

# GASTON GTF range battery manual

## 1. Brief introduction

GTF stationary lead-acid battery (acid spray-proof type), ranging from 200ah to 3000ah at 10hr rate in 17 models, are mainly applied in power system, telecommunication, signal system and emergency lighting, computer system as backup power.

The 2V cell is delivered without electrolyte. Through filtering-off acid and flame retardant funnel plugs, the electrolyte density and temperature can be measured directly. The SAN container is corrosion-proof, flame retardant, and of high strength, the transparency of which also allows the direct examine on the internal structure and state.

Type	Rated voltage (V)	Rated cap (Ah)	Max overall dimensions mm				Cell weight approx Kg			Terminal Nos Of the same polariaty
			Length (L)	Width (W)	Container height (h)	Total height (H)	Without acid	With acid	Acid weight (d=1.24 g/L)	
GTF-200	2	200	103	206	354	409	13.2	17.2	4.0	1
GTF-250	2	250	124	206	354	409	16.2	20.8	4.6	1
GTF-300	2	300	145	206	354	409	19.2	24.3	5.1	1
GTF-350	2	350	124	206	470	525	19.4	26.9	7.5	1
GTF-420	2	420	145	206	470	525	23.4	31.5	8.1	1
GTF-500	2	500	166	206	470	525	27.4	36.1	8.7	1
GTF-600	2	600	145	206	645	700	33.9	44.8	10.9	1
GTF-800	2	800	191	210	645	700	45.3	61.3	16.0	2
GTF-1000	2	1000	233	210	645	700	55.5	74.6	19.1	2
GTF-1200	2	1200	275	210	645	700	65.8	88.0	22.2	2
GTF-1500	2	1500	275	210	795	850	87.0	114.3	27.3	3
GTF-1750	2	1750	399	212	771	826	105.0	140.2	35.2	3
GTF-1875	2	1875	399	212	771	826	113.0	158.0	45.0	3
GTF-2000	2	2000	399	214	771	826	123.0	166.0	43.0	3
GTF-2250	2	2250	487	212	771	826	142.0	195.0	53.0	4
GTF-2500	2	2500	487	212	771	826	152.0	204.0	52.0	4
GTF-3000	2	3000	576	212	771	826	179.0	242.0	63.0	4

## 2. specification and performance

### 2.1

### 2.2 Main technical performance

Fig2

Type	0.5Hour Rate 0.5HR Final volt. 1.65V		1Hour Rate 1HR Final volt. 1.67V		3 Hour Rate 3HR Final volt. 1.75V		5Hour Rate 5HR Final volt 1.77V		10Hour Rate 10HR Final volt. 1.80V	
	Cur. A	Cap.Ah	Cur. A	Cap.Ah	Cur. A	Cap.Ah	Cur. A	Cap.Ah	Cur. A	Cap.Ah
GTF-200	153.9	76.8	106	106	50	150	34.5	172	20	200
GTF-250	192	96	132.5	132.5	62.5	187.5	43	215	250	250
GTF-300	230	115	159	159	75	225	51.5	258	30	300
GTF-350	268	134	185	185	87.5	262.5	60	300	35	350
GTF-420	322	161	222	222	105	315	72	360	42	420
GTF-500	375	187	259	259	122.5	367.5	84	420	50	500
GTF-600	426	213	312	312	150	450	103	516	60	600
GTF-800	568	284	416	416	200	600	137.5	688	80	800
GTF-1000	710	355	520	520	250	750	172	860	100	1000
GTF-1200	852	426	624	624	300	900	206.5	1032	120	1200
GTF-1500	1056	528	744	744	372	1116	252	1260	150	1500
GTF-1750	1242	621	868	868	434	1302	294	1470	175	1750
GTF-1875	1320	660	930	930	465	1395	315	1575	187.5	1875
GTF-2000	1408	704	992	992	496	1488	336	1680	200	2000
GTF-2250	1584	792	1125	1125	562	1686	387	1935	225	2250
GTF-2500	1760	880	1240	1240	620	1860	420	2100	250	2500
GTF-3000	2112	1056	1488	1488	744	2232	504	2520	300	3000

### 3. Operational instruction

#### 3 . 1 Installation

3.1.1 The batteries should installed in the clean, cool, dry and well ventilated room equipped with water supply and drainage system, of which the ground is corrosion resistant.

3.1.2 Pls see the following fig for the single and double row installation

3 .1.3 and open the crate by special tool and take off all the nails before getting the battery out.

3.1.4 Take away the cover and foam plate, keep the technical document and certificate enclosed well;

3.1.5 Carefully put the battery in the right position ,leaving enough room between each cells. When moving the large capacity cell with forklift, do pay attention to the center of gravity and balance.

3.1.6 Clean the battery surface with soft clothes. Remove the oxide on the terminals

and use some petroleum jelly to protect the terminal surface from the corrosion. Connect the cells with cable or connector and check the polarity of the cells connected in series.

### 3.2 making electrolyte

#### 3.2.1 preparation

3.2.1.1 Get the acid-proof clothes, rubber gloves and goggle ready.

3.2.1.2 Get certain amount of qualified special acid and distilled water ready

3.2.1.3 Choose the container according to the capacity and quantity of cells, which should be made of plastic or rubber enduring the acid and thermal distortion, or wooden trough covered by lead plate, or ceramic vat without any element of iron. Clean the container first and also get the rubber or plastic stick.

#### 3.2.2 the way to make the electrolyte

3.2.2.1 Put on all the protection articles before starting. Pour the distilled water into the container and afterward acid slowing, while keep mixing using the stick to make the acid and distilled water mix evenly and heat being emitted fast. CAUTION: DO NOT DO IN REVERSED OREDER., otherwise the liquor will spill out and harm the man. The temperature of liquor will be quite high and should be cooled down to below 40C, then check the density and do some adjustment according to the temperature quotiety

3.2.2.2 The electrolyte of GTF series battery be 1.200 in density, in which the sulfate acid should be 28%, the volume ratio of dense acid and water should be 1:4.73, and mass ratio 1:2.5. The density of acid decreases by 0.0065 if temperature goes up by 10C.

Fig 3

C	0	5	10	15	20	25	30	35	40
Aicd density	1.213	1.210	1.207	1.203	1.200	1.197	1.194	1.190	1.187

### 3.3 perfusion of electrolyte

3.3.1 Check the density and temperature of electrolyte and put on all the protection articles first. Fill the acid in the cells slowly and always keep attention to the electrolyte level. Recheck the electrolyte level of whole group cells and make sure they are the same.

3.3.2 Screw on the funnel plug and clean the battery case and cover. Neutralize the electrolyte on the floor with sodium hydroxide and then wash the floor by water.

### 3.4 Initial charge

3.4.1 Initial charge should only be done after 8-12 hours after acid filling and electrolyte temperature drops below 30°C.

3.4.2 Connect the battery to the charger, make sure the polarity is right.

3.4.3 Choose one of following two methods of initial charge

3.4.3.1 Constant current method. Charge the battery for 55-60hrs to the full capacity at current of 0.05C10A

3.4.3.2 Low voltage constant voltage method. Charge the cell at current of 0.1C10A until the terminal voltage reach the 2.35±0.02V and then to the full capacity at constant voltage

3.4.4 Notice:

a Keep the temperature of electrolyte under the 40°C during the process of initial charge. If over 45°C, immediately decrease the charging current and bring the temperature down, or stop the charging and only resume the charging after the temperature drops down, in this case, the charge time should be longer than planned.

B . During the process of initial charge, record the charging current and voltage of battery group every hour, check the electrolyte , temperature and voltage change of single cell in the latter period of charge process.

3.4.5 Before the end of initial charge, the electrolyte density should be adjusted to 1.220±0.01g/cm<sup>3</sup>(20°C) and the electrolyte should go to the high level mark. If the density is lower, take some electrolyte out and refill with same amount of sulfate acid, if higher, then refill with distilled water. The additional charging time is required in order to make the electrolyte mixed evenly.

3.4.6 the end of charge

a . In the constant current method, stop charging when voltage and electrolyte density of cell remain the same for 3 hours and bubbles come out in the cell.

B . In the low voltage constant voltage method, stop charging when electrolyte

density of cell remains the same for 3 hours and charging current remain 0.002 to 0.01C<sub>10A</sub> for long time without change.

### 3 .5 normal charge

The normal charge is divided into constant current and constant voltage methods

3.5.1 Constant current. Charge the single cell at the current of 0.1C<sub>10A</sub> until the voltage reaches 2.40V, then at the current of 0.05C<sub>10A</sub> to the full capacity.

3.5.2 Constant voltage. Charge the single cell at the current of 0.1 ~0.15C<sub>10A</sub> until the voltage reaches 2.40V, then at the voltage of 2.4V to the full capacity.

### 3 .6 Equalizing charge

3.6.1 Equalizing charge is to equalize the electrolyte and voltage of single cell in one group and should applied when the cells

3.6.2 Two hours after floating charge, charge the cell at the 0.03C<sub>10A</sub> for 2 hours, then one hour later, charge at 0.03C<sub>10A</sub> for another 2 hours. Repeat this process three to four times until the voltage value reads same as last time once connected to the power.

### 3 .7 operation

#### 3.7.1 floating operation

3.7.1.1 In the floating operation, the floating voltage of single cell can be either of the following: 2.24±0.01V without equalizing charge or 2.17V with equalizing charge every three month.

3.7.1.2 Equalizing charge is necessary when the phenomena of 3.6.1 occurs

#### 3.7.2 Fully charge/discharge operation

3.7.2.1 The over discharge is forbidden in all the discharge rate. The EOD voltage should never below the value in fig2

3.7.2.2 The cells in fully charge/discharge operation need to be equalizing charged every three month.

### 3 .8 backup operation(backup cells)

3.8.1 The backup cell is used when one cell in the group fails.

3.8.2 backup cells need being charged termly(3 months to 6 month), the electrolyte density should be 1.220±0.005g/cm<sup>3</sup>(20C).

#### 4 . maintenance

4.1 The surface of cell should be kept clean during the process of operation, especially the cover. The acid spray-proof plug must be always fastened tightly during the operation and be taken off to wash away the dust on the cover.

4.2 Check the connection cable once a month and tighten any loose connections. Keep the post surface clean and free of oxide.

4.3 Protect the container from any organic solvent such as oil. Use alcohol or saleratus solution of 5% to clean the surface.

4.4 Check the electrolyte level termly, which should be no lower than the level mark and exactly the same with each other. If lower, add some distilled water, NO ACID.

4.5 Take a good record of voltage, electrolyte density and temperature during the operation. No less than one time every day in the floating period and one time every three hours in the fully charge/discharge period.

4.6 Charge and discharge: No over charge or over discharge is allowed. The cell should be charged in time. The users should also check the battery by discharging one or two times a yea according to the operation requirements.

4.7 The storage: the cells without electrolyte should be stored in the dry and ventilated warehouse, where the ambient temperature are between 5 to 40C, at least 5 meters away from heat source. During the transportation, handle with great care, no upside down, no direct sunshine. The new battery can be stored for two years.