

FLOODED CYCLING-BATTERY CHARGING (GOLF CAR/FLOOR SCRUBBER/DEEP CYCLE)

Flooded, Maintenance Accessible Design

These batteries are filled with liquid electrolyte. The maintenance accessible design utilizes removable vent caps to access the vent well opening for watering and testing. Flooded designs should always remain upright to avoid leaking acid.

INSTRUCTIONS FOR STAGES OF CHARGING

STAGE	END CONDITIONS	ERROR
Bulk Stage I₁ Maintain Current ≤ 30 A per 100 Ah C ₂₀ Typically, Constant Current, but Constant Power, or Taper Charge Permitted	End when voltage = 2.30 to 2.35 V/cell (20°C) Max time (h) = $1.3 \times \text{DoD (Ah)} / \text{Avg. Current (A)}$	If Max time is exceeded: STOP
Absorption Stage V₁ Maintain Constant Terminal Voltage (Adjusting only for changing battery temperature) Voltage = 2.30 to 2.35 V/cell (20°C)	Maintain charge until current acceptance drops by less than 10% or by less than 0.1 ampere over a 1 hour period Total Max Time: 24h (typically much less) Equalize 1 time per week; otherwise, go to Float (optional) or Stop	
Equalization Maintain Constant Current: 3 to 5 A per 100 Ah C ₂₀	Charge until a level or declining voltage is measured, then continue charging at this rate for 2 additional hours. Max Time: 6 hours (typical 3-4)	
Optional Float Stage V₂ Maintain Constant Terminal Voltage (Adjusting only for changing battery temperature) Voltage = 2.25 V/cell (20°C)		

To compensate for battery temperature not at 20°C, subtract 0.005 V/cell for each 1°C above 20°C; add 0.005 V/cell for each 1°C under 20°C. It is not required to continue temperature adjustment below -20°C—if there is no reasonable expectation of frequent operation below this level.

Adding Water While Charging

Periodic water additions are required. Add only pure (distilled) water, and only near the end of charge. Impurities in water will build up over time if pure water is not used. Never allow electrolyte level to drop below the top of the plates. Never overfill. Overfilling a battery, especially a discharged battery, may cause overflow during charging. Keep top surface of battery clean and dry.

CURRENT LIMITS AND VOLTAGE TARGETS

Calculations (current limit and normal absorption voltage):

	CURRENT LIMIT	SINGLE UNIT VOLTAGE TARGET	24V PACK VOLTAGE TARGET	36V PACK VOLTAGE TARGET	48V PACK VOLTAGE TARGET
GC10 (6V)	64.5	6.9 to 7.05	27.6 to 28.2	41.4 to 42.3	55.2 to 56.4
GC15 (6V)	69				
GC25 (6V)	70.5				
GC45 (6V)	76.5				
GC8V (8V)	49.5	9.2 to 9.4		N/A	
GC12T (12V)	45	13.8 to 14.1		41.4 to 42.3	
8C12 (12V)	58.5				
9C12 (12V)	68.4				
8C11 (6V)	70.5	6.9 to 7.05			
9C11 (6V)	75				
8C6V (6V)	99				
8L16 (6V)	111				
819 (8V)	50	9.2 to 9.4			
821 (8V)	56				
825 (8V)	67				

STATE OF CHARGE VS. OPEN CIRCUIT VOLTAGE AND SPECIFIC GRAVITY

SOC %	OCV (12 VOLT)	OCV (8 VOLT)	OCV (6 VOLT)	SG
100	12.74	8.49	6.37	1.279
90	12.60	8.40	6.30	1.254
80	12.50	8.33	6.25	1.235
70	12.40	8.27	6.20	1.217
60	12.30	8.20	6.15	1.199
50	12.20	8.13	6.10	1.180
40	12.10	8.07	6.05	1.162
30	12.0	8.00	6.00	1.144
20	11.90	7.93	5.95	1.126

⚠ DANGER/POISON

SHIELD EYES. EXPLOSIVE GASES CAN CAUSE BLINDNESS OR INJURY.	NO • SPARKS • FLAMES • SMOKING	SULFURIC ACID CAN CAUSE BLINDNESS OR SEVERE BURNS.	FLUSH EYES IMMEDIATELY WITH WATER. GET MEDICAL HELP FAST.
 KEEP OUT OF THE REACH OF CHILDREN.	 READ ALL INSTRUCTIONS.	 DO NOT TIP. KEEP VENT CAPS TIGHT & LEVEL.	

WARNING: RISK OF FIRE, EXPLOSION OR BURNS. DO NOT DISASSEMBLE OR INCINERATE. NOT RECOMMENDED FOR INVERTED USE. FOLLOW PROPER CHARGING INSTRUCTIONS.

Proposition 65 Warning

Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and reproductive harm. Batteries also contain other chemicals known to the State of California to cause cancer. **WASH HANDS AFTER HANDLING.**



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