



# Digital Duo Charge

## Installation and Operator's Manual

### I. INTRODUCTION

Thank you for choosing your Digital Duo Charge.

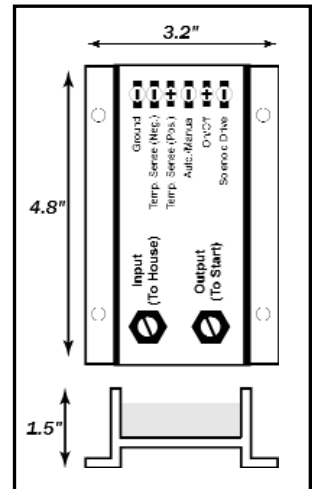
Like our ARS-4 and Max Charge voltage regulators, the Duo Charge features a programmable micro-processor with four preset programs to ensure proper charging for Gel, AGM, Standard Flooded and Deep-Cycle Flooded batteries.

The addition of an optional battery temperature sensor (MC-TS-B) enables the Duo Charge to monitor the ambient temperature of the battery being charged. Should a battery over-temperature condition occur, the Duo Charge will automatically discontinue charging.

The Duo Charge delivers charging current to a maximum of 30A. Should the secondary battery bank require charging currents in excess of that amount, the Duo Charge can be used in conjunction with a solenoid to provide a charging pathway up to the amperage limits of the alternator or other charging source.

### II. INSTALLATION

The Duo Charge is housed in a durable anodized aluminum heat sink. Four pre-drilled mounting holes enable the Duo Charge to be easily mounted to a bulkhead, stringer or other flat surface. For optimal viewing of the color-coded LED display, a vertical mount with the 1/4" spade terminals at the top of the unit (as shown in the drawing at right) is preferred. Installation is as follows:



1. Mount the Duo Charge in a dry, well-ventilated place. Avoid excess heat and/or vibration. Avoid locations where Duo Charge or wiring connections could be exposed to sprayed water or coolant.
2. A pre-made 10-gauge fused wire, with ring terminals at each end, runs between the primary battery and the Duo Charge INPUT terminal. Use caution when installing the ring terminal at the house battery.
3. A fused 10-gauge wire with ring terminal and butt connector is supplied. The ring terminal is connected at the start battery positive with the butt connector crimped to the user-supplied 10-gauge wire required to connect to the OUTPUT terminal on the Duo Charge. A minimum run of eight feet is recommended for the output wire.
4. The Duo Charge must be connected to a common ground source. A 16-gauge BLACK ground wire should be connected between the Ground terminal (marked "ground" in diagram) and the system's central ground bus.

### **BATTERY BANKS MUST BE CONNECTED BY A COMMON GROUND!**

5. The Duo Charge is equipped with a sleep state which uses minimal current when voltage falls below 13 volts in a 12-volt system or 26 volts in a 24-volt system. In most cases, this terminal can be connected via 14-gauge wire to the house battery or the INPUT terminal on the Duo Charge. An ON/OFF toggle can be installed in this wire to manually shut down the Duo Charge. If using the Duo Charge to control charge flow from a shorepower charger, be sure that the output from the charger to the starting battery is disconnected.
6. The Duo Charge can monitor and respond to battery over-temperature conditions at the starting battery when optional battery temperature sensor (MC-TS-B) is installed. To install, connect the sensor lug at the negative post of the starting battery and the 1/4" spade terminals to the positive and negative pins marked TEMP SENSE (+) and TEMP SENSE (-) on the Duo Charge.
7. Should a larger secondary battery require charging amperage greater than the Duo Charge's 30-amp rating, the Duo Charge can be connected to a solenoid. Be sure that the solenoid used is adequate to handle amperages in excess of the alternator's rated output. When using a solenoid, cabling between the house and starting batteries via the solenoid must meet or exceed gauges recommended by the 3% voltage drop chart included in your alternator or regulator's installation manual. The "Solenoid" terminal should be connected to the ground side of the solenoid activation relay. To activate the solenoid, install an ON/OFF toggle between the Duo Charge's Auto/Manual terminal and system ground. When the toggle is in the ON position, the solenoid drive will go to ground and the Duo Charge's internal circuitry will be bypassed.

### III. OPERATION & PROGRAMMING

Once the Duo Charge wiring is installed, . When the Duo Charge is powered up, the LEDs will increment from right to left four times -- followed by #1 and #2 (Amber) lights and a (Green) light indicating the base program as described below. Note: Display reads from right to left:

PRO #1 Standard Flooded (UFP) - Indicated by #1 Amber, #2 Amber, #3 Green (Voltage limits: 13V to 14V)

PRO #2 Deep Cycle Flooded (FLA) - Indicated by #1 Amber, #2 Amber, #4 Green (Voltage limits: 13V to 14.4V)

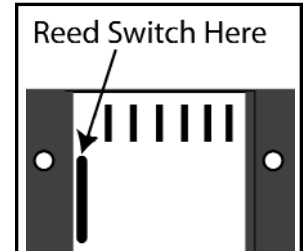
PRO #3 Gel - Indicated by #1 Amber, #2 Amber, #5 Green (Voltage limits: 13V to 13.9V)

PRO #4 Absorbed Glass Mat - Indicated by #1 Amber, #2 Amber, #6 Green (Voltage limits: 13V to 14.2V)

The #3 (Green) LED will illuminate as soon as charging voltage at input terminal reaches 13 volts (or 26 volts in a 24V system). This indicates that the Duo Charge is supplying charging current to the starting battery. The #3 (Green) LED will remain illuminated during normal automatic operation. The #4 (Green) light will illuminate if the Duo Charge is switched to Manual Mode.

### IV. PROGRAMMING FOR SYSTEM VOLTAGE

The Duo Charge is compatible for 12VDC and 24VDC systems. At start-up the Duo Charge display will scroll from amber to green to indicate 12-volt, or green to amber to indicate 24-volt operation. The Duo Charge is shipped from the factory in 12-volt mode. To change the Duo Charge for 24-volt operation:



1. Disconnect the power wire from the ON/OFF terminal.
2. Hold the magnetic tip of the screwdriver atop the reed switch. Re-attach the ON/OFF wire, while maintaining contact with the reed switch. A single green (#3) LED should illuminate.
3. Continue to hold the magnet to the switch until the #4 green LED illuminates as well. Release. After several seconds, the green LEDs will go dark and the #1 and #2 ambers LEDs will flutter. Later, the display will scroll from green to amber, indicating 24-volt operation.
4. To return the Duo Charge to 12-volt operation, activate the reed switch prior to startup, release the switch after the #3 and #4 (Green) LEDs are illuminated. When the LEDs are extinguished, re-activate the reed switch and hold. The #3 and #5 (Green) LEDs will illuminate, indicating re-entry into 12V mode.

### V. PROGRAMMING FOR BATTERY TYPE

The Duo Charge comes from the factory pre-programmed for the Standard Flooded (UFP) setting. To adjust the Duo Charge for your battery type:

1. With the Duo Charge powered up, activate the magnetic reed switch (see illustration) and hold. #1 and #2 (Amber) lights will be illuminated, followed by individual scrolling green lights indicating the battery program choices.

#3 Green Light indicates Standard Flooded (UFP)

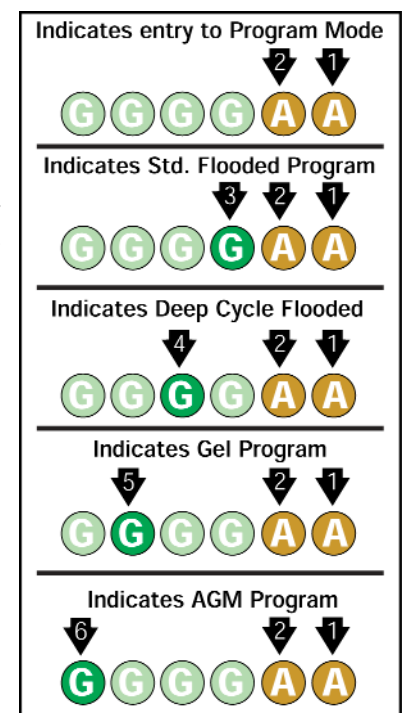
#4 Green Light indicates Deep Cycle Flooded (FDC)

#5 Green Light indicates Gel Cell (GEL)

#6 Green Light indicates Glass Mat (AGM)

2. When the desired Green LED is indicated, release the magnetic switch by removing the magnetic programming tool. If you go beyond your desired program, release the switch, wait for the Green LED to go out, re-activate and hold the switch with the programming tool, and the LEDs will scroll in the opposite direction. Remove the magnetic tool when the desired Green LED is indicated.
3. When the desired program is selected, the lights will go out and then the #1 and #2 (Amber) LEDs will come on, then go out. Then the #1 (amber) will come on, then extinguish. The #2 (amber) will come on, then go out. This will happen 3 times. Both #1 and #2 (Amber) LEDs will flash 8 times. This signifies the Duo Charge is saving the selection.

NOTE: When programming the Duo Charge, the reed switch must be activated while the two amber lights are illuminated after start up, or the voltage at the house battery must be greater than 13 volts. Once the Duo Charge enters sleep mode (and all lights are extinguished) programming will not be possible without re-starting the Duo Charge.



# PROGRAMMING FOR CHARGING VOLTAGE

While we do recommend using the preset programs in most circumstances, the Duo Charge can be programmed based on upper and lower voltage values. To change lower limits, activate the switch when the #1 (Amber) LED is lit as described in Step #3. Voltage values will be indicated as shown in the chart in Section VII. To change upper limits, activate the switch when the #2 (Amber) LED is lit as described in Step #3. Voltage values will be indicated as shown on the following page.

Lower & Upper Voltage Limits											
12V	24V		12V	24V		12V	24V		12V	24V	
12.3V	24.6V		13.2V	26.4V		14.1V	28.2V				
12.4V	24.8V		13.3V	26.6V		14.2V	28.4V				
12.5V	24.8V		13.4V	26.8V		14.3V	28.6V				
12.6V	25.2V		13.5V	27.0V		14.4V	28.8V				
12.7V	25.4V		13.6V	27.2V		14.5V	29.0V				
12.8V	25.6V		13.7V	27.4V		14.6V	29.2V				
12.9V	25.8V		13.8V	27.6V		14.7V	29.4V				
13.0V	26.0V		13.9V	27.8V		14.8V	29.6V				
13.1V	26.2V		14.0V	28.0V							

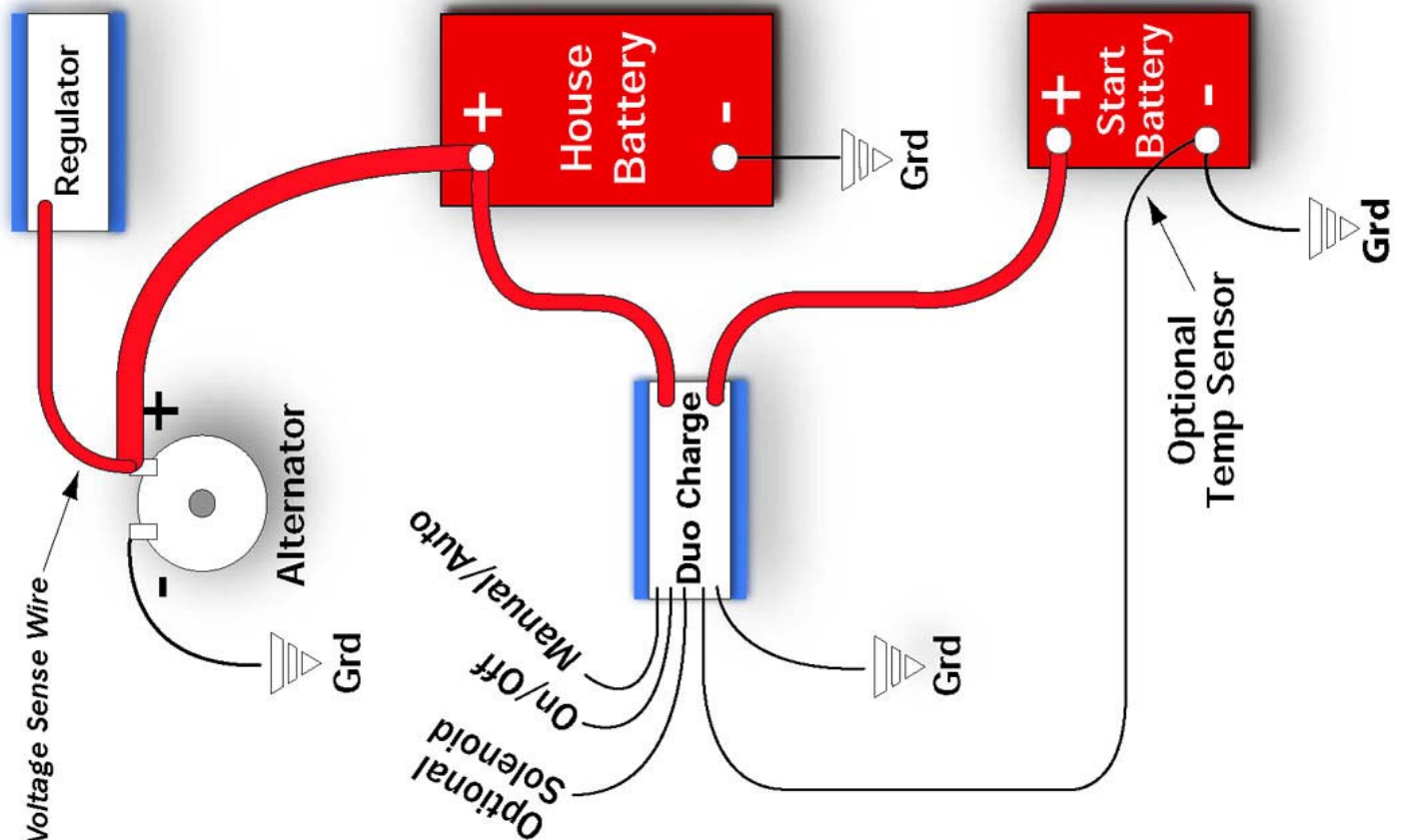
## VI. ERROR/ADVISORY CODES

Should the Duo Charge sense an error condition, the specific cause of error will be indicated on the display. Conditions and their indicators are by a system of intermittent blinks on Green LED #4, as described below:

CONDITION	NUMBER OF BLINKS
SYSTEM TEMPERATURE TOO HIGH	ONE BLINK
START BATTERY TOO HIGH VOLTAGE	TWO BLINKS
HOUSE BATTERY TOO LOW VOLTAGE	THREE BLINKS
HOUSE BATTERY TOO HIGH VOLTAGE	FOUR BLINKS
BATTERY TEMPERATURE TOO HIGH	FIVE BLINKS
VOLTAGE AT ON/OFF CIRCUIT TOO LOW	SIX BLINKS

If an error condition exists that cannot be corrected through repair or replacement of the system wiring, contact the Balmar Customer Service department at 360-435-6100. Should your Duo Charge require replacement under warranty, a Return Authorization will be assigned by a Customer Service representative. Do not return the product without prior authorization. Please include a copy of the original purchase receipt with the unit and note the Return

## SUGGESTED DIGITAL DUO CHARGE WIRING DETAIL



### LIMITED PRODUCT WARRANTY

BALMAR warrants to the original consumer/purchaser the product is free from any defects in material or workmanship for a period of one year from the date of purchase. If any such defect is discovered within the warranty period, BALMAR will replace the regulator free of charge, subject to verification of the defect or malfunction upon delivery or shipping prepaid to BALMAR. This warranty DOES NOT apply to defects or physical damage resulting from abuse, neglect, accident, improper repair, alteration, modification, or unreasonable use of the products resulting in breakdown, cracked or broken cases nor are parts damaged by fire, water, freezing, collision, theft, explosion, rust, corrosion or items damaged in shipment in route to BALMAR for repair. BALMAR assumes no responsibility for consequential damage or loss or expense arising from these products or any labor required for service or repair.

BALMAR WILL NOT repair or be held responsible for any product sent without proper identification and return address or RA number clearly marked on the package. You must include proof of date and place of purchase (photocopy of purchase invoice) or we cannot be responsible for repairs or replacement. In order to expedite warranty claims more efficiently, BALMAR asks that prior to returning a defective product for repair, you call their customer service department for a warranty return authorization number .

If factory service is required, you can contact our BALMAR Customer Service Department Monday through Thursday, 7:30 AM to 5:30 PM, (PST)1-360 435-6100 ext. "3".

Material required for the repair or replacement for the defective part or product is to be supplied free of charge upon delivery of the defective regulator to BALMAR, 19009 61st Ave. NE, Arlington, WA 98223. Customer is responsible for all return transportation charges and any air or rush delivery expense. BALMAR reserves the right to determine whether to repair or replace defective components.

THE ABOVE LIMITATIONS MAY NOT APPLY TO YOU. SOME STATES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS. NO PERSON, AGENT, DEALER IS AUTHORIZED TO GIVE ANY WARRANTY.

BALMARr 19009 61st Ave. NE, Arlington, WA 98223 Phone: (360) 435-6100,  
Fax: (360) 435-3210 E-mail: [balmar@balmar.net](mailto:balmar@balmar.net), Web: <http://www.balmar.net>

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