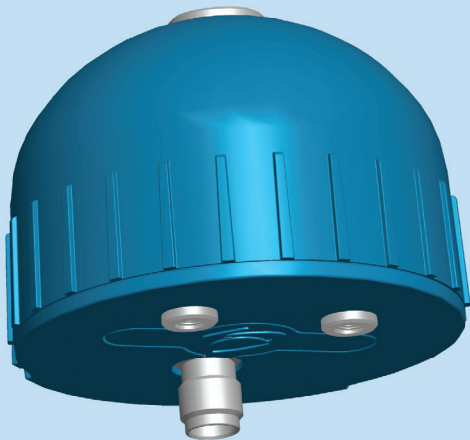


# Corinex Overhead MV Coupler



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**NOTE:** This equipment has been tested and found to comply with the limits for Class B information technology equipment. 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, the end user is advised to take adequate measures.

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# 1 Introduction

The *Corinex Overhead MV coupler* (as shown in Figure 1.0) is designed to Inject/Extract BPL signals over MV (Medium Voltage) lines of up to 18 kV RMS, across a frequency range of 2 to 35 MHz. The unit consists of a 3rd party Arrester and our Corinex BPL Terminal.

- Arrester Component from Cooper Power Systems (model S235-35-1) supports
  - IEEE C62.22 and C62.11-2005
  - Can be used in multiple 2, 3, or 4 wire circuit configurations
  - Ground Disconnector
- BPL Terminal Component (the module in Figure 1.1) is from Corinex

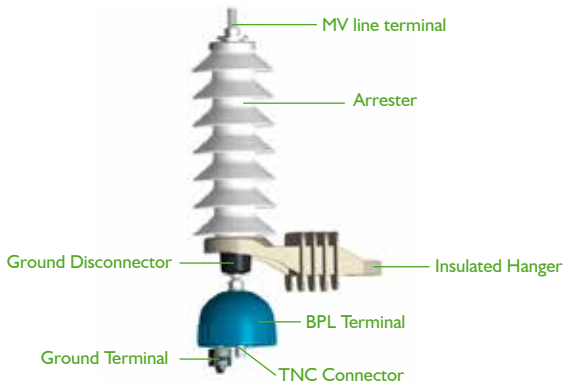


Figure 1.0 Corinex Overhead MV Coupler

## Arrester – Technical Specs

Environment	Outdoor, all-weather
Safety	IEEE C62.22 IEEE C62.11-2005
Weight	Less than 4.5 kg

## Arrester – Protective Specs

Arrester Rating (kV RMS)	MCOV (kV RMS)	Front-of-Wave Protective Level* (kV Crest)	MAX discharge Voltage (kV Crest)8/20 us Current Wave					
			1.5kA	3kA	5kA	10kA	20kA	40kA
18	15.3	66	49.1	52.3	54.7	59.6	65.9	74.2

\* based on 10 kA current impulse that results in a discharge voltage cresting in 0.5 us

## Arrester – General Applications

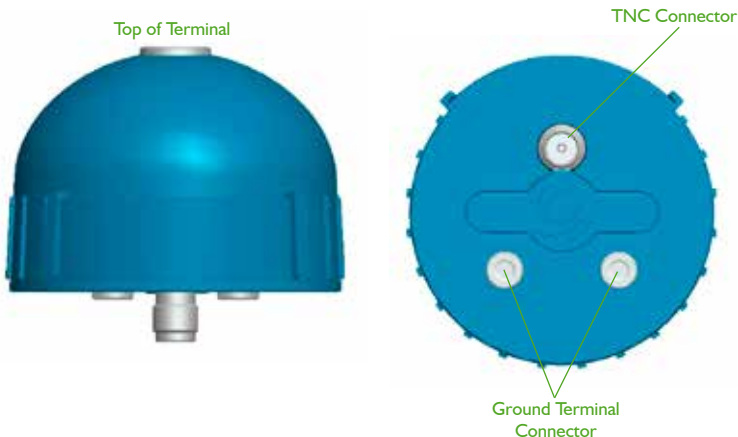
Recommended maximum system voltage (KV RMS) according to IEEE C62.22

Four-wire Wye Multi-Grounded Neutral	Three-Wire Wye Solid Grounded Neutral	Delta and Ungrounded Wye
22.86Y / 13.2	13.8Y / 7.97	13.8Y / 7.97

Three-wire Dual-phase Multi-Grounded Neutral	Two-wire Single-phase Multi-Grounded Neutral	Two-wire Dual-phase ungrounded
26.4 line / 13.2	13.2	6.9

**BPL Terminal – Technical Specs**

Frequency band	2 - 35 MHz
Insertion Loss	1.5 dB (average)
BPL Connector	TNC
Operating Temperature	- 40 °C to +85 °C
Environment	Outdoor, all weather
Safety	100% Production Tests
Insulation between TNC and Ground & Top Terminals	5 KV (1 mA, 6 seconds)
Weight	Less than 0.6 kg



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## 2 Basic Safety

The installation of the *Corinex MV coupler* unit must be performed by personnel qualified to install/service electrical equipment in high, medium and low voltage environments, adhering to the electrical codes/guidelines and safety practices of the region/locale in which the equipment is being deployed.

Please be sure that you have read and have understood the Installation Manual of the Cooper Arrester (model S235-35-1) before attempting to install the *Corinex MV coupler* unit. The Cooper safety manual is included in the *Corinex MV coupler* kit.

Please ensure that the operational voltage between the different phases of the MV line does not exceed the capacity of the Arrester component.

The Cooper Power Systems Arrester Component is classified by the USDOT as an explosive device, therefore the Arrester Component and its Ground Disconnecter should not be disassembled beyond its original state (as shown in Fig 1.2).

The ground and BPL signal cables from the MV coupler (that are referenced to earth) cannot be placed near other medium voltage equipment.

The insulation between the TNC connector and ground is 5 kV (1 mA, 6 second test). This protection is designed to insulate possible surge voltage (which may) pass through the arrester. Therefore the distance between the TNC connector and ground terminal must NOT be reduced below the recommended distance of 10 mm. However, typically, the insulation of the outdoor coax cable is good enough for this clearance. Please check the specs of the coax cable.

---

## 3 Installation

### 3.1 Pre-installation

The *Corinex MV overhead* coupler should be visually inspected prior to installation. If in the event there is the appearance of damage it must be reported to Corinex Communications Corp immediately.

Be sure to de-energize the electrical circuit/system, before performing any installation work on or near the Medium Voltage Line.

### 3.2 Installation

#### 3.2.1 Single MV Coupler

*All installation steps must be followed in the order as defined below!*

#### **STEP 1**

Please note the *Corinex MV Coupler* comes partially assembled as shown in Figure 1.1 (next page).

- Remove Wild Life protector cap (if it is installed, i.e. it should simply snap off)
- Remove the bottom nut and washer next to the Ground Disconnect
- Remove the metal wire (this is not required in the final assembly)
- Insert the washer back in and re-tighten the nut until it is securely fastened
- Screw in and tighten the BPL terminal, to 5 Nm (torque rating)
- Tighten the BPL ground terminal to the BPL terminal, to 10 Nm (torque rating)





Figure 1.1

**STEP 2**

Install the Arrester hanger to a compatible mounting bracket. A sample mounting bracket assembly can be found in the S235-35-1 Cooper Power Systems installation document.

(Please be sure to read all the Arrester safety instructions as outlined by Cooper Power Systems)

The minimum clearances of the *Corinex MV coupler* will depend on 2 factors:

- dimensions of the Arrester
- type of electrical circuit configuration

The table below shows the min recommended clearances, based on connection type:

		Arrester Dimensions (inches)				Min Recommended Clearance (inches)			
						HeavyDuty		NormalDuty	
ArresterRating (kV rms)	A+	B	C+	D	Phase to GND	Phase-to-Phase	Phase to GND	Phase-to-Phase	
18	11.7	5	10.8	8.7	9.25	11.25	9	10.75	

Please see Figure 1.2, 1.3, for a visual representation of the Arrester dimensions along with various mounting brackets and the recommended clearances.

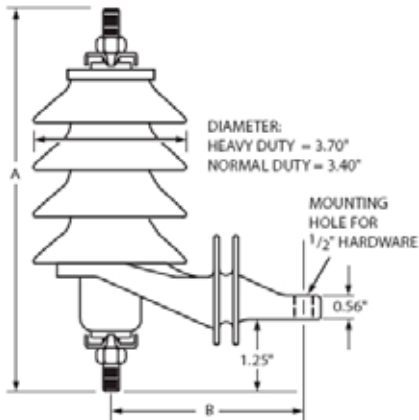


Figure 1.2 Arrester with isolator (i.e. Ground Disconnector) and insulated hanger (default Arrester configuration)

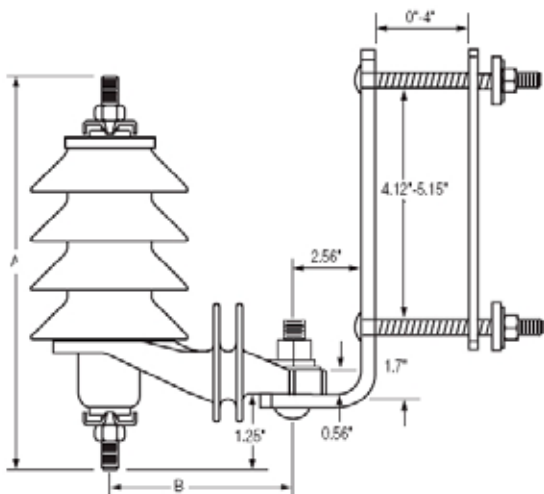


Figure 1.3 Arrester with isolator (Ground Disconnector) and insulated hanger and NEMA cross bracket (sold separately)

**STEP 3**

Connect the ground cable from ground terminal of the BPL terminal (as shown in Figure I.4) to the earth connection point of the pole. The type and quality of the ground connection must be in accordance with Utility and/or national/local electrical installation and safety procedures. This is very important for both safety and BPL performance reasons. The ground connection must NEVER be removed on an active system.



Figure I.4

**STEP 4**

Connect a weather-proof (RG-6 outdoor) cable to the TNC connector of the BPL terminal. Connect the other end of that cable to MV coaxial port of the MV gateway. It is also important to seal the ends of each connectors with weather-proof electrical tape (this is to prevent water seepage into the cable).

**Note:** The length of the ground and coaxial cable must be as short as possible, however some slack must be given such that the cable can handle hot/cold temperature variations.

**STEP 5**

- Unscrew the nut from the Line Terminal
- Insert the MV line lead wire between the washer and the base of the top of the MV coupler to the MV line according to Utility and/or national/local electrical installation and safety procedures. If the MV line lead wire is insulated, then the end portion that will connect to the Arrester will need to be stripped and wrapped around the Line Terminal in order for there to be good metal-to-metal contact (as shown in Fig. I.5 below)

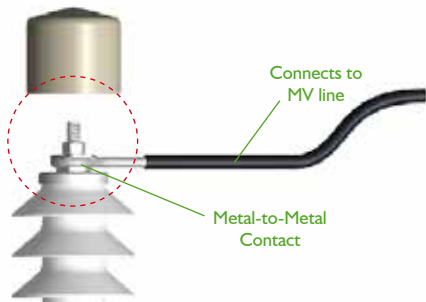


Figure I.5

- Retighten the nut on the MV Line Terminal
- Optionally, the Wild Life protector cap can be installed at this point. Please refer to the S235-35-I Cooper Power Systems installation document

Figure I.5-b (next page) shows an example of the completed MV coupler installation.

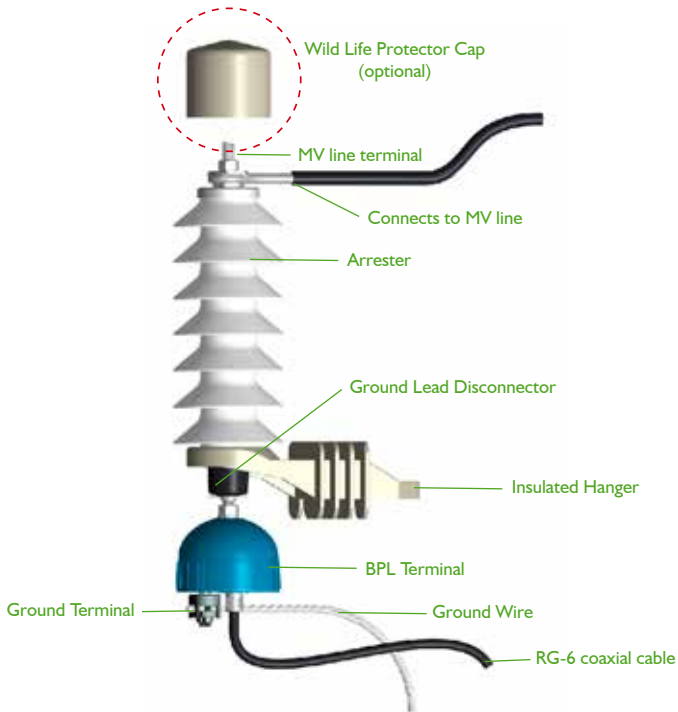


Figure I.5-b – Completed MV Coupler Installation

### 3.2.2 Dual MV Coupler

When installing the *Corinex MV couplers* with a *Noise Resistant MV Gateway*, 2 *Corinex overhead MV couplers* will need to be used. The installation of the individual couplers remains the same, however there are two differences to consider in this scenario:

- The location of the couplers in the circuit (relative to each other) must be equidistant in all directions (see Figure I.6)
- The length of the grounding and coaxial cables must be of equal distance (see Figure I.7)

#### Overhead Aerial view of the location of the Corinex MV overhead couplers

The couplers must be installed in equal distance from one another  
(in both dimensions)

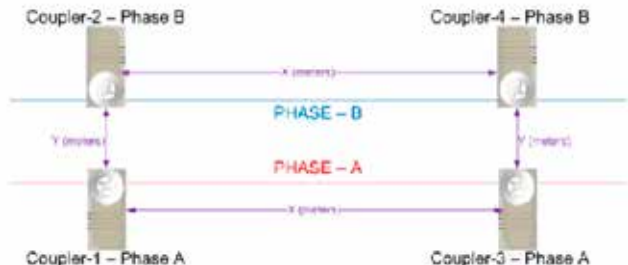


Figure I.6

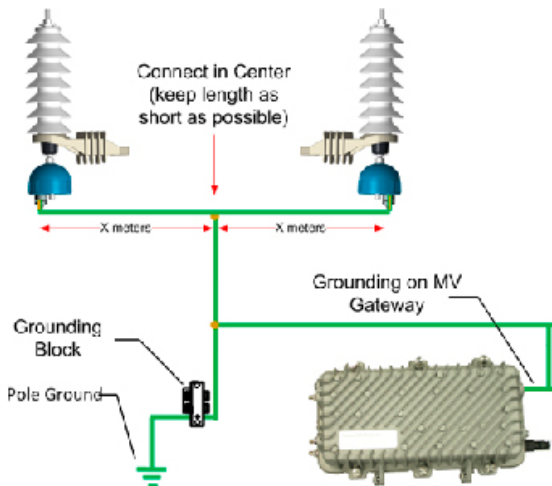


Figure I.7

### 3.3 Field Testing

All *Corinex MV overhead couplers* undergo rigorous lab and production testing prior to shipment, so additional testing of the unit(s) is unnecessary.

However, should you require to perform any field test(s), please contact your Account Manager at Corinex Communications Corp. prior to doing so, as some test procedures may damage the Arrester or the BPL terminal, rendering it unsafe or unusable.



## **4 Troubleshooting**

### **4.1 Common Installation Errors**

Errors made during installation may affect the electrical safety or the coupler's BPL performance. Below is a list of some of the common installation errors.

#### **4.1.1 Electrical**

- The ground connection is maintained at all times with a resistance reading that is in accordance to the region/locale to where the unit is being deployed.
- The recommended safety distance between the ground terminal and the TNC connector must be maintained at all times.
- All the components of the *Corinex MV overhead coupler* must be assembled in accordance to the specifications listed in this document and the manual of the Arrester. This includes verifying:
  - that all components are not damaged and are fully operational
  - that all components are secured at their appropriate torque ratings

#### **4.1.2 BPL Communications**

- The ground connection is maintained at all times with a resistance reading that is in accordance to the electrical code of the region/locale to where the unit is deployed.
- The ground wire connection from the coupler to the grounding point must be kept as short as possible

## 4.2 Maintenance

The *Corinex Overhead MV Coupler* does not require any maintenance under normal usage. However, the coupler's BPL signal connection to the BPL device must be maintained at all times. Furthermore, to ensure electrical safety, the coupler's connection to the ground must also be maintained at all times in accordance with the electricity codes/regulations of the region/locale in which the unit is deployed.

## 4.3 Uninstalling the MV coupler

- De-energize the electrical circuit/system
- Disconnect the MV line from the Coupler
- Discharge the arrester from by connecting the line terminal to a temporary ground
- Disconnect the BPL coaxial cable connection from the BPL terminal
- Disconnect the ground connection from the Ground terminal
- Re-energize the electrical circuit/system