Installation Instructions

Allen-Bradley

ControlLogix Chassis and Power Supply

Standard Chassis Catalog Numbers 1756-A4, 1756-A7, 1756-A10, 1756-A13, 1756-A17

ControlLogix-XT Chassis Catalog Numbers 1756-A4LXT, 1756-A5XT, 1756-A7XLT, 1756-A7XT

Standard Power Supplies Catalog Numbers 1756-PA72, 1756-PA75, 1756-PB72, 1756-PB75, 1756-PC75, 1756-PH75

ControlLogix-XT Power Supplies Catalog Numbers 1756-PAXT, 1756-PBXT

Redundant Power Supplies Catalog Numbers 1756-PA75R, 1756-PB75R

Redundant Power Supplies Chassis Adapter Catalog Number 1756-PSCA2

ControlLogix-XT Redundant Power Supplies Catalog Numbers 1756-PAXTR, 1756-PBXTR

ControlLogix-XT Redundant Power Supplies Chassis Adapter Catalog Number 1756-PSCA2XT

Important User Information

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.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

No patent liability is assumed by Rockwell Automation, Inc. with respect to use of information, circuits, equipment, or software described in this manual.

Reproduction of the contents of this manual, in whole or in part, without written permission of Rockwell Automation, Inc., is prohibited.

Throughout this manual, when necessary, we use notes to make you aware of safety considerations.

	WARNING: Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.
	ATTENTION: Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard, and recognize the consequence.
IMPORTANT	Identifies information that is critical for successful application and understanding of the product.

Labels may also be on or inside the equipment to provide specific precautions.

	SHOCK HAZARD: Labels may be on or inside the equipment, for example, a drive or motor, to alert people that dangerous voltage may be present.
	BURN HAZARD: Labels may be on or inside the equipment, for example, a drive or motor, to alert people that surfaces may reach dangerous temperatures.
	ARC FLASH HAZARD: Labels may be on or inside the equipment, for example, a motor control center, to alert people to potential Arc Flash. Arc Flash will cause severe injury or death. Wear proper Personal Protective Equipment (PPE). Follow ALL Regulatory requirements for safe work practices and for Personal Protective Equipment (PPE).

Allen-Bradley, ControlLogix, ControlLogix-XT, FLEX I/O-XT, Rockwell Automation, and Rockwell Software are trademarks of Rockwell Automation, Inc.

Trademarks not belonging to Rockwell Automation are property of their respective companies.

This manual contains new and updated information. Changes throughout this revision are marked by change bars, as shown to the right of this paragraph.

New and Updated Information

Graphics have been updated throughout this publication to reflect the correct chassis mounting tabs and dual protective earth ground lugs. Series C chassis catalog numbers and information have been added to the publication. Detailed instructions have been included to install a second protective earth ground.

Notes:

Preface

Standard ControlLogix Systems 7
ControlLogix-XT Systems 7
Where to Start 8
Installation Advisories 9
Additional Resources 11

Chapter 1

Install Chassis and Power Supplies

Tools Required 13
Parts Required 13
Follow These Steps 15
Plan the System 16
- Power Supply and Chassis Compatibility 16
- Minimum Cabinet Size 16
- Spacing Requirements 17
- Mounting Dimensions (Series B) 18
- Mounting Dimensions (Series C) 22

Install the Chassis and Power Supply 25
Ground the Chassis 27
- Install a Central Ground Bus 28
- Connect the Functional Earth Ground on the Chassis 28
- Connect the Protective Earth Ground (Series B) 29
- Connect the Protective Earth Ground (Series C) 31
- Connect the Grounding Conductors to the Ground Bus 33
- Connect Ground Bus to Grounding-electrode System 33

Connect the Power 34
Remove the Protective Label 36
Apply Power to the Chassis 36
Input Power Requirements and Transformer Sizing 37
Troubleshoot the Power Supply 38

Chapter 2

Install Chassis and Redundant Power Supplies

Redundant Power Supplies 39
Components of the Redundant System 40
Tools Required 41
Parts Required 41
Follow These Steps 43
Plan the System 44
- Redundant Power Supply and Chassis Compatibility 44
- Spacing Requirements 44
- Mounting Dimensions (Series B) 46
- Mounting Dimensions (Series C) 50
- System Configuration Recommendations 51

Install the Chassis and Chassis Adapter 52
Install the Redundant Power Supplies 54
Ground the Chassis 55

Install a Central Ground Bus 56
Connect the Functional Earth Ground on the Chassis 56
Connect the Protective Earth Ground on the Chassis and Redundant Power Supply (Series B) 57
Connect the Protective Earth Ground on the Chassis and Redundant Power Supply (Series C) 59
Connect the Grounding Conductors to the Ground Bus 61
Connect Ground Bus to Grounding-electrode System 61
Connect the Power 62
Connect the 1756-CPR2 Cable 62
Connect Power to the Redundant Power Supply 63
Connect the Solid-state Relay 64
Remove the Protective Label 66
Apply Power to the Chassis 67
Input Power Requirements and Transformer Sizing 68
Troubleshoot the Redundant Power Supplies 69
Chassis Adapter Status Indicator 69
Remove or Replace a Redundant Power Supply 70
Remove a Redundant Power Supply 70
Replace a Redundant Power Supply 70
Remove or Replace a Chassis Adapter 71
Remove a Chassis Adapter 71
Replace a Chassis Adapter 71

Standard ControlLogix Systems

The ControlLogix® system is a modular system that requires a 1756 I/O chassis that houses various modules. Chassis are available with 4, 7, 10, 13, and 17 slots for standard applications where temperatures range from 0...60 °C (32...140 °F). The temperature range for series C chassis is from -25...70 °C (-13...158 °F). You can place any module into any slot.

The chassis backplane provides the following features:

- A high-speed communication path between modules
- Power distribution to each module housed in the chassis
- Messages that are passed between multiple controllers that are housed in the chassis
- Messages that are passed between and through multiple communication-interface modules that are housed on the chassis

ControlLogix-XT Systems

The ControlLogix-XT™ products include power, control, and communication system components that, when used with FLEX I/O-XT™ products, provide a complete control system solution that can be used in environments where temperatures range from -20...70 °C (-4...158 °F). The temperature range for series C chassis is from -25...70 °C (-13...158 °F). Chassis are available with 7 slots.

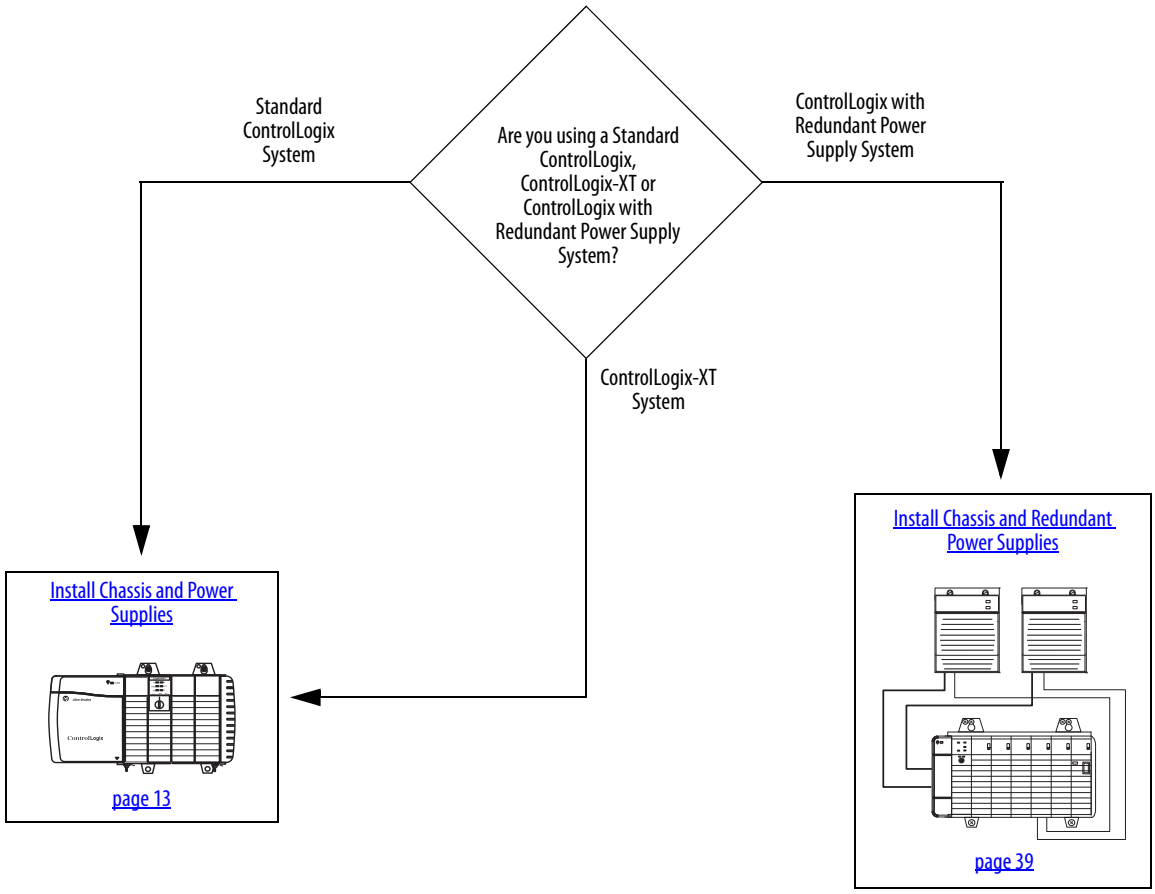
When used independently, ControlLogix-XT systems can withstand environments where temperatures range from -25...70 °C (-13...158 °F) for equipment that is designated as 'XT' and -25...60 °C (-13...140 °F) for equipment designated 'LXT'.

These installation instructions describe how to install the following components of a ControlLogix system:

- Standard ControlLogix chassis
- Standard ControlLogix power supplies
- ControlLogix-XT chassis
- ControlLogix-XT power supplies
- ControlLogix redundant power supplies
- ControlLogix chassis adapters

Use the Where to Start chart to determine the steps to follow.

Where to Start



Installation Advisories

ATTENTION: Environment and Enclosure

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. 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 250 and IEC 60529, as applicable, for explanations of the degrees of protection provided by enclosures

ATTENTION: Prevent Electrostatic Discharge

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.

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

European Hazardous Location Approval

The following applies when the product bears the Ex Marking.

This equipment is intended for use in potentially explosive atmospheres as defined by European Union Directive 94/9/EC and has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of Category 3 equipment intended for use in Zone 2 potentially explosive atmospheres, given in Annex II to this Directive.

Compliance with the Essential Health and Safety Requirements has been assured by compliance with EN 60079-15 and EN 60079-0.

ATTENTION: This equipment is not resistant to sunlight or other sources of UV radiation.

WARNING:

- This equipment shall be mounted in an ATEX-certified enclosure with a minimum ingress protection rating of at least IP54 (as defined in IEC60529) and used in an environment of not more than Pollution Degree 2 (as defined in IEC 60664-1) when applied in Zone 2 environments. The enclosure must have a tool-removable cover or door.
- 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 certified Rockwell Automation backplanes.
- 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.

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.**
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.	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.

WARNING: EXPLOSION HAZARD -

- Do not disconnect equipment unless power has been removed or the area is known to be nonhazardous.
- 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.
- Substitution of components may impair suitability for Class I, Division 2.
- If this product contains batteries, they must only be changed in an area known to be nonhazardous.

AVERTISSEMENT: RISQUE D'EXPLOSION –

- Couper le courant ou s'assurer que l'environnement est classé non dangereux avant de débrancher l'équipement.
- 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.
- La substitution de composants peut rendre cet équipement inadapté à une utilisation en environnement de Classe I, Division 2.
- S'assurer que l'environnement est classé non dangereux avant de changer les piles.

Additional Resources

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

Resource	Description
1756 ControlLogix Chassis Specifications Technical Data, publication 1756-TD006	Provides technical specifications for ControlLogix chassis.
1756 ControlLogix Power Supplies Specifications Technical Data, publication 1756-TD005	Provides technical specifications for ControlLogix power supplies.
ControlLogix System Selection Guide, publication 1756-SG001	Provides overview of the ControlLogix system and its products.
ControlLogix System User Manual, publication 1756-UM001	Provides information on how to install, configure, program, and use ControlLogix controllers.
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	Provides general guidelines for installing a Rockwell Automation® industrial system.
Product Certifications website, http://www.ab.com	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.

Notes:

Install Chassis and Power Supplies

This chapter describes how to install standard and ControlLogix-XT versions of the 1756 chassis with nonredundant power supplies. Sections in this chapter that are not marked as specific to series B or series C chassis apply to both chassis series.

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

Parts Required

Use these tables to determine the parts that are required to install your chassis. These parts are not included with the chassis and must be ordered separately.

Table 1 - Parts Required Per Mounting Tab

Tab Position	With SEM Screws(1)	Without SEM Screws
Top	• 1 Phillips screw • 1 flat washer • 1 split-lock washer	N/A
Bottom	1 SEM screw	• 1 Phillips screw • 1 star washer

(1) Phillips screw with attached star washer.

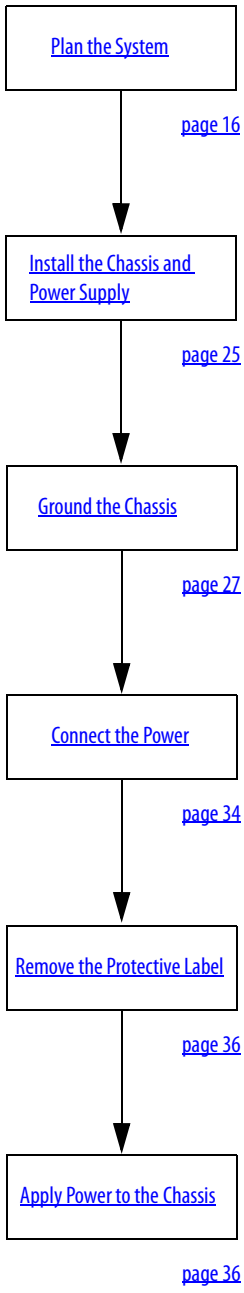
Series C chassis offer:

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

Table 2 - Total Parts Required Per Chassis

Chassis	Number of Mounting Tabs	Total Parts Required Per Chassis	
		With SEM Screws	**Without SEM Screws**
1756-A4, 1756-A4/B, 1756-A4/C, 1756-A7, 1756-A7/B, 1756-A7/C, 1756-A4LXT/B, 1756-A7LXT/B	2 top 2 bottom	• 2 Phillips screws • 2 flat washers • 2 split-lock washers • 2 SEM screws	• 4 Phillips screws • 2 flat washers • 2 split-lock washers • 2 star washers
1756-A10, 1756-A10/B, 1756-A10/C, 1756-A5XT/B, 1756-A7XT/B, 1756-A7XT/C	3 top 3 bottom	• 3 Phillips screws • 3 flat washers • 3 split-lock washers • 3 SEM screws	• 6 Phillips screws • 3 flat washers • 3 split-lock washers • 3 star washers
1756-A13, 1756-A13/B, 1756-A13/C	4 top 4 bottom	• 4 Phillips screws • 4 flat washers • 4 split-lock washers • 4 SEM screws	• 8 Phillips screws • 4 flat washers • 4 split-lock washers • 4 star washers
1756-A17, 1756-A17/B, 1756-A17/C	5 top 5 bottom	• 5 Phillips screws • 5 flat washers • 5 split-lock washers • 5 SEM screws	• 10 Phillips screws • 5 flat washers • 5 split-lock washers • 5 star washers

Follow These Steps



Plan the System

Use the following information to assist you in planning your system.

Power Supply and Chassis Compatibility

The chassis series that you have determines the power supply that you can use. The following table lists the chassis that can be installed with each power supply.

Table 3 - Chassis Compatibility

Power Supply Cat. No.	Chassis Cat. No.
1756-PA72/C	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-PA75/B	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-PC75/B	
1756-PH75/B	
1756-PBXT	1756-A4LXT/B, 1756-A5XT/B, 1756-A7LXT/B, 1756-A7XT/B, 1756-A7XT/C
1756-PAXT	

Minimum Cabinet Size

The following table lists the minimum cabinet size for each ControlLogix chassis.

IMPORTANT To meet the UL/CSA standards, the cabinet housing your ControlLogix chassis cannot be smaller than these minimum cabinet-size requirements.

Chassis	Minimum Cabinet Size (H x W x D), approx
1756-A4	50.8 x 50.8 x 20.3 cm (20 x 20 x 8 in.)
1756-A7	50.8 x 60.9 x 20.3 cm (20 x 24 x 8 in.)
1756-A10	50.8 x 76.2 x 20.3 cm (20 x 30 x 8 in.)
1756-A13	60.9 x 76.2 x 20.3 cm (24 x 30 x 8 in.)
1756-A17	76.2 x 91.4 x 20.3 cm (30 x 36 x 8 in.)
1756-A4LXT	50.8 x 50.8 x 20.3 cm (20 x 20 x 8 in.)
1756-A5XT	50.8 x 76.2 x 20.3 cm (20 x 30 x 8 in.)
1756-A7LXT	50.8 x 60.9 x 20.3 cm (20 x 24 x 8 in.)
1756-A7XT	50.8 x 76.2 x 20.3 cm (20 x 30 x 8 in.)

Spacing Requirements

Use the following information to plan your installation.

IMPORTANT	Make sure you meet the minimum spacing requirements specified. Allow 15.3 cm (6.0 in.) between chassis and a heat source, and allow 5.1 cm (2.0 in.) between a wireway and the top or bottom of a chassis. Chassis are intended to be mounted only horizontally. Do not mount vertically.

Figure 1 depicts series C chassis. Dimensions are in cm (in.)

Figure 1 - Minimum Spacing Requirements

The 10.2 (4.0) measurement to the side of the enclosure can include the wireway.

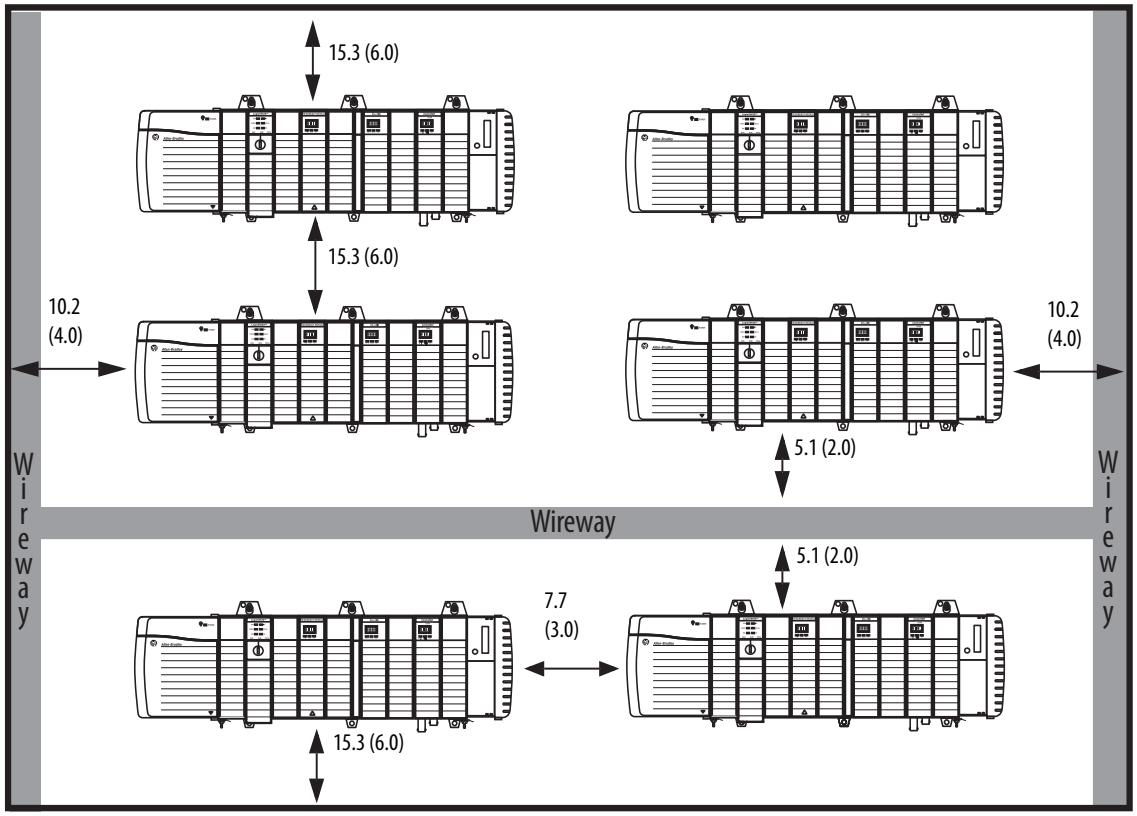


Table 4 - Spacing Requirements, Top and Bottom

From a chassis to a	Requires this space, min
Cabinet	15.3 cm (6.0 in.)
Chassis or other heat source	15.3 cm (6.0 in.)
Wireway	5.1 cm (2.0 in.)

Table 5 - Spacing Requirements, Sides

From a chassis to a	Requires this space, min
Cabinet	10.2 cm (4.0 in.)
Chassis or other heat source	7.7 cm (3.0 in.)
Wireway	No minimum spacing required

Mounting Dimensions (Series B)

Use these dimensions to plan your chassis installation.

Dimensions are in cm (in.).

Figure 2 - Chassis Common Dimensions

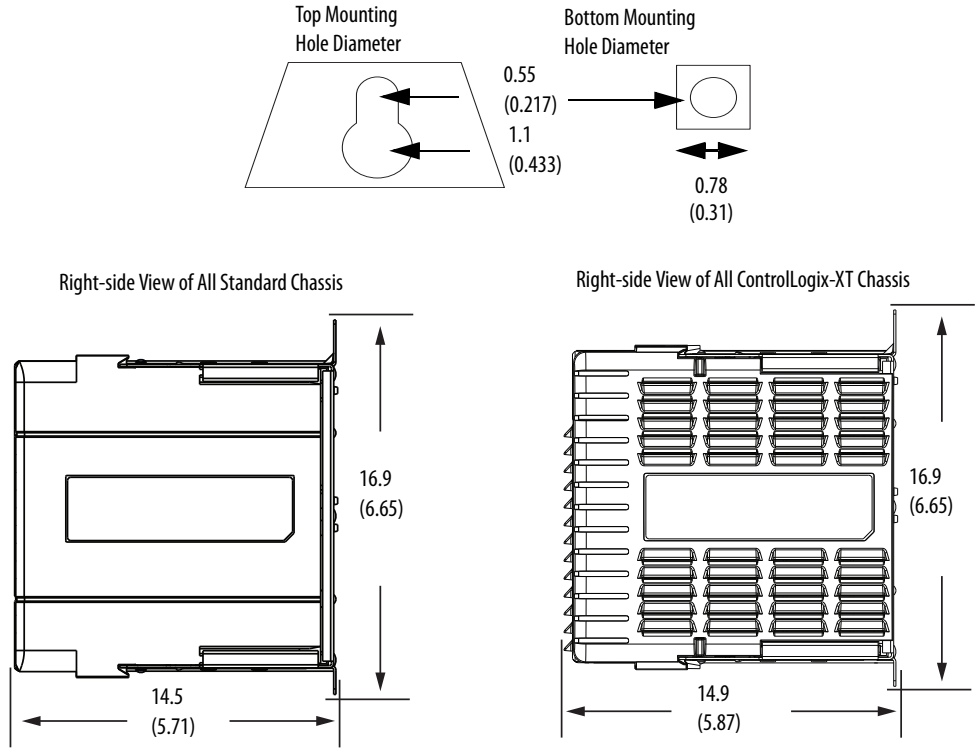


Figure 3 - 1756-A4/B Chassis and Power Supply

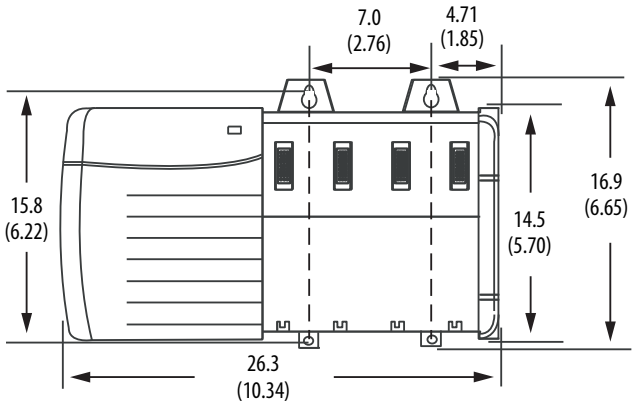


Figure 4 - 1756-A7/B Chassis and Power Supply

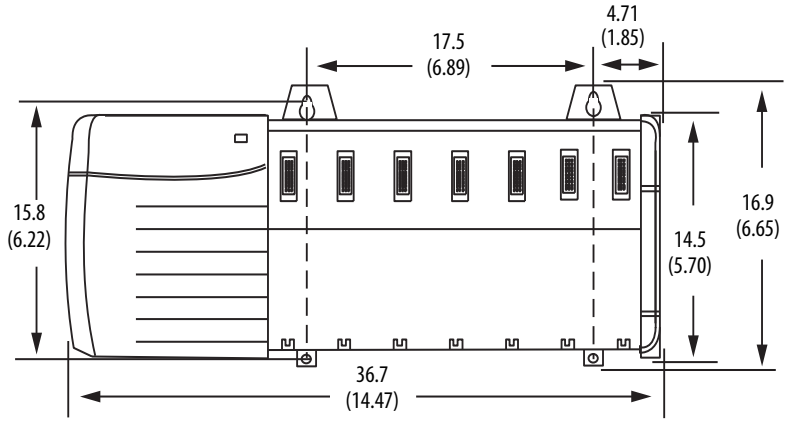


Figure 5 - 1756-A10/B Chassis and Power Supply

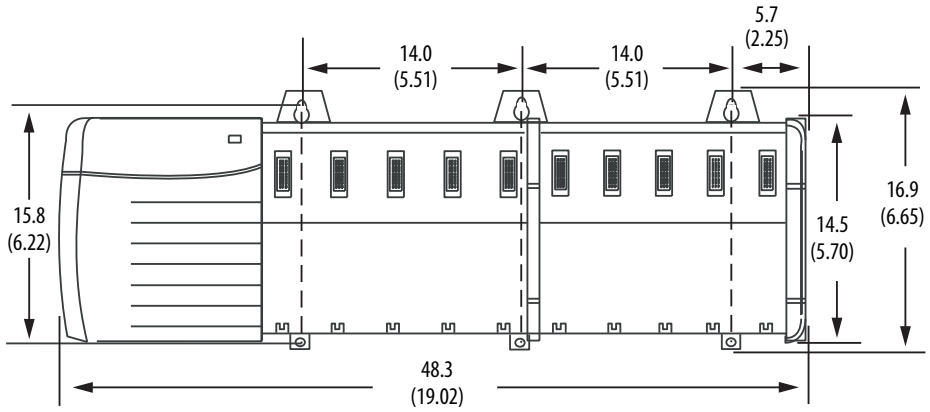


Figure 6 - 1756-A13/B Chassis and Power Supply

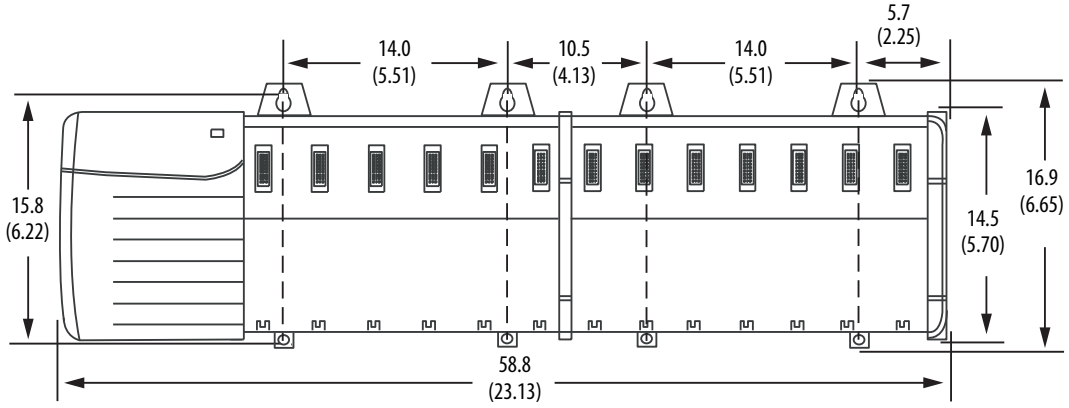


Figure 7 - 1756-A17/B Chassis and Power Supply

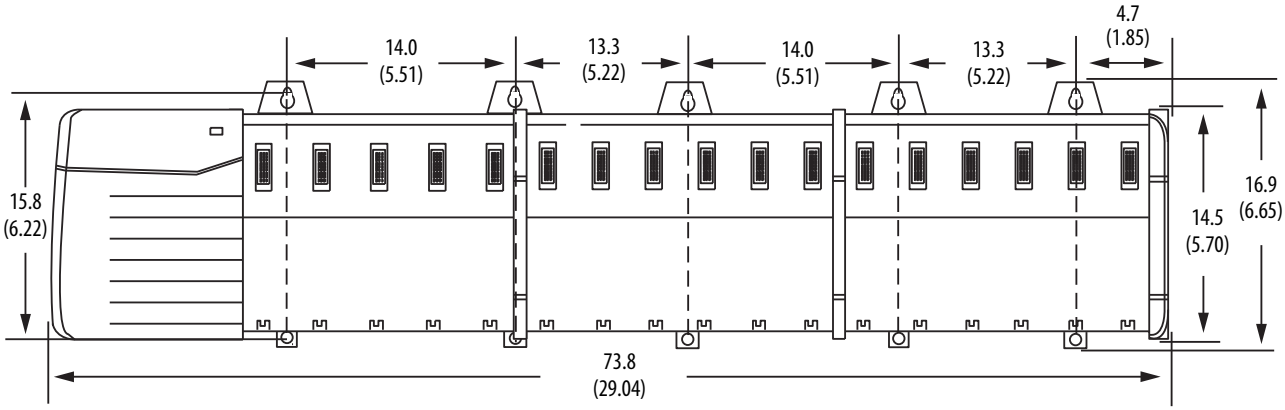


Figure 8 - 1756-A4LXT/B Chassis and Power Supply

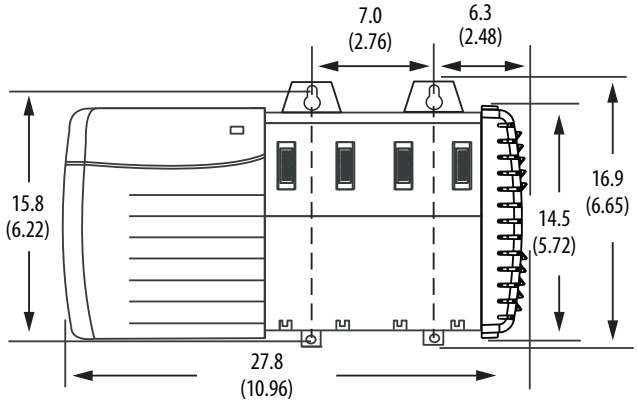


Figure 9 - 1756-A5XT/B Chassis and Power Supply

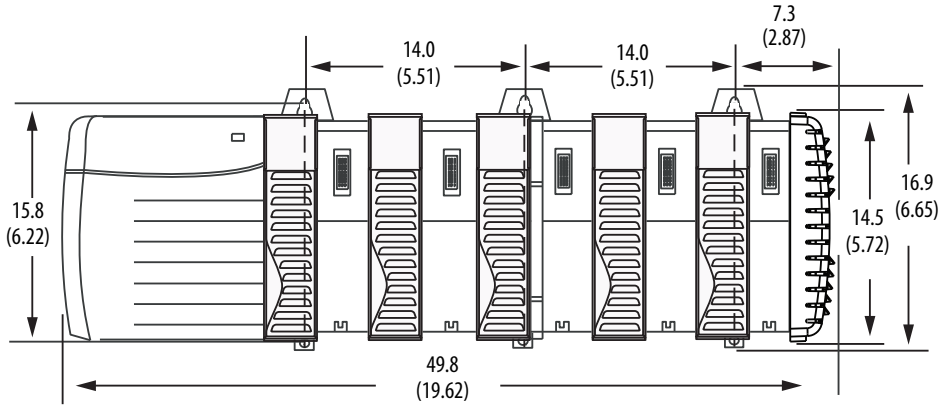


Figure 10 - 1756-A7LXT/B Chassis and Power Supply

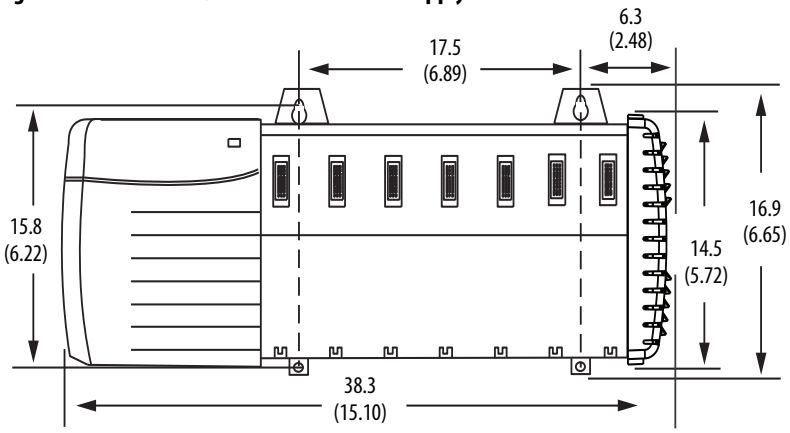
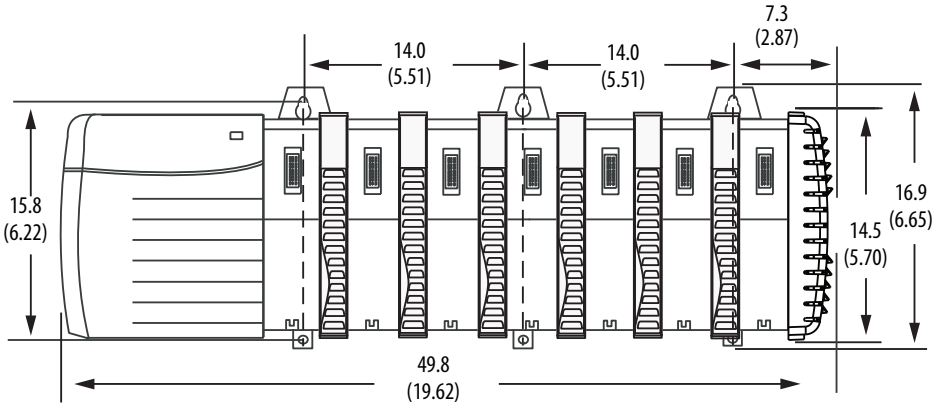


Figure 11 - 1756-A7XT/B Chassis and Power Supply



Mounting Dimensions (Series C)

Use these dimensions to plan your chassis installation.

Dimensions are in cm (in.).

Figure 12 - Chassis Common Dimensions (Series C)

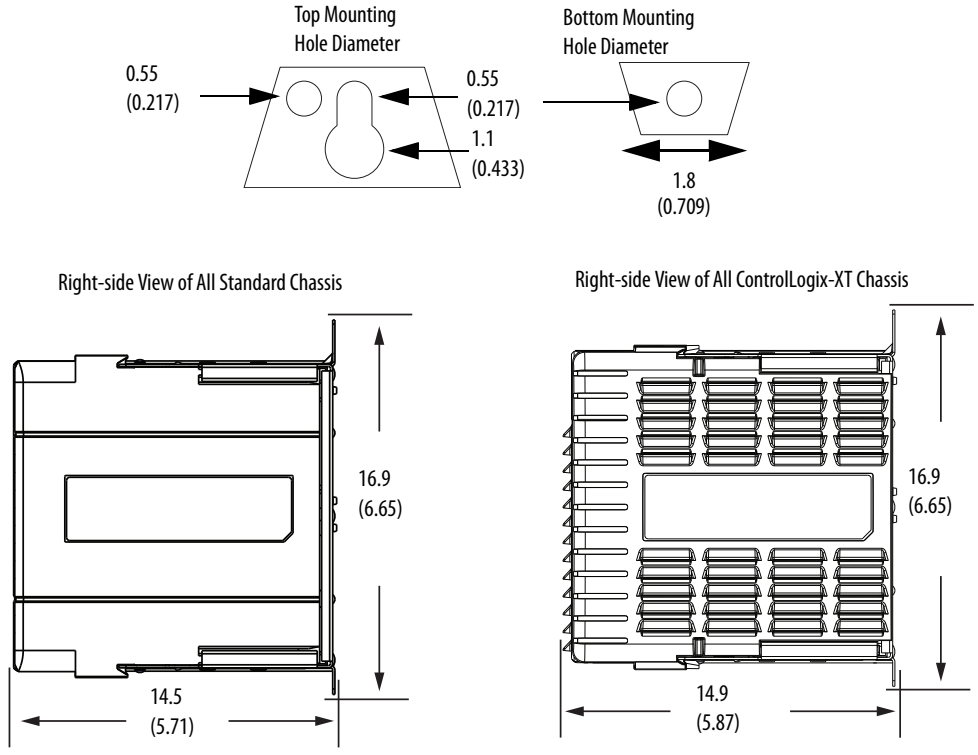


Figure 13 - 1756-A4/C Chassis and Power Supply

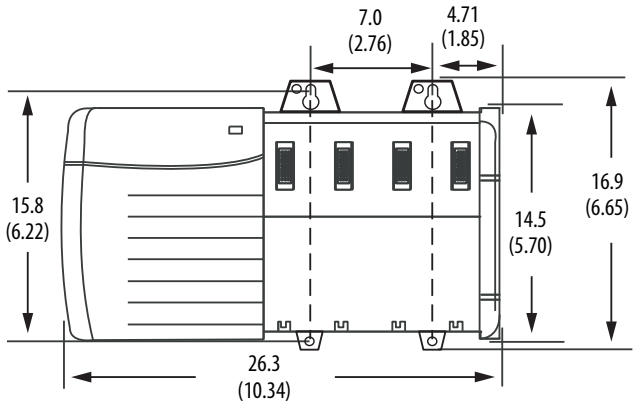


Figure 14 - 1756-A7/C Chassis and Power Supply

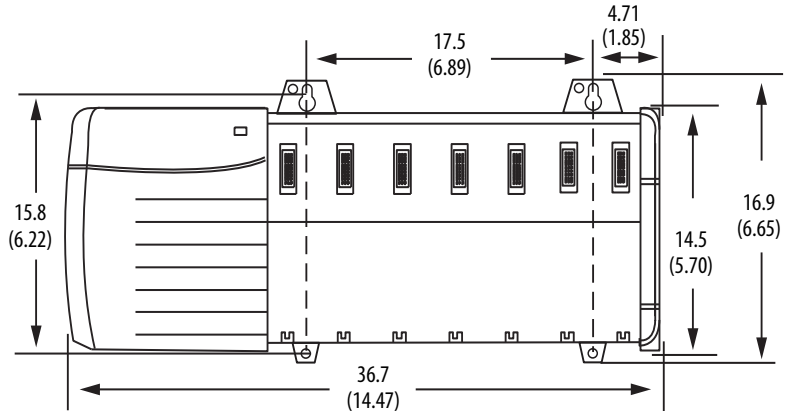


Figure 15 - 1756-A10/C Chassis and Power Supply

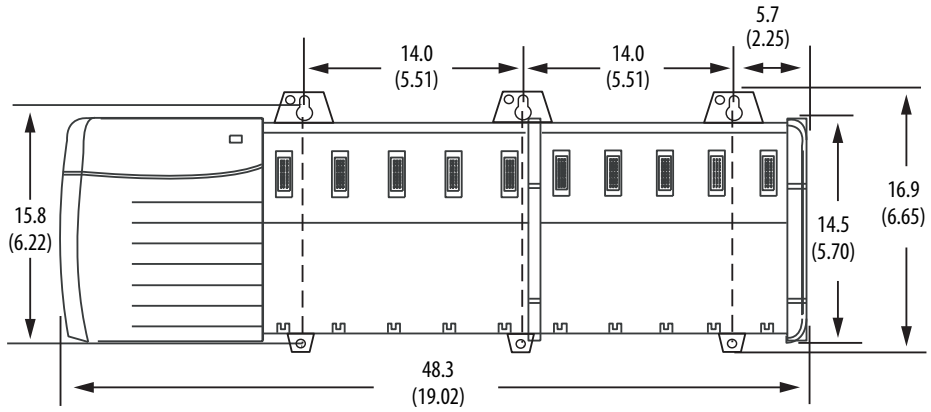


Figure 16 - 1756-A13/C Chassis and Power Supply

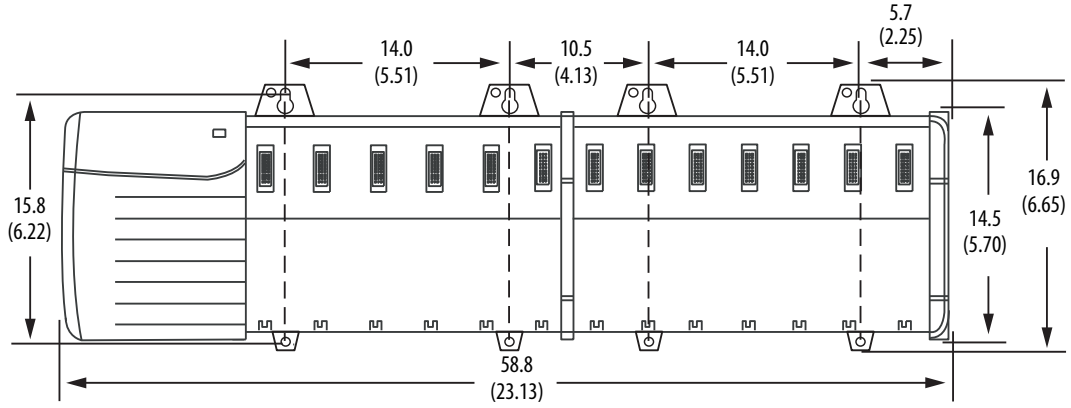


Figure 17 - 1756-A17/C Chassis and Power Supply

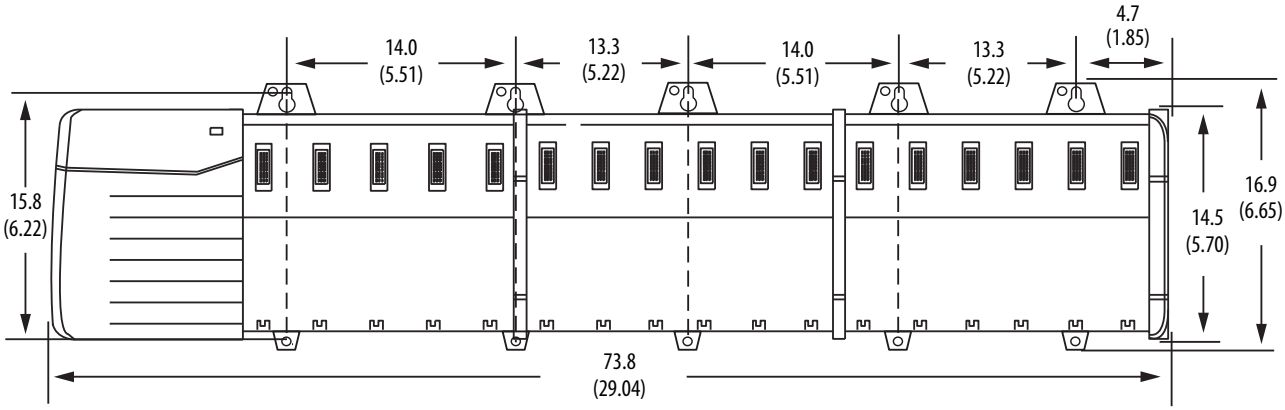
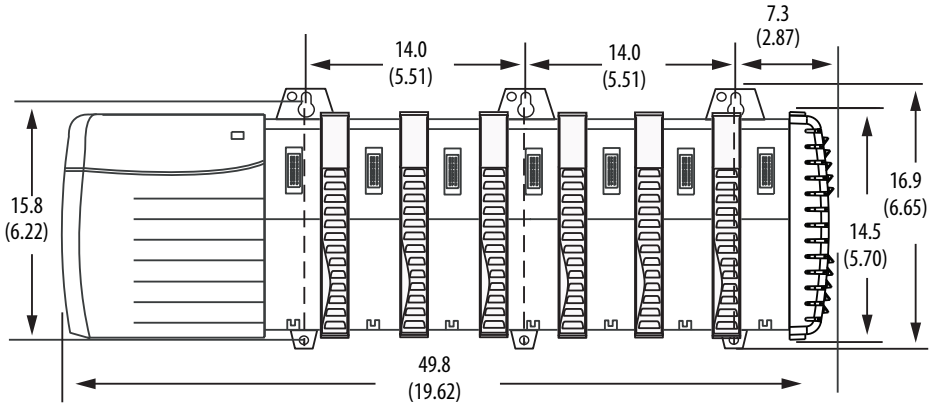


Figure 18 - 1756-A7XT/C Chassis and Power Supply



Install the Chassis and Power Supply

After planning your system, use these instructions to install the standard or ControlLogix-XT versions of your 1756 chassis and power supplies.

ATTENTION: Do not drill holes above an installed chassis. Metal chips from drilling can damage the backplane and cause intermittent operation.

IMPORTANT Chassis are intended to be mounted only horizontally. Do not mount vertically.

The graphics in this section depict series C chassis.

1. Drill holes in the back panel of the enclosure for the chassis mounting tabs.

   See the Plan the System on page 16 for assistance in hole placement.

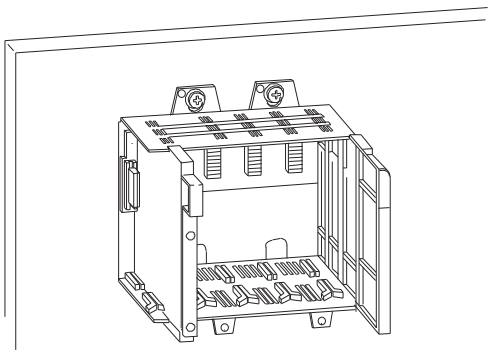
2. Scrape paint off the back panel for an electrical connection between the chassis and back panel.
3. Hold the chassis in place against the holes.

ATTENTION: If the chassis mounting tabs do not lay flat before the screws are tightened, use additional washers as shims so the chassis is not warped by tightening the screws.

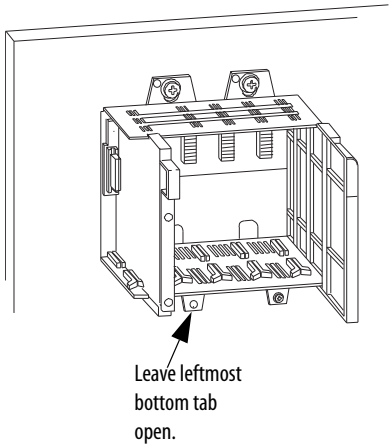
Warping a chassis can damage the backplane and cause intermittent operation.

4. Install the hardware for the top mounting tabs and tighten.

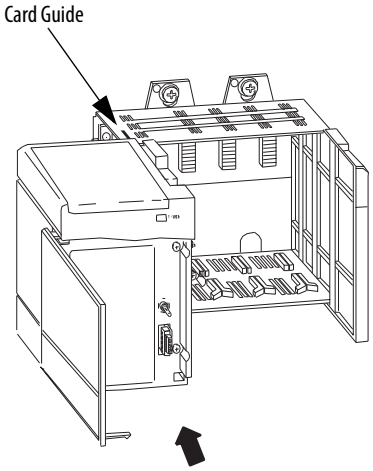
   See Parts Required on page 13 for more information.



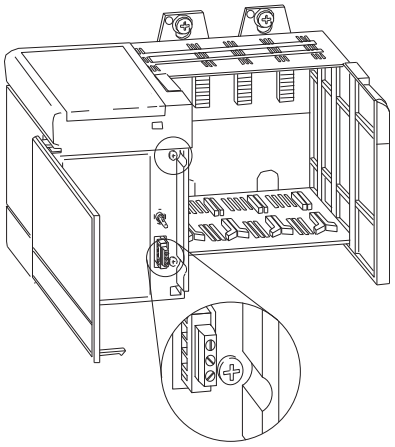
5. Install the remaining tab screws, but leave the leftmost bottom tab open for the functional ground.



6. Align the power-supply circuit board with the card guides on the left side of the chassis and slide the power supply back until it is flush with the front of the chassis.



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



Ground the Chassis

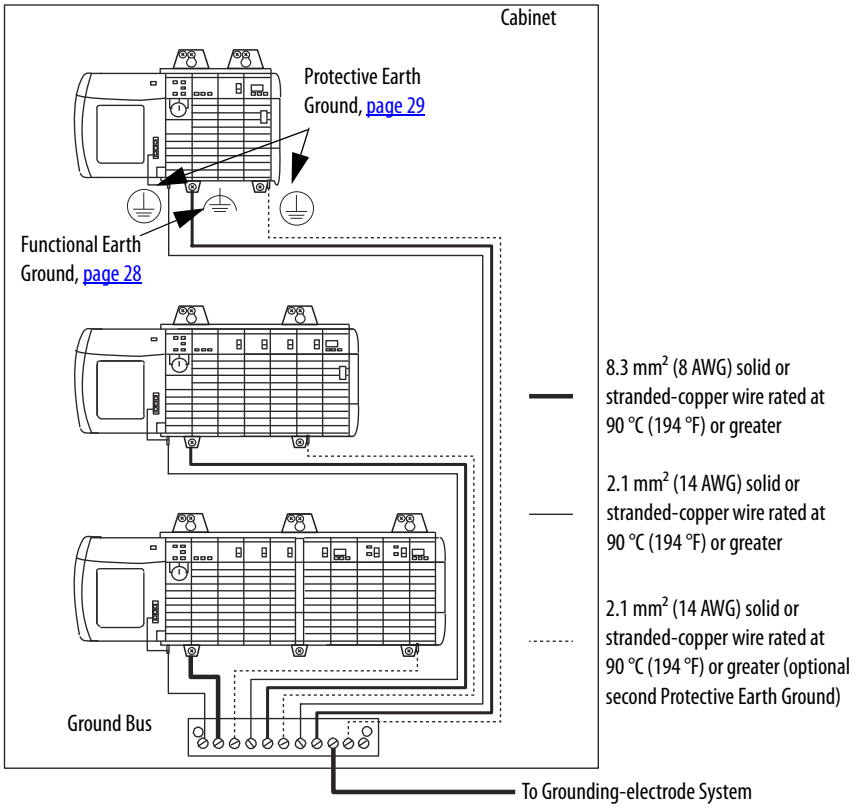
Complete these steps to ground your chassis.

Grounding Step	Page
Install a Central Ground Bus	28
Connect the Functional Earth Ground on the Chassis	28
Connect the Protective Earth Ground (Series B)	29
Connect the Grounding Conductors to the Ground Bus	33
Connect Ground Bus to Grounding-electrode System	33

Figure 19 shows an example grounding configuration. After you complete the grounding steps, your system looks similar to this figure.

TIP To minimize the resistance between the chassis and ground connection, keep wire lengths as short as possible.

Figure 19 - Grounding Configuration Example (Series C shown)



Use these guidelines when connecting the grounding:

- Use a steel enclosure to guard against electromagnetic interference (EMI).
- Install a bonding wire for electrical contact between the enclosure door and the enclosure; do not rely on the hinge.
- Make sure the enclosure-door viewing window is a laminated screen or a conductive optical substrate (to block EMI).

Install a Central Ground Bus

Each enclosure must contain a central ground bus. The ground bus is the common connection for each chassis within the enclosure and the enclosure itself.

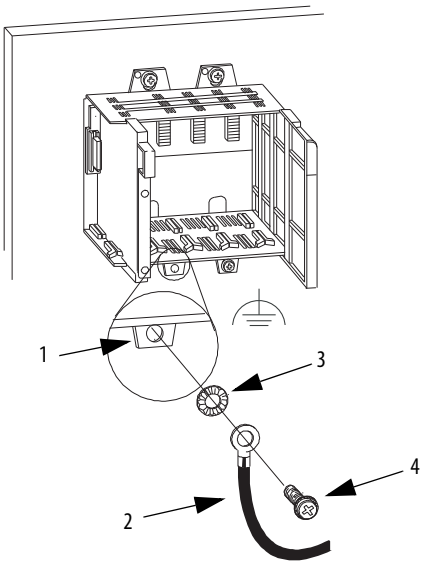
For more information on installing a central ground bus, see the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

Connect the Functional Earth Ground on the Chassis

Use 8.3 mm² (8 AWG) solid or stranded-copper wire rated at 90 °C (194 °F) or greater to connect the functional earth ground.

Connect the functional earth ground as shown in Figure 20.

Figure 20 - Functional Earth Ground Connection (Series C shown)



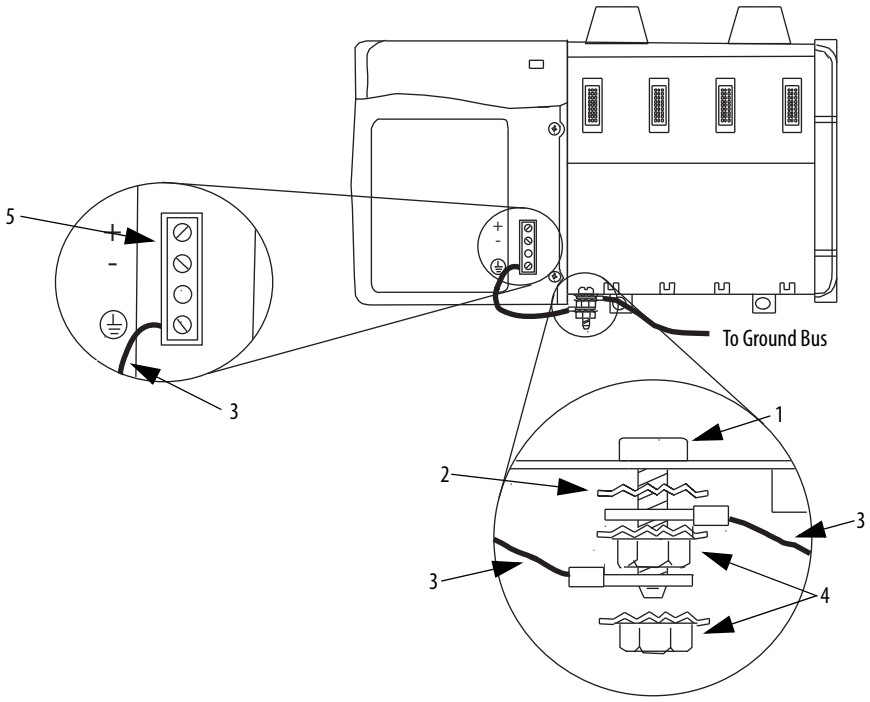
Item	Description
1	Chassis mounting tab
2	Equipment grounding conductor (ground lug with 8.3 mm² [8 AWG] solid or stranded-copper wire rated at 90 °C [194 °F] or greater)
3	M4 or M5 (#10 or #12) flat or star washer
4	M4 or M5 (#10 or #12) Phillips screw and flat or star washer (or SEM screw)

Connect the Protective Earth Ground (Series B)

Use 2.1 mm² (14 AWG) solid or stranded-copper wire that is rated at 90 °C (194 °F) or greater to connect the protective earth ground. Tighten the nuts on the protective earth ground terminal stud to a torque of 16.27 N•m (12 lb•in).

Connect the functional earth ground as shown in Figure 21.

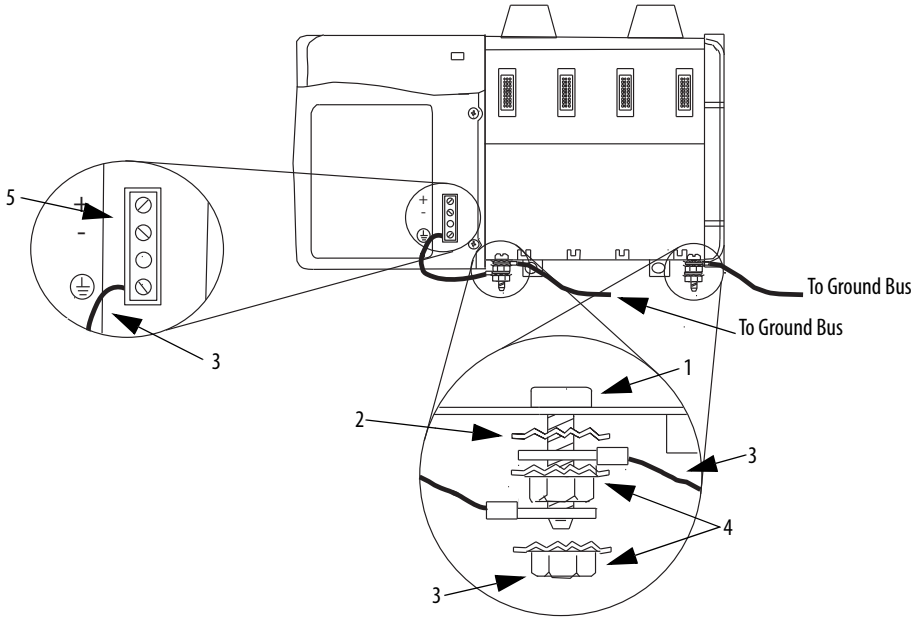
Figure 21 - Protective Earth Ground Connection



IMPORTANT If your application requires the use of the second protective earth-ground terminal stud, use the additional protective earth-ground terminal stud to connect the chassis to the ground bus. Figure 22 depicts the connection of the second protective earth-ground terminal stud.

Item	Description
1	Protective earth-ground terminal stud
2	Star washer
3	Equipment grounding conductor (ground lug with 2.1 mm² [14 AWG] solid or stranded-copper wire rated at 90 °C [194 °F] or greater)
4	Nut with captive star washer
5	Wiring terminal block (bottom terminal is protective earth ground)

Figure 22 - Dual Protective Earth Ground Connection

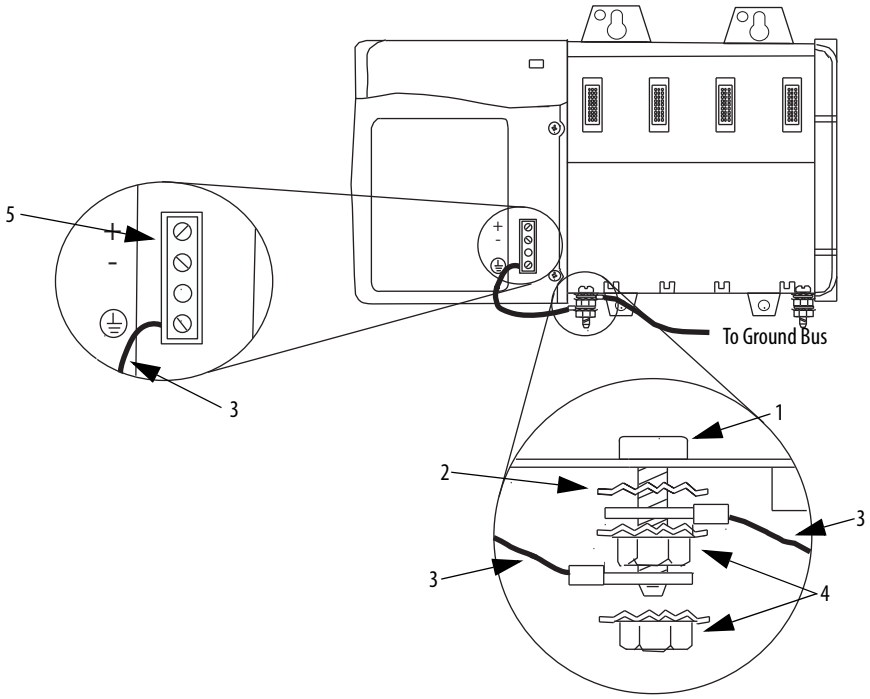


Connect the Protective Earth Ground (Series C)

Use 2.1 mm² (14 AWG) solid or stranded-copper wire that is rated at 90 °C (194 °F) or greater to connect the protective earth ground. Tighten the nuts on the protective earth ground terminal stud to a torque of 16.27 N•m (12 lb•in).

Connect the functional earth ground as shown in Figure 23.

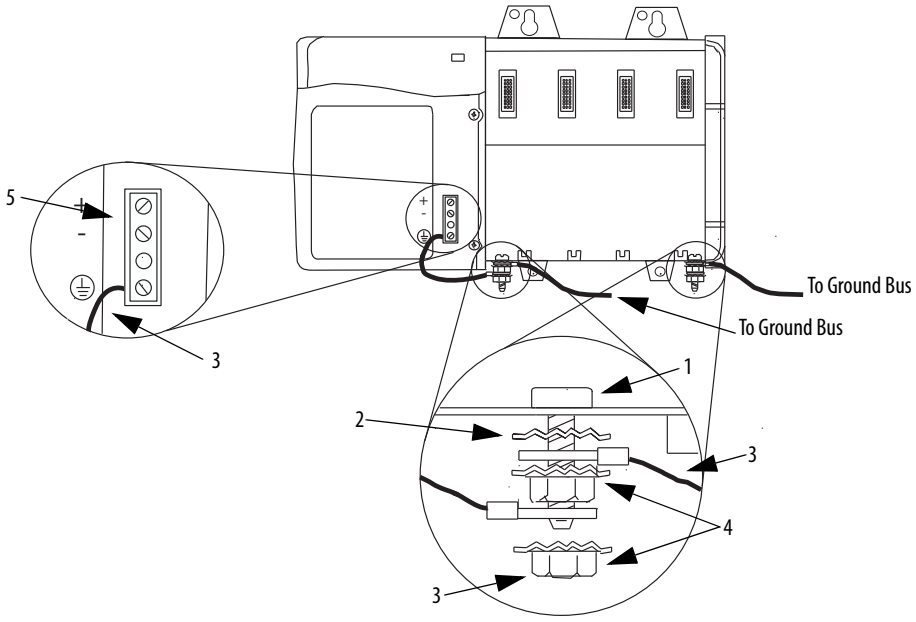
Figure 23 - Protective Earth Ground Connection



IMPORTANT If your application requires the use of the second protective earth-ground terminal stud, use the additional protective earth-ground terminal stud to connect the chassis to the ground bus. Figure 24 depicts the connection of the second protective earth-ground terminal stud.

Item	Description
1	Protective earth-ground terminal stud
2	Star washer
3	Equipment grounding conductor (ground lug with 2.1 mm² [14 AWG] solid or stranded-copper wire rated at 90 °C [194 °F] or greater)
4	Nut with captive star washer
5	Wiring terminal block (bottom terminal is protective earth ground)

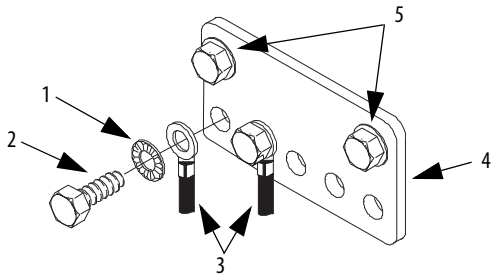
Figure 24 - Dual Protective Earth Ground Connection



Connect the Grounding Conductors to the Ground Bus

Connect the equipment grounding conductors (functional and protective earth ground) directly from each chassis to an individual bolt on the ground bus.

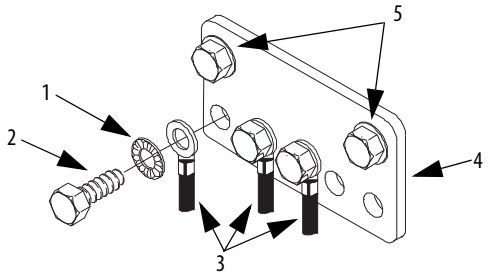
Figure 25 - Ground Bus Connection



Item	Description
1	Flat or star washer
2	Bolt
3	Equipment grounding conductor (from protective and functional earth ground connections)
4	Ground bus
5	Ground bus mounting

Connect the second protective earth ground to the ground bus as shown in Figure 26 if necessary.

Figure 26 - Ground Bus Connection (second Protective Earth Ground)

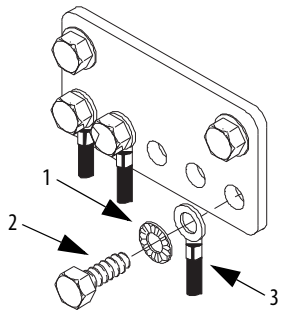


Connect Ground Bus to Grounding-electrode System

Use a grounding-electrode conductor to connect the ground bus to the grounding-electrode system.

At minimum, use 8.3 mm^2 (8 AWG) solid or stranded-copper wire that is rated at 90 °C (194 °F) or greater for the grounding-electrode conductor to guard against EMI. The National Electrical Code specifies safety requirements for the grounding-electrode conductor.

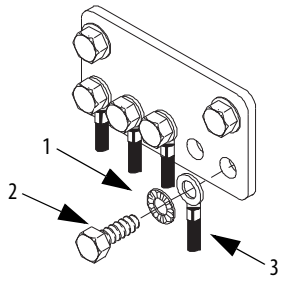
Figure 27 - Grounding-electrode System Connection



Item	Description
1	Flat or star washer
2	Bolt
3	Equipment grounding conductor (ground lug with minimum 8.3 mm² [8 AWG] solid or stranded-copper wire rated at 90 °C [194 °F] or greater)

Connect the ground bus as shown in Figure 28 if using a second protective earth ground.

Figure 28 - Grounding-electrode System Connection (second Protective Earth Ground)



Connect the Power

WARNING: If you connect or disconnect wiring while the field-side power is on, an electrical 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 1 conductor on any single terminal.

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

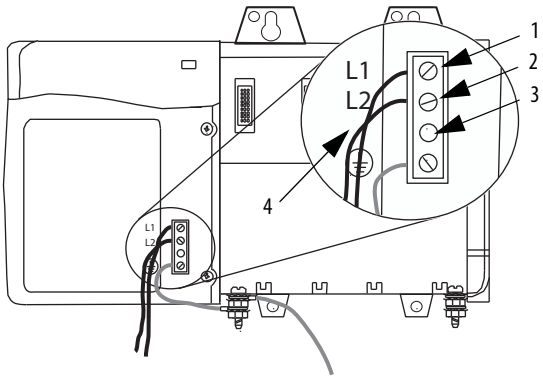
Use 2.5 mm² (14 AWG) solid or stranded-copper wire that is rated at 90 °C (194 °F), or greater, 1.2 mm (3/64 in.) insulation maximum to connect power. Tighten the terminals to a torque of 0.8 N•m (7 lb•in).

Connect the power as shown in Figure 29.

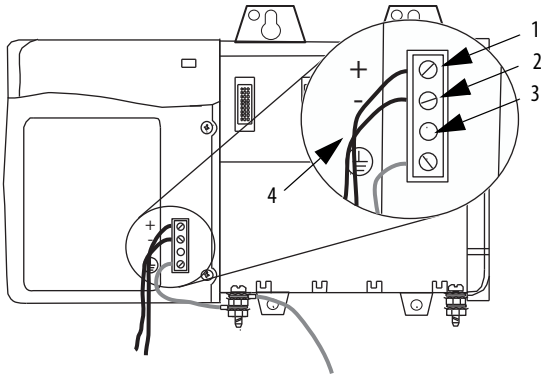
IMPORTANT The voltage input connections of the power supplies are auto-sensing. You do **not** use a jumper, for example, a 120/240V AC jumper, when connecting external power to the power supply, as shown in Figure 29.

Figure 29 - Power Connection (Series C shown)

AC Power Supplies



DC Power Supplies



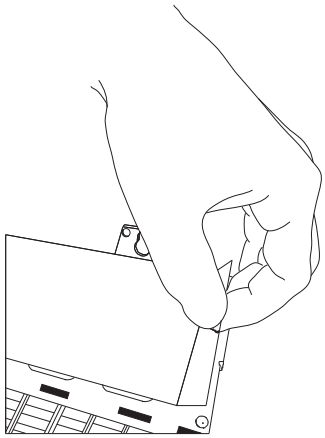
Item	Description, AC Power Supplies	Description, DC Power Supplies
1	L1 (high side of line power)	DC+ (positive supply)
2	L2 (low side of line power)	DC- (negative supply return)
3	This terminal is not used and is capped to prevent use	
4	2.5 mm^2 (14 AWG) 75 °C (167 °F) copper wire with 1.2 mm (3/64-in.) insulation	

Remove the Protective Label

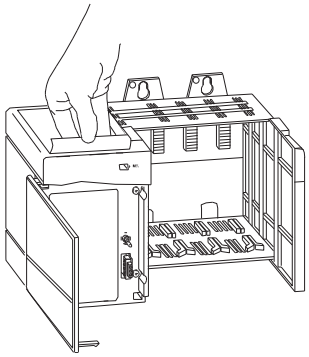
ATTENTION: Make sure the chassis is mounted and all panel fabrication is complete before you remove the protective label. This label protects the power supply from metal shavings falling inside the power supply and damaging it during operation.

These figures depict series C chassis.

Remove the protective label from the chassis.

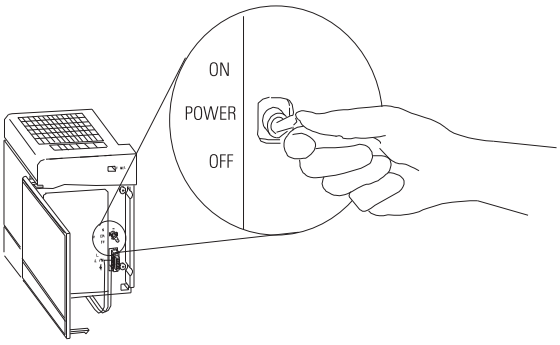


Remove the protective label from the top of the power supply.



Apply Power to the Chassis

Turn on the power.



Input Power Requirements and Transformer Sizing

These graphs show the input power requirements for the power supplies, given the power 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.

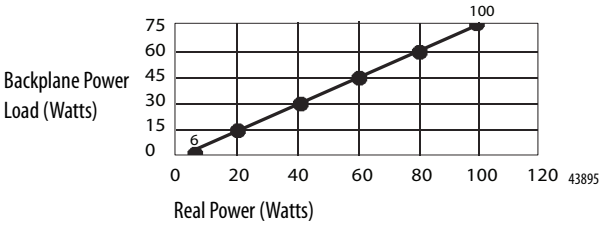
   See the module specification tables in the ControlLogix Selection Guide, publication 1756-SG001, for module power draws.

2. Locate the Backplane Power Load on the graph's vertical (y) axis and determine the corresponding Real Power (input-power) rating on the horizontal (x) axis.

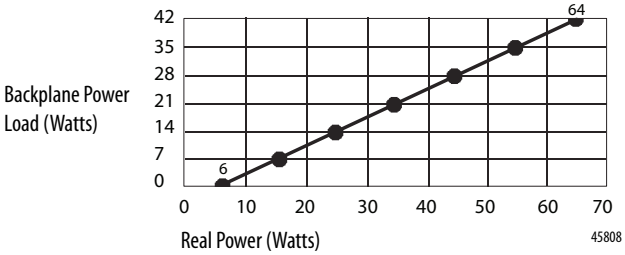
   The amount of power consumed by the power supply equals the Real Power value.

Figure 30 - Power Supply Power Requirements

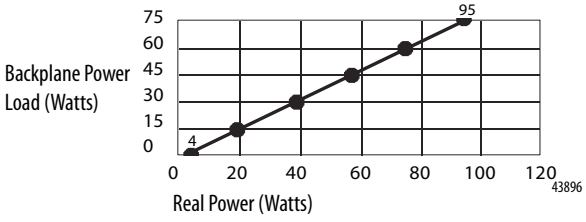
1756-PA72/C, 1756-PA75/B (AC)



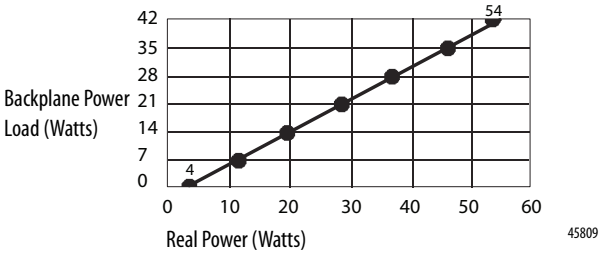
1756-PAXT (AC)



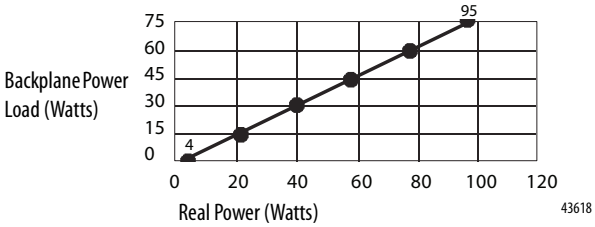
1756-PB72/C, 1756-PB75/B (DC)



1756-PBXT (DC)



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

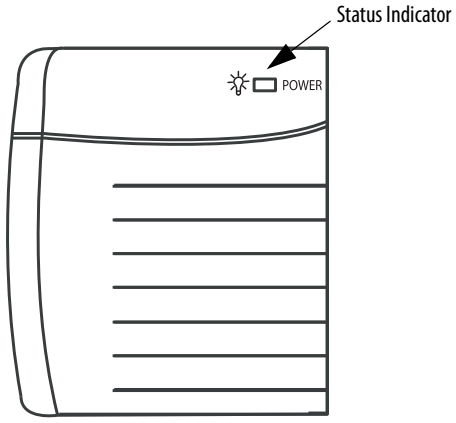


Apparent Power (Watts) = Transformer Load (VA) = Real Power (Watts)

For more information about calculating the required power for your system, see the ControlLogix Selection Guide, publication 1756-SG001.

Troubleshoot the Power Supply

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



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 holding the power supply to the chassis.

   See step 7 on page 26 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.

Install Chassis and Redundant Power Supplies

This chapter describes how to install standard and ControlLogix-XT versions of the 1756 chassis with redundant power supplies. Sections in this chapter that are not marked as specific to series B or series C chassis apply to both chassis series.

Redundant Power Supplies

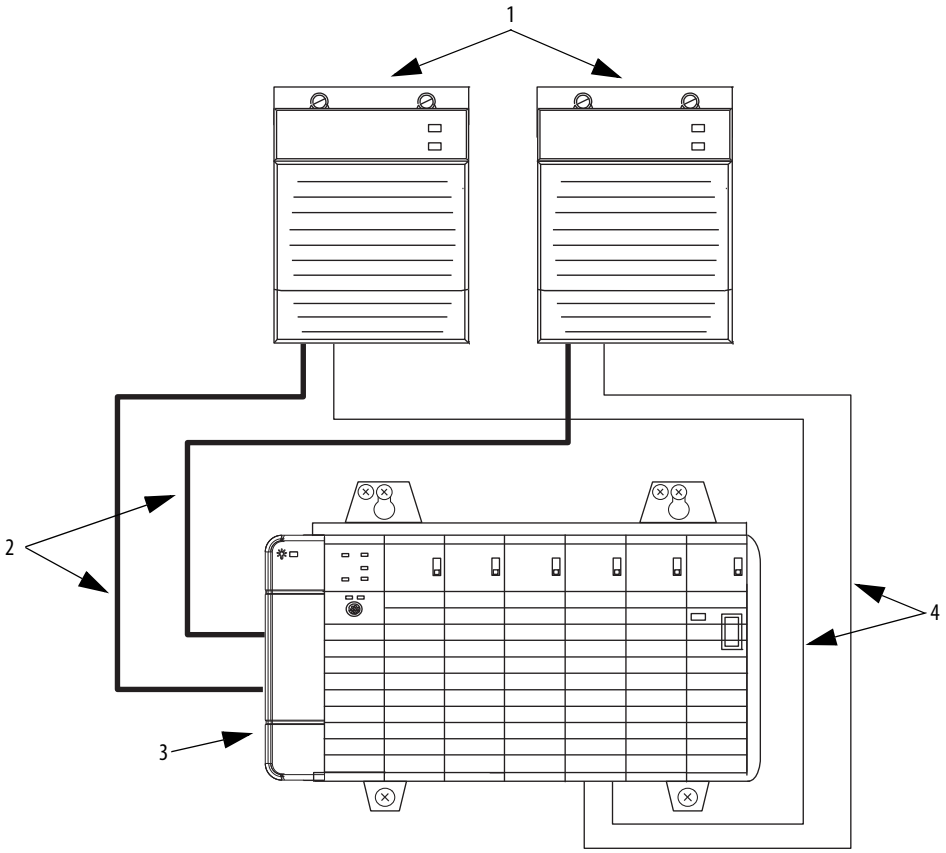
The redundant power supply system provides additional uptime protection for chassis that are used in critical applications. The two remotely mounted supplies are designed to share the current required by the chassis and are available in AC (catalog number 1756-PA75R/A or 1756-PAXTR) and DC (catalog number 1756-PB75R/A or 1756-PBXTR) versions that can be mixed or matched when used in tandem.

If one power supply fails, the remaining supply accommodates the entire load of the chassis without disruption to chassis activity.

The 1756-PSCA2 chassis adapter is a passive device that is designed to funnel power from one or two ControlLogix redundant power supplies to the single power connector on the ControlLogix chassis (only series B) backplane.

Components of the Redundant System

The following graphic (series C chassis depicted) shows the components of a redundant system in a typical configuration.



Item	Description	Cat. No.
1	Redundant power supply	1756-PA75R/A and/or 1756-PB75R/A
2	Redundant power supply cable(1) (Length = 0.91 m [3 ft])	1756-CPR2
3	Redundant power supply chassis adapter	1756-PSCA2
4	Annunciator wiring(2) (Maximum length = 10 m [32.8 ft])	User-supplied

(1) Cable bend radius is 12.7 cm (5.0 in.)

(2) Optional user-provided annunciator wiring can be connected to the solid-state relay for status and troubleshooting purposes. See page 64 for more information.

Tools Required

When installing your 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-head screwdriver
- Torque screwdriver
- Needle-nose pliers
- Crimper
- Wire stripper
- Drill

Parts Required

Each redundant power supply requires four, #10 Phillips screws for installation. Eight, #10 Phillips screws are required to install two redundant power supplies.

Use these tables to determine the parts that are required to install your chassis. These parts are not included with the chassis and must be ordered separately.

For each mounting tab on the chassis, the following parts are required.

Tab Position	With SEM Screws[1]	Without SEM Screws
Top	• 1 Phillips screw • 1 flat washer • 1 split-lock washer	N/A
Bottom	1 SEM screw	• 1 Phillips screw • 1 star washer

(1) Phillips screw with attached star washer.

Series C chassis offer:

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

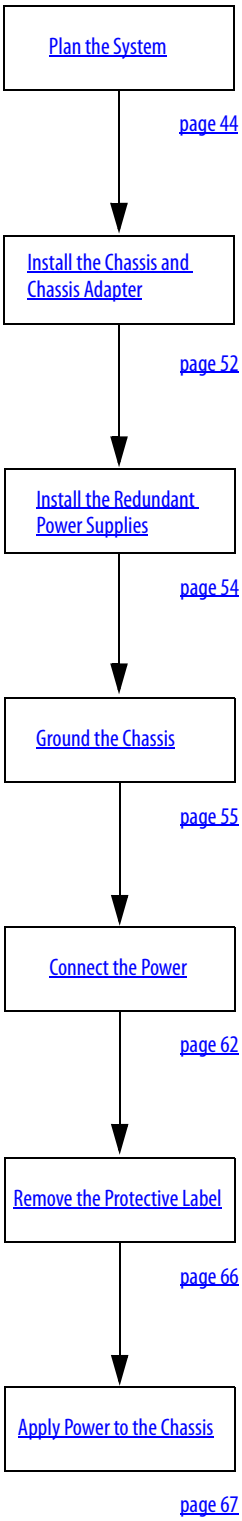
Table 6 - Mounting Tabs per Chassis

Chassis	Number of Mounting Tabs	Total Parts Required Per Chassis	
		With SEM Screws	Without SEM Screws
1756-A4, 1756-A4/B, 1756-A4/C, 1756-A7, 1756-A7/B, 1756-A7/C, 1756-A4XLT/B, 1756-A7XLT/B	2 top 2 bottom	• 2 Phillips screws • 2 flat washers • 2 split-lock washers • 2 SEM screws	• 4 Phillips screws • 2 flat washers • 2 split-lock washers • 2 star washers
1756-A10, 1756-A10/B, 1756-A10/C, 1756-A5XT/B, 1756-A7XT/B, 1756-A7XT/C	3 top 3 bottom	• 3 Phillips screws • 3 flat washers • 3 split-lock washers • 3 SEM screws	• 6 Phillips screws • 3 flat washers • 3 split-lock washers • 3 star washers

Table 6 - Mounting Tabs per Chassis

Chassis	Number of Mounting Tabs	Total Parts Required Per Chassis	
		With SEM Screws	Without SEM Screws
1756-A13, 1756-A13/B, 1756-A13/C	4 top 4 bottom	• 4 Phillips screws • 4 flat washers • 4 split-lock washers • 4 SEM screws	• 8 Phillips screws • 4 flat washers • 4 split-lock washers • 4 star washers
1756-A17, 1756-A17/B, 1756-A17/C	5 top 5 bottom	• 5 Phillips screws • 5 flat washers • 5 split-lock washers • 5 SEM screws	• 10 Phillips screws • 5 flat washers • 5 split-lock washers • 5 star washers

Follow These Steps



Plan the System

Use the following information to assist you in planning your system.

Redundant Power Supply and Chassis Compatibility

The chassis series that you have determines the redundant power supply that you can use. Table 7 lists the chassis that can be installed with each redundant power supply.

Table 7 - Chassis Compatibility

Power Supply Cat. No.	Chassis Cat. No.
1756-PA75R	1756-A4/B, 1756-A7/B, 1756-A10/B, 1756-A13/B, 1756-A17/B
1756-PB75R	
1756-PAXTR	1756-A4/B, 1756-A7/B, 1756-A10/B, 1756-A13/B, 1756-A17/B, 1756-A4LXT/B, 1756-A5XT/B, 1756-A7LXT/B, 1756-A7XT/B, 1756-A7XT/C
1756-PBXTR	

Spacing Requirements

Use the following information to plan your installation.

IMPORTANT Make sure that you meet the minimum spacing requirements specified:

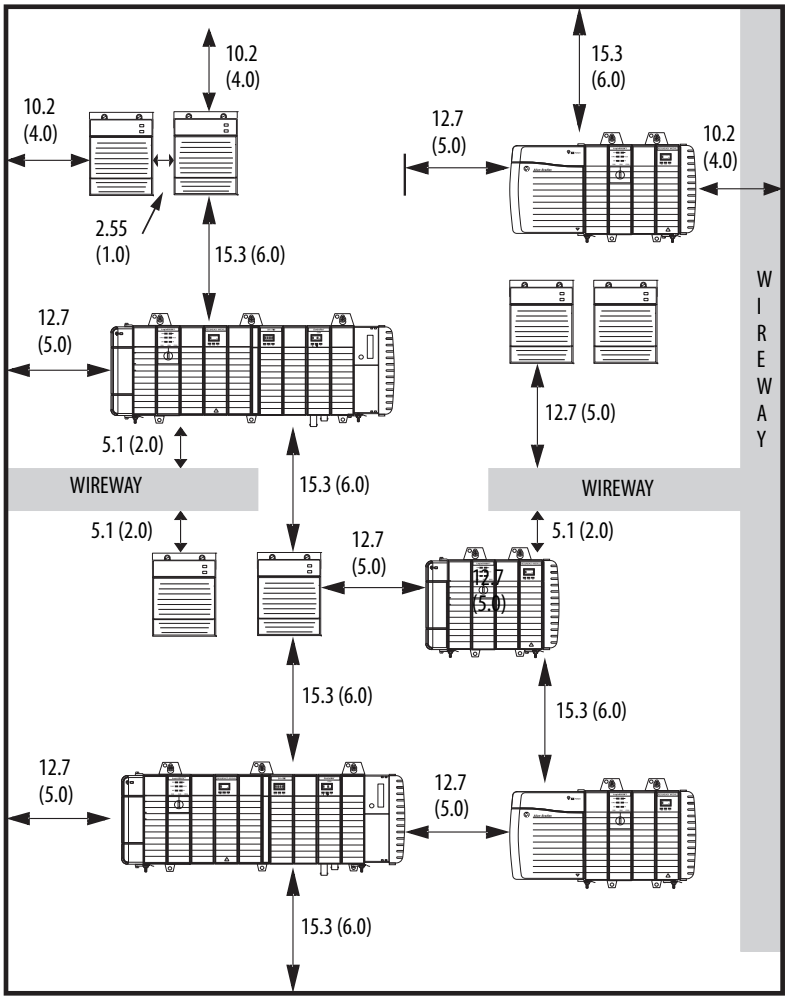
- 10.2 cm (4.0 in.) between redundant power supplies and cabinet housing the control system
- 12.7 cm (5.0 in.) below redundant power supply for 1756-CPR2 cable routing and connection
- 2.55 cm (1.0 in.) between redundant power supplies
- 15.3 cm (6.0 in.) between chassis and heat source
- 5.1 cm (2.0 in.) between wireway and top or bottom of chassis or redundant power supply
- 12.7 cm (5.0 in.) of clearance next to the chassis adapter for 1756-CPR2 cable routing to conform to cable bend radius

Chassis and redundant power supplies are intended to be mounted only horizontally. Do not mount vertically.

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.

Figure 31 depicts series C chassis. Dimensions are in cm (in.).

Figure 31 - Minimum Spacing Requirements



The 10.2 (4.0) measurement to the side of the enclosure can include the wireway on the right side of the chassis.

Table 8 - Spacing Requirements, Top and Bottom

From a	To a chassis requires this space, min	To a redundant power supply requires this space, min
Cabinet	15.3 cm (6.0 in.)	10.2 cm (4.0 in.), 12.7 cm (5.0 in.) (only bottom)
Chassis or other heat source	15.3 cm (6.0 in.)	15.3 cm (6.0 in.)
Wireway	5.1 cm (2.0 in.)	5.1 cm (2.0 in.), 2.7 cm (5.0 in.) (only bottom)

Table 9 - Spacing Requirements, Sides

From a	To a chassis requires this space, min	To a redundant power supply requires this space, min
Cabinet	10.2 cm (4.0 in.), 12.7 cm (5.0 in.) (only left side)	10.2 cm (4.0 in.)

Table 9 - Spacing Requirements, Sides

From a	To a chassis requires this space, min	To a redundant power supply requires this space, min
Chassis or other heat source	7.7 cm (3.0 in.), 12.7 cm (5.0 in.) (only left side)	7.7 cm (3.0 in.)
Redundant power supply	7.7 cm (3.0 in.), 12.7 cm (5.0 in.) (only left side)	2.55 cm (1.0 in.)
Wireway	No minimum spacing required, 12.7 cm (5.0 in.) (only left side)	No minimum spacing required

Mounting Dimensions (Series B)

Use these dimensions to plan your chassis installation.

Dimensions are in cm (in.).

Figure 32 - Redundant Power Supplies

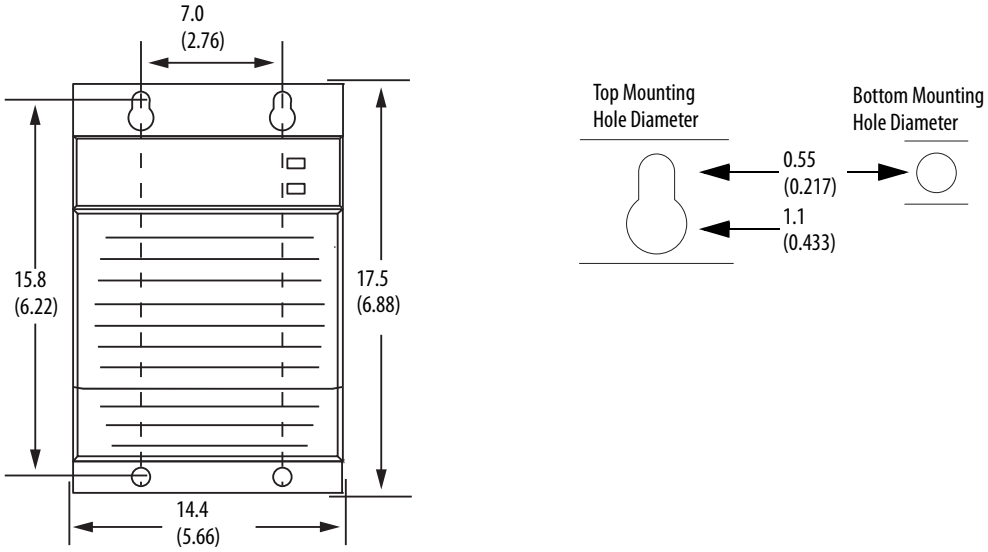


Figure 33 - Chassis Common Dimensions

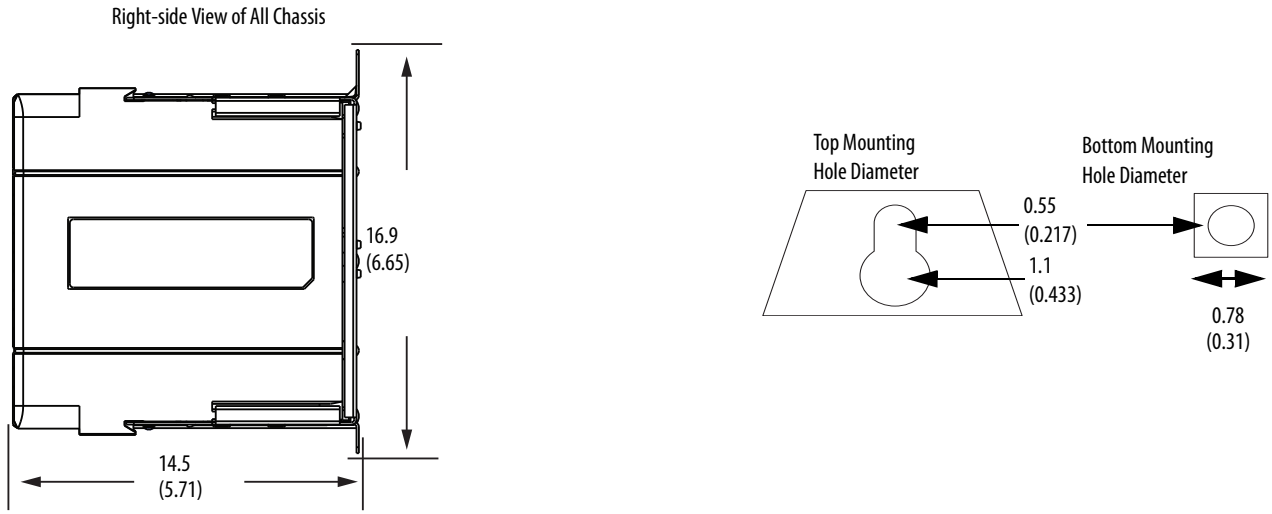


Figure 34 - 1756-A4/B Chassis and Chassis Adapter

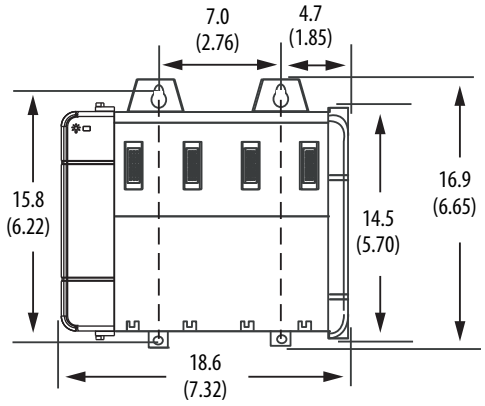


Figure 35 - 1756-A7/B Chassis and Chassis Adapter

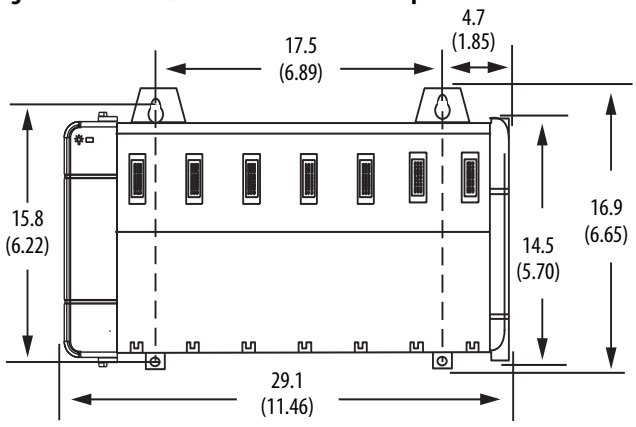


Figure 36 - 1756-A10/B Chassis and Chassis Adapter

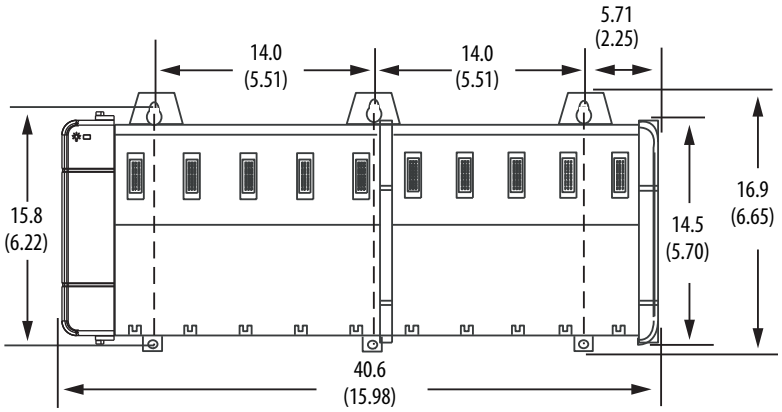


Figure 37 - 1756-A13/B Chassis and Chassis Adapter

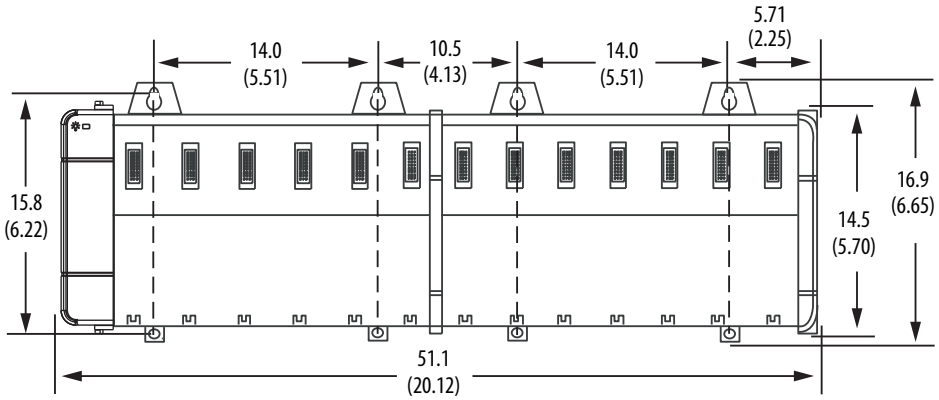


Figure 38 - 1756-A17/B Chassis and Chassis Adapter

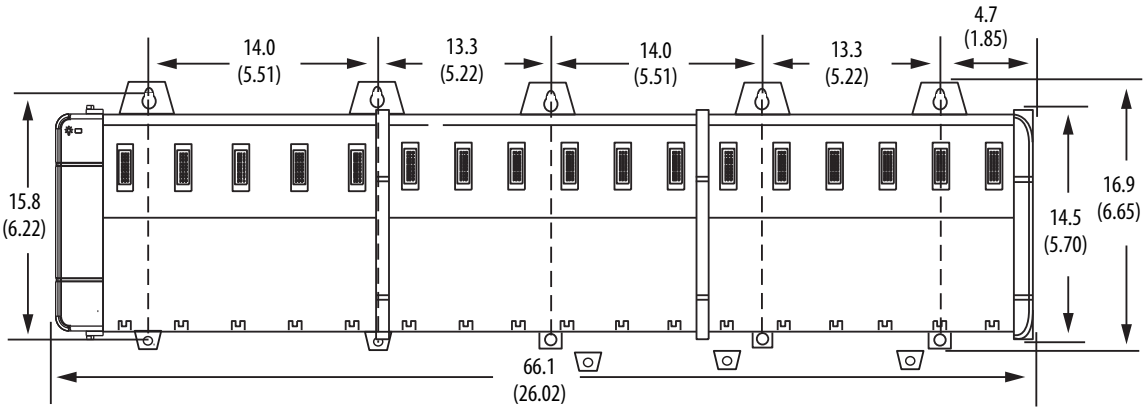


Figure 39 - 1756-A4LXT/B Chassis and Chassis Adapter

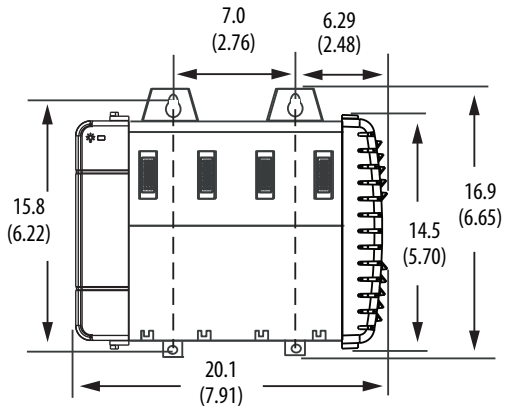
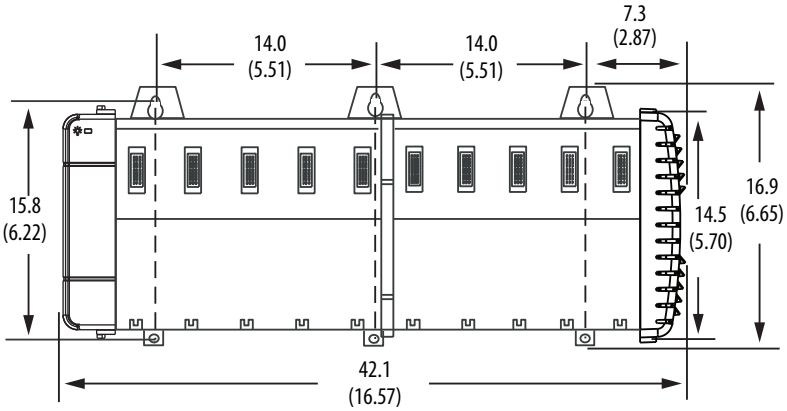


Figure 40 - 1756-A5XT/A7XT/B Chassis and Chassis Adapter



Mounting Dimensions (Series C)

Use these dimensions to plan your chassis installation.

Dimensions are in cm (in.).

Figure 41 - Redundant Power Supplies

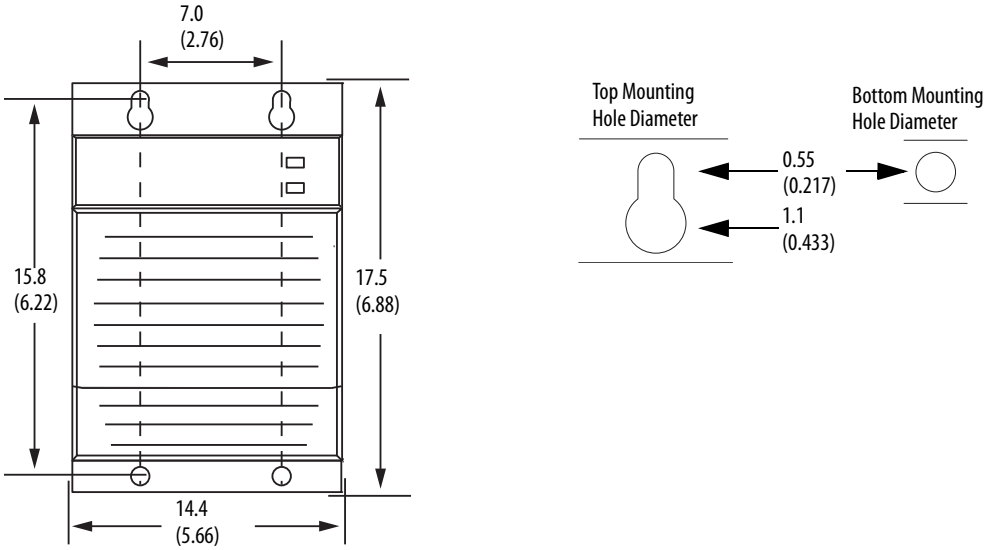


Figure 42 - Chassis Common Dimensions (Series C)

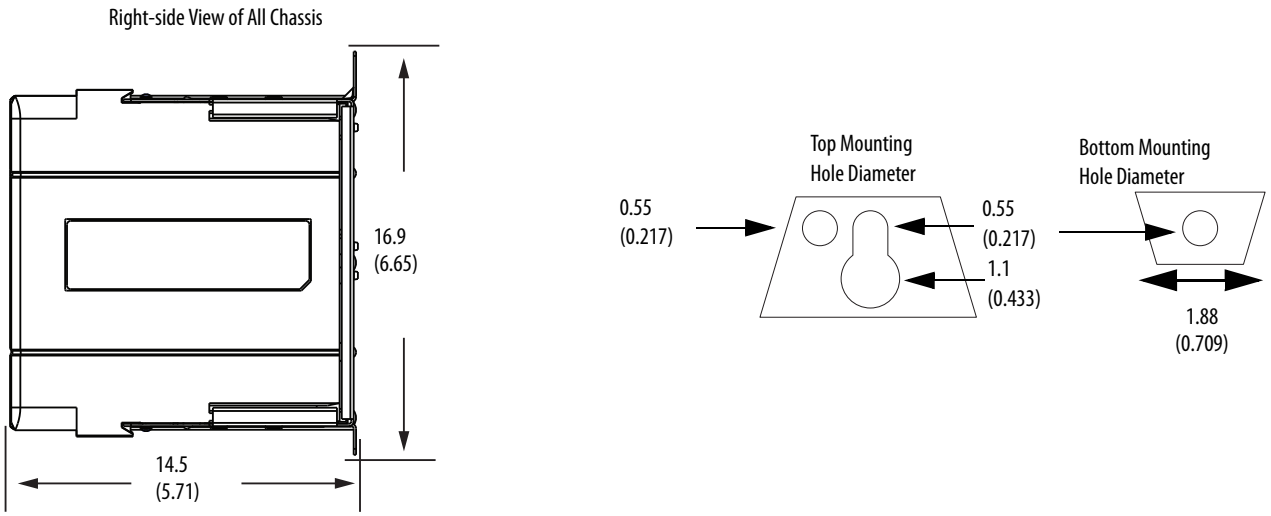
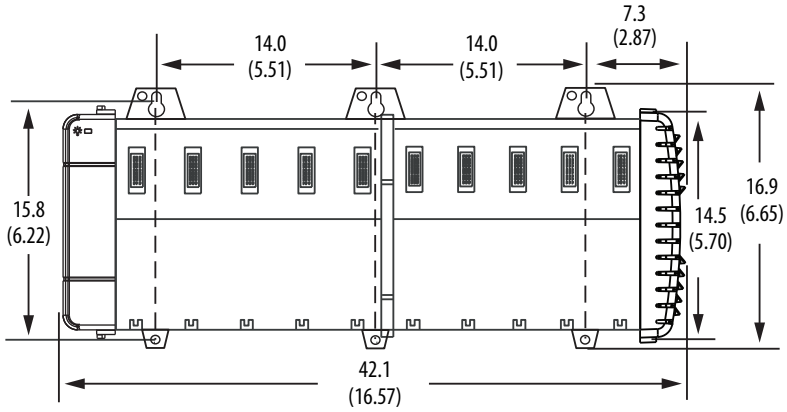


Figure 43 - 1756-A7XT/C Chassis and Chassis Adapter



System Configuration Recommendations

We recommend that you use one of these methods to configure your redundant power supply system.

Figure 44 - Recommended Configurations for a System That Uses One Chassis (Series C shown)

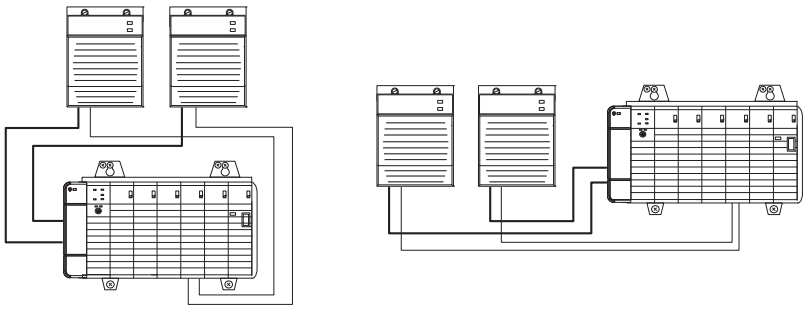
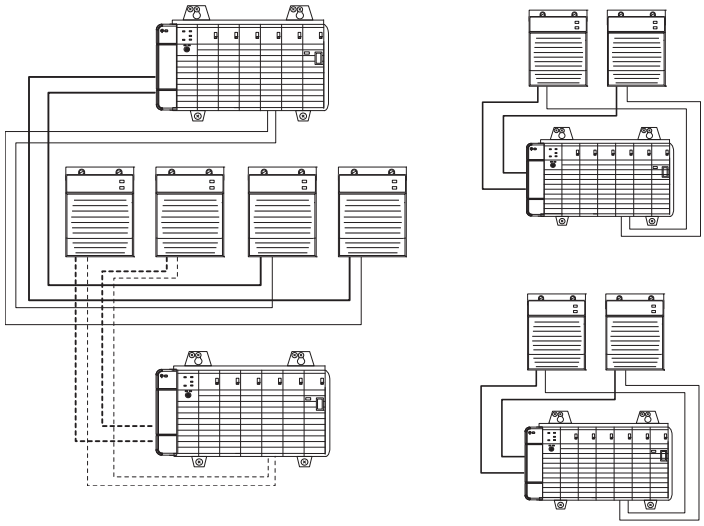


Figure 45 - Recommended Configurations for a System That Uses Two Chassis (Series C shown)



Install the Chassis and Chassis Adapter

After planning your system, use the instructions below to install your chassis and 1756-PSCA2 chassis adapter.

ATTENTION: Do not drill holes above an installed chassis. Metal chips from drilling can damage the backplane and cause intermittent operation.

IMPORTANT Chassis are intended to be mounted only horizontally. Do not mount vertically.

The graphics in this section depict series C chassis.

1. Drill holes in the back panel of the enclosure for the chassis mounting tabs.

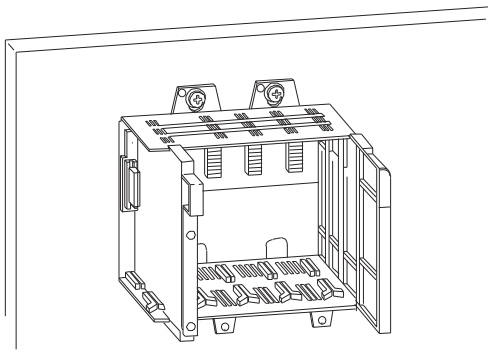
   See the Spacing Requirements on page 44 for assistance in hole placement.
2. Scrape paint off the back panel for an electrical connection between the chassis and back panel.
3. Hold the chassis in place against the holes.

ATTENTION: If the chassis mounting tabs do not lay flat before the screws are tightened, use additional washers as shims so the chassis is not warped by tightening the screws.

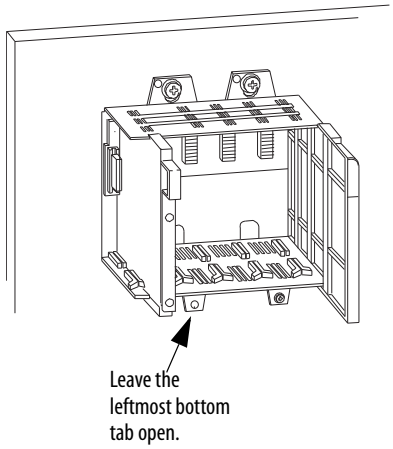
Warping a chassis can damage the backplane and cause intermittent operation.

4. Install the hardware for the top mounting tabs and tighten.

   See Parts Required on page 41 for more information.



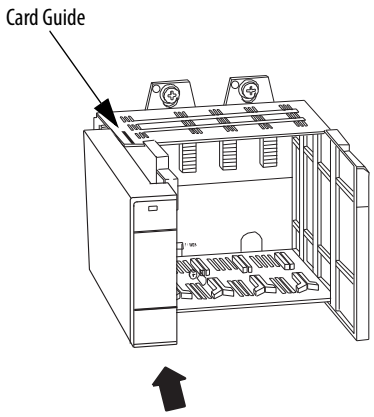
5. Install the remaining tab screws, but leave the leftmost bottom tab open for the functional ground.



6. Align the 1756-PSCA2 adapter's circuit board with the card guides on the left side of the chassis and slide the adapter back until it is flush with the front of the chassis.

WARNING: If you connect or disconnect the 1756-CPR2 cables while either backplane power source is on, an electrical arc can occur. This could cause an explosion in hazardous location installations. Repeated electrical arcing causes excessive wear to contacts on both the module and its mating connector. Worn contacts may create electrical resistance that can affect module operation.

Be sure that power is removed or the area is nonhazardous before proceeding.



Install the Redundant Power Supplies

Follow these steps to install your redundant power supplies.

ATTENTION: Do not drill holes for a redundant power supply above installed equipment. Metal chips from drilling can damage the backplane and cause intermittent operation.

1. Drill holes in the back panel of the enclosure for the redundant power supply.

   See the Spacing Requirements on page 44 for assistance in hole placement.
2. Insert the #10 Phillips screws into the top mounting holes, but do not tighten completely.
3. Slide the redundant power supply over the installed screws and tighten the screws.
4. Insert the bottom screws and tighten them.
5. Repeat these steps for additional power supplies.

Ground the Chassis

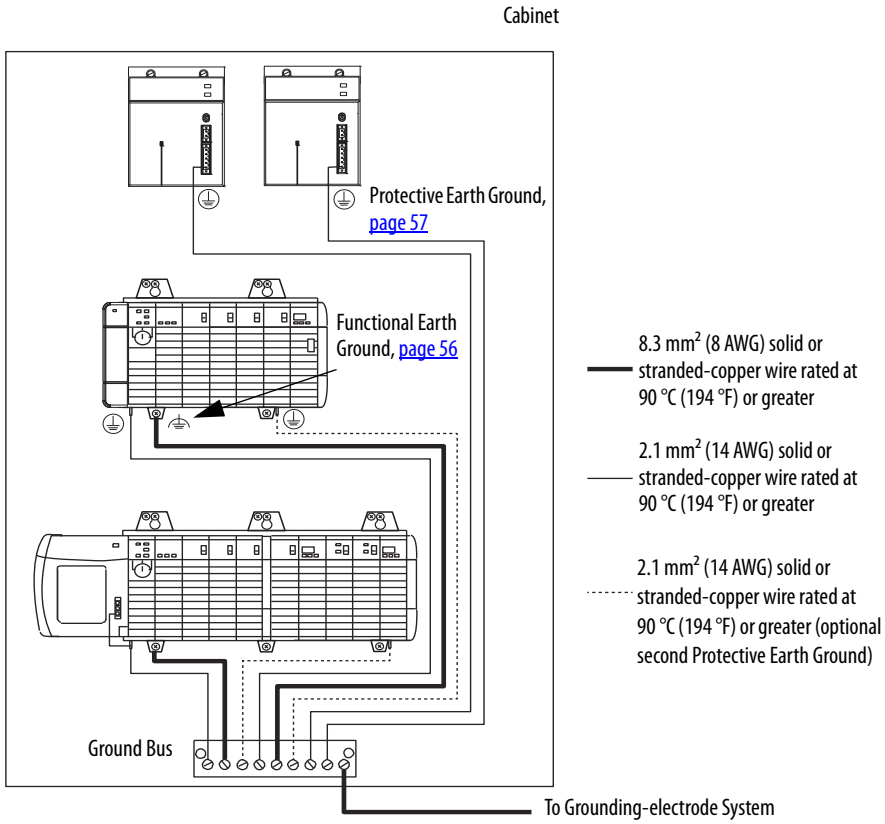
Complete these steps to ground your system.

Grounding Step	Page
Install a Central Ground Bus	56
Connect the Functional Earth Ground on the Chassis	56
Connect the Protective Earth Ground on the Chassis and Redundant Power Supply (Series B)	57
Connect the Grounding Conductors to the Ground Bus	61
Connect Ground Bus to Grounding-electrode System	61

Figure 46 shows an example grounding configuration. After you complete the grounding steps, your system looks similar to this figure.

TIP To minimize the resistance between the chassis and ground connection, keep wire lengths as short as possible.

Figure 46 - Grounding Configuration Example (Series C shown)



Use these guidelines when connecting the grounding:

- Use a steel enclosure to guard against electromagnetic interference (EMI).
- Install a bonding wire for electrical contact between the enclosure door and the enclosure; do not rely on the hinge.
- Make sure the enclosure-door viewing window is a laminated screen or a conductive optical substrate (to block EMI).

Install a Central Ground Bus

Each enclosure must contain a central ground bus. The ground bus is the common connection for each chassis within the enclosure and the enclosure itself.

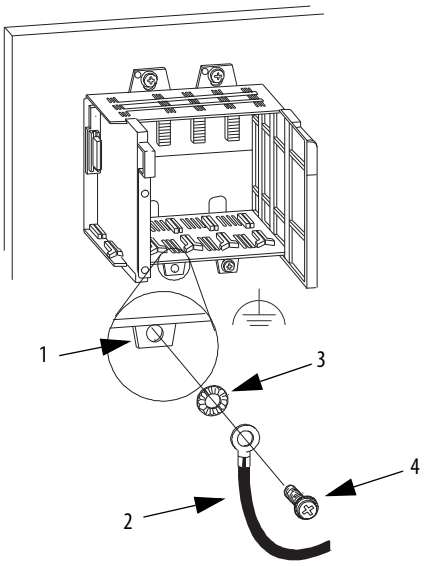
For more information on installing a central ground bus, see the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

Connect the Functional Earth Ground on the Chassis

Use 8.3 mm² (8 AWG) solid or stranded-copper wire rated at 90 °C (194 °F) or greater to connect the functional earth ground.

Connect the functional earth ground as shown in Figure 47.

Figure 47 - Functional Earth Ground Connection (Series C shown)



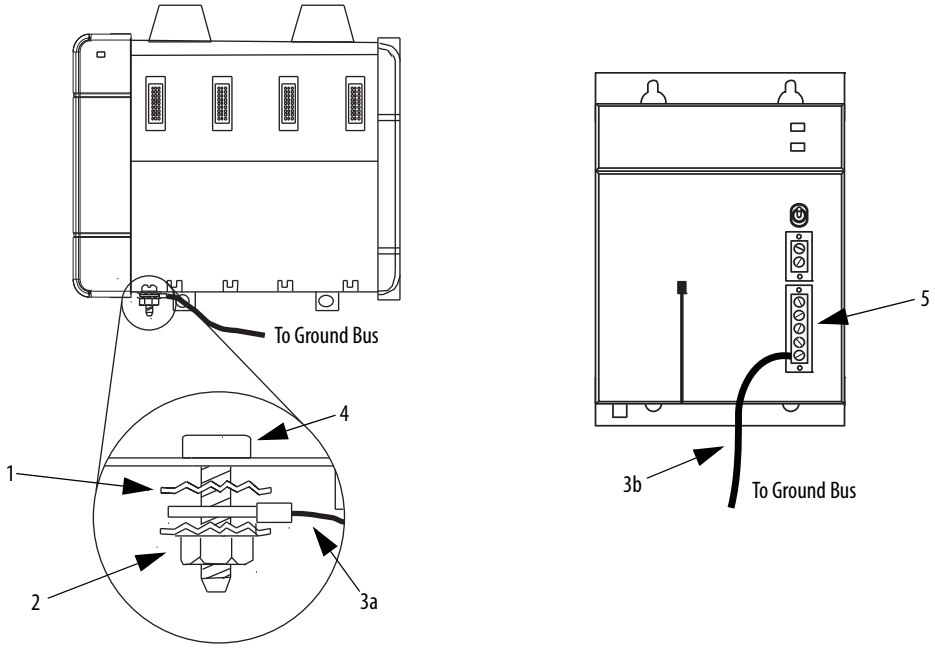
Item	Description
1	Chassis mounting tab
2	Equipment grounding conductor (ground lug with 8.3 mm² [8 AWG] solid or stranded-copper wire rated at 90 °C [194 °F] or greater)
3	M4 or M5 (#10 or #12) flat or star washer
4	M4 or M5 (#10 or #12) Phillips screw and flat or star washer (or SEM screw)

Connect the Protective Earth Ground on the Chassis and Redundant Power Supply (Series B)

Use 2.1 mm² (14 AWG) solid or stranded-copper wire rated at 90 °C (194 °F) or greater to connect the protective earth ground. Tighten the nuts on the protective earth ground terminal stud to a torque of 16.27 N•m (12 lb•in).

Connect the protective earth ground as shown in Figure 48.

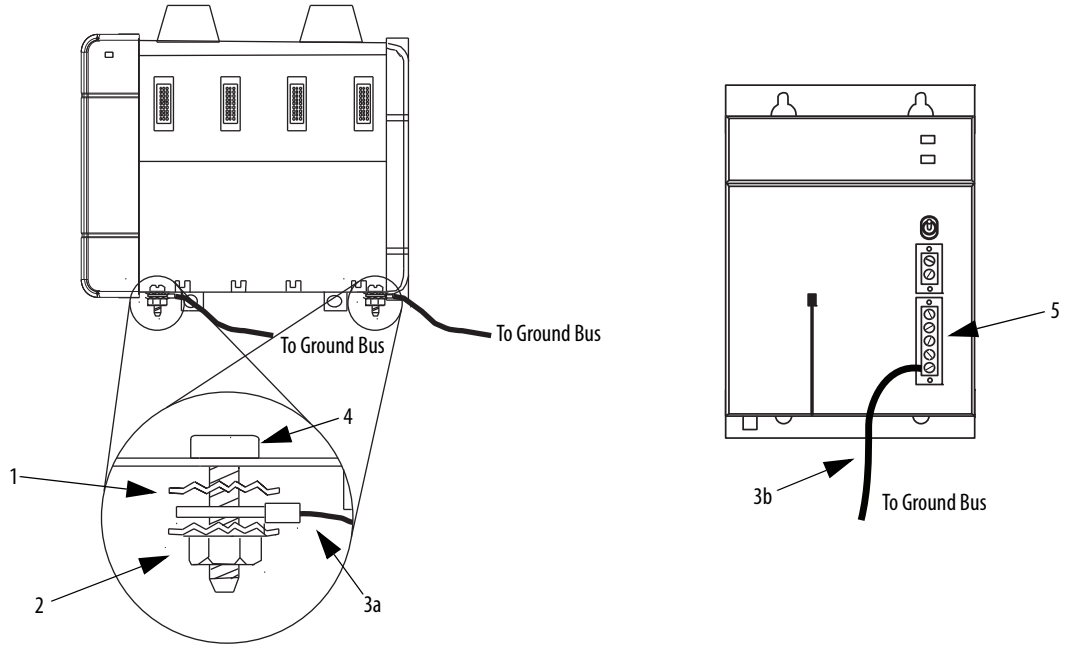
Figure 48 - Protective Earth Ground Connection



IMPORTANT If your application requires the use of the second protective earth-ground terminal stud, use the additional protective earth-ground terminal stud to connect the chassis to the ground bus. Figure 49 depicts the connection of the second protective earth-ground terminal stud.

Item	Description
1	Star washer
2	Nut with captive star washer
3a	Equipment grounding conductor (ground lug with 2.1 mm² [14 AWG] solid or stranded-copper wire rated at 90 °C [194 °F] or greater)
3b	Equipment grounding conductor (2.1 mm² [14 AWG] solid or stranded-copper wire rated at 90 °C [194 °F] or greater)
4	Protective earth-ground terminal stud
5	Wiring terminal block (bottom terminal is protective earth ground)

Figure 49 - Dual Protective Earth Ground Connection

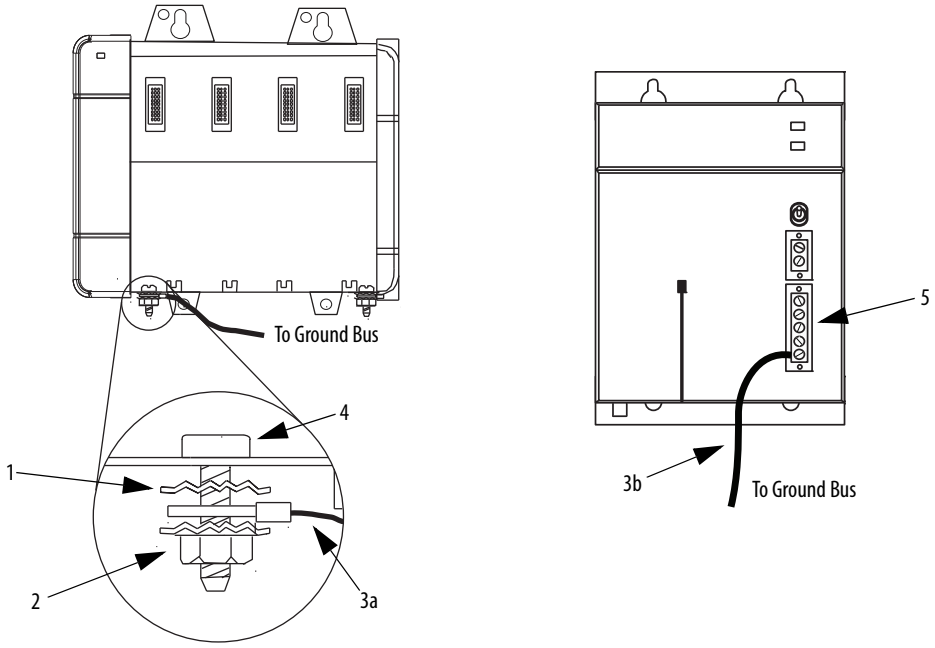


Connect the Protective Earth Ground on the Chassis and Redundant Power Supply (Series C)

Use 2.1 mm² (14 AWG) solid or stranded-copper wire rated at 90 °C (194 °F) or greater to connect the protective earth ground. Tighten the nuts on the protective earth ground terminal stud to a torque of 16.27 N•m (12 lb•in).

Connect the protective earth ground as shown in Figure 50.

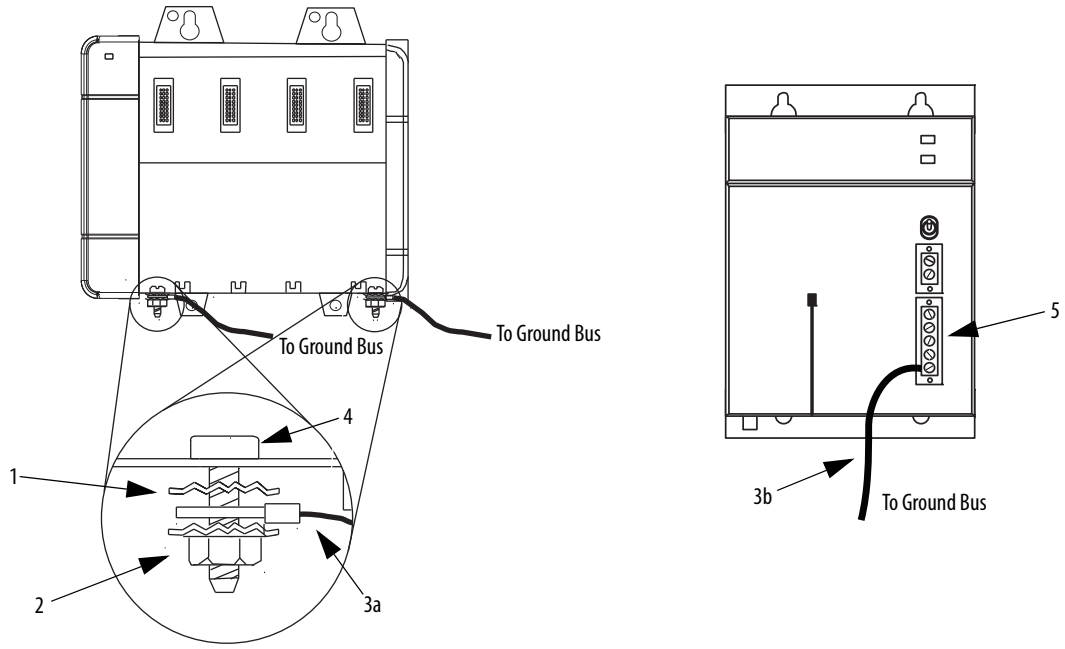
Figure 50 - Protective Earth Ground Connection



IMPORTANT If your application requires the use of the second protective earth-ground terminal stud, use the additional protective earth-ground terminal stud to connect the chassis to the ground bus. Figure 51 depicts the connection of the second protective earth-ground terminal stud.

Item	Description
1	Star washer
2	Nut with captive star washer
3a	Equipment grounding conductor (ground lug with 2.1 mm² [14 AWG] solid or stranded-copper wire rated at 90 °C [194 °F] or greater)
3b	Equipment grounding conductor (2.1 mm² [14 AWG] solid or stranded-copper wire rated at 90 °C [194 °F] or greater)
4	Protective earth-ground terminal stud
5	Wiring terminal block (bottom terminal is protective earth ground)

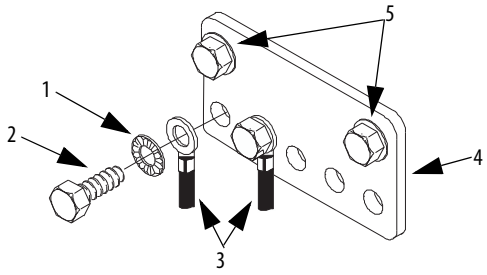
Figure 51 - Dual Protective Earth Ground Connection



Connect the Grounding Conductors to the Ground Bus

Connect the equipment grounding conductors (functional and protective earth ground) directly from each chassis to an individual bolt on the ground bus.

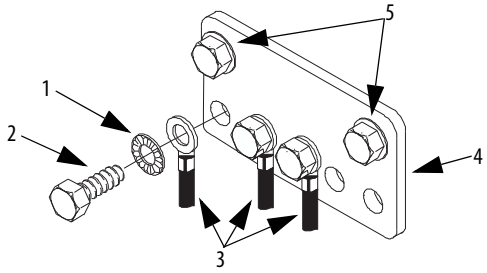
Figure 52 - Ground Bus Connection



Item	Description
1	Flat or star washer
2	Bolt
3	Equipment grounding conductor (from protective and functional earth ground connections)
4	Ground bus
5	Ground bus mounting

Connect the second protective earth ground to the ground bus as shown in Figure 53, if necessary.

Figure 53 - Ground Bus Connection (second Protective Earth Ground)

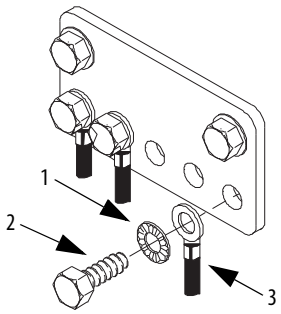


Connect Ground Bus to Grounding-electrode System

Use a grounding-electrode conductor to connect the ground bus to the grounding-electrode system.

At minimum, use 8.3 mm^2 [8 AWG] solid or stranded-copper wire rated at 90 °C [194 °F] or greater for the grounding-electrode conductor to guard against EMI. The National Electrical Code specifies safety requirements for the grounding-electrode conductor.

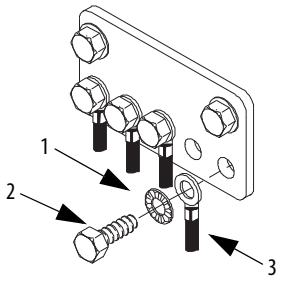
Figure 54 - Grounding-electrode System Connection



Item	Description
1	Flat or star washer
2	Bolt
3	Equipment grounding conductor (ground lug with minimum 8.3 mm^2 [8 AWG] solid or stranded-copper wire rated at 90 °C [194 °F] or greater)

Connect the ground bus as shown in Figure 55 if using a second protective earth ground.

Figure 55 - Grounding-electrode System Connection (second Protective Earth Ground)



Connect the Power

Use the information in the following sections to connect the power.

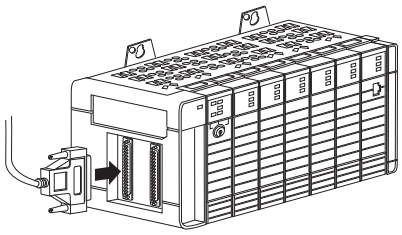
Connect the 1756-CPR2 Cable

Use the 1756-CPR2 cable to connect your redundant power supply to the 1756-PSCA2 chassis adapter.

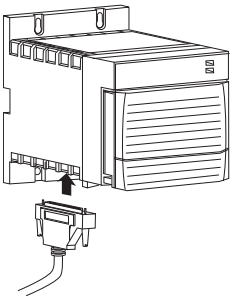
WARNING: If you connect or disconnect the 1756-CPR2 cables while either backplane power source is on, an electrical arc can occur. This could cause an explosion in hazardous location installations. Repeated electrical arcing causes excessive wear to contacts on both the module and its mating connector. Worn contacts may create electrical resistance that can affect module operation.

Be sure that power is removed or the area is nonhazardous before proceeding.

1. Connect the male end of the 1756-CPR2 cable to the 1756-PSCA2 chassis adapter (series C depicted).



2. Connect the female end of the 1756-CPR2 cable to the redundant power supply.



3. Tighten the screws to hold the cable in place.

   Make sure you tighten the screws securely to hold the cable in place for the life of the product.

4. Repeat these steps with the second redundant power supply.

Connect Power to the Redundant Power Supply

WARNING: If you connect or disconnect wiring while the field-side power is on, an electrical 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 1 conductor on any single terminal.

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

Use 2.5 mm^2 (14 AWG) solid or stranded-copper wire 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 0.8 N•m (7 lb•in).

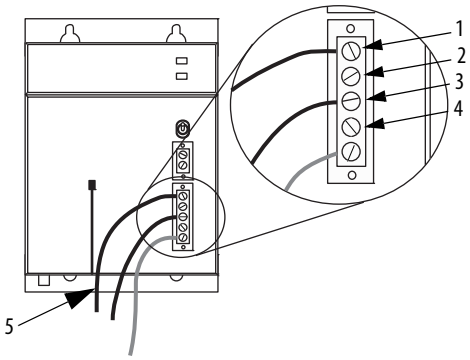
Connect the power as shown in Figure 56.

IMPORTANT The power supplies' voltage input connections are auto-sensing.

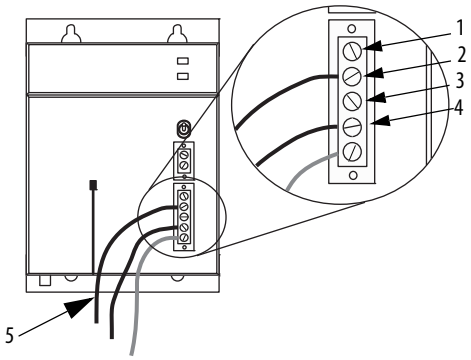
You do **not** use a jumper, for example, a 120/240V AC jumper, when connecting external power to the power supply, as shown in Figure 56.

Figure 56 - Power Connection

1756-PA75R/A (AC)



1756-PB75R/A (DC)



Item	Description, 1756-PA75R/A (AC)	Description, 1756-PB75R/A (DC)
1	L1 (high side of line power)	Not used
2	Not used	DC+ (positive supply)
3	L2 (low side of line power)	Not used
4	Not used	DC- (negative supply return)
5	2.5 mm^2 (14 AWG) solid or stranded-copper wire rated at 90 °C (194 °F), or greater, 1.2 mm (3/64 in.) insulation max	

For recommendations on how to route the wiring in your redundant power supply application, see page 55.

Connect the Solid-state Relay

A solid-state relay on your redundant power supplies can be connected to any compatible monitoring or signaling device. This connection indicates if the supplies are functioning properly.

The relays are closed during standard operation. The solid-state relay contacts open if one of these events occurs:

- One or more of the supplies fail.
  In this case, the contact opens on the failed supply (or supplies), and the input module alerts you to the failure through the controller program.
- The connected redundant power supplies are turned OFF.

When you use the solid-state relay annunciator function, connect a compatible source voltage to a contact terminal. Then connect the other terminal to the monitoring or signaling device.

ATTENTION: Annunciator cable length is less than 10 m (32.8 ft).

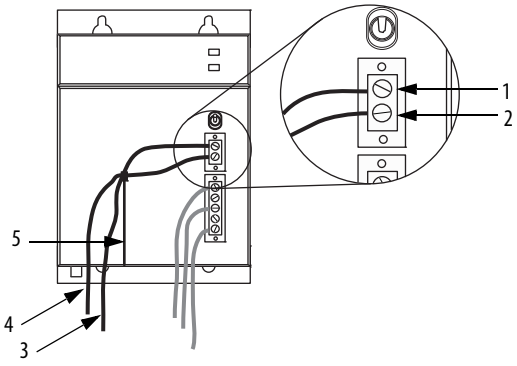
The annunciator output is rated for resistive loads. Do not use it to drive the coil of an electromagnetic relay.

Connect the solid-state relay as shown in Figure 57.

Figure 57 - Solid-state Relay Connection

Configuration 1

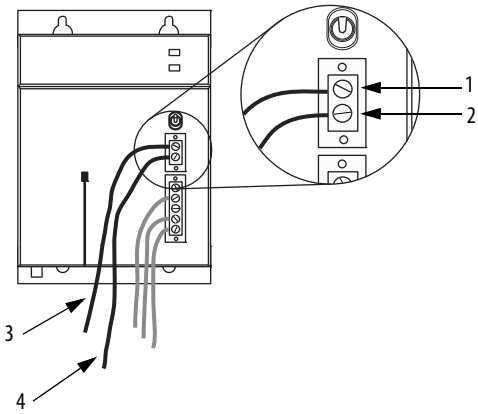
The redundant power supply and the annunciator cable that use different input power sources.



The annunciator wiring must be tucked under the tab at the top of the plastic barrier and routed separately from the power wires.

Configuration 2

Redundant power supply and the annunciator cable that use the same input power source.

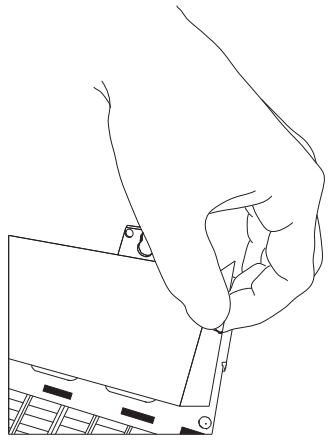


Item	Description
1	Source voltage
2	Annunciator cable to input module
3	0.25…2.5 mm^2 (22…14 AWG) solid or stranded-copper wire rated at 90 °C (194 °F), or greater, 1.2 mm (3/64 in.) insulation max
4	0.25…2.5 mm^2 (22…14 AWG) solid or stranded-copper wire rated at 90 °C (194 °F), or greater, 1.2 mm (3/64 in.) insulation max
5	Plastic barrier

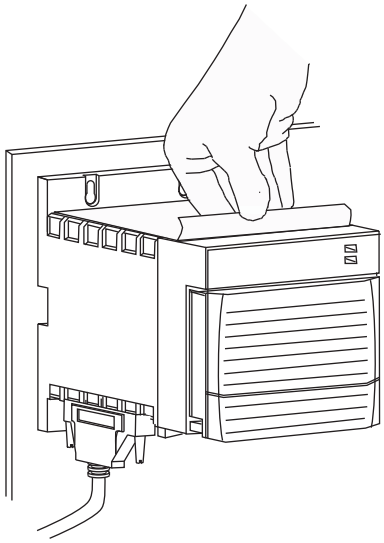
Remove the Protective Label

ATTENTION: Make sure the power supply 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.

Remove the protective label from the chassis (series C chassis shown).

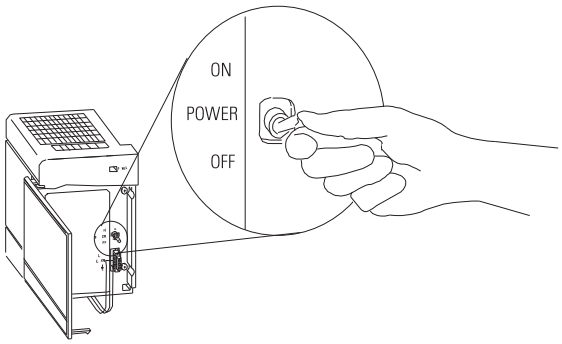


Remove the protective label from the top of the power supply.



Apply Power to the Chassis

Turn on the power.



Input Power Requirements and Transformer Sizing

These graphs show the input power requirements for the power supplies, given the power they are providing to the modules in the chassis.

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

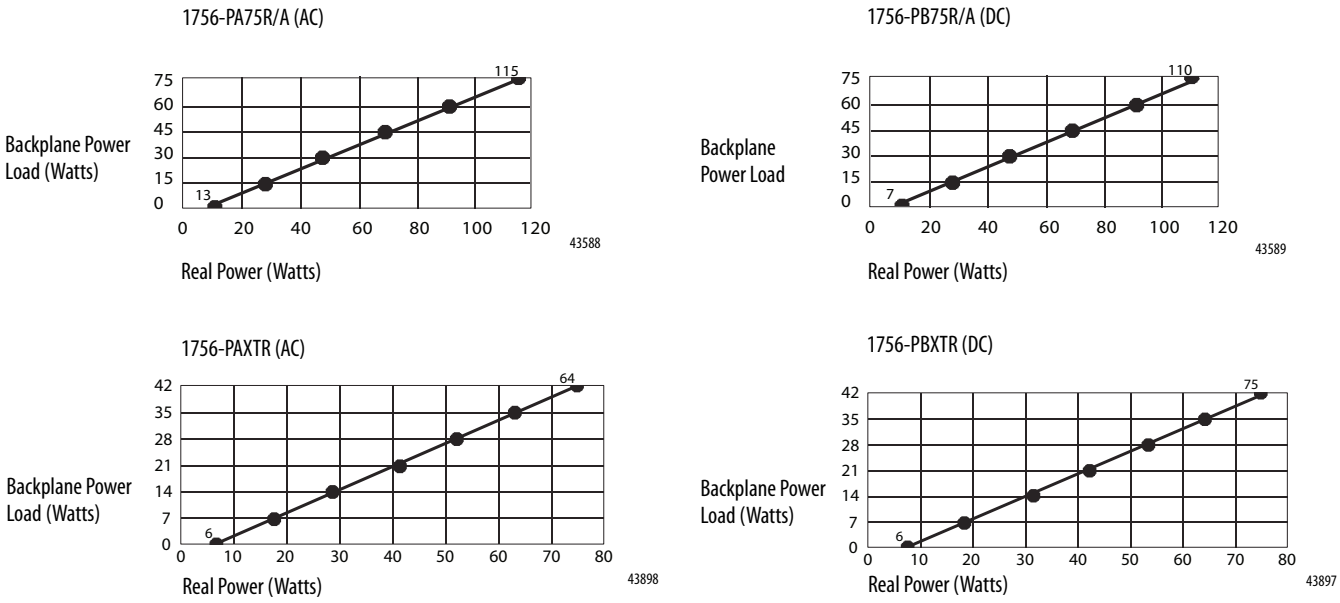
1. Calculate the Backplane Power Load by adding the power draw (in Watts) for all planned modules.

   See the module specification tables in the ControlLogix Selection Guide, publication 1756-SG001, for module power draws.

2. Locate the Backplane Power Load on the graph's vertical (y) axis 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.

Figure 58 - Power Supply Power Requirements

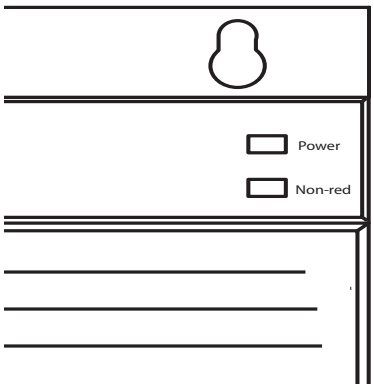


Apparent Power (Watts) = Transformer Load (VA) = Real Power (Watts)

For more information about calculating the required power for your system, see the ControlLogix Selection Guide, publication 1756-SG001.

Troubleshoot the Redundant Power Supplies

The redundant power supplies have a green status indicator for power and an amber status indicator for non-redundancy.



The following table describes how to use the status indicators to troubleshoot your redundant power supplies.

Power Indicator	Non-red Indicator	Description	Take This Action
Solid green	Off	The power supplies are operating properly.	None
Solid green	Solid amber	This power supply is operating properly, but is the only power supply providing power to the chassis adapter.	Check the other power supply.
Off	Solid amber	All possible connections are made, but the power supply is turned off.	Turn the power supply ON. If the power supply does not turn ON, follow these steps. 1. Remove the input power from the power supply 2. Wait 30 seconds 3. Reconnect the input power 4. Turn the power supply ON. If the power supply still does not turn ON, it can require replacement.
Off	Off	Any of the following conditions can apply:	Take the corresponding action:
		The supply is turned OFF.	Turn the power supply ON.
		Line voltage is not within the specified range.	Verify that line power is in the specified range. If the indicators remain OFF, cycle power.
		All connections are made, but input power is not supplied.	Verify that input power is supplied and turn the power supply ON.
		All connections are made, including input power, but the output cable (1756-CPR2) is not connected.	Connect the output cable and turn the power supply ON.
		The power supply is ON but defective.	The power supply can require replacement.

Chassis Adapter Status Indicator

The chassis adapter has a green power status indicator. When the status indicator is solid green, the chassis is receiving power from the redundant power supplies. If the indicator is off, the chassis is not receiving power from the redundant power supplies. See the previous table to troubleshoot the redundant power supplies.

Remove or Replace a Redundant Power Supply

Use this information to remove or replace a redundant power supply.

WARNING: Remove or replace power supplies only when backplane and power supply power are removed or the area is known to be nonhazardous. Removal or replacement of a power supply in a hazardous area can cause an electrical arc across the contacts if backplane power is still applied.

IMPORTANT You can replace one redundant power supply while the other supply is operating in nonredundant mode without affecting chassis operation.

Remove a Redundant Power Supply

Follow these steps to remove the redundant power supply.

1. Turn the redundant power supply OFF.
2. Disconnect the line power source voltage from the redundant power supply and annunciator.
3. Remove the wiring terminal blocks.
4. Unscrew and disconnect the 1756-CPR2 cable.
5. Remove the bottom mounting screws.
6. Loosen the top mounting screws and slide the supply up and off the mounting screws.

Replace a Redundant Power Supply

Follow these steps to replace a redundant power supply.

1. Slide the redundant power supply over the top mounting screws and tighten them.
2. Install the bottom mounting screws.
3. Connect the 1756-CPR2 cable.
4. Install the wiring terminal blocks.
5. Connect the line power source voltage to the redundant power supply and annunciator.
6. Turn the redundant power supply ON.

   When you turn ON the replacement redundant power supply, the connected chassis automatically draws power from the redundant power supplies.

Remove or Replace a Chassis Adapter

Use this information to remove or replace a redundant power supply.

Remove a Chassis Adapter

Follow these steps to remove a chassis adapter.

1. Turn the redundant power supplies OFF.
2. Disconnect the 1756-CPR2 cable.
3. Push the top and bottom locking tabs on the chassis adapter to the side and pull the module off the chassis.

Replace a Chassis Adapter

Align the adapter's circuit board with the card guides on the left side of the chassis and slide the adapter back until it is flush with the front of the chassis.

Notes:

Rockwell Automation Support

Rockwell Automation provides technical information on the Web to assist you in using its products. At http://www.rockwellautomation.com/support you can find technical and application notes, sample code, and links to software service packs. You can also visit our Support Center at https://rockwellautomation.custhelp.com/ for software updates, support chats and forums, technical information, FAQs, and to sign up for product notification updates.

In addition, we offer multiple support programs for installation, configuration, and troubleshooting. For more information, contact your local distributor or Rockwell Automation representative, or visit http://www.rockwellautomation.com/services/online-phone.

Installation Assistance

If you experience a problem within the first 24 hours of installation, review the information that is contained in this manual. You can contact Customer Support for initial help in getting your product up and running.

United States or Canada	1.440.646.3434
Outside United States or Canada	Use the Worldwide Locator at http://www.rockwellautomation.com/rockwellautomation/support/overview.page, or contact your local Rockwell Automation representative.

New Product Satisfaction Return

Rockwell Automation tests all of its products to help ensure that they are fully operational when shipped from the manufacturing facility. However, if your product is not functioning and needs to be returned, follow these procedures.

United States	Contact your distributor. You must provide a Customer Support case number (call the phone number above to obtain one) to your distributor to complete the return process.
Outside United States	Please contact your local Rockwell Automation representative for the return procedure.

Documentation Feedback

Your comments will help us serve your documentation needs better. If you have any suggestions on how to improve this document, complete this form, publication RA-DU002, available at http://www.rockwellautomation.com/literature/.

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

Rockwell Otomasyon Ticaret A.Ş., Kar Plaza İş Merkezi E Blok Kat:6 34752 İçerenköy, İstanbul, Tel: +90 (216) 5698400

www.rockwellautomation.com

Power, Control and Information Solutions Headquarters

Americas: Rockwell Automation, 1201 South Second Street, Milwaukee, WI 53204-2496 USA, Tel: (1) 414.382.2000, Fax: (1) 414.382.4444
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

Publication 1756-IN005D-EN-P - July 2014
Supersedes Publication 1756-IN005C-EN-P - March 2014

Copyright © 2014 Rockwell Automation, Inc. All rights reserved. Printed in the U.S.A.