

# Panelboards

## Circuit Breaker / Lighting and Distribution

General

### Type P1

**480Y/277 Vac Maximum  
600Y/ 347 Vac (CSA only) Maximum  
400 Ampere Mains  
400 Ampere Maximum Branch  
UL Short Circuit Rating —  
200,000 A. @ 240 Vac / 100,000 A. @  
480/277 Vac. IR Maximum**

**Branch Breaker Symmetrical  
Interrupting Capacity**

**Based on Underwriters' Test Procedure**

Feed thru and subfeed lugs may result in lower interrupting ratings if not protected by a main device. Consult sales office.

Meets 2008 NEC wire bending requirement, section 408.55.

Meet Federal Specification W-P-115C.

### Panelboards

Listed by Underwriters' Laboratories, Inc., under "Panelboards" File #E2269 for interiors and #E4016 for boxes and fronts.

### Service

1-phase 2-wire - 120 Vac, 240 Vac,  
24 Vdc, 48 Vdc, 125 Vdc

1-phase 3-wire - 120/240 Vac,  
125/250 Vdc

3-phase 3-wire - 480Y/277 (when derived from 3-phase 4-wire system), 240 Vac, 120 Vac, 125/250 Vdc

3-phase 4-wire - 208Y/120 Vac, 240/120 Vac, 480Y/277 Vac, 600Y/347 Vac, 380/220 Vac.

### Panelboard Fronts and Doors

Standard panelboards are furnished with trim featuring concealed fasteners and hinges with a flush door lock. All are factory-assembled for ease of installation. Fronts are fabricated from code gauge steel and finished ANSI-61. See page 11-73 for optional fronts.

### Main Breakers

BL, BLH, HBL, BQD, ED4, ED6, HED4, HHED6, QJ2, QJH2, QJ2-H, FXD6, FD6, HFD6, HFXD6, JXD6, JD6, HJXD6, HJD6. (All main breakers except 400 amp frame are mounted horizontal.)

### Main Breaker Panel Connectors

Ampere Rating	Connectors Suitable for Cu or Al
100	(1)—#14 1/0 AWG
125	(1)—#4 1/0 AWG
225	(1)—#4 AWG-300 kcmil
250	(1)—#4/0 AWG-350 kcmil Al (1)—#6/0 AWG-350 kcmil Cu
400 <sup>①</sup>	(2)—#3/0 AWG-250 kcmil Al or (1)—#3/0 AWG-500 kcmil Al

Connector ranges indicated do not apply to all main breaker types. Refer to molded case circuit breaker standard pressure wire connector chart (Section 7) for the connector range of a specific frame.

### Main Lug Connectors

125	(1)—#6 AWG-350 kcmil
250	(1)—#6 AWG-350 kcmil
400	(2)—#3/0 AWG-250 kcmil or (1)—#3/0 AWG-600 kcmil

### Boxes

20" wide, 5.75" deep

- End walls are blank as standard. End walls with knockouts will be supplied at no charge on 5.75" deep panels if requested at time of order.

### Main Breaker Gutter Dimensions (inches)

Main Breaker	Side Gutter		Neutral Location
	20" w/box	24" w/box	20" w/box
BL, BLH, HBL, BQD	8.500	10.500	11.500
NGB	8.000	10.000	11.500
ED4, ED6, HED4	6.125	8.125	11.500
QJ2, QJH2, QJ2-H	6.500	8.500	11.500
FD6, FXD6, HFD6	5.250	7.250	11.500
JD6 <sup>②</sup> , JXD6 <sup>③</sup>	15.000	15.000	26.750

### Main Lug End Gutter Dimensions (inches)

Amp Rating	End Gutter	Neutral Location
125	10.500	11.500
250	10.500	11.500
400 <sup>③</sup>	25.500	26.750

### Side Gutter Wiring Space (inches)

Reference Letter	Panel Width 20"	Panel Width 24" (Optional)
A	6.375	7.375
B	5.500	7.500
C	6.125	8.125
D <sup>④</sup>	6.500	8.500
E	5.250	7.250
F	5.000	7.000

### Branch Breaker Side Gutters

A →	BL, BLH, HBL	BL, BLH, HBL	← A
→ B	BLF, BLHF	BLF, BLHF	← B
→ C	BQD	BQD	← C
→ D	ED, ED4, ED6, HED4, HHED6		← D
→ E	QJ2, QJH2, QJ2-H		← E
→ F	FXD6, FD6, HFD6 <sup>④</sup>		← F
	NGB	NGB	

### Weight — Approximate

Total panelboard weight when filled with a normal quantity of breakers and accessories is:

- About 3 lbs. per inch of box height

### Gauge Steel Boxes

Width	Height	Gauge Steel
20"	All	#16

### Fronts — Surface, Flush

20"	All	#14
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### Series Connected Short Circuit Ratings

The term "Series Connected Short Circuit Rating" refers to the application of series connected circuit breakers in a combination that allows some breakers to have lower individual interrupting ratings than the available fault current. This is permitted as long as the series combination has been tested and certified by UL.

The table below lists specific main and branch breaker series combinations that are marked on all P1 panels. All combinations shown have been tested for use in P1 panelboards and are UL listed. Other combinations are available. See Circuit Breaker Section, of this book.

These series ratings must be specified on order at time of entry.

① P1 400 amp main breaker panels have wire bending space available for 600 kcmil.

② 400A main breaker is vertical mounted.

For inches / millimeters conversion, see Application Data section.

③ Feed-thru lug and neutral wire bending space is 15.000" and 16.250" respectively on 400A panel.

④ P1 panel limited to (1) subfeed 250 amperes max.

# Panelboards

## Circuit Breaker / Lighting and Distribution

*Selection*

### Type P1

#### Shown with Standard Mains, Top Fed and Surface Trim

Catalog number is for aluminum main bus. For optional copper main bus change "A" in position 11 to "C".

Panels are top feed, surface mounted. For bottom feed, change "T" in position 12 to "B". For flush mounting, change "S" in position 13 to "F".

Replace fifth and sixth position in panelboard catalog number, with alternate main breaker code. Use price adders from main breaker selection table. Horizontally mounted.

#### Main Lugs Only

Maximum Panel Ampere Rating	Maximum 1-Pole Circuits	Box Height (inches)	208Y/120V	120/240V	480Y/277V
			3-Phase, 4-Wire Catalog Number	1-Phase, 3-Wire Catalog Number	3-Phase, 4-Wire Catalog Number
125	18	32	P1C18ML125ATS	P1A18ML125ATS	P1E18ML125ATS
	30	38	P1C30ML125ATS	P1A30ML125ATS	P1E30ML125ATS
	42	44	P1C42ML125ATS	P1A42ML125ATS	P1E42ML125ATS
250	18	32	P1C18ML250ATS	P1A18ML250ATS	P1E18ML250ATS
	30	38	P1C30ML250ATS	P1A30ML250ATS	P1E30ML250ATS
	42	44	P1C42ML250ATS	P1A42ML250ATS	P1E42ML250ATS
400	18	56	P1C18ML400ATS	P1A18ML400ATS	P1E18ML400ATS
	30	62	P1C30ML400ATS	P1A30ML400ATS	P1E30ML400ATS
	42	68	P1C42ML400ATS	P1A42ML400ATS	P1E42ML400ATS

#### Main Circuit Breaker

100	18	32	P1C18BL100ATS	P1A18BL100ATS	P1E18BD100ATS
	30	38	P1C30BL100ATS	P1A30BL100ATS	P1E30BD100ATS
	42	44	P1C42BL100ATS	P1A42BL100ATS	P1E42BD100ATS
125	18	32	P1C18NB125ATS	P1A18NB125ATS	P1E18NB125ATS
	30	38	P1C30NB125ATS	P1A30NB125ATS	P1E30NB125ATS
	42	44	P1C42NB125ATS	P1A42NB125ATS	P1E42NB125ATS
225	18	32	P1C18QJ225ATS	P1A18QJ225ATS	P1E18FX225ATS
	30	38	P1C30QJ225ATS	P1A30QJ225ATS	P1E30FX225ATS
	42	44	P1C42QJ225ATS	P1A42QJ225ATS	P1E42FX225ATS
250	18	32	P1C18FX250ATS	P1A18FX250ATS	P1E18FX250ATS
	30	38	P1C30FX250ATS	P1A30FX250ATS	P1E30FX250ATS
	42	44	P1C42FX250ATS	P1A42FX250ATS	P1E42FX250ATS
400	18	56	P1C18JX400ATS	P1A18JX400ATS	P1E18JX400ATS
	30	62	P1C30JX400ATS	P1A30JX400ATS	P1E30JX400ATS
	42	68	P1C42JX400ATS	P1A42JX400ATS	P1E42JX400ATS

#### Main Breaker Selection

Ampere Rating	Breaker Type	Maximum Interrupting Rating		Catalog Number	Available Trip Values
		240 Vac	480/277 Vac		
100	BL	10	—	BL	15, 20, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100
	BLH	22	—	BH	15, 20, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100
	HBL	65	—	HB	15, 20, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100
	BOD	65	14	BQ	15, 20, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100
125	NGB	100	25	NB	15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100, 110, 125
	ED4	65	18	E4	15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100, 110, 125
	HED4	100	42	H4	15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100, 110, 125
	HHED6	100	65	HA	15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100, 110, 125
225	QJ2	10	—	QJ	60, 70, 80, 90, 100, 110, 125, 150, 175, 200, 225
	QJH2	22	—	QH	60, 70, 80, 90, 100, 110, 125, 150, 175, 200, 225
	QJ2-H	42	—	Q2	60, 70, 80, 90, 100, 110, 125, 150, 175, 200, 225
	HQJ2H	100	—	HQ	60, 70, 80, 90, 100, 110, 125, 150, 175, 200, 225
	FD6	—	35	FD	—
	FXD6	65	35	FX	70, 80, 90, 100, 110, 125, 150, 175, 200, 225
	HFD6	100	65	HF	70, 80, 90, 100, 110, 125, 150, 175, 200, 225
	HFXD6	—	65	H2	—
250	FD6	—	—	FD	—
	FXD6	65	35	FX	250
	HFD6	100	65	HF	250
	HFXD6	—	—	H2	—
400	JD6	—	—	J6	—
	JXD6	65	35	JX	200, 225, 250, 300, 350, 400
	HJD6	100	65	H6	200, 225, 250, 300, 350, 400
	HJXD6	—	—	H5	—

For inches / millimeters conversion, see Application Data section.

# Panelboards

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*Selection*

### Branch Circuit Breakers

Breaker Type	Number of Poles	Max. Interrupting Rating (kA)					Available Trip Values
		120V	120/240V	240V	277V	480/277V	
BL	1	10	—	—	—	—	15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 70
	2	—	10	—	—	—	15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100
	3	—	—	10	—	—	15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100
BLR	2	—	—	10	—	—	15, 20, 30, 40, 50, 60, 70, 90, 100
BL, HID	1	10	—	—	—	—	15, 20, 30
	2	—	10	—	—	—	15, 20, 30
BLH	1	—	22	—	—	—	15, 20, 30, 40, 50, 55, 60, 70
	2	—	22	—	—	—	15, 20, 30, 40, 50, 60, 70, 90, 100
	3	—	—	22	—	—	15, 20, 30, 40, 50, 60, 70, 80, 90, 100
HBL	1	—	65	—	—	—	15, 20, 30, 40, 50
	2	—	65	—	—	—	15, 20, 30, 40, 50, 60, 70
	3	—	—	65	—	—	15, 20, 30, 40, 50, 60, 70, 80, 90, 100
BLF	1	10	—	—	—	—	15, 20, 30
	2	—	10	—	—	—	15, 20, 30, 40, 50, 60
BLHF	1	22	—	—	—	—	15, 20, 30
	2	—	22	—	—	—	15, 20, 30, 40, 50, 60
BGL <sup>①</sup>	2	10	—	—	—	—	15, 20, 30
	3	—	10	—	—	—	15, 20, 30
BLE	1	10	—	—	—	—	15, 20, 30
	2	—	10	—	—	—	15, 20, 30, 40, 50, 60
BLEH	1	22	—	—	—	—	20, 30
	2	—	22	—	—	—	15, 20, 30, 40, 50, 60
BAF	1	10	—	—	—	—	15, 20
BAFH	1	22	—	—	—	—	15, 20
BQD	1	—	65	—	14	—	15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100
	2	—	65	—	—	14	
	3	—	—	65	—	14	
NGB <sup>②</sup>	1	100	—	—	25	—	15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100, 125
	2	—	100	100	—	25	
	3	—	100	100	—	25	

### Subfeed Breakers

Breaker Type	Number of Poles	Max. Interrupting Rating (kA)		Available Trip Values
		240V	480Y/277V	
QJ2	2, 3	10	—	60, 70, 80, 90, 100, 110, 125, 150, 175, 200, 225
QJH2	2, 3	22	—	60, 70, 80, 90, 100, 110, 125, 150, 175, 200, 225
QJ2H	2, 3	42	—	60, 70, 80, 90, 100, 110, 125, 150, 175, 200, 225
HQJ2H	2, 3	100	—	60, 70, 80, 90, 100, 110, 125, 150, 175, 200, 225
ED4	2, 3	65	18	15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 70, 80, 90, 100, 110, 125
HED4	2, 3	100	42	15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 70, 80, 90, 100, 110, 125
FXD6	2, 3	65	35	70, 80, 90, 100, 110, 125, 150, 175, 200, 225, 250
FD6	2, 3	65	35	70, 80, 90, 100, 110, 125, 150, 175, 200, 225, 250
HFD6	2, 3	100	65	70, 80, 90, 100, 110, 125, 150, 175, 200, 225, 250
HFXD6	2, 3	100	65	70, 80, 90, 100, 110, 125, 150, 175, 200, 225, 250

① 2-pole breaker is one phase and neutral. 3-pole is two phases and neutral.  
 ② P1 panel with NGB branch devices will not accept BL or BQD frames in the same panel as branch devices.

**Note:** BL, HBL, BQD breakers are mounted in common mountings in 3" or 6-pole increments.

# Panelboards

• Revised •

07/25/13

## Type 1 P1 Panelboard Modifications and Additions

*Selection*

### Enclosures

Description
6" end gutter 2" side gutter Barrier in gutter (add to extra gutter price – min 4" required) 24" wide
Hinged trims Piano hinged trims Door-in-door trims Screw to the box trims
Trim mounted devices . . . . . See page 11-74 <ul style="list-style-type: none"><li>• Pilot lights</li><li>• Toggle switches</li><li>• Push buttons</li></ul> (Devices mounted to be wired to the trim should also have hinged trim specified)
Painted boxes . . . . . See page 11-74 Custom colors . . . . . See painted boxes Increase gauge trims and boxes . . . . . See page 11-74 Stainless steel trims and boxes, Type 1 . . . . . See page 11-74

### Meters

(Contact sales for pricing and application engineering for space requirements)

### Panel Skirts

See page 11-75

### Special Locks

TEY TEU1 Cat 60 LL803 LL806 Yale 47 (NYC) National C413A Best Lock 7-pin tumbler Southco 1/4 Fastener Corbin 1001 FAB7
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### Panel Modifications

Catalog No. Addition	Main Bus	Amp Ratings
C	Copper (tin pltd.)	125A
C	Copper (tin pltd.)	250A
C	Copper (tin pltd.)	400A

\* "C" represents "A" in the 11th digit of the catalog number.

### Branch and Main Breaker and Accessories

See breaker section for pricing on the following options

- Handle blocks
- Handle locks
- Aux. Contacts<sup>①</sup>
- UVR<sup>②</sup>

### Bus mounted SPD see section 10 Service Entrance Label

Type P1 Panelboards are factory labeled suitable for use as service entrance equipment when NEC requirements are met. A panelboard cannot have more than six main disconnects, unless it is a lighting and appliance branch panelboard. Lighting and appliance branch panelboards are limited to two main disconnects.

<sup>①</sup> Accessories on 1" pole breakers (BL, BQD, ED) will take unit space.

### Panel Modifications (cont.)

#### Grounding of Panelboards

Ground Bars except for brazed to box are shipped with the panel interior factory mounted.

- Non-Insulated Equipment Ground Bar
- Copper Non-Insulated Ground Bar
- Al Insulated Equipment Ground Bar
- Cu Insulated Equipment Ground Bar
- Ground Bar Brazed to Box (not recommended for painted boxes)

#### Shunt Trip on Main or Branch

BL, BLH, HBL, BQD as branch only.  
BL, BLH, HBL, NGB, ED4, ED6, HED4, HED6, HHED6 uses 1" unit space for shunt trip as a branch device. All others may be used on mains or subfeeds. See breaker section for list price adders.

#### Time Clocks

Time clocks may be mounted in a 23" enclosure to be cable connected to the panel. Sangamo, Tork or Paragon time clock can be supplied.

Description
Time Clock (1 or 2-pole, single or double throw contacts; 3-pole, single throw) 277V maximum with plain dial
Astronomical dial
An omitting device
Reserve power or carryover
Space and mounting provisions only

### Remote Switches Modifications (See page 11-73)

#### Remote Control Switches

480V AC max. mounted in a 23" enclosure to be cable connected to the panel.

#### Application for Remote Switch

Switch Type	Modification
920	Mounts in 23" relay cabinet as a main only
LEN	30A mounts in 23" relay cabinet as a main only

#### Feed-Thru Lugs

Cannot be used in conduction with SPD or subfeed breakers

Ampere Rating	Type	Connector Range
250	Al/Cu Lay-in Mechanical Cu Lay-in Mechanical Al/Cu Compression	(1)—#6 AWG-350 kcmil (1)—#6 AWG-350 kcmil (1)—#6 AWG-350 kcmil
400	Al/Cu AWG Mechanical Cu Al/Cu Compression	(2)—#3/0 AWG-250 kcmil or (1)—#3/0 AWG-600 kcmil (2)—#3/0 AWG-250 kcmil or (1)—#3/0 AWG-600 kcmil (1) 400—600 kcmil

**Note:** Specify copper or aluminum cable.

## Type P1, P2, and P3 Panelboards

### Miscellaneous Parts and Accessories

Catalog Number	Description
EGK	Al Ground Bus 44 Connections
BK1	Bonding kit for 250A max. and all P1 panels
IMK1	Interior Adjusting Kit
11-1824-01	Directory Card Holder
12-1110-01	Directory Card
11-1056-01	NEMA Instruction Book
NBK03	Number Strips 1–42. Stick-on type; Use w/ P1 series Panels
NBK04	Number Strips 43–84. Stick-on type; Use w/ P1 series Panels
NBK05	Number Strips 85–126. Stick-on type; Use w/ P1 series Panels
NBK06	Number Strips 127–168. Stick-on type; Use w/ P1 series Panels
ECGK	Cu Ground Bus 44 Connections
IGK	Insulated Al Ground Bus
ICGK	Insulated Cu Ground Bus
EWK1	End Wall Kit with Knockouts (20" W x 5.75" DP)
EWK2	End Wall Kit with Knockouts (24" W x 7.75" DP)
QF3	Filler Plate
EBF1	NEB/HEB Filler Plate

## Type P1 Panelboard Connector Modifications

*Selection*

### Compression Lugs

Style	Amp Rating	Breaker Type	Compression Connectors	Box Height Addition
MLO	125	N/A	(1) #4 AWG - 350 kcmil	None
	250			
Main Breaker	400	N/A	(1) 250-600 kcmil or (2) #3/0 AWG - 250 kcmil (custom option)	None
	125	ED4, ED6, HED4 HHED6	(1) #12-1/0 AWG	Box must go to 24" wide
	225	QJ2, QJH2, QJ2H	(1) #6 AWG - 350 kcmil Cu or Al	Box must go to 24" wide for all breakers
	250	FXD6, HFD6	(1) #6 AWG - 350 kcmil Cu or Al	Box must go to 24" wide for all breakers

**NOTE:** Standard compression lugs used for P1 panels are range taking lugs and may require a particular crimping tool (tool is Anderson VC6) to accommodate the range. Consult factory for information. 200% neutral not available with compression lugs. NGB breakers cannot accommodate compressions lugs.

### Enclosure Modifications

Description
20" Panel Width NEMA 3R enclosures NEMA 3R/12 enclosures Gasket between trim and box (Type 1)
24" Panel Width NEMA 3R enclosures NEMA 3R/12 enclosures Gasket between trim and box (Type 1)

**NEMA-4—Water Tight, Dust Tight, Steel Enclosure** (consult plant for actual enclosure size and for anything larger than 44")

Box Height (inches)	Enclosure Size		
	H	W	D
32	32	24	8
38	38	30	8
48	48	36	8

**Additional Enclosure Modifications**  
(check with factory for availability)

Description
Strip Heaters
Humidstat Control
Thermostat Control

**NEMA-4X—Water Tight, Dust Tight and Corrosion Resistant**  
(consult plant for actual enclosure size)

Catalog Number	Enclosure – Stainless Steel Size (inches)		
	H	W	D
B4X26	26	20	5.75
B4X32	32	20	5.75
B4X38	38	20	5.75
B4X44	44	20	5.75
B4X56	56	20	5.75
B4X62	62	20	5.75
B4X68	68	20	5.75
B4X74	74	20	5.75

Enclosure – Fiberglass Size (inches)		
H	D	W
36	30	8
48	36	12

# Panelboards

## Type P1

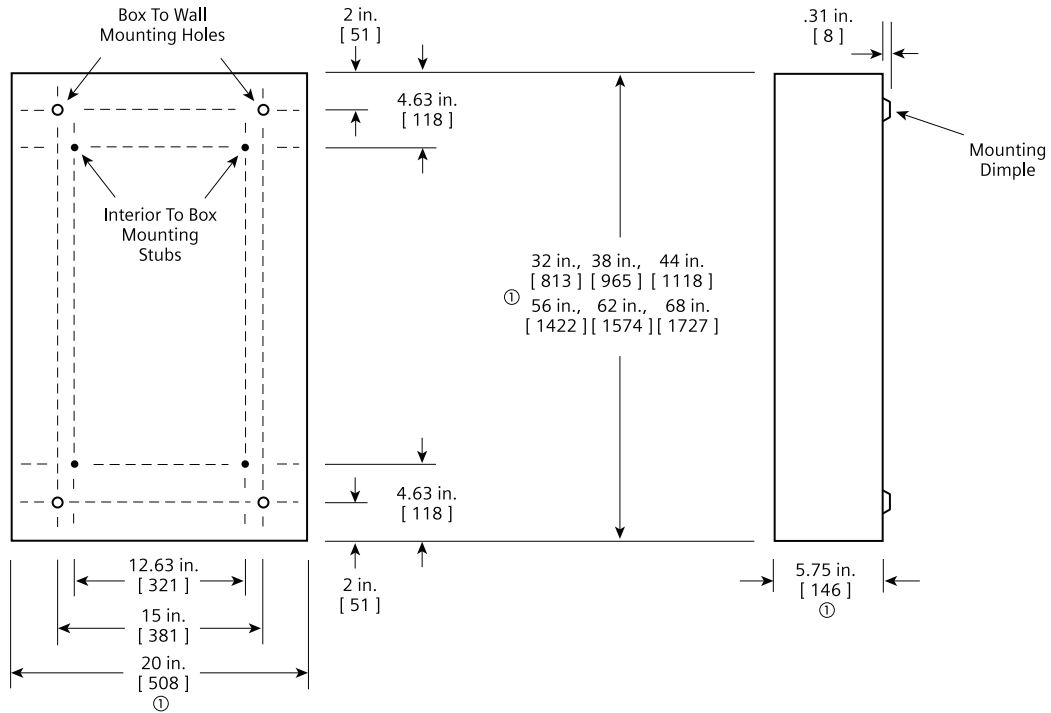
## Dimensions

11

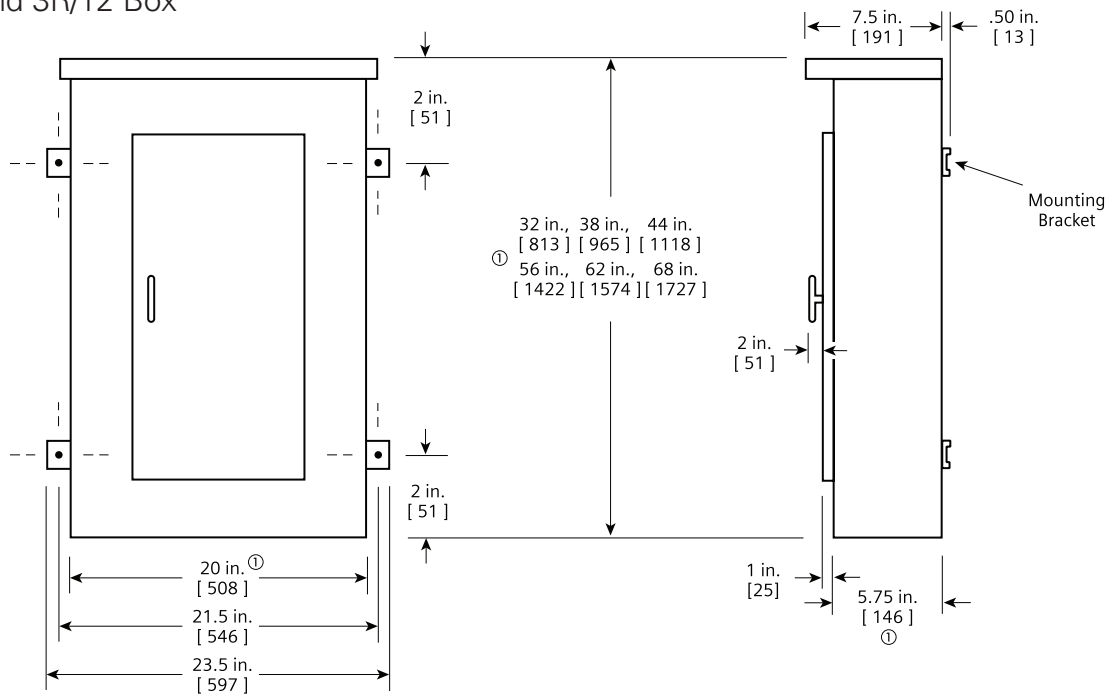
PANELBOARDS

### Type 1 Box

Box is symmetrical



### Type 3R and 3R/12 Box



①Dimensions are interior of the box. Add 5/8" to width for absolute dimension.  
Add 1/8" to height for absolute dimension.

Dimensions shown in inches and millimeters [ ].