



WHITE PAPER

Battery Cable Information

This white paper outlines the importance of proper cabling and overviews the leading causes of faulty connections to a battery. You will learn best practice techniques in maintaining your cables to minimize potential problems from occurring.

Introduction

Battery cables provide the vital link between the battery, load and charging system. Faulty connections can lead to poor system performance, affect battery life, or damage battery components. This white paper identifies the main causes of faulty connections and recommends practices that will aide in minimizing problems that may occur.

Loose Connection

The table below shows torque values that should be used when attaching cables to the battery terminals.

Terminal Type	Torque (in lbs)
AP	50 - 70
LT	100 - 120
LPT, HPT, WNT, DWNT, UT	95 - 105
ST	120 - 180

** For DT (Automotive Post & Stud) refer to AP or ST type*

Do not over-torque. Doing so can result in terminal post breakage, terminal post meltdown or a fire.

Clean the cable connectors and the battery terminal posts with a small stainless steel wire brush before connecting them together.

Use two half-thickness lock nuts instead of the standard hex-nut for added security in applications where high shock or vibration may be encountered. Do not use a washer or anything that may interfere with the metal-to-metal contact between the battery terminal post and the cable connector.

Check all connections periodically to make certain that they are and remain tight. Re-torque if necessary.

Corroded Terminals

If corrosion is found on the terminal posts, remove the cables from the battery and clean all mating surfaces. Use a terminal post cleaning brush or a small wire brush. Neutralize the surfaces of the cable connector and terminal post with a solution of baking soda and water and dry thoroughly.

To prevent corrosion, apply a thin coat of petroleum jelly or corrosion inhibitor to the connections after reattaching the cables. Keep the top of the battery clean and dry.

Remove dirt from the top of the battery with a cloth or a brush and a solution of baking soda and water. Do not remove the vent caps during cleaning to prevent any cleaning solution or foreign matter from entering the battery. Finish off by wiping the top with a wet cloth. Dry the top of the battery thoroughly.

Undersized Cable

Battery cable should be sized to properly handle the expected load. Undersized cables can lead to an unacceptable voltage drop and/or increased cable temperature. Refer to the table on the following page for the suggested maximum ampacity for copper wire. Ampacity is the ultimate safe current carrying capacity of the wire before damage occurs to the insulation.

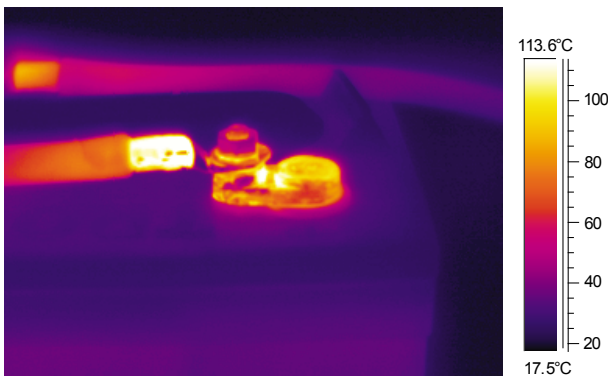
Refer to the National Electric Code or the local code for correct wire size usage.

Wire Gauge Size (AWG)	Ampacity (amps)
14	25
12	30
10	40
8	55
6	75
4	95
2	130
1	150
1/0	170
2/0	265
4/0	360

Improper Connector Assembly

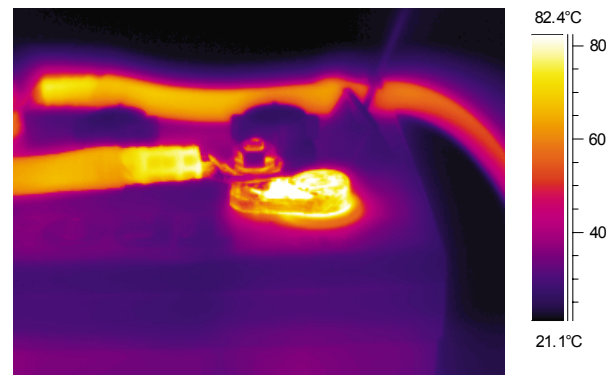
Connectors that are mechanically crimped to the cable’s end will create a high resistance area. At high discharge rates, this resistance can create enough heat to melt the terminal post on the battery and/or melt the adjacent insulation on the cable.

The infrared picture below shows a cable with a crimped connector under a high-rate discharge. Note that the crimped area is considerably hotter than the rest of the terminal post and the cabling. If allowed to continue the high temperature will be transferred to the terminal post through the connector and eventually a melting down of the terminal will occur.



It is therefore highly recommended that connectors not only be mechanically crimped but also soldered to the cable’s end. A properly crimped and soldered connector will provide a low resistance connection and reduce the amount of heat buildup at the connecting junction.

The infrared picture below shows a cable with crimped and soldered connector under a high-rate discharge. Note that the high temperature area is no longer near the connecting junction but evenly distributed along the cable and battery terminal.



Conclusion

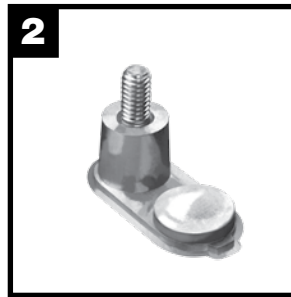
Faulty connection can negatively affect the performance of a battery system and is the leading cause of most battery terminal post meltdowns. By sizing the correct cable, using properly assembled cable connectors, and practicing good maintenance habits, the potential for a problem to occur can be greatly minimized.

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TERMINAL CONFIGURATIONS



LPT
Low Profile
Terminal



HPT
High Profile
Terminal



WNT
Wingnut
Terminal



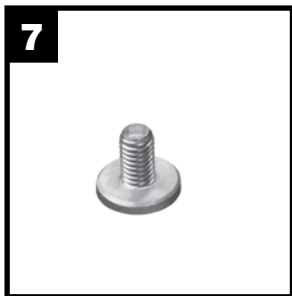
AP
Automotive Post
Terminal



UT
Universal
Terminal



DT
Automotive Post
& Stud Terminal



ST
Stud Terminal



DWNT
Dual Wingnut
Terminal



LT
L-Terminal



For a Trojan Master Distributor near you, call 800-423-6569 or 562-236-3000 or visit us at www.trojanbattery.com.