

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 2005 NEC wire bending requirement, section 312.6.

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 10-71 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 ^①	(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 6) 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 ^② , JXD6 ^②	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 ^③	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 ^④	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 ^⑤		← E
→ F	FXD6, FD6, HFD6		← 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

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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".

See copper price adder on page 10-20.

Main Lugs Only

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.

Maximum Panel Ampere Rating	Maximum 1-Pole Circuits	Box Height (inches)	208Y/120V		120/240V		480Y/277V	
			3-Phase, 4-Wire Catalog Number	List Price \$	1-Phase, 3-Wire Catalog Number	List Price \$	3-Phase, 4-Wire Catalog Number	List Price \$
125	18	32	P1C18ML125ATS	840.00	P1A18ML125ATS	750.00	P1E18ML125ATS	910.00
	30	38	P1C30ML125ATS	1060.00	P1A30ML125ATS	980.00	P1E30ML125ATS	1190.00
	42	44	P1C42ML125ATS	1250.00	P1A42ML125ATS	1180.00	P1E42ML125ATS	1440.00
250	18	32	P1C18ML250ATS	910.00	P1A18ML250ATS	820.00	P1E18ML250ATS	1020.00
	30	38	P1C30ML250ATS	1100.00	P1A30ML250ATS	1010.00	P1E30ML250ATS	1270.00
	42	44	P1C42ML250ATS	1330.00	P1A42ML250ATS	1230.00	P1E42ML250ATS	1540.00
400	18	56	P1C18ML400ATS	1240.00	P1A18ML400ATS	1110.00	P1E18ML400ATS	1240.00
	30	62	P1C30ML400ATS	1440.00	P1A30ML400ATS	1340.00	P1E30ML400ATS	1440.00
	42	68	P1C42ML400ATS	1710.00	P1A42ML400ATS	1580.00	P1E42ML400ATS	1710.00

Main Circuit Breaker

100	18	32	P1C18BL100ATS	1170.00	P1A18BL100ATS	1060.00	P1E18BD100ATS	1520.00
	30	38	P1C30BL100ATS	1370.00	P1A30BL100ATS	1250.00	P1E30BD100ATS	1740.00
	42	44	P1C42BL100ATS	1640.00	P1A42BL100ATS	1450.00	P1E42BD100ATS	2230.00
125	18	32	P1C18NB125ATS	1710.00	P1A18NB125ATS	1600.00	P1E18NB125ATS	1710.00
	30	38	P1C30NB125ATS	1920.00	P1A30NB125ATS	1790.00	P1E30NB125ATS	1920.00
	42	44	P1C42NB125ATS	2190.00	P1A42NB125ATS	2010.00	P1E42NB125ATS	2190.00
225	18	32	P1C18QJ225ATS	2350.00	P1A18QJ225ATS	1950.00	P1E18FX225ATS	2510.00
	30	38	P1C30QJ225ATS	2540.00	P1A30QJ225ATS	2150.00	P1E30FX225ATS	2780.00
	42	44	P1C42QJ225ATS	2760.00	P1A42QJ225ATS	2360.00	P1E42FX225ATS	3030.00
250	18	32	P1C18FX250ATS	2760.00	P1A18FX250ATS	2360.00	P1E18FX250ATS	2760.00
	30	38	P1C30FX250ATS	2950.00	P1A30FX250ATS	2550.00	P1E30FX250ATS	2950.00
	42	44	P1C42FX250ATS	3160.00	P1A42FX250ATS	2770.00	P1E42FX250ATS	3160.00
400	18	56	P1C18JX400ATS	3160.00	P1A18JX400ATS	2650.00	P1E18JX400ATS	3990.00
	30	62	P1C30JX400ATS	3370.00	P1A30JX400ATS	2850.00	P1E30JX400ATS	4190.00
	42	68	P1C42JX400ATS	4540.00	P1A42JX400ATS	3160.00	P1E42JX400ATS	4540.00

Main Breaker Selection (Cost adder for other than std.)

Ampere Rating	Breaker Type	Maximum Interrupting Rating 240 Vac	480/277 Vac	Catalog Number	List Price \$	Available Trip Values
100	BL	10	—	BL	STD @ 240 Vac	15, 20, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100
	BLH	22	—	BH	65.	15, 20, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100
	HBL	65	—	HB	400.	15, 20, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100
	BQD	65	14	BQ	400. @ 240 Vac / STD @ 480/277 Vac	15, 20, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100
125	NGB	100	25	NB	STD	15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100, 110, 125
	ED4	65	18	E4	55.	15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100, 110, 125
	HED4	100	42	H4	540.	15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100, 110, 125
	HHED6	100	65	HA	540.	15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100, 110, 125
225	QJ2	10	—	QJ	STD @ 240 Vac	60, 70, 80, 90, 100, 110, 125, 150, 175, 200, 225
	QJH2	22	—	QH	75.	60, 70, 80, 90, 100, 110, 125, 150, 175, 200, 225
	QJ2-H	42	—	Q2	160.	60, 70, 80, 90, 100, 110, 125, 150, 175, 200, 225
	HQJ2H	100	—	HQ	1360.	60, 70, 80, 90, 100, 110, 125, 150, 175, 200, 225
	FD6	—	35	FD	140.	60, 70, 80, 90, 100, 110, 125, 150, 175, 200, 225
	FXD6	65	35	FX	140.	70, 80, 90, 100, 110, 125, 150, 175, 200, 225
	HFD6	100	65	HF	1760.	70, 80, 90, 100, 110, 125, 150, 175, 200, 225
	HFXD6	65	65	H2	1760.	70, 80, 90, 100, 110, 125, 150, 175, 200, 225
250	HHFD6	200	100	H1	2120.	70, 80, 90, 100, 110, 125, 150, 175, 225
	FD6	—	—	FD	STD	—
	FXD6	65	35	FX	STD	250
	HFD6	100	65	HF	1900.	250
400	HFXD6	200	100	H2	1900.	250
	HHFD6	—	—	H1	2120.	—
	JD6	—	—	J6	STD	—
	JXD6	65	35	JX	STD	200, 225, 250, 300, 350, 400
400	HJD6	100	65	H6	2270.	200, 225, 250, 300, 350, 400
	HJXD6	—	—	H5	2270.	—

For inches / millimeters conversion, see Application Data section.

Note: Price branch devices from page 10-19.

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Type P1

Branch Breaker Selection

Breaker Type	Available Ampere Rating	List Price \$ Installed			Provisions for Future \$	Maximum Interrupting Rating (kA)				
		1-Pole	2-Pole	3-Pole		120V	120/240V	240V	277V	480/277V
BL (120V)	15, 20, 25, 30, 35, 40, 45, 50, 60 70 80, 90, 100	25. 35. —	45. 85. 140.	140. 190. 210.	— — —	10	10	—	—	—
BL (HID)	15, 20, 30	40.	70.	—	—	—	—	—	—	—
BLH (120V)	15, 20, 25, 30, 35, 40, 45, 50, 55, 60 70 80, 90, 100	35. 75. —	85. 130. 200.	220. 300. 310.	— — —	22	22	—	—	—
HBL	15, 20, 30, 40, 50 60, 70, 80, 90, 100	65. —	150. 400.	290. 480.	— —	65	65	65		
BLF (GFCI)	15, 20, 30 40, 50, 60	140. —	240. 250.	— —	— —	10	—	—	—	—
BLE (EQGFI)	15, 20, 30	220.	330.	—	—	10	—	—	—	—
BLEH	15, 20, 30 40, 50, 60 (2-Pole Only)	420. —	530. 530.	—	—	22	22	—	—	—
BGL (SWN)	15, 20, 30 15, 20, 30	— —	100. —	— 120.	— —	10	10	—	—	—
BAF	15, 20	160.	330.	—	—	10	—	—	—	—
BAFH	15, 20	180.	340.	—	—	22	—	—	—	—
BLR (240V)	15, 20, 25, 30, 35, 40, 45, 50, 55, 60 70, 80, 90, 100	— —	110. 190.	— —	— —	10	10	10	—	—
BLHF (GFCI)	15, 20, 30 40, 50, 60	160. —	280. 300.	— —	— —	22	22	—	—	—
BQD	15, 20, 30, 40, 50, 60 70, 80, 90, 100	85. 200.	270. 400.	380. 490.	— —	65	65	65	14	14
NGB	15, 20, 30, 40, 50, 60 70, 80, 90, 100, 110, 125	130. 210. —	360. 420. 710.	480. 540. 910.	— — —	100	100	100	25	25

Subfeed Breakers — Limit One Per Panel

Breaker Type	Available Ampere Rating	List Price \$ Installed			Provisions for Future \$	Maximum Interrupting Rating (kA)		
		1-Pole	2-Pole	3-Pole		120V	120/240V	240V
ED4	15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100 110, 125	— —	520. 880.	670. 1120.	120. 120.	— —	— —	65 65
HED4	15, 20, 30, 40, 50, 60, 70, 80, 90, 100 110, 125	— —	690. 1260.	770. 1460.	120. 120.	— —	— —	100 100
HHED6	15, 20, 30, 40, 50, 60, 70 80, 90, 100, 110	— —	1270. 1270.	1400. 1400.	120. 120.	— —	— —	100 100
QJ2	60, 70, 80, 90, 100, 110, 125, 150, 175, 200, 225	—	420.	880.	170.	—	—	10
QJH2	60, 70, 80, 90, 100, 110, 125, 150, 175, 200, 225	—	930.	1140.	170.	—	—	22
QJ2H	60, 70, 80, 90, 100, 110, 125, 150, 175, 200, 225	—	1080.	1410.	170.	—	—	42
HQJ2H	60, 70, 80, 90, 100, 110, 125, 150, 175, 200, 225	—	—	1940.	170.	—	—	100
FXD6	70, 80, 90, 100, 110, 125, 150, 175, 200, 225, 250	—	1220.	1540.	220.	—	—	65
HFD6	70, 80, 90, 100, 125, 150, 175, 200, 225, 250	—	2440.	2550.	220.	—	—	100

Note: BGL Breaker — 1-pole takes 2" unit space or 2-poles
— 2-pole takes 3" unit space or 3-poles

Note: 1-pole HBL limited to 50 amps

Panelboards

Type 1 P1 Panelboard Modifications and Additions

Selection

Enclosures

Description	List Price \$
6" end gutter	235.
2" side gutter	200.
Barrier in gutter (add to extra gutter price)	200.
24" wide	235.

Hinged trims	160.
Piano hinged trims	360.
Door-in-door trims	360.
Screw to the box trims	160.

Trim mounted devices	See page 10-72
• Pilot lights	
• Toggle switches	
• Push buttons	
(Devices mounted to be wired to the trim should also have hinged trim specified)	

Painted boxes	See page 10-72
Custom colors	See painted boxes
Increase gauge trims and boxes	See page 10-72
Stainless steel trims and boxes, Type 1	See page 10-72
Aluminum trims and boxes, Type 1	See page 10-72

Meters

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

Panel Skirts

See page 10-73

Special Locks	List Price \$
TEY	235.
TEU1	255.
Cat 60	235.
LL803	235.
LL806	235.
Yale 47 (NYC)	425.

Panel Modifications

Main Bus	Catalog Number*	Amp Ratings
		125A 250A 400A
Copper (tin pltd.)	C	255. 255. 390.

* "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^①
- UVR^①

Bus mounted TVSS see section 9

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.

Grounding of Panelboards

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

- Non-Insulated Equipment Ground Bar – STD
- Copper Non-Insulated Ground Bar 40.
- Al Insulated Equipment Ground Bar 40.
- Cu Insulated Equipment Ground Bar 75.
- Ground Bar Brazed to Box 245. (recommended for painted boxes)

Shunt Trip on Main or Branch

BL, BLH, HBL, BQD as branch only. BL, BLH, HBL 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.

QJ2, QJ2-H, QJH2, HQJ2H, ED4, ED6, HED4, HED6, HHED6, FXD6, HFD6, JXD6, JD6, HJD6, HJXD6
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Remote Control Switches

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

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	List Price \$
Time Clock (1 or 2-pole, single or double throw contacts; 3-pole, single throw) 277V maximum with plain dial	1070.
Astronomical dial	210.
An omitting device	75.
Reserve power or carryover	2450.
Space and mounting provisions only	540.

Remote Switches Modifications (See page 10-71)

Application for Remote Switch

Switch Type	Modification
920	Mounts in 23" relay cabinet as a main only
911	≤ 150 AMPS mounts in 23" relay cabinet as a main only >150 AMPS not available
LEN	30A mounts in 23" relay cabinet as a main only

Feed-Thru Lugs

Cannot be used in conduction with TVSS or subfeed breakers

Ampere Rating	List Price \$	Type	Connector Range
250	190.	Al/Cu Lay-in Mechanical	(1)—#6 AWG-350 kcmil
	370.	Cu Lay-in Mechanical	(1)—#6 AWG-350 kcmil
	285.	Al/Cu Compression	(1)—#6 AWG-350 kcmil
400	490.	Al/Cu AWG Mechanical	(2)—#3/0 AWG-250 kcmil or (1)—#3/0 AWG-600 kcmil
	775.	Cu	(2)—#3/0 AWG-250 kcmil or (1)—#3/0 AWG-600 kcmil
	585.	Al/Cu Compression	(1) 400—600 kcmil

Note: Specify copper or aluminum cable.

^① Accessories on 1" pole breakers (BL, BQD, ED) will take unit space.

Panelboards

Type P1 Panelboard Connector Modifications

Selection

Compression Lugs

Style	Amp Rating	Breaker Type	Compression Connectors	Box Height Addition	List Price Adder \$			
					3-Phase/ 4-Wire	3-Phase/ 3-Wire	1-Phase/ 3-Wire	1-Phase/ 2-Wire
MLO	125	N/A	(1) #4 AWG - 350 kcmil	None	105.	105.	105.	105.
	250							
	400	N/A	(1) 250-600 kcmil or (2) #3/0 AWG - 250 kcmil	None	150.	150.	150.	150.
Main Breaker	125	ED4, ED6, HED4 HHED6, CED6	(1) #12-1/0 AWG	Box must go to 24" wide	115.	85.	85.	85.
	225	QJ2, QJH2, QJ2H	(1) #6 AWG - 350 kcmil Cu or Al	Box must go to 24" wide for all breakers	225.	180.	180.	180.
	250	FXD6, HFD6, CFD6	(1) #6 AWG - 350 kcmil Cu or Al	Box must go to 24" wide for all breakers	225.	180.	180.	180.

NOTE: Standard compression lugs used for P1 panels are range taking lugs and may require a particular crimping tool to accommodate the range. Consult factory for information. 200% neutral not available with compression lugs.

Enclosure Modifications

Description	List Price Adder \$	
	Panel Width 20"	Panel Width 24"
NEMA 3R enclosures	860.	1180.
NEMA 3R/12 enclosures	1175.	1180.
Gasket between trim and box (Type 1)	680.	900.

NEMA-4—Water Tight, Dust Tight, Steel Enclosure (consult plant for actual enclosure size)

Box Height (inches)	Enclosure Size			List Price Adder \$
	H	W	D	
32	32	20	5.75	4230.
38	38	20	5.75	5330.
44	44	20	5.75	6605.
56	56	20	5.75	16260.
62	62	20	5.75	17500.
68	68	20	5.75	19025.

Additional Enclosure Modifications

Description	List Price \$
Strip Heaters	895.
Humidstat Control	1570.
Thermostat Control	1570.

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

Box Height (inches)	Enclosure - Stainless Steel & Steel with Epoxy Coating			Enclosure - Fiberglass Size (inches)			List Price \$
	H	W	D	H	D	W	
32	32	20	5.75	36	24	8	10145.
38	38	20	5.75	48	36	12	12085.
44	44	20	5.75	48	36	12	15805.
56	56	20	5.75	60	36	12	20265.
62	62	20	5.75	66	36	12	23710.
68	68	20	5.75	72	36	12	27435.

Remote Switches Modifications (See page 10-71)

Application for Remote Switch

Switch Type	Modification
920	Mounts in 23" relay cabinet as a main only
911	≤ 150 AMPS mounts in 23" relay cabinet as a main only >150 AMPS not available
LEN	30A mounts in 23" relay cabinet as a main only

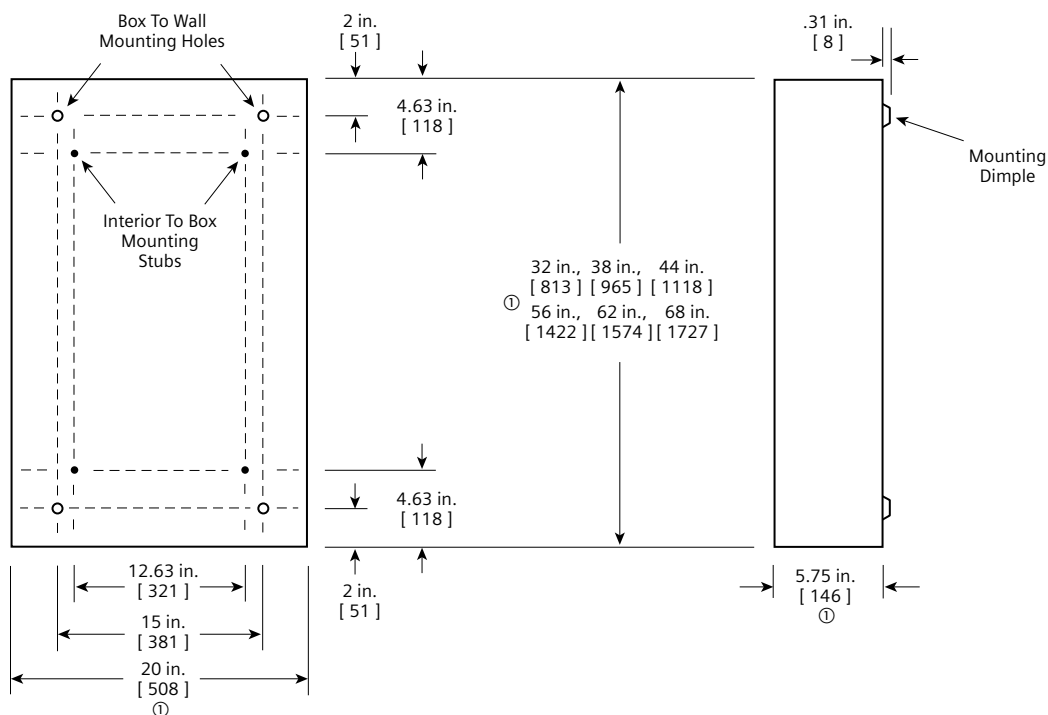
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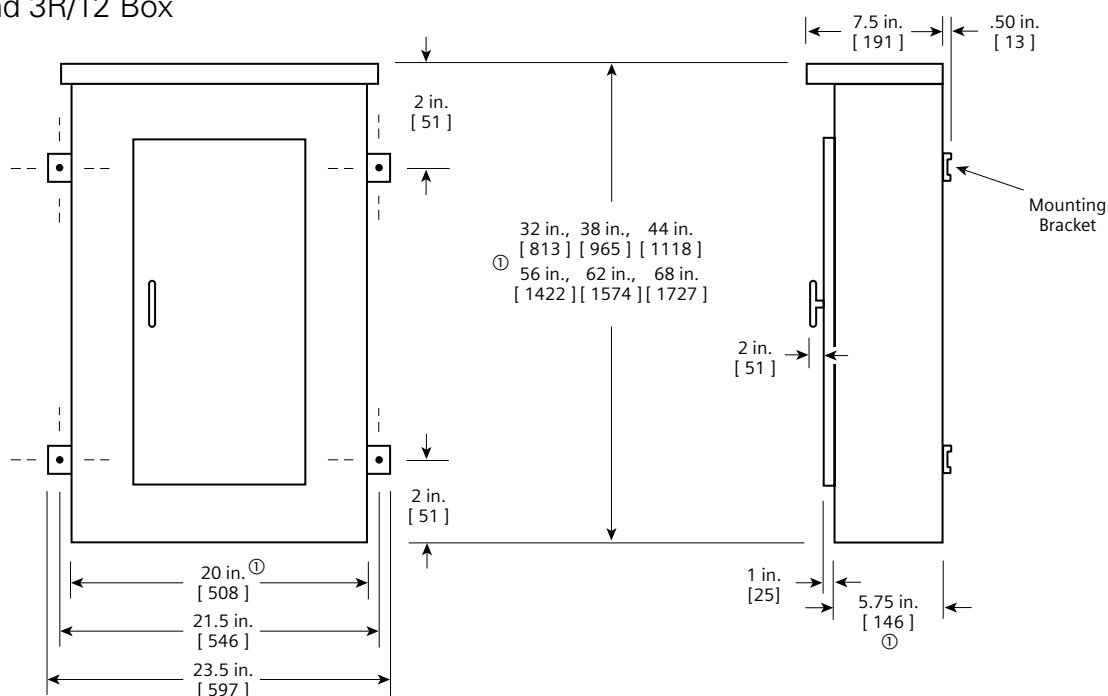
Dimensions

Type 1 Box

Box is symmetrical



Type 3R and 3R/12 Box



① Dimensions 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 [].