TOSHIBA

4400 SERIES
BATTERY CABINET

INSTALLATION AND OPERATION MANUAL



MNL-00200 REV A
July 2020

c UL us

This manual provides instructions regarding safety, storage, installation, operation and maintenance. Failure to observe the precautions as presented may result in injury or loss of life.

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TOSHIBA INTERNATIONAL CORPORATION
SOCIAL INFRASTRUCTURE SYSTEMS GROUP
POWER ELECTRONICS DIVISION - UPS
13131 West Little York Road
Houston, Texas 77041-9990
www.toshibaups.com

Toshiba Customer Support Center
8 a.m. to 5 p.m. (CST) – Monday through Friday

Main Tel: 855-803-7087
Option 1: Order Processing & Customer Service
Option 2: Application and Sales Support
Option 3: Field Service, Repair and Maintenance Service

Tel:877-867-8773 (24/7) Field Service Support

Fax (713) 896-5212

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1. INTRODUCTION

Toshiba Interntaional Corporation Top Terminal Battery Cabinets are shipped loaded with batteries partially assembled, internally pre-wired and come standard with an over current breaker. The removable hinged front doors and removable rear cover also allow for easier battery access. Refer to the battery layout drawings and schematics at the end of this manual. Consult the battery manufacturer's battery operation and maintenance manual for complete instructions.

These battery systems are built and tested to UL 1778 standards at the factory prior to shipment. All system settings are also adjusted at this time according to the specification sheet.

2. PRECAUTIONS

⚠ **It is very important to read, understand and follow the instructions in this manual. Also note all SAFETY PRECAUTIONS before beginning the installation of this system.**

⚠ **Consult the Battery Manufacturer's Operation and Maintenance Manual for important battery information.**

⚠ **Battery cabinet systems are very heavy. Total weight can exceed 5,500 lbs, for a fully loaded cabinet. Use at least 3 people when unloading and setting equipment in place.**

⚠ **It is imperative that only qualified personnel work on this system and installation, maintenance or upgrades be performed with insulated tools and equipment.**

⚠ **When installing this battery system, follow all applicable federal, state and local regulations and industry guidelines to insure a proper installation.**

⚠ **DC power and battery supplies are dangerous and have extremely high short circuit currents. Severe burns or death can result from a system short. They also can leak potentially explosive gas (hydrogen). Never enclose batteries or battery cabinets in a sealed air tight room.**

⚠ **All jewelry and watches must be removed prior to installing or servicing this system.**

⚠ **Do not smoke or present flame near or around any battery cabinet system.**

⚠ **Never leave a panel off or door open and unattended.**

3. INSPECTION UPON RECEIPT OF GOODS

3.1 General

Special precautions and care have been taken to ensure the cabinet system arrives safe and undamaged. However, upon receipt, you should inspect the entire shipment, including the crate and any boxes for evidence of damage that may have occurred during transit.

3.2 Visible Damage

It is the responsibility of the person receiving the shipment to inventory and fully inspect all materials against the bill of lading or way bill IMMEDIATELY, while the carrier representative is still present. Ensure that all items are accounted for, including number of skids and quantity of boxes. Also note any visible external damage that may have occurred during transit. Make all applicable notations on the delivery receipt before signing even if noting "POSSIBLE CONCEALED DAMAGE" and file a damage report with the carrier.

3.3 Concealed Damage

Immediately after receipt, unpack the cabinet system and check for any concealed damage. Check the materials received against the detailed packing list to verify the quantity and the condition as complete and satisfactory.

Note any damage to the internal packaging, then request an inspection by the carrier and file a concealed damage claim. If there is a material shortage, contact us at the number listed at the end of this manual.

Please contact your shipping company for all shipping damage. Toshiba International Corporation is not responsible for any shipping damage.

3.4 Return of Damaged Goods

An RMA number must be obtained before returning equipment to Toshiba International Corporation. Please contact a representative or call the corporate number listed at the end of this manual.

4. SYSTEM OVERVIEW

The enclosed cabinet systems provide the necessary DC backup power required in UPS applications. Over-current breaker/fuse protection is supplied. DC connections are front accessible and made via terminal blocks and/or mechanical lugs. Refer to the drawings and schematics at the end of this manual for these connections. Cabinets are equipped with 3-pole breakers. There are 2 holes per polarity on 300 Amp to 600 Amp breakers. Breakers 30 Amps to 250 Amps have a single hole per polarity. It is highly recommended to run 2 runs of smaller cable into the cabinets and breakers 300 Amps to 600 Amps because of bend radius requirements inside the cabinets. **See table below for standard output lug sizes of breakers.**

BREAKER SIZING						
BREAKER SIZE AMPS	30A	40A	50A	75A	100A	125A
A.I.C. RATING, 500DC	20,000 A.I.C	20,000 A.I.C	20,000 A.I.C	20,000 A.I.C	20,000 A.I.C	20,000 A.I.C
OUTPUT LUG SIZE	(1)#14-3/0	(1)#14-3/0	(1)#14-3/0	(1)#14-3/0	(1)#14-3/0	(1)#4-3/0
BREAKER SIZE AMPS	150A	175A	200A	225A	250A	300A
A.I.C. RATING, 500DC	20,000 A.I.C	20,000 A.I.C	20,000 A.I.C	20,000 A.I.C	20,000 A.I.C	20,000 A.I.C
OUTPUT LUG SIZE	(1)#4-4/0	(1)#4-4/0	(1)3/0-350	(1)3/0-350	(1)3/0-350	(2) 2/0-500
BREAKER SIZE AMPS	350A	400A	450A	500A	600	
A.I.C. RATING, 500DC	20,000 A.I.C	20,000 A.I.C	20,000 A.I.C	20,000 A.I.C	20,000 A.I.C	
OUTPUT LUG SIZE	(2) 2/0-500	(2) 2/0-500	(2) 2/0-500	(2) 2/0-500	(2) 2/0-500	

During normal conditions the UPS supplies the load power and the necessary power required to keep the batteries at the proper float voltage. Verify that the charger is set to charge parameters within the approved float voltage range of the batteries, refer to manufacturer's battery operation and maintenance manual.

When AC fails, the batteries discharge in order to provide the necessary backup power. It is the responsibility of the customer to make sure the batteries are not discharged below the battery manufacturer's recommendations. Always recharge batteries per manufacturer's battery operation and maintenance manual. Batteries will be damaged if not recharged right away. See the UPS or DC system manual for more information. Also see label on exterior of cabinet packaging for next top charge date under normal environmental conditions.

5. GENERAL SYSTEM SPECIFICATIONS

5.1 DC Output Characteristics

- **Voltage:** (UPS Application) 288 VDC Nominal
- **Breaker:** Standard
- **Fuse Type:** Not standard, consult factory. If a fuse is provided, it is only to be replaced by a factory service technician.

CAUTION! Fire Hazard Warning:
Replace only with same type and rating of fuses supplied with the system.

- **Wire Size and Type:** Per NEC and/or local building and electrical codes.
- **Disconnect:** If a fuse has been provided in lieu of a breaker inside the cabinet, a disconnecting method must be provided per NEC code. This may be a fuse switch or circuit breaker. Size accordingly.

5.2 Batteries

- **Type**: Valve Regulated Lead Acid (VRLA), sealed, non-spillable.
- **Voltage**: 6 or 12 Volt DC Nominal, Top Terminal Design.
- **Only cabinets with flame retardant batteries are suitable for computer room use.**

5.3 Grounding

- All grounding should be derived from the main building ground source.
- **Note**: All cabinet systems require grounding.
- All cabinets have a defined ground connection point.

5.4 Environmental Conditions

Breakers are located at the top of the cabinet.

Standard Cabinet Dimensions:

Toshiba 4400 Series Battery Cabinet (15-30kVA)	36.0” W x 29.5” D* x 65.1” H
Toshiba 4400 Series Battery Cabinet (50-100kVA)	36.0” W x 29.5” D* x 73.6” H

For mounting hole dimensions, please refer to the cabinet layout drawing at the end of this manual.

Cabinet Weight (empty):

Toshiba 4400 Series Battery Cabinet (15-30kVA)	515 lbs. (233.6 Kg.)
Toshiba 4400 Series Battery Cabinet (50-100kVA)	550 lbs. (249.5 Kg.)

Loaded weight will vary depending on battery model, system voltage and cable size used throughout battery cabinet. Please contact a representative if a loaded battery cabinet weight is required.

****Consult with factory for additional configurations.**

- **Temperature:** Normal operating temperatures are between 68ºF -77ºF. **Note:** Batteries typically should be at 77ºF for optimum battery life and performance.
- **Ventilation/Cooling:** Provided through ventilation slots in front door, the rear panel, bottom panel, and top of cabinet, thus providing a chimney effect for natural convection cooling. If local codes require forced air exhaust, unused covers serve as conduit entry or duct work entry points. Fan kits are also available as an option.
- **Clearance:** A minimum of four inches is required in the rear of the cabinet for ventilation requirements. NEC requires a minimum of 36 inches in front of the cabinet. Reference NEC and local codes for additinal clearance requirements.

CAUTION! Explosion/Fire Hazard Warning:
Batteries can generate potentially explosive gas (hydrogen).
Never enclose batteries or battery cabinets in a sealed, airtight room.

6. INSTALLATION PRODEDURES

BEFORE PROCEEDING WITH INSTALLATION READ THE FOLLOWING:

6.1 Preparation

6.1.1 Necessary Equipment and Tools

- Rigging tools for moving cabinets. Pallet jack and forklift of 5,500 lbs. minimum capacity.
- Heavily insulated assortment of hand tools.
- Digital Voltmeter

6.1.2 Equipment Inspection

Remove the packaging material from the cabinet and inspect for any concealed shipping damage that may have been overlooked upon receipt of goods. Use the packing list to verify the system has all components and cables for installation.

6.1.3 Safety Precautions

DC VOLTAGE WARNING!
Hazardous DC Voltages are present in the battery cabinet. This hazard will always be present, even when the battery system is off-line. Accidental short circuit of the positive and negative terminals will cause tremendous currents to flow resulting in severe burns, fire and possible death. Use extreme caution!

IMPORTANT SAFETY INSTRUCTIONS. SAVE THESE INSTRUCTIONS!!

- **All disconnecting means should be in the open/off position before servicing.**
- **All installation drawings and schematics should be reviewed and clearly understood before hooking up this system.**
- **Only qualified DC power technicians or electricians should attempt to work on and install this equipment.**
- **All jewelry, rings and watches should be removed when working on this equipment.**
- **All tool handles and shafts must be heavily insulated.**
- **Do not rest any tools or loose cables on top of batteries.**
- **Make sure all connections are properly torqued and secure. Torque values are provided on battery label.**
- **Do not smoke or present flames near or around any battery system.**
- **Always wear safety glasses and gloves and use insulating mats to stand on when working on this system.**
- **Do not allow bare skin to come into contact with battery cabinet, as this could result in an electrical shock.**
- **Do not install any cable terminations until it has been verified that such a termination will not create a short circuit.**

7. INSTALLATION STEPS

7.1 Cabinet Location

Prior to installation, verify floor loading requirements and all applicable codes pertaining to the related equipment. Environmental conditions should also be reviewed. Proper ventilation and cooling must be adequate for optimum battery life and performance. A clearance of 4" is recommended at the front and rear of the cabinet. This refers to obstruction of ventilation only. Clearance around the cabinet sides should be as suggested by NEC and local codes. Ambient temperature should be between 68ºF -77ºF.

7.2 Cabinet Mounting

1. Remove any remaining packaging materials (cardboard, plastic).
2. Unbolt the cabinet from the pallet. Remove the cabinets from the pallet using a forklift rated for at least 5,500 lbs.
3. The battery cabinet is equipped with narrow pallet jack or forklift access openings in the front and rear of the cabinet. Move the equipment into the desired location and set in place.
4. In order to meet seismic requirements, refer to the SEISMIC ANCHORING drawings included with this manual. The following steps detail the necessary actions to be taken to meet Zone 4 mounting requirements.
5. On the floor, mark the location of the 6 mounting holes found at the bottom of the cabinet legs.
6. Use the hole location drawing provided with each shipment to mark holes for anchors. Use ½" or 12mm anchors. Install anchors per manufacturer's instructions.
7. Move the cabinet into place, align holes, check levelness, and tighten hardware. **Note:** Should any drilling be performed on this equipment, make sure all exposed batteries and connections are completely covered using insulated type mats. Prevent dust from entering cabinets and clear any debris that has collected.
8. Install the front doors on the cabinet.
9. If multiple battery cabinets are installed, repeat above steps. Check height and levelness with adjoining cabinets.

7.3 DC Connections

CAUTION!
PLEASE READ ALL SAFETY INSTRUCTIONS BEFORE PROCEEDING.

1. Open the cabinet door and check for any noticeable problems or damage that may have occurred during shipment. Remove the cardboard box from the cabinet (right cabinet in a dual cabinet system). Use the packing list to verify all bus bars, cables, battery covers and hardware required for assembly is available.
2. Review the installation drawing and schematic diagram included in this manual. A cable has been left off in the battery string for safety and will need to be installed later.
3. Connect main cables to the circuit breaker, when applicable, inside the cabinet from the UPS or charger source. All cables should be sized per NEC and any other local codes pertaining to this equipment. Refer to the UPS or charger manual for wiring external batteries. **Note:** Make sure charging source is disconnected before making these connections; also verify the battery cabinet is turned off.
4. Connect the battery interconnect cables/bus bars that were left off during shipment and install as shown on the installation drawing included in this manual. Torque connections properly. Torque values are provided on battery label.

7.4 Grounding

Ground the battery cabinet to the main building ground. A ground stud inside the cabinet is provided for this.

7.5 System Operation

Refer to the UPS or charger manual for start up and operation of system.

8. SYSTEM MAINTENANCE

CAUTION!
PLEASE READ ALL SAFETY PRECAUTIONS BEFORE PROCEEDING

8.1 Blown Fuse Replacement

If a fuse has blown in the system, contact an authorized factory technician to replace it.

CAUTION! Fire Hazard Warning:
Replace only with same type and rating of fuses supplied with the system.

8.2 Battery Replacement Steps

Servicing of batteries should be performed or supervised by personnel knowledgeable about batteries and the required precautions. When replacing batteries, replace with the same type and number of batteries.

CAUTION!
Do not dispose of batteries in a fire. The batteries may explode.

Do not open or mutilate batteries. Released electrolyte is harmful to the skin and eyes. It may be toxic.

A battery can present a risk of electrical shock and high short-circuit current. The following precautions should be observed when working on batteries:

- Remove jewelry, rings, watches or other metal objects.
- Use tools with insulated handles.
- Wear rubber gloves and boots. Wear safety glasses.
- Do not lay tools or metal parts on top of batteries.
- Disconnect charging source prior to connecting or disconnecting battery terminals.
- Determine if the battery is inadvertently grounded. Remove string from buss and check voltages to ground. Contact with any part of a grounded battery can result in electrical shock. The likelihood of such shock can be reduced if grounds are kept during installation and maintenance.

1. Prepare the new battery for installation. Check to make sure the battery is the same type and amp-hour rating. Use a non-metallic brush or Scotch Brite pad to clean the terminals. Apply a light coat of No-ox grease to the terminal to avoid corrosion "per battery manufacturer's recommendation".
2. Disconnect the charger or UPS from the battery string by opening the breaker.
3. Remove the center jumper on the battery string to reduce the voltage. If replacing all batteries, continue reducing the voltage in this manner.
4. Disconnect the interconnect bus bars and/or cables from the battery to be replaced.
5. Remove the old battery.
6. Install the new battery. Make sure the new battery is installed the same way regarding polarity orientation and verify with drawing.
7. Reconnect cables to the battery. Make sure connections are properly torqued. Torque values are provided on the battery label.
8. Reconnect the center jumper. Make sure connections are properly torqued. Torque values are provided on the battery label.
9. Check voltage at terminal block.
10. Close breaker when ready. If your model has a disconnect with an exterior handle to the door, close and latch on the door first before closing the breaker.

9. WARRANTY RELATED MAINTENANCE

1. The purchaser (user) shall give freshening charges to the battery a minimum of every six (6) months for Lead-Calcium batteries after shipment from the factory and until final installation. Refer to the installation and maintenance instructions from the battery manufacturer for maximum storage intervals at different environmental situations. Extreme heat could cause more frequent freshing charges.

2. At least once every six (6) months, purchaser (user) must take readings and record information per battery manufacturer’s installation/maintenance instructions. These records must be maintained for warranty claim purposes. If warranty records are not kept, the warranty shall be null and void.

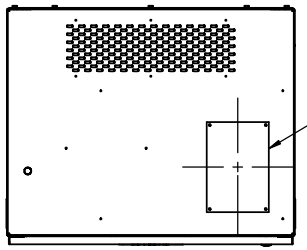
3. Parallel strings should be limited to two (2) strings.

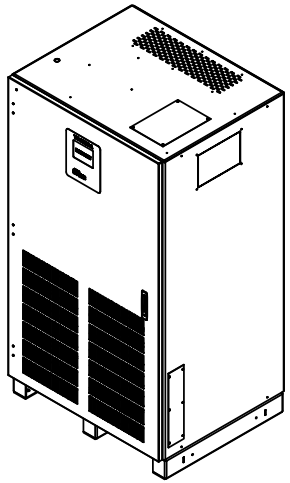
4. Movement of batteries from original point of installation shall immediately void the product warranty, except with the expressed written consent from Toshiba International Corporation.

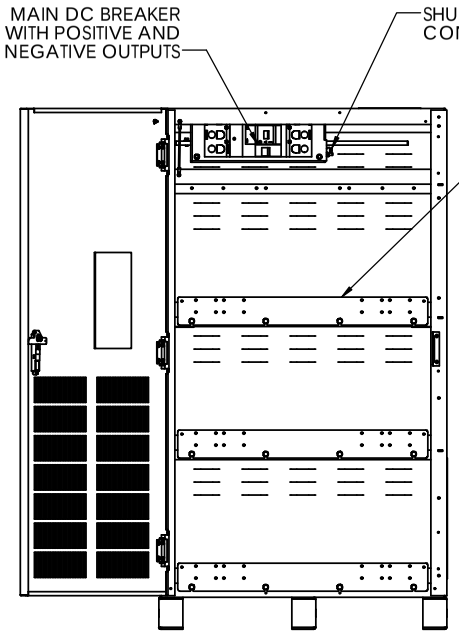
5. Any storage shall be in a dry area having ambient temperature of 67º F (19º C) - 77º F (25° C), and in accordance with battery manufacturer published installation, operation and maintenance instructions. Failure to follow the battery manufacturer’s published guidelines and/or instructions may invalidate the product warranty, at the sole discretion of Toshiba International Corporation.

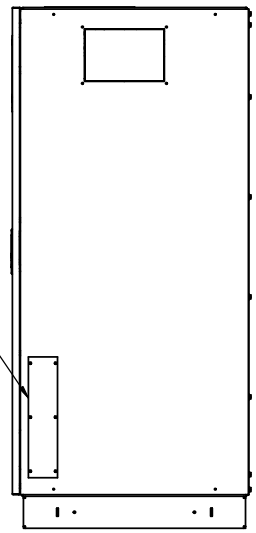
6. During service or extended storage, a battery system monitor is recommended to be used to record temperatures, voltages, AC ripple, Float currents, Discharge and more to provide more accurate battery and environmental data for warranty with battery manufacturer's claims.

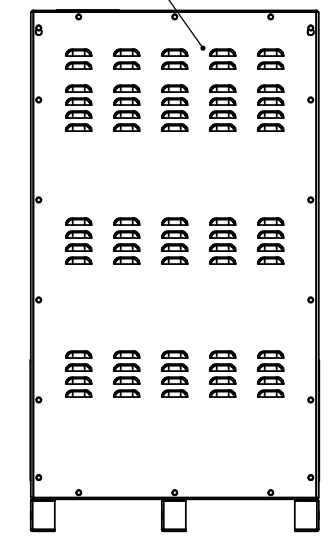
GENERAL BATTERY CABINET DRAWING











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TITLE:
MANUAL DRAWING
44B2 BATTERY CABINETS, GENERAL VIEWS

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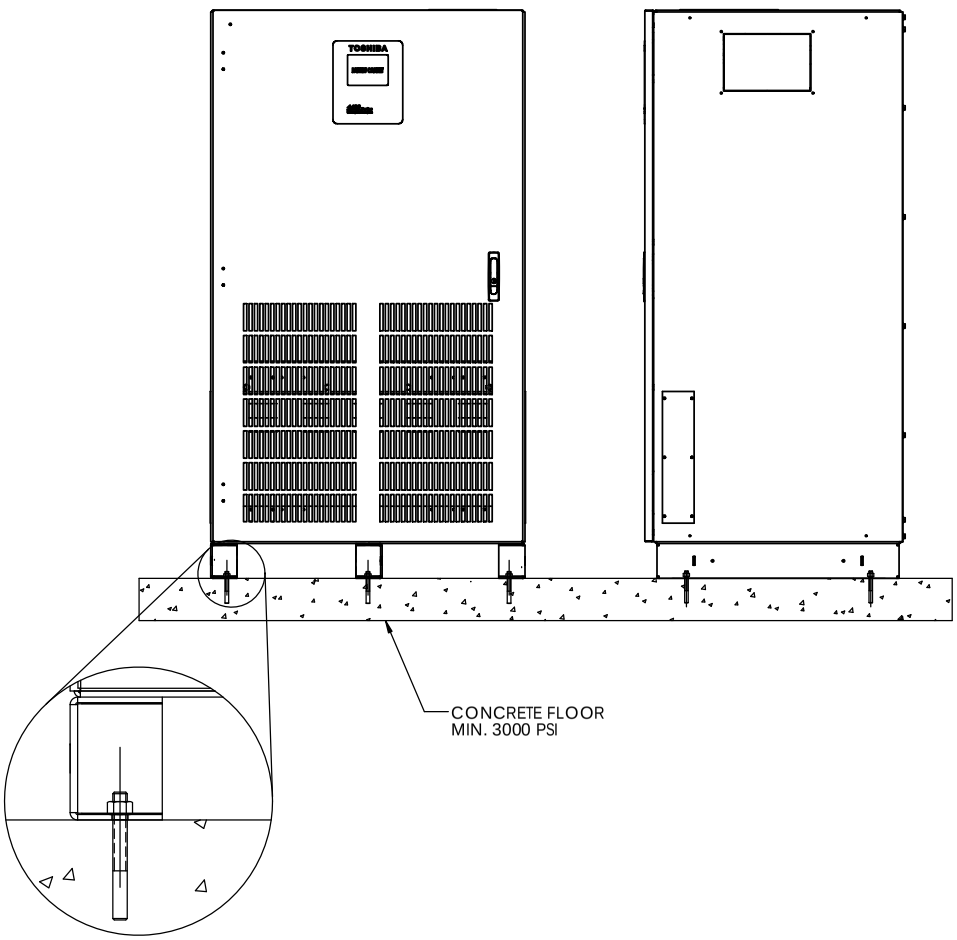
MNL-002000
Rev A
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NOTES:

THE BATTERY CABINETS HAVE BEEN CERTIFIED TO IBC 2012, SECTION 1621 AND 1622.
CABINET MUST BE ANCHORED WITH 6 HILTI KB-TZ EXPANSION ANCHORS OR EQUIVALENT.
CHECK APPLICABLE LOCAL BUILDING CODES FOR LENGTH AND STYLE
OF ANCHORS TO BE USED WITH THE FLOORING SUBSTRATE. INSTALL ANCHORS
PER MANUFACTURER'S INSTRUCTIONS. THIS DRAWING IS A GENERAL REPRESENTATION.
ANCHORS WILL BE 2 PER RAIL AS SHOWN.

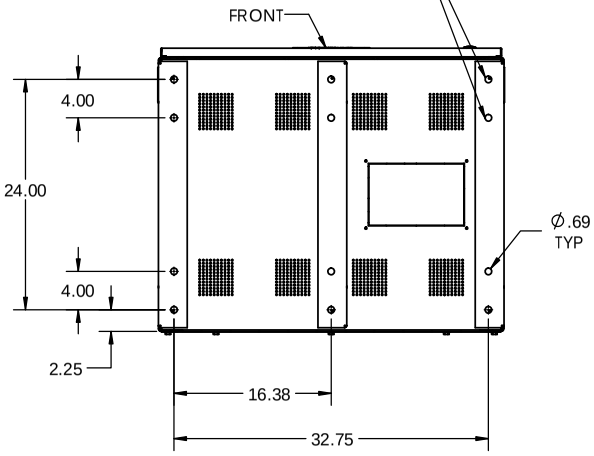
FRONT VIEW

SIDE VIEW



1/2" DIAMETER HILTI KB-TZ EXPANSION ANCHORS
PER ESR-1917

FOR SIDE BY SIDE
INSTALLATIONS, USE AN OFFSETTING
PATTERN BY USING EITHER OF THE 2 HOLES.
ONLY 2 ANCHORS PER RAIL AS SHOWN



BOTTOM VIEW - ANCHORING LOCATIONS

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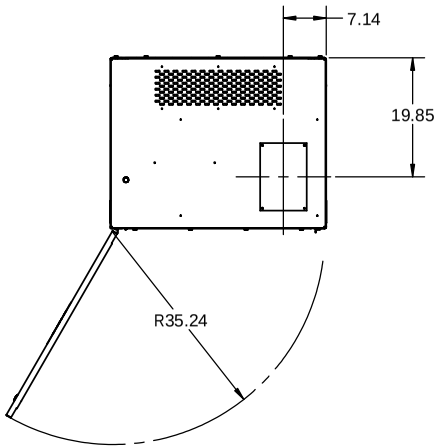
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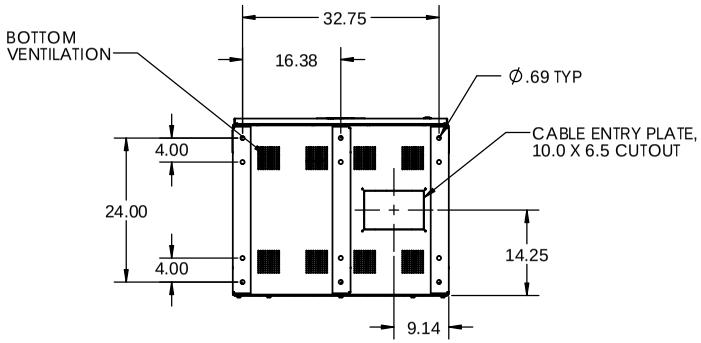
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44B2 BATTERY CABINETS, SEISMIC ANCHORING

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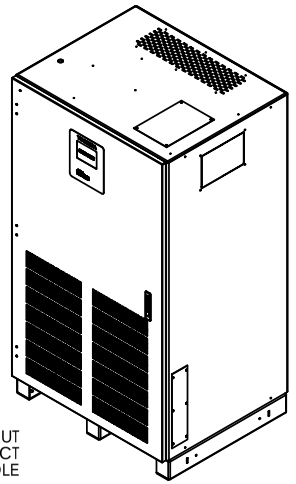
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July 2020

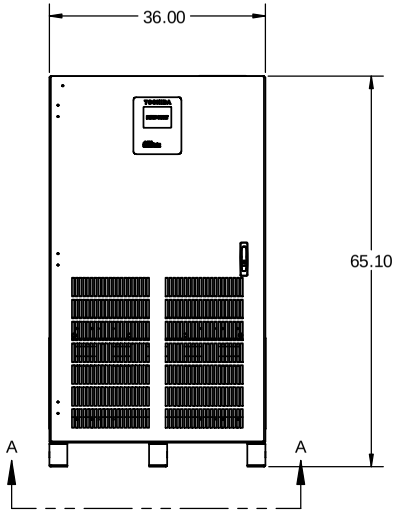


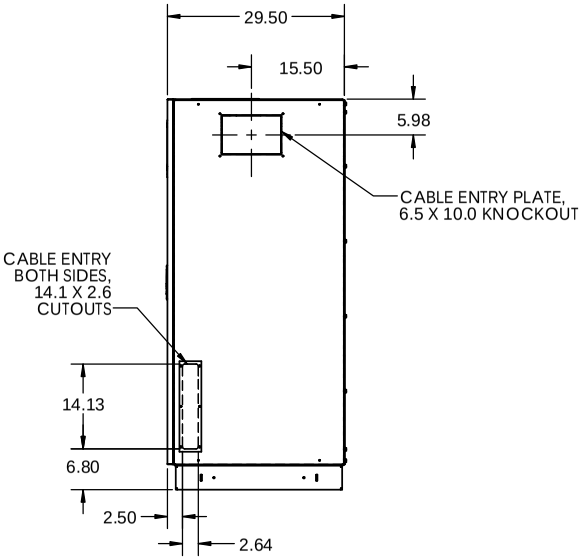


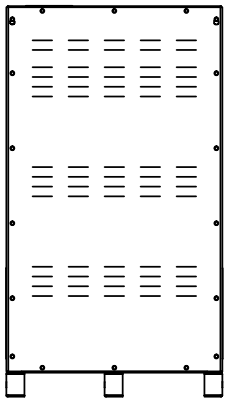
SECTION A-A
SCALE 1 : 16



SHOWN WITHOUT
MANUAL DISCONNECT
HANDLE







CABINET NOTES:

1. NEMA 1 DESIGN.
2. EMPTY CABINET WEIGHT 515 LBS (233.6 KG)
3. FULLY WELDED FRAME. MANUFACTURED FROM HEAVY GAUGE STEEL.
4. POWDER COATED WITH A CORROSION RESISTANT, EPOXY HYBRID POWDER USING A FIVE STAGE EMERSION PRETREATMENT PROCESS.
5. BATTERIES CAN BE ACCESSED FROM FRONT, REAR, AND BOTH SIDES.
6. CUSTOM DESIGNED PALLETS FOR SHIPPING ANYWHERE LOCALLY AND GLOBALLY (UPON REQUEST).
7. BATTERY CABINET CAN BE MOVED WITH A NORMAL PALLET JACK FROM FRONT AND REAR. FROM SIDES, BATTERY CABINET CAN BE MOVED WITH ROLL-A-LIFT TYPE MOVER. ONLY LIFT CABINET FROM BOTTOM.
8. BATTERIES ARE SECURED WITH NON-CONDUCTIVE STRAPPING FOR FOR SAFE TRANSIT.
9. STANDARD AND CUSTOM SPILL CONTAINMENT OPTIONS ARE AVAILABLE.

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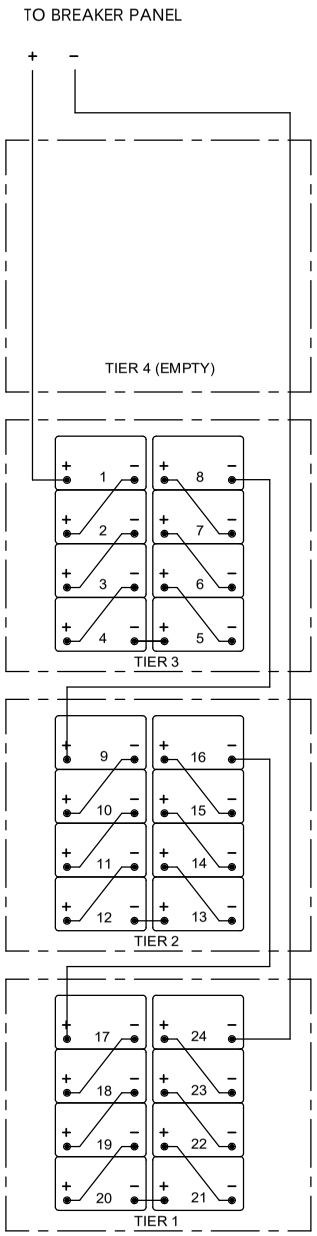
TOSHIBA
TOSHIBA INTERNATIONAL CORPORATION

TITLE:
TOSHIBA 4400 15-30 kVA BATTERY CABINET
44B2 MECHANICAL/ELECTRICAL DRAWING

SIZE	DWG. NO.	REV
C	DOC-020800	A

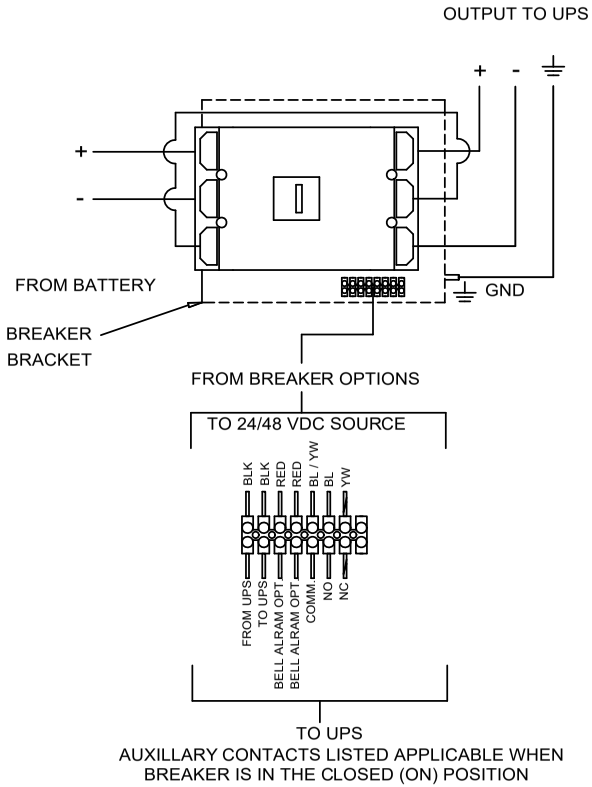
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July 2020



TYP 288V WIRING

BREAKER OPTIONS DETAIL



AUXILLARY CONTACTS LISTED APPLICABLE WHEN BREAKER IS IN THE CLOSED (ON) POSITION

ELECTRICAL NOTES:

1. ALL CABLES ARE UL LISTED.
2. ALL BREAKERS ARE UL RECOGNIZED.
3. TERMINAL BLOCKS ARE UL RECOGNIZED, 600V RATED.
4. CABINETS ARE SHIPPED WITH THE BREAKER IN THE TRIPPED POSITION.
5. CABINET GROUND CONNECTION IS A 5/16-18 THREADED STUD.
6. CABLES BETWEEN BATTERY CABINET TO UNINTERRUPTIBLE POWER SUPPLY ARE OPTIONAL.

PROPRIETARY AND CONFIDENTIAL
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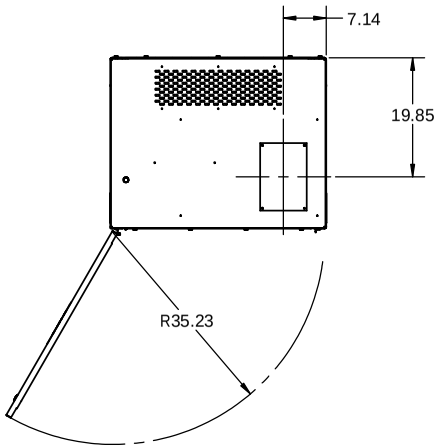
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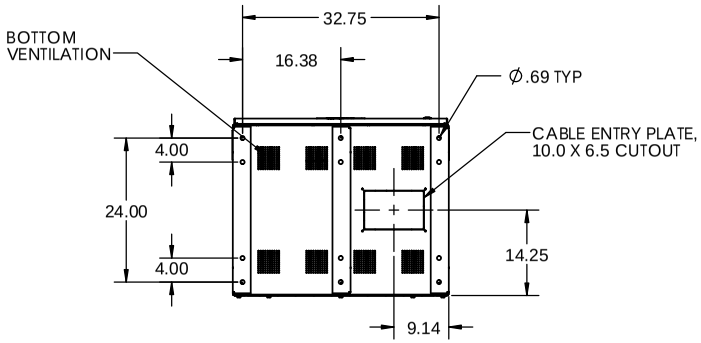
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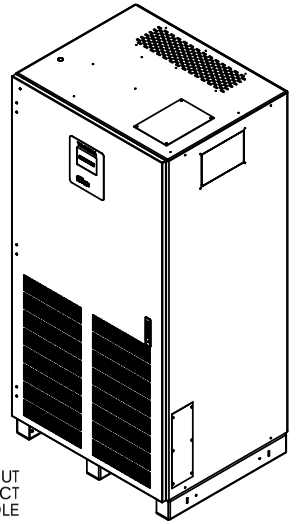
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C	DOC-020800	A
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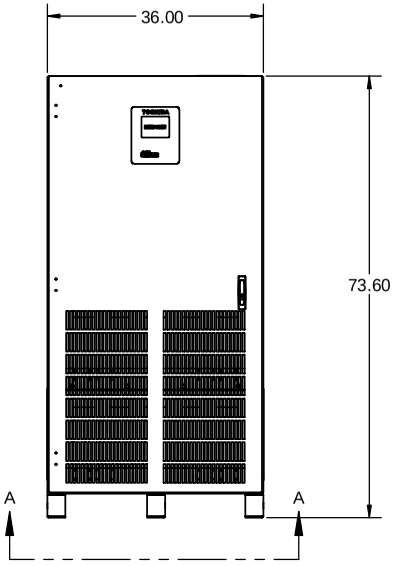


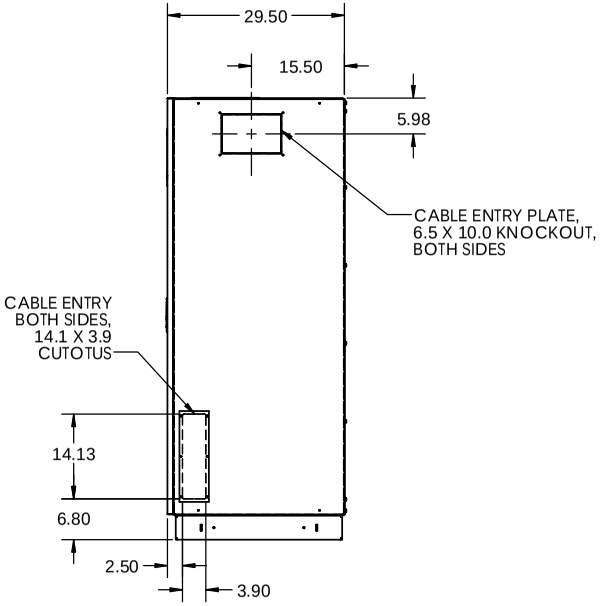


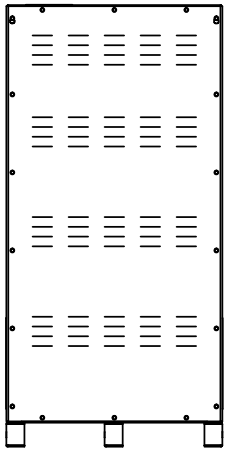
SECTION A-A
SCALE 1 : 16



SHOWN WITHOUT
MANUAL DISCONNECT
HANDLE







CABINET NOTES:

1. NEMA 1 DESIGN.
2. EMPTY CABINET WEIGHT 550 LBS (249.5 KG)
3. FULLY WELDED FRAME. MANUFACTURED FROM HEAVY GAUGE STEEL.
4. POWDER COATED WITH A CORROSION RESISTANT, EPOXY HYBRID POWDER USING A FIVE STAGE EMERSION PRETREATMENT PROCESS.
5. BATTERIES CAN BE ACCESSED FROM FRONT, REAR, AND BOTH SIDES.
6. CUSTOM DESIGNED PALLETS FOR SHIPPING ANYWHERE LOCALLY AND GLOBALLY (UPON REQUEST).
7. BATTERY CABINET CAN BE MOVED WITH A NORMAL PALLET JACK FROM FRONT AND REAR. FROM SIDES, BATTERY CABINET CAN BE MOVED WITH ROLL-A-LIFT TYPE MOVER. ONLY LIFT CABINET FROM BOTTOM.
8. BATTERIES ARE SECURED WITH NON-CONDUCTIVE STRAPPING FOR FOR SAFE TRANSIT.
9. STANDARD AND CUSTOM SPILL CONTAINMENT OPTIONS ARE AVAILABLE.

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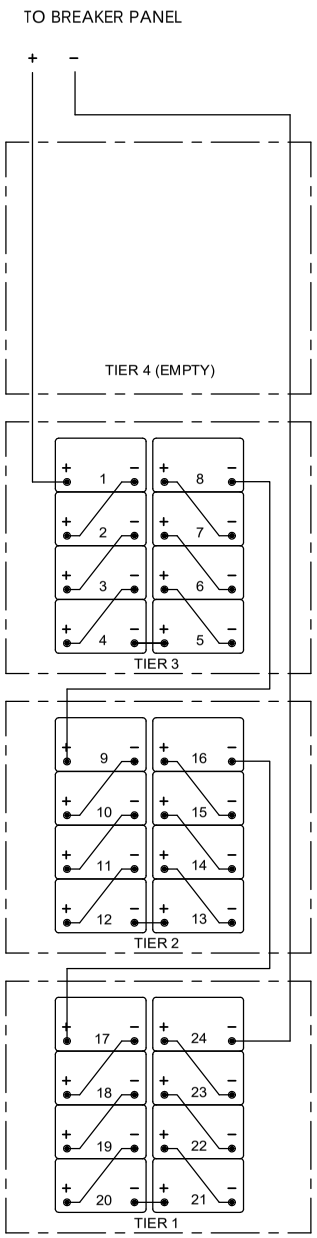
	NAME	DATE
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TOSHIBA
TOSHIBA INTERNATIONAL CORPORATION

TITLE:
TOSHIBA 4400 50-100 kVA BATTERY CABINET
44B2 MECHANICAL/ELECTRICAL DRAWING

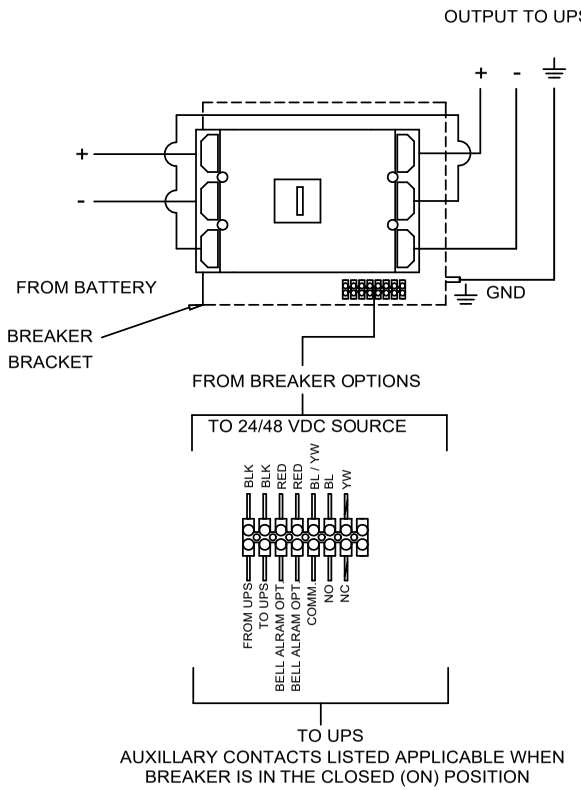
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TYP 288V WIRING

BREAKER OPTIONS DETAIL



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NOTES



TOSHIBA INTERNATIONAL CORPORATION

SOCIAL INFRASTRUCTURE SYSTEMS GROUP
POWER ELECTRONICS DIVISION
13131 West Little York Rd., Houston, TX 77041
Tel: 855-803-7087 Fax 713-896-5212
US 800/231-1412 Canada 800/872-2192 Mexico 01/800/527-1204

www.toshibaups.com