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BladeUPS Power System Technical Specs (5 kW models) ¹

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General Characteristics

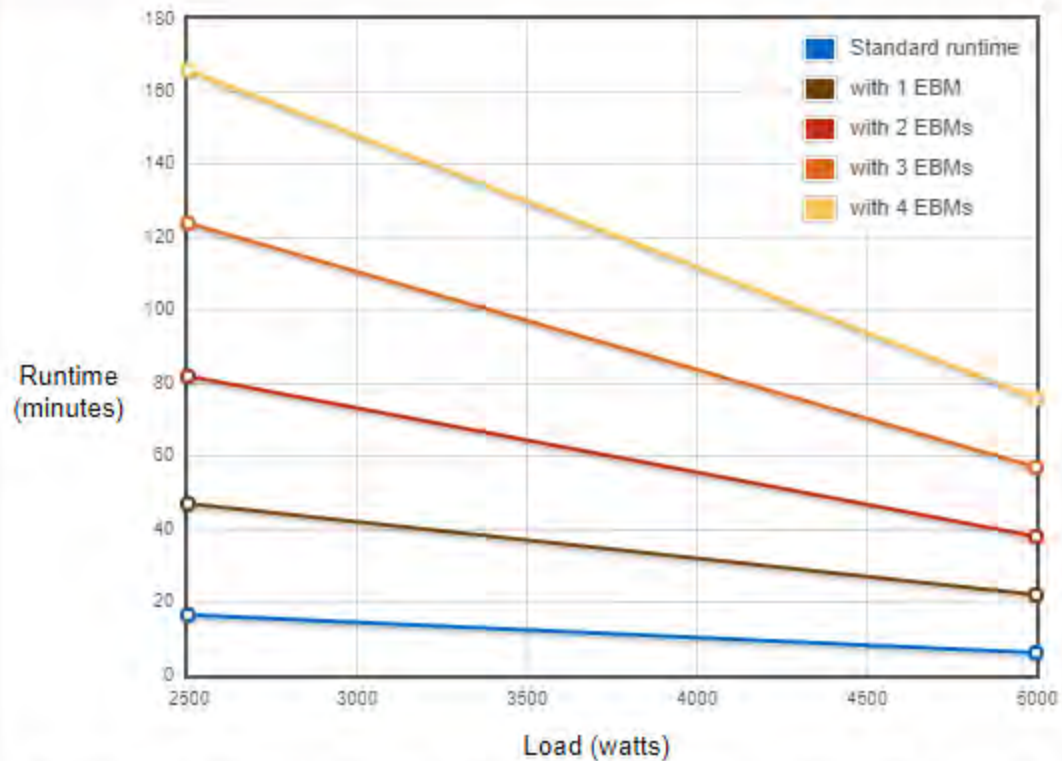
Part number	ZC0517700110000
Power Rating	5 kW per UPS Module
Efficiency	Up to 97%

Battery Characteristics

Battery Type

VRLA - AGM

Efficiency



Load (%): **38%**
 Efficiency: **92.22%**

* These efficiencies are for guidance only. Actual unit and system efficiencies will vary based on site design/conditions and environmental parameters.

Battery runtimes are approximate and may vary with equipment, configuration, battery age, temperature, etc.

- Show:
- Standard runtime
 - with 1 EBM
 - with 2 EBMs
 - with 3 EBMs
 - with 4 EBMs

Heat Dissipation	197 watts/673 BTU/hr (HE Mode), 650 watts/2217 BTU/hr (DC Mode) at 100% rated load
Cooling	Fan cooled, temperature microprocessor monitored; front air entry, rear exhaust
Audible Noise, Normal Operation	<60 dBA at 1 meter
Altitude before derating	1000 meters (3300 ft. ASL)

Input Characteristics

Input Voltage	208 Vac models
Voltage Range	180 to 265 Vac
Input connection	L21-20P
Frequency Range	50 or 60 Hz, ± 5 Hz
Input Current Distortion	<5% with IT loads (PFC power supplies, Load dependent in HE Mode)
Input Power Factor	>0.99 with IT loads (PFC power supplies, Load dependent in HE Mode)
Inrush Current	Load dependent

Input Requirements

Three-phase, four-wire + ground

Bypass Source

Same as input, (single feed)

Generator Compatibility

Fast sync slew rate for optimum generator synchronization
programmable return to AC source delay

Output Characteristics

Output connection

L21-20R, RPM Port

Rated Output Voltage

180 to 225 Vac, phase to phase

Output Configuration

Three-phase, four-wire + ground

Output Frequency (nominal)

50 or 60 Hz auto-detection on startup

Frequency Regulation

0.1 Hz free running

Load Power Factor Range

Lagging: 0.7
Leading: 0.9

Total Output Voltage Distortion

<3% with IT loads (PFC power supplies)
<5% non-linear or non-PFC power supplies

Battery Characteristics

Battery Type

VRLA - AGM

Runtime
(minutes)

2500
3000
3500
4000
4500
5000

0
20
40
60
80
100
120
140
160
180

Standard
runtime

with 1 EBM

with 2
EBMs

with 3
EBMs

with 4
EBMs

Load (watts)

Battery runtimes are approximate and may vary with equipment, configuration, battery age, temperature, etc.

Show:

Standard runtime

- with 1 EBM
- with 2 EBMs
- with 3 EBMs
- with 4 EBMs

Mouseover graph for detailed runtime values

Battery Runtime (Internal)

16.5 minutes at 50% load
6.1 minutes at 100% load

Battery String Voltage

240 Vdc

Battery Test

Automatic battery test standard
(remote scheduling capable).
Manual battery test from front
display

Battery Recharge Profile

[ABM three-stage charging
technology](#)

Battery Cut-off Voltage

Variable from 1.67 VPC at <5 min.
runtime to 1.75 VPC at >90 min.
runtime

Battery Low Condition

Announced with alarm

Extended Battery Capability

Yes, add up to four additional 3U battery modules
120 minutes at 50% load; 55 minutes at 100% load

Physical Characteristics

Dimensions H x W x D, in (mm)
UPS
EBM

10.3 (6U) x 17.4 x 26.0 (267 x 442 x 660)
5.2 (3U) x 17.2 x 26.0 (132 x 437 x 660)

Note:

Total Chassis Weight
without batteries or
electronics

100 lb. (46 kg)

Total Chassis Weight
with batteries or
electronics

218 lb. (99 kg)

Total UPS Weight without Batteries

135 lb. (61 kg)

Total UPS Weight with Batteries

218 lb. (99 kg)

EBM Shipping Weight

170 lb. (77 kg)

Communications and User Interface

Software Compatibility

UPS ships with Software Suite CD containing [Intelligent Power Manager](#) supervisory software and

	Intelligent Power Protector protection software
X-Slot Bays	Two available for the cards listed below
Control panel LCD	Two lines by 20 characters Four menu-driven interface buttons Four status at a glance LEDs
Multi Language	English standard; 20 languages available
Configuration Changes	User capable, firmware auto configures
Dry Contact Inputs	Two, user-configurable
Dry Contact Outputs	One, user-configurable

Service

Installation	User capable, optional factory service available located in the IT racks
Preventive Maintenance	User capable, optional factory service available
Corrective Maintenance	User capable, optional factory service available
Serviceability Features	Hot-swappable batteries Hot-swappable electronics module

Automated internal maintenance
bypass
Auto-configure firmware
Flash firmware upgradeable

Certifications

Safety	UL1778, cUL
EMI	FCC Part15 Class A
Surge Protection	ANSI C62.41, Cat B-3
Hazardous materials (RoHS)	EU Directive 2002/95/EC Category 3 (4 of 5)

Warranty

Standard	18 months from date of shipment
Warranty Repair	Factory depot repair or replace

Service Support Agreements²

Depot	PowerTrust Express
On-site 5x8	PowerTrust Value
On-site 7x24	PowerTrust eight-, six- or two-hour response

Options and Accessories

Detachable input cord

Detachable input/output cord assembly

Detachable paralleling cord assembly

3U Extended Battery Modules (EBMs)

3U Configurable Rack Power Module (RPM)

0U to 3U rack power strips

Four-post rail kit

[Environmental Monitoring Probe](#) (EMP) for temperature and humidity monitoring

[Environmental Rack Monitor](#) (ERM)

Optional X-Slot Communication Cards

Application

Card

Web/SNMP

[PowerXpert Gateway Series UPS card](#)

Modbus RTU

Modbus Card

Modbus TCP/IP

[PowerXpert Gateway Series UPS card](#)

BacNET IP

[PowerXpert Gateway Series UPS card](#)

IBM eServer (i5, iSeries, or AS/400)

[Relay Interface Card](#)

N/O, N/C (dry contacts)

Industrial relay card

Parallel

[Powerware Hot Sync CAN Bridge card](#)

Compatible ePDU models for rackmount power distribution

Basic (BA)

[EBA302-10](#) with (30) C13-grip, (6) C19-grip outlets
[EBA308-10](#) with (21) 5-20R, (6) L6-20R
[EBA309-10](#) with (39) 5-20R
[EBA312-10](#) with (42) C13-grip outlets
[PW309BA0U409](#) with (24) 5-20R outlets

Metered Input (MI)

[EMI302-06](#) with (30) C13-grip, (6) C19-grip outlets
[EMI302-10](#) with (30) C13-grip, (6) C19-grip outlets
[EMI308-10](#) with (21) 5-20R, (6) L6-20R
[EMI309-10](#) with (39) 5-20R
[EMI312-10](#) with (42) C13-grip outlets
[EMI318-10](#) with (30) C13-grip, (6) C19-grip, (3) 5-20R outlets

Metered Output (MO)

EMO325-10 with (18) C13, (6) C19

Managed (MA): Switched/outlet level monitoring

EMA325-10 with (18) C13-grip, (6)
C19-grip
EMA334-10 with (24) 5-20R
EMA340-10 with (21) C13-grip, (3)
C19-grip

1. Due to continuing product improvement programs, specifications are subject to change without notice.
2. [PredictPulse remote monitoring service](#) and 24x7 technical support included.





The bridge to possible

[Data sheet](#)
Cisco public

Cisco Catalyst 9115 Series Wi-Fi 6 Access Points

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The Cisco® Catalyst® 9115 Series with Wi-Fi 6 is the next generation of enterprise access points. They are resilient, secure, and intelligent.



Hyperconnectivity with steady performance in demanding environments. Exponential growth of Internet of Things (IoT) devices and next-generation applications. Advanced persistent security threats. All of these require a wireless network that provides resiliency and superior connectivity, integrated security with advanced classification and containment, and hardware and software innovations to automate, secure, and simplify networks. Updating your wireless infrastructure to one that will meet these needs is paramount for today's digital business. The new generation of Cisco Catalyst 9100 Access Points, with high-performance Wi-Fi 6 (802.11ax) capabilities and innovations in RF performance, security, and analytics, enables end-to-end digitization and helps accelerate the rollout of business services by delivering beyond Wi-Fi.

Extending Cisco's intent-based network and perfect for networks of all sizes, the Catalyst 9115 Series scales to meet the growing demands of IoT while fully supporting the latest innovations and new technologies. The Catalyst 9115 Series is also a leader in performance, security, and analytics.

The Catalyst 9115 Series Access Points, paired with the Cisco Digital Network Architecture (Cisco DNA), are enterprise-class products that will address both your current and future needs. They are the first step in updating your network to take better advantage of all of the features and benefits that Wi-Fi 6 provides.

With the Catalyst 9115 Series, you can secure remote workers or the micro-office. Any Cisco Aironet or Catalyst access point can function as an OfficeExtend Access Point (OEAP). With an OEAP, an employee at home or in a temporary micro-office will have access to the corporate SSID and the corporate network without the need to set up a VPN or have any advanced technical know-how.

Table 1. Features and benefits

Feature	Benefits
802.11ax (Wi-Fi 6)	The IEEE 802.11ax emerging standard, also known as High-Efficiency-Wireless (HEW) or Wi-Fi 6, builds on 802.11ac. It will deliver a better experience in typical environments and more predictable performance for advanced applications such as 4K or 8K video, high-density, high-definition collaboration apps, all-wireless offices, and IoT. 802.11ax is designed to use both the 2.4-GHz and 5-GHz bands, unlike the 802.11ac standard.
Uplink/downlink OFDMA	OFDMA-based scheduling splits the bandwidth into smaller chunks called Resource Units (RUs), which can be allocated to individual clients in both the downlink and uplink directions to reduce overhead and latency.
MU-MIMO technology	Supporting four spatial streams, MU-MIMO enables access points to split spatial streams between client devices, to maximize throughput.
BSS coloring	Spatial reuse (also known as Basic Service Set [BSS] coloring) allows the Access Points (APs) and their clients to differentiate between BSSs, thus permitting more simultaneous transmissions.
Target wake time	A new power savings mode called Target Wake Time (TWT) allows the client to stay asleep and to wake up only at prescheduled (target) times to exchange data with the AP. This offers significant energy savings for battery-operated devices, up to 3x to 4x compared to 802.11n and 802.11ac.
Cisco Embedded Wireless Controller	The 9115 Wi-Fi 6 access points are available with a built-in controller. The Cisco Embedded Wireless Controller on Catalyst 9100 Access Points provides an easy-to-deploy and manage option that does not require a physical appliance. The control resides on the access point, so there is no added footprint or complexity. And because it uses Cisco Catalyst 9800 Series code, it's easy to migrate your network as your needs grow. For more details refer to EWC
User Defined Network	A feature available in Cisco DNA Center, allows IT to give end users control of their very own wireless network partition on a shared network. End users can then remotely and securely deploy their devices on this network. Perfect for university dormitories or extended hospital stays, Cisco User Defined Network grants both device security and control, allowing each user to choose who can connect to their network. (Available second half of calendar year 2020.) For more details refer to UDN.
Application Hosting on Catalyst 9100 Access	Application Hosting on Catalyst 9100 Access Points helps future-proof and simplify IoT deployments by eliminating the need to install and manage overlay networks. Utilizing the USB interface, containerized applications and hardware modules can be deployed to reduce cost and complexity. Adding Cisco DNA Center provides workflows and deployment-wide application lifecycle management.
Multigigabit Ethernet support	Provides uplink speeds of 2.5 Gbps, in addition to 100 Mbps and 1 Gbps. All speeds are supported on Category 5e cabling for an industry first, as well as 10GBASE-T (IEEE 802.3bz) cabling.
Bluetooth 5.0	Integrated Bluetooth Low Energy (BLE) 5.0 radio to enable IoT use cases such as location tracking and wayfinding.

Feature	Benefits
Apple features	<p>Apple and Cisco have partnered to create an optimal mobile experience for iOS devices on corporate networks based on Cisco technologies. Using new features in iOS 10, in combination with the latest software and hardware from Cisco, businesses can now more effectively use their network infrastructure to deliver an enhanced user experience across all business applications.</p> <p>At the center of the collaboration is a unique handshake between the Cisco WLAN and Apple devices. This handshake enables the Cisco WLAN to provide an optimal Wi-Fi roaming experience to Apple devices. Additionally, the Cisco WLAN trusts Apple devices and gives priority treatment for business-critical applications specified by the Apple device. This feature is also known as Fast Lane.</p>

For more details about Wi-Fi 6, see [Cisco's technical white paper](#) on Wi-Fi 6.

For more details about C9115 feature support, see [Cisco's Feature Matrix](#).

Secure infrastructure

Trustworthy systems built with Cisco Trust Anchor Technologies provide a highly secure foundation for Cisco products. With the Cisco Catalyst 9100 Access Points, these technologies enable hardware and software authenticity assurance for supply chain trust and strong mitigation against man-in-the-middle attacks that compromise software and firmware. Trust Anchor capabilities include:

- **Image signing**
- **Secure Boot**
- **Cisco Trust Anchor module**

Cisco DNA support

Pairing the Cisco Catalyst 9115 Series Access Points with Cisco DNA allows for a total network transformation. Cisco DNA allows you to truly understand your network with real-time analytics, quickly detect and contain security threats, and easily provide networkwide consistency through automation and virtualization. The Catalyst 9115 Series Access Points support SD-Access, Cisco's leading enterprise architecture.

Working together, the Cisco Catalyst 9115 Series and Cisco DNA offer such features as:

- Cisco DNA Spaces
- Cisco Identity Services Engine
- Cisco DNA Analytics and Assurance

The result? Your network stays relevant, becomes digital ready, and is the lifeblood of your organization.

Note: For information about Cisco DNA, refer to the [Cisco DNA](#)

Product specifications

Table 2. Specifications

Item	Specification
Part numbers	<p>Cisco Catalyst 9115AXI Access Point: Indoor environments, with internal antennas</p> <ul style="list-style-type: none"> • C9115AXI-x: Cisco Catalyst 9115 Series <p>Cisco Catalyst 9115AXE Access Point: Indoor, challenging environments, with external antennas</p> <ul style="list-style-type: none"> • C9115AXE-x: Cisco Catalyst 9115 Series <p>Cisco Catalyst 9115AXI Access Point: Indoor environments, with internal antennas, with embedded wireless controller</p> <ul style="list-style-type: none"> • C9115AXI-EWC-x: Cisco Catalyst 9115 Series <p>Cisco Catalyst 9115AXE Access Point: Indoor, challenging environments, with external antennas, with embedded wireless controller</p> <ul style="list-style-type: none"> • C9115AXE-EWC-x: Cisco Catalyst 9115 Series <p>Regulatory domains: (x = regulatory domain)</p> <p>Customers are responsible for verifying approval for use in their individual countries. To verify approval and to identify the regulatory domain that corresponds to a particular country, visit https://www.cisco.com/go/aironet/compliance.</p> <p>Not all regulatory domains have been approved. As they are approved, the part numbers will be available on the Global Price List.</p> <p>Cisco Wireless LAN Services</p> <ul style="list-style-type: none"> • AS-WLAN-CNSLT: Cisco Wireless LAN Network Planning and Design Service • AS-WLAN-CNSLT: Cisco Wireless LAN 802.11n Migration Service • AS-WLAN-CNSLT: Cisco Wireless LAN Performance and Security Assessment Service
Software	<ul style="list-style-type: none"> • Cisco Unified Wireless Network Software Release 8.9 or later • Cisco IOS® XE Software Release 16.11 or later
Supported wireless LAN controllers	<ul style="list-style-type: none"> • Cisco Catalyst 9800 Series Wireless Controllers • Cisco 3500, 5520, and 8540 Series Wireless Controllers and Cisco Virtual Wireless Controller
802.11n version 2.0 (and related) capabilities	<ul style="list-style-type: none"> • 4x4 MIMO with four spatial streams • Maximal Ratio Combining (MRC) • 802.11n and 802.11a/g beamforming • 20- and 40-MHz channels • PHY data rates up to 890 Mbps (40 MHz with 5 GHz and 20 MHz with 2.4 GHz) • Packet aggregation: A-MPDU (transmit and receive), A-MSDU (transmit and receive) • 802.11 Dynamic Frequency Selection (DFS) • Cyclic Shift Diversity (CSD) support

Item	Specification
802.11ac	<ul style="list-style-type: none"> • 4x4 downlink MU-MIMO with four spatial streams • MRC • 802.11ac beamforming • 20-, 40-, 80-, and 160-MHz channels • PHY data rates up to 3.47 Gbps (160 MHz with 5 GHz) • Packet aggregation: A-MPDU (transmit and receive), A-MSDU (transmit and receive) • 802.11 DFS • CSD support
802.11ax	<ul style="list-style-type: none"> • 4x4 downlink MU-MIMO with four spatial streams • Uplink/downlink OFDMA • TWT • BSS coloring • MRC • 802.11ax beamforming • 20-, 40-, 80-, and 160-MHz channels • PHY data rates up to 5.38 Gbps (160 MHz with 5 GHz and 20 MHz with 2.4 GHz) • Packet aggregation: A-MPDU (transmit and receive), A-MSDU (transmit and receive) • 802.11 DFS • CSD support
Integrated antenna	<ul style="list-style-type: none"> • 2.4 GHz, peak gain 3 dBi, internal antenna, omnidirectional in azimuth • 5 GHz, peak gain 4 dBi, internal antenna, omnidirectional in azimuth
External antenna (sold separately)	<ul style="list-style-type: none"> • Cisco Catalyst 9115E Access Points are certified for use with antenna gains up to 6 dBi (2.4 GHz and 5 GHz) • Cisco offers the industry's broadest selection of antennas, delivering optimal coverage for a variety of deployment scenarios • For more details, C9115 Guide
Interfaces	<ul style="list-style-type: none"> • 1x 100, 1000, 2500 Multigigabit Ethernet (RJ-45) – IEEE 802.3bz • Management console port (RJ-45) • USB 2.0
Indicators	<ul style="list-style-type: none"> • Status LED indicates boot loader status, association status, operating status, boot loader warnings, and boot loader errors
Dimensions (W x L x H)	<ul style="list-style-type: none"> • Access point (without mounting brackets): C9115I: 8.0 x 8.0 x 1.5 in. (20.3 x 20.3 x 3.8 cm), C9115E: 8.0 x 8.0 x 1.7 in. (20.3 x 20.3 x 4.3 cm)
Weight	<p>Cisco Catalyst 9115AXI</p> <ul style="list-style-type: none"> • 1.98 lb (0.9 kg) <p>Cisco Catalyst 9115AXE</p> <ul style="list-style-type: none"> • 2.43 lb (1.1 kg)
Input power requirements	<ul style="list-style-type: none"> • 802.3at Power over Ethernet Plus (PoE+), 802.3bt Cisco Universal PoE (Cisco UPOE+, Cisco UPOE®) • Cisco power injector, AIR-PWRINJ6= • 802.3af PoE • Cisco power injector, AIR-PWRINJ5= (Note: This injector supports only 802.3af) <p>Note: When 802.3af PoE is the source of power, both 2.4-GHz and 5-GHz radios will be reduced to 2x2 and Ethernet downgraded to 1 Gigabit Ethernet. In addition, the USB port will be off.</p>

Item	Specification														
Power draw	802.3at full feature - Catalyst 9115I														
	<table border="1"> <thead> <tr> <th>Power source</th> <th>Power type</th> <th>2.4-GHz radio</th> <th>5-GHz radio</th> <th>Link speed</th> <th>USB</th> <th>LLDP</th> </tr> </thead> <tbody> <tr> <td>802.3at</td> <td>PoE</td> <td>4x4</td> <td>4x4</td> <td>2.5G</td> <td>Y</td> <td>20.4W</td> </tr> </tbody> </table>	Power source	Power type	2.4-GHz radio	5-GHz radio	Link speed	USB	LLDP	802.3at	PoE	4x4	4x4	2.5G	Y	20.4W
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	802.3at full feature - Catalyst 9115E														
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802.3at	PoE	4x4	4x4	2.5G	Y	21.4W									
802.3af reduced feature															
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Power source	Power type	2.4-GHz radio	5-GHz radio	Link speed	USB	LLDP									
802.3af	PoE	2x2	2x2	1G	N	13W									
	Note: Power required at the Power Source Equipment (PSE) will depend on the cable length and other environmental issues.														
Environmental	<p>Cisco Catalyst 9115AXI</p> <ul style="list-style-type: none"> • Nonoperating (storage) temperature: -22° to 158°F (-30° to 70° C) • Nonoperating (storage) altitude test: 25°C, 15,000 ft. • Operating temperature: 32° to 122°F (0° to 50° C) • Operating humidity: 10% to 90% (noncondensing) • Operating altitude test: 40°C, 9843 ft. <p>Note: When the ambient operating temperature exceeds 40° C, the access point will shift from 4x4 to 2x2 on both the 2.4-GHz and 5-GHz radios, uplink Ethernet will downgrade to 1 Gigabit Ethernet, and the USB interface will be disabled.</p> <p>Cisco Catalyst 9115AXE</p> <ul style="list-style-type: none"> • Nonoperating (storage) temperature: -22° to 158°F (-30° to 70° C) • Nonoperating (storage) altitude test: 25°C, 15,000 ft. • Operating temperature: -4° to 122°F (-20° to 50° C) • Operating humidity: 10% to 90% (noncondensing) • Operating altitude test: 40°C, 9843 ft. 														
System memory	<ul style="list-style-type: none"> • 2048 MB DRAM • 1024 MB flash 														
Warranty	Limited lifetime hardware warranty														
Available transmit power settings	<table border="1"> <thead> <tr> <th>2.4 GHz</th> <th>5 GHz</th> </tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> • 23 dBm (200 mW) • -4dBm (0.39mW) </td> <td> <ul style="list-style-type: none"> • 23 dBm (200 mW) • -4dBm (0.39mW) </td> </tr> </tbody> </table>	2.4 GHz	5 GHz	<ul style="list-style-type: none"> • 23 dBm (200 mW) • -4dBm (0.39mW) 	<ul style="list-style-type: none"> • 23 dBm (200 mW) • -4dBm (0.39mW) 										
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Regulatory domains	Note: Customers are responsible for verifying approval for use in their individual countries. To verify approval and to identify the regulatory domain that corresponds to a particular country, visit https://www.cisco.com/go/aironet/compliance														

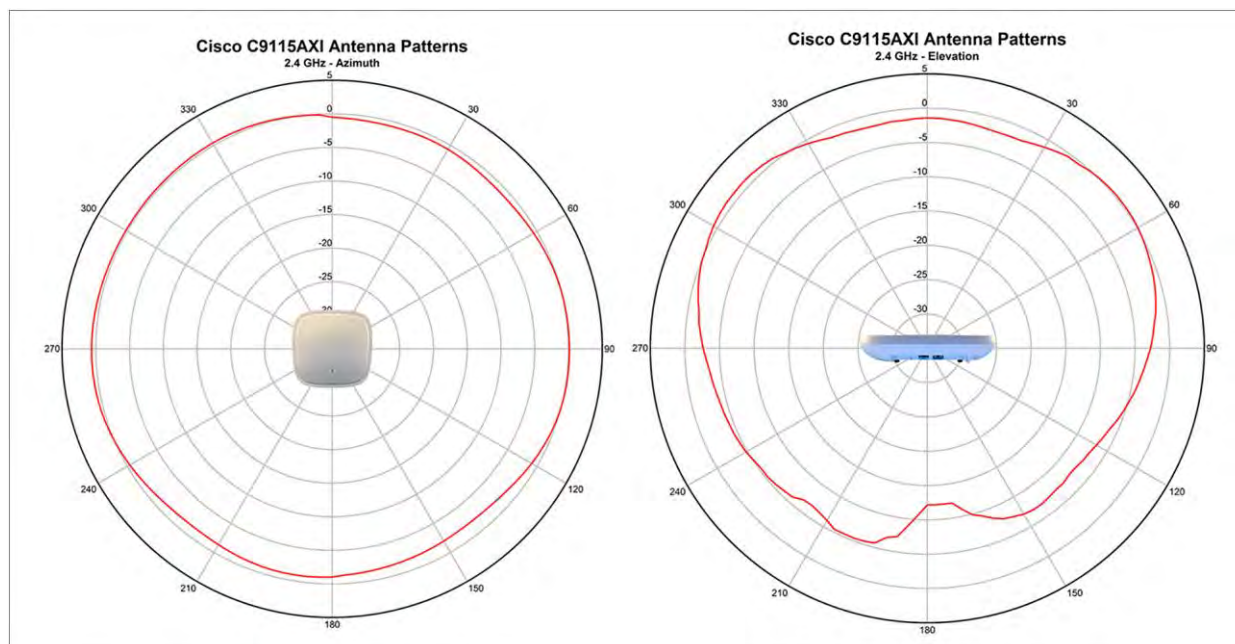
Item	Specification
	For information about Regulatory Domain support, refer to the Cisco Regulatory Domain White Paper
Compliance standards	<ul style="list-style-type: none"> • Safety: <ul style="list-style-type: none"> ◦ IEC 60950-1 ◦ EN 60950-1 ◦ UL 60950-1 ◦ CAN/CSA-C22.2 No. 60950-1 ◦ AS/NZS 60950-1 ◦ UL 2043 ◦ Class III equipment • Emissions: <ul style="list-style-type: none"> ◦ CISPR 32 (rev. 2015) ◦ EN 55032 (rev. 2012/AC:2013) ◦ EN 55032 (rev. 2015) ◦ EN61000-3-2 (rev. 2014) ◦ EN61000-3-3 (rev. 2013) ◦ KN61000-3-2 ◦ KN61000-3-3 ◦ AS/NZS CISPR 32 Class B (rev. 2015) ◦ 47 CFR FCC Part 15B ◦ ICES-003 (rev. 2016 Issue 6, Class B) ◦ VCCI (V3) ◦ CNS (rev. 13438) ◦ KN-32 ◦ TCVN 7189 (rev. 2009) • Immunity: <ul style="list-style-type: none"> ◦ CISPR 24 (rev. 2010) ◦ EN 55024/EN 55035 (rev. 2010) • Emissions and immunity: <ul style="list-style-type: none"> ◦ EN 301 489-1 (v2.1.1 2017-02) ◦ EN 301 489-17 (v3.1.1 2017-02) ◦ QCVN (18:2014) ◦ KN 489-1 ◦ KN 489-17 ◦ EN 60601 (1-1:2015) • Radio: <ul style="list-style-type: none"> ◦ EN 300 328 (v2.1.1) <ul style="list-style-type: none"> ◦ EN 301 893 (v2.1.1) ◦ AS/NZS 4268 (rev. 2017) ◦ 47 CFR FCC Part 15C, 15.247, 15.407 ◦ RSP-100 ◦ RSS-GEN ◦ RSS-247 ◦ China regulations SRRC ◦ LP0002 (rev 2018.1.10) ◦ Japan Std. 33a, Std. 66, and Std. 71 <ul style="list-style-type: none"> • RF safety: <ul style="list-style-type: none"> ◦ EN 50385 (rev. Aug 2002) ◦ ARPANSA ◦ AS/NZS 2772 (rev. 2016) ◦ EN 62209-1 (rev. 2016) ◦ EN 62209-2 (rev. 2010) ◦ 47 CFR Part 1.1310 and 2.1091 ◦ RSS-102 • IEEE standards: <ul style="list-style-type: none"> ◦ IEEE 802.3 ◦ IEEE 802.3ab ◦ IEEE 802.3af/at ◦ IEEE 802.11 a/b/g/n/ac/ax ◦ IEEE 802.11h, 802.11d • Security: <ul style="list-style-type: none"> ◦ 802.11i, Wi-Fi Protected Access 3 (WPA3), WPA2, WPA ◦ 802.1X ◦ Advanced Encryption Standard (AES) • Extensible Authentication Protocol (EAP) types: <ul style="list-style-type: none"> ◦ EAP-Transport Layer Security (TLS) ◦ EAP-Tunneled TLS (TTLS) or Microsoft Challenge Handshake Authentication Protocol Version 2 (MSCHAPv2) ◦ Protected EAP (PEAP) v0 or EAP-MSCHAPv2 ◦ EAP-Flexible Authentication via Secure Tunneling (EAP-FAST) ◦ PEAP v1 or EAP-Generic Token Card (GTC) ◦ EAP-Subscriber Identity Module (SIM)
Datarate/Transmit Power/ Receive sensitivity	For more detailed information about Datarate/TX Power/Receive sensitivity, Please refer Cisco RF Details

Item		Specification			
Transmit power and receive sensitivity					
		5-GHz radio		2.4-GHz radio	
	Spatial streams	Total transmit power (dBm)	Receive sensitivity (dBm)	Total transmit power (dBm)	Receive sensitivity (dBm)
802.11/11b					
1 Mbps	1	-	-	23	-98
11 Mbps	1	-	-	23	-90
802.11a/g					
6 Mbps	1	23	-96	23	-95
24 Mbps	1	23	-87	23	-85
54 Mbps	1	23	-76	23	-76
802.11n HT20					
MCS0	1	23	-95	23	-94
MCS31	4	23	-70	23	-70
802.11n HT40					
MCS0	1	23	-93	-	-
MCS31	4	23	-68	-	-
802.11ac VHT20					
MCS0	1	23	-95	-	-
MCS9	1	22	NA	-	-
MCS0	2	23	-92	-	-
MCS9	2	22	NA	-	-
MCS0	3	23	-91	-	-
MCS9	3	22	-67	-	-
MCS0	4	23	-90	-	-
MCS9	4	22	-66	-	-

Item		Specification			
802.11ac VHT40					
MCS0	1	23	-89	-	-
MCS9	1	22	-65	-	-
MCS0	2	23	-86	-	-
MCS9	2	22	-62	-	-
MCS0	3	23	-85	-	-
MCS9	3	22	-61	-	-
MCS0	4	23	-84	-	-
MCS9	4	22	-59	-	-
802.11ac VHT80					
MCS0	1	23	-84	-	-
MCS9	1	22	-60	-	-
MCS0	2	23	-81	-	-
MCS9	2	22	-57	-	-
MCS0	3	23	-80	-	-
MCS9	3	22	-55	-	-
MCS0	4	23	-77	-	-
MCS9	4	22	-54	-	-
802.11ac VHT160					
MCS0	1	23	-84	-	-
MCS9	1	21	-59	-	-
MCS0	2	23	-85	-	-
MCS9	2	21	-57	-	-
MCS0	3	23	-85	-	-
MCS9	3	21	-55	-	-
MCS0	4	23	-85	-	-
MCS9	4	21	-53	-	-

Item		Specification			
802.11ax VHT20					
MCS0	1	23	-94	23	-93
MCS11	1	21	-64	20	-62
MCS0	2	23	-91	23	-90
MCS11	2	21	-61	20	-59
MCS0	3	23	-90	23	-88
MCS11	3	21	-60	20	-58
MCS0	4	23	-87	23	-86
MCS11	4	21	-59	20	-57
802.11ax VHT40					
MCS0	1	23	-92	23	-91
MCS11	1	21	-60	20	-60
MCS0	2	23	-89	23	-87
MCS11	2	21	-57	20	-57
MCS0	3	23	-88	23	-85
MCS11	3	21	-56	20	-55
MCS0	4	23	-86	23	-83
MCS11	4	21	-54	20	-54
802.11ax VHT80					
MCS0	1	23	-87	-	-
MCS11	1	21	-58	-	-
MCS0	2	23	-84	-	-
MCS11	2	21	-55	-	-
MCS0	3	23	-83	-	-
MCS11	3	21	-54	-	-
MCS0	4	23	-81	-	-
MCS11	4	21	-52	-	-

Item		Specification			
802.11ax VHT160					
MCS0	1	23	-84	-	-
MCS11	1	20	-55	-	-
MCS0	2	23	-81	-	-
MCS11	2	20	-52	-	-
MCS0	3	23	-80	-	-
MCS11	3	20	-51	-	-
MCS0	4	23	-78	-	-
MCS4	4	23	-67	-	-
MCS7	4	23	-60	-	-
MCS8	4	21	-57	-	-
MCS9	4	21	-55	-	-
MCS10	4	20	-51	-	-
MCS11	4	20	-49	-	-



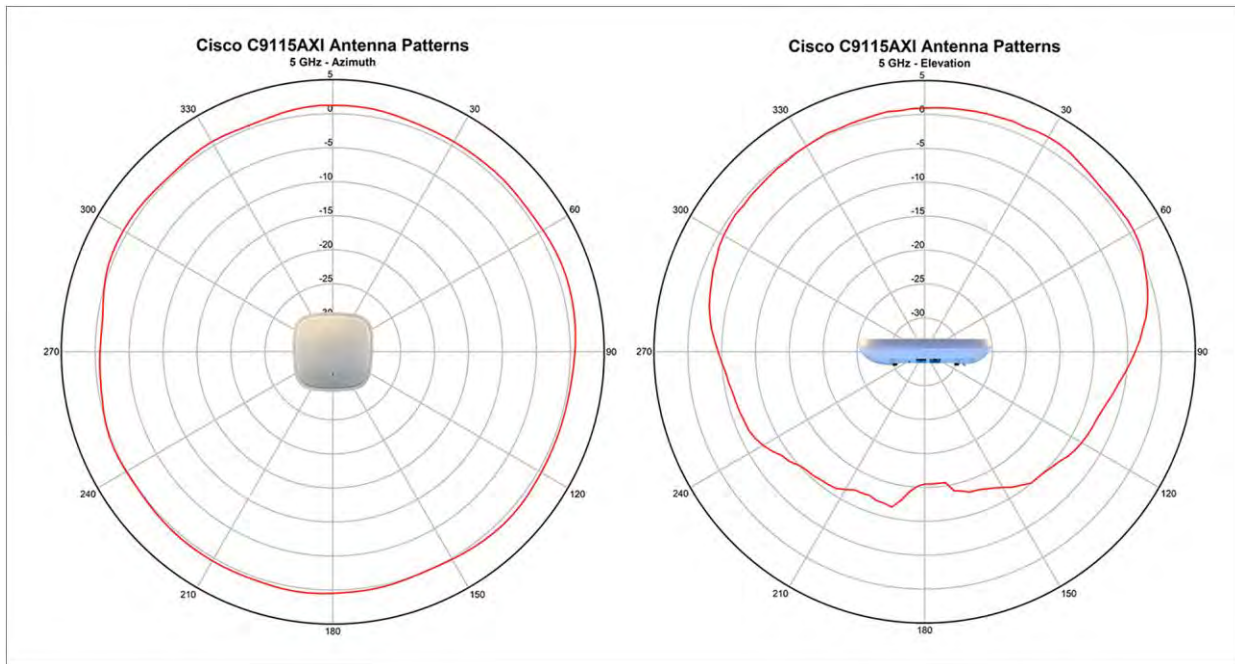


Figure 1.
Antenna radiation pattern

For information about feature support, please refer to the Cisco Catalyst 9100 Release Notes.

Licensing

For information about Licensing and packaging, refer to [Cisco Licensing](#).

Warranty information

The Cisco Catalyst 9115 Series Access Points come with a limited lifetime warranty that provides full warranty coverage of the hardware for as long as the original end user continues to own or use the product. The warranty includes 10-day advance hardware replacement and ensures that software media are defect-free for 90 days. For more details, visit <https://www.cisco.com/go/warranty>.

Cisco environmental sustainability

Information about Cisco’s environmental sustainability policies and initiatives for our products, solutions, operations, and extended operations or supply chain is provided in the “Environment Sustainability” section of Cisco’s [Corporate Social Responsibility](#) (CSR) Report. Reference links to information are below.

Information on product material content laws and regulations - [Materials](#).

Information on electronic waste laws and regulations, including products, batteries, and packaging - [WEEE compliance](#).

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Cisco Services

With Cisco Services, you can achieve infrastructure excellence faster with less risk. From an initial WLAN readiness assessment to implementation, full solution support, and in-depth training, our services for the Cisco Catalyst 9115 Series provide expert guidance to help you successfully plan, deploy, manage, and support your new access points. With unmatched networking expertise, best practices, and innovative tools, Cisco Services can help you reduce overall upgrade, refresh, and migration costs as you introduce new hardware, software, and protocols into the network. With a comprehensive lifecycle of services, Cisco experts will help you minimize disruption and improve operational efficiency to extract maximum value from your Cisco DNA-ready infrastructure.

Cisco Capital

Cisco Capital makes it easier to get the right technology to achieve your objectives, enable business transformation and help you stay competitive. We can help you reduce the total cost of ownership, conserve capital, and accelerate growth. In more than 100 countries, our flexible payment solutions can help you acquire hardware, software, services and complementary third-party equipment in easy, predictable payments. [Learn more.](#)

Smart Account

Creating Smart Accounts by using the Cisco Smart Software Manager (SSM) enables you to order devices and licensing packages and also manage your software licenses from a centralized website. For more information on Smart Accounts, refer to <https://www.cisco.com/go/smartaccounts>.

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Single-Gang QuickPort® Wallplates

APPLICATION

Single-Gang QuickPort Wallplates accept QuickPort connectors to support multimedia applications with 1, 2, 3, 4, or 6 ports. Use where a one-piece, single-gang, economical flush-mount housing is desired. Available in six colors (white, light almond, ivory, grey, brown, and black) with color-matched screws.



SPECIFICATION

The wallplate housing shall be a one-piece, single-gang flush-mount style that fits standard NEMA openings, or four-square boxes with reducer. It should provide 1, 2, 3, 4, or 6 ports. Must be able to accept all Leviton QuickPort connectors. It must be made of high-impact, fire-retardant plastic rated UL 94V-0, and be cULus Listed, and compliant with ANSI/TIA-568-C.0 specifications. The wallplate shall accommodate low-voltage box eliminators for a flush mount.

FEATURES

- Color-matched wallplate screws
- Fits within minimum rectangular NEMA openings and accommodates low-voltage box eliminators for a flush mount
- Compatible with all individual QuickPort connectors
- Individual port configurability allows specification flexibility
- Narrow module width allows high port density in a small area

DESIGN CONSIDERATIONS

- Fits single-gang back boxes, or four-square boxes with appropriate user-provided reducer
- Put blanks in unused ports for future expansion
- Specify port identification method (colored modules, designation labels, and custom silk-screening available/to identify ports, use different colored connectors for each application or Leviton pre-printed Port Designation Labels (41080-LEB)

STANDARDS COMPLIANCE

- cULus Listed (UL 1863 & CAN/CSA-C22.2 No. 182.4)
- ANSI/TIA-568-C.0

PHYSICAL SPECIFICATIONS

- Dimensions: See page two
- Materials: High-impact, durable, fire-retardant plastic rated UL 94V-0
- Capacity: Available in 1-, 2-, 3-, 4-, and 6-port versions
- Mounting: Color-matched screws

COUNTRY OF ORIGIN

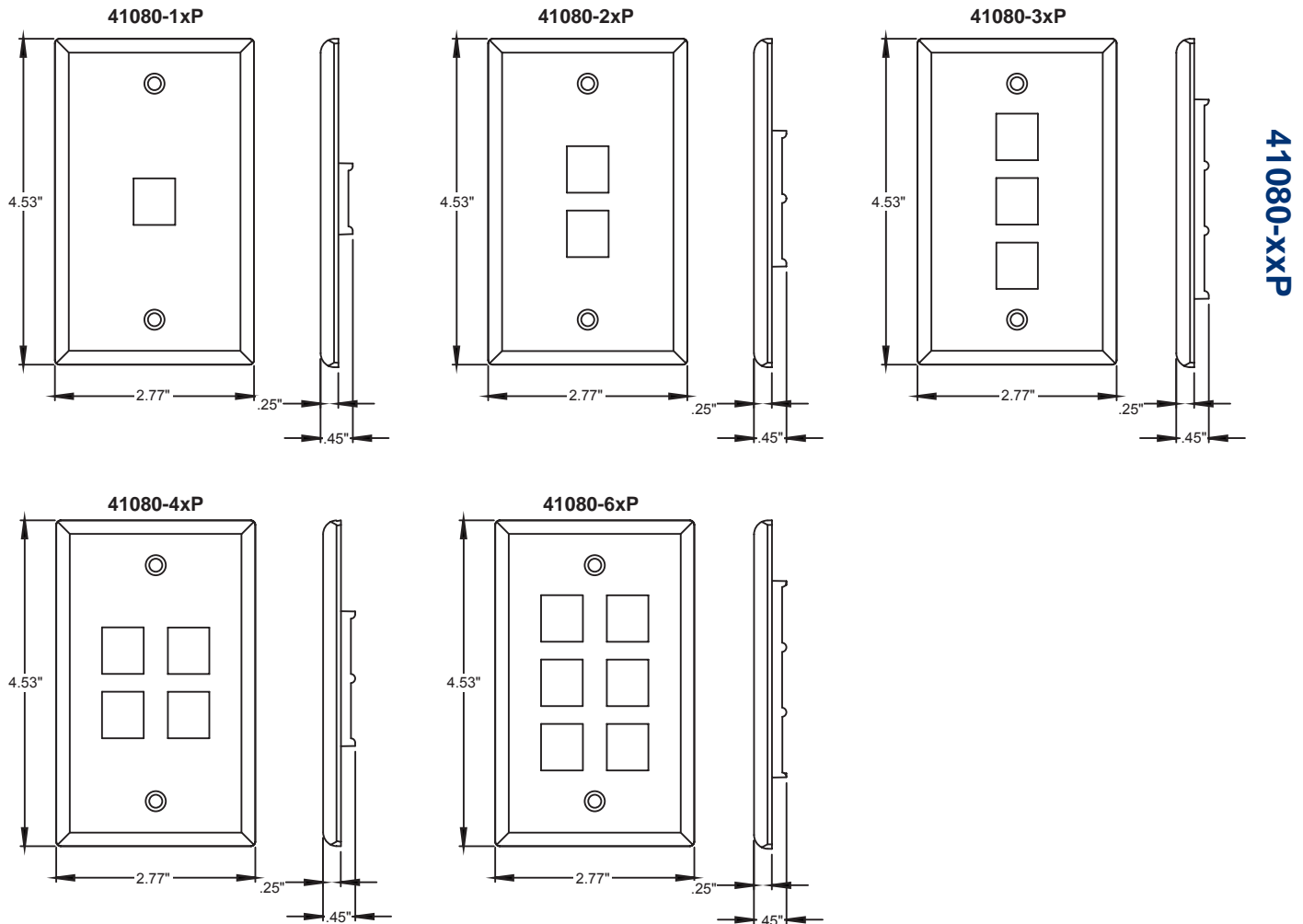
USA

WARRANTY INFORMATION

For a copy of Leviton product warranties, visit www.leviton.com/warranty.

ELECTRONIC FILES

For CAD files, typical specs, or technical drawings (.DXF, .DWG), visit www.leviton.com.



PART NUMBERS

Description	WHITE	LT. ALMOND	IVORY	GREY	BROWN	BLACK
Single-Gang QuickPort® Wallplate, 1 Port	41080-1WP	41080-1TP	41080-1IP	41080-1GP	41080-1BP	41080-1EP
Single-Gang QuickPort Wallplate, 2 Ports	41080-2WP	41080-2TP	41080-2IP	41080-2GP	41080-2BP	41080-2EP
Single-Gang QuickPort Wallplate, 3 Ports	41080-3WP	41080-3TP	41080-3IP	41080-3GP	41080-3BP	41080-3EP
Single-Gang QuickPort Wallplate, 4 Ports	41080-4WP	41080-4TP	41080-4IP	41080-4GP	41080-4BP	41080-4EP
Single-Gang QuickPort Wallplate, 6 Ports	41080-6WP	41080-6TP	41080-6IP	41080-6GP	41080-6BP	41080-6EP



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eXtreme® Cat 6 Component-Rated UTP QuickPort® Jack

APPLICATION

The eXtreme Cat 6 jack is designed to be used with all QuickPort compatible products. The jack includes patented Retention Force Technology™ which promotes consistent performance over the life of the system. It features unique pair separation towers allowing for quicker and easier terminations. The jack is built on a 180-degree configuration with the punch field in the back, allowing for rear termination.



SPECIFICATION

The jack shall meet or exceed the requirements for channel- and component-level performance as described in ANSI/TIA-568.2-D Category 6 standards, as well as the Class E requirements described in ISO/IEC 11801-1. The jack shall also be in compliance with all National Electrical Codes; compliant with ANSI/TIA-1096-A; UL listed; and independently verified. In addition to Category 6 compliance, the jack shall have the ability to support high-megabit and shared-sheath applications. All plastics used in construction of the jack bodies shall be fire retardant with a UL flammability rating of 94V-0. Termination of all jacks shall be 110-type insulation displacement connectors (IDC). The jack shall provide a ledge directly adjacent to the 110-style termination against which the wires can be terminated and cut in one action by the installation craftsperson. Jack wiring is universal and will accommodate installation color codes for T568A and T568B wiring schemes. The jack shall be individual snap-in style and the termination field shall be in the rear for easy access. The jack shall include a snap on dust cap with high pull-out force and shall fit in a variety of telecommunications wallplates, outlets, and field-configurable patch panels and patch blocks.

COUNTRY OF ORIGIN

USA

FEATURES

- Terminates 26 to 22-gauge solid conductors and 24 to 22-gauge stranded conductors
- Terminates 26-gauge stranded conductors up to 5 times
- Capable of multiple re-terminations
- Gas-tight IDC jacks prevent corrosion
- Dual-layer T568B/T568A wiring label simplifies punchdown
- Patented Retention Force Technology protects tines from damage and increases system longevity
- Pair Separation Tower design facilitates separation of conductors and minimizes untwisting
- 180-degree configuration allows for rear termination
- Available in 13 ANSI/TIA-606-C compatible colors for color coding or organization
- Available individually, in bulk packages of 25, and in bulk packages of 150 with a JackRapid™ Punchdown Tool

DESIGN CONSIDERATIONS

- Use in any QuickPort housing to support eXtreme Cat 6 UTP connectivity in surface-mount, flush-mount, or modular furniture outlets and field-configurable panels
- Can be used in conjunction with other QuickPort snap-in modules for voice/data and video applications over UTP, coax, and fiber

STANDARDS COMPLIANCE

- ANSI/TIA-568.2-D (Cat 6)
- ISO/IEC 11801-1 (Class E)
- ANSI/TIA-1096-A (formerly FCC Part 68)
- cULus Listed
- PoE standards: IEEE 802.3af, 802.3at, 802.3bt, Cisco UPoE, and Power over HDBaseT™ (PoH) up to 100 watts
- UL 2043 Plenum Certified

PHYSICAL SPECIFICATIONS

Dimensions: See page two

Materials: **Connector Body:** High-impact, fire-retardant plastic rated UL 94V-0.

Spring-Wire Contacts: High-quality copper-based alloy, plated with 50 micro-inches of gold over 100 micro-inches of nickel for lowest contact resistance, maximum life.

Environmental

Conditions: **Storage Temperature:** -40 °C to +70 °C

Operating Temperature: -10 °C to +60 °C

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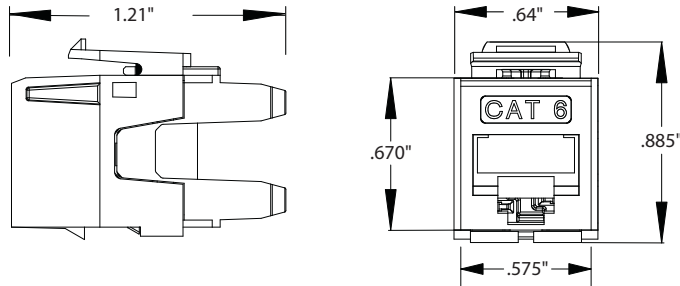
WARRANTY INFORMATION

Limited product and limited extended warranties are rendered VOID if the installed structured cabling system is used for Power over Ethernet applications that exceed the product's specified power rating.

For a copy of Leviton product warranties, visit www.leviton.com/warranty.

ELECTRONIC FILES

For CAD files, typical specs, or technical drawings (.DXF, .DWG), visit www.leviton.com.



61110-xx6

PART NUMBERS

Description	Jack	QuickPack® 25/Bag	150/Bag with JackRapid™ Tool
eXtreme® Cat 6 Component-Rated UTP QuickPort® Jack, white	61110-RW6	61110-BW6	61110-JW6
eXtreme Cat 6 Component-Rated UTP QuickPort Jack, ivory	61110-RI6	61110-BI6	61110-JI6
eXtreme Cat 6 Component-Rated UTP QuickPort Jack, orange	61110-RO6	61110-BO6	61110-JO6
eXtreme Cat 6 Component-Rated UTP QuickPort Jack, blue	61110-RL6	61110-BL6	61110-JL6
eXtreme Cat 6 Component-Rated UTP QuickPort Jack, black	61110-RE6	61110-BE6	61110-JE6
eXtreme Cat 6 Component-Rated UTP QuickPort Jack, light almond	61110-RT6	61110-BT6	61110-JT6
eXtreme Cat 6 Component-Rated UTP QuickPort Jack, gray	61110-RG6	61110-BG6	61110-JG6
eXtreme Cat 6 Component-Rated UTP QuickPort Jack, crimson red	61110-RC6	61110-BC6	61110-JC6
eXtreme Cat 6 Component-Rated UTP QuickPort Jack, yellow	61110-RY6	61110-BY6	61110-JY6
eXtreme Cat 6 Component-Rated UTP QuickPort Jack, green	61110-RV6	61110-BV6	61110-JV6
eXtreme Cat 6 Component-Rated UTP QuickPort Jack, purple	61110-RP6	61110-BP6	61110-JP6
eXtreme Cat 6 Component-Rated UTP QuickPort Jack, brown	61110-RB6	61110-BB6	61110-JB6
eXtreme Cat 6 Component-Rated UTP QuickPort Jack, dark red	61110-RR6	61110-BR6	61110-JR6



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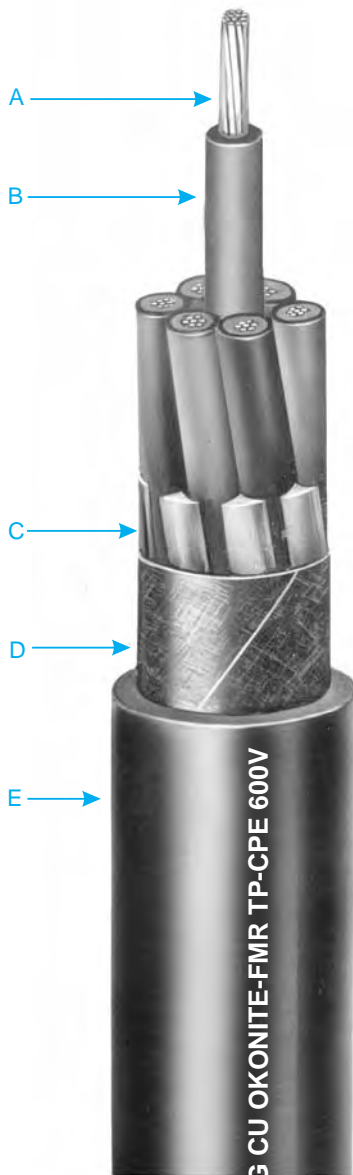
Okonite-FMR® Okolon® TP-CPE

UL Type TC/TC-ER (XHH/XHHW-2) and cUL Type CIC and TC

600V Power and Control Tray Cable

Multiple Copper Conductors With or Without Grounding Conductor/90°C Wet or Dry

For Cable Tray Use - Sunlight Resistant - For Direct Burial



- A Stranded Conductors
- B Okonite-FMR Insulation
- C Fillers, as necessary
- D Binder Tape
- E Okolon TP-CPE Jacket — Black

Insulation

Okonite-FMR is Okonite's trade name for its heat, moisture, flame and chemical resistant, mechanically rugged ethylene-propylene insulating compound.

The properties of Okonite-FMR insulation substantially enhance the well known features of ethylene-propylene rubber insulations.

Overall Jacket

Okolon TP-CPE is a thermoplastic chlorinated polyethylene compound. This jacket has excellent resistance to moisture, ozone, oil and many chemicals.

Applications

Okonite-FMR Okolon TP-CPE tray cable is permitted for use on power, lighting, control, and signal circuits; indoors or outdoors; in cable trays, raceways, direct burial in the ground, or where supported in outdoor locations by a messenger wire; for Class 1 circuits as permitted by Article 725 of the NEC; and in cable trays in Class I Division 2 hazardous locations in industrial establishments where the conditions of maintenance and supervision assure that only qualified persons will service the installation.

Cables marked TC-ER may also be used between a cable tray and the utilization equipment or device, when installed in accordance with NEC 336.10(7).

Sizes \leq 4/0 AWG are listed as c(UL) Type CIC and TC and are approved for installation in Zone 1, Zone 2, Class I Div. 2, Class II Div. 2, and Class III Div. 2 locations per the CEC.

Specifications

Conductors: Uncoated soft copper per ASTM B-3. Sizes smaller than #8 are compact stranded per ASTM B-8. Sizes #8 and larger are compact stranded per ASTM B-496.

Insulation: Okonite-FMR meets or exceeds requirements of UL 1581 and ICEA S-73-532 (NEMA WC57) & ICEA S-95-658 (NEMA WC70) Type II insulation.

Color Coding: Base colors and tracers as shown on reverse of Data Sheet. For sizes #8 AWG and larger black conductors with surface printing of numbers per ICEA S-73-532 NEMA/WC57 Method 4.

Grounding Conductor: Where indicated, bare stranded copper per ASTM B-8 for sizes #7 AWG and smaller, compact round for sizes #8 AWG and larger per ASTM B-496 and in accordance with NEC Table 250.122.

Assembly: Conductors cabled in accordance with UL 1277 using fillers, as necessary, with a cable tape overall.

Overall Jacket: Complies with UL 1277. The Okolon TP-CPE compound meets or exceeds the requirements of UL 1581, ICEA S-73-532 (NEMA WC57) & ICEA S-95-658 (NEMA WC70).

UL Listed as Type TC or TC-ER cable with a sunlight resistant jacket and for direct burial. Sizes 4 AWG and larger, without a grounding conductor, are Type TC only (not ER).

Product Features

- For cable tray use.
- For direct burial.
- Sunlight resistant.
- Insulated conductors are UL rated XHH/XHHW-2, cUL rated RW75/RW90, VW-1, PR I, and -40°C.
- Flame Retardant - passes the vertical tray flame test requirements of IEEE 383-1974, IEEE 1202/FT4, UL 1277, and ICEA T-29-520 (210,000 BTU/hr.).
- UL listed for cable tray use.
- 90°C continuous rating in wet or dry locations
130°C emergency overload rating
250°C short circuit rating.
- Okonite-FMR Okolon TP-CPE cables are quality control inspected to meet or exceed applicable industry standards.
- Resistant to moisture and most chemical atmospheres.
- Thermal stability at elevated temperatures.
- Flexible, easy to install and terminate.
- Mechanically rugged.
- High dielectric strength.
- Small diameter, lightweight.
- Minimum installation temperature of -22°F or -30°C.
- CSA C22.2 No. 239 Type CIC for sizes 4/0 and smaller.

Okonite-FMR Okolon® TP-CPE

UL Type TC/TC-ER (XHH/XHHW-2) and cUL Type CIC and TC

600V Power and Control Tray Cable

Multiple Copper Conductors With or Without
Grounding Conductor/90°C Wet or Dry

For Cable Tray Use - Sunlight Resistant - for Direct Burial



Product Data Section 4: Sheet 7

Catalog Number	Conductor Size AWG/kcmil	UL Type	Number of Conductors	Insulation Thickness (mils)	Grounding Conductor AWG*	Jacket Thickness (mils)	Jacket Thickness (mm)	Approx. O.D. (in.)	Approx. O.D. (mm)	Cross-Sectional Area (sq. in.) †	Approx. Net Weight lbs./1000'	Approx. Ship Weight lbs./1000'	90°C Wet or Dry NEC Ampacity (1)*	75°C Wet NEC Ampacity (1)*
202-10-4602	14(7X)	TC	2	30	—	45	1.14	0.38	9.6	0.12	79	90	15	15
202-10-4603		TC-ER	3		—	45	1.14	0.40	10.2	0.13	104	127	15	15
202-10-4604		TC-ER	4		—	45	1.14	0.44	11.2	0.16	126	149	15	15
202-10-4605		TC-ER	5		—	45	1.14	0.48	12.2	0.18	151	174	15	15
202-10-4607		TC-ER	7		—	45	1.14	0.52	13.2	0.22	195	218	15	14
202-10-4609		TC-ER	9		—	60	1.52	0.63	16.0	0.32	260	292	15	14
202-10-4612		TC-ER	12		—	60	1.52	0.71	18.0	0.40	332	364	12	10
202-10-4619		TC-ER	19		—	60	1.52	0.82	20.8	0.54	480	519	12	10
202-10-4637		TC-ER	37		—	80	2.03	1.14	29.0	1.03	925	1005	10	8
202-10-4702	12(7X)	TC	2	30	—	45	1.14	0.42	10.7	0.14	102	125	20	20
202-10-4703		TC-ER	3		—	45	1.14	0.44	11.2	0.16	134	157	20	20
202-10-4743		TC-ER	3		3x16	45	1.14	0.44	12.2	0.18	162	185	20	20
202-10-4704		TC-ER	4		—	45	1.14	0.48	12.2	0.19	167	190	20	20
202-10-4705		TC-ER	5		—	45	1.14	0.52	13.2	0.22	202	225	20	20
202-10-4707		TC-ER	7		—	60	1.52	0.60	15.2	0.29	281	305	20	17
202-10-4709		TC-ER	9		—	60	1.52	0.70	17.8	0.39	363	395	20	17
202-10-4712		TC-ER	12		—	60	1.52	0.78	19.8	0.49	446	485	15	12
202-10-4719		TC-ER	19		—	80	2.03	0.95	24.1	0.73	697	752	15	12
202-10-4737	TC-ER	37	—	80	2.03	1.26	32.0	1.27	1266	1266	12	10		
202-10-4802	10(7X)	TC	2	30	—	45	1.14	0.46	11.7	0.17	140	163	30	30
202-10-4803		TC-ER	3		—	45	1.14	0.49	12.4	0.20	183	206	30	30
202-10-4843		TC-ER	3		3x14	45	1.14	0.49	13.5	0.23	223	247	30	30
202-10-4804		TC-ER	4		—	60	1.52	0.57	14.5	0.26	243	267	30	28
202-10-4805		TC-ER	5		—	60	1.52	0.62	15.7	0.31	294	318	30	28
202-10-4807		TC-ER	7		—	60	1.52	0.67	17.0	0.37	384	416	28	24
202-10-4809		TC-ER	9		—	60	1.52	0.78	19.8	0.49	494	533	28	24
202-10-4812		TC-ER	12		—	80	2.03	0.92	23.4	0.68	669	724	20	17

Okonite's website, www.okonite.com contains the most up to date information.

*** Grounds may be split**

Equipment Grounding Conductor: Any conductor in these cables may be permanently reidentified during installation as the equipment grounding conductor in accordance with Section 250.119(B) of the NEC.

† **Cross-sectional** area for calculation of cable tray fill in accordance with Section 392.22 of the NEC.

(1) Ampacities

Ampacities are based on 310.16 of the National Electrical Code for conductors rated 90°C, in a multi-conductor cable, at an ambient temperature of 30°C (86°F). The 75°C column is provided for additional information.

The ampacities shown apply to open runs of cable, installation in any approved raceway, direct burial in the earth, or as aerial cable on a messenger. Derating for more than three current carrying conductors within the cable is in accordance with NEC Section 310.15(C)(1).

*Current limited to 15, 20 and 30 amps per Section 240.4(D) of the NEC for #14, #12 and #10 AWG, respectively.

Product Data

Section 4: Sheet 7

Catalog Number	Conductor Size AWG/kcmil	UL Type	Number of Conductors	Insulation Thickness (mils)	Grounding Thickness (mils)	Jacket Thickness AWG*	Jacket Thickness (mils)	Approx. O.D. (mm)	Approx. O.D. (In.)	Cross-Sectional Area (sq. In.) †	Approx. Net Weight lbs./1000'	Approx. Ship Weight lbs./1000'	90°C Wet or Dry NEC Ampacity (1)	75°C Wet NEC Ampacity (1)
112-10-4042	8(7X)	TC-ER	3	—	—	60	1.52	0.65	16.5	0.33	287	319	55	50
112-10-4044		TC-ER	3	3x14	—	60	1.52	0.65	17.3	0.36	328	360	55	50
112-10-4045		TC-ER	4	—	—	60	1.52	0.72	18.3	0.41	368	407	45	40
112-10-4047		TC-ER	4	3x14	—	60	1.52	0.72	18.8	0.43	407	446	45	40
112-10-4052	6(7X)	TC-ER	3	—	—	60	1.52	0.73	18.5	0.42	400	439	75	65
112-10-4054		TC-ER	3	3x12	—	60	1.52	0.73	19.1	0.44	469	508	75	65
112-10-4055		TC-ER	4	—	—	60	1.52	0.80	20.3	0.50	515	554	60	52
112-10-4057		TC-ER	4	3x12	—	60	2.03	0.80	22.4	0.61	575	630	60	52
112-10-4062	4(7X)	TC	3	—	—	60	1.52	0.83	21.1	0.54	571	626	95	85
112-10-4064		TC-ER	3	8	—	60	1.52	0.83	21.1	0.54	618	673	95	85
112-10-4065		TC	4	—	—	80	2.03	0.95	24.1	0.71	779	834	76	68
112-10-4067		TC-ER	4	8	—	80	2.03	0.98	24.9	0.75	865	929	76	68
112-10-4072	2(7X)	TC	3	—	—	80	2.03	0.99	25.1	0.77	872	936	130	115
112-10-4074		TC-ER	3	6	—	80	2.03	0.99	25.1	0.77	948	1012	130	115
112-10-4075		TC	4	—	—	80	2.03	1.08	27.4	0.92	1133	1200	104	92
112-10-4077		TC-ER	4	6	—	80	2.03	1.13	28.7	1.00	1266	1346	104	92
112-10-4082	1(19X)	TC	3	—	—	80	2.03	1.10	27.9	0.95	1098	1165	145	130
112-10-4084		TC-ER	3	6	—	80	2.03	1.10	27.9	0.95	1172	1236	145	130
112-10-4085		TC	4	—	—	80	2.03	1.21	30.7	1.15	1408	1498	116	104
112-10-4087		TC-ER	4	6	—	80	2.03	1.21	30.7	1.15	1483	1583	116	104
112-10-4092	1/0(19X)	TC	3	—	—	80	2.03	1.18	30.0	1.09	1328	1406	170	150
112-10-4094		TC-ER	3	6	—	80	2.03	1.18	30.0	1.09	1403	1483	170	150
112-10-4095		TC	4	—	—	80	2.03	1.30	33.0	1.33	1732	1832	136	120
112-10-4097		TC-ER	4	6	—	80	2.03	1.30	33.0	1.33	1806	1906	136	120
112-10-4102	2/0(19X)	TC	3	—	—	80	2.03	1.27	32.3	1.27	1626	1726	195	175
112-10-4104		TC-ER	3	6	—	80	2.03	1.27	32.3	1.27	1700	1800	195	175
112-10-4105		TC	4	—	—	80	2.03	1.40	35.6	1.54	2106	2222	156	140
112-10-4107		TC-ER	4	6	—	80	2.03	1.40	35.6	1.54	2180	2296	156	140
112-10-4122	4/0(19X)	TC	3	—	—	80	2.03	1.48	37.6	—	2444	2587	260	230
112-10-4124		TC-ER	3	4	—	80	2.03	1.48	37.6	—	2564	2707	260	230
112-10-4125		TC	4	—	—	80	2.03	1.64	41.7	—	3184	3361	208	184
112-10-4127		TC-ER	4	4	—	80	2.03	1.64	41.7	—	3303	3480	208	184
112-10-4128	250(37X)	TC	3	—	—	80	2.03	1.62	41.1	—	2874	3051	290	255
112-10-4129		TC-ER	3	4	—	80	2.03	1.62	41.1	—	2994	3171	290	255
112-10-4130		TC	4	—	—	110	2.79	1.85	47.0	—	3872	4138	232	204
112-10-4131		TC-ER	4	4	—	110	2.79	1.85	47.0	—	3992	4258	232	204
112-10-4132	350(37X)	TC	3	—	—	110	2.79	1.88	47.8	—	3994	4260	350	310
112-10-4133		TC-ER	3	3	—	110	2.79	1.88	47.8	—	4144	4410	350	310
112-10-4134		TC	4	—	—	110	2.79	2.08	52.8	—	5230	5620	280	248
112-10-4135		TC-ER	4	3	—	110	2.79	2.08	52.8	—	5380	5770	280	248
112-10-4136	500(37X)	TC	3	—	—	110	2.79	2.13	54.1	—	5532	5922	430	380
112-10-4137		TC-ER	3	2	—	110	2.79	2.13	54.1	—	5723	6113	430	380
112-10-4138		TC	4	—	—	110	2.79	2.36	59.9	—	7221	7780	344	304
112-10-4139		TC-ER	4	2	—	110	2.79	2.36	59.9	—	7409	7968	344	304
112-10-4140	750(61X)	TC	3	—	—	110	2.79	2.56	65.0	—	8184	8811	535	475
112-10-4141		TC-ER	3	1	—	110	2.79	2.56	65.0	—	8423	9050	535	475
112-10-4142		TC	4	—	—	140	3.56	2.90	73.7	—	10907	11669	428	380
112-10-4143		TC-ER	4	1	—	140	3.56	2.90	73.7	—	11146	11908	428	380
112-10-4144	1000(61X)	TC	3	—	—	140	3.56	2.94	74.7	—	10856	11618	615	545
112-10-4145		TC-ER	3	1/0	—	140	3.56	2.94	74.7	—	11157	11919	615	545
112-10-4146		TC	4	—	—	140	3.56	3.26	82.8	—	14229	15162	492	436
112-10-4147		TC-ER	4	1/0	—	140	3.56	3.26	82.8	—	14530	15463	492	436

Okonite's website, www.okonite.com contains the most up to date information.

*Grounds may be split, however 3 separate grounds are required on conductor sizes 18-5 AWG.

Okonite-FMR Okolon TP-CPE



Product Data Section 4: Sheet 7

UL Type TC/TC-ER (XHH/XHHW-2) and cUL Type CIC and TC 600V Power and Control Tray Cable

Multiple Copper Conductors With or Without

Grounding Conductor/ 90°C Wet or Dry

For Cable Tray Use - Sunlight Resistant - For Direct Burial

Conductor Color Coding Sequence

Conductor Number	Base Color	Tracer Color
1	Black	
2	Red	
3	Blue	
4	Orange	
5	Yellow	
6	Brown	
7	Red	Black
8	Blue	Black
9	Orange	Black
10	Yellow	Black
11	Brown	Black
12	Black	Red
13	Blue	Red
14	Orange	Red
15	Yellow	Red
16	Brown	Red
17	Black	Blue
18	Red	Blue
19	Orange	Blue
20	Yellow	Blue
21	Brown	Blue
22	Black	Orange
23	Red	Orange
24	Blue	Orange
25	Yellow	Orange
26	Brown	Orange
27	Black	Yellow
28	Red	Yellow
29	Blue	Yellow
30	Orange	Yellow
31	Brown	Yellow
32	Black	Brown
33	Red	Brown
34	Blue	Brown
35	Orange	Brown
36	Yellow	Brown
37	Black	

Color Coding

Sizes 18 - 9 AWG:
per ICEA Method 1, E-2
color sequence

Sizes 8 AWG and larger:
Surface Printing of Numbers per
ICEA Method 4

Special Order: Any or all of the following conductors may be added when specifically requested by the customer to meet their specific application requirements. These conductor codings comply with UL and NEC requirements.

Purpose	Base Color	Tracer Color
Equipment Grounding	Uninsulated Green Green	1 or more continuous yellow stripes
Grounded	White White White White White White	Black continuous stripe Red continuous stripe Blue continuous stripe Orange continuous stripe Brown continuous stripe Numeric Printing



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- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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CHAPTER 1

Your Phone

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The Cisco IP Phone 7800 Series

The Cisco IP Phones 7811, 7821, 7841, and 7861 deliver easy-to-use, highly-secure voice communications.

Figure 1: The Cisco IP Phone 7800 Series



The following table shows the major features for the Cisco IP Phone 7800 Series.

Table 1: Cisco IP Phone 7800 Series Major Features

Features	7811	7821	7841	7861
Screen	Greyscale, no backlight	Greyscale, with backlight	Greyscale, with backlight	Greyscale, with backlight
Lines	1	2	4	16
Fixed feature keys	8	9	9	9

Your phone must be connected to a network and configured to connect to a call control system. The phones support many functions and features, depending on the call control system. Your phone might not have all functions available, based on the way your administrator has set it up.

When you add features to your phone, some features require a line button. But each line button on your phone can support only one function (a line, a speed dial, or a feature). If your phone's line buttons are already in use, your phone won't display any additional features.

To check which phone model you have, press **Applications**  and select **Phone information**. The **Model number** field shows your phone model.

New and Changed Information

New and Changed Information for Firmware Release 14.0(1)

Table 2: New and Changed Information

Feature	New or Changed
Hunt Group Enhancements	Recent Calls List, on page 55
New Menu Setting for the Cisco Headset 500 Series	Change Your Headset Ringer Settings, on page 78
Headset Upgrade Progress Indicator	Update Your Cisco Headset Firmware With a Cisco IP Phone, on page 78

New and Changed Information for Firmware Release 12.8(1)

The following table shows the changes made for Firmware Release 12.8(1).

Table 3: Cisco IP Phone 7800 Revisions for Firmware Release 12.8(1)

Feature	New or Changed Content
Simplify Extension Mobility Login with a Cisco Headset 500 Series	Sign into Extension Mobility with Your Cisco Headset, on page 11 Associate Your Headset with Your User Information
Phone Data Migration	Replace Your Existing Phone with a New Phone, on page 9

New and Changed Information for Firmware Release 12.7(1)

The following table shows the changes made for Firmware Release 12.7(1).

Table 4: Cisco IP Phone 7800 User Guide Revisions for Firmware Release 12.7(1)

Revision	Updated Section
Updated for Select Key LED and Energy Savings.	Energy Savings, on page 20 Turn Off the Select Key LED for Energy Save Mode, on page 62
Updated for E-hook.	Enable Electronic Hookswitch Control on Your Phone, on page 79
Updated for hunt group calls on Call Alert	Answer a Call Within Your Hunt Group, on page 30
Cisco Headset 500 Series Firmware Release 1.5 Change	Erase All Bluetooth Pairings, on page 77
General changes	In certain circumstances, users who dialed a number that was busy received the reorder tone. With this release, the user hears the busy tone. New section Phone Icons, on page 17

New and Changed Information for Firmware Release 12.6(1)

The following table shows the changes made for Firmware Release 12.6(1).

Table 5: Cisco IP Phone 7800 User Guide Revisions for Firmware Release 12.6(1)

Revision	Updated Section
Added a section about sharing a network connection between phone and computer.	Share a Network Connection with Your Phone and Computer, on page 7

New and Changed Information for Firmware Release 12.5(1)SR3

All references into Cisco Unified Communications Manager documentation have been updated to support all Cisco Unified Communications Manager releases.

The following table shows the changes made for Firmware Release 12.5(1)SR3.

Table 6: Cisco IP Phone 7800 User Guide Revisions for Firmware Release 12.5(1)SR3

Revision	Updated Section
Added support for Reset Headset Settings	Reset Cisco Headset Settings from Your Phone, on page 78
New topic	Phone Keypad Characters, on page 15
New topic	Share a Network Connection with Your Phone and Computer, on page 7

New and Changed Information for Firmware Release 12.5(1)SR2

No user guide updates were required for Firmware Release 12.5(1)SR2.

Firmware Release 12.5(1)SR2 replaces Firmware Release 12.5(1) and Firmware 12.5(1)SR1. Firmware Release 12.5(1) and Firmware Release 12.5(1)SR1 have been deferred in favor of Firmware Release 12.5(1)SR2.

New and Changed Information for Firmware Release 12.5(1)SR1

All references into Cisco Unified Communications Manager documentation have been updated to support all Cisco Unified Communications Manager releases.

The following table shows the changes made for Firmware Release 12.5(1)SR1.

Table 7: Cisco IP Phone 7800 User Guide Revisions for Firmware Release 12.5(1)SR1

Revision	Updated Section
Connect with Activation Code Onboarding	Connect with Activation Code Onboarding, on page 8
Cisco Headset 561 and 562 Multibase	Cisco Headset 561 and 562 with Multibase, on page 72

New and Changed Information for Firmware Release 12.5(1)

All references into Cisco Unified Communications Manager documentation have been updated to support all Cisco Unified Communications Manager releases.

The following table shows the changes made for Firmware Release 12.5(1).

Table 8: Cisco IP Phone 7800 User Guide Revisions for Firmware Release 12.5(1)

Revision	Updated Section
Whisper Paging on Cisco Unified Communications Manager Express	Intercom Calls, on page 39
Disable handset so audio path can be kept on headset	Audio Path Selection, on page 23
Cisco Headset 561 and 562	Cisco Headset 500 Series, on page 67

New and Changed Information for Firmware Release 12.1(1)SR1

No updates were required for firmware release 12.1(1)SR1.

New and Changed Information for Firmware Release 12.1(1)

The following table shows the changes made for Firmware Release 12.1(1).

Table 9: Cisco IP Phone 7800 Series User Guide Revisions for Firmware Release 12.1(1).

Revision	Updated Section
Updated for Cisco Headset 531 and Cisco Headset 532.	Cisco Headset 500 Series, on page 67

New and Changed Information for Firmware Release 12.0(1)

No updates were required for firmware release 12.0(1).

New and Changed Information for Firmware Release 11.7(1)

No user guide updates were required for firmware release 11.7(1).

New and Changed Information for Firmware Release 11.5(1)SR1

The following table shows the changes made for Firmware Release 11.5(1)SR1.

Table 10: Cisco IP Phone 7800 User Guide revisions for Firmware Release 11.5(1)SR1.

Revision	Updated Section
Updated for MLPP and Do not disturb support	Turn On Do Not Disturb, on page 28 Prioritized Calls, on page 41 Answer a Priority Call, on page 42

New and Changed Information for Firmware Release 11.5(1)

This User Guide has been streamlined and restructured to improve the customer experience.

The following table shows the changes made for Firmware Release 11.5(1).

Table 11: Cisco IP Phone 7800 User Guide revisions for Firmware Release 11.5(1).

Revision	Updated Section
Added the following section for Postpone a Phone Upgrade	Phone Firmware and Upgrades, on page 19

New and Changed Information for Firmware Release 11.0

This User Guide has been streamlined and restructured to improve the customer experience.

The following table shows the changes made for Firmware Release 11.0(1).

Table 12: Cisco IP Phone 7800 User Guide revisions for Firmware Release 11.0(1).

Revision	Updated Section
Added the following section for Problem Report Tool support	Report All Phone Issues , on page 22

Revision	Updated Section
Revised the following sections for cBarge and Barge	Shared Lines , on page 44
Revised the following sections for Do Not Disturb(DND)	Turn On Do Not Disturb , on page 28

Feature Support

This document describes all the features that the device supports. However, not all features may be supported with your current configuration. For information on supported features, contact your administrator.

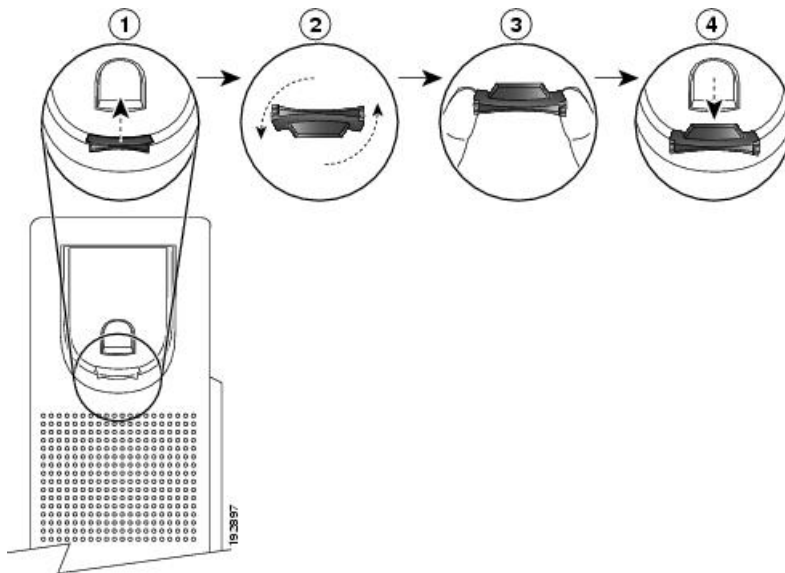
Phone Setup

Your administrator sets up your phone and connects it to the network. If your phone is not set up and connected, contact your administrator for instructions.

Adjust the Handset Rest

If your phone is wall-mounted or if the handset slips out of the cradle too easily, you may need to adjust the handset rest to ensure that the receiver does not slip out of the cradle.

Figure 2: Adjust the Handset Rest



Procedure

-
- Step 1** Remove the handset from the cradle and pull the plastic tab from the handset rest.
 - Step 2** Rotate the tab 180 degrees.

- Step 3** Hold the tab between two fingers, with the corner notches facing you.
- Step 4** Line up the tab with the slot in the cradle and press the tab evenly into the slot. An extension protrudes from the top of the rotated tab.
- Step 5** Return the handset to the handset rest.
-

Change the Viewing Angle of Your Phone

You can change the angle of the phone, except the Cisco IP Phone 7811, to eliminate glare on the screen.

Procedure

- Step 1** Unplug the phone from the network.
- Step 2** Place the phone so that the keypad faces the desktop.
- Step 3** Grasp one side of the footstand with one hand and place your other hand on the phone.
- Step 4** Hold down the phone and pull up on the footstand.
- Step 5** Turn the footstand over.
- Step 6** Push the footstand back into the phone until the stand locks into place.
- Step 7** Place the phone upright and plug it into the network.
-

Connect to the Network

You need to connect the phone to the network.

- Wired network connection—The phone is plugged into the network with an Ethernet cable.

After connecting the phone to the network, your phone may be set up for:

- Mobile and Remote Access Through Expressway—If your administrator sets up Mobile and Remote Access Through Expressway and you connect your phone to the network, it connects to the Expressway server.

Share a Network Connection with Your Phone and Computer

Both your phone and your computer must connect to your network to function. If you only have one Ethernet port, then your devices can share the network connection.

Before you begin

Your administrator must enable the PC port in Cisco Unified Communications Manager before you can use it.

Procedure

- Step 1** Connect the phone SW port to the LAN with an Ethernet cable.
 - Step 2** Connect your computer to the phone PC port with an Ethernet cable.
-

Connect with Activation Code Onboarding

If your network has been configured to support this feature, then you can use Activation Code Onboarding to connect to your company's phone network.

Enter an Activation Code

Activation codes are used to set up your new phone. They can only be used once, and expire after 1 week. Contact your administrator if you don't know your code or if you need a new one.

Procedure

- Step 1** Enter your activation code on the activation screen.
 - Step 2** Press **Submit**.
-

Connect to Expressway

You can use Mobile and Remote Access Through Expressway to connect into your corporate network when you are working away from your office. Because your phone does not have a TFTP address configured, the phone displays a Welcome screen to begin the sign-in process.

Before you begin

If you have been using your phone at the office or with a VPN, reset your service mode before you connect to Expressway.

If you need to connect to Mobile and Remote Access Through Expressway on-premise, restart your phone and press **Select** when prompted.

Procedure

- Step 1** Enter your activation code or service domain on the **Welcome** screen and press **Continue**.
 - Step 2** Enter your username and password.
 - Step 3** Press **Submit**.
-

Change the Service Mode

When your phone connects to the existing server, you hear a beep tone that exists for 5 seconds. You also view an alert message window which indicates that you can change the service mode to Huron.

Procedure

- Step 1** To change the service mode:
- Press the **Select** key on the phone.
 - Select **Settings > Admin Settings > Reset Settings > Service Mode**.
- Your phone deactivates your VPN, and then restarts.
- Step 2** Press **Reset** to change the service to Huron.
- Step 3** Press **Cancel** to retain the existing service.
-

Replace Your Existing Phone with a New Phone

You can change your phone model. The change can be required for a number of reasons, for example:

- You have updated your Cisco Unified Communications Manager (Unified CM) to a software version that doesn't support the phone model.
- You want a different phone model from their current model.
- Your phone requires repair or replacement.

Limitation: If the old phone has more lines or line buttons than the new phone, the new phone doesn't have the extra lines or line buttons configured.

The phone reboots when the configuration is complete.

Before you begin

Your administrator needs to set up Cisco Unified Communications Manager to enable the phone migration. You need a new phone that hasn't been connected to the network or previously configured.

Procedure

- Step 1** Power off the old phone.
- Step 2** Power on the new phone.
- Step 3** If prompted, enter your activation code.
- Step 4** Select **Replace an existing phone**.
- Step 5** Enter the primary extension of the old phone.
- Step 6** If the old phone had a PIN assigned, enter the PIN.
- Step 7** Press **Submit**.
- Step 8** If you have several devices, select the device to replace from the list and press **Continue**.
-

Activate and Sign In to Your Phone

You may need to activate or sign in to your phone. Activation happens once for your phone, and connects the phone to the call control system. Your administrator gives you your sign-in and activation credentials.

Sign In to Your Phone

Before you begin

Get your user ID and PIN or password from your administrator.

Procedure

- Step 1** Enter your user ID in the **User ID** field.
 - Step 2** Enter your PIN or password in the **PIN** or **Password** field, then press **Submit**.
-


Sign In to Your Extension from Another Phone

You can use Cisco Extension Mobility to sign in to a different phone in your network and have it act the same as your phone. After you sign in, the phone adopts your user profile, including your phone lines, features, established services, and web-based settings. Your administrator sets you up for the Cisco Extension Mobility service.

Before you begin

Get your user ID and PIN from your administrator.

Procedure

- Step 1** Press **Applications** .
 - Step 2** Select **Extension Mobility** (name can vary).
 - Step 3** Enter your user ID and PIN.
 - Step 4** If prompted, select a device profile.
-

Sign Out of Your Extension from Another Phone

Procedure

- Step 1** Press **Applications** .

- Step 2** Select **Extension Mobility**.
- Step 3** Press **Yes** to sign out.
-

Sign into Extension Mobility with Your Cisco Headset

You can use Cisco Extension Mobility to sign in to a different phone in your network and have it act the same as your phone. After you sign in, the phone adopts your user profile, including your phone lines, features, established services, and web-based settings. Your administrator sets you up for the Cisco Extension Mobility service.

You plug your Cisco Headset 500 Series into someone else's phone. The headsets need to use the Y-cable to access this feature.

If your headset is not mapped to your user id, the first time you perform this procedure, phone may prompt you to map the headset to your ID and the Cisco Unified Communications Manager maps the headset to your user record. The prompt depends on configuration settings for the phone. When your headset is mapped to you, the phone gets your user ID, based on the headset serial number, and displays your ID in the Extension Mobility sign in screen.



Note If the headset is upgrading or you're on a call, the association can't be made. Wait until the upgrade is finished or the call is finished before you perform this procedure.

When you unplug the headset, you are signed out of Extension Mobility after a delay unless you confirm the sign-out.

You are also automatically signed out of Extension Mobility after a predetermined inactivity time.

Before you begin

A headset firmware upgrade can't be in progress.

The phone must be idle.

Procedure

- Step 1** Plug your headset into the phone.
- Step 2** If prompted, enter your user ID and PIN to map the headset to your user information.
- Step 3** In the Extension Mobility screen, enter your user ID and PIN, and press **Submit**.
- Step 4** If prompted, select a device profile.
- Step 5** When finished, unplug your headset.
- Step 6** Press **Sign out**.
-

Related Topics

[Associate Your Headset with Your User Information](#)

Self Care Portal

You can customize some phone settings with the Self Care portal web site, which you access from your computer. The Self Care portal is part of your organization's Cisco Unified Communications Manager.

Your administrator gives you the URL to access the Self Care portal, and provides your user ID and password.

In the Self Care portal, you can control features, line settings, and phone services for your phone.

- Phone features include speed dial, do not disturb, and your personal address book.
- Line settings affect a specific phone line (directory number) on your phone. Line settings can include call forwarding, visual and audio message indicators, ring patterns, and other line-specific settings.
- Phone services can include special phone features, network data, and web-based information (such as stock quotes and movie listings). Use the Self Care Portal to subscribe to a phone service before you access it on your phone.

The following table describes some specific features that you configure with the Self Care portal. For more information, see the Self Care portal documentation for your call control system.

Table 13: Features Available on the Self Care Portal

Features	Description
Call forward	Use the number that receives calls when call forward is enabled on the phone. Use the Self Care portal to set up more complicated call forward functions, for example, when your line is busy.
Additional phones	Specify the additional phones such as your mobile phone that you want to use to make and receive calls with the same directory numbers as your desk phone. You can also define blocked and preferred contacts to restrict or allow calls from certain numbers to be sent to your mobile phone. When you set up additional phones, you can also set up these features: <ul style="list-style-type: none"> • Single number reach—Specify whether the additional phone should ring when someone calls your desk phone. • Mobile calls—If the additional phone is a mobile phone, you can set it up to allow you to transfer mobile calls to your desk phone or desk phone calls to your mobile phone.
Speed dial	Assign phone numbers to speed-dial numbers so that you can quickly call that person.

Related Topics

[Phone Calls with Mobile Connect](#), on page 45

[Speed Dial](#), on page 25

[Forward Calls](#), on page 35

Speed-Dial Numbers

When you dial a number on your phone, you enter a series of digits. When you set up a speed-dial number, the speed-dial number must contain all the digits you need to make the call. For example, if you need to dial 9 to get an outside line, you enter the number 9 and then the number you want to dial.

You can also add other dialed digits to the number. Examples of additional digits include a meeting access code, an extension, a voicemail password, an authorization code, and a billing code.

The dial string can contain the following characters:

- 0 to 9
- Pound (#)
- Asterisk (*)
- Comma (,)—This is the pause character, and gives a 2 second delay in the dialing. You can have several commas in a row. For example, two commas (,,) represent a pause of 4 seconds.

The rules for dial strings are:

- Use the comma to separate the parts of the dial string.
- An authorization code must always precede a billing code in the speed-dial string.
- A single comma is required between the authorization code and the billing code in the string.
- A speed-dial label is required for speed dials with authorization codes and additional digits.

Before you configure the speed dial, try to dial the digits manually at least once to ensure that the digit sequence is correct.

Your phone does not save the authorization code, billing code, or extra digits from the speed dial in the call history. If you press **Redial** after you connect to a speed-dial destination, the phone prompts you to enter any required authorization code, billing code, or additional digits manually.

Example

To set up a speed-dial number to call a person at a specific extension, and if you need an authorization code and billing code, consider the following requirements:

- You need to dial **9** for an outside line.
- You want to call **5556543**.
- You need to input the authorization code **1234**.
- You need to input the billing code **9876**.
- You must wait for 4 seconds.
- After the call connects, you must dial the extension **56789#**.

In this scenario, the speed-dial number is **95556543,1234,9876,,56789#**.

Related Topics

[Calls That Require a Billing Code or Authorization Code](#), on page 27

[Phone Keypad Characters](#), on page 15

Buttons and Hardware

The Cisco IP Phone 7800 Series has distinct hardware types:



- Cisco IP Phone 7811 No buttons on either side of the screen
- Cisco IP Phone 7821 Two buttons on the left side of the screen
- Cisco IP Phone 7841 Two buttons on either side of the screen
- Cisco IP Phone 7861 16 buttons at the right edge of the phone













Figure 3: Cisco IP Phone 7800 Series Buttons and Features



The following table describes the Cisco IP Phone 7800 Series buttons and hardware.

Table 14: Cisco IP Phone 7800 Series Buttons and Features

1	Handset and Handset light strip	Indicates whether you have an incoming call (flashing red) or a new voice message (steady red).
2	Programmable feature buttons and line buttons	 Access your phone lines, features, and call sessions. For more information, see Softkey, Line, and Feature Buttons, on page 16 . The Cisco IP Phone 7811 does not have programmable feature buttons or line buttons.
3	Softkey buttons	 Access functions and services. For more information, see Softkey, Line, and Feature Buttons, on page 16 .

4	Navigation cluster	Navigation ring and Select  button. Scroll through menus, highlight items, and select the highlighted item.
5	Hold/Resume, Conference, and Transfer	Hold/Resume  Place an active call on hold and resume the held call. Conference  Create a conference call. Transfer  Transfer a call.
6	Speakerphone, Mute, and Headset	Speakerphone  Toggle the speakerphone on or off. When the speakerphone is on, the button is lit. Mute  Toggle the microphone on or off. When the microphone is muted, the button is lit. Headset  Toggle the headset on. When the headset is on, the button is lit. To leave headset mode, you pick up the handset or select Speakerphone  . The Cisco IP Phone 7811 does not have a Headset button.
7	Contacts, Applications, and Messages	Contacts  Access personal and corporate directories. Applications  Access call history, user preferences, phone settings, and phone model information. Messages  Autodial your voice messaging system.
8	Volume button	 Adjust the handset, headset, and speakerphone volume (off hook) and the ringer volume(on hook).

Phone Keypad Characters

The phone keypad allows you to enter letters, numbers, and special characters. You press the **Two (2)** to **Nine (9)** keys to get the letters and numbers. You use the **One (1)**, **Zero (0)**, **Asterisk (*)**, and **Pound (#)** keys for special characters. The following table lists the special characters for each key for the English locale. Other locales will have their own characters.

Table 15: Special Characters on the Keypad

Keypad Key	Special Characters
One (1)	/ . @ : ; = ? - _ & %
Zero (0)	(space) , ! ^ ' "
Asterisk (*)	+ * ~ ` < >

Keypad Key	Special Characters
Pound (#)	# \$ £ □ \ () { } []

Navigation

Use the outer ring of the Navigation cluster to scroll through menus and to move between fields. Use the inner **Select** button of the Navigation cluster to select menu items.









If a menu item has an index number, you can enter the index number with the keypad to select the item.

Softkey, Line, and Feature Buttons

You can interact with the features on your phone in several ways:

- Softkeys, located below the screen, give you access to the function displayed on the screen above the softkey. The softkeys change depending on what you are doing at the time. The **More ...** softkey shows you that more functions are available.
- Feature and line buttons, located on either side of the screen, give you access to phone features and phone lines.
 - Feature buttons—Used for features such as **Speed dial** or **Call pickup**, and to view your status on another line.
 - Line buttons—Used to answer a call or resume a held call. When not used for an active call, used to initiate phone functions, such as the missed calls display.

Feature and line buttons illuminate to indicate status.

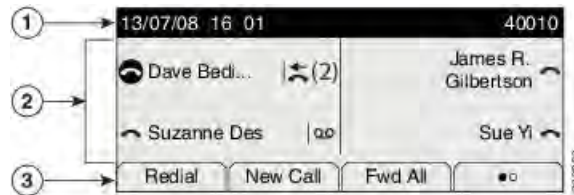
-  Green, steady LED—Active call or two-way intercom call
-  Green, flashing LED—Held call
-  Amber, steady LED—Privacy in use, one-way intercom call, or logged into a Hunt Group
-  Amber, flashing LED—Incoming call or reverting call
-  Red, steady LED—Remote line in use (shared line or Line Status) or Do Not Disturb (DND) active
-  Red, flashing LED—Remote line on hold

Your administrator can set up some functions as softkeys or as feature buttons. You can also access some functions with softkeys or the associated hard button.

Phone Screen Features

The phone screen shows information about your phone such as directory number, active call and line status, softkeys, speed dials, placed calls, and phone menu listings. The screen is made up of three sections: the header row, the middle section, and the footer row.

Figure 4: Cisco IP Phone 7800 Screen



The following table describes the Cisco IP Phone screen components.

Table 16: Cisco IP Phone Screen Information





1	At the top of the screen is the header row. The header row displays the phone number, current date and time, as well a number of icons. The icons display when features are active.
2	The middle of the phone screen displays the information associated with the line and feature buttons on the phone.
3	The bottom row of the screen contains the softkey labels. Each label indicates the action for the softkey button below the screen.


Phone Icons

Your phone screen displays many icons. This section gives images of the common icons



Icons are in color or grayscale, depending on the screen.

Lines




Icon	Description
	Line/Directory Number
	Speed dial
	Intercom
	Held call

Icon	Description
	Active call

Shared Lines

Icon	Description
	Incoming call on shared line.
	Shared line active by another user.

Recents

Icon	Description
	Incoming call
	Outgoing call
	Missed call

Clean the Phone Screen

Procedure

If your phone screen gets dirty, wipe it with a soft, dry cloth.

Caution Do not use any liquids or powders on the phone because they can contaminate the phone components and cause failures.

Differences Between Phone Calls and Lines

We use the terms *lines* and *calls* in very specific ways to explain how to use your phone.

- **Lines**—Each line corresponds to a directory number or intercom number that others can use to call you. You have as many lines as you have directory numbers and phone line icons. Depending upon how your phone is configured, you could have up to 16 lines.
- **Calls**—Each line can support multiple calls. By default, your phone supports four connected calls per line, but your administrator can adjust this number according to your needs.

Only one call can be active at any time; other calls are automatically placed on hold.

Here is an example: If you have two lines and each line supports four calls, then you could have up to eight connected calls at one time. Only one of those calls is active and the other seven are held calls.

Power Requirements

The following Cisco-approved power adaptors must be used with the Cisco IP Phone 7800 Series:

- Phihong adapter (PSC18U-480); Rating: 48 VDC 0.38A
- Delta adapter (EADP-18VB B); Rating: 48 VDC 0.375A

Phone Firmware and Upgrades

Your phone comes pre-installed with firmware that is specific to the call control system.

Occasionally, your administrator upgrades the phone firmware for you. This upgrade happens when you are not using your phone because the phone resets to use the new firmware.

Postpone a Phone Upgrade

When new firmware is available, the **Ready to upgrade** window is displayed on your phone and a timer begins a 15-second countdown. If you do nothing, the upgrade proceeds.

You can postpone your firmware upgrade for 1 hour and up to 11 times. The upgrade is also postponed if you make or receive a phone call.


Procedure

Select **Delay** to postpone a phone upgrade.

View the Progress of a Phone Firmware Upgrade

During a phone firmware upgrade, you can view the upgrade progress.

Procedure

- Step 1** Press **Applications** .
- Step 2** Select **Phone information** > **Show detail**.
- Step 3** Press **Exit**.
-

Energy Savings

Your administrator can reduce the amount of power your phone screen uses with the following options:

- Power Save—The backlight or screen turns off when the phone is inactive for a set interval.
- You can manage the backlight.
- Power Save Plus—Your phone screen turns on and off at times that are based on your work schedule. If your work hours or work days change, you can contact your administrator to reconfigure your phone.

For example, your administrator can set your phone to alert you 10 minutes before it turns off. You get a message that your phone is turning off soon and you get notifications at these intervals:

- Four rings at 10 minutes before power off
- Four rings at 7 minutes before power off
- Four rings at 4 minutes before power off
- 15 rings at 30 seconds before power off

If your phone is active, it waits until it has been inactive for a set interval before it notifies you of the pending power shutdown.

The Cisco IP Phone 7811 doesn't support Power Save or Power Save Plus.

Related Topics

[Adjust the Phone Screen Backlight](#), on page 62

Turn On Your Phone

When your phone turns off to save energy, the phone screen is blank and the **Select** button lights up.

Procedure

Press **Select** to turn your phone back on.

Additional Help and Information

If you have questions about the functions available on your phone, contact your administrator.

The Cisco website (<https://www.cisco.com>) contains more information about the phones and call control systems.

- For quick start guides and end-user guides in English, follow this link:

<https://www.cisco.com/c/en/us/support/collaboration-endpoints/unified-ip-phone-7800-series/products-user-guide-list.html>

- For guides in languages other than English, follow this link:

<https://www.cisco.com/c/en/us/support/collaboration-endpoints/unified-ip-phone-7800-series/tsd-products-support-translated-end-user-guides-list.html>

- For licensing information, follow this link:

<https://www.cisco.com/c/en/us/support/collaboration-endpoints/unified-ip-phone-7800-series/products-licensing-information-listing.html>

Accessibility Features

Cisco IP Phones provide accessibility features for the vision impaired, the blind, and the hearing and mobility impaired.

For detailed information about the accessibility features on these phones, see <http://www.cisco.com/c/en/us/support/collaboration-endpoints/unified-ip-phone-7800-series/products-technical-reference-list.html>.

You can also find more information about accessibility at this Cisco website:

<http://www.cisco.com/web/about/responsibility/accessibility/index.html>

Troubleshooting

You may experience issues related to the following scenarios:


- Your phone cannot communicate with the call control system.
- The call control system has communication or internal problems.
- Your phone has internal problems.

If you experience problems, your administrator can help troubleshoot the root cause of the problem.

Find Information About Your Phone

Your administrator may ask for information about your phone. This information uniquely identifies the phone for troubleshooting purposes.

Procedure

-
- | | |
|---------------|---|
| Step 1 | Press Applications  . |
| Step 2 | Select Phone information . |
| Step 3 | (Optional) Press Show detail to view the active load information. |
| Step 4 | Press Exit . |
-

Report Call Quality Issues

Your administrator may temporarily configure your phone with the Quality Reporting Tool (QRT) to troubleshoot performance problems. Depending on the configuration, use the QRT to:

- Immediately report an audio problem on a current call.
- Select a general problem from a list of categories and choose reason codes.


Procedure

- Step 1** Press **Report quality**.
- Step 2** Scroll and select the item that closely matches your problem.
- Step 3** Press the **Select** softkey to send the information to your system administrator.
-

Report All Phone Issues

You can use the Cisco Collaboration Problem Report Tool (PRT) to collect and send phone logs, and to report problems to your administrator. If you see a message that the PRT upload has failed, the problem report is saved on the phone and you should alert your administrator.

Procedure

- Step 1** Press **Applications** .
- Step 2** Select **Phone information** > **Report**.
- Step 3** Enter the date and time that you experienced the problem in the Date of problem and Time of problem fields.
- Step 4** Select **Problem description**.
- Step 5** Select a description from the displayed list, then press **Submit**.
-

Lost Phone Connectivity

Sometimes your phone loses its connection to the phone network. When this connection is lost, your phone displays a message.

If you are on an active call when the connection is lost, the call continues. But, you don't have access to all normal phone features because some functions require information from the call control system. For example, your softkeys might not work as you expect.

When the phone reconnects to the call control system, you'll be able to use your phone normally again.

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Special terms apply to your hardware warranty and services that you can use during the warranty period.

Your formal Warranty Statement, including the warranties and license agreements applicable to Cisco software, is available on Cisco.com at this URL: <https://www.cisco.com/go/hwwarranty>.







CHAPTER 2

Calls



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Audio Path Selection

When you make or receive a call, the audio path goes to the last device used by you, either the handset, the headset, or the speakerphone. The following list describes each scenario:

- Pick up the handset when you make or answer a call, and all of your calls are routed to your handset until you select **Headset**  or **Speakerphone** .
- Select **Headset**  when you make or answer a call, and all of your calls are routed to your headset until you pick up the handset or select **Speakerphone** .

If your administrator sets your headset as the audio path on your phone, then you can remove the handset and use your headset. This is ideal for anyone who prefers the convenience of a headset. But you must still select **Headset** the first time you handle a call.

- Select **Speakerphone**  when you make or answer a call, and all of your calls are routed to your speakerphone until you pick up the handset or select **Headset** .

Make Calls

Your phone works just like a regular phone. But we make it easier for you to make calls.

Make a Call

Use your phone just like any other phone to make a call.

Procedure

Enter a number and pick up the handset.

Make a Call with the Speakerphone

Use your speakerphone for hands-free calling. Keep in mind that your coworkers might be able to hear your call too.

Procedure

Step 1 Enter a number using the keypad.

Step 2 Press **Speakerphone** .

Make a Call with a Standard Headset

Use your headset for hands-free calling that won't disturb your coworker and gives you some privacy.

Procedure

Step 1 Plug in a headset.

Step 2 Enter a number using the keypad.

Step 3 Press **Headset** .

Redial a Number

You can call the most recently dialed phone number.

Procedure

- Step 1** (Optional) Select a line.
Step 2 Press **Redial**.
-

Speed Dial

You can assign buttons or codes to quickly dial the numbers of people you call often. Before you can use speed-dial features on your phone, set up speed dial in the Self Care portal.

Depending on your setup, your phone can support these features:

- Speed-dial buttons—Dial a phone number from one or more line buttons set up for speed dialing.
- Speed-dial codes—Dial a phone number from a code (sometimes referred to as abbreviated dialing).

Related Topics

[Self Care Portal](#), on page 12

[Speed-Dial Numbers](#), on page 13

Make a Call with a Speed-Dial Button

Each phone model has a specific number of lines available for phone features. Each feature requires one line to function so not all lines are available for speed-dial numbers. Some lines could be used for other features. If you add more speed-dial numbers than available lines, the remaining speed-dial numbers do not display on your phone.

For example, if you add 10 speed-dial numbers but your phone has 7 lines available then only 7 speed-dial numbers display on the phone.


To check which phone model you have, press **Applications**  and select **Phone information**. The **Model number** field shows your phone model.

On the Cisco IP Phone 7800 Series, you can use the navigation cluster to view all your speed-dial numbers. Use the up and down buttons in the cluster to scroll through your speed-dial numbers, then select a speed-dial number. This includes any speed-dial numbers that do not display on the phone.

Before you begin

Set up speed-dial codes in the Self Care portal.

Procedure

Press a speed-dial button .

Related Topics

[Self Care Portal](#), on page 12

Make a Call With a Speed-Dial Code

Before you begin

Set up speed-dial codes in the Self Care portal.

Procedure

Enter the speed-dial code and press **Speed Dial**.

Related Topics

[Self Care Portal](#), on page 12

Make a Call With a Fast-Dial Button

Before you begin

You need to set up the fast-dial codes in your personal directory.

Procedure

- Step 1** Press **Fast Dial**.
 - Step 2** Sign in to Personal Directory.
 - Step 3** Select **Personal Fast Dials**.
 - Step 4** Select a fast-dial code and then press the **Dial** softkey.
-

Related Topics

[Assign a Fast-Dial Code to a Contact](#), on page 51

Dial an International Number

You can dial international calls when you prefix the phone number with a plus (+) sign.

Procedure

- Step 1** Press and hold **star** (*) for at least 1 second.
The plus (+) sign is displayed as the first digit in the phone number.
 - Step 2** Enter the phone number.
 - Step 3** Press **Call** or wait 10 seconds after the last key press to automatically place the call.
-

Get Notified When a Contact is Available

If you call someone and their line is busy or they do not answer, you can be notified with a special ringtone and a message when they are available.

Procedure

- Step 1** Press **Callback** while you are listening to the busy tone or ring sound.
 - Step 2** Press **Exit** to exit the confirmation screen.
 - Step 3** When you hear the ringtone that the person is available and see the message, press **Call** to place the call again.
-

Calls That Require a Billing Code or Authorization Code

Your administrator may require that you enter a billing code or authorization code (or both codes) after you dial a phone number. The billing code, called a Client Matter Code, is used for accounting or billing purposes. The authorization code, called a Forced Authorization Code, controls access to certain phone numbers.

When a billing code is required, the phone displays `Enter Client Matter Code`, the dialed number changes to “*****”, and you hear a special tone.

When an authorization code is required, the phone displays `Enter Authorization Code`, the dialed number changes to “*****”, and you hear a special tone. For security reasons, the phone displays a “*” instead of the number entered.

When both a billing code and an authorization code are required, you are prompted for the authorization code first. Then you are prompted for the billing code.

Related Topics

[Speed-Dial Numbers](#), on page 13

Secure Calls

Your administrator can take steps to protect your calls from tampering by people outside your company. When a lock icon is displayed on your phone during a call, your phone call is secure. Depending upon how your phone is configured, you may have to sign on before you make a call or before a security tone plays over your handset.

Answer Calls

Your Cisco phone works just like a regular phone. But we make it easier for you to answer calls.

Answer a Call

Procedure

When your phone rings, press the flashing line button to answer the call.

Answer Call Waiting

When you are on an active call, you know that a call is waiting when you hear a single beep and see the line button flash.

The Cisco IP Phone 7811 doesn't support call waiting.

Procedure

Step 1 Press the line button.

Step 2 (Optional) If you have more than one call waiting, select an incoming call.

Decline a Call

You can send a ringing call to your voicemail system (if configured) or to a preset phone number. If not set up, the call is rejected and the caller hears a busy tone.

Procedure

Decline a call by performing one of the following actions:

- Press **Decline**.
 - If you have multiple incoming calls, highlight the incoming call and press **Decline**.
-

Turn On Do Not Disturb

Use do not disturb (DND) to silence your phone and ignore incoming call notifications when you need to avoid distractions.

When you turn on DND, your incoming calls are forwarded to another number, such as your voicemail, if it is set up.

When you turn on DND, it affects all lines on your phone. However, you will always receive intercom and emergency calls, even when DND is turned on.

If multilevel precedence and preemption (MLPP) is set up for your phone, priority calls will ring your phone with a special ringtone, even when DND is turned on.

Procedure

- Step 1** Press **Do not disturb** to turn on DND.
- Step 2** Press **Do not disturb** again to turn off DND.
-

Related Topics

[Self Care Portal](#), on page 12

Answer a Coworker's Phone (Call Pickup)

If you share call handling tasks with your coworkers, you can answer a call that is ringing on a coworker's phone. First, your administrator has to assign you to at least one call pickup group.

Answer a Call Within Your Group (Pickup)

You can answer a call that rings on another phone within your call pickup group. If multiple calls are available for pickup, you'll answer the call that has been ringing for the longest time.

Procedure

- Step 1** (Optional) Press the line button.
- Step 2** Press **PickUp** to transfer an incoming call within your pickup group to your phone.
- Step 3** Press **Answer** to connect to the call when the call rings.
-

Answer a Call from Another Group (Group Pickup)

Group pickup allows you to answer a call on a phone that is outside your call pickup group. You can use the group pickup number to pick up the call, or you can use the number of the phone line that is ringing.

Procedure

- Step 1** (Optional) Press the line button.
- Step 2** Press **Group PickUp**.
- Step 3** Do one of the following actions:
- Enter the number of the phone line with the call that you want to pick up.
For example, if the call is ringing on line 12345, enter **12345**.
 - Enter the group pickup number.

- Step 4** Press **Answer** to connect to the call when the call rings.
-

Answer a Call From an Associated Group (Other Pickup)

Procedure

- Step 1** (Optional) Press the line button.
- Step 2** Press **PickUp** to answer a call in your pickup group or in a group that is associated with your phone.
- Step 3** If the call rings, press **Answer** to connect to the call when the call rings.
-

Answer a Call Within Your Hunt Group

Hunt groups allow organizations that receive many incoming calls to share the call load. Your administrator sets up a hunt group with a series of directory numbers. Phones ring based on the hunt sequence that your administrator specifies for a hunt group. If you are a member of a hunt group, you sign into a hunt group when you want to receive calls. You sign out of the group when you don't want calls to ring on your phone.

The feature configuration determines if you see your hunt group name or pilot number displayed on your Incoming Call Alert.

Before you begin

You must be signed into the hunt group to receive hunt group calls.

Procedure

When a hunt group call rings on your phone, answer the call.

Sign In and Out of a Hunt Group

Sign out of your hunt group to stop receiving calls from it. You continue receiving calls placed directly to you.

Procedure

- Step 1** Press **Hunt Group** to sign in.
- Step 2** Press **Hunt Group** again to sign out.
-

View the Call Queue in a Hunt Group

You can use the queue statistics to check the status of the hunt group queue. The queue status display provides the following information:

- The phone number used by the hunt group
- Number of queued callers on each hunt group queue
- Longest waiting time

Procedure

- Step 1** Press **Queue Status**.
- Step 2** Press **Update** to refresh the statistics.
- Step 3** Press **Exit**.
-

Answer Calls Automatically


If your phone is set up to answer calls automatically, you don't do anything when your phone rings. After one ring, you're automatically connected to the call using the speakerphone.

If you prefer to use your headset to answer the call, set up your headset first.

The Cisco IP Phone 7811 doesn't support a headset.

If you automatically answer calls on your speakerphone and you change the call to the headset, your next incoming call automatically answers on the headset. If you automatically answer calls on your headset and you change the call to the speakerphone, your next incoming call automatically rings on the speakerphone. Automatic answer ensures that the call is answered; it does not change the location that you used for the previous call.

Procedure

- Step 1** Connect your headset to your phone.
- Step 2** Make sure that the **Headset** button  lights up.
- Step 3** When your phone automatically answers the incoming call, talk to the caller using your headset.
- If you don't want to use your headset anymore, then pick up the handset and you will leave headset mode.
-

Trace a Suspicious Call

If you receive unwanted or harassing calls, use malicious call identification (MCID) to alert your administrator. Your phone sends a silent notification message to your administrator with information about the call.

Procedure

Press **MCID**.

Mute Your Call

While you are on a call, you can mute the audio, so that you can hear the other person, but they cannot hear you.

Procedure


-
- Step 1** Press **Mute** .
- Step 2** Press **Mute** again to turn mute off.
-

Hold Calls

Put a Call on Hold

You can put an active call on hold and then resume the call when you're ready.

Procedure

-
- Step 1** Press **Hold** .
- Step 2** To resume a call from hold, press **Hold** again.
-

Answer a Call Left on Hold for Too Long

When you've left a call on hold too long, you'll be notified with these cues:

- Single ring, repeating at intervals
- Flashing amber line button
- Flashing message indicator on the handset
- Visual notification on the phone screen

Procedure

Press the flashing amber line button or **Answer** to resume the held call.

Swap Between Active and Held Calls

You can easily switch between active and held calls.

Procedure

Press **Swap** to switch to the held call.

Swap Between Active and Held Calls on the Cisco IP Phone 7811

The Cisco IP Phone 7811 does not have line buttons. If you have a held call and an active call, you see the **Swap** softkey. If you have more than two calls, you see the **Calls** softkey.

Procedure

Press **Swap** or **Calls**.

Call Park

You can use your phone to park a call. You can then retrieve the call either from your phone or another phone, such as a phone at a coworker's desk or in a conference room.

There are two ways you can park a call: call park and directed call park. You'll only have one type of call park available on your phone.

A parked call is monitored by your network so you won't forget about it. If the call remains parked for too long, you hear an alert. You can then answer, decline to answer, or ignore the call on your original phone. You can also continue retrieving it from another phone.

If you don't answer the call within a certain length of time, it's routed to voicemail or another destination, as set by your administrator.

Place a Call on Hold with Call Park

You can park an active call that you answered on your phone and then use another phone in the call control system to retrieve the call.

You can park only one call at the call park number.

Before you begin

Your call must be active.

Procedure

- Step 1** Press **Park**, and then hang up.
- Step 2** (Optional) Communicate the parked number to the person who needs to answer the call.
-

Retrieve a Call on Hold with Call Park

You can set up call park in two different ways:

- The parked call displays on the phone where the user can pick it up.
- The user must dial the displayed number to pick up the call.

You set the field **Dedicate one line for Call Park** in Cisco Unified Communications Manager to enable or disable the feature. By default, the feature is enabled.

Before you begin

You need the number that was used to park the call.

Procedure

Enter the number where the call is parked and retrieve the call.

Place a Call on Hold with Assisted Directed Call Park

You can park and retrieve an active call using a dedicated call park number. Using assisted directed call park, you use a button to park an active call. Your administrator sets up the button as a speed-dial line. With this type of directed call, you can use line status indicators to monitor the status of the line (in-use or idle).

Procedure

Press **BLF Directed Call Park** on a line that displays an idle line status indicator for an assisted directed call park.

Retrieve a Call on Hold with Assisted Directed Call Park


Procedure

Press **BLF Directed Call Park**.

Place a Call on Hold with Manual Directed Call Park

You can park and retrieve an active call using a dedicated call park number. Using manual directed call park, you transfer an active call to a directed call park number, which your administrator sets up.

Procedure

- Step 1** Press **Transfer** .
- Step 2** Required: Enter the directed call park number.
- Step 3** Required: Press **Transfer** again to park the call.
-

Retrieve a Call on Hold with Manual Directed Call Park

You can pick up a call that was parked to a dedicated call park number.

Before you begin

You need the directed call park number and the park retrieval prefix.

Procedure


- Step 1** Dial the park retrieval prefix.
- Step 2** Dial the directed call park number.
-

Forward Calls

You can forward calls from any line on your phone to another number. Call forward is phone-line specific. If a call reaches you on a line where call forwarding is not enabled, the call rings as usual.

There are two ways of forwarding your calls:

- Forward all calls
- Forward calls in special situations, such as when the phone is busy or there is no answer.

When a line is forwarded, you see the Forward all  icon with the line.

Procedure

- Step 1** When the line to be forwarded is inactive, press **Fwd All**.
- Step 2** Enter the call forward target number exactly as you would dial it from your phone, or select an entry from your list of recent calls.
-

Related Topics

[Self Care Portal](#), on page 12

Transfer Calls

You can transfer an active call to another person.

Transfer a Call to Voicemail



You can transfer a call directly to your manager's or to a coworker's voicemail. This is a convenient way for a caller to leave a message but not disturb anyone in the office.

Before you begin

Your administrator must set up your phone system so that the * prefix before an extension means forward a call directly to voicemail.

Know your coworker's extension.

Procedure


- Step 1** Press **Transfer** 
- Step 2** Enter * followed by the person's extension.
- Step 3** Press **Transfer** 
-

Transfer a Call to Another Person

When you transfer a call, you can stay on the original call until the other person answers. This way, you can talk privately with the other person before you remove yourself from the call. If you don't want to talk, transfer the call before the other person answers.

You can also swap between both callers to consult with them individually before you remove yourself from the call.

Procedure

- Step 1** From a call that is not on hold, press **Transfer** .
 - Step 2** Enter the other person's phone number.
 - Step 3** (Optional) Wait until you hear the line ring or until the other person answers the call.
 - Step 4** Press **Transfer** again.
-


Consult Before You Complete a Transfer

Before you transfer a call, you can talk to the person that you're transferring the call to. You can also swap between that call and the call that you're transferring, before you complete the transfer.

Before you begin

You have an active call that needs to be transferred.

Procedure

- Step 1** Press **Transfer** .
 - Step 2** Enter the other person's phone number.
 - Step 3** Press **Swap** to return to the held call.
 - Step 4** Press **Transfer** to complete the transfer.
-

Conference Calls and Meetings


You can talk with several people in a single call. You can dial another person and add them to the call. If you have multiple phone lines, you can join two calls across two lines.

When you add more than one person to a conference call, wait a few seconds between adding participants.

As the conference host, you can remove individual participants from the conference. The conference ends when all participants hang up.

Add Another Person to a Call (7811)


Procedure

- Step 1** From an active call, press **Conference** .
- Step 2** Add the other person to the call by doing one of the following:

- Press **Calls**, select a held call, and press **Yes**.
 - Enter a phone number and press **Conference**
-

Add Another Person to a Call (7821, 7841, 7861)

Procedure

- Step 1** From an active call, press **Conference** .
- Step 2** Add the other person to the call by doing one of the following:
- Select a held call and press **Yes**.
 - Enter a phone number and press **Conference**.
-

Swap Between Calls Before You Complete a Conference

You can talk to a person before you add them to a conference. You can also swap between the conference call and the call with the other person.

Procedure

- Step 1** Call a new conference participant, but do not add the participant to the conference.
Wait until the call is connected.
- Step 2** Press **Swap** to toggle between the participant and the conference.
-

View and Remove Conference Participants

If you create a conference, you can view the details of the last 16 participants who join the conference. You can also remove participants.

Procedure

- Step 1** While you are in a conference, press **Details** to view a list of participants.
- Step 2** (Optional) Highlight a participant and press **Remove** to drop the participant from the conference.
-

Scheduled Conference Calls (Meet Me)

You can host or join a conference call at a scheduled time.

The conference call does not start until the host dials in, and it ends when all participants hang up. The conference does not automatically end when the host hangs up.

Host a Meet-Me Conference

Before you begin

Get a meet-me phone number from your administrator, and distribute the number to the conference participants.

Procedure

- Step 1** Lift the handset to get a dial tone and press **Meet Me**.
- Step 2** Dial the meet-me phone number.
-

Join a Meet-Me Conference

You cannot join a meet-me conference until the conference hosts dials in. If you hear a busy tone, the host has not dialed into the conference. Hang up and try your call again.

Procedure

Dial the meet-me phone number that the conference host provides.

Intercom Calls

You can use an intercom line to place and receive one-way calls.



Note Cisco IP Phone 7811 does not support intercom.

When you place an intercom call, the recipient's phone answers the call automatically with mute activated (whisper mode). Your message is broadcast through the recipient's speakerphone, headset, or handset, if one of these devices is active.

After receiving the intercom call, the recipient can start two-way audio (connected mode) to allow for further conversation.

Make an Intercom Call

When you place an intercom call, your phone enters whisper mode until the recipient accepts the intercom call. In whisper mode, the other person can hear you, but you can't hear them. If you are on an active call, that call is placed on hold.

Procedure

- Step 1** Press **Intercom**.
 - Step 2** (Optional) Enter the intercom code.
 - Step 3** Listen for the intercom alert tone, and then begin speaking.
 - Step 4** Press **Intercom** to end the call.
-

Answer an Intercom Call

You can answer an intercom call to talk to the other person.

Before you begin

You receive a message on your phone screen, and an audible alert. Your phone answers the intercom call in whisper mode.

Procedure

- Step 1** Press **Intercom** to switch to connected mode. In connected mode, you can speak to the intercom caller.
 - Step 2** Press **Intercom** to end the call.
-

Supervise and Record Calls

You can supervise and record a call. But you must have a minimum of three people on a line: the person calling, the chaperone, and the person called.

The chaperone answers a call, creates a conference call, and monitors and records the conversation.


The chaperone performs the following tasks:

- Records the call.
- Conferences in the first participant only. Other participants add people as needed.
- Ends the call.

The conference ends when the chaperone hangs up the call.

Set Up a Supervised Call

Procedure

- Step 1** Answer an incoming call.
Record is displayed if the system determines that the call must be chaperoned and recorded.
- Step 2** Press **Conference**  to create a conference call.
- Step 3** Enter the phone number for the supervisor and press **Call**.
- Step 4** Press **Conference** when the supervisor answers.
- Step 5** Press **End Call** to end the call.
-

Record a Call

You can record a call. You might hear a notification tone as you record the call.

Procedure

Press **Record** to start or stop recording.

Prioritized Calls

In your job, you might need to handle urgent or critical situations with your phone. You can identify calls as very important; these have a higher priority than normal calls. The priorities range from level 1 (low) to level 5 (high). This system of priorities is called multilevel precedence and preemption (MLPP).

Your administrator sets up the priorities that you can use and determines whether you need special sign-in information.

When a high-priority call rings on your phone, you see the priority level on the phone screen and the call appears at the top of the call list. If you are on a call when a high-priority call comes to your phone, the high-priority call preempts the current call and you hear a special preemption ringtone. You should hang up from your current call to answer the high-priority call.






If you have turned on do not disturb (DND), a priority call will still ring your phone with a special ringtone.

When you are on a high-priority call, the priority of the call does not change when you:

- Put the call on hold
- Transfer the call
- Add the call to a three-way conference
- Use call pickup to answer the call.

The following table describes the Multilevel Precedence and Preemption Priority icons and the corresponding level.

Table 17: Multilevel Precedence and Preemption Priority Levels

MLPP icon	Priority Level
	Level 1—Priority call
	Level 2—Medium priority (Immediate) call
	Level 3—High priority (Flash) call
	Level 4—Flash Override
	Level 5—Executive Override

Make a Priority Call

To make a priority call, you might need to sign in with your special credentials. You have three chances to enter these credentials, and you're notified if you've entered them incorrectly.

Procedure

- Step 1** Pick up the handset.
 - Step 2** Press **PrecLevel**.
 - Step 3** Select a priority level for the call.
 - Step 4** (Optional) Enter your credentials on the authorization screen.
 - Step 5** Enter the destination number.
You see the precedence level icon on the phone screen and you hear the precedence ringback tone.
-

Answer a Priority Call

If you hear a special ring that's faster than usual, you are receiving a priority call.

Procedure

Press the flashing amber session button when you hear the special ringtone for a precedence call.

Answer a Priority Call While on Another Call

If you hear a continuous tone that interrupts your call, you or your coworker are receiving a priority call. Hang up immediately and let the higher priority call go to the intended person.

Procedure

Hang up the handset.

Your call ends, and the higher priority call rings on the appropriate phone.

Multiple Lines

If you share phone numbers with other people, you could have multiple lines on your phone. When you have multiple lines, you have more calling features available to you.

View All Calls on Your Primary Line

You can have a list of current and missed calls display on your primary line.

Use this feature if you have multiple lines and want to see all your calls—on all lines—displayed on a single screen. You can still filter for a specific line.

Your administrator sets up this feature.

Answer the Oldest Call First

You can answer the oldest call available on all your phone lines, including Hold Reversion and Park Reversion calls that are in an alerting state. Incoming calls always have priority over Held or Park Reversion calls.

When working with multiple lines, you typically press the line button for the incoming call you want to answer. If you just want to answer the oldest call regardless of line, press **Answer**.

View All Calls on Your Phone

You can view a list of all your active calls—from all your phone lines—sorted in chronological order, oldest to newest.

The list of all calls is useful if you have multiple lines or if you share lines with other users. The list displays all your calls together.

You can also display your active calls on your primary line, which is useful if you want all your calls displayed on a single screen.

Procedure

Press **All Calls** or the session button for your primary line.

Shared Lines

You can share a single phone number with one or more of your coworkers. For example, as an administrative assistant, you may be responsible for screening calls for the person you support.

When you share a phone number, you can use that phone line just like any other line. Be aware of these special characteristics about shared lines:

- The shared phone number appears on all phones that share the number.
- If your coworker answers the call, the shared line button and the session button are solid red on your phone.
- If you put a call on hold, your line button is solid green and the session button pulses green. But your coworker's line button is solid red and the session button pulses red.

Add Yourself to a Call on a Shared Line

You or your coworker can join a call on the shared line. Your administrator needs to enable the feature on your phone.

If you try to add yourself to a call on a shared line and see a message that you cannot be added, try again.

If a user with whom you share a line has privacy turned on, you can't see their line settings and you can't add yourself to their call.

Procedure

Step 1 Press the line button for the shared line or select the line and press **Barge**.

You need to press **Calls** to add yourself to a call on a shared line.

Step 2 (Optional) If you see a confirmation message, press **Yes** to add yourself to the call.

Enable Privacy on a Shared Line

Privacy prevents others who share your line from seeing information about your calls.

Privacy applies to all shared lines on your phone. If you have multiple shared lines and privacy is enabled, others cannot view any of your shared lines.

If the phone that shares your line has privacy enabled, you can make and receive calls using the shared line as usual.

Visual confirmation is displayed on your phone screen for as long as the feature is enabled.

Procedure

- Step 1** Press **Privacy** to enable the feature.
- Step 2** Press **Privacy** again to turn off the feature.
-

Phone Calls with Mobile Connect

You can use your mobile phone to handle calls that are associated with your desk phone number. This service is called Mobile Connect.

You associate your mobile phone with your desk phone in the Self Care portal, as an additional phone. You can control which calls are sent to your mobile phone.

When you enable additional phones:

- Your desk phone and your additional phones receive calls simultaneously.
- When you answer the call on your desk phone, the additional phones stop ringing, disconnect, and display a missed call message.
- When you answer the call on one additional phone, the other additional phones and desk phone stop ringing and disconnect. A missed call message shows on the other additional phones.
- You can answer the call on an additional phone and switch the call to a desk phone that shares the line. If you do so, the desk phones that share the same line display a `Remote In Use` message.

Related Topics

[Self Care Portal](#), on page 12

Enable Mobile Connect

Procedure

- Step 1** Press **Mobility** to display the current remote destination status (Enabled or Disabled).
- Step 2** Press **Select** to change the status.
-

Move a Call from Your Desk Phone to Your Mobile Phone

You can move a call from your desk phone to your mobile phone. The call is still connected to the line on your desk phone, so you cannot use that line for other calls. The line remains in use until the call ends.

Before you begin

You need to enable Mobile Connect on your desk phone.

Procedure

- Step 1** Press **Mobility**.
 - Step 2** Press **Select** to send a call to your mobile phone.
 - Step 3** Answer the active call on your mobile phone.
-

Move a Call from Your Mobile Phone to Your Desk Phone

You can move a call from your mobile phone to your desk phone. The call is still connected to your mobile phone.

Before you begin

You need to enable Mobile Connect on your desk phone.

Procedure

- Step 1** Hang up the call on your mobile phone to disconnect the mobile phone, but not the call.
 - Step 2** Press the line on your desk phone within 5 to 10 seconds to resume the call on your desk phone.
-

Transfer a Call from Your Mobile Phone to Your Desk Phone

You can transfer a call from your mobile phone to your desk phone.

Before you begin

You need to enable Mobile Connect on your desk phone.

Get the access code from your administrator.

Procedure

- Step 1** On the mobile phone, enter the access code for the hand-off feature.
 - Step 2** Hang up the call on your mobile phone to disconnect the mobile phone, but not the call.
 - Step 3** Press **Answer** on your desk phone within 10 seconds and start talking on the desk phone.
-

Voicemail

You can access your voice messages directly from your phone. Your administrator must set up your voicemail account and set up your phone before you can access the voicemail system.

The **Messages** button on your phone acts as a speed dial into the voicemail system.

When you aren't at your desk, you can call your voicemail system to access your voicemail. Your administrator can give you the external phone number of the voicemail system.



Note This document has limited voicemail information because voicemail is not part of your phone. It is a separate component with a server and firmware that are purchased by your company. For information on setting up and using your voicemail, see the *User Guide for the Cisco Unity Connection Phone Interface* at <https://www.cisco.com/c/en/us/support/unified-communications/unity-connection/products-user-guide-list.html>.

Voicemail Message Indication

To find out if you have new voicemail messages, look for one of these signs:

- The light strip on your handset is solid red.
- The number of missed calls and voicemail messages is displayed on your screen. If you have more than 99 new messages, a plus (+) sign is displayed.

You will also hear a stutter tone played from your handset, headset, or speakerphone when you use a phone line. This stutter tone is line-specific. You only hear it when you use a line that has voice messages.

Related Topics

[Self Care Portal](#), on page 12


Access Your Voicemail Messages

You can check your current voicemail messages or listen to your old messages again.

Before you begin

Each voicemail system is different so check with your administrator or IT department to find out which system your company uses. This section is for Cisco Unity Connection because most Cisco customers use that product for their voicemail system. But your company may use a different product.

Procedure

-
- Step 1** Press **Messages** .
- Step 2** Follow the voice prompts.
-

Access Audio Voicemail

Depending upon how your administrator has set up your phone, you can retrieve your voicemail without viewing a list of messages. This option is useful if you prefer a list of voicemail messages, but you occasionally access your messages without the visual prompts.

Procedure

- Step 1** In the screen, press the **Audio** softkey.
- Step 2** When prompted, enter your voicemail credentials.
-



CHAPTER 3

Contacts


- [Corporate Directory](#), on page 49
- [Personal Directory](#), on page 49
- [Cisco Web Dialer](#), on page 53

Corporate Directory

You can look up a coworker's number from your phone, which makes it easier to give them a call. Your administrator sets up and maintains the directory.

Dial a Contact in the Corporate Directory

Procedure

- Step 1** Press **Contacts** .
 - Step 2** Select **Corporate Directory**.
 - Step 3** Select a search criteria.
 - Step 4** Enter your search criteria and press **Submit**.
 - Step 5** Select the contact and press **Dial**.
-

Personal Directory

Use the personal directory to store the contact information for friends, family, or coworkers. You can add your own contacts to the personal directory. You can add special speed-dial codes for people who you often call.

You can set up your personal directory from your phone or from the Self Care portal. Use your phone to assign speed-dial codes to the directory entries.

Related Topics


[Self Care Portal](#), on page 12

Sign In and Out of a Personal Directory

Before you begin


Before you can sign in to your personal directory, you need your user ID and PIN. Contact your administrator if you don't know this information.

Procedure

- Step 1** Press **Contacts** .
 - Step 2** Select **Personal directory**.
 - Step 3** Enter your user ID and PIN, and press **Submit**.
 - Step 4** To sign out, select **Log out**, press **Select**, and then press **OK**.
-


Add a New Contact to Your Personal Directory

Procedure

- Step 1** Press **Contacts** .
 - Step 2** Sign in to your personal directory.
 - Step 3** Select **Personal Address Book** and press **Submit**.
 - Step 4** Press **New**.
 - Step 5** Enter first name, last name, and optionally a nickname.
 - Step 6** Press **Phones**, enter the phone number along with any required access codes, and then press **Submit**.
-


Search for a Contact in Your Personal Directory

Procedure

- Step 1** Press **Contacts** .
 - Step 2** Sign in to your personal directory.
 - Step 3** Select **Personal Address Book**.
 - Step 4** Select a search criteria.
 - Step 5** Enter your search criteria and press **Submit**.
-

Call a Contact in Your Personal Directory


Procedure

- Step 1** Press **Contacts** .
 - Step 2** Sign in to your personal directory.
 - Step 3** Select your **Personal directory** and search for an entry.
 - Step 4** Select the personal address book entry that you want to dial.
 - Step 5** Select the required fast-dial code and press **Dial**.
-

Assign a Fast-Dial Code to a Contact


A fast-dial code makes it easier to call a contact.

Procedure

- Step 1** Press **Contacts** .
 - Step 2** Sign in to your personal directory.
 - Step 3** Select **Personal Address Book**.
 - Step 4** Select a search criteria.
 - Step 5** Enter the search criteria information and press **Submit**.
 - Step 6** Select the contact.
 - Step 7** Press **FastDial**.
 - Step 8** Select a number and press **Select**.
 - Step 9** Scroll to an unassigned fast-dial index and press **Submit**.
-


Call a Contact with a Fast-Dial Code

Procedure

- Step 1** Press **Contacts** .
 - Step 2** Sign in to your personal directory.
 - Step 3** Select **Personal Fast Dials** and scroll to a fast-dial code.
 - Step 4** Select the required fast-dial code and press **Dial**.
-


Edit a Contact in Your Personal Directory

Procedure

- Step 1** Press **Contacts** .
 - Step 2** Sign in to your Personal directory.
 - Step 3** Select **Personal address book** and search for an entry.
 - Step 4** Press **Select**, then **Edit**.
 - Step 5** Modify the entry information.
 - Step 6** Press **Phones** to modify a phone number.
 - Step 7** Press **Update**.
-


Remove a Contact from Your Personal Directory

Procedure

- Step 1** Press **Contacts** .
 - Step 2** Sign in to your personal directory.
 - Step 3** Select **Personal Address Book** and search for an entry.
 - Step 4** Press **Select**, then **Edit**, then **Delete**.
 - Step 5** Press **OK** to confirm the deletion.
-

Delete a Fast-Dial Code

Procedure

- Step 1** Press **Contacts** .
 - Step 2** Sign in to your personal directory.
 - Step 3** Select **Personal Fast Dials** and search for a fast-dial code.
 - Step 4** Select the required code and press **Remove**.
 - Step 5** Select the index and press **Remove**.
-

Cisco Web Dialer

You can use Cisco Web Dialer, a web browser, and your Cisco IP phone to make calls from web and desktop applications. Use your web browser and go to a website or your company directory, and then click a hyperlinked phone number to begin your call.

You need a user ID and password to make a call. Your administrator can give you this information. First-time users have to configure their preferences before a call.

For more information, see the “Cisco Web Dialer” document in <https://www.cisco.com/c/en/us/support/unified-communications/unified-communications-manager-callmanager/products-installation-and-configuration-guides-list.html>



CHAPTER 4

Recent Calls

- [Recent Calls List, on page 55](#)
- [View Your Recent Calls, on page 55](#)
- [Return a Recent Call, on page 56](#)
- [Clear the Recent Calls List, on page 56](#)
- [Delete a Call Record , on page 56](#)

Recent Calls List

Use the Recents list to see the 150 most recent individual calls and call groups.

If your Recents list reaches the maximum size, the next new entry overwrites the oldest entry in the list.

Calls in the Recents list are grouped if they are to and from the same number and are consecutive. Missed calls from the same number also get grouped.

- If your phone is part of a broadcast hunt group, calls picked up by other members of the hunt group display in your call history as a Received call.

View Your Recent Calls

Check to see who's called you recently.

Procedure

Step 1 Press **Applications** .

Step 2 Select **Recents**.


When the phone is in the idle state, you can also view the Recent calls list by pressing the Navigation cluster up.

Step 3 If you have more than one line, select a line to view.

Return a Recent Call

You can easily call someone who has called you.


Procedure

- Step 1** Press **Applications** .
 - Step 2** Select **Recents**.
 - Step 3** (Optional) Select the required line.
 - Step 4** Select the number that you want to dial.
 - Step 5** (Optional) Press **EditDial** to edit the number.
 - Step 6** Press **Call**.
-

Clear the Recent Calls List

You can clear the Recents list on your phone.


Procedure

- Step 1** Press **Applications** .
 - Step 2** Select **Recents**.
 - Step 3** (Optional) Select the required line.
 - Step 4** Press **Clear**.
 - Step 5** Press **Delete**.
-

Delete a Call Record

You can edit Recents to remove a single call from your history. This helps preserve important contact information because Recents holds only 150 calls.

Procedure

- Step 1** Press **Applications** .
- Step 2** Select **Recents**.
- Step 3** (Optional) Select the required line.
- Step 4** Highlight the individual record or call group that you want to delete.

- Step 5** Press **Delete**.
- Step 6** Press **Delete** again to confirm.
-



CHAPTER 5

Applications

- [Available Applications](#), on page 59
- [View Active Applications](#), on page 59
- [Switch to Active Applications](#), on page 59
- [Close Active Applications](#), on page 60


Available Applications

Cisco phones don't include these applications by default. But your company might have added applications such as the weather, stock information, company news, to-do lists, or similar information and services.

View Active Applications

You can easily see what applications you already have open.

Procedure

- Step 1** Press **Applications** .
 - Step 2** Select **Running applications**.
 - Step 3** Press **Exit**.
-

Switch to Active Applications


Procedure

- Step 1** Press **Applications** .
- Step 2** Select **Running applications**.
- Step 3** Select a running application and press **Switch to** to open and use the selected application.

Step 4 Press **Exit**.

Close Active Applications

Procedure

- Step 1** Press **Applications** .
- Step 2** Select **Running applications**.
- Step 3** Select a running application and press **Close app** to close the application.
- Step 4** Press **Close**, then press **Exit**.
-



CHAPTER 6

Settings

- [Settings Menu](#), on page 61
- [Adjust the Volume During a Call](#), on page 63
- [Adjust the Phone Ringer Volume](#), on page 63
- [Phone Display Language](#), on page 63


Settings Menu

You can control some attributes and features on your phone from the **Settings** menu.

Change the Ringtone

You can change the sound that your phone uses for incoming calls.

Procedure


- Step 1** Press **Applications** .
 - Step 2** Select **Settings** > **Ringtone**.
 - Step 3** Select a line.
 - Step 4** Scroll through the list of ringtones and press **Play** to hear a sample.
 - Step 5** Press **Set** to use the ringtone.
-

Adjust the Contrast

You can change the contrast of your phone screen to make the screen easier to read.

To check which phone model you have, press **Applications**  and select **Phone information**. The **Model number** field shows your phone model.

Procedure

- Step 1** Press **Applications** .
 - Step 2** Select **Settings** > **Contrast**.
 - Step 3** Select **Contrast**.
 - Step 4** Enter a number between 1-10.
 - Step 5** Press **Save** to set the contrast.
-

Adjust the Phone Screen Backlight

You can adjust the backlight to make the phone screen easier to read.

Backlights are not supported on the Cisco IP Phone 7811.

Procedure


- Step 1** Press **Applications** .
 - Step 2** Choose **Preferences** > **Backlight**.
 - Step 3** Press **On** to turn the backlight on or press **Off** to turn the backlight off.
 - Step 4** Press  to exit.
-

Turn Off the Select Key LED for Energy Save Mode

You can turn off the **Select** button LED when in Power Save mode. This reduces visual distractions in your workplace.

The **Select** button is in the middle of the Navigation cluster on your phone. The **Select** button LED is on by default when you are in Power save mode.

Procedure

- Step 1** Press **Applications** .
 - Step 2** Choose **Settings** > **Power save indicator**.
 - Step 3** Press **Off** to turn off the LED.
 - Step 4** At the warning window, press **Ok**.
-

Adjust the Volume During a Call

If the sound in your handset, headset, or speakerphone is too loud or too soft, you can change the volume while you are listening to the other person. When you change the volume during a call, the change only affects the speaker you're using at the time. For example, if you adjust the volume while you're using a headset, the handset volume doesn't change.

Procedure



Press **Volume** up and down to adjust the volume while you are on a call.

Adjust the Phone Ringer Volume

If your phone ringer is too loud or too soft when you get an incoming call, you can change the ringer volume. Changes to the ringer volume do not affect the call volume you hear when you are on a call.

Procedure



Press **Volume** up and down to adjust the ringer volume when the phone rings.

Phone Display Language

Your phone can display text in many languages. Your administrator sets the language the phone uses. If you want the language changed, contact your administrator.



CHAPTER 7

Accessories

- [Supported Accessories, on page 65](#)
- [View the Accessories Associated with Your Phone, on page 66](#)
- [Check Your Phone Model, on page 66](#)
- [Headsets, on page 66](#)
- [Silicone Covers, on page 83](#)

Supported Accessories

You can use your phone with different types of accessories, such as headsets, microphones, and speakers. This table shows you which ones you can use with your particular phone.

To check which phone model you have, press **Applications**  and select **Phone information**. The **Model number** field shows your phone model.

When you add features to your phone, some features require a line button. But each line button on your phone can support only one function (a line, a speed dial, or a feature). If your phone's line buttons are already in use, your phone won't display any additional features.

The following table describes the accessories supported on the Cisco IP Phone 7800 Series.

Table 18: Accessory Support for the Cisco IP Phone 7811, 7821, 7841, and 7861


Accessory	Type	7811	7821	7841	7861
Cisco Accessory					
Wall Mount Kit		Supported	Supported	Supported	Supported
Cisco Headset 531 and Cisco Headset 532	Analog	Not supported	Supported	Supported	Supported
Cisco Headset 561 and Cisco Headset 562	Wireless with the base station	Not supported	Supported	Supported	Supported
Silicone Case		Supported	Supported	Supported	Supported

Accessory	Type	7811	7821	7841	7861
Third-Party Accessories					
Headsets	Analog	Not supported	Supported	Supported	Supported
Headsets	Analog Wideband	Not supported	Supported	Supported	Supported
Microphone	External	Not supported	Not supported	Not supported	Not supported
Speakers	External	Not supported	Not supported	Not supported	Not supported

View the Accessories Associated with Your Phone

You can use headset jack to connect external hardware to your phone. The accessory list, by default, contains an analog headset that can be set up to enable wideband.

Procedure

-
- Step 1** Press **Applications** .
 - Step 2** Select **Accessories**.
 - Step 3** (Optional) Select an accessory and press **Show detail**.
 - Step 4** Press **Exit**.
-

Check Your Phone Model

It is important to know your phone model because each phone supports a different set of accessories.

Procedure

-
- Step 1** Press **Applications** .
 - Step 2** Select **Phone information**. The **Model number** field shows your phone model.
-

Headsets

There are a number of Cisco and third party headsets available for use on your Cisco IP Phones and devices. For additional information about Cisco headsets, see <https://www.cisco.com/c/en/us/products/collaboration-endpoints/headsets/index.html>.

Important Headset Safety Information



High Sound Pressure—Avoid listening to high volume levels for long periods to prevent possible hearing damage.

When you plug in your headset, lower the volume of the headset speaker before you put the headset on. If you remember to lower the volume before you take the headset off, the volume will start lower when you plug in your headset again.

Be aware of your surroundings. When you use your headset, it may block out important external sounds, particularly in emergencies or in noisy environments. Don't use the headset while driving. Don't leave your headset or headset cables in an area where people or pets can trip over them. Always supervise children who are near your headset or headset cables.

Cisco Headset 500 Series

The following Cisco headsets are available:

- Cisco Headset 521—A headset with a single earpiece that comes with an inline USB controller.
- Cisco Headset 522—A headset with a dual earpiece that comes with an inline USB controller.
- Cisco Headset 531—A headset with a single earpiece that can be used as either a standard headset or a USB headset with the USB adapter.
- Cisco Headset 532—A standard headset with a dual earpiece that can be used as either a standard headset or a USB headset with the USB adapter.
- Cisco Headset 561—A wireless headset with a single earpiece that comes with a base.
- Cisco Headset 562—A wireless headset with a dual earpiece that comes with a base.

Cisco Headset 521 and 522

The Cisco Headset 521 and 522 are two wired headsets that have been developed for use on Cisco IP Phones and devices. The Cisco Headset 521 features a single earpiece for extended wear and comfort. The Cisco Headset 522 features two earpieces for use in a noisy workplace.

Both headsets feature a 3.5-mm connector for use on laptops and mobile devices. An inline USB controller is also available for use on the Cisco IP Phone 8851, 8851NR, 8861, 8865, and 8865NR. The controller is an easy way answer your calls, and to access basic phone features such as hold and resume, mute, and volume control.

Phone Firmware Release 12.1(1) and later is required for these headsets to function properly.

Figure 5: Cisco Headset 521



Figure 6: Cisco Headset 522



Cisco Headset 531 and 532

The Cisco Headset 531 and 532 can be used as standard headsets on the phones. You plug the headset into the headset port using the RJ connector.

The Cisco Headset USB Adapter is also available for use on the Cisco IP Phone 8851, 8851NR, 8861, 8865, and 8865NR. The adapter converts the Cisco Headset 531 and 532 into a USB headset, and it gives you a few extra features. It provides a convenient way to handle calls, to test your microphone, and to customize your bass and treble, gain, and sidetone settings.

Phone Firmware Release 12.1(1) and later is required for the headsets to function properly.

Figure 7: Cisco Headset 531



Figure 8: Cisco Headset 532



Cisco Headset 561 and 562

Cisco Headset 561 and 562 are two wireless headsets that have been developed for use in today's office. The Cisco Headset 561 features a single earpiece for extended wear and comfort. Cisco Headset 562 features two earpieces for use in a noisy workplace.

Both headsets come with either the Standard base or the Multibase for charging your headset, and for monitoring the headset power level with the LED display. Both bases also displays your call status, such as incoming call, active call, and calls on mute. If your headset is upgrading the firmware, then the LEDs show the upgrade progress.

The base connects to the phone using the included Y cable, which plugs into the AUX and headset ports of the phone.

An AC plug is included for connecting the base to a power outlet. You have to install the power clip for your region before you can plug in the power adapter.

Occasionally a tone is played over your Cisco Headset 561 or 562. Some of these tones alert you when you perform an action, such as pressing a button. Other tones warn you that the headset requires attention, such as when the battery needs recharging, or when you are too far from the base station.

Phone Firmware Release 12.5(1) or later and the defaultheadsetconfig.json file for the Cisco Headset 561 and 562 to function properly with Cisco Unified Communications Manager 12.5(1) or earlier.

Figure 9: Cisco Headset 561



Figure 10: Cisco Headset 562



Cisco Headset 500 Series Support

The Cisco IP Phone 7811 is the only phone in the Cisco IP Phone 7800 Series that does not support a headset. The Cisco IP Phone 7821, 7841, and 7861 use an RJ-style connector to connect with a headset or base.

Related Topics

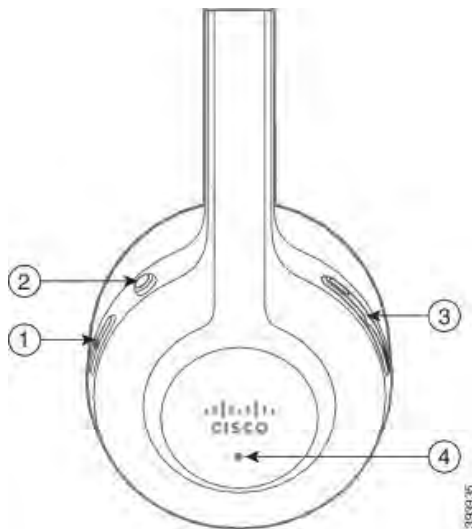
[Connect a Headset to Your Phone](#), on page 75

[Configure a Headset on the Phone](#), on page 78

Cisco Headset 561 and 562 Buttons and LED


Your headset buttons are used for basic call features.

Figure 11: Cisco Headset 561 and 562 Headset Buttons



The following table describes the Cisco Headset 561 and 562 Headset buttons.

Table 19: Cisco Headset 561 and 562 Headset Buttons

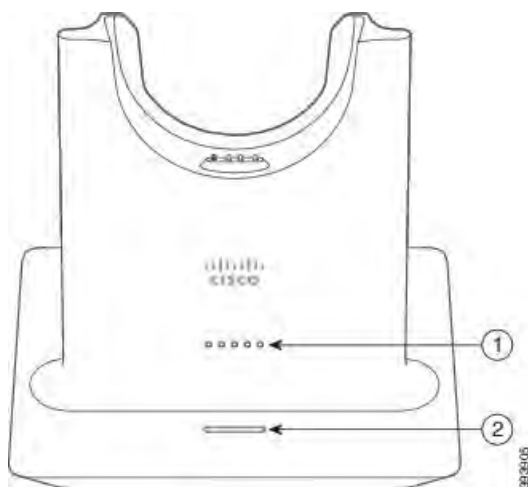
Number	Name	Description
1	Power and Call button	<p>Use to power the headset on and off.</p> <p>Press and hold for 4 seconds to power on and off the headset.</p> <p>Incoming and active call management depends upon if you have one call or multiple calls.</p> <p>One call:</p> <ul style="list-style-type: none"> • Press once to answer incoming calls. • Press once to put an active call on hold. Press again to retrieve a call from hold. • Press twice to reject an incoming call. • Press and hold to end an active call. <p>Multiple calls:</p> <ul style="list-style-type: none"> • Press once to put an active call on hold, and to answer a second incoming call. • Press once to put a current call on hold. Press again to resume a call, or press and hold for 2 seconds to end the current call and to resume a held call. • Press and hold to end an active call, and to answer another incoming call. • Press twice to stay on a current call, and to reject a second incoming call.
2	Mute button	<p>Toggle the microphone on and off. The Mute  on the phone lights when Mute on the headset is enabled.</p>
3	Volume button	<p>Adjust the volume on your headset.</p>
4	LED	<p>Shows the headset status:</p> <ul style="list-style-type: none"> • Blinking red—Incoming call. • Steady red—Active call. • Blinking white—Firmware upgrade is in progress.

Standard Base for Cisco Headset 561 and 562

The Cisco Headset 561 and 562 come with a standard base to charge your headset. The base's LED display shows the current battery level, and your call state. In addition to the call control buttons on the headset, you can also answer and end calls when you lift or set down your headset on the base.

The connection between the base and the headset is made with Digital Enhanced Cordless Telecommunications (DECT).

Figure 12: LED Display on the Standard Base for Cisco 561 and 562 Headset



The following table describes the standard base for Cisco 561 and 562 Headset.

Table 20: Standard Base for Cisco 561 and 562 Headset

Number	Name	Description
1	Battery Status LED	Indicates the headset battery charge.
2	Call Status LED	Alerts you to the call state: <ul style="list-style-type: none"> • Incoming call—Blinking green. • Active call—Steady green. • Muted call—Steady red.

Cisco Headset 561 and 562 with Multibase

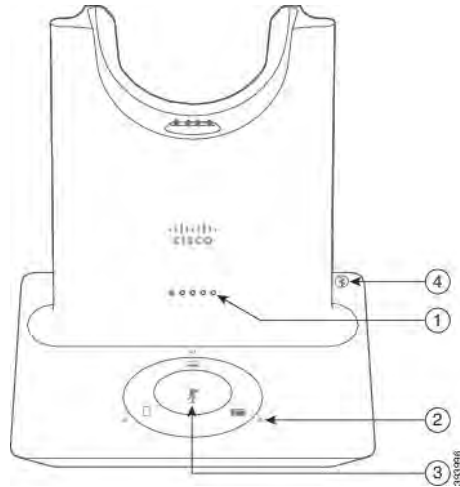
The multibase can connect up to three call sources through Bluetooth, the USB connector, or the Y-cable. The multibase can save up to four Bluetooth devices. You can switch between call sources using the buttons on the multibase. You use the call control buttons on the headset to answer and end calls. When your headset is in the base, you automatically answer the call when you remove the headset from the base. You can return the headset to the base to end the call.

The multibase comes with the following connector cables:

- USB to USB Cable: for Cisco IP Phones with USB connectivity

- USB Y-Cable: for Cisco IP Phones without a USB port
- Mini USB Cable: for PC or Mac.
- Mini USB to USB-C cable: available separately for PC or Mac devices.

Figure 13: Multibase LEDs



The following table describes the Cisco Headset 560 Series Multibase multibase LEDs.

Table 21: Multibase LEDs

Number	Name	Description
1	Battery Status LED	<p>Indicates the headset battery charge and base status:</p> <ul style="list-style-type: none"> • Headset battery strength—LEDs blink and change to solid as the battery charges • Headset update in progress—LEDs blink in sequence, left to right • Headset and base not paired—All LEDs blink • Power save mode—Middle LED shows solid <p>The base enters power save mode when there is no call source connectivity after 10 minutes.</p>
2	Call Status LEDs	<p>Alerts you to the call state of each source:</p> <ul style="list-style-type: none"> • Active Source—Steady white • Incoming call on a selected source—Blinks green • Incoming call on an unselected source—Blinks green • Active call—Steady green • Call on an inactive source—Pulses green

Number	Name	Description
3	Mute Status LED	Alerts you when your headset is muted.
4	Bluetooth Status LED	Alerts you to the Bluetooth status: <ul style="list-style-type: none"> • Paired with a call source—Steady white • Pairing mode—Blinking white • Searching for a call source—Pulse white • Bluetooth is Off—LED is off

You use the source control buttons on the base to control the active source. Each source button corresponds with a specific connection on the multibase.

Even if you are connected to a source, the LED may not be lit. The source LED only lights when the source is selected or has an active call. For example, you may be properly connected to a Cisco IP Phone, your PC, and your mobile phone through Bluetooth. However, the respective source LED is only lit when it is selected, has an active call, or has an incoming call. Press the source button to check if a source is properly connected. The source LED flashes three times if there is no connection.

You can alternate between active call sources.



Note Place an active call on hold before you change to a different call source. Calls on one call source aren't automatically put on hold when you switch to a different call source.

Third Party Headsets

Cisco performs internal testing of third-party headsets for use with Cisco IP Phones. But Cisco does not certify or support products from headset or handset vendors. Check with the headset manufacturer to confirm whether you can use it with your Cisco phone.



Note The Cisco IP Phone 7811 does not support a headset.

Headsets connect to your phone using either the USB or the auxiliary port. Depending upon your headset model, you have to adjust your phone's audio settings for the best audio experience, including the headset sidetone setting.

If you have a third party headset, and you apply a new sidetone setting, then wait one minute and reboot the phone so the setting is stored in flash.

The phone reduces some background noise that a headset microphone detects. You can use a noise canceling headset to further reduce the background noise and improve the overall audio quality.

If you are considering a third part headset, we recommend the use of good quality external devices; for example, headsets that are screened against unwanted radio frequency (RF) and audio frequency (AF) signals. Depending on the quality of headsets and their proximity to other devices, such as mobile phones and two-way radios, some audio noise or echo may still occur. Either the remote party or both the remote party and the Cisco IP

Phone user may hear an audible hum or buzz. A range of outside sources can cause humming or buzzing sounds; for example, electric lights, electric motors, or large PC monitors.

Sometimes, use of a local power cube or power injector may reduce or eliminate hum.

Environmental and hardware inconsistencies in the locations where Cisco IP Phones are deployed mean that no single headset solution is optimal for all environments.

We recommend that customers test headsets in the intended environment to determine performance before making a purchasing decision to deploy on a large scale.

You can use only one headset at a time. The most-recently connected headset is the active headset.

For a list of suggested headsets and other audio accessories, see http://www.cisco.com/c/en/us/products/unified-communications/uc_endpoints_accessories.html.

Audio Quality

Beyond physical, mechanical, and technical performance, the audio portion of a headset must sound good to the user and to the party on the far end. Sound quality is subjective, and we cannot guarantee the performance of any third-party headset. However, various headsets from leading headset manufacturers are reported to perform well with Cisco IP Phones.

Cisco doesn't recommend or test any third-party headsets with their products. For information about third-party headset support for Cisco products, go to the manufacturer's web site.

Cisco does test the Cisco headsets with the Cisco IP Phones. For information about Cisco Headsets and Cisco IP Phone support, see <https://www.cisco.com/c/en/us/products/collaboration-endpoints/headsets/index.html>.

Wired Headsets

A wired headset works with all Cisco IP Phone features, including the Volume and Mute buttons. These buttons adjust the earpiece volume and mute the audio from the headset microphone.

When you install a wired headset, make sure you press the cable into the channel in the phone.



Caution Failure to press the cable into the channel in the phone can lead to cable damage.

Wireless Headsets

You can use most wireless headsets with your phone. For a list of supported wireless headsets, see http://www.cisco.com/c/en/us/products/unified-communications/uc_endpoints_accessories.html

Refer to your wireless headset documentation for information about connecting the headset and using the features.

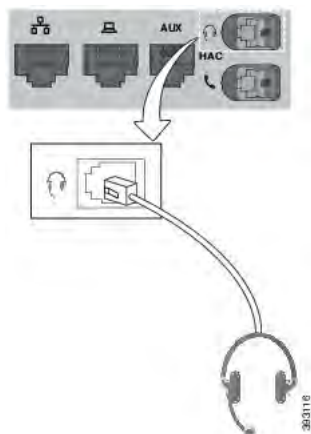
Connect a Headset to Your Phone

Each type of wired headset, adapter, or base connects to a phone using a different port and a different type of connector and cable. Common types include an RJ connector, a USB connector, and a Y-cable.

Connect a Standard Headset

You can use a standard headset with your desk phone. Standard headsets plug into the headset jack on the back of the phone with an RJ-type connector.

Figure 14: Standard Headset Connection



Caution

Failure to press the cable into the channel in the phone can damage the printed circuit board inside the phone. The cable channel reduces the strain on the connector and the printed circuit board.

Procedure

Plug the headset into the headset jack on the back of the phone. Press the cable into the cable channel.

Connect a Cisco Standard Base with the Y-Cable

You can connect the standard base to your phone with the included Y-cable. But note that the Y-cable has two RJ-type connectors - one for the auxiliary or AUX port, and one for the headset port. You can distinguish between the two connectors by their size, as the AUX port connector is slightly larger than the headset port connector.



Caution

Failure to press the cable into the channel in the phone can damage the printed circuit board inside the phone. The cable channel reduces the strain on the connector and the printed circuit board.

Procedure

Step 1

Plug the smaller connector into the headset jack that is located on the back of the phone. Press the cable into the cable channel.

- Step 2** Plug the larger cable into the AUX port located next to the headset port.
-

Connect the Multibase to a Bluetooth Device

The Cisco Headset 560 Series Multibase can connect to Bluetooth devices such as a mobile phone or tablet. The headset base appears on your call device as **Cisco Headset** followed by the last three digits on your headset serial number.



Note You can find your headset serial number in the lower right corner on the underside of your base.

The multibase can store up to four different paired Bluetooth devices. If you already have four paired devices, the base will replace the device which has not been used in the longest time.

Procedure

- Step 1** Press the **Bluetooth** button on the back of the base twice to start pairing.
- Step 2** Select your headset from the **Settings** menu on your device.
- The Bluetooth LED lights white when pairing is successful.
-

Disconnect the Multibase from a Bluetooth Device

You can disconnect your Multibase from its paired Bluetooth call device.

Procedure

- Step 1** Press the **Bluetooth button** on the back of the base once. The LED may take a moment to turn off.
- Step 2** Press the **Bluetooth button** again to reconnect to the same call device.
-

Erase All Bluetooth Pairings

You can erase all saved Bluetooth device pairings.


Procedure

Press and hold the **Bluetooth** button on the back of the multibase for four seconds to clear the memory.

Change Your Headset Ringer Settings

You can change your headset ringtone behavior on Cisco IP Phones with Phone Firmware 14.0 or later. The setting is saved on the phone and will apply to any Cisco Headset 500 Series that connects.

Procedure

- Step 1** Press **Applications** .
- Step 2** Select **Preferences > Headset ringer**.
- Step 3** Select a ringer setting.

By default, your phone follows the behavior of the phone ringer settings. Select **On** if you want to always hear the phone ring when you have an incoming call. If you select **Off**, you won't hear any ring through your headset when there is an incoming call.

- Step 4** Select **Set** to apply your settings.
-

Update Your Cisco Headset Firmware With a Cisco IP Phone

You can update your headset software on any supported Cisco IP Phone. During a headset firmware upgrade, you can view the progress on your phone screen.

Procedure

- Step 1** Connect your headset to a Cisco IP Phone.
- Step 2** If the headset does not automatically begin to update, restart the phone. The phone downloads the latest headset version file when the phone restarts and uploads it to the headset.
-

Configure a Headset on the Phone

After you have connected the headset, you may have to configure it on your phone.

Reset Cisco Headset Settings from Your Phone

You can reset your Cisco headset to remove your custom settings. This action returns the headset to the original configuration set by your administrator.

Your phone must be running Firmware Release 12.5(1)SR3 or later for this feature to function.


Before you begin

Connect your headset to the phone:

- Cisco Headset 520 Series: Connect with the USB adapter
- Cisco Headset 530 Series: Connect with the USB cable

- Cisco Headset 560 Series: Connect the standard base or multibase with the USB or Y-cable.


Procedure

- Step 1** On the phone, press **Applications** .
- Step 2** Select **Accessories > Setup > Reset settings**.
- Step 3** At the warning window, select **Reset**.
-

Adjust the Headset Feedback

When you use a headset, you can hear your own voice in the earpiece, which is called headset sidetone or headset feedback. You can control the amount of headset sidetone on your phone.



Procedure

- Step 1** Press **Applications** .
- Step 2** Select **Settings > Headset sidetone**.
- Step 3** Select a setting.
-

Set Up a Wideband Standard Headset

You can use a headset that supports wideband audio. Wideband audio improves the quality of the sound you hear in the headset.

Procedure

- Step 1** Press **Applications** .
- Step 2** Select **Accessories > Analog headset > Setup**.
- Step 3** Press **On** or **Off** to enable or disable wideband for the analog headset.
- Step 4** Press **Return** .
-


Enable Electronic Hookswitch Control on Your Phone

If your administrator has enabled **Admin settings** on your Cisco IP Phone, you can enable or disable electronic hookswitch control to connect with a Cisco Headset 560 Series base. Electronic hookswitch control is enabled by default.



Note This feature is available on Cisco IP Phone Firmware Release 12.7(1) and later.

Procedure

- Step 1** On your phone, press **Applications** .
- Step 2** Navigate **Admin settings > Aux port**.
- Step 3** Select **Connect e-hook headset** to enable electronic hookswitch control.
-

Swap Headsets While on a Call

When you connect multiple headsets to the phone, you can switch among the headsets during a call by pressing the **Headset** key on the phone. Though the phone is connected to multiple devices, you see a specific headset is selected as the preferred audio device in the following priority order:

- When you connect only an analog headset to the phone, you make your analog headset the preferred audio device.

Procedure

- Step 1** Before you make or answer a call, press **Headset**.
- Step 2** (Optional) If you place a call, dial the number.
-

Troubleshoot Your Cisco Headset

Try the following basic troubleshooting steps if you have trouble with your Cisco headset.

- Restart your headset.
- Make sure that all cords are properly plugged in and functioning properly.
- Test a different headset with your device to determine if the problem is with your wireless headset or your device.
- Make sure that your phone firmware is the latest release.

Confirm that Your Headset Is Registered

Procedure

Check to see if your headset is registered with the phone.

- Step 1** Press **Applications** .
- Step 2** Navigate to **Accessories**. Select **Show detail**.
-

No Sound in Headset

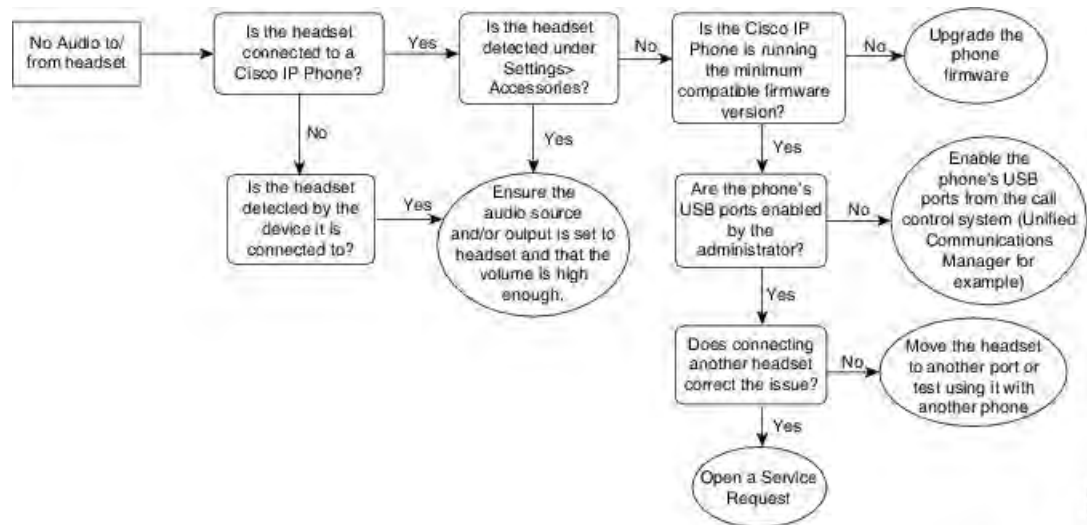
Problem

There is little or no sound coming through the headset.

Solution

Check the volume level on your headset by pressing the volume controls to adjust the sound level. If the problem continues, use the following work flow to troubleshoot your problem.

Figure 15: No Audio Workflow



Poor Audio

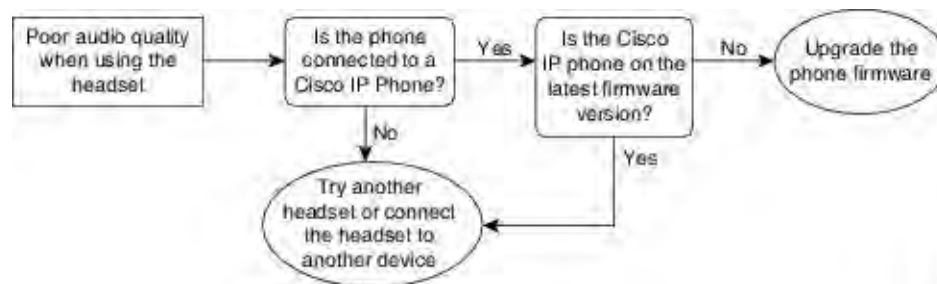
Problem

Your headset is functioning, but the audio quality is poor.

Solution

Use the following work flow to troubleshoot your problem.

Figure 16: Poor Audio



Microphone Not Picking up Sound

Problem

You cannot be heard when using your headset.

Solutions

- Check to make sure your microphone is not muted. Press the mute button on your headset to mute and unmute your microphone.
- Make sure that the microphone boom has been lowered. For optimal sound, keep the headset microphone no further than 1 in or 2.5 cm from your face.
- Make sure that your headset is properly plugged into your device.
- For the Cisco Headset 560 Series, check that you are not taking your headset too far from the headset base. The headset has an effective range of approximately 100 feet or 30 meters.

Headset Not Charging

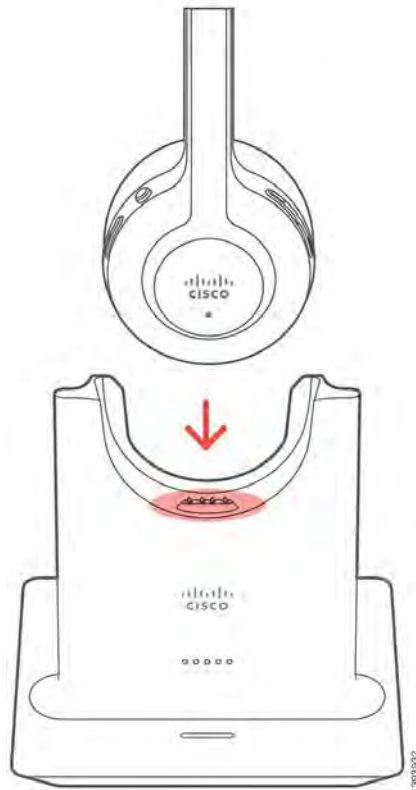
Problem

Your Cisco Headset 561 and 562 is not charging when placed on the base.

Solution

- Check that your base is plugged into a reliable power source.
- Make sure that your headset is properly seated on the base. When the headset is properly seated, the LED shows solid white. When charging, the LEDs on the base light up in sequence from left to right. When the headset is fully charged, all five battery indicator LEDs show solid white.

Figure 17: Cisco Headset 561 and 562 Headset Placement



Headset Battery Not Holding a Charge

Problem

The wireless headset is not holding a full charge.

Solution

Your Cisco Headset 561 and 562 holds a charge for up to 8 hours of continuous use. If your headset battery seems weak or defective, contact Cisco support.

Silicone Covers

You can use the Cisco IP Phone Silicone Cover to protect your desk phone and handset.

The case offers the following benefits:

- Hypoallergenic
- Resistant to wear from a variety of cleaning agents.



Note Use a low-strength cleaning agent to prolong the life and look of the case.

- Reduces damage when the handset is dropped.

For part numbers and other additional information, refer to the phone model data sheet. The Cisco IP Phone 8800 Series data sheets can be found here <https://www.cisco.com/c/en/us/products/collaboration-endpoints/unified-ip-phone-8800-series/datasheet-listing.html>. The Cisco IP Phone 7800 Series data sheets can be found here <https://www.cisco.com/c/en/us/products/collaboration-endpoints/unified-ip-phone-7800-series/datasheet-listing.html>.

To check which phone model you have, press **Applications**  and select **Phone information**. The **Model number** field shows your phone model.

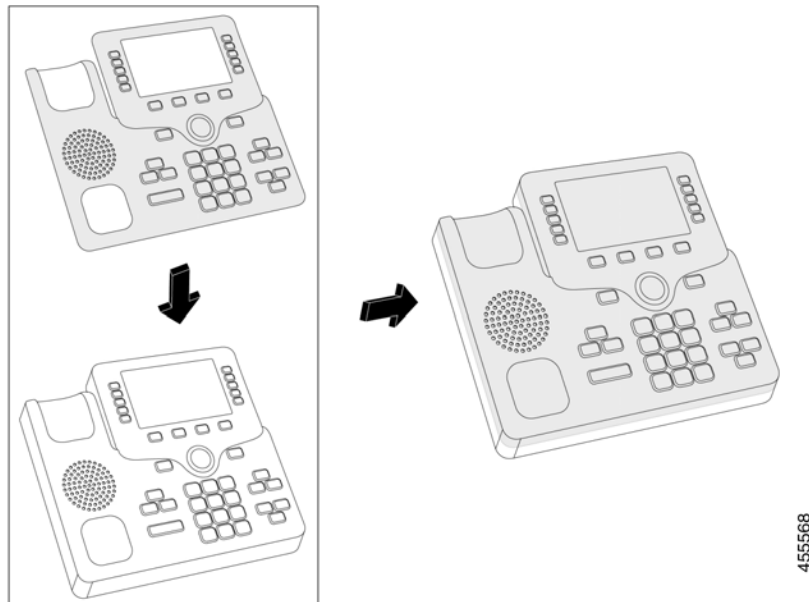
Table 22: Silicone Covers

Cisco IP Phone	Cisco IP Phone Silicone Cover	Notes
Cisco IP Phone 7821	<ul style="list-style-type: none"> • 10 pack of Silicone Covers for 7821 Desktop Phone Series (CP-7821-COVER=) • 10 pack of Silicone Covers for 7821 Desktop Phone Series and Handset (CP-7821-COVER-BUN=) 	
Cisco IP Phone 7841	<ul style="list-style-type: none"> • 10 pack of Silicone Covers for 7841 Desktop Phone Series (CP-7841-COVER=) • 10 pack of Silicone Covers for 7841 Desktop Phone Series and Handset (CP-7841-COVER-BUN=) 	
Cisco IP Phone 8811, 8841, 8851, 8851NR, 8861, and 8861NR	<ul style="list-style-type: none"> • 10 pack of Silicone Covers for 88X1 Desktop Phone Series (CP-88X1-COVER=) • 10 pack of Silicone Covers for 88X1 Desktop Phone Series and Handset (CP-88X1-COVER-BUN=) 	Note The silicone cover doesn't protect the Key Expansion Module.

Cisco IP Phone	Cisco IP Phone Silicone Cover	Notes
Cisco IP Phone 8845, 8865, and 8865NR	<ul style="list-style-type: none"> • 10 pack of Silicone Covers for 88X5 Desktop Phone Series (CP-88X5-COVER=) • 10 pack of Silicone Covers for 88X5 Desktop Phone Series and Handset (CP-88X5-COVER-BUN=) 	Note The silicone cover doesn't protect the Key Expansion Module.
Cisco IP Phone Handset	<ul style="list-style-type: none"> • 10 pack of Silicone Covers for Desktop Phone Handsets (CP-HS-COVER=) 	

Install the Cisco IP Phone Silicone Cover

The silicone cover helps prolong the life of your Cisco IP Phone and make it easier to keep the buttons and number pad clean.



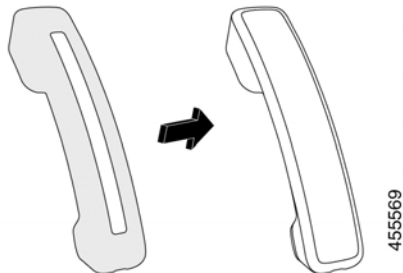
Procedure

-
- Step 1** Position the phone facing you.
 - Step 2** Remove the handset from the cradle.
 - Step 3** Align the cover over the phone with the handset on the left.

- Step 4** Secure the cover around the corners and side of the phone. The cover should fit securely over the phone without much resistance.
- Step 5** Place the handset back on the cradle.
-

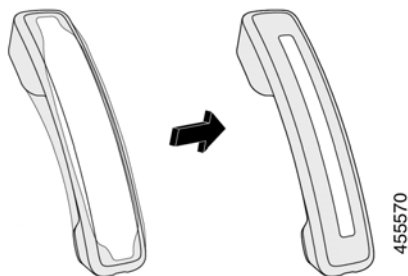
Install the Cisco IP Phone Handset Cover

A silicone cover helps to protect your handset from damage and reduces the spread of germs.



Procedure

- Step 1** Remove the handset from the phone cradle.
- Step 2** Disconnect the cable from the handset.
- Step 3** Slide the silicone cover over the handset until the ear cup is completely inside the cover.
- Step 4** Pull the cover over the other end of the handset.



- Step 5** Make sure the cover is flush against the handset and that the cable port is unobstructed.
- Step 6** Reconnect the handset to the phone and return it to the cradle.
-

Clean the Silicone Cover

Clean your cover if you are worried about dirt and grime. A regular cleaning also prevents the spread of bacteria or germs.

Procedure

Step 1 Remove the silicone cover.

Step 2 Clean the cover.

Note Use a low-strength cleaning agent to prolong the life and look of the case.

Step 3 Dry the cover thoroughly. Don't put it back on the phone until it is completely dry.

Step 4 Put the cover back on the phone.



CHAPTER 8

Product Safety and Security

- [Safety and Performance Information, on page 89](#)
- [Compliance Statements, on page 91](#)
- [Cisco Product Security Overview, on page 93](#)
- [Important Online Information, on page 93](#)

Safety and Performance Information

Power Outage

Your access to emergency service through the phone requires that the phone receive power. If a power interruption occurs, service or emergency calling service dialing does not function until power is restored. If a power failure or disruption occurs, you may need to reset or reconfigure the equipment before you can use service or emergency calling service dialing.

External Devices

We recommend that you use good-quality external devices that are shielded against unwanted radio frequency (RF) and audio frequency (AF) signals. External devices include headsets, cables, and connectors.

Depending on the quality of these devices and their proximity to other devices, such as mobile phones or two-way radios, some audio noise may still occur. In these cases, we recommend that you take one or more of these actions:

- Move the external device away from the source of the RF or AF signals.
- Route the external device cables away from the source of the RF or AF signals.
- Use shielded cables for the external device, or use cables with a better shield and connector.
- Shorten the length of the external device cable.
- Apply ferrites or other such devices on the cables for the external device.


Cisco cannot guarantee the performance of external devices, cables, and connectors.

**Caution**

In European Union countries, use only external speakers, microphones, and headsets that are fully compliant with the EMC Directive [89/336/EC].

Ways to Provide Power to Your Phone

You can provide power to your phone in one of these ways:

- Use the power adapter that comes with your phone.
- If your network supports Power over Ethernet (PoE), you can plug your phone into the network. Plug an Ethernet cable into the Ethernet phone port  and into the network.

If you are not sure whether your network supports PoE, check with your administrator.

Phone Behavior During Times of Network Congestion

Anything that degrades network performance can affect phone audio and, in some cases, can cause a call to drop. Sources of network degradation can include, but are not limited to, the following activities:

- Administrative tasks, such as an internal port scan or security scan
- Attacks that occur on your network, such as a Denial of Service attack

UL Warning

The LAN/Ethernet cable or other cables attached to the device should not be extended outside of the building.

EnergyStar



The following phones have EnergyStar certification:

- Cisco IP Phone 7811
- Cisco IP Phone 7841

Any phone model that isn't listed in the above list isn't certified.

Product Label

The product label is located on the bottom of the device.

Compliance Statements

Compliance Statements for the European Union

CE Marking

The following CE mark is affixed to the equipment and packaging.



Compliance Statements for Canada

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device. Privacy of communications may not be ensured when using this phone.

This product meets the applicable Innovation, Science and Economic Development Canada technical specifications.

Avis de Conformité Canadien

Cet appareil est conforme aux normes RSS exemptes de licence RSS d'Industry Canada. Le fonctionnement de cet appareil est soumis à deux conditions : (1) ce périphérique ne doit pas causer d'interférence et (2) ce périphérique doit supporter les interférences, y compris celles susceptibles d'entraîner un fonctionnement non souhaitable de l'appareil. La protection des communications ne peut pas être assurée lors de l'utilisation de ce téléphone.

Le présent produit est conforme aux spécifications techniques applicables d'Innovation, Sciences et Développement économique Canada.

Compliance Statements for New Zealand

Permit to Connect (PTC) General Warning

The grant of a Telepermit for any item of terminal equipment indicates only that Spark NZ has accepted that the item complies with minimum conditions for connection to its network. It indicates no endorsement of the

product by Spark NZ, nor does it provide any sort of warranty. Above all, it provides no assurance that any item will work correctly in all respects with another item of Telepermitted equipment of a different make or model, nor does it imply that any product is compatible with all of Spark NZ network services.

Compliance Information for Brazil

Art. 6º - 506

This equipment is a secondary type device, that is, it is not protected against harmful interference, even if the interference is caused by a device of the same type, and it also cannot cause any interference to primary type devices.

For more information, go to this URL: <http://www.anatel.gov.br>

Este equipamento opera em caráter secundário, isto é, não tem direito a proteção contra interferência prejudicial, mesmo de estações do mesmo tipo, e não pode causar interferência a sistemas operando em caráter primário.

Site Anatel: <http://www.anatel.gov.br>

Model	Certificate Number
7811	0897-15-1086
7821	3844-13-1086
7841	3842-13-1086
7861	3844-13-1086

Compliance Information for Japan



VCCI Compliance for Class B Equipment

FCC Compliance Statements

The Federal Communications Commission requires compliance statements for the following:

FCC Part 15.19 Statement

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC Part 15.21 Statement

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC RF Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. End users must follow the specific operating instructions for satisfying RF exposure compliance. This transmitter must be at least 20 cm from the user and must not be collocated or operating in conjunction with any other antenna or transmitter.

FCC Receivers and Class B Digital Statement

This product has been tested and complies with the specifications for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used according to the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which is found by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment or devices
- Connect the equipment to an outlet other than the receiver's
- Consult a dealer or an experienced radio/TV technician for assistance

Cisco Product Security Overview

This product contains cryptographic features and is subject to U.S. and local country laws that govern import, export, transfer, and use. Delivery of Cisco cryptographic products does not imply third-party authority to import, export, distribute, or use encryption. Importers, exporters, distributors, and users are responsible for compliance with U.S. and local country laws. By using this product, you agree to comply with applicable laws and regulations. If you are unable to comply with U.S. and local laws, return this product immediately.

Further information regarding U.S. export regulations can be found at <https://www.bis.doc.gov/policiesandregulations/ear/index.htm>.

Important Online Information

End User License Agreement

The End User License Agreement (EULA) is located here: <https://www.cisco.com/go/eula>

Regulatory Compliance and Safety Information

Regulatory Compliance and Safety Information (RCSI) is located here:

https://www.cisco.com/c/dam/en/us/td/docs/voice_ip_comm/cuipph/7800-series/regulatory_compliance/RCSI-0312-book.pdf



YORK® Duct-Free Mini-Split Systems Selection Software Report

Project Name: 2Ton Split GreatLakes

Project Number:

Submitter Name: Jonathan Graham

Revision: 1

Equipment Release and Approval Form

The following tables must be completed prior to releasing the equipment for fabrication/shipment. Please initial the column indicating the information contained in this submittal has been verified, or indicate to refer to a marked-up page.

SUBMITTAL VERIFICATION	
	<i>Purchaser Initials:</i>
Electrical voltage and electrical connections are compatible with jobsite requirements.	
Refrigerant Piping Lengths have been verified.	
Unit tag designations are correct.	
Equipment dimensions (length, width, and height) and weights have been verified to comply with jobsite conditions and rigging requirements. Please indicate approval by your initials on all included drawings.	

Important Notes:

- 1) Actual release cannot commence until this form is signed by the customer and returned to the submitter along with a release notification, want date, and ship to address.
- 2) Equipment "lead-time" does not start until confirmed release documentation is received, and the order is actually released to the factory.
- 3) Modifications to equipment configurations after release may impact cost and lead-time.
- 4) Attached configurations are as shown in the approved equipment submittals or as defined in superseding customer correspondence.
- 5) It is recommended that systems designed for operation below 14F ambient air temperature in heating mode and/or above 109F in cooling mode not exceed 100% connection ratio or total pipe length of 984ft. If exceed, the system may be at risk for reduced capacity (comfort) and/or shorter equipment lifespan. Consideration should be given to reducing connection ratio by upsizing the outdoor unit or utilizing building diversity for a true "operating" connection ratio and re-design the layout to reduce total pipe length.
- 6) "Want date" and/or "ship to address" changes made after this document is confirmed may impact cost and lead-time.

Please fill out the following table and refer to the receiving/rigging instructions in this submittal to help ensure a smooth delivery and installation of the equipment.

DELIVERY INFORMATION	
	<i>Please fill out information below:</i>
Contact name for coordinating delivery of equipment with transportation company.	
Contact phone number	
Advance notice required from transportation company prior to delivering equipment (typically 48 hours)	
Ship to address:	
Other special shipping instructions or requirements	

<p>CUSTOMER APPROVAL:</p> <p>Customer Name: _____</p> <p>Signature (*) _____</p> <p>Date: _____</p>
--

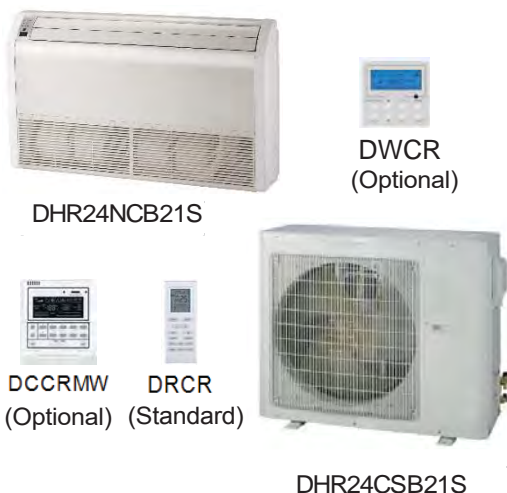
Submittal Summary Page

Qty	Tag#	Model#	Description
1		DHR24CSB21S	Ductless, Heat Pump, Up to 20 SEER, 2 Ton, Outdoor Unit with Single Indoor Unit, Modulating Inverter Compressor, R-410A,208/230-1-60
1		DHR24NCB21S	Ductless, Heat Pump, Up to 20 SEER, 2 Ton, Indoor Floor/ceiling Unit, R-410A, 208/230-1-60
1		DWCR	WIRED CONTROL (R SERIES MODELS)
1		DL87743	STAND,CONDENSER

Effective Date 11/16
 R Series

Form No. DFS-24RHPNC-2016B

DHR24NCB21S/DHR24CSB21S 24,000 BTU/H Heat Pump Single Zone with Floor/Ceiling (208/230V)



System Rating		
System Type		Heat Pump
Rated Cooling Capacity	Btu/h	23,800
Cooling Capacity (Min-Max)	Btu/h	8,200-29,000
Rated Heating Capacity	Btu/h	27,200
Heating Capacity (Min-Max)	Btu/h	8,200-32,400
EER (Btu/h)/W		10.65
SEER		16
HSPF		10
Rated Voltage (IDU&ODU Require separate power source)	V-PH-Hz	208/230-1-60
Rated Cooling Current	Amps	19.4
Rated Heating Current	Amps	20.5
MCA/MOCP (Outdoor unit)	Amps	24/40
MCA/MOCP (Indoor unit)	Amps	1.0/15
Max. Total Piping Length	ft. (m)	98 (30)
Max. Total Piping Height	ft. (m)	49 (15)
Piping Connection Diameter - Liquid (O.D.)	in.	3/8
Piping Connection Diameter - Gas (O.D.)	in.	5/8
Outdoor Model Number		DHR24CSB21S
Operation Range - Cooling	°F (°C)	0~118 (-18~48)
Operation Range - Heating	°F (°C)	0~75 (-18~24)
Refrigerant		R410A
Refrigerant Charge	oz (kg)	78.4 (2.2)
Unit Dimension (WxHxD)	in. (mm)	39x31x17 (991x797x432)
Net / Gross Weight	lbs (kg)	152/163 (69/74)
Sound Pressure Level	dB(A)	57
Indoor Model Number		DHR24NCB21S
System Type		Heat Pump
Rated Cooling Capacity	Btu/h	23,800
Cooling Capacity (Min-Max)	Btu/h	8,200-27,800
Rated Heating Capacity	Btu/h	27,200
Heating Capacity (Min-Max)	Btu/h	8,200-30,600
Rated Voltage	V-PH-Hz	208/230-1-60
Airflow High to Low	CFM	708/679/620/484
Sound Pressure Level High to Low	dB(A)	49/48/46/40
Unit Dimension (WxHxD)	in.(mm)	48x27.5x9 (1347x318x826)
Net Weight	lbs (kg)	88 (40)
Gross Weight	lbs (kg)	110 (50)
Set Temperature Range	°F (°C)	61 ~ 86 (16~30)
Piping Connection Diameter - Drain	(OD) in.	1

FEATURES

- Multi-Speed Fan
- Medium Static Pressure Capability
- Bottom or Rear Return
- Internal Condensate Drain Pump
- Sentry condensate Overflow Protection
- Wired Controller

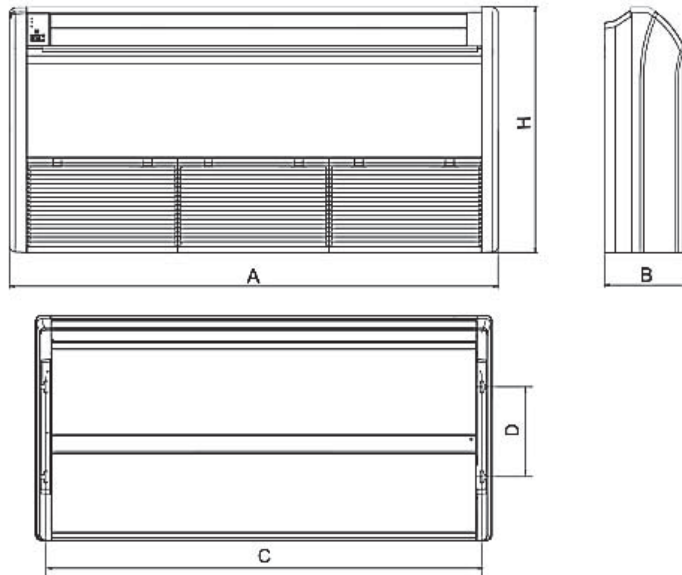
ACCESSORIES

- Central Controller, DCCRMW
- Wired Controller, DWCR

DHR24NDB21S/DHR24CSB21S

Unit: inch

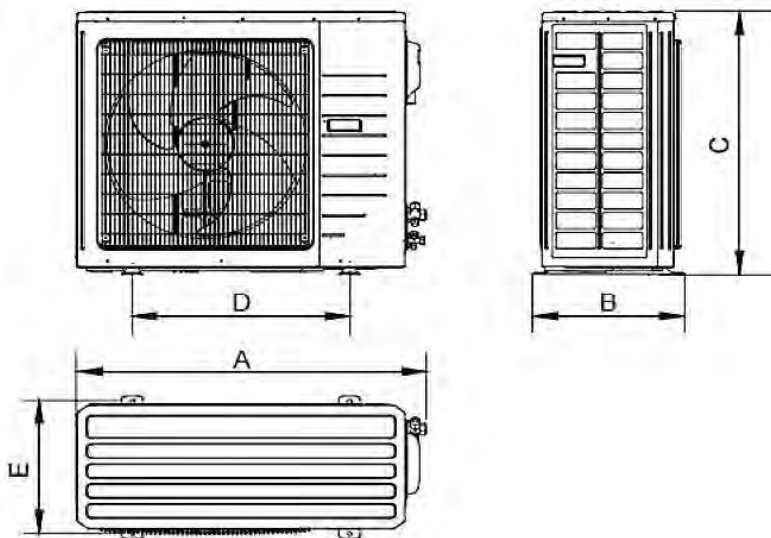
Indoor Unit Dimensions



Dimensions	
A	48
B	8 7/8
C	45 5/8
D	11
H	27 1/2

Outdoor Unit Dimensions

Unit: inch



Dimensions	
A	38 5/8
B	16 3/4
C	31 1/8
D	24
E	15 1/2

Notes:

1. Recommended Communication Cable Type 18-2 AWG Stranded Copper THHN 600V Wire
2. Power wiring cable size must comply with applicable national and local codes
3. Test conditions are based on AHRI 210/240

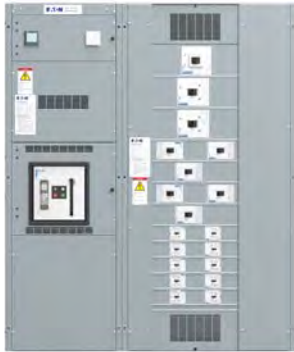


All equipment must be installed per the Installation and Maintenance Manual and local codes.

Information is subject to change without notice.

Equipment models depicted are representational only. Refer to submittal documents for specifications.

Pow-R-Line Xpert Group-Mounted Distribution Switchboard



4.1 Group-Mounted Switchboards

Pow-R-Line Xpert® Distribution Switchboards

Product Description	V2-T4-2
Application Description	V2-T4-2
Standards and Certifications	V2-T4-2
Product Selection	V2-T4-2

Commercial Metering Switchboards

Product Description	V2-T4-3
Application Description	V2-T4-3
Standards and Certifications	V2-T4-5
Product Selection	V2-T4-5
Technical Data and Specifications	V2-T4-5

4.2 Integrated Facility Switchboards™

Product Description	V2-T4-6
Application Description	V2-T4-6
Standards and Certifications	V2-T4-7
Product Selection	V2-T4-7

4.3 Pow-R-Line Drawout Molded Case Circuit Breaker Switchboards

Product Description	V2-T4-8
Application Description	V2-T4-8
Standards and Certifications	V2-T4-8
Product Selection	V2-T4-9
Dimensions	V2-T4-10
Options, Accessories and Modifications	V2-T4-13

4.4 Pow-R-Line XD Switchboards

Product Description	V2-T4-15
Application Description	V2-T4-15
Benefits	V2-T4-15
Key Features	V2-T4-16
Modifications	V2-T4-16
Standards and Certifications	V2-T4-16

4.5 Instant Service Switchboards

Product Description	V2-T4-17
Application Description	V2-T4-17
Standards and Certifications	V2-T4-17
Product Selection	V2-T4-18
Accessories	V2-T4-20
Technical Data and Specifications	V2-T4-21
Dimensions	V2-T4-21

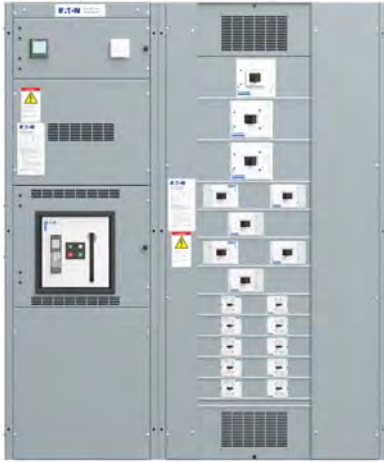
4.6 Roll-Up Generator Termination Box

Product Description	V2-T4-22
Standards and Certifications	V2-T4-22
Technical Data and Specifications	V2-T4-23
Dimensions	V2-T4-36

4.7 Power Xpert Multipoint Metering Switchboard

Overview	V2-T4-37
Product Description	V2-T4-37
Application Description	V2-T4-37
Standards and Certifications	V2-T4-38
Product Selection	V2-T4-38
Options	V2-T4-38

Pow-R-Line Xpert Group-Mounted Distribution Switchboard



Contents

Description	Page
Pow-R-Line Xpert Distribution Switchboards	
Product Description	V2-T4-2
Application Description	V2-T4-2
Features, Benefits and Functions	V2-T4-2
Standards and Certifications	V2-T4-2
Product Selection	V2-T4-2

Pow-R-Line Xpert Distribution Switchboards

Product Description

Eaton's Pow-R-Line Xpert distribution switchboards combine a space-saving design with modular construction and increased system ratings to provide economical and dependable electrical system distribution and protection.

Application Description

Refer to Eaton's *Pow-R-Line Xpert Switchboard Design Guide*.

Features, Benefits and Functions

- 6000A maximum main bus rating
- 600 Vac and below
- 600 Vdc and below
- Front or rear accessible
- Type 1 or Type 3R enclosures
- ANSI-61 gray powder coat paint finish
- Power Defense molded case circuit breakers
- Microprocessor-based metering and monitoring devices
- Utility metering provisions
- Surge protective devices (SPD)
- Ground fault protection on mains and distribution devices
- Busway and transformer connections
- Complete protective device accessory capability
- 65 kAIC bus bracing standard; optional 100 or 200 kAIC
- Standard tin-plated aluminum bus; optional copper- or silver-plated copper bus
 - Standard bus ampacities based on UL® heat test ratings. Optional density rated bus systems are also available

Main and Individually Mounted Devices

- Magnum® SB insulated case circuit breakers, 800–5000A, fixed or drawout
- Magnum DS power circuit breakers, 800–5000A, fixed or drawout
- Series NRXT™ insulated circuit breaker, 400–3000A, fixed or drawout
- Power Defense molded case circuit breakers, 400–2500A, fixed mounted
- Bolted pressure switches, 800–5000A
- FDPW fusible switches, 400–1200A

Group-Mounted Distribution Devices

- Power Defense molded case circuit breakers, 15–1200A
- FDPW fusible switches, 30–1200A

Standards and Certifications

- Meets NEMA® Standard PB-2 and UL 891
- Seismically qualified



Product Selection

For complete application and pricing information, contact your local Eaton sales office.

Commercial Metering Switchboards



For EUSERC Service Areas



For Non-EUSERC Service Areas

Contents

<i>Description</i>	<i>Page</i>
Commercial Metering Switchboards	
Features, Benefits and Functions	V2-T4-4
Standards and Certifications	V2-T4-5
Product Selection	V2-T4-5
Technical Data and Specifications	V2-T4-5

Commercial Metering Switchboards

Product Description

Eaton’s commercial metering switchboards provide electrical system distribution and metering for shopping centers, office buildings and other commercial multimetering applications.

Using standard Pow-R-Line Xpert construction and features, these switchboards incorporate metering sections with tenant feeder circuits using meter sockets to meet local utility or customer requirements.

All meter sockets and associated feeder devices are completely factory prewired and shipped ready for the installation of the meters.

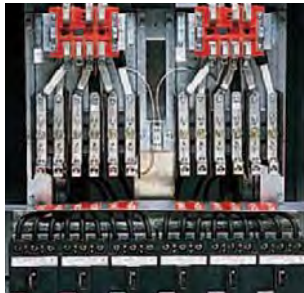
Application Description

For EUSERC Service Areas

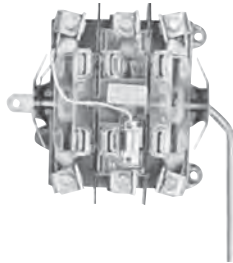
For EUSERC serviced areas. The self-contained meter sockets include a test bypass/disconnect block per EUSERC requirements, and are arranged, typically, for hot sequence metering.

For Non-EUSERC Service Areas

For other than EUSERC serviced areas. Self-contained meter sockets are provided with manual lever bypass and can be arranged for either hot or cold sequence metering.



Socket and Test Block Assembly



Socket with Manual Lever Bypass

Refer to Eaton’s *Commercial Metering Switchboard Design Guide*.

Features, Benefits and Functions

Pow-R-Line Xpert designates a family of distribution switchboards, incorporating design concepts that fit the ever-increasing need for applications on high short-circuit systems, while retaining maximum safety and convenience throughout the line.

Front Accessible

Front-accessible switchboards align at the rear, enabling them to be placed against a wall (Pow-R-Line Xpert front accessible). If the main section is deeper than others, due to physical size of the main device, the necessary off-set in line-up will occur in front, and the main section will be accessible from the side as well as from the front. Standard front accessible switchboards will align at the front and rear.

Rear Accessible

Rear-accessible switchboards align at the front and the rear. Bus maintenance and cable entry and exit require rear access. There are two types of rear accessible switchboards. Both types use the same incoming utility and/or main structures. The first type uses group-mounted feeder devices with panel construction (Pow-R-Line Xpert rear accessible). The second type uses individually compartmentalized feeder devices with load side insulated bus bar extensions (Pow-R-Line *iX*).

Standard Switchboard Height

Standard Pow-R-Line Xpert switchboard height is 90 inches (2286.0 mm).

Group Mounting

Group-mounted circuit protective devices are an assembly of units mounted on a panelboard type base (panelboard construction). Units may be molded case breakers, or FDPW fusible switches. Circuit protective devices are accessible from the front.

A main molded case breaker or main FDPW fusible switch, within the sizes listed for panelboard design, can be included in the panel-mounted assembly in lieu of a separate, individually mounted unit.

Space Only for Future Devices Group-Mounted Construction

Where space only for future circuit protective devices is required, the proper space and a blank filler plate will be supplied. Connections and mounting hardware are not included.

Provision for Future Devices

Where provisions for future circuit protective devices are required, space for the device, corresponding vertical bus, device connectors and the necessary mounting hardware will be supplied.

Bus Bar System

Standard bus in the switchboards is tin-plated aluminum. Copper and silver-plated copper are also available.

Main bus and sub-main buses meet UL and NEMA standards for temperature rise on all Pow-R-Line Xpert switchboards. Special bus densities are available.

Overcurrent Devices

To properly select and size overcurrent devices for use in a switchboard, the allowable temperature rise must be taken into account as to its effect on the tripping characteristics of the devices in question.

Accordingly, Article 220 of the NEC[®] requires overcurrent devices to be rated not less than 125% of the continuous load they are protecting. To comply with this, an 80% derating factor must be used with all overcurrent devices such as molded case breakers and FDPW fusible switches unless they are tested and marked as 100% rated devices.

Short-Circuit Rating

Standard bus and connectors on all switchboards are rated for use on systems capable of producing up to 65,000A rms symmetrical short-circuit current at the incoming terminals.

Increased bus short-circuit ratings equal to that of connected switchboard devices, up to 200,000A rms symmetrical, are available in most Pow-R-Line Xpert switchboards when approved main devices are installed. Contact Eaton for more information. UL labeled switchboard sections are marked with their applicable short-circuit rating.

Provision for Busway Entrance and Exit

Busway connections to switchboard sections include cutout and drilling in the top of the switchboard with riser connections from the switchboard device or bus, up to the point where the bus duct enters the switchboard. No connections are furnished external to the switchboard.

Note: In all transactions involving busway attached to switchboards, it is essential that information regarding orientation of the busway with respect to the front of the switchboard be supplied to the coordinating assembly plant.

On Pow-R-Line Xpert switchboards, solid bus bar is used to connect the bus duct to the individually mounted main device, main or sub-main switchboard bus, or vertical main bus of panel mounted circuit protective device panels. Busway fed by group-mounted branch devices are cable connected.

Aluminum riser connections are standard. Copper- or silver-plated copper is available as a modification.

Transitions

Transition structures are required for connecting switchboards to the secondary of power center transformer (dry or fluid filled), motor control centers, and for other special switchboard configurations such as "L" or "U" shaped lineups. In some application, an extra structure complete with connections is required; in others, where switchboard depth and space permit, only the connection conductors are required. Refer to factory for these applications.

Standards and Certifications

- UL 891
- NEMA PB-2
- Seismically qualified

**Product Selection**

For complete application and pricing information, contact your local Eaton sales office.

Technical Data and Specifications**Service**

- 120/240V, single-phase, three-wire
- 240/120V, 208Y/120V, 415Y/240V, 480Y/277V or 600Y/347V three-phase, four-wire
- 600 Vdc

Main Bus Rating

- 400–4000A

Service Section

- Main circuit breaker, 400–4000A
- Main fusible switch, 400–4000A
- Main lugs only, 400–6000A

Metering Sections

- Tenant main disconnects and meter sockets (200A maximum self-contained metered circuits)
- Hot sequence metering circuits
- Cold sequence metering circuits (WCMS only)
- Optional rear barriered wireways or load side pull sections for cable exit requirements
- Sections for metered circuits larger than 200A available with 400A continuous rated self-contained sockets or with CT compartment and transformer rated socket in combination with disconnect

Integrated Facility Switchboard



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Integrated Facility Switchboards	
Features, Benefits and Functions	V2-T4-7
Standards and Certifications	V2-T4-7
Product Selection.	V2-T4-7



Product Description

Eaton’s Integrated Facility Switchboards use the modular Pow-R-Line Xpert group-mounted switchboard design to integrate traditionally separate electrical distribution and control equipment into a single space-saving factory assembled and connected package.

The service entrance equipment can be integrated with multiple lighting and appliance branch panelboards into a compact front-accessible group-mounted switchboard. Where multiple panelboards are used in the same electrical room as a conventional distribution switchboard or power panelboards, the integrated design will significantly reduce equipment space requirements, as well as reduce installation time and costs.

Other associated equipment can also be integrated into the assembly, including dry-type distribution transformers, Building Management Systems, Pow-R-Command™ lighting control system, electronic controls, surge protective devices, metering and energy monitoring devices. Depending upon the application, other user-defined equipment such as a subsystem control package may also be incorporated.

Application Description

Eaton’s Integrated Facility Switchboards are designed to meet specific needs for:

- Retail chain stores
- Commercial offices
- High rise buildings
- Correctional facilities
- Agricultural facilities
- Industrial facilities
- Hospitals/healthcare facilities
- Educational facilities

Whether the application is a multi-site prototype or single application, integrated switchboards offer time and space-saving features.

For complete application description, refer to Eaton’s *Integrated Facility Switchboard Design Guide*.

Features, Benefits and Functions

Front Accessible

Integrated Facility Switchboards are front accessible and align at the rear, enabling them to be placed against a wall. Most switchboards align at the front and the rear. If the main section is deeper than others, due to physical size of the main device, the necessary off-set in line-up will occur in front, and the main section will be accessible from the side as well as from the front.

Standard Switchboard Height

Switchboard height is 90 inches (2286.0 mm).

A limited offering of 78-inch (1981.2 mm) high equipment is available. Consult the factory for specific applications.

Switchboard Shipping Splits

The sections can be shipped as specified by the customer to meet specific requirements.

For retrofit applications, single-piece switchboard structures can be shipped to facilitate movement through limited access doorways, etc.

Factory Interconnections

Most sub-panels are fed from the main distribution panel feeder circuit breakers using copper cable sized per the NEC and UL.

Space Savings

The space-saving switchboard installation provides additional usable floor space. For example:

- Retail stores—floor space for sales
- Offices—additional storage, cubicle
- Healthcare—additional work area
- Retrofits—ability to fit existing rooms

Site Construction Savings

Timely installation of the electrical system typically is a key element on the critical path for any project.

Along with the time to install the equipment, other expenses include the time to handle all of the loose pieces of equipment arriving on a job site and ensuring it reaches the proper trades person. With Eaton’s Integrated Facility Switchboards, one piece of equipment is typically shipped to a job site virtually eliminating these issues.

The equipment may also be used for temporary power on job sites, further reducing construction expenses and times.

Standards and Certifications

- Meets NEMA Standard PB-2 and UL 891
- Panelboards mounted inside the sections meet NEMA PB-1 and UL 67
- Other equipment is UL listed as applicable and appropriate



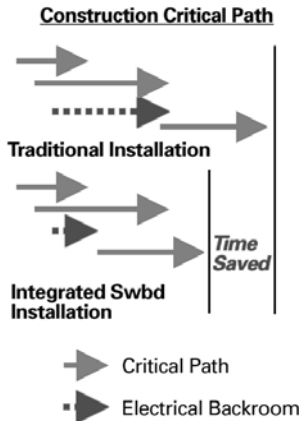
Product Selection

For complete application and pricing information, contact your local Eaton sales office.



Traditionally Mounted Equipment

Construction Savings



Pow-R-Line Drawout Molded Case Circuit Breaker Switchboards



4

Contents

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Pow-R-Line Drawout Molded Case Circuit Breaker Switchboards	
Product Selection	V2-T4-9
Dimensions	V2-T4-10
Options, Accessories and Modifications	V2-T4-13

Product Description

- Drawout molded case circuit breaker switchboard
- Front accessible
- Front connected
- Through-the-door design drawout mechanism through 600A
- Insulated case UL 489 breakers up to 1200A
- Visual indication of breaker status and position
- Large grab handles for easy removal
- 600 Vac maximum
- 600A maximum, group-mounted, drawout molded case feeder breakers
- Individually mounted insulated UL 489 breakers through 1200A

Application Description

- Drawout feeders in UL 891 distribution switchboards
- Rated as Service Entrance Equipment when appropriately equipped
- Ideal for:
 - Data centers
 - Industrial facilities
 - Process equipment manufacturing
 - Anywhere that requires quick change of feeder devices is needed

Features, Benefits and Functions

Eaton’s Pow-R-Line Drawout switchboard design is listed and labeled to the UL 891 standard. Switchboards may be rated up to 4000A. Main breakers are available up to 4000A in both fixed-mounted and drawout configurations. Main breakers may be Magnum DS® power circuit breakers or Magnum SB insulated case circuit breakers in either drawout or fixed-mounted configurations. Both are front-accessible configurations. Fixed-mounted molded case circuit breaker mains are available up through 2500A.

Utility and customer-owned metering is available. Customer metering includes Web-enabled communicating systems.

Aluminum bus is standard with copper and silver-plated copper optional. Other common options include surge protective devices (SPDs), seismically qualified designs, density rated bus and many more.

Drawout feeder MCCBs are available in two-pole and three-pole offerings from 20A to 600A in the high-density, group-mounted design.

Drawout feeders above 600A through 1200A integrate the molded case NX drawout breaker. Drawout breakers above 1200A through 2000A use the Magnum SB insulated case circuit breaker. All are front accessible and front connected.

Standards and Certifications

- UL 891 listed



Pow-R-Line Drawout Molded Case Circuit Breaker Switchboards

Product Selection

Select drawout molded case circuit breaker and UL 489 listed insulated case circuit breakers from the following pages.

- Always select front access/rear aligned
- IFS sections are permissible but will be bolt-on devices only
- Pow-R-Line drawout molded case circuit breaker switchboards currently use legacy Series C and Series G product offerings

Drawout Branch/Feeder Breakers**Single Branch/Feeder****Dual Branch/Feeder****Single-Mount Two-Pole and Three-Pole**

Ampere Rating	Interrupting Rating (kA Symmetrical)			Breaker Type	"X" Space
	240 Vac	480 Vac	600 Vac		
Single-Mount Breakers with Thermal-Magnetic Trip Units					
70–250	85	35	18	JGS	7X
70–250	100	65	25	JGH	7X
70–250	200	100	35	JGC	7X
250–600	85	35	18	LGS	9X
250–600	100	65	35	LGH	9X
250–600	200	100	50	LGC	9X
Single-Mount Breakers with Electronic 310+ Trip Units (Three-Pole Only)					
20–50	85	35	18	JGS	7X
20–50	100	65	25	JGH	7X
20–50	200	100	35	JGC	7X
40–100	85	35	18	JGS	7X
40–100	100	65	25	JGH	7X
40–100	200	100	35	JGC	7X
80–150	85	35	18	JGS	7X
80–150	100	65	25	JGH	7X
80–150	200	100	35	JGC	7X
100–250	85	35	18	JGS	7X
100–250	100	65	25	JGH	7X
100–250	200	100	35	JGC	7X
100–250	85	35	18	LGS	9X
100–250	100	65	35	LGH	9X
100–250	200	100	50	LGC	9X
200–400	85	35	18	LGS	9X
200–400	100	65	35	LGH	9X
200–400	200	100	50	LGC	9X
250–600	85	35	18	LGS	9X
250–600	100	65	35	LGH	9X
250–600	200	100	50	LGC	9X
Single-Mount 310+ Electronic Trip Unit					
500–1200	85	50	25	NGS	12X
500–1200	100	65	35	NGH	12X
500–1200	200	100	65	NGC	12X
Provision for Future (Includes Factory-Installed Base Cassette)					
20–250	Any JG family branch/feeder breaker				7X
100–600	Any LG family branch/feeder breaker				9X

4.3

Switchboards

Pow-R-Line Drawout Molded Case Circuit Breaker Switchboards

Dimensions

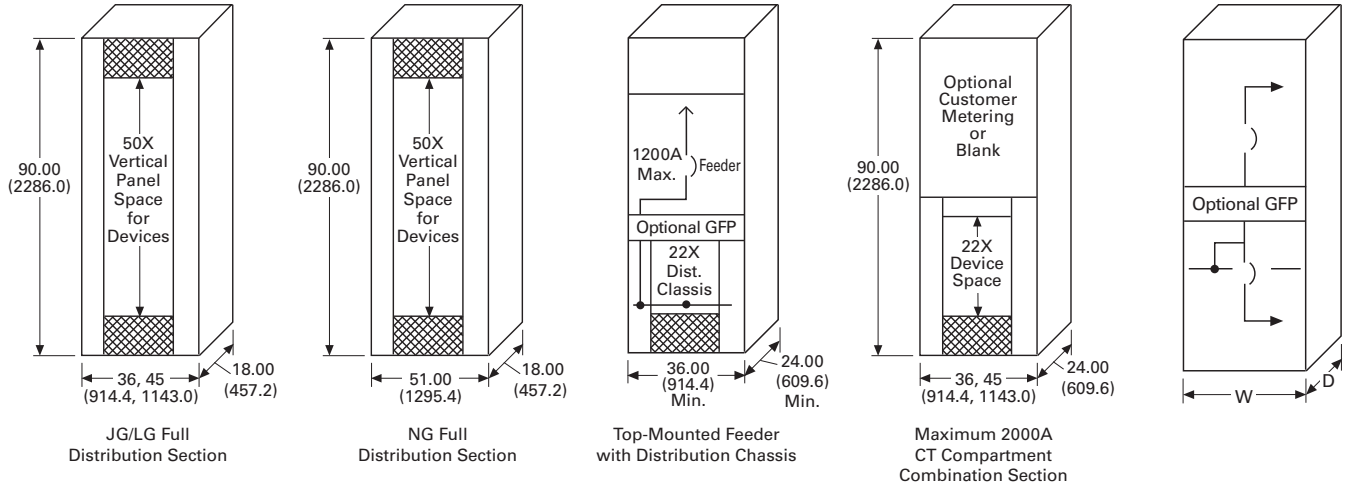
Approximate Dimensions in Inches (mm)

Select the appropriate distribution section(s) for drawout MCCB feeder devices from the sections shown below.

All breakers are front accessible and front connected.

4

Drawout Molded Case Circuit Breaker Feeder Devices



Notes

All four sections widths 36-inch minimum.

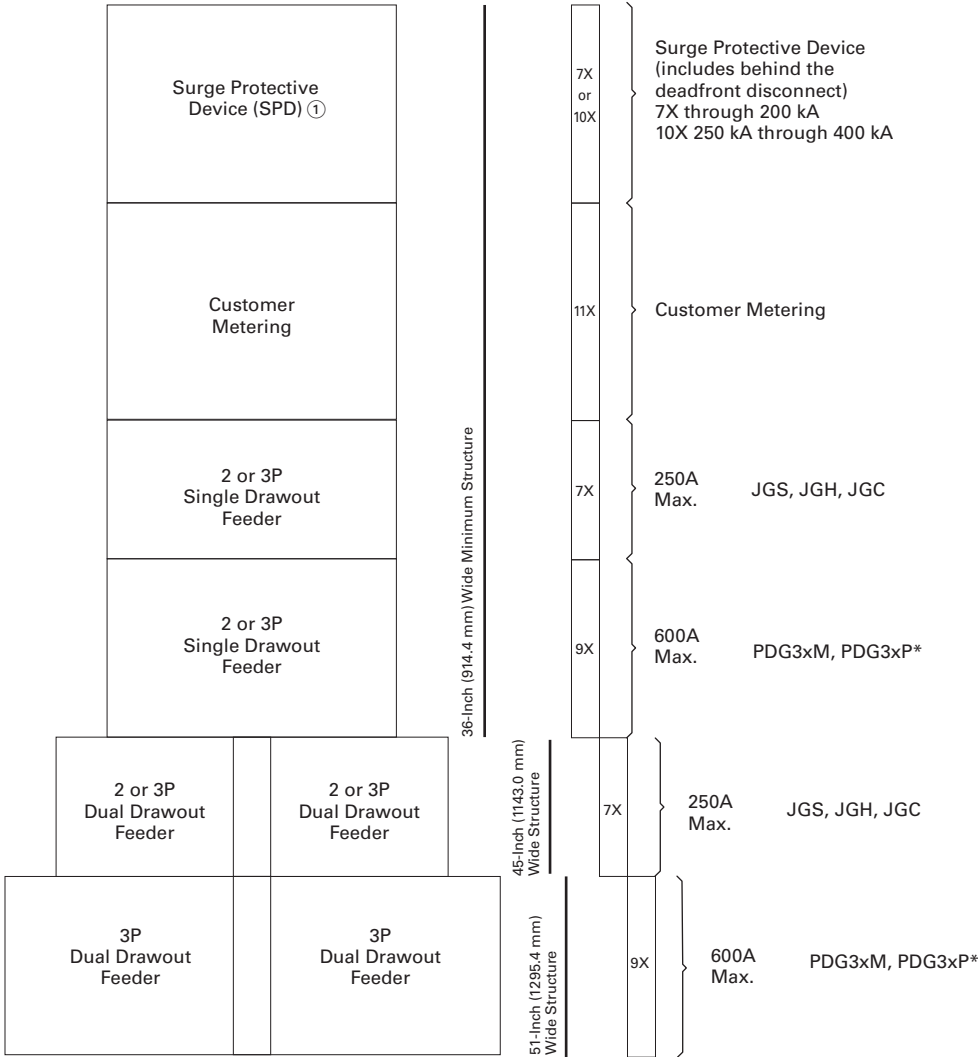
See distribution layout Guides **Page V2-T4-11** for actual minimum structure width and for feeder device "X" requirements.

Pow-R-Line Drawout Molded Case Circuit Breaker Switchboards

Layout for Group-Mounted Drawout Molded Case Circuit Breaker Feeder Devices

Instructions

Determine the structure width by the group-mounted drawout MCCB feeder devices below. The width of the structure is determined by the maximum structure size shown for each device.



Note

① Preferred location of SPD is mounted at the top of the first distribution section.

4.3

Switchboards

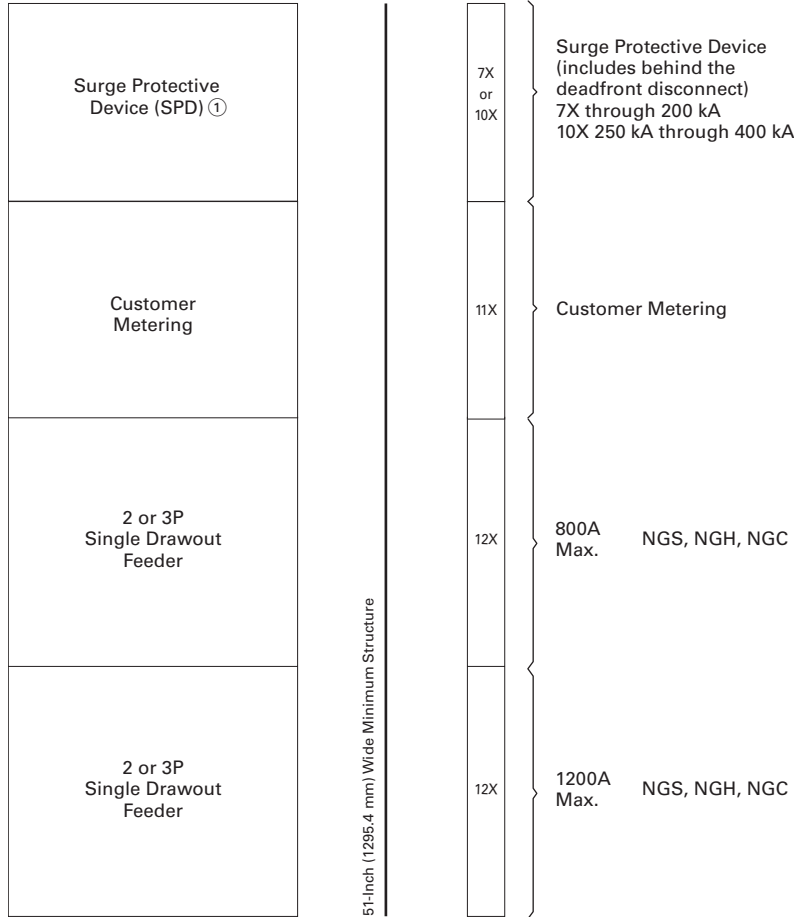
Pow-R-Line Drawout Molded Case Circuit Breaker Switchboards

NG Molded Case Drawout Chassis

Instructions

Determine the structure width by the group-mounted drawout MCCB feeder devices below. The width of the structure is determined by the maximum structure size shown for each device.

4



Note

① Preferred location of SPD is mounted at the top of the first distribution section.

Options, Accessories and Modifications

1. Ambient Compensating Breakers

For ambient compensating breakers (where available) in lieu of standard breakers, add 10% to panelboard branch breaker and to main breaker list prices, when required. Panels with this option can not be UL listed.

2. JG and LG Breaker Accessories—Internal (Only One Accessory Per Position)

Accessories

Breaker Type	Device Mounting	Internal Breaker Accessory
JG family	Drawout ①	Auxiliary switch 1A-1B
JG family	Drawout ①	Auxiliary switch 2A-2B
JG family	Drawout ①	Bell alarm
JG family	Drawout ①	High load alarm w/trip
JG family	Drawout ①	Ground fault alarm w/trip
JG family	Drawout ②	Undervoltage release
JG family	Drawout ②	Zone selective interlock
LG family	Drawout ①	Auxiliary switch 1A-1B
LG family	Drawout ①	Auxiliary switch 2A-2B
LG family	Drawout ①	Bell alarm
LG family	Drawout ①	High load alarm w/trip
LG family	Drawout ①	Ground fault alarm w/trip
LG family	Drawout ②	Undervoltage release ③
LG family	Drawout ②	Zone selective interlock

3. Drawout NG Breaker Accessories Internal

Accessories

Internal NG Breaker Accessories

Drawout ①	Auxiliary switch 1A-1B
Drawout ①	Auxiliary switch 2A-2B
Drawout ①	Bell alarm
Drawout ①	High load alarm with trip
Drawout ①	Ground fault alarm with trip
Drawout ②	Undervoltage release ③
Drawout ②	Zone selective interlock

4. Compression Main Lugs

Al/Cu Burndy Range Taking Type.

Modification 4

Main Lug Amperes	PRL4D Lug Wire Range
800	(3) 500–750 kcmil
1200	(4) #2–600 kcmil (4) 500–750 kcmil

5. Copper Lugs/Terminals

Optional copper mechanical main lugs only and includes main incoming neutral lug.

Modification 5

Main Lug Amperes	PRL4D Lug Wire Range
600	(2) 1/0–600 kcmil
800	(2) 1/0–600 kcmil
1200	(3) 1/0–600 kcmil

6. Copper Main Busbars

Optional copper busbars are available in all ampere ratings.

Modification 6

Ampere Range	Bare Copper Chassis Bus	Silver-Plated Copper Bus
800		
1200		
1600		
2000		
2500		
3000		
4000		

7. Density Rated Bus

Standard main bus ampere rating is determined by UL listed temperature rise testing. Density rated bus is defined at 750A per square inch for aluminum bus and 1000A per square inch for copper bus. Adder for aluminum density rated bus is in addition to the base price. Adder for copper density rated bus is in addition to the base price plus the appropriate adder for copper bus. See Modification 7.

Modification 7

Ampere Rating

Aluminum – 750A per Square Inch

800
1200
1600
2000
2500
3000
4000

Copper – 1000A per Square Inch

800
1200
1600
2000
2500
3000
4000

8. Electronic Trip Units

Thermal-magnetic trip units are standard. For electronic trip units, select appropriate breaker from the electronic trip section of **Pages V2-T4-9** and **V2-T4-11**. See selection below for electronic trip units.

Modification 8

Breaker Frame Family

Breaker Frame Family	Trip Unit Type
Drawout Feeder JGS, JGH, JGC	Digitrip 310+ LS
	Digitrip 310+ LSI
	Digitrip 310+ LSG
	Digitrip 310+ LSIG
LGS, LGH, LGC Drawout	310+ LS
	310+ LSI
	310+ LSG
	310+ LSIG
	310+ w/GFA LSA
	310+ w/GFA LSIA
	310+ w/Arcflash ALSI
	310+ w/Arcflash ALSIG
	310+ w/ZSI LSI
	310+ w/ZSI LSIG
	310+ w/ZSI, Arcflash ALSI
	310+ w/ZSI, Arcflash ALSIG
NG Drawout	310+ LS
	310+ LSI
	310+ LSG
	310+ LSIG
	310+ w/GFA LSA
	310+ w/GFA LSIA
	310+ w/Arcflash ALSI
	310+ w/Arcflash ALSIG
	310+ w/ZSI LSI
	310+ w/ZSI LSIG
	310+ w/ZSI, Arcflash ALSI
	310+ w/ZSI, Arcflash ALSIG

Notes

- L = Adjustable long time pickup
- S = Adjustable short time pickup w/fixed short time delay
- I = Adjustable instantaneous pickup
- G = Adjustable ground fault pickup
- A = Adjustable ground fault alarm only (no trip)
- Arcflash = Arcflash Reduction Maintenance System
- ZSI = Zone selective interlocking

① Accessories wired to a pull-apart terminal block. Right position only.
 ② Accessories wired to a pull-apart terminal block. Left position only.
 ③ Not available when breaker is equipped with Arcflash Reduction Maintenance System trip unit.

9. Ground Bus

Copper or silver-plated copper ground bus in lieu of standard aluminum.

Modification 9

Bus Material	Size in Inches (mm)
Copper	0.25 (6.4) x 1.50 (38.1)
	0.25 (6.4) x 2.00 (50.8)
Silver-plated copper	0.25 (6.4) x 1.50 (38.1)
	0.25 (6.4) x 2.00 (50.8)

10. Ground Fault Protection

Refer to Modification 8 for ground fault trip units.

11. Infrared (IR) Viewing Windows

Infrared viewing windows for main devices and drawout single-mounted feeder devices.

Modification 11

Overcurrent Device	IR Window Manufacturer
All fixed mount mains	Iriss Hawk (Fluke)
Single drawout feeder breakers ^①	Iriss Hawk (Fluke)

12. Nameplates, Engraved

Field-attached nameplates.

Modification 12

Description

Mastic back, engraved, black with white lettering

Mastic back, engraved, colors other than black

Nameplates, screw attached

13. Seismically Qualified

For seismically qualified PRL drawout switchboard, request seismic labeling on order.

14. Service Entrance Equipment

Service Entrance labeling as detailed under the “Service Entrance Equipment” per UL and NEC. Only switchboards meeting these requirements may be labeled as such. The requirement or service entrance labeling must be noted on the order. Includes neutral disconnect link and labeling “Suitable Only For Use as Service Equipment” (SUSE).

15. Surge Protective Devices (SPD)

Package includes SPD unit and integral circuit breaker disconnect (30A) connected to the chassis bus.

Modification 15

Surge Current Rating	50	80	100	120	160	200	250	300	400
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SPD Package Options—Basic Package

LED monitor, L-N, L-G, L-L and N-G	■	■	■	■	■	■	■	■	■
------------------------------------	---	---	---	---	---	---	---	---	---

Standard Package

LED monitor, L-N, L-G, L-L and N-G. EMI/RFI filtering. Audible alarm with disable switch. Form C relay contact.	■	■	■	■	■	■	■	■	■
---	---	---	---	---	---	---	---	---	---

Premium Package

LED monitor, L-N, L-G, L-L and N-G. EMI/RFI filtering. Audible alarm with disable switch. Form C relay contact. Six-digit LCD display. Counts surges in all modes. Nonvolatile memory (no battery backup). Reset button designed to prevent accidental resets.	■	■	■	■	■	■	■	■	■
--	---	---	---	---	---	---	---	---	---

16. Touchup Paint

Modification 16

Description

12 oz spray can. ANSI-61 light gray indoor

Case lot of 12—12 oz spray can. ANSI-61 light gray indoor

Note

^① Available on only single-mounted drawout. Not available on dual-mounted feeder devices.

Pow-R-Line XD Switchboards



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Key Features	V2-T4-16
Modifications	V2-T4-16
Standards and Certifications	V2-T4-16

Product Description

Eaton’s Pow-R-Line XD switchboard integrates both drawout insulated case and molded case circuit breakers into a single UL 891 assembly, including Eaton’s new Power Defense™ circuit breakers. This switchboard can be configured to a variety of applications including single-ended and double-ended substation lineups, and can easily align with existing Pow-R-Line Xpert series switchboard configurations and designs.

Pow-R-Line XD provides a safer, compartmentalized switchboard solution. Each vertical section consists of a front compartment (with inter-section wiring compartment), cross bus compartment, and rear cable pull compartment with termination space.

Application Description

- Data centers
- Healthcare and institutions
- Commercial construction
- Machine building
- Infrastructure
- Mining, minerals and metals
- Education
- Oil and gas
- Electric utilities
- Pulp and paper
- Industrial and manufacturing
- Food and beverage
- Transportation
- Government
- Water/wastewater

Benefits

- **Reliable solution:** Reduce downtime with improved breaker change-out capability
- **Safer design:** Enhance safety with drawout compartmentalized design
- **Intelligent design:** Communicate through new Power Defense breaker trip units, allowing you to use fewer components and a simplified design while keeping your system connected and customers informed
- **Adaptability:** Endless configurations available to suit your specific applications

4.4

Switchboards

Pow-R-Line XD Switchboards

4

Key Features

- 2000–6000 A rated bus
- 240 Vac and 480 Vac ratings
- Short-circuit current rating up to 100 kAIC at 480 Vac
- Silver- or tin-plated copper bus
- 400–5000 A drawout insulated case circuit breakers
- 70–600 A drawout molded case circuit breakers
- 20–1200 A fixed group-mounted molded case circuit breakers
- Rear-accessible terminations for individually mounted devices
- Front-accessible terminations for the group-mounted devices
- Barriers included (breaker, bus and cable compartments)
- Control wiring on top with integrated tie lances
- Overhead or rolling lifting device
- Indoor enclosures (NEMA® Type 1)

Modifications

- Coordination with other Eaton divisions for busway and transformer connections
- Communications capability
- Transfer schemes

Standards and Certifications

- UL 891 listed
- Circuit breakers—UL 489
- Seismic certified to UBC, IBC and California Building Code to exceed Zone 4



Pow-R-Line XD Key Features

Instant Service Switchboards



Type 1 Indoor



Type 3R Outdoor

Contents

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Instant Service Switchboards	
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Technical Data and Specifications	V2-T4-21
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Product Description

Eaton’s Instant® Service Switchboards are designed as stocked units to provide fast delivery to match the needs of the construction market.

Suitable for use as service entrance equipment, they combine utility metering provisions with a fused main switch in a single compact section that can also include a distribution panel for feeder and branch circuit breakers.

Application Description

Typical applications for these versatile switchboards include small office buildings and factories, stores, supermarkets and shopping centers.

Features, Benefits and Functions

These switchboards are available in either indoor or outdoor enclosures manufactured of code-gauge steel with a durable light gray finish. All units are completely enclosed with front, rear and side covers. Outdoor units include a front hinged door.

The service section includes:

- Main lugs mounted at the top (two #4–600 kcmil per phase) for overhead feed or for use with an underground pull section
- A sealable metering and CT compartment with bussing for utility bar type CTs and two 15-inch (381.0 mm) high meter compartment doors—one with provisions for meter socket and test block, one blank (meter socket is ordered separately)
- A 400 or 600A T-Type fused main switch or 400, 600 or 800A main circuit breaker with either load lugs (same as main lugs) or with connections to a factory installed distribution panel

Underground pull sections are available with lug landing kits providing studs for incoming cables per EUSERC standards and

two #4–600 kcmil lugs per phase for cable connection to the service section.

Distribution panels can be included for 240 Vac maximum (single-phase three-wire or three-phase four-wire), 480Y/277 Vac (three-phase four-wire) or 480 Vac (three-phase three-wire). The 240V panels have provisions for four Type PD2 225A frame circuit breakers and 24 poles of Type BAB 100A frame circuit breakers. The 480Y/277V panel has provisions for four Type PD2 225A frame circuit breakers and 24 poles of Type PD1 100A frame circuit breakers. The bolt-on type circuit breakers are ordered separately.

For applications that require the load circuit conductors to exit at the top, a loadside wireway compartment is available that bolts to the service section.

Standard switchboards include two 15.00-inch (381.0 mm) high meter compartment doors, one with meter socket provisions and one blank. For other arrangements, accessory units are available. Check utility requirements.

Standards and Certifications

Eaton’s Instant Service Switchboards are listed by Underwriters Laboratories and comply with all applicable industry standards.

These switchboards meet EUSERC standards as well as other local utility codes.

Seismic Qualified

Eaton’s Instant Service Switchboards are seismically tested, seismically qualified and meet or exceed requirements of the Uniform Building Code® (UBC), the California Building Code (CBC) and the International Building Code (IBC) for all seismic zones.



Product Selection

Main Fused Switch Only

Service	Main Ampere Rating	Type 1—Indoor Catalog Number	Type 3R—Outdoor Catalog Number
240 Vac Maximum			
Single-phase three-wire	400	MSB423	RMSB423
	600	MSB623	RMSB623
Three-phase four-wire	400	MSB424	RMSB424
	600	MSB624	RMSB624
480Y/277 Vac			
Three-phase four-wire	400	MSB444	RMSB444
	600	MSB644	RMSB644

Main Fused Switch with Distribution Panel

Service	Main Ampere Rating	Type 1—Indoor Catalog Number	Type 3R—Outdoor Catalog Number
240 Vac Maximum ^①			
Single-phase three-wire	400	MSBP423	RMSBP423
	600	MSBP623	RMSBP623
Three-phase four-wire	400	MSBP424	RMSBP424
	600	MSBP624	RMSBP624
480Y/277 Vac ^②			
Three-phase four-wire	400	MSBP444	RMSBP444
	600	MSBP644	RMSBP644

Main Breaker Switch Only

Service	Main Ampere Rating	Type 1—Indoor Catalog Number	Type 3R—Outdoor Catalog Number
240 Vac Maximum ^①			
Single-phase three-wire	400	MBB423	RMBB423
	600	MBB623	RMBB623
	800	MBB823	RMBB823
Three-phase four-wire	400	MBB424	RMBB424
	600	MBB624	RMBB624
	800	MBB824	RMBB824
480Y/277 Vac ^②			
Three-phase four-wire	400	MBB444	RMBB444
	600	MBB644	RMBB644
	800	MBB844	RMBB844

Notes

- ^① 240V distribution panels have double branch provisions for four Type PD2 225A frame circuit breakers and 24 poles of Type BAB 100A frame circuit breakers.
- ^② 480Y/277V distribution panels have double branch provisions for four Type PD2 225A frame circuit breakers and 24 poles of Type PD1 100A frame circuit breakers.

Circuit breakers for distribution panels are ordered separately.

Main Breaker Only with Distribution Panel

Service	Main Ampere Rating	Type 1—Indoor Catalog Number	Type 3R—Outdoor Catalog Number
240 Vac Maximum			
Single-phase three-wire	400	MBBP423 ①	RMBBP423 ①
	600	MBBP623 ①	RMBBP623 ①
	800	MBBP823 ②	RMBBP823 ②
	800	MBBP823-P ③	RMBBP823-P ③
	800	MBBP823-K ④	RMBBP823-K ④
Three-phase four-wire	400	MBBP424 ①	RMBBP424 ①
	600	MBBP624 ①	RMBBP624 ①
	800	MBBP824 ②	RMBBP824 ②
	800	MBBP824-P ③	RMBBP824-P ③
	800	MBBP824-K ④	RMBBP824-K ④
480Y/277 Vac			
Three-phase four-wire	400	MBBP444 ⑤	RMBBP444 ⑤
	600	MBBP644 ⑤	RMBBP644 ⑤
	800	MBBP844 ②	RMBBP844 ②
	800	MBBP844-K ④	RMBBP844-K ④

Underground Pull Sections—Same Depth as Switchboard with Provisions for Lug Landing Kit

Section Width Inches (mm)	Type 1—Indoor Catalog Number	Type 3R—Outdoor Catalog Number
24.00 (609.6) ⑥	UG24W	RUG24W
30.00 (762.0)	UG30W	RUG30W

NEMA Type 1 pull section can be installed separate from service section. Add side closer plate, catalog number UGCP.

Lug Landing Kits for Underground Pull Sections

Maximum Ampere Rating	Service	Catalog Number
400	Single-phase three-wire	LL4003
	Three-phase four-wire	LL4004
800	Single-phase three-wire	LL8003 ⑦
	Three-phase four-wire	LL8004 ⑦

Load Side Wireway—12 Inches (304.8 mm) Wide Same Depth as Switchboard

Type	Catalog Number
Type 1—Indoor	LSS12W
Type 3R—Outdoor	RLSS12W

Notes

- ① 240V distribution panels have double branch provisions for four Type PD2 225A frame circuit breakers and 24 poles of Type BAB 100A frame circuit breakers.
- ② 800A distribution panels have double branch provision for six Type PD2 225A frame circuit breakers only.
- ③ Suffix-P: four Type PD2 225A frame circuit breakers and 24 poles of Type PD1 100A frame circuit breakers.
- ④ Suffix-K: one Type PD3 400A frame circuit breakers and four Type PD2 225A frame circuit breakers.
- ⑤ 480Y/277V distribution panels have double branch provisions for four Type PD2 225A frame circuit breakers and 24 poles of Type PD1 100A frame circuit breakers.
- ⑥ Check utility requirements—most EUSERC utilities require 30-inch (762.0 mm) width.
- ⑦ Mounts in 30-inch (762.0 mm) wide section only.

Circuit breakers for distribution panels are ordered separately.

Accessories

Meter Compartment Doors—(Meter Sockets Not Included)

Height	Width	Drilling	Catalog Number
15.00 (381.0)	32.00 (812.8)	Blank	MD150
		One socket	MD151
30.00 (762.0)	32.00 (812.8)	Blank	MD300
		Two sockets	MD302

Meter Sockets—For Field Installation

Number of Jaws	Catalog Number	Number of Jaws	Catalog Number
4	M4	8	M8
5 ^①	M5	13	M13
6 ^②	M6	15 ^③	M15

Circuit Breakers for Distribution Panels 240 Vac Three-Phase Four-Wire Maximum

Ampere Rating	Single-Pole 120/240 Vac Catalog Number	Two-Pole 120/240 Vac Catalog Number	Two-Pole 240 Vac Catalog Number	Three-Pole 240 Vac Catalog Number
15	BAB1015I	BAB2015I	BAB2015HI	BAB3015HI
20	BAB1020I	BAB2020I	BAB2020HI	BAB3030HI
30	BAB1030I	BAB2030I	BAB2030HI	BAB3030HI
40	BAB1040I	BAB2040I	BAB2040HI	BAB3040HI
50	BAB1050I	BAB2050I	BAB2050HI	BAB3050HI
60	BAB1060I	BAB2060I	BAB2060HI	BAB3060HI
70	—	BAB2070I	BAB2070HI	BAB3070HI
90	—	BAB2090I	BAB2090HI	BAB3090HI
100	—	BAB2100I	BAB2100HI	BAB3100HI
100	—	—	ED2100I	ED3100I
125	—	—	ED2125I	ED3135I
150	—	—	ED2150I	ED3150I
175	—	—	ED2175I	ED3175I
200	—	—	ED2200I	ED3200I
225	—	—	ED2225I	ED2225I
300	—	—	KD2300I	KD3300I
350	—	—	KD2350I	KD3350I
400	—	—	KD2400I	KD3400I

Circuit Breakers for Distribution Panels 480Y/277 Vac (Three-Phase Four-Wire)

Ampere Rating	Single-Pole Catalog Number	Two-Pole Catalog Number	Three-Pole Catalog Number
15	GHB1015I	GHB2015I	GHB3015I
20	GHB1020I	GHB2020I	GHB3030I
30	GHB1030I	GHB2030I	GHB3030I
40	GHB1040I	GHB2040I	GHB3040I
50	GHB1050I	GHB2050I	GHB3050I
60	GHB1060I	GHB2060I	GHB3060I
70	—	GHB2070I	GHB3070I
90	—	GHB2090I	GHB3090I
100	—	GHB2100I	GHB3100I
100	—	FD2100I	FD3100I
125	—	FD2125I	FD3135I
150	—	FD2150I	FD3150I
175	—	FD2175I	FD3175I
200	—	FD2200I	FD3200I
225	—	FD2225I	FD2225I
300	—	HKD2300I	HKD3300I
350	—	HKD2350I	HKD3350I
400	—	HKD2400I	HKD3400I

Special Utility Options—Select for the Following Utilities

Utility Company	Catalog Number
City of Anaheim	ISTAHEIM
City of Burbank	ISTBANK

Special Bus Options

Maximum Ampere Rating	Catalog Number
Density Bus Kit	
400	DBK400
600	DBK600
800	DBK800
Copper Bus Kit	
400	CUK400
600	CUK600
800	CUK800

Notes

- ① 240V distribution panels have double branch provisions for four Type PD2 225A frame circuit breakers and 24 poles of Type BAB 100A frame circuit breakers.
- ② 800A distribution panels have double branch provision for six Type PD2 225A frame circuit breakers only.
- ③ Suffix-P: four Type PD2 225A frame circuit breakers and 24 poles of Type PD1 100A frame circuit breakers.

Technical Data and Specifications

- 120/240 Vac, single-phase three-wire
- 208Y/120V or 240/120 Vac, three-phase four-wire
- 240 Delta/120 Vac, three-phase four-wire
- 480Y/277 Vac, three-phase four-wire
- 480 Vac, three-phase three-wire

Interrupting Ratings (Series Rating)

- 65,000 rms symmetrical amperes at 240 Vac, using Types BAB and PD2 branch circuit breakers
- 65,000 rms symmetrical amperes at 480Y/277 Vac, using Types PD1 and PD2 branch circuit breakers

Dimensions

Approximate Dimensions in Inches (mm)

Instant Service Switchboards

Height	Width	Depth
Indoor		
90.00 (2286.0)	32.00 (812.8)	14.00 (355.6)
Outdoor		
90.00 (2286.0)	38.00 (965.2)	26.00 (660.4)

Roll-Up Generator Termination Box



4

Product Description

Eaton's roll-up generator termination boxes (RUGTB) are designed as an intermediate termination cabinet between temporary, portable roll-up generator and the facility being served. The RUGTB is designed for permanent installation and is secured to a concrete pad with bolts.

The RUGTB includes line terminations for the temporary connection of the portable generator and permanent connections on the load side to the secondary disconnect in the facility, which is interlocked with the main overcurrent device in a manner that ensures that only one (either the service main or the generator main) can be energized at any one time. The conductors and conduits must be sized and suitable for carrying the load ratings marked on the equipment per the National Electrical Code.

Features

Enclosure

The enclosure is free-standing with feet on the bottom, providing access to the cable connections for temporary roll-up generator terminations. The enclosure is made from code gauge steel and is suitable for either outdoor or indoor installation (Type 3R construction). The enclosure is powder coat painted ANSI 61 gray. Each enclosure houses line and load phase, neutral and ground connections. Access is provided at the bottom of the enclosure for both the temporary connections to the roll-up generator and permanent connections to the facility's generator overcurrent disconnecting means. The permanent connection section at the bottom of the enclosure contains a fixed mounting plate. The temporary generator connection to the RUGTB contains a hinged cover that allows access to the enclosure for generator conductors.

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Terminations

All roll-up generator termination boxes contain a termination/lug landing for three phases and neutral plus ground. Line termination options include mechanical lugs, one-hole and two-hole compression lugs, one-hole and two-hole compression lug provisions, and quick disconnect.

Lug provisions are provided with bolt configurations as described in the catalog data on the following pages. Where lug provisions are ordered, lugs are supplied by others.

Standards and Certifications

- UL 1773 listed—termination boxes
- 600 Vac maximum
- Amperage ratings: 800, 1200, 1600, 2000 and 2500
- Assembly short-circuit rating: 25,000A rms symmetrical
- Marked "Suitable for use on the line side of service equipment" per UL 1773



Technical Data and Specifications

Approximate Dimensions in Inches (mm)

Roll-Up Generator Termination Box with Line and Load Mechanical Box Lugs ①

Ampere Rating	Dimensions Height	Width	Depth	Mechanical Box Lugs Line Termination Number, Range and Type	Mechanical Box Lugs Load Termination Number, Range and Type	Catalog Number
800	78.00 (1981.2)	36.00 (914.4)	24.00 (609.6)	(3) 4/0–500 kcmil Al/Cu	(3) 4/0–500 kcmil Al/Cu	GTB08MAMA
				(3) 4/0–500 kcmil Al/Cu	(2) 3/0–750 kcmil Al/Cu	GTB08MAMB
				(2) 3/0–750 kcmil Al/Cu	(3) 4/0–500 kcmil Al/Cu	GTB08MBMA
				(2) 3/0–750 kcmil Al/Cu	(2) 3/0–750 kcmil Al/Cu	GTB08MBMB
1200	78.00 (1981.2)	36.00 (914.4)	24.00 (609.6)	(4) 4/0–500 kcmil Al/Cu	(4) 4/0–500 kcmil Al/Cu	GTB12MCMC
				(4) 4/0–500 kcmil Al/Cu	(3) 3/0–750 kcmil Al/Cu	GTB12MCMD
				(3) 3/0–750 kcmil Al/Cu	(4) 4/0–500 kcmil Al/Cu	GTB12MDMC
				(3) 3/0–750 kcmil Al/Cu	(3) 3/0–750 kcmil Al/Cu	GTB12MDMD
1600	78.00 (1981.2)	36.00 (914.4)	24.00 (609.6)	(5) 4/0–500 kcmil Al/Cu	(5) 4/0–500 kcmil Al/Cu	GTB16MEME
				(5) 4/0–500 kcmil Al/Cu	(4) 3/0–750 kcmil Al/Cu	GTB16MEMF
				(4) 3/0–750 kcmil Al/Cu	(5) 4/0–500 kcmil Al/Cu	GTB16MFME
				(4) 3/0–750 kcmil Al/Cu	(4) 3/0–750 kcmil Al/Cu	GTB16MFMF
2000	78.00 (1981.2)	36.00 (914.4)	24.00 (609.6)	(6) 4/0–500 kcmil Al/Cu	(6) 4/0–500 kcmil Al/Cu	GTB20MGMG
				(6) 4/0–500 kcmil Al/Cu	(5) 3/0–750 kcmil Al/Cu	GTB20MGMH
				(5) 3/0–750 kcmil Al/Cu	(6) 4/0–500 kcmil Al/Cu	GTB20MHMG
				(5) 3/0–750 kcmil Al/Cu	(5) 3/0–750 kcmil Al/Cu	GTB20MHMH
2500	78.00 (1981.2)	36.00 (914.4)	24.00 (609.6)	(8) 4/0–500 kcmil Al/Cu	(8) 4/0–500 kcmil Al/Cu	GTB25MJMJ
				(8) 4/0–500 kcmil Al/Cu	(7) 3/0–750 kcmil Al/Cu	GTB25MJMK
				(7) 3/0–750 kcmil Al/Cu	(8) 4/0–500 kcmil Al/Cu	GTB25MKMJ
				(7) 3/0–750 kcmil Al/Cu	(7) 3/0–750 kcmil Al/Cu	GTB25MJMJ

4

Roll-Up Generator Termination Box with Line Mechanical Box Lugs; Load Single-Hole Compression Lugs ①②

Ampere Rating	Dimensions Height	Width	Depth	Mechanical Box Lugs Line Termination Number, Range and Type	Single-Hole Compression Load Termination Number, Range and Type	Catalog Number
800	78.00 (1981.2)	36.00 (914.4)	24.00 (609.6)	(3) 4/0–500 kcmil Al/Cu	(3) 4/0–500 kcmil Al/Cu	GTB08MACA
				(3) 4/0–500 kcmil Al/Cu	(2) 3/0–750 kcmil Al/Cu	GTB08MACB
				(2) 3/0–750 kcmil Al/Cu	(3) 4/0–500 kcmil Al/Cu	GTB08MBCA
				(2) 3/0–750 kcmil Al/Cu	(2) 3/0–750 kcmil Al/Cu	GTB08MBCB
1200	78.00 (1981.2)	36.00 (914.4)	24.00 (609.6)	(4) 4/0–500 kcmil Al/Cu	(4) 4/0–500 kcmil Al/Cu	GTB12MCCC
				(4) 4/0–500 kcmil Al/Cu	(3) 3/0–750 kcmil Al/Cu	GTB12MCCD
				(3) 3/0–750 kcmil Al/Cu	(4) 4/0–500 kcmil Al/Cu	GTB12MDCC
				(3) 3/0–750 kcmil Al/Cu	(3) 3/0–750 kcmil Al/Cu	GTB12MDCD
1600	78.00 (1981.2)	36.00 (914.4)	24.00 (609.6)	(5) 4/0–500 kcmil Al/Cu	(5) 4/0–500 kcmil Al/Cu	GTB16MECE
				(5) 4/0–500 kcmil Al/Cu	(4) 3/0–750 kcmil Al/Cu	GTB16MECF
				(4) 3/0–750 kcmil Al/Cu	(5) 4/0–500 kcmil Al/Cu	GTB16MFCE
				(4) 3/0–750 kcmil Al/Cu	(4) 3/0–750 kcmil Al/Cu	GTB16MFCF
2000	78.00 (1981.2)	36.00 (914.4)	24.00 (609.6)	(6) 4/0–500 kcmil Al/Cu	(6) 4/0–500 kcmil Al/Cu	GTB20MGCG
				(6) 4/0–500 kcmil Al/Cu	(5) 3/0–750 kcmil Al/Cu	GTB20MGCH
				(5) 3/0–750 kcmil Al/Cu	(6) 4/0–500 kcmil Al/Cu	GTB20MHCG
				(5) 3/0–750 kcmil Al/Cu	(5) 3/0–750 kcmil Al/Cu	GTB20MHCH
2500	78.00 (1981.2)	36.00 (914.4)	24.00 (609.6)	(8) 4/0–500 kcmil Al/Cu	(8) 4/0–500 kcmil Al/Cu	GTB25MJCJ
				(8) 4/0–500 kcmil Al/Cu	(7) 3/0–750 kcmil Al/Cu	GTB25MJCK
				(7) 3/0–750 kcmil Al/Cu	(8) 4/0–500 kcmil Al/Cu	GTB25MKCJ
				(7) 3/0–750 kcmil Al/Cu	(7) 3/0–750 kcmil Al/Cu	GTB25MJCJ

Notes

① Line side mechanical lugs are factory selected and installed.

② Load side Anderson, single-hole compression lugs are factory selected and installed.

4.6

Switchboards

Roll-Up Generator Termination Box

Approximate Dimensions in Inches (mm)

Roll-Up Generator Termination Box with Line Mechanical Box Lugs; Load Two-Hole Compression Lugs ^{①②}

Ampere Rating	Dimensions			Mechanical Box Lugs Line Termination Number, Range and Type	Two-Hole Compression Load Termination Cu Only Wire Size	Catalog Number
	Height	Width	Depth			
800	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(3) 4/0–500 kcmil Al/Cu	(3) 350 kcmil Cu only	GTB08MACL
				(3) 4/0–500 kcmil Al/Cu	(3) 400 kcmil Cu only	GTB08MBCM
				(2) 3/0–750 kcmil Al/Cu	(3) 350 kcmil Cu only	GTB08MBCL
				(2) 3/0–750 kcmil Al/Cu	(3) 400 kcmil Cu only	GTB08MACL
1200	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(4) 4/0–500 kcmil Al/Cu	(4) 500 kcmil Cu only	GTB12MCCN
				(4) 4/0–500 kcmil Al/Cu	(3) 600 kcmil Cu only	GTB12MCCP
				(4) 4/0–500 kcmil Al/Cu	(3) 750 kcmil Cu only	GTB12MCCQ
				(3) 3/0–750 kcmil Al/Cu	(4) 500 kcmil Cu only	GTB12MDCN
				(3) 3/0–750 kcmil Al/Cu	(3) 600 kcmil Cu only	GTB12MDCP
				(3) 3/0–750 kcmil Al/Cu	(3) 750 kcmil Cu only	GTB12MDCQ
				1600	78.00 (1981.2)	45.00 (1143.0)
(5) 4/0–500 kcmil Al/Cu	(4) 600 kcmil Cu only	GTB16MECS				
(5) 4/0–500 kcmil Al/Cu	(4) 750 kcmil Cu only	GTB16MECT				
(4) 3/0–750 kcmil Al/Cu	(5) 500 kcmil Cu only	GTB16MFCR				
(4) 3/0–750 kcmil Al/Cu	(4) 600 kcmil Cu only	GTB16MFCS				
(4) 3/0–750 kcmil Al/Cu	(4) 750 kcmil Cu only	GTB16MFCT				
2000	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(6) 4/0–500 kcmil Al/Cu	(6) 500 kcmil Cu only	GTB20MGCU
				(6) 4/0–500 kcmil Al/Cu	(5) 600 kcmil Cu only	GTB20MGCV
				(6) 4/0–500 kcmil Al/Cu	(5) 750 kcmil Cu only	GTB20MGCW
				(5) 3/0–750 kcmil Al/Cu	(6) 500 kcmil Cu only	GTB20MHCU
				(5) 3/0–750 kcmil Al/Cu	(5) 600 kcmil Cu only	GTB20MHCV
				(5) 3/0–750 kcmil Al/Cu	(5) 750 kcmil Cu only	GTB20MHCW
2500	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(8) 4/0–500 kcmil Al/Cu	(7) 500 kcmil Cu only	GTB25MJCX
				(8) 4/0–500 kcmil Al/Cu	(6) 600 kcmil Cu only	GTB25MJCY
				(8) 4/0–500 kcmil Al/Cu	(6) 750 kcmil Cu only	GTB25MJCZ
				(7) 3/0–750 kcmil Al/Cu	(7) 500 kcmil Cu only	GTB25MKCX
				(7) 3/0–750 kcmil Al/Cu	(6) 600 kcmil Cu only	GTB25MKCY
				(7) 3/0–750 kcmil Al/Cu	(6) 750 kcmil Cu only	GTB25MKCZ

Notes

- ① Line side mechanical lugs are factory selected and installed.
- ② Load side factory installed Burndy, two-hole, short barrel compression lugs suitable for copper wire only requires a 45-inch (1143.0 mm) wide enclosure.

Roll-Up Generator Termination Box

Approximate Dimensions in Inches (mm)

Roll-Up Generator Termination Box with Line Mechanical Box Lugs; Load Provisions Only, Single-Hole Compression Lugs ①②

Ampere Rating	Dimensions			Mechanical Box Lugs Line Termination Number, Range and Type	Single-Hole Compression Load Provisions Only Number and Range	Catalog Number
	Height	Width	Depth			
800	78.00 (1981.2)	36.00 (914.4)	24.00 (609.6)	(3) 4/0–500 kcmil Al/Cu	(3) Provisions per phase	GTB08MAP1
				(2) 3/0–750 kcmil Al/Cu	(3) Provisions per phase	GTB08MBP1
1200	78.00 (1981.2)	36.00 (914.4)	24.00 (609.6)	(4) 4/0–500 kcmil Al/Cu	(4) Provisions per phase	GTB12MCP2
				(3) 3/0–750 kcmil Al/Cu	(4) Provisions per phase	GTB12MDP2
1600	78.00 (1981.2)	36.00 (914.4)	24.00 (609.6)	(5) 4/0–500 kcmil Al/Cu	(5) Provisions per phase	GTB16MEP3
				(4) 3/0–750 kcmil Al/Cu	(5) Provisions per phase	GTB16MFP3
2000	78.00 (1981.2)	36.00 (914.4)	24.00 (609.6)	(6) 4/0–500 kcmil Al/Cu	(6) Provisions per phase	GTB20MGP4
				(5) 3/0–750 kcmil Al/Cu	(6) Provisions per phase	GTB20MHP4
2500	78.00 (1981.2)	36.00 (914.4)	24.00 (609.6)	(8) 4/0–500 kcmil Al/Cu	(8) Provisions per phase	GTB25MJP5
				(7) 3/0–750 kcmil Al/Cu	(8) Provisions per phase	GTB25MKP5

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Roll-Up Generator Termination Box with Line Mechanical Box Lugs; Load Provisions Only, Two-Hole Compression Lugs ①③④

Ampere Rating	Dimensions			Mechanical Box Lugs Line Termination Number, Range and Type	Two-Hole Compression Load Provisions Only Number and Range	Catalog Number
	Height	Width	Depth			
800	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(3) 4/0–500 kcmil Al/Cu	(3) Provisions per phase	GTB08MAPA
				(2) 3/0–750 kcmil Al/Cu	(3) Provisions per phase	GTB08MBPA
1200	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(4) 4/0–500 kcmil Al/Cu	(4) Provisions per phase	GTB12MCPB
				(3) 3/0–750 kcmil Al/Cu	(4) Provisions per phase	GTB12MDPB
1600	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(5) 4/0–500 kcmil Al/Cu	(5) Provisions per phase	GTB16MEPC
				(4) 3/0–750 kcmil Al/Cu	(5) Provisions per phase	GTB16MFPC
2000	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(6) 4/0–500 kcmil Al/Cu	(6) Provisions per phase	GTB20MGPD
				(5) 3/0–750 kcmil Al/Cu	(6) Provisions per phase	GTB20MHPD
2500	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(8) 4/0–500 kcmil Al/Cu	(8) Provisions per phase	GTB25MJPE
				(7) 3/0–750 kcmil Al/Cu	(8) Provisions per phase	GTB25MKPE

Notes

- ① Line side mechanical lugs are factory selected and installed.
- ② Load side factory installed 3/8-inch bolt provisions for single-hole compression lugs (lugs furnished by others).
- ③ Load side factory installed 1/2-inch bolt provisions on 1-3/4-inch hole centers for two-hole compression lugs (lugs furnished by others).
- ④ Requires 45-inch (1143.0 mm) wide enclosure.

4.6

Switchboards

Roll-Up Generator Termination Box

Approximate Dimensions in Inches (mm)

Roll-Up Generator Termination Box with Line Single-Hole Compression Lugs and Load Mechanical Box Lugs ^{①②}

Ampere Rating	Dimensions Height	Width	Depth	Single-Hole Compression Line Termination Number, Range and Type	Mechanical Box Lugs Load Termination Number, Range and Type	Catalog Number
800	78.00 (1981.2)	36.00 (914.4)	24.00 (609.6)	(3) 4/0–500 kcmil Al/Cu	(3) 4/0–500 kcmil Al/Cu	GTB08CAMA
				(3) 4/0–500 kcmil Al/Cu	(2) 3/0–750 kcmil Al/Cu	GTB08CAMB
				(2) 3/0–750 kcmil Al/Cu	(3) 4/0–500 kcmil Al/Cu	GTB08CBMA
				(2) 3/0–750 kcmil Al/Cu	(2) 3/0–750 kcmil Al/Cu	GTB08CBMB
1200	78.00 (1981.2)	36.00 (914.4)	24.00 (609.6)	(4) 4/0–500 kcmil Al/Cu	(4) 4/0–500 kcmil Al/Cu	GTB12CCMC
				(4) 4/0–500 kcmil Al/Cu	(3) 3/0–750 kcmil Al/Cu	GTB12CCMD
				(3) 3/0–750 kcmil Al/Cu	(4) 4/0–500 kcmil Al/Cu	GTB12CDMC
				(3) 3/0–750 kcmil Al/Cu	(3) 3/0–750 kcmil Al/Cu	GTB12CDMD
1600	78.00 (1981.2)	36.00 (914.4)	24.00 (609.6)	(5) 4/0–500 kcmil Al/Cu	(5) 4/0–500 kcmil Al/Cu	GTB16CEME
				(5) 4/0–500 kcmil Al/Cu	(4) 3/0–750 kcmil Al/Cu	GTB16CEMF
				(4) 3/0–750 kcmil Al/Cu	(5) 4/0–500 kcmil Al/Cu	GTB16CFME
				(4) 3/0–750 kcmil Al/Cu	(4) 3/0–750 kcmil Al/Cu	GTB16CFMF
2000	78.00 (1981.2)	36.00 (914.4)	24.00 (609.6)	(6) 4/0–500 kcmil Al/Cu	(6) 4/0–500 kcmil Al/Cu	GTB20CGMG
				(6) 4/0–500 kcmil Al/Cu	(5) 3/0–750 kcmil Al/Cu	GTB20CGMH
				(5) 3/0–750 kcmil Al/Cu	(6) 4/0–500 kcmil Al/Cu	GTB20CHMG
				(5) 3/0–750 kcmil Al/Cu	(5) 3/0–750 kcmil Al/Cu	GTB20CHMH
2500	78.00 (1981.2)	36.00 (914.4)	24.00 (609.6)	(8) 4/0–500 kcmil Al/Cu	(8) 4/0–500 kcmil Al/Cu	GTB25CJMJ
				(8) 4/0–500 kcmil Al/Cu	(7) 3/0–750 kcmil Al/Cu	GTB25CJMK
				(7) 3/0–750 kcmil Al/Cu	(8) 4/0–500 kcmil Al/Cu	GTB25CKMJ
				(7) 3/0–750 kcmil Al/Cu	(7) 3/0–750 kcmil Al/Cu	GTB25CJMK

Roll-Up Generator Termination Box with Line and Load Single-Hole Compression Lugs ^③

Ampere Rating	Dimensions Height	Width	Depth	Single-Hole Compression Line Termination Number, Range and Type	Single-Hole Compression Load Termination Number, Range and Type	Catalog Number
800	78.00 (1981.2)	36.00 (914.4)	24.00 (609.6)	(3) 4/0–500 kcmil Al/Cu	(3) 4/0–500 kcmil Al/Cu	GTB08CACA
				(3) 4/0–500 kcmil Al/Cu	(2) 3/0–750 kcmil Al/Cu	GTB08CACB
				(2) 3/0–750 kcmil Al/Cu	(3) 4/0–500 kcmil Al/Cu	GTB08CBCA
				(2) 3/0–750 kcmil Al/Cu	(2) 3/0–750 kcmil Al/Cu	GTB08CBCB
1200	78.00 (1981.2)	36.00 (914.4)	24.00 (609.6)	(4) 4/0–500 kcmil Al/Cu	(4) 4/0–500 kcmil Al/Cu	GTB12CCCC
				(4) 4/0–500 kcmil Al/Cu	(3) 3/0–750 kcmil Al/Cu	GTB12CCCD
				(3) 3/0–750 kcmil Al/Cu	(4) 4/0–500 kcmil Al/Cu	GTB12CDCC
				(3) 3/0–750 kcmil Al/Cu	(3) 3/0–750 kcmil Al/Cu	GTB12CDCD
1600	78.00 (1981.2)	36.00 (914.4)	24.00 (609.6)	(5) 4/0–500 kcmil Al/Cu	(5) 4/0–500 kcmil Al/Cu	GTB16CECE
				(5) 4/0–500 kcmil Al/Cu	(4) 3/0–750 kcmil Al/Cu	GTB16CECF
				(4) 3/0–750 kcmil Al/Cu	(5) 4/0–500 kcmil Al/Cu	GTB16CFCE
				(4) 3/0–750 kcmil Al/Cu	(4) 3/0–750 kcmil Al/Cu	GTB16CFCF
2000	78.00 (1981.2)	36.00 (914.4)	24.00 (609.6)	(6) 4/0–500 kcmil Al/Cu	(6) 4/0–500 kcmil Al/Cu	GTB20CGCG
				(6) 4/0–500 kcmil Al/Cu	(5) 3/0–750 kcmil Al/Cu	GTB20CGCH
				(5) 3/0–750 kcmil Al/Cu	(6) 4/0–500 kcmil Al/Cu	GTB20CHCG
				(5) 3/0–750 kcmil Al/Cu	(5) 3/0–750 kcmil Al/Cu	GTB20CHCH
2500	78.00 (1981.2)	36.00 (914.4)	24.00 (609.6)	(8) 4/0–500 kcmil Al/Cu	(8) 4/0–500 kcmil Al/Cu	GTB25CJCJ
				(8) 4/0–500 kcmil Al/Cu	(7) 3/0–750 kcmil Al/Cu	GTB25CJCK
				(7) 3/0–750 kcmil Al/Cu	(8) 4/0–500 kcmil Al/Cu	GTB25CKCJ
				(7) 3/0–750 kcmil Al/Cu	(7) 3/0–750 kcmil Al/Cu	GTB25CJCK

Notes

- ① Line side Anderson, single-hole compression lugs are factory selected and installed.
- ② Load side mechanical lugs are factory selected and installed.
- ③ Line side and load Anderson, single-hole compression lugs are factory selected and installed.

Roll-Up Generator Termination Box

Approximate Dimensions in Inches (mm)

Roll-Up Generator Termination Box with Line Single-Hole Compression Lugs; Load Two-Hole Compression Lugs ^{①②③}

Ampere Rating	Dimensions Height	Width	Depth	Single-Hole Compression Line Termination Number, Range and Type	Two-Hole Compression Load Termination Cu Only Wire Size	Catalog Number
800	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(3) 4/0–500 kcmil Al/Cu	(3) 350 kcmil Cu only	GTB08CACL
				(3) 4/0–500 kcmil Al/Cu	(3) 400 kcmil Cu only	GTB08CACM
				(2) 3/0–750 kcmil Al/Cu	(3) 350 kcmil Cu only	GTB08CBCL
				(2) 3/0–750 kcmil Al/Cu	(3) 400 kcmil Cu only	GTB08CBCM
1200	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(4) 4/0–500 kcmil Al/Cu	(4) 500 kcmil Cu only	GTB12CCCN
				(4) 4/0–500 kcmil Al/Cu	(3) 600 kcmil Cu only	GTB12CCCP
				(4) 4/0–500 kcmil Al/Cu	(3) 750 kcmil Cu only	GTB12CCCQ
				(3) 3/0–750 kcmil Al/Cu	(4) 500 kcmil Cu only	GTB12CDCN
				(3) 3/0–750 kcmil Al/Cu	(3) 600 kcmil Cu only	GTB12CDCP
				(3) 3/0–750 kcmil Al/Cu	(3) 750 kcmil Cu only	GTB12CDCQ
1600	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(5) 4/0–500 kcmil Al/Cu	(5) 500 kcmil Cu only	GTB16CECR
				(5) 4/0–500 kcmil Al/Cu	(4) 600 kcmil Cu only	GTB16CECS
				(5) 4/0–500 kcmil Al/Cu	(4) 750 kcmil Cu only	GTB16CECT
				(4) 3/0–750 kcmil Al/Cu	(5) 500 kcmil Cu only	GTB16CFCR
				(4) 3/0–750 kcmil Al/Cu	(4) 600 kcmil Cu only	GTB16CFCS
				(4) 3/0–750 kcmil Al/Cu	(4) 750 kcmil Cu only	GTB16CFCT
2000	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(6) 4/0–500 kcmil Al/Cu	(6) 500 kcmil Cu only	GTB20CGCU
				(6) 4/0–500 kcmil Al/Cu	(5) 600 kcmil Cu only	GTB20CGCV
				(6) 4/0–500 kcmil Al/Cu	(5) 750 kcmil Cu only	GTB20CGCW
				(5) 3/0–750 kcmil Al/Cu	(6) 500 kcmil Cu only	GTB20CHCU
				(5) 3/0–750 kcmil Al/Cu	(5) 600 kcmil Cu only	GTB20CHCV
				(5) 3/0–750 kcmil Al/Cu	(5) 750 kcmil Cu only	GTB20CHCW
2500	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(8) 4/0–500 kcmil Al/Cu	(7) 500 kcmil Cu only	GTB25CJCX
				(8) 4/0–500 kcmil Al/Cu	(6) 600 kcmil Cu only	GTB25CJCY
				(8) 4/0–500 kcmil Al/Cu	(6) 750 kcmil Cu only	GTB25CJCZ
				(7) 3/0–750 kcmil Al/Cu	(7) 500 kcmil Cu only	GTB25CKCX
				(7) 3/0–750 kcmil Al/Cu	(6) 600 kcmil Cu only	GTB25CKCY
				(7) 3/0–750 kcmil Al/Cu	(6) 750 kcmil Cu only	GTB25CKCZ

Roll-Up Generator Termination Box with Line Single-Hole Compression Lugs; Load Provisions Only, Single-Hole Compression Lugs ^{①④}

Ampere Rating	Dimensions Height	Width	Depth	Single-Hole Compression Line Termination Number, Range and Type	Single-Hole Compression Load Provisions Only Number and Range	Catalog Number
800	78.00 (1981.2)	36.00 (914.4)	24.00 (609.6)	(3) 4/0–500 kcmil Al/Cu	(3) Provisions per phase	GTB08CAP1
				(2) 3/0–750 kcmil Al/Cu	(3) Provisions per phase	GTB08CBP1
1200	78.00 (1981.2)	36.00 (914.4)	24.00 (609.6)	(4) 4/0–500 kcmil Al/Cu	(4) Provisions per phase	GTB12CCP2
				(3) 3/0–750 kcmil Al/Cu	(4) Provisions per phase	GTB12CDP2
1600	78.00 (1981.2)	36.00 (914.4)	24.00 (609.6)	(5) 4/0–500 kcmil Al/Cu	(5) Provisions per phase	GTB16CEP3
				(4) 3/0–750 kcmil Al/Cu	(5) Provisions per phase	GTB16CFP3
2000	78.00 (1981.2)	36.00 (914.4)	24.00 (609.6)	(6) 4/0–500 kcmil Al/Cu	(6) Provisions per phase	GTB20CGP4
				(5) 3/0–750 kcmil Al/Cu	(6) Provisions per phase	GTB20CHP4
2500	78.00 (1981.2)	36.00 (914.4)	24.00 (609.6)	(8) 4/0–500 kcmil Al/Cu	(8) Provisions per phase	GTB25CJP5
				(7) 3/0–750 kcmil Al/Cu	(8) Provisions per phase	GTB25CKP5

Notes

- ① Line side Anderson, single-hole compression lugs are factory selected and installed.
- ② Load side factory installed Burndy, two-hole, short barrel compression lugs suitable for copper wire only.
- ③ Requires 45-inch (1143.0 mm) wide enclosure.
- ④ Load side factory installed 3/8-inch bolt provisions for single-hole compression lugs (lugs furnished by others).

4.6

Switchboards

Roll-Up Generator Termination Box

Approximate Dimensions in Inches (mm)

Roll-Up Generator Termination Box with Single-Hole Compression Lugs; Load Provisions Only, Two-Hole Compression Lugs) ^{①②③}

Ampere Rating	Dimensions			Single-Hole Compression Line Termination Number, Range and Type	Two-Hole Compression Load Provisions Only Number and Range	Catalog Number
	Height	Width	Depth			
800	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(3) 4/0–500 kcmil Al/Cu	(3) Provisions per phase	GTB08CAPA
				(2) 3/0–750 kcmil Al/Cu	(3) Provisions per phase	GTB08CBPA
1200	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(4) 4/0–500 kcmil Al/Cu	(4) Provisions per phase	GTB12CCPB
				(3) 3/0–750 kcmil Al/Cu	(4) Provisions per phase	GTB12CDPB
1600	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(5) 4/0–500 kcmil Al/Cu	(5) Provisions per phase	GTB16CEPC
				(4) 3/0–750 kcmil Al/Cu	(5) Provisions per phase	GTB16CGPC
2000	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(6) 4/0–500 kcmil Al/Cu	(6) Provisions per phase	GTB20CGPD
				(5) 3/0–750 kcmil Al/Cu	(6) Provisions per phase	GTB20CHPD
2500	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(8) 4/0–500 kcmil Al/Cu	(8) Provisions per phase	GTB25CJPE
				(7) 3/0–750 kcmil Al/Cu	(8) Provisions per phase	GTB25CKPE

Roll-Up Generator Termination Box with Line Two-Hole Compression Lugs and Load Mechanical Box Lugs ^{③④⑤}

Ampere Rating	Dimensions			Two-Hole Compression Line Termination Cu Only Wire Size	Mechanical Box Lugs Load Termination Number, Range and Type	Catalog Number
	Height	Width	Depth			
800	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(3) 350 kcmil Cu only	(3) 4/0–500 kcmil Al/Cu	GTB08CLMA
				(3) 350 kcmil Cu only	(2) 3/0–750 kcmil Al/Cu	GTB08CLMB
				(3) 400 kcmil Cu only	(3) 4/0–500 kcmil Al/Cu	GTB08CMMA
				(3) 400 kcmil Cu only	(2) 3/0–750 kcmil Al/Cu	GTB08CMMB
1200	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(4) 500 kcmil Cu only	(4) 4/0–500 kcmil Al/Cu	GTB12CNMC
				(4) 500 kcmil Cu only	(3) 3/0–750 kcmil Al/Cu	GTB12CNMD
				(3) 600 kcmil Cu only	(4) 4/0–500 kcmil Al/Cu	GTB12CPMC
				(3) 600 kcmil Cu only	(3) 3/0–750 kcmil Al/Cu	GTB12CPMD
				(3) 750 kcmil Cu only	(4) 4/0–500 kcmil Al/Cu	GTB12CQMC
				(3) 750 kcmil Cu only	(3) 3/0–750 kcmil Al/Cu	GTB12CQMD
				1600	78.00 (1981.2)	45.00 (1143.0)
(5) 500 kcmil Cu only	(4) 3/0–750 kcmil Al/Cu	GTB16CRMF				
(4) 600 kcmil Cu only	(5) 4/0–500 kcmil Al/Cu	GTB16CSME				
(4) 600 kcmil Cu only	(4) 3/0–750 kcmil Al/Cu	GTB16CSMF				
(4) 750 kcmil Cu only	(5) 4/0–500 kcmil Al/Cu	GTB16CTME				
(4) 750 kcmil Cu only	(4) 3/0–750 kcmil Al/Cu	GTB16CTMF				
2000	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)			
				(6) 500 kcmil Cu only	(5) 3/0–750 kcmil Al/Cu	GTB20CUMH
				(5) 600 kcmil Cu only	(6) 4/0–500 kcmil Al/Cu	GTB20CVMG
				(5) 600 kcmil Cu only	(5) 3/0–750 kcmil Al/Cu	GTB20CVMH
				(5) 750 kcmil Cu only	(6) 4/0–500 kcmil Al/Cu	GTB20CWMG
				(5) 750 kcmil Cu only	(5) 3/0–750 kcmil Al/Cu	GTB20CWMH
2500	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(7) 500 kcmil Cu only	(8) 4/0–500 kcmil Al/Cu	GTB25CXMJ
				(7) 500 kcmil Cu only	(7) 3/0–750 kcmil Al/Cu	GTB25CXMK
				(6) 600 kcmil Cu only	(8) 4/0–500 kcmil Al/Cu	GTB25CYMJ
				(6) 600 kcmil Cu only	(7) 3/0–750 kcmil Al/Cu	GTB25CYMK
				(6) 750 kcmil Cu only	(8) 4/0–500 kcmil Al/Cu	GTB25CZMJ
				(6) 750 kcmil Cu only	(7) 3/0–750 kcmil Al/Cu	GTB25CZMK

Notes

- ① Line side Anderson, single-hole compression lugs are factory selected and installed.
- ② Load side factory installed 1/2-inch bolt provisions on 1-3/4-inch hole centers for two-hole compression lugs (lugs furnished by others).
- ③ Requires 45-inch (1143.0 mm) wide enclosure.
- ④ Line side factory installed Burndy, two-hole, short barrel compression lugs suitable for copper wire only.
- ⑤ Load side mechanical lugs are factory selected and installed.

Roll-Up Generator Termination Box

Approximate Dimensions in Inches (mm)

Roll-Up Generator Termination Box with Line Two-Hole Compression Lugs and Load Single-Hole Compression Lugs

Ampere Rating	Dimensions			Two-Hole Compression Line Termination Cu Only Wire Size	Single-Hole Compression Load Termination Number, Range and Type	Catalog Number
	Height	Width	Depth			
800	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(3) 350 kcmil Cu only	(3) 4/0–500 kcmil Al/Cu	GTB08CLCA
				(3) 350 kcmil Cu only	(2) 3/0–750 kcmil Al/Cu	GTB08CLCB
				(3) 400 kcmil Cu only	(3) 4/0–500 kcmil Al/Cu	GTB08CMCA
				(3) 400 kcmil Cu only	(2) 3/0–750 kcmil Al/Cu	GTB08CMCB
1200	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(4) 500 kcmil Cu only	(4) 4/0–500 kcmil Al/Cu	GTB12CNCC
				(4) 500 kcmil Cu only	(3) 3/0–750 kcmil Al/Cu	GTB12CNCD
				(3) 600 kcmil Cu only	(4) 4/0–500 kcmil Al/Cu	GTB12CPCC
				(3) 600 kcmil Cu only	(3) 3/0–750 kcmil Al/Cu	GTB12CPCD
				(3) 750 kcmil Cu only	(4) 4/0–500 kcmil Al/Cu	GTB12CQCC
				(3) 750 kcmil Cu only	(3) 3/0–750 kcmil Al/Cu	GTB12CQCD
1600	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(5) 500 kcmil Cu only	(5) 4/0–500 kcmil Al/Cu	GTB16CRCE
				(5) 500 kcmil Cu only	(4) 3/0–750 kcmil Al/Cu	GTB16CRCF
				(4) 600 kcmil Cu only	(5) 4/0–500 kcmil Al/Cu	GTB16CSCE
				(4) 600 kcmil Cu only	(4) 3/0–750 kcmil Al/Cu	GTB16CSCF
				(4) 750 kcmil Cu only	(5) 4/0–500 kcmil Al/Cu	GTB16CTCE
				(4) 750 kcmil Cu only	(4) 3/0–750 kcmil Al/Cu	GTB16CTCF
2000	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(6) 500 kcmil Cu only	(6) 4/0–500 kcmil Al/Cu	GTB20CUCG
				(6) 500 kcmil Cu only	(5) 3/0–750 kcmil Al/Cu	GTB20CUCH
				(5) 600 kcmil Cu only	(6) 4/0–500 kcmil Al/Cu	GTB20CVCG
				(5) 600 kcmil Cu only	(5) 3/0–750 kcmil Al/Cu	GTB20CVCH
				(5) 750 kcmil Cu only	(6) 4/0–500 kcmil Al/Cu	GTB20CWCG
				(5) 750 kcmil Cu only	(5) 3/0–750 kcmil Al/Cu	GTB20CWCH
2500	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(7) 500 kcmil Cu only	(8) 4/0–500 kcmil Al/Cu	GTB25CX CJ
				(7) 500 kcmil Cu only	(7) 3/0–750 kcmil Al/Cu	GTB25CXCK
				(6) 600 kcmil Cu only	(8) 4/0–500 kcmil Al/Cu	GTB25CYCJ
				(6) 600 kcmil Cu only	(7) 3/0–750 kcmil Al/Cu	GTB25CYCK
				(6) 750 kcmil Cu only	(8) 4/0–500 kcmil Al/Cu	GTB25CZCJ
				(6) 750 kcmil Cu only	(7) 3/0–750 kcmil Al/Cu	GTB25CZCK

Notes

Line side factory installed Burndy, two-hole, short barrel compression lugs suitable for copper wire only.

Load side Anderson, single-hole compression lugs are factory selected and installed.

Requires 45-inch (1143.0 mm) wide enclosure.

4.6

Switchboards

Roll-Up Generator Termination Box

Approximate Dimensions in Inches (mm)

Roll-Up Generator Termination Box with Line Two-Hole Compression Lugs; Load Two-Hole Compression Lugs

Ampere Rating	Dimensions			Two-Hole Compression Line Termination Cu Only Wire Size	Two-Hole Compression Load Termination Cu Only Wire Size	Catalog Number
	Height	Width	Depth			
800	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(3) 350 kcmil Cu only	(3) 350 kcmil Cu only	GTB08CLCL
				(3) 350 kcmil Cu only	(3) 400 kcmil Cu only	GTB08CLCM
				(3) 400 kcmil Cu only	(3) 350 kcmil Cu only	GTB08CMCL
				(3) 400 kcmil Cu only	(3) 400 kcmil Cu only	GTB08CMCM
1200	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(4) 500 kcmil Cu only	(4) 500 kcmil Cu only	GTB12CNCN
				(4) 500 kcmil Cu only	(3) 600 kcmil Cu only	GTB12CNCP
				(4) 500 kcmil Cu only	(3) 750 kcmil Cu only	GTB12CNCQ
				(3) 600 kcmil Cu only	(4) 500 kcmil Cu only	GTB12PCPN
				(3) 600 kcmil Cu only	(3) 600 kcmil Cu only	GTB12PCPP
				(3) 600 kcmil Cu only	(3) 750 kcmil Cu only	GTB12PCPQ
				(3) 750 kcmil Cu only	(4) 500 kcmil Cu only	GTB12CQCN
				(3) 750 kcmil Cu only	(3) 600 kcmil Cu only	GTB12CQCP
				(3) 750 kcmil Cu only	(3) 750 kcmil Cu only	GTB12CQCQ
				1600	78.00 (1981.2)	45.00 (1143.0)
(5) 500 kcmil Cu only	(4) 600 kcmil Cu only	GTB16CRCS				
(5) 500 kcmil Cu only	(4) 750 kcmil Cu only	GTB16CRCT				
(4) 600 kcmil Cu only	(5) 500 kcmil Cu only	GTB16CSCR				
(4) 600 kcmil Cu only	(4) 600 kcmil Cu only	GTB16SCSS				
(4) 600 kcmil Cu only	(4) 750 kcmil Cu only	GTB16CSCT				
(4) 750 kcmil Cu only	(5) 500 kcmil Cu only	GTB16CTCR				
(4) 750 kcmil Cu only	(4) 600 kcmil Cu only	GTB16CTCS				
(4) 750 kcmil Cu only	(4) 750 kcmil Cu only	GTB16CTCT				
2000	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(6) 500 kcmil Cu only	(6) 500 kcmil Cu only	GTB20UCU
				(6) 500 kcmil Cu only	(5) 600 kcmil Cu only	GTB20UCUV
				(6) 500 kcmil Cu only	(5) 750 kcmil Cu only	GTB20UCUW
				(5) 600 kcmil Cu only	(6) 500 kcmil Cu only	GTB20VCU
				(5) 600 kcmil Cu only	(5) 600 kcmil Cu only	GTB20VCUV
				(5) 600 kcmil Cu only	(5) 750 kcmil Cu only	GTB20VCUW
				(5) 750 kcmil Cu only	(6) 500 kcmil Cu only	GTB20WCU
				(5) 750 kcmil Cu only	(5) 600 kcmil Cu only	GTB20WCV
				(5) 750 kcmil Cu only	(5) 750 kcmil Cu only	GTB20WCW
2500	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(7) 500 kcmil Cu only	(7) 500 kcmil Cu only	GTB25CXCX
				(7) 500 kcmil Cu only	(6) 600 kcmil Cu only	GTB25CXCY
				(7) 500 kcmil Cu only	(6) 750 kcmil Cu only	GTB25CX CZ
				(6) 600 kcmil Cu only	(7) 500 kcmil Cu only	GTB25CYCX
				(6) 600 kcmil Cu only	(6) 600 kcmil Cu only	GTB25CYCY
				(6) 600 kcmil Cu only	(6) 750 kcmil Cu only	GTB25CY CZ
				(6) 750 kcmil Cu only	(7) 500 kcmil Cu only	GTB25CZCX
				(6) 750 kcmil Cu only	(6) 600 kcmil Cu only	GTB25CZCY
				(6) 750 kcmil Cu only	(6) 750 kcmil Cu only	GTB25CZ CZ

Notes

Line and load side factory installed Burndy, two-hole, short barrel compression lugs suitable for copper wire only. Requires 45-inch (1143.0 mm) wide enclosure.

Roll-Up Generator Termination Box

Approximate Dimensions in Inches (mm)

Roll-Up Generator Termination Box with Line Two-Hole Compression Lugs; Load Provisions Only, Single-Hole Compression Lugs ^{①②③}

Ampere Rating	Dimensions Height	Width	Depth	Two-Hole Compression Line Termination Cu Only Wire Size	Single-Hole Compression Load Provisions Only Number and Range	Catalog Number
800	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(3) 350 kcmil Cu only	(3) Provisions per phase	GTB08CLP1
				(3) 400 kcmil Cu only	(3) Provisions per phase	GTB08CMP1
1200	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(4) 500 kcmil Cu only	(4) Provisions per phase	GTB12CNP2
				(3) 600 kcmil Cu only	(4) Provisions per phase	GTB12CPP2
				(3) 750 kcmil Cu only	(4) Provisions per phase	GTB12CQP2
2000	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(6) 500 kcmil Cu only	(6) Provisions per phase	GTB20CUP4
				(5) 600 kcmil Cu only	(6) Provisions per phase	GTB20CVP4
				(5) 750 kcmil Cu only	(6) Provisions per phase	GTB20CWP4
2500	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(7) 500 kcmil Cu only	(8) Provisions per phase	GTB25CXP5
				(6) 600 kcmil Cu only	(8) Provisions per phase	GTB25CYP6
				(6) 750 kcmil Cu only	(8) Provisions per phase	GTB25CZP6

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Roll-Up Generator Termination Box with Two-Hole Compression Lugs; Load Provisions Only, Two-Hole Compression Lugs ^④

Ampere Rating	Dimensions Height	Width	Depth	Two-Hole Compression Line Termination Cu Only Wire Size	Two-Hole Compression Load Provisions Only Number and Range	Catalog Number
800	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(3) 350 kcmil Cu only	(3) Provisions per phase	GTB08CLPA
				(3) 400 kcmil Cu only	(3) Provisions per phase	GTB08CMPA
1200	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(4) 500 kcmil Cu only	(4) Provisions per phase	GTB12CNPB
				(3) 600 kcmil Cu only	(4) Provisions per phase	GTB12CPPB
				(3) 750 kcmil Cu only	(4) Provisions per phase	GTB12CQPB
1600	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(5) 500 kcmil Cu only	(5) Provisions per phase	GTB16CRPC
				(4) 600 kcmil Cu only	(5) Provisions per phase	GTB16CSPC
				(4) 750 kcmil Cu only	(5) Provisions per phase	GTB16CTPC
2000	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(6) 500 kcmil Cu only	(6) Provisions per phase	GTB20CUPD
				(5) 600 kcmil Cu only	(6) Provisions per phase	GTB20CVPD
				(5) 750 kcmil Cu only	(6) Provisions per phase	GTB20CWPD
2500	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(7) 500 kcmil Cu only	(8) Provisions per phase	GTB25CXPE
				(6) 600 kcmil Cu only	(8) Provisions per phase	GTB25CYPE
				(6) 750 kcmil Cu only	(8) Provisions per phase	GTB25CZPE

Notes

- ① Line side factory installed Burndy, two-hole, short barrel compression lugs suitable for copper wire only.
- ② Load side factory installed 3/8-inch bolt provisions for single-hole compression lugs (lugs furnished by others).
- ③ Requires 45-inch (1143.0 mm) wide enclosure.
- ④ Load side factory installed 1/2-inch bolt provisions on 1-3/4-inch hole centers for two-hole compression lugs (lugs furnished by others).

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Switchboards

Roll-Up Generator Termination Box

Approximate Dimensions in Inches (mm)

Roll-Up Generator Termination Box with Line Single-Hole Compression Lug Provisions; Load Mechanical Box Lugs ^{①②}

Ampere Rating	Dimensions			Single-Hole Compression Line Provisions Only Number and Range	Mechanical Box Lugs Load Termination Number, Range and Type	Catalog Number
	Height	Width	Depth			
800	78.00 (1981.2)	36.00 (914.4)	24.00 (609.6)	(3) Provisions per phase	(3) 4/0–500 kcmil Al/Cu	GTB08P1MA
				(3) Provisions per phase	(2) 3/0–750 kcmil Al/Cu	GTB08P1MB
1200	78.00 (1981.2)	36.00 (914.4)	24.00 (609.6)	(4) Provisions per phase	(4) 4/0–500 kcmil Al/Cu	GTB12P2MC
				(4) Provisions per phase	(3) 3/0–750 kcmil Al/Cu	GTB12P2MD
1600	78.00 (1981.2)	36.00 (914.4)	24.00 (609.6)	(5) Provisions per phase	(5) 4/0–500 kcmil Al/Cu	GTB16P3ME
				(5) Provisions per phase	(4) 3/0–750 kcmil Al/Cu	GTB16P3MF
2000	78.00 (1981.2)	36.00 (914.4)	24.00 (609.6)	(6) Provisions per phase	(6) 4/0–500 kcmil Al/Cu	GTB20P4MG
				(6) Provisions per phase	(5) 3/0–750 kcmil Al/Cu	GTB20P4MH
2500	78.00 (1981.2)	36.00 (914.4)	24.00 (609.6)	(8) Provisions per phase	(8) 4/0–500 kcmil Al/Cu	GTB25P5MJ
				(8) Provisions per phase	(7) 3/0–750 kcmil Al/Cu	GTB25P5MK

Roll-Up Generator Termination Box with Line Single-Hole Compression Lug Provisions; Load Single-Hole Compression Lugs ^{①③}

Ampere Rating	Dimensions			Single-Hole Compression Line Provisions Only Number and Range	Single-Hole Compression Load Termination Number, Range and Type	Catalog Number
	Height	Width	Depth			
800	78.00 (1981.2)	36.00 (914.4)	24.00 (609.6)	(3) Provisions per phase	(3) 4/0–500 kcmil Al/Cu	GTB08P1CA
				(3) Provisions per phase	(2) 3/0–750 kcmil Al/Cu	GTB08P1CB
1200	78.00 (1981.2)	36.00 (914.4)	24.00 (609.6)	(4) Provisions per phase	(4) 4/0–500 kcmil Al/Cu	GTB12P2CC
				(4) Provisions per phase	(3) 3/0–750 kcmil Al/Cu	GTB12P2CD
1600	78.00 (1981.2)	36.00 (914.4)	24.00 (609.6)	(5) Provisions per phase	(5) 4/0–500 kcmil Al/Cu	GTB16P3CE
				(5) Provisions per phase	(4) 3/0–750 kcmil Al/Cu	GTB16P3CF
2000	78.00 (1981.2)	36.00 (914.4)	24.00 (609.6)	(6) Provisions per phase	(6) 4/0–500 kcmil Al/Cu	GTB20P4CG
				(6) Provisions per phase	(5) 3/0–750 kcmil Al/Cu	GTB20P4CH
2500	78.00 (1981.2)	36.00 (914.4)	24.00 (609.6)	(8) Provisions per phase	(8) 4/0–500 kcmil Al/Cu	GTB25P5CJ
				(8) Provisions per phase	(7) 3/0–750 kcmil Al/Cu	GTB25P5CK

Notes

- ① Line side factory installed 3/8-inch bolt provisions for single-hole compression lugs (lugs furnished by others).
- ② Load side mechanical lugs are factory selected and installed.
- ③ Load side Anderson, single-hole compression lugs are factory selected and installed.

Roll-Up Generator Termination Box

Approximate Dimensions in Inches (mm)

Roll-Up Generator Termination Box with Line Single-Hole Compression Lug Provisions; Load Two-Hole Compression Lugs ^{①②③}

Ampere Rating	Dimensions			Single-Hole Compression Line Provisions Only Number and Range	Two-Hole Compression Load Termination Cu Only Wire Size	Catalog Number
	Height	Width	Depth			
800	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(3) 4/0–500 kcmil	(3) 350 kcmil Cu only	GTB08P1CL
				(3) 4/0–500 kcmil	(3) 400 kcmil Cu only	GTB08P1CM
1200	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(4) 4/0–500 kcmil	(4) 500 kcmil Cu only	GTB12P2CN
				(4) 4/0–500 kcmil	(3) 600 kcmil Cu only	GTB12P2CP
				(4) 4/0–500 kcmil	(3) 750 kcmil Cu only	GTB12P2CQ
1600	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(5) 4/0–500 kcmil	(5) 500 kcmil Cu only	GTB16P3CR
				(5) 4/0–500 kcmil	(4) 600 kcmil Cu only	GTB16P3CS
				(5) 4/0–500 kcmil	(4) 750 kcmil Cu only	GTB16P3CT
2000	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(6) 4/0–500 kcmil	(6) 500 kcmil Cu only	GTB20P4CU
				(6) 4/0–500 kcmil	(5) 600 kcmil Cu only	GTB20P4CU
				(6) 4/0–500 kcmil	(5) 750 kcmil Cu only	GTB20P4CW
2500	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(8) 4/0–500 kcmil	(7) 500 kcmil Cu only	GTB25P5CX
				(8) 4/0–500 kcmil	(6) 600 kcmil Cu only	GTB25P5CY
				(8) 4/0–500 kcmil	(6) 750 kcmil Cu only	GTB25P5CZ

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Roll-Up Generator Termination Box with Line Single-Hole Compression Lug Provisions; Load Single-Hole Compression Lugs ^④

Ampere Rating	Dimensions			Single-Hole Compression Line Provisions Only Number and Range	Single-Hole Compression Load Provisions Only Number and Range	Catalog Number
	Height	Width	Depth			
800	78.00 (1981.2)	36.00 (914.4)	24.00 (609.6)	(3) Provisions per phase	(3) Provisions per phase	GTB08P1P1
1200	78.00 (1981.2)	36.00 (914.4)	24.00 (609.6)	(4) Provisions per phase	(4) Provisions per phase	GTB12P2P2
1600	78.00 (1981.2)	36.00 (914.4)	24.00 (609.6)	(5) Provisions per phase	(5) Provisions per phase	GTB16P3P3
2000	78.00 (1981.2)	36.00 (914.4)	24.00 (609.6)	(6) Provisions per phase	(6) Provisions per phase	GTB20P4P4
2500	78.00 (1981.2)	36.00 (914.4)	24.00 (609.6)	(8) Provisions per phase	(8) Provisions per phase	GTB25P5P5

Notes

- ① Line side factory installed 3/8-inch bolt provisions for single-hole compression lugs (lugs furnished by others).
- ② Load side factory installed Burndy, two-hole, short barrel compression lugs suitable for copper wire only.
- ③ Requires 45-inch (1143.0 mm) wide enclosure.
- ④ Line and load side factory installed 3/8-inch bolt provisions for single-hole compression lugs (lugs furnished by others).

4.6

Switchboards

Roll-Up Generator Termination Box

Approximate Dimensions in Inches (mm)

Roll-Up Generator Termination Box with Line Single-Hole Compression Lug Provisions; Load Provisions Only, Two-Hole Compression Lugs ^{①②③}

Ampere Rating	Dimensions			Single-Hole Compression Line Provisions Only Number and Range	Two-Hole Compression Load Provisions Only Number and Range	Catalog Number
	Height	Width	Depth			
800	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(3) Provisions per phase	(3) Provisions per phase	GTB08P1PA
1200	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(4) Provisions per phase	(4) Provisions per phase	GTB12P2PB
1600	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(5) Provisions per phase	(5) Provisions per phase	GTB16P3PC
2000	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(6) Provisions per phase	(6) Provisions per phase	GTB20P4PD
2500	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(8) Provisions per phase	(8) Provisions per phase	GTB25P5PE

Roll-Up Generator Termination Box with Line Single-Hole Compression Lug Provisions; Load Mechanical Box Lugs ^{②③④}

Ampere Rating	Dimensions			Two-Hole Compression Line Provisions Only Number and Range	Mechanical Box Lugs Load Termination Number, Range and Type	Catalog Number
	Height	Width	Depth			
800	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(3) Provisions per phase	(3) 4/0–500 kcmil	GTB08PAMA
				(3) Provisions per phase	(2) 3/0–750 kcmil	GTB08PAMB
1200	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(4) Provisions per phase	(4) 4/0–500 kcmil	GTB12PBMC
				(4) Provisions per phase	(3) 3/0–750 kcmil	GTB12PBMD
1600	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(5) Provisions per phase	(5) 4/0–500 kcmil	GTB16PCME
				(5) Provisions per phase	(4) 3/0–750 kcmil	GTB16PCMF
2000	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(6) Provisions per phase	(6) 4/0–500 kcmil	GTB20PDMG
				(6) Provisions per phase	(5) 3/0–750 kcmil	GTB20PDH
2500	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(8) Provisions per phase	(8) 4/0–500 kcmil	GTB25PEMJ
				(8) Provisions per phase	(7) 3/0–750 kcmil	GTB25PEMK

Roll-Up Generator Termination Box with Line Two-Hole Compression Lug Provisions; Load Single-Hole Compression Lugs ^{②③⑤}

Ampere Rating	Dimensions			Two-Hole Compression Line Provisions Only Number and Range	Single-Hole Compression Load Termination Number, Range and Type	Catalog Number
	Height	Width	Depth			
800	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(3) Provisions per phase	(3) 4/0–500 kcmil Al/Cu	GTB08PACA
				(3) Provisions per phase	(2) 3/0–750 kcmil Al/Cu	GTB08PACB
1200	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(4) Provisions per phase	(4) 4/0–500 kcmil Al/Cu	GTB12PBCC
				(4) Provisions per phase	(3) 3/0–750 kcmil Al/Cu	GTB12PB CD
1600	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(5) Provisions per phase	(5) 4/0–500 kcmil Al/Cu	GTB16PCCE
				(5) Provisions per phase	(4) 3/0–750 kcmil Al/Cu	GTB16PCCF
2000	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(6) Provisions per phase	(6) 4/0–500 kcmil Al/Cu	GTB20PD CG
				(6) Provisions per phase	(5) 3/0–750 kcmil Al/Cu	GTB20PD CH
2500	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(8) Provisions per phase	(8) 4/0–500 kcmil Al/Cu	GTB25PECJ
				(8) Provisions per phase	(7) 3/0–750 kcmil Al/Cu	GTB25PECK

Notes

- ① Line side factory installed 3/8-inch bolt provisions for single-hole compression lugs (lugs furnished by others).
- ② Load side factory installed 1/2-inch bolt provisions on 1-3/4-inch hole centers for two-hole compression lugs (lugs furnished by others).
- ③ Requires 45-inch (1143.0 mm) wide enclosure.
- ④ Load side mechanical lugs are factory selected and installed.
- ⑤ Load side Anderson, single-hole compression lugs are factory selected and installed.

Roll-Up Generator Termination Box

Approximate Dimensions in Inches (mm)

Roll-Up Generator Termination Box with Line Two-Hole Compression Lug Provisions; Load Two-Hole Compression Lugs ^{①②③}

Ampere Rating	Dimensions			Two-Hole Compression Line Provisions Only Number and Range	Two-Hole Compression Load Termination Cu Only Wire Size	Catalog Number
	Height	Width	Depth			
800	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(3) Provisions per phase	(3) 350 kcmil Cu only	GTB08PACL
				(3) Provisions per phase	(3) 400 kcmil Cu only	GTB08PACM
1200	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(4) Provisions per phase	(4) 500 kcmil Cu only	GTB12PBCN
				(4) Provisions per phase	(3) 600 kcmil Cu only	GTB12PBCP
				(4) Provisions per phase	(3) 750 kcmil Cu only	GTB12PBCQ
1600	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(5) Provisions per phase	(5) 500 kcmil Cu only	GTB16PCCR
				(5) Provisions per phase	(4) 600 kcmil Cu only	GTB16PCCS
				(5) Provisions per phase	(4) 750 kcmil Cu only	GTB16PCCT
2000	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(6) Provisions per phase	(6) 500 kcmil Cu only	GTB20PDCU
				(6) Provisions per phase	(5) 600 kcmil Cu only	GTB20PDCU
				(6) Provisions per phase	(5) 750 kcmil Cu only	GTB20PDCW
2500	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(8) Provisions per phase	(7) 500 kcmil Cu only	GTB25PECX
				(8) Provisions per phase	(6) 600 kcmil Cu only	GTB25PECY
				(8) Provisions per phase	(6) 750 kcmil Cu only	GTB25PECZ

4

Roll-Up Generator Termination Box with Line Two-Hole Compression Lug Provisions; Load Single-Hole Compression Lugs ^{①③④}

Ampere Rating	Dimensions			Two-Hole Compression Line Provisions Only Number and Range	Single-Hole Compression Load Provisions Only Number and Range	Catalog Number
	Height	Width	Depth			
800	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(3) Provisions per phase	(3) Provisions per phase	GTB08PAP1
1200	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(4) Provisions per phase	(4) Provisions per phase	GTB12PBP2
1600	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(5) Provisions per phase	(5) Provisions per phase	GTB16PCP3
2000	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(6) Provisions per phase	(6) Provisions per phase	GTB20PDP4
2500	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(8) Provisions per phase	(8) Provisions per phase	GTB25PEP5

Roll-Up Generator Termination Box with Line Two-Hole Compression Lug Provisions; Load Two-Hole Compression Lugs Provisions ^{③⑤}

Ampere Rating	Dimensions			Two-Hole Compression Line Provisions Only Number and Range	Two-Hole Compression Load Provisions Only Number and Range	Catalog Number
	Height	Width	Depth			
800	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(3) Provisions per phase	(3) Provisions per phase	GTB08PAPA
1200	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(4) Provisions per phase	(4) Provisions per phase	GTB12PBPB
1600	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(5) Provisions per phase	(5) Provisions per phase	GTB16PCPC
2000	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(6) Provisions per phase	(6) Provisions per phase	GTB20PDPD
2500	78.00 (1981.2)	45.00 (1143.0)	24.00 (609.6)	(8) Provisions per phase	(8) Provisions per phase	GTB25PEPE

Notes

- ① Line side factory installed 1/2-inch bolt provisions on 1-3/4-inch hole centers for two-hole compression lugs (lugs furnished by others).
- ② Load side factory installed Burndy, two-hole, short barrel compression lugs suitable for copper wire only.
- ③ Requires 45-inch (1143.0 mm) wide enclosure.
- ④ Load side factory installed 3/8-inch bolt provisions for 1-hole compression lugs (lugs furnished by others).
- ⑤ Line and load side factory installed 1/2-inch bolt provisions on 1-3/4-inch hole centers for two-hole compression lugs (lugs furnished by others).

4.6

Switchboards

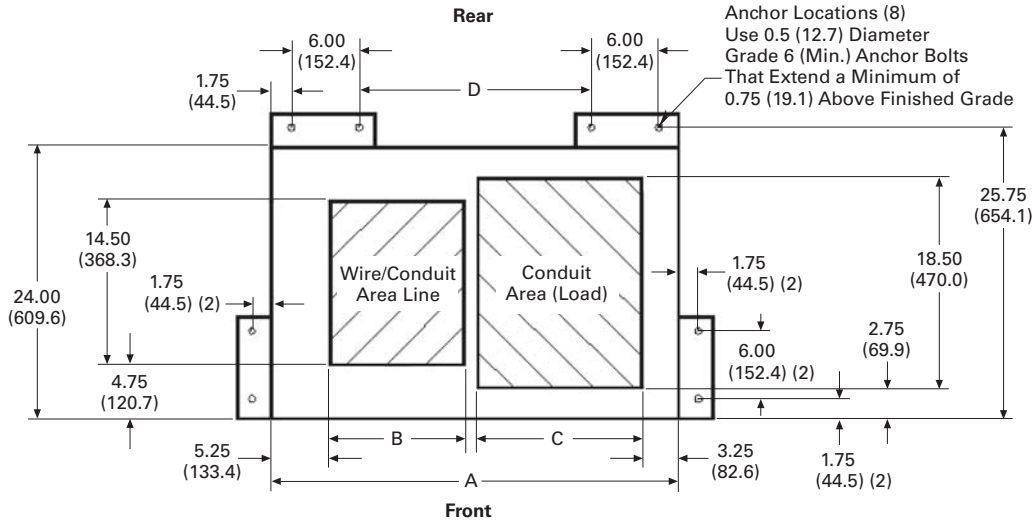
Roll-Up Generator Termination Box

Dimensions

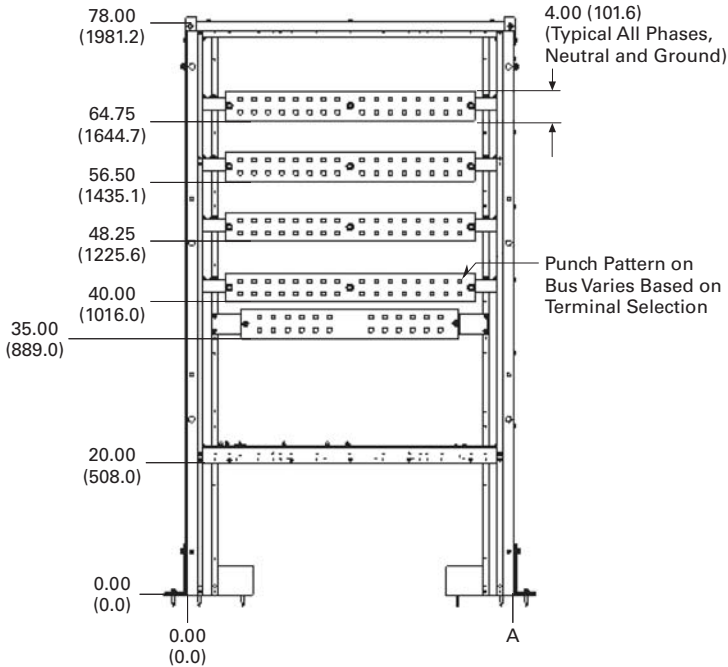
Approximate Dimensions in Inches (mm)

Enclosure

4



Termination/Lug Landing



Enclosure Dimensions ^①

Structure Width	A	B	C	D
36.00 (914.4)	28.00 (711.2)	11.75 (298.5)	14.50 (368.3)	20.50 (520.7)
45.00 (1143.0)	45.00 (1143.0)	18.25 (463.6)	18.00 (457.2)	28.50 (723.9)

Termination/Lug Landing Dimensions

Structure Width	A
36.00 (914.4)	36.00 (914.4)
45.00 (1143.0)	45.00 (1143.0)

Note

^① Conduit landing surface will be 20.00 (508.0) above finished grade.

Power Xpert Multipoint Metering Switchboard



Contents

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Power Xpert Multipoint Meter	
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Power Xpert Multipoint Metering Switchboard

Overview

Allocation of energy consumption in a residential or commercial application is a tremendous task for a property owner, management firm or electrical energy manager. Eaton’s Power Xpert Multipoint Meter low-cost solution can assist in allocation or direct billing of consumed energy. The Power Xpert Multipoint Meter provides a cost-effective energy tabulation system for residential or commercial metering installations, including:

- High-rise buildings
- Universities and campuses
- Office buildings
- Apartment and condominium complexes
- Shopping malls
- Airports

Eaton’s Power Xpert Multipoint Meter can provide accurate information of consumed energy for monthly involving statements. Using the Power Xpert Multipoint Meter for utility allocation maximizes revenue by effectively measuring, allocating and recovering utility expenditures. The Power Xpert Multipoint Meter solution can interface with a third-party utility allocation service and offers the following advantages:

- Purchase energy at bulk rates while charging consumer rates
- Capitalize on naturally variable tenant loads by purchasing energy at a lower coinciding load
- Capture and allocate common area maintenance cost
- Promote tenant retention with accurate and defensible billing
- Eliminate subsidization of other tenants

Product Description

Using Eaton’s Power Xpert Multipoint Metering Switchboard design, multiple tenant submetering has never been easier. The Power Xpert Multipoint Metering Switchboard combines the Power Xpert Multi-Point Meter and Eaton’s PRL4X, PRLX or Integrated Facility System™ (IFS™) to provide a space-saving, cost-effective energy tabulation system for residential or commercial metering installations.

Application Description

With energy cost on the rise, it is vital to proactively monitor and conserve electrical energy. Documentations of electrical energy usage can promote energy conservation for tenants or business departments. When the need for accurate energy consumption information for monthly tenant invoicing arises, use Eaton’s Power Xpert Multipoint Metering Switchboard solution.

Using the Power Xpert Multipoint Meter for utility allocation maximizes revenue by effectively measuring, allocating and recovering utility expenditures. The Power Xpert Multipoint Meter, using Eaton’s cost-allocation software or a third-party billing software, can generate single-rate or multi-rate billing.

Features, Benefits and Functions

The Power Xpert Multipoint Metering Switchboard offers the property owner or the property management firm the ability to:

- Capture and allocate common area maintenance cost
- Promote tenant retention with accurate billing
- Eliminate subsidization of other tenants

The Power Xpert Multipoint Meter's space-saving design reduces the need for multi-metering equipment for each tenant. Additionally, the Power Xpert Multipoint Meter can monitor loads up to 5000A for energy billing or cost allocation. The meter is rated per ANSI C12.20 for revenue metering grade accuracy. With built-in communications capabilities, the Power Xpert Multipoint Meter can be connected to a local PC or network. The Power Xpert Multipoint Meter can connect to a third-party billing service to provide monthly energy consumption charges used by tenants. Additionally, unit status and communication activity are provided by a display on the metering compartment front panel.

The Power Xpert Multipoint Meter device can measure up to 60 total poles in any combination of single-, two- or three-pole breakers. The meters and current sensors are factory mounted with the current sensors factory wired to the meter inside the host structure. The meter monitors power and energy including instantaneous (kW), demand and cumulative (kWh) measurements for each load. The meter provides the following:

- Interval energy data logging
- Time-of-use energy registers
- Coincident peak demand storage
- Schedule remote meter reading data in non-volatile memory
- Measure bus voltage
- Factory-wired system
- Saves floor space
- Lower installed cost
- Network compatible
- Tenant sub-billing

Standards and Certifications

- UL listed



Product Selection

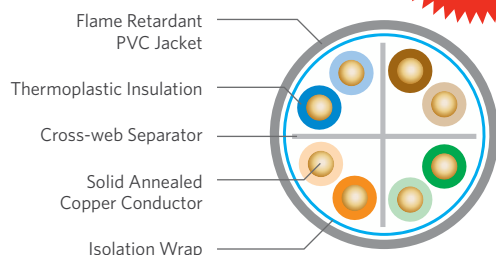
For complete application and pricing information, contact your local Eaton sales office.

Options

- Energy Portal Module or Ethernet-based communications plus Modbus®TCP and BACnet/IP
- Pulse input module for WAGES inputs
- Digital output module for programmable alarm functions

10Gain® XP Category 6A

CMR-LP/CMP-LP



SPECIFICATIONS

Pair Count	4
Conductor	Solid annealed copper
AWG (mm)	23 (0.57)
Insulation	CMR: Thermoplastic CMP: FEP CMR-LSHF: HDPE
Insulation Colors	Pair 1: ColorTip Light Blue, Blue Pair 2: ColorTip Light Orange, Orange Pair 3: ColorTip Light Green, Green Pair 4: ColorTip Light Brown, Brown
Separator	Cross-web
Isolation Wrap	Proprietary construction
Jacket	CMR: Flame retardant (FR) PVC CMP: FR, low smoke PVC CMR-LSHF: Flame retardant LSHF
Characteristic Impedance Ohms	100 ± 15
Velocity of Propagation %	CMR: 66 CMP: 71 CMR-LSHF: 66
Performance Compliance	UL 444 CSA C22.2 No. 214-08 UL 1666 NFPA 262 ANSI/TIA-568.2-D Article 800, NEC (NFPA 70) HDBaseT Class A and B
NRTL Programs	UL Verified CAT 6A UL Listed CMR-LP (0.5) c(UL) Listed CMR UL Listed CMP-LP (0.6) c(UL) Listed CMP HDBaseT Certified UL, c(UL) Listed CMR-LSHF
Sustainability	UL Certified EPD HPD Multi-Attribute Certification USGBC® Member RoHS-compliant/RoHS 2-compliant REACH-compliant

PRODUCT DESCRIPTION



FIRST MANUFACTURER IN THE INDUSTRY
to offer products that contribute toward LEED!

10Gain® XP is the first Category 6A cable without a continuous shield to offer 7 dB margin over Alien Crosstalk (AXT) performance requirements in ANSI/TIA-568.2-D. Its uniquely designed Isolation Wrap contains discontinuous sections of metallized material, held in place by a polymeric layer. **10Gain XP** has a nominal 0.25" (CMP) or 0.275" (CMR) diameter that allows for higher cable density than other CAT 6A cable products. 10Gain XP is ideal for PoE applications requiring higher levels of current and simultaneously up to 10 Gigabit Ethernet. 10Gain XP is certified for HD A/V applications using HDBaseT Class A and B protocol. A CMR-LSHF cable version is available for applications and environments requiring a Low Smoke Halogen-Free (LSHF) construction.

APPLICATIONS

- 10BASE-T through 10GBASE-T Ethernet
- Power over Ethernet (PoE) - IEEE 802.3bt Type 1 to 4
- ATM and token ring
- Backward compatible to legacy protocols and applications
- HDBaseT Class A and B

FEATURES

- UL Certified Environmental Product Declaration (EPD)
- Health Product Declaration™ (HPD™)
- Multi-Attribute Certification by GreenCircle Certified, LLC
- Non-conductive Isolation Wrap
- Tested to 650 MHz
- Nominal 0.25 (CMP) or 0.275 (CMR) inch diameter
- CableID® alpha numeric code printed every 2 feet
- ColorTip® circuit identification system
- Tested up to 100 W in most severe temperature conditions in a bundle of 100 cables
- HDBaseT Class A and B certified
- UL LP listed
- Temperature cable rating: 75°C for CMR and 90°C for CMP
- Low Smoke Halogen-Free

BENEFITS

- Contributes toward 1 LEED credit under the Material and Resources credit (MRc)
- Contributes toward 1 LEED credit under the MRc
- Offers an overview of the sustainability of a product, its packaging and manufacturing
- 8 dB AXT performance without grounding or bonding
- Assures ample bandwidth headroom
- Higher cable density, smaller bend radius and lowers installation costs
- Easily identifies both ends of a cable run without the need to separately label or tone the cable
- Easily identify conductor mates even in low-light environments
- Offers 82% power efficiency and lowest temperature increase inside a bundle
- Ideal for any A/V application up to 100m channel
- Third-party assurance of product safety in high-heat and high-power applications
- Temperature rating of the insulation AND of the jacket provide improved cable lifespan despite high-heat and high-power applications
- Meets IEC 62821 requirements for toxicity, acidity and smoke

PART NUMBERS AND PHYSICAL CHARACTERISTICS

Listing	Part Number ¹	Nominal Diameter in (mm)	Approx. Weight lbs/kft (kg/km)	Package	Packages per Pallet
CMR	6H-246-xA	0.275 (6.99)	28 (12.5)	1,000' BrakeBox®	12
CMR	6H-272-xA	0.275 (6.99)	28 (12.5)	1,000' Plywood reel	16
CMR-LSHF	6H-272-xM	0.3 (7.62)	40 (59.7)	1,000' Plywood reel	12
CMP	6H-246-xB	0.25 (6.35)	29 (13)	1,000' BrakeBox	12
CMP	6H-272-xB	0.25 (6.35)	29 (13)	1,000' Plywood reel	16

ELECTRICAL SPECIFICATIONS

Frequency MHz	Insertion Loss @ 20°C Maximum dB/100 m		NEXT Minimum dB/100 m		ACR Minimum dB/100 m		PSNEXT Minimum dB/100 m		PSACR Minimum dB/100 m	
	Guaranteed	Typical	Guaranteed	Typical	Guaranteed	Typical	Guaranteed	Typical	Guaranteed	Typical
1	2.1	2.0	74.3	78.3	72.2	77.3	72.3	77.3	70.2	76.3
4	3.8	3.7	65.3	69.3	61.5	66.6	63.3	68.3	59.5	65.6
8	5.3	5.1	60.8	64.8	55.4	60.6	58.8	63.8	53.4	59.6
10	5.9	5.7	59.3	63.3	53.4	58.6	57.3	62.3	51.4	57.6
16	7.5	7.3	56.2	60.2	48.8	54.0	54.2	59.2	46.8	53.0
20	8.4	8.1	54.8	58.8	46.4	51.7	52.8	57.8	44.4	51.2
25	9.4	9.1	53.3	57.3	44.0	49.7	51.3	56.3	42.0	49.0
31.25	10.5	10.2	51.9	55.9	41.4	47.2	49.9	54.9	39.4	46.7
62.5	15.0	14.4	47.4	51.4	32.4	39.0	45.4	50.4	30.4	38.4
100	19.1	18.4	44.3	48.3	25.2	32.4	42.3	47.3	23.2	31.7
200	27.6	26.5	39.8	43.8	12.2	20.1	37.8	42.8	10.2	19.5
250	31.1	29.8	38.3	42.3	7.3	15.5	36.3	41.3	5.3	15.1
300	34.3	32.9	37.1	41.1	2.9	11.4	35.1	40.1	0.9	10.8
400	40.1	38.3	35.3	39.3		4.6	33.3	38.3		3.6
500	45.3	43.0	33.8	37.8			31.8	36.8		
600		47.5		36.4				35.6		
650		49.7		35.9				35.1		
700		51.4		35.5				34.6		
750		53.3		35.1				34.2		

Frequency MHz	Return Loss Minimum dB/100 m		ACRF Minimum dB/100 m		PSACRF Minimum dB/100 m		PSANEXT Minimum dB/100 m		PSAACRF Minimum dB/100 m	
	Guaranteed	Typical	Guaranteed	Typical	Guaranteed	Typical	Guaranteed	Typical	Guaranteed	Typical
1	20.0	22.0	67.8	73.8	64.8	70.8	75.0	96.5	75.0	80.0
4	23.0	25.0	55.8	61.8	52.8	58.8	75.0	87.5	74.2	79.2
8	24.5	26.5	49.7	55.7	46.7	52.7	75.0	83.0	68.1	73.1
10	25.0	27.0	47.8	53.8	44.8	50.8	75.0	81.5	66.2	71.2
16	25.0	27.0	43.7	49.7	40.7	46.7	75.0	80.0	62.1	67.1
20	25.0	27.0	41.8	47.8	38.8	44.8	75.0	80.0	60.2	65.2
25	24.3	26.3	39.8	45.8	36.8	42.8	75.0	80.0	58.2	63.2
31.25	23.6	25.6	37.9	43.9	34.9	40.9	75.0	80.0	56.3	61.3
62.5	21.5	23.5	31.9	37.9	28.9	34.9	73.6	78.6	50.3	55.3
100	20.1	22.1	27.8	33.8	24.8	30.8	70.5	75.5	46.2	51.2
200	18.0	20.0	21.8	27.8	18.8	24.8	66.0	71.0	40.2	45.2
250	17.3	19.3	19.8	25.8	16.8	22.8	64.5	69.5	38.2	43.2
300	16.8	18.8	18.3	24.3	15.3	21.3	63.3	68.3	36.7	41.7
400	15.9	17.9	15.8	21.8	12.8	18.8	64.5	66.5	35.2	39.2
500	15.2	17.2	13.8	19.8	10.8	16.8	60.0	65.0	32.3	37.2
600		16.7		18.2		15.2		63.8		35.6
650		16.4		17.5		14.5		63.3		34.9
700		16.2		16.9		13.9				
750		16.0		16.3		13.3				

SUSTAINABILITY LEADERSHIP



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CYCLONE® Mxi MODULATING

MODULATING BURNER ADVANCES THE CYCLONE TO HIGHER LEVELS OF EFFICIENCY

The full line of A. O. Smith Cyclone Mxi condensing water heaters has been designed to provide years of dependable service and feature industry leading technology. Models are available from 120,000 to 500,000 Btu/h and all deliver thermal efficiencies of 95% and higher. The unique helical coil heat exchanger limits weld joints for optimal service life while maximizing heat transfer.

Cyclone is the industry leader in high efficiency commercial water heating. The current Mxi modulating models adjust firing rate to the specific demand further increasing efficiency and money savings.

INTELLIGENT CONTROL SYSTEM WITH TOUCH SCREEN DISPLAY AND ICOMM CONNECTIVITY ONBOARD*

- Exclusive A. O. Smith designed color touch display control system
- Provides detailed water heater status information
- Precise temperature control adjustable from 90 to 180 degrees
- Built-in diagnostics
- Run history information
- *Cyclone Mxi models manufactured March 1, 2018 to present come standard with iCOMM Wi-Fi connectivity onboard. Remotely monitor and adjust the water heater via the A. O. Smith app. No charge connectivity using Wi-Fi or Ethernet connection.
- Intelligent Demand Response (IDR) feature senses large water draws and automatically adjusts the differential setpoint. This feature increases the hot water available when it is needed the most.

SUBMERGED COMBUSTION CHAMBER, WITH HELICAL HEAT EXCHANGER COIL

- Positioned in center of tank, surrounded by water to virtually eliminate radiant heat loss from chamber
- Direct spark ignition
- Spiral heat exchanger keeps hot burner gases swirling, uses centrifugal force to maximize efficiency of heat transfer to water in tank
- Spiral heat exchanger reduces lime scale from forming on water-side surfaces, which maintains energy efficiency over time

POWERED ANODES STANDARD ON ALL MODELS

- Provides long-lasting tank protection in varying water conditions

- Powered anodes are non-sacrificial
- Automatically adjusts output needed to properly protect the tank

PERMAGLAS® ULTRA COAT™ GLASS LINING

- Glass coating is applied using a liquid slush coating technique to ensure uniform coating
- Heat exchanger coil is glassed both externally and internally for optimum protection

MECHANICAL VENTING VERSATILITY

- Conventional power venting or direct venting
- Vents vertically or through a sidewall
- Front located exhaust and condensate connections allow for easy install and access
- Vents with low cost PVC Schedule 40 intake and exhaust pipe. Approved for optional CPVC Schedule 40, Polypropylene and AL29-4C stainless steel vent materials
- Direct-vent intake and exhaust pipe can terminate separately outside building or through single opening, using concentric vent assembly

- Canadian installations require ULC S636 PVC/CPVC, ULC S636 Polypropylene and AL29-4C stainless steel pipe for intake and exhaust

HIGH EFFICIENCY MODULATING PRE-MIX POWERED BURNER

- Down-fired pre-mix burner provides optimum efficiency and quiet operation
- Top-mounted burner position prevents condensation from affecting burner operation

3-YEAR LIMITED TANK / 1-YEAR LIMITED PARTS WARRANTY

- For complete warranty information, consult written warranty or go to hotwater.com



BTH-120(A) THROUGH BTH-500(A)
MODEL SHOWN:
BTH-199(A) SERIES 300/301





Commercial Gas Water Heaters

OTHER FEATURES:

SPACE-SAVING DESIGN FOR INSTALLATION FLEXIBILITY

- Easy-to-remove top cover for convenient access to serviceable parts
- 0" installation clearances on sides and rear, 1-1/2" installation clearance on top
- Handhole cleanout allows easy access to tank interior for cleaning
- 0" clearance to combustibles, approved for installation on combustible floors

CODES AND STANDARDS

- CSA certified and ASME rated T&P relief valve
- Maximum hydrostatic working pressure: 160 psi
- All models are design certified by Underwriters Laboratories (UL), Inc., to ANSI Z21.10.3 - CSA 4.3 Standards
- Meets the thermal efficiency and standby loss requirements of the U.S. Department of Energy and current edition ASHRAE/IES 90.1
- Design Certified by Underwriters Laboratories to NSF standard 5 for 180°F (62°C) water
- Complies with SCAQMD Rule 1146.2 and other Air Quality Management Districts with similar requirements for ultra low-NOx emissions
- ASME tank construction optional on 120-500 model sizes

VENT REQUIREMENTS FOR BTH 120(A) - 250(A)

Number of 90° Elbows Installed	3 Inch Pipe	4 Inch Pipe
	Maximum Feet (Meters)	Maximum Feet (Meters)
One (1)	45 feet (13.7 meters)	115 feet (35 meters)
Two (2)	40 feet (12.2 meters)	110 feet (33.5 meters)
Three (3)	35 feet (10.7 meters)	105 feet (32 meters)
Four (4)	30 feet (9.1 meters)	100 feet (30.5 meters)
Five (5)	N/A	95 feet (29 meters)
Six (6)	N/A	90 feet (27.4 meters)

VENT REQUIREMENTS FOR BTH 300(A) - 500(A)

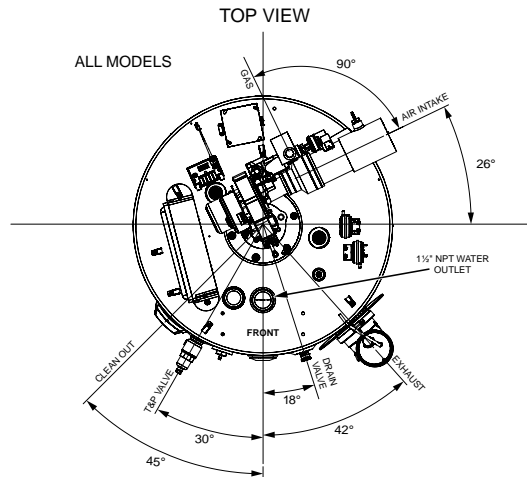
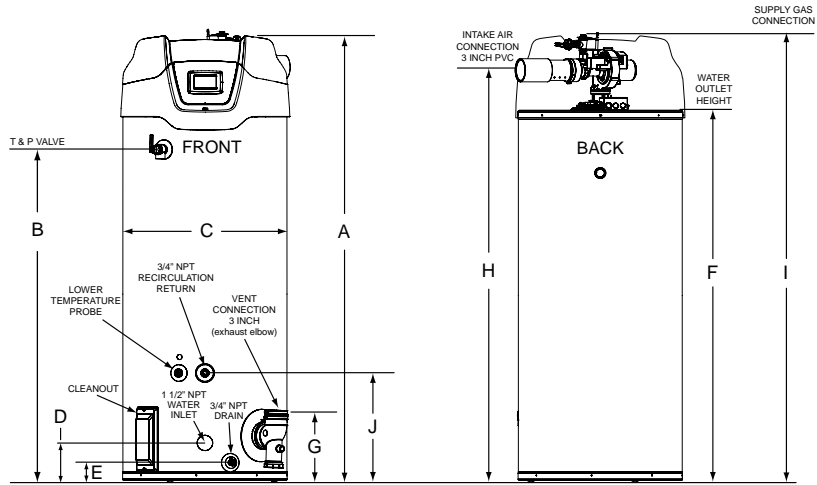
Number of 90° Elbows Installed	4 Inch Pipe	6 Inch Pipe
	Maximum Feet (Meters)	Maximum Feet (Meters)
One (1)	65 feet (19.8 meters)	115 feet (35 meters)
Two (2)	60 feet (18.2 meters)	110 feet (33.5 meters)
Three (3)	55 feet (16.8 meters)	105 feet (32 meters)
Four (4)	50 feet (15.2 meters)	100 feet (30.5 meters)
Five (5)	45 feet (13.7 meters)	95 feet (29 meters)
Six (6)	40 feet (12.2 meters)	90 feet (27.4 meters)

GAS PRESSURE REQUIREMENTS

Model Number	Manifold Pressure		Minimum Supply Pressure		Maximum Supply Pressure	
	Natural Gas	Propane Gas	Natural Gas	Propane Gas	Natural Gas	Propane Gas
BTH-120(A)	0"W.C. (0 kPa)	0"W.C. (0 kPa)	3.5"W.C. (1.10 kPa)	8.5"W.C. (2.12 kPa)	14"W.C. (3.49 kPa)	14"W.C. (3.49 kPa)
BTH-150(A)	0"W.C. (0 kPa)	0"W.C. (0 kPa)	3.5"W.C. (1.10 kPa)	8.5"W.C. (2.12 kPa)	14"W.C. (3.49 kPa)	14"W.C. (3.49 kPa)
BTH-199(A)	0"W.C. (0 kPa)	0"W.C. (0 kPa)	3.5"W.C. (1.10 kPa)	8.5"W.C. (2.12 kPa)	14"W.C. (3.49 kPa)	14"W.C. (3.49 kPa)
BTH-250(A)	0"W.C. (0 kPa)	0"W.C. (0 kPa)	3.5"W.C. (1.10 kPa)	8.5"W.C. (2.12 kPa)	14"W.C. (3.49 kPa)	14"W.C. (3.49 kPa)
BTH-300(A)	0"W.C. (0 kPa)	0"W.C. (0 kPa)	4.8"W.C. (1.19 kPa)	8.5"W.C. (2.12 kPa)	14"W.C. (3.49 kPa)	14"W.C. (3.49 kPa)
BTH-400(A)	0"W.C. (0 kPa)	0"W.C. (0 kPa)	4.8"W.C. (1.19 kPa)	8.5"W.C. (2.12 kPa)	14"W.C. (3.49 kPa)	14"W.C. (3.49 kPa)
BTH-500(A)	0"W.C. (0 kPa)	0"W.C. (0 kPa)	4.8"W.C. (1.19 kPa)	8.5"W.C. (2.12 kPa)	14"W.C. (3.49 kPa)	14"W.C. (3.49 kPa)

Depending on the installed equivalent length, and/or the number of appliances connected, the supply gas line size may need to be increased beyond the minimum required size.

BTH 120-250



* Center line of water outlet on top of the water heaters is approximately 7 inches from the front edge of the water heater

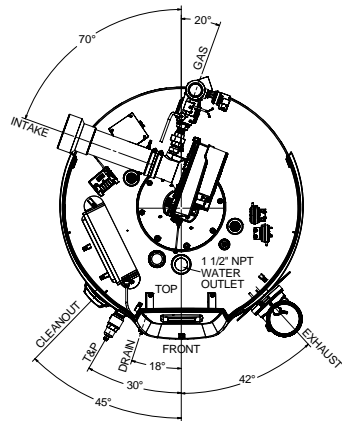
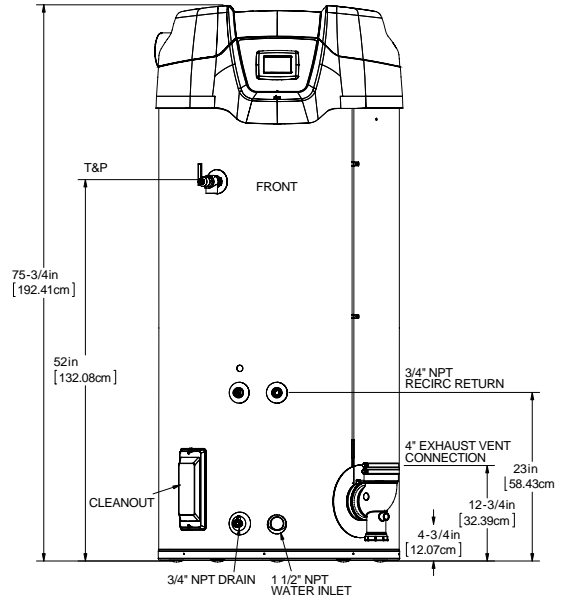
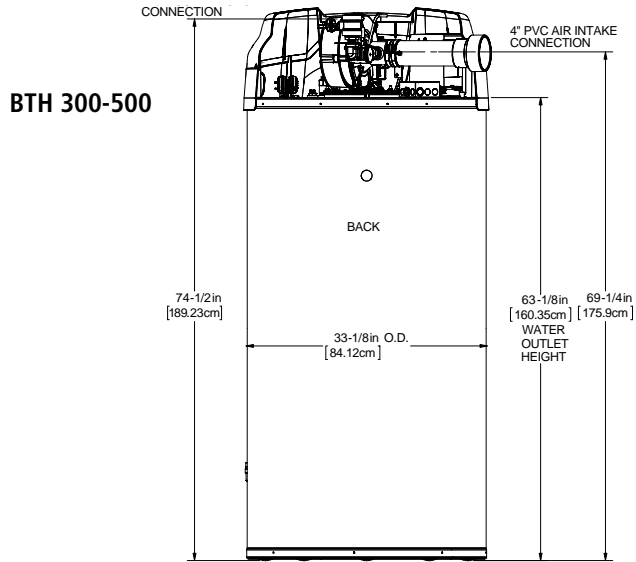
Model Number	Approx. Capacity		Dimensions										lb/kg	Approx. Shipping Weight Std	Approx. Shipping Weight ASME
			A	B	C	D	E	F	G	H	I	J			
BTH-120(A)	Gallons	60	55 1/2	35	27 3/4	6 5/16	3	42 1/4	11 1/4	48 1/2	53 1/2	18 1/4	lb	460	490
	Liters	227	141	88.9	70.5	16	7.62	107.32	28.6	123.2	135.9	46.36	kg	208	220
BTH-150(A)	Gallons	100	76 1/2	56 3/8	27 3/4	6 5/16	3	64	11 1/4	70	75 1/2	18 1/4	lb	523	553
	Liters	379	194.9	143.2	70.5	16	7.62	162.6	28.6	177.8	191.8	46.36	kg	237	251
BTH-199(A)	Gallons	100	76 1/2	56 3/8	27 3/4	6 5/16	3	64	11 1/4	70	75 1/2	18 1/4	lb	523	553
	Liters	379	194.9	143.2	70.5	16	7.62	162.6	28.6	177.8	191.8	46.36	kg	237	251
BTH-250(A)	Gallons	100	76 1/2	56 3/8	27 3/4	6 5/16	3	64	11 1/4	70	75 1/2	18 1/4	lb	523	553
	Liters	379	194.9	143.2	70.5	16	7.62	162.6	28.6	177.8	191.8	46.36	kg	237	251

Electrical characteristics-120V-60Hz A.C., 5.0 A

"A" in model represents ASME construction

Propane gas models available

Dimensions and specifications subject to change without notice in accordance with our policy of continuous product improvement.



Model Number	Approx. Capacity		Dimensions										lb/kg	Approx. Shipping Weight Std	Approx. Shipping Weight ASME
			A	B	C	D	E	F	G	H	I	J			
BTH-300(A)	Gallons	119	75 3/4	52	33 1/8	4 3/4	4 3/4	63 1/8	12 3/4	69 1/4	74 1/2	23	lb	855	855
	Liters	450.96	192.41	132.08	84.12	12.07	12.07	160.35	32.39	175.9	189.23	58.43	kg	387	387
BTH-400(A)	Gallons	119	75 3/4	52	33 1/8	4 3/4	4 3/4	63 1/8	12 3/4	69 1/4	74 1/2	23	lb	855	855
	Liters	450.96	192.41	132.08	84.12	12.07	12.07	160.35	32.39	175.9	189.23	58.43	kg	387	387
BTH-500(A)	Gallons	119	75 3/4	52	33 1/8	4 3/4	4 3/4	63 1/8	12 3/4	69 1/4	74 1/2	23	lb	855	855
	Liters	450.96	192.41	132.08	84.12	12.07	12.07	160.35	32.39	175.9	189.23	58.43	kg	387	387

Electrical characteristics-120V-60Hz A.C., 5.0 A

"A" in model represents ASME construction

Propane gas models available

Dimensions and specifications subject to change without notice in accordance with our policy of continuous product improvement.



Commercial Gas Water Heaters

RECOVERY CAPACITY

Model Number	Type of Gas	Input		Thermal Efficiency
		BTU/HR	kW	
BTH-120(A)	Natural/Propane	120,000	35	95%
BTH-150(A)	Natural/Propane	150,000	44	98%
BTH-199(A)	Natural/Propane	199,900	58	97%
BTH-250(A)	Natural/Propane	250,000	73	96%
BTH-300(A)	Natural/Propane	300,000	88	96%
BTH-400(A)	Natural/Propane	399,900	117	95%
BTH-500(A)	Natural/Propane	499,900	146	95%

Model Number	U.S. GALLONS/HR AND LITRES/HR AT TEMPERATURE RISE INDICATED													
	Approx. Capacity	°F	30°F	40°F	50°F	60°F	70°F	80°F	90°F	100°F	110°F	120°F	130°F	140°F
		°C	17°C	22°C	28°C	33°C	39°C	44°C	50°C	56°C	61°C	67°C	72°C	78°C
BTH-120(A)	60 U.S. Gals.	GPH	461	345	276	230	197	173	154	138	126	115	106	99
	227 Litres	LPH	1743	1308	1046	872	747	654	581	523	475	436	402	374
BTH-150(A)	100 U.S. Gals.	GPH	594	445	356	297	255	223	198	178	162	148	137	127
	379 Litres	LPH	2248	1686	1349	1124	963	843	749	674	613	562	519	482
BTH-199(A)	100 U.S. Gals.	GPH	783	588	470	392	336	294	261	235	214	196	181	168
	379 Litres	LPH	2965	2224	1779	1483	1271	1112	988	890	809	741	684	635
BTH-250(A)	100 U.S. Gals.	GPH	970	727	582	485	416	364	323	291	264	242	224	208
	379 Litres	LPH	3670	2753	2202	1835	1573	1376	1223	1101	1001	918	847	786
BTH-300(A)	119 U.S. Gals.	GPH	1164	873	698	582	499	436	388	349	317	291	269	249
	450.96 Litres	LPH	4405	3304	2643	2202	1888	1652	1468	1321	1201	1101	1017	944
BTH-400(A)	119 U.S. Gals.	GPH	1535	1151	921	767	658	576	512	460	419	384	354	329
	450.96 Litres	LPH	5810	4358	3486	2905	2490	2179	1937	1743	1585	1453	1341	1245
BTH-500(A)	119 U.S. Gals.	GPH	1919	1439	1151	959	822	720	640	576	523	480	443	411
	450.96 Litres	LPH	7263	5448	4358	3632	3113	2724	2421	2179	1981	1816	1676	1556

Recovery capacities are based on AHRI rated thermal efficiencies.
For ASME Construction add an "A" to the end of the model number ex: BTH-120A.

STORAGE CAPACITY

Model Number	U.S. Gallons	Liters
BTH 120	60	227
BTH 150	100	379
BTH 199	100	379
BTH 250	100	379
BTH 300	119	450.96
BTH 400	119	450.96
BTH 500	119	450.96

GAS LINE CONNECTION SIZE

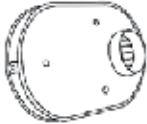
Model	Series	Natural Gas	Propane Gas
BTH 120	300/301	3/4" NPT	3/4" NPT
BTH 150	300/301	3/4" NPT	3/4" NPT
BTH 199	300/301	3/4" NPT	3/4" NPT
BTH 250	300/301	3/4" NPT	3/4" NPT
BTH 300	300/301	1-1/2" NPT	1-1/2" NPT
BTH 400	300/301	1-1/2" NPT	1-1/2" NPT
BTH 500	300/301	1-1/2" NPT	1-1/2" NPT

OPTIONAL KITS



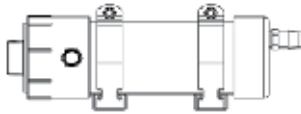
OPTIONAL CONCENTRIC VENT KITS

- BTH-120 - 250 vent kit p/n 100111100
- BTH-300 - 500 vent kit p/n 100113124



OPTIONAL LOW PROFILE TERMINATION VENT KITS

- 3" Flush Mount Vent Kit p/n 100187887
- 4" Flush Mount Vent Kit p/n 100187888
- 6" Flush Mount Vent Kit p/n 100187889



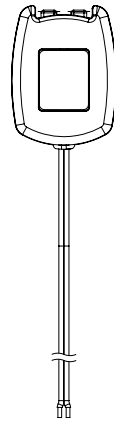
OPTIONAL CONDENSATE NEUTRALIZATION KITS

- BTH-120-300 kit p/n 100289339
- BTH-400-500 kit p/n 100289340

COMMON VENTING KITS FOR UP TO 3 WATER HEATERS (ONE KIT PER WATER HEATER REQUIRED)

Kit	Description
100227396	PVC Common Vent Kit, 120 – 250 Models
100223775	PVC Common Vent Kit, 300 – 500 Models
100227395	Polypropylene Common Vent Kit, 120 -250 Models
100223774	Polypropylene Common Vent Kit, 300 - 500 Models

Installations must comply with all national, state and local codes. See kit instructions and corresponding water heater manual for detailed installation instructions and additional information. 50 Feet maximum equivalent length of straight pipe common vent and elbows
NOTE: Order 1 kit for each water heater.
See the Common Vent Kit manual or spec sheet for detailed information.



OPTIONAL LEAK DETECTION KIT

- BTH-120 - 500 kit p/n 100302557

SPECIFICATION

(Natural or Propane) gas water heater(s) shall be A. O. Smith Cyclone Mxi model # _____ or equal, minimum 95% thermal efficiency, a storage capacity of _____ gallons, an input rating of _____ BTUs per hour, a recovery rating of _____ gallons per hour (gph) at 100°F rise and a maximum hydrostatic working pressure of 160 psi. Water heater(s) shall: 1. Modulating gas burner that automatically adjusts the input based on demand. 2. Powered anodes that are non sacrificial and maintenance free. 3. Have seamless glass-lined steel tank construction, with glass lining applied to all water-side surfaces after the tank has been assembled and welded; 4. Meets the thermal efficiency and/or standby loss requirements of the U. S. Department of Energy and current edition of ASHRAE/IES 90.1; 5. Have foam insulation and a CSA Certified and ASME rated T&P relief valve; 6. Have a down-fired power burner designed for precise mixing of air and gas for optimum efficiency, requiring no special calibration on start-up; 7. Be approved for 0" clearance to combustibles.

The control shall be an integrated solid-state temperature and ignition control device with integral diagnostics, graphic user interface, fault history display, and shall have digital temperature readout. No charge connectivity shall be provided allowing for remote viewing and fault notification via app. 1. All models are design certified by Underwriters Laboratories (UL), Inc., according to ANSI Z21.10.3 - CSA 4.3 standards governing storage type water heaters; 2. Meet the thermal efficiency and standby loss requirements of the U. S. Department of Energy and current edition ASHRAE/IES 90.1. Complies with SCAQMD Rule 1146.2 and other air quality management districts with similar requirements for low NOx emissions.

120K-250K BTU Input: For Standard Power Venting: Water heater(s) shall be suitable for power venting using a (3" or 4") _____ diameter PVC pipe for a total distance of (50 ft or 120 ft.) _____ equivalent feet of vent piping. For Power Direct Venting: Water heater(s) shall be suitable for power direct venting using a (3" or 4") _____ diameter PVC pipe for a total distance of (50 ft or 120 ft.) _____ equivalent feet of vent piping and (50 ft. or 120 ft.) _____ equivalent feet of intake air piping.

300K - 500K BTU Input: For Standard Power Venting: Water heater(s) shall be suitable for standard power venting using a (4" or 6") _____ diameter PVC pipe for a total distance of (70 ft. or 120 ft.) _____ equivalent feet of vent piping. For Power Direct Venting: Water heater(s) shall be suitable for power direct venting using a (4" or 6") _____ diameter PVC pipe for a total distance of (70 ft or 120 ft.) _____ equivalent feet of vent piping and (70 ft. or 120 ft.) _____ equivalent feet of intake air piping.

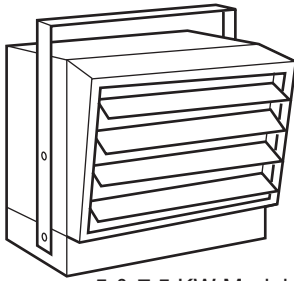
Operation of the water heater(s) in a closed system where thermal expansion has not been compensated for (with a properly sized thermal expansion tank) will void the warranty.

For Technical Information, call 800-527-1953. A. O. Smith Corporation reserves the right to make product changes or improvements without prior notice.

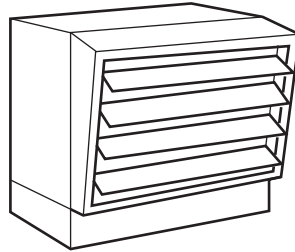


SUBMITTAL SHEET IUH SERIES INDUSTRIAL UNIT HEATERS

IUH SERIES - INDUSTRIAL UNIT HEATERS



5 & 7.5 KW Models



10 & 30 KW Models



File # E21609

CAPACITIES
5, 7.5, 9.6, 10, 15 KW 208, 240, 480, 600V
1Ø or 3Ø 20, 25, 30 KW 480 or 600V 3Ø

JOB NAME: _____

LOCATION: _____

ARCHITECT: _____

ENGINEER: _____

CONTRACTOR: _____

SUBMITTED BY: _____

DATE: _____

ITEM	QTY.	CATALOG NUMBER	TAG	HEATER			AMPS	CONTROL CKT. MOTOR VOLTS	MOTOR VOLTS	AIR FLOW		THROW	BUILT-IN CNTRL.
				KW	VOLTS	Ø				CFM	F'RISE		

ACCESSORIES
AND
CONTROLS

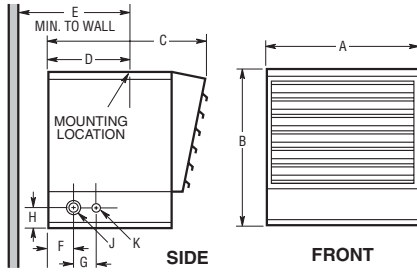
TAG	QTY.	CAT. NO.	DESCRIPTION

SUBMITTED BY:	DATE	APPROVED BY:	DATE



A Marley Engineered Products Brand
 470 Beauty Spot Rd. E, Bennettsville, SC 29512
 visit www.qmarkmep.com for more info

DIMENSIONS



KW SIZE	A	B	C	D	E	F	G	H	J	K
5-7.5	14"	12 1/2"	12 3/8"	5 1/2"	13"	1 3/4"	1 3/8"	1 1/2"	(2) 1/2", 3/4"	1/2"
10-20	18"	18"	17 1/2"	9 15/32"	*	2"	2 1/2"	2 1/4"	(2) 3/4", 1"	(3) 1", 1 1/4", 1 1/2"
25-30	26"	24"	23 1/8"	9 15/32"	20"	2"	2 3/4"	2 1/4"	(2) 1", 1 1/2"	(3) 1", 1 1/2", 2"

*13" for 10-15 KW units; 16" for 20 KW unit.

CONTROLS & ACCESSORIES

CATALOG NUMBER	DESCRIPTION
IUHCWB1	Combination wall/ceiling bracket for 5KW thru 15KW units.
IUHCWB2	Same as above but for 20KW thru 30KW units.
IUHTA1	Single pole thermostat kit (60-120°F temp. range) for field installation in all units.
IUHTA2	Double pole thermostat kit (60-120°F temp. range) for use with IUH-520 and IUH-524, 3ø.
IUHDS30	3-pole power disconnect switch kit for field installation on all horizontal unit heaters rated 30 amps. or less.
IUHDS63	3-pole power disconnect switch kit for field installation on all horizontal unit heaters 10KW and above rated at 30 to 63 amps.
IUHSW	Summer/Winter fan switch kit for field installation, built-in or remote for all units. Provides summer fan operation.

SELECTION CHART

CATALOG NUMBER	KW. CAP.	BTU/HR.	HTR. VOLT	PHASE	THREADED ROD SIZE	HEATER AMPS		FAN MTR. HP OR WATTS	CONT. CKT. & FAN MOTOR VOLTAGE	FAN MOTOR RPM	AIR VOL. CFM	AIR TEMP. RISE	THROW	MAX MTG. HT.	WT. (Lbs.)
						1Ø	3Ø								
IUH-520 IUH-524 IUH-548 IUH-560	5	17.0	208 240 480 600	1-3 1-3 1-3 3	1/2"-13 NC	24.0 20.8 10.4 -	13.8 12.0 6.0 4.8	6.0W	208 240 240 240	1400	270	60°F	16'	8'	25
IUH-724 IUH-748 IUH-760	7.5	25.6	240 480 600	1-3 1-3 3	1/2"-13 NC	31.3 15.6 -	18.1 9.0 7.2	6.0W	240 240 240	1400	270	85°F	18'	8'	26
IUH-1020 IUH-1024 IUH-1048 IUH-1060	9.6 10 10 10	34.1	208 240 480 600	1-3 1-3 1-3 3	1/2"-13 NC	47.8 43.3 21.6 -	27.6 25.7 12.8 9.6	1/10 HP	208 240 240 240	1550	500	63°F	20'	9'	60
IUH-1524 IUH-1548 IUH-1560	15	51.2	240 480 600	1-3 1-3 3	1/2"-13 NC	64.1 32.1 -	37.7 18.8 14.5	1/10 HP	240 240 240	1550	750	63°F	28'	11'	66 76 78
IUH-2048 IUH-2060	20	68.2	480 600	1-3 3	1/2"-13 NC	42.5 -	24.8 19.3	1/10 HP	240	1550	1000	63°F	32'	13'	76 78
IUH-2548 IUH-2560	25	85.2	480 600	3 3	1/2"-13 NC	- -	31.1 24.0	1/3 HP	240	1550	1300	61°F	34'	14'	134 140
IUH-3048 IUH-3060	30	102.2	480 600	3 3	1/2"-13 NC	- -	36.9 28.9	1/3 HP	240	1550	1800	53°F	38'	15'	140

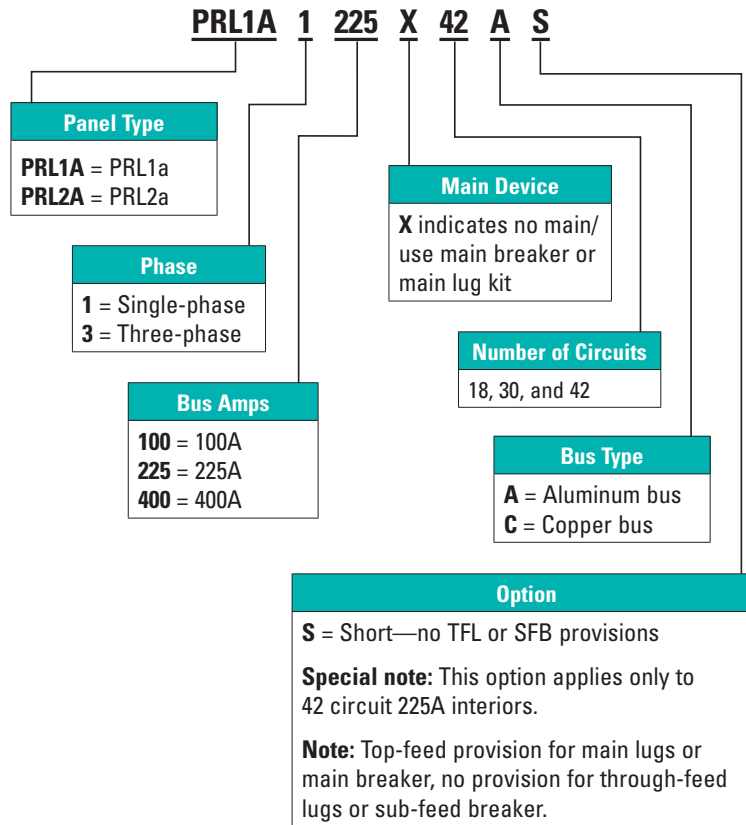
ARCHITECT'S AND ENGINEER'S SPECIFICATIONS*

Furnish and install where indicated on plans, electric unit heaters suitable for small and large areas and UL and CUL listed for wall or ceiling mounting. The cabinet shall be made of 18 gauge cold rolled steel, welded, and phosphate coated to resist corrosion. Side, front, and back panels shall be removable without dismantling the heater by removing four screws from inside the control compartment, thus permitting full access to the elements and fan motor areas. Individual adjustable louvers with 30 degree downward stops shall be furnished to provide desired control of discharge air. The control compartment shall be located at the bottom of the cabinet and provided with a swing down hinged cover to permit full access for cleaning and servicing without dismantling the heater. All heater and control wiring shall terminate inside the control compartment. The heater shall be provided with combination wall/ceiling bracket for 5.0 KW and 7.5 KW units and shall have capability of full horizontal and vertical positions. The cabinet shall be finished in a neutral grey polyester powder paint. The heating elements shall be of the non-glowing design consisting of 80/20 nickel-chromium resistance wire, embedded in magnesium oxide and enclosed in a metal sheath to which metal plated fins are copper brazed. The elements shall be painted with aluminized paint for corrosion resistance and cover the entire discharge area for uniform heating. The heating elements shall be warranted for five years. The fan motor shall be totally enclosed, permanently lubricated, impedance protected, and of unit bearing design suitable for horizontal or vertical operation with high starting and running torques. (5.0 & 7.5 KW units) The fan motor shall

be totally enclosed, permanently lubricated, thermal protected, and of double bearing design with high starting and running torques. (10 - 30 KW units) The fan blade shall be aluminum and directly connected to the fan motor, designed specifically for unit heater application. The fan control shall be of the bimetallic snap-action type and shall activate fan motor after heating elements reach operating temperature and continue to operate the fan motor after thermostat is satisfied and until the heating elements cool. A thermal cutout shall be built into the system to automatically shut off the heater in the event of overheating and reactivate when temperature returns to normal. The heater shall be provided with a factory installed, heavy duty, 3-pole contactor providing quiet, efficient operation, making external contacts and additional wiring unnecessary. Optional controls and accessories:
 a. Single pole built-in thermostat
 b. Three pole built-in disconnect switch (30 amp rated)
 c. Three pole built-in disconnect switch (63 amp rated)
 d. Summer/Winter built-in fan switch
 e. Combination wall/ceiling bracket
 Heaters shall be IUH Series as manufactured by QMark, a division of Marley Engineered Products, Bennettsville, SC.

* Marley Engineered Products reserves the right to change specifications without prior notice.

Catalog numbering system—Pow-R-Stock panelboard interiors



NEMA 1 Pow-R-Stock Panelboard Boxes

EZB 20 36 R BS

EZB are available boxes used for all Type 1 PRL1a, PRL2a, and PRL3a panels
Width in inches = 20 **Height in inches** = 36, 48, 60, or 72

R = Right-hand flange

NEMA 1 Pow-R-Stock Panelboard Trims

EZT 20 36 S

EZT are available laser cut trims used on all PRL1a, PRL2a, and PRL3a panels
Width in inches = 20 **Height in inches** = 36, 48, 60, or 72

Mounting

S = Surface
F = Flush

Main Breaker Kits

BK ED 100 T

Breaker kit
Breaker frame
ED or FD or KD
Trip rating 100, 125 150, 175, 200, 225, 250, 300, 350, 400

Mounting

T = Top
B = Bottom

Pow-R-Stock Plus program reference guide



Note: The colors shown in the table to the right correspond to the color-coding on the trim, interior and box product packaging labels. Be sure that all three parts match when delivering to your customer.

Unassembled panelboards—EZ Box™ and EZ Trim™

Ampere Rating	Maximum Number of Poles	Catalog Numbers					
		Interiors (Less Main Device)		Boxes	Trims (NEMA® 1)		NEMA 3R Enclosures
		Aluminum Bus	Copper Bus	NEMA 1	Surface	Flush	
Single-Phase, Three-Wire, 120/240V							
100	18	PRL1A1100X18A	PRL1A1100X18C	EZB2036R	EZT2036S	EZT2036F	GWPBQ2036PR
100	30	PRL1A1100X30A	PRL1A1100X30C	EZB2048R	EZT2048S	EZT2048F	GWPBQ2048PR
225	30	PRL1A1225X30A	PRL1A1225X30C	EZB2048R	EZT2048S	EZT2048F	GWPBQ2048PR
225	42	PRL1A1225X42AS	PRL1A1225X42CS	EZB2048R	EZT2048S	EZT2048F	GWPBQ2048PR
225	42	PRL1A1225X42A	PRL1A1225X42C	EZB2060R	EZT2060S	EZT2060F	GWPBQ2060PR
400	42	PRL1A1400X42A	PRL1A1400X42C	EZB2072R	EZT2072S	EZT2072F	GWPBQ2072PR
Three-Phase, Four-Wire, 208Y/120V							
100	18	PRL1A3100X18A	PRL1A3100X18C	EZB2036R	EZT2036S	EZT2036F	GWPBQ2036PR
100	30	PRL1A3100X30A	PRL1A3100X30C	EZB2048R	EZT2048S	EZT2048F	GWPBQ2048PR
225	30	PRL1A3225X30A	PRL1A3225X30C	EZB2048R	EZT2048S	EZT2048F	GWPBQ2048PR
225	42	PRL1A3225L42AS	PRL1A3225L42CS	EZB2042R	EZT2042S	EZT2042F	GWPBQ2042PR
225	42	PRL1A3225X42AS	PRL1A3225X42CS	EZB2048R	EZT2048S	EZT2048F	GWPBQ2048PR
225	42	PRL1A3225X42A	PRL1A3225X42C	EZB2060R	EZT2060S	EZT2060F	GWPBQ2060PR
400	42	PRL1A3400X42A	PRL1A3400X42C	EZB2072R	EZT2072S	EZT2072F	GWPBQ2072PR
Three-Phase, Four-Wire, 480Y/277V							
100	18	PRL2A3100X18A	PRL2A3100X18C	EZB2036R	EZT2036S	EZT2036F	GWPBQ2036PR
100	30	PRL2A3100X30A	PRL2A3100X30C	EZB2048R	EZT2048S	EZT2048F	GWPBQ2048PR
225	30	PRL2A3225X30A	PRL2A3225X30C	EZB2048R	EZT2048S	EZT2048F	GWPBQ2048PR
225	42	PRL2A3225L42AS	PRL2A3225L42CS	EZB2042R	EZT2042S	EZT2042F	GWPBQ2042PR
225	42	PRL2A3225X42AS	PRL2A3225X42CS	EZB2048R	EZT2048S	EZT2048F	GWPBQ2048PR
225	42	PRL2A3225X42A	PRL2A3225X42C	EZB2060R	EZT2060S	EZT2060F	GWPBQ2060PR
400	42	PRL2A3400X42A	PRL2A3400X42C	EZB2072R	EZT2072S	EZT2072F	GWPBQ2072PR

Summary of branch breakers available

Breaker	Poles	Ampere Rating	Voltage	kAIC Rating	Example	Panel Type
BAB	1	15–60	120V	10	BAB1020	PRL1A
	2	15–100	120/240V	10	BAB2020	PRL1A
	2	15–100	240V	10	BAB2040H	PRL1A
	3	15–100	240V	10	BAB3030H	PRL1A
QBGF	1	15–30	120V	10	QBGF1020	PRL1A
	2	15–40	120/240V	10	QBGF2040	PRL1A
QBHW	1	15–60	120V	22	QBHW1020	PRL1A
	2	15–100	120/240V	22	QBHW2020	PRL1A
	2	15–100	240V	22	QBHW2040H	PRL1A
	3	15–100	240V	22	QBHW3030H	PRL1A
GHQ	1	15–20	277V	14	GHQ1020	PRL2A
GHB	1	15–100	277V	14	GHB1020	PRL2A
	2	15–100	480Y/277V	14	GHB2040	PRL2A
	3	15–100	480Y/277V	14	GHB3060	PRL2A



Powering Business Worldwide

Circuit breaker kits—unassembled panelboards

Maximum Voltage	Ampere Rating	Service	Catalog Number	Breaker Frame	Mounting Location	Wire Range Al/Cu
Kits—Main Circuit Breaker or Subfeed Circuit Breaker (Includes Circuit Breaker and Terminals)						
240V	100	Single- or three-phase	BKED100T	ED	Top	(1) #14–1/0
	125	Single- or three-phase	BKED125T	ED	Top	(1) #4–4/0
	150	Single- or three-phase	BKED150T	ED	Top	(1) #4–4/0
	175	Single- or three-phase	BKED175T	ED	Top	(1) #4–4/0
	200	Single- or three-phase	BKED200T	ED	Top	(1) #4–4/0
	225	Single- or three-phase	BKED225T	ED	Top	(1) #4–4/0
240V	100	Single- or three-phase	BKED100B	ED	Bottom	(1) #14–1/0
	125	Single- or three-phase	BKED125B	ED	Bottom	(1) #4–4/0
	150	Single- or three-phase	BKED150B	ED	Bottom	(1) #4–4/0
	175	Single- or three-phase	BKED175B	ED	Bottom	(1) #4–4/0
	200	Single- or three-phase	BKED200B	ED	Bottom	(1) #4–4/0
	225	Single- or three-phase	BKED225B	ED	Bottom	(1) #4–4/0
480V	100	Single- or three-phase	BKFD100T	FD	Top	(1) #14–1/0
	125	Single- or three-phase	BKFD125T	FD	Top	(1) #4–4/0
	150	Single- or three-phase	BKFD150T	FD	Top	(1) #4–4/0
	175	Single- or three-phase	BKFD175T	FD	Top	(1) #4–4/0
	200	Single- or three-phase	BKFD200T	FD	Top	(1) #4–4/0
	225	Single- or three-phase	BKFD225T	FD	Top	(1) #4–4/0
480V	100	Single- or three-phase	BKFD100B	FD	Bottom	(1) #14–1/0
	125	Single- or three-phase	BKFD125B	FD	Bottom	(1) #4–4/0
	150	Single- or three-phase	BKFD150B	FD	Bottom	(1) #4–4/0
	175	Single- or three-phase	BKFD175B	FD	Bottom	(1) #4–4/0
	200	Single- or three-phase	BKFD200B	FD	Bottom	(1) #4–4/0
	225	Single- or three-phase	BKFD225B	FD	Bottom	(1) #4–4/0

Kits—Main Circuit Breaker (Includes Circuit Breaker and Terminals)

480V	250	Single- or three-phase	BKKD250T	KD	Top	(1) 250–500 kcmil
	300	Single- or three-phase	BKKD300T	KD	Top	(1) 250–500 kcmil
	350	Single- or three-phase	BKKD350T	KD	Top	(1) 250–500 kcmil
	400	Single- or three-phase	BKKD400T	KD	Top	(2) 3/0–250 kcmil or (1) 3/0–500 kcmil
480V	250	Single- or three-phase	BKKD250B	KD	Bottom	(1) 250–500 kcmil
	300	Single- or three-phase	BKKD300B	KD	Bottom	(1) 250–500 kcmil
	350	Single- or three-phase	BKKD350B	KD	Bottom	(1) 250–500 kcmil
	400	Single- or three-phase	BKKD400B	KD	Bottom	(2) 3/0–250 kcmil or (1) 3/0–500 kcmil

Note: Order optional lug kit catalog number **3TA225FDK** for 175–225A F-Frame three-pole circuit breakers to provide terminations for (1) #6–300 kcmil.

Kits—main lugs or through-feed lugs

Ampere Rating	Service	Catalog Number	Wire Range Al/Cu
100	Single- or three-phase	LUGKIT100	(1) #14–1/0
225	Single- or three-phase	LUGKIT225	(1) #6–300 kcmil
400	Single- or three-phase	LUGKIT400	(2) #2–500 kcmil

Kits—service entrance

Ampere Rating	Service	Catalog Number	Panel Type
100/225	Single- or three-phase	SEK1/2	PRL1a or PRL2a
400	Single- or three-phase	SEK4/6	PRL1a or PRL2a

Kits—insulated/isolated ground (carton quantity of five)

Ampere Rating	Service	Catalog Number	Panel Type
—	Single- or three-phase	ISOGROUND	PRL1a or PRL2a

Kits—200% neutral

Ampere Rating	Service	Catalog Number	Panel Type
100	Single- or three-phase	2NK100	PRL1a or PRL2a
225	Single- or three-phase	2NK225	PRL1a or PRL2a

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Powering Business Worldwide

Product Selection

Type PRL1a



PRL1a

Ampere Rating	Interrupting Rating (kA Sym.) 240 Vac	Breaker Type
Main Lug Only		
100	—	—
225	—	—
400	—	—
Main Breaker		
100	10	BAB
100	18	EHD
100	22	QBHW
100	22	EDB
100	42	EDS
100	65	ED
100	65	FD, FDE
100	100	EDH
100	100	HFD, HFDE
225	22	EDB
225	42	EDS
225	65	ED
225	100	EDH
250	65	JD
250	100	HJD
250	200	JDC
400	65	DK
400	65	KD
400	100	HKD
400	100	LHH
400	200	KDC

PRL1a Branch Circuit Breakers

Bolt-on = BAB, QBHW, QBGF, QBHGF, QBGFEP, QBHGFEP, QBAF, QBAG, QBHAF, QBHAG
Plug-on = HQP, QPHW, QPGF, QPHGF, QPGFEP, QPHGFEP

Ampere Rating	Interrupting Rating (kA Sym.) 240 Vac ^①	Breaker Type
15–60	10	BAB, HQP
70	10	BAB, HQP
80–100	10	BAB, HQP
15–50 ^②	10	QBGF, QPGF ^③
15–50 ^②	10	QBGFEP, QPGFEP ^④
15–20	10	QBCAF ^⑤
15–60	10	BAB-D, HQP-D ^⑥
15–30	10	BAB-C, HQP-B ^⑦
15–30	10	BABRP ^⑧
15–30	10	BABRSP ^⑧
15–60	22	QBHW, QPHW
70	22	QBHW, QPHW
80–100	22	QBHW, QPHW
15–30	22	QBHGF, QPHGF ^③
15–30	22	QBHGFEP, QPHGFEP ^④
15–20	22	QBHCAF ^⑤
Provision	—	—

Notes

- ① Single-pole breakers are rated 120 Vac maximum.
- ② 50A devices are available as two-pole only.
- ③ GFCI for 5 mA personnel protection.
- ④ GFP for 30 mA equipment protection.
- ⑤ Arc fault circuit breaker.
- ⑥ HID (High Intensity Discharge) rated breaker.
- ⑦ Switching Neutral Breaker. single-pole device requires two-pole space, two-pole device requires three-pole space.
- ⑧ Solenoid operated breaker.

Approximate Dimensions in Inches (mm)

PRL1a Panelboard Sizing

Panelboard Types	Main Breaker Types and Mounting Position (H) = Horizontal (V) = Vertical	Sub-Feed Breaker Types and Mounting Position (H) = Horizontal (V) = Vertical	Maximum No. of Branch Circuits Including Provisions	Box Dimensions ①			YS Box Catalog Number	LT Trim Catalog Number	EZ Box Catalog Number	EZ Trim Catalog Number
				Height	Width	Depth				
100A										
Main breaker	BAB, QBHW (H)	—	15	36.00 (914.4)	20.00 (508.0)	5.75 (146.1)	YS2036	LT2036S or F	EZB2036R	EZT2036S or F
		—	27	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	YS2048	LT2048S or F	EZB2048R	EZT2048S or F
		—	39	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	YS2048	LT2048S or F	EZB2048R	EZT2048S or F
		—	42	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	YS2060	LT2060S or F	EZB2060R	EZT2060S or F
Main lugs or main breaker	EHD, FD, HFD (V)	—	18	36.00 (914.4)	20.00 (508.0)	5.75 (146.1)	YS2036	LT2036S or F	EZB2036R	EZT2036S or F
		—	30	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	YS2048	LT2048S or F	EZB2048R	EZT2048S or F
		—	42	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	YS2048	LT2048S or F	EZB2048R	EZT2048S or F
Main lugs or main breaker with 100A through-feed lugs or sub-feed breaker	EHD, FD, HFD (V)	EHD, FD	18	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	YS2048	LT2048S or F	EZB2048R	EZT2048S or F
		FD, HFD	30	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	YS2048	LT2048S or F	EZB2048R	EZT2048S or F
		FD, HFD (V)	42	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	YS2060	LT2060S or F	EZB2060R	EZT2060S or F
225A										
Main lugs or main breaker	EDB, EDS, ED, EDH, FD, HFD (V)	—	18	36.00 (914.4)	20.00 (508.0)	5.75 (146.1)	YS2036	LT2036S or F	EZB2036R	EZT2036S or F
		—	30	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	YS2048	LT2048S or F	EZB2048R	EZT2048S or F
		—	42	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	YS2048	LT2048S or F	EZB2048R	EZT2048S or F
Main lugs or main breaker with 225A through-feed lugs or sub-feed breaker	FD, HFD, EDS, ED, EDH (V)	FD, HFD, EDS, ED, EDH	18	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	YS2048	LT2048S or F	EZB2048R	EZT2048S or F
		FD, HFD, EDS, ED, EDH (V)	30	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	YS2060	LT2060S or F	EZB2060R	EZT2060S or F
		FD, HFD, EDS, ED, EDH (V)	42	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	YS2060	LT2060S or F	EZB2060R	EZT2060S or F
400A										
Main breaker	DK, KD, HKD, KDC, LHH (V)	—	18	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	YS2048	LT2048S or F	EZB2048R	EZT2048S or F
		—	30	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	YS2060	LT2060S or F	EZB2060R	EZT2060S or F
		—	42	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	YS2060	LT2060S or F	EZB2060R	EZT2060S or F
Main lugs or main breaker with 225A through-feed lugs or sub-feed breaker	DK, KD, HKD, KDC, LHH (V)	FD, HFD, EDS, ED, EDH	18	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	YS2060	LT2060S or F	EZB2060R	EZT2060S or F
		FD, HFD, EDS, ED, EDH (V)	30	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	YS2060	LT2060S or F	EZB2060R	EZT2060S or F
		FD, HFD, EDS, ED, EDH (V)	42	72.00 (1828.8)	20.00 (508.0)	5.75 (146.1)	YS2072	LT2072S or F	EZB2072R	EZT2072S or F
Main breaker with 400A through-feed lugs or sub-feed breaker	DK, KD, HKD, KDC, LHH (V)	DK, KD, HKD, HKD, KDC	18	72.00 (1828.8)	20.00 (508.0)	5.75 (146.1)	YS2072	LT2072S or F	EZB2072R	EZT2072S or F
		DK, KD, HKD, HKD, KDC (V)	30	72.00 (1828.8)	20.00 (508.0)	5.75 (146.1)	YS2072	LT2072S or F	EZB2072R	EZT2072S or F
		DK, KD, HKD, HKD, KDC (V)	42	90.00 (2286.0)	20.00 (508.0)	5.75 (146.1)	YS2090	LT2090S or F	EZB2090R	EZT2090S or F

Note

① Smaller panelboard box sizes are available if required. Contact Eaton for application information.

Product Selection

Type PRL2a



PRL2a

Ampere Rating	Interrupting Rating (kA Symmetrical)			Breaker Type
	240 Vac	480Y/277 Vac	125/250 Vdc	
Main Lug Only				
100	—	—	—	—
225	—	—	—	—
400	—	—	—	—
Main Breaker				
100	65	14	14	GHB
100	18	14	10	EHD
100	65	35	10	FD, FDE
100	100	65	22	HFD, HFDE
100	200	100	22	FDC
225	65	—	—	ED
225	65	35	10	FD, FDE
225	100	65	22	HFD, HFDE
225	200	100	22	FDC
250	65	35	10	JD
250	100	65	22	HJD
250	200	100	22	JDC
400	65	35	10	KD
400	100	65	22	HKD
400	100	65	—	LHH
400	200	100	22	KDC

PRL2a Branch Circuit Breakers

Ampere Rating	Interrupting Rating (kA Symmetrical)			Breaker Type
	240 Vac ①	480Y/277 Vac	125/250 Vdc	
15–20	65	14	—	GHQ ②
15–20	65	14	14	GHB ②
25–60	65	14	14	GHB ②
70–100	65	14	14	GHB ②
15–30	65	25	—	HGHB ②
15–20	65	14	—	GHQRSP ③
15–30	65	14	—	GHBS ②③
15–60	—	14	—	GHBGFEP ②④
15–20	—	14	—	GHBHID ②⑤
Provision	—	—	—	—

Notes

- ① Interrupting ratings in this column are applicable to 120 Vac for single-pole breakers.
- ② Must be used on 480Y/277V grounded wye systems only.
- ③ Remote controllable breaker.
- ④ GFP for 30 mA equipment protection. Requires two-pole spaces. 277 Vac only.
- ⑤ HID (High Intensity Discharge) rated breaker.

Approximate Dimensions in Inches (mm)

PRL2a Panelboard Sizing

Panelboard Types	Main Breaker Types and Mounting Position (H) = Horizontal (V) = Vertical	Sub-Feed Breaker Types and Mounting Position (H) = Horizontal (V) = Vertical	Maximum No. of Branch Circuits Including Provisions	Box Dimensions ①			YS Box Catalog Number	LT Trim Catalog Number	EZ Box Catalog Number	EZ Trim Catalog Number
				Height	Width	Depth				
100A										
Main breaker	BAB, QBHW (H)	—	15	36.00 (914.4)	20.00 (508.0)	5.75 (146.1)	YS2036	LT2036S or F	EZB2036R	EZT2036S or F
		—	27	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	YS2048	LT2048S or F	EZB2048R	EZT2048S or F
		—	39	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	YS2048	LT2048S or F	EZB2048R	EZT2048S or F
		—	42	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	YS2060	LT2060S or F	EZB2060R	EZT2060S or F
Main lugs or main breaker	EHD, FD, HFD, FDE, HFDE (V)	—	18	36.00 (914.4)	20.00 (508.0)	5.75 (146.1)	YS2036	LT2036S or F	EZB2036R	EZT2036S or F
		—	30	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	YS2048	LT2048S or F	EZB2048R	EZT2048S or F
		—	42	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	YS2048	LT2048S or F	EZB2048R	EZT2048S or F
Main lugs or main breaker with 100A through-feed lugs or sub-feed breaker	EHD, FD, FDE, HFD, HFDE (V)	EHD, FD	18	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	YS2048	LT2048S or F	EZB2048R	EZT2048S or F
		FD, HFD	30	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	YS2048	LT2048S or F	EZB2048R	EZT2048S or F
		HFDE (V)	42	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	YS2060	LT2060S or F	EZB2060R	EZT2060S or F
225A										
Main lugs or main breaker	EDB, EDS, ED, EDH, FD, HFD, FDE, HFDE (V)	—	18	36.00 (914.4)	20.00 (508.0)	5.75 (146.1)	YS2036	LT2036S or F	EZB2036R	EZT2036S or F
		—	30	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	YS2048	LT2048S or F	EZB2048R	EZT2048S or F
		—	42	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	YS2048	LT2048S or F	EZB2048R	EZT2048S or F
	JD, HJD, JDC (V)	—	18	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	YS2060	LT2060S or F	EZB2060R	EZT2060S or F
		—	30	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	YS2060	LT2060S or F	EZB2060R	EZT2060S or F
Main lugs or main breaker with 225A through-feed lugs or sub-feed breaker	EHD, FD, HFD, EDB, EDS, ED, EDH (V)	—	18	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	YS2048	LT2048S or F	EZB2048R	EZT2048S or F
		—	30	48.00 (1219.2)	20.00 (508.0)	5.75 (146.1)	YS2048	LT2048S or F	EZB2048R	EZT2048S or F
		—	42	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	YS2060	LT2060S or F	EZB2060R	EZT2060S or F
	JD, HJD, JDC (V)	EHD, FD, HFD, EDB, EDS, ED, EDH (V)	18	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	YS2060	LT2060S or F	EZB2060R	EZT2060S or F
		—	30	72.00 (1828.8)	20.00 (508.0)	5.75 (146.1)	YS2072	LT2072S or F	EZB2072R	EZT2072S or F
		—	42	72.00 (1828.8)	20.00 (508.0)	5.75 (146.1)	YS2072	LT2072S or F	EZB2072R	EZT2072S or F
400A										
Main lugs or main breaker	DK, KD, HKD, KDC, LHH (V)	—	18	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	YS2060	LT2060S or F	EZB2060R	EZT2060S or F
		—	30	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	YS2060	LT2060S or F	EZB2060R	EZT2060S or F
		—	42	72.00 (1828.8)	20.00 (508.0)	5.75 (146.1)	YS2072	LT2072S or F	EZB2072R	EZT2072S or F
Main lugs or main breaker with 225A through-feed lugs or sub-feed breaker	DK, KD, HKD, KDC, LHH (V)	EHD, FD, HFD, EDB, EDS, ED, EDH (V)	18	60.00 (1524.0)	20.00 (508.0)	5.75 (146.1)	YS2060	LT2060S or F	EZB2060R	EZT2060S or F
		—	30	72.00 (1828.8)	20.00 (508.0)	5.75 (146.1)	YS2072	LT2072S or F	EZB2072R	EZT2072S or F
		—	42	72.00 (1828.8)	20.00 (508.0)	5.75 (146.1)	YS2072	LT2072S or F	EZB2072R	EZT2072S or F
Main lugs or main breaker with 400A through-feed lugs or sub-feed breaker	DK, KD, HKD, KDC, LHH (V)	JD, HJD, JDC, DK, KD, HKD, KDC (V)	18	72.00 (1828.8)	20.00 (508.0)	5.75 (146.1)	YS2072	LT2072S or F	EZB2072R	EZT2072S or F
		—	30	90.00 (2286.0)	20.00 (508.0)	5.75 (146.1)	YS2090	LT2090S or F	EZB2090R	EZT2090S or F
		—	42	90.00 (2286.0)	20.00 (508.0)	5.75 (146.1)	YS2090	LT2090S or F	EZB2090R	EZT2090S or F

Note

① Smaller panelboard box sizes are available if required. Contact Eaton for application information.

Panelboard Trim Locks

Panelboard trims use different trim locks; see pictures below for styles and part numbers.

Table 8. Panelboard Trim Locks

Description	Catalog Number
For use on left-handed door. (Hinged on left side.)	K80522
For use on right-handed door. (Hinged on right side.)	8450C62H39
T-Handle lock, at one time used on all trims over 48.00 inches (1219.2 mm) in height. Also used on outdoor NEMA® 12/3R trims.	0080429
Used on PRL 4 lighting and power panels as standard.	1A32258H03
Used on PRL 1, 2, 3, 1a, 2a, and 3a lighting panels as standard. WEM-2 key.	5155C81G01



K80522



8450C62H39



0080429



1A32258H03



5155C81G01

PRL 1a and 2a Service Entrance Kits

Table 9. PRL 1a and 2a Service Entrance Kits

Drawing Number [Ⓢ]	Panel Ampere Rating	Tin-Plated Aluminum	Silver-Plated Copper
		Item Number	
Mechanical Main Lugs or Main Breakers			
4180B62	100-225	G01	G03
4180B62	400	G05	G07
Compression (Crimp) Main Lugs			
4180B62	100-225	G09	G11
4180B62	400	G13	G15
Copper Main Lugs			
4180B62	100-225	N/A	G19
4180B62	400	N/A	G23

[Ⓢ] Order the basic drawing number, along with the equivalent G-number that is needed (example: 4180B62G03).



4180B62G01

Effective January 2011

PRL 3a Ground Assemblies

Table 10. PRL 3a Ground Assemblies

Material	Standard	Isolated
	Catalog Number	
Aluminum/Copper	5158C05G02	2C11296G02



5158C05G02

PRL 3a Service Entrance Kits

Table 11. PRL 3a Service Entrance Kits

Style Number [®]	Panel Ampere Rating	Tin-Plated Aluminum	Silver-Plated Copper
		Item Number	
Mechanical Main Lugs or Main Breakers			
5078A98	100 250-600	G01 G13	G03 G15

[®] When ordering, use complete style number (example: 100 Ampere Tin-Plated Aluminum 5078A98G01).



5078A98G01

PRL 3a Parts

Table 12. 20"- and 28"-Wide

Cover	Fills This Height Space	Width	Part Number
1X Blank Cover	1 3/8"	13"	4176B72H01
2X Blank Cover	2 3/4"	13"	4176B72H02
3X Blank Cover	4 1/8"	13"	4176B72H03
4X Blank Cover	5 1/2"	13"	4176B72H04
5X Blank Cover	6 7/8"	13"	4176B72H05
6X Blank Cover	8 1/4"	13"	4176B72H06
7X Blank Cover	9 5/8"	13"	4176B72H07
8X Blank Cover	11"	13"	4176B72H08
9X Blank Cover	12 3/8"	13"	4176B72H09
10X Blank Cover	13 3/4"	13"	4176B72H10
11X Blank Cover	15 1/8"	13"	4176B72H11
12X Blank Cover	16 1/2"	13"	4176B72H12

Connector Kit Description	Additional Information	Max Amps	Part Number
6-Pole BAB Connector Kit	Three-Phase	100 Amp	KPRL3ABA06
6-Pole BAB Connector Kit	Single-Phase	100 Amp	KPRL3ABA06-1
12-Pole BAB Connector Kit	Three-Phase	100 Amp	KPRL3ABA12
12-Pole BAB Connector Kit	Single-Phase	100 Amp	KPRL3ABA12-1
18-Pole BAB Connector Kit	Three-Phase	100 Amp	KPRL3ABA18
18-Pole BAB Connector Kit	Single-Phase	100 Amp	KPRL3ABA18-1
24-Pole BAB Connector Kit	Three-Phase	100 Amp	KPRL3ABA24
24-Pole BAB Connector Kit	Single-Phase	100 Amp	KPRL3ABA24-1
6-Pole GHB Connector Kit	Three-Phase	100 Amp	KPRL3AGB06
6-Pole GHB Connector Kit	Single-Phase	100 Amp	KPRL3AGB06-1
12-Pole GHB Connector Kit	Three-Phase	100 Amp	KPRL3AGB12
12-Pole GHB Connector Kit	Single-Phase	100 Amp	KPRL3AGB12-1
18-Pole GHB Connector Kit	Three-Phase	100 Amp	KPRL3AGB18
18-Pole GHB Connector Kit	Single-Phase	100 Amp	KPRL3AGB18-1
24-Pole GHB Connector Kit	Three-Phase	100 Amp	KPRL3AGB24
24-Pole GHB Connector Kit	Single-Phase	100 Amp	KPRL3AGB24-1
2-Pole ED Connector Kit	Single-Breaker Mounting	225 Amp	KPRL3AED2
3-Pole ED Connector Kit		225 Amp	KPRL3AED3
1-Pole FD Connector Kit	Twin-Breaker Mounting	150 Amp	KPRL3AFD1
2-Pole FD Connector Kit		150 Amp	KPRL3AFD2
3-Pole FD Connector Kit		150 Amp	KPRL3AFD3

Effective January 2011

PRL 4 Blank Covers**Table 13. Fits Only 24"-Wide Tub**

Cover	Fills This Height Space	Width	Part Number
1X Blank Cover	1 3/8"	17"	6554C01H01
2X Blank Cover	2 3/4"	17"	6554C01H02
3X Blank Cover	4 1/8"	17"	6554C01H03
4X Blank Cover	5 1/2"	17"	6554C01H13
5X Blank Cover	6 7/8"	17"	6554C01H14
6X Blank Cover	8 1/4"	17"	6554C01H04
7X Blank Cover	9 5/8"	17"	6554C01H05
9X Blank Cover	12 3/8"	17"	6554C01H06
10X Blank Cover	13 3/4"	17"	6554C01H07
11X Blank Cover	15 1/8"	17"	6554C01H08
12X Blank Cover	16 1/2"	17"	6554C01H09
13X Blank Cover	17 7/8"	17"	6554C01H10
15X Blank Cover	20 5/8"	17"	6554C01H11
20X Blank Cover	27 1/2"	17"	6554C01H12

Table 14. Fits Only 36"- and 44"-Wide Tubs

Cover	Fills This Height Space	Width	Part Number
1X Blank Cover	1 3/8"	25"	6554C02H01
2X Blank Cover	2 3/4"	25"	6554C02H02
3X Blank Cover	4 1/8"	25"	6554C02H03
4X Blank Cover	5 1/2"	25"	6554C02H13
5X Blank Cover	6 7/8"	25"	6554C02H14
6X Blank Cover	8 1/4"	25"	6554C02H04
7X Blank Cover	9 5/8"	25"	6554C02H05
9X Blank Cover	12 3/8"	25"	6554C02H06
10X Blank Cover	13 3/4"	25"	6554C02H07
11X Blank Cover	15 1/8"	25"	6554C02H08
12X Blank Cover	16 1/2"	25"	6554C02H09
13X Blank Cover	17 7/8"	25"	6554C02H10
15X Blank Cover	20 5/8"	25"	6554C02H11
20X Blank Cover	27 1/2"	25"	6554C02H12

Table 15. PRL 4 Connector Kits

Connector Kit Description	Additional Information	Max Amps	Part Number
3-Pole F-Frame Connector Kit	Single- and Twin-Mount	225 Amp	KPRL4FD
3-Pole J-Frame Connector Kit	Single-Mount	250 Amp	KPRL4JDS
3-Pole J-Frame Connector Kit	Twin-Mount	250 Amp	KPRL4JDT
3-Pole K-Frame Connector Kit	Single-Mount	400 Amp	KPRL4KDS
3-Pole K-Frame Connector Kit	Twin-Mount/44"-Wide Box Min.	400 Amp	KPRL4KDT
3-Pole L-Frame Connector Kit	Single-Mount/36"-Wide Box Min.	600 Amp	KPRL4LD
3-Pole M-Frame Connector Kit	Single-Mount/36"-Wide Box Min.	800 Amp	KPRL4MD
3-Pole N-Frame Connector Kit	Single-Mount/36"-Wide Box Min.	1200 Amp	KPRL4ND
Fusible Switch (FDPW) Connector Kit	Twin-Mount	60 Amp	KPRL44X
Fusible Switch (FDPW) Connector Kit	Twin-Mount	100 Amp	KPRL45X
Fusible Switch (FDPW) Connector Kit	Single-Mount	100 Amp	KPRL45XS
Fusible Switch (FDPB) Connector Kit	Single-Mount	200 Amp	KPRL4B6XS
Fusible Switch (FDPB) Connector Kit	Twin-Mount/44"-Wide Box Min.	200 Amp	KPRL4B6XT
Fusible Switch (FDPW) Connector Kit	Single-Mount	400 Amp	KPRL4W9X
Fusible Switch (FDPW) Connector Kit	Single-Mount	600 Amp	KPRL4W11X
Fusible Switch (FDPW) Connector Kit	Single-Mount/44"-Wide Box Min.	800 Amp	KPRL4W11X
Fusible Switch (FDPW) Connector Kit	Single-Mount/44"-Wide Box Min.	1200 Amp	KPRL4W15X

Panelboard Fastrim Clamps and Screw-On Hardware Kits

Table 16. Panelboard Fastrim Clamps and Screw-On Hardware Kits

Description	Style Number
Trim Clamps—Used on PRL 1a, 2a, and 3a Fastrims (6 Per Bag).	2C11641G02
Trim Screws—Used on PRL 1a, 2a, 3a, and 4B Standard Trim (10 Per Bag).	5157C83G06
Chassis Mounting Hardware Bag—PRL 1a, 2a, and 3a Panels.	7499A48G04



2C11641G02



5157C83G06



7499A48G04

Table 22. 1/4-20 Flange Mounting Hex Nut

Description	Part Number
1/4-20 Flange Mounting Hex Nut	70210AL616



Hex Nut

Table 23. Anti-Lift Slide Bracket

Description	Part Number
EZ Trim Anti-Lift Slide Bracket	1A85195H01



EZ Trim Anti-Lift Slide Bracket

Table 24. EZ Trim Locks (Include One Key)

Description	Part Number
EZ Trim Lock Keyed to WEM-2 (Standard)	1A85194G01
EZ Trim Lock Keyed to GE75 (Optional)	1A85194G03
EZ Trim Lock Keyed to Corbin WEM-1 (Optional)	1A85194G05
EZ Trim Lock Keyed to Corbin TEU 1 (Optional)	1A85194G09
EZ Trim Lock Keyed to CAT 60 (Optional)	1A85194G10



EZ Trim Lock Mechanism With Standard Keying

Pow-R-Kit

Table 25. Parts Order Form

Description	Style Number	Max. Order Quantity	Order Quantity
One complete Pow-R-Kit—Initial Orders Only	Pow-R-Kit	1	
Yearly Pow-R-Stock Renewal Fee	Renewal	1	
PRL 1a, 2a, and 3a Ground Bar	5158C05G02	2	
PRL 1a, 2a, and 3a Isolated Ground Bar	2C11296G03	2	
PRL 1a, 2a, and 3a Chassis Mounting Hardware	42C1129H02	2	
PRL 1a, 2a, and 3a Trim Mounting Screws and Captive Nuts (LT Trims Only)	5157C83G06	4	
PRL 1a, 2a, and 3a DF Assembly Screws (1/4-20 x .75 Square Rec.)	70030KBDBR	12	
PRL 1a, 2a, and 3a Breaker Mounting Screws (10-32 x .56 Hex Head)	70010RBB8G	50	
PRL 1a, 2a, and 3a DF Mounting Screws (10-32 x .38 Hex Head)	70032SBB8D	10	
BAB 1-Pole Lock Off (Non-Padlockable)	1256C42G02	10	
BAB 2- and 3-Pole Lock Off (Non-Padlockable)	1256C42G01	5	
BAB/GHB 1-Pole Fillers	5155C62H01	20	
PRL 3a F-Frame 1-Pole Provision Fillers	4178B06H01	10	
Directory Card Envelope	6725D41H30	5	
Directory Card	114B361H01	10	
Number Tabs (1–42)	267P963H01	10	
Number Tabs (43–84)	267P963H02	10	
PRL 4 Chassis Mounting Hardware (Nuts and Washers)	5081A08G02	8	
PRL 4 Gutter Cover Mounting Hardware (Screws and Captive Nuts)	5081A09G02	2	
PRL 4/PRLC Dead Front Cover Screws (1/4-20 x .50)	70010DCBCH	12	
PRLC Switchboard Cover Screws (1/4-20 x 1.50)	1A84774H01	12	
Standard 1a, 2a, and 3a Trim Lock Assembly for LT Style Trim (Not EZ)	5155C81G01	5	
Panelboard and Switchboard Series Rating Manual	1C96944H01 Rev. G	5	
EZ Box 1/4-20 Hex Flange Mounting Nut	70210AL616	20	
EZ Trim Anti-Lift Slide Bracket	1A85195H01	2	
EZ Trim Anti-Lift Slide Bracket 10–32 Screw	70010RBBB8P	5	
EZ Trim Lock Keypad to WEM-2 (Standard Lock)	1A85194G01	5	

Note: An order must consist of at least three separate items.

Note: All orders must have your purchase order number.

Fax completed form to your local Satellite Plant (See *Page 13* for Satellite Plant fax numbers).

Purchase Order Number: _____

Ship to: _____

Attention: _____

Date: _____

Next Generation SYSTIMAX® Category 6A U/UTP Cable – North America Only

CommScope introduces the 2091SDB - the next generation of SYSTIMAX Category 6A U/UTP small diameter cable. It maintains the same trusted performance of its predecessor (2091SD) at a smaller cable diameter. The 2091SDB retains its cross-web separator design for reliable near-end crosstalk (NEXT) performance and robust cable structural integrity.



- Guaranteed by SYSTIMAX Application Assurance and 25-year warranty
- Cable diameter reduction from 0.265 inch to 0.249 inch (6.325 mm) compared to previous generation
- Cross-web separator for optimal NEXT margin and stable cable structure

First Availability: April 1, 2022 order date

General Availability: Q2, 2022

Ordering Information:

Material ID	Description
760253621	2091SDB BLU C6A 4/23 U/UTP R1000
760253622	2091SDB WHT C6A 4/23 U/UTP R1000
760253623	2091SDB SLT C6A 4/23 U/UTP R1000
760253624	2091SDB YEL C6A 4/23 U/UTP R1000
760253625	2091SDB GRN C6A 4/23 U/UTP R1000
760253629	2091SDB RED C6A 4/23 U/UTP R1000
760253630	2091SDB BLK C6A 4/23 U/UTP R1000

For product specifications and installation procedures, click on the links above.

General Duty Safety Switches

GE's general duty safety switches are available in 30-600 amps, 240 Vac, 250 Vdc maximum in both fusible and non-fusible units, and in NEMA Type 1 (indoor) and Type 3R (outdoor) enclosures. The UL Listed short-circuit rating is 10,000 rms symmetrical amps as standard. When Class R fuses and fuse kits are installed, 30-200 amp switches have a UL Listed short circuit rating of 100,000 rms symmetrical amps. GE's general duty safety switches are UL Listed as service entrance equipment when installed in accordance with the National Electrical Code.

All GE General Duty safety switches carry the following certifications:

- UL Listed and cUL Listed (UL98 Enclosed Switches/CSA-C22.2 No. 4-04)
- Federal Specification WS-865C
- NEMA Enclosed Safety Switch Standard KS1-2013
- Seismic Certified

Features



60A/Fusible/3 Pole/240V/N1
TG4322

- 1** Highly visible ON/OFF label
- 2** Highly visible, easy to grip red handle and accepts 1 padlock in the OFF position
- 3** Direct-drive, quick-make, quick-break mechanism "snaps" contacts open and closed providing positive ON/OFF indication
- 4** Unobstructed gutter
- 5** Self-leveling, three-point mounting system
- 6** Integral cover interlock
- 7** Visible confirmation of plated blade contact positions
- 8** Spring reinforced fuse clips assure reliable contact for cool operation. Suitable for Class H, K or R fuses, where applicable

- Safety
- Ease of Installation and Maintenance

General Duty Safety Switch Short Circuit Ratings

Maximum System Voltage	Ampere Rating	UL Listed Fusing		Enclosure Type
		Class	Withstand Rating (rms Sym Amps)	
Fusible				
240 Vac 250 Vdc	30-600	K	10,000	N1 N3R
		H	10,000	
		R ¹	100,000	
Non-Fusible: Fuse withstand ratings apply to non-fused switches when protected by an upstream fuse as listed				
240 Vac 250 Vdc	30-600	No upstream protection	10,000	N1 N3R
		K upstream	10,000	
		H upstream	10,000	
		R upstream	100,000	

¹Class R fuse is not available for 400A or 600A General Duty switches.

Lug Wire Sizes Line and Load Terminals

Ampere Rating	Wire Range AWG/kcmil Copper	Wire Range AWG/kcmil Aluminum
30A (250V)	14-8	12-8
30A (600V)	12-2	12-2
60A	12-2	12-2
100A	10-1/0	10-1/0
200A	2-250	2-250
400A	(1) 2-800 or (2) 1/0-250	(1) 2-800 or (2) 1/0-250
600A	(2) 4-500	(2) 4-500

General Duty Safety Switches

	Amperage Rating	Product Number		Horsepower Rating				DC Hp
		NEMA Type 1 Indoor	NEMA Type 3 Outdoor	Single-Phase 240 Vac		Three-Phase 240 Vac		250 Vdc
				Standard Fuse	Time Delay	Standard Fuse	Time Delay	Standard Fuse
Fusible / 2 Pole / 3 Wire / 240V / 50/60 Hz								
	30	TG3221	TG3221R	1.5	3			5
	60	TG3222	TG3222R	3	10			10
	100	TG3223	TG3223R	7.5	15			20
	200	TG3224 ¹	TG3224R	15	15			
	400	TG3225 ^{1,2}	TG3225R ²					
	600	TG3226 ^{1,2}	TG3226R ²					

Fusible / 3 Pole / 4 Wire / 240V / 50/60 Hz								
	30	TG4321	TG4321R	1.5	3	3	7.5	5
	60	TG4322	TG4322R	3	10	7.5	15	10
	100	TG4323	TG4323R	7.5	15	15	30	20
	200	TG4324 ¹	TG4324R	15	15	25	50	
	400	TG4325 ^{1,2}	⁴			50	100	
	600	TG4326 ^{1,2}	⁴			75	100	

	Amperage Rating	Product Number		Horsepower Rating				DC Hp
		NEMA Type 1 Indoor	NEMA Type 3R Outdoor	Single-Phase 240 Vac		Three-Phase 480 Vac		250Vdc
				Standard Fuse	Time Delay	Standard Fuse	Time Delay	Standard Fuse
Fusible / 2 Pole / 3 Wire / 240V / 50/60 Hz (Painted Red)								
	30	TG3221VRED		1.5	3			5

Fusible / 3 Pole / 4 Wire / 240V / 50/60 Hz (Painted Red)								
	30	TG4321VRED		1.5	3	3	7.5	10
	60	TG4322VRED		3	10	7.5	15	20

	Amperage Rating	Product Number		Horsepower Rating		DC Hp
		NEMA Type 1 Indoor	NEMA Type 3 Outdoor	Single-Phase	Three-Phase	250 Vdc
				240 Vac Standard		Standard
Non-Fusible / 3 Pole / 3 Wire / 240V / 50 / 60 Hz						
	30	TGN3321	TGN3321R	3	7.5	5
	60	TGN3322 ³	TGN3322R ³	10	15	10
	100	TGN3323 ³	TGN3323R ³	15	30	20
	200	TGN3324 ¹	TGN3324R	15	50	
	400	TGN3325 ^{1,2}	⁴		100	
	600	TGN3326 ^{1,2}	⁴		100	

For Type 3R Enclosure: 30-200 amp devices have removable closing cap. Order hubs for these devices separately on page 24.

Larger amp devices require field cut openings and customer-supplied hub.

General Duty safety switches are not suitable for use as service equipment in Canada. Use Heavy Duty safety switches.

¹Add "B" suffix for factory reversed bottom feed. (e.g., TG3224B.) UL Listed.

²Single make- single break mechanism

³Not suitable for use as service equipment. Solid neutral not available.

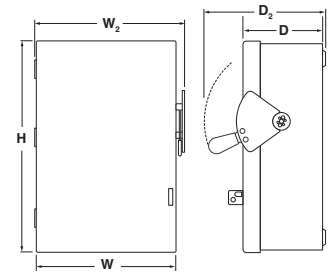
⁴NEMA Type 3R Fusible or Non-Fusible versions, 400-600 ampere rating, available in heavy duty, type TH models. See pages 7-10.



Safety Switch Enclosure Dimensions

General Duty, NEMA Type 1 Approximate Dimensions in inches

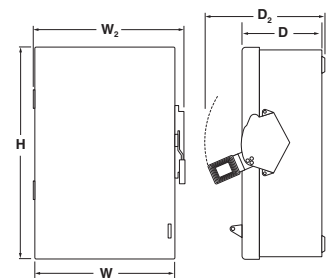
Product Number	Dimension H	Dimension W (Box)	Dimension W ₂ (W/ Handle)	Dimension D (Box)	Dimension D ₂ (W/ Handle)	Weight (lbs)	Drawing #	KO Figure Number
TG3221	10.3	6.4	6.9	3.3	6.3	5	10103091SH104	1
TG3221VRED	10.3	6.4	6.9	3.3	6.3	5	10103091SH104	1
TG3222	13.8	8.4	8.9	4.0	7.9	10	10103091SH104	15
TG3223	21.3	9.4	10.6	4.9	9.9	16	10103091SH108	3
TG3224	29.1	13.4	14.6	5.2	9.3	30	10103091SH108	4
TG3224B	29.1	13.4	14.6	5.2	9.3	30	10103091SH108	4
TG3225	49.4	21.6	22.8	8.7	14.6	102	10103091SH116	5
TG3225B	49.4	21.6	22.8	8.7	14.6	102	10103091SH116	5
TG3226	49.9	22.9	24.1	9.0	14.8	107	10103091SH116	6
TG3325	49.4	21.6	22.8	8.7	14.6	107	10103091SH116	7
TG3325B	49.4	21.6	22.8	8.7	14.6	107	10103091SH116	7
TG3326	49.9	22.9	24.1	9.0	14.8	124	10103091SH116	6
TG3326B	49.9	22.9	24.1	9.0	14.8	124	10103091SH116	6
TG4321	10.3	6.4	6.9	3.3	6.3	5	10103091SH104	1
TG4321VRED	10.3	6.4	6.9	3.3	6.3	5	10103091SH104	1
TG4322	13.8	8.4	8.9	4.0	7.9	10	10103091SH104	15
TG4322VRED	13.8	8.4	8.9	4.0	7.9	10	10103091SH104	15
TG4323	21.3	9.4	10.6	4.9	9.9	17	10103091SH108	3
TG4324	29.1	13.4	14.6	5.2	9.3	32	10103091SH108	4
TG4324B	29.1	13.4	14.6	5.2	9.3	32	10103091SH108	4
TG4325	49.4	21.6	22.8	8.7	14.6	111	10103091SH116	7
TG4325B	49.4	21.6	22.8	8.7	14.6	111	10103091SH116	7
TG4326	49.9	22.9	24.1	9.0	14.8	126	10103091SH116	6
TG4326B	49.9	22.9	24.1	9.0	14.8	126	10103091SH116	6
TGN3321	10.3	6.4	6.9	3.3	6.3	5	10103091SH104	1
TGN3322	13.8	8.4	8.9	4.0	7.9	10	10103091SH104	15
TGN3323	21.3	9.4	10.6	4.9	9.9	16	10103091SH108	3
TGN3324	29.1	13.4	14.6	5.2	9.3	30	10103091SH108	4
TGN3324B	29.1	13.4	14.6	5.2	9.3	30	10103091SH108	4
TGN3325	49.4	21.6	22.8	8.7	14.6	118	10103091SH116	7
TGN3325B	49.4	21.6	22.8	8.7	14.6	118	10103091SH116	7
TGN3326	49.9	22.9	24.1	9.0	14.8	120	10103091SH116	6
TGN3326B	49.9	22.9	24.1	9.0	14.8	120	10103091SH116	6



General Duty
NEMA Type 1

Heavy Duty, NEMA Type 1 Approximate Dimensions in inches

Product Number	Dimension H	Dimension W (Box)	Dimension W ₂ (W/ Handle)	Dimension D (Box)	Dimension D ₂ (W/ Handle)	Weight (lbs)	Drawing #	KO Figure Number
TH2261DC	12.6	8.3	9.5	4.0	7.6	11	10103091SH102	15
TH2262DC	21.3	9.1	9.4	5.0	8.6	18	10103091SH102	3
TH2263DC	22.3	9.3	10.1	4.8	9.8	19	10103091SH105	14
TH3221	10.3	6.3	7.1	3.3	6.1	6	10103091SH102	1
TH3222	17.6	9.4	10.1	5.0	9.0	15	10103091SH102	3
TH3223	21.3	9.3	10.1	4.8	9.8	17	10103091SH105	3
TH3224	31.5	13.3	14.1	5.1	10.5	33	10103091SH105	4
TH3224B	31.5	13.3	14.1	5.1	10.5	33	10103091SH105	4
TH3224C	31.5	13.3	14.1	5.1	10.5	33	10103091SH105	4
TH3225	50.9	22.9	23.6	8.3	14.4	120	10103091SH112	6
TH3225B	50.9	22.9	23.6	8.3	14.4	120	10103091SH112	6
TH3225C	50.9	22.9	23.6	8.3	14.4	135	10103091SH112	6
TH3226	50.9	22.9	23.6	8.3	14.4	134	10103091SH112	6
TH3226B	50.9	22.9	23.6	8.3	14.4	134	10103091SH112	6
TH3226C	50.9	22.9	23.6	8.3	14.4	134	10103091SH112	6
TH3267C	61.5	40.8	44.0	11.9	18.5	500	10103091SH112	6
TH3268C	76.6	46.6	45.8	12.9	18.9	480	10103091SH112	6
TH3325	50.9	22.9	23.6	8.3	14.4	126	10103091SH112	6
TH3325B	50.9	22.9	23.6	8.3	14.4	126	10103091SH112	6
TH3326	50.9	22.9	23.6	8.3	14.4	138	10103091SH112	6
TH3326B	50.9	22.9	23.6	8.3	14.4	138	10103091SH112	6
TH3361	12.6	8.3	9.5	4.0	7.6	11	10103091SH102	15
TH3362	21.3	9.1	9.4	5.0	8.6	18	10103091SH102	3
TH3363	22.3	9.3	10.1	4.8	9.8	18	10103091SH105	14
TH3364	31.5	13.3	14.1	5.1	10.5	33	10103091SH105	4
TH3364B	31.5	13.3	14.1	5.1	10.5	34	10103091SH105	4
TH3365	53.9	22.9	23.6	8.3	14.4	126	10103091SH112	6
TH3365B	53.9	22.9	23.6	8.3	14.4	122	10103091SH112	6
TH3366	53.9	22.9	23.6	8.3	14.4	139	10103091SH112	6
TH3366B	53.9	22.9	23.6	8.3	14.4	139	10103091SH112	6
TH4321	10.3	6.3	7.1	3.3	6.1	6	10103091SH102	1



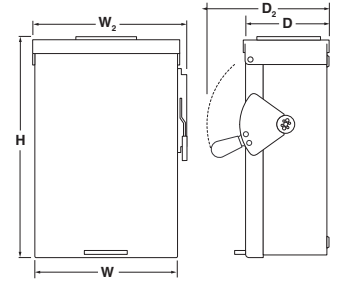
Heavy Duty
NEMA Type 1

(table continued on next page)

Safety Switch Enclosure Dimensions

General Duty, NEMA Type 3R Approximate Dimensions in inches

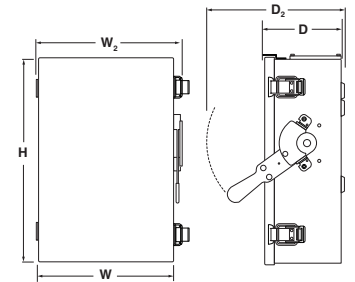
Product Number	Dimension H	Dimension W (Box)	Dimension W ₂ (W/ Handle)	Dimension D (Box)	Dimension D ₂ (W/ Handle)	Weight (lbs)	Drawing #	KO Figure Number
TG3221R	9.8	6.4	6.8	3.3	6.3	6	10103091SH103	8
TG3222R	13.7	8.4	8.8	3.9	7.9	11	10103091SH103	19
TG3223R	21.1	9.3	10.3	5.0	9.1	17	10103091SH107	10
TG3224R	29.3	13.4	13.7	5.4	9.9	31	10103091SH183	11
TG3225R	49.7	21.7	22.4	8.9	14.7	110	10103091SH141	12
TG3226R	50.1	23.0	23.8	9.4	15.1	119	10103091SH141	13
TG3325R	49.7	21.7	22.4	8.9	14.7	109	10103091SH141	12
TG3326R	50.1	23.0	23.8	9.4	15.1	124	10103091SH141	13
TG4321R	9.8	6.4	6.8	3.3	6.3	6	10103091SH103	8
TG4322R	13.7	8.4	8.8	3.9	7.9	11	10103091SH103	19
TG4323R	21.1	9.3	10.3	5.0	9.1	17	10103091SH107	10
TG4324R	29.3	13.4	13.7	5.4	9.9	32	10103091SH183	11
TGN3321R	9.8	6.4	6.8	3.3	6.3	6	10103091SH103	8
TGN3322R	13.7	8.4	8.8	3.9	7.9	10	10103091SH103	19
TGN3323R	15.6	9.3	10.3	5.0	9.1	13	10103091SH107	10
TGN3324R	29.3	13.4	13.7	5.4	9.9	31	10103091SH183	11



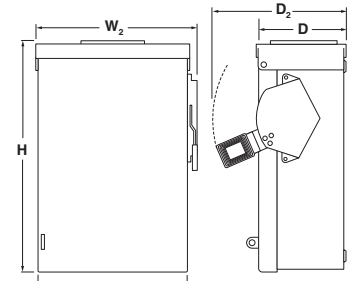
General Duty
NEMA Type 3R

Heavy Duty, NEMA Type 3R Approximate Dimensions in inches

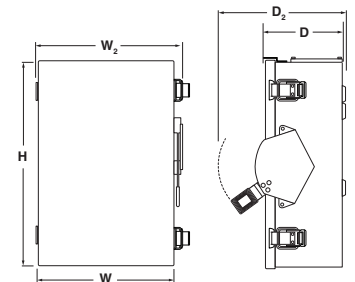
Product Number	Dimension H	Dimension W (Box)	Dimension W ₂ (W/ Handle)	Dimension D (Box)	Dimension D ₂ (W/ Handle)	Weight (lbs)	Drawing #	KO Figure Number
TH2261RDC	13.1	8.2	8.9	4.0	7.9	11	10103091SH101	19
TH2262RDC	22.0	9.2	9.7	4.8	7.9	19	10103091SH101	10
TH2263RDC	22.1	9.3	10.2	4.9	9.8	20	10103091SH106	10
TH3221R	10.5	6.2	6.6	3.1	7.7	7	10103091SH101	8
TH3222R	17.2	9.2	9.7	4.8	7.9	16	10103091SH101	10
TH3223R	22.1	9.3	10.2	4.9	9.8	18	10103091SH106	10
TH3224R	31.7	13.4	14.3	5.4	9.5	34	10103091SH182	11
TH3224RC	31.7	13.4	14.3	5.4	9.5	34	10103091SH182	11
TH3225R	49.5	23.0	24.1	8.5	13.9	128	10103091SH140	18
TH3225RC	49.5	23.0	24.1	8.5	13.9	128	10103091SH140	18
TH3226R	53.5	23.0	24.1	8.5	13.9	134	10103091SH140	18
TH3226RC	53.5	23.0	24.1	8.5	13.9	134	10103091SH140	18
TH3267RC	61.5	40.8	44.0	11.9	18.5	500	10103091SH118	No KO
TH3268RC	76.6	46.6	45.8	12.9	18.9	490	10103091SH118	No KO
TH3325R	49.5	23.0	24.1	8.5	13.9	127	10103091SH140	18
TH3326R	53.5	23.0	24.1	8.5	13.9	139	10103091SH140	18
TH3361R	13.1	8.2	8.9	4.0	7.9	11	10103091SH101	19
TH3361RF	14.9	10.3	10.9	3.9	8.0	11	10103091SH133	No KO
TH3361RF2	22.4	13.3	14.0	4.8	9.9	23	10103091SH134	No KO
TH3362R	22.0	9.2	9.7	4.8	7.9	18	10103091SH101	10
TH3362RF	22.4	13.3	14.0	4.8	9.9	18	10103091SH134	No KO
TH3363R	22.1	9.3	10.2	4.9	9.8	19	10103091SH106	10
TH3364R	31.7	13.4	14.3	5.4	9.5	33	10103091SH182	11
TH3365R	53.5	23.0	24.1	8.5	13.9	132	10103091SH140	18
TH3366R	53.5	23.0	24.1	8.5	13.9	136	10103091SH140	18
TH4321R	10.5	6.2	6.6	3.1	7.7	7	10103091SH101	8
TH4322R	17.2	9.2	9.7	4.8	7.9	16	10103091SH101	10
TH4323R	22.1	9.3	10.2	4.9	9.8	18	10103091SH106	10
TH4324R	31.7	13.4	14.3	5.4	9.5	34	10103091SH182	11
TH4324RC	31.7	13.4	14.3	5.4	9.5	34	10103091SH182	11
TH4325RC	49.5	23.0	24.1	8.5	13.9	125	10103091SH140	No KO
TH4326RC	53.5	23.0	24.1	8.5	13.9	130	10103091SH140	No KO
TH4361R	13.1	8.2	8.9	4.0	7.9	11	10103091SH101	19
TH4362R	22.0	9.2	9.7	4.8	7.9	18	10103091SH101	10
TH4363R	22.1	9.3	10.2	4.9	9.8	19	10103091SH106	10
TH4364R	31.7	13.4	14.3	5.4	9.5	33	10103091SH182	11
TH4364RC	31.7	13.4	14.3	5.4	9.5	32	10103091SH182	No KO
TH4365RC	49.5	23.0	24.1	8.5	13.9	130	10103091SH140	No KO
TH4366RC	53.5	23.0	24.1	8.5	13.9	132	10103091SH140	No KO
TH4367RC	61.5	40.8	44.0	11.9	18.5	510	10103091SH118	No KO
TH4368RC	76.6	46.6	45.8	12.9	18.9	750	10103091SH118	No KO
THN2261RDC	13.1	8.2	8.9	4.0	7.9	11	10103091SH101	19
THN2262RDC	17.2	9.2	9.7	4.8	7.9	16	10103091SH101	10
THN2263RDC	17.3	9.3	10.2	4.9	9.8	16	10103091SH106	10
THN3361R	13.1	8.2	8.9	4.0	7.9	11	10103091SH101	19
THN3361RF	14.9	10.3	10.9	3.9	8.0	13	10103091SH133	19
THN3361RF2	22.4	13.3	14.0	4.8	9.9	22	10103091SH134	17
THN3362R	17.2	9.2	9.7	4.8	7.9	15	10103091SH101	10
THN3362RF	22.4	13.3	14.0	4.8	9.9	22	10103091SH134	17
THN3363R	17.3	9.3	10.2	4.9	9.8	15	10103091SH106	10
THN3364R	31.7	13.4	14.3	5.4	9.5	33	10103091SH182	11
THN3365R	49.5	23.0	24.1	8.5	13.9	122	10103091SH140	18
THN3366R	53.5	23.0	24.1	8.5	13.9	130	10103091SH140	18



General Duty
NEMA Type 3R
200-600A Side Swing



Heavy Duty
NEMA Type 3R



Heavy Duty
NEMA Type 3R
200-600A Side Swing

Safety Switch Knockouts

Dimensions—Knockouts

Symbol	A	B	C	D	E	F	G	H	J	K	L	M	N
Conduit Size (Inches)	9/32	½	½	½	½	½	¾	¾	1	1	2	2	2 ½
	-	-	¾	¾	¾	¾	1	1	1 ¼	1 ½	2 ½	2 ½	3
	-	-	-	-	1 ¼	1 ½	-	1 ½	2	2 ½	-	3 ½	-

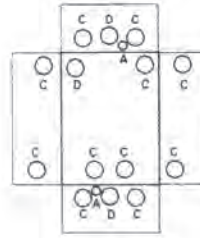


Figure 1

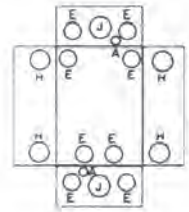


Figure 2

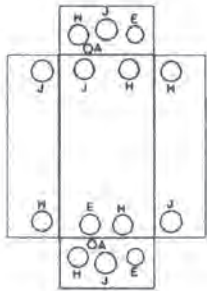


Figure 3

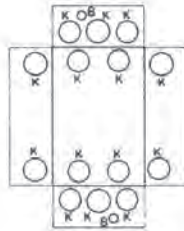


Figure 4

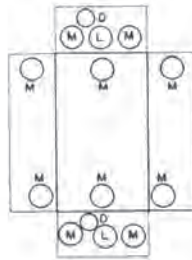


Figure 5

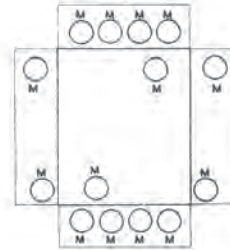


Figure 6

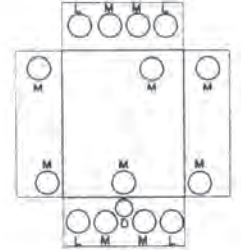


Figure 7

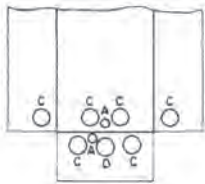


Figure 8

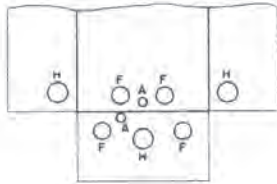


Figure 9

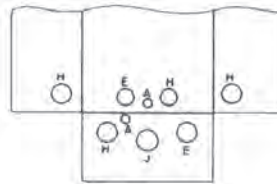


Figure 10

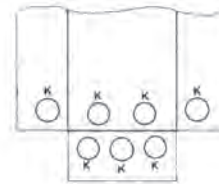


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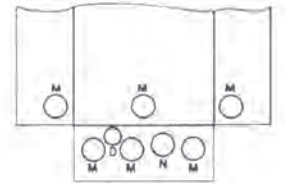


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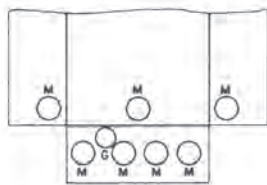


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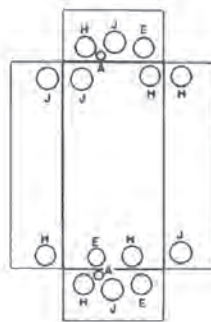


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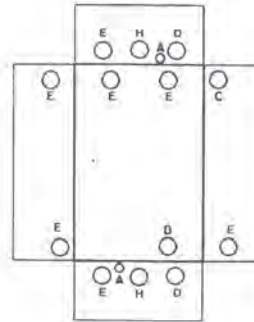


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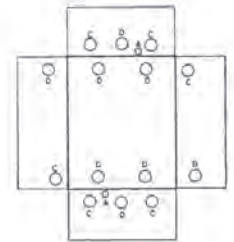


Figure 16

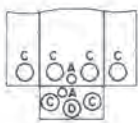


Figure 17

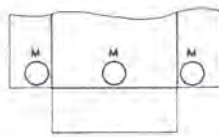


Figure 18

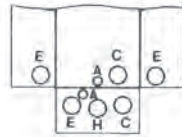


Figure 19

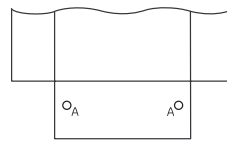


Figure 20



Science.
Applied to Life.™

3M™ Fire Protection

Trust and Confidence. Even under fire.

Full Line Catalog



3M Fire Protection



Through-Penetration Firestops

Fire Barrier Sealants and Foam..... 6-7

Fire Barrier Watertight Sealants & Tape..... 8

Fire Barrier Devices & Kits..... 9-11

Fire Barrier Specialty Products..... 11-17

Residential and Non-Rated Fireblocks
& Acoustic Sealants..... 18

Construction Joint Firestop Solutions

Construction Joint Spray & Sealants 19-21

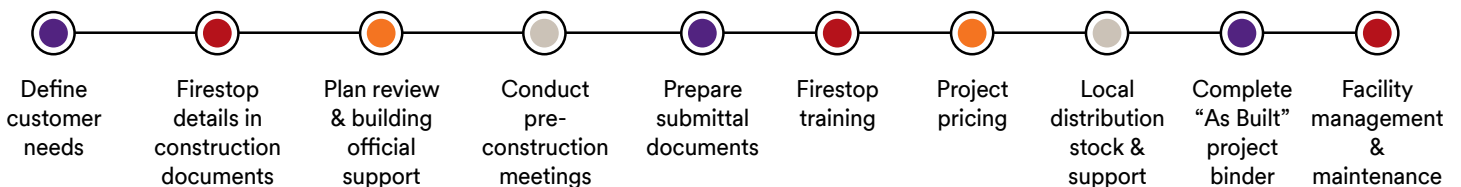
Fire & Water and Smoke & Sound Tapes 21

Flexible Wrap Firestop Systems

Flexible Wrap Systems..... 22–23

Ordering Information 24-30

From Understanding Your Needs to Providing the Solution



Value Beyond the Products

The 3M Fire Protection Product website is designed to enhance our technical and sales support by providing users easy access to critical information needed in the construction and maintenance of buildings requiring passive fire protection. In addition to a wealth of product and technical information, here are some value-add tools that can be accessed from the 3M Fire Protection website:



3M System Selector

Helps you quickly navigate through our extensive library of tested and listed systems to provide a short list of suitable systems for a specific application.

3M Submittal Wizard

Allows users to access, select and combine documents from multiple applications on the 3M Fire Protection website. Selected documents can be combined into a single document for user's submittal

Training

3M offers fire protection training at your site, online or at our UL certified test center. Our website provides information on upcoming courses as well as registration for online training. 3M Fire Protection's online learning management system is designed to provide users with general firestopping information and trade-specific installation details.



3M Firestop Management System

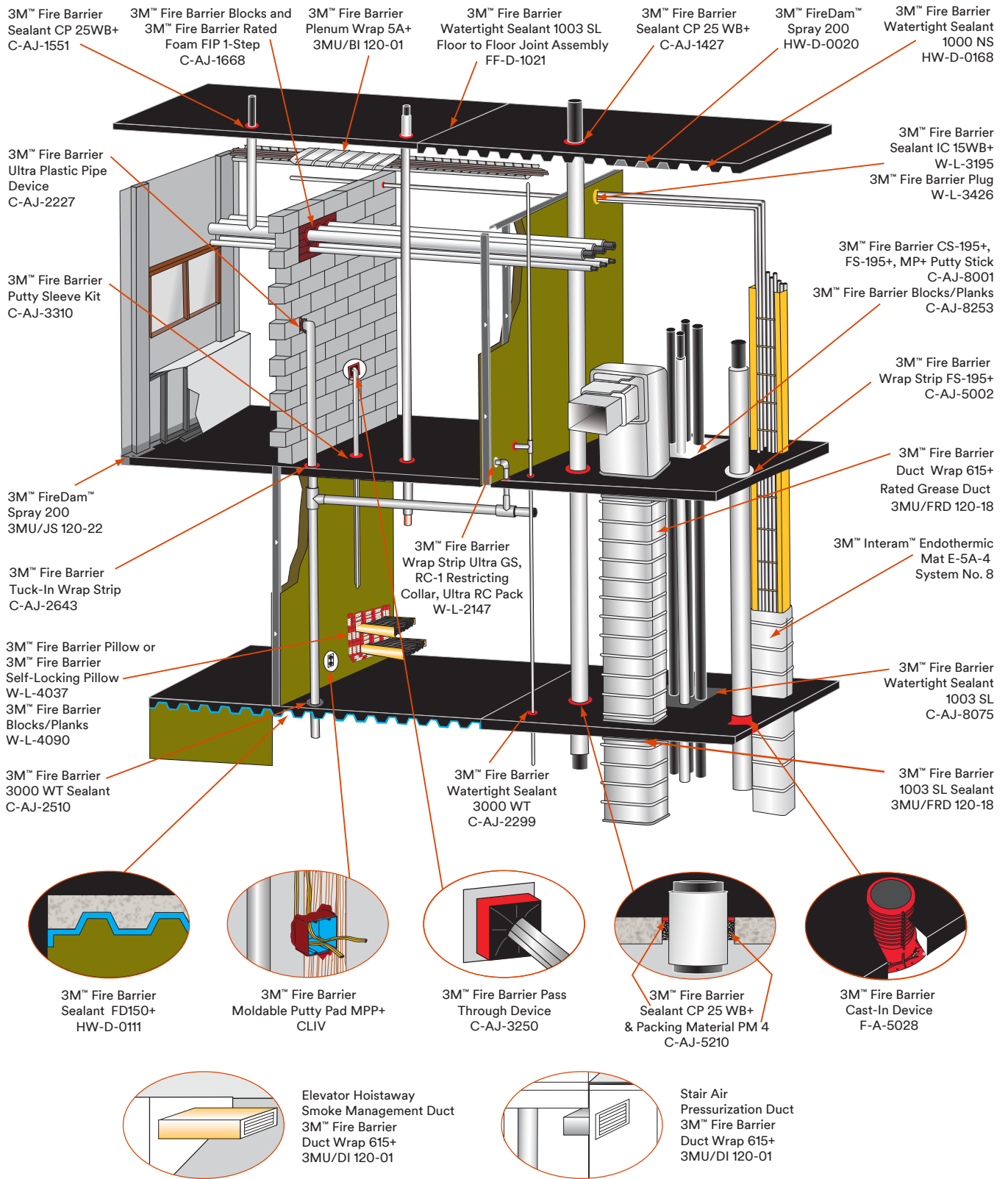
This web-based application is designed to help existing facilities monitor their fire barrier management system. With specific functionality to help healthcare facilities pass Joint Commission and other key life safety inspections, key features include contractor management (e.g. issue permits, monitor access), firestop system management down to every floor or wall, document retention including life safety plans and installation photos, and report generation (e.g. system inventory or contractor status).

3M.com/firestop

Please visit our website often. It contains the most current product information and is your first step to find a system solution and to stay informed about what's new with our products. All of the resources provided in this guide are constantly updated and made available for you to download at any time.

- For distributors near you, click **"WHERE TO BUY"**
- For your local sales representative, click **"SALES REP LOCATOR"**
- Can't find what you are looking for?
Click **"CONTACT US"** or call us at **1-800-328-1687**





The listed systems are typical applications only. Please refer to the volume of your 3M specification guide for your specific application or use the 3M System Selector available at 3M.com/firestop

Through-Penetration Firestops

Fire Barrier Sealants and Foam

3M™ Fire Barrier Rated Foam FIP 1-Step

Designed to expand up to 5 times in volume after dispensing, 3M™ Fire Barrier Rated Foam FIP 1-Step is a two-part urethane, smoke, sound and firestopping foam. This intumescent foam can be used to fill the annular space created by pipes and cables penetrating through fire-rated construction. It's an alternative to mineral wool, bricks, pillows and runny, ineffective foams and is UL listed.

- Firestop tested and rated up to 2 hours in accordance with ASTM E 814 (UL 1479) and CAN/ULC S115
- Sag resistant, quick curing formulation that expands up to 5 times in volume during installation
- Intumescent foam expands when exposed to fire
- Re-enterable and repairable foam remains pliable after installation
- Excellent adhesion and does not require backing material in wall or floor applications
- Paintable with primer



FIRE BARRIER



SMOKE SEAL



SOUND BARRIER



3M™ Fire Barrier Sealant IC 15WB+

3M™ Fire Barrier Sealant IC 15WB+ is a latex sealant designed for use as a one-part fire, smoke, toxic gas sealant. Approved for up to 3 hour rated systems.

- Firestop tested up to 3 hours in accordance with ASTM E 814 (UL 1479)
- Acoustic barrier: STC-Rating of 54 when tested in a STC 54-rated wall assembly)
- Provides L-Rating (smoke seal)
- Water based: easy cleanup and routine disposal with no special handling
- Intumescent: expands when heated to seal around items consumed by fire
- Halogen-free and no-sag formulation
- Fast drying: tack-free in approximately 8–12 minutes @ 73°F (23°C)
- Paintable (best results obtained after 72 hour cure)
- High caulk rate: 2000g/min. with 1/4 in. nozzle
- Easy-to-identify yellow color
- Check CPVC manufacturers' current compatibility list for firestop products before using



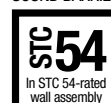
FIRE BARRIER



SMOKE SEAL



SOUND BARRIER



3M™ Fire Protection Products

3M™ Fire Barrier Sealant CP 25WB+

3M™ Fire Barrier Sealant CP 25WB+ is a high-performance, intumescent latex-based sealant offering outstanding fire performance plus a non-halogen formula. Approved for the majority of caulk through penetration systems.

- Firestop tested up to 4 hours in accordance with ASTM E 814 (UL 1479)
- Acoustic barrier: STC-Rating of 54 when tested in a STC 54-rated wall assembly
- Provides L-Rating (smoke seal)
- Water based: easy cleanup and routine disposal with no special handling
- Intumescent: expands when heated to seal around items consumed by fire
- Re-enterable/repairable
- Halogen-free and no-sag formulation
- Over 600 tested and listed systems
- One-part system: no mixing or measuring required
- Fast-drying: tack-free in approximately 10–15 minutes
- Paintable (best results obtained after 72 hour cure)
- Red color widely recognized as a firestop for inspections
- High caulk rate: 1000g/min. with 1/4 in. nozzle opening
- Documented aging properties

Not for use with CPVC pipe.



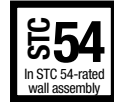
FIRE BARRIER



SMOKE SEAL



SOUND BARRIER



3M™ Fire Barrier Sealant FD 150+

3M™ Fire Barrier Sealant FD 150+ is the economical alternative to costly firestopping applications. Used to firestop metal pipes or cables through concrete or gypsum, and in dynamic head-of-wall systems.

- Firestop tested up to 3 hours in accordance with ASTM E 814 (UL 1479)
- Fire Resistive Joint System tested up to 4 hours in accordance with ASTM E 1966 (UL 2079)
- Water based acrylic latex: easy cleanup and routine disposal
- Safe, solvent-free: fully cured, continuous seal with ±19% dynamic joint movement capability
- Single-part formulation
- Remains pliable allowing for normal pipe movement
- Fast-drying: tack-free in approximately 30–60 minutes
- Paintable (best results obtained after 72 hour cure)
- Excellent adhesion: multi-viscosity grade offers excellent caulking properties
- Available in limestone gray, blue and red

Not for use with CPVC pipe.



FIRE BARRIER



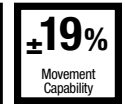
SMOKE SEAL



SOUND BARRIER



ELASTOMERIC



Fire Barrier Water Tight Sealants & Tape

3M™ Fire Barrier Water Tight Sealant 3000 WT

3M™ Fire Barrier Water Tight Sealant 3000 WT Intumescent Sealant forms an effective barrier to fire and water in through penetrations. This high-performance sealant helps prevent water and moisture intrusion while protecting buildings and their occupants by preventing the spread of fire, smoke and toxic gas.

- Intumescent silicone for use in systems with a firestop rating up to 4 hours when tested in accordance with ASTM E 814 (UL1479)
- Meets UL Water Leakage Test, W Rating: Class 1 requirements for systems tested in accordance with ANSI/UL 1479
- Helps prevent moisture and water migration through a building
- Minimizes noise transfer: STC-rating of 53 when tested in STC 54-rated wall assembly
- Excellent weathering properties
- Ideal for fast-track construction
- Easy application with standard caulking gun or pneumatic pump
- Excellent bonding
- Gray color with black flecks



FIRE BARRIER SMOKE SEAL WATER BARRIER SOUND BARRIER



3M™ Fire Barrier Water Tight Sealant 1000 NS and 3M™ Fire Barrier Water Tight Sealant 1003 SL

3M™ Fire Barrier Water Tight Sealant 1000 NS (non-slump) and 3M™ Fire Barrier Water Tight Sealant 1003 SL Silicone Sealant (self-leveling) are ready to use, one-component silicone elastomers. Both cure upon exposure to atmospheric humidity to form a flexible seal. Both sealants remain elastomeric and are weather resistant. They bond to most common construction materials.

- Firestop tested up to 3 hours in accordance with ASTM E 814 (UL 1479)
- Joint System Fire Resistance tested in accordance with ASTM E 1966 (UL 2079)
- Meets UL Water Leakage Test, W Rating: Class 1 requirements
- Minimizes noise transfer: STC-rating of 56 when tested in STC 56-rated wall assembly
- ±25% dynamic joint movement capability
- Excellent adhesion
- Cures upon exposure to atmospheric humidity
- Applied with conventional caulking equipment
- Re-enterable/repairable
- Aids in the prevention of moisture and water migration through a building
- Light gray color



FIRE BARRIER WATER BARRIER SMOKE SEAL SOUND BARRIER ELASTOMERIC



3M™ Fire and Water Barrier Tape FWBT

3M™ Fire and Water Barrier Tape is a self-adhered membrane that provides a tough, elastomeric coating. This product has a unique pressure sensitive adhesive that aggressively sticks and stays stuck to a wide variety of substrates at both high and low temperatures, and will even adhere to damp surfaces.

- Up to 4-hour fire protection in construction joints per ASTM E 1966 (UL 2079)
- Up to 3-hour fire protection in perimeter joints per ASTM E 2307
- Up to 2-hour fire protection in through-penetration applications per ASTM E 814 (UL 1479)
- Elastic material maintains performance with up to ±50% movement capabilities
- Can be installed in temperatures as low as 0°F (18°C) and as high as 120°F (49°C)



3M™ Fire Protection Products

Fire Barrier Devices & Kits

3M™ Fire Barrier Pass-Through Devices

3M™ Fire Barrier Pass-Through Devices are a line of integrated firestopping devices that create a fire-proofed dedicated space for voice, data, telecom wires and pipes. Available in a variety of shapes and sizes. Mounting accessories and foam replacements sold separately.

- Firestop tested for up to 4 hours in accordance with ASTM E 814 (UL 1479)
- One-piece, hinged metal enclosure makes installations fast and easy
- Blank to multiple penetrants tested (0 to 100% fillable)
- Red color: easy to identify as a fire rated device during inspection
- Stackable for multiple penetrations (square devices)
- Warning labels included on device
- UL classified: meets code requirements
- Re-enterable for addition and removal of penetrants



FIRESTOP TESTED FOR UP TO 4 HOURS IN THICK-GAS-PENETRATION FIRESTOP SYSTEMS. SEE UL DIRECTORY OF PRODUCTS FOR LISTINGS AND L.F. FIRE RESISTANCE DIRECTORY.



Achieves an UL Classified L-Rating when used in conjunction with 3M™ Fire Barrier Sealant or Moldable Putty+.

3M™ Fire Barrier Pass-Through Mounting Brackets

Used in conjunction with 3M™ Fire Barrier Pass-Through Devices, these metal brackets support and strengthen firestop through penetration installations. Brackets come in pairs for securing the device on each side of the floor or wall assembly.



3M™ Fire Barrier Foam Plugs

These pre-formed foam blocks are used in conjunction with 3M™ Fire Barrier Pass-Through Devices.

- Effectively seal larger openings against smoke, toxic gas and flame
- Help reduce sound transmission
- Easy to install



4 in. Square

4 in. Round

2 in. Round

Fire Barrier Devices & Kits (cont.)

3M™ Fire Barrier Putty Sleeve Kits

3M™ Fire Barrier Putty Sleeve Kits offer an affordable and re-enterable solution to meet firestop codes for the installation of cable and blanks in both new or retrofit applications. Ready-to-install kit with all items needed for a complete cable or blank firestop installation.

- Firestop tested for up to 4 hours in accordance with ASTM E 814 (UL 1479)
- One-piece, hinged metal enclosure makes installations fast and easy
- Blank sleeve (0% cable fill) accommodates future cable installation
- Two-piece split/hinged design for easy retrofit installation on existing cables
- Suitable for installation in gypsum wallboard and concrete walls or floors
- No gasket required

Cable types can be a mixture of the following:

- 100 pr. No. 24 AWG copper conductor telephone cables
- 1/C-750 kcmil copper conductor power cable
- 7/C-No. 12 AWG copper conductor control cables
- Coaxial cables
- No. 23 AWG Category 6 data cables
- Fiber optic cable
- 3/C-No. 2/0 AWG aluminum conductor SER cable with No. 1 AWG aluminum ground conductor



Each Kit Includes:
(1) Split Metal Sleeve; (2) Split Mounting Brackets; (1) Bag Screws; (2) Wall Labels



3M™ Fire Barrier Cast-In Devices and Accessories

3M™ Fire Barrier Cast-In Devices are designed to make firestopping through concrete easy and affordable. 3M™ Fire Barrier Cast-In Devices are installed prior to the concrete pour (attaching directly to the wood forms or fluted metal decking) and can be adjusted to various concrete depths. Both devices feature easily adjustable bodies that can be adopted to concrete height, before or after pour. These devices are used primarily in new installations and are designed to accommodate concrete thickness as thin as 2-1/2 in. and pipe sizes from 1-1/2 in. to 6 in. Achieve up to 3 hour F Ratings when tested in accordance with ASTM E 814 (UL 1479).

Accessories include: 3M™ Fire Barrier Cast-In Device Height Adapter (for use up to up to 12 in. concrete thickness), 3M™ Fire Barrier Cast-In Metal Deck Adapter (for use with fluted metal decks), 3M™ Fire Barrier Cast-In Tub Box Assembly (to create a void for plumbing access) and 3M™ Fire Barrier Cast Aerator Adaptor (to create a void around aerators).

- Easy installation, annular space allows for easier pipe installation
- Pipes may be installed from top or bottom of floor
- Color coded caps, retainers and labels allow quick identification of device type (white for plastic and black for metal)
- Easily adjustable bodies that can be adapted to concrete height from 2-1/2 in. to 8 in. (thicker pours can be accommodated with height adapter)
- Available in 2 in., 3 in., 4 in. and 6 in. diameter by 8 in. height
- Metallic devices (black cap) are used for metallic pipe, single and multiple cables, insulated pipe and HVAC line sets
- Non-metallic devices (white cap) are used for non-metallic pipe (including CPVC) and HVAC line sets



3M™ Fire Protection Products

3M™ Fire Barrier Cast-In Tub Box Assembly

Fastens to a 2 in. metallic 3M™ Fire Barrier Cast-In Device and creates a void for plumbing access.

- 2 in. or 3 in. foam insert depending on desired depth of access void
- Easily snaps into place and then attaches directly to wood forms
- Accommodates 1-1/2 in. and 2 in. pipe



3M™ Fire Barrier Cast-In Metal Deck Adapter

One-piece plastic body assembly to accommodate fluted metal decks.

- Use in conjunction with 3M™ Fire Barrier Cast-in Devices
- Available for use with 2 in., 3 in., 4 in. and 6 in. 3M™ Fire Barrier Cast-In Devices



3M™ Fire Barrier Cast-In Aerator Adaptor

One-piece plastic body assembly used to create a void around aerators.

- For use with 4 in. metallic or non-metallic 3M™ Fire Barrier Cast-In Devices



3M™ Fire Barrier Cast-In Device Height Adapter

One-piece plastic body assembly allows 3M™ Fire Barrier Cast-in Devices to be used in up to 12 in. concrete thickness.

- Designed to accommodate pipe sizes from 1-1/2 in. to 6 in.
- Easily snaps into place — no additional fastening required
- Available for use with 2 in., 3 in., 4 in. and 6 in. 3M™ Fire Barrier Cast-In Devices



Fire Barrier Specialty Products

3M™ Fire Barrier Packing Material PM4

3M™ Fire Barrier Packing Material PM4 is designed to be used as an alternative packing material to mineral wool, fiberglass and backer rod in through penetration firestop systems. With excellent strength and flexibility characteristics, it is an ideal through penetration packing material.

3M™ Fire Barrier Packing Material PM4 is an asbestos-free, inorganic material that is mold and fungi resistant when tested in accordance with ASTM C 1338. This installation friendly material is easy to dispense and its compact packaging is optimized for portability. The smooth textured woven material can be torn by hand, eliminating the need for a knife.



3M™ Fire Barrier Packing Material PM4 is approved for use in all 3M through penetration firestop systems requiring backing material.



Fire Barrier Specialty Products (cont.)

3M™ Fire Barrier Mortar

3M™ Fire Barrier Mortar is a lightweight non-structural cementitious firestop product with variable mix ratios for use in through penetration applications. Up to 3-hour fire protection in tested and listed systems. Off-white with dark flecks, ready for mixing with potable water.

- Variable mix ratio: permits self-leveling as well as no-sag (no forming) application consistencies, resulting in labor savings
- Excellent adhesion: will bond to concrete, metals, wood, plastic and cable jacketing
- Re-enterable without use of power tools: results in lower maintenance costs due to ease of making cable changes
- Asbestos-free



3M™ Fire Barrier Tuck-In Wrap Strips and Rolls

3M™ Fire Barrier Tuck-In Wrap Strips and Rolls are designed for use with plastic pipe penetrations through floors and walls. Engineered for top-side firestop installations, the tuck-in wrap strip simplifies labor by helping to eliminate the need for retaining collars, concrete screws, ladders, etc. The flexible intumescent strip wraps around the pipe and easily slides into the annular space.

- Firestop tested up to 3 hours in accordance with ASTM E 814 (UL 1479)
- Designed for improved top-side concrete floor installations to help eliminate the need for steel retaining collars and most other bottom-side installation equipment and materials
- Adhesive-backed label for quick installation
- Ready-to-install 3/16 in. thick x 2-1/2 in. wide wrap strips: available in 8.2 ft. rolls or strips precut to length for 2 in., 3 in. and 4 in. non-metallic pipes



3M™ Firestop Identification Label

In fire-rated construction applications and firestops, it's crucial to have the necessary information clearly visible. Our 3M™ Firestop Identification Labels can be applied quickly and reliably to clean, dry, frost-free surfaces in order to provide the required information regarding firestop maintenance, repair and inspection. These identification labels are bright red with a bright white backing for maximum visibility.

- Adhesive-backed label provides messaging in firestop systems
- For use in penetration or joint firestop systems
- Provides clear messaging in fire-rated construction setups
- Bright red label provides high visibility
- Applies easily and quickly to surfaces



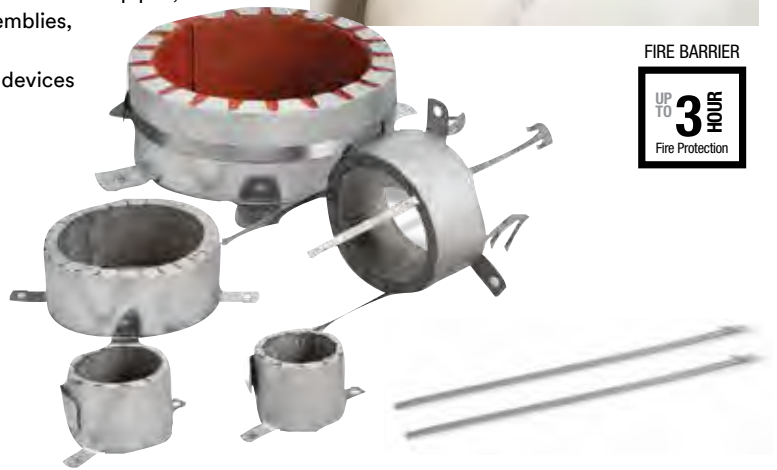
3M™ Fire Protection Products

3M™ Fire Barrier Ultra Plastic Pipe Device, 3M™ Fire Barrier Plastic Pipe Device and 3M™ Ultra Fast Anchors

3M™ Fire Barrier Ultra Plastic Pipe Devices are one-piece metal collar assemblies encasing heat expanding 3M™ Ultra GS (intumescent) material. These devices are used for new and retrofit installations and will accommodate 1-1/2 in., 2 in., 3 in. and 4 in. pipes. The 3M™ Fire Barrier Plastic Pipe Device utilizes 3M™ Fire Barrier Wrap FS-195+ (intumescent) material and will accommodate and 6 inch plastic pipes.

These devices firestop ccPVC, PVC, CPVC, FRPP, PVDF, ccABS and ABS pipes, cables or combos penetrating 1- and 2-hour floor/ceiling assemblies, as well as 1-, 2- and 3-hour fire-rated gypsum wallboard and fire-rated concrete wall, floor or hollow core assemblies. The devices are ideal for application in drain, waste and vent or closed pipe systems.

- Up to 3-hour fire ratings when tested in accordance with ASTM E814 (UL1479)
- Ultra fast anchoring system (optional)
- One piece assembly for quick and easy installation
- Factory-made helps ensure quality consistency
- UL Classified: meets code requirements — universally recognized
- Easily identified red color (fire rated device)



3M™ Fire Barrier Self-Locking Pillows

3M™ Fire Barrier Self-Locking Pillows are self-contained, highly-intumescent product designed to firestop a wide variety of through penetrations including cable trays, conduit and blank openings. Interlocking strips hold pillows securely together yet release easily for retrofit or reuse — just remove and reinstall pillows as needed.

- Firestop tested for up to 3 hours in accordance with ASTM E 814 (UL 1479)*
- L-Rating (smoke seal) achievable when used in conjunction with 3M™ Fire Barrier Moldable Putty
- Easy retrofit: remove and reuse pillows as needed
- Interlocking strips lock pillows together
- Graphite-free composition
- Available in three sizes**
- Easy to install, easy to inspect
- No wire mesh required to secure in opening
- Can be cut and retaped with box sealing tape for odd-sized gaps



* Ratings achieved in openings up to 1024 sq. in. (6606 sq. cm).

** Any combination of pillow sizes can be used to firestop an opening provided the minimum compression requirements are met (minimum of 25% within the opening).



Fire Barrier Specialty Products (cont.)

3M™ Fire Barrier Pillows

3M™ Fire Barrier Pillows are self-contained, highly-intumescent product designed to firestop a wide variety of through penetrations including cable trays, conduit and blank openings.

- Firestop tested for up to 3 hours in accordance with ASTM E 814 (UL 1479)*
- L-Rating (smoke seal) achievable when used in conjunction with 3M™ Fire Barrier Moldable Putty
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* Ratings achieved in openings up to 1024 sq. in. (6606 sq. cm).

** Any combination of pillow sizes can be used to firestop an opening provided the minimum compression requirements are met (minimum of 25% within the opening).



FILL VOID OR CAVITY MATERIALS LISTED 2017

FILL VOID OR CAVITY MATERIALS CLASSIFIED BY UNDERWRITERS LABORATORIES, INC. FOR USE IN THROUGH-PENETRATION FIRESTOP SYSTEMS SEE UL FIRE RESISTANCE DIRECTORY 2017



SUBJECT TO THE CONDITIONS OF APPROVAL AS A WALL & FLOOR PENETRATION FIRESTOP WHEN INSTALLED AS DESCRIBED IN THE CURRENT EDITION OF THE FIVE: APPROVAL GUIDE

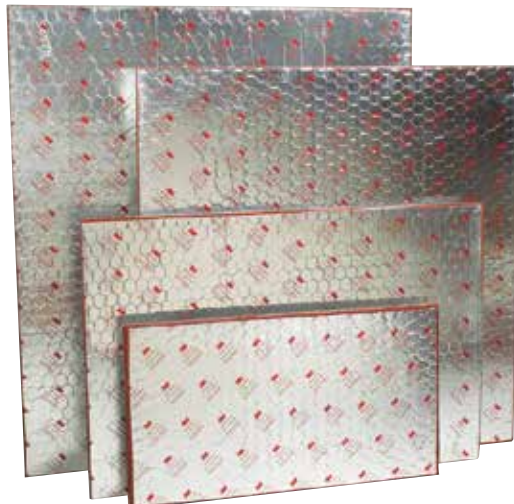
FIRE BARRIER

UP TO **3** HOUR Fire Protection

3M™ Fire Barrier Composite Sheet CS-195+

Intumescent sheet used to firestop large openings. Seals penetrations against flame spread, smoke and toxic gases. This composite sheet has multiple applications, including blank openings, through penetrations of multiple cable, pipe ducts, bus ducts and cable trays. The fire-resistive intumescent sheet is bonded on one side to a layer of 28-gauge galvanized steel. The other side is reinforced with hexagonal shaped steel-wire mesh and covered with an aluminum foil scrim.

- Firestop tested for up to 4 hours in accordance with ASTM E 814 (UL 1479)
- Intumescent (expands with heat) to form a hard char that tightly seals penetrations against flame spread, smoke and toxic gases
- Multiple applications: through-penetration firestop, heat shield and firebreak protection
- UL-classified: meets all code requirements
- 100% solids
- Lightweight: easy to handle, just cut and form to desired shape
- Re-enterable for new or retrofit installations
- Easy to fasten: bolt-punch or drill-through
- No mixing or damming: installs easily with screws or anchor bolts
- Versatile: can be cut to fit irregular shapes
- Thermally conductive: allows unwanted heat buildup to escape
- Easy to install using common trade tools



FILL VOID OR CAVITY MATERIALS CLASSIFIED BY UNDERWRITERS LABORATORIES, INC. FOR USE IN THROUGH-PENETRATION FIRESTOP SYSTEMS (MESH). SEE CURRENT UL FIRE RESISTANCE DIRECTORY

FIRE BARRIER

UP TO **4** HOUR Fire Protection

3M™ Fire Protection Products

3M™ Fire Barrier Blocks, Plugs and Planks

3M™ Fire Barrier Blocks and Planks are pre-formed foam units designed for easy installation to effectively seal medium to large openings in wall and floor through-penetrations against smoke, toxic gas and flame. Plugs are designed for up to 5 inch diameter openings.

- No cure time means faster completion
- Paintable with primer
- Installation requires no special tools
- Can be repaired and reused as needed, saving time and labor
- Firestop tested in accordance with ASTM E 814/UL 1479
- Can be sealed with 3M™ Fire Barrier Rated Foam FIP 1-Step and other 3M™ Fire Barrier Sealants (sold separately)



WALL OPENING



3M™ Fire Barrier Moldable Putty Stix MP+

A one-part, ready-to-use, re-enterable, intumescent putty that can be easily formed to firestop through penetrations and blank openings in fire-rated assemblies. Often used to fill voids in large openings and/or complex firestop systems.

- Up to 4-hours fire ratings per ASTM E 814 (UL 1479)
- Provides draft and cold smoke seal
- Helps reduce noise transfer (STC-Rating of 56 when tested in STC 56-rated wall assembly)
- Noncorrosive to metal and compatible with synthetic cable jackets
- Will not dry out or crumble, re-enterable



3M™ Fire Barrier Moldable Putty Pads MPP+

A one-part firestop material used in various fire-rated assemblies, such as electrical box protection and wall openings. Ready to use in convenient, thick pads.

- Provides draft and cold smoke seal, helps reduce noise transfer
- Up to 4-hour fire ratings per ASTM E 814 (UL 1479)
- Excellent adhesion to a wide range of construction materials



Fire Barrier Specialty Products (cont.)

3M™ Fire Barrier Silicone Sealant 2000+

3M™ Fire Barrier Silicone Sealant 2000+ is a ready-to-use, gun-grade, one-component silicone elastomer that cures upon exposure to atmospheric humidity to form a flexible seal. Sealant remains elastomeric and is weather resistant. It will bond to most common construction materials.

- Firestop tested up to 3 hours in accordance with ASTM E 814 (UL 1479)
- Firestop tested for up to 4 hours in construction joint systems in accordance with ASTM E 1966 (UL 2079)
- Minimizes noise transfer: STC-Rating of 56 when tested in STC 56-rated wall assembly
- ±13% dynamic joint movement capability
- Re-enterable/repairable
- Excellent weatherability
- Superior adhesion
- Gray color

Not for use with CPVC pipe.



FIRE BARRIER SMOKE SEAL ELASTOMERIC SOUND BARRIER

UP TO
4 HOUR
Fire Protection

L RATED
Meets Optional L Requirements

±13%
Movement Capability

STC 56
In STC 56-rated Wall Assembly



3M™ Fire Barrier Ultra GS Wrap Strip

A graphite-based, largely inorganic, flexible, fire resistive, intumescent wrap designed to firestop plastic pipe penetrations in fire-rated walls, floors and floor/ceiling assemblies. The unique, intumescent property of this material means that as penetrating items such as plastic pipe are consumed by fire, 3M™ Fire Barrier Ultra GS Wrap Strip expands to maintain a tight seal, preventing the spread of fire, deadly smoke and other by-products of combustion.

- Intumescent: expands when heated to seal around items consumed by fire
- UL approved for up to 3 hour fire ratings when tested in accordance with ASTM E 814 (UL1479)
- Excellent flexibility and versatility
- Thermal insulator and smoke seal



SMOKE SEAL
L RATED
Meets Optional L Requirements

FIRE BARRIER
UP TO
3 HOUR
Fire Protection

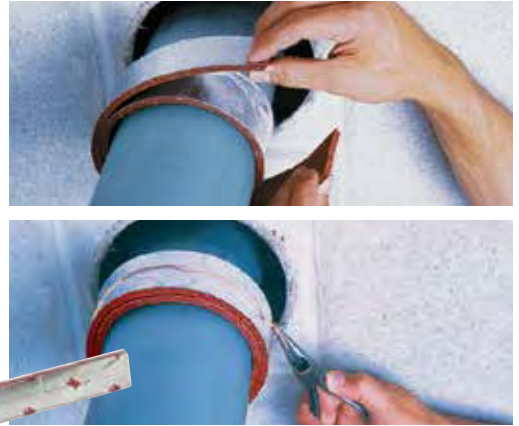
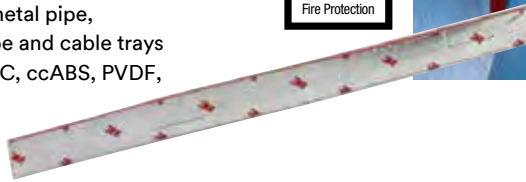
3M™ Fire Protection Products

3M™ Fire Barrier Wrap Strip FS-195+

Firestops difficult through penetrations such as plastic pipe, insulated pipe and cables. When exposed to heat, this flexible, rubber-like strip intumesces, expanding up to ten times its original volume, forming a very hard char to prevent the migration of fire, smoke and toxic gas.

- Firestop tested up to 4 hours in accordance with ASTM E 814 (UL 1479)
- 100% solids
- One-part, graphite-free, fire-resistive strips with foil on one side
- Versatile: can be cut to fit irregular shapes
- Re-enterable: no special tools required
- Non-flame supporting
- Applications include: telephone cable, metal pipe, plastic pipe, conduit, insulated metal pipe and cable trays
- UL-classified for use on PVC, ABS, ccPVC, ccABS, PVDF, FRPP, PP and PB plastic pipe
- Dark red color

FIRE BARRIER
UP TO **4** HOUR
Fire Protection



3M™ Fire Barrier RC-1 Restricting Collar

This collar works in conjunction with 3M™ Fire Barrier Wrap Strip FS-195+ and 3M™ Fire Barrier Wrap Ultra GS to close an opening left by a burned away plastic pipe.

- UL-classified for use on PVC, CPVC, ABS, ccPVC, ccABS, PVDF, PP and PB plastic pipe
- 28 gauge steel
- Used in conjunction with 3M™ Fire Barrier Wrap Strips (FS-195+ or Ultra GS) when plastic pipes have larger than a 4 in. diameter (refer to system details)



Smoke and Sound Sealant

3M™ Smoke and Sound Sealant SS 100

Economical, ready to use, gun-grade, elastomeric sealant that dries to form a monolithic flexible seal that helps prevent unwanted noise infiltration and mitigates the spread of smoke and toxic gas during a fire.

- ±10% movement capability
- An effective draftstop
- Re-enterable / repairable
- Sag-resistant formulation
- Excellent adhesion
- Paintable
- Cleans up with water

SOUND BARRIER

STC 56
In STC 56-rated wall assembly

ELASTOMERIC

±10%
Movement Capability

SMOKE SEAL

L RATED
Meets Optional L Requirements



Smoke and Sound Tape

3M™ Smoke and Sound Tape SST

Provides a smoke and sound seal for construction joints and through-penetration in non-fire rated wall and floor assemblies, including smoke partitions and acoustic assemblies. When installed properly, this material provides a smoke seal to mitigate the spread of smoke and toxic gas as well as help reduce the transmission of sound.

- Elastic material maintains performance with up to \pm 50% movement capabilities
- Paintable
- Creates an effective barrier to mitigate smoke and toxic gas spread, L-rating of less than 1 CFM/linear foot at ambient and 400°F
- High tack adhesive sticks and stays stuck to most common building materials – exceeds the AAMA 711 minimum for adhesion in peel
- Can be installed in temperatures as low as 0°F (18°C) and as high as 120°F (49°C)
- Unique adhesive even adheres to damp surfaces



Residential and Non-Rated Fireblocks & Acoustic Sealants

3M™ Fire Block Foam FB-Foam

Combines the high-speed application properties of foam and the long-lasting protection of caulk.

- Ready-to-use — no mixing required
- Expands up to 200% in volume to quickly and effectively seal openings
- Heat-resistant up to 240°F
- Tested to ASTM E 84 (modified) as a Type V Residential Fireblock
- Draftstop — helps reduce air infiltration
- Minimal shrinkage and sag-resistance help ensure longevity



3M™ Fire Block Sealant FB 136

Lightweight cementitious sealant with excellent adhesion. Bonds to concrete, metals, wood, plastic and cable jacketing.

- Heat-resistant up to 2,000°F
- Easy clean up with water
- No special handling — routine disposal
- Will not sag or run in vertical or overhead applications
- Formulated without halogens



Construction Joint Firestop Solutions

Construction Joint Spray & Sealants

3M™ FireDam™ Spray 200

3M™ FireDam™ Spray 200 is a flexible, sprayable, water-based coating that dries in ambient conditions to form a flexible seal. 3M™ FireDam™ Spray 200 has an extensive portfolio of tested and listed systems for protecting construction joints, and perimeter joints (curtain wall joints). In addition this product is used to firestop through penetrations with up to 2-hour rated systems.

- Up to 4-hour fire protection in construction joints per ASTM E 1966 (UL 2079)
- Up to 2-hour fire protection for through penetration systems per ASTM E 814 (UL 1479)
- Highly elastic material maintains performance with up to ±50% movement capabilities
- High-cling properties help prevent sagging
- Water-based: dries when exposed to the atmosphere, easy water clean-up
- Robust job site formula: freeze/thaw resistant, uniform seal formation in heat and cold conditions
- Available in gray and red: applied with conventional airless spray equipment
- Fast drying: paintable when cured



FIRE BARRIER	SMOKE SEAL	ELASTOMERIC	SOUND BARRIER
UP TO 4 HOUR Fire Protection	L RATED Meets Optional L Requirements	±50% Movement Capability	STC 56 In STC 56-rated wall assembly



3M™ Fire Barrier Sealant FD 150+

3M™ Fire Barrier Sealant FD 150+ is the economical alternative to costly firestopping applications. Used to firestop metal pipes or cables through concrete or gypsum, and in dynamic head-of-wall systems.

- Firestop tested up to 3 hours in accordance with ASTM E 814 (UL 1479)
- Fire Resistive Joint System tested up to 4 hours in accordance with ASTM E 1966 (UL 2079)
- Water based acrylic latex: easy cleanup and routine disposal
- Safe, solvent-free: fully cured, continuous seal with ±19% dynamic joint movement capability
- Single-part formulation
- Remains pliable allowing for normal pipe movement
- Fast-drying: tack-free in approximately 30–60 minutes
- Paintable (best results obtained after 72 hour cure)
- Excellent adhesion: multi-viscosity grade offers excellent caulking properties
- Available in limestone gray, blue and red



FIRE BARRIER	SMOKE SEAL	SOUND BARRIER	ELASTOMERIC
UP TO 4 HOUR Fire Protection	L RATED Meets Optional L Requirements	STC 56 In STC 56-Rated Wall Assembly	±19% Movement Capability

Not for use with CPVC pipe.

Construction Joint Spray & Sealants (cont.)

3M™ Fire Barrier Water Tight Sealant 1000 NS and 3M™ Fire Barrier Water Tight Sealant 1003 SL

3M™ Fire Barrier Water Tight Sealant 1000 NS (non-slump) and 3M™ Fire Barrier Water Tight Sealant 1003 SL Silicone Sealant (self-leveling) are ready to use, one-component silicone elastomers. Both cure upon exposure to atmospheric humidity to form a flexible seal. Both sealants remain elastomeric and are weather resistant. They bond to most common construction materials.

- Firestop tested up to 3 hours in accordance with ASTM E 814 (UL 1479)
- Joint System Fire Resistance tested in accordance with ASTM E 1966 (UL 2079)
- Meets UL Water Leakage Test, W Rating: Class 1 requirements
- Minimizes noise transfer: STC-rating of 56 when tested in STC 56-rated wall assembly
- ±25% dynamic joint movement capability
- Excellent adhesion
- Cures upon exposure to atmospheric humidity
- Applied with conventional caulking equipment
- Re-enterable/repairable
- Aids in the prevention of moisture and water migration through a building
- Light gray color



FIRE BARRIER	WATER BARRIER	SMOKE SEAL	SOUND BARRIER	ELASTOMERIC
UP TO 3 HOUR Fire Protection	MEETS CLASS 1W Rating UL Water Leakage	L RATED Meets Optional L Requirements	STC 56 In STC 56-rated Wall Assembly	± 25% Movement Capability



3M™ Fire Barrier Watertight Spray

3M™ Fire Barrier Watertight Spray is a sprayable, moisture-curing hybrid siliconized polymer that forms a tough, elastomeric coating. This material is used to firestop perimeter joints (curtain wall) and construction joints.

- Up to 3-hour fire protection in construction joints per ASTM E 1966 (UL 2079)
- Up to 3-hour fire protection in perimeter joints per ASTM E 2307
- Elastic material maintains performance with up to ±10% movement capabilities
- Paintable with primer
- Broad range of applications (extensive portfolio of tested and listed building and perimeter joint systems)
- Improved spraying pattern: applied with conventional airless spray equipment
- Robust jobsite formula (freeze/thaw resistant and uniform seal formation in hot or cold conditions)



3M™ Fire Protection Products

3M™ Fire Barrier Silicone Sealant 2000+

3M™ Fire Barrier Silicone Sealant 2000+ is a ready-to-use, gun-grade, one-component silicone elastomer that cures upon exposure to atmospheric humidity to form a flexible seal. Sealant remains elastomeric and is weather resistant. It will bond to most common construction materials.

- Firestop tested up to 3 hours in accordance with ASTM E 814 (UL 1479)
- Firestop tested for up to 4 hours in construction joint systems in accordance with ASTM E 1966 (UL 2079)
- Minimizes noise transfer: STC-Rating of 56 when tested in STC 56-rated wall assembly
- ±13% dynamic joint movement capability
- Re-enterable/repairable
- Excellent weatherability
- Superior adhesion
- Gray color

Not for use with CPVC pipe.



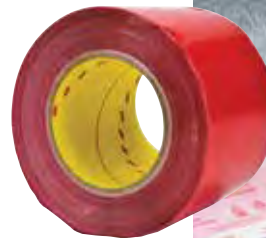
FIRE BARRIER	SMOKE SEAL	ELASTOMERIC	SOUND BARRIER
UP TO 4 HOUR Fire Protection	L RATED Meets Optional L Requirements	±13% Movement Capability	STC 56 In STC 56-rated Wall Assembly
CLASSIFIED UL	ULC LISTED	UL Classified	Intertek
FILL JOBS OR SAFETY MATERIAL FOR USE IN JOINT SYSTEMS AND THROUGH-PENETRATION FIRESTOP SYSTEMS. SEE UL FIRE RESISTANCE DIRECTORY (957)		FILL JOBS OR SAFETY MATERIALS ONLY. SEE UL FIRE RESISTANCE DIRECTORY (957)	

Fire & Water Barrier and Smoke & Sound Tapes

3M™ Fire and Water Barrier Tape FWBT

3M™ Fire and Water Barrier Tape is a self-adhered membrane that provides a tough, elastomeric coating. This product has a unique pressure sensitive adhesive that aggressively sticks and stays stuck to a wide variety of substrates at both high and low temperatures, and will even adhere to damp surfaces.

- Up to 4-hour fire protection in construction joints per ASTM E 1966 (UL 2079)
- Up to 3-hour fire protection in perimeter joints per ASTM E 2307
- Up to 2-hour fire protection in through-penetration applications per ASTM E 814 (UL 1479)
- Elastic material maintains performance with up to ±50% movement capabilities
- Can be installed in temperatures as low as 0°F (18°C) and as high as 120°F (49°C)



3M™ Smoke and Sound Tape SST

Provides a smoke and sound seal for construction joints and through-penetration in non-fire rated wall and floor assemblies, including smoke partitions and acoustic assemblies. When installed properly, this material provides a smoke seal to mitigate the spread of smoke and toxic gas as well as help reduce the transmission of sound.

- Elastic material maintains performance with up to ±50% movement capabilities
- Paintable
- Creates an effective barrier to mitigate smoke and toxic gas spread, L-rating of less than 1 CFM/linear foot at ambient and 400°F



Flexible Wrap Firestop Systems

Flexible Wrap Systems

3M™ Fire Barrier Duct Wrap 615+

Flexible solutions for the protection of grease ducts, ventilation air ducts, return air plenums, emergency circuits, structural steel and more. These flexible wrap products make installation easy, even around corners. Ideal for use in a wide variety of commercial and industrial applications.

Two-layer grease duct applications: 3M™ Fire Barrier Duct Wrap 615+ meets the criteria of ASTM E 2336 Standard Test Methods for Fire Resistant Grease Duct Enclosure Systems.

Single-layer air duct applications:

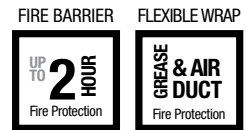
3M™ Fire Barrier Duct Wrap 615+ has passed ISO 6944-1985 Fire Resistance Tests — Ventilation Ducts.

T-rating for metallic through-penetrating items:

3M™ Fire Barrier Duct Wrap 615+ is used in conjunction with 3M Fire Barrier sealants to achieve up to 2-hour equal F-rating and T-rating in ASTM E 814 (UL 1479) tested through-penetrations.

- Lighter weight for easier installation (nom. 1-1/2 in. thick, 6 pcf density)
- Zero clearance to combustible throughout the entire enclosure system
- Highly flexible for installation ease
- Widest range of duct penetration firestop systems
- Low thermal conductivity and thermal shock resistant
- Supports continuous use temperatures of up to 1832°F (1000°C)
- Safer fiber construction* for contractor piece of mind

*Has been demonstrated to be soluble in the lungs according to EU guidelines 97/69/EC. Note Q for biopersistence.

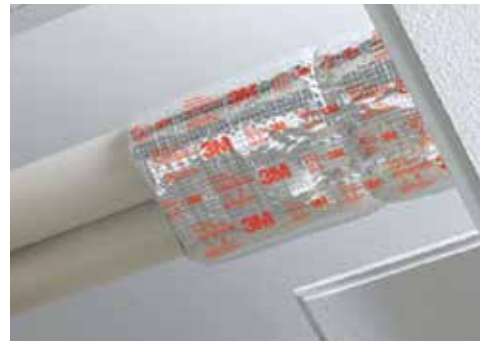


3M™ Fire Barrier Plenum Wrap 5A+

3M™ Fire Barrier Plenum Wrap 5A+ is a fire resistant wrap encapsulated with a scrim-reinforced foil. It provides a flexible, non-combustible enclosure for cables and pipes in return air plenums as tested to NFPA 262 (UL 910). Use with single and multiple 1 in. and larger plastic pipes and cables. This non-asbestos wrap contains a safer fiber construction and installs easily because of its high flexibility and strength.

- Tested to NFPA 262 (UL 910) flammability test, UL 1887 and ASTM E 84
- Lightweight with high flexibility for easy installation
- Safer fiber construction*

*Has been demonstrated to be soluble in the lungs according to EU67/548/EWG, Note Q for biopersistence.



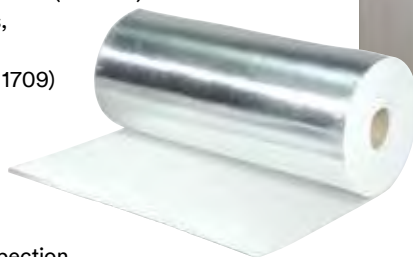
3M™ Fire Protection Products

3M™ Interam™ Endothermic Mat E-5A-4

When properly installed, 3M™ Interam™ Endothermic Mat E-5A-4 provides a uniform covering that, when exposed to high temperatures, releases chemically-bound water to cool the outer surfaces of the protected item and significantly retard heat transfer. Helps protect structural steel components for up to four hours, critical electrical components for up to three hours and wall opening membranes for up to two hours. Applied to the back and sides of metallic utility boxes, this product helps achieve an equal F-rating and T-rating in membrane penetrations of rated wall assemblies. 3M™ Interam™ Endothermic Mat E-5A-4 is non-flame supporting with low-smoke evolution. The mat is flexible which aids in installation and allows it to more easily be applied on complex shapes and around corners.

- Up to 4-hour protection for structural steel (ASTM E119/UL 263 and ASTM E 1725/UL 1709), up to 3-hour electrical circuit protection (ASTM E 1725) and up to 2-hour protection for wall opening membranes (UL 1479)*
- Outstanding performance in high-intensity fires, provides protection against large hydrocarbon pool fires in accordance with ASTM E 1529 (UL 1709)
- Easy to cut and easy to install, flexible mat can even be installed directly over existing conduits fire protection
- Exterior durability when covered with 0.010 in. stainless steel jacketing
- Re-enterable for effective maintenance and inspection

*See System details for layering requirements.



High-performance endothermic mat with a protective aluminum foil.



WALL OPENING MEMBRANES	ELECTRICAL CIRCUITS	STRUCTURAL STEEL
UP TO 2 HOUR Fire Protection	UP TO 3 HOUR Fire Protection	UP TO 4 HOUR Fire Protection

3M™ Aluminum Foil Tape 425

3M™ Aluminum Foil Tape 425, dead-soft aluminum foil backing, excellent heat and light reflection to protect against high temperatures and U.V. degradation. The foil also serves as an excellent barrier against moisture, dust, flame and certain chemicals. Acrylic adhesive supplies superior temperature, U.V. and solvent resistance. It provides excellent age life and is ideal for harsh, long-term outdoor environments. Meets F.A.R. 25.853(a), O447.

- Used to seal cut edges of 3M™ Interam™ Endothermic Mat E-5A-4 in order to complete total encapsulation
- Thermally-conductive, dead-soft aluminum backing combined with a transparent acrylic adhesive backing
- 4.6 mils thick, aluminum foil backed, 4 in. x 60 yd. roll



3M™ FSK Facing Tape 1525CW



3M™ FSK Facing Tape 1525CW is a conformable, easy-to-apply tape that is used to seal cut edges of 3M™ Fire Barrier Duct Wrap, 3M™ Fire Barrier Plenum Wrap and similar products in order to complete total encapsulation.

- High-performance reinforced insulation tape (Foil/Scrim/Kraft)
- Mold-resistant
- Special acrylic adhesive works in both very cold and hot temperatures
- High-performance reinforced insulation tape (Foil/Scrim/Kraft)
- 5.5 mils thick, 3.89 in. x 50 yd. roll











































Ordering Information















3M™ Fire Barrier Rated Foam FIP 1-Step

Product Number	Description	Size	Color	Unit	Billing UPC Number	Qty.	Price Unit
FIP 1-Step	Firestop Foam Up to 2-hr Penetration Firestop	12.85 oz.		 Cartridge	0-00-51115-54925-0	1/Cs	Each
Mixing Nozzles	Mixing Nozzles	—	—	Nozzle	0-00-51115-54933-0	5/Cs	Bag
Albion® Manual Dispenser Gun	Manual gun for 3M™ Fire Rated Foam FIP 1-Step	—	—	Gun	0-00-76308-14612-2	1/Cs	Each
Albion® Power Dispenser Gun	Power gun for 3M™ Fire Rated Foam FIP 1-Step	—	—	Gun	0-00-76308-14610-8	1/Cs	Each
	18V Li-ion Battery	—	—	Battery	0-00-76308-14614-6	1/Cs	Each

3M™ Fire Barrier Sealants













Product Number	Description	Size	Color	Unit	Billing UPC Number	Qty.	Price Unit
CP 25WB+	Up to 4-hr Penetration Firestop	10.1 oz.		 Tube	0-00-51115-11638-4	12/Cs	Each
	Up to 4-hr Penetration Firestop	20 oz.		 Sausage	0-00-51115-11642-1	10/Cs	Each
	Up to 4-hr Penetration Firestop	27 oz.		 Cartridge	0-00-51115-11641-4	6/Cs	Each
	Up to 4-hr Penetration Firestop	2 gal.		 Pail	0-00-51115-11639-1	1/Cs	Each
	Up to 4-hr Penetration Firestop	5 gal.		 Pail	0-00-51115-11640-7	1/Cs	Each
IC 15WB+	Up to 3-hr Penetration Firestop	10.1 oz.		 Tube	0-00-51115-16557-3	12/Cs	Each
	Up to 3-hr Penetration Firestop	20 oz.		 Sausage	0-00-51115-16560-3	10/Cs	Each
	Up to 3-hr Penetration Firestop	4.5 gal.		 Pail	0-00-51115-16558-0	1/Cs	Each
FD 150+	Up to 3-hr Penetration/4-hr Joint Firestop	10.1 oz.		 Tube	0-00-51115-11574-5	12/Cs	Each
	Up to 3-hr Penetration/4-hr Joint Firestop	20 oz.		 Sausage	0-00-51115-11634-6	12/Cs	Each
	Up to 3-hr Penetration/4-hr Joint Firestop	28 oz.		 Cartridge	0-00-51115-11602-5	6/Cs	Each
	Up to 3-hr Penetration/4-hr Joint Firestop	4.5 gal.		 Pail	5-00-51115-11575-7	1/Cs	Each
FD 150+	Up to 3-hr Penetration/4-hr Joint Firestop	10.1 oz.		 Tube	0-00-51115-18812-1	12/Cs	Each
	Up to 3-hr Penetration/4-hr Joint Firestop	20 oz.		 Sausage	0-00-51115-18810-7	12/Cs	Each
	Up to 3-hr Penetration/4-hr Joint Firestop	28 oz.		 Cartridge	0-00-51115-18811-4	6/Cs	Each
	Up to 3-hr Penetration/4-hr Joint Firestop	4.5 gal.		 Pail	0-00-51115-18813-8	1/Cs	Each
FD 150+	Up to 3-hr Penetration/4-hr Joint Firestop	10.1 oz.		 Tube	0-00-51115-16564-1	12/Cs	Each
	Up to 3-hr Penetration/4-hr Joint Firestop	20 oz.		 Sausage	0-00-51115-16567-2	12/Cs	Each
	Up to 3-hr Penetration/4-hr Joint Firestop	28 oz.		 Cartridge	0-00-51115-16566-5	6/Cs	Each
	Up to 3-hr Penetration/4-hr Joint Firestop	4.5 gal.		 Pail	0-00-51115-16565-8	1/Cs	Each

3M™ Fire Barrier Water Tight Sealants and Spray (W-Rated)

Product Number	Description	Size	Color	Unit	Billing UPC Number	Qty.	Price Unit
3000 WT 	Intumescent Silicone (Up to 4-hr Penetration Firestop)	10.1 oz.		 Tube	0-00-51115-16593-1	12/Cs	Each
	Intumescent Silicone (Up to 4-hr Penetration Firestop)	20 oz.		 Sausage	0-00-51115-18788-9	12/Cs	Each
	Intumescent Silicone (Up to 4-hr Penetration Firestop)	4.5 gal.		 Pail	5-00-51115-16594-3	1/Cs	Each
1000 NS 	Non-slump Silicone (Up to 3-hr Penetration/Joint Firestop)	10.1 oz.		 Tube	0-00-51115-11535-6	12/Cs	Each
	Non-slump Silicone (Up to 3-hr Penetration/Joint Firestop)	20 oz.		 Sausage	0-00-51115-18790-2	12/Cs	Each
	Non-slump Silicone (Up to 3-hr Penetration/Joint Firestop)	4.5 gal.		 Pail	5-00-51115-11537-5	1/Cs	Each

3M™ Fire Protection Products

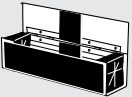
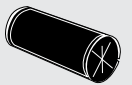


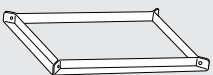

3M™ Fire Barrier Water Tight Sealants and Spray (W-Rated) (cont.)

Product Number	Description	Size	Color	Unit	Billing UPC Number	Qty.	Price Unit
1003 SL 	Self-Leveling Silicone (Up to 3-hr Penetration/Joint Firestop)	10.1 oz.		 Tube	0-00-51115-11538-7	12/Cs	Each
	Self-Leveling Silicone (Up to 3-hr Penetration/Joint Firestop)	20 oz.		 Sausage	0-00-51115-18789-6	12/Cs	Each
	Self-Leveling Silicone (Up to 3-hr Penetration/Joint Firestop)	4.5 gal.		 Pail	5-00-51115-11540-5	1/Cs	Each
Watertight Spray 	Moisture-curing hybrid siliconized polymer (Up to 3-hr Penetration/Joint Firestop)	5 gal.		 Pail	0-00-76308-98232-4	1/Cs	Each
	Moisture-curing hybrid siliconized polymer (Up to 3-hr Penetration/Joint Firestop)	5 gal.		 Pail	0-00-76308-86113-1	1/Cs	Each




3M™ Fire and Water Barrier Tape FWBT

Product Number	Description	Size	Unit	Billing UPC Number	Qty.	Price Unit
FWBT2	Used to firestop perimeter joints (curtain wall), construction joints, and through penetration openings Up to 4-hour fire protection in construction joints	2" x 75' (51 mm x 22.8 m)	Rolls	0-00-76308-86899-4	24/Cs	Each
FWBT3		3" x 75' (76 mm x 22.8 m)	Rolls	0-00-76308-14448-7	16/Cs	Each
FWBT4		4" x 75' (101 mm x 22.8 m)	Rolls	0-00-76308-86900-7	12/Cs	Each
FWBT6		6" x 75' (152 mm x 22.8 m)	Rolls	0-06-38060-13883-0	8/Cs	Each
FWBT8		8" x 75' (202 mm x 22.8 m)	Rolls	0-00-76308-86901-4	4/Cs	Each
FWBT12		12" x 75' (303 mm x 22.8 m)	Rolls	0-00-76308-86902-1	4/Cs	Each



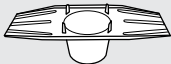


3M™ Fire Barrier Pass-Through Devices and Accessories

Product	Product Number	Description	Shipping Wt./Carton	Billing UPC Number	Qty.	Price Unit
Square Device 	PT4SD	4 in. Square Re-enterable Firestop Device (Up to 4-hr Firestop)	13.6 lbs.	0-00-51115-16597-9	6/Cs	Each
	Round Device 	PT2RD	2 in. Round Re-enterable Firestop Device (Up to 4-hr Firestop)	7.7 lbs.	0-00-51115-18773-5	6/Cs
PT4RD		4 in. Round Re-enterable Firestop Device (Up to 4-hr Firestop)	12.4 lbs.	0-00-51115-16598-6	6/Cs	Each
Product Accessories						
Single Mounting Brackets 	PT4SMB	For use with 4 in. Square Device	16.4 lbs.	0-00-51115-18752-0	24 Pair/Cs	Pair
	PT2RMB	For use with 2 in. Round Device	11.6 lbs.	0-00-51115-18774-2	24 Pair/Cs	Pair
	PT4RMB	For use with 4 in. Round Device	10.3 lbs.	0-00-51115-18754-4	24 Pair/Cs	Pair
Triplex Mounting Bracket 	PT4TMB	Gang up to three 4 in. Square Devices	29.1 lbs.	0-00-51115-18753-7	24 Pair/Cs	Pair
Sixplex Mounting Bracket 	PT4SSMB	Gang up to six 4 in. Square Devices	9.5 lbs.	0-00-51115-18777-3	6 Pair/Cs	Pair
Foam Plugs 	PT4SRP	For use with 4 in. Square Device	1.3 lbs.	0-00-51115-18794-0	24/Cs	Each
	PT2RRP	For use with 2 in. Round Device	0.4 lbs.	0-00-51115-18793-3	24/Cs	Each
	PT4RRP	For use with 4 in. Round Device	0.8 lbs.	0-00-51115-18791-9	24/Cs	Each


3M™ Fire Barrier Putty Sleeve Kits

Product Number	Description	Sleeve Size	Shipping Wt./Case	Unit	Billing UPC Number	Qty.	Price Unit
Each Kit Includes: (1) Split Metal Sleeve; (2) Split Mounting Brackets; (1) Bag Screws; (2) Wall Labels							
DT 100	 Re-enterable Firestop Kit (Up to 4-hr Penetration Firestop)	1 in. Dia.	1.7 lbs.	Kit	0-00-51115-18809-1	1/Cs	Each
DT 200	 Re-enterable Firestop Kit (Up to 4-hr Penetration Firestop)	2 in. Dia.	3.0 lbs.	Kit	0-00-51115-18808-4	1/Cs	Each
DT 400	 Re-enterable Firestop Kit (Up to 4-hr Penetration Firestop)	4 in. Dia.	6.9 lbs.	Kit	0-00-51115-18806-0	1/Cs	Each





3M™ Fire Barrier Cast-In Devices and Accessories

Product	Product Number	Description	Shipping Wt./Carton	Billing UPC Number	Qty./Case	Qty./Pallet	Price Unit
Cast-In Devices for Plastic Pipes	 2PCID	2 in. Diameter	11.4 lbs.	0-00-51115-16536-8	12	420	Each
	3PCID	3 in. Diameter	17.0 lbs.	0-00-51115-16537-5	12	240	Each
	4PCID	4 in. Diameter	12.4 lbs.	0-00-51115-16538-2	6	180	Each
	6PCID	6 in. Diameter	8.7 lbs.	0-00-51115-16539-9	2	70	Each
Cast-In Devices for Metal Pipes	 2MCID	2 in. Diameter	11.6 lbs.	0-00-51115-16540-5	12	420	Each
	3MCID	3 in. Diameter	15.3 lbs.	0-00-51115-16541-2	12	240	Each
	4MCID	4 in. Diameter	10.5 lbs.	0-00-51115-16542-9	6	180	Each
	6MCID	6 in. Diameter	6.0 lbs.	0-00-51115-16543-6	2	70	Each
Product Accessories							
Metal Deck Adaptors	 2MDA	For use with 2PCID and 2MCID	5.2 lbs.	0-00-51115-16544-3	12	240	Each
	3MDA	For use with 3PCID and 3MCID	6.6 lbs.	0-00-51115-16545-0	12	240	Each
	4MDA	For use with 4PCID and 4MCID	7.0 lbs.	0-00-51115-16546-7	12	240	Each
	6MDA	For use with 6PCID and 6MCID	8.2 lbs.	0-00-51115-16547-4	12	192	Each
Height Adaptors	 2HA	For use with 2PCID and 2MCID	4.1 lbs.	0-00-51115-16548-1	12	420	Each
	3HA	For use with 3PCID and 3MCID	5.2 lbs.	0-00-51115-16549-8	12	240	Each
	4HA	For use with 4PCID and 4MCID	6.3 lbs.	0-00-51115-16550-4	12	240	Each
	6HA	For use with 6PCID and 6MCID	4.9 lbs.	0-00-51115-16551-1	12	144	Each
Tub Box Assembly	 3TB	For use with 2PCID and 2MCID	8.5 lbs.	5-00-51115-16586-8	6	108	Each

3M™ Fire Barrier Packing Material PM 4



Product Number	Description	Size	Unit	Shipping Wt./Case	Billing UPC Number	Qty.	Price Unit
PM 4	 Packing material for use in 3M through-penetration firestop systems	4 in. x 20.5 ft.	Roll	19.6 lbs.	0-00-51115-18764-3	5/Cs	Roll

3M™ Fire Barrier Mortar




Product	Description	Size	Color	Unit	Billing UPC Number	Qty.	Price Unit
Mortar (non load-bearing)	Dry Mix Mortar Firestop (Up to 3-hr Penetration Firestop)	28 lbs.		 Pail	0-00-51115-54901-4	1/Cs	Each
	Dry Mix Mortar Firestop (Up to 3-hr Penetration Firestop)	44 lbs.		 Bag	0-00-51115-54900-7	1/Cs	Each

3M™ Fire Protection Products


3M™ Fire Barrier Tuck-In Wrap Strips or Roll

Product	Product Number	Description	Size	Unit	Shipping Wt./Case	Billing UPC Number	Qty.	Price Unit
	WS 200	Intumescent wrap for 2 in. nominal plastic pipes (Up to 3-hr Firestop)	2-1/2 in. x 8-1/4 in. (3/16 in. thick)	Strip	3.9 lbs.	5-00-51115-18814-0	24/Cs	Each
	WS 300	Intumescent wrap for 3 in. nominal plastic pipes (Up to 3-hr Firestop)	2-1/2 in. x 11-1/2 in. (3/16 in. thick)	Strip	5.4 lbs.	5-00-51115-18815-7	24/Cs	Each
	WS 400	Intumescent wrap for 4 in. nominal plastic pipes (Up to 3-hr Firestop)	2-1/2 in. x 14-7/8 in. (3/16 in. thick)	Strip	7.0 lbs.	5-00-51115-18817-1	24/Cs	Each
	WS Roll	Intumescent wrap for plastic pipes (Up to 3-hr Firestop)	2-1/2 in. x 98.4 in. (3/16 in. thick)	Roll	15.9 lbs.	5-00-51115-18821-3	6/Cs	Roll


3M™ Fire Barrier Plastic Pipe Devices

Product	Product Number	Description	Size	Unit	Shipping Wt./Case	Billing UPC Number	Qty.	Price Unit
	Ultra PPD 1.5	Firestop for non-metallic pipes, cables and combos (Up to 3-hr Firestop)	1.5 in. Dia.	Device	3.9 lbs.	0-00-51115-08378-5	10/Cs	Each
	Ultra PPD 2.0		2 in. Dia.	Device	4.5 lbs.	0-00-51115-08379-2	10/Cs	Each
	Ultra PPD 3.0		3 in. Dia.	Device	7.5 lbs.	0-00-51115-08380-8	10/Cs	Each
	Ultra PPD 4.0		4 in. Dia.	Device	11.9 lbs.	0-00-51115-08381-5	10/Cs	Each
	PPD 6.0	Firestop for non-metallic pipes, cables and combos (Up to 3-hr Firestop)	6 in. Dia.	Device	20.2 lbs.	0-00-51115-08253-5	5/Cs	Each
Mounting Accessories								
	UF Anchor	Anchors for fast installation of plastic pipe devices	3/4 in. x 16 in.	Anchors	14.9 lbs.	0-00-51115-11530-1	400/Cs	Each


3M™ Fire Barrier Self-Locking Pillows

Product	Product Number	Description	Size	Unit	Shipping Wt./Case	Billing UPC Number	Qty.	Price Unit
	FB249SL	Re-enterable, self-locking pillows (Up to 3-hr Firestop)	2 in. x 4 in. x 9 in. (Small)	Pillow	12.5 lbs.	5-00-51115-16578-3	24/Cs	Each
	FB269SL	Re-enterable, self-locking pillows (Up to 3-hr Firestop)	2 in. x 6 in. x 9 in. (Medium)	Pillow	12.5 lbs.	5-00-51115-16579-0	16/Cs	Each
	FB369SL	Re-enterable, self-locking pillows (Up to 3-hr Firestop)	3 in. x 6 in. x 9 in. (Large)	Pillow	15.8 lbs.	5-00-51115-16580-6	20/Cs	Each

3M™ Fire Barrier Pillows

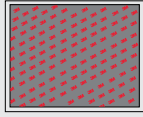
Product	Product Number	Description	Size	Unit	Shipping Wt./Case	Billing UPC Number	Qty.	Price Unit
	FB249	Re-enterable pillows (Up to 3-hr Firestop)	2 in. x 4 in. x 9 in. (Small)	Pillow	12.5 lbs.	0-00-51115-16530-6	24/Cs	Each
	FB269	Re-enterable pillows (Up to 3-hr Firestop)	2 in. x 6 in. x 9 in. (Medium)	Pillow	12.5 lbs.	0-00-51115-16531-3	16/Cs	Each
	FB369	Re-enterable pillows (Up to 3-hr Firestop)	3 in. x 6 in. x 9 in. (Large)	Pillow	15.8 lbs.	0-00-51115-16532-0	20/Cs	Each

3M™ Firestop Identification Label

Product	Product Number	Description	Size	Unit	Shipping Wt./Case	Billing UPC Number	Qty.	Price Unit
	WRNGLBL	Adhesive-backed label used to identify through penetration or joint firestop systems in fire-rated construction. 250 labels per roll.	3 in x 5 in	RL	4.97 lbs.	0-00-51115-54917-5	4/Cs	RL

3M™ Fire Barrier Composite Sheet CS-195+

Product Number	Description	Size	Unit	Shipping Wt./Case	Billing UPC Number	Qty.	Price Unit
CS-195+ (non load-bearing) Openings up to 36 sq. ft.	Composite Sheet (Up to 4-hr Penetration Firestop)	36 in. x 24 in. (0.303 in. thick nominal)	Sheet	18.6 lbs.	0-00-51115-07220-8	1/Cs	Each
	Composite Sheet (Up to 4-hr Penetration Firestop)	28 in. x 52 in. (0.303 in. thick nominal)	Sheet	32.0 lbs.	0-00-51115-08260-3	1/Cs	Each
	Composite Sheet (Up to 4-hr Penetration Firestop)	16 in. x 28 in. (0.303 in. thick nominal)	Sheet	10.6 lbs.	0-00-51115-07437-0	1/Cs	Each
	Composite Sheet (Up to 4-hr Penetration Firestop)	36 in. x 41 in. (0.303 in. thick nominal)	Sheet	34.9 lbs.	0-00-51115-07224-6	1/Cs	Each
	Composite Sheet (Up to 4-hr Penetration Firestop)	36 in. x 36 in. (0.303 in. thick nominal)	Sheet	30.2 lbs.	0-00-51115-07222-2	1/Cs	Each



3M™ Fire Barrier Blocks, Plugs and Planks

Product	Product Number	Description	Size	Unit	Shipping Wt./Case	Billing UPC Number	Qty.	Price Unit
Block	B258	Used to fill annular space created by pipes and cables penetrating through fire rated construction	2.36 in. x 5.12 in. x 7.87 in.	Block	14.78 lbs.	0-00-76308-97939-3	12/Cs	Each
Plugs	PLG2		2 in.	Plug	1.41 lbs.	0-00-76308-98126-6	4/Cs	Each
	PLG4		4 in.	Plug	3.23 lbs.	0-00-76308-98203-4	4/Cs	Each
Plank	PK39		2.35 in. x 5.12 in. x 39.37 in.	Plank	19.02 lbs.	0-00-76308-98231-7	3/Cs	Each

3M™ Fire Barrier Moldable Putty MP+


Product Number	Description	Size	Color	Unit	Billing UPC Number	Qty.	Price Unit
MPP-1+	Moldable Putty Firestop—Pad (Up to 2-hr Wall Openings/ 4-hr Penetration Firestop)	4 in. x 8 in. (1/10 in. thick)	Red	Pad	0-00-51115-16508-5	10/Pk, 10 Pk/Cs	Each
MPP-4S+	Moldable Putty Firestop—Pad (Up to 2-hr Wall Openings/ 4-hr Penetration Firestop)	7 in. x 7 in. (1/10 in. thick)	Red	Pad	0-00-51115-16509-2	20/Cs	Each
MPP-5S+	Moldable Putty Firestop—Pad (Up to 2-hr Wall Openings/ 4-hr Penetration Firestop)	9.5 in. x 9.5 in. (1/10 in. thick)	Red	Pad	0-00-51115-16510-8	20/Cs	Each
MP+	Moldable Putty Firestop—Stix in Tube (Up to 4-hr Penetration Firestop)	1.45 in. Dia. x 6 in. Approximate Dimension	Red	Stix	0-00-51115-16561-0	12/Cs	Each
MPS-2+	Moldable Putty Firestop—Stix (Up to 4-hr Penetration Firestop)	1.5 in. Dia. x 11.5 in. Approximate Dimension	Red	Stix	0-00-51115-16526-9	10/Cs	Each

3M™ Fire Barrier Silicone Sealant 2000+ (water-resistant)


Product Number	Description	Size	Color	Unit	Billing UPC Number	Qty.	Price Unit
2000+	Up to 3-hr Penetration/4-hr Joint Firestop	10.3 oz.	Grey	Tube	0-00-51115-11558-5	12/Cs	Each
	Up to 3-hr Penetration/4-hr Joint Firestop	4.5 gal.	Grey	Pail	5-00-51115-11559-7	1/Cs	Each

3M™ Fire Protection Products


3M™ Fire Barrier Ultra GS Wrap Strip

Product	Product Number	Description	Size	Unit	Shipping Wt./Case	Billing UPC Number	Qty.	Price Unit
 Ultra GS	ULTRA-GS-40	Intumescent wrap for insulated pipes, plastic pipes and combos (Up to 4-hr Firestop)	2 in. x 40 ft. (1/8 in. thick)	Roll	29.0 lbs.	0-00-51115-16507-8	5/Cs	Each

3M™ Fire Barrier Wrap Strip FS-195+

Product	Product Number	Description	Size	Unit	Shipping Wt./Case	Billing UPC Number	Qty.	Price Unit
 Wrap Strip	FS-195+	Intumescent wrap for most pipes and cables (Up to 4-hr Firestop)	2 in. x 24 in. (1/4 in. thick)	Strip	7.7 lbs.	0-00-51115-07115-7	10/Cs	Each

3M™ Fire Barrier RC-1 Restricting Collar

Product Number	Description	Size	Unit	Shipping Wt./Case	Billing UPC Number	Qty.	Price Unit
 RC-1	Steel collar for use with Ultra GS or FS-195+ for firestopping up to 10 in. diameter plastic pipe	2 in. x 25 ft.	Roll	5.4 lbs.	0-00-54007-08324-5	1/Cs	Roll

3M™ Smoke and Sound Sealant SS 100

Product Number	Description	Size	Unit	Billing UPC Number	Qty.	Price Unit
SS 100	Mitigates smoke and toxic gas spread -- helps minimize sound transfer	20 fl. oz	Sausage Pack	0-00-51115-54923-6	12/Cs	Each


3M™ Smoke and Sound Tape SST

Product Number	Description	Size	Unit	Billing UPC Number	Qty.	Price Unit
SST2	Provides a smoke and sound seal for construction joints and through-penetration in non-fire rated wall and floor assemblies, including smoke partitions and acoustic assemblies.	2" x 75' (51 mm x 22.8 m)	Rolls	0-00-76308-86903-8	24/Cs	Each
SST3		3" x 75' (76 mm x 22.8 m)	Rolls	0-00-76308-14452-4	16/Cs	Each
SST4		4" x 75' (101 mm x 22.8 m)	Rolls	0-00-76308-86936-6	12/Cs	Each
SST6		6" x 75' (152 mm x 22.8 m)	Rolls	0-06-38060-13884-7	8/Cs	Each
SST8		8" x 75' (202 mm x 22.8 m)	Rolls	0-00-76308-86937-3	4/Cs	Each
SST12		12" x 75' (303 mm x 22.8 m)	Rolls	0-00-76308-86938-0	4/Cs	Each





3M™ Fire Block Foam FB-Foam

Product Number	Description	Size	Unit	Billing UPC Number	Qty.	Price Unit
FB Foam	Fireblock and draftstop for interior construction	12.0 fl. oz	Can	0-00-51115-54907-6	12/Cs	Each

3M™ Fire Block Sealant FB 136

Product Number	Description	Size	Color	Unit	Billing UPC Number	Qty.	Price Unit
FB 136	Water-based draft, smoke and fireblocking sealant	10.1 fl. oz		Cartridge	0-00-51115-16591-7	12/Cs	Each

3M™ FireDam™ Spray 200

Product Number	Description	Size	Color	Unit	Billing UPC Number	Qty.	Price Unit
200	Up to 2-hr Penetration/4-hr Joint Firestop	5.0 gal.		 Pail	0-00-51115-18797-1	1/Cs	Each
	Up to 2-hr Penetration/4-hr Joint Firestop	5.0 gal.		 Pail	0-00-51115-18798-8	1/Cs	Each

3M™ Fire Barrier Duct Wrap 615+


Product Number	Description	Size	Unit	Shipping Wt./Case	Billing UPC Number	Qty.	Price Unit
615+		Space saving, flexible wrap for protection of air, grease, and chemical fume ducts	24 in. x 25 ft. (1.5 in. thick)	Roll	49.7 lbs.	0-00-51115-54905-2	1/Cs Each
		Space saving, flexible wrap for protection of air, grease, and chemical fume ducts	48 in. x 25 ft. (1.5 in. thick)	Roll	99.4 lbs.	0-00-51115-54906-9	1/Cs Each
	Collar for butted joint installations	6 in. x 25 ft. (1.5 in. thick)	Collar	49.7 lbs.	0-00-51115-18804-6	4/Cs	Each

Use 2 layers for grease ducts per ASTM 2336. Use 1 layer for air ducts per ISO 6994. Up to 2-hour T-ratings for through penetrations.


3M™ Interam™ Endothermic Mat E-5A-4

Product Number	Description	Size	Unit	Shipping Wt./Case	Billing UPC Number	Qty.	Price Unit
E-5A-4	Protective wrap for cable trays, conduits, wall opening membranes and more	24.5 in. x 20 ft. (.408 in. thick)	Roll	86.1 lbs.	0-00-51115-54913-7	1/Cs	Roll


3M™ Fire Barrier Plenum Wrap 5A+

Product Number	Description	Size	Unit	Shipping Wt./Case	Billing UPC Number	Qty.	Price Unit
5A+		Flexible wrap for protection of plenum spaces	24 in. x 50 ft. (0.5 in. thick)	Roll	34.8 lbs.	0-00-51115-18802-2	1/Cs Roll
		Flexible wrap for protection of plenum spaces	48 in. x 25 ft. (0.5 in. thick)	Roll	115.0 lbs.	0-00-51115-18805-3	2/Cs Roll

3M™ Aluminum Foil Tape 425

Product Number	Description	Size	Unit	Shipping Wt./Case	Billing UPC Number	Qty.	Price Unit
425	 Seals cut edges of 3M™ Interam™ Endothermic Mat	4 in. x 60 yd. (4.6 mil thick)	Roll	6.4 lbs.	0-00-51138-95074-3	2/Cs	Roll

3M™ FSK Facing Tape 1525CW

Product Number	Description	Size	Unit	Shipping Wt./Case	Billing UPC Number	Qty.	Price Unit
1525CW	 Seals cut edges of 3M™ Fire Barrier Duct Wrap and Plenum Wrap	3.89 in. x 50 yd. (5.5 mil thick)	Roll	24.8 lbs.	0-07-50351-50015-4	12/Cs	Roll



Warranty: 3M warrants that the Product will be free from defects in material and manufacture during the Extended Warranty Period. If the Product does not conform to this warranty during the Extended Warranty Period, then 3M will, as the sole and exclusive remedy, provide replacement Product (or, if replacement material is unavailable, refund the Product purchase price) for the Project. 3M MAKES NO OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OR CONDITION OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR ARISING OUT OF A COURSE OF DEALING, CUSTOM, OR USAGE OF TRADE.

This warranty is void if the Product is not installed: (1) in accordance with the applicable UL or Intertek listings; (2) in accordance with the applicable Product data sheet and installation instructions; (3) in accordance with the specifications for the Project; and (4) by a 3M trained Installer. This warranty does not cover damage or failure caused by Product misuse, improper Product storage, improper Product installation, Product or Project abuse, natural disasters, or other force majeure events.

Limitation of Liability: EXCEPT FOR THE LIMITED EXTENDED WARRANTY AND REMEDY STATED ABOVE, AND EXCEPT TO THE EXTENT PROHIBITED BY LAW, 3M WILL NOT BE LIABLE FOR ANY LOSS OR DAMAGE ARISING FROM OR RELATING TO THE PRODUCT, WHETHER DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL, (INCLUDING, BUT NOT LIMITED TO, LOST PROFITS OR BUSINESS OPPORTUNITY), REGARDLESS OF THE LEGAL OR EQUITABLE THEORY ASSERTED, INCLUDING, BUT NOT LIMITED TO, WARRANTY, CONTRACT, NEGLIGENCE, OR STRICT LIABILITY.

Product Selection and Use: Many factors beyond 3M's control and uniquely within user's knowledge and control can affect the use and performance of a 3M product in a particular application. As a result, customer is solely responsible for evaluating the 3M product and determining whether it is appropriate and suitable for customer's application, including conducting a workplace hazard assessment and reviewing all applicable regulations and standards (e.g., OSHA, ANSI, etc.). Failure to properly evaluate, select, and use a 3M product and appropriate safety products, or to meet all applicable safety regulations, may result in injury, sickness, death, and/or harm to property.



3M Industrial Adhesives and Tapes Division

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98-0213-4364-9

GenSPEED® 10 MTP™ Small Diameter Category 6A Cable

The Industry's Smallest Full Channel 6A Cable

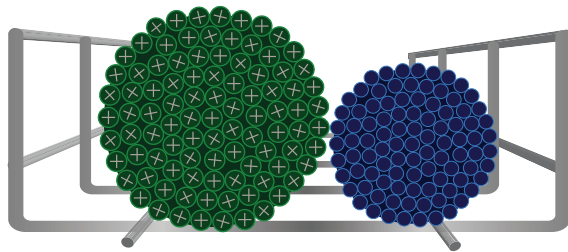
GenSPEED®

Record-Breaking Cat 6A Cables with Superior Alien Crosstalk Protection and EMI Immunity

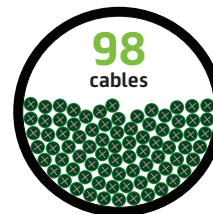


GenSPEED 10MTP is the world's first Category 6A Cable to feature a record-breaking 0.230" overall diameter with guaranteed performance that meets or exceeds all TIA standards, providing industry-leading alien crosstalk protection and EMI Immunity. Without needing to be grounded, GenSPEED 10 MTP's Mosaic Variable Laser Cut Tape shields the cable from noise coming from external cable sources (PSANEXT and PSAACRF). Its improved design, reduced diameter, lighter weight and increased flexibility translates to simplified cable handling and optimized cable management: less conduit, less cable tray and more cable in existing conduit and trays which lowers overall project costs.

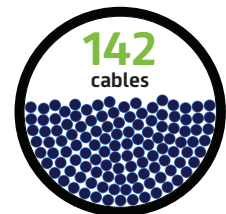
- Innovative design provides guaranteed performance using the world's smallest fully compliant Cat 6A cable.
- Smaller cable diameter allows for greater cable density, reducing cable management costs.
- Simplified design and improved bend radius make it easier to strip, terminate and route, reducing installation time and expense.
- Utilizes innovative Mosaic™ Variable Laser Cut Tape to provide superior protection against alien crosstalk. Random laser cut pattern delivers maximum protection against EMI noise interference.
- UL Listed CMP-LP 0.7A with certified performance for high power PoE applications up to 140 W. UL verified with certified performance for 100W power over HDBaseT.



First Cat 6A to feature 0.230" OD allowing for easier installation and increased cabling fill capacity: less cable tray and more cable in existing trays, which lowers overall costs.



4 inch conduit with 0.275" OD cable



4 inch conduit with GenSPEED 10 0.230" OD cable

Reduced diameter translates to simplified cable management: GenSPEED 10 is the only cable to allow up to 142 cables in a 4 in. conduit vs. 98 cables.

Cable OD	TRAY SIZE		
	4" x 6"	4" x 12"	4" x 18"
0.230	288	577	865
0.250	240	484	728
0.275	198	400	602
0.300	167	336	506

Cable OD	CONDUIT SIZE		
	3/4"	1"	4"
0.230	5	8	142
0.250	4	7	119
0.275	3	5	98
0.300	2	4	80

APPLICATIONS

- IEEE 802.3: 10G BASE-T, 1000 BASE-T, 100 BASE-TX, 10 BASE-T, PoE, PoE+ and PoE++
- ANSI/TIA 854: 1000 BASE-TX
- Digital Video
- Broadband and Baseband Analog Video
- CDDI, Token Ring, ATM

STANDARD COMPLIANCES

- ANSI/TIA 568.2-D
- NEC/CEC Type CMP (NFPA 262) for Plenum
- UL Listed CMP-LP 0.7A*
- UL 444
- UL 4299
- RoHS Compliant Directive 2011/65/EU
- ANSI/TIA 862 (Building Automation)
- ICEA S-116-732
- ISO/IEC 11801 Ed. 2.0 (Class E_x)

*0.7A is the ampacity rating of the cable, which equals to 140 watts using 50 volts over four pairs.



FEATURING

MOSAIC
VARIABLE LASER CUT TAPE



CONSTRUCTION

Conductors

- 23 AWG solid bare annealed copper

Insulation

- Plenum: Fluoropolymer

Color Code

- Pair 1: Blue-White
- Pair 2: Orange-White
- Pair 3: Green-White
- Pair 4: Brown-White

ANEXT Protection:

- Mosaic™ Variable Laser Cut Tape

Jacket

- Plenum: Low-Smoke, Flame-Retardant PVC

PART NUMBERS

Jacket Color	CMP (Plenum)	
		Spool
Blue		7151849
White		7151850
Gray		7151851
Yellow		7151852
Green		7151853
Red		7151854
Purple		7151855
Orange		7151856
Pink		7151857
Black		7151858

Non-stock items may be subject to minimum order quantities.

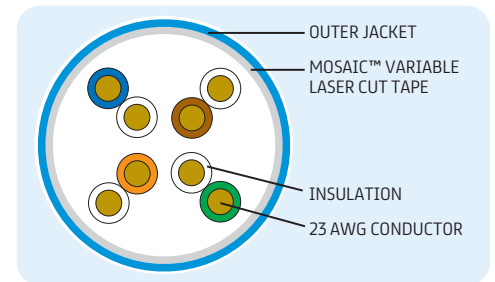
PHYSICAL DATA

	CMP
Nominal Cable Diameter (in)	0.230
Nominal Cable Weight (lbs/1000 ft)	30
Minimum Bend Radius (in)	1
Maximum Pulling Force (lbs)	40
Temperature Rating (°C)	
Installation:	0 to +60
Operation:	-20 to +105

ELECTRICAL CHARACTERISTICS

	Max.	Nom.
DC Resistance Ohms/100 m (328 ft) @ 20°C	9.38	7.00
DC Resistance Unbalanced Individual Pair %	4.00	<1
Delay Skew (Max) ns/100 m	45	
Nom. Velocity of Propagation % Speed of Light	70	
Characteristic Impedance Frequency (f): 1-500 MHz	Ohms 100 ± 15	

CROSS-SECTION



ELECTRICAL PERFORMANCE

Frequency MHz	PSACR* (min)	ACR* (min)	Insertion Loss (min)	PSNEXT (min)	NEXT (min)	PSACRF (min)	ACRF (min)	Return Loss (min)	TCL (min)	PSANEXT (min)		PSAACRF (min)			
	General Cable Guaranteed	General Cable Guaranteed	TIA Guaranteed	TIA Guaranteed	TIA Guaranteed	TIA Guaranteed	TIA Guaranteed	TIA Guaranteed	TIA Guaranteed	TIA Guaranteed	General Cable Guaranteed	General Cable Typical	TIA Guaranteed	General Cable Guaranteed	General Cable Typical
1	70.2	72.2	2.1	72.3	74.3	64.8	67.8	20.0	40.0	67.0	75.0	79.0	67.0	75.0	79.0
4	59.5	61.5	3.8	63.3	65.3	52.8	55.8	23.0	40.0	67.0	75.0	79.0	66.2	74.4	78.2
10	51.4	53.4	5.9	57.3	59.3	44.8	47.8	25.0	40.0	67.0	75.0	79.0	58.2	66.2	70.2
16	46.8	48.8	7.5	54.2	56.2	40.7	43.7	25.0	38.0	67.0	75.0	79.0	54.1	62.1	66.1
20	44.4	46.4	8.4	52.8	54.8	38.8	41.8	25.0	37.0	67.0	75.0	79.0	52.2	60.2	64.2
31.25	39.4	41.4	10.5	49.9	51.9	34.9	37.9	23.6	35.1	67.0	75.0	79.0	48.3	56.3	60.3
62.5	30.4	32.4	15.0	45.4	47.4	28.9	31.9	21.5	32.0	65.6	73.6	77.6	42.3	50.3	54.3
100	23.2	25.2	19.1	42.3	44.3	24.8	27.8	20.1	30.0	62.5	70.5	74.5	38.2	46.2	50.2
150	16.0	18.0	23.7	39.7	41.7	21.3	24.3	18.9	28.2	59.9	67.9	71.9	34.7	42.7	46.7
200	10.2	12.2	27.6	37.8	39.8	18.8	21.8	18.0	27.0	58.0	66.0	70.0	32.2	40.2	44.2
250	5.2	7.2	31.1	36.3	38.3	16.8	19.8	17.3	26.0	56.5	64.5	68.5	30.2	38.2	42.2
300	0.9	2.9	34.3	35.1	37.1	15.3	18.3	16.8	25.2	55.3	63.3	67.3	28.7	36.7	40.7
400	—	—	40.1	33.3	35.3	12.8	15.8	15.9	24.0	53.5	61.5	65.5	26.2	34.2	38.2
500	—	—	45.3	31.8	33.8	10.8	13.8	15.2	23.0	52.0	60.0	64.0	24.2	32.2	36.2

Note: Values are expressed in dB per 100 m (328 ft.) length @ 20°C.

*PSACR & ACR not specified in ANSI/TIA 568.2-D



The bridge to possible

[Data sheet](#)
Cisco public

Cisco 250 Series Smart Switches

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Build a reliable, easy-to-use business network at an affordable price

In today's hyper-connected world, reliable access to network resources is critical to all businesses. However, you also need to invest wisely to stay competitive, knowing how to separate the essential from the extraneous and get the most value for your dollar. For investment in network infrastructure, building a solid foundation for your business is essential, but it doesn't mean you need the most advanced feature set on the market.

For businesses requiring high performance, advanced security, and rich manageability from the network, fully managed switches are an excellent choice. However, they also typically come with high price tags. Smart switches provide the right level of network features and capabilities for growing businesses at a lower price, so you'll have more dollars to put toward other areas of your business.

With Cisco® 250 Series Smart Switches (Figure 1), you can achieve business-class network performance and security without paying for advanced network features that you will not use. When you need a reliable solution to share online resources and connect computers, phones, and wireless access points, but low cost is a top priority, Cisco 250 Series Smart Switches provide the ideal solution.



Figure 1.
Cisco 250 Series Smart Switches

The Cisco 250 Series is the next generation of affordable smart switches that combine powerful network performance and reliability with a complete suite of the network features you need for a solid business network. These powerful Fast Ethernet or Gigabit Ethernet switches, with Gigabit or 10 Gigabit Ethernet uplinks, provide multiple management options, sophisticated security capabilities, fine-tuned Quality-of-Service (QoS) and Layer 3 static routing features far beyond those of an unmanaged or consumer-grade switch, at a lower cost than for fully managed switches. And with an easy-to-use web user interface, Smart Network Application, and Power over Ethernet Plus (PoE+) capability, you can deploy and configure a complete business network in minutes.

Business applications

Whether you need basic, high-speed connectivity for your computers and servers or a comprehensive voice, data, and wireless technology solution, Cisco 250 Series switches can meet your business needs. Possible deployment scenarios include:

- **High-speed desktop connectivity:** Cisco 250 Series switches can quickly and securely connect employees working in small offices with one another and with all of the printers, servers, and other devices they use. High performance and reliable connectivity help speed up file transfers and data processing, improve network uptime, and keep your employees productive.

- **Flexible wireless connectivity:** Cisco 250 Series switches work with Cisco and third-party wireless solutions to extend the reach of your network. With security features, Power over Ethernet (PoE), VLAN, and QoS, these switches are the perfect foundation to add business-grade wireless to a network.

The capability of up to 30W of power per port provided through the Ethernet cable means you can easily deploy innovative 802.11ac wireless technology to maximize workforce productivity.

- **Unified communications:** The Cisco 250 Series provides QoS features to enable you to prioritize delay-sensitive traffic in your network and let you converge all of your communications solutions such as IP telephony and video surveillance onto a single Ethernet network. Cisco offers a complete portfolio of IP telephony and other unified communications products designed for small businesses, and Cisco 250 Series switches have been rigorously tested to help ensure easy integration and full compatibility with these and other vendor products.

Features and benefits

Cisco 250 Series Smart Switches provide all of the features you need to create a basic business-class network at an affordable price. These features include:

- **Easy configuration and management:** Cisco 250 Series switches are designed to be easy to deploy and use by small businesses or the partners that serve them:
 - Smart Network Application (SNA) is an innovative network-level monitoring and management tool embedded in the Cisco 100 to 500 Series switches. It can discover network topology, display link status, monitor events, apply configurations, and upgrade software images across multiple switches in the network.
 - The FindIT Network Manager and Probe are designed to manage Cisco 100 to 500 Series switches, routers, and wireless access points. They let you proactively manage the network instead of just reacting to events. Cisco 250 Series switches support the embedded FindIT Network Probe, eliminating the need to set up a separate hardware or virtual machine on site. For more information, visit <https://www.cisco.com/c/en/us/products/cloud-systems-management/findit-network-management/index.html>.
 - The FindIT Network Discovery Utility works through a simple toolbar on the user's web browser to discover Cisco devices on the network and display basic device information, inventory, and new firmware updates to aid in the configuration and speed the deployment of Cisco Small Business products. For more information, visit <https://www.cisco.com/c/en/us/products/cloud-systems-management/small-business-findit-network-discovery-utility/index.html>.
 - Simple or advanced-mode graphic user interfaces reduce the time required to deploy, troubleshoot, and manage the network. Configuration wizards simplify the most common configuration tasks and provide the ultimate tool for anyone to set up and manage the network.
 - Cisco Smartports technology provides more advanced capabilities and hands-on control by automatically configuring ports with specific levels of security, QoS, and availability according to the type of connected device, based on Cisco best practices and pretested configurations. The Auto Smartports feature automatically applies the intelligence delivered through the Smartports roles to the port based on the device types discovered over Cisco Discovery Protocol or LLDP-MED. This capability facilitates zero-touch deployments.
 - The USB port on the front panel of the switch enables easy image and configuration transfer for faster deployment or upgrades.

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- **Reliability and performance:** Cisco 250 Series switches have been tested to deliver the high performance and reliability you would expect from a Cisco switch and help you prevent costly downtime. The switches speed file transfer times, improve slow and sluggish networks, keep your vital business applications available, and help your employees respond more quickly to customers and each other. With a network based on Cisco 250 Series switches, you can address all of your business communications and connectivity needs and reduce the total cost of ownership of your technology infrastructure. Cisco 250 Series switches also support 10 Gigabit Ethernet uplinks on select models, so you can build a high-performance and future-ready network to support your thriving business.
 - **Layer 3 static routing:** This capability allows you to segment your network into separate workgroups and communicate across VLANs without degrading application performance. As a result, you can manage internal routing with your switches and dedicate your router to external traffic and security, helping your network run more efficiently.
 - **Power over Ethernet Plus (PoE+):** Cisco 250 Series switches are available with PoE+ on both Fast Ethernet and Gigabit Ethernet models. This capability simplifies the deployment of IP telephony, wireless, video surveillance, and other solutions by allowing you to send data and power to network endpoints over the single network cable, eliminating the need for separate power supplies or outlets. PoE+ provides up to 30W of power per port, enabling deployments for 802.11ac wireless access points, Pan-Tilt-Zoom (PTZ) IP cameras, videophones, and thin client devices, delivering more flexibility and investment protection.
 - **PoE powered device and PoE pass-through:** The 10-port compact models of Cisco 250 Series can work as PoE powered devices and draw power from upstream PoE switches in the wiring closet, simplifying the deployment in meeting rooms, classrooms, hotel rooms, and other flexible locations. Each switch can accept up to 60W of power per uplink port to power itself and pass through the power to the downstream PoE end devices if needed.
 - **Network security:** Cisco 250 Series switches provide the security and network management features you need to maintain a high level of security for your business, keep unauthorized users off the network, and protect your business data. The switches include integrated network security to reduce the risk of a security breach, with IEEE 802.1X port security to control access to your network, Denial-of-Service (DoS) attack prevention to increase network uptime during an attack, and extensive Access Control Lists (ACLs) to protect sensitive portions of the network from unauthorized users and guard against network attacks.
 - **IPv6 support:** As the IP network addressing scheme evolves to accommodate more devices, you can have peace of mind that your network is ready. Cisco 250 Series switches provide native support for IPv6 alongside traditional IPv4. With USGv6 and IPv6 Gold Logo certifications, the 250 Series will enable you to take full advantage of IPv6-enabled operating systems and applications in the future, without having to upgrade your network equipment.
 - **IP telephony support:** Cisco 250 Series switches include QoS features to prioritize delay-sensitive services such as voice and video, simplify unified communications deployments, and help ensure consistent network performance for all services.

- **Networkwide automatic voice deployment:** Using a combination of Cisco Discovery Protocol, LLDP-MED, Auto Smartports, and Voice Services Discovery Protocol (VSDP, a unique, patented Cisco protocol), customers can deploy an end-to-end voice network dynamically. The switches in the network automatically converge into a single voice VLAN and set of QoS parameters and then propagate them out to the phones on the ports where they are discovered. For example, automated voice VLAN capabilities let you plug any IP phone (including third-party phones) into your IP telephony network and receive an immediate dial tone. The switch automatically configures the device with the right VLAN and QoS parameters to prioritize voice traffic.
- **An energy-efficient solution:** Cisco 250 Series switches are designed to be energy efficient and eco friendly without compromising performance. They help conserve energy by optimizing power use, which helps protect the environment and lowers your energy costs. Power-saving features include:
 - Support for the Energy Efficient Ethernet (IEEE 802.3az) standard, which reduces energy consumption by monitoring the amount of traffic on an active link and putting the link into a sleep state during quiet periods
 - Automatic power shutoff on ports when a link is down
 - Embedded intelligence to adjust power based on cable length
 - Fanless design in most models, which reduces power consumption, increases reliability, and provides quieter operation
 - Ability to turn off LEDs to conserve power
- **Peace of mind and investment protection:** Cisco 250 Series switches offer the reliable performance, investment protection, and peace of mind you expect from a Cisco switch. When you invest in the Cisco 250 Series, you gain the benefits of:
 - Cisco limited lifetime warranty to protect your investment
 - Rigorous testing to help ensure easy integration and compatibility with other Cisco networking and communications products, including the complete Cisco Small Business portfolio
- **Limited lifetime warranty:** The Cisco 250 Series switches come with the Cisco limited lifetime hardware warranty, with return-to-factory replacement, software updates for bug fixes for the warranty term, and 1-year limited warranty for fans and power supplies. In addition, Cisco offers telephone technical support at no charge for the first 12 months following the date of purchase. To download software updates, go to <https://www.cisco.com/cisco/web/download/index.html>.
- **World-class support:** To extend the support coverage beyond the warranty provisions, choose Cisco Smart Net Total Care™, which helps you get the most value from Cisco Small Business solutions, providing peace of mind at an affordable price. Cisco Smart Net Total Care provides a single service platform for all Cisco networking products. With global coverage, flexible contract terms, and multiple advance hardware replacement options, this comprehensive service includes software upgrades, access to the Cisco Small Business Support Center, and extended telephone and online chat support. To learn more, visit <https://www.cisco.com/c/en/us/solutions/small-business/services.html>.

To find out where Cisco Small Business Support Service is available by country, go to <https://supportforums.cisco.com/t5/regional-service-support-options/bd-p/4626-discussions-smb-support-country>.

- **Multiple language options:** The Cisco 250 Series switches are available in multiple languages. Product documentation and user interfaces are translated, giving you the ability to select your preferred language.

Product specifications

Table 1 describes product specifications.

Table 1. Product specifications

Feature	Description		
Performance			
Switching capacity and forwarding rate All switches are wire-speed and nonblocking	Model	Capacity in millions of packets per second (mpps) (64-byte packets)	Switching capacity in gigabits per second (Gbps)
	SF250-24	9.52	12.8
	SF250-24P	9.52	12.8
	SF250-48	13.10	17.6
	SF250-48HP	13.10	17.6
	SG250-08	11.90	16.0
	SG250-08HP	11.90	16.0
	SG250-10P	14.88	20.0
	SG250-18	26.78	36.0
	SG250-26	38.69	52.0
	SG250-26HP	38.69	52.0
	SG250-26P	38.69	52.0
	SG250-50	74.41	100.0
	SG250-50HP	74.41	100.0
	SG250-50P	74.41	100.0
	SG250X-24	95.23	128.0
	SG250X-24P	95.23	128.0
	SG250X-48	130.94	176.0
SG250X-48P	130.94	176.0	

Feature	Description
Layer 2 switching	
Spanning Tree Protocol (STP)	<p>Standard 802.1d spanning tree support</p> <p>Fast convergence using 802.1w (Rapid Spanning Tree Protocol [RSTP]), enabled by default</p> <p>Multiple spanning tree instances using 802.1s (MSTP); 8 instances are supported</p> <p>Per-VLAN Spanning Tree Plus (PVST+) and Rapid PVST+ (RPVST+); 126 instances are supported</p>
Port grouping/link aggregation	<p>Support for IEEE 802.3ad Link Aggregation Control Protocol (LACP)</p> <ul style="list-style-type: none"> • Up to 4 groups • Up to 8 ports per group with 16 candidate ports for each (dynamic) 802.3ad LAG
VLAN	<p>Support for up to 255 active VLANs simultaneously</p> <p>Port-based and 802.1Q tag-based VLANs</p> <p>Management VLAN</p> <p>Guest VLAN</p>
Voice VLAN	<p>Voice traffic is automatically assigned to a voice-specific VLAN and treated with appropriate levels of QoS. Auto voice capabilities deliver networkwide zero-touch deployment of voice endpoints and call control devices</p>
Generic VLAN Registration Protocol (GVRP) and Generic Attribute Registration Protocol (GARP)	<p>Protocols for automatically propagating and configuring VLANs in a bridged domain</p>
IGMP (versions 1, 2, and 3) snooping	<p>Internet Group Management Protocol (IGMP) limits bandwidth-intensive multicast traffic to only the requesters; supports 255 multicast groups (source-specific multicasting is also supported)</p>
IGMP querier	<p>Used to support a Layer 2 multicast domain of snooping switches in the absence of a multicast router</p>
HOL blocking	<p>Head-Of-Line (HOL) blocking</p>
Loopback detection	<p>Provides protection against loops by transmitting loop protocol packets out of ports on which loop protection has been enabled. It operates independently of STP</p>
Layer 3 routing	
IPv4 routing	<p>Wire-speed routing of IPv4 packets</p> <p>Up to 32 static routes and up to 16 IP interfaces</p>
IPv6 routing	<p>Wire-speed routing of IPv6 packets</p>
Layer 3 interface	<p>Configuration of Layer 3 interface on physical port, LAG, VLAN interface, or loopback interface</p>
Classless Interdomain Routing (CIDR)	<p>Support for CIDR</p>

Feature	Description
DHCP relay at Layer 3	Relay of DHCP traffic across IP domains
User Datagram Protocol (UDP) relay	Relay of broadcast information across Layer 3 domains for application discovery or relaying of bootP/DHCP packets
Security	
SSL	Secure Sockets Layer (SSL) encrypts all HTTPS traffic, allowing secure access to the browser-based management GUI in the switch
Secure Shell (SSH) Protocol	SSH is a secure replacement for Telnet traffic. Secure Copy (SCP) also uses SSH. SSH v1 and v2 are supported
IEEE 802.1X (authenticator role)	RADIUS authentication, guest VLAN, single/multiple host mode, and single/multiple sessions
Secure Core Technology (SCT)	Ensures that the switch will receive and process management and protocol traffic no matter how much traffic is received
Secure Sensitive Data (SSD)	A mechanism to manage sensitive data (such as passwords, keys, and so on) securely on the switch, populating this data to other devices, and secure autoconfig. Access to view the sensitive data as plaintext or encrypted is provided according to the user-configured access level and the access method of the user
Trustworthy systems	Trustworthy systems provide a highly secure foundation for Cisco products Run-time defenses (Executable Space Protection [X-Space], Address Space Layout Randomization [ASLR], Built-In Object Size Checking [BOSC])
Port security	Ability to lock source MAC addresses to ports and limit the number of learned MAC addresses
RADIUS	Supports RADIUS authentication for management access. Switch functions as a client
Storm control	Broadcast, multicast, and unknown unicast
DoS prevention	Denial-of-Service (DoS) attack prevention
Multiple user privilege levels in CLI	Level 1, 7, and 15 privilege levels
Access Control Lists (ACLs)	Support for up to 512 rules Drop or rate limit based on source and destination MAC, VLAN ID or IP address, protocol, port, differentiated services code point (DSCP)/IP precedence, TCP/UDP source and destination ports, 802.1p priority, Ethernet type, Internet Control Message Protocol (ICMP) packets, IGMP packets, TCP flag; ACL can be applied on both ingress and egress sides Time-based ACLs supported
STP loopback guard	Provides additional protection against Layer 2 forwarding loops (STP loops)
Quality of service	
Priority levels	8 hardware queues
Scheduling	Strict priority and Weighted Round-Robin (WRR) queue assignment based on DSCP and class of service (802.1p/CoS)

Feature	Description
Class of service	Port based; 802.1p VLAN priority based; IPv4/v6 IP precedence/Type of Service (ToS)/DSCP based; Differentiated Services (DiffServ); classification and re-marking ACLs, trusted QoS
Rate limiting	Ingress policer; egress shaping and rate control; per VLAN, per port, and flow based
Congestion avoidance	A TCP congestion avoidance algorithm is required to reduce and prevent global TCP loss synchronization
Standards	
Standards	IEEE 802.3 10BASE-T Ethernet, IEEE 802.3u 100BASE-TX Fast Ethernet, IEEE 802.3ab 1000BASE-T Gigabit Ethernet, IEEE 802.3ad Link Aggregation Control Protocol, IEEE 802.3z Gigabit Ethernet, IEEE 802.3x Flow Control, IEEE 802.3ad LACP, IEEE 802.1D (STP), IEEE 802.1Q/p VLAN, IEEE 802.1w RSTP, IEEE 802.1s Multiple STP, IEEE 802.1X Port Access Authentication, IEEE 802.3af, IEEE 802.3at, RFC 768, RFC 783, RFC 791, RFC 792, RFC 793, RFC 813, RFC 879, RFC 896, RFC 826, RFC 854, RFC 855, RFC 856, RFC 858, RFC 894, RFC 919, RFC 920, RFC 922, RFC 950, RFC 951, RFC 1042, RFC 1071, RFC 1123, RFC 1141, RFC 1155, RFC 1157, RFC 1213, RFC 1215, RFC 1286, RFC 1350, RFC 1442, RFC 1451, RFC 1493, RFC 1533, RFC 1541, RFC 1542, RFC 1573, RFC 1624, RFC 1643, RFC 1700, RFC 1757, RFC 1867, RFC 1907, RFC 2011, RFC 2012, RFC 2013, RFC 2030, RFC 2131, RFC 2132, RFC 2233, RFC 2576, RFC 2616, RFC 2618, RFC 2665, RFC 2666, RFC 2674, RFC 2737, RFC 2819, RFC 2863, RFC 3164, RFC 3411, RFC 3412, RFC 3413, RFC 3414, RFC 3415, RFC 3416, RFC 4330
IPv6	
IPv6	IPv6 host mode IPv6 over Ethernet Dual IPv6/IPv4 stack IPv6 neighbor and Router Discovery (ND) IPv6 stateless address auto configuration Path Maximum Transmission Unit (MTU) discovery Duplicate Address Detection (DAD) Internet Control Message Protocol (ICMP) version 6 IPv6 over IPv4 network with Intrasite Automatic Tunnel Addressing Protocol (ISATAP) support USGv6 and IPv6 Gold Logo certified
IPv6 QoS	Prioritize IPv6 packets in hardware
IPv6 ACL	Drop or rate limit IPv6 packets in hardware
Multicast Listener Discovery (MLD v1/2) snooping	Deliver IPv6 multicast packets only to the required receivers
IPv6 applications	Web/SSL, Telnet server/SSH, Ping, Traceroute, Simple Network Time Protocol (SNTP), Trivial File Transfer Protocol (TFTP), Simple Network Management Protocol (SNMP), Remote Authentication Dial-In User Service (RADIUS), Syslog, DNS client, DHCP client, DHCP autoconfig

Feature	Description	
IPv6 RFCs supported	<p>RFC 4443 (which obsoletes RFC 2463): ICMPv6</p> <p>RFC 4291 (which obsoletes RFC 3513): IPv6 address architecture</p> <p>RFC 4291: IPv6 Addressing Architecture</p> <p>RFC 2460: IPv6 Specification</p> <p>RFC 4861 (which obsoletes RFC 2461): Neighbor Discovery for IPv6</p> <p>RFC 4862 (which obsoletes RFC 2462): IPv6 Stateless Address Autoconfiguration</p> <p>RFC 1981: Path MTU Discovery</p> <p>RFC 4007: IPv6 Scoped Address Architecture</p> <p>RFC 3484: Default address selection mechanism</p> <p>RFC 5214 (which obsoletes RFC 4214): ISATAP tunneling</p> <p>RFC 4293; MIB IPv6: Textual Conventions and General Group</p> <p>RFC 3595: Textual Conventions for IPv6 Flow Label</p>	
Management		
Web user interface	<p>Built-in switch configuration utility for easy browser-based device configuration (HTTP/HTTPS). Supports configuration, wizards, system dashboard, system maintenance, and monitoring</p> <p>Basic and advanced mode for maximum operational efficiency</p>	
Smart Network Application (SNA)	<p>An innovative network-level monitoring and management tool embedded in Cisco 250 to 550X Series switches. It can discover network topology, display link status, monitor events, apply configurations, and upgrade software images across multiple switches in the network</p>	
SNMP	<p>SNMP versions 1, 2c, and 3 with support for traps, and SNMP v3 User-based Security Model (USM)</p>	
Standard MIBs	<p>lldp-MIB</p> <p>lldpextdot1-MIB</p> <p>lldpextdot3-MIB</p> <p>lldpextmed-MIB</p> <p>rfc2674-MIB</p> <p>rfc2575-MIB</p> <p>rfc2573-MIB</p> <p>rfc2233-MIB</p> <p>rfc2013-MIB</p> <p>rfc2012-MIB</p> <p>rfc2011-MIB</p> <p>RFC-1212</p> <p>RFC-1215</p> <p>SNMPv2-CONF</p> <p>SNMPv2-TC</p> <p>p-bridge-MIB</p>	<p>rfc2665-MIB</p> <p>rfc2668-MIB</p> <p>rfc2737-MIB</p> <p>rfc2925-MIB</p> <p>rfc3621-MIB</p> <p>rfc4668-MIB</p> <p>rfc4670-MIB</p> <p>trunk-MIB</p> <p>tunnel-MIB</p> <p>udp-MIB</p> <p>draft-ietf-bridge-8021x-MIB</p> <p>draft-ietf-bridge-rstpmib-04-MIB</p> <p>draft-ietf-hubmib-etherif-mib-v3-00-MIB</p> <p>draft-ietf-syslog-device-MIB</p> <p>ianaaddrfamnumbers-MIB</p> <p>ianaifty-MIB</p>

Feature	Description	
	q-bridge-MIB rfc1389-MIB rfc1493-MIB rfc1611-MIB rfc1612-MIB rfc1850-MIB rfc1907-MIB rfc2571-MIB rfc2572-MIB rfc2574-MIB rfc2576-MIB rfc2613-MIB	ianaprot-MIB inet-address-MIB ip-forward-MIB ip-MIB RFC1155-SMI RFC1213-MIB SNMPv2-MIB SNMPv2-SMI SNMPv2-TM RMON-MIB rfc1724-MIB dcb-raj-DCBX-MIB-1108-MIB rfc1213-MIB rfc1757-MIB
Private MIBs	CISCOSB-ldp-MIB CISCOSB-brgmulticast-MIB CISCOSB-bridgemibobjects-MIB CISCOSB-bonjour-MIB CISCOSB-dhcpcl-MIB CISCOSB-MIB CISCOSB-wrandomtaildrop-MIB CISCOSB-traceroute-MIB CISCOSB-telnet-MIB CISCOSB-stormctrl-MIB CISCOSBssh-MIB CISCOSB-socket-MIB CISCOSB-sntp-MIB CISCOSB-smon-MIB CISCOSB-phy-MIB CISCOSB-multisessionterminal-MIB CISCOSB-mri-MIB CISCOSB-jumboframes-MIB CISCOSB-gvrp-MIB CISCOSB-endofmib-MIB CISCOSB-dot1x-MIB CISCOSB-deviceparams-MIB CISCOSB-cli-MIB	CISCOSB-ip-MIB CISCOSB-iprouter-MIB CISCOSB-ipv6-MIB CISCOSB-mnginf-MIB CISCOSB-lcli-MIB CISCOSB-localization-MIB CISCOSB-mcmngr-MIB CISCOSB-mng-MIB CISCOSB-physdescription-MIB CISCOSB-PoE-MIB CISCOSB-protectedport-MIB CISCOSB-rmon-MIB CISCOSB-rs232-MIB CISCOSB-SecuritySuite-MIB CISCOSB-snmp-MIB CISCOSB-specialbpdu-MIB CISCOSB-banner-MIB CISCOSB-syslog-MIB CISCOSB-TcpSession-MIB CISCOSB-traps-MIB CISCOSB-trunk-MIB CISCOSB-tuning-MIB CISCOSB-tunnel-MIB

Feature	Description	
	CISCOSB-cdb-MIB CISCOSB-brgmacswitch-MIB CISCOSB-3sw2swtables-MIB CISCOSB-smartPorts-MIB CISCOSB-tbi-MIB CISCOSB-macbaseprio-MIB CISCOSB-env_mib-MIB CISCOSB-policy-MIB CISCOSB-sensor-MIB CISCOSB-aaa-MIB CISCOSB-application-MIB CISCOSB-bridgesecurity-MIB CISCOSB-copy-MIB CISCOSB-CpuCounters-MIB CISCOSB-Custom1BonjourService-MIB CISCOSB-dhcp-MIB CISCOSB-dlf-MIB CISCOSB-dnscl-MIB CISCOSB-embweb-MIB CISCOSB-fft-MIB CISCOSB-file-MIB CISCOSB-greeneth-MIB CISCOSB-greeneth-MIB CISCOSB-interfaces-MIB CISCOSB-interfaces_recovery-MIB	CISCOSB-udp-MIB CISCOSB-vlan-MIB CISCOSB-ipstdacl-MIB CISCOSB-eee-MIB CISCOSB-ssl-MIB CISCOSB-digitalkeymanage-MIB CISCOSB-qosclimib-MIB CISCOSB-digitalkeymanage-MIB CISCOSB-tbp-MIB CISCOSMB-MIB CISCOSB-secsd-MIB CISCOSB-draft-ietf-entmib-sensor-MIB CISCOSB-draft-ietf-syslog-device-MIB CISCOSB-rfc2925-MIB CISCO-SMI-MIB CISCOSB-DebugCapabilities-MIB CISCOSB-CDP-MIB CISCOSB-vlanVoice-MIB CISCOSB-EVENTS-MIB CISCOSB-sysmng-MIB CISCOSB-sct-MIB CISCO-TC-MIB CISCO-VTP-MIB CISCO-CDP-MIB
Remote Monitoring (RMON)	Embedded RMON software agent supports 4 RMON groups (history, statistics, alarms, and events) for enhanced traffic management, monitoring, and analysis	
IPv4 and IPv6 dual stack	Coexistence of both protocol stacks to ease migration	
Firmware upgrade	Web browser upgrade (HTTP/HTTPS) and TFTP and upgrade over SCP running over SSH Dual images for resilient firmware upgrades	
Port mirroring	Traffic on a port can be mirrored to another port for analysis with a network analyzer or RMON probe. Up to 4 source ports can be mirrored to one destination port	
VLAN mirroring	Traffic from a VLAN can be mirrored to a port for analysis with a network analyzer or RMON probe. Up to 4 source VLANs can be mirrored to one destination port	
Dynamic Host Configuration Protocol (DHCP) (options 12, 66, 67, 129, and 150)	DHCP options facilitate tighter control from a central point (DHCP server), to obtain IP address, autoconfiguration (with configuration file download), DHCP Relay, and host name	

Feature	Description
Secure Copy (SCP)	Securely transfers files to and from the switch
Autoconfiguration with SCP file download	Enables mass deployment with protection of sensitive data
Text-editable configs	Config files can be edited with a text editor and downloaded to another switch, facilitating easier mass deployment
Smartports	Simplified configuration of QoS and security capabilities
Auto Smartports	Automatically applies the intelligence delivered through the Smartports roles to the port based on the devices discovered over Cisco Discovery Protocol or LLDP-MED. This facilitates zero-touch deployments
Textview Command-Line Interface (CLI)	Scriptable CLI. A full CLI as well as a menu-based CLI is supported. User privilege levels 1, 7, and 15 are supported for the CLI
Cloud services	Support for Cisco FindIT Network Manager and Cisco Active Advisor
Embedded FindIT Network Probe	Support for embedded FindIT Network Probe running on the switch. Eliminates the need to set up a separate hardware or virtual machine for the FindIT Network Probe on site
Cisco Network Plug and Play (PnP) agent	The Cisco Network Plug and Play solution provides a simple, secure, unified, and integrated offering to ease new branch or campus device rollouts or for provisioning updates to an existing network. The solution provides a unified approach to provision Cisco routers, switches, and wireless devices with a near-zero-touch deployment experience Supports Cisco PnP Connect
Localization	Localization of GUI and documentation into multiple languages
Login banner	Configurable multiple banners for web as well as CLI
Other management	Traceroute; single IP management; HTTP/HTTPS; RADIUS; port mirroring; TFTP upgrade; DHCP client; Simple Network Time Protocol (SNTP); cable diagnostics; Ping; syslog; Telnet client (SSH secure support); automatic time settings from Management Station
Green (power efficiency)	
Energy detect	Automatically turns power off on RJ-45 port when detecting link down. Active mode is resumed without loss of any packets when the switch detects the link is up
Cable length detection	Adjusts the signal strength based on the cable length. Reduces the power consumption for shorter cables
EEE compliant (802.3az)	Supports IEEE 802.3az on all copper Gigabit Ethernet ports
Disable port LEDs	LEDs can be manually turned off to save on energy
Time-based port operation	Link up or down based on user-defined schedule (when the port is administratively up)
Time-based PoE	PoE power can be on or off based on user-defined schedule to save energy

Feature	Description																																	
General																																		
Jumbo frames	Frame sizes up to 9K bytes. The default MTU is 2K bytes																																	
MAC table	8K addresses																																	
Discovery																																		
Bonjour	The switch advertises itself using the Bonjour protocol																																	
Link Layer Discovery Protocol (LLDP) (802.1ab) with LLDP-MED extensions	Link Layer Discovery Protocol (LLDP) allows the switch to advertise its identification, configuration, and capabilities to neighboring devices that store the data in a MIB. LLDP-MED is an enhancement to LLDP that adds the extensions needed for IP phones																																	
Cisco Discovery Protocol	The switch advertises itself using the Cisco Discovery Protocol. It also learns the connected device and its characteristics using Cisco Discovery Protocol																																	
Product specifications																																		
802.3at PoE+ and 802.3af PoE delivered over any of the RJ-45 ports within the listed power budgets	The following switches support 802.3at PoE+, 802.3af, and Cisco prestandard (legacy) PoE. Maximum power of 30.0W to any 10/100 or Gigabit Ethernet port, until the PoE budget for the switch is reached. The total power available for PoE per switch is as follows:																																	
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="background-color: #D3D3D3;">Model</th> <th style="background-color: #D3D3D3;">Power dedicated to PoE</th> <th style="background-color: #D3D3D3;">Number of ports that support PoE</th> </tr> </thead> <tbody> <tr> <td>SF250-24P</td> <td>185W</td> <td>24</td> </tr> <tr> <td>SF250-48HP</td> <td>195W</td> <td>48</td> </tr> <tr> <td>SG250-08HP</td> <td>45W</td> <td>8</td> </tr> <tr> <td>SG250-10P</td> <td>62W</td> <td>8</td> </tr> <tr> <td>SG250-26HP</td> <td>100W</td> <td>24</td> </tr> <tr> <td>SG250-26P</td> <td>195W</td> <td>24</td> </tr> <tr> <td>SG250-50HP</td> <td>192W</td> <td>48</td> </tr> <tr> <td>SG250-50P</td> <td>375W</td> <td>48</td> </tr> <tr> <td>SG250X-24P</td> <td>195W</td> <td>24</td> </tr> <tr> <td>SG250X-48P</td> <td>382W</td> <td>48</td> </tr> </tbody> </table>	Model	Power dedicated to PoE	Number of ports that support PoE	SF250-24P	185W	24	SF250-48HP	195W	48	SG250-08HP	45W	8	SG250-10P	62W	8	SG250-26HP	100W	24	SG250-26P	195W	24	SG250-50HP	192W	48	SG250-50P	375W	48	SG250X-24P	195W	24	SG250X-48P	382W	48
	Model	Power dedicated to PoE	Number of ports that support PoE																															
	SF250-24P	185W	24																															
	SF250-48HP	195W	48																															
	SG250-08HP	45W	8																															
	SG250-10P	62W	8																															
	SG250-26HP	100W	24																															
	SG250-26P	195W	24																															
	SG250-50HP	192W	48																															
	SG250-50P	375W	48																															
SG250X-24P	195W	24																																
SG250X-48P	382W	48																																
PoE Powered Device (PD) and PoE pass-through	<p>Besides AC power, select compact switch models can work as PoE Powered Device (PD) and be powered by PoE switches connected to the uplink ports. The switch can also pass through the power to downstream PoE end devices if required</p> <p>Maximum of 60W can be drawn per uplink port if the peer PoE switch supports 60W PoE. When multiple uplink ports are connected to PoE switches, the power drawn from these ports is combined</p> <p>When AC power is connected and functioning correctly, it is preferred over PoE power. The PoE power can function as a backup to the AC power source or be used as the sole power source for the switch</p>																																	

Feature	Description				
	Model	Power option	Available PoE pass-through power (W)	Can switch be powered with uplinks?	
	SG250-08	1 x PoE uplink	N/A	Yes	
		1 x PoE+ uplink	N/A	Yes	
		AC Power	N/A	Yes	
	SG250-10P	1 x PoE uplink	0W	Yes	
		2 x PoE uplink	0W	Yes	
		1 x PoE+ uplink	0W	Yes	
		2 x PoE+ uplink	22W	Yes	
		1 x 60W PoE uplink	22W	Yes	
		2 x 60W PoE uplink	50W	Yes	
AC Power		62W	Yes		
Power consumption (worst case)	Model	Green power (mode)	System power consumption	Power consumption (with PoE)	Heat dissipation (BTU/hr)
	SF250-24	EEE, Energy Detect	110V=10.6W 220V=10.9W	-	37.19
	SF250-24P	EEE, Energy Detect	110V=29.2W 220V=28.3W	110V=238W 220V=230W	812.09
	SF250-48	EEE, Energy Detect	110V=23.4W 220V=24.2W	-	82.57
	SF250-48HP	EEE, Energy Detect	110V=43.1W 220V=44.3W	110V=265.2W 220V=255.8W	904.90
	SG250-08	EEE, Energy Detect, Short Reach	110V=7.6W 220V=7.6W	-	25.93
	SG250-08HP	EEE, Energy Detect, Short Reach	110V=9.1W 220V=10.1W	110V=61.4W 220V=59.8W	209.51
	SG250-10P	EEE, Energy Detect, Short Reach	110V=13.25W 220V=13.42W	110V=85.19W 220V=84.17W	290.68
	SG250-18	EEE, Energy Detect, Short Reach	110V=13.1W 220V=13.0W	-	44.70
	SG250-26	EEE, Energy Detect, Short Reach	110V=18.1W 220V=18.9W	-	64.49

Feature	Description				
	SG250-26HP	EEE, Energy Detect, Short Reach	110V=23.5W 220V=24.4W	110V=135.2W 220V=133.9W	461.32
	SG250-26P	EEE, Energy Detect, Short Reach	110V=34.2W 220V=37.2W	110V=262W 220V=254.5W	893.98
	SG250-50	EEE, Energy Detect, Short Reach	110V=35.2W 220V=35.4W	-	120.79
	SG250-50HP	EEE, Energy Detect, Short Reach	110V=57.5W 220V=59.3W	110V=267.2W 220V=263.5W	911.72
	SG250-50P	EEE, Energy Detect, Short Reach	110V=58.5W 220V=60.3W	110V=481.9W 220V=468.1W	1,644.31
	SG250X-24	EEE, Energy Detect, Short Reach	110V=28.7W 220V=29.1W	-	99.29
	SG250X-24P	EEE, Energy Detect, Short Reach	110V=46.8W 220V=49.2W	110V=260.1W 220V=257.1W	887.50
	SG250X-4 8	EEE, Energy Detect, Short Reach	110V=46.0W 220V=45.6W	-	156.96
	SG250X-48P	EEE, Energy Detect, Short Reach	110V=68.4W 220V=70.3W	110V=502.3W 220V=487.1W	1,713.92
Ports	Model name	Total system ports	RJ-45 ports	Combo ports (RJ-45 + SFP)	
	SF250-24	24 Fast Ethernet + 4 Gigabit Ethernet	24 Fast Ethernet	2 Gigabit Ethernet combo + 2 SFP	
	SF250-24P	24 Fast Ethernet + 4 Gigabit Ethernet	24 Fast Ethernet	2 Gigabit Ethernet combo + 2 SFP	
	SF250-48	48 Fast Ethernet + 4 Gigabit Ethernet	48 Fast Ethernet	2 Gigabit Ethernet combo + 2 SFP	
	SF250-48HP	48 Fast Ethernet + 4 Gigabit Ethernet	48 Fast Ethernet	2 Gigabit Ethernet combo + 2 SFP	
	SG250-08	8 Gigabit Ethernet	8 Gigabit Ethernet	-	
	SG250-08HP	8 Gigabit Ethernet	8 Gigabit Ethernet	-	
	SG250-10P	10 Gigabit Ethernet	8 Gigabit Ethernet	2 Gigabit Ethernet combo	
	SG250-18	18 Gigabit Ethernet	16 Gigabit Ethernet	2 Gigabit Ethernet combo	
	SG250-26	26 Gigabit Ethernet	24 Gigabit Ethernet	2 Gigabit Ethernet combo	

Feature	Description			
	SG250-26HP	26 Gigabit Ethernet	24 Gigabit Ethernet	2 Gigabit Ethernet combo
	SG250-26P	26 Gigabit Ethernet	24 Gigabit Ethernet	2 Gigabit Ethernet combo
	SG250-50	50 Gigabit Ethernet	48 Gigabit Ethernet	2 Gigabit Ethernet combo
	SG250-50HP	50 Gigabit Ethernet	48 Gigabit Ethernet	2 Gigabit Ethernet combo
	SG250-50P	50 Gigabit Ethernet	48 Gigabit Ethernet	2 Gigabit Ethernet combo
	SG250X-24	24 Gigabit Ethernet + 4 10 Gigabit Ethernet	24 Gigabit Ethernet	2 10 Gigabit Ethernet copper + 2 SFP+
	SG250X-24P	24 Gigabit Ethernet + 4 10 Gigabit Ethernet	24 Gigabit Ethernet	2 10 Gigabit Ethernet copper + 2 SFP+
	SG250X-48	48 Gigabit Ethernet + 4 10 Gigabit Ethernet	48 Gigabit Ethernet	2 10 Gigabit Ethernet copper + 2 SFP+
	SG250X-48P	48 Gigabit Ethernet + 4 10 Gigabit Ethernet	48 Gigabit Ethernet	2 10 Gigabit Ethernet copper + 2 SFP+
USB slot	USB Type-A slot on the front panel of the switch for easy file and image management			
Buttons	Reset button			
Cabling type	Unshielded Twisted Pair (UTP) Category 5 or better for 10BASE-T/100BASE-TX; UTP Category 5e or better for 1000BASE-T			
Mounting Options	Desktop placement, rackmount (excluding SG250-08 and SG250-08HP) and wall-mount			
LEDs	System, Link/Act, PoE, Speed			
Flash	256 MB			
CPU	800 MHz ARM			
CPU memory	512 MB			
Packet buffer	All numbers are aggregate across all ports because the buffers are dynamically shared:			
	Model name	Packet buffer		
	SF250-24	12 Mb		
	SF250-24P	12 Mb		
	SF250-48	24 Mb		
	SF250-48HP	24 Mb		
	SG250-08	12 Mb		
	SG250-08HP	12 Mb		

Feature	Description			
	SG250-10P		12 Mb	
	SG250-18		12 Mb	
	SG250-26		12 Mb	
	SG250-26HP		12 Mb	
	SG250-26P		12 Mb	
	SG250-50		24 Mb	
	SG250-50HP		24 Mb	
	SG250-50P		24 Mb	
	SG250X-24		12 Mb	
	SG250X-24P		12 Mb	
	SG250X-48		24 Mb	
	SG250X-48P		24 Mb	
	Supported SFP/SFP+ modules	SKU	Media	Speed
MGBBX1		Single-mode fiber	1000 Mbps	10 km
MGBSX1		Multimode fiber	1000 Mbps	500 m
MGBLH1		Single-mode fiber	1000 Mbps	40 km
MGBLX1		Single-mode fiber	1000 Mbps	10 km
MGBT1		UTP cat 5e	1000 Mbps	100 m
GLC-LH-SMD=		Single-mode fiber	1000 Mbps	10 km
GLC-BX-U=		Single-mode fiber	1000 Mbps	10 km
SFP-H10GB-CU1M		Copper coax	10 Gig	1 m
SFP-H10GB-CU3M		Copper coax	10 Gig	3 m
SFP-H10GB-CU5M		Copper coax	10 Gig	5 m
SFP-10G-SR		Multimode fiber	10 Gig	26 m - 400 m
SFP-10G-LR		Single-mode fiber	10 Gig	10 km
SFP-10G-SR-S		Multimode fiber	10 Gig	26 m - 400 m
SFP-10G-LR-S	Single-mode fiber	10 Gig	10 km	

Feature	Description	
Environmental		
Unit dimensions (W x H x D)	Model name	Unit dimensions
	SF250-24	440 x 44 x 202 mm (17.3 x 1.73 x 7.95 in)
	SF250-24P	440 x 44 x 257 mm (17.3 x 1.73 x 10.12 in)
	SF250-48	440 x 44 x 257 mm (17.3 x 1.73 x 10.12 in)
	SF250-48HP	440 x 44 x 350 mm (17.3 x 1.73 x 13.78 in)
	SG250-08	160 x 30 x 128 mm (6.3 x 1.18 x 5.04 in)
	SG250-08HP	160 x 30 x 128 mm (6.3 x 1.18 x 5.04 in)
	SG250-10P	280 x 44 x 170 mm (11.0 x 1.73 x 6.69 in)
	SG250-18	440 x 44 x 202 mm (17.3 x 1.73 x 7.95 in)
	SG250-26	440 x 44 x 202 mm (17.3 x 1.73 x 7.95 in)
	SG250-26HP	440 x 44 x 257 mm (17.3 x 1.73 x 10.12 in)
	SG250-26P	440 x 44 x 257 mm (17.3 x 1.73 x 10.12 in)
	SG250-50	440 x 44 x 257 mm (17.3 x 1.73 x 10.12 in)
	SG250-50HP	440 x 44 x 350 mm (17.3 x 1.73 x 13.78 in)
	SG250-50P	440 x 44 x 350 mm (17.3 x 1.73 x 13.78 in)
	SG250X-24	440 x 44 x 257 mm (17.3 x 1.73 x 10.12 in)
	SG250X-24P	440 x 44 x 257 mm (17.3 x 1.73 x 10.12 in)
	SG250X-48	440 x 44 x 257 mm (17.3 x 1.73 x 10.12 in)
SG250X-48P	440 x 44 x 350 mm (17.3 x 1.73 x 13.78 in)	
Unit weight	Model name	Unit weight
	SF250-24	2.72 kg (6 lb)
	SF250-24P	4.1 kg (9.04 lb)
	SF250-48	3.57 kg (7.87 lb)
	SF250-48HP	4.93 kg (10.87 lb)
	SG250-08	0.54 kg (1.19 lb)
	SG250-08P	0.56 kg (1.23 lb)

Feature	Description			
	SG250-10P	1.2 kg (2.65 lb)		
	SG250-18	2.08 kg (4.59 lb)		
	SG250-26	2.72 kg (6.0 lb)		
	SG250-26HP	3.37 kg (7.43 lb)		
	SG250-26P	3.81 kg (8.40 lb)		
	SG250-50	2.94 kg (6.48 lb)		
	SG250-50HP	4.8 kg (10.58 lb)		
	SG250-50P	4.82 kg (10.63 lb)		
	SG250X-24	2.66 kg (5.86 lb)		
	SG250X-24P	3.86 kg (8.51 lb)		
	SG250X-48	3 kg (6.61 lb)		
	SG250X-48P	4.84 kg (10.67 lb)		
	Power	<p>100 to 240V 50 to 60 Hz, internal, universal: SF250-24, SF250-24P, SF250-48, SF250-48HP, SG250-26, SG250-26HP, SG250-26P, SG250-50, SG250-50HP, SG250-50P, SG250X-24, SG250X-24P, SG250X-48, SG250X-48P</p> <p>100 to 240V 50 to 60 Hz, external: SG250-08, SG250-08HP, SG250-10P</p>		
Certification	UL (UL 60950), CSA (CSA 22.2), CE mark, FCC Part 15 (CFR 47) Class A			
Operating temperature	32° to 122° F (0° to 50° C)			
Storage temperature	-4° to 158° F (-20° to 70° C)			
Operating humidity	10% to 90%, relative, noncondensing			
Storage humidity	10% to 90%, relative, noncondensing			
Acoustic noise and Mean Time Between Failures (MTBF)	Model name	Fan (number)	Acoustic noise	MTBF at 50° C (hours)
	SF250-24	No fan	-	630,719
	SF250-24P	2	0° to 25° C: 39.7dB 50° C: 52.2dB	314,040
	SF250-48	No fan	-	256,281
	SF250-48HP	2	0° to 30° C: 38.0dB 50° C: 52.7dB	286,555
	SG250-08	No fan	-	1,305,509

Feature	Description			
	SG250-08HP	No fan	-	506,682
	SG250-10P	No fan	-	205,647
	SG250-18	No fan	-	1,425,277
	SG250-26	No fan	-	343,592
	SG250-26HP	1	0° to 30° C: 37.5dB 50° C: 49.7dB	333,792
	SG250-26P	2	0° to 30° C: 36.0dB 50° C: 53.7dB	430,341
	SG250-50	1	0° to 30° C: 35.1dB 50° C: 47.5dB	134,933
	SG250-50HP	2	0° to 30° C: 34.2dB 50° C: 47.3dB	62,607
	SG250-50P	4	0° to 30° C: 35.6dB 50° C: 50.2dB	53,839
	SG250X-24	1	0° to 30° C: 32.6dB 50° C: 44.9dB	130,255
	SG250X-24P	2	0° to 30° C: 35.1dB 50° C: 46.2dB	62,949
	SG250X-48	2	0° to 30° C: 36.6dB 50° C: 49.3dB	68,585
	SG250X-48P	4	0° to 30° C: 35.9dB 50° C: 50.6dB	53,722
Warranty	Limited lifetime			
Package contents				
<ul style="list-style-type: none"> • Cisco 250 Series Smart Switch • Power cord (power adapter for 8-port and 10-port SKUs) • Mounting kit • Quick Start Guide 				
Minimum requirements				
<ul style="list-style-type: none"> • Web browser: Mozilla Firefox version 36 or later; Microsoft Internet Explorer version 9 or later, Chrome version 40 or later, Safari version 5 or later • Category 5 Ethernet network cable • TCP/IP, network adapter, and network operating system (such as Microsoft Windows, Linux, or Mac OS X) installed 				

Ordering information

Table 2 provides ordering information.

Table 2. Ordering information

Model name	Product order ID number	Description
Fast Ethernet		
SF250-24	SF250-24-K9-xx	<ul style="list-style-type: none"> • 24 10/100 ports • 2 Gigabit copper/SFP combo + 2 SFP ports
SF250-24P	SF250-24P-K9-xx	<ul style="list-style-type: none"> • 24 10/100 PoE+ ports with 185W power budget • 2 Gigabit copper/SFP combo + 2 SFP ports
SF250-48	SF250-48-K9-xx	<ul style="list-style-type: none"> • 48 10/100 ports • 2 Gigabit copper/SFP combo + 2 SFP ports
SF250-48HP	SF250-48HP-K9-xx	<ul style="list-style-type: none"> • 48 10/100 PoE+ ports with 195W power budget • 2 Gigabit copper/SFP combo + 2 SFP ports
Gigabit Ethernet		
SG250-08	SG250-08-K9-xx	<ul style="list-style-type: none"> • 8 10/100/1000 ports (Port 8 with PoE+ power input support)
SG250-08HP	SG250-08HP-K9-xx	<ul style="list-style-type: none"> • 8 10/100/1000 PoE+ ports with 45W power budget
SG250-10P	SG250-10P-K9	<ul style="list-style-type: none"> • 8 10/100/1000 PoE+ ports with 62W power budget • 2 Gigabit copper/SFP combo ports with 60W PoE power input support
SG250-18	SG250-18-K9-xx	<ul style="list-style-type: none"> • 16 10/100/1000 ports • 2 Gigabit copper/SFP combo ports
SG250-26	SG250-26-K9-xx	<ul style="list-style-type: none"> • 24 10/100/1000 ports • 2 Gigabit copper/SFP combo ports
SG250-26HP	SG250-26HP-K9-xx	<ul style="list-style-type: none"> • 24 10/100/1000 PoE+ ports with 100W power budget • 2 Gigabit copper/SFP combo ports
SG250-26P	SG250-26P-K9-xx	<ul style="list-style-type: none"> • 24 10/100/1000 PoE+ ports with 195W power budget • 2 Gigabit copper/SFP combo ports
SG250-50	SG250-50-K9-xx	<ul style="list-style-type: none"> • 48 10/100/1000 ports • 2 Gigabit copper/SFP combo ports
SG250-50HP	SG250-50HP-K9-xx	<ul style="list-style-type: none"> • 48 10/100/1000 PoE+ ports with 192W power budget • 2 Gigabit copper/SFP combo ports
SG250-50P	SG250-50P-K9-xx	<ul style="list-style-type: none"> • 48 10/100/1000 PoE+ ports with 375W power budget • 2 Gigabit copper/SFP combo ports

Model name	Product order ID number	Description
10 Gigabit Ethernet		
SG250X-24	SG250X-24-K9-xx	<ul style="list-style-type: none"> • 24 10/100/1000 ports • 4 10 Gigabit Ethernet (2 x 10GBASE-T + 2 x SFP+)
SG250X-24P	SG250X-24P-K9-xx	<ul style="list-style-type: none"> • 24 10/100/1000 PoE+ ports with 195W power budget • 4 10 Gigabit Ethernet (2 x 10GBASE-T + 2 x SFP+)
SG250X-48	SG250X-48-K9-xx	<ul style="list-style-type: none"> • 48 10/100/1000 ports • 4 10 Gigabit Ethernet (2 x 10GBASE-T + 2 x SFP+)
SG250X-48P	SG250X-48P-K9-xx	<ul style="list-style-type: none"> • 48 10/100/1000 PoE+ ports with 382W power budget • 4 10 Gigabit Ethernet (2 x 10GBASE-T + 2 x SFP+)

Each combo port has one 10/100/1000 copper Ethernet port and one SFP Gigabit Ethernet slot, with one port active at a time.

The -xx in the product order ID number is a country/region specific suffix. For example, the complete PID of SG250-26 for the United States is SG250-26-K9-NA. Please refer to the following table for the suffix to use for your country/region.

Table 3. Country/region suffix for product order ID number

Suffix	Country/region
-NA	USA, Canada, Mexico, Colombia, Chile, and rest of LATAM
-BR	Brazil
-AR	Argentina
-EU	EU, Russia, Ukraine, Israel, UAE, Turkey, Egypt, South Africa, Indonesia, Philippines, Vietnam, Thailand, India, Korea
-UK	United Kingdom, Saudi Arabia, Qatar, Kuwait, Singapore, Hong Kong, Malaysia
-AU	Australia, New Zealand
-CN	China
-IN	India
-JP	Japan
-KR	Korea

The products may also be available in countries or regions not listed above. Not all product models are offered in all countries/regions. For India, either the -EU or -IN suffix will be used, depending on product models. For Korea, either the -EU or -KR suffix will be used, depending on product models. Please consult with your local Cisco sales representative or Cisco partner for more details.

A powerful foundation for the basic business network

As you strive to make your business more competitive and efficient, every dollar counts. Cisco 250 Series Smart Switches give you just the right the features, performance, and reliability you need, without making you pay for advanced features you don't. With Cisco 250 Series switches, you can rest assured that your business applications and communications tools are resting on a strong technology foundation, so you can focus on achieving your business goals.

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Reference links to information about key environmental sustainability topics (mentioned in the "Environment Sustainability" section of the CSR Report) are provided in the following table:

Sustainability topic	Reference
Information on product material content laws and regulations	Materials
Information on electronic waste laws and regulations, including products, batteries, and packaging	WEEE compliance

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For more information

To find out more about the Cisco 250 Series switches, visit <https://www.cisco.com/c/en/us/products/switches/250-series-smart-switches/index.html>.

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Cisco Catalyst 9300 Series Ordering Guide

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Things to know

Before placing an order, please review the following:

- The Cisco® Catalyst® 9300 Series offer structure has three main components: the switch hardware, a Network stack perpetual license, and a Cisco Digital Network Architecture (Cisco DNA™) software subscription license.
- Cisco DNA Software subscription licenses and Network Stack perpetual licenses are smart product IDs (SKUs). Both licenses are required with a hardware purchase.
- Smart Accounts are strongly recommended and will be mandated post launch (for more information, please see Smart Accounts section).
- Smart Licensing technology is not enabled on the switch at launch but will be available later. At launch, the license SKUs are set up as Smart SKUs but will operate in Right-To-Use (RTU) mode. For details, see Smart Licensing section.
- Available service options:
 - Solution support
 - Enhanced Limited Lifetime Warranty (E-LLW)
 - Smart Net Total Care® support
 - Embedded software support for Cisco DNA software subscription license

Common terminology

- Network Stack: NW
- Cisco Digital Network Architecture: Cisco DNA
- Cisco DNA Essentials: -E
- Cisco DNA Advantage: -A
- Cisco DNA Premier: -P
- Smart Account: SA
- Smart License: SL

Purpose of this document

This document is aimed at providing a detailed overview of the ordering process for Cisco Catalyst 9300 Series switches on Cisco Commerce Workspace.

Hardware and software order overview

Cisco Catalyst 9300 Series switches can be ordered through Cisco Commerce Workspace as a Cisco DNA Premier bundled subscription or as an individual Cisco DNA Essentials or Advantage subscription. Both options include switch hardware coupled with Cisco IOS® and the Network Stack software. In addition to the hardware and Network Stack software, the offer requires the addition of the term-based Cisco DNA Software subscription license, which includes embedded software support. Figure 1 gives an overview of what is included in each software package, including perpetual Network Essentials and Network Advantage and term subscription-based Cisco DNA Essential, Advantage and Premier Software options.

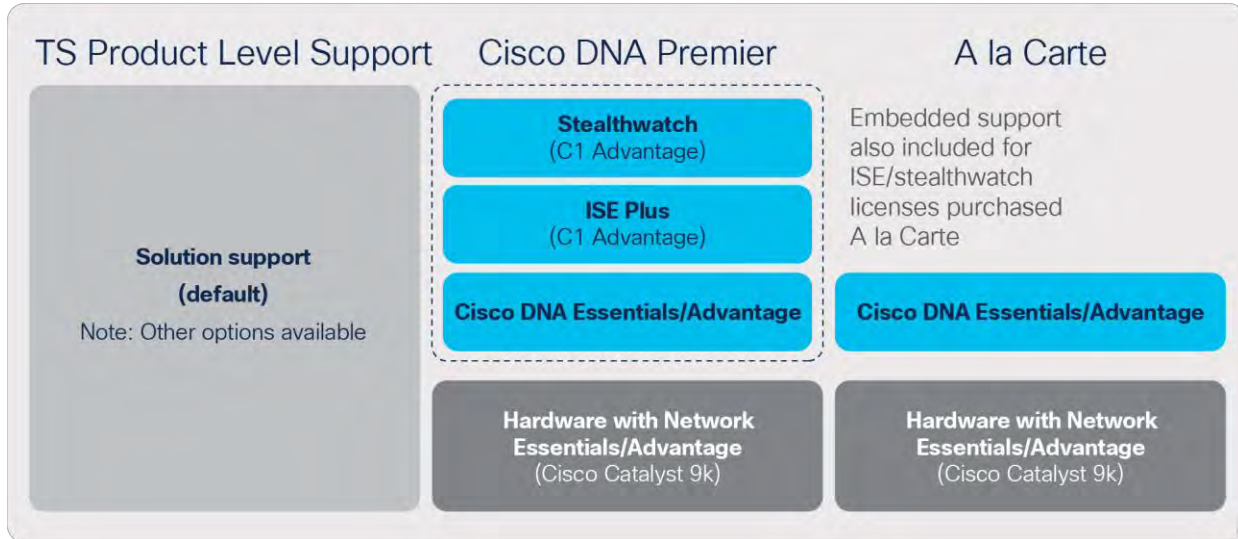


Figure 1.
Cisco Catalyst 9300 Series Offer Overview

Cisco DNA Software Subscription Overview

	Network Essentials	Network Advantage	Cisco DNA Essentials	Cisco DNA Advantage	Cisco DNA Premier
Audience	Entry level with full switching	Entry level with full routing and switching	Entry level to small or midsize looking for base automation and monitoring	Small to midsize looking to upgrade to advanced automation and monitoring	Small, midsize to large looking for advanced automation and monitoring with bundled security features
License type	Perpetual license, one-time purchase	Perpetual license, one-time purchase	3/5/7 year term subscription, license portability, support	Includes Cisco DNA Essentials, 3/5/7 year term subscription, license portability, support	Includes Cisco DNA Advantage, 3/5/7 year term subscription, license portability, support
Management options	CLI, WebUI	CLI, WebUI	CLI, WebUI, Cisco DNA Center	CLI, WebUI, Cisco DNA Center	CLI, WebUI, Cisco DNA Center

Cisco DNA Software Subscription feature matrix

	Features				
	Network Essentials	Network Advantage	Cisco DNA Essentials	Cisco DNA Advantage	Cisco DNA Premier
Essential switch capabilities Layer 2, routed access, OSPF, PBR, PIM Stub Multicast, PVLAN, VRRP, PBR, Cisco Discovery Protocol, QoS, FHS, 802.1X, MACsec-128, CoPP, SXP, IP SLA responder, SSO.	✓	✓	✓	✓	✓
DevOps integration Make it easy for your development and operations teams to continuously deliver applications.	✓	✓	✓	✓	✓
Layer 2, routed access Your network can achieve high availability and recovery analysis.	✓	✓	✓	✓	✓
Programmability, NETCONF/RESTCONF/gRPC/YANG Model-driven programmability lets you automate configuration and control of your network devices, managed by Cisco DNA Center.	✓	✓	✓	✓	✓
MACsec encryption Configure MACsec for authenticating and encrypting packets between MACsec-capable devices, managed by Cisco DNA Center.					
Advanced telemetry and flexibility (EEM), SPAN, RSPAN Advanced telemetry and visibility includes Flexible NetFlow and Wireshark for providing near real-time access to operational statistics, managed by Cisco DNA Center.	✓	✓	✓	✓	✓
Telemetry and visibility Model-driven telemetry lets you monitor your network by streaming data from network devices, continuously providing near-real-time access to operational statistics.	✓	✓	✓	✓	✓

	Features				
	Network Essentials	Network Advantage	Cisco DNA Essentials	Cisco DNA Advantage	Cisco DNA Premier
Cisco trustworthy solutions Help ensure hardware and software authenticity for supply chain trust and strong mitigation against man-in-the-middle attacks that compromise software and firmware.	✓	✓	✓	✓	✓
Full routing functionality BGP, HSRP, OSPF, IS-IS, GLBP.		✓		✓	✓
IoT and mobility CoAP, AVB, PTP.		✓		✓	✓
Flexible network segmentation VRF, VXLAN, LISP, SGT, MPLS.		✓		✓	✓
High availability and resiliency (patching) Support operational continuity and maintain availability during routine maintenance, and perform disaster recovery.		✓		✓	✓
Optimize bandwidth utilization (multicast) Multicast is used between routers so they can track which multicast packets to forward to each other and to their directly connected LANs.		✓		✓	✓
License portability Software services-enabled license portability lets your software licenses stay current through hardware upgrades and replacements at no additional cost.			✓	✓	✓
Full Flexible NetFlow This next generation in flow technology optimizes the network infrastructure, reducing operating costs and improving capacity planning and security incident detection.			✓	✓	✓
IPv6 tunnel capabilities Overlay tunneling encapsulates IPv6 packets in IPv4 packets for delivery across an IPv4 infrastructure (a core network or the Internet).			✓	✓	✓

	Features				
	Network Essentials	Network Advantage	Cisco DNA Essentials	Cisco DNA Advantage	Cisco DNA Premier
<p>Easy QoS dynamic monitoring</p> <p>Assign policies to applications based on business relevance and business-critical QoS priority for life-saving devices, for example.</p>			✓	✓	✓
<p>Branch deployment automation</p> <p>Support for simplified workflows for physical and virtual branch automation and day-0 router/NFV design.</p>			✓	✓	✓
<p>Software Image Management (SWIM)</p> <p>Automatically manage software upgrades and control the consistency of image versions and configurations across your network, managed by Cisco DNA Center.</p>			✓	✓	✓
<p>Enterprise Network Functions Virtualization (ENFV)</p> <p>Facilitates branch virtualization on any hardware device – Cisco or third party. Supports existing branch migration without hardware upgrade.</p>			✓	✓	✓
<p>LAN automation</p> <p>Accelerates building the SD-Access overlay network without the traditional network planning and implementation process, managed by Cisco DNA Center.</p>			✓	✓	✓
<p>Wireless automation</p> <p>Supports intent-based workflows for simplified wireless deployment and automation, managed by Cisco DNA Center appliance.</p>			✓	✓	✓
<p>Policy creation</p> <p>Create policies based on business intent for a particular part of the network that are network- and device-specific, adjusted dynamically to guarantee services, managed by Cisco DNA Center.</p>			✓	✓	✓
<p>Overall health dashboard</p> <p>Gives a high-level overview of the health of every network device/client on the network, wired and wireless, Cisco and Meraki, managed by Cisco DNA Center.</p>			✓	✓	✓

	Features				
	Network Essentials	Network Advantage	Cisco DNA Essentials	Cisco DNA Advantage	Cisco DNA Premier
<p>Network health dashboard</p> <p>Provides operational status of every network device connected to Cisco DNA Center, with suggested remediation for any communication issues, managed by Cisco DNA Center.</p>			✓	✓	✓
<p>Client health dashboard</p> <p>Displays operational status of every client connected to Cisco DNA Center, with suggested remediation for any issues, managed by Cisco DNA Center.</p>			✓	✓	✓
<p>Application health dashboard</p> <p>Displays overall health of all applications on the network, with special section for business-relevant application issues and suggested remediation, managed by Cisco DNA Center.</p>			✓	✓	✓
<p>Streaming telemetry</p> <p>Enables network devices to send near-real-time telemetry information to Cisco DNA Center.</p>			✓	✓	✓
<p>Network Plug and Play (PnP) provisioning</p> <p>Zero-touch provisioning for new device installation allows off-the-shelf Cisco devices to be provisioned simply by connecting to the network, managed by Cisco DNA Center.</p>			✓	✓	✓
<p>SD-Access and switch insights</p> <p>Enables policy-based automation with secure segmentation, complete visibility, and delivery of new services quickly on SDAccess devices, managed by Cisco DNA Center.</p>				✓	✓
<p>Patch lifecycle management</p> <p>Intelligent device management for lifecycle patching, managed by Cisco DNA Center.</p>				✓	✓
<p>Flexible network segmentation</p> <p>Segment your network for security, compliance, and complex processes, managed by Cisco DNA Center.</p>				✓	✓

	Features				
	Network Essentials	Network Advantage	Cisco DNA Essentials	Cisco DNA Advantage	Cisco DNA Premier
Device 360 and Client 360 Display devices and client connectivity from any angle or context, providing for very granular troubleshooting in seconds.				✓	✓
Cisco Catalyst 9800 Series embedded wireless controller Fabric technology is an integral part of SD-Access. Fabric-enabled wireless is a deployment option, managed by Cisco DNA Center.				✓	✓
Application policy creation Assign policies to applications based on business relevance and business-critical QoS priority for life-saving devices, for example.				✓	✓
Software Maintenance Upgrade (SMU) SMUs, also known as Patching, allows limited updates within the operating software without having to upgrade the entire image. This means bugs and security vulnerabilities can be resolved without having to requalify an entirely new image and potentially without having to reset a switch and incur downtime.				✓	✓
Path trace Visualize the path of an application or service from client through all devices and to the server, troubleshooting issues instantly.				✓	✓
Network time travel Visualize device or client performance in a timeline view to identify the cause of a network issue instead of trying to re-create the issue in a lab.				✓	✓
Application hosting Allows third-party applications to be hosted in a secure container environment (for example, Wireshark and Docker).				✓	✓

	Features				
	Network Essentials	Network Advantage	Cisco DNA Essentials	Cisco DNA Advantage	Cisco DNA Premier
<p>Encrypted Traffic Analytics (ETA)</p> <p>Detect malware within encrypted traffic. This is an optional feature of Cisco Stealthwatch, managed by Cisco DNA Center.</p>				✓	✓
<p>Cisco DNA Services for Bonjour</p> <p>This software-defined, controller-based solution enables Bonjour services discovery and advertisement at scale across multiple domains, managed by Cisco DNA Center.</p>				✓	✓
<p>ERSPAN and AVC</p> <p>Monitor and send traffic, detect every application in your network, and optimize bandwidth with application-aware policies, managed by Cisco DNA Center.</p>				✓	✓
<p>Extended node</p> <p>Extend the reach of products connected to the fabric edge devices, managed by Cisco DNA Center.</p>				✓	✓
<p>Fabric in a box</p> <p>Add the selected device as a control plane, a border node, and an edge node. Does not require Cisco DNA Center.</p>				✓	✓
<p>AVB 1588</p> <p>Audio Video Bridging standards provide the means for highly reliable delivery of low-latency, time-synchronized audio and video streaming services. Does not require Cisco DNA Center.</p>				✓	✓
<p>AVC (NBAR2)</p> <p>Gain application visibility and control through Next-Generation Network-Based Application Recognition. Does not require Cisco DNA Center.</p>				✓	✓
<p>ETA/MUD+</p> <p>Encrypted Traffic Analytics detects malware within encrypted traffic. Manufacturer user description validates the IoT device, extends trust, and applies policy to the device. Does not require Cisco DNA Center.</p>				✓	✓

	Features				
	Network Essentials	Network Advantage	Cisco DNA Essentials	Cisco DNA Advantage	Cisco DNA Premier
<p>Cisco ThousandEyes Network and Application Synthetics</p> <p>Network performance metrics, dashboarding, visibility into app and service experience, end-to-end visibility across cloud and DC applications</p>				✓	✓
<p>Cisco DNA Spaces IoT Services on Catalyst Switching</p> <p>Cisco DNA Spaces on Catalyst 9000 switches and access points acts as a layer between different wired and wireless IoT solutions, giving more options and greater flexibility to help smart buildings proactively adapt to changing conditions.</p>				✓	✓
<p>Stealthwatch</p> <p>Gain complete security and threat containment, managed by Cisco DNA Center.</p>			a-la-carte	a-la-carte	✓
<p>Identity Services Engine (ISE) Base and Plus</p> <p>Working with Cisco DNA Center, ISE is a complete authentication, policy, and identity services engine.</p>			a-la-carte	a-la-carte	✓
<p>E-LLW</p> <p>Enhanced limited lifetime hardware warranty.</p>	✓	✓	✓	✓	✓
<p>SWSS</p> <p>Software Support Service that also offers license portability and ongoing innovation in the software stack, including 24-hourTAC support.</p>			✓	✓	✓

How to order a Cisco Catalyst 9300 Series switch

Both Network Stack licenses and Cisco DNA Software subscription licenses are mandatory at the time of purchase and come in three licensing tier options: Cisco DNA Premier (-P), Cisco DNA Advantage and Cisco DNA Essentials (-E). The Network Stack licenses, Network Advantage or Network Essentials is included with the hardware, while a Cisco DNA Software subscription term license needs to be selected at the time of order.

To order in the Cisco Commerce Workspace, follow these steps:

1. Select the appropriate Network Stack license type -A or -E
2. Choose the preferred consumption model - Cisco DNA Premier (default and recommended) or individual.
3. Choose the Cisco DNA Software subscription term license (3, 5 or 7 years).
4. Add other components (for example: secondary power supply, power cables, etc.).

Step-by-Step Ordering in Cisco Commerce Workspace

Enter the hardware SKU in [Cisco Commerce Workspace](#).



The screenshot shows a product listing for a Cisco Catalyst 9300 48-port UPOE, Network Advantage switch. The product code is C9300-48U-A, with a version of 4.0. It is priced at 10,300.00. The listing includes a 'more' link, a warning that the product is 'Invalid as of 20-Jun-2017 04:19:34 PDT', and several action links: 'Edit Options', 'Select Service/Subscription', 'Validate', 'Add Note', 'More Actions', and 'Add Subtotal'.

The Network Stack license is perpetual and included with the hardware by default (it will not be visible in the selection menu) per the respective hardware SKU suffix (example: C9300-48P-E/C9300-48P-A).

The Cisco ThousandEyes Network and Application Synthetics license is included by default upon the selection of a Cisco DNA Advantage or Cisco DNA Premier option with a 3 year, 5 year or a 7 year subscription. Each Catalyst 9300 Cisco DNA Advantage or Premier subscription entitles the customer to run the equivalent of one ThousandEyes network or web test every 5 mins from a ThousandEyes enterprise agent (22 units per month), up to a maximum of 110,000 units per month of ThousandEyes test capacity per customer.

Expand to “View Full Summary” view to view the Cisco ThousandEyes Network and Application Synthetics license (TE-EMBEDDED-T). The TE-EMBEDDED-T is bundled with the Cisco DNA Advantage and Cisco DNA Premier subscriptions and follow the same term as the Cisco DNA subscriptions.

FULL CONFIGURATION SUMMARY C9300-48U-A		Global Price List in US Dollars (USD)			
SKU	Qty	Estimated Lead Time	Unit List Price (USD)	Extended List Price (USD)	Included
Network License					
1.1 C9300-NW-A-48 C9300 Network Advantage, 48-port license	1	14 Days	0.00	0.00	Yes
DNA On-Prem Subscription					
1.2 C9300-DNA-A-48 C9300 DNA Advantage, 48-Port Term Licenses	1	14 Days	0.00	0.00	No
1.2.1 C9300-DNA-A-48-5Y C9300 DNA Advantage, 48-Port, 5 Year Term License Duration: 60 Month(s)			0.00	0.00	No
1.3 C1-ADD-OPTOUT Cisco DNA Premier Add-On Session Opt Out (No Fulfillment) More	1	21 Days	0.00	0.00	No
1.4 PI-LFAS-T Prime Infrastructure Lifecycle & Assurance Term - Smart Lic. More	1	14 Days	0.00	0.00	Yes
1.4.1 PI-LFAS-AP-T-5Y PI Dev Lic for Lifecycle & Assurance Term 5Y Duration: 60 Month(s)			0.00	0.00	No
1.5 TE-EMBEDDED-T Cisco ThousandEyes Enterprise Agent IBN Embedded More	1	14 Days	0.00	0.00	Yes
1.5.1 TE-EMBEDDED-T-5Y			0.00	0.00	No

A Cisco DNA Premier option is available for selection and is the default. Customers are encouraged to purchase the Cisco DNA Premier option to enable advanced Cisco DNA features as a bundled solution:

OPTION SELECTION C9300-48UN-A Global Price List in US Dollars (USD)

Configuration Summary [View Full Summary](#)

Country Specification
Select Country (Not Required)

Category	Qty	Extended List Price (USD)
ISE-BASE-T	25	0.00
ISE-BASE-TRK-5Y 60 Mth(s)		0.00
ISE-PLS-T	25	0.00
ISE-PLS-TRK-5Y 60 Mth(s)		0.00
SWATCH-T	25	0.00
SWATCH-TRK-5Y 60 Mth(s)		0.00
CAT-DNA-P-ADD	1	0.00
CAT-DNA-P-ADD-5Y 60 Mth(s)		1,240.00
ISE-BASE-T	25	0.00
ISE-BASE-TRK-5Y 60 Mth(s)		0.00
Subtotal		25,010.00
Estimated Lead Time		35 days

[Reset Configuration](#) [Cancel](#) [Done](#)

Warnings (13):

- A selection of Power Cables is required for every AC Power Supply selected (1 is auto-included). Please adjust the selections. (CE200586)
- We strongly recommend the term of the hardware support contract match the software subscription license term. (CF202343)

C9300-48UN-A > Subscription Software Class [Key](#)

Subscription Software [Add-On](#)

SKU	Qty	Estimated Lead Time	Unit List Price (USD)
<input checked="" type="radio"/> C9300-DNA-P-48 C9300 48-Port DNA-Premier License	<input type="text" value="1"/>	14 days	0.00
<input type="radio"/> C9300-DNA-A-48 C9300 DNA Advantage, 48-Port Term Licenses	<input type="text" value="Qty"/>	14 days	0.00

[Clear Selection](#) [Show Incompatible SKUs](#)

Note: Follow steps below to change from 5 year default term to a 3 or 7 year term for Cisco DNA Premier Software subscription license

Subscription SKU	Product SKU	Qty	Unit List Price USD	Total List Price USD
Software Subscriptions (8 Items) SSTC (SUBSCRIPTION-CONTENT)				
GROUP DESCRIPTION SUMMARY				
Duration 60 Months License Band 1-999999 Users Term 5YR				
C9300-DNA-P-48-5Y + SVIP ***		1	7,270.00	7,270.00
SUBSCRIPTION SKU C9300 DNA Premier, 48-Port, 5 Year Term License	C9300-DNA-P-48	1		
Edit Subscription Remove Subscription				
<input type="radio"/> C9300-DNA-P-48-3Y			4,620.00	
C9300 DNA Premier, 48-Port, 3 Year Term License			Duration (Months) 36	
<input checked="" type="radio"/> C9300-DNA-P-48-5Y			7,270.00	
C9300 DNA Premier, 48-Port, 5 Year Term License			Duration (Months) 60 Range: 60 to 83	
<input type="radio"/> C9300-DNA-P-48-7Y			10,180.00	
C9300 DNA Premier, 48-Port, 7 Year Term License			Duration (Months) 84	
Cancel Apply				
Duration 60 Months License Band 1-999999 Users Term 5YR				

Check Summary to validate all terms are aligned to intended term.

Subscription SKU	Product SKU	Qty	Unit List Price USD	Total List Price USD
Software Subscriptions (8 Items) SSTC (SUBSCRIPTION-CONTENT)				
GROUP DESCRIPTION SUMMARY				
Duration 84 Months License Band 1-999999 Users Term 7YR				
C9300-DNA-P-48-7Y + SVIP ***		1	10,180.00	10,180.00
SUBSCRIPTION SKU C9300 DNA Premier, 48-Port, 7 Year Term License	C9300-DNA-P-48	1		
Edit Subscription Remove Subscription				
ISE-BASE-TRK-7Y +		25	0.00	0.00
SUBSCRIPTION SKU ISE BASE Tracker Term 7Y	ISE-BASE-T	25		
Edit Subscription Remove Subscription				
ISE-PLS-TRK-7Y +		25	0.00	0.00
SUBSCRIPTION SKU ISE PLS Tracker Term 7Y	ISE-PLS-T	25		
Edit Subscription Remove Subscription				
SWATCH-TRK-7Y +		25	0.00	0.00
SUBSCRIPTION SKU ISE BASE Tracker Term 7Y	SWATCH-T	25		
Edit Subscription Remove Subscription				
CAT-DNA-P-ADD-7Y +		1	1,740.00	1,740.00

For Cisco DNA Premier Software subscription option, Catalyst 9300 Series modular and fixed uplink 48 port models C9300 and C9300L SKUs) come defaulted with additional 25 end points in addition to typical 25 endpoints or flow.

OPTION SELECTION C9300-48UN-A Global Price List in US Dollars (USD)

Configuration Summary [View Full Summary](#)

Country Specification
Select Country (Not Required) ▼

Category	Qty	Extended List Price (USD)
Subscription Software Class		
C9300-DNA-P-48	1	0.00
C9300-DNA-P-48-7Y 84 Mth(s)		10,180.00
ISE-BASE-T	25	0.00
ISE-BASE-TRK-7Y 84 Mth(s)		0.00
ISE-PLS-T	25	0.00
ISE-PLS-TRK-7Y 84 Mth(s)		0.00
SWATCH-T	25	0.00
SWATCH-TRK-7Y 84 Mth(s)		0.00
CAT-DNA-P-ADD	1	0.00
Subtotal		28,420.00
Estimated Lead Time		35 days

[Reset Configuration](#) [Cancel](#) [Done](#)

Warnings (11):

- A selection of Power Cables is required for every AC Power Supply selected (1 is auto-included). Please adjust the selections. (CE200586)
- We strongly recommend the term of the hardware support contract match the software subscription license term. (CF202343)

Option Search Multiple Options Search ▼

C9300-48UN-A > Subscription Software Class Key ▼

Subscription Software **Add-On**

SKU	Qty	Estimated Lead Time	Unit List Price (USD)
<input type="radio"/> C1-ADD-OPTOUT <small>Cisco ONE Add-On Session Opt Out (No Fulfillment) More</small>	<input type="text" value="1"/>	21 days	0.00
<input checked="" type="radio"/> CAT-DNA-P-ADD <small>Catalyst DNA Premier, 24-Port Term Licenses Includes 25 ISE BASE & 25 ISE PLS Endpoints, and 25 FPS Stealthwatch Hide</small>	<input type="text" value="1"/>	14 days	0.00

[Clear Selection](#) [Show Incompatible SKUs](#)

If only 25 endpoints are needed you can choose to opt out of the additional end points/flows by selecting C1-ADD-OPTOUT.

OPTION SELECTION C9300-48UN-A Global Price List in US Dollars (USD)

Configuration Summary [View Full Summary](#)

Country Specification
Select Country (Not Required) ▼

Category	Qty	Extended List Price (USD)
Software		
SWATCH-T	25	0.00
SWATCH-TRK-7Y 84 Mth(s)		0.00
C1-ADD-OPTOUT	1	0.00
Primary Power Supply		
S9300UK9-169	1	0.00
PWR-C1-1100WAC-P	1	0.00
Secondary Power Supply		
PWR-C1-1100WAC-P/2	1	1,900.00
Power Cables		
Subtotal		26,680.00
Estimated Lead Time		35 days

[Reset Configuration](#) [Cancel](#) [Done](#)

Warnings (12):

- A selection of Power Cables is required for every AC Power Supply selected (1 is auto-included). Please adjust the selections. (CE200586)
- We strongly recommend the term of the hardware support contract match the software subscription license term. (CF202343)

Option Search Multiple Options Search ▼

C9300-48UN-A > Subscription Software Class Key ▼

Subscription Software **Add-On**

SKU	Qty	Estimated Lead Time	Unit List Price (USD)
<input checked="" type="radio"/> C1-ADD-OPTOUT <small>Cisco ONE Add-On Session Opt Out (No Fulfillment) Cisco ONE Add-On Session Opt Out (No Fulfillment) Hide</small>	<input type="text" value="1"/>	21 days	0.00
<input type="radio"/> CAT-DNA-P-ADD <small>Catalyst DNA Premier, 24-Port Term Licenses More</small>	<input type="text" value="Qty"/>	14 days	0.00

[Clear Selection](#) [Show Incompatible SKUs](#)

North America cable is defaulted, but another cable can be selected based on country or geography. A power cable must be selected to complete the configuration:

Configuration Summary [View Full Summary](#)

Country Specification
Select Country (Not Required)

Category	Qty	Unit List Price (USD)
C9300-DNA-A-48-5Y 60 Mth(s)		5,950.00
Software		
S9300UK9-165	1	0.00
Secondary Power Supply		
PWR-C1-1100WAC/2	1	1,900.00
Network Module		
C9300-NM-8X	1	2,500.00
Power Cables		
CAB-TA-NA	2	0.00
Subtotal		20,650.00
Estimated Lead Time		59 days

[Reset Configuration](#) [Cancel](#) [Done](#)

Warnings (5):

- A minimum of 3 Year DNA Term License is required (CE201302)
- We strongly recommend Solution Support for this product purchase. This provides coverage for the Cisco DNA or Cisco ONE software license subscriptions. <http://www.cisco.com/c/en/us/services/technical/solution-support.html>

Option Search [Multiple Options Search](#)

C9300-48U-A > Power Cables [Key](#)

SKU	Qty	Lead Time	Unit List Price (USD)
<input checked="" type="radio"/> CAB-TA-NA North America AC Type A Power Cable	2	14 days	0.00
<input type="radio"/> CAB-TA-UK United Kingdom AC Type A Power Cable	Qty	14 days	0.00
<input type="radio"/> CAB-C15-CBN Cabinet Jumper Power Cord, 250 VAC 13A, C14-C15 Connectors	Qty	8 days	0.00
<input type="radio"/> CAB-TA-SW Switzerland AC Type A Power Cable	Qty	14 days	0.00
<input type="radio"/> CAB-TA-AP Australia AC Type A Power Cable	Qty	14 days	0.00
<input type="radio"/> CAB-TA-AR Argentina AC Type A Power Cable	Qty	14 days	0.00
<input type="radio"/> CAB-C15-CBN-JP Japan Cabinet Jumper Power Cord, 250 VAC 12A, C14-C15	Qty	8 days	0.00
<input type="radio"/> CAB-TA-250V-JP Japan 250V AC Type A Power Cable	Qty	14 days	0.00

The primary power supply is added by default, based on the hardware model:

OPTION SELECTION C9300-48U-A

Configuration Summary [View Full Summary](#)

Country Specification
Select Country (Not Required)

Category	Qty	Unit List Price (USD)
DNA Term License		
C9300-DNA-A-48	1	0.00
C9300-DNA-A-48-5Y 60 Mth(s)		5,950.00
Software		
S9300UK9-165	1	0.00
Primary Power Supply		
PWR-C1-1100WAC	1	0.00
Secondary Power Supply		
Network Model		
Subtotal		16,250.00
Estimated Lead Time		21 days

[Reset Configuration](#) [Cancel](#) [Done](#)

A secondary power supply is selected by default. Please select the C9300-SPS-NONE or C9300L-SPS-NONE option if a secondary power supply is not required.

OPTION SELECTION C9300-48U-A Global Price List in US Dollars (USD)

Subscription Duration Preference

Configuration Summary [View Full Summary](#)

Country Specification ⓘ

Select Country (Not Required) ▼

Category ⓘ	Qty	Unit List Price (USD)
Software		
S9300UK9-165 ⓘ	1	0.00
Secondary Power Supply		
PWR-C1-1100WAC/2	1	1,900.00
Network Module		
C9300-NM-8X	1	2,500.00
Power Cables		
CAB-TA-NA ⓘ	2	0.00
Console Cables		
StackWise Cable		
Subtotal		21,650.00
Estimated Lead Time		59 days

[Reset Configuration](#) Cancel Done

Warnings (5):

- We strongly recommend Solution Support for this product purchase. This provides coverage for the Cisco DNA or Cisco ONE software license subscriptions. <http://www.cisco.com/c/en/us/services/technical/solution-support.html> (CE201302)
- We strongly recommend the term of the hardware contract extend match the software subscription license term.

Option Search ⓘ Multiple Options Search

C9300-48U-A > Secondary Power Supply Key ▼

Secondary Power Supply

SKU	Qty	Lead Time ⓘ	Unit List Price (USD)
<input type="radio"/> C9300-SPS-NONE ⓘ	1	21 days	0.00
No Secondary Power Supply Selected			
<input checked="" type="radio"/> PWR-C1-1100WAC/2	1	14 days	1,900.00
1100W AC Config 1 Secondary Power Supply			
<input type="radio"/> PWR-C1-715WAC/2	1	14 days	1,250.00
715W AC Config 1 Secondary Power Supply			

[Clear Selection](#) | [Show Incompatible SKUs](#)

For modular uplink models (C9300 SKUs), C9300-NM-8X network module is defaulted, but another selection can be made. C9300-NM-NONE can be selected if a network module is not desired. This step is not required when ordering fixed uplink models (C9300L SKUs) since they have fixed uplinks that are already part of the SKU.

OPTION SELECTION C9300-48U-A Global Price List in US Dollars (USD)

Subscription Duration Preference

Configuration Summary [View Full Summary](#)

Country Specification ⓘ

Select Country (Not Required) ▼

Category ⓘ	Qty	Unit List Price (USD)
C9300-DNA-A-48	1	0.00
C9300-DNA-A-48-5Y 60 Mth(s)		5,950.00
Software		
S9300UK9-165 ⓘ	1	0.00
Secondary Power Supply		
PWR-C1-1100WAC/2	1	1,900.00
Network Module		
C9300-NM-8X	1	2,500.00
Power Cables		
Subtotal		20,650.00
Estimated Lead Time		59 days

[Reset Configuration](#) Cancel Done

Warnings (5):

- A minimum of 3 Year DNA Term License is required (CE201302)
- We strongly recommend Solution Support for this product purchase. This provides coverage for the Cisco DNA or Cisco ONE software license subscriptions. <http://www.cisco.com/c/en/us/services/technical/solution-support.html> (CE201302)

Option Search ⓘ Multiple Options Search

C9300-48U-A > Network Module Key ▼

Network Module

SKU	Qty	Lead Time ⓘ	Unit List Price (USD)
<input type="radio"/> C9300-NM-2Q ⓘ CP PLH SVP***	1	21 days	2,500.00
Catalyst 9300 2 x 40GE Network Module			
<input checked="" type="radio"/> C9300-NM-8X ⓘ CP PLH SVP***	1	21 days	2,500.00
Catalyst 9300 8 x 10GE Network Module			
<input type="radio"/> C9300-NM-4G ⓘ CP PLH SVP***	1	21 days	500.00
Catalyst 9300 4 x 1GE Network Module			
<input type="radio"/> C9300-NM-NONE ⓘ	1	21 days	0.00
No Network Module Selected			

[Clear Selection](#) | [Show Incompatible SKUs](#)

A 50cm StackWise® cable is selected by default for both -E and -A hardware models. Customers have the option to choose a different StackWise cable type. If a StackWise cable is not required, C9300-STACK-NONE should be selected:

OPTION SELECTION C9300-48U-A Global Price List in US Dollars (USD)

Subscription Duration Preference

Configuration Summary [View Full Summary](#)

Country Specification
Select Country (Not Required)

Category	Qty	Unit List Price (USD)
Network Module		
C9300-NM-8X	1	2,500.00
Power Cables		
CAB-TA-NA	2	0.00
Console Cables		
StackWise Cable		
STACK-T1-50CM	1	0.00
Stack Power Cables		
CAB-SPWR-30CM	1	0.00
Subtotal		20,650.00
Estimated Lead Time		59 days

Reset Configuration Cancel Done

Warnings (5):

- A minimum of 3 Year DNA Term License is required (CE201302)
- We strongly recommend Solution Support for this product purchase. This provides coverage for the Cisco DNA or Cisco ONE software license subscriptions. <http://www.cisco.com/c/en/us/services/technical/solution-support.html>

Option Search Multiple Options Search

C9300-48U-A > StackWise Cable Key

StackWise Cable

SKU	Qty	Lead Time	Unit List Price (USD)
<input type="radio"/> C9300-STACK-NONE FLR	1	21 days	0.00
No Stack Cable Selected			
<input type="radio"/> STACK-T1-3M	1	14 days	300.00
3M Type 1 Stacking Cable			
<input checked="" type="radio"/> STACK-T1-50CM	1	14 days	0.00
50CM Type 1 Stacking Cable			
<input type="radio"/> STACK-T1-1M	1	14 days	200.00
1M Type 1 Stacking Cable			

Clear Selection | Show Incompatible SKUs

For fixed uplink models (C9300L SKUs), a C9300L-STACK-KIT is selected by default which includes a 50CM stacking cable by default. 1M and 3M stacking cable options are available if required:

OPTION SELECTION C9300L-48P-4X-A Global Price List US Availability (USD)

Configuration Summary [View Full Summary](#)

Country Specification
Select Country (Not Required)

Category	Qty	Extended List Price (USD)
Console Cables		
Stack Module		
C9300L-STACK-KIT	1	1,450.00
STACK-T3-50CM	1	0.00
Fan		
FAN-T2	3	0.00
Storage Module		
SSD-120G	1	1,500.00
Network PNP License		
NETWORK_PNP_L	1	0.00
Subtotal		20,350.00
Estimated Lead Time		56 days

Reset Configuration Cancel Done

Warnings (3):

- The quantity of Power Cables should be equal to the quantity of AC Power Supplies selected. Please adjust the quantity from Power Cables. (CE200376)
- SSD-120G is defaulted under Storage Module. (CE100033)

Option Search Multiple Options Search

C9300L-48P-4X-A > Stack Module Key

Stack Module Cat

SKU	Qty	Estimated Lead Time	Unit List Price (USD)
<input checked="" type="checkbox"/> C9300L-STACK-KIT OK	1	56 days	1,450.00
Cisco Catalyst 9300L Stacking Kit More			

Show Incompatible SKUs



A 30cm Cisco StackPower® cable is selected by default for both -E and -A hardware models. Customers have the option to choose a different StackPower cable type or select C9300-STACK-NONE if StackPower is not desired.

The screenshot shows the configuration interface for a Cisco C9300-48U-A. The left sidebar contains a 'Configuration Summary' with a table of items:

Category	Qty	Unit List Price (USD)
Network Module	1	1,300.00
C9300-NM-8X	1	2,500.00
Power Cables	2	0.00
Console Cables		
StackWise Cable		
STACK-T1-50CM	1	0.00
Stack Power Cables		
CAB-SPWR-30CM	1	0.00
Subtotal		20,650.00
Estimated Lead Time		59 days

The main area shows 'Option Search' results for 'Stack Power Cables':

SKU	Qty	Lead Time	Unit List Price (USD)
<input type="radio"/> C9300-SPWR-NONE	1	21 days	0.00
No Stack Power Cable Selected			
<input type="radio"/> CAB-SPWR-150CM	1	14 days	100.00
Catalyst Stack Power Cable 150 CM - Upgrade			
<input checked="" type="radio"/> CAB-SPWR-30CM	1	14 days	0.00
Catalyst Stack Power Cable 30 CM			

Warnings (5):

- A minimum of 3 Year DNA Term License is required (CE201302)
- We strongly recommend Solution Support for this product purchase. This provides coverage for the Cisco DNA or Cisco ONE software license subscriptions. <http://www.cisco.com/c/en/us/services/technical/solution-support.html>

Console cables are also available as shown below:

The screenshot shows the configuration interface for a Cisco C9300-48U-A. The left sidebar contains a 'Configuration Summary' with a table of items:

Category	Qty	Unit List Price (USD)
Network Module	1	1,300.00
C9300-NM-8X	1	2,500.00
Power Cables	2	0.00
Console Cables		
StackWise Cable		
STACK-T1-50CM	1	0.00
Stack Power Cables		
CAB-SPWR-30CM	1	0.00
Subtotal		21,650.00
Estimated Lead Time		59 days

The main area shows 'Option Search' results for 'Console Cables':

SKU	Qty	Lead Time	Unit List Price (USD)
<input type="radio"/> CAB-CONSOLE-USB	1	14 days	30.00
Console Cable 6ft with USB Type A and mini-B			
<input type="radio"/> CAB-CONSOLE-RJ45	1	14 days	30.00
Console Cable 6ft with RJ45 and DB9F			

Warnings (5):

- We strongly recommend Solution Support for this product purchase. This provides coverage for the Cisco DNA or Cisco ONE software license subscriptions. <http://www.cisco.com/c/en/us/services/technical/solution-support.html> (CE201302)
- We strongly recommend the type of the hardware should match the software subscription license type

Default accessories shipped with the switch

Cisco Catalyst 9300 Series switches ships with the following components and accessories by default:

- Switch
- Default power supply (based on selected switch)
- Secondary power supply (same as default primary)
- 2 Power cables (specific power cable needs to be selected)
- Stacking Kit (for C9300L SKUs only with 50cm stacking cable)
- Stack cable (50cm) unless not selected (for C9300 SKUs only)
- StackPower cable (30cm) unless not selected (for C9300 SKUs only)
- Mounting brackets

Licensing

All Cisco Catalyst 9300 Series switches are available with two software options. Each software option includes two components, as shown in Table 1.

Table 1. License Levels and Options

License Level	Network Stack offer (Perpetual and embedded)	Cisco DNA Software Subscription offer (Term based)
-E	Network Essentials	Cisco DNA Essentials (3, 5, or 7 years)
-A	Network Advantage	Cisco DNA Advantage (3, 5, or 7 years)

Upgrading license level

Customers will have the option to upgrade the Network Stack and Cisco DNA license levels (for example, -E to -A license upgrade) through a license upgrade, which will be available post launch. Customers will purchase the upgrade license and then reach out to CPS to initiate the upgrade process. The customer will be able to select term licenses using the C9300-LIC= or C9300L-LIC= SKU to upgrade a-la-carte Cisco DNA license or CAT-CDNA-P for Cisco DNA Premier Software license. The Cisco Catalyst 9300 Series software license upgrade SKUs are listed in the “Ordering information” section.

Note that a license cannot be upgraded at the time of purchase.

Smart accounts

As with all Catalyst 9000 family switches, Smart Accounts are mandatory when ordering a Catalyst 9300 Series switch. A [Smart Account](#) is a central data repository that provides visibility and access control to all the Cisco software licenses and entitlements across an organization. Smart Accounts allow customers to store, manage, and move assets across locations and devices and begin to use them immediately. Smart Accounts are required for enabling Cisco Smart Software Licensing.

After a Smart Account has been set up, customers have the flexibility to create subaccounts (virtual accounts) to help manage licenses for departments, areas, or locations within their organization. Licenses can be pooled within virtual accounts as needed. Smart Accounts support role-based user access controls, which allow the delegation of authority to account administrators at the Smart Account level or at the virtual account level. In addition, customers can assign partner visibility and management rights to their virtual or enterprise-level accounts.

Smart licensing

Smart Licensing is a cloud-based licensing managed platform built to simplify the purchase, deployment, and management of Cisco software assets. Entitlements are immediately deposited into a customer's virtual account for usage. This eliminates the need to install license files on every device. Products that are Smart License enabled communicate to Cisco to report consumption. The primary location to manage product registration and monitor Smart License consumption is the Cisco Smart Software Manager. License ownership and consumption are readily available to help make better purchase decisions based on consumption or other business needs.

Cisco Smart Software Manager

Cisco Smart Software Manager enables the management of software licenses. The interface allows you to activate your product, manage entitlements, and renew and upgrade software. An active Smart Account is required to complete the Smart License registration process. To learn more about end-to-end Smart Account and Smart License management, visit <https://www.cisco.com/c/en/us/buy/smart-accounts/software-manager.html>.

Smart Account and Smart License availability

Important information about smart account and smart license availability

- Cisco Catalyst 9300 Series switch SKUs are smart SKUs. License entitlements will be deposited in the Cisco Smart Software Manager and the Smart Accounts
- In addition to viewing entitlements, customers will also be able to track consumption

Smart Accounts are mandatory at the time of the order of a Cisco Catalyst 9300 Series switch. If a customer does not have a Smart Account set up prior to the purchase, a new Smart Account must be created at the time of purchase.

Deploying Smart Licenses for Cisco Catalyst 9300 Series switches

Cisco Catalyst 9300 Series switches come in different licensing packages in comparison to existing Cisco Catalyst platforms. After Smart Licensing technology (available later) is enabled on the switch, the ordering process will include a requirement to establish a Smart Account where software licenses will be deposited. Smart Licenses are transferable between the same types of devices (for example, from one Cisco Catalyst 9300 Series switches to another). (See Figure 2.)

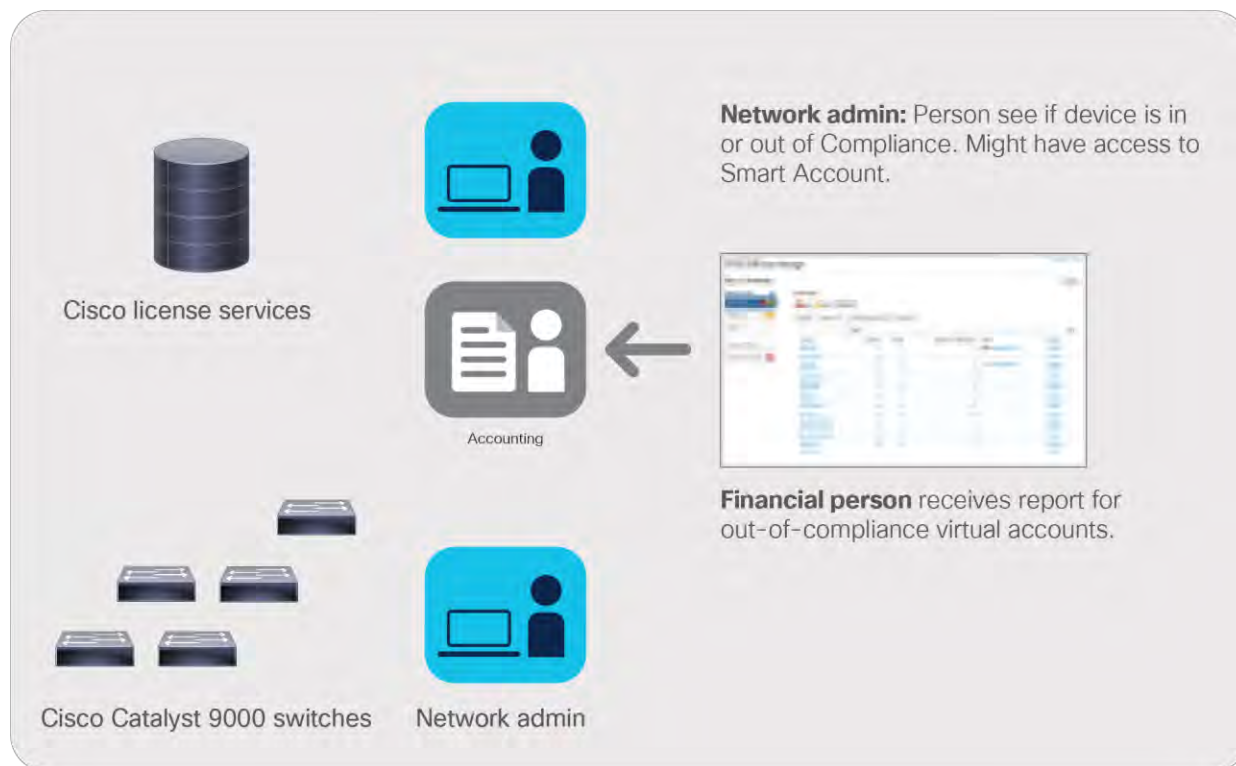


Figure 2.
Deploying Smart Licenses

In the deployment model shown in Figure 2, the Smart Account Cisco back end and Cisco Catalyst 9300 Series switches do not have a communication channel to report usage and consumption. They operate as separate entities. The switches must be configured in RTU mode with correct license level to enable the purchased feature set.

- Possible deployment modes:
 - RTU: The licensing mode on Cisco Catalyst 9300 Series switches remains RTU in Cisco IOS® XE 16.5.1a. However, the licensing structure in RTU has been modified to match the same packaging model that will be used with Smart License mode in the future. Unified licensing modes between RTU and Smart License mode will help to simplify the migration and reduce the time for implementing Smart License with usage report
- Consumption reporting: License usage and consumption reporting is performed on Cisco Smart Software Manager only when the device has capability to report Smart License usage. Cisco IOS XE 16.5.1a release does not include the license reporting infrastructure to Cisco Smart Software Manager on the switches

For further information about the Cisco Catalyst 9000 RTU licensing, model, see the Configuration Guide.

Software-Defined Access (SD-Access)

Software-Defined Access (SD-Access) enables Policy-based Automation from edge to Cloud with foundational capabilities leveraging controller-based architecture including: Design with Validated Design Templates, Simplified device deployment, Unified management of Wired and Wireless, Network Virtualization with Segmentation, Group Based Policies and Contextual based analytics.

SD-Access can be enabled with Cisco DNA Advantage or Cisco DNA Premier Software subscriptions. Note that with Cisco DNA Advantage, customers will need to additionally purchase ISE. With Cisco DNA Premier, ISE is bundled in the features.

Services and Warranty

The Solution Support service option is strongly recommended; it provides coverage for a Cisco DNA Essentials, Advantage or Premier software license. Additional product-level hardware support options are available: Smart Net Total Care® support, partner service support, embedded support, and enhanced limited lifetime hardware warranty. Please note that if Solution Support is not selected, Cisco DNA Software subscription licenses can still be covered by selecting the embedded support option.

It is strongly recommended that the term of the hardware support contract match the software subscription license term to avoid any service support gaps for the duration of the term.

Figures 3 through 6 describe the various service options for Cisco Catalyst 9300 Series switches.

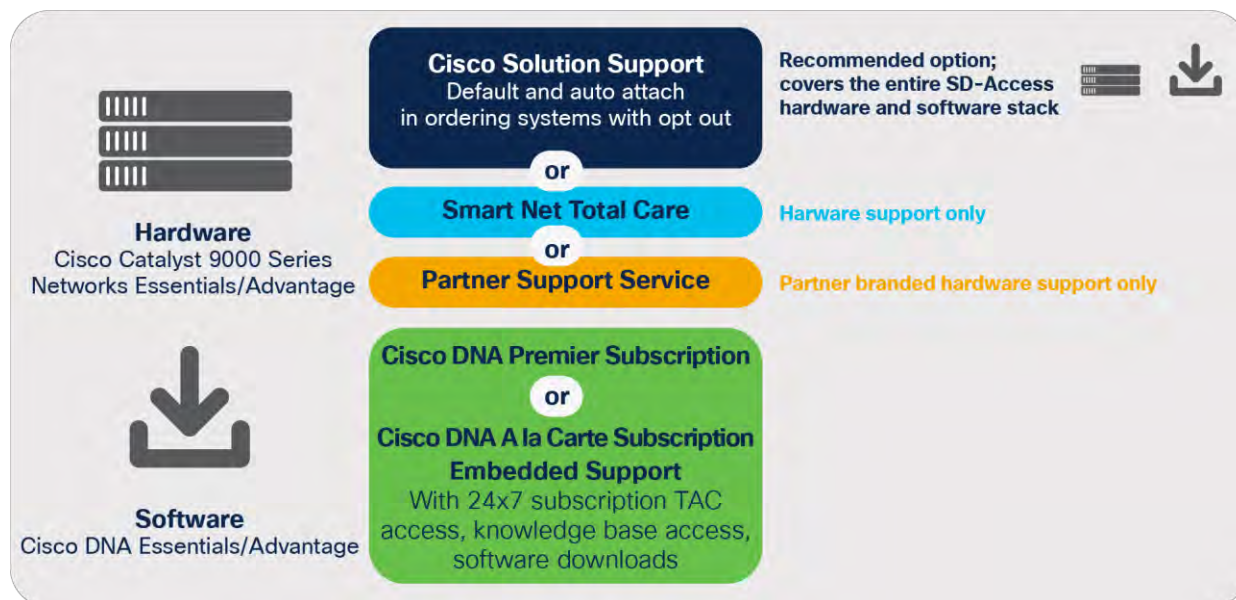


Figure 3. Services Support for Cisco Catalyst 9300 Series switches

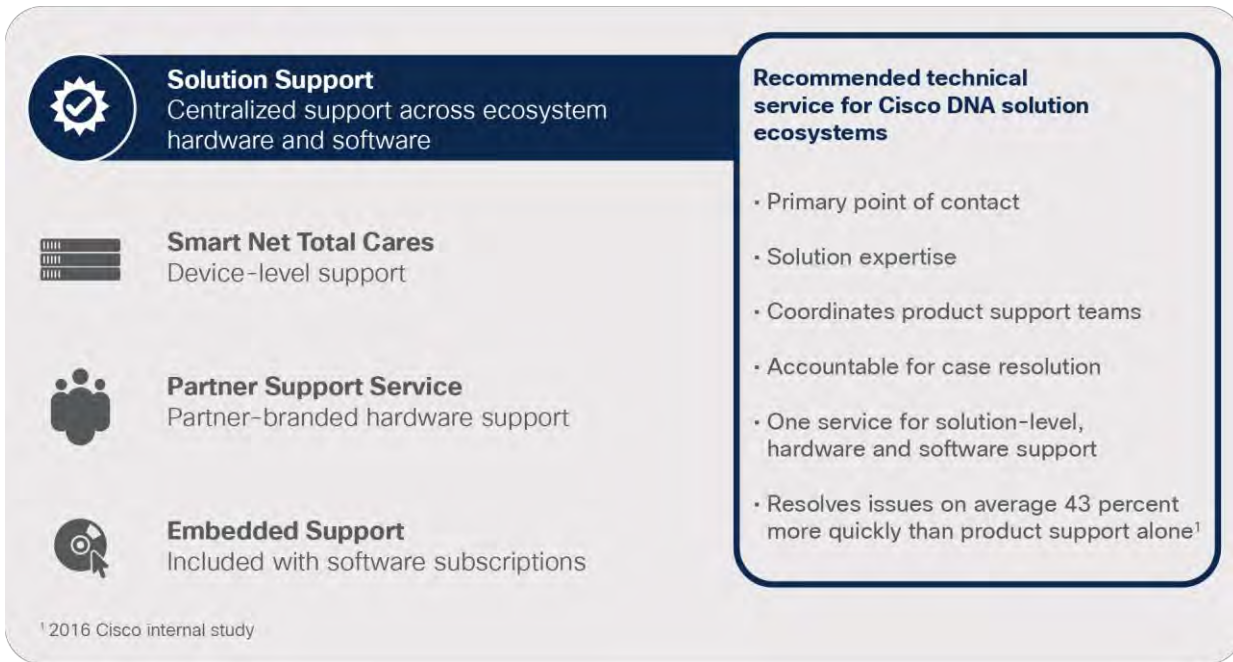


Figure 4.
Solution Support

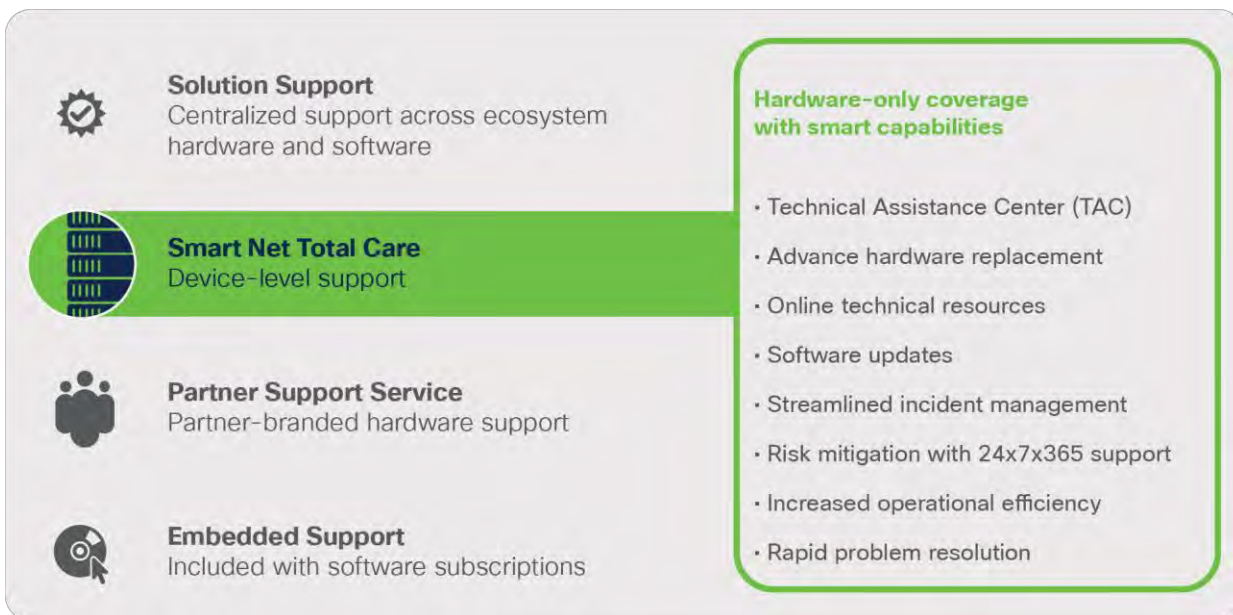


Figure 5.
Smart Net Total Care Support

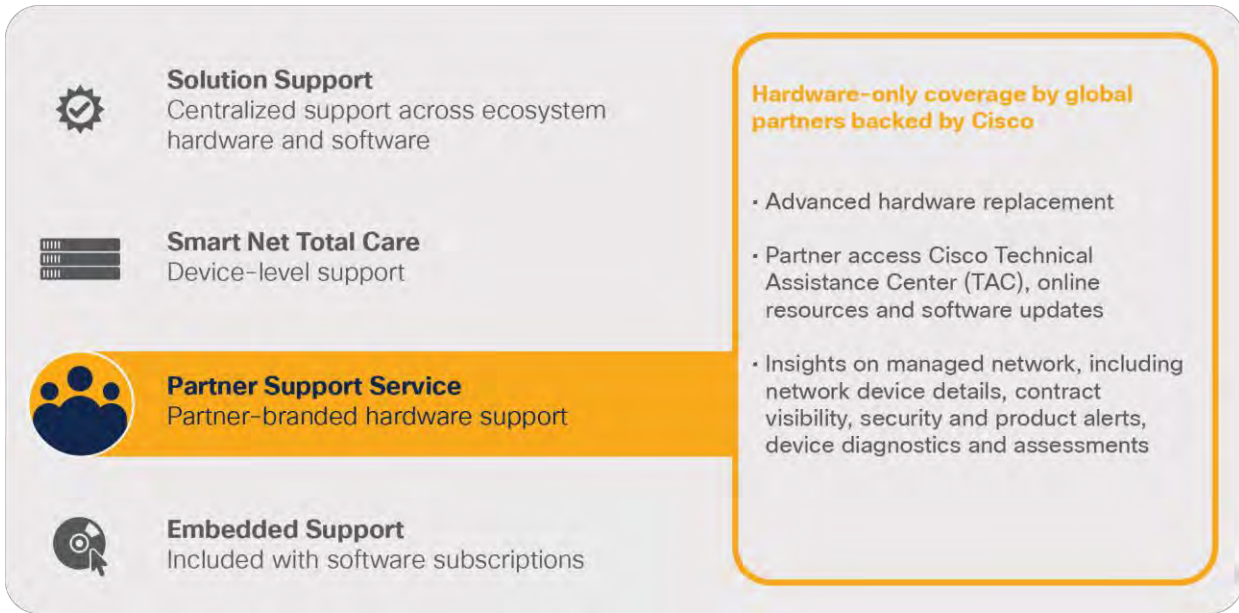


Figure 6.
Partner Support Service

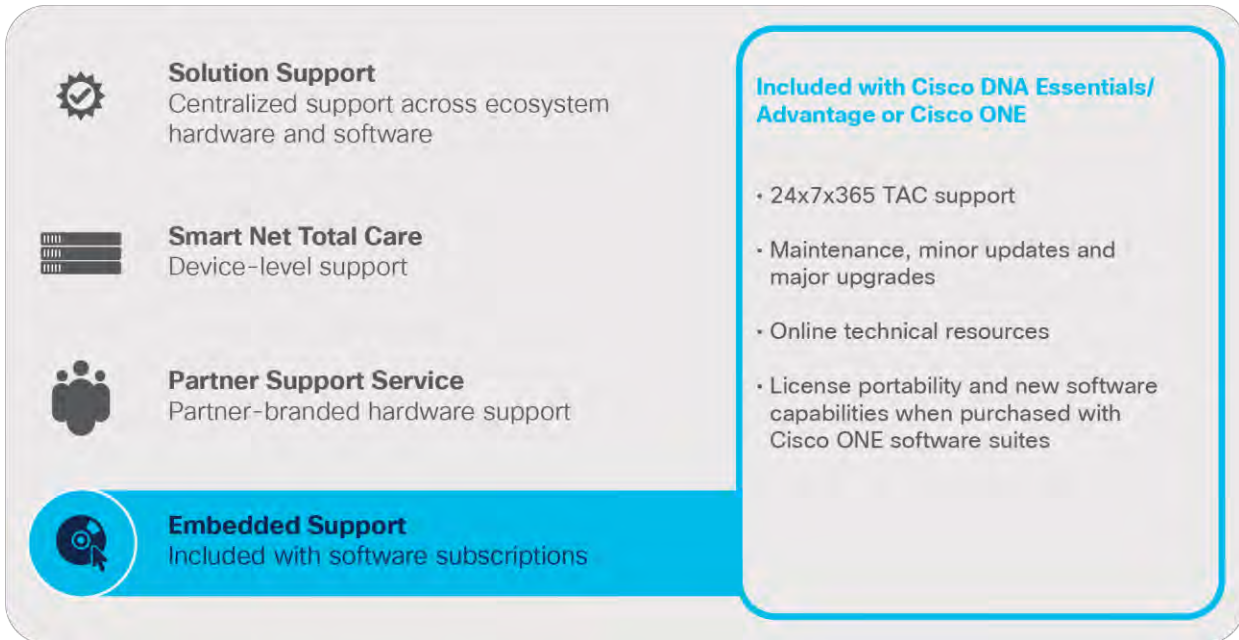


Figure 7.
Embedded Support

Technical service features comparison

Service features	Enhanced limited lifetime warranty	Cisco smart net total care	Partner support service	Cisco solution support
Warranty: 90 days of Cisco TAC support; local business hours, 8x5	●			
Warranty: hardware replacement (next business day where available)	●			
Warranty: Duration is lifespan of hardware product	●			
Global 24x7 product-level technical support		●		●
24-hour access to Cisco® online resources		●		●
Hardware replacement (2- and 4-hour, next business day)		●		●
Network management / operating system software updates and upgrades		●		●
Proactive diagnostics/immediate alerts on devices through Cisco Smart Call Home		●		●
Web-based user community for self-service support of smart capabilities		●		●
Partner first line of response; Cisco second			●	
Distributor first line of response; Cisco second			●	
Primary point of contact with solution-level expertise				●
Accountability for issue resolution, no matter where it resides				●
Coordination between Cisco TAC and solution partner product support teams				●
Case management from first call to resolution				●
Differentiated delivery experience				●
JumpStart / Onboarding				●

Figure 8.
Technical Service Features Comparison

Cisco Enhanced Limited Lifetime Hardware Warranty

The Cisco Catalyst 9300 Series Switches come with an Enhanced Limited Lifetime hardware Warranty (E-LLW) that includes Next-Business-Day (NBD) delivery of replacement hardware where available and 90 days of 8 x 5 Cisco Technical Assistance Center (TAC) support.

How to order Cisco Catalyst 9300 Series switches with services

Solution Support is the defaulted service. Customers can attach desired services by following the steps outlined below:

1. Customer will click “Edit Options”.

<input type="checkbox"/>	Hardware, Software and Services	Lead Time ⓘ	Unit List Price (USD)	Qty	Unit Net Price (USD)	Discount (%)	Extended Net Price (USD)
<input type="checkbox"/>	1.0 C9300-24T-A CP SVIP C-1 more Catalyst 9300 24-port data only, Network Advantage ⚠ Invalid as of 22-Aug-2017 03:30:58 PDT	22 days	4,600.00	<input type="text" value="1"/>	4,600.00	<input type="text" value="0.00"/>	4,600.00
Edit Options Select Service/Subscription Validate Add Note More Actions ⌵							Add Subtotal

2. Customer will then configure the product. Cisco DNA Software subscription option will be chosen. Then click “Done”.

OPTION SELECTION C9300-48U-A Global Price List in US Dollars (USD)

Configuration Summary [View Full Summary](#)

Country Specification ⓘ
Select Country (Not Required) ⌵

Category ⓘ	Qty	Extended List Price (USD)
Subscription Software Class		
C9300-DNA-P-48	1	0.00
C9300-DNA-P-48-5Y 60 Mth(s)		7,270.00
ISE-BASE-T IC	25	0.00
ISE-BASE-TRK-5Y 60 Mth(s)		0.00
ISE-PLS-T IC	25	0.00
ISE-PLS-TRK-5Y 60 Mth(s)		0.00
SWATCH-T IC	25	0.00
SWATCH-TRK-5Y 60 Mth(s)		0.00
CAT-DNA-P-APP	1	0.00
Subtotal		25,705.00
Estimated Lead Time		21 days

[Reset Configuration](#) [Cancel](#) [Done](#)

Warnings (14):

- A selection of Power Cables is required for every AC Power Supply selected (1 is auto-included). Please adjust the selections. (CE200586)
- We strongly recommend the term of the hardware support contract match the software subscription license term. (CF202343)

Option Search ⓘ Multiple Options Search ⓘ ⌵

C9300-48U-A > Subscription Software Class Key ⌵

Subscription Software | [Add-On](#)

SKU	Qty	Estimated Lead Time ⓘ	Unit List Price (USD)
<input checked="" type="radio"/> C9300-DNA-P-48 IC SA C9300 48-Port DNA-Premier License	<input type="text" value="1"/>	14 days	0.00
<input type="radio"/> C9300-DNA-A-48 IC SA C9300 DNA Advantage, 48-Port Term Licenses	<input type="text" value="Qty"/>	14 days	0.00
<input type="radio"/> C1A1TCAT93002 IC CP DNA Premier Term, C9300 48-port More	<input type="text" value="Qty"/>	14 days	0.00

[Clear Selection](#) | [Show Incompatible SKUs](#)

Customer will select “Edit Service/Subscription” to view and edit service options.

Export Email Share Clone Delete Add Tag Continue Shopping

ESTIMATE NAME Estimate_ES93984016BG (ES93984016BG) Global Price List in US Dollars (USD)

ESTIMATE ID ES93984016BG CREATED BY Jeffrey Meek CREATED ON 12-Jul-2019

Set preferences for this estimate

Search by SKU, Program ID, Description and Product Family 1 Add Find Products & Solutions Actions

The product discounts are cascaded to subscription SKUs, but they may be eligible for lower discounts. To apply proper discount to subscriptions, please click "More" → "Apply Discounts"

Remove Selected Lines More Manage Groups / Rearrange Lines

	Hardware, Software and Services	Estimated Lead Time	Unit List Price (USD)	Qty	Unit Net Price (USD)	Discount (%)	Extended Net Price (USD)
<input type="checkbox"/>	1.0 C9300-48U-A RF CP SVIP more Catalyst 9300 48-port UPOE, Network Advantage Invalid Edit Service/Subscription	14 days	19,341.29	1	19,341.29	0.00	19,341.29

Edit Options Edit Service/Subscription Validate Add Note More Actions Add Subtotal

3. Customer will select "Change Services" to change services if needed.

Service SKU	Product SKU	Unit List Price (USD)	Qty	Total List Price (USD)
SOLUTION SUPPORT WITH SNTC (1 ITEM) SERVICE PROGRAM	SSSNT (SOLN SUPP 8X5XNBD) SUMMARY		Duration 12 Months	
CON-SSSNT-C93004UA SOLN SUPP 8X5XNBD Catalyst 9300 48-port UPOE, Netwo... SERVICE SKU	C9300-48U-A Catalyst 9300 48-port UPOE, Network Advantage PRODUCT SKU	906.29	1	906.29

Change Service Remove Service

Remove All Services Remove All Additional Services Configuration Summary All prices shown in USD

4. The customer can then choose from a variety of different service options. Click "Apply" the "Done" when finished.

SELECT SERVICES FOR
C9300-24T-A

Technical Support Services

Filter by Brand **CISCO BRANDED**

Service	Duration
<input type="checkbox"/> SOLUTION SUPPORT WITH SNTC	
<input type="checkbox"/> NETWORK SUPPORT COMBINED SERVICES	
<input type="checkbox"/> SP BASE SERVICES	
<input type="checkbox"/> SMART NET TOTAL CARE	
<input type="checkbox"/> SMART NET TOTAL CARE 3 YEAR SUPPORT	
<input type="checkbox"/> CISCO SUPPORT ESSENTIALS (CSE)	

Affected Line Items

Update Clicking Update allows you to preview changes to pricing for all affected line items based on your service or duration choices.

Description	Service	SKU	Unit List Price
<input type="button" value="Cancel"/> <input type="button" value="Done"/>			

How to order Cisco ThousandEyes internet and cloud intelligence with your existing Catalyst 9300 switches

Customers with existing Catalyst 9300 switches can claim the credits to Cisco ThousandEyes by following the steps mentioned in this document.

Link to [CSSM Activation guide](#) hosted on cisco.com

Ordering information

Tables 2 through 6 provide ordering information for switches, network modules, stacking cables, Cisco DNA 24-port licenses, and Cisco DNA 48-port licenses, respectively.

Table 2. Switch ordering information

Product ID	Product Description
C9300X-12Y-E	Catalyst 9300 12-port 25G/10G/1G SFP28 with modular uplinks, Network Essentials
C9300X-12Y-A	Catalyst 9300 12-port 25G/10G/1G SFP28 with modular uplinks, Network Advantage
C9300X-24Y-E	Catalyst 9300 24-port 25G/10G/1G SFP28 with modular uplinks, Network Essentials
C9300X-24Y-A	Catalyst 9300 24-port 25G/10G/1G SFP28 with modular uplinks, Network Advantage
C9300-24T-E	Cisco Catalyst 9300 24-port data only, Network Essentials
C9300-24T-A	Cisco Catalyst 9300 24-port data only, Network Advantage
C9300-24P-E	Cisco Catalyst 9300 24-port PoE+, Network Essentials
C9300-24P-A	Cisco Catalyst 9300 24-port PoE+, Network Advantage

Product ID	Product Description
C9300-24U-E	Cisco Catalyst 9300 24-port UPOE, Network Essentials
C9300-24U-A	Cisco Catalyst 9300 24-port UPOE, Network Advantage
C9300-24UX-E	Cisco Catalyst 9300 24-port mGig and UPOE, Network Essentials
C9300-24UX-A	Cisco Catalyst 9300 24-port mGig and UPOE, Network Advantage
C9300-48T-E	Cisco Catalyst 9300 48-port data only, Network Essentials
C9300-48T-A	Cisco Catalyst 9300 48-port data only, Network Advantage
C9300-48P-E	Cisco Catalyst 9300 48-port PoE+, Network Essentials
C9300-48P-A	Cisco Catalyst 9300 48-port PoE+, Network Advantage
C9300-48U-E	Cisco Catalyst 9300 48-port UPOE, Network Essentials
C9300-24S-E	Cisco Catalyst 9300 24-port modular uplinks 1G SFP, Network Essentials
C9300-24S-A	Cisco Catalyst 9300 24-port modular uplinks 1G SFP, Network Advantage
C9300-48S-E	Cisco Catalyst 9300 48-port modular uplinks 1G SFP, Network Essentials
C9300-48S-A	Cisco Catalyst 9300 48-port modular uplinks 1G SFP, Network Advantage
C9300L-24T-4G-E	Catalyst 9300 24-port fixed uplinks data only, 4X1G uplinks, Network Essentials
C9300L-24T-4G-A	Catalyst 9300 24-port fixed uplinks data only, 4X1G uplinks, Network Advantage
C9300L-24P-4G-E	Catalyst 9300 24-port fixed uplinks PoE+, 4X1G uplinks, Network Essentials
C9300L-24P-4G-A	Catalyst 9300 24-port fixed uplinks PoE+, 4X1G uplinks, Network Advantage
C9300L-48T-4G-E	Catalyst 9300 48-port fixed uplinks data only, 4X1G uplinks, Network Essentials
C9300L-48T-4G-A	Catalyst 9300 48-port fixed uplinks data only, 4X1G uplinks, Network Advantage
C9300L-48P-4G-E	Catalyst 9300 48-port fixed uplinks PoE+, 4X1G uplinks, Network Essentials
C9300L-48P-4G-A	Catalyst 9300 48-port fixed uplinks PoE+, 4X1G uplinks, Network Advantage
C9300L-24T-4X-E	Catalyst 9300 24-port fixed uplinks data only, 4X10G uplinks, Network Essentials
C9300L-24T-4X-A	Catalyst 9300 24-port fixed uplinks data only, 4X10G uplinks, Network Advantage
C9300L-24P-4X-E	Catalyst 9300 24-port fixed uplinks PoE+, 4X10G uplinks, Network Essentials
C9300L-24P-4X-A	Catalyst 9300 24-port fixed uplinks PoE+, 4X10G uplinks, Network Advantage
C9300L-48T-4X-E	Catalyst 9300 48-port fixed uplinks data only, 4X10G uplinks, Network Essentials
C9300L-48T-4X-A	Catalyst 9300 48-port fixed uplinks data only, 4X10G uplinks, Network Advantage

Product ID	Product Description
C9300L-48P-4X-E	Catalyst 9300 48-port fixed uplinks PoE+, 4X10G uplinks, Network Essentials
C9300L-48P-4X-A	Catalyst 9300 48-port fixed uplinks PoE+, 4X10G uplinks, Network Advantage

Table 3. Network Module Ordering information

Product ID	Product Description
C9300X-NM-8M	Catalyst 9300 8 x 10G mGig Network Module
C9300X-NM-8M=	Catalyst 9300 8 x 10G mGig Network Module, spare
C9300X-NM-8Y	Catalyst 9300 8 x 25G/10G/1G multi-rate SFP Network Module
C9300X-NM-8Y=	Catalyst 9300 8 x 25G/10G/1G multi-rate SFP Network Module, spare
C9300X-NM-2C	Catalyst 9300 2 x 100G/40G dual rate QSFP Network Module
C9300X-NM-2C=	Catalyst 9300 2 x 100G/40G dual rate QSFP Network Module, spare
C9300-NM-4G	Cisco Catalyst 9300 4 x 1GE network module
C9300-NM-4G=	Cisco Catalyst 9300 4 x 1GE network module, spare
C9300-NM-8X	Cisco Catalyst 9300 8 x 10GE network module
C9300-NM-8X=	Cisco Catalyst 9300 8 x 10GE network module, spare
C9300-NM-2Q	Cisco Catalyst 9300 2 x 40GE network module
C9300-NM-2Q=	Cisco Catalyst 9300 2 x 40GE network module, spare

Table 4. Stacking Cable Ordering information

Product ID	Product Description
Catalyst 9300 Series switches: modular uplink models (C9300 SKUs)	
STACK-T1-50CM	50CM type 1 stacking cable
STACK-T1-50CM=	50CM type 1 stacking cable, spare
STACK-T1-1M	1M type 1 stacking cable
STACK-T1-1M=	1M type 1 stacking cable, spare
STACK-T1-3M	3M type 1 stacking cable
STACK-T1-3M=	3M type 1 stacking cable, spare

Product ID	Product Description
Catalyst 9300 Series switches: fixed uplink models (C9300L SKUs)	
C9300L-STACK-KIT	Stacking Kit – includes 2 Stack Adaptors and 1 Stack Cable (50cm by default)
STACK-T3-50CM	50CM type 1 stacking cable
STACK-T3-50CM=	50CM type 1 stacking cable, spare
STACK-T3-1M	1M type 1 stacking cable
STACK-T3-1M=	1M type 1 stacking cable, spare
STACK-T3-3M	3M type 1 stacking cable
STACK-T3-3M=	3M type 1 stacking cable, spare

Software SKUs

Table 5. Cisco DNA 24-Port License Ordering Information

License Type	SKU	Description
Catalyst 9300 Switches: modular uplink models (C9300 SKUs)		
Essentials	C9300-DNA-E-24	C9300 Cisco DNA Essentials, 24-port term licenses
	C9300-DNA-E-24-3Y	C9300 Cisco DNA Essentials, 24-port, 3-year term license
	C9300-DNA-E-24-5Y	C9300 Cisco DNA Essentials, 24-port, 5-year term license
	C9300-DNA-E-24-7Y	C9300 Cisco DNA Essentials, 24-port, 7-year term license
Advantage	C9300-DNA-A-24	C9300 Cisco DNA Advantage, 24-port term licenses
	C9300-DNA-A-24-3Y	C9300 Cisco DNA Advantage, 24-port, 3-year term license
	C9300-DNA-A-24-5Y	C9300 Cisco DNA Advantage, 24-port, 5-year term license
	C9300-DNA-A-24-7Y	C9300 Cisco DNA Advantage, 24-port, 7-year term license
Catalyst 9300 Switches: 1G Fiber modular uplink models (C9300 SKUs)		
Essentials	C9300-DNA-E-24S	C9300 Cisco DNA Essentials, 24-port term licenses
	C9300-DNA-E-24S-3Y	C9300 Cisco DNA Essentials, 24-port, 3-year term license
	C9300-DNA-E-24S-5Y	C9300 Cisco DNA Essentials, 24-port, 5-year term license
	C9300-DNA-E-24S-7Y	C9300 Cisco DNA Essentials, 24-port, 7-year term license
Advantage	C9300-DNA-A-24S	C9300 Cisco DNA Advantage, 24-port term licenses
	C9300-DNA-A-24S-3Y	C9300 Cisco DNA Advantage, 24-port, 3-year term license

License Type	SKU	Description
	C9300-DNA-A-24S-5Y	C9300 Cisco DNA Advantage, 24-port, 5-year term license
	C9300-DNA-A-24S-7Y	C9300 Cisco DNA Advantage, 24-port, 7-year term license
Catalyst 9300L Switches:		
Essentials	C9300L-DNA-E-24	C9300L Cisco DNA Essentials, 24-port term licenses
	C9300L-DNA-E-24-3Y	C9300L Cisco DNA Essentials, 24-port, 3-year term license
	C9300L-DNA-E-24-5Y	C9300L Cisco DNA Essentials, 24-port, 5-year term license
	C9300L-DNA-E-24-7Y	C9300L Cisco DNA Essentials, 24-port, 7-year term license
Advantage	C9300L-DNA-A-24	C9300L Cisco DNA Advantage, 24-port term licenses
	C9300L-DNA-A-24-3Y	C9300L Cisco DNA Advantage, 24-port, 3-year term license
	C9300L-DNA-A-24-5Y	C9300L Cisco DNA Advantage, 24-port, 5-year term license
	C9300L-DNA-A-24-7Y	C9300L Cisco DNA Advantage, 24-port, 7-year term license

Table 6. Cisco DNA 48-Port License Ordering Information

License Type	SKU	Description
Catalyst 9300 Switches: modular uplink models (C9300 SKUs)		
Essentials	C9300-DNA-E-48	C9300 Cisco DNA Essentials, 48-port term licenses
	C9300-DNA-E-48-3Y	C9300 Cisco DNA Essentials, 48-port, 3-year term license
	C9300-DNA-E-48-5Y	C9300 Cisco DNA Essentials, 48-port, 5-year term license
	C9300-DNA-E-48-7Y	C9300 Cisco DNA Essentials, 48-port, 7-year term license
Advantage	C9300-DNA-A-48	C9300 Cisco DNA Advantage, 48-port term licenses
	C9300-DNA-A-48-3Y	C9300 Cisco DNA Advantage, 48-port, 3-year term license
	C9300-DNA-A-48-5Y	C9300 Cisco DNA Advantage, 48-port, 5-year term license
	C9300-DNA-A-48-7Y	C9300 Cisco DNA Advantage, 48-port, 7-year term license
Catalyst 9300 Switches: 1G Fiber modular uplink models (C9300 SKUs)		
Essentials	C9300-DNA-E-48S	C9300 Cisco DNA Essentials, 48-port term licenses
	C9300-DNA-E-48S-3Y	C9300 Cisco DNA Essentials, 48-port, 3-year term license
	C9300-DNA-E-48S-5Y	C9300 Cisco DNA Essentials, 48-port, 5-year term license
	C9300-DNA-E-48S-7Y	C9300 Cisco DNA Essentials, 48-port, 7-year term license

License Type	SKU	Description
Advantage	C9300-DNA-A-48S	C9300 Cisco DNA Advantage, 48-port term licenses
	C9300-DNA-A-48S-3Y	C9300 Cisco DNA Advantage, 48-port, 3-year term license
	C9300-DNA-A-48S-5Y	C9300 Cisco DNA Advantage, 48-port, 5-year term license
	C9300-DNA-A-48S-7Y	C9300 Cisco DNA Advantage, 48-port, 7-year term license
Catalyst 9300 Switches: fixed uplink models (C9300L SKUs)		
Essentials	C9300L-DNA-E-48	C9300L Cisco DNA Essentials, 48-port term licenses
	C9300L-DNA-E-48-3Y	C9300L Cisco DNA Essentials, 48-port, 3-year term license
	C9300L-DNA-E-48-5Y	C9300L Cisco DNA Essentials, 48-port, 5-year term license
	C9300L-DNA-E-48-7Y	C9300L Cisco DNA Essentials, 48-port, 7-year term license
Advantage	C9300L-DNA-A-48	C9300L Cisco DNA Advantage, 48-port term licenses
	C9300L-DNA-A-48-3Y	C9300L Cisco DNA Advantage, 48-port, 3-year term license
	C9300L-DNA-A-48-5Y	C9300L Cisco DNA Advantage, 48-port, 5-year term license
	C9300L-DNA-A-48-7Y	C9300L Cisco DNA Advantage, 48-port, 7-year term license

Cisco DNA Premier Software subscription for Cisco Catalyst 9300 Series switches

Cisco DNA Premier Software subscription for switching simplifies the consumption of Cisco DNA solutions by combining automation, analytics, and security with comprehensive software support in a single purchase. Design, provision, and assure services with full network visibility while quickly accessing updates and the latest innovation. Enjoy lower cost of entry and flexible terms.

There is a Cisco DNA Premier Software subscription option available for Cisco Catalyst 9300 Series switches which includes ISE Base and ISE Plus, Stealthwatch® software, and a Cisco DNA Advantage term license.

Cisco DNA Premier ordering information

Tables 7 through 10 provide Cisco DNA Premier ordering information.

Table 7. Cisco DNA Premier 24 Port option ordering information

Product ID	Description
C9300-DNA-P-24	Cisco DNA Premier Term licenses, Cisco Catalyst 9300 Series 24 port modular uplink models (C9300 SKUs)
C9300-DNA-P-24-3Y	Cisco DNA Premier Software subscription C9300 24-Port 3 year term
C9300-DNA-P-24-5Y	Cisco DNA Premier Software subscription C9300 24-Port 5 year term
C9300-DNA-P-24-7Y	Cisco DNA Premier Software subscription C9300 24-Port 7 year term

Product ID	Description
C9300-DNA-P-24S	Cisco DNA Premier Term licenses, Cisco Catalyst 9300 Series 24 port 1G Fiber modular uplink models (C9300 SKUs)
C9300-DNA-P-24S-3Y	Cisco DNA Premier Software subscription C9300 1G Fiber 24-Port 3 year term
C9300-DNA-P-24S-5Y	Cisco DNA Premier Software subscription C9300 1G Fiber 24-Port 5 year term
C9300-DNA-P-24S-7Y	Cisco DNA Premier Software subscription C9300 1G Fiber 24-Port 7 year term
C9300L-DNA-P-24	Cisco DNA Premier Term licenses, Cisco Catalyst 9300 Series 24 port fixed uplink models (C9300L SKUs)
C9300L-DNA-P-24-3Y	Cisco DNA Premier Software subscription C9300L 24-Port 3 year term
C9300L-DNA-P-24-5Y	Cisco DNA Premier Software subscription C9300L 24-Port 5 year term
C9300L-DNA-P-24-7Y	Cisco DNA Premier Software subscription C9300L 24-Port 7 year term

Table 8. Cisco DNA Premier 48-Port option ordering information

Product ID	Description
C9300-DNA-P-48	Cisco DNA Premier Term licenses, Cisco Catalyst 9300 Series 48 port modular uplink models (C9300 SKUs)
C9300-DNA-P-48-3Y	Cisco DNA Premier Software subscription C9300 48-Port 3 year term
C9300-DNA-P-48-5Y	Cisco DNA Premier Software subscription C9300 48-Port 5 year term
C9300-DNA-P-48-7Y	Cisco DNA Premier Software subscription C9300 48-Port 7 year term
C9300-DNA-P-48S	Cisco DNA Premier Term licenses, Cisco Catalyst 9300 1G Fiber Series 48 port modular uplink models (C9300 SKUs)
C9300-DNA-P-48S-3Y	Cisco DNA Premier Software subscription C9300 1G Fiber 48-Port 3 year term
C9300-DNA-P-48S-5Y	Cisco DNA Premier Software subscription C9300 1G Fiber 48-Port 5 year term
C9300-DNA-P-48S-7Y	Cisco DNA Premier Software subscription C9300 1G Fiber 48-Port 7 year term
C9300L-DNA-P-48	Cisco DNA Premier Term licenses, Cisco Catalyst 9300 Series 48 port fixed uplink models (C9300L SKUs)
C9300L-DNA-P-48-3Y	Cisco DNA Premier Software subscription C9300L 48-Port 3 year term
C9300L-DNA-P-48-5Y	Cisco DNA Premier Software subscription C9300L 48-Port 5 year term
C9300L-DNA-P-48-7Y	Cisco DNA Premier Software subscription C9300L 48-Port 7 year term

Cisco Catalyst 9300 Series software license ordering information

Tables 11 and 12 provide license upgrade ordering information.

Table 9. Cisco Catalyst 9300 24-Port License Upgrade

License Type	SKU	Description
License PID	C9300-LIC=	Electronic Software License for Cisco Catalyst 9300 Series switches (C9300 SKUs)
License level upgrade-Essentials to Advantage (on both NW stack and Cisco DNA)	C9300-24-E-A-3	24-port NW & Cisco DNA Essentials to NW & Cisco DNA Advantage upgrade license (3Y)
	C9300-24-E-A-5	24-port NW & Cisco DNA Essentials to NW & Cisco DNA Advantage upgrade license (5Y)
	C9300-24-E-A-7	24-port NW & Cisco DNA Essentials to NW & Cisco DNA Advantage upgrade license (7Y)
License PID	C9300L-LIC=	Electronic SW License for Cisco Catalyst 9300 Series switches (C9300L SKUs)
License level upgrade-Essentials to Advantage (on both NW stack and Cisco DNA)	C9300L-24-E-A-3	24-port NW & Cisco DNA Essentials to NW & Cisco DNA Advantage upgrade license (3Y)
	C9300L-24-E-A-5	24-port NW & Cisco DNA Essentials to NW & Cisco DNA Advantage upgrade license (5Y)
	C9300L-24-E-A-7	24-port NW & Cisco DNA Essentials to NW & Cisco DNA Advantage upgrade license (7Y)

Table 10. Cisco Catalyst 9300 48 Port license upgrade

License Type	SKU	Description
License PID	C9300-LIC=	Electronic SW License for Cisco Catalyst 9300 Series modular uplink models (C9300 SKUs)
License level upgrade-Essentials to Advantage (on both NW stack and Cisco DNA)	C9300-48-E-A-3	48-port NW & Cisco DNA Essentials to NW & Cisco DNA Advantage upgrade License (3Y)
	C9300-48-E-A-5	48-port NW & Cisco DNA Essentials to NW & Cisco DNA Advantage upgrade License (5Y)
	C9300-48-E-A-7	48-port NW & Cisco DNA Essentials to NW & Cisco DNA Advantage upgrade License (7Y)
License PID	C9300L-LIC=	Electronic SW License for Cisco Catalyst 9300 Series fixed uplink models (C9300L SKUs)

License Type	SKU	Description
License level upgrade-Essentials to Advantage (on both NW stack and Cisco DNA)	C9300L-48-E-A-3	48-port NW & Cisco DNA Essentials to NW & Cisco DNA Advantage upgrade License (3Y)
	C9300L-48-E-A-5	48-port NW & Cisco DNA Essentials to NW & Cisco DNA Advantage upgrade License (5Y)
	C9300L-48-E-A-7	48-port NW & Cisco DNA Essentials to NW & Cisco DNA Advantage upgrade License (7Y)

Table 11. Cisco Catalyst 9300 Cisco DNA Premier subscription license upgrade

License Type	SKU	Description
License PID	CAT-CDNA-P	Cisco DNA Premier Term Add for Cisco Catalyst Switches
License level upgrade	C9300-DNA-P-48	Cisco DNA Premier Term licenses, Cisco Catalyst 9300 Series 48 port modular uplink models (C9300 SKUs)
	C9300-DNA-P-24	Cisco DNA Premier Term licenses, Cisco Catalyst 9300 Series 24 port modular uplink models (C9300 SKUs)
	C9300-DNA-P-48S	Cisco DNA Premier Term licenses, Cisco Catalyst 9300 1G Fiber Series 48 port modular uplink models (C9300 SKUs)
	C9300-DNA-P-24S	Cisco DNA Premier Term licenses, Cisco Catalyst 9300 1G Fiber Series 24 port modular uplink models (C9300 SKUs)
	C9300L-DNA-P-48	Cisco DNA Premier Term licenses, Cisco Catalyst 9300 Series 48 port fixed uplink models (C9300L SKUs)
	C9300L-DNA-P-24	Cisco DNA Premier Term licenses, Cisco Catalyst 9300 Series 24 port fixed uplink models (C9300L SKUs)

Cisco Catalyst 9300 Series hardware to Cisco DNA Software subscription license mapping

Table 12. Hardware to Cisco DNA Software subscription license mapping

Catalyst 9300 Series switch		Cisco DNA PID	Cisco DNA term license options (one must be selected)
Cisco Catalyst 9300 Series 48 port modular uplink models, Cisco DNA Essentials Software licenses			
C9300-48T-E	Cisco DNA Essentials	C9300-DNA-E-48	C9300-DNA-E-48-3Y
C9300-48P-E			C9300-DNA-E-48-5Y
C9300-48U-E			C9300-DNA-E-48-7Y
C9300-48UXM-E			C9300-DNA-E-48-3Y=
			C9300-DNA-E-48-5Y=
			C9300-DNA-E-48-7Y=

Catalyst 9300 Series switch		Cisco DNA PID	Cisco DNA term license options (one must be selected)
Cisco Catalyst 9300 Series 48 port modular uplink models, Cisco DNA Advantage Software licenses			
C9300-48T-A C9300-48P-A C9300-48U-A C9300-48UXM-A	Cisco DNA Advantage	C9300-DNA-A-48	C9300-DNA-A-48-3Y C9300-DNA-A-48-5Y C9300-DNA-A-48-7Y C9300-DNA-A-48-3Y= C9300-DNA-A-48-5Y= C9300-DNA-A-48-7Y=
	Cisco DNA Premier	C9300-DNA-P-48	C9300-DNA-P-48-3Y C9300-DNA-P-48-5Y C9300-DNA-P-48-7Y C9300-DNA-P-48-3Y= C9300-DNA-P-48-5Y= C9300-DNA-P-48-7Y=
		CAT-DNA-P-ADD	CAT-DNA-P-ADD-1Y CAT-DNA-P-ADD-3Y CAT-DNA-P-ADD-5Y CAT-DNA-P-ADD-7Y
Cisco Catalyst 9300 Series 1G Fiber 48 port modular uplink models, Cisco DNA Advantage Software licenses			
C9300-48S-A	Cisco DNA Advantage	C9300-DNA-A-48S	C9300-DNA-A-48S-3Y C9300-DNA-A-48S-5Y C9300-DNA-A-48S-7Y C9300-DNA-A-48S-3Y= C9300-DNA-A-48S-5Y= C9300-DNA-A-48S-7Y=
Cisco Catalyst 9300 Series 24 port modular uplink models, Cisco DNA Essentials Software licenses			
C9300-24T-E C9300-24P-E C9300-24U-E C9300-24UX-E	Cisco DNA Essentials	C9300-DNA-E-24	C9300-DNA-E-24-3Y C9300-DNA-E-24-5Y C9300-DNA-E-24-7Y C9300-DNA-E-24-3Y= C9300-DNA-E-24-5Y= C9300-DNA-E-24-7Y=

Catalyst 9300 Series switch		Cisco DNA PID	Cisco DNA term license options (one must be selected)
Cisco Catalyst 9300 Series 1G Fiber 24 port modular uplink models, Cisco DNA Essentials Software licenses			
C9300-24S-E	Cisco DNA Essentials	C9300-DNA-E-24S	C9300-DNA-E-24S-3Y C9300-DNA-E-24S-5Y C9300-DNA-E-24S-7Y C9300-DNA-E-24S-3Y= C9300-DNA-E-24S-5Y= C9300-DNA-E-24S-7Y=
Cisco Catalyst 9300 Series 24 port modular uplink models, Cisco DNA Advantage Software licenses			
C9300-24T-A C9300-24P-A C9300-24U-A C9300-24UX-A	Cisco DNA Advantage	C9300-DNA-A-24	C9300-DNA-A-24-3Y C9300-DNA-A-24-5Y C9300-DNA-A-24-7Y C9300-DNA-A-24-3Y= C9300-DNA-A-24-5Y= C9300-DNA-A-24-7Y=
	Cisco DNA Premier	C9300-DNA-P-24	C9300-DNA-P-24-3Y C9300-DNA-P-24-5Y C9300-DNA-P-24-7Y C9300-DNA-P-24-3Y= C9300-DNA-P-24-5Y= C9300-DNA-P-24-7Y=
		CAT-DNA-P-ADD	CAT-DNA-P-ADD-1Y CAT-DNA-P-ADD-3Y CAT-DNA-P-ADD-5Y CAT-DNA-P-ADD-7Y
Cisco Catalyst 9300 Series 48 port fixed uplink models, Cisco DNA Essentials Software licenses			
C9300L-48T-4G-E C9300L-48P-4G-E C9300L-48T-4X-E C9300L-48P-4X-E	Cisco DNA Essentials	C9300L-DNA-E-48	C9300L-DNA-E-48-3Y C9300L-DNA-E-48-5Y C9300L-DNA-E-48-7Y C9300L-DNA-E-48-3Y= C9300L-DNA-E-48-5Y= C9300L-DNA-E-48-7Y=

Catalyst 9300 Series switch		Cisco DNA PID	Cisco DNA term license options (one must be selected)
Cisco Catalyst 9300 Series 48 port fixed uplink models, Cisco DNA Advantage Software licenses			
C9300L-48T-4G-A C9300L-48P-4G-A C9300L-48T-4X-A C9300L-48P-4X-A	Cisco DNA Advantage	C9300L-DNA-A-48	C9300L-DNA-A-48-3Y C9300L-DNA-A-48-5Y C9300L-DNA-A-48-7Y C9300L-DNA-A-48-3Y= C9300L-DNA-A-48-5Y= C9300L-DNA-A-48-7Y=
	Cisco DNA Premier	C9300L-DNA-P-48	C9300L-DNA-P-48-3Y C9300L-DNA-P-48-5Y C9300L-DNA-P-48-7Y C9300L-DNA-P-48-3Y= C9300L-DNA-P-48-5Y= C9300L-DNA-P-48-7Y=
		CAT-DNA-P-ADD	CAT-DNA-P-ADD-1Y CAT-DNA-P-ADD-3Y CAT-DNA-P-ADD-5Y CAT-DNA-P-ADD-7Y
Cisco Catalyst 9300 Series 24 port fixed uplink models, Cisco DNA Essentials Software licenses			
C9300L-24T-4G-E C9300L-24P-4G-E C9300L-24T-4X-E C9300L-24P-4X-E	Cisco DNA Essentials	C9300L-DNA-E-24	C9300L-DNA-E-24-3Y C9300L-DNA-E-24-5Y C9300L-DNA-E-24-7Y C9300L-DNA-E-24-3Y= C9300L-DNA-E-24-5Y= C9300L-DNA-E-24-7Y=

Catalyst 9300 Series switch		Cisco DNA PID	Cisco DNA term license options (one must be selected)
Cisco Catalyst 9300 Series 24 port fixed uplink models, Cisco DNA Advantage Software licenses			
C9300L-24T-4G-A C9300L-24P-4G-A C9300L-24T-4X-A C9300L-24P-4X-A	Cisco DNA Advantage	C9300L-DNA-A-24	C9300L-DNA-A-24-3Y C9300L-DNA-A-24-5Y C9300L-DNA-A-24-7Y C9300L-DNA-A-24-3Y= C9300L-DNA-A-24-5Y= C9300L-DNA-A-24-7Y=
	Cisco DNA Premier	C9300L-DNA-P-24	C9300L-DNA-P-24-3Y C9300L-DNA-P-24-5Y C9300L-DNA-P-24-7Y C9300L-DNA-P-24-3Y= C9300L-DNA-P-24-5Y= C9300L-DNA-P-24-7Y=
		CAT-DNA-P-ADD	CAT-DNA-P-ADD-1Y CAT-DNA-P-ADD-3Y CAT-DNA-P-ADD-5Y CAT-DNA-P-ADD-7Y

Distribution ordering addendum

This section details the steps necessary to order Cisco Catalyst 9300 Switches through distribution partners.



Figure 9. Distribution ordering options for Cisco Catalyst 9300 Series switches

Cisco Catalyst 9300 Series switches for stocking

By selecting “Stocking” as “Intended Use”, the system will show only hardware and does not include the Cisco DNA subscription (the subscription must be ordered at point of sale).

Distributor stocking order

C9300 configuration without DNA subscription

1 Select intended use as “stocking”

2 Select appropriate PID: -E or -A

3 The DISTRIBUTOR-STOCKING SKU defaults. SW attach not enforced since the intent is to stock

P.O. Line Reference	Lead Time	Unit List Price (AUD)	Qty	Ext. List Price (AUD)
1.0 C9300-24T-E Catalyst 9300 24-port data only, Network Essentials more	14 days	12,449.50	1	12,449.50
1.1 DISTR-STOCKING DIFF. DLT SKU FOR DISTR. STOCKING USE ONLY more	Not Applicable	0.00	1	0.00
1.2 CAB-AC15A-90L-US 15A AC Power Cord, left angle (United States) bundle - options more	21 days	0.00	1	0.00

Figure 10. Distributor ordering Cisco Catalyst 9300 Series switches for stocking

Figure 11 shows the scenario where the distributor will dropship the entire order from Cisco to the end customer. The intended-use drop-down menu is set to Resale, which allows the default options for hardware support and software to become available. The system defaults will be Cisco DNA Premier and Solution Support. Cisco DNA Premier can be changed to the a-la-carte Cisco DNA Software subscription, and hardware support can be changed to premium Solution Support or Smart Net Total Care, or it can be removed completely.

Distributor dropship entire order

Catalyst 9300 Series switches with Cisco DNA Premier Software subscription

- 1 Select intended use as "resale"
- 2 Select appropriate PID: Cisco DNA Essentials (-E) or Cisco DNA Advantage (-A)
- 3 Select the consumption model: Cisco DNA Premier, Advantage and Essentials Software subscription
- 4 Select the term of the license, 5 years default (can be changed)
- 5 ISE Base added automatically during configuration. (Cisco DNA Premier)
- 6 Solution support is selected as default service, but can be changed

• Subscription offset to 60 days*

Figure 11.
Distributor drop shipping the entire order

Figure 12 shows the distributor drop-shipping the entire order from Cisco to the end customer using Cisco DNA Essentials or Advantage software subscriptions instead of Cisco DNA Premier Software subscription.

Distributor dropship entire order

Catalyst 9300 Series switches with Cisco DNA Premier Software subscription

- 1 Select appropriate PID: Cisco DNA Essentials (-E) or Cisco DNA Advantage (-A)
- 2 Select the consumption model: Cisco DNA Premier, Advantage and Essentials Software subscription
- 3 Select the term of the license, 5 years default (can be changed)
- 4 Select support is selected as default service, but can be changed

- Subscription offset to 60 days* after ship date

Item	P.O. Line Reference	Lead Time	Unit List Price	Qty	Ext. List Price
1.0 C9300-24T-E Catalyst 9300 24 port data only, Network Essentials, more ECCN EAR99		14 days	6,595.00	1	6,595.00
1.1 CON-SSNT-CAS SOLN SUPP EXCHNGD MDS 8148S 16G FC switch, w/ 12 active port more		Not Applicable	330.0	1	330.00
1.2 C9300-DNA-E-24 Cisco DNA Essentials, 24 port Term license more		9 days	0.0	1	0.00
1.3.1 C9300-DNA-E-24-5Y Cisco DNA Essentials, 24 port, 5 Year Term license more		Not Applicable	1,270.0	1	1,270.00
1.4 CAB-L622P-C13-US Power Cord, 250WAC, 15A, NEMA L6-20 to C13, US more ECCN EAR99		14 days	0.0	1	0.00

Figure 12. Distributor drop-shipping entire Cisco Catalyst 9300 Series switch Cisco DNA Essentials or Advantage software subscription order

Figure 13 shows the partner quote request to the distributor. The distributor can choose to fulfill the entire order by drop-shipping or fulfill the hardware from stock and create a dropship order for Cisco DNA software.

Distributor - partner quote request

Catalyst 9300 Series product quote with Cisco DNA Software subscription and hardware support

- Distributor receives quote from Partner
- Distributor fulfills the hardware from stock and will create a dropship for the Cisco DNA Team software and HW support services

- 1 Partner select appropriate PID: Cisco DNA Essentials (-E) or Advantage (-A)
- 2 Partner selects the HW support during configuration. Defaults to solution support, but can be changed
- 3 Cisco DNA term license selected during configuration. The distributor will order the C9300-DNA-E-24-5 years= instead of the SKU in the configuration

Item	Lead Time	Unit List Price	Qty	Extended List Price
1.0 C9300-24T-E Catalyst 9300 24 port data only, Network Essentials, Smart Access, more VALID Wks 17-May-2017 13:41:17 PDT	Not Applicable	6,595.00	1	6,595.00
1.1 CON-SSNT-CAS SOLN SUPP EXCHNGD MDS 8148S 16G FC switch, w/ 12 active port more	Not Applicable	330.00	1	330.00
1.2 C9300-DNA-E-24 Cisco DNA Essentials, 24 port Term license more	Not Applicable	0.00	1	0.00
1.3.1 C9300-DNA-E-24-5Y Cisco DNA Essentials, 24 port, 5 Year Term license more	Not Applicable	9,000.00	1	9,000.00

Figure 13. Distributor fulfilling partner quote

Figure 14 shows the distributor using either the Cisco DNA Essentials, Advantage or Premier subscription option when fulfilling software as dropship.

Fulfilled from inventory

Distributor order for SW and HW support

- 1 Distributor fulfills the hardware from stock for the quote from Partner and create a dropship for the Cisco DNA Term software
- 2 Distributor also places the service order at this time
- 3 As an alternative to the a la carte Cisco DNA subscription the Cisco DNA Premier is available and distributor would order using the **CAT-DNA-P-ADD**

1 Cisco DNA subscription

2 Service only

OR

3 Cisco ONE

Item ID	Description	Unit	Price	Qty	Total Price
1	Cisco DNA subscription	2 days	0.00	1	0.00
2	Service only	1 day	1.00	1	1.00
3	Cisco ONE	1 day	0.00	1	0.00

Figure 14. Distributor drop-shiping software only

Figure 15 shows the SKUs that the distributor has to use when ordering software as a dropship in Cisco DNA Essentials, Advantage or Premier subscription option scenarios.

SKU details for distributor ordering software as dropship

A la Carte			
Product type	Reseller quote	Distributor stock	Distributor dropship
Switch	C9300-24T-E	C9300-24T-E	C9300-24T-E
Cisco DNA Essentials	C9300-DNA-E-24		C9300-DNA-E-24=
Cisco DNA Advantage	C9300-DNA-A-24		C9300-DNA-A-24=

1 Distributor fulfills the hardware from stock for the quote from partner and creates a dropship for the Cisco DNA Term software. When placing the order for Cisco DNA Term SW, the Distributor will use C9300-DNA-E-24=

Cisco DNA Premier			
Product type	Reseller quote	Distributor stock	Distributor dropship
Switch	C9300-24T-E	C9300-24T-E	C9300-24T-E
Cisco DNA Premier	C9300-DNA-P-24		C9300-DNA-P-24

2 Distributor fulfills the hardware from stock for the quote from partner and creates dropship for the Cisco DNA Term Software. When placing the order for Cisco DNA Term Software, the Distributor will use CAT-CDNA-P SKU

Figure 15. SKU details for distributor ordering software as dropship

Important links

Smart Accounts: All you need to know

- [Operations exchange: Partner and distributor software training](#): A comprehensive list of external software training resources and detailed training modules for ordering and license management
- [Smart Account leading practices for customers](#): A leading practices guide that can help customers decide how to structure their Smart Accounts, including if they need multiple Smart Accounts
- [Smart Account decision tree](#): A short branching survey that helps partners and customers understand what type of Smart Accounts to create
- [Cisco Smart Accounts on Cisco.com](#): The primary Cisco.com site for Smart Accounts

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Feedback

Need help?

760234859 | 2091SD BLU C6A 4/23 U/UTP R1000

Base Product: **2091SD**

Available in: [Asia](#) | [Australia/New Zealand](#) | [EMEA](#) | [Latin America](#) | [North America](#)

GigaSPEED X10D® 2091SD ETL Verified Category 6A U/UTP Cable, plenum, blue jacket, 4 pair count, 1000 ft (305 m) length, reel

Specifications

View	Download 	Share 
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Menu



Features and Benefits

- Ideal solution where space is a concern – 0.265" outer diameter maximum utilizing a specially designed non-conductive tape around the 4 pairs
- Part of the SYSTIMAX GigaSPEED X10D family of products
- Meets and exceeds performance specifications for all channel configurations currently supported by the GigaSPEED X10D system

Specifications

Product Classification

Regional Availability	Asia Australia/New Zealand EMEA Latin America North America
Portfolio	SYSTIMAX®
Product Type	Twisted pair cable
Product Brand	GigaSPEED X10D®

General Specifications

Product Number	2091SD
ANSI/TIA Category	6A
Cable Component Type	Horizontal
Cable Type	U/UTP (unshielded)

Feedback

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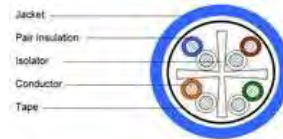
Note	Consult ANSI/TIA-568-C.2 Annex G for length de-rating guidance for cable installation in higher temperature environments
Pairs, quantity	4
Separator Type	Isolator
Transmission Standards	ANSI/TIA-568.2-D

Dimensions

Cable Length	304.8 m 1000 ft
Diameter Over Conductor	1.115 mm 0.0439 in
Diameter Over Jacket, nominal	6.731 mm 0.265 in
Jacket Thickness	0.406 mm 0.016 in
Conductor Gauge, singles	23 AWG

Cross Section Drawing

Click on image to enlarge.



Electrical Specifications

dc Resistance Unbalance, maximum	4 %
dc Resistance, maximum	8 ohms/100 m 2.438 ohms/100 ft
Dielectric Strength, minimum	1500 Vac 2500 Vdc

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Feedback

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Operating Frequency, maximum	500 MHz
Operating Voltage, maximum	80 V
Remote Powering	Fully complies with the recommendations set forth by IEEE 802.3bt (Type 4) for the safe delivery of power over LAN cable when installed according to ISO/IEC 14763-2, CENELEC EN 50174-1, CENELEC EN 50174-2 or TIA TSB-184-A

Material Specifications

Conductor Material	Bare copper
Insulation Material	FEP
Jacket Material	PVC
Separator Material	FEP
Tape Material	Poly/Aluminum/Poly

Mechanical Specifications

Pulling Tension, maximum	11.34 kg 25 lb
--------------------------	------------------

Environmental Specifications

Installation temperature	0 °C to +60 °C (+32 °F to +140 °F)
Operating Temperature	-20 °C to +75 °C (-4 °F to +167 °F)
Environmental Space	Plenum
Temperature Rating, UL	105 °C 221 °F
Flame Test Method	CMP/FT6



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Packaging Type

Reel


Regulatory Compliance/Certifications


Agency	Classification
ISO 9001:2015 	Designed, manufactured and/or distributed under this quality management system
ROHS	Compliant
CHINA-ROHS 	Below maximum concentration value
REACH-SVHC	Compliant as per SVHC revision on www.commscope.com/ProductCompliance

Specifications



Product Support

 [Customer and Technical Support, Software/Firmware, Repair Services](#)

 [Technical Training for CommScope](#)

Product Support



Documentation & Downloads

3rd Party Certification - Component

 [2091SD_U-UTP_CMP](#)

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Product Compliance Documentation

 [Statement of Compliance RoHS/REACH](#)


Product Specification


 [760234859 Product specifications](#)

Technical Publication

 [Use of SYSTIMAX cabling for PoE applications](#)

Warranty

 [CommScope Extended System Warranty](#)

 [CommScope Limited Product Warranty](#)

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Documentation & Downloads

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Berk-Tek LANmark-SST Reduced Diameter UTP Plenum Category 6A



LANmark-SST's reduced diameter (0.250" CMP vs. 0.275" for average Cat 6A cable) offers better flexibility, optimized cable management, and improved tray-fill ratio for high-density installations.

DESCRIPTION

LANmark™-SST is the smallest diameter, highest-performing Cat 6A cable. It offers outstanding signal isolation, excellent high-PoE performance and Alien Crosstalk performance that exceeds the standard, making it an excellent choice for high-power, high-bandwidth applications like 802.11ac wireless, HD video and IP security.

Its specially designed insulated metallic isolation wrap provides superior heat management and noise-cancelling performance preventing electrical energy from running along the shield, eliminating the need for grounding.

LANmark-SST's reduced diameter (0.250" CMP vs. 0.275" for average Cat 6A cable) offers better flexibility, optimized cable management, and improved tray-fill ratio for high-density installations.

Based on Berk-Tek's advanced testing, LANmark-SST has a Universal Application Score (UA Score) of 8.6 and is a great choice for high bandwidth requirements with excellent PoE performance and the superior choice for HD Video and 802.11ac wireless.

Construction:

Bare copper wire insulated with FEP. Two primaries are twisted together to form a pair and four such pairs are cabled together with a central filler to form the basic unit. The cable core is surrounded by an insulated metallic isolation wrap and jacketed with flame-retardant polymer alloy.

Flame Rating:

Plenum-NFPA 70, CMP
ETL Listed as CMP-LP (0.7A)

Reduced Diameter Benefits:

- Reduced cable size of 0.250" which is up to 9% nominal reduction versus the industry average of 0.275"
- Supports high-density applications and installations
- Improved pathway space and fill rations - 20% increase in number of cables per tray versus average 0.275" size cable
- Small diameter provides better operational airflow and cooling in congested pathways such as a data center environment
- Smaller size allows for a smaller bend radius in tight spaces and improved cable management
- Reduced cable weight causes less strain on pathways and improves ease of installation

Environmental Features:

- Health Product Declaration
- Product Environmental Profile

Perform Beyond Expectations, choose Berk-Tek.

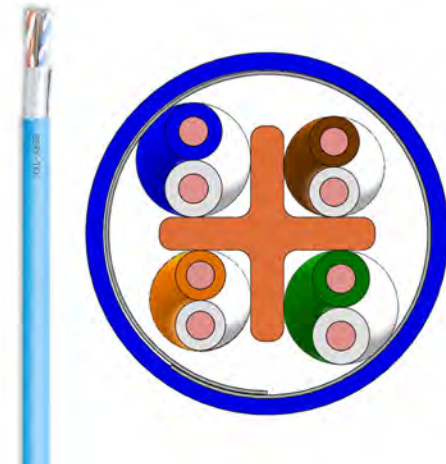
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SS2028-BTv2 - Released April 2021

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NETWORK SOLUTIONS HEADQUARTERS

Bothell, WA, USA | leviton.com/ns
(800) 824 3005 / +1 (425) 486 2222 | appeng@leviton.com



STANDARDS

National ANSI/TIA 568.2-D;
CSA C22.2 N° 214-02; UL 444

BERK-TEK A LEVITON COMPANY
New Holland, PA, USA | leviton.com/berktek
+1 (717) 354 6200 | berktek.support@leviton.com

Berk-Tek LANmark-SST Reduced Diameter UTP Plenum Category 6A

CHARACTERISTICS

Dimensional characteristics



Length per reel	1000.0 ft
Number of pairs	4

Usage characteristics

Category	Cat. 6A
Fire safety	CMP - Plenum Rated
Recommended operating temperature range	-20 .. 105 °C

PRODUCT LIST

Part Number	Description	Colour	Packaging	Field of application
 11101842 New	LANmark-SST Reduced Diameter UTP Plenum Category 6A	Blue	Reel	Indoor
 11140408 New	LANmark-SST Reduced Diameter UTP Plenum Category 6A	Orange	Reel	Indoor
 11140403 New	LANmark-SST Reduced Diameter UTP Plenum Category 6A	Yellow	Reel	Indoor
 11140405 New	LANmark-SST Reduced Diameter UTP Plenum Category 6A	Red	Reel	Indoor
 11140402 New	LANmark-SST Reduced Diameter UTP Plenum Category 6A	Dark grey	Reel	Indoor
 11140404 New	LANmark-SST Reduced Diameter UTP Plenum Category 6A	Green	Reel	Indoor
 11140406 New	LANmark-SST Reduced Diameter UTP Plenum Category 6A	Black	Reel	Indoor
 11140407 New	LANmark-SST Reduced Diameter UTP Plenum Category 6A	Violet	Reel	Indoor
 11140401 New	LANmark-SST Reduced Diameter UTP Plenum Category 6A	White	Reel	Indoor
 11140627 New	LANmark-SST Reduced Diameter UTP Plenum Category 6A	Blue	Reel in a box	Indoor
 11140635 New	LANmark-SST Reduced Diameter UTP Plenum Category 6A	Orange	Reel in a box	Indoor
 11140630 New	LANmark-SST Reduced Diameter UTP Plenum Category 6A	Yellow	Reel in a box	Indoor
 11140632 New	LANmark-SST Reduced Diameter UTP Plenum Category 6A	Red	Reel in a box	Indoor
 11140629 New	LANmark-SST Reduced Diameter UTP Plenum Category 6A	Dark grey	Reel in a box	Indoor
 11140631 New	LANmark-SST Reduced Diameter UTP Plenum Category 6A	Green	Reel in a box	Indoor
 11140633 New	LANmark-SST Reduced Diameter UTP Plenum Category 6A	Black	Reel in a box	Indoor
 11140634 New	LANmark-SST Reduced Diameter UTP Plenum Category 6A	Violet	Reel in a box	Indoor
 11140628 New	LANmark-SST Reduced Diameter UTP Plenum Category 6A	White	Reel in a box	Indoor

 = Make to order,  = In stock

Berk-Tek LANmark-SST Reduced Diameter UTP Plenum Category 6A



LANMARK-SST PLENUM - TECHNICAL INFORMATION

Electrical Characteristics

FQ = Frequency (MHz) / TIA = TIA Spec / PG = Product Guarantee

FQ	RL (dB)		NEXT (dB)		PSNEXT (dB)		ACRF (dB)		PSANEXT (dB)		LCL/TCL
	TIA	PG	TIA	PG	TIA	PG	TIA	PG	TIA	PG	
1	20.00	20.00	74.30	74.30	72.30	72.30	67.80	71.80	67.00	77.00	50.00
4	23.00	23.00	65.30	65.30	63.30	63.30	55.80	59.80	67.00	77.00	44.0
10	25.00	25.00	59.30	59.30	57.30	57.30	47.80	51.80	67.00	77.00	40.00
16	25.00	25.00	56.20	56.30	54.20	54.30	43.70	47.70	67.00	77.00	38.00
20	25.00	25.00	54.80	54.80	52.80	52.80	41.80	45.80	67.00	77.00	37.00
31.25	23.60	23.60	51.90	51.90	49.90	49.90	37.90	41.90	67.00	77.00	35.10
62.5	21.50	21.50	47.40	47.40	45.40	45.40	31.90	35.90	65.60	76.60	32.00
100	20.10	20.10	44.30	44.30	42.30	42.30	27.80	31.80	62.50	72.50	30.00
250	17.30	17.30	38.30	38.30	36.30	36.30	19.80	23.80	56.50	66.50	26.00
350	16.30	16.30	36.10	36.20	34.10	34.20	16.90	20.90	—	64.30	24.60
400	15.90	15.90	35.30	35.30	33.30	33.30	15.80	19.80	53.50	63.50	23.40
500	15.20	15.20	33.80	33.80	31.80	31.80	13.80	17.80	52.00	62.00	23.00
600	—	14.70*	—	32.60*	—	30.60*	—	16.20*	—	60.80*	22.20*
750	—	14.00*	—	31.20*	—	29.20*	—	14.30*	—	59.40*	21.20*

FQ	IL (dB/100 m)		ACR (dB/100 m)		PSACR (dB/100 m)		PSACRF (dB/100 m)		PSAACRF (dB)		EL TCTL
	TIA	PG	TIA	PG	TIA	PG	TIA	PG	TIA	PG	
1	2.10	2.10	72.20	72.20	70.20	70.20	64.80	68.80	67.00	77.00	35.00
4	3.80	3.80	61.50	61.50	59.50	59.50	52.80	56.70	66.20	76.20	23.00
10	5.90	5.90	53.40	53.40	51.40	51.40	44.80	48.80	58.20	68.20	15.00
16	7.50	7.50	48.80	48.80	46.80	46.80	40.70	44.70	54.10	64.10	10.90
20	8.40	8.40	46.40	46.40	44.40	44.40	38.80	42.80	52.20	62.20	9.00
31.25	10.50	10.50	41.40	41.40	39.40	39.40	34.90	38.90	48.30	58.30	—
62.50	15.00	15.00	32.40	32.40	30.40	30.40	28.90	32.80	42.30	52.30	—
100	19.10	19.10	25.20	25.20	23.20	23.20	24.80	28.80	38.20	48.20	—
250	31.10	31.10	7.30	7.30	5.30	5.30	16.80	20.80	30.20	40.20	—
350	37.20	37.20	-1.10	-1.10	-3.10	-3.10	13.90	17.90	—	37.30	—
400	40.10	40.10	-4.80	-4.80	-6.80	-6.80	12.80	16.70	26.20	36.20	—
500	45.30	45.30	-11.40	-11.40	-13.40	-13.40	10.80	14.80	24.20	34.20	—
600	—	50.10*	—	—	—	—	—	13.20*	—	32.60*	—
750	—	56.70*	—	—	—	—	—	11.30*	—	30.70*	—

*Values provided for reference only

Berk-Tek LANmark-SST Reduced Diameter UTP Plenum Category 6A



Parametric Measurements

Description	
Mutual Capacitance (nominal)	5.1 nF Ohms/100m
DC Resistance	9.38 Ohms/100m max.
Skew	45 ns/100m max.
Pair-to-Ground Unbalance	330 pF/100m max.
Velocity of Propagation	70% nom.
DC Resistance Unbalance	4% max.

Color Code

Pair-1	White/Blue	Blue
Pair-2	White/Orange	Orange
Pair-3	White/Green	Green
Pair-4	White/Brown	Brown

Supported Category 6A Applications

Standard	Application	Speed
IEEE 802.3an	10GBASE-T	10 Gb/s
IEEE 802.3	1000BASE-T	1 Gb/s
TIA/EIA 854	1000BASE-TX	1 Gb/s
ATM	155 Mb/s	155 Mb/s
CDDI		100 Mb/s
IEEE 802.3	100BASE-T	10 Mb/s
IEEE 802.3 af	PoE	1 Gb/s
IEEE 802.3 at	PoE+, Type 1 & 2	1 Gb/s
IEEE 802.3 bt	PoE++, Type 3 & 4	10 Gb/s

Technical Data - Physical

Conductor	23 AWG Bare Copper	
Conductor Diameter - in. (mm)	0.022	(0.56)
Insulated Conductor Diameter - in. (mm)	0.042	(1.07)
Cable Diameter - in. (mm)	0.250	(6.35)
Nom. Cable Weight - lb./kft (kg/kft)	33	(14.97)
Max. Installation Tension - lb. (N)	25	(110)
Min. Bend Radius - in. (mm)	1.00	(25.40)

LANMARK-SST UTP PLENUM JACKET LEGEND

BERK-TEK LANMARK-SST UTP 23 AWG CMP 105C C(ETL)US CMP-LP (0.7A) ETL VERIFIED TIA-568.2-D CAT 6A [DATE] [COUNTER] [UID]" FT

LANMARK-SST UNIVERSAL APPLICATION SCORE

A cable's Universal Application Score (UA Score) is an indicator of how well IP traffic is protected and how much heat rise there is when the cable undergoes PoE testing. The score is represented by a numeric value between 1 and 10, with 1 being the lowest and 10 being the highest. In reality, a score of 1 is unattainable because it would represent no connection, as is a score of 10 because it would mean zero heat rise with high power PoE. UA Scores range between 2 and 9.

		LANmark-SST					
UA Score	Score	> 3.6	3.6 - 5.5	5.6 - 6.5	6.6 - 7.5	7.6 - 8.5	8.6 +
	Performance	Unacceptable	Poor	Limited	Good	Better	Best
	Heat Rise	Severe	Significant	Moderate	Moderate	Moderate	Low

What does the UA Score tell you? A performance rating of "Poor" (less than 3.6) means that there were consistent noticeable flaws (dropped frames, media loss, etc) in the applications tested. As you move towards higher performance scores, you would notice fewer and fewer flaws, until you reach a score of 9, which is almost flawless. PoE testing is also an important factor; cables that experienced less temperature rise achieve higher UA Scores.

SELLING INFORMATION

PLEASE NOTE: In the interest of product improvement, Berk-Tek may make improvements or changes in the products, the programs or services described at any time without notice. Additionally, the information contained herein may include typographical errors or technical inaccuracies. Changes will be periodically made to address any such issues.

TR & TRS

TIME DELAY/CLASS RK5



THE INDUSTRY'S MOST POPULAR FUSE FOR MOTOR CIRCUIT PROTECTION.

Tri-onic® SmartSpot® fuses now provide a visual open fuse indicator. With advanced material technology added to the existing product the TR and TRS current limiting time delay fuses are engineered for overcurrent protection of motors and transformers, service entrance equipment, feeder and branch circuits. Tri-onic proven time delay characteristic safely handles harmless starting currents and inrush currents associated with today's motors and transformers.

Features/Benefits

- **Solid State SmartSpot Indicator**
- **Time delay** for motor start-ups and transformer inrush currents without nuisance opening
- **Current limiting** for low peak let-thru current
- **Rejection-style design** prevents replacement errors (when used with recommended fuse blocks)
- **Easy-to-read label** for quick recognition and replacement
- **Metal-embossed date and catalog number** for traceability and lasting identification
- **Fiberglass body** provides dimensional stability in harsh industrial settings
- **High-grade silica filler** ensures fast arc quenching and high current limitation

HIGHLIGHTS:

- Time Delay
- Current Limiting
- AC & DC Rated

APPLICATIONS:

- Motor Circuits
- Mains
- Feeders
- Branch Circuits
- Transformers
- Service Entrance Equipment
- General-purpose Protection

Ratings

- **TR**
AC: 1/10 to 600A
250VAC, 200kA I.R.
- **DC:** 1/10 to 2 8/10A
& 35 to 400A, 250VDC,
20kA I.R.; 3 to 30A &
450 to 600A, 160VDC,
20kA I.R.
- **TRS**
AC: 1/10 to 600A
600VAC, 200kA I.R.
- **DC:** 1/10 to 12A,
600VDC, 20kA I.R.;
15 to 60A, 300VDC,
20kA I.R. 70 to 600A,
600VDC, 100kA I.R.

Approvals

- UL Listed to Standard
248-12 File E2137
- CSA Certified to
Standard C22.2
No. 248.12
- DC Listed to UL
Standard 248 TRS only



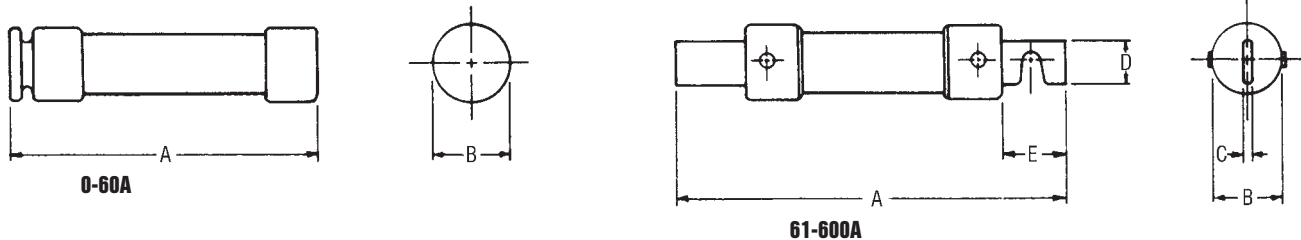
TIME DELAY/CLASS RK5 FUSES

TR & TRS

Standard Fuse Ampere Ratings, Catalog Numbers

Ampere Rating	Catalog Number		Ampere Rating	Catalog Number		Ampere Rating	Catalog Number	
	250V	600V		250V	600V		250V	600V
1/10	TR1/10R	TRS1/10R	3-1/2	TR3-1/2R	TRS3-1/2R	50	TR50R	TRS50R
15/100	TR15/100R	TRS15/100R	4	TR4R	TRS4R	60	TR60R	TRS60R
2/10	TR2/10R	TRS2/10R	4-1/2	TR4-1/2R	TRS4-1/2R	70	TR70R	TRS70R
3/10	TR3/10R	TRS3/10R	5	TR5R	TRS5R	75	TR75R	TRS75R
4/10	TR4/10R	TRS4/10R	5-6/10	TR5-6/10R	TRS5-6/10R	80	TR80R	TRS80R
1/2	TR1/2R	TRS1/2R	6	TR6R	TRS6R	90	TR90R	TRS90R
6/10	TR6/10R	TRS6/10R	6-1/4	TR6-1/4R	TRS6-1/4R	100	TR100R	TRS100R
8/10	TR8/10R	TRS8/10R	7	TR7R	TRS7R	110	TR110R	TRS110R
1	TR1R	TRS1R	8	TR8R	TRS8R	125	TR125R	TRS125R
1-1/8	TR1-1/8R	TRS1-1/8R	9	TR9R	TRS9R	150	TR150R	TRS150R
1-1/4	TR1-1/4R	TRS1-1/4R	10	TR10R	TRS10R	175	TR175R	TRS175R
1-4/10	TR1-4/10R	TRS1-4/10R	12	TR12R	TRS12R	200	TR200R	TRS200R
1-6/10	TR1-6/10R	TRS1-6/10R	15	TR15R	TRS15R	225	TR225R	TRS225R
1-8/10	TR1-8/10R	TRS1-8/10R	17-1/2	TR17-1/2R	TRS17-1/2R	250	TR250R	TRS250R
2	TR2R	TRS2R	20	TR20R	TRS20R	300	TR300R	TRS300R
2-1/4	TR2-1/4R	TRS2-1/4R	25	TR25R	TRS25R	350	TR350R	TRS350R
2-1/2	TR2-1/2R	TRS2-1/2R	30	TR30R	TRS30R	400	TR400R	TRS400R
2-8/10	TR2-8/10R	TRS2-8/10R	35	TR35R	TRS35R	450	TR450R	TRS450R
3	TR3R	TRS3R	40	TR40R	TRS40R	500	TR500R	TRS500R
3-2/10	TR3-2/10R	TRS3-2/10R	45	TR45R	TRS45R	600	TR600R	TRS600R

Note: Indicator not available (1/10 - 7) amps.



Dimensions

AMPERE RATING	A		B		C		D		E	
	In.	mm	In.	mm	In.	mm	In.	mm	In.	mm
250V-TR FUSES										
0-30	2	51	9/16	14	-	-	-	-	-	-
31-60	3	76	13/16	21	-	-	-	-	-	-
61-100	5-7/8	149	1-1/16	27	1/8	3	3/4	19	1	25
101-200	7-1/8	181	1-9/16	40	3/16	5	1-1/8	28	1-3/8	35
201-400	8-5/8	219	2-1/16	53	1/4	6	1-5/8	41	1-7/8	48
401-600	10-3/8	264	2-9/16	66	1/4	6	2	51	2-1/4	57
600V-TRS FUSES										
0-30	5	127	13/16	21	-	-	-	-	-	-
31-60	5-1/2	139	1-1/16	27	-	-	-	-	-	-
61-100	7-7/8	200	1-5/16	34	1/8	3	3/4	19	1	25
101-200	9-5/8	244	1-13/16	46	3/16	5	1-1/8	28	1-3/8	35
201-400	11-5/8	295	2-9/16	66	1/4	6	1-5/8	41	1-7/8	48
401-600	13-3/8	340	3-1/8	80	1/4	6	2	51	2-1/4	57

Recommended Fuse Blocks With Box Connectors For Tri-onic® Class RK5 Fuses

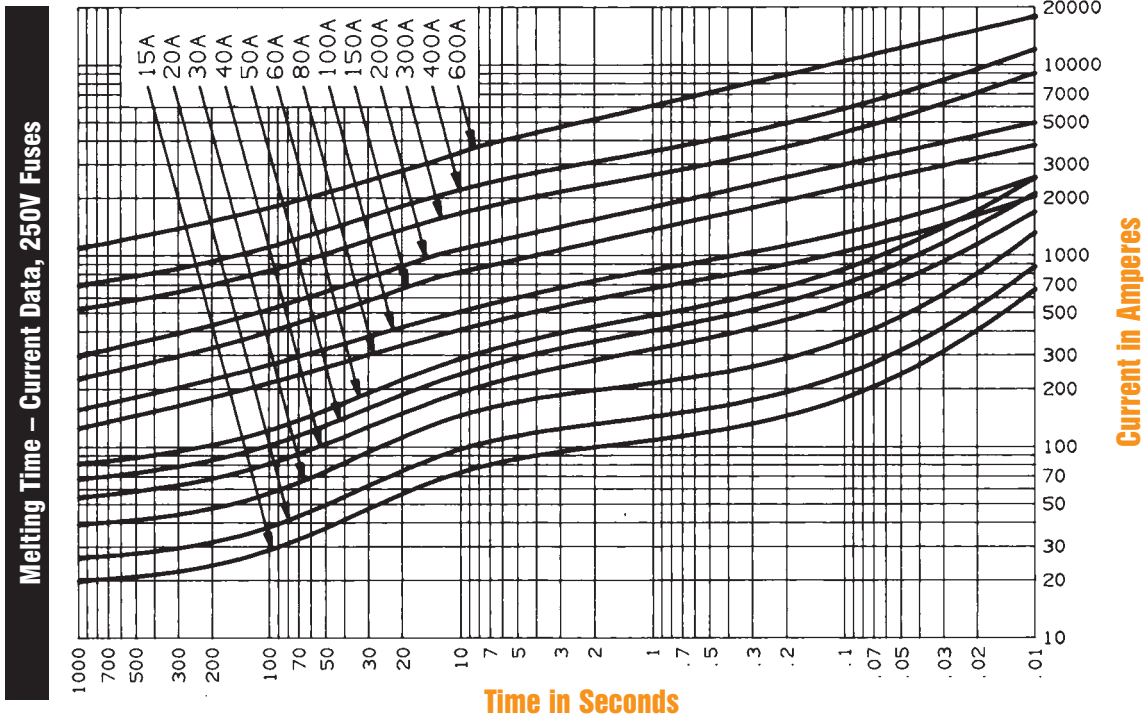
Fuse Ampere Rating	Catalog Number			
	250V		600V	
	1 Pole	3 pole	1 pole	3 pole
0-30	20306R	20308R	60306R	60308R
31-60	20606R	20608R	60606R	60608R
61-100	21036R	21038R	61036R	61038R
101-200	22001R	22003R	62001R	62003R
201-400	24001R	24003R	64001R	64003R
401-600	2631R	2633R	6631R	6633R



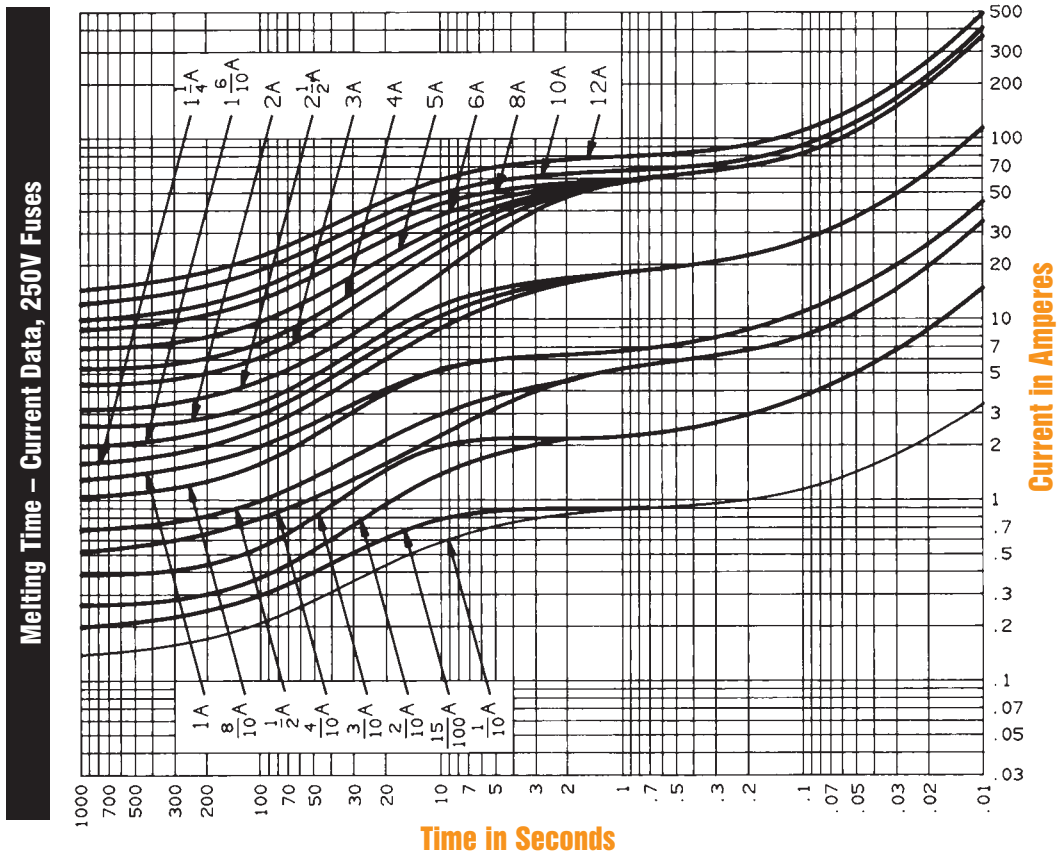
TIME DELAY/CLASS RK5 FUSES

TR & TRS

TR15 TO 600



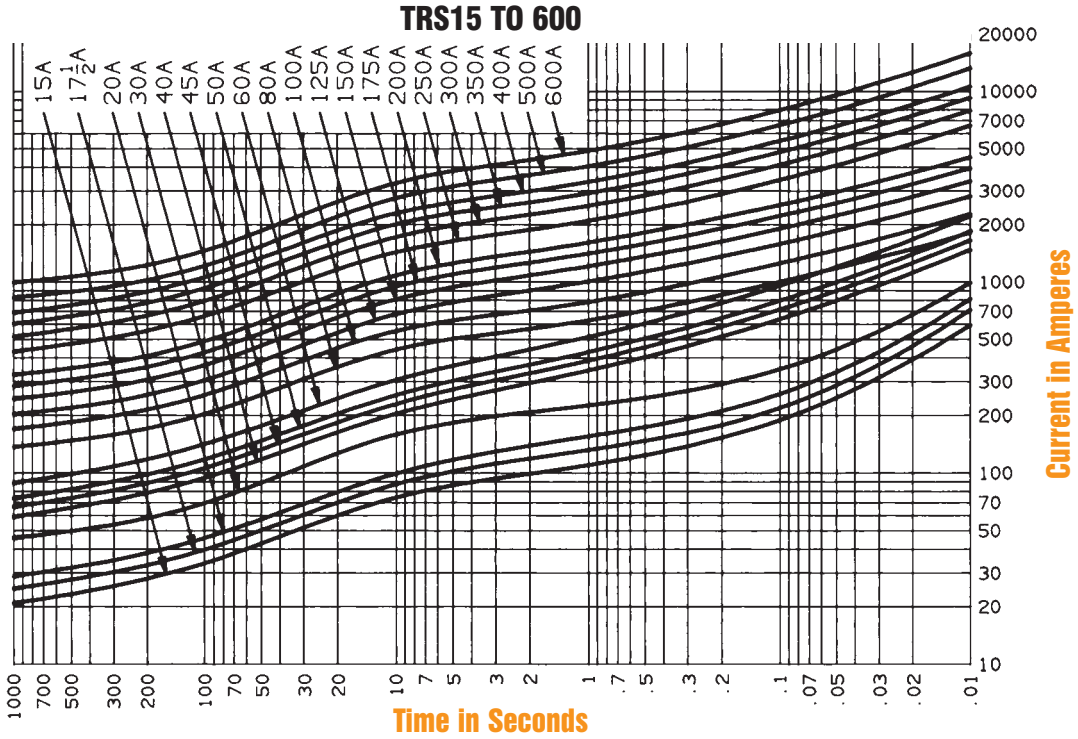
TR1/10 TO 12



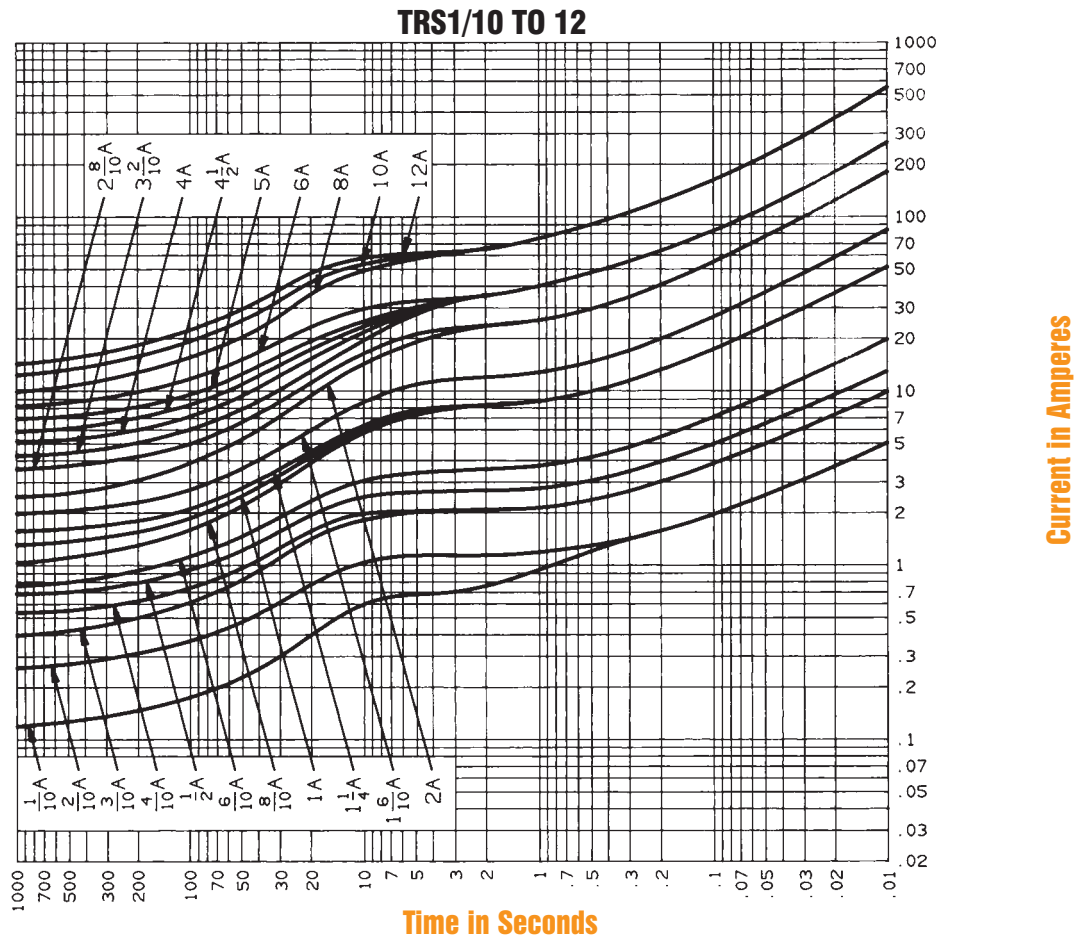
TIME DELAY/CLASS RK5 FUSES

TR & TRS

Melting Time – Current Data, 600V Fuses



Melting Time – Current Data, 600V Fuses

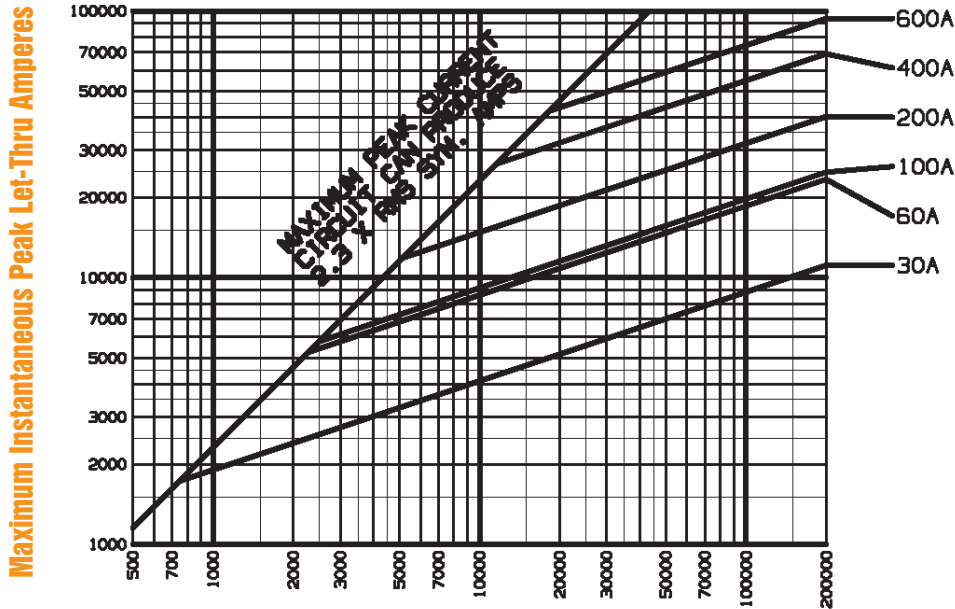


B

TIME DELAY/CLASS RK5 FUSES

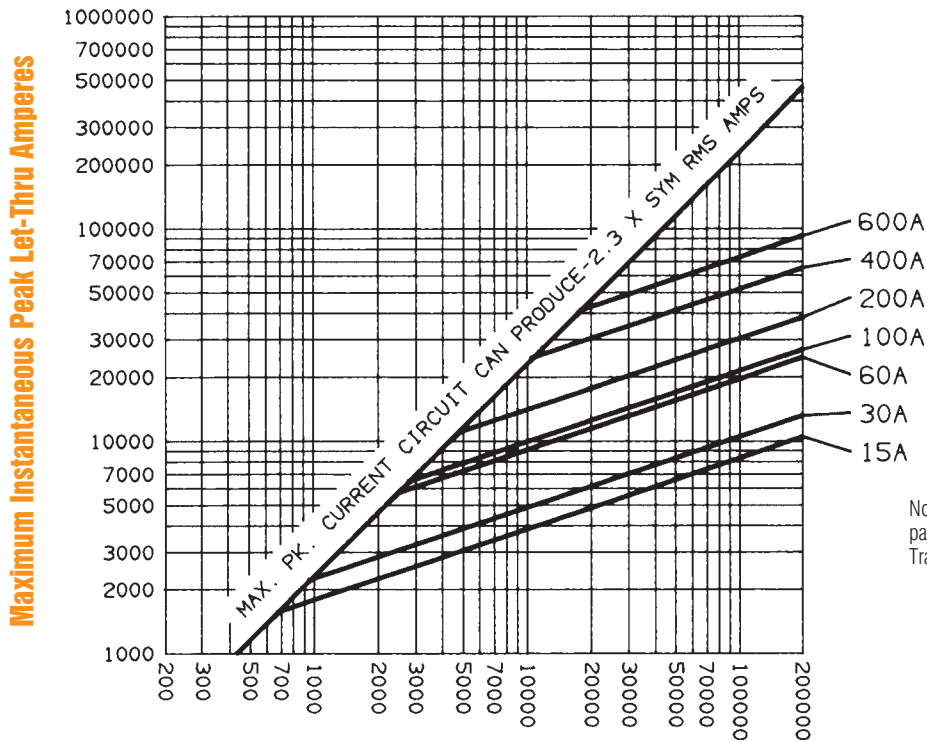
TR & TRS

Peak Let-Through Current Data – TR30 to 600, 250 Volts AC



Available Current in RMS Symmetrical Amperes

Peak Let-Through Current Data – TRS15 to 600, 600 Volts AC



Note: See Application Information page L9 for All Motor and Transformer Tables.



A Series® Panelboards

Accessories

Field Installed Kits/Replacement Parts

Order By Catalog Number from Factory

Enclosures ①

Panel Size	Box Catalog Number	Box Size Inches ②	List Price ③, GO-134B	Front Catalog Number ④	List Price ③, GO-134B
0-25.5	AB25B	25.5	\$166.00	AF25F.S	\$170.00
28.5-31.5	AB31B	31.5	170.00	AF31F.S	174.00
34.5-37.5	AB37B	37.5	182.00	AF37F.S	191.00
40.5-43.5	AB43B	43.5	204.00	AF43F.S	218.00
46.5-49.5	AB49B	49.5	233.00	AF49F.S	257.00
52.5-55.5	AB55B	55.5	261.00	AF55F.S	299.00
57.5-64.5	AB64B	64.5	286.00	AF64F.S	326.00
67.5-76.5	AB76B	76.5	324.00	AF76F.S	367.00

- ① "B" suffix provides blank end walls. Order "K" suffix for end-walls with knockouts.
- ② Standard boxes are 20" wide by 5.81 inches deep.
- ③ Use when ordering items separately for replacement. Do not deduct from panel list price to obtain interior only pricing.
- ④ Flush fronts are 1½" larger than box. Surface fronts are ¼" larger.

Box Options

Description	Catalog Number Suffix ⑤	List Price, GO-101
7.81 deep ⑥	D	\$200.00
Painted Box	P	200.00
30" wide ⑦	W	250.00
NEMA 3R/12	3	950.00

- ⑤ Add to base box catalog number.
- ⑥ K frame main only.
- ⑦ Includes field installable gutter barrier

Front Options

Description	Catalog Number Suffix ⑧	List Price, GO-101
Screw cover	C	\$ 61.00
Front hinged to box	D	110.00
Optional Locks:		
Yale 5116 w/ Rosette	Y	300.00
Corbin 15767	L	146.00
Door within a door ⑨	P	238.00
Stainless steel ⑩	S	1467.00
30" wide	W	82.00
Nameplate	N	27.00
Screw on nameplate	U	74.00
Metal directory	M	50.00

- ⑧ Add to base front catalog number.
- ⑨ Consists of two lockable doors—one over panel interior and one over box wiring gutters. Yale locks not available.
- ⑩ Flush only. Available with C and N options.

Box Extensions — Bolts to A SERIES box with or without box endwall in place. Extensions can be combined to obtain lengths greater than 18 and 24 inches.

Box Width and Depth	Box Mounting	Box Extension Length (Inches)	Box Extension Catalog Number	List Price, GO-101
20 x 5.81	Flush	9	ABX2509F	\$145.00
		18	ABX2518F	167.00
		24	ABX2524F	194.00
	Surface	9	ABX2509S	145.00
		18	ABX2518S	167.00
		24	ABX2524S	194.00
		31	ABX2531S	220.00
		37	ABX2537S	240.00
		43	ABX2543S	271.00
		49	ABX2549S	311.00
55	ABX2555S	358.00		
64	ABX2564S	353.00		
76	ABX2576S	440.00		
20 x 7.81	Flush	18	ABX2718F	184.00
		24	ABX2724F	206.00
	Surface	18	ABX2718S	184.00
		24	ABX2724S	206.00
30 x 5.81	Flush	18	ABX3518F	194.00
		24	ABX3524F	223.00
	Surface	18	ABX3518S	194.00
		24	ABX3524S	223.00
30 x 7.81	Flush	18	ABX3718F	223.00
		24	ABX3724F	250.00
	Surface	18	ABX3718S	223.00
		24	ABX3724S	250.00

Box Extensions Covers Only — 10 covers per kit.

Description	Catalog Number	List Price, GO-101
9" Covers Surface	ASPABX09S	\$145.00
9" Covers Flush	ASPABX09F	155.00
18" Covers Surface	ASPABX18S	285.00
18" Covers Flush	ASPABX18F	300.00

THQB/THQB/THQL/THHQL/TEY Filler Plates

Catalog Number	List Price, GO-137A
TQLFP1	\$2.50

TQD/THQD/TEY4 Filler Plates

Catalog Number	List Price, GO-101
TEDFP1	\$1.00

Breaker Mounting ⑪ Hardware Kits

Catalog Number	List Price, GO-134B
ASPTED3P (Breaker type TED/THED4)	\$83.50
ASPTQD3P (Breaker type TQD/THQD)	83.50

- ⑪ Use to mount breaker in existing space.

A Series® Panelboards—Types AL, AQ, AE

Main Molded Case Switch Interiors
Factory Assembled Pricing ①

NOTE: Sizing dimensions to be used only for enclosure selection, not to determine interior length.

Type AL 240Vac Max. ②

Panel Amps Max.	Branch Space Required	Interior Catalog Number 1-Phase, 3-Wire	List Price, ③ GO-101	Interior Catalog Number 3-Phase, 4-Wire	List Price, ③ GO-101	Sizing Dim. (Inches)	UL Listed Short Circuit Withstand Rating
100	0-12	ALF1121YB	\$ 508.00	ALF3121YB	\$ 624.00	25.5	10,000 Amps max, when protected by line side THQB circuit breaker
	13-18	ALF1181YB	552.00	ALF3181YB	657.00	28.5	
	19-24	ALF1241YB	612.00	ALF3241YB	718.00	31.5	
	25-30	ALF1301YB	672.00	ALF3301YB	778.00	34.5	
	31-36	ALF1361YB	730.00	ALF3361YB	838.00	37.5	
	37-42	ALF1421YB	791.00	ALF3421YB	898.00	40.5	
225	0-12	ALF1122YB	1147.00	ALF3122YB	1344.00	34.5	10,000 Amps max, when protected by line side TQD circuit breaker
	13-18	ALF1182YB	1182.00	ALF3182YB	1380.00	37.5	
	19-24	ALF1242YB	1242.00	ALF3242YB	1441.00	40.5	
	25-30	ALF1302YB	1302.00	ALF3302YB	1500.00	43.5	
	31-36	ALF1362YB	1362.00	ALF3362YB	1560.00	46.5	
	37-42	ALF1422YB	1423.00	ALF3422YB	1620.00	49.5	
400	19-24	ALF1244YB	1861.00	ALF3244YB	2202.00	61.5	22,000 Amps max, when protected by line side TJD circuit breaker
	25-30	ALF1304YB	1893.00	ALF3304YB	2234.00	64.5	
	31-36	ALF1364YB	1926.00	ALF3364YB	2268.00	67.5	
	37-42	ALF1424YB	1958.00	ALF3424YB	2301.00	70.5	

Pricing Information:

- Price branch breakers from corresponding panel sections.
- Refer to page 13-27 for enclosure information.
- Price modifications from options table, page 13-28.

Type AQ 240Vac Max. ②

Panel Amps Max.	Branch Space Required	Interior Catalog Number 1-Phase, 3-Wire	List Price, ③ GO-101	Interior Catalog Number 3-Phase, 4-Wire	List Price, ③ GO-101	Sizing Dim. (Inches)	UL Listed Short Circuit Withstand Rating
100	0-12	AQF1121YB	\$ 508.00	AQF3121YB	\$ 624.00	25.5	10,000 Amps max, when protected by line side THQB circuit breaker
	13-18	AQF1181YB	552.00	AQF3181YB	657.00	28.5	
	19-24	AQF1241YB	612.00	AQF3241YB	718.00	31.5	
	25-30	AQF1301YB	672.00	AQF3301YB	778.00	34.5	
	31-36	AQF1361YB	730.00	AQF3361YB	838.00	37.5	
	37-42	AQF1421YB	791.00	AQF3421YB	898.00	40.5	
225	0-12	AQF1122YB	1147.00	AQF3122YB	1344.00	34.5	10,000 Amps max, when protected by line side TQD circuit breaker
	13-18	AQF1182YB	1182.00	AQF3182YB	1380.00	37.5	
	19-24	AQF1242YB	1242.00	AQF3242YB	1441.00	40.5	
	25-30	AQF1302YB	1302.00	AQF3302YB	1500.00	43.5	
	31-36	AQF1362YB	1362.00	AQF3362YB	1560.00	46.5	
	37-42	AQF1422YB	1423.00	AQF3422YB	1620.00	49.5	
400	19-24	AQF1244YB	1919.00	AQF3244YB	2251.00	61.5	22,000 Amps max, when protected by line side TJD circuit breaker
	25-30	AQF1304YB	1980.00	AQF3304YB	2312.00	64.5	
	31-36	AQF1364YB	2040.00	AQF3364YB	2372.00	67.5	
	37-42	AQF1424YB	2100.00	AQF3424YB	2432.00	70.5	

Type AE 480Y/277Vac Max. ②

Panel Amps Max.	Branch Space Required	Interior Catalog Number 3-Phase, 4-Wire	List Price, ③ GO-101	Sizing Dim. (Inches)	UL Listed Short Circuit Withstand Rating	
					240Vac Max.	480/277Vac Max.
225	0-12	AEF3122YB	1518.00	40.5	14,000 Amps max, when protected by line side TFJ circuit breaker	
	13-18	AEF3182YB	1572.00	43.5		
	19-24	AEF3242YB	1663.00	46.5		
	25-30	AEF3302YB	1754.00	49.5		
	31-36	AEF3362YB	1845.00	52.5		
	37-42	AEF3422YB	1936.00	55.5		
400	19-24	AEF3244YB	2487.00	61.5	14,000 Amps max, when protected by line side TJJ circuit breaker	
	25-30	AEF3304YB	2579.00	64.5		
	31-36	AEF3364YB	2670.00	67.5		
	37-42	AEF3424YB	2762.00	70.5		

① Molded case switches cannot be used as subfeed or branch breakers as they do not meet UL wire protection requirements.

② Bottom feed supplied as standard. Change last character in Catalog Number from B to T for Top Feed.

③ Includes standard panelboard interior box and front. Add price for options when required.

A Series® Panelboards—Type AD

600Vac

Factory Assembled

Three-Phase, 3-Wire/4-Wire Pricing

13 PANELBOARDS

Main Lug Interiors ①

Use E150 Line Bolt-on Branch Breakers		Single Main Lugs			Subfeed Main Lugs		
Panel Amps Max	Branch Space Required	Interior Catalog Number	List Price, GO-101	Sizing Dim's (In's)	Interior Catalog Number	List Price, GO-101	Sizing Dim's (In's)
125	0-12	ADF3121MB	\$ 579.00	25.5	ADF3121SB	\$ 616.00	28.5
	13-18	ADF3181MB	633.00	28.5	ADF3181SB	670.00	34.5
	19-24	ADF3241MB	728.00	31.5	ADF3241SB	764.00	37.5
	25-30	ADF3301MB	821.00	34.5	ADF3301SB	858.00	40.5
	31-36	ADF3361MB	915.00	37.5	ADF3361SB	951.00	46.5
	37-42	ADF3421MB	1009.00	40.5	ADF3421SB	1046.00	49.5
225	0-12	ADF3122MB	648.00	31.5	ADF3122SB	689.00	31.5
	13-18	ADF3182MB	703.00	37.5	ADF3182SB	743.00	37.5
	19-24	ADF3242MB	796.00	40.5	ADF3242SB	836.00	40.5
	25-30	ADF3302MB	890.00	43.5	ADF3302SB	930.00	43.5
	31-36	ADF3362MB	984.00	49.5	ADF3362SB	1024.00	49.5
	37-42	ADF3422MB	1077.00	52.5	ADF3422SB	1117.00	52.5
400	0-12	ADF3124MB	812.00	40.5	ADF3124SB	907.00	46.5
	13-18	ADF3184MB	890.00	46.5	ADF3184SB	985.00	49.5
	19-24	ADF3244MB	976.00	49.5	ADF3244SB	1071.00	52.5
	25-30	ADF3304MB	1070.00	52.5	ADF3304SB	1164.00	58.5
	31-36	ADF3364MB	1163.00	58.5	ADF3364SB	1258.00	61.5
	37-42	ADF3424MB	1256.00	61.5	ADF3424SB	1351.00	64.5
600	0-12	ADF3126MB	953.00	46.5	—	—	—
	13-18	ADF3186MB	1033.00	49.5	—	—	—
	19-24	ADF3246MB	1120.00	52.5	—	—	—
	25-30	ADF3306MB	1214.00	58.5	—	—	—
	31-36	ADF3366MB	1308.00	61.5	—	—	—
	37-42	ADF3426MB	1401.00	64.5	—	—	—
800②	0-12	ADF3128MB	1350.00	55.5	—	—	—
	13-18	ADF3188MB	1545.00	55.5	—	—	—
	19-24	ADF3248MB	1740.00	55.5	—	—	—
	25-30	ADF3308MB	1935.00	55.5	—	—	—
	31-36	ADF3368MB	2130.00	61.5	—	—	—
	37-42	ADF3428MB	2325.00	64.5	—	—	—

Service Information:

- 3-ph, 4w 120/208Vac
- 3-ph, 3w 480Vac
- 3-ph, 4w 480Y/277Vac
- 3-ph, 3w 600Vac
- 3-ph, 4w 600Y/347Vac
- UL Listed
- CSA Certified

Branch Breakers:

- 15-100A 1P, 2P; 15-150A 3P
- 180A Max. double branch
- (90/90A, 80/100A, 150/30A, etc.)

Mains:

- 150A - THED, SE
- 225A - TFF, SF
- 400A - TJJ, SG
- 600A - SG
- 800A - SK
- 150-800A MLO

Enclosures ③

Sizing Dimensions (Inches)	Box Catalog Number	Inside Box Dim's (Inches)			Front Catalog Number
		Length	Width	Depth	
28.5-31.5	AB31	31.5	20	5.81	AF31F.S
34.5-37.5	AB37	37.5	20	5.81	AF37F.S
40.5-43.5	AB43	43.5	20	5.81	AF43F.S
46.5-49.5	AB49	49.5	20	5.81	AF49F.S
52.5-55.5	AB55	55.5	20	5.81	AF55F.S
57.5-64.5	AB64	64.5	20	5.81	AF64F.S
67.5-76.5	AB76	76.5	20	5.81	AF76F.S

① Bottom feed supplied as standard. Change last character in catalog number from B to T for top feed.

② Box is 30" wide x 7.81" deep.

③ Box supplied as standard for 225A 150kA and 400A 65 and 100kA ratings is 7.81 inches deep, when used with THLC.

④ TFJ main rated 22,000AIC max.

Flush fronts are 1.5 inches larger than box. Surface fronts are .25 inches larger than box.

Main Breaker Interiors ①

Use E150 Line Bolt-on Branch Breakers		Interrupting Rating														
Panel Amps Max.	Branch Space Required	25kA 480Vac④		35kA 480Vac		65kA 480Vac		100kA 480Vac		18kA 600Vac		100kA 480Vac		18kA 600Vac		
		Interior Catalog Number	List Price, GO-101	Sizing Dim's (In's)	Interior Catalog Number	List Price, GO-101	Sizing Dim's (In's)	Interior Catalog Number	List Price, GO-101	Sizing Dim's (In's)	Interior Catalog Number	List Price, GO-101	Sizing Dim's (In's)	Interior Catalog Number	List Price, GO-101	Sizing Dim's (In's)
150	0-12	ADF3121TB	\$ 974.00	31.5	ADF3121KB	\$1174.00	31.5	ADF3121DB	\$1644.00	28.5	ADF3121GB	\$2160.00	28.5	ADF3121UB	\$ 974.00	28.5
	13-18	ADF3181TB	1028.00	37.5	ADF3181KB	1228.00	37.5	ADF3181DB	1700.00	31.5	ADF3181GB	2217.00	31.5	ADF3181UB	1028.00	31.5
	19-24	ADF3241TB	1121.00	40.5	ADF3241KB	1321.00	40.5	ADF3241DB	1796.00	34.5	ADF3241GB	2312.00	34.5	ADF3241UB	1121.00	34.5
	25-30	ADF3301TB	1215.00	43.5	ADF3301KB	1415.00	43.5	ADF3301DB	1892.00	37.5	ADF3301GB	2408.00	37.5	ADF3301UB	1215.00	37.5
	31-36	ADF3361TB	1309.00	49.5	ADF3361KB	1509.00	49.5	ADF3361DB	1988.00	40.5	ADF3361GB	2504.00	40.5	ADF3361UB	1309.00	40.5
	37-42	ADF3421TB	1400.00	52.5	ADF3421KB	1600.00	52.5	ADF3421DB	2084.00	43.5	ADF3421GB	2600.00	43.5	ADF3421UB	1400.00	43.5
225	0-12	ADF3122TB	1713.00	43.5	ADF3122KB	923.00	43.5	ADF3122DB	3343.00	43.5	ADF3122GB	3610.00	43.5	ADF3122UB	1713.00	43.5
	13-18	ADF3182TB	1767.00	49.5	ADF3182KB	923.00	49.5	ADF3182DB	3398.00	49.5	ADF3182GB	3664.00	49.5	ADF3182UB	1767.00	49.5
	19-24	ADF3242TB	1859.00	52.5	ADF3242KB	923.00	52.5	ADF3242DB	3493.00	52.5	ADF3242GB	3761.00	52.5	ADF3242UB	1859.00	52.5
	25-30	ADF3302TB	1954.00	55.5	ADF3302KB	923.00	55.5	ADF3302DB	3590.00	55.5	ADF3302GB	3857.00	55.5	ADF3302UB	1954.00	55.5
	31-36	ADF3362TB	2047.00	61.5	ADF3362KB	923.00	61.5	ADF3362DB	3685.00	61.5	ADF3362GB	3952.00	61.5	ADF3362UB	2047.00	61.5
	37-42	ADF3422TB	2140.00	64.5	ADF3422KB	923.00	64.5	ADF3422DB	3742.00	64.5	ADF3422GB	4049.00	64.5	ADF3422UB	2140.00	64.5
400	0-12	ADF3124TB	2577.00	49.5	ADF3124KB	3410.00	49.5	ADF3124DB	4305.00	49.5	ADF3124GB	4599.00	49.5	ADF3124UB	2577.00	49.5
	0-18	ADF3184TB	2666.00	55.5	ADF3184KB	3499.00	55.5	ADF3184DB	4396.00	55.5	ADF3184GB	4690.00	55.5	ADF3184UB	2666.00	55.5
	19-24	ADF3244TB	2758.00	58.5	ADF3244KB	3591.00	58.5	ADF3244DB	4489.00	58.5	ADF3244GB	4783.00	58.5	ADF3244UB	2758.00	58.5
	25-30	ADF3304TB	2853.00	61.5	ADF3304KB	3686.00	61.5	ADF3304DB	4584.00	61.5	ADF3304GB	4878.00	61.5	ADF3304UB	2853.00	61.5
	31-36	ADF3364TB	2946.00	67.5	ADF3364KB	3779.00	67.5	ADF3364DB	4680.00	67.5	ADF3364GB	4975.00	67.5	ADF3364UB	2946.00	67.5
	37-42	ADF3424TB	3038.00	70.5	ADF3424KB	3871.00	70.5	ADF3424DB	4775.00	70.5	ADF3424GB	5070.00	70.5	ADF3424UB	3038.00	70.5
600	0-12	—	—	—	ADF3126KB	5389.00	49.5	ADF3126DB	6284.00	49.5	—	—	—	ADF3126UB	4556.00	49.5
	0-18	—	—	—	ADF3186KB	5480.00	55.5	ADF3186DB	6375.00	55.5	—	—	—	ADF3186UB	4647.00	52.5
	19-24	—	—	—	ADF3246KB	5572.00	58.5	ADF3246DB	6467.00	58.5	—	—	—	ADF3246UB	4739.00	55.5
	25-30	—	—	—	ADF3306KB	5666.00	61.5	ADF3306DB	6561.00	61.5	—	—	—	ADF3306UB	4833.00	61.5
	31-36	—	—	—	ADF3366KB	5759.00	67.5	ADF3366DB	6654.00	67.5	—	—	—	ADF3366UB	4926.00	64.5
	37-42	—	—	—	ADF3426KB	5851.00	70.5	ADF3426DB	6748.00	70.5	—	—	—	ADF3426UB	5018.00	70.5
800②	0-12	—	—	—	—	—	—	—	—	—	—	—	—	ADF3128KB	6313.00	58.5
	13-18	—	—	—	—	—	—	—	—	—	—	—	—	ADF3188KB	6428.00	64.5
	19-24	—	—	—	—	—	—	—	—	—	—	—	—	ADF3248KB	6519.00	67.5
	25-30	—	—	—	—	—	—	—	—	—	—	—	—	ADF3308KB	6793.00	70.5
31-36	—	—	—	—	—	—	—	—	—	—	—	—	ADF3368KB	7045.00	76.5	



Pro-Stock™ and A Series® Merchandised Panelboards—Enclosures, Fronts, Accessories

Order by Catalog Number from the Customer Service Center.

Enclosure

Height (Inches)	NEMA 1 (Endwall with knockouts)		NEMA 1 (w/Blank Endwall)		NEMA 3R (Includes Front)	
	Catalog Number	List Price, GO-134B	Catalog Number	List Price, GO-134B	Catalog Number	List Price, GO-134B
49.5	AB49K	\$233.00	AB49B	\$233.00	AB493	\$1344.00
55.5	AB55K	261.00	AB55B	261.00	AB553	1372.00
64.5	AB64K	286.00	AB64B	286.00	AB643	1399.00
76.5	AB76K	324.00	AB76B	324.00	AB763	2441.00

Fronts

Flush		Surface	
Catalog Number	List Price, GO-134B	Catalog Number	List Price, GO-134B
AF49F	\$257.00	AF49S	\$257.00
AF55F	299.00	AF55S	299.00
AF64F	326.00	AF64S	326.00
AF76F	367.00	AF76S	367.00

Main Lug Kits (For A-Series Panels Only) ①

Panel Amps	Description	Pressure Lugs			Compression Lugs ②			Copper Only Lugs		
		Wire Range Al/Cu	Catalog Number	List Price, GO-134B	Wire Range Al/Cu	Catalog Number	List Price, GO-134B	Wire Range Cu Only	Catalog Number	List Price, GO-134B
400	Standard	4-600 kcmil or (2) 1/0-250 kcmil	ASA42	\$ 81.00	500-750 kcmil ③	AST40 ④	\$331.00	1/0-600 kcmil	ASC42	\$318.00
	Oversize or Subfeed	(2) 4-600 kcmil or (4) 1/0-250 kcmil	ASA64	145.00	(2) 500-750 kcmil ③	ADT46 ④	605.00	(2) 1/0-600 kcmil	ADC64	569.00
600	Standard	(2) 4-600 kcmil or (4) 1/0-250 kcmil	ASA64	145.00	(2) 2/0-500 kcmil	AST60	389.00	(2) 1/0-600 kcmil	ADC64	569.00
	Oversize	(2) 300-800 kcmil	ASA60	275.00	(2) 500-750 kcmil	ADT46	605.00			

① Kits may be used to field modify lug type, e.g. pressure to compression. They *cannot*

be used to change lug descriptions e.g. standard to oversize or subfeed on 400A, 600A, 800A panels.

② Use VC6 crimp tool for all AL+ up to 500 kcmil and VC7 for 500-750 kcmil.

③ Cu wire rating is 500 kcmil only.
④ 500 kcmil copper cable max.

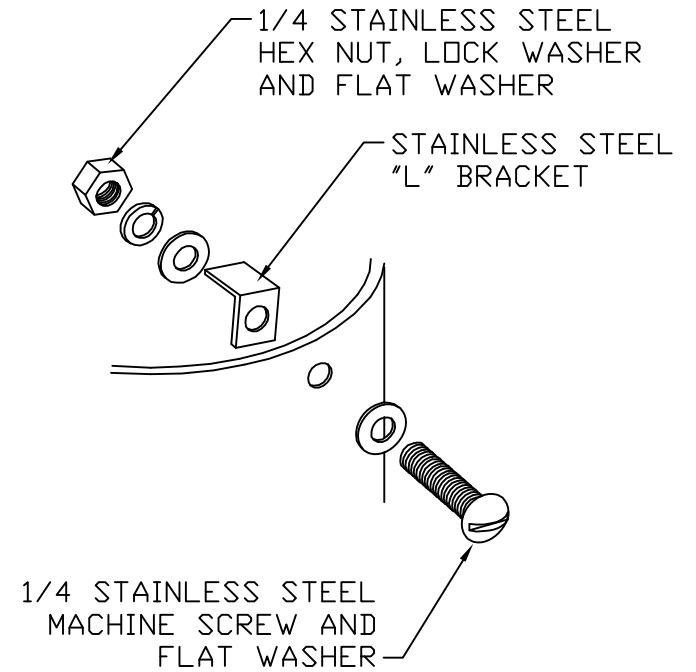
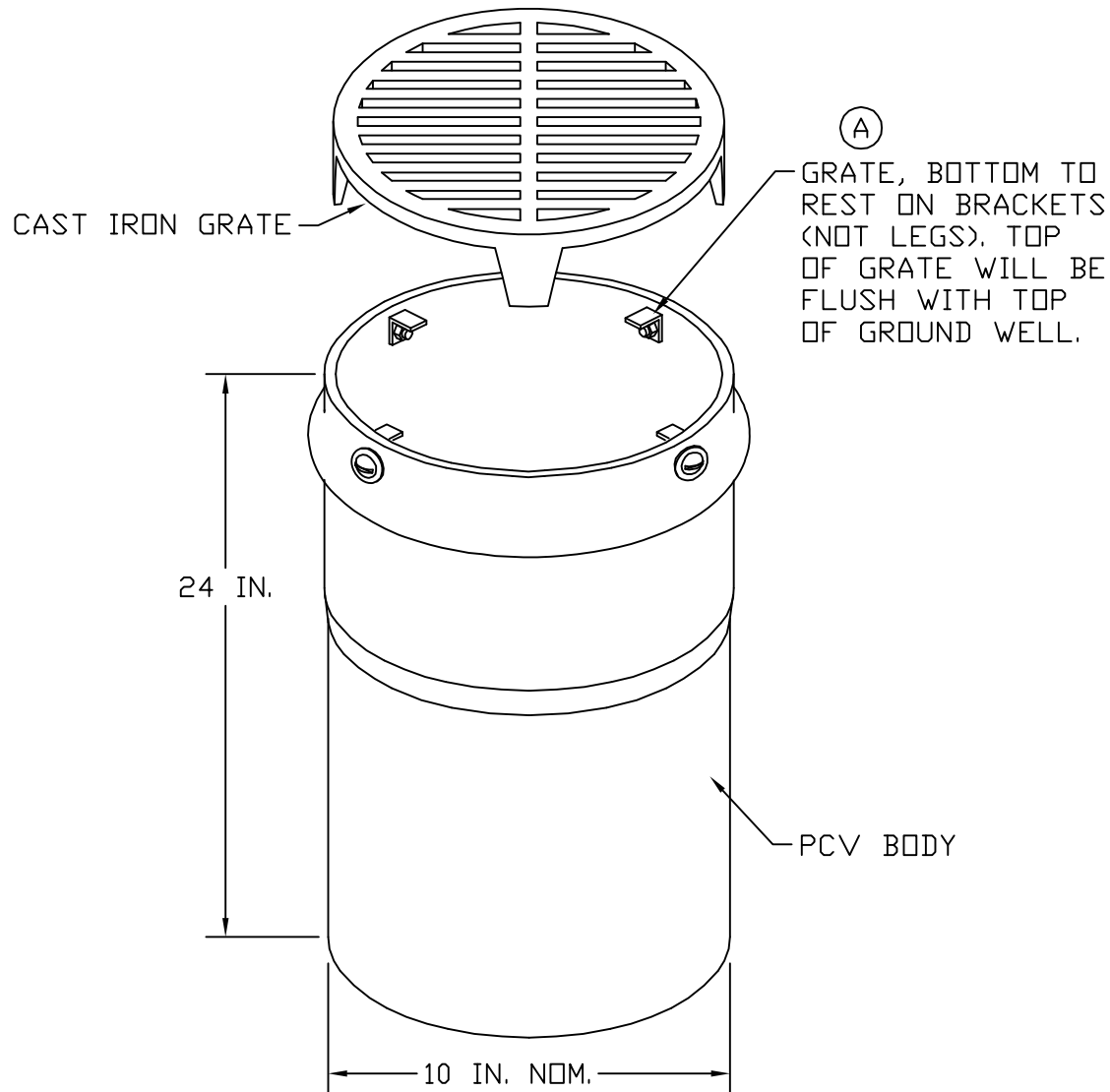
Miscellaneous Kits For Pro-Stock™ and A-Series® Panels

Description	Catalog Number	List Price	GO Sched.
Equipment Grounds:			
Standard Terminal Strip With Provision for (1) 14-8 Cu or 12-8 Al (3) 14-4 Cu or 6-4 Al	TGL2	\$ 6.75	137A
Above terminal with Copper Strap	TGC2	94.00	134B
Main Lug 6-2/0 Cu/Al	TGL20	11.50	137A
Standard Isolated Insulated (1) 14-8 Cu or 12-8 Al (3) 14-4 Cu or 6-4 Al	EGS12	39.00	134B
Above terminal with Copper Strap	EGC12	132.00	134B
Handle Locking Devices:			
THQL, THQL, THQB, THQB	THL103	6.50	137A
TEY	TEYLD1	5.00	135B
TED	TLD3	5.00	135B
TFJ, TFL, THLC2, THLC4, TLB4	TFKLD1	6.00	135B

Description	Catalog Number	List Price	GO Sched.
Padlocking Devices:			
THQL, THQL, TXQL, THQB, THQB, TXQB	THP100	\$ 6.50	137A
TEY	TEYPLD1	9.00	135B
TED, TEL	TEFPLD1	8.00	135B
THLC1	TLC1PLD1	17.00	135B
TQD	TQDPLD1	20.75	137A
TFJ, TFL	TFKPLD1	4.00	135B
THLC2, THLC4, TLB4	TLC4PLD1	22.00	135B
TJD, TJJ	TJKPLD1	8.00	135B
Filler Plate for Q Line and TEY Breakers	TQLFP1	2.50	137A
Package of Assorted Hardware, Keys, Circuit Strips, Directory Cards	ACARE ⑤	81.00	134B
Blank Endwall Kits	ABEW2	31.00	134B
Knock Out Endwall Kits	AKEW2	21.00	134B
Permanent Circuit Number Kit (1-48)	APN48	116.00	134B
Permanent Circuit Number Kit (43-84)	APN84	116.00	134B
Circuit Numbering Strips (1-48)	569B806G1	4.00	101
Circuit Numbering Strips (43-84)	569B806G2	4.00	101
Circuit Numbering Strips (85-126)	569B806G3	4.00	101

⑤ Contact your local sales office for a more detailed listing of contents.

13 PANELBOARDS



PVC GROUND ACCESS WELL

EST WT 22#

APPROVED

AS DRAWN: _____
 AS NOTED: _____
 DATE: _____

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A	ADDED NOTE	010918	LAL
LET	REVISION	DATE	BY
TOLERANCES UNLESS NOTED:		3RD ANGLE PROJECTION	
FRACTIONAL +/- 1/16		⊕	
DECIMAL +/- .030		⊖	
BREAK SHARP EDGES			

PART NO. 360PBG
 GROUND ACCESS WELL

DRAWN BY:
LAL
 CHECKED BY:
 DATE:
021700

HARGER
 301 ZIEGLER DRIVE
 GRAYSLAKE, IL 60030
 (847) 548-8700

REVISION:
A
 SCALE:
NTS
 SHEET:
1 OF 1

Backup power, UPS, surge and IT power distribution

Surge protective devices (SPD) and power conditioning products

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Overview

Facility-Wide Protection

A Facility-Wide Protection Strategy Should be Employed to Address Power Quality Issues

Why Coordinated (Cascaded) Facility-Wide Protection?

As recommended in the IEEE® *Emerald Book*, a cascaded or staged protection approach should be developed and executed to reduce external/internal impulse waveforms to harmless levels. Eaton surge protection solutions are available in all common voltages and configurations, in surge current capacity ratings up to 800 kA and with a variety of optional features such as EMI/FFI filtering, audible alarm, Form C contacts, surge counters and Power Xpert® feature package. Eaton's complete offering of surge protective devices ensures there is a solution for any application in a cascaded facility-wide protection strategy.

A surge device equipped with filtering should be installed at the main service entrance and key distribution or branch panelboards to eliminate ringing and impulse disturbances, as well as high frequency EMI/RFI noise. Filtering is available on the SPD and RSPF Series models.

Eaton surge devices are coordinated to work on a "system basis." Surge units installed at each level in the system work together to isolate and remove externally/internally generated disturbances, creating superior facility-wide performance and reliability.

Integrated SPD Series units maximize flexibility, space and protection and are available in switchboards, switchgear, panelboards, motor control centers and automatic transfer switches. Integrating the surge device into the electrical assembly maximizes protection by keeping installation leads as short as possible.

Benefits of Facility-Wide Surge Protection

- High amplitude lightning impulses reduced to negligible levels
- The electrical distribution's noise attenuation is significantly enhanced

The coordinated design ensures effective current sharing between main and branch surge devices. Installing appropriately rated surge protection at locations throughout a facility provides a layered defense solution and helps ensure complete protection of critical equipment.

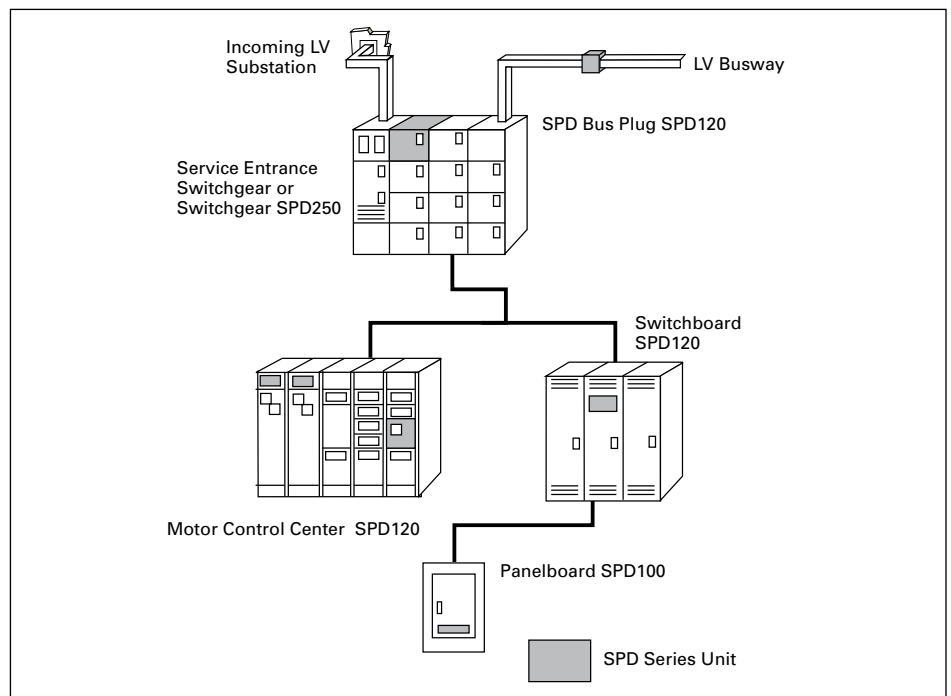


Figure 34.2-1. Cascaded Performance

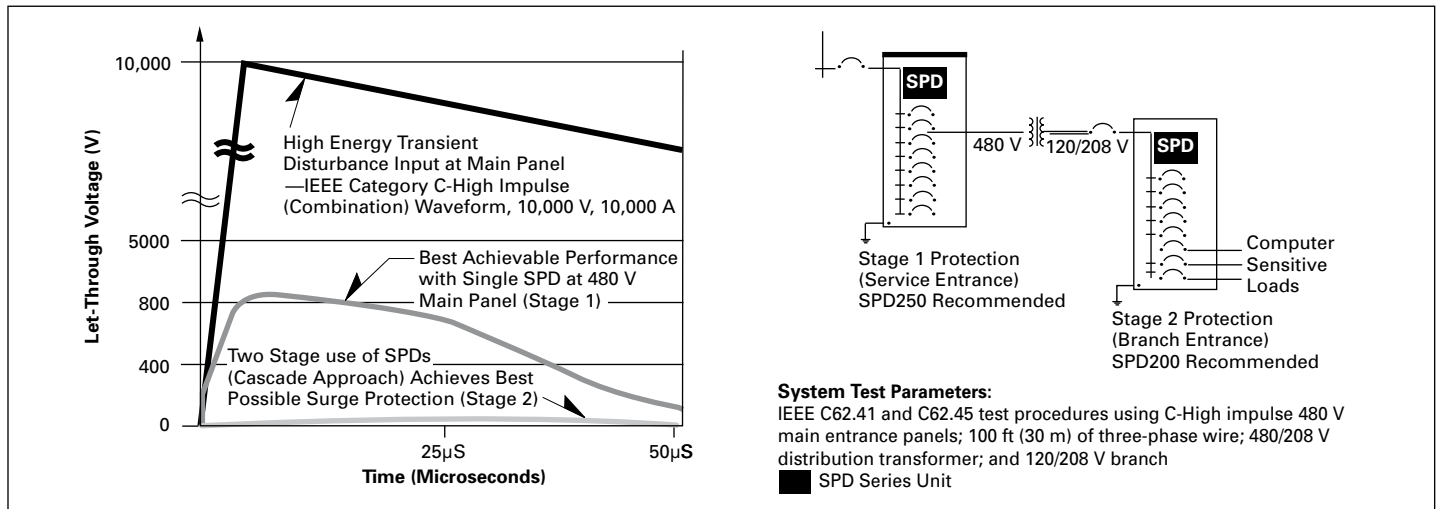


Figure 34.2-2. IEEE Emerald Book Recommends a Cascaded (or Two-Stage) Approach

System Applications

The SPD applications covered under this section include distribution and branch panel locations, busway, motor control centers (MCC), switchgear and switchboard assemblies. All SPDs shall be tested and demonstrate suitability for application within ANSI/IEEE C62.41 Category C, B and A environments.

Surge Current Capacity

The minimum surge current capacity that the device is capable of withstanding shall be as shown in **Table 34.2-1**.

SPD Type

All SPDs installed on the line side of the service entrance disconnect shall be Type 1 SPDs. All SPDs installed on the load side of the service entrance disconnect shall be Type 1 or Type 2 SPDs.

Table 34.2-1. Surge Current Capacity

Minimum Surge Current Capacity Based on ANSI/IEEE C62.41 Location Category			
Category	Application	Per Phase	Per Mode
C	Service entrance locations (switchboards, switchgear, MCC, main entrance)	250 kA	125 kA
B	High exposure roof top locations (distribution panelboards)	160 kA	80 kA
A	Branch locations (panelboards, MCCs, busway)	120 kA	60 kA

Features

Table 34.2-2. Eaton Surge Protection Model Features

Product Series	L to N Protection Mode	L to G and N to G Protection Modes	Per Phase kA Range	EMI/RFI Filtering Attenuation	Nominal Discharge Current (I_n)	Short-Circuit Current Rating (SCCR)	Alarm Contacts (Option)	Audible Alarm (Option)	Surge Counter (Option)	Warranty (Years)	Enclosure Options (NEMA® Types)	Disconnect (Option)	Power Xpert SPD (Option)
SPD	Yes	Yes	50–400	50 dB	20 kA	200 kA	Yes	Yes	Yes	15 ④	1, 4 & 4X ⑤	Yes	Yes
SPM	Yes	Yes	100–800	50 dB	20 kA	200 kA	Yes	Yes	Yes	20 ④	4 & 4X	Yes	Yes
SPC	Yes	Yes	50–200	40 dB	20 kA	200 kA	Yes	Yes	No	10 ④	4X	No	No
CVX	Yes	Yes ①	50–100	No	20 kA ②	200 kA	No	No	No	5	4X	No	No
SP1	Yes	No	50 only	No	20 kA ③	200 kA	No	No	No	2	4	No	No
SP2	Yes	No	45 only	No	10 kA	200 kA	No	No	No	2	4X	No	No

① 100 kA units only.

② 480L, 600D, and 600Y units rated 10 kA I_n .

③ 600Y and 600D units rated 10 kA I_n .

④ With on-line product registration.

⑤ Power Xpert SPD option for SPD Max units are available in NEMA 1 enclosure only.

Table 34.2-3. Feature Package Comparison

Feature	Basic	Standard	Standard with Surge Counter	Power Xpert SPD
Surge protection using thermally protected MOV technology	■	■	■	■
Dual-colored protection status indicators for each phase and the neutral-ground protection mode ⑥	■	■	■	■
Audible alarm with silence button		■	■	■
Form C relay contact		■	■	■
EMI/RFI filtering, providing up to 50 dB of noise attenuation from 10 kHz to 100 MHz		■	■	■
Surge counter with reset			■	■
Tri-colored protection status indicators for each phase and the neutral-ground protection mode ⑥				■
Percentage protection remaining status				■
RJ45 Ethernet port for LAN connection, Modbus® TCP/IP, or BACnet/IP				■
UI webpage and programmable settings				■
Time-and-date stamped surge log and surge categorization				■

⑥ Neutral-ground protection mode available in applicable voltage configurations only.

SPD Series



SPD Series Sidemount Units

General Description

Eaton's SPD Series surge protective devices are the latest and most advanced UL® 1449 4th Edition certified surge protectors. Units are available integrated within Eaton electrical assemblies, including panelboards, switchboards, motor control centers, switchgear, automatic transfer switches and bus plugs.

A complete offering of sidemount units designed for mounting external to electrical distribution equipment is also available. Application of SPD Series units throughout a facility will ensure that equipment is protected with the safest and most reliable surge protective devices available. SPD Series units are available in all common voltages and configurations and also in a variety of surge current capacity ratings from 50 through 400 kA. Four feature package options are also available to choose from, ensuring the proper unit is available for a variety of applications.



Power Xpert SPD Display for SPD Series Side-Mounted Units

Features

- Uses thermally protected metal oxide varistor (MOV) technology
- Four feature package options
- True protection status indicators report the status of the protection elements, not the status of the applied power
- 10-year warranty (15-year with registration)

Safety Features

- All units use thermally protected metal oxide varistor technology (MOV) as their core surge suppression component. Usage of this technology ensures safe operation when the unit is subjected to abnormal conditions such as temporary overvoltage or high fault current conditions. Under such conditions, the thermally protected MOVs are removed from the circuit quickly and safely before a potentially unsafe condition can occur
- SPD Series units contain no replaceable parts such as surge modules, fuses, or surge counter memory backup batteries. This prevents potential arc flash and shock hazards, as the units require no periodic service or user intervention after installation

Feature Package Options

The SPD Series provides users with the option of selecting between four feature packages. These feature packages are the basic, standard, standard with surge counter, and Power Xpert SPD. The proper feature package can be selected based on the requirements of the application or specification. A side-by-side comparison of the individual features found in each package is below.

Basic Feature Package

The basic feature package is perfect for applications where basic, cost-effective, safe and reliable surge protection is required, but budgets don't allow for extra, additional features. Rather than sacrifice performance or safety due to cost, SPD Series units with the basic feature package provide you with high-performing surge protection without sacrificing safety or reliability. The basic feature package provides the same level of surge protection and safety provided by the standard and standard with surge counter feature packages minus some of the features found in them. The package contains dual-colored protection status LEDs that report the true status of the protection in each phase/mode. All four-wire plus ground units also contain an additional set of dual-colored protection status LEDs that report the status of the protection in the neutral/ground mode.

Standard Feature Package

The standard feature package includes all of the features found in the basic feature package, plus an audible alarm with silence button, EMI/RFI filtering, and a Form C relay contact that can be used for remote annunciation of the SPD's status. The audible alarm activates and the Form C relay contact changes state when any loss of protection is detected or a fault condition exists with the unit. Should such a condition occur, the audible alarm can be silenced by pressing the silence button. The EMI/RFI filter provides up to 50 dB of noise attenuation over the range of 10 kHz through 100 MHz.

Standard with Surge Counter Feature Package

The standard with surge counter feature package includes all of the features found in the standard feature package plus a six-digit surge counter with a reset button. The surge counter indicates the ongoing count of the number of surges the unit has been exposed to and stores them in nonvolatile memory. Should power to the SPD Series unit be completely interrupted, the surge counter will recall and display the surge count prior to the interruption when power is restored. Unlike many surge protectors, the SPD Series' surge counter memory feature does not require a backup battery that would require periodic replacement in order to achieve its memory functionality.

Power Xpert SPD Feature Package

All features of the Standard with Surge Counter feature package including advanced monitoring and communication.

- Display upgraded to a 20x4 character liquid crystal display (LCD)
- Power Xpert Gateway (PXG900) with firmware version 4.6.4 and higher are Modbus® TCP supported and configurable with the ability to receive email notifications; ModbusTCP/IP must be enabled on the PX SPD prior to use
- LCD main menu options include the following:
 - SPD status—Surge event logs
 - Event logs—All events including phase protection percentage, phase loss, alarm status, power on/off, and low, medium and high level surges
 - Settings—Includes device setup, changing the password and the option of giving the device a unique name
 - Identification—Information on the device

- One Form C relay contact rated at 150 Vac at 0.46 A, 30Vdc at 1 A. Normal operating conditions. NO = OPEN. NC = CLOSED. Loss of protection on any phase or loss of power. NO = CLOSED. NC = OPEN
- Audible alarm with push any button to silence
- EMI/RFI filtering
- Remote monitoring via web UI, ModbusTCP/IP or BACnet/IP protocols. Modbus, BACnet and HTTP are initially disabled for cybersecurity purposes
- Phase surge event counters
- Time/date stamp event logs
- Green LEDs: Illumination indicates the phase is fully protected (100%), and operating normally, with all protection active and available. Green LEDs also indicate neutral-to-ground protection on units with a neutral wire. Green LEDs do not indicate on/off status of power
- Yellow LEDs: Illumination indicates a partial loss of protection (>1% to 99%), and that one or more protective devices are now inactive and unavailable for that phase
- Red LEDs: Illumination indicates a total loss of protection (0%), and that one or more protective devices are now inactive and unavailable for that phase. Red LEDs do not indicate on/off status of power

Standards and Certifications

- Sidemount versions are UL 1449 4th Edition listed devices and are also CSA® approved
- UL 1283 7th Edition listed device
- Can be used for UL 96A compliance
- Can be used for NFPA 780 compliance
- Can be used for RoHS compliance
- PXSPD tested to UL 2900-1 cybersecurity standard

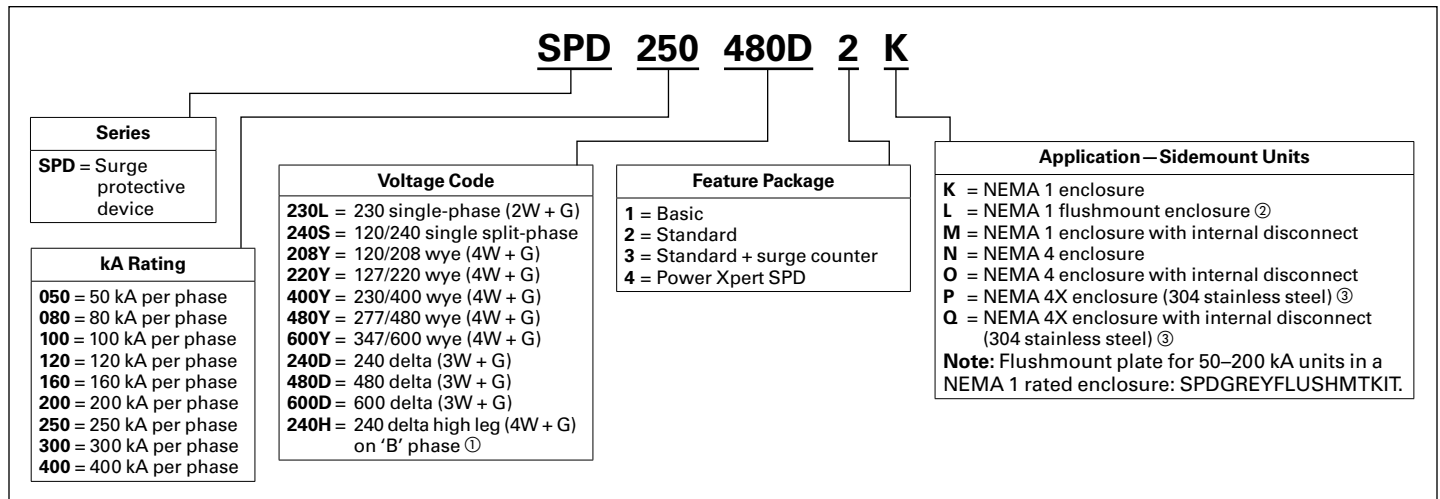
Table 34.2-4. Feature Package Comparison

Feature	Basic	Standard	Standard with surge counter	Power Xpert SPD
Surge protection using thermally protected MOV technology	■	■	■	■
Dual-colored protection status indicators for each phase and the neutral-ground protection mode ①	■	■	■	
Audible alarm with silence button		■	■	■
Form C relay contact		■	■	■
EMI/RFI filtering, providing up to 50 dB of noise attenuation from 10 kHz to 100 MHz		■	■	■
Surge counter with reset			■	■
Tri-colored protection status indicators for each phase and the neutral-ground protection mode ①				■
Percentage protection remaining status				■
RJ45 Ethernet port for LAN connection, ModbusTCP/IP, or BACnet/IP				■
UI webpage and programmable settings				■
Time-and-date stamped surge log and surge categorization				■

① Neutral-ground protection mode available in applicable voltage configurations only.

Catalog Numbering Selection

Table 34.2-5. SPD Series catalog number configuration for units mounted external to electrical distribution equipment



Example: SPD250480D2K = SPD Series, 250 kA per phase, 480D voltage, standard feature package, housed in NEMA 1 enclosure.

- ① Please consult the factory for 240 delta high leg (4W + G) applications with high leg on 'C' phase.
- ② NEMA 1 flushmount units are available in 50–200 kA ratings only.
- ③ PXSPD, feature package 4, not available in NEMA 4X enclosures.

SPD MAX Series



SPD MAX Series

General Description

Eaton's SPD MAX Series side-mounted surge protective devices are the latest and most advanced UL 1449 4th Edition certified surge protectors. Applying SPD MAX Series units at main service entrances and critical loads will ensure that equipment is protected with the safest and most reliable surge protective devices (SPDs) available. Units are available in all common voltages and configurations, and also in a variety of surge current capacity ratings from 100 kA through 800 kA. Additionally, you may choose from two feature package options.

Application Description

The breadth of the SPD MAX Series' features, options, and configurations ensures that the correct unit is available for all electrical applications, including service entrances, main switchgear, motor control centers, distribution switchboards, panelboards, and point-of-use applications.

Features

- Uses thermally protected metal oxide varistor (MOV) technology
- Lockout and tagout provisions
- Safety barriers
- 20 kA nominal discharge current (I_n) rating (maximum rating assigned by UL)
- 100 kA through 800 kA surge current capacity ratings
- Installation flexibility, #10 to 1/0 wire may be used
- Three feature package options
- 200 kA short-circuit current rating (SCCR) (maximum rating assigned by UL)
- Field serviceable
- 15-year warranty standard, additional 5 years with product registration

Feature Package Options

The SPD MAX Series provides users with the option of selecting between three feature packages: basic, standard with surge counter and Power Xpert SPD. The proper feature package can be selected based on the application's requirements or specifications. See **Table 34.2-17**.

Enclosure Options, Dimensions and Weights

There are two enclosure options for the SPD MAX Series, painted steel NEMA 4 or stainless steel NEMA 4X. The maximum weight of the SPD MAX Series is 52 lb.

Standards and Certifications

- UL 1449 4th Edition
- UL 1283 7th Edition
- Canadian Standards Association (CSA)
- Built in an ISO® 9001 facility
- Designed and tested in accordance with:
 - IEEE C62.41.1
 - IEEE C62.41.2
 - IEEE C62.43-2005
 - IEEE C62.45-2002
 - IEEE C62.48-2005
 - IEEE C62.62-2010

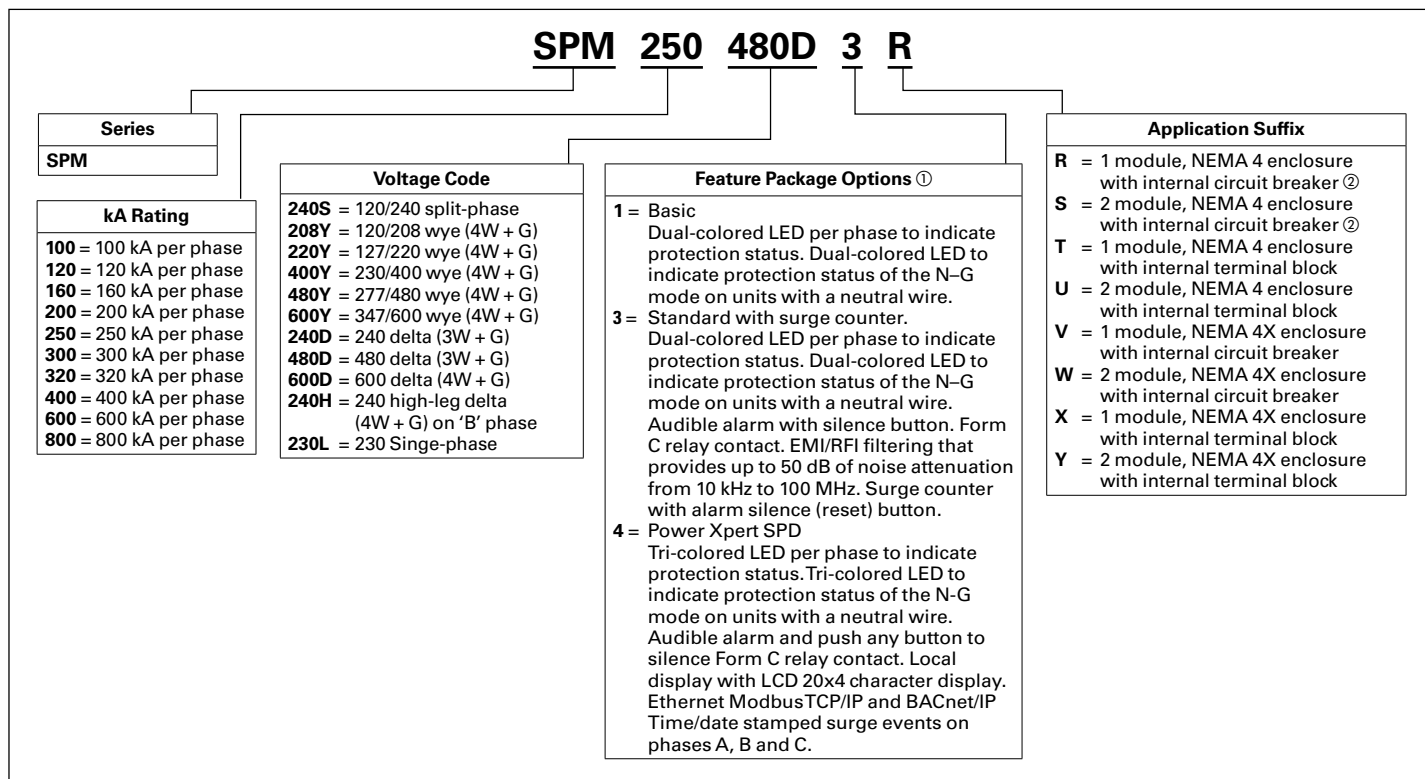
Table 34.2-6. Feature package comparison

Feature	Basic	Standard with surge counter	Power Xpert SPD
Surge protection using thermally protected MOV technology	■	■	■
Dual-colored protection status indicators for each phase and the neutral-ground protection mode ①	■	■	
Audible alarm with silence button		■	■
Form C relay contact		■	■
EMI/RFI filtering, providing up to 50 dB of noise attenuation from 10 kHz to 100 MHz		■	■
Surge counter with reset		■	■
Tri-colored protection status indicators for each phase and the neutral-ground protection mode ①			■
Percentage protection remaining status			■
RJ45 Ethernet port for LAN connection, Modbus TCP/IP, or BACnet/IP			■
UI webpage and programmable settings			■
Time-and-date stamped surge log and surge categorization			■

① Neutral-ground protection mode available in applicable voltage configurations only.

Catalog Numbering Selection

Table 34.2-7. SPD MAX Series Catalog Numbering System



Example: SPD250480D3R = SPD MAX Series, 250 kA per phase, 480 D voltage, standard with counter features package, NEMA 4 enclosure with internal circuit breaker.

① Please consult the factory for 240 delta high leg (4W+G) applications with high leg on C phase.
 ② Available in Power Xpert SPD NEMA 1 enclosure.

Table 34.2-8. Valid Module and Enclosure Configurations per kA

kA per Phase	Number of Surge Modules	Available Enclosure Options
100 kA	Single module only	R,T,V, X enclosures
120 kA	Single module only	R,T,V, X enclosures
160 kA	Single module only	R,T,V, X enclosures
200 kA	Single or dual module	All enclosures
250 kA	Single module only	R,T,V, X enclosures
300 kA	Single module only	R,T,V, X enclosures
320 kA	Dual module only	S, U, W,Y enclosures
400 kA	Single or dual module	All enclosures
500 kA	Dual module only	S, U, W,Y enclosures
600 kA	Dual module only	S, U, W,Y enclosures
800 kA	Dual module only	S, U, W,Y enclosures

SPC Series



SPC Series

General Description

The SPC Series offers robust protection in a compact, flexible design configurable for commercial and light industrial applications. The SPC Series offers maximum flexibility with configurable features such as: EMI/RFI filtering, audible alarm and Form C contacts. SPC Series units are available in all common voltages and configurations, and in a variety of peak surge current capacity ratings from 50 through 200 kA per phase. The compact design and NEMA 4X enclosure of the SPC Series allows for installation external to an electrical assembly in a wide variety of environments including service entrances, distribution panelboards and point-of-use applications.

Features

- Uses thermally protected metal oxide varistor (MOV) technology
- Proprietary tri-colored LED protection status indicators showing results of continuous self-diagnostic testing, including neutral-ground mode
- 20 kA nominal discharge current (I_n) rating (maximum rating in the UL 1449 4th Edition standard)
- 50 through 200 kA per phase peak surge current capacity ratings
- Configure to order with eight custom feature combinations
- Corrosion-resistant NEMA 4X enclosure with mounting feet
- 200 kA short-circuit current rating (SCCR)
- Factory prewired with 36 inches of 10 AWG wire
- No user-serviceable parts or items requiring periodic maintenance
- 5-year warranty can be extended to 10 years with product registration at www.eaton.com/spc

Standards and Certifications

- UL 1449 4th Edition Type 1 and Type 2
- UL 1283 7th Edition
- Canadian Standards Association (CSA) Type 1 and Type 2
- CSA C22.2 No. 269.1-14 for Type 1 SPD, CSA C22.2 No. 269.2-13 for Type 2 SPD, CSA C22.2 no. 8-13 for EMI filter



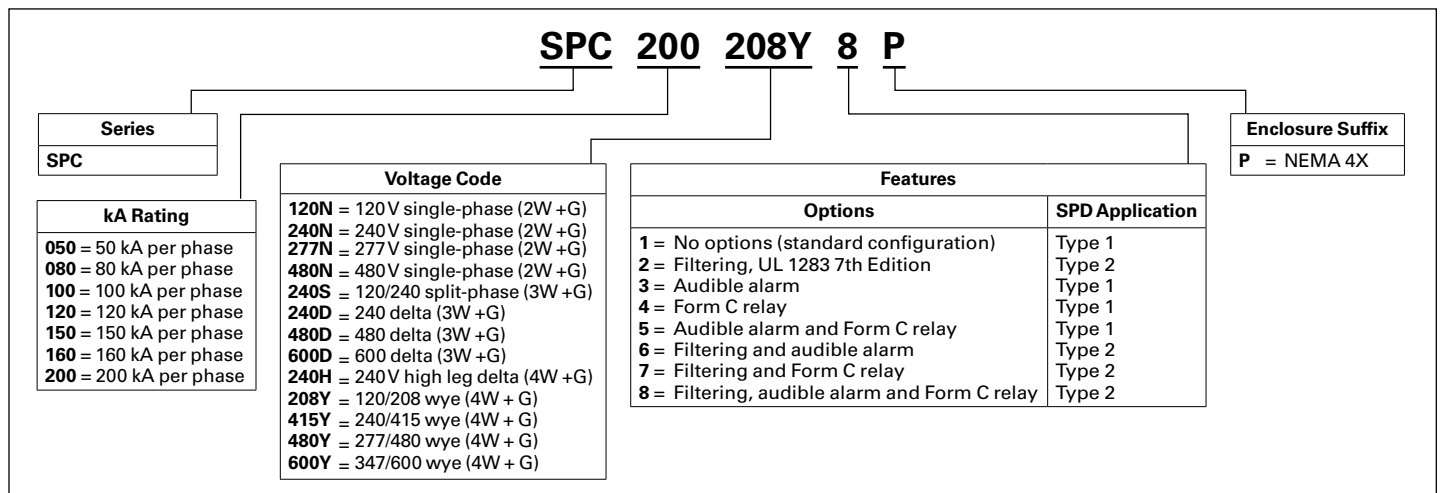
SPC Device Mounted to an Eaton Panelboard

Table 34.2-9. SPC Configurable Features

Feature	Standard	Available Option
Surge protection using thermally protected MOV technology	■	■
Tri-colored LED protection status indicators for each phase	■	■
Tri-colored LED protection status indicators for the neutral-ground protection mode	■	■
Audible alarm	■	■
Form C relay contact	■	■

Catalog Numbering Selection

Table 34.2-10. SPC Series Catalog Numbering System



Example: SPC200208Y8P = SPC Series, 200 kA per phase, 208 wye voltage, features: filtering, audible alarm and Form C relay, NEMA 4X enclosure.

The two corrosion-resistant NEMA 4X enclosure sizes are determined by the voltage code and surge rating as shown in **Table 34.2-11**.

Table 34.2-11. SPC Voltage Configurations per Enclosure Size

P1 Enclosure 5.6 x 6 x 3.2 in.; 2.5 lb		P2 Enclosure 7.6 x 8.5 x 3.2 in.; 4 lb	
120N/240N/277N/480N	50–200 kA	240S	120–200 kA
240S	50–100 kA	208Y/415Y/480Y/600Y	120–200 kA
208Y/415Y/480Y/600Y	50–100 kA	240D/480D	120–200 kA
240D/480D	50–100 kA	600D	50–200 kA
240H	50–100 kA	240H	120–200 kA

Table 34.2-12. Available Optional Equipment

Available Optional Equipment	Catalog Number
Flush mount plate for P1 enclosure	FLUSHMNTPLATE13
Flush mount plate for P2 enclosure	FLUSHMNTPLATE14

CVX Series



CVX050/100A

General Description

With over two decades of experience in the surge suppression industry and extensive R&D initiatives, Eaton is considered a world leader in surge protective device (SPD) manufacturing. All of Eaton's products are manufactured in an ISO 9001:2000 and ISO 14001 certified facility.

Eaton's CVX050/100 models are rugged, cost-effective, high-quality SPDs that feature thermally protected MOVs that eliminate the failure characteristics of standard Metal-Oxide-Varistors. The TPMOV is a fail-safe device that monitors the status of the metal-oxide disk and connects itself from the power system when the disk is approaching breakdown.

The CVX050/100 is easy to install adjacent or even internal to electrical equipment. When installing an SPD in a retrofit environment, it is important to mount the device as close to the electrical equipment as possible. Keep the wiring (lead length) between the electrical equipment and SPD as short as possible, and twist or wire tie the conductors together to reduce the wire's impedance factor.

Application Description

Eaton's CVX050 and CVX100 SPDs protect electronic equipment from damaging transients. These units are suitable for medium and low exposure level applications that require cost-effective, high quality system protection including:

- Residential/small business
- Light industrial
- Light commercial
- Branch panel protection

Features

- Advanced surge path technology for high fault current capacity, low impedance, high frequency design
- Rugged NEMA 4X (IP65) enclosure
- Large diameter, thermally protected metal oxide varistors provide long life and fail-safe operation
- LED monitoring of each phase
- Wide range of voltage applications from 100 to 480 Vac, and 48 and 125 Vdc
- 5-year free replacement warranty

Optional Features

- External mounting feet (catalog number MNTGFTX)
- Flush mounting plate (catalog number FLUSHMNTPLATE12)

Standards and Certifications

- UL 1449 4th Edition for surge protective devices
- CE marked
- Vibration tested IEC 60255-21-1 and -2

Note: Note: CE, CSA and UL on AC unit only.

Catalog Numbering Selection

Table 34.2-13. CVX050/100

CVX 050 - 230L	
Per Phase Peak Surge Current	Configuration and Voltage Ranges (Vac)
050 = 50 kA 100 = 100 kA 1	230L = Single-phase-200, 208, 220, 230, 240, 277 480L = Split-phase-380, 400, 440, 460, 480 240S = Split-phase-100/200, 110/220, 120/240 240H = Three-phase high leg delta-120/240 208Y = Three-phase wye (star)-100/174, 110/190, 120/208, 127/220 480Y = Three-phase wye (star)-220/380, 230/400, 240/415, 277/480 600Y = Three-phase wye (star)-305/525, 347/600 240D = Three-phase delta-200, 208, 220, 230, 240 480D = Three-phase delta-380, 400, 415, 440, 480 600D = Three-phase delta-525, 600 Vac (600D available in 50 kA only)
	Configuration and Voltage Ranges (Vdc)
	048DC = Direct Current 48 Vdc ① 048DC = Direct Current 125 Vdc ①

① DC models only available in 50 kA.

SP1 Series



Eaton SP1

General Description

Eaton's SP1 is a UL 1449 4th Edition listed surge protective device that provides reliable, cost-effective surge protection. This Type 1 SPD is capable of being installed on either the line or load side of the service entrance disconnect and can be used as a replacement for devices formerly known as secondary surge arresters or lightning arresters, which could not be manufactured after UL 1449 3rd Edition went into effect on September 29, 2009. The unit is available in many common voltages and configurations. Multiple mounting options coupled with a compact footprint enables installation of the SP1 in a wide range of applications, including panelboards, loadcenters, pump panels, control cabinets, and other electrical assemblies and applications.

Installation and Operation

Installation and operation of the SP1 is simple. The unit comes pre-wired with 24.00 inches (609.6 mm) of 10-gauge wire and is mounted via the 0.50-inch (12.7 mm) nipple that is molded into its enclosure. Wall or DIN rail mounting can also be accomplished with the addition of an optional kit. When powered, the unit's light-emitting diode (LED) indicator reports the status of the protection elements and is active when all of them are intact and providing protection. Any loss of protection is signaled when the LED extinguishes.

Features

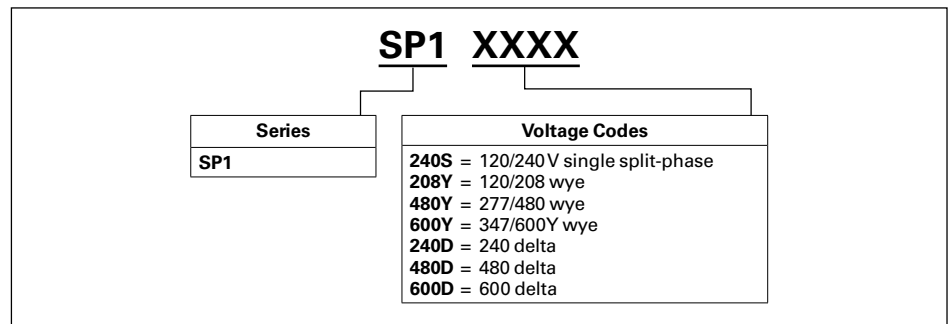
- Type 1 SPD capable of installation on either the line or load side of the service entrance disconnect
- 20 kA nominal discharge current rating (I_n) on most models
- 50 kA per phase surge current capacity
- Compact footprint—
4.80 inches (121.9 mm) L x
2.90 inches (73.7 mm) W x
2.50 inches (63.5 mm) D
- Pre-wired with 24.00 inches (609.6 mm) of 10-gauge wire
- 0.50-inch (12.7 mm) nipple molded into enclosure enables quick and easy mounting
- Optional kit enables wall or DIN rail mounting
- Two-year warranty

Standards and Certifications

- UL 1449 4th Edition-listed device

Catalog Numbering Selection

Table 34.2-14. SP1 Catalog Numbering System



Note: SP1MNTGKIT = optional wall or DIN rail mounting kit (order separately— not included with SP1 unit).

SP2 Series



*Surge Protection for Light Commercial
and UL 508A Panel Applications*

General Description

The SP2 provides basic surge protection for light commercial electrical systems and OEM equipment requirements. The SP2 is available in the most popular voltage and system configurations and delivers superior surge protection using MOV thermal disconnect technology that eliminates the need for additional overcurrent protection.

Studies have shown that failure to protect sensitive electronic loads costs American manufacturing and commercial and service industries more than \$39 billion per year in lost time and revenue. Preventing these losses is a major cost-saving opportunity. The SP2 can be used to protect downstream points in the electrical distribution system along with machinery control panels to keep your facility and processes running.

Application Description

By providing surge protection, the SP2 can suppress the transients that are prevalent throughout the power distribution system to support reliable operations in applications including:

- HVAC systems
- Control panels
- Automation cabinets
- Pumping systems
- Lighting systems
- Commercial facilities
- Food processing
- Warehouses
- Retail facilities
- Manufacturing operations

Features

- Type 1 UL 1449 4th Edition listed SP2s are easily selected and installed on the loadside or lineside of the service entrance overcurrent protective device
- Thermal disconnect technology eliminates the need for additional overcurrent protection
- Compact UV-resistant NEMA 4X enclosure for indoor or outdoor applications

- LED status indicators provide surge protection status at a glance—green when good, red to replace
- Voltage-specific models protect electrical systems and equipment, improving performance by more than 110% over “one-size-fits-all” economy surge arresters
- Compact enclosure takes up less space and can be installed in tight spaces
- Can be used on single-phase, splitphase, wye, delta, and high-leg delta systems
- All SP2 devices are individually marked with a serial number for easy tracking and identification
- Two-year warranty
- Compact design allows for easy installation on an electrical panel or meter socket, or integrated into control cabinets

Standards and Certifications

- UL 1449 4th Edition-listed device

Product Selection

Table 34.2-15. SP2 Product Selection

Nominal System Voltage	Maximum Continuous Operating AC Voltage (MCOV)	System Type	Voltage Protection Ratings (VPR)	Connection Points	Catalog Number
120	150	Single-phase, two-wire	700 L-N	2	SP2-120
240	320	Single-phase, two-wire	1200 L-N	2	SP2-240
120/240	150	Split-phase, three-wire	700 L-N, 1200 L-L	3	SP2-240S
240	320	Three-phase delta, three-wire + ground	1200 L-G, 2500 L-L	4	SP2-240D
480	550	Three-phase delta, three-wire + ground	1800 L-G, 3000 L-L	4	SP2-480D
120/208	150	Three-phase wye, three-wire + ground	700 L-G, 1200 L-L	4	SP2-208Y
277/480	320	Three-phase wye, three-wire + ground	1200 L-G, 2500 L-L	4	SP2-480Y
34/600	420	Three-phase wye, three-wire + ground	1500 L-G, 2500 L-L	4	SP2-600Y

Standard Dimensions in Inches (mm)

SPD Series Dimensions

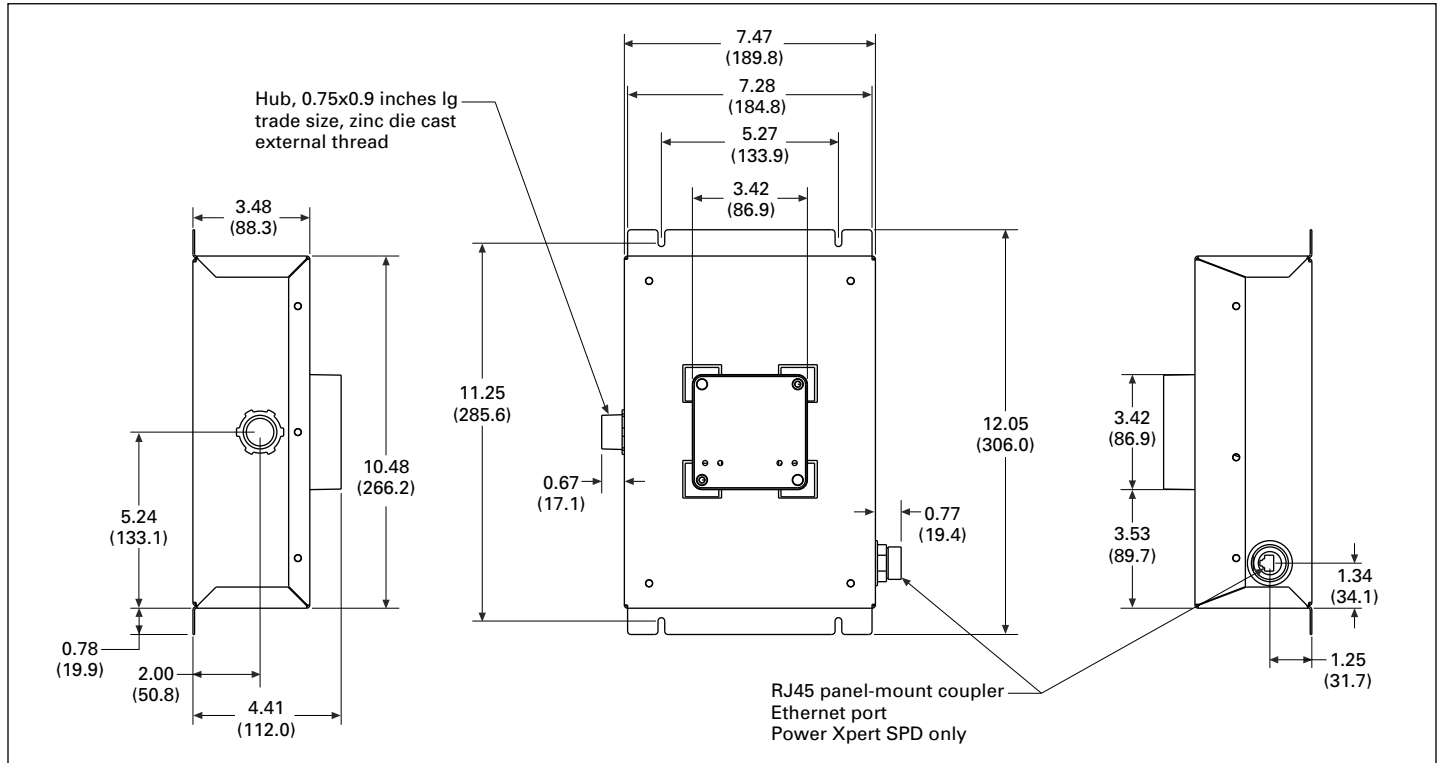


Figure 34.2-3. PXSPD 50–200 kA Units in a NEMA 1 Rated Enclosure, Weight = 6.8 lb

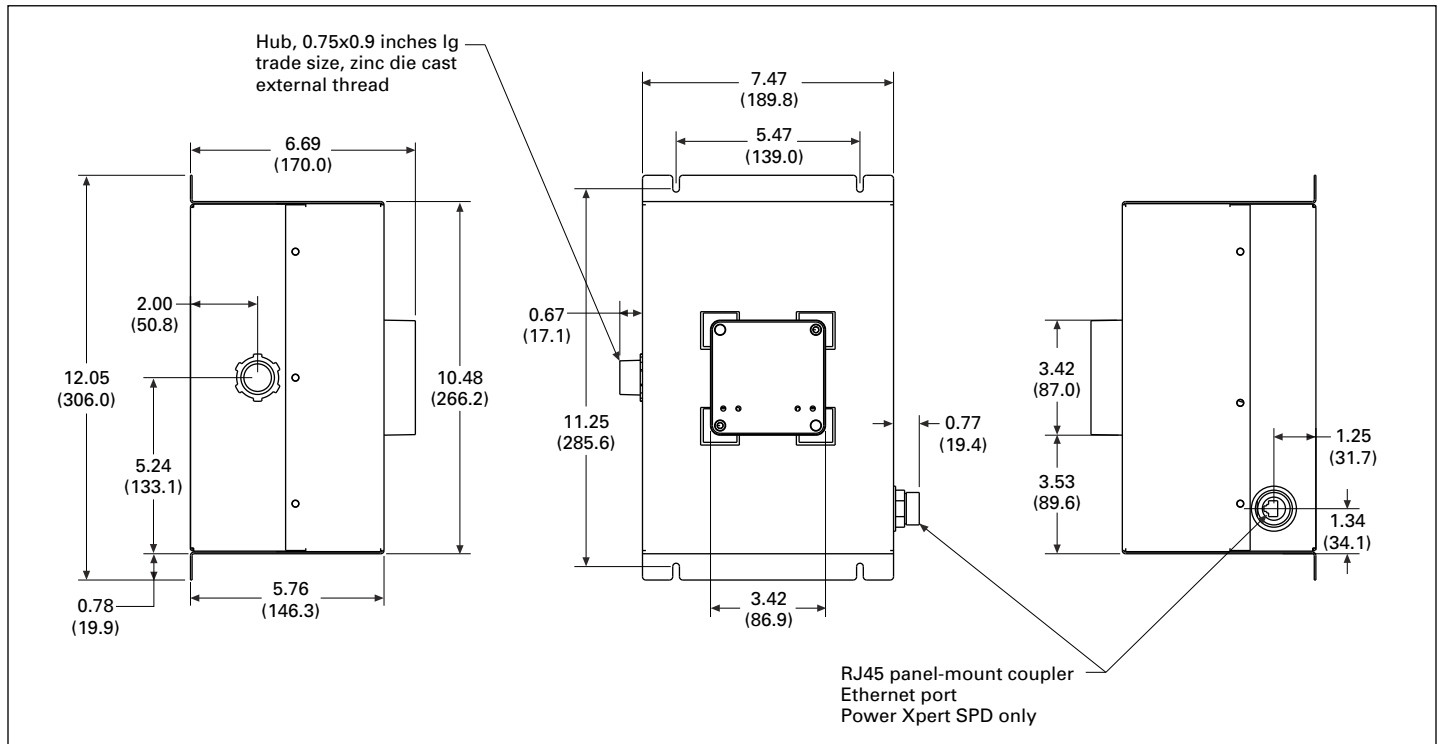


Figure 34.2-4. PXSPD 250–400 kA Units in a NEMA 1 Rated Enclosure, Weight = 13.5 lb

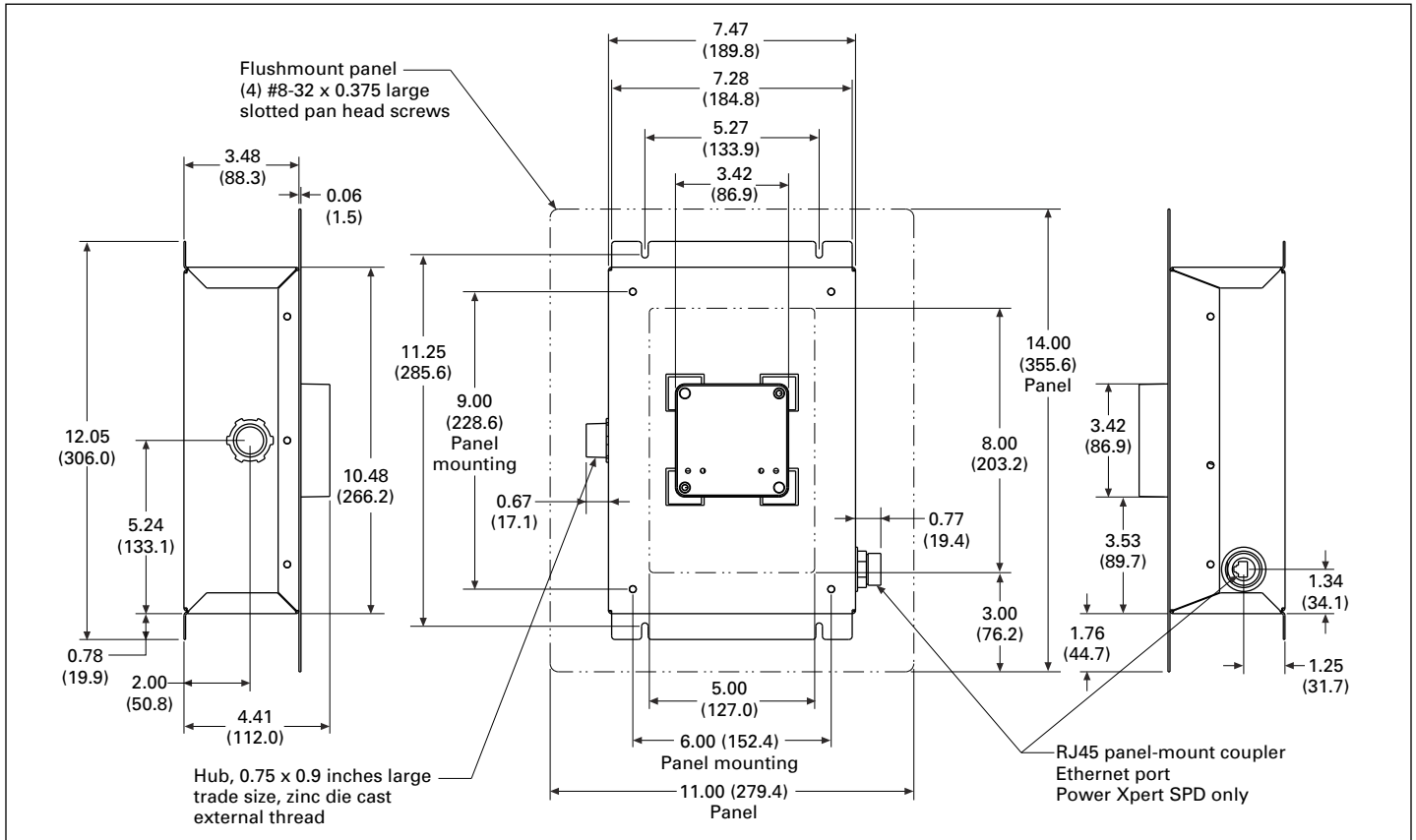


Figure 34.2-5. PXSPD 50–200 kA Units in a NEMA 1 Rated Flushmount Enclosure, Weight = 6.8 lb

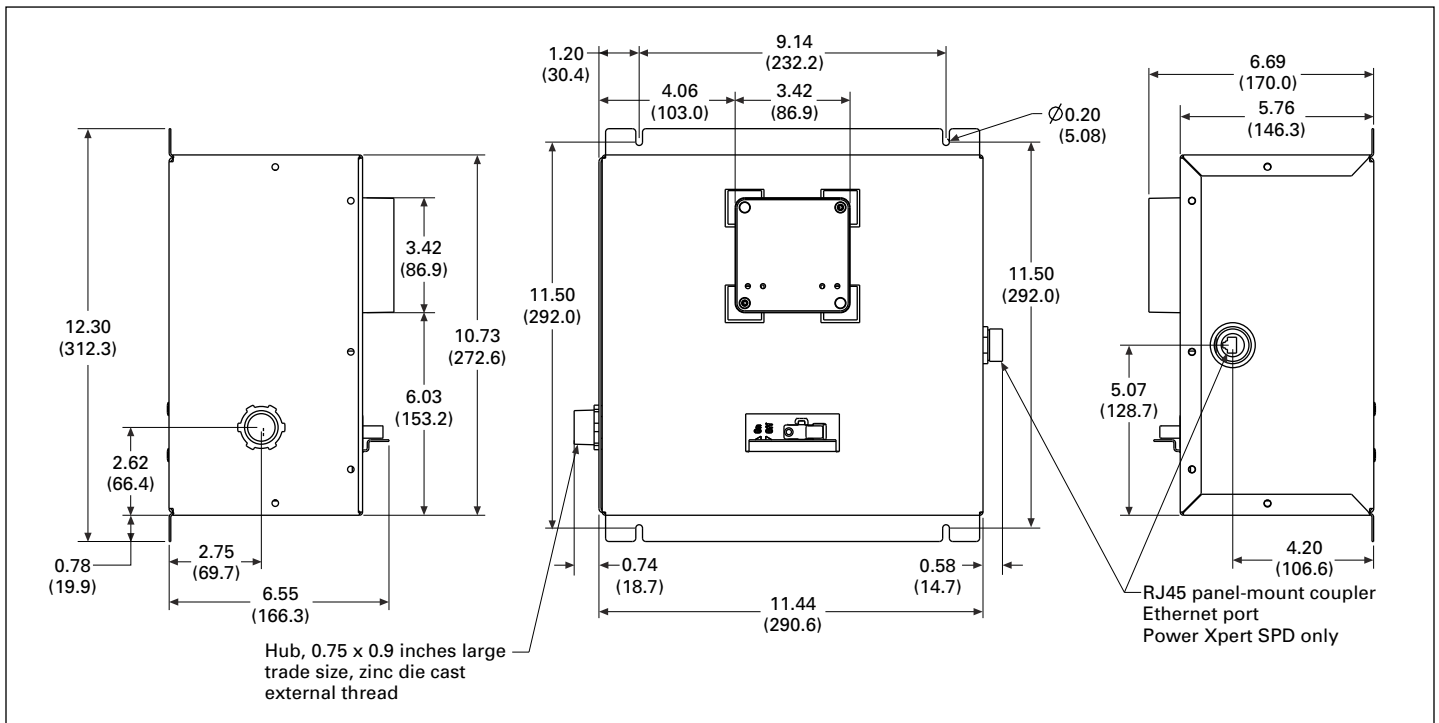


Figure 34.2-6. PXSPD 50–400 kA Units in a NEMA 1 Rated Enclosure With Internal Disconnect, Weight = 14.7 lb

SPD MAX Series Dimensions

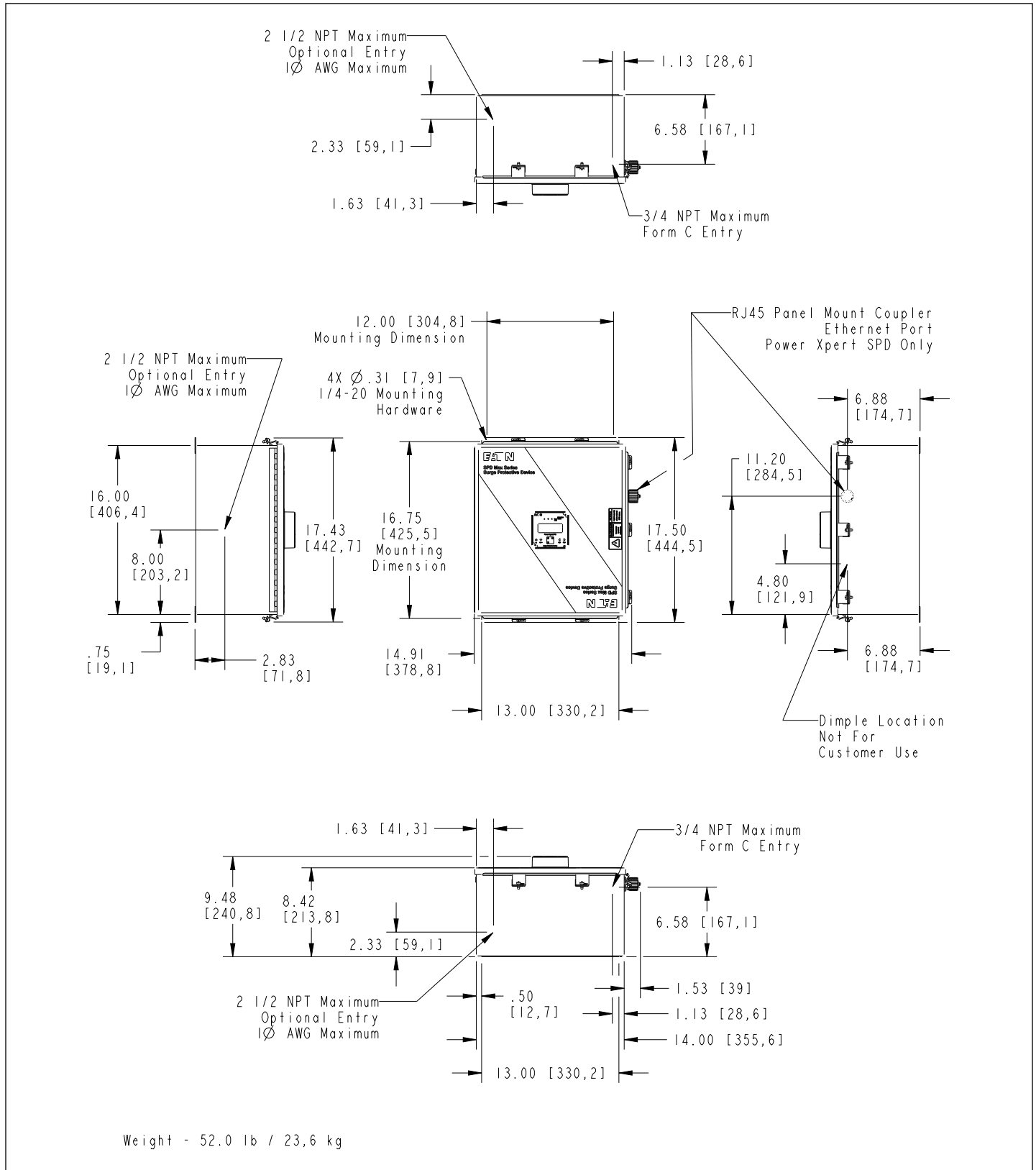


Figure 34.2-7. SPD MAX Dimension in Inches (mm)

SPC Series Dimensions

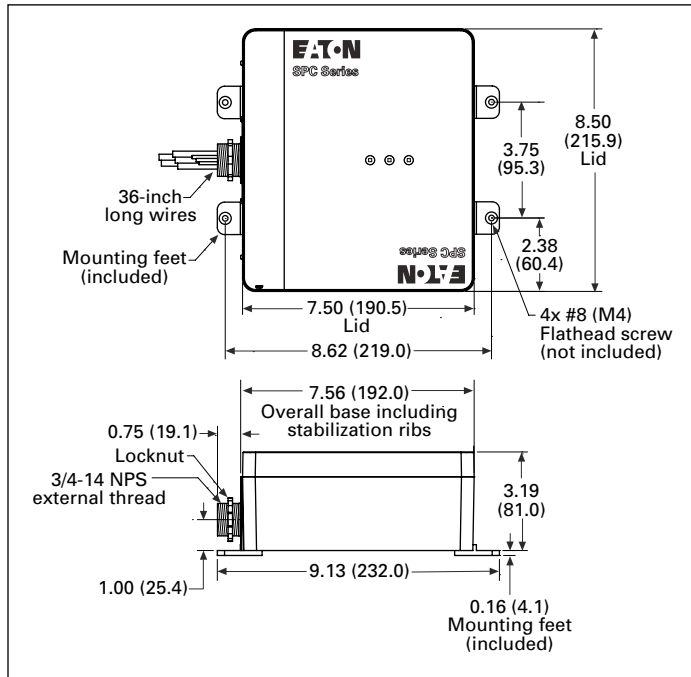


Figure 34.2-8. P1 Enclosure, NEMA 4X with Mounting Feet Dimensions, Weight = 2.5 lb

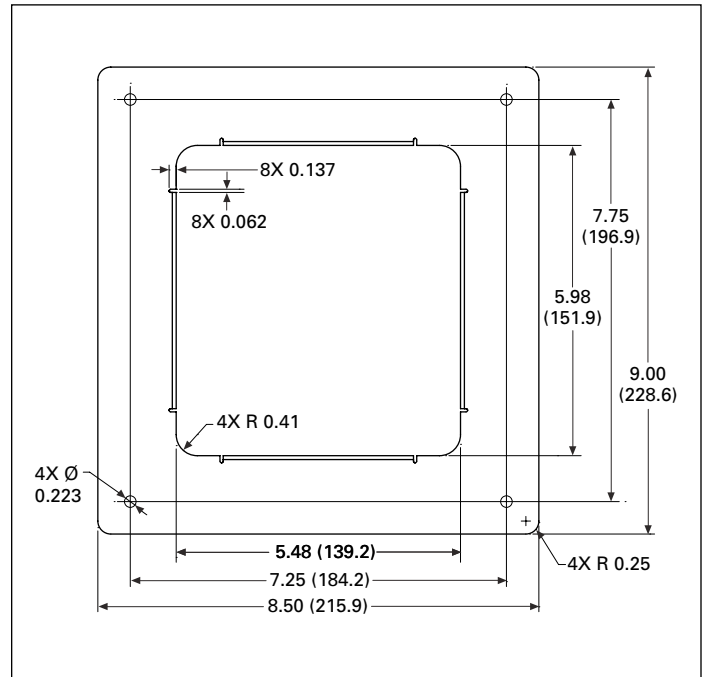


Figure 34.2-10. Optional Flush Mount Plate for P1 Enclosure (Catalog Number FLUSHMNTPLATE13)

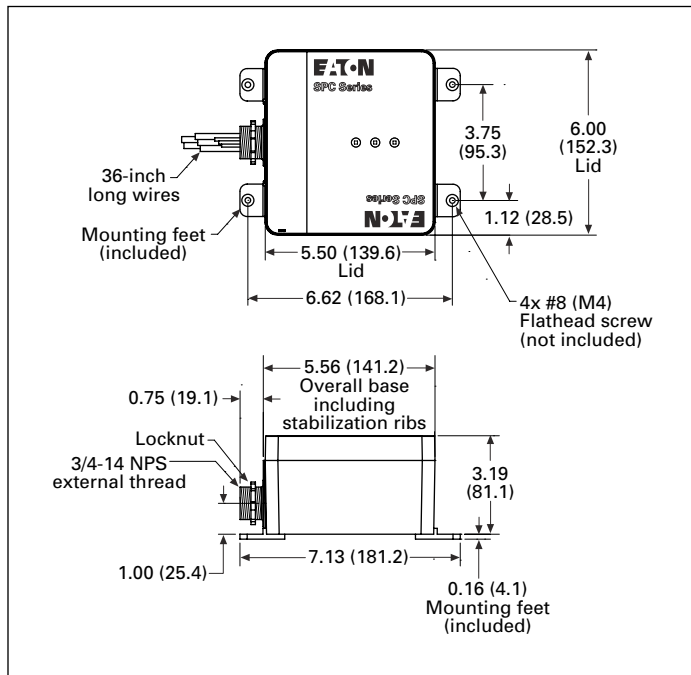


Figure 34.2-9. P2 Enclosure, NEMA 4X with Mounting Feet Dimensions, Weight = 4 lb

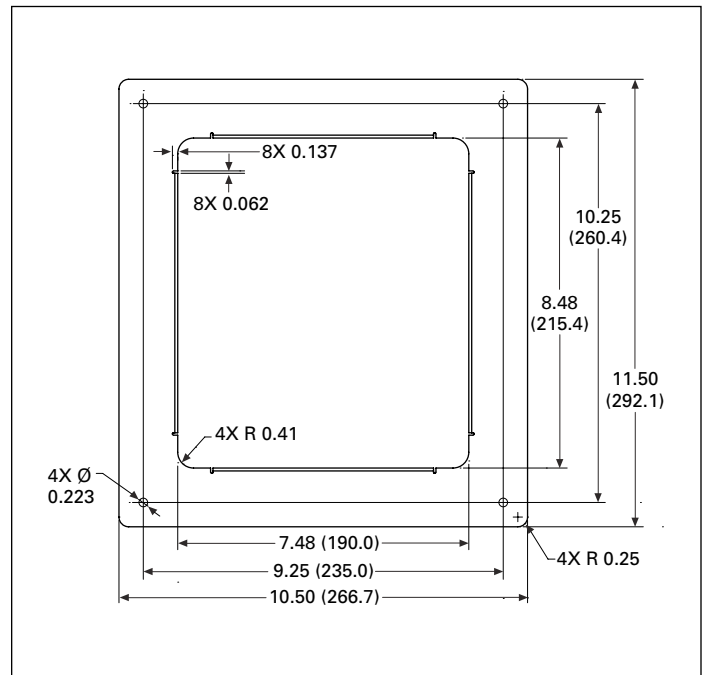


Figure 34.2-11. Optional Flush Mount Plate for P2 Enclosure (Catalog Number FLUSHMNTPLATE14)

CVX Dimensions

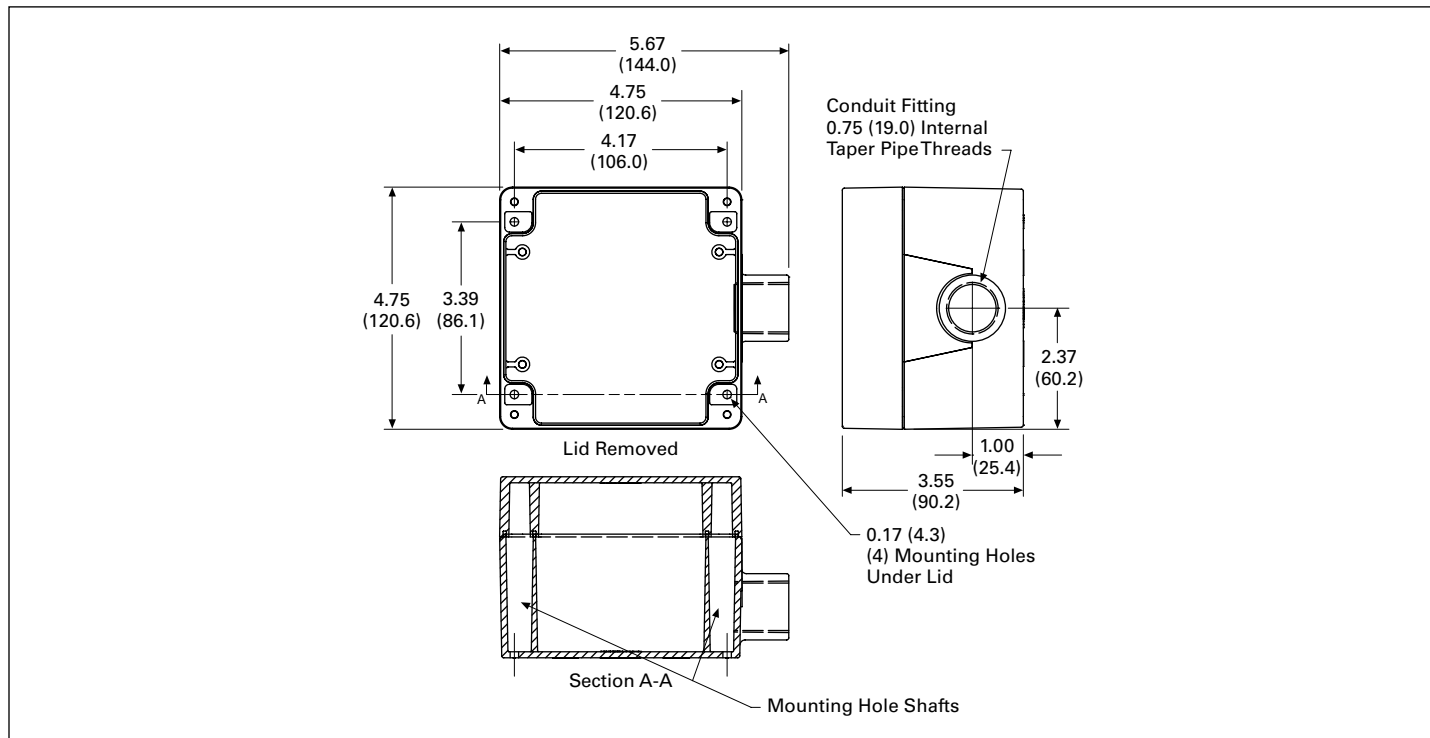


Figure 34.2-12. CVX050/100 Standard Dimensions—Approximate Dimensions in Inches (mm)

SP1 and SP2 Dimensions

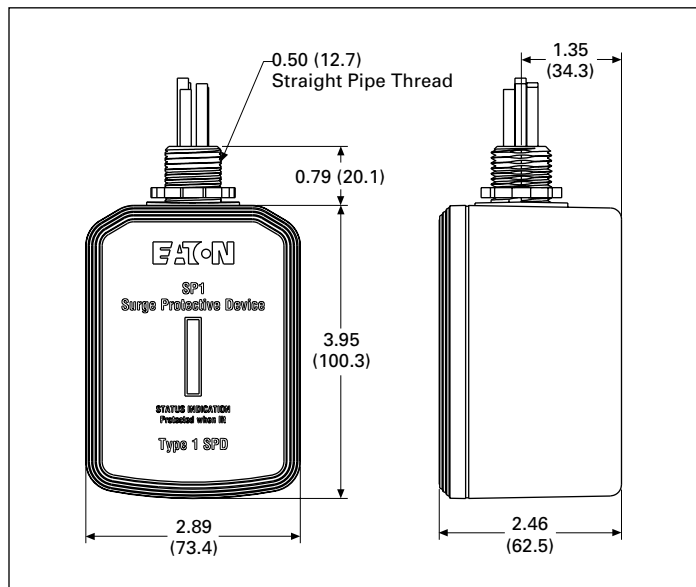


Figure 34.2-13. SP1 Dimensions

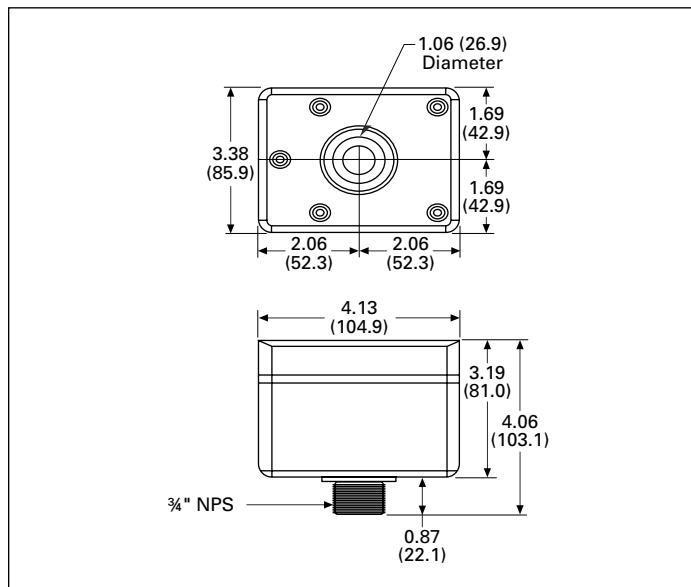


Figure 34.2-14. SP2 Enclosure

Specifications

Table 34.2-16. SPD Series Specifications

Description	Specification
Surge current capacity per phase	50, 80, 100, 120, 160, 200, 250, 300, 400 kA ratings available
Nominal discharge current (In)	20 kA
Short-circuit current rating (SCCR)	200 kA
SPD type	Basic feature package = Type 1 (can also be used in Type 2 applications) Standard, standard with surge counter, and Power Xpert SPD feature packages = Type 2
Enclosure types	NEMA 1, NEMA 4, NEMA 4X (304 SST) (Power Xpert SPD not available in NEMA 4X)
Standard split phase voltages available	120/240
Single-phase	230
Three-phase wye system voltages available	120/208, 127/220, 230/400, 277/480, 347/600
Three-phase delta system voltages	240, 480, 600
Three-phase high-leg delta system voltages	120/240
Phase wire length	48 inches of 10 AWG extend beyond the conduit hub
Relay wire length (optional)	48 inches of 10 AWG extend beyond the conduit hub
RoHS compliant	Yes
Internal disconnect (optional)	Eaton 30 A FDC circuit breaker, type MCCB
Input power frequency	50/60 Hz, Power Xpert SPD tested to 60 Hz only
Power consumption (basic units): 208Y, 220Y, 230L, 240S, 240D, and 240H voltage codes 400Y and 480Y and 480D voltage codes 600Y and 600D voltage codes	0.5 W 1.1 W 1.3 W
Power consumption (standard and standard with surge counter units): 208Y, 220Y, 230L, 240S, 240D, and 240H voltage codes 400Y, 480Y, and 480D basic voltage codes 600Y and 600D voltage codes	0.6 W 1.7 W 2.1 W
Power consumption (Power Xpert SPD units): 208Y, 220Y, 240S, 240D, and 240H voltage codes 400Y, 480Y, and 480D basic voltage codes 600Y and 600D voltage codes	4 W 4 W 4 W
Phase protection: 208Y, 220Y, 230L, 240S, 240D, and 240H voltage codes 400Y, 480Y, and 480D voltage codes 600Y and 600D voltage codes	Single split-phase L-N, L-G, N-G, L-L Single-phase L-N, L-G, N-G Three-phase delta L-G, L-L Three-phase wye L-N, L-G, N-G, L-L Three-phase high-leg delta L-N, L-G, N-G, L-L, H-N, H-G, H-L
Maximum continuous operating voltage (MCOV): 208Y, 220Y, 240S voltage codes 230L 240H 400Y and 480Y voltage codes 600Y voltage code 240D voltage code 480D voltage code 600D voltage code	150 L-N, 300 L-G, 150 N-G, 300 L-L 320 L-N, 640 L-G, 320 N-G 150 L-N, 300 L-G, 150 N-G, 300 L-L, 320 H-N, 470 H-G, 470 H-L 320 L-N, 640 L-G, 320 N-G, 640 L-L 420 L-N, 420 L-G, 420 N-G, 840 L-L 300 L-G, 300 L-L 640 L-G, 640 L-L 840 L-G, 840 L-L
Ports	1
Operating temperature	-40 °F to +122 °F (-40 °C to +50 °C), Power Xpert SPD surge protection (-40 °C to +50 °C) Power Xpert LCD module (-20 °C through +70 °C)
Operating humidity	5% through 95%, noncondensing
Operating altitude	Up to 16,000 ft (5000 m), Power Xpert SPD up to 6561 ft (2000 m)
Weight	Reference Figure 34.2-2 through Figure 34.2-7 , on Page 34.2-2 through Page 34.2-16
Form C relay contact ratings	150 Vac at 0.46 A or 30 Vdc at 1A, terminal block rated 300V, 16 A suitable for use with 30–12 AWG solid or stranded copper wire. Torque 5–7 lb-in
Form C relay contact logic	Power on, normal state–NO contact = OPEN, NC contact = CLOSED Power off, fault state–NO contact = CLOSED, NC contact = OPEN
Real-time clock accuracy, Power Xpert SPD	Synchronized when connected to a network via an Ethernet cable, ± 2 min/month at 25 °C when not connected to a network
EMI/RFI filtering attenuation (standard and standard with surge counter and Power Xpert SPD)	Up to 50 dB from 10 kHz to 100 MHz
Ethernet port	Data rate 10/100 Mbps, wire type: equal or exceed 5 UTP category 5, use of STP (shielded twisted pair) will improve EMI performance. Connector type: RJ45 modular, ground metal shield
Agency certifications and approvals Feature packages 1, 2, and 3	UL 1449 4th Edition listed, CSA (excludes 230L voltage code), UL 1283 7th Edition (type 2 SPDs only) IEC 61643-11/EN 61643-11, Part 11: Test Class II
Agency certifications and approvals Feature package 4 (Power Xpert SPD)	cULus certified, UL 1449 4th Edition listed, UL 1283 7th Edition IEC 61643-11/EN 61643-11, Part 11: Test Class II
Warranty	10 years, 15 years if you register on www.eaton.com/spd and then click the warranty registration icon
ROHS compliant	Yes
Wire length and AWG	Factory prewired with 48 inches of #10 AWG wire

Table 34.2-17. SPD MAX Series Specifications

Description	Specification
Surge current capacity per phase	100 kA, 120 kA, 160 kA, 200 kA, 250 kA, 300 kA, 320 kA, 400 kA, 600 kA, 800 kA ratings available
Nominal discharge current (In)	20 kA
Short-circuit current rating (SCCR)	200 kA
SPD type	Basic feature package = Type 1 (can also be used in Type 2 applications) Standard with surge counter feature package and Power Xpert SPD feature package = Type 2
Enclosure types	NEMA 4, NEMA 4X enclosure, Power Xpert SPD available in NEMA 1 enclosures
Circuit breaker – 30 A	Eaton catalog number: FDC3030L

Circuit Breaker Load and Line

Terminal torque specifications	#10 AWG 35 lb-in; #8 AWG 40 lb-in; #6–#4 AWG 45 lb-in; #3–1/0 AWG 50 lb-in (SPD maximum wire range #10–1/0 AWG)
Standard split phase voltages available	120/240
Single-phase	230
Three-phase wye system voltages available	120/208, 127/220, 230/400, 277/480, 347/600
Three-phase delta system voltages	240, 480, 600
Three-phase high leg delta system voltages	120/240 high leg phase wire will be identified with a tag from the factory
Input power frequency	50/60 Hz, 60 Hz Power Xpert SPD

Power Consumption (Standard with Surge Counter Units)

208Y, 220Y, 230 L, 240 S, 240 D, and 240 H voltage codes	0.6W
400Y, 480Y, and 480 D basic voltage codes	1.7W
600Y and 600 D voltage codes	2.1W
Protection modes	Single split phase L–N, L–G, N–G, L–L, single-phase L–N, L–G, N–G, three-phase delta L–G, L–L, three-phase wye L–N, L–G, N–G, L–L, three-phase high leg delta L–N, L–G, N–G, L–L

Power Consumption (Power Xpert SPD units)

208Y, 220Y, 230L, 240S, 240D, and 240H voltage codes	4W
400Y, 480Y, and 480D voltage codes	4W
600Y and 600D voltage codes	4W

Maximum Continuous Operating Voltage (MCOV)

230V single-phase	320V L–N, 320V L–G, 320V N–G
127V/220V wye, 120V/240V single split phase	150V L–N, 150V L–G, 150V N–G, 300V L–L
120V/240V hi leg	150V L–N, 150V L–G, 150V N–G, 300V L–L, 320V H–N, 320V H–G, 470V H–L
230V/400V wye, 277V/480V wye	320V L–N, 320V L–G, 320V N–G, 640V L–L
347V/600V wye	420V L–N, 420V L–G, 420V N–G, 840V L–L
240V delta	300V L–G, 300V L–L
480V delta	640V L–G, 640V L–L
600V delta	840V L–G, 840V L–L

Ports	1 or 2
Operating temperature and humidity	–20 °C through +50 °C (–4 °F through +122 °F), 5% through 95%, noncondensing Power Xpert LCD module (–20 °C through +70 °C)
Storage temperature	–20 °C through +50 °C (–4 °F through +122 °F)
Operating altitude	Up to 16,000 ft (5000 m)
Weight	Not to exceed 52 lb
Form C relay contact ratings	150 Vac at 0.46 A, 30Vdc at 1 A
Form C terminal block ratings	Rated 300V, 16 A, 30–12 AWG solid or stranded wire. Torque range 5–7 lb-in
Form C relay contact logic	Power on, normal state – NO contact = OPEN, NC contact = CLOSED Power off, fault state – NO contact = CLOSED, NC contact = OPEN
EMI/RFI filtering attenuation (standard with surge counter)	Up to 50 dB from 10 kHz to 100 MHz
Ethernet port	Data rate 100/10 Mbps Wire type: equal or exceed 5 UTP category 5, use of STP (shielded twisted pair) will improve EMI performance Connector type: RJ45 modular, ground metal shield
Standards / agency certifications	UL 1449 4th Edition – standard for surge protective devices UL 1283 7th Edition – standard for EMI filters (Type 2 SPDs only) CSA Electrical Notice No. 516 Edition 1 – surge/transient voltage suppressor CSA 22.2 No. 8-13 Electromagnetic Interference (EMI) Filters – Edition 5 Issue Date 2013/11/01
Warranty	15 years from the date of delivery to the purchaser, 20 years if the product is properly registered at www.eaton.com
RoHS compliant	Yes

Table 34.2-18. SPC Series Specifications

Description	Specification
Peak surge current capacity ratings available	50, 80, 100, 120, 150, 160, 200 kA per phase
Nominal discharge current (I_n)	20 kA
Short-circuit current rating (SCCR)	200 kA
Single phase voltages available (2W + G)	120, 240, 277, 480
Split phase voltages available (3W + G)	120/240
Three-phase wye system voltages available (4W + G)	120/208, 240/415, 277/480, 347/600
Three-phase delta system voltages available (3W + G)	240, 480, 600
Three-phase high leg delta system voltage available (4W + G)	240
Input power frequency	50/60 Hz
Protection modes	Single-phase L-N, N-G, L-G Split-phase L-N, N-G, L-G, L-L Wye L-N, N-G, L-G, L-L Delta L-G, L-L
Maximum continuous operating voltage (MCOV): 120N 240N, 277N 480N 240S, 208Y 240H 415Y and 480Y 600Y 240D 480D 600D	150 L-N, 150 L-G1, 150 N-G 320 L-N, 320 L-G1, 320 N-G 550 L-N, 550 L-G1, 550 N-G 150 L-N, 150 L-G, 150 N-G, 300 L-L 150 L-N, 150 L-G, 150 N-G, 300 L-L, 470 H-L, 320 H-N, 320 H-G 320 L-N, 320 L-G, 320 N-G, 640 L-L 420 L-N, 420 L-G, 420 N-G, 840 L-L 320 L-G, 300 L-L 550 L-G, 640 L-L 840 L-G, 840 L-L
Ports	1
Operating temperature	-40 °F to +140 °F (-40 °C to +60 °C)
Storage temperature	-40 °F to +140 °F (-40 °C to +60 °C)
Operating humidity	5% through 95%, noncondensing
Operating altitude	Up to 2000 m (6561 ft)
Agency certification/listing	UL 1449 4th Edition, UL 1283 7th Edition, CSA C22.2 No. 269.1-14 for Type 1 SPD, CSA C22.2 No. 269.2-13 for Type 2 SPD, CSA C22.2 no. 8-13 for EMI filter
Durability Repetitive Strike Test	Passed 12,000 strikes to ANSI/IEEE C62.41 (20 kV, 10 kA) Category C Waveform
SPD type	UL 1449 4th Edition and CSA Type 1 and Type 2 SPD (dependent on feature options)
Enclosure dimensions and weights	Refer to Figure 34.2-8 and Figure 34.2-9 for enclosure dimensions and weights
Enclosure rating	NEMA 4X enclosure ①
Form C relay contact ratings	2 A at 30 Vdc or 250 Vac
Form C relay contact logic	Power ON, normal state—NO contact = open, NC contact = closed Power OFF or fault state—NO contact = closed, NC contact = open
EMI/RFI filtering attenuation	Up to 40 dB from 10 kHz to 100 MHz
RoHS compliant	Yes
Warranty	5 years standard, 10 years with product registration on www.eaton.com/spc

① Mounting feet required to achieve NEMA 4X rating.

Table 34.2-19. CVX050/100 Model Specifications

Description	Specification
Peak kA per phase	50, 100
Peak kA per mode	50
Nominal discharge current	20 kA ①
Short-circuit current rating	100 kA
Single-phase voltages	200, 208, 220, 230, 240, 277, 380, 400, 440, 460, 480
Split-phase voltages	100/200, 110/220/ 120/240
High leg delta voltages	240
Wye system voltages	100/175, 110/190, 120/208, 127/220, 220/380, 230/400, 240/415, 277/480, 305/525, 347/600
Delta system voltages	200, 208, 220, 230, 240, 380, 400, 415, 440, 480, 525, 600
Direct current voltage ②	48 Vdc, 125 Vdc
Input power frequency	47–420 Hz (50/60 Hz typical)
Protection modes	Single-phase: L-N, N-G, L-G Split-phase: L-N, N-G, L-G, L-L High leg delta: L-N, N-G, L-G, L-L, H-N, H-G, H-L Wye: L-N, N-G, L-G, L-L Delta: L-G, L-L Direct current (DC): L-L, L-G b
Number of ports	1
Specific energy	100 kJ/Ohm
Weight (approximate)	2.0 lb (1.0 kg)
Operating temperature	–13 °F (–25 °C) to +140 °F (+60 °C)
Vibration tested	IEC 60255-21-1 and IEC 60255-21-2

① 480L, 600D and 600Y units rated 10 kA I_n .

② DC models only available in 50 kA.

Table 34.2-20. SP1 Specifications

Description	Rating
Surge current capacity per phase	50 kA
Nominal discharge current (I_n)	20 kA for SP1-240S, 208Y, 480Y, 240D and 480D 10 kA for SP1-600Y and 600D
Short-circuit current rating (SCCR)	200 kA
SPD type	Type 1 (can also be used in Type 2 applications)
System voltages available (Vac) Single split-phase Three-phase wye Three-phase delta	120/240 120/208, 277/480, 347/600 240, 480, 600
Protection modes Single split-phase and three-phase wye Three-phase delta	L-N, L-L L-G, L-L
Maximum continuous operating voltage (MCOV) SP1-240S and SP1-208Y SP1-480Y SP1-600Y SP1-240D SP1-480D SP1-600D	150 L-N, 300 L-L 320 L-N, 640 L-G 420 L-N, 840 L-G 300 L-G, 300 L-L 640 L-G, 640 L-L 840 L-G, 840 L-L
Input power frequency	50/60 Hz
Enclosure rating	NEMA 4
Operating temperature	–20 °C to +50 °C (–4 °F to +122 °F)
Operating humidity	5–95%, noncondensing
Operating altitude	Up to 16,000 ft (5000 m)
Agency certification and approvals	UL 1449 4th Edition listed device
Warranty	2 years

Table 34.2-21. SP2 Specifications

Description	Specification
Markets	Light commercial and UL 508A panels
Product warranty	2 years
System types	Single, split, delta, and wye
Nominal system voltage	120, 208, 240, 480, 600 Vac
Installation	Two-, three-, four-wire
Maximum continuous operating AC voltage	Matched to nominal voltage
MCOV	150–550 Vac (see table above)
L–N protection	Yes (single-phase units)
L–L protection	Yes
L–G protection	Yes (three-phase units)
Protection	Surges and transients
SCCR	200 kA
Nominal discharge current (8 x 20 μ s) I_n	10 kA
Maximum discharge current (8 x 20 μ s) I_{max}	45 kA per phase
Response time t_A	<25 ns
Voltage protection ratings (VPRs)	See Table 34.2-15
Overcurrent device (if required by local code)	Circuit breaker or fuse sized to protect wires per local codes
Frequency	50/60 Hz
Operating status / fault indication	One bi-color LED— green (good) / red (replace)
Conductor gauge/length	10 AWG stranded copper / 18 inches
Mounting	Chase nipple (0.75-inch NPS)
Enclosure rating	NEMA 4X— UL 94-5VA
Degree of protection (installed state)	IP20 (finger-safe)
Install location	Indoor/outdoor
Circuit location	Lineside/loadside
Standards / agency information	UL 1449 4th Edition Type 1 Listed SPD— cULus,
RoHS compliant	
Operating temperature	–40 °C to +65 °C
Maximum operating altitude	12,000 ft
Weight	17 oz (476 g)

Voltage Protection Ratings (VPR)

The measured limiting voltage test in UL 1449 4th Edition uses a 6 kV/3 kA combination wave surge to determine the voltage protection rating (VPR) of the SPD. This test is similar to the suppressed voltage rating (SVR) as performed in UL 1449 2nd Edition. The key difference between the tests in the 2nd Edition and the 4th Edition is that the magnitude of the current used for the test is six times greater in the 4th Edition versus the 2nd Edition. This much higher current level will mean that the measured limiting voltage will likely be significantly higher for the higher current level. For example, the VPR for an SPD will likely be much higher than the SVR of an identical SPD. With higher current levels come higher limiting voltages. Please note that VPR values fall into predefined voltage categories as outlined in the UL 1449 4th Edition. The standard VPR voltages are shown in the following table.

Table 34.2-22. Voltage Protection Ratings

Measured Limiting Voltage	Minimum Voltage Protection Rating (VPR)
330 V or Less	330
331 V to 400 V	400
401 V to 500 V	500
501 V to 600 V	600
601 V to 700 V	700
701 V to 800 V	800
801 V to 900 V	900
901 V to 1000 V	1000
1001 V to 1200 V	1200
1201 V to 1500 V	1500
1501 V to 1800 V	1800
1801 V to 2000 V	2000
2001 V to 2500 V	2500
2501 V to 3000 V	3000
3001 V to 4000 V	4000

Therefore, if an SPD is tested with a 6 kV/3 kA combination wave surge and the let-through voltage is measured to be 610 V, the SPD is given a VPR of 700 V. The SPD is given the same 700 V VPR if the same test results in a let-through voltage measurement of 698 V. Additionally, if the let-through voltage is measured to be 2005 V, the SPD is given a VPR of 2500 V.

It is important that users are familiar with the difference in testing methods and the subsequent effect on the value of the VPR. Without considering or understanding the differences in the level of currents used in the test, one might assume that a UL 1449 4th Edition device with a VPR of 700 V has a higher limiting voltage than a UL 1449 2nd Edition device with an SVR of 400 V. Such a conclusion would be inaccurate.

The higher VPR of 700 V is likely caused by the higher level of surge current during the measured limiting voltage test. In order to make an accurate assessment of devices, the VPR of one device must be compared with the VPR of another device. Comparing a VPR to an SVR yields no useful or conclusive information.

Table 34.2-23. 80–400 kA Units Rated 120/240 V Single Split-Phase VPR ①

Type (All Voltage Code 240S)	Protection Mode			
	L–N	L–G	N–G	L–L
Sidemount NEMA 1	700	800	700	1200
Sidemount NEMA 1 with breaker	800	800	700	1500
Sidemount NEMA 4/4X	900	900	700	1200
Sidemount NEMA 4/4X with breaker	900	900	700	1500

① Highest VPR shown for each model and mode. Specific units may have lower VPR based upon options used. Refer to specific VPR shown in TD01005025E for sidemount SPDs.

Note: VPR of 50 kA units and ratings of each specific configuration can be found in TD01005025E for sidemount SPDs.

Table 34.2-24. 80–400 kA Units Rated 120/208 V Wye (4W + G) and 127/220 V Wye (4W + G) VPR ②

Type (All Voltage Code 208Y and 220Y)	Protection Mode			
	L–N	L–G	N–G	L–L
Sidemount NEMA 1	700	800	700	1200
Sidemount NEMA 1 with breaker	800	1200	700	1500
Sidemount NEMA 4/4X	900	900	700	1500
Sidemount NEMA 4/4X with breaker	900	900	700	1500

② Highest VPR shown for each model and mode. Specific units may have lower VPR based upon options used. Refer to specific VPR shown in TD01005025E for sidemount SPDs.

Note: VPR of 50 kA units and ratings of each specific configuration can be found in TD01005025E for sidemount SPDs.

Table 34.2-25. 80–400 kA Units Rated 230/400 V Wye (4W + G) and 277/480 V Wye (4W + G) VPR ③

Type (All Voltage Code 400Y and 480Y)	Protection Mode			
	L–N	L–G	N–G	L–L
Sidemount NEMA 1	1200	1200	1200	2500
Sidemount NEMA 1 with breaker	1500	1500	1200	2500
Sidemount NEMA 4/4X	1200	1200	1200	2500
Sidemount NEMA 4/4X with breaker	1200	1500	1200	2500

③ Highest VPR shown for each model and mode. Specific units may have lower VPR based upon options used. Refer to specific VPR shown in TD01005025E for sidemount SPDs.

Note: VPR of 50 kA units and ratings of each specific configuration can be found in TD01005025E for sidemount SPDs.

Table 34.2-26. 80–400 kA Units Rated 347/600 V Wye (4W + G) VPR ④

Type (All Voltage Code 600Y)	Protection Mode			
	L–N	L–G	N–G	L–L
Sidemount NEMA 1	1500	1500	1500	2500
Sidemount NEMA 1 with breaker	1500	1500	1500	2500
Sidemount NEMA 4/4X	1500	1500	1500	2500
Sidemount NEMA 4/4X with breaker	1500	1500	1500	2500

④ Highest VPR shown for each model and mode. Specific units may have lower VPR based upon options used. Refer to specific VPR shown in TD01005025E for sidemount SPDs.

Note: VPR of 50 kA units and ratings of each specific configuration can be found in TD01005025E for sidemount SPDs.

Table 34.2-27. 80–400 kA Units Rated 240 V Delta (3W +G) VPR ①

Type (All Voltage Code 240D)	Protection Mode			
	L–N	L–G	N–G	L–L
Sidemount NEMA 1	N/A	1000	N/A	1000
Sidemount NEMA 1 with breaker	N/A	1000	N/A	1000
Sidemount NEMA 4/4X	N/A	1000	N/A	1000
Sidemount NEMA 4/4X with breaker	N/A	1000	N/A	1000

① Highest VPR shown for each model and mode. Specific units may have lower VPR based upon options used. Refer to specific VPR shown in TD01005025E for sidemount SPDs.

Note: VPR of 50 kA units and ratings of each specific configuration can be found in TD01005025E for sidemount SPDs.

Table 34.2-28. 80–400 kA Units Rated 480 V Delta (3W +G) VPR ②

Type (All Voltage Code 480D)	Protection Mode			
	L–N	L–G	N–G	L–L
Sidemount NEMA 1	N/A	2500	N/A	2500
Sidemount NEMA 1 with breaker	N/A	2500	N/A	2500
Sidemount NEMA 4/4X	N/A	2500	N/A	2500
Sidemount NEMA 4/4X with breaker	N/A	2500	N/A	2500

② Highest VPR shown for each model and mode. Specific units may have lower VPR based upon options used. Refer to specific VPR shown in TD01005025E for sidemount SPDs.

Note: VPR of 50 kA units and ratings of each specific configuration can be found in TD01005025E for sidemount SPDs.

Table 34.2-29. 80–400 kA Units Rated 600 V Delta (3W +G) VPR ③

Type (All Voltage Code 600D)	Protection Mode			
	L–N	L–G	N–G	L–L
Sidemount NEMA 1	N/A	3000	N/A	2500
Sidemount NEMA 1 with breaker	N/A	3000	N/A	2500
Sidemount NEMA 4/4X	N/A	3000	N/A	2500
Sidemount NEMA 4/4X with breaker	N/A	2500	N/A	2500

③ Highest VPR shown for each model and mode. Specific units may have lower VPR based upon options used. Refer to specific VPR shown in TD01005025E for sidemount SPDs.

Note: VPR of 50 kA units and ratings of each specific configuration can be found in TD01005025E for sidemount SPDs.

Table 34.2-30. 80–400 kA Units Rated 240 V High-Leg Delta (4W +G) VPR ④

Type (All Voltage Code 240H)	Protection Mode			
	L–N	L–G	N–G	L–L
Sidemount NEMA 1	700	800	700	1200
Sidemount NEMA 1 with breaker	800	900	700	1500
Sidemount NEMA 4/4X	900	900	700	1500
Sidemount NEMA 4/4X with breaker	900	900	700	1500

④ Highest VPR shown for each model and mode. Specific units may have lower VPR based upon options used. Refer to specific VPR shown in TD01005025E for sidemount SPDs.

Note: VPR of 50 kA units and ratings of each specific configuration can be found in TD01005025E for sidemount SPDs.

Performance Data

Table 34.2-31 contains representative VPR data for all SPD MAX Series voltage ratings, but the VPR varies based on the feature package, kA rating, number of modules, and enclosure option. The UL website contains the actual VPR for every possible configuration.

Table 34.2-31. SPD MAX ANSI/UL 1449 4th Edition VPR

Nominal Voltage	L–G VPR	L–L VPR	L–N VPR	N–G VPR	H–G VPR	H–L VPR	H–N VPR
208Y	800	1200	900	900	—	—	—
220Y	800	1200	900	900	—	—	—
230L	1500	—	1500	1200	—	—	—
240D	1200	1200	—	—	—	—	—
240H	800	1200	900	900	1500	2000	1500
240S	800	1200	900	900	—	—	—
400Y	1500	2000	1500	—	—	—	—
480D	1500	2000	—	—	—	—	—
480Y	1500	2000	1500	—	—	—	—
600D	1500	2500	—	—	—	—	—
600Y	1500	2500	1800	1500	—	—	—

Table 34.2-32. SPC Series ANSI/UL 1449 4th Edition VPR

Voltage Code	Protection Mode			
	L–N	L–G	N–G	L–L

120–200 kA Unit VPR

120N	700	700	700	—
240N	1000	1000	1000	—
277N	1200	1200	1200	—
480N	1800	1800	1800	—
240S	700	700	700	1200
208Y	700	700	700	1200
415Y	1200	1200	1200	2000
480Y	1200	1200	1200	2000
600Y	1500	1500	1500	2500
240D	—	1000	—	1000
480D	—	1800	—	2000
600D	—	2500	—	2500
240H ⑤	700	700	700	1200

80–100 kA Unit VPR

120N	600	600	600	—
240N	1200	1200	1200	—
277N	1200	1200	1200	—
480N	1800	1800	1800	—
240S	600	600	600	1000
208Y	600	600	600	1000
415Y	1200	1200	1200	2000
480Y	1200	1200	1200	2000
600Y	1500	1500	1500	2500
240D	—	1000	—	1000
480D	—	2000	—	2500
600D	—	2500	—	2500
240H ⑥	600	600	600	1000

50 kA Unit VPR

120N	700	1200	700	—
240N	1200	2000	1500	—
277N	1200	2000	1500	—
480N	1800	1800	1800	—
240S	700	1200	700	1200
208Y	700	1200	700	1200
415Y	1200	2000	1500	2000
480Y	1200	2000	1500	2000
600Y	1500	1500	1500	2500
240D	—	1000	—	1000
480D	—	2000	—	2500
600D	—	2500	—	2500
240H ⑥	700	1200	700	1200

⑤ Additional 240H VPRs: 2000 H–L, 1200 H–N, 1200 H–G.

⑥ Additional 240H VPRs: 2000 H–L, 1200 H–N, 2000 H–G.

Note: **Table 34.2-32** contains representative VPR data for all SPC Series voltage ratings.

Table 34.2-33. CVX050/100 VPR

Model	System Configuration	Nominal System Voltage	MCOV				UL 1449-4 VPR ①			
			L-L	L-N	L-G	N-G	L-L	L-N	L-G	N-G
CVX050										
230L	Single-phase two-wire + ground	200, 208, 220, 230, 240, 277	—	320	640	320	—	1200	1200	1200
480L	Single-phase two-wire + ground	380, 400, 440, 460, 480	—	550	1100	550	—	1800	4000	1800
240S	Split-phase three-wire + ground	100/200, 110/220, 120/240	300	150	300	150	1200	700	1200	800
208Y	Three-phase wye (star) four-wire + ground	100/175, 110/190, 120/208, 127/220	300	150	300	150	1200	700	1200	800
480Y	Three-phase wye (star) four-wire + ground	220/380, 230/400, 240/415, 277/480	640	320	640	320	2500	1200	2000	1200
600Y	Three-phase wye (star) four-wire + ground	305/525, 347/600	840	420	840	420	2500	1500	2500	1500
240D	Three-phase delta three-wire + ground	200, 208, 220, 230, 240	640	—	320	—	2000	—	1200	—
240H	Three-phase high leg delta	240	300	150	150	640	1500	700	1200	700
480D	Three-phase delta three-wire + ground	380, 400, 415, 440, 480	1100	—	550	—	3000	—	1800	—
600D	Three-phase delta three-wire + ground	525, 600	1100	—	700	—	3000	—	2500	—
048DC	Direct current	48 Vdc ②	130	—	65	—	—	—	—	—
125DC	Direct current	125 Vdc ②	v288	—	144	—	—	—	—	—

CVX100

230L	Single-phase two-wire + ground	200, 208, 220, 230, 240, 277	—	320	320	320	—	1200	1200	1200
480L	Single-phase two-wire + ground	380, 400, 440, 460, 480	—	550	550	550	—	1800	1800	1800
240S	Split-phase three-wire + ground	100/200, 110/220, 120/240	300	150	150	150	1200	700	800	700
208Y	Three-phase wye (star) four-wire + ground	100/175, 110/190, 120/208, 127/220	300	150	150	150	1000	600	700	700
480Y	Three-phase wye (star) four-wire + ground	220/380, 230/400, 240/415, 277/480	640	320	320	320	1800	1200	1200	1200
600Y	Three-phase wye (star) four-wire + ground	305/525, 347/600	840	420	420	420	2500	1500	1500	1500
240D	Three-phase delta three-wire + ground	200, 208, 220, 230, 240	640	—	320	—	1800	—	1200	—
240H	Three-phase high leg delta	240	300	150	150	150	1200	700	700	700
480D	Three-phase delta three-wire + ground	380, 400, 415, 440, 480	1100	—	550	—	3000	—	1800	—

① UL 1449 4th Edition VPR (voltage protection rating) test environment: all tests performed with 6-inch lead length, positive polarity.

② DC units available in 50 kA only. Voltages shown are the maximum suggested operating voltages and are not UL certified.

Table 34.2-34. SP2 Series VPR

Nominal System Voltage	Maximum Continuous Operating AC Voltage (MCOV)	System Type	Voltage Protection Ratings (VPR)	Connection Points	Catalog Number
120	150	Single-phase, two-wire	700 L-N	2	SP2-120
240	320	Single-phase, two-wire	1200 L-N	2	SP2-240
120/240	150	Split-phase, three-wire	700 L-N, 1200 L-L	3	SP2-240S
240	320	Three-phase delta, three-wire + ground	1200 L-G, 2500 L-L	4	SP2-240D
480	550	Three-phase delta, three-wire + ground	1800 L-G, 3000 L-L	4	SP2-480D
120/208	150	Three-phase wye, three-wire + ground	700 L-G, 1200 L-L	4	SP2-208Y
277/480	320	Three-phase wye, three-wire + ground	1200 L-G, 2500 L-L	4	SP2-480Y
34/600	420	Three-phase wye, three-wire + ground	1500 L-G, 2500 L-L	4	SP2-600Y

Table 34.2-35. SP1 ANSI/UL 1449 4th Edition VPR

Protection Mode			Catalog Number
L-N	L-G	L-L	
600	N/A	1000	SP1-240S
600	N/A	1000	SP1-208Y
1200	N/A	2000	SP1-480Y
1500	N/A	2500	SP1-600Y
N/A	1000	1000	SP1-240D
N/A	2000	2000	SP1-480D
N/A	2500	2500	SP1-600D

Technical Support Information

If you have any questions or need additional information, please contact the Eaton Technical Resource Center at 800-809-2772, option 5, option 2. You may also submit inquiries via email: spd@eaton.com.

Low-voltage power distribution and control systems > Switches and disconnects >

Safety switches

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Note: For customized safety switches see, Safety Switches—Customized Solutions (CA008014EN).



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Product Description

Safety Switches



Safety switches have a number of applications from service entrance to branch circuit protection. They are also horsepower rated for use as motor circuit switches. **Table 28.1-1** summarizes major differences and similarities between the heavy-duty and general-duty type of Eaton’s safety switches. In addition to heavy-duty and general-duty applications, we have seen many industry trends that have created needs for specialized versions of safety switches:

- Eaton’s EnviroLine line of switches come with options for stainless steel enclosures, mechanisms and springs, various types of interlocked receptacles, viewing windows and also non-metallic enclosures for use in abnormal environments. Solar switches made to meet specific requirements and demands of the solar industry

- Shunt trippable switches for a quick and safe means to remotely open a switch in an emergency situation. Service Entrance capability at 480 Vac, 1200 A with integrated ground fault relay and/or arc reduction relay
- Auxiliary power switches for providing control power for HVAC and other applications that may require disconnect and receptacle to meet NEC requirements
- Rotary switches for OEM and compact applications where space is limited

If you don’t see your specific application listed above, make sure to call your local Eaton salesperson to discuss the capabilities of our Flex Center that will provide custom switches to meet many industry needs.

The following pages give more details on the many types of switching devices Eaton can provide to meet your every need.

Table 28.1-1. Safety Switch Application Guide—See Catalog Selection Tables for Specific Ratings

Application/ Features	General-Duty Safety Switches	Heavy-Duty Safety Switches
Type of facility	Residential, commercial, light industrial	Commercial, institutional, industrial
Maximum voltages	240 Vac—250 Vdc in larger sizes	600 Vac—250 Vdc and 600 Vdc
Short-circuit rating for non-fused switches	10,000 rms symmetrical amperes	10,000 rms symmetrical amperes. Higher combination ratings available with upstream Eaton molded case circuit breakers and fuses.
Short-circuit rating with standard fuse clips	With Class H fuse clips—10,000 rms symmetrical amperes	Switches with Class H Fuse Clips—10,000 rms amperes 800–1200 A switches with Class L fusing—200,000 rms
Short-circuit rating with fuse options	Class R fuse adaptation and 400–600 A switches with T or J fuse adaptation—100,000 rms amperes	Switches with Class R or Class J fusing and 200–800 A switches with Class T fuse adaptation—200,000 A at 480 V and 100,000 rms symmetrical amperes at 600V
Ampere sizes	30, 60, 100, 200, 400, 600	30, 60, 100, 200, 400, 600, 800, 1200
Maximum horsepower ratings	200 hp at 240 Vac	250 hp at 240 V, 500 hp at 480 and 600 Vac
UL (NEMA) enclosure types	Type 1—general purpose indoor use Type 3R—rainproof and sleet-resistant	Type 1 indoor, 3R outdoor Type 4 watertight and dust-tight Type 4X watertight, dust-tight and corrosion-resistant Type 12 indoor falling dust, dirt and liquids Type 12/3R convertible to outdoor use Type 7/9 hazardous (classified) locations
Terminals	Box lug (screw pressure) for Al/Cu wire	Box lug (screw pressure) for Al/Cu wire
Electrical interlock—snap-switch type	Field-installed kit, 200–600 A sizes	Field- or factory-installed for all sizes
Control pole interlock	Field-installed kit, 400–600 A sizes	Field- or factory-installed for K-Series switches
Fuse pullers	Not available	Standard in Type 4X and 12 enclosed switches through 200 A field- or factory-installed for all other 30–200 A switches

Safety Switch Selection Guide

Table 28.1-2. Safety Switch Selection Guide

Type	Fuse Type	Fuse Class	Ampere Rating	Number of Poles	Enclosure Types									
					NEMA 1	NEMA 3R	NEMA 12	NEMA 4 Painted Steel	NEMA 4X Stainless Steel	NEMA 4X Non-Metallic	NEMA 4X 316 Grade Stainless Steel	NEMA 7/9		
General-duty	Single-throw max. 240 Vac horsepower rated	Fusible	Plug	—	30	1 and 2	Yes	Yes	—	—	—	—	—	—
		Cartridge	H ①	30–600	2 and 3	Yes	Yes	—	—	—	—	—	—	
		Non-fusible	—	—	30–600	2 and 3	Yes	Yes	—	—	—	—	—	
Heavy-duty ②	Single-throw max. 600 Vac horsepower rated	Fusible	Cartridge	H ① L	30–600 800–1200	2, 3 and 4	Yes up to 1200 A	Yes up to 1200 A	Yes ③ up to 1200 A	Yes 400–1200 A	Yes up to 1200 A	Yes up to 200 A	Yes up to 1200 A	Yes ④ up to 100 A
		Non-fusible	—	—	30–1200	2, 3 and 4	Yes	Yes	Yes ③ up to 1200 A	Yes 400–1200 A	Yes up to 1200 A	Yes up to 200 A	Yes up to 1200 A	Yes up to 100 A
Double-throw	Max. 600 Vac horsepower rated	Fusible	Cartridge	H ① T (600V) J L	30–400 400 600 800–1200	2 and 3	Yes	Yes	Yes up to 600 A ③	—	Yes up to 400 A	—	Yes up to 400 A	—
		Non-fusible	—	—	30–1200	2, 3, 4 and 6	Yes	Yes	Yes up to 800 A ③	—	Yes up to 600 A	—	Yes up to 600 A	—
Shunt trip	Single-throw max. 600 Vac horsepower rated	Fusible	Cartridge	H ① L	30–600 800–1200	2, 3 and 4	—	—	Yes ③	Yes	Yes	—	Yes	—
		Non-fusible	—	—	30–1200	2, 3 and 4	—	—	Yes ③	Yes	Yes	—	Yes	—
Auxiliary power heavy-duty	Max. 600 Vac horsepower rated	Fusible	Cartridge	H ①	30–200	3	—	Yes	—	—	—	—	—	—
		Non-fusible	—	—	30–200	3	—	Yes	—	—	—	—	—	—
Rotary switches	Max. 600 Vac	Non-fusible	—	—	16–80	3, 4	Yes	Yes	Yes	—	Yes	Yes	Yes	—

① Class J, R and T available in many instances with the use of adapter kits listed on Page 28.1-8.

② Data applicable to heavy-duty, enhanced visible blade and heavy-duty surge switches.

③ NEMA Type 12 enclosures (30–1200 A) can be field modified to meet NEMA 3R rainproof requirements when a factory provided drain screw is removed.

④ Class J clips provided.

Table 28.1-3. EnviroLine Safety Switch Selection Guide

EnviroLine	Fuse Type	Fuse Class	Ampere Rating	Number of Poles	Enclosure Types						
					NEMA 1	NEMA 3R	NEMA 12	NEMA 4 Painted Steel	NEMA 4X Stainless Steel	NEMA 4X Non-Metallic	
Stainless enclosure with stainless mechanism	Fusible	Cartridge	H ⑤	30–400	2 and 3	—	—	—	—	Yes	—
	Non-fusible	—	—	30–400	3	—	—	—	—	Yes	—
Viewing window	Fusible	Cartridge	H ⑤ L	30–600 800–1200	2, 3, 4 and 6	—	—	Yes ⑥	Yes	Yes	—
	Non-fusible	—	—	30–1200	2, 3, 4 and 6	—	—	Yes ⑥	Yes	Yes	—
Welding receptacle	Fusible	Cartridge	H ⑤	30–100	3	—	—	Yes ⑥	—	Yes	—
	Non-fusible	—	—	30–100	3	—	—	Yes ⑥	—	Yes	—
Non-metallic	Fusible	Cartridge	H ⑤	30–200	3	—	—	—	—	—	Yes
	Non-fusible	—	—	30–200	3	—	—	—	—	—	Yes

⑤ Class J, R and T available in many instances with the use of adapter kits listed on Page 28.1-8.

⑥ NEMA Type 12 enclosures (30–1200 A) can be field modified to meet NEMA 3R rainproof requirements when a factory provided drain screw is removed.

General-Duty



General-Duty (Plug Fuse)



General-Duty (Cartridge Fuse)

For residential and commercial applications. Suitable for light-duty motor circuits and service entrance.

- 240 Vac
- 30–600 A
- For short-circuit ratings, see **Table 28.1-42**
- Suitable for service entrance applications unless otherwise noted
- Fusible and non-fusible switches are 100% load break and load make rated
- The continuous load current of fusible switches is not to exceed 80% of the rating of fuses employed in other than motor circuits. Non-fusible switches are 100% fully rated
- 200–600 A features K-Series design
- Horsepower rated
- Ample wire bending space provides for easier installation
- With Class R fuses, switches may be used on systems capable of delivering 100,000 A rms symmetrical

Note: Plug fuse switches are not service entrance rated.

Heavy-Duty



Heavy-Duty

For heavy commercial and industrial applications where reliable performance and service continuity are critical.

- 600 Vac, 600 Vdc maximum
- 30–1200 A
- For short-circuit ratings, see **Table 28.1-43**
- Horsepower rated
- Fusible and non-fusible switches are 100% load break and load make rated
- The continuous load current of fusible switches is not to exceed 80% of the rating of fuses employed in other than motor circuits. Non-fusible switches are 100% fully rated
- Suitable for service entrance applications unless otherwise noted
- Visible double break rotary blade mechanism. Two points of contact provide a positive open and close, easier operation, and also help to prevent contact burning for longer contact life
- Triple padlocking capability. Personnel safety feature because the large hasp can accommodate up to three 3/8-inch (9.5 mm) shank locks. Cabinet door can be further padlocked at the top and bottom
- Interlocking mechanism. Door cannot be opened when the handle is in the ON position. Built-in defeater mechanism provides for user access when necessary
- De-ionizing arc chutes. Arc chutes confine and suppress the arcs produced by contacts under load

Enhanced Visible Blade



Enhanced Visible Blade

- Heavy-duty safety switches with enhanced visible blade provide a highly visible means of disconnect to help improve personnel safety and equipment protection
- Enhanced visible means of disconnect allows personnel to clearly see that blades are disengaged from stationary contacts when the switch handle is in the OFF position
- New visible blade design provides increased visibility over each pole, allowing users to clearly see the trailing edge of the blade
- Material color update from red to yellow creates greater contrast between blades and arc shield
- Available in 30–1200 A ratings
- Fusible and non-fusible configurations in two-, three-, four- and six-pole
- NEMA 1, 3R, 12, 4 and 4X enclosures for robust environmental protection
- Modifications available such as auxiliary contacts, pilot lights and more. Call the Flex Center at 888-329-9272 or email FlexSwitches@eaton.com
- To order safety switches with enhanced visible blade features and no viewing window, the standard heavy-duty catalog number should be used with the addition of a 'V' suffix

Window Switches



Advanced Visibility Features

These switches incorporate a new external viewing window to replace the internal design. The new design instills confidence by allowing users to easily view the trailing edge of the blade to confirm disconnect is open while the switch handle is in the OFF position.

- All Eaton safety switches featuring a viewing window incorporates enhanced visible blade components as standard
- Viewing window provides clear path to view switch interior
- Window material is high-quality laminated safety glass
- External viewing window design is field replaceable—kits available for switches 30–1200 A
- 30 A and 60 A heavy-duty safety switches feature a vertical viewing window
- 100–1200 A heavy-duty safety switches feature a horizontal viewing window(s)
- Ratings are 30–1200 A, 240–600 Vac, fusible and non-fusible. Available in NEMA 12/3R, 4X stainless steel enclosures

Heavy-Duty Surge Switch



Heavy-Duty Surge Switch

Eaton's Switching Device product line combined heavy-duty safety switches and Eaton's SP1 and CVX series surge protective devices (SPDs) to provide reliable, cost-effective surge protection. Integral to the switch, an SPD provides significantly better performance compared to a device that is externally mounted, resulting in better protection for connected equipment. Eaton's new packaged solution provides contractors and end users a UL listed product by connecting the SPD to the safety switch at the factory.

- 30–1200 A
- NEMA 12/3R or 4X 304-grade stainless steel enclosures
- External window over switching base standard
- Window to view LEDs of SPD for quick status view
- Enhanced visible blades included
- Eaton Type SP1 and CVX surge protective devices available

EnviroLine



Stainless Steel Switch

Eaton offers a line of safety switches designed for your special application and/or extreme environmental conditions.

The EnviroLine stainless steel switch is primarily used in the meatpacking and food processing industries, or any application where water is frequently used to hose down equipment.

- Stainless steel NEMA 4X enclosure
- Stainless steel interior mechanism, back pan and springs
- Available in 30–400 A ratings, 240–600 Vac
- Fusible and non-fusible configurations
- 316 grade stainless steel option replaces standard 304 grade stainless steel and hardware with 316 stainless. 316 stainless holds up better in high salt environments found in coastal areas, and in water/wastewater applications

EnviroLine



Receptacle Switches

Receptacle Switches

These heavy-duty switches are pre-wired and interlocked to polarized receptacles for three-phase, three-wire, grounded type power plugs.

- Used for portable power applications such as welders, infrared ovens, batch feeders, conveyors, and truck and marine docks
- Receptacles are interlocked to handle mechanisms so that power plugs may not be inserted or removed when the switch is in the ON position unless noted otherwise
- Ratings are 30–100 A, 600 Vac
- Available in NEMA 12 and 4X stainless steel enclosures



Non-Metallic Switches

Non-Metallic Switch

This switch has a KRYDON™ enclosure. This is a compression molded fiberglass reinforced polyester enclosure, which is capable of withstanding almost any corrosive environment. Ratings are 30–200 A, 240–600 Vac, fusible and non-fusible. Enclosure is NEMA 4X rated.

Heavy-Duty Double-Throw



Heavy-Duty Double-Throw

Used to transfer service from a normal power source to an alternate source, or to switch from one load circuit to another.

- For short-circuit ratings, see **Table 28.1-44**
- 30–1200 A switches are horsepower rated
- 600 Vac, 250 Vdc maximum
- Fusible or non-fusible
- Fusible and non-fusible switches are 100% load break and load make rated
- The continuous load current of fusible switches is not to exceed 80% of the rating of fuses employed in other than motor circuits. Non-fusible switches are 100% fully rated
- Suitable for service entrance applications unless otherwise noted
- Wiring configuration from factory allows a single load to be supplied by a normal or alternate source. Can be field modified to allow two loads to be alternately supplied by a single source
- Ample wire bending space provides for easier installation
- Visible double-break rotary blade mechanism. Two points of contact provide a positive open and close, easier operation, and also help to prevent contact burning for longer contact life

- Triple padlocking capability. Personnel safety feature because the large hasp can accommodate up to three 3/8-inch (9.5 mm) shank locks
- Clearly visible handle. The position (ON or OFF) can be clearly seen from a distance
- Additional locking capability. Cabinet door can be further padlocked at the top and bottom
- Clear line shield protects against accidental contact with energized parts. Probe holes enable the user to test if the line side is energized without removing the shield
- De-ionizing arc chutes. Arc chutes confine and suppress the arcs produced by contacts under load
- UL listed switching neutral capability is available on three-pole and four-pole non-fusible double-throw switches with the installation of the proper bonding kit shown on **Page 28.1-3**
- 600–1200 A fusible utilizes a common set of fuses; two source, one load applications

Shunt Trip Safety Switch



Shunt Trip Safety Switch

Integrates shunt trip technology, enhancing safety by providing a means to remotely open a safety switch electrically.

- Heavy-duty safety switch design with integrated shunt trip module
- Visible means of disconnect—visible blade
- 30–800 A (240–600 Vac)
- NEMA® Type 12/3R, 4 (painted steel) and 4X (stainless steel) enclosures
- Horsepower ratings same as standard safety switches
- Passes Class 1 ground fault testing (1200% opening)
- Maximum response time of 50 ms
- Switch arcing time less than 10 ms (AC)
- Class H fuse clips supplied as standard on fusible devices 30–600 A, Class L for 800 A; Class R, J, T fuse clips available

Modifications available, such as viewing windows, pilot lights, and more. Call the Flex Center at 888-329-9272 for more information.

Auxiliary Power Heavy-Duty Safety Switch



Auxiliary Power Heavy-Duty Safety Switch

NEC Article 210.63 requires that a 125 V, single-phase, 15 or 20 A rated receptacle be installed at an accessible location for the servicing of heating, air-conditioning and refrigeration equipment. The receptacle must be located on the same level and within 25 ft (7.5 m) of the heating, air-conditioning and refrigeration equipment. Eaton's heavy-duty safety switch is an ideal solution for these applications, including elimination of the need for running a separate 120V circuit to the rooftop.

- 30–200 A
- Horsepower rated
- NEMA 3R outdoor enclosure standard
- 15 A ground fault receptacle standard

Enclosed Rotary



Enclosed Rotary







Provides users with the ability to lock directly wired motor loads in the OFF position to comply with new OSHA lockout/tagout regulations. Also for machine applications that require compact, economical disconnect switches.




- Padlockable in the OFF position (up to three padlocks) to meet OSHA lockout requirements
- Available 16–80 A ratings
- 600 Vac, three- and four-pole non-fusible device
- Rated at highest available hp rating (at 480 Vac, 16 A–10 hp, 25 A–15 hp, 30 A–15 hp, 40 A–20 hp, 60 A–30 hp, 80 A–40 hp)
- Rated for making and breaking loads
- Accepts auxiliary contacts
- Capability to signal PLC controllers
- Ground lug connection provided
- Can be rated up to 65 kAIC, when protected by applicable upstream fusing

Accessories and Field Kits

For General Duty, Heavy Duty and Double Throw Safety Switches

Table 28.1-4. Safety Switches—Accessories

Description	Catalog Number	
Neutral Kits ①		
	DH030NK	
	30 A DG	DG030NB
	60–100 A DG	DG100NB
	200 A DG, DH (NEMA 1, 3R enclosures)	DG200NK
	30–60 A DH	DH030NK
	100 A DH	DH100NK
	200 A DH (NEMA 4X, 12 enclosures)	DH200NK
	400 A DG, DH	DS400NK
	600 A DG, DH	DS600NK
	400 A fusible DT, 800–1200 A DH	DS800NK
	30–100 A DT	DT100NK
	200 A DT	DT200NK
	400 A non-fusible DT	DT400NK
	600 A non-fusible DT	DT600NK
600 A fusible DT, 800 A DT	DT800NK	
1200 A DT	DT1200NK	
Ground Lug Kits		
Factory-installed ground lug is supplied in all safety switches		
	DS200GK	
	30–100 A DG	DG030GB
	30–100 A DH, DT ②	DS100GK
	200 A DG, DH, DT	DS200GK
	400–600 A DG, 400–1200 A DH, 400–1200 A DT	DS468GK
Switching Neutral Bonding Kits ③		
	DT100BK	
	30–100 A DT, 3P, 4P non-fusible	DT100BK
	200 A DT, 3P, 4P non-fusible	DT200BK
	400 A DT, 3P, 4P non-fusible	DT400BK
	600 A DT, 3P, 4P non-fusible	DT600BK
	800–1200 A DT, 3P, 4P non-fusible	DT800BK
Control Pole Kit (For 2P, 3P Switches)		
	DS16CP	
	400–600 A DG, 30–1200 A DH, 30–1200 A DT Multiple key options are included with the control pole kit. Standard keys provide late-make, early-break functionality. Flanged key provides same make, same break functionality.	DS16CP
Auxiliary Contact Kits		
Auxiliary contact kits are not field installable on shunt trip safety switches		
	DS200EK1	
	All switches (except 30–100 A DG) 1NO/1NC	DS200EK1 ④
	All switches (except 30–100 A DG) 2NO/2NC	DS200EK2 ④
	NEMA 7/9 switches (30–100 A) 1NO/1NC	178C265G05
	NEMA 7/9 switches (30–100 A) 2NO/2NC	178C265G06
Copper Lug Kits		
	DS36CL	
	30 A DH, DT ⑤	DS16CL
	60 A DH, DT ⑤	DS26CL
	100 A DH, DT ⑤	DS36CL
	200 A DH ⑤	DS46CL
	400 A DH (NEMA 4, 4X, 12 enclosures) ⑤	DS56CL
	600–800 A DH (NEMA 4, 4X, 12 enclosures) ⑤	DS66CL

Description	Catalog Number	
Crimp Lug Pad Kit (NEMA 4, 4X, 12 Enclosures Only)		
	DS56CK	
	400–600 A DH ⑥	DS56CK
	800 A DH ⑥	DS76CK
	400–800 A neutral DH ⑥	DS800CNK
Fuse Puller Kits		
	DS30FP	
	30 A DH ⑥	DS30FP
	60 A DH ⑥	DS60FP
	100 A DH ⑥	DS100FP
	200 A DH ⑥	DS200FP
"J" Fuse Adapter Kits ⑦⑧		
	DS22JK	
	60 A 240 V DH ⑥	DS22JK
	60 A DH, DT and receptacle switches ⑥	DS26JK
	400 A 600 V DT ⑥	DT400JK
	600 A 240–600 V DH, 600 A DG ⑥	DS600JK
"R" Fuse Adapter Kits 4		
	DS12FK	
	30 A DG	DG030RB
	100 A DG	DG100RB
	30 A 240 V DH, DT	DS12FK
	30 A 600 V DH, DT, 60 A 240 V DH, DT, 60 A DG	DS16FK
	60 A 600 V DH, DT	DS26FK
	100 A 240–600 V DH, DT	DS36FK
	200 A 240–600 V DH, DT, 200 A DG	DS46FK
	400 A 240–600 V DH, 240 V DT, 400 A DG	DS56FK
	600 A 240–600 V DH, DT, 600 A DG	DS66FK
"T" Fuse Adapter Kits		
	DS426TK	
	200 A 240 V DH ⑥	DS426TK
	200 A 600 V DH ⑥	DS466TK
	400 A 240 V DG, DH, DT ⑥	DS526TK
	400 A 600 V DH ⑥	DS566TK
	600 A 240 V DG, DH ⑥	DS626TK
	600 A 600 V DH ⑥	DS666TK
	600 A 240 V DT ⑥	DT626TK
	600 A 600 V DT ⑥	DT666TK
	800 A 240 V DH ⑥	DS726TK
		800 A 600 V DH, DT ⑥
Miscellaneous Kits		
Hookstick handle	DH800HSH	
Lubricating grease for safety switch blades and contacts (each kit contains three 30 cc tubes of lubricating grease)	DSLUBEKIT	

- ① Service entrance bonding kit and sticker are included with the neutral kit.
- ② Ground bar kit is not listed on device publications.
- ③ Order one kit per switch.
- ④ For duty ratings, see table on following page.
- ⑤ Order one kit for three poles.
- ⑥ Order one kit for each pole.
- ⑦ 30 A Class J available as factory option only.
- ⑧ If Class J fuse kit is not listed, then switch will accept Class J fusing by repositioning either fuse base or fuse clips. No drilling required.
- ⑨ Order one kit for six poles.

Note: Accessories are not applicable to NEMA 7/9 switches unless indicated otherwise.

Auxiliary Contact Rating

Table 28.1-5. AC Pilot Duty Ratings

Description	Volts	Break (Amperes)	Make (Amperes)	Catalog Number
1NO-1NC	110	15.0	40.0	DS200EK1
1NO-1NC	220	10.0	20.0	DS200EK1
1NO-1NC	440	6.0	10.0	DS200EK1
1NO-1NC	600	5.0	8.0	DS200EK1
2NO/2NC	110	3.0	30.0	DS200EK2
2NO/2NC	220	1.5	15.0	DS200EK2
2NO/2NC	440	1.0	8.0	DS200EK2
2NO/2NC	600	0.8	6.0	DS200EK2

Table 28.1-6. DC Pilot Duty Ratings

Description	Volts	Single Throw (Amperes)	Double Throw (Amperes)	Catalog Number
1NO-1NC	115	2.0	0.5	DS200EK1
1NO-1NC	230	0.5	0.2	DS200EK1
1NO-1NC	600	0.1	0.02	DS200EK1
2NO/2NC	115	1.0	0.2	DS200EK2
2NO/2NC	230	0.3	0.1	DS200EK2
2NO/2NC	600	0.1	—	DS200EK2

Table 28.1-7. Myers Type Hubs—Dimensions in Inches (mm)

NEMA 3R (400 A and above)
NEMA 4, 4X (stainless steel), 12



	Conduit Size	Catalog Number
 <p>DS050MH</p>	0.50 (12.7)	DS050MH
	0.75 (19.1)	DS075MH
	1.00 (25.4)	DS100MH
	1.25 (31.8)	DS125MH
	1.50 (38.1)	DS150MH
	2.00 (50.8)	DS200MH
	2.50 (63.5)	DS250MH
	3.00 (76.2)	DS300MH
	3.50 (88.9)	DS350MH
	4.00 (101.6)	DS400MH
5.00 (127.0)	DS500MH	

Table 28.1-8. Plate Type Hubs—Dimensions in Inches (mm)

For NEMA 3R enclosures (up to 200 A)

	Group 1 General-Duty, Heavy-Duty, Double-Throw Through 100 A		Group 2 General-Duty, Heavy-Duty, Double-Throw Through 200 A	
	Conduit Size	Catalog Number	Conduit Size	Catalog Number
 <p>DS075H1</p>	0.75 (19.1)	DS075H1	2.00 (50.8)	DS200H2
	1.00 (25.4)	DS100H1	2.50 (63.5)	DS250H2
	1.25 (31.8)	DS125H1	3.00 (76.2)	DS300H2
	1.50 (38.1)	DS150H1	—	—
	2.00 (50.8)	DS200H1	—	—

Note: Catalog number DS900AP adapter kit permits installation of Group 1 hubs on 200 A type general-duty, heavy-duty and double-throw switches.

Flex Center

Introduction

The Switching Device Flex Center is a special facility at the site of Eaton’s Cleveland, Tennessee plant that is dedicated to providing customized safety switches and enclosed breakers that meet customer’s challenging applications.

Table 28.1-9. Common Flex Center Design Offerings

Modification	Catalog Suffix	Description
Custom paint	(varies)	Special paint colors are available such as red, orange, yellow, green, black, white. Other colors may be available upon request. Custom color is applied over the standard ANSI-61 gray finish.
Nameplates	-00NP	Plastic or phenolic nameplates are available. Up to three lines of text, 25 characters per line. Standard offering is white with black letters. Custom colors and sizes available upon request. Specify text at order entry.
Lock on provisions	-00LO	Available on heavy-duty and double-throw safety switches. Provision will accept a single lock.
Trapped key interlock	-00TK	Available on heavy-duty and double-throw safety switches. Trapped key systems are used on safety switches to prevent unauthorized operations or to predetermine a series of power transfers by an authorized operator.
Upper viewing window	W	An upper viewing window is centered over the switching contacts to provide visual verification of ON/OFF status. Available on NEMA 12/3R and NEMA 4X stainless steel heavy-duty and double-throw safety switches. Note: 30–100 A switches are now provided with a full view cover window for both blade and blown fuse viewing.
Lower viewing window	LW	A lower viewing window is centered over the fuses and provides visual verification of blown fuse indicators. Available on 200–1200 A NEMA 12/3R and NEMA 4X stainless steel heavy-duty and double-throw safety switches. Available for fusible switches only. Note: 30–100 A switches are now provided with a full view cover window for both blade and blown fuse viewing.
Neutral assemblies	N	Factory-installed field neutral accessory kits. Add Suffix N on non-fusible switches, or replace the 6th character “F” with “N” on fusible switches.
Class “R” fuse clips	5 or 6	Factory-installed Class R fuse clips/provisions. Add Suffix 5 for 240 V switches, and Suffix 6 for 600 V switches. Available on 30–600 A safety switches.
Class “T” fuse clips	T	Factory-installed Class T fuse clips/provisions. Available on 200–1200 A safety switches.
Class “J” fuse clips	J	Factory-installed Class J fuse clips/provisions. Available on 30–600 A safety switches. Note: Field modification kits are not available for 30 A heavy-duty safety switches. 30 A switches requiring Class J fusing must be ordered factory installed with J suffix.
Fungus proofing	-00FP	All non-metallic components of the switch are coated with a moisture and fungus-resistant varnish. The inhibitor used meets military specification: MIL-V-173C for MOISTURE AND FUNGUS-RESISTANT TREATMENT. The treated switch meets military specification MIL-T-152E for MOISTURE AND FUNGUS-RESISTANT TREATMENT OF COMMUNICATIONS, ELECTRONICS, AND ASSOCIATED EQUIPMENT. Not UL Listed.
Fuse pullers	FE	Factory-installed fuse pullers. Note: Standard NEMA 12/3R and 4X switches 30–200 A are supplied with fuse pullers from the factory.
Crimp lug pads	-00CK	Factory-installed crimp lug pad kits. Available on 400–800 A safety switches. Crimp lugs are not included. Note: Standard heavy-duty Type DH switches 30–200 A are adaptable to crimp lugs; simply remove the box lugs.
Copper lugs	-00CL	Factory-installed copper lug kits. Available on 30–800 A safety switches.
Ground lug kits factory installed	G	Factory-installed ground lug kits. Provides additional ground lug capacity when compared to ground lugs that come with standard safety switches. Available on 30–1200 A safety switches.
Custom lugs	-000L	Customer-specified lug arrangements are available on heavy-duty and double-throw safety switches.
Auxiliary contacts	2 or 3	Factory-installed auxiliary contact kits (DS200EK1 or DS200EK2). Auxiliary contacts are Early-Make/Early-Break operation. To specify 1NO/1NC contact, add Suffix 2. To specify 2NO/2NC contacts, add Suffix 3.
Control pole	-00CP	The K-Series control pole provides one NO contact. It mounts in the exact location as the neutral block using the same pre-drilled holes. This is directly connected to the power pole operating shaft. Direct connection and visible blades provide more secure electrical interlocking than handle linkage operation of a snap/switch type interlock. This reliability meets the requirements of many specifications for four-pole switches when the fourth pole is required for secure electrical interlocking. This control pole provides Same-Make/Same-Break operation.
Control pole with offset	-0CP2	Same as above except this control pole provides Late-Make/Early-Break operation. Both Control Pole options are provided when you purchase the DS16CP field kit.
Switching neutral double throws	SN	UL Listed for three-pole and four-pole non-fusible double-throw safety switches. Switching neutrals are required for separately derived systems when bonding the neutral of the generator to a grounding system at the generator.
Surge protection	(varies)	Factory-installed Eaton Type 1 (SP1 series) or Type 2 (CVX series) surge protective device products. SPD installed and wired to load side of disconnect.

Additional Flex Center Design Offerings

- Left-hand design (30–200 A)
- Cover controls
- 200% neutrals
- Seam-welded stainless steel
- Quick Connect products with Cam-Lok and Posi-Lok receptacles
- Custom enclosures
- 316 grade stainless steel
- Mill-duty switches
- Irrigation switches
- Fuses installed
- Hook stick handles (heavy-duty switches only)
- Custom labels
- Custom mounting
- Pad-mount designs
- Non-standard receptacles
- Enhanced visible blade
- Voltage indicators

Contact

For more information on these or any other modifications, please contact the Switching Device Flex Center at 1-888-329-9272, email FlexSwitches@eaton.com or visit Eaton.com/FlexCenter.

General-Duty

Table 28.1-10. General-Duty, Non-Fusible, 240 V, Three-Pole, Single-Throw

Ampere Rating	NEMA 1					NEMA 3R				
	Dimensions in Inches (mm)				Weight Lb (kg)	Dimensions in Inches (mm)				Weight Lb (kg)
	Width (W)	Height (H)	Depth (D)	Depth (D2)		Width (W)	Height (H)	Depth (D)	Depth (D2)	
30	6.38 (162.1)	10.69 (271.5)	6.88 (174.8)	3.75 (95.2)	6 (2.724)	6.38 (162.1)	10.81 (274.6)	6.88 (174.8)	3.75 (95.2)	6 (2.724)
60	8.69 (220.7)	14.19 (360.4)	7.38 (187.5)	4.21 (106.9)	9 (4.086)	8.69 (220.7)	14.38 (365.3)	7.38 (187.5)	4.21 (106.9)	9 (4.086)
100	9.13 (231.9)	18.81 (477.8)	7.38 (187.5)	4.23 (107.4)	12 (5.448)	9.13 (231.9)	19.25 (489.0)	7.38 (187.5)	4.23 (107.4)	12 (5.448)
200	16.00 (406.4)	25.25 (641.4)	11.25 (285.8)	6.14 (156.0)	48 (21.792)	16.00 (406.4)	25.50 (647.7)	11.25 (285.8)	6.14 (156.0)	55 (24.97)
400	23.00 (584.2)	44.75 (1136.7)	12.63 (320.8)	7.27 (184.7)	100 (45.4)	23.00 (584.2)	45.19 (1147.8)	12.63 (320.8)	7.27 (184.7)	105 (47.67)
600	24.00 (609.6)	52.25 (1327.2)	14.25 (362.0)	8.95 (227.3)	130 (59.02)	24.00 (609.6)	52.70 (1338.6)	14.25 (362.0)	8.95 (227.3)	135 (61.29)

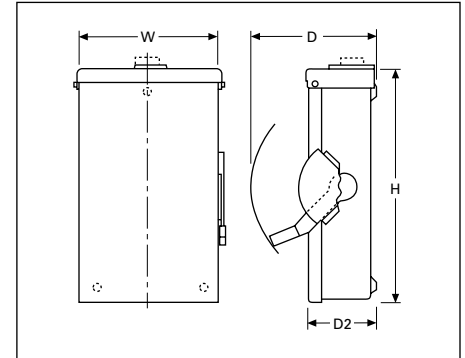


Figure 28.1-1. NEMA 1-3R 30-100 A

Table 28.1-11. General-Duty, Fusible, 240 V, Three-Pole, Solid Neutral, Single-Throw

Ampere Rating	NEMA 1					NEMA 3R				
	Dimensions in Inches (mm)				Weight Lb (kg)	Dimensions in Inches (mm)				Weight Lb (kg)
	Width (W)	Height (H)	Depth (D)	Depth (D2)		Width (W)	Height (H)	Depth (D)	Depth (D2)	
30	6.38 (162.1)	10.69 (271.5)	6.88 (174.8)	3.75 (95.2)	6 (2.724)	6.38 (162.1)	10.81 (274.6)	6.88 (174.8)	3.75 (95.2)	6 (2.724)
60	8.68 (220.7)	14.19 (360.4)	7.38 (187.5)	4.21 (106.9)	10 (4.54)	8.69 (220.7)	14.38 (365.3)	7.38 (187.5)	4.21 (106.9)	10 (4.54)
100	9.13 (231.9)	18.81 (477.8)	7.38 (187.5)	4.23 (107.4)	14 (6.356)	9.13 (231.9)	19.25 (489.0)	7.38 (187.5)	4.23 (107.4)	14 (6.356)
200	16.00 (406.4)	24.75 (628.7)	11.25 (285.8)	6.14 (156.0)	48 (21.792)	16.00 (406.4)	25.50 (647.7)	11.25 (285.8)	6.14 (156.0)	55 (24.97)
400	23.00 (584.2)	44.75 (1136.7)	12.63 (320.8)	7.27 (184.7)	110 (49.94)	23.00 (584.2)	45.19 (1147.8)	12.63 (320.8)	7.27 (184.7)	115 (52.21)
600	24.00 (609.6)	52.25 (1327.2)	14.25 (362.0)	8.95 (227.3)	145 (65.83)	24.00 (609.6)	52.70 (1338.6)	14.25 (362.0)	8.95 (227.3)	150 (68.1)

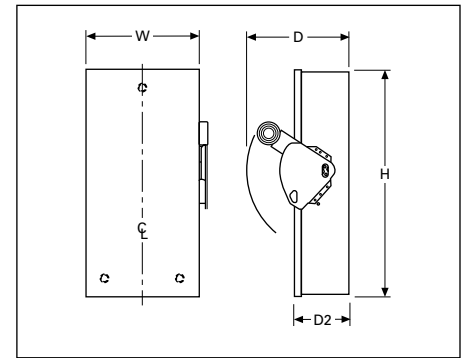


Figure 28.1-2. NEMA 1-3R 200-600 A

Note: Not applicable to plug fuse.

Heavy-Duty

Approximate Dimensions in Inches (mm)

Table 28.1-12. Heavy-Duty, Non-Fusible, 600 V, Three-Pole, Single-Throw ①

Ampere Rating	NEMA 1, 3R					NEMA 12, 4X Stainless Steel, 4				
	Dimensions in Inches (mm)				Weight Lb (kg)	Dimensions in Inches (mm)				Weight Lb (kg)
	Width (W)	Height (H)	Depth (D)	Depth (D2)		Width (W)	Height (H)	Depth (D)	Depth (D2)	
30	8.13 (206.5)	15.88 (403.4)	10.00 (254.0)	5.25 (133.3)	16 (7.264)	8.13 (206.5)	12.13 (308.1)	10.00 (254.0)	5.50 (139.7)	17 (7.718)
60	8.13 (206.5)	15.88 (403.4)	10.00 (254.0)	5.25 (133.3)	16 (7.264)	8.13 (206.5)	12.13 (308.1)	10.00 (254.0)	5.50 (139.7)	17 (7.718)
100	11.13 (282.7)	21.69 (550.9)	10.00 (254.0)	5.25 (133.3)	22 (9.988)	11.13 (282.7)	24.00 (609.6)	10.25 (260.4)	5.50 (139.7)	28 (12.712)
200	16.00 (406.4)	27.63 (701.8)	11.25 (285.8)	6.14 (156.0)	46 (20.884)	16.00 (406.4)	34.38 (873.3)	11.50 (292.1)	6.44 (163.6)	55 (24.97)
400	23.00 (584.2)	45.19 (1147.8)	12.63 (320.8)	7.27 (184.7)	110 (49.94)	23.00 (584.2)	57.63 (1463.8)	12.63 (320.8)	7.19 (182.6)	125 (56.75)
600	24.00 (609.6)	52.70 (1338.6)	14.25 (362.0)	8.95 (227.3)	135 (61.29)	24.00 (609.6)	63.00 (1600.2)	14.25 (362.0)	8.88 (225.6)	167 (75.818)
800	25.38 (644.7)	56.69 (1439.9)	14.25 (362.0)	8.95 (227.3)	158 (71.732)	25.38 (644.7)	71.75 (1822.5)	14.25 (362.0)	8.88 (225.6)	175 (79.45)
1200	41.47 (1053.3)	70.31 (1785.9)	19.94 (506.5)	12.44 (316.0)	430 (195.22)	41.47 (1053.3)	70.31 (1785.9)	19.94 (506.5)	13.51 (343.2)	475 (215.65)

① Data applicable to heavy-duty and enhanced visible blade switches.

Table 28.1-13. Heavy-Duty, Fusible, 240 and 600 V, Three-Pole Solid Neutral, Single-Throw ②

Ampere Rating	NEMA 1, 3R					NEMA 12, 4X Stainless Steel, 4				
	Dimensions in Inches (mm)				Weight Lb (kg)	Dimensions in Inches (mm)				Weight Lb (kg)
	Width (W)	Height (H)	Depth (D)	Depth (D2)		Width (W)	Height (H)	Depth (D)	Depth (D2)	
30	8.13 (206.5)	15.88 (403.4)	10.00 (254.0)	5.25 (133.3)	20 (9.08)	8.13 (206.5)	17.88 (454.2)	10.00 (254.0)	5.50 (139.7)	22 (9.988)
60	8.13 (206.5)	15.88 (403.4)	10.00 (254.0)	5.25 (133.3)	20 (9.08)	8.13 (206.5)	17.88 (454.2)	10.00 (254.0)	5.50 (139.7)	22 (9.988)
100	11.13 (282.7)	21.69 (550.9)	10.00 (254.0)	5.25 (133.3)	27 (12.258)	11.13 (282.7)	24.00 (609.6)	10.25 (260.4)	5.50 (139.7)	30 (13.62)
200	16.00 (406.4)	27.63 (701.8)	11.25 (285.8)	6.14 (156.0)	52 (23.608)	16.00 (406.4)	34.38 (873.3)	11.50 (292.1)	6.44 (163.6)	61 (27.694)
400	23.00 (584.2)	45.19 (1147.8)	12.63 (320.8)	7.27 (184.7)	120 (54.48)	23.00 (584.2)	57.63 (1463.8)	12.63 (320.8)	7.19 (182.6)	135 (61.29)
600	24.00 (609.6)	52.70 (1338.6)	14.25 (362.0)	8.95 (227.3)	153 (69.462)	24.00 (609.6)	63.00 (1600.2)	14.25 (362.0)	8.88 (225.6)	203 (92.162)
800	25.38 (644.7)	56.69 (1439.9)	14.25 (362.0)	8.95 (227.3)	168 (76.272)	25.38 (644.7)	71.75 (1822.5)	14.25 (362.0)	8.88 (225.6)	213 (96.702)
1200	41.47 (1053.3)	70.31 (1785.9)	19.94 (506.5)	12.44 (316.0)	465 (211.11)	41.47 (1053.3)	70.31 (1785.9)	19.94 (506.5)	13.51 (343.2)	510 (231.54)

② Data applicable to heavy-duty and enhanced visible blade switches.

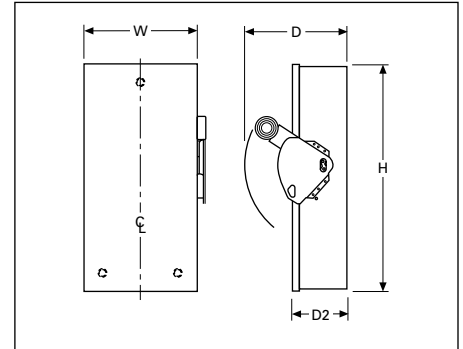


Figure 28.1-3. NEMA 1, 3R 30–1200 A

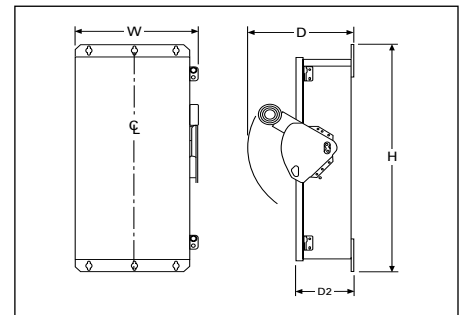


Figure 28.1-4. NEMA 4/4X and 12 30–1200 A

Heavy-Duty Safety Switches with Surge Protection

Approximate Dimensions in Inches (mm)

Table 28.1-14. Heavy-Duty Safety Switches with Surge Protection

Ampere rating	Height (H)	Width (W)	Depth (D1)	Depth (D2)
30	25.02 (635.5)	15.00 (381.0)	10.31 (261.9)	5.62 (142.7)
60	25.02 (635.5)	15.00 (381.0)	10.31 (261.9)	5.62 (142.7)
100	25.02 (635.5)	15.00 (381.0)	10.31 (261.9)	5.62 (142.7)
200	35.37 (898.4)	20.44 (519.2)	11.66 (296.2)	6.48 (164.6)
400	57.47 (1459.7)	23.30 (591.8)	12.45 (316.2)	7.36 (186.9)
600	62.97 (1599.4)	24.30 (617.2)	14.08 (357.6)	8.98 (228.1)
800	71.72 (1821.7)	25.55 (649.0)	14.08 (357.6)	8.98 (228.1)
1200 ①	73.77 (1873.8)	43.12 (1095.0)	19.20 (487.7)	12.46 (316.5)

① Available with SP1 type surge protective device only.

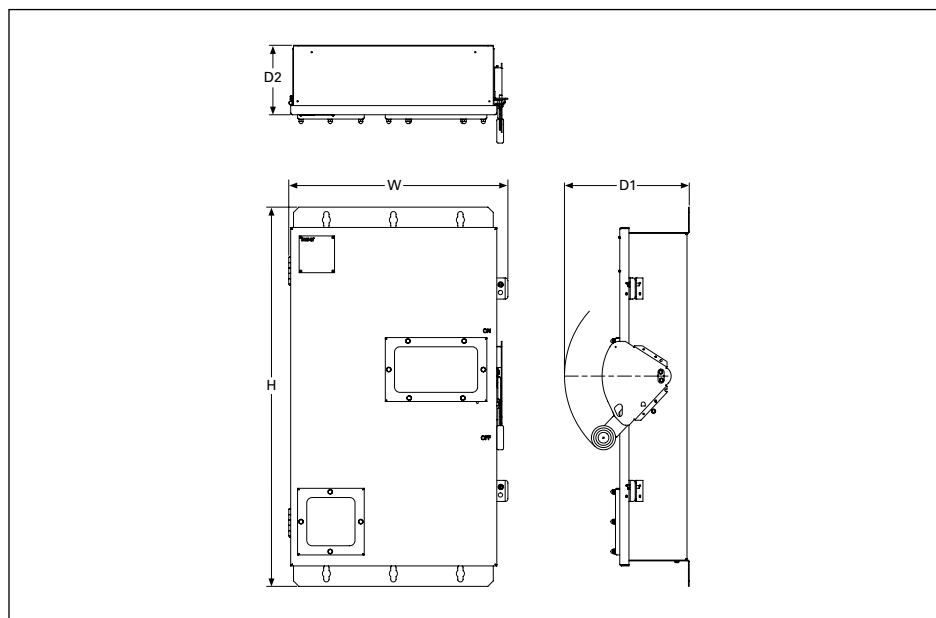


Figure 28.1-5. Heavy-Duty Safety Switch with Surge Protection

EnviroLine

Approximate Dimensions in Inches (mm)

Table 28.1-16. Heavy-Duty, Non-Fusible, 600 V, Three-Pole, Single-Throw

Ampere Rating	Width (W)	Height (H)	Depth (D)	Depth (D2)	Weight Lb (kg)
4X Stainless Steel					
30	8.13 (206.5)	12.13 (308.1)	10.00 (254.0)	5.50 (139.7)	17 (7.718)
60	8.13 (206.5)	12.13 (308.1)	10.00 (254.0)	5.50 (139.7)	17 (7.718)
100	11.13 (282.7)	24.00 (609.6)	10.25 (260.4)	5.50 (139.7)	28 (12.712)
200	16.00 (406.4)	34.38 (873.3)	11.50 (292.1)	6.44 (163.6)	55 (24.97)
400	23.00 (584.2)	57.63 (1463.8)	12.63 (320.8)	7.19 (182.6)	125 (56.75)

Table 28.1-17. Heavy-Duty, Fusible, 240 V and 600 V, Three-Pole, Solid Neutral, Single-Throw

Ampere Rating	Width (W)	Height (H)	Depth (D)	Depth (D2)	Weight Lb (kg)
4X Stainless Steel					
30	8.13 (206.5)	17.88 (454.2)	10.00 (254.0)	5.50 (139.7)	22 (9.988)
60	8.13 (206.5)	17.88 (454.2)	10.00 (254.0)	5.50 (139.7)	22 (9.988)
100	11.13 (282.7)	24.00 (609.6)	10.25 (260.4)	5.50 (139.7)	30 (13.62)
200	16.00 (406.4)	34.38 (873.3)	11.50 (292.1)	6.44 (163.6)	61 (27.694)
400	23.00 (584.2)	57.63 (1463.8)	12.63 (320.8)	7.19 (182.6)	135 (61.29)

Table 28.1-18. Heavy-Duty, Non-Fusible, 600 V, Three-Pole, Single-Throw

Ampere Rating	Width (W)	Height (H)	Depth (D)	Depth (D2)	Weight Lb (kg)
NEMA 12/3R, 4, 4X Stainless Steel					
30	8.76 (222.5)	19.08 (484.6)	10.22 (259.6)	5.50 (139.7)	22 (9.988)
60	8.76 (222.5)	19.08 (484.6)	10.22 (259.6)	5.50 (139.7)	22 (9.988)
100	11.79 (299.5)	24.95 (633.7)	10.22 (259.6)	5.50 (139.7)	30 (13.62)
200	16.95 (430.5)	35.38 (898.7)	11.63 (295.4)	6.44 (163.6)	61 (27.694)
400	24.12 (612.6)	57.47 (1459.7)	12.43 (315.7)	7.19 (182.6)	135 (61.29)
600	25.01 (635.3)	62.97 (1599.4)	12.79 (324.9)	8.95 (227.3)	203 (92.162)
800	26.35 (669.3)	71.72 (1821.7)	12.79 (324.9)	8.95 (227.3)	213 (96.702)
1200	43.11 (1095.0)	73.77 (1873.8)	17.15 (435.6)	12.45 (316.2)	510 (231.54)

Approximate Dimensions in Inches (non-window version)
Dimensions are for estimating purposes only

Table 28.1-19. Heavy-Duty Safety Switches with Weld Receptacle, Fusible and Non-Fusible

Ampere Rating	Width			Height		Depth		Receptacle Brand
	(W1)	(W2)	(W3)	(H1)	(H2)	(D1)	(D2)	
NEMA Type 12/3R, 4X Stainless Steel								
30	8.05	6.75	7.73	19.09	6.67	5.50	10.22	Crouse-Hinds
60	8.05	6.75	7.73	19.09	6.67	5.50	10.22	Crouse-Hinds
100	11.08	9.75	10.76	24.95	7.48	5.50	10.22	Crouse-Hinds
30	8.05	6.75	7.73	19.09	6.13	5.50	10.22	Appleton
60	8.05	6.75	7.73	19.09	6.13	5.50	10.22	Appleton
100	11.08	9.75	10.76	24.95	6.12	5.50	10.22	Appleton
30	9.42	7.50	9.11	26.48	1.62	6.34	11.53	Russellstoll
60	9.42	7.50	9.11	26.48	1.69	6.34	11.53	Russellstoll
100	9.42	7.50	9.11	26.48	1.94	6.34	11.53	Russellstoll

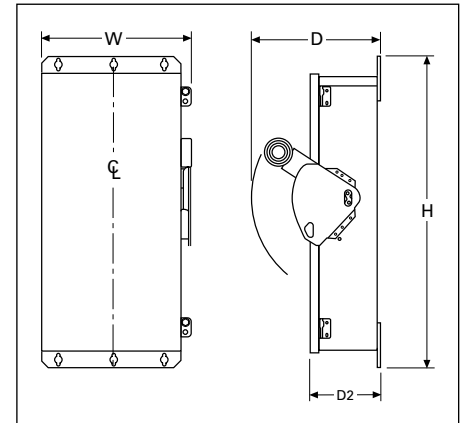


Figure 28.1-6. NEMA 4X Heavy-Duty 30-400 A

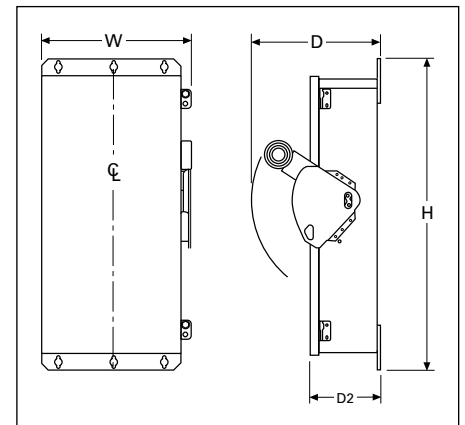


Figure 28.1-7. NEMA 12/3R, 4, 4X Heavy-Duty 30-1200 A

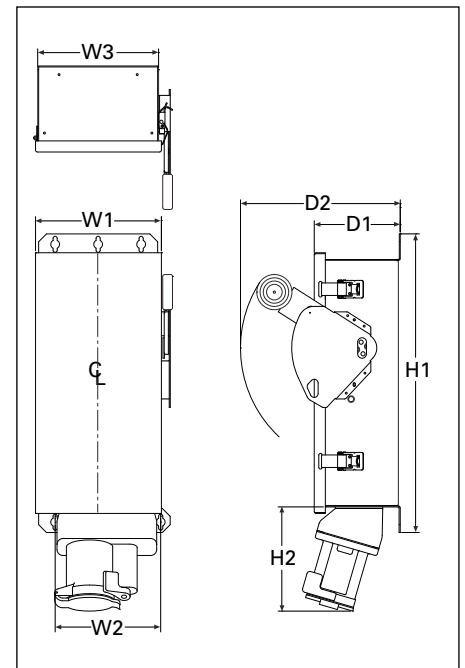


Figure 28.1-8. Receptacle Switches

Table 28.1-20. Non-Metallic NEMA 4X Rated Safety Switches, Fusible and Non-Fusible

Ampere Rating	Height	Width	Depth		Weight Lb (kg)
	Height (H)	Width (W)	Depth (D1)	Depth (D2)	
30	19.25 (489.0)	11.30 (287.0)	15.46 (392.7)	8.63 (219.2)	32 (14.5)
60	19.25 (489.0)	11.30 (287.0)	15.46 (392.7)	8.63 (219.2)	32 (14.5)
100	27.25 (692.2)	15.30 (388.6)	16.46 (418.1)	9.70 (246.4)	45 (20.4)
200	27.25 (692.2)	25.30 (642.6)	16.46 (418.1)	9.70 (246.4)	77 (35.0)

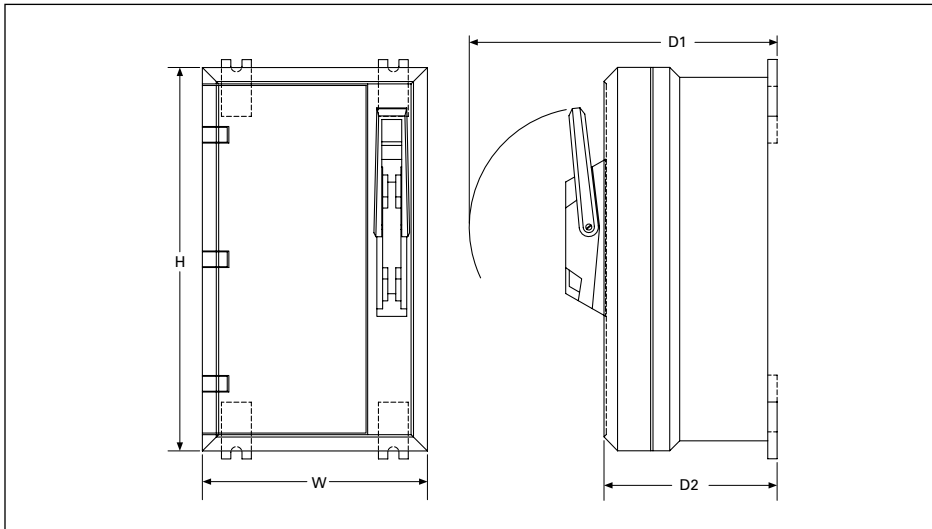


Figure 28.1-9. 240 Vac and 600 Vac Heavy-Duty Non-Metallic

Heavy-Duty Double-Throw

Approximate Dimensions in Inches (mm)

Table 28.1-21. Heavy-Duty, Non-Fusible, 240 V and 600 V, Three-Pole, Double-Throw

Ampere Rating	Width (W)	Height (H)	Depth (D)	Depth (D2)	Weight Lb (kg)
NEMA 1, 3R					
30	11.94 (303.3)	24.63 (625.6)	9.88 (251.0)	5.38 (136.7)	34 (15.436)
60	11.94 (303.3)	24.63 (625.6)	9.88 (251.0)	5.38 (136.7)	34 (15.436)
100	11.94 (303.3)	24.63 (625.6)	9.88 (251.0)	5.38 (136.7)	34 (15.436)
200	19.56 (496.8)	37.38 (949.5)	11.25 (285.8)	6.10 (154.9)	80 (36.32)
400	23.13 (587.5)	53.81 (1366.8)	12.50 (317.5)	7.25 (184.2)	140 (63.56)
600	27.44 (697.0)	63.31 (1608.1)	14.13 (358.9)	8.88 (225.6)	175 (79.45)
800	27.44 (697.0)	63.31 (1608.1)	14.13 (358.9)	8.88 (225.6)	175 (79.45)
1200	42.62 (1082.5)	78.11 (1984.0)	29.62 (752.3)	20.47 (519.9)	473 (214.6)
NEMA 12, 4X Stainless Steel					
30	12.00 (304.8)	25.88 (657.4)	10.25 (260.4)	5.50 (139.7)	60 (27.24)
60	12.00 (304.8)	25.88 (657.4)	10.25 (260.4)	5.50 (139.7)	60 (27.24)
100	12.00 (304.8)	25.88 (657.4)	10.25 (260.4)	5.50 (139.7)	60 (27.24)
200	19.50 (495.3)	41.00 (1041.4)	11.63 (295.4)	6.48 (164.6)	105 (47.67)
400	23.00 (584.2)	57.50 (1460.5)	12.50 (317.5)	7.25 (184.2)	185 (83.99)

Table 28.1-22. Heavy-Duty, Fusible, 240 V and 600 V, Three-Pole, Double-Throw

Ampere Rating	Width (W)	Height (H)	Depth (D)	Depth (D2)	Weight Lb (kg)
NEMA 1, 3R					
30	11.94 (303.3)	36.63 (930.4)	9.88 (251.0)	5.38 (136.7)	44 (19.976)
60	11.94 (303.3)	36.63 (930.4)	9.88 (251.0)	5.38 (136.7)	44 (19.976)
100	11.94 (303.3)	36.63 (930.4)	9.88 (251.0)	5.38 (136.7)	44 (19.976)
200	19.56 (496.8)	50.88 (1292.4)	11.25 (285.8)	6.10 (154.9)	95 (43.13)
400	25.38 (644.7)	74.75 (1898.7)	14.13 (358.9)	8.88 (225.6)	230 (104.42)
600	28.12 (714.3)	58.86 (1495.0)	25.62 (650.7)	20.47 (520.0)	282 (127.9)
800	28.12 (714.2)	58.86 (1495.0)	25.62 (650.7)	20.47 (519.9)	282 (127.9)
1200	42.62 (1082.5)	78.11 (1984.0)	29.62 (752.3)	20.47 (519.9)	509 (230.9)
NEMA 12, 4X Stainless Steel					
30	12.00 (304.8)	39.81 (1011.2)	10.25 (260.4)	5.50 (139.7)	45 (20.43)
60	12.00 (304.8)	39.81 (1011.2)	10.25 (260.4)	5.50 (139.7)	45 (20.43)
100	12.00 (304.8)	39.81 (1011.2)	10.25 (260.4)	5.50 (139.7)	45 (20.43)
200	19.56 (496.8)	55.63 (1413.0)	11.63 (295.4)	6.46 (164.1)	100 (45.4)
400	25.38 (644.7)	74.75 (1898.7)	14.13 (358.9)	8.92 (226.6)	260 (118.04)

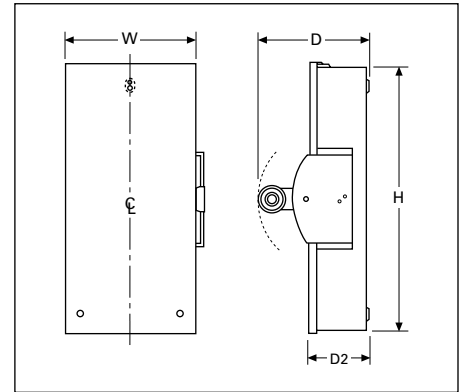


Figure 28.1-10. NEMA 1, 3R Double-Throw 30–1200 A

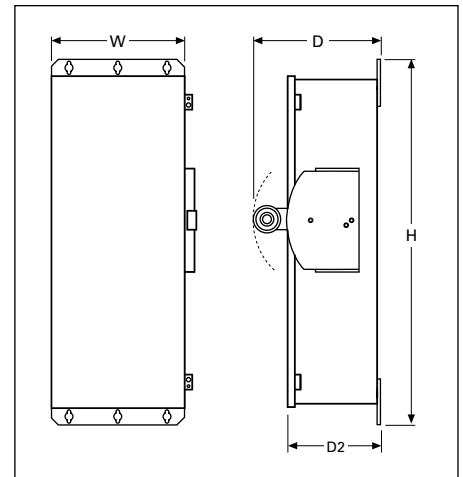


Figure 28.1-11. NEMA 12, 4X Double-Throw 30–400 A

Shunt Trip

Approximate Dimensions in Inches (mm)

Table 28.1-23. Shunt Trip Safety Switch, 240 Vac and 600 Vac

Ampere Rating	Fuse Class ①	Number of Poles	Enclosure Dimensions ②, Exterior in Inches (mm)			
			Height (H)	Width (W)	Depth (D1)	Depth (D2)
Fusible						
30	H	2, 3 or 4 ③	21.58 (548.1)	11.58 (294.1)	11.43 (290.3)	5.58 (141.7)
60	H	2, 3 or 4 ③	21.58 (548.1)	11.58 (294.1)	11.43 (290.3)	5.58 (141.7)
100	H	2, 3 or 4 ③	24.95 (633.7)	14.89 (378.2)	11.51 (282.4)	5.58 (141.7)
200	H	2, 3 or 4	35.38 (898.7)	20.11 (510.8)	11.61 (294.9)	6.45 (163.8)
400	H	2, 3 or 4	57.47 (1459.7)	27.29 (693.2)	12.43 (315.7)	7.42 (188.5)
600	H	2, 3 or 4	62.97 (1599.4)	28.29 (718.6)	12.43 (315.7)	7.42 (188.5)
800	L	2, 3	71.72 (1821.7)	29.54 (750.3)	12.43 (315.7)	7.42 (188.5)
1200	L	2, 3	72.50 (1841.5)	47.23 (1199.6)	23.15 (588.0)	12.46 (316.5)
Non-Fusible						
30	—	2, 3 or 4 ③	21.58 (548.1)	11.58 (294.1)	11.43 (290.3)	5.58 (141.7)
60	—	2, 3 or 4 ③	21.58 (548.1)	11.58 (294.1)	11.43 (290.3)	5.58 (141.7)
100	—	2, 3 or 4 ③	24.95 (633.7)	14.89 (378.2)	11.51 (282.4)	5.58 (141.7)
200	—	2, 3 or 4	35.38 (898.7)	20.11 (510.8)	11.61 (294.9)	6.45 (163.8)
400	—	2, 3 or 4	57.47 (1459.7)	27.29 (693.2)	12.43 (315.7)	7.42 (188.5)
600	—	2, 3	62.97 (1599.4)	28.29 (718.6)	12.43 (315.7)	7.42 (188.5)
800	—	2, 3	71.72 (1821.7)	29.54 (750.3)	12.43 (315.7)	7.42 (188.5)
1200	—	2, 3	72.50 (1841.5)	47.23 (1199.6)	23.15 (588.0)	12.46 (316.5)

① Class H fuse clips supplied as standard on fusible devices 30–600 A, Class L for 800 A; Class R, J, T fuse clips available.

② Accurate for all enclosure NEMA type ratings—12/3R, 4, 4X stainless steel.

③ Four-pole devices are wider than dimension for 30, 60 and 100 A devices. Consult factory for details.

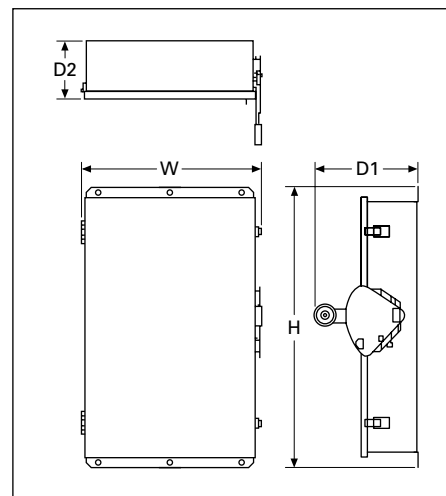


Figure 28.1-12. Shunt Trip Safety Switch, 240 Vac and 600 Vac

Auxiliary Power Heavy-Duty Safety Switch

Approximate Dimensions in Inches (mm)

Table 28.1-24. Auxiliary Power Heavy Duty Safety Switch

Ampere Rating	NEMA 3R				Weight Lb (kg)
	Width (W)	Height (H)	Depth (D1)	Depth (D2)	
30	26.58 (675.1)	24.93 (633.2)	16.00 (406.4)	11.29 (286.8)	④
60	26.58 (675.1)	24.93 (633.2)	16.00 (406.4)	11.29 (286.8)	④
100	26.58 (675.1)	24.93 (633.2)	16.00 (406.4)	11.29 (286.8)	④

④ 108 lbs (49 kg) with a 15 A GFI receptacle; 130 lbs (59 kg) with a 20 A GFI receptacle.

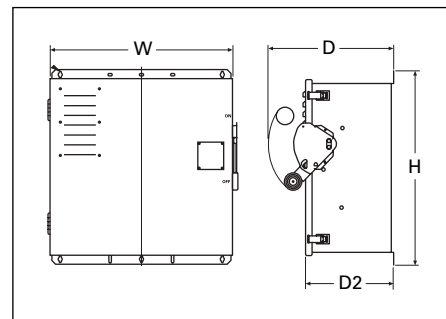


Figure 28.1-13. Auxiliary Power Heavy-Duty Safety Switch

Enclosed Rotary

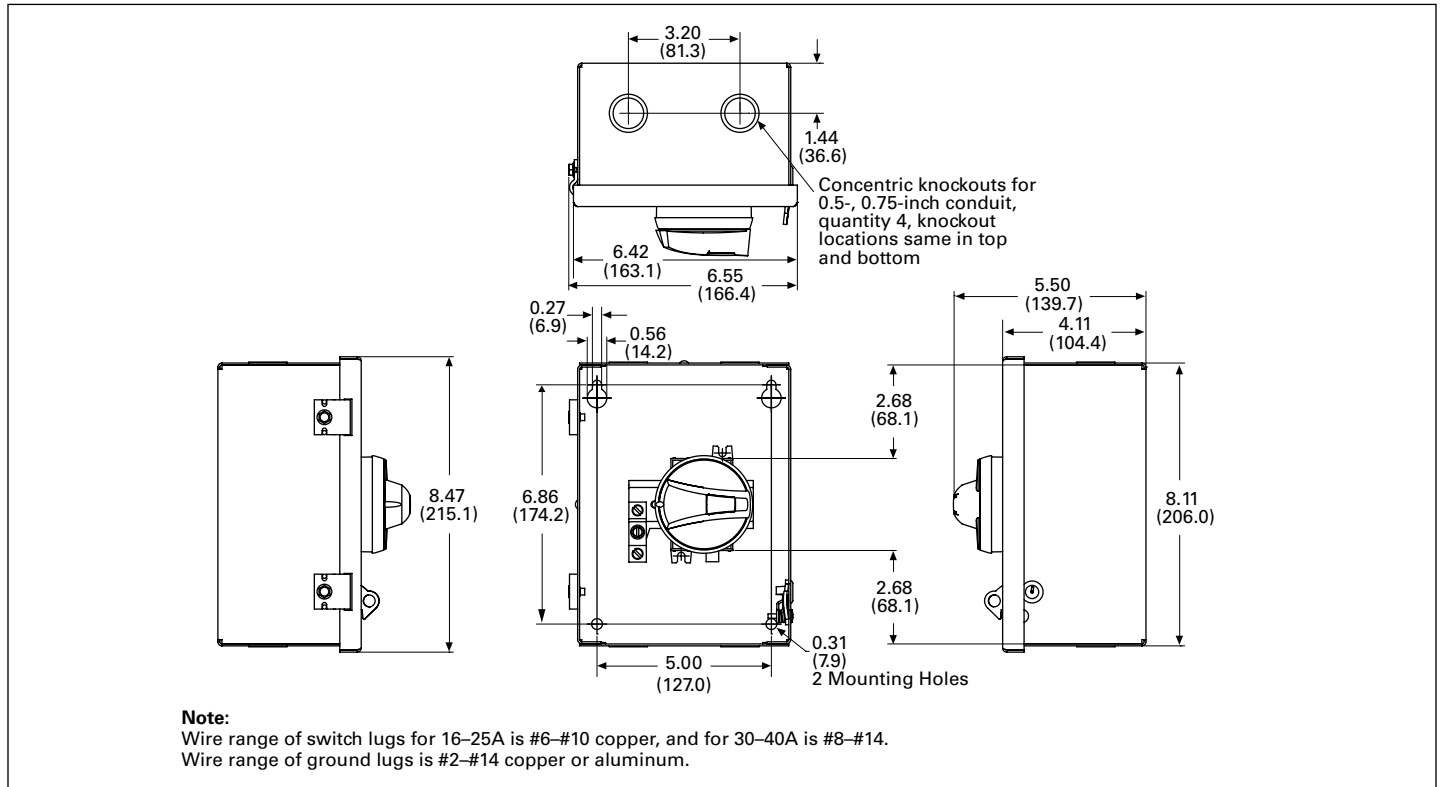


Figure 28.1-14. NEMA Type 1 (16–40 A)

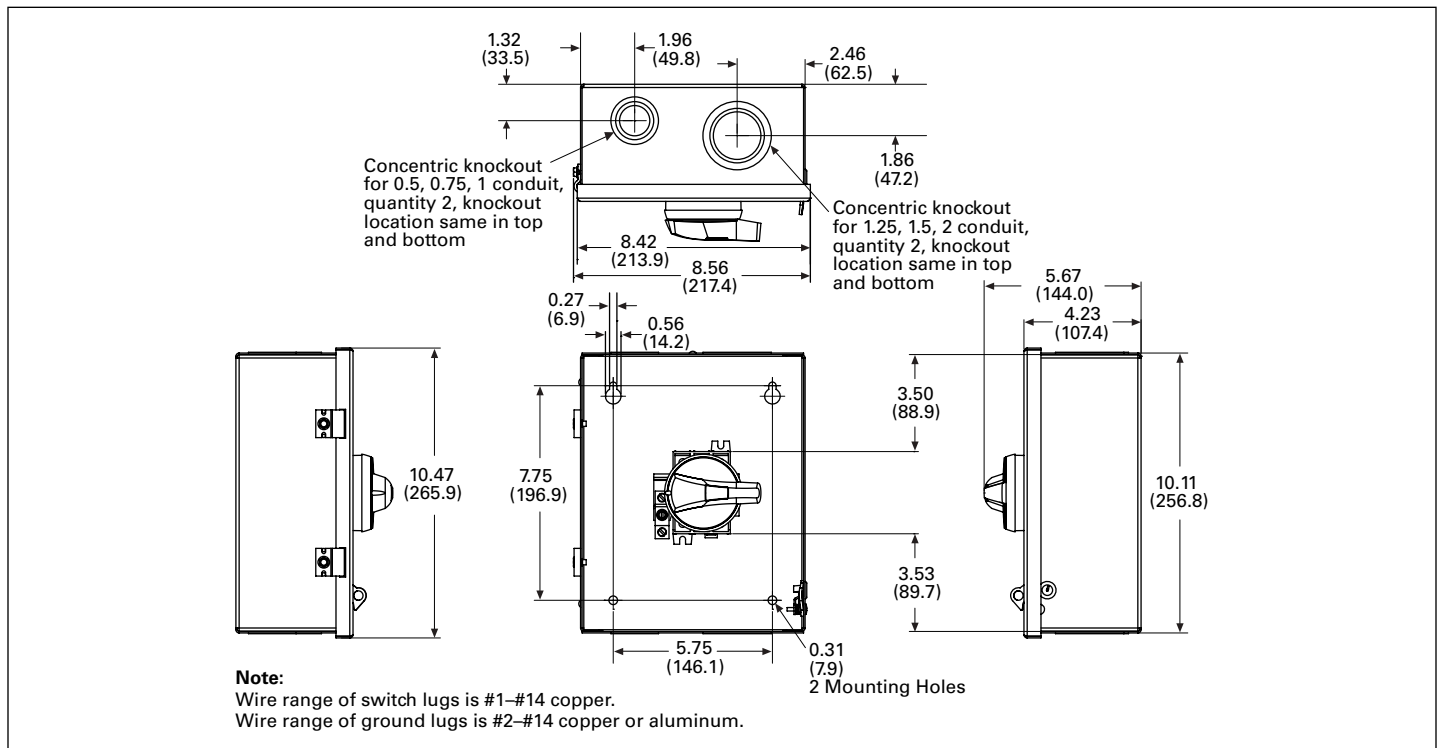


Figure 28.1-15. NEMA Type 1 (60–80 A)

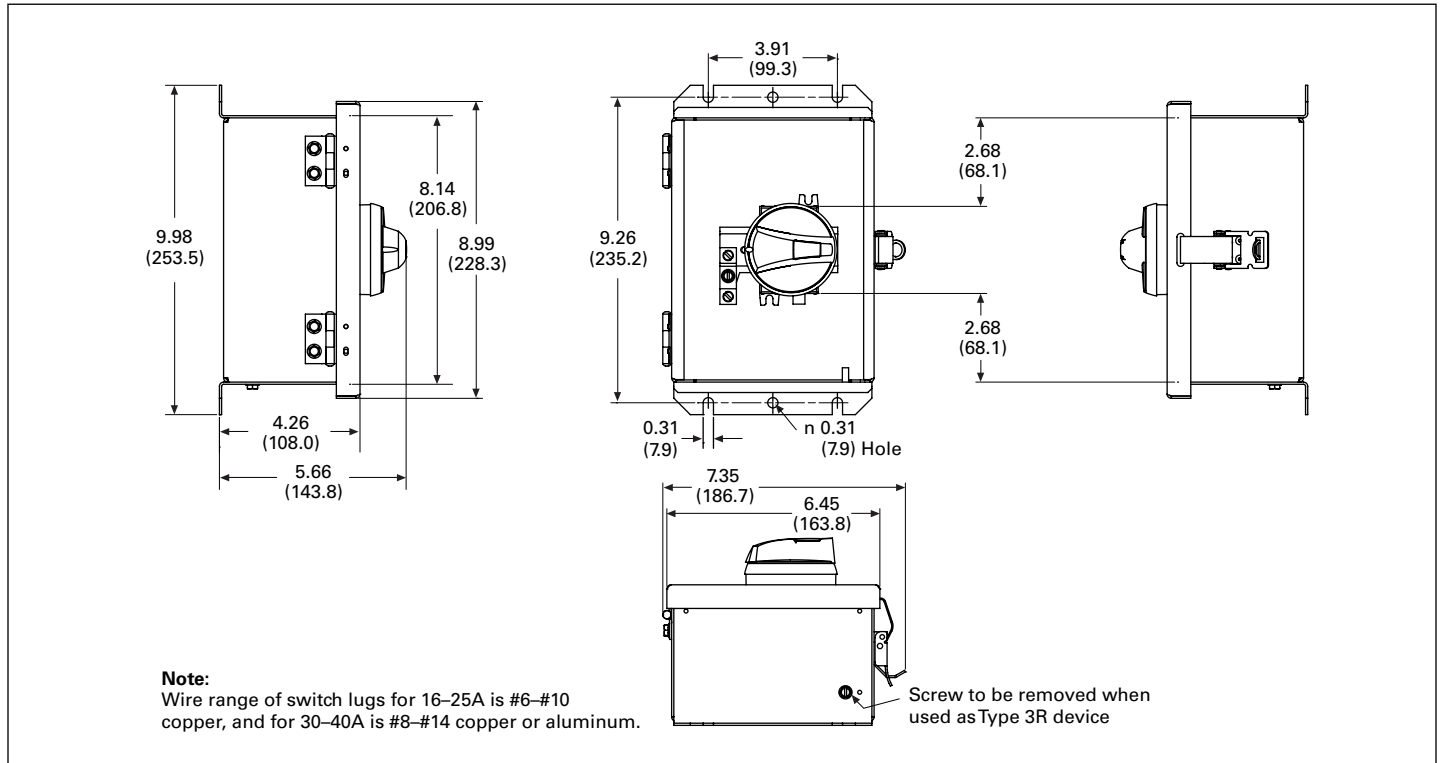


Figure 28.1-16. NEMA Type 12/3R (16–40 A)

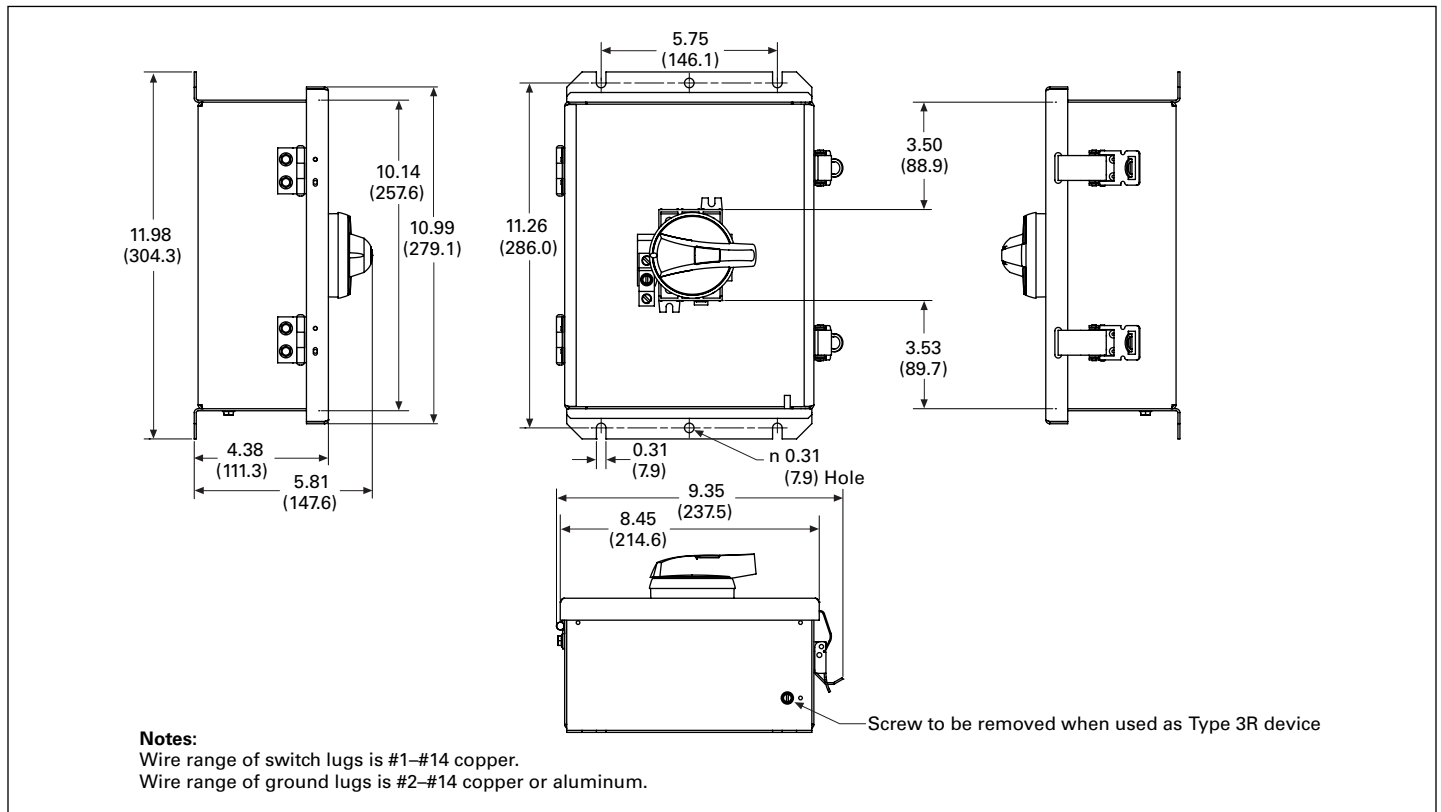


Figure 28.1-17. NEMA Type 12/3R (60–80 A)

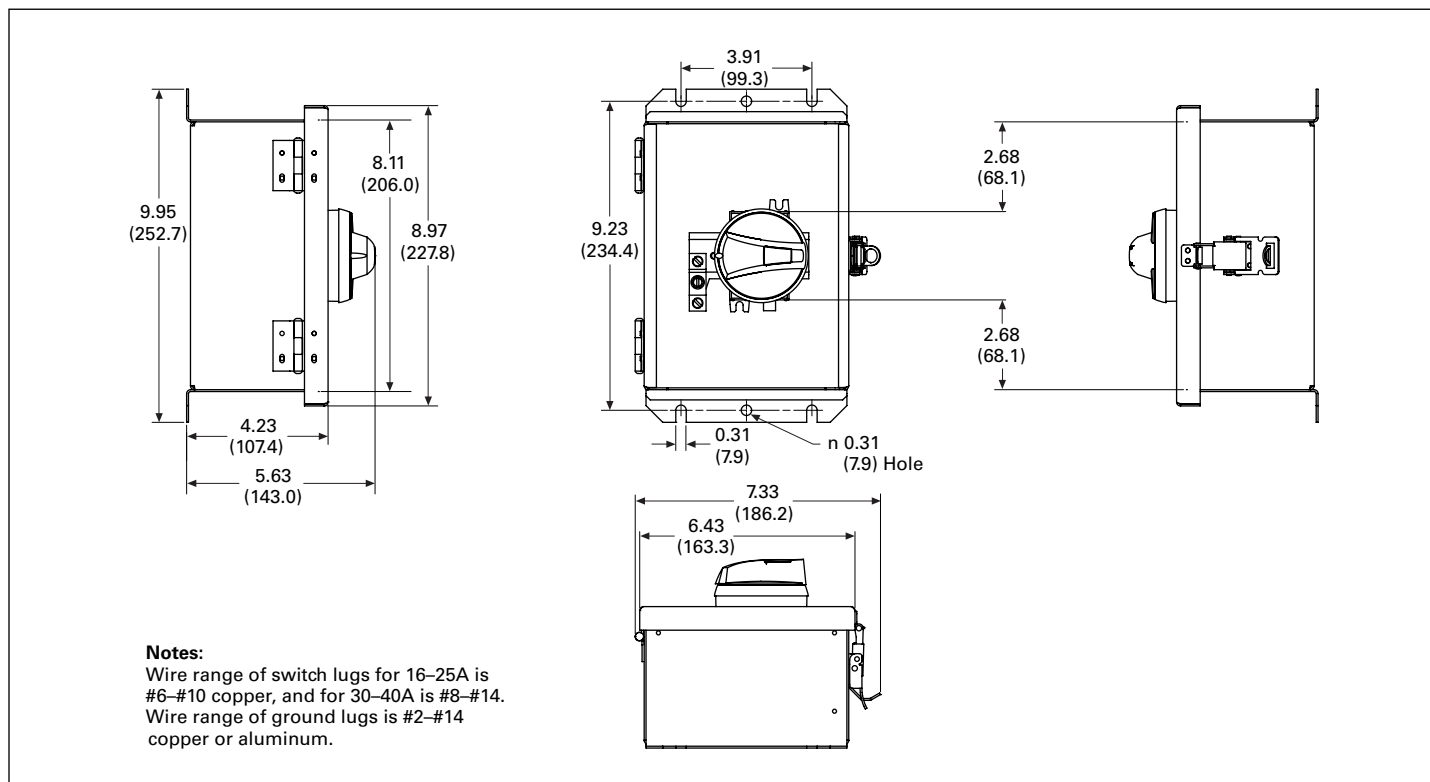


Figure 28.1-18. NEMA Type 4X Stainless (16–40 A)

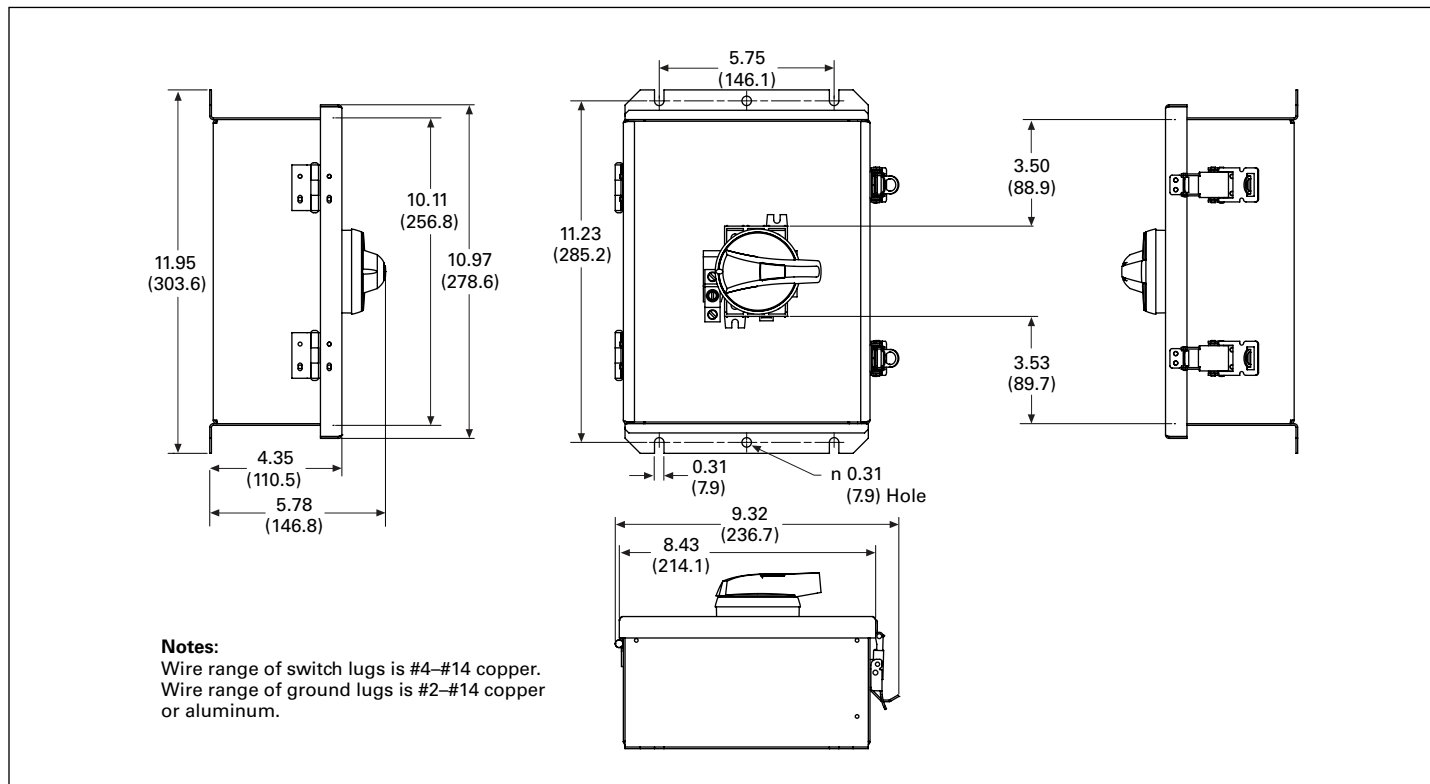


Figure 28.1-19. NEMA Type 4X Stainless (60–80 A)

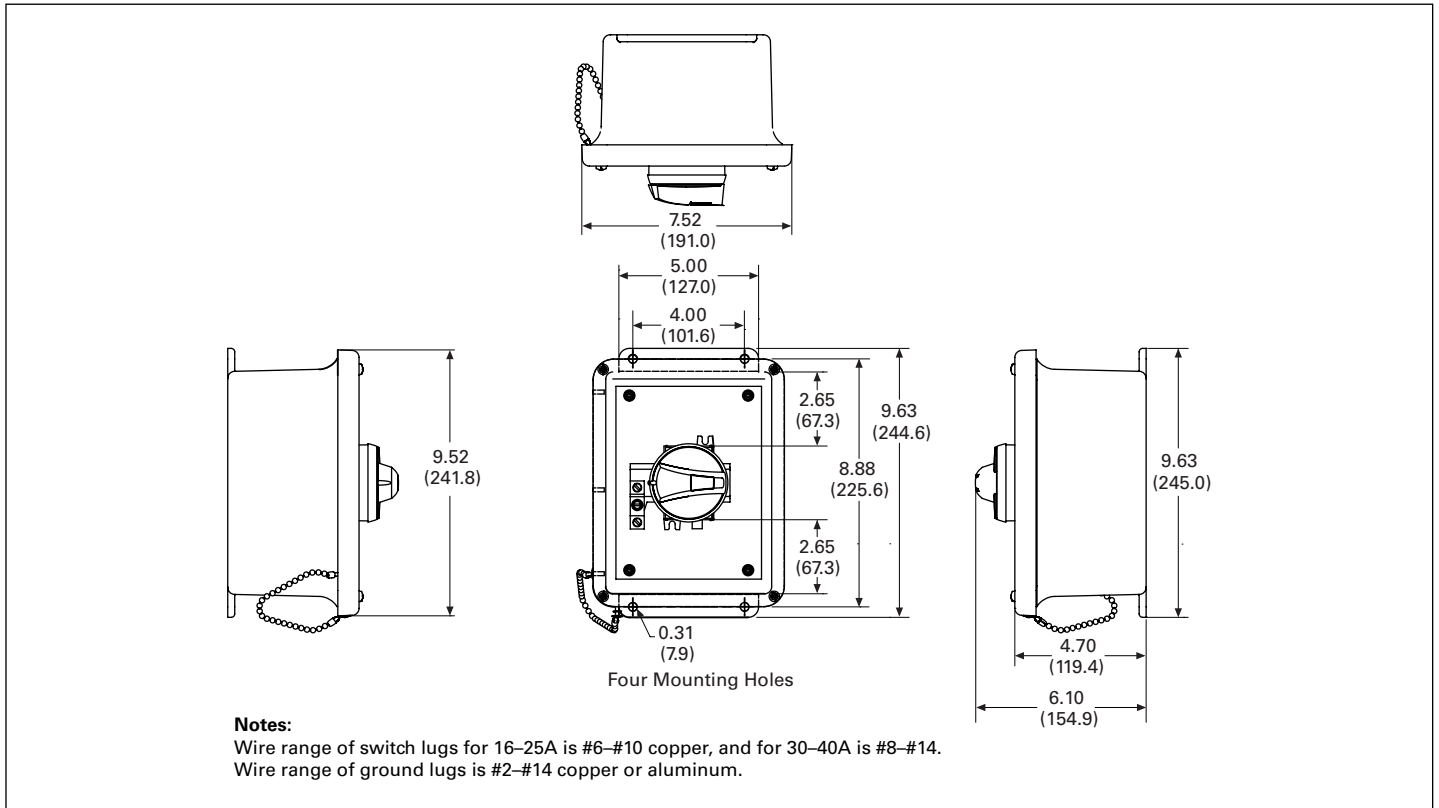


Figure 28.1-20. NEMA Type 4X Thermoset Polyester (16–40 A)

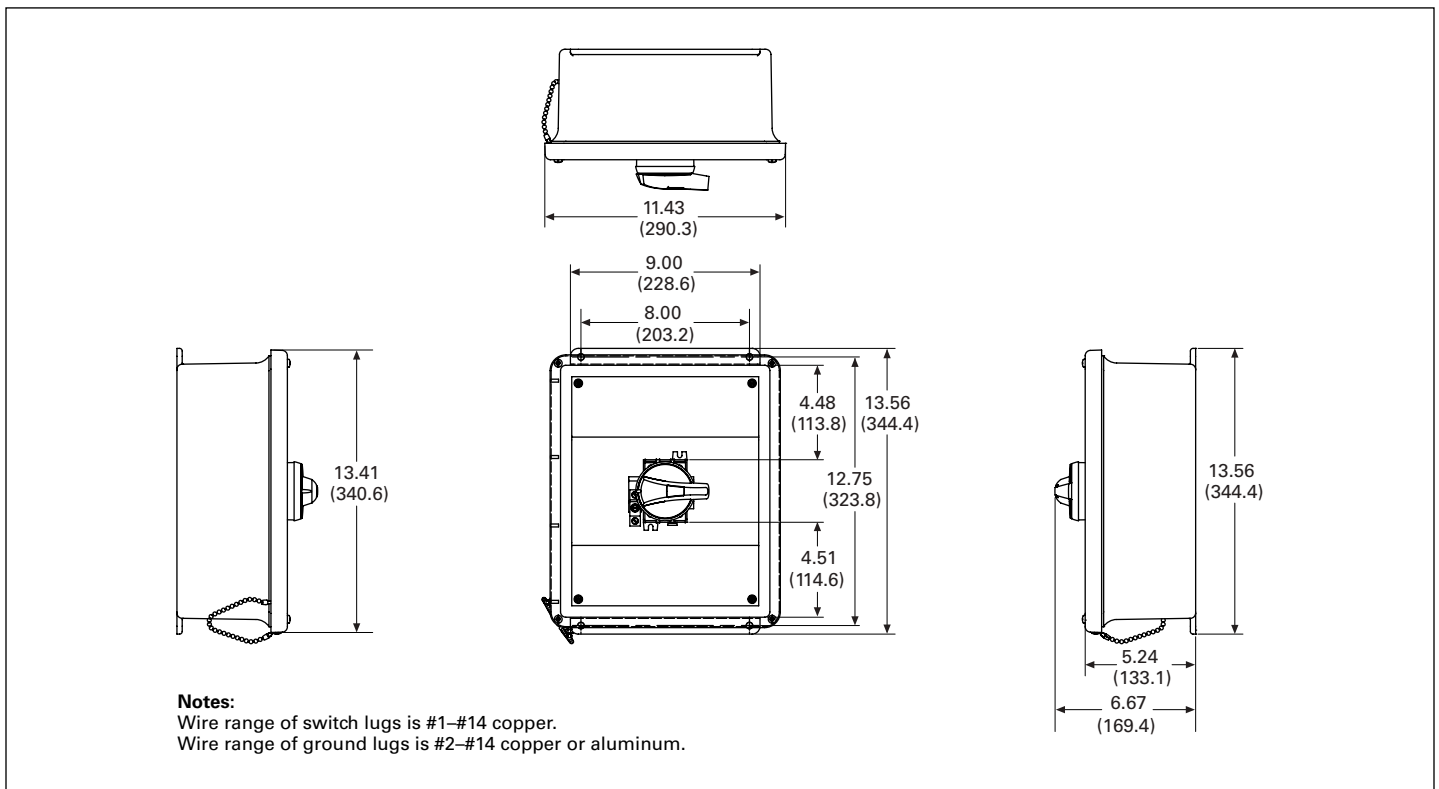


Figure 28.1-21. NEMA Type 4X Thermoset Polyester (60–80 A)

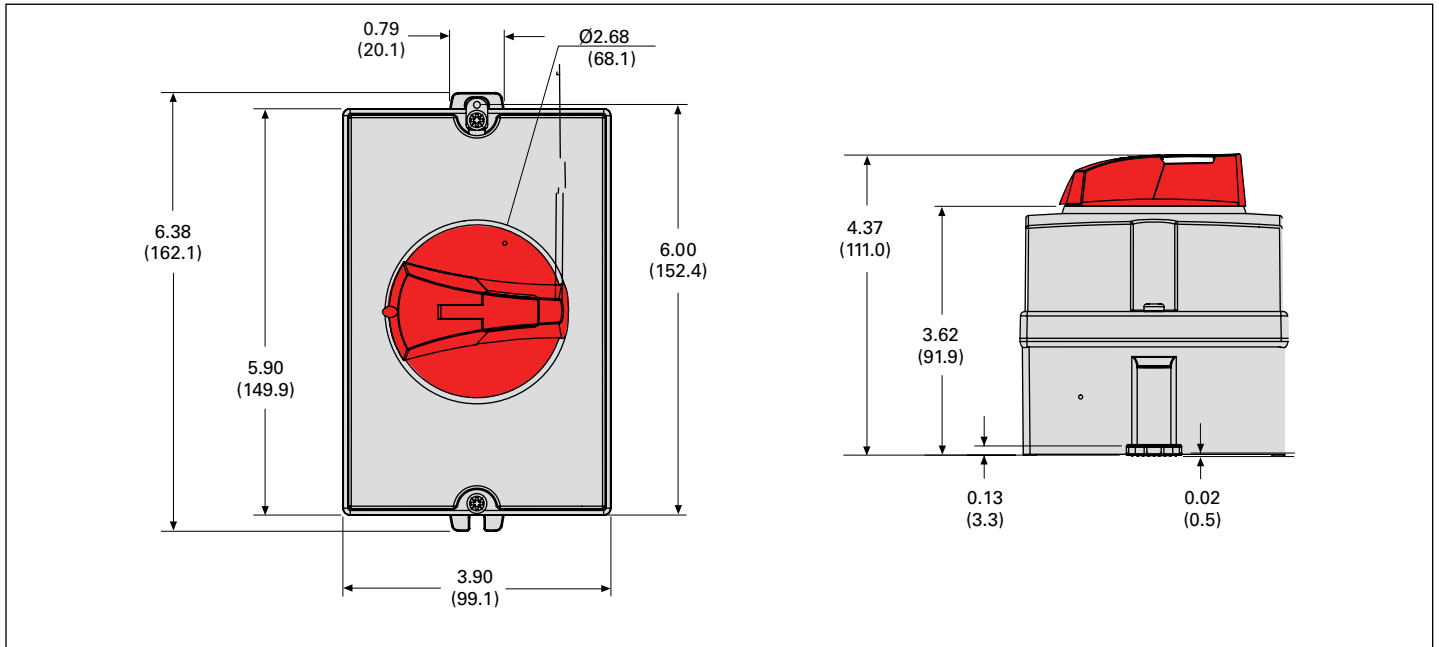


Figure 28.1-22. NEMA Type 4X—Polycarbonate (30 A)

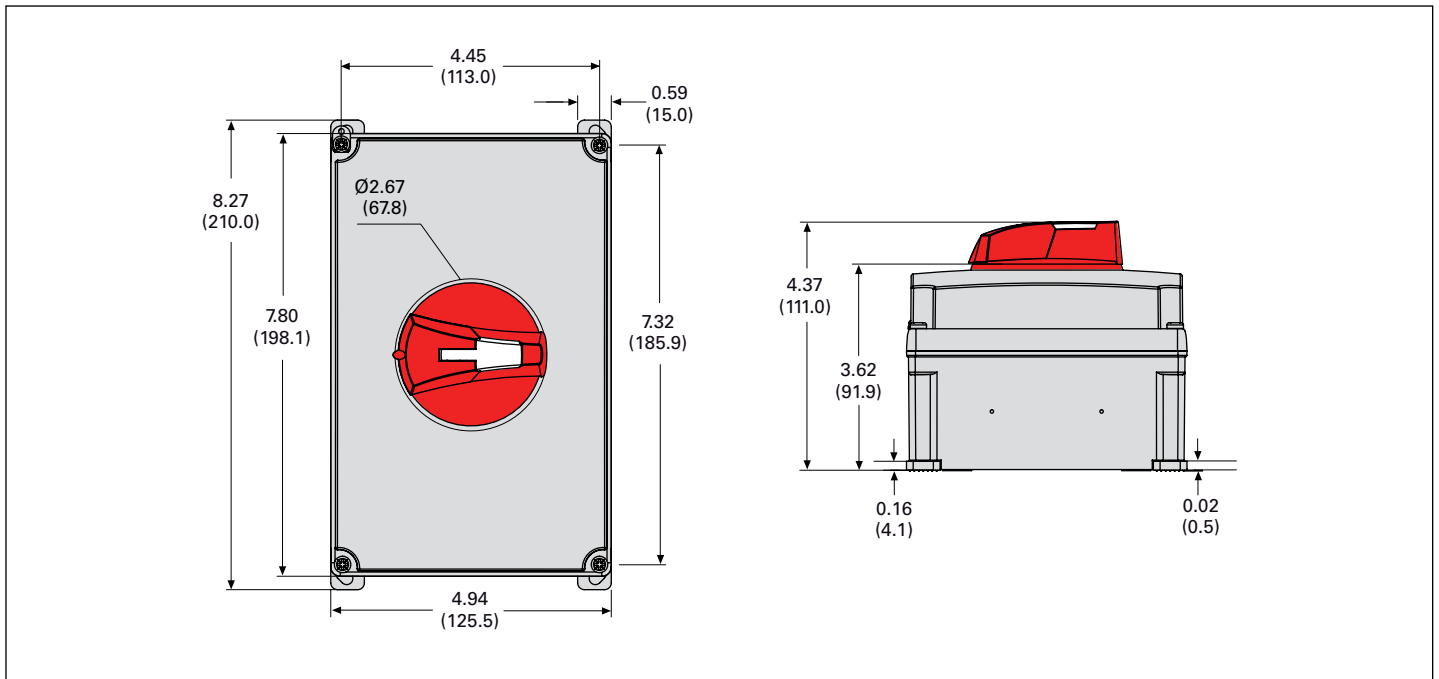


Figure 28.1-23. NEMA Type 4X—Polycarbonate (60 A)

Maximum Horsepower Ratings

Table 28.1-25. General-Duty, Fusible and Non-Fusible, 120 V with Time Delay Fuses

Ampere Rating	Single-Phase AC	Three-Phase AC
30	2	3
60	3	7-1/2

Table 28.1-26. General-Duty, Fusible and Non-Fusible, 240 V with Time Delay Fuses

Ampere Rating	Single-Phase AC	Three-Phase AC
30	3	7-1/2
60	10	15
100	15	30
200	15	60
400	—	125
600	—	200

Table 28.1-27. Heavy-Duty, Non-Fusible, 120 V

Ampere Rating	Single-Phase AC	Three-Phase AC
30	2	5
60	3	10

Table 28.1-28. Heavy-Duty, Fusible, 240 V with Time Delay Fuses ①

Ampere Rating	Single-Phase AC	Three-Phase AC
30	3	7-1/2
60	10	15
100	15	30
200	15	60
400	—	125
600	—	200
800	—	250

① Data applicable to heavy-duty, enhanced visible blade and heavy-duty surge switches.

Table 28.1-29. Heavy-Duty, Fusible, 480 V with Time Delay Fuses ②

Ampere Rating	Single-Phase AC	Three-Phase AC
30	7-1/2	15
60	20	30
100	30	60
200	50	125
400	—	250
600	—	400
800	—	500

② Data applicable to heavy-duty, enhanced visible blade and heavy-duty surge switches.

Table 28.1-30. Heavy-Duty, Fusible, 600 V with Time Delay Fuses ③

Ampere Rating	Single-Phase AC	Three-Phase AC
30	10	20
60	25	50
100	40	75
200	50	150
400	—	350
600	—	500
800	—	500

③ Data applicable to heavy-duty, enhanced visible blade and heavy-duty surge switches.

Table 28.1-31. Heavy-Duty, Non-Fusible, 240 V ④

Ampere Rating	Single-Phase AC	Three-Phase AC
30	3	10
60	10	20
100	20	40
200	15	60
400	—	125
600	—	200
800	—	—

④ Data applicable to heavy-duty, enhanced visible blade and heavy-duty surge switches.

Table 28.1-32. Heavy-Duty, Non-Fusible, 480 V ⑤

Ampere Rating	Single-Phase AC	Three-Phase AC
30	7-1/2	20
60	20	50
100	40	75
200	50	125
400	—	250
600	—	400
800	—	500

⑤ Data applicable to heavy-duty, enhanced visible blade and heavy-duty surge switches.

Table 28.1-33. Heavy-Duty, Non-Fusible, 600 V ⑥

Ampere Rating	Single-Phase AC	Three-Phase AC
30	10	30
60	25	60
100	50	100
200	50	150
400	—	350
600	—	500
800	—	500

⑥ Data applicable to heavy-duty, enhanced visible blade and heavy-duty surge switches.

Table 28.1-34. Double Throw, Fusible, 240 V with Time Delay Fuses

Ampere Rating	Single-Phase AC	Three-Phase AC
30	3	7-1/2
60	10	15
100	15	30
200	15	60
400	—	125
600 ⑦	—	50

⑦ Only available for use with fast acting fuses. Standard hp rating is shown.

Table 28.1-35. Double Throw, Fusible, 480 V with Time Delay Fuses

Ampere Rating	Single-Phase AC	Three-Phase AC
30	7-1/2	15
60	20	30
100	30	60
200	50	125
400	—	250

Note: Ratings are based on three-pole designs.

Table 28.1-36. Double-Throw, Fusible, 600 V with Time Delay Fuses

Ampere Rating	Single-Phase AC	Three-Phase AC
30	10	20
60	25	50
100	40	75
200	50	150
400	—	350

Table 28.1-37. Double-Throw, Non-Fusible, 240 V

Ampere Rating	Single-Phase AC	Three-Phase AC
30	3	10
60	10	20
100	20	40
200	15	60
400	—	125
600	—	125
800	—	125

Table 28.1-38. Double-Throw, Non-Fusible, 480 V

Ampere Rating	Single-Phase AC	Three-Phase AC
30	7-1/2	20
60	20	50
100	40	75
200	50	125
400	—	250
600	—	250
800	—	250

Table 28.1-39. Double-Throw, Non-Fusible, 600 V

Ampere Rating	Single-Phase AC	Three-Phase AC
30	10	30
60	25	60
100	50	100
200	50	150
400	—	350
600	—	350
800	—	350

Table 28.1-40. Heavy-Duty, Non-Fusible, 480 V, 600 V Types 7 and 9

Ampere Rating	Three-Phase, 480V AC	Three-Phase, 600V AC
30	20	20
60	40	50
100	75	75
200	125	150

Table 28.1-41. Heavy-Duty, Fusible, 480 V, 600 V Types 7 and 9 with Time Delay Fuses

Ampere Rating	Three-Phase, 480V AC	Three-Phase, 600V AC
30	15	20
60	30	50
100	60	75
200	125	150

Note: Ratings are based on three-pole designs.

Short-Circuit Ratings

General-Duty

Table 28.1-42. Short-Circuit Ratings Using Class “R,” “J” or “T” Fusing where Applicable

Ampere Rating	Short-Circuit Ratings (Amperes)	
	Type 1	Type 3R
30	100 k at 240 V	100 k at 240 V
60	100 k at 240 V	100 k at 240 V
100	100 k at 240 V	100 k at 240 V
200	100 k at 240 V	100 k at 240 V
400	100 k at 250 V	100 k at 250 V
600	100 k at 250 V	100 k at 250 V

Note: Class “H” fuse clips supplied as standard for 30–600 A. Rated at 10,000 rms symmetrical when using Class “H” fuses.

Heavy-Duty

Table 28.1-43. Short-Circuit Ratings Using Class “R,” “J” or “T” Fusing where Applicable

Ampere Rating	Short-Circuit Ratings (Amperes)			
	Type 1	Type 3R	Type 12	Type 4 and 4X
30	200 k at 600 V	200 k at 600 V	200 k at 600 V	200 k at 600 V
60	200 k at 600 V	200 k at 600 V	200 k at 600 V	200 k at 600 V
100	200 k at 480 V 100 k at 600 V	200 k at 480 V 100 k at 600 V	200 k at 600 V	200 k at 600 V
200	200 k at 600 V	200 k at 600 V	200 k at 600 V	200 k at 600 V
400	200 k at 480 V 100 k at 600 V	200 k at 480 V 100 k at 600 V	200 k at 480 V 100 k at 600 V	200 k at 480 V 100 k at 600 V
600	200 k at 480 V 100 k at 600 V	200 k at 480 V 100 k at 600 V	200 k at 480 V 100 k at 600 V	200 k at 480 V 100 k at 600 V
800 ①	200 k at 480 V 100 k at 600 V	200 k at 480 V 100 k at 600 V	200 k at 480 V 100 k at 600 V	200 k at 480 V 100 k at 600 V
1200 ①	200 k at 600 V	200 k at 600 V	200 k at 600 V	200 k at 600 V

① Class “L” fuse connectors supplied as standard for 800 A and 1200 A.

Note: Class “H” fuse clips supplied as standard for 30–600 A. Rated at 10,000 A rms symmetrical when using Class “H” fuses.

Double Throw

Table 28.1-44. Short-Circuit Ratings Using Class “R,” “J” or “T” Fusing where Applicable

Ampere Rating	Short-Circuit Ratings (Amperes) (600V)			
	Type 1	Type 3R	Type 12	Type 4 and 4X
30	100 k	100 k	100 k	100 k
60	100 k	100 k	100 k	100 k
100	100 k	100 k	100 k	100 k
200	100 k	100 k	100 k	100 k
400	100 k	100 k	100 k	100 k
600	100 k	100 k	100 k	100 k
800	100 k	100 k	—	—
1200	100 k	100 k	—	—

Note: Class “H” fuse clips supplied as standard for 30–600 A, except Class “T” for 400 A at 600 V and 600 A at 240 V. Rated at 10,000 A rms symmetrical when using Class “H” fuses.

Note: Class “L” fuse connectors supplied as standard for 800 A and 1200 A.

Note: Safety switch short-circuit ratings are applicable to AC only.

Note: Safety switch I^2t and I_p values are identical to UL maximum acceptable I^2t and I_p values for the corresponding class fuse.

Note: Table 28.1-44 is not applicable to the compact design shown in Eaton’s Volume 2—Commercial Distribution, CA08100003E, Tab 8, Section 8.1. The compact design is suitable for use on a circuit capable of delivering not more than 10,000 rms symmetrical amperes.

Shunt Trip Safety Switch

Table 28.1-45. Short-Circuit Ratings Using Class “R,” “J/L” or “T” Fusing ②

Ampere Rating	480 V	600 V
30	200 kAIC	200 kAIC
60	200 kAIC	200 kAIC
100	200 kAIC	200 kAIC
200	200 kAIC	100 kAIC
400	200 kAIC	100 kAIC
600	200 kAIC	100 kAIC
800	200 kAIC	200 kAIC

② Non-fusible values are based on combination rating with upstream device (see TD00801005E).

Short-Circuit Ratings of Non-Fusible Switches

The UL listed short-circuit ratings for Eaton’s non-fusible switches are based on the switches being properly protected by overcurrent protective devices. For applications that require a UL listed short-circuit rating of 10,000 rms symmetrical amperes or less, an Eaton non-fusible switch must be properly protected by any overcurrent protective device rated no greater than the ampere rating of the switch. For applications that require a UL listed short-circuit rating of greater than 10,000 rms symmetrical amperes, an Eaton non-fusible switch must be properly protected by the appropriate class and size fusing noted in the applicable table on this page. Otherwise, this non-fusible switch must be replaced with an Eaton fusible switch that uses the appropriate fusing required. Molded case circuit breaker protection of non-fusible Eaton switches for applications that require a short-circuit rating of greater than 10,000 rms symmetrical amperes has been evaluated and is summarized below. Refer to the reference tables for typical Eaton fusible switch UL listed short-circuit ratings.

Table 28.1-46. UL Recognized Safety Switch/Circuit Breaker Series-Connected Ratings

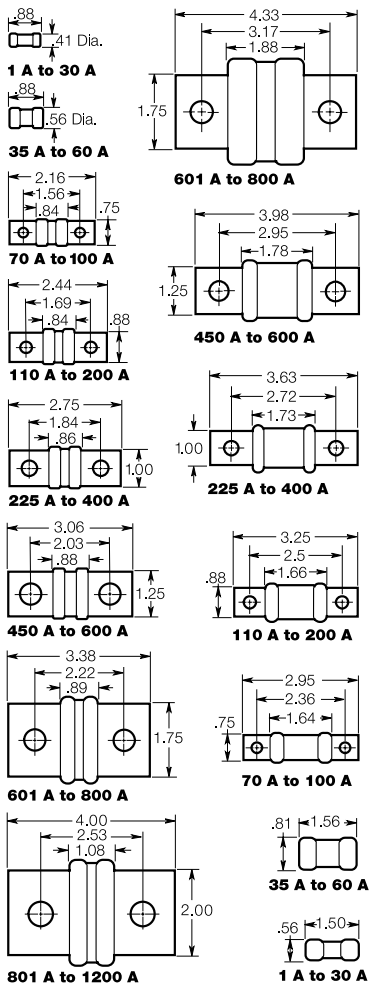
Safety Switch Ampere Rating	Maximum System Voltage AC	Circuit Breaker Maximum Short Circuit Rating (rms Symmetrical)	Circuit Breaker Frame(s)
30 and 60	600	25,000	FDC, HFD, HFDE, EGH
		18,000	FD, EGE
100	600	14,000	FDB
		25,000	FDC, HFD, HFDE, EGH
		18,000	FD, EGE
200	600	14,000	FDB
		35,000	EGH, EGS
		25,000	FDC, HFD, HFDE, HJD, JGH
		18,000	FD, JD, JGE
480	65,000	14,000	FDB
		65,000	HFD, HFDE, HJD, JGH

Fuse Dimensions

Class T

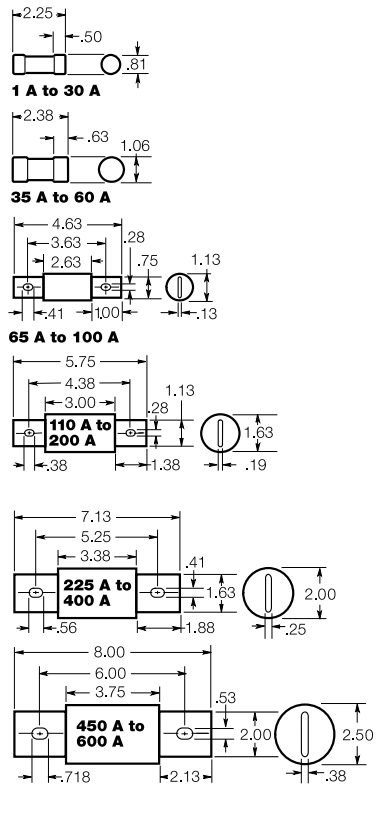
T-Tron™ Fuses

JJN (300V) JJS (600V)



Class J

Low-Peak® and Limitron® Fuses
LPJ & JKS (600V)

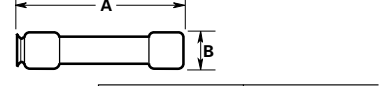


Class RK5 and RK1

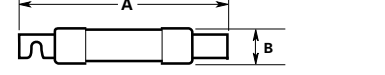
Fusetron®, Low-Peak and Limitron Fuses (250 and 600V)

FRN-R and FRS-R; LPN-RK and LPS-RK; KTN-R and KTS-R
Basic dimensions are same as Class H (formerly NEC) ONE-TIME (NON and NOS) and SUPERLAG Renewable RES and REN fuses.

Note: These fuses can be used to replace existing Class H, RK1 and RK5 fuses relating to dimensional compatibility.



Ampere	250V		600V	
	A	B	A	B
1/10-30	2.00	0.56	5.00	0.81
35-60	3.00	0.81	5.50	1.06



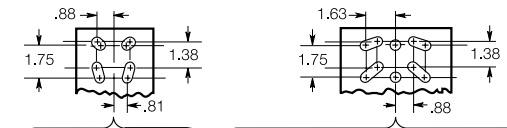
Fusetron and Limitron

Ampere	250V		600V	
	A	B	A	B
70-100	5.88	1.06	7.88	1.34
110-200	7.13	1.56	9.63	1.84
225-400	8.63	2.06	11.63	2.59
450-600	10.38	2.59	13.38	3.13

Low-Peak

Ampere	250V		600V	
	A	B	A	B
70-100	5.88	1.16	7.88	1.16
110-200	7.13	1.66	9.63	1.66
225-400	8.63	2.38	11.63	2.38
450-600	10.38	2.88	13.38	2.88

Class L Low-Peak and Limitron Fuses
KRP-C, KTU & KLU (601-4000A) (600V)



Note: KRP-CL (150-600A) fuses have same dimensions as 601-800A case size. KTU (200-600A) have same dimensions, except tube 3-inch lgth. x 2-inch dia.; terminal 1.63-inch width x 1.25-inch thick.

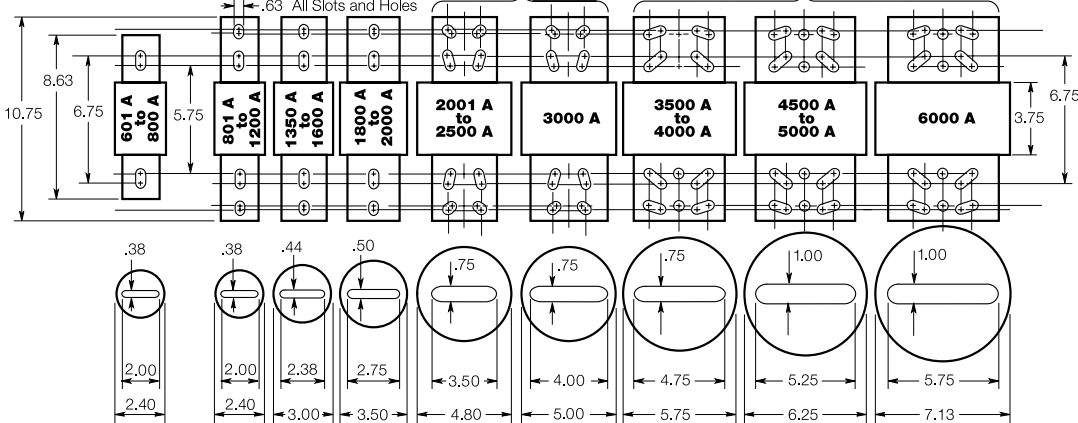


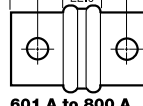
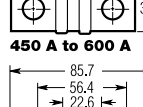
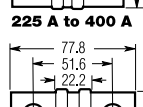
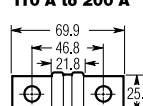
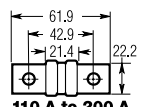
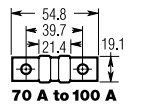
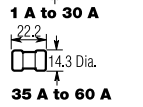
Figure 28.1-24. Typical Fuse Dimensions in Inches

Note: For typical fuse dimensions in millimeters, see Figure 28.1-25 on Page 28.1-27.

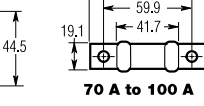
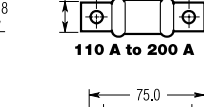
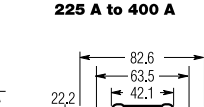
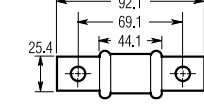
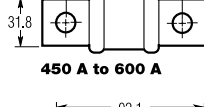
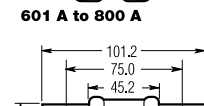
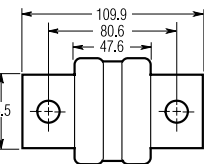
Class T

T-Tron Fuses
JJN (300V)

1 A to 30 A
35 A to 60 A



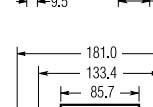
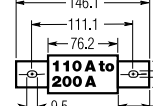
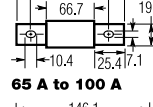
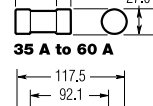
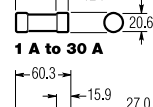
JJS (600V)



Class J

Low-Peak and Limitron Fuses
LPJ and JKS (600V)

1 A to 30 A
35 A to 60 A



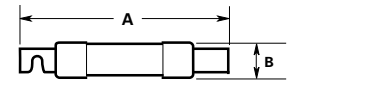
Class RK5 and RK1

Fusetron, Low-Peak and Limitron Fuses (250 and 600V)

FRN-R and FRS-R; LPN-RK and LPS-RK; KTN-R and KTS-R
Basic dimensions are same as Class H (formerly NEC) ONE-TIME (NON and NOS) and SUPERLAG Renewable RES and REN fuses.

Note: These fuses can be used to replace existing Class H, RK1 and RK5 fuses relating to dimensional compatibility.

Ampere	250V		600V	
	A	B	A	B
1/10-30	50.8	14.3	127.0	20.6
35-60	76.2	20.6	139.7	27.0



Fusetron and Limitron

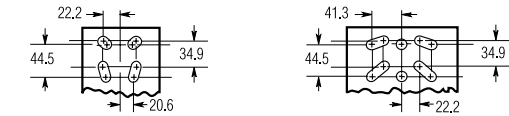
Ampere	250V		600V	
	A	B	A	B
70-100	149.2	26.9	200.0	34.0
110-200	181.0	39.6	244.5	46.7
225-400	219.1	52.3	295.3	65.8
450-600	263.5	65.8	339.7	79.5

Low-Peak

Ampere	250V		600V	
	A	B	A	B
70-100	149.2	29.5	200.0	29.5
110-200	181.0	42.2	244.5	42.2
225-400	219.1	60.5	295.3	60.5
450-600	263.5	73.2	339.7	73.2

Class L Low-Peak and Limitron Fuses

KRP-C, KTU and KLU (601-4000A) (600V)



Note: KRP-CL (150-600A) fuses have same dimensions as 601-800A case size. KTU (200-600A) have same dimensions, except tube 76.2 mm lgth. x 50.8 mm dia.; terminal 41.3 mm width x 31.8 mm thick.

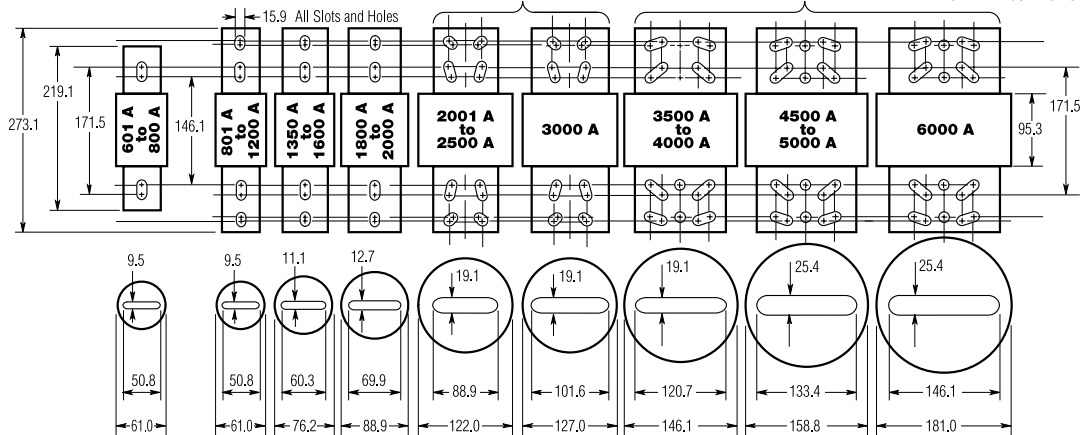


Figure 28.1-25. Typical Fuse Dimensions in Millimeters

Note: For typical fuse dimensions in inches, see Figure 28.1-24 on Page 28.1-26.

Table 28.1-47. Safety Switch Catalog Numbering System—General Duty

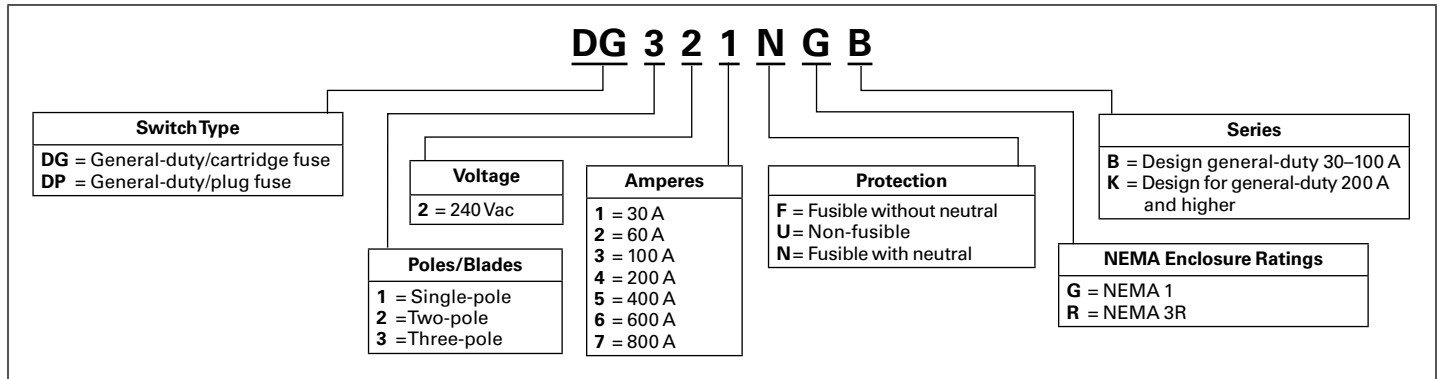
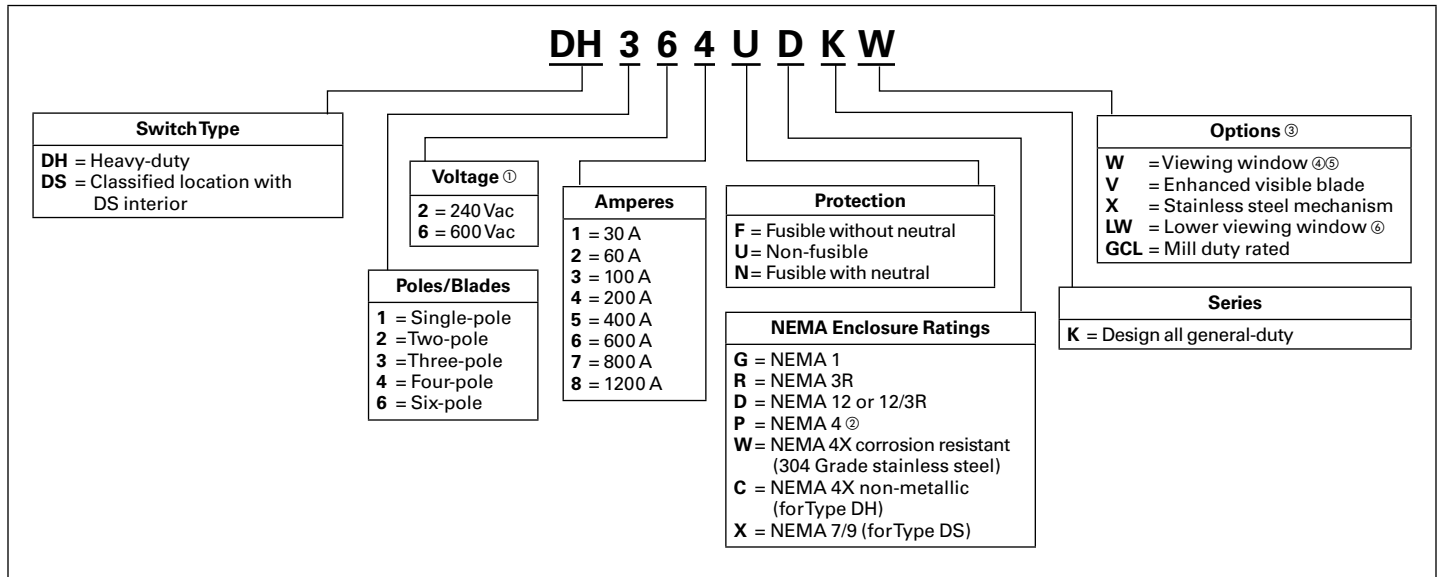


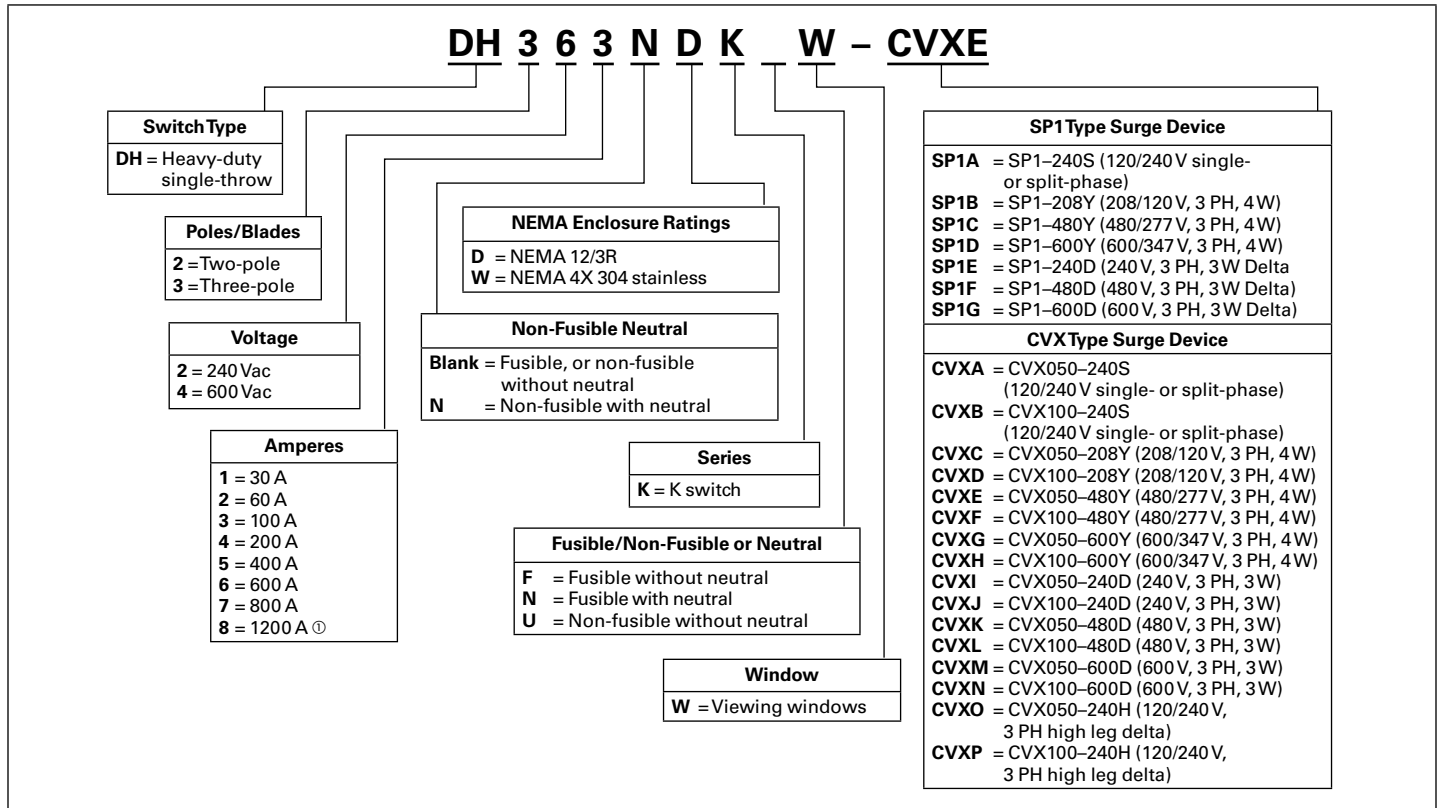
Table 28.1-48. Safety Switch Catalog Numbering System—Heavy Duty



① For DC ratings, check individual switch ratings.
 ② Only available for 400 A and higher safety switches.
 ③ See Modifications-Flex Center for additional available options.
 ④ All window switches feature enhanced visible blade design as standard.
 ⑤ Only available in NEMA 12/3R and NEMA 4X enclosures.
 ⑥ Only available in 200 to 1200 A NEMA 12/3R and NEMA 4X enclosures.

Note: These tables are intended for use in breaking down existing catalog numbers. They are not intended for building new catalog numbers. A factory-installed ground lug is supplied on all safety switches.

Table 28.1-49. Heavy-Duty Safety Switch with Surge Protection Catalog Numbering System



① Available with SP1 type surge device only.

Note: This table is intended for use in breaking down existing catalog numbers. It is not intended for building new catalog numbers.

Table 28.1-50. Auxiliary Power Heavy-Duty Safety Switch Catalog Numbering System

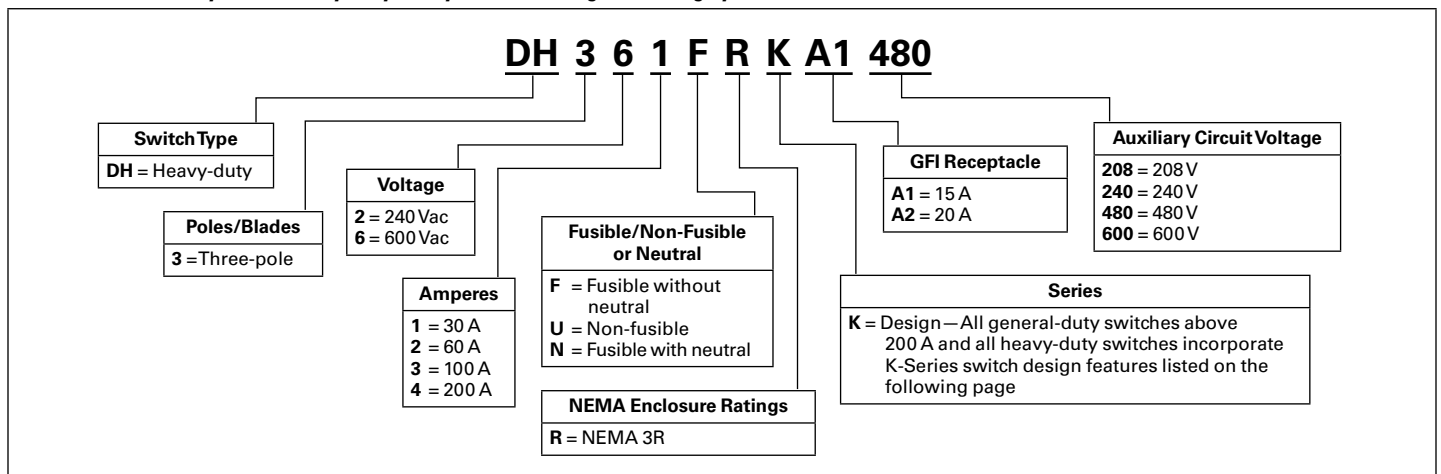
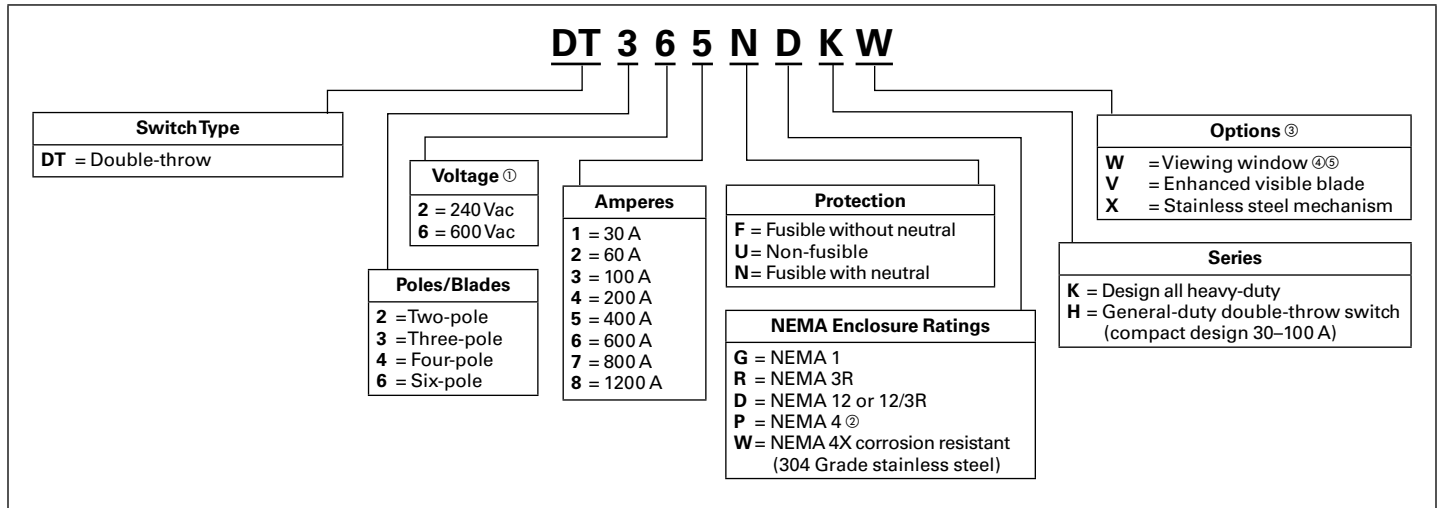


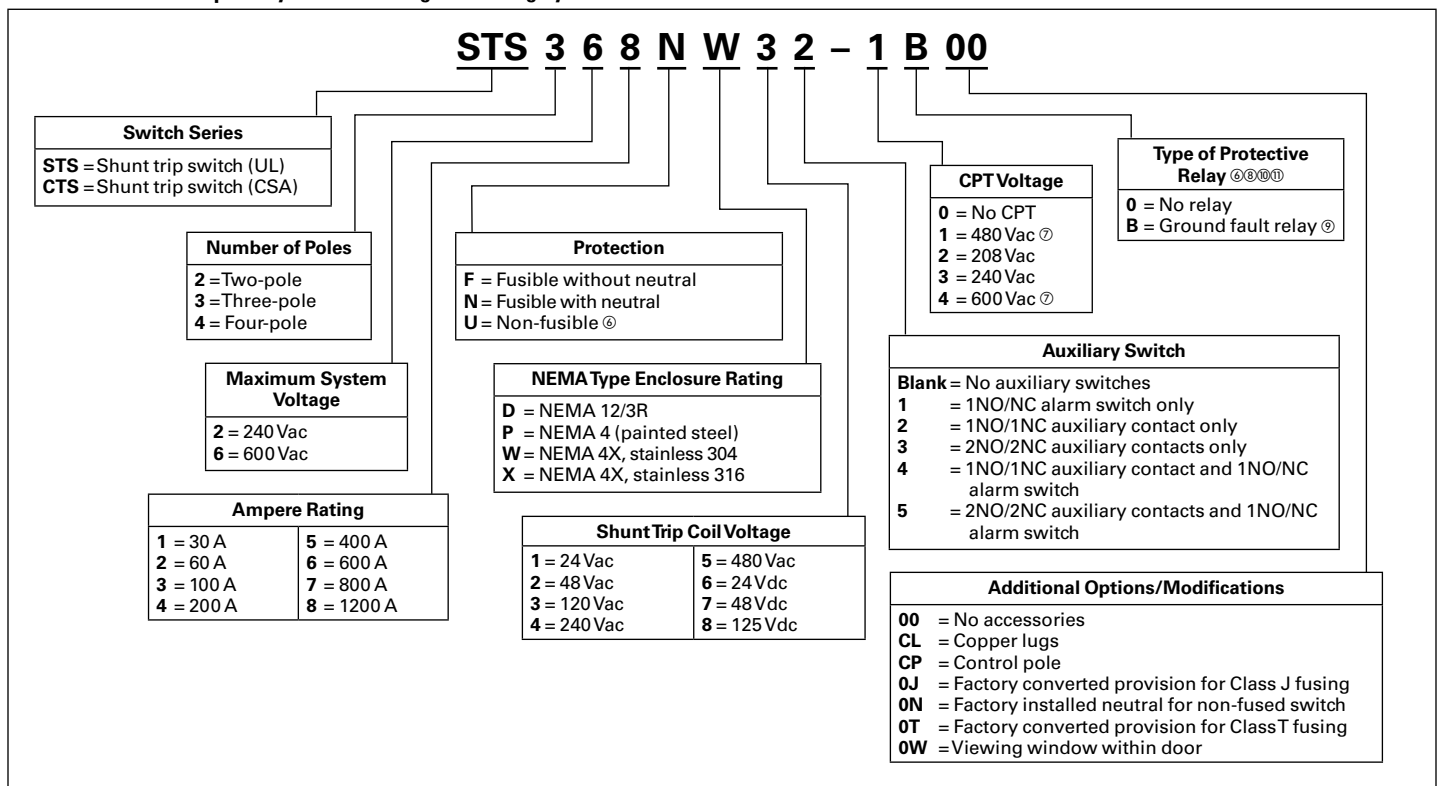
Table 28.1-51. Safety Switch Catalog Numbering System—Double Throw



- ① For DC ratings, check individual switch ratings.
- ② Only 22 available for 400 A and higher safety switches.
- ③ See Modifications-Flex Center for additional available options.
- ④ All window switches feature enhanced visible blade design as standard.
- ⑤ Only available in NEMA 12/3R and NEMA 4X enclosures.

Note: These tables are intended for use in breaking down existing catalog numbers. They are not intended for building new catalog numbers. A factory-installed ground lug is supplied on all safety switches.

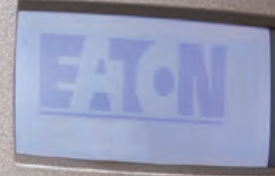
Table 28.1-52. Shunt Trip Safety Switch Catalog Numbering System



- ④ Ground fault relays can only be used with fusible switches.
- ⑦ Available for 600 Vac switches only.
- ⑧ Shunt trip safety switch with relay protection must use 120 Vac coils.
- ⑨ Available for 400–1200 A fusible switches only.
- ⑩ Only one relay option allowed.
- ⑪ Relay viewing window standard with relay option.

BladeUPS

EATON



BladeUPS

5 kW to 60 kW redundant UPS solutions

BladeUPS

EATON

Powering Business Worldwide



An Eaton Green Product

BladeUPS uninterruptible power system

Designed specifically for high-density computing environments, the Eaton® BladeUPS® delivers 5, 8 or 12 kW of efficient, reliable power in only 6U of standard rack space, including batteries. Expand capacity by combining 12 kW modules in a building block fashion to deliver 60 kW (N+1) from a single rack enclosure. This powerful configuration delivers higher power density than competitive, modular solutions, while dissipating only one-third of the heat.

The standard internal batteries provide needed ride-through power until an auxiliary power source takes over or systems are gracefully shut down. Extend runtime up to 94 minutes at full load* (or 250 minutes at half load) with extended battery modules (EBMs).

** 5 kW model only available at 208V input.*

Features

- Protects mission-critical applications with innovative backup power technology designed specifically for high-density computing environments
- Supports the constant moves, adds and changes of today's dynamic data centers with a modular, scalable, and flexible backup power architecture
- Conserves valuable rack space with 5, 8 or 12 kW of power in only 6U of rack height, including batteries
- Accommodates growth by enabling building-block upgrades from 12 to 60 kW in a single rack enclosure
- Reduces energy costs and cooling needs through best-in-class efficiency performance
- Delivers highest levels of reliability at the rack with patented Powerware Hot Sync paralleling technology and intelligent bypass design, field proven in thousands of large data centers globally
- Simplifies installation and service with true plug-and-power connections and hot-swappable batteries and electronics modules
- Increases battery life through ABM® technology, resulting in more uptime and fewer battery replacements



Eaton BladeUPS

POWER PROTECTION FOR:

- Blade servers
- Small, medium and large data centers
- Network closets
- PBX and VoIP equipment
- Networking applications: IPTV, security
- Storage devices: RAID, SAN
- Converged infrastructure
- Database clusters



BladeUPS in a rack
(60 kW, N+1 redundant)



The BladeUPS is TAA Compliant

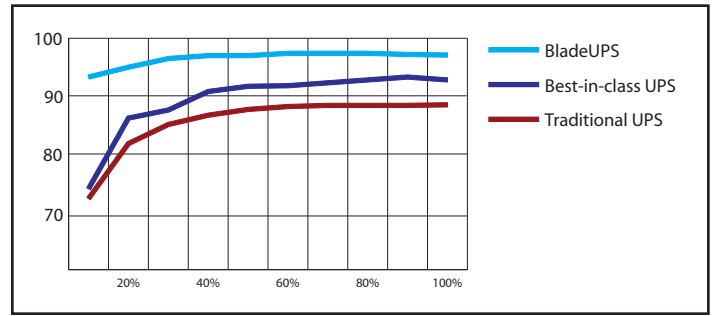
Reduce energy costs with high efficiency

As utility rates continue to climb, energy efficiency becomes a sticking point with data center managers.

The BladeUPS delivers an outstanding, industry-leading 98 percent efficiency in normal operation. Even at a load of less than 50 percent, where efficiency is typically much lower, this UPS performs more efficiently than competitors' modular products at full load.

In addition to dramatic cost savings, high system efficiency extends battery runtimes and produces cooler operating conditions within the UPS. This extends the life of components and increases the life of components and increasing overall reliability and performance.

Even small increases in efficiency can quickly translate into thousands of dollars. The example below compares annual and five-year energy costs for the BladeUPS and a competitor's solution. It's easy to see that the BladeUPS pays for itself through energy and cooling savings alone.



Even at very small loads, where you would expect efficiency to be lower, the BladeUPS is still more efficient than other UPS products at full load.

Efficiency comparison and savings

	BladeUPS	Traditional UPS
UPS efficiency rating	>98%	91.5%
Rack power consumption	60 kW	60 kW
Cost per kWh	\$0.10	\$0.10
Cost to operate per hour	\$6.18	\$6.56
Monthly power savings	\$273	
Heat dissipation (BTUs per hour)	6,300	19,000
*Monthly cooling savings	\$246	
Annual savings with the BladeUPS	\$6,238	
Five-year savings with the BladeUPS	\$31,190	

* Cooling savings based on industry calculation of cooling costs per kW of power costs.

Reduce cooling costs with lower heat dissipation

The high-efficiency BladeUPS reduces the power requirements for the data center. In the example shown, the BladeUPS reduces energy costs by an average of \$273 per month. In addition, the high efficiency of a BladeUPS reduces overall air conditioning needs by more than one third; multiply that with a reduction in cooling costs by one-third and utility bills are further decreased by an additional \$246 per month. The savings compound with the data center size and the number of UPS products. The low heat dissipation means this UPS can be located close to equipment racks without a concern for creating hot spots in the data center.



The BladeUPS remains cool even in a data center full of servers.

Meet current and changing requirements with modular architecture

The building block of the scalable BladeUPS system is a 6U rackmount module that provides 12 kW of backup power protection. The system expands easily to provide maximum results. As your data center grows, the system's modularity plays a key role in optimizing your capital planning and deployment. Using the patented and field-proven Powerware Hot Sync paralleling technology, up to six BladeUPS modules can be paralleled for extra capacity or redundancy, providing 60 kW of redundant backup power protection in one 19-inch rack.

Patented load-sharing control intelligently distributes the workload among modules without requiring direct synchronization links among them. Any module can provide backup support for any other, with no interruption or downtime. For instance, in a redundant system you could perform full maintenance on any module without any interruption of conditioned power to the protected IT equipment.

YEAR 1: INITIAL INSTALL



12 kW

BladeUPS Parallel Bar for paralleling UPS modules

42U Eaton enclosure

12 kW BladeUPS occupies 6U of space

YEAR 3: EXPANSION



36 kW

Total rack space: 24U

Three 12 kW UPS modules = 36 kW of backup power

6U electrical wire-way

YEAR 5: FURTHER EXPANSION



60 kW, N+1

Redundant N+1 configuration: Six 12 kW UPS modules share the load equally. If a UPS module is removed from service, the remaining modules seamlessly support the load without interruption.

The BladeUPS is extraordinarily flexible—configured as a single module or multi-module system (up to six modules) in a standard 42U enclosure. The modular design enables you to deploy just the right amount of backup protection at the right price for your current needs and expand later whenever needed.

The BladeUPS can also be deployed as a single UPS module in 5, 8 or 12 kW sizes. This allows a high power UPS to be placed in the same rack as IT equipment, reducing footprint. In addition, it ensures the backup power is close to the loads being supported so chances of power wiring or human error issues between systems are minimized. This is optimal for high power converged infrastructure applications.

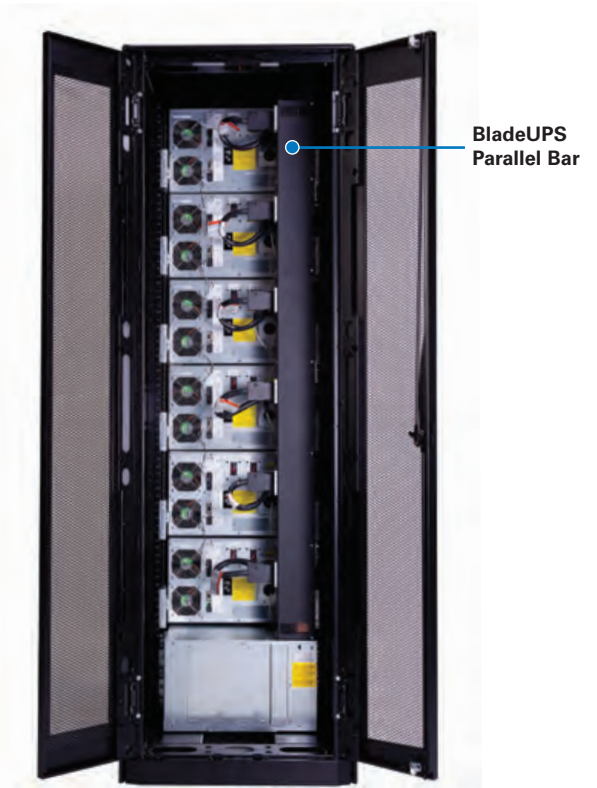


12 kW BladeUPS with extended battery module (EBM)

Easy setup with simple parallel configuration changes

The BladeUPS is easy to install, configure, and deploy—and easy to expand later, without help from Eaton. To link multiple BladeUPS modules into a parallel configuration, all you need is a BladeUPS Parallel Bar—a simple kit installed in the top or bottom of the rack and on the back rail. IT personnel can then simply plug additional modules into the parallel bus bar. The system is intelligent, so it automatically detects paralleled modules and fully configures itself for parallel operations.

Eaton also offers an assortment of plug-and-play power distribution accessories with various input and output connections to distribute power from the BladeUPS to rack power strips or directly to high-power servers. You can choose from distribution designs with or without monitoring capability for redundant or non-redundant applications spanning from OU to full rack height.



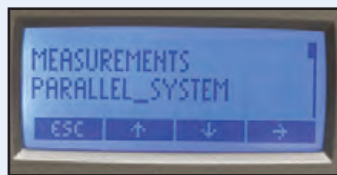
The BladeUPS Parallel Bar easily connects up to six modules in parallel.



Adding modules is a simple plug-and-power procedure for IT personnel with safety-approved connectors.

Administrators can monitor and manage the BladeUPS using the unit's LCD panel or remote monitoring software. The UPS provides data for the entire multi-module system, as well as the individual module. In addition, a module working in a parallel configuration can be separated at any time and re-deployed as a standalone module to meet a data center's changing requirements.

The brightly backlit 2.6" LCD shows parameters of the system or a module.



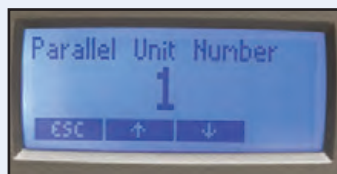
Access parallel system information



Display output from multiple modules on one screen



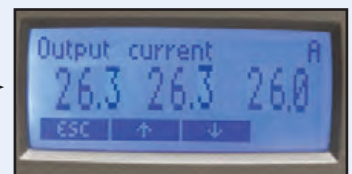
Display full system output from any UPS



Review any UPS from any display



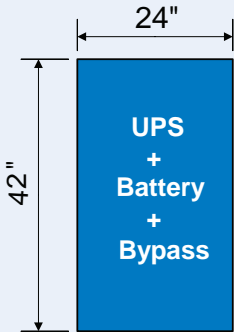
Display individual module output voltage



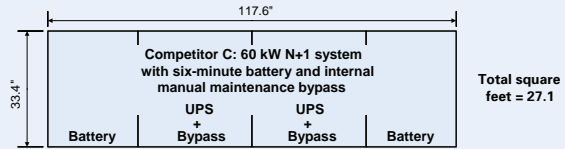
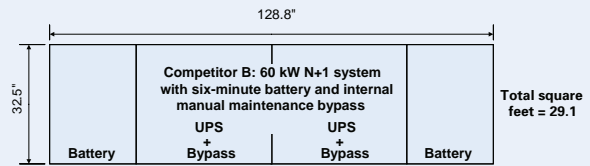
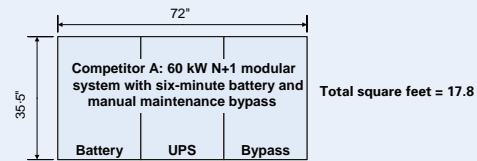
Display individual module output current

Save space with a high power density UPS

The BladeUPS offers the smallest footprint of any UPS in its class, as well as double the power density of other UPSs on the market. This compact design leaves more space for IT equipment in the rack and data center.



BladeUPS
60 kW N+1 modular
system with six-minute
battery and automatic
maintenance bypass
Total square feet = 7.0



BladeUPS system footprint compared to competitors' footprints for 60 kW N+1 redundant application

Expedite deployment with flexible installation options

The BladeUPS can be deployed in a variety of system architectures to support the specific requirements of your computer room or data center and the desired level of redundancy (Tier I through Tier IV, as defined by the Uptime Institute). Data center managers can tailor power protection to adapt to changing needs, often without the need for an electrician or service technician.

Hybrid power protection

The BladeUPS also offers stronger redundancy of power protection for equipment racks containing critical IT equipment.

- For dual-corded loads with one source on a central UPS and the other on utility power, you can back up selected loads with a local BladeUPS, deployed in a distributed or zone fashion.
- For dual- or single-corded loads on a central UPS, you can back up selected loads with a local BladeUPS (distributed or zone) in series with the central UPS. This configuration provides maximum reliability close to critical loads, with minimal heat dissipation and maximum efficiency.

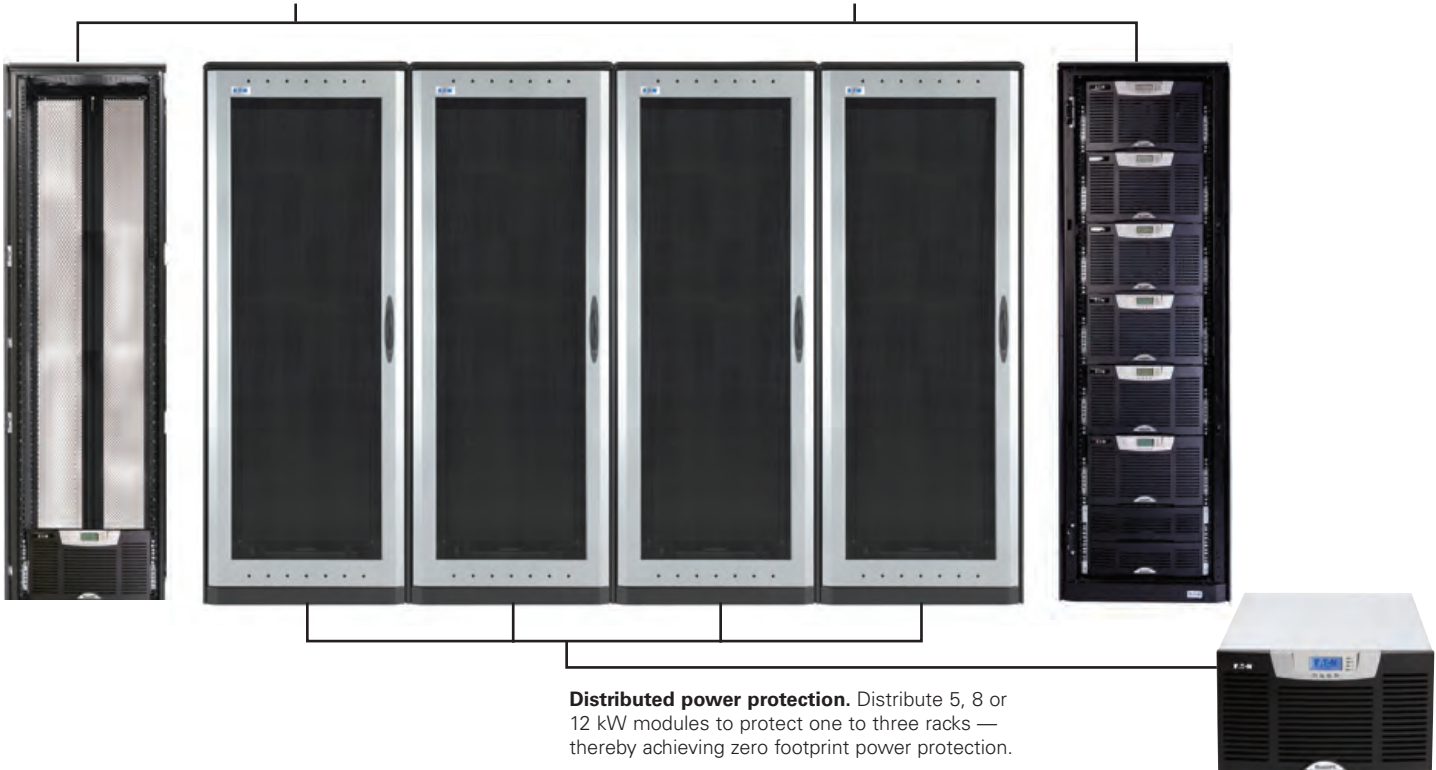
System architecture with the BladeUPS

Centralized power protection for small computer rooms.

Start with one 12 kW module and expand to 60 kW with N+1 redundancy in a single 19-inch rack enclosure.

Zone power protection for mid-sized computer rooms.

Deploy 60 kW (N+1) in a 19-inch rack to protect a row of IT equipment racks. Use 3U rack mount RPMs to distribute power to the IT equipment.



Eaton BladeUPS pre-assembled system

Take advantage of Eaton's turnkey solution with the BladeUPS pre-assembled system. Depending on your power requirements, order pre-assembled systems with one to six BladeUPS units installed to provide the right level of power protection today while looking ahead to future growth. The top-entry models are ideal for data center environments that don't have a raised floor and a flexible option is available to facilitate data center moves, additions or changes. Bottom entry models are also available.

Each pre-assembled system is factory installed, tested and placed in the Eaton S-Series Enclosure (42U). Eaton fully assembles the system prior to shipping, complete with communications cards and system wiring validation. It's delivered on a single, shock-absorbent pallet*.

Please note that extended battery modules and other BladeUPS accessories for these systems must be ordered separately.

Cost savings

BladeUPS pre-assembled systems are more affordable than ordering the standard system components and onsite installation service separately; you'll save 7 percent on the overall cost of the product by purchasing the pre-assembled unit. Even more, since it's shipped on a single pallet, you can save up to 20 percent on shipping costs!

Easy installation

Each pre-assembled system comes with all UPS modules and communication cards already installed. For BladeUPS systems with five and six modules, the internal batteries are shipped uninstalled for better weight distribution.

Simply unwrap the enclosure and roll it off the pallet via a specially designed ramp that's packaged with the unit. Once the enclosure is set in place, all you have to do is bring electricity to the unit and initiate the startup.

The maintenance bypass module (MBM) is available factory installed in the BladeUPS preassembled systems. Six module parallel systems will lose one UPS slot to make room for the MBM. Four module parallel systems will have wire way moved to allow all four ups modules to be installed.



BladeUPS pre-assembled system on shock-absorbent pallet with specially-designed ramp.

* Batteries for top two UPS modules shipped on a separate pallet for 60 kW and 60 kW (N+1)

S-Series Enclosure

Eaton S-Series Enclosures are scalable and feature a fully welded steel frame. A wide range of horizontal and vertical cable management options enhance cabinet-to-cabinet and top-to-bottom cable routing. Split rear doors provide easier access and maneuverability in data center environments and a broad range of rack accessories, as well as power distribution, management and protection products, provide a proven platform you can depend on to support your critical IT operations. Interact with the S-Series enclosure at Eaton.com/S-Series.



Fully welded frame allows unobstructed access along the sides, eliminating cumbersome pass-through holes.



Open base offers unsurpassed access of cables through the bottom of the enclosure.



Enclosed, integrated trough allows for overhead cable distribution.

Key technology features

- Factory pre-tested system accelerates installation and minimizes on-site testing requirements
- Save up to 20 percent in shipping costs
- Top and bottom entry models available
- Modularity and scalability allow the system to be easily moved
- Installed in Eaton S-Series Enclosure
- Quick and easy installation process

Shipping features

- Shock-absorbent pallet
- Specially-designed ramp included for easy on-site product placement
- Extra space on pallet for internal batteries to provide improved weight distribution for five- and six-module systems during shipping
- Shipped as one unit, resulting in lower cost and easier installation

BladeUPS pre-assembled system – bottom entry (12 kW to 60 kW N+1)

Part Number	Model
ZP21110XXXXX000	12 kW, 208V
ZP21115XXXXX000	12 kW, 208V with (1) Power Xpert SNMP/ModBus card
ZP21210XXXXX000	24 kW, 208V
ZP21215XXXXX000	24 kW, 208V with (1) Power Xpert SNMP/ModBus card
ZP2131000XXXX000	36 kW, 208V
ZP2131500XXXX000	36 kW, 208V with (1) Power Xpert SNMP/ModBus card
ZP21410000XX000	48 kW, 208V
ZP21415000XX000	48 kW, 208V with (1) Power Xpert SNMP/ModBus card
ZP215100000X000	60 kW, 208V
ZP215150000X000	60 kW, 208V with (1) Power Xpert SNMP/ModBus card
ZP2161000000000	60 kW N+1, 208V
ZP2161500000000	60 kW N+1, 208V with (1) Power Xpert SNMP/ModBus card

BladeUPS pre-assembled system – top entry (12 kW to 60 kW N+1)

ZP22110XXXXX000	12 kW, 208V
ZP22115XXXXX000	12 kW, 208V, with (1) Power Xpert SNMP/ModBus card
ZP222100XXXX000	24 kW, 208V
ZP222150XXXX000	24 kW, 208V, with (1) Power Xpert SNMP/ModBus card
ZP2231000XXXX000	36 kW, 208V
ZP2231500XXXX000	36 kW, 208V, with (1) Power Xpert SNMP/ModBus card
ZP22410000XX000	48 kW, 208V
ZP22415000XX000	48 kW, 208V, with (1) Power Xpert SNMP/ModBus card
ZP225100000X000	60 kW, 208V
ZP225150000X000	60 kW, 208V, with (1) Power Xpert SNMP/ModBus card
ZP2261000000000	60 kW N+1, 208V
ZP2261500000000	60 kW N+1, 208V, with (1) Power Xpert SNMP/ModBus card

BladeUPS standalone systems (or capacity additions to parallel systems)

*W represents wire count in plug or connector assembly**

ZC0517700110000	5 kW 208V w/20A 5W in/5W out, One internal battery string
ZC0517708110000	5 kW 208V w/20A 5W in/5W out, PXGX-UPS, One int battery
ZC0517700100000	5 kW 208V w/20A 5W in/5W out, Two internal battery string
ZC0517708100000	5 kW 208V w/20A 5W in/5W out, PXGX-UPS, Two int battery
ZC0811100100000	8 kW 208V w/30A 5W in/5W out
ZC0811108100000	8 kW 208V w/30A 5W in/5W out, PXGX-UPS
ZC1212200100000	12 kW 208V w/60A 5W in/5W out
ZC1212208100000	12 kW 208V w/60A 5W in/5W out, PXGX-UPS
ZC1212600100000	12 kW 208V w/60A 5W in/4W out
ZC1212608100000	12 kW 208V w/60A 5W in/4W out, PXGX-UPS
ZC121P060100000	12 kW 208V for parallel configuration
ZC121P068100000	12 kW 208V for parallel config, PXGX-UPS
ZC1224408100000	12kW 400V w/30A 5W in/5W out, PXGX-UPS
ZC122P060100000	12kW 400V for parallel configuration
ZC122P068100000	12kW 400V for parallel config, PXGX-UPS

BladeUPS pre-assembled system – bottom entry (12 kW to 48 kW)

Part Number	Model
ZP23110XXXXX000	12 kW, 208V
ZP23115XXXXX000	12 kW, 208V with (1) Power Xpert SNMP/ModBus card
ZP232100XXXX000	24 kW, 208V
ZP232150XXXX000	24 kW, 208V with (1) Power Xpert SNMP/ModBus card
ZP2331000XXXX000	36 kW, 208V
ZP2331500XXXX000	36 kW, 208V with (1) Power Xpert SNMP/ModBus card
ZP23410000XX000	48 kW, 208V
ZP23415000XX000	48 kW, 208V with (1) Power Xpert SNMP/ModBus card

BladeUPS pre-assembled system – top entry (12 kW to 48 kW)

ZP24110XXXXX000	12 kW, 208V
ZP24115XXXXX000	12 kW, 208V, with (1) Power Xpert SNMP/ModBus card
ZP242100XXXX000	24 kW, 208V
ZP242150XXXX000	24 kW, 208V, with (1) Power Xpert SNMP/ModBus card
ZP2431000XXXX000	36 kW, 208V
ZP2431500XXXX000	36 kW, 208V, with (1) Power Xpert SNMP/ModBus card
ZP24410000XX000	48 kW, 208V
ZP24415000XX000	48 kW, 208V, with (1) Power Xpert SNMP/ModBus card

Preamsembled systems have hardwire input and output.

Additional configurations available, please contact your Eaton sales representative.

Preamsembled system dimensions

Unit dimensions (H x W x D, in)	(H x W x D, mm)
81.0 x 24.0 x 42.0	2057.4 x 609.6 x 1066.8
Shipping dimensions (H x W x D, in)	(H x W x D, mm)
86.5 x 32.0 x 77.0	2197.1 x 812.8 x 1955.8

Standalone system dimensions

Unit Dimensions (H x W x D, in)	(H x W x D, mm)
10.3 x 17.4 x 26.0	267 x 442x 660
Shipping Dimensions (H x W x D, in)	(H x W x D, mm)
27 x 39.0 x 46.0	677 x 979 x 1155

** Wire count in plug or connector assembly.*

12 kW 208V - IEC 60309 60A, Input 560P9, Output 560C9 or 460C9

8 kW 208V - NEMA 30A, Input L21-30P, Output L21-30R

5 kW 208V - NEMA 20A, Input L21-20P, Output L21-20R

12 kW 400V - IEC 60309 30A, Input 532P6, Output 532C6

To add maintenance bypass module (MBM) to preassembled configurations, change digit 13 from "0" to "1". Not available in 60 kW (N+1) configurations.

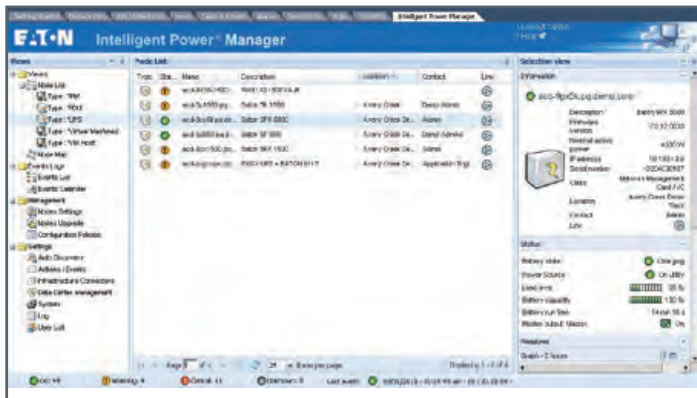
Power management software

Eaton's BladeUPS configurable and pre-assembled systems seamlessly integrate into the leading virtualization platforms, allowing you to view your entire data center on a single dashboard.

Intelligent Power® Manager (IPM) software

Eaton's IPM software provides all the tools you need to monitor and manage power devices in your physical or virtual environment. This innovative software solution ensures system uptime and data integrity by allowing you to remotely monitor, manage and control devices on your network. IPM provides a solution that is easy to use and maintains business continuity.

- Remotely monitor and manage multiple devices across your network from a single interface; this can be integrated into an already existing platform, such as VMware, Microsoft or Citrix
- Suspend non-critical virtual machines, consolidate critical virtual machines and shut down unused servers to extend battery runtime
- Set server power consumption limits for extended battery runtime with UCS management software



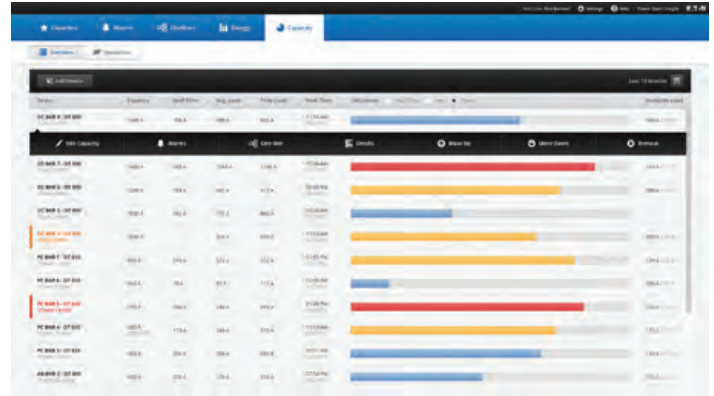
Intelligent Power Manager plugs into VMware's vCenter dashboard.



A single PXGX UPS communication card can be used to monitor all BladeUPS in a parallel system.

Power Xpert Insight software

Power Xpert® Insight takes the complexity out of monitoring your entire electrical system. It's simple to install, simple to use, simple to add new devices and simple to obtain the information needed to make important operating decisions.

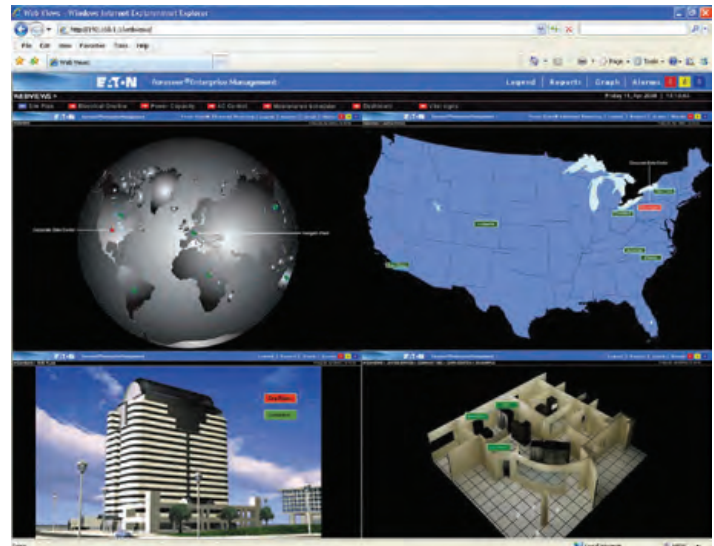


Power Xpert Insight software seamlessly handles Eaton's communications equipment in a graphical manner without additional serial interfaces, protocols or customization.

FORESEER services

FORESEER® analyzes thousands of data points to proactively manage key equipment throughout an enterprise-wide infrastructure. This system interfaces with an extensive collection of devices from most major manufacturers of power and environmental equipment, as well as subsystems for fire detection and suppression, security, fuel handling and building controls.

Software and connectivity options provide a unified window into the state of IT and facilities systems. With this level of visibility, you can transform the power system into a powerful strategic asset.



FORESEER has a highly configurable user interface to allow you to see everything needed to run your data center.

Count on reliable performance and uptime

Recognizing the mission-critical nature of data center operations, the BladeUPS has been designed for premium reliability and continuous operation. It incorporates leading technologies that Eaton developed for its largest UPSs, such as:

Robust paralleling. With Eaton's patented Powerware Hot Sync technology, UPS modules work in peer-to-peer fashion when configured in a parallel system. Most other paralleling systems on the market use a single central main controller with a backup controller. If the main controller fails, the system must recognize this and transfer control to the backup control, or the entire system fails. With Eaton's patented approach, each UPS module operates independently, yet is completely synchronized with the others. There is no change in control, therefore no single point of failure.

Intelligent maintenance bypass switch. The internal switch inside the UPS chassis automatically activates bypass mode whenever an electronics module is removed. This feature ensures that power to protected loads is not accidentally interrupted by human error. (If the UPS is in a parallel environment with N+1 redundancy, removing an electronics module only causes that particular UPS module to go offline while the protected equipment is supported by other modules in the configuration).

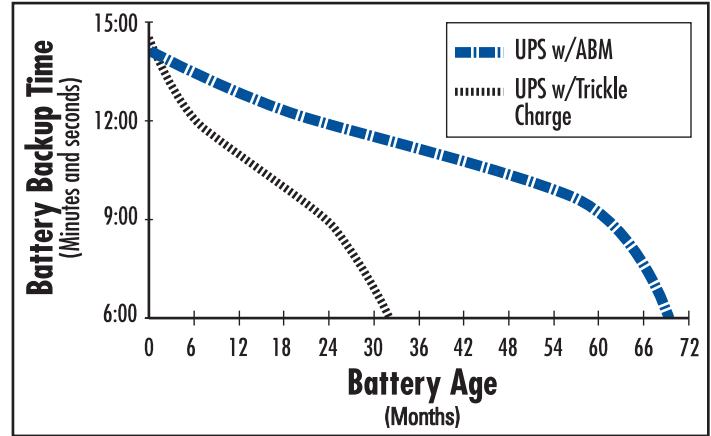
Static bypass switch. All BladeUPS modules have their own static switch for normal operations and internal bypass in case of a high overload condition, output load fault or internal failure.

Hot-swappable electronics and battery modules. Replacing batteries or electronics modules can be done in minutes without interrupting power to IT equipment. This hot-swap capability helps reduce mean time to repair (MTTR) and dramatically improves the availability of the protected IT equipment.



IT staff can easily replace battery modules.

Eaton's advanced battery management technique. ABM technology significantly extends battery service life with a unique three-stage charging technique. The UPS automatically tests battery health and provides advance notification when preventive maintenance is needed, allowing ample time to hot-swap batteries without ever having to shut down connected equipment.



Eaton's ABM technology significantly increases battery service life.

Flexibly distribute power to racks.

Partner the BladeUPS with a rack power module (RPM) to create a highly flexible, adaptable power delivery architecture at the rack level. The RPM delivers up to 36 kW (hardwired models) of power in an organized manner to loads of various voltages, power cords and layouts.

The 3U RPM can be deployed in the same rack with the UPS and IT equipment; there's no need for a dedicated infrastructure rack. The resulting architecture has fewer cables to manage, fewer distribution points to monitor and greater flexibility for IT personnel to make changes without an electrician.

When BladeUPS and RPMs are used in a "plug and play" configuration, each RPM will supply 12 kW of power to the IT loads or other ePDUs. Power distribution changes can be made easily and in some situations while equipment is operating.

Consider a Tier II data center with 42 racks at 5 kW per rack: the BladeUPS with RPM can meet power requirements with half the number of racks, 60 percent less rack space, 45 percent less cabling and 41 percent less square footage than other vendors' power distribution products that require dedicated racks. These advantages make the BladeUPS with RPM ideal for distributed protection in small to mid-sized data centers, or to add zone protection in large data centers that have centralized UPSs.



Eaton RPM front and Eaton RPM rear

Simplify UPS installation and maintenance

The BladeUPS is easy to install, configure and deploy. All BladeUPS modules (UPS and battery) come with rackmount kits for easy installation in standard equipment racks. In-house IT staff can install and service this UPS themselves. Adding parallel units for future expansion is a simple, plug-and-play procedure.

The BladeUPS internal battery trays are user-replaceable so that one person, working alone, can replace the battery without disrupting data center operations or power to protected equipment.

Most IT teams are confident managing the BladeUPS without outside help because of its simplicity. However, Eaton is ready to provide support with its world-class service organization of customer service technicians who deliver 24x7 support including on-site corrective and preventive maintenance, battery solutions, service training, integration services and spare parts.

The BladeUPS is also compatible with Eaton's PredictPulse™ remote monitoring service. It collects and analyzes data from connected power infrastructure devices 24x7, providing Eaton's staff of technical experts with the insight needed to make recommendations and take action on your behalf. PredictPulse comes with an online dashboard for real-time status information, mobile app for alarm updates and monthly summary report that details UPS performance and alarm history. Visit Eaton.com/PredictPulse to learn more..



IT staff can easily install electronics modules.



BladeUPS extended battery module

Flexible runtime options

Each BladeUPS can be configured with its own external battery backup. The BladeUPS design eliminates this single point of failure. Competitive, modular systems use a centralized battery bank with a shared connection point that presents a potential single point of failure.

12 kW BladeUPS typical battery runtime chart (in minutes)

Single Module		Internal Battery	+ 1 EBM	+ 2 EBMs	+ 3 EBMs	+ 4 EBMs
Load kW	Load %					
12	100%	4.7	9.5	17	27	34
11	92%	5.4	10.9	20	30	38
10	83%	6.2	13	22	33	42
9	75%	7.3	15	24	38	48
8	67%	8.7	18	28	43	55
7	58%	10.7	23	32	50	64
6	50%	13.6	27	42	60	76
5	42%	18.5	33	51	73	94
4	33%	23	42	66	94	120
3	25%	30	56	89	128	165
2	17%	44	85	137	199	258

8 kW BladeUPS typical battery runtime chart (in minutes)

Single Module		Internal Battery	+ 1 EBM	+ 2 EBMs	+ 3 EBMs	+ 4 EBMs
Load kW	Load %					
8	100%	8.7	18	28	43	55
6	75%	13.6	27	42	60	76
4	50%	23	42	66	94	120
2	25%	44	85	137	199	258

5 kW BladeUPS typical battery runtime chart (in minutes)

Single Module		Internal Battery	Internal Battery	+ 1 EBMs	+ 2 EBMs	+ 3 EBMs	+ 4 EBMs
Load kW	Load %	One (1) string	Two (2) string				
5	100%	8.7	18	33	51	73	94
2.5	75%	13.6	27	68	109	157	203

BladeUPS typical battery runtime chart (Parallel UPS, in minutes)

Number of UPS Models	Total Load kW	Internal Battery	+1 EBM per UPS		+2 EBMs per UPS		+3 EBMs per UPS		+4 EBMs per UPS		Configuration	Load %	kW per UPS Modules
			Min	EBMs	Min	EBMs	Min	EBMs	Min	EBMs			
6	60	6.2	13	6	22	12	33	18	42	24	N+1	83%	10
5	48	6.7	13	5	23	10	35	15	44	20	N+1	80%	9.6
4	36	7.3	15	4	24	8	38	12	48	16	N+1	75%	9
3	24	8.7	18	3	28	6	43	9	55	12	N+1	67%	8
2	12	14	27	2	42	4	60	6	76	8	N+1	50%	6

* 5kW EBM runtimes shown with two (2) internal battery strings

Technical specifications¹

General characteristics

Power rating	5, 8 or 12 kW per UPS module (5 kW only available at 208V)
Efficiency	Up to 98%
Heat dissipation (HE mode)	371 watts/1266 BTU/hr at 100% rated load (12 kW) 264 watts/903 BTU/hr at 100% rated load (8 kW) 210 watts/707 BTU/hr at 100% rated load (5 kW)
Cooling	Fan cooled, temperature microprocessor monitored; front air entry, rear exhaust
Audible noise, normal operation	<60 dBA at 1 meter
Altitude before derating	1000 meters (3300 ft ASL)
Input characteristics	
Input voltage	208 Vac and 400 Vac models
Voltage range	208V model: 180 to 265 Vac 400V model: 311 to 500 Vac
Frequency range	50 or 60 Hz, \pm 5 Hz
Input current distortion	<5% with IT loads (PFC power supplies)
Input power factor	>0.99 with IT loads (PFC power supplies)
Inrush current	Load dependent in HE mode, 100% in normal mode
Input requirements	Three-phase, four-wire + ground
Bypass source	Same as input (single feed)
Generator compatibility	Fast sync slew rate for generator synchronization, programmable return to AC source delay

Output characteristics

Rated output voltage	208V model: 180 to 225 Vac, Ph to Ph 400V model: 180 to 240 Vac, Ph to N
Output configuration	Three-phase, four-wire + ground
Output frequency (nominal)	50 or 60 Hz auto-detection on startup
Frequency regulation	0.1 Hz free running
Load power factor range	Lagging: 0.7 Leading: 0.9
Total output voltage distortion	<3% with IT loads (PFC power supplies) <5% non-linear or non-PFC power supplies

Battery characteristics

Battery type	VRLA - AGM
Battery runtime (internal)	50% loading 23 min (8 kW) 13 min (12 kW) 100% loading 9 min (8 kW) 4.7 min (12 kW)
Battery string voltage	240 Vdc
Battery test	Automatic battery test standard (remote scheduling capable); manual battery test from front display
Battery recharge profile	ABM three-stage charging technology
Battery cut-off voltage	Variable from 1.67 VPC at <5 min runtime to 1.75 VPC at >90 min runtime
Battery low condition	Announced with alarm
Extended battery capability	Yes, add up to four additional 3U battery enclosures 50% loading 120 min (8 kW) 76 min (12 kW) 100% loading 55 min (8 kW) 34 min (12 kW)

Physical characteristics

Dimensions H x W x D, in (mm)	UPS: 10.3 (6U) x 17.4 x 28.4 (267 x 442 x 720) EBM: 5.2 (3U) x 17.2 x 26 132 x 437 x 660)
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Note:

Total chassis weight without batteries or electronics: 80 lb (36 kg)
Total chassis weight with batteries or electronics: 307 lb (140 kg)

Total UPS weight without batteries	135 lb (61 kg)
Total UPS weight with 2 strings of batteries	307 lb (140 kg)
Total UPS weight with 1 string of batteries	218 lb (99 kg) (5 kW UPS only)
EBM shipping weight	170 lb (77 kg)

Communications and user interface

Software compatibility	UPS ships with Software Suite CD containing Intelligent Power Manager supervisory software and Intelligent Power Protector protection software
X-Slot Bays	Two available for the cards listed below
Optional X-Slot communication cards	Application: Web/SNMP: PowerXpert Gateway Series UPS card Modbus RTU: Modbus card Modbus TCP/IP: PowerXpert Gateway Series UPS card IBM eServer™ (i5™, iSeries™, or AS/400): Relay interface card N/O, N/C dry contacts: Industrial relay card Parallel: Powerware Hot Sync CAN Bridge card
Control panel LCD	Two lines by 20 characters Four menu-driven interface buttons Four status-at-a-glance LEDs
Multi-language	English standard; 20 languages available
Configuration changes	User capable, firmware auto configures
Dry contact inputs	Two, user-configurable
Dry contact outputs	One, user-configurable

Service

Installation	User capable, optional factory service available
Preventive maintenance	User capable, optional factory service available
Corrective maintenance	User capable, optional factory service available
Serviceability features	Hot-swappable batteries Hot-swappable electronics module Automated internal maintenance bypass Auto-configure firmware Flash firmware upgradeable

Certifications

Safety	208V model: UL1778, cUL 400V model: CE, EN 62040-1, EN 60950-1: 2006, cULus
EMI/EMC	208V model: FCC Part 15 Class A EN 62040-2: 2006
Surge protection	208V ANSI C62.41, Cat B-3 EN 62000-4-5
Additional ratings	EN 61000-3-2, EN 61000-3-3, EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-8
Hazardous materials (RoHS)	EU Directive 2002/95/EC

Warranty

Standard	18 months from date of shipment
Warranty repair	Factory depot repair or replace

Service Support Agreements²

Depot	PowerTrust Express
On-site 8x5	PowerTrust Value
On-site 24x7	PowerTrust eight-, six- or two-hour response

Options and accessories

Detachable input cord
Detachable input/output cord assembly
Detachable paralleling cord assembly
EBMs
3U output sub-distribution module
0U to 3U rack power distribution units (ePDU)
60 kW BladeUPS Parallel Bar, Top Entry, Bottom Entry & 4-high versions
Environmental Monitoring Probe (EMP) for temperature and humidity monitoring
X-Slot communication cards (see Communications and user interface section)
6U Maintenance Bypass Module
External Battery Interconnect for use with 400V models

1. Due to continuing product improvement programs, specifications are subject to change without notice.
2. PredictPulse remote monitoring and 24x7 technical support included.

For complete information about the BladeUPS,
please visit Eaton.com/BladeUPS.