

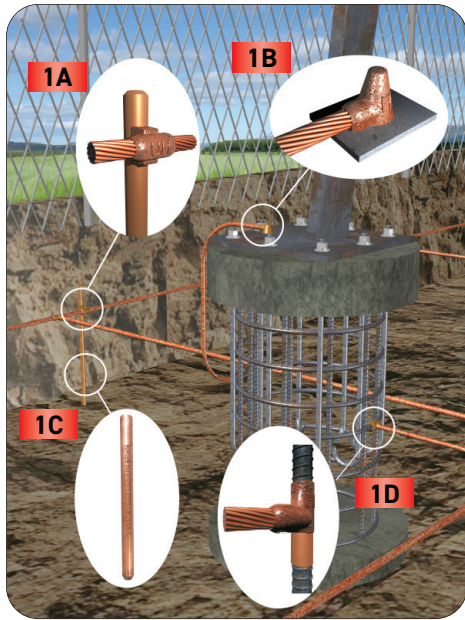
# SUBSTATION GROUNDING



**HARGER**<sup>®</sup>

grounding • exothermic • lightning protection

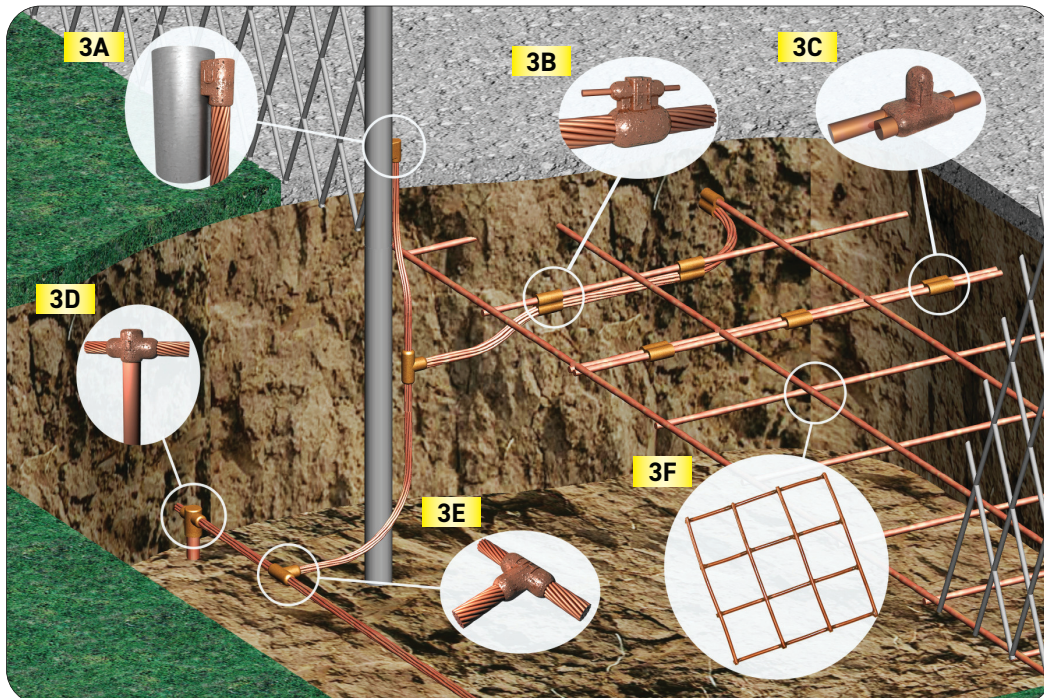




**1** 1A. GS Ultraweld Connection  
 1B. HD Ultraweld Connection  
 1C. Copper Clad Ground Rod  
 1D. RE Ultraweld Connection



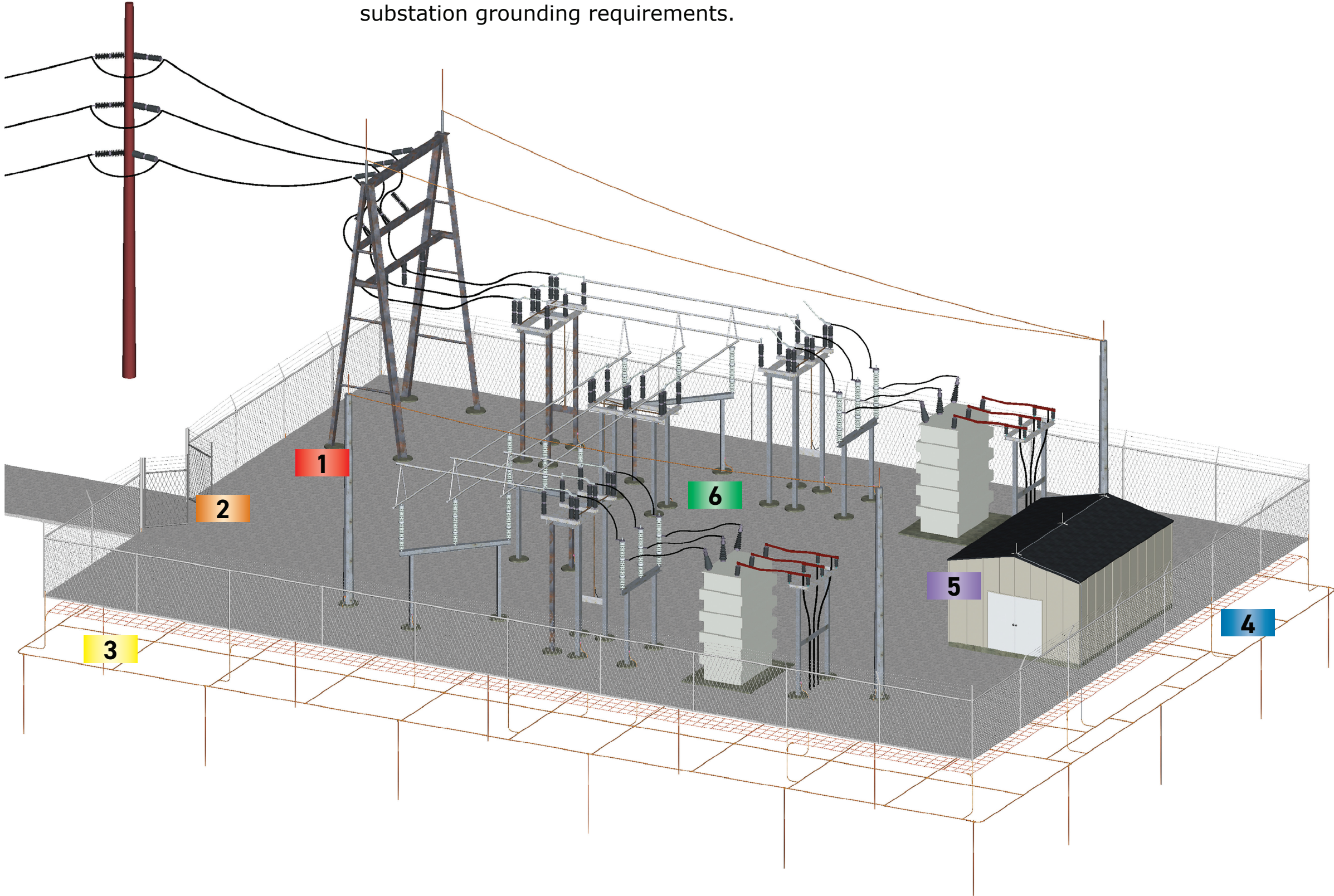
**2** 2A. CPC Series Pipe Clamp  
 2B. Tinned Conductor  
 2C. Fence Fabric Grounding Clamp  
 2D. VD Pipe Ultraweld Connection  
 2E. Flexible Gate Jumper



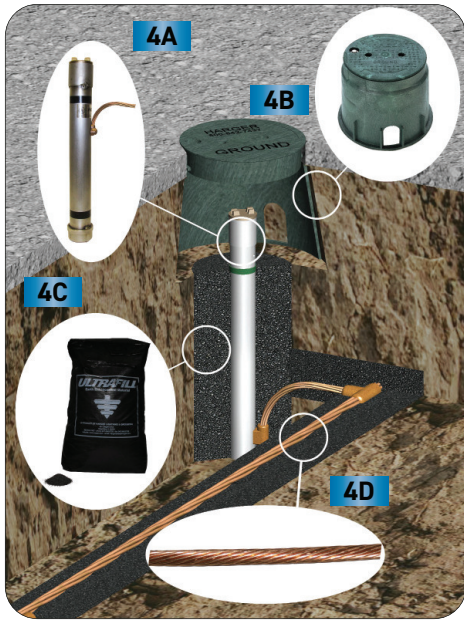
**3** 3A. VD Pipe Ultraweld Connection  
 3B. PT Ultraweld Connection  
 3C. PS Ultraweld Connection  
 3D. GO Ultraweld Connection  
 3E. RT Ultraweld Connection  
 3F. Copper Ground Mesh



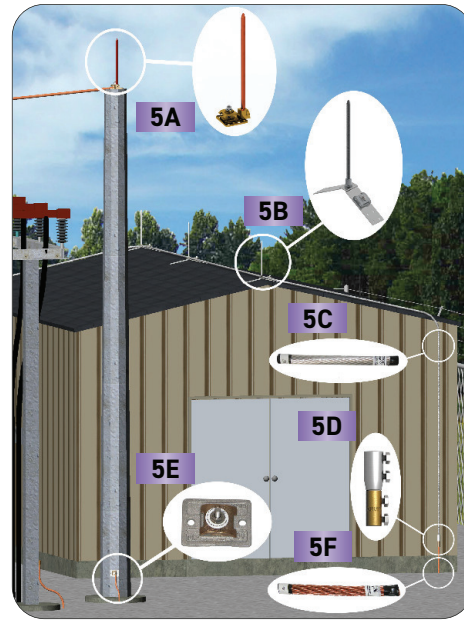
Harger provides a complete line of grounding, bonding and lightning protection products for substations. Harger's leading field services department can help provide solutions for your substation grounding requirements.



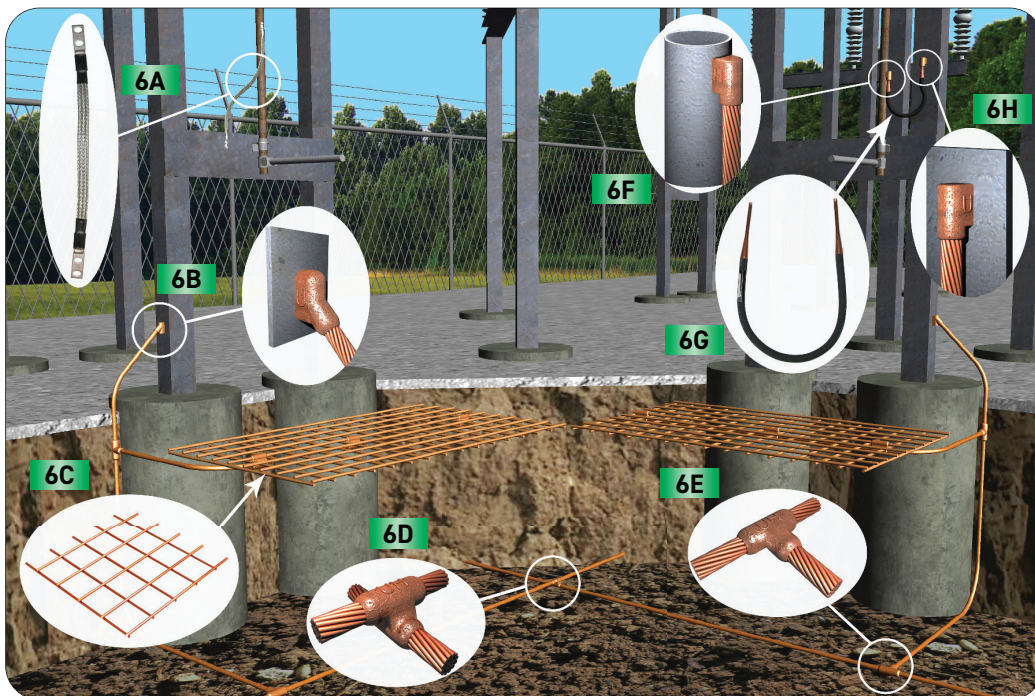




- 4** 4A. Stainless Steel Enhanced Ground Rod  
 4B. Ground Access Well  
 4C. Ultrafill  
 4D. Grounding Conductor



- 5** 5A. Air Terminal Assembly  
 5B. Ridge Saddle Assembly  
 5C. Aluminum LP Conductor  
 5D. Bi-Metal Cable Connector  
 5E. Bonding Plate  
 5F. Copper LP Conductor



- 6** 6A. Flat Braid Bonding Strap  
 6B. VA Ultraweld Connection  
 6C. Personnel Safety Mat  
 6D. XO Ultraweld Connection  
 6E. RT Ultraweld Connection  
 6F. VD Pipe Ultraweld Connection  
 6G. Flexible Gate Jumper  
 6H. VD Ultraweld Connection



# Exothermic Connections

Properly installed exothermic connections are essential to the grid integrity and system reliability for the life of the substation, as well as ensuring safe conditions for workers and the general public.

Harger offers two systems for making exothermic connections, UltraShot® & NUWTube®.

## ULTRAWELDED ULTRASHOT®

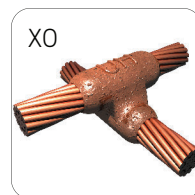
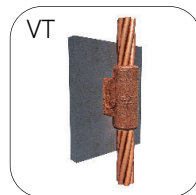
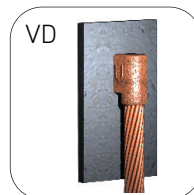
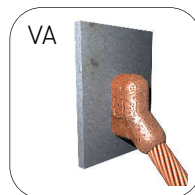
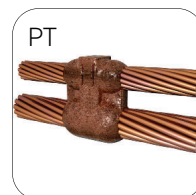
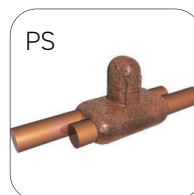
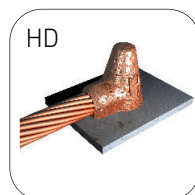
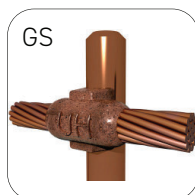


- The Drone, Harger's patent pending handheld electronic ignition system with audible ignition alert produces a high quality connection while eliminating issues associated with starting powder. Eliminating the use of starting powder drastically reduces emissions and extends mold life.
- The Drone uses an 18 volt Milwaukee® lithium ion battery with built-in fuel gauge and makes over 1,000 connections on a single charge.
- The system provides superior safety by allowing the user to maintain a safe distance from the reaction during ignition.
- Reduces labor and material costs due to misfires.

## ULTRAWELDED nuw TUBE®



- Uses the traditional method of ignition with starting powder.
- Innovative dual chamber design keeps weld metal and starting powder separate until point of use.
- Reduces material and labor costs by eliminating migrating starting powder issues.





# Step & Touch Voltage

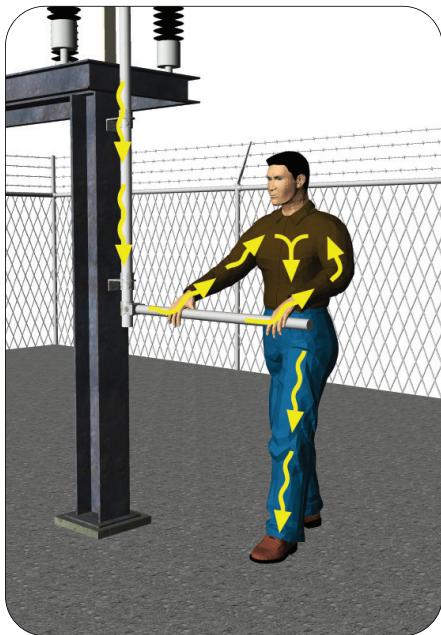


## Step Voltage

Eliminate Step Voltage Threats by providing additional ground conductors (electrodes) in the area of the step voltage hazard such as the perimeter of the Substation Grid.

Options include:

- Additional Grid Conductor
- Additional Ground Rods
- Use of Deep Driven Ground Rods
- Prefabricated Wire Mesh



## Touch Voltage

Eliminate Touch Voltage Threats by providing additional ground conductors in the area of the Touch Voltage hazard such as a switch handle.

Options include:

- Personnel Safety Mats
- Counterpoise Wires



## Harger Lightning & Grounding

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