

EFFEKTA - Battery ***Technical specification***



Type
BTL 12-100
12 V / 100 Ah

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1 Range

This specification applies to the sealed lead-acid batteries manufactured by EFFEKTA.

Type: **BFR/BTL12-100** (12V / 100Ah).

2 Specifications

2.1	Voltage:	12V
2.2	Cells Per Unit:	6
2.3	Capacity:	100Ah (@ 20hr-rate to 1.75V per cell @ 25°C)
2.4	Weight:	app. 32kg
2.5	Max. discharge current:	800A (5 sec)
2.6	Internal resistance:	app. 5 mΩ
2.7	Temperature range:	discharge: -20°C~50°C charge: -0°C~50°C storage: -20°C~60°C
2.8	Normal operating temperature range:	25°C±5°C
2.9	Float charging voltage:	13.6 - 13.8VDC / unit @ 25°C
2.10	Equalization and cycle service:	14.4 - 15.0VDC / unit @ 25°C
2.11	Recommended max. charging current limit:	30A
2.12	Terminals:	selectable F12 or F5
2.13	Dimensions	
	Length	328mm
	Width	172mm
	Height / totally height	222mm

3 Electric specifications

3.1 Test conditions

The test is carried out with new batteries. (Using 14.5-14.9V voltage to charge the test batteries for 24h before testing and the initial charging current less than 30A.).

Temperature:	25±5 °C
Humidity:	25-85% rel.
Pressure:	86-106Kpa

3.2 Final discharge voltage

3.3 The battery should never be discharged to less than the predetermined final discharge voltage. Otherwise over discharge may result. Repeated over discharge may cause failure to recover capacity by charging.

Discharge current (A)	Final discharge voltage
(A) < 0.1 C	10.8V
0.1 C ≤ (A) < 0.5 C	10.5V
0.5 C ≤ (A) < 1.0 C	10.2V
(A) ≥ 1.0 C	9.6V

3.3 Capacity affected by temperature

Temperature	Capacity
40°C (104°F)	102%
25°C (77°F)	100%
0°C (32°F)	85%
-15°C (5°F)	65%

3.4 Test methods & performance

ITEM	Unit	Performance	Condition	Remark
Open Circuit Voltage(OCV)	V	≥13.02	New batteries	(Full charged)
Capacity	Ah	≥100 (20 h)	Discharging battery's voltage to 10.5V with 5.0A current	1.) New batteries 2.) Up to 3 cycles are allowed
		≥96 (10 h)	Discharging battery's voltage to 10.5V with 9.6A current	
		≥82,5 (5 h)	Discharging battery's voltage to 10.5V with 16,5A current	
		≥61,8 (1 h)	Discharging battery's voltage to 10.2V with 61,8A current	
		≥43,75 (15 min)	Discharging battery's voltage to 9.6V with 175A current	
Internal Resistance	mΩ	4,5	Fully charged batteries	
High Rate Discharge (1000A)		No appearance charge, terminals of battery are ok	Discharge for 3 Seconds	
Over charge		No leakage Nor explosion	Charging battery for 160 hours with 0,03C	Fully charged batteries
Sealing reaction efficiency	%	≥95	Charging battery for 96 hours 0,01C ₁₀ , then charging battery for 1 hour with 0,005C ₁₀	Fully charged batteries

ITEM	Unit	Performance	Condition	Remark
Safety valve action	Kpa	10-20(opening) ≤2(closing)	Test battery inner pressure of opening valve and closing valve	
Blast prevented capability		No explosion	The battery encountered with fire	Fully charged batteries
Moisture prevented capability		No acid on the surface of the battery	Battery in the moisture surroundings	Fully charged batteries
Maintenance of charge	Ah	≥80%C ₂₀	After stored 120 days, then discharging battery with 0,04CA	Fully charged batteries
Cycle Life	Cycle	≥250	JISC 8702-1995,8.3.12	
Vibration		The battery's mechanically and electrically are normal	To vibrate the battery which is in upside-stand direction after vibration which has an amplitude of 4mm a frequency of 16.7 Hz and it should be continued for 60 minutes	
Shock		The battery's mechanically and electrically are normal	Dropping the battery which is in upside-stand direction from a height 200mm to a wood board which thicker than 10mm for 3 times.	

4 Charging instructions

- 4.1 Always recharge the battery immediately after use.
- 4.2 Constant Voltage charging is recommended. The maximum initial charging current should be less than 30A. The charging voltage is 14.5-14.9V(Cycle use) and 13.5-13.8V (Standby use)
- 4.3 If batteries are used in series or parallel, the correct size cabling should be used.
- 4.4 Do not charge the battery in upside-down position.
- 4.5 The battery requires approx. 110% of the total discharging energy to fully recharge.

5 Discharging instructions

- 5.1 Never leave a battery in a discharging condition.
- 5.2 Never allow a battery to fall below 12V in storage. The full capacity may not be able to be reached and actual service life decreased.
- 5.3 Maximum continuous discharge current is 1000A. For greater continuous discharge currents, please consult our technical staff.
- 5.4 Avoiding over discharging the battery, the discharge cut off voltage should be more than 9.6V.

6 Storage

- 6.1 When storing the batteries, be sure to remove them from the equipment, or disconnect them from the charger and the other load. Keep them in a place where the air is dry and the temperature is sufficiently low.
- 6.2 The batteries gradually deteriorate even during storage.
- 6.3 Stored batteries should receive a supplementary charge at intervals suggested as follows:

Storage temperature	Charging Interval
0°C bis 20°C	every 12 months
21°C bis 30°C	every 9 months
31°C bis 40°C	every 5 months
41°C bis 50°C	every 2.5 months

Storage temperature over 40°C only for absolute short storage.

- 6.4 Stored batteries self-discharge if the battery don't have been charged for a long time, so the capacity of stored batteries will decline as follows (At 20°C):

Storage time	remaining capacity
after 3 months	90%
after 6 months	80%
after 9 months	60%

7 Precautions

- a) When cleaning the batteries, use soft cloth only.
- b) Batteries may generate inflammable gas in some cases. Do not expose them to flame or excess heat. Do not short batteries!
- c) Do not attempt to disassemble the batteries!
- d) Batteries may explode if put into the fire. Never dispose of batteries in fire.
- e) Do not mix use the different manufacturer or history of use (charge/discharge operation).

8 Specification

Charging characteristics

- i. Float service 2.27-2.30V/C at 25°C (Fig 1)
- ii. Cycle service 2.40-2.45V/C at 25°C (Fig 2)

NOTE: As temperature rises, charging voltage should be reduced to prevent overcharge, and increased as temperature falls to avoid undercharge. The recommend compensation factor is:

–3mv/°C.Cell (standby use) and

–4mv/°C cell (cyclic use).

The standard center point for temperature composition is 25°C

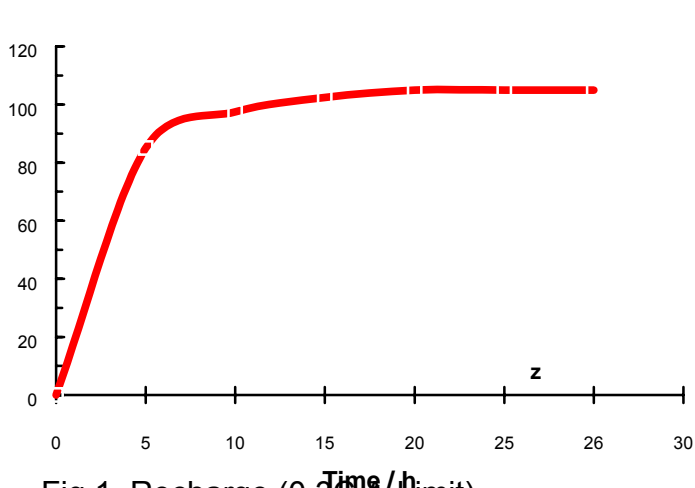


Fig.1 Recharge (0,3C A-Limit)

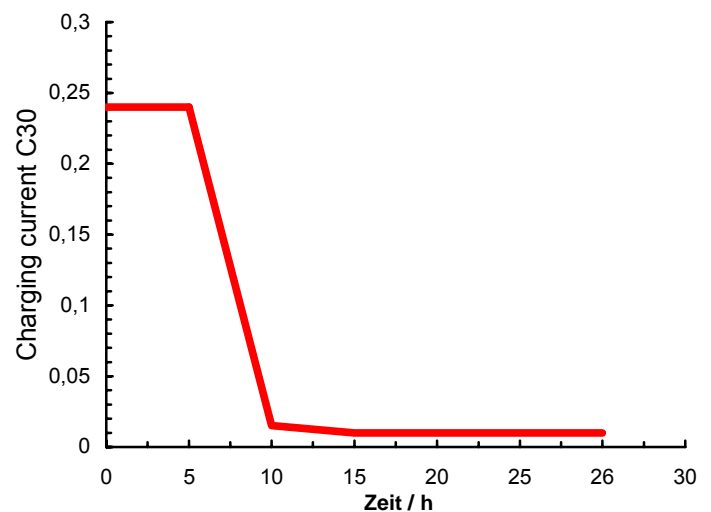
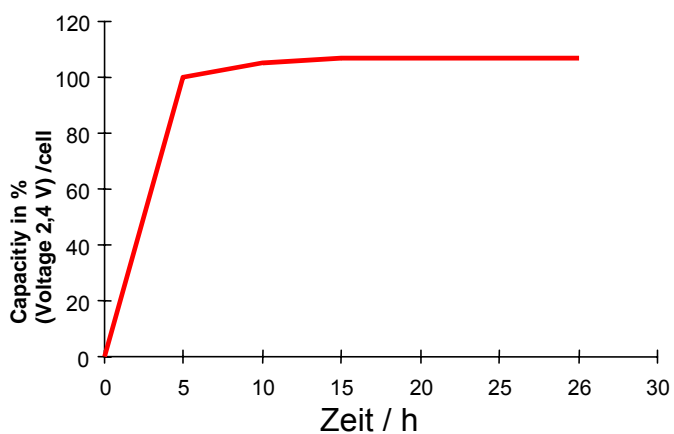
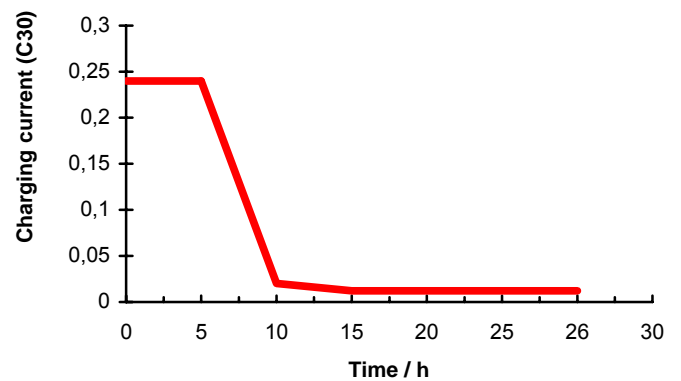


Fig.2 Cycling service recharge

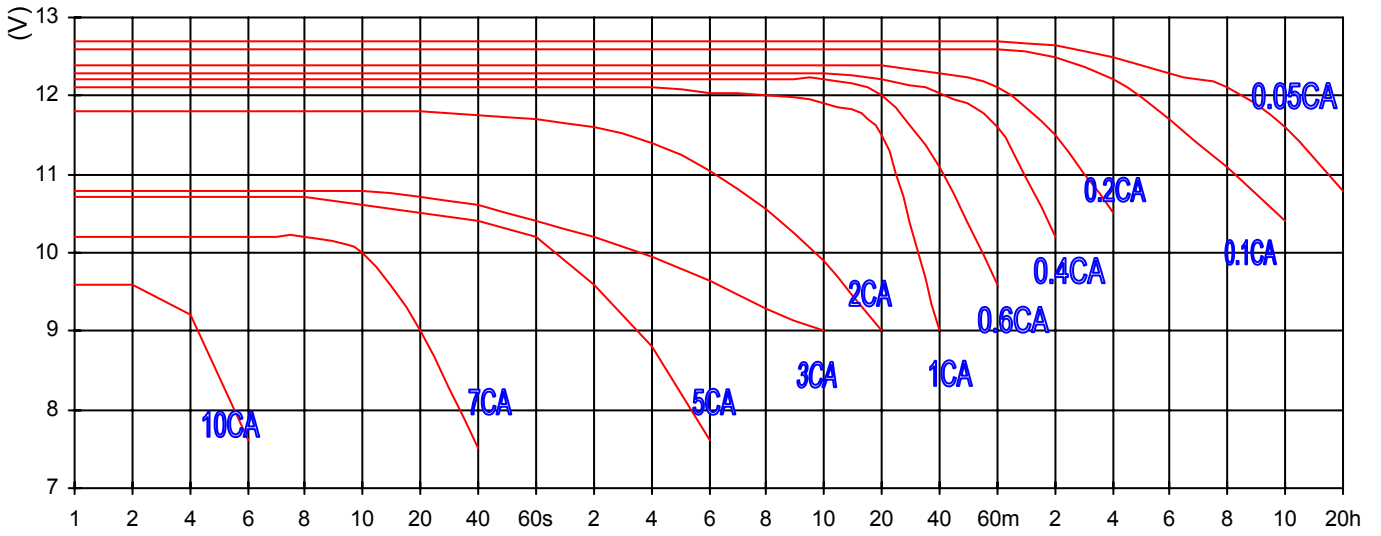


Fig.3: Discharge characteristic (C=100)

Discharging time

Cycle service

The greater the depth of discharge of each cycle, the lesser the number of cycles available from the battery (Fig4).

Fig.4: Cycle service life

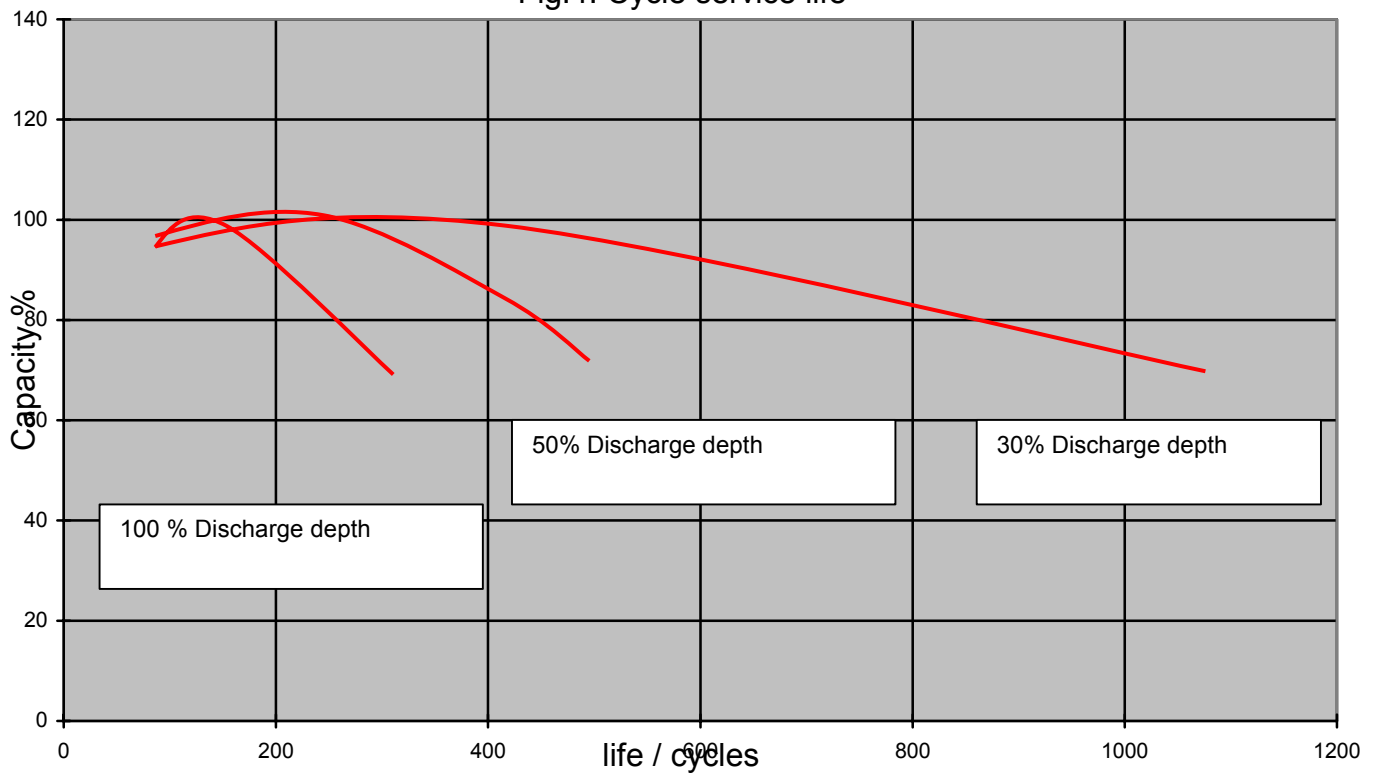


Fig.5: Discharge characteristics

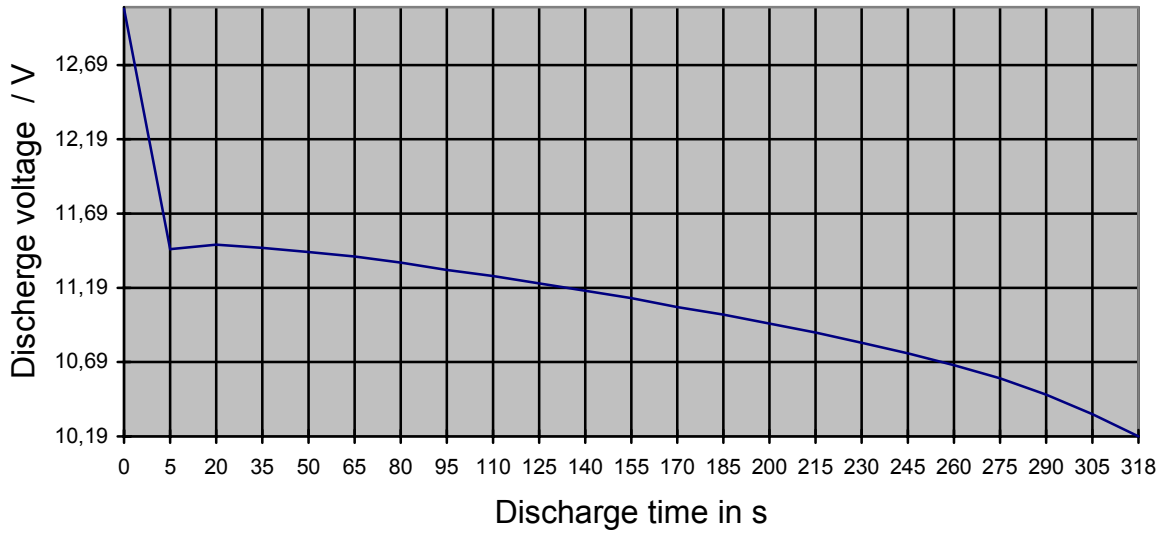
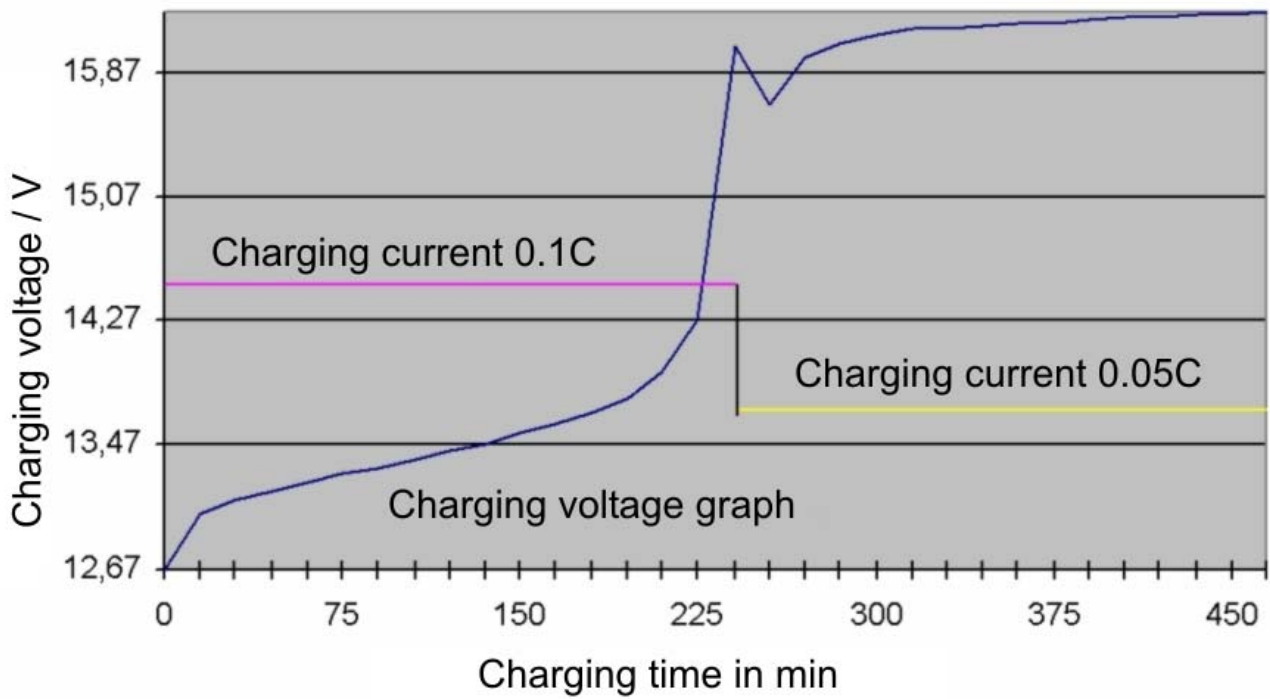
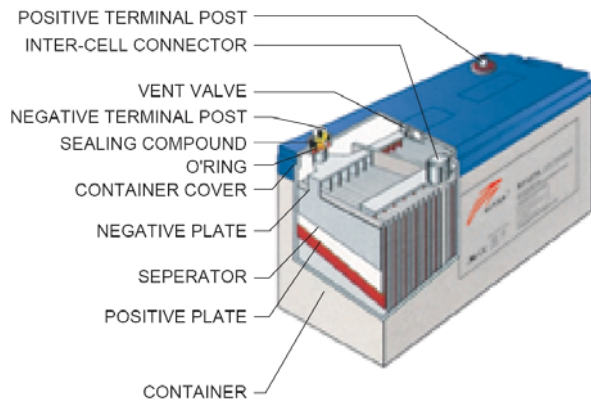


Fig.6: Charge characteristics



9 Battery construction

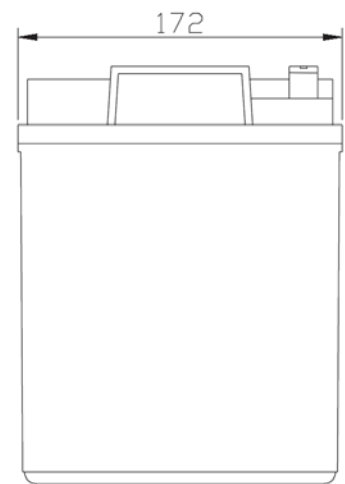
Construction of 12V Series



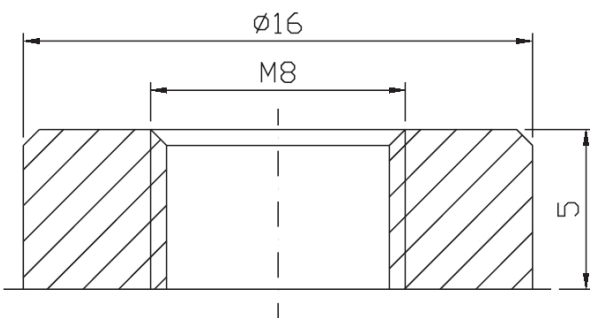
Battery Parts	Material used	Special Function
Positive and Negative plates	Heavy duty anti-corrosive Lead-calcium alloy grids pasted with active material	<ol style="list-style-type: none"> 1. Retain high capacity 2. Maintain capacity performance throughout service life 3. Minimize self-discharge
Separator	High density glass fiber	<ol style="list-style-type: none"> 1. Prevents short-circuit between (+) and (-) plates 2. Prevents active material from shedding 3. Retains electrolyte
Safety valve	Synthetic rubber cap	Release gas if internal pressure rises too high. Operate at 0.07-0.43kg/cm ²
Electrolyte	Dilute sulphuric acid fully absorbed by plates & separator	Conduct electro-chemical reaction in (+) and (-) plates
Sealing epoxy	Acid-resistant epoxy resin from Japan	<ol style="list-style-type: none"> 1. Sealed construction allow the gas recombination system which transforms the generated gas into water, thus no topping-up is required throughout battery life and is maintenance-free 2. Leak-proof from terminal or case 3. Ensure safety
Case Components: Container, cover and top lid	Injection-moulded made of ABS plastics resin with UL94HB grade and optionally with UL94V0 grade	<ol style="list-style-type: none"> 1. Provides heat-sealed compartment for 2V cell grid groups 2. Withstands thermal and mechanical shock 3. Integral handle incorporated into lid for easy lifting

10 Dimensions / terminals

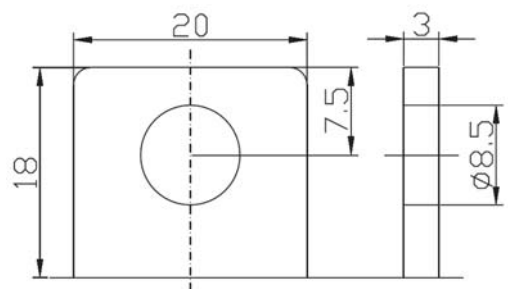
units: mm



Terminals (Standard F12 optional F5):



F12



F5

11 Discharging characteristics

Constant current discharge														
A (25°C)														
	1min	5min	10min	15min	30min	45min	1h	2h	3h	5h	8h	10h	12h	24h
1.60V	585	531	365	265	159	116	95.1	53.8	39.1	25.0	17.3	14.1	12.5	6.6
1.65V	558	509	330	257	156	115	93.9	53.8	39.1	25.0	17.3	14.1	12.5	6.6
1.70V	531	463	319	254	155	114	93.8	53.8	39.1	25.0	17.3	14.1	12.5	6.6
1.75V	468	418	293	247	154	110	92.6	53.6	37.8	25.0	17.0	13.9	12.3	6.5
1.80V	414	380	273	229	145	109	91.7	51.5	36.8	24.5	16.4	13.5	11.9	6.4
1.85V	306	277	210	184	134	98.2	85.8	49.6	35.5	23.2	15.5	12.4	11.6	6.1

Constant power discharge														
W/Cell (25°C)														
	1min	5min	10min	15min	30min	45min	1h	2h	3h	5h	8h	10h	12h	24h
1.60V	990	864	594	468	297	224	185	107	74.9	49.2	33.2	27.6	23.9	11.2
1.65V	972	828	590	465	288	222	184	107	74.9	49.2	33.2	27.6	23.9	12.2
1.70V	942	774	576	456	282	216	180	105	74.5	48.9	33.2	27.6	23.9	12.2
1.75V	810	720	540	426	267	214	179	103	73.5	48.3	32.8	27.2	23.6	12.1
1.80V	720	648	504	402	264	208	174	101	72.0	47.7	32.4	26.9	23.3	11.9
1.85V	630	522	414	348	246	192	162	97.5	70.0	44.7	30.4	25.5	22.0	11.6