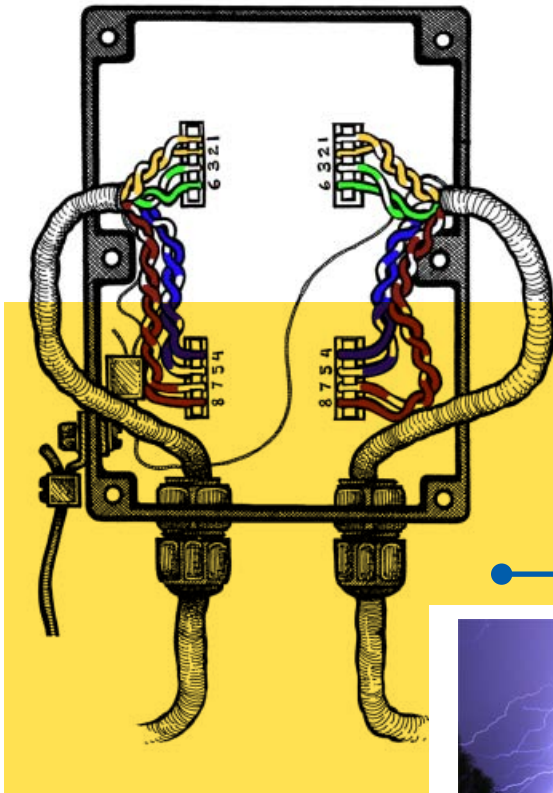


# LIGHTNING PROTECTION GUIDE



**MOTOROLA  
POINT-TO-POINT BROADBAND  
WIRELESS SOLUTIONS**

**MOTOROLA  
PTP 400 and 600 SERIES  
WIRELESS ETHERNET BRIDGES**

*MOTO***Wi**<sup>4</sup>



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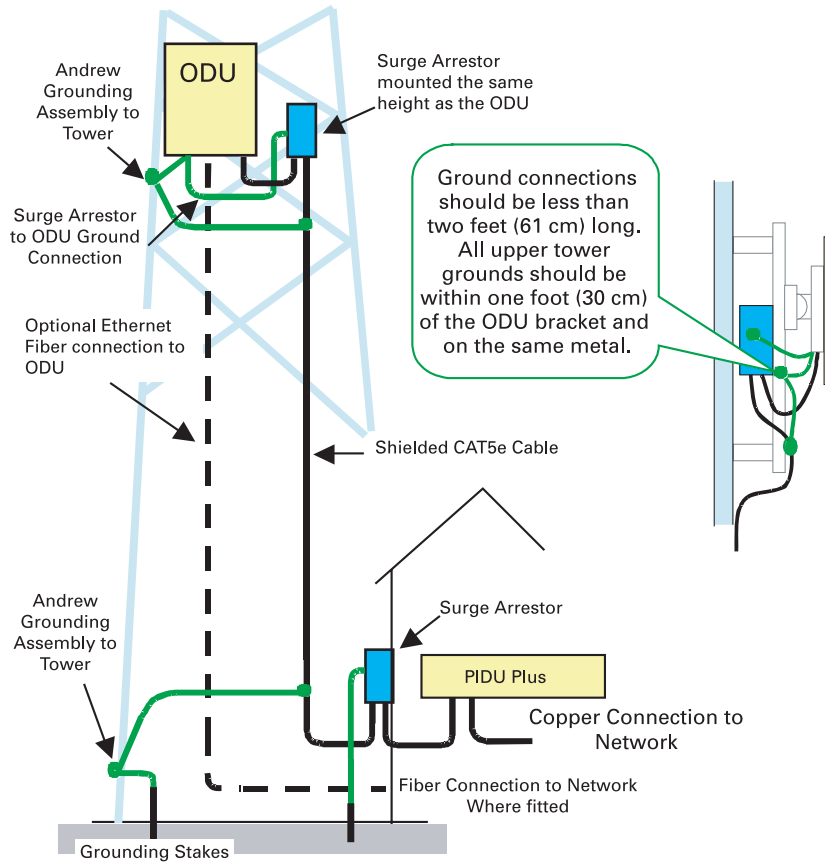
## Introduction

This Technical Note provides you with detailed instructions for setting up lightning arrestors to protect your Motorola PTP 400 and 600 Series bridges. The recommendations provided in this Technical Note will provide the best protection from the harmful effects of electro-magnetic discharge (EMD). The Surge Arrestor (ALPU-ORT) should be used on all PTP 400 and 600 bridge interface ports, including the Ethernet, T1/E1 and power ports. Specifically, this document includes:

- Illustrations showing the placement of your arrestors and the recommended components for installation
- Diagrams indicating the proper wiring procedures

## Recommended Tower/Mast Installation for Motorola PTP 400 and 600 Series Bridges

(Applicable to ODUs marked MODIFICATION STRIKE 2 and above)



### For Use with Tower/Mast Installations

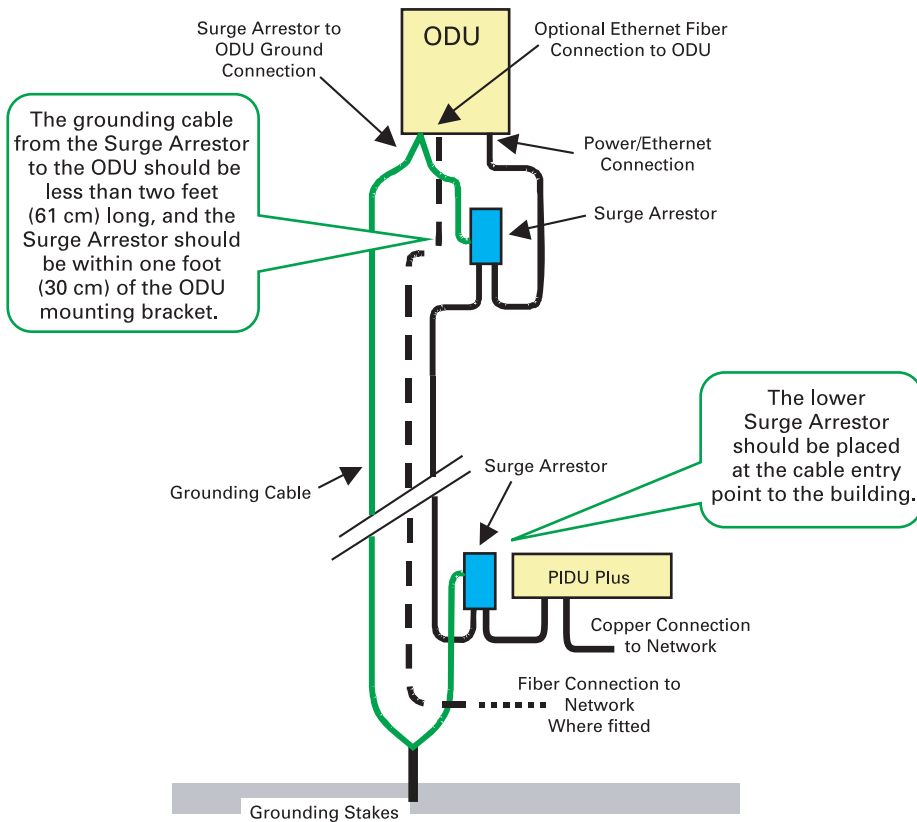
The recommended components for protecting an installation are:

- Grounding Kit – Andrew Type 223158 ([www.andrew.com](http://www.andrew.com))
- Screened CAT5e cable, also known as Shielded Twisted Pair or Shielded CAT5e – DO NOT USE “NON-shielded CAT5e cable.” It will not provide any grounding points or protect from static discharge or lightning strike. There may be a local regulatory requirement to cross bond the CAT5e cable at regular intervals to the mast. This may be as frequent as every 33 feet (10 meters).
- Surge Arrester – ALPU-ORT
- Grounding Stake
- 8 AWG Grounding Cable (minimum gauge)

**NOTE:** Lightning damage is not covered under the Motorola Warranty. When correctly installed, the recommendations on this page and in this Technical Note give the user the best protection from the harmful effects of lightning. However, 100% protection is not implied or possible.

## Recommended Wall-Mount Installation for Motorola PTP 400 and 600 Series Bridges

(Applicable to ODUs marked MODIFICATION STRIKE 2 and above)



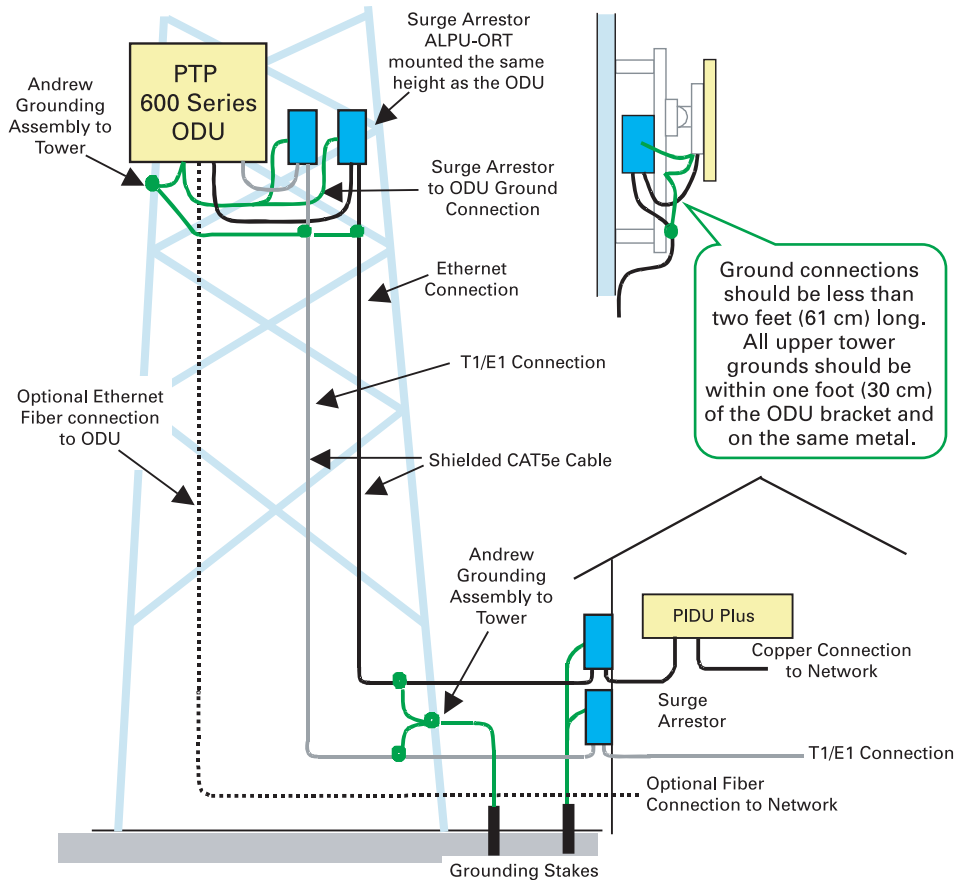
### For Use with Wall-Mount Installations

The recommended components for protecting an installation are:

- Grounding Kit – Andrew Type 223158 ([www.andrew.com](http://www.andrew.com))
- Screened CAT5e cable, also known as Shielded Twisted Pair or Shielded CAT5e – DO NOT USE “NON-shielded CAT5e cable.” It will not provide any grounding points or protect from static discharge or lightning strike.
- Surge Arrestor – ALPU-ORT
- Grounding Stake
- 8 AWG Grounding Cable (minimum gauge)

**NOTE:** Lightning damage is not covered under the Motorola Warranty. When correctly installed, the recommendations on this page and in this Technical Note give the user the best protection from the harmful effects of lightning. However, 100% protection is not implied or possible.

## Recommended Tower/Mast Installation for Motorola PTP 600 Series Bridges with T1/E1



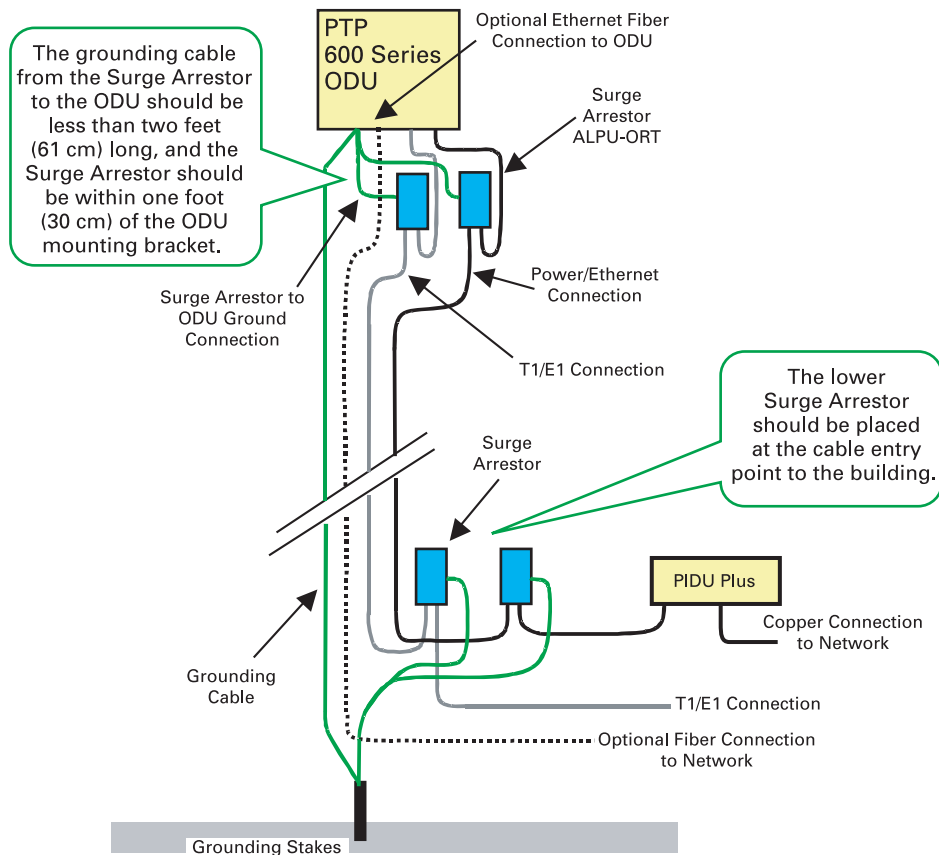
### For Use with Tower/Mast Installations with T1/E1 Cable

The recommended components for protecting an installation are:

- Grounding Kit – Andrew Type 223158 ([www.andrew.com](http://www.andrew.com))
- Screened CAT5e cable, also known as Shielded Twisted Pair or Shielded CAT5e – DO NOT USE “NON-shielded CAT5e cable.” It will not provide any grounding points or protect from static discharge or lightning strike. There may be a local regulatory requirement to cross bond the CAT5e cable at regular intervals to the mast. This may be as frequent as every 33 feet (10 meters).
- Surge Arrestor – ALPU-ORT – 4 per link (or 8 per link with T1/E1)
- Grounding Stake
- 8 AWG Grounding Cable (minimum gauge)

**NOTE:** Lightning damage is not covered under the Motorola Warranty. When correctly installed, the recommendations on this page and in this Technical Note give the user the best protection from the harmful effects of lightning. However, 100% protection is not implied or possible.

## Recommended Wall-Mount Installation for Motorola PTP 600 Series Bridges with T1/E1



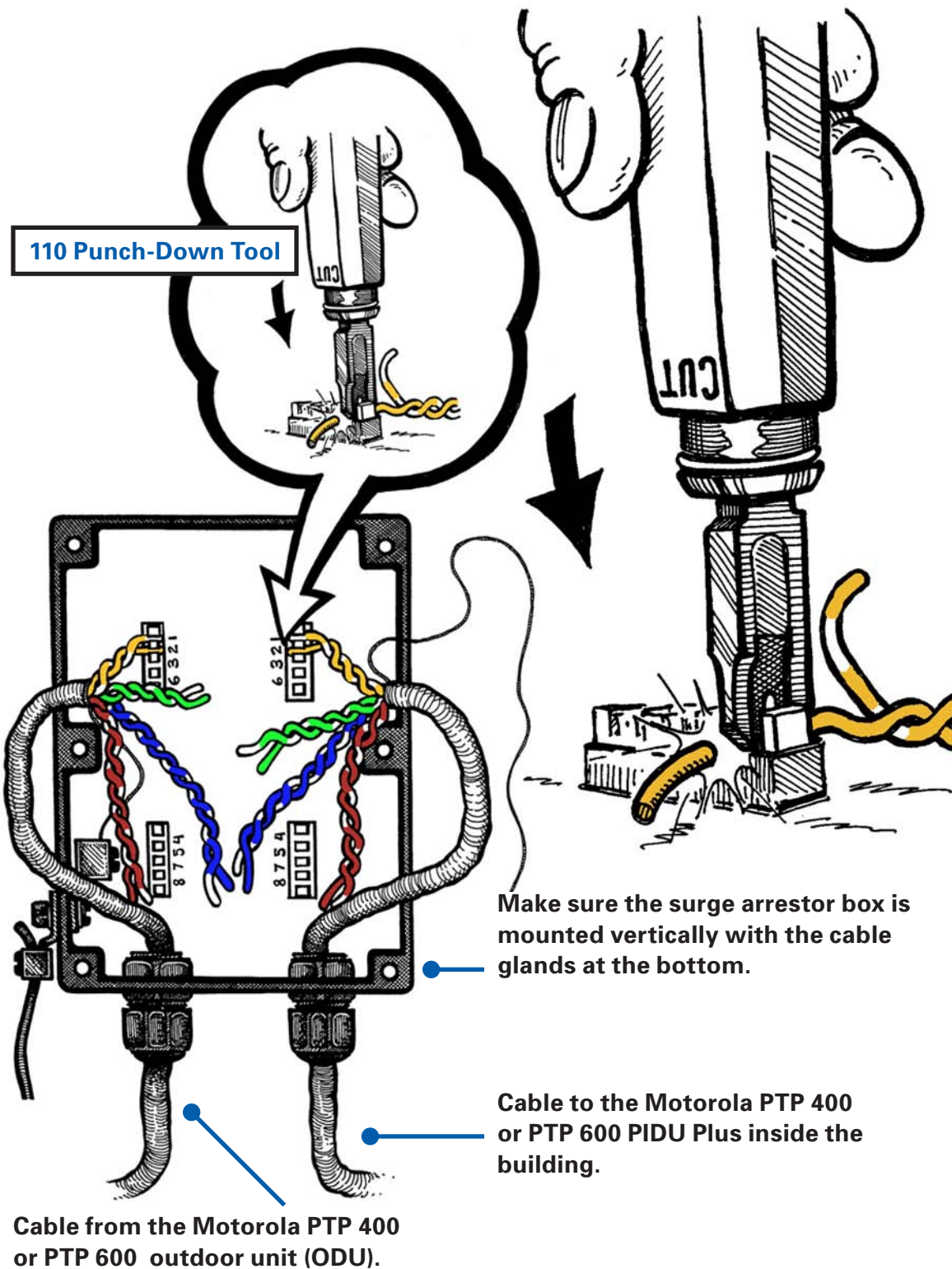
### For Use with Wall-Mount Installations with T1/E1 cable

The recommended components for protecting an installation are:

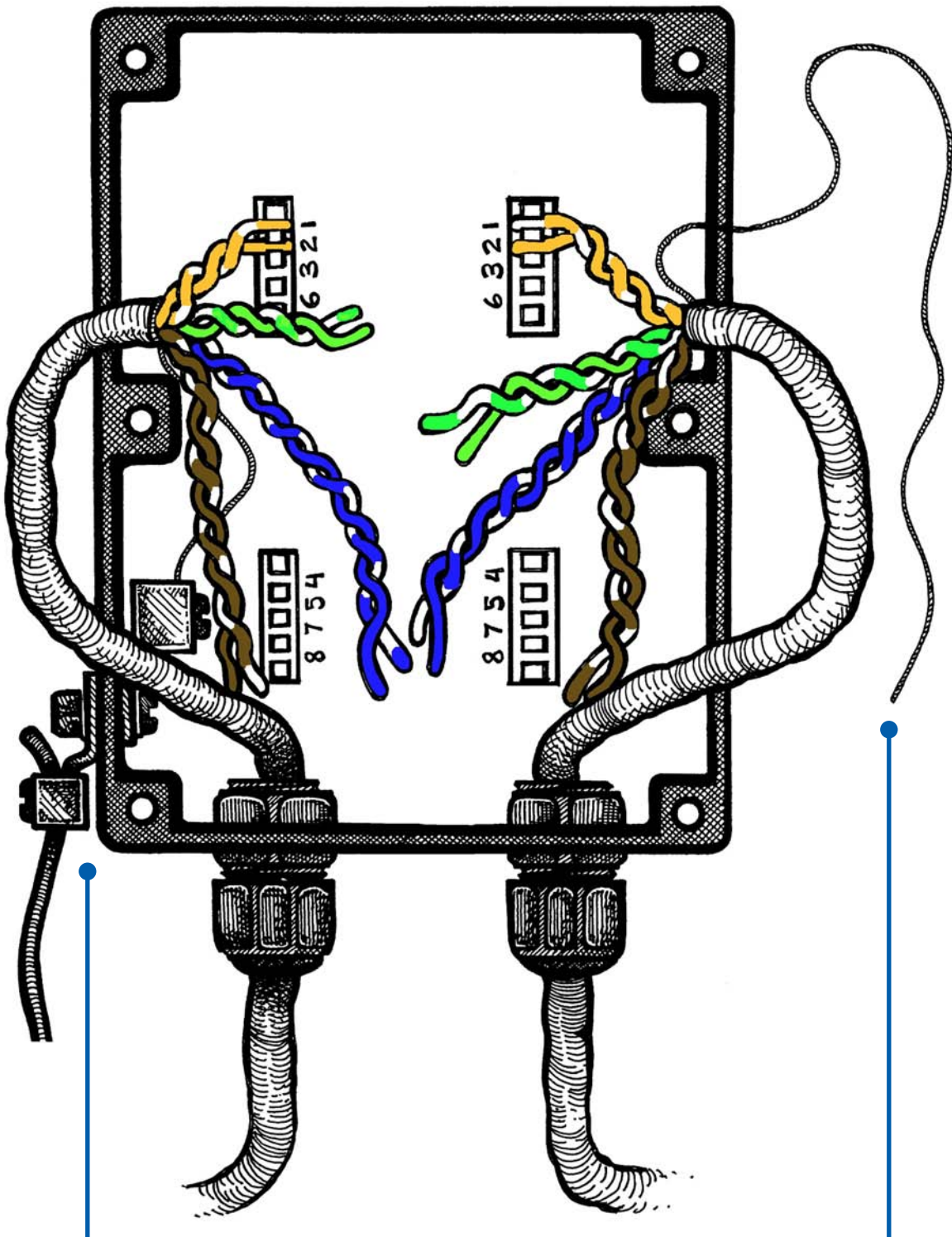
- Grounding Kit – Andrew Type 223158 ([www.andrew.com](http://www.andrew.com))
- Screened CAT5e cable, also known as Shielded Twisted Pair or Shielded CAT5e – DO NOT USE “NON-shielded CAT5e cable.” It will not provide any grounding points or protect from static discharge or lightning strike.
- Surge Arrester – ALPU-ORT – 4 per link (or 8 per link with T1/E1)
- Grounding Stake
- 8 AWG Grounding Cable (minimum gauge)

**NOTE:** Lightning damage is not covered under the Motorola Warranty. When correctly installed, the recommendations on this page and in this Technical Note give the user the best protection from the harmful effects of lightning. However, 100% protection is not implied or possible.

**Installation  
Diagram 1**

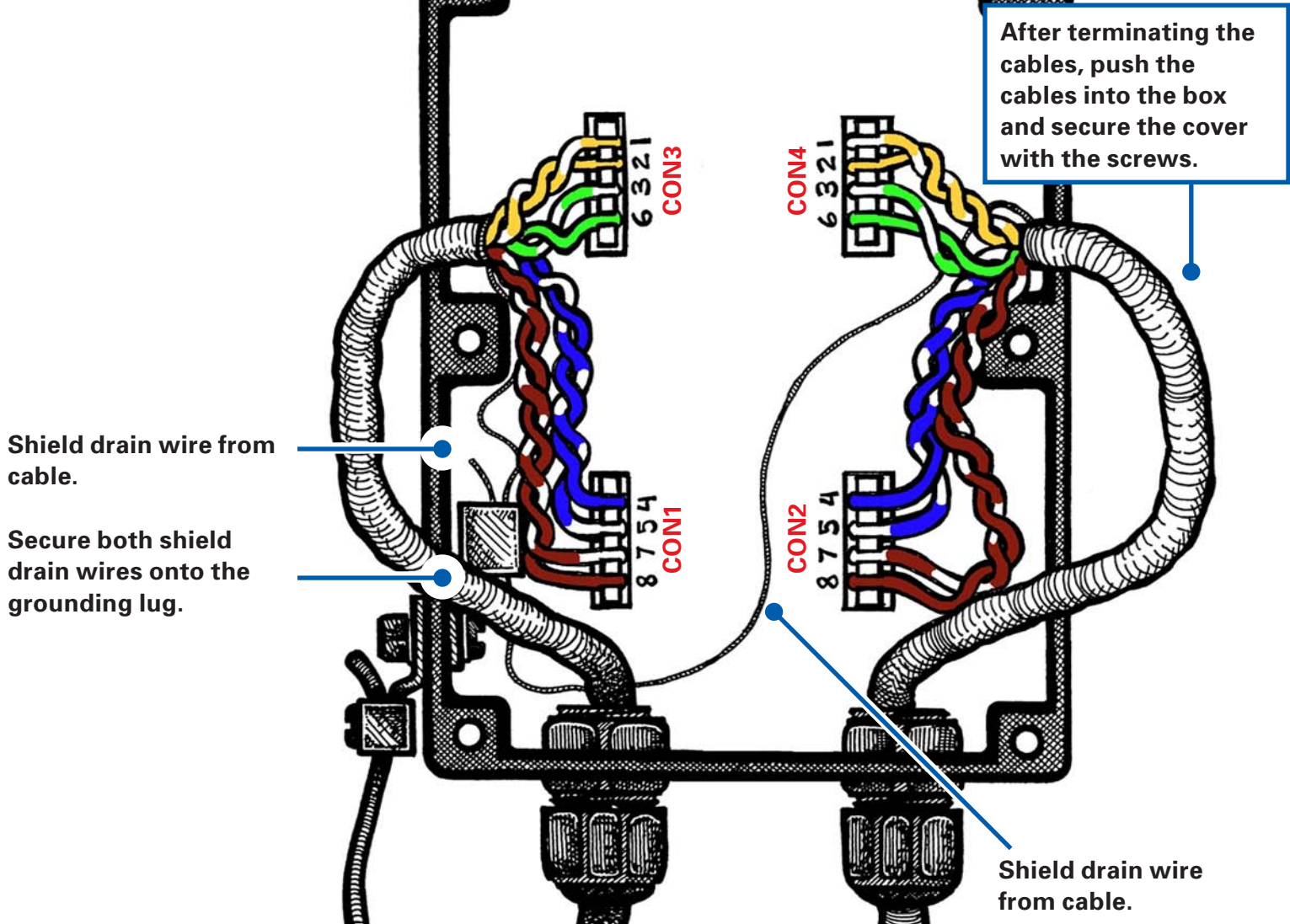


**Installation  
Diagram 2**



**Attach a 6- or 8-gauge ground wire from a verified building ground point to the lug on the side of the suppressor.**

**Installation  
Diagram 3**



Punch down the remaining wires in the color sequence shown above.  
(See the following wiring charts for details.)

Terminal Identification	Conductor	RJ45 Pin
CON3 PIN 1	Orange/White	1
CON3 PIN 2	Orange	2
CON3 PIN 3	Green/White	3
CON3 PIN 6	Green	6
CON1 PIN 4	Blue	4
CON1 PIN 5	Blue/White	5
CON1 PIN 7	Brown/White	7
CON1 PIN 8	Brown	8

**ALPU-ORT Cable 1 Termination**

Terminal Identification	Conductor	RJ45 Pin
CON4 PIN 1	Orange/White	1
CON4 PIN 2	Orange	2
CON4 PIN 3	Green/White	3
CON4 PIN 6	Green	6
CON2 PIN 4	Blue	4
CON2 PIN 5	Blue/White	5
CON2 PIN 7	Brown/White	7
CON2 PIN 8	Brown	8

**ALPU-ORT Cable 2 Termination**

## Pre- and Post-Power Testing for the PTP 400 Series Bridges

### Pre-Power Testing for Motorola PTP 400 Series Bridges

Before plugging in the RJ45 to the PIDU Plus, check the following impedances at the RJ45:

1. Check the cable resistance between pins 7 and 4 at the RJ45 against column 2 in the table.
2. Check the resistance between pins 8 and 5 at the RJ45 against column 3 in the table.
3. Check the resistance between pins 7 and 8 at the RJ45. The value should be greater than 1000 ohms.

CAT-5 Length meters	Resistance pins 4-7 ohms	Resistance pins 8-5 ohms
0	0.0	2.3
10	1.7	4.0
20	3.4	5.7
30	5.1	7.4
40	6.8	9.1
50	8.5	10.8
60	10.2	12.5
70	11.9	14.2
80	13.6	15.9
90	15.3	17.6
100	17.0	19.3

**Resistance Table referenced to the RJ45 at the PIDU Plus**

### Post-Power Testing for PTP 400 Series Bridges

1. Connect the RJ45 to the PIDU Plus and apply power. The power LED should be illuminated continuously. If the power LED does not illuminate, unplug the ODU connection from the PIDU Plus and check the power LED illumination. If the power LED still does not light, then check the power source.
2. The Ethernet LED should be observed starting with 10 slow flashes, 30 seconds after powering. This confirms that the ODU has the correct power connections. If the Ethernet LED does not light, check the wiring to pins 4 and 5 and 7 and 8.
3. If a computer, switch or router is connected to the LAN side of the PIDU Plus, then the Ethernet LED should flash with network activity. If the Ethernet LED does not show Ethernet activity, then the network equipment and the Ethernet cables need to be checked, specifically continuity through to the ODU of pins 1 and 2 and 3 and 6.

## Pre- and Post-Power Testing for the PTP 600 Series Bridges

### Pre-Power Testing for Motorola PTP 600 Series Bridges

Before plugging in the RJ45 to the PIDU Plus, check the following impedances at the RJ45:

1. Check the cable resistance between pins 1 and 2, 3 and 6, 4 and 5, and 7 and 8 at the RJ45 against column 2 in the table.
2. Check the resistance between pins 1 and 3 and 4 and 7 at the RJ45 against column 3 and 4 in the table.

CAT-5 Length meters	Resistance pins 1&2, 3&6, 4&5 and 7&8 – ohms	Resistance pins 1&3 ohms	Resistance between pins 4&7 – ohms
0	0.8	1.0	1.6
10	2.5	2.7	3.3
20	4.2	4.4	5.0
30	5.9	6.1	6.7
40	7.6	7.8	8.4
50	9.3	9.5	10.1
60	11.0	11.2	11.8
70	12.7	12.9	13.5
80	14.4	14.6	15.2
90	16.1	16.3	16.9
100	17.8	18.0	18.6

**Resistance Table referenced to the RJ45 at the PIDU Plus**

### Post-Power Testing for PTP 600 Series Bridges

1. Connect the RJ45 to the PIDU Plus and apply power. The power LED should be illuminated continuously. If the power LED does not illuminate, unplug the ODU connection from the PIDU Plus and check the power LED illumination. If the power LED still does not light, then check the power source.
2. The Ethernet LED should be observed starting with 10 slow flashes, 45 seconds after powering. If the Ethernet LED does not continue to show Ethernet activity, then the ODU is working but there is no network connection. Check that the network equipment is connected and that the wiring to pins 1 and 2 and 3 and 6 is correct.
3. If the Ethernet connection to the network is only 10/100 BaseT, when 1000 BaseT was expected, it is likely there is a fault with the wiring to pins 4 and 5 and 7 and 8.
4. If the Ethernet LED flashes 10 times but irregularly, a short gap followed by a long gap, the ODU has booted in recovery mode. This may be due to either the installation wiring or a corrupted main code image in the ODU.

## Pre-Power Testing for the PTP 600 Series with T1/E1

### Pre-Power Testing for Motorola PTP 600 Series T1/E1 Connections

Before plugging in the RJ45 to the PIDU Plus, check the following impedances at the RJ45:

1. Check the cable resistance between pins 3 and 6 and pins 7 and 8 at the RJ45 against column 2 in the table.
2. Check the cable resistance between pins 1 and 2 and pins 4 and 5 at the RJ45 against column 3 in the table.

CAT-5 Length meters	Resistance between pins 3&6, and pins 7&8	Resistance between pins 1&2, and pins 4&5
0	0.8	1.3
10	2.5	3.0
20	4.2	4.7
30	5.9	6.4
40	7.6	8.2
50	9.3	9.8
60	11.0	11.5
70	12.7	13.2
80	14.4	14.9
90	16.1	16.6
100	17.8	18.3

**Resistance Table referenced to the RJ45 at the PIDU Plus**

## Lightning Protection Guide: Motorola PTP 400 and 600 Series Bridges



**MOTOROLA**

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