

Vertiv™ PowerBoard Go Switchboard GUIDE SPECIFICATIONS

1.0 GENERAL

1.1 Related Documents

Drawings and general provisions of the contract, including general and supplementary conditions and division [XX] specification sections, apply to this section.

1.2 Summary

- The Vertiv™ PowerBoard Go Switchboard (hereafter referred to as the switchboard) is a standardized, configure-at-speed switchboard designed to improve efficiency, save space, and enhance operator safety.
- This switchboard is a low-voltage switchboard designed for the North American market. The switchboard uses a Configure-to-Order (CTO) approach with a predefined set of standard components to reduce engineering effort and simplify installation.
- The switchboard provides high power density in a compact footprint, featuring a standard shallow enclosure depth of 37 in. to optimize floor space.
- Designed, tested, and certified to UL 891, the dead-front enclosure supports safe front access and complies with applicable NEMA indoor requirements.
- The modular architecture supports group-mounted molded case circuit breakers (MCCB) distribution sections up to 1200 A and allows future expansion using captive splice plates.

1.3 Applications

The switchboard is intended for use in the following applications:

- Commercial facilities
- Industrial facilities
- Hospitals and healthcare facilities
- Universities and educational institutions
- Warehouses and distribution centers
- Data centers

1.4 Standards

The switchboards shall be designed, manufactured, tested, and labeled in accordance with the latest applicable standards:

- UL 891 – Low Voltage Switchboards
- UL 489 – Molded Case Circuit Breakers (MCCB)
- UL 50 / UL 50E – Enclosures for Electrical Equipment
- NEMA PB-2 – Dead-Front Distribution Switchboards
- UL 1449 – Surge Protective Devices (when provided)
- UL 1066 – Draw-out air circuit breaker (ACB)
- NFPA 70 (NEC) – National Electrical Code

The switchboard shall be UL 891 certified.

1.5 System Description

1.5.1 Environmental Conditions

The switchboard shall be suitable for operation under the following conditions:

- **Ambient temperature (operating):** 0 °C to 40 °C (32 °F to 104 °F)
- **Relative humidity:** Up to 60% non-condensing
- **Installation location:** Indoor
- **Altitude:** Up to 1000 m above sea level

1.6 Electrical Specification / Performance Requirements

The switchboard shall perform as specified herein while supplying rated full-load current as indicated on the project drawings.

- **System Voltage:** The switchboard shall be designed for rated voltages of 208/120 V AC or 480/277 V AC.
- **Frequency:** The system shall be rated for operation at 60 Hz.
- **System:** The system shall be available in the following configurations:
 - Three-phase, three-wire (3P3W)
 - Three-phase, four-wire (3P4W)
- **Main Bus Rating:** The main bus rating shall be one of the following:
 - 2000 A
 - 2500 A
 - 3000 A
 - 4000 A

- **Short-circuit Rating:** The switchboard shall be rated for interrupting capacities up to 100 kAIC, depending on system configuration.
- **Grounding:** The switchboard shall include provisions for grounding in accordance with applicable codes and standards.

1.7 Submittals

The supplier shall submit the following for review and record:

- Product data sheets
- Overall dimensions and weights
- Single-line diagrams
- Installer/User guide

1.7.1 Installation and Operations

The Installer/User guide shall be provided.

1.7.2 Warranty

The standard warranty shall be 18 months from the date of shipment against defects in materials and workmanship. Supplementary and extended warranty options shall be available upon request.

2.0 PRODUCT

2.1 Manufacturers

This specification is based on the Vertiv™ PowerBoard Go Switchboard manufactured by Vertiv.

Substitutions are not permitted unless approved by the Engineer.

2.2 General Construction

The switchboard shall be a low-voltage, dead-front, floor-standing assembly with modular construction.

The switchboard shall be:

- Floor-standing
- Dead-front construction
- Modular and sectional
- Front-accessible only

The switchboard shall be shipped in sections for ease of transportation and installation.

2.3 Key Features

The switchboard shall include the following features:

- UL-certified low-voltage switchboard solution.
- Main circuit breaker ratings up to 4000 A.
- Group-mounted distribution sections using MCCBs rated up to 1200 A.
- Interrupting ratings up to 100 kAIC, based on system configuration.
- Voltage ratings up to 480 V AC, available in three-phase, three-wire and three-phase, four-wire systems.
- Suitable for indoor (NEMA 1) installations.
- Tin-plated aluminum or tin-plated copper busbar construction.
- Support for approved circuit breaker manufacturers within the standard offering.
- Modular construction with a compact footprint.
- Front access for operation and maintenance only.
- Optional surge protective devices and customer metering.
- Optional energy reduction maintenance switches (ERMS), where available.
- Configure-to-Order (CTO) product architecture to support quick quotation and submittal preparation.
- Switchboard sections provided with captive splice plates to simplify installation and allow future expansion.

2.4 Enclosures

2.4.1 Enclosure Type

- Indoor: NEMA 1

2.4.2 Paint Finish

- ANSI 61 light gray, standard

2.5 Busbar Systems

2.5.1 Busbar Material

Select one of the following:

- Tin-plated copper
- Tin-plated aluminum

2.5.2 Neutral Bus

In a balanced system, the phase voltages shall be approximately equal in magnitude and equally spaced in phase relative to the neutral.

- A neutral bus shall be provided for 3P4W systems.

2.5.3 Ground Bus

- A continuous ground bus shall be provided throughout the switchboard lineup.
- The ground bus shall include taps along the lineup to accommodate equipment and field grounding connections.

2.5.4 Mimic Bus

Where specified, the switchboard shall be provided with a mimic bus to visually represent the one-line diagram.

Mimic bus options shall include:

- Option A – Mimic tape
- Option B – Phenolic adhesive tape
- Option C – Phenolic adhesive with fasteners

2.6 Circuit Breakers

2.6.1 General

Molded case circuit breakers (MCCB), listed to UL 489, and air circuit breakers (ACB), listed to UL 1066, are available in both fixed-mounted and draw-out configurations, with a wide selection from major manufacturers.

2.6.2 Approved Breaker Manufacturers

- ABB
- SIEMENS
- LS ELECTRIC

2.6.3 Feeder Breaker Ratings

Typical feeder breaker frame sizes include:

- 125 A
- 250 A
- 600 A
- 1200 A

Note: Intermediate current requirements may be achieved by selecting the next higher standard breaker frame size.

2.6.4 Distribution Section Capacity

Table 2.1: Distribution Section Capacity

MCCB Rating (A)	Typical Maximum Quantity Per Distribution Section
125 A	Up to 14 breakers
250 A	Up to 14 breakers
600 A	Up to 10 breakers
1200 A	Up to 7 breakers (manufacturer dependent)

Note: Various MCCB combinations are possible. The customer must identify the required MCCB ratings and quantities.

2.6.5 Distribution Section Notes

For circuits rated at 1200 A, MCCBs shall be supplied with an energy reduction maintenance switch (ERMS), where specified. ERMS is applicable for MCCB ratings up to and including 1200 A.

Different combinations of MCCB frame sizes should be possible.

2.7 Optional Features

Where specified, the following options may be provided:

- Energy reduction maintenance switch (ERMS)
- Surge protective device (SPD)
- Customer metering
- Power quality meter (PQM)

2.8 Cable Entry

Select one of the following cable entry options:

- Top entry
- Bottom entry

2.9 Cable Exit

Select one of the following cable exit options:

- Top exit
- Bottom exit

2.10 Lifting and Handling

The switchboard shall include provisions for:

- Top lifting
- Bottom lifting
- Top and bottom lifting

Shipping sections shall include lifting instructions.

2.11 Instrumentation and Monitoring (Optional)

Where specified, the switchboard may be provided with factory-installed instrumentation for system monitoring.

Optional instrumentation may include:

- Customer metering
- Power quality monitoring
- Status indication devices
- Mimic bus (refer to Mimic Bus section 2.5.4)

2.12 Communication Interfaces (Optional)

Where specified, the switchboard may include communication interfaces to allow integration with external monitoring systems, such as building management or supervisory systems, as required by the project.

2.13 Safety and Interlocks

The switchboard shall include safety features intended to reduce the risk of unintended access to energized components.

Safety features may include:

- Door interlocks
- Barriers to limit access to busbars and terminals
- Warning labels identifying electrical hazards

The switchboard design should support front access for normal operation and maintenance only.

2.14 Control and Auxiliary Power Isolation

Where control or auxiliary power is provided, provisions shall be included to allow isolation of these circuits during maintenance operations.

Isolation shall reduce the risk of exposure to energized control wiring when the main incoming device is opened.

3.0 EXECUTION

3.1 Factory Testing

Each switchboard shall undergo factory production testing prior to shipment.

Factory testing shall include:

- Visual inspection
- Mechanical inspection
- Insulation resistance testing
- Hi-Pot (high potential) testing
- Continuity testing
- Electrical functional testing

Certified factory test reports shall be available upon request.

3.1.1 Factory Acceptance Testing and Witness Testing

At the factory, the switchboard manufacturer shall perform tests on the switchboard.

- Verify the proper operation of each component.
- Demonstrate full compliance with the requirements of this specification.
- Provide a factory witness test for the owner's representatives.
- Simulate and demonstrate the successful operation of the equipment at the factory before shipment.

3.2 Examination

- Examine the installation areas to confirm that conditions are suitable for the installation of the switchboard.
- Do not proceed with installation until unsatisfactory conditions have been corrected.

3.3 Installation

Install the switchboard in accordance with:

- Manufacturer's written instructions
- Approved drawings
- Applicable codes and standards

Install the switchboard in the location and orientation shown on the drawings.

Ensure that required working clearances are maintained in accordance with applicable codes.

3.4 Field Quality Control

3.4.1 Site Inspection

Upon delivery to the site:

- Inspect the switchboard for shipping damage.
- Perform continuity checks of the main power circuit using a high-resolution resistance tester to record baseline measurements, as these results can be compared during each service interval, and any anomalies can be investigated.
- It is recommended to use authorized documentation for verifying the equipment configuration.

Note: Report any discrepancies or damage before installation.

3.4.2 System Acceptance Test

Where specified, the system acceptance test (SAT) shall be performed while the system is energized.

SAT may include:

- Verification of mechanical installation
- Verification of grounding connections
- Functional checks of circuit breakers
- Verification of labeling and identification

3.4.3 Manufacturer's Services

Where specified, manufacturer-authorized services shall be provided by factory-authorized technicians to support installation, startup, commissioning, testing, and ongoing maintenance of the switchboard.

Table 3.1: Service Level Table

Level	Service	Description
L1	Site arrival inspection	Equipment inspection and configuration verification
L2	Visual and mechanical inspection	Mechanical and electrical checks, pre-energized tests
L3	System acceptance test and startup	System controls, voltage verifications, and communications, post-energized tests
L4	Standby commissioning support	Commissioning service support availability
L5	Standby integrated system test	Integrated system test service support availability

3.5 Field Adjustments

Verify and adjust protective device settings in accordance with the approved coordination study prior to energization.

3.6 Cleaning

Remove debris and foreign materials from the switchboard interior prior to energization.

3.7 Closeout Activities

Provide the following documentation:

- As-built drawings
- Installer/User guide
- Final test documentation