

Digital Duo Charge

Installation and Operator's Manual

BALMAR®

I. INTRODUCTION

Thank you for choosing your Digital Duo Charge charge flow regulator. The Duo Charge provides an intelligent system for charging at a secondary battery bank -- even if primary and secondary batteries are of different technologies

Like our ARS-4 and Max Charge regulators, the Duo Charge features programmable micro-processor controlled operation. Four preset programs 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 at the battery.

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.

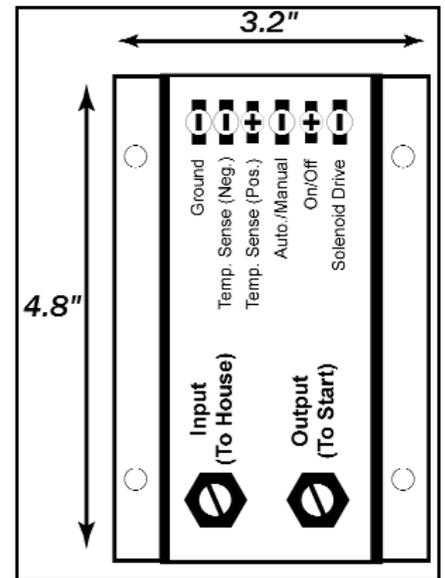
II. INSTALLATION

The Duo Charge is housed in a durable anodized aluminum heat sink measuring 3.2 W x 4.8 L x 1.5 T. 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 built-in 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 installation in areas of excess heat and/or vibration. Avoid locations where Duo Charge or wiring connections could be exposed to sprayed water or coolant.
2. The Duo Charge should be mounted within two feet of the house battery. A pre-made 10-gauge fused wire, with ring terminal connectors, is supplied for the run between the house (primary) battery and the input terminal at the Duo Charge. Use caution when installing the terminal at the house battery.
3. A fused 10-gauge wire with ring terminal and butt connector is supplied. This wire is connected at the positive post of the start battery, fuse closer to battery.
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 (upper left corner) and the house negative post or central ground bus to provide grounding for the processor.

BATTERY BANKS MUST BE CONNECTED BY A COMMON GROUND!

5. The ON/OFF terminal must sense system battery voltage to operate properly. A 14-gauge wire run between the ON/OFF terminal at the top of the Duo Charge and the house battery positive. A simple loop wire, connected between the ON/OFF terminal and the Duo Charge's Input post provides a convenient connection method. When connected to the house battery, the Duo Charge will remain in a sleep state when voltage remains under 13VDC (or 26VDC in 24-Volt mode). Should the vessel be stored for long periods without a source of charging, the ON/OFF wire can be unplugged to avoid unintended discharge. Should you prefer the Duo Charge to operate only when the engine is running, the ON/OFF wire can be connected to the same source used by the BROWN ignition wire in the Balmar Max Charge or ARS-4 wiring harness. A toggle switch can be installed in the ON/OFF wire to



II. INSTALLATION (CONTINUED)

6. Should the user require the ability to manually override control of the Duo Charge, a toggle can be installed between a negative (ground) source and the AUTO/MANUAL terminal at the top of the Duo Charge. Activation of the manual override opens a direct pathway between the house and secondary battery regardless of system voltage.
7. The Duo Charge can monitor and respond to battery over-temperature conditions at the secondary battery when optional battery temperature sensor (MC-TS-B) is installed. To install, connect the sensor lug at the negative post of the secondary battery and the positive and negative terminals to the positive and negative pins noted on the drawing on page one of this manual. Be sure to observe proper polarity when connecting the temperature sensor.
8. 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 must meet or exceed gauges recommended by the 3% voltage drop chart included in your alternator's installation manual. The Solenoid terminal should be connected to the GROUND side of the solenoid activation circuit.

III. OPERATION & PROGRAMMING

Once the Duo Charge is properly connected to the house and secondary batteries as described above, the unit will be powered up with the connection of the ON/OFF circuit wire. 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)

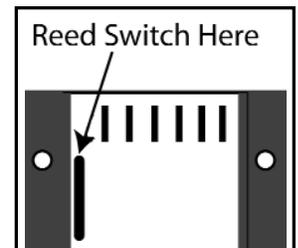
PRO #4 Absorbed Glass Mat - Indicated by #1 Amber, #2 Amber, #6 Green (Voltage limits: 13V to 14.2V)

If the engine is started and charging is occurring, the #3 (Green) LED will illuminate as soon as charging voltage at the house battery reaches 13 volts. This indicates that the Duo Charge is supplying charging current to the secondary (start) 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.

Following start up, the Duo Charge will indicate the voltage parameters of the charge program, based on the chart provided in Section XII.

IV. PROGRAMMING FOR SYSTEM VOLTAGE

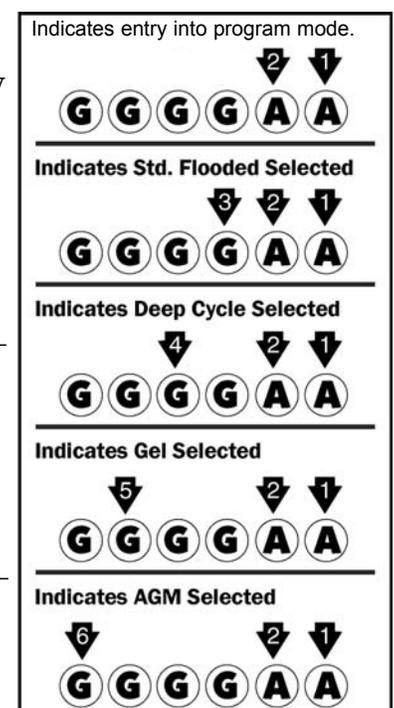
The Duo Charge is compatible for 12VDC and 24VDC systems. Activating the reed switch prior to start up will change voltage levels. The Duo Charge will indicate 24VDC mode by flashing lights from left to right at start up. To return the Duo Charge to 12-volt operation, activate the reed switch prior to 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 located in the upper left corner of the Duo Charge (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.



- 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.

The Duo Charge may be custom adjusted to provide the the exact upper and lower limits required for your system. While we do recommend using the preset programs in most circumstances, this function may be useful in some limited situations. 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 in the chart in Section VII.

VI. ERROR/ADVISORY CODES

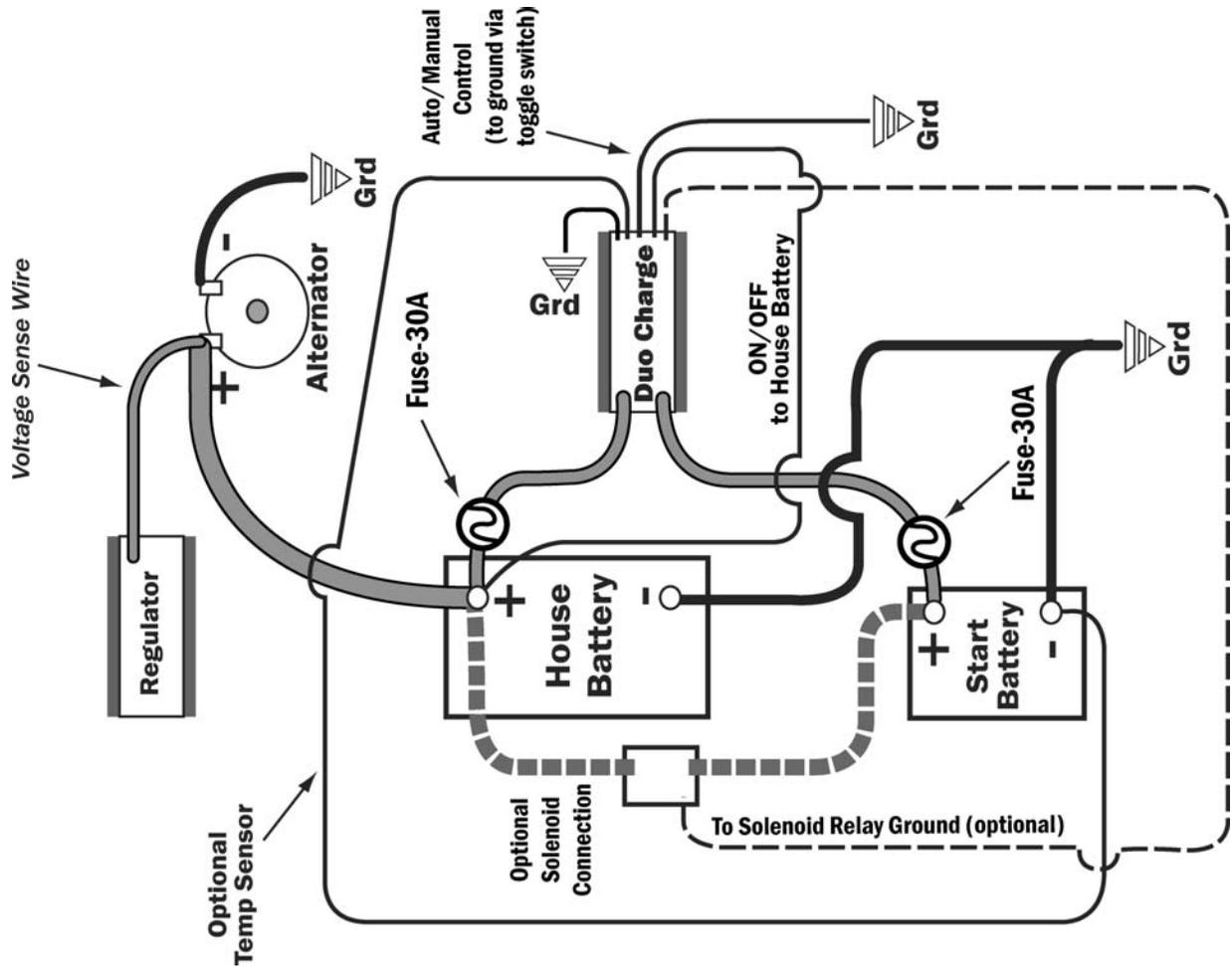
Should the Duo Charge sense an error condition, the specific cause of error will be indicated on the display. Conditions and their indicators are by a system of intermittent blinks on Green LED #4, as described below:

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 Authorization # on the outside of the package, when returning the unit for warranty inspection.

Lower & Upper Voltage Limits					
12-volt	24-volt	5 4 3 1	12-volt	24-volt	6 5 4 3 2 1
12.3V	24.6V	G G G G A A	13.2V	26.4V	G G G G A A
12.4V	24.8V	6 4 3 1	13.3V	26.6V	G G G G A A
12.5V	24.8V	G G G G A A	13.4V	26.8V	G G G G A A
12.6V	25.2V	6 5 3 1	13.5V	27.0V	G G G G A A
12.7V	25.4V	G G G G A A	13.6V	27.2V	G G G G A A
12.8V	25.6V	6 3 1	13.7V	27.4V	G G G G A A
12.9V	25.8V	G G G G A A	13.8V	27.6V	G G G G A A
13.0V	26.0V	6 1	13.9V	27.8V	G G G G A A
13.1V	26.2V	5 1	14.0V	28.0V	G G G G A A
					6 5 3 2
					G G G G A A
					6 5 2
					G G G G A A
					3 2
					G G G G A A
					6 2
					G G G G A A
					5 2
					G G G G A A
					6 5 2
					G G G G A A
					6 4 2
					G G G G A A
					6 4 2
					G G G G A A
					5 4 2
					G G G G A A

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.

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