Peter Hayden
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This is a re-write of the operational sections of the Balmar MC624 regulator manual, making it clearer, and correcting errors in the descriptions and operation.

Regulator Operation

The MC-624 regulator's microprocessor controlled charging system uses a sophisticated, multi-stage profile to deliver maximum charging output, while protecting the batteries from overcharging damage. When the regulator is first turned on, the processor performs a quick one-second self diagnostic assessment. Following that diagnostic, the MC-624 initiates a charge program as follows:

1. Start Delay - Factory set at one second. Can be user-adjusted (dLc) to a maximum of 999 seconds in the regulator's advanced programming mode. See Advanced Programming section for adjustment instructions.

2. Soft Ramp - Gently increases voltage to bulk preset levels based on battery program selected.

3. Bulk Charge - The most aggressive of the charging stages. Voltage is held at a pre-set level (bv), specified by battery program selected, for a set time period. Factory-set bulk time is 18 minutes. Adjustable in 6-minute increments via (b1c).

4. Calculated Bulk Charge - Holds voltage at bulk level for six minutes, then calculates battery condition by comparing existing voltage, time at voltage, and field percentage to target values. If all conditions are met (voltage >=bv, % field voltage <= FbA, and elapsed time > b1c), the regulator advances to the next stage. If values are not met, the regulator continues to bulk charge and compares real-time to target values. This will re-occur until all values are met.

5. Ramps down to Absorption voltage.

6. Absorption Charge - Regulator continues to control the alternator's output voltage for an additional 18 minutes (time set by A1c) at approximately 2/10's of a volt below bulk charging voltage (voltage set by Av). Time adjustable in 6-minute increments.

7. Calculated Absorption Charge - Holds voltage at absorption level (Av) for six minutes (A1c), then calculates battery condition by comparing existing voltage, time at voltage, and field percentage to target values. If values are met (voltage >=Av, % field voltage <= FbA, and elapsed time > A1c), the regulator advances to the next stage. If values are not met, the regulator extends the absorption charge values and compares realtime to target values. This will re-occur until all values are met.

8. Ramp down to Float.

9. Float Charge - Regulator continues to control the alternator's output voltage for an additional 18 minutes (programmed in F1c), typically at a volt less than bulk voltage (programmed in Fv). After that initial fixed time period, the regulator can respond to increased charging demand by cycling to absorption voltage if the field voltage % exceeds the value programmed in Ffl. After 12 hours of continuous operation, the regulator will automatically revert to absorption voltage through calculated absorption and back to float charging stage.
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FbA: Field Threshold - Bulk To Absorption and absorption to float . Controls the criteria used to determine field output required to maintain calculated bulk charging mode and calculated absorption mode. Factory set at 65% field output. Transitions from bulk to absorb, and from absorb to float occur when the field voltage drops below FbA. So raising "FbA" shortens calculated bulk charge time. Lowering "FbA" increases calculated bulk charge time. Span of adjustment is 16% to 96%. To reverse direction of scroll, release magnet and wait for LED to display "fba" code. Reactivate switch and release when desired value is indicated.

FFl: Field Threshold - Absorption to Float. Controls the criteria used to determine the field current threshold required to cycle from float back into absorption charging mode. When the field voltage exceeds FFl, the charger can transition from float back tp absorb mode. Factory set at 65%. Raising "ffl" increases calculated float charge time. Adjusted in 1% increments. Span of adjustment is 16% to 96%. To reverse direction of scroll, release "ffl" code. Reactivate switch with magnet and release when desired value is indicated.