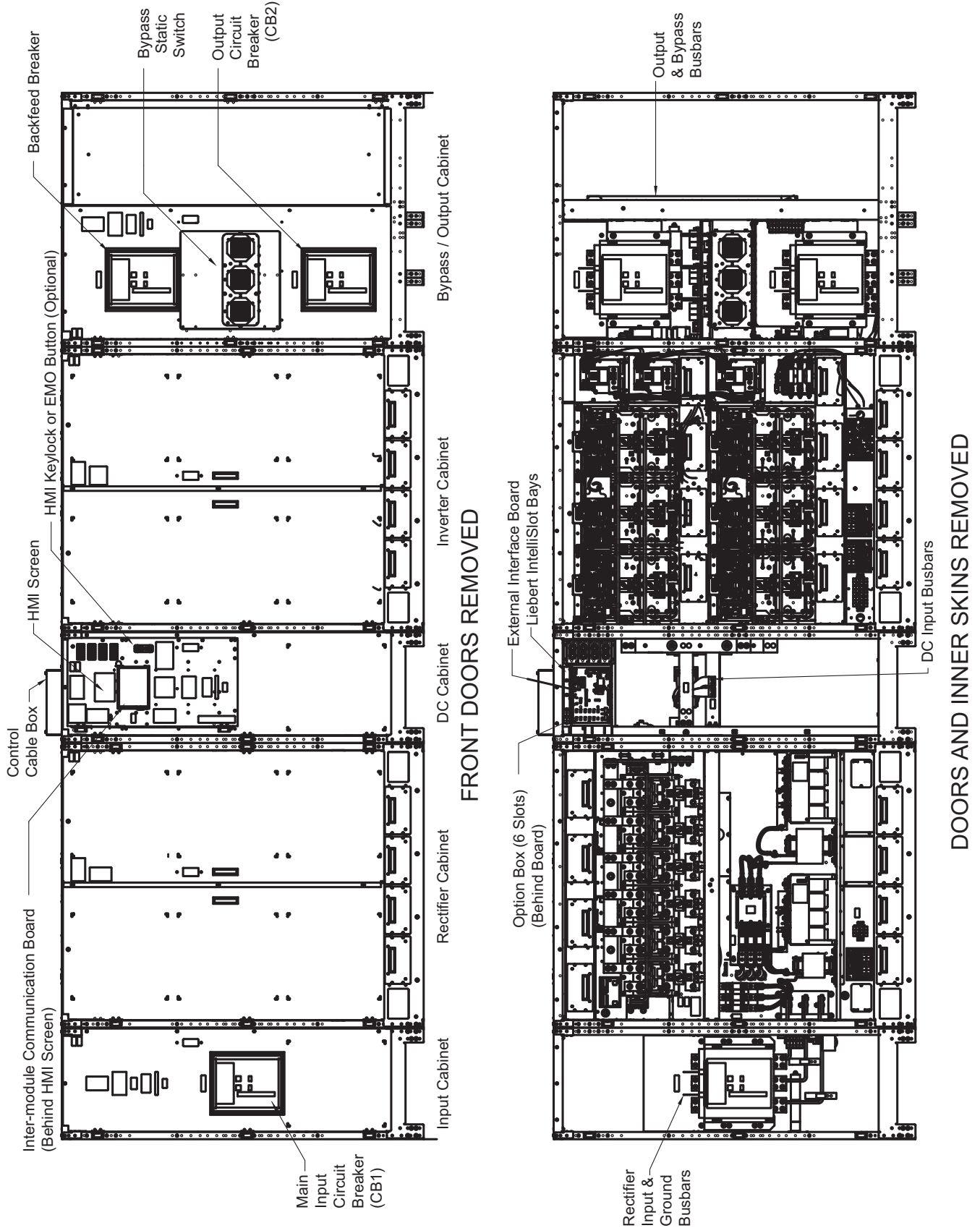


Figure 47 Conduit landing, 1100kVA UPS 1+N multi-module or SMS with static bypass

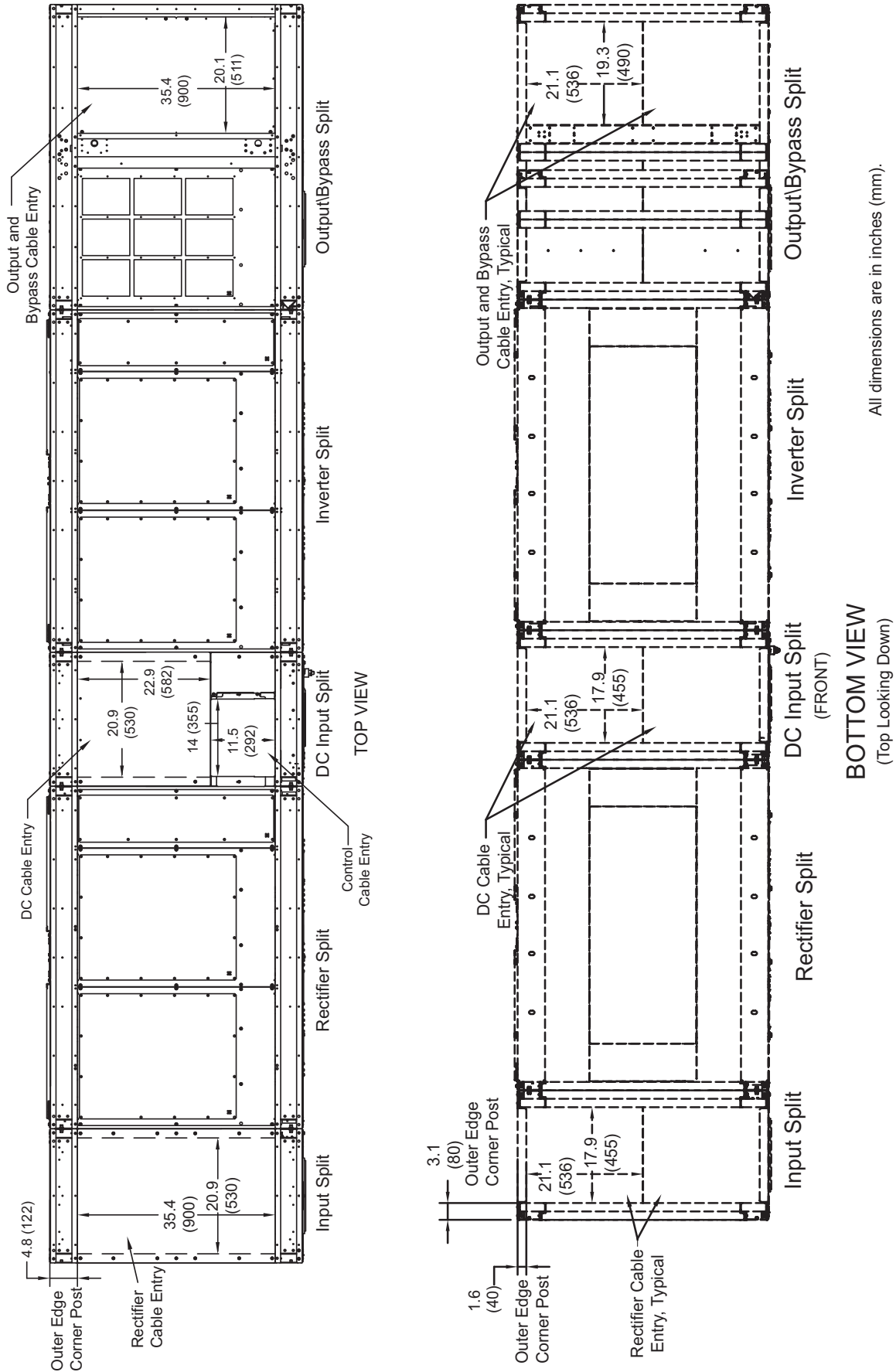


Figure 48 Main components, 1100kVA UPS N+1 multi-module without static bypass

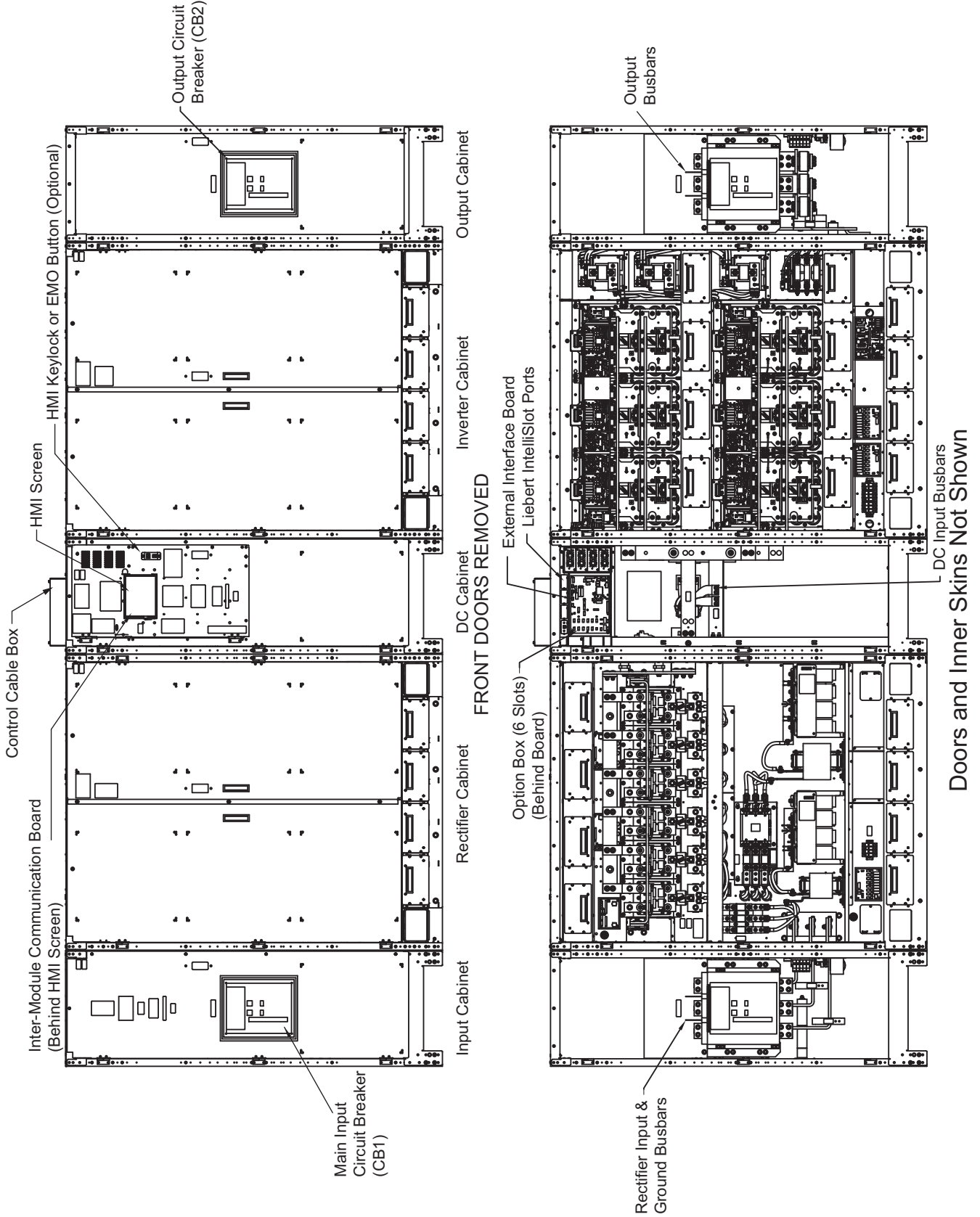
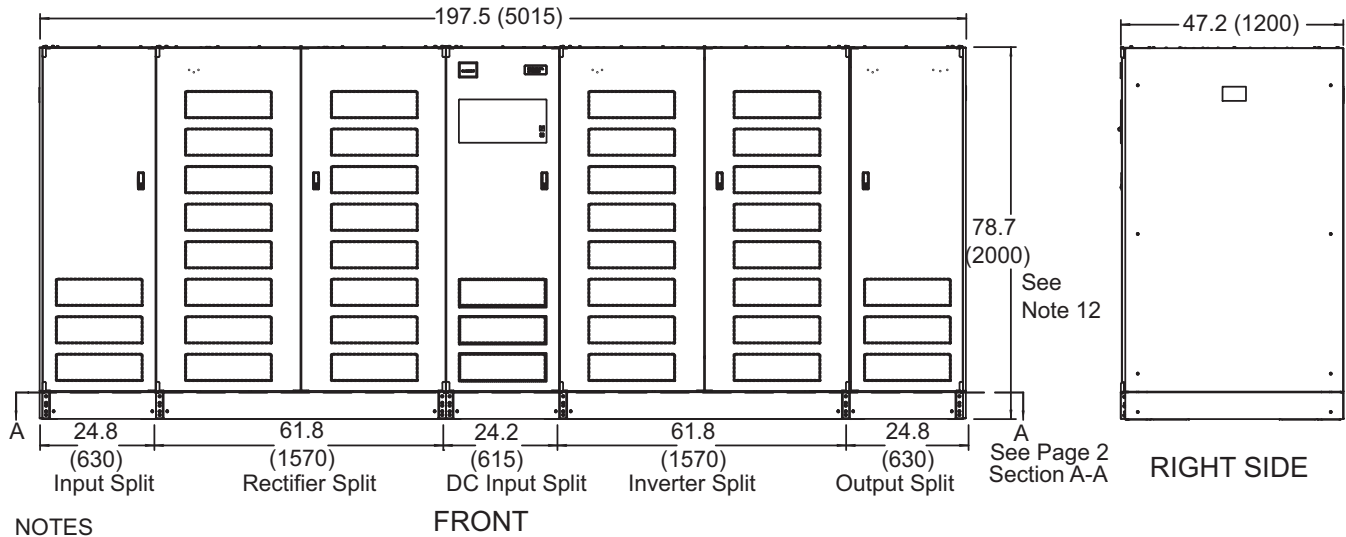


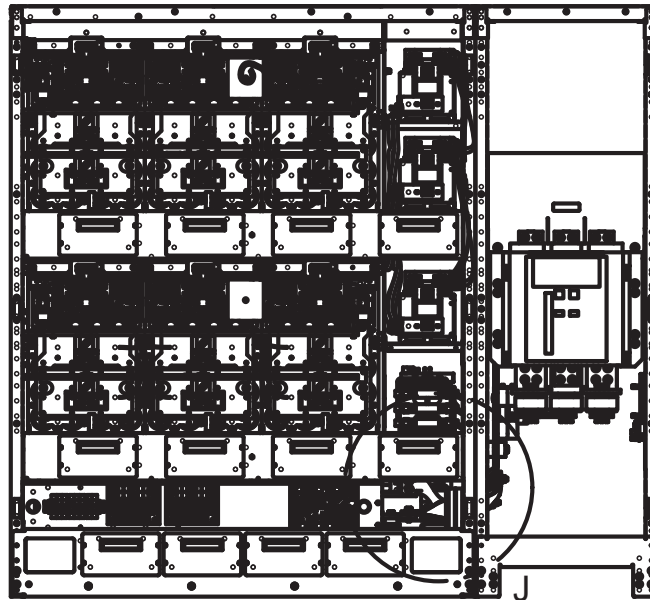
Figure 49 Outline drawing 1100kVA UPS N+1 multi-module without static bypass



NOTES

1. All dimensions are in inches (mm).
2. 24" (610) minimum clearance above unit required for air exhaust, and 36" (914) front access required for service.
3. Keep cabinet within 15 degrees of vertical.
4. Top and bottom cable entry available through removable access plates. Remove, punch to suit conduit size and replace.
5. Unit bottom is structurally adequate for forklift handling.
6. Control wiring and power wiring must be run in separate conduits.
7. Unless otherwise noted, use copper or aluminum conductors suitable for at least 75°C.
8. Depth dimension includes front door and rear panel.
9. Width dimensions include side panels. Subtract 1.2" (30mm) when removing both side panels.
10. The height increases to 81.9" (2080) when the control cable box is installed on top of the DC input cabinet. The control cable box is 14" W x 11.5" D x 3.2" H (355 x 292 x 81.3mm).

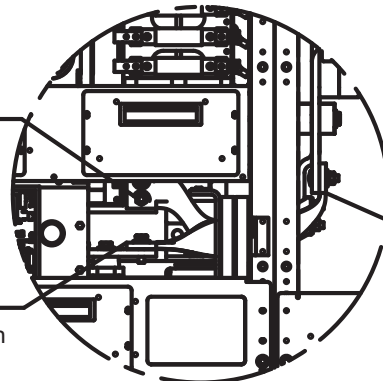
Figure 51 Liebert NXL 1100kVA, multi-module system, shipping split—Interconnections between inverter and bypass



**INTERCONNECTS BETWEEN INVERTER
AND OUTPUT (MMS SYSTEM)**

Neutral
Route flex bus through opening and connect with the following hardware:
M10 large flat washer (2)
(2) M10 Belleville washers per bolt
M10 nut (2)
Torque to 27Nm (240 in-lb)

Phases A, B, C
Route flex bus through opening and connect with the following hardware:
Install M10x40 hex bolt (6)
M10 large flat washer (6)
(2) M10 Belleville washers per bolt
Torque to 27Nm (240 in-lb)



DETAIL J

These flex bus are already connected to the bypass cabinet when shipped. Connect to inverter cabinet, based off labels (A, B, C, N).

Table 11 Interconnects for 1100kVA UPS multi-module unit

Cable Part #.	Cabinet Start	Connector Label	Cabinet Finish	Connector Label	Notes
531983G3	DC - UPSC Board	P0701	Inverter - Load V/I Board	P0701	Route in Front Duct
531988G8	DC - UPSC Board	P0700	Inverter - Load V/I Board	P0700	Route in Front Duct
531985G10	DC - UPSC Board	P0400A	Inverter - Parallel Interface Board	P0400A	Route in Front Duct
531985G11	DC - UPSC Board	P0400B	Inverter - Parallel Interface Board	P0400B	Route in Front Duct
531985G12	DC - UPSC Board	P0400C	Inverter - Parallel Interface Board	P0400C	Route in Front Duct
544895G1	DC - EIB Board	P0814	Inverter - Parallel Interface Board	P814	Route in Front Duct
531987G3	DC - UPSC Board	P0600	Rectifier - Source V/I Board	P0600	Route in Front Duct
531984G10	DC - UPSC Board	P0601	Rectifier - Source V/I Board	P0601	Route in Front Duct
531986G6	DC - UPSC Board	P0300D	Rectifier - Delta Gate Drive Board	P0300D	Route in Front Duct
531986G7	DC - UPSC Board	P0300Y	Rectifier - Wye Gate Drive Board	P0300Y	Route in Front Duct
546920G1	DC-PS Board	P99B	Inverter Parallel Interface - Board	P66B	Route in Front Duct
544897G1	Rectifier - Source V/I Board	P0606	DC - Batt Hall Sensor	HP1	Route in Front Duct
	Rectifier - Fuses F1, F6	F1NC2, F6COM1	Inverter - Parallel Interface Board	P0814R	
545311G1	Rectifier - FIB1	P99	DC - EIB Board	P66B	Route in Front Duct
	Rectifier - FIB1	P66	Inverter - Parallel Interface Board	P99B	
546357G1	Rectifier - Fuses F7, F9	F7COM1, F9NC2	Dc -EIB Board	TB0840	Route in Front Duct
544891G1	Input - CB Interface Board	P1100	Rectifier - Source V/I Board	P1100S	Route in Front Duct
	Input - CT1	X1, X2	Rectifier - Source V/I Board	P0607	
	Input - CT2	X1, X2	Rectifier - Source V/I Board	P0608	
	Input - Fuses F50-F52	F50-2, F51-2, F52-2	Rectifier - Source V/I Board	P0603	Not Required for Remote CB1 (RIB)
	Input - Fuses F46, F47	F46-2, F47-2	DC - P1304 (Connect to Connector In Rear Duct Labeled P1304J)	P1304J	Route in Rear Duct

Table 11 Interconnects for 1100kVA UPS multi-module unit (continued)

Cable Part #.	Cabinet Start	Connector Label	Cabinet Finish	Connector Label	Notes
544903G1	Output - PS Service	PS SERVICE	DC - P1305 (Connect to Connector in Rear Duct Labeled P1305J)	P1305J	Route in Rear Duct
	Output - Fuses F42, F43	F42-2, F43-2	DC - P1306 (Connect to Connector In Rear Duct Labeled P1306J)	P1306J	
	Output - Output Fuses	VOF-A, VOF-B, VOF-C	Inverter - Load V/I Board	P0707	Route Through Bushing in Right Side of Inverter Cabinet
	Output - CT7	X1, X2	Inverter - Load V/I Board	P0713	
	Output - CT8	X1, X2	Inverter - Load V/I Board	P0714	
	Output - CT9	X1, X2	Inverter - Load V/I Board	P0715	
	Output - CB2 Interface Board	P1103	Inverter - Fuses F36, F37	F36-2, F37-2	
	Output - Fuses F89-F92	F89-2, F90-2, F91-2, F92-2	Inverter - Load V/I Board	P0702	Not Required for Remote CB2 (IOB)

Figure 53 Liebert NXL 1100kVA, single module system, shipping split—Power wiring

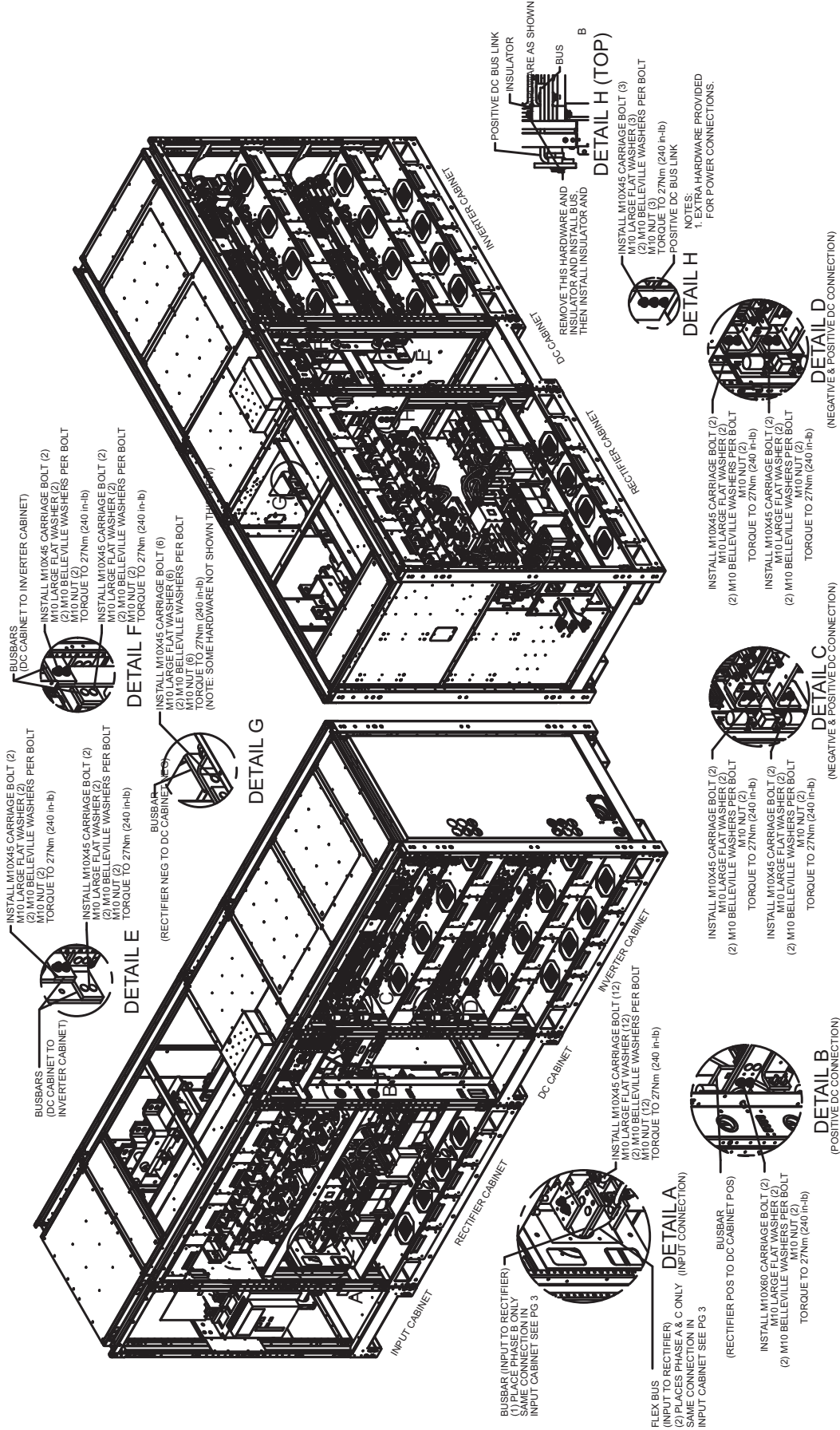
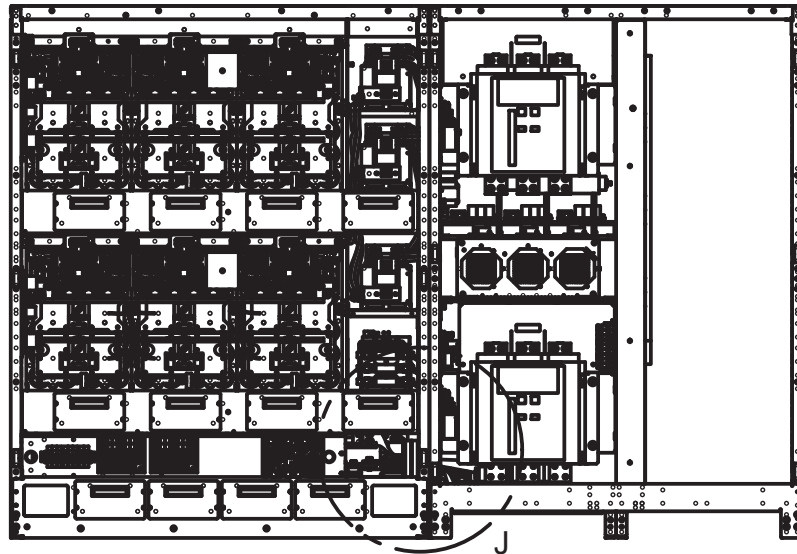


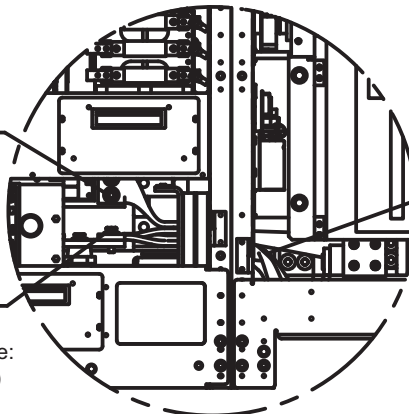
Figure 54 Liebert NXL 1100kVA, single module system, shipping split—Interconnections between inverter and bypass



INTERCONNECTS BETWEEN INVERTER AND BYPASS (SMS SYSTEM)

Neutral
Route flex bus through opening and connect with the following hardware:
M10 large flat washer (2)
(2) M10 Belleville washers per bolt
M10 nut (2)
Torque to 27Nm (240 in-lb).

Phases A, B, C
Route flex bus through opening and connect with the following hardware:
Install M10x40 hex bolt (6)
M10 large flat washer (6)
(2) M10 belleville washers per bolt
Torque to 27Nm (240 in-lb).



DETAIL J

These flex bus are already connected to the bypass cabinet when shipped. Connect to inverter cabinet, based off labels (A, B, C, N).

Figure 55 Control wiring—Liebert NXL 1100kVA, single module system, shipping split

After the interconnect wiring is completed, the covers for the front and rear wiring ducts must be installed. The front wiring duct cover for the DC section is located with the rear duct cover in the DC section.

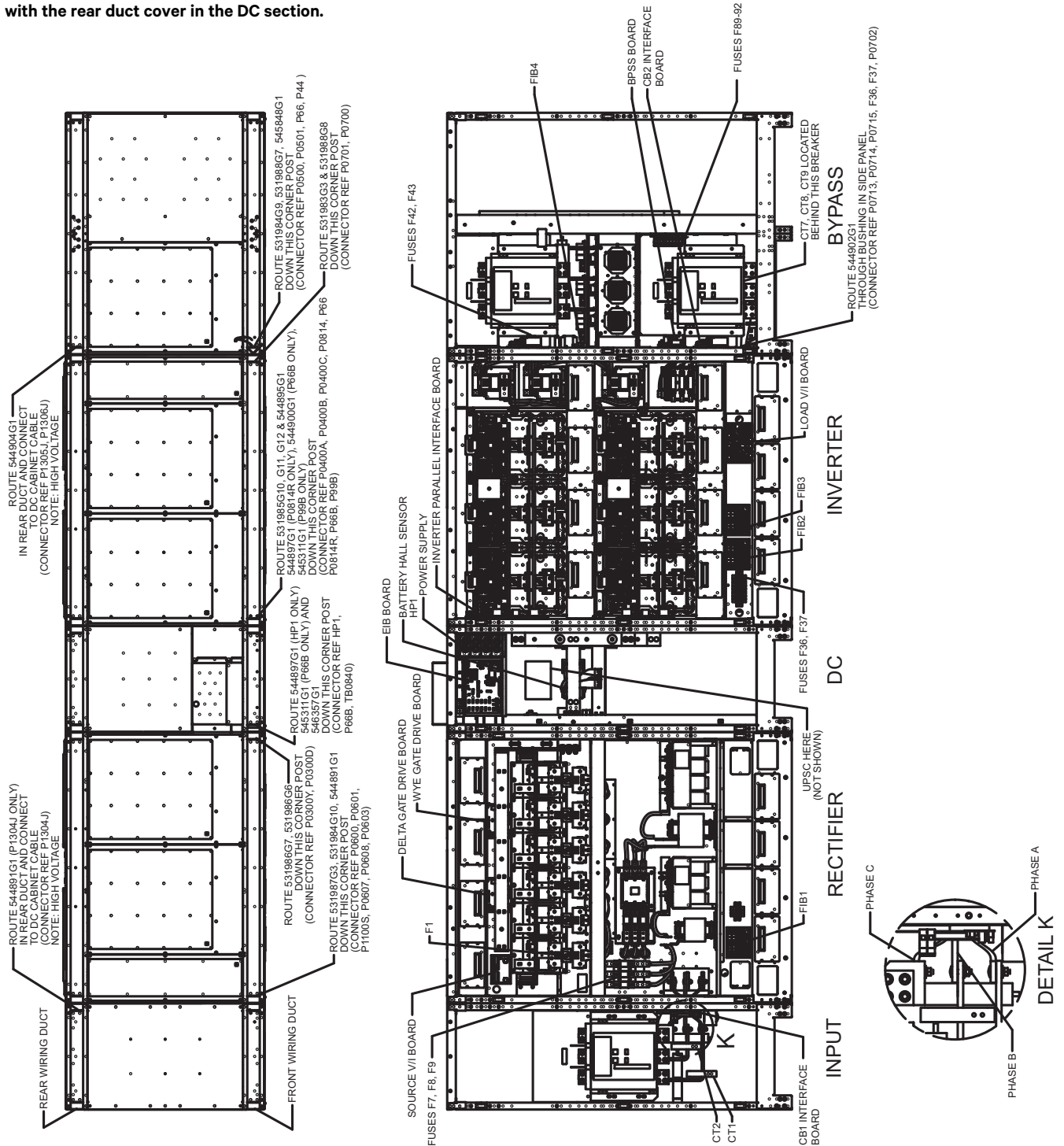


Table 12 Interconnects for 1100KVA UPS single module unit

Cable Part #	Cabinet Start	Connector Label	Cabinet Finish	Connector Label	Notes
531983G3	DC - UPSC Board	P0701	Inverter - Load V/I Board	P0701	Route in Front Duct
531988G8	DC - UPSC Board	P0700	Inverter - Load V/I Board	P0700	Route in Front Duct
531985G10	DC - UPSC Board	P0400A	Inverter - Parallel Interface Board	P0400A	Route in Front Duct
531985G11	DC - UPSC Board	P0400B	Inverter - Parallel Interface Board	P0400B	Route in Front Duct
531985G12	DC - UPSC Board	P0400C	Inverter - Parallel Interface Board	P0400C	Route in Front Duct
544895G1	DC - EIB Board	P0814	Inverter - Parallel Interface Board	P814	Route in Front Duct
531987G3	DC - UPSC Board	P0600	Rectifier - Source V/I Board	P0600	Route in Front Duct
531984G10	DC - UPSC Board	P0601	Rectifier - Source V/I Board	P0601	Route in Front Duct
531986G6	DC - UPSC Board	P0300D	Rectifier - Delta Gate Drive Board	P0300D	Route in Front Duct
531986G7	DC - UPSC Board	P0300Y	Rectifier - Wye Gate Drive Board	P0300Y	Route in Front Duct
544897G1	Rectifier - Source V/I Board	P0606	DC - Batt Hall Sensor	HP1	Route in Front Duct
	Rectifier - Fuses F1, F6	F1NC2, F6COM1	Inverter - Parallel Interface Board	P0814R	
545311G1	Rectifier - FIB1	P99	DC - EIB Board	P66B	Route in Front Duct
	Rectifier - FIB1	P66	Inverter - Parallel Interface Board	P99B	
546357G1	Rectifier - Fuses F7, F9	F7COM1, F9NC2	DC - EIB Board	TB0840	Route in Front Duct
544891G1	Input - CB Interface Board	P1100	Rectifier - Source V/I Board	P1100S	Route in Front Duct
	Input - CT1	X1, X2	Rectifier - Source V/I Board	P0607	
	Input - CT2	X1, X2	Rectifier - Source V/I Board	P0608	
	Input - Fuses F50-F52	F50-2, F51-2, F52-2	Rectifier - Source V/I Board	P0603	
	Input - Fuses F46, F47	F46-2, F47-2	DC - P1304 (Connect to Connector in Rear Duct Labeled P1304J)	P1304J	Route in Rear Duct
531984G9	DC - UPSC Board	P0500	Bypass - BPSS Board	P0500	Route in Front Duct
531988G7	DC - UPSC Board	P0501	Bypass - BPSS Board	P0501	Route in Front Duct
544900G1	Bypass - FIB4	P99	Inverter - Parallel Interface Board	P66B	Route in Front Duct
545848G1	DC - Power Supply	P99	Bypass - FIB4	P66	Route in Front Duct
	DC - Power Supply	P44	Bypass - BPSS Board	P44	
544902G1	Bypass - CT7	X1, X2	Inverter - Load V/I Board	P0713	Route through bushing in right side of inverter cabinet
	Bypass - CT8	X1, X2	Inverter - Load V/I Board	P0714	
	Bypass - CT9	X1, X2	Inverter - Load V/I Board	P0715	
	Bypass - CB2 Interface Board	P1103	Inverter - Fuses F36, F37	F36-2, F37-2	
	Bypass - Fuses F89-F92	F89-2, F90-2, F91-2, F92-2	Inverter - Load V/I Board	P0702	
544904G1	Bypass - PS Service	PS SERVICE	DC - P1305 (Connect to Connector in Rear Duct Labeled P1305J)	P1305J	Route in Rear Duct
	Bypass - Fuses F42, F43	F42-2, F43-2	DC - P1306 (Connect to Connector in Rear Duct Labeled P1306J)	P1306J	

Figure 56 Conduit landing drawing 1100kVA UPS N+1 multi-module without static bypass

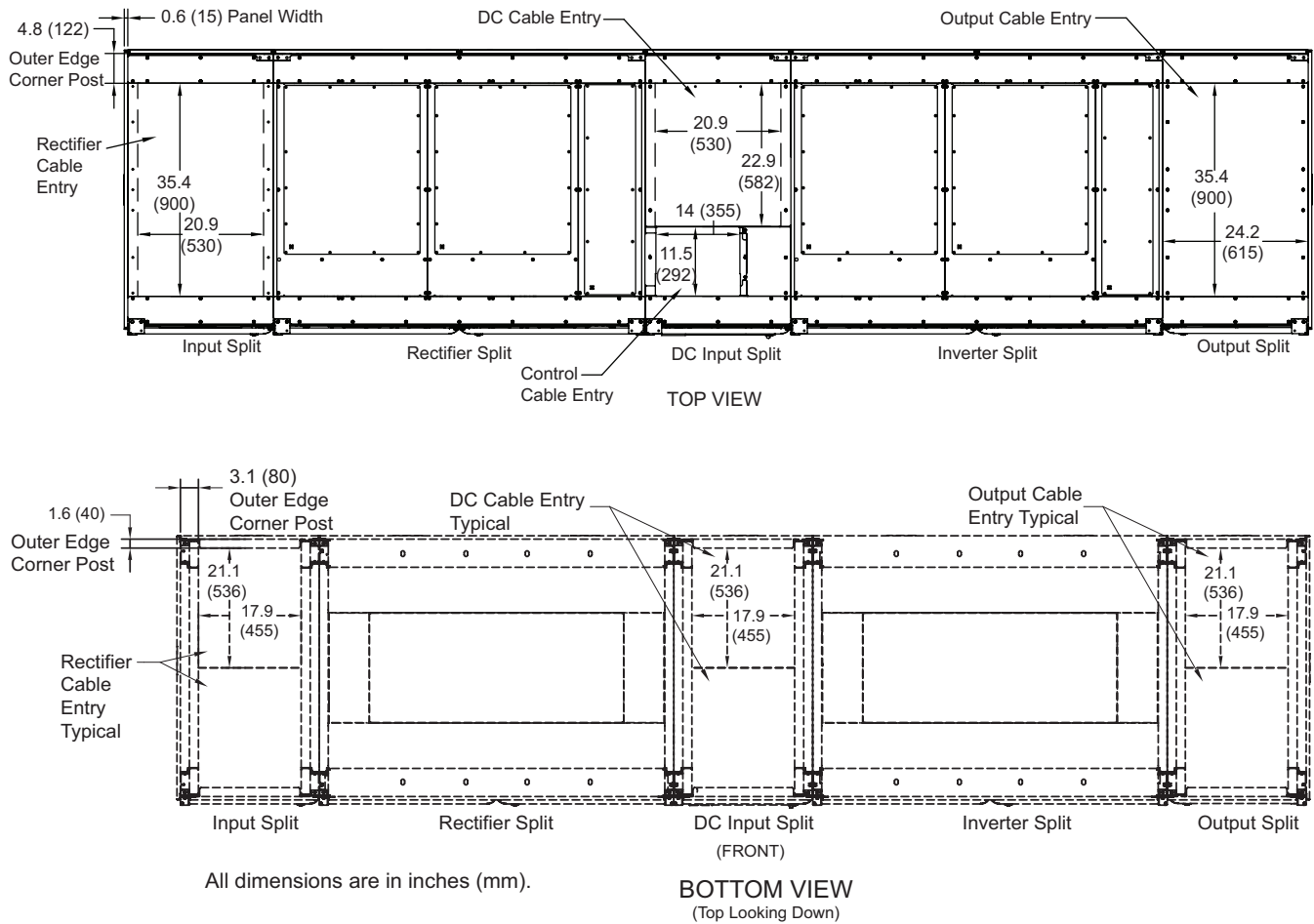
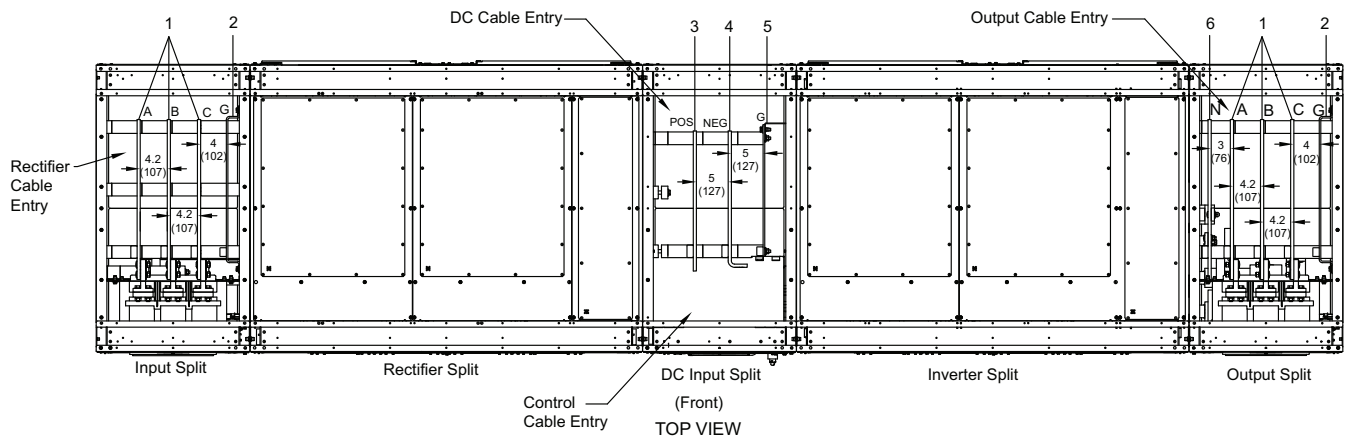


Figure 57 Terminal details 1100kVA UPS, N+1 multi-module without static bypass



See busbar detail Figure 58

- ① Input/output phase busbar
- ② Ground busbar
- ③ DC pos. busbar
- ④ DC neg. busbar
- ⑤ DC ground busbar
- ⑥ Neutral busbar



DO NOT DOUBLE-STACK THE LUGS.

This is to prevent the cables from coming into contact with other busbars.

Notes:

1. All dimensions are in inches (mm).
2. Control wiring and power wiring must be run in separate conduits.
3. Unless otherwise noted, use copper or aluminum conductors suitable for at least 75°C.
4. All wiring is to be in accordance with national and local electrical codes.

Figure 58 Busbar terminal details, 1100kVA UPS, N+1 multi-module without static bypass

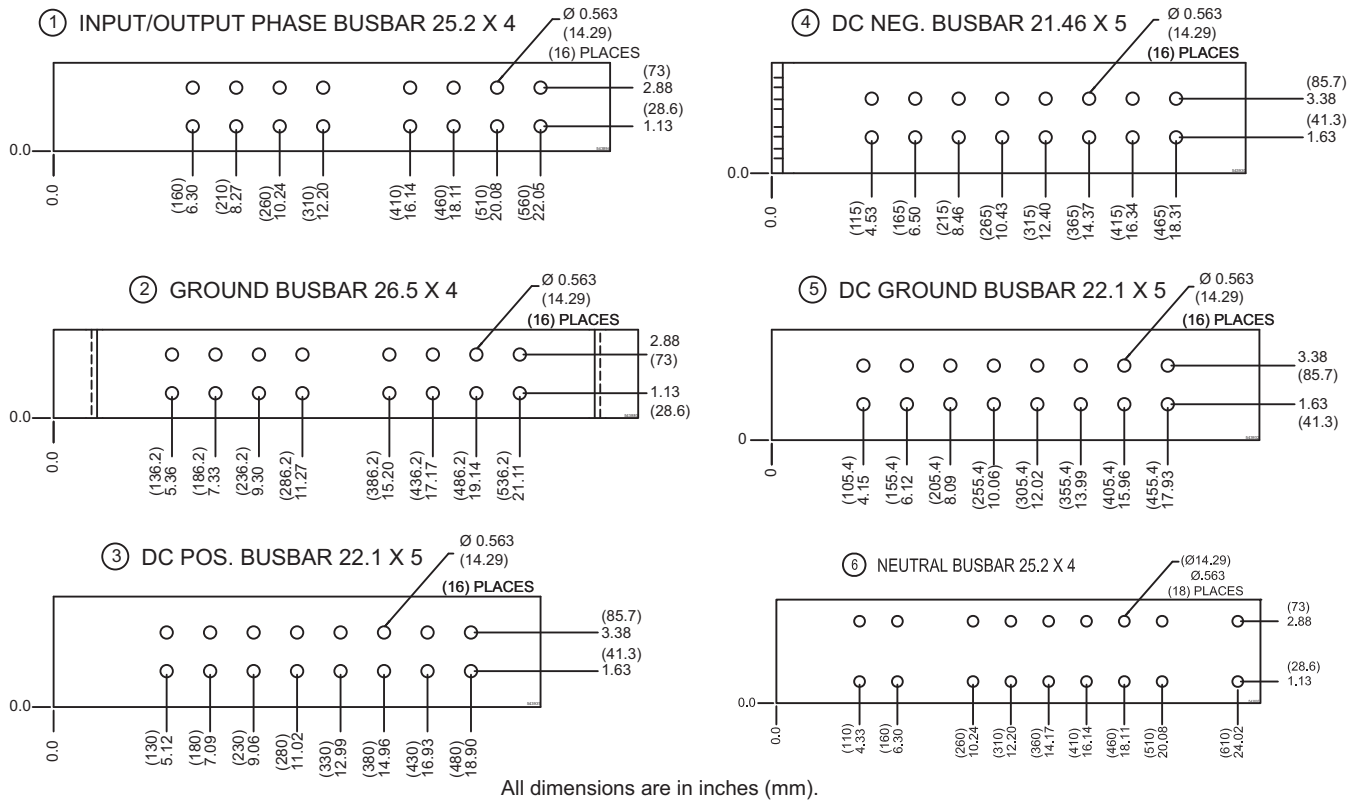
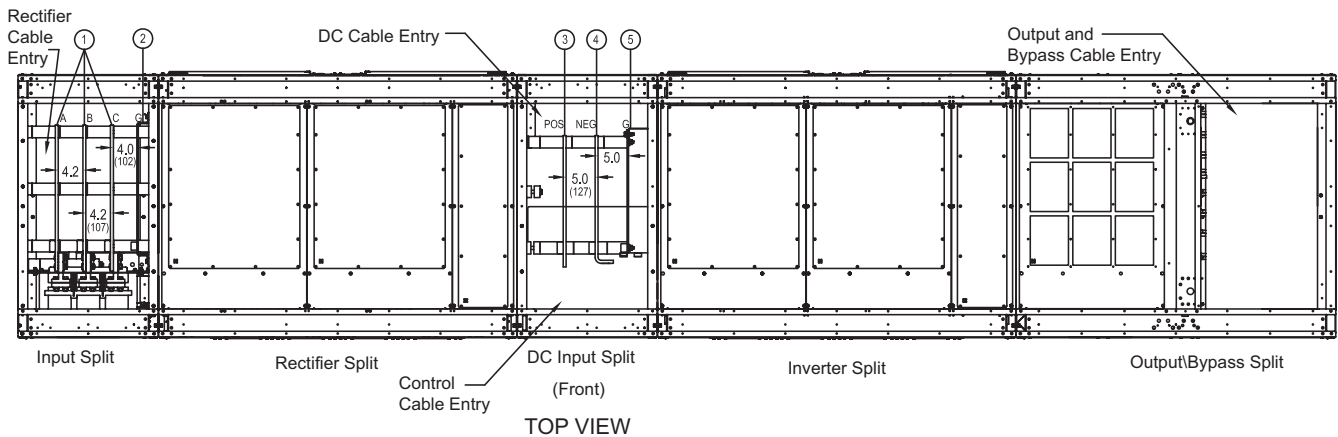


Figure 59 Terminal details, 1100kVA UPS, 1+N multi-module or SMS with static bypass



See busbar detail Figure 60

SEE BUSBAR DETAIL FIGURE (U40-11E-3200B-NFC-00)

- ① Input phase busbar
- ② Ground busbar
- ③ DC pos. busbar
- ④ DC neg. busbar
- ⑤ DC ground busbar
- ⑥ Bypass input, neutral, & output busbar
- ⑦ Neutral output busbar
- ⑧ Ground bypass busbar



DO NOT DOUBLE STACK THE LUGS.
 This is to prevent the cables from coming into contact with other busbars.

- Notes:
1. All dimensions are in inches (mm).
 2. Control wiring and power wiring must be run in separate conduits.
 3. Unless otherwise noted, use copper or aluminum conductors suitable for at least 75°C.
 4. All wiring is to be in accordance with national and local electrical codes.

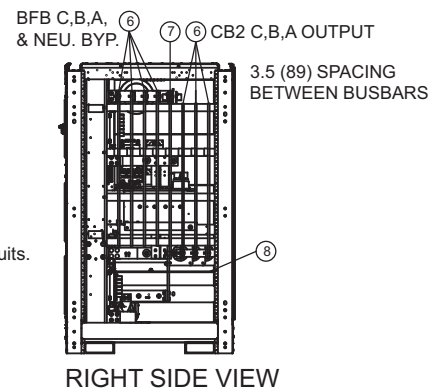


Figure 60 Busbar terminal details, 1100kVA UPS, 1+N multi-module or SMS with static bypass

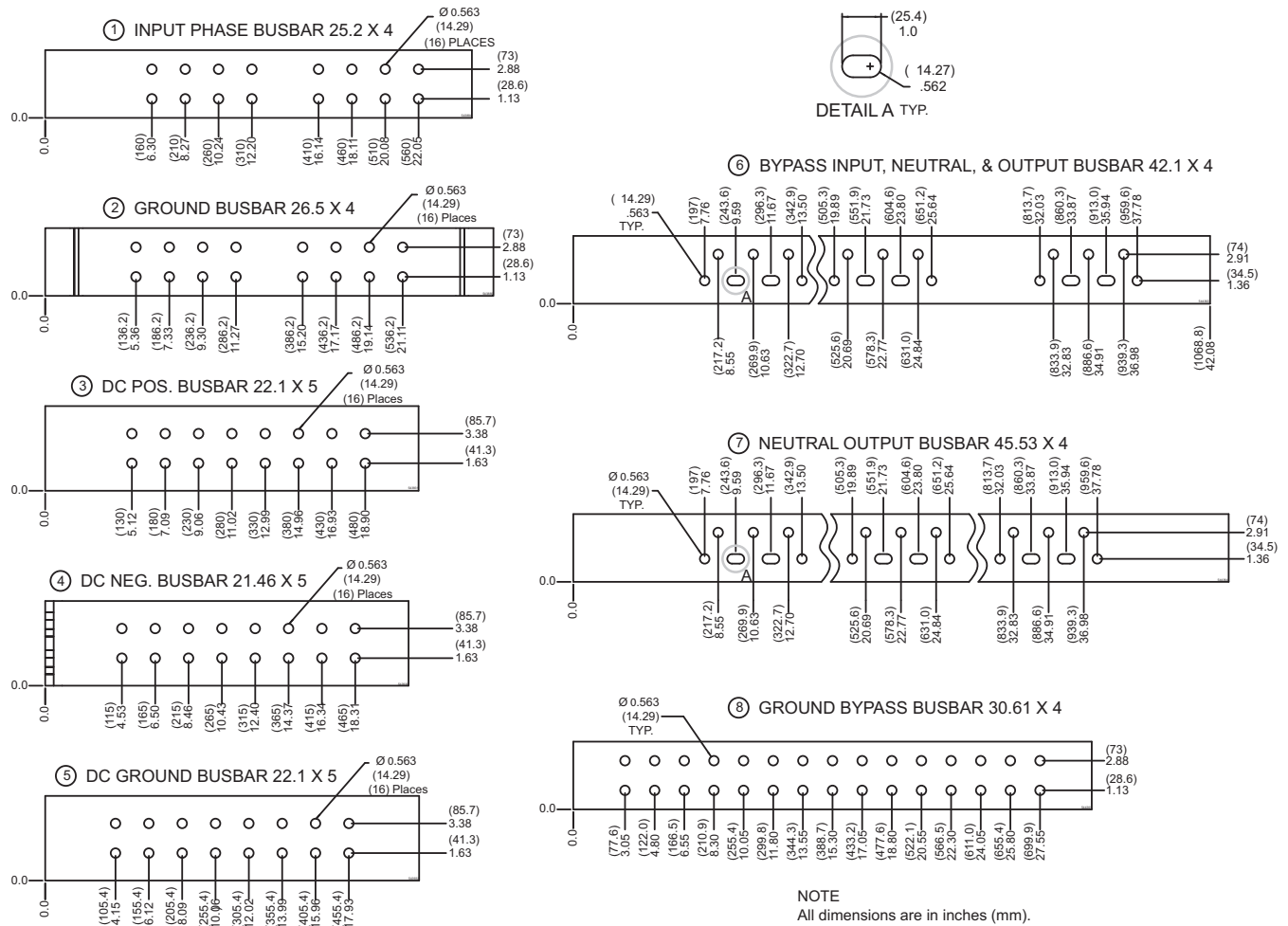
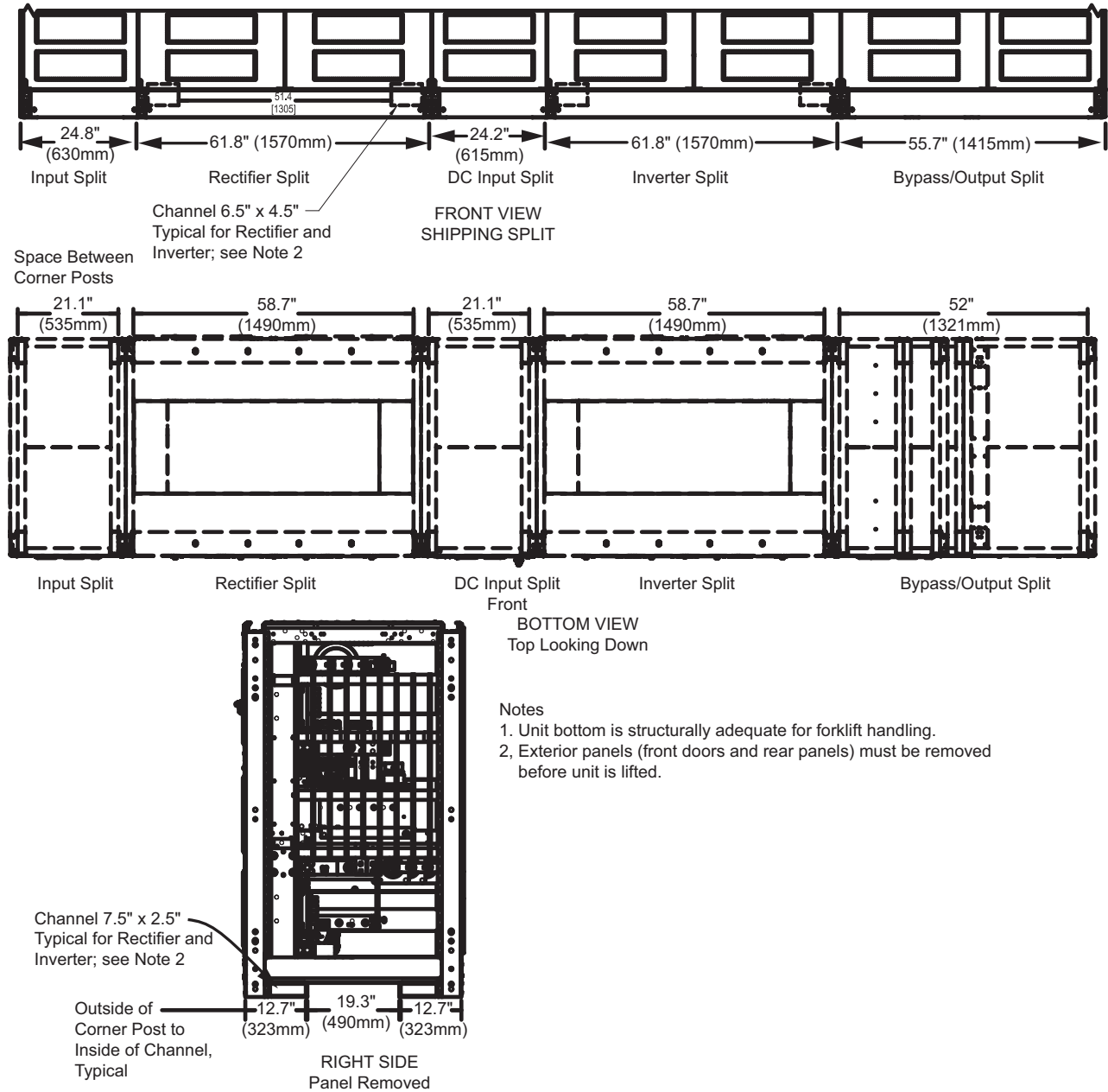


Figure 61 Base detail drawing 1100kVA UPS 1+ N multi-module or SMS with static bypass



- Notes
1. Unit bottom is structurally adequate for forklift handling.
 2. Exterior panels (front doors and rear panels) must be removed before unit is lifted.

Figure 62 Base detail drawing 1100kVA UPS N+1 multi-module without static bypass

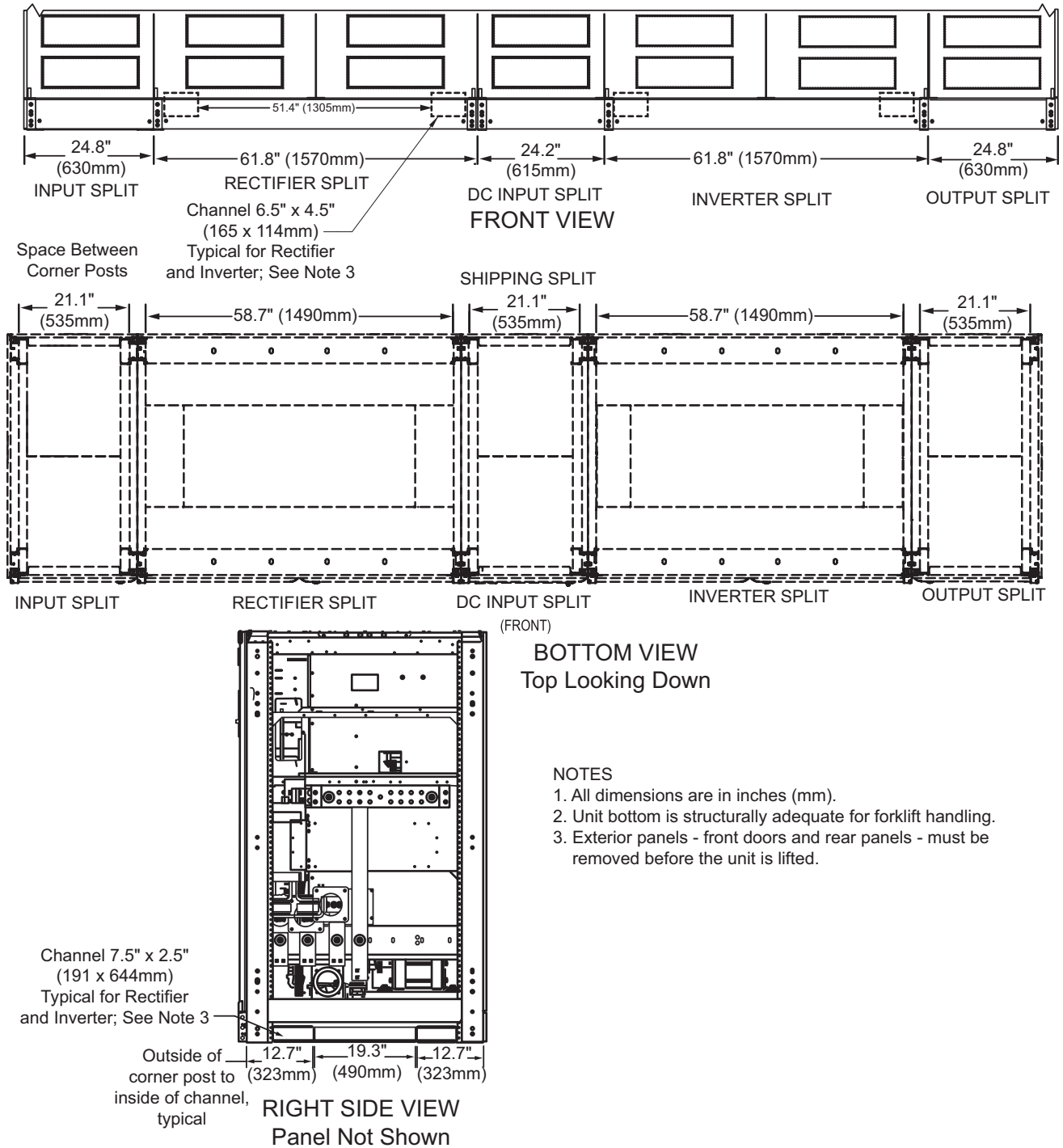


Figure 63 Auxiliary wiring cabinet— 625kVA only

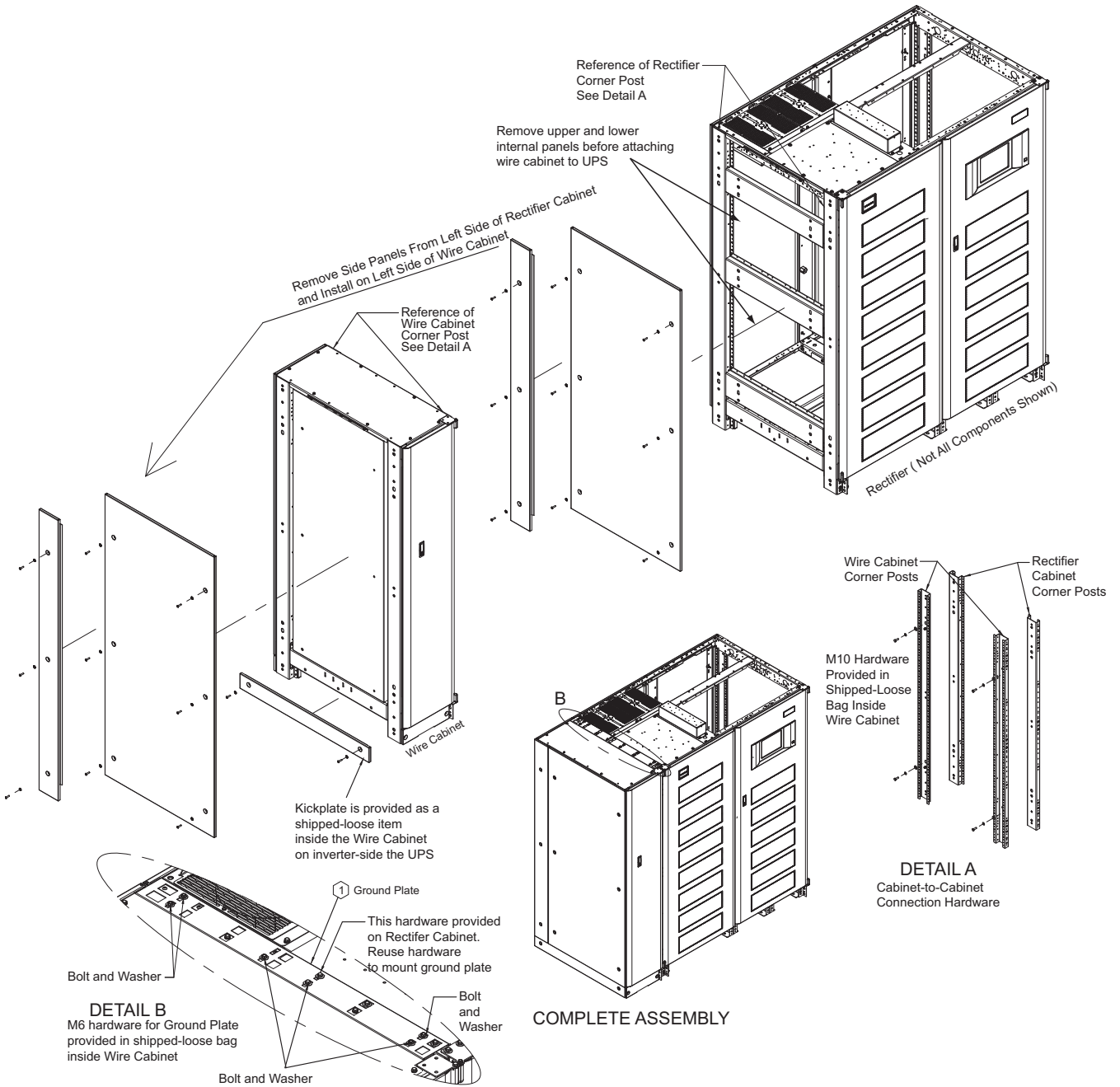
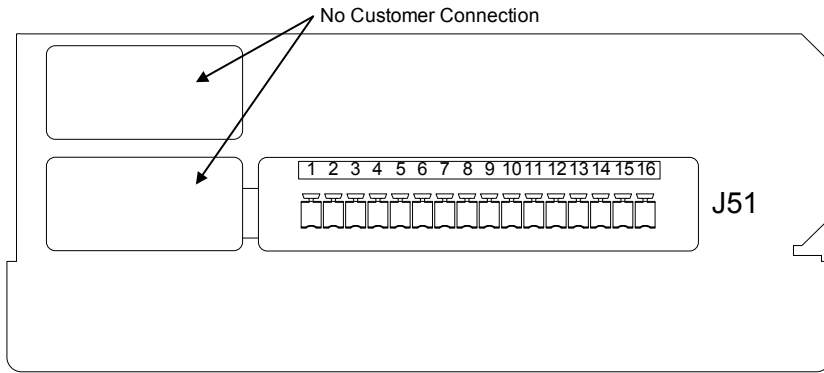


Figure 64 Optional Input Contact Isolator Board

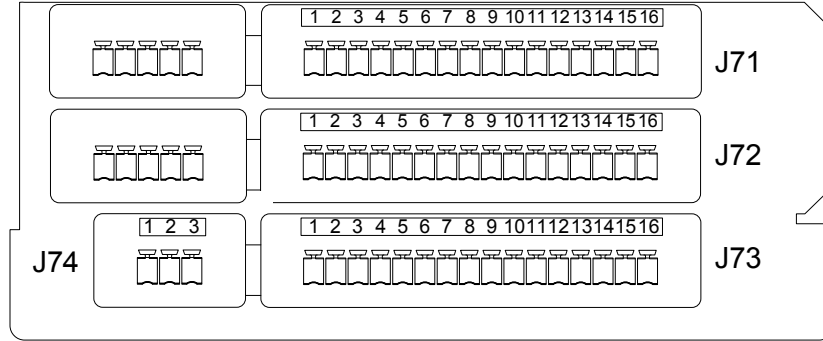


1. Customer control wiring connection points are terminals 1 through 16 (see **Table 13**).
2. Customer provided normally open dry contacts for user alarm messages.
3. All control wiring (by others) must be run separate from power wiring. Control wiring runs should not be combined in the same conduit.
4. Signal voltage: 100mA @ 12VDC.
5. Maximum cable length 500 ft. (152m) with #16AWG and flexible stranded cable.
6. All wiring must be in accordance with national and local electrical codes.

Table 13 Input Contact Isolator Board control wiring connections

Input Contact	Pin No.
1	1
	2
2	3
	4
3	5
	6
4	7
	8
5	9
	10
6	11
	12
7	13
	14
8	15
	16

Figure 65 Control wiring, Programmable Relay Board



1. Customer control wiring connection points are terminals 1 through 15. (Pin 16 not used on J71, J72, and J73.)
2. Programmable Relay Board option includes eight signal channels with two Form-C dry contacts per channel (see **Table 14**).
3. All control wiring (by others) must be run separate from power wiring. Control wiring runs should not be combined in the same conduit.
4. Contact ratings: 1A @ 30VDC or 125VAC @ 0.45A
5. Maximum cable length 500 ft. (152m) with #16AWG and flexible stranded cable.
6. All wiring must be in accordance with national and local electrical codes.

Table 14 Programmable Relay Board pin out

Terminal Block	Channel	Pin No.	Common	Normally Closed	Normally Open	
J71	CH1	A	1-3	1	2	3
		B	4-6	4	5	6
	CH2	A	7-9	7	8	9
		B	10-12	10	11	12
	CH3	A	13-15	13	14	15
		B	1-3	1	2	3
J72	CH4	A	4-6	4	5	6
		B	7-9	7	8	9
	CH5	A	10-12	10	11	12
		B	13-15	13	14	15
	CH6	A	1-3	1	2	3
		B	4-6	4	5	6
CH7	A	7-9	7	8	9	
	B	10-12	10	11	12	
J74	CH8	A	13-15	13	14	15
		B	1-3	1	2	3

Note: Pin 16 not used on J71, J72, and J73.

5.0 SPECIFICATIONS

Table 15 Liebert NXL UPS specifications

Model Size	625kVA	800kVA	1100kVA
Input Parameters			
Input Voltage to Rectifier, VAC	480V 3-phase, 3-wire 575V 3-phase, 3-wire 600V 3-phase, 3-wire		
Input Voltage to Bypass, VAC	480V 3-phase, 3-wire or 4-wire 575V 3-phase, 3-wire or 4-wire 600V 3-phase, 3-wire or 4-wire		
Input Voltage Range, VAC	+10% to -30%		
Input Frequency, Hz	60		
Permissible Input Frequency Range, Hz	55 to 65		
Reflected Input THDi, Nominal Voltage, Full Load, %	<5%		
Power Walk-In, sec	1 to 30 (selectable) in 1 sec. Increment		
Bypass Neutral Current	up to 1.7 times full-phase current		
Battery & DC Parameters			
Battery Type	VRLA (Valve Regulated Lead Acid) or FLA (Flooded Lead Acid)		
Nominal Battery Bus, VDC	480V		
Battery Float Voltage, VDC	540V		
Minimum End of Discharge Voltage, VDC	384V (for VRLA / Flooded Lead Acid)		
DC Ripple Voltage in Float & Const V Ch. Mode, %	<1 (RMS value) < 3,4% Vpp		
Temperature Compensated Battery Charging	Optional (with temperature probe)		
Output Parameters			
Inverter Type	IGBT-based Sine-Sine PWM Controlled		
Output Power, kW	625	800	1100
Output Voltage, VAC	480V 3-ph, 3-wire or 4-wire 575V 3-ph, 3-wire or 4-wire 600V 3-ph, 3-wire or 4-wire		
Output Voltage Regulation, %	< 1% (3-phase RMS average)		
Output Voltage Regulation (100% Unb. Load)	< 2% (3-phase RMS average)		
Output Frequency, Hz	60		
Output Frequency Regulation, %	± 0.1		
Output THDv Linear Load at Nominal Voltage, %	<2%		
Output THDv at Nominal Voltage Including a 100kVA Non Linear Load per EN 62040-3, %	2.5% (max)		
Capacity to Handle High Crest Factor Load	3:1		
Capacity to handle Step Load, %	0-100 or 100-0		
Step Load Transient Recovery (linear loads), %	Within 5% peak-to-peak in one line cycle.		
Unbalance Loads Current Capacity	100% of nominal phase current		
Capacity to Handle Leading PF Load			
at 0.95 Lead	Subject to Max. kW rating		
at 0.9 Lead	Subject to 12.5% kW derate or same Rating and 10°C Temp. Derate		
Voltage Displacement, ° el	120° ±1° el (with 100% unbalanced load)		
Compliance to FCC Class-A	Standard		
Overload Conditions, % FL	See Figures 66, 67 and 68		

Table 15 Liebert NXL UPS specifications (continued)

Model Size	625kVA	800kVA	1100kVA
Physical Parameters and Standards, in (mm)			
Width, With Static Bypass	140.5 (3568.7)	184.8 (4694)	228.3 (5798.8)
Width, without Static Bypass	125 (3175)	164.8 (4186)	197.5 (5016.5)
Depth	39.4 (1000.7)	47.2 (1200)	47.2 (1200)
Height	76.8 (1950.7)	78.7 (2000)	78.7 (1999)
Weight, Unpackaged, lb. (kg) approx.,			
with Static Bypass (SMS)	13,650 (6191.5)	16,120 (7312)	21,450 (9730)
with Static Bypass (1+N)	13,100 (5942)	16,470 (7471)	21,800 (9888)
without Static Bypass (N+1)	13,800 (6260)	15,620 (7085)	20,050 (9095)
Maximum Heat Dissipation, Full Load, BTU/hr	167,265	177,240	252,540
Cooling Air, CFM	15,760	10,000	8,700
Color	Black (ZP-7021)		
Front Door Opening (for serviceability)	More than 180°		
Degree of Protection for UPS Enclosure	IP 20 (with and without front door open)		
Minimum Clearance, Top, in (mm)	24 (610)		
Minimum Clearance, Back, in (mm)	0		
Minimum Clearance, Sides, in (mm)	0		
Location of Cable Entrance	Top or Bottom		
Standards and Conformities	UL 1778, 4th Ed. CSA 22.2 107.3 FCC Part 15, Class A IEC62040-2, Level 4, Criteria A EN61000-4-3, Level 3, Criteria A EN61000-4-6, Level 4, Criteria A EN61000-2-2, Criteria A EN61000-4-4, Level 4, Criteria A ANSI C62.41, Category A3 & B3 ISTA Procedure 1H WEEE IBC 2012/CBC 2010		
Environmental Parameters			
Storage Temperature Range, °F (°C)	-13 to 158 (-25 to 70)		
Operating Temperature Range, °F (°C)	32 to 104 (0 to 40) (UPS)		
Relative Humidity	95% or less Non-Condensing (Operating and Non-Operating)		
Maximum Altitude Above MSL	4920 ft. (1500m) (as per IEC 62040/3) - 1% Maximum kW derate / 328 ft. rise between 4921-9842 ft. (100m rise between 1500-3000m)		

Width dimensions are with side panels attached. Subtract 1.4" (35mm) for dimensions without side panels.
 Depth dimensions include the front door and rear panel.

For multi-module systems (1+N and N+1), the output neutrals of all the modules must be tied together.

Table 16 Current ratings—rectifier input

UPS Rating		Voltage VAC	Nominal Current	Maximum Current
kVA	kW			
625	625	480	907	952
625	625	575	753	791
625	625	600	722	758
800	800	480	1139	1195
1100	1100	480	1534	1611
1100	1100	575	1313	1379
1100	1100	600	1252	1314

Table 17 Current ratings—bypass input

UPS Rating		Voltage VAC	Nominal Current
kVA	kW		
625	625	480	752
625	625	575	628
625	625	600	601
800	800	480	962
1100	1100	480	1323
1100	1100	575	1104
1100	1100	600	1058

Table 18 Current ratings—output

UPS Rating		Voltage VAC	Nominal Current
kVA	kW		
625	625	480	752
625	625	575	628
625	625	600	601
800	800	480	962
1100	1100	480	1323
1100	1100	575	1104
1100	1100	600	1058

Table 19 Current ratings—battery

UPS Rating		Maximum Battery Current at EOD
kVA	kW	
625	625	1645
800	800	2061
1100	1100	2860

Notes on Tables

1. Nominal input current (considered continuous) is based on full-rated output load. Maximum current includes nominal input current and maximum battery recharge current (considered noncontinuous). Continuous and noncontinuous current are defined in NEC 100.
2. Maximum input current is controlled by the current limit setting, which is adjustable. Values shown are for maximum current limit. If a smaller input feed breaker is used, the input current limit can be adjusted; see your Vertiv representative for more information.
3. The Rectifier Input Feed Breaker must be set to withstand the Liebert NXL transformer inrush of up to eight times the nominal current.
4. For breaker coordination while the module is overloaded, see the current versus time values on the overload curves.
5. Nominal battery voltage is shown at 2.0 volts/cell.

Figure 66 Inverter overload data

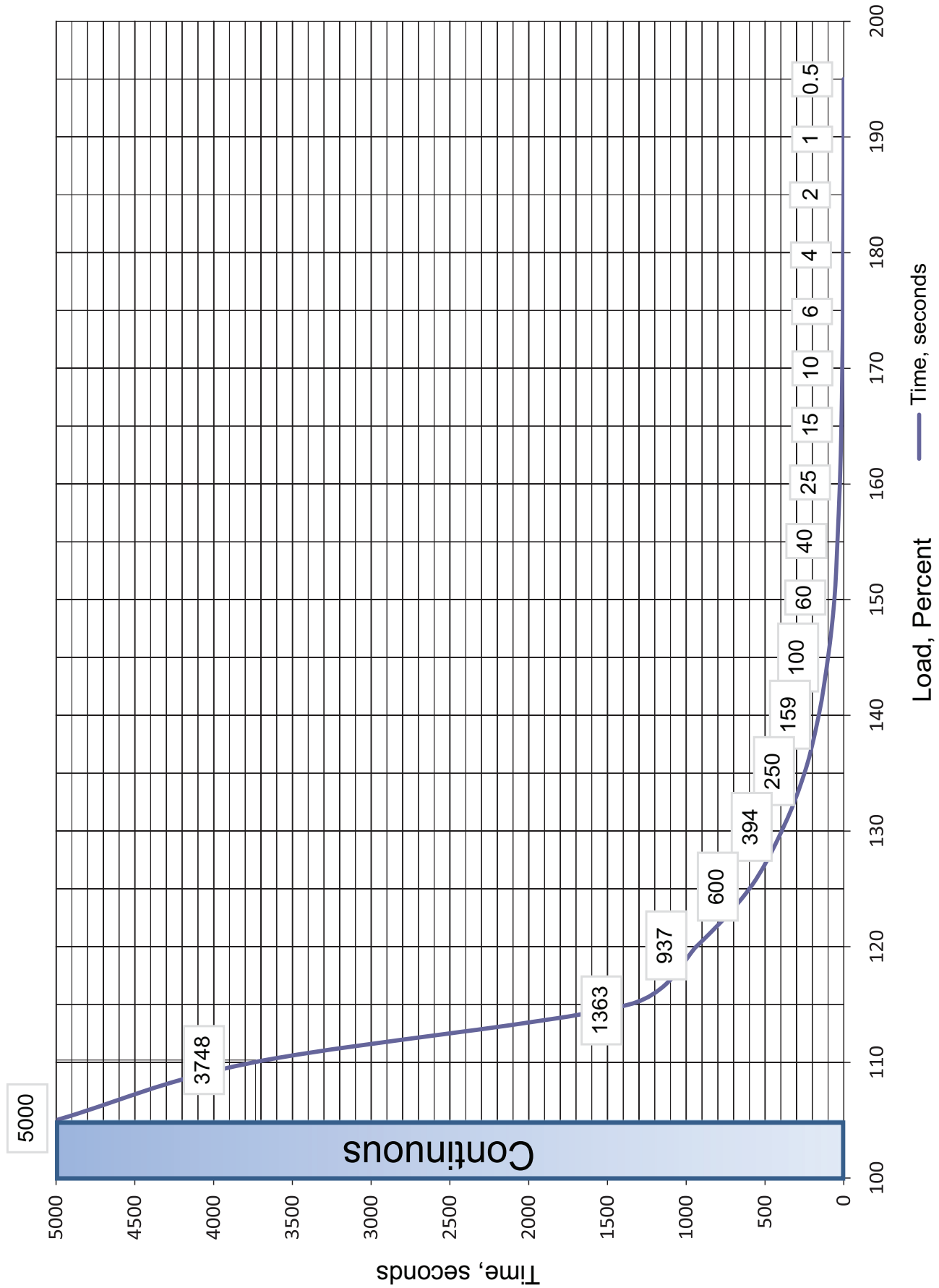


Figure 67 Rectifier overload data

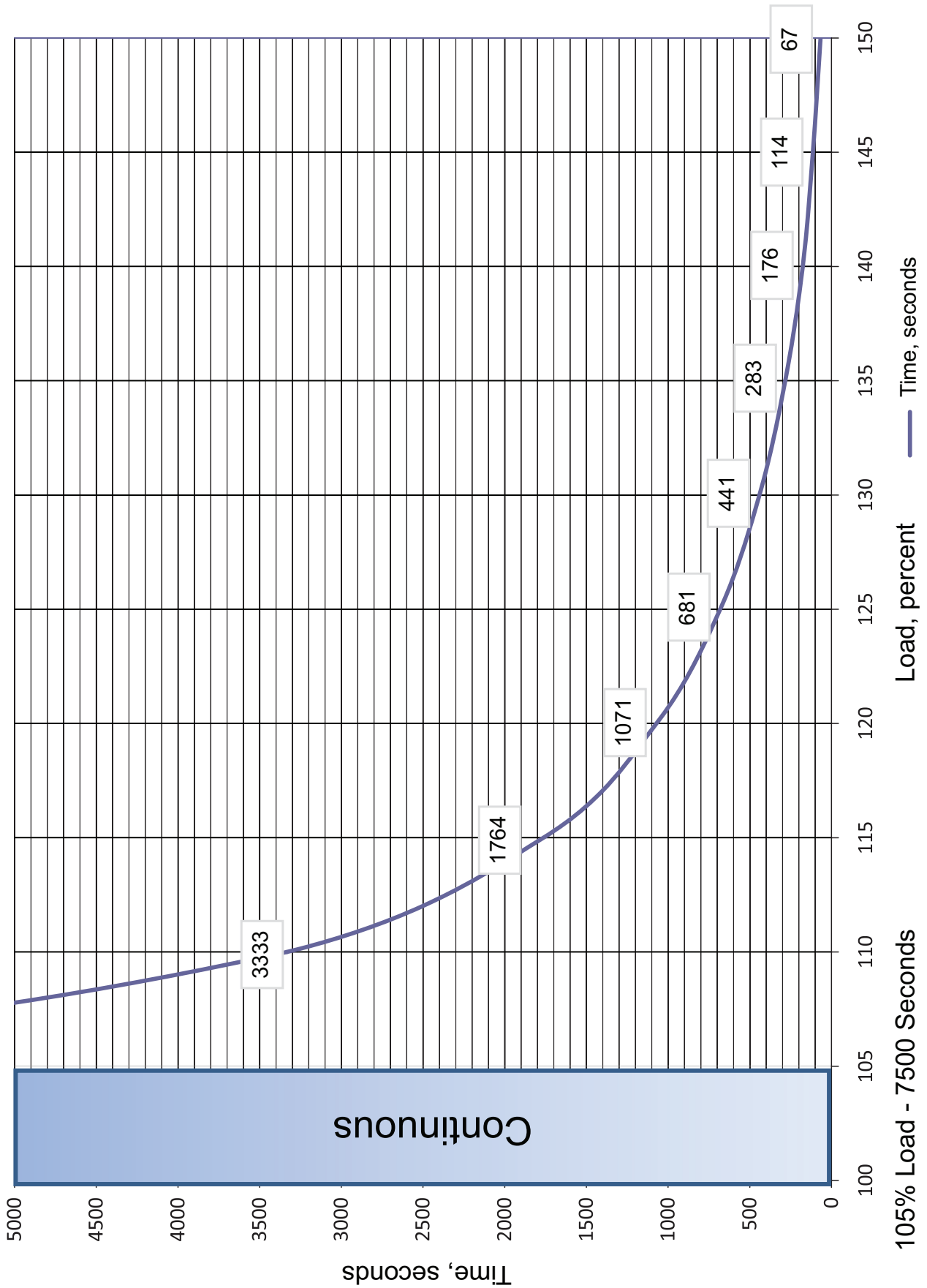


Figure 68 Bypass overload data

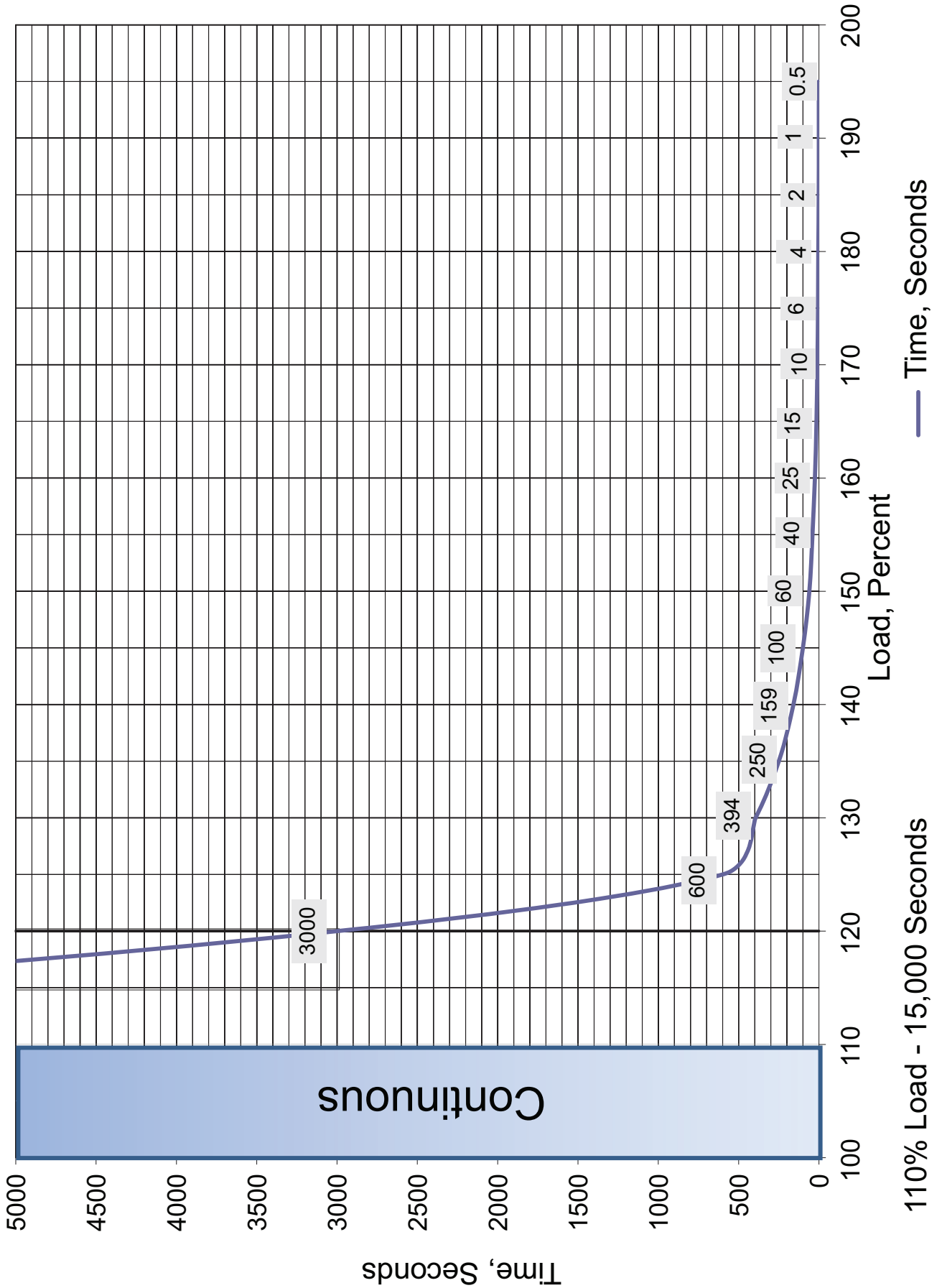


Table 20 Recommended conduit and cable sizes

Rectifier Input				
UPS Rating		Voltage (VAC)	(# of conduits); size of conduits; # -size of phase cables per conduit; size of cable for ground per conduit	
kVA	kW		Copper Conductors	Aluminum Conductors
625	625	480	(3) 2.5C 3-500kcmil, #2/OAWG	(3) 2.5C 3-600kcmil, #4/OAWG
625	625	575	(3) 2.5C 3-500kcmil, #1/OAWG	(3) 2.5C 3-600kcmil, #3/OAWG
625	625	600	(3) 2.5C 3-500kcmil, #1/OAWG	(3) 2.5C 3-600kcmil, #3/OAWG
800	800	480	(3) 3C 3-600kcmil, #3/OAWG	(4) 2.5C 3-500kcmil, 250kcmil
1100	1100	480	(5) 3C 3-600kcmil, 250kcmil	(6) 2.5C 3-600kcmil, 400kcmil
1100	1100	575	(4) 2.5C 3-500kcmil, #4/OAWG	(4) 3.0C 3-700kcmil, 350kcmil
1100	1100	600	(4) 2.5C 3-500kcmil, #4/OAWG	(4) 3.0C 3-700kcmil, 350kcmil
Bypass Input				
UPS Rating		Voltage (VAC)	(# of conduits); size of conduits; # -size of phase cables per conduit; # -size of neutral cables per conduit; size of cable for ground per conduit	
kVA	kW		Copper Conductors	Aluminum Conductors
625	625	480	(3) 3.5C 3-600kcmil, 2-500kcmil, #1/OAWG	(3) 3.0C 3-500kcmil, 2-350kcmil, #3/OAWG
625	625	575	(3) 3C 3-500kcmil, 2-#350kcmil, #1/OAWG	(3) 3.0C 3-600kcmil, 2-400kcmil, #3/OAWG
625	625	600	(3) 3C 3-500kcmil, 2-250kcmil, #1/OAWG	(3) 3.0C 3-600kcmil, 2-400kcmil, #3/OAWG
800	800	480	(3) 4C 3-750kcmil, 2-600kcmil, #2/OAWG	(4) 3.5C 3-700kcmil, 2-500kcmil, #4/OAWG
1100	1100	480	(5) 3.5C 3-600kcmil, 2-500kcmil, #4/OAWG	(6) 3.5C 3-600kcmil, 2-500kcmil, 350kcmil
1100	1100	575	(4) 3.5C 3-500kcmil, 2-500kcmil, #3/OAWG	(4) 3.5C 3-700kcmil, 2-700kcmil, 250kcmil
1100	1100	600	(4) 3.5C 3-500kcmil, 2-500kcmil, #3/OAWG	(4) 3.5C 3-700kcmil, 2-600kcmil, 250kcmil
Output				
UPS Rating		Voltage (VAC)	(# of conduits); size of conduits; # -size of phase cables per conduit; # -size of neutral cables per conduit; size of cable for ground per conduit	
kVA	kW		Copper Conductors	Aluminum Conductors
625	625	480	(3) 3.5C 3-600kcmil, 2-500kcmil, #1/OAWG	(3) 3.0C 3-500kcmil, 2-350kcmil, #3/OAWG
625	625	575	(3) 3C 3-500kcmil, 2-#350kcmil, #1/OAWG	(3) 3.0C 3-600kcmil, 2-400kcmil, #3/OAWG
625	625	600	(3) 3C 3-500kcmil, 2-250kcmil, #1/OAWG	(3) 3.0C 3-600kcmil, 2-400kcmil, #3/OAWG
800	800	480	(3) 4C 3-750kcmil, 2-600kcmil, #2/OAWG	(4) 3.5C 3-700kcmil, 2-500kcmil, #4/OAWG
1100	1100	480	(5) 3.5C 3-600kcmil, 2-500kcmil, #4/OAWG	(6) 3.5C 3-600kcmil, 2-500kcmil, 350kcmil
1100	1100	575	(4) 3.5C 3-500kcmil, 2-500kcmil, #3/OAWG	(4) 3.5C 3-700kcmil, 2-700kcmil, 250kcmil
1100	1100	600	(4) 3.5C 3-500kcmil, 2-500kcmil, #3/OAWG	(4) 3.5C 3-700kcmil, 2-600kcmil, 250kcmil
Battery				
UPS Rating		(# of conduits); size of conduits; # -size of phase cables per conduit; size of cable for ground per conduit		
kVA	kW	Copper Conductors	Aluminum Conductors	
625	625	(5) 2.5C 2-600kcmil, 250kcmil	(6) 2.5C 2-600kcmil, 400kcmil	
800	800	(6) 2.5C 2-600kcmil, 350kcmil	(7) 2.5C 2-700kcmil, 600kcmil	
1100	1100	(7) 2.5C 2-750kcmil, 400kcmil	(8) 2.5C 2-700kcmil, 600kcmil	

Table 20 Recommended conduit and cable sizes (continued)

Bonding			
UPS Rating		Main Bonding Jumper/Grounding Electrode Conductor	
kVA	kW	Copper Conductors	Aluminum Conductors
625	625	(1) 250kcmil/ (1) 250kcmil	(1) 250kcmil/ (1) 250kcmil
800	800	(1) 250kcmil/ (1) 250kcmil	(1) 250kcmil/ (1) 250kcmil
1100	1100	(1) 350kcmil/ (1) 350kcmil	(1) 350kcmil/ (1) 350kcmil

1. Recommended cable sizes are 167°F (75°C) (THW) wire at 86°F (30°C) ambient. Unless otherwise noted, use copper or aluminum conductors suitable for at least 75°C.
2. For continuous operation not at 86°F (30°C), Vertiv recommends that the site planner choose the appropriate cable type based on the particular installation requirements.
3. Conduit size is based on FMC type conduit with two neutral conductors rated at 200% of phase.

Table 21 Recommended lug sizes

Cable Size	T&B Copper One Hole	T&B Copper Two Hole	T&B Aluminum One Hole	T&B Aluminum Two Hole
#8AWG	54930BE	54850BE	60104-TB	—
#6AWG	54905BE	256-30695-868	60109-TB	—
#4AWG	54906BE	256-30695-733	60114-TB	—
#2-3AWG	54942BE	54811BE	60120	—
#1AWG	54947BE	54857BE	60126	—
#1/0AWG	54950BE	256-30695-593	60132	—
#2/0AWG	54951BE	54862BE	60138	60238
#3/0AWG	54965BE	54864BE	60144	60244
#4/0AWG	54970BE	54866BE	60150	60250
250kcmil	54913BE	54868BE	60156	60256
300kcmil	54914BE	54870BE	60162	60262
350kcmil	54915BE	54872BE	60165	60267
400kcmil	54916BE	54874BE	60168	60269
500kcmil	54918BE	54876BE	60171	60273
600kcmil	54920BE	54878BE	60176	60275
750kcmil	54922BE	54880BE	60178	60277

Table 22 Recommended torque values

Grade 5 Steel: Unified Thread System Torque, lbf.*in.				Class 8.8 Steel: Metric Thread System Torque, N*m			
Fastener Finish ⇒		Plain Steel	Zinc Plating	Fastener Finish ⇒		Plain Steel	Zinc Plating
Size	Threads/Inch, Tpi	No Washer/Flat Washer	No Washer/Flat Washer	Size	Thread Pitch, Tp	No Washer/Flat Washer	No Washer/Flat Washer
1/4	20	101	91	M5	0.8	6.1	5.5
	28	116	104		0.5	6.9	6.2
5/16	18	209	188	M6	1	10	9
	24	231	208		0.75	11	10
3/8	16	370	333	M8	1.25	25	23
	24	420	378		1	27	24
7/16	14	593	534	M10	1.5	50	45
	20	662	596		1.25	53	47
1/2	13	904	814	M12	1.75	87	78
	20	1,020	918		1.25	95	86
9/16	12	1,305	1,175	M14	2	139	125
	18	1,456	1,310		1.5	151	136

NOTES

NOTES

TECHNICAL SUPPORT / SERVICE

Web Site

www.vertivco.com

Monitoring

liebert.monitoring@vertivco.com

800-222-5877

Outside North America: +00800 1155 4499

Three-Phase UPS & Power Systems

800-543-2378

Outside North America: 614-841-6598

LOCATIONS

United States

1050 Dearborn Drive

P.O. Box 29186

Columbus, OH 43229

Europe

Via Leonardo Da Vinci 8

Zona Industriale Tognana

35028 Piove Di Sacco (PD) Italy

+39 049 9719 111

Fax: +39 049 5841 257

Asia

29/F, The Orient Square Building

F. Ortigas Jr. Road, Ortigas Center

Pasig City 1605

Philippines

+63 2 687 6615

Fax: +63 2 730 9572



VertivCo.com | Vertiv Headquarters, 1050 Dearborn Drive, Columbus, OH, 43085, USA

© 2016 Vertiv Co. All rights reserved. Vertiv and the Vertiv logo are trademarks or registered trademarks of Vertiv Co. All other names and logos referred to are trade names, trademarks or registered trademarks of their respective owners. While every precaution has been taken to ensure accuracy and completeness herein, Vertiv Co. assumes no responsibility, and disclaims all liability, for damages resulting from use of this information or for any errors or omissions. Specifications are subject to change without notice.

SL-25435_REV7_12-16