ProPower

Batteries and more…

Powered by

VISION
UPS SYSTEMS

(CE, UL & ISO9001 APPROVAL)

1. Feature

1) Maintenance free-operation. There is no need to check the special gravity of the electrolyte or to add water during the service life.
2) Wide applicable temperature range (-30°C – 60°C)
3) Long service life, high reliability
   Expected service life under float-voltage charging:
   FP series: 3-5 years / LFP series: 5-7 years / CFP Series: 15-20 years
4) Non-ionic electrolyte. Electrolyte is absorbed into plates and separator.
5) Anti-explosive
6) Low resistance with large output power
7) Low self-discharge
   Because of the use of lead calcium grids alloy and highly pure material
   VRLA battery can be stored long period
8) Exceptional deep discharge recovery
9) Quick chargeability where rapid recharge is required for portable devices such as tools or computers. High charge rate batteries are available. Coupled with proper recharge in 1-1,5 hours is readily achieved.
10) High quality and high reliability
    VRLA battery has stable and reliable capacity. It can be easily maintained to permit proper operation of the equipment that it powers. The battery withstands overcharge, over-discharge, vibration and shock more readily than competitive products, and is capable of extended storage. To assure this high quality and reliability, the batteries are 100% tested on line for voltage, capacity, and seals (glue and / or heat seal). And all valves are 100% visually inspected during the final assembly process.
11) The battery can be deposited in any direction
12) No need to discharge with equalizing voltage

2. Application

Communication system	UPS
Electric power system	solar energy system
Emergency lighting and alarm system	Medical equipment
Marine standby-power system	Railway system
Radio controller	Aviation and military power
Geophysical equipment	Electric scooter
Cable television	Machines
Electronic test equipment	Electronic cash register

3. General characteristics

3.1.Discharging

Discharging current rate and recommended turn off voltage

Discharging current	Final discharge voltage (vpc)
Up to 0,1 CA	1,75
0,11-0,17 CA	1,70
0,18-0,25 CA	1,67
0,26-0,60 CA	1,60
3 CA	1,30

Above 3 CA, refer for advice

The slowest practical rate of discharge for a lead acid battery is self-discharge. As the current is very low and the fully discharged voltage is high, i.e. the battery is flat at 2,00-2,03 vpc. Therefore a

program of stock control must be introduced to ensure that batteries are recharged well before that voltage is reached.

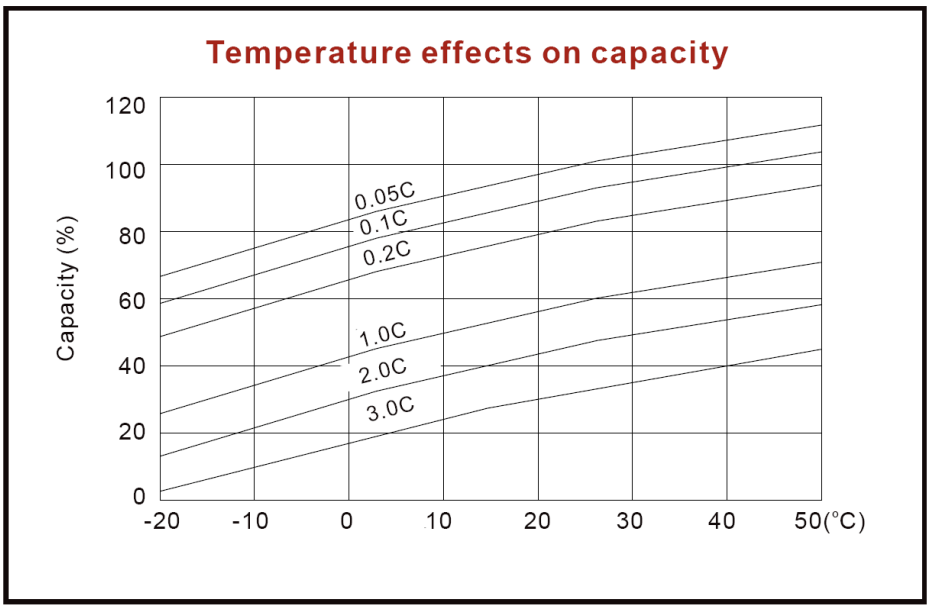
3.2.Discharging temperature

(1) The ambient temperature during discharge should be held within the range of 5 to 122°F (-15 to 50°C)
(2) Low temperature (below 5°F / -15°C) may reduce the available capacity; and high temperature (over 122°F / 50°C) may cause deformation of the battery case and damage the battery.

3.3.Effect of temperature upon performance

The available capacity is affected by both temperature and discharge current as shown in figure 1.

Figure 1:



3.4.Discharge current

For the best efficiency, discharge within the range of 0,05 CA to 3 CA.

3.5.Charging

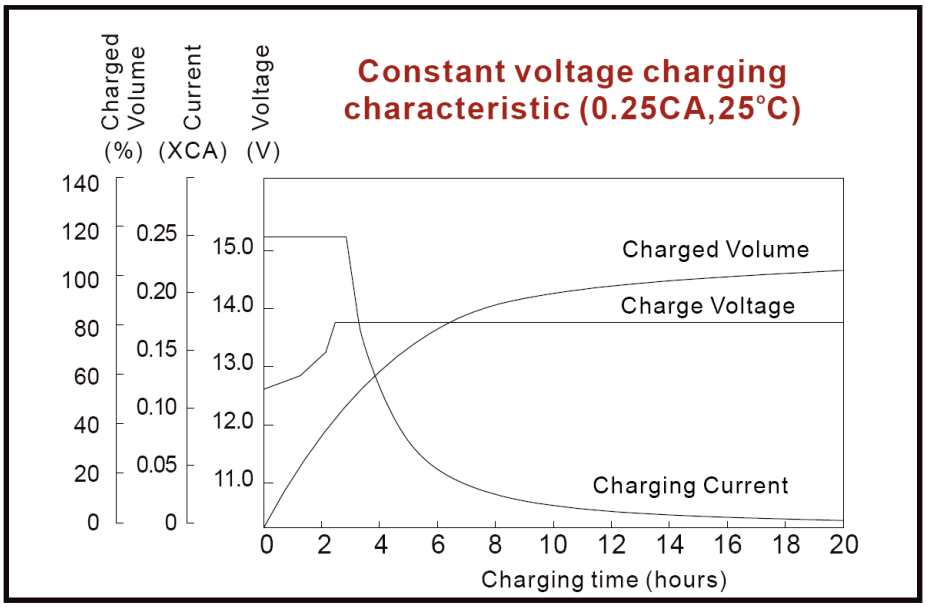
Correct battery charging ensures the maximum possible working life for the battery
There are four major method of charging:

- constant voltage charging
- constant current charging
- two stages charging
- trickle current charging

Constant voltage charging
This is the recommended method of charging for VRLA batteries. It is necessary to closely control the actual voltage to ensure it is within the limits advised.
Standby service: 2,23 – 2,30 vpc at 25°C
Cycle service: 2,40 – 2,45 vpc at 25°C
It is suggested that the initial current be set within 0,45 Amps. The attached graph indicates the time taken to fully recharge the battery. It should be noted the graph illustrated is for a fully discharged battery, i.e. a battery that has reached the minimum cell voltage recommended for its discharge time. It

is also seen that it is necessary to indicate that the battery is fully charged is approx. 5 mA / Ah under charging voltage is 2,30 vpc.

Figure 2:



Note: it is necessary to ensure that the voltage is correctly set. A charging voltage set too high will increase the corrosion of the positive plates and shorten battery life. A charging voltage set too low will lead to sulphating of the plates causing loss of capacity and ultimately shortening the life of the battery.

Constant current charging

This method of charging is generally not recommended for VRLA batteries. It is necessary to understand that if the batteries are not removed from the charger as soon as possible after reaching stats of full charge. Considerable damage will occur to the batteries due to overcharging.

Two stages charging

This method should not be used where the battery and load are connected in parallel. If this method is to be used, it is suggested that department is contacted.

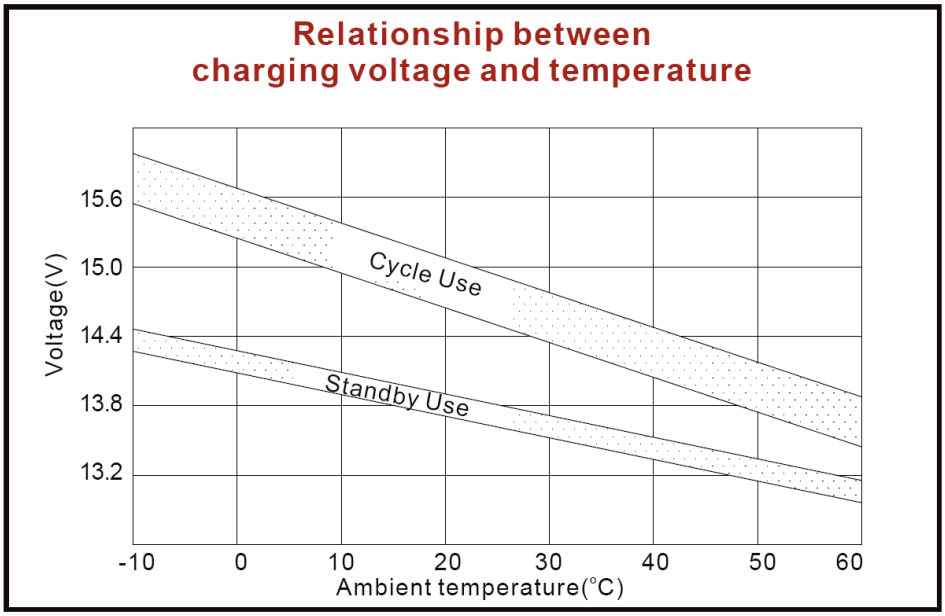
Trickle current charging

This method is not recommended for VRLA batteries, however, if this method is to be used. It is suggested that the technical department is contacted.

Effect of temperature on charging voltage

As temperature rising, electrochemical activity in battery increases. Similarly, as temperature falling, electrochemical activity decreases. Therefore, as temperature rising, charging voltage should be reduced to prevent overcharge and reverse increase as temperature falls to avoid undercharge. In general, to assure design service life, a charger with temperature compensation function is recommended to be used, the recommended compensation factor for Power Pro batteries is +/- 3 mV/°C per cell (standby use) and +/- 4 mV/°C per cell (cycling use). The standard centre point for temperature compensation is 20°C. Figure 3 shows the relationship between temperature and charging voltage in both cyclic and standby applications.

Figure 3:



Effect of voltage on battery gassing

Although the batteries are of the recombination type and the amount of gassing at normal operating voltage and temperature is negligible. If the charging voltage is increased, gassing will occur despite the recombination design of the product. Gassing does not normally occur while the battery is operating under float conditions and normal constant voltage recharge of 2,23 – 2,30 vpc at 25°C. Very little gassing occur when the battery is recharged under normal cycling recharge procedures. However it can be seen on the accompanying graph the higher voltage that this especially under conditions of constant current charging will substantially increase the volume of gas.

4. Charging time

The time required to complete each charge depends on the discharged condition of battery, characteristics of charger used, or the temperature during charge. For cycling use, using constant voltage charging, this time can be estimated by the following expression:

(1) discharge current: larger than 0,25 CA (formel)
(2) discharge current: less than 0,25 CA (formel)

Tch = time required for charge (hours)
Cdis = ampere-hour discharge before charge started
I = initial charging current

Complete charge time for float service will be slightly more than 24 hours

5. Storage

General storage conditions

The battery should be stored under the following conditions:

(3) low humidity
(4) 5 to 104°F (-15 to 40°C)
(5) clean and avoid direct sunlight

Capacity after long term storage

After long term storage, all batteries deliver less than rated capacity on first cycle. In cyclic application, full capacity may be obtained through several charge / discharge cycles; typically3 – 5 cycles.

Refresh charge

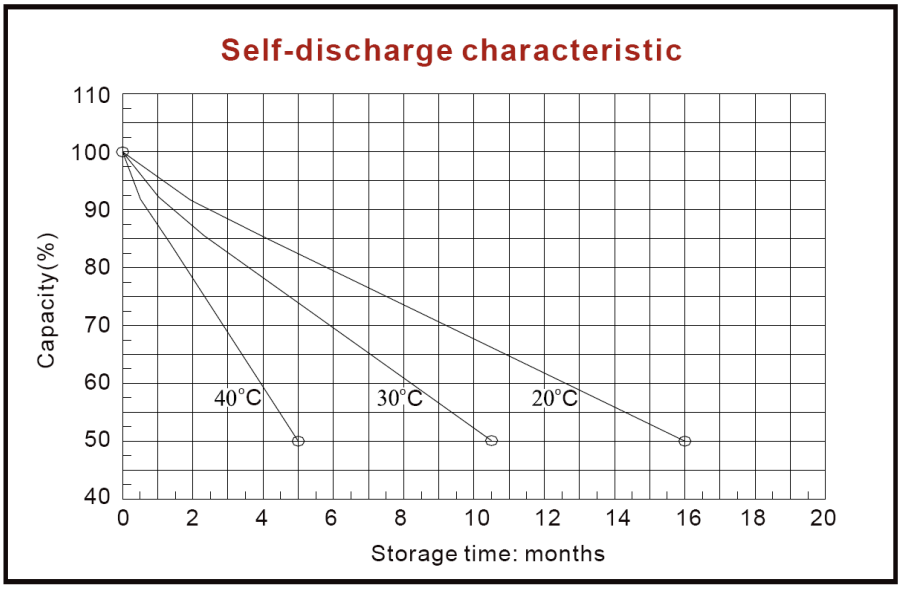
When batteries are placed in extended storage, it is recommended that they receive a refresh charge at recommended intervals.

Storage ambient	*recommended interval*
Below 68°F (20°C)	12 months
68 to 86°F (20 to 30°C)	6 months
86 to 104°F (30 to 40°C)	3 months

6. ***Shelf life – Typical capacity Vs Time***

Self-discharge rate is very much dependant on the storage temperature as shown in figure 5. Lower temperature allows the battery to be stored for a longer period (each ten degree centigrade drops result in a halving of self-discharge rate and double storage time).

Figure 4:



7. ***Battery design life***

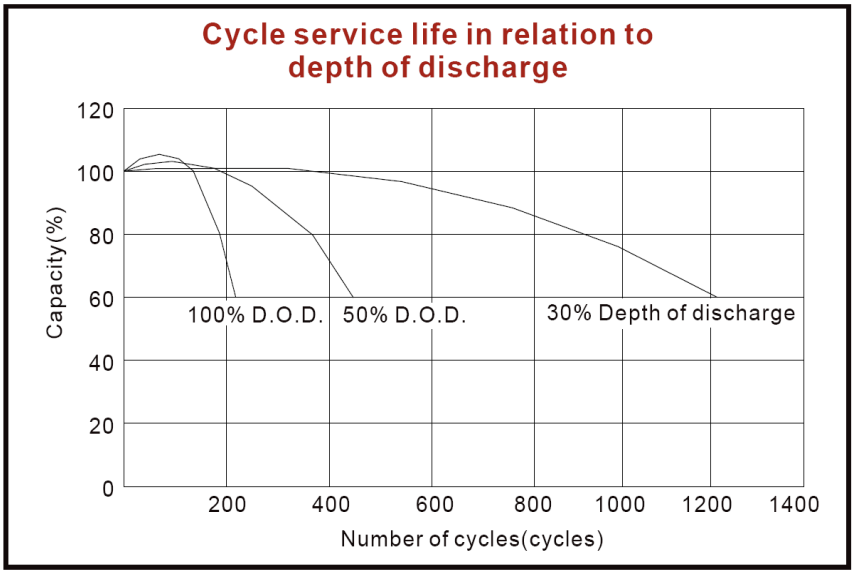
Battery life depends on a number of key factors. These include:

- operating temperature of the battery;
- method of charging utilized;
- actual use of the product, i.e. standby or cycle service ...

Cycling life

Giving due consideration to the above factors, the actual life of a battery in cycle service is dependant on the depth of discharge of each cycle. The greater the depth of discharge of each cycle, the lesser the number of cycle available from the battery

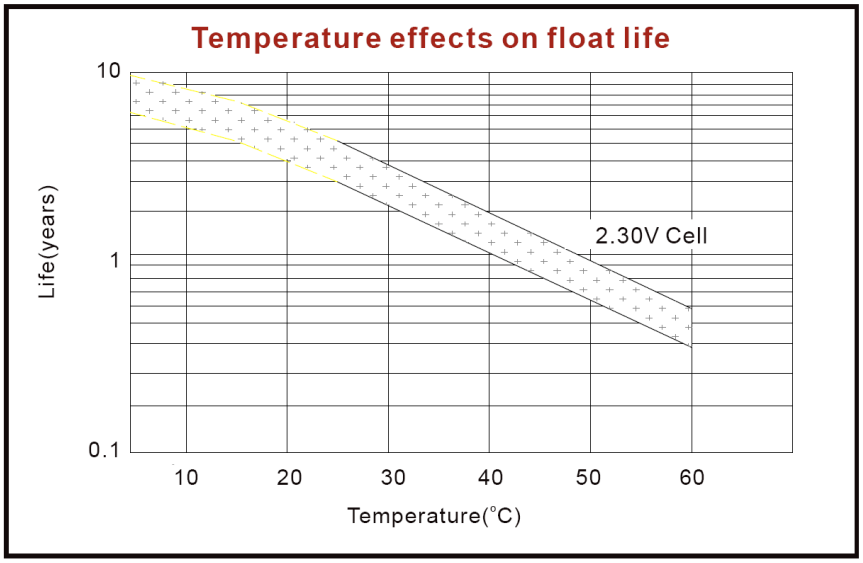
Figure 5:



Standby life

The estimated life under float service of FP series is 3 – 5 years at 25+2°C; LFP series in 5 – 7 years at 25+2°C; CFP series is more than 15 years at 25+2°C, the float service is affected by the factors listed above and the depth of discharge. Basically, the more battery discharging is effected, the deeper the discharge and the higher temperature are, and the shorter battery life would be.

Figure 6:



8. ***Care and handling***

1) *Disassembly*
   Do not disassemble the battery, as its strong acid electrolyte may burn your skin or clothes.
2) *Shoring*
   Do not short-circuit two posts of batteries as it can burn away the connection and could damage equipment.
3) *Disposing*
   Do not incinerate batteries; it may burst if thrown into fire. Arrange for proper return for recycling in your locality.
4) *Keep the battery clean*
   Wipe the battery with a dry cloth or, if necessary, use water dampened cloth. Never use oil, gasoline, thinner or other petrochemicals.

5) *Do not use in totally sealed case or container*
   If the battery is used in a totally sealed case or container, it can be filled with the gases generated during overcharging. In the worst case, the container may explode because the internal pressure might exceed the strength limit of the container or from an ignition of hydrogen gas in the event that there is an internal spark or flame. To avoid this, it is recommended that the battery receives adequate ventilation so that any gases generated can be released to outside atmosphere.
6) *If the battery is broken*
   If the battery is accidentally broken and electrolyte (sulphuric acid) leak out, wipe it up with a cloth. Neutralize the acid with some ready alkaline substance such as ammonia solution or baking powder (sodium hydrogen carbonate). In the event electrolyte contact skin, immediately flush with flooded water and consult a doctor.

9. Prolonging battery life

9.1. Charging instructions

1) recharge the battery immediately after use;
2) constant voltage charging is recommended at 25°C, 2.23 – 2.30 vpc for standby use and 2.40 – 2.45 for cycle use;
3) the maximum initial charging current should be 0,4 CA;
4) If batteries are used in series or parallel, the correct size cabling should be used;
5) do not charge the battery in upside-down position;
6) The battery requires aprrox. 110 % of the total discharging energy to fully recharge;
7) Mixed usage of batteries differing in capacity, type, manufacturers or history or use (charge / discharge operation) may damage the batteries and the equipment due to the difference in characteristics values. This must not be attempted anyhow.

9.2. Discharging instructions

1) never leave a battery in a discharging condition;
2) Never allow a battery to fall below 2 vpc in storage. The full capacity may not be able to be reached and actual life decreases;
3) maximum continuous discharge current is 5 CA for greater continuous discharge current; please contact technical department;
4) avoid over discharging the battery;
5) Stored batteries should receive a supplementary charge at intervals suggested.

9.3. Supplementary charge suggestion

When storing the batteries, be sure to remove them from the equipment, or disconnect them from the charger and the load. Keep them in a place where the air is dry and the temperature is sufficiently low. It is recommended that they receive a refresh charge at recommended intervals.

Storage Temperature	*charging interval*
20°C or less	every 9 months
20 – 30°C	every 6 months
30 – 40°C	every 3 months

10. Battery Index

FP Series

Model	*Nominal Voltage*	*20H Rate Capacity (Ah)*	*L (mm)*	*W (mm)*	*H (mm)*	*TH (mm)*	*Weight (Kg)*
FP640	6	4	70	47	101	107	0.85
FP645	6	4.5	70	47	101	107	0.85
FP650	6	5	70	47	101	107	0.92
FP1250	12	5	90	70	101	107	1.80
FP1270	12	7	151	65	93	99	2.66
FP1290	12	9	151	65	93	99	2.80
FP12120	12	12	151	98	95	101	4.20
FP12180	12	18	181	77	167	167	5.70
FP12250	12	25	175	166	125	125	8.60

(*) Note: Other (special) capacities like 1.2Ah, 1.5Ah… are also available. Please contact Vision UPS Systems.

LFP Series

Model	*Nominal Voltage*	*20H Rate Capacity (Ah)*	*L (mm)*	*W (mm)*	*H (mm)*	*TH (mm)*	*Weight (Kg)*
LFP1240	12	40	197	165	170	170	13.5
LFP1265	12	65	355	167	179	183	22.2
LFP1280	12	80	355	167	179	183	24.0
LFP12100	12	100	330	171	220	227	32.0
LFP12120	12	120	410	175	227	227	38.0
LFP12160	12	160	485	172	240	240	47.0
LFP12200	12	200	522	238	218	236	65.0

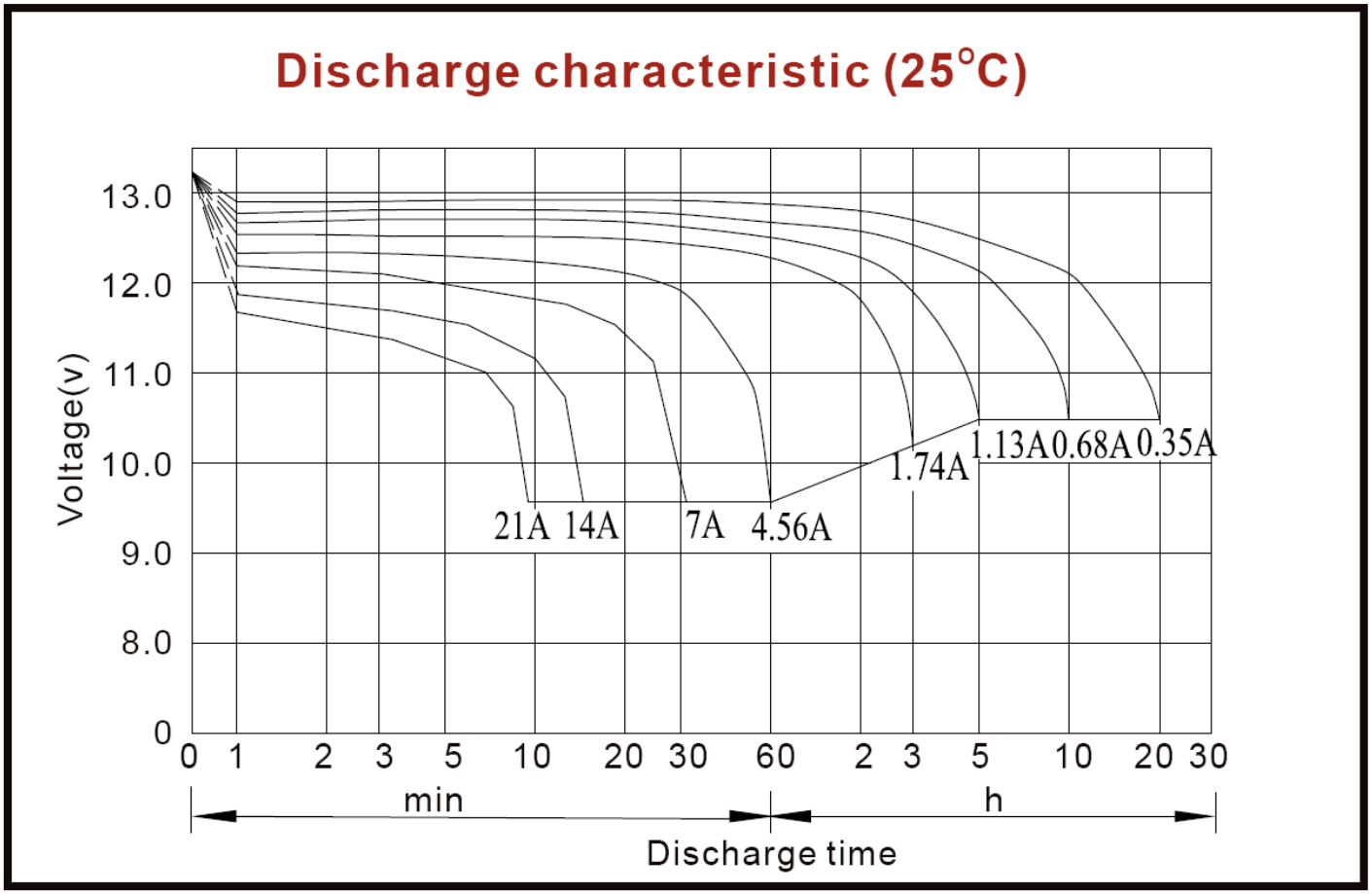
(*) Note: Other capacities are also available. Please contact Vision UPS Systems.

CFP Series

Model	*Voltage*	*Ah*	*L (mm)*	*W (mm)*	*H (mm)*	*TH (mm)*	*Weight (Kg)*
CFP2100	2	100	169	71	206	206	8.0
CFP2150	2	150	169	100	206	206	12.0
CFP2200	2	200	171	106	330	367	15.0
CFP2300	2	300	171	151	330	367	21.0
CFP2400	2	400	210	173	330	367	28.0
CFP2500	2	500	241	171	330	367	33.0
CFP2600	2	600	302	175	330	367	42.0
CFP2800	2	800	410	175	330	367	57.0
CFP21000	2	1000	482	175	330	367	66.5
CFP21500	2	1500	400	350	345	382	100
CFP22000	2	2000	490	350	345	382	132
CFP23000	2	3000	710	350	345	382	204

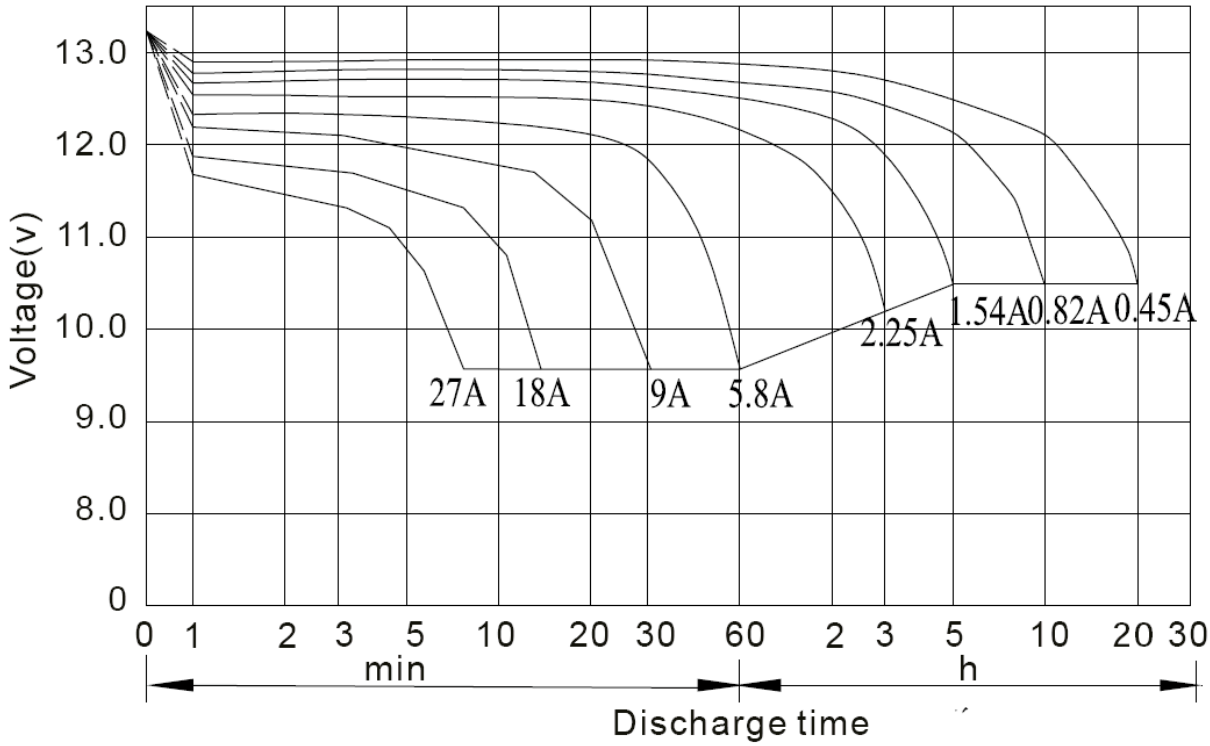
11. Discharge characteristics for some of the most used UPS batteries

12V-7Ah

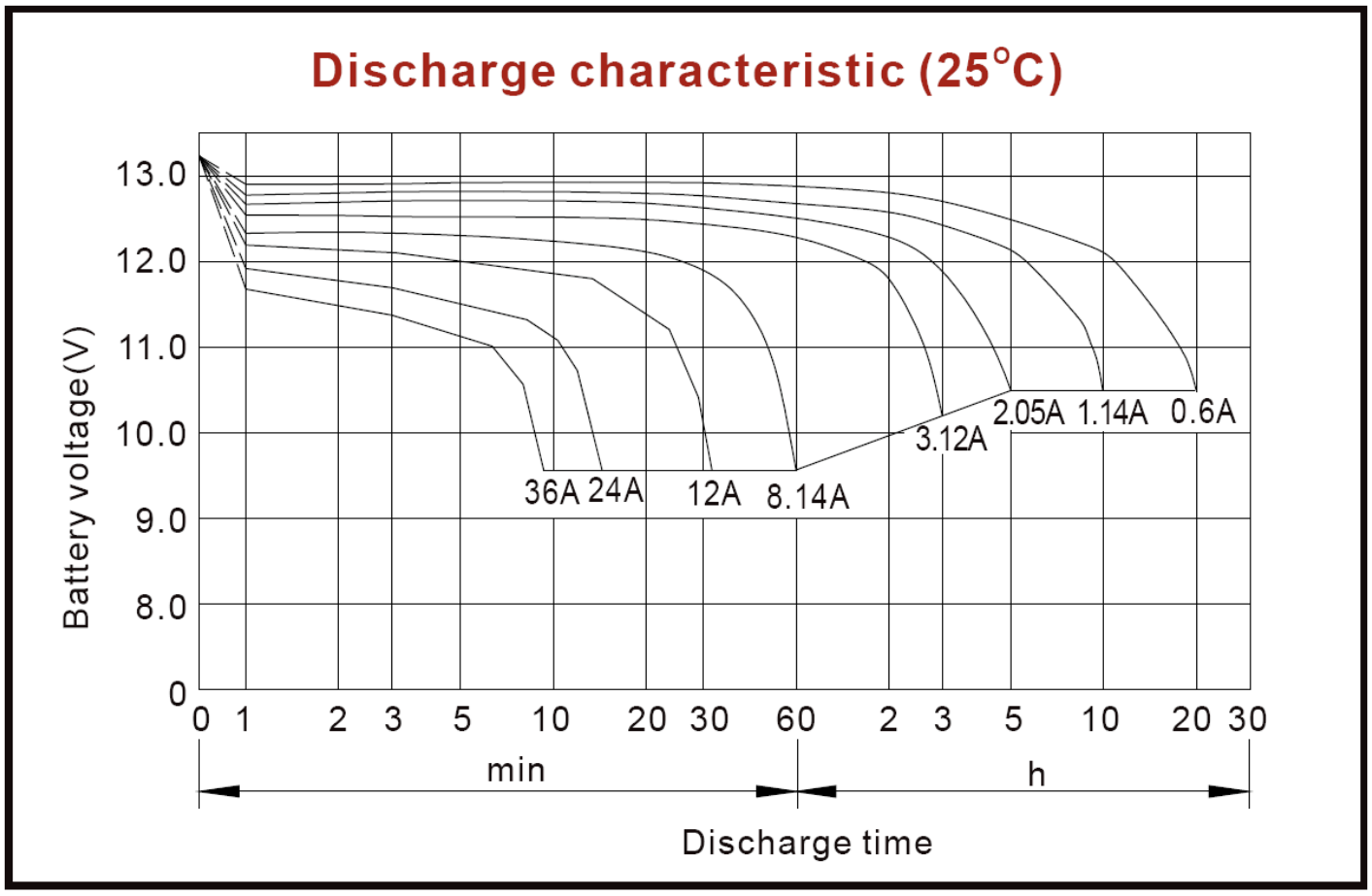


12V-9Ah

Discharge characteristic (25°C)

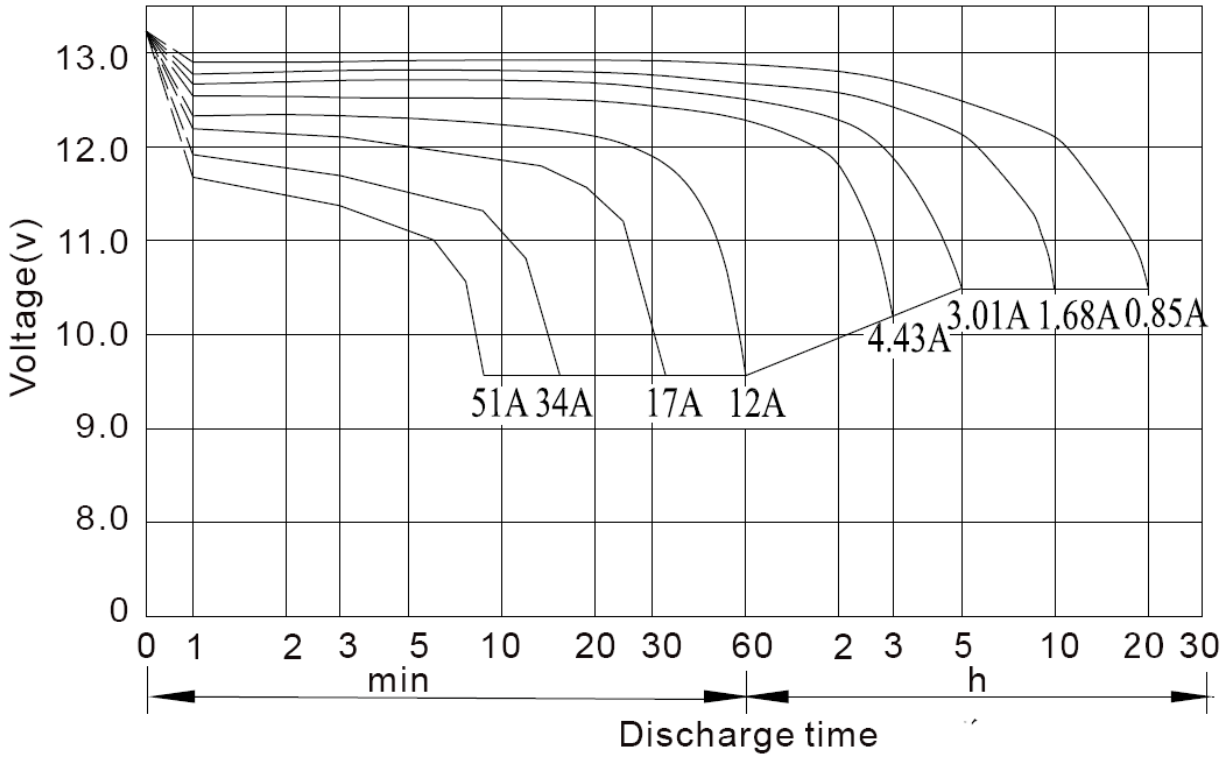


12V-12Ah


Discharge characteristic (25°C)
Battery voltage(V)
13.0
12.0
11.0
10.0
9.0
8.0
0
0 1 2 3 5 10 20 30 60 2 3 5 10 20 30
min
h
Discharge time
36A
24A
12A
8.14A
3.12A
2.05A
1.14A
0.6A

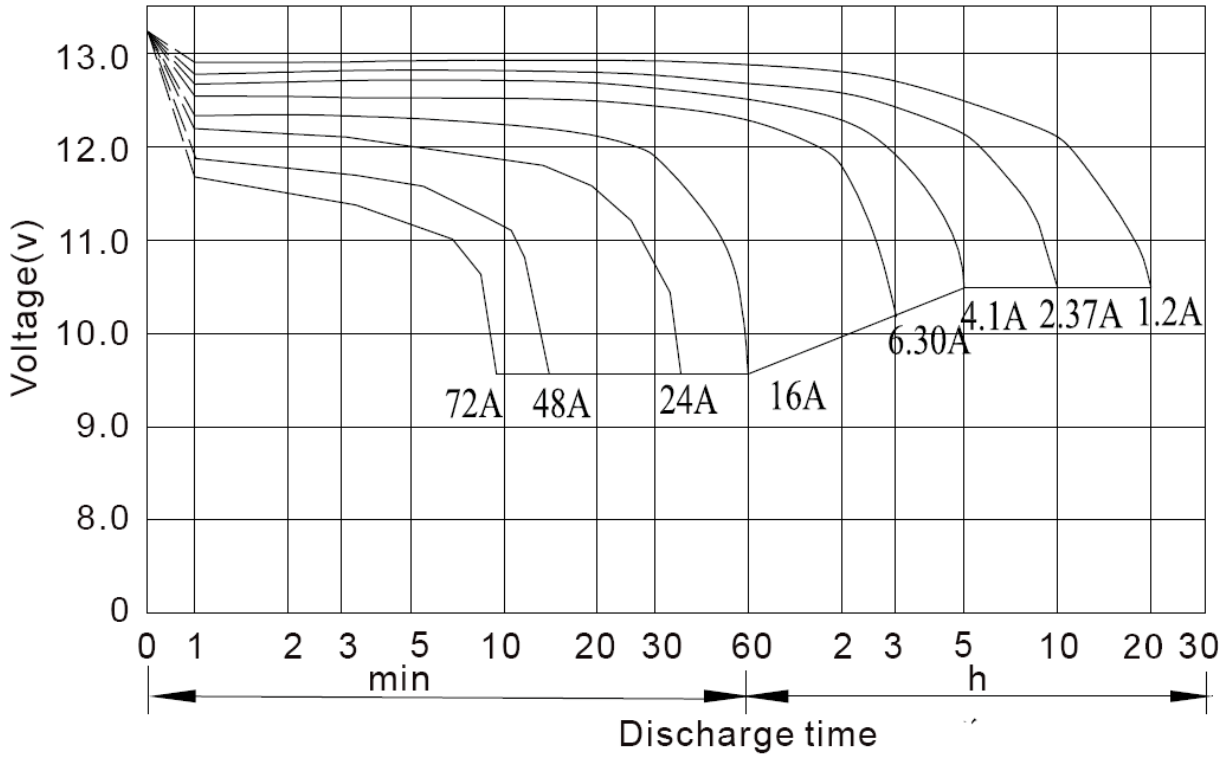
12V-18Ah

Discharge characteristic (25°C)

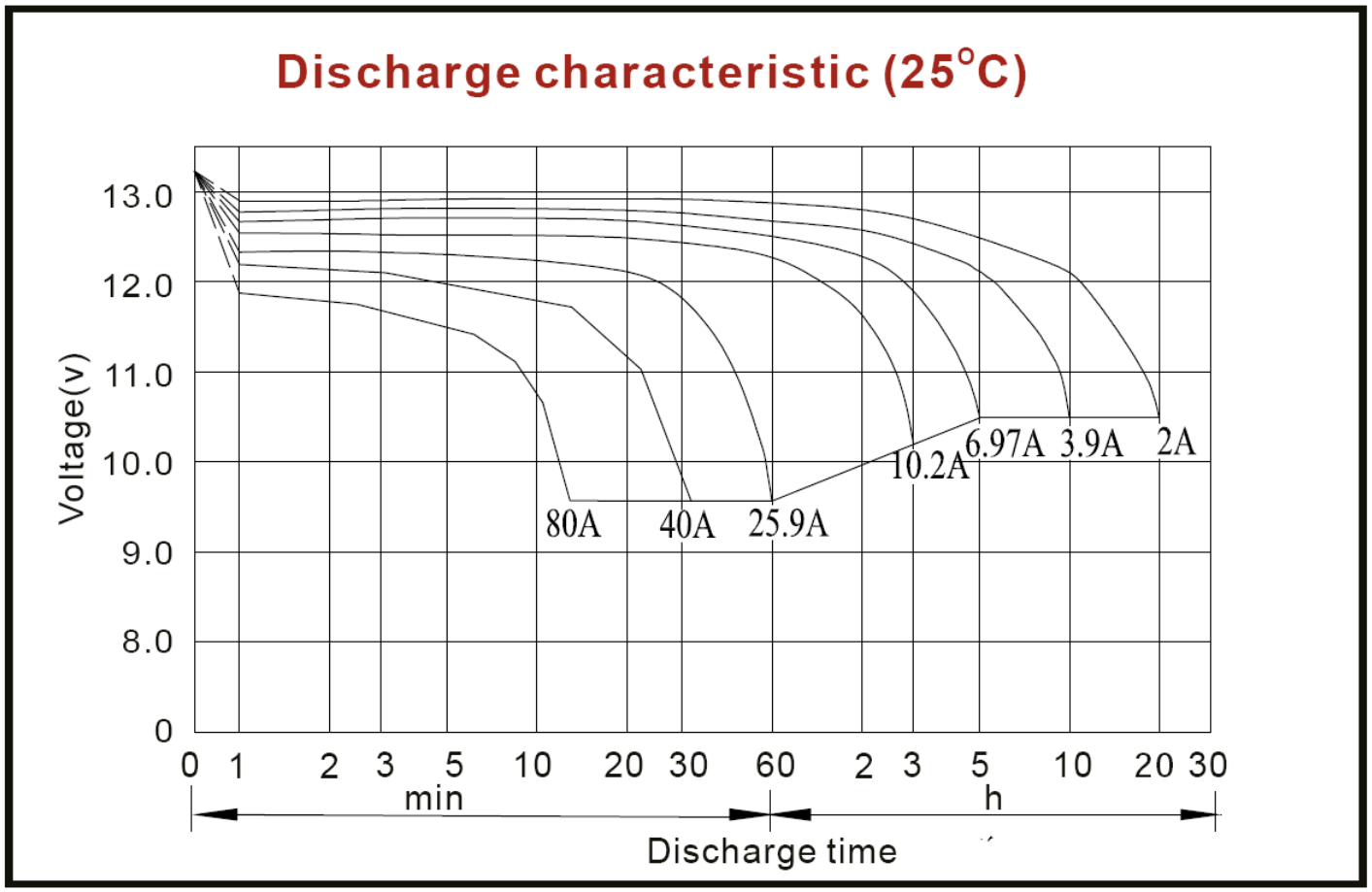


12V-25Ah

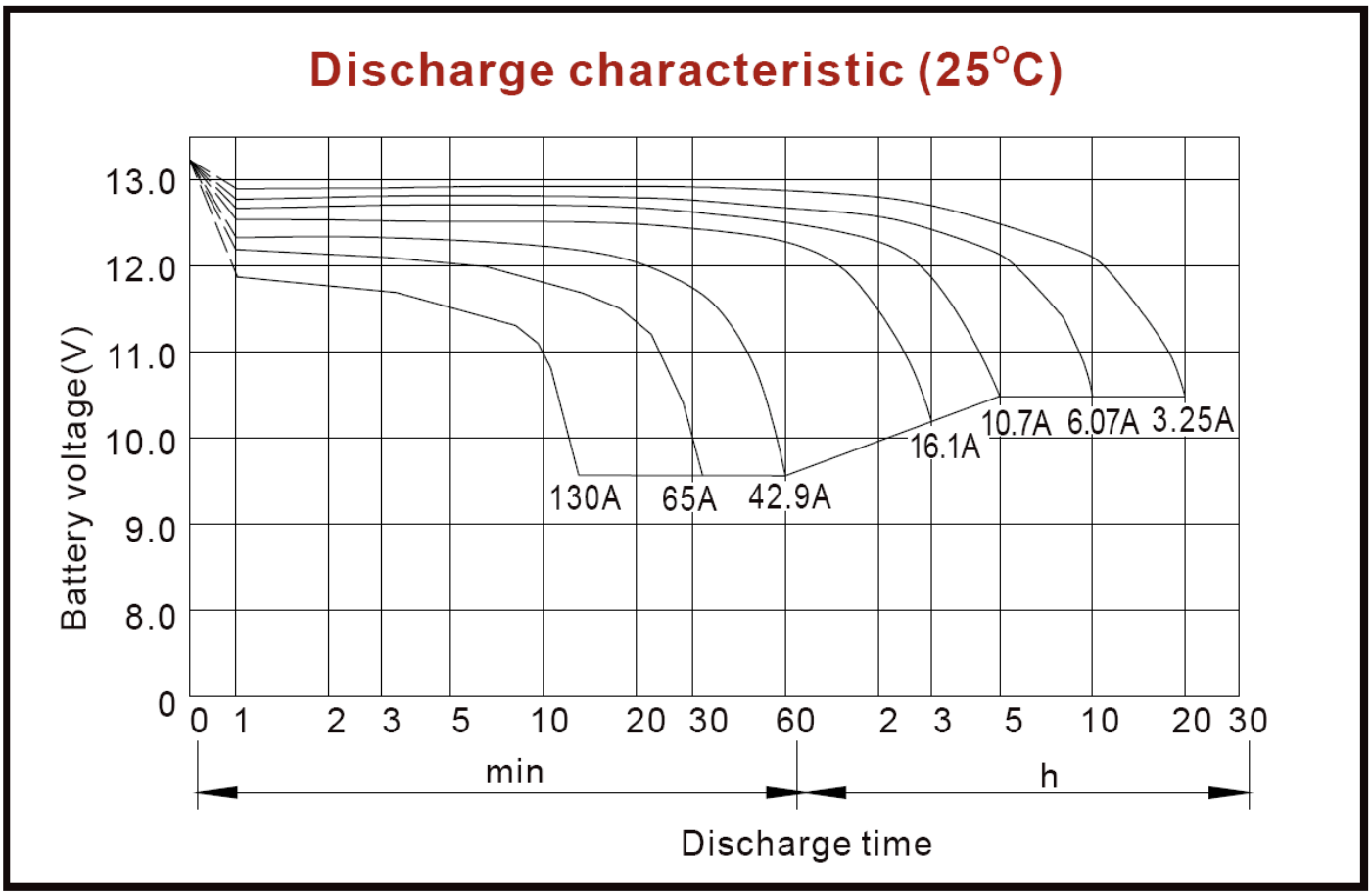
Discharge characteristic (25°C)



12V-40Ah

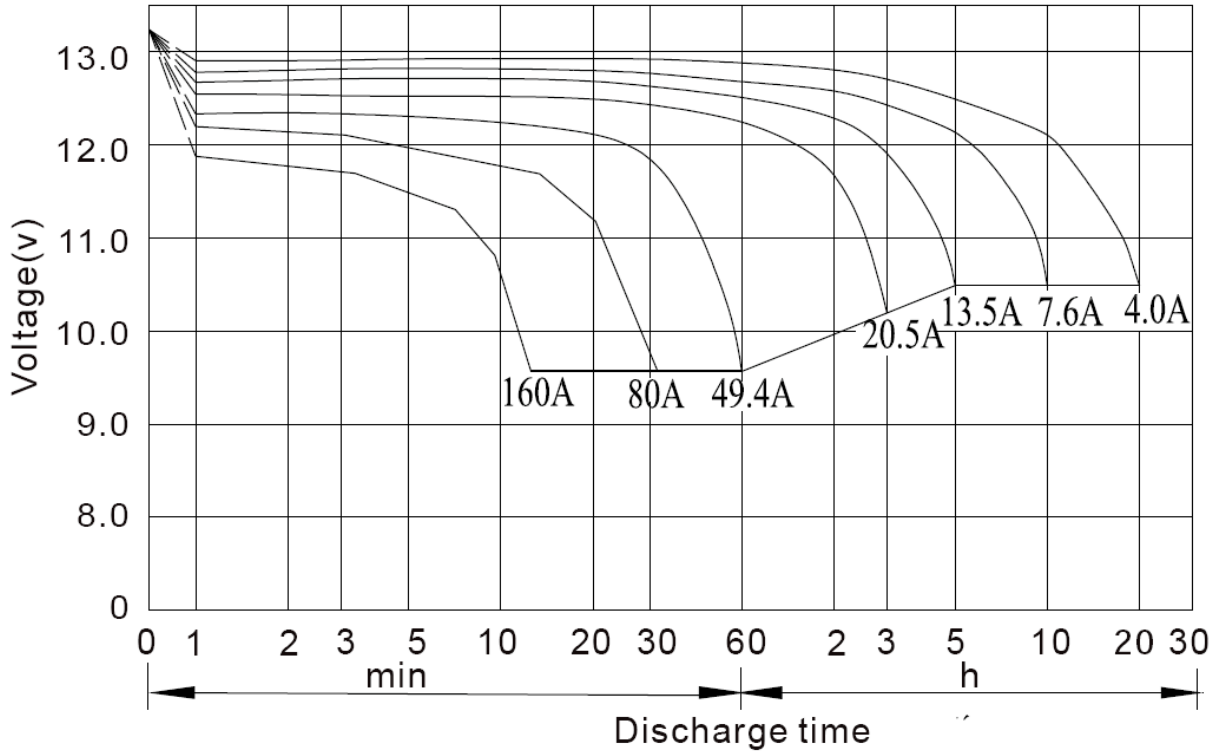

Discharge characteristic (25°C)
Voltage(v)
13.0
12.0
11.0
10.0
9.0
8.0
0
80A
40A
25.9A
10.2A
6.97A
3.9A
2A
0 1 2 3 5 10 20 30 60 2 3 5 10 20 30
min
h
Discharge time

12V65Ah


Discharge characteristic (25°C)
Battery voltage(V)
13.0
12.0
11.0
10.0
9.0
8.0
0
0 1 2 3 5 10 20 30 60 2 3 5 10 20 30
min
h
Discharge time
130A
65A
42.9A
16.1A
10.7A
6.07A
3.25A

12V-80Ah

Discharge characteristic (25°C)



12V-100Ah

Discharge characteristic (25°C)