

Colorado Department of Transportation  
Golden, CO

## SUBMITTAL MANUAL - SECTION 613 SCADA Rack

For project:

### *Eisenhower/Johnson Memorial Tunnel 480V Motor Control Center Replacement*

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<b>Submittal Information</b>	
Facility / Building / Area	Eisenhower/Johnson Memorial Tunnel
General Contents / Description	SCADA Rack
Panel No. / Equipment No. / Etc.	East and West SCADA Racks
Submittal Number	<b>613-003-E</b>
Volume	<b>1 of 1</b>
Specification Section(s)	613
Submittal Type	<input type="checkbox"/> Product Data
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<b>Revision History:</b>	
REVA	09MAR2020
REVB	08MAY2020
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REVE	09SEP2021 – Final O&M



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SCADA System			
Model Number	Description	Manufacturer	Quantity
PDCP2078B12	SCADA Server Rack	Hoffman	2
DV6S7	Vertical Cable Management System	Hoffman	2
PDU 1215	Power Distribution Unit	Tripp-Lite	2
RCB1112BK15	Adjustable Depth Rackmount Din Rail Panel	Industrial Automation and Enclosures	4
1756-A4	ControlLogix 4-Slot Chassis	Allen-Bradley	4
1756-PA72	ControlLogix 120VAC Power Supply	Allen-Bradley	4
1756-L73	ControlLogix CPU	Allen-Bradley	4
1756-EN2TR	ControlLogix Ethernet/IP Communication Module	Allen-Bradley	4
1756-RM2	ControlLogix Redundancy Module	Allen-Bradley	4
1783-IMS28NAC	Stratix 5410 Rack Mount Managed Ethernet Switch	Allen-Bradley	2
1783-SFP1GLX	Gigabit Fiber SFP Module, Single Mode	Allen-Bradley	4
9324M-RLDT31	Studio 5000 PLC Software and License Bundle	Allen-Bradley	5
SBS-2000-125-2U	Inverter, 1600W, 125VDC to 120VAC	SBS Battery	2
B020-U08-19-IP	8 Port NetDirector 1U Rackmount Console IP KVM Switch with 19" LCD Monitor, Touchpad, and Keyboard	Tripp-Lite	2
Power Edge R740	X2 Intel Xeon Gold 6230, Bus Speed 10.4GT/s, 20C/40T: # of Cores 20, # of threads 40, Cache memory 27.5 MB, Internal Memory 240 GB; Dell Power Edge Server R740, Network Interface Cards: Data transfer rate: 10Gps Dual-Port NIC, 1Gps Dual-Port NIC, Internal RAID Arrays (3TB)	Dell	2
Windows Server 2016	Server Operating System	Microsoft	2
Attached Storage ME4012	8 Port Dual Controller, 480GB SSD x3, 1.2TB HDD 10krpm x3, 12GB SAS	Dell	2
Precision Tower 3630	Intel Xeon E3-1220 (Quad Core 3.0GHz, 8MB) 250GB SSD drive (RAID0) 1Gbps Dual NIC Standard MS Keyboard and Mouse	Dell	2
Monitor U2412M	Ultrasharp Series 24" LED 1920 x 1200 native, 16.7Mil colors 16:10 aspect ratio	Dell	6

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## PROLINE VOICE/DATA AND SERVER CABINET, TYPE 12



### INDUSTRY STANDARDS

EIA RS-310-D

UL 508A Listed; Type 12; File Number E61997  
cUL Listed per CSA C22.2 No 94; Type 12; File Number E61997

NEMA/EEMAC, Type 12

### APPLICATION

Robustly built and sealed for use in wet, dusty or hot environments, ProLine Type 12 Cabinets have optional cutouts to air condition voice/data equipment and servers.

### FEATURES

- Three-point locking handles on all doors provide easy but controlled access; two keys included
- Fully welded frame safely supports sensitive equipment
- Fully gasketed to keep contaminants away from equipment, reducing maintenance costs
- Two sets of 19-in. rack angles support both front and rear of equipment
- Rack angles are infinitely adjustable from front to rear for positioning flexibility
- Mobile base provides easy placement of cabinet
- Levelers and anti-tip bracket secure cabinet to the floor

### SPECIFICATIONS

- Welded 12 gauge steel frame with integral struts
- Front window door made of 16 or 14 gauge steel with safety glass window
- Solid 16 or 14 gauge steel back door
- Standard package has solid 16 or 14 gauge steel sides
- AC package has cutout for easy in-the-field installation of any G28 or G52 Series air conditioner (ordered and shipped separately)
- Models available with EIA Universal standard 3/8-in. square or 10-32 tapped holes
- Mobile base includes casters, levelers and gland plate
- Gland plate allows easy routing of cable

### FINISH

Pretreated steel coated with RAL 9005 black or RAL 7035 light-gray textured, low-gloss polyester powder paint. Other finishes available—contact nVent HOFFMAN Customer Service.

### LOAD RATING

#### Static Load Rating: 2500 lb. (1134 kg)

A cabinet has a static load when:

- it is in its final, permanent, fully secured location
- its levelers are fully extended
- the anti-tip bracket is installed
- its load is uniformly applied to the two sets of rack-mounting angles, and
- the casters are not supporting any load (use the casters only to move the cabinet to its final location before loading)

**Never move a cabinet with its maximum static load applied.**

Contact Hoffman if further information is needed.

#### Casters Maximum Load: 1000 lb. (453 kg)

Exercise care when using casters to move the cabinet. Do not use casters to move a cabinet with more than 1000 lb. (453 kg) load.

Avoid tipping and damage to the cabinet and its contents by slowly moving the cabinet on its casters across smooth, flat flooring. Avoid obstructions such as:

- large cracks
- floor displacement
- seams
- gravel

**Never use casters while transporting a cabinet by truck on roadways.**

Contact nVent HOFFMAN if further information is needed.

### ACCESSORIES

See the Package Components table. For AC-Ready Cabinet, see G28 or G52 air conditioner specifications following the Package Components table. Full AC specifications available in the Thermal chapter. Air conditioner must be ordered and shipped separately; it cannot be factory installed.

### NOTES

**The cabinet must be fully secured in its final position before the AC unit (ordered separately) is mounted to the cabinet. Never move the cabinet with the AC mounted.**

**BULLETIN: DPC, DPSR**

Standard Product

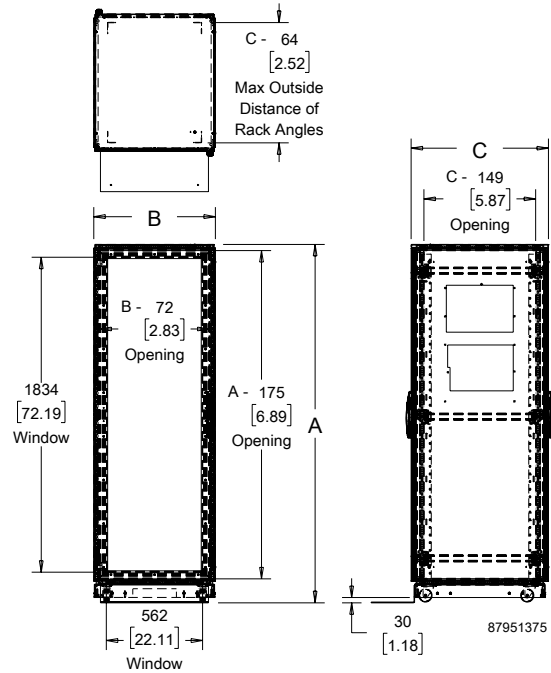
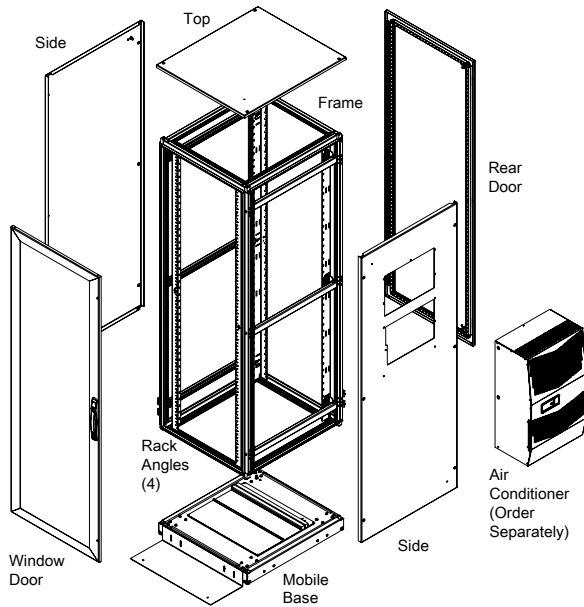
Catalog Number	AxBxC mm	AxBxC in.	Cabinet, Package Type	Finish	Rack Units	Hole Type	Rack Angle
PDCP2078B12	2085 x 708 x 799	82.10 x 27.87 x 31.46	Voice Data, Standard	DataCom Black	42	Tapped	PRA1920TPL1
PDCP2078G12	2085 x 708 x 799	82.10 x 27.87 x 31.46	Voice Data, Standard	ProLine Gray	42	Tapped	PRA1920TPL1
PSC20610B12	2085 x 608 x 999	82.10 x 23.94 x 39.34	Server, Standard	DataCom Black	42	Square	PRA1920THL1
PSC20610G12	2085 x 608 x 999	82.10 x 23.94 x 39.34	Server, Standard	ProLine Gray	42	Square	PRA1920THL1

### AC-Ready Cabinets

Catalog Number	AxBxC mm	AxBxC in.	Cabinet Package Type	Finish	AC	Rack Units	Hole Type	Rack Angle
PDCP2078BAC	2085 x 708 x 799	82.10 x 27.87 x 31.46	Voice/Data, AC-Ready	DataCom Black	G28	42	Tapped	PRA1920TPL1
PDCP2078GAC	2085 x 708 x 799	82.10 x 27.87 x 31.46	Voice/Data, AC-Ready	ProLine Gray	G28	42	Tapped	PRA1920TPL1
PSC20610BAC	2085 x 608 x 999	82.10 x 23.94 x 39.34	Server, AC-Ready	DataCom Black	G28	42	Square	PRA1920THL1
PSC20610GAC	2085 x 608 x 999	82.10 x 23.94 x 39.34	Server, AC-Ready	ProLine Gray	G28	42	Square	PRA1920THL1
PDCP2078BAC2	2082 x 708 x 799	81.98 x 27.87 x 31.47	Voice/Data, AC-Ready	DataCom Black	G52	42	Tapped	PRA1920TPL1
PDCP2078GAC2	2082 x 708 x 799	81.98 x 27.87 x 31.47	Voice/Data, AC-Ready	ProLine Gray	G52	42	Tapped	PRA1920TPL1
PSC20610BAC2	2082 x 609 x 999	81.98 x 23.96 x 39.32	Server, AC-Ready	DataCom Black	G52	42	Square	PRA1920THL1
PSC20610GAC2	2082 x 609 x 999	81.98 x 23.96 x 39.32	Server, AC-Ready	ProLine Gray	G52	42	Square	PRA1920THL1

**Package Components and Replacement Parts**

Catalog Number	AxBxC mm	AxBxC in.	Description	Finish
PFD2078B	2000 x 700 x 800	78.70 x 27.60 x 31.50	Frame	Black
PFD2078G	2000 x 700 x 800	78.70 x 27.60 x 31.50	Frame	Gray
PFD20610B	2000 x 600 x 1000	78.70 x 23.60 x 39.40	Frame	Black
PFD20610G	2000 x 600 x 1000	78.70 x 23.60 x 39.40	Frame	Gray
PDWG206B	2000 x 600	78.70 x 23.60	Window Doors	Black
PDWG206G	2000 x 600	78.70 x 23.60	Window Doors	Gray
PDWG207B	2000 x 700	78.70 x 27.60	Window Doors	Black
PDWG207G	2000 x 700	78.70 x 27.60	Window Doors	Gray
PDS206B	2000 x 600	78.70 x 23.60	Solid Doors	Black
PDS206G	2000 x 600	78.70 x 23.60	Solid Doors	Gray
PDS207B	2000 x 700	78.70 x 27.60	Solid Doors	Black
PDS207G	2000 x 700	78.70 x 27.60	Solid Doors	Gray
PSS208B	2000 x 800	78.74 x 31.50	Solid Sides	Black
PSS208G	2000 x 800	78.74 x 31.50	Solid Sides	Gray
PSS2010B	2000 x 1000	78.74 x 39.37	Solid Sides	Black
PSS2010G	2000 x 1000	78.74 x 39.37	Solid Sides	Gray
PSS208ACB	2000 x 800	78.74 x 31.50	Sides with AC Cutout	Black
PSS208ACG	2000 x 800	78.74 x 31.50	Sides with AC Cutout	Gray
PSS2010ACB	2000 x 1000	78.74 x 39.37	Sides with AC Cutout	Black
PSS2010ACG	2000 x 1000	78.74 x 39.37	Sides with AC Cutout	Gray
PSS208AC2B	1939 x 753 x 25	76.34 x 29.66 x 0.99	Sides with AC Cutout	Black
PSS208AC2G	1939 x 753 x 25	76.34 x 29.66 x 0.99	Sides with AC Cutout	Gray
PSS2010AC2B	1939 x 953 x 25	76.34 x 37.54 x 0.99	Sides with AC Cutout	Black
PSS2010AC2G	1939 x 953 x 25	76.34 x 37.54 x 0.99	Sides with AC Cutout	Gray
PT78B	700 x 800	27.56 x 31.50	Top	Black
PT78G	700 x 800	27.56 x 31.50	Top	Gray
PT610B	600 x 1000	23.62 x 39.37	Top	Black
PT610G	600 x 1000	23.62 x 39.37	Top	Gray
PBMG78B	700 x 800	27.60 x 31.50	Mobile Base	Black
PBMG610B	600 x 1000	23.60 x 39.37	Mobile Base	Gray





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**CABLETEK VERTICAL CABLE MANAGER**



**INDUSTRY STANDARDS**

EIA 310-D

**APPLICATION**

Available in single- and double-sided models, this vertical cable manager mounts on the sides of or between 2- and 4-post open frame racks. The front side of the manager provides support, management and high capacity for patch cords, while the back supports Cat 5e, 6, 6A and fiber optic cables.

**FEATURES**

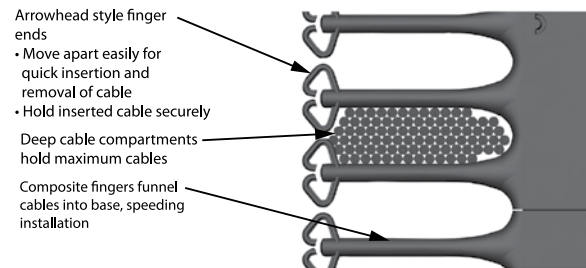
- Easily removable one-piece front cover with access from right or left as needed opens 180° to allow full access to cables
- Self-aligning bolt locations minimize lifting and speed installation
- Self-captivating fasteners; bolt doesn't turn while tightening nut
- Generous finger depth allows for maximum cable density and allows smooth transitions from vertical to horizontal positions
- Unobstructed cable access to rack equipment—no keep-out areas
- Rounded edges on composite material and grommets protect cable jackets from damage
- Robust arrowhead fingers are shaped to funnel cables into base and are made of black or white composite material
- Cable tiedown points provided on back
- Pass-through holes protect cable while facilitating routing between front and back
- Single central door latch allows quick and easy access to cables
- Double-sided cable manager with front and rear supporting fingers includes snap-on cover
- Double-sided cable manager with posts and gates support and contain cables. Three sets of posts and gates are included; additional sets are available as accessories
- Posts snap into prepunched holes in the back of the cable manager
- Gates snap onto posts, open from left or right as needed and swing 225° for cable access. Posts can be used alone as slack spools to control long patch cords.
- Horizontal and vertical cable managers designed as a system for streamlined appearance and improved functionality

**SPECIFICATIONS**

- Front door and cable channel made of multi-formed lightweight aluminum
- Hinge points and supporting fingers made of high-strength composite material

**FINISH**

Aluminum components are coated with RAL 9005 black or RAL 9003 white low-gloss lightly-textured polyester powder paint. Arrowhead fingers match look of aluminum components; other composite part have a low-gloss finish that matches look of RAL 9005 textured paint.

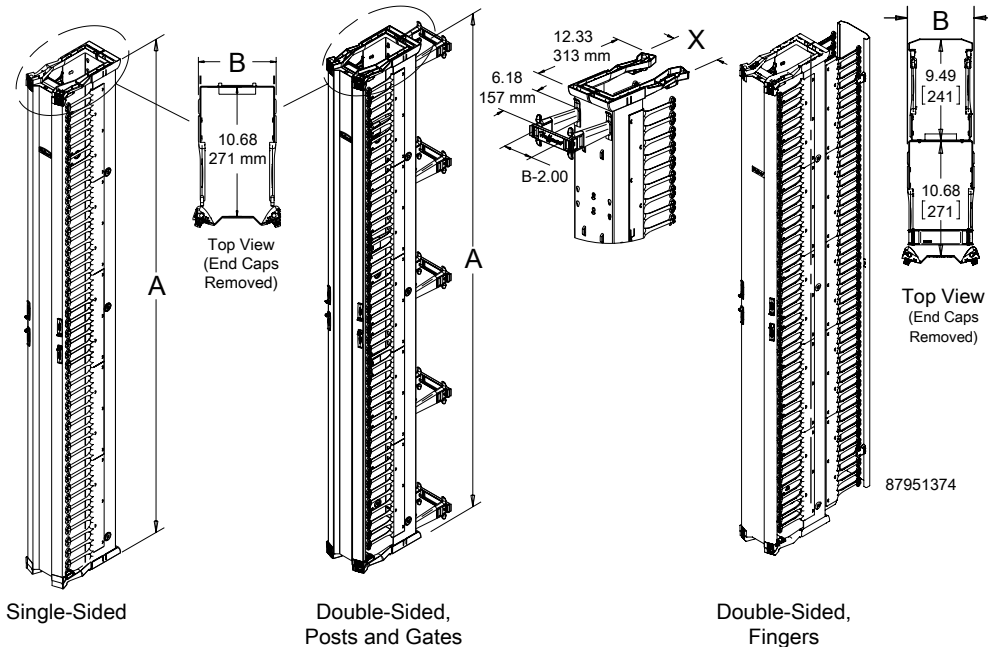


**BULLETIN: DOFRY**

Standard Product Vertical Cable Manager

Catalog Number	AxBxC in.	AxBxC mm	Description	Finish	Fits Rack		Rack Units	A (in.)	A (mm)	B (in.)	B (mm)	X (in.)	X (mm)
					Height (ft.)	45 U							
DV6S7	0.00		Single-Sided	Black	7	45 U	84.00	2134	6.25	159	7.12	183	
DV6S7W	84.00 x 7.22 x 12.33	2134 x 184 x 313	Single-Sided	White	7	45 U	84.00	2134	6.25	159	7.12	183	
DV10S7	0.00		Single-Sided	Black	7	45 U	84.00	2134	10.25	260	11.21	285	
DV10S7W	84.00 x 11.15 x 12.33	2134 x 283 x 313	Single-Sided	White	7	45 U	84.00	2134	10.25	260	11.21	285	
DV12S7	0.00		Single-Sided	Black	7	45 U	84.00	2134	12.25	311	13.21	336	
DV12S7W	84.00 x 13.15 x 12.33	2134 x 334 x 313	Single-Sided	White	7	45 U	84.00	2134	12.25	311	13.21	336	
DV6D7	0.00		Double-Sided, Posts and Gates	Black	7	45 U	84.00	2134	6.25	159	7.12	183	
DV10D7	0.00		Double-Sided, Posts and Gates	Black	7	45 U	84.00	2134	10.25	260	11.21	285	
DV12D7	0.00		Double-Sided, Posts and Gates	Black	7	45 U	84.00	2134	12.25	311	13.21	336	
DV6DF7	0.00		Double-Sided, Fingers	Black	7	45 U	84.00	2134	6.25	159	7.12	183	
DV6DF7W	84.00 x 7.22 x 21.01	2134 x 184 x 534	Double-Sided, Fingers	White	7	45 U	84.00	2134	6.25	159	7.12	183	
DV10DF7	0.00		Double-Sided, Fingers	Black	7	45 U	84.00	2134	10.25	260	11.21	285	
DV10DF7W	84.00 x 11.15 x 21.01	2134 x 283 x 534	Double-Sided, Fingers	White	7	45 U	84.00	2134	10.25	260	11.21	285	
DV12DF7	0.00		Double-Sided, Fingers	Black	7	45 U	84.00	2134	12.25	311	13.21	336	
DV12DF7W	84.00 x 13.15 x 21.01	2134 x 334 x 534	Double-Sided, Fingers	White	7	45 U	84.00	2134	12.25	311	13.21	336	
DV6S8	0.00		Single-Sided	Black	8	51 U	96.00	2438	6.25	159	7.12	183	
DV10S8	0.00		Single-Sided	Black	8	51 U	96.00	2438	10.25	260	11.21	285	
DV12S8	0.00		Single-Sided	Black	8	51 U	96.00	2438	12.25	311	13.21	336	
DV6D8	0.00		Double-Sided, Posts and Gates	Black	8	51 U	96.00	2438	6.25	159	7.12	183	
DV10D8	0.00		Double-Sided, Posts and Gates	Black	8	51 U	96.00	2438	10.25	260	11.21	285	
DV12D8	0.00		Double-Sided, Posts and Gates	Black	8	51 U	96.00	2438	12.25	311	13.21	336	
DV12DF8	0.00		Double-Sided, Fingers	Black	8	51 U	96.00	2438	12.25	311	13.21	336	
DV6DF8	0.00		Double-Sided, Fingers	Black	8	51 U	96.00	2438	6.25	159	7.12	183	
DV10DF8	0.00		Double-Sided, Fingers	Black	8	51 U	96.00	2438	10.25	260	11.21	285	
DV6S9	0.00		Single-Sided	Black	9	58 U	108.00	2743	6.25	159	7.12	183	
DV10S9	0.00		Single-Sided	Black	9	58 U	108.00	2743	10.25	260	11.21	285	
DV12S9	0.00		Single-Sided	Black	9	58 U	108.00	2743	12.25	311	13.21	336	
DV6D9	0.00		Double-Sided, Posts and Gates	Black	9	58 U	108.00	2743	6.25	159	7.12	183	
DV10D9	0.00		Double-Sided, Posts and Gates	Black	9	58 U	108.00	2743	10.25	260	11.21	285	
DV12D9	0.00		Double-Sided, Posts and Gates	Black	9	58 U	108.00	2743	12.25	311	13.21	336	

B dimension represents the mounting space between ganged open-frame racks.



Cable Manager Cable Capacity; 60% Fill Rate

Cable Manager Width (inch)	Front Cross-Section Area (in. <sup>2</sup> )	Front Cable Fill Rate 60%	Front Cable Fill Rate 60%	Front Cable Fill Rate 60%	Back Cross-Section Area (in. <sup>2</sup> )	Back Cable Fill Rate 60%	Back Cable Fill Rate 60%	Back Cable Fill Rate 60%
		5e Cable (0.22-in. dia.)	6 Cable (0.25-in. dia.)	6A Cable (0.30-in. dia.)		5e Cable (0.22-in. dia.)	6 Cable (0.25-in. dia.)	6A Cable (0.30-in. dia.)
6.00	58.1	917	710	493	27.9	441	341	236
10.00	100.8	1592	1232	855	51.7	816	631	439
12.00	122.1	1928	1492	1036	64.0	1011	782	543

Arrowhead Cable Capacity, 60% Fill Rate

Cross-Section Area (in. <sup>2</sup> )	5e Cable (0.22-in. dia.)	6 Cable (0.25-in. dia.)	6A Cable (0.30-in. dia.)
5.44	85	66	46

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To obtain a copy of the owner's manual for your B020-U08-19-IP or B020-U16-19-IP KVM, please contact Product/Technical Support – (773) 869-1234. You will need to have the serial number for your product at the time of the call. Should you experience any inconsistencies in upgrading firmware or lengthy load times, please contact the Product/Tech Support team at Tripp Lite.

## NetDirector 8-Port 1U Rack-Mount Console KVM Switch with 19-in. LCD and IP Remote Access

MODEL NUMBER: **B020-U08-19-IP**



Control up to 8 computers from anywhere in the world with a single KVM switch with integrated console and IP remote access. This KVM switch is a smart solution for secure server control that saves rack space and money.

### Description

Tripp Lite's B020-U08-19-IP KVM Switch gives you a rack-mountable keyboard, LCD and touchpad in a single console that occupies only 1U of rack space. From across the room, down the street or halfway around the globe, the B020-U08-19-IP can be accessed from any computer on the LAN, WAN or Internet. Easy to install and use, it's the optimal solution for controlling up to 8 computers/servers. Increase the number of connected computers up to 256 by daisy-chaining up to 31 B022-U08 KVM switches.

The B020-U08-19-IP has a built-in 19" LCD screen that supports video resolutions up to 1280 x 1024 @ 75Hz, with remote monitor resolutions up to 1600 x 1200 @ 60Hz. You can switch easily between the 8 ports using on-console push buttons, an on-screen display (OSD) or keyboard hot key commands. Up to 64 users can be authorized with any combination of admins and users. Multi-level security enhances protection of data and equipment.

This switch controls PS/2 or USB computers/servers using a P778-Series Combo KVM Cable Kit (two cable kits are included). A USB port on the front of the keyboard lets you connect an external mouse, plus an external USB 1.1 port means you can add a peripheral that can be shared across all connected servers. When not in use, the B020-U08-19-IP stores neatly in a rack drawer and pulls out when needed. This KVM console is compatible with all major operating systems. Heavy-duty steel housing stands up to frequent use.

### Features

### Highlights

- Control computers/servers locally or via LAN, WAN or Internet
- Occupies just 1U of space in a rack-mountable drawer
- 19" LCD screen supports video resolutions up to 1280 x 1024
- Allows up to 64 user accounts, with multi-level security
- Compatible with all operating systems

### System Requirements

- Servers being connected to the KVM must have a HD15 port, and a USB port or PS/2 Keyboard/Mouse ports; a P778-Series combo KVM cable kit is required for each connected computer
- Computers that access the KVM remotely should have at least a Pentium III, 1GHz processor
- If remote computer is accessing the switch with Windows Client, DirectX 7.0 or higher is needed; if accessing the switch with Java Client, Sun's Java 2 (1.4.2 or higher) runtime environment must be installed
- A network transfer speed of 128Kbps or higher is recommended
- Supports Internet Explorer, Firefox, Mozilla, Safari, Chrome, Opera and Netscape web browsers
- Compatible with all major

### **Saves Space and Money**

- Combines 8-port KVM switch, 19-in. LCD screen, keyboard and touchpad in a 1U rack-mountable drawer – ideal when rack space is at a premium
- Mounts into 19"-wide rack, 26"-38" deep
- Flip-up/fold-down screen keeps console from blocking access to rack equipment when not in use

### **IP Remote Access for Fewer Trips to the Server Room**

- Remote access offers convenience of controlling servers from anywhere...no need to travel to the server room or network closet
- Supports both IPv4 and IPv6 and network interfaces TCP/IP, HTTP, HTTPS, RADIUS, DHCP, SSL, ARP, DNS, 10Base-T/100Base-TX, Auto Sense and Ping

### **Simplifies IT Tasks**

- Switch easily between the 8 ports via on-console buttons, on-screen display or hot keys; OSD can be set to English, Spanish, French, German or Japanese
- Panel array mode lets you monitor multiple ports at same time
- Supports RADIUS and LDAP/S authentication
- Auto-scan mode automatically sequences through all active ports accessible to the user
- Includes USB port for an external mouse and a USB 1.1 port for sharing a peripheral across the installation
- Log server tracks events on your installation

### **Large 19" LCD**

- Extra-wide display makes multitasking easier
- Supports video resolutions up to 1280 x 1024; remote monitor resolutions up to 1600 x 1200
- DDC emulation allows for optimal output to the LCD

### **Advanced Security Features**

- Includes password protection and advanced encryption: 512-bit RSA, 256-bit AES, 56-bit DES, 168-bit 3DES, 128-bit RC4 and 128-bit SSL
- Allows up to 64 user accounts, with 3 levels of access

### **Expandability and Long-Lasting Reliability**

- Increase the number of connected computers up to 256 by daisy-chaining up to 31 B022-U08 KVM switches
- Compatible with all major operating systems for easy integration into existing structure
- Firmware is upgradable so your software remains up-to-date
- Heavy-duty steel housing stands up to frequent use

operating systems

- Power consumption: 120V, 60Hz, 33.5W; 230V, 50Hz, 34W

### **Package Includes**

- B020-U08-19-IP 8-Port console KVM switch with 19" LCD and built-in IP access
- (x2) P778-Series 6 ft. USB/PS2 combo KVM Cable Kits
- USB/PS2 combo external console Cable Kit
- Grounding wire
- RJ11 to DB9 firmware upgrade cable
- Rackmount hardware
- C13 to 5-15P power cord
- CD with owner's manual, quick start guide, and device files

## **Specifications**



<b>OVERVIEW</b>	
UPC Code	037332152886
Max CPU	8
<b>INPUT</b>	
Nominal Input Voltage(s) Supported	100V AC; 110V AC; 115V AC; 120V AC; 127V AC; 140V AC; 200V AC; 208V AC; 220V AC; 230V AC; 240V AC
Recommended Electrical Service	100-250V
Maximum Input Amps	1
Input Frequency	50/60Hz
Input Current	120V (0.8A) / 230V (0.4A)
<b>PHYSICAL</b>	
Housing Color	Black
LCD Monitor (cm)	48.26
LCD Monitor (in.)	19
Shipping Dimensions (hwd / cm)	13.00 x 66.50 x 83.01
Shipping Dimensions (hwd / in.)	5.12 x 26.18 x 32.68
Shipping Weight (kg)	18.14
Shipping Weight (lbs.)	40.00
Unit Dimensions (hwd / cm)	4.39 x 48.00 x 68.58
Unit Dimensions (hwd / in.)	1.73 x 18.9 x 27
Unit Weight (kg)	14.06
Unit Weight (lbs.)	31
<b>ENVIRONMENTAL</b>	
Storage Temperature Range	-20 to 60 C (-4 to 140 F)
Relative Humidity	0 to 80% RH, Non-Condensing
Operating Temperature	0 to 50 C (32 to 122 F)
<b>COMMUNICATIONS</b>	
Port Control	Push Buttons, Hotkeys, OSD
IP Remote Access	Yes
<b>CONNECTIONS</b>	
Ports	8
PC/Server Connections	PS/2; USB; VGA



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1111 W. 35th Street  
Chicago, IL 60609 USA  
Telephone: 773.869.1234  
[www.tripplite.com](http://www.tripplite.com)

<b>FEATURES &amp; SPECIFICATIONS</b>	
Autoscan (Y,N)	Y
Autoscan Duration	1 - 255 seconds
Number of Users	1
NIAP-Certified Secure	No
Cat5 KVM Switch	No
Technology	PS/2; USB; VGA/SVGA
<b>CERTIFICATIONS</b>	
Certifications	UL 60950-1 (USA), CAN/CSA (Canada), FCC Part 15 Class A, CE, EN 60950-1
Approvals	UL, cUL, CE, FCC, RoHS
<b>WARRANTY</b>	
Product Warranty Period (Worldwide)	1-year limited warranty

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## 1.8kW Single-Phase 120V Basic PDU, 13 NEMA 5-15R Outlets, NEMA 5-15P Input, 15 ft. Cord, 1U Rack-Mount

MODEL NUMBER: PDU1215



Delivers 120V single-phase AC power to multiple loads from a utility outlet, generator or UPS system in a high-density IT environment. Ideal for networking, telecom, security, audio/video and sound reinforcement applications.

### Description

The PDU1215 1.8kW Single-Phase 120V Basic PDU is the perfect no-frills unit for networking, telecom, security, audio/video and sound reinforcement applications. Perfectly suited for high-density IT environments, the PDU1215 features a single breakered load bank with 13 NEMA 5-15R outlets—12 in the rear and one in front. The NEMA 5-15P input plug with long 15-foot (4.5 m) cord connects to your facility's compatible AC power source, generator or protected UPS to distribute power to connected equipment.

The switchless design prevents an accidental shutdown, which could lead to costly downtime. A 15A circuit breaker protects connected equipment from dangerous overloads. The reversible all-metal housing mounts in 1U of space in EIA-standard 19-inch racks, as well as on a wall or workbench or under a counter. With a compatible rack and Tripp Lite's PDUSIDEBRKT accessory (sold separately), you can adapt the PDU1215 for vertical 0U rack-mounting.

### Features

#### Reliable Single-Phase Power Distribution

- Ideal no-frills PDU for networking, telecom, security, audio/video and sound reinforcement applications
- 13 NEMA 5-15R outlets in one breakered load bank
- 15A circuit breaker protects outlets against overloads
- NEMA 5-15P input plug with 15 ft. cord
- Rear-panel grounding lug

### Highlights

- NEMA 5-15P input with 15 ft. (4.5 m) cord
- 13 NEMA 5-15R outlets—12 rear and 1 front
- Switchless design prevents accidental shutdown
- Reversible all-metal housing
- Installs in rack, on wall or under counter

### Package Includes

- PDU1215 1.8kW Single-Phase 120V Basic PDU
- Mounting hardware
- Owner's manual



### Switchless Design

- Prevents accidental shutdowns and costly downtime

### Versatile Installation Options

- Mounts horizontally in 1U of EIA-standard 19 in. 2- and 4-post racks
- Reversible all-metal housing faces front or rear in rack
- Ready for toolless 0U vertical installation with optional PDUSIDEBRKT (sold separately)
- Also mounts on wall, workbench or under a counter

## Specifications

OVERVIEW	
UPC Code	037332116727
PDU Type	Basic
OUTPUT	
Frequency Compatibility	50 / 60 Hz
Output Capacity Details	1.9kW (127V), 1.8kW (120V), 1.5kW (100V) / 15A total capacity; 12A max per 5-15R outlet
Output Receptacles	(13) 5-15R
Output Nominal Voltage	100; 120; 127
Overload Protection	15A breaker
INPUT	
PDU Input Voltage	100; 120; 127
Recommended Electrical Service	15A 120V
Maximum Input Amps	15
PDU Plug Type	NEMA 5-15P
Input Phase	Single-Phase
Input Cord Length (ft.)	15
Input Cord Length (m)	4.57
USER INTERFACE, ALERTS & CONTROLS	
Switches	No power switch
PHYSICAL	
Form Factors Supported	1U rackmount, 0U vertical rackmount, wall-mount and undercounter installation supported
Material of Construction	Metal



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1111 W. 35th Street  
Chicago, IL 60609 USA  
Telephone: 773.869.1234  
[www.tripplite.com](http://www.tripplite.com)

Minimum Required Rack Depth (cm)	19.05
Minimum Required Rack Depth (inches)	7.5
Outlets Measurement (Center to Center)	30.2mm
PDU Form Factor	Horizontal (1U)
Shipping Dimensions (hwd / cm)	5.59 x 51.82 x 23.62
Shipping Dimensions (hwd / in.)	2.20 x 20.40 x 9.30
Shipping Weight (kg)	2.39
Shipping Weight (lbs.)	5.27
Unit Dimensions (hwd / cm)	4.44 x 44.5 x 11.4
Unit Dimensions (hwd / in.)	1.75 x 17.5 x 4.5
Unit Weight (kg)	2.22
Unit Weight (lbs.)	4.9
<b>ENVIRONMENTAL</b>	
Storage Temperature Range	-30°C to +50°C (-22°F to +122°F)
Relative Humidity	5 to 95% non-condensing
Operating Elevation (ft.)	0-10,000
Operating Elevation (m)	0-3000
<b>SPECIAL FEATURES</b>	
TVSS Grounding	Back panel grounding lug
<b>CERTIFICATIONS</b>	
Certifications	Tested to UL1363 5TH Edition, CAN/CSA-22.2 No. 308-14
<b>WARRANTY</b>	
Product Warranty Period (Worldwide)	5-year limited warranty

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## Dell - Saved Cart 3/29/2020

Dell UltraSharp 24 Monitor - U2412M



**Dell UltraSharp 24 Monitor - U2412M**

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Dell UltraSharp 24 Monitor - U2412M  
Dell UltraSharp 24 Monitor - U2412M

Hardware Support Services  
3 Years Advanced Exchange Service

Precision 3630 Tower Workstation



**Precision 3630 Tower Workstation**

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Precision 3630 Tower  
Precision 3630 Tower CTO BASE

Processor

Intel Xeon E-2246G,(6 Core, 12MB Cache, 3.6Ghz, 4.8Ghz Turbo w/UHD Graphics 630)

Operating System

Windows 10 Pro for Workstations (4 Cores Plus) Multi - English, French, Spanish

Windows AutoPilot

No Windows AutoPilot

Chassis Options

Precision 3630 Tower with 460W up to 90% efficient PSU (80Plus Gold) with SD card reader v2

Video Card

Radeon Pro WX 3100, 4GB, DP, 2 mDP to DP adapter

Memory

16GB 2X8GB DDR4 2666MHz UDIMM Non-ECC Memory

Systems Management

No Out-of-Band Systems Management

Storage Configuration

C2 2.5 inch Boot HD with optional 1-3 2.5 inch HD

2nd Storage Drive

2.5 inch 256GB Class 20 SATA Solid State Drive

Storage Drive

2.5" 256GB SATA Class 20 Solid State Drive

3rd Storage Drive

No Additional Hard Drive

4th Storage Drive

No Additional Hard Drive

5th Storage Drive

No Additional Hard Drive

Storage Volume

Boot drive or storage volume is greater than 2TB (select when 3TB/4TB HDD is ordered)

Raid Connectivity

RAID 0 for SATA HDD

Keyboard

Dell Multimedia English Keyboard - KB216

Mouse

Dell MS116 Wired Mouse

Teradici Remote Workstation Access Host Card

No Remote Access Host Card

Network Card

Intel I210 1Gb Ethernet Adapter (1X1GbE)

Wireless

No Wireless LAN Card

PCIe I/O Cards

Not selected in this configuration

Serial Port / Parallel Port

No Parallel or Serial Port

Optical or CAC/PIV reader

No Optical Drive

Power Cord

US Power Cord

Documentation/Disks

Safety, Environmental, and Regulatory Information (English/French/Multi-language)

Placemat

Quick Start Guide

Operating System Recovery Options

OS-Windows Media Not Included

ENERGY STAR

Not ENERGY STAR Qualified

Optimizer

Dell Precision Optimizer

Configuration Type

Custom Configuration

Packaging

Shipping Material for MT DAO

Driver

No Wireless LAN

Label

Precision 3630, 460W Reg Label DAO

Canada Ship Options

US No Canada Ship Charge

Processor Branding

Intel Xeon CPU label

Optical Software

PowerDVD Software not included

Dell Backup & Recovery

Dell Backup and Recovery

UPC Label

No UPC Label

TPM Security

Dell Precision TPM

Stands and Mounts

No Stand Option

Cables and Dongles

No Accessories

Hardware Support Services

3 Years ProSupport with Next Business Day Onsite Service

Optional Integrated Video or USB Ports

No Additional Port

Microsoft Office

No Productivity Software

Security Software

No Security Software

Non-Microsoft Application Software

Dell Applications for Windows 10



External Speakers  
External Speaker Not Included

PowerEdge R740 Rack Server



**PowerEdge R740 Rack Server**

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PowerEdge R740  
PowerEdge R740 Server

Motherboard  
PowerEdge R740/R740XD Motherboard

Trusted Platform Module  
No Trusted Platform Module

Chassis Configuration  
Chassis with up to 8 x 2.5" SAS/SATA Hard Drives for 2CPU Configuration

Shipping  
PowerEdge R740 Shipping

Shipping Material  
PowerEdge R740 Shipping Material

Processor  
Intel® Xeon® Gold 6230 2.1G, 20C/40T, 10.4GT/s, 27.5M Cache, Turbo, HT (125W) DDR4-2933

Additional Processor  
Intel® Xeon® Gold 6230 2.1G, 20C/40T, 10.4GT/s, 27.5M Cache, Turbo, HT (125W) DDR4-2933

Processor Thermal Configuration

2 Standard Heatsinks for 125W or less CPUs

Memory DIMM Type and Speed

2666MT/s RDIMMs

Memory Configuration Type

Performance Optimized

Memory Capacity

(2) 8GB RDIMM, 2666MT/s, Single Rank

RAID Configuration

C7, Unconfigured RAID for HDDs or SSDs (Mixed Drive Types Allowed)

RAID/Internal Storage Controllers

PERC H330 RAID Controller, Adapter, Low Profile

Hard Drives

(4) 1.2TB 10K RPM SAS 12Gbps 512n 2.5in Hot-plug Hard Drive

Operating System

No Operating System

OS Media Kits

No Media Required

Embedded Systems Management

iDRAC9, Express

Group Manager

iDRAC Group Manager, Disabled

Password

iDRAC, Factory Generated Password

PCIe Riser

Riser Config 1, 4 x8 slots

Network Daughter Card

Broadcom 57416 Dual Port 10GbE BASE-T & 5720 Dual Port 1GbE BASE-T, rNDC

Internal Optical Drive

No Internal Optical Drive

Fans

6 Standard Fans for R740/740XD

Power Supply

Single, Hot-plug Power Supply (1+0), 495W

Power Cords

NEMA 5-15P to C13 Wall Plug, 125 Volt, 15 AMP, 10 Feet (3m), Power Cord, North America

Bezel

No Bezel

Quick Sync 2 (Wireless At-the-box mgmt)

No Quick Sync

BIOS and Advanced System Configuration Settings

Performance BIOS Setting

Rack Rails

No Rack Rails or Cable Management Arm

System Documentation

No Systems Documentation, No OpenManage DVD Kit

Shipping Information

US No Canada Ship Charge

Regulatory

PowerEdge R740 CE, CCC, BIS Marking

Dell Services: Hardware Support

Basic Next Business Day 36 Months, 36 Month(s)

Deployment Services

No Installation

Remote Consulting Services

Declined Remote Consulting Service

PowerVault ME4012 Storage Array



**PowerVault ME4012 Storage Array**

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Dell EMC ME4012 Storage Array

Dell EMC ME4012 Storage Array

Controller Cards

12Gb SAS 8 Port Dual Controller

SAS Cables

(2) 2x12Gb HD Mini-SAS to HD Mini-SAS 2M Cable

Hard Drives

(3) 480GB SSD SAS Mixed use 12Gbps 512e 2.5in with 3.5in HYB CARR; (3) 1.2TB HDD 10K 512e SAS12 Hybrid HYB CARR Drive 3.5in; (6) Hard Drive Filler 3.5in, Single Blank

Rack Rails

Rack Rails 2U

Bezel

ME4 2U Bezel

Power Supply

Power Supply, 580W, Redundant, Flex

Power Cords

NEMA 5-15P to C13 Wall Plug, 125 Volt, 15 AMP, 10 Feet (3m), Power Cord, North America

Shipping

Dell EMC ME4012 Shipping

Canada Ship Options

US No Canada Ship Charge

Hardware Support Services

3 Years ProSupport with Next Business Day Onsite Service

Deployment Services

ONSITE INSTALL DECLINED

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## Features and Benefits

- 19" rack mount design for increased port density
- All-Gigabit Ethernet (GE) platform with optional 10 GE ports for high performance network requirements
- Provides access switching and distribution layer routing capabilities for flexibility in designing network architectures
- Offers support for up to 12 ports of Power over Ethernet (PoE/PoE+) to help minimize hardware and cabling with 28 total ports
- Default configurations for industrial applications providing easy setup and optimized performance
- Support for multiple high performance network resiliency protocols
- Multi-port Network Address Translation (NAT) providing centralized high performance node commissioning
- Secure Digital (SD) card for simplified configuration and device replacement

### Optimized Integration:

- Studio 5000® Add-on Profiles (AOPs) enable premier integration into the Rockwell Automation Integrated Architecture® system
- Predefined Logix tags for monitoring and port control
- FactoryTalk® View Faceplates help to enable status monitoring and alarming
- Embedded Cisco technology helps enable integration with the enterprise network and provides common IT development and management tools



Getting the full value out of your network infrastructure is critical, especially in industrial environments where conditions can be extreme and high performance connectivity is required.

To address these challenges, Rockwell Automation offers the Allen-Bradley® Stratix 5410™ Industrial Distribution Switch with a 19" rack mount design. With a rugged exterior, rear mounting capabilities and multiple fiber port options, this switch is an ideal solution for a centralized point of network distribution.

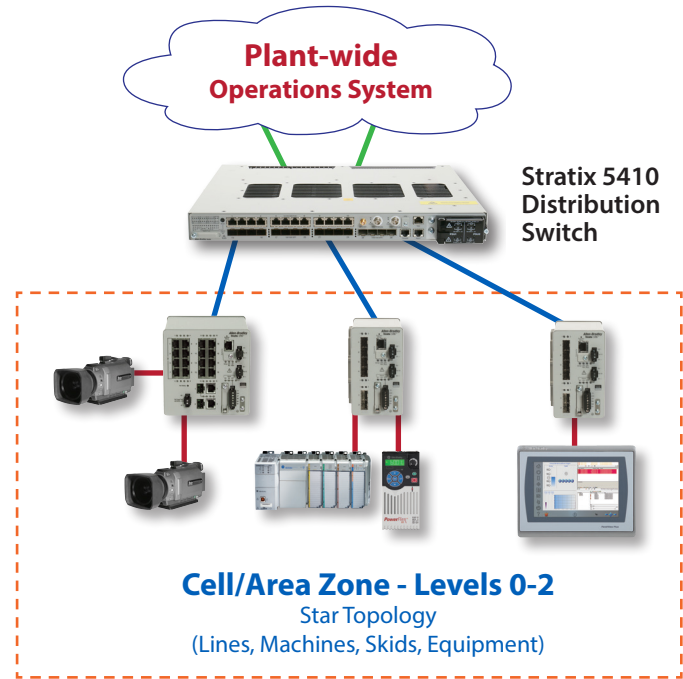
The Stratix 5410 offers an all-Gigabit Ethernet (GE) platform with optional 10 GE ports providing high performance capabilities for networks where high-bandwidth support is needed. This switch can be used as a layer 2 access switch or a layer 3 routing switch providing scalability for use in various applications.

As part of the Stratix™ portfolio of products, the Stratix 5410 offers the same programming and support tools already familiar to both your Operations Technology (OT) and Information Technology (IT) professionals. With integration into Studio 5000 Automation Engineering and Design Environment, FactoryTalk View faceplates and Add-on Profiles can be leveraged for simplified configuration and monitoring. This optimized level of integration helps you experience easier commissioning and faster diagnostics retrieval.

## Stratix 5410 in a Network Architecture

When used as a layer 2 switch, the Stratix 5410 is an ideal solution for heavy industry applications where resiliency is often required or where high performance end devices, such as video or telephony, are needed.

When used as a Layer 3 switch, the Stratix 5410 provides routing capabilities between segmented networks for better performance and protection from unwanted network traffic. Additionally, segmenting the network helps simplify network security management by building domains of trust.



## Stratix 5410 Configuration Options:

Catalog Item	Total ports	SFP slots	PoE Copper ports*	FW type	1588	NAT	Power Supply**
1783-IMS28GNDC	28	16 GE	12 GE	Layer 2	Yes	Yes	Low DC
1783-IMS28GNAC	28	16 GE	12 GE	Layer 2	Yes	Yes	AC/High DC
1783-IMS28GRDC	28	16 GE	12 GE	Layer 3	Yes	Yes	Low DC
1783-IMS28GRAC	28	16 GE	12 GE	Layer 3	Yes	Yes	AC/High DC
1783-IMS28NDC	28	12 GE + 4 TEN	12 GE	Layer 2	Yes	Yes	Low DC
<b>1783-IMS28NAC</b>	<b>28</b>	<b>12 GE + 4 TEN</b>	<b>12 GE</b>	<b>Layer 2</b>	<b>Yes</b>	<b>Yes</b>	<b>AC/High DC</b>
1783-IMS28RDC	28	12 GE + 4 TEN	12 GE	Layer 3	Yes	Yes	Low DC
1783-IMS28RAC	28	12 GE + 4 TEN	12 GE	Layer 3	Yes	Yes	AC/High DC

Optional Power Supplies	
1783-IMXDC	Low DC
1783-IMXAC	AC/High DC

GE = Gigabit Ethernet, TEN = 10 Gigabit Ethernet

\*May be limited to less than 12 PoE ports depending on power available. One power supply provides 60 W for PoE/PoE+. Two power supplies provide 185 W for PoE/PoE+.

\*\*One power supply ships pre-installed in each Stratix 5410 switch. The switch can also support an optional second power supply of any voltage type, if needed.

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Asia Pacific: Rockwell Automation, Level 14, Core F, Cyberport 3, 100 Cyberport Road, Hong Kong, Tel: (852) 2887 4788, Fax: (852) 2508 1846

# Stratix 5410 Ethernet Managed Switches and Power Supply

Catalog Numbers 1783-IMS28NDC, 1783-IMS28RDC, 1783-IMS28GNDC, 1783-IMS28GRDC, 1783-IMS28NAC, 1783-IMS28RAC, 1783-IMS28GNAC, 1783-IMS28GRAC

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**ATTENTION:** Read this document and the documents listed in the Additional Resources section about installation, configuration and operation of this equipment before you install, configure, operate or maintain this product. Users are required to familiarize themselves with installation and wiring instructions in addition to requirements of all applicable codes, laws, and standards.

Activities including installation, adjustments, putting into service, use, assembly, disassembly, and maintenance are required to be carried out by suitably trained personnel in accordance with applicable code of practice.

If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

注意：在安装、配置、操作和维护本产品前，请阅读本文档以及“其他资源”部分列出的有关设备安装、配置和操作的相应文档。除了所有适用规范、法律和标准的相关要求之外，用户还必须熟悉安装和接线说明。

安装、调整、投运、使用、组装、拆卸和维护等各项操作必须由经过适当训练的专业人员按照适用的操作规范实施。

如果未按照制造商指定的方式使用该设备，则可能会损害设备提供的保护。

**ATENCIÓN:** Antes de instalar, configurar, poner en funcionamiento o realizar el mantenimiento de este producto, lea este documento y los documentos listados en la sección Recursos adicionales acerca de la instalación, configuración y operación de este equipo. Los usuarios deben familiarizarse con las instrucciones de instalación y cableado y con los requisitos de todos los códigos, leyes y estándares vigentes.

El personal debidamente capacitado debe realizar las actividades relacionadas a la instalación, ajustes, puesta en servicio, uso, ensamblaje, desensamblaje y mantenimiento de conformidad con el código de práctica aplicable.

Si este equipo se usa de una manera no especificada por el fabricante, la protección provista por el equipo puede resultar afectada.

**ATENÇÃO:** Leia este e os demais documentos sobre instalação, configuração e operação do equipamento que estão na seção Recursos adicionais antes de instalar, configurar, operar ou manter este produto. Os usuários devem se familiarizar com as instruções de instalação e fiação além das especificações para todos os códigos, leis e normas aplicáveis.

É necessário que as atividades, incluindo instalação, ajustes, colocação em serviço, utilização, montagem, desmontagem e manutenção sejam realizadas por pessoal qualificado e especializado, de acordo com o código de prática aplicável.

Caso este equipamento seja utilizado de maneira não estabelecida pelo fabricante, a proteção fornecida pelo equipamento pode ficar prejudicada.

**ВНИМАНИЕ:** Перед тем как устанавливать, настраивать, эксплуатировать или обслуживать данное оборудование, прочитайте этот документ и документы, перечисленные в разделе «Дополнительные ресурсы». В этих документах изложены сведения об установке, настройке и эксплуатации данного оборудования. Пользователи обязаны ознакомиться с инструкциями по

установке и прокладке соединений, а также с требованиями всех применимых норм, законов и стандартов.

Все действия, включая установку, наладку, ввод в эксплуатацию, использование, сборку, разборку и техническое обслуживание, должны выполняться обученным персоналом в соответствии с применимыми нормами и правилами.

Если оборудование используется не предусмотренным производителем образом, защита оборудования может быть нарушена.

注意：本製品を設置、構成、稼働または保守する前に、本書および本機器の設置、設定、操作についての参考資料の該当箇所に記載されている文書に目を通してください。ユーザは、すべての該当する条例、法律、規格の要件に加えて、設置および配線の手順に習熟している必要があります。

設置調整、運転の開始、使用、組立て、解体、保守を含む諸作業は、該当する実施規則に従って訓練を受けた適切な作業員が実行する必要があります。本機器が製造メーカーにより指定されていない方法で使用されている場合、機器により提供されている保護が損なわれる恐れがあります。

**ACHTUNG:** Lesen Sie dieses Dokument und die im Abschnitt „Weitere Informationen“ aufgeführten Dokumente, die Informationen zu Installation, Konfiguration und Bedienung dieses Produkts enthalten, bevor Sie dieses Produkt installieren, konfigurieren, bedienen oder warten. Anwender müssen sich neben den Bestimmungen aller anwendbaren Vorschriften, Gesetze und Normen zusätzlich mit den Installations- und Verdrahtungsanweisungen vertraut machen.

Arbeiten im Rahmen der Installation, Anpassung, Inbetriebnahme, Verwendung, Montage, Demontage oder Instandhaltung dürfen nur durch ausreichend geschulte Mitarbeiter und in Übereinstimmung mit den anwendbaren Ausführungsvorschriften vorgenommen werden.

Wenn das Gerät in einer Weise verwendet wird, die vom Hersteller nicht vorgesehen ist, kann die Schutzfunktion beeinträchtigt sein.

**ATTENTION:** Lisez ce document et les documents listés dans la section Ressources complémentaires relatifs à l'installation, la configuration et le fonctionnement de cet équipement avant d'installer, configurer, utiliser ou entretenir ce produit. Les utilisateurs doivent se familiariser avec les instructions d'installation et de câblage en plus des exigences relatives aux codes, lois et normes en vigueur.

Les activités relatives à l'installation, le réglage, la mise en service, l'utilisation, l'assemblage, le démontage et l'entretien doivent être réalisées par des personnes formées selon le code de pratique en vigueur.

Si cet équipement est utilisé d'une façon qui n'a pas été définie par le fabricant, la protection fournie par l'équipement peut être compromise.

주의：본 제품 설치, 설정, 작동 또는 유지 보수하기 전에 본 문서를 포함하여 설치, 설정 및 작동에 관한 참고 자료 섹션의 문서들을 반드시 읽고 숙지하십시오. 사용자는 모든 관련 규정, 법규 및 표준에서 요구하는 사항에 대해 반드시 설치 및 배선 지침을 숙지해야 합니다.

설치, 조정, 가동, 사용, 조립, 분해, 유지보수 등 모든 작업은 관련 규정에 따라 적절한 교육을 받은 사용자를 통해서만 수행해야 합니다.

본 장비를 제조사가 명시하지 않은 방법으로 사용하면 장비의 보호 기능이 손상될 수 있습니다.

**ATTENZIONE:** Prima di installare, configurare ed utilizzare il prodotto, o effettuare interventi di manutenzione su di esso, leggere il presente documento ed i documenti elencati nella sezione "Altre risorse", riguardanti l'installazione, la configurazione ed il funzionamento dell'apparecchiatura. Gli utenti devono leggere e comprendere le istruzioni di installazione e cablaggio, oltre ai requisiti previsti dalle leggi, codici e standard applicabili.

Le attività come installazione, regolazioni, utilizzo, assemblaggio, disassemblaggio e manutenzione devono essere svolte da personale adeguatamente addestrato, nel rispetto delle procedure previste.

Qualora l'apparecchio venga utilizzato con modalità diverse da quanto previsto dal produttore, la sua funzione di protezione potrebbe venire compromessa.

**DİKKAT:** Bu ürünün kurulumu, yaplandırılması, işletilmesi veya bakımı öncesinde bu dokümanı ve bu ekipmanın kurulumu, yaplandırılması ve işletimi ile ilgili ilave Kaynaklar bölümünde yer listelenmiş dokümanları okuyun. Kullanıcılar yürürlükteki tüm yönetmelikler, yasalar ve standartların gereksinimlerine ek olarak kurulum ve kablolama talimatlarını da öğrenmek zorundadır.

Kurulum, ayarlar, hizmete alma, kullanma, parçaları birleştirme, parçaları sökme ve bakım gibi aktiviteler sadece uygun eğitimleri almış kişiler tarafından yürürlükteki uygulama yönetmeliklerine uygun şekilde yapılabilir.

Bu ekipman üretici tarafından belirlenmiş amaç dışında kullanılırsa, ekipman tarafından sağlanan koruma bozulabilir.

注意事項：在安装、設定、操作或維護本產品前，請先閱讀此文件以及列於「其他資源」章節中有關安裝、設定與操作此設備的文件。使用者必須熟悉安裝和配線指示，並符合所有法規、法律和標準要求。

包括安裝、調整、交付使用、使用、組裝、拆卸和維護等動作都必須交由已經過適當訓練的人員進行，以符合適用的實作法規。

如果將設備用於非製造商指定的用途時，可能會造成設備所提供的保護功能受損。

**POZOR:** Než začnete instalovat, konfigurovat či provozovat tento výrobek nebo provádět jeho údržbu, přečtěte si tento dokument a dokumenty uvedené v části Dodatečné zdroje ohledně instalace, konfigurace a provozu tohoto zařízení. Uživatelé se musejí vedle požadavků všech relevantních vyhlášek, zákonů a norem nutně seznámit také s pokyny pro instalaci a elektrické zapojení.

Činnosti zahrnující instalaci, nastavení, uvedení do provozu, užívání, montáž, demontáž a údržbu musí vykonávat vhodně proškolený personál v souladu s příslušnými prováděcími předpisy.

Pokud se toto zařízení používá způsobem neodpovídajícím specifikaci výrobce, může být narušena ochrana, kterou toto zařízení poskytuje.

**UWAGA:** Przed instalacją, konfiguracją, użytkowaniem lub konserwacją tego produktu należy przeczytać niniejszy dokument oraz wszystkie dokumenty wymienione w sekcji Dodatkowe źródła omawiające instalację, konfigurację i procedury użytkowania tego urządzenia. Użytkownicy mają obowiązek zapoznać się z instrukcjami dotyczącymi instalacji oraz oprzewodowania, jak również z obowiązującymi kodeksami, prawem i normami.

Działania obejmujące instalację, regulację, przekazanie do użytkowania, użytkowanie, montaż, demontaż oraz konserwację muszą być wykonywane przez odpowiednio przeszkolony personel zgodnie z obowiązującym kodeksem postępowania.

Jeśli urządzenie jest używane w sposób inny niż określony przez producenta, zabezpieczenie zapewniane przez urządzenie może zostać ograniczone.

**OBSI:** Läs detta dokument samt dokumentet, som står listat i avsnittet Övriga resurser, om installation, konfiguration och drift av denna utrustning innan du installerar, konfigurerar eller börjar använda eller utföra underhållsarbete på produkten. Användare måste bekanta sig med instruktioner för installation och kabeldragning, förutom krav enligt gällande koder, lagar och standarder.

Åtgärder som installation, justering, service, användning, montering, demontering och underhållsarbete måste utföras av personal med lämplig utbildning enligt lämpligt bruk.

Om denna utrustning används på ett sätt som inte anges av tillverkaren kan det hända att utrustningens skyddsanordningar försätts ur funktion.

**LET OP:** Lees dit document en de documenten die genoemd worden in de paragraaf Aanvullende informatie over de installatie, configuratie en bediening van deze apparatuur voordat u dit product installeert, configureert, bedient of onderhoudt. Gebruikers moeten zich vertrouwd maken met de installatie en de bedrijfsinstructies, naast de vereisten van alle toepasselijke regels, wetten en normen.

Activiteiten zoals het installeren, afstellen, in gebruik stellen, gebruiken, monteren, demonteren en het uitvoeren van onderhoud mogen uitsluitend worden uitgevoerd door hiervoor opgeleid personeel en in overeenstemming met de geldende praktijkregels.

Indien de apparatuur wordt gebruikt op een wijze die niet is gespecificeerd door de fabrikant, dan bestaat het gevaar dat de beveiliging van de apparatuur niet goed werkt.

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## Environment and Enclosure

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**ATTENTION:** This equipment is intended for use in a Pollution Degree 2 industrial environment, in overvoltage Category II applications (as defined in IEC 60664-1), at altitudes up to 2000 m (6562 ft) without derating.

This equipment is not intended for use in residential environments and may not provide adequate protection to radio communication services in such environments.

This equipment is supplied as open-type equipment for indoor use. It must be mounted within an enclosure that is suitably designed for those specific environmental conditions that will be present and appropriately designed to prevent personal injury resulting from accessibility to live parts. The enclosure must have suitable flame-retardant properties to prevent or minimize the spread of flame, complying with a flame spread rating of 5VA or be approved for the application if nonmetallic. The interior of the enclosure must be accessible only by the use of a tool. Subsequent sections of this publication may contain additional information regarding specific enclosure type ratings that are required to comply with certain product safety certifications.

In addition to this publication, see the following:

- Industrial Automation Wiring and Grounding Guidelines, publication [1770-4.1](#), for additional installation requirements
  - NEMA Standard 250 and IEC 60529, as applicable, for explanations of the degrees of protection provided by enclosures
- 

## Prevent Electrostatic Discharge

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**ATTENTION:** This equipment is sensitive to electrostatic discharge, which can cause internal damage and affect normal operation. Follow these guidelines when you handle this equipment:

- Touch a grounded object to discharge potential static.
  - Wear an approved grounding wriststrap.
  - Do not touch connectors or pins on component boards.
  - Do not touch circuit components inside the equipment.
  - Use a static-safe workstation, if available.
  - Store the equipment in appropriate static-safe packaging when not in use.
- 



**ATTENTION:** The USB port is intended for temporary local programming purposes only and not intended for permanent connection. The USB cable is not to exceed 3.0 m (9.84 ft) and must not contain hubs.

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**ATTENTION:** This product is grounded through the DIN rail to chassis ground. Use zinc-plated yellow-chromate steel DIN rail to assure proper grounding. The use of other DIN rail materials (for example, aluminum or plastic) that can corrode, oxidize, or are poor conductors, can result in improper or intermittent grounding. Secure DIN rail to mounting surface approximately every 200 mm (7.8 in.) and use end-anchors appropriately.

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**ATTENTION:** Under certain conditions, viewing the optical port may expose the eye to hazard. When viewed under some conditions, the optical port may expose the eye beyond the maximum permissible exposure recommendations.

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**ATTENTION:** Class 1 laser product. Laser radiation is present when the system is open and interlocks bypassed. Only trained and qualified personnel should be allowed to install, replace, or service this equipment.

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**ATTENTION:** If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

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**ATTENTION:** Use only a soft dry anti-static cloth to wipe down equipment. Do not use any cleaning agents.

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### Electrical Safety Considerations



**ATTENTION:** (Switches with DC power supply modules). To comply with the CE Low Voltage Directive (LVD), all connections to this equipment must be powered from a source compliant with the following:

- Safety Extra Low Voltage (SELV) Supply
- Protected Extra Low Voltage (PELV) Supply

### European Hazardous Location Approval

The following applies to products marked **CE**  **II 3 G: Such modules:**

- Are Equipment Group II, Equipment Category 3, and comply with the Essential Health and Safety Requirements relating to the design and construction of such equipment given in Annex II to Directive 94/9/EC. See the EC Declaration of Conformity at <http://www.rockwellautomation.com/products/certification> for details.
- The type of protection is “Ex nA nC IIC T4 Gc” according to EN 60079-15.
- Comply to Standards EN 60079-0:2012+A11:2013, EN 60079-15:2010, reference certificate number DEMKO15ATEX1492X.
- Are intended for use in areas in which explosive atmospheres caused by gases, vapors, mists, or air are unlikely to occur, or are likely to occur only infrequently and for short periods. Such locations correspond to Zone 2 classification according to ATEX directive 1999/92/EC.



### Special Conditions for Safe Use



**WARNING:**

- This equipment shall be mounted in an ATEX Zone 2 certified enclosure with a minimum ingress protection rating of at least IP54 (as defined in EN 60529) and used in an environment of not more than Pollution Degree 2 (as defined in EN 60664-1) when applied in Zone 2 environments. The enclosure must be accessible only by the use of a tool.
- This equipment shall be used within its specified ratings defined by Rockwell Automation.
- Provision shall be made to prevent the rated voltage from being exceeded by transient disturbances of more than 140% of the rated voltage when applied in Zone 2 environments.
- Secure any external connections that mate to this equipment by using screws, sliding latches, threaded connectors, or other means provided with this product.
- Do not disconnect equipment unless power has been removed or the area is known to be nonhazardous.
- The USB port is intended for temporary local programming purposes only and not intended for permanent connection. Do not use the USB port in hazardous locations.

### North American Hazardous Location Approval

The following information applies when operating this equipment in hazardous locations.	Informations sur l'utilisation de cet équipement en environnements dangereux.
<p>Products marked "CL I, DIV 2, GP A, B, C, D" are suitable for use in Class I Division 2 Groups A, B, C, D, Hazardous Locations and nonhazardous locations only. Each product is supplied with markings on the rating nameplate indicating the hazardous location temperature code. When combining products within a system, the most adverse temperature code (lowest "T" number) may be used to help determine the overall temperature code of the system. Combinations of equipment in your system are subject to investigation by the local Authority Having Jurisdiction at the time of installation.</p>	<p>Les produits marqués "CL I, DIV 2, GP A, B, C, D" ne conviennent qu'à une utilisation en environnements de Classe I Division 2 Groupes A, B, C, D dangereux et non dangereux. Chaque produit est livré avec des marquages sur sa plaque d'identification qui indiquent le code de température pour les environnements dangereux. Lorsque plusieurs produits sont combinés dans un système, le code de température le plus défavorable (code de température le plus faible) peut être utilisé pour déterminer le code de température global du système. Les combinaisons d'équipements dans le système sont sujettes à inspection par les autorités locales qualifiées au moment de l'installation.</p>
<div style="display: flex; align-items: center;">  <div> <p><b>WARNING:</b> <b>Explosion Hazard –</b></p> <ul style="list-style-type: none"> <li>• Do not disconnect equipment unless power has been removed or the area is known to be nonhazardous.</li> <li>• Do not disconnect connections to this equipment unless power has been removed or the area is known to be nonhazardous. Secure any external connections that mate to this equipment by using screws, sliding latches, threaded connectors, or other means provided with this product.</li> <li>• Substitution of components may impair suitability for Class I, Division 2.</li> <li>• If this product contains batteries, they must only be changed in an area known to be nonhazardous.</li> </ul> </div> </div>	<div style="display: flex; align-items: center;">  <div> <p><b>AVERTISSEMENT:</b> <b>Risque d'Explosion –</b></p> <ul style="list-style-type: none"> <li>• Couper le courant ou s'assurer que l'environnement est classé non dangereux avant de débrancher l'équipement.</li> <li>• Couper le courant ou s'assurer que l'environnement est classé non dangereux avant de débrancher les connecteurs. Fixer tous les connecteurs externes reliés à cet équipement à l'aide de vis, loquets coulissants, connecteurs filetés ou autres moyens fournis avec ce produit.</li> <li>• La substitution de composants peut rendre cet équipement inadapté à une utilisation en environnement de Classe I, Division 2.</li> <li>• S'assurer que l'environnement est classé non dangereux avant de changer les piles.</li> </ul> </div> </div>

**North American Zones:**  
 UL 60079-0, 5th Ed, 2009-10-21; UL 60079-15, 3rd Ed, 2009-7-17;  
 CAN/CSA C22.2 No. 60079-15-12 Ed. 1; CAN/CSA C22.2 No. 60079-0-11 Ed. 2



**WARNING:** If you connect or disconnect the communication cable with power applied to this module or any device on the network, an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.



**WARNING:** Use supply wires suitable for 30 °C (86 °F) above surrounding ambient.



**WARNING:** When used in a Class I, Division 2, hazardous location, this equipment must be mounted in a suitable enclosure with proper wiring method that complies with the governing electrical codes.



**WARNING:** If you connect or disconnect wiring while the field-side power is on, an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.



**WARNING:** When you insert or remove the CompactFlash/SD memory Card while power is on, an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.



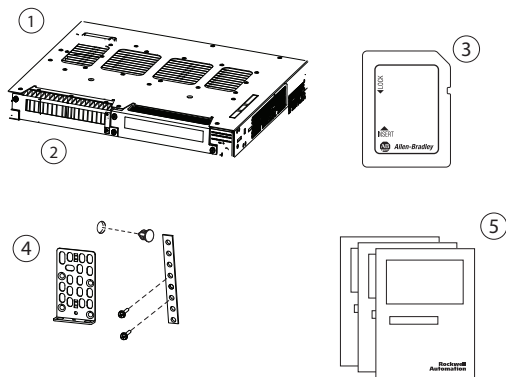
**WARNING:** When you insert or remove the small form-factor pluggable (SFP) optical transceiver while power is on, an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.



**WARNING:** Do not use the USB port in hazardous locations.

## Parts List

Verify that you have these items. The secure digital (SD) card and power supply comes installed in the switch.



- 1 Stratix® 5410 switch
- 2 Power supply module
- 3 SD card
- 4 Mounting kit<sup>(1)</sup>
- 5 Documentation

(1) Replacement kits can be ordered by requesting part number 53-100573-01.



At the end of its life, this equipment should be collected separately from any unsorted municipal waste.

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## Required Tools

Obtain these tools:

- Ring, spade, or flanged spade terminal (terminals should be insulated)
  - Ring terminal (such as Tyco part number 2-34158-1 for 16...14 AWG or 2-34852-1 for 12...10 AWG wire)
  - Spade terminal (such as Tyco part number 54367-2 for 16...14 AWG wire)
  - Flanged spade terminal (such as Tyco part number 2-324165-1 for 16...14 AWG wire or 1-324581-1 for 12...10 AWG wire)
- Crimping tool
- 6-gauge copper ground wire, such as Belden part number 9906 or equivalent
- 12-AWG wire (minimum) for the low-voltage power-supply module and 16-AWG (minimum) wire for the high-voltage power-supply module
- For power source connections, use wires that are rated for at least 194°F (90°C).
- UL- and CSA-rated style 1007 or 1569 twisted-pair copper wire, such as Belden part number 9318
- Wire-stripping tools for stripping 6-, 10-, 12-, 14-, and 16-gauge wires.
- Number-2 Phillips screwdriver
- Flat-blade screwdriver

For simplified cabling, the automatic medium-dependent interface crossover (auto-MDIX) feature is enabled by default on the switch. With auto-MDIX enabled, the switch detects the required cable type for copper Ethernet connections and configures the interfaces accordingly. You can use either a crossover or a straight-through cable for connections to a 10/100/1000 Ethernet, PoE/PoE+ switch port, regardless of the type of device on the other end of the connection.

## Site Requirements

Observe these site requirements:

- To prevent the switch from overheating, observe these minimum clearances:
  - Top and bottom: 44.45 mm (1.75 in.)
  - Sides: 50.8 mm (2.0 in.)
  - Front: 50.8 mm (2.0 in.)
- For 10/100/1000 Ethernet, PoE/PoE+ ports, the cable length from a switch to an attached device cannot exceed 100 m (328 ft).
- Temperature surrounding the unit must be in a range of -40...60 °C (-40...140 °F).

- Clearance to front and rear panels meets these conditions:
  - Front- or back-panel status indicators can be easily read.
  - Access to ports is sufficient for unrestricted cabling.
  - Power and alarm relay connectors are within reach of the connection to the AC or DC power source.
- Cabling is away from sources of electrical noise, such as radios, power lines, and fluorescent lighting fixtures.

## Mount the Switch on a Rack

To mount the switch on a rack, see the following:

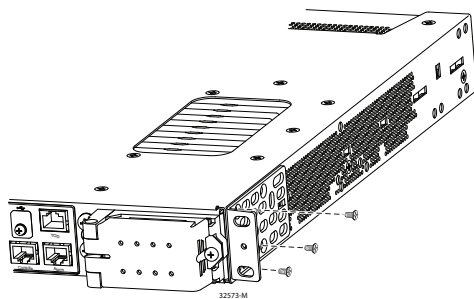
- [Attach Brackets on page 7](#)
- [Mount the Switch on page 8](#)

## Attach Brackets

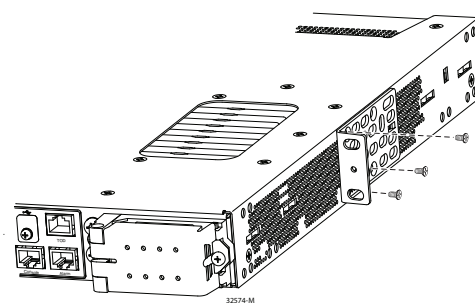
To attach brackets on the switch, follow this procedure.

1. Identify a mount position and attach brackets to both sides of the switch.

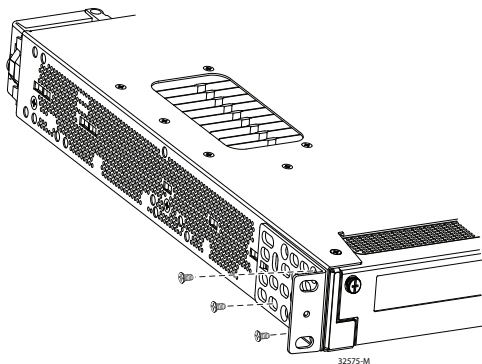
**Cable-side Mount Position**



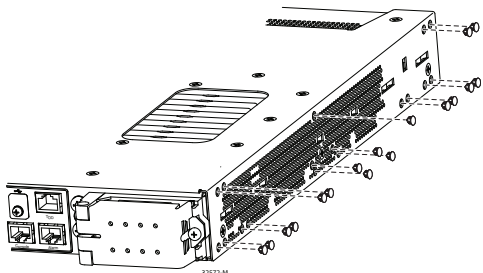
**Center Mount Position**



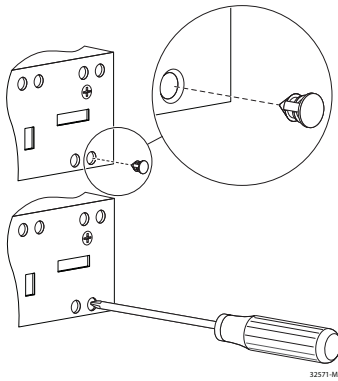
**Power-supply Mount Position**



2. Insert the rubber plugs in the unused holes on both sides of the switch.



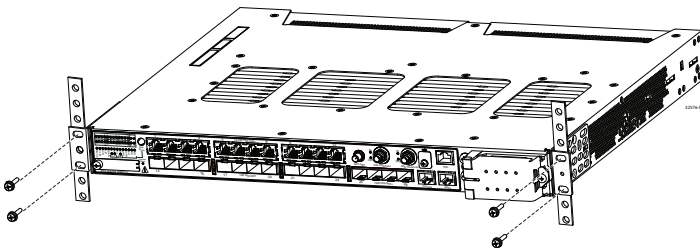
- Use a screwdriver or pen to push in the rubber plugs completely.



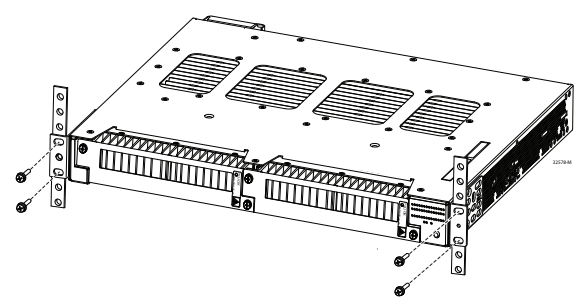
## Mount the Switch

After you attach the brackets on the switch, use the four supplied number-12 Phillips machine screws to attach the brackets to the rack.

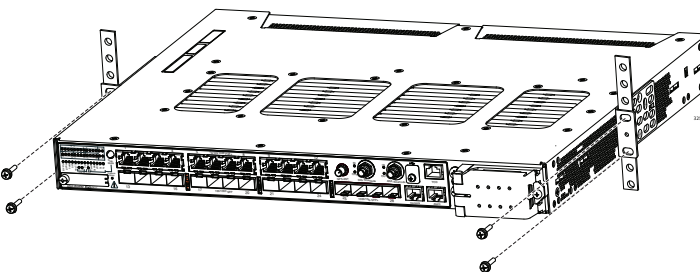
Cable-side Mount Position



Power-supply Mount Position



Center Mount Position



## Mount the Switch on a Wall

To mount the switch on a wall, see the following:

- [Attach the Brackets on page 9](#)
- [Mount the Switch on page 10](#)

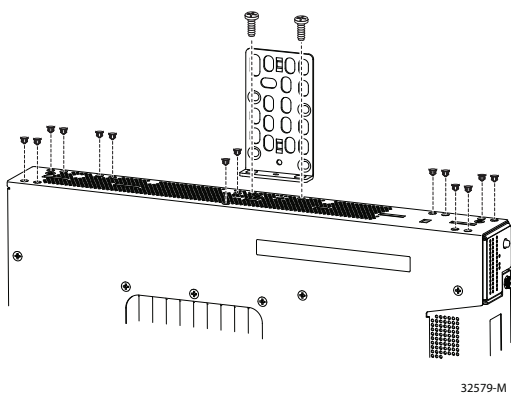
**IMPORTANT** To mount the switch on a wall in an enclosure, follow these minimum clearances:

- Sides of switch facing up and facing down: 9.52 cm (3.75 in.)
- Port side: 7.62 cm (3.0 in.)
- Power supply side: 13.33 cm (5.25 in.)
- Cover side not facing wall: 4.44 cm (1.75 in.)
- Base side facing wall: 0 cm (0 in.)

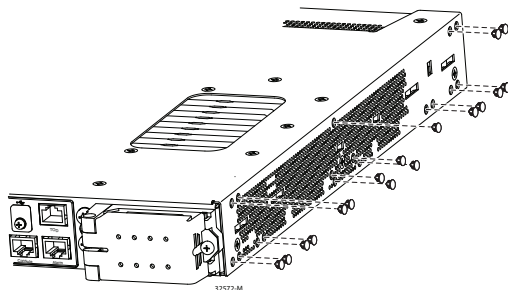
## Attach the Brackets

To attach brackets to the switch, follow this procedure.

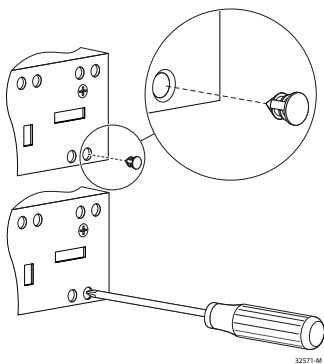
1. Attach the brackets on both sides of the switch.



2. Insert the rubber plugs in the unused holes on both sides of the switch.



3. Use a screwdriver or pen to push in the rubber plugs completely.

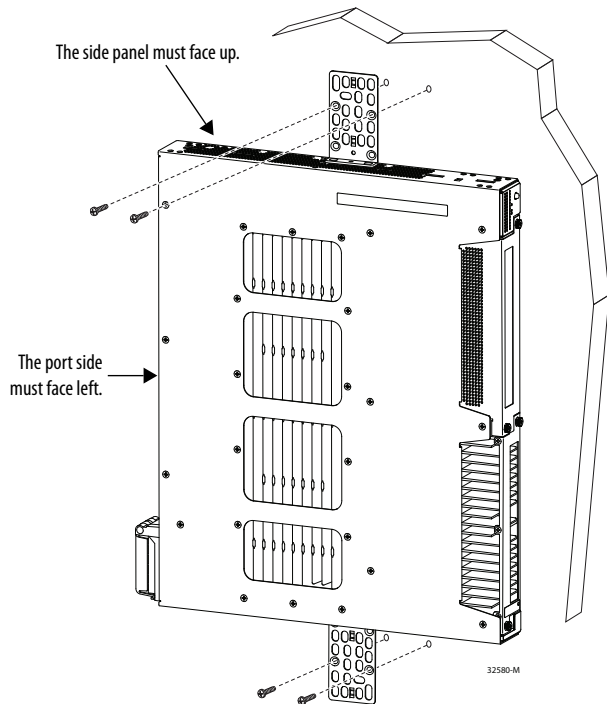




## Mount the Switch

The switch can be mounted on a wall in only one position: the side panel must face up, and the port side must face left.

For the best support of the switch and cables, make sure that the switch is attached securely to wall studs or to a firmly attached plywood backboard.



## Ground the Switch

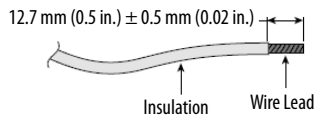
To ground the switch, follow these steps. Be sure to follow any grounding requirements at your site.

1. To remove the ground screw from the cable side of the switch, use a Phillips screwdriver or a ratcheting torque screwdriver with a Phillips head.

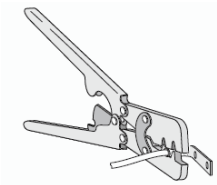
Store the ground screw for later use.

2. Strip the 13.3 mm<sup>2</sup> (6 AWG) ground wire to 12.7 mm (0.5 in.) ± 0.5 mm (0.02 in.).

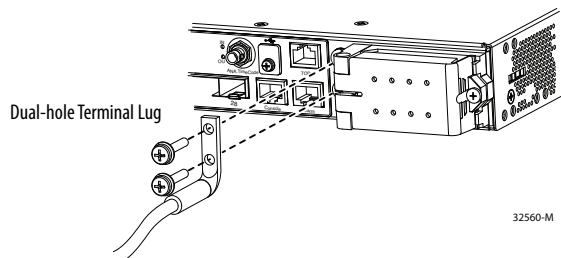
Stripping more than the recommended amount of wire can leave exposed wire from the connector.



3. Insert the ground wire into the terminal lug, and crimp the terminal to the wire.



- Slide the ground screw from Step 1 through the terminal lug, and insert the ground screws into the opening on the cable side.

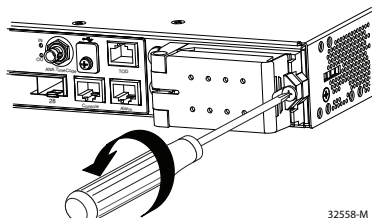


- Use a ratcheting-torque screwdriver to tighten the ground screws to 3.39 N•m ( $\pm 0.23$  N•m) or 30 in•lb ( $\pm 2$  in•lb).
- Attach the other end of the ground wire to a grounded bare metal surface, such as a ground bus or a grounded bare rack.

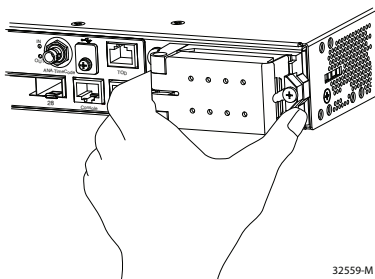
## Wire the Power Source

To wire the power source, follow these steps.

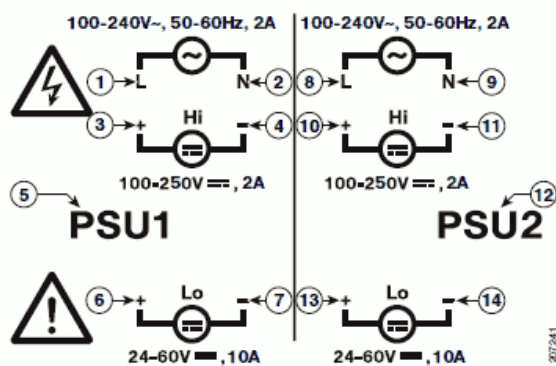
- Turn power off at the AC and DC circuits.
- Loosen the captive screw on the power input terminal by using a Phillips screwdriver.



- Open the cover.



The terminal screws labels are on the power-input terminal cover.

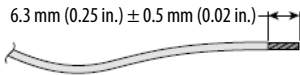


1	Line connection for high-voltage AC (PSU1)
2	Neutral connection for high-voltage AC (PSU1)
3	Positive connection for high-voltage DC (PSU1)
4	Negative connection for high-voltage DC (PSU1)
5	PSU1 (power-supply module 1)
6	Positive connection for low-voltage DC (PSU1)
7	Negative connection for low-voltage DC (PSU1)
8	Line connection for high-voltage AC (for PSU2)
9	Neutral connection for high-voltage AC (PSU2)
10	Positive connection for high-voltage DC (PSU2)
11	Negative connection for high-voltage DC (PSU2)
12	PSU2 (power-supply module 2)
13	Positive connection for low-voltage DC (PSU2)
14	Negative connection for low-voltage DC (PSU2)

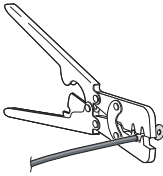
4. To connect from the power-input terminal to the power source, use twisted-pair copper wire (12...18 AWG):
  - For the low-voltage DC power supply, use 12 AWG (minimum)
  - For the high-voltage AC or DC power supply module, use 16 AWG (minimum)

5. Strip each of the two wires to 6.3 mm (0.25 in.) ± 0.5 mm (0.02 in.).

Do not strip more than 6.8 mm (0.27 in.) of insulation from the wire. Stripping more than the recommended amount of wire can leave exposed wire from the connector after installation.



6. Insert the wire into a spade terminal, and crimp it to the wire.



7. Loosen the terminal screw, and slide the terminal under the screw and washer.

---

**IMPORTANT** Use the appropriate terminal screws that are based on power supply type: high-voltage (AC or DC) or a low-voltage (DC).

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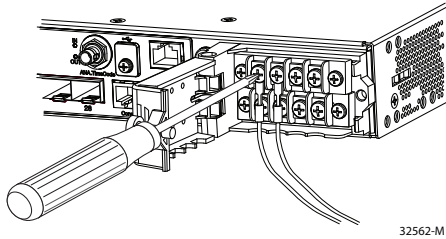
8. Make the power connection:

---

**IMPORTANT** Make sure that you cannot see any wire lead. Only wire with insulation should extend from the terminal screw.

---

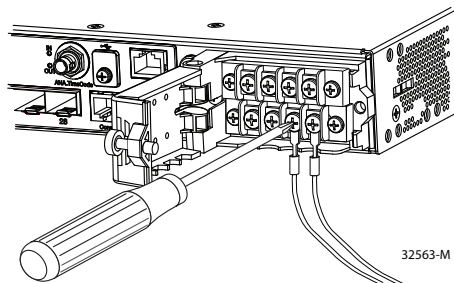
- For AC power, connect the line wire into the terminal screw that is labeled L and the neutral wire into the terminal screw labeled N.



- For DC power, connect the positive wire into the terminal screw that is labeled +, and connect the negative wire into the terminal screw labeled -.

For low-voltage DC power, connect the wires to the terminals labeled Lo.

For high-voltage DC power, connect the wires to the terminals labeled Hi.



9. Torque the captive screws above the wires to 0.79 N•m (7 in•lb).

10. Complete the power connection:

---

**IMPORTANT** Make sure that you cannot see any wire lead. Only wire with insulation should extend from the terminal screw.

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- For AC power, connect the other end of the line wire (the one connected to L) to the line terminal on the AC power source. Connect the other end of the neutral wire (the one connected to N) to the neutral terminal on the AC power source.
- For DC power, connect the other end of the positive wire (the one connected to +) to the positive terminal on the DC power source. Connect the other end of the negative wire (the one connected to –) to the negative terminal on the DC power source.

---

**IMPORTANT** On switches that support PoE, do not connect the negative (return) terminal of the DC power source to earth ground.

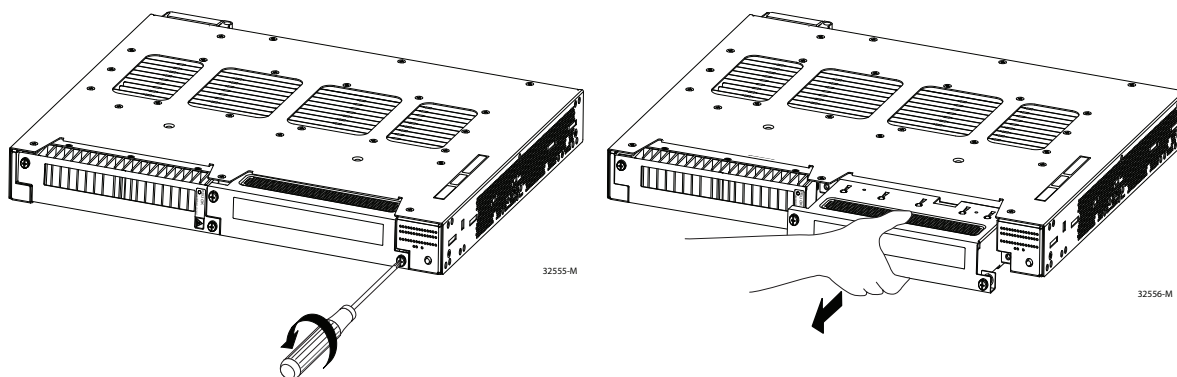
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11. Close the power input terminal cover.
12. Use a ratcheting torque screwdriver to torque the screw to 0.79 N•m (7 in•lb).
13. Turn on the power at the AC or DC circuit.
14. Verify that the PSU 1 or 2 status indicator on the switch and PSU OK status indicator on the power supply module are green.

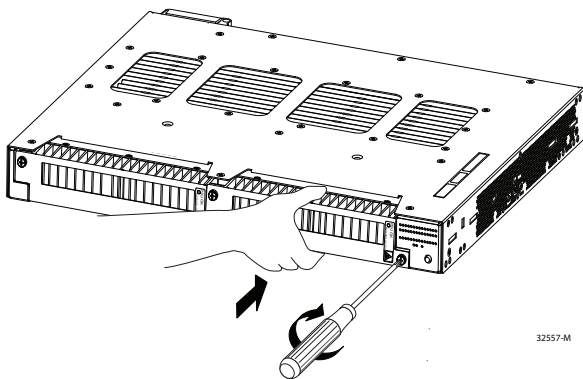
## Install a Power Supply Module in the Switch

The switch ships with one pre-installed power supply. To install a second power supply, follow these steps.

1. Turn power off at the AC and DC circuits.
2. To loosen the two captive screws of the blank power-supply module and gently pull it out, use a Phillips screwdriver.



3. Insert the power supply module into the slot, and gently push it in.  
When inserted correctly, the power-supply module is flush with the switch.



4. Use a ratcheting torque screwdriver to torque each screw to 0.904...1.13 N•m (8...10 in•lb).

## Remove a Power Supply Module from the Switch

By removing the power-supply modules, you can power off the switch without disconnecting the wiring from the power-input terminal. To remove a power supply module from the switch, follow these steps.

1. Turn power off at the AC and DC circuits.
2. Verify that the PSU 1 or 2 and PSU OK status indicators are blinking red or are off.
3. Use a Phillips screwdriver to loosen the captive screws that secure the power-supply module to the switch.
4. Remove the power-supply module from the power slot. The power-supply module might be hot.
5. Install a new power-supply module or a blank cover.

## Wire the External Alarms

The switch has four alarm inputs and one Form C (single-pole, double-throw) alarm output relay circuits for external alarms. The input alarm relay circuits are designed to sense if the alarm input is open or closed relative to the alarm input reference pin. The output alarm relay circuit has one Form C relay, with one normally open (NO) and one normally closed (NC) contact. You can configure the output alarm relay as either normally energized or normally de-energized by using the CLI.

Alarm signals are connected to the switch through the 8-way alarm relay RJ45 connector. An alarm input and the common wiring connection are required to complete one input alarm circuit. You must provide either an NO or an NC dry contact to complete the alarm circuit between common and one of the four alarm inputs.



**ATTENTION:** Do not apply an external voltage source to the alarm inputs. Limit alarm output wiring to 48 V DC, 0.5 A.

An alarm output and the common wiring connection are required to complete one output alarm circuit. The Form C output alarm relay provides one NO and one NC dry contact

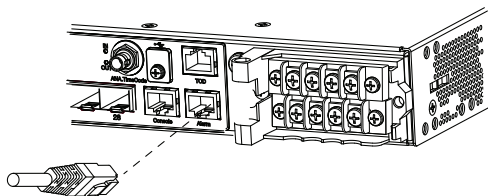
Pin	Label	1 2 3 4 5 6 7 8
1	Alarm 1 input	
2	Alarm 2 input	
3	Alarm output normally closed	
4	Alarm 3 input	
5	Alarm 4 input	
6	Alarm output normally open	
7	Alarm output common	
8	Alarm input common	



**ATTENTION:** Wire connections to the power and relay connector, must be UL- and CSA-rated, style 1007 or 1569 twisted-pair copper appliance wiring material (AWM) wire.

## Attach the Alarm Relay Connector to the Switch

Insert the alarm relay RJ45 connector into the receptacle on the switch front panel.



## Install or Remove an SFP Module



**ATTENTION:** Use SFP modules from only Rockwell Automation. For details about supported modules, see the Stratix Ethernet Device Specifications Technical Data, publication [1783-TD001](#).

SFP modules are inserted into SFP module slots on the front of the switch. These field-replaceable modules provide the uplink optical interfaces, send (TX) and receive (RX).

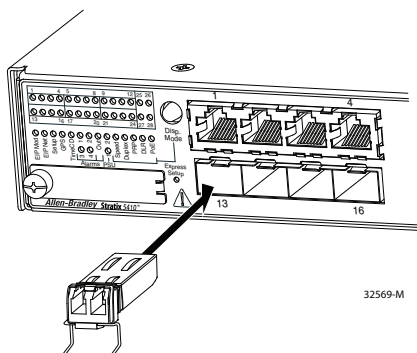
You can use any combination of compatible SFP modules:

- Each SFP module must be of the same type as the SFP module on the other end of the cable. The cable must not exceed the stipulated cable length for reliable communications.
- Once you install SFP modules in the switch, be aware that the overall temperature rating of the combined modules (switch and SFP modules) is limited to the lowest maximum temperature rating and the highest minimum temperature rating.

For cable length and temperature specifications, see the Stratix Ethernet Device Specifications Technical Data, publication [1783-TD001](#).

To insert or remove an SFP module into an SFP slot, follow these steps.

1. Attach an ESD-preventive wrist strap to your wrist and to a bare metal surface.
2. To insert an SFP module, do the following.
  - a. Find the send (TX) and receive (RX) markings on the top of the module. On some SFP modules, the send and receive (TX and RX) markings are replaced by arrows that show the direction of the connection.
  - b. If the module has a bale-clasp latch, move it to the open, unlocked position.
  - c. Align the module in front of the slot opening and push until you feel the connector snap into place.



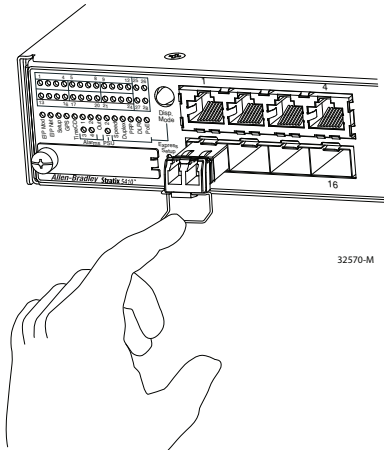
- d. If the module has a bale-clasp latch, close it.
- e. For fiber-optic SFP modules, remove the dust plugs and save.



**ATTENTION:** Do not remove the rubber plugs from the SFP module port or the rubber caps from the fiber-optic cable until you are ready to connect the cable. The plugs and caps protect the SFP module ports and cables from contamination and ambient light.

- f. Connect the SFP cables.
3. To remove an SFP module from an SFP slot, do the following.
  - a. Disconnect the cable from the SFP module. For reattachment, note which cable connector plug is send (TX) and which is receive (RX).
  - b. Insert a dust plug into the optical ports of the SFP module.

- c. If the module has a bale-clasp latch, pull the bale out and down to eject it. If the latch is obstructed and you cannot use your finger, use a small, flat-blade screwdriver or other long, narrow instrument.



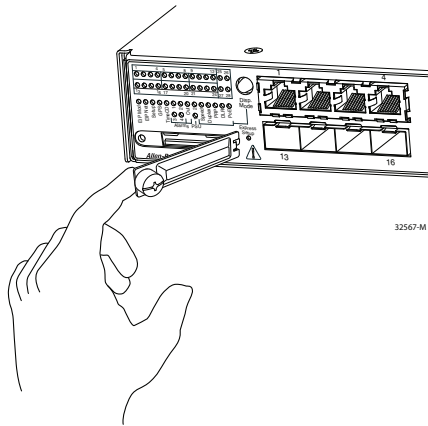
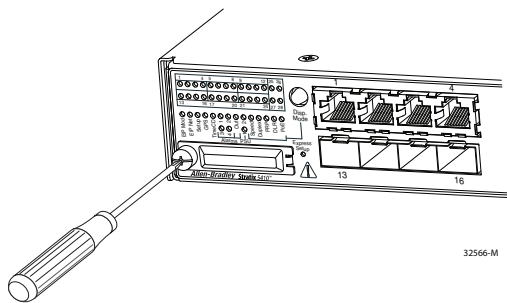
- 4. Grasp the SFP module, and carefully remove it from the slot.
- 5. Place the module in an antistatic bag or other protective environment.

### Install or Remove the SD Card

A secure digital (SD) card ships with the Stratix 5410 switch. The SD card contains the switch firmware and initial configuration. You can order a replacement SD card from Rockwell Automation, catalog number 1784-SD1, if needed. The replacement card ships without firmware and must be synced with the internal memory of the switch.

To install or replace the SD card, follow these steps.

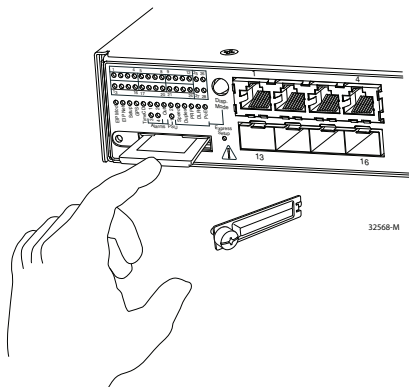
- 1. On the front of the switch, locate the door that protects the SD card slot.
  - 2. Loosen the captive thumb screw on the door by using a screwdriver and open the door.
- Use caution when removing the non-captive door.



3. Install or remove the card.

To install the card, slide it into the slot, and press it firmly in place until it latches in the spring loaded mechanism. The card is keyed so that you cannot fully insert it the wrong way.

To remove the card, push it in and let it pop out via the spring-loaded mechanism. Grasp the card top and pull it out. Place it in an antistatic bag to protect it from static discharge.



4. Close the guard door and fasten the captive screw by using a screwdriver to keep the door in place.

### Connect to 10/100/1000 Ethernet, PoE/PoE+ Ports

The 10/100/1000 ports on the switch automatically configure themselves to operate at the speed of attached devices. If the attached ports do not support autonegotiation, you can explicitly set the speed and duplex parameters. Connecting devices that do not autonegotiate or that have their speed and duplex parameters that are manually set can reduce performance or result in no linkage.

The Auto-MDIX feature is enabled by default. Unless this feature is disabled, you can use either straight-through or crossover cables to connect to other devices on the network.

To maximize performance, choose one of these methods for configuring the Ethernet ports:

- Let the ports autonegotiate both speed and duplex
- Set the port speed and duplex parameters on both ends of the connection

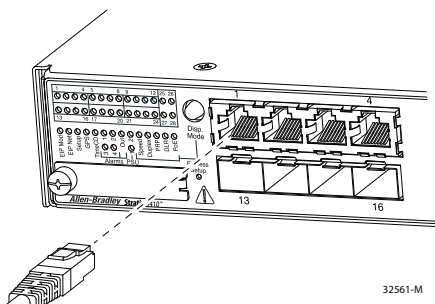
To connect a device to a 10/100/1000 Ethernet, PoE/PoE+ port, follow these steps.

1. Choose one of these options:

- If the auto-MDIX feature is enabled, connect either a crossover or straight-through cable to an RJ45 connector on the front panel. The default setting for auto-MDIX is enabled.
- If auto-MDIX is disabled, use the following guidelines to choose the cable for connecting the 10/100/1000 Ethernet ports to other devices.

Device	Crossover Cable <sup>(1)</sup>	Straight-through Cable <sup>(1)</sup>
Switch to switch	Yes	No
Switch to hub	Yes	No
Switch to computer or server	No	Yes
Switch to router	No	Yes

(1) 100BASE-TX and 1000BASE-T traffic requires twisted four-pair, Category 5, Category 5e, or Category 6 cable. 10BASE-T traffic uses Category 3 or Category 4 cable.





2. Connect the other end of the cable to an RJ45 connector on the other device.

The port status indicator turns on when both the switch and the connected device have an established link.

The port status indicator is amber while Spanning Tree Protocol (STP) discovers the topology and searches for loops. This process can take as long as 30 seconds, and then the Port status indicator turns green.

The following conditions can prevent the Port status indicator from turning On:

- The device at the other end is not turned On.
  - A problem exists with a cable or the adapter that is installed in the attached device.
3. Reconfigure and restart the connected device if necessary.
  4. To connect another device, repeat this procedure.

## Connect to SFP/SFP+ Ports

To connect a fiber-optic cable to an SFP or SFP+ module, follow these steps.

1. Remove the rubber plugs from the module port and fiber-optic cable, and store them for future use.
2. Insert one end of the fiber-optic cable into the SFP module port.
3. Insert the other cable end into a fiber-optic receptacle on a target device.
4. Observe the port status indicator:
  - The status indicator turns amber while the SFP discovers the network topology and searches for loops. This process takes about 30 seconds, and then the port status indicator turns green.
  - The status indicator turns green when the switch and the target device have an established link.
  - The status indicator turns off if the target device is not turned on or there is a problem with the cable or the adapter in the target device.
5. If necessary, reconfigure and restart the switch or the target device.

## Confirm Installation

Before installing the switch in its final location, power on the switch, and verify that the switch powers up.

The time that is required for the switch to start up is directly related to your switch configuration. Start time is negatively affected by such things as the following:

- Spanning Tree Learning mode
- Number of files or images in onboard memory

To test the switch, follow these steps.

1. Apply power to the switch.

If the switch is directly connected to a power source, locate the circuit breaker on the panel board that services the circuit. Switch the circuit breaker to the On position.

2. Verify the start-up process.

When you power on the switch, it begins a start-up process. The Setup status indicator blinks green as the IOS software image loads. If the process fails, the Setup status indicator turns red.

---

**IMPORTANT** Start-up failures can be fatal to the switch. Contact your Rockwell Automation representative immediately if your switch does not complete the start-up process successfully.

---

3. After successfully running this test, do the following:
  - a. Turn off power to the switch.
  - b. Disconnect the cables.
  - c. Decide where you want to install the switch.

## Specifications

### Switch Specifications

Attribute	1783-IMS28NDC, 1783-IMS28RDC, 1783-IMS28GND, 1783-IMS28GRDC	1783-IMS28NAC, 1783-IMS28RAC, 1783-IMS28GNAC, 1783-IMS28GRAC
Power input	24...60V DC, 10 A	100...240V AC, 50...60 Hz, 2 A (per slot) or 100...250V DC, 2 A (per slot)
PoE output, max	54V DC, 15.4 W	
PoE+ output, max	54V DC, 30 W	
Alarm relay	30V DC, 1 A or 48V DC, 0.5 A	
Torque, power supply mount screw	0.904...1.13 N·m (8...10 in·lb)	
Torque, power terminal screw	0.96 N·m (± 0.06 N·m) or 8.5 in·lb (± 0.5 in·lb)	
Torque, functional ground lug screw	3.39 N·m (± 0.23 N·m) or 30 in·lb (± 2 in·lb)	
Temperature, operating	-40 °C < Ta < +60 °C (-40...+140 °F)	
Temperature, ambient, max	60 °C (140 °F)	
Temperature, surrounding air, max	60 °C (140 °F)	
Enclosure type rating	None (open-style)	
Isolation voltage	60V (continuous), basic insulation type	
Wire size, Ethernet connections	RJ45 connector according to IEC 60603-7, 2 or 4 pair Category 5e minimum cable according to TIA 568-B.1 or Category 5 cable according to ISO/IEC 24702	
Wire size, functional ground	13.3 mm <sup>2</sup> (6 AWG) solid or stranded copper wire	
Wire size, alarm connections	Category 5e minimum cable according to TIA 568-B.1 or Category 5 cable according to ISO/IEC 24702	
Wire size, power supply	3.3 mm <sup>2</sup> (12 AWG) twisted-pair copper wire	1.3 mm <sup>2</sup> (16 AWG) twisted-pair copper wire
Wire type	Copper	
Pilot duty rating	Alarm not rated	
North American temp code	T4	
ATEX temp code	T4	
RED certification <sup>(1)</sup>	Hereby, Rockwell Automation declares that the radio equipment type Stratix 5410 is in compliance with Directive 2014/53/EU. The full text of the EU Declaration of Conformity is available at the following internet address: <a href="http://www.rockwellautomation.com">www.rockwellautomation.com</a> .	

(1) For a complete list of Stratix 5410 certifications, see the Stratix Ethernet Device Specifications Technical Data, publication [1783-TD001](#).

### Power Supply Specifications

Attribute	1783-IMXDC	1783-IMXAC
Input	24...60V DC, 10 A	100...240V AC, 2.0 A or 100...250V DC, 2.0 A
Output	-54V DC...2.9 A or 4.5V DC, 0.5 A	-54V DC, 2.9 A or 4.5V DC, 0.5A

## Additional Resources

These documents contain additional information concerning related products from Rockwell Automation.

Resource	Description
Stratix Ethernet Device Specifications Technical Data, publication <a href="#">1783-TD001</a>	Provides specification information for Ethernet switches and other devices.
Stratix Ethernet Switches User Manual, publication <a href="#">1783-UM007</a>	Provides information about configuring, monitoring, and troubleshooting the switches.
Industrial Automation Wiring and Grounding Guidelines, publication <a href="#">1770-4.1</a>	Provides general guidelines for installing a Rockwell Automation industrial system.
Product Certifications website, <a href="#">rok.auto/certifications</a>	Provides declarations of conformity, certificates, and other certification details.

You can view or download publications at <http://www.rockwellautomation.com/global/literature-library/overview.page>. To order paper copies of technical documentation, contact your local Allen-Bradley distributor or Rockwell Automation sales representative.

## Rockwell Automation Support

Use the following resources to access support information.

<b>Technical Support Center</b>	Knowledgebase Articles, How-to Videos, FAQs, Chat, User Forums, and Product Notification Updates.	<a href="https://rockwellautomation.custhelp.com/">https://rockwellautomation.custhelp.com/</a>
<b>Local Technical Support Phone Numbers</b>	Locate the phone number for your country.	<a href="http://www.rockwellautomation.com/global/support/get-support-now.page">http://www.rockwellautomation.com/global/support/get-support-now.page</a>
<b>Direct Dial Codes</b>	Find the Direct Dial Code for your product. Use the code to route your call directly to a technical support engineer.	<a href="http://www.rockwellautomation.com/global/support/direct-dial.page">http://www.rockwellautomation.com/global/support/direct-dial.page</a>
<b>Literature Library</b>	Installation Instructions, Manuals, Brochures, and Technical Data.	<a href="http://www.rockwellautomation.com/global/literature-library/overview.page">http://www.rockwellautomation.com/global/literature-library/overview.page</a>
<b>Product Compatibility and Download Center (PCDC)</b>	Get help determining how products interact, check features and capabilities, and find associated firmware.	<a href="http://www.rockwellautomation.com/global/support/pcdc.page">http://www.rockwellautomation.com/global/support/pcdc.page</a>

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Rockwell Automation maintains current product environmental information on its website at <http://www.rockwellautomation.com/rockwellautomation/about-us/sustainability-ethics/product-environmental-compliance.page>.

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# 1756 ControlLogix Chassis Specifications

Catalog Numbers 1756-A4/B, 1756-A4K/B, 1756-A4/C, 1756-A4K/C, 1756-A7/B, 1756-A7K/B, 1756-A7/C, 1756-A7K/C, 1756-A10/B, 1756-A10K/B, 1756-A10/C, 1756-A10K/C, 1756-A13/B, 1756-A13K/B, 1756-A13/C, 1756-A13K/C, 1756-A17/B, 1756-A17K/B, 1756-A17/C, 1756-A17K/C, 1756-A4LXT/B, 1756-A5XT/B, 1756-A7LXT/B, 1756-A7XT/B, 1756-A7XT/C, 1756-A10XT/C

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ControlLogix-XT Chassis Specifications	4
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Series C ControlLogix Chassis with Standard and Slim Power Supply Mounting Dimensions	12
Series B ControlLogix Chassis with Redundant Power Supply Mounting Dimensions	15
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The ControlLogix® system is a modular system that requires a 1756 ControlLogix chassis. The chassis are designed for only horizontal back-panel mounting. Place any module into any slot. The backplane provides a high-speed communication path between modules.

AutoCAD product drawings are available at <http://www.rockwellautomation.com/global/support/drawings.page>.



## Standard ControlLogix Chassis Specifications

The chassis backplane provides a high-speed communication path between modules and distributes power to each of the modules within the chassis.

### Technical Specifications - ControlLogix Standard Chassis (Series B)

Attribute	1756-A4/B	1756-A7/B	1756-A10/B	1756-A13/B	1756-A17/B
Backplane current, chassis/slot max @ 1.2V DC	1.5 A/–				
Backplane current, chassis/slot max @ 3.3V DC	4 A/4 A				
Backplane current, chassis/slot max @ 5.1V DC	15 A/6 A				
Backplane current, chassis/slot max @ 24V DC	2.8 A/2.8 A				
Power dissipation, max	4 W	4.5 W	5 W	5.4 W	6 W
Isolation voltage	Determined by installed power supply and modules				
Slots	4	7	10	13	17
Mounting method	Only horizontal				
Cabinet size (HxWxD), min	50.8 x 50.8 x 20.3 cm (20 x 20 x 8 in.)	50.8 x 60.9 x 20.3 cm (20 x 24 x 8 in.)	50.8 x 76.2 x 20.3 cm (20 x 30 x 8 in.)	60.9 x 76.2 x 20.3 cm (24 x 30 x 8 in.)	76.2 x 91.4 x 20.3 cm (30 x 36 x 8 in.)
Weight, approx	0.75 kg (1.7 lb)	1.10 kg (2.4 lb)	1.45 kg (3.2 lb)	1.90 kg (4.2 lb)	2.20 kg (4.8 lb)
Location	Panel				
Wire size	Functional Earth Ground - 8.3 mm <sup>2</sup> (8 AWG) solid or stranded copper wire rated at 90 °C (194 °F) or greater Protective Earth Ground - 2.1 mm <sup>2</sup> (14 AWG) solid or stranded copper wire rated at 90 °C (194 °F) or greater				
North American temperature code	T5				
IEC temperature code	T4	T5			
Enclosure type rating	None (open-style)				

### Technical Specifications - ControlLogix Standard Chassis (Series C)

Attribute	1756-A4/C	1756-A7/C	1756-A10/C	1756-A13/C	1756-A17/C
Backplane current, chassis/slot max @ 1.2V DC	1.5 A/–				
Backplane current, chassis/slot max @ 3.3V DC	4 A/4 A				
Backplane current, chassis/slot max @ 5.1V DC	15 A/6 A				
Backplane current, chassis/slot max @ 24V DC	2.8 A/2.8 A				
Power dissipation, max	4 W	4.5 W	5 W	5.4 W	6 W
Isolation voltage	Determined by installed power supply and modules				
Slots	4	7	10	13	17
Mounting method	Only horizontal				
Cabinet size (HxWxD), min	50.8 x 50.8 x 20.3 cm (20 x 20 x 8 in.)	50.8 x 60.9 x 20.3 cm (20 x 24 x 8 in.)	50.8 x 76.2 x 20.3 cm (20 x 30 x 8 in.)	60.9 x 76.2 x 20.3 cm (24 x 30 x 8 in.)	76.2 x 91.4 x 20.3 cm (30 x 36 x 8 in.)
Weight, approx	0.75 kg (1.7 lb)	1.10 kg (2.4 lb)	1.45 kg (3.2 lb)	1.90 kg (4.2 lb)	2.20 kg (4.8 lb)
Location	Panel				
Wire size	Functional earth ground - 8.3 mm <sup>2</sup> (8 AWG) solid or stranded copper wire rated at 90 °C (194 °F) or greater Protective earth ground - 2.1 mm <sup>2</sup> (14 AWG) solid or stranded copper wire rated at 90 °C (194 °F) or greater				
North American temperature code	T4				
IEC temperature code	T4				
Enclosure type rating	None (open-style)				

## Environmental Specifications - ControlLogix Standard Chassis

Attribute	1756-A4/B, 1756-A7/B, 1756-A10/B, 1756-A13/B, 1756-A17/B	1756-A4/C, 1756-A7/C, 1756-A10/C, 1756-A13/C, 1756-A17/C
Temperature, operating IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock)	0...60 °C (32...140 °F)	-25...+60 °C (-13...+140 °F)
Temperature, surrounding air	60 °C (140 °F)	
Temperature, nonoperating IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40...+85 °C (-40...+185 °F)	
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5...95% noncondensing	
Vibration IEC 60068-2-6 (Test Fc, Operating)	2 g @ 10...500 Hz	
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g	
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	50 g	30 g
Emissions	IEC 61000-6-4	
ESD immunity IEC 61000-4-2	6 kV contact discharges 8 kV air discharges	
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine-wave 80% AM from 80...2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 1890 MHz 3V/m with 1 kHz sine-wave 80% AM from 2000...2700 MHz	

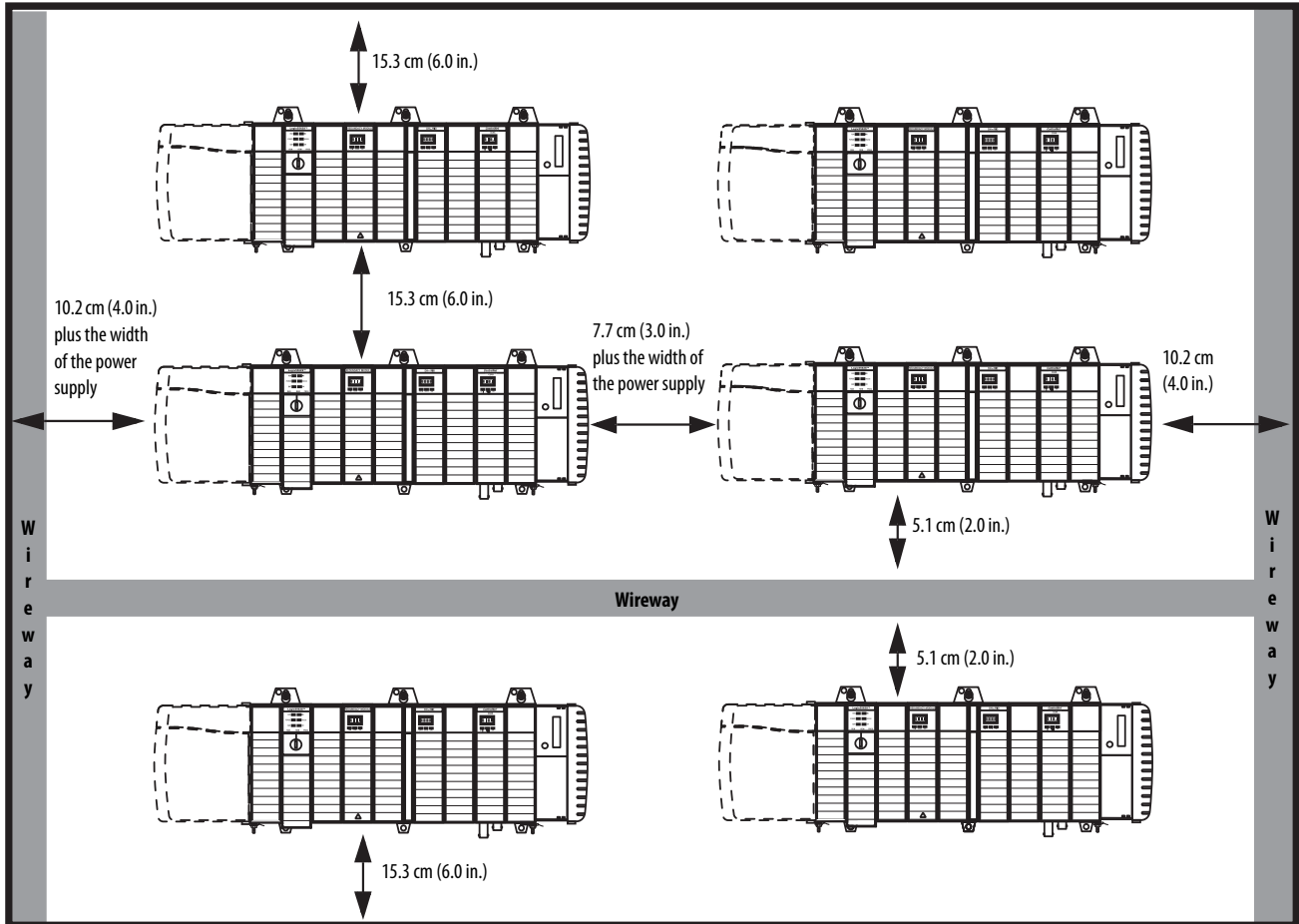
## Certifications - ControlLogix Standard Chassis

Certification <sup>(1)</sup>	1756-A4/B	1756-A7/B, 1756-A10/B, 1756-A13/B, 1756-A17/B	1756-A4/C, 1756-A7/C, 1756-A10/C, 1756-A13/C, 1756-A17/C
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810.		
CSA	CSA Certified Process Control Equipment. See CSA File 54689. CSA Certified Process Control Equipment for Class I, Division 2 Group A,B,C,D Hazardous Locations. See CSA File 69960.		
FM	FM Approved Equipment for use in Class I Division 2 Group A,B,C,D Hazardous Locations.		
CE	European Union 2004/108/EC EMC Directive, compliant with: <ul style="list-style-type: none"> <li>EN 61326-1; Meas./Control/Lab., Industrial Requirements</li> <li>EN 61000-6-2; Industrial Immunity</li> <li>EN 61000-6-4; Industrial Emissions</li> <li>EN 61131-2; Programmable Controllers (Clause 8, Zone A &amp; B)</li> </ul>		
RCM	Australian Radiocommunications Act, compliant with: EN 61000-6-4; Industrial Emissions		
Ex	European Union 94/9/EC ATEX Directive, compliant with: <ul style="list-style-type: none"> <li>EN 60079-15; Potentially Explosive Atmospheres, Protection "n"</li> <li>EN 60079-0; General Requirements</li> <li>II 3 G Ex nA IIC T4 Gc X</li> </ul>	European Union 94/9/EC ATEX Directive, compliant with: <ul style="list-style-type: none"> <li>EN 60079-15; Potentially Explosive Atmospheres, Protection "n"</li> <li>EN 60079-0; General Requirements</li> <li>II 3 G Ex nA IIC T5 Gc X</li> </ul>	European Union 94/9/EC ATEX Directive, compliant with: <ul style="list-style-type: none"> <li>EN 60079-15; Potentially Explosive Atmospheres, Protection "n"</li> <li>EN 60079-0; General Requirements</li> <li>II 3 G Ex nA IIC T4 Gc</li> <li>DEMKO13ATEX1325026X</li> </ul>
IECEX	N/A	IECEX System, compliant with: <ul style="list-style-type: none"> <li>IEC 60079-15; Potentially Explosive Atmospheres, Protection "n"</li> <li>IEC 60079-0; General Requirements</li> <li>II 3 G Ex nA IIC T4 Gc</li> <li>IECEXUL14.0008X</li> </ul>	
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3		
EAC	Russian Customs Union TR CU 020/2011 EMC Technical Regulation Russian Customs Union TR CU 004/2011 LV Technical Regulation		

(1) See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.

## Spacing Requirements

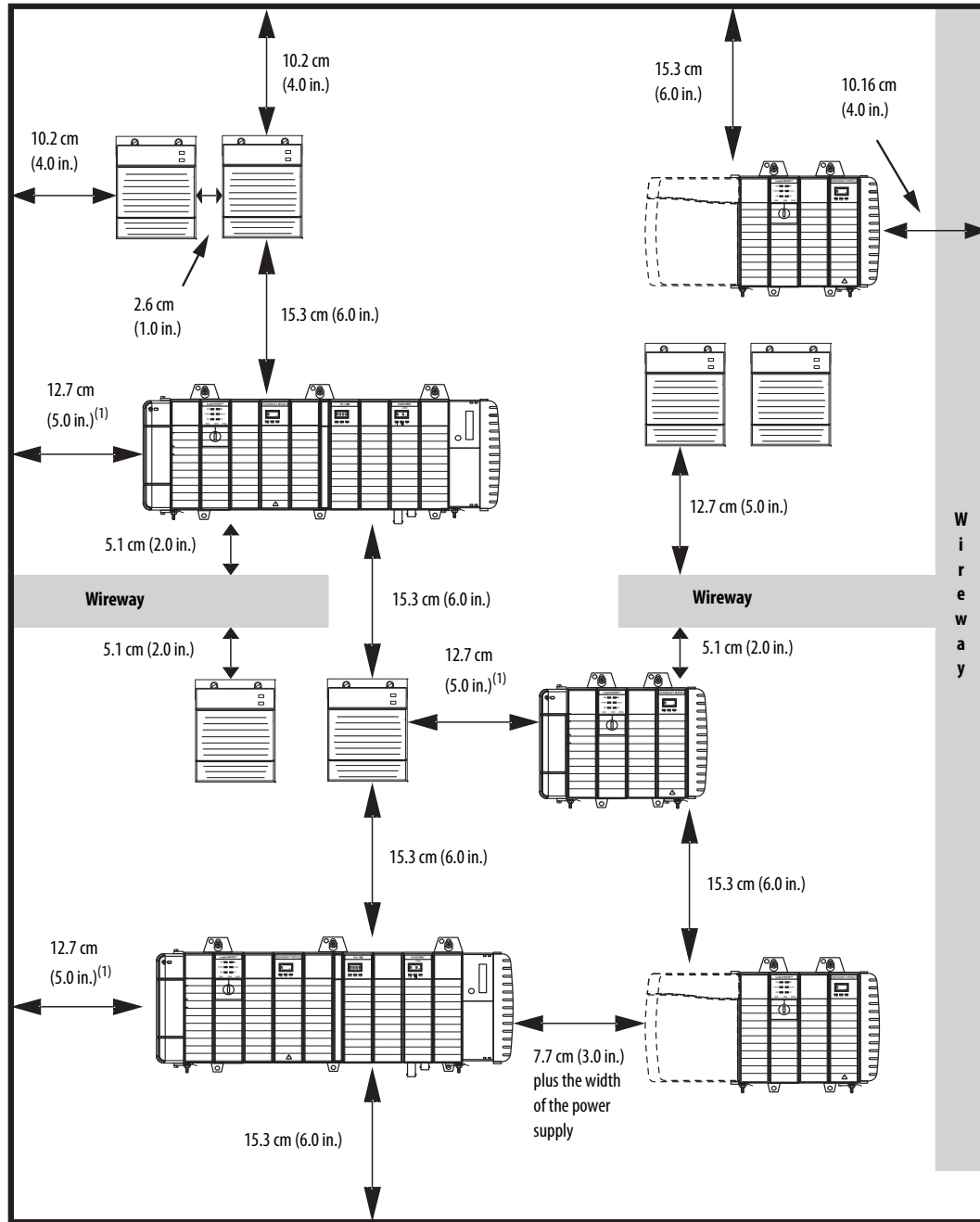
When you mount a ControlLogix chassis with a standard power supply in an enclosure, follow these spacing requirements (series C chassis depicted).



**IMPORTANT** The 1756-CPR2 cable has a bend radius of 12.7 cm (5.0 in.). The chassis must have a minimum clearance of 12.7 cm (5.0 in.) on the left side to route and connect the 1756-CPR2 cable. The redundant power supplies must have a minimum clearance of 12.7 cm (5.0 in.) below the supply to route and connect the 1756-CPR2 cable.



When you mount a ControlLogix chassis with a redundant power supply and a chassis adapter in an enclosure, follow these spacing requirements (series C chassis depicted).



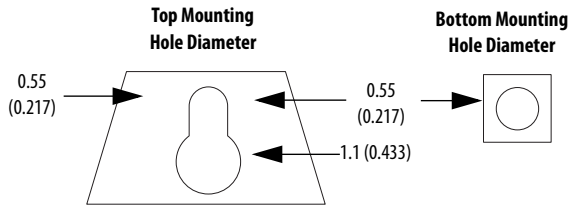
Series C chassis offer these features:

- Improved slot guidelines
- Improved ventilation
- Stronger mounting tabs
- Additional hole in mounting tab
- Additional ground screw

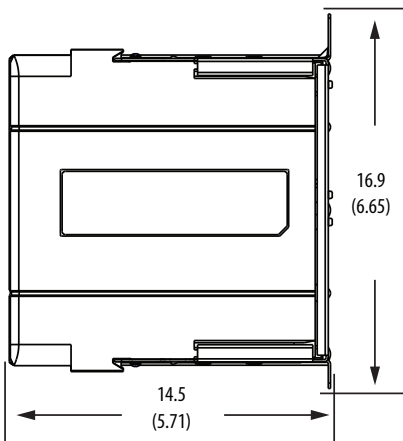
## Series B ControlLogix Chassis with Standard and Slim Power Supply Mounting Dimensions

Dimensions are in cm (in.).

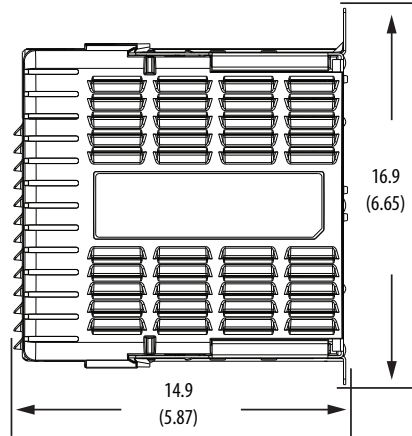
### Chassis Common Dimensions



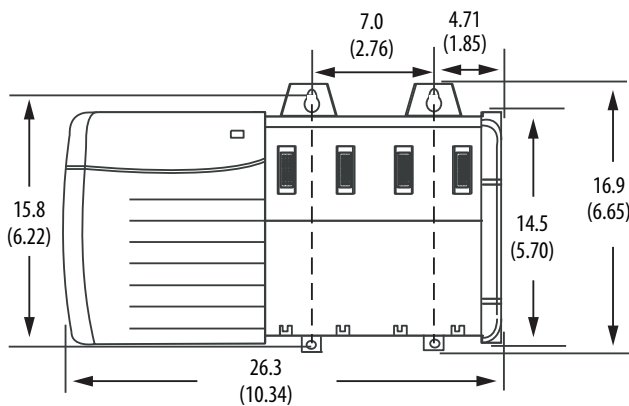
Right-side View of All Standard Chassis



Right-side View of All ControlLogix-XT Chassis



### 1756-A4/B Chassis and Power Supply



## Rockwell Automation Support

Use the following resources to access support information.

<b>Technical Support Center</b>	Knowledgebase Articles, How-to Videos, FAQs, Chat, User Forums, and Product Notification Updates.	<a href="http://www.rockwellautomation.com/knowledgebase">www.rockwellautomation.com/knowledgebase</a>
<b>Local Technical Support Phone Numbers</b>	Locate the phone number for your country.	<a href="http://www.rockwellautomation.com/global/support/get-support-now.page">www.rockwellautomation.com/global/support/get-support-now.page</a>
<b>Direct Dial Codes</b>	Find the Direct Dial Code for your product. Use the code to route your call directly to a technical support engineer.	<a href="http://www.rockwellautomation.com/global/support/direct-dial.page">www.rockwellautomation.com/global/support/direct-dial.page</a>
<b>Literature Library</b>	Installation Instructions, Manuals, Brochures, and Technical Data.	<a href="http://www.rockwellautomation.com/literature">www.rockwellautomation.com/literature</a>
<b>Product Compatibility and Download Center (PCDC)</b>	Get help determining how products interact, check features and capabilities, and find associated firmware.	<a href="http://www.rockwellautomation.com/global/support/pcdc.page">www.rockwellautomation.com/global/support/pcdc.page</a>

## Documentation Feedback

Your comments will help us serve your documentation needs better. If you have any suggestions on how to improve this document, complete the How Are We Doing? form at [http://literature.rockwellautomation.com/idc/groups/literature/documents/du/ra-du002\\_-en-e.pdf](http://literature.rockwellautomation.com/idc/groups/literature/documents/du/ra-du002_-en-e.pdf).

Rockwell Automation maintains current product environmental information on its website at <http://www.rockwellautomation.com/rockwellautomation/about-us/sustainability-ethics/product-environmental-compliance.page>.

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# 1756 ControlLogix Power Supplies Specifications

Product	Catalog Number
Standard Power Supplies	1756-PA72, 1756-PA72K, 1756-PA75, 1756-PA75K, 1756-PB72, 1756-PB72K, 1756-PB75, 1756-PB75K, 1756-PC75, 1756-PH75
Standard Slim Power Supplies	1756-PA50, 1756-PA50K, 1756-PB50, 1756-PB50K
ControlLogix-XT Power Supplies	1756-PAXT, 1756-PBXT
ControlLogix-XT Slim Power Supplies	1756-PA30XT, 1756-PB30XT
Redundant Power Supplies	1756-PA75R, 1756-PA75RK, 1756-PB75R, 1756-PB75RK
Redundant Power Supplies Chassis Adapter	1756-PSCA2, 1756-PSCA2K
ControlLogix-XT Redundant Power Supplies	1756-PAXTR, 1756-PBXTR
ControlLogix-XT Redundant Power Supplies Chassis Adapter	1756-PSCA2XT
Redundant Power Supply Power Cable	1756-CPR2, 1756-CPR2D, 1756-CPR2U

Topic	Page
Standard AC Power Supplies	2
Standard DC Power Supplies	4
1756 ControlLogix-XT Power Supplies	8
Redundant Power Supplies	11
Power Load and Transformer Sizing	19
Additional Resources	21

ControlLogix® power supplies are used with the 1756 chassis to provide 1.2V, 3.3V, 5V, and 24V DC power directly to the chassis backplane. Standard, Slim, ControlLogix-XT™, and redundant power supplies are available.

## Summary of Changes

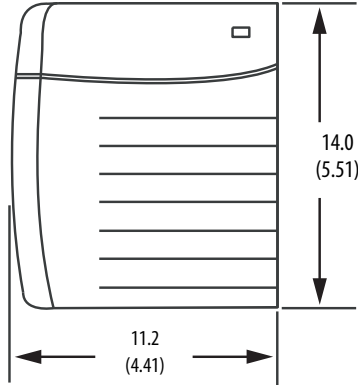
This manual contains updated torque requirements on pages [3](#), [5](#), [9](#), [13](#), and [15](#).



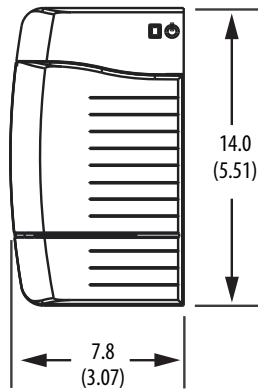
## Standard AC Power Supplies

### Mounting Dimensions

1756-PA72, 1756-PA72K, 1756-PA75, 1756-PA72K



1756-PA50, 1756-PA50K



Dimensions are in cm (in.).

### Technical Specifications - Standard AC Power Supplies

Attribute	1756-PA50, 1756-PA50K	1756-PA72/C, 1756-PA72K/C	1756-PA75/B, 1756-PA75K/B
Input voltage range <sup>(1)</sup>	85...265V AC		
Input voltage, nom	120V/240V AC		
Input frequency range	47...63 Hz		
Input power, max	81 W/91VA @ 50 °C (122 °F) 68 W/77VA @ 60 °C (140 °F)	100VA/100 W	
Output power, max	60 W @ 0...+50 °C (+32...+122 °F) <sup>(3)</sup> 50 W @ 0...+60 °C (+32...+140 °F) <sup>(4)</sup>	75 W @ 0...+60 °C (+32...+140 °F) <sup>(6)</sup>	
Inrush current, max	20 A		
Hold up time <sup>(2)</sup>	4 cycles @85...265V AC, 50/60 Hz, 60 W 5 cycles @85...265V AC, 50/60 Hz, 50 W	5 cycles @ 85V AC, 50/60 Hz 6 cycles @ 120V AC, 50/60 Hz 6 cycles @ 200V AC, 50/60 Hz 6 cycles @ 240V AC, 50/60 Hz	2 cycles @ 85V AC, 60 Hz 6 cycles @ 120V AC, 60 Hz 20 cycles @ 220V AC, 60 Hz
Current capacity @ 1.2V DC	1.5 A		
Current capacity @ 3.3V DC	2 A	4 A	
Current capacity @ 5.1V DC	8 A @ 50 °C (122 °F) 6 A @ 60 °C (140 °F)	10 A	13 A
Current capacity @ 24V DC	2.5 A @ 50 °C (122 °F) 2.0 A @ 60 °C (140 °F)	2.8 A	
Isolation voltage	250V (continuous), Reinforced Insulation Type, Power Input to Backplane Type tested @ 3150V DC for 60 s	250V (continuous), Reinforced Insulation Type, Power Input to Backplane Type tested at 3500V DC for 60 s	
Weight, approx	0.77 kg (1.7 lb)	0.95 kg (2.10 lb)	
Dimensions (HxWxD), approx	14.0 x 7.8 x 14.5 cm (5.51 x 3.07 x 5.71 in.)	14.0 x 11.2 x 14.5 cm (5.51 x 4.41 x 5.71 in.)	
Module location	Left side of 1756 chassis		
Chassis	1756-A4, 1756-A7, 1756-A10, 1756-A13, 1756-A17		
Chassis compatibility	Series A Series B Series C	Series B Series C	
Wire size	2.5 mm <sup>2</sup> (14 AWG) solid or stranded copper wire rated at 90 °C (194 °F), or greater, 1.2 mm (3/64 in.) insulation max		

## Technical Specifications - Standard AC Power Supplies

Attribute	1756-PA50, 1756-PA50K	1756-PA72/C, 1756-PA72K/C	1756-PA75/B, 1756-PA75K/B
Wire category	1 - on power ports <sup>(5)</sup>		
Conductor screw torque	0.565 N·m (5 lb-in)		
North American temperature code	T4		
Enclosure type rating	None (open-style)		

- (1) UL certification for 120/240V AC, 50/60 Hz nominal. Rockwell Automation specified 85...265V AC, 47...63 Hz.  
 (2) The hold up time is the time between input voltage removal and DC power failure.  
 (3) The combination of all output power (5.1V backplane, 24V backplane, 3.3V backplane, and 1.2V backplane) cannot exceed 60W @ 50 °C (122 °F) maximum temperature.  
 (4) The combination of all output power (5.1V backplane, 24V backplane, 3.3V backplane, and 1.2V backplane) cannot exceed 50W @ 60 °C (140 °F) maximum temperature.  
 (5) Use this conductor category information to plan conductor routing as described in the system level installation manual. See the Industrial Automation Wiring and Grounding Guidelines, publication [1770-4.1](#).  
 (6) The combination of all output power (5.1V backplane, 24V backplane, 3.3V backplane, and 1.2V backplane) cannot exceed 75W.

## Environmental Specifications - Standard AC Power Supplies

Attribute	1756-PA50, 1756-PA50K	1756-PA72/C, 1756-PA72K/C, 1756-PA75/B, 1756-PA75K/B
Temperature, operating IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock)	0 °C < Ta < +60 °C (+32 °F < Ta < +140 °F)	
Temperature, surrounding air, max	60 °C (140 °F)	
Temperature, non-operating IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40...+85 °C (-40...+185 °F)	
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5...95% noncondensing	
Vibration IEC 60068-2-6 (Test Fc, Operating)	2 g @ 10...500 Hz	
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g	
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	50 g <sup>(1)</sup>	
Emissions	IEC 61000-6-4	
ESD immunity IEC 61000-4-2	6 kV contact discharges 8 kV air discharges	
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine-wave 80% AM from 80...2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 1890 MHz 3V/m with 1 kHz sine-wave 80% AM from 2000...2700 MHz	
EFT/B immunity IEC 61000-4-4	±4 kV at 5 kHz on power ports	
Surge transient immunity IEC 61000-4-5	±1 kV line-line (DM) and ±2 kV line-earth (CM) on power ports	
Conducted RF immunity IEC 61000-4-6	10V rms with 1 kHz sine-wave 80% AM from 150 kHz...80 MHz	
Voltage variation IEC 61000-4-11	30% dips for 1 period at 0° and 180° on AC supply ports 60% dips for 5 and 50 periods on AC supply ports ±10% fluctuations for 15 min on AC supply ports >95% interruptions for 250 periods on AC supply ports	
Damped oscillatory wave immunity IEC 61000-4-18	±2.5 kV line-line (DM) and ±2.5 kV line-earth (CM) on power ports	—

- (1) Series C chassis have a maximum nonoperating shock value of 30 g. If you select a Series C chassis for use with your power supply, you are limited to a maximum nonoperating shock value of 30 g.

**Certifications - Standard AC Power Supplies**

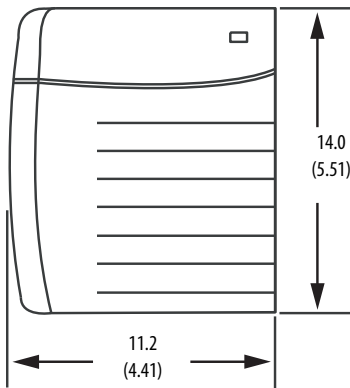
Certification <sup>(1)</sup>	1756-PA50, 1756-PA50K	1756-PA72/C, 1756-PA72K/C	1756-PA75/B, 1756-PA75K/B
UL	–	UL Listed Industrial Control Equipment. See UL File E65584.	
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810.	–	
CSA	–	CSA Certified Process Control Equipment. See CSA File LR54689C. CSA Certified Process Control Equipment for Class I, Division 2 Group A,B,C,D Hazardous Locations. See CSA File LR69960C.	
FM	FM Approved Equipment for use in Class I Division 2 Group A,B,C,D Hazardous Locations		
CE	European Union 2014/30/EU EMC Directive, compliant with: <ul style="list-style-type: none"> <li>• EN 61326-1; Meas./Control/Lab., Industrial Requirements</li> <li>• EN 61000-6-2; Industrial Immunity</li> <li>• EN 61000-6-4; Industrial Emissions</li> <li>• EN 61131-2; Programmable Controllers (Clause 8, Zone A &amp; B)</li> </ul> European Union 2014/35/EU LVD, compliant with: <ul style="list-style-type: none"> <li>• EN 61010-2-201; Control Equipment Safety Requirements</li> </ul>	European Union 2014/30/EU EMC Directive, compliant with: <ul style="list-style-type: none"> <li>• EN 61326-1; Meas./Control/Lab., Industrial Requirements</li> <li>• EN 61000-6-2; Industrial Immunity</li> <li>• EN 61000-6-4; Industrial Emissions</li> <li>• EN 61131-2; Programmable Controllers (Clause 8, Zone A &amp; B)</li> </ul> European Union 2014/35/EU LVD, compliant with: <ul style="list-style-type: none"> <li>• EN 61131-2; Programmable Controllers (Clause 11)</li> </ul>	
RCM	Australian Radiocommunications Act, compliant with: <ul style="list-style-type: none"> <li>• EN 61000-6-4; Industrial Emissions</li> </ul>		
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: <ul style="list-style-type: none"> <li>• Article 58-2 of Radio Waves Act, Clause 3</li> </ul>		
EAC	Russian Customs Union TR CU 020/2011 EMC Technical Regulation Russian Customs Union TR CU 004/2011 LV Technical Regulation		

(1) See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.

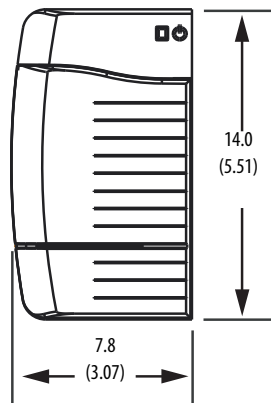
**Standard DC Power Supplies**

**Mounting Dimensions**

**1756-PB72, 1756-PB72K, 1756-PB75, 1756-PB75K, 1756-PC75, 1756-PH75**



**1756-PB50, 1756-PB50K**



Dimensions are in cm (in.).

**Technical Specifications - Standard DC Power Supplies**

Attribute	1756-PB50, 1756-PB50K	1756-PB72/C, 1756-PB72K/C	1756-PB75/B, 1756-PB75K/B	1756-PC75/B	1756-PH75/B
Input voltage range	18...32V DC <sup>(2)</sup>			30...60V DC <sup>(5)</sup>	90...143V DC <sup>(6)</sup>
Input voltage, nom	24V DC			48V DC	125V DC
Input power, max	85 W @ 50 °C (122 °F) 70 W @ 60 °C (140 °F)	95 W			



## Power Load and Transformer Sizing

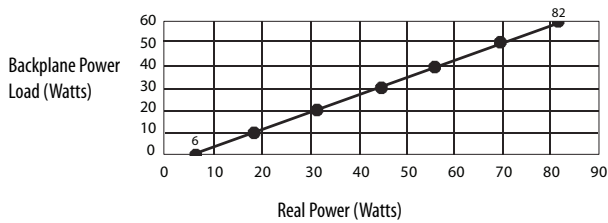
The following graphs show the input power requirements for slim and standard power supplies, given the power that they are providing to the modules in the chassis.

Follow these steps to determine the power requirements for your chassis.

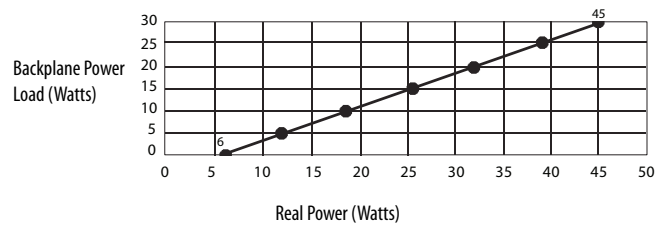
1. Calculate the Backplane Power load by adding the power draw (in watts) for all planned modules.  
For module power draws, refer to the module specification tables in the ControlLogix Selection Guide, publication [1756-SG001](#).
2. Locate the Backplane Power load on the vertical (y) axis of the graph and determine the corresponding Real Power (input-power) rating on the horizontal (x) axis.  
The Real Power value is the amount of power that is consumed by the power supply.

### Slim Power Supply Power Requirements

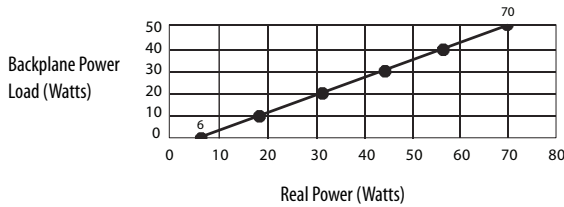
1756-PA50, 1756-PA50K @ 50 °C (AC)



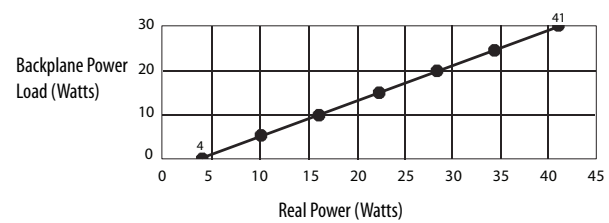
1756-PA30XT (AC)



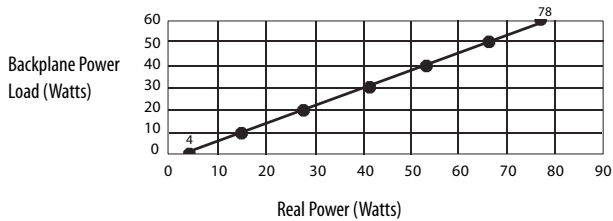
1756-PA50, 1756-PA50K @ 60 °C (AC)



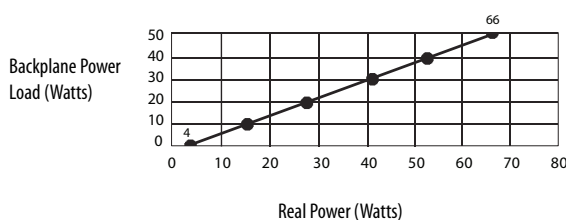
1756-PB30XT (DC)



1756-PB50, 1756-PB50K @ 50 °C (DC)



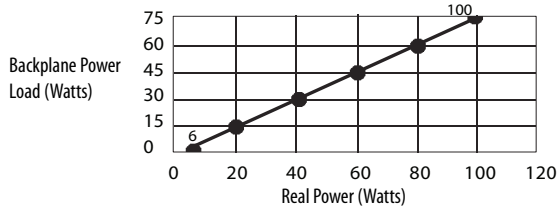
1756-PB50, 1756-PB50K @ 60 °C (DC)



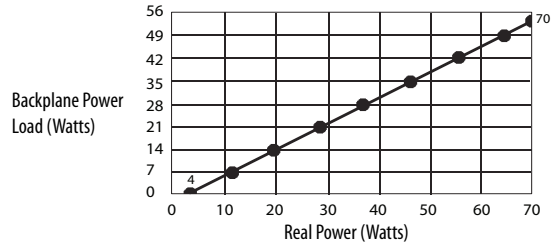
$$\text{Apparent Power (Watts)} = \text{Transformer Load (VA)} = \text{Real Power (Watts)}$$

**Standard Power Supply Power Requirements**

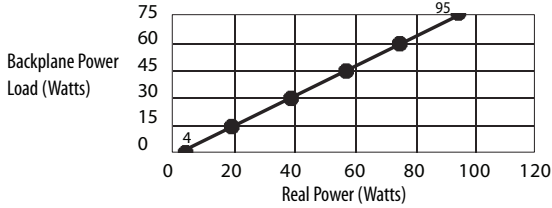
**1756-PA72/C, 1756-PA72K/C, 1756-PA75/B (AC), 1756-PA75K/B (AC)**



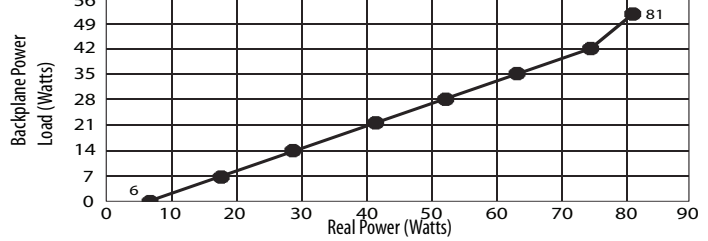
**1756-PBXT (DC)**



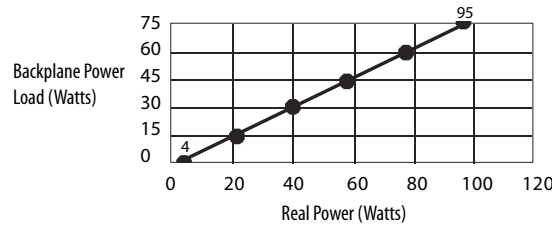
**1756-PB72/C, 1756-PB72K/C, 1756-PB75/B (AC), 1756-PB75K/B (DC)**



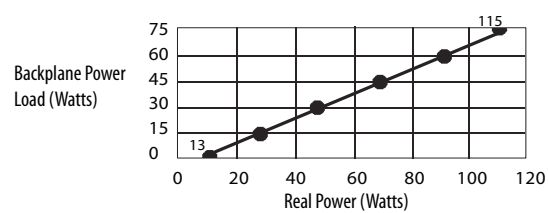
**1756-PBXT (DC)**



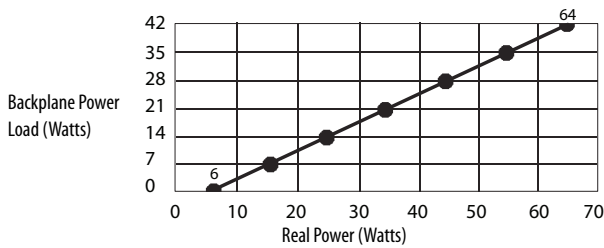
**1756-PH75/B, 1756-PC75/B (DC)**



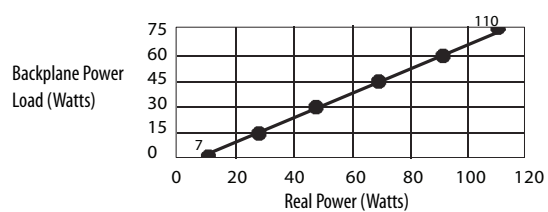
**1756-PA75R/A, 1756-PA75RK/A(AC)**



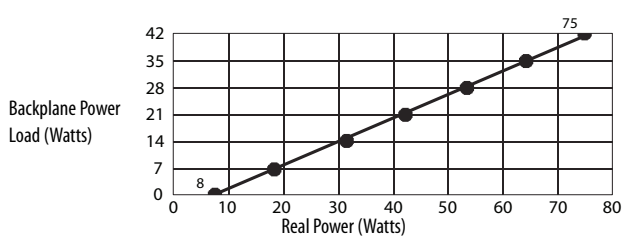
**1756-PAXT (AC)**



**1756-PB75R/A, 1756-PB75RK/A (DC)**



**1756-PAXTR (AC)**



Apparent Power (Watts) = Transformer Load (VA) = Real Power (Watts)

## Additional Resources

These documents contain additional information concerning related products from Rockwell Automation.

Resource	Description
ControlLogix Chassis Specifications Technical Data, publication <a href="#">1756-TD006</a>	Provides technical specifications for ControlLogix chassis.
ControlLogix Selection Guide, publication <a href="#">1756-SG001</a>	Provides overview of the ControlLogix system and its products.
ControlLogix Power Supply Installation Instructions, publication <a href="#">1756-IN619</a>	Provides information on how to install ControlLogix standard power supplies.
ControlLogix Redundant Power Supply Installation Instructions, publication <a href="#">1756-IN620</a>	Provides information on how to install ControlLogix redundant power supplies.
ControlLogix Chassis Installation Instructions, publication <a href="#">1756-IN621</a>	Provides information on how to install ControlLogix chassis.
ControlLogix System User Manual, publication <a href="#">1756-UM001</a>	Provides information on how to install, configure, program, and use ControlLogix systems.
Industrial Automation Wiring and Grounding Guidelines, publication <a href="#">1770.4.1</a>	Provides general guidelines for installing a Rockwell Automation® industrial system.
Product Certifications website, <a href="http://www.rockwellautomation.com/global/certification/overview.page">http://www.rockwellautomation.com/global/certification/overview.page</a>	Provides declarations of conformity, certificates, and other certification details.

You can view or download publications at <http://www.rockwellautomation.com/literature/>. To order paper copies of technical documentation, contact your local Allen-Bradley distributor or Rockwell Automation sales representative.

## Rockwell Automation Support

Use the following resources to access support information.

<b>Technical Support Center</b>	Knowledgebase Articles, How-to Videos, FAQs, Chat, User Forums, and Product Notification Updates.	<a href="http://www.rockwellautomation.com/knowledgebase">www.rockwellautomation.com/knowledgebase</a>
<b>Local Technical Support Phone Numbers</b>	Locate the phone number for your country.	<a href="http://www.rockwellautomation.com/global/support/get-support-now.page">www.rockwellautomation.com/global/support/get-support-now.page</a>
<b>Direct Dial Codes</b>	Find the Direct Dial Code for your product. Use the code to route your call directly to a technical support engineer.	<a href="http://www.rockwellautomation.com/global/support/direct-dial.page">www.rockwellautomation.com/global/support/direct-dial.page</a>
<b>Literature Library</b>	Installation Instructions, Manuals, Brochures, and Technical Data.	<a href="http://www.rockwellautomation.com/literature">www.rockwellautomation.com/literature</a>
<b>Product Compatibility and Download Center (PCDC)</b>	Get help determining how products interact, check features and capabilities, and find associated firmware.	<a href="http://www.rockwellautomation.com/global/support/pcdc.page">www.rockwellautomation.com/global/support/pcdc.page</a>

## Documentation Feedback

Your comments will help us serve your documentation needs better. If you have any suggestions on how to improve this document, complete the How Are We Doing? form at [http://literature.rockwellautomation.com/idc/groups/literature/documents/du/ra-du002\\_-en-e.pdf](http://literature.rockwellautomation.com/idc/groups/literature/documents/du/ra-du002_-en-e.pdf).

Rockwell Automation maintains current product environmental information on its website at <http://www.rockwellautomation.com/rockwellautomation/about-us/sustainability-ethics/product-environmental-compliance.page>.

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# ControlLogix Power Supply

Catalog Numbers 1756-PA30XT, 1756-PA50, 1756-PA50K, 1756-PA72, 1756-PA72K, 1756-PA75, 1756-PA75K, 1756-PB30XT, 1756-PB50, 1756-PB50K, 1756-PB72, 1756-PB72K, 1756-PB75, 1756-PB75K, 1756-PC75, 1756-PH75, 1756-PH75K, 1756-PAXT, 1756-PBXT

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ControlLogix® power supplies are used with the 1756 chassis to provide 1.2V, 3.3V, 5V, and 24V DC power directly to the chassis backplane. Standard, ControlLogix-XT™, and slim (reduced width) power supplies are available.

The catalog number of the conformal coated product includes the designation 'K' in the last position before the series identifier.

## Power Supply and Chassis Compatibility

Your chassis series determines the power supply that you can use. This table lists the chassis that can be installed with each power supply.

Power Supply Cat. No.	Chassis Cat. No.
1756-PA72/C, 1756-PA72K	1756-A4/A, 1756-A7/A, 1756-A10/A, 1756-A13/A, 1756-A17/A, 1756-A4/B, 1756-A7/B, 1756-A10/B, 1756-A13/B, 1756-A17/B, 1756-A4/C, 1756-A7/C, 1756-A10/C, 1756-A13/C, 1756-A17/C
1756-PB72/C, 1756-PB72K	
1756-PA50, 1756-PA50K	
1756-PB50, 1756-PB50K	
1756-PA75/B, 1756-PA75K	1756-A4/B, 1756-A7/B, 1756-A10/B, 1756-A13/B, 1756-A17/B, 1756-A4/C, 1756-A7/C, 1756-A10/C, 1756-A13/C, 1756-A17/C
1756-PB75/B, 1756-PB75K	
1756-PC75/B	
1756-PH75/B, 1756-PH75K	
1756-PBXT	1756-A4LXT/B, 1756-A5XT/B, 1756-A7LXT/B, 1756-A7XT/B, 1756-A7XT/C, 1756-A10XT/C
1756-PAXT	
1756-PA30XT	
1756-PB30XT	



**ATTENTION:** Read this document and the documents listed in the Additional Resources section about installation, configuration and operation of this equipment before you install, configure, operate or maintain this product. Users are required to familiarize themselves with installation and wiring instructions in addition to requirements of all applicable codes, laws, and standards.

Activities including installation, adjustments, putting into service, use, assembly, disassembly, and maintenance are required to be carried out by suitably trained personnel in accordance with applicable code of practice.

If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

**注意:** 在安装、配置、操作和维护本产品前, 请阅读本文档以及“其他资源”部分列出的有关设备安装、配置和操作的相应文档。除了所有适用规范、法律和标准的相关要求之外, 用户还必须熟悉安装和接线说明。

安装、调整、投运、使用、组装、拆卸和维护等各项操作必须由经过适当训练的专业人员按照适用的操作规范实施。

如果未按照制造商指定的方式使用该设备, 则可能会损害设备提供的保护。

**ATENCIÓN:** Antes de instalar, configurar, poner en funcionamiento o realizar el mantenimiento de este producto, lea este documento y los documentos listados en la sección Recursos adicionales acerca de la instalación, configuración y operación de este equipo. Los usuarios deben familiarizarse con las instrucciones de instalación y cableado y con los requisitos de todos los códigos, leyes y estándares vigentes.

El personal debidamente capacitado debe realizar las actividades relacionadas a la instalación, ajustes, puesta en servicio, uso, ensamblaje, desensamblaje y mantenimiento de conformidad con el código de práctica aplicable.

Si este equipo se usa de una manera no especificada por el fabricante, la protección provista por el equipo puede resultar afectada.

**ATENÇÃO:** Leia este e os demais documentos sobre instalação, configuração e operação do equipamento que estão na seção Recursos adicionais antes de instalar, configurar, operar ou manter este produto. Os usuários devem se familiarizar com as instruções de instalação e fiação além das especificações para todos os códigos, leis e normas aplicáveis.

É necessário que as atividades, incluindo instalação, ajustes, colocação em serviço, utilização, montagem, desmontagem e manutenção sejam realizadas por pessoal qualificado e especializado, de acordo com o código de prática aplicável.

Caso este equipamento seja utilizado de maneira não estabelecida pelo fabricante, a proteção fornecida pelo equipamento pode ficar prejudicada.

**ВНИМАНИЕ:** Перед тем как устанавливать, настраивать, эксплуатировать или обслуживать данное оборудование, прочитайте этот документ и документы, перечисленные в разделе «Дополнительные ресурсы». В этих документах изложены сведения об установке, настройке и эксплуатации данного оборудования. Пользователи обязаны ознакомиться с инструкциями по установке и прокладке соединений, а также с требованиями всех применимых норм, законов и стандартов.

Все действия, включая установку, наладку, ввод в эксплуатацию, использование, сборку, разборку и техническое обслуживание, должны выполняться обученным персоналом в соответствии с применимыми нормами и правилами.

Если оборудование используется не предусмотренным производителем образом, защита оборудования может быть нарушена.

**注意:** 本製品を設置、構成、稼働または保守する前に、本書および本機器の設置、設定、操作についての参考資料の該当箇所に記載されている文書に目を通してください。ユーザは、すべての該当する条例、法律、規格の要件に加えて、設置および配線の手順に習熟している必要があります。

設置調整、運転の開始、使用、組立て、解体、保守を含む諸作業は、該当する実施規則に従って訓練を受けた適切な作業員が実行する必要があります。

本機器が製造メーカーにより指定されていない方法で使用されている場合、機器により提供されている保護が損なわれる恐れがあります。

**ACHTUNG:** Lesen Sie dieses Dokument und die im Abschnitt „Weitere Informationen“ aufgeführten Dokumente, die Informationen zu Installation, Konfiguration und Bedienung dieses Produkts enthalten, bevor Sie dieses Produkt installieren, konfigurieren, bedienen oder warten. Anwender müssen sich neben den Bestimmungen aller anwendbaren Vorschriften, Gesetze und Normen zusätzlich mit den Installations- und Verdrahtungsanweisungen vertraut machen.

Arbeiten im Rahmen der Installation, Anpassung, Inbetriebnahme, Verwendung, Montage, Demontage oder Instandhaltung dürfen nur durch ausreichend geschulte Mitarbeiter und in Übereinstimmung mit den anwendbaren Ausführungsvorschriften vorgenommen werden.

Wenn das Gerät in einer Weise verwendet wird, die vom Hersteller nicht vorgesehen ist, kann die Schutzfunktion beeinträchtigt sein.

**ATTENTION :** Lisez ce document et les documents listés dans la section Ressources complémentaires relatifs à l'installation, la configuration et le fonctionnement de cet équipement avant d'installer, configurer, utiliser ou entretenir ce produit. Les utilisateurs doivent se familiariser avec les instructions d'installation et de câblage en plus des exigences relatives aux codes, lois et normes en vigueur.

Les activités relatives à l'installation, le réglage, la mise en service, l'utilisation, l'assemblage, le démontage et l'entretien doivent être réalisées par des personnes formées selon le code de pratique en vigueur.

Si cet équipement est utilisé d'une façon qui n'a pas été définie par le fabricant, la protection fournie par l'équipement peut être compromise.

**주의:** 본 제품 설치, 설정, 작동 또는 유지 보수하기 전에 본 문서를 포함하여 설치, 설정 및 작동에 관한 참고 자료 섹션의 문서들을 반드시 읽고 숙지하십시오. 사용자는 모든 관련 규정, 법규 및 표준에서 요구하는 사항에 대해 반드시 설치 및 배선 지침을 숙지해야 합니다.

설치, 조정, 가동, 사용, 조립, 분해, 유지보수 등 모든 작업은 관련 규정에 따라 적절한 교육을 받은 사용자를 통해서만 수행해야 합니다.

본 장비를 제조사가 명시하지 않은 방법으로 사용하면 장비의 보호 기능이 손상될 수 있습니다.

**ATTENZIONE** Prima di installare, configurare ed utilizzare il prodotto, o effettuare interventi di manutenzione su di esso, leggere il presente documento ed i documenti elencati nella sezione "Altre risorse", riguardanti l'installazione, la configurazione ed il funzionamento dell'apparecchiatura. Gli utenti devono leggere e comprendere le istruzioni di installazione e cablaggio, oltre ai requisiti previsti dalle leggi, codici e standard applicabili.

Le attività come installazione, regolazioni, utilizzo, assemblaggio, disassemblaggio e manutenzione devono essere svolte da personale adeguatamente addestrato, nel rispetto delle procedure previste.

Qualora l'apparecchio venga utilizzato con modalità diverse da quanto previsto dal produttore, la sua funzione di protezione potrebbe venire compromessa.

**DIKKAT:** Bu ürünün kurulumu, yapılandırılması, işletilmesi veya bakımı öncesinde bu dokümanı ve bu ekipmanın kurulumu, yapılandırılması ve işletimi ile ilgili ilave Kaynaklar bölümünde yer listelenmiş dokümanları okuyun. Kullanıcılar yürürlükteki tüm yönetmelikler, yasalar ve standartların gereksinimlerine ek olarak kurulum ve kablolama talimatlarını da öğrenmek zorundadır.

Kurulum, ayarlama, hizmet alma, kulanma, parçaları birleştirme, parçaları sökme ve bakım gibi aktiviteler sadece uygun eğitimleri almış kişiler tarafından yürürlükteki uygulama yönetmeliklerine uygun şekilde yapılabilir.

Bu ekipman üretici tarafından belirlenmiş amacın dışında kullanılırsa, ekipman tarafından sağlanan koruma bozulabilir.

**注意事項:** 在安装、設定、操作或維護本產品前, 請先閱讀此文件以及列於「其他資源」章節中有關安裝、設定與操作此設備的文件。使用者必須熟悉安裝和配線指示, 並符合所有法規、法律和標準要求。

包括安裝、調整、交付使用、使用、組裝、拆卸和維護等動作都必須交由已經過適當訓練的人員進行, 以符合適用的實作法規。

如果將設備用於非製造商指定的用途時, 可能會造成設備所提供的保護功能受損。

**POZOR:** Než začnete instalovat, konfigurovat či provozovat tento výrobek nebo provádět jeho údržbu, přečtěte si tento dokument a dokumenty uvedené v části Dodatečné zdroje ohledně instalace, konfigurace a provozu tohoto zařízení. Uživatelé se musejí vedle požadavků všech relevantních vyhlášek, zákonů a norem nutně seznámit také s pokyny pro instalaci elektrické zapojení.

Činnosti zahrnující instalaci, nastavení, uvedení do provozu, užívání, montáž, demontáž a údržbu musí vykonávat vhodně proškolený personál v souladu s příslušnými prováděcími předpisy.

Pokud se toto zařízení používá způsobem neodpovídajícím specifikaci výrobce, může být narušena ochrana, kterou toto zařízení poskytuje.

**UWAGA:** Przed instalacją, konfiguracją, użytkowaniem lub konserwacją tego produktu należy przeczytać niniejszy dokument oraz wszystkie dokumenty wymienione w sekcji Dodatkowe źródła omawiające instalację, konfigurację i procedury użytkowania tego urządzenia. Użytkownicy mają obowiązek zapoznać się z instrukcjami dotyczącymi instalacji oraz oprzewodowania, jak również z obowiązującymi kodeksami, prawem i normami.

Działania obejmujące instalację, regulację, przekazanie do użytkowania, użytkowanie, montaż, demontaż oraz konserwację muszą być wykonywane przez odpowiednio przeszkolony personel zgodnie z obowiązującym kodeksem postępowania.

Jeśli urządzenie jest użytkowane w sposób inny niż określony przez producenta, zabezpieczenie zapewniane przez urządzenie może zostać ograniczone.

**OBST!** Läs detta dokument samt dokumentet, som står listat i avsnittet Övriga resurser, om installation, konfigurering och drift av denna utrustning innan du installerar, konfigurerar eller börjar använda eller utföra underhållsarbete på produkten. Användare måste bekanta sig med instruktioner för installation och kabeldragning, förutom krav enligt gällande koder, lagar och standarder.

Åtgärder som installation, justering, service, användning, montering, demontering och underhållsarbete måste utföras av personal med lämplig utbildning enligt lämpligt bruk.

Om denna utrustning används på ett sätt som inte anges av tillverkaren kan det hända att utrustningens skyddsanordningar försätts ur funktion.

**LET OP:** Lees dit document en de documenten die genoemd worden in de paragraaf Aanvullende informatie over de installatie, configuratie en bediening van deze apparatuur voordat u dit product installeert, configureert, bediend of onderhoudt. Gebruikers moeten zich vertrouwd maken met de installatie en de bedradinginstructies, naast de vereisten van alle toepasselijke regels, wetten en normen.

Activiteiten zoals het installeren, afstellen, in gebruik stellen, gebruiken, monteren, demonteren en het uitvoeren van onderhoud mogen uitsluitend worden uitgevoerd door hiervoor opgeleid personeel en in overeenstemming met de geldende praktijkregels.

Indien de apparatuur wordt gebruikt op een wijze die niet is gespecificeerd door de fabrikant, dan bestaat het gevaar dat de beveiliging van de apparatuur niet goed werkt.

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## Environment and Enclosure

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**ATTENTION:** This equipment is intended for use in a Pollution Degree 2 industrial environment, in overvoltage Category II applications (as defined in EN/IEC 60664-1), at altitudes up to 2000 m (6562 ft) without derating.

This equipment is not intended for use in residential environments and may not provide adequate protection to radio communication services in such environments.

This equipment is supplied as open-type equipment for indoor use. It must be mounted within an enclosure that is suitably designed for those specific environmental conditions that will be present and appropriately designed to prevent personal injury resulting from accessibility to live parts. The enclosure must have suitable flame-retardant properties to prevent or minimize the spread of flame, complying with a flame spread rating of 5VA or be approved for the application if nonmetallic. The interior of the enclosure must be accessible only by the use of a tool. Subsequent sections of this publication may contain additional information regarding specific enclosure type ratings that are required to comply with certain product safety certifications.

In addition to this publication, see the following:

- Industrial Automation Wiring and Grounding Guidelines, publication [1770-4.1](#), for additional installation requirements.
  - NEMA Standard 250 and EN/IEC 60529, as applicable, for explanations of the degrees of protection provided by different types of enclosures.
- 

## Prevent Electrostatic Discharge

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**ATTENTION:** This equipment is sensitive to electrostatic discharge, which can cause internal damage and affect normal operation. Follow these guidelines when you handle this equipment:

- Touch a grounded object to discharge potential static.
  - Wear an approved grounding wriststrap.
  - Do not touch connectors or pins on component boards.
  - Do not touch circuit components inside the equipment.
  - Use a static-safe workstation, if available.
  - Store the equipment in appropriate static-safe packaging when not in use.
- 

**IMPORTANT** **ControlLogix-XT system components are rated for extreme environmental conditions only when used properly with other Logix-XT system components. The use of ControlLogix-XT components with standard ControlLogix system components nullifies extreme-environment ratings.**

If a ControlLogix-XT module is used with standard ControlLogix products, the ControlLogix-XT module can withstand only the environments specified for the standard ControlLogix version of the module. For example, if a 1756-L63XT controller is used in a standard 1756-A10 chassis, the ControlLogix-XT controller can withstand only the environment specified for the standard 1756-L63 controller.



The ControlLogix-XT system components are designed to meet the same and greater operational and environmental requirements as traditional ControlLogix products.

When a ControlLogix-XT component is used as a replacement for a traditional ControlLogix component, the functional and environmental requirements of the traditional ControlLogix component apply, with the exception of the power output ratings.

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### North American Hazardous Location Approval

The following information applies when operating this equipment in hazardous locations.	Informations sur l'utilisation de cet équipement en environnements dangereux.
<p>Products marked "CL I, DIV 2, GP A, B, C, D" are suitable for use in Class I Division 2 Groups A, B, C, D, Hazardous Locations and nonhazardous locations only. Each product is supplied with markings on the rating nameplate indicating the hazardous location temperature code. When combining products within a system, the most adverse temperature code (lowest "T" number) may be used to help determine the overall temperature code of the system. Combinations of equipment in your system are subject to investigation by the local Authority Having Jurisdiction at the time of installation.</p>	<p>Les produits marqués "CL I, DIV 2, GP A, B, C, D" ne conviennent qu'à une utilisation en environnements de Classe I Division 2 Groupes A, B, C, D dangereux et non dangereux. Chaque produit est livré avec des marquages sur sa plaque d'identification qui indiquent le code de température pour les environnements dangereux. Lorsque plusieurs produits sont combinés dans un système, le code de température le plus défavorable (code de température le plus faible) peut être utilisé pour déterminer le code de température global du système. Les combinaisons d'équipements dans le système sont sujettes à inspection par les autorités locales qualifiées au moment de l'installation.</p>
<div style="display: flex; align-items: center;">  <div> <p><b>WARNING: EXPLOSION HAZARD</b></p> <ul style="list-style-type: none"> <li>Do not disconnect equipment unless power has been removed or the area is known to be nonhazardous.</li> <li>Do not disconnect connections to this equipment unless power has been removed or the area is known to be nonhazardous. Secure any external connections that mate to this equipment by using screws, sliding latches, threaded connectors, or other means provided with this product.</li> <li>Substitution of components may impair suitability for Class I, Division 2.</li> <li>If this product contains batteries, they must be changed only in an area known to be nonhazardous.</li> </ul> </div> </div>	<div style="display: flex; align-items: center;">  <div> <p><b>AVERTISSEMENT: RISQUE D'EXPLOSION</b></p> <ul style="list-style-type: none"> <li>Couper le courant ou s'assurer que l'environnement est classé non dangereux avant de débrancher l'équipement.</li> <li>Couper le courant ou s'assurer que l'environnement est classé non dangereux avant de débrancher les connecteurs. Fixer tous les connecteurs externes reliés à cet équipement à l'aide de vis, loquets coulissants, connecteurs filetés ou autres moyens fournis avec ce produit.</li> <li>La substitution de composants peut rendre cet équipement inadapté à une utilisation en environnement de Classe I, Division 2.</li> <li>S'assurer que l'environnement est classé non dangereux avant de changer les piles.</li> </ul> </div> </div>

### European Hazardous Location Approval

The following applies to products marked , , II 3:

- Such modules are Equipment Group II, Equipment Category 3, and comply with the Essential Health and Safety Requirements relating to the design and construction of such equipment given in Annex II to Directive 94/9/EC. See the EC Declaration of Conformity at [rok.auto/certifications](http://rok.auto/certifications) for details. The type of protection for 1756-PB50, 1756-PB72, 1756-PB75, 1756-PBXT, and 1756-PB30XT is "Ex nA IIC T4 Gc" according to EN 60079-15.
- Such modules may have catalog numbers followed by a "K" to indicate a conformal coating option.
- Such modules are intended for use in areas in which explosive atmospheres caused by gases, vapors, mists, or air are unlikely to occur, or are likely to occur only infrequently and for short periods. Such locations correspond to Zone 2 classification according to ATEX directive 1999/92/EC.
- The 1756-PB50, 1756-PB72, 1756-PB75, 1756-PBXT, and 1756-PB30XT comply to Standards EN 60079-0:2012+A11:2013, EN 60079-15:2010, reference ATEX certificate number DEMK013ATEX1325026X.

## IEC Hazardous Location Approval

The following applies to products with IECEx certification:

- Such modules are intended for use in areas in which explosive atmospheres caused by gases, vapors, mists, or air are unlikely to occur, or are likely to occur only infrequently and for short periods. Such locations correspond to Zone 2 classification to IEC 60079-0.
- Such modules may have catalog numbers followed by a "K" to indicate a conformal coating option.
- The type of protection for 1756-PB50, 1756-PB72, 1756-PB75, 1756-PBXT, and 1756-PB30XT, is "Ex nA IIC T4 Gc" according to IEC 60079-15.
- The 1756-PB50, 1756-PB72, 1756-PB75, 1756-PBXT, and 1756-PB30XT comply to Standards IEC 60079-0:2011, IEC 60079-15:2010, reference IECEx certificate number IECExUL14.0008X.

### ATEX and IECEx Hazardous Location Conformity

Model	Protection Type	ATEX Certificate	IECEx Certificate
1756-PA50, 1756-PA50K	None	—	—
1756-PA72, 1756-PA72K	None	—	—
1756-PA75, 1756-PA75K	None	—	—
1756-PB50, 1756-PB50K	Ex nA IIC T4 Gc	DEMKO13ATEX1325026X	IECEx UL 14.0008X
1756-PB72, 1756-PB72K	Ex nA IIC T4 Gc	DEMKO13ATEX1325026X	IECEx UL 14.0008X
1756-PB75, 1756-PB75K	Ex nA IIC T4 Gc	DEMKO13ATEX1325026X	IECEx UL 14.0008X
1756-PC75	None	—	—
1756-PH75, 1756-PH75K	None	—	—
1756-PAXT	None	—	—
1756-PBXT	Ex nA IIC T4 Gc	DEMKO13ATEX1325026X	IECEx UL 14.0008X
1756-PA30XT	None	—	—
1756-PB30XT	Ex nA IIC T4 Gc	DEMKO13ATEX1325026X	IECEx UL 14.0008X

### Waste Electrical and Electronic Equipment (WEEE)



At the end of its life, this equipment should be collected separately from any unsorted municipal waste.

### Special Conditions for Safe Use



#### WARNING:

- This equipment shall be mounted in an ATEX/IECEx Zone 2-certified enclosure with a minimum ingress protection rating of at least IP54 (as defined in EN/IEC 60529) and used in an environment of not more than Pollution Degree 2 (as defined in EN/IEC 60664-1) when applied in Zone 2 environments. The enclosure must be accessible only by the use of a tool.
- This equipment shall be used within its specified ratings defined by Rockwell Automation.
- Provision shall be made to prevent the rated voltage from being exceeded by transient disturbances of more than 140% of the rated voltage when applied in Zone 2 environments.
- This equipment must be used only with ATEX/IECEx certified Rockwell Automation backplanes.
- Instructions in the user manual shall be observed.
- Secure any external connections that mate to this equipment by using screws, sliding latches, threaded connectors, or other means provided with this product.
- Do not disconnect equipment unless power has been removed or the area is known to be nonhazardous.
- Devices shall be used in an environment of not more than Pollution Degree 2.

## Summary of Changes

We updated the torque requirement on pages [7](#) and [10](#) for these power supplies.

## Tools Required

When installing the standard or ControlLogix-XT versions of your 1756 chassis and power supplies, the following items are required:

- 3.18 mm (0.125 in.) slotted screwdriver
- 6.35 mm (0.25 in.) slotted or #2 Phillips screwdriver
- Torque screwdriver
- Needle-nose pliers
- Crimper
- Wire stripper
- Drill



**ATTENTION:** If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

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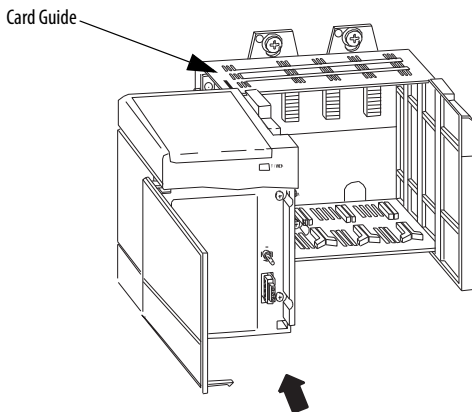


**ATTENTION:** Make sure the chassis is mounted and all panel fabrication is complete before you remove the protective label. This label protects the power supply from metal shavings falling inside the power supply and damaging it during operation.

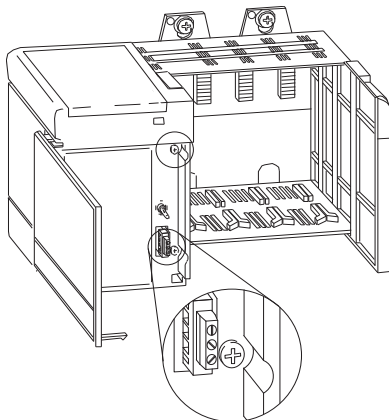
---

## Install the Power Supply

1. Make sure that the chassis is installed and grounded correctly.
2. Align the power-supply circuit board with the card guides on the left side of the chassis.
3. Slide the power supply back until it is flush with the front of the chassis.



4. Tighten the top and bottom screws to fasten the power supply to the chassis.



## Connect the Power



### WARNING: EXPLOSION HAZARD

If you connect or disconnect wiring while the field-side power is on, an electric arc can occur. This can cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.



### ATTENTION: Do not wire more than one conductor on any single terminal.

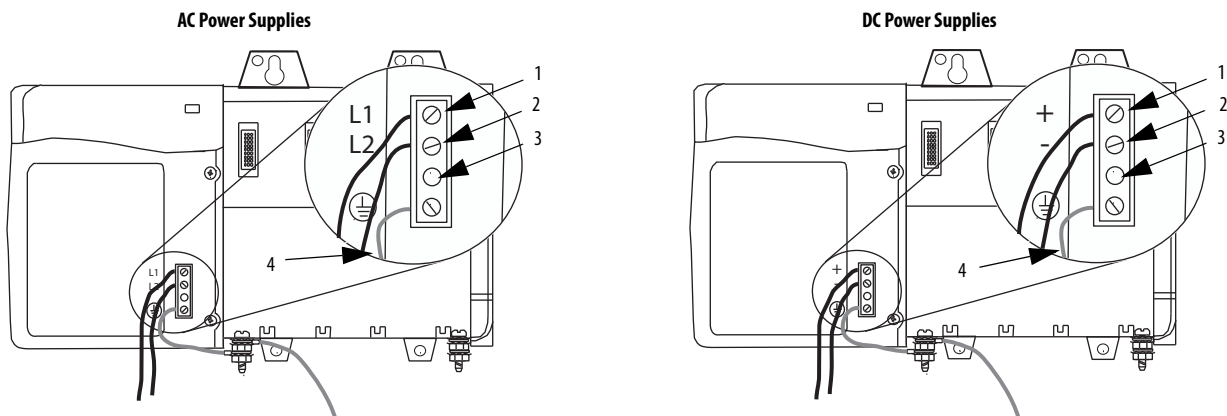
Use 15 A time-delay type fuse in all ungrounded power connections.

Use 2.5 mm<sup>2</sup> (14 AWG) solid or stranded-copper wire that is rated at 90 °C (194 °F), or greater, 1.2 mm (3/64 in.) insulation maximum to connect power. Tighten the terminals to a torque of 0.565 N•m (5 lb•in).

Connect the power as shown in the figure.

### IMPORTANT The voltage input connections of the power supplies are auto-sensing.

You do **not** use a jumper, for example, a 120/240V AC jumper, when connecting external power to the power supply, as shown in the following figure.



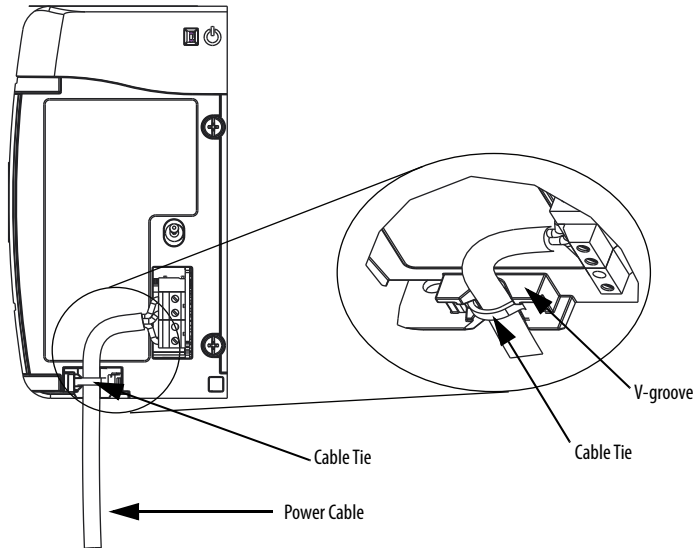
Item	Description, AC Power Supplies	Description, DC Power Supplies
1	L1 (high side of line power)	DC+ (positive supply)
2	L2 (low side of line power)	DC- (negative supply return)
3	This terminal is not used and is capped to prevent use.	
4	Protective Earth. Attach to chassis ground lug or ground bus. See the ControlLogix Chassis Installation Instructions, publication <a href="#">1756-IN621</a> , for details.	

## Optional Power Cable Connection

The 1756-PA50, 1756-PA50K, 1756-PB50, 1756-PB50K, 1756-PA30XT, and 1756-PB30XT power supplies offer an optional cable retention mechanism.

Install the optional cable retention mechanism per the following procedure.

1. Align the power cable in the v-groove at the front of the power supply.
2. Feed a cable tie through the retainer on the v-groove.
3. To secure the power cable, tighten the cable tie.
4. Trim any excess cable tie length as appropriate.



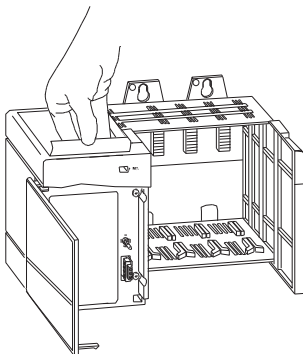
## Remove the Protective Label



**ATTENTION:** Make sure the chassis is mounted and all panel fabrication is complete before you remove the protective label. This label protects the power supply from metal shavings falling inside the power supply and damaging it during operation.

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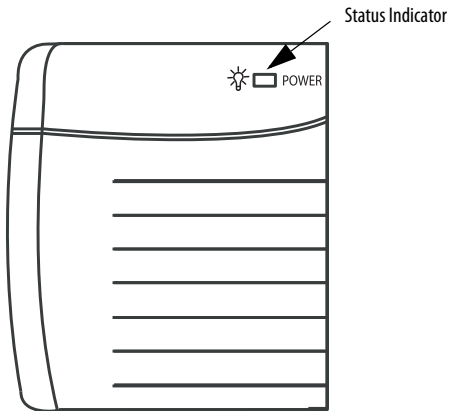
Remove the protective label from the top of the power supply.



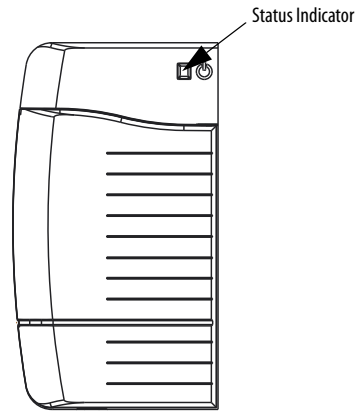
## Troubleshoot the Power Supply

All ControlLogix power supplies have a green status indicator that remains ON during normal operation.

**Standard Power Supply**



**Slim Power Supply**



If the indicator turns OFF during operation, take these steps to troubleshoot the power supply.

1. Verify that the line voltage is within the specified range.
2. If the indicator remains OFF, turn off the power.
3. Loosen the screws that secure the power supply to the chassis.  
See [step 4 on page 6](#) for the location of the screws on the power supply.
4. Slide the power supply out so that the rear connector is disconnected.
5. Turn on the power.
6. Follow these steps if the indicator does the following:
  - Turns ON:
    - a. Verify that the Backplane Power Load of the system is within the output rating of the power supply.
    - b. Turn off the power.
    - c. Reinstall the power supply in the chassis.
    - d. Turn on the power.
  - Remains OFF: Contact your local Allen-Bradley distributor.

## Specifications

Attribute	1756-PA72, 1756-PA72K	1756-PA75, 1756-PA75K	1756-PB72, 1756-PB72K	1756-PB75, 1756-PB75K	1756-PC75	1756-PH75, 1756-PH75K
Voltage and current ratings	Input 120/240V AC, 50/60 Hz, 100VA, 100 W	120/240V AC, 50/60 Hz, 100VA, 100 W	24V DC, 95 W	24V DC, 95 W	48V DC, 95 W	125V DC, 95 W
	Output (current capacity) 2.8 A, 24V DC; 10.0 A, 5.1V DC; 4.0 A, 3.3V DC; 1.5 A, 1.2V DC; 75 W max, 20 A inrush max	2.8 A, 24V DC; 13.0 A, 5.1V DC; 4.0 A, 3.3V DC; 1.5 A, 1.2V DC; 75 W max, 20 A inrush max	2.8 A, 24V DC; 10.0 A, 5.1V DC; 4.0 A, 3.3V DC; 1.5 A, 1.2V DC; 75 W max, 30 A inrush max	2.8 A, 24V DC; 13.0 A, 5.1V DC; 4.0 A, 3.3V DC; 1.5 A, 1.2V DC; 75 W max, 30 A inrush max	2.8 A, 24V DC; 13.0 A, 5.1V DC; 4.0 A, 3.3V DC; 1.5 A, 1.2V DC; 75 W max, 30 A inrush max	2.8 A, 24V DC; 13.0 A, 5.1V DC; 4.0 A, 3.3V DC; 1.5 A, 1.2V DC; 75 W max, 30 A inrush max
Isolation voltage	250V (continuous), Reinforced Insulation Type, Power Input to Backplane					
Temperature, operating IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock)	0 °C < Ta < +60 °C (+32 °F < Ta < 140 °F)					
Temperature, surrounding air, max	60 °C (140 °F)					
Enclosure type rating	None (open-style)					
Torque	0.565 N·m (5 lb·in)					
Dimensions (HxWxD), approx	14.0 x 11.2 x 14.5 cm (5.51 x 4.41 x 5.71 in.)					
Wire size	2.5 mm <sup>2</sup> (14 AWG) solid or stranded copper wire rated at 90 °C (194 °F), or greater, 1.2 mm (3/64 in.) insulation max					
North American temperature code	T4					
ATEX temperature code	-		T4		-	
IECEx temperature code	-		T4		-	

Attribute	1756-PA50, 1756-PA50K	1756-PB50, 1756-PB50K
Voltage and current ratings	Input 120/240V AC, 50/60 Hz, 81 W (90VA), 50 °C (122 °F), 68 W (77VA), 60 °C (140 °F)	24V DC; 50 °C (122 °F), 85 W; 60 °C (140 °F), 70 W
	Output (current capacity) 2.5 A, 24V DC; 8.0 A, 5.1V DC; 2.0 A, 3.3V DC; 1.5 A, 1.2V DC; 50 °C (122 °F), 60 W max; 60 °C (140 °F), 50 W max; 20 A inrush max	2.5 A, 24V DC; 8.0 A, 5.1V DC; 2.0 A, 3.3V DC; 1.5 A, 1.2V DC; 50 °C (122 °F), 60 W max; 60 °C (140 °F), 50 W max; 20 A inrush max
Isolation voltage	250V (continuous), Reinforced Insulation Type, Power Input to Backplane	
Temperature, operating IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock)	0 °C < Ta < +60 °C (+32 °F < Ta < +140 °F)	
Temperature, surrounding air, max	60 °C (140 °F)	
Enclosure type rating	None (open-style)	
Torque	0.565 N·m (5 lb·in)	
Dimensions (HxWxD), approx	14.0 x 7.8 x 14.5 cm (5.51 x 3.07 x 5.71 in.)	
Wire size	2.5 mm <sup>2</sup> (14 AWG) solid or stranded copper wire rated at 90 °C (194 °F), or greater, 1.2 mm (3/64 in.) insulation max	
North American temperature code	T4	
ATEX temperature code	-	T4
IECEx temperature code	-	T4

Attribute	1756-PAXT	1756-PBXT	1756-PA30XT	1756-PB30XT
Voltage and current ratings	Input 120/240V AC, 50/60 Hz, 82VA, 64 W	18...32V DC, 70 W	120/240V AC, 50/60 Hz, 50 W (60VA), 70 °C (158 °F)	24V DC, 50W 70 °C (158 °F)
Output (current capacity)	1.75 A, 24V DC, 8.0 A, 5.1V DC, 4.0 A, 3.3V DC, 1.5 A, 1.2V DC, 42 W max, 20 A inrush max	2.1 A, 24V DC, 10.0 A, 5.1V DC, 4.0 A, 3.3V DC, 1.5 A, 1.2V DC, 52 W max, 30 A inrush max	1.25 A, 24V DC; 6.0 A, 5.1V DC; 2.0 A, 3.3V DC; 1.5 A, 1.2V DC; 30 W max, 20 A inrush max	1.25 A, 24V DC; 6.0 A, 5.1V DC; 2.0 A, 3.3V DC; 1.5 A, 1.2V DC; 30 W max, 20 A inrush max
Isolation voltage	250V (continuous), Reinforced Insulation Type, Power Input to Backplane			
Temperature, operating IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock)	-25 °C < Ta < +70 °C (-13 °F < Ta < +158 °F)			
Temperature, surrounding air, max	70 °C (158 °F)			
Enclosure type rating	None (open-style)			
Torque	0.565 N·m (5 lb·in)			
Dimensions (HxWxD), approx	14.0 x 11.2 x 14.5 cm (5.51 x 4.41 x 5.71 in.)		14.0 x 7.8 x 14.5 cm (5.51 x 3.07 x 5.71 in.)	
Wire size	2.5 mm <sup>2</sup> (14 AWG) solid or stranded copper wire rated at 90 °C (194 °F), or greater, 1.2 mm (3/64 in.) insulation max			
North American temperature code	T4	T4A	T4	
ATEX temperature code	-	T4	-	T4
IECEx temperature code	-	T4	-	T4

## Additional Resources

These documents contain additional information concerning related products from Rockwell Automation.

Resource	Description
1756 ControlLogix Specifications Technical Data, publication <a href="#">1756-ID006</a>	Provides technical specifications for ControlLogix chassis.
1756 ControlLogix Power Supplies Specifications Technical Data, publication <a href="#">1756-ID005</a>	Provides technical specifications for ControlLogix power supplies.
ControlLogix Chassis Installation Instructions, publication <a href="#">1756-IN621</a>	Provides information on how to install ControlLogix chassis.
ControlLogix System User Manual, publication <a href="#">1756-UM001</a>	Provides instructions for installation and use of ControlLogix Systems, application design, and other general information for these systems.
Industrial Automation Wiring and Grounding Guidelines, publication <a href="#">1770-4.1</a>	Provides general guidelines for installing a Rockwell Automation industrial system.
Product Certifications website, <a href="http://www.rockwellautomation.com/rockwellautomation/certification/overview.page">http://www.rockwellautomation.com/rockwellautomation/certification/overview.page</a>	Provides declarations of conformity, certificates, and other certification details.

You can view or download publications at <http://www.rockwellautomation.com/literature/>. To order paper copies of technical documentation, contact your local Allen-Bradley distributor or Rockwell Automation sales representative.



## Rockwell Automation Support

Use the following resources to access support information.

<b>Technical Support Center</b>	Knowledgebase Articles, How-to Videos, FAQs, Chat, User Forums, and Product Notification Updates.	<a href="https://rockwellautomation.custhelp.com/">https://rockwellautomation.custhelp.com/</a>
<b>Local Technical Support Phone Numbers</b>	Locate the phone number for your country.	<a href="http://www.rockwellautomation.com/global/support/get-support-now.page">http://www.rockwellautomation.com/global/support/get-support-now.page</a>
<b>Direct Dial Codes</b>	Find the Direct Dial Code for your product. Use the code to route your call directly to a technical support engineer.	<a href="http://www.rockwellautomation.com/global/support/direct-dial.page">http://www.rockwellautomation.com/global/support/direct-dial.page</a>
<b>Literature Library</b>	Installation Instructions, Manuals, Brochures, and Technical Data.	<a href="http://www.rockwellautomation.com/global/literature-library/overview.page">http://www.rockwellautomation.com/global/literature-library/overview.page</a>
<b>Product Compatibility and Download Center (PCDC)</b>	Get help determining how products interact, check features and capabilities, and find associated firmware.	<a href="http://www.rockwellautomation.com/global/support/pcdc.page">http://www.rockwellautomation.com/global/support/pcdc.page</a>

## Documentation Feedback

Your comments will help us serve your documentation needs better. If you have any suggestions on how to improve this document, complete the How Are We Doing? form at [http://literature.rockwellautomation.com/idc/groups/literature/documents/du/ra-du002\\_-en-e.pdf](http://literature.rockwellautomation.com/idc/groups/literature/documents/du/ra-du002_-en-e.pdf).

Rockwell Automation maintains current product environmental information on its website at <http://www.rockwellautomation.com/rockwellautomation/about-us/sustainability-ethics/product-environmental-compliance.page>.

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# 1756 ControlLogix and GuardLogix Controllers

ControlLogix Controller Catalog Numbers    1756-L61, 1756-L62, 1756-L63, 1756-L63XT, 1756-L64, 1756-L65  
 1756-L71, 1756-L72, 1756-L73, 1756-L73XT, 1756-L74, 1756-L75  
 1756-L71K, 1756-L72K, 1756-L73K, 1756-L74K, 1756-L75K  
 1756-L81E, 1756-L82E, 1756-L83E, 1756-L84E, 1756-L85E,  
 1756-L81EK, 1756-L82EK, 1756-L83EK, 1756-L84EK, 1756-L85EK

GuardLogix Controller Catalog Numbers    1756-L61S, 1756-L62S, 1756-L63S, 1756-LSP  
 1756-L71S, 1756-L71SK, 1756-L72S, 1756-L72SK, 1756-L73S, 1756-L73SK, 1756-L7SP,  
 1756-L7SPK, 1756-L73SXT, 1756-L7SPXT  
 1756-L81ES, 1756-L81ESK, 1756-L82ES, 1756-L82ESK, 1756-L83ES, 1756-L83ESK,  
 1756-L84ES, 1756-L84ESK, 1756-L8SP, 1756-L8SPK

Armor ControlLogix Catalog Numbers    1756-L72EROM, 1756-L73EROM

Armor GuardLogix Catalog Numbers    1756-L72EROMS, 1756-L73EROMS

ControlLogix Redundancy Catalog Numbers    1756-RM2, 1756-RM2XT

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## 1756 ControlLogix Controllers

The ControlLogix® controller provides a scalable controller solution that is capable of addressing many I/O points. You can place the ControlLogix controller into any slot of a ControlLogix I/O chassis, and install multiple controllers in the same chassis.

ControlLogix controllers can monitor and control I/O across the ControlLogix backplane, and over network links. The ControlLogix 5580 controllers have an embedded Ethernet port for a direct connection to Ethernet-enabled devices and networks, and also support communication interface modules in the local chassis. To provide communication for ControlLogix 5570 or ControlLogix 5560 controllers, install the appropriate communication interface module into the local chassis.

ControlLogix 5580 and ControlLogix 5570 controllers are available with a conformal coating. A conformal coating provides a layer of protection against contaminants and humidity to help protect the assembly and extend product life in harsh, corrosive environments. Products with a conformal coating have a 'K' suffix at the end of the catalog number.

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ControlLogix 5570 Controllers Features and Specifications	7
ControlLogix 5560 Controllers Features and Specifications	10

## ControlLogix 5570 Controllers Features and Specifications

Feature	1756-L71, 1756-L71K, 1756-L72, 1756-L72K, 1756-L73, 1756-L73K, 1756-L74, 1756-L74K, 1756-L75, 1756-L75K
Controller tasks	<ul style="list-style-type: none"> <li>• 32 tasks</li> <li>• 100 programs/task</li> <li>• Event tasks: all event triggers</li> </ul>
Built-in communication ports	1 port USB <sup>(2)</sup>
Communication options	<ul style="list-style-type: none"> <li>• EtherNet/IP</li> <li>• ControlNet</li> <li>• DeviceNet</li> <li>• Data Highway Plus</li> <li>• Remote I/O</li> <li>• SynchLink</li> <li>• Third-party process and device networks</li> </ul>
USB port communication	Programming, configuration, firmware update, and on-line edits only
Controller connections supported, max <sup>(1)</sup>	500
Network connections, per network module	<ul style="list-style-type: none"> <li>• 100 ControlNet (1756-CN2/A)</li> <li>• 40 ControlNet (1756-CNB/D, 1756-CNB/E)</li> <li>• 128 ControlNet (1756-CN2/B)</li> <li>• 256 EtherNet/IP; 128 TCP (1756-EN2x)</li> <li>• 128 EtherNet/IP; 64 TCP (1756-ENBT)</li> </ul>
Controller redundancy	Full support
Integrated motion	<ul style="list-style-type: none"> <li>• SERCOS interface</li> <li>• Analog options (encoder input, LDT input, SSI input)</li> <li>• Integrated Motion on the EtherNet/IP network</li> </ul>
Programming languages	<ul style="list-style-type: none"> <li>• Relay Ladder</li> <li>• Structured Text</li> <li>• Function Block Diagram</li> <li>• Sequential Function Chart (SFC)</li> </ul>

(1) ControlLogix 5570 controllers use connections to establish communication links between devices. For more information on how to use and calculate connections, see the ControlLogix System User Manual, publication [1756-UM001](#).

(2) The USB port is intended for temporary local programming purposes only and not intended for permanent connection. Do not use the USB port in hazardous locations.

**Technical Specifications - ControlLogix 5570 Controllers**

Attribute	1756-L71, 1756-L71K	1756-L72, 1756-L72K	1756-L73, 1756-L73K	1756-L74, 1756-L74K	1756-L75, 1756-L75K
User memory	2 MB	4 MB	8 MB	16 MB	32 MB
I/O memory	0.98 MB				
Optional nonvolatile memory storage	1 GB (1784-SD1 ships with every controller) 2 GB (1784-SD2)				
Digital I/O, max	128,000				
Analog I/O, max	4000				
Total I/O, max	128,000				
Energy storage module	<ul style="list-style-type: none"> <li>1756-ESMCAP, 1756-ESMCAPK capacitor energy storage module (removable, ships installed with every controller)</li> <li>1756-ESMNSE, 1756-ESMNSEK capacitor energy storage module (removable, no residual WallClockTime power backup)</li> <li>1756-ESMNRM, 1756-ESMNRMK capacitor energy storage module (nonremovable, helps prevent USB connection and SD card use to help secure the controller)</li> </ul>				
Current draw @ 1.2V DC	5 mA				
Current draw @ 5.1V DC	800 mA				
Power dissipation	2.5 W				
Thermal dissipation	8.5 BTU/hr				
Isolation voltage	30V (continuous), basic insulation type, USB port-to-system Type tested at 500V AC for 60 s				
USB port <sup>(1)</sup>	USB 2.0, full speed (12 Mbps)				
Weight, approx	0.25 kg (0.55 lb)				
Slot width	1				
Module location	Chassis-based, any slot				
Chassis	1756-A4, 1756-A4K, 1756-A7, 1756-A7K, 1756-A10, 1756-A10K, 1756-A13, 1756-A13K, 1756-A17, 1756-A17 K				
Power supply, standard	1756-PA50, 1756-PA72, 1756-PA72K, 1756-PA75, 1756-PA75K, 1756-PB50, 1756-PB72, 1756-PB72K, 1756-PB75, 1756-PB75K, 1756-PH75				
Power supply, redundant	1756-PA75R, 1756-PA75RK, 1756-PB75R, 1756-PB75RK, 1756-PSCA2, 1756-PSCA2K				
Wire category <sup>(2)</sup>	3 - on USB port				
North American temperature code	T4A				
ATEX temperature code	T4				
IECEx temperature code	T4				
Enclosure type rating	None (open-style)				

(1) The USB port is intended for temporary local programming purposes only and not intended for permanent connection. Do not use the USB port in hazardous locations.

(2) Use this conductor category information to plan conductor routing. See Industrial Automation Wiring and Grounding Guidelines, publication [1770-4.1](#).

**Environmental Specifications - ControlLogix 5570 Controllers**

Attribute	1756-L71, 1756-L71K, 1756-L72, 1756-L72K, 1756-L73, 1756-L73K, 1756-L74K, 1756-L74, 1756-L75, 1756-L75K
Temperature, operating IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock)	0 °C < Ta < +60 °C (+32 °F < Ta < +140 °F)
Temperature, nonoperating IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40...+85 °C (-40...+185 °F)
Temperature, surrounding air, max	60 °C (140 °F)
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5...95% noncondensing
Vibration IEC 60068-2-6 (Test Fc, Operating)	2 g @ 10...500 Hz
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	50 g (45 g with SD card installed)
Emissions	IEC 61000-6-4
ESD immunity IEC 61000-4-2	6 kV contact discharges 8 kV air discharges
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine-wave 80% AM from 80...2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 1890 MHz 3V/m with 1 kHz sine-wave 80% AM from 2000...2700 MHz
Conducted RF Immunity IEC 61000-4-6	Not applicable: USB is a temporary programming port.

**Certifications - ControlLogix 5570 Controllers**

Certification <sup>(1)</sup>	1756-L71, 1756-L71K, 1756-L72, 1756-L72K, 1756-L73, 1756-L73K, 1756-L74, 1756-L74K, 1756-L75, 1756-L75K
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810.
CE	European Union 2004/108/EC EMC Directive, compliant with: EN 61326-1; Meas./Control/Lab., Industrial Requirements EN 61000-6-2; Industrial Immunity EN 61000-6-4; Industrial Emissions EN 61131-2; Programmable Controllers (Clause 8, Zone A & B)
RCM	Australian Radiocommunications Act, compliant with EN 61000-6-4; Industrial Emissions
Ex	European Union 94/9/EC ATEX Directive, compliant with: EN 60079-0; General Requirements EN 60079-15; Potentially Explosive Atmospheres, Protection "n" II 3 G Ex nA IIC T4 Gc DEMKO13ATEX1325026X
IECEX	IECEX System, compliant with: IEC 60079-0; General Requirements IEC 60079-15; Potentially Explosive Atmospheres, Protection "n" II 3 G Ex nA IIC T4 Gc IECEX UL 14.0008X
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with Article 58-2 of Radio Waves Act, Clause 3
EAC	Russian Customs Union TR CU 020/2011 EMC Technical Regulation Russian Customs Union TR CU 004/2011 LV Technical Regulation

(1) When marked. See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.

## Controller Compatibility

The following tables provide compatibility with I/O modules, display devices, and other controllers and communication devices.

### Control Distributed I/O Modules

The controller can control these distributed I/O modules via the I/O Configuration tree in the programming software.

I/O Modules	EtherNet/IP	ControlNet	DeviceNet	Remote I/O
<b>Chassis-based I/O</b>				
1715 Redundant I/O	Yes	No	No	Yes
1746 SLC™ I/O	No	No	No	Yes
1756 ControlLogix I/O	Yes	Yes	No	No
1769 Compact I/O™	No	No	Yes	Yes <sup>(2)</sup>
1771 Universal I/O	No	Yes	No	Yes
<b>In-cabinet I/O</b>				
1734 POINT I/O™	Yes	Yes	Yes	No
1734D POINTBlock I/O	No	No	Yes	No
1790, 1790D, 1790P CompactBlock™ LDX I/O	No	No	Yes	No
1791D, 1791P, 1791R CompactBlock I/O	No	No	Yes	No
1794 FLEX™ I/O	Yes	Yes	Yes	Yes
1797 FLEX Ex™ I/O	No	Yes	No	No
5069 Compact I/O™ <sup>(1)</sup>	Yes	No	No	No
<b>On-Machine™ I/O</b>				
1732 ArmorBlock® I/O	Yes	No	Yes	No
1738 ArmorPOINT® I/O	Yes	Yes	Yes	No
1792D ArmorBlock® MaXum™ I/O	No	No	Yes	No
1799 Embedded I/O	No	No	Yes	No

(1) Compatible with ControlLogix 5580 Controllers only.

(2) With a third-party module.

### Control Safety Distributed I/O Modules

The GuardLogix controller can control these safety distributed I/O modules in a safety system.

I/O Modules	EtherNet/IP	ControlNet	DeviceNet
<b>In-cabinet I/O</b>			
1791DS CompactBlock™ Guard I/O™	No	No	Yes
1791ES CompactBlock Guard I/O	Yes	No	No
1734 POINT Guard I/O™	Yes	No	Yes
<b>On-Machine I/O</b>			
1732DS ArmorBlock® Guard I/O™	No	No	Yes
1732ES ArmorBlock Guard I/O	Yes	No	No



## Communicate with Display Devices

The controller can communicate with these display devices.

Display Devices	EtherNet/IP	ControlNet	DeviceNet	DH+™	Remote I/O	RS-232 (DF1)
<b>Industrial Computers</b>						
Allen-Bradley® industrial computers (all) <sup>(1)</sup>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Graphic Terminals</b>						
PanelView™ Plus and PanelView e terminals	Yes	Yes	Yes	Yes	Yes	Yes
PanelView Standard terminals	Yes	Yes	Yes	Yes	Yes	Yes
PanelView e terminals	No	Yes	No	Yes	Yes	No
<b>Message Displays</b>						
InView™ message displays	Yes	Yes	Yes	Yes	Yes	Yes

(1) Includes Allen-Bradley integrated display rotating media (HDD) and solid state (SSD) computers, Rockwell Automation® non-display computers, and Allen-Bradley integrated display computers with keypad.

## Communicate with Other Controllers

The controller can communicate with these programmable controllers.

Controller	EtherNet/IP	ControlNet	DeviceNet	DH+	RS-232 (DF1)	DH-485 <sup>(5)</sup>
1756 ControlLogix 1756 GuardLogix	Yes	Yes	Yes	Yes	Yes	Yes
5069 CompactLogix™	Yes	No	No	No	No	No
1768, 1769 CompactLogix 1768, 1769 Compact GuardLogix	Yes	Yes	Yes	No	Yes	Yes
1789 SoftLogix™ 5800	Yes	Yes	Yes	No	Yes	No
1794 FlexLogix™	Yes	Yes	Yes	No	Yes	Yes
PowerFlex® with DriveLogix™	Yes	Yes	Yes	No	Yes	Yes
1785 PLC-5 <sup>®(1)</sup> (2)(3)	Yes	Yes	Yes	Yes	Yes	No
1747 SLC™(4)	Yes	Yes	Yes	Yes	Yes	Yes
1761 MicroLogix™(4)	Yes	No	Yes	No	Yes	Yes
1762 MicroLogix <sup>(4)</sup>	Yes	No	Yes	No	Yes	Yes
1763 MicroLogix <sup>(4)</sup>	Yes	No	Yes	No	Yes	Yes
1764 MicroLogix <sup>(4)</sup>	Yes	No	Yes	No	Yes	Yes
1772 PLC-2 <sup>®</sup>	No	No	No	Yes	Yes	No
1775 PLC-3 <sup>®</sup>	No	No	No	Yes	Yes	No
5250 PLC-5/250	No	No	No	Yes	Yes	No

(1) The Ethernet PLC-5 controller must be series C, firmware revision N.1 or later; series D, firmware revision E.1 or later; or series E, firmware revision D.1 or later.

(2) The 1785-ENET Ethernet communication interface module must be series A, firmware revision D or later.

(3) The PLC-5, SLC, and MicroLogix processors appear as I/O points to the Logix controller. Use the appropriate DeviceNet interface for the controller.

(4) Use a 1747-L55x controller with OS501 or later.

(5) The 1756-DH485 module supports full DH-485 functionality.

## Communicate with Other Communication Devices

The controller can communicate with these communication devices.

Communication Device	EtherNet/IP	ControlNet	DeviceNet	DH+
Linking device	1788-EN2DNROM	1788-CN2DN 1788-CN2FF	1788-EN2DNR 1788-EN2DNROM (On-Machine version) 1788-CN2DN	—
PCMCIA card	—	1784-PCC	1784-PCD	1784-PCMK
PCI card	—	1784-PCIC 1784-PCICS	1784-PCID 1784-PCIDS 1784-CPCIDS	—
Drives SCANport™ module <sup>(1)</sup>	—	1203-FM1 1203-FB1	—	—
Communication module <sup>(2)</sup>	—	1203-CN 1770-KFC15 1770-KFCD15 1747-KFC15	1770-KFD 1770-KFG	1770-KF2
Communication card	—	1784-PKTCS 1784-KTCS 1784-KTCX15	1784-PKTX 1784-PKTXD	—
USB communication device	—	1784-U2CN	1784-U2DN	1784-U2DHP

(1) Use a CIP generic MSG instruction to communicate with the 1203-FM1 SCANport™ module on a DIN rail that is remote to the controller. The remote DIN rail also requires a 1794-ACN15 or 1794-ACNR15 ControlNet adapter.

(2) Use the generic module configuration to configure the 1203-CN1 module and a CIP generic MSG instruction to communicate with the module.

## ControlLogix Redundancy

The ControlLogix 5560 and ControlLogix 5570 controllers support controller redundancy. In a redundant controller system, you need these components:

- Two 1756 chassis, each with the same of the following:
  - Number of slots
  - Compatible modules in the same slots
  - Redundancy firmware revisions in each module
  - Two additional ControlNet nodes outside the redundant chassis pair if the application uses ControlNet networks
- One 1756-RM2 or 1756-RM2XT redundancy module per chassis that is connected by a 1756-RMCx cable
- One or two ControlLogix 5560 or ControlLogix 5570 controllers
- As many as seven enhanced communication modules, that is, 1756-CN2/B, 1756-CN2R/B, 1756-CN2RXT modules, or 1756-EN2T, 1756-EN2TR, 1756-EN2TXT modules

### 1756-RM2, 1756-RM2XT Redundancy Modules

#### Technical Specifications - 1756-RM2, 1756-RM2XT Redundancy Modules

Attribute	1756-RM2, 1756-RM2K	1756-RM2XT
Current draw @ 5.1V DC	1.16 A	
Current draw @ 24V DC	3.4 mA	
Power dissipation	6 W, max	
Thermal dissipation	21 BTU/hr	
Connector cables	1756-RMC1, 1 m (3.28 ft) 1756-RMC3, 3 m (9.84 ft) 1756-RMC10, 10 m (32.81 ft)	
Slot width	1 slot	
Module location	Chassis-based, any slot	
Chassis	1756-A4, 1756-A7, 1756-A10, 1756-A13, 1756-A17	1756-A7XT, 1756-A10XT, 1756-A4LXT, 1756-A5LXT, 1756-A7LXT
Controller families, supported	ControlLogix 5560, ControlLogix 5570	
Power supply, standard	1756-PA72, 1756-PA75, 1756-PB72, 1756-PB75	1756-PAXT, 1756-PBXT
Power supply, redundant	1756-PA75R, 1756-PB75R, 1756-PSCA2	None
North American temperature code	T4	
IECEX temperature code	T4	
ATEX temperature code	T4	
Enclosure type	None (open-style)	
Weight, approx	0.29 kg (0.64 lb)	
Mounting	ControlLogix-XT chassis, single-slot module	

**Environmental Specifications - 1756-RM2, 1756-RM2XT Redundancy Modules**

Attribute	1756-RM2, 1756-RM2K	1756-RM2XT
Temperature, operating IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock)	0...60 °C (32...140 °F)	-25...+70 °C (-13...+158 °F)
Temperature, nonoperating IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40...+85 °C (-40...+185 °F)	
Temperature, surrounding air, max	60 °C (140 °F)	70 °C (158 °F)
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5...95% noncondensing	
Vibration IEC 60068-2-6 (Test Fc, Operating)	2 g @ 10...500 Hz	
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g	
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	50 g	
Emissions	IEC 61000-6-4	
ESD immunity IEC 61000-4-2	6 kV contact discharges 8 kV air discharges	
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine-wave 80% AM from 80...2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 1890 MHz 3V/m with 1 kHz sine-wave 80% AM from 2000...2700 MHz	

**Certifications - 1756-RM2, 1756-RM2XT Redundancy Modules**

Certification <sup>(1)</sup>	1756-RM2, 1756-RM2K	1756-RM2XT
CSA	CSA Certified Process Control Equipment. See CSA File LR54689C. CSA Certified Process Control Equipment for Class I, Division 2 Group A,B,C,D Hazardous Locations. See CSA File LR69960C.	—
CE	European Union 2004/108/IEC EMC Directive, compliant with: <ul style="list-style-type: none"> <li>EN 61326-1; Meas./Control/Lab., Industrial Requirements</li> <li>EN 61000-6-2; Industrial Immunity</li> <li>EN 61000-6-4; Industrial Emissions</li> <li>EN 61131-2; Programmable Controllers (Clause 8, Zone A &amp; B)</li> </ul>	
RCM	Australian Radiocommunications Act, compliant with EN 61000-6-4; Industrial Emissions	
c-UL-us	UL Listed Industrial Control Equipment, certified for U.S. and Canada. See UL file E65584. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810.	
Ex	European Union 94/9/EC ATEX Directive, compliant with: <ul style="list-style-type: none"> <li>EN 60079-15; Potentially Explosive Atmospheres, Protection “n”</li> <li>EN 60079-0; General Requirements</li> <li>II 3 G Ex nA IIC T4 Gc</li> <li>DEMKO13ATEX1325026X</li> </ul>	
IECEx	IECEx System, compliant with: <ul style="list-style-type: none"> <li>EN 60079-15; Potentially Explosive Atmospheres, Protection “n”</li> <li>EN 60079-0; General Requirements</li> <li>II 3 G Ex nA IIC T4 Gc</li> <li>IECEx UL 14.0008X</li> </ul>	
FM	FM Approved Equipment for use in Class I Division 2 Group A,B,C,D Hazardous Locations	—
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with Article 58-2 of Radio Waves Act, Clause 3	
EAC	Russian Customs Union TR CU 020/2011 EMC Technical Regulation Russian Customs Union TR CU 004/2011 LV Technical Regulation	

(1) When marked. See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.

## ControlLogix Controller Accessories

You can use these accessories with ControlLogix controllers.

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Serial Communication Cables	51

### Memory Cards

Memory cards offer nonvolatile memory to store a user program and tag data on a controller.

- The ControlLogix 5560 controllers support optional 1784-CF128 CompactFlash cards purchased separately.
- The ControlLogix 5570 controllers come with the 1784-SD1 Secure Digital (SD) card installed and support optional 1784-SD2 cards purchased separately.
- The ControlLogix 5580 controllers come with the 1784-SD2 Secure Digital (SD) card installed and support optional 1784-SDHC8 and 1785-SDHC32 cards purchased separately.

The memory cards are installed in a socket on the controller. Through the programming software, you can manually trigger the controller to save to, or load from, nonvolatile memory or configure the controller to load from nonvolatile memory on powerup.

#### Technical Specifications - 1784 Memory Cards

Attribute	1784-CF128	1784-SD1	1784-SD2	1784-SDHC8	1784-SDHC32
Memory	128 MB	1 GB	2 GB	8 GB	32 GB
Supported controllers	1756-L6, 1756-L6S <sup>(1)</sup>	1756-L71, 1756-L71K, 1756-L71S, 1756-L71SK, 1756-L72, 1756-L72K, 1756-L72S, 1756-L72SK, 1756-L72EROM, 1756-L72EROMS, 1756-L73, 1756-L73K, 1756-L73S, 1756-L73SK, 1756-L73EROM, 1756-L73EROMS, 1756-L73XT, 1756-L73SXT, 1756-L74, 1756-L74K, 1756-L75, 1756-L75K		—	
		1756-L81E, 1756-L81EK, 1756-L81ES, 1756-L81ESK, 1756-L82E, 1756-L82EK, 1756-L82ES, 1756-L82ESK, 1756-L83E, 1756-L83EK, 1756-L83ES, 1756-L83ESK, 1756-L84E, 1756-L84EK, 1756-L84ES, 1756-L84ESK, 1756-L85E, 1756-L85EK			
Weight, approx	14.20 g (0.50 oz)	1.76 g (0.06 oz)			

(1) For safety controllers using RSLogix 5000 programming software version 18 or later.

#### Environmental Specifications - 1784 Memory Cards

Attribute	1784-CF128, 1784-SD1, 1784-SD2, 1784-SDHC8, 1784-SDHC32
Temperature, operating IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock)	-25...+70 °C (-13...+158 °F)
Temperature, storage IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40...+85 °C (-40...+185 °F)
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5...95% noncondensing
Vibration IEC 60068-2-6 (Test Fc, Operating)	2 g @ 10...500 Hz
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g

**Environmental Specifications - 1784 Memory Cards**

Attribute	1784-CF128, 1784-SD1, 1784-SD2, 1784-SDHC8, 1784-SDHC32
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	50 g
Emissions CISPR 11	Group 1, Class A
ESD immunity IEC 61000-4-2	6 kV contact discharges 8 kV air discharges
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine-wave 80% AM from 80...2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 1890 MHz 3V/m with 1 kHz sine-wave 80% AM from 2000...2700 MHz

**Certifications - 1784 Memory Cards**

Certification <sup>(1)</sup>	1784-CF128, 1784-SD1, 1784-SD2, 1784-SDHC8, 1784-SDHC32
CE	European Union 2004/108/EC EMC Directive, compliant with: <ul style="list-style-type: none"> <li>EN 61000-6-4; Industrial Emissions</li> <li>EN 61326-1; Meas./Control/Lab., Industrial Requirements</li> <li>EN 61000-6-2; Industrial Immunity</li> <li>EN 61131-2; Programmable Controllers (Clause 8, Zone A &amp; B)</li> </ul>
RCM	Australian Radiocommunications Act, compliant with EN 61000-6-4; Industrial Emissions
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with Article 58-2 of Radio Waves Act, Clause 3

(1) See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.

## Rockwell Automation Support

Use the following resources to access support information.

<b>Technical Support Center</b>	Knowledgebase Articles, How-to Videos, FAQs, Chat, User Forums, and Product Notification Updates.	<a href="http://www.rockwellautomation.com/knowledgebase">www.rockwellautomation.com/knowledgebase</a>
<b>Local Technical Support Phone Numbers</b>	Locate the phone number for your country.	<a href="http://www.rockwellautomation.com/global/support/get-support-now.page">www.rockwellautomation.com/global/support/get-support-now.page</a>
<b>Direct Dial Codes</b>	Find the Direct Dial Code for your product. Use the code to route your call directly to a technical support engineer.	<a href="http://www.rockwellautomation.com/global/support/direct-dial.page">www.rockwellautomation.com/global/support/direct-dial.page</a>
<b>Literature Library</b>	Installation Instructions, Manuals, Brochures, and Technical Data.	<a href="http://www.rockwellautomation.com/literature">www.rockwellautomation.com/literature</a>
<b>Product Compatibility and Download Center (PCDC)</b>	Get help determining how products interact, check features and capabilities, and find associated firmware.	<a href="http://www.rockwellautomation.com/global/support/pcdc.page">www.rockwellautomation.com/global/support/pcdc.page</a>

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# 1756 ControlLogix Communication Modules Specifications

Standard ControlLogix Catalog Numbers: 1756-CN2, 1756-CN2R, 1756-CNB, 1756-CNBR, 1756-DNB, 1756-DHRIO, 1756-DH485, 1756-EN2F, 1756-EN2T, 1756-EN2TP, 1756-EN2TR, 1756-EN2TSC, 1756-EN3TR, 1756-EN4TR, 1756-ENBT, 1756-EWEB, 1756-RIO, 1756-SYNCH, 1756-TIME

ControlLogix 1756 Communication Module Conformal Coated Catalog Numbers: 1756-CN2RK, 1756-EN2FK, 1756-EN2TK, 1756-EN2TPK, 1756-EN2TRK, 1756-EN4TRK, 1756-ENBTK, 1756-TIMEK

ControlLogix-XT Catalog Numbers: 1756-CN2RXT, 1756-DHRIOXT, 1756-EN2TPXT, 1756-EN2TXT, 1756-EN2TRXT, 1756-EN4TRXT

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## Additional Resources

These documents contain additional information concerning related products from Rockwell Automation.

Resource	Description
EtherNet/IP Modules Installation Instructions, publication <a href="#">ENET-IN002</a>	Provides information on installing EtherNet/IP™ modules.
EtherNet/IP Secure Communication User Manual, publication <a href="#">ENET-UM003</a>	Provides information on system architecture, configuring secure communication, and diagnostics.
ControlNet Modules Installation Instructions, publication <a href="#">CNET-IN005</a>	Provides instructions for installing ControlNet® modules.
ControlLogix System User Manual, publication <a href="#">1756-UM001</a>	Provides information on system architecture, configuring secure communication, and diagnostics.
ControlLogix Time Synchronization Module - Series B User Manual, publication <a href="#">1756-UM542</a>	Describes the functionality, installation, configuration, and operation of the 1756-TIME module.
DeviceNet Network Configuration User Manual, publication <a href="#">DNET-UM004</a>	Provides information on system architecture, configuring communication, and diagnostics.
EtherNet/IP Network Devices User Manual, publication <a href="#">ENET-UM006</a>	Describes how to use EtherNet/IP communication modules in Logix 5000™ control systems
ControlLogix DH-485 Communication Module User Manual, publication <a href="#">1756-UM532</a>	Provides information on system architecture, configuring communication, and diagnostics.
ControlLogix Data Highway Plus-Remote I/O Communication Interface Module User Manual, publication <a href="#">1756-UM514</a>	Provides information about programming, messaging, applying, and connecting the module.
ControlLogix SynchLink Module User Manual, publication <a href="#">1756-UM521</a>	Provides information about topologies, configurations, planning, and installing a Synchlink™ module.
Industrial Automation Wiring and Grounding Guidelines, publication <a href="#">1770-4.1</a>	Provides general guidelines for installing a Rockwell Automation industrial system.
Product Certifications website, <a href="http://rok.auto/certifications">rok.auto/certifications</a>	Provides declarations of conformity, certificates, and other certification details.

You can view or download publications at <http://www.rockwellautomation.com/literature/>. To order paper copies of technical documentation, contact your local Allen-Bradley distributor or Rockwell Automation sales representative.

## Summary of Changes

This table contains the changes made in this revision.

Topic	Page
Catalog Numbers 1756-EN4TR, 1756-EN4TRK, and 1756-EN4TRXT added.	Throughout

## Available Communication Modules

Network	Cat. No.	Description	Page
EtherNet/IP	1756-EN2F	EtherNet/IP bridge, fiber, 256 Logix connections	7
	1756-EN2T	EtherNet/IP bridge, copper, 256 Logix connections	7
	1756-EN2TSC	EtherNet/IP secure communication module	7
	1756-EN2TR, 1756-EN2TRK	EtherNet/IP bridge, embedded switch, copper Supports as many as 8 axis of motion	7
	1756-EN3TR	EtherNet/IP bridge, embedded switch, copper Supports as many as 128 axis of motion	7
	1756-EN2TP, 1756-EN2PK, 1756-EN2PXT	EtherNet/IP bridge with Parallel Redundancy Protocol Supports as many as 8 axis of motion	7
	1756-ENBT	EtherNet/IP bridge, copper, 128 Logix connections	7
	1756-EWEB	Ethernet web server, 128 Logix connections, Class 3 messaging only	7
	1756-EN2TXT	ControlLogix-XT™, EtherNet/IP bridge, copper, 256 Logix connections	7
	1756-EN2TRXT	ControlLogix-XT EtherNet/IP bridge module with embedded switch	7
	1756-EN4TR, 1756-EN4TRK, 1756-EN2TRXT	ControlLogix® EtherNet/IP with CIP Security™	7
	1756-EN4TRXT	ControlLogix-XT EtherNet/IP with CIP Security	7
ControlNet	1756-CN2/B, 1756-CN2/C, 1756-CN2R/B, 1756-CN2R/C, 1756-CN2RK	ControlNet bridge, 128 Logix connections <sup>(1)</sup>	15
	1756-CNB, 1756-CNBR	ControlNet bridge, 64 connections; recommend using only 40 . . . 48 Logix connections for I/O	15
	1756-CN2RXT	ControlLogix-XT, ControlNet bridge, 128 Logix connections <sup>(1)</sup>	19
DeviceNet®	1756-DNB/E	DeviceNet bridge	23
Data Highway Plus™	1756-DHRIO	Data Highway Plus/Remote I/O module	27
	1756-DHRIOXT	ControlLogix-XT, Data Highway Plus/Remote I/O module	29
Remote I/O	1756-DHRIO	Data Highway Plus/Remote I/O module	27
	1756-RI0/B	Remote I/O module	27
	1756-DHRIOXT	ControlLogix-XT, Data Highway Plus/Remote I/O module	29
DH-485 module	1756-DH485	DH-485 module	32
SynchLink	1756-SYNCH	SynchLink fiber-optic communication link	34
Time Synchronization	1756-TIME	Time synchronization on different interfaces by using Global Positioning System (GPS) technology	36

(1) 128 connections are available for standard use. An additional three connections are reserved for redundant control.

## Communication Connections

A ControlLogix system uses connections to establish communication links between devices. The types of connections include the following:

- Controller-to-local I/O modules or local communication modules
- Controller-to-remote I/O or remote communication modules
- Controller-to-remote I/O (rack-optimized) modules
- Produced and consumed tags
- Messages
- Controller access with the Studio 5000™ environment
- Controller access with RSLinx® software for HMI or other applications

You indirectly determine the number of connections the controller uses by configuring the controller to communicate with other devices in the system. The limit of connections ultimately resides in the communication module you use for the connection. If a message path routes through a communication module, the connection that is related to the message also counts towards the connection limit of that communication module.

## EtherNet/IP Network



The Ethernet Industrial (EtherNet/IP) network protocol is an open industrial-networking standard that supports both real-time I/O messaging and message exchange. The EtherNet/IP network uses off-the-shelf Ethernet communication chips and physical media.

If you need to	Select this interface
Control I/O modules and drives Act as an adapter for I/O on remote EtherNet/IP links Communicate with other EtherNet/IP devices (messages and HMI) Bridge EtherNet/IP links to route messages to devices on other networks	1756-EN2F, 1756-EN2FK 1756-EN2T, 1756-EN2TK, 1756-EN2TXT 1756-EN2TP, 1756-EN2TPK, 1756-EN2TPXT <b>1756-EN2TR</b> , 1756-EN2TRK, 1756-EN2TRXT 1756-ENBT, 1756-ENBTK
Support device level ring (DLR) and linear topologies	1756-EN2TR, 1756-EN2TRK 1756-EN3TR, 1756-EN3TRK
Support for Parallel Redundancy Protocol	1756-EN2TP, 1756-EN2TPK 1756-EN2TPXT
Provide control in environments where temperatures range from -25...70 °C (-13...158 °F)	1756-EN2TPXT 1756-EN2TRXT 1756-EN2TXT 1756-EN4TRXT
Secure access to a control system from within the plant network	1756-EN2TSC 1756-EN4TR, 1756-EN4TRK
Use an Internet browser to remotely access tags in a ControlLogix controller Communicate with other EtherNet/IP or generic Ethernet devices (messaging only; no I/O control) Bridge EtherNet/IP links to route messages to devices on other networks	1756-EWEB, 1756-EWEBK web server

## EtherNet/IP Network Specifications

**Table 1 - ControlLogix EtherNet/IP Connections Specifications<sup>(1)</sup>**

Cat. No.	Connections		CIP Unconnected Messages (backplane + Ethernet)
	TCP	CIP <sup>(2)</sup>	
1756-ENBT	64	128	64 + 64
1756-EN2F	128	256	128 + 128
1756-EN2T	128	256	128 + 128
1756-EN2TXT	128	256	128 + 128
1756-EN2TP	128	256	128 + 128
1756-EN2TPXT	128	256	128 + 128
1756-EN2TR	128	256	128 + 128
1756-EN2TRXT	128	256	128 + 128
1756-EN2TSC	128	256	128 + 128
1756-EN3TR	128	256	128 + 128
1756-EN4TR	512	1000 I/O 528 <sup>(3)</sup>	256+256
1756-EN4TRXT	512	1000 I/O 528 <sup>(3)</sup>	256+256
1756-EWEB	64	128	128 + 128

(1) Includes the K conformal coating catalog numbers.

(2) CIP™ connections can be used for all explicit or all implicit applications. For example, a 1756-ENBT module has a total of 128 CIP connections that can be used for any combination of connections.

(3) There are 1000 CIP I/O connections and 528 CIP messaging connections.

**Table 2 - ControlLogix EtherNet/IP Data Specifications<sup>(1)</sup>**

Cat. No.	Produced/Consumed Tags		Socket Services	SNMP Support (password required)	Duplicate IP Detection (starting revision)
	Number of Multicast Tags, Max <sup>(2)</sup>	Unicast Available in RSLogix 5000 Software			
1756-ENBT	32	Version 16.03.00 or later	No	Yes	Revision 3.3
1756-EN2F	32	Version 16.03.00 or later	Yes	Yes	Revision 1.x
1756-EN2T	32	Version 16.03.00 or later	Yes	Yes	Revision 1.x
1756-EN2TXT	32	Version 16.03.00 or later	Yes	Yes	Revision 1.x
1756-EN2TP	32	Version 24.00.00 or later	Yes	Yes	Revision 10.x
1756-EN2TR	32	Version 17.01.02 or later	Yes	Yes	Revision 1.x
1756-EN2TRXT	32	Version 20.01.00 or later	Yes	Yes	Revision 1.x
1756-EN2TSC	32	Version 20.01.00 or later	No	Yes	Revision 1.x
1756-EN3TR	32	Version 18.02.00 or later	Yes	Yes	Revision 3.x
1756-EN4TR	32	Version 24.00.00 or later	Yes	Yes	Revision 2.001
1756-EN4TRXT	32	Version 24.00.00 or later	Yes	Yes	Revision 2.001
1756-EWEB	N/A	N/A	Yes	Yes	Revision 2.2

(1) Includes the K conformal coating catalog numbers.

(2) Each controller can send a maximum of 32 produced tags to one single consuming controller. If these same tags are sent to multiple consumers, the maximum number is 31.

**Table 3 - ControlLogix EtherNet/IP Packet Rates Specifications<sup>(1)</sup>**

Cat. No.	Firmware Revision	RSLogix 5000 Software Version	RSLinx Software Version	Packet Rate Capacity (packets/second) <sup>(3)</sup>		Support for Extended Environment <sup>(4)</sup>	Integrated Motion on the EtherNet/IP Network Axes
				I/O	HMI/MSG		
1756-ENBT	Any	8.02.00 or later	2.30 or later	5000	900	No	N/A
1756-EN2F	2.x	15.02.00 or later	2.51 or later	10,000	2000	No	N/A
	3.6 or later	18.02.00 or later <sup>(2)</sup>		25,000			Up to 4 axes supported <sup>(5)</sup>
1756-EN2T	2.x or earlier	15.02.00 or later	2.51 or later	10,000	2000	No	N/A
	3.6 or later	18.02.00 or later <sup>(2)</sup>		25,000 <sup>(5)</sup>			Up to 8 axes supported <sup>(5)</sup>
1756-EN2TXT	2.x	15.02.00 or later	2.51 or later	10,000	2000	Yes	N/A
	3.6 or later	18.02.00 or later <sup>(2)</sup>		25,000 <sup>(5)</sup>			Up to 8 axes supported <sup>(5)</sup>
1756-EN2TP	2.x	17.01.02 or later	2.55 or later	10,000	2000	No	N/A
	10.x or later	18.02.00 or later <sup>(2)</sup>	2.56 or later	25,000 <sup>(5)</sup>			Up to 8 axes supported <sup>(5)</sup>
1756-EN2TPXT	10.x or later	20.01.00 or later	2.56 or later	25,000 <sup>(5)</sup>	2000	Yes	N/A
1756-EN2TR	2.x	17.01.02 or later	2.55 or later	10,000	2000	No	N/A
	3.6 or later	18.02.00 or later <sup>(2)</sup>	2.56 or later	25,000 <sup>(5)</sup>			Up to 8 axes supported <sup>(5)</sup>
1756-EN2TRXT	5.028 or later	20.01.00 or later	2.56 or later	25,000 <sup>(5)</sup>	2000	Yes	N/A
1756-EN2TSC	5.028 or later	20.01.00 or later	2.56 or later	25,000 <sup>(5)</sup>	<ul style="list-style-type: none"> <li>• 1800 without encryption</li> <li>• 930 with encryption</li> </ul>	No	N/A
1756-EN3TR	3.6 or later	18.02.00 or later <sup>(2)</sup>	2.56 or later	25,000 <sup>(5)</sup>	2000	No	Up to 128 axes supported <sup>(5)</sup>
1756-EN4TR	Any	24.00.00 or later	4.10 or later	<ul style="list-style-type: none"> <li>• 50,000 without CIP Security</li> <li>• 25,000 with integrity</li> <li>• 15,000 with integrity and confidentiality</li> </ul>	<ul style="list-style-type: none"> <li>• 3,700 without CIP Security</li> <li>• 2,700 with integrity</li> <li>• 1,700 with integrity and confidentiality</li> </ul>	No	Up to 256 axes supported <sup>(5)</sup>
1756-EN4TRXT	Any	24.00.00 or later	4.10 or later	<ul style="list-style-type: none"> <li>• 50,000 without CIP Security</li> <li>• 25,000 with integrity</li> <li>• 15,000 with integrity and confidentiality</li> </ul>	<ul style="list-style-type: none"> <li>• 3,700 without CIP Security</li> <li>• 2,700 with integrity</li> <li>• 1,700 with integrity and confidentiality</li> </ul>	Yes	Up to 256 axes supported <sup>(5)</sup>

(1) Includes the K conformal coating catalog numbers.

(2) This version is required to use CIP Sync™ technology, Integrated Motion on the EtherNet/IP Network, or Exact Match keying.

(3) I/O numbers are maximums; they assume no HMI/MSG. HMI/MSG numbers are maximums, they assume no I/O. Packet rates vary depending on packet size. For more details, see Troubleshoot EtherNet/IP Application Technique, publication [ENET-AT003](#), and the EDS file for a specific catalog number.

(4) Module operates in a broad temperature spectrum, -20...70 °C (-4...158 °F), and meets ANSI/ISA-S71.04-1985 Class G1, G2 and G3, as well as cULus, Class 1 Div 2, C-Tick, CE, ATEX Zone 2 and SIL 2 requirements for increased protection against salts, corrosives, moisture/condensation, humidity, and fungal growth.

(5) This value assumes the use of a 1756-L7x ControlLogix controller. For a 1756-L6x ControlLogix controller, see ControlLogix Controllers User Manual, publication [1756-UM001](#).

**Table 4 - Technical Specifications - 1756 EtherNet/IP Modules<sup>(1)</sup>**

Attribute	1756-EN2F/B 1756-EN2F/C	1756-EN2T/D, 1756-EN2TSC/B, 1756-EN2TP/A	1756-EN2TR/C, 1756-EN3TR/B	1756-EN4TR/A	1756-ENBT/A	1756-EWEB/B
EtherNet/IP communication rate	10/100 Mbps			10/100 Mbps 1 Gbps	10/100 Mbps	
Current draw @ 5.1V DC	1.2 A	1A			700 mA	
Current draw @ 24V DC	3 mA	—			3 mA	
Voltage and current ratings	5.1 V DC, 1.2A	—		5.1 V DC, 1.2A	—	
Power dissipation	6.2 W	5.1 W		6.12 W	3.7 W	
Thermal dissipation	21.28 BTU/hr	17.4 BTU/hr		20.9BTU/Hr	12.6 BTU/hr	
Isolation voltage	30V (continuous), Basic Insulation Type, USB to Backplane Type tested at 980V AC for 60 s	30V (continuous), Basic Insulation Type, Ethernet to Backplane, USB to Backplane, and USB to Ethernet <sup>(4)</sup> Type tested at 980V AC for 60 s		30V (continuous), Basic Insulation Type, Ethernet to Backplane, USB to Backplane, and USB to Ethernet Type tested at 860V AC for 60 s	30V (continuous), basic insulation type, Ethernet network to backplane Type tested @ 707V DC for 60 s	
Slot width	1					
Module location	Chassis-based, any slot					
Chassis	1756-A4, 1756-A7, 1756-A10, 1756-A13, 1756-A17					
Power supply, standard	1756-PA72, 1756-PA75, 1756-PB72, 1756-PB75, 1756-PC75, 1756-PH75					
Power supply, redundant	1756-PA75R, 1756-PB75R, 1756-PSCA2					
Ethernet port	1 Ethernet fiber	1 Ethernet RJ45 Category 5	2 Ethernet RJ45 Category 5	Category 5E	1 Ethernet RJ45 Category 5	
Ethernet cable	Multimode fiber, LC connector	802.3 compliant shielded or unshielded twisted pair				
USB port <sup>(2)</sup>	USB 1.1, full speed (12 Mbps)					—
Wiring category <sup>(3)</sup>	3 - on USB ports	2 - on Ethernet ports 3 - on USB ports			2 - on Ethernet ports	2 - on Ethernet ports
North American temp code	T4A					
ATEX temp code	T4					
IECEX temp code	T4					
Enclosure type rating	None (open-style)					
Transmitter launch power at Beginning of Life (BOL), min Allow -1 dB at End of Life (EOL)	-19 dBm into 62.5/125 $\mu$ m fiber, N/A = 0.275 -22.5 dBm into 50/125 $\mu$ m fiber, N/A = 0.20	—				

(1) Includes the K conformance catalog numbers.

(2) The USB port is intended for temporary local programming purposes only and not intended for permanent connection. Do not use the USB port in hazardous locations.

(3) Use this conductor category information for planning conductor routing as described in the system level installation manual. See the Industrial Automation Wiring and Grounding Guidelines, publication [1770-4.1](#).

(4) Applies only to these modules/series: 1756-EN2T/D, 1756-EN2TSC/B, 1756-EN2TR/C, 1756-EN3TR/B.



**Table 5 - Environmental Specifications - 1756 EtherNet/IP Modules<sup>(1)</sup>**

Attribute	1756-EN2F/B 1756-EN2F/C	1756-EN2T/D, 1756-EN2TSC/B, 1756-EN2TP/A	1756-EN2TR/C, 1756-EN3TR/B	1756-EN4TR/A	1756-ENBT/A, 1756-EWEB/B
Temperature, operating IEC 60068-2-1 (Test Ad, Operating Cold) IEC 60068-2-2 (Test Bd, Operating Dry Heat) IEC 60068-2-14 (Test Nb, Operating Thermal Shock)	0 °C < Ta < 60 °C (32 °F < Ta < 140 °F)			For Series C Chassis: • 0 ≤ Ta ≤ +60 °C (+32 ≤ Ta ≤ +140 °F) For Series B Chassis: • 0 ≤ Ta ≤ +50 °C (+32 ≤ Ta ≤ +122 °F)	0 °C < Ta < 60 °C (32 °F < Ta < 140 °F)
Temperature, surrounding air, max	60 °C (140 °F)			For Series C Chassis: • 60 °C (140 °F) For Series B Chassis: • 50 °C (122 °F)	60 °C (140 °F)
Temperature, storage IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold) IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat) IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40 °C < Ta < 85 °C (-40 °F < Ta < 185 °F)				
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged damp heat)	5...95% noncondensing				
Vibration IEC 60068-2-6 (Test Fc, Operating)	2 g @ 10...500 Hz				
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g				
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g	30 g <sup>(2)</sup>	30 g <sup>(2)</sup>	30g	50 g
Emission CISPR 11 (IEC 61000-6-4)	Class A				
ESD immunity IEC 61000-4-2	6 kV contact discharges 8 kV air discharges				
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine-wave 80% AM from 80...2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 1890 MHz 3V/m with 1 kHz sine-wave 80% AM from 2000...2700 MHz	10V/m with 1 kHz sine-wave 80% AM from 80...2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 1890 MHz 3V/m with 1 kHz sine-wave 80% AM from 2000...2700 MHz 3V/m with 1 kHz sine-wave 80% AM from 2700...6000 MHz			10V/m with 1 kHz sine-wave 80% AM from 80...2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 1890 MHz 1V/m with 1 kHz sine-wave 80% AM from 2000...2700 MHz
EFT/B immunity IEC 61000-4-4	—	±3 kV at 5 kHz on Ethernet ports <sup>(2)</sup>		±3 kV at 5 kHz on Ethernet ports	±2 kV at 5 kHz on Ethernet ports
Surge transient immunity IEC 61000-4-5	—	±2 kV line-earth (CM) on Ethernet ports			
Conducted RF immunity IEC 61000-4-6	10V rms with 1 kHz sine-wave 80% AM from 150 kHz...80 MHz				

(1) Includes the K conformal coating catalog numbers.

(2) Applies only to these modules/series: 1756-EN2T/D, 1756-EN2TSC/B, 1756-EN2TR/C, 1756-EN3TR/B.

**Table 6 - Certifications - 1756 EtherNet/IP Modules<sup>(1)</sup>**

Certification <sup>(2)</sup>	1756-EN2T/D 1756-EN2TP/A	1756-EN2F/B 1756-EN2F/C	1756-EN2TSC/B	1756-EN2TR/C, 1756-EN3TR/B	1756-ENBT/A	1756-EWEB/B	1756-EN4TR/A
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810.						UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810.
CSA	CSA Certified Process Control Equipment. See CSA File LR54689C. CSA Certified Process Control Equipment for Class I, Division 2 Group A,B,C,D Hazardous Locations. See CSA File LR69960C.		—	CSA Certified Process Control Equipment. See CSA File LR54689C. CSA Certified Process Control Equipment for Class I, Division 2 Group A,B,C,D Hazardous Locations. See CSA File LR69960C.			—
CE	European Union 2004/108/IEC EMC Directive, compliant with: EN 61326-1; Meas./Control/Lab., Industrial Requirements EN 61000-6-2; Industrial Immunity EN 61000-6-4; Industrial Emissions EN 61131-2; Programmable Controllers (Clause 8, Zone A & B)						
RCM	Australian Radiocommunications Act, compliant with EN 61000-6-4; Industrial Emissions						
ATEX	European Union 94/9/EC ATEX Directive, compliant with the following: EN 60079-15; Potentially Explosive Atmospheres, Protection “n” EN 60079-0; General Requirements II 3 G Ex nA IIC T4 Gc X DEMKO13ATEX1325026X (1756-EN2T/C only)						European Union 2014/34/EU ATEX Directive, compliant with the following: EN IEC 60079-0 General Requirements; EN 60079-7 Explosive Atmospheres, Protection “e”; II 3 G Ex ec IIC T4 Gc DEMKO18ATEX2139X
FM	<b>All modules except 1756-EN2TSC:</b> FM Approved Equipment for use in Class I Division 2 Group A,B,C,D Hazardous Locations						
IECEX	—	IECEX System, compliant with: IEC 60079-15; Potentially Explosive Atmospheres, Protection “n” IEC 60079-0; General Requirements II 3 G Ex nA IIC T4 Gc IECEX UL 14.0008X	—	IECEX System, compliant with: IEC 60079-0; General Requirements IEC 60079-15; Potentially Explosive Atmospheres, Protection “n” IEC 60079-0; General Requirements II 3 G Ex nA IIC T4 Gc IECEX UL 14.0008X	—	IECEX System, compliant with the Standards IEC 60079-0, Edition 7 General Requirements, and 60079-7, Edition 5.1, Explosive Atmospheres, Protection “e”; II 3 G Ex ec IIC T4 Gc IECEXUL 18.0130X	
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3						
EAC	Russian Customs Union TR CU 020/2011 EMC Technical Regulation Russian Customs Union TR CU 004/2011 LV Technical Regulation						
EtherNet/IP	ODVA conformance tested to EtherNet/IP specifications						

(1) Includes the K conformal coating catalog numbers.

## EtherNet/IP Module Diagrams

Figure 1 - 1756-EN2T

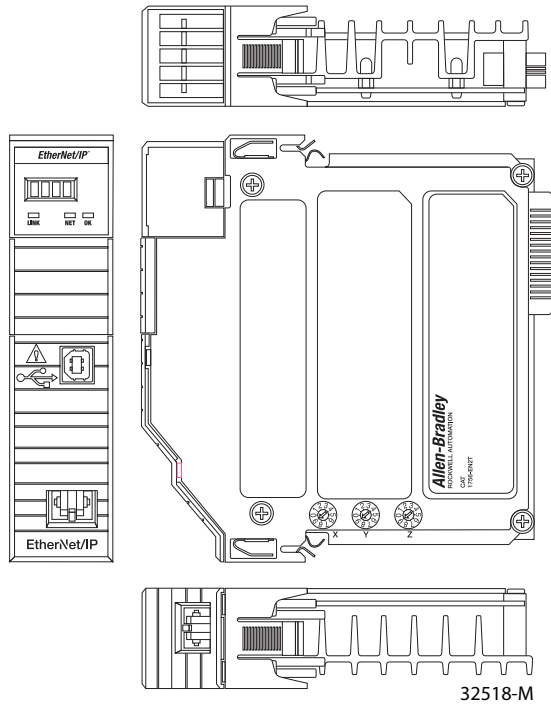


Figure 2 - 1756-EN2TP

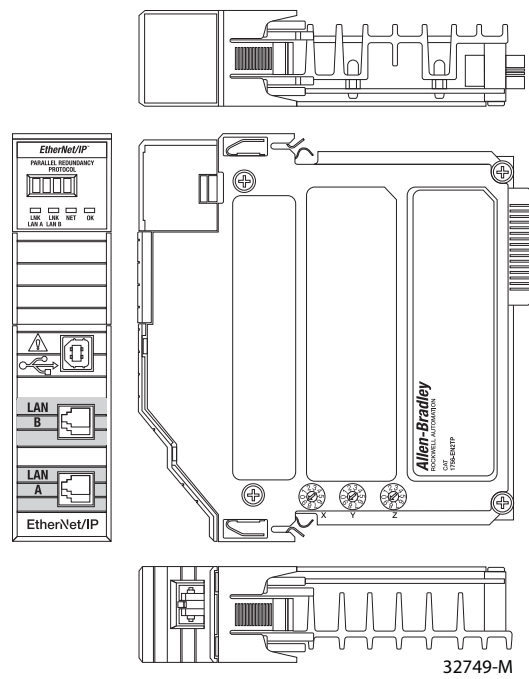


Figure 3 - 1756-EN2TR, 1756-EN3TR

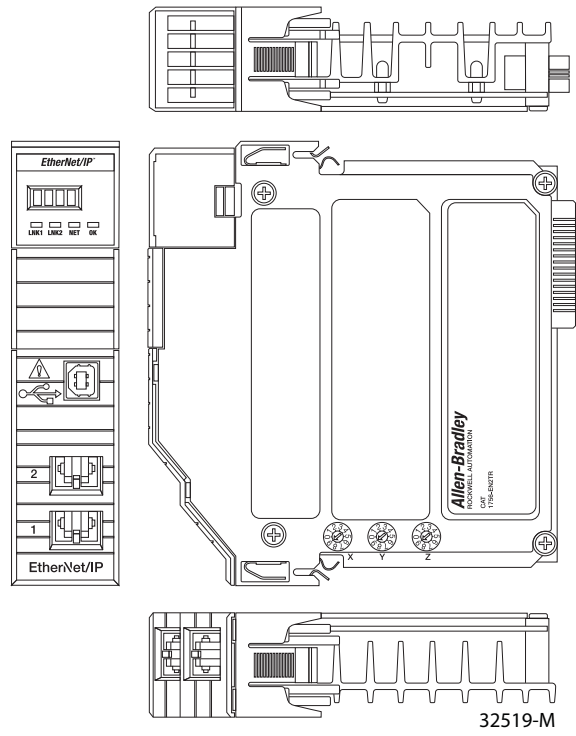
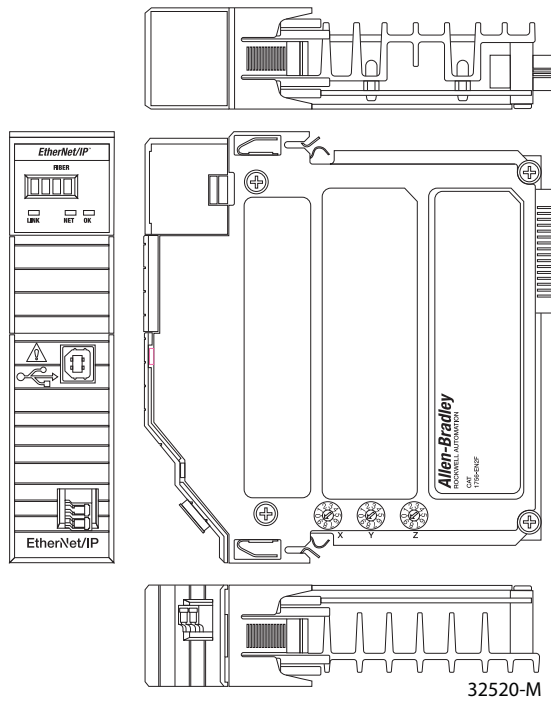
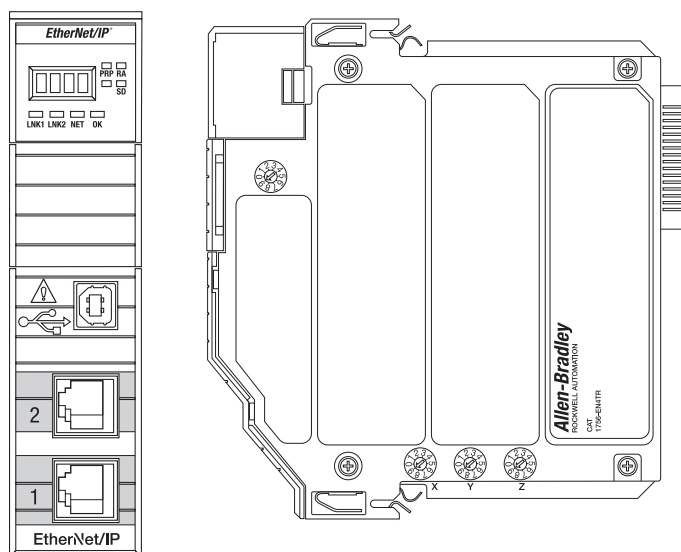


Figure 4 - 1756-EN2F



**Figure 5 - 1756-EN4TR**

## Accessories—Ethernet Network

Cat. No.	Description	Specifications
1585J-M8PBJM-x	Ethernet RJ45 patchcord x = 2 (2 m), 5 (5 m), or 10 (10 m)	8-conductor, teal riser PVC cable (flex-rated cable also available)
1585J-M8CC-H	RJ45 insulation displacement connector (IDC)	0.128...0.325 mm <sup>2</sup> (26...22 AWG), Cat. 6, IDC, no tool required
1585J-M8CC-C	RJ45 crimp connector with boot, qty = 50 pieces	0.128...0.205 mm <sup>2</sup> (26...24 AWG), Cat. 5e, requires crimp tool for assembly
1585A-JCRIMP	Crimp tool	—
9300-RADES	Remote access dial-in kit	56 Kbps modem connection to devices on an Ethernet network

## Stratix Switches

To effectively manage real-time control and information flow throughout the manufacturing and IT enterprise, Rockwell Automation offers a full portfolio of industrial Ethernet switches and media, including a line of Stratix® switches integrated with Cisco® technology. The Stratix line of switches includes modular managed, fixed managed, and unmanaged switches.

For detailed specifications for Stratix switches, see Stratix Ethernet Switch Specifications Technical Data, publication [1783-TD001](#).

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# Ethernet Switches

Introduction	Environmentals and Certifications	Stratix 8300 Modular Managed Switches	Stratix 8000 Modular Managed Switches	Stratix 6000 Fixed Managed Switches	<b>Accessories</b>
Stratix 5700 Managed Switches	Stratix 2000 Unmanaged Switches	Embedded Switch Technology			




## Accessories

### SFP (Small Form-factor Pluggable) Transceivers

Cat. No.	Description	Wavelength	Fiber Type	Core Size/Cladding Size (micron)	Modal Bandwidth (MHz/km) *	Cable Length	Compatible With
1783-SFP100FX	100Base-FX Multi-mode Fiber SFP	1310 nm	MMF	50/125 62.5/125	500	2 km (6562 ft)	Stratix 5700, 8000, 8300
1783-SFP100LX	100Base-LX Single-mode Fiber SFP	1310 nm	SMF	G.652	—	10 km (32.81 ft)	Stratix 5700, 8000, 8300
1783-SFP1GSX	1000Base-SX Multi-mode Fiber Transceiver	850 nm	MMF	62.5/125 62.5/125 50/125 50/125	160 200 400 500	220 m (722 ft) 275 m (902 ft) 500 m (1640 ft) 550 m (1804 ft)	Stratix 5700, 6000, 8000, 8300
1783-SFP1GLX	1000Base-LX/LH Single-mode Fiber SFP	1310 nm	SMF	G.652	—	10 km (32.81 ft)	Stratix 5700, 6000, 8000, 8300

\* Modal bandwidth applies only to multi-mode fiber.

### Ethernet Cable

Cat. No.	Description	
1585J-M8PBJM-2 *	RJ45 to RJ45 patchcord	
1585-C8PB-S100 ‡	Ethernet cable spool	
1585J-M8CC-H	Field attachable connector, IDC	

\* Replace -2 (2 m) with 5 (5 m) or 10 (10 m) for additional standard cable lengths.

‡ Replace 100 (100 m) with 300 (300 m) or 600 (600 m) for additional standard cable lengths.

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# Studio 5000 Automation Engineering & Design Environment®

Enhance Productivity through Simplified System Development

## Overview

The Studio 5000® environment combines elements of design into one standard framework that optimizes productivity and reduces time to commission.

This intuitive integrated design environment focuses on rapid design, re-use, collaboration and virtual design.

The updated user interface provides a common, modern user experience across all Studio 5000 applications.

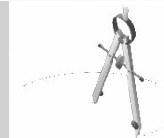
### With the Studio 5000 Applications you can:

- Build and maintain a system layout in a central place with **Architect™**
- Configure, program and maintain your Logix 5000™ family of controllers with **Logix Designer®**
- Create intuitive, modern screens for the PanelView™ 5000 graphic terminals with **View Designer™**
- Create and leverage re-usable libraries of content for rapid project development with **Application Code Manager**
- Simulate your control system in a safe, virtual environment while reducing project cost and risk with **Logix Emulate™**
- Link Rockwell controllers to various simulation and modeling tools for virtual commissioning, model based design, and self-configuring machines with **Simulation Interface**

Rockwell Software

# Studio 5000

## Architect



Enables Simplified System Design and Data Exchange

## Logix Designer



Collaborative System Programming and Configuration

## View Designer



Highly Integrated HMI with Logix

## Application Code Manager



System Reuse and Quickly Build Projects

## Logix Emulate



Virtual Design and Operator Training Systems

## Simulation Interface



Connect Logic to Simulation Models

**Rockwell  
Automation**

## Studio 5000 Architect

Studio 5000 Architect is the central point within the Studio 5000 environment where users can view the overall automation system; configure devices such as controllers, Human Machine Interface (HMI) and Electronic Operator Interface (EOI); and manage the communications between the devices. The Studio 5000 Architect application also exchanges data with other Studio 5000 applications and third-party CAD packages to simplify the development experience.

This helps streamline the time to build your Logix and View automation system and allows you to:

- Create a graphical representation of your system for easier system modifications
- Build Logix and View projects from an integrated environment
- Re-use Logix and View content as well as use content from the Rockwell Automation Library of Process Objects
- Exchange hardware configuration data, like Controller, I/O, and Communications modules, with third-party tools
- AutomationML import/export capabilities for bi-directional exchange of data between Studio 5000 and electrical CAD packages for robust data management

Manage the System Layout



## Studio 5000 Logix Designer

Studio 5000 Logix Designer is the one application to configure, program and maintain the entire Allen-Bradley® Logix 5000™ family of controller products and related devices. Its intuitive, modern programming environment allows users to work collaboratively to design and maintain their systems.

- One programming software for all disciplines – safety, motion, drives, process and discrete
- Easily configure devices with graphical wizards and automatically create tags
- Simplified, modern programming with multiple editors and modular programming features for increased productivity
- View the system and easily find what you need with the Logical Organizer and Controller Organizer views – helping maintain uptime
- Create code simultaneously with others, and then compare and merge changes
- Protect the design and execution of your Logix content with license-based protection capabilities – to help ensure that only authorized users are able to view, modify or execute protected code
- Logix tag-based alarms functionality allows users to add alarms directly to any tag or structure with a simple right click; no additional programming required
- Expanded library of safety instructions for network-based safety and motion instructions for improved kinematics support
- Supports scalable safety offerings providing a more right-sized solution SIL 2 and SIL 3
- Offers AutomationML capabilities for bidirectional exchange of data between Studio 5000 Design Environment and electrical CAD packages for robust data exchange and flexibility

**Configure, Program and Maintain Your Controllers**

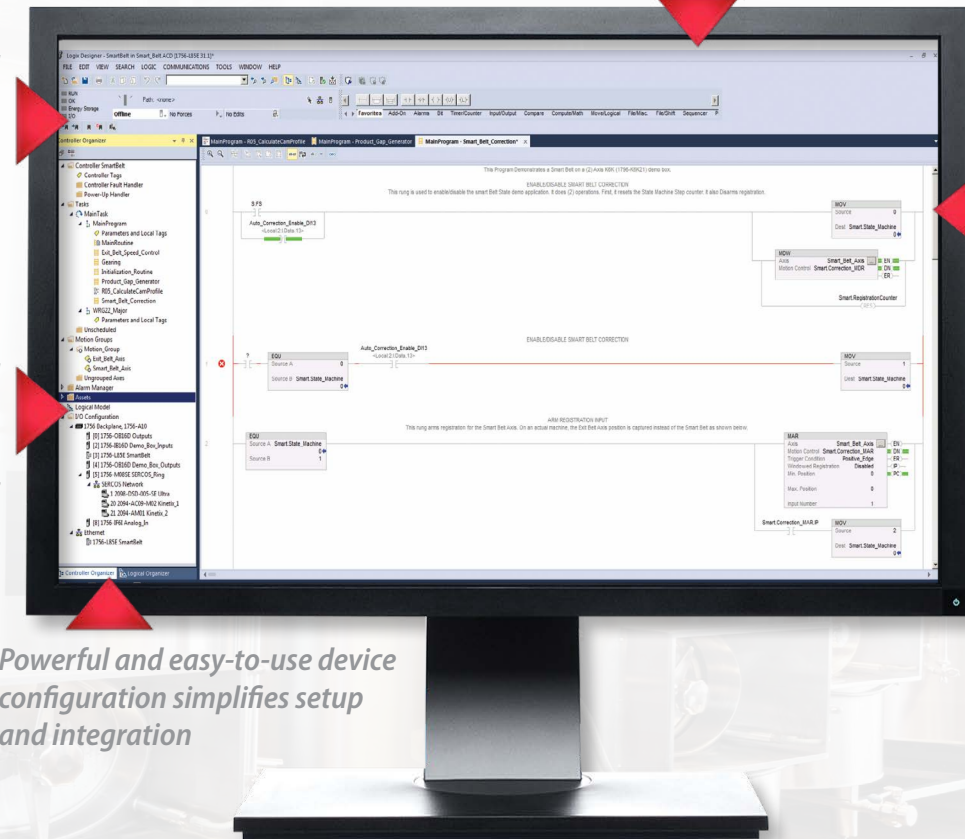
*Instruction Palette contains over 250 predefined instructions*

*Project Explorer offers multiple views to help define organization and execution*

*Integrated Motion and Integrated Safety in an intuitive design environment*

*Powerful and easy-to-use device configuration simplifies setup and integration*

*Feature-rich editors help users write modular code*



## Studio 5000 View Designer

Studio 5000 View Designer is the design environment for the PanelView™ 5000 family of operator terminals. The integration of the PanelView 5000 terminals with Studio 5000 View Designer helps build modern applications more easily and improve operator performance.

The View Designer application provides an intuitive, modern design environment and enhances integration between the control system and operator interface to improve programming efficiency and runtime performance.

- Preconfigured banner, alarm summary and diagnostic displays help reduce design time
- Simplify your engineering with shared tags between HMI and controller
- Eliminate alarm programming and reduce network traffic with Logix-tag based alarms
- High-speed button control provides quick response and feedback for machine jogging applications
- Create custom, re-usable add-on graphics to more efficiently build your applications
- Multi-language support with a language switching feature enables users to switch between languages on the PanelView 5000 terminals to support global user needs
- Emulation capabilities enable users to test run a project to decrease overall project risks
- Data logging and historical trending features show historical data immediately when the screen is displayed, helping decrease troubleshooting time
- Built-in VNC server enables a remote VNC client for monitoring and troubleshooting

**Configure, Program and Maintain Your Operator Interfaces**

*Project Explorer  
to easily develop  
screens and menus*

*Searchable toolbox  
of graphic elements  
for screens*

*Custom, re-usable add-on graphics  
help increase productivity*

*Integrated data  
sharing between  
View Designer  
application and  
Logix system*



## Studio 5000 Application Code Manager

Studio 5000 Application Code Manager helps speed system development by building libraries of re-usable code that can be managed and deployed across the entire enterprise. Creating projects with Application Code Manager helps improve design consistency, reduce engineering costs and achieve faster commissioning.

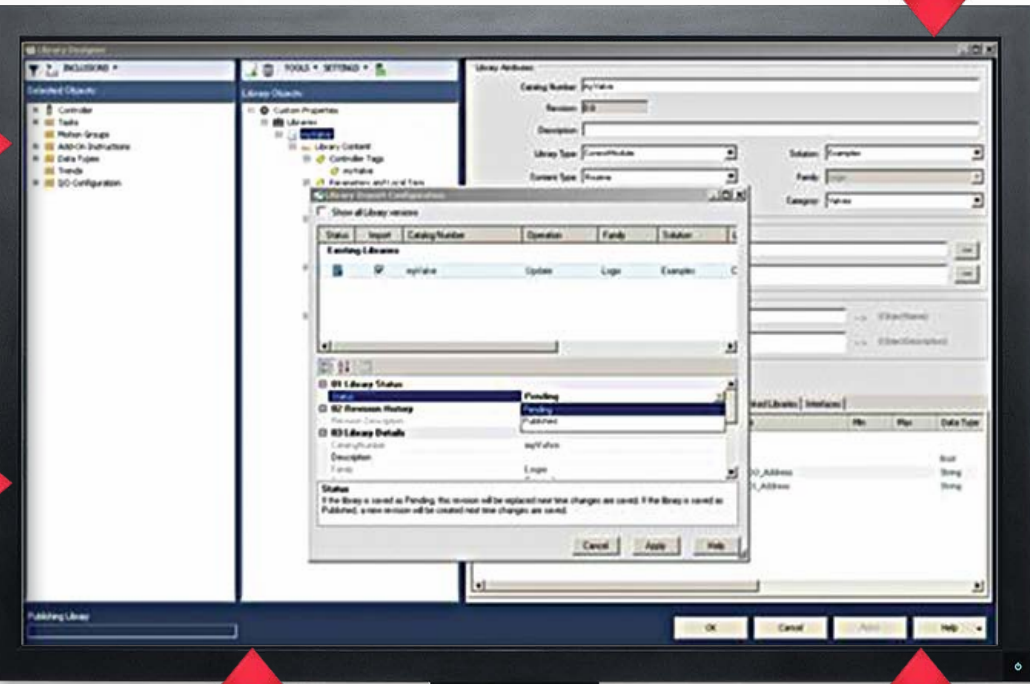
- Easily create and configure objects in bulk using re-usable libraries of code to increase application development, without any additional programming
- The auto content generation feature creates not only the controller code for the modular object, but also the associated visualization, historical and alarming data – helping to build projects more efficiently
- Easily instantiate complex re-usable library objects into a new or an existing project
- Use standardized, application-focused libraries of code at no cost, including PlantPax® Process Object Libraries and our Machine Builder Libraries, to save time and more easily maintain your systems

A no-cost Lite Edition is available from **PCDC** (Product Compatibility and Download Center) and includes the ability to use Rockwell Automation libraries and create custom libraries, but is limited to a single controller and local database. Studio 5000 Application Code Manager Standard Edition is available as a low cost, annual subscription.

**Accelerate Project Creation Using Re-usable Content**

*Easily import and export configuration data using Microsoft Excel*

*Project Explorer shows all of the configured objects in your automation project*



*Add, edit and delete project content by Library Objects with Class View*

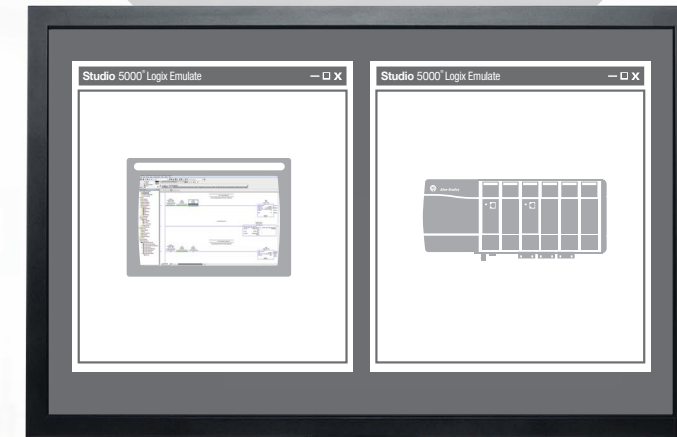
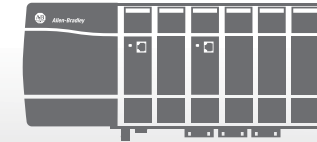
*Manage your comprehensive library of reusable content across projects*

*Quickly and easily configure modular objects through simple parameter configuration*

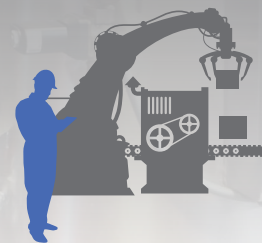
## Studio 5000 Logix Emulate

Studio 5000 Logix Emulate increases design productivity, reduces risk and decreases overall project costs. It is the core of Studio 5000 virtual design; enabling Machine Prototyping, Throughput Analysis, Virtual Commissioning and Operator Training Systems (OTS). Logix Emulate provides the ability to validate, test and optimize application code independent of physical hardware. Interface capabilities provide connectivity to 3rd party simulation and OTS, enabling users to simulate their entire process and train teams in a safe, virtual environment.

- Simulate discrete Input/Output (I/O) and Logix5000 based controllers
- Simplify troubleshooting by utilizing advanced debugging to support code validation and virtual commissioning
- Easily adjust execution speeds to identify potential issues long before they are found in a production system
- Integrate into high fidelity process simulation systems for operator and situational based training



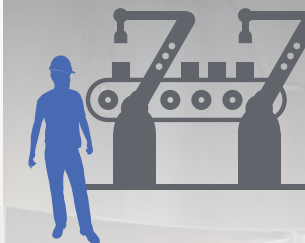
**MACHINE  
PROTOTYPING**



**THROUGHPUT  
ANALYSIS**



**VIRTUAL  
COMMISSIONING**



**OPERATOR TRAINING  
SYSTEMS (OTS)**



**Simulate Your System in a Safe, Virtual Environment**

## Studio 5000 Simulation Interface

- Studio 5000 Simulation Interface connects controllers – physical or emulated – to simulation and modeling tools to enable virtual commissioning and model-based design. This can help you design, test, validate and commission smart machines before they are put into service.
- Uses Functional Mock-up, a tool-independent standard, to support both model exchange and co-simulation of dynamic models to design and test smart machines easier
- Supports Matlab Simulink, allowing bi-directional communication with Simulink Models
- Simulate discrete Input/Output (I/O) and Logix5000 based controllers
- Simplify troubleshooting by utilizing advanced debugging to support code validation and virtual commissioning
- Easily adjust execution speeds to identify potential issues long before they are found in a production system
- Integrate into high fidelity process simulation systems for operator and situational based training



Simulation  
Interface



Connectivity to support smart machines and digital design

## Studio 5000 Software Package Options

Studio 5000 Edition	Professional	Standard	Lite
Architect	✓	✓	✓
Logix Designer	✓	✓	✓
Controllers supported	All	All	CMX Only
Editors included (before add-ons <sup>1</sup> )	All	Ladder Only	All
View Designer	✓	✓	✓
Logix Emulate <sup>2</sup>	✓	+	+
Application Code Manager Lite <sup>3</sup>	✓	✓	✓

<sup>1</sup>Additional add-ons are available. For complete offering, consult the [Studio 5000 Ordering Information Guide](#)

<sup>2</sup>Logix Emulate is included in the Professional Edition, however Logix Emulate for Operator Training is a standalone license and must be purchased separately.

<sup>3</sup>Application Code Manager Lite is available at no charge on PCDC, Standard Edition is available as an add-on purchase.

✓ Included + Add-on Purchase

## Purchasing Options

### Perpetual Software License & Maintenance Bundle

Work more confidently with automatic access to software version updates for a full year. Rockwell Automation software licenses are bundled with first year maintenance benefits to deliver important version updates. Perpetual licenses never expire.

### Software Subscription

For more flexibility, opt for a software subscription. Add or remove licenses with a subscription to scale usage up or down and prevent overpaying for unused licenses. Change and edit the Studio 5000 design environment without reinvesting in new software. Access to support and upgrades are automatically included with subscriptions. Find the right fit with various term options (from 1-year to 5-year subscription plans).

### Buy Now

The [myRockwell Software Portal](#) is a central location for all things Rockwell Automation. Create an account with just a few clicks and gain access to BOMS, services, quotations, software subscriptions and more ways to customize your software package.

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EUROPE/MIDDLE EAST/AFRICA: Rockwell Automation NV, Pegasus Park, De Kleetlaan 12a, 1831 Diegem, Belgium, Tel: (32) 2 663 0600, Fax: (32) 2 663 0640

ASIA PACIFIC: Rockwell Automation, Level 14, Core F, Cyberport 3, 100 Cyberport Road, Hong Kong, Tel: (852) 2887 4788, Fax: (852) 2508 1846

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**INVERTERS**



**DC/AC Power Inverters**

SBS offers a variety of inverters ranging from 1kVA to 10kVA in several design topologies including transformer based, ferro-resonant as well as switch-mode MOSFET.

Used to convert available DC power supplied by large rectifier and battery systems to nominal 120 volt AC power for discrete computer and other office loads, the inverter is extremely popular within the telecommunications environment.

Because the DC power buss is reserve in nature, a virtually uninterrupted power supply is created for PC workstations, SCADA systems, alarm panels, security devices and fire protection systems.

The most popular and economical units are the 1 kVA (25A) & 2 kVA (50A) styles in electronic switch-mode (SMPS) design.

**1-2kVA Rack Mount Inverters**

- 24, 48 & 125 Vdc nominal input
- 120 Vac output
- Integral AC bypass switch
- 19" & 23" rack mounting
- Optional SNMP communications
- Hardwire input
- UL certification
- >85% efficiency
- Transistorized IGBT sinewave output
- High MTBF

**Ordering Information**

Part No.	Input	Output	KVA	Watts	Mounting
SBS-1000-48-2U	40 - 60 Vdc	100 - 120 Vac	1	800	19"/23" 2U Rackmount
SBS-2000-48-2U	40 - 60 Vdc	100 - 120 Vac	2	1600	19"/23" 2U Rackmount

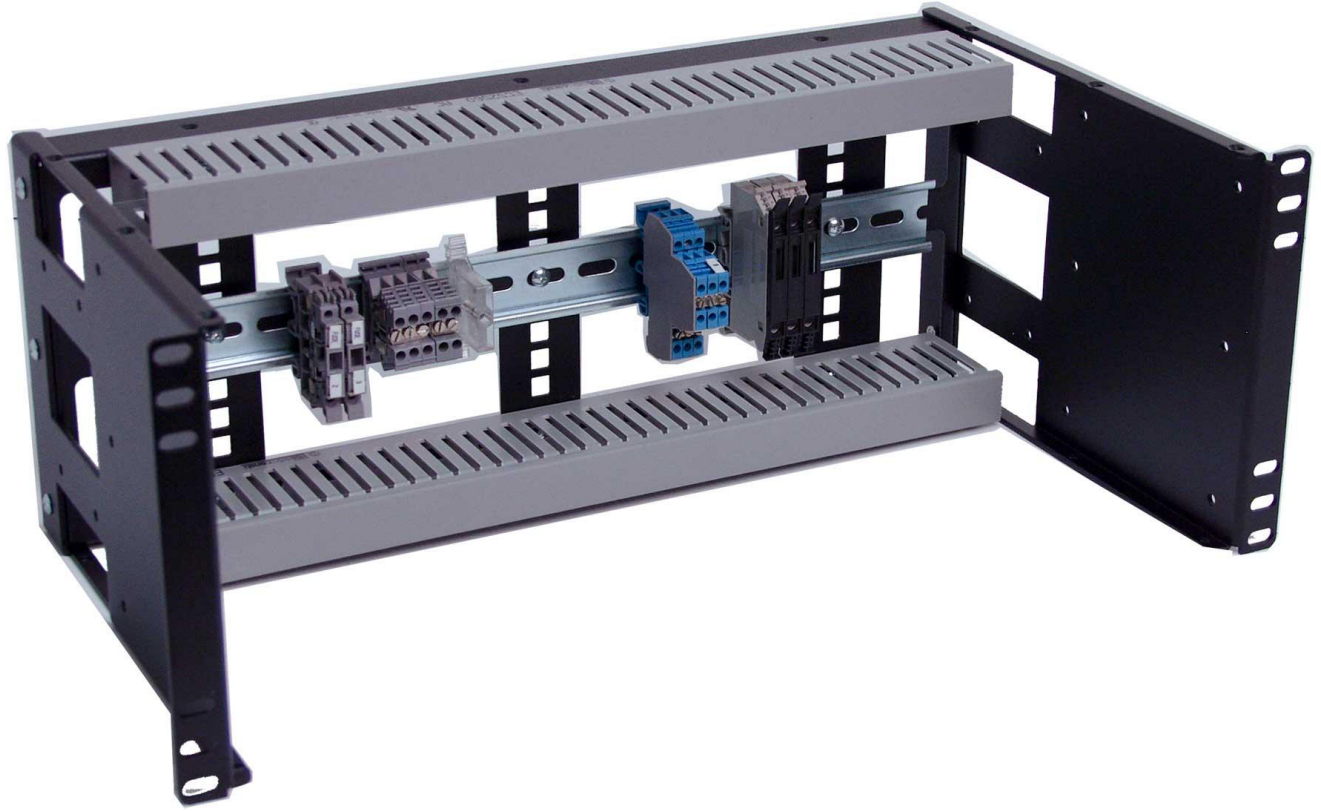


SBS-1000-125-2U	100 - 150 Vdc	100 - 120 Vac	1	800	19"/23" 2U Rackmount
SBS-2000-125-2U	100 - 150 Vdc	100 - 120 Vac	2	1600	19"/23" 2U Rackmount




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## RCB1112BK15 4U ADJUSTABLE DEPTH RACKMOUNT DIN RAIL PANEL



OTHER SIZE








ONLINE-ORDER

Model#	Description	Price	
RCB1112BK15	4U Adjustable Depth Rackmount Din Rail Panel.	\$159.00	

\* QTY discount and reseller pricing available. Call or e-mail for your price quote.

[+ OTHER SIZES](#)

Product ID	Description	Price	Buy
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Product ID	Description	Price	Buy
IRP1029D	2U Adjustable Depth Rackmount Din Rail Panel. ⓘ	\$129.00	 BUY
RCB1111BK15	3U Adjustable Depth Rackmount Din Rail Panel. ⓘ	\$149.00	 BUY
RCB1112BK15	4U Adjustable Depth Rackmount Din Rail Panel. ⓘ	\$159.00	 BUY
RCB1118BK15	5U Adjustable Depth Rackmount Din Rail Panel. ⓘ	\$179.00	 BUY
RCB1122BK15	6U Adjustable Depth Rackmount Din Rail Panel. ⓘ	\$199.00	 BUY
RCB1132BK15	8U Adjustable Depth Rackmount Din Rail Panel. ⓘ	\$279.00	 BUY
RCB1138BK15	10U Adjustable Depth Rackmount Din Rail Panel. ⓘ	\$319.00	 BUY

[+ PANELS ONLY](#)

[+ OPTIONAL ACCESSORIES](#)

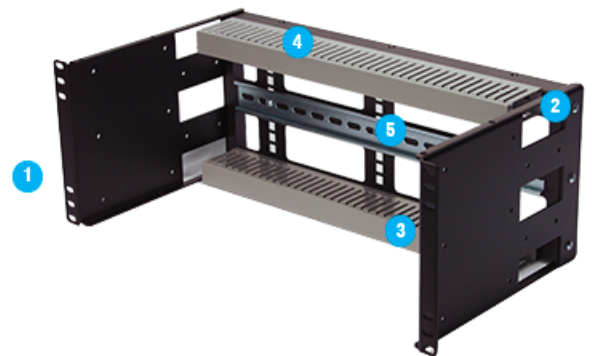
## Introduction

Most of the industrial control panel projects are unique and almost all required custom build solution. For small custom build solution, it usually means higher cost and longer lead time. There is no way around it for custom build project until now. Introducing the new adjustable depth rackmount din rail panel. RCB1112BK15 offers traditional panel fabricator a way to reduce cost and shorten lead time for small and larger projects.

Our industrial control panel (ICP) solution is simple and easy to integrate into any ICP design. We utilize existing EIA-301 19" rackmount cabinet standard for our product design. Since, EIA-310 19" rackmount cabinet is widely used in the telecom and datacenter industry, panel fabricator or in-house engineer can easily order 19" cabinet from almost any e-retailer or local reseller at very competitive pricing.

EIA-310 19" cabinet offers excellent air flow, security and protection from environment. It is available in many size ranging from 13U up to 47U. The mounting platform can be as simple as a 2 Post relay rack to a fully enclosed 4 post cabinet with a build in air conditioning unit. With so many size and shape to choose from, you will not have any problem finding a suitable size enclosure for your project need.

RCB1112BK15 adjustable depth rackmount din rail panel is design to work with any standard EIA-310 rack cabinet. Our unique DIN Rail mounting system allows ICP engineers to pack more DIN Rail equipment within the stander EIA-310 rack space than any other similar design on the market. You can provision the DIN Rail and PVC Wire Ducts horizontally, vertically or even at the rear to double your



equipment density by using the same panel. RCB1112BK15 Din rail panel offers the simplest way to route, organize, and store large bundles of control cables connected to your Din Rail Equipment. RCB1111BK15 can help you to deploy your small or large project with in your project time frame and within budget.

## Features


- Easy to install and integrate into industrial control panel design.
- Depth adjustable Panel.
- Din rail vertical mounting position adjustable.
- (1) 7.5mm height Din Rail included. 3
- (2) PVC Wire Management duct included. 4
- All Din Rail and PVC Wire duct are removable.
- Heavy Duty construction
- (1) #6-32 standoff for mounting grounding cable.
- (2) large rectangle cable access ports on both right and left side. 2
- Supports any standard EIA-310 rackmount cabinet. 1
- Optional Rear Expansion mounting bracket for additional DIN Rail and PVC wire duct installation.
- Available from 1U to 10U rack space height.

## Specifications

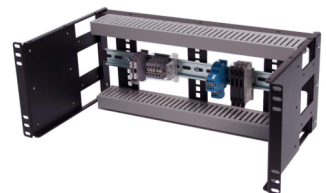
Model	RCB1112BK15
Rack Space Height	4U
Rack Standard Support	EIA-310-D
Din Rail Standard	Top Hat Din Rail EN500222
Din Rail Size	35mm (W) x 7.5mm (H) x 398mm (L)
Din Rail Included	2
PVC Wire duct Size	60mm (W) x 25mm (H) x 398mm (L)
PVC Wire Management duct Included	2
Data Cable Access ports	Two large rectangle cable access holes on both the right and left side.
Mounting Hardware Included	(4) #10-32 rack screws, and (12) M4 screws.
Assembly Required	Yes
Metal Type	Steel
Panel Thickness	14 Gauge, 1.98mm

Rack Mounting Bracket Thickness	12 Gauge
Color	Black Powder Paint finish
Panel Depth Adjustable	Yes
Din Rail height Adjustable	Yes
Grounding Support	(1) #6-32 standoff
Max Load Load Capacity for panel	150LB Max.
Environmental compliance	RoHS
Country of Origin	USA
Gross Weight	10 LB
Dimension W x H x D	18.82" (480.56mm) x 7" (177.8mm) x 9.84" (250mm)
Warranty	Limited 3 year warranty

### Technical Document

Doc#	Description	Download
1	RCB1112BK15 Dimensional CAD Drawing.	<a href="#">↓ PDF</a>
2	RCB1112BK15 Installation Manual	<a href="#">↓ PDF</a>
3	RCB1112BK15 360 Degree View PDF 	<a href="#">↓ PDF</a>
4	3D STEP and DWG files are available upon request. Need major or minor modification? Call for detail.	

### Product Gallery





## Application Note

Ideal for Automation, Process Control, Testing Equipment, Clean room, Solar and Wind Energy industry.

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**BBB Rating: A+**  
as of 1/23/2020  
[Click for Profile](#)

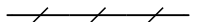
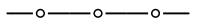


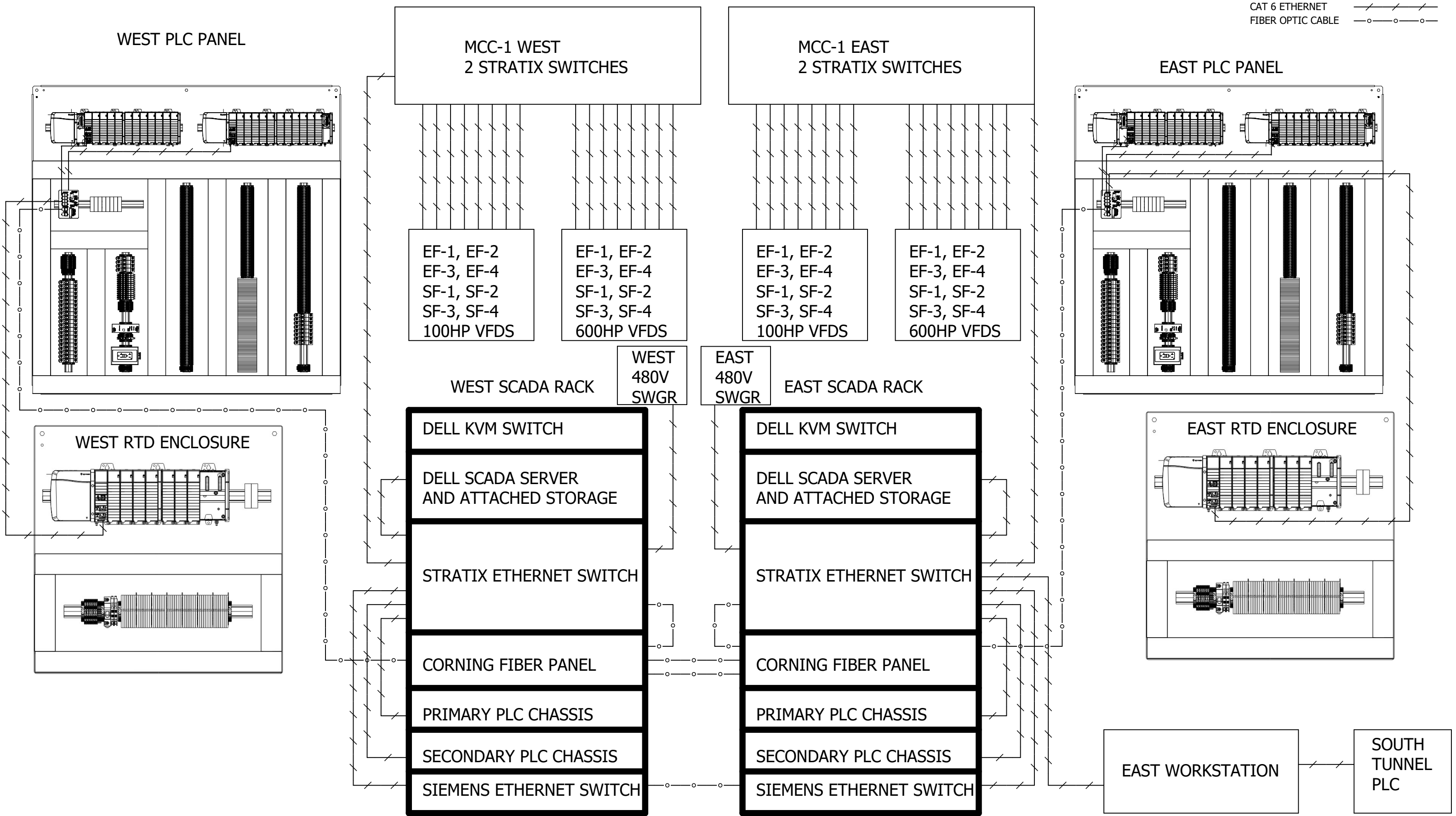
Technology  
Provider  
**Gold 2018**

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CAT 6 ETHERNET   
 FIBER OPTIC CABLE 



STATE OF COLORADO DEPARTMENT OF TRANSPORTATION  
 EISENHOWER/JOHNSON MEMORIAL TUNNEL 480V MCC REPLACEMENT

EAST PLC PANEL - COMMUNICATIONS OVERVIEW

PROJECT # CMS203      SCALE N/A      ENG: E. KILGORE

REV	DATE	NAME	REMARKS
5.0	09/17/21	ekilgore	FIELD MODIFICATIONS
5.0	09/17/21	ekilgore	FIELD MODIFICATIONS
5.0	09/08/21	ekilgore	FIELD MODIFICATIONS
4.0	08/02/21	ekilgore	AS-BUILT
3.1	09/28/20	ekilgore	ADDED SWBD
1.2	08/31/20	ekilgore	RFI RESPONSE
1.1	06/18/20	ekilgore	SUBMITTAL REV D
0.1	05/08/20	ekilgore	DESIGN CHANGES

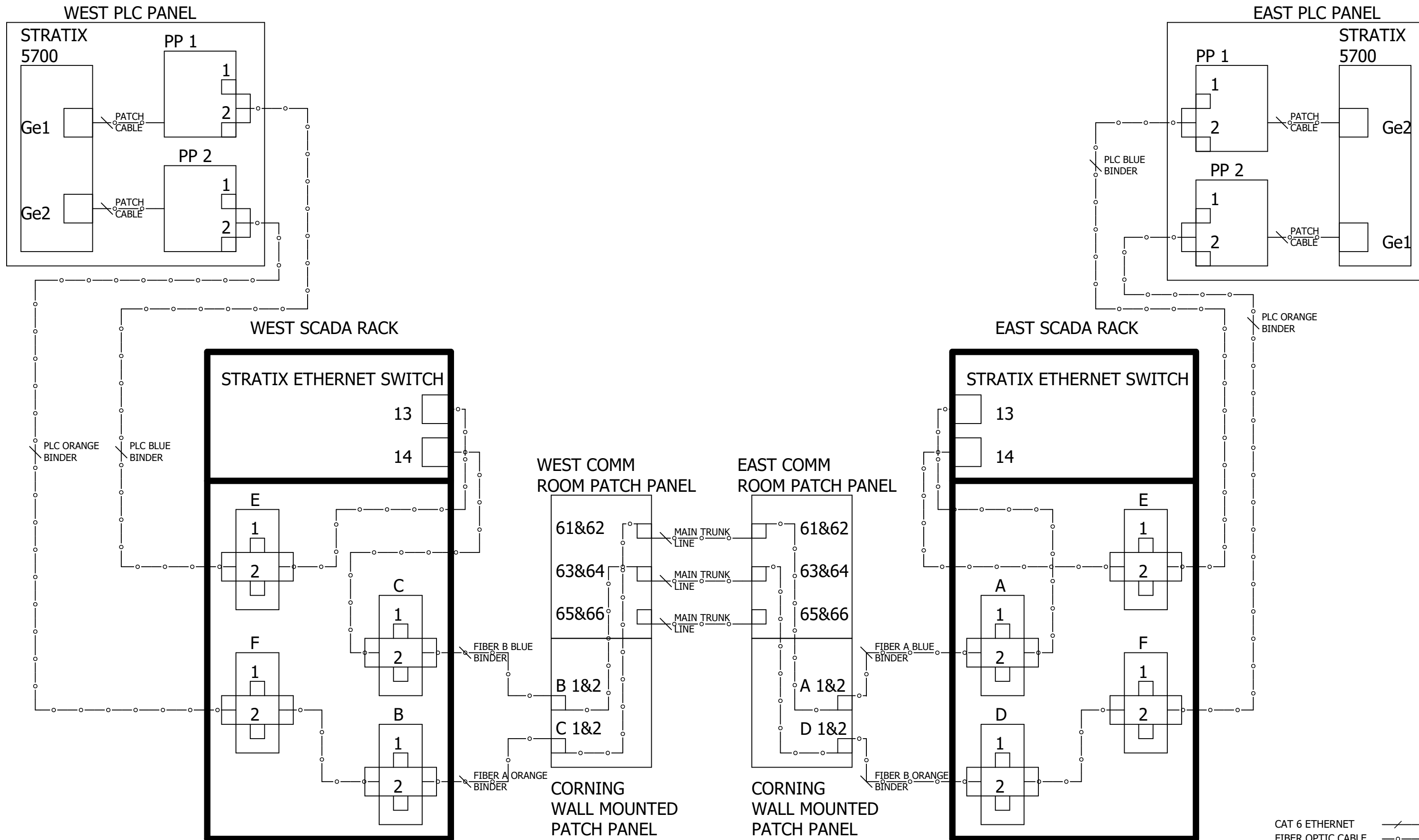
REV	DATE	NAME	REMARKS
5.0	09/08/21	ekilgore	FIELD MODIFICATIONS
4.0	08/02/21	ekilgore	AS-BUILT
3.0	09/04/20	ekilgore	SHIPPED FOR ONSITE INSTALLATION
2.0	09/04/20	ekilgore	SUBMITTAL APPROVED. RELEASED FOR FABRICATION.
1.0	05/08/20	ekilgore	SUBMITTED FOR CUSTOMER APPROVAL

DWG # CMS203-E01A09



5301 NORTH 57TH STREET  
 LINCOLN, NEBRASKA 68507  
 (402) 464-6823

112 INVERNESS CIRCLE EAST, SUITE E  
 ENGLEWOOD, COLORADO 80112  
 (303) 376-6280



STATE OF COLORADO DEPARTMENT OF TRANSPORTATION  
EISENHOWER/JOHNSON MEMORIAL TUNNEL 480V MCC REPLACEMENT

FIBER RING OVERVIEW

PROJECT # CMS203

SCALE N/A

ENG: E. KILGORE

REV	DATE	NAME	REMARKS
4.3	09/13/21	ekilgore	AS-BUILT
4.2	09/13/21	ekilgore	AS-BUILT
4.1	04/26/21	ekilgore	FIBER TESTING RESULTS
4.0	04/26/21	ekilgore	FIBER TESTING RESULTS
4.0	04/26/21	ekilgore	New page created
3.1	09/28/20	ekilgore	ADDED SWBD
1.2	08/31/20	ekilgore	RFI RESPONSE
1.1	06/18/20	ekilgore	SUBMITTAL REV D
0.1	05/08/20	ekilgore	DESIGN CHANGES

REV	DATE	NAME	REMARKS
5.0	09/08/21	ekilgore	FIELD MODIFICATIONS
4.0	08/02/21	ekilgore	AS-BUILT
3.0	09/04/20	ekilgore	SHIPPED FOR ONSITE INSTALLATION
2.0	09/04/20	ekilgore	SUBMITTAL APPROVED. RELEASED FOR FABRICATION.
1.0	05/08/20	ekilgore	SUBMITTED FOR CUSTOMER APPROVAL

DWG # CMS203-E01A09A

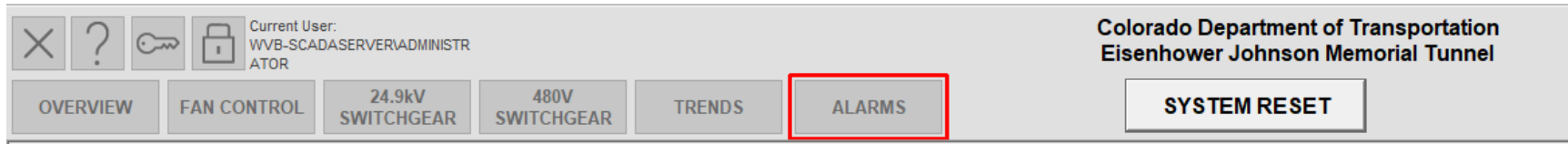


5301 NORTH 57TH STREET  
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ENGLEWOOD, COLORADO 80112  
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## NAVIGATION



The navigation bar is a horizontal strip at the top of the screen. On the left, it contains four icons: a close (X) button, a help (?) button, a key icon for login, and a padlock icon for logout. To the right of the padlock icon, the current user is listed as 'Current User: WVB-SCADASERVERADMINISTRATOR'. On the far right, the text 'Colorado Department of Transportation Eisenhower Johnson Memorial Tunnel' is displayed. Below these elements is a row of navigation buttons: 'OVERVIEW', 'FAN CONTROL', '24.9kV SWITCHGEAR', '480V SWITCHGEAR', 'TRENDS', 'ALARMS', and 'SYSTEM RESET'. The 'ALARMS' button is highlighted with a red border, indicating an active alarm.

The navigation bar is visible at the top of every screen. Clicking on the key symbol will display a login prompt allowing a user to enter username and password. The padlock icon logs out the current user and to the right of that button the current user is displayed. Underneath is a series of navigation buttons that allow a user to open various pages in the system. If there is an active alarm in the system, the Alarms navigation button will highlight red. A System Reset button is also displayed on the navigation bar. There are various faults in the PLC that are latched in and require a System Reset to clear them. For troubleshooting purposes, if an alarm is not clearing and the alarm condition has been remedied, clicking the System Reset button may clear the alarm condition and allow the fans to run.

### OVERVIEW

Current User:  
WVB-SCADASERVERADMINISTRATOR

**Colorado Department of Transportation**  
 Eisenhower Johnson Memorial Tunnel

September 9, 2021  
 3:49:42 PM  
 Listen, Think, Solve

OVERVIEW
FAN CONTROL
24.9KV SWITCHGEAR
480V SWITCHGEAR
TRENDS
ALARMS

SYSTEM RESET

#### OVERVIEW

EAST VENTILATION BUILDING - NORTH TUNNEL

SF-#4	SF-#3	SF-#2	SF-#1
OFF	OFF	OFF	25%
EF-#4	EF-#3	EF-#2	EF-#1
OFF	OFF	25%	OFF

WEST VENTILATION BUILDING - NORTH TUNNEL

SF-#1	SF-#2	SF-#3	SF-#4
OFF	OFF	25%	OFF
EF-#1	EF-#2	EF-#3	EF-#4
25%	OFF	OFF	OFF

EAST VENTILATION BUILDING - SOUTH TUNNEL

ES-7	ES-6	ES-5
OFF	LOW	OFF
EE-7	EE-6	EE-5
LOW	OFF	OFF

WEST VENTILATION BUILDING - SOUTH TUNNEL

WS-5	WS-6	WS-7
LOW	OFF	OFF
WE-5	WE-6	WE-7
OUT OF SERVICE	LOW	OFF

EAST VENTILATION BUILDING - DC LIGHTING

STATUS	CONTROL	

WEST VENTILATION BUILDING - DC LIGHTING

STATUS	CONTROL	

SYSTEM RESET

The Overview screen shows information of the fans on the West and East side for the North and South tunnels. The fan running status, speed, and Out of Service (OOS) status is displayed. Clicking on any of the fans on the Overview screen will display a popup for the individual fan with more information. There is also a system reset button that is like the one that is on the navigation bar and will reset any latched-in alarms in the PLC. The DC lighting status for both the east and west portals is displayed along with controls to turn them on or off.

### FAN CONTROL

**CDOT Eisenhower Tunnel - FactoryTalk View SE Client**

Current User: EVB-SCADASERVERADMINISTRATOR

Colorado Department of Transportation  
Eisenhower Johnson Memorial Tunnel

June 10, 2021 12:41:42 PM  
Listen, Think, Solve

OVERVIEW | **FAN CONTROL** | SWITCHGEAR | SWITCHBOARD | TRENDS | ALARMS | SYSTEM RESET

#### FAN CONTROL

**NORTH TUNNEL FIRE SECTORS**

1  
2  
3  
4  
5  
CLEAR

**EAST VENTILATION BUILDING - NORTH TUNNEL**

<b>SF-#4</b> 25% PRI 1	<b>SF-#3</b> OUT OF SERVICE OFF PRI 4	<b>SF-#2</b> OUT OF SERVICE OFF PRI 2	<b>SF-#1</b> OUT OF SERVICE OFF PRI 4
<b>EF-#4</b> OFF PRI 3	<b>EF-#3</b> OUT OF SERVICE OFF PRI 4	<b>EF-#2</b> OUT OF SERVICE OFF PRI 1	<b>EF-#1</b> OUT OF SERVICE OFF PRI 2

**WEST VENTILATION BUILDING - NORTH TUNNEL**

<b>SF-#1</b> OFF PRI 4	<b>SF-#2</b> OFF PRI 3	<b>SF-#3</b> 25% PRI 1	<b>SF-#4</b> OFF PRI 2
<b>EF-#1</b> OFF PRI 2	<b>EF-#2</b> 25% PRI 1	<b>EF-#3</b> OFF PRI 4	<b>EF-#4</b> OFF PRI 3

**SOUTH TUNNEL FIRE SECTORS**

1  
2  
3  
4  
5  
CLEAR

**EAST VENTILATION BUILDING - SOUTH TUNNEL**

<b>ES-7</b> LOW PRI 1	<b>ES-6</b> OUT OF SERVICE OFF PRI 3	<b>ES-5</b> OFF PRI 2
<b>EE-7</b> OFF PRI 3	<b>EE-6</b> LOW PRI 1	<b>EE-5</b> OFF PRI 2

**WEST VENTILATION BUILDING - SOUTH TUNNEL**

<b>WS-5</b> OFF PRI 3	<b>WS-6</b> LOW PRI 1	<b>WS-7</b> OFF PRI 2
<b>WE-5</b> OUT OF SERVICE OFF PRI 3	<b>WE-6</b> LOW PRI 1	<b>WE-7</b> OFF PRI 2

The Fan Control screen is like the overview screen but shows additional information for the fans on the West and East side for the North and South tunnels. Along with the fan running status, speed, and Out of Service (OOS) status the fan priority and fire sector (when selected) is displayed. On the left side of the screen are selection buttons that an operator can press to show which fans should run if a fire is occurring in a certain sector. The Set Fan Priorities button will display a screen where the fan priorities can be adjusted. Clicking on any of the fans on the Fan Control screen will display a popup for the individual fan with more information.



### FAN PRIORITIES

CDOT Eisenhower Tunnel - FactoryTalk View SE Client

Current User: EVB-SCADASERVERADMINISTRATOR

Colorado Department of Transportation  
Eisenhower Johnson Memorial Tunnel

June 10, 2021  
12:42:17 PM  
Listen, Think, Solve

OVERVIEW FAN CONTROL SWITCHGEAR SWITCHBOARD TRENDS **ALARMS** SYSTEM RESET

#### NORTH TUNNEL

SUPPLY FANS				EXHAUST FANS															
EAST		WEST		EAST		WEST													
SF1	1	2	3	4	SF1	1	2	3	4	EF1	1	2	3	4	EF1	1	2	3	4
SF2	1	2	3	4	SF2	1	2	3	4	EF2	1	2	3	4	EF2	1	2	3	4
SF3	1	2	3	4	SF3	1	2	3	4	EF3	1	2	3	4	EF3	1	2	3	4
SF4	1	2	3	4	SF4	1	2	3	4	EF4	1	2	3	4	EF4	1	2	3	4

#### SOUTH TUNNEL

SUPPLY FANS			EXHAUST FANS												
EAST	WEST		EAST	WEST											
SF5	1	2	3	SF5	1	2	3	EF5	1	2	3	EF5	1	2	3
SF6	1	2	3	SF6	1	2	3	EF6	1	2	3	EF6	1	2	3
SF7	1	2	3	SF7	1	2	3	EF7	1	2	3	EF7	1	2	3

The Fan Priorities screen shows priority information for the fans on the West and East side for the North and South tunnels and allows an operator to manually set the priority of the fans by selecting the corresponding button.

### NORTH TUNNEL SUPPLY FAN POPUP

The screenshot displays a HMI popup window for the 'WEST SUPPLY FAN #1'. The interface is organized into several functional areas:

- COOLING FAN:** Mode is set to 'MANUAL' (highlighted with a green border). Status is 'STOPPED'. Controls include 'STOP', 'LOW SPEED', and 'HIGH SPEED' buttons.
- WEST SUPPLY FAN #1:** Speed command is 'STOPPED'. Runtime is 44608.9 HRS. Controls include 'STOP', 'FORWARD 25%', 'FORWARD 50%', and 'FORWARD 100%' buttons.
- DAMPER:** Mode is 'AUTO'. Status is 'CLOSED'. Controls include 'MANUAL', 'AUTO', 'OPEN', 'CLOSE', and 'STOP' buttons.
- 100 HP MOTOR:** Mode and Ctrl Mode are 'AUTO'. Speed is 'STOPPED'. Motor temperatures are Phase A: 31 °C, Phase B: 34 °C, and Phase C: 29 °C. Includes an 'ADVANCED VFD CONTROL' button.
- 600 HP MOTOR:** Mode and Ctrl Mode are 'AUTO'. Speed is 'STOPPED'. Motor temperatures are Phase A: 30 °C, Phase B: 0 °C, and Phase C: 0 °C. Includes an 'ADVANCED VFD CONTROL' button.
- Central Fan Assembly:** Shows a 'COOLING FAN' and '100 HP' fan (green), and a '600 HP' fan (green). A large green diamond labeled 'SF-#1' indicates 'STOPPED' status for both 'SHAFT SPEED' and the motor. An 'OOS' (Out of Service) button is located at the bottom left of the assembly diagram.

Selecting a north tunnel supply fan on either the Overview or Fan Control screen will display a popup that shows various information about the supply fan and its associated equipment. Each of the lighter-gray control boxes provides status and control for an individual control element and are detailed individually below. The center fan depiction shows the status for the fan as an assembly. Each green element turns red if the component it represents is running. The OOS button is used to apply the Out of Service tag to the overview and fan control screens.

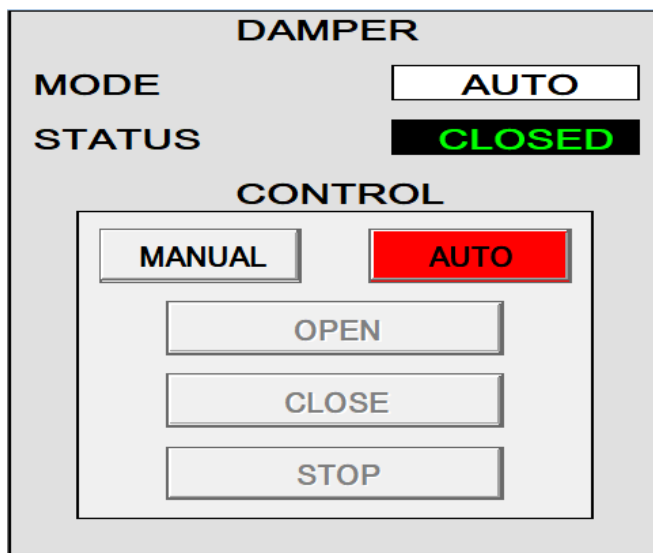
### NORTH TUNNEL EXHAUST FAN POPUP

Selecting a north tunnel exhaust fan on either the Overview or Fan Control screen will display a popup that shows various information about the supply fan and its associated equipment. The exhaust fan popup is the same as the supply fan popup except it does not have a cooling fan. Each of the lighter-gray control boxes provides status and control for an individual control element and are detailed individually below. The center fan depiction shows the status for the fan as an assembly. Each green element turns red if the component it represents is running. The OOS button is used to apply the Out of Service tag to the overview and fan control screens.

### DAMPER

The accessibility of the damper section is dependent upon the state of the HOA switches at both the Local Control Station (LCS) and at the Motor Control Center (MCC) bucket. Control of the equipment from the SCADA system requires the HOA switches at both the LCS and MCC to be in AUTO. If either of those switches are in HAND, the MODE box will display HAND. If either of the switches are off there will be no display in the MODE box. When the hand switch mode is AUTO, there are two ways that the damper can be controlled. If AUTO is selected in the control box, the damper will open when its associated fan shaft speed reaches 25% and closes when the shaft speed falls past 25%. If MANUAL is selected, the OPEN/CLOSE/STOP buttons become available, and an operator can select the desired operation.

When running the dampers from the SCADA system or the LCS, the damper will run open or closed until it reaches the corresponding limit switch. When running the damper from the MCC, care must be taken as the limit switch will not stop the damper.



Damper Control Box



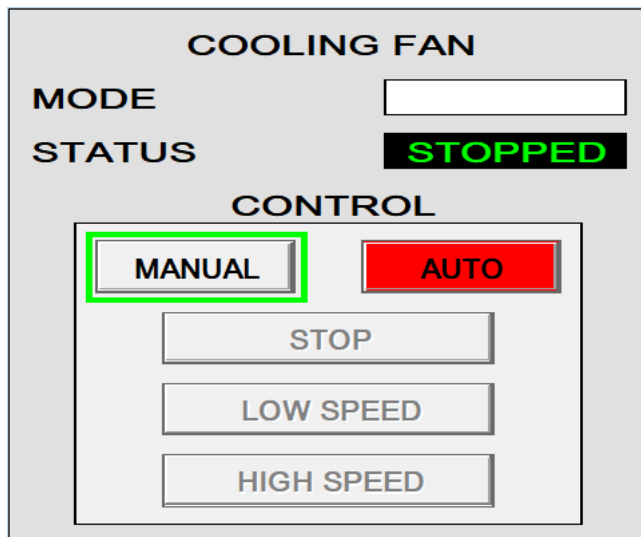
MCC Bucket



Local Control Station

### COOLING FAN

The accessibility of the cooling section on the supply fan popup is dependent upon the state of the HOA switches at both the Local Control Station (LCS) and at the Motor Control Center (MCC) bucket. Control of the equipment from the SCADA system requires the HOA switches at both the LCS and MCC to be in AUTO. If either of those switches are in HAND, the MODE box will display HAND. If either of the switches are off there will be no display in the MODE box. When the hand switch mode is AUTO, there are two ways that the cooling can be controlled. If AUTO is selected in the control box, the cooling fan will run at low speed when a winding temperature of the associated motor exceeds 97°C and at high speed if a winding temperature exceeds 100°C. If a winding temperature exceeds 104°C the cooling fan will continue to run at high speed and the VFDs for the fan will be commanded to stop. If MANUAL is selected, the STOP/LOW SPEED/HIGH SPEED buttons become available, and an operator can select the desired operation.



Cooling Fan Control Box



MCC Bucket



Local Control Station

VFD

The accessibility of the VFD sections on the fan popup is dependent upon the state of the HOA switches at both the Local Control Station (LCS) and at the Variable Frequency Drive (VFD). Since the 100HP and 600HP VFDs are connected to the same fan they share a LCS, and that hand switch applies to both the 100HP and 600HP VFD. Control of the equipment from the SCADA system requires the HOA switches at both the LCS and VFD to be in AUTO. If either of those switches are in HAND, the MODE box will display HAND. If either of the switches are off there will be no display in the MODE box. When the hand switch mode is AUTO, there are two ways that the VFD can be controlled. If AUTO is selected from the Advanced VFD Control popup for both the 100HP and 600HP VFD, the buttons in the main speed control box become available fan will run at whatever speed is selected. If MANUAL is selected in the Advanced VFD Control popup, the VFD will run at the manual speed setpoint.

**100 HP MOTOR**

MODE

CTRL MODE

SPEED

**MOTOR TEMPERATURES**

PHASE A TEMP

PHASE B TEMP

PHASE C TEMP

VFD Control Box

**WEST EXHAUST FAN #1  
100 HP VFD**

VFD SPEED

**CONTROL**

MANUAL SPEED SETPOINT

Advanced VFD Control Popup

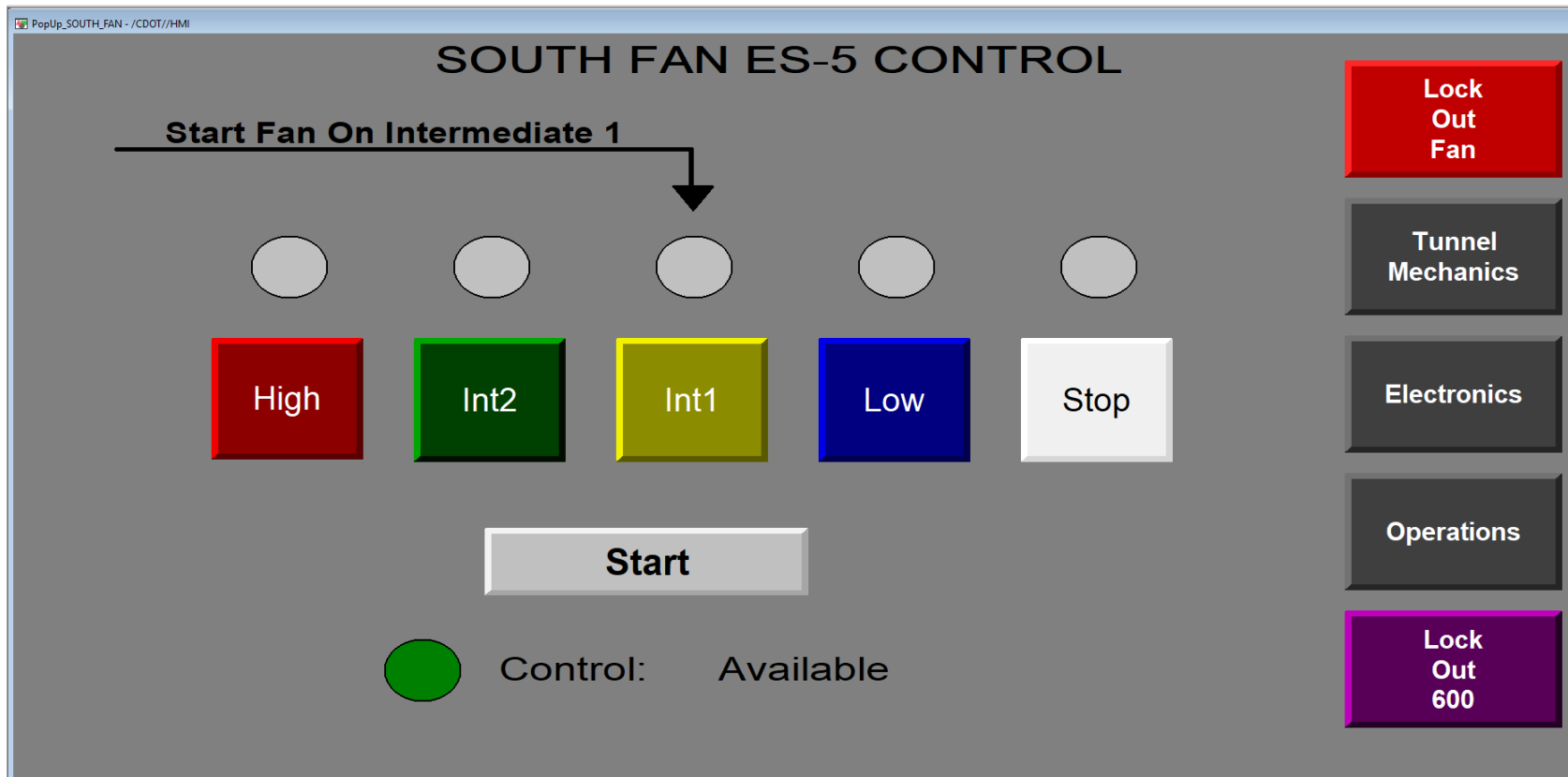
SPEED CMD

RUNTIME

**CONTROL**

Combined Fan Control Box

SOUTH TUNNEL FAN POPUP

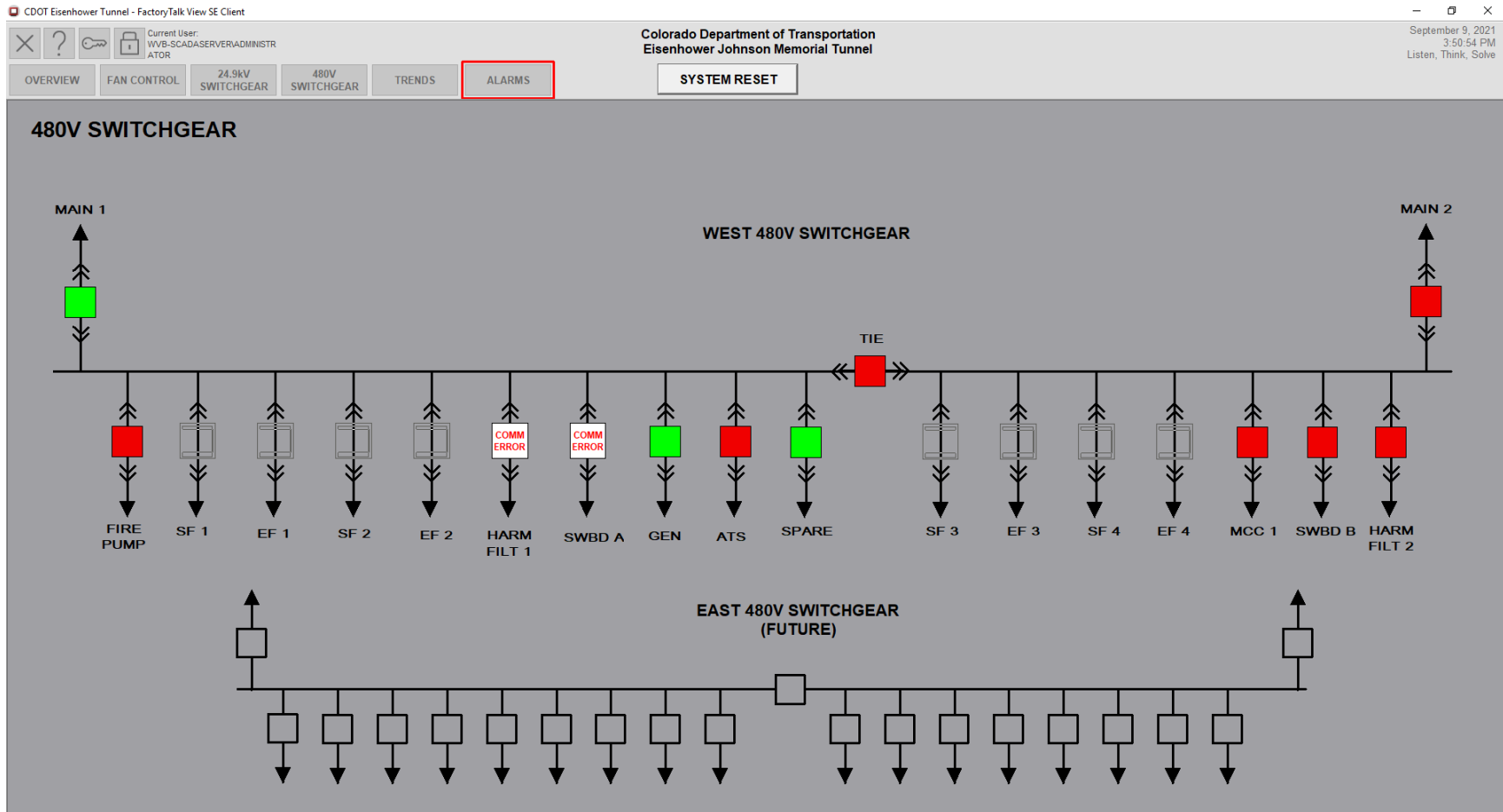


Selecting a south tunnel fan on either the Overview or Fan Control screen will display a popup that shows various information about the fan. These screens are an exact copy of the existing SCADA screens.





### 480V SWITCHGEAR



The 480V Switchgear page shows the open/closed status of the breakers. Clicking on a breaker will bring up a popup that allows a user to open or close the breaker.

### TRENDS

CDOT Eisenhower Tunnel - FactoryTalk View SE Client

Current User: EVB-SCADASERVERADMINISTRATOR

Colorado Department of Transportation  
Eisenhower Johnson Memorial Tunnel

June 10, 2021  
12:46:51 PM  
Listen, Think, Solve

OVERVIEW FAN CONTROL SWITCHGEAR SWITCHBOARD TRENDS **ALARMS** SYSTEM RESET

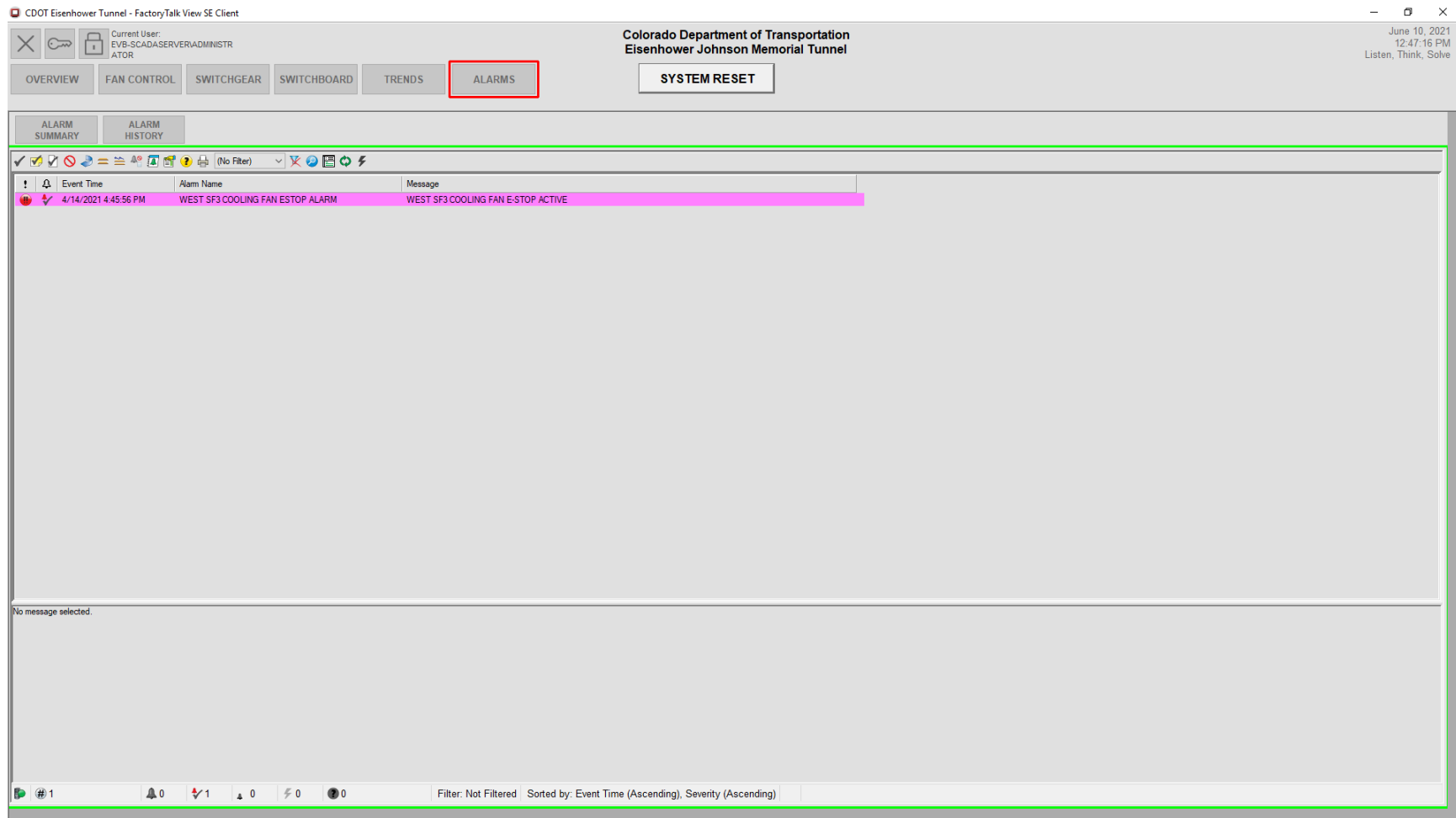
### TRENDS

Tag	Historical Model	Style	Axis Min	Axis Max	Unit	Precision	Format	Tag Min	Tag Max
..._WEST}WVB_EF1_100HP_MWT_A}	TEMPS		35.09	35.12		2	Decimal	0.00	100.00
..._WEST}WVB_EF1_100HP_MWT_B}	TEMPS		34.65	34.67		2	Decimal	0.00	100.00
..._WEST}WVB_EF1_100HP_MWT_C}	TEMPS		33.88	33.91		2	Decimal	0.00	100.00

Priority Alarm State Event Time Source Location Condition... Message Resource User Name Curren... Limit V...

The trend screen allows a user to see historical data of analog signals in chart form.

### ALARM SUMMARY



CDOT Eisenhower Tunnel - FactoryTalk View SE Client

Current User: EVB-SCADASERVERADMINISTRATOR

Colorado Department of Transportation  
Eisenhower Johnson Memorial Tunnel

June 10, 2021  
12:47:16 PM  
Listen, Think, Solve

OVERVIEW FAN CONTROL SWITCHGEAR SWITCHBOARD TRENDS **ALARMS** SYSTEM RESET

ALARMS SUMMARY ALARM HISTORY

Event Time	Alarm Name	Message
4/14/2021 4:45:56 PM	WEST SF3 COOLING FAN E-STOP ALARM	WEST SF3 COOLING FAN E-STOP ACTIVE

No message selected.

Filter: Not Filtered Sorted by: Event Time (Ascending), Severity (Ascending)

The Alarm Summary screen shows any active alarms in the system. Users can acknowledge the alarm by right clicking on it and selecting acknowledge or selecting it and clicking the check mark icon at the top of the alarm display. An entire page of alarm can be acknowledged by clicking the checkmark in front of the white page icon.

### ALARM HISTORY

CDOT Eisenhower Tunnel - FactoryTalk View SE Client

Current User: EVB-SCADASERVERADMINSTRATOR

Colorado Department of Transportation  
Eisenhower Johnson Memorial Tunnel

June 10, 2021  
12:47:57 PM  
Listen, Think, Solve

OVERVIEW FAN CONTROL SWITCHGEAR SWITCHBOARD TRENDS **ALARMS** SYSTEM RESET

ALARM SUMMARY ALARM HISTORY

(No Filter)

Event Time	Alarm Name	Condition Name	Message
6/10/2021 11:17:14 AM	EAST SF3 DAMPER TRANSIT STALL ALARM	TRIP	EAST SF3 DAMPER FAIL TO REACH DESTINATION
6/10/2021 11:17:13 AM	EAST SF3 DAMPER TRANSIT STALL ALARM	TRIP	EAST SF3 DAMPER FAIL TO REACH DESTINATION
6/10/2021 11:17:13 AM	EAST SF3 DAMPER TRANSIT STALL ALARM	TRIP	Acknowledged alarm [EAST SF3 DAMPER TRANSIT STALL ALARM] in alarm server [RNA://\$Global/CDOT/HMI/CDOT_ALARMS...
6/2/2021 11:56:58 AM	EAST SF3 DAMPER TRANSIT STALL ALARM	TRIP	EAST SF3 DAMPER FAIL TO REACH DESTINATION
6/2/2021 11:55:29 AM	EAST SF3 DAMPER TRANSIT STALL ALARM	TRIP	EAST SF3 DAMPER FAIL TO REACH DESTINATION
6/2/2021 11:55:28 AM	EAST SF3 DAMPER TRANSIT STALL ALARM	TRIP	EAST SF3 DAMPER FAIL TO REACH DESTINATION
6/2/2021 11:55:28 AM	EAST SF3 DAMPER TRANSIT STALL ALARM	TRIP	Acknowledged alarm [EAST SF3 DAMPER TRANSIT STALL ALARM] in alarm server [RNA://\$Global/CDOT/HMI/CDOT_ALARMS...
6/1/2021 10:21:02 AM	EAST SF3 DAMPER TRANSIT STALL ALARM	TRIP	EAST SF3 DAMPER FAIL TO REACH DESTINATION
6/1/2021 10:19:33 AM	EAST SF3 DAMPER TRANSIT STALL ALARM	TRIP	EAST SF3 DAMPER FAIL TO REACH DESTINATION
6/1/2021 10:19:32 AM	EAST SF3 DAMPER TRANSIT STALL ALARM	TRIP	EAST SF3 DAMPER FAIL TO REACH DESTINATION
6/1/2021 10:19:32 AM	EAST SF3 DAMPER TRANSIT STALL ALARM	TRIP	Acknowledged alarm [EAST SF3 DAMPER TRANSIT STALL ALARM] in alarm server [RNA://\$Global/CDOT/HMI/CDOT_ALARMS...
6/1/2021 8:58:50 AM	EAST SF3 DAMPER TRANSIT STALL ALARM	TRIP	EAST SF3 DAMPER FAIL TO REACH DESTINATION
6/1/2021 8:57:20 AM	EAST SF3 DAMPER TRANSIT STALL ALARM	TRIP	EAST SF3 DAMPER FAIL TO REACH DESTINATION
6/1/2021 8:57:20 AM	WEST EF3 600 HP VFD FAULT ALARM	TRIP	WEST EF3 600 HP VFD DRIVE FAULT
6/1/2021 8:57:20 AM	WEST EF3 600 HP VFD IO FAULT ALARM	TRIP	WEST EF3 600 HP VFD COMMUNICATION FAILURE
6/1/2021 8:57:20 AM	WEST EF3 600 HP VFD FAULT ALARM	TRIP	Acknowledged alarm [WEST EF3 600 HP VFD FAULT ALARM] in alarm server [RNA://\$Global/CDOT/HMI/CDOT_ALARMS] using...
6/1/2021 8:57:20 AM	WEST EF3 600 HP VFD IO FAULT ALARM	TRIP	Acknowledged alarm [WEST EF3 600 HP VFD IO FAULT ALARM] in alarm server [RNA://\$Global/CDOT/HMI/CDOT_ALARMS] usi...
6/1/2021 8:57:20 AM	EAST SF3 DAMPER TRANSIT STALL ALARM	TRIP	EAST SF3 DAMPER FAIL TO REACH DESTINATION
6/1/2021 8:57:20 AM	EAST SF3 DAMPER TRANSIT STALL ALARM	TRIP	Acknowledged alarm [EAST SF3 DAMPER TRANSIT STALL ALARM] in alarm server [RNA://\$Global/CDOT/HMI/CDOT_ALARMS...
6/1/2021 8:56:40 AM	WEST EF3 600 HP VFD FAULT ALARM	TRIP	WEST EF3 600 HP VFD DRIVE FAULT
6/1/2021 8:56:40 AM	WEST EF3 600 HP VFD IO FAULT ALARM	TRIP	WEST EF3 600 HP VFD COMMUNICATION FAILURE
6/1/2021 8:50:25 AM	WEST EF3 600 HP VFD IO FAULT ALARM	TRIP	WEST EF3 600 HP VFD COMMUNICATION FAILURE
6/1/2021 8:54:44 AM	EAST SF3 DAMPER TRANSIT STALL ALARM	TRIP	EAST SF3 DAMPER FAIL TO REACH DESTINATION
6/1/2021 6:53:16 AM	WEST EF3 600 HP VFD FAULT ALARM	TRIP	WEST EF3 600 HP VFD DRIVE FAULT
6/1/2021 6:53:14 AM	WEST EF3 600 HP VFD FAULT ALARM	TRIP	WEST EF3 600 HP VFD DRIVE FAULT
6/1/2021 6:53:14 AM	EAST SF3 DAMPER TRANSIT STALL ALARM	TRIP	EAST SF3 DAMPER FAIL TO REACH DESTINATION
6/1/2021 4:04:30 AM	EAST SF3 DAMPER TRANSIT STALL ALARM	TRIP	EAST SF3 DAMPER FAIL TO REACH DESTINATION
6/1/2021 4:04:30 AM	EAST SF3 DAMPER TRANSIT STALL ALARM	TRIP	Acknowledged alarm [EAST SF3 DAMPER TRANSIT STALL ALARM] in alarm server [RNA://\$Global/CDOT/HMI/CDOT_ALARMS]
6/1/2021 4:03:20 AM	WEST EF3 600 HP VFD FAULT ALARM	TRIP	WEST EF3 600 HP VFD DRIVE FAULT
6/1/2021 4:03:20 AM	WEST EF3 600 HP VFD FAULT ALARM	TRIP	Acknowledged alarm [WEST EF3 600 HP VFD FAULT ALARM] in alarm server [RNA://\$Global/CDOT/HMI/CDOT_ALARMS]
5/31/2021 12:21:51 PM	EAST SF3 DAMPER TRANSIT STALL ALARM	TRIP	EAST SF3 DAMPER FAIL TO REACH DESTINATION
5/31/2021 12:20:23 PM	WEST EF3 600 HP VFD FAULT ALARM	TRIP	WEST EF3 600 HP VFD DRIVE FAULT

Priority: Urgent Severity: 1000  
 Alarm State: Normal, Acked Current Value: 0.0  
 Event Time: 6/10/2021 11:17:14 AM Limit Value Exceeded: 0.0  
 Condition Name: TRIP Tag 1 Value:  
 Alarm Class: Discrete Tag 2 Value:  
 Event Type: Condition Tag 3 Value:  
 Event Category: Discrete Tag 4 Value:  
 User Name: Computer:  
 User Comment:  
 Area: RNA://\$Global/CDOT/HMI  
 Server Name: CDOT\_ALARMS  
 Group: EAST\_SF3  
 Alarm Name: EAST SF3 DAMPER TRANSIT STALL ALARM  
 Message: EAST SF3 DAMPER FAIL TO REACH DESTINATION  
 Condition Quality: Good Quality - Non-specific

The Alarm History screen shows a historical view of alarm activity in the system. Selecting a specific alarm event will show more information in the bottom section of the alarm display.