

Specification



The series is specially designed for frequent discharge deep cycle application. By using the specially designed active material, strong grids and thick plate construction, the series battery offers reliable performance in high load situations and could provide competitive cycle performance. Suitable for Electric Vehicle and Golf cart; Industrial equipment, Floor machines, Forklifts, Aerial lifts, and Robotics; Marine, RV, and no-idle solutions; Mobility and Medical equipment; and most outdoor application.



ISO 9001



ISO 14001



OHSAS 18001



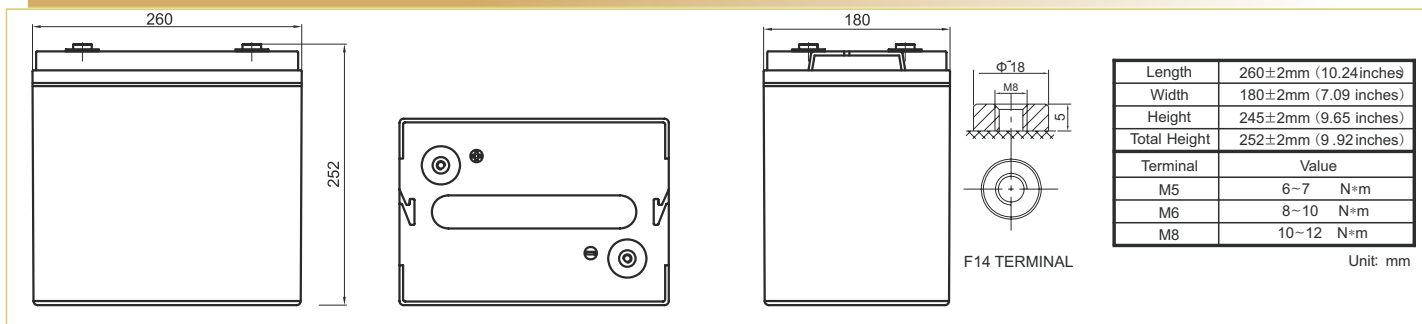
MH 60419



G4M20206-0910-E-16

| | |
|------------------------------------|--|
| Cells Per Unit | 3 |
| Voltage Per Unit | 6 |
| Capacity | 224Ah@20hr-rate to 1.75V per cell @25°C |
| Weight | Approx. 31.5 Kg/69.46Lbs (Tolerance ± 2%) |
| Internal Resistance | Approx. 2.5 mΩ |
| Terminal | F14(M8) |
| Max. Discharge Current | 2050A (5 sec) |
| Cold Cranking Ampere(CCA) | 780A |
| Cranking Ampere(CA) | 1130A |
| Maximum Charging Current | 61.5A |
| Reserve Capacity | 485min@25A to 1.75V/Cell(25°C) 118min@75A to 1.75V/Cell(25°C) |
| Reference Capacity | C10 205.2AH C20 225.0AH |
| Float Charging Voltage | 6.80 V~6.90 V @ 25°C Temperature Compensation: -3mV/°C/Cell |
| Cycle Use Voltage | 7.30 V~7.40 V @ 25°C Temperature Compensation: -4mV/°C/Cell |
| Operating Temperature Range | Discharge: -20°C~60°C Charge: 0°C~50°C Storage: -20°C~60°C |
| Normal Operating Temperature Range | 25°C ± 5°C |
| Self Discharge | RITAR Valve Regulated Lead Acid (VRLA) batteries can be stored for up to 6 months at 25°C and then recharging is recommended. Monthly Self-discharge ratio is less than 3% at 25°C. Please charged batteries before using. |
| Container Material | A.B.S. UL94-HB, UL94-V0 Optional. |

Dimensions



Constant Current Discharge Characteristics : A(25°C)

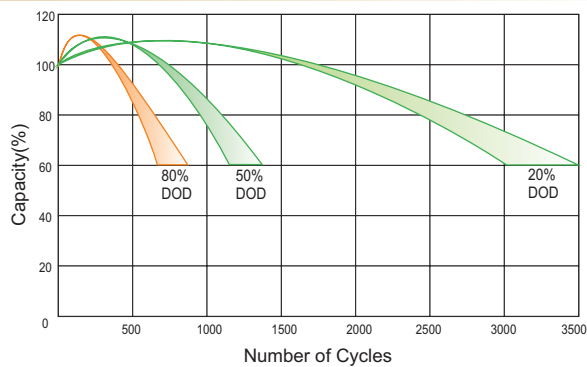
| F.V/Time | 5MIN | 10MIN | 15MIN | 30MIN | 1HR | 2HR | 3HR | 4HR | 5HR | 8HR | 10HR | 20HR |
|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 4.80V | 732.9 | 539.6 | 398.2 | 233.0 | 133.3 | 81.28 | 54.82 | 45.58 | 36.33 | 26.21 | 21.33 | 11.92 |
| 5.00V | 711.7 | 513.4 | 390.0 | 229.0 | 130.6 | 80.67 | 54.41 | 45.37 | 36.10 | 26.00 | 21.12 | 11.70 |
| 5.10V | 690.6 | 495.3 | 383.9 | 224.8 | 127.3 | 80.06 | 53.38 | 45.16 | 35.87 | 25.79 | 20.91 | 11.47 |
| 5.25V | 620.1 | 457.1 | 365.5 | 223.1 | 124.6 | 79.45 | 52.13 | 44.74 | 35.42 | 25.57 | 20.71 | 11.25 |
| 5.40V | 559.7 | 416.8 | 336.9 | 219.3 | 121.0 | 78.02 | 51.27 | 43.68 | 35.16 | 25.15 | 20.52 | 11.14 |
| 5.55V | 477.9 | 372.5 | 302.2 | 205.3 | 116.6 | 74.56 | 50.39 | 41.57 | 34.27 | 24.08 | 20.28 | 10.68 |

Constant Power Discharge Characteristics : W(25°C)

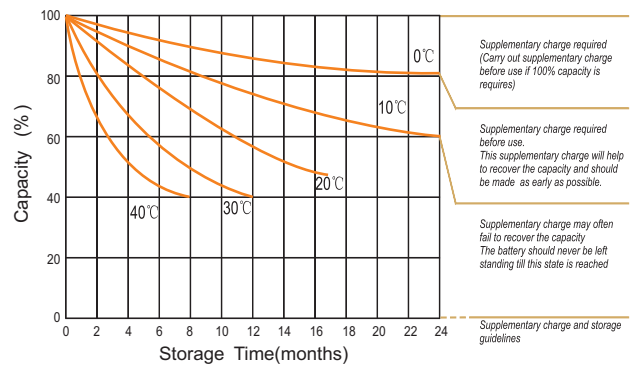
| F.V/Time | 5MIN | 10MIN | 15MIN | 30MIN | 1HR | 2HR | 3HR | 4HR | 5HR | 8HR | 10HR | 20HR |
|----------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 4.80V | 3866 | 2902 | 2203 | 1334 | 769.5 | 482.4 | 326.0 | 271.7 | 217.6 | 156.5 | 128.0 | 71.51 |
| 5.00V | 3790 | 2813 | 2168 | 1317 | 768.0 | 480.9 | 324.6 | 271.3 | 216.0 | 155.7 | 127.2 | 70.17 |
| 5.10V | 3747 | 2739 | 2151 | 1306 | 762.1 | 477.9 | 319.6 | 270.7 | 215.3 | 154.7 | 126.0 | 68.84 |
| 5.25V | 3411 | 2550 | 2085 | 1312 | 747.1 | 476.5 | 312.5 | 268.2 | 213.2 | 153.4 | 124.8 | 67.50 |
| 5.40V | 3107 | 2351 | 1927 | 1291 | 725.9 | 469.3 | 308.7 | 262.1 | 211.0 | 150.9 | 123.6 | 66.81 |
| 5.55V | 2729 | 2146 | 1769 | 1216 | 700.4 | 449.1 | 303.5 | 249.4 | 206.0 | 144.5 | 122.0 | 64.10 |

(Note) The above characteristics data are average values obtained within three charge/discharge cycle not the minimum values.

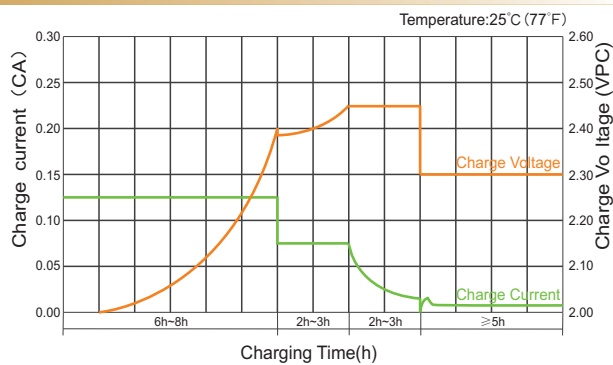
Cycle Life in Relation to Depth of Discharge



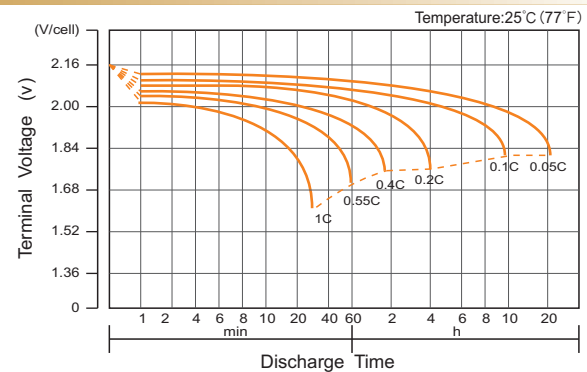
Storage Characteristics



Charge Characteristic Curve for Cycle Use(IUUU)



Discharge Characteristics Curve



CHARGE VOLTAGES

| Charge Stage | Battery Voltage | | | |
|---|-----------------|------|------|------|
| | 12V | 24V | 36V | 48V |
| Bulk | 14.6 | 29.2 | 43.8 | 58.4 |
| Absorption | 14.6 | 29.2 | 43.8 | 58.4 |
| Float | 13.6 | 27.2 | 40.8 | 54.4 |
| TC Factor: (-3mV/°C/cell) or (-4mV/°C/cell) | | | | |

Capacity Factors With Different Temperature

| Battery Type | -20°C | -10°C | 0°C | 5°C | 10°C | 20°C | 25°C | 30°C | 40°C | 45°C |
|--------------|-------|-------|-----|-----|------|------|------|------|------|------|
| GEL 6V&12V | 50% | 70% | 83% | 85% | 90% | 98% | 100% | 102% | 104% | 105% |
| Battery 2V | 60% | 75% | 85% | 88% | 92% | 99% | 100% | 103% | 105% | 106% |
| AGM 6V&12V | 46% | 66% | 76% | 83% | 90% | 98% | 100% | 103% | 107% | 109% |
| Battery 2V | 55% | 70% | 80% | 85% | 92% | 99% | 100% | 104% | 108% | 110% |

Discharge Current VS. Discharge Voltage

| Final D ischarge Voltage V /cell | 1.75V | 1.70V | 1.60V |
|----------------------------------|------------|-------------------|------------|
| Discharge Current (A) | (A) ≤ 0.2C | 0.2C < (A) < 1.0C | (A) ≥ 1.0C |

Charge the batteries at least once every six months, if they are stored at 25°C.

Charging Method:

| | |
|------------------|--|
| Constant Voltage | -0.2Cx2h+2.4-2.45V/cellx24h, Max. Current 0.3C |
| Constant Current | -0.2Cx2h+0.1Cx12h |
| Fast | -0.2Cx2h+0.3Cx4h |

Maintenance & Cautions

Cycle Service

- ▶ Avoid battery overcharge, especially in series connection use.
- ▶ Charge with recommended voltage. Ensure battery fully recharges. In general, recharge capacity should be 1.1-1.15 times discharge capacity.
- ▶ Effect of temperature on cycle charge voltage: -4mV/°C / Cell
- ▶ The length of cycle service will be affected by depth of discharge, ambient temperature, discharge rate, and the manner in which the battery is recharged. Generally speaking, the most important factor is depth of discharge.

Float Service:

- ▶ Every month, recommend inspection of every battery's voltage.
 - ▶ Every three months, recommend a one time equalization charge.
- Equalization charge method:
- Discharge - 100% rate capacity discharge
 - Charge - Max. current 0.3C, constant voltage 2.4-2.45V/Cell charge 24h.
 - ▶ Effect of temperature on float charge voltage: -3mV/°C/Cell.
 - ▶ Length of service life will be affected by the number of discharge cycles, depth of discharge, ambient temperature, and charging voltage