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TECHNICAL AND APPLICATION GUIDE

## ReliaGear® ND

5/15 kV ANSI narrow design metal-clad switchgear

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**ReliaGear® ND is ABB’s ANSI narrow design metal-clad switchgear. Complete sets of rugged, stackable circuit breaker and auxiliary compartment modules are assembled to form a ReliaGear ND lineup with flexible configurations.**

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# General overview

## ReliaGear® ND switchgear

ReliaGear® ND is ABB’s ANSI narrow design metal-clad switchgear. Complete sets of rugged, stackable circuit breaker and auxiliary compartment modules are assembled to form a ReliaGear ND lineup with flexible configurations.

### Certifications

ReliaGear ND metal-clad switchgear is certified to IBC region D with importance factor of 1.0. The manufacturing location for ReliaGear ND is both ISO 9001 and 140001 certified. ReliaGear ND switchgear is available with UL label.

### Applicable standards

The ReliaGear ND design is built, tested, and certified to IEEE C37.20.2-1999 metal-clad switchgear standard.

### Construction

ReliaGear ND is manufactured of, galvanized and stainless steel for superior rust and scratch protection. All parts of ReliaGear ND that are not galvanized or stainless steel are treated and painted ANSI 61 gray.

### Outdoor enclosures

ReliaGear ND can be supplied for outdoor sheltered-aisle enclosures or PDC (power distribution center) enclosures for outdoor applications.

### Breakers used in the ReliaGear ND platform

The ReliaGear ND platform uses ABB Vmax/ATM breakers. More details, including ratings tables, can be found in The Vmax Breaker Technical Guide (1VAL057601-TG).

### Instrument transformers

ReliaGear ND switchgear is available using SCH-3U CTs. Up to three sets of SCH-3U CTs can be fitted per phase.

For ground CT requirements, ReliaGear ND can be supplied with BYZ-S or BYZ-O ground CTs. The type of CT is chosen based on the necessary window size required for cables and cable bending.

ReliaGear ND switchgear utilizes ABB VIZ-11, VIZ-75, VIY-60 and TJC-5 potential transformers.

Available in wye-wye, open delta, line to line and line to ground configurations, ABB VIZ-11, VIY-60 and TJC-5 PTs offer flexible options for PTs.

For more information on CTs, GCTs and PTs, please see the Switchgear Components and Accessories Technical Guide (1VAL104601-TG).

### Available Accessories

ReliaGear ND is available with the following accessories:

- Breaker maintenance kit
- Breaker racking handle
- PT and CPT draw-out handle
- Breaker lift truck
- Test cabinet and test jumper
- SmartRack remote racking device
- Manually operated ground and test device
- Breaker lifting yokeFor 5 kV applications, SafeGear switchgear utilizes ABB VIY-60 potential transformers. For 15 kV applications, SafeGear uses ABB VIZ-11 and VIZ-75 PTs. All PTs are available in wye-wye, open delta, line to line and line to ground connections.
- Rating tables and additional details for all instrument transformers can be found in the Switchgear Components and Accessories Technical and Applications Guide (1VAL104601-TG)

ReliaGear ND ratings\*

Characteristic	Unit	Rated maximum voltage level	
		5 kV	15 kV
Rated nominal voltages	kV	2.4, 4.16, 4.8	6.9, 7.2, 8.4, 11, 12, 12.47, 13.2, 13.8, 14.4
Main bus continuous current	A	1200, 2000	1200, 2000
Short term current (rms)	kA	25, 31.5	25, 31.5
Momentary	kA	65	82
Rated frequency	Hz	50, 60	50, 60
Low frequency withstand (rms)	kV	19	36
Impulse level (BIL,crest)	kV	60	95

\* Ratings given are for service conditions within temperature and altitude limitations as defined by IEEE C37.20.2-2015 metal-clad standard.

ABB ReliaGear ND is design tested per IEEE C37.20.2 and includes the following production tests:

- One second dielectric test of 1800 VAC for control circuits
- Control circuit verification
- Instruments energized from the low voltage winding of instrument transformers and operated through ratings ranges
- Mechanical check for breaker alignment and interlock verification
- Power frequency withstand test from phase to phase and phase to ground
- Static circuit check
- Relays checked for proper performance characteristics
- Ratio and interconnection check for potential transformers

Factory witness testing is also available on request.

Options

Installation, operation and maintenance manuals are available in electronic (CD) or printed format.

Mechanical options

- Tin plated bus
- Mimic bus
- Cable supports
- IR windows (IRISS or Fluke)
- Surge arrestors
- Ground studs

Electrical options

- Separate or common pull-out fuse block or molded case circuit breaker trip and close coil protection
- 10%, 15%, 20% spare terminal blocks
- Phase bus marking labels
- Instrument door ground strap
- 12 or 10 AWG CT wiring

Configuration Software

Medium Voltage Pro (MVP) has been developed to be a switchgear configuration tool and helps engineers in creating a switchgear lineup including front elevations and floor plans. A version of this software is available for consultants and designers. Please contact your local ABB representative for more information.

Other reference documents

Document	Document number
ReliaGear ND Descriptive Bulletin	1VAL107501-DB
ReliaGear ND Flyer	1VAL107501-FL
ReliaGear ND Installation, Operation and Maintenance Manual	1VAL107501-MB
Vmax/A Technical Guide	1VAL057601-TG
REF615 Feeder Protection Relay Product Guide	1MAC105361-PG
REF620 Feeder Protection Relay Product Guide	1MAC506635-PG
REM615 Motor Protection Relay Product Guide	1MAC251744-PG
REM620 Motor Protection Relay Product Guide	1MAC609372-PG
RET615 Transformer Protection Relay Product Guide	1MAC204375-PG
RET620 Transformer Protection Relay Product Guide	1MAC554110-PG
REA Arc Fault Protection System Product Guide	1MRS756449

# Compartment types

## Circuit breaker compartments

ReliaGear ND circuit breaker compartments are designed for operator safety by providing one large viewing window and three-position racking.

01 Vmax/A breaker in circuit breaker compartment

02 Interior of breaker compartment

Unique racking system and interlocks

The racking system is unique and features a three-state system for all circuit breakers. The racking mechanism is integral to the circuit breaker, so moving parts can be inspected and maintained outside the circuit breaker compartment and away from energized primary parts.

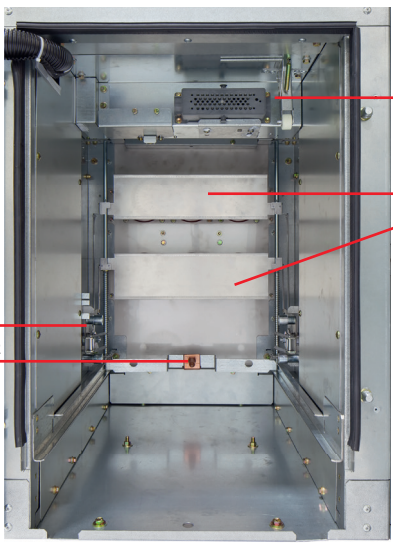
The three states are defined as follows:

- Disconnect: Primary and Secondary (control) contacts are disengaged
- Test: Primary contacts are disengaged. Secondary (control) contacts are engaged for in-cell breaker testing
- Connected: Primary and secondary (control) contacts are engaged

The racking system includes all necessary interlocks in compliance with ANSI/IEEE standards to assure proper sequencing and safe operation. For improved safety, the interlocking system prohibits operation of the breaker in-between the test and connected position and prohibits insertion of an improperly rated breaker.

Shutter system

Shutters automatically cover primary contacts when the breaker is not in the connected position. Shutter opening and closing is forced by circuit breaker movement. Padlocking provisions are provided to prevent opening the shutters when the circuit breaker is removed.





# Compartment types

## Auxiliary primary modules

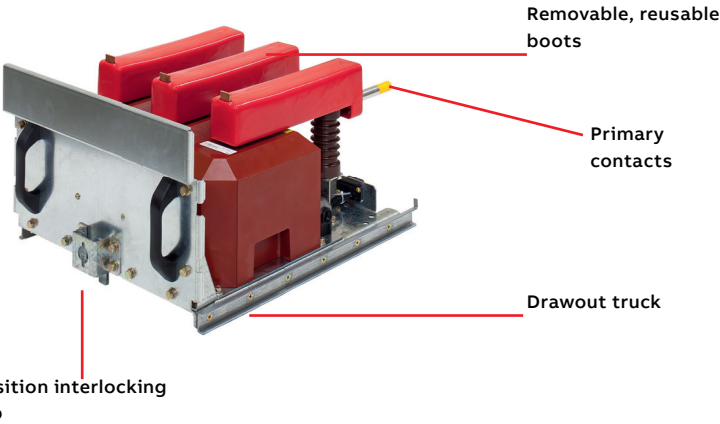
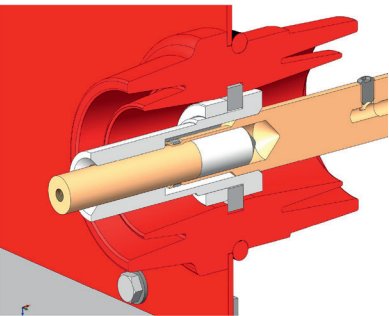
- 01 Delrin primary probe and recessed contact assembly
- 02 PT drawout assembly with three voltage transformers

**PT/CPT compartments**  
Potential transformer and draw-out fuse compartments are inserted via push-pull mechanism which secondary contacts engage/disengage automatically and interlocks ensure proper operation.

All primary auxiliary compartments, including potential transformers, control power transformers and draw-out fuse compartments, use arc-quenching Delrin® technology for primary contact assemblies (Delrin® is a registered trademark of DuPont). A Delrin® tipped conductor probe is inserted into a Delrin® receptacle with recessed contacts. During load break, localized heating of the Delrin® material due to arcing causes the material to release a gas which fills the small isolating gap to contain the arc and extinguish it safely.

The PT drawout units can be withdrawn beyond the front of the frame via rails, which allow easy access to the fuses for inspection or replacement.

**Control Power Transformer (CPT)**  
CPT modules provide convenient mounting and operation of single-phase control power transformers in ratings up to 15 kVA, minimizing the possibility of inadvertent interruption of control power for AC operated switchgear.



# Compartment types

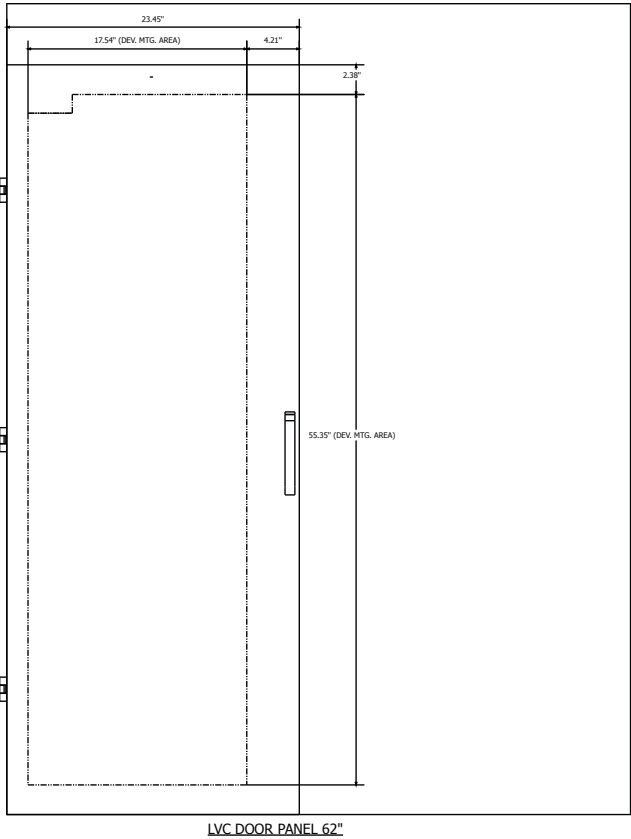
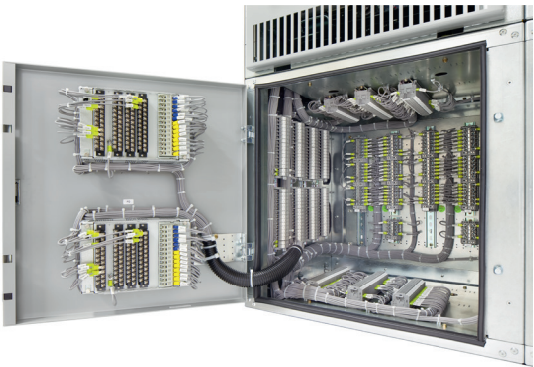
## Instrument compartment

- 01 Low voltage instrument compartment
- 02 Low voltage cabinet door panel 62"

**Instrument compartment**  
ABB mounts protection and control devices in a dedicated low voltage module. Each low voltage instrument module is completely isolated and segregated from high-voltage components which ensures the safety of operations and maintenance personnel while they work on control and auxiliary circuits. The LV wiring pans are designed to be removeable and customizable.

Devices and control switches are mounted on the door for easy readability and convenient access. Those devices that do not require immediate access are mounted inside the compartment.

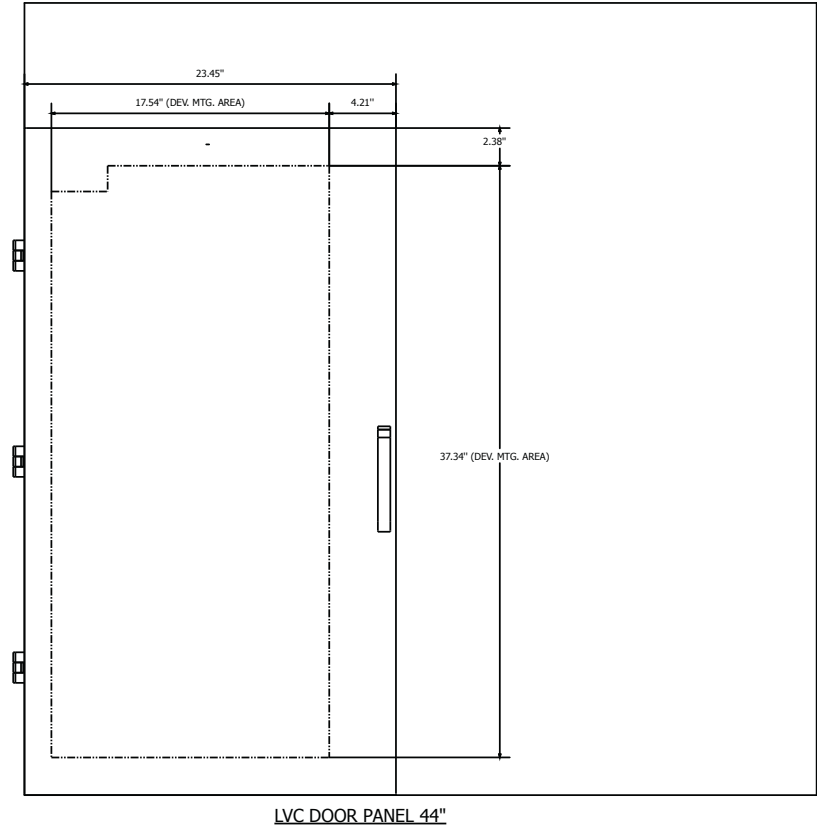
Frame-to-frame interconnect wiring is achieved through accessholes located in the rear of the LV compartment. Each hole is 2.8" x 5" and provides with edge guard to ensure wires do not run over sharp edges.



# Compartment types

## Instrument compartment

01 Low voltage door panel 44"



# Compartment types

## Bus compartment

01 Bus compartment

### Bus compartment

All primary buses are copper with corona-free design, and are available in 1200 A and 2000 A ratings. The bus is silver-plated at joints and bolted together with a minimum two (2) half-inch SAE grade 5 bolts. Proper torque is verified by calibrated tools for both safety and optimum performance. The main bus is not tapered and is easily extended at both ends to facilitate future expansions.

The bus is epoxy insulated with an advanced powder coat system that eliminates voids and other potential defects, resulting in maximum integrity of the insulation system.

Removable, reusable boots are provided at each joint to simplify access and maintenance.

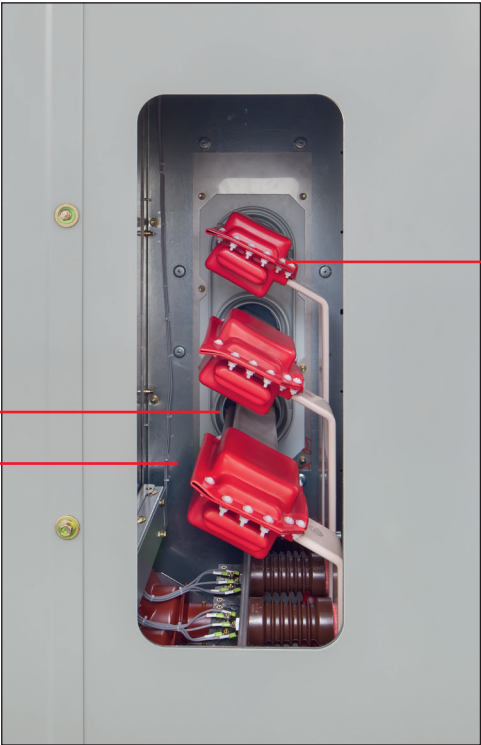
Insulating standoffs rigidly support the bus. This includes jumps, the connections from stationary primary contacts to the main bus and risers, and connections from the stationary primary contacts to line or bus terminations. Internal standoffs are epoxy for all ratings.

Continuous current	Rating	Quantity	Size (in)
1200 aA	31.5 kA	1	.375 x 3.5
2000 A	31.5 kA	1	.75 x 3.5

ReliaGear ND metal-clad switchgear design certifications are based on epoxy primary bus supports. Epoxy is standard for standoff bus insulator supports, primary breaker bushings. Physical characteristics of the epoxy material is provided in the following table.

Characteristic	X-run specification
Bending strength, ksi	120-150 MPA per ISO 178
Tensile strength, ksi	70-90 MPA per ISO 527
Izod impact strength, ft-lb/inch of notch 10-15 K/m2 per ISO 179	10-15 KJ/m2 per ISO 179
Thermal shock-cycles	Not available
Dielectric strength (short time), V/m	>23 kV/mm per IEC 60243

Main bus  
Interframe bus support



Reusable boot



# Compartment types

## Cable compartment

- 01 Cable compartment (main bus cover uninstalled)
- 02 Surge arrestors
- 03 PT line connection via Natvar
- 04 Standard 2000 A lug pad (boot removed)

Compartments for ReliaGear ND provide an efficient layout with ample room for stress cones and a choice of cable terminations and lug types. Customers also have the flexibility of top or bottom cable entry. Connections can also be provided for bus duct provisions

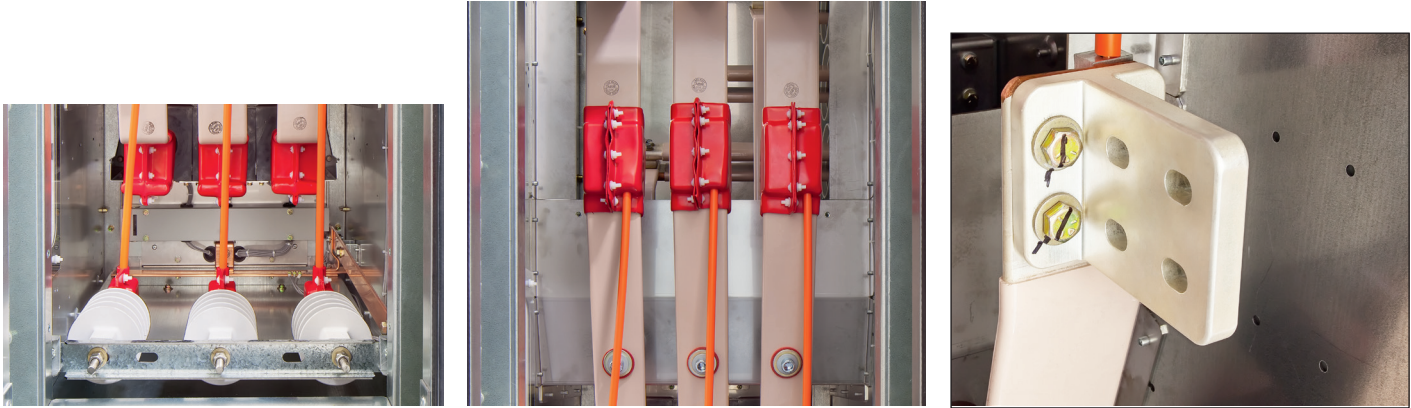
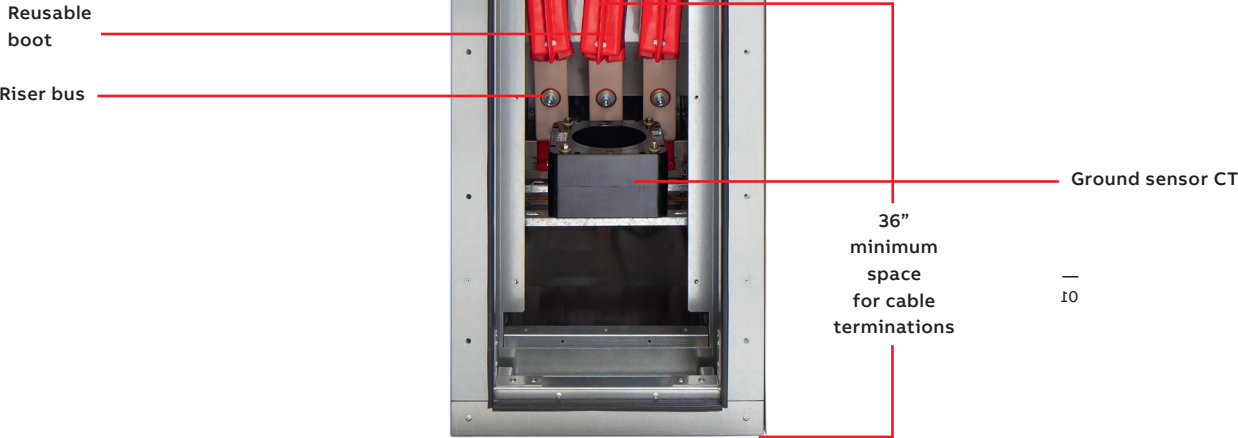
In two-high arrangements with stacked circuit breakers, steel barriers separate the compartments and isolate the primary circuits. All configurations come standard with lug boots and have the option for cable supports to make field connections more secure.

Cable compartments are available with optional readily accessible zero sequence current transformers and surge arrestors on the bus risers.

The 77-inch depth of one-high and 85-inch depth of two-high ReliaGear ND switchgear provides ample space for various cable terminations and protective, monitoring, and control devices as needed.

Primary supports and current transformers  
Primary contacts are encapsulated in epoxy bushings.

CTs can be mounted on both line and load primary bushings. Bushings accommodate up to three standard accuracy CTs per phase.



# Available frame types

## One-high frames

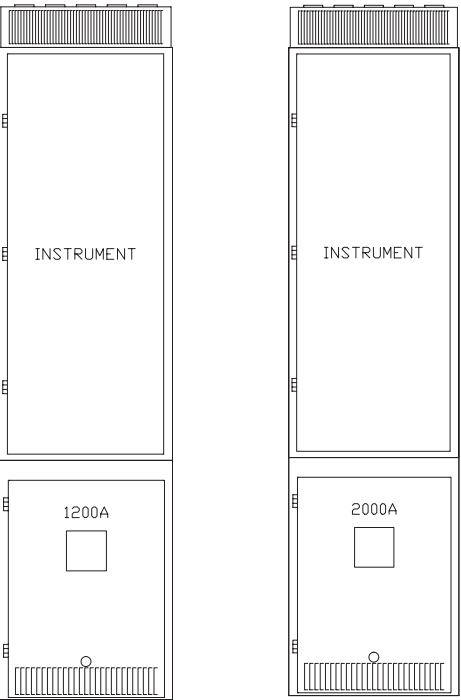
**Description**  
The one-high, bottom-mounted device frame consists of a 62-inch instrument compartment stacked over a 36-inch breaker compartment.

Cable termination information			
Cable size	# of terms single pad per phase		
	W/O GCT	BYZ-O	BYZ-S
#2 AWG	4	4	4
4/O	4	4	4
500 MCM	4	4	4
750 MCM	4	4	4
1000 MCM (4-hole)	2	2	2

Dimensions			
Frame	Width (in)	Height with vent box (in)	Depth (in)
All ratings	26	104	77*

\*If coupled with two-high frames, switchgear depth will be 85 inches for all frames

- Options**
- Ground CTs
  - Surge arrestors
  - Distribution
  - Intermediate
  - Ground studs
  - Space heaters



# Available frame types

## Two-high frames

Description

The two-high breaker frame consists of two 36-inch breaker compartments with a 26-inch instrument compartment in between for two breakers in a single frame.

Cable termination information

Cable size	# of terms single pad per phase		
	W/O GCT	BWZ-O	BWZ-S
#2 AWG	4	4	4
4/O	4	4	4
500 MCM	4	4	4
750 MCM	4	3	2
1000 MCM (4-hole)	2	2	2

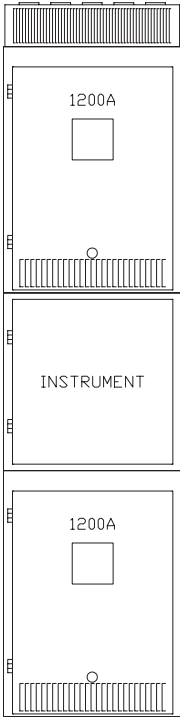
Dimensions

Frame	Width (in)	Height with vent box (in)	Depth (in)
All ratings	26	104	85*

\* If two-high frames are used in conjunction with one-high frames, line-up depth will be 85 inches

Options

- Ground CTs
- Surge arrestors
- Distribution
- Intermediate
- Ground studs
- Space heaters



# Available frame types

## Breaker and auxiliary frames

Description

The breaker and auxiliary frame consists of one 36-inch compartment, two 18-inch compartments (that can be combined for another 36-inch compartment) and a 26- or 44-inch instrument compartment.

Cable termination information

Cable size	# of terms single pad per phase		
	W/O GCT	BWZ-O	BWZ-S
#2 AWG	4	4	4
4/O	4	4	4
500 MCM	4	4	4
750 MCM	4	3	2
1000 MCM (4-hole)	2	2	2

Dimensions

Frame	Width (in)	Height with vent box (in)	Depth (in)
All ratings	26	104	77

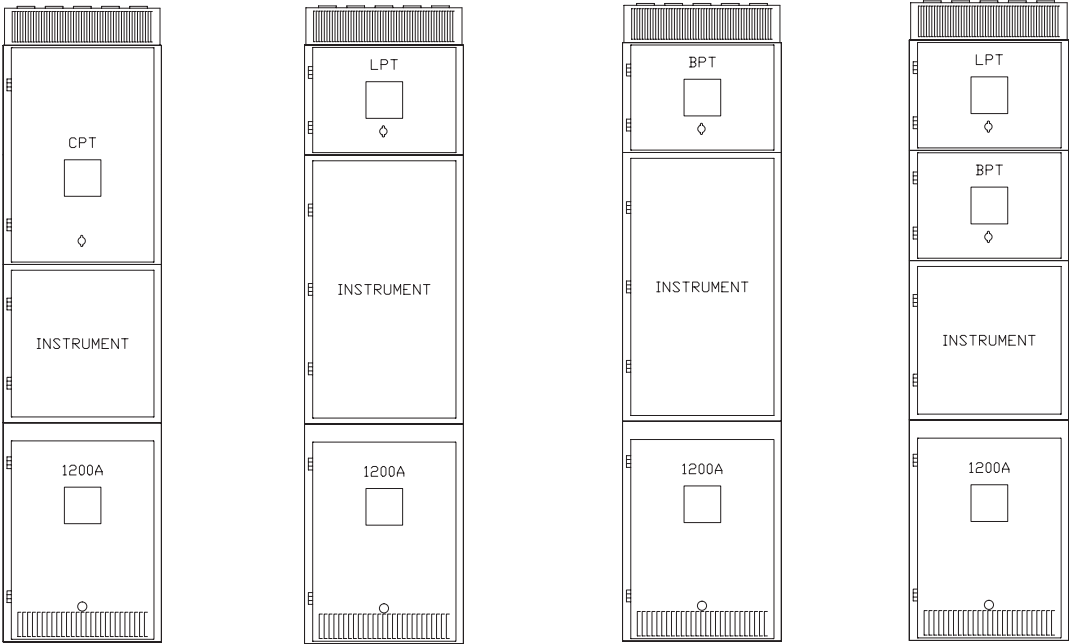
Options

- Ground CTs
- Surge arrestors
- Distribution
- Intermediate
- Ground studs
- Space heaters

01 Refer to page 21 floorplans  
02 CPT=control power transformer  
03 LVC=low voltage compartment/instrument compartment

04 PT=potential transformer  
05 DOF=drawout fuse  
06 BPT=Bus PT  
07 LPT=Line PT

Breaker below

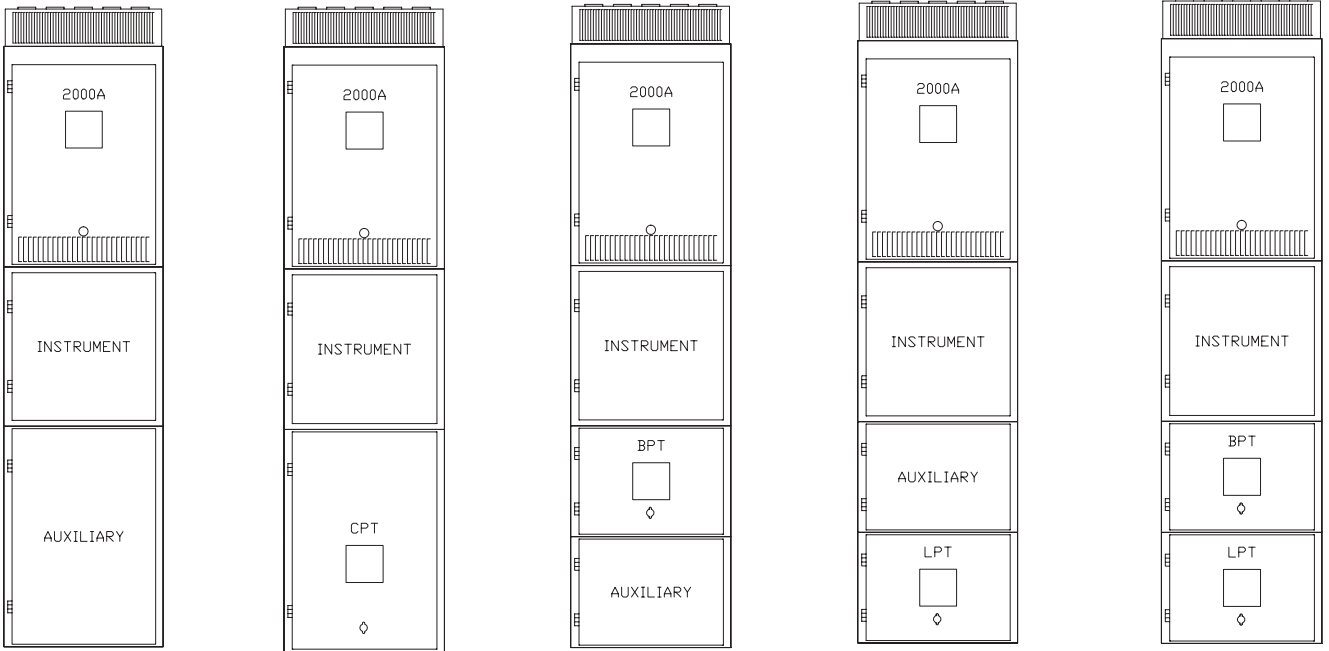
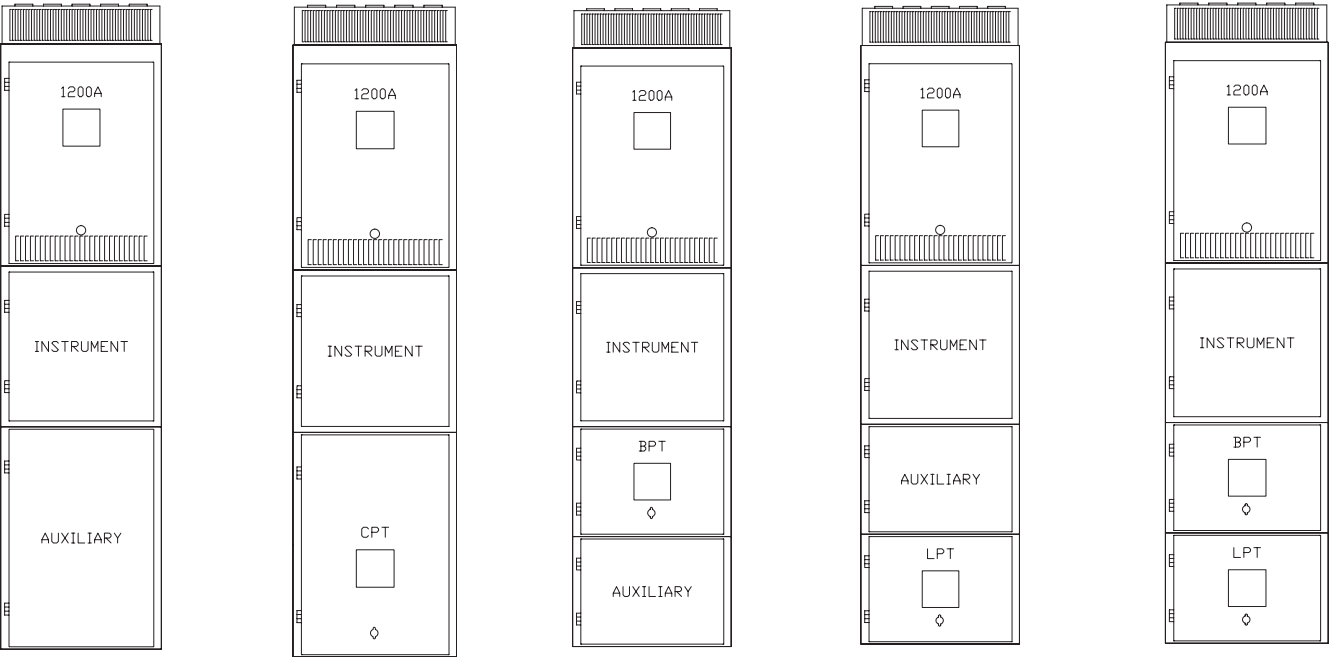




Available frame types

Breaker and auxiliary frames

Breaker above



Available frame types

Auxiliary frames

Description

The auxiliary frame consists of four 18-inch compartments with a 26-inch instrument compartment in between. For CPTs, two 18-inch compartments are combined for a 36-inch CPT compartment.

Cable termination information

Cable size	# of terms single pad per phase		
	W/O GCT	BWZ-O	BWZ-S
#2 AWG	4	4	4
4/O	4	4	4
500 MCM	4	4	4
750 MCM	4	3	2
1000 MCM (4-hole)	2	2	2

Dimensions

Frame	Width (in)	Height with vent in)	Depth (in)
All ratings	26	104	77

Options

- Space heaters

01 CPT=control power transformer

02 LVC=low voltage compartment/instrument compartment

03 PT=potential transformer

04 DOF=drawout fuse

All ratings

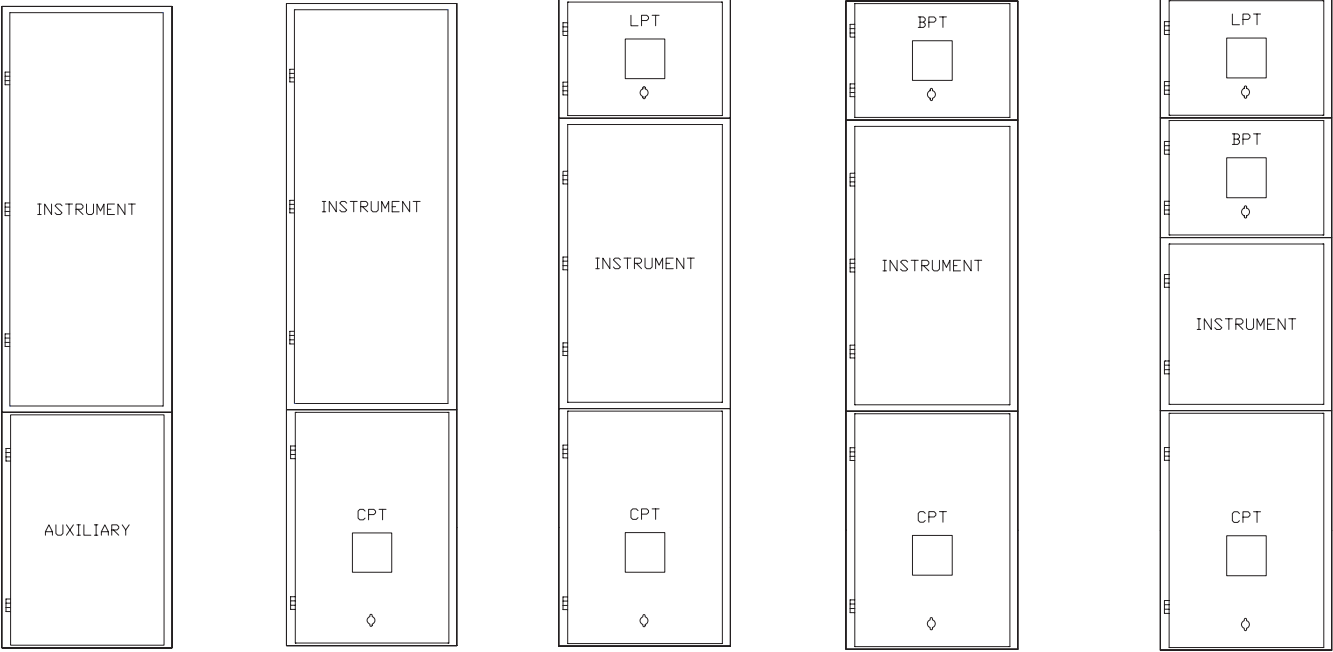


Figure 1 displays five vertical panels, each representing a different instrument configuration. Each panel is divided into three main sections: a top section labeled 'INSTRUMENT', a middle section labeled 'AUXILIARY', and a bottom section labeled 'LPT'. The configurations are as follows:

- Panel 1:** The 'INSTRUMENT' section is present. The 'AUXILIARY' section is present. The 'LPT' section is present and contains a diamond symbol.
- Panel 2:** The 'INSTRUMENT' section is present. The 'AUXILIARY' section is present. The 'LPT' section is present and contains a diamond symbol.
- Panel 3:** The 'INSTRUMENT' section is present. The 'AUXILIARY' section is present. The 'LPT' section is present and contains a diamond symbol.
- Panel 4:** The 'INSTRUMENT' section is present. The 'AUXILIARY' section is present. The 'LPT' section is present and contains a diamond symbol.
- Panel 5:** The 'INSTRUMENT' section is present. The 'AUXILIARY' section is present. The 'LPT' section is present and contains a diamond symbol.

6.40

98.00

1200A

1200A

2000A

INSTRUMENT

2000A

1200A

1200A

INSTRUMENT

INSTRUMENT

INSTRUMENT

INSTRUMENT

INSTRUMENT

1200A

1200A

BPT

2000A

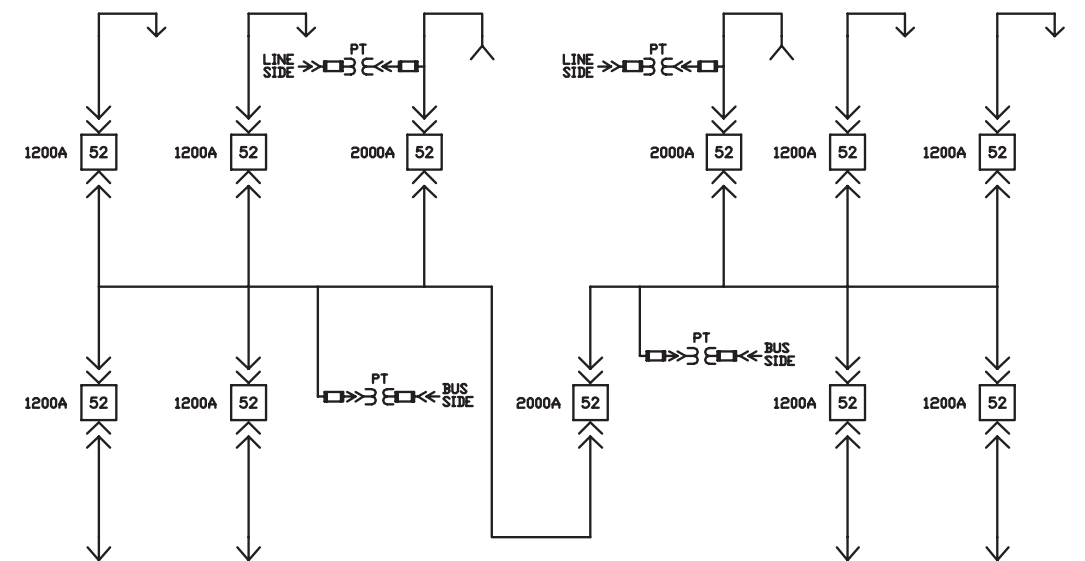
BPT

1200A

1200A

LPT

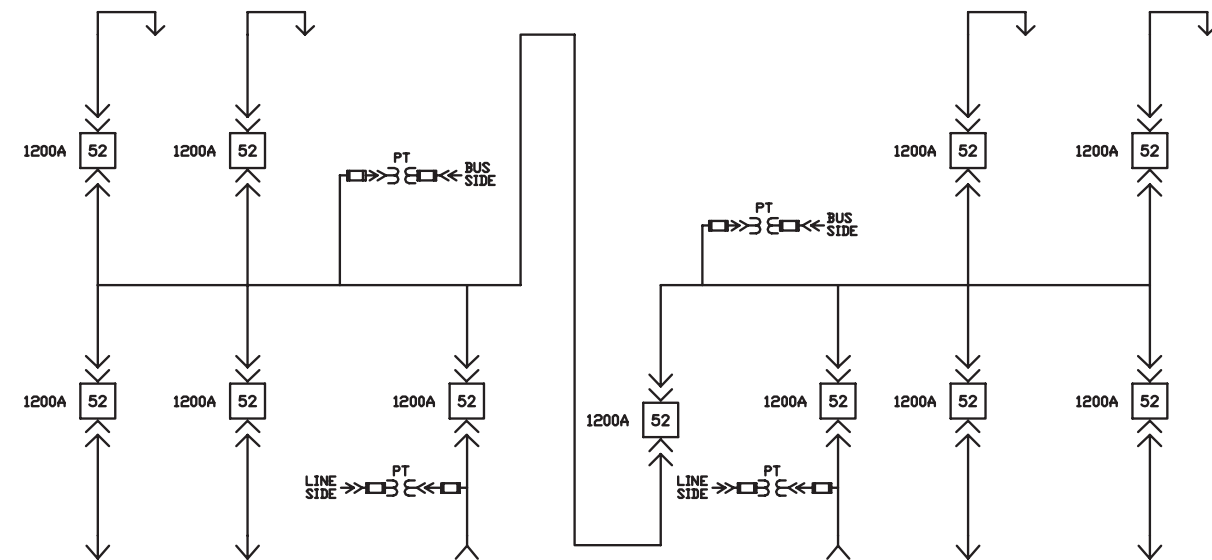
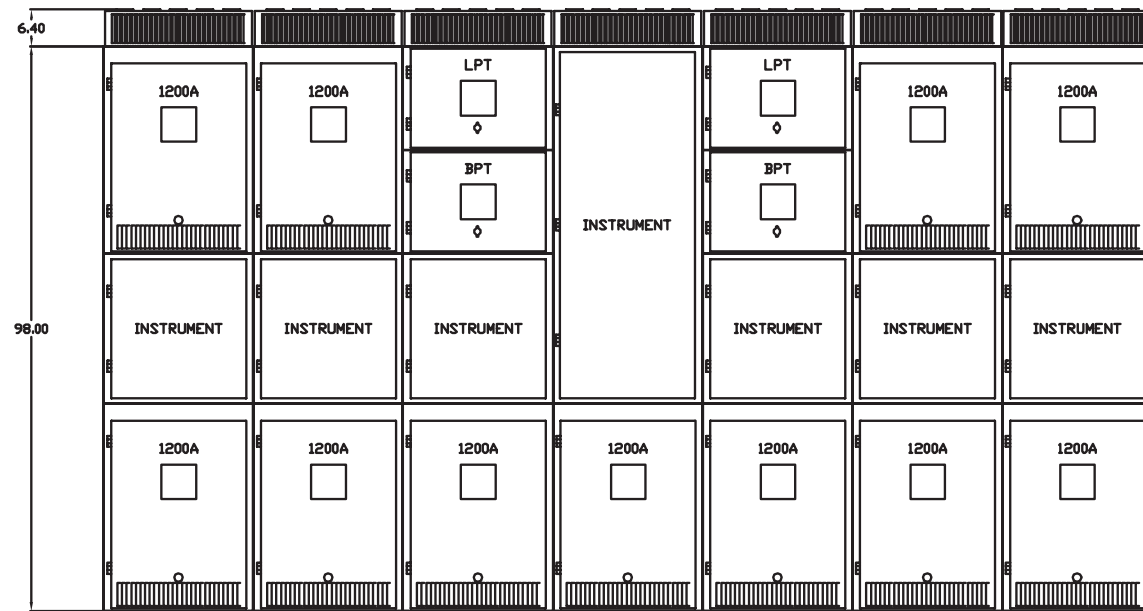
LPT





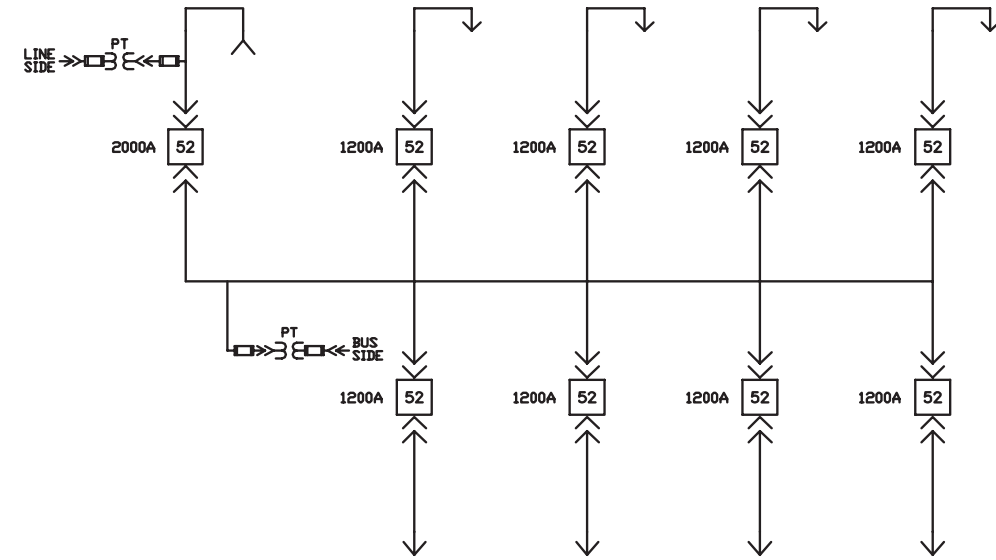
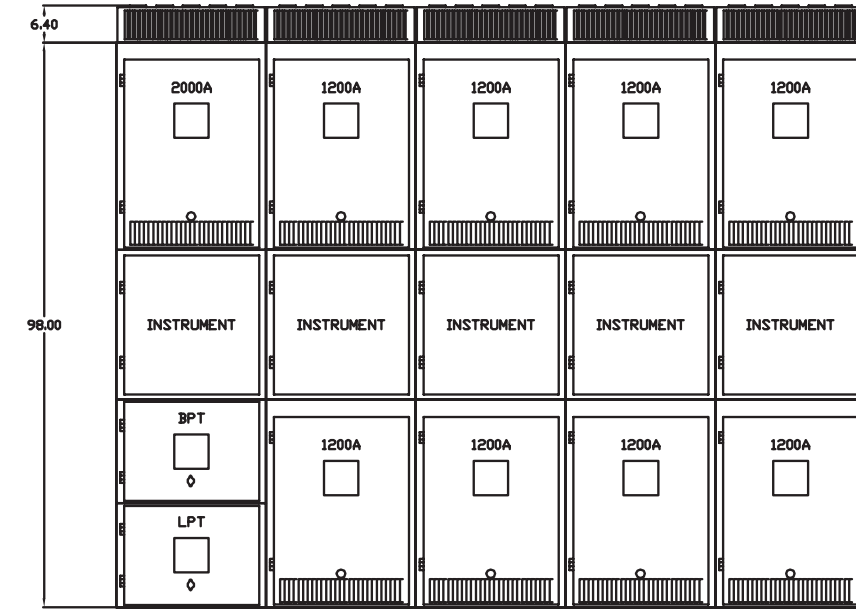
## Typical arrangements

Main-Tie-Main: 1200 A



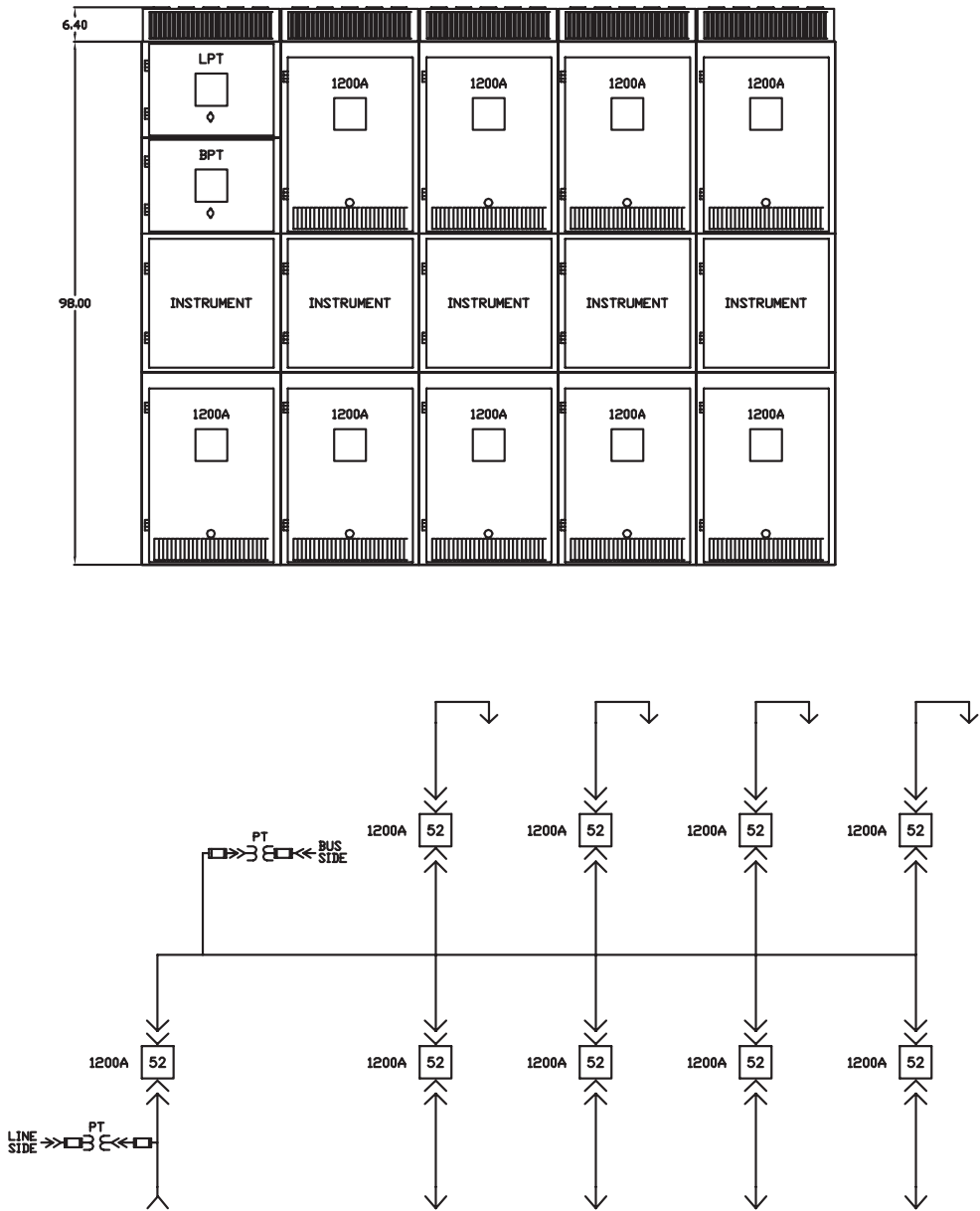
## Typical arrangements

Main with feeders: 2000 A



Typical arrangements

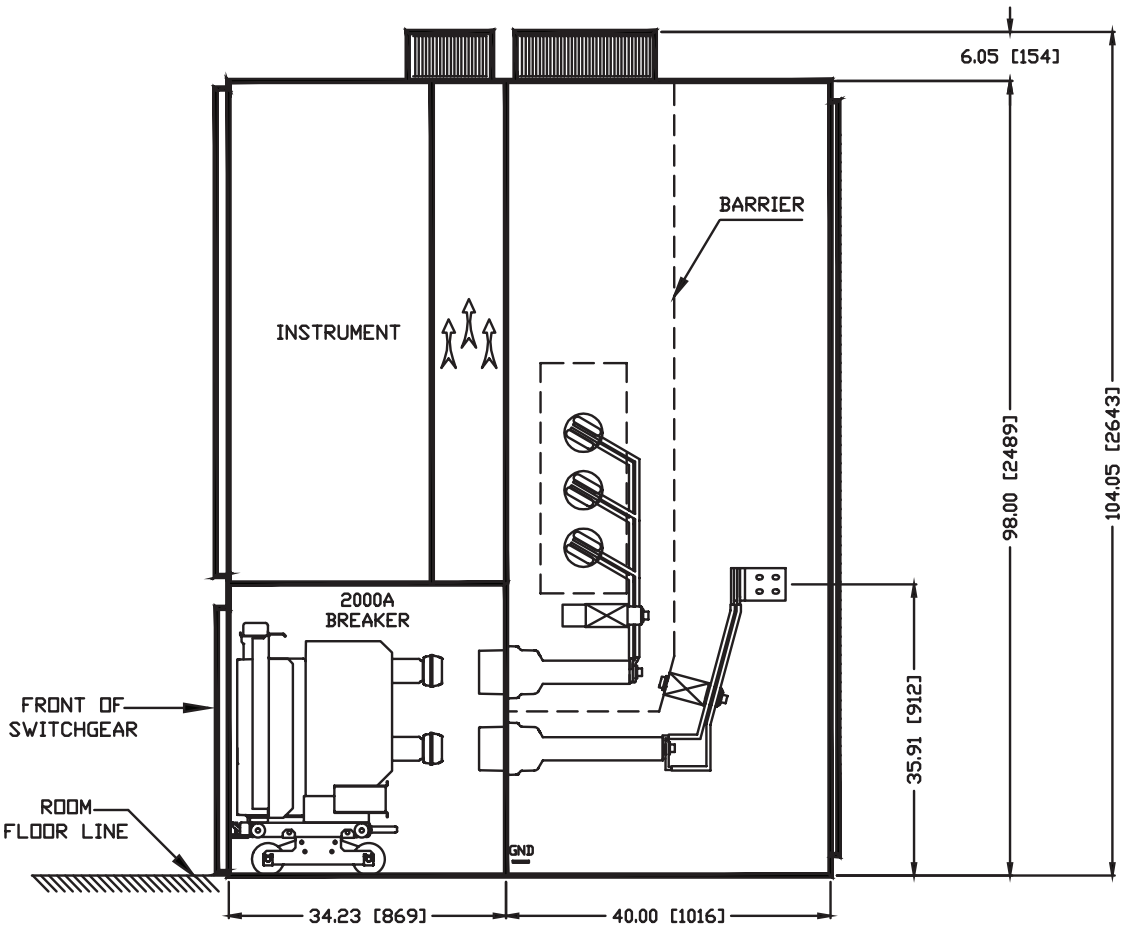
Main with feeders: 1200 A



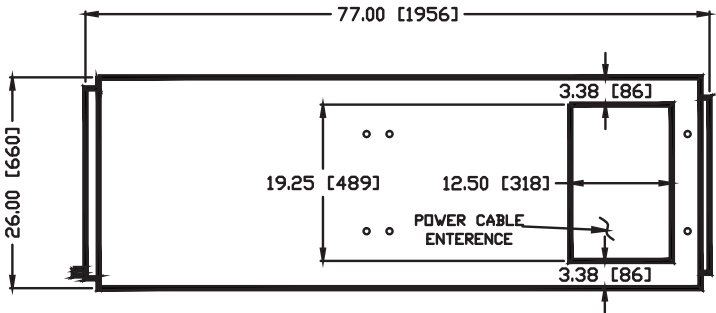
Civil engineering details

Typical side views, floor plans, and clearances

ReliaGear ND switchgear one-high frames  
Circuit breaker: 2000 A



SIDE SECTION

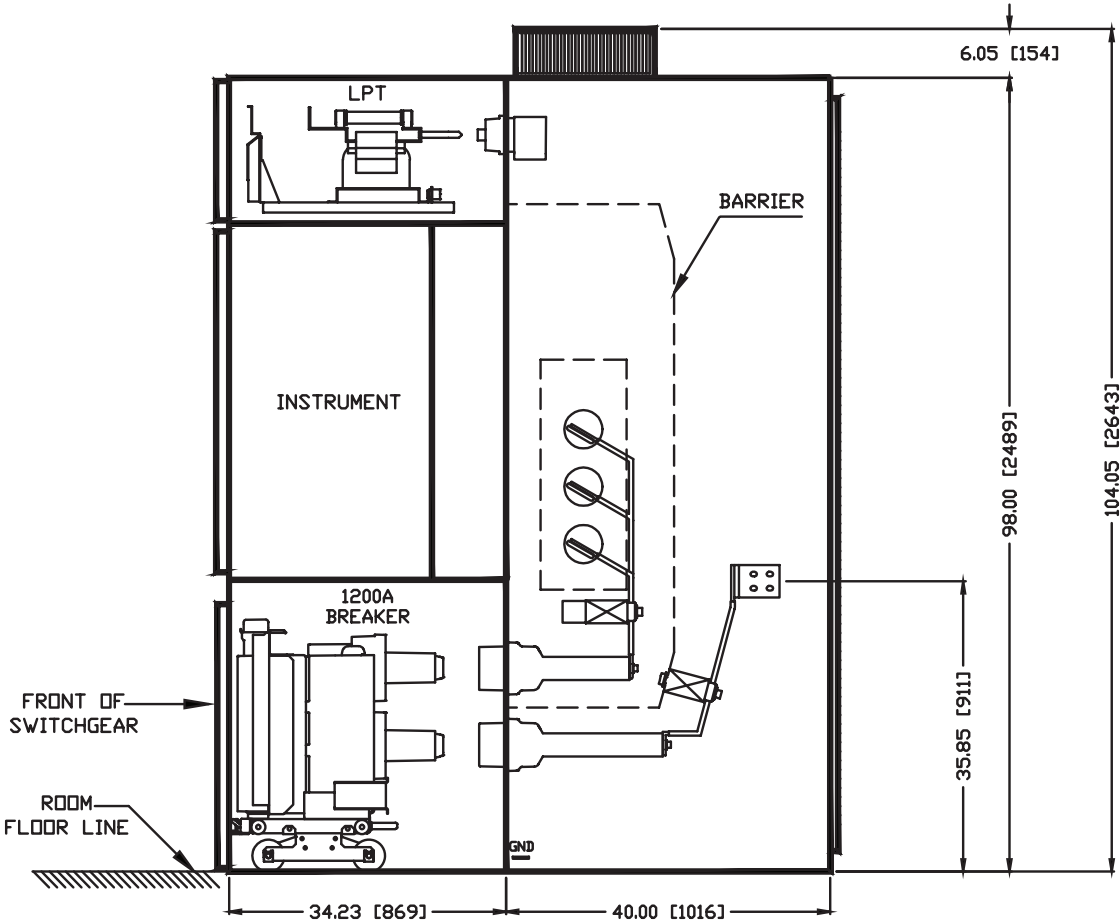


FLOOR PLAN

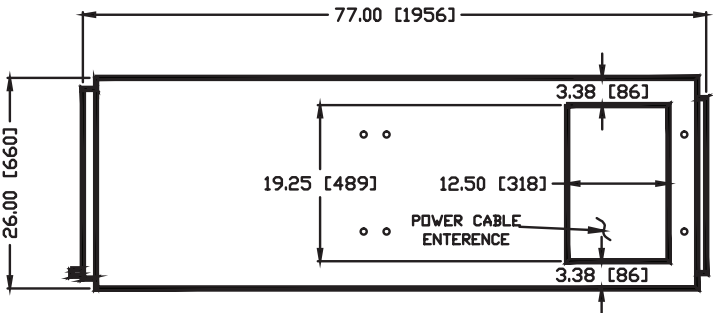
Civil engineering details

Typical side views, floor plans, and clearances

ReliaGear ND switchgear one-high frames  
Circuit breaker: LPT 1200 A



SIDE SECTION

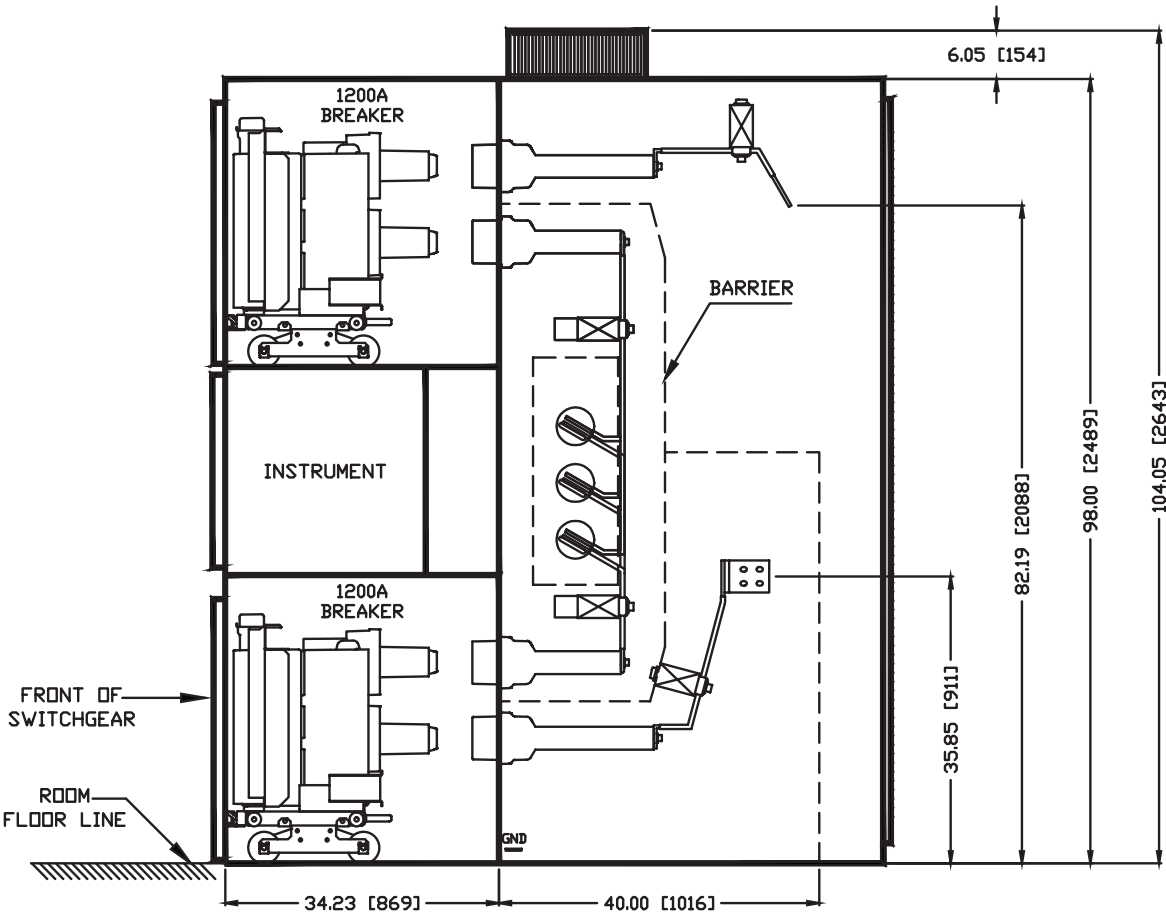


FLOOR PLAN

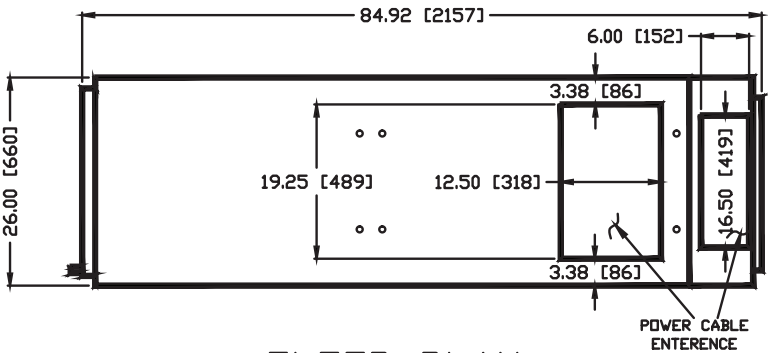
Civil engineering details

Typical side views, floor plans, and clearances

ReliaGear ND switchgear two-high frames  
Two-high circuit breaker: 1200 A



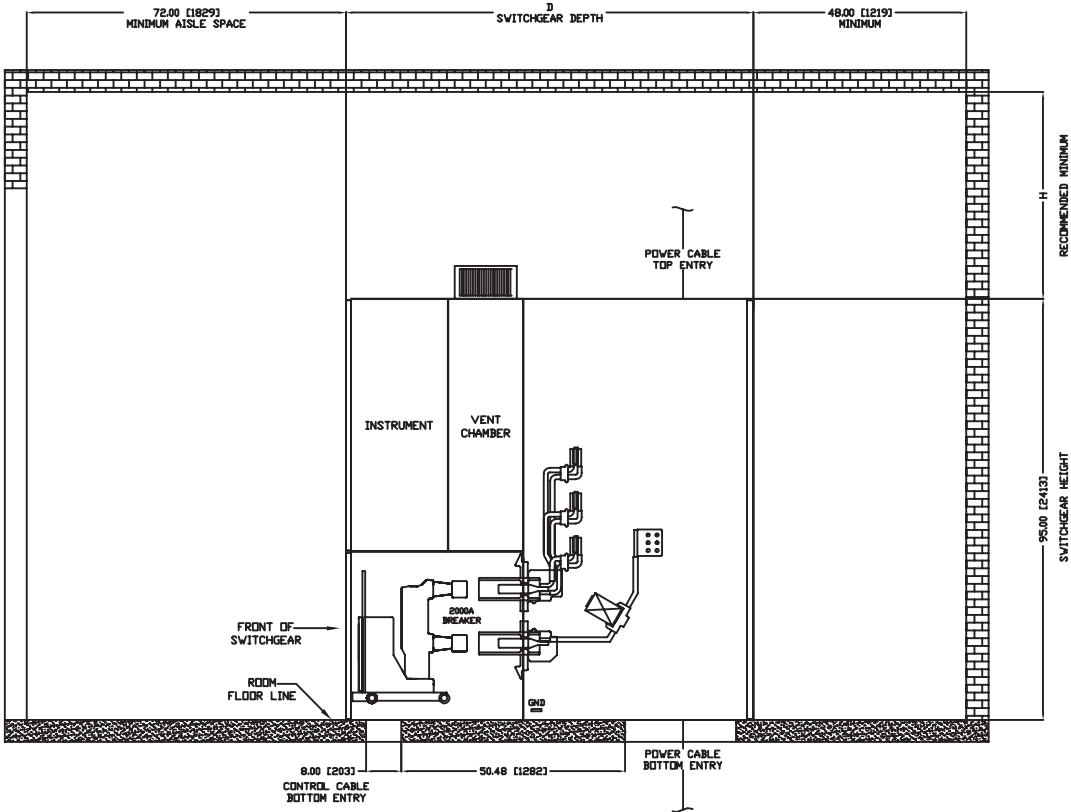
SIDE SECTION



FLOOR PLAN

Civil engineering details

Typical side views, floor plans, and clearances



Typical civil engineering dimensions - inches (mm)

Depth (D)	
ReliaGear ND	77 or 85 (2337)

Dimension H:

- 6 inches for 1200 A lineups
- 14 inches for 2000 A lineups

Additional information

Additional height clearance may be needed during installation of the switchgear. Please allow for 6-inch shipping base for movement during installation.

Frame weights calculation

All frame styles

To calculate the weight of a frame, identify the current rating for each module. Select the weights from the appropriate column in the adjoining table for A components.

A frame consists of one bus and cable module and the appropriate circuit breaker is given separately and must be added.

Low voltage modules may contain significant amounts of secondary equipment and wiring. Depending on the extent of secondary protection and control equipment, ABB recommends adding 20% to 50% of the empty weight of the low voltage module.

The weight of the end panels has to be considered per lineup of switchgear. Weights given are for two end panels, one on each end of the switchgear lineup.

Typical frame weights are listed below. Weights include all modules and components as listed above.

Basic frame configuration	Circuit breaker (rating)	Weight	
		lbs	kg
One circuit breaker	1200	1800	816.5
	2000	2020	916.3
Two circuit breakers	1200	2560	1161.2
One circuit breaker, one PT	1200	2060	934.4
One circuit breaker, one CPT	1200	2660	1206.6
	2000	2880	1306.3

Component	Rating/size (in)	Weight	
		lbs	kg
Vmax/A circuit breaker	1200	2023	918
	2000	2441	1107
Circuit breaker module (including bus risers, runbacks and supports)	1200/1200	3013	1367
	1200/1200	3302	1498
Low voltage module (not including instruments and wiring)	1200	2440	1107
	2000	2858	1396
Bus and cable module (rating is for main bus)	1200	2859	1297
	2000	3277	1486
PT module (including 3 PT's)	1200	3210	1456
Rear extension	2000	3628	1646
End panels (per lineup)	2000	3008	1364



Auxiliary device ratings

Current transformers

Current transformer ratings

ReliaGear ND is designed and tested for use with the ABB SCH-3U current transformers. These CTs are used for voltage ratings of 5 and 15 kV. Each breaker can accommodate up to two load side and one bus side CT for a total possible three current transformers per phase.

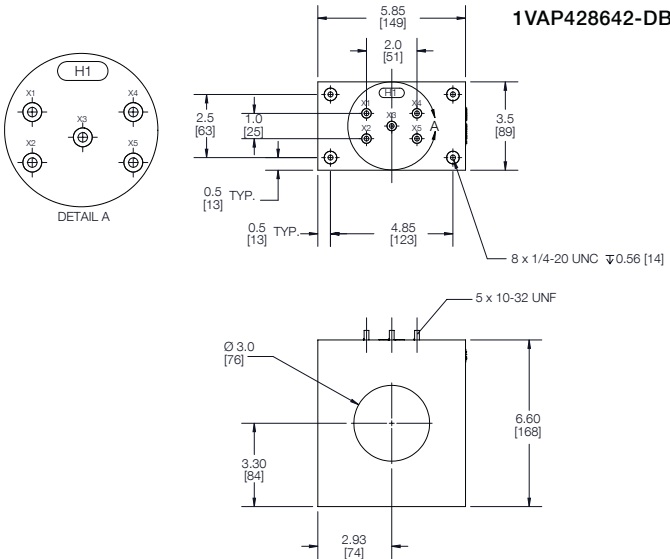
The ABB SCH-3U current transformers are available in single and multi-ratio styles with primary am- pere ratings from 50 to 2000 A. These current transformers are used as a source of current for both relaying and metering.



- SCH-3U**
- 600 V indoor
  - 10 kV BIL
  - 60 Hz
  - Mechanical rating: 180 x Normal

The ring-type core is insulated and toroidally wound with a fully distributed secondary winding. The protective case, made of an impact-resistant polycarbonate, is assembled using self-tapping screws. Secondary terminals are 10-32 brass termi- nal screws with hardware.

These units meet all applicable IEEE and NEMA standards and are UL recognized components.



Type SCH-3U (3.0" window)

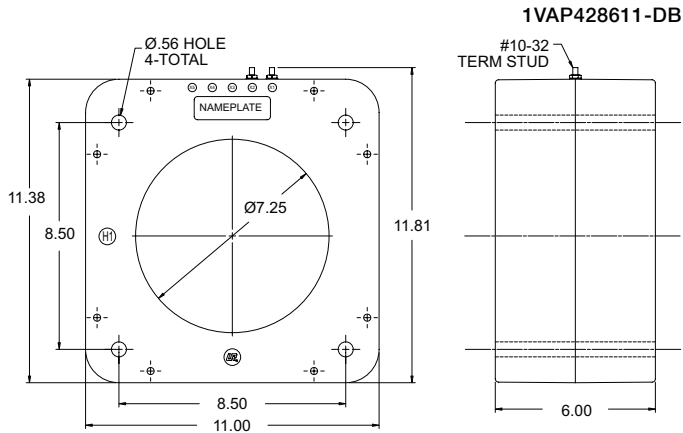
Primary amps	Rating factor		IEEE metering accuracy					Relay accuracy	Weight lbs.
	30°C	55°C	B-0.1	B-0.2	B-0.5	B-0.9	B-1.8		
50	2.0	1.5	4.8	-	-	-	-	C5	12
75	2.0	1.5	2.4	2.4	4.8	-	-	C10	12
100	2.0	1.5	1.2	2.4	4.8	4.8	-	C10	12
150	2.0	1.5	0.6	1.2	2.4	2.4	4.8	C20	12
200	2.0	1.5	0.6	0.6	1.2	2.4	2.4	C20	12
300	2.0	1.5	0.3	0.3	0.6	1.2	1.2	C40	12
400	2.0	1.5	0.3	0.3	0.3	0.6	1.2	C50	12
600 MR	2.0	1.5	0.3	0.3	0.3	0.3	0.6	C80	12
800 MR	1.5	1.0	0.3	0.3	0.3	0.3	0.3	C100	12
1200 MR	1.33	1.0	0.3	0.3	0.3	0.3	0.3	C100	12
1500 MR	1.25	1.0	0.3	0.3	0.3	0.3	0.3	C100	12
2000 MR	1.25	1.0	0.3	0.3	0.3	0.3	0.3	C100	12

Auxiliary device ratings

Ground sensor current transformers



- BYZ-S**
- 600 V indoor
  - 10 kV BIL
  - 60 Hz
  - Mechanical rating: 180 x Normal

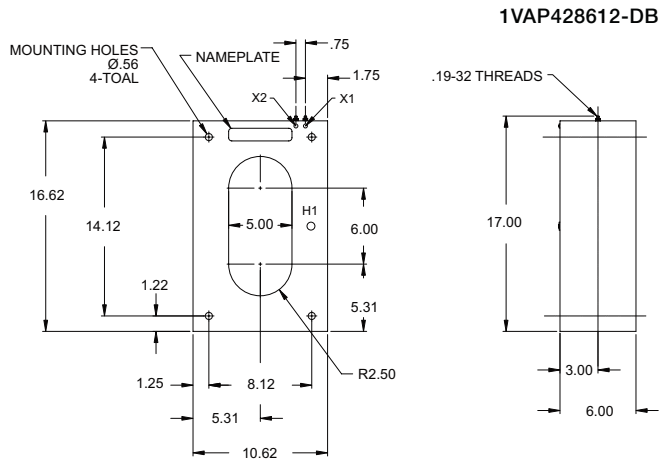


BYZ-S

Primary current rating	Relaying accuracy	Thermal rating (x normal, 1 sec)	Window diameter (in)	Weight (lb)
50	C10	100	7.25	52
100	C20	100	7.25	52



- BYZ-O**
- 600 V indoor
  - 10 kV BIL
  - 60 Hz



BYZ-O

Primary current rating	Relaying accuracy	Thermal rating (x normal, 1 sec)	Window diameter (in)	Weight (lb)
50	C20	100	5 x 10 oval	110
100	C50	100	5 x 10 oval	110

# Auxiliary device ratings

## Potential transformers

**VIY-60, VIZ-75, VIZ-11,TJC-5**

Potential transformers (PTs) are indoor type, designed for metering and relaying applications. The primary and secondary coils of the transformer are wound using special winding and shielding techniques for improved voltage stress distribution. The entire assembly is cast in polyurethane under vacuum for added insulation and protection.

PTs are supplied with primary fusing to take the transformer off-line in the event of an internal failure and to protect the transformer from partial primary and secondary short-circuit.

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Three phase 60 Hz, 208/120 V secondary, epoxy-cast			
Primary voltage (V)	BIL (kV)	Ratios	Metering accuracy
2400,4200, 4800	60	20.1, 35.1, 40.1	0.3 W, X, Y and 1.2 Z at 120 V
7300, 8400, 12000, 14400	110	60.1, 70.1, 100.1, 120.1	0.3 W, X, M, Y and 1.2Z at 69.3 V
12000, 14400	95	100.1, 120.1, 60.1	0.3 W, X and 1.2 Y



# Auxiliary device ratings

## Control power transformers

CPTs are designed to provide control power in medium voltage switchgear. All CPTs are manufactured to meet the requirements of IEEE C57.12.01. Primary windings are vacuum cast for high dielectric strength and ruggedness. Transformers are constructed with high quality grain-oriented core steel and copper conductor.

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Single phase 60 Hz, 240/120 V secondary, epoxy-cast		
Primary voltages (V)	BIL (kV)	Available kVA
2400, 4160, 4800	60	15
7200, 7620, 8320	95	15
12000, 12470, 13200, 13800	95	15
12000, 14400	125	15



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## Power Distribution Center (PDC)

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Power Distribution Centers are prefabricated, modular, skid-mounted enclosures for electrical distribution systems including low and medium voltage switchgear and motor control as well as auxiliary equipment such as batteries, SCADA systems and unit substation transformers.

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As a self-contained unit, the PDC and all enclosed equipment are completely coordinated, assembled and tested in a controlled factory environment. This offers many advantages over conventional types of outdoor switchgear construction:

- Single source responsibility and accountability
- Reduced installation and ownership costs
- Application flexibility for a variety of equipment types, operating environments and changing system requirements





# Accessories

The accessory group for ReliaGear ND metal-clad switchgear and the Vmax/A circuit breaker includes a complete array of required and optional special tools for proper handling, operation and maintenance.

- 01 Racking crank
- 02 Lift truck
- 03 Test jumper
- 04 Test cabinet

Required accessories include the circuit breaker racking crank for inserting and removing the circuit breaker, a lift truck to insert/remove breakers in top cells, and a PT/CPT tool to connect/disconnect PT and CPT trucks.

**Lift truck**  
A lift truck is required for all primary devices in upper cubicles or breakers in lower cubicles without roll-on-the-floor provisions. The lift truck is available in manual hydraulic or electric winch versions. The lift truck docks with the switchgear, allowing a primary device to be raised or lowered to the appropriate height and safely rolled into the compartment. The lift truck has wheels for easy maneuvering in restricted aisle space that is common to switchgear installations.

**Test jumper**  
A test jumper is an extension cord. It allows the connection of secondary contacts on a circuit breaker to the switchgear, while outside a breaker compartment. This enables the breaker to be electrically operated using controls in the switchgear.

**Test cabinet**  
A test cabinet is a wall-mounted control cabinet connected to a separate power source, containing switches to open and close a breaker. The test cabinet has a female connector and an umbilical cord (stored inside the cabinet) for connection to the circuit breaker secondary contacts, and serves as an aid to breaker inspection and maintenance in switchgear aisles or work areas.

**Breaker ramp**  
A breaker ramp is available to insert breakers without roll-on-the-floor provision into lower cubicles without the use of a lift truck.

**PT/CPT tool**  
The PT/CPT tool is required to connect and disconnect PT and CPT drawout trucks with the door closed.



01



02



03



04

# Ground and Test device (G&T)

- 01 The device is for use with cells designed for Vmax/A breakers
- 02 Either upper or lower terminals are grounded at any time

A Ground and Test (G&T) device is a drawout assembly compatible with circuit breaker compartments. The G&T provides a means to select and test primary circuits in a controlled manner, then connect de-energized primary circuits to the switchgear ground bus to support maintenance activity.

**Grounding feature**  
The 15 kV manual G&T device is for use with the ABB ReliaGear ND platform. These devices are supplied when specified by the customer.

**Insertion and withdrawal**  
The device is able to be inserted and withdrawn from the circuit breaker compartment in the same manner as the circuit breaker, including use of the same lift truck and racking tools.

**Coordination**  
The device is equipped with mechanical interlock that coordinates with the circuit breaker compartment. The device is blocked from being inserted into a circuit breaker compartment where the required ratings exceed those of the G&T device.

**Terminal sets**  
The device features one terminal set tht can be configured to test and ground the line or load side. Only one set can be grounded at any time.

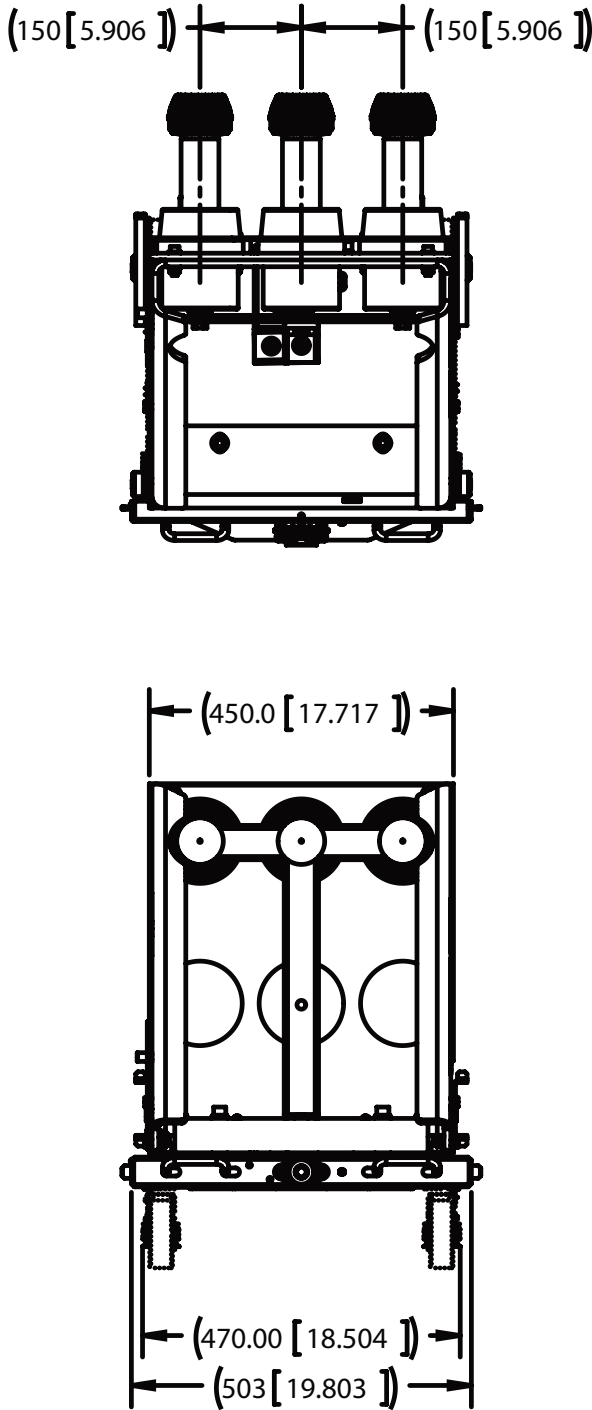
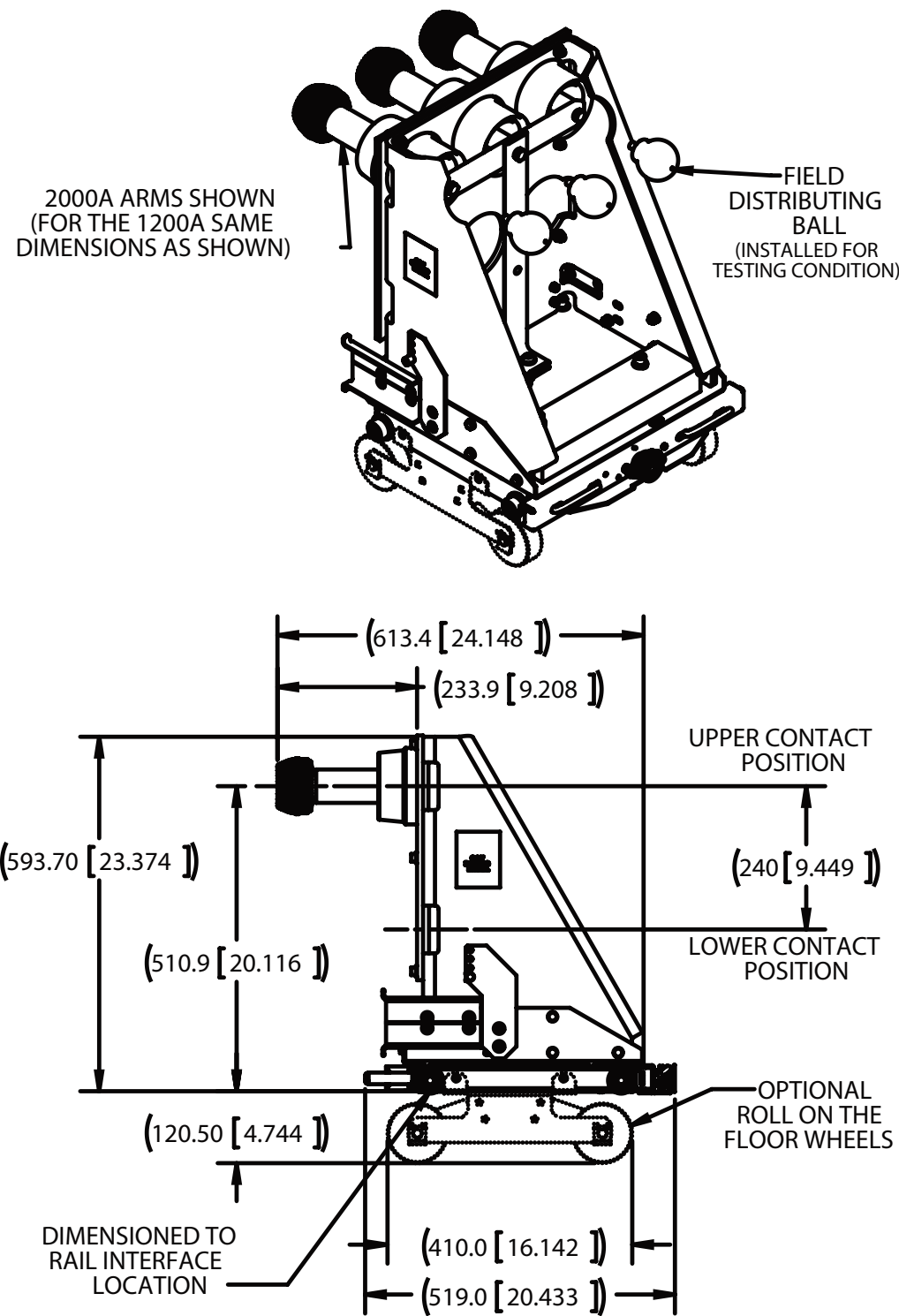
**Grounding connection system**  
The device features a grounding connection system that operates with the use of grounding bus bars. The grounding bus bars and related hardware provided with the device satisfy the requirements of the design tests for the short time and momentary tests as required per IEEE C37.20.6.

**Interrupting or closing capability**  
The ABB manual G&T device does not feature closing or interrupting. The device does not have a mechanism by which to open or close a circuit. different devices are required for 1200 A and 2000 A compartments.





GROUND AND TEST DIMENSIONS



# SmartRack™

## Electrical remote racking device

The ABB SmartRack™ Electric Remote Racking De-vice is intended to assist technicians with the pro-cess of racking ABB medium voltage circuit break-ers and most auxiliary devices. The main function of the device is to perform the racking operation with minimal manual interaction. This allows the operator of the device to maintain a significant dis-tance between themselves and the removable ele-ment while racking is performed as compared to the traditional hand-crank method of racking.

The ABB SmartRack Electric Remote Racking Device is able to perform this complex task through the use of a programmable logic controller and servo-motor. Throughout operation, the controller and motor are in constant communication allowing the device to accurately position a circuit breaker or other device in the switchgear cell.

SmartRack application guide

The SmartRack remote racking device is designed to operate with the following devices.

	Breaker/ contactor	G&T device	PT unit	CPT unit	CPT fuse unit
Advance	X	X	X	X	X
Advance 27	X	X	X	X	X
SafeGear	X	X	X	X	X
SafeGear HD	X	X	X	X	X
ReliaGear ND	X	X	N/A	N/A	N/A
SafeGear MCC	X	N/A	N/A	N/A	N/A





# Notes