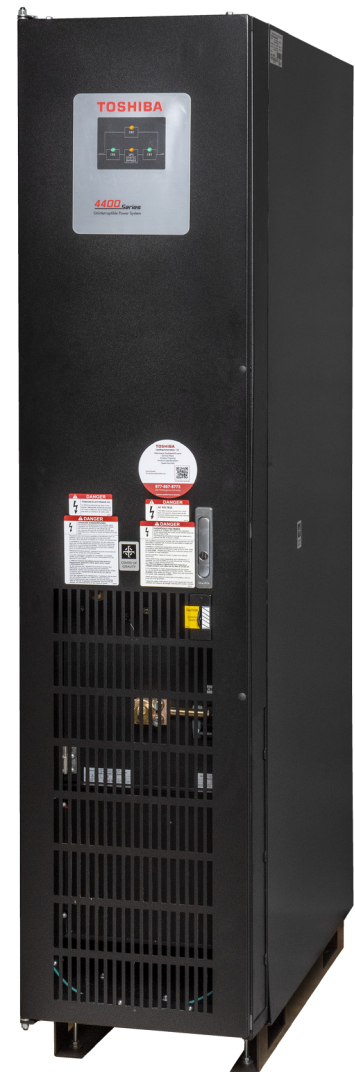


TOSHIBA

4400 SERIES Slim Maintenance Bypass INSTALLATION AND OPERATION MANUAL



Part # 96013-001
October 2019
Manufactured in the USA

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The Toshiba products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.). These Toshiba products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or where a malfunction or failure may cause loss of human life or bodily injury (Unintended Usage). Unintended Usage includes atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, life-support equipment, all types of safety devices, etc. Unintended Usage of Toshiba products listed in this document shall be made at the customer's own risk.

NOTICE

PLEASE INFORM TOSHIBA INTERNATIONAL CORPORATION OR AUTHORIZED REPRESENTATIVE IN CASE OF INCONSISTENCIES, OMISSIONS, OR QUESTIONS.

The instructions contained in this manual are not intended to cover all of the details or variations in equipment, or to provide for every possible contingency concerning installation, operation, or maintenance. Should further information be required or if problems arise which are not covered sufficiently, contact your Toshiba sales office.

The contents of this instruction manual shall not become a part of or modify any prior or existing agreement, commitment, or relationship. The sales contract contains the entire obligation of Toshiba International Corporation Power Electronics Division. The warranty contained in the contract between the parties is the sole warranty of Toshiba International Corporation Power Electronics Division and any statements contained herein DO NOT create new warranties or modify the existing warranty.

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QUALIFIED PERSONNEL ONLY

Qualified Personnel are those who have the skills and knowledge relating to the construction, installation, operation, and maintenance of the electrical equipment and have received safety training on the hazards involved (Refer to the latest edition of NFPA 70E for additional safety requirements).

UNINTERRUPTIBLE POWER SYSTEM (UPS)

Please complete the following information and retain for your records.

JOB NUMBER

MODEL NUMBER

SERIAL NUMBER

APPLICATION

SHIPMENT DATE

INSTALLATION DATE

INSPECTED BY

Purpose

This manual provides information on how to safely install your Toshiba International Corporation power electronics product. This manual includes a section of general safety instructions that describes the warning labels and symbols that are used throughout the manual. Read the manual completely before installing, operating, or performing maintenance on this equipment.

This manual and the accompanying drawings should be considered a permanent part of the equipment and should be readily available for reference and review. Dimensions shown in the manual are in metric and/or the English customary equivalent.

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Toshiba Customer Support Center

Contact the Toshiba Customer Support Center for assistance with application information or for any problems that you may experience with your Uninterruptible Power System Auxiliary Cabinet.

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You may also contact Toshiba by writing to:

**TOSHIBA INTERNATIONAL CORPORATION
INFRASTRUCTURE SYSTEMS & SOLUTIONS COMPANY
POWER ELECTRONICS DIVISION**

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Houston, Texas 77041-9990

Attn: UPS Product Manager

For further information on Toshiba products and services, please visit our website at:
www.toshiba.com/tic/industrial/uninterruptible-power-systems

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1 Introduction

This manual provides information on how to safely install and operate your 4400 Series Maintenance Bypass Cabinet. This manual includes a section of general safety instructions that describes the warning labels and symbols that are used throughout the manual. Read the manual completely before installing, operating, or performing maintenance on this equipment.

Qualified personnel should read this manual carefully before transporting, installing, and wiring the UPS Ancillary Cabinets. In addition they have a thorough understanding of the information provided in the chapters titled:

- General Safety Instructions
- Important Safety Instructions
- Safety Precautions
- Installation Precautions

Please read the 4400 Series UPS Installation and Operation Manual in addition to this manual for important instructions on installing and operating the Maintenance Bypass Cabinet in accompaniment with the UPS. This manual and the accompanying drawings should be considered a permanent part of the equipment and should be readily available for reference and review. Dimensions shown in the manual are in metric and/or the English customary equivalent.

Keep the Installation Manual and the Operation Manual near the Maintenance Bypass for necessary reference.

1.1 System Compatibility

This manual is designed to be used as a reference with products with the following Toshiba part numbers:

Small Frame

440S150MF

440S200MF

440S250MF

440S300MF

Large Frame

440S500MF

440S800MF

440S10KMF

SAVE THESE INSTRUCTIONS

2 General Safety Instructions

DO NOT attempt to transport, install, operate, maintain or dispose of this equipment until you have read and understood all of the product safety information provided in this manual.

2.1 Symbols

The symbols listed below are used throughout this manual. When symbols are used in this manual they will include important safety information that must be carefully followed.



Safety Alert Symbol indicates that a potential personal injury hazard exists.



Prohibited Symbol indicates **DO NOT** take action.



Mandatory Symbol indicates that the following instruction is required.



Ground Symbol indicates the location of the equipment grounding conductor.



Electrical - Voltage & Shock Hazard Symbol indicates parts inside may cause electric shock.



Explosion Hazard Symbol indicates parts may explode.

2.2 Signal Words

The signal words listed below are used throughout this manual. When the words DANGER, WARNING, CAUTION and ATTENTION are used in this manual they will include important safety information that must be carefully followed.



The word **DANGER** in capital letters preceded by the safety alert symbol indicates that an **imminently hazardous** situation exists, and if not avoided **will result in loss of life or serious injury to personnel**.



The word **WARNING** in capital letters preceded by the safety alert symbol indicates that a **potentially hazardous** situation exists, and if not avoided **may result in loss of life or serious injury to personnel**.



The word **CAUTION** in capital letters preceded by the safety alert symbol indicates that a **potentially hazardous** situation exists, and if not avoided **may result in minor or moderate injury**.



The word **NOTICE** in capital letters without the safety alert symbol indicates a **potentially hazardous** situation exists, and if not avoided **may result in equipment and property damage**.

2.3 Qualified Personnel

Installation, operation, and maintenance shall be performed by Qualified Personnel Only. A Qualified Person is one who has the skills and knowledge relating to the construction, installation, operation, and maintenance of the electrical equipment and has received safety training on the hazards involved (Refer to the latest edition of NFPA 70E for additional safety requirements).

Qualified Personnel shall:

- Have read the entire operation manual.
- Be familiar with the construction and function of the Maintenance Bypass Cabinet, the equipment being driven, and the hazards involved.
- Be trained and authorized to safely energize, de-energize, ground, lockout/tagout circuits and equipment, and clear faults in accordance with established safety practices.
- Be trained in the proper care and use of protective equipment such as safety shoes, rubber gloves, hard hats, safety glasses, face shields, flash clothing, etc., in accordance with established safety practices.
- Be trained in rendering first aid.

For further information on workplace safety visit www.osha.gov.

2.4 Factory Authorized Personnel

Factory authorized personnel have been factory trained and certified to install, service, and repair the UPS. Contact the Toshiba Customer Support Center for assistance in locating the factory authorized personnel nearest you.

3 Important Safety Instructions

The following contains important instructions that should be followed during the installation, operation, and maintenance of the 4400 Series Maintenance Bypass Cabinet.

3.1 Maximum Operating Temperatures

 CAUTION
Misuse of this equipment could result in personal injury and/or equipment damage. In no event will Toshiba Corporation be responsible or liable for either indirect or consequential damage or injury that may come from the use of this equipment.

The maximum operating ambient temperature for the 4400 Series Maintenance Bypass Cabinet is:

- 440S (Slim MBS Cabinet) – 104 °F (40 °C)

4 Safety Precautions

The Toshiba products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.). These Toshiba products are neither intended nor warranted for use in equipment that, if a malfunction or failure occurs, may result in loss of human life or bodily injury (collectively referred to as "Unintended Usage"). Unintended Usage includes atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, life support equipment, all types of safety devices, etc. Unintended Usage of Toshiba products listed in this document shall be made at the customer's own risk.

The application of the UPS without special consideration for equipment that supports human safety and/or maintain public services may cause serious accidents.

4.1 Disclaimer

IN NO EVENT WILL TOSHIBA CORPORATION BE RESPONSIBLE OR LIABLE FOR EITHER INDIRECT OR CONSEQUENTIAL DAMAGE OR INJURY THAT MAY COME FROM THE MISUSE OF THIS EQUIPMENT. ANY MODIFICATIONS WITHOUT AUTHORIZATION BY TOSHIBA COULD RESULT IN PERSONAL INJURIES, DEATH OR DESTRUCTION OF THE AUXILIARY CABINET.

TOSHIBA RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN. TOSHIBA DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR AUXILIARY CABINET DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

4.2 General Maintenance

 WARNING	
	DO NOT remove the rear/side panels, or any sheet metal not designed to be removed. Removing rear/side panels may result in electric shock, burns, personal injuries or Maintenance Bypass Cabinet failure.
	Keep the area around the Maintenance Bypass Cabinet clean. Use a non-metal vacuum cleaner to clean the Auxiliary Cabinet.
	Only factory authorized personnel should perform internal general maintenance on the UPS and Maintenance Bypass Cabinet.
	Contact the authorized Toshiba Customer Support Center or an authorized Toshiba representative for information on proper disposal of UPS and Maintenance Bypass Cabinet components. It is illegal to dispose of certain components without conforming to environmental regulations for industrial/commercial waste.

4.3 Transporting

 WARNING	
	DO NOT tilt the Maintenance Bypass Cabinet more than 10° from upright position. Tilting more than 10° may cause crushing, trapping or other personal injuries.
 CAUTION	
	DO NOT transport, move, store, or place the Maintenance Bypass Cabinet on its sides. Excessive force applied from heavy components inside may damage the Maintenance Bypass Cabinet.
	Avoid vibration or shock exceeding 0.5 g. Failing to observe this precaution may cause damage to the Maintenance Bypass Cabinet.
	DO NOT allow the Maintenance Bypass Cabinet to suffer shock or impact when unpacking. Tools used to remove packaging materials may cause damage to the Maintenance Bypass Cabinet.
	DO NOT install the Maintenance Bypass Cabinet where water may fall on it. Water may cause electrical shock, personal injury or Maintenance Bypass Cabinet failure.
	DO NOT push or pull on the sides of the packaging or the Maintenance Bypass Cabinet to move it. Always use a crane, forklift, or pallet jack for transporting and positioning the cabinet. Pushing/pulling on the sides of the unit to move it may result in damage to the Maintenance Bypass Cabinet.

The Maintenance Bypass Cabinet may be packed in a crate for extra protection during transportation. Avoid impact or vibration against the Maintenance Bypass Cabinet during transportation. DO NOT expose the Maintenance Bypass Cabinet directly to water.

5 Storage/Operating Environment

5.1 Inspection/Storage

Inspection

Upon receipt of the Slim MBS, an inspection for shipping damage should be performed. Use caution when removing the unit from the pallet. Refer to labels or documentation attached to packing material.

Unpacking

Check the unit for loose, broken, bent or otherwise damaged parts. If damage has occurred during shipping, keep all original crating and packing materials for return to the shipping agent.

NOTE: The factory warranty does not apply to damage incurred during shipping!

Ensure that the rated capacity and the model number specified on the nameplate conform to the order specifications.

Storage

During periods of non-use, the following guidelines are recommended for storage.

Storage Preparation

- Place all MBS Circuit Breaker switches in the “OFF” position.

Storage Conditions

- For best results, store the Slim MBS cabinet in the original shipping container and place on a wood or metal pallet
- Storage temperature range: 32 to 104 °F (0 to 40 °C)
- **Avoid the following storage locations:**
 - Locations that are subject to extreme temperature changes or high humidity
 - Locations that are subject to high levels of dust or metal particles
 - Locations that are subject to excessive vibration
 - Inclined floor surfaces

5.2 Storage Environment

Observe the following when storing the Slim MBS.

- Store indoors.
- Temperature fluctuations should be minimized.
- A maximum temperature range of 32 – 104 °F (0 – 40 °C) should be observed.
- The optimal relative humidity at the storage location should be between 50 – 60% without condensation.
- Humidity must not exceed 90%.
- Avoid locations where the Slim MBS cabinet may be exposed to corrosive gas.
- Avoid locations with dirt and/or dust.
- Avoid locations that are subject to excessive vibration. Avoid inclined floor surfaces.

TABLE 5.1 - SLIM MBS CABINET STORAGE/OPERATING ENVIRONMENT STANDARDS

Item	Environment standard	
Storage Location	Indoors	
Ambient Temperature	Minimum storage temperature: 32 °F (0 °C)	
	Maximum storage temperature: 104 °F (40 °C)	
Relative Humidity	The relative humidity must be between 30% and 90% and without condensation due to temperature changes.	
Altitude	This equipment is rated for installations up to 3240 ft. (1000 m) above sea level. Consult with the factory to determine the derating factor for installations above 3240 ft. (1000 m).	
Dust	Dust must not exceed normal atmospheric levels and must not include conductive/corrosive particles, silicone or oils.	
Flammable Gas	No flammable and/or explosive gas.	
	Hydrogen sulfide (H ₂ S)	Less than or equal to 0.0001 PPM
	Sulfurous acid gas (SO ₂)	Less than or equal to 0.05 PPM
	Chlorine gas (Cl ₂)	Less than or equal to 0.002 PPM
	Ammonia gas (NH ₃)	Less than or equal to 0.1 PPM
	Nitrous acid gas (NO ₂)	Less than or equal to 0.02 PPM
	Nitrous oxides (NO _x)	Less than or equal to 0.02 PPM
	Ozone (O ₃)	Less than or equal to 0.002 PPM
	Hydrochloric acid mist (HCl)	Less than or equal to 0.1 mg/m ³

5.3 Operating Precautions

Initial startup/commissioning of the Slim MBS cabinet should be performed by factory authorized personnel.

- 1) The Slim MBS cabinet should not be powered up until the entire operation manual has been read. Follow Lockout/Tag Out procedures.
- 2) The voltage of the input power source must be within the rated input voltage range. The input frequency range must be within the rated input frequency range.
- 3) The Slim MBS cabinet should not be used with a load that has a rated input that is greater than the rated output of the Slim MBS.
- 4) DO NOT insert metal objects or combustible materials in the ventilation slots of the Slim MBS cabinet.
- 5) DO NOT place, hang, or paste any objects on the exterior surfaces of the Slim MBS cabinet.
- 6) DO NOT attempt to disassemble, modify, or repair the Slim MBS cabinet. Call your Toshiba sales representative for repair information.
- 7) Turn the power on only after installing **ALL** of the covers.
- 8) DO NOT remove any covers of the Slim MBS cabinet when power is on.
- 9) If the Slim MBS cabinet should emit smoke or an unusual odor or sound, turn the power off immediately.

- 10) Additional warnings and notifications shall be posted at the equipment installation location as deemed required by **Qualified Personnel**.

5.4 Maintenance Precautions

All internal maintenance should be performed by factory authorized personnel.

- 1) Turn off, lockout, and tagout ALL power sources before connecting the power wiring to the equipment or when performing maintenance.
- 2) Hard-wire type UPS units are not equipped with an over-current protection device, nor do they have an output disconnect for the AC output. A user-installed circuit breaker should be provided between the UPS output and the load input.
- 3) The maximum ambient operating temperature is 104 °F (40 °C) for the 4400 Slim MBS.
- 4) Only factory authorized personnel should service the UPS. Contact Toshiba for the nearest authorized service center.

Qualified Personnel ONLY!

Qualified Personnel have the skills and knowledge relating to the construction, installation, operation, and maintenance of the electrical equipment and has received safety training on the hazards involved (Refer to the latest edition of NFPA 70E for additional safety requirements).

Qualified Personnel shall:

- 1) Have read the entire operation manual.
- 2) Be trained and authorized to safely energize, de-energize, ground, lockout and tag circuits and equipment, and clear faults in accordance with established safety practices.
- 3) Be trained in the proper use and care of protective equipment such as safety shoes, rubber gloves, hard hats, safety glasses, face shields, flash clothing, etc., in accordance with established safety practices.
- 4) Be trained in rendering first aid.
- 5) Be knowledgeable of the DC backup supply system and the required handling and maintenance precautions.

For further information on workplace safety visit www.osha.gov.

 WARNING	
	Misuse of equipment could result in injury and equipment damage. In no event will Toshiba Corporation be responsible or liable for either indirect or consequential damage or injury that may result from the misuse of this equipment.

6 Unpacking

6.1 General Instructions

Unpack the Slim MBS Cabinet indoors on a paved floor. The Slim MBS Cabinet should be as close as possible to its final location. Allow enough space for forklift operations to unpack the Slim MBS Cabinet from the packing crate. Then remove the crate. Properly dispose of the crate.

Points to observe:

- Retain all small articles during unpacking and installation.
- Make sure that exterior paint is not scratched and that the Slim MBS Cabinet is not damaged before uncrating.
- DO NOT damage the Slim MBS Cabinet when using tools to remove packaging materials.
- If provided, DO NOT remove the protective plastic sheet cover until installation.
- Packing materials should be disposed by the appropriate means.
- Immediately report any abnormalities to Toshiba Customer Support Center or an authorized representative.
- Retain the packing rails, if included, for offloading the Slim MBS Cabinet from the shipping pallet.

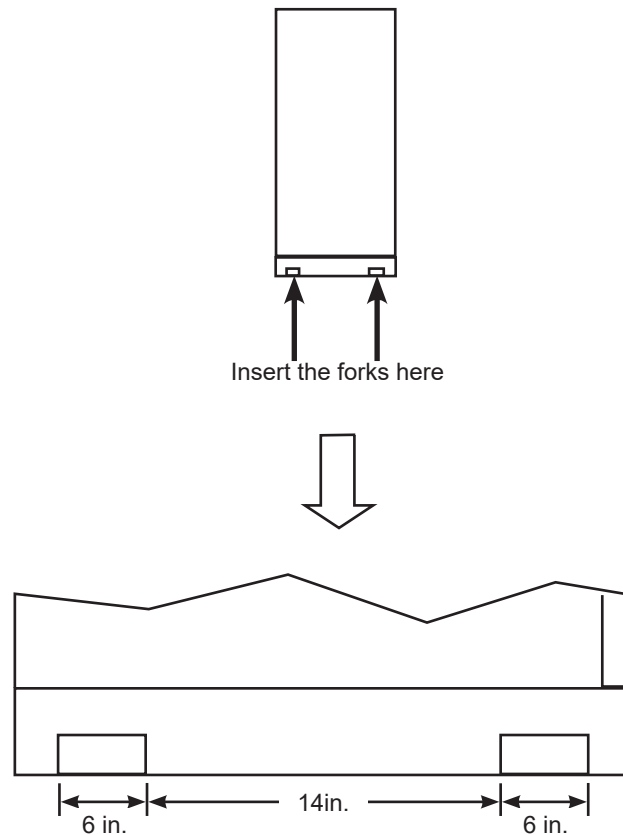
6.2 Unpack the Slim Maintenance Bypass Cabinet

	
	TOP HEAVY EQUIPMENT. THIS EQUIPMENT WILL TIP OVER EASILY UNTIL FIXED IN PLACE. Lift and move carefully, and only with adequate equipment and trained personnel. IMPROPER LIFTING CAN RESULT IN INJURY OR DEATH.

6.3 Transporting By Forklift

Verify forklift maximum load capacity and ensure that the forks are long enough to properly support the UPS. Insert the forks into the space shown in Figure 6.1. Spaces for the forks are provided underneath the maintenance bypass cabinet.

DO NOT tilt MBS when lifting and/or transporting. Minimize the impact when lowering the cabinet to the floor.



4400 Slim MBS Cabinet Cabinet: Side View -
Fork Access Dimensions in Channel Base

Figure 6.1 - Transporting by Forklift

7 Installation

7.1 Installation Precautions

 CAUTION	
	Install the Slim MBS Cabinet in a controlled environment. Improper storage and installation environment may deteriorate insulation, shorten component life and cause malfunctions. <i>See Table 5.1 - Slim MBS Cabinet Installation Environment Standards</i>
	DO NOT tilt the Slim MBS cabinet more than 10° from upright position. Tilting the Slim MBS Cabinet more than 10° may cause crushing, trapping or other personal injuries and cause physical damage to internal components.
 WARNING	
	Keep the SPECIFIED CLEARANCE around the UPS. Inadequate space around the UPS makes it difficult to perform maintenance/inspections, will lead to insufficient ventilation, and/or cause malfunctions.
	Only factory authorized personnel should relocate, modify, or replace parts in the Slim MBS Cabinet after initial installation. Electrical shock, injury or Slim MBS Cabinet failure may occur if non-authorized technicians attempt to modify or relocate the Slim MBS Cabinet. Please contact Toshiba Customer Support Center if you plan to move or make modifications to the Slim MBS Cabinet
 WARNING	
	METAL CONDUIT IS NOT AN ACCEPTABLE GROUND.

Conductor Routing and Grounding

- 1) Use separate metal conduits for routing the input power, output power, and control circuits.
- 2) Follow the wire size and tightening torque specifications.
- 3) Always ground the unit to reduce the potential for electrical shock and to help reduce electrical noise.
- 4) A separate ground cable should be run inside the conduit with the input power, output power, and control circuits.

7.2 Slim MBS Cabinet Clearance

Maintain the indicated clearance during installation. See Figure 7.1. Ensure that the front and top air vents are NOT blocked.

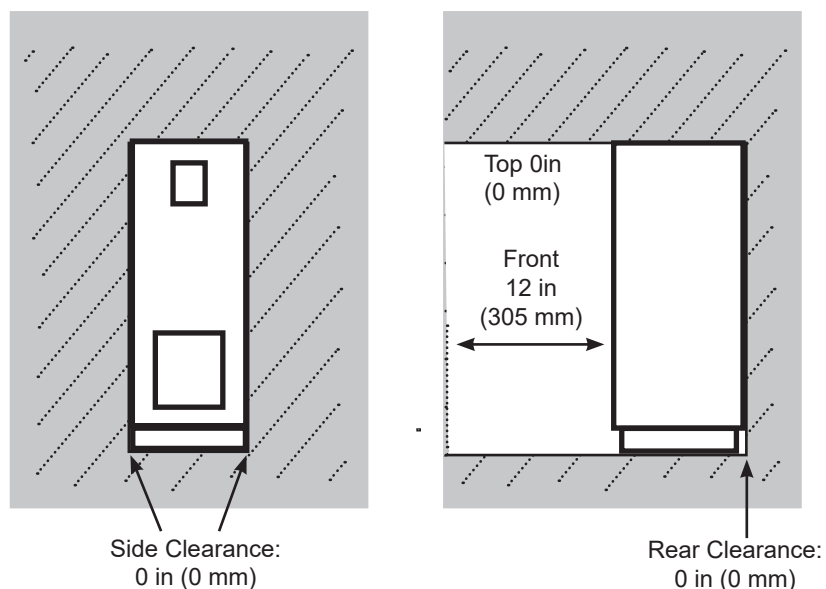


FIGURE 7.1 CLEARANCE FOR 15-30KVA SLIM MBS CABINET

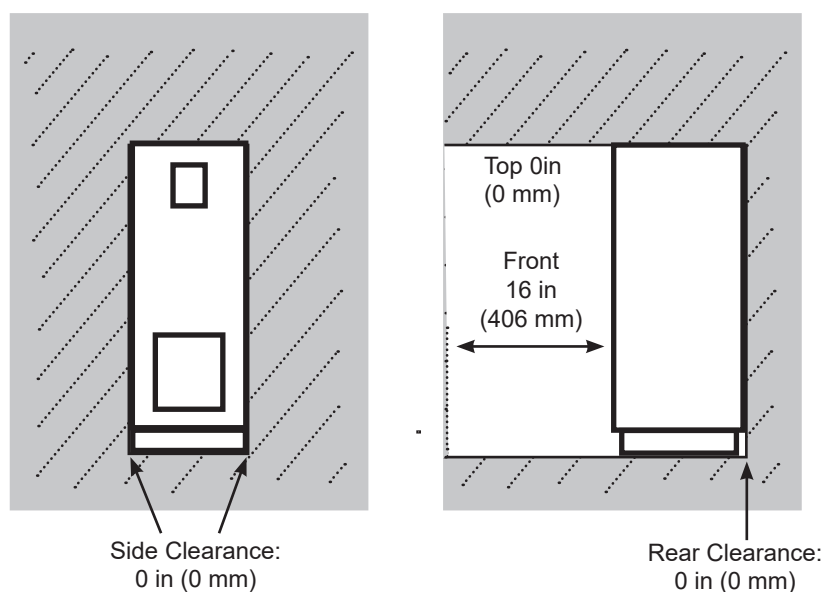


FIGURE 7.2 CLEARANCE FOR 50-100KVA SLIM MBS CABINET

7.3 Power Cable Layout and Sizing (15-50kVA Cabinet TB-1)

See Figure 7.3 for correct landing terminals for each of the necessary power cables in the UPS system. Refer to the following section for TB-1 location in the overall layout of the Slim MBS cabinet. This figure also corresponds with the system one-line shown in Figure 10.1.

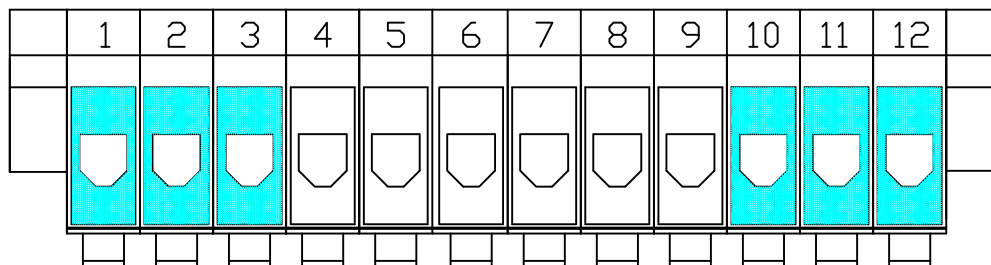


FIGURE 7.3 – TB-1 TERMINAL DETAIL

Terminal Number	Terminal Function
TB1-1	Utility Input Phase A
TB1-2	Utility Input Phase B
TB1-3	Utility Input Phase C
TB1-4	UPS Input Phase A
TB1-5	UPS Input Phase B
TB1-6	UPS Input Phase C
TB1-7	UPS Output Phase A
TB1-8	UPS Output Phase B
TB1-9	UPS Output Phase C
TB1-10	Load Connection Phase A
TB1-11	Load Connection Phase B
TB1-12	Load Connection Phase C

Note: Always consult your site specific, local, state, and NEC electrical codes for wiring, cabling, and circuit protection device requirements.

Recommended cable sizing for the 15-50kVA terminal block is shown in Tables 7.1 and 7.2.

TABLE 7.1 RECOMMENDED CABLE SIZE & TIGHTENING TORQUE FOR 15-30KVA SYSTEM

Block Number	Cable Size (Min-Max) 75 °C Copper Wire in Conduit					Tightening Torque
	Terminal Lug Capacity (AWG)	15 kVA (AWG)	20 kVA (AWG)	25 kVA (AWG)	30 kVA (AWG)	
Utility Input A, B, C	#10 – #0	#4	#3	#2	#1	25-27 in-lb (2.8-3.0 N•m) (6.5 x 1.2 mm Flat blade screwdriver)
UPS Input A, B, C	#10 – #0	#4	#3	#2	#2	
UPS Output A, B, C	#10 – #0	#4	#3	#2	#2	
Load Connection A,B,C	#10 – #0	#4	#3	#2	#2	
Neutral Bus Connection ¹	N/A	#0	#0	#0	#0	

TABLE 7.2 RECOMMENDED CABLE SIZE & TIGHTENING TORQUE FOR 50KVA SYSTEM

Block Number	Cable Size (Min-Max) 75 °C Copper Wire in Conduit		Tightening Torque
	Terminal Lug Capacity (AWG)	50 kVA (AWG)	
Utility Input A, B, C	#2 – 2/0	2/0	53.1-61.9 in-lb (6.0-7.0 N•m) (6.5 x 1.2 mm Flat blade screwdriver)
UPS Input A, B, C	#2 – 2/0	2/0	
UPS Output A, B, C	#2 – 2/0	2/0	
Load Connection A,B,C	#2 – 2/0	2/0	
Neutral Bus Connection ¹	N/A	250 kcmil	

7.4 Power Cable Layout and Sizing (80-100kVA Cabinet Bus Bar)

See Section 8.3 for bus bar location and orientation. Follow Table 7.3 for recommended cable size and and torque recommendations.

TABLE 7.3 RECOMMENDED CABLE SIZE & TIGHTENING TORQUE FOR 80-100KVA SYSTEM

Block Number	Cable Size (Min-Max) 75 °C Copper Wire in Conduit		Tightening Torque
	80 kVA	100 kVA	
Utility Input A, B, C	400kcmil	600kcmil	3/8" Bolt-SAE Grade 8: 47 ft-lb 1/2" Bolt - SAE Grade 8: 119 ft-lb
UPS Input A, B, C	400kcmil	600kcmil	
UPS Output A, B, C	400kcmil	600kcmil	
Load Connection A,B,C	400kcmil	600kcmil	
Neutral Bus Connection ¹	(2) x 300kcmil	(2) x 500kcmil	

¹ See Section 8 for location of Neutral Bus Bars in each cabinet type. Use same Tightening Torque recommendation for 80-100kVA System bus bars. Size neutral cable appropriate to actual load type: balanced, unbalanced, non-linear.

7.5 Control Wiring Layout (15-100kVA Cabinet TB-2)

See figure 7.4 for functional description of each landing point on TB-2 Terminal Block. Refer to electrical one line drawings in Section 10.1 and 10.2 for correct control wiring configuration between UPS and MBS Cabinet. Wiring and torque recommendations are summarized in Table 7.4.

Note: Except for TB2-1 and TB2-2 which must be connected to UPS, the rest of the terminals are used for internal wiring. Only qualified personnel should rewire other terminals and only for reasons related to service or troubleshooting of the connected components.

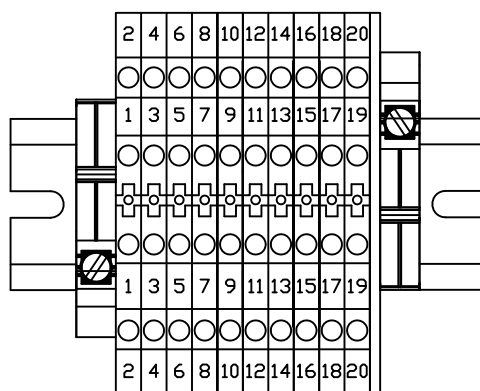


FIGURE 7.4 – TB-2 TERMINAL DETAIL

Terminal Number	Terminal Function	Terminal Number (cont.)	Terminal Function (cont.)
TB2-1	Bypass Active 1	TB2-11	LED 2 +
TB2-2	Bypass Active 2	TB2-12	SKRU 1
TB2-3	CB1-AUX 1	TB2-13	LED 1 +
TB2-4	CB1-AUX 2	TB2-14	Spare
TB2-5	CB2-AUX 1	TB2-15	Spare
TB2-6	CB2-AUX 2	TB2-16	Spare
TB2-7	CB3-AUX 1	TB2-17	Spare
TB2-8	CB3-AUX 2	TB2-18	Spare
TB2-9	LED 4 +	TB2-19	Spare
TB2-10	LED 3 +	TB2-20	Spare

TABLE 7.4 TB-2 TERMINAL FASTENING TORQUE

TB3 Terminals	Wire Size	Fastener Torque
1 thru 20	14 – 16 AWG	8 in-lb (0.9 N·m)

8 MBS Component Layout

8.1 15-30kVA Cabinet Component Layout

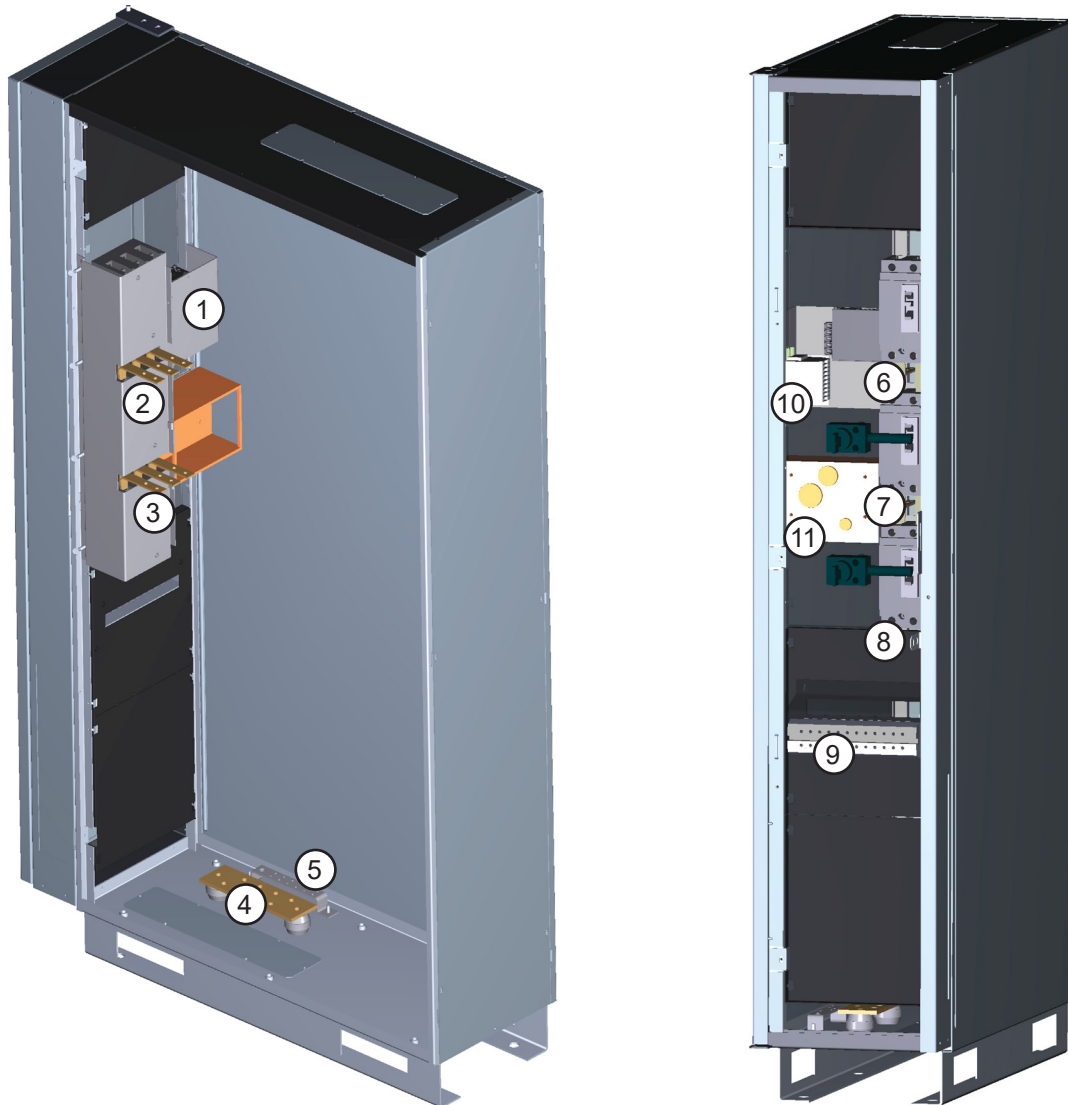


FIGURE 8.1 – 15-30KVA FRONT AND INNER COMPONENT LAYOUTS

Part Number	Part Description	Part Number	Part Description
1	Power Supply	7	CB-2
2	Utility Connection	8	CB-3
3	Load Connection	9	TB-1
4	Neutral Bus Bar	10	TB-2
5	Ground Bus Bar	11	SKRU
6	CB-1		

8.2 50kVA Cabinet Component Layout

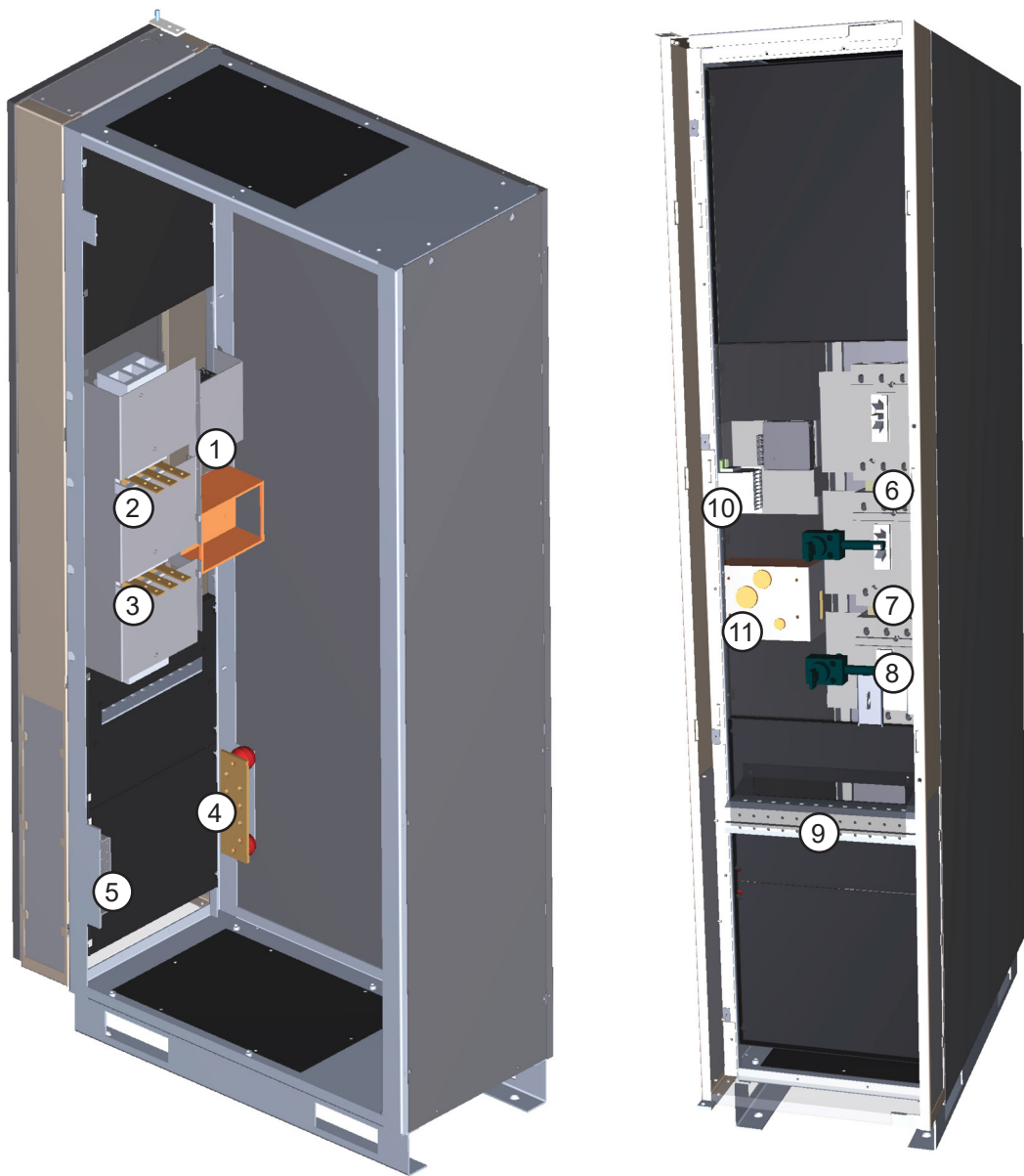


FIGURE 8.2 – 50KVA FRONT AND INNER COMPONENT LAYOUTS

Part Number	Part Description	Part Number	Part Description
1	Power Supply	7	CB-2
2	Utility Connection	8	CB-3
3	Load Connection	9	TB-1
4	Neutral Bus Bar	10	TB-2
5	Ground Bus Bar	11	SKRU
6	CB-1		

8.3 80-100kVA Cabinet Component Layout

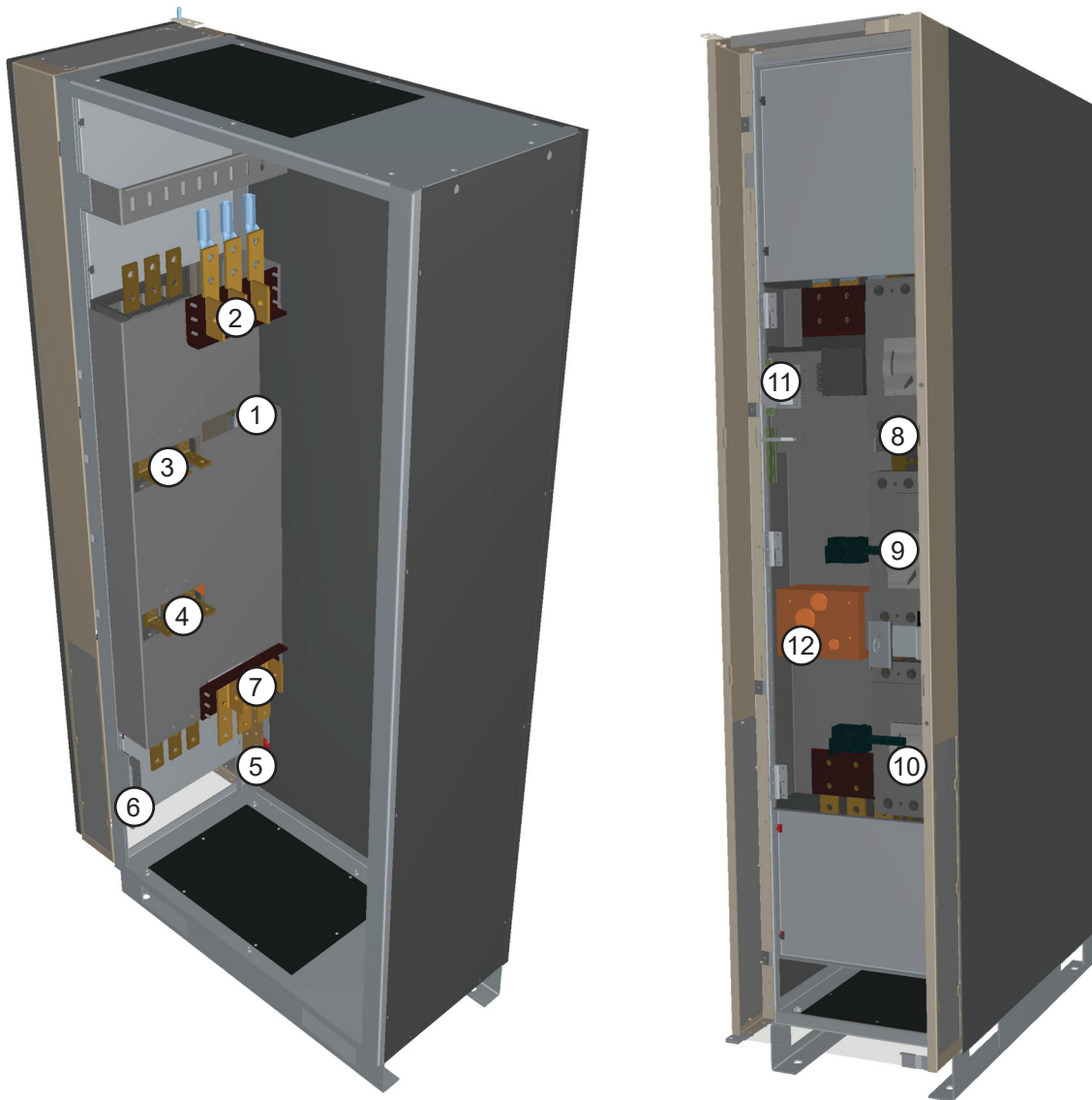


FIGURE 8.3 – 80-100KVA FRONT AND INNER COMPONENT LAYOUTS

Part Number	Part Description	Part Number	Part Description
1	Power Supply	7	UPS Out Connection
2	UPS In Connection	8	CB-1
3	Utility Connection	9	CB-2
4	Load Connection	10	CB-3
5	Neutral Bus Bar	11	TB-2
6	Grouding Bus Bar	12	SKRU

9 MBS Operation

Begin this procedure only with the system in the normal operating mode (UPS On-Line)

- 1) Touch the "Start/Stop" button on the MAIN screen on the UPS Cabinet. Touch and Hold the "Stop" button until it beeps (this will transfer the UPS to static bypass.) If SKRU in MBS is equipped with a light, it should now be illuminated, and the key can be removed.
- 2) Extract the key from the SKRU.
- 3) Insert the key in the lock on CB-2, and unlock CB-2.
- 4) Close CB-2 (Maintenance Bypass Breaker)
- 5) Open CB-3 (UPS Output Isolation Breaker)
- 6) Lock CB-3. Remove the key from the lock on CB-3, and insert it in the SKRU.
- 7) Turn off all DC breakers.
- 8) At this time, CB-1 (UPS Input Breaker) may now be opened. Any input isolation breakers to the rectifier input of the UPS must now be opened to isolate the UPS completely.
- 9) End of Procedure.

System is now on External Maintenance Bypass

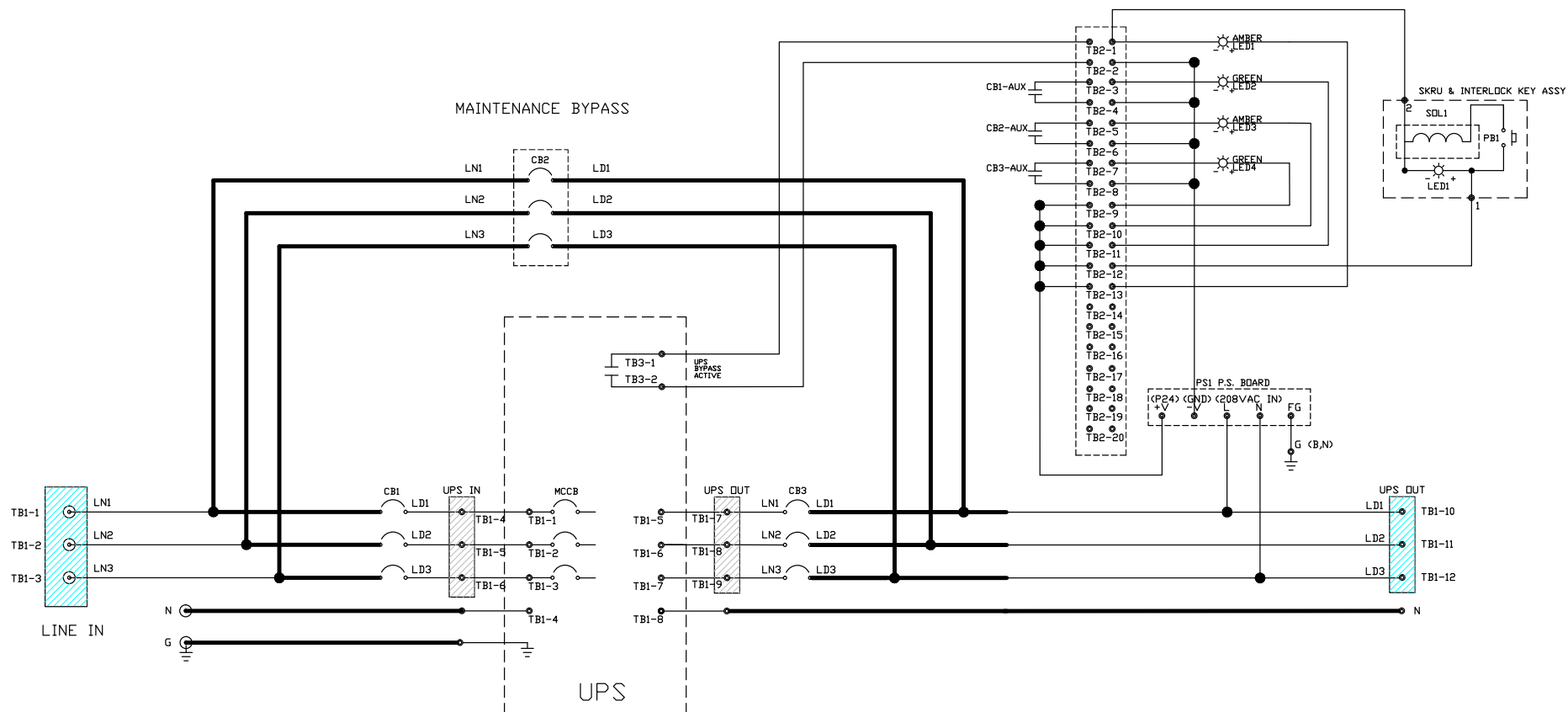
This procedure is for the system in the maintenance bypass-operating mode (System is on External Maintenance Bypass)

- 1) Close CB-1 (UPS Input Breaker) and close input isolation breakers to the UPS.
- 2) Wait until the UPS turns ON.
- 3) Turn ON all DC breakers.
- 4) Verify that the UPS is in Bypass via the mimic panel.
- 5) Verify that the Bypass and Inverter LED's are on. If so, the key in the SKRU can now be removed.
- 6) Extract the key from the SKRU. Insert it in the lock on CB-3, and unlock CB-3.
- 7) Close CB-3 (UPS Output Isolation Breaker)
- 8) Open CB-2 (Maintenance Bypass Breaker)
- 9) Lock CB-2. Remove key from CB-2, and insert it in SKRU.
- 10) Touch the "Start/Stop" button on the MAIN screen. Touch and hold the "Start" button until it beeps (this will transfer the UPS to inverter operation.)
- 11) End of Procedure.

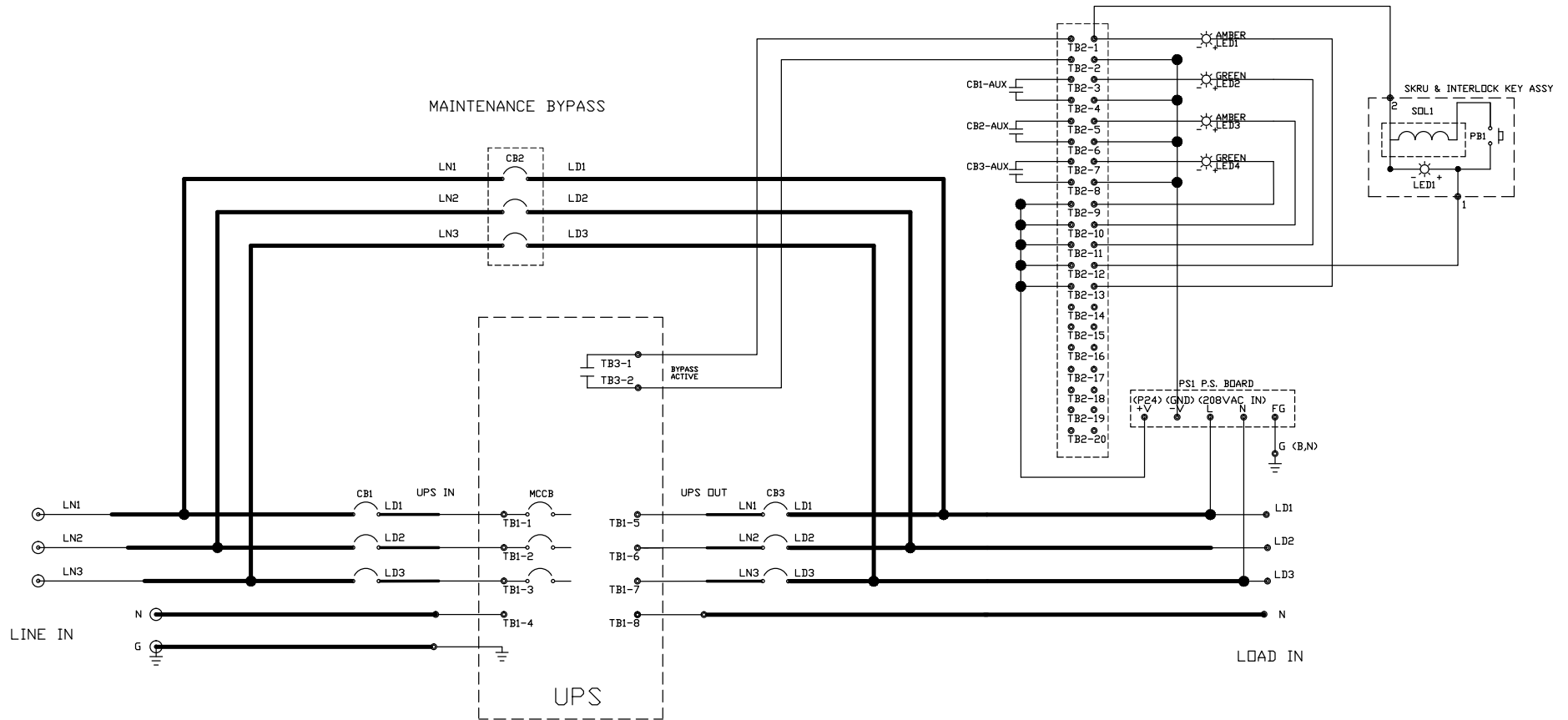
System is now being supported by the UPS.

10 MBS One-line and Wiring Drawings

10.1 15-50kVA One Line and Wiring Diagram



10.2 80-100kVA One Line and Wiring Diagram

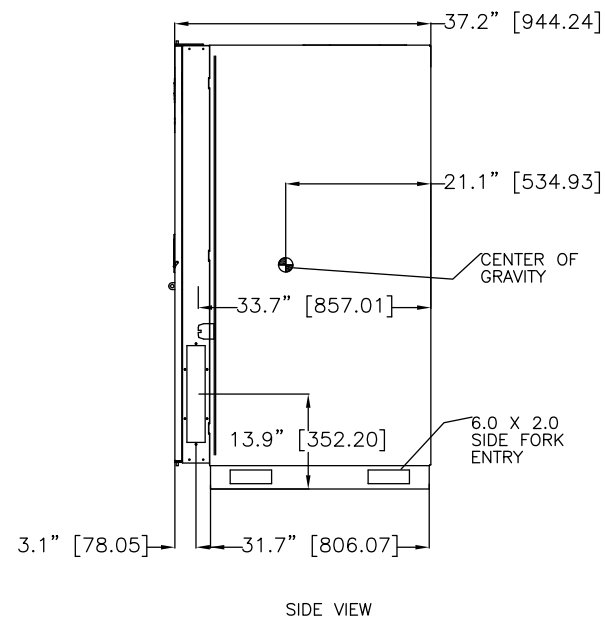
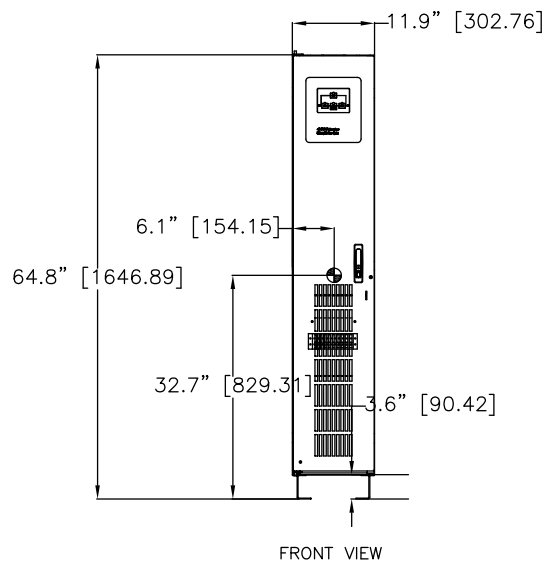
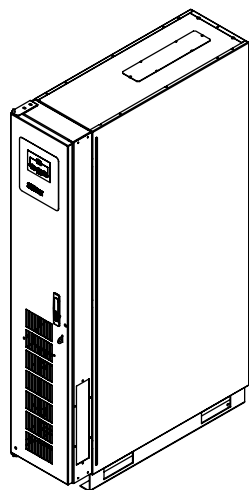
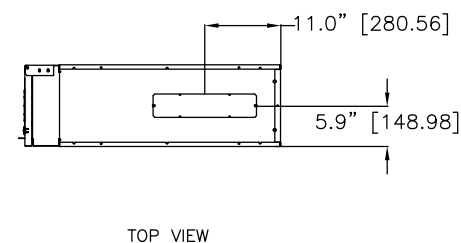
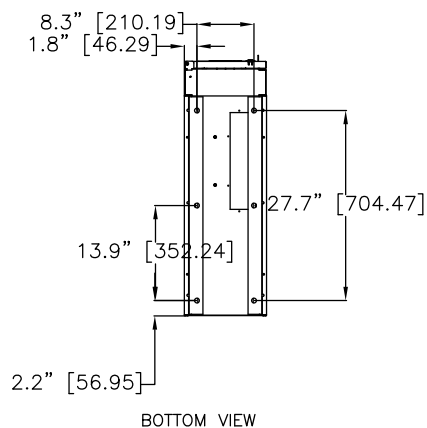


11 MBS Mechanical Drawings

11.1 15-30kVA Mechanical Drawings

PARAMETERS	15-30KVA
WEIGHT (LBS/KGS)	205/93
VENTILATION CLEARANCE	FRONT 12"; SIDES/BACK/TOP 0"
FINISH	O'BRIEN BLACK OR WHITE GRAY

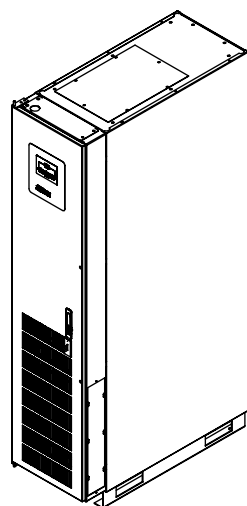
NOTE: SEE PRODUCT MANUAL FOR COMPLETE SPECIFICATIONS



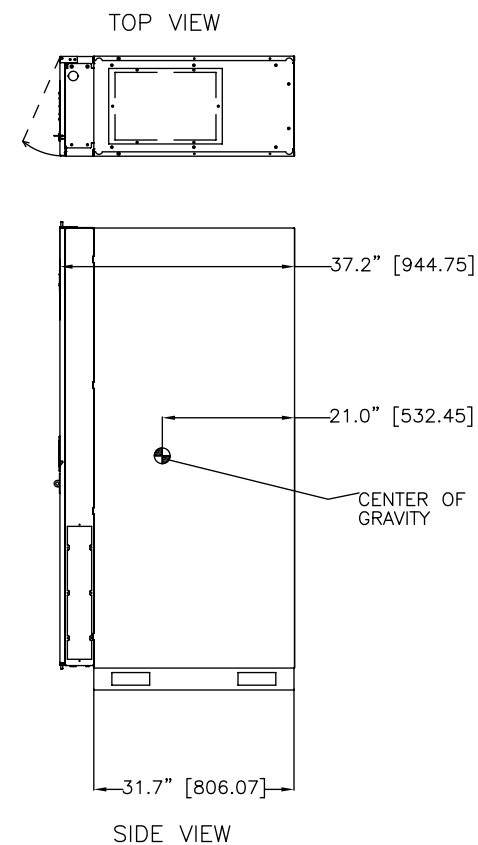
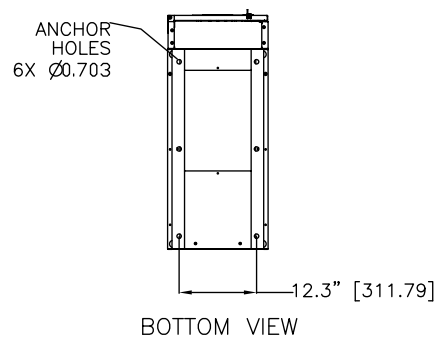
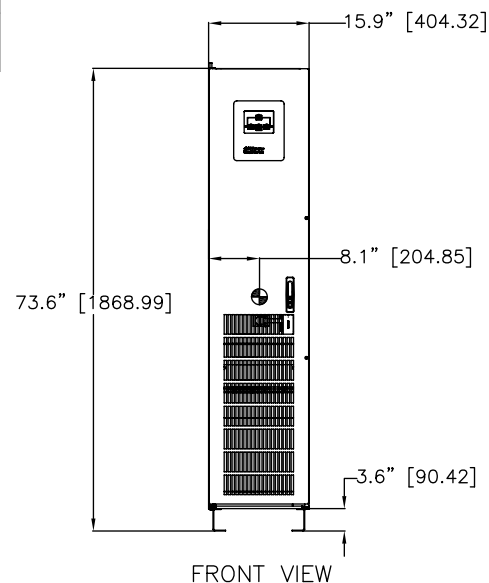
11.2 50-100kVA Mechanical Drawings

PARAMETERS	50 KVA	80–100 KVA
WEIGHT (LBS/KGS)	275/125	320/145
VENTILATION CLEARANCE	FRONT 16"; SIDES/BACK/TOP 0"	
FINISH	O'BRIEN BLACK OR WHITE GRAY	

NOTE: SEE PRODUCT MANUAL FOR COMPLETE SPECIFICATIONS



ISOMETRIC VIEW



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