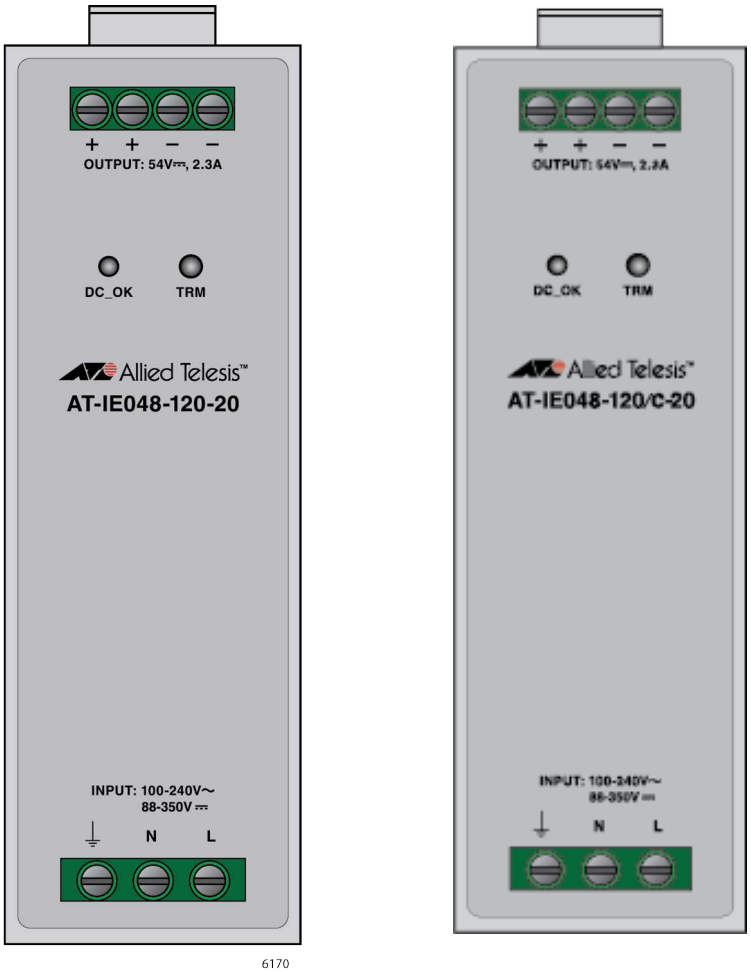
IE048-120

Industrial AC/DC Power Supplies

IE048-120-20

IE048-120/C-20



6170

Installation Guide

613-003144 Rev. A

Electrical Safety and Emissions Standards

This section contains the following:

US Federal Communications Commission

Radiated Energy

Note
This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with this instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Note
Modifications or changes not expressly approved of by the manufacturer or the FCC, can void your right to operate this equipment.

Industry Canada

Radiated Energy

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

VCCI Statement

この装置は、クラスA情報処理装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。VCCI-A

Regulatory Approvals

Compliance Marks

CE, cULus, RCM, TUV

Environmental Compliance

RoHS, China-RoHS, TSCA, SCIP

Safety

UL62368-1 2nd edition
CAN/CSA C22.2 No.62368-1-14 2nd edition
UL 61010-1 3rd edition
UL 61010-2-201 2nd edition
CAN/CSA-C22.2 No. 61010-1 3rd edition
CAN/CSA-C22.2 No. 61010-2-01 2nd edition
EN 62368-1:2014+A11:2017
IEC 62368-1:2014
IEC 61010-1 3.1 edition
IEC61010-2-201 2nd edition

Electromagnetic Immunity

EN 61000-3-2:2014
EN 61000-3-3:2013
EN 61000-4-2:2009
EN 61000-4-3:2006
EN 61000-4-4:2012
EN 61000-4-5:2014
EN 61000-4-6:2014

EN 61000-4-8:2010

EN 61000-4-11:2004

Electromagnetic Emissions

FCC47 CFR Part15 Subpart B, Class A

ICES-003:2020, issue7, Class A

VCCI 32-1, Class A

CISPR32:2015, Class A

EN55032:2015+A11:2020, Class A

EN55011:2016+A2:2021, Class A

RCM AS/NZS CISPR 32:2015, Class A

EN 61000-6-2:2019

EN 55035:2017+A11:2020

Shock

IEC 60068-2-27

Operation shock: 20g, 11ms, half sine, 3 times, 6 angles
Non-operational: 65g, 11ms, half sine, 3 times, 6 angles

Vibration

IEC 60068-2-6

Operational vibration: 10-58Hz, 0.15mm 58-500Hz, 2g, 10 cycles, 3 angles

Operating Temperature Range

-25° to 70°C

Translated Safety Statements

Important: The ✍ indicates that translations of the safety statement are available in the PDF document ***Translated Safety Statements*** posted on the Allied Telesis website at ***alliedtelesis.com/library***.

Übersetzte Sicherheitserklärungen

Wichtig: Das ✍ zeigt an, dass Übersetzungen der Sicherheitserklärung in den **übersetzten** PDF-**Sicherheitserklärungen** auf der Allied Telesis-Website unter ***alliedtelesis.com/library*** verfügbar sind.

Declaraciones de seguridad traducidas

Importante: El 🖋 indica que las traducciones de la declaración de seguridad están disponibles en las **Declaraciones de seguridad traducidas** en PDF publicadas en el sitio web de Allied Telesis en ***alliedtelesis.com/library***.

Consignes de sécurité traduites

Important: Le symbole 🖋 indique que les traductions de la déclaration de sécurité sont disponibles dans le PDF **Traduit des déclarations de sécurité** publiées sur le site Web de Allied Telesis à l'adresse ***alliedtelesis.com/library***.

Dichiarazioni di sicurezza tradotte

Importante: 🖋 indica che le traduzioni della dichiarazione di sicurezza sono disponibili nelle **dichiarazioni di sicurezza tradotte** in PDF pubblicate sul sito Web di Allied Telesis all'indirizzo ***alliedtelesis.com/library***.

Перевод заявлений о безопасности

IВажное замечание: 🖋 указывает на то, что переводы заявления о безопасности доступны в **переведенных заявлениях о безопасности** в формате PDF, размещенных на веб-сайте Allied Telesis по адресу ***alliedtelesis.com/library***.

Contents

Preface

This guide contains the hardware installation instructions for the IE048-120 Industrial AC/DC Power Supplies. The power supply models included in this manual are:

- IE048-120-20
- IE048-120/C-20

The preface contains the following sections:

Safety Symbols Used in this Document

This document uses the following conventions.

Note
Notes provide additional information.

Caution
Cautions inform you that performing or omitting a specific action may result in equipment damage or loss of data.

Warning
Warnings inform you that performing or omitting a specific action may result in bodily injury.

Contacting Allied Telesis

If you need assistance with this product, visit the Allied Telesis web site at **www.alliedtelesis.com/support**.

Chapter 1

Overview

This chapter describes the hardware features of the IE048-120 Power Supplies. The sections in the chapter are listed here:

IE048-120 Power Supplies

The IE048-120 power supply is designed to take AC power and supply DC power to IE series Ethernet switches in industrial environments. The IE048-120 power supply also takes DC power in and supply DC power out with 120 watts continuous power.

Allied Telesis offers two models: IE048-120-20 and IE048-120/C-20. Both models function the same; however, the IE048-120/C-20 model is designed for harsher conditions. Its PCB is applied with conformal coating, which protects against moisture and gaseous pollutants.

Hardware Components

The hardware components on the front panel are identified in Figure 1.

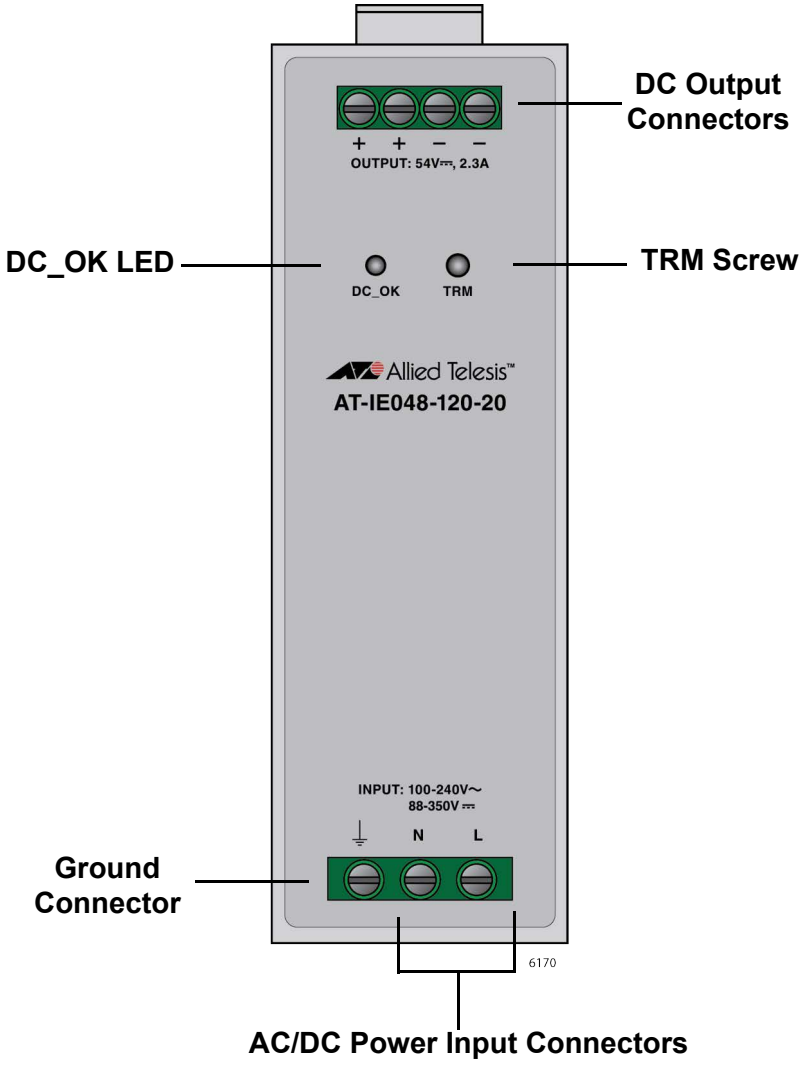


Figure 1. IE048-120 Front Panel

The hardware components on the top panel are shown in Figure 2.

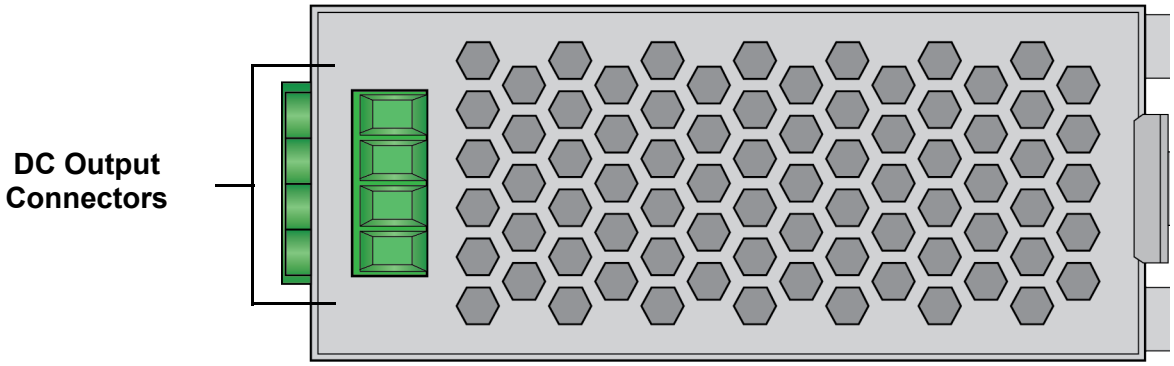


Figure 2. Top Panel

The hardware components on the bottom panel are identified in Figure 3.

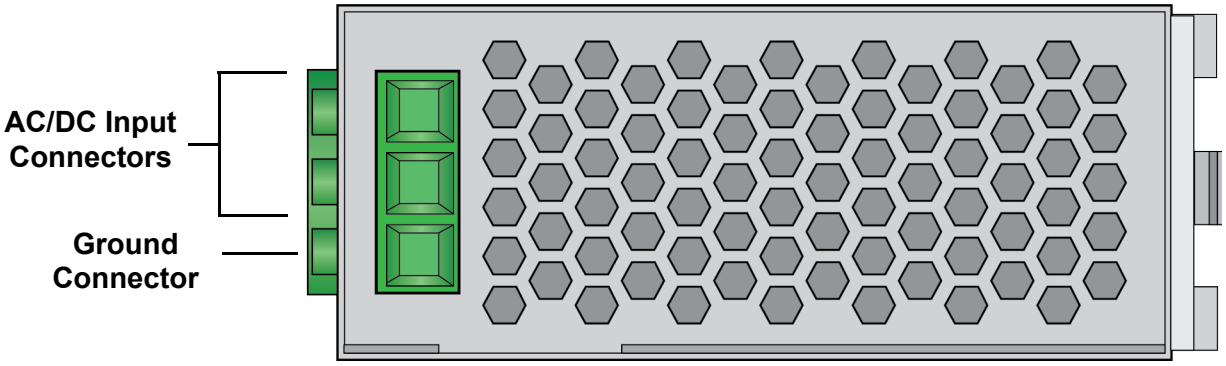


Figure 3. Bottom Panel

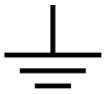
Symbols and Text

The hardware components on the power supply unit are labeled with symbols and text on the unit.

Caution
The symbols and text printed on the unit are official information and equivalent to documented information in other forms.

Table 1 describes the symbols used on the power supply unit.

Table 1. Symbols

Symbol	Meaning
	Earth; ground
	Class II equipment with functional earthing for IEC 62368-1
	Direct current
	Alternating current

AC/DC Input Connectors

You can connect AC power or DC power source to the AC/DC Input Connectors.

AC Power Input

Power the IE048-120 Power Supply with AC power on the two N (Neutral) and L (Live) Input connectors on the front panel. The AC input power range is 90V to 264V.

See Table 2 for the wire specifications for the AC/DC input connectors.

Table 2. Wire Specifications for the AC N and L Input Connectors

Wire	Description
Solid Wire	AWG 20 to AWG 10 (Diameter 0.8 to 2.6mm)
Stranded Wire	AWG 20 to AWG 10 (Diameter 0.5 to 5.2mm; conductor diameter more than 0.18mm)
Insulation Strip Length	8mm

Warning
Never handle live AC power wires. Always verify that the AC circuit is powered off before connecting or disconnecting AC power wires from the AC circuit breaker or power supply. E 130

DC Power Input

Power the IE048-120 power supply with DC power on the two N (Neutral) and L (Live) input connectors on the front panel. Connect the Positive (+) input to the L (Live) connector and the Negative (-) input to N (Neutral) input connector on the front panel.

The DC input power range is DC88V to DC350V. The DC input power must be generated by a secondary circuit of an Overvoltage Category II device.

Warning
Never handle live DC power wires. Always verify that the DC circuit is powered off before connecting or disconnecting DC power wires from the DC circuit breaker or power supply.

Note
A protective device against the AC power should be rated for a maximum of 20A.

DC Output Connectors

The power supply has four DC output connectors on the front panel, two positive (+) and two negative (-).

Here are the connector guidelines:

- You can use either of the positive connectors with either of the negative connectors. (The positive connectors are connected internally in the power supply as are the two negative connectors.)
- You can adjust the DC output of the connectors with the TRM screw on the front panel. The range is 51V to 57V. The default is 54V. See “TRM Screw” on page 18.
- Allied Telesis recommends testing the output voltages on the output connectors with a voltmeter and adjusting the output voltage with the TRM screw, if necessary, before connecting devices to the power supply. Testing is to ensure that the power supply provides the correct DC voltage to the devices.

The wire specifications for the DC output connectors are listed in Table 3.

Table 3. Wire Specifications for the DC Output Connectors

Wire	Description
Solid Wire	AWG 20 to AWG 10 (Diameter 0.8 to 2.6mm)
Stranded Wire	AWG 20 to AWG 10 (Diameter 0.5 to 5.2mm; Conductor diameter more than 0.18mm)
Insulation Strip Length	8mm

TRM Screw

You can adjust the output DC voltage using the TRM screw as shown in Figure 1 on page 14. The DC output connectors on the power supply have a power range of 51V to 57V. The default is 54V.

Here are the guidelines:

- A voltmeter is required to adjust the DC output voltage.
- You should verify and adjust output voltage before connecting devices to the power supply.
- The TRM screw configures the voltages on both sets of DC output connectors together. You cannot set the connectors separately.
- See the installation guide of a device to be powered for input power requirements.

LED

The status LED is defined in Table 4.

Table 4. Status LED

LED	State	Description
DC_OK	Off	The power supply is powered off or has shut down.
	Green	The power supply is operating normally.
	Amber	The output voltage is low compared to the set voltage. See Table 12 on page 54.
	Flashing Amber	The output is overloaded.

Features

Here are the main features of the IE048-120 Power Supplies:

- ❒ Maximum 120W DC output power
- ❒ AC input power of 100V to 240V
- ❒ AC input power range of 90V to 264V
- ❒ DC input power range of DC88V to DC350V
- ❒ Adjustable DC output range of 51V to 57V
- ❒ Default DC output 54V
- ❒ LED for the operation
- ❒ DIN rail bracket installation
- ❒ Operating temperature range of -25°C to 70°C
- ❒ Electromagnetic Susceptibility (EMS) suitable for industrial applications
- ❒ High efficiency: 95% @220Vac
- ❒ Protection: output over-current, output over-voltage

Note
The DC output power of the IE048-120 Power Supply is affected by the input voltage and ambient temperature. See “Derating Graphs - Operating Properties and Ambient Temperature” on page 56 for the derating curve.

Note
The power supplies do not support parallel, backup, or redundancy operation.

Note
AC power input must not exceed the input voltage range. The IE048-120 power supply is a device of Overvoltage Category II.

DIN Rail Installation

The power supply must be installed on a DIN rail. The product comes with a standard EN60715 TH 35 DIN rail clip on its back panel, for 35x7.5mm or 35x15mm top hat DIN rails.

To install the product on a wall, install a short length of DIN rail on the wall and then affix the power supply on the rail. Allied Telesis sells packets of five 35x7.5mm DIN rails for wall installations. Refer to Figure 4 and the Allied Telesis web site for details.

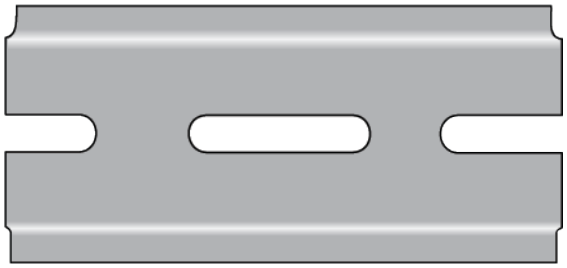


Figure 4. DIN Rail

Network Devices

The power supply supports a variety of products from Allied Telesis, including the IE Series of Industrial Ethernet Switches. For a complete list, refer to the Allied Telesis web site.

The power supply has a maximum DC output power of 120W. The output power can be less, depending on input voltage and ambient temperature. Refer to the “Derating Graphs - Operating Properties and Ambient Temperature” on page 56.

The product can support two devices simultaneously, up to its maximum DC output power. Your installation plans should include determining the power requirements of the individual devices before connecting them to the power supply. Ensure that the total power requirements do not exceed the available power of the product.

Note
The power supply does not alert you if the devices to be connected to the power supply exceed its maximum output power.

Chapter 2

Beginning the Installation

The chapter contains the following sections:

Reviewing Safety Precautions

Please review the following safety precautions before beginning the installation procedures.

Note
Safety statements that have the ☞ symbol are translated into multiple languages in the *Translated Safety Statements* document at **www.alliedtelesis.com/library**.

Caution
The protection provided by the equipment may be impaired if the equipment is used in a manner not specified by Allied Telesis, Inc.

Warning
To prevent electric shock, do not remove the cover. No user-serviceable parts inside. This unit contains hazardous voltages and should only be opened by a trained and qualified technician. To avoid the possibility of electric shock, disconnect electric power to the product before connecting or disconnecting the LAN cables. ☞ E1

Warning
Do not work on equipment or cables during periods of lightning activity. ☞ E2

Note
An appropriate disconnect device must be provided as part of the building or enclosure installation.

Warning
This equipment must be earthed. The ground screw on the unit must be connected to a properly earthed bonding point. ☞ E120

Warning
When installing this equipment, always be sure to connect the frame ground wire first. When removing the equipment, always be sure to disconnect the frame ground wire last. ☞ E11

Warning
Check to see if there are any exposed copper strands coming from the installed wires. When the installation is done correctly there should be no exposed copper wire strands extending from the terminal block. Any exposed wiring can conduct harmful levels of electricity to persons touching the wires. E12

Note
Ground resistance from the building primary bonding point to earth should be less than 5 ohms.

Caution
Air flow around the unit and through the cooling fins must not be restricted. E20

Note
All Countries: Install product in accordance with local and National Electrical Codes. E8

Warning
Only trained and qualified personnel are allowed to install or replace this equipment. E14

Caution
Circuit Overloading: Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern. E21

Caution
The unit does not contain serviceable components. Please return damaged units for servicing. E42

Caution
An Energy Hazard exists inside this equipment. Do not insert hands or tools into open chassis slots or plugs. E44

Warning
This equipment shall be installed in a Restricted Access location. E45

Warning
An operational unit can be hot. Exercise caution when handling with unprotected hands. E125

Warning
Per NEC section 800.90, all exposed cables, service wires, or drops entering a building must have primary over-voltage protection if they are classified as exposed plants. E121

Warning
The device must be installed in a fire protection enclosure when installed on walls of combustible material (e.g., wood). Additionally, the floor area directly below the power supply should be noncombustible (e.g., metal or concrete) and be free of combustible material (e.g., paper, plastic, or wood). E134

Warning
Never handle live AC power wires. Confirm that the AC circuit breaker is powered off before attaching the wires to the circuit break or power supply. Always connect the wires to the power supply first and then to the AC circuit breaker. E135

Warning
Do not handle live DC power wires. Connect the wires to the powered device first and then to the power supply. E136

Note
Allied Telesis does not warrant against lightning or power surges damaging the device. Such damage will be the responsibility of the equipment owner.

Safety Precautions When Working with Electricity

Review the following additional safety guidelines before beginning the installation procedure.

- ❒ Disconnect all power by turning off the circuit breakers before installing or removing the device or when working with the power supplies.
- ❒ Do not work alone if potential hazards exist.
- ❒ Never assume that the power is disconnected from a circuit; always check the circuit.
- ❒ Inspect the work area carefully for possible hazards, such as moist floors, ungrounded power extension cables, frayed power cord, or missing safety grounds.

If an electrical accident occurs, proceed as follows:

- ❒ Use caution; do not become a victim yourself.
- ❒ Turn off power to the system.
- ❒ If possible, send another person to get medical aid. Otherwise, access the condition of the victim and then call for help.
- ❒ Determine if the person needs rescue breathing or external cardiac compressions and take appropriate action.

Reviewing Site Requirements

Observe the following requirements when choosing a site for the device:

General Site Requirements

Listed below are general site requirements:

- ❒ The power supply must be installed indoor only.
- ❒ You must install the power supply in a restricted access area.
- ❒ You must install the power supply on a DIN 35x7.5mm or 35x15mm top hat DIN rail.
- ❒ Do not operate the power supply on a table, desk, or shelf.
- ❒ The site should allow for easy access to the connectors on the front, top and bottom of the device, so that you can easily connect and disconnect cables, and view the LED.
- ❒ The power supply should be located near the devices to be powered in order to keep the DC power wires as short as possible to minimize voltage loss.
- ❒ The site should not expose the device to moisture or water.
- ❒ The site should be a dust-free environment.
- ❒ Do not place objects on top of the power supply.
- ❒ Mounting orientations affect maximum operating temperature capability. The power supply must be installed vertically.
- ❒ Electromagnetic interference might occur between switches and other devices when multiple switches are powered by a single DC power supply. This can be addressed by installing clamp-on ferrite beads on the DC power cables, between the DC power supply and switches.
- ❒ The site should include dedicated power circuits or power conditioners to supply reliable electrical power to network devices.

Indoor Enclosure Requirements

The power supply requires an enclosure for safety purposes.

The following are enclosure requirements:

- ❒ Safety must be verified when the installation is completed.
- ❒ The power supply must be installed in a UL-listed or Nationally Recognized Test Lab (NRTL) enclosure when used in Measurement, Control, or Laboratory environments.

Warning
The device must be installed in a fire protection enclosure when installed on walls of combustible material (e.g., wood). Additionally, the floor area directly below the power supply should be non-combustible (e.g., metal or concrete) and be free of combustible material (e.g., paper, plastic, or wood). E134

- Verify that the enclosure has adequate airflow so that unit does not overheat.
- Select an enclosure that is large enough for the switch, power supply, and all other included equipment.
- The enclosure size must be determined by considering multiple factors, including the ambient temperature, total heat generated by the installed equipment, sealed or unsealed enclosure type, enclosure material, paint color, mounting method (wall, pole, ground, etc.), and sun load. The smaller enclosure size you choose, the higher the risk of overheating the product faces.

  If the product overheats in an enclosure that was built without taking into account these factors, the warranty of the product might be voided. Consult Allied Telesis when assistance is needed.
- The enclosure's BTU/hour rating must be higher than the total BTU/hour values of equipment installed in the enclosure, over the expected operating temperature range. For the operating temperature ratings, refer to Table 13 on page 55.
- Be sure to review the enclosure's installation guide for rules and restrictions on site requirements, and to follow all guidelines and safety warnings.

Grounding Requirements

Here are the requirements for grounding the power supply:

- The power supply and switches must be properly connected to a protective earth ground.
- The power supply and switches must be individually grounded to the grounding conductor. Do not daisy-chain the ground wires.
- If you install the device in a metal enclosure, the enclosure must be properly grounded to a protective earth ground following local electrical codes and the instructions in the manufacturer's installation guide.
- Recommendations for ground resistivity are listed in Table 5 on page 30.

Table 5. Ground Resistivity Recommendations

Level	Recommendation
Best Practice	<5 ohms
Acceptable	5 to 15 ohms
Marginal	15 to 25 ohms
Non-compliant	>25 ohms

Lightning Protection Requirements

Lightning strikes the ground and follows the paths of least impedance to cause damage. To provide an effective lighting protection system, you must put the following fundamental measures in place:

- ❒ Install surge protectors. Every service entrance should have surge protection to stop the intrusion of lightning from outside.
- ❒ Implement bonding. Eliminate the opportunity for lightning to side-flash internally. The bonding resistance between any termination point and the related earthing rod should not exceed 0.01 ohms.
- ❒ Install grounding electrode system. The system should efficiently move the lightning to its final destination away from the structure and its contents.The resistance of the common grounding electrode must not exceed 5 ohms.
- ❒ Install cable conductors. Cable conductors route lightning current over and through the construction, without damage, toward the grounding electrode system.
- ❒ Use appropriate grounding. Systems without appropriate grounding can experience either complete system failures or intermittent problems that are hard to diagnose. Improper installation of electrical grounding components can make the components work ineffectively. Installing a system with the proper grounding equipment and following proper installation guidelines can reduce potential down time as well as costly repairs to system electronics.

Note
The users of the plant or those responsible for the installation should apply the necessary measures (e.g., shielding, bonding, and grounding protection) to ensure that the interference voltages caused by lighting strikes do not exceed the available immunity level.

Chapter 3

Installing the Power Supply

The chapter contains the following sections:

Power Supply Orientations

The power supply is cooled by convection airflow. The airflow direction is bottom to top. Install the power supply vertically to promote the best possible airflow and cooling. See Figure 5.

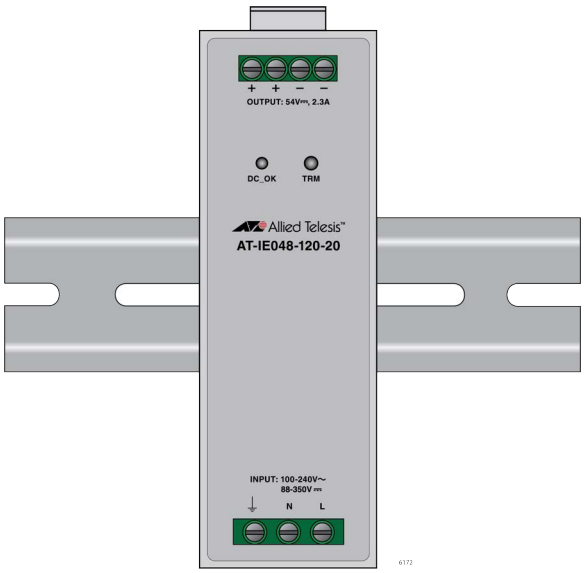


Figure 5. Vertical Installation

Do not install the power supply up-side-down. This might cause the power supply to overheat from insufficient convection cooling. See Figure 6.

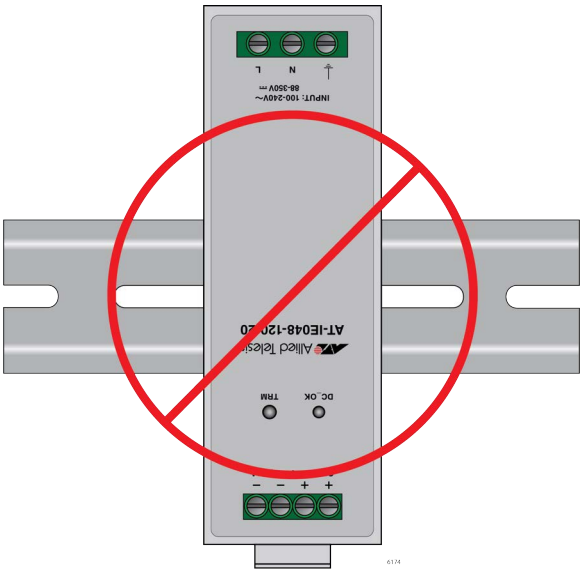


Figure 6. Unsupported DIN Rail Installation

IE048-120 Power Supply Installation Guide

Do not operate the power supply on a table, desk, or shelf. See Figure 7.

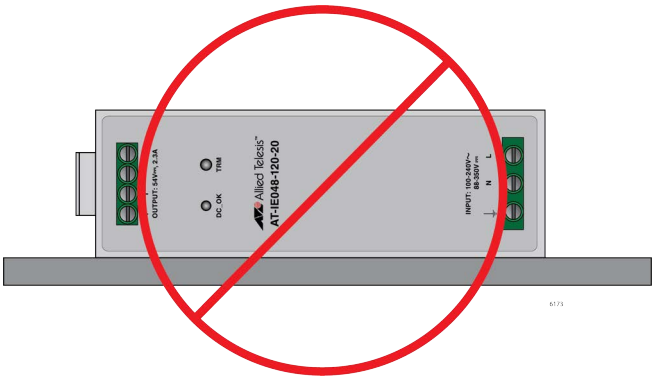


Figure 7. Unsupported Table, Desk, or Shelf Installation

Allow for sufficient space for cooling between the power supply and adjacent objects or devices. Allied Telesis recommends a minimum space of 25mm between the top and bottom of the power supply and adjacent objects. Allied Telesis also recommends minimum spaces of 15mm on the left and right sides when adjacent objects are non-heating (e.g., walls or cabinets) and 50mm for adjacent heating sources (e.g., switches, routers, or other power supplies). See Figure 8.

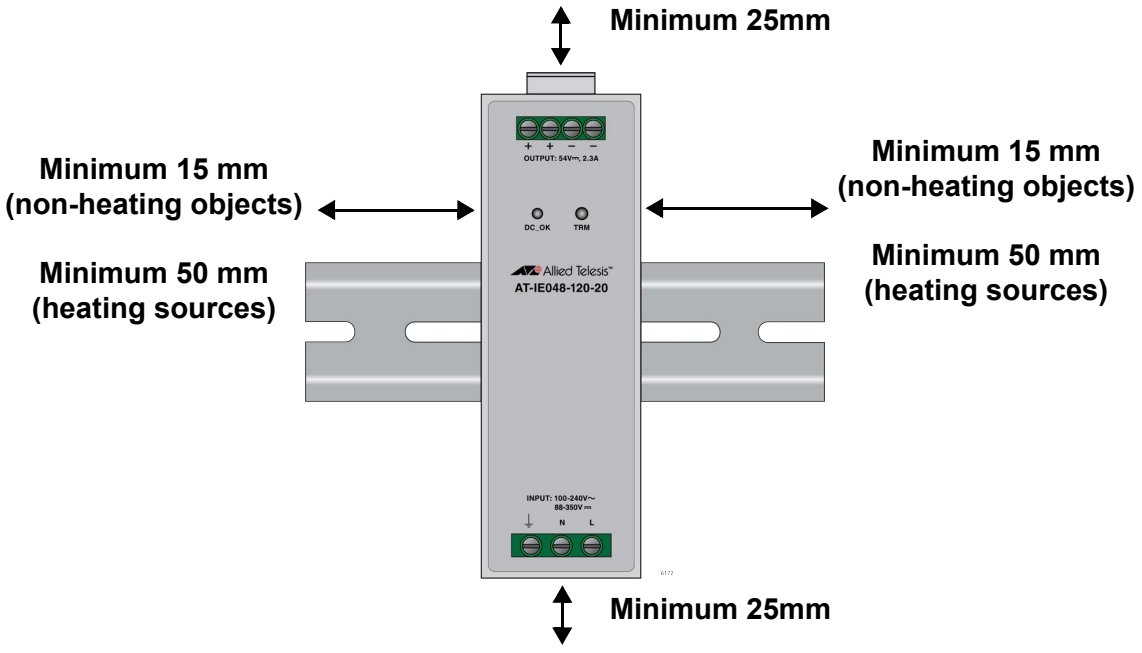


Figure 8. Minimum Spacing Requirement

Power and Control Wires Guidelines

The wire specifications for the connectors on the power supply are listed in Table 6.

Table 6. Wire Specifications

Connector	Wire	Description
AC/DC Input Connectors (N - Neutral and L - Live	Solid Wire	AWG 20 to AWG 10 (Diameter 0.8 to 2.6mm)
	Standard Wire	AWG 20 to AWG 10 (Diameter 0.5 to 5.2mm; Conductor diameter more than 0.18mm)
	Insulation Strip Length	8mm
Ground Wire	Solid Wire	Minimum AWG 16 (Diameter 1.3mm)
	Insulation Strip Length	8mm
DC Output Connectors	Solid Wire	AWG 20 to AWG 10 (Diameter 0.8 to 2.6mm)
	Standard Wire	AWG 20 to AWG 10 (Diameter 0.5 to 5.2mm; Conductor diameter more than 0.18mm)
	Insulation Strip Length	8mm

Listed here are guidelines to preparing power and control wires:

- ❒ Do not strip more wire insulator than specified in Table 6.
- ❒ Keep the wires as short as possible to avoid unnecessary power loss.
- ❒ When using stranded wire, always tightly wrap the wire with your fingertips. This is to prevent loose strands from touching adjacent wires and causing electrical shorts. See Figure 9.

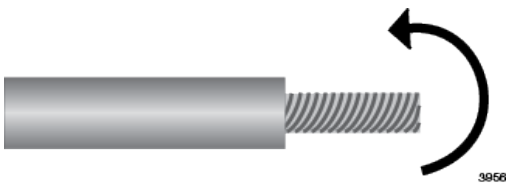


Figure 9. Ripping Wire Strands

- ❒ For added protection against loose strands, tin stranded wires with solder or use electric wire ferrules.
- ❒ Do not route wires on the floor or other areas where they might pose a hazard.
- ❒ After installing wires, visually inspect them for exposed wires or loose wire strands. See Figure 10.

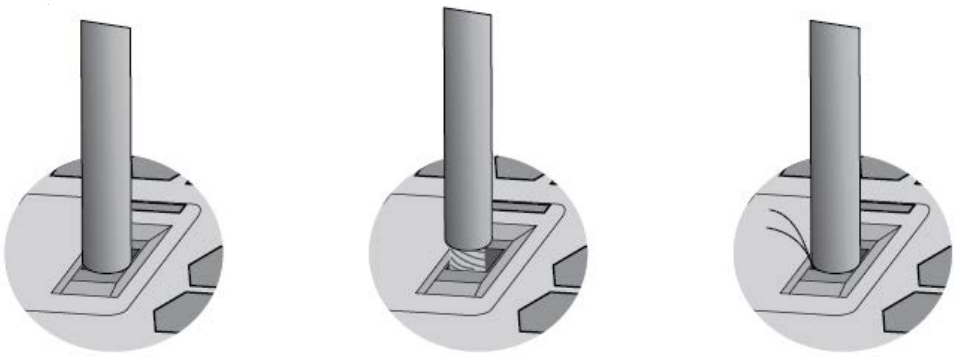


Figure 10. Verifying Wire Installation

Warning
Check to see if there are any exposed copper strands coming from the installed wires. When the installation is done correctly there should be no exposed copper wire strands extending from the terminal block. Any exposed wiring can conduct harmful levels of electricity to persons touching the wires. E12

Installing the Power Supply on a DIN Rail

The IE048-120 Power Supply comes with a DIN rail bracket on the back panel for 35x7.5mm or 35x15mm rails. Review the following guidelines before installing the power supply:

- Depending on the installation site, it may be easier to wire the connectors before installing the power supply on the DIN rail. For instructions, begin with “Connecting the Ground Wire” on page 38.
- To install the power supply on a concrete, metal, or other noncombustible wall, install a short length of DIN rail on the wall. Allied Telesis sells packets of five 35x7.5mm DIN rails for wall installations. See Figure 5 on page 32 and the Allied Telesis web site for details.

Warning
The device must be installed in a fire protection enclosure when installed on walls of combustible material (e.g., wood). Additionally, the floor area directly below the power supply should be noncombustible (e.g., metal or concrete) and be free of combustible material (e.g., paper, plastic, or wood). E134

To install the power supply on a DIN rail, place the upper notch on the bracket over the top rail edge (A) and push the lower edge of the power supply until the bracket snaps onto the rail (B). See Figure 11.

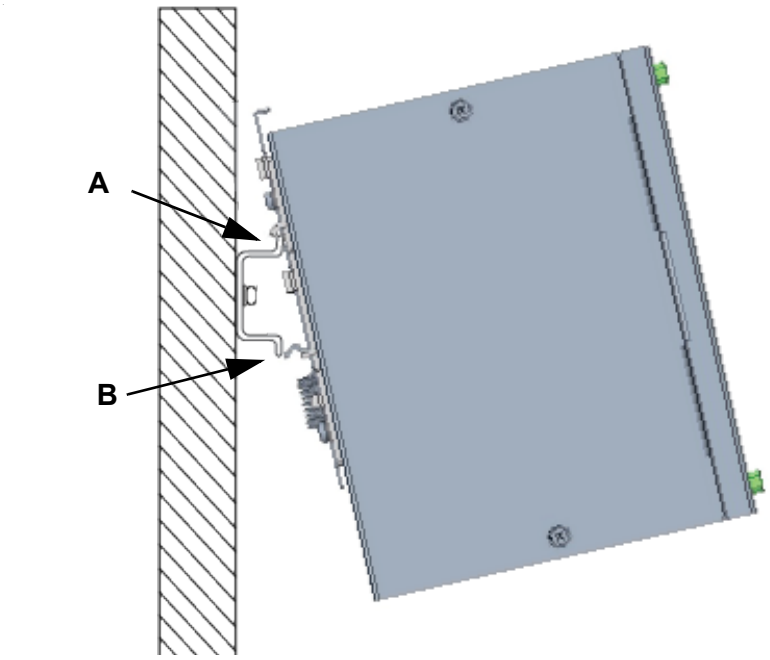


Figure 11. Installing the Power Supply on a DIN Rail

Visually inspect the bracket to verify that the DIN rail is now fitted into the top and bottom bracket slots.

Note
Allied Telesis recommends installing DIN rail end clamps to the sides of the device to prevent damage or network traffic loss from vibration or shock. End clamps are not available from Allied Telesis.

Connecting the Ground Wire

This section contains the procedure for installing the ground wire.

Warning
When installing this equipment, always be sure to connect the frame ground wire first. When removing the equipment, always be sure to disconnect the frame ground wire last. E11

The procedure requires the following items:

- One ground wire. See Table 6 on page 34 for the specifications.
- Flat-head screwdriver (not provided).
- Wire insulator stripper (not provided).

To install the ground wire, perform the following procedure:

1. Prepare an adequate length of wire by stripping 8mm of insulation from one end.
2. Loosen the ground screw on the front panel of the power supply and insert the ground wire in the connector on the bottom panel. See Figure 12 on page 39.
3. Tighten the ground screw to secure the ground wire to the power supply. (Tightening torque: 1Nm)
4. Visually inspect the wire for exposed wire and loose strands. See Figure 10 on page 35.
5. Connect the other end of the ground wire to the building's protective earth.

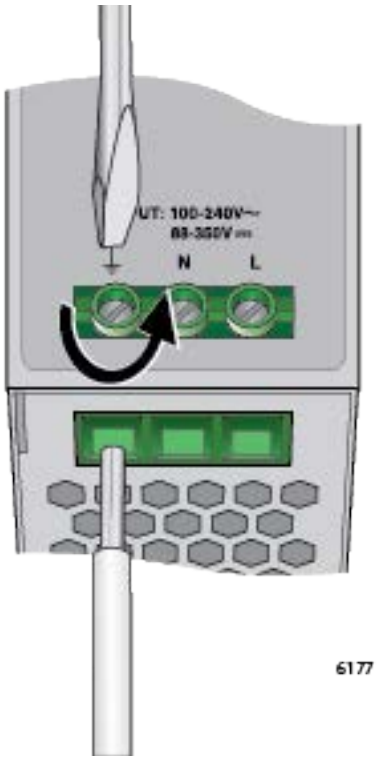


Figure 12. Installing the Ground Wire

Connecting the AC Power Wire

The procedure requires the following items:

- ❒ Two AC power wires. Table 6 on page 34 for the specifications.
- ❒ Flat-head screwdriver (not provided).
- ❒ Wire insulator stripper (not provided).

Note
When selecting and installing AC power wires, be sure to follow all industry rules, restrictions, and guidelines that apply to your locale, such as insulator color, length, and routing.

Warning
Never handle live AC power wires. Confirm that the AC circuit breaker is powered off before attaching the wires to the circuit break or power supply. Always connect the wires to the power supply first and then to the AC circuit breaker. E135

To attach the AC power wires to the power supply, perform the following procedure:

1. Verify that the AC circuit breaker is powered off.
2. Loosen the two N (Neutral) and L (Live) screws on the front panel of the IE048-120 Power Supply.
3. Insert the wires into the connectors on the bottom panel. See Figure 13 on page 41.
4. Tighten the N and L screws to the secure the wires to the power supply. (Tightening torque: 1Nm)
5. Visually inspect the wires for exposed wires and loose strands. See Figure 10 on page 35.
6. Connect the wires to the AC circuit breaker.
7. To test and adjust the voltage on the DC output connectors, go to “Adjusting the Voltage on the DC Output Connectors” on page 42. Otherwise, go to“Wiring the DC Output Connectors to Devices” on page 43.

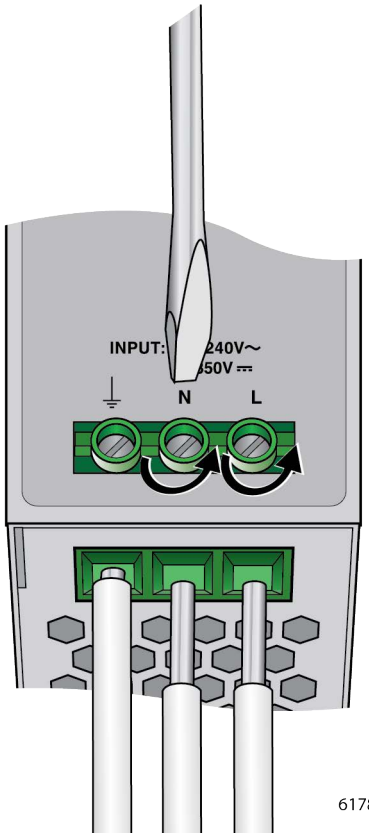


Figure 13. Installing the AC Power Wires

Adjusting the Voltage on the DC Output Connectors

This procedure explains how to verify and adjust the output voltage on the DC output connectors with the TRM screw on the front panel. The range is 51V to 57V. The default is 54V. Perform this procedure before connecting devices to the power supply to verify that the power supply is supplying the correct voltage.

The following procedure assumes you have already connected the power supply to an AC power source. For instructions, see “Connecting the AC Power Wire” on page 40.

To verify and adjust the output voltage on the DC output connectors, perform the following procedure:

1. Turn on the AC circuit breaker to power on the power supply.
2. Connect a volt meter to one positive and one negative DC Output connector on the front panel.
3. Test and adjust the output voltage.

   To increase the voltage, turn the TRM screw clockwise. To decrease it, turn the screw counterclockwise.
4. Remove the volt meter.
5. Go to “Wiring the DC Output Connectors to Devices” on page 43.

Wiring the DC Output Connectors to Devices

Connecting a device to the IE048-120 Power Supply requires the following items:

- ❒ Two DC power wires. See Table 6 on page 34 for the specifications.
- ❒ Flat-head screwdriver (not provided).
- ❒ Wire insulator stripper (not provided).

Warning
Do not handle live DC power wires. Connect the wires to the powered device first and then to the power supply. E136

Note
Connecting more than two devices to the power supply requires a power distribution system, such as DC power bus bars. This guide does not explain how to install power distribution systems. Consult with a qualified electrician.

Note
The power supply does not support parallel, backup, or redundancy operation.

Note
The DC output connectors must be connected to the DC input of a device classified as an SELV system.

To connect a device to the DC Output connectors, perform the following procedure:

1. Prepare adequate lengths of cables by stripping 8mm of insulation from the ends.
2. Connect the DC power wires to the DC positive and negative connectors on the device. Refer to the device's installation guide for instructions.
3. Loosen the screws for one positive (+) connector and one negative (-) connector on the front panel of the power supply.
4. Insert the wires into the connectors on the top panel.

The positive connectors are connected internally in the power supply. The negative connectors are also connected internally. You can use either of the positive connectors with either of the negative connectors. See Figure 14 on page 44.

Caution

Do not crossover the wires. Be sure to connect the positive connector on the power supply to the positive connector on the powered device, and the negative connector on the power supply to the negative connector on the powered device. E137

5. Tighten the screws to secure the wires (Tightening torque: 1Nm).
6. Visually inspect the wires for exposed wires and loose strands. See Figure 10 on page 35.
7. To connect a second device to the power supply, repeat this procedures.

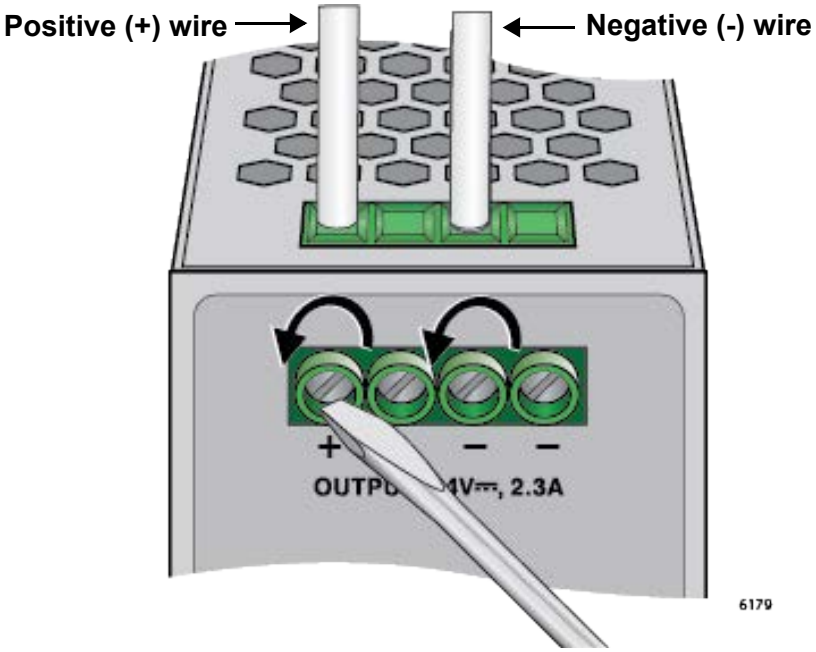


Figure 14. Installing the DC Output Power Wires

Verifying the Power Supply

To verify the power supply and devices to be powered, perform the following procedure:

1. If the power supply is powered off, turn on the AC circuit breaker.
2. Inspect the DC_OK LED on the front panel.

   The DC_OK should be solid green.
3. Wait for the devices to power on and initialize their management software.
4. Examine the devices' LED to verify that they are operating normally.

   See the devices' installation guides for LED descriptions.
5. For Power over Ethernet (PoE) switches, check the power budgets for powered devices.

   Start management sessions and display their power budgets. See their installation or management software user guides for instructions.

   For IE series Ethernet switches from Allied Telesis, the `SHOW POWER-INLINE` command displays the power budgets on the switches.

Chapter 4
Troubleshooting

This chapter provides suggestions on how to troubleshoot the IE048-120 Power Supply should a problem occur.

> **Note**
> For further assistance, contact Allied Telesis at **www.alliedtelesis.com/contact**.

Problem 1: The DC_OK LED is off.

Possible causes of this state are listed here:

- The AC power source of the power supply is turned off or has a technical problem.
- Positive and negative voltages on the DC Output connectors are shorted.
- The power supply has a technical problem.
- Voltage from the AC power source is decreasing.

Solutions: Try the following:

- Verify that the AC circuit breaker is On.
- Try connecting another device to the AC circuit breaker to verify that it has power.
- Measure the output voltage on the AC circuit breaker to confirm that it is within the supported range of the power supply. Refer to “Power Specifications” on page 53.
- Verify that the power supply is installed vertically and that there is adequate spacing between it and adjacent devices. Refer to “Power Supply Orientations” on page 32.
- Power cycle the power supply by powering off and on the AC circuit breaker.
- Try replacing the power supply.

Problem 2: The DC_OK LED is amber.

DC power on the DC Output connectors is decreasing. Here are possible causes of this state:

- ❒ The power supply has a technical problem.
- ❒ The power wires are not installed correctly.
- ❒ The device has a technical problem.

Solutions: Disconnect all the device/devices from the DC Output connectors and see the DC_OK LED status. Try the following according to the LED status:

- ❒ The DC_OK LED is off:
  - See “**Problem 1:** The DC_OK LED is off.” on page 47.
- ❒ The DC_OK LED is green:
  - Connect again the DC power wires from the device to the DC positive and negative connectors on the power supply.
  - Verify that the device is connected to one positive and one negative DC output connector on the power supply.
  - Verify that the power wires are properly wired and not crossed over. The positive DC output connector on the power supply has to connect to the device’s positive connector, and the negative DC output connector on the power supply has to connect to the device’s negative connector.
  - If the wires are all installed correctly, try replacing the device. If the new device works, then the problem is with the first device.
- ❒ The DC_OK LED is amber:
  - Measure the output voltage from the AC circuit breaker to confirm that it is within the supported range of the power supply. Refer to “Power Specifications” on page 53.
  - Verify that the power supply is installed vertically and that there is adequate spacing between it and adjacent devices. Refer to “Power Supply Orientations” on page 32.
  - Measure the ambient temperature of the site. High temperatures can cause a decrease in DC output power. Refer to “Derating Graphs - Operating Properties and Ambient Temperature” on page 56.
  - Try replacing the power supply.

Problem 3: The DC_OK LED is flashing amber.

Possible causes of this state:

- ❒ The power output is overloaded.
- ❒ The AC power source of the power supply has a technical problem.
- ❒ The power supply has a technical problem.

Solutions: Try the following:

- ❒ Verify that the positive and negative power wires are securely connected to both the power supply and device.
- ❒ Verify that the total power requirement of PoE powered devices does not exceed the switch's maximum power budget.
- ❒ Verify that the power supply has not reached its maximum output of 120W.

Problem 4: The IE048-120 Power Supply is not supplying power to a device.

Solutions: Try the following:

- ❒ Verify that the AC circuit breaker is on.
- ❒ Measure the output voltage on the AC circuit breaker to confirm that the output voltage is within the supported range of the power supply. See "Power Specifications" on page 53.
- ❒ Verify that the positive and negative power wires are securely connected to both the power supply and device.
- ❒ Verify that the device is connected to one positive and one negative DC output connector on the power supply.
- ❒ Verify that the power wires are properly wired and not crossed over. The positive DC output connector on the power supply must connect to the device's positive connector, and the negative DC output connector on the power supply has to connect to the device's negative connector.
- ❒ Try replacing the device. If the new device works, then the problem is with the first device.

Problem 5: A PoE switch powered by the IE048-120 Power Supply is not supporting all its PoE devices. Possible causes are listed here:

- ❒ The default DC output voltage 54V is not within the input voltage range of the PoE switch.
- ❒ The switch has a technical problem.
- ❒ The PoE devices have a total power requirement that exceeds the switch's maximum power budget.

- ❒ The power supply has reached its maximum output of 120W.
- ❒ The output voltage on the DC output connectors needs to be adjusted within the input voltage range of the PoE switch. See “Adjusting the Voltage on the DC Output Connectors” on page 42.
- ❒ High ambient temperature caused the power supply to reduce power on the DC Output connectors. Refer to “Derating Graphs - Operating Properties and Ambient Temperature” on page 56.

Solutions: Try the following:

- ❒ See the PoE switch’s installation guide or product data sheet for its input voltage requirements. If the default DC output voltage 54V is not within the input voltage range of the PoE switch, adjust the DC output voltage to be within the input voltage range of the PoE switch. See “Adjusting the Voltage on the DC Output Connectors” on page 42.
- ❒ See the switch’s installation guide or product data sheet for its maximum power budget for PoE devices. Calculate the total power requirements of all the powered devices connected to the device by referring to their installation guides. The switch cannot support all the devices if its power budget is less than their total power requirements. If this is the case, remove some powered devices from the switch.
- ❒ Calculate the maximum power consumption values of the powered devices connected to the IE048-120 Power Supply. The value should not exceed 120W.
- ❒ Measure the ambient temperature of the site. Refer to “Derating Graphs - Operating Properties and Ambient Temperature” on page 56.
- ❒ Refer to the switch’s installation guide for more troubleshooting suggestions for PoE devices.

Problem 6: A PoE switch suddenly stopped supplying power to one or more powered devices. Possible causes of this state are listed here:

- ❒ The DC power output has dropped on the DC output connectors on the power supply.
- ❒ The switch or powered device has a technical problem.

Solutions: Try the following:

- ❒ Check the DC_OK LED status and see “**Problem 1:** The DC_OK LED is off.” on page 47, “**Problem 2:** The DC_OK LED is amber.” on page 48, or “**Problem 3:** The DC_OK LED is flashing amber.” on page 49 accordingly.
- ❒ Refer to the switch’s installation guide for troubleshooting suggestions for PoE devices.

Appendix A
Technical Specifications

This appendix contains the following sections:

Physical Specifications

Dimensions

Table 7. Product Dimensions (W x D x H)

IE048-120-20	46 x 115 x 140 mm (1.8 x 4.5 x 5.5 in.)
IE048-120/C-20	

Weight

Table 8. Product Weight

IE048-120-20 with DIN rail bracket	0.9 kg (2.0 lbs)
IE048-120/C-20 with DIN rail bracket	

Ventilation

Table 9. Ventilation Requirements

Minimum Open Space Left and Right Sides with Adjacent Non-heat Sources	15mm (0.59 in)
Minimum Open Space Left and Right Sides with Adjacent Heat Sources	50mm (1.97 in)
Minimum Open Space Above and Below	25mm (1.0 in)

Cabinet (Enclosure) Dimensions

Table 10. Minimum Cabinet (Enclosure) Dimensions

Minimum Cabinet Dimensions (W x H x D)	50.8 x 50.8 x 30.5 cm (20.0 x 20.0 x 12.0 in)

Note

The enclosure size should be determined by considering multiple factors. This includes the outside ambient temperature, total heat generated from the installed equipment, sealed or unsealed enclosure type, enclosure material, paint color, mounting method (wall, pole, ground, etc.), and sun load. The smaller enclosure size you choose, the higher risk of overheating the product.

If the product overheats in an enclosure that was built without taking into account these factors, the warranty of the product might be voided. Consult Allied Telesis when assistance is needed.

Power Specifications

The power input and output specifications are listed in Table 11 and Table 12 on page 54.

Table 11. Input Characteristic

	Condition	Specification
Rated Input Voltage		100 - 240 Vac
		88 - 350 Vdc
Input Voltage Range		90 - 264 Vac
		88 - 350 Vdc
Rated Input Frequency		50/60 Hz
Input Frequency Range		47 - 63 Hz
Rated Input Current	100 Vac	1.7 A
Maximum Input Current	90 Vac, 120 W	1.6 A (Maximum)
Average Input Current	100 Vac, 120 W	1.3 A
	220 Vac, 120W	0.6A
Surge Current	100 Vac/220 Vac	50A/100A pk (Maximum)
Efficiency	100 Vac, 120 W	92%
	220 Vac, 120 W	95%
Power Factor	115 Vac, 120 W	0.99
	220 Vac, 120 W	0.97
Leakage Current	100 Vac, 60 Hz	0.45 mA (Maximum)
	240 Vac, 60Hz	0.75 mA (Maximum)

Table 12. Output Characteristics

	Condition	Specification
Output Voltage[1]		54 V
Output Voltage Adjustment Range[2]	Temperature: 25˚C 120 W	51 - 57 V
Ripple/Noise Voltage	Temperatures: 25 ~ 70˚C IO: 0 to 2.3 A	100/200 mV
Line Regulation	90 - 264 Vac	+/- 0.5% (Maximum)
Load Regulation	IO: 0 to 2.3 A	+/- 0.5% (Maximum)
Temperature Regulation	Temperatures: 25 ~ 70˚C	+/- 1% (Maximum)
Rated Output Current	VO: 54V	2.3 A (120W)
Minimum Output Current		
Start-up Time	100 Vac, 120 W	750 ms (Maximum)
Hold-up Time	90 Vac, 120 W	20 ms (Minimum)

1. This value is the default set voltage for the LED unless you change the voltage.
2. When you adjust the voltage within the adjustment range, the new voltage becomes the set voltage for the LED.

Environmental Specifications

Table 13. Environmental Specifications

Operating Temperature Range	-25° to 70°C
Storage Temperature Range	-40° to 85°C
Operating Humidity Range	10% to 90% RH, non-condensing
Storage Humidity Range	
Operating Altitude	3,000m
Cooling Method	Air Convention
Pollution Degree	2

Derating Graphs - Operating Properties and Ambient Temperature

The derating properties correspond to a vertically mounted device. The operational ambient temperature varies depending on mounting orientation. Vertical orientation for the device is strongly recommended for best convection cooling. Refer to “Power Supply Orientations” on page 32.

AC Input Power Derating Curves

AC input power derating graphs are shown in Table 15, Table 16 on page 57, and Table 17 on page 57.

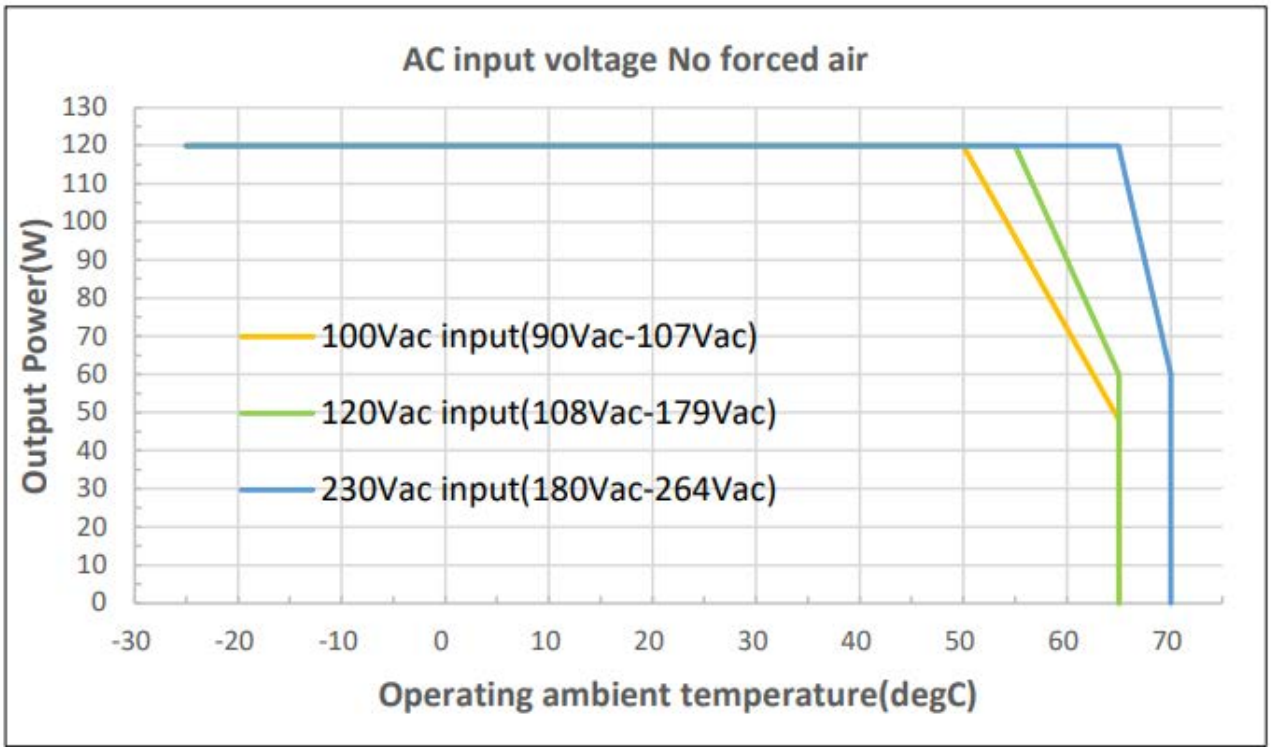


Figure 15. Power Derating Curve- AC Input Voltage No Forced Air

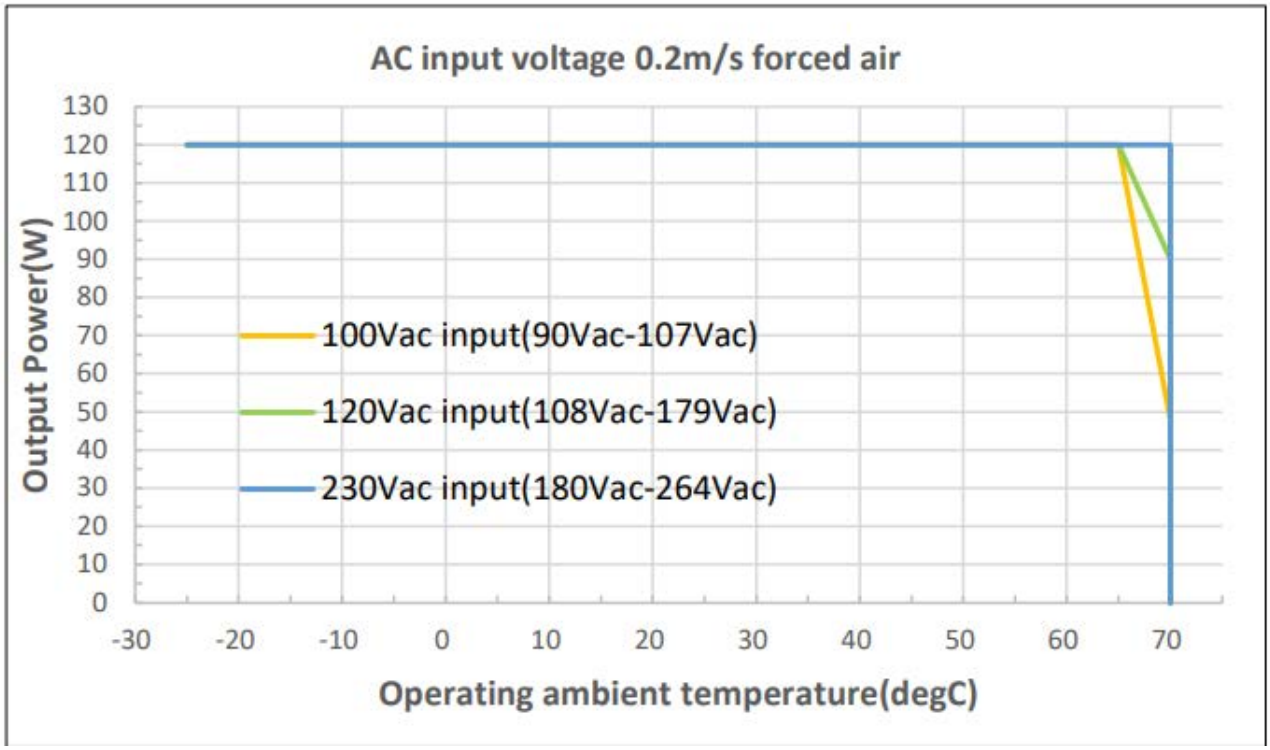


Figure 16. Power Derating Curve - AC Input Voltage 0.2m/s Forced Air

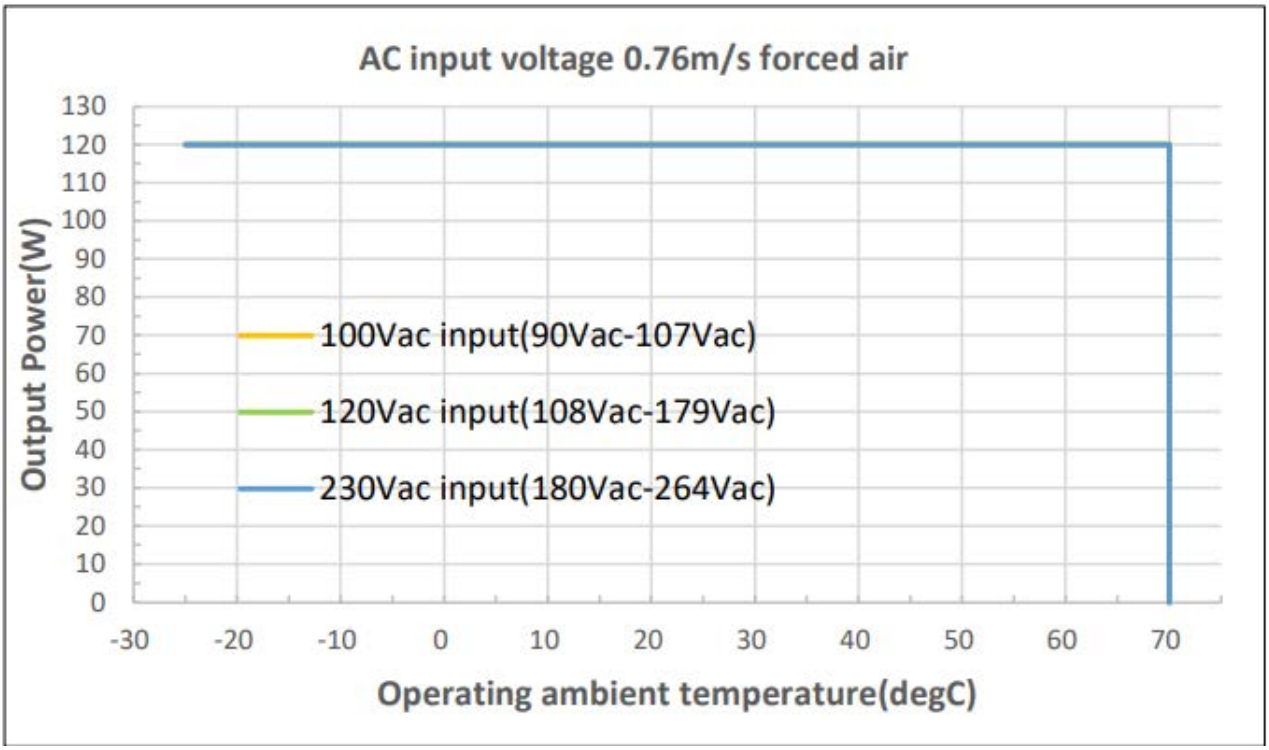


Figure 17. Power Derating Curve - AC Input Voltage 0.76m/s Forced Air

DC Input Power Derating Curves

DC input power derating graphs are shown in Table 18, Table 19, and Table 20 on page 59.

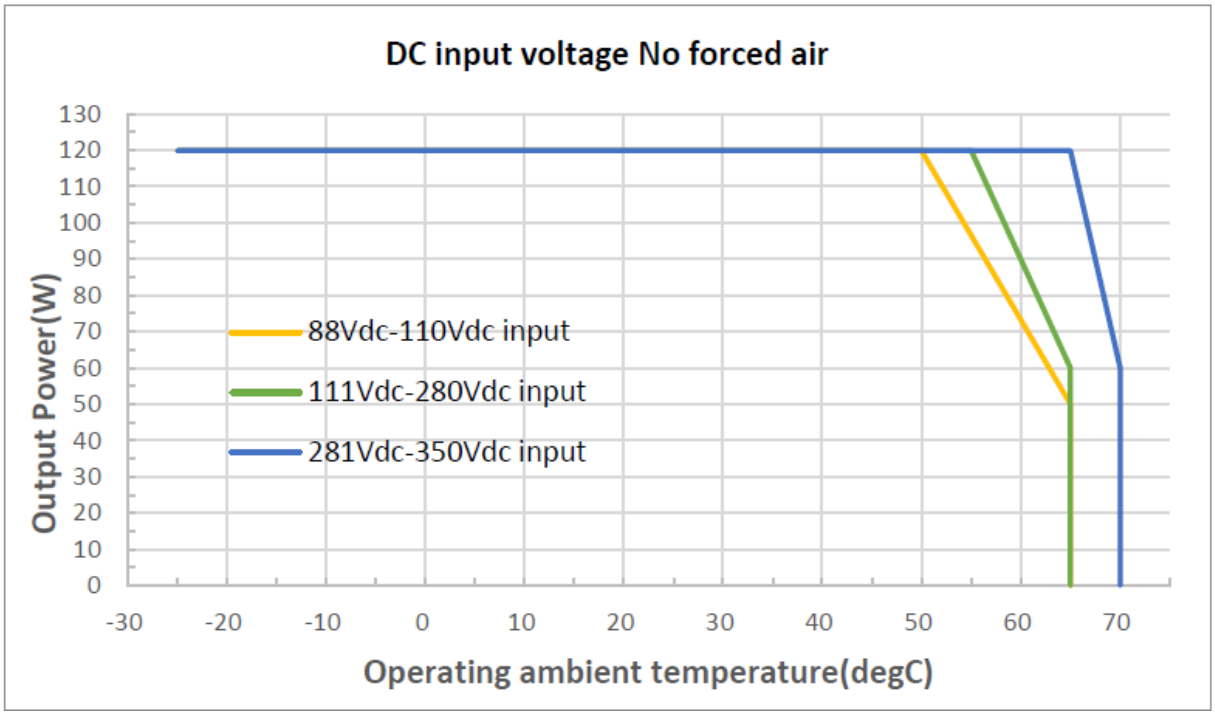


Figure 18. Power Derating Curve - DC Input Voltage No Forced Air

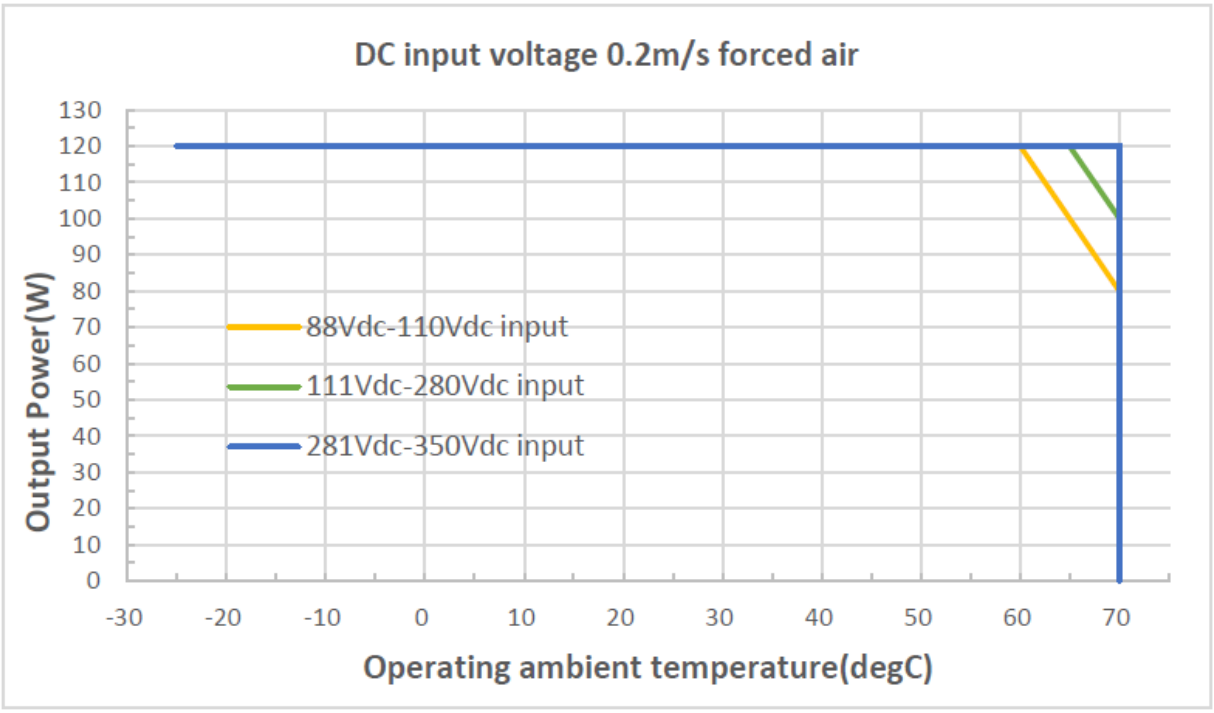


Figure 19. Power Derating Curve - DC Input Voltage 0.2m/s Forced Air

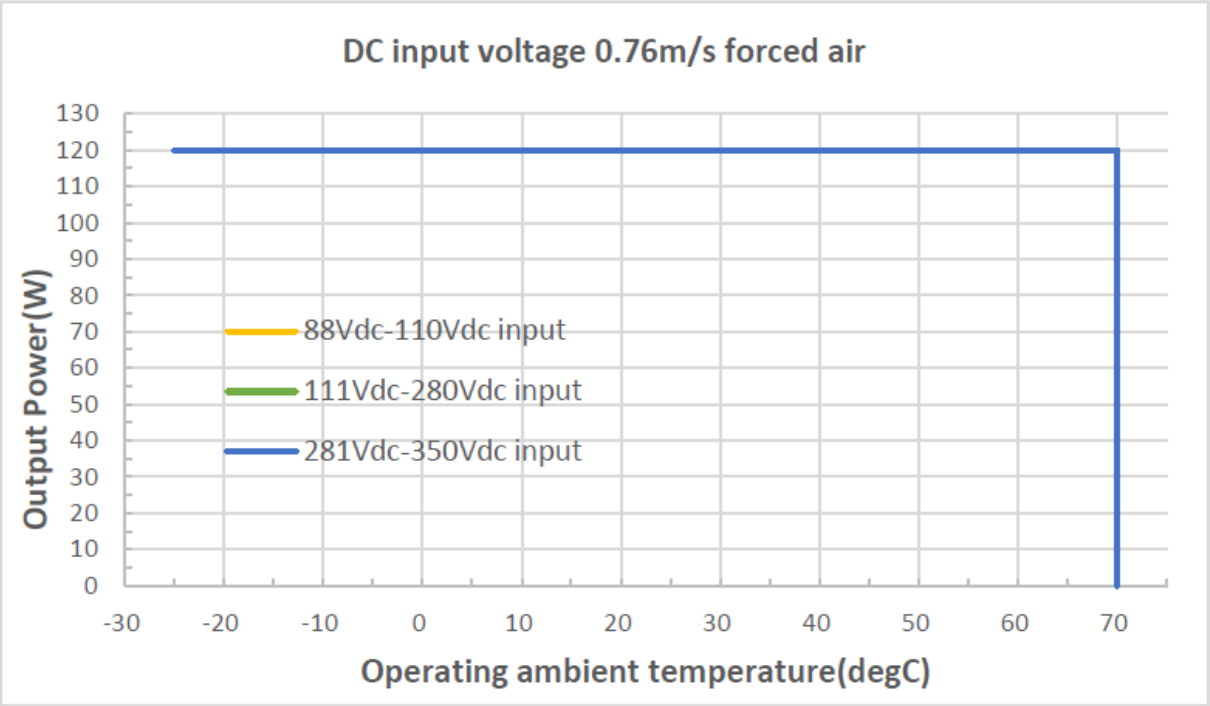


Figure 20. Power Derating Curve - DC Input Voltage 0.76m/s Forced Air

Device Dimensions

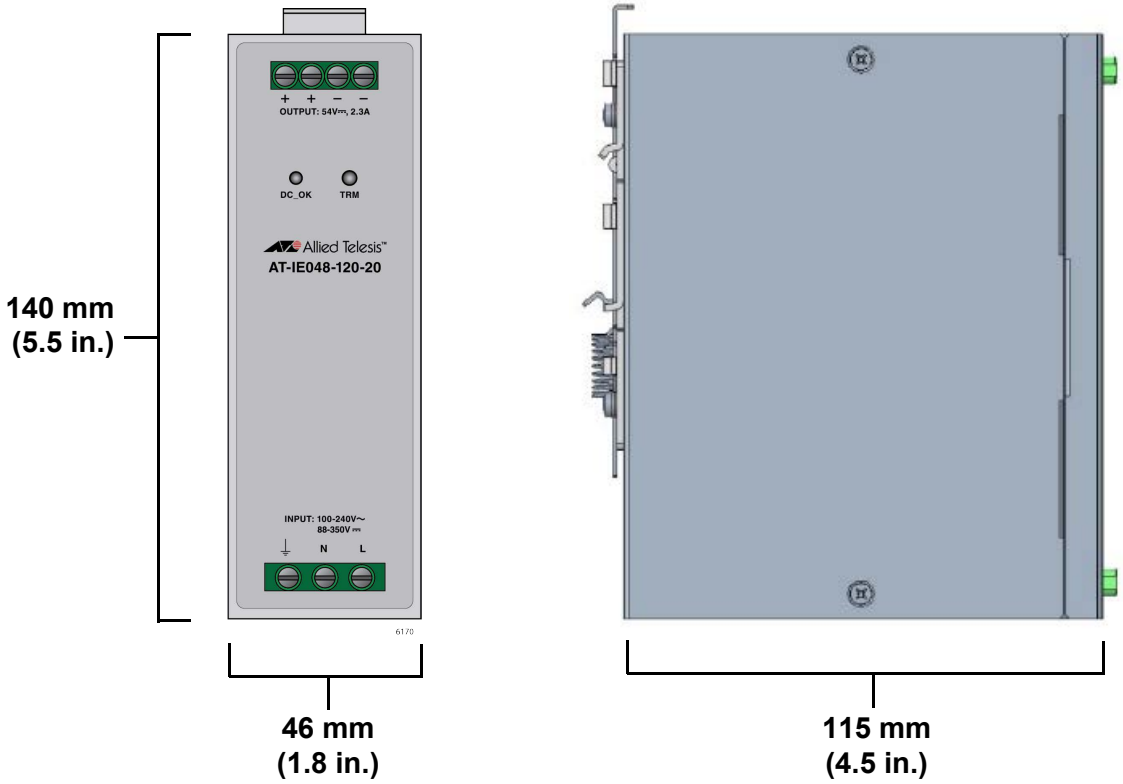


Figure 21. IE048-120 Power Supply Dimensions