

Service Bulletins & Tips

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Tips from the Experts – Some tips concerning DC cord, plug, and connector replacements.

MC3 Electronic Controller Selection and Information– A summary of the MC3 electronic controllers available from Lester Electrical and how to choose the right one for your application.

Updated Price Lists – The standard price list for Lester Electrical chargers has been posted to the website.

Previous Issues of Service Bulletins & Tips – All issues of the *Service Bulletins & Tips* Newsletter can be accessed at <http://www.lesterelectrical.com/news/archives.htm>

DC CORD REPLACEMENT

In our first issue of the Service Newsletter, we covered the issue of replacing DC cord sets. In this issue, we go a little more in depth on the topic.

As many of you know, Lester Electrical manufactures almost every component used in our chargers. This includes most DC cords, plugs, and receptacles. The only exceptions are Anderson plugs, which we purchase and install on the cords as requested by customers, and a few customer-specific cords/plugs. Each DC plug and cord set we manufacture goes through a visual and functional inspection process before it leaves the wire assembly department to be used in final assembly of the charger. This inspection process holds true for all service and replacement cord sets, plugs, and receptacles as well.

The DC cord, plug, and mating receptacle are critical parts in the charging process, which is why it is important to properly install these components. We recommend installation of these components at the factory by our trained personnel, but we also understand that this often must be done in the field. If these repairs and installations are completed in the field we recommend that someone with the appropriate training or experience perform them. For those doing this work in the field, there are several items of concern with each of these parts.

DC Cord Information

1. The first thing to mention with any of these repairs is that black is always the negative (-) in DC applications.
2. The primary concern for installing the DC cord on the charger is correctly wiring it to the proper locations inside the charger. Because Lester Electrical manufactures so many different charger models, no single set of instructions can cover all situations. It is best to make note of the previous wiring of the charger and follow that same wiring scheme. We have had some customers even tell us they took a digital picture of the connections inside their charger before taking out the old DC cord, so they have a reference of how it is supposed to be wired. If there is any question on the wiring of your charger, please contact our Service Department at (402) 477-8988 or service@lesterelectrical.com. Also, there are several wiring diagrams available through the Document Search feature on our website at www.lesterelectrical.com.

DC Plug Installation

1. When installing the connector to the DC plug, it is important to have the correct wire

size for the connector/plug you are using. There are a variety of connectors/plugs used in the field such as ring terminals, molded plugs, and Anderson connectors. It is important to know the specifications of each component involved with the connection you are working with. Improper wire size can affect the quality of your connection, especially on crimped connections.

2. Installation of the connector with the correct polarity is also important. Be sure the Positive (+) wire from the charger is correctly installed to the Positive (+) terminal in the connector. The same goes for the Negative (-) side. Continuing this, ensure the mating receptacle is wired correctly to match the connector, especially if both parts of the connection were replaced.

DC Receptacle Installation

It's not uncommon to see chargers returned a second time for service with a plug showing signs of heat damage that had been replaced previously. This condition is the result of a poor connection between the plug and its mating receptacle. Replacing only one-half of a poor electrical connection will seldom correct the potentially dangerous condition that is present. Therefore, upon inspection, we recommend to "look both ways" at the connection, inspecting both the plug and receptacle. On plugs that show signs of heat damage, we recommend replacing both the plug and the mating receptacle, to ensure a proper connection and reduce the risk of further damage down the road.

A plug with signs of heat buildup is a warning sign of a potential for a catastrophic failure of the connection, which may result in extensive equipment damage or fire. It's always good practice to replace the mating receptacle whenever the DC cord set is replaced.

NOTE: If this condition is found on the AC cord of the charger, be sure to have a qualified electrician service the AC receptacle the charger had been connected to.

MC3 ELECTRONIC CONTROLLER SELECTION AND INFORMATION

This article is a guide to help you choose the correct timer/controller for your application. If you have any doubts as to which controller to select, please contact Customer Service at Lester Electrical for advice.

Our traditional 3-layer CT timer boards will be phased out and replaced with our MC3 controllers. The details describing operating features, parameters, and application of the MC3 controller follows.

Maximum Normal Charge Time – 20 hours is the longest the electronic controller will allow the charger to operate. If the charger does not reach the peak on-charge battery voltage required to charge a battery pack within 20 hours, the maximum charge time shutoff will occur, preventing overcharging the batteries. Batteries that do not accept a charge in this time are typically beyond their useful life or are too large for the charger.

Under-Voltage Shutoff Level – Under normal conditions a battery system that is properly matched to a charger should respond to charging by an increase in voltage. A battery system that does not increase in voltage may no longer have useable capacity or may be the incorrect size system for the charger. The new MC3 timers will terminate a charge cycle after 10 minutes if the battery system voltage does not obtain the following minimum thresholds:

Minimum Threshold Voltage	Battery System Voltage Rating
9	12
18	24
33	36
48	48

Over-Voltage Shutoff Level – An over-voltage state will occur if the voltage reaches this

level at any time. This indicates and limits the charging of wrong voltage battery systems. The maximum voltage values per battery system size are:

Maximum Threshold Voltage	Battery System Voltage Rating
16.8	12
33.6	24
50.4	36
64.0	48

Traditional battery charging algorithms originally developed and patented by Lester Electrical have been optimized – the MC3 controllers continuously sample the instantaneous voltage and the rate of increase over time (V/T) to precisely determine when the batteries are fully charged. Charger shutoff occurs when 2.5 to 2.6 volts per cell is reached while the voltage increases at a rate of less than .012 volts over 30 minutes.

MC3 controllers and CT timers do not perform a ‘maintainer’ battery charging role. They will NOT automatically start a charge cycle when the batteries need charging if left unattended for any length of time. They will perform one charge cycle only and will need an AC or DC reset as described below to restart.

If, for example, you anticipate that your golf cart will not be used for the next 4 months, we suggest that you manually disconnect and reconnect the AC and DC plugs on the charger once a month to perform a charge cycle. We discourage continuously leaving the charger connected to both AC and the batteries due to potential damage caused by lightning strikes, power outages, and power fluctuations.

1. Shelf mounted (SH) or portable chargers have a quick-disconnect DC plug that is inserted into a matching female receptacle on the machine to be charged. These plugs may be the traditional Lester ‘crowfoot’ with two protruding flat blades at a 60° angle, the industry-standard Anderson SB series, or one of the unique plugs proprietary to OEMs such as those used by Club Car, E-Z-Go, Yamaha and other manufacturers.

Chargers with **SH** timer/controllers must have the DC plug removed and reinserted to restart once they have turned off after a charge cycle. This DC interrupt design is intended to prevent the unwanted starting of a charger in the event of a local power loss. Because of this need for a DC interrupt **SH** timer/controllers will NOT work with chargers that have the DC output wires ‘hard-wired’ or permanently connected to the batteries common to onboard or built-in chargers

2. Built-in (BI) or onboard chargers do not have quick-disconnect plugs. The DC output wires are ‘hard-wired’ or permanently connected directly to the battery pack, and usually terminate with ring terminals. Built-in and onboard chargers are permanently mounted on the machine they charge, yet can also be used in a shelf mounted or portable application when a DC plug is installed.

Chargers with **BI** timers must have the AC plug removed and reinserted into the AC wall outlet to restart once they have turned off after a charge cycle.

The majority of our 24 and 36-volt timers have been replaced with the MC3, with the 12 and 48-volt timers to follow.

24 Volt Controllers

Controller part number **24800S** is a **BI** application and replaces these timers:

09662S

11890S

11995S

20585S

21805S

Controller part number 24920S is a SH application and replaces these timers:

12955S

13235S

14345S

36 Volt Controllers

Controller part number **24840S** is a **BI** application and replaces these timers:

09685S

15005S

15470S

18635S

22790S

Controller part number **24925S** is a **SH** application and replaces these timers:

06234S

06357S

09560S

12545S

12575S

14890S

Installation instructions for these controllers can be found at our website in the Service Topics under the Tech Service section. The website for this is at <http://www.lesterelectrical.com/techservice/topics.htm>.

For pricing and availability on any of the above-mentioned products, please contact one of our Sales Representatives at (402) 477-8988.

UPDATED PRICE LIST

As most of our customers know, new pricing on chargers went into effect on February 1st. Since then, we have put together an updated price list that better reflects our product offering. This new price list is now posted on our [Products section](#) on the Lester Electrical website. In addition to pricing, the new price list includes AC input and DC output specifications, case dimensions, shipping weight, DC Plug option pricing, and terms.

While this price list is representative of the various chargers and plugs we manufacture and offer, it is not an all-inclusive list. As many of you know, we manufacture over 400 different models of chargers every year. If you do not see a charger that specifically meets your needs on the Price List, please call one of our Customer Service representatives at (402) 477-8988 (ask for Technical Service) and they will gladly help you find what you are looking for. Or if you do not require an immediate response, feel free to send an email with your inquiry to service@lesterelectrical.com.