

MDG100DF4 | 4.5 L | 100 kVA

MOBILE DIESEL GENERATOR SET

EPA Emissions Certification: Final Tier 4

GENERAC® MOBILE

Standby Power Rating

85 kW, 106.25 kVA, 60 Hz

Prime Power Rating

80 kW, 100 kVA, 60 Hz



Image used for illustration purposes only

Codes and Standards

Generac Mobile products are designed to the following standards:



CSA



NATM



TIER 4 FINAL EMISSIONS



ISO 8528-5

Power When and Where You Need It

Generac Mobile diesel generators are designed and engineered to power a variety of projects, in the most extreme environments. Gensets are configured to meet customer needs, including choice of containment, cold weather packages, trailer options, and more.

Generac Magnum mobile diesel generators are manufactured to deliver reliable power, when and where you need it.

STANDARD FEATURES

ENGINE SYSTEM

- John Deere® 4045HFG04A
- 4 cylinder
- Turbocharged
- 275 in³ (4.5 L) displacement
- EPA Final Tier 4
- Power @ 1,800 rpm – hp (kW):
 - Prime: 122 (90)
 - Standby: 133 (99)

Fuel System

- Fuel tank capacity – gal (L):
 - Total: 165 (625)
 - Usable: 146 (552)
- Maximum run time @ 100% load: 24 h
- Fuel consumption @ prime – gal/h (L/h):
 - 25% load: 1.90 (6.37)
 - 50% load: 3.17 (12.02)
 - 75% load: 4.51 (17.07)
 - 100% load: 6.01 (22.72)

Cooling System

- Capable of operating at 107 °F ambient
- Oil filter: Spin-on cartridge
- Air filter: Disposable – paper element
- Radiator and oil drains plumbed to exterior

System Outputs

- Voltage selection switch: 3-position, lockable
- Electrical power output – kW (kVA):
 - 1-phase standby: 85 (85)
 - 1-phase prime: 77 (77)
 - 3-phase standby: 85 (106)
 - 3-phase prime: 80 (100)

GENERATOR

- 60 Hz engine/generator
- Marathon Electric® 362CSL1606
 - Brushless
 - 4-pole
 - Class H insulation
- Voltage regulation ± 1.0% with PM600 voltage regulator

ENCLOSURE

- Aluminum, sound attenuated enclosure
 - UV and fade resistant, high temperature cured, white polyester powder paint
 - Insulated and baffled
 - 74 dB(A) @ 23 ft (7 m) @ prime power
- Fully lockable – including doors, fuel fill, and DEF fill
- Exterior emergency stop switch
- Central lifting point
- Multi-lingual operating and safety decals

- Document holder with owner's manual – includes AC and DC wiring diagrams

TRAILER

- DOT approved tail, side, brake, and directional lights; recessed rear lights
- Surge brakes
- Transportation tie downs
- Safety chains with spring loaded safety hooks
- 3 in (76.2 mm) ring hitch
- Single axle – 6,000 lb (2,722 kg)
- 2,000 lb (906 kg) tongue jack w/footplate
- Tires: 15 in (381 mm), 10-ply, tubeless, load range E

WARRANTY

- 2 year limited or 2,000 hours
 - Unlimited hours covered in first year

CERTIFICATIONS

- CSA certified

SYSTEM CONTROLS

Power Zone® Controller And Display

- Backlit, 800×480 pixel resolution color display
- -40—185 °F (-40—85 °C) operating temperature range
- Automatic coarse voltage adjustment
- Integrated fine voltage adjustment
- PLC functionality

Push Buttons For Easy Operation

- Manual or Auto start
- Engine start
- Engine stop/reset
- Alarm mute
- Operator screens:
 - Home
 - Engine
 - Generator
 - Voltage Adjust

Scrolling Arrows for Diagnostic Information

- Engine diagnostic display
 - Oil pressure
 - Engine temperature
 - Fuel level
 - Battery
 - After-treatment inlet/outlet temperature
 - Ash/soot levels
- Generator diagnostic display
 - System kW output display
 - Line output and frequency display

Alarms

- Warning
- Shutdown
- Electrical Trip
- Engine

Alarm list – warnings/shutdowns; 250 event history log – date/time stamp

- Fuel level: warning – 15%; shutdown – 5%
- Over speed protection: shutdown – 115%
- Oil pressure: warning – 25 psi (172.4 kPa); shutdown – 20 psi (137.9 kPa)
- Coolant temperature: warning – 230 °F (110 °C); shutdown – 235 °F (113 °C)
- Battery voltage: over – 15 VDC; under – 11 VDC
- Generator over voltage: warning – 110%; electrical trip – 125%
- Generator under voltage: warning – 91.4%; shutdown – 70%
- Generator over frequency: warning – 102.5%; electrical trip – 110%
- Generator under frequency: warning – 95%; electrical trip – 90%

Inputs/outputs

- Auto-schedule
- Status
- View controller functional parameters (configuration, firmware version, connections)

ELECTRICAL CONTROLS

- Remote start/stop contacts in receptacle box
- Lockable control box door with diagnostics window
- Lockable lug box with safety switch
 - Trips main breaker when door is opened
 - Disables voltage regulator
- Output ground connection lug inside lug box
- 400 A main breaker with shunt trip
- Convenience receptacles with individual breakers (restricted use in high wye mode)
 - Two 120 V, 20 A, GFCI, duplex outlets (NEMA 5-20R type)
 - Three 125/250 V, 50 A, 3-pole, 4-wire, twistlock outlets (Non-NEMA 6369)
- One 12 V, 720 CCA, wet cell battery

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OPTIONS*

ENGINE SYSTEM

- Two fuel filter heaters
- Oil pan heater
- Battery heater
- CCV multi-heater system
- 60/40 coolant
- Positive air shutdown

FUEL SYSTEM

- 110% fluid containment
- Leak detection
- Extended run fuel and DEF system

TRAILER

- Electric brakes
- Tandem axle
- Stabilizer jacks
- Tool box/storage bin
- 2 in ball hitch
- 2-5/16 in (5.9 cm) ball hitch
- Full-size spare tire

CABINET

- Fire extinguisher
- Control panel light
- Interior lights

CONTROL SYSTEM

- 4-position phase switch
- PMG/DVR
- Paralleling
- Buck transformer
- Battery disconnect switch
- Cam locks
- 10 A battery charger

GENERATOR SYSTEM

- SuperStart



RATING DEFINITIONS

Standby: Applies to varying emergency load for the duration of a utility power outage.

Prime: Applies to supplying power to a varying load in lieu of utility for an unlimited amount of running time.

*Consult factory for availability

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APPLICATION AND ENGINEERING DATA

ENGINE SPECIFICATIONS

General

Make (Model)	John Deere (4045HFG04A)
EPA Emissions Compliance	Final Tier 4
After-Treatment System	DOC and SCR
Cylinders: Configuration-Qty	Inline-4
Displacement: in ³ (L)	275 (4.5)
Bore: in (mm)	4.2 (106)
Stroke: in (mm)	5.0 (127)
Compression Ratio	17:1
Intake Air Method	Turbo/air-to-air, after-cooled

Engine Governing

Governor	Electronic
Frequency Regulation (Steady State)	2%

Lubrication System

Oil Pump Type	Gear
Oil Filter Type	Spin-on cartridge
Crankcase Capacity: qt (L)	15.9 (15)

Cooling System

Cooling System Type	Radiator and CAC
Water Pump Type	Belt driven
Fan Type	Pusher
Fan Speed: rpm	1,800
Fan Diameter: in (mm)	23.2 (590)
Cooling System Capacity: qt (L)	22.0 (20.8)

Fuel System

Fuel Type	Ultra low sulfur diesel
Fuel Specifications	EN 590/ASTM D975
Fuel Filtering: μ	Primary: 10 Final: 2
Fuel Injection Pump: Make (Model)	Denso HP3
Fuel Pump Type	Engine driven – belt
Injection Type	Electronic
Engine Type	Direct Injection
Fuel Supply Line Diameter: in (mm)	.313 (8.0)
Fuel Return Line Diameter: in (mm)	.313 (8.0)

Engine Electrical System

System Voltage: VDC	12
Battery Charger Alternator	STD
Battery: CCA	750
Battery: V (Qty)	12 (1)
Ground Polarity	Negative (-)

ALTERNATOR SPECIFICATIONS

Make (Model)	Marathon Electric (362CSL1606)
Poles: Qty	4
Field Type	Rotating
Insulation Class—Rotor	H
Insulation Class—Stator	H
Total Harmonic Distortion (THD)	<3.5%
Telephone Interference Factor (TIF)	<50
Standard Excitation	Brushless

Bearings	Single bearing
Coupling	Direct, flex disc
Prototype Short Circuit Test	Yes
Voltage Regulator Type	Analog
Number of Sensed Phases	1
Regulation Accuracy (Steady State)	$\pm 1\%$

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GENERAC® MOBILE

OPERATING DATA

POWER RATINGS

	Standby: KW/kVA (A)	Prime: KW/kVA (A)
1-phase, 120/240 VAC @ 1.0 pf	85/85 (320)	77/77 (354)
3-phase, 120/208 VAC @ 0.8 pf	85/106.25 (295)	80/100 (278)
3-phase, 120/240 VAC @ 0.8 pf*	85/106.25 (256)	80/100 (241)
3-phase, 277/480 VAC @ 0.8 pf	85/106.25 (128)	10/100 (120)

*Power ratings achieved through use of optional 4-position phase switch.

STARTING CAPABILITIES (sKVA)

sKVA vs. Voltage Dip		
208 VAC		
150	vs.	28.60%

FUEL AND DEF CONSUMPTION RATES

Load	Fuel: gal/hr (L/hr)		DEF: gal/hr (L/hr)	
	@ Standby	@ Prime	@ Standby	@ Prime
25%	2.0 (7.57)	1.90 (6.37)	TBD	TBD
50%	3.46 (13.10)	3.17 (12.02)	TBD	TBD
75%	4.95 (18.75)	4.51 (17.07)	TBD	TBD
100%	6.64 (25.12)	6.01 (22.72)	TBD	0.26 (1.15)

Deration – Operational characteristics consider maximum ambient conditions. Derate factors may apply under atypical site conditions.

Please consult a Generac Mobile Authorized Service Dealer for additional details. All performance ratings in accordance with ISO3046, BS5514, ISO8528, ISO8665, ISO3046, SAE J1228, SAE J1995, and DIN6271 standards.

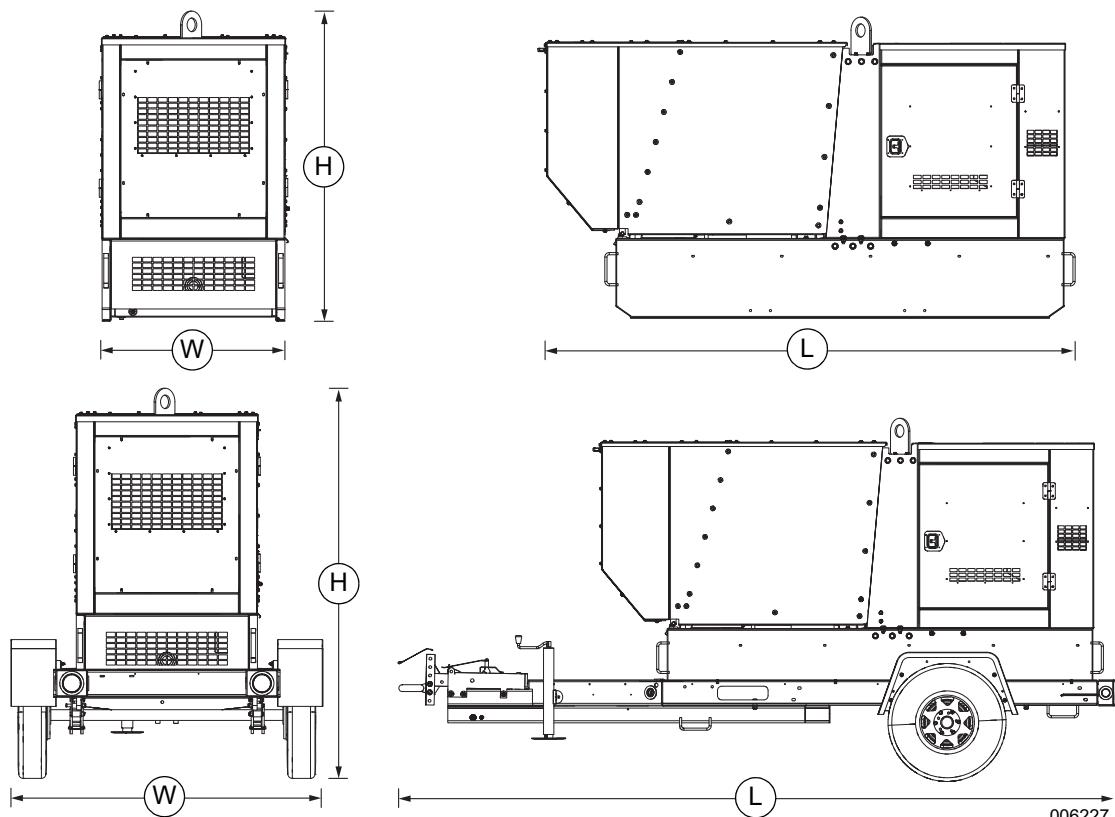
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DIMENSIONS AND WEIGHTS*



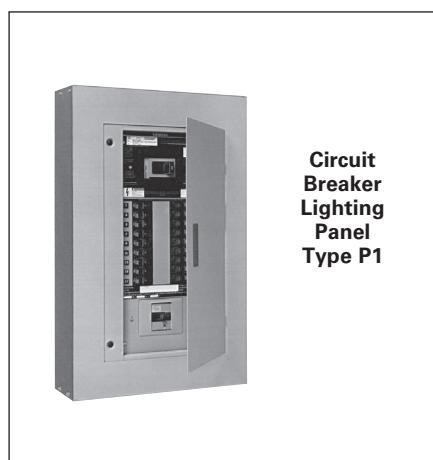
	Run Time: hr	Usable Fuel Capacity: gal (L)	Dimensions – L×W×H: in (m)	Weight: lb (kg)
Skid	24	146 (552)	119×40×62 (3.02×1.02×1.57)	Dry: 3,980 (1,805) Operating: 4,940 (2,240)
Trailer	24	146 (552)	170×69×80 (4.31×1.75×2.03)	Dry: 4,680 (2,122) Operating: 5,640 (2,555)

* All measurements are approximate and for estimation purposes only.

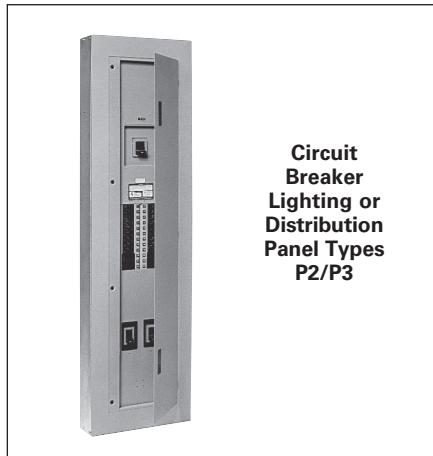
YOUR FACTORY RECOGNIZED GENERAC MOBILE DEALER

Specification characteristics may change without notice. Dimensions and weights are for preliminary purposes only. Please consult a Generac Mobile Authorized Service Dealer for detailed installation drawings.

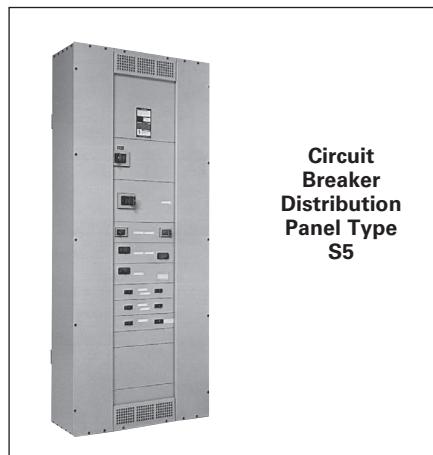
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Breaker
Lighting
Panel
Type P1



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Breaker
Lighting or
Distribution
Panel Types
P2/P3



Circuit
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Panel Type
S5

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Panelboards

Introduction

This generation of panelboards from Siemens offers the high level of engineering and innovation you've come to expect from the leader in power distribution technology. The "P Series" line of panelboards offers a stepped approach to power distribution.

Additional strength has been added to an already rugged and durable panelboard family. Engineered specifically to provide maximum flexibility, the new designs simplify wiring and reduce material requirements making them easier to install and less costly than competitive products. At the heart of the product line is the extensive research and technology found among Siemens circuit protection devices – both fusible switches and molded case circuit breakers.

The line is anchored by the innovative P1. Featuring the industry's most flexible designs, the P1 virtually eliminates common errors, such as feed direction, and main lug versus main breaker. Increasing distribution is simplified by the ability to add feed-thru lugs. The Revised P1 design introduced in June 2015 has added Extended Circuits up to 66 and has available smaller Enclosures with no Subfeed option for added flexibility.

Subsequent steps in the P Series offer increased capacity and more design options:

- The highly flexible P2 provides options to fit the most demanding specifications.
- Sized more like a lighting panel, the P3 packs the power of a distribution panel in a space-saving, highly flexible design.

Key Panelboard Features

	P1	P2	P3	S5	F2
Power Panelboard Applications	—	●	●	●	●
Convertible From Top Feed To Bottom Feed Or Vice Versa	●	—	—	—	—
Change From Main Lug To Main Breaker Or Add Subfeed Without Changing Enclosure Size ^②	●	—	—	—	—
Space-Saving, Horizontally Mounted Main Breaker	Up To 250 Amps	Up To 250 Amps	—	●	●
Short-Circuit Rating Label Giving Performance Level	●	●	●	●	●
Standard Aluminum Ground Assembly	●	●	●	●	●
Blank End-Walls Standard ^①	●	●	●	●	●
Bolted Current-Carrying Parts	●	●	●	●	●
Split Neutral	●	—	●	●	●
Connection Accessible From Front	●	●	●	●	●
Screw-Type Mechanical Lugs	●	●	●	●	●
Time-Reducing Wing Nuts To Secure Interior Without Tools	●	●	●	●	●
Main and Branch Devices Connected With Case-Hardened Hardware	●	●	●	●	●
Flush Lock, Concealed Door Hinges/Trim Screws	●	●	●	—	—
Symmetrical Interior Mounting Studs To Eliminate Upside-Down Mounting of Box	●	●	●	●	●
Interior Height Adjustment For Flush Applications	●	●	●	—	—
Shallow Depth	5.75"	5.75"	7.75"	12.75"	12.75"
Accepts A Wide Range Of Fuse Types	—	—	—	—	●
Accepts Vacu-Break Fusible Switch	—	—	—	—	●
Accepts A Wide Range Of Circuit Breakers	●	●	●	●	●
Optional Compression Lugs	●	●	●	●	●

General

- The powerful S5 and F2 are distribution power panels that allow circuit breakers as branch and main devices.

Siemens also offers a number of specialty panels, like column panels, SEM3 (Embedded Micro Metering Module™) and others. Don't see a panel to meet your requirements? Ask your Siemens representative about our custom capabilities.

Features Overview

P Series lighting panel features include Fas-Latch trim, which is popular among installers; the jacking screw system, that permits adjustments even after wiring has been installed; our exclusive split neutral, and more. Many panelboards have the capability of mixing and matching breakers of different sizes and ratings – or changing from main lug to main breaker, or adding subfeed breakers without changing the box size. Other models accept a wide range of fuse types, including Siemens exclusive Vacu-Break® technology.

Panelboards

General Specifications

Service Entrance Equipment

When a panelboard is used as service entrance equipment, it must be located as close as practicable to the point of entrance of building supply conductors. Panelboards must be identified as "Service Entrance" at the time of order entry in order to be supplied with the appropriate CSA certification and labelling. Panels must include a connector for bonding and grounding neutral conductor. Please consult CSA, CEC and local inspection authorities for specification and installation guidelines.

Integrated Equipment Short Circuit Rating

The term "Integrated Equipment 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 CSA. "Series Rated" must be identified at the time of order entry.

Standards

CSA: C22.2 No.29. Certified under files # 93833
 UL: 67 and 50. Listed by Underwriter's Laboratories, Inc., under "Panelboards" File #E2269 and #E4016.
 NEMA: PB1.1

Wire Connectors

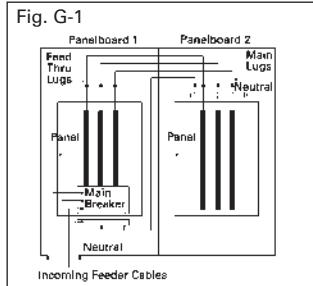
Standard wire connectors in Siemens panels are suitable for copper or aluminum cables rated 60/75 degree. Copper main lugs are a price-added option for most panel types and some Circuit Breakers (check with Siemens sales for availability). It should be noted that most copper lugs will only accept copper cables. Some applications, 100% rated devices in particular, require that the cable and connectors be rated 90 degree but are sized to the 75 degree tables.

Standard ground connectors are also suitable for copper or aluminum wire. Ground connector assemblies (EGK, IGK) have (6) 1/0 max. and (15) #6 max. connections. The 1/0 holes are capable of connecting up (3) #10 max. wires. Copper ground assemblies (ECGK, ICGK) are rated for copper wire only and have the same wiring capacity as the Al/Cu connectors.

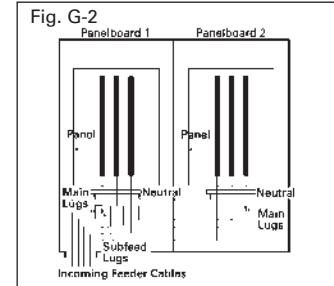
Standard neutrals, like standard main lugs, are also rated for copper or aluminum wire. The neutral cross bar material follows the selection bus. Copper neutral lugs are rated for copper cable only and available as a price added option.

General

Lug Data Feed-Thru Lugs



Subfeed Lugs or Double Lug



Feed-thru lugs are mounted at the opposite end of the main bus from the main lugs or main breaker and are used to connect two or more panelboards to the incoming feeder. The feeder cables are brought into Panelboard 1 and connected to the main lugs or main breaker. Cables interconnecting the two panelboards are connected to the feed-thru lugs in Panelboard 1 and are carried over the main lugs in Panelboard 2. This arrangement could be reversed with the main lugs located at the top and the feed-thru lugs at the bottom of the panel.

Subfeed lugs are mounted directly beside the main incoming lugs and are used to connect two or more panelboards to the incoming feeder. The feeder cables are brought into Panelboard 1 and connected to the main lugs. Another set of cables that are the same size are connected to the subfeed lugs of Panelboard 1 and are carried over the main lugs of Panelboard 2.

Note: P1 panelboards do not have subfeed lugs available. If this configuration is needed, move to a P2 or P3 panelboard.

Note: For Panelboards, Siemens uses this Document for the Operations and Maintenance manual: ANSI/NEMA PB 1.1-2013 [General Instructions for Proper Installation, Operation, and Maintenance of Panelboards Rated 600 Volts and Less (O&M Manual)] ** The PDF of this document can be downloaded (at no cost) for printing at this location: <https://www.nema.org/standards/view/Panelboards> (ref. Material # 11-1056-01)

Panelboards

General Specifications

General

Bussing Sequence

Interiors are designed to accommodate top or bottom feed.

All breakers have bolted connections.

The panel design provides bracing up to 200,000A IR CSA short circuit rating. Case-hardened, high performance, thread rolling screws are used on branch bus.



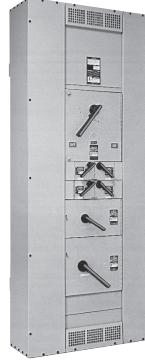
Circuit Breaker Lighting Panel Type P1



Circuit Breaker Lighting or Distribution Panel Types P2/P3



Circuit Breaker Distribution Panel Type S5



Fusible Switch Distribution Panel Type F2

Panelboard Ratings

Description	Revised P1	P2	P3	S5	F2
Max. Voltage	600Y/347V AC Max.	600V AC Max. 250V DC Max.	600V AC Max. 250V DC Max.	600V AC Max. 250V DC Max.	600V AC Max. 250V DC Max.
System	1-Phase, 2-wire 1-Phase, 3-wire 3-Phase, 3-wire 3-Phase, 4-wire	1-Phase, 2-wire 1-Phase, 3-wire 3-Phase, 3-wire 3-Phase, 4-wire	1-Phase, 2-wire 1-Phase, 3-wire 3-Phase, 4-wire 3-Phase, 3-wire	1-Phase, 3-wire 3-Phase, 4-wire 3-Phase, 3-wire	1-Phase, 3-wire 3-Phase, 4-wire 3-Phase, 3-wire
Mains					
Main Lugs	125A-400A	125A-600A	400A-800A	225A-1200A	225A-1200A
Main Breaker	100A-400A	100A-600A	200A-600A	400A-1200A	—
Main Switch	—	—	—	—	200A-600A
Circuits	18, 30, 42, 54, 66 (250A) 30, 42, 54, 66 (400A)	18, 30, 42, 54, 66 78, 90 ^①	18, 30, 42, 54, 66, 78, 90	—	—
Branch Ratings	15-125A (Interior) 250A Max. (Subfeed breaker)	15-225A (Interior) 250A Max. (Subfeed breaker)	15-225A (Interior) 400A Max. (Subfeed breaker)	15-1200A MCCB	30-1200A Fusible
Branch Disconnect Devices	BL/BQD series, BT series, xGB series, 3VA41 series ^⑥ , AFCI/GFCI series,	BL/BQD series, BT series, xGB series, 3VA41 series, QR series ^⑦ , AFCI/GFCI series, ED series,	BL/BQD series, BT series, xGB series, 3VA41 series, QR series ^⑦ , AFCI/GFCI series, ED series,	All 15-1200A MCCBs, and VL DG, FG, JG	All 30-600A VB switches, 30-200A VK switches, and 800-1200A HCP switches
Subfeed Circuit Breakers ^{⑧⑨}	ED Series, QR series, FD series,	FD series, JD series,	FD series, JD series,	—	—
Enclosure Heights Inches – (mm)	26, 32, 38, 44, 50, 56 @ 250A (660, 813, 965, 1118, 1270, 1422) 56, 62, 68, 74 @ 400A (1422, 1575, 1727, 1880)	26, 32, 38, 44, 50, 56, 62, 68, 74 (660-1880)	56, 62, 68, 74, 80 (1422-2032)	60, 75, 90 (1524, 1905, 2286)	60, 75, 90 (1524, 1905, 2286)
Standard Trims	Fas-Latch – 1 Piece Surface or Flush	Fas-Latch – 1 Piece Surface or Flush	Fas-Latch – 1 Piece Surface or Flush	—	—

^① Functional pricing is based on circuits shown. However, the panel can be figured with less circuits.

^② P1 can have max. 1 subfeed breaker when Subfeed Space is available. P2 and P3 can have up to (2) FD subfeed breakers.

^③ JD and FD breakers are mounted vertical. Limitations apply.

^④ A maximum of (3) QR breakers may be mounted in a P2 Panel and are single mounted.

^⑤ A maximum of (4) QR breakers may be mounted in a P3 panel and are twin mounted.

^⑥ P1 panels with xGB/3VA41 are limited to interiors for xGB/3VA41 breakers only.

Panelboards

General Specifications

Typical Panelboard Modifications

General

Description	Lighting and Distribution Panelboards			Distribution Panelboards	
	P1	P2	P3	S5	F2
Box					
Type 1	Standard (20" W)	Standard (20" W)	Standard (24" W)	Standard	Standard
Type 1 Enclosure with Hood (available from distributor stock)	●	●	●	●	●
Type 1 w/Gasket between box and front	●	●	●	●	●
Type 2 Enclosure - Drip Tight ^①	●	●	●	●	●
Type 3R/12	●	●	●	●	●
Type 4, 4X (size varies by type/material)	●	●	●	—	—
Wider Box (check w/factory for custom options)	● (24"W)	● (24", 30" or 36"W)	● (30" or 36"W)	● (custom)	● (custom)
Deeper Box (check w/factory for custom options)	(7.75"D)	● (7.75"D)	● (custom)	● (custom)	● (custom)
Front					
Front with Door	Standard	Standard	Standard	●	●
4-piece Front	—	—	—	Standard	Standard
4-piece Front w/Hinged Gutter Covers	—	—	—	●	●
Hinged-to-Box Front/Skew-to-Box Front	●	●	●	(see Door-in-Door)	(see Door-in-Door)
Door-in-Door Front	●	●	●	●	●
Door with padlock	●	●	●	—	—
Special Locks	●	●	●	●	●
Nameplate	●	●	●	●	●
Interior					
Aluminum Equipment Ground Bar	Standard	Standard	Standard	Standard	Standard
Copper Equipment Ground Bar	●	●	●	●	●
Insulated Equipment Ground (CU or AL)	●	●	●	●	●
Subfeed Lugs	—	●	●	●	●
Feed-Thru Lugs	●	●	●	●	●
Compression Lugs	●	●	●	●	●
Copper Lugs	●	●	●	●	●
200% Neutral	●	●	●	400 - 600A	400 - 600A
Tin Plated Aluminum Bussing	Standard	Standard	Standard	Standard	Standard
Tin Plated Copper Bussing	●	●	●	●	●
Silver Plated Copper Bussing	—	●	●	●	●
R, J and T Fuse Clips	—	—	—	—	●

● Available as an option.

— Not Available

^① To meet sprinkler proof requirements (CEC Rule 26-008):

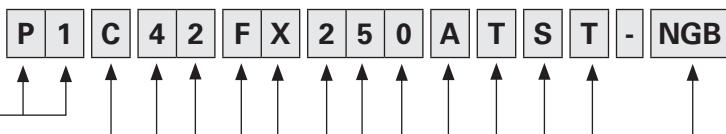
- P1/P2/P3 Panels:
- Select Type 2 enclosure for non-service entrance applications.
- Select Type 3R enclosure for service entrance applications.
- S5/F2 Panels:
- Select Type 3R enclosure.

Panelboards

Factory Assembled

Selection

Catalogue Numbering System



Type of Panel P1, P2, P3, S5, F2

Voltage and System*

C = 208Y/120 3Ø 4 W Yye AC - All	R = 415/240 3Ø 4 W Yye AC - All
E = 480Y/277 3Ø 4 W Yye AC - All	S = 440/250 3Ø 4 W Yye AC - All
D = 240 3Ø 3 W Delta AC - All	L = 600/347 3Ø 4 W Yye AC - All
F = 480 3Ø 3 W Delta AC - All	T = 230 3Ø 3 W Delta AC - All
G = 600 3Ø 3 W Delta AC - P2, P3, P4, P5	W = 380 3Ø 3 W Delta AC - P2, P3, P4, P5
I = 347 3Ø 3 W Delta AC P2, P3, P4, P5	1 = 24V DC 1-Pole Branch Only - P2, P3, P4, P5
B = 240/120 3Ø 4 W Delta Ø High Leg AC - P2, P3, P4, P5	2 = 24V DC 2-Pole Branch Only - P2, P3, P4, P5
Q = 240/120 3Ø 4 W Delta Ø High Leg AC - P2, P3, P4, P5	3 = 48V DC 1-Pole Branch Only - P2, P3, P4, P5
A = 120/240 1Ø 3 W Grounded Neutral AC - All	4 = 48V DC 2-Pole Branch Only - P2, P3, P4, P5
H = 120 1Ø 2 W Grounded Neutral AC - P2, P3, P4, P5	5 = 125V DC 1-Pole Branch Only - P2, P3, P4, P5
J = 240 1Ø 2 W No Neutral AC - All	N = 125V DC 2-Pole Branch Only - P2, P3, P4, P5
Y = 125 1Ø 2 W Grounded Neutral AC - P2, P3, P4, P5	O = 125/250V DC 2-Pole Branch Only - P2, P3, P4, P5
Z = No Longer Available	P = 125/250V DC 2 & 3-Pole Branch - All
K = 220/127 3Ø 4 W Yye AC - All	U = 120V AC 3Ø3W - All
M = 380/220 3Ø 4 W Yye AC - All	V = 240V 3Ø3W Grounded B Phase - P2, P3, P4, P5

*For any voltage system not listed, check with sales for availability.

Circuits or

Enclosure Height

P1 – 18, 30, 42, 54, 66
P2 – 18, 30, 42, 54, 66, 78, 90
P3 – 18, 30, 42, 54, 66, 78, 90

S5, F2 - 60, 75, 90

Main Lug (ML), Main Breaker

(See Main Breaker Table coding below)

Amperage

100–400A = P1^③ 400–800A = P3
100–600A = P2 400–1200A = S5, F2

Bus Code ^①	Bus Material	Bus Plating
A	Aluminum	Tin-Plated
C	Copper	Tin-Plated
E	Copper	Silver-Plated

P1	P2	P3	S5	F2
•	•	•	•	• Indicates default
optional	optional	optional	n/a	n/a for this bus type.
optional	optional	optional	•	•

Feed Location T = Top B = Bottom

Mounting

S = Surface

F = Flush. Flush trims extend 1 1/2" beyond the base box dimensions on P1, P2 and P3.

Subfeed Space Indicator (for P1 only)

T = Subfeed Space Included

N^④ = No Subfeed Space

Branch Breaker Type

NONE = BL/BQD type

NGB = NGB/3VA41 type only^④

Main Breaker Coding

Code	Breaker Type														
BL	BL	H2	HFXD6	J6	JD6	L6	LD6	MD	MD6	ND	ND6	L3	LLK	N8	HNG
BH	BLH	H1	HHFD6	JD	JXD2	LX	LXD6	MX	MXD6	NX	NXD6	J2	NJG	N2	HNX
BR	BLR	H3	HHFXD6	JX	JXD6	LH	LXD6H	MH	MXD6H	NT	NXD6H	J1	NJX	N5	HNX
HB	HBL	G2	HGB	JH	JXD6H	S1	SCLD6	SO	SCMD6	SR	SCND6	J4	NJY	N9	LNG
BQ	BQD	G3	LGB	SC	SCJD6	S2	SHLD6	SQ	SCMD6H	ST	SCND6H	L2	HLK	N3	LNX
B6	BQD6	NB	NGB	SX	SHJD6	SL	SLD6	S5	SHMD6	AD	SHND6	L7	NLK	N6	LNY
CE	CED6	G4	NGB2	SY	SHJD6H	QJ	QJ2	S6	SHMD6H	SD	SHND6H	M5	HMG	N7	NNG
E4	ED4	G5	HGB2	SJ	SJD6	Q2	QJ2H	SM	SMD6	SN	SND6	M2	HMX	N1	NNX
E6	ED6	G6	LGB2	SH	SJD6H	QH	QJH2	AX	SMD6H	AY	SND6H	M8	HMY	N4	NNY
H4	HED4	CJ	CJD6	CL	CLD6	C9	CMD6	CN	CND6	J6	HJG	M6	LMG	QR	QR2
HA	HHED6	6H	HHJD6	HH	HHLD6	CH	CMD6H	C6	CND6H	J7	HJX	M3	LMX	Q4	QRH2
CF	CFD6	H9	HHJXD6	XH	HHLXD6	HM	HMD6	HN	HND6	J5	HJY	M9	LMY	Q5	HQR2
FD	FD6	H6	HJD6	HL	HLD6	HR	HMXD6	HT	HNXD6	J9	LJG	M4	NMG	Q6	HQR2H
FX	FXD6	H5	HJXD6	HO	HLXD6	HS	HMXD6H	HX	HNXD6H	J3	LJX	M1	NMX	Q7	QR2-MCS
HF	HFD6	H7	HJXD6H	HP	HLXD6H	—	—	—	—	J8	LJY	M7	NMY	—	—

① Standard bussing in P1, P2 and P3 panels is tin-plated for aluminum and copper.

② Not available for Revised P1 NGB/3VA41 interiors.

③ P1 Bus is either 250A max or 400A max.

④ 3VA41 breakers can only be used in interiors manufactured after October 2020 and marked with the NGB suffix.

⑤ Not available for Revised P1 xGB interiors.

Panelboards

Distributor stock - Type P1 Ready To Assemble Panelboards

Reference

Type P1 ready to assemble panelboards are completely convertible from main lug to main breaker and vice-versa. Additionally, feed-thru lugs or subfeed circuit breakers up to 400 amperes can be added without increasing the box height for Revised P1 with "T" suffix, see the chart.

1. Compute total number of poles to determine interior catalog number. (Note: BL / BQD (or) or NGB Main Breaker will use unit space. The total number of poles should include 2 or 3 poles for 1-phase or 3-phase mains.)
2. List catalog number of interior, box and front.
3. Select main lug kit or main breaker kit from appropriate tables.

Note: Revised P1 was introduced in June 2015. All original P1 devices do not include the "Subfeed Space" Indicator. All original P1 included the Subfeed Space as standard.

Type of Panel

P1

Voltage and System

C = 208Y/120, 3-Phase 4-Wire
A = 120/240V, 1-Phase 3-Wire
L = 600Y/347V, 3-Phase 4-Wire

Circuits

18, 30, 42, 54* (*Revised P1 only)

Mains

ML = Main lugs
MC = Main convertible
Select Main Lug Kit or Breaker Mounting Kit from pages 10-12 or 10-13

Amperage

250A max or 400A max only (typically 250A max Bus (or) 400A max Bus^①)

Main Bus Material

A = Aluminum
C = Copper

Subfeed Space Indicator (for Nex Gen P1 only) | **T = Subfeed Space Included**

Note: Standard bussing in P1 panels is tin plated for aluminum and copper. Standard bus is rated to the maximum amperage in the panel.

Branch Breaker Type

NONE = BL/BQD type NGB = NGB/3VA41 type only^②

Branch Breakers

Panel Type	Voltage Reference	Revised P1 Branch Breaker Reference				
		BL	BQD	BQD6	NGB	3VA41
Revised P1	120/240V	10-65kA	65kA	65kA	100kA	65-150kA
	240V	10-65kA	65kA	65kA	100kA	65-150kA
	480/277V	—	14kA	10kA	25kA	25-65kA
	480V	—	—	—	—	25-65kA
	600/347V	—	—	10kA	14kA	14-25kA
Revised P1 Interior Type						
P1C	208Y/120, 3-Phase 4-Wire	✓	✓	✓	✓	✓
P1A	120/240V, 1-Phase 3-Wire	✓	✓			
P1L	600Y/347V, 3-Phase 4-Wire			✓		
P1L (NGB) Manufactured prior to October 2020	600Y/347V, 3-Phase 4-Wire				✓	
P1L (NGB) Manufactured after October 2020	600Y/347V, 3-Phase 4-Wire				✓	✓

^① P1 panels use either 250A rated bus or 400A rated bus, regardless of the Main Breaker installed (or) MLO Amp rating chosen. Panels with 250A bus can have up to 250A Main Breaker or Main Lugs. Panels with 400A bus can have up to 400A Main Breaker or Main Lugs.

^② 3VA41 breakers can only be used in interiors manufactured after October 2020 and marked with the NGB suffix.

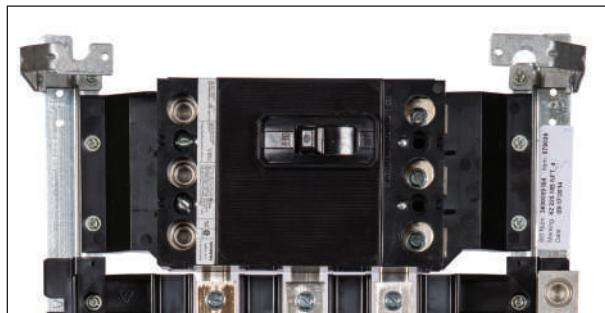
Panelboards

Features / Benefits

Reference

The standard Siemens P1 panelboard has some unique features that make it easier to design for an engineer, easier to reconfigure in the field for a contractor, and easier to upgrade and maintain for the Owner. The P1 is the smallest panel in the Siemens lineup, with bus sizes up to 400A. What makes it different is the split neutral design and the open ended bus. In the Siemens panel, instead of the common single neutral bus on one end, we have a neutral bus on both sides that is cross-bussed. This makes branch wiring simpler and cleaner – the lead lengths for line and neutral can now be made nearly the same, creating more room and a neater installation. It also allows access to both ends of the bus as a standard feature – this provides the flexibility to make changes in the field, even if it wasn't part of the original configuration. Revised P1 introduced in 2015 has extended circuits up to 66 available and also non-feed thru versions are available, without the Subfeed Space, in a 6" smaller enclosure.

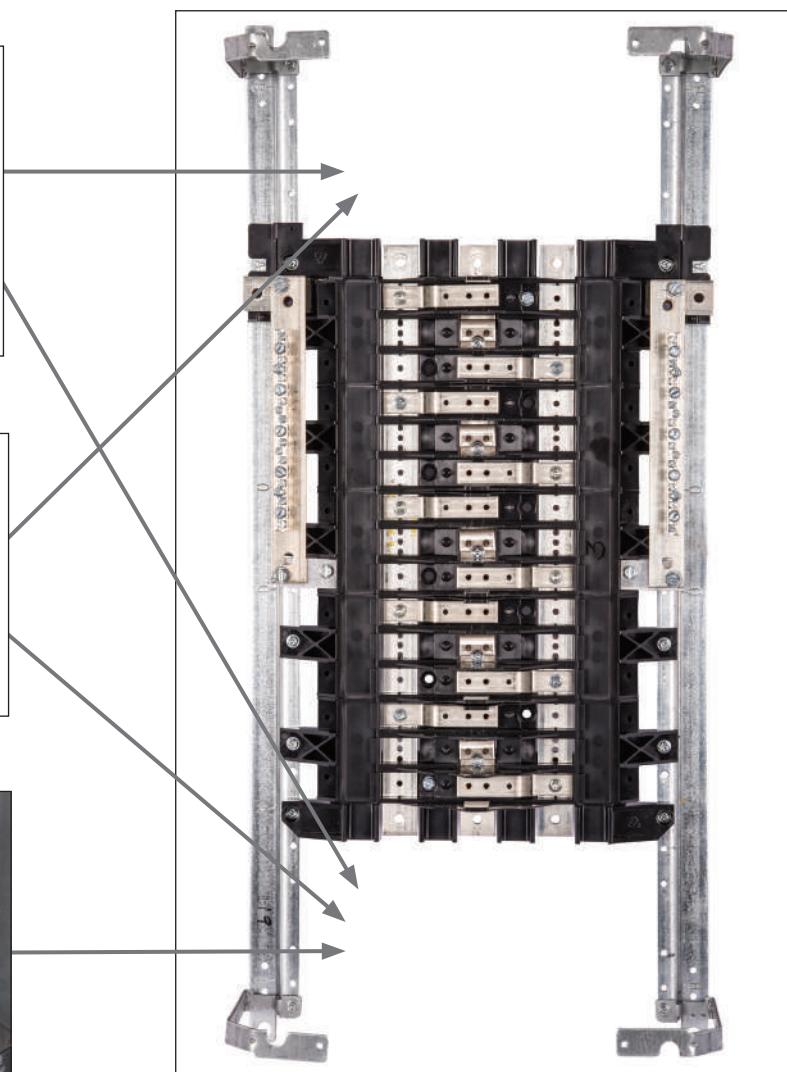
MAIN BREAKER or SUB-FEED BREAKER



MAIN LUGS or FEED-THROUGH LUGS



INTEGRAL BUS MOUNTED SPD



The following can be done to a standard P1 panelboard **in the field** with no modifications:

- Change from top fed to bottom fed
- Add feed-through lugs^①
- Add an Integral bus-mounted SPD^①
- Add a sub feed breaker up to 250 amps^①
- Change from Main Lugs to Main Breaker
- Change from Main Breaker to Main Lugs
- Panel may have up to two ground assemblies. Options are: (a) standard aluminum, (b) optional copper, or (c) optional insulated/isolated aluminum or copper. Mounting provisions in opposing corners of the box are standard. Any of these options may be added after installation.

^① Only when Subfeed Space is selected/available.

Panelboards

Distributor stock - Type P1 Ready To Assemble Panelboards

To better serve the needs of customers, Ready to Assemble Panelboards offer product flexibility, quicker job turn-around, and affordable pricing. All Siemens ready to assemble panelboards are fully backed for high quality, and trouble-free operation.

Flexibility and ease of assembly:

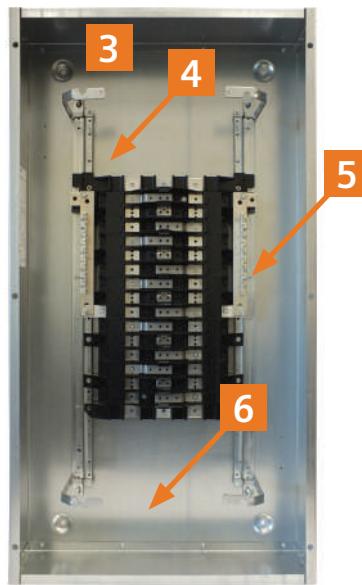
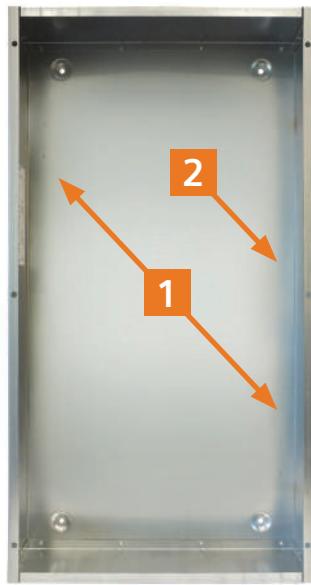
Customer oriented design creates installation convenience. For all of its one-of-a-kind features, the P1 panelboard is also designed to be extremely user friendly. For instance, field convertible main breaker and main lug kits, (through 400 amps), will allow you to switch from main lug to main breaker, and vice versa with no change in box size or additional cabling. Plus, lay-in construction (for 250 A CU) and/or removable lugs make wiring the main and neutral lugs easier and faster.

To further speed wiring, as well as reduce clutter, the P1 panel also features a split neutral design and branch neutral connections which are closer to the breakers than competitors. Additionally, field addable sub-fed breakers (up to 250 amps) or feed through lug kits can be field installed without utilizing any of your feeder breaker positions or increasing your box height. Furthermore, the unique design allows the panel to be inverted in the field and keep its labeling legible.

- 1) Completely symmetrical Type 1 boxes may be mounted with either end up. There are two pre-punched equipment ground connector locations for contractor friendly installation.
- 2) Box comes pre-punched for optional, field installable door-in-door or hinged style trims. There are also two pre-punched ground connector locations. The panel box will accept both standard ground connector (EGK and ECGK) assemblies and insulated ground connector kits (IGK and ICGK).
- 3) Interior mounting is completely symmetrical allowing it to be changed from top to bottom feed by simply rotating the interior.
- 4) Choose either a Main Breaker kit or Main Lug kit with which to terminate your incoming cables. Main lug kits are contractor friendly lugs through 350 kcmil (250 amp panel), (1) 600 kcmil or (2) 250 kcmil connectors for 400 amp panels. No line connectors in the P1 panel require multiple wires under one screw. Main Breaker kits (250 amps and below) are horizontally mounted allowing field convertible top or bottom feeds to be performed easily. MLO kits and

Main Breaker Kits are interchangeable and can be changed/added in the field without making changes to the enclosure or interior.

- 5) Branch neutral connections are near the breaker connections to speed wiring and reduce clutter. The standard P1 neutral is rated for 100% of the panel's ampacity and will accept copper or aluminum wire. Optional 200% and 2/0 neutral kits are also available. (2/0 max. Neutral strips are now standard on all NGB/3VA41 Interiors.)
- 6) The panel includes space to add (1) sub-feed breaker (max 250 amps), feed-thru lugs or one TPS3 (SPD) kit.
- 7) Siemens standard trim has hidden hinges and mounting hardware for added safety. The rounded door corners not only enhance the panel's appearance but also help to eliminate injuries caused from sharp corners.
- 8) Semi-flush lock comes standard. Easily identified locked position denoted by keyway being horizontal when door has been locked.



Panelboards

Revised P1 Panelboard 250 & 400A

Reference

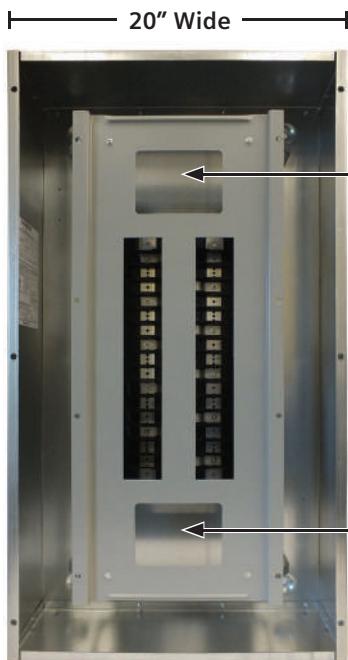
Invertability and Flexibility!

All FT and NFT are invertable in field – Top-feed or Bottom-feed

FT

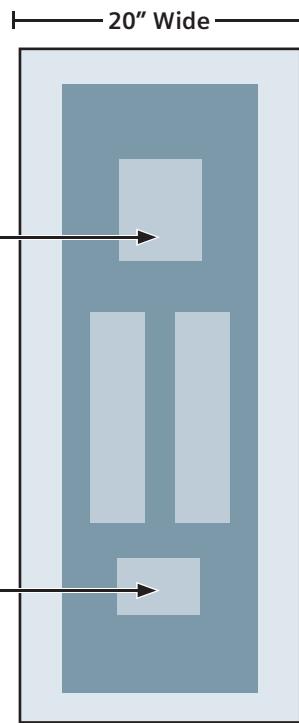
Feed-Thru Style Panel
(Catalog Number ends with "T")^①

250A MLO/MB



Box Sizes	Circuits
32"	18
38"	30
44"	42
50"	54
56"	66

400A MLO / MB

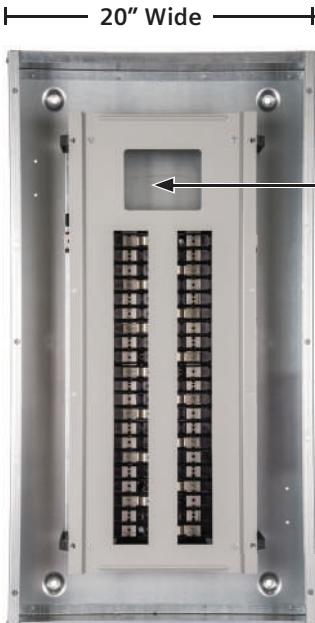


Box Sizes	Circuits
62"	30
68"	42
74"	54

NFT

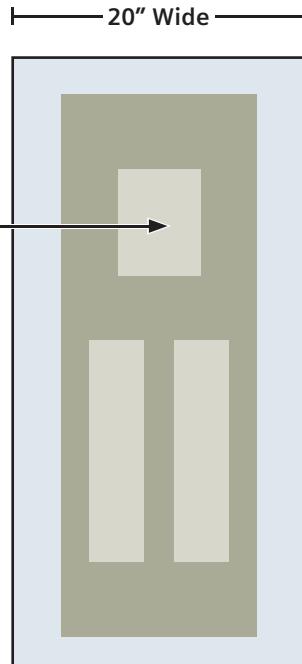
Non-Feed-Thru Style Panel
(Catalog Number ends with "N")^②

250A MLO/MB



Box Sizes	Circuits
26"	18
32"	30
38"	42
44"	54
50"	66

400A MLO / MB



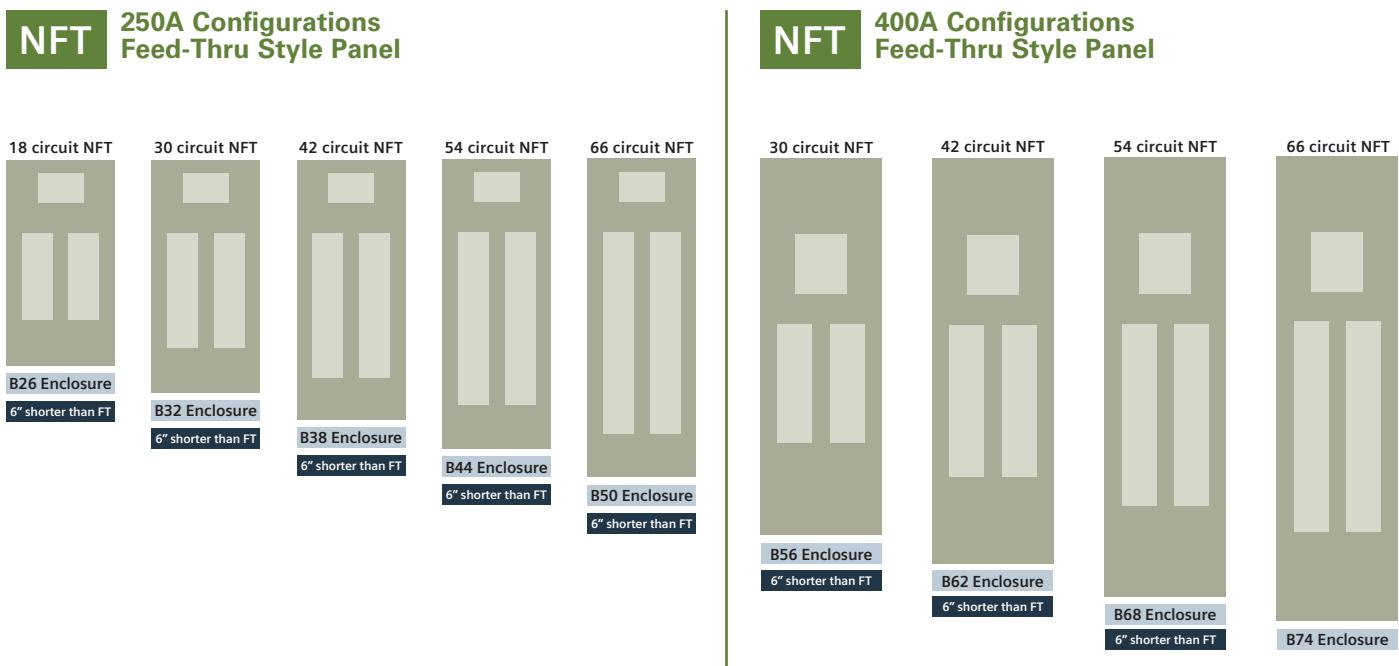
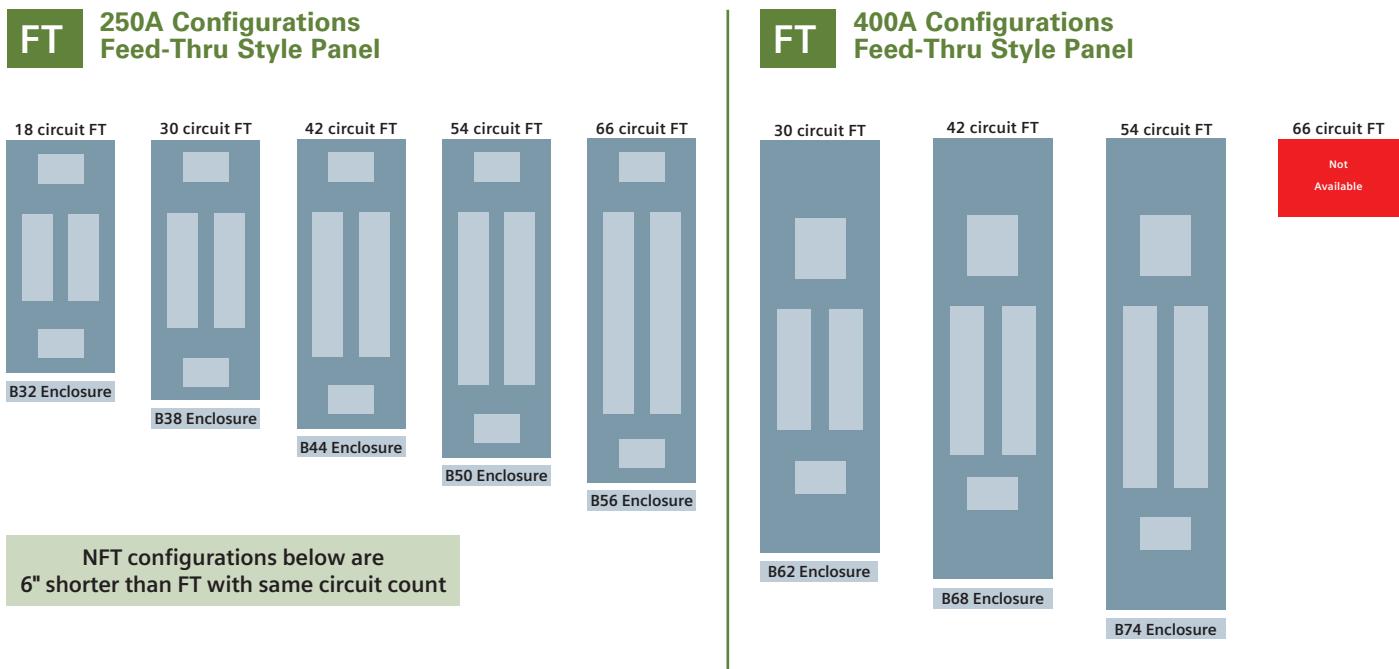
Box Sizes	Circuits
56"	30
62"	42
68"	54
74"	66

Panelboards

Revised P1 Panelboard 250A and 400A

Reference

Revised P1 Panelboard 250A and 400A



Panelboards

Distributor Stock - Type P1 Ready To Assemble Panelboards

Reference

400A Max. — 20" Wide x 5.75" Deep

- Choose the appropriate Interior from the table below.
- Choose the Main Device: Main Lugs from page 10-13, Main Breaker Kit from pages 10-13 - 10-14.
- Choose Branch Breakers. BL, BQD and NGB/3VA41 breakers from pages 10-16 - 10-19.
- Choose Feed-Thru Lugs or Subfeed Breaker Kit from page 10-13.

Type P1 Into Stock Panelboards (Revised P1 introduced in June 2015)

Amps	Max. # of Poles	Original Main Lugs Interior Cat. Number	Revised P1 Main Lug Interior Cat. Number	Original Main Convertible Interior Cat. Number	Revised P1 Main Convertible Interior Cat. Number	Box Size	Type 1 Encl.	Type 3R/12 Encl. ^①	Type 1 Front Surface	Type 1 Front Flush
1-Phase, 3-Wire 120/240V (BL/BQD Branch Breakers only)										
250	18 30 42 54	P1A18ML250A P1A30ML250A P1A42ML250A —	P1A18ML250AT P1A30ML250AT P1A42ML250AT P1A54ML250AT	P1A18MC250A P1A30MC250A P1A42MC250A —	P1A18MC250AT P1A30MC250AT P1A42MC250AT P1A54MC250AT	32 38 44 50	B32 B38 B44 B50	WP32 WP38 WP44 WP50	S32B S38B S44B S50B	F32B F38B F44B F50B
400	18 30 42 54	P1A18ML400A P1A30ML400A P1A42ML400A —	— P1A30ML400AT P1A42ML400AT P1A54ML400AT	P1A18MC400A P1A30MC400A P1A42MC400A —	— P1A30MC400AT P1A42MC400AT P1A54MC400AT	62 68 74	B62 B68 B74	WP62 WP68 WP74	S62B S68B S74B	F62B F68B F74B
250	18 30 42 54	P1A18ML250C P1A30ML250C P1A42ML250C —	P1A18ML250CT P1A30ML250CT P1A42ML250CT P1A54ML250CT	P1A18MC250C P1A30MC250C P1A42MC250C —	P1A18MC250CT P1A30MC250CT P1A42MC250CT P1A54MC250CT	32 38 44 50	B32 B38 B44 B50	WP32 WP38 WP44 WP50	S32B S38B S44B S50B	F32B F38B F44B F50B
400	18 30 42 54	P1A18ML400C P1A30ML400C P1A42ML400C —	— P1A30ML400CT P1A42ML400CT P1A54ML400CT	P1A18MC400C P1A30MC400C P1A42MC400C —	— P1A30MC400CT P1A42MC400CT P1A54MC400CT	62 68 74	B62 B68 B74	WP62 WP68 WP74	S62B S68B S74B	F62B F68B F74B
3-Phase, 4-Wire 208Y/120V (BL/BQD Branch Breakers only)										
250	18 30 42 54	P1C18ML250A P1C30ML250A P1C42ML250A —	P1C18ML250AT P1C30ML250AT P1C42ML250AT P1C54ML250AT	P1C18MC250A P1C30MC250A P1C42MC250A —	P1C18MC250AT P1C30MC250AT P1C42MC250AT P1C54MC250AT	32 38 44 50	B32 B38 B44 B50	WP32 WP38 WP44 WP50	S32B S38B S44B S50B	F32B F38B F44B F50B
400	18 30 42 54	P1C18ML400A P1C30ML400A P1C42ML400A —	— P1C30ML400AT P1C42ML400AT P1C54ML400AT	P1C18MC400A P1C30MC400A P1C42MC400A —	— P1C30MC400AT P1C42MC400AT P1C54MC400AT	62 68 74	B62 B68 B74	WP62 WP68 WP74	S62B S68B S74B	F62B F68B F74B
250	18 30 42 54	P1C18ML250C P1C30ML250C P1C42ML250C —	P1C18ML250CT P1C30ML250CT P1C42ML250CT P1C54ML250CT	P1C18MC250C P1C30MC250C P1C42MC250C —	P1C18MC250CT P1C30MC250CT P1C42MC250CT P1C54MC250CT	32 38 44 50	B32 B38 B44 B50	WP32 WP38 WP44 WP50	S32B S38B S44B S50B	F32B F38B F44B F50B
400	18 30 42 54	P1C18ML400C P1C30ML400C P1C42ML400C —	— P1C30ML400CT P1C42ML400CT P1C54ML400CT	P1C18MC400C P1C30MC400C P1C42MC400C —	— P1C30MC400CT P1C42MC400CT P1C54MC400CT	62 68 74	B62 B68 B74	WP62 WP68 WP74	S62B S68B S74B	F62B F68B F74B
3-Phase, 4-Wire 600Y/347V (BQD6 Branch Breakers only)										
250	18 30 42 54	P1L18ML250A P1L30ML250A P1L42ML250A —	P1L18ML250AT P1L30ML250AT P1L42ML250AT P1L54ML250AT	P1L18MC250A P1L30MC250A P1L42MC250A —	P1L18MC250AT P1L30MC250AT P1L42MC250AT P1L54MC250AT	32 38 44 50	B32 B38 B44 B50	WP32 WP38 WP44 WP50	S32B S38B S44B S50B	F32B F38B F44B F50B
400	18 30 42 54	P1L18ML400A P1L30ML400A P1L42ML400A —	— P1L30ML400AT P1L42ML400AT P1L54ML400AT	P1L18MC400A P1L30MC400A P1L42MC400A —	— P1L30MC400AT P1L42MC400AT P1L54MC400AT	62 68 74	B62 B68 B74	WP62 WP68 WP74	S62B S68B S74B	F62B F68B F74B
250	18 30 42 54	P1L18ML250C P1L30ML250C P1L42ML250C —	P1L18ML250CT P1L30ML250CT P1L42ML250CT P1L54ML250CT	P1L18MC250C P1L30MC250C P1L42MC250C —	P1L18MC250CT P1L30MC250CT P1L42MC250CT P1L54MC250CT	32 38 44 50	B32 B38 B44 B50	WP32 WP38 WP44 WP50	S32B S38B S44B S50B	F32B F38B F44B F50B
400	18 30 42 54	P1L18ML400C P1L30ML400C P1L42ML400C —	— P1L30ML400CT P1L42ML400CT P1L54ML400CT	P1L18MC400C P1L30MC400C P1L42MC400C —	— P1L30MC400CT P1L42MC400CT P1L54MC400CT	62 68 74	B62 B68 B74	WP62 WP68 WP74	S62B S68B S74B	F62B F68B F74B
Interiors for NGB/3VA41 Breakers — 3-Phase, 4-Wire 600Y/347V (NGB/3VA41 Branch Breakers only)^②										
250	18 30 42	— P1L30ML250A P1L42ML250A —	P1L18ML250AT-NGB P1L30ML250AT-NGB P1L42ML250AT-NGB	— P1L30MC250A P1L42MC250A —	P1L18MC250AT-NGB P1L30MC250AT-NGB P1L42MC250AT-NGB	32 38 44	B32 B38 B44	WP32 WP38 WP44	S32H S38H S44H	F32H F38H F44H
400	18 30 42	— P1L30ML400AT-NGB P1L42ML400AT-NGB —	— P1L30MC400AT-NGB P1L42MC400AT-NGB	— P1L30MC400AT-NGB P1L42MC400AT-NGB	— P1L30MC400AT-NGB P1L42MC400AT-NGB	62 68	B62 B68	WP62 WP68	S62H S68H	F62H F68H
250	18 30 42	— P1L30ML250CT-NGB P1L42ML250CT-NGB —	P1L18ML250CT-NGB P1L30ML250CT-NGB P1L42ML250CT-NGB	— P1L30MC250CT-NGB P1L42MC250CT-NGB	P1L18MC250CT-NGB P1L30MC250CT-NGB P1L42MC250CT-NGB	32 38 44	B32 B38 B44	WP32 WP38 WP44	S32H S38H S44H	F32H F38H F44H
400	18 30 42	— P1L30ML400CT-NGB P1L42ML400CT-NGB —	— P1L30MC400CT-NGB P1L42MC400CT-NGB	— P1L30MC400CT-NGB P1L42MC400CT-NGB	— P1L30MC400CT-NGB P1L42MC400CT-NGB	62 68	B62 B68	WP62 WP68	S62H S68H	F62H F68H



42 circuit with Back-fed Main



54 circuit 400A

Panelboards

Warehouse Stock – Type P1 Panelboards

Selection

Lug Kits – Main or Feed Thru

Amp Rating	Matl.	Wire Range (includes Neutral)	Service	Original P1 Cat. No.	Revised P1 Cat. No.
250	AL	(1) #6 AWG- 350 kcmil (CU or AL)	1 Phase	MLKA1	MLKA1A
			3 Phase	MLKA3	MLKA3A
	CU	(1) #6 AWG- 350 kcmil (CU or AL)	1 Phase	MLKC1	MLKC1A
			3 Phase	MLKC3	MLKC3A
400	AL	(2) 1/0 - 250 kcmil or (1) #2 AWG-600 kcmil	1 Phase	4MLKA1	4MLKA1A
			3 Phase	4MLKA3	4MLKA3A
	CU	(2) 1/0 - 4/0 or (1) 1/0 - 600 kcmil	1 Phase	4MLKC1	4MLKC1A
			3 Phase	4MLKC3	4MLKC3A
400	AL	(1) AL 1/0-750 kcmil (2) AL/CU 250 kcmil max. [max.(1) 600 kcmil CU wire]	1 Phase	—	4MLKA1B
			3 Phase	—	4MLKA3B



MBKFD3A

Breaker Mounting Kits 250A Max. – Main or Subfeed w/o Breaker

Amp Rating	Breaker Types	Service	Original P1 Cat. No.	Revised P1 Cat. No.
100A	BL, BLH, HBL	1-Phase	MBKBL1	
		3-Phase	MBKBL3	
100A	BQD	1-Phase	—	Use Back-fed Main Label Kit # MBKBFA ®
		3-Phase	—	
125A	NGB	1-Phase	MBKNB1	
		3-Phase	MBKNB3	
125A	ED4, ED6, HED4, HED6	1-Phase	MBKED1	MBKED1A
		3-Phase	MBKED3	MBKED3A
225A®	QR2, QRH2, HQR2, HQR2H	1-Phase	MBKQR1	MBKQR1A
		3-Phase	MBKQR3	MBKQR3A
250A	FXD6, FD6, HFD6, HFXD6	1-Phase	MBKFD1	MBKFD1A
		3-Phase	MBKFD3	MBKFD3A
400A®	JXD2, JD6, JXD6, HJD6, HJXD6	1-Phase	MBKJD1	
		3-Phase	MBKJD3	



Neutral Kits for Revised P1

Group	Amp	Circuits	Revised P1 Cat. No.	Description
1/0 Neutral Kits	250A & 400A	2 Strips per pack	LNLK5X12A	RP1 1/0 NEUTRAL LUG KIT [(5x)1/0 + (12x) #6] short 1/0 replacement neutral strip (17POS) (5.80 long)
			LNLK7X18A	RP1 1/0 NEUTRAL LUG KIT [(7x)1/0 + (18x) #6] long 1/0 replacement neutral strip (25POS) (8.14 Long)
2/0 Neutral Kits	250A & 400A	2 Strips per pack	LNLK4X11B	RP1 & P3 2/0 NEUTRAL LUG KIT (15POS) [(4x)2/0 + (11x) #6] - 2/0 max neutral strips (6.17 Long)
			LNLK6X17B	RP1 & P3 2/0 NEUTRAL LUG KIT (23POS) [(5x)2/0 + (17x) #6] - 2/0 max neutral strips (8.67 Long)
			LNLK7X20B	RP1 & P3 2/0 NEUTRAL LUG KIT (27POS) [(7x)2/0 + (20x) #6] - 2/0 max neutral strips (9.92 Long)
Copper Neutral Kits	250A	18, 30, 42	CNLK42B	RP1 CU NEUTRAL LUG KIT, 42B - 2 short & 2 long strips (17 & 25 pos) contains: CU neutral strips and CU riser extension, plus all hardware to replace standard neutrals. CU strips are 1/0 max. and require CU cable.
	250A & 400A	54, 66	CNLK54B	RP1 CU NEUTRAL LUG KIT, 54B - 4 long strips (25 pos) contains: CU neutral strips and CU riser extension, plus all hardware to replace standard neutrals. CU strips are 1/0 max. and require CU cable.
200% Neutral Kits	250A	18, 30, 42	2NLK42B	RP1 250A 200% NEUTRAL LUG KITS - Contains: CU neutral strips (2 short & 2 long strips (17 & 25 pos)), CU neutral extensions and an additional AL Line Lug (350kcmil), plus all hardware to replace standard neutrals. CU strips are 1/0 max. and require CU cable. (200% neutral kits require CU neutrals)
		54, 66	2NLK54B	RP1 250A 200% NEUTRAL LUG KITS. Contains: CU neutral strips (4 long strips (25 pos)), CU neutral extensions and an additional AL Line Lug (350kcmil), plus all hardware to replace standard neutrals. CU strips are 1/0 max. and require CU cable. (200% neutral kits require CU neutrals)
	400A	30, 54, 66	42NLK54B	RP1 400A 200% NEUTRAL LUG KIT - Contains: CU neutral strips (4 long strips (25 pos)), CU neutral extensions and an additional AL Line Lugs (600kcmil and 300kcmil), plus all hardware to replace standard neutrals. CU strips are 1/0 max. and require CU cable. (200% neutral kits require CU neutrals)

① 400 amp kit is for main only – not allowed for subfeed breaker.

② **MBKBFA** kit is available to mount BL/BOD/NGB 2-pole or 3-pole in unit space as a "Back-Fed Main". This occupies branch space and reduces circuit count by 2 or 3 positions. (includes Neutral Lug, "MAIN" label and instructions).

③ Although QR is rated 250A, it is limited to 225A in panelboard.

④ Original P1 kits will not work with Next Gen P1 interiors if the chart shows different part numbers for each.

⑤ Next Gen P1 kits will not work with Original P1 interiors if the chart shows different part numbers for each.

⑥ Replacement parts only.

Panelboards

Warehouse Stock – Type P1 Panelboards

Selection

Main Breaker Mounting Kits with Breakers for P1 Panels

(250A and lower can be used as subfeed kits also)

Nex Gen P1 Catalogue No.	Description	Ratings	
		240V	600V
MBKED33100A	Kit w/3-pole ED6 100A breaker	65kA	18kA
MBKED33125A	Kit w/3-pole ED6 125A breaker	65kA	18kA
MBKQR12225A	Kit w/2-pole QR2 225A breaker	10kA	—
MBKQR33150A	Kit w/3-pole QR2 150A breaker	10kA	—
MBKQR33200A	Kit w/3-pole QR2 200A breaker	10kA	—
MBKQR33225A	Kit w/3-pole QR2 225A breaker	10kA	—
MBKFD33200A	Kit w/3-pole FXD6 200A breaker	65kA	22kA
MBKFD33225A	Kit w/3-pole FXD6 225A breaker	65kA	22kA
MBKFD33250A	Kit w/3-pole FXD6 250A breaker	65kA	22kA
MBKHF33250A	Kit with 3-Pole HFD6 250A Breaker	100kA	25kA
MBKJD33400A ^①	Kit w/3-pole JXD6 400A breaker	65kA	25kA

NOTE: "Next Gen P1" Kits above only work for interior numbers ending in "T" or "N". Use "Original P1" main connector kits and loose breaker for all others.

Miscellaneous Parts and Accessories

Catalogue no.	Description
BK1A	Bonding Kit for 250A max. Next Gen P1 panels
EGK	Al Ground Bus 44 Connections
ECGK	Cu Ground Bus 44 Connections
IGK	Insulated Al Ground Bus
ICGK	Insulated Cu Ground Bus
DFFP1A	1" Branch circuit blank filler plate - BL/BQD/xGB/3VA41 provisions
DFFP01B	P1 Main & Sub-feed Blank Filler (Small Main & Sub-feed opening) *Replaces DFFP01CAN
DFFPVA41A	RP1 Main/Sub-feed Breaker Filler 125A Max. - 3VA4/BL/BQD/ED/xGB *Replaces DFFPED01CAN (Ref. 12-A-1802-01)
MBKQRFK	P1/RP1 Main Breaker Filler for 1PH/3PH QR - Horizontal Mount only
DFFPD01CAN	P1 Main Breaker, FD Filler, 250A Frame
DFFPJ01CAN	P1 Main Breaker, JD Filler, 400A Frame (Small opening - prior to 3VA)
DFFP01C	RP1 400A Main Blank Filler Plate - 1 Piece for large opening
DFFPJ02	RP1 400A w/JD Main Breaker - 1 Piece for large opening
MCHK	1 Metallic directory card holder
EWK1	End Wall Kit with KO's (20"W x 5.75"D)
IMK1	Interior Adjusting Kit
LPDC01	Panelboard Directory Card 5.5" x 5" (Pack of 10; Ref. 12-1110-01)
LPDC01CAN	Panelboard Directory Card 9" x 4" (Pack of 8; Ref. 9270-1/3/8/9)
LPDC02	Directory Card Holder for 5.5" x 5"(Pack of 10; Ref. 11-1824-01)
9271-1	Directory Card Holder for 9" x 4"
NBK01A	STICK-ON NUMBERS 1 THRU 60 (includes BT - 1/2" size)
NBK02A	STICK-ON NUMBERS 61 THRU 120 (includes BT - 1/2" size)
NBK03A	STICK-ON NUMBERS 121 THRU 240 (includes BT - 1/2" size)
P1SCRWS	Breaker Mounting Screws for P1 (Pack of 42)
P1CONBPHCU	Connector kit - 6 pcs. B-phase Copper
P1CONBPHAL	Connector kit - 6 pcs. B-phase Aluminum
P1CONACPHCU	Connector kit - 6 pcs. A or C-phase Copper
P1CONACPHAL	Connector kit - 6 pcs. A or C-phase Aluminum
JCK24	J-type Speed Nut Lighting Panel Fronts (Pack of 24)
LPKEY01ACAN	Key for FAS-Latch lock (Pack of 4; Ref. B363A)
FPLK2	2 Spare Fas-latch trim locks with 2 keys
SDKN	Dripshield kit for Standard Enclosure (20"W x 5.75"D)
TPS9IKITP1	P1 mounting bracket for SPD TPS3 09



300A Main installed.

These Next Gen P1 kits can now be used as top or bottom feed.

Panelboards

Panelboard Replacement, Modification, and Additions

Selection

S1/S2 Panels—All the original P1 panel kits for 250 amp and below panels will work for 250 amp maximum S1/S2 panels.

Note: Revised P1 kits will not work with S1/S2

400/600 Amp S1/S2 and All SE Panels

Lug Kits — Main or Feed Thru

Ampere Rating	Material	Wire Range	Service	Catalogue Number
125A/250A	Al/Cu	(2) 1/0–250 kcmil	1-Phase	MLKA1
125A/250A	Al/Cu	(2) 1/0–250 kcmil	3-Phase	MLKA3
400A/600A	Al/Cu	(2) #3/40—250 kcmil or (1) 3/0-500 kcmil	1-Phase	SMLKA1
400A/600A	Al/Cu	(2) #3/40—250 kcmil or (1) 3/0-500 kcmil	3-Phase	SMLKA3

Breaker Mounting Kits

Ampere Rating	Breaker Types	Service	Catalogue Number
125A	ED2, ED4, ED6, HED4, HED6, HHED6	1-Phase	SMBKED1
125A	ED2, ED4, ED6, HED4, HED6, HHED6	3-Phase	SMBKED3
250A	FXD6, FD6, HFXD6, HFD6	1-Phase	SMBKFD1
250A	FXD6, FD6, HFXD6, HFD6	3-Phase	SMBKFD3
400A	JD6, JXD6, HJD6, HJXD6	1-Phase	SMBKJD1
400A	JD6, JXD6, HJD6, HJXD6	3-Phase	SMBKJD3
600A	LD6, LXD6, HLD6, HLXD6	1-Phase	SMBKLD1
600A	LD6, LXD6, HLD6, HLXD6	3-Phase	SMBKLD3

Neutral Kits

Ampere Rating	Description	Catalogue Number
250A max.	30/42 circuit 200% neutral kit	2NLK2
400/600A max.	42 circuit 200% neutral kit	2NLK1

For CDP-7 and S3

Breaker Mounting Kits

Ampere Rating	Breaker Types	Material	Catalogue Number
70A	BQD6	Aluminum	7BQD6-2
70A	BQD6	Copper	7BQD6-2C
100A	BL	Aluminum	7BL-2
100A	BL	Copper	7BL-2C
100A	BQD	Aluminum	7BQ-2
100A	BQD	Copper	7BQ-2C
125A	ED2, ED4, ED6, HED4	Aluminum	7E6-2
125A	ED2, ED4, ED6, HED4	Copper	7E6-2C

For CDP-6, VB-6, SPP-6 and FPP6:

Breaker Mounting Kits

Ampere Rating	Breaker Types	Material	Catalogue Number
100A	BL	Copper	6BL2C
125A	ED2, ED4, ED6, HED4	Copper	6E62C
125A	CED6	Copper	6CLE2C
250A	FD6, FXD6, HFD6	Copper	6F62C
400A	JXD6, JD6, HJD6, SJ6	Copper	6JJ62C

Panelboards

Warehouse Stock/Unassembled

Branch Breakers Selection for P1

Selection

BL Family Circuit Breakers

Amp Ratings	1-Pole	2-Pole	3-Pole
	120V	240/120V	240V
Type BL - 10,000A IR^①			
15	B115	B215	B215R
20	B120	B220	B220R
25	B125	B225	B225R
30	B130	B230	B230R
35	B135	B235	B235R
40	B140	B240	B240R
45	B145	B245	B245R
50	B150	B250	B250R
60	B160	B260	—
70	B170	B270	B370
80	—	B280	B380
90	—	B290	B390
100	—	B2100	B3100
Type BLH - 22,000 IR^①			
15	B115H	B215H	—
20	B120H	B220H	B320H
25	B125H	B225H	B325H
30	B130H	B230H	B330H
35	B135H	B235H	B335H
40	B140H	B240H	B340H
45	B145H	B245H	B345H
50	B150H	B250H	B350H
60	B160H	B260H	B360H
70	B170H	B270H	B370H
80	—	B280H	B380H
90	—	B290H	B390H
100	—	B2100H	B3100H
Type HBL - 65,000A IR^①			
15	B115HH	B215HH	—
20	B120HH	B220HH	B320HH
30	B130HH	B230HH	B330HH
40	B140HH	B240HH	B340HH
50	B150HH	B250HH	B350HH
60	—	B260HH	B360HH
70	—	B270HH	B370HH
80	—	B280HH	B380HH
90	—	B290HH	B390HH
100	—	B2100HH	B3100HH

BQD6 Family Circuit Breakers

Amp Ratings	1-Pole	2-Pole	3-Pole
	347V	600/347V	600/347V
Type BQD6 - 10,000A IR @ 600/347V			
15	BQD6115	BQD6215	BQD6315
20	BQD6120	BQD6220	BQD6320
25	BQD6125	BQD6225	BQD6325
30	BQD6130	BQD6230	BQD6330
35	BQD6135	BQD6235	BQD6335
40	BQD6140	BQD6240	BQD6340
45	BQD6145	BQD6245	BQD6345
50	BQD6150	BQD6250	BQD6350
60	BQD6160	BQD6260	BQD6360
70	BQD6170	BQD6270	BQD6370

① To add shunt trip to BL breakers, see Breaker Accessories.

② To add Shunt trip or other accessories to BQD and NGB family breakers, See Breaker accessories.

BQD & GB Family Circuit Breakers

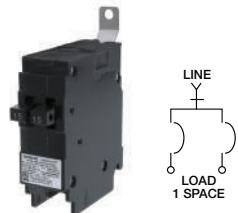
Amp Ratings	1-Pole	2-Pole	3-Pole
	277V	480Y/277V	480Y/277V
Type BQD^② - 14,000A IR @ 480/277V 65,000A IR @ 240V			
15	BQD115	BQD215	BQD315
20	BQD120	BQD220	BQD320
25	BQD125	BQD225	BQD325
30	BQD130	BQD230	BQD330
35	BQD135	BQD235	BQD335
40	BQD140	BQD240	BQD340
45	BQD145	BQD245	BQD345
50	BQD150	BQD250	BQD350
60	BQD160	BQD260	BQD360
70	BQD170	BQD270	BQD370
80	BQD180	BQD280	BQD380
90	BQD190	BQD290	BQD390
100	BQD1100	BQD2100	BQD3100
Type NGB - 14,000A IR @ 600/347V 100,000A IR @ 240V			
Amp Ratings	347V	600/347V	600/347V
	15	NGB1B015B	NGB2B015B
20	NGB1B020B	NGB2B020B	NGB3B020B
25	NGB1B025B	NGB2B025B	NGB3B025B
30	NGB1B030B	NGB2B030B	NGB3B030B
35	NGB1B035B	NGB2B035B	NGB3B035B
40	NGB1B040B	NGB2B040B	NGB3B040B
45	NGB1B045B	NGB2B045B	NGB3B045B
50	NGB1B050B	NGB2B050B	NGB3B050B
60	NGB1B060B	NGB2B060B	NGB3B060B
70	NGB1B070B	NGB2B070B	NGB3B070B
80	NGB1B080B	NGB2B080B	NGB3B080B
90	NGB1B090B	NGB2B090B	NGB3B090B
100	NGB1B100B	NGB2B100B	NGB3B100B
110	NGB1B110B	NGB2B110B	NGB3B110B
125	NGB1B125B	NGB2B125B	NGB3B125B

Typical Cable Ranges by Breaker Type

UL Breaker Type	Amps	Connector Range for AL cable	Connector Range for CU cable
BL	15-20A	#12-#10 AWG	#14-#10 AWG
	25-35A	#8-#6 AWG	#8-#6 AWG
	10-50A	#8-#4 AWG	#8-#6 AWG
	55-70A	#8-#2 AWG	#8-#4 AWG
	80-100A	#2-#1/0 AWG	#4-#1/0 AWG
BQD	15-40A	#12-#6 AWG	#14-#6 AWG
	45-100A	#6-1/0 AWG	#8 - #1 AWG
xGB	15-30A	#12-#6 AWG	#14-#6 AWG
	35-125A	#4-2/0 AWG	#6-1/0 AWG
3VA41	15-125A	#14 AWG - 3/0	#14 AWG - 2/0

BT Twin Family Circuit Breakers

The Space saver duplex breakers combine two independent 1/2" breaker poles in a common unit. This unit bolts into any location that would typically fit a 1-pole BL breaker and requires only 1" of panel space.



Replacement for 1-pole BL series (15A & 20A only)

Amp Ratings	Width	Circuits	BT (10k AIC)	BTH (22k AIC)	Details
Type BT and BTH					
15-15	1" pole	2	B1515	B1515H	Two 15A circuits
20-20	1" pole	2	B2020	B2020H	Two 20A circuits

Panelboards

Warehouse Stock/Unassembled

Selection

AFCI/GFCI

Electronic Circuit Breakers		1-Pole		2-Pole		Catalog Number
Trip Type	Breaker Type	Max IR (kA) at 120V	Amp Ratings Available	Max IR (kA) at 120/240	Amp Ratings Available	
Combination AFCI	BAF2	10	15	—	—	BA115AFC
		10	20	—	—	BA120AFC
	BAFH2	22	15	—	—	BA115AFCH
		22	20	—	—	BA120AFCH
	HBAF2	65	15	—	—	BA115AFCHH
		65	20	—	—	BA120AFCHH
	BAF	—	—	10	15	B215AFC
		—	—	10	20	B220AFC
	BAFH	—	—	22	15	B215AFCH
		—	—	22	20	B220AFCH
Dual Function AFCI/GFCI	BFGA2	10	15	—	—	B115DF
		10	20	—	—	B120DF
	BFGAH2	22	15	—	—	B115DFH
		22	20	—	—	B120DFH
	HBFGA2	65	15	—	—	B115DFHH
		65	20	—	—	B120DFHH
GFCI Personnel Protection (5mA)	BLF2	10	15	—	—	BF115A
		10	20	—	—	BF120A
		10	30	—	—	BF130A
	BLF	—	—	10	15	BF215A
		—	—	10	20	BF220A
		—	—	10	30	BF230A
		—	—	10	40	BF240A
		—	—	10	50	BF250A
		—	—	10	60	BF260A
	BLHF2	22	15	—	—	BF115AH
		22	20	—	—	BF120AH
		22	30	—	—	BF130AH
	BLHF	—	—	22	15	BF215AH
		—	—	22	20	BF220AH
		—	—	22	30	BF230AH
		—	—	22	40	BF240AH
		—	—	22	50	BF250AH
		—	—	22	60	BF260AH
	HBLF2	65	15	—	—	BF115AHH
		65	20	—	—	BF120AHH
		65	30	—	—	BF130AHH
GFCI Ground Fault Equipment Protection (30mA)	BLE	10	15	—	—	BE1153
		10	20	—	—	BE1203
		10	30	—	—	BE130
		—	—	10	15	BE215
		—	—	10	20	BE220
		—	—	10	30	BE230
		—	—	10	40	BE240
		—	—	10	50	BE250
	BLEH	—	—	10	60	BE260
		22	15	—	—	BE115H2
		22	20	—	—	BE120H2
		22	30	—	—	BE130H2
		—	—	22	15	BE215H2
		—	—	22	20	BE220H2
		—	—	22	30	BE230H2
		—	—	22	40	BE240H2
		—	—	22	50	BE250H2
		—	—	22	60	BE260H2

① Built to order. Additional "circuit" is included for neutral (via pigtail) and is NOT connected to bus. 2-pole is one phase and one neutral pigtail. 3-pole is two phase connections and one neutral pigtail.

② Allow 8-10 weeks for delivery
③ UL Listed as SWD (Switching Duty) Rated, suitable for 120V AC fluorescent lighting

Panelboards

Warehouse Stock/Unassembled

Selection

3VA41 TMTU 125A max. - breakers w/AL lugs included

3VA41 1-Pole (1" wide)

amps	code	UL Type Code ==>	SEAB	MEAB	HEAB
15	95	Panelboard MB codes ==>	V1 1-pole 65 25 14 125 VDC kAIC rating ==>	V2 1-pole 85 35 18 25 ^②	V3 1-pole 150 ^① 65 25 30 ^②
20	20	120 VAC kAIC rating ==>			
25	25	277 VAC kAIC rating ==>			
30	30	347 VAC kAIC rating ==>			
35	35	125 VDC kAIC rating ==>			
40	40				
45	45				
50	50				
60	60				
70	70				
80	80				
90	90				
100	10				
110	11				
125	12	IC family @ 277VAC ==>	25kA	35kA	65kA
		FTFM Trip included ==>	TM230	TM230	TM230
		3VA41 1P breaker w/TM230	3VA4195-4ED11-0AA0	...-5ED...	...-6ED...
			3VA4120-4ED11-0AA0	...-5ED...	...-6ED...
		1 Pole 3VA41 with AL connectors included for CU order one 3VA9133-0JD11 connector kit	3VA4125-4ED11-0AA0	...-5ED...	...-6ED...
		Note: No accessory pockets available	3VA4130-4ED11-0AA0	...-5ED...	...-6ED...
			3VA4135-4ED11-0AA0	...-5ED...	...-6ED...
			3VA4140-4ED11-0AA0	...-5ED...	...-6ED...
			3VA4145-4ED11-0AA0	...-5ED...	...-6ED...
			3VA4150-4ED11-0AA0	...-5ED...	...-6ED...
			3VA4160-4ED11-0AA0	...-5ED...	...-6ED...
			3VA4170-4ED11-0AA0	...-5ED...	...-6ED...
			3VA4180-4ED11-0AA0	...-5ED...	...-6ED...
			3VA4190-4ED11-0AA0	...-5ED...	...-6ED...
			3VA4110-4ED11-0AA0	...-5ED...	...-6ED...
			3VA4111-4ED11-0AA0	...-5ED...	...-6ED...
			3VA4112-4ED11-0AA0	...-5ED...	...-6ED...

3VA41 1-Pole in 2-Pole Frame (2" wide)

amps	code	UL Type Code ==>	25kA	35kA	65kA
15	95	FTFM Trip included ==>	TM230	TM230	TM230
20	20	3VA41 1P in 2-P Frame breaker w/TM230	3VA4195-4ED51-0AA0	...-5ED...	...-6ED...
25	25		3VA4120-4ED51-0AA0	...-5ED...	...-6ED...
30	30		3VA4125-4ED51-0AA0	...-5ED...	...-6ED...
35	35		3VA4130-4ED51-0AA0	...-5ED...	...-6ED...
40	40		3VA4135-4ED51-0AA0	...-5ED...	...-6ED...
45	45		3VA4140-4ED51-0AA0	...-5ED...	...-6ED...
50	50		3VA4145-4ED51-0AA0	...-5ED...	...-6ED...
60	60		3VA4150-4ED51-0AA0	...-5ED...	...-6ED...
70	70		3VA4160-4ED51-0AA0	...-5ED...	...-6ED...
80	80		3VA4170-4ED51-0AA0	...-5ED...	...-6ED...
90	90		3VA4180-4ED51-0AA0	...-5ED...	...-6ED...
100	10		3VA4190-4ED51-0AA0	...-5ED...	...-6ED...
110	11		3VA4110-4ED51-0AA0	...-5ED...	...-6ED...
125	12		3VA4111-4ED51-0AA0	...-5ED...	...-6ED...
			3VA4112-4ED51-0AA0	...-5ED...	...-6ED...

Panelboards

Warehouse Stock/Unassembled

Selection

3VA41 TMTU 125A max. - breakers w/AL lugs included

3VA41 2-Pole & 3-Pole (2" & 3" wide)

		UL Type Code ==>	SEAB	MEAB	HEAB
		Panelboard MB codes ==>	V1 3-pole 2-pole 65 65	V2 3-p 2-p 85 85	V3 3-p 2-p 150 ^① 150 ^①
amps	code	FTAM Trip included ==>	TM230	TM230	TM230
15	95	3VA41 2P breaker w/TM230	3VA4195-4ED21-0AA0	...-5ED...	...-6ED...
20	20		3VA4120-4ED21-0AA0	...-5ED...	...-6ED...
25	25		3VA4125-4ED21-0AA0	...-5ED...	...-6ED...
30	30		3VA4130-4ED21-0AA0	...-5ED...	...-6ED...
35	35		3VA4135-4ED21-0AA0	...-5ED...	...-6ED...
40	40		3VA4140-4ED21-0AA0	...-5ED...	...-6ED...
45	45		3VA4145-4ED21-0AA0	...-5ED...	...-6ED...
50	50		3VA4150-4ED21-0AA0	...-5ED...	...-6ED...
60	60		3VA4160-4ED21-0AA0	...-5ED...	...-6ED...
70	70		3VA4170-4ED21-0AA0	...-5ED...	...-6ED...
80	80		3VA4180-4ED21-0AA0	...-5ED...	...-6ED...
90	90		3VA4190-4ED21-0AA0	...-5ED...	...-6ED...
100	10		3VA4110-4ED21-0AA0	...-5ED...	...-6ED...
110	11		3VA4111-4ED21-0AA0	...-5ED...	...-6ED...
125	12		3VA4112-4ED21-0AA0	...-5ED...	...-6ED...
amps	code	FTAM Trip included ==>	TM230	TM230	TM230
15	95	3VA41 3P breaker w/TM230	3VA4195-4ED31-0AA0	...-5ED...	...-6ED...
20	20		3VA4120-4ED31-0AA0	...-5ED...	...-6ED...
25	25		3VA4125-4ED31-0AA0	...-5ED...	...-6ED...
30	30		3VA4130-4ED31-0AA0	...-5ED...	...-6ED...
35	35		3VA4135-4ED31-0AA0	...-5ED...	...-6ED...
40	40		3VA4140-4ED31-0AA0	...-5ED...	...-6ED...
45	45		3VA4145-4ED31-0AA0	...-5ED...	...-6ED...
50	50		3VA4150-4ED31-0AA0	...-5ED...	...-6ED...
60	60		3VA4160-4ED31-0AA0	...-5ED...	...-6ED...
70	70		3VA4170-4ED31-0AA0	...-5ED...	...-6ED...
80	80		3VA4180-4ED31-0AA0	...-5ED...	...-6ED...
90	90		3VA4190-4ED31-0AA0	...-5ED...	...-6ED...
100	10		3VA4110-4ED31-0AA0	...-5ED...	...-6ED...
110	11		3VA4111-4ED31-0AA0	...-5ED...	...-6ED...
125	12		3VA4112-4ED31-0AA0	...-5ED...	...-6ED...
amps	code	Molded Case Switch			
100	10	3VA41 3P MCS 65 kA		HEAB only 65ka ==> 3VA4110-1BB31-0AA0	

^① Although some breakers have a kAIC rating above 100 kAIC – many panels are limited to 100 kAIC or less.

^② DC Voltage panels are limited by various factors.
These DC ratings apply to the Breaker only.

Panelboards

Circuit Breaker / Lighting and Distribution

General

Revised Type P1

600Y/ 347 Vac Maximum

400 Ampere Mains

400 Ampere Maximum Branch

Short Circuit Rating —

200,000 A. @ 240 Vac / 100,000 A. @

600Y/347 Vac. IR Maximum

Branch Breaker Symmetrical Interrupting Capacity

Based on CSA's Test Procedure

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

Panelboards

Certified by CSA under file #165172 and 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,

1-phase 3-wire - 120/240 Vac,

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

3-phase 4-wire - 208Y/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 10-29 for optional fronts.

Main Breakers

BL, BLH, HBL, NGB, BQD, BQD6, ED4, ED6, HED4, QR2, QRH2, HQR2, HQR2H, FXD6, FD6, HFD6, HFHD6, JXD6, JD6, HJXD6, HJD6. (All main breakers except 400 amp frame are mounted horizontal.)

Note: All Revised P1 interiors with BL, BQD or GB Type Mains are Back-fed in unit space (GB Type = NGB). BQD, BQD6

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 5) for the connector range of a specific frame.

Main Lug Connectors

125	(1) #6 AWG-350 kcmil
250	(1) #6 AWG-350 kcmil
400 std.	AL (2) 110-250 kcmil or (1) #2 AWG-600 kcmil
400 opt.	CU (2) 1/0-4/0 or (1) 110-600 kcmil
400 opt.	AL (1) AL 1/0-750 kcmil (2) AL/CU 250 kcmil max. [max. (1) 600 kcmil (1) wire]

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, BQD6	8.500	10.5	11.5
NGB	8.000	10	11.5
ED4, ED6, HED4	6.125	8.125	11.5
QR2, QRH2, HQR2, HQR2H	6.500	8.5	11.5
FD6, FXD6, HFD6, HFHD6	5.250	7.25	11.5
JD6 ^② , JXD6 ^②	15.000	15	26.75

Main Lug End Gutter Dimensions - Inches

Amp Rating	End Gutter	Neutral Location
125	10.500	11.5
250	10.500	11.5
400 ^③	25.500	26.75

^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 wire bending space is 15.000" (381mm) and neutral wire bending space is 15.880" (413mm) on 400A panel.

^④ P1 panel limited to (1) subfeed 250 amperes max.
^⑤ See Branch Breaker Side Gutter Chart for
Nex Gen P1 Backfed Options.

Side Gutter Wiring Space - Inches

Reference Letter	Panel Width 20"	Panel Width 24" (Optional)
A	6.375	7.375
B	5.500	7.5
C	6.125	8.125
D	6.500	8.5
E ^④	5.250	7.25
F	5.000	7

Branch Breaker Side Gutters

← A →	BL, BLH, HBL	BL, BLH, HBL	← A →
← B →	BLF, BLHF	BLF, BLHF	← B →
← C →	BQD, BQD6	BQD, BQD6	← C →
← D →	ED, ED4, ED6, HED4	QJ2, QJH2, QJ2H	← D →
← E →	QR2, QRH2, HQR2, HQR2H	FDX6, FD6, HFD6, HFHD6 ^④	← E →
← F →	NGB	NGB	← F →

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 (Type 1)

Width	Height	Gauge Steel
20"	All	#14

Fronts — Surface, Flush (Type 1)

20"	All	#14
-----	-----	-----

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 CSA.

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 CSA listed. Other combinations are available. See Circuit Breaker Section, of this book.

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

Panelboards

Circuit Breaker / Lighting and Distribution

Selection

Table P1-3 – Main Breaker Panel Size Selector – Revised P1

RP1 Est. size/weights for AL MLO panels. - Add Main Breaker weights as needed. - Add 20% for CU Bus.		Max # of 1" Poles		Max # of Poles w/BT ^②		Dimensions in inches (mm)		MLO ^① Estimated Weight in Lbs. (kg) with Breakers	
Type of RP1 interior ==>		BL/BQD or xGB/3VA41 ^③		BL/BQD only		Unit Space			
Main Breaker Amp Rating / Type	Main Lug Amp Rating	FT #	NFT #	FT w/BT	NFT w/BT	FT A"	NFT A"		
250A max. Main Bus rating 100A max BL or BQD/BQD6 series 125A max NGB or 225A max QR Series 250A max FD	(all bus is 250A max.)	—	18	—	18 + 10	—	9	26 (661) 95 (43)	
		125A or 250A	18	30	18 + 10	30 + 20	9	32 (813) 110 (50)	
		30	42	30 + 20	42 + 30	15	21	38 (965) 125 (57)	
		42	54	42 + 30	54 + 30	21	27	44 (1118) 140 (64)	
		54	66	54 + 30	66 + 30	27	33	50 (1270) 155 (71)	
		66	—	66 + 30	—	33	—	56 (1423) 170 (78)	
400A max. Main Bus rating 400A max JD Series	(all bus is 400A max.)	400A	—	30	—	30 + 20	—	15 56 (1423) 172 (78)	
		30	42	30 + 20	42 + 30	15	21	62 (1575) 190 (86)	
		42	54	42 + 30	54 + 30	21	27	68 (1728) 208 (95)	
		54	66	54 + 30	66 + 30	27	33	74 (1880) 226 (104)	

^① Estimated weights are for Aluminum bus MLO panels and vary by MB and installed Branches

^② BT - twin style breakers are available in 15A and 20A only and provide two 1-pole circuits in 1" of unit space.

The maximum Qty. of BT twins allowed in a panel is restricted to the max. number of neutral positions and/or physical space available, whichever is lower. Values shown are recommended maximums.

^③ BT twins can only be used in BL/BQD RP1 panels. The NGB series of interiors do not accept BL/BQD or BT style of breakers.

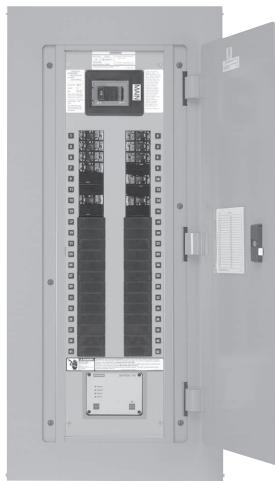


Table P1-4 – Main Breaker Selection

P1 Main Circuit Breakers & Subfeed					2-Pole and 3-Pole					Available for Sub-feed Horizontal mount only
					Max IR (kA) at ^④					
Amp Rating	Trip Type	Breaker Family	Main Breaker Code	Breaker Type	240V	480Y /277V	480V	600Y /347V	600V	Amp Ratings Available
70	Thermal Magnetic	BQD6	B6	BQD6	65	—	—	10	—	15-70 Single
			BL	BL	10	—	—	—	—	15-100 Single
100			BH	BLH	22	—	—	—	—	15-100 Single
			HB	HBL	65	—	—	—	—	15-100 Single
125		BQD	BQ	BQD5	65	14	—	10	—	15-100 Single
		Sentron GB	NB	NGB	100	25	—	14	—	15-125 Single
225	Sentron QR	Sentron ED	E4	ED4	65	—	18	—	—	15-125 Single
			E6	ED66	65	—	25	—	18	20-125 Single
			H4	HED4	100	—	42	—	—	15-125 Single
250		Sentron FD	QR	QR2	10	—	—	—	—	100-225 Single
			Q4	QRH2	25	—	—	—	—	100-225 Single
			Q5	HQR2	65	—	—	—	—	100-225 Single
			Q6	HQR2H	100	—	—	—	—	100-225 Single
400	Sentron JD	FX, FD	FX, FD	FXD6-A, FD6-A	65	—	35	—	22	70-250 Single
			HF	HFD6	100	—	65	—	25	70-250 Single
		H2	HFXD6	100	—	65	—	—	—	70-250 Single
		JX, J6	JXD6-A, JD6-A	65	—	35	—	—	25	200-400 N/A
		H5, H6	HJXD6-A, HJD6-A	100	—	65	—	—	35	200-400 N/A
		JD	JXD2	65	—	—	—	—	—	300-400 N/A

^④ DC System Voltages are not available for RP1 series.

^⑤ Approved for CSA and UL Listed.

^⑥ ED 2-pole only available in 20A, 25A and 30A.

Panelboards

Circuit Breaker / Lighting and Distribution

Selection

Table P1-5 - Main Lug Panel Size Selector - Revised P1

Maximum Ampere rating	Max # Poles FT	Max # Poles NFT	Dimensions in inches (mm)				Weight in Lbs. (kg)	MLO Connectors Suitable for		
			Unit Space		Box Height B"					
			FT A	NFT A						
125 (or) 250		18	—	9	26 (661)	90 (41)	(1) #6 AWG - 350 kcmil (CU or AL)			
		18	30	9	32 (813)	105 (48)				
		30	42	15	38 (965)	120 (55)				
		42	54	21	44 (1118)	135 (61)				
		54	66	27	33	150 (67)				
		66	—	33	56 (1423)	165 (73)				
400		—	30	—	15	56 (1423)	AL (2) 1/0 - 250 kcmil or (1) #2 AWG - 600 kcmil CU (2) 1/0 - 4/0 or (1) #2 AWG - 600 kcmil			
		30	42	15	21	62 (1575)				
		42	54	21	27	68 (1728)				
		54	66	27	33	74 (1880)				

Table P1-6 – Branch Circuit Breakers

Max. Amp Rating	Breaker Type	No. of Poles	Max. Interrupting Rating (kA)						Available Trip Values	Connections Suitable for Cu or Al	
			120V	120/240V	240V	277V	480/277V	347V	600Y/347V		
70	BQD6	1	—	65	—	—	—	10	—	15, 20, 25, 30, 35, 40, 50, 60, 70	15-40A #14-#6 AWG Cu #12-#6 AWG Al
		2	—	65	—	—	—	—	10	15, 20, 25, 30, 35, 40, 50, 60, 70	
		3	—	65	—	—	—	—	10	15, 20, 25, 30, 35, 40, 50, 60, 70	
	BL	1	10	—	—	—	—	—	—	15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 70	45-70A #8-#1 AWG Cu #6-#1/0 AWG Al
		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	
		1	10	—	—	—	—	—	—	15, 20, 30	
		2	—	10	—	—	—	—	—	15, 20, 30	
	BLH	1	—	22	—	—	—	—	—	15, 20, 30, 40, 50, 55, 60, 70	15-20A #14-#10 AWG Cu #12-#10 AWG Al
		2	—	22	—	—	—	—	—	15, 20, 30, 40, 50, 60, 70, 90, 100	
		3	—	22	—	—	—	—	—	15, 20, 30, 40, 50, 60, 70, 80, 90, 100	
100	HBL	1	—	65	—	—	—	—	—	15, 20, 30, 40, 50	25-35A #8-#6 AWG Cu #8-#6 AWG Al
		2	—	65	—	—	—	—	—	15, 20, 30, 40, 50, 60, 70, 80, 90, 100	
		3	—	65	—	—	—	—	—	15, 20, 30, 40, 50, 60, 70, 80, 90, 100	
	BLF2	1	10	—	—	—	—	—	—	15, 20, 30	40-50A #8-#6 AWG Cu #8-#4 AWG Al
		2	—	10	—	—	—	—	—	15, 20, 30, 40, 50, 60	
	BLHF2	1	22	—	—	—	—	—	—	15, 20, 30	55-70A #8-#4 AWG Cu #8-#2 AWG Al
		2	—	22	—	—	—	—	—	15, 20, 30, 40, 50, 60	
	HBLF2	1	65	—	—	—	—	—	—	15, 20, 30	
	BLE	1	10	—	—	—	—	—	—	15, 20, 30	
	BLE	2	—	10	—	—	—	—	—	15, 20, 30, 40, 50, 60	
	BLEH	1	22	—	—	—	—	—	—	15, 20, 30	
	BLEH	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	80-100A #4-#1/0 AWG Cu #2-#1/0 AWG Al
		2	—	65	—	14	—	—	—	15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100	
		3	—	65	—	14	—	—	—	15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100	
125	NGB ^{②③}	1	100	—	—	25	—	14	—	15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100, 125 ^③	15-30A #14-#6 Cu #12-#6 Al
		2	—	100	100	—	25	—	14	15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100, 125 ^③	
		3	—	100	100	—	25	—	14	15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100, 125 ^③	
	3VA41 - SEAB	1	65	—	—	25	—	14	—	15-125	35-125 #6-1/0 Cu #4-2/0 Al
		2	—	65	65	—	25	—	14	15-125	
	3VA41 - MEAB	1	85	—	—	35	—	18	—	15-125	15-125A #14 AWG - 3/0 Cu #14 AWG - 3/0 Al
	3VA41 - MEAB	2	—	85	85	—	35	—	18	15-125	
	3VA41 - HEAB	1	150	—	—	65	—	25	—	15-125	
	3VA41 - HEAB	2	—	150	150	—	65	—	25	15-125	
	3VA41 - HEAB	3	—	150	150	—	65	—	25	15-125	

① Two-pole breaker is one phase and neutral. Three-pole is two phases and neutral.

② P1 panel with NGB/3VA41 branch devices will not accept BL or BQD frames in the same panel as branch devices.

③ The Revised P1 (18 circuit 250A only) is limited to 100A per connection (200A per pair) when installing Branch Breakers across from one another.

All other configurations allow 125A per connection max. (250A per pair max.)

NOTE: BL, HBL and BQD breakers are mounted in common mountings in 3" or (6) pole increments.

Panelboards

Circuit Breaker / Lighting and Distribution

Dimensions

Table P1-7 – Subfeed Breakers

Breaker Type	Number of Poles	Max. Interrupting Rating (kA)			Available Trip Values
		240V	480Y/277V	600Y/347V	
QR2	2, 3	10	–	–	100, 110, 125, 150, 175, 200, 225
QRH2	2, 3	25	–	–	100, 110, 125, 150, 175, 200, 225
HQR2	2, 3	65	–	–	100, 110, 125, 150, 175, 200, 225
HQR2H	2, 3	100	–	–	100, 110, 125, 150, 175, 200, 225
ED6	2, 3	65	18	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	22	70, 80, 90, 100, 110, 125, 150, 175, 200, 225, 250
FD6	2, 3	65	35	22	70, 80, 90, 100, 110, 125, 150, 175, 200, 225, 250
HFD6	2, 3	100	65	22	70, 80, 90, 100, 110, 125, 150, 175, 200, 225, 250
HFxD6	2, 3	100	65	25	70, 80, 90, 100, 110, 125, 150, 175, 200, 225, 250

Panelboards

Circuit Breaker / Lighting and Distribution

Selection

Table P1-13 – Main Breaker Gutter Dimensions Inches (mm)

Main Breaker	Gutter Space inches (mm)	Neutral Location to Endwall
	20" wide box	24" wide box
BL, BLH, HBL ^①	8.500 (215) ^③	10.500 (267) ^③
BQD, BQD6 ^②	7.750 (196) ^③	9.750 (248) ^③
NGB ^②	7.500 (190) ^③	9.500 (241) ^③
ED4, ED6, HED4	6.125 (156)	8.125 (206)
QR2, QRH2, HQR2, HQR2H	6.500 (165)	8.500 (216)
FD6, FXD6, HFD6, HFxD6	5.250 (133)	7.250 (184)
JD6, JXD6 ^①	15.000 (381)	15.000 (381)
		26.500 (674)

^① JD frame mounted vertically.

- ② For Revised P1 with Back-fed Main option, use Side Gutter Wiring Spec Table P1-15.**

^③ These dimensions are for Revised P1 only. See Original P1 cut sheets for valid dimensions if needed (P1 production prior to January 2015).



Feed-Thru (FT)



Non-Feed-Thru (NFT)

Table P1-14 – Main Lug End Gutter Dimensions Inches (mm)

Amp Rating	End Gutter		Neutral Location - to Endwall	
	20" wide box	24" wide box	20" wide box	24" wide box
125	9.500 (242)	9.500 (242)	10.500 (267)	10.500 (267)
250	9.500 (242)	9.500 (242)	10.500 (267)	10.500 (267)
400	25.500 (648)	25.500 (648)	26.750 (680)	26.750 (680)

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

Table P1-15 – Side Gutter Wiring

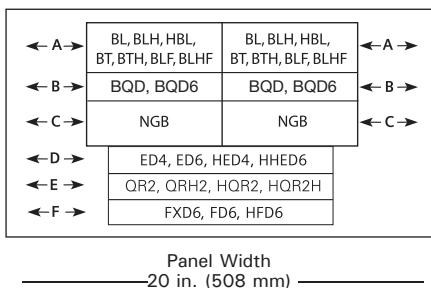
Space Inches (mm) (Fig P1-1)

Reference Letter	Panel Width 20"	Panel Width 24" Optional
A ^②	6.375 (167)	8.375 (213)
B ^②	5.500 (140)	7.500 (191)
C ^②	5.000 (127)	7.000 (178)
D	6.125 (156)	8.125 (206)
E	6.500 (165)	8.500 (216)
F	5.250 (133)	7.250 (184)

^① Subfeed mounting limit 1 per panel.

- ② For all Revised P1 panels using BL/BQD or xGB breakers as mains in back-fed position, use this chart for wiring space.**

Fig P1-1



Example of Back-fed xGB Main breaker installed

Panelboards

Type P1 Panelboard Modifications and Additions

Selection

Panel Options

Enclosures

- Extra gutter to sides or ends of the can
- 24" wide boxes
- Hinged trims
- Door-in-door trims
- Screw to the box trims
- Piano hinge trims
- Painted boxes
- Custom colors
- Stainless steel trims and boxes
- Type 1 enclosures (Std 16 Gage)
- Type 3R/12 enclosures 16 Gauge Can w/ 14 Gauge front)
- Type 4 enclosures (14 Gauge only)
- Type 4X enclosures (14 Gauge only - 304SS Std, 316SS Optional)
- Panel skirts
- Gaskets between trim and box

Panel Modifications

Enclosures

- Main Bus
Standard main bus is tin-plated aluminum. For copper main bus, add from the table for each panel. Includes copper neutral cross bar. For copper neutral branch lugs, see miscellaneous.
- Compression lug for MLO^①
- Contactor mains - Mount in 23" enclosure ahead of panel.
 - Asco 920 through 225 amps^③
 - Asco 911 through 150 amps^③
 - Siemens LEN through 30 amps^③
- Branch and main breaker accessories
 - Handle blocks
 - Handle locks
- Feed-thru lugs^①
Cannot be used in conjunction with SPD/TVSS or subfeed breakers. Do not add height to the panel.

Surge Protection Devices

- TPS3 02
 - Bus connected
 - Internally mounted (30A breaker required to feed SPD)
 - Externally mounted in a 15" high aux. enclosure (30A breaker required to feed SPD)
- TPS3 09
 - Internally mounted (20A breaker required to feed SPD)
 - Externally mounted (20A breaker required to feed SPD)
- TPS3 12
 - Externally mounted (40A breaker required to feed SPD)

- Copper lugs, mechanical line and branch neutral^①
- Bus mounted SPD/TVSS^①
- Grounding of Panelboards
Ground Bars except for brazed to box are shipped with the panel interior factory mounted.
 - Non-Insulated Equipment Ground Bar – Standard
 - Copper Non-Insulated Ground Bar
 - AL Insulated Equipment Ground Bar
 - CU Insulated Equipment Ground Bar
- Shunt Trip on Main or Branch
BL^②, BLH^②, HBL^②, BQD^②, NGB^② as branch use 1" unit space for shunt trip.

QR2, QRH2, HQR2, HQR2H, ED2, ED4, ED6,
HED4, FD6, FXD6, HFD6

HFXD6, JXD6, JD6, HJD6, HJXD6

Feed-thru Lugs Amp Rating	Type	Connector CU/AL Range
250	AL/CU Mechanical	(1)-#6 AWG-350 kcmil
	CU Mechanical	(1)-#6 AWG-350 kcmil
	AL/CU Compression	(1)-#6 AWG-350 kcmil
400	AL/CU AWG Mechanical	(2)-#10 - 250 kcmil or (1)-#2 AWG-600 kcmil
	CU	(1)-1/0-600 kcmil (2)-1/0-4/0
	AL/CU Compression	(1) 400-600 kcmil AL (1) 400-500 kcmil CU

- 200% neutral^①

NOTE: Specify copper or aluminum cable.

① Do not increase panel or enclosure size.

② Accessories on 1" pole breakers (BL, BQD, xGB, ED) will take 1" unit space.

③ External to the panel, supplied in a separate enclosure.

Panelboards

Type P1 Panelboard Modifications and Additions

Reference

Compression Lugs

Table P1-19 – Lugs

Style	Amp Rating	Breaker Type	Compression Connectors	Box Height Addition
MLO	125	N/A	(1) #6 AWG - 350 kcmil	None
	250		(1) 400 - 600 kcmil AL (1) 400 - 500 kcmil CU	None
	400	N/A		
Main Breaker	125	ED4, ED6, HED4	(1) #14 AWG - 2/0	Box must go to 24" wide
	225	QR2, QRH2, HQR2, HQR2H	(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 require a particular crimping tool (tool is Hubbell/Anderson Versa Crimp VC6 -for 250A) to accommodate the range. Consult factory for information. 200% neutral not available with compression lugs. xGB breakers cannot accommodate compression lugs. (For 400A tool use Hubbell/Anderson Versa Crimp VC6FT/VC7FT - see instruction sheet for details.)

Enclosure Modifications

Type-4-Water Tight, Dust Tight, Steel Enclosure

(Actual Type-4 enclosure is larger than standard Type 1 enclosure. See chart below for reference to approximate actual size.)

Table P1-20

Standard Box Height (in inches)	Actual NEMA 4 Enclosure Size		
	H	W	D
32	32	20	8
38	42	30	8
44	48	36	8
56	60	36	10

NOTE: Larger Type 4 enclosures are not available.

Remote Switch Modifications

Table P1-22 – Control Power Transformer

Size	VA Relay
0, 1	50
2	75
3	150
4	250

Table P1-24 – Remote Control Switch Modification

Description
Auxiliary Contacts (mounted, not wired)
2-Wire Control

Type-4X For Type P1

Water Tight, Dust Tight and Corrosion Resistant
(consult plant to verify actual enclosure size)

Table P1-21

Catalogue Number	Enclosure – Stainless Steel Size (inches) (304SS is standard)		
	H	W	D
B4X26	26	20	5.75
B4X32	32	20	5.75
B4X38	38	20	5.75
B4X44	44	20	5.75
B4X50	50	20	5.75
B4X56	56	20	5.75
B4X62	62	20	5.75
B4X68	68	20	5.75
B4X74	74	20	5.75

NOTE: 316SS is available as an option – must be specified.

Table P1-23 – Applications for a 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

Gauge Steel of Boxes/Fronts, Surface and Flush

Dimensions in Inches (mm)		Gauge Steel		
H	W	Box	Front/Door	Type
26-74 (660-1880)	20 (508)	16 ^①	14 ^③	Type 1
26-74 (660-1880)	20 (508)	16 ^②	16/14 ^②	Type 3R/12
32-60 (813-1524)	20-36 (508-914)	14 ^③	14 ^③	Type 4
26-74 (660-1879)	20 (508)	14 ^④	14 ^④	Type 4X
36-60 (914-1524)	30-36 (762-914)	N/A ^⑤	N/A ^⑤	Type 4X Non-Metallic

① 16 Gauge is Standard (14 Gauge & 12 Gauge are optional)

② 15 Gauge Steel Can with 14 Gauge Door or Similar Approved Construction

③ No Optional Gauge available

④ 304SS 14 Gauge Std., 316SS 14 Gauge optional

⑤ Sizes do not match Standard Enclosure Sizes - See Table P1-21 - material is non-metallic - No Gauge Specified.

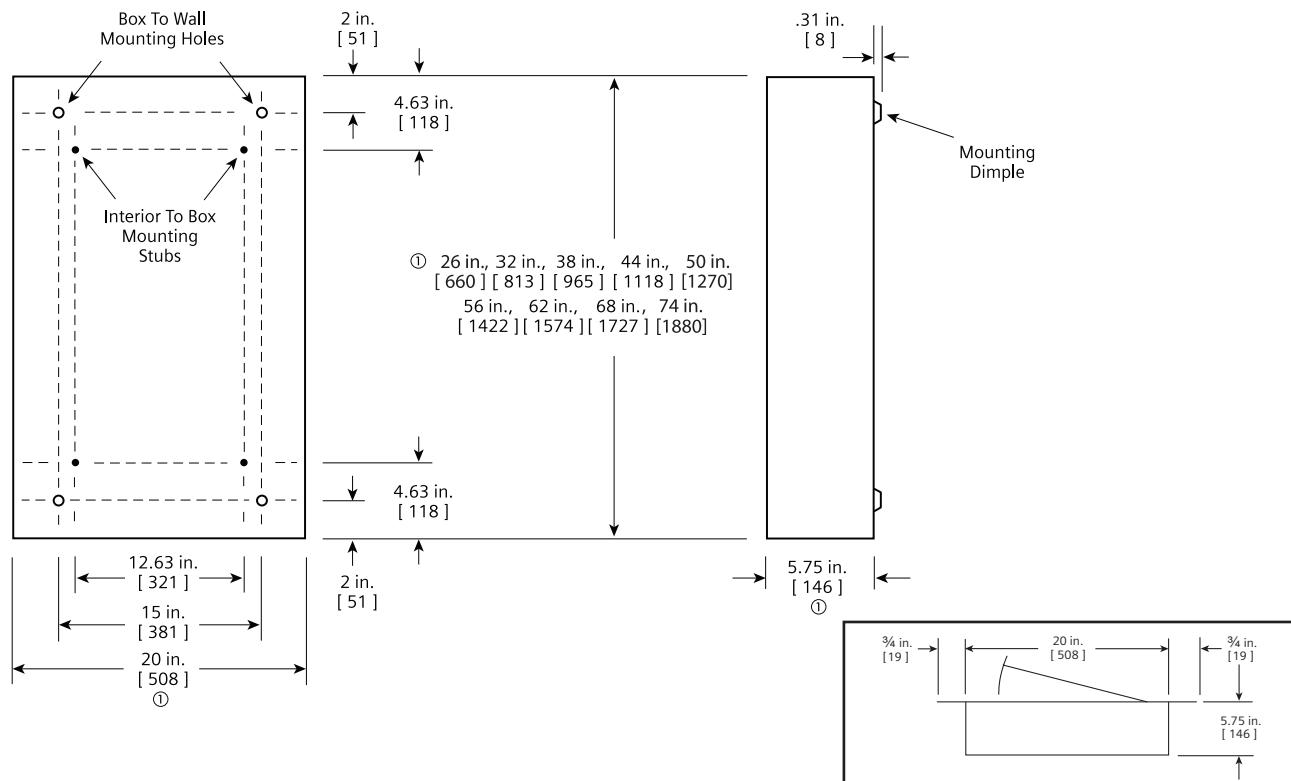
Panelboards

Type P1 Enclosure Details

Dimensions

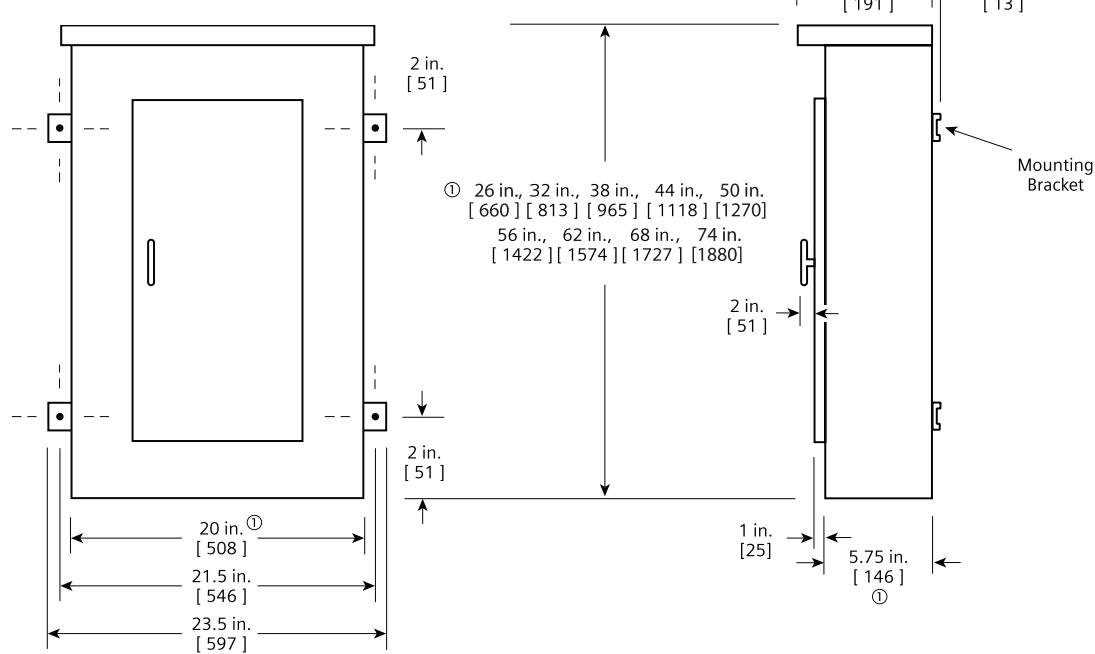
Type 1 Box

Box is symmetrical



Flush Mounting

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 [].

Panelboards

NEMA Enclosures

Enclosures

Introduction

NEMA Type 1

Primarily indoor use: Box and front needed for complete enclosure.



NEMA Type 3R

Outdoor use primarily to provide a degree of protection against rain, sleet, and damage from external ice formation.



NEMA Type 12 (Siemens 3R/12)

These enclosures for Lighting Panels are useable as Type 12 or Type 3R by adding the gasket shown around the door.



NEMA Type 4 or 4X

Indoor or outdoor use primarily to provide a degree of protection against splashing water, corrosion, windblown dust and rain, hose-directed water, and damage from external ice formation.



Note: NEMA Type 4 is painted steel.
NEMA Type 4X is typically stainless or non-metallic.

Panelboards

Trim / Front

Dimensions

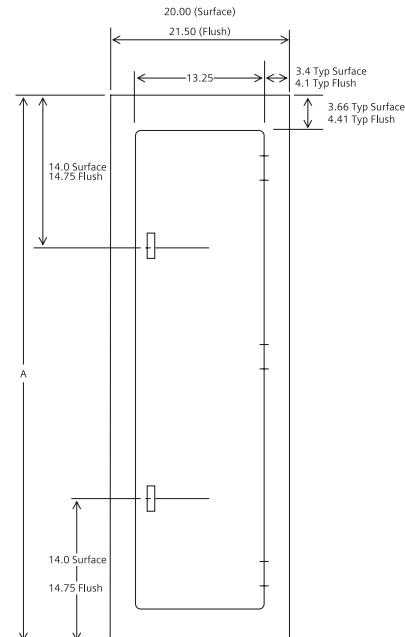
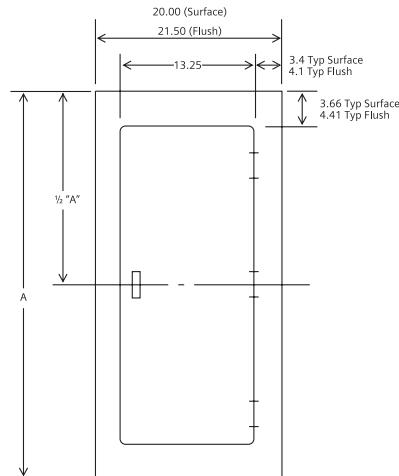


Standard Trim (FAS-Latch)

(14 Gage Standard)

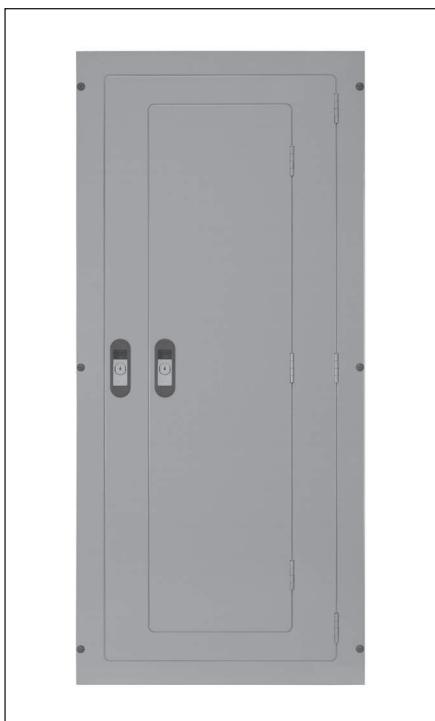
(In stock includes surface or flush versions of this style in chart on page 11.)

Standard Trim (FAS-Latch) Typical Dimensions
(Hinges available as shown on right side only)
(Typical 14 Gage Steel construction or approved equivalent)



Box Size	Surface	Flush	# of Hinges
	A	A	
26	26	27.5	2
32	32	33.5	2
38	38	39.5	2
44	44	45.5	3
50	50	51.5	3

Box Size	Surface	Flush	# of Hinges
	A	A	
56	56	57.5	3
62	62	63.5	3
68	68	69.5	3
74	74	75.5	3



Door in Door Front
(14 Gage Standard)



Hinged to Box Front
(14 Gage Standard)

Also available

- Screw to Box Trim (14 Gauge Std.)
- Piano Hinge Trim (14 Gauge Std.)
 - a) Screw to box with Piano Hinge Door
 - b) Hinge to Box with Piano Hinge and Piano Hinge Door
 - c) Door-in-Door with Piano Hinge, Both Doors

Panelboards

Type P2 Panelboards

Features

Flexibility is the hallmark of the P2 panel and with the addition of the 3VA family of breakers in 2021 it is more capable than ever.

This panel offers a wide array of factory assembled options to meet almost all panel board applications up to 600A Maximum Bus ratings. With this design, the ability to mix breaker frames in unit space up to 250 amps will also meet many distribution panel requirements in a much smaller package.

Subfeed lugs (up to 400 amp) are just a few of the options of this flexible panel.

Similar to Siemens P1 Panel board, P2 is set up around 18, 30, 42, 54, 66, 78, and 90 circuit configurations in 6" increments of Box size. It will also allow the user to configure the panel to the smallest possible size. Enclosures are shared with the P1 series as well and are from 26" to 74" high (in 6" increments to match interiors).

The P2 panel starts with 9" of unit space (18 circuits of 1" pole breakers). Breaker strap kits mounted in unit space can be mixed and matched to meet customer requirements for many types of breakers. All 1" pole breakers (BL, BQD, xGB, xGB2, ED & 3VA41 frames) are mounted in 3" or 6-pole increments. Breaker frames, above 125 amps, are mounted in 6" single breaker mounting kits (Sentron QR, FD cover all requirements up to 250A).

Main Breakers from 100A frame to 600A frame can be configured as needed.

As an example of a minimum panel, (6) 20 amp 1-pole BL breakers (3" of unit space) and a 3-pole 225 amp QR breaker (6" of unit space) equaling 9" of unit space can be configured in a P2 panel without any extra provisions or space required.

Another unique feature of the P2 panel is that blank unit space can be added to allow for future expansions or modifications. - Any expansions or modifications must be in 3" or 6" increments for these kits and they can be mixed in unit space as needed.

General

Short circuit rating

- 200 KAIC max. symmetrical or equal to the lowest rated device installed unless a series rating is indicated.
- Panels with subfeed or feed-thru lugs without a main device*, circuit breaker or fusible unit, are limited to a three-cycle rating. The three-cycle rating for the P2 panel is limited to 22 KAIC.

*Note: The main device may be mounted remote from the panel.

Bussing – The P2 panel has more options to meet market requirements. The standard bussing is temperature rated aluminum. The rating is per the requirements of CSA C22.2 No.29 - the standard for panelboards. All aluminum bussing is tin-plated. Optional bussing for the P2 panel is copper.

The copper bus option for this panel is tin-plated as standard or silver.

Weight – Approximate

Total panelboard weight when filled with a normal quantity of breakers and accessories is about 3 lbs. (1 kg) per inch (54g per mm) of box height.

Small frame breakers of the same frame can cross from one mounting kit to another if needed.

- BL/BQD 100A max. has 3" kits - 6-poles max.
- xGB/3VA41 125A max. has 3" kits - 6-poles max.
- xGB2 and ED 125A max. each have 3" kits also, but are no longer needed with the introduction of 3VA.
- Larger frame breaker kits are single mount in 6" of unit space:
- QR 225A max. 2-pole or 3-pole have 6" kits.
- Changes in the field for unit space length for any 3" kit may require an addition deadfront center strip kit. Check with sales or the factory for field installable unit space strap kits.

Enclosures for P1 and P2

- Standard Type 1 enclosures are 20" wide x 5.75" deep. Box Height is determined by main device and unit space. See charts for box height.
- Height: 26", 32", 38", 44", 50", 56", 62", 68" and 74" are standard sizes used for both P1 and P2
- NEMA 3R, 3R/12, 4X are typical examples of product available in 20" wide x 5.75" deep enclosures.
- For most applications, 24" wide and 7.75" deep variations are also available. (see end of P1 section for more details)

Main Lug / Main Breaker for P2

Voltage – 600V AC max./250V DC max.

Amperage

- Main Lug: 125 to 600 amp max.
- Main Breaker: 100 to 600 amp max.

Gauge Steel of Boxes/Fronts, Surface and Flush (see pgs. 11-6 & 11-7)

Dimensions in Inches (mm)		Gauge Steel		
H	W	Box	Front/Door	Type
26-74 (660-1880)	20 (508)	16 ^①	14 ^⑤	Type 1
26-74 (660-1880)	20 (508)	16 ^②	16/14 ^②	Type 3R/12
32-60 (813-1524)	20-36 (508-914)	14 ^③	14 ^③	Type 4
26-74 (660-1879)	20 (508)	14 ^④	14 ^④	Type 4X

^① 16 Gauge is Standard (14 Gauge & 12 Gauge are optional)

^② 15 Gauge Steel Can with 14 Gauge Door or Similar Approved Construction

^③ No Optional Gauge available

^④ 304SS 14 Gauge Std., 316SS 14 Gauge optional

^⑤ FAS-Latch is 14 GA only.

Screw-to-Box, Hinge-to-Box, Door-in-Door (14 GA Std./12 GA Std. or 10 GA Optional)

STB/HTB/DND with Piano Hinge (14 GA Std./12 GA Optional)

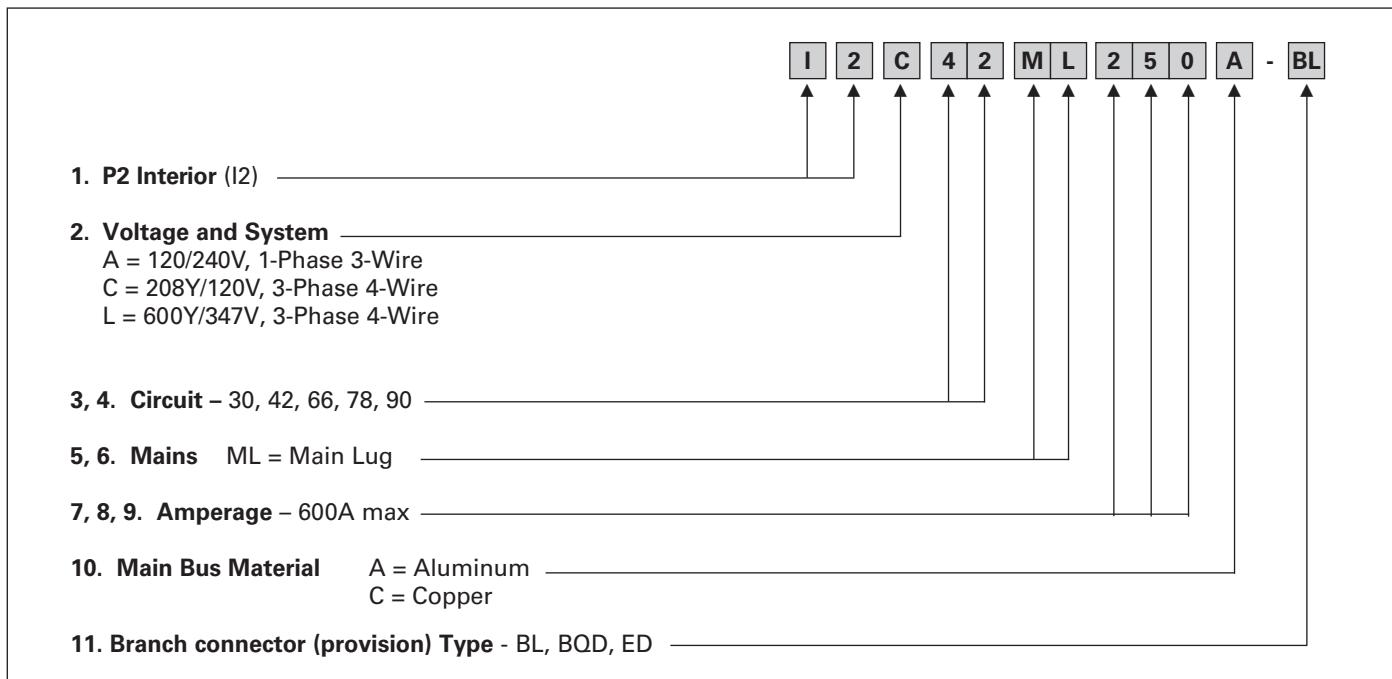
Panelboards

Distributor Stock - Type P2 Main Lug Only

Reference

Interior Numbering System

Type P2 unassembled panelboards are available as main lug only and come with provisions for the branch breaker type selected.



Branch Breakers

Panel Type	Voltage (Max.)	Breaker Type	Power Product Catalogue Page
P2	240 600/347	BL, BLH, HBL, BQD BQD6, ED6	See section 5

Panelboards

Distributor Stock - Type P2 Main Lug Only

Selection

Interior, Box and Trim Selection
600A Max. — 20" Wide x 5.75" Deep

1. Determine voltage, system, amperage and type of branch breaker connectors to select the appropriate Interior from the table below.
2. Select the type of box and trim needed.
3. List required branch circuit breakers:
 Type BL, BQD or ED breakers.

Type P2 Unassembled Panelboards

Interiors Only - Less Branch Breakers			Boxes			Trim		
Amperes Rating Mains	Max. No. of Circuits	Provision Type	Main Lug + provisions	Height - Inches (mm)	Type 1	Type 3R/12 ^①	Surface	Flush ^②

1-Phase, 3-Wire

120 / 240V

250	66 78	BL/BQD	I2A66ML250A-BL I2A78ML250A-BL	56 (1422) 62 (1575)	B56 B62	WP56 WP62	S56B S62B	F56B F62B
400	42 66	BL/BQD	I2A42ML400A-BL I2A66ML400A-BL	50 (1270) 62 (1575)	B50 B62	WP50 WP62	S50B S62B	F50B F62B

3-Phase, 4-Wire

208Y / 120V

250	42 66 78	BL/BQD	I2C42ML250A-BL I2C66ML250A-BL I2C78ML250A-BL	44 (1118) 56 (1422) 62 (1575)	B44 B56 B62	WP44 WP56 WP62	S44B S56B S62B	F44B F56B F62B
400	42 66 78 90	BL/BQD	I2C42ML400A-BL I2C66ML400A-BL I2C78ML400A-BL I2C90ML400A-BL	50 (1270) 62 (1575) 68 (1727) 74 (1880)	B50 B62 B68 B74	WP50 WP62 WP68 WP74	S50B S62B S68B S74B	F50B F62B F68B F74B
600	66	BL/BQD	I2C66ML600A-BL	62 (1575)	B62	WP62	S62B	F62B

3-Phase, 4-Wire

600Y / 347V

250	30	ED	I2L30ML250A-ED	38 (965)	B38	WP38	S38B	F38B
	42	ED	I2L42ML250A-ED	44 (1118)	B44	WP44	S44B	F44B
	66	BQD6 ED	I2L66ML250A-BQD I2L66ML250A-ED	56 (1422) 56 (1422)	B56 B56	WP56 WP56	S56B S56B	F56B F56B
	78	BQD6 ED	I2L78ML250A-BQD I2L78ML250A-ED	62 (1575) 62 (1575)	B62 B62	WP62 WP62	S62B S62B	F62B F62B
400	42	BQD6 ED	I2L42ML400A-BQD I2L42ML400A-ED	50 (1270) 50 (1270)	B50 B50	WP50 WP50	S50B S50B	F50B F50B
	66	BQD6 ED	I2L66ML400A-BQD I2L66ML400A-ED	62 (1575) 62 (1575)	B62 B62	WP62 WP62	S62B S62B	F62B F62B
	78	BQD6 ED	I2L78ML400A-BQD I2L78ML400A-ED	68 (1727) 68 (1727)	B68 B68	WP68 WP68	S68B S68B	F68B F68B
	90	BQD6 ED	I2L90ML400A-BQD I2L90ML400A-ED	74 (1880) 74 (1880)	B74 B74	WP74 WP74	S74B S74B	F74B F74B
600	66	BQD6 ED	I2L66ML600A-BQD I2L66ML600A-ED	62 (1575) 62 (1575)	B62 B62	WP62 WP62	S62B S62B	F62B F62B

Panelboards

Type P2 Panelboards

Selection/Dimensions

Standard Circuit P2 Panels

Base Box Size Requirements for P2 Panels with Standard Line Lugs. Unit Spaces range from 9" to 45" (in 6" increments). Boxes range from 26" to 74" high (in 6" increments). Inclusion of optional modifications may require size increases that must be added to these base values to calculate the final box size for the panel (see pages 6-28, 10-37). Values in brackets [], at the bottom of each column, indicate the maximum allowable 1" module branch poles for each main type.

"B" Dimen- sion Box Height	P2 Panels with Standard Line Lugs. Unit Space (starting with 9" and adding 6" increments) "A" Dimension														
	Main Lugs			Main Breakers											
	125A	250A	400A 600A	125A Horiz. BL, BQD, ED	125A Vert. ED ^①	125A Horiz. CED	225A Horiz. QR	225A Vert. QR ^①	250A Horiz. FD	250A Vert. FD ^①	250A CFD	400A JD	400A CJD	600A LD	600A CLD
26	9	—	—	9	—	—	—	—	—	—	—	—	—	—	—
32	15	9	—	15	9	9	9	—	—	—	—	—	—	—	—
38	21	15	9	21	15	15	15	9	9	—	—	—	—	—	—
44	27	21	15	27	21	21	21	15	15	9	—	—	—	—	—
50	27	27	21	33	27	27	27	21	21	15	9	—	—	—	—
56	39	27	27	39	33	33	33	27	27	21	15	15	—	9	—
62	45	39	33	45	39	39	39	33	33	27	21	21	9	15	9
68	51	45	39	51	45	45	45	39	39	33	27	27	15	21	15
74	57	51	45	57	54	54	54	45	45	39	33	33	21	27	21
	[114p]	[102p]	[90p]	[114p]	[102p]	[102p]	[90p]	[90p]	[78p]	[66p]	[66p]	[42p]	[54p]	[42p]	

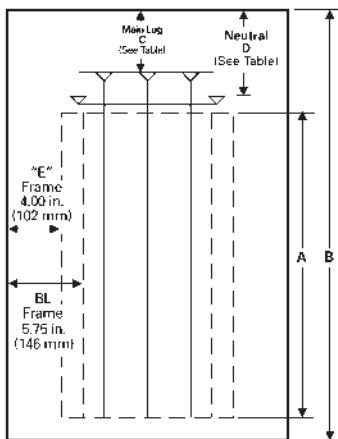
Panelboards

Type P2 Panelboards

Selection

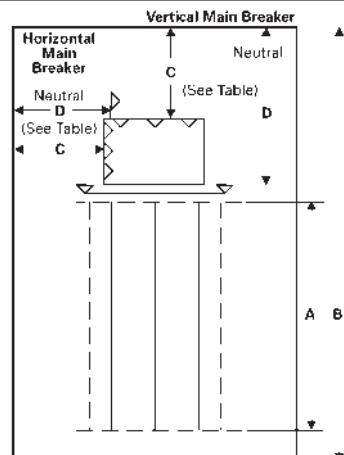
Main lug wire bending space diagram

Box depth = 5.75 in.
(146 mm)
Box width = 20 in.
(508 mm)
for 100-600A



Main breaker wire bending space diagram

Box depth = 5.75 in.
(146 mm)
Box width = 20 in.
(508 mm)
for 100-600A



Standard Circuit P2 Panels

Main Breaker Wire Bending

Panel Amps	Standard Circuits (up to 54 1" module branch poles)			
	Breaker Frames	Mounting	C ^① (Main)	D ^① (Neutral)
100	BL	Horiz.	5.75	8.00
	BQD	Horiz.	5.13	8.00
125	ED	Horiz.	4.00	8.00
	ED	Vert.	6.56	11.13
225	QR	Horiz.	5.00	7.00
	QR	Vert.	10.06	16.69
250	FD	Horiz.	5.00	7.00
	FD	Vert.	13.25	22.72
400	JD	Vert.	15.38	25.00
600	LD	Vert.	15.38	23.00 ^③

Main Lug Connectors

Standard Circuits (up to 54 1" module branch poles)

Panel Amps	Standard Connectors	C ^①	D ^①
125	(1) #14-2/0	12.62	14.19
250	(1) #6 AWG - 350 MCM	11.75	10.72
400	(1) #4 AWG - 600 MCM or (2) #6 - 250 MCM	14.00	13.09
600	(2) #4 AWG - 500 MCM	14.00	11.00

Panelboards

Type P2 Panelboards

Selection/Dimensions

Branch Breaker Side Gutters Inches (mm)

← 20" (508mm) box width reference →			20" W box	
Ref code	Breaker type or Family		Ref code	Gutter Space inches (mm)
← A →	BL, BLH, HBL	BL, BLH, HBL	← A →	= 5.750 (146)
← B →	BLF2, BLHF2, HBLF2, BLFB, BLHFB BQD, BQD6	BLF2, BLHF2, HBLF2, BLFB, BLHFB BQD, BQD6	← B →	= 5.125 (130)
	NGB, HGB, LGB NGB2, HGB2, LGB2	NGB, HGB, LGB NGB2, HGB2, LGB2		
← C →	3VA41	3VA41	← C →	= 4.625 (117)
← D →	ED4, ED6	ED4, ED6	← D →	= 4.625 (117)
	HED4, HHED6	HED4, HHED6		
← F →	QR2, QRH2, HQR2, HQR2H (Single Mounted)		← F →	= 5.000 (127)

Panelboards

Type P2 Panelboards

Selection

Main Breaker Selection^①

Ampere Rating	Breaker Type	Max. Interrupting Rating (kA)			Ref. Catalogue No.	Available Trip Values
		240V	480V	600V		
70	BQD6	65	—	—	10 B6	15, 20, 25, 30, 35, 40, 45, 50, 60, 70
100	BL	10	—	—	— BL	15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100
	HBL	65	—	—	— HB	15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100
	BQD	65	14	—	— BQ	15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100
	BLH	22	—	—	— BH	15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100
125	ED4	65	18	—	— E4	15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100, 110, 125
	ED6	100	25	14	— E6	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
225	QR2	10	—	—	— QR	100, 110, 125, 150, 175, 200, 225
	QRH2	25	—	—	— Q4	100, 110, 125, 150, 175, 200, 225
	HQR2	65	—	—	— Q5	100, 110, 125, 150, 175, 200, 225
	HQR2H	100	—	—	— Q6	100, 110, 125, 150, 175, 200, 225
250	FD6	65	35	18	FD	70, 80, 90, 100, 110, 125, 150, 175, 200, 225
	FXD6	65	35	18	FX	70, 80, 90, 100, 110, 125, 150, 175, 200, 225
	HFD6	100	65	25	HF	70, 80, 90, 100, 110, 125, 150, 175, 200, 225
	HFXD6	100	65	25	H2	70, 80, 90, 100, 110, 125, 150, 175, 200, 225
	CFD6 ^②	200	200	100	CF	70, 80, 90, 100, 110, 125, 150, 175, 200, 225
300	FD6	65	35	18	FD	70, 80, 90, 100, 110, 125, 150, 175, 200, 225, 250
	FXD6	65	35	18	FX	70, 80, 90, 100, 110, 125, 150, 175, 200, 225, 250
	HFD6	100	65	35	HF	70, 80, 90, 100, 110, 125, 150, 175, 200, 225, 250
	HFXD6	100	35	25	H2	70, 80, 90, 100, 110, 125, 150, 175, 200, 225, 250
400	JXD6 ^②	65	35	25	JX	200, 225, 250, 300, 350, 400
	JD6 ^②	65	35	35	J6	200, 225, 250, 300, 350, 400
	HJXD6 ^②	100	65	35	H6	200, 225, 250, 300, 350, 400
	HJD6 ^②	100	65	35	H5	200, 225, 250, 300, 350, 400
	SJD6 ^②	65	35	25	SJ	200, 300, 400
	SHJD6 ^②	100	65	35	S2	200, 300, 400
	CJD6 ^②	200	200	100	CJ	200, 300, 400
600	SCJD6 ^②	200	200	100	SC	200, 300, 400
	LXD6 ^②	65	35	25	LX	450, 500, 600
	LD6 ^②	65	35	25	L6	250, 300, 350, 400, 450, 500, 600
	HLXD6 ^②	100	65	35	HL	250, 300, 350, 400, 450, 500, 600
	HLD6 ^②	100	65	35	HO	250, 300, 350, 400, 450, 500, 600
	SLD6 ^②	65	35	25	SL	300, 400, 500, 600
	SHLD6 ^②	100	65	35	S6	300, 400, 500, 600
	CLD6 ^②	200	150	100	CL	300, 400, 500, 600
	SCLD6	200	150	100	C6	300, 400, 500, 600

Vertically Mounted Main Breaker (available in 2-pole or 3-pole)

Ampere Rating	Breaker Type(s)	Unit Space (in.)
100	ED4, ED6, HED4	6
225	FXD6, FD6, HFD6 QR2, QRH2, HQR2, HQR2H	6

Subfeed Breakers (available in 2-pole or 3-pole)

Breaker Type	Mounting Position When Used as Subfeed Breaker	Ampere Ratings For Load	Maximum Interrupting Rating (kA) Symmetrical		
			240V AC	480V AC	600V AC
FD6 ^② , FDX6	Twin	70–250	65	35	22
HFD6 ^② , HFXD6	Twin	70–250	100	65	25
JD6 ^② , JXD6	Single	200–250	65	35	25
HJD6 ^② , HJXD6	Single	200–250	100	65	35

^① Interchangeable trip main breakers are mounted at top of panel only.

^② Vertically mounted.

^③ Twin mounted subfeed breakers are mounted at the bottom of panelboard only and adds 24" to the panel height.

^④ Subfeed breaker is mounted at bottom of panelboard only. 250 amp subfeed breaker adds 24" to the panel height. (Only for use with MLO)

Panelboards

P2 Branch Circuit Breakers

Selection

Branch Circuit Breakers

Max. Amp Rating	Bolt-On Breaker Type	Amps	Availability			Maximum Interrupting Rating (kA)						
			1-Pole	2-Pole	3-Pole	120V AC	120/240V AC	240V AC	277V AC	480V AC	600V AC	250V DC
70	BQD6	15-70	✓	✓	✓	65	65	65	—	—	—	10
100	BL	15-60	✓	✓	✓	10	—	—	—	—	—	—
		70	✓	✓	✓	—	10	—	—	—	—	—
		80-100	—	✓	✓	—	—	10	—	—	—	—
	BLH	15-60	✓	✓	✓	—	22	—	—	—	—	—
		70	✓	✓	✓	—	22	—	—	—	—	—
		80-100	—	✓	✓	—	—	22	—	—	—	—
	HBL BLR (240V)	15-55	✓	✓	✓	—	65	—	—	—	—	—
		60-100	—	✓	✓	—	65	—	—	—	—	—
		15-60	—	✓	—	—	—	10	—	—	—	—
	BLE (GFCI)	70-100	—	✓	—	—	—	10	—	—	—	—
		15-30	✓	✓	—	10	—	—	—	—	—	—
		40-60	—	✓	—	—	10	—	—	—	—	—
125	BLEH	20-30	✓	—	—	22	—	—	—	—	—	—
		15-60	✓	✓	—	—	22	—	—	—	—	—
	BLF (GFCI)	15-30	✓	✓	—	10	—	—	—	—	—	—
		40-60	✓	✓	—	—	10	—	—	—	—	—
	BLHF (GFCI)	15-30	✓	✓	—	22	—	—	—	—	—	—
		40-60	✓	✓	—	—	22	—	—	—	—	—
	HBLF2 (GFCI)	15-30	✓	—	—	65	—	—	—	—	—	—
		15-20	✓	✓	—	10	—	—	—	—	—	—
	BAF BAFH	15-20	✓	✓	—	22	—	—	—	—	—	—
		15-60	✓	✓	✓	—	65	—	14	—	—	14
225	BQD	70-100	✓	✓	✓	—	65	—	14	—	—	14
		15-60	✓	✓	✓	—	—	65	—	14	—	—
		15-30	✓	✓	—	65	—	—	—	—	—	—
	NGB2	15-60	✓	✓	✓	100	100	100	25	25	14	14 ^④
		70-100	✓	✓	✓	100	100	100	25	25	14	14 ^④
		110-125	—	✓	✓	100	100	100	25	25	14	14 ^④
	HGB2	15-60	✓	✓	✓	100	100	100	35	35	22	14 ^④
		70-100	✓	✓	✓	100	100	100	35	35	22	14 ^④
		110-125	—	✓	✓	100	100	100	35	35	22	14 ^④
	LGB2	15-60	✓	✓	✓	100	100	100	65	65	25	14 ^④
		70-100	✓	✓	✓	100	100	100	65	65	25	14 ^③
		110-125	—	✓	✓	100	100	100	65	65	25	14 ^③
125	ED4	15-60	✓	✓	✓	65	—	—	22	—	—	—
		70-100	✓	✓	✓	—	65	—	18	—	30	—
		110-125	—	✓	✓	—	65	—	18	—	—	—
	ED6	15-60	—	✓	✓	—	—	65	—	25	18	30
		70-100	—	✓	✓	—	—	65	—	25	18	—
		110-125	—	✓	✓	—	—	65	—	25	18	—
	HED4 ^①	15-60	✓	✓	✓	—	—	65	—	42	18	30
		70-100	✓	✓	✓	—	—	65	—	42	18	—
		110-125	—	✓	✓	—	—	65	—	42	18	—
	CED6 ^④	15	—	—	✓	—	—	200	—	—	100	—
		20-125	—	✓	✓	—	—	200	—	—	100	—
225	QR2 QRH2 HQR2 HQR2H	100-225	—	✓	✓	—	—	10	—	—	—	—
		100-225	—	✓	✓	—	—	25	—	—	—	—
		100-225	—	✓	✓	—	—	65	—	—	—	—
		100-225	—	✓	✓	—	—	100	—	—	—	—

Branch Neutral Connections

Wire Range	Max. Number of Connections	Max. Amp ^②
#14-#6	26	65
#14-1/0	28	125
#6-350 kcmil	3	250
(1) #4-600 kcmil or (2) #6-250 kcmil	1	400

^① 1-Pole HED 4 15-30A Rated 65kA 35 through 100A Rated 25kA.

^② Based on 75 degree copper.

^③ 2-pole only (or) two outer poles of 3-pole breaker.

^④ CED6 breaker can be used in 400A panel with copper bussing only.

Panel enclosure required is 24" (610mm) wide.

NOTE: QR Breakers are single mounted in unit space and take 6" of unit space.

Limited to (4) per panel max. BL, HBL, BLH and BQD breakers are mounted in common mountings in 3" or (6) pole increments. ED4, ED6 and HED4 breakers are mounted in common mountings in 3" or (6) pole increments.

Panelboards

Type P2 Panelboard Modifications and Additions

Selection

Enclosure Modifications

Description
Type 1 with gasket
Type 1 with dripshield
Type 3R - Waterproof and silicone free
Type 3R/12 - Dustproof
Type 4/4X - Standard type 304 Stainless Steel
Type 4/4X - Type 316 Stainless Steel
Wider enclosure - 24", 30" or 36" wide
Hinged trim
Piano hinged trim
Trim with padlock
Door-in-door trim
Screw to the box trim
Trim with gasketed door
Stainless steel trim
Trim mounted devices (Devices mounted into a 10" minimum box extension)
• Pilot lights
• Toggle switches
• Push buttons
Painted boxes
Custom colors
Increase gauge trims and boxes
Stainless steel trims and boxes, Type 1

Meters

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

Panel Skirts

See page 10-64

Panel Bus Modifications

Bus Material

Represented by "A", "C" or "E" in the 11th digit of the catalogue number.

Standard bussing is tin plated Al, alternate bus bar material can be selected:

- Tin plated copper
- Silver plated copper - optional

Subfeed and Feed-Thru (for 2-pole or 3-pole)

Ampere Rating	Connector Cu/Al Wire Range	Unit Space (inches)
---------------	----------------------------	---------------------

Subfeed (Double) Lugs for Main Lug Panelboards Only

100/125	(2)-#12 AWG - 2/0 AWG	6
225/250	(2)-#6 AWG-350 kcmil	6
400	(4)-250 kcmil (2)-600 kcmil	6

Feed-Thru Lugs — Cannot be used in conjunction with SPD or Subfeed Breakers (200% Neutral not available)

Amp Rating	Type	Connector Wire Range
125	Al Mechanical	(1) #6 AWG - 2/0 AWG Al/Cu
	Cu Mechanical	(1) #6 AWG - 350 kcmil Cu
	Compression	(1) #6 AWG - 350 kcmil Al/Cu
250	Al Mechanical	(1) #6 AWG - 350 kcmil Al/Cu
	Cu Mechanical	(1) #6 AWG - 350 kcmil Cu
	Compression	(1) #6 AWG - 350 kcmil Al/Cu
400	Al Mechanical	(1) #2 AWG - 600 kcmil Al/Cu and (1) 1/0 AWG - 250 kcmil Al/Cu
	Cu Mechanical	(1) 1/0 AWG - 600 kcmil or (2) 1/0 AWG - 4/0 AWG
	Compression	(1) 250 kcmil - 600 kcmil Cu or (2) #6 AWG - 350 kcmil Al/Cu
600	Al Mechanical	(2) #2 AWG - 600 kcmil Al/Cu
	Cu Mechanical	(2) #2 AWG - 600 kcmil Cu
	Compression	(2) #6 AWG - 350 kcmil Al/Cu (2) 400 kcmil - 600 kcmil Al or (2) 400 kcmil - 500 kcmil Cu

Increase Capacity Neutral up to 200% (N/A on FeedThru Lugs & Subfeed Lugs)

Main Bus Amps
125
250
400
600

See page 10-37 for unit space adders and compatibility with other options.

(Devices mounted and wired to the trim should also have hinged trim specified)

Bus mounted SPD

See Section 9

TPS3 01

- Bus connected
- Internally mounted (30A breaker required to feed SPD)
- Externally mounted in a 15" high aux. enclosure (30A breaker required to feed SPD)

TPS3 09

- Internally mounted (20A breaker required to feed SPD)
- Externally mounted (20A breaker required to feed SPD)

TPS3 12

- Externally mounted (40A breaker required to feed SPD)

Service Entrance Label

Type P2 Panelboards are factory labeled "SUITABLE FOR USE AS SERVICE ENTRANCE EQUIPMENT" when identified as "Service Entrance" at the time of order entry. For regulations governing this feature, please consult CEC, CSA or local electrical authorities.

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

Shunt Trip on Main or Branch

BL, BLH, HBL, NGB, xGB2, ED6, HED4, uses 1" unit space for shunt trip. All others may be used on mains or subfeeds.

Contactor Mains or Submain*

- Asco 920 through 225 amps – adds 12" unit space as main, 15" unit space as submain
- External with manufacture supplied enclosure
- Siemens LEN through 30 amps - adds 6" as main; 18" for up to 100A submain and 21" for 200A. 7.75" depth cans for up to 100A and 10" depth cans for 200A.

Branch and Main Breaker Accessories

See breaker section of this catalog.

- Handle blocks
- Handle locks
- Aux. Contacts®
- UVR®

Panelboards

Type P2 Panelboard Standard Modifications and Additions

Selection

Box Size Additions for Optional Features

Options	Main Lugs				Main Breakers											
	125A	250A	400A	600A	125A Horiz. BL, BQD, ED, xGB	125A Horiz. CED	125A Vert. ED	225A Horiz. QR	225A Vert. QR	225A Horiz. FD	250A Vert. FD	400A Vert. CFD	400A JD	400A CJD	600A LD	600A CLD
*Min. Box Size	26"	32"	38"	38"	26"	32"	32"	32"	38"	38"	44"	50"	50"	62"	56"	62"
200% Neutral (lug type)	0	0	6 (all)	6 (all)	0	0	0	N/A	0	N/A	0	0	0	0	0	0
Std. Lugs (100% Neut. PNL)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CU Lugs (100% Neut. PNL)	6	6	6	0	N/A	N/A	0	N/A	0	N/A	0	0	0	0	0	0
Comp Lugs (100% Neut. PNL)	6	6	6	6	N/A	N/A	0	N/A	0	N/A	0	0	0	0	0	0
Feed-thru Standard Lugs	6	6	12	12	6	6	6	N/A	6	N/A	6	6	12	12	12	12
Feed-thru Cu Lugs Feed-thru	6	6	12	N/A	N/A	N/A	6	N/A	6	N/A	6	6	12	12	N/A	N/A
Comp Lugs	6	12	12	N/A	N/A	N/A	6	N/A	6	N/A	12	12	12	12	N/A	N/A
Subfeed Standard Lugs	0	6	6	N/A	—	—	—	—	—	—	—	—	N/A	—	—	—
(1) FD Subfeed (Horizontal Mtg.)	N/A	12	12	12	N/A	N/A	N/A	N/A	N/A	12	12	12	12	12	12	12
(2) FD Subfeed (Vertical Mtg.)	N/A	24	24	24	N/A	N/A	N/A	N/A	N/A	24	24	24	24	N/A	N/A	N/A
SPD	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12

NOTE: N/A = OPTION NOT AVAILABLE

*Min. Box Size, corresponding to 9" of Unit Space.

Compression Lugs

Style	Amp Rating	Breaker Type	Compression Connectors	Box Height Addition - Inches (mm)
MLO	125	N/A	(1)#6 - 350 kcmil Al/Cu	6 (152)
	250	N/A	(1)#6 - 350 kcmil Al/Cu	6 (152)
	400	N/A	(1) 400 - 600 kcmil Cu or (2)#6 - 350 kcmil Al/Cu	6 (152)
	600	N/A	(2)#6 - 350 kcmil Cu or Cu/Al or 400 - 600 kcmil Al/Cu	6 (152)
Main Breaker	100	ED4, ED6, HED4, CED6 ^①	(1)#14-2/0 AWG Cu or Al	Box must go to 24" wide on CED6 breaker only Add 6" to box height for NØ
	225	QR2, QRH2, HQR2, HQR2H	(1)#6 AWG - 350 kcmil Cu or Al	Box must go to 24" wide
	250	FXD6, HFD6, CFD6	(1)#6 AWG - 350 kcmil Cu or Al	Box must go to 24" wide for all breakers Requires an additional 6.0" box height
	400	JD6, JXD6, HJD6, CJD6, SJD6, SHJD6, SCJD6	(2)#1/0 AWG - 500 kcmil Cu or Al	9 (229)
	600	LD6, LXD6, HLD6, CJD6, SLD6, SHLD6, SCLD6	(2)#2/0 AWG - 500 kcmil Cu or Al	6 (152)

Alternate Lugs

Style	Amp Rating	Breaker Type	Standard AL Connectors	Box Height Addition - Inches (mm)
MLO	400	N/A	(1) 250 - 750 kcmil or (2)#3/0 AWG - 250 kcmil Cu or Al	6 (152)
Main Breaker	400	JD6, JXD6, HJD6, CJD6, SJD6, SHJD6, SCJD6	(1)#4/0 AWG - 750 kcmil Cu or Al	6 (152)

^① Not available for feed thru lug.

Panelboards

Embedded Micro Metering Module™ (Type P2 Panelboard)

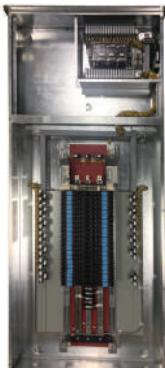
Selection

SEM3 System configured in Panelboards

The Siemens SEM3 system can be configured for factory installation in branch circuit monitoring applications. This option can lower the installation time of the system for the installer while providing a factory warrantied solution.

The SEM3 system can be factory installed in unit space in type P2 & S5 Siemens panel boards and in Siemens switchboards. Please note P1 and P3 configurations are not available at this time and the amount of unit space needed varies depending upon the application. Please note that lead time adders will apply and may vary depending upon the configuration of the system.

SEM3 for use in Siemens Panelboards



Type P2: Enclosure

- Available in a Type 1 rated enclosure.
- Minimum width & depth: 30" width x 7.75" depth
- Height: Up to 74" depending on branch breaker selection
 - Addition of monitoring on some mains (primary and subfeed) may require additional box length. In these cases the box will be increased to the next size available as a standard design. The option of monitoring on mains is not available for equipment rated for service entrance.
 - In cases where enclosure size is increased all multi-section panels will be increased to match the largest section.



Controller

SEM3 controller is mounted in a separate enclosure (relay cabinet) opposite of the feed location (i.e., bottom mount for top feed) with a height of 24". Each controller will be powered by direct tap connection to the panel section or through a 150VA potential transformer for systems above 480V. the direct tap connection will use 2 circuits from the distribution section (i.e., 42 circuits panel will have 40 circuits usable for distribution. Each controller can monitor up to 45 circuits. Applications that require monitoring more than 45 circuits will require additional P2 panel complete with SEM3.



Current Transformers (CTs)

Five sizes of CTs are available for use in the P2 panel: 50, 125, 250, 400 & 600 amp. All CTs are pre-mounted to a support bracket that attaches to the base rail of the interior of the panel board. Each bracket supports a maximum of 3 CTs and is designed for the breaker selected (brackets are not interchangeable between breaker frames). Each CT will be attached to a data module that is placed in the meter racks.



Meter Racks

All meter racks will be installed next to the SEM3 controller in the relay cabinet.

NOTE: Monitoring of 45 circuits will require: two 21 position racks and one 3 position rack

Panelboards

Embedded Micro Metering Module™ (Type P2 Panelboard)

Selection

P2 Devices

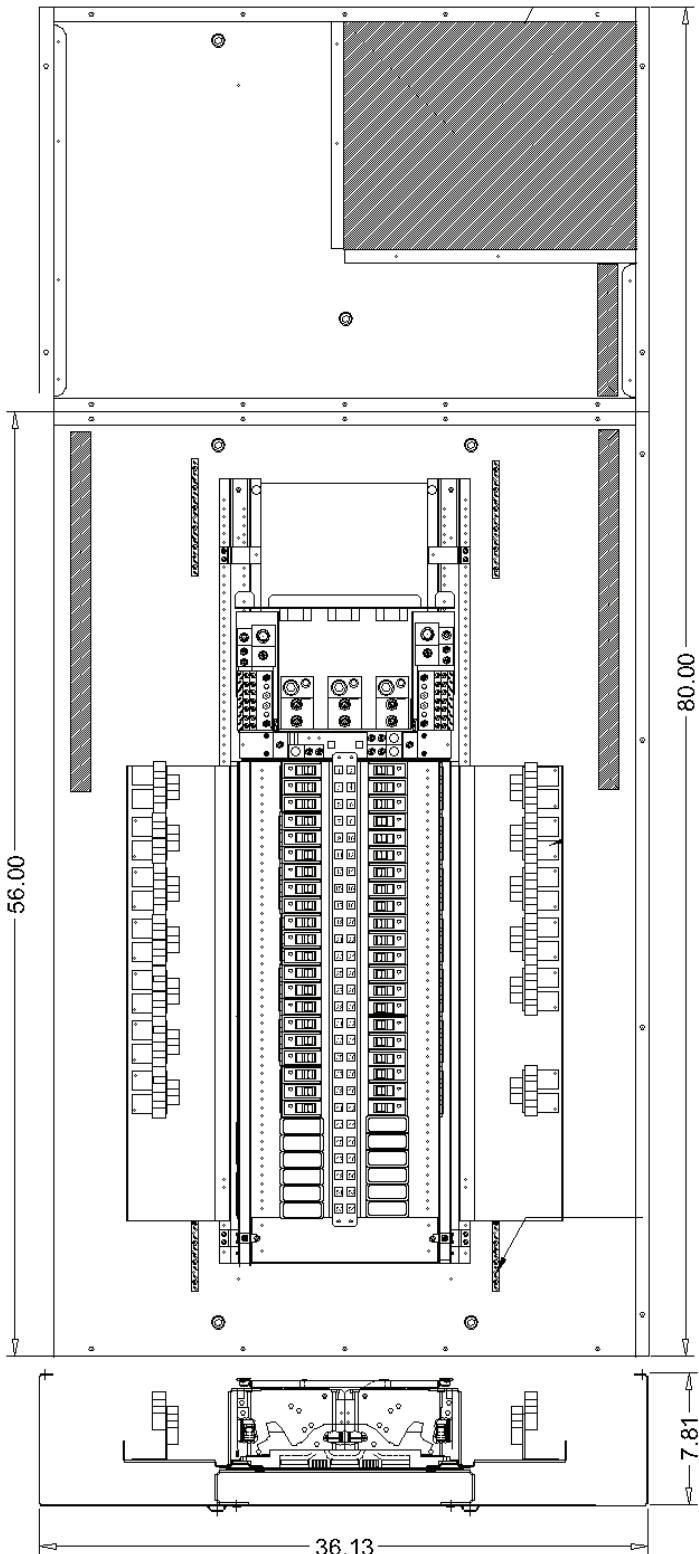
Enclosure sizes

Example P2 Panel with SEM3 Type 1 Enclosure (36" Wide x 7.75" Deep)

Enclosure heights are in 6" increments from 26" thru 74".

Enclosure heights: 26", 32", 38", 44", 50", 56", 62", 68", 74"

Example below is largest standard P2 enclosure for factory assembled panel with all small (1") branch breakers installed.



36" std. width

Relay Cabinet which includes SEM3 components:

- Meter rack
- 3 Phase PT 150VA
- Controller:
 - 21 circuits monitored: one controller and one 21-pos rack
 - 42 circuits monitored: one controller and two 21-pos racks
 - 45 circuits monitored: one controller and two 21-pos racks plus one 3-pos rack

Main Breaker / Main Lug space varies based on selected options

Unit space varies based on selected options

Note: All circuits do not have to be monitored by SEM3 - user can select any circuits in this space to be monitored.

Based on smallest branch breakers and a 3-phase main being monitored.

There is a maximum of 42 circuits that can be monitored with the configuration shown.

Some selections of main breakers and other subfeed options could limit this further.

In this situation there is 27" of unit space available - so 54 branch circuits could be monitored. If monitoring the main three additional circuits could be monitored with a total of 57 circuits.

This requires two controllers and three 21 position racks using 15" of unit space.
- see below -

Note: If subfeed space is needed - it will take away from available unit space.

Panelboards

Type P2 Panelboard Connector Modifications

Selection

Enclosure Modifications

Description
Wider enclosure - 24" wide
Type 1 with gasket
Type 1 with dripshield
Type 2 enclosures
Type 3R enclosures
Type 3R/12 enclosures

Type 4—Water Tight, Dust Tight, Steel Enclosure® (Actual NEMA-4 enclosure is larger than standard Type 1 enclosure. See chart below for reference to approximate actual size.)

Standard Box Height (in inches)	Actual NEMA 4 Enclosure Size®		
	H	W	D
32	32	20	8
38	42	30	8
44	48	36	8
56	60	36	10

NOTE: Larger Type 4 enclosures are not available.

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

Catalogue Number	Enclosure – Stainless Steel Size (inches) (304SS is standard)		
	H	W	D
B4X26	26	20	5.75
B4X32	32	20	5.75
B4X38	38	20	5.75
B4X44	44	20	5.75
B4X50	50	20	5.75
B4X56	56	20	5.75
B4X62	62	20	5.75
B4X68	68	20	5.75
B4X74	74	20	5.75

NOTE: 316SS is available as an option - must be specified.

① 16 Gauge Cans w/ 14 Gauge Front

② 14 Gauge only

③ 14 Gauge only - 304SS Std, 316SS Optional)

Gauge Steel of Boxes/Fronts, Surface and Flush

Dimensions in Inches (mm)		Gauge Steel		
Width	Height	Box	Front/Door	Type
20 (508)	26-74 (660-1880)	14	14 ^③	Type 1
20 (508)	26-74 (660-1880)	16 ^②	16/14 ^②	Type 3R/12
20-36 (508-914)	32-60 (813-1524)	14 ^③	14 ^③	Type 4
20 (508)	26-74 (660-1879)	14 ^④	14 ^④	Type 4X

② 15 Gauge Steel Can with 14 Gauge Door or Similar Approved Construction

③ No Optional Gauge available

④ 304SS 14 Gauge Std., 316SS 14 Gauge optional

⑤ Sizes do not match Standard Enclosure Sizes - See Table P1-21 - material is non-metallic - No Gauge Specified.

Panelboards

Type P2 Panelboard Kits and Accessories

Selection

Standard Enclosures

Box Height Inches	Catalogue Number				
	Type 1 Standard Trim			Type 3R	Type 3R/12 ①
Box	Surface	Flush			
26	B26	S26B	F26B	NR26	WP26
32	B32	S32B	F32B	NR32	WP32
38	B38	S38B	F38B	NR38	WP38
44	B44	S44B	F44B	NR44	WP44
50	B50	S50B	F50B	NR50	WP50
56	B56	S56B	F56B	NR56	WP56
62	B62	S62B	F62B	NR62	WP62
68	B68	S68B	F68B	NR68	WP68
74	B74	S74B	F74B	NR74	WP74

① Same as Type 3R with Gasket added for Type 12 Spec.

Options For Type 1 Trims

Items must be ordered as manual line item on Spartanburg

Hinged trim – Replace "B" suffix with "H"

Door-in-door – Replace "B" suffix with "D"

Screw to Box - Replace "B" suffix with "C"

Metal card holder - Add "M" suffix on all trims

Option For 24" Wide Enclosures with Equal Gutter on Both Sides (Excludes Type 3R)

24" wide with equal gutter on both sides - Add "24" as prefix

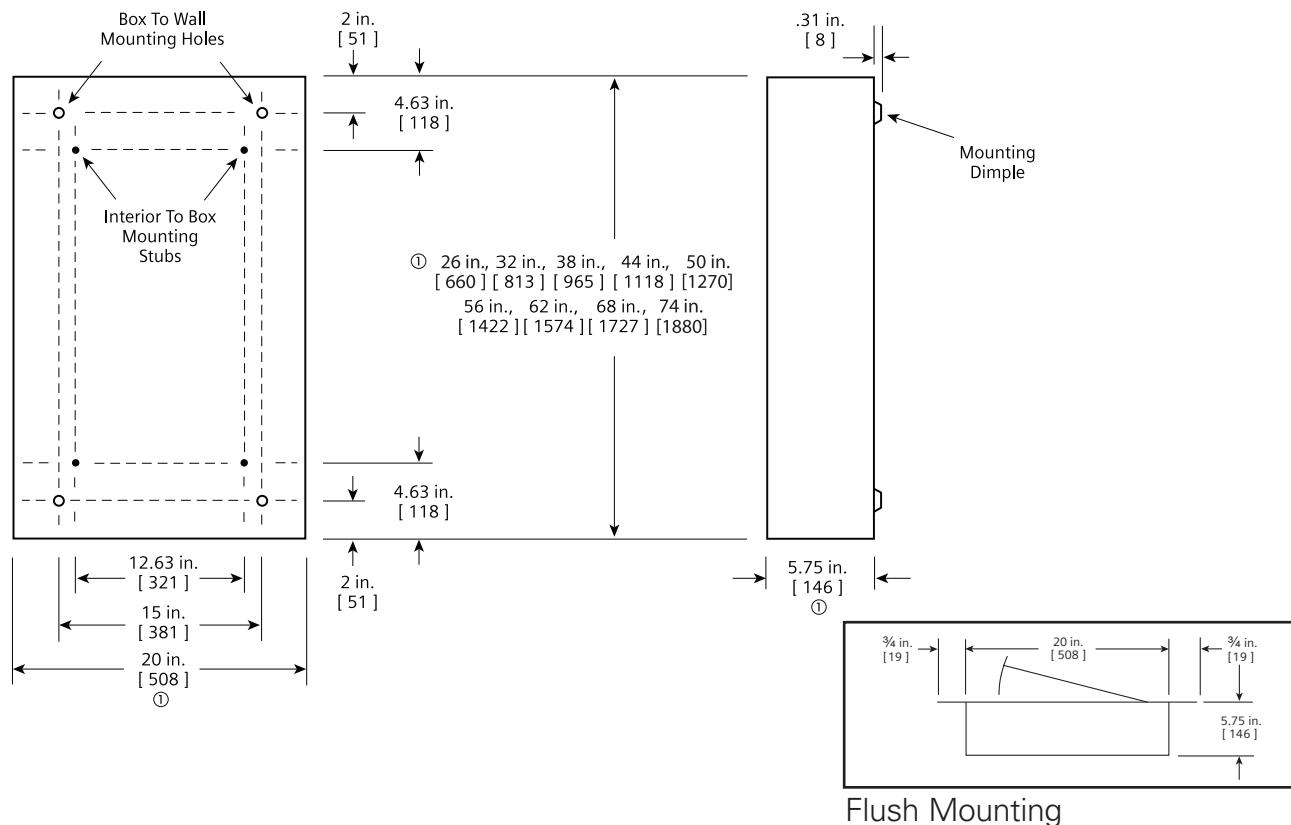
Panelboards

Type P2 Panelboards

Dimensions

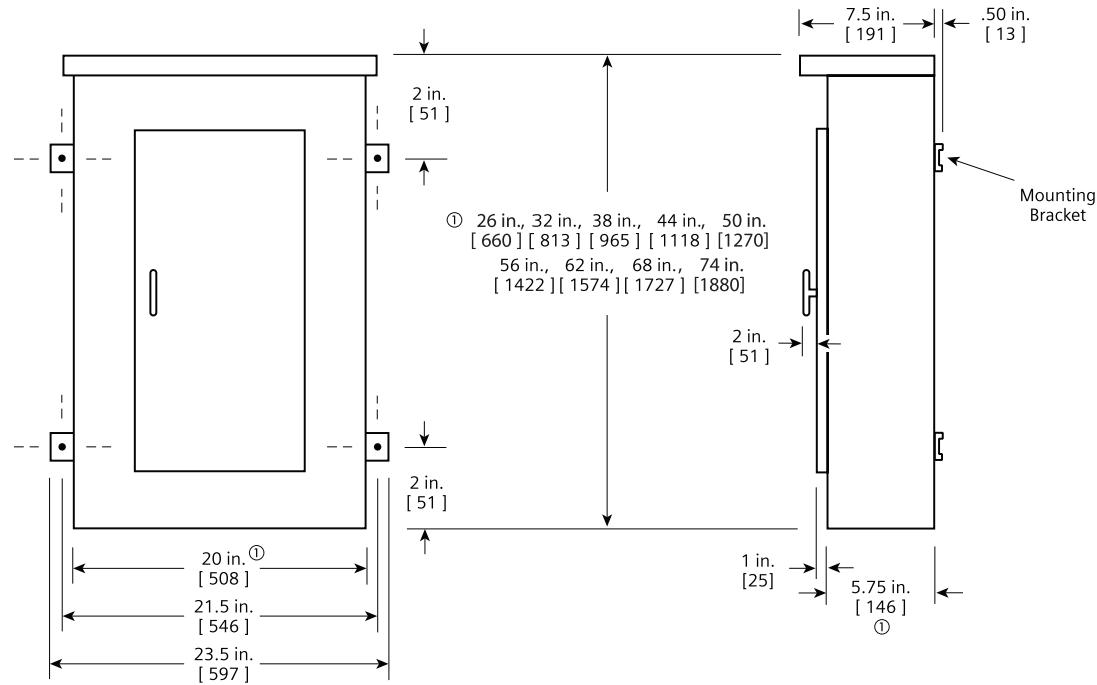
Type 1 Box

Box is symmetrical



Flush Mounting

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 [].

Panelboards

Type P3 Panelboards

General

Features

Another innovation from Siemens is the P3 panel. It is a smaller, footprint distribution panel to fit a large number of applications that require more (or larger) branch devices than the lighting panel class offer. This panel offers a wide array of factory-assembled options, and has the ability to mix breaker frames in unit space up to 250 amps. Bussing options for the P3 vary from the standard aluminum to copper designs. All bussing in the P3 panel is tin-plated as a standard. Silver-plated copper is offered as an option on a copper bus. Subfeed lugs (up to 400 amp) are just a few of the options of this unique panel.

The P3 panel configurations, defined by the unit space, allow for a given amperage, main device, and box height. The P3 panel starts with a 56" high box. Breaker unit space can be mixed and matched to meet customer requirements. All 1" pole breakers (BL, BQD, ED, xGB frames) are mounted in 3" or 6" pole increments. Breakers frames, above 125 amps, are mounted in 6" single or twin breaker mountings. As an example panel, FD 250 amp and JD 400 amp breakers are mounted as subfeed breakers outside of unit space.

Like other distribution panels, the P3 panel can have blank space added into the panel to allow for future expansions or modifications. Any expansions or modifications must be in 3" increments. BL, BQD and ED frame breakers have 3" or 6-pole kits and can be mixed in unit space by these increments.

Breakers of the same frame can cross from one mounting to another if contiguous. xGB frame breakers cannot be mixed with other frame types. Any expansion or modification must be in 3" increments also. QR frame breakers are mounted in 6" increments for two and three pole single and twin mounted units. Changes in the unit space length for BL, BQD, xGB, or ED frame breakers require an additional deadfront center strip kit. Check with sales or the factory for additional unit space kits.

Main Lug/Main Breaker

Enclosure – Standard Type 1 enclosure is 24" wide x 7.75" deep. X Box Height is determined by main device and unit space. See charts for box height.

Voltage – 600V AC max.
250V DC max.

Amperage – 800 amp max.

Short Circuit Rating –

200,000 A @ 480 Vac
100,000 A @ 600 Vac IR max.
symmetrical or equal to the lowest rated device installed unless a series rating is indicated. Panels with subfeed or feed-thru lugs without a main device, circuit breaker or fusible unit, are limited to a three-cycle rating. The three-cycle rating for the P3 panel is limited to 22 Kaic. Note that the main device may be mounted remote from the panel.

Bussing – The P3 panel has more options to meet market requirements. The standard bussing is aluminum. The rating is per the requirements of CSA C22.2 No.29 – the standard for panelboards. All aluminum bussing is tin-plated. Optional bussing for the P3 panel is copper. The copper bus option for this panel is tin-plated.

Weight – Approximate

Total panelboard weight when filled with a normal quantity of breakers and accessories is about 5 lbs. (1 kg) per inch (54g per mm) of box height.

Gauge Steel of Boxes Fronts,

Surface & Flush

Dimensions in inches (mm)		Gauge Steel	
Width	Height	Box	Front
24" (610)	56 - 80" (1422, 2032)	#14	#14

Panelboards

Type P3 Panelboards

Selection/Dimensions

Panel Unit Space To Box Height Requirements

"B" Dimension Box Height	P3 Panels With Standard Line Lugs. Unit Space (starting with 9" and adding 6" increments) "A" Dimension				
	Main Lugs			Main Breakers	
	400A	600A	800A	400A JD	600A LD
56	21	21	21	9	9
62	27	27	27	15	15
68	33	33	33	21	21
74	39	39	39	27	27
80	45	45	45	33	33

Main Lug Wire Bending

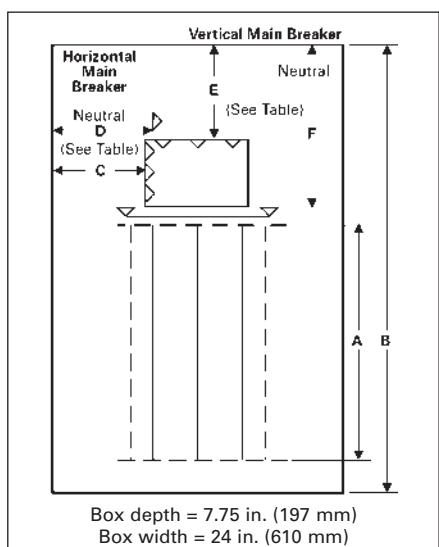
Panel Amps	Standard Connectors	C	D
400	(2) #3/0 AWG - 250 kcmil or (1) 600 kcmil	16.00	17.88
600	(2) #3/0 AWG - 500 kcmil	16.00	17.88
800	(2) 600 kcmil	16.00	17.88

Main Breaker Wire Bending - Inches (mm)

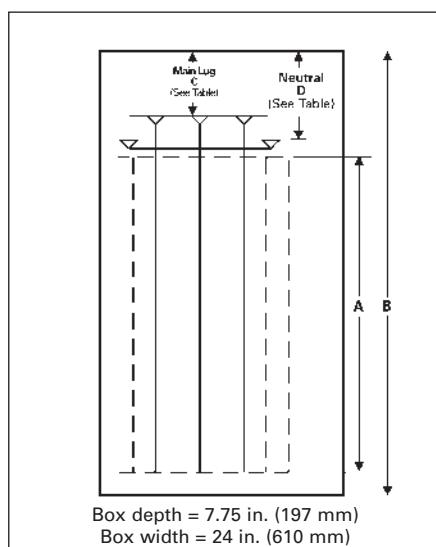
Panel Amps	C	E	F
JD	—	15.63 (397)	29.38 (746)
LD	—	14.75 (375)	29.38 (746)

① This lug is removable.

Main Breaker Wire Bending Diagram



Main Lug Wire Bending Diagram



Main Breaker Wire Bending

**Branch Breaker
Side Gutters Inches (mm)**

Reference Letter	Panel Width 24" (609)
A	7.750 (197)
B	7.125 (181)
C	6.000 (152)
D ^③	7.000 (178)
E	5.000 (127)
F	6.625 (168)

① Single branch mounting construction

Main Lug Wire Bending

Branch Breaker Wire Bending Diagram

← A →	BL, BLH, HBL BLF2, BLHF2 HBLF2, BLFB, BLHFB	BL, BLH, HBL BLF2, BLHF2 HBLF2, BLFB, BLHFB	← A →
← B →	BQD, BQD6	BQD, BQD6	← B →
← C →	ED, ED4, ED6 HED4	ED, ED4, ED6 HED4	← C →
← D/E →	QR2, QRH2 HQR2, HQR2H	QR2, QRH2 HQR2, HQR2H	← D/E →
← F →	NGB2, HGB2, LGB2	NGB2, HGB2, LGB2	← F →

← Panel Width →

24 in. (610 mm)

Panelboards

Type P3 Panelboards

Selection

Alternate Main Breakers

Ampere Rating	Breaker Type	Maximum Interrupting Rating (kA)			Ref. Catalogue Number	Available Configurations ^②			Available Trip Values
		240V	480V	600V		240V AC	480V AC	600V AC	
400	JXD6 ^①	65	35	25	JX	STD	STD	STD	200, 225, 250, 300, 350, 400
	JD6 ^①	65	35	25	J6	STD	STD	STD	200, 225, 250, 300, 350, 400
	HJXD6 ^①	100	65	35	H6	ADD	ADD	ADD	200, 225, 250, 300, 350, 400
	HJD6 ^①	100	65	35	H5	ADD	ADD	ADD	200, 225, 250, 300, 350, 400
	SJD6 ^①	65	35	25	SJ	ADD	ADD	ADD	200, 300, 400
	SHJD6 ^①	100	65	35	S2	ADD	ADD	ADD	200, 300, 400
600	LXD6 ^①	65	35	25	LX	STD	STD	STD	450, 500, 600
	LD6 ^①	65	35	25	L6	STD	STD	STD	250, 300, 350, 400, 450, 500, 600
	HLXD6 ^①	100	65	35	HL	ADD	ADD	ADD	250, 300, 350, 400, 450, 500, 600
	HLD6 ^①	100	65	35	HO	ADD	ADD	ADD	250, 300, 350, 400, 450, 500, 600
	SLD6 ^①	65	35	25	SL	ADD	ADD	ADD	300, 400, 500, 600
	SHLD6 ^①	100	65	35	S6	ADD	ADD	ADD	300, 400, 500, 600

^①Vertically mounted

^②STD = Standard configuration. ADD = Additional cost.

Panelboards

Type P3 Panelboards

Selection

Branch Circuit Breakers

Max. Amp Rating	Bolt-On Breaker Type	Amps	Provisions for Maximum Interrupting Rating (kA)						
			120V AC	120/240V AC	240V AC	277V AC	480V AC	600V AC	250V DC
70	BQD6	15-70	—	65	65	—	—	10	14
100	BL	15-60 70 80-100	10 — —	— 10 —	— — 10	— — —	— — —	— — —	— — —
	BLH	15-60 70 80-100	— — —	22 22 —	— — 22	— — —	— — —	— — —	— — —
	HBL	15-55 60-100	— —	65 —	— 65	— —	— —	— —	— —
	BLR (240V)	15-60 70-100	— —	— —	10 10	— —	— —	— —	— —
	BLE (GFCI)	15-30 40-60	10 —	— 10	— —	— —	— —	— —	— —
	BLEH (GFCI)	15-30 15-60	22 —	— 22	— —	— —	— —	— —	— —
	BLF (GFCI)	15-30 40-60	10 —	— 10	— —	— —	— —	— —	— —
	BLHF (GFCI)	15-30 40-60	22 —	— 22	— —	— —	— —	— —	— —
	HBLF2 (GFCI)	15-30	65	—	—	— —	— —	— —	— —
	BAF BAFH	15-20 15-20	10 22	— —	— —	— —	— —	— —	— —
125	BQD	15-60 70-100	— —	65 —	— 65	— —	— 14	— 14	— 14
	NGB2	15-125	100	100	100	25	25	14	14 ^④
	HGB2	15-125	100	100	100	35	35	22	14 ^④
	LGB2	15-125	100	100	100	65	65	25	14 ^④
	ED4	15-60 70-100 110-125	65 — —	— 65 65	— — —	22 18 18	— — —	— 30	— — —
	ED6	15-60 70-100 110-125	— — 100	— — —	65 65 —	— 25 —	25 18 —	18 30	— — —
	HED4	15-60 70-100 110-125	100 — —	— — —	— — —	— 65 65	— — —	— — —	— — —
225	OR2 QRH2 HQR2 HQR2H	100-225 100-225 100-225 100-225	— — — —	— 25 65 100	10 — — —	— — — —	— — — —	— — — —	— — — —

Subfeed Breakers (available in 2-pole or 3-pole)

Breaker Type	Mounting Position When Used as Subfeed Breaker	Ampere Ratings For Load	Maximum Interrupting Rating (kA) Symmetrical		
			240V AC	480V AC	600V AC
FD6 ^① , FXD6	Twin	70-250	65	35	18
HFD6 ^① , HFXD6	Twin	70-250	100	65	25
JD6 ^② , JXD6	Single	200-400	65	35	25
HJD6 ^② , HJXD6	Single	200-400	100	65	35

Neutral Connectors

Wire Range	Max. Number of Connections	Max. Amps
#14-#1/0	44	125
#4 - 350 kcmil	6	250
(1)#4 - 600 kcmil or (2)#6 - 250 kcmil	1	400

NOTE: QR Breakers are twin mounted in unit space and take 6" of unit space. Limited to (6) per panel max. BL, HBL, BLH and BQD breakers are mounted in common mountings in 3" or 4" pole increments. ED2, ED4, ED6 and HED4 breakers are mounted in common mountings in 3" or (6) pole increments.

^① Twin mounted subfeed breakers are mounted at bottom of panelboard only and adds 24" to the panel height.
^② Subfeed breaker is mounted at bottom of panelboard only. 400 amp subfeed breaker adds 30" to the panel height.

^④ 2-pole only (or) two outer poles of 3-pole breaker.

Panelboards

Type P3 Panelboard Modifications and Additions

Selection

Enclosures

Extra Gutter to Sides or Ends of the Can (Type 1 Only)

Description
6" end gutter 2" side gutter Barrier in gutter (add to extra gutter price - min 4" required)
Hinged trims Piano hinged trims Door-in-door trims Screws to the box trims
Trim mounted devices • Pilot lights • Toggle switches • Push buttons
Painted boxes Custom colours Increase gauge trims and boxes Stainless steel trims, Type 1

Meters

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

Panel Skirts

See page 10-64

Panel Bus Modifications

Represented by "A", "C" or "E" in the 11th digit of the catalogue number

Standard bussing is tin plated Al, alternate bus bar material can be selected:
• Tin plated copper
• Silver plated copper - optional

Subfeed and Feed-Thru (for 2-pole or 3-pole)

Ampere Rating	Connector Cu/Al Wire Range	Unit Space (inches)
---------------	----------------------------	---------------------

Subfeed (Double) Lugs for Main Lug Panelboards Only

225/250	(2)—#6 AWG-350 kcmil	6
400	(2)—250 kcmil (1)—600 kcmil	6

Feed-Thru Lugs — Cannot Be Used in Conjunction with SPD or Subfeed Breakers

See page <?> for unit space adders and compatibility with other options.

225/250	(1)—#6 AWG-350 kcmil	6
400	(2)—250 kcmil (1)—600 kcmil	6
600	(2)—250-500 kcmil	9
800	(2)—600 kcmil	12

Branch and Main Breaker Accessories

See page 10-44 and Breaker Section

- Handle blocks
- Handle locks
- Aux. Contacts®
- UVR®

Increase capacity neutral up to 200%

Main Bus Amps
125
250
400
600

See page 10-44 for unit space adders and compatibility with other options.

Copper MLO Only

Main Bus Amps
125
250
400
600

(Devices mounted and wired to the trim should also have hinged trim specified)

Surge Protection Device

See Section 10

Service Entrance Label

Type P3 Panelboards are factory labeled "SUITABLE FOR USE AS SERVICE ENTRANCE EQUIPMENT" when identified as "Service Entrance" at the time of order entry. For regulations governing this feature, please consult CEC, CSA or local electrical authorities.

P3 service entrance panels are available in type 1 enclosure only (indoor application) and come standard with plated copper.

Grounding of Panelboards

Ground Bars 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

Shunt Trip on Main or Branch

BL, BLH, HBL, BQD, ED4, HED4, ED6, HED6, QR2, QRH2, HQR2, HQRH2 as branch only. BL, BLH, HBL, NGB2, HGB2, LGB2, ED2, ED4, HED4, ED6, uses 1" unit space for shunt trip. All others may be used on mains or subfeeds.

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

Panelboards

Type P3 Panelboard Standard Modifications

Selection

Option Combinations

Amps	Incoming	Subfeed Lugs	Feed-thru Lugs	FDa Subfeed	JD ^① Subfeed	FD ^② Subfeed	200% Neutral	Min. Box Size (in.)	Unit Space (in)
400 ^{②③}	Main Lug Only	•	—	—	—	—	•	56	21
		—	•	—	—	—	•	56	15
		—	—	•	—	—	•	56	9
		—	—	—	•	—	•	56	9
	Main Breaker (JD)	None Std.	—	—	—	—	•	56	9
			•	—	—	—	•	62	9
			—	•	—	—	•	68	9
			—	—	•	—	•	68	9
600 ^{②③}	Main Lug Only	—	—	—	—	—	•	56	21
			•	—	—	—	•	56	15
			—	•	—	—	•	56	9
			—	—	•	—	—	56	9
	Main Breaker LD	—	—	—	—	—	•	56	9
			•	—	—	—	•	62	9
			—	•	—	—	•	68	9
			—	—	—	•	—	68	9
800 ^{②③}	Main Lug Only	—	—	—	—	—	•	56	21
			•	—	—	—	•	56	9
			—	•	—	—	•	56	9
			—	—	•	—	—	56	9
			—	—	—	•	•	62	9

① Subfed lugs are currently not offered as standard with main circuit breakers.

② Subfed lugs on panels above 400A are not standard.

③ 200% neutral cannot be provided along with a 400A subfeed breaker because the breaker blocks the 4th lug site.

Panelboards

Type P3 Panelboard Modifications and Additions

Selection

Compression Lugs

Style	Amp Rating	Breaker Type	Compression Connectors	Box Height Addition
MLO	400	N/A	(1) 250 - 500 kcmil or (2) #1/0 AWG - 250 kcmil	— —
	600	N/A	(2) #3/0 AWG - 500 kcmil	—
	800	N/A	(2) 400-750 kcmil Cu only	—
Main Breaker	400	JD6, JXD6, HJD6, SJD6, SHJD6	(2) #1/0 AWG - 500 kcmil Cu or Al	—
	600	LD6, LXD6, HLD6, SLD6, SHLD6	(2) #2/0 AWG - 500 kcmil Cu or Al	—

Alternate Lugs

Style	Amp Rating	Breaker Type	Standard AL Connectors	Box Height Addition
MLO	400	N/A	(1) 250 - 750 kcmil or (2) #3/0 AWG - 250 kcmil Cu or Al	6
	800	N/A	(3) 500 kcmil	6
	800	N/A	(4) 1/0-750 kcmil Cu or Al	6
Main Breaker	400	JD6, JXD6, HJD6, SJD6, SHJD6	(1) #4/0 AWG - 750 kcmil Cu or Al	6

Enclosure Modifications

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

Type 4X For Type P3^③

Water Tight, Dust Tight and Corrosion Resistant

(consult plant for actual enclosure size and for Type 4^② enclosures)

Box Height Inches	Enclosure – Stainless Steel		
	H	W	D
56	56	24	7.75
62	62	24	7.75
68	68	24	7.75
74	74	24	7.75
80	80	24	7.75

^① 16 Gauge Cans w/ 14 Gauge Front)

^② 14 Gauge only

^③ 14 Gauge only - 304SS Std, 316SS Optional)

Panelboards

Type P3 Panelboard Kits and Accessories

Selection

Standard Enclosures

Box Height (in.)	Catalog Number			
	Type 1 Standard Trim		Type 3R	Type 3R/12
Box	Surface	Flush		
56	24WD56	P3S56	P3F56	24NRD56
62	24WD62	P3S62	P3F62	24NRD62
68	24WD68	P3S68	P3F68	24NRD68
74	24WD74	P3S74	P3F74	24NRD74
80	24WD80	P3S80	P3F80	24NRD80
				24WPD80

Options For Type 1 Trims

Items must be ordered as manual line item on factory
 Hinged trim – Add "H" suffix
 Door-in-door – Add "D" suffix
 Metal card holder - Add "M" suffix
 Provision for padlock - Add "-PL" suffix
 Service entrance application - Add "SE" suffix

Breaker Kits and Accessories

Kit Number	Description	Contents
BBKGB32 (P2/P3)	NGB2, HGB2, LGB2 3" branch breaker kit	Kit contains top barrier, (3) A/C connectors, (1) B connector, hardware
BBKB32 (P2/P3)	BL/BQD 6-pole 3" branch breaker kit	Kit contains top barrier, (3) A/C connectors, (1) B connector, hardware
BBKNB32 (P2/P3)	NGB, 6-pole 3" branch breaker kit	Kit contains top barrier, (3) A/C connectors, (1) B connector, hardware
BBKEB32 (P3)	HEB 6-pole 3" branch breaker kit	Kit contains top barrier, (3) A/C connectors, (1) B connector, hardware
BBKED32 (P2/P3)	ED 6-pole 3" branch breaker kit	Kit contains breaker support, inter-phase barriers, (3) A/C connectors, (1) B connector, hardware
BBKQR2®	P3 twin BKR mounting kit for 1-phase/3-phase.	Kit contains all connectors and cover plates necessary to mount both 2 and 3-pole breakers
DFK1	BL, BQD, ED deadfront kit for 1" pole breakers	Center strips 3", 6", 9", 15", 21" plus mounting hardware
DFFP3	Deadfront filler 3"	3" empty space filler and hardware
DFFP6	Deadfront filler 6"	6" empty space filler and hardware
P3BK1	P3 bonding kit	Bonding strap and hardware
EBF1	HEB/NEB Filler Plate	Filler Plate
BBKQRP2FK	P3 Filler for QR. Dual mount horizontal. 1-phase/3-phase.	Kit contains all cover plates necessary to change from QJ to QR both 2 and 3-pole breakers. For 1-phase panel, both breakers must change from QJ to QR, cannot have one of each installed.

① Although QR is rated 250A, it is limited to 225A in panelboard.

Type P3 Panelboards

Miscellaneous Parts and Accessories

Catalogue Number	Description
EGK	Al Ground Bus 44 Connections
BK1	Bonding kit for 250A max. and all P1 panels
IMK1	Interior Adjusting Kit
9271-1	Directory Card Holder
NBK3	1 Numbering Button Kit "Snap-in" type 1 @ 42
NBK4	1 Numbering Button Kit "Snap-in" type 43 @ 84
NBK5	1 Numbering Button Kit "Snap-in" type 85 @ 126
NBK6	Number Strips 127-168.
NBK7	Number Strips 169-210.
NBK8	Number Strips 211-252.
ECGK	Cu Ground Bus 44 Connections
IGK	Insulated Al Ground Bus
ICGK	Insulated Cu Ground Bus
EWK2	End Wall Kit with Knockouts (24" W x 7.75" D)
DFFP1A	1" Filler Plate (Suitable for replacing QF3 in P1 thru S5 Panelboards and Switchboards)
P3BK1	P3 Bonding Kit
JCK24	24 trim screws and 24 trim clips
DFK1	BL, BQD, ED deadfront kit for 1" (include 7 different length centre strips)
12-1110-01	1 Directory card for 1-42 circuits
MCHK	1 Metallic directory card holder
FPLK2	2 Spare Fas-latch trim locks with 2 keys
DSK724	1 Dripshield 24"W x 7.75"D

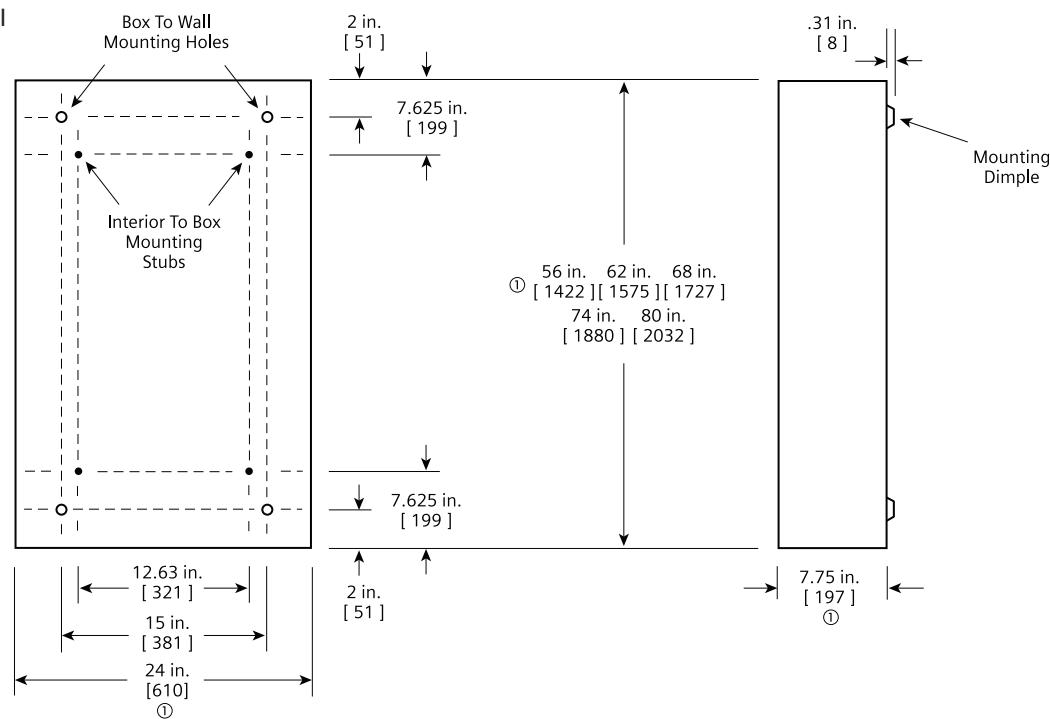
Panelboards

Type P3 Panelboards

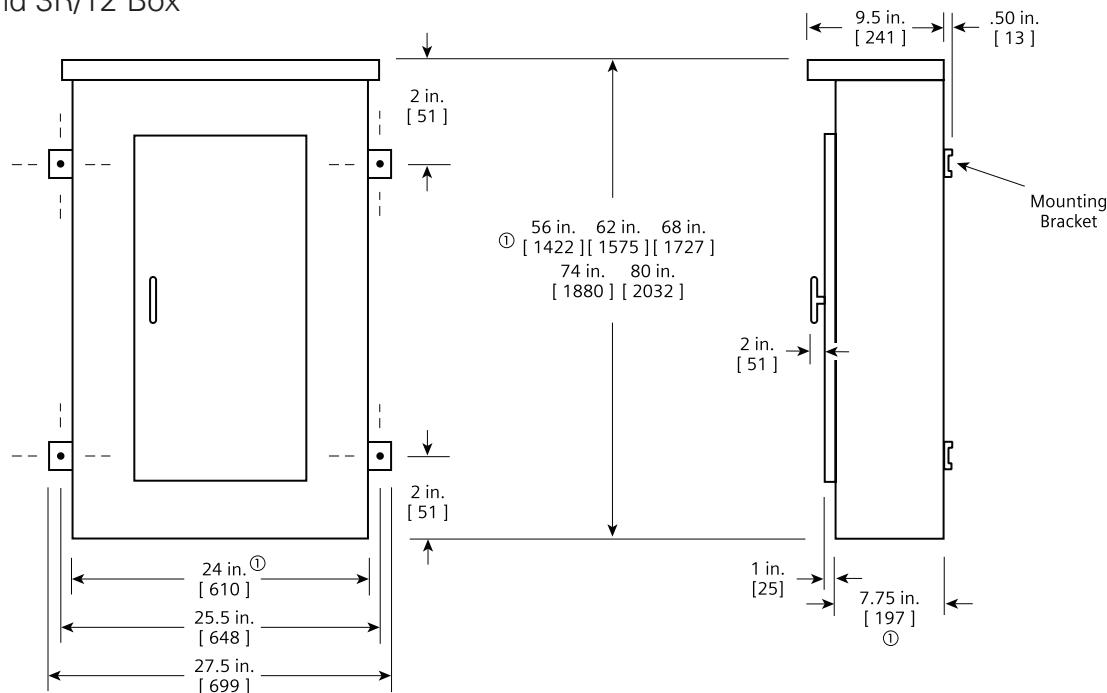
Dimensions

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 [].

Panelboards

Distribution Connector Kits (Circuit Breakers)

Reference

Max Amp Rating	Breaker Family	Branch Breaker Type	Revised P1	P2	P3	S5	F2
100	General	BL, BLH, HBL, BQD6	No kit required	BBKB32	BBKB32	6BL2C ^③	—
125	General	NGB	No kit required ^①	BBKNB32	BBKNB32	SNBD	—
	General	NGB2, HGB2, LGB2	—	BBKGB32	BBKGB32	SGB2DCAN	—
	General	HEB	—	—	BBKEB32	SEBD	—
	Sentron	ED2, ED4, ED6, HED4	—	BBKED32	BBKED32	6E62 ^{②③}	—
	Sentron	CED6	—	BBKCED32	—	6CLE2 ^②	—
150	VL	NDG, LDG	—	—	—	SDGD	—
	3VA	3VA61	—	—	—	S3VA52TDCAN ^⑤	—
225	General Purpose	QR2, QR2H, HQR2, HQR2H	—	BBKQR1	BBKQR2	6QR2CAN ^④	—
250	Sentron	FXD6, FD6, HFD6, HHFD6	—	—	—	6F62 ^②	—
	VL	NFG, LFG	—	—	—	SFGD	—
	Sentron	CFD6	—	—	—	6CLF1C	—
	3VA	3VA52, 3VA62	—	—	—	S3VA52TDCAN ^⑤	—
400	Sentron	JXD6, JD6, HJD6, HHJD6	—	—	—	6JJ62 ^②	—
	VL (Single)	NJG, LJG	—	—	—	SJG1D	—
	VL (Twin)	NJG, LJG	—	—	—	SJG2D	—
	Sentron	CJD6	—	—	—	6CLJ1C	—
600	Sentron	LXD6, LD6, HLD6, HHLD6, SLD6, SHLD6, SJD6, SHJD6	—	—	—	6LL61C	—
	Sentron	CLD6	—	—	—	6CLL1C	—
	Sentron	SCJD6, SCLD6	—	—	—	6SCL61C	—
800	Sentron	MXD6, MD6, HMD6, CMD6, SHMD6, SCMD6	—	—	—	6M61C	—
1200	Sentron	NXD6, ND6, HND6, CND6, SHND6, SCND6	—	—	—	6N61C	—

① NGB branch breakers can be installed in P1 interior ending with suffix "-NGB" only.
 ② These are aluminum connectors. If copper is required please add suffix C.

③ 3.75" plate accommodates six 1-pole breakers.
 ④ For QR filler plate only, use p/n: **6QR2FKCAN**. For copper QR kit, use p/n: **6QR2CCAN**.

⑤ To field install a single **3VA52**, **3VA61** or **3VA62** breaker to an existing strap, provision kit p/n: **S3VA52PRCAN** is required.

Panelboards

Miscellaneous accessories

Selection

Spare Parts Kits

Kit Number	Current Product				Old Product is no longer Manufactured, some kits are available				
	P1 Revised	P2	P3	C1	C2	P1 Original	S1, S2, SE	QTY/ Kit	Product Description
Strap Kits									
BBKB32		X	X				1	P2/P3 BL/BOD 100A max. Branch Strap kit Cu/Tin, uses 3 of unit space for 6 circuits total. Kit contains top barrier, (3) A/C connectors, (1) B connector, hardware.	
BBKB32AT		X	X				1	P2/P3 BL/BOD 100A max. Branch Strap kit Al/Tin, uses 3 of unit space for 6 circuits total. Kit contains top barrier, (3) A/C connectors, (1) B connector, hardware.	
BBKB32CS		X	X				1	P2/P3 BL/BOD 100A max. Branch Strap kit Cu/Silver, uses 3 of unit space for 6 circuits total. Kit contains top barrier, (3) A/C connectors, (1) B connector, hardware.	
BBKCED32		X					1	CED branch breaker kit Cu/Tin. Kit contains connector kit for P2 400A, 24 wide only	
BBKCED32CS		X					1	CED branch breaker kit Cu/Silver. Kit contains connector kit for P2 400A, 24 wide only	
BBKVA4P2P3		X	X				1	P2/P3 3VA41/xGB 125A max. Twin Mount Strap Kit, uses 3 of unit space for 6 circuits.	
BBKQR1		X					1	P2 QR 225A max. Single Mount Branch Strap Kit, 6 of unit space for one 2-p or 3-p breaker	
BBKQR2			X				1	P3 twin BKR mounting kit for 1-phase/3-phase. Kit contains all connectors and cover plates necessary to mount both 2 and 3-pole breakers	
BBKED32		X	X				1	P2/P3 ED Twin Mount Branch Strap Kit Cu/Tin, uses 3 of unit space for 6 circuits. Kit contains breaker support, inter-phase barrier, (3) A/C connectors, (1) B connector, hardware	
BBKED32AT		X					1	P2/P3 ED Twin Mount Branch Strap Kit Al/Tin, uses 3 of unit space for 6 circuits. Kit contains breaker support, inter-phase barrier, (3) A/C connectors, (1) B connector, hardware	
BBKED32CS		X					1	P2/P3 ED Twin Mount Branch Strap Kit Cu/Silver, uses 3 of unit space for 6 circuits. Kit contains breaker support, inter-phase barrier, (3) A/C connectors, (1) B connector, hardware	
BBKNB32		X	X				1	P2/P3 xGB Twin Mount Branch Strap Kit, 3 of unit space for 6 circuits. Kit contains top barrier, (3) A/C connectors, (1) B connector, hardware	
BBKGB32		X	X				1	P2/P3 GB2 Twin Mount Branch Strap Kit, 3 of unit space for 6 circuits. Kit contains top barrier, (3) A/C connectors, (1) B connector, hardware	
BBKEB32			X				1	HEB 6-pole 3 branch breaker kit, Kit contains top barrier, (3) A/C connectors, (1) B connector, hardware	
BBKQ1 (QJ is not avail. Use QR)	X						1	P2 QJ Sgl Mnt Branch Strap Kit, 6 of unit space for one 2-p or 3-p brkr	
Deadfront Parts									
NBK01A	X				X	1	Number Strips 1-60. Stick-on type; Use w/ P1 series Panels – includes 1/2 spacing numbers for BT twins. Replaces NBK03		
NBK02A	X				X	1	Number Strips 61-120. Stick-on type; Use w/ P1 series Panels – includes 1/2 spacing numbers for BT twins. Replaces NBK04-05		
NBK03A	X				X	1	Number Strips 121-240. Stick-on type; Use w/ P1 series Panels – includes 1/2 spacing numbers for BT twins. Replaces NBK06-08		
NBK3	X	X	X	X		1	Number Strips 1-42 (snap-in type, P2/P3 panels)		
NBK4	X	X	X	X		1	Number Strips 43-84 (snap-in type, P2/P3 panels)		
NBK5	X	X	X	X		1	Number Strips 85-126 (snap-in type, P2/P3 panels)		
NBK6	X	X	X	X		1	Number Strips 127-168 (snap-in type, P2/P3 panels)		
NBK7	X	X	X	X		1	Number Strips 169-210 (snap-in type, P2/P3 panels)		
NBK8	X	X	X	X		1	Number Strips 211-252 (snap-in type, P2/P3 panels)		
P1DFS250AFT	X					1	P1 250A Deadfront Support - for Feed-thru interiors only (4 per interior) Part # 11-D-3323-01 (replaces # 11-D-3212-01)		
P1DFS250ANFT	X					1	P1 250A Deadfront Support - for Non Feed-thru interiors only (4 per interior) Part # 11-D-3323-02 (replaces # 11-D-3212-02)		
P1DFS400A	X					1	P1 400A Deadfront Support (new for 3VA) - for both FT and NFT interiors. (#11-D-3315-01 replaces # 11-D-3004-01) (4 per interior)		
DFK1		X	X			1	BL, BOD, ED, xGB, xGB2, 3VA41 deadfront center strip kit for 1 pole breakers with mounting hardware. Center strips included (7 sizes) 3, 6, 9, 12, 15, 18, 21 (of branch height)		
DFK1-**		X	X			1	P2/P3 Deadfront center plate - available in 3 increments (starting with 3 and up to a max. of 57) ** represents the deadfront center length in inches.		
DFFP3		X	X			1	Deadfront filler, 3 steel blank filler plate (one each P2&P3) P2 Blank Deadfront Plate 3 / P3 Blank Cover Plate 2.97		
DFFP6		X	X			1	Deadfront filler, 6 steel blank filler plate (one each P2&P3) P2 Blank Deadfront Plate 6 / P3 Blank Cover Plate 5.97		
Filler Plates									
DFFP1A	X	X	X	X	X	X	1	DFFP1A Blank filler , 1 inch snap-in, replaced old QF3 and DFFP1 in Systems Products. Ref. old #12-1800-01 and 11-D-4554-01	
DFFP01B	X		X		X		1	P1 Main or Subfeed 250A Blank Filler Plate (use for Original or Revised P1 - also replaces DFFP01A/11-D-4560-01/12-A-1801-01) (Installs Vertical for 400A Main w/small DF opening)	
DFFP01C	X						1	P1 Main 400A Blank Filler Plate (use for Revised P1 400A with Large MB opening only)	
DFFPVPA41A	X						1	RP1 Main/Sub-feed, 3VA4/BL/BOD/ED/xGB filler (replaces DFFPED01CAN / 12-A-1802-01)	
DFFPED01CAN	X				X	5	P1 Main Filler 100-125A frames ED, BL/BOD or xGB (old filler used for Original or Revised P1 and other applications)		
DFFPF01CAN	X				X	5	FD Main Filler Plate for 1-Ph and 3-Ph P1 Panels (use for Original or Revised P1 and other applications)(P2/P3 and S1/S2/SE)		
DFFPJ01CAN	X				X	5	JD Main Filler Plate for 1-Ph and 3-Ph P1 Panels – Small MB opening (use for Original or Revised P1 & other applications)(P2/P3 & S1/S2)		
DFFPJ02	X				X	1	JD Main Filler Plate for 1-Ph and 3-Ph – for P1 Panels with Large MB Opening only.		
DFFPQJ01CAN	X				X	5	QJ Main Filler Plate for 3-Phase (3-pole) P1 Panels (use for Original or Revised P1 and other applications)		
DFFPQJ02CAN	X				X	5	QJ Main Filler Plate for 1-Phase (2-pole) P1 Panels (use for Original or Revised P1 and other applications)		
MBKQRFK	X				X	1	P1/Revised P1 Filler for 1PH/3PH QR. Horizontal Mount only.		
BBKQRP1FK		X				1	P2 Filler for QR. Horiz. or vert. mount. Contains all cover plates necessary to change from QJ to QR both 2 and 3-pole breakers.		
BBKQRP2FK			X			1	P3 Filler for QR. Dual mount horiz. Kit contains all cover plates necessary to change from QJ to QR both 2 and 3-pole breakers. For 1-phase panel, both breakers must change from QJ to QR, cannot have one of each installed.		
EBF1		X				1	EB Filler Plate		
DFP3AP01CAN		X				5	Used for filling space in a P3 dead-front when a BL, BOD, ED, xGB or 3VA41 branch breaker is installed. Can be replaced in field if lost or damaged.		

Panelboards

Miscellaneous accessories

Selection

Spare Parts Kits (cont.)

Kit Number	Current Product						Old Product is no longer Manufactured, some kits are available		
	P1 Revised	P2	P3	C1	C2	P1 Original	S1, S2, SE	QTY/Kit	Product Description
Locks, Handles, & Keys									
LPKEY01ACAN	X	X	X	X	X	X		4	Key for FAS-Latch lock Siemens FAS-Latch and other various fronts use this standard key #B363A
LPKEY01BCAN	X	X	X	X	X	X		25	Key for FAS-Latch lock Siemens FAS-Latch and other various fronts use this standard key #B363A
FPLK2	X	X	X	X	X	X		1	FAS-Latch lock with 2 keys, 14-16 gauge door - for Lighting Panel Type 1 front Replacement lock for use when door thickness is 14-16 gauge painted steel
LPLOCK02ACAN	X	X	X	X	X	X		5	Siemens FAS-Latch Replacement Lock Kit with two B363A Keys, for 12 Gauge Steel, Lighting Panel Type 1 Fronts, various styles.
LPLOCK03ACAN	X	X	X	X	X	X		5	Siemens FAS-Latch Replacement Lock Kit with two B363A Keys, for 10 Gauge Steel, Lighting Panel Type 1 Fronts, various styles.
K71-1804-01	X	X	X	X	X	X		1	T-Handle lock - for Lighting Panels Type 3R & 12 Replacement lock for use with any P1, P2, & P3 panels with Type 3R/12 enclosures.
General Hardware									
JCK24	X	X	X	X	X	X		1	J-Type speed nut - lighting panel fronts - 24 pieces per pack Replacement J-nuts for use with lighting panel fronts and deadfronts.
BNK2		X						1	P2 neutral 3-step lug - Tin-plated aluminum - 1 piece per pack with mounting hardware 14 connections for #6-1/0 wire and 12 connections for #14-#6 wire
BNK350NCAN		X	X					10	Narrow 350 KCMLI lug - Tin-plated aluminum - 1 piece per pack with mounting hardware One #6-350KCMLI connection.
LPP2NB01CAN		X						10	P2 Neutral 2-Step lug - Tin-plated aluminum - 1 piece per pack with mounting hardware Three connections for #6-1/0 wire and 18 connections for #14-#6 wire.
ECGK	X	X	X			X		1	ECGK Copper Ground Bus Kit, Connection count: (6) of #14-1/0 and (15) of #14-6 Connections (21 Holes total). Some connections allow multiple wires.
EGK	X	X	X			X		1	EGK Al/Cu Ground Bus Kit, Connection count: (6) of #14-1/0 and (15) of #14-6 Connections (21 Holes total). Some connections allow multiple wires.
ICGK	X	X	X			X		1	ICGK Insulated Copper Ground Bus Kit, Connection count: (6) of #14-1/0 and (15) of #14-6 Connections (21 Holes total). Some connections allow multiple wires.
IGK	X	X	X			X		1	IGK Insulated Al/Cu Ground Bus Kit, Connection count: (6) of #14-1/0 and (15) of #14-6 Connections (21 Holes total). Some connections allow multiple wires.
IMK1	X	X	X			X		1	Interior Mounting Kit with Adjustment Provisions for P1/P2/P3
LPDC01CAN	X	X	X	X	X	X		10	Panelboard Directory Card 9 x 4 - 8 pieces per pack Kit includes 8 cards. New cards have 1-42, 43-84, 85-126, and 127-168 circuits.
LPDC01	X	X	X	X	X	X		10	Panelboard Directory Card, 5.5X5, for 1-90 circuits.
LPDC02	X	X	X	X	X	X		10	Panelboard Directory Vinyl Pouch, 6.3x6.1.
9271-1	X	X	X	X	X	X		10	Directory Card Holder for 9 x 4
P1CONACPHCU	X							6	P1 A/C-Phase Replacement Copper Connectors, Kit of 6 pcs plus mounting hardware. Also can be used to replaced AL A/C-Phase Connectors.
P1CONBPHAL	X							6	P1 B-Phase Replacement Aluminum Connectors, Kit of 6 pcs plus mounting hardware
P1CONBPHCU	X							6	P1 B-Phase Replacement Copper Connectors, Kit of 6 pcs plus mounting hardware
P1SCRWS	X					X		42	P1 Branch breaker mounting screws - pack of 42 screws, part #11-A-1505-03, 10-32 x 0.312 Hex Washer Head Screw - Do Not Substitute
MCHK	X	X	X	X	X	X		1	Metal Card Holder Kit - Field Installable
SDKN	X	X				X		1	Dripshield kit for Standard Enclosure (20W x 5.75D)
DSK724			X					1	Dripshield 24"W x 7.75"D
Bonding Kits									
BK1A	X							1	Revised P1 Bonding Kit including Service Disconnect Label
P2BK1		X						1	P2 250A Max Horiz. MB Bonding Strap Kit
P2BK2		X						1	P2 125A max. Main Lug Bonding Strap Assembly
P2BK3		X						1	P2 250-600A MLO and all Vert MB Bonding Kit
P3BK1			X					1	P3 bonding kit 800A max MLO+MB

Panelboards

B74FLR Enclosures & Related Bottom Covers

Quick & Easy Installation Features

This "universal fit" enclosure is capable of sitting on the floor or over the conduit, eliminating the need to extend conduit or cut knockouts. If installed correctly, there will be no need for a panel skirt.

This enclosure includes two bottom endwalls: a standard and a special endwall with a cutout. The standard endwall is mounted at the bottom as usual, and the special endwall is mounted above it with two screws. By removing the standard endwall and moving the special endwall to the lower position, the enclosure can be mounted around conduit stubbed up from the floor.*

Any size P1 or P2 interior from 26" to 74" can fit in this 20" wide enclosure with the proper lower cover installed. See chart below for part numbers (See back for details).

The bottom section of the enclosure left open by all fronts (except the 74" front) will require a special lower cover installation. These are available in both surface and flush variations in six-inch increments from 6"- 48" height, to match the front "void" sizes. The chart to the right shows which lower covers are available for the interior selected.

Contractor Labor Savings

When installed to code, the labor to cut knockouts and extend conduit to the bottom endwall is eliminated.

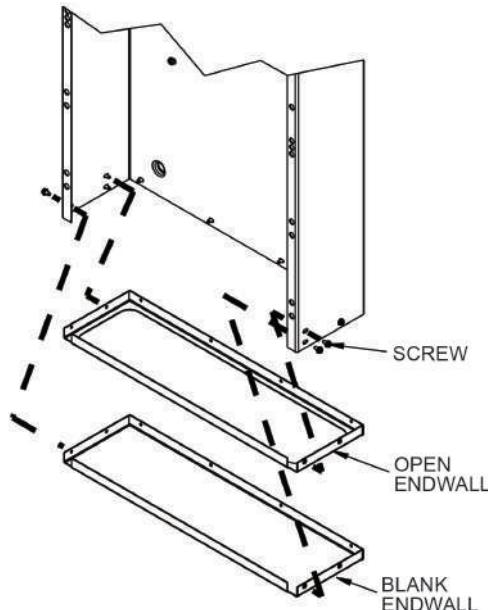
Instruction Sheets:

Enclosure: B74FLR Instructions

Lower Cover: BXXCVR Instructions

Endwall Kit: EWK3 Instructions

Enclosure Part Number: B74FLR



Standard Box Size	Standard Front Size	Required Lower Cover		
		Flush Mounted	Surface Mounted	
26" x 20"	26"	48"	BXXCVR48F	48" BXXCVR48S
32" x 20"	32"	42"	BXXCVR42F	42" BXXCVR42S
38" x 20"	38"	36"	BXXCVR36F	36" BXXCVR36S
44" x 20"	44"	30"	BXXCVR30F	30" BXXCVR30S
50" x 20"	50"	24"	BXXCVR24F	24" BXXCVR24S
56" x 20"	56"	18"	BXXCVR18F	18" BXXCVR18S
62" x 20"	62"	12"	BXXCVR12F	12" BXXCVR12S
68" x 20"	68"	6"	BXXCVR06F	6" BXXCVR06S
74" x 20"	74"	0"	None Required	0" None Required

*Contractor is required to seal and install as required per local/national codes.

Panelboards

B74FLR Enclosures & Related Bottom Covers

The enclosure to the right shows two mounting studs at the top which are used for all sizes of P1/P2 panels that fit 20" wide x 5.75" deep enclosures. There are two studs at the bottom for mounting a 74" interior (Note: Interior sizes reference the standard enclosure size needed for the interior and front). The 74" can fits the 74" interior and front without any additional covers.

As interiors get shorter in six-inch increments, lower covers are needed to fill the space below the interior and standard front. Mounting holes and hardware are provided for attaching the bottom of the base rails.

Example: A 44" interior is 30" shorter than a 74" enclosure so it will need a 30" lower cover. Pick Surface or Flush to match the front.

Fronts available to use

- Standard FasLatch Front
 - Screw-to-box front (standard & piano hinge)
- Hinge-to-box front (standard & piano hinge)
- Door-to-door front (standard & piano hinge)

Note: Although stainless steel piano hinge fronts are available, stainless steel lower covers are NOT available at this time.

Special endwall retrofit kit: EWK3

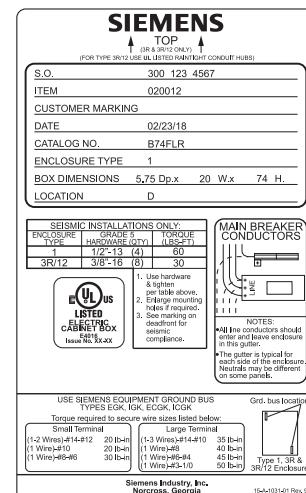
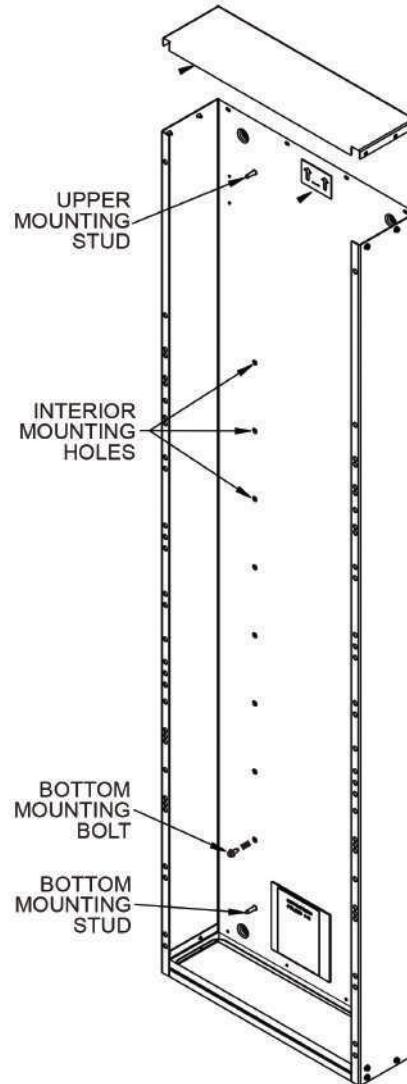
This kit includes the "open" endwall that can be used to replace a standard endwall in any 20" wide x 5.75" deep enclosure if needed for special mounting situations.

Contractor is responsible to seal and secure per local/national codes.

Note: This B74FLR Enclosure is cULus Listed as a Electric Cabinet Box and when additional gutter space is available (beyond the required minimum Enclosure size required by the Panel Interior), this additional Gutter space is considered part of the Enclosure and does not require special wiring rules that apply to a "wire way". It is not a Panel Skirt, although in some cases it can be used in place of an Enclosure plus a panel skirt when installed per local and National codes.

Think of this as you would a "Switchboard Enclosure" resting on the floor, similar wiring rules should apply to the open bottom.

Enclosure Part Number: B74FLR



Example of Label provided on each enclosure with UL/cULus marking

Panelboards

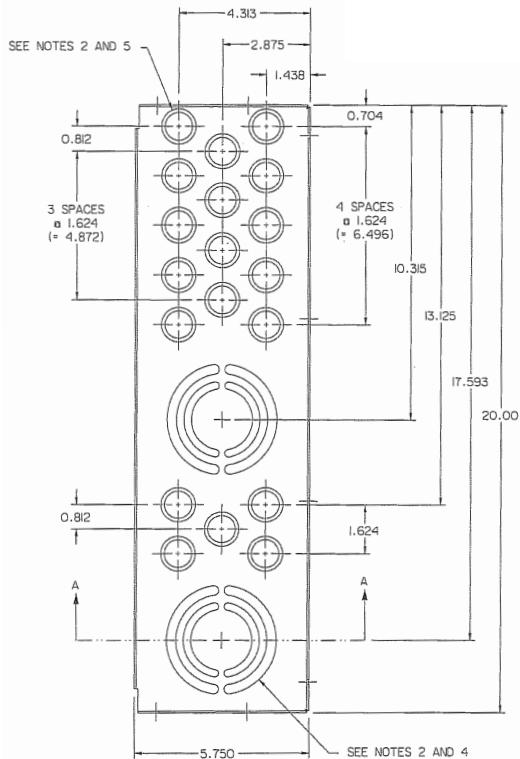
Accessories Enclosures

Miscellaneous parts and accessories-enclosures

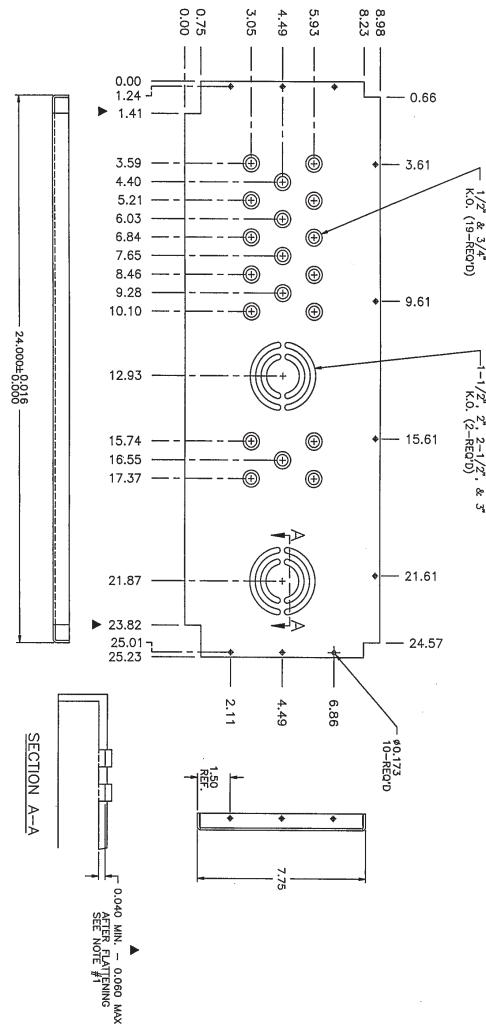
Selection

Catalog Number	Description	Comments
EWK1	End Wall Kit with Knockouts (20"W x 5.75" DP)	Type 1 Only
EWK2	End Wall Kit with Knockouts (24"W x 7.75" DP)	Type 1 Only
EWK3	End Wall Kit - open center space - ref B74FLR (20" W x 5.75" DP)	Type 1 Only

EWK1 End Wall w/KOs (20"W X 5.75"D)



EWK2 End Wall w/KOs (20"W X 5.75"D)



Panelboards

Lighting panel ground bus information: P1, P2, P3

Selection

Lighting panel ground bus information: P1-P2-P3

Catalog Number	Description	Comments
EGK	Al Ground Bus 44 Connections	Type 1, 3R, 3R/12
ECGK	Cu Ground Bus 44 Connections	Type 1, 3R, 3R/12
IGK	Insulated Al Ground Bus	Type 1, 3R, 3R/12
ICGK	Insulated Cu Ground Bus	Type 1, 3R, 3R/12

EGK / ECGK / IGK / ICGK Installation Instructions:

Ground bus to be mounted in either left or right gutter with hardware provided. Applied torque ratings shall be 45-lbs-inch for three No. 10 AWG solid copper conductors in the large holes. For all other combinations of conductors, refer to the torque rating label on the panelboard.

Note: For IGK / ICGK, insure ground bar is attached to Glastic insulator with two screws before mounting insulator to enclosure. Ground Bar mounts thru side holes oriented as shown on picture below.

Wire size range of the

EGK/ECGK/IGK/ICGK lug connections/holes:

(Note: The multiple combinations typically only apply when used as an equipment ground. If similar bar is used as a neutral bar, only one wire can be used in each hole.)

1. Connection count: (6) of #14-1/0 and (15) of #14-6 Connections (21 Holes total). (note: one Connection may be needed for incoming Ground Connection)
2. The Maximum wire size the standard ground accepts is:
1/0 in the Large Holes and #6 in the Smaller Holes.
3. Small Hole can accept:
(1-2 wires) #14-12; (1 wire) #10; (1 wire) #8-#6.
4. The Large Hole can accept:
(1-3 wires) #14-#10; (1 wire) #8; (1 wire) #6 - #4; (1 wire) #3-1/0.
5. Max. connections if largest wire size is used:
 $(6 \times 1) + (15 \times 1) = 21$
6. Max. connections if smallest wire size is used:
 $(6 \times 3) + (15 \times 2) = 48$
7. Request for Ground Lug greater than 1/0 in Size requires a Special Modification in COMPAS when Line Item is entered (specify number of connections needed greater than 1/0) or Manual Line for Custom Ground (specify number of connections needed greater than

This chart is on labels for P1, P2 and P3 enclosures.

USE SIEMENS EQUIPMENT GROUND BUS TYPES EGK, IGK, ECGK, ICGK		Grd. bus location
Torque required to secure wire sizes listed below:		
Small Terminal	Large Terminal	
(1-2 Wires)-#14-#12	20 lb-in	
(1 Wire)-#10	20 lb-in	
(1 Wire)-#8-#6	30 lb-in	
	(1-3 Wires)-#14-#10	35 lb-in
	(1 Wire)-#8	40 lb-in
	(1 Wire)-#6-#16	45 lb-in
	(1 Wire)-#3-1/0	50 lb-in

Type 1, 3R and 3R/12 Enclosure



EGK / ECGK kit parts



IGK / ICGK kit parts

Panelboards

Power and Distribution

Type S5 (SPP6)

600 Volts AC, 250 Volts DC Maximum

1200 Ampere Mains

1200 Ampere Maximum Branch

UL & CSA Short Circuit Rating —

200,000A IR Maximum

Branch Breaker Symmetrical Interrupting Capacity

Based on Underwriters' Test Procedure

Meets 1996 NEC wire bending requirement, section 373-6.

CSA - C22.2 No. 0.12

Panelboards

Listed by Underwriters' Laboratories, Inc., under "Panelboards" File #E2269 for interiors and #E4016 for boxes and fronts. Meet Federal Specification W-C375B/Gen. & CSA Certificate No. 1518681.

Service

600 Volts AC, 250 Volts DC, Maximum. 1 Phase, 3 Wire; 3 Phase, 3 Wire; or or 3 Phase, 4 Wire.

Panelboard Fronts and Doors

Standard panelboards are furnished with 4 piece trim with ventilation. Fronts are fabricated from code gauge steel and finished ASA61.

Main Breakers

All 400A and 1200A frame main breakers are mounted horizontally.

Main Lug Connectors

Ampere Rating	Connectors Range/Phase
225A - 400A	(1) #1/0-750MCM CU/AL or (2) #1/0-250MCM CU/AL
600A	(2) #1/0-750MCM CU/AL or (4) #1/0-250MCM CU/AL
800A	(3) #1/0-750MCM CU/AL or (6) #1/0-250MCM CU/AL
1200A	(4) #1/0-750MCM CU/AL or (8) #1/0-250MCM CU/AL

End Gutters

Ampere Rating	Main Lug (inches)	Main Breaker (inches)
400/600	15.967	13.0
800/1200	15.967	13.0

Boxes

38" wide, 12.75" deep (Type 1, 2)

38" wide, 14.25" deep (Type 3R/12)

Panelboard Specifications

Maximum Panel Ampere	Unit Space (MLO)	Box Height	120/240Volts 1 Phase, 3 Wire	120/208 Volts 3 Phase, 4 Wire	600 Volts 3 Phase, 3 Wire	347/600 Volts 3 Phase, 4 Wire
400A	30"	60"				
600A	45"	75"				
800A	60"	90"				
1200A	60"	90"				

Selection

Integrated Equipment Short Circuit Ratings

The term "Integrated Equipment 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 & CSA.

Series ratings must be specified on order at time of entry.

Panelboards

Power and Distribution

Selection

Main Breaker Selection

Amperage Rating	Breaker Type	Trip Type	Maximum Interrupting Rating (kA)			Available Trip Values
			240V	480V	600V	
400	JXD6	Thermal Magnetic	65	35	25	200, 225, 250, 300, 350, 400
	JD6		65	35	25	200, 225, 250, 300, 350, 400
	HJD6		100	65	35	200, 225, 250, 300, 350, 400
	HHJD6		200	100	50	200, 225, 250, 300, 350, 400
	CJD6		200	150	100	200, 225, 250, 300, 350, 400
	SJD6	Electronic (Solid State)	65	35	25	200, 300, 400
	SHJD6		100	65	35	200, 300, 400
	SCJD6		200	150	100	200, 300, 400
600	LXD6	Thermal Magnetic	65	35	25	450, 500, 600
	LD6		65	35	25	250, 300, 350, 400, 450, 500, 600
	HLD6		100	65	35	250, 300, 350, 400, 450, 500, 600
	HHLD6		200	100	50	250, 300, 350, 400, 450, 500, 600
	CLD6		200	150	100	450, 500, 600
	SLD6	Electronic (Solid State)	65	35	25	300, 400, 500, 600
	SHLD6		100	65	35	300, 400, 500, 600
	SCLD6		200	150	100	300, 400, 500, 600
800	MXD6	Thermal Magnetic	65	50	25	500, 600, 700, 800
	MD6		65	50	25	500, 600, 700, 800
	HMD6		100	65	50	500, 600, 700, 800
	CMD6		200	100	65	500, 600, 700, 800
	SMD6	Electronic (Solid State)	65	50	25	600, 700, 800
	SHMD6		100	65	50	600, 700, 800
	SCMD6		200	100	65	600, 700, 800
1200	NXD6	Thermal Magnetic	65	50	25	800, 900, 1000, 1200
	ND6		65	50	25	800, 900, 1000, 1200
	HND6		100	65	50	800, 900, 1000, 1200
	CND6		200	100	65	800, 900, 1000, 1200
	SND6		65	50	25	800, 1000, 1200
	SHND6	Electronic (Solid State)	100	65	50	800, 1000, 1200
	SCND6		200	100	65	800, 1000, 1200

Branch Breaker Side Gutter Inches (mm)

Reference Letter	Panel Width 38 Inches Dimensions in inches (mm)
A	14.00 (356)
B	13.98 (355)
C	11.62 (295)
D	10.00 (254)
E	7.61 (193)
F	8.75 (222)
G	8.25 (210)
J	11.76 (299)
K	7.92 (201)
M	13.42 (341)
N	12.00 (305)
P	14.25 (362)
Q	13.42 (341)

← A →	BL, BLH, HBL, BQD	BL, BLH, HBL, BQD
← B →	NGB2, HGB2, LGB2	NGB2, HGB2, LGB2
← D →	ED4, ED6, HED4, HHED6	ED4, ED6, HED4, HHED6
← E →	CED6	CED6
← F →	QR2, QRH2, HQR2, HQR2H	QR2, QRH2, HQR2, HQR2H
← G →	FD6, FXD6, HFD6, HHFD6	FD6, FXD6, HFD6, HHFD6
← AA →	3VA52 (MFAS, HFAS, CFAS)	3VA52 (MFAS, HFAS, CFAS)
← AB →	3VA61 (MDAE, HDAE, CDAE, LDAE)	3VA61 (MDAE, HDAE, CDAE, LDAE)
← AC →	3VA62 (MFAE, HFAE, CFAE, LFAE)	3VA62 (MFAE, HFAE, CFAE, LFAE)
← J →	CFD	
← K →	JD6, JXD6, HJD6, HHJD6	JD6, JXD6, HJD6, HHJD6
← M →	SJD6, SHJD6, LD6, LXD6, HLD6, HHLD6, SLD6, SHLD6	
← N →	CJD6, SCJD6, CLD6, SCLD6	
← P →	MXD6, MD6, HMD6, CMD6, NXD6, ND6, HND6, CND6	
← Q →	SMD6, SHMD6, SCMD6, SND6, SHND6, SCND6	

Panelboards

Power and Distribution

Selection

Branch Circuit Breaker Selection^①

Breaker Frame Rating	Trip Type	Breaker Type	Poles	Trip Amperage	Mounting Height Inches (mm)			Max IC Rating (kA)		
					Single	Twin	Gutter ^③	240V	480V	600V
100	Thermal Magnetic	BL	1, 2, 3	15, 20, 25, 30, 40, 50, 60, 70, 80, 90, 100	—	3.75 (95) ^{②③}	14 (356)	10	—	—
		BLH	1, 2, 3	15, 20, 25, 30, 40, 50, 60, 70, 80, 90, 100	—	3.75 (95) ^{②③}	14 (356)	22	—	—
		HBL	1, 2, 3	15, 20, 25, 30, 40, 50, 60, 70, 80, 90, 100	—	3.75 (95) ^{②③}	14 (356)	65	—	—
		BQD6 ^④	1, 2, 3	15, 20, 30, 40, 50, 60, 70	—	3.75 (95) ^{②③}	14 (356)	65	—	10
	Ground Fault Circuit Interrupter	BLE (GFCI)	1, 2	15, 20, 30, 40, 50, 60	—	3.75 (95) ^②	14 (356)	10	—	—
		BLF (GFCI)	1, 2	15, 20, 30, 40, 50, 60	—	3.75 (95) ^②	14 (356)	10	—	—
		BLHF (GFCI)	1, 2	15, 20, 30, 40, 50, 60	—	3.75 (95) ^②	14 (356)	22	—	—
	Arc Fault Circuit Interrupter	BAF (AFCI)	1	15, 20	—	3.75 (95) ^②	14 (356)	10	—	—
		BAFH (AFCI)	1	15, 20	—	3.75 (95) ^②	14 (356)	22	—	—
125	Thermal Magnetic	ED2	1, 2, 3	15, 20, 30, 40, 50, 60, 70, 80, 90, 100	3.75 (95) ^{②③}	3.75 (95) ^{②③}	10 (254)	10	—	—
		ED4	1, 2, 3	15, 20, 30, 35, 40, 50, 60, 70, 80, 90, 100, 110, 125	3.75 (95) ^{②③}	3.75 (95) ^{②③}	10 (254)	65	18	—
		ED6	1, 2, 3	15, 20, 30, 35, 40, 50, 60, 70, 80, 90, 100, 110, 125	3.75 (95) ^{②③}	3.75 (95) ^{②③}	10 (254)	100	18	18
		HED4	1, 2, 3	15, 20, 30, 35, 40, 50, 60, 70, 80, 90, 100, 110, 125	3.75 (95) ^{②③}	3.75 (95) ^{②③}	10 (254)	100	65	30
		CED6	2, 3	15, 20, 30, 35, 40, 50, 60, 70, 80, 90, 100, 110, 125	3.75 (95) ^③	3.75 (95) ^③	7.61 (193)	200	200	100
		NGB2	1, 2, 3	15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100, 110, 125	3.75 (95) ^{②③}	3.75 (95) ^{②③}	13.98 (355)	100	25	14
		HGB2	1, 2, 3	15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100, 110, 125	3.75 (95) ^{②③}	3.75 (95) ^{②③}	13.98 (355)	100	35	22
		LGB2	1, 2, 3	15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100, 110, 125	3.75 (95) ^{②③}	3.75 (95) ^{②③}	13.98 (355)	100	65	25
		3VA41 (SEAB)	1, 2, 3	15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100, 110, 125	3.75 (95)	3.75 (95)	13.98 (355)	65	25	14
		3VA41 (MEAB)	1, 2, 3	15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100, 110, 125	3.75 (95)	3.75 (95)	13.98 (355)	85	35	18
		3VA41 (HEAB)	1, 2, 3	15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100, 110, 125	3.75 (95)	3.75 (95)	13.98 (355)	150	65	25
150	Electronic (Solid State)	3VA61 (MDAE)	3	40, 100, 150	5 (127)	5 (127)	9.59 (244)	100	35	18
		3VA61 (HDAE)	3	40, 100, 150	5 (127)	5 (127)	9.59 (244)	100	65	22
		3VA61 (CDAE)	3	40, 100, 150	5 (127)	5 (127)	9.59 (244)	200	100	35
		3VA61 (LDAE)	3	40, 100, 150	5 (127)	5 (127)	9.59 (244)	200	150	50
225	Thermal Magnetic	QR2	2, 3	100, 110, 125, 150, 175, 200, 225	5 (127)	5 (127)	8.75 (222)	10	—	—
		ORH2	2, 3	100, 110, 125, 150, 175, 200, 225	5 (127)	5 (127)	8.75 (222)	25	—	—
		HQR2	2, 3	100, 110, 125, 150, 175, 200, 225	5 (127)	5 (127)	8.75 (222)	65	—	—
		HQR2H	2, 3	100, 110, 125, 150, 175, 200, 225	5 (127)	5 (127)	8.75 (222)	100	—	—
250	Thermal Magnetic	FXD6, FD6	2, 3	70, 80, 90, 100, 110, 125, 150, 175, 200, 225, 250	5 (127)	5 (127)	8.25 (210)	65	35	22
		HFD6	2, 3	70, 80, 90, 100, 110, 125, 150, 175, 200, 225, 250	5 (127)	5 (127)	8.25 (210)	100	65	25
		CFD6	2, 3	70, 80, 90, 100, 110, 125, 150, 175, 200, 225, 250	—	5 (127)	11.76 (299)	200	200	100
		3VA52 (MFAS)	2, 3	40, 45, 50, 60, 70, 80, 90, 100, 110, 125, 150, 175, 200, 225, 250	5 (127)	5 (127)	10.10 (257)	85	35	18
		3VA52 (HFAS)	2, 3	40, 45, 50, 60, 70, 80, 90, 100, 110, 125, 150, 175, 200, 225, 250	5 (127)	5 (127)	10.10 (257)	100	65	25
		3VA52 (CFAS)	2, 3	40, 45, 50, 60, 70, 80, 90, 100, 110, 125, 150, 175, 200, 225, 250	5 (127)	5 (127)	10.10 (257)	200	100	35
	Electronic (Solid State)	3VA62 (MFAE)	3	100, 250	5 (127)	5 (127)	9.59 (244)	100	35	18
		3VA62 (HFAE)	3	100, 250	5 (127)	5 (127)	9.59 (244)	100	65	22
		3VA62 (CFAE)	3	100, 250	5 (127)	5 (127)	9.59 (244)	200	100	35
		3VA62 (LFAE)	3	100, 250	5 (127)	5 (127)	9.59 (244)	200	150	50
400	Thermal Magnetic	JXD6, JD6	2, 3	200, 225, 250, 300, 350, 400	8.75 (222)	8.75 (222)	7.92 (201)	65	35	25
		HJD6	2, 3	200, 225, 250, 300, 350, 400	8.75 (222)	8.75 (222)	7.92 (201)	100	65	35
		HJJ6D	2, 3	200, 225, 250, 300, 350, 400	8.75 (222)	8.75 (222)	7.92 (201)	200	100	50
		CJD6	2, 3	200, 225, 250, 300, 350, 400	8.75 (222)	—	12 (305)	200	150	100
	Electronic (Solid State)	SJD6	3	200, 300, 400	8.75 (222)	—	13.42 (341)	65	35	25
		SHJD6	3	200, 300, 400	8.75 (222)	—	13.42 (341)	100	65	35
		SCJD6	3	200, 300, 400	8.75 (222)	—	12 (305)	200	150	100
		NJG	3	250, 400	6.25 (159)	6.25 (159)	8 (203)	65	35	25
600	Thermal Magnetic	LXD6	2, 3	450, 500, 600	8.75 (222)	—	13.42 (341)	65	35	25
		LD6	2, 3	250, 300, 350, 400, 450, 500, 600	8.75 (222)	—	13.42 (341)	65	35	25
		HLD6	2, 3	250, 300, 350, 400, 450, 500, 600	8.75 (222)	—	13.42 (341)	100	65	35
		HHLD6	2, 3	250, 300, 350, 400, 450, 500, 600	8.75 (222)	—	13.42 (341)	200	100	50
		CLD6	2, 3	450, 500, 600	8.75 (222)	—	12 (305)	200	150	100
	Electronic (Solid State)	SLD6	3	300, 400, 500, 600	8.75 (222)	—	13.42 (341)	65	35	25
		SHLD6	3	300, 400, 500, 600	8.75 (222)	—	13.42 (341)	100	65	35
		SCLD6	3	300, 400, 500, 600	8.75 (222)	—	12 (305)	200	150	100
800	Thermal Magnetic	MXD6	2, 3	500, 600, 700, 800	10 (254)	—	13 (330)	65	50	25
		MD6	2, 3	500, 600, 700, 800	10 (254)	—	13 (330)	65	50	25
		HMD6	2, 3	500, 600, 700, 800	10 (254)	—	13 (330)	100	65	50
	Electronic (Solid State)	CMD6	2, 3	500, 600, 700, 800	10 (254)	—	13 (330)	200	100	65
		SMD6	3	600, 700, 800	10 (254)	—	12 (305)	65	50	25
		SHMD6	3	600, 700, 800	10 (254)	—	12 (305)	100	65	50
1200	Thermal Magnetic	NXD6	2, 3	800, 900, 1000, 1200	10 (254)	—	13 (330)	65	50	25
		ND6	2, 3	800, 900, 1000, 1200	10 (254)	—	13 (330)	65	50	25
	Electronic (Solid State)	HND6	2, 3	800, 900, 1000, 1200	10 (254)	—	13 (330)	100	65	50
		CND6	2, 3	800, 900, 1000, 1200	10 (254)	—	13 (330)	200	100	65

^① Space includes housing frame plate with blank cover plate. Provision includes all necessary mounting hardware, less circuit breaker, and includes housing frame cover plate with breaker handle opening.

^② 1 to 6 poles may be mounted in 3.75" (95) of unit space
^③ Accessories such as shunt trips on three pole breakers require 6.25" (159) of unit space.
^④ Also 10kA at 600Y/347 Volts.

^⑤ Refer to Table 5 for layout dimensions.

Panelboards

Modifications and Additions

Selection

Type S5

When required, special constructions or additions to standard panelboards may be specified for all **factory-assembled** Power and Distribution Panelboards. Below and on the next page are listed many of those available for Type S5 panelboards. In no case do these apply to **Narrow** (Column) Width Lighting Panelboards or **Unassembled** Panelboards.

1. Miscellaneous

ENCLOSURE TYPE	
Type1	
Type 2 (Drip-proof)	
Type 3R	
Type 12	

2. Painted Finish

Touch-Up Paint (ASA61, Light Gray) 12 oz. aerosol can, Catalog Number TUP61

3. Miscellaneous Accessories

Nameplate — laminated, engraved Tamper-Resistant Screws

4. Devices Mounted on Gutter Cover — Includes Device, Mounting — Wired or Unwired

Toggle Switch — SPST or 3-way; 15A
Pilot Light — General Purpose, Neon or Incandescent
Pushbutton

5. Feed-Thru Lugs^① (One Set Per Panel)

Ampere Rating	Unit Space (Additional inches)		MLO
	3-Pole	2-Pole	
400		10	
600		10	
800	Consult Sales	17.5	
1200		17.5	

6. MLO Compression Lugs —

Available as main lugs and neutral lug.

Ampere Rating	Aluminum (Specify Size)	Copper (Specify Size)	Deduct From Available Unit Space (inches)
400	Consult Sales	Consult Sales	5
600			5
800			5
1200			5

7. Grounding of Panelboards^②

Non-Insulated Equipment Ground Bus
Including Ground Lug
Insulated Equipment Ground Bus
Including Ground Lug

8. Remote Control Switches^{③④}

600V AC Ampere Rating	ASCO 920 Mechanically Held ^{⑤⑥}		Siemens CLH Electrically Held ^⑦	
	2-Pole	3-Pole	2-Pole	3-Pole
30				
60				
75				
100				
150 ^⑧				
200 ^⑨				
225				

9. Increased Capacity Neutral

Ampere Rating Phase	Unit Space (inches)	
	Neutral	Unit Space (inches)
400	600	None
400	800	None
600	1200	None
800	1200	None

10. Circuit Breaker Accessories

Handle Blocking Device Blocks handle in either the "ON" or "OFF" position. Available for:

Breaker Type	Cat. Number
BL, BLH, HBL, BQ, BQH, HBO	ECQL1
All BQD, GB	BQDHB
All QR	HPLQR
All BQD, NGB, NGB2, HGB2, LGB2	BQDPLD
All ED	E2HBL
All FD	FD6HB1
All JD, LD	JD6HBL
All MD, ND, PD	MN6BL
3VA52/61/62	3VA93780LB10

^①For use on main lug, main breaker or main switch panels without subfeed breakers.
^②Ground bar not installed in box.
^③For short circuit ratings with remote control switches, consult sales office.
^④Available in 90" high enclosure only. Unit space is 42 1/2" with Test and Monitor Panel; 45" without Test and Monitor Panel.

^⑤Not available on Sensitrip IV.
^⑥For required unit space — consult local sales office.
^⑦Price does not include control power transformer.
^⑧Price 600 Volt 7 1/2" high units.
Mounting height increases to 6.25" when shunt trip is required.
^⑨Shunt Trip on 100A frame breakers increases mounting height to 6.25" for twin mounting.

Padlocking Device — Padlocks in "OFF" position. Available for:

Breaker Type	Cat. Number
BQ, BQH, BL, BLH, HBL	ECQLD3
One Pole BL, BLF, BE, BAF	ECPLD1
Two-Pole BL, BLF, BE	ECPLD2
All QR	HPLQR
All BQD, NGB, NGB2, HGB2, LGB2	BQDPLD
All ED	ED2HPL
All FD	FD6PL1
All JD, LD	JD6HPL
All MD, ND, PD	MN6PLD
3VA41	3VA90380LB11
3VA52/61/62	3VA91380LB11

11. Ground Fault Sensing Relay Kit^⑩ Equipment Protection (30 mA)

For Use with Breaker Types	Number of Poles	Description
ED4, ED6, HED4	1, 2, 3	Basic kit Basic kit with bell alarm

12. Main Bus

Standard main bus and ground bus are tin plated aluminum. For copper main bus, neutral bus and ground bus change prefix 'A' to 'C' on catalog number and contact your sales office for pricing.

13. Copper Lugs — For Main Lug Only Panels

Standard main lugs and neutral lugs are tin plated aluminum, UL & CSA listed for use with aluminum/copper cables. For copper lugs in the mains and neutral for use with copper cables only, contact sales.

14. Shunt Trip on Main^{⑪⑫⑬⑭} and Branches

Description	Cat. Number
"BL, BQD6 (branch only) QR2, QRH2, HQR2, HQR2H, ED2, ED4, HED4 (branch only) All others through 1200A"	See breaker portion of this catalogue

15. Sentron TPS (TVSS Modules)

100kA, 150kA, 200kA, 250kA, 300kA Options Surge Counter Remote Indicator

16. Customer Metering

Siemens Digital Metering with Remote Display SEM3 Embedded Metering

^⑩Not CSA approved.

Panelboards

Modifications and Additions Replacements for Circuit Breakers

Selection

Replacement Connecting Strap Guide

The following table may be used to obtain the proper connector kit by measuring the exterior dimensions of the panel. Every attempt has been made to make this table complete and accurate. The table is based on panels produced by ITE, Bulldog and Siemens from 1958 to present. Should any questions arise please contact your Siemens sales office for replacements.

Panelboard				
Tub Width	Depth	Panel Type	Replacement Max Amps	Note
30" - 36" - 42"	9"	OLD CDP	400	MCCB only.
	9.75"	OLD CDP	600	MCCB only.
32" - 38"	13.75"	CDP/VB6	1200A	MCCB series 6 connectors
			600A	"VB" style units only (*)
38"	12.75"	SPP/FPP6	1200A	MCCB series 6 connectors
			600A	"VK" or "VB" style (*)

* If switch unit width is 17" it is a vacubreak. If switch unit width is 23" or 28" it is a "VK" switch.

Connecting Strap For Use With SPP/FPP, S5^③

Max Amp Rating	Breaker Family	Breaker Type	Catalogue Number	Unit Height	Mounting
100	General	BO, BQH, HB BL, BLH, HBL, BQD6	6BL2C ^{②④}	3.75" (95)	Twin
125	General	NGB2, HGB2, LGB2	SGB2DCAN	3.75" (95)	Twin
	Sentron	ED2, ED4, ED6, HED4	6E62 ^{①②}	3.75" (95)	
		CED6	6CLE2 ^①	3.75" (95)	
	3VA	3VA41	S3VA41TDCAN	3.75" (95)	Twin
150	3VA	3VA61	S3VA52TDCAN ^⑤	7.50" (191)	Twin, High Density
225	General Purpose	QR2, QR2H, HQR2, HQR2H	6QR2CAN ^④	5" (127)	Twin
250	Sentron	FXD6, FD6, HFD6, HHFD6	6F62 ^①	5" (127)	Twin
	VL	NFG, LFG	SFGD	5" (127)	
	Sentron	CFD6	6CLF1C	5" (127)	Single
	3VA	3VA52, 3VA62	S3VA52TDCAN ^⑤	5" (127)	Twin
400	Sentron	JXD6, JD6, HJD6, HHJD6	6JJ62 ^①	8.75" (222)	Twin
	Sentron	CJD6	6CLJ1C	8.75" (222)	Single
600	Sentron	LXD6, LD6, HLD6, HHLD6, SLD6, SHLD6, SJD6, SHJD6	6LL61C	8.75" (222)	Single
		CLD6	6CLL1C	8.75" (222)	
		SCJD6, SCLD6	6SCL61C	8.75" (222)	
800	Sentron	MXD6, MD6, HMD6, CMD6, SHMD6, SCMD6, SJD6, SHJD6, SCJD6, SCLD6	6M61C	10" (254)	Single
1200	Sentron	NXD6, ND6, HND6, CND6, SHND6, SCND6	6N61C	10" (254)	Single

3VA Breaker Provision Kits

Breaker Type	Cat. Number	Description
3VA52, 3VA61 or 3VA62 Breaker	S3VA52PRCAN	Contains the necessary hardware to land breaker on an existing scrap kit

Blank Filler Plates (No Breaker Cutout)

For use with Series 6 CDP Panelboards, S5, F2, SMP, FCI and FCII Switchboards.	
Height	SPP/FPP/CDP/VB 6
1.25"	6FPB01
2.50"	6FPB02
3.75"	6FPB03
5.00"	6FPB05
10.00"	6FPB10
15.00"	6FPB15

Connecting Strap Kits and Front-Filler Plates^① For use with NDP-CDP-7, S3

Breakers	Catalogue Number
BQD6 (S3 only)	7 BQD6-2
BL, BLH, HBL,	7 BL-2
ED2, ED4, ED6, HED4	7 E6-2
Filler 1 Pole	DFFP1A

① These are aluminum connectors. If copper is required please add suffix C.
 ② 3.75" (95) plate accommodates six 1-pole breakers.
 ③ Connecting strap kits include connecting straps, hardware, and cover plates for switchboards and power panels. Breakers to be ordered separately.

④ QR filler plate only, use p/n: 6QR2FKCAN.
 For copper QR kit, use p/n: 6QR2CCAN.
 ⑤ To field install a single 3VA52, 3VA61 or 3VA62 breaker to an existing strap, provision kit p/n: S3VA52PRCAN is required.

⑥ High Density Kit, requires 7.50" Unit Space to fit QTY (6) 2 Pole breakers.

Panelboards

Fusible/Power and Distribution

Selection

Type F2

600 Volts AC, 250 Volts DC Maximum

600 Ampere Main Switch,

1200 Ampere Main Lugs Only

600 Ampere Maximum Branch

UL & CSA Short Circuit Rating —

200,000A IR Maximum

Meets 1996 NEC wire bending requirement, section 373-6.

CSA - C22.2 No. 0.12

Panelboards

Listed by Underwriters' Laboratories, Inc., under "Panelboards" File #E2269 for interiors and #E4016 for boxes and fronts & CSA Certificate No. 1518681.

Service

600 Volts AC, 250 Volts DC, Maximum. 1 Phase, 3 Wire; 3 Phase, 3 Wire; or 3 Phase, 4 Wire.

Boxes

38" wide, 12.75" deep, Type 1

Panelboard Fronts and Doors

Standard panelboards are furnished with 4 piece trim. Fronts are fabricated from code gauge steel and finished ASA61.

Fuses

The Proper Fuse Type for the Application is Selected Using the Following Parameters:

- Voltage Requirements
- Conductor Ampacity
- Horsepower Requirements
- Maximum Available RMS Fault Current
- CSA Fuse Class

Main Switch Panel Connectors

Ampere Rating	Connectors Range/Phase
400A-600A	(1, 2) #3/0-500MCM CU or (1) #4/0-500MCM AL
800A	(1-3) #1/0-500MCM CU/AL
1200A	(1-3) #1/0-500MCM CU/AL

Main Lug Panels

Ampere Rating	Connectors Range/Phase
225A - 400A	(1) #1/0-750MCM CU/AL or (2) #1/0-250MCM CU/AL
600A	(2) #1/0-750MCM CU/AL or (4) #1/0-250MCM CU/AL
800A	(3) #1/0-750MCM CU/AL or (6) #1/0-250MCM CU/AL
1200A	(4) #1/0-750MCM CU/AL or (8) #1/0-250MCM CU/AL

Branch Switch Connectors

Switch Ampere Rating	Wire and Cable Range
30	(1) - #14-#2 AWG (Cu or Al)
60	(1) - #14-#2 AWG (Cu or Al)
100	(1) - #14-#1/0 AWG (Cu or Al)
200	(1) - #6 AWG-350 kcmil (Cu or Al)
400	(1) - 750 kcmil OR (2) - 250 kcmil (Cu or Al)
600	(2) - 750 kcmil OR (4) - 250 kcmil (Cu or Al)

Gutters

Amperes Rating	End Gutters (Minimum inches)	Side Gutters (Minimum inches)
400	12	7.9
600	12	7.9
800	12	7.9
1200	12	7.9

Maximum VB HP Ratings

Amp Rating	3 Phase			Single Phase	DC
	Volts			Volts	Volts
	240	480	600	240	250
30	7.5	15	20	3	5
60	15	30	50	10	10
100	30	60	50	15	20
200	60	125	50	-	40
400	50	50	50	-	50
600	50	50	-	-	-

Maximum VK HP Ratings

Amp Rating	3 Phase			Single Phase	DC
	Volts			Volts	Volts
	240	480	600	240	250
30	7.5	15	20	3	5
60	1.5	30	50	10	10
100	30	50	75	15	20
200	60	125	150	15	40

CSA Fuse Classes

Class	Amperes	Volts	Interrupting Ratings	I ² t, I _p	Circuits
H (code)	1-600A	250 and 600V or less AC	10,000A	—	Less than 10,000A available
K [®]	1-600A	250 and 600V or less AC	50,000A	—	Feeder circuits
J	1-600A	600V or less	To 200,000A	I ² t-Low I _p -Low	Feeder circuits (motor load small %)
RK1	1/10-600A	600V or less 250V or less	To 200,000A	I ² t-Slightly > J I _p -Slightly > J	Feeder circuits (motor load small %)
RK5	1/10-600A	600V or less 250V or less	To 200,000A	I ² t- > RK-1 I _p -> RK-1	Motor starting currents a factor
T	1-600A	300 and 600V or less AC	To 200,000A	I ² t-Low I _p -Low	Non-motor loads
L	601-5000A	600V or less	To 200,000A	I ² t-Low I _p -Low	Feeder circuits motor loads

Panelboards

Power and Distribution

Type F2

Selection

Maximum Panel Ampere	Unit Space (MLO)	Box Height	120/240Volts 1 Phase, 3 Wire	120/208 Volts 3 Phase, 4 Wire	600 Volts 3 Phase, 3 Wire	347/600 Volts 3 Phase, 4 Wire
400A	30"	60"				
600A	45"	75"				
800A	60"	90"				
1200A	60"	90"				

Branch Switches 600V Maximum^①

Rating Ampere	Maximum Voltage	Fusing (1)	Mounting Height F2 38" W
30/30A (VK)			6.25(159)
60/60A (VK)			6.25(159)
100/100A (VK)			7.5(190)
200/200A (VK)			10(254)
30/30A, 60/60A, 100/100A (VB)			7.5(190)
200A (VB)	600V	J	10(254)
400A (VB)			15(381)
600A (VB)			15(381)

^① Single or twin units as listed and are valid for class C or J fuses. If class R or T fuse provisions are required add per table above.
^② Not applicable to VB style units 400A and 600A.

^③ Use of auxiliary switch kit will require the use of a 7.5" (190) high unit for 30 and 60 Amp. switches.
^④ Refer to Siemens for single phase and DC horsepower requirements.

^⑤ Ratings are based on UL test procedure. CSA will not recognize ratings above 100Hp.

Panelboards

Modifications and Additions

Type F2

When required, special constructions or additions to standard panelboards may be specified for all **factory-assembled** Power and Distribution Panelboards.

Below and on the next page are listed many of those available, for Type F2 panelboards. In no case do these apply to **Narrow** (Column) Width Lighting Panelboards.

1. Miscellaneous

ENCLOSURE TYPE
Type 1
Type 2 (Drip-proof)
Type 3R
Type 12

2. Painted Finish

Description
Touch-Up Paint (ASA61, Light Gray) 12 oz. aerosol can, Catalog Number TUP-61

3. Miscellaneous Accessories

Nameplate — laminated, engraved
Tamper-Proof Screws

4. Devices Mounted on Gutter Cover Includes Device, Mounting — Wired or Unwired

Description
Toggle Switch — SPST or 3-way; 15A
Pilot Light — General Purpose, Neon or Incandescent
Pushbutton

5. Grounding of Panelboards^③

Non-Insulated Equipment Ground Bus Including Ground Lug
Insulated Equipment Ground Bus Including Ground Lug

6. Remote Control Switches^④ 600V AC

Ampere Rating	600V AC		ASCO 920 Mechanically Held ^{⑤⑥}		Siemens CLH Electrically Held ^⑦	
	2-Pole	3-Pole	2-Pole	3-Pole	2-Pole	3-Pole
30						
60						
75						
100						
150 ^⑧						
200 ^⑨						
225						
			Unit space 20"		Unit space 20"	

7. Increased Capacity Neutral

Phase	Ampere Rating		Unit Space (inches)
	Neutral		
400	600		None
400	800		None
600	1200		None
800	1200		None

8. Main Bus

Standard main bus and ground bus is tin plated aluminum. For copper main bus, neutral bus and ground bus change prefix 'A' to 'C' on catalog number and contact your sales office for pricing.

9. Copper Lugs — For Main Lug Only Panels

Standard main lugs and neutral lugs are tin plated aluminum, UL & CSA listed for use with aluminum/copper cables. For copper Lugs in the mains and neutral for use with copper cables only, contact sales.

Selection

10. Feed-Through Lugs^⑩ (One Set Per Panel)

Ampere Rating			Unit Space (Additional inches)
	3-Pole	2-Pole	
400			10
600	Consult Sales Office	Consult Sales Office	10
800			17.5
1200			17.5

11. MLO Compression Lugs

Available as main lugs and neutral lug.

Ampere Rating	Aluminum (Specify Size)	Copper (Specify Size)	Deduct From Available Unit Space (inches)
400			5
600			5
800			5
1200			5

12. VK Switch Accessories

Item	Cat. No.
Fuse Pullers (2) 30/60 mp	FP2
100 amp	FP3
200 amp	FP4

13. Sentron TPS (SPD Modules)

100 KA	200 KA	300 KA
150 KA	250 KA	
Options		
Surge Counter		
Remote Indicator		

14. Customer Metering

Siemens Digital Metering with Remote Display SEM3 Embedded Metering

^③ For use on main lug, main breaker or main switch panels without subfeed breakers.

^④ For increase in panelboard height — Consult local sales office.

^⑤ Ground bar is not installed in box.

^⑥ For required unit space — consult local sales office. Price includes increased enclosure height if required.

^⑦ Devices listed by Underwriters' Laboratories, Inc.

^⑧ When 2 wire control is required. Relay and Terminal Block (9" of unit space required).

^⑨ For short circuit ratings with remote control switches consult sales office.

^⑩ Panelboard short circuit rating is limited to 5,000 RMS symmetrical.

Panelboards

Modifications, Additions Replacements for Fusible Switches

Selection

Type F2 Replacement Units^{①②}

Amperes Rating	600 Volts J Fuses Cat. No.	Height in (mm)
----------------	----------------------------	----------------

VK Switch For Use With FPP6 Panelboard^{③④⑤⑨⑪}

30/30	VK23611JP	6.25 (159)
60/60	VK23622JP	6.25 (159)
100/100	VK33633JP	7.5 (90)
200/200	VK73644JP	10 (254)

VB Switch For Use With VB6 Panelboards^{⑨⑩}

30/30	V7E3611JP	7.5(190)
60/60	V7E3622JP	7.5(190)
100/100	V7E3633JP	7.5(190)
200	V7F3604JP	10(254)
400	V7H3605JP	15(381)
600	V7H3606JP	15(381)

Panelboard				
Tub Width	Depth	Panel Type	Replacement Max Amps	Note
30" - 36" - 42"	9"	OLD CDP	400	MCCB only.
	9.75"	OLD CDP	600	MCCB only.
32" - 38"	13.75"	CDP6/VB6	1200A 600A	MCCB series 6 connectors "VB" style units only (*)
	12.75"	SPP6/FPP6	1200A	MCCB series 6 connectors
38"			600A	"VK" or "VB" style (*)

Connecting Strap Kits^{⑩⑪}

Rating Amperes	VB Switch Cat. No.	VK Switch Cat. No.	HCP Switch Cat. No.
30/30	VB6-71	VK6-57	N/A
60/60		VK6-58	
100/100		N/A	
200		VK6-72	
200/200		N/A	
400-600	VB6-150	N/A	F6162DCAN
800-1200	N/A		

Blank Filler Plates^⑥

For use with Series 6 CDP Panelboards, S5, F2, FCI and FCII Switchboards.	
Height	SPP/FPP/CDP/VB 6
1.25"	6FPB01
2.50"	6FPB02
3.75"	6FPB03
5.00"	6FPB05
10.00"	6FPB10
15.00"	6FPB15

- ① For Series 6 Main Devices above 200A, add suffix MS to Catalog Number when ordering.
- ② When 2-Pole units are required, use 3-Pole.
- ③ Series 6 (VB6, CDP6) replacement units and connector kits also accommodates FCI and FCII distributions interiors. Units installed after October 1991 will be FPP6 type.
- ④ Refer to Siemens for units equipped with auxiliary switches.
- ⑤ Price is for two brackets – to be included with filler plates.

- ⑥ To be used in tubs with 30-200A, VB units or fillers in 12⁵/₈" deep tub.
- ⑦ Can be used as fillers or in place of circuit breakers, VK or VB Switches.
- ⑧ Special order
- ⑨ Fusible switch kits include fusible switches and cover plates for switchboards and power panels. Connecting strap kits to be ordered separately.

- ⑩ Connecting strap kits include connecting straps and hardware. See Note 9 for cover plates.

- ⑪ The fusible switches and connecting strap kits are designed for standard 38⁵/8" sections. Additional covers are required for wider sections. Please consult your local sales contact.

Panelboards

Embedded Micro Metering Module™

Selection

SEM3 System Configured in Panelboards

The Siemens SEM3 system can be configured for factory installation in branch circuit monitoring application. This option can lower the installation time of the system for the installer while providing a factory warranted solution.

The SEM3 system can be factory installed in unit space in type P2 & S5 Siemens panel boards. Please note P1 and P3 configurations are not available at this time and the amount of unit space needed varies depending upon the application. Please note that lead time adders will apply and may vary depending upon the configuration of the system.

SEM3 for use in Siemens Panelboards

Available in a Type 1 and 2 rated enclosure



Controller

Each SEM3 Controller can monitor up to 45 circuits. Applications that require monitoring more than 45 circuits will require additional controllers.



Current Transformers (CTs)

Five sizes of CTs are available for use in the S5 panel: 50, 125, 250, 400, 600, 800 & 1200 amp. Each bracket supports a maximum of 3 CTs and is designed for the breaker selected (brackets are not interchangeable between breaker frames). Each CT will be attached to a data module that is placed in the meter racks.



Meter Racks

All meter racks will be installed next to the SEM3 controller unit space. The 21 space meter rack is used as a default option where possible.

NOTE: Monitoring of 45 circuits will require: two 21 position racks and one 3 position rack

Other Considerations

Configuration: Data modules from CTs monitoring a circuit breaker must be mounted adjacent to one another in the meter rack. Any field changes to the factory configuration must take this into account.

Start-up & Commissioning: Siemens can provide these services. Contact your local Siemens sales office for more details.

Panelboards

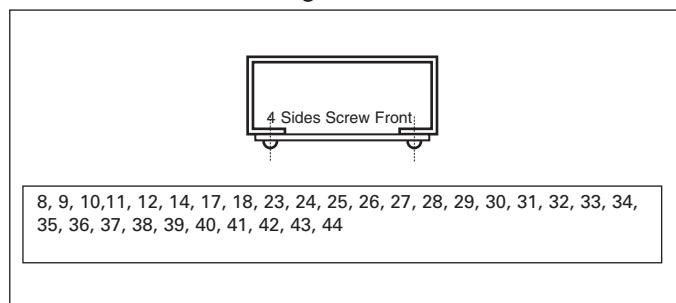
Panel Skirts/System Types, AC & DC Voltages

Conduit Enclosing Shield (Panel Skirts)

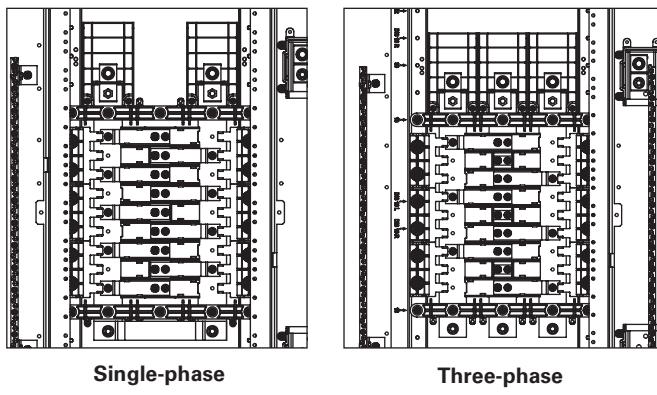
Sheet metal to cover conduits above or below a standard panelboard box.

Skirt Length	Width	Depth
8, 9, 11, 12	20.00	5.75
14, 17, 18, 23, 25	20.00	5.75
26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36	20.00	5.75
37, 38, 39, 40, 41, 42, 43, 44	20.00	5.75
8, 9, 11, 12	24.00	7.75
14, 17, 18, 23, 25	24.00	7.75
26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36	24.00	7.75
37, 38, 39, 40, 41, 42, 43, 44	24.00	7.75

Panel Skirts Standard Length



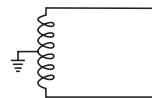
Busing



AC Voltages

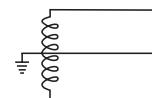
1 phase, 2 wire

- 120V 1 phase, 2 wire
- 240V 1 phase, 2 wire



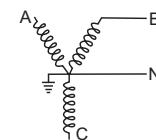
1 phase, 3 wire

- 120/240V 1 phase, 3 wire



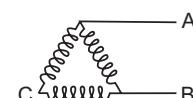
1 phase, 2 wire, Wye

- 277V 1 phase, 2 wire



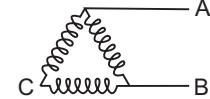
1 phase, 2 wire, Delta

- 480V 1 phase, 2 wire



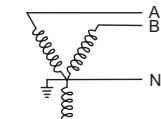
1 phase, 3 wire, Delta

- 240/480V 1 phase, 3 wire



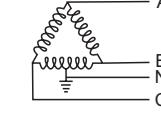
3 phase, 4 wire, Wye

- 208Y/120V 3 phase, 4 wire
- 480Y/277V 3 phase, 4 wire
- 600Y/347V 3 phase, 4 wire



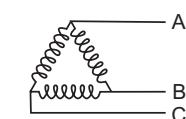
3 phase, 4 wire, Delta

- 240/120V 3 phase, 4 wire
- 480/240V 3 phase, 4 wire



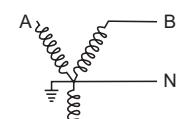
3 phase, 3 wire, Delta

- 240V, 3 phase, 3 wire
- 480V, 3 phase, 3 wire
- 600V, 3 phase, 3 wire
- 240V, 3 phase, 3 wire, grounded B
- 480V, 3 phase, 3 wire, grounded B
- 600V, 3 phase, 3 wire, grounded B



1 phase, 3 wire, Wye

- 208Y/120V 1 phase, 3 wire
- 480Y/277V 1 phase, 3 wire

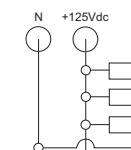


DC voltage

1 phase, 2 wire

- 125Vdc, 2 wire

(Up to 125Vdc,
MLO option only.)



Panelboards

Type HCP Switchboard and Power Panel Units, Accessories

Selection

Features

- CSA certified under file #24563 and UL Listed under file #E6849 Vol 1, Sect. 8
- 400-1200A ratings
- Visible contacts
- Field installable shunt trip and auxiliary switch accessory kits
- Installs in existing Siemens switchboards
- Suitable for use on systems with up to 200,000A available fault current, RMS symmetrical when equipped with Class J or Class L fuses

- Group mounts with other 30A through 600A switches, and 100 through 1200 amp frame breakers
- Allows 800A and 1200A switches in standard 38" wide distribution sections in either main or branch configurations
- 16 1/4" mounting height is the smallest 1200A design in the industry, allowing up to 4 units in one vertical section
- Field reversible horizontal mounting design for left or right hand cabling
- Handle can be padlocked in the OFF position with up to three padlocks with 5/16" hasps. A cover padlocking provision is also supplied



3-Pole, Horizontal Mount^①

Catalogue Number	Maximum Ampere Rating	Maximum AC Voltage Rating ^②	Fuse Class	Dimensions (inches*)			Horsepower Rating						
				H	W	D	240V Std	240V Max	480V Std	480V Max	600V Std	600V Max	
HCP367HJ400	400	600	J	16.25	17.22	7.38	50	125	100	250	125	350	40
HCP367HJ600	600	600	J	16.25	17.22	7.38	75	200	150	400	200	400	40
HCP327HT	800	240	T	16.25	17.22	7.38	100	250	—	—	—	—	50
HCP367H	800	600	L	16.25	17.22	7.38	100	250	200	500	250	500	50
HCP328HT	1200	240	T	16.25	17.22	7.38	100	250	—	—	—	—	50
HCP368H	1200	600	L	16.25	17.22	7.38	100	250	200	500	250	500	50

3-Pole, Vertical Mount

HCP367VJ400	400	600	J	17.00	16.25	7.38	50	125	100	250	125	350	40
HCP367VJ600▲	600	600	J	17.00	16.25	7.38	75	200	150	400	200	400	40
HCP327VT	800	240	T	17.00	16.25	7.38	100	250	—	—	—	—	50
HCP367V	800	600	L	17.00	16.25	7.38	100	250	200	500	250	500	50
HCP328VT	1200	240	T	17.00	16.25	7.38	100	250	—	—	—	—	50
HCP368V	1200	600	L	17.00	16.25	7.38	100	250	200	500	250	500	50

Accessories

Terminal Connectors (one lug per kit)

Ampere Rating	Catalogue Number	Connector Wire Range
400-600A	TA2K500	(2) #1 AWG-500 kcmil (Cu or Al)
400-600A	TC2K500	(2) #1 AWG-500 kcmil (Cu only)
400-800A	TA3K500	(3) #1 AWG-500 kcmil (Cu or Al)
400-800A	TC3K350	(3) #1 AWG-350 kcmil (Cu only)
800-1200A	TA4H500	(4) #2 AWG-500 kcmil (Cu or Al)
800-1200A	TA3H750	(3) 500-750 kcmil (Cu or Al)

Auxiliary Switch Kits

Contact Ampere Rating	Maximum Voltage	Switch Mounting	Contacts	Catalogue Number
AC	DC			
15A	480	Left Pole	1NO/1NC	A01HCPL4▲
15A	480	Right Pole	1NO/1NC	A01HCPR4

10

PANELBOARDS

Shunt Trip Kit

Control Voltage		Catalogue Number
AC	DC	
120	—	HCPST120
240	—	HCPST240▲
277	—	HCPST277
480	—	HCPST480▲

*For inches / millimeters conversion, multiply inches by 25.4.

Switchboard Connection Strap Kit^①

Switch Ampere Rating	Catalogue Number
400-1200A	F6162DCAN

▲ Built to order. Allow 6-8 weeks for delivery.

① For horizontal mounting only in either 38" wide min switchboards or F2 power panelboards.

T Fuse Adapter Kits (one per pole)

Catalogue Number	Description
TFAK72	800A, 300V AC
TFAK75	800A, 600V AC
TFAK82	1200A, 300V AC

HCP Replacement Handle Kit

(For use on all HCP switches)

SW Ampere Rating	Catalogue Number
400-1200A	HCPHK

Compression Lug Adapter Kit

The use of this kit provides for the mounting of up to four lugs per phase. Each kit accepts lugs with (2) 3/8" diameter mounting holes on 1" centers. One kit per pole line or load is required. Lugs are not provided.

Ampere Rating	Catalog Number
400-1200A	HCPCLP

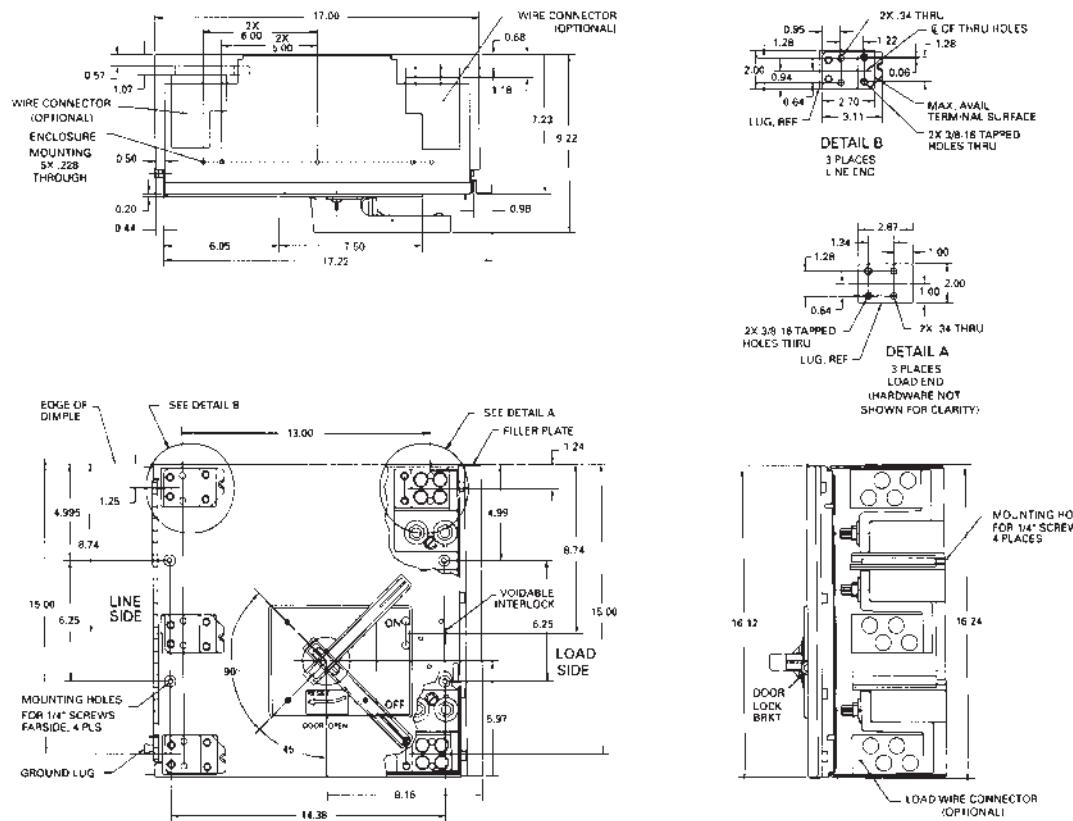
② Both 240 and 600V AC switches are also rated 250V DC max.

Panelboards

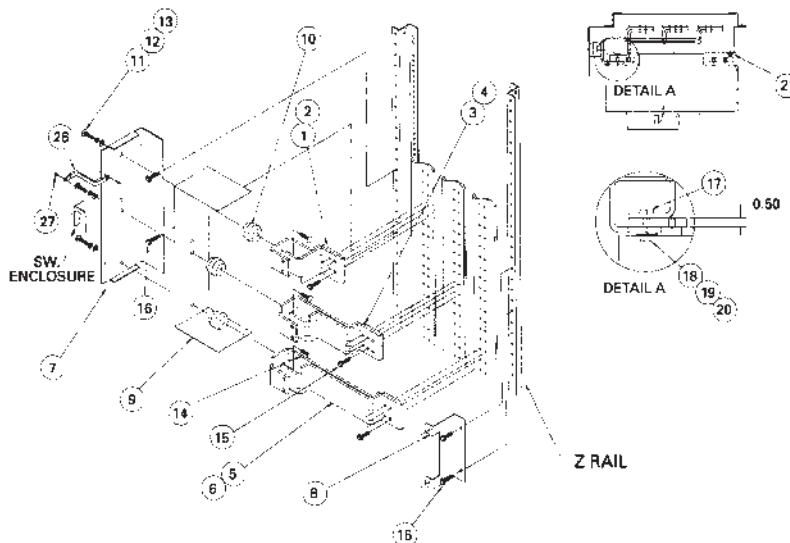
Type HCP Switchboard Units

Dimensions

Horizontal Mount Drawing



Group Mounting Assembly (Horizontal Mount Only)



Note: Right exit shown, rotate 180° for left exit.
Note: Items 26 & 27 are used to ground the switch enclosure (Route bonding wire along fange!)

Item	Parts Supplied in Connection Strap Kit Cat. No. F6162D	Qty.
1-2	A/C Ø Strap (Short)	1ea.
3-4	BØ Strap	1ea.
5-6	A/C Ø Strap (Long)	1ea.
7-8	Switch Mounting Bracket	1ea.
9	Insulation	1
10	1-3/8" Insulator	3
11	3/8-16 X 3/4" HHMS	3
12	3/8" Lock Washer	3
13	3/8" Flat Washer	3
14	3/8-16 X 3/4" RHSNB	3
15	Strap Bus Hardware Kit	2
16	1/4 28 X 3/8" S-IWHSW	4
17	5/16-18 Insert	6
18	5/16-18 X 1" SRHMS	6
19	5/16 Flat Washer	6
20	5/16 Lock Washer	6
21	1/4-20 X 1" SRHMS	2
26	Ground Bracket	1
27	10-32 X 1/4" SHWHSW	2

Panelboards

Circuit Breaker / Column Type

General

Type C1

240 Volts AC Maximum

250 Ampere Mains

250 Ampere Maximum Branch

UL Short Circuit Rating —

200,000 IR Maximum

**Branch Breaker Symmetrical
Interrupting Rating**

Based on Underwriters' Test Procedure

Type C2

480Y/277 Volts AC Maximum

250 Ampere Mains

250 Ampere Maximum Branch

UL Short Circuit Rating —

100,000 IR Maximum

Meets NEC wire bending requirement,
section 312-6.

Panelboards

Listed by Underwriter's Laboratories,
Inc., under "Panelboards" File #E2269.

Meets Federal Specification
W-C375B/Gen.

Service

240 Volts Maximum. 1-Phase, 3-Wire, or
3-Phase, 4-Wire.

Panelboards Fronts and Doors

Standard panelboards are furnished with
trim with a flush door lock. All are factory
assembled for ease of installation. Fronts
are fabricated from code gauge steel and
finished ANSI-61.

Main Breakers C1

BL, BLH and HBL frame breakers are
mounted horizontally. All other frames
are mounted vertically.

Main Breakers C2

BQD frame breakers are mounted
horizontally. All other frames are
mounted vertically.

Boxes

C1 — 7 $\frac{1}{8}$ " wide, 5 $\frac{3}{4}$ " deep.

C2 — 8 $\frac{1}{2}$ " wide, 5 $\frac{3}{4}$ " deep.

Branch Breaker Side Gutters

Type	Circuit Breaker	Side Gutter (inches)
C1	BL, BLH, HBL	3.505
C2	BQD	3.5

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

Type	Width	Height	Gauge Steel
C1	7 $\frac{1}{8}$ "	48", 73", 85"	#14
C2	8 $\frac{1}{2}$ "	48", 73", 85"	#14

Fronts

C1	7 $\frac{1}{8}$ "	48", 73", 85"*	#14
C2	8 $\frac{1}{2}$ "	48", 73", 85"*	#14

*Note: Feed thru lugs and subfeed breaker not available
for this height.

Main Breaker Connectors

Ampere Rating	Connectors suitable for Cu or Al
100	(1) #14-1/0 AWG
125	(1) #4-1/0 AWG
225	(1) #6 AWG-300 kcmil
250	(1) #4 AWG-350 kcmil Al (1) #6 AWG-350 kcmil Cu

Main Lugs

125	(1) #6 AWG-350 kcmil
250	(1) #6 AWG-350 kcmil

Panelboards

Circuit Breaker / Column Type

Selection

Branch Breaker Selection C1

Breaker Type	Available Ampere Rating	Availability			Maximum Interrupting Rating (kA)		
		1-Pole	2-Pole	3-Pole	120V	120/240V	240V
BL (120V)	15, 20, 30, 40, 50, 60	✓	✓	✓	—	10	—
	70	✓	✓	✓	—	10	—
	70, 80, 90, 100	—	✓	✓	—	10	—
BLF (GFCI)	15, 20, 30	✓	✓	—	10	—	—
	40, 50, 60	—	✓	—	10	—	—
BLE (EOGFI)	15, 20, 30	✓	✓	—	10	—	—
BGL (SWN)	15, 20, 30	—	✓	✓	10	—	—
BLR (240V)	15, 20, 30, 40, 50, 60	—	✓	—	—	—	10
	70, 80, 90, 100	—	✓	—	—	—	10
	15, 20, 30, 40, 50, 60	✓	✓	✓	—	22	—
BLH (120V)	70	✓	✓	✓	—	22	—
	70, 80, 90, 100	—	✓	✓	—	22	—
	15, 20, 30	✓	✓	—	—	22	—
BLHF (GFCI)	40, 50, 60	—	✓	—	—	22	—
	15, 20, 30, 40, 50	✓	✓	✓	—	65	65
HBL	60, 70, 80, 90, 100	—	✓	✓	—	65	65

Subfeed Breakers — Limit One Per Panel^① C1 (Not available for 42 circuit panels)

ED4	15, 20, 30, 40, 50, 60, 70, 80, 90, 100 110, 125	—	✓	✓	—	—	65
HED4	15, 20, 30, 40, 50, 60, 70, 80, 90, 100 110, 125	—	✓	✓	—	—	65
QR2	100, 110, 125, 150, 175, 200, 225	—	✓	✓	—	—	10
FXD6	70, 80, 90, 100, 110, 125, 150, 175, 200, 225, 250	—	✓	✓	—	—	65
HFD6 ^②	70, 80, 90, 100, 110, 125, 150, 175, 200, 225, 250	—	✓	✓	—	—	100

Alternate Main Breaker Selection^③ C2

Ampere Rating	Breaker Type	IR	Catalogue Number	Available Trip Values		
				BD	E4	E6
100	BQD	14	BD	50, 60, 70, 80, 90, 100	50, 60, 70, 80, 90, 100	50, 60, 70, 80, 90, 100
	ED4	18	E4	50, 60, 70, 80, 90, 100	50, 60, 70, 80, 90, 100	50, 60, 70, 80, 90, 100
	ED6	25	E6	50, 60, 70, 80, 90, 100	50, 60, 70, 80, 90, 100	50, 60, 70, 80, 90, 100
	HED4	42	H4	50, 60, 70, 80, 90, 100	50, 60, 70, 80, 90, 100	50, 60, 70, 80, 90, 100
	HHED6	65	H6	50, 60, 70, 80, 90, 100	50, 60, 70, 80, 90, 100	50, 60, 70, 80, 90, 100
125	ED4	18	E4	110, 125	110, 125	110, 125
	ED6	25	E6	110, 125	110, 125	110, 125
	HED4	42	H4	110, 125	110, 125	110, 125
	HHED6	65	H6	110, 125	110, 125	110, 125
225	FXD6	35	FX	70, 80, 90, 100, 110, 125, 150, 175, 200, 225	70, 80, 90, 100, 110, 125, 150, 175, 200, 225	70, 80, 90, 100, 110, 125, 150, 175, 200, 225
	HFD6	65	HF	170, 80, 90, 100, 110, 125, 150, 175, 200, 225	170, 80, 90, 100, 110, 125, 150, 175, 200, 225	170, 80, 90, 100, 110, 125, 150, 175, 200, 225
250	FXD6	35	FX	250	250	250
	HFD6	65	HF	250	250	250

Branch Circuit Breakers C2

Breaker Type	Available Ampere Rating	Availability			Maximum Interrupting Rating (kA)		
		1-Pole	2-Pole	3-Pole	277V	480/277V	480V
BQD	15, 20, 30, 40, 50, 60 70, 80, 90, 100	✓ ✓	✓ ✓	✓ ✓	14 14	14 14	— —

Subfeed Breakers — Limit One Per Panel^① C2 (Not available for 42 circuit panels)

ED4	15, 20, 30, 40, 50, 60, 70, 80, 90, 100 110, 125	—	✓ ✓	✓ ✓	—	18 18	18 18
ED6	15, 20, 30, 40, 50, 60, 70, 80, 90, 100 110, 125	—	✓ ✓	✓ ✓	—	—	25 25
HED4	15, 20, 30, 40, 50, 60, 70, 80, 90, 100 110, 125	—	✓ ✓	✓ ✓	—	—	42 42
FXD6	70, 80, 90, 100, 110, 125, 150, 175, 200, 225, 250	—	✓ ✓	✓ ✓	—	—	35
HFD6	70, 80, 90, 100, 110, 125, 150, 175, 200, 225, 250	—	✓ ✓	✓ ✓	—	—	65

^① No increase in box height. Space is already built into C1 panel.

^③ Interchangeable trip breakers such as FD6 and HFD6 cannot be back fed. Must be top feed only.

^② BL, BLH, HBL and BQD are horizontally mounted.
All others vertically mounted.

Panelboards

Circuit Breaker / Column Type, Modifications and Additions

Selection

Type C1/C2

When required, special constructions or additions to standard panelboards may be specified for factory-assembled column panelboards.

Box Modifications

Description
Gasketed
Metal Card Holder
Welded Metal Card Holder
Nameplate
AI Ground Bar
Cu Ground Bar
Insulated AI Ground Bar
Insulated Cu Ground Bar

Interior Modifications

Description
Feed-Thru Lugs
Cu Neutral Lugs
Cu main Lugs 125A
Cu main Lugs 250A

Column Extension

Available in various standard lengths, extensions are 5½ inches deep and 7 inches wide.

Height (inches)	Catalogue Number ^①
14	LXX-14
20	LXX-20
26	LXX-26
32	LXX-32
38	LXX-38
41	LXX-41
44	LXX-44
53	LXX-53
56	LXX-56
62	LXX-62
65	LXX-65
68	LXX-68
74	LXX-74
80	LXX-80
86	LXX-86

Box Sizing Chart

Certain modifications such as subfeed breakers and feed-thru lugs require additional unit space. Use this chart to determine proper enclosure size.

Panel Configuration	Box Height (inches)
All MLO 18 Circuit	48
All MLO 30 Circuit	73
All MLO 42 Circuit	85
All MLO 18 Circuit with feed-thru lugs	73
All MLO 30 Circuit with feed-thru lugs	85
All MLO 18 Circuit with subfeed breaker	73
All MLO 30 Circuit with subfeed breaker	85
All Main Breaker 18 Circuit	48
All Main Breaker 30 Circuit	73
All Main Breaker 42 Circuit	85
All Main Breaker 18 Circuit with feed-thru lugs	73
All Main Breaker 30 Circuit with feed-thru lugs	85
All Main Breaker 18 Circuit with subfeed breaker	73
All Main Breaker 30 Circuit with subfeed breaker	85

Pull Boxes

Two styles of pull boxes are available, top and front mounted. When the panel and its extensions are mounted in a structural WVF beam a front mounted pull box is required. When the panels are surface mounted, a top mounted pull box may be used. Provisions are made so that the neutral bar may be mounted in the pull box when required. (Front mounted pull box dimensions are 14" H. X 20" W.)

Description	Catalogue Number ^①
Top Mount	LXXP-T
Front Mount ^②	LXX50-F

Breaker Kits and Accessories

Kit Number	Description	Contents
MBKQRC1FK	C1 Filler for QR in Main position 1PH or 3PH	Kit contains all cover plates necessary to change from QJ to QR both 2 and 3-pole breakers.

Panelboards

Circuit Breaker / Column Type

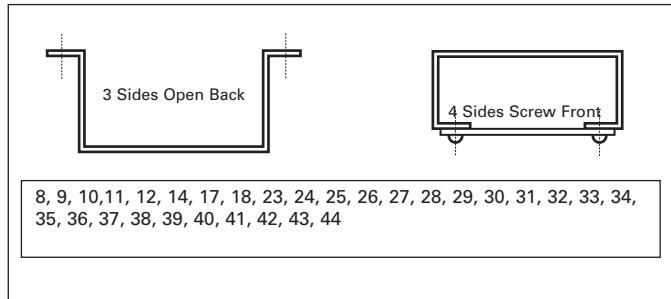
Selection

Conduit Enclosing Shield (Panel Skirts)

Sheet metal to cover conduits above or below a standard panelboard box.

Skirt Length	Width	Depth
8, 9, 11, 12	20.00	5.75
14, 17, 18, 23, 25	20.00	5.75
26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36	20.00	5.75
37, 38, 39, 40, 41, 42, 43, 44	20.00	5.75
8, 9, 11, 12	24.00	7.75
14, 17, 18, 23, 25	24.00	7.75
26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36	24.00	7.75
37, 38, 39, 40, 41, 42, 43, 44	24.00	7.75

Panel Skirts Standard Length



8, 9, 10, 11, 12, 14, 17, 18, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34,
35, 36, 37, 38, 39, 40, 41, 42, 43, 44

① Available only as a main switch for non-service equipment applications. Not available for branch devices.

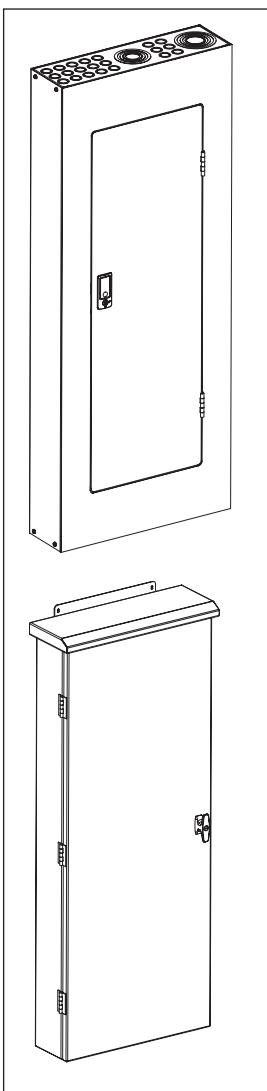
Panelboards

Enclosure/System Types, AC & DC Voltages

Selection

Type 1

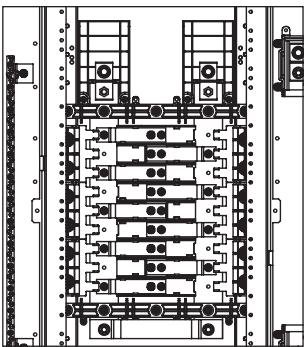
- Flush or surface mount.
- Galvanized steel with removable end walls –blank or with knockouts to order.
- Box sizes: 20" W x 5.75" D x 33", 50", 59" or 69" H (510 W x 145 D x 838, 1270, 1500 or 1753mm H). Box can be rotated 180° to accommodate conduit feed.
- Enclosure and chassis mounting instructions are found in supplied literature.
- Chassis mounts directly onto studs in the enclosure.
- Trim finished with gray powder coat paint over phosphatized steel (ANSI 61).
- Door and door-in-door configurations with locks.
- Door locks use key #2A1910-2.
- Circuit directory card is located on the inside of the door.
- Trim screws are concealed.



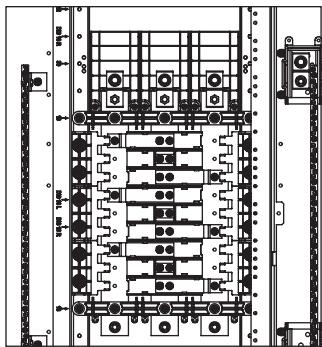
Type 3R

- Surface mount only.
- Finished with gray powder coat paint over phosphatized steel (ANSI 61).
- Bottom feed only, no knockouts
- Box sizes: 20" W x 7.7" D x 34.5", 51.5", 60.5" or 70.5 H (510 W x 195 D x 876, 1310, 1535 or 1791mm H).
- Enclosure and chassis mounting instructions are found in supplied literature.
- Chassis mounts directly onto studs in the enclosure.
- Gasketed door has vault handle with lock.
- Door locks use key #2A1910-1.
- Circuit directory card is located on the inside of the door.

Busing



Single-phase

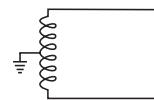


Three-phase

AC Voltages

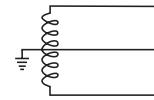
1 phase, 2 wire

- 120V 1 phase, 2 wire
- 240V 1 phase, 2 wire



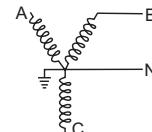
1 phase, 3 wire

- 120/240V 1 phase, 3 wire



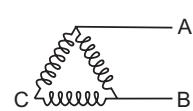
1 phase, 2 wire, Wye

- 277V 1 phase, 2 wire



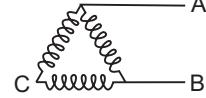
1 phase, 2 wire, Delta

- 480V 1 phase, 2 wire



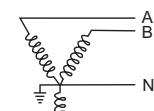
1 phase, 3 wire, Delta

- 240/480V 1 phase, 3 wire



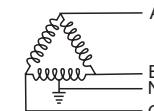
3 phase, 4 wire, Wye

- 208Y/120V 3 phase, 4 wire
- 480Y/277V 3 phase, 4 wire
- 600Y/347V 3 phase, 4 wire



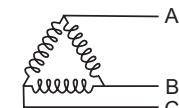
3 phase, 4 wire, Delta

- 240/120V 3 phase, 4 wire
- 480/240V 3 phase, 4 wire



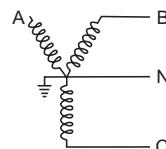
3 phase, 3 wire, Delta

- 240V, 3 phase, 3 wire
- 480V, 3 phase, 3 wire
- 600V, 3 phase, 3 wire
- 240V, 3 phase, 3 wire, grounded B
- 480V, 3 phase, 3 wire, grounded B
- 600V, 3 phase, 3 wire, grounded B



1 phase, 3 wire, Wye

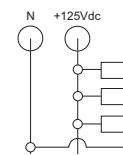
- 208Y/120V 1 phase, 3 wire
- 480Y/277V 1 phase, 3 wire



DC voltage

1 phase, 2 wire

- 125Vdc, 2 wire



(Up to 125Vdc, MLO option only, SCCPB 40A or less.)

Panelboards

Dimensions and Panelboard Configurations

Selection

NEMA 1 and 3R Enclosure Dimensions

Encl. Type	Encl. Height	Dimensions (inches)			CH	DH	RH	SH	DW	D
		H	HC	MH						
NEMA 1	33	33.0	N/A	29.0	26.0	28.9	25.0	2.0	20.0	5.7
	50	50.0	N/A	43.0	40.0	37.9	39.0	3.5	20.0	5.7
	59	59.0	N/A	52.0	49.0	46.9	48.0	3.5	20.0	5.7
	69	69.0	N/A	62.0	59.0	56.9	58.0	3.5	20.0	5.7
NEMA 3R	33	33.0	34.5	35.5	26.0	28.9	25.0	2.0	20.0	6.3
	50	50.0	51.5	52.5	40.0	37.9	39.0	2.0	20.0	6.3
	59	59.0	60.5	61.5	49.0	46.9	48.0	2.0	20.0	6.3
	69	69.0	70.5	71.5	59.0	56.9	58.0	2.0	20.0	6.3

Available panelboard configurations

Based on enclosure height, panel amp rating and number of branch circuit positions

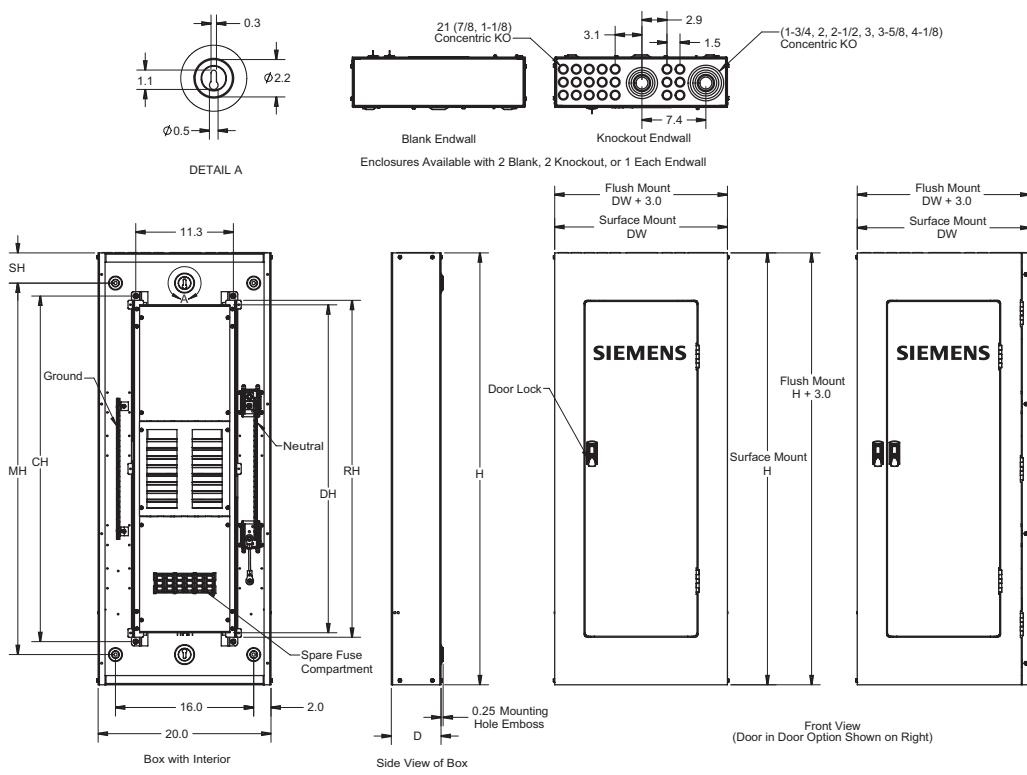
Encl. height (inches)	Panel amp rating	Branch positions	Available configurations
33"	30–200	18	<ul style="list-style-type: none"> Main lug only, with or without feed-through lugs Non-fused disconnect, no loadside options
		30	<ul style="list-style-type: none"> Main lug only, no loadside options
50"	30–60	18	<ul style="list-style-type: none"> 30 through 60A fused main disconnect with or without feed-through lugs or TVSS device
		30	<ul style="list-style-type: none"> 30 through 60A fused main disconnect with or without feed-through lugs or TVSS device
		42	<ul style="list-style-type: none"> 30 through 60A fused main disconnect with or without feed-through lugs or TVSS device
	70–200	18	<ul style="list-style-type: none"> 70 through 200A fused main disconnect with or without feed-through lugs or TVSS device
		30	<ul style="list-style-type: none"> 70 through 200A fused disconnect with or without feed-through lugs
	30–200	18	<ul style="list-style-type: none"> Main lug only with TVSS device Non-fused disconnect, with feed-through lugs or TVSS device
		30	<ul style="list-style-type: none"> Main lugs only, with feed-through lugs or TVSS device Non-fused disconnect, with or without feed through lugs
		42	<ul style="list-style-type: none"> Main lug only, with or without feed-through lugs or TVSS device Non-fused disconnect, with or without feed-through lugs
	225–400A	18	<ul style="list-style-type: none"> Main lug only, with or without feed through lugs or TVSS device Non-fused disconnect, with or without feed-through lugs
		30	<ul style="list-style-type: none"> Main lug only, with or without feed-through lugs
59"	70–200	30	<ul style="list-style-type: none"> 70 through 200A fused main disconnect, with TVSS device
		42	<ul style="list-style-type: none"> 70 through 200A fused main disconnect with or without feed-through lugs or TVSS device
	30–200	42	<ul style="list-style-type: none"> Non-fused disconnect with TVSS device
	225–400A	18	<ul style="list-style-type: none"> Main lug only with loadside disconnect Non-fused disconnect, with TVSS device 225 through 400A fused disconnect with or without feed-through lugs or TVSS device
		30	<ul style="list-style-type: none"> Main lug only, with TVSS device 225 through 400A fused disconnect, with no loadside options
		42	<ul style="list-style-type: none"> Main lug only, with or without feed-through lugs or TVSS device Non-fused disconnect, with no loadside options
		18	<ul style="list-style-type: none"> Non-fused disconnect, with loadside disconnect
69"	225–400A	30	<ul style="list-style-type: none"> Main lug only with loadside disconnect 225 through 400A fused disconnect with feed-through lugs or TVSS device
		42	<ul style="list-style-type: none"> Non-fused disconnect, with or without feed through lugs or TVSS device 225 through 400A fused main disconnect, with or without feed-through lugs or TVSS device

Panelboards

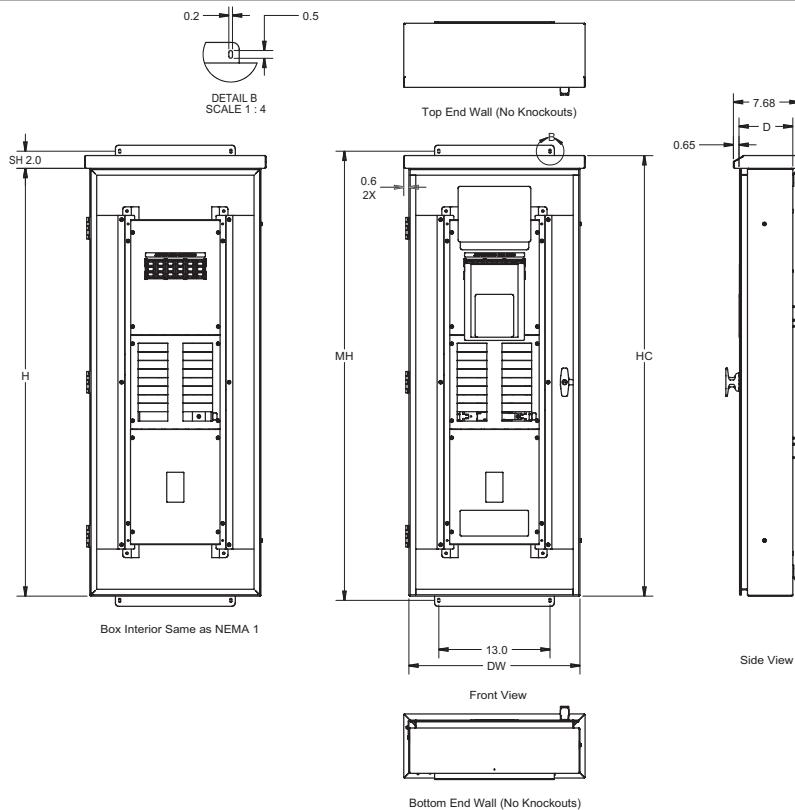
NEMA 1 and NEMA 3R

Dimensions

NEMA 1 Enclosures and Interior



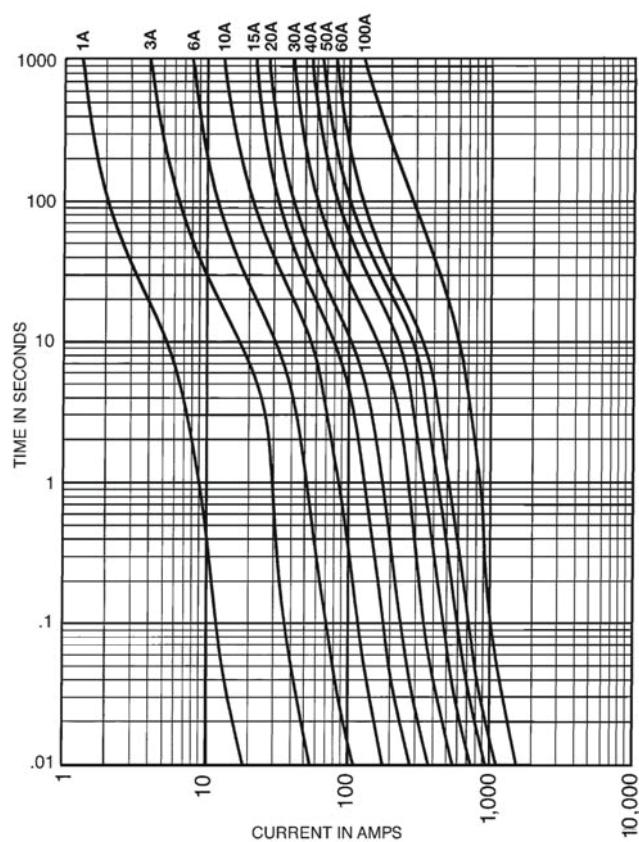
NEMA 3R Enclosures Interior same as NEMA 1



Panelboards

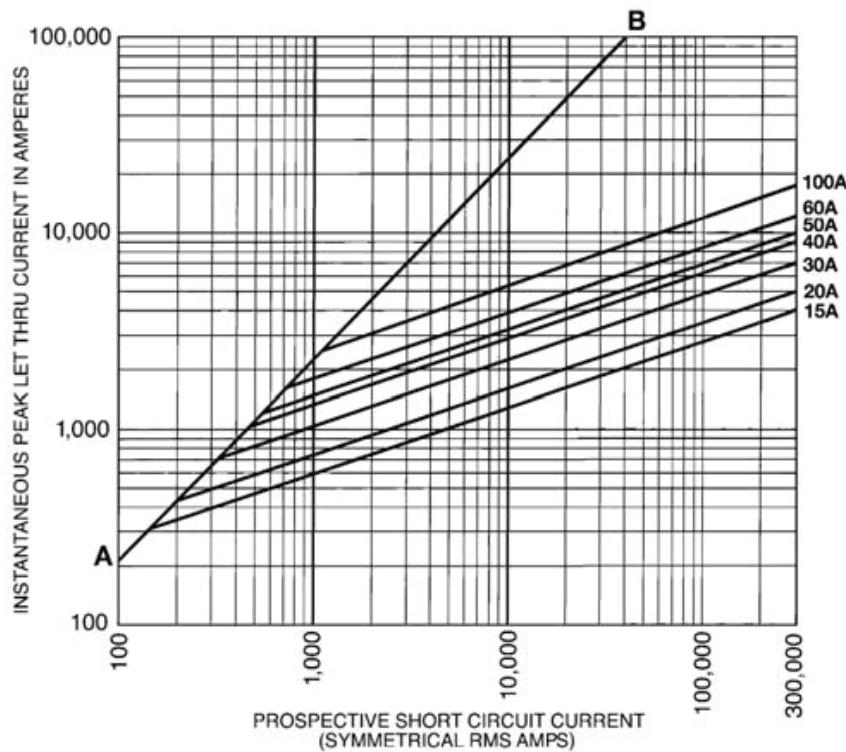
Fuse Curves

Selection



Time-Current Characteristic Curves—
Average Melt

Current Limitation Curves



Notes

Tmax-Molded Case Circuit Breakers

T6 800A Frame

AC Circuit Breakers and Switches

DC Circuit Breakers and Switches

3 and 4 Pole

Motor Circuit Protectors

Higher Performances in Less Space

Field Installable Accessories and Trip Units



Dimensions 3P Fixed Version 10.55H x 8.26W x 4.07D

Weight 20.9 (lbs)

Compliance with Standards

UL 489

CSA C22.2 No.5.1

IEC 60947-2

Standards

EC directive:

- "Low Voltage Directives" (LVD) no. 73/23 EEC
- "Electromagnetic Compatibility Directive" (EMC) no.89/336 EEC

The ABB Quality System complies with the international ISO 9001 - 2000 Standard (model for quality assurance in design, development, construction, and installation and service) and with the equivalent European EN ISO 9001 and Italian UNI EN ISO 9001 Standards

Interrupting ratings (RMS sym. kAmps)

T6

		800	3-4	
	N	S	H	L
AC				
240V	65	100	200	200
480V	35	50	65	100
600V	20	25	35	42
DC*				
500V 2 poles in series	35	35	50	65
600V 3 poles in series	20	20	35	50

*Thermal Magnetic Trip Only

ABB

Company Quality Systems and Environmental Systems

The new Tmax series has a hologram on the front, obtained using special anti-imitation techniques, which guarantees the quality and that the circuit breaker is an original ABB product.

Attention to protection of the environment and to health and safety in the work place is another priority commitment for ABB and, as confirmation of this, the company environmental management system has been certified by RINA in 1997, in conformity with the international ISO 14001 Standard. This certification has been integrated in 1999 with the Management System for Health and Safety in the workplace, according to OHSAS 18001 (British Standards), obtaining one of the first certification of integrated management System, QES (Quality, Environment,

Safety) issued by RINA. ABB - the first industry in the electro-mechanical section in Italy to obtain this recognition - thanks to a revision of the production process with an eye to ecology has been able to reduce the consumption of raw materials and waste from processing by 20%. ABB's commitment to safeguarding the environment is also shown in a concrete way by the Life Cycle Assessments of its products carried out directly by the ABB Research and Development in collaboration with the ABB Research Center. Selection of materials, processes and packing materials is made optimizing the true environmental impact of the product, also foreseeing the possibility of its being recycled.

Mounting

Fixed
Drawout

Connections

Busbar connection or compression lugs
Pressure-type terminals for bare cables
Rear connections

Trip Unit

TMA thermal magnetic trip units, with adjustable thermal threshold ($I_1 = 0.7 \dots 1 \times I_n$) and adjustable magnetic threshold ($I_3 = 5 \dots 10 \times I_n$).

PR221DS, PR222DS/P, and PR222DS/PD-A electronic trip unit

Auxiliary Devices for Indication and Control

- Auxiliary contacts - AUX
- Undervoltage release - UVR
- Shunt trip - SOR
- Terminal covers
- Front for lever operating mechanism - FLD
- Direct rotary handle - RHD
- Stored energy motor operator - MOE
- Key lock - KLF
- Early auxiliary contact - AUE
- Transmitted rotary handle - RHE
- Front extended terminal - EF
- Front terminal for copper-aluminum - FC CuAl
- Front extended spread terminal – ES
- Rear orientated terminal - R
- Phase separators
- Residual current relay (IEC Only)



ABB Inc.

1206 Hatton Road
Wichita Falls, TX 76302
For more information and
the location of your local
field office please go to
www.abb-control.com

DATA SHEET: TEMBREAK 2 E250-SJ MCCB

MCCB Electrical Characteristics to IEC 60947-2, EN 60947-2, JIS C 8201-2-1 ANN.1, NEMA AB-1

Frame Reference	Quantity	Unit	Condition	TB2 Lite 250
Max In (A) of Frame				250
Model				E250
Number of Poles				3, 4
Type				SJ
Nominal current ratings	I_n	(A)	50°C	100,125, 160,200 250
Electrical characteristics				
Rated operational voltage	U_e	(V)	AC 50/60 Hz DC	525 250
Rated insulation voltage	U_i	(V)		800
Rated impulse voltage	U_{imp}	(kV)		8
Ultimate breaking capacity (IEC, JIS, AS/NZS)	I_{cu}	(kA)	690V AC 525V AC 440V AC 400/415V AC 220/240V AC 250V DC	- 7.5 15 25 35 15
Service breaking capacity (IEC, JIS, AS/NZS)	I_{cs}	(kA)	690V AC 525V AC 440V AC 400/415V AC 220/240V AC 250V DC	- 6 12 19 27 12
Rated breaking capacity (NEMA)		(kA)	480V AC 240VAC	10 35
Protection				
Fixed thermal, fixed magnetic				-
Adjustable thermal, adjustable magnetic				■
Utilisation category				A
Installation				
Front connection (FC) Extension bar (FB) Cable clamp (FW) Rear connection (RC) Plug-in (PM) DIN rail mounting (DA)				■ • • • -
Dimensions	height width	(mm) (mm)	3 pole 4 pole	165 105 140
Weight	depth weight	(mm) (kg)	3 pole 4 pole	68 1.5 1.9
Operation				
Direct Opening Action Toggle operation Door mounted (HS) / Breaker mounted handle (HB) Motor operation				■ ■ • •
Endurance	Electrical Mechanical	cycles cycles	415V AC	6,000 18,000

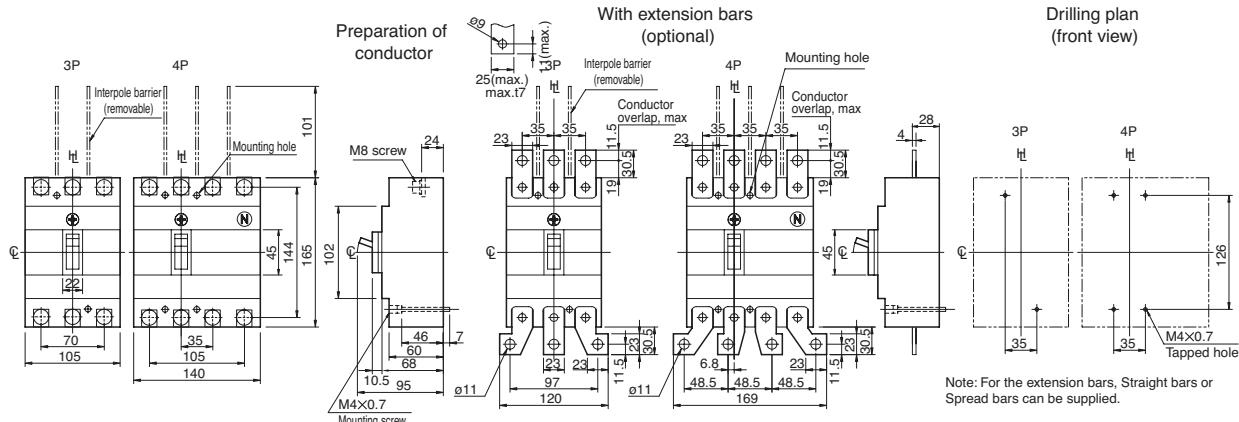
■ Standard • Optional - Not Available

DATA SHEET: TEMBREAK 2 E250-SJ MCCB

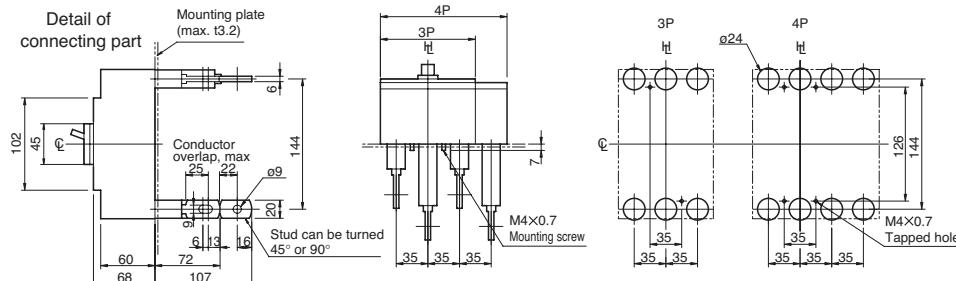
Outline Dimensions E250-SJ

ASL: Arrangement Standard Line H : Handle Frame Centre Line

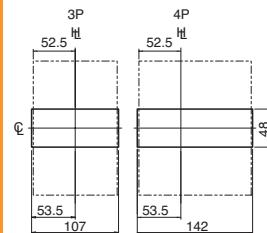
Front connected



Rear connected



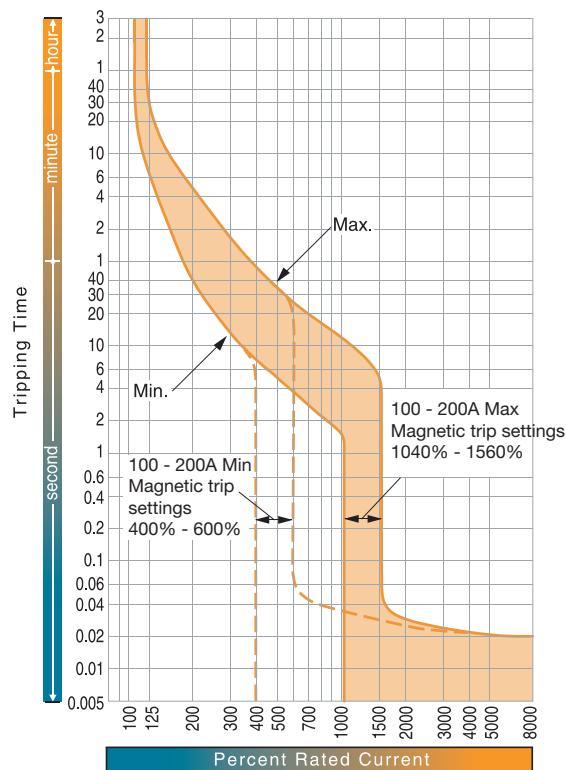
Panel cutout (front view)



DATA SHEET: TEMBREAK 2 E250-SJ MCCB

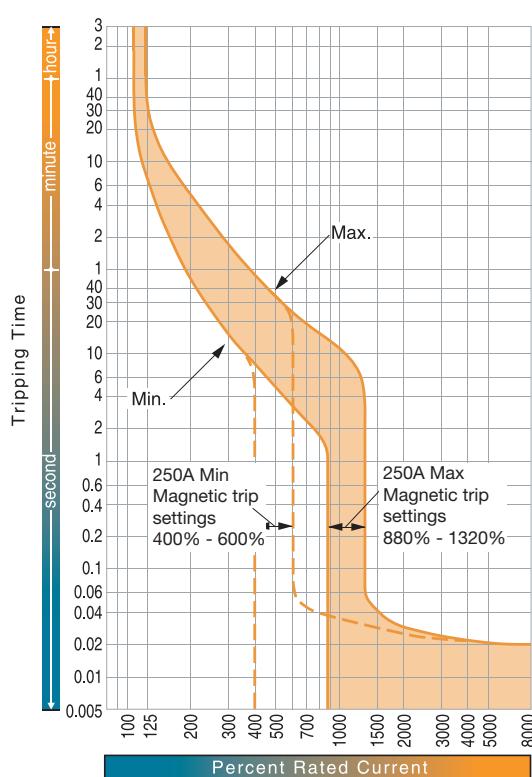
Time/Current Characteristic Curves

E250-SJ (100 ~ 200A)



Time/Current Characteristic Curves

E250-SJ (250A)



UL 489 DIN rail miniature circuit breakers



Optimum product quality, tested reliability and safety stand for the best protection of personnel, installations and plant. Eaton's FAZ-NA DIN rail mountable circuit breakers are designed for use in branch service applications.



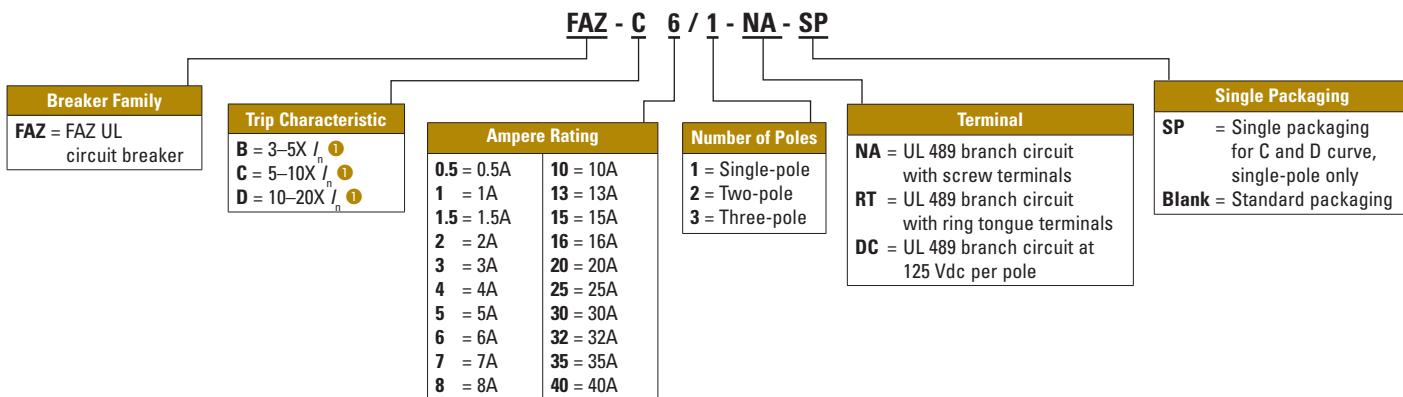
Features

- Complete range of UL® 489 Listed DIN rail mounted miniature circuit breakers, up to 40A current rating
- Rated for 10 kAIC at 277/480 Vac
- Current limiting design provides fast short-circuit interruption, reducing the let-through energy that can damage the circuit
- Suitable for branch circuit device protection
- Thermal-magnetic overcurrent protection
 - Three levels of short-circuit protection, categorized by B, C and D curves
- Trip-free design—breaker can not be defeated by holding the handle in the ON position
- Captive screws cannot be lost
- SWD (switching duty)—suitable for switching fluorescent lighting loads ($I_n \leq 20A$)
- Fulfill UL 489, CSA® C22.2 No. 5 and also IEC 60947-2 Standard
- For use in applications for which UL 1077 or CSA C22.2 No. 235 are also allowed
- Field-installable shunt trip and auxiliary switch subsequent mounting
- Separate version for ring tongue connection (Type FAZ-RT); terminal screws can be removed (on both sides)
- Module width of only 17.7 mm (per pole)
- Contact position indicator (red/green)
- Easy installation on DIN rail
- Possibility for sealing the toggle in ON or OFF position
- Complements UL 1077 offering

EATON

Powering Business Worldwide

FAZ-NA UL 489 miniature circuit breakers catalog numbering system



① I_n = Rated current for instantaneous trip characteristics.

FAZ-NA UL 489 circuit breakers—10 kAIC

Ampères	Single-Pole ①	Two-Pole ①	Three-Pole ①
	Catalog Number	Catalog Number	Catalog Number
B Curve (3-5X I_n Current Rating)			
1	FAZ-B1/1-NA	FAZ-B1/2-NA	FAZ-B1/3-NA
1.5	FAZ-B1.5/1-NA	FAZ-B1.5/2-NA	FAZ-B1.5/3-NA
2	FAZ-B2/1-NA	FAZ-B2/2-NA	FAZ-B2/3-NA
3	FAZ-B3/1-NA	FAZ-B3/2-NA	FAZ-B3/3-NA
4	FAZ-B4/1-NA	FAZ-B4/2-NA	FAZ-B4/3-NA
5	FAZ-B5/1-NA	FAZ-B5/2-NA	FAZ-B5/3-NA
6	FAZ-B6/1-NA	FAZ-B6/2-NA	FAZ-B6/3-NA
7	FAZ-B7/1-NA	FAZ-B7/2-NA	FAZ-B7/3-NA
8	FAZ-B8/1-NA	FAZ-B8/2-NA	FAZ-B8/3-NA
10	FAZ-B10/1-NA	FAZ-B10/2-NA	FAZ-B10/3-NA
13	FAZ-B13/1-NA	FAZ-B13/2-NA	FAZ-B13/3-NA
15	FAZ-B15/1-NA	FAZ-B15/2-NA	FAZ-B15/3-NA
16	FAZ-B16/1-NA	FAZ-B16/2-NA	FAZ-B16/3-NA
20	FAZ-B20/1-NA	FAZ-B20/2-NA	FAZ-B20/3-NA
25	FAZ-B25/1-NA	FAZ-B25/2-NA	FAZ-B25/3-NA
30	FAZ-B30/1-NA	FAZ-B30/2-NA	FAZ-B30/3-NA
32	FAZ-B32/1-NA	FAZ-B32/2-NA	FAZ-B32/3-NA
35 ③	FAZ-B35/1-NA	FAZ-B35/2-NA	FAZ-B35/3-NA
40 ③	FAZ-B40/1-NA	FAZ-B40/2-NA	FAZ-B40/3-NA

Ampères	Single-Pole ①②	Two-Pole ①	Three-Pole ①
	Catalog Number	Catalog Number	Catalog Number
D Curve (10-20X I_n Current Rating)			
0.5	FAZ-D0.5/1-NA-SP	FAZ-D0.5/2-NA	FAZ-D0.5/3-NA
1	FAZ-D1/1-NA-SP	FAZ-D1/2-NA	FAZ-D1/3-NA
1.5	FAZ-D1.5/1-NA-SP	FAZ-D1.5/2-NA	FAZ-D1.5/3-NA
2	FAZ-D2/1-NA-SP	FAZ-D2/2-NA	FAZ-D2/3-NA
3	FAZ-D3/1-NA-SP	FAZ-D3/2-NA	FAZ-D3/3-NA
4	FAZ-D4/1-NA-SP	FAZ-D4/2-NA	FAZ-D4/3-NA
5	FAZ-D5/1-NA-SP	FAZ-D5/2-NA	FAZ-D5/3-NA
6	FAZ-D6/1-NA-SP	FAZ-D6/2-NA	FAZ-D6/3-NA
7	FAZ-D7/1-NA-SP	FAZ-D7/2-NA	FAZ-D7/3-NA
8	FAZ-D8/1-NA-SP	FAZ-D8/2-NA	FAZ-D8/3-NA
10	FAZ-D10/1-NA-SP	FAZ-D10/2-NA	FAZ-D10/3-NA
13	FAZ-D13/1-NA-SP	FAZ-D13/2-NA	FAZ-D13/3-NA
15	FAZ-D15/1-NA-SP	FAZ-D15/2-NA	FAZ-D15/3-NA
16	FAZ-D16/1-NA-SP	FAZ-D16/2-NA	FAZ-D16/3-NA
20	FAZ-D20/1-NA-SP	FAZ-D20/2-NA	FAZ-D20/3-NA
25	FAZ-D25/1-NA-SP	FAZ-D25/2-NA	FAZ-D25/3-NA
30	FAZ-D30/1-NA-SP	FAZ-D30/2-NA	FAZ-D30/3-NA
32	FAZ-D32/1-NA-SP	FAZ-D32/2-NA	FAZ-D32/3-NA
35 ③	FAZ-D35/1-NA-SP	FAZ-D35/2-NA	FAZ-D35/3-NA
40 ③	FAZ-D40/1-NA-SP	FAZ-D40/2-NA	FAZ-D40/3-NA

Ampères	Single-Pole ①②	Two-Pole ①	Three-Pole ①
	Catalog Number	Catalog Number	Catalog Number
C Curve (5-10X I_n Current Rating)			
0.5	FAZ-C0.5/1-NA-SP	FAZ-C0.5/2-NA	FAZ-C0.5/3-NA
1	FAZ-C1/1-NA-SP	FAZ-C1/2-NA	FAZ-C1/3-NA
1.5	FAZ-C1.5/1-NA-SP	FAZ-C1.5/2-NA	FAZ-C1.5/3-NA
2	FAZ-C2/1-NA-SP	FAZ-C2/2-NA	FAZ-C2/3-NA
3	FAZ-C3/1-NA-SP	FAZ-C3/2-NA	FAZ-C3/3-NA
4	FAZ-C4/1-NA-SP	FAZ-C4/2-NA	FAZ-C4/3-NA
5	FAZ-C5/1-NA-SP	FAZ-C5/2-NA	FAZ-C5/3-NA
6	FAZ-C6/1-NA-SP	FAZ-C6/2-NA	FAZ-C6/3-NA
7	FAZ-C7/1-NA-SP	FAZ-C7/2-NA	FAZ-C7/3-NA
8	FAZ-C8/1-NA-SP	FAZ-C8/2-NA	FAZ-C8/3-NA
10	FAZ-C10/1-NA-SP	FAZ-C10/2-NA	FAZ-C10/3-NA
13	FAZ-C13/1-NA-SP	FAZ-C13/2-NA	FAZ-C13/3-NA
15	FAZ-C15/1-NA-SP	FAZ-C15/2-NA	FAZ-C15/3-NA
16	FAZ-C16/1-NA-SP	FAZ-C16/2-NA	FAZ-C16/3-NA
20	FAZ-C20/1-NA-SP	FAZ-C20/2-NA	FAZ-C20/3-NA
25	FAZ-C25/1-NA-SP	FAZ-C25/2-NA	FAZ-C25/3-NA
30	FAZ-C30/1-NA-SP	FAZ-C30/2-NA	FAZ-C30/3-NA
32	FAZ-C32/1-NA-SP	FAZ-C32/2-NA	FAZ-C32/3-NA
35 ③	FAZ-C35/1-NA-SP	FAZ-C35/2-NA	FAZ-C35/3-NA
40 ③	FAZ-C40/1-NA-SP	FAZ-C40/2-NA	FAZ-C40/3-NA

① For ring tongue terminals, remove suffix NA and add suffix RT.

② For single packaging on single-pole C and D curves only, add suffix SP when ordering.

③ 240 Vac only.

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of their respective owners.

Product data sheet

Specifications

SQUARE D



Mini circuit breaker, QO, 20A, 1 pole, 120/240VAC, 10kA, bolt on

QOB120

Main

Product	Miniature circuit-breaker
Range	QO
Current Rating	20 A
Voltage Rating	120/240 V AC 120 V AC
Mounting Type	Bolt-on
Number Of Poles	1P
Circuit Breaker Type	Standard
Ratings	HACR and Switching Duty rated
Electrical Connection	Pressure plate

Complementary

Interrupt Rating	10 kA 120/240 V AC 10 kA 120 V AC
Number Of Panel Spaces	1
Wire Size	AWG 14...AWG 8 copper or aluminum
Tightening Torque	35.40 lbf.in (4 N.m)
Height	2.99 in (76 mm)
Width	0.75 in (19 mm)
Depth	2.91 in (74 mm)
Net Weight	0.30 lb(US) (0.136 kg)

Environment

Certifications	UL listed CSA
Ambient Rating	104 °F (40 °C)

Packing Units

Unit Type Of Package 1	PCE
Number Of Units In Package 1	1
Package 1 Height	0.70 in (1.778 cm)
Package 1 Width	3.00 in (7.62 cm)
Package 1 Length	3.40 in (8.636 cm)

Package 1 Weight	4.48 oz (127.006 g)
Unit Type Of Package 2	BB1
Number Of Units In Package 2	10
Package 2 Height	3.50 in (8.89 cm)
Package 2 Width	3.30 in (8.382 cm)
Package 2 Length	7.90 in (20.066 cm)
Package 2 Weight	2.85 lb(US) (1.293 kg)
Unit Type Of Package 3	CAR
Number Of Units In Package 3	100
Package 3 Height	8.50 in (21.59 cm)
Package 3 Width	17.10 in (43.434 cm)
Package 3 Length	8.00 in (20.32 cm)
Package 3 Weight	29.00 lb(US) (13.154 kg)

Contractual warranty

Warranty 18 months

Sustainability



Green Premium™ label is Schneider Electric's commitment to delivering products with best-in-class environmental performance. Green Premium promises compliance with the latest regulations, transparency on environmental impacts, as well as circular and low-CO₂ products.

Guide to assessing product sustainability is a white paper that clarifies global eco-label standards and how to interpret environmental declarations.

[Learn more about Green Premium >](#)

[Guide to assess a product's sustainability >](#)



RoHS/REACH

Well-being performance

Toxic Heavy Metal Free

Mercury Free

RoHS Exemption Information Yes

Halogen Free Product

Certifications & Standards

Reach Regulation

[REACH Declaration](#)

Eu RoHS Directive

Compliant with Exemptions

China RoHS Regulation

[China RoHS declaration](#)

Product out of China RoHS scope. Substance declaration for your information

Circularity Profile

No need of specific recycling operations

Product data sheet

Specifications

SQUARE D



Mini circuit breaker, QO, 15A, 1 pole, 120/240VAC, 10kA, bolt on

QOB115

Main

Product	Miniature circuit-breaker
Range	QO
Current Rating	15 A
Voltage Rating	120/240 V AC 120 V AC
Mounting Type	Bolt-on
Number Of Poles	1P
Circuit Breaker Type	Standard
Ratings	HACR and Switching Duty rated
Electrical Connection	Pressure plate

Complementary

Interrupt Rating	10 kA 120/240 V AC 10 kA 120 V AC
Number Of Panel Spaces	1
Wire Size	AWG 14...AWG 8 copper or aluminum
Tightening Torque	35.40 lbf.in (4 N.m)
Height	2.99 in (76 mm)
Width	0.75 in (19 mm)
Depth	2.91 in (74 mm)
Net Weight	0.28 lb(US) (0.127 kg)

Environment

Certifications	UL listed CSA
Ambient Rating	104 °F (40 °C)

Packing Units

Unit Type Of Package 1	PCE
Number Of Units In Package 1	1
Package 1 Height	3.30 in (8.382 cm)
Package 1 Width	0.80 in (2.032 cm)
Package 1 Length	3.40 in (8.636 cm)

Package 1 Weight	4.48 oz (127.0 g)
Unit Type Of Package 2	BB1
Number Of Units In Package 2	10
Package 2 Height	3.30 in (8.382 cm)
Package 2 Width	0.80 in (2.032 cm)
Package 2 Length	7.80 in (19.812 cm)
Package 2 Weight	2.85 lb(US) (1.293 kg)
Unit Type Of Package 3	CAR
Number Of Units In Package 3	100
Package 3 Height	8.00 in (20.32 cm)
Package 3 Width	7.90 in (20.066 cm)
Package 3 Length	17.10 in (43.434 cm)
Package 3 Weight	29.05 lb(US) (13.177 kg)

Contractual warranty

Warranty 18 months

Sustainability



Green Premium™ label is Schneider Electric's commitment to delivering products with best-in-class environmental performance. Green Premium promises compliance with the latest regulations, transparency on environmental impacts, as well as circular and low-CO₂ products.

Guide to assessing product sustainability is a white paper that clarifies global eco-label standards and how to interpret environmental declarations.

[Learn more about Green Premium >](#)

[Guide to assess a product's sustainability >](#)



RoHS/REACH

Well-being performance

Toxic Heavy Metal Free

Mercury Free

RoHS Exemption Information Yes

Halogen Free Product

Certifications & Standards

Reach Regulation

[REACH Declaration](#)

Eu RoHS Directive

Compliant with Exemptions

China RoHS Regulation

[China RoHS declaration](#)

Product out of China RoHS scope. Substance declaration for your information

Circularity Profile

No need of specific recycling operations



Autotransformers

Autotransformers

General Purpose Autotransformers

HPS three phase autotransformers are available for applications where small voltage corrections are necessary in a distribution system. They are frequently used as an economical alternative to general purpose distribution isolation transformers to adjust the supply voltage to match specific load requirements when load isolation from the supply line is not required. Autotransformers can be used as either a step-up or step-down transformer.

THREE PHASE STANDARD SPECIFICATIONS



3 TO (15)(30)(45) kVA



(30)(45)(75) TO 500 kVA



UL Listed:	File: E258346 (UL1604, Class I, Division 2)	File: E112313
CSA Certified:	File: LR3902	File: LR3902
ABS Type Approval:	Certificate No.: 04-HS435190/1-PDA	Optional
Frequency:	60 Hz	60 Hz
Insulation System:	130°C (80°C rise) standard on all units 180°C (115°C rise) standard on all encapsulated units	200°C (130°C rise) or 220°C (150°C rise) available
Encapsulation:	Select units are encapsulated with electrical grade silica sand and resin compounds	Not Applicable (ventilated core and coil)
Enclosure Type:	Heavy duty type 3R Optional type 4, 4X (Stainless steel) and 12	Heavy duty type 3R Optional type 4, 4X (Stainless steel) and 12
Termination:	Top accessible separate high and low voltage lead wires or copper tabs	Front accessible compartment with high and low voltage terminals; connectors suitable for copper cables provided where indicated
Conduit Knock-Outs:	Standard side and rear knock-outs on all units (no knock-outs on Stainless Steel enclosures)	Standard side knock-outs on all units (no knock-outs on Stainless Steel enclosures)
Impedance:	Less than 3%	Less than 3%
Mounting:	Refer to tables on the next page	Refer to tables on next page
Sound Level:	Meets NEMA ST-20 standards (Optional low noise available on request)	Meets NEMA ST-20 standards (Optional low noise available on request)

Other voltages not listed are available upon request. Please contact customer service for details, price and availability.
Note: Autotransformers incorporate a single winding design without isolation in a Wye configuration.

Selection Tables



Hammond
Power Solutions



Three Phase, NEMA 3R Style Enclosures

600Y - 480Y Volts

480Y - 380Y Volts** (Alternate Rating)

60 Hz

50/60 Hz**

kVA		Catalog Number	Case Style	Approx. Dimensions (Inches)			Approx. Weight (Lbs.)	Mtg Type W - Wall F - Floor	Wiring Diagram
60 Hz	50/60 Hz			Width	Depth	Height			
3	2.4	Y003PKCB3L0U	NQT2	9.38	4.94	8.63	19	W	SCD 24
6	4.8	Y006PKCB3L0U	NQT2	9.38	4.94	8.63	26	W	SCD 24
9	7.2	Y009PKCB3L0U	NQT3	12.38	5.44	11.13	50	W	SCD 24
15	12	Y015PKCB3L0U	NQT3	12.38	5.44	11.13	60	W	SCD 24
30	24	Y030PKCF3L0U	NQT4	15.19	6.94	16.39	135	W	SCD 24
45	36	Y045PKCN3L0U	NH5	19.40	20.20	21.50	130	F or W*	SCD 24
75	60	Y075PKCN3L0U	NH5	19.40	20.20	21.50	170	F or W*	SCD 24
112.5	90	Y112PKCH3L0U	NH6	23.90	25.00	28.75	245	F or W*	SCD 24
150	120	Y150PKCH3L0U	NH6	23.90	25.00	28.75	285	F or W*	SCD 24
225	180	Y225PKCH3L0U	NH6	23.90	25.00	28.75	360	F or W*	SCD 24
300	240	Y300PKCH3L0U	NH3	26.00	21.00	38.00	500	F or W*	SCD 24
500	400	Y500PKCH3L0U	NH3	26.00	21.00	38.00	650	F or W*	SCD 24

**Note: The kVA rating must be reduced for operation at the alternative rating 480Y, 380Y (50/60 Hz). Please refer to the 50/60 Hz column under kVA in the above table. 50/60 Hz only available at 480-380Y rating. Above units from 3 kVA to 30 kVA are encapsulated.

*WALL MOUNTING KIT AND/OR DRIP PLATE KIT REQUIRED.

600Y, 480Y - 400Y, 240Y 208Y Volts

60 Hz

kVA	Catalog Number	Case Style	Approx. Dimensions (Inches)			Approx. Weight (Lbs.)	Mtg Type W - Wall F - Floor	Wiring Diagram
			Width	Depth	Height			
3	Y003QTCB3L0U	NQT3	12.38	5.44	11.13	49	W	SCD 14
6	Y006QTCB3L0U	NQT3	12.38	5.44	11.13	69	W	SCD 14
9	Y009QTCF3L0U	NQT4	15.19	6.94	16.39	138	W	SCD 14
15	Y015QTCF3L0U	NQT4	15.19	6.94	16.39	170	W	SCD 14
30	Y030QTCN3L0U	NH5	19.40	20.20	21.50	210	F or W*	SCD 14
45	Y045QTCN3L0U	NH6	23.90	25.00	28.75	305	F or W*	SCD 14
75	Y075QTCN3L0U	NH6	23.90	25.00	28.75	400	F or W*	SCD 14
112.5	Y112QTCN3L0U	NH3	26.00	21.00	38.00	585	F or W*	SCD 14
150	Y150QTCN3L0U	NH3	26.00	21.00	38.00	685	F or W*	SCD 14
225	Y225QTCN3L0U	NH4	32.00	29.50	41.00	980	F	SCD 14

Above units from 3 kVA to 15 kVA are encapsulated.

*WALL MOUNTING KIT AND/OR DRIP PLATE KIT REQUIRED.

240Y, 216Y - 208Y

60 Hz

kVA	Catalog Number	Case Style	Approx. Dimensions (Inches)			Approx. Weight (Lbs.)	Mtg Type W - Wall F - Floor	Wiring Diagram
			Width	Depth	Height			
3	Y003CECB3L0U	NQT2	9.38	4.94	8.63	19	W	SCD 15
6	Y006CECB3L0U	NQT2	9.38	4.94	8.63	28	W	SCD 15
9	Y009CECB3L0U	NQT3	12.38	5.44	11.13	49	W	SCD 15
15	Y015CECB3L0U	NQT3	12.38	5.44	11.13	58	W	SCD 15
30	Y030CECF3L0U	NQT4	15.19	6.94	16.39	115	W	SCD 15
45	Y045CECF3L0U	NQT4	15.19	6.94	16.39	130	W	SCD 15
75	Y075CECN3L0U	NH5	19.40	20.20	21.50	170	F or W*	SCD 15

Above units from 3 kVA to 45 kVA are encapsulated.

*WALL MOUNTING KIT AND/OR DRIP PLATE KIT REQUIRED.

Units provided with neutral terminals. Autotransformers without Neutrals are available. Please contact your HPS Sales Representative.

Products listed on this page are available with optional 'CE Mark'. Please consult our sales office.

Neutral Terminals

The part numbers listed are provided with neutral terminals. Autotransformers without neutral terminals are available as a special order. Please consult your HPS Sales Representative.

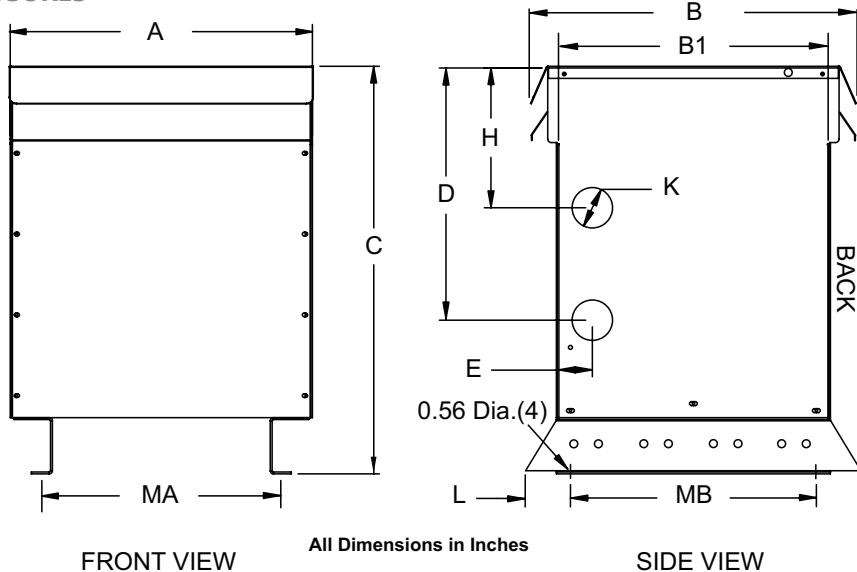
Autotransformers with neutrals provide the customer with a common (H0/X0) neutral connection point that is connected by the factory to the middle point of the 'Y' winding configuration. When selecting this option, both the line and load side neutral cables must be connected to the neutral terminals in order to ensure the proper operation of the autotransformer.

When installing the autotransformer special attention should be given to the neutral and grounding connections to comply with the above and also avoid possible multiple grounding situations. Please follow all applicable codes and standards and refer to the local electrical code requirements for grounding and short circuit protection of a three phase autotransformer. When necessary please review your specific application with the local inspection agency.

For more information, please visit our FAQ section of our website, <https://www.hammondpowersolutions.com/en/Resources/categories/frequently-asked-questions>.

TYPE 3R ENCLOSURE DIMENSIONAL DRAWINGS

'NH' SERIES ENCLOSURES



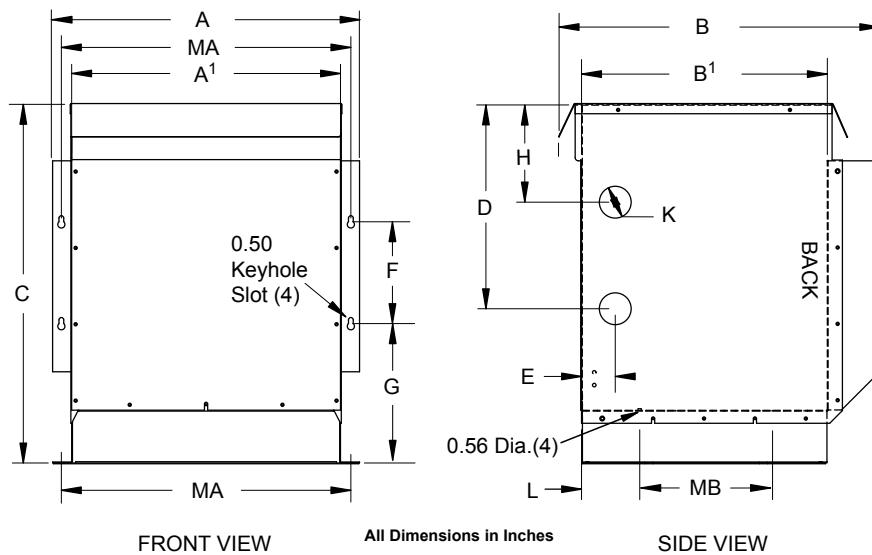
Case Style	Dimensions in Inches											
	A	B	B ¹	C	D	E	H	K ¹	L	MA	MB	
NH3	26.00	25.00	24.00	38.00	24.00	2.50	14.00	2.00 X 3.00	2.50	21.50	19.00	
NH4	32.00	29.50	28.50	41.00	24.00	2.50	12.00	2.00 X 3.00	2.50	23.50	23.50	

Note: Mounting hole dimension is 0.56" diameter.

¹ Knockout (K) sizes are actual diameters of knockout, not conduit sizes.

Refer to page 7 for conduit sizes.

OPTIONAL TYPE 4, 12 AND STAINLESS STEEL ENCLOSURES ARE AVAILABLE.



Case Style	Dimensions in Inches													
	A	A ¹	B	B ¹	C	D	E	F	G	H	K ¹	L	MA	MB
NH5	19.40	16.75	20.20	15.00	21.50	12.00	2.00	7.00	7.81	6.00	1.38 X 1.75	2.80	18.00	9.00
NH6	23.90	21.50	25.00	19.50	28.75	17.00	2.00	8.00	10.29	8.50	1.38 X 2.50	5.20	22.75	9.00

Note: Mounting hole dimension is 0.56" diameter.

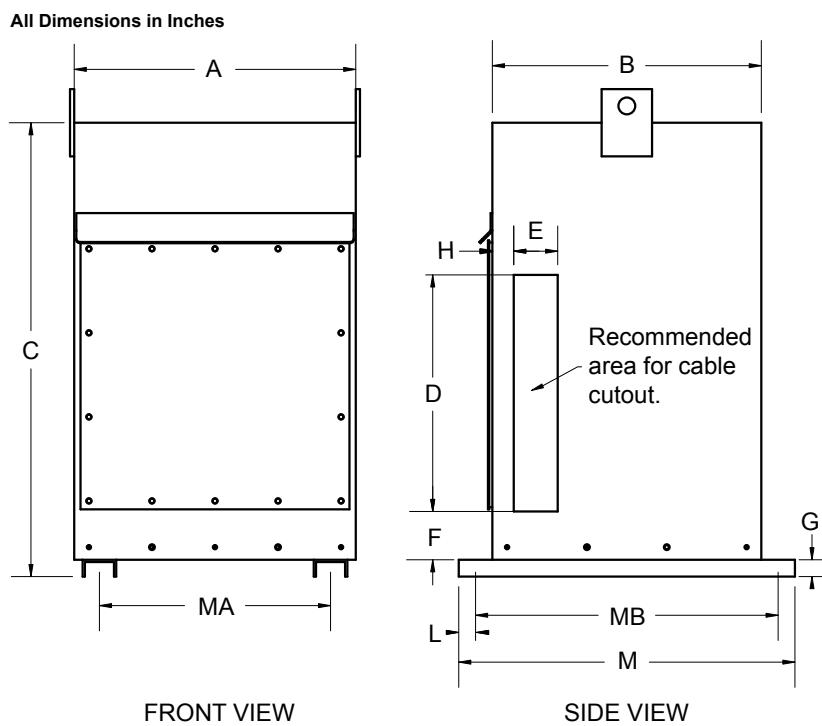
¹ Knockout (K) sizes are actual diameters of knockout, not conduit sizes.

Refer to page 7 for conduit sizes.

OPTIONAL TYPE 4, 12 AND STAINLESS STEEL ENCLOSURES ARE AVAILABLE.

Enclosure Drawings

OPTIONAL TYPE 4 & 12 ENCLOSURE DIMENSIONAL DRAWINGS 'NH-N4 & NH-N12' SERIES ENCLOSURES



Case Style	Dimensions in Inches											
	A	B	C	D	E	F	G	H	L	M	MA	MB
NH5-N4, NH5-N12	16.75	16.00	27.00	16.00	4.00	4.00	1.00	2.00	1.00	20.00	13.75	18.00
NH6-N4, NH6-N12	21.50	21.00	41.00	24.00	5.00	4.00	1.00	2.00	1.00	25.00	17.00	23.00
NH3-N4, NH3-N12	28.00	23.00	55.50	32.00	6.00	4.00	1.50	2.00	1.00	27.00	21.50	25.00
NH4-N4, NH4-N12	34.00	27.00	61.50	36.00	7.00	4.00	1.50	2.00	1.00	31.00	23.50	29.00

Note: Mounting hole dimension is 0.69" diameter.

Optional Type 4 & 12 Stainless Steel Enclosures

Optional type 4 and 12 rated stainless steel enclosures are available and are designed using either type 304 or 316 stainless steel in accordance with ANSI, NEMA, UL and ABS requirements for indoor, outdoor and marine duty applications.

TYPE 3R ENCLOSURE DIMENSIONAL DRAWINGS

'NQT' SERIES ENCLOSURES

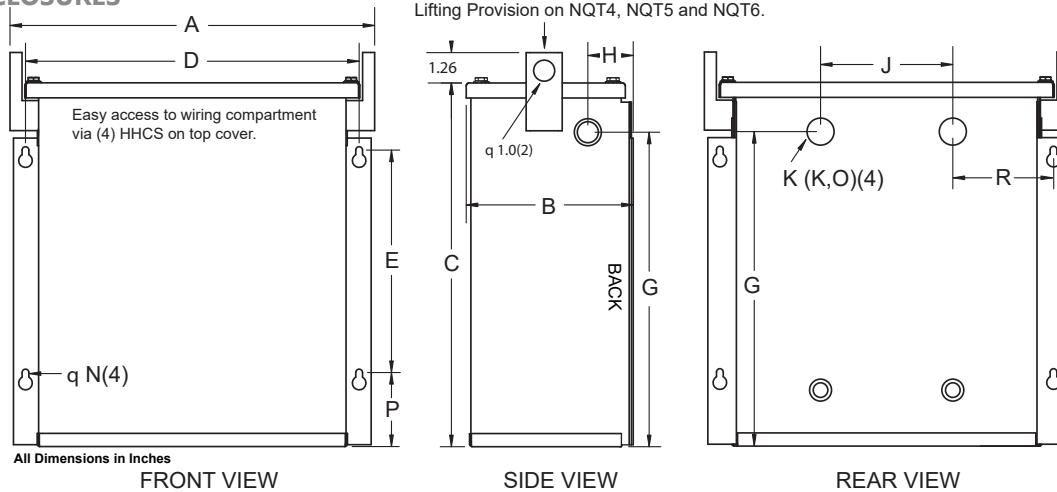


Figure 1

Case Style	Fig #	Dimensions in Inches														
		A	B	C	D	E	F	G	H	J	K ¹	L	M	N	P	R
NQT2	1	9.38	4.94	8.63	8.38	4.00	-	7.06	2.38	4.50	0.88 X 1.13	-	-	0.28	1.81	2.44
NQT3	1	12.38	5.44	11.13	11.38	6.50	-	9.50	2.38	5.50	0.88 X 1.13	-	-	0.28	1.81	3.44
NQT4	1	15.19	6.94	15.13	13.88	9.25	-	13.56	1.88	5.50	0.88 X 1.13	-	-	0.28	3.06	4.19

¹ Knockout (K) sizes are actual diameters of knockout, not conduit sizes.
Refer to the table below for conduit sizes.

OPTIONAL STAINLESS STEEL ENCLOSURES ARE AVAILABLE.

Optional Stainless Steel Enclosures

Optional type 4 and 12 rated stainless steel enclosures for encapsulated transformers are identical to the standard steel enclosure designs but are designed using either type 304 or 316 stainless steel in accordance with ANSI, NEMA, UL and ABS requirements for indoor, outdoor and marine duty applications.

Conduit Size vs. Actual Knockout Size Reference Table

Standard Conduit Size	Actual Knockout Diameter
1/2"	7/8"
3/4"	1 1/8"
1"	1 3/8"
1 1/4"	1 3/4"
1 1/2"	2"
2"	2 1/2"
2 1/2"	3"
3"	3 5/8"
3 1/2"	4 1/8"

Please note the above table is not applicable for Stainless Steel enclosures.

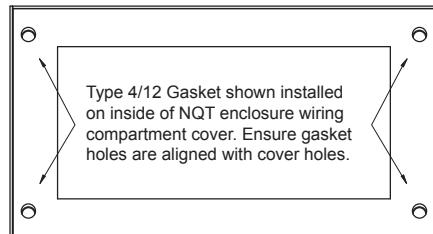
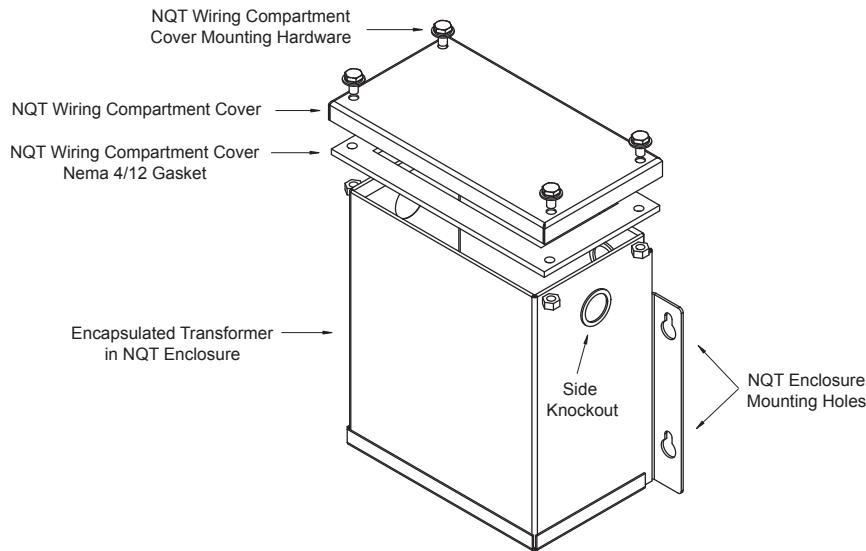
Enclosure Mounting Kits

NQT ENCLOSURE SERIES TYPE 4/12 GASKET KITS

Optional Type 4/12 Gasket Kits

Standard type 3R rated NQT enclosures can easily be converted to a type 4 or 12 rating by ordering and installing the appropriate gasket kit as listed in the table below.

Enclosure Style	Gasket Kit P/N
NQT2	NQT2GK
NQT3	NQT3GK
NQT4	NQT4GK



ACCESSORIES

ENCLOSURE MOUNTING KITS

If wall and/or ceiling mounting is desired for a transformer, optional mounting kits can be ordered separately. These mounting kits are NOT available for all enclosure case styles. Therefore, it is important that you confirm your enclosure case style, then use the selection table to the right to determine if A) a mounting kit is available and B) determine the correct HPS "Mounting Kit" part number that you must order. One kit is required for each transformer.

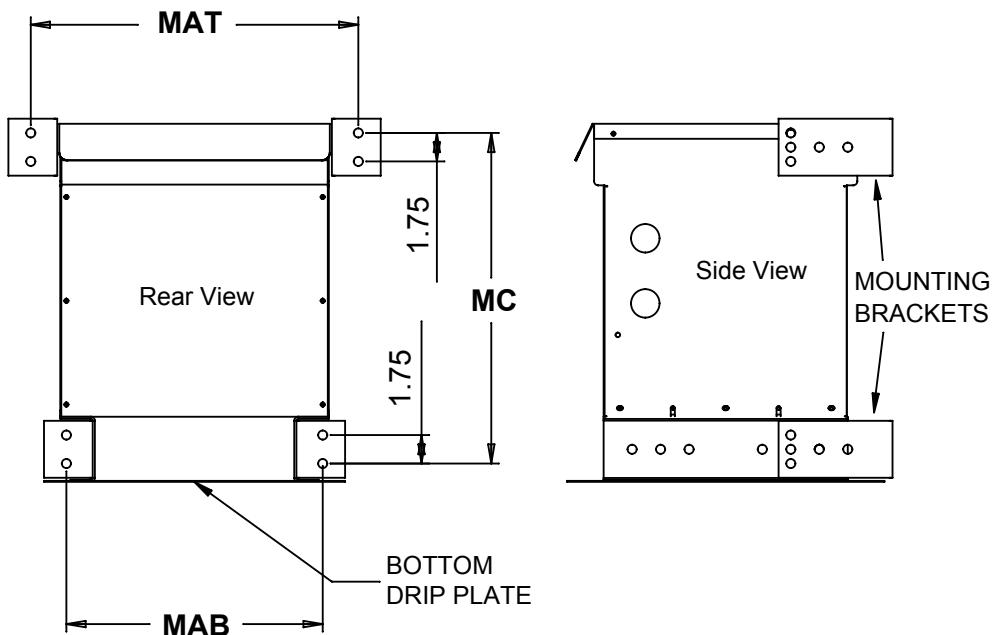
Note: Some of the mounting kits can be used for both wall and ceiling mount, while others are for wall mounting only. The table indicates which mounting methods are available for each kit.

Enclosure Case Style	Wall Mount Available	Ceiling Mount Available	HPS Mounting Kit P/N
NH3	Yes	Yes	NW2
NH4	No	No	N/A
NH5	Yes	Yes	NH5DP
NH6	Yes	Yes	NH6DP

NW2 WALL/CEILING MOUNTING KITS

The following drawings detail the wall and ceiling mounting dimensions required and method by which the NW2 kits are installed on the NH3 enclosures.

NW2 WALL MOUNT - MOUNTING DIMENSIONS

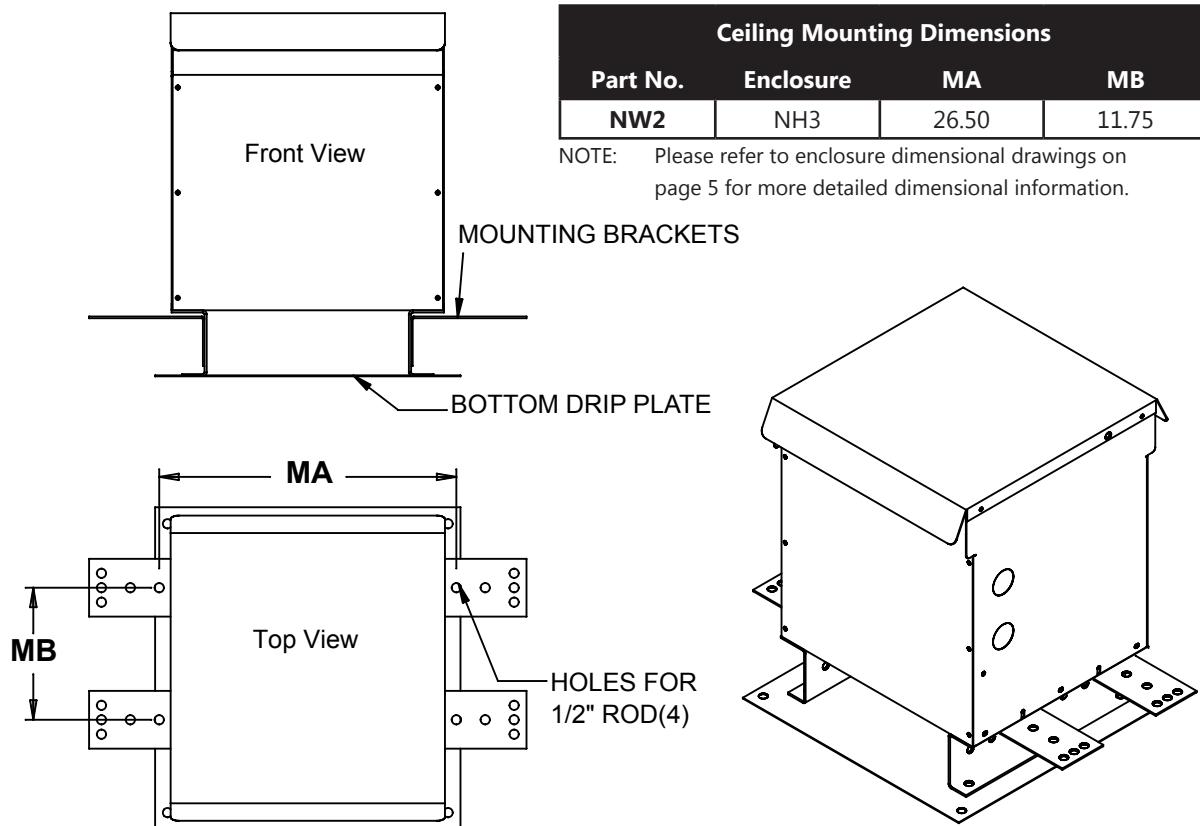


Wall Mounting Dimensions				
Part No.	Enclosure	MAT	MAB	MC
NW2	NH3	29.375	23.50	36.50

NOTE: Please refer to enclosure dimensional drawings on page 7 for more detailed dimensional information.

Enclosure Wall Mounting Dimensions

NW2 CEILING MOUNT - MOUNTING DIMENSIONS



Ceiling Mounting Dimensions

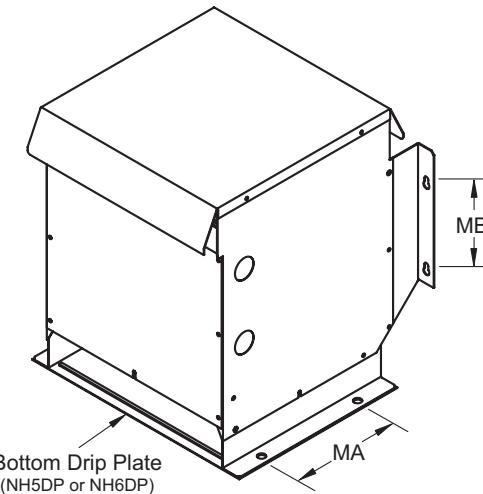


NH5DP & NH6DP WALL/CEILING MOUNTING KITS

The NH5 and NH6 enclosures are designed with integral wall mounting capabilities. However, when you wall mount them, you must also install the bottom drip plate as shown below. The "MB" dimensions listed in the table below indicate the location for the wall mounting hardware.

For ceiling mounting of the NH5 and NH6, refer to the "MA" dimensions listed in the table below and hang the enclosure using appropriate sized ceiling hanger rods. However, you must be sure to install the bottom drip plate to the bottom of the enclosure, then bring the hanger rod down through both the enclosure bottom mounting holes and through the drip plate mounting holes and install mounting hardware.

NOTE: Do not ceiling mount either the NH5 or NH6 enclosures without installing the bottom drip plate. All mounting hardware should be rated Grade 8 or higher.



Mounting Kit P/N	Enclosure Style	MA Dimension	MB Dimension
NH5DP	NH5	9.00	7.00
NH6DP	NH6	9.00	8.00

NOTE: Please refer to enclosure dimensional drawings on page 5 for more detailed dimensional information.

Anti-Vibration Pad

ANTI-VIBRATION PAD AND VIBRATION ISOLATOR KITS

All standard transformers come with installed internal vibration absorbing pads to minimize noise during operation. Optional external "anti-vibration" pad and "vibration isolator" (for higher noise dampening) kits can be used to reduce operating noise even further. All are resistant to industrial contaminants like oils, acids and alkalies.

Part No.	Case Style	Description
P1	NH Series	Set of four (4) rubber anti-vibration pads which replace the standard steel enclosure washers



All Anti-Vibration Pad kits and Vibration Isolator kits contain a set of four (4) pads or isolators. Therefore only one kit is required per transformer.

Part No.	Transformer Weight (Lb)	Description
NMP	Up to 340 lbs	
NMP2	341 to 680 lbs	
NMP3	681 to 1040 lbs	
NMP4	1041 to 1740 lbs	
NMP5	1741 to 2330 lbs	
NMP6	2331 to 3450 lbs	
NMP7	3451 to 4690 lbs	Set of four (4) molded neoprene and steel plate assemblies that virtually eliminate vibration noise between the transformer and the mounting surface.



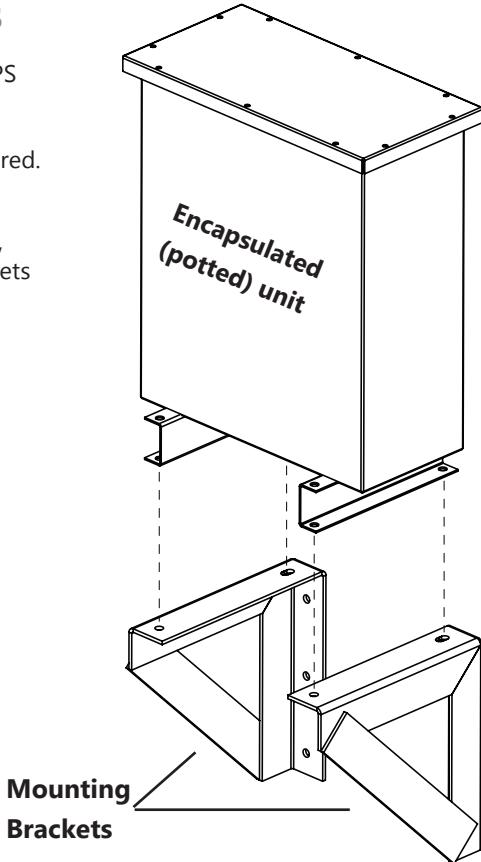
NQTW1 and NQTW2 Wall Mounting Kits

The **NQTW1** and **NQTW2** wall mounting kits are specifically designed for HPS commercial or industrial encapsulated (potted) distribution transformer units up to a maximum of 45kVA or 800 pounds (363 kg). These mounting kits are designed for encapsulated (potted) units only, no drip plate is included/required. Please contact HPS customer service if you have any questions.

Note: Always measure and secure mounting brackets to the wall surface first, then lift the transformer (using appropriate lifting equipment) onto the brackets and attach using minimum Grade 8 hardware.

Enclosure Case Style	Mounting Type	Wall Mounting Kit Part Number
NQT3-NQT4	Wall	Included

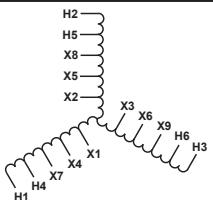
*Applies to HPS Fortress line only.



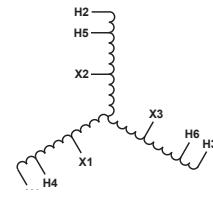
Electrical Schematics & Connection Drawings

ELECTRICAL SCHEMATICS AND CONNECTION DIAGRAMS

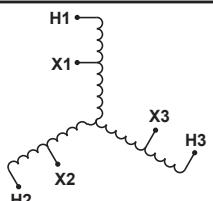
SCD 14

SCHEMATIC	CONNECTIONS		
	Connect to	Step Down	Step Up
	Lines from Supply	H1, H2, H3	X1, X2, X3
	Lines to Load	X1, X2, X3	H1, H2, H3

SCD 15

SCHEMATIC	CONNECTIONS		
	Connect to	Step Down	Step Up
	Lines from Supply	H1, H2, H3	X1, X2, X3
	Lines to Load	X1, X2, X3	H1, H2, H3

SCD 24

SCHEMATIC	CONNECTIONS		
	Connect to	Step Down	Step Up
	Lines from Supply	H1, H2, H3	X1, X2, X3
	Lines to Load	X1, X2, X3	H1, H2, H3

Notes



CANADA

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marketing-india@hammondpowersolutions.com

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Hammond Power Solutions SpA
Tel: +49 (152) 08800468
sales-emea@hammondpowersolutions.com

DESCRIPTION

The Encounter™ redefines ambient lighting by being the first fixture to blend modern contemporary styling with the innovative WaveStream™ technology to deliver exceptional performance and superior energy savings. Encounter's highly efficient LED system with advance optical design delivers an unparalleled combination of optimal light uniformity for enhanced visual comfort and superior efficiency for greater energy savings.

Encounter is compatible with all of today's popular ceiling systems and available in a variety of configurations for application versatility. Its perfect balance of form and function make it an ideal choice for commercial office spaces, schools, hospitals, retail and other indoor ambient applications.

SPECIFICATION FEATURES

Construction

Shallow 3-1/4" deep housing is extruded aluminum frame and injected molded composite end plates. End plates are securely attached with screws for strength and rigidity and the elimination of gaps. End plates have accessory grid-lock feature for safety and convenience. Four auxiliary fixture end suspension points are provided. Large access plate for supply connection.

Controls

Metalux LED luminaires come standard with 0-10V dimming drivers (1% standard).

Options compatible with Eaton's Connected Lighting Systems:

- WaveLinx sensor
- LumaWatt Pro sensor
- SVPD sensor
- DLVP sensor and driver
- Fifth Light DALI driver

Other options include step-dimming and 3rd party drivers. Refer to the Connected Lighting options page and ordering information for more details.

Electrical

Long-life LED system coupled with electrical driver to deliver optimal performance. LED's available in 3000K, 3500K, 4000K or 5000K with a minimum CRI of 80. Projected life is 100,000 hours at 92% lumen output. Electronic drivers are available for 120-277V applications.

Emergency Battery Pack Option

Optional 120V-277V integral emergency battery pack is available in 7-watts or 14-watts to meet critical life-safety lighting requirements. The 90-minute batteries provide constant power to the LED system, ensuring code-compliance. A test switch/indicator button can be tested safely from the ground using a laser pointer, while the patented EZ Key prevents accidental discharge of the battery during construction. Emergency/generator transfer options available – see ordering information for details.

Driver Access

Drivers can be accessed via plenum.

Catalog #		Type
Project		
Comments		Date
Prepared by		



24EN
LED

2' X 4' TROFFER
LED MODULE

Specification Grade Troffer



CERTIFICATION DATA

cULus - 1598 and 2043**

Damp Location Listed

CSA

IC Rated

LM79/LM80 Compliant

ROHS Compliant

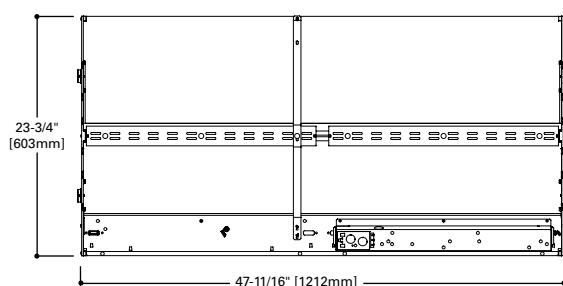
DesignLights Consortium® Qualified

NOM Compliant

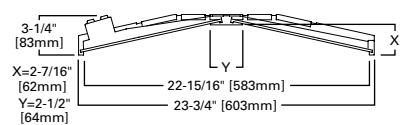
*See Drywall Frame Kit Accessory in Ordering Information section.

**Fixture construction is suitable for use in Air-handling and plenum rated spaces in accordance with Section 300.22 (C) of the National Electrical Code, Section 4.3.11.2.6.5 of NFPA 90A and Section 602.2.1.4 of ICC.

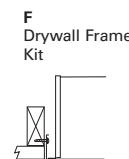
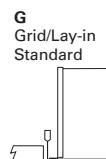
MOUNTING DATA



LAMP CONFIGURATIONS



CEILING COMPATIBILITY

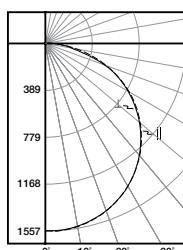


G Grid/Lay-in Standard	F Drywall Frame Kit	Ceiling Type	Trim Type
Exposed Grid	G		
Concealed T	G or T		
Slot Grid	G or T		
Flange	*		

LINEAR DISCONNECT

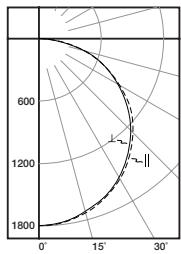
Safe and convenient means of disconnecting power



PHOTOMETRICS**24EN-LD2-45-UNV-L835-CD1-U**

Electronic Driver
Linear LED 3500K
Spacing criterion:
(II) 1.29 x mounting height, (\perp) 1.29 x mounting height
Lumens: 4656
Input Watts: 38W
Efficacy: 122.5 lm/W
Test Report: 24EN-LD2-45-UNV-L835-CD1-U.IES

Candlepower			
Angle	Along II	45°	Across \perp
0	1552	1552	1552
5	1552	1544	1548
10	1533	1525	1529
15	1502	1495	1499
20	1461	1454	1459
25	1408	1401	1408
30	1343	1336	1343
35	1269	1261	1268
40	1188	1175	1182
45	1093	1078	1086
50	991	974	983
55	881	860	869
60	759	735	751
65	628	602	625
70	490	470	469
75	349	334	282
80	206	175	180
85	82	77	71
90	0	0	0

**24EN-LD2-54-UNV-L835-CD1-U**

Electronic Driver
Linear LED 3500K
Spacing criterion:
(II) 1.3 x mounting height, (\perp) 1.3 x mounting height
Lumens: 5410
Input Watts: 43.0W
Efficacy: 125.8 lm/W
Test Report: 24EN-LD2-54-UNV-L835-CD1-U.IES

Candlepower

Angle	Along II	45°	Across \perp
0	1791	1791	1791
5	1792	1782	1784
10	1770	1759	1761
15	1734	1721	1723
20	1684	1670	1673
25	1621	1609	1610
30	1550	1533	1531
35	1465	1444	1439
40	1372	1348	1344
45	1270	1241	1238
50	1153	1124	1125
55	1029	997	998
60	893	860	867
65	743	706	721
70	588	558	550
75	423	401	345
80	258	223	226
85	110	106	101
90	0	0	0

Coefficients of Utilization

Effective floor cavity reflectance 20%											
rc	80%	70%	50%	30%	10%	0%	50	30	10	50	30
rw	70	50	30	10	70	50	30	10	50	30	10
RCR	0	119	119	119	119	116	116	116	111	111	106
1	109	104	99	95	106	101	97	94	97	94	85
2	98	90	83	77	96	88	82	76	84	79	74
3	90	79	70	64	87	77	69	63	74	67	62
4	82	70	61	54	79	68	60	53	66	61	58
5	75	62	53	46	73	61	52	46	59	51	45
6	69	56	47	40	67	55	46	40	53	44	39
7	64	50	42	35	62	50	41	35	48	40	34
8	60	46	37	31	58	45	37	31	44	36	31
9	56	42	34	28	54	42	34	28	40	33	28
10	52	39	31	26	51	38	31	25	37	30	25

Zonal Lumen Summary

Zone	Lumens	% Fixture
0-30	1216	26.1
0-40	2007	43.1
0-60	3616	77.7
0-90	4656	100.0
0-180	4656	100.0

Luminance Data

Angle in Deg	Average 0-Deg cd/sm	Average 45-Deg cd/sm	Average 90-Deg cd/sm
45	2368	2335	2351
55	2353	2296	2320
65	2277	2182	2263
75	2066	1974	1669
85	1436	1350	1248

Zonal Lumen Summary

Zone	Lumens	% Fixture
0-30	1398	25.8
0-40	2305	42.6
0-60	4164	77.0
0-90	5410	100.0
0-180	5410	100.0

LUMEN MAINTENANCE

Ambient Temperature	TM-21 Lumen Maintenance (100,000 hours)	Theoretical L70 (Hours)
25°C	> 92%	> 448,000

Non-IC data

90 CRI

Lumen Adjustment Factors 80>90 CRI	
3000K	0.861
3500K	0.864
4000K	0.883
5000K	0.86

Example of Lumen Adjustment Calculation

24EN-LD2-45-UNV-L835-CD1-U
at 90CRI at 3500K

Lumen Adjustment Factor = 0.864

Total Light Output =
 $4,651 \text{ lm} \times 0.864 = 4,022 \text{ lm}$ Efficacy = $\frac{4,022 \text{ lm}}{38 \text{ W}} = 105.8 \text{ lm/W}$

ENERGY AND PERFORMANCE DATA BY CATALOG NUMBER

Stock or MTO*	Catalog Logic (Curved)	Delivered Lumens	Watts	Efficacy (LPW)
MTO	24EN-LD2-30-UNV-L830-CD1-U	3023	24.6	123
MTO	24EN-LD2-30-UNV-L835-CD1-U	3117	24.6	127
MTO	24EN-LD2-30-UNV-L840-CD1-U	3180	24.6	129
MTO	24EN-LD2-30-UNV-L850-CD1-U	3460	24.6	141
MTO	24EN-LD2-34-UNV-L830-CD1-U	3502	28.7	122
MTO	24EN-LD2-34-UNV-L835-CD1-U	3610	28.7	126
MTO	24EN-LD2-34-UNV-L840-CD1-U	3682	28.7	128
MTO	24EN-LD2-34-UNV-L850-CD1-U	4008	28.7	140
MTO	24EN-LD2-40-UNV-L830-CD1-U	4079	33.9	120
MTO	24EN-LD2-40-UNV-L835-CD1-U	4204	33.9	124
MTO	24EN-LD2-40-UNV-L840-CD1-U	4289	33.9	127
MTO	24EN-LD2-40-UNV-L850-CD1-U	4667	33.9	138
MTO	24EN-LD2-45-UNV-L830-CD1-U	4516	38.0	119
STOCK	24EN-LD2-45-UNV-L835-CD1-U	4656	38.0	123
STOCK	24EN-LD2-45-UNV-L840-CD1-U	4748	38.0	125
MTO	24EN-LD2-45-UNV-L850-CD1-U	5168	38.0	136
MTO	24EN-LD2-49-UNV-L830-CD1-U	4946	42.2	117
MTO	24EN-LD2-49-UNV-L835-CD1-U	5099	42.2	121
MTO	24EN-LD2-49-UNV-L840-CD1-U	5200	42.2	123
MTO	24EN-LD2-49-UNV-L850-CD1-U	5659	42.2	134
MTO	24EN-LD2-54-UNV-L830-CD1-U	5248	43.0	122
STOCK	24EN-LD2-54-UNV-L835-CD1-U	5410	43.0	126
STOCK	24EN-LD2-54-UNV-L840-CD1-U	5518	43.0	128
MTO	24EN-LD2-54-UNV-L850-CD1-U	6005	43.0	140
MTO	24EN-LD2-58-UNV-L830-CD1-U	5663	47.0	120
MTO	24EN-LD2-58-UNV-L835-CD1-U	5838	47.0	124
MTO	24EN-LD2-58-UNV-L840-CD1-U	5955	47.0	127
MTO	24EN-LD2-58-UNV-L850-CD1-U	6480	47.0	138
MTO	24EN-LD2-67-UNV-L830-CD1-U	6529	56.1	116
STOCK	24EN-LD2-67-UNV-L835-CD1-U	6731	56.1	120
STOCK	24EN-LD2-67-UNV-L840-CD1-U	6866	56.1	122
MTO	24EN-LD2-67-UNV-L850-CD1-U	7471	56.1	133
MTO	24EN-LD2-70-UNV-L830-CD1-U	6812	60.2	113
MTO	24EN-LD2-70-UNV-L835-CD1-U	7023	60.2	117
MTO	24EN-LD2-70-UNV-L840-CD1-U	7163	60.2	119
MTO	24EN-LD2-70-UNV-L850-CD1-U	7796	60.2	130
MTO	24EN-LD2-74-UNV-L830-CD1-U	7259	63.6	114
MTO	24EN-LD2-74-UNV-L835-CD1-U	7484	63.6	118
MTO	24EN-LD2-74-UNV-L840-CD1-U	7634	63.6	120
MTO	24EN-LD2-74-UNV-L850-CD1-U	8307	63.6	131

*Made to order (MTO) requires a typical two week lead time.

ORDERING INFORMATION

SAMPLE NUMBER: 24EN-LD2-67-UNV-L835-CD1-SVPD1-U

Rating Blank=Standard ATW-SW4 =Chicago Rated ⁽⁶⁾	Lamp Type LD2 =LED 2.0	Optics Blank=Standard	Driver Type CD =0-10V Dimming Driver (1%-100% Dimming) SR =Sensor-ready Dimming Driver for LWIPD1 option (1%-100% Dimming) ⁽⁸⁾ 5LTD =Fifth Light DALI Driver (10%-100% Dimming) ^{(10), (E)} 5LTHD =Fifth Light Dimming Driver (1%-100% Dimming) ^{(7), (E)} LV1 =DLVP Dimming Driver (0%-100% Dimming) ^(C) SD =Step Dimming Driver (50% or 100% Dimming) ⁽³⁾ LH =Lutron HiLume (LDE1 series) 1%-100% EcoSystem Driver with Soft-on Fade to Black dimming ^(F) L5 =Lutron 5 Series (LDE5-Series) 5%-100% EcoSystem Driver ^(F) LU =Lutron HiLume (L3D series) 1%-100% EcoSystem/3-wire Driver ^(F)
Series⁽⁵⁾ 24EN =2' x 4' Encounter Series	Stock Lumen Outputs 45 =4500 Lumens 54 =5400 Lumens 67 =6700 Lumens	Voltage⁽¹⁾ UNV =Universal Voltage 120-277 347V =347 Volt ⁽⁴⁾ 48V =48 Volt Low-voltage (Class 2) ^(C)	
Air [Blank]=Standard A=Air (Vented) ⁽⁹⁾	MTO Lumen Outputs 30=3000 Lumens ^{(3), (10)} 34=3400 Lumens ^{(3), (10)} 40=4000 Lumens 49=4900 Lumens 58=5800 Lumens 70=7000 Lumens ⁽³⁾ 74=7400 Lumens ⁽³⁾	Options Emergency EL7W =7-watt, 120V-277V emergency battery pack installed ⁽²⁾ EL14W =14-watt 120V-277V emergency battery pack installed ⁽²⁾ ELV7W =7-watt, DLVP-compatible low voltage emergency battery pack installed ^(C) ELV14W =14-watt DLVP-compatible low voltage emergency battery pack installed ^(C) GTR2 =Bodine Generator Transfer Relay ⁽⁹⁾ ETRD =Iota Emergency Transfer Relay with dimming control ⁽⁹⁾	
	CCT L830 =3000K L835 =3500K L840 =4000K L850 =5000K L930 =3000K L935 =3500K L940 =4000K L950 =5000K	Flex A3/8-4/18GDIM =3/8" Flex with 0-10V Dimming Leads Multiple other configurations available. See below for details.	
Integrated Sensing Systems SWPD1 =WaveLinx Wireless Integrated Sensor ^(A) LWIPD1 =LumaWatt Pro Wireless Integrated Sensor ^(B) LWTPD1 =LumaWatt Pro Wireless Tile-mount Sensor ^(B) SLVPD1 =DLVP Low-voltage Integrated Sensor ^(C) SVPD1 =0-10V Stand-alone Integrated Sensor ^(D)	Packaging U=Unit Pack PALC=Job Pack, in carton	ACCESSORIES T3A END E.O. BRACKET PARTS BAG (Standard with fixture) DF-24-W =2' x 4' Drywall Frame Kit SK-24-WS =2' x 4' Shallow Surface Mount Kit SK-24-WT =2' x 4' Tall Surface Mount Kit DF10P-C _Decorator Dimmer, 0-10V SF10P- _Decorator Slide Dimmer, 0-10V ISHH-01 -Programming Remote for Integrated Sensor ^(D) ISHH-02 -Personal Control Remote for Integrated Sensor ^(D)	

NOTES: ⁽¹⁾Products also available in non-US voltages and frequencies for international markets. ⁽²⁾With integral test switch/indicator/laser test. For approximate delivered lumens multiply the lumens per watt of the desired fixture by the wattage of the emergency battery pack (100 lm/W x 7=700 lumens). IES-format photometry for luminaire under emergency operation available. ⁽³⁾Step-dim driver not available with 3000, 3400, 7000 and 7400 lumen options. ⁽⁴⁾347V emergency option not available. ⁽⁵⁾DesignLights Consortium® Qualified and classified for both DLC Standard and DLC Premium, refer to www.designlights.org for details. ⁽⁶⁾Chicago rated version does not allow for row mounting. ⁽⁷⁾Two drivers required for 5LTHD option for 6700 lumens and up. ⁽⁸⁾Air version is vented but does not meet air handling requirements. ⁽⁹⁾Used to bypass local control during outage. Must be used in conjunction with UL 1008 device (provided by others). GTR2 option includes 2 relays on fixtures with dimming drivers. ETRD option only requires one relay when used on a dimming fixture. Must specify voltage as 120V or 277V when ordering these devices. ⁽¹⁰⁾5LTD DALI option not available with 3000 and 3400 lumen packages.

Integrated Sensing and Control System Options

NOTES: Integrated options must be used in conjunction with the associated system and may not be compatible with other options or accessories. Please refer to the following ^(A)Consult WaveLinx system pages for additional details and compatibility. ^(B)Consult LumaWatt Pro system pages for additional details and compatibility. ^(C)Consult DLVP system pages for additional details and compatibility. ^(D)Consult SVPD series system pages for additional details and compatibility. ^(E)Consult Fifth Light system pages for additional details and compatibility. ^(F)Consult Marketplace Options - Lutron system pages for additional details and compatibility. Compatible only with driver series shown, and may require two or more drivers. Requires field commissioning to operate or dim. Contact Lutron at www.lutron.com.

Flexible Metal Conduit Options

Flex options available for 0-10V dimming control, DALI dimming control, emergency and night light functions. 72-inch factory-installed and pre-wired to driver, fitted to luminaire housing access plate with 90° enclosed FMC connector. Not all options may be combined and installation ratings vary by type.

A3/8-4/18GDIM series notes: Factory installed dimming option 3/8" flexible metal conduit with 2#18 power and ground wires and 2#18 UL-listed jacketed 0-10V +/- control wires. Meets UL 66, 83, 1479, 1569, 1581, 2556. NEC® 250.118, 300.22(C), 392, 396, 330, 501, 502, 503, 530, 504, 505, 518, 520, 530, 645, 72; Federal Specification A-A-59544 (formerly J-C-30B); all applicable OSHA and HUD Requirements. UL Classified 1-, 2-, and 3-hour through penetration with applicable fire stop product (not included). May be surface mounted, fished and/or embedded in plaster. Cable tray and approved raceway rated, install per NEC®; Environmental Air-Handling Space Installation per NEC® 300.22(C).

Specifications & dimensions subject to change without notice. Consult your Eaton Representative for availability and ordering information.

SHIPPING DATA

Catalog No.	Wt.
24EN-LD2-45	28 lbs.
24EN-LD2-54	28 lbs.
24EN-LD2-67	28 lbs.

INTEGRATED SENSOR

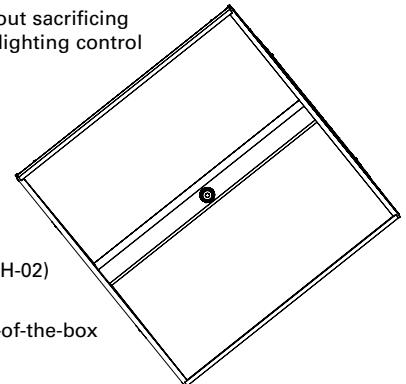
The Encounter and Encounter HP with Integrated Sensor technology provides automatic energy savings without sacrificing performance. Traditionally, these types of energy savings required coordination between the luminaire and a lighting control system. The Encounter delivers superior lighting with integrated occupancy and daylighting controls.

Capture the benefits of traditional lighting controls, without complicated coverage planning or special wiring. Ideal for new construction or retrofit, the Encounter delivers automatic ON to an energy saving light level, while ensuring lighting is turned OFF when the space is unoccupied.

The integral daylight sensor reduces the need for special daylight zone planning. Each luminaire will automatically adjust the light level based on reflected light beneath the sensor in a closed loop method.

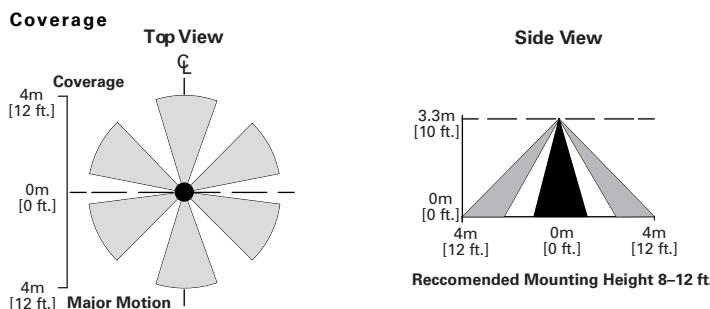
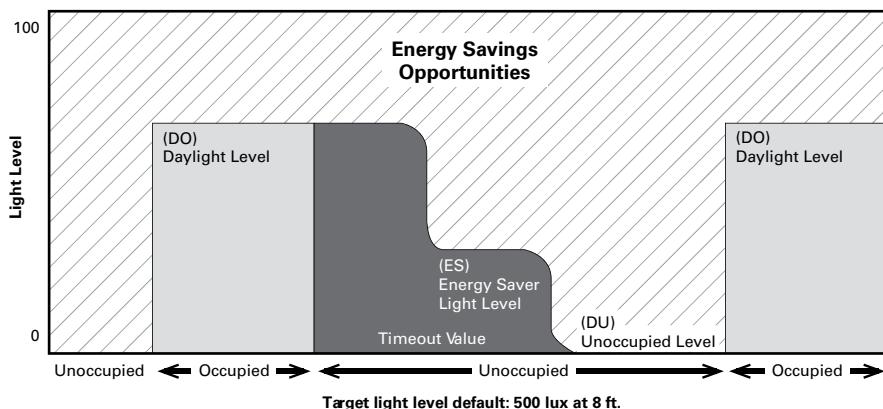
Occupied daylight light levels and unoccupied light levels can be adjusted using the integrated sensor programming remote (Catalog Number: ISHH-01). The integrated sensor personal remote (Catalog Number: ISHH-02) provides code compliant manual raise, lower, ON, OFF control.

The Encounter with Integrated Sensor is easy to install with no special wiring and ensures energy savings out-of-the-box with default control settings.



How it works:

- As the user enters the space controlled by the integral sensor, the lighting turns ON to the default daylight level.
- Lighting will remain at that the daylight level until the space is unoccupied. This will start the occupancy timeout period (default 20 minutes).
- If the space remains unoccupied for half of the timeout period, the lighting will automatically reduce to the Energy Saver light level. This adjustable light level is typically half of the occupied daylight level.
- At the end of the timeout period the lighting will go to the unoccupied light level. This adjustable light level uses the OFF default setting.



Optional Remote Controls



ISHH-01 Programming Remote



ISHH-02 Personal Control Remote

DESCRIPTION

The Encounter™ redefines ambient lighting by being the first fixture to blend modern contemporary styling with the innovative WaveStream™ technology to deliver exceptional performance and superior energy savings. Encounter's highly efficient LED system with advance optical design delivers an unparalleled combination of optimal light uniformity for enhanced visual comfort and superior efficiency for greater energy savings.

Encounter is compatible with all of today's popular ceiling systems and available in a variety of configurations for application versatility. Its perfect balance of form and function make it an ideal choice for commercial office spaces, schools, hospitals, retail and other indoor ambient applications.

SPECIFICATION FEATURES

Construction

Shallow 3-1/4" deep housing is extruded aluminum frame and injected molded composite end plates. End plates are securely attached with screws for strength and rigidity and the elimination of gaps. End plates have accessory grid-lock feature for safety and convenience. Four auxiliary fixture end suspension points are provided. Large access plate for supply connection.

Controls

The Encounter LED is Powered by Fifth Light, with a standard 0-10V continuous dimming driver that works with any 0-10V control/dimmer. Combine with energy saving products like occupancy sensors, daylighting controls and lighting relay panels to maximize energy savings. In addition, the Encounter can include a factory-installed integrated sensor system for occupancy and daylight dimming control and manual control from an optional handheld remote. Or, specify the Digital Addressable Lighting Interface (DALI) drivers, dimmable down to 1% with the HD option, for use with Fifth Light controls. See ordering information for details on all three options.

Electrical

Long-life LED system coupled with electrical driver to deliver optimal performance. LED's available in 3000K, 3500K, 4000K or 5000K with a typical CRI \geq 85. Projected life is 100,000 hours at 92% lumen output. Electronic drivers are available for 120-277V applications.

Emergency Battery Pack Option

Optional 120v-277v integral emergency battery pack is available in 7-watts or 14-watts to meet critical life-safety lighting requirements. The 90-minute batteries provide constant power to the LED system, ensuring code-compliance. A test switch/indicator button can be tested safely from the ground using a laser pointer, while the patented EZ Key prevents accidental discharge of the battery during construction. See ordering information for details.

Driver Access

Drivers can be accessed via plenum.

Finish

Durable frame has high reflectance baked matte white enamel finish for luminous uniformity.

Optics

Precision formed optical assembly with positively retained high optical grade acrylic lenses provide a directed optical distribution using WaveStream technology.

Compliance

Components are UL recognized. Indoor luminaires are cULus and CSA listed for 25° C ambient environments, RoHS compliant, and comply with IESNA LM-79. LEDs comply with LM-80 standards. DesignLights Consortium™ Qualified and classified for both DLC Standard and DLC Premium, refer to www.designlights.org for details.

Warranty

Five year warranty.



22EN
LED

2' X 2' TROFFER
LED MODULE

Specification Grade Troffer



powered by
fifthlight
technology

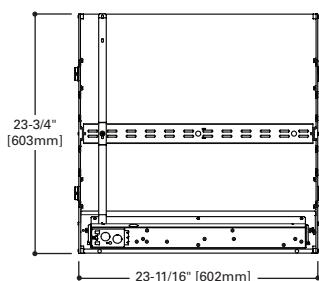
CERTIFICATION DATA

cULus - 1598 and 2043**
Damp Location Listed
CSA
IC Rated
LM79/LM80 Compliant
RoHS Compliant
DesignLights Consortium™ Qualified
NOM Compliant

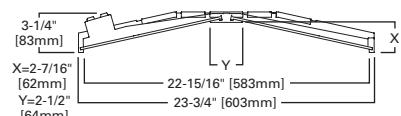
*See Drywall Frame Kit Accessory in Ordering Information section.

**Fixture construction is suitable for use in Air-handling and plenum rated spaces in accordance with Section 300.22 (C) of the National Electrical Code, Section 4.3.11.2.6.5 of NFPA 90A and Section 602.2.1.4 of ICC.

MOUNTING DATA



LAMP CONFIGURATIONS



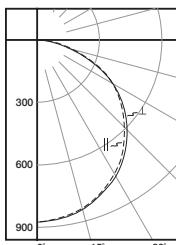
CEILING COMPATIBILITY

G	F	Ceiling Type	Trim Type
Grid/Lay-in Standard	Drywall Frame Kit	Exposed Grid Concealed T Slot Grid Flange	G G or T G or T *

LINEAR DISCONNECT

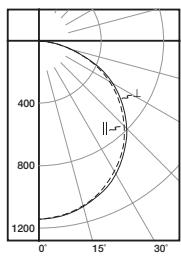
Safe and convenient means of disconnecting power



PHOTOMETRICS

22EN-LD2-25-UNV-L835-CD1-U
Electronic Driver
Linear LED 3500K
Spacing criterion:
(II) 1.3 x mounting height, (\perp) 1.3 x mounting height
Lumens: 2571
Input Watts: 20.9W
Efficacy: 122.5 lm/W
Test Report:
22EN-LD2-25-UNV-L835-CD1-U.IES

Candlepower				
Angle	Along II	45°	Across	
0	873	873	873	
5	869	868	871	
10	856	856	861	
15	837	837	844	
20	811	811	819	
25	780	779	790	
30	741	741	753	
35	700	698	711	
40	650	649	662	
45	598	595	608	
50	539	535	549	
55	474	472	486	
60	405	402	421	
65	335	328	348	
70	259	255	257	
75	185	178	157	
80	111	97	103	
85	41	43	43	
90	0	0	0	



22EN-LD2-34-UNV-L835-CD1-U
Electronic Driver
Linear LED 3500K
Spacing criterion:
(II) 1.3 x mounting height, (\perp) 1.3 x mounting height
Lumens: 3370
Input Watts: 28.5W
Efficacy: 118.2 lm/W
Test Report:
22EN-LD2-34-UNV-L835-CD1-U.IES

Candlepower				
Angle	Along II	45°	Across \perp	
0	1142	1142	1142	
5	1137	1136	1141	
10	1121	1120	1127	
15	1098	1097	1106	
20	1064	1064	1075	
25	1023	1023	1037	
30	974	971	988	
35	918	917	933	
40	854	852	869	
45	784	780	800	
50	708	702	722	
55	624	618	638	
60	534	526	553	
65	440	431	457	
70	339	334	340	
75	241	232	205	
80	145	126	135	
85	54	56	58	
90	0	0	0	

Coefficients of Utilization

Effective floor cavity reflectance 20%											
rc	80%	70%	50%	30%	10%	0%	rc	80%	70%	50%	30%
rw	70	50	30	10	70	50	30	10	50	30	10
RCR	0	119	119	119	116	116	116	111	111	111	106
1	109	104	99	95	106	101	97	94	91	88	80
2	99	90	83	77	96	88	82	76	75	79	75
3	90	79	71	64	87	77	70	63	74	68	62
4	82	70	61	54	80	68	60	54	66	59	53
5	75	62	53	46	73	61	52	46	57	50	45
6	69	56	47	40	68	55	46	40	53	45	39
7	64	51	42	36	63	50	41	35	47	40	35
8	60	46	38	32	58	45	37	32	44	37	31
9	56	42	34	28	54	42	34	28	41	33	28
10	52	39	31	26	51	39	31	26	38	30	26

Zonal Lumen Summary

Zone	Lumens	% Fixture
0-30	680	26.4
0-40	1118	43.5
0-60	2005	78.0
0-90	2571	100.0
0-180	2571	100.0

Zonal Lumen Summary

Zone	Lumens	% Fixture
0-30	891	26.4
0-40	1467	43.5
0-60	2630	78.0
0-90	3370	100.0
0-180	3370	100.0

LUMEN MAINTENANCE

Ambient Temperature	TM-21 Lumen Maintenance (100,000 hours)	Theoretical L70 (Hours)
25°C	> 92%	> 448,000

Non-IC data

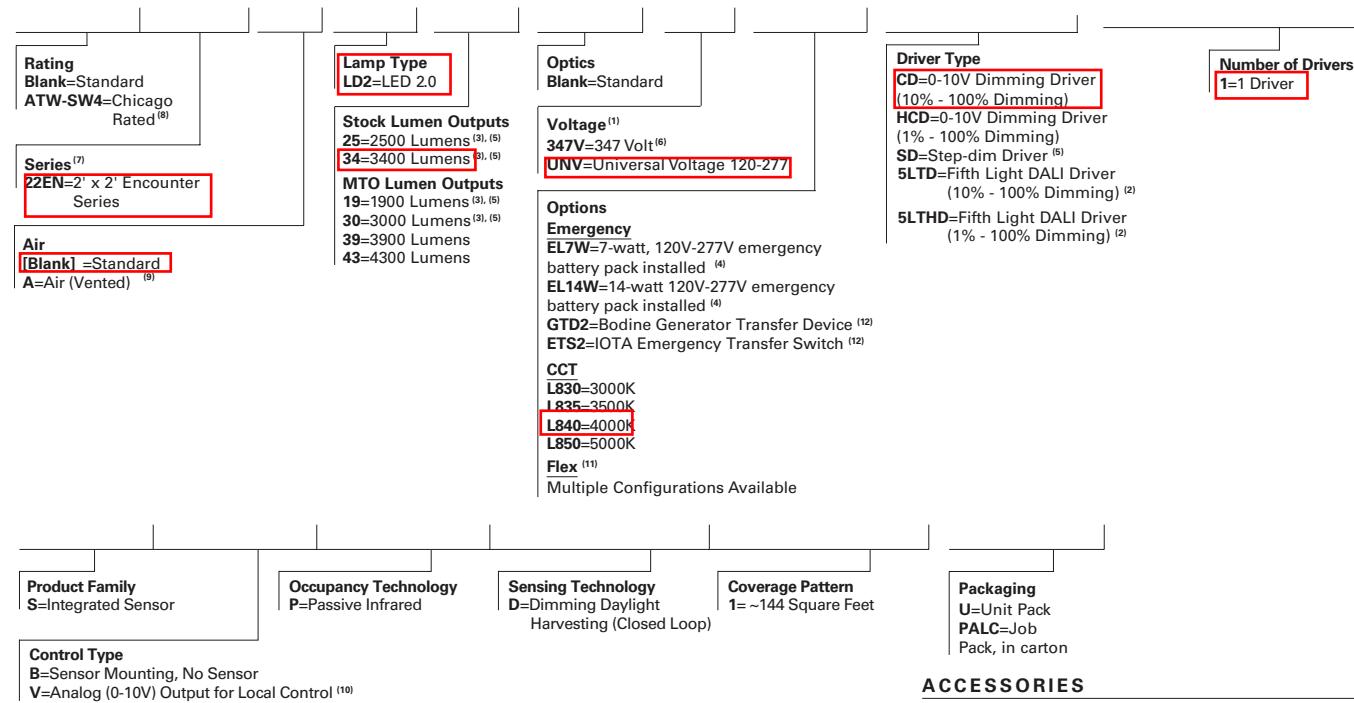
ENERGY AND PERFORMANCE DATA BY CATALOG NUMBER

Stock or MTO*	Catalog Logic (Curved)	Delivered Lumens	Watts	Efficacy (LPW)
MTO	22EN-LD2-19-UNV-L830-CD1-U	1969	16.5	119
MTO	22EN-LD2-19-UNV-L835-CD1-U	2030	16.5	123
MTO	22EN-LD2-19-UNV-L840-CD1-U	2071	16.5	126
MTO	22EN-LD2-19-UNV-L850-CD1-U	2253	16.5	137
MTO	22EN-LD2-25-UNV-L830-CD1-U	2494	20.0	125
STOCK	22EN-LD2-25-UNV-L835-CD1-U	2571	20.0	129
STOCK	22EN-LD2-25-UNV-L840-CD1-U	2622	20.0	131
MTO	22EN-LD2-25-UNV-L850-CD1-U	2854	20.0	143
MTO	22EN-LD2-30-UNV-L830-CD1-U	2898	24.9	116
MTO	22EN-LD2-30-UNV-L835-CD1-U	2988	24.9	120
MTO	22EN-LD2-30-UNV-L840-CD1-U	3048	24.9	122
MTO	22EN-LD2-30-UNV-L850-CD1-U	3317	24.9	133
MTO	22EN-LD2-34-UNV-L830-CD1-U	3269	28.5	115
STOCK	22EN-LD2-34-UNV-L835-CD1-U	3370	28.5	118
STOCK	22EN-LD2-34-UNV-L840-CD1-U	3437	28.5	121
MTO	22EN-LD2-34-UNV-L850-CD1-U	3741	28.5	131
MTO	22EN-LD2-39-UNV-L830-CD1-U	3747	33.3	113
MTO	22EN-LD2-39-UNV-L835-CD1-U	3863	33.3	116
MTO	22EN-LD2-39-UNV-L840-CD1-U	3940	33.3	118
MTO	22EN-LD2-39-UNV-L850-CD1-U	4288	33.3	129
MTO	22EN-LD2-43-UNV-L830-CD1-U	4218	38.3	110
MTO	22EN-LD2-43-UNV-L835-CD1-U	4348	38.3	114
MTO	22EN-LD2-43-UNV-L840-CD1-U	4435	38.3	116
MTO	22EN-LD2-43-UNV-L850-CD1-U	4826	38.3	126

*Made to order (MTO) requires a typical two week lead time.

ORDERING INFORMATION

SAMPLE NUMBER: 22EN-LD2-34-UNV-L835-CD1-SVPD1-U



ACCESSORIES

- T3A END E.Q. BRACKET PARTS BAG (Standard with fixture)
- DF-22-W=2' x 2' Drywall Frame Kit
- SK-22-WS=2' x 2' Shallow Surface Mount Kit
- SK-22-WT=2' x 2' Tall Surface Mount Kit
- DF10P-C_=Decorator Dimmer, 0-10V
- SF10P_=_Decorator Slide Dimmer, 0-10V
- ISHH-01=Programming Remote for Integrated Sensor
- ISHH-02=Personal Control Remote for Integrated Sensor

NOTES: ⁽¹⁾Products also available in non-US voltages and frequencies for international markets. ⁽²⁾Must be used in conjunction with a DALI control system. For complete DALI solutions by Fifth Light, visit www.eaton.com/lightingsystems. ⁽³⁾1900, 2500, 3000 and 3400 lumen option are not available with a Fifth Light DALI (5LTD) driver. ⁽⁴⁾With integral test switch/indicator/laser test. For approximate delivered lumens multiply the lumens per watt of the desired fixture by the wattage of the emergency battery pack (100 lm/W x 7=700 lumens). IES-format photometry for luminaire under emergency operation available. ⁽⁵⁾Step-dim driver not available with 1900, 2500, 3000 and 3400 lumen option. ⁽⁶⁾347V emergency option not available. ⁽⁷⁾DesignLights Consortium™ Qualified and classified for both DLC Standard and DLC Premium, refer to www.designlights.org for details. ⁽⁸⁾Chicago rated version does not allow for row mounting. ⁽⁹⁾Air version is vented but does not meet air handling requirements; a 6% reduction in delivered lumens is experienced with this option. ⁽¹⁰⁾Integral sensor works only with "CD" driver and is factory prewired to the driver for stand-alone control. ⁽¹¹⁾Flex does not include dimming leads. Control leads provided by others. ⁽¹²⁾Used to transfer fixture to secondary power source for life-safety operation. When used with a dimming fixture, two devices are required to ensure control is disabled while operating under emergency power.

Specifications & dimensions subject to change without notice. Consult your Eaton Representative for availability and ordering information.

SHIPPING DATA

Catalog No.	Wt.
22EN-LD2-25	14 lbs.
22EN-LD2-34	14 lbs.

INTEGRATED SENSOR

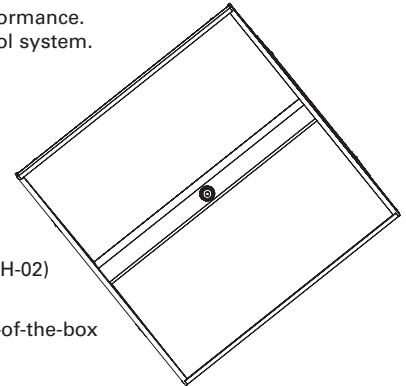
The Encounter with Integrated Sensor technology provides automatic energy savings without sacrificing performance. Traditionally, these types of energy savings required coordination between the luminaire and a lighting control system. The Encounter delivers superior lighting with integrated occupancy and daylighting controls.

Capture the benefits of traditional lighting controls, without complicated coverage planning or special wiring. Ideal for new construction or retrofit, the Encounter delivers automatic ON to an energy saving light level, while ensuring lighting is turned OFF when the space is unoccupied.

The integral daylight sensor reduces the need for special daylight zone planning. Each luminaire will automatically adjust the light level based on reflected light beneath the sensor in a closed loop method.

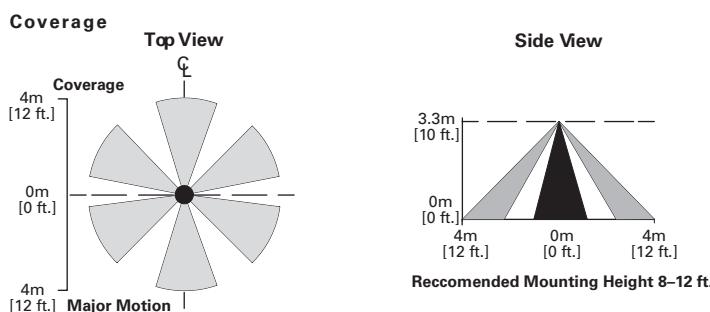
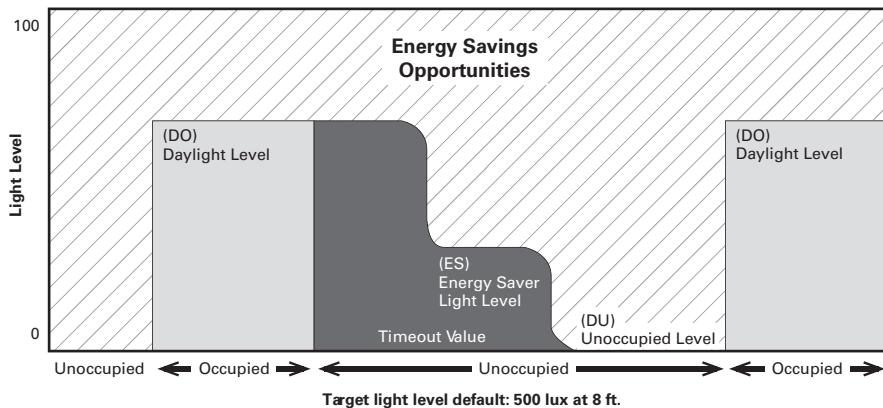
Occupied daylight light levels and unoccupied light levels can be adjusted using the integrated sensor programming remote (Catalog Number: ISHH-01).The integrated sensor personal remote (Catalog Number: ISHH-02) provides code compliant manual raise, lower, ON, OFF control.

The Encounter with Integrated Sensor is easy to install with no special wiring and ensures energy savings out-of-the-box with default control settings.



How it works:

- As the user enters the space controlled by the integral sensor, the lighting turns ON to the default daylight level.
- Lighting will remain at that the daylight level until the space is unoccupied. This will start the occupancy timeout period (default 20 minutes).
- If the space remains unoccupied for half of the timeout period, the lighting will automatically reduce to the Energy Saver light level. This adjustable light level is typically half of the occupied daylight level.
- At the end of the timeout period the lighting will go to the unoccupied light level. This adjustable light level uses the OFF default setting.



Optional Remote Controls



ISHH-01 Programming Remote



ISHH-02 Personal Control Remote



Project: _____

Fixture Type: _____

Location: _____

Contact/Phone: _____

**TRAC-MASTER®**

Avant Garde

ARC™ 9W LED**T271L G2****PRODUCT DESCRIPTION**

The ultra-efficient optical system of the Arc LED trac fixture maximizes efficiency while minimizing fixture depth, yielding a unique and attractive aesthetic. It approximates the light output and distribution of 60-75W PAR30 halogen lamps, utilizing about 20% of the energy and having a rated life of 50,000 hours. Available in 2700K, 3000K, 3500K and 4000K color temperatures, the white-light Arc LED may be specified in 80 CRI versions, 90 CRI versions, or in optional SpectralWhite color/white enhancing versions which offer CRI of 90+, rendering colors richly and making whites appear naturally brilliant. The Arc LED is available with or without louver to optimize visual cutoff; there is also a louver accessory that can be added at a later time if desired.

**PRODUCT SPECIFICATIONS**

Construction Die cast aluminum housing provides outstanding thermal management of LED, yielding 70% average lumen maintenance at 50,000 hours of operation • Fashionable, elegant design complements any decor • Available in white, black and silver painted finishes.

LED High performance LED array provides outstanding reliability, performance and color quality/consistency • 2700K, 3000K, 3500K or 4000K white phosphor high performance LEDs • Chromaticity range within a 3-step MacAdam Ellipse • 80 CRI minimum on standard product • Optional high CRI versions offer 90 CRI typical • Optional SpectralWhite color/white enhancing versions are available which make whites appear naturally brilliant and render colors more richly.

Driver Concealed behind LED light engine housing to minimize overall fixture footprint • Insulating air gap between driver and LED light engine optimizes thermal operation • Provides quiet operation with or without dimming • Dimmable using high quality reverse phase electronic low voltage (ELV) dimmers – see [T271LG2-DIM](#) • Solid state electronic, Class 2 compliant • Integral overcurrent and short circuit protection • Designed for greater than 50,000 hour operating life • FCC Certified to Part 15 Class B EMI standards.

Optics Proprietary, interchangeable polycarbonate lenses available in three factory-configured beam spreads • One lens provided with fixture (as specified in catalog number) • Accessory lenses available to enable simple beam changes in the field.

Lensholder Standard lensholder minimizes overall fixture depth • Optional louver version retains lens and offers additional visual cutoff using a hexcell design • Louvered lensholder also available as a field-installed accessory.

Juno Universal Trac Adapter Universally compatible with both Trac-Master 1-circuit or 2-circuit trac, Trac-Lites trac, monopoints and special mountings • Also UL Recognized for use on ConTech® LT Series track • Copper alloy contacts provide precise spring action - no arcing and will not take a set • True, positive electrical ground • On/off switch included • Patented embossed polarity arrows on bottom of adapter • Spring-loaded positive latch with embossed polarity arrows secures trac light to trac • Two-position power contact provided for two-circuit application.

Alternate TEK Trac Adapter Compatible with Juno TEK trac system • System specific and assembled to trac fixture • Integrally polarized construction to prevent reverse installation – only allows insertion in proper orientation • Rotary circuit selector enables simple switching between circuits • Integral on/off switch enables individual fixtures to be switched for servicing.

Alternate GTYPE Trac Adapter Compatible with track systems based on GES type track, including Lithonia LT Commercial Track (not LTS type) • System specific and assembled to trac fixture • Consult factory for additional information.

Alternate HTYPE Trac Adapter Compatible with track systems which use a H-type track adapter, including Lithonia LTS Decorative Track (not LT type) • System specific and assembled to trac fixture • Two-position power contact provided for two-circuit application • Consult factory for additional information.

Alternate LTYPE Trac Adapter Compatible with track systems which use a L-type track adapter • System specific and assembled to trac fixture • Two-position power contact provided for two-circuit application • Consult factory for additional information.

Aiming 360° horizontal coverage • 95° vertical aiming capability.

Labels UL and C-UL Listed • ENERGY STAR® certified (except THCL1 versions) • DLC Qualified (excluding accessories) • Union made • Assembled in U.S.A.

Government Procurement

BAA – Buy America(n) Act: Product qualifies as a domestic end product under the Buy American Act as implemented in the FAR and DFARS. Product also qualifies as manufactured in the United States under DOT Buy America regulations.

BABA – Build America Buy America: Product qualifies as produced in the United States under the definitions of the Build America, Buy America Act.

Please refer to www.acuitybrands.com/buy-american for additional information.

Warranty 5-year limited warranty. This is the only warranty provided and no other statements in this specification sheet create any warranty of any kind. All other express and implied warranties are disclaimed. Complete warranty terms located at: www.acuitybrands.com/support/warranty/terms-and-conditions

Note: Actual performance may differ as a result of end-user environment and application.

All values are design or typical values, measured under laboratory conditions at 25 °C.

Specifications subject to change without notice.

ConTech is a registered trademark of ConTech Lighting.



One Lithonia Way • Conyers, GA 30012 • Phone 1-800-705-SERV (7378) • Visit us at www.acuitybrands.com

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TRAC-MASTER®

Avant Garde

ARC™ 9W LED**T271L G2****ORDERING INFORMATION**

Ordering Examples: T271L G2 27K 80CRI PDIM SP BL, T271L TEK G2 30K SPW PDIM NFL WH THCL1WH

Series	Mounting Adapter Type	Generation	Color Temperature	Color Rendering Index	Dimming Compatibility	Distribution	Finish	Factory Installed Louvers
T271L 9W Arc LED	Blank Universal 120V Trac Adapter TEK TEK 120V Trac Adapter GTYPE G-Type Trac Adapter HTYPE H-Type Trac Adapter LTYPE L-Type Trac Adapter	G2 Gen 2	27K 2700K 30K 3000K 35K 3500K 40K 4000K	80CRI 80 CRI 90CRI 90 CRI SPW ⁴ SpectralWhite	PDIM Phase Dimmable	SP Spot NFL Narrow Flood FL Flood	BL Black SL Silver WH White	THCL1BL Black THCL1SL Silver THCL1WH White

Accessories ¹								
XBAFLBL 469 ²	Cross Baffle - Black	DGF 469 ²	Dichroic Glass Filters	THCL1BL	Hexcell Louver Assembly - Black			
SNOOTBL 390	Snoot - Black	UVF 469 ²	UV Filter	THCL1SL	Hexcell Louver Assembly - Silver			
SNOOTSL 390	Snoot - Silver	DIFF 469 ²	Diffusion Lens	THCL1WH	Hexcell Louver Assembly - White			
SNOOTWH 390	Snoot - White	SOLITE 469 ²	Uniformity Lens	TLENS3 SPT	Polycarbonate Lens - Spot			
EYEBROWBL 469 ²	Eyebrow - Black	PRISM 469 ²	Prismatic Spread Lens	TLENS3 NFLD	Polycarbonate Lens - Narrow Flood			
TBDR BLCK 440	Barn Doors - Black	LSPREAD 469 ²	Linear Spread Lens	TLENS3 FLD	Polycarbonate Lens - Flood			
CGF 469 ²	Color Glass Filters	T40N ³	Monopoint Canopy					

See specification sheet [D1.2.2](#) for details.Other accessories can be found on specification sheet [D1.2.0](#).

Notes:

1 Accessories not DLC qualified.

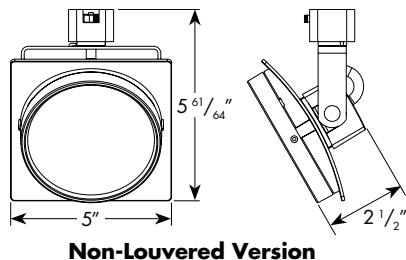
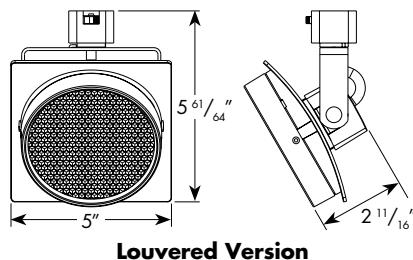
2 Filters, lenses, eyebrow and cross baffle require barn doors for installation.

3 Add finish code to complete catalog number (Example: T40N WH).

4 3000K and 3500K only.

TRAC-MASTER®

Avant Garde
ARC™ 9W LED
T271L G2

DIMENSIONS**Non-Louvered Version****Louvered Version****PERFORMANCE DATA¹**

Catalog Number	Input Voltage	Watts (Typical)	Lumens	Efficacy (LPW)	Rated Life (Hours)
T271L G2 27K 80CRI SP	120V	9	1081	120	50,000
T271L G2 27K 80CRI NFL	120V	9	1057	117	50,000
T271L G2 27K 80CRI FL	120V	9	1067	119	50,000
T271L G2 27K 90CRI SP	120V	9	882	98	50,000
T271L G2 27K 90CRI NFL	120V	9	863	96	50,000
T271L G2 27K 90CRI FL	120V	9	871	97	50,000
T271L G2 30K 80CRI SP	120V	9	1103	123	50,000
T271L G2 30K 80CRI NFL	120V	9	1079	120	50,000
T271L G2 30K 80CRI FL	120V	9	1089	121	50,000
T271L G2 30K 90CRI SP	120V	9	927	103	50,000
T271L G2 30K 90CRI NFL	120V	9	906	101	50,000
T271L G2 30K 90CRI FL	120V	9	915	102	50,000
T271L G2 30K SPW SP	120V	9	971	108	50,000
T271L G2 30K SPW NFL	120V	9	950	106	50,000
T271L G2 30K SPW FL	120V	9	958	106	50,000
T271L G2 35K 80CRI SP	120V	9	1147	127	50,000
T271L G2 35K 80CRI NFL	120V	9	1122	125	50,000
T271L G2 35K 80CRI FL	120V	9	1133	126	50,000
T271L G2 35K 90CRI SP	120V	9	949	105	50,000
T271L G2 35K 90CRI NFL	120V	9	928	103	50,000
T271L G2 35K 90CRI FL	120V	9	937	104	50,000
T271L G2 35K SPW SP	120V	9	1004	112	50,000
T271L G2 35K SPW NFL	120V	9	982	109	50,000
T271L G2 35K SPW FL	120V	9	991	110	50,000
T271L G2 40K 80CRI SP	120V	9	1158	129	50,000
T271L G2 40K 80CRI NFL	120V	9	1133	126	50,000
T271L G2 40K 80CRI FL	120V	9	1143	127	50,000
T271L G2 40K 90CRI SP	120V	9	971	108	50,000
T271L G2 40K 90CRI NFL	120V	9	950	106	50,000
T271L G2 40K 90CRI FL	120V	9	958	106	50,000

ELECTRICAL DATA

Input Voltage	120V
Input Current (max.)	0.08A
Power Factor	>0.90

¹ Performance data, including Rated Life, is based on measurements of an individual fixture operating in a 25°C ambient.

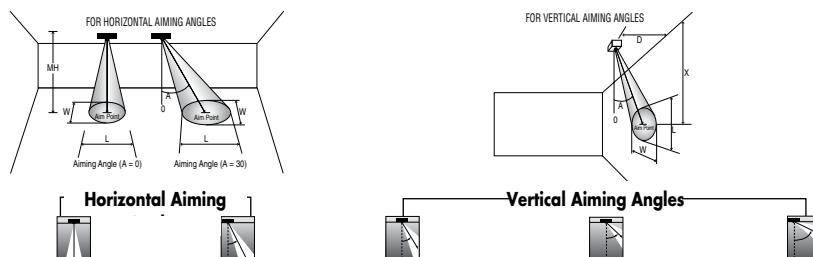
TRAC-MASTER®

Avant Garde

ARC™ 9W LED**T271L G2****PHOTOMETRICS**

CBCP • Centerbeam candlepower
FC • Footcandles at beam center (aim point)

In vertical aiming applications, aim point (X) is determined by dividing distance from the wall (D) by the tangent of the desired aim angle (A) (0.5774 for 30°, 1.0 for 45°, 1.732 for 60°).



Fixture	Beam Type	Beam Spread	Rated Life	CBCP	0°			30°			30°			45°			60°			
					MH	FC	L	W	FC	L	W	D	FC	X	L	W	FC	X	L	W
S Arc 9W LED, 3000K, 80CRI Spot		11°	50000	9871	6	274	1.1	1.1	178	1.5	1.3	4	77	6.9	3.1	1.5	218	4.0	1.5	1.1
					8	154	1.5	1.5	100	2.0	1.7	6	34	10.4	4.7	2.3	97	6.0	2.3	1.6
					10	99	1.9	1.9	64	2.5	2.2	8	19	13.9	6.2	3.0	55	8.0	3.1	2.1
					12	69	2.3	2.3	45	3.0	2.6	10	12	17.3	7.8	3.8	35	10.0	3.8	2.7
					14	50	2.6	2.6	33	3.5	3.1	12	9	20.8	9.3	4.5	24	12.0	4.6	3.2
N Arc 9W LED, 3000K, 80CRI Narrow Flood		23°	50000	3466	4	217	1.7	1.7	141	2.2	1.9	2	108	3.5	3.8	1.7	306	2.0	1.7	1.2
					6	96	2.5	2.5	63	3.4	2.9	3	48	5.2	5.7	2.5	136	3.0	2.6	1.8
					8	54	3.3	3.3	35	4.5	3.8	4	27	6.9	7.6	3.3	77	4.0	3.5	2.3
					10	35	4.1	4.1	23	5.6	4.8	5	17	8.7	9.5	4.1	49	5.0	4.3	2.9
					12	24	5.0	5.0	16	6.7	5.7	6	12	10.4	11.4	5.0	34	6.0	5.2	3.5
F Arc 9W LED, 3000K, 80CRI Flood		37°	50000	2087	3	232	2.0	2.0	151	2.8	2.3	1.5	116	2.6	6.0	2.0	328	1.5	2.3	1.4
					4	130	2.7	2.7	85	3.7	3.1	2	65	3.5	8.1	2.7	184	2.0	3.0	1.9
					5	83	3.3	3.3	54	4.6	3.9	2.5	42	4.3	10.1	3.3	118	2.5	3.8	2.4
					6	58	4.0	4.0	38	5.6	4.6	3	29	5.2	12.1	4.0	82	3.0	4.5	2.8
					7	43	4.7	4.7	28	6.5	5.4	3.5	21	6.1	14.1	4.7	60	3.5	5.3	3.3

For 27K 80CRI fixtures, use 0.98 multiplier; For 27K 90CRI fixtures, use 0.80 multiplier;

For 30K 90CRI fixtures, use 0.84 multiplier; For 30K SPW, use 0.88 multiplier;

For 35K 80CRI fixtures, use 1.04 multiplier; For 35K 90CRI fixtures, use 0.86 multiplier; For 35K SPW fixtures, use 0.91 multiplier;

For 40K 80CRI fixtures, use 1.05 multiplier; For 40K 90CRI fixtures, use 0.88 multiplier.



RNG-175D

175W Monocrystalline Solar Panel

Key Features

The Renogy 175W solar panel offers more power and durability. Corner supports for frame protection and corrosion-resistant aluminum frames. The new 175W rigid solar panel has better conversion efficiency, improving the power output per surface area.

- High module conversion efficiency
- Top ranked PTC rating
- Quick and inexpensive mounting
- 100% EL testing on all Renogy modules
- No hot spots guaranteed

Potential Uses

The Renogy 175W Monocrystalline Solar Panel has applications in off-grid power systems. That includes 12 and 24 volts battery banks, water pumping systems, signaling systems, and other off-grid applications.



Power Output Warranty



Material and Workmanship Warranty

RNG-175D

175W Monocrystalline Solar Panel

Electrical Data

Maximum Power at STC*	175 W
Optimum Operating Voltage (V_{mp})	18.1 V
Optimum Operating Current (I_{mp})	9.67 A
Open Circuit Voltage (V_{oc})	21.6 V
Short Circuit Current (I_{sc})	10.31 A
Module Efficiency	19.8%
Maximum System Voltage	6000 VDC
Maximum Series Fuse Rating	20 A

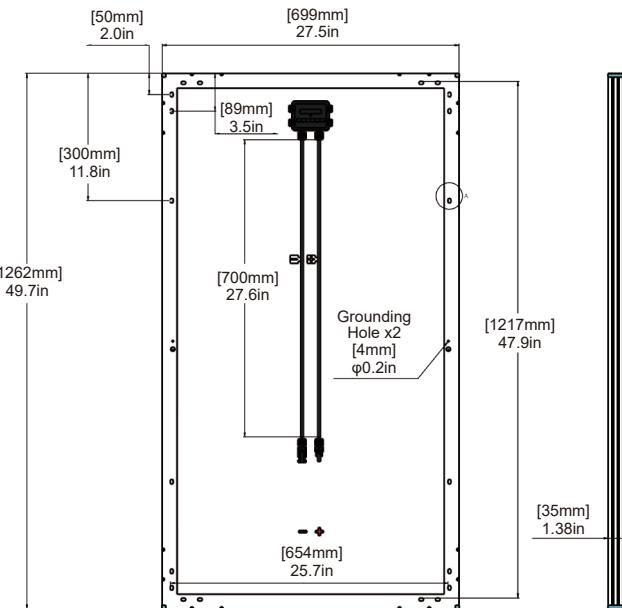
Thermal Characteristics

Operating Temp. Range	-40°C - 85°C (-40°F - 185°F)
Nominal Operating Cell Temperature (NOCT)	45±2°C
Temperature Coefficient of Pmax	-0.37%/°C
Temperature Coefficient of Voc	-0.28%/°C
Temperature Coefficient of Isc	0.05%/°C

Junction Box

IP Rating	IP 65
Diode Type	20SQ045
Number of Diodes	2 Diode(s)
Output Cables	14 AWG 700mm (27.6 in)

Module Diagram



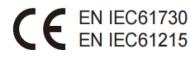
Mechanical Data

Solar Cell Type	Monocrystalline (6.5 x 2.9 in)
Number of Cells	64 (4 x 16)
Dimensions	1262 x 699 x 35 mm (49.7x27.5x1.4in)
Weight	10 kg (22lbs)
Front Glass	Tempered Glass 0.13 in (3.2 mm)
Frame	Anodized Aluminum Alloy
Connectors	Solar Connectors
Fire Performance	Type 1

MC4 Connectors

Rated Current	30 A
Maximum Voltage	1000 VDC
Maximum AWG Size Range	12 AWG
Temperature Range	-40°C - 90°C (-40°F - 194°F)
IP Rating	IP 68

Certifications

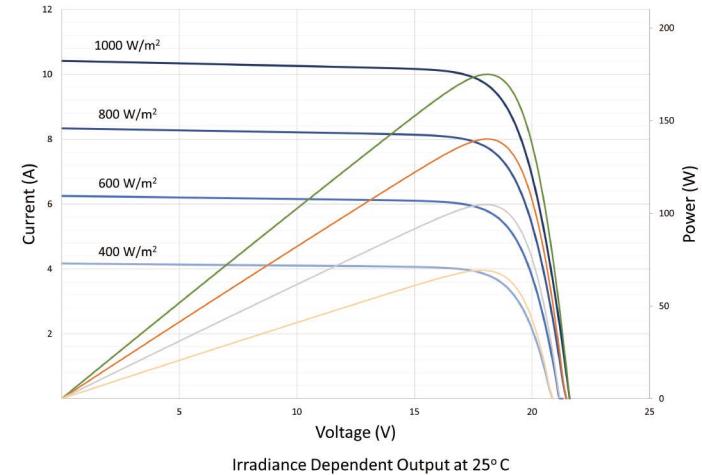


ISO 9001:
Quality Management System



IV-Curve

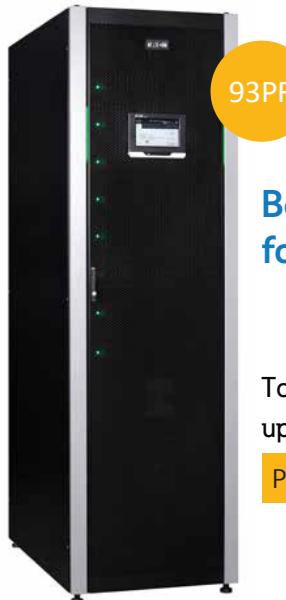
RNG-175D Characteristics Versus Voltage



*All specifications and data described in this data sheet are tested under Standard Test Conditions (STC - Irradiance: 1000W/m², Temperature: 25°C, Air Mass: 1.5) and may deviate marginally from actual values. Renogy and any of its affiliates has reserved the right to make any modifications to the information on this data sheet without notice. It is our goal to supply our customers with the most recent information regarding our products. These data sheets can be found in the downloads section of our website, www.renogy.com

Eaton Power Xpert 93PR

25 kW to 125 kW



**Best Reliability
for IT space**

Total capacity in parallel
upto 1000 kW

Power factor 1

The Dashboard:

**Best in
Class Efficiency**

96.3%

**Best in
Class Footprint**

99.3%

Double conversion efficiency

40°C without de-rating
Native N+1, N+2

ESS efficiency

3 Levels IGBT 2ms
MTTR=10 min



Power
Failure



Power
Sag



Power
Surge



Under-
Voltage



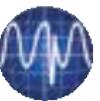
Over-
voltage



Line
Noise



Frequency
variation



Switching
Transient



Harmonic
Distortion

Key Features:

- Modular and Transformer free Design
- Scalable (Off and On premises)
- Easy modules replacement 28Kg
- Hot swappable / scalable modules
 - 19" rack size
 - VRLA and LIB ready
- WEB / SNMP / MODBUS communication
- Top and bottom cable entry
- Critical components redundancy

Key Patents:

ESS Energy Saver System

VMMS Variable Module Management

HotSync® spofless technology

ECT Easy Capacity Test

ABM Advanced battery management

Easy sync control

The UPM Advantage:

- Enhanced reliability with 3 level IGBT
- Patented method for load sharing (Hot-Synch)
- Peer-to-peer control strategy
- Each UPM/unit synchronises independently
- No SPOF - single point of failure

- Ensure vertical and horizontal upgrade
- No 'master-slave' configuration
- No load share signals
- Selective tripping



Powering Business Worldwide

Eaton 93PR 25-50-75-100-125 kW Technical Specification as per IEC 62040-3

General

Ratings	25 kW	50 kW	75 kW	100 kW	125 kW
UPS option	With Back-Feed & Without Bac-Feed				
Frames Capacity	125 kW Frame				
Upgradability	Upto 125 kW				
Upgradability	Upto 125 kW				
External paralleling	Up to 8 units with HotSync technology				
UPS performance classification	VFI-SS-111				

EFFICIENCY & HEAT DISSIPATION

Ratings	25 kW	50 kW	75 kW	100 kW	125 kW
Efficiency in double-conversion, rated linear load					
100% load	95.0%	95.0%	95.0%	95.6%	95.6%
75% load	95.3%	95.3%	95.3%	96.1%	96.1%
50% load	95.5%	95.5%	95.5%	96.3%	96.3%
25% load	94.5%	94.5%	94.5%	95.7%	95.7%
Heat dissipation (watt) in double conversion					
100% load	1316	2632	3947	4603	5753
75% load	987	1974	2961	3206	4008
50% load	616	1233	1849	2029	2536
25% load	364	728	1091	1178	1473

INPUT CHARACTERISTICS

Ratings	25 kW	50 kW	75 kW	100 kW	125 kW
Rated input voltage					
Voltage tolerance Rectifier input	220/380 V; 230/400 V; 240/415 V				
Voltage tolerance Bypass input	305 to 478 V				
rated voltage -15% / +10%					
Rated input frequency					
Frequency tolerance	50 or 60 Hz, user configurable	40 to 72 Hz			
Number of input phases					
Rectifier input Bypass input	3 phases + neutral				
3 phases + neutral					
Input power factor, double conversion 100% load					
Maximum input r.m.s. current	45	90 A	135 A	180 A	225 A
Input current distortion at rated input current					
<3%, 100% load					
<3%, 75% load					
<5%, 50% load					
<10%, 25% load					
Rectifier ramp-up, rectifier start and load step					
	5 A/s (default), configurable.				
	Minimum 1 A/s.				

BYPASS CHARACTERISTICS

Ratings	25 kW	50 kW	75 kW	100 kW	125 kW
Type of bypass					
Bypass rating	Static				
Bypass rating					
Bypass voltage range	125 kW				
Bypass voltage range					
Transfer time break	No break in Synchronized Conditions				
Maintenance bypass	2 ms typical under Unynchronized Conditions				
Maintenance bypass					
Inbuilt & without both available					

MECHANICAL PARAMETER

Ratings	25 kW	50 kW	75 kW	100 kW	125 kW
UPS dimensions (W x D x H)	603 x 1013 x 2050 mm				
Weight, UPS frame w/o UPM	425 kg				
Weight, UPM (power module)	28 kg (< 25 kg w/o fan panel & DC capacitors)				
UPS Degree of protection	IP 20				
UPS colour	Black; RAL 9005				

ENVIRONMENTAL PARAMETER

Ratings	25 kW	50 kW	75 kW	100 kW	125 kW
Acoustic noise at 1 m, in 25 °C ambient temperature	< 70 dBA in double conversion < 55 dBA in ESS				
Ambient service temperature range UPS Internal battery	0 °C to + 40 °C without output power derating + 20 °C to + 25 °C recommended for optimized battery life time				
Relative humidity range	5 to 95%, no condensation allowed				
Maximum service altitude	1000 m (3300 ft) above sea level at 40 °C Maximum 2000 m (6600 ft) with 1% derating per each add. 100 m				

OUTPUT CHARACTERISTICS

Ratings	25 kW	50 kW	75 kW	100 kW	125 kW
Number of output phases					
Crest factor	3				
Rated output voltage					
Output voltage variation, steady state	220/380 V; 230/400 V; 240/415 V, configurable				
Total voltage harmonic distortion	< 1%				
100% linear load	< 1%				
100% non-linear load	< 5%				
Maximum frequency range for synchronization with bypass	± 4 Hz as default. User settable	0.5 to 5 Hz.			
Maximum synchronized phase error	< 1° with static balanced load				
Maximum slew-rate when synchronizing	1 Hz/s				
Overload capability On inverter	10 min 102-110% load @ Unity PF Load 60 sec 111-125% load @ Unity PF Load 10 sec 126-150% load @ Unity PF Load 60 Min 102-110% load @ 0.9 PF Load 10 Min 111-125% load @ 0.9 PF Load 60 sec 126-150% load @ 0.9 PF Load 300 ms >150% load				
Load power factor	1.0				
Rated Permitted range	0.8 lagging to 0.8 leading				

BATTERY CHARACTERISTICS

Ratings	25 kW	50 kW	75 kW	100 kW	125 kW
Battery technology	12 V, VRLA/Lithium ION				
Battery quantity	36 to 44 blocks, 216 to 264 cells per battery string 400Vdc minimum cut-off				
Battery voltage	432 to 528 V, default				
Recharge profile	ABM or float				
Charge current limit	Default 5 A, configurable, maximum 25A per UPM with derating to 60% Capacity with Charger current incremental				
Battery start option	Yes				

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Powering Business Worldwide

Eaton 9355 UPS

Scalable. Compact. Flexible.



Agility, scalability and space efficiency – with greater standard runtime

The Eaton 9355 is a mid-size, three-phase uninterruptible power system (UPS) that delivers superior power protection for the ever-expanding loads in today's space-constrained data centers.

The double-conversion topology of the 9355 means that it protects IT infrastructure from all of the most common power problems to give data center managers greater peace of mind. The 9355 also offers an industry-leading combination of flexibility, scalability and power density—all in an innovative, high-efficiency package.

 The 9355's sleek, end-of-row tower design is available in 10 kVA and 20 kVA configurations, upgradeable to 15 kVA and 30 kVA, respectively, and offers the smallest footprint of any comparable UPS. Standard internal batteries often eliminate the need for costly and space-consuming external battery cabinets.

 An on-board power distribution module gives data center managers additional flexibility by helping to preserve valuable rack space and making the rack-based environment truly plug and play. This module can be configured for hardwired output or with a variety of output receptacles, reducing site preparation and installation expenses.

 Up to four 9355 UPSs can be paralleled for either redundancy or extra capacity using Eaton's patented Powerware Hot Sync paralleling technology.

Powerware Hot Sync also enables wireless paralleling in the event of a communications failure, providing the industry's only truly redundant paralleling solution.

The 9355's space-efficient design and outstanding performance and reliability make it perfect for corporate, telecom, healthcare, banking, industrial and retail applications. Combined with Eaton's world-class warranty and service plans, expert technical support, and broad selection of options—and backed by 40 years of R&D excellence—the 9355 is the ideal power protection solution for small data centers.

Product snapshot

Power rating:	10, 15, 20 and 30 kVA at 0.9 power factor (three phase)	Frequency:	50/60 Hz auto-sensing
Form factor:	Small-footprint tower, black	Dimensions:	10 and 15 kVA two-high configuration: 32.2" H x 12" W x 32.5" D
Topology:	Double conversion		10 and 15 kVA three-high configuration: 47.8" H x 12" W x 32.5" D
Battery backup:	Up to 22 minutes typical, extendable up to three hours		20 and 30 kVA: 66" H x 20" W x 34" D
Input voltage:	208V/120V or 220V/127V		
Output voltage:	208V/120V or 220V/127V 480V: 120V/208V or 600V: 120/208 with input isolation transformer (at 60 Hz only)		

Eaton 9355 UPS

Features and benefits

- Compact tower form factor offers up to 75 percent smaller footprint and 13 percent more power capacity than comparable UPSs for industry-leading power density
- All-in-one design with internal batteries and integrated power distribution module with maintenance bypass switch delivers a complete power protection solution in one box for simplified installation
- Double-conversion topology provides complete power protection, isolating valuable IT equipment from all nine of the most common power problems
- High 0.9 output power factor for more real power in less space
- Internal batteries on all standard configurations support up to 350 percent more runtime than comparable UPSs
- Scalable 10 kVA and 20 kVA configurations can be upgraded to provide 50 percent more power without additional hardware
- On-board, plug-and-play power distribution module allows for hardwired output or 15 different output receptacle options, enhancing flexibility and reducing installation costs
- Patented Powerware Hot Sync paralleling technology enables paralleling of up to four 9355 UPSs for additional capacity or redundancy
- Microprocessor-controlled ABM technology with innovative three-stage charging technique extends the useful life of UPS batteries and optimizes battery recharge time
- Power management software suite includes applications for remote UPS monitoring, management and shutdown to help ensure system and data integrity





Premium power protection

With the 9355 UPS, data center managers can safely eliminate the effects of electrical line disturbances and guard the integrity of their systems and equipment. The 9355 is a true double-conversion, three-phase system that can be used to prevent loss of valuable electronic information and minimize equipment downtime.

- The 9355 continually monitors incoming electrical power and removes the surges, spikes, sags, and other irregularities that are inherent in commercial utility power
- Working with a building's electrical system, the 9355 supplies the clean, consistent power required by sensitive electronic equipment for reliable operation
- During brownouts, blackouts, and other power interruptions, internal batteries provide emergency power to safeguard operation

Self-diagnosis

The 9355 constantly monitors its own operation—such as voltage, temperature and function of internal components—and sends an alarm or takes action if it detects a potential problem.

Self-correction

If it senses a problem, the 9355 instantly transfers the power path to a bypass source with zero interruption in power. When the alarm condition passes, the 9355 automatically reverts from bypass to normal power.

The 9355 UPS features a four-button graphical LCD that provides useful information such as load status, events, measurements and settings.

Advanced battery management

The 9355 UPS offers innovative technologies to maximize the health and service life of its internal and external batteries:

- ABM technology uses a unique three-stage charging technique that significantly extends battery service life and optimizes recharge time when compared to traditional trickle charging
- Temperature-compensated charging monitors battery temperature and adjusts the charge rate accordingly, which properly charges the battery and greatly extends battery life
- An integrated battery management system tests and monitors battery health and remaining lifetime, providing user notification to guide preventive maintenance

Eaton's UPS batteries are field replaceable. One person, working alone, can easily replace a battery without disrupting data center operations or power to protected equipment.

Green power performance

The 9355 delivers a robust combination of low input current distortion and high power factor for maximum efficiency. Operating at greater than 90 percent efficiency across all load ranges, the 9355 helps to reduce utility costs, extend battery runtimes and produce cooler operating conditions.

In addition, Eaton's use of sustainable materials and highly efficient manufacturing technology results in dramatic savings in carbon footprint as compared to competitive UPS products.

Maximum runtime, minimum footprint

The 9355 UPS provides industry-leading power density and a 75 percent footprint reduction versus comparable UPS solutions. All standard 9355 configurations incorporate internal batteries to provide up to 350 percent more runtime and offer 13 percent more capacity at equivalent VA ratings. Extended runtime allows the 9355 to power this extra capacity nearly four times longer without additional hardware, eliminating the need for costly and space-consuming external battery cabinets.

Standard 10 kVA and 20 kVA capacity models can also be upgraded to 15 kVA and 30 kVA, respectively, providing 50 percent more power with no additional hardware and no increase in footprint.

The 9355's small footprint requires only three to six square feet of floor space, enabling easy data center space-planning and preserving valuable raised-floor real estate.

Industry-leading scalability and redundancy

Today's critical applications require redundancy for ultimate reliability—and the 9355 delivers. Eaton's innovative Hot Sync technology and optional maintenance bypass parallel tie cabinet work together with the 9355 to provide an advanced, cost-effective UPS paralleling system.

The patented Hot Sync technology enables system load sharing, allowing any UPS module in the system to serve as a backup for any other module. Hot Sync's wireless paralleling capability also ensures system stability in the event of a communications failure.

Using a wall-mounted maintenance bypass parallel tie cabinet, data center managers can easily parallel up to four 9355 UPSs for either redundancy or capacity. UPSs can be quickly added to the pre-installed parallel tie cabinet and brought online in minutes, and individual UPSs can be isolated and swapped out for maintenance—significantly reducing installation and maintenance expenses.

Most other paralleling systems on the market use a top-down configuration in which the master fails when any subsidiary module fails. With Eaton's unique approach, each UPS is independent, yet synchronized with the others to prevent any single point of failure and help eliminate costly downtime.

Additional paralleling benefits include:

- Scalability, from 10 to 120 kVA using one parallel tie cabinet
- N+3, N+2 or N+1 redundancy, from 10 to 90 kVA in a compact footprint—often in a smaller footprint than a single large UPS
- Redundant battery systems, with each parallel UPS containing its own internal batteries



Up to four 9355 UPSs can be paralleled for capacity or redundancy—often in a smaller footprint than a single large UPS

Parallel tie cabinet



Front



Rear

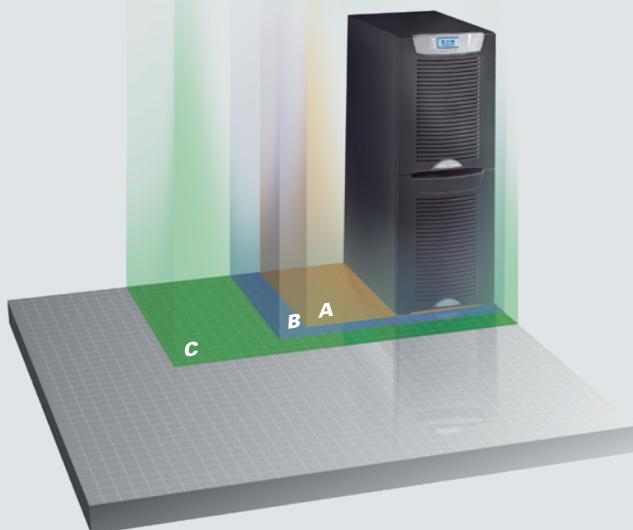
10 and 15 kVA Configurations

At 15 kVA, the 9355 occupies
70% less footprint
than competitor C

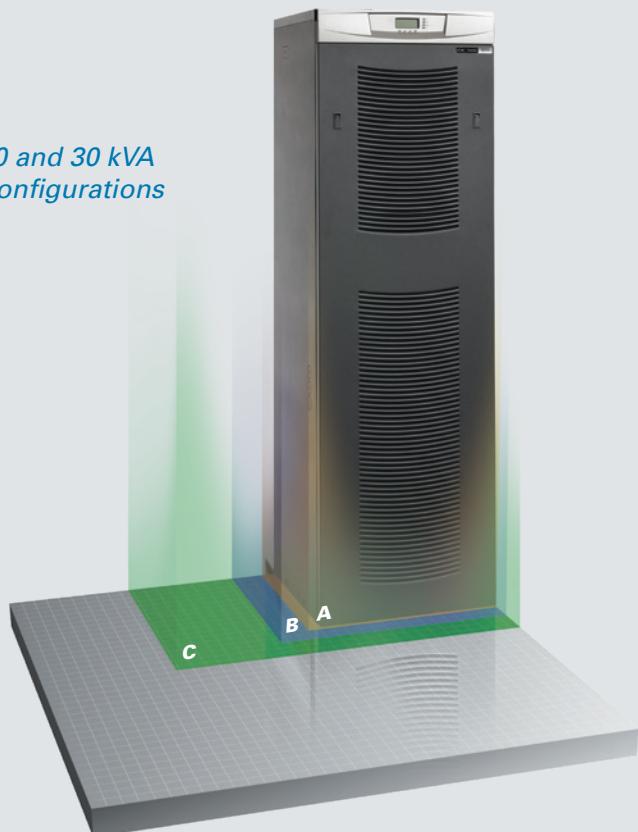
20 and 30 kVA Configurations

At 20 kVA, the 9355 occupies
48% less footprint
and delivers over three times
the battery runtime

*10 and 15 kVA
Configurations*



*20 and 30 kVA
Configurations*



	Dimensions (inches)			Footprint (square inches)	Battery Runtime (minutes)	
	W	D	H		10 kVA	15 kVA
9355	12	34	32	408	9	5
Competitor A	21	33	59	693	5	5
Competitor B	24	36	82	864	5	5
Competitor C	33	40	63	1320	5	5

	Dimensions (inches)			Footprint (square inches)	Battery Runtime (minutes)	
	W	D	H		20 kVA	30 kVA
9355	20	34	66	680	18	11
Competitor A	21	33	59	693	5	5
Competitor B	24	36	82	864	5	5
Competitor C	33	40	63	1320	5	5

Flexible, integrated power distribution

An on-board power distribution module (PDM) gives the 9355 the flexibility necessary to adapt to the diverse and continually changing data center environment. This integrated PDM allows data center managers to preserve valuable rack space and reduce heat by feeding nine to 100 kW of rack servers from one 9355 UPS.

The PDM can be configured to feature a user-selectable mix of NEMA and IEC output receptacles, helping to reduce site preparation and installation costs. These high-density, high-amperage receptacles support blade servers, network switches and other power-hungry IT equipment.

The PDM's circuits are clearly labeled to simplify load balancing while branch circuit breakers provide branch circuit protection and on/off operation for groups of receptacles. Other features include a maintenance bypass switch that allows the data center manager to service the 9355 without shutting down the connected loads to increase availability, reduce mean time to repair and maintenance costs, and lower total cost of ownership.

Simplified rack-based power distribution options

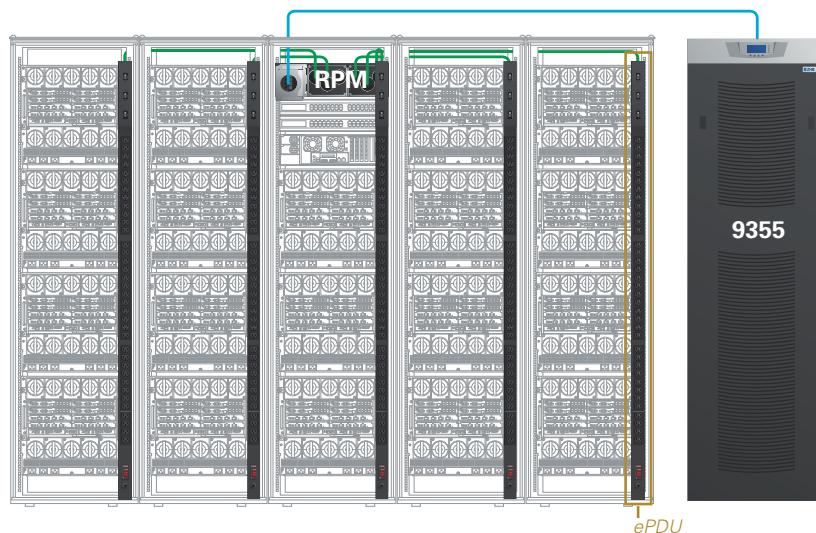
The 9355's on-board power distribution module is compatible with Eaton's optional rack power modules (RPM) and enclosure power distribution units, providing maximum flexibility in distributing power throughout the facility or data center. The RPM and ePDU enable primary power distribution from the 9355 to secondary power distribution devices or directly to IT equipment, for organized power distribution with fewer cables to manage and fewer distribution points to monitor.

Both solutions deliver power to loads of various voltages and can be configured to include user-selectable combinations of NEMA, IEC and hardwired inputs, and NEMA and IEC output receptacles.

ePDUs are available in space-saving 0U-vertical and 1U-horizontal configurations making the ePDU ideal for high-density rack environments.

ePDUs allow users to meter, monitor, switch, sequence and manage branches or individual outlets.

Eaton RPMs and ePDUs simplify power distribution by reducing the number of cables to manage and distribution points to monitor



ePDUs



Rack power module
(front and rear view)



Integrated power distribution module

Options & service

Additional 9355 options

Options cabinets

For maximum flexibility, Eaton offers four options cabinet models for the following applications:

- Options cabinet with a maintenance bypass switch (MBS) that provides wrap-around bypass for UPS maintenance or service without shutting down the load
- Options cabinet with both MBS and input isolation transformer that allows operation from a 208V, 480V, or 600V 60-Hz source (input transformer in single-feed systems or bypass transformer in dual-feed systems)
- Options cabinet for dual-feed systems that provides a second input from a 208V, 480V, or 600V 60-Hz source
- Options cabinet with an output isolation transformer for 480V loads

Wall-mount maintenance bypass panels

Eaton offers a comprehensive line of optional wall-mounted maintenance bypass panels compatible with the 9355 UPS. The wall-mounted bypass panel is used to bypass the UPS during maintenance or servicing, providing wrap-around bypass for UPS service without shutting down the load. And for more flexible power distribution, these maintenance bypass panels can be equipped with surge protection and provisions for 36 poles of distribution utilizing Eaton's Cutler-Hammer breakers.

Proven warranty and support services

Customers consistently rank Eaton services number one in quality. Eaton's comprehensive, world-class service solutions are designed to improve costs, uptime, reliability, power quality and safety. And with 240 customer service engineers in North America and 1,200 international authorized service providers, Eaton has more service personnel than any other UPS manufacturer.

The standard factory warranty covers:

- System warranty: One year parts / 90 days labor
- Battery warranty: Two years parts / 90 days labor

Extensive service options for enhanced reliability

For support beyond the warranty period, Eaton offers enhanced service options including onsite startup, corrective and preventive maintenance, battery solutions, training, remote monitoring and factory spare parts and upgrades. Customizable three-phase UPS services packages allow customers to select the plan that provides the right combination of system uptime, convenience and value.

Service Plans

Eaton 9355 UPS Service Plans	PowerTrust Value	ProActive	PowerTrust	PowerTrust Preferred	Flex Contracts
Parts and Labor for Electronics	●	●	●	●	
Parts and Labor for Batteries	○	○	○	○	
5x8 On-Site Corrective Maintenance	●				
7x24 On-Site Corrective Maintenance		●	●	●	
Next Business Day Response	●				
Eight-Hour Response		●	●	●	
Four-Hour Response		○	○	○	
Two-Hour Response		○	○	○	
5x8 UPS Preventive Maintenance Visit	One per year	○	One per year		
7x24 UPS Preventive Maintenance Visit	○	One per year	○	Two per year	
Battery Preventive Maintenance Visit	○	○	One per year	Two per year	
eNotify Remote Monitoring Service	●	●	●	●	
Discounted Spare Parts Kit, T&M, and Upgrades		30%	30%	30%	

● Included feature

○ Optional

Enhanced communication capabilities

The 9355 UPS is equipped with a variety of standard communications features for network connectivity and remote management applications, including:

- RS-232 serial port
- Two X-Slot communication bays
- Relay output contacts
- Two programmable signal inputs
- Remote emergency power-off (REPO)

Easy network connectivity and monitoring

ConnectUPS-X card

The ConnectUPS-X Web/SNMP X-Slot card connects the 9355 directly to an Ethernet network and the Internet and enables graceful shutdown of multiple computers over the network. The ConnectUPS-X Web/SNMP also features a three-port switching hub.

Modbus card

The Modbus card is an X-Slot device that allows continuous, real-time monitoring of the 9355 through a Building Management System (BMS) or industrial automation system.

Relay interface cards

The relay interface card for the X-Slot enables remote UPS shutdown and provides isolated dry contact Form-C relay outputs for utility failure, low battery, UPS alarm/OK, and on bypass.

Environmental Monitoring Probe

The environmental monitoring probe (EMP) works with the 9355 and ConnectUPS-X card to remotely monitor ambient temperature and relative humidity of the remote environment. The EMP can also be configured to provide status of two additional contact devices such as smoke detectors or open-door sensors.



ConnectUPS-X Web/
SNMP X-Slot card



Power Xpert Gateway
Card 2000

Power Xpert Gateway Series cards

Power Xpert Gateway Series X-Slot cards provide Web-enabled, real-time monitoring of UPSs, PDUs and RPPs through standard onboard Web pages, Power Xpert software or third-party software.

Power Xpert meters

Power Xpert meters combine state-of-the-art technology with next-generation power diagnostics, data trending and performance benchmarking with a twist-and-click LCD display.

Centralized control and visibility

The 9355 UPS is shipped with the Eaton Software Suite CD. The software suite includes the following applications, as well as a user-friendly wizard to guide users through software selection and installation:

- LanSafe power management software
- PowerVision UPS performance analysis and monitoring software (30-day trial version)
- NetWatch network monitoring software

eNotify Remote Monitoring

Eaton's eNotify Remote Monitoring Service provides 24x7 real-time monitoring of the 9355 and battery systems and alerts both service technicians and the customer when a problem is detected. Proactive monitoring enables technical experts to respond immediately to more than 40 alarm conditions and, in many cases, resolve issues remotely with minimal or no downtime. Additional eNotify benefits include:

- One-way outbound status and event e-mails for security and reliability
- Fast diagnosis and notification of critical alarms
- Monthly customer reports including power event logs and overall UPS and battery health summaries



Modbus card



Relay Interface cards



Environmental
Monitoring Probe



LanSafe



Foreseer



PowerVision

Model selection guide (10 and 15 kVA)

Power Rating (kVA/kW) ¹	Description	Input/Output Voltage	Part Number ²	Base Runtime	Dimensions (HxWxD, in.)	Weight (lb.) ³
10 / 9	2-high w/32 battery	208/208	KA1011100000010	8	32.2x12.0x33.5	373.0
10 / 9	3-high w/64 battery	208/208	KA1012100000010	22	47.8x12.0x33.5	609.0
10 / 9	2-high w/32 battery	220/220 ⁴	KA1011200000010	8	32.2x12.0x33.5	373.0
10 / 9	3-high w/64 battery	220/220 ⁴	KA1012200000010	22	47.8x12.0x33.5	609.0
10 / 9	3-high w/32 battery and input isolation transformer	480/208	KA1013400000010	8	47.8x12.0x33.5	577.0
10 / 9	3-high w/32 battery and input isolation transformer	600/208	KA1013600000010	8	47.8x12.0x33.5	577.0
15 / 13.5	2-high w/32 battery	208/208	KA1511100000010	4	32.2x12.0x33.5	373.0
15 / 13.5	3-high w/64 battery	208/208	KA1512100000010	13	47.8x12.0x33.5	609.0
15 / 13.5	2-high w/32 battery	220/220 ⁴	KA1511200000010	4	32.2x12.0x33.5	373.0
15 / 13.5	3-high w/64 battery	220/220 ⁴	KA1512200000010	13	47.8x12.0x33.5	609.0
15 / 13.5	3-high w/32 battery and input isolation transformer	480/208	KA1513400000010	4	47.8x12.0x33.5	577.0
15 / 13.5	3-high w/32 battery and input isolation transformer	600/208	KA1513600000010	4	47.8x12.0x33.5	577.0

1. 50/60 Hz auto-sensing.
 2. An input neutral is required for all configurations unless the input isolation transformer is used. For parallel systems, change the fifth configure-to-order (CTO) digit to a 2 and include parallel tie cabinet.
3. Add 47 lb. for two-high configurations or 50 lb. for three-high configurations to determine shipping weight.
 4. 220V units are wye connected 220/127V input and 220/127V output, three-phase, four-wire plus ground.

Model selection guide (20 and 30 kVA)

Power Rating (kVA/kW) ¹	Input/Output Voltage	Feed	UPS Part Number ²	Options Cabinet(s)	Base Runtime ³	Dimensions (HxWxD, in.)	Weight (lb.) ⁴
20 / 18	208/208	Single	KB2013100000010	None	18	66.0 x 20.0 x 34.1	1160.0
20 / 18	208/208	Single ⁶	KB2013100000010	KBT001100000010 ⁵	18	66.0 x 40.0 x 34.1	1695.0
20 / 18	208/208	Dual ⁶	KB2013100000010	KBT001100000010 KBT002100000010 ⁵	18	66.0 x 60.0 x 34.1	2230.0
20 / 18	220/220 ⁷	Single	KB2013200000010	None	18	66.0 x 20.0 x 34.1	1160.0
20 / 18	480/208	Single	KB2013100000010	KBT001200000010 ⁵	18	66.0 x 40.0 x 34.1	1695.0
20 / 18	480/208	Dual	KB2013100000010	KBT002200000010 KBT001200000010 ⁵	18	66.0 x 60.0 x 34.1	2230.0
20 / 18	600/208	Single	KB2013100000010	KBT001300000010	18	66.0 x 40.0 x 34.1	1695.0
20 / 18	600/208	Dual	KB2013100000010	KBT001300000010 ⁵ KBT002300000010	18	66.0 x 60.0 x 34.1	2230.0
20 / 18	480/480	Single	KB2013100000010	KBT001200000010 ⁵ KBT003200000010	18	66.0 x 60.0 x 34.1	2230.0
30 / 27	208/208	Single	KB3013100000010	None	11	66.0 x 20.0 x 34.1	1160.0
30 / 27	208/208	Single ⁶	KB3013100000010	KBT001100000010 ⁵	11	66.0 x 40.0 x 34.1	1695.0
30 / 27	208/208	Dual ⁶	KB3013100000010	KBT001100000010 ⁵ KBT002100000010	11	66.0 x 60.0 x 34.1	2230.0
30 / 27	220/220 ⁷	Single	KB3013200000010	None	11	66.0 x 20.0 x 34.1	1160.0
30 / 27	480/208	Single	KB3013100000010	KBT001200000010 ⁵	11	66.0 x 40.0 x 34.1	1695.0
30 / 27	480/208	Dual	KB3013100000010	KBT001200000010 ⁵ KBT002200000010	11	66.0 x 60.0 x 34.1	2230.0
30 / 27	600/208	Single	KB3013100000010	KBT001300000010	11	66.0 x 40.0 x 34.1	1695.0
30 / 27	600/208	Dual	KB3013100000010	KBT001300000010 ⁵ KBT002300000010	11	66.0 x 60.0 x 34.1	2230.0
30 / 27	480/480	Dual	KB3013100000010	KBT001200000010 ⁵ KBT003200000010	11	66.0 x 60.0 x 34.1	2230.0

1. 50/60 Hz auto-sensing.
 2. An input neutral is required for all configurations unless the input isolation transformer is used. For parallel systems, change the fifth CTO digit to a 2 and include parallel tie cabinet.
 3. All models include internal batteries.
 4. Add 50 lb. to determine shipping weight.
 5. Contains on-board maintenance bypass.
 6. With isolation transformer.
 7. 220V units are wye connected 220/127V input and 220/127V output, three-phase, four-wire plus ground.

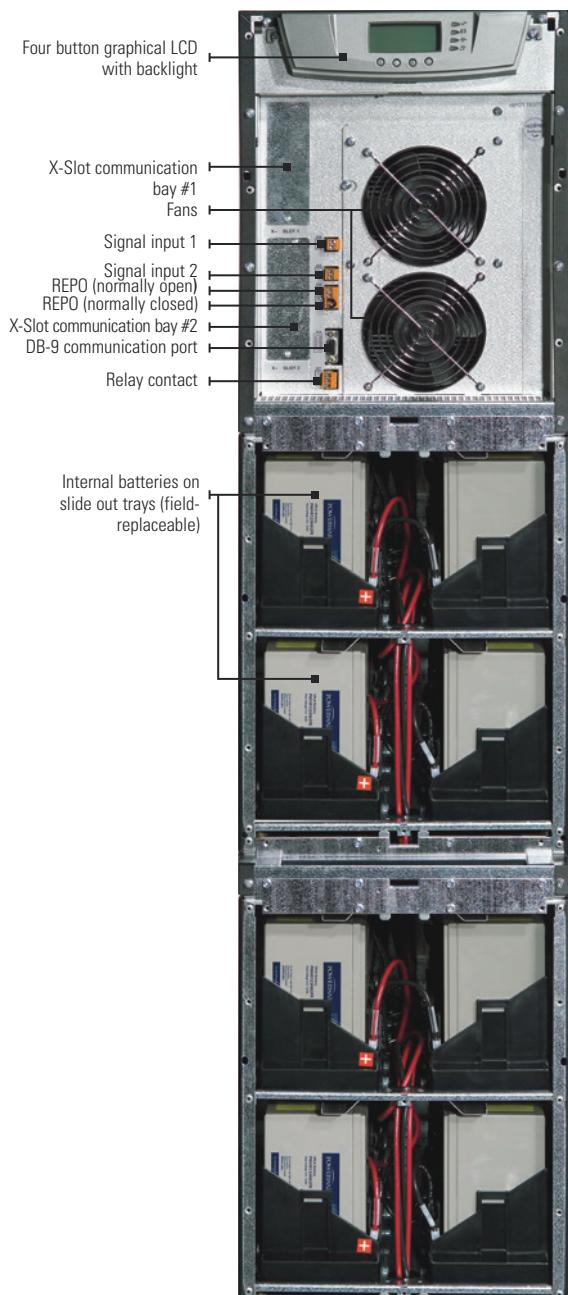
Battery backup times (in minutes)

10-15 kVA backup times										
VA	Watt	UPS + Internal 32 Battery	(1) EBM	(2) EBM	(3) EBM	(4) EBM	UPS + Internal 64 Battery	(1) EBM	(2) EBM	(3) EBM
			64	64	64	64	96	96	96	96
15000	13500	5	23	43	65	89	13	43	77	113
14500	13050	5	24	45	68	93	14	45	81	119
14000	12600	5	25	47	72	97	15	47	84	125
13500	12150	6	26	49	75	102	16	49	88	130
13000	11700	6	28	52	78	106	17	52	92	136
12500	11250	6	29	54	82	111	18	54	96	142
12000	10800	7	30	57	86	116	19	57	101	149
11500	10350	7	32	59	90	122	19	59	106	156
11000	9900	7	33	62	94	129	20	62	111	164
10500	9450	8	35	66	100	136	21	66	117	174
10000	9000	8	37	70	106	144	23	70	124	184
9500	8550	9	40	74	112	153	24	74	132	196
9000	8100	10	42	79	120	163	26	79	141	209
8500	7650	11	46	85	129	175	28	85	152	225
8000	7200	12	49	92	139	189	30	92	164	242
7500	6750	13	53	100	151	205	32	100	178	263
7000	6300	15	58	109	164	224	35	109	194	286
6500	5850	16	64	119	180	245	39	119	212	314
6000	5400	18	70	131	198	270	43	131	234	346
5500	4950	20	78	145	220	300	47	145	259	383
5000	4500	22	87	162	245	334	53	162	289	428
4500	4050	25	97	182	276	376	59	182	325	-
4000	3600	29	110	207	313	426	67	207	369	-
3500	3150	33	127	238	359	-	77	238	423	-
3000	2700	38	148	277	418	-	90	277	-	-
2500	2250	46	176	329	-	-	107	329	-	-

20-30 kVA backup times										
VA	Watt	UPS + Internal 1 Battery	Internal Battery + EBC - 36			Internal Battery + (1) EBC - 72		Internal Battery + (2) EBC-72		
			11	31	33	35	40	43	46	53
30000	27000	11		31			56			89
29000	26100	11		33			58			90
28000	25200	12		35			60			93
27000	24300	12		38			62			95
26000	23400	13		40			65			98
25000	22500	14		43			68			101
24000	21600	14		46			71			103
23000	20700	15		48			74			106
22000	19800	16		51			76			109
21000	18900	17		53			79			111
20000	18000	18		56			82			114
19000	17100	19		58			85			117
18000	16200	20		62			88			120
17000	15300	22		66			92			130
16000	14400	24		71			96			142
15000	13500	26		75			101			154
14000	12600	28		79			105			166
13000	11700	31		84			110			178
12000	10800	35		88			114			201
11000	9900	38		94			119			256
10000	9000	42		101			134			251
7500	6750	58		117			188			347
5000	4500	90		188			294			543

Note: Backup times are approximate and may vary with equipment, configuration, battery age, temperature, etc.

Technical Specifications for 10 and 15 kVA¹



Power

Ratings (kVA/Watts)	10 kVA/9 kW and 15 kVA/13.5 kW at 0.9 power factor
Topology	Double conversion
Electrical input	
Nominal input voltage	208V/120V or 220V/127V three-phase 400V models also available
Input voltage range	-15%, +10% from nominal at 100% load without depleting battery
Operating frequency	50/60 Hz (45 to 65 Hz)
Input power factor	>0.99 typical, >0.96 frequency converter
Input current distortion	5% THD
Electrical output	
Nominal output voltage	208/120, 220/127 Vac
Output voltage regulation	±1% static; ±5% dynamic at 100% resistive load change, <1 ms response time
Efficiency	91%, typical
Heat dissipation (BTU/hr)	<i>10 kVA models:</i> 3,798 @ 208V and 220V input 6,294 @ 480V and 600V (with input isolation transformer) <i>15 kVA models:</i> 5,122 @ 208V and 220V input 8,134 @ 480V and 600V (with input isolation transformer)

Battery

Battery type	9 Ah, sealed, lead-acid, maintenance-free
Battery runtime	See battery backup time chart
Battery replacement	Field-replaceable
Charger	Default is 3.4A per battery string. Charger current is configurable from 0.5A to 25A per string with an overall maximum of 34A (limited by input current)
Start-on-battery	Allows start of UPS without utility input

General

Diagnostics	Full system self-test at startup
UPS bypass	Automatic on overload or UPS failure
Parallel for redundancy	Yes, using Powerware Hot Sync technology and capacity
Dimensions and weights	See model selection table
Overload (normal operation)	150% for 5 sec / 125% for 1 min (online), 110% for 10 min

Communications

LCD display	Graphical LCD with blue backlight
LEDs	(4) LEDs for notice and alarm
Audible alarms	Yes
Communication ports	(1) RS-232, (1) relay contact, (1) REPO, (2) environmental input
Communication slots	(2) X-Slot communication bays
Power management software	Bundled Software Suite CD

Environmental

Operating temperature	50–104°F (10–40°C), 45°C with 7.5% derating; Optimal battery performance: 77°F (25°C)
Storage temperature	32–77°F (0–25°C); Recommended battery storage: 59–77°F (15–25°C)
Relative humidity	0–95%, non-condensing
Audible noise	< 56 dBA at 1 meter (noiseless room) typical
Altitude	9,843 ft. (3000m) without derating

Certifications

Safety certifications	UL1778 5th Edition, CSA C22.2 No. 107.3-14, NOM-NYCE
EMC compliance	47 CFR Part 15/ICES-003 Class A
Quality	ISO 9001:2015, ISO 14001:2004
Surge	ANSI C62.41 Category B3, IEC 61000-4-5
Markings	cULus, NOM-NYCE

1. Due to continuous product improvements, program specifications are subject to change without notice.

Technical Specifications for 20 and 30 kVA¹

Power

Ratings	20 kVA/18 kW and 30 kVA/27 kW at 0.9 power factor
Topology	Double conversion

Electrical input

Nominal input voltage	208V/120V, 220V/127V +10, -15% 480V/277V, 600V (480+600 with transformer) 400V models also available
Operating frequency	50/60 Hz (45 to 65 Hz)
Input power factor	0.99 typical

Input current distortion

<5% THD

Electrical output

Nominal output voltage	208/120, 220/120 Vac 480/227 with output transformer
Output voltage regulation	±1% static; ±4% dynamic with 100% step load recovery within 1 ms response time

Efficiency

91%, typical

Heat dissipation (BTU/hr)

20 kVA models:
6,762 @ 208V and 220V input
10,450 @ 480V and 600V (with input isolation transformer)
30 kVA models:
9,220 @ 208V and 220V input
13,831 @ 480V and 600V (with input isolation transformer)

Battery

Battery type	9 Ah, sealed, lead-acid, maintenance-free
Battery runtime	See battery backup time chart
Battery replacement	Field-replaceable
Charger	Default is 8A

General

Diagnostics	Full system self-test at startup
UPS bypass	Automatic on overload or UPS failure
Parallel for redundancy	Yes, using Powerware Hot Sync technology for redundancy and capacity
Dimensions and weights	See model selection table
Overload	150% for 5 sec / 125% for 1 min (online), 110% for 10 min

Communications

LCD display	Graphical LCD with blue backlight
LEDs	(4) LEDs for notice and alarm
Audible alarms	Yes
Communication ports	(1) RS-232, (1) relay contact, (1) REPO, (2) environmental input
Communication slot	(2) X-Slot communication bays
Power management software	Bundled Software Suite CD

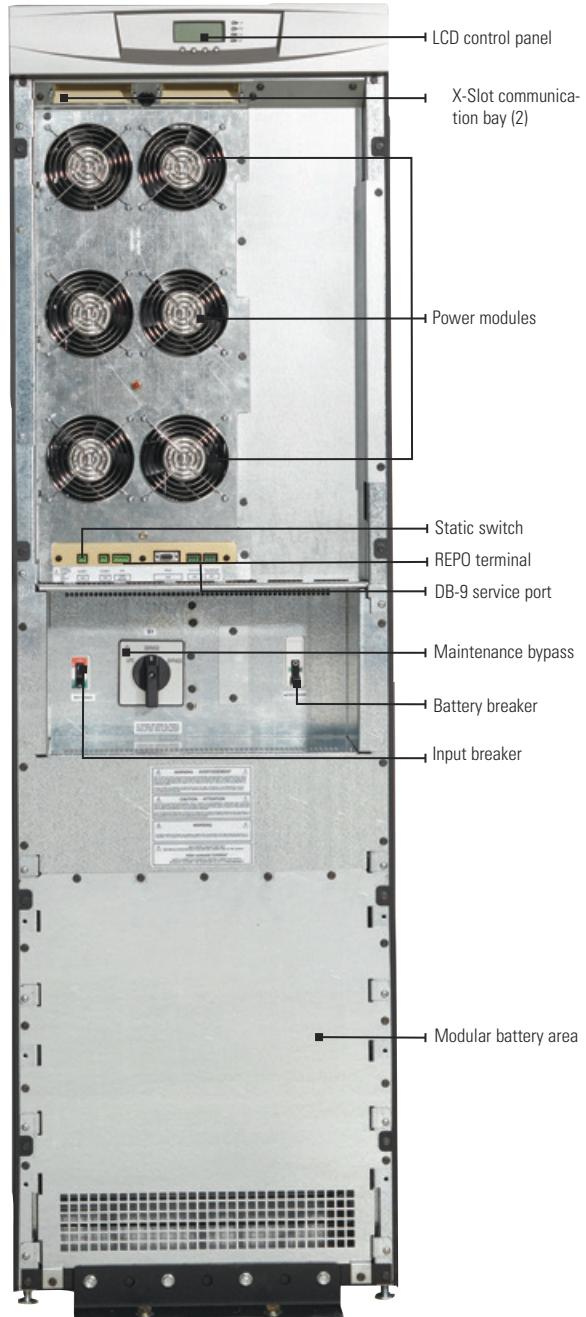
Environmental

Operating temperature	50–104°F (10–40°C), 45°C with 7.5% derating; Optimal battery performance: 77°F (25°C)
Storage temperature	32–77°F (0–25°C); Recommended battery storage: 59–77°F (15–25°C)
Relative humidity	0–95%, non-condensing
Audible noise	< 58 dBA at 1 meter depending on load
Altitude	<3000m

Certifications

Safety certifications	IEC 62040-1-1, IEC 60950, EN 62040-1-1, UL 1778, NOM-0190SCP8-1993
EMC compliance	EN 50091-2 Class A
Quality	ISO 9001: 2000 and ISO 14001:1996
Markings	UL, cUL, NOM-NYCE

1. Due to continuous product improvements, program specifications are subject to change without notice.



20/30 kVA UPS

Power Distribution Module with Mechanical Bypass Switch (10 and 15 kVA Models)

NEMA Output Receptacle(s) ¹ Quantity	Breaker	Voltage (V)	Receptacle Code ²	Phase(s)	Enter "Receptacle Code" into CTO Digits #
(1) L15-30R	30A	208	2	3	9, 10 or 11 only
(1) L21-20R	20A	208/120	3	3	9, 10 or 11 only
(1) L21-30R	30A	208/120	4	3	9, 10 or 11 only
(2) 5-15R	15A	120	A	1	9,10,11,12
(2) 5-20R UL	20A	120	B	1	9,10,11,12
(2) 6-15R	15A	208	D	2	9,10,11,12
(2) 6-20R	20A	208	E	2	9,10,11,12
(2) L5-15R	15A	120	F	1	9,10,11,12
(1) L5-20R*	20A	120	G	1	9,10,11,12
(1) L5-30R*	30A	120	H	1	9,10,11,12
(2) L6-15R	15A	208	I	2	9,10,11,12
(1) L6-20R*	20A	208	J	2	9,10,11,12
(1) L6-30R*	30A	208	K	2	9,10,11,12
(1) L14-20R*	20A	120/208	L	2	9,10,11,12
(1) L14-30R*	30A	120/208	M	2	9,10,11,12
Blank Panel	N/A	N/A	X	N/A	9,10,11,12
(2) IEC 320 C13 (120V)	20A	120	N	1	9,10,11,12
(2) IEC 320 C19 (120V)	20A	120	P	1	9,10,11,12

1. The combined quantities of LOCKING receptacles (denoted by *) must not exceed four per unit.1. Arrange receptacle codes in numerical-alphabetical order in digits 9 through 12 of the CTO number. Example 1: A PDM with an L21-20, an L14-30, and Qty 2 IEC320-C19 would have digits 9 through 12 of the CTO arranged as "3MPP". Example 2: A PDM with a 5-15R, and an L6-30 and an L14-30 would have digits 9 through 12 of the CTO arranged as "AKMX". Please be sure utilize the "X" designation for any of the four total slots not populated.

Options (10 and 15 kVA)

Description	Part Number	Input/Output Voltage (V)	Dimensions (H x W x D, inches)	Weight (lb)
Two-high line and match battery module (64 batteries)	103004192-5501	N/A	32.2 x 12 x 30.2	480
Three-high line and match battery module (96 batteries)	103004193-5501	N/A	47.8 x 12 x 30.2	710
Wall-mount parallel tie cabinet (2-Breaker MBP) ^{1,3}	124100020-001	N/A	36 x 20 x 5.8	68
Wall-mount Remote EPO Switch	103002939	N/A	4.5 x 4.5 x 4.5	3
Zone 4 Seismic Mounting Kit	103004194-5501	N/A	-	-
Remote monitor display panel ²	103002687-001	N/A	4.9 x 5.9 x 1.6	3
Spare parts kit	106711169	N/A	N/A	N/A
10 to15 kVA upgrade	103004657	N/A	N/A	N/A
Upgrade to a parallel UPS module				
three-breaker maintenance bypass panels	UP08N-PAR1	N/A	N/A	N/A
100A Bus, 200A Neutral, & 60A MBP, MIB, MIS ³	124100027-001	208/208	48 x 20 x 5.8	120
With integral 120 KA TVSS (100A Bus, 200A Neutral, and 60A MBP, MIB, MIS) ³	124100027-002	208/208	60 x 20 x 5.8	120
With 36-pole distribution provisions (Cutler-Hammer GHB 65 kAIC, or GBHW 22 kAIC and BAB 10 kAIC only) ³	124100027-003	208/208	72 x 20 x 5.8	210
With 36-pole distribution provisions and integrated TVSS (Cutler-Hammer GHB 65 kAIC, GBHW 22 kAIC and BAB 10 kAIC only) ³	124100027-004	208/208	90 x 20 x 5.8	225

1. 208V/208V input/output voltage. 225A bus, 200A neutral, (1) 225A MBP and (4) 80A MIS.

2. Requires Industrial Relay and Display Card. See X-Slot Connectivity

3. Add 40 lb. for shipping weight of panels and 50 lb. for panels with panelboard provisions.

Options (20 and 30 kVA)

Description	Part Number	Input/Output Voltage (V)	Dimensions (H x W x D, inches)	Weight (lb)
Two-string line and match battery cabinet (36 batteries)	103005183	N/A	66.0 x 20.0 x 34.1	1105
Four-string line and match battery cabinet (72 batteries)	103004868	N/A	66.0 x 20.0 x 34.1	2060
Option cabinet containing maintenance bypass (no transformer)	KBT000000000010	208/208	67.0 x 20.0 x 34.1	205
Wall-mount parallel tie cabinet (two-breaker MBP) ^{1,3}	124100026-001	208/208	48.0 x 20.0 x 5.8	150
Remote monitor display panel ²	103002687-001	N/A	N/A	N/A
Remote EPO switch (wall mounted)	103002939	N/A	N/A	N/A
Zone 4 seismic kit	103004896	N/A	N/A	N/A
Spare parts kit	106711170	N/A	N/A	N/A
20 to 30 kVA upgrade	103004901	N/A	N/A	N/A
Upgrade to a parallel UPS module	UP08N-PAR	N/A	N/A	N/A
Three-breaker maintenance bypass panels				
225A Bus, 200A Neutral and 125A MBP, 110A MIB, 110A MIS) ³	124100028-001	208/208	48.0 x 20.0 x 5.8	120
With integral 120 KA TVSS				
(100A Bus, 200A Neutral and 60A MBP, MIB, MIS) ³	124100028-002	208/208	60.0 x 20.0 x 5.8	120
With 36-pole distribution provisions (Cutler-Hammer GHB 65 kAIC, or GBHW 22 kAIC and BAB 10 kAIC only) ³	124100028-003	208/208	72.0 x 20.0 x 5.8	210
With 36-pole distribution provisions and integrated TVSS (Cutler-Hammer GHB 65 kAIC, GBHW 22 kAIC and BAB 10 kAIC only) ³	124100028-004	208/208	90.0 x 20.0 x 5.8	225

1. 400A Bus, 200A Neutral, (1) 350A MBP and (4) 110A MIS.

2. Requires Industrial Relay and Display Card. See X-Slot Connectivity Options table.

3. Add 40 lb. for shipping weight of panels and 50 lb. for panels with panelboard provisions.



Options cabinet

X-Slot Connectivity Options

Description ¹	Value for CTO Digit 8	Part Number (if ordered separately)
None (No Pre-installed X-Slot card)	0	—
ConnectUPS-X Web/SNMP/xHub Card	3	116750221-001
Modem Card	7	05146288-5501
Modbus Card	4	103005425-5591
Relay Card (AS/400 compatible)	5	1018460
Industrial Relay and Display Card ²	6	103003055
CAN Bridge Parallel Card	N/A	103004336

1. The UPS has two X-Slots. One card can be factory installed while the second X-Slot card can be purchased separately.

2. 5A @ 250V. Provides (4) form-C relay contacts for integrating UPS alarms into security and alarm systems. Also provides signal information for the Remote Monitor Display Panel (part number 103002687-001).

RPM Configurations for 9355

Part Number	Input Cable	Receptacle 1	Receptacle 2	Metering
Y03100011100000	Hardwired Input	L21-20 (2)	L21-20 (2)	Local Power Meter
Y03100022100000	Hardwired Input	L21-30 (2)	L21-30 (2)	Local Power Meter
Y03100055100000	Hardwired Input	L6-30 (3)	L6-30 (3)	Local Power Meter
Y03100047100000	Hardwired Input	L6-20 (3)	5-20 (6)	Local Power Meter
Y03100017100000	Hardwired Input	L21-20 (2)	5-20 (6)	Local Power Meter
Y031000FF100000	Hardwired Input	L15-30 (2)	L15-30 (2)	Local Power Meter
Y301000BB100000	Hardwired Input	IEC320-C19 (6)	IEC320-C19 (6)	Local Power Meter



Wall-mount maintenance bypass panel

Learn more at
Eaton.com
1.800.356.5794

Eaton
1000 Eaton Boulevard
Cleveland, OH 44122
United States
Eaton.com

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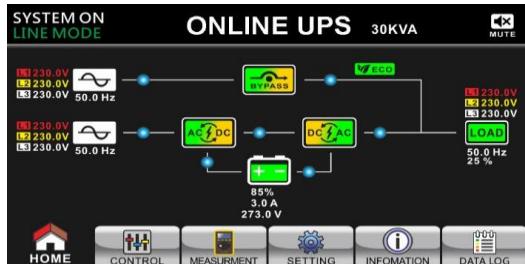
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latest product and support information.





- True double-conversion
- DSP technology guarantees high performance
- 4.3" LCD for comprehensive UPS information
- Active power factor correction in all phases
- 50Hz/60Hz frequency converter mode
- ECO mode operation for energy saving (ECO)
- Emergency power off function (EPO)
- Generator compatible
- SNMP+USB multiple communications
- 3-stage extendable charging design for optimized battery performance
- Maintenance bypass available
- Parallel operation with common battery
- Dual AC inputs
- Optional parallel operation



3P/3P LV (UL) 10K~40K ONLINE UPS SELECTION GUIDE									
MODEL	BBP-AR-33-10K	BBP-AR-33-15K	BBP-AR-33-20K	BBP-AR-33-30K	BBP-AR-33-40K				
PHASE									
CAPACITY	10KVA / 10KW	15KVA / 15KW	20KVA / 20KW	30KVA / 30KW	40KVA / 40KW				
INPUT									
Nominal Voltage	120/208Y Or 127/220Y VAC (3Ph+N)								
Voltage Range	138-270 VAC (3-phase) @ 50% load 173-253 VAC (3-phase) @ 100% load								
Frequency Range	46-54Hz or 56-64Hz								
Power Factor	≥ 0.99 @ 100% load								
OUTPUT									
Output Voltage	120/208Y Or 127/220Y VAC (3Ph+N)								
AC Voltage Regulation (Batt. Mode)	± 1%								
Frequency Range (Synchronized Range)	46-54Hz or 56-64Hz								
Frequency Range (Batt. Mode)	50 Hz ± 0.1 Hz or 60 Hz ± 0.1 Hz								
Current Crest Ratio	3:1 (max.) ≤ 2 % THD (Linear Load) ≤ 4 % THD (Non-linear Load PF≥0.8)								
Harmonic Distortion									
Transfer Time	AC mode to Battery mode	zero							
Time	Inverter to Bypass	zero							
Waveform (Batt. Mode)	Pure Sine Wave								
Overload	AC Mode Battery Mode	100-110% for 1 hr, 110-130% for 1 min, >130% for 1 second 100-110% for 30 seconds, 110-130% for 10 seconds, >130% for 1 second							
PARALLEL CAPACITY									
EFFICIENCY									
AC Mode	94%								
ECO Mode	97%								
Battery Mode	93.5%								
BATTERY									
Standard Model	Battery Type	12V/9Ah	12V/9Ah	12V/9Ah	N/A				
	Numbers	(10+10)pcs x 1 string Optional for max. 2 strings	(10+10)pcs x 2 strings Optional for max. 3 strings	(10+10)pcs x 3 strings					
	Typical Recharge Time	9 hours recover to 90% capacity							
	Charging Current (max.)	1A/2A/3A/4A (Adjustable)							
	Charging Voltage	+/-136.5 VDC							
Long-run Model	Battery Type	Depending on the capacity of external batteries							
	Numbers	16-20 pcs (Adjustable)							
	Charging Current	4A/8A/12A (Adjustable) Max. 12A	4A/8A/12A (Adjustable) Optional parallel up to Max. 20A	4A/8A/12A/16A (Adjustable) Optional parallel up to Max. 24A					
	Charging Voltage	+/-13.65V*N (N = 8-10)							
INDICATORS									
LCD Panel	UPS status, Load level, Battery level, Input/Output voltage, Discharge timer, and Fault conditions								
ALARM									
Battery Mode	Sounding every 4 seconds								
Low Battery	Sounding every second								
Overload	Sounding twice every second								
Fault	Continuously sounding								
PHYSICAL									
Standard Model	Dimension, D X W X H (mm)/(inches)	667x250x827 / 26.5x10x33	865x300x1020 / 34x12x40.25	N/A					
Model	Net Weight (kgs) / (lbs)	95 / 209	181 / 399	231 / 509.5					
Long-run Model	Dimension, D X W X H (mm)	667x250x827 / 26.5x10x33	865x300x1020 / 34x12x40.25	790x420x1200 / 31.5x17x47.5					
	Net Weight (kgs) / (lbs)	45 / 99.5	81 / 179	108 / 238	113 / 249.5				
ENVIRONMENT									
Operation Temperature	0-40°C								
Operation Humidity	<95% and non-condensing								
Noise Level	Less than 60dB @ 1 Meter	Less than 70dB @ 1 Meter							
MANAGEMENT									
Smart USB	Supports Windows® 2000/2003/XP/Vista/2008, Windows® 7/8/10, Linux and MAC								
Optional SNMP	Power management from SNMP manager and web browser								

*If the UPS is installed or used in a place where the altitude is above than 1000m, the output power must be derated 1% per 100m.

Product specifications are subject to change without further notice



ELECTRICAL

Rigid PVC Conduit Pipe & Fittings

A System for Residential, Industrial, Commercial
and Institutional Applications

Westlake
Pipe & Fittings

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Note: This brochure is not intended to assume the authority of the Design Engineer. Actual jobsite conditions will vary significantly. The sole responsibility for all design and installation decisions lies with the Design Engineer. All local health and safety regulations must be followed.



Rigid PVC Conduit Pipe & Fittings

A system for residential, industrial, commercial and institutional applications.

Product Description & Applications

We manufacture a complete line of Rigid PVC Conduit pipe and fittings for electrical applications. Our products are designed to reduce labour and maintenance costs, while offering superior performance.

Products are certified by the Canadian Standards Association (CSA) and Underwriters Laboratories (UL) for use in above and below ground applications. Our Rigid PVC conduit pipe and fittings are available in 12 to 150mm (0- to 6-inch) diameters and 3- or 6-metre (10- or 20-foot) lengths.

Standards and Codes

Rigid PVC Conduit pipe and fittings are certified to CSA Standards as noted below. Our Rigid PVC conduit pipe and fittings shall be installed according to the Canadian Electrical Code (CEC) Part I, Rules 12-1100 - 12-1122 and the National Electrical Code (NEC) Article 352.

FEATURES AND BENEFITS

Saves Labour

Rigid PVC Conduit pipe and fittings are easy to install, cut and join.

Easy Wire Pulls

The conduit's smooth interior surface reduces friction and prevents damage to wires when pulling wire and conductors for long runs and even through 90° bends.

Pipe		Fittings	
	UL 651		UL 514C (Boxes)
C22.2 No. 211.2		C22.2	UL 50 (Electrical Encl.)
 Conforms to NEMA TC2		No. 18.2, 85 (Boxes) No. 40 (Electrical Encl.) No. 42.1 (Covers) No. 85 (Fittings)	UL 514D (Covers) UL 651 (Fittings)

Approximate Weight Comparison

Size mm (in.)	PVC lb/100ft (kg/m)	Aluminum lb/100ft (kg/m)	Steel lb/100ft (kg/m)
6 (1/2)	16.1 (0.24)	16.1 (0.24)	79 (1.20)
19 (3/4)	21.5 (0.32)	21.5 (0.32)	105 (1.55)
25 (1)	31.9 (0.47)	31.9 (0.47)	153 (2.30)
32 (1 1/4)	43.8 (0.65)	43.8 (0.65)	201 (3.00)
38 (1 1/2)	52.3 (0.78)	52.3 (0.78)	249 (3.70)
50 (2)	70.3 (1.05)	70.3 (1.05)	334 (5.00)
63 (2 1/2)	112.0 (1.61)	112.0 (1.61)	527 (7.85)
75 (3)	146.7 (2.18)	146.7 (2.18)	690 (10.25)
90 (3 1/2)	176.4 (2.63)	176.4 (2.63)	831 (12.40)
100 (4)	208.9 (3.11)	208.9 (3.11)	982 (14.60)
125 (5)	283.4 (4.22)	283.4 (4.22)	1,344 (20.40)
150 (6)	368.0 (5.48)	368.0 (5.48)	1,771 (26.35)

Lightweight Materials

Rigid PVC Conduit is easier to move and handle because it is approximately one-fifth the weight of steel and half the weight of aluminium.

Simplifies Direct Burial

Rigid PVC Conduit does not require additional protection for direct burial installations according to the Canadian Electrical Code (CEC) and the National Electrical Code (NEC). Normal construction practices should be followed for trenching and backfill operations.

Non-Conductive

Rigid PVC Conduit is non-conductive.

Long Life

Rigid PVC Conduit and fittings resist acids, alkalis, salt solutions and most other chemicals. (Refer to the Chemical Resistance Guide for detailed information.) There is no risk of corrosion when exposed to naturally corrosive soil conditions, electrochemical or galvanic environments. Rigid PVC Conduit has achieved sunlight resistance as per the requirements of the Electrical Code.

FT-4 Rating

Rigid PVC Conduit pipe has an FT-4 Rating and can be used in non-combustible construction as per Part 3 of the National Building Code of Canada (NBC).

Installation Guidelines

Cutting

Rigid PVC Conduit can easily be cut with a hacksaw, a fine-toothed handsaw or PVC conduit cutters. For conduit with more than a 50mm (2-inch) diameter, use a mitre box or saw guide to ensure a square cut. Deburr the end using a knife or file.



Bending

It may be necessary to create bends in the field by heating and deforming Rigid PVC Conduit. To accomplish this, the following guidelines should be followed:

- For heating the Rigid PVC Conduit, use a heat gun or some other flameless heat source. Do not use an open flame to heat the conduit. Rigid PVC Conduit must be heated to approximately 127°C (260°F) in order to bend without kinking.
- Heat a length of conduit equal to approximately 10 times the nominal diameter.
- Once the Rigid PVC Conduit has been adequately heated, bend it to the required angle plus 3 extra degrees. The additional angle will accommodate the "spring back" which will occur during cooling.
- After bending of the conduit is completed, immediately cool the bend using water or cold air.
- According to the Canadian Electrical Code (CEC) and the National Electrical Code (NEC), the minimum bending radius for rigid conduit is as shown in the table below.

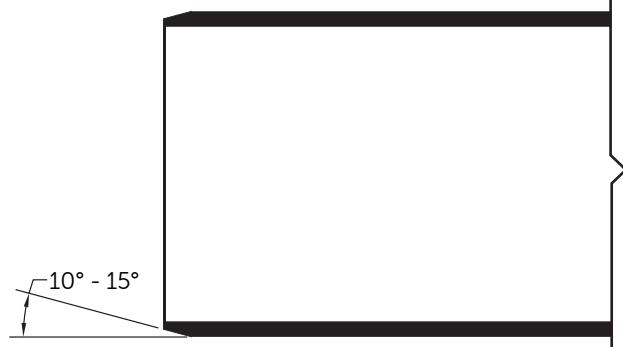
Nominal Size mm (in.)	Min. Radius to Centre of Conduit or Tubing mm (in.)
6 (1/2)	102 (4.016)
21 (3/4)	114 (4.489)
27 (1)	146 (5.748)
35 (1 1/4)	184 (7.244)
41 (1 1/2)	210 (8.268)
53 (2)	241 (9.488)
63 (2 1/2)	267 (10.512)
78 (3)	330 (12.992)
91 (3 1/2)	381 (14.606)
103 (4)	406 (15.984)
129 (5)	610 (24.016)
155 (6)	762 (30.000)

Procedure for Solvent Welding Joints

- Use solvent cement and primer prior to expiration date marked on container.
 - Above 0°C Ambient temperature, joints may be assembled without the use of primer, provided adequate penetration and softening of the pipe/fitting surface can be achieved with solvent cement alone.
1. Assemble materials for the job, including correct solvent cement, primer and correctly sized applicator.
 2. Cut pipe as square as possible using a hand saw and miter box or mechanical saw. Do not use a diagonal cut, as it reduces the bonding area in the joint.
 3. If plastic tubing cutters are used, care must be taken to remove any raised bead at the end of the pipe, caused by cutting. A file or reamer may be used to remove the bead.
 4. Use a knife, file or reamer to remove burrs from the inside and outside of the pipe end, as these will hinder the integrity of the joint. All sharp edges should be removed from the inside and outside edges of the pipe to prevent the pipe from pushing the solvent cement into the fitting socket, thereby causing a weak spot to form.

The pipe end should be chamfered, as shown below.

Chamfered Pipe



Procedure for Solvent Welding Joints

(Continued)

5. All dirt, grease and moisture should be removed from the pipe and socket by thoroughly wiping with a clean, dry cloth.
6. Dry fit pipe and fitting joints prior to cementing. For proper interference fit, the pipe should go easily into the socket approximately to of the socket depth. If this is not the case, other pipe or fittings should be used.
7. The applicator should be sized according to the size of pipe and fittings being joined. The brush width of the applicator should be equal to approximately $\frac{1}{2}$ of the pipe diameter.
8. Primer is used to penetrate and soften the surfaces so that they will fuse together under a wide variety of conditions. The penetration or softening can be checked by dragging the edge of a knife or sharp object over the coated surface. If a few thousandths of an inch of the primed surface can be scratched or scraped away, proper penetration has occurred. Varying weather conditions affect priming and cementing action and may require more time or repeated applications to either or both surfaces.
9. If using primer, use the correct applicator size (see #7) and aggressively work the primer into the socket, keeping the surface and applicator wet until the surface has softened, re-dipping the applicator as required. When the surface is primed, remove any puddles of primer from the socket.
10. Aggressively work the primer on to the end of the pipe, to a point $\frac{1}{2}$ " beyond the depth of the socket.
11. Perform a second application of primer in the socket.
12. While the surfaces are still wet, the appropriate solvent cement should be applied.
13. Using the correct applicator size, aggressively work a full, even layer of cement onto the pipe end to a point equal to the depth of the socket. Do not brush out to a thin paint type layer, as this will dry within a few seconds.
14. Aggressively work a medium layer of cement into the fitting socket; avoid puddling cement in the socket. On the pipe end, do not coat beyond the socket depth or allow cement to run down into the pipe beyond the socket.
15. Apply a second full, even layer of cement on the pipe.
16. Immediately, while the cement is still wet, assemble the joint. Use enough force to ensure that the pipe is fully inserted into the socket. Twist the pipe a . turn as it is being inserted.
17. Hold the joint together for approximately 30 seconds to avoid push out.

18. After assembly, inspect the joint to ensure that there is a ring or bead of cement completely around the juncture of the pipe and socket. If there are voids in this ring, sufficient cement was not applied and the joint may be defective.
19. Remove the excess cement from the pipe and socket (including the ring or bead) using a cloth. Avoid disturbing or moving the joint.
20. Handle newly cemented joints with care until initial set has taken place. Follow set and cure times before handling or testing the system.

PIPE DIMENSIONS				
Nominal Size mm (in.)	Avg. Outside Diameter mm (in.)	Avg. Inside Diameter mm (in.)	Avg. Wall Thickness mm (in.)	Approx. Weight lb/100ft (kg/m)
12 ($\frac{1}{2}$)	21 (0.840)	15 (0.608)	3 (0.116)	16.1 (0.24)
19 ($\frac{3}{4}$)	27 (1.050)	21 (0.810)	3 (0.120)	21.5 (0.32)
25 (1)	33 (1.315)	26 (1.033)	4 (0.141)	31.9 (0.47)
32 ($\frac{1}{4}$)	42 (1.660)	35 (1.362)	4 (0.149)	43.8 (0.65)
38 ($\frac{1}{2}$)	48 (1.900)	40 (1.592)	4 (0.154)	52.3 (0.78)
50 (2)	60 (2.375)	52 (2.049)	4 (0.163)	70.3 (1.05)
63 ($\frac{5}{8}$)	73 (2.875)	62 (2.445)	5 (0.215)	112.0 (1.61)
75 (3)	89 (3.500)	77 (3.042)	6 (0.229)	146.7 (2.18)
90 ($\frac{3}{4}$)	102 (4.000)	89 (3.520)	6 (0.240)	176.4 (2.63)
100 (4)	114 (4.500)	102 (3.998)	6 (0.251)	208.9 (3.11)
125 (5)	141 (5.565)	127 (5.017)	7 (0.274)	283.4 (4.22)
150 (6)	168 (6.625)	153 (6.031)	8 (0.297)	368.0 (5.48)

Specification

All wiring shall be installed in Rigid PVC Conduit and secured with proper fittings. All conduit and fittings shall be manufactured by, Pipe & Fittings Solutions. All outlets, pull boxes and junction points.

Exposed conduit shall be securely attached and supported with straps that are installed at the recommended spacing specified in CEC Section 12-1114. The straps must allow for linear expansion and contraction of the conduit due to temperature change. If the variance in temperature exceeds 14°C (25°F), expansion joints shall be installed according to the manufacturer's recommendations.

If Rigid PVC Conduit is embedded in concrete or direct buried, support straps are not required.

Solvent Cementing

All connections should be made using and applying Westlake Pipe & Fittings solvent cement.

SET TIMES Average Initial Set Times			
Temperature Range	Pipe Sizes $\frac{1}{2}$ " to $1\frac{1}{4}$ "	Pipe Sizes $1\frac{1}{2}$ " to 2"	Pipe Sizes $2\frac{1}{2}$ " to 6"
15°C to 40°C	2 min.	5 min.	30 min.
5°C to 15°C	5 min.	10 min.	2 hrs.
-16°C to 5°C	10 min.	15 min.	12 hrs.

JOINT CURE SCHEDULE Average Joint Cure Schedule			
Temperature Range During Assembly & Cure Periods	Pipe Sizes $\frac{1}{2}$ " to $1\frac{1}{4}$ "	Pipe Sizes $1\frac{1}{2}$ " to 2"	Pipe Sizes $2\frac{1}{2}$ " to 6"
15°C to 40°C	2 min.	5 min.	30 min.
5°C to 15°C	5 min.	10 min.	2 hrs.
-16°C to 5°C	10 min.	15 min.	12 hrs.

ESTIMATED PRIMER REQUIREMENTS Average Number of Joints per Litre of Solvent Cement									
Pipe/Fitting Diameter	$\frac{1}{2}$ "	$\frac{3}{4}$ "	1"	$1\frac{1}{2}$ "	2"	$2\frac{1}{2}$ "	3"	4"	6"
Number of Joints	300	200	125	90	60	40	40	30	10

ESTIMATED PRIMER REQUIREMENTS Average Number of Joints per Litre of Primer									
Pipe/Fitting Diameter	$\frac{1}{2}$ "	$\frac{3}{4}$ "	1"	$1\frac{1}{2}$ "	2"	$2\frac{1}{2}$ "	3"	4"	6"
Number of Joints	600	400	250	180	120	80	80	60	20

SET Solvent Cementing in Cold Weather

- Store pipe and fittings in a heated area. Prefabricate as much of the system as possible in a heated area.
- When not in use, store sealed solvent cement and primer between 5°C and 21°C. Do not use open flame or electric heaters to warm cements and primers.
- Take care to remove moisture, ice and snow from the mating surfaces.

Solvent Cementing in Hot Weather

- At the time of assembly, the surface temperature of the mating surfaces should not exceed 45°C. Shade or shelter the joint surfaces from direct sunlight for at least 1 hour prior to joining and during

the joining process. If necessary, swab the mating surfaces with clean, wet rags to reduce the surface temperature (thoroughly dry surfaces before applying primer or cement).

- Make joints during the cooler early morning hours.
- Apply cement quickly and join pipe to fitting as quickly as possible after applying the cement.
- Keep solvent cement container closed or covered when not in use, to minimize solvent loss.

Solvent Cementing in Wet Conditions

- Mating surfaces must be dry when the joint is made.
- Work under a cover or canopy to keep rain off pipe and fittings.
- Work quickly after drying the pipe and fitting to avoid condensation.
- Allow a longer cure time before the system is tested or used.

Storage and Handling of Solvent Cement and Primer

- Solvent cement and primer contain highly flammable solvents.

Follow all specific safety precautions provided on container label and Material Safety Data Sheet.

- Keep primer and solvent cement away from heat, sparks and open flame.
- Keep containers tightly closed except when in use.
- Ensure proper ventilation of work area and avoid inhaling solvent vapours.
- Where the possibility of splashing exists, wear proper eye protection or a face shield.
- Avoid contact with skin.

Support Straps

Rigid PVC conduit must be supported with straps when installed in above ground applications. These straps should be installed snugly, while allowing linear movement of the conduit. See the table below for recommended maximum spacing of support straps.

MAXIMUM RECOMMENDED SPACING OF SUPPORT STRAPS		
Nominal Size mm (in.)	CEC Recommended Spacing ft (m)	NEC Recommended Spacing ft (m)
16 ($\frac{1}{2}$)	2 $\frac{1}{2}$ (0.75)	3 (0.91)
21 ($\frac{3}{4}$)	2 $\frac{1}{2}$ (0.75)	3 (0.91)
27 (1)	2 $\frac{1}{2}$ (0.75)	3 (0.91)
35 ($1\frac{1}{4}$)	4 (1.20)	5 (1.50)
41 ($1\frac{1}{2}$)	4 (1.20)	5 (1.50)
53 (2)	6 (1.80)	5 (1.50)
63 ($2\frac{1}{2}$)	6 (1.80)	3 - 6 (1.80)
78 (3)-129 (5)	7 (2.10)	3 $\frac{1}{2}$ - 5 (2.10)
155 (6)	8 (2.50)	8 (2.50)

Storing Conduit Pipe and Fittings

Store Rigid PVC conduit pipe and fittings at the same temperature. Otherwise they may expand and contract at different rates and become incompatible.

Maximum Operating Temperatures

According to the Canadian Electrical Code (CEC), Rigid PVC conduit is intended for use at a continuous operating temperature of 75°C (167°F). For US applications, our Rigid PVC conduit is rated for use with 90°C wiring, according to the requirements of the NEC.

Ambient Temperatures

Rigid PVC Conduit and fittings can be installed in locations with an ambient temperature not exceeding 50°C (122°F).

Expansion Joints

According to the CEC, if the amount of expansion expected due to temperature variance during and after construction is more than 45mm, expansion joints must be used.

Expected Expansion

The coefficient of linear expansion for Rigid PVC conduit is as follows:

$$3 \times 10^{-5} \text{ in (expansion/contraction)/in. (pipe length)}/^{\circ}\text{F}$$

(change in temperature),

$$5.4 \times 10^{-5} \text{ mm (expansion/contraction)/mm (pipe length)}/^{\circ}\text{C}$$

(change in temperature)



Note:

The following chart shows the amount of expansion expected with various pipe lengths/temperature changes. If the Rigid PVC Conduit is installed in an exposed location, 17°C (30°F) should be added to the amount of temperature change (T) due to the effects of radiant heat.

Pipe Dimensions

ΔT (°C)	EXPANSION/CONTRACTION OF PVC (MM)									
	Length of Pipe Run (m)									
2	4	6	8	10	12	14	16	18	20	
5	0.54	1.08	1.62	2.16	2.70	3.24	3.78	4.32	4.86	5.40
10	1.08	2.16	3.24	4.32	5.40	6.48	7.56	8.64	9.72	10.80
15	1.62	3.24	4.86	6.48	8.10	9.72	11.34	12.96	14.58	16.20
20	2.16	4.32	6.48	8.64	10.80	12.96	15.12	17.28	19.44	21.60
25	2.70	5.40	8.10	10.80	13.50	16.20	18.90	21.60	24.30	27.00
30	3.24	6.48	9.72	12.96	16.20	19.44	22.68	25.92	29.16	32.40
35	3.78	7.56	11.34	15.12	18.90	22.68	26.46	30.24	34.02	37.80
40	4.32	8.64	12.96	17.28	21.60	25.92	30.24	34.56	38.88	43.20
45	4.86	9.72	14.58	19.44	24.30	29.16	34.02	38.88	43.74	48.60
50	5.40	10.80	16.20	21.60	27.00	32.40	37.80	43.20	48.60	54.00

ΔT (°C)	EXPANSION/CONTRACTION OF PVC (IN.)									
	Length of Pipe Run (ft)									
5	0.01	0.02	0.03	0.04	0.05	0.05	0.06	0.07	0.08	0.09
10	0.02	0.04	0.05	0.07	0.09	0.11	0.13	0.14	0.16	0.18
15	0.03	0.05	0.08	0.11	0.14	0.16	0.19	0.22	0.24	0.27
20	0.04	0.07	0.11	0.14	0.18	0.22	0.25	0.29	0.32	0.36
25	0.05	0.09	0.14	0.18	0.23	0.27	0.32	0.36	0.41	0.45
30	0.05	0.11	0.16	0.22	0.27	0.32	0.38	0.43	0.49	0.54
35	0.06	0.13	0.19	0.25	0.32	0.38	0.44	0.50	0.57	0.63
40	0.07	0.14	0.22	0.29	0.36	0.43	0.50	0.58	0.65	0.72
45	0.08	0.16	0.24	0.32	0.41	0.49	0.57	0.65	0.73	0.81
50	0.09	0.18	0.27	0.36	0.45	0.54	0.63	0.72	0.81	0.90

Required Number of Expansion Joints

The following table shows the amount of travel that is available with each trade size of Westlake Pipe & Fittings Rigid PVC conduit expansion joints:

Part Number	Description (in.)	Description, mm (in.)
REJ10	1/2" Expansion Joint	102 (4)
REJ15	3/4" Expansion Joint	102 (4)
REJ20	1" Expansion Joint	102 (4)
REJ25	1 1/4" Expansion Joint	102 (4)
REJ30	1 1/2" Expansion Joint	102 (4)
REJ35	2" Expansion Joint	102 (4)
REJ40	2 1/2" Expansion Joint	102 (4)
REJ45	3" Expansion Joint	204 (8)
REJ50	3 1/2" Expansion Joint	204 (8)
REJ55	4" Expansion Joint	204 (8)
REJ60	5" Expansion Joint	204 (8)
REJ65	6" Expansion Joint	204 (8)

The required number of expansion joints can be calculated using the following formula:

$$\# \text{ Expansion Joints Required} = \frac{\text{Total Expected Amount of Expansion (in.)}}{\text{Expansion Joint Travel Allowance (in.)}}$$

$$\# \text{ Expansion Joints Required} = \frac{\text{Total Expected Amount of Expansion (mm)}}{\text{Expansion Joint Travel Allowance (mm)}}$$

The number of expansion joints calculated above should be rounded up to the nearest whole number.

SETTING THE PISTON OPENING

Expansion joints must be installed such that they allow for both expansion and contraction of the conduit. The piston of the expansion joint must be set at the correct position to allow for this linear movement. To determine the correct position for the piston at the time and temperature of installation, the following formula should be used:

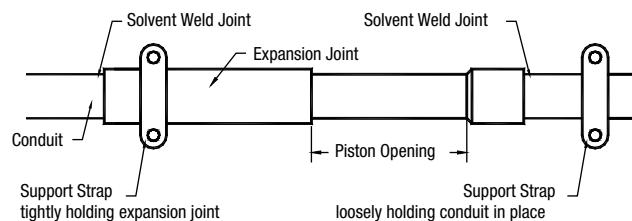
$$\text{Piston Setting (in.)} = \frac{(\text{Max. Temp. } ^\circ\text{F} - \text{Install. Temp. } ^\circ\text{F})}{\text{Total Expected Temperature Change } ^\circ\text{F}} \times \left[\frac{\text{Expansion Joint}}{\text{Expansion Allow. (in.)}} \right]$$

$$\text{Piston Setting (mm)} = \frac{(\text{Max. Temp. } ^\circ\text{C} - \text{Install. Temp. } ^\circ\text{C})}{\text{Total Expected Temperature Change } ^\circ\text{C}} \times \left[\frac{\text{Expansion Joint}}{\text{Expansion Allow. (mm)}} \right]$$

INSTALLATION GUIDELINES

- Securely fasten the expansion joint barrel so that it does not shift. Loosely connect the conduit so that it is free to move.
- To function properly, expansion joints should be installed near a fixed point.
- It is better to use more expansion joints than not enough, since problems are difficult to correct after conductors and wires have been pulled through the conduit.
- Ensure that the barrel and piston are aligned and level.
- For vertical installations of expansion joints, install with the piston at the bottom to prevent dirt and water from getting inside the joint.

INSTALLATION EXAMPLE



IF ONE EXPANSION JOINT IS REQUIRED:

Securely fasten the barrel of the expansion joint close to one of the boxes. Support the conduit with straps, but allow free movement of the conduit for expansion and contraction. (See Drawing 1)

IF TWO EXPANSION JOINTS ARE REQUIRED:

There are two options available:

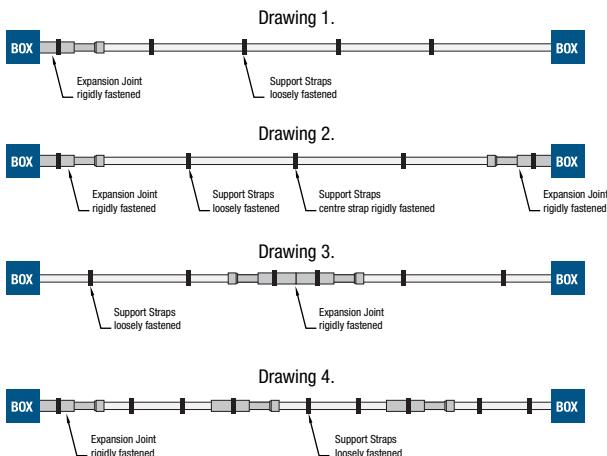
- Firmly fasten one expansion joint near each end of the run and firmly fasten the conduit at the centre. Support the rest of the conduit with straps allowing for movement of the conduit. (See Drawing 2)
- Firmly fasten the expansion joints back-to-back at the centre of the run. The conduit should be supported with straps to allow free movements as it expands and contracts. (See Drawing 3)

IF THREE OR MORE EXPANSION JOINTS ARE REQUIRED:

Evenly space the expansion joints along the run of Rigid PVC conduit. Tightly fasten each expansion joint and support the conduit with straps. Do not restrict the movement of the conduit.

**For information on Maximum Recommended Spacing of Support Straps, see page 4.*

DRAWINGS 1-4



Fittings – Bends (Bell Ends)

90° ELBOWS - BELL END	Sizes (in.)	Product Code	UPC Number	Diameter (D) (in.)	Length (L) (in.)	Radius (R) (in.)
	1/2	REE1090	46120	0.840	1.500	4.00
	3/4	REE1590	46150	1.050	1.500	4.50
	1	REE2090	46180	1.315	1.875	5.75
	1 1/4	REE2590	46210	1.660	2.000	7.25
	1 1/2	REE3090	46240	1.900	2.000	8.25
	2	REE3590	46270	2.375	2.000	9.50
	2 1/2	REE4090	46330	2.875	3.000	10.50
	3	REE4590	46360	3.500	3.125	13.00
	3 1/2	REE5090	46390	4.000	3.250	15.00
	4	REE5590	46420	4.500	3.375	16.00
	5	REE6090	46440	5.565	3.622	24.00
	6	REE6590	46460	6.625	3.740	30.00

45° ELBOWS - BELL END	Sizes (in.)	Product Code	UPC Number	Diameter (D) (in.)	Length (L) (in.)	Radius (R) (in.)
	1/2	REE1045	46120	0.840	1.500	4.00
	3/4	REE1545	46150	1.050	1.500	4.50
	1	REE2045	46180	1.315	1.875	5.75
	1 1/4	REE2545	46210	1.660	2.000	7.25
	1 1/2	REE3045	46240	1.900	2.000	8.25
	2	REE3545	46270	2.375	2.000	9.50
	2 1/2	REE4045	46330	2.875	3.000	10.50
	3	REE4545	46360	3.500	3.125	13.00
	3 1/2	REE5045	46390	4.000	3.250	15.00
	4	REE5545	46420	4.500	3.375	16.00
	5	REE6045	46440	5.565	3.625	24.00
	6	REE6545	46460	6.625	3.750	30.00

30° ELBOWS - BELL END	Sizes (in.)	Product Code	UPC Number	Diameter (D) (in.)	Length (L) (in.)	Radius (R) (in.)
	1/2	REE1030	46100	0.840	1.500	4.00
	3/4	REE1530	46130	1.050	1.500	4.50
	1	REE2030	46160	1.315	1.875	5.75
	1 1/4	REE2530	46190	1.660	2.000	7.25
	1 1/2	REE3030	46220	1.900	2.000	8.25
	2	REE3530	46274	2.375	2.000	9.50
	2 1/2	REE4030	46310	2.875	3.000	10.50
	3	REE4530	46340	3.500	3.125	13.00
	3 1/2	REE5030	46375	4.000	3.250	15.00
	4	REE5530	46400	4.500	3.375	16.00
	5	REE6030	46425	5.565	3.625	24.00
	6	REE6530	46442	6.625	3.750	30.00

UTILITIES 90° ELBOWS - BELL END	Sizes (in.)	Product Code	UPC Number	Diameter (D) (in.)	Length (L) (in.)	Radius (R) (in.)
	2	REE2-24	46501	2.375	41.20	24.00
	2	REE2-36	46502	2.375	31.70	36.00
	3	REE3-24	46503	3.500	41.20	24.00
	3	REE3-36	46504	3.500	31.70	36.00
	4	REE4-36	46465	4.500	31.70	36.00
	4	REE4-48	46505	4.500	31.70	48.00
	5	REE5-36	46506	5.565	31.70	36.00
	6	REE6-36	46507	6.625	31.70	36.00

Bends (Plain Ends)

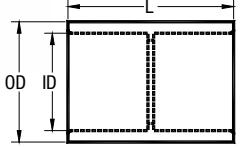
90° ELBOWS - PLAIN END	Sizes (in.)	Product Code	UPC Number	Diameter (D) (in.)	Length (L) (in.)	Radius (R) (in.)
	1/2	REE1090PE	46120	0.840	1.500	4.00
	3/4	REE1590PE	46150	1.050	1.500	4.50
	1	REE2090PE	46180	1.315	1.875	5.75
	1 1/4	REE2590PE	46210	1.660	2.000	7.25
	1 1/2	REE3090PE	46240	1.900	2.000	8.25
	2	REE3590PE	46270	2.375	2.000	9.50
	2 1/2	REE4090PE	46330	2.875	3.000	10.50
	3	REE4590PE	46360	3.500	3.125	13.00
	3 1/2	REE5090PE	46390	4.000	3.250	15.00
	4	REE5590PE	46420	4.500	3.375	16.00
	5	REE6090PE	46440	5.565	3.622	24.00
	6	REE6590PE	46460	6.625	3.740	30.00

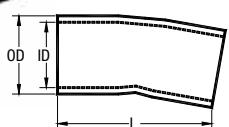
45° ELBOWS - PLAIN END	Sizes (in.)	Product Code	UPC Number	Diameter (D) (in.)	Length (L) (in.)	Radius (R) (in.)
	1/2	REE1045PE	46110	0.840	1.500	4.00
	3/4	REE1545PE	46140	1.050	1.500	4.50
	1	REE2045PE	46170	1.315	1.875	5.75
	1 1/4	REE2545PE	46200	1.660	2.000	7.25
	1 1/2	REE3045PE	46230	1.900	2.000	8.25
	2	REE3545PE	46280	2.375	2.000	9.50
	2 1/2	REE4045PE	46320	2.875	3.000	10.50
	3	REE4545PE	46350	3.500	3.125	13.00
	3 1/2	REE5045PE	46380	4.000	3.250	15.00
	4	REE5545PE	46415	4.500	3.375	16.00
	5	REE6045PE	46430	5.565	3.625	24.00
	6	REE6545PE	46450	6.625	3.750	30.00

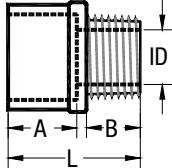
30° ELBOWS - PLAIN END	Sizes (in.)	Product Code	UPC Number	Diameter (D) (in.)	Length (L) (in.)	Radius (R) (in.)
	1/2	REE1030PE	46100	0.840	1.500	4.00
	3/4	REE1530PE	46130	1.050	1.500	4.50
	1	REE2030PE	46160	1.315	1.875	5.75
	1 1/4	REE2530PE	46190	1.660	2.000	7.25
	1 1/2	REE3030PE	46220	1.900	2.000	8.25
	2	REE3530PE	46274	2.375	2.000	9.50
	2 1/2	REE4030PE	46310	2.875	3.000	10.50
	3	REE4530PE	46340	3.500	3.125	13.00
	3 1/2	REE5030PE	46375	4.000	3.250	15.00
	4	REE5530PE	46400	4.500	3.375	16.00
	5	REE6030PE	46425	5.565	3.625	24.00
	6	REE6530PE	46442	6.625	3.750	30.00

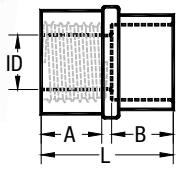
UTILITIES 90° ELBOWS - PLAIN END	Sizes (in.)	Product Code	UPC Number	Diameter (D) (in.)	Length (L) (in.)	Radius (R) (in.)
	1 1/4	REE2590E	46125	1.660	14.750	7.25
	1 1/2	REE3090E	46260	1.900	14.750	8.25
	2	REE3590E	43290	2.375	14.750	9.50

Couplings and Adapters

COUPLINGS	Sizes (in.)	Product Code	UPC Number	Outside Diameter (OD) (in.)	Inside Diameter (ID) (in.)	Length (L) (in.)
	$\frac{1}{2}$	REC10	45950	1.080	0.840	1.437
	$\frac{3}{4}$	REC15	45960	1.300	1.050	1.703
	1	REC20	45970	1.590	1.315	2.031
	$1\frac{1}{4}$	REC25	45980	2.000	1.660	2.156
	$1\frac{1}{2}$	REC30	45990	2.230	1.900	2.281
	2	REC35	46000	2.720	2.375	2.406
	$2\frac{1}{2}$	REC40	46010	3.320	2.875	3.187
	3	REC45	46020	4.000	3.500	3.437
	$3\frac{1}{2}$	REC50	46030	4.500	4.000	3.625
	4	REC55	46060	5.000	4.500	3.750
	5	REC60	46080	6.120	5.565	4.187
	6	REC65	46090	7.370	6.625	4.562

5° COUPLINGS (*FABRICATED)	Sizes (in.)	Product Code	UPC Number	Outside Diameter (OD) (in.)	Inside Diameter (ID) (in.)	Length (L) (in.)
	2	R5EC35	46800	2.375	2.049	4.0
	$2\frac{1}{2}$	R5EC40	46805	3.500	2.445	5.5
	3	R5EC45	46810	3.500	3.042	6.0
	$3\frac{1}{2}$	R5EC50	46815	4.500	3.521	7.0
	4	R5EC55	46820	4.500	3.998	7.0
	5	R5EC60	46825	5.565	5.018	7.5
	6	R5EC65	46830	6.625	6.031	11.0

TERMINAL ADAPTERS (1/2" - 1 1/4" TAPERED THREAD, 6" NPT)	Sizes (in.)	Product Code	UPC Number	A (in.)	B (in.)	Inside Diameter (ID) (in.)	Thread (in.)
	$\frac{1}{2}$	RTA10	45730	0.750	0.700	0.591	1.550
	$\frac{3}{4}$	RTA15	45740	1.000	0.675	0.790	1.750
	1	RTA20	45750	1.115	0.625	1.000	1.860
	$1\frac{1}{4}$	RTA25	45760	1.300	0.640	1.311	2.125
	$1\frac{1}{2}$	RTA30	45770	1.425	0.725	1.530	2.250
	2	RTA35	45780	1.150	0.800	1.970	2.100
	$2\frac{1}{2}$	RTA40	45790	1.900	0.800	2.346	2.930
	3	RTA45	45800	2.000	0.815	2.915	3.055
	$3\frac{1}{2}$	RTA50	45810	1.715	1.000	3.385	3.055
	4	RTA55	45820	1.990	0.815	3.850	3.215
	5	RTA60	45830	2.000	1.725	5.015	5.985
	6	RTA65	45840	2.130	1.875	6.025	6.500

FEMALE ADAPTERS (NPT TAPERED THREAD)	Sizes (in.)	Product Code	UPC Number	A (in.)	B (in.)	Inside Diameter (ID) (in.)	Thread (in.)
	$\frac{1}{2}$	RFA10	44990	0.800	0.825	0.620	1.725
	$\frac{3}{4}$	RFA15	45000	0.800	1.000	0.820	1.900
	1	RFA20	45010	1.000	1.200	1.065	2.300
	$1\frac{1}{4}$	RFA25	45020	1.015	1.300	1.395	2.425
	$1\frac{1}{2}$	RFA30	45030	1.050	1.290	1.575	2.440
	2	RFA35	45040	1.075	1.375	2.050	2.550
	$2\frac{1}{2}$	RFA40	45050	1.675	1.985	2.470	3.760
	3	RFA45	45060	1.630	2.150	3.090	4.100
	$3\frac{1}{2}$	RFA50	45070	1.800	2.000	3.540	3.985
	4	RFA55	45080	1.755	2.185	4.025	4.210
	5	RFA60	45090	2.065	3.000	5.035	5.240
	6	RFA65	45100	2.065	3.000	6.045	5.235

Fittings – Expansions Joints, Straps and Meter Accessories

EXPANSION JOINTS		Sizes (in.)	Product Code	UPC Number	Expanded Length (E) (in.)	Contracted Length (C) (in.)	Travel (in.)
		1/2	REJ10	44870	12.00	8.00	4.00
		3/4	REJ15	44880	12.00	8.00	4.00
		1	REJ20	44890	12.50	8.50	4.00
		1 1/4	REJ25	44900	13.00	9.00	4.00
		1 1/2	REJ30	44910	13.00	9.00	4.00
		2	REJ35	44920	13.25	9.25	4.00
		2 1/2	REJ40	44930	13.25	9.25	4.00
		3	REJ45	44940	22.25	14.25	8.00
		3 1/2	REJ50	44950	22.25	14.25	8.00
		4	REJ55	44960	22.25	14.25	8.00
		5	REJ60	44963	22.25	14.25	8.00
		6	REJ65	44966	22.25	14.25	8.00

EXPANSION JOINTS												
PVC	Sizes (in.)	Product No.	UPC No.	PVC Coated Steel	Sizes (in.)	Product No.	UPC No.	PVC Coated Steel	Sizes (in.)	Product No.	UPC No.	
		1/2	RPS10	45540		2	RCS35	44783		1/2	RCS10-1	46850
		3/4	RPS15	45550		2 1/2	RCS40	44784		3/4	RCS15-1	46852
		1	RPS20	45560		3	RCS45	44785		1	RCS20-1	46854
		1 1/4	RPS25	45570		3 1/2	RCS50	44786		1 1/4	RCS25-1	46856
		1 1/2	RPS30	45580		4	RCS55	44787		1 1/2	RCS30-1	46858
		2	RPS35	45590		5	RCS60	44788		2	RCS35-1	46860
				6	RCS65	44789	2 1/2	RCS40-1	46862			
							3	RCS10-1	46864			
							4	RCS10-1	46866			

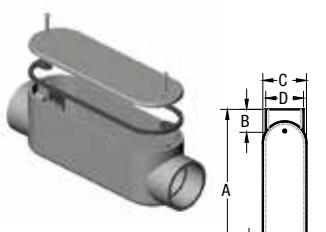
METER OFFSETS				METER HUBS			
Sizes (in.)	Product No.	UPC No.	Sizes (in.)	Product No.	UPC No.		
1 1/4	RM025	45500	2	RMHU25	45480		
2	RM035	45510	1 1/2	RMHU30	45485		
			2	RMHU35	45490		

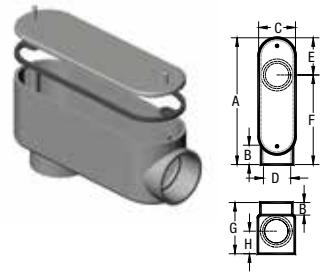
LONG METER OFFSETS (FABRICATED)				EXPANSION & DEFLECTION FITTINGS ASSEMBLY			
Sizes (in.)	Product No.	UPC No.	Sizes (in.)	Product No.	UPC No.		
1 1/4	RLM025	45472	2	RSEJ35	46990		
1 1/2	RML030	45474	3	RSEJ45	46992		
2	RML035	45476	4	RSEJ55	46994		

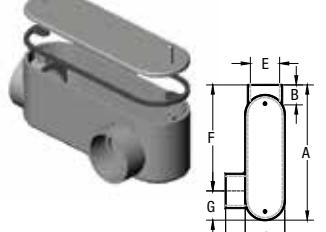
SERVICE ENTRANCE FITTINGS				ECOVOC SOLVENT CEMENT (*C/W SCREW CAP & DAUBER)			
Sizes (in.)	Product No.	UPC No.	Sizes (in.)	Product No.	UPC No.	Carton Qty.	
1/2	REF10	44795	250ml	RVOC250*	54790	24	
3/4	REF15	44800	475ml	RVOC475*	54795	12	
1	REF20	44810	950ml	RVOC950*	54797	12	
1 1/4	REF25	44820	4L	RVOC4L	54799	4	
1 1/2	REF30	44830					
2	REF35	44840					
2 1/2	REF40	44842					
3	REF45	44844					
3 1/2	REF50	44852					
4	REF55	44860					

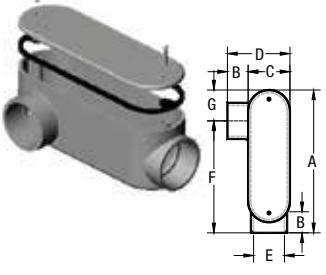
PRIVOC SOLVENT CEMENT (*C/W SCREW CAP & DAUBER)			
Sizes (in.)	Product No.	UPC No.	Carton Qty.
250ml	RVOPCR250*	54800	24
475ml	RVOPCR475*	54802	12
950ml	RVOPCR950*	54804	12
4L	RVOPCR4L	54806	4

Fittings – Access Fittings

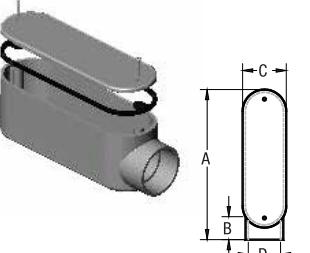
TYPE C	Sizes (in.)	Product Code	UPC Number	A (in.)	B (in.)	C (in.)	D (in.)
	1/2	RSC10S	46600	5.606	0.639	1.268	1.100
	3/4	RSC20S	46605	5.606	0.810	1.536	1.325
	1	RSC30S	46610	6.500	0.910	1.700	1.600
	1 1/4	RSC40S	46615	7.900	1.050	2.300	2.250
	1 1/2	RSC50S	46620	8.500	1.125	2.675	2.250
	2	RSC60S	45605	10.875	1.160	3.188	2.820
	2 1/2	RSC70S	45606	14.600	1.750	4.500	3.950
	3	RSC80S	45607	14.600	1.900	4.500	3.950
	3 1/2	RSC90S	45609	17.040	2.125	5.536	5.000
	4	RSC100S	45608	17.040	2.125	5.536	5.000

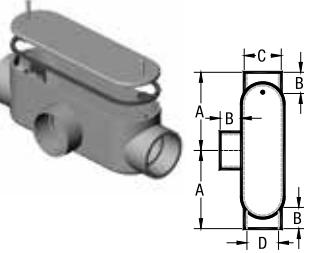
TYPE LB	Sizes (in.)	Product Code	UPC Number	A (in.)	B (in.)	C (in.)	D (in.)	E (in.)	F (in.)	G (in.)	H (in.)
	1/2	RSLB10S	45620	4.337	0.639	1.268	0.840	1.297	4.095	2.487	1.005
	3/4	RSLB20S	45630	5.395	0.810	1.536	1.050	1.297	4.095	2.487	1.005
	1	RSLB30S	45640	6.250	0.910	1.700	1.335	1.500	4.750	2.075	1.125
	1 1/4	RSLB40S	45650	7.625	1.050	2.300	1.100	1.750	5.750	3.575	1.562
	1 1/2	RSLB50S	45660	8.250	1.125	2.675	1.900	1.750	6.500	3.938	1.656
	2	RSLB60S	45670	10.531	1.160	3.188	2.375	2.344	8.156	4.535	1.968
	2 1/2	RSLB70S	45675	13.630	1.750	4.500	2.870	2.733	9.825	6.240	2.610
	3	RSLB80S	45680	13.630	1.900	4.500	3.510	3.805	10.897	6.240	2.610
	3 1/2	RSLB90S	45610	16.000	2.125	5.536	4.000	4.535	11.465	7.500	2.975
	4	RSLB100S	45681	16.000	2.125	5.536	4.530	4.535	11.465	7.500	2.975

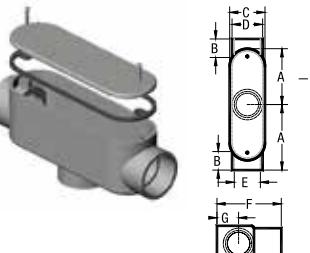
TYPE LL	Sizes (in.)	Product Code	UPC Number	A (in.)	B (in.)	C (in.)	D (in.)	E (in.)	F (in.)	G (in.)
	1/2	RSLL10S	46650	4.337	0.639	1.268	2.487	0.840	4.095	1.297
	3/4	RSLL20S	46655	5.395	0.810	1.536	2.487	1.050	4.095	1.297
	1	RSLL30S	46660	6.250	0.910	1.700	2.075	1.335	4.750	1.500
	1 1/4	RSLL40S	46665	7.625	1.050	2.300	3.575	1.100	5.750	1.750
	1 1/2	RSLL50S	46670	8.250	1.125	2.675	3.938	1.900	6.500	1.750
	2	RSLL60S	45682	10.531	1.160	3.188	4.535	2.375	8.156	2.344
	2 1/2	RSLL70S	45672	13.630	1.750	4.500	6.240	2.870	9.825	3.805
	3	RSLL80S	46674	13.630	1.900	4.500	6.240	3.510	10.897	2.733
	3 1/2	RSLL90S	46678	16.000	2.125	5.536	7.500	4.000	11.465	4.535
	4	RSLL100S	46676	16.000	2.125	5.536	7.500	4.530	11.465	4.535

TYPE LR	Sizes (in.)	Product Code	UPC Number	A (in.)	B (in.)	C (in.)	D (in.)	E (in.)	F (in.)	G (in.)
	1/2	RSLR10S	46700	4.337	0.639	1.268	2.487	0.840	4.095	1.297
	3/4	RSLR20S	46705	5.395	0.810	1.536	2.487	1.050	4.095	1.297
	1	RSLR30S	46710	6.250	0.910	1.700	2.075	1.335	4.750	1.500
	1 1/4	RSLR40S	46715	7.625	1.050	2.300	3.575	1.100	5.750	1.750
	1 1/2	RSLR50S	46720	8.250	1.125	2.675	3.938	1.900	6.500	1.750
	2	RSLR60S	45683	10.531	1.160	3.188	4.535	2.375	8.156	2.344
	2 1/2	RSLR70S	46725	13.630	1.750	4.500	6.240	2.870	9.825	3.805
	3	RSLR80S	46728	13.630	1.900	4.500	6.240	3.510	10.897	2.733
	3 1/2	RSLR90S	46738	16.000	2.125	5.536	7.500	4.000	11.465	4.535
	4	RSLR100S	46735	16.000	2.125	5.536	7.500	4.530	11.465	4.535

Fittings – Access Fittings

TYPE E	Sizes (in.)	Product Code	UPC Number	A (in.)	B (in.)	C (in.)	D (in.)
	1/2	RSE10S	46630	4.337	0.639	1.268	0.840
	3/4	RSE20S	46632	5.395	0.810	1.536	1.050
	1	RSE30S	46634	6.250	0.910	1.700	1.335
	1 1/4	RSE40S	46636	7.625	1.050	2.300	1.100
	1 1/2	RSE50S	46638	8.250	1.125	2.675	1.900
	2	RSE60S	46640	10.351	1.160	3.188	2.375
	2 1/2	RSE70S	46642	13.630	1.750	4.500	2.870
	3	RSE80S	46644	13.630	1.900	4.500	3.510
	3 1/2	RSE90S	46648	16.000	2.125	5.536	4.000
	4	RSE100S	46646	16.000	2.125	5.536	4.530

TYPE T	Sizes (in.)	Product Code	UPC Number	A (in.)	B (in.)	C (in.)	D (in.)
	1/2	RST10S	45690	2.280	0.639	1.100	0.840
	3/4	RST20S	45700	2.803	0.810	1.325	1.050
	1	RST30S	45710	3.250	0.910	1.600	1.335
	1 1/4	RST40S	45720	3.950	1.050	2.250	1.100
	1 1/2	RST50S	45723	4.250	1.125	2.250	1.900
	2	RST60S	45725	5.438	1.160	2.820	2.375
	2 1/2	RST70S	46745	7.300	1.750	3.950	2.870
	3	RST80S	46748	7.300	1.900	3.950	3.510
	3 1/2	RST90S	46752	8.535	2.125	5.000	4.000
	4	RST100S	46750	8.535	2.125	5.000	4.530

TYPE TB	Sizes (in.)	Product Code	UPC Number	A (in.)	B (in.)	C (in.)	D (in.)	E (in.)	F (in.)	G (in.)	H (in.)
	1/2	RSTB10S	45692	2.280	0.639	1.268	1.100	0.840	2.487	1.005	0.750
	3/4	RSTB20S	45702	2.803	0.810	1.536	1.325	1.050	2.487	1.005	0.810
	1	RSTB30S	45712	3.250	0.910	1.700	1.600	1.335	2.075	1.125	1.115
	1 1/4	RSTB40S	45721	3.950	1.050	2.300	2.250	1.100	3.575	1.562	1.300
	1 1/2	RSTB50S	45724	4.250	1.125	2.675	2.250	1.900	3.938	1.656	1.425
	2	RSTB60S	45727	5.438	1.160	3.188	2.820	2.375	4.535	1.968	1.160
	2 1/2	RSTB70S	46760	7.300	1.750	4.500	3.950	2.870	6.240	2.610	-
	3	RSTB80S	46762	7.300	1.900	4.500	3.950	3.510	6.240	2.610	-
	3 1/2	RSTB90S	46766	8.535	2.125	5.536	5.000	4.000	7.500	2.975	-
	4	RSTB100S	46764	8.535	2.125	5.536	5.000	4.530	7.500	2.975	-

Fittings – Cover Plates

SINGLE GANG COVER PLATES - F SERIES

						
RTSC15-10	RDRC15-10	R20RC15-10	R20-3RC15-10	R30-3RC15-10	RBRC15-10	GASK15-10
Description	Product Code	UPC Number				
Toggle Switch	RTSC15-10	45845				
Duplex Receptacle	RDRC15-10R20	44685				
Single Receptacle - 15 Amp	RC15-10R20-3	47035				
Single Receptacle - 20 Amp	RC15-10R30-3	47036				
Single Receptacle - 30 Amp	RC15-10	47037				
Single Blank with Gasket	RBRC15-10	44680				
Gasket	GASK15-10	44682				

DOUBLE GANG COVER PLATES - F SERIES

				
RTSC20-2	RTSDC20-2	RDRC20-2	RBRC20-2	GASK20-2
Description	Product Code	UPC Number		
Double Switch	RTSC20-2	45846		
Combo Switch/Receptacle	RTSDC20-2	45847		
Double Duplex	RDRC20-2	44686		
Double Blank with Gasket	RBRC20-2	44681		
Gasket	GASK20-2	45949		

TRIPLE GANG COVER PLATES - F SERIES

				
RTSC20-3	RDSDR20-3	RTSDC20-3	RDRC20-3	RBRC20-3
GASK20-3				
Description	Product Code	UPC Number		
Triple Switch	RTSC20-3	45857		
Double Switch Receptacle	RDSDR20-3	44689		
Double Receptacle/Switch	RTSDC20-3	45858		
Triple Receptacle	RDRC20-3	44688		
Triple Blank with Gasket	RBRC20-3	44683		
Gasket	GASK20-3	45859		

Fittings – Weatherproof Cover Plates

SINGLE GANG WEATHERPROOF COVER PLATES



RVSC15-10

RVSC15-10

RWLG15-10

RWGF15-10

RWTL

RVSC15-10

GASK W

Description	Product Code	UPC Number
Toggle Switch Cover	RVSC15-10	45940
Plunger Switch Cover	RVPT15-10	45930
Toggle	RWTG15-10	45339
Duplex Receptacle	RWDR15-10	45093
Duplex Receptacle - White	RWDR15-10W	45094
Ground Fault Receptacle	RWGF15-10	45095
Ground Fault Receptacle - White	RWGF15-10W	45098
Single Receptacle - 15 Amp	RWTL15	45470
Single Receptacle - 20 Amp	RWTL20	45472
Single Receptacle - 30 Amp	RWTL30	45480
Single Receptacle - 50 Amp	RWTL50	45482
Gasket	GASK W	45484

DOUBLE GANG WEATHERPROOF COVER PLATES



RTSC20-2

RTSDC20-2

RDRC20-2

RBRC20-2

GASK20-2

Description	Product Code	UPC Number
Double Toggle	RVSC20-2	45941
Plunger/GFI	RVSRC20-2	45947
Plunger/Duplex Receptacle	RVSDR20-2	45945
Plunger/Single Receptacle	RVSRR20-2	45948
Gasket	GASK20-2	45949

Fittings – Slab Boxes

SINGLE GANG BOXES - F SERIES



RFSC



RFSS



RFSC



RFSCC

Description	Product Code	UPC Number	Volume (in ³)
1/2" FS	RFS10	45200	17.0
3/4" FS	RFS15	45210	17.0
1/2" FSS	RFSS10	45240	17.5
3/4" FSS	RFSS15	45250	17.5
1/2" FSC	RFSC10	45220	16.3
3/4" FSC	RFSC15	45230	16.3
1/2" FSCC	RFSCC10	45233	17.0
3/4" FSCC	RFSCC15	45235	17.0

SINGLE GANG DEEP BOXES - FD SERIES



RFDS



RFDC



BLANK



347 VOLT

OUTSIDE DIMENSIONS: LENGTH = 4.59", WIDTH = 2.83", HEIGHT = 2.92"

Description	Product Code	UPC Number	Volume (in ³)
1/2" FDS	RFDS10	45178	27.6
3/4" FDS	RFDS15	45180	27.6
1" FDS	RFDS20	45190	27.6
1/2" FDC	RFDC10	45170	25.9
3/4" FDC	RFDC15	45175	25.9
1" FDC	RFDC20	45177	25.9
BLANK	RFD	45160	36
347 volt	RFD347	45162	24.2

Fittings – Slab Boxes

DOUBLE GANG BOXES - F SERIES



FS



FSS



FSC



FSCC



BLANK

Outside Dimensions: Length = 4.5", Width = 4.75", Height = 2.5", except BLANK, L=4.75", W=4.75", H=3.0"

Description	Product Code	UPC Number	Volume (in ³)
1/2" FS	RFS2-10	45205	39.5
3/4" FS	RFS2-15	45215	39.5
1" FS	RFS2-20	45216	39.5
1/2" FSS	RFSS2-10	45242	37.0
3/4" FSS	RFSS2-15	45244	37.0
1" FSS	RFSS2-20	45246	37.0
1/2" FSC	RFSC2-10	45222	37.0
3/4" FSC	RFSC2-15	45231	37.0
1" FSC	RFSC2-20	45226	37.0
1/2" FSCC	RFSCC2-10	45234	36.0
3/4" FSCC	RFSCC2-15	45238	36.0
1" FSCC	RFSCC2-20	45239	36.0
BLANK	RFD-D	45150	52.0

TRIPLE GANG BOXES - F SERIES



FSC



FSC



BLANK

Outside Dimensions: Length = 4.5", Width = 6.6", Height = 2.5", except BLANK, L = 4.5", W = 6.6", H = 3.0"

Description	Product Code	UPC Number	Volume (in ³)
1/2" FSC	RFSC3-10	45224	56.0
3/4" FSC	RFSC3-15	45232	56.0
1" FSC	RFSC3-20	45228	56.0
1/2" FS	RFS3-10	45208	54.0
3/4" FS	RFS3-15	45218	54.0
1" FS	RFS3-20	45219	54.0
BLANK	RFD-3	45155	73.8

OCTAGONAL BOXES



Sizes (in.)	Product No.	UPC No.
4 x 1 1/2	ROB15/10	45520
4 x 2	ROB20	45525
3/4	RKO15	45450
1	RKO20	45455

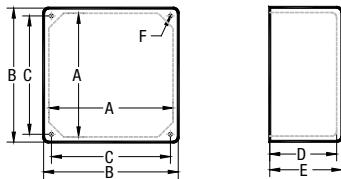
OCTAGONAL BOX EXTENSION RINGS



Sizes (in.)	Product No.	UPC No.
1	RXR20	46490
2	RXR35	46495

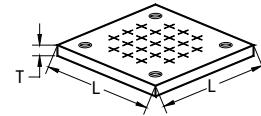
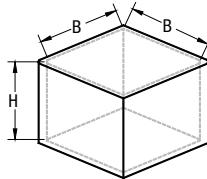
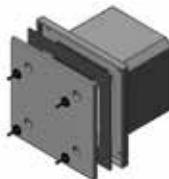
Fittings – Slab Boxes

JUNCTION BOXES WITH GASKET



Nominal Size (in.)	Product Number	UPC Number	Inside Length & Width (A) (in.)	Outside Length & Width (B) (in.)	Length Screw to Screw (C) (in.)	Outside Height (E) (in.)	Inside Height (D) (in.)	Screw Size (F)	Volume (in³)
4 x 4 x 2	RJB442	45300	3.675	4.000	3.450	2.125	2.000	8-32	25.4
4 x 4 x 4	RJB444	45310	3.675	4.000	3.450	4.188	3.750	8-32	47.5
4 x 4 x 6	RJB446	45315	3.675	4.000	3.450	6.225	6.000	8-32	76.1
5 x 5 x 2	RJB552	45320	4.680	5.000	4.485	2.000	1.845	8-32	38.7
6 x 6 x 4	RJB664	45330	6.000	6.375	5.813	4.188	4.000	10-32	139.5
6 x 6 x 6	RJB666	45335	6.000	6.375	5.813	6.188	6.000	10-32	209.3
8 x 8 x 4	RJB884	45340	8.075	8.625	7.996	4.230	4.005	.-20	258.6
8 x 8 x 7	RJB887	45350	8.100	8.625	7.996	7.250	7.035	.-20	455.6
12 x 12 x 4	RJB12124	45280	12.085	12.580	11.874	4.256	4.030	.-20	578.3
12 x 12 x 6	RJB12126	45290	12.085	12.580	11.874	6.240	6.025	.-20	864.6
12 x 12 x 8	RJB12128	45295	12.085	12.580	11.874	8.250	8.025	.-20	1151.6

JUNCTION BOXES WITH GASKET



Nominal Size (in.)	Product Number	UPC Number	Box Inside Length & Width (B) (in.)	Box Inside Depth (H) (in.)	Lid Length & Width (L) (in.)	Thickness of Lid (T) (in.)	Volume (in³)
6 x 6 x 4	H664	47040	6.0	4.25	9.0	0.60	139.5
6 x 6 x 6	H666	47041	6.0	6.25	9.0	0.60	209.3
8 x 8 x 4	H884	47042	8.0	4.25	11.5	0.75	258.6
8 x 8 x 6	H886	47043	8.0	6.25	11.5	0.75	400.0
8 x 8 x 7	H887	47044	8.0	7.25	11.5	0.75	455.6
8 x 8 x 7	H887-A	47045	8.0	7.25	11.5	0.75	418.4

JUNCTION BOX ADAPTERS



Size (in.)	Product No.	UPC No.
1/2	RJBA10	45360
3/4	RJBA15	45370
1	RJBA20	45380
1 1/4	RJBA25	45390
1 1/2	RJBA30	45400
2	RJBA35	45410
2 1/2	RJBA40	45420
3	RJBA45	45430
3 1/2	RJBA50	45435
4	RJBA55	45440

DUPLEX FLOOR BOXES & COVER

(*INCLUDES LEVELING RING)

Size (in.)	Product No.	UPC No.
4 x 3/4	RFDB4	46980
2 x 3/4, 2 x 1	RFDB2	46982
Polycarbonate Bronze Cover	RFDBC	46984

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REGAL[®]

BUILT TO GO THE DISTANCE

Globetrotter®

TOTALLY ENCLOSED MOTORS

Customers choose Globetrotter motors for general purpose industrial applications. Why? Globetrotter motors, 1.5 HP through 200 HP, provide the much sought after durability and dependability.

The redesigned totally enclosed cast iron construction now includes:

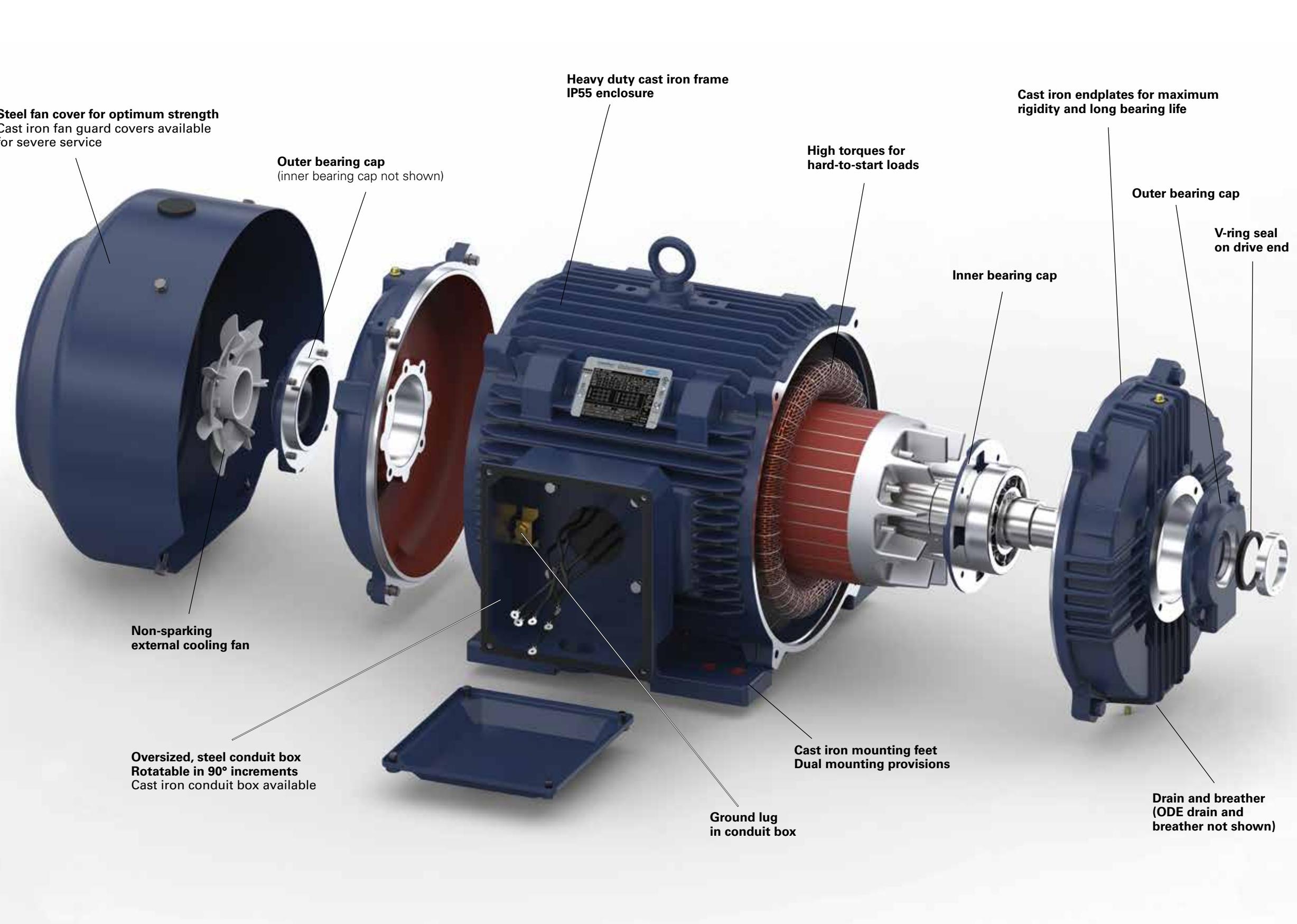
- IP55 protection
- Division 2/ Zone 2, Class I (gases), Groups A, B, C, D
- Dual frame mounting holes
- F1 to F2 mounting capability

These additional features make this motor ready for the toughest environments and more versatile than ever.

Globetrotter motors are designed to meet or exceed the customer's expectations in the most demanding applications.

SEE OUR ACCESSORY KITS AND MODIFICATION SECTIONS IN OUR PRODUCT CATALOG FOR ADDITIONAL OPTIONS:

- C-face
- Cast iron conduit boxes
- Cast iron fan guards
- BCP™ bearing current protection*



*Bearing current protection may not be installed on motors used in a division 2 location.

FOR TOUGH APPLICATIONS



GLOBETROTTER® GENERAL PURPOSE DRIP PROOF

- 182-365 steel frame; 404-449 cast iron frame
- 1.5 - 200 HP
- 2, 4, 6 pole
- 200V, 230/460V, 460V on 125 HP and up, 575V
- Drip proof enclosure
- Steel conduit box
- 1.15 service factor on sinewave
- Class F, Class B rise insulation
- Bearing caps 284-449
- NEMA Premium® efficiencies
- Inverter duty 10:1
- F1/F2 compatible
- Dual frame mounting
- UL recognized, CSA certified, CE mark



GLOBETROTTER® GENERAL PURPOSE DRIP PROOF C-FACE

- 182-365 steel frame, 404 cast iron frame
- 1.5 - 100 HP
- 2, 4 pole
- 230/460V, 575V (only through 50 HP)
- Drip proof enclosure
- Steel conduit box
- 1.15 service factor on sinewave
- Class F, Class B rise insulation
- Ball bearings, mechanically locked on shaft end
- NEMA Premium efficiencies
- Inverter duty 10:1
- F1/F2 compatible
- Dual frame mounting
- UL recognized, CSA certified, CE mark



GLOBETROTTER® CLOSE COUPLED PUMP DRIP PROOF

- 182-326 steel frame
- 1.5 - 200 HP
- 2, 4, 6 pole
- 200V, 230/460V, 575V
- NEMA® JM and JP shaft dimensions
- JM and JP frames have rigid base
- JMV and JPV frames for vertical mount without base
- Drip proof enclosure
- Steel conduit box
- 1.15 service factor on sinewave
- Ball bearings, mechanically locked on shaft end
- Class F, Class B rise insulation
- Meets or exceeds USA mandated efficiencies
- Inverter duty 10:1
- F1/F2 compatible
- Dual frame mounting
- UL recognized, CSA certified, CE mark



GLOBETROTTER® GENERAL PURPOSE TEFC

- Rolled steel frame 182-256
- Cast iron frame 182-449
- 1.5 - 200 HP
- 2, 4, 6 pole
- 200V, 230/460V, 460V on 125 HP and up, 575V
- TEFC enclosure
- IP43 protection on rolled steel frames
- IP55 protection on cast iron frames
- Division 2, Zone 2 Class I (gases) Groups A,B,C,D
- Meets temperature code T2B
- Steel conduit box & fan guard
- 1.15 service factor on sinewave
- Class F, Class B rise insulation
- Bearing lock 182-286
- Bearing caps 324 and up
- NEMA Premium® efficiencies
- Inverter duty 10:1
- F1/F2 compatible
- Dual frame mounting
- UL recognized, CSA certified, CE mark



GLOBETROTTER GENERAL PURPOSE TEFC C-FACE

- Rolled steel frame 182-256
- Cast iron frame 182-405
- 1.5 - 100 HP, 2, 4, 6 pole, C-face footed
- 1.5 - 10 HP, 2, 4, 6 pole, C-face footless
- 200V, 230/460V, 575V (only C-face footed)
- TEFC enclosure
- IP43 protection on rolled steel frames
- IP55 protection on cast iron frames
- Division 2, Zone 2 Class I (gases) Groups A,B,C,D
- Meets temperature code T2B
- Steel conduit box & fan guard
- 1.15 service factor on sinewave
- Class F, Class B rise insulation
- Bearing lock 182-286
- Bearing caps 324 and up
- NEMA Premium efficiencies
- Inverter duty 10:1
- F1/F2 compatible
- Dual frame mounting
- UL recognized, CSA certified, CE mark



GLOBETROTTER CLOSE COUPLED PUMP TEFC

- Rolled steel frame 182-215
- Cast iron frame 254-326
- 1.5 - 50 HP
- 2, 4, 6 pole
- 200V, 230/460V, 575V
- NEMA® JM and JP shaft dimensions
- JM and JP frames have rigid base
- JMV and JPV frames for vertical mount without base
- TEFC enclosure
- IP43 protection on rolled steel frames
- IP55 protection on cast iron frames
- Division 2, Zone 2 Class I (gases) Groups A,B,C,D
- Meets temperature code T2B
- Steel conduit box & fan guard
- 1.15 service factor on sinewave
- Class F, Class B rise insulation
- Bearing lock 182-286, bearing caps 324-326
- Meets or exceeds USA mandated efficiencies
- Inverter duty 10:1
- F1/F2 compatible
- Dual frame mounting
- UL recognized, CSA certified, CE mark

HVAC



CONVEYORS



COMMERCIAL PUMPING



COOLING TOWERS



INDUSTRIAL CONVEYORS



INDUSTRIAL PUMPING



GENERAL INFORMATION

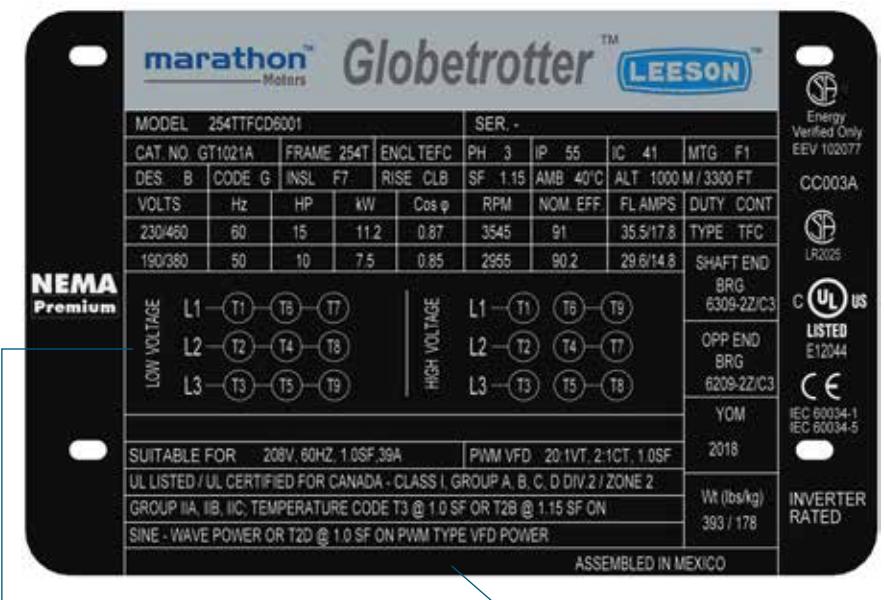
WEBSITE AND E-COMMERCE

Information can be accessed instantly, any time of the day on our website and e-commerce site at www.regalbeloit.com/Brands/Marathon-Motors. Our comprehensive product data is available in a convenient bundled file called our data sheet, or by individual certification and performance files. Download CAD files for products, view products in a 360° rotatable view or access necessary dimensional drawings all in one place.



[DATA SHEET](#) [OUTLINE](#) [CONNECTION](#) [CERTIFICATION](#) [PERFORMANCE](#) [2D CAD](#) [3D CAD](#) [WARRANTY](#) [MANUAL](#)

NAMEPLATE INFORMATION



The nameplate is the key to selecting the proper replacement motor. The model number is the key to finding the correct replacement parts.

Agency symbols

Connection details for low or high voltage

Inverter information and UL listed Division 2

MODEL - The ID number

CAT.NO. - Catalog number

FRAME - Size and mounting

ENCL - Enclosure

PH - Electrical phase

IP - Ingress protection

IC - Inherent cooling

MTG - Conduit box location - F1 or F2

DES - Code by NEMA®

CODE - NEMA locked-rotor KVA

INSL - Insulation class

RISE - Full load operating temperature

SF - Percentage of rated HP the motor can safely operate at

AMB - The allowable surrounding air temperature

ALT - The allowable altitude

VOLTS - Voltage rating of the motor at the operating frequency

Hz - Input frequency of the power supply

HP - Rated horsepower the motor will produce

kW - Rated output in watts

Cos - Cosine is the ratio of actual power to the apparent power

RPM - Full load speed at rated frequency

NOM.EFF - Average efficiency

FL AMPS - The rated load current expressed in amps at the nameplate HP, voltage and frequency

DUTY - Time rating under load

SHAFT END BRG - Drive end bearing size

OPP END BRG - Opposite drive bearing size

YOM - Year of Manufacture

Wt (lbs/kg) - Motor weight in pounds and kilograms

COMPETITIVE ANALYSIS - TEFC - FOOTED

Features	Marathon® Globetrotter® Motors (Old)	Marathon® Globetrotter® Motors (New)	Baldor® Super-E® Motors ECP-Severe Duty	TECO® MAX-E1® Motors	WEG® W22® Motors Severe Duty
NEMA Premium®	Yes	Yes	Yes	Yes	Yes
Inverter Capable	Yes	Yes	Yes	Yes	Yes
SGR	Pre drilled for SGR	Mod available	Mod available	Mod available	Optional
Frame Material	Cast iron 182-449	Rolled steel up to 256, cast iron 182-449	Steel up to 210, cast iron 250 and up	Cast iron	Cast iron
F2 Convertible	Yes	Yes and dual drilled for larger frames	Yes	Yes with dual drilled for larger frames	Yes
IP Code	IP43	IP43 rolled steel IP55 cast iron	IP55	IP54	IP55
Hazardous loc.	None	Div 2, class I	Div 2, class I	Div 2, class I	Div 2, class I
Drain	Drain hole in bracket up to 210, and in frame for 250 and up	Brass drain & brass breather on each bracket, radially	On brackets, axial	Drain hole on each bracket, rubber plug, radially	On bracket, rubber plug, radially
Bearing Cap	Internal & external on both ends	Internal & external on both ends (324 frame and up)	Internal on both ends	Internal & external on 280 and up	Internal & external on 250 and up
Greasing	Grease fittings	Grease fittings	Pipe plug	Automatic grease discharge fittings	Grease relief fitting on 250 & up
Fan Guard/Conduit Box Material	Steel with cast iron kits available	Steel with cast iron kits available	Cast iron	Cast iron	Fan guard: steel up to 210, cast iron 250 & up Conduit box: cast iron
Name Plate Material	Aluminum	Stainless steel	Stainless steel	Stainless steel	Stainless steel

COMPETITIVE ANALYSIS - ODP - FOOTED

Features	Marathon Globetrotter (Old)	Marathon Globetrotter (New)	Baldor Super-E Motors	TECO Motors ASHH & ASGH	WEG Motors
NEMA Premium	Yes	Yes	Yes	Yes	Yes
Inverter Capable	Yes	Yes	Yes	Yes	Yes
SGR	Pre-drilled for SGR	Mod available	Mod available	Some models may have SGR	Optional
Frame Material	Rolled steel up to 286, cast iron for 324 & up	Rolled steel extended up to 365 frame, cast iron 400 frame & up	Rolled steel up to 400	Rolled steel up to 280 cast iron 140 to 440	Rolled steel up to 250 cast iron 250 & up
F2 Convertible	Yes	Yes and dual drilled for larger frames	Yes	No for rolled steel up to 280. Yes for all cast iron frames	Rolled steel, F1 only cast iron, yes
IP Code	IP21	IP21	-	IP22	Rolled steel frames, IP21 Cast iron frames (256-5810), IP23
Bearing Cap	Internal & external on both ends	Internal & external on both ends (284 frame and up)	No	Internal & external on both ends 280TS & up	Optional, standard for flanged motors
End Brackets Material	Cast iron	Cast iron	Cast iron on cast iron frames	Cast iron on cast iron frames	Aluminum on rolled steel frames, cast iron on cast iron frames
Conduit Box Material	Steel with cast iron kits available	Steel with cast iron kits available	Aluminum up to 360, cast iron for 400 & up	Rolled steel	Aluminum on rolled steel frames, cast iron on cast iron frames
Name Plate Material	Aluminum	Stainless steel	Aluminum	Stainless steel	Stainless on cast iron frames

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APPLICATION CONSIDERATIONS

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