



Griffin™ 1000 MV

Installation Guide

821-0008-00 B02

October 2004

Griffin™ 1000 MV

Installation Guide

This manual provides installation procedures for the Griffin 1000 MV.

Revision: B02
Part No.: 821-0008-00
Date: October 2004

Amperion
2 Tech Drive
Andover, Massachusetts 01810

CAUTION: Changes or modifications not expressly approved by Amperion, Inc. could void the user's authority to operate the equipment.

RADIO AND TELEVISION INTERFERENCE

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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

You may also find helpful the following booklet, prepared by the FCC: "How to Identify and Resolve Radio-TV Interference Problems." This booklet is available from the U.S. Government Printing Office, Washington D.C. 20402.

Changes and Modifications not expressly approved by the manufacturer or registrant of this equipment can void your authority to operate this equipment under Federal Communications Commissions rules.

This device has been designed to operate with an antenna having a maximum gain of 12 dBi. Use of an antenna having a higher gain is strictly prohibited per regulations of Industry Canada. The required antenna impedance is 50 ohms.

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Preface

About This Guide

Introduction

This guide is written for power utility companies and describes how to install Griffin™ 1000 MV products.

Topics

This preface covers the following Griffin 1000 MV topics.

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Chapters In This Guide

This guide contains the following chapters:

For	Go to
Requirements	Chapter 1
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Information About Griffin 1000 MV Products

About This Release

This version of the Griffin 1000 documentation supports hardware that is installed on MV power lines.

Related Documentation

For more information about Amperion products, refer to the following documents:

- *Amperion Connect™ Administration Guide*
- *Falcon™ 1000 MV Installation Guide*
- *Amperion Connect™ Release Notes*
- *Lynx™ 1000 MV Installation Guide*

Conventions

Typographical Conventions

This guide uses the following typographical conventions.

angle brackets < >	Enclose a range of valid values for a parameter. Example: <1-16>
bold text	Command names and text that you must enter. Example: Use the set command.
brackets []	Items enclosed in square brackets are optional and are not required for the command's execution. Do not type the brackets when entering the command.
<i>italic text</i>	A variable for which you must enter an explicit value. Also used for emphasis in explanatory text; for example, Griffin 1000 products <i>must</i> be installed by trained line workers.
parentheses ()	Parentheses are used to define a list of variables that the user must supply a value. Do not type the parentheses when entering the command.
quotation marks “ ”	Enclose titles of sections, chapters, and appendixes within a book.
screen text	Text that appears on a screen, or in printed output.

Customer Services

Technical Support

When contacting Amperion technical support, please have the following information available to assist with the call:

- Site Information - Company, location, and contact name.
- Product Information - Product family, Injector, Extractor, Repeater/Extractor, and serial number.
- Software Build - The software version number.
- Background information - Provide as much information about the operational state as possible:
 - Installation or an operation issue.
 - Client, server, or administration issue.
 - Error or status message.
 - What you were doing when the problem occurred.

In the USA: Dial 1.800.654.7554 to speak with an Amperion technical support engineer.

The Email address for Amperion technical support is:
tech-support@amperion.com.

For information about Amperion, visit the World Wide Web (WWW) site at <http://www.amperion.com>.

Product Damage

If any part of the Griffin 1000 equipment is damaged upon arrival, contact the shipper to conduct an inspection, and prepare a damage report. Save the shipping container and all packing materials until the inspection and the damage report are completed.

In addition, contact technical support as instructed in the previous section so that arrangements can be made for replacement equipment. Do not return any part of the shipment until you receive detailed instructions from a technical representative.

Equipment Warranty

Amperion warrants its hardware and software for 90 days from the date of purchase.

Equipment Problems

If repair or modification is required in order for your equipment to operate properly, contact technical support. All repairs or modifications must be completed by Amperion or an authorized Amperion representative. Opening the CPU chassis voids the warranty.

Chapter 1

Requirements

About This Chapter

Introduction

This chapter lists the requirements for Griffin™ 1000 MV installation.

Topics

This chapter covers the following topics:

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Site Requirements

The utility company has to prepare the site prior to installing Amperion equipment. All site requirements should be met prior to installing any equipment.

Warning: The utility company must have a trained line crew install Griffin 1000 components on their equipment.

Installation Requirements

The Griffin should be installed above the neutral on a utility pole. The insulated coupler **MUST** be installed using a hot stick. This may be done from a bucket truck or lineman on the utility pole. Amperion recommends that you do not attempt to install the insulated coupler from the ground due to the distance involved and the weight at the end of the telescoping hot stick.

Any wireless antenna installed in conjunction with the Griffin must be installed a minimum of 15 feet (5 meters) above ground level, and at least 3 feet (one meter) from any point accessible to “the public” (any person besides a qualified and trained installer). Harmful radiation may be present up to 10 cm from the wireless antenna during operation.

The antenna(s) used for this transmitter must not be co-located with or operated in conjunction with any other antenna or transmitter.

Tools Required

The installation does not require special tools beyond those normally carried by a line crew. All tools **MUST** be rated for the line voltage.

- Installation gloves
- Hotstick
- Any specific utility tools

Antenna Required

The unit must be installed with one of the following Amperion 2.4GHz antennas:

Amperion Part Number	Antenna Description
170-0000-020-37	5 dBi Monopole Omni Directional Antenna Kit
170-0000-021-38	8 dBi Monopole Omni Directional Antenna Kit
170-0000-026-34	12 dBi Directional Antenna

Power Requirements

At the time of installation, the power company determines the pole placement and runs a cable from AC power to the terminal strip inside the enclosure. (The power terminal strip accepts a 10 gauge wire.) Refer to the *Griffin 1000 MV Specifications* section for all power and site specifications.

Installation Locations

During the planning process, the utility company and its partner plans the installation and identifies installation locations and creates an installation map. The line crew should have this map that clearly shows the installation locations for each device. This information should provide:

- Install location
- Equipment being installed
- Equipment type and serial numbers

Griffin 1000 MV Specifications

Enclosure Specifications

The Griffin 1000 enclosure has the following dimensions and weight specifications:

Width: 16.16 in. (41.05 cm)

Height: 22.12 in. (56.18 cm) / with flange 28.06 in. (71.27 cm)
Depth: 6.33 in. (16.08 cm)
Weight: 35 lbs (15.876 kg)
Coupler: 12.4 lbs (5.624 kg)

Insulated Coupler Specifications

The insulated coupler has the following specifications:

Current: Up to 300 A
Voltage: 4Kv - 15Kv
BIL rating: 95Kv
Wire size: MV feeder diameters from 0.25 inch (0.635 cm) to 1.375 inches (3.49 cm)

Power Specifications

The customer site must provide AC power and a ground as follows:

AC Input: 115 VAC +/- 10%

Current: 1.0 Amp

Frequency: 50 - 60 Hz

Fuse: 3 Amp 250 V SB (Amperion P/N 640-0010-00) or
Bussmann MDA3 or equivalent

Environmental Specifications

The Griffin 1000 equipment operates within the following temperature and humidity ranges:

Operating Temperature: -4 to 131 F (-20 to 55 Degrees C)

Storage Temperature: -40 to 176 F (-40 to 80 Degrees C)

Altitude: -200 to 6,000 ft (-60.96 to 1828.80 m)

Humidity: 0-100%

Chapter 2

Installation

About This Chapter

Introduction

This chapter describes how to install Griffin™ 1000 MV equipment.

Topics

This chapter covers the following topics:

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Overview

The installation procedure is written for overhead power distribution utilities; where the equipment is installed on utility poles. Check with the power utility's administrator for installation locations. The installation should take approximately 45 minutes per unit.

Installation Kit

Unpack the installation kit (Griffin enclosure and coupler) for the site and check the packing list to ensure you have received all the parts. If any parts are missing, contact the site administrator before continuing with the installation. (Injectors and Extractors are shipped with a single coupler and Repeater/Extractors are shipped with 2 couplers.)

Pre-Installation Instructions

All site prep requirements must be met, including any power utility company or customer requirements. Make sure there is sufficient AC power for the Griffin power supply. The AC power requirements are in [Chapter 1](#).

Griffin 1000 MV Equipment

The Griffin 1000 MV components are shipped in a NEMA-3 enclosure. The power supply and logic chassis is a single unit that is mounted within the NEMA-3 enclosure. The installation process requires enough space on the pole for the enclosure, an AC power source, and couplers mounted on the MV feeder. Chapter 1 has the device specifications.

Griffin 1000 Installation

Installation Overview

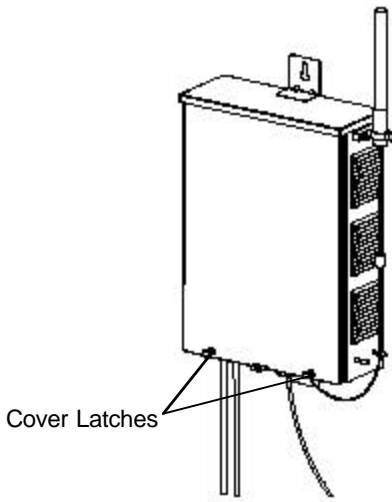
The Injector must be the first device installed in the Power Line Communication (PLC) network and be installed close to the WAP at the substation shed. Each installed device should be configured by the system administrator before installing the next device. Amperion recommends that you install the Injector and then install the Extractor(s) and Repeater/Extractor(s). Once the Injector is installed, repeat this section to install the Extractor(s) and Repeater/Extractor(s).

Note: It is very important to install the equipment in the appropriate location. If you install a Repeater/Extractor or Extractor where the Injector (or Injector where an Extractor or Repeater/Extractor) is suppose to be installed, you will not be able to connect to the PLC network. Check the device label before installing the unit on the MV feeder.

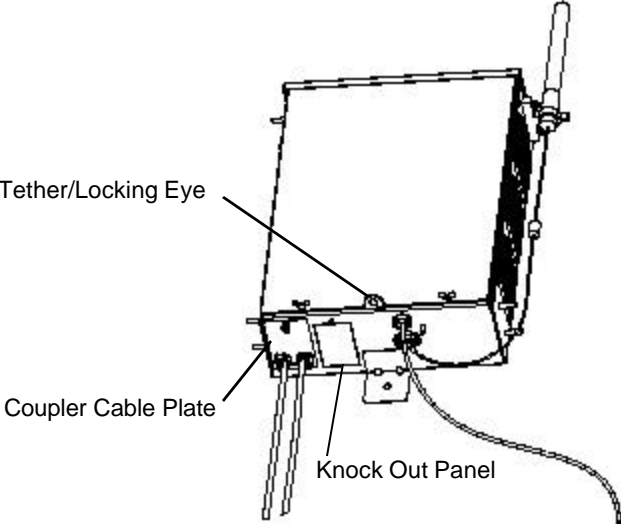
Danger: Amperion equipment is installed on utility poles and MV feeders where lethal voltages are present. To avoid serious personal injury, Griffin 1000 MV installation must be performed by a trained line crew. You must follow all regional safety electrical codes as well as those of the power utility.

Griffin 1000 MV Installation

To install a Griffin, perform the following steps:

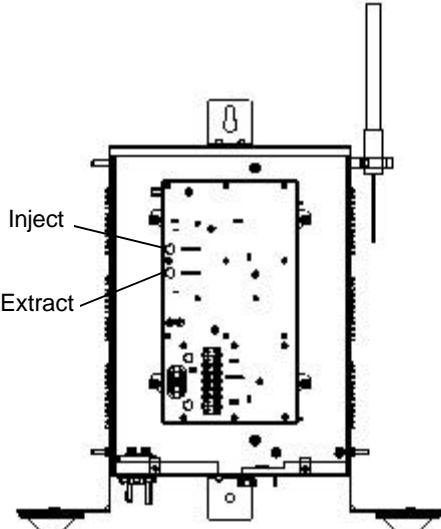
Step	Action
1	Remove the Griffin enclosure from the shipping carton.
2	Remove the enclosure cover by turning the two 1/4 turn cover latches counter clockwise and lifting the cover off. Check the device for any signs of damage that might have occurred during shipping and replace the cover.
 <p>The diagram shows a rectangular metal enclosure with a vertical antenna on the right side. Two latches are located at the bottom of the front panel, indicated by a label 'Cover Latches' with two lines pointing to them. The enclosure is mounted on three vertical posts. A cable is connected to the bottom of the enclosure.</p>	
Note:	If you are installing a Repeater/Extractor (two couplers came with the device), and there are two coupler panel openings at the bottom of the chassis. Do NOT remove the second plate if you are installing an Injector or Extractor which uses a single coupler.

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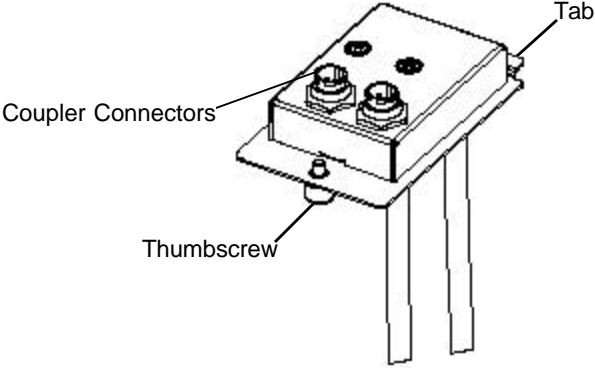
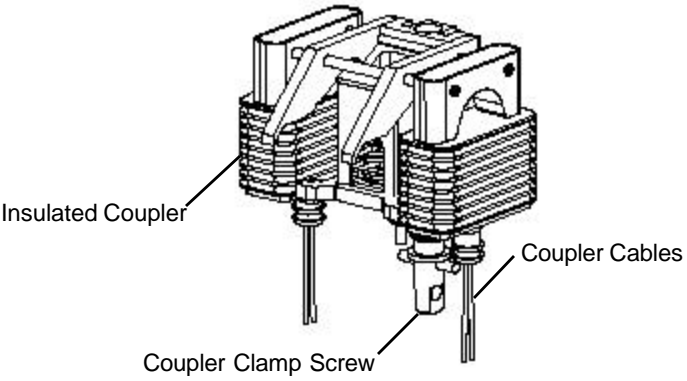
Step	Action
3	Place the enclosure and insulated coupler(s) in the bucket and be sure to attached safety tether to the pad lock loop at the bottom of the enclosure and attach the other end to the utility pole.
 <p>The diagram shows a perspective view of the Griffin 1000 enclosure. A line points from the text 'Tether/Locking Eye' to a loop at the bottom of the enclosure. Another line points from 'Coupler Cable Plate' to a plate at the bottom left. A third line points from 'Knock Out Panel' to a panel on the bottom right. A cable is shown extending from the bottom right of the enclosure.</p>	
4	Using 7/16 lag screws (or bolts) install the top lag screw in to the utility pole. Do not install the lag screw flush with the pole, leave approximately a 1/2 inch of room to hang the enclosure. Since the enclosure is mounted on a utility pole, consideration should be given to the pole installation location. Try to install the enclosure to provide an optimum line of sight to the desired area (wireless access point or subscribers). Note: The utility may decide to install the Griffin enclosure on standoffs to allow ease of access around the utility pole.
5	Hang the enclosure on the lag screw. Level the box and install a second lag screw on the bottom of the enclosure. Once the enclosure is installed, you may tighten the top lag screw.
6	Remove the safety tether after the enclosure is securely attached to the utility pole. Connect a ground strap from the griffon chassis to pole ground.
7	Remove the enclosure cover. If possible, attached a safety tether to the enclosure cover.
8	Do NOT attach the power cable to the chassis until you are told to do so.

Insulated Coupler Installation

To install the insulated coupler, perform the following steps:

Step	Action
1	<p>With the Griffin enclosure cover removed, connect the coupler cables from the coupler connectors on the Griffin to the connectors on the coupler cable plate.</p> <p>Injectors and Extractors - Attach a cable from each connector on the coupler cable panel to a connector (Inject and Extract) on the Griffin.</p> <p>Repeater/Extractors - There are two Y-type coupler cables. Connect the two ends from the connector labeled Inject to the coupler that is on the downstream side (towards the next device that is further away from the Injector) of the Griffin enclosure. Connect the two ends from the connector labeled Extract to the coupler that is on the upstream side (towards the previous device that is closer to the Injector) of the Griffin enclosure.</p>
	
Note:	<p>It is very important to connect the Repeater/Extractor coupler cables properly. If the cables are incorrectly installed, it may result in PLC signal loss.</p>

(continued)

Step	Action
2	Install the coupler cables to the Griffin enclosure. The end of the coupler cable has a plate with two connectors. This plate fits over the cutout on the bottom of the enclosure. Align the tab on the edge of the coupler panel with the edge on the enclosure. Fasten the plate to the enclosure with the thumbscrew.
 <p>The diagram shows a rectangular metal plate with two circular connectors on top. A thumbscrew is attached to the bottom of the plate. A tab is visible on the right side of the plate. Two cables are shown extending downwards from the bottom of the plate.</p>	
3	Fully open the coupler by turning the coupler clamp screw counter clockwise. Place the coupler on the hot stick and lock it in place. Place the coupler on the MV feeder and rotate the hot stick clockwise until the coupler is snug on the wire.
 <p>The diagram shows a complex assembly of metal parts. It includes a central screw labeled 'Coupler Clamp Screw' and two large, cylindrical components labeled 'Insulated Coupler'. Two cables labeled 'Coupler Cables' are shown extending from the bottom of the assembly.</p>	

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Griffin 1000 Installation

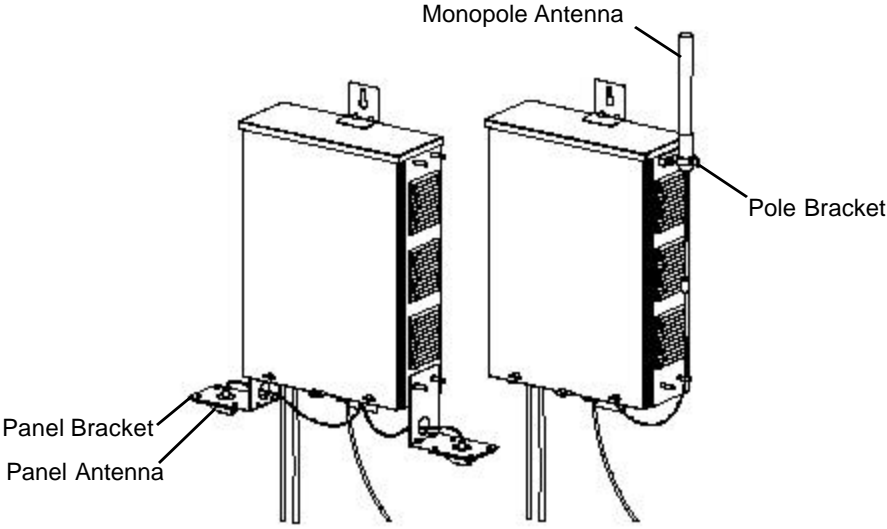
Step	Action
4	Release the coupler from the hot stick. If you are installing couplers for a Repeater/Extractor, install the second coupler. When installing two couplers, Amperion recommends that you install one coupler on the left hand side of the Griffin enclosure and one coupler on the right hand side.
Note:	If the couplers are installed next to each other, you MUST maintain a minimum spacing of 7 inches between the couplers.

Antenna Installation

Danger: The installer of this radio equipment must ensure that the antenna is located or pointed such that it does not emit RF field in excess of Health Canada limits for the general population; consult Safety Code 6, obtainable from Health Canada’s website <http://www.hc-sc.gc.ca>

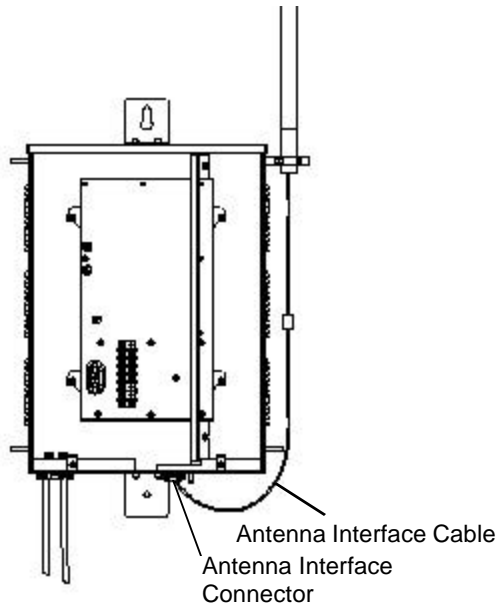
Danger: Verify that the Griffin unit is powered off prior to installing or adjusting the antenna. The antenna may radiate harmful levels of RF energy within 10cm of any part of the antenna.

To install the antenna, perform the following steps:

Step	Action
1	Install the antenna bracket (integral to the antenna kit) to the enclosure. The enclosure is equipped with threaded posts (at four locations) to allow for a variety of antenna mounts and to allow the installer to chose the best Line of Sight (LOS) mounting location. The following picture shows two types of antennas and mounting brackets.
	
<i>(continued)</i>	
2	Attach the antenna to the bracket using the mounting hardware. (Some installations may use diversity antennas, where two antennas are installed.)

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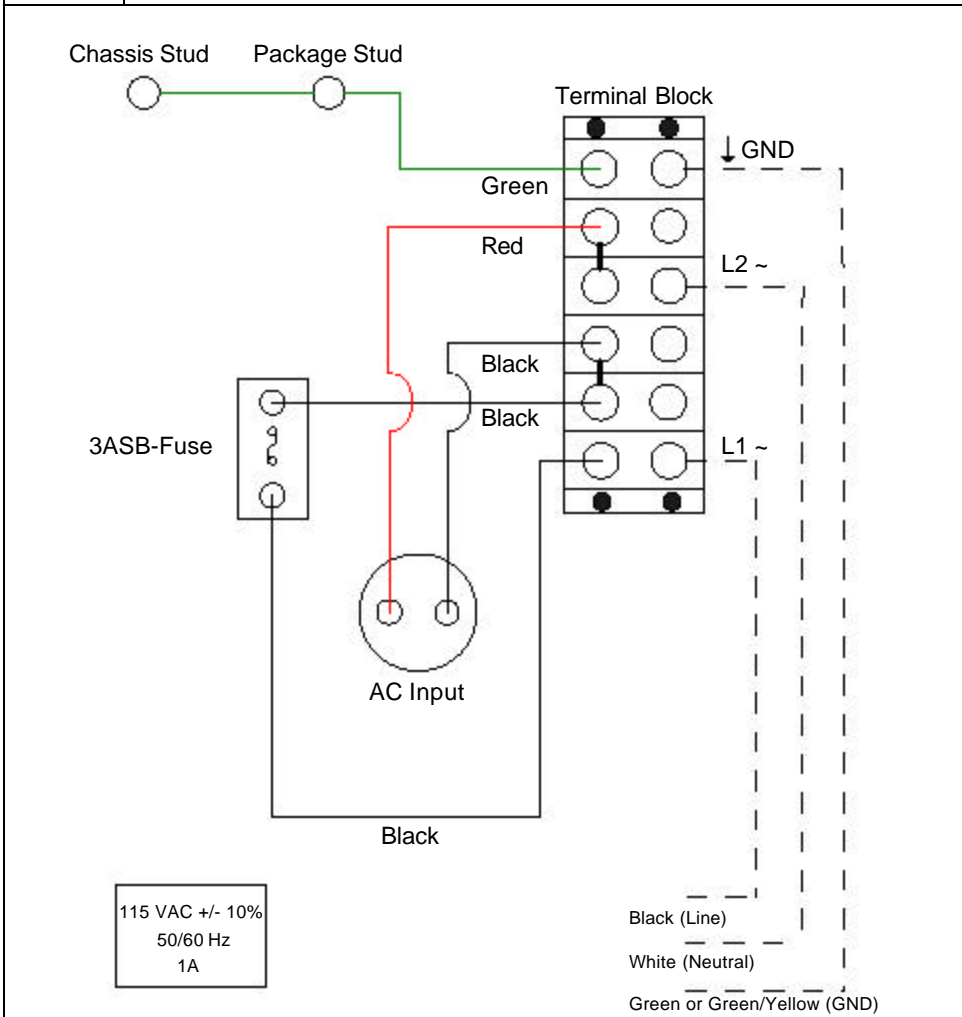
Step	Action
3	Attach the antenna interface cable to the antenna connector and then connect the cable to the antenna connector at the bottom of the enclosure. Note: Do not substitute the inner antenna cables provided with the unit. These cables connect the inner enclosure with the outer NEMA enclosure, as well as the optional WiFi amplifier if so equipped.



AC Wiring

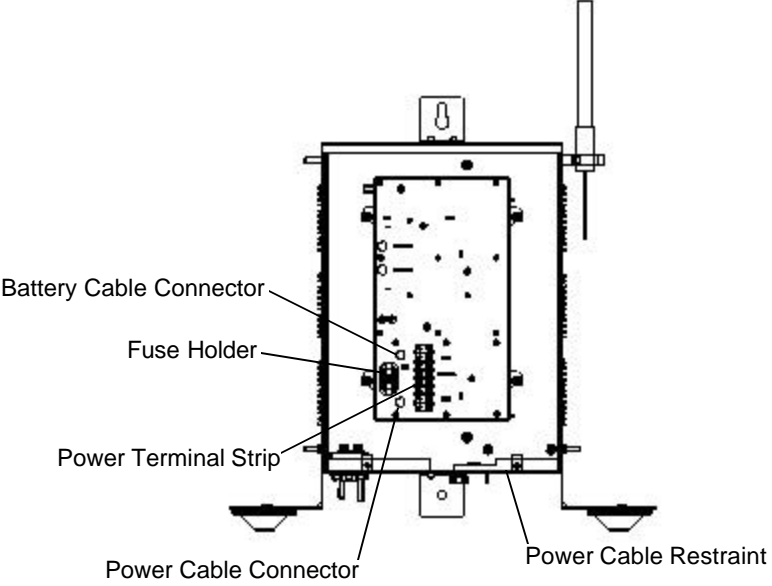
Wire the Griffin to AC as follows:

Step	Action
1	Wire AC power to the terminal strip using 10 gauge cable. Be sure to route the power cable through the cutouts in the bottom of the cabinet and secure it with the strain relief clamps. (There is a cable diagram on the back of the cover that shows how to wire AC to the terminal strip.)

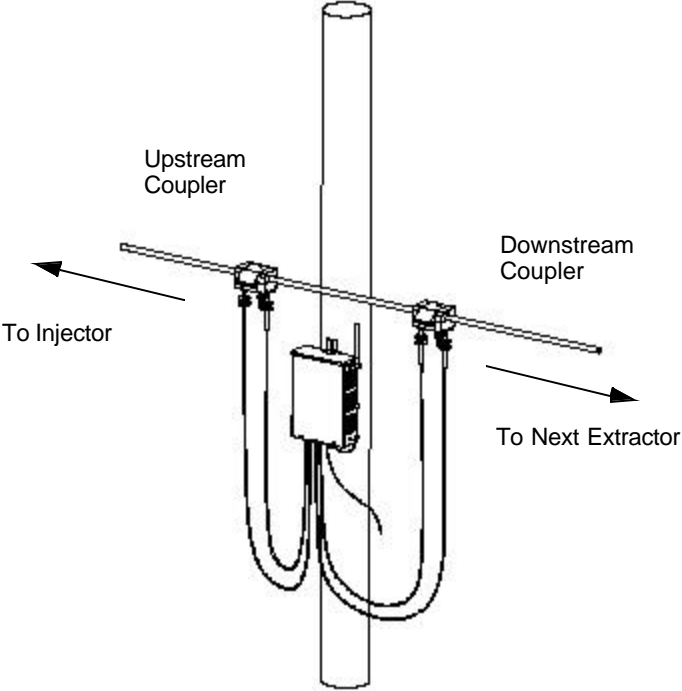


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Griffin 1000 Installation

Step	Action
2	Once AC power is connected to the terminal block, connect the power cable (that is hard-wired to the terminal strip) to the power connector on the Griffin chassis.
 <p>The diagram shows a top-down view of the Griffin 1000 chassis. It is a rectangular metal enclosure with a central panel. On the left side of the panel, there is a 'Battery Cable Connector'. In the center, there is a 'Fuse Holder'. Below the fuse holder is a 'Power Terminal Strip'. At the bottom of the chassis, there is a 'Power Cable Connector' and a 'Power Cable Restraint' on the right side. A vertical cable is shown entering the top of the chassis.</p>	
3	Connect the battery cable to the battery connector on the Griffin chassis. (The battery has a magnetic mount and should be mounted on top of the Griffin chassis.)

(continued)

Step	Action
4	Replace the Griffin enclosure cover and padlock (not included in kit) the cover. An example of a completed Repeater/Extractor installation is shown below.
	

Completing the Installation

Once the Griffin 1000 MV is installed and in a normal operating condition, notify the system administrator. Repeat the same procedure for each device (Injector, Extractor, and Repeater/Extractor) until all the equipment has been installed.

Griffin™ 1000 MV Installation Guide

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821-0008-00 Rev B02

October 2004



Emissions Notice:

When using the YDI model A2440-AF-I WiFi amplifier with the Griffin system, in order to comply with United States and Canada radio emissions requirements, WiFi channel 11 must not be used.

When using this amplifier, use only WiFi channels 1 through 10, inclusive.