BALMAR®
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DC CHARGING SOLUTIONS

Digital Duo Charge
DDC-12/24



INSTALLATION AND OPERATION MANUAL

Introduction

The Digital Duo Charge provides a safe method to charge your engine starting battery. Unlike switches, isolators and other charge splitting devices, the Digital Duo Charge installs between the vessel's house and starting batteries rather than between the alternator and batteries. This allows the alternator and regulator to concentrate output based on the house battery's needs. When the Digital Duo Charge senses charging voltage at the house battery, it works like a DC-to-DC battery charger, providing up to 30 amps of regulated charging current to support the starting battery.

In most installations, the Digital Duo Charge requires just four wires for operation; a fused input wire, a fused output wire, a ground wire and an ON/OFF wire. In applications where the Digital Duo Charge is used to supply a battery bank that may require more than 30 amps of regulated charging current, the Digital Duo Charge may be used to manually control an external solenoid. Please note the section in the manual relating to solenoid control.

The Digital Duo Charge is designed specifically to enable its user to control charging voltage output -- making it possible to safely mix house and starting battery technologies. The Digital Duo Charge features four different programs based on four battery technologies: Standard Flooded, Deep Cycle Flooded, Gel and AGM battery types. In addition, the Digital Duo Charge can be programmed for 12-volt or 24-volt operation. When used with an optional Battery Temperature Sensor cable (MC-TS-B), the Digital Duo Charge responds to a battery over-temperature condition by automatically discontinuing charging output.

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Safety Considerations

Before installing your Digital Duo Charge, please take a moment to consider these guidelines for safe regulator installation. Failure to work safely could result in injury or damage to your electrical system.

1. *Always disconnect your battery banks and ensure that switches are "OFF" prior to installing your regulator.*
2. *Remove loose-fitting clothing or jewelry, which could become entangled in your motor or other machinery.*
3. *Wear ANSI-approved safety glasses.*
4. *DO NOT modify the Digital Duo Charge. Alterations could result in damage, and will void your warranty.*
5. *DO NOT attempt installation if tired or fatigued.*
6. *Ensure the engine has cooled before initiating installation.*
7. *DO NOT attempt installation while using alcohol or medication that could impair your judgment or reaction time.*
8. *Always use the right tool for the job. Improper tool use may damage regulator or your boat and could result in personal injury.*
9. *Take time to read the manual. Equipment damage and possible injuries may result from an incomplete understanding of the installation and operation of the Digital Duo Charge. If you are unfamiliar with DC electrical systems, consult with a licensed marine electrician.*

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Unpacking The Box

Prior to installing the Digital Duo Charge, we recommend that you inventory the contents of the packaging and ensure that the following items are included. Contact Balmar Customer Service at 360-435-6100 if any items listed below are missing.

- Digital Duo Charge
- Input Cable (Includes two ring terminal connectors and 30-amp ATC fuse and fuseholder)
- Output Cable (includes one ring terminal and one butt connector, with a 30-amp ATC fuse and fuseholder)
- Programming screwdriver (magnetic tip at end of screwdriver handle is used for programming, not the blade end)
- DDC-12/24 Quick Strike Guide

Installation Basics

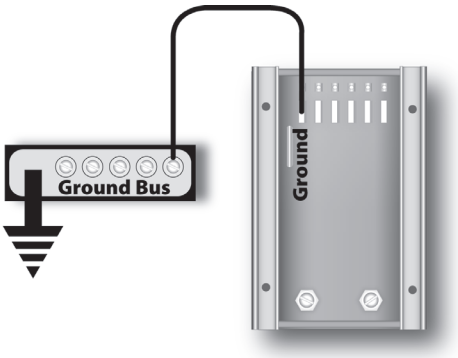
The Digital Duo Charge MUST be mounted within the length of the Input Cable from the house battery. Four mounting holes are included on the mounting tabs of the Digital Duo Charge. Ensure that the mounting location is protected from moisture and temperatures in excess of 120º F. The Duo Charge should be installed far enough from inverters, navigational, and communications equipment to ensure protection from radio frequency noise. The location of the Digital Duo Charge should make it possible to easily view its LED display. The short length of the Input Cable and longer Output Cable allow the wiring to act like an electric spring, enabling the Digital Duo Charge to address high battery loads more efficiently.

Wiring Basics

Once installed as described above, the Digital Duo Charge can be wired for proper operation. The following sections will describe the recommended connection points for optimal charging performance. The four following connections are required.

Ground Wire

The Digital Duo Charge must be properly connected to system ground, which must be shared between the house and starting battery banks, for proper operation. Failure to do so will result in non-operation and potential damage to the device. Connection to system ground can be made at one of the following: house battery negative post, starting battery negative post, or system ground bus. User-supplied 14-gauge wire is recommended. To install the ground wire:

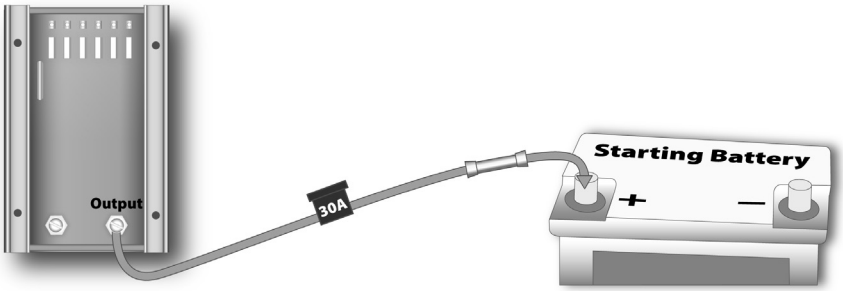


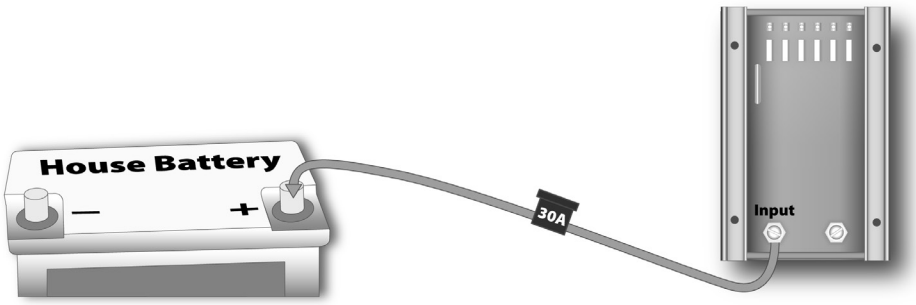
1. Select a length of 14-gauge wire long enough to extend from the Ground Terminal on the Digital Duo Charge to your intended ground source, such as a ground bus as shown at right.
2. Crimp appropriately-sized ring terminal and 1/4” female spade connector to the wire ends.
3. Connect the female spade terminal to the Ground Terminal on the Digital Duo Charge.
4. Connect the ring terminal to the desired ground source.

Output Cable

The Digital Duo Charge includes a 30-amp, fused 10-gauge cable with one ring terminal and a butt connector terminal. The installer must supply the length of 10-gauge wire required to extend to the starting battery from the butt connector end of the Output Cable. A minimum run of eight feet of wire from the Output Cable to the starting battery is recommended. Again, the reason for the extra wire length is to act like an electric spring which allows the Digital Duo Charge to produce a higher current. To install the Output Cable:

1. Attach the Output Cable’s ring terminal to the starting battery positive post.
2. Determine the correct length of 10-gauge wire to extend from the Output Cable to the Digital Duo Charge. Connect at the butt connector. Attach a ring terminal connector at the end of the 10-gauge wire and connect to the Digital Duo Charge output terminal.





Input Wire

The Digital Duo Charge includes a 30-amp, fused 10-gauge cable with two ring terminals. To install the Input Cable:

1. Connect the larger of the two ring terminal connections to the positive post of your house battery. Most marine batteries will include a secondary stud on the battery lug that will provide a satisfactory connection point.
2. Connect the smaller of the two ring terminal connections to the input terminal of the Digital Duo Charge.

While it may be more convenient to mount the Digital Duo Charge a further distance than is allowed by the length of the Input Cable, we strongly recommend limiting that distance to the length provided. Again, the shorter length of the input wire allows for a longer run of the output side of the Digital Duo Charge wiring to add greater ability to address larger loads.

ON/OFF Wire

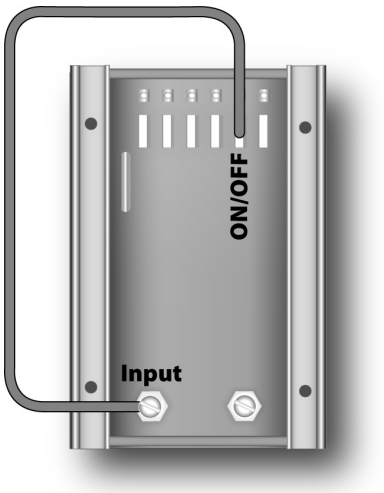
The fourth and final wire required for basic operation is the ON/OFF wire, which supplies either switched or constant power to the Digital Duo Charge. If automatic activation of the Digital Duo Charge is desired whenever a source of charging is available at the house battery bank, the ON/OFF wire can be connected directly to the positive post of the house battery or at the Input terminal of the Digital Duo Charge (as shown in diagram at right).

When connected directly to house battery voltage, the Digital Duo Charge will remain in a sleep mode whenever input voltage remains below 13 volts in a 12-volt charging system, or 26 volts in a 24-volt charging system. When voltage at the Input terminal exceeds that voltage threshold, the Digital Duo Charge will provide charging current to the starting battery. When used in this mode, the Digital Duo Charge will require a nominal amount of current while asleep (approximately 500mA). If the vessel remains disconnected from a charge source for an extended period, the Digital Duo Charge can be disabled by disconnecting the ON/OFF wire from the ON/OFF terminal, or by installing and using an ON/OFF toggle in the ON/OFF wire.

If the Digital Duo Charge is only intended for use when the house battery is being charged by the alternator and regulator, the ON/OFF wire can be connected to the same switched voltage source that's used to supply the voltage regulator's ignition circuit.

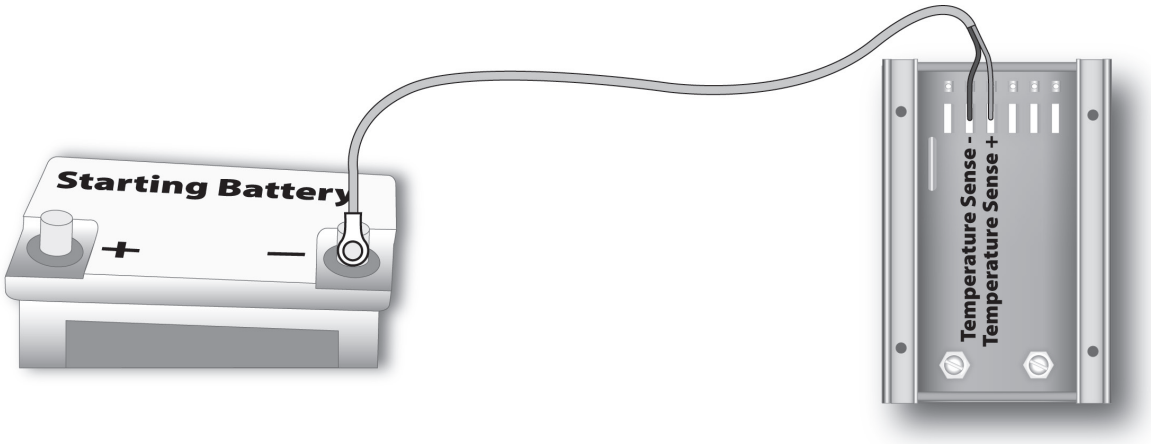
To install the ON/OFF wire:

1. Determine the preferred method for Digital Duo Charge activation, and the preferred source for ON/OFF voltage.
2. Provide a length of 14-gauge wire suitable for the intended voltage source and the Duo Charge.
3. Attach one appropriately sized ring terminal or other suitable termination connector, and a 1/4" female spade connector to the ends of the wire.
4. Plug the 1/4" spade terminal onto the Digital Duo Charge's ON/OFF connector pin.
5. Connect the other end of the wire, as required, to the desired source of ON/OFF voltage.



Optional Wiring Connections

While the Digital Duo Charge does provide full functionality with the basic four-wire connections discussed above, there are a number of optional functions which may provide additional capacity or intelligence. These include battery temperature sensing and solenoid control, which enables the manual bypass of the Digital Duo Charge's internal circuitry and activation of a solenoid drive circuit that can be used in conjunction with a higher capacity solenoid relay.



Battery Temperature Sensor

When used in conjunction with the optional MC-TS-B Battery Temperature Sensor, the Digital Duo Charge can automatically respond to a potential battery thermal runaway by discontinuing charging output to the starting battery — adding a level of safety to the charging system. To install the MC-TS-B Battery Temperature Sensor:

1. Attach the lug that houses the sensor module to the negative post of the starting battery.
2. Using care to match polarity between the temperature sensor positive and negative wires and the positive and negative temperature sensor terminal pins on the Digital Duo Charge, connect wires to the terminal pins.

Solenoid Drive

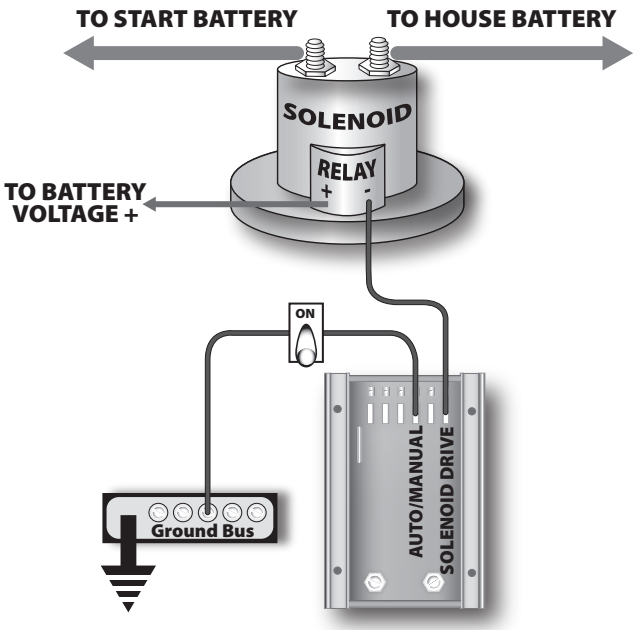
In applications where the Digital Duo Charge is used to support larger capacity starting batteries (such as 4D and 8D models) or windlass and/or thruster batteries, there may be instances when the 30-amp capacity of the Digital Duo Charge's circuitry may not provide sufficient current to satisfy demands. When used as a standalone charge source, the Duo Charge is designed to discontinue charging when demands exceed its capabilities. At that point, the Digital Duo Charge will wait for a short period and query if the demand has diminished to below its 30-amp capacity. If so, the Digital Duo Charge will continue charging. If demand continues to exceed capacity, the Digital Duo Charge will continue to shut down, while periodically checking to see if demand has diminished.

If your application requires frequent charging levels in excess of 30 amps, it may be necessary to add a solenoid as a method to manually bypass the Digital Duo Charge's internal circuitry. Keep in mind, the Digital Duo Charge will not automatically activate the solenoid if the demand exceeds its capacity. As such, it is important to monitor charging voltage closely at the battery being charged by the Digital Duo Charge. To utilize the Digital Duo Charge's solenoid drive function, it will be necessary for the user to supply an appropriate-capacity solenoid and a toggle or other ON/OFF switching mechanism to control the bypass function.

To install the external solenoid control circuit:

1. Install solenoid between primary and secondary battery banks. Ensure that solenoid is properly sized to handle maximum current flow. Ensure that wire gauge is adequate to supply maximum current flow.
2. Connect positive solenoid relay terminal to a source of positive system voltage.
3. Connect the negative solenoid relay to the Solenoid Drive terminal on the Digital Duo Charge.
4. Create a switched circuit between system ground and the Auto/Manual terminal on the Digital Duo Charge.

Once installed, the Duo Charge will be in the Auto mode whenever the toggle switch is in the OFF position, and charging will occur via the Digital Duo Charge's internal circuitry. When the toggle switch is in the ON position, the Duo Charge will revert to manual mode, allowing the solenoid to control charge flow to the secondary battery bank.



Digital Duo Charge Operation

When the four required wires are connected to the Digital Duo Charge, a start-up sequence will initiate on the Duo Charge's six color-coded LED display. When powered up, the LEDs will:

1. Illuminate from right to left (amber to green) four times, indicating that the Digital Duo Charge is set for 12-volt operation.
2. Illuminate the #1 and #2 amber LEDs, followed by a green LED, indicating battery program type. The #3 green indicates Standard Flooded; the #4 green indicates Deep Cycle Flooded; the #5 green indicates gel; and the #6 green indicates AGM.
3. Illuminate the #1 amber, followed by a combination of green LEDs, indicating low voltage activation. See the Balmar Digital Duo Charge web page for detailed values for low and high voltage settings.
4. Illuminate the #2 amber, followed by a combination of green LEDs, indicating maximum voltage ouput.
5. Illuminate the #3 green LED, indicating that the Digital Duo Charge is in operation.

If, upon start up, the Digital Duo Charge display deviates from the sequence above, or if the #3 LED begins to blink, proceed to the troubleshooting instructions.

The Digital Duo Charge performs like a DC to DC battery charger. When the Digital Duo Charge recognizes 13 volt or greater on the input terminal the Digital Duo Charge will turn on and start passing current to the start battery.

The maximum output amperage of the Digital Duo Charge is 30 amps. When used as a stand alone charge source, the Digital Duo Charge is designed to discontinue charging when demands exceed its capabilities. At that point, the Digital Duo Charge will wait for a short period and query if the demand has diminished to below its 30-amp capacity. If so, the Digital Duo Charge will continue charging. If demand continues to exceed capacity, the Digital Duo Charge will continue to shut down, while checking periodically to see if demand has diminished. So, if you decided to install the Digital Duo Charge to charge a bow thruster battery, windlass battery or a battery that can be highly discharged the Digital Duo Charge may go into the over current condition because the demand is greater than 30 amps. If you intend to use the Digital Duo Charge to support charging at a larger battery with demands greater than a typical starting battery, please contact Balmar Customer Service at 360-435-6100 for technical support.



If your application requires frequent charging levels in excess of 30 amps, it may be necessary to add a solenoid as a method to manually bypass the Digital Duo Charge's internal circuitry. Keep in mind, the Digital Duo Charge will not automatically activate the solenoid if the demand exceeds its capacity. As such, it is important to monitor charging voltage closely at the battery being charged by the Digital Duo Charge.

To utilize the Digital Duo Charge's solenoid drive function, it will be necessary for the user to supply an appropriate-capacity solenoid and a toggle or other ON/OFF switching mechanism to control the bypass function.

Programming The Digital Duo Charge

The Digital Duo Charge features four selectable program types for the following battery types: standard flooded, deep cycle flooded, gel and absorbed glass mat (AGM). Program changes are made by activating a magnetic reed switch located on the Digital Duo Charge circuit board with the magnetic tipped programming tool provided. In addition to battery type, the Digital Duo Charge can be programmed to support 12-volt or 24-volt charging systems.

Programming For System Voltage - 12 to 24 Volt

The Digital Duo Charge is preset at the factory for 12-volt operation. To adjust the Duo Charge for 24-volt charging:

1. Remove the wire supplying the ON/OFF terminal from the ON/OFF pin.
2. Place the magnetic end of the programming screwdriver on the RED dot (or against one or the other end of the reed switch).
3. Reconnect the wire to the ON/OFF terminal while continuing to hold the magnet against the RED dot. After a couple of seconds, the #3 green LED will illuminate. Continue to hold the magnet to the switch.

Programming The Digital Duo Charge (Continued)

4. After a few additional seconds, the #3 green and #4 green will both illuminate. Remove the magnet from the switch. Wait until the green LEDs go dark.
5. After saving the program change, the display will indicate 24-volt mode by scrolling from left to right (green to amber) at start up.

Programming For System Voltage - 24 to 12-Volt

1. Remove the wire supplying the ON/OFF terminal from the ON/OFF pin.
2. Place the magnetic end of the programming screwdriver on the RED dot (or against one or the other end of the reed switch).
3. Reconnect the wire to the ON/OFF terminal while continuing to activate the reed switch with the magnet. After a couple of seconds, the #3 green LED will illuminate.. Continue to hold the magnet to the switch.
4. After another couple of seconds, the #3 green and #4 green will both be illuminated. Remove the magnet from the switch. Wait until the green LEDs go dark.
5. Re-activate and hold the magnet to the switch. After a couple of seconds, the #3 green LED will illuminate. Continue to hold. After several seconds, the #3 green and #5 green LEDs will illuminate. Release the magnet. After saving the program change, the display will indicate 12-volt mode by scrolling from right to left (amber to green) at start up.

Program #1 - Standard Flooded	◯ ◯ ◯ 3 2 1
Program #2 - Deep Cycle Flooded	◯ ◯ 4 ◯ 2 1
Program #3 - Gel	◯ 5 ◯ ◯ 2 1
Program #4 - Absorbed Glass Mat (AGM)	6 ◯ ◯ ◯ 2 1

Programming For Battery Type

The Duo Charge's factory default program is suitable, right out of the box, for the majority of cranking-type batteries – and will require no programming after installation. Some technologies, however, may benefit from some voltage adjustment. Four programs, based on standard flooded, deep cycle flooded, gel and AGM battery types are included in the Duo Charge's programming mode. To select the program that's best suited to your battery type:

1. Ensure that the #3 green LED is illuminated. Place the magnetic end of the programming screwdriver on the RED dot (or against one or the other end of the reed switch).
2. Continue to hold the magnet against the switch. After several seconds, the #3 green LED will go dark, and the #1 and #2 amber LEDs will illuminate.
3. Continue to hold the magnet against the switch. After several seconds, the #1 and #2 amber and the #3 LEDs will be illuminated.
4. Continue to hold the magnet to the switch. After a few more seconds, the #3 green light will go dark and the next green LED will illuminate.
5. When the green LED indicating your desired battery type is illuminated, release the switch by removing the magnet.
6. Should you need to change the programming selection, activate and hold the switch until the #1 and #2 amber and #6 green LEDs are illuminated. Release the switch until the LEDs go dark. Re-activate the switch. The LEDs will illuminate, and the green LEDs will scroll the opposite direction.

Programming Lower And Upper Voltage Limits

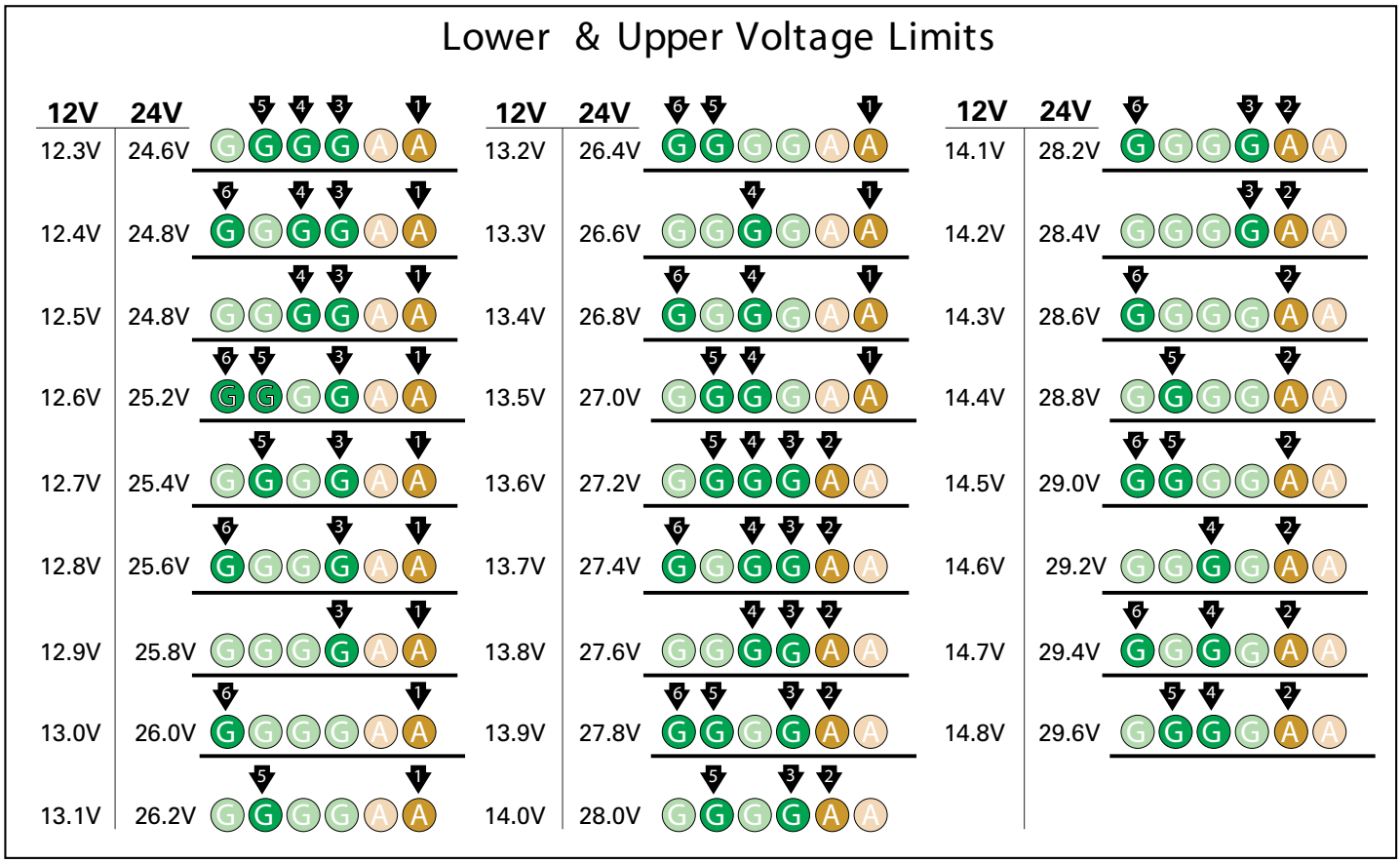
In addition to its ability to be programmed for specific battery type, the Digital Duo Charge offers the ability to adjust the upper and lower voltage limits for charging, enabling the Digital Duo Charge to be used with battery types not included in the four selectable preset programs.

To program the lower voltage limit:

7. With the Digital Duo Charge powered up, place the magnetic end of the programming screwdriver against the RED dot on the epoxy potting (or against one or the other end of the reed switch). The #1 and #2 Amber LEDs will illuminate, followed by the #3 green LED.
8. Release the magnet from the RED dot. Once the reed switch is disengaged, the LEDs will go dark. Shortly thereafter, the #1 Amber LED will illuminate.
9. Re-activate the switch by returning the magnetic screwdriver to the RED dot.
10. The 1# Amber LED will be joined by a number of sequenced Green LEDs as described in the chart below. Release the magnet from the switch when the desired value is indicated.
11. The 1# Amber LED will re-illuminate, followed by the #2 Amber LED.
12. If you choose to select the upper voltage value, continue to the following instructions.

To program the upper voltage limit:

13. Re-activate the switch by returning the magnetic screwdriver to the RED dot when the #2 Amber LED is illuminated.
14. The 2# Amber LED will be joined by a number of sequenced Green LEDs as described in the chart below. Release the magnet from the switch when the desired value is indicated.
15. The 2# Amber LED will re-illuminate, allowing you to change your programming choice, if needed.
16. If the reed switch is not re-activated, the display will cycle between the #1 and #2 Amber LEDs two more times. Both #1 and #2 LEDs will flash together a total of eight times, indicating that your program choices have been saved.

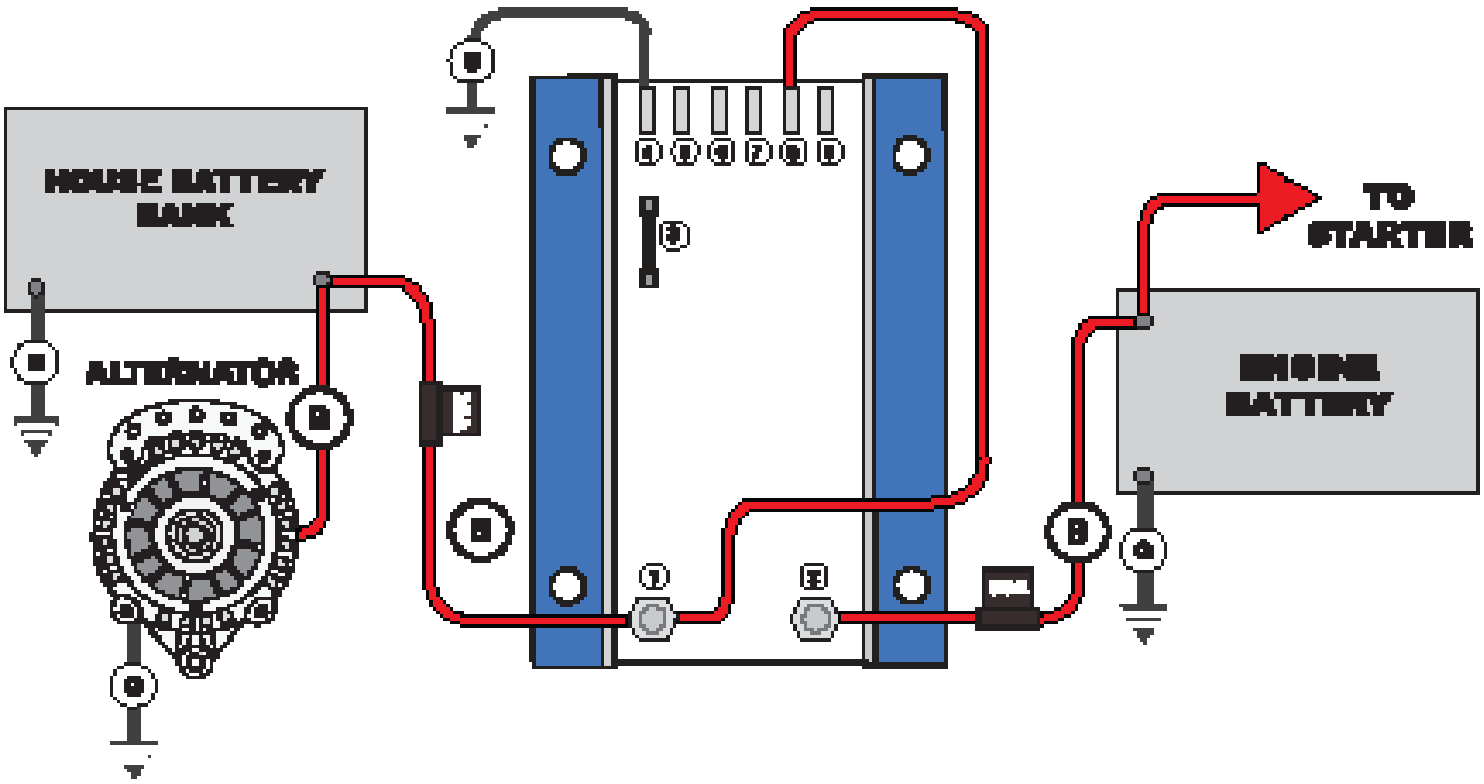


Digital Duo Charge Terminal Legend

1. **OUTPUT TERMINAL**
2. **MAGNETIC REED SWITCH**
3. **GROUND**
4. **BATTERY TEMP. (NEG.)**
5. **BATTERY TEMP. (POS.)**
6. **AUTO/MANUAL (NEG.)**
7. **ON/OFF (POS.)**
8. **SOLENOID DRIVE (NEG.)**

Digital Duo Charge Troubleshooting

Symptom	Cause/Solution
No Lights/No Output	1. No voltage at input wire or ON/OFF wire – Check wiring and repair. 2. Bad fusing on input wire – Replace 30A fuse in input cable. 3. Voltage too low at house battery bank – Check house battery charging system. 4. Starting battery demanding >30A – Install solenoid and manual over-ride switch. Check grounding. 5. Bad Duo Charge unit – Contact Balmar Customer Service at 360-435-6100 or at balmar@balmar.net.
Interference at radio, autopilot or navigation equipment when Digital Duo Charge is active	1. Input, Output or ON/OFF wires causing interference – Re-route wiring. Check system grounding. 2. Output wire is coiled – Uncoil any surplus wire and re-arrange to ensure noise is reduced. 3. Duo Charge is mounted too close to electronics – Relocate Duo Charge. 4. Frequency interference – Install noise reduction filter on electronics power wire.
Output voltage is not appropriate for battery type selected	1. Wrong battery program selected – Verify program and re-program as described above. 2. Voltage drop in output cable – Check wiring resistance and repair as needed. 3. Voltage drop in input cable – Check wiring resistance and repair as needed. 4. Voltage drop in output cable – Check wiring resistance and repair as needed.
No Output. #4 LED blinks once intermittent	1. High system temperature – Determine source of overheating and repair.
No Output. #4 LED blinks twice intermittent	1. Start battery voltage too high – Inspect starting battery for secondary charge sources and correct.
No Output. #4 LED blinks three times intermittent	1. House battery voltage too low – Correct charging source for house battery bank. 2. House battery voltage too low – Check wiring resistance in Input wire and repair as needed.
No Output. #4 LED blinks four times intermittent	1. House battery voltage too high – Correct charging source for house battery bank.
No Output. #4 LED blinks five times intermittent	1. Start battery temperature too high – Shut down system. CAREFULLY inspect starting battery for signs of overheating. Repair condition and/or replace starting battery. 2. Bad Temperature Sensor cable – Check wiring resistance (approx. 34-40k). Repair or replace Temperature Sensor cable. 3. Bad system grounding – Test ground-side resistance between batteries and charging system. Repair.
No Output. #4 LED blinks six times intermittent	1. Voltage too low at ON/OFF terminal – Repair or relocate ON/OFF wire.



Balmar Warranty

Balmar Limited Warranty

Balmar's Limited Warranty covers defects in material or workmanship on new Balmar products generally for a period of one (1) year from the purchase date. Only consumers or dealers purchasing Balmar products from authorized Balmar retailers or resellers and installed by a qualified installer may obtain coverage under Balmar's Limited Warranty. Components with a manufacturing date greater than ten (10) years old are not covered under the Balmar Warranty, even if the purchase date has been within the past two (2) years. Purchase from unauthorized resellers, which may include some online entities, may not guarantee the purchaser will receive a newly manufactured component, and therefore does not guarantee Warranty coverage.

Warranty Resolution

If Balmar authorizes a product to be returned to Balmar or an authorized service provider, Balmar will repair the product or replace it without charge with a functionally equivalent replacement product. Balmar may replace the product with a product that was previously in service or repaired, but re-tested to meet Balmar specifications. Balmar will pay to ship the replacement product to the purchaser. By sending the product for replacement, ownership of the original product will be transferred to Balmar. Labor charges at the consumer's site are not covered under this Warranty. Balmar warrants that repaired or replaced products shall be covered under the Balmar Warranty for the remainder of the original product warranty, or 90 days, whichever is greater.

Not Covered Under Warranty

Balmar's Warranty does not cover any problem that is caused by (a) an accident, abuse, neglect, exposure to shock, electrostatic discharge, heat or humidity beyond the product's specifications, improper installation, inappropriate operation/misapplication, maintenance or modification, or (b) any misuse contrary to the instructions provided with the product, or (c) loss, or (d) malfunctions caused by other equipment, or (e) acts of God. Examples of conditions not warranted: cracked or broken cases, parts damaged by fire, water, freezing, lightning, collision, theft, explosion, rust, corrosion, or items damaged in route to Balmar for repair. Balmar's Warranty is void if a product is returned with removed, damaged or tampered labels or any other alterations (including removal of any component or external cover) to the product. Balmar's Warranty does not cover labor charges or any direct, consequential, or incidental damages. Costs related to recovery removal or installation are not recoverable under the Balmar Limited Warranty.

Applicable Laws

Balmar's Warranty is governed by the laws of the State of Alabama, USA. The Balmar Warranty provides the purchaser specific legal rights, and you may also have other rights that vary from state to state. Balmar's Warranty does not affect any additional rights consumers have under laws in their jurisdictions governing the sale of consumer goods, including, without limitation, national laws implementing EC Directive 44/99/EC. Some states do not allow the exclusion of limitation of incidental or consequential damages, so the limitation or exclusions of Balmar's Warranty may not apply in certain jurisdictions.

Warranty Return Material Process

1. Contact Balmar Technical Support at +1 (360) 435-6100. Tech Support will review the troubleshooting steps with you to help determine if Balmar's product is defective.
2. Go to www.balmar.net and download the RMA request.
3. Once complete, you will receive an RMA number, at which point you should complete the forms and send them with the product and the original receipt showing the date of purchase to Balmar at the address listed below. Please include the RMA number on the outside of the package.
4. Please send the product postage prepaid via a carrier that can track the package. Note: If you have a 9-Series Alternator to return, please ship it to our Marysville, WA location.

Balmar LLC
353 James Record Road SW
Huntsville, AL 35824
Attention: Warranty Returns RMA# _____

Balmar LLC
15201 39th Ave. NE
Marysville, WA 98271
Attention: Warranty Returns RMA# _____

Once Balmar receives the product, we will test the product to determine if the problem is due to a defect in the product. If, at the sole discretion of Balmar, the problem is determined to be a manufacturer defect, Balmar will repair the product or send a new product to replace the defective product.

Balmar will not provide Warranty coverage unless Warranty claims are made in compliance with all the terms listed here, and the specified return procedures are followed.

For more information, contact Balmar Customer Service or Technical Support at +1(360) 435-6100 or visit the Balmar website at www.balmar.net. Balmar LLC believes all information herein to be factual and accurate, yet maintains no liability for factual or typographic error. In addition, Balmar retains the right to revise or update products without notification. Visit the Balmar website for product updates or bulletins and may apply to your alternator or voltage regulator. No part of this document may be reproduced without express written permission of Balmar LLC © Copyright 2017.

Balmar Knows How To Charge Your Batteries

BALMAR® WWW.BALMAR.NET DC CHARGING SOLUTIONS

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ISO 9001 CERTIFIED

CDI Electronics designs and manufactures ignition components for outboard motors and diagnostic software for most Marine Engines. CDI enjoys relationships with 70 distribution partners around the world. To Find a CDI distribution partner, visit **www.cdielectronics.com.**

Both Balmar and CDI Products are manufactured in our ISO 9000-Certified Factory in Huntsville, Alabama.

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