





# BATTERY







### **Industrial Batteries**

Lead acid batteries used in non-automotive applications are generally referred to as industrial batteries. There are various definitions and categories for these batteries, but in short, industrial batteries are advanced batteries that are used to power computer systems, medical equipment, industrial vehicles, etc.

# Industrial battery categories terms of electrolyte type

- Flooded Batteries
- Valve Regulated Lead \_ acid (VRLA) Batteries



## **Advantages of VRLA Batteries**

- Due to oxygen recombination, water consumption is lower, and thus they are maintenance\_free (MF)
- Due to the stabilization of the electrolyte in a fixed bed (gel for gel batteries and absorbed glass mat layer for AGM batteries), there is no risk of acid leakage and splashing even when the battery is tilted.
- Due to the fact that acid is not layered in VRLA batteries, the number of charge-discharge cycles of the battery is more.























These batteries are VRLA battery type (with regulated pressure valve) and with gel electrolyte. Unlike batteries with liquid electrolytes there is no acid layering phenomenon in this type of stabilized electrolyte, which as well as increases battery life and makes it suitable for industrial use by reducing grid corrosion and reducing water consumption.

Solar batteries with oxygen recombination technology do not require maintenance, meaning that they do not need to be checked for electrolyte levels and frequently add water while being used. It is because the oxygen recovery cycle prevents water loss and the gel electrolyte minimizes the possibility of acid leakage from the battery. Civolex solar batteries are manufactured in accordance with the requirements of IEC 61427-1 international standard and have apt performance conditions and efficiency.

#### **Applications of Solar Batteries**

Batteries can be used in applications that require a large number of charge and discharge cycles with high discharge depth. One of the most important sources of energy storage produced by renewable energy sources includes:

- Solar energy
- Wind energy





#### **Features of solar batteries**

#### • Suitable for frequent charge-discharge application with deep cycle

Solar batteries are designed to be used in applications where the battery can withstand a large number of charge and discharge cycles with high discharge depth. These batteries are designed in such a way that even if they do not receive enough charge in a certain period of time, they can still be discharged in order to run the user's device.

#### Maintenance Free (MF)

Regulated valves and gel electrolytes used in this product cause water reabsorption. With this system, any further inspection and water addition to the electrolyte is eliminated.

#### Low self-discharge

Battery design and high-quality raw materials in these batteries lead to decrease self-discharge.

• Vast range of environmental temperature

Solar batteries can be used in the temperature range of -20 to 45°C.







#### Service life

Corrosion resistance provided by thick grids with optimized lead alloy which is used to produce plates, improved standby service.

#### Pressure\_regulated valves

With these valves, the pressure of gas in the battery is higher than the atmosphere pressure which led to a decrease in water loss.

#### • Compliance with the international standards

The solar batteries were produced according to the requirements of the international standards IEC 61427-1.

	F	hysical Ch	naracterist	tics		
Part Number	Capacity 20 HR	Max Ove	erall Dimens	ion (mm)	Terminal Type	Terminal Layout
	(AH)	Length	Width	T.Height	.,,,,	,
SFGHU100-12	100	344	173	240	UT	0
SFGHI100-12	100	344	173	226	1	0



### **Electrical Characteristics**

Items	Value (	(at 25°C)		
Nominal voltage	1.	2 V		
Open circuit voltage at full charge	(12.7	<b>– 13.0)</b>		
The lowest permissible voltage during discharge	9	V		
Charge voltage for cyclic applications	(14.20 -	- 14.40) V		
Charge voltage for standby applications (float charge)	(13.60 -	- 13.80) V		
Correction factor of charge voltage	-15 (1	mV/°C)		
Internal resistance at full state of charge	(6-1	0) mΩ		
Maximum discharge current (1 sec)	100 Ah	750 A		
Maximum discharge current (continuous)	100 Ah	300 A		
Maximum allowable charge current	100 Ah	25 A		

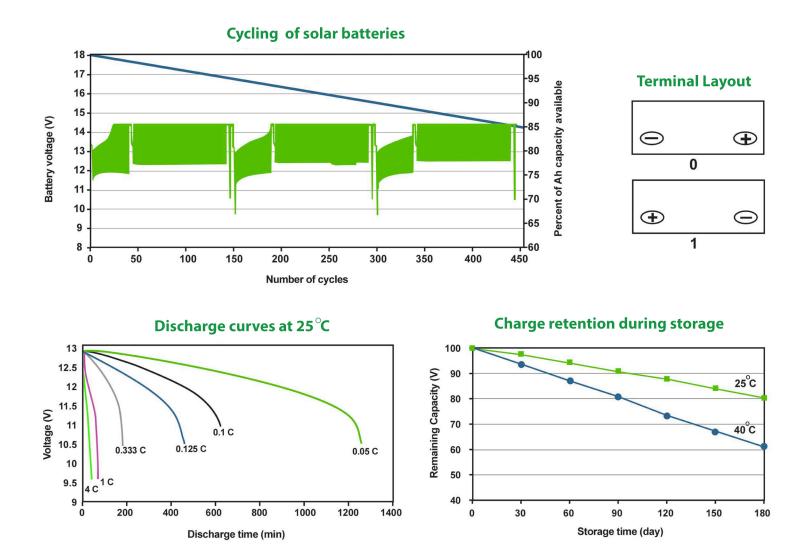
## Discharge with constant power at 25°C (100Ah battery)

	Discharge with constant power at 25 c (100/111 battery)															
						C	Cut off V	oltage (\	V/Cell)							
Rate	1.	50	1.	60	1.	67	1.7	70	1.	75	1.8	30	1.	85	1.9	90
	I (A)	Cn(Ah)	I (A)	Cn(Ah)	I (A)	Cn(Ah)	I (A)	Cn(Ah)	I (A)	Cn(Ah)	I (A)	Cn(Ah)	I (A)	Cn(Ah)	I (A)	Cn(Ah
20 h	5.36	107.3	5.20	103.9	5.15	103.0	510	102.0	5.00	100.0	4.79	95.7	4.64	92.8	4.42	88.3
10 h	10.28	102.8	10.11	101.1	9.92	99.2	9.82	98.2	9.63	96.3	9.24	92.4	8.80	88.0	8.30	83.0
7 h	12.88	90.1	12.83	89.8	12.73	89.1	12.59	88.2	12.35	86.4	12.03	84.2	11.76	82.3	11.47	80.3
6 h	15.05	90.3	14.85	89.1	14.67	88.0	14.43	86.6	14.27	85.6	13.93	83.6	13.61	81.6	13.30	79.8
5 h	17.46	87.3	17.38	86.9	17.22	86.1	17.06	85.3	16.72	83.6	16.40	82.0	16.07	80.3	15.84	79.2
4 h	20.88	83.5	20.73	82.9	20.54	82.2	20.33	81.3	19.96	79.8	19.13	76.5	18.39	73.5	17.53	70.1
3 h	23.65	70.9	23.15	69.4	22.75	68.2	22.43	67.3	22.08	66.2	21.52	64.6	21.31	63.9	21.10	63.3
2 h	33.28	66.6	32.81	65.6	32.37	64.7	32.08	64.2	31.48	63.0	30.23	60.5	27.98	56.0	25.81	51.6
1 h	60.90	60.9	59.52	59.5	57.49	57.5	56.97	57.0	55.81	55.8	53.59	53.6	49.56	49.6	44.43	44.4
30 min	98.13	49.1	97.92	49.0	96.96	48.5	96.15	48.1	94.24	47.1	90.38	45.2	83.64	41.8	74.97	37.5
10 min	209.92	35.0	207.49	34.6	205.20	34.2	203.56	33.9	199.50	33.3	191.49	31.9	177.08	29.5	158.82	26.5
5 min	333.35	27.8	329.54	27.5	323.30	26.9	316.21	26.4	301.89	25.2	286.55	23.9	267.65	22.3	249.64	20.8

## Discharge with constant power at 25°C (100Ah battery)

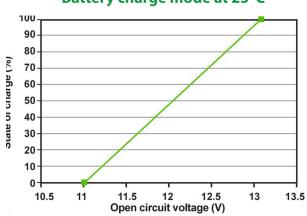
					iai ge v	vitil co	IIJtaiit	power	at 25	C (100	/ III But	(C) )				
						(	Cut off V	oltage (	V/Cell)							
Rate	1.	50	1.0	60	1.0	67	1.7	70	1.7	75	1.8	30	1.	85	1.9	90
	P (Wh/Cell)	Cn (Wh/Cell)	P (Wh / Cell)	Cn (Wh / Cell)	P (Wh / Cell)	Cn (Wh / Cell)	P (Wh / Cell)	Cn (Wh / Cell)	P (Wh / Cell)	Cn (Wh/Cell)	P (Wh / Cell)	Cn (Wh/Cell)	P (Wh / Cell)	Cn (Wh / Cell)	P (Wh / Cell)	Cn (Wh / Cell)
20 h	9.16	183.3	8.88	177.5	8.80	175.9	8.71	174.2	8.54	170.8	8.18	163.6	7.92	158.5	7.55	150.9
10 h	17.57	175.7	17.27	172.7	16.95	169.5	16.78	167.8	16.46	164.6	15.79	157.9	15.03	150.3	14.17	141.7
7 h	22.15	155.0	22.07	154.5	21.89	153.2	21.66	151.6	21.23	148.6	20.68	144.8	20.22	141.5	19.72	138.0
6 h	25.86	155.2	25.52	153.1	25.20	151.2	24.80	148.8	24.51	147.1	23.94	143.6	23.38	140.3	22.86	137.2
5 h	29.98	149.9	29.84	149.2	29.56	147.8	29.29	146.5	28.71	143.5	28.15	140.7	27.59	137.9	27.20	136.0
4 h	35.81	143.2	35.55	142.2	35.23	140.9	34.86	139.4	34.23	136.9	32.81	131.2	31.53	126.1	30.07	120.3
3 h	44.49	133.5	43.55	130.7	42.79	128.4	42.19	126.6	41.54	124.6	40.48	121.5	40.09	120.3	39.70	119.1
2 h	61.67	123.3	60.81	121.6	59.99	120.0	59.45	118.9	58.35	116.7	56.03	112.1	51.86	103.7	47.84	95.7
1 h	112.31	112.3	109.77	109.8	106.01	106.0	105.06	105.1	102.92	102.9	98.83	98.8	91.40	91.4	81.94	81.9
30 min	179.13	89.6	178.76	89.4	176.99	88.5	175.53	87.8	172.03	86.0	164.98	82.5	152.68	76.3	136.85	68.4
10 min	400.92	66.8	396.29	66.0	391.91	65.3	388.78	64.8	381.03	63.5	365.72	61.0	338.20	56.4	303.33	50.6
5 min	633.36	52.8	626.13	52.2	614.27	51.2	600.79	50.1	573.58	47.8	544.45	45.4	508.53	42.4	474.32	39.5

#### Battery voltage in cycling endurance test in photovoltaic applicationc (Extreme condition)

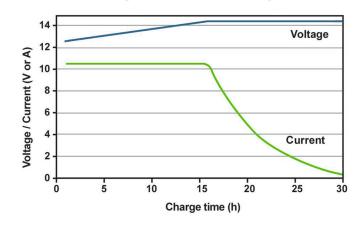




## Battery charge mode at 25°C



## **Charge characteristic diagram**





# **UPS batteries**

UPS gel battery is a valve-regulated lead acid (VRLA) battery with gel electrolyte. In these batteries, sulfuric acid as the electrolyte is immobilized in a porous structure. This porous structure is the AGM separator in the AGM batteries and silica particles in the gel batteries.

In contrast to the flooded batteries, there is no electrolyte stratification that occurs in the VRLA batteries that led to less grid corrosion and water consumption.

These improvements would increase service life and the battery can be used in industrial applications. Due to the recombination technology in the UPS batteries, there is no need for any further investigation of electrolyte level and water addition. The oxygen gas regeneration cycle decreases water loss and the gel electrolyte minimizes the possibility of acid leakage from the battery.

#### **Features of solar batteries**

#### Suitable for the stand-by application

The ups batteries are designed for stand-by application. UPS batteries can be used in various types of UPS (Online, Offline and line interactive) that supply backup energy for computers, laboratories and clinical equipment as well as other power-sensitive instruments. Moreover, the UPS batteries can be used as backup power in other devices if the applied voltage and current in charge and discharge are in accordance with the electrical requirements of the battery. Elevators, fire extinguishers and emergency lighting are examples of such applications.





#### Maintenance Free (MF)

Regulated valves and gel electrolytes used in this product cause water reabsorption. With this system, any further inspection and water addition to the electrolyte is eliminated.

#### Low self-discharge

Battery design and high-quality raw materials in these batteries lead to decrease self-discharge.

#### High energy density

Improving battery design lead to the maximum usage of free space in the battery and reach high energy density.

#### • Vast range of environmental temperature

UPS batteries can be used in the temperature range of -20 to 45°C.









#### Service life

Corrosion resistance provided by thick grids with optimized lead alloy which is used to produce plates, improved standby service.

#### Pressure\_regulated valves

With these valves, the pressure of gas in the battery is higher than the atmosphere pressure which led to a decrease in water loss.

#### • Compliance with the international standards

The UPS batteries were produced according to the requirements of the international standards IEC 60896-21&22 in order to improve performance and proper efficiency in long service life





## **Physical Characteristics**

Part Number	Capacity 20 HR	Max Ove	erall Dimens	ion (mm)	Terminal Type	Terminal Layout
	(AH)	Length	Width	T.Height	.,,,,,	
UFGMU42-12	42	218	173	219	UT	0
UFGMI42-12	42	218	173	205		0
UFGMU65-12	65	350	173	216	UT	0
UFGMI65-12	65	350	173	203		0
UFGHU100-12	100	344	173	240	UT	0
UFGHI100-12	100	344	173	226	ı	0



## Electrical Characteristics

Electrical chart		
Items	Value	(at 25° C)
Nominal voltage	1	2 V
Open circuit voltage at full charge	(12.7 -	– 13.0) V
The lowest permissible voltage during discharge	,	9 V
Charge voltage for cyclic applications	(14.20	– 14.40) V
Charge voltage for standby applications (float charge)	(13.60	– 13.80) V
Correction factor of charge voltage	-15 (	mV/°C)
Internal resistance at full state of charge	(6-1	0) mΩ
	42 Ah	325 A
Maximum discharge current (1 sec)	65 Ah	500 A
	100 Ah	750 A
	42 Ah	130 A
Maximum discharge current (continuous)	65 Ah	200 A
	100 Ah	300 A
	42 Ah	10 A
Maximum allowable charge current	65 Ah	16 A
	100 Ah	25 A

# Discharge with constant current at 25°C (42Ah battery)

					arge vi	itii toii	Jeane	carrent	ut 25	C (42A	II Batt	-				
						C	Cut off V	/oltage (\	V/Cell)							
Rate	1.	50	1.	60	1.	.67	1.1	70	1.	75	1.8	30	1.	85	1.9	90
	I (A)	Cn(Ah)	I (A)	Cn(Ah)	I (A)	Cn(Ah)	I (A)	Cn(Ah)	I (A)	Cn(Ah)	I (A)	Cn(Ah)	I (A)	Cn(Ah)	I (A)	Cn(Ah
20 h	2.25	45.1	2.18	43.6	2.16	43.2	2.14	42.8	2.10	42.0	2.01	40.2	1.95	39.0	1.86	37.1
10 h	4.32	43.2	4.24	42.4	4.17	41.7	4.13	41.3	4.05	40.5	3.88	38.8	3.69	36.9	3.48	34.8
7 h	5.41	37.9	5.39	37.7	5.35	37.4	5.29	37.0	5.19	36.3	5.05	35.4	4.94	34.6	4.82	33.7
6 h	6.32	37.9	6.24	37.4	6.16	37.0	6.06	36.4	5.99	35.9	5.85	35.1	5.71	34.3	5.59	33.5
5 h	7.33	36.7	7.30	36.5	7.23	36.2	7.17	35.8	7.02	35.1	6.89	34.4	6.75	33.7	6.65	33.3
4 h	8.77	35.1	8.71	34.8	8.63	34.5	8.54	34.1	8.38	33.5	8.03	32.1	7.72	30.9	7.36	29.5
3 h	9.93	29.8	9.72	29.2	9.55	28.7	9.42	28.3	9.27	27.8	9.04	27.1	8.95	26.9	8.86	26.6
2 h	13.98	28.0	13.78	27.6	13.59	27.2	13.47	26.9	13.22	26.4	12.70	25.4	11.75	23.5	10.84	21.7
1 h	25.58	25.6	25.00	25.0	24.14	24.1	23.93	23.9	23.44	23.4	22.51	22.5	20.82	20.8	18.66	18.7
30 min	41.21	20.6	41.13	20.6	40.72	20.4	40.38	20.2	39.58	19.8	37.96	19.0	35.13	17.6	31.49	15.7
10 min	88.17	14.7	87.15	14.5	86.18	14.4	85.50	14.2	83.79	14.0	80.43	13.4	74.37	12.4	66.70	11.1
5 min	140.01	11.7	138.41	11.5	135.79	11.3	132.81	11.1	126.79	10.6	120.35	10.0	112.41	9.4	104.85	8.7

# Discharge with constant power at 25°C (42Ah battery)

	Discharge with constant power at 25 C (42An battery)															
						(	Cut off V	oltage (	V/Cell)							
Rate	1.5	50	1.0	60	1.	67	1.7	70	1.3	75	1.8	30	1.	85	1.9	90
	P (Wh/Cell)	Cn (Wh/Cell)	P (Wh / Cell)	Cn (Wh / Cell)	P (Wh / Cell)	Cn (Wh / Cell)	P (Wh / Cell)	Cn (Wh / Cell)	P (Wh / Cell)	Cn (Wh/Cell)	P (Wh / Cell)	Cn (Wh/Cell)	P (Wh / Cell)	Cn (Wh / Cell)	P (Wh / Cell)	Cn (Wh / Cell)
20 h	3.85	77.0	3.73	74.6	3.69	73.9	3.66	73.2	3.59	71.8	3.43	68.7	3.33	66.6	3.17	63.4
10 h	7.38	73.8	7.25	72.5	7.12	71.2	7.05	70.5	6.91	69.1	6.63	66.3	6.31	63.1	5.95	59.5
7 h	9.30	65.1	9.27	64.9	9.19	64.4	9.10	63.7	8.92	62.4	8.69	60.8	8.49	59.4	8.28	58.0
6 h	10.86	65.2	10.72	64.3	10.59	63.5	10.41	62.5	10.30	61.8	10.06	60.3	9.82	58.9	9.60	57.6
5 h	12.59	62.9	12.53	62.7	12.41	62.1	12.30	61.5	12.06	60.3	11.82	59.1	11.59	57.9	11.42	57.1
4 h	15.04	60.2	14.93	59.7	14.80	59.2	14.64	58.6	14.38	57.5	13.78	55.1	13.24	53.0	12.63	50.5
3 h	18.68	56.1	18.29	54.9	17.97	53.9	17.72	53.2	17.45	52.3	17.00	51.0	16.84	50.5	16.68	50.0
2 h	25.90	51.8	25.54	51.1	25.20	50.4	24.97	49.9	24.51	49.0	23.53	47.1	21.78	43.6	20.09	40.2
1 h	47.17	47.2	46.10	46.1	44.52	44.5	44.13	44.1	43.23	43.2	41.51	41.5	38.39	38.4	34.42	34.4
30 min	75.23	37.6	75.08	37.5	74.34	37.2	73.72	36.9	72.25	36.1	69.29	34.6	64.13	32.1	57.48	28.7
10 min	168.39	28.1	166.44	27.7	164.60	27.4	163.29	27.2	160.03	26.7	153.60	25.6	142.04	23.7	127.40	21.2
5 min	266.01	22.2	262.98	21.9	257.99	21.5	252.33	21.0	240.91	20.1	228.67	19.1	213.58	17.8	199.21	16.6

## Discharge with constant current at 25°C (65 Ah battery)

20 h     3.49     69.7     3.38     67.5     3.35     66.9     3.31     66.3     3.25     65.0     3.11     62.2     3.01     60.3       10 h     6.69     66.9     6.57     65.7     6.45     64.5     6.39     63.9     6.26     62.6     6.01     60.1     5.72     57.2	current at 25 C (65 Am Battery)						
I (A)     Cn(Ah)     I							
20 h     3.49     69.7     3.38     67.5     3.35     66.9     3.31     66.3     3.25     65.0     3.11     62.2     3.01     60.3       10 h     6.69     66.9     6.57     65.7     6.45     64.5     6.39     63.9     6.26     62.6     6.01     60.1     5.72     57.2       7 h     8.37     58.6     8.34     58.4     8.27     57.9     8.19     57.3     8.02     56.2     7.82     54.7     7.64     53.5	1.90						
10 h 6.69 66.9 6.57 65.7 6.45 64.5 6.39 63.9 6.26 62.6 6.01 60.1 5.72 57.2  7 h 8.37 58.6 8.34 58.4 8.27 57.9 8.19 57.3 8.02 56.2 7.82 54.7 7.64 53.5	(A) Cn(Ah						
7 h 8.37 58.6 8.34 58.4 8.27 57.9 8.19 57.3 8.02 56.2 7.82 54.7 7.64 53.5	.87 57.4						
	53.9						
6 h 9.78 58.7 9.66 57.9 9.53 57.2 9.38 56.3 9.27 55.6 9.06 54.3 8.84 53.1	7.45 52.2						
	8.65 51.9						
5 h 11.35 56.8 11.30 56.5 11.19 56.0 11.09 55.5 10.87 54.3 10.66 53.3 10.45 52.2 1	0.30 51.5						
4 h 13.57 54.3 13.47 53.9 13.35 53.4 13.21 52.8 12.97 51.9 12.43 49.7 11.95 47.8 1	1.40 45.6						
3 h 15.37 46.1 15.05 45.1 14.78 44.4 14.58 43.7 14.35 43.1 13.99 42.0 13.85 41.6 1	3.72 41.2						
2 h 21.63 43.3 21.33 42.7 21.04 42.1 20.85 41.7 20.46 40.9 19.65 39.3 18.19 36.4 1	6.78 33.6						
1 h 39.59 39.6 38.69 38.7 37.37 37.4 37.03 37.0 36.28 36.3 34.84 34.8 32.22 32.2 2	8.88 28.9						
30 min 63.78 31.9 63.65 31.8 63.02 31.5 62.50 31.3 61.25 30.6 58.75 29.4 54.37 27.2 4	3.73 24.4						
10 min 136.45 22.7 134.87 22.5 133.38 22.2 132.32 22.1 129.68 21.6 124.47 20.7 115.10 19.2 1	3.23 17.2						
5 min 216.68 18.1 214.20 17.9 210.14 17.5 205.53 17.1 196.23 16.4 186.26 15.5 173.97 14.5 1	2.27 13.5						

### Discharge with constant power at 25°C (65 Ah battery)

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						(	Cut off V	oltage (	V/Cell)							
Rate	1.5	50	1.0	60	1.	67	1.7	0	1.7	75	1.8	0	1.	85	1.9	90
	P (Wh/Cell)	Cn (Wh/Cell)	P (Wh / Cell)	Cn (Wh/Cell)	P (Wh / Cell)	Cn (Wh / Cell)	P (Wh / Cell)	Cn (Wh / Cell)	P (Wh / Cell)	Cn (Wh/Cell)	P (Wh / Cell)	Cn (Wh/Cell)	P (Wh / Cell)	Cn (Wh / Cell)	P (Wh/Cell)	Cn (Wh / Cell)
20 h	5.96	119.1	5.77	115.4	5.72	114.3	5.66	113.3	5.55	111.0	5.32	106.3	5.15	103.0	4.91	98.1
10 h	11.42	114.2	11.22	112.2	11.02	110.2	10.91	109.1	10.70	107.0	10.26	102.6	9.77	97.7	9.21	92.1
7 h	14.40	100.8	14.35	100.4	14.23	99.6	14.08	98.6	13.80	96.6	13.44	94.1	13.14	92.0	12.82	89.7
6 h	16.81	100.9	16.59	99.5	16.38	98.3	16.12	96.7	15.93	95.6	15.56	93.4	15.20	91.2	14.86	89.2
5 h	19.48	97.4	19.40	97.0	19.21	96.1	19.04	95.2	18.66	93.3	18.30	91.5	17.93	89.7	17.68	88.4
4 h	23.27	93.1	23.11	92.4	22.90	91.6	22.66	90.6	22.25	89.0	21.33	85.3	20.50	82.0	19.54	78.2
3 h	28.92	86.7	28.31	84.9	27.82	83.4	27.43	82.3	27.00	81.0	26.31	78.9	26.06	78.2	25.81	77.4
2 h	40.09	80.2	39.53	79.1	39.00	78.0	38.64	77.3	37.93	75.9	36.42	72.8	33.71	67.4	31.10	62.2
1 h	73.00	73.0	71.35	71.3	68.91	68.9	68.29	68.3	66.90	66.9	64.24	64.2	59.41	59.4	53.26	53.3
30 min	116.43	58.2	116.19	58.1	115.05	57.5	114.09	57.0	111.82	55.9	107.24	53.6	99.24	49.6	88.95	44.5
10 min	260.60	43.4	257.59	42.9	254.74	42.5	252.71	42.1	247.67	41.3	237.72	39.6	219.83	36.6	197.16	32.9
5 min	411.68	34.3	406.99	33.9	399.27	33.3	390.51	32.5	372.83	31.1	353.89	29.5	330.55	27.5	308.31	25.7

## Discharge with constant current at 25°C (100 Ah battery)

				Discinc						C (100		,,,				
						(	Cut off V	oltage (	V/Cell)							
Rate	1.	50	1.	60	1.	67	1.7	70	1.	75	1.8	30	1.	85	1.	90
	I (A)	Cn(Ah)	I (A)	Cn(Ah)	I (A)	Cn(Ah)	I (A)	Cn(Ah)	I (A)	Cn(Ah)	I (A)	Cn(Ah)	I (A)	Cn(Ah)	I (A)	Cn(Ah
20 h	5.36	107.3	5.20	103.9	5.15	103.0	5.10	102.0	5.00	100.0	4.79	95.7	4.64	92.8	4.42	88.3
10 h	10.28	102.8	10.11	101.1	9.92	99.2	9.82	98.2	9.63	96.3	9.24	92.4	8.80	88.0	8.30	83.0
7 h	12.88	90.1	12.83	89.8	12.73	89.1	12.59	88.2	12.35	86.4	12.03	84.2	11.76	82.3	11.47	80.3
6 h	15.05	90.3	14.85	89.1	14.67	88.0	14.43	86.6	14.27	85.6	13.93	83.6	13.61	81.6	13.30	79.8
5 h	17.46	87.3	17.38	86.9	17.22	86.1	17.06	85.3	16.72	83.6	16.40	82.0	16.07	80.3	15.84	79.2
4 h	20.88	83.5	20.73	82.9	20.54	82.2	20.33	81.3	19.96	79.8	19.13	76.5	18.39	73.5	17.53	70.1
3 h	23.65	70.9	23.15	69.4	22.75	68.2	22.43	67.3	22.08	66.2	21.52	64.6	21.31	63.9	21.10	63.3
2 h	33.28	66.6	32.81	65.6	32.37	64.7	32.08	64.2	31.48	63.0	30.23	60.5	27.98	56.0	25.81	51.6
1 h	60.90	60.9	59.52	59.5	57.49	57.5	56.97	57.0	55.81	55.8	53.59	53.6	49.56	49.6	44.43	44.4
30 min	98.13	49.1	97.92	49.0	96.96	48.5	96.15	48.1	94.24	47.1	90.38	45.2	83.64	41.8	74.97	37.5
10 min	209.92	35.0	207.49	34.6	205.20	34.2	203.56	33.9	199.50	33.3	191.49	31.9	177.08	29.5	158.82	26.5
5 min	333.35	27.8	329.54	27.5	323.30	26.9	316.21	26.4	301.89	25.2	286.55	23.9	267.65	22.3	249.64	20.8

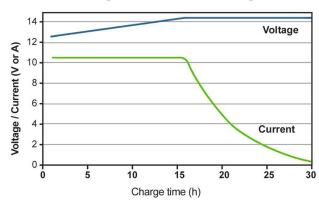
## Discharge with constant power at 25℃ (100 Ah battery)

											All but					
						(	Cut off V	oltage (	V/Cell)							
Rate	1.	50	1.0	60	1.	67	1.7	70	1.1	75	1.8	30	1.8	85	1.9	90
	(W/P Cell)	Cn (Wh / Cell)														
20 h	9.16	183.3	8.88	177.5	8.80	175.9	8.71	174.2	8.54	170.8	8.18	163.6	7.92	158.5	7.55	150.9
10 h	17.57	175.7	17.27	172.7	16.95	169.5	16.78	167.8	16.46	164.6	15.79	157.9	15.03	150.3	14.17	141.7
7 h	22.15	155.0	22.07	154.5	21.89	153.2	21.66	151.6	21.23	148.6	20.68	144.8	20.22	141.5	19.72	138.0
6 h	25.86	155.2	25.52	153.1	25.20	151.2	24.80	148.8	24.51	147.1	23.94	143.6	23.38	140.3	22.86	137.2
5 h	29.98	149.9	29.84	149.2	29.56	147.8	29.29	146.5	28.71	143.5	28.15	140.7	27.59	137.9	27.20	136.0
4 h	35.81	143.2	35.55	142.2	35.23	140.9	34.86	139.4	34.23	136.9	32.81	131.2	31.53	126.1	30.07	120.3
3 h	44.49	133.5	43.55	130.7	42.79	128.4	42.19	126.6	41.54	124.6	40.48	121.5	40.09	120.3	39.70	119.1
2 h	61.67	123.3	60.81	121.6	59.99	120.0	59.45	118.9	58.35	116.7	56.03	112.1	51.86	103.7	47.84	95.7
1 h	112.31	112.3	109.77	109.8	106.01	106.0	105.06	105.1	102.92	102.9	98.83	98.8	91.40	91.4	81.94	81.9
30 min	179.13	89.6	178.76	89.4	176.99	88.5	175.53	87.8	172.03	86.0	164.98	82.5	152.68	76.3	136.85	68.4
10 min	400.92	66.8	396.29	66.0	391.91	65.3	388.78	64.8	381.03	63.5	365.72	61.0	338.20	56.4	303.33	50.6
5 min	633.36	52.8	626.13	52.2	614.27	51.2	600.79	50.1	573.58	47.8	544.45	45.4	508.53	42.4	474.32	39.5

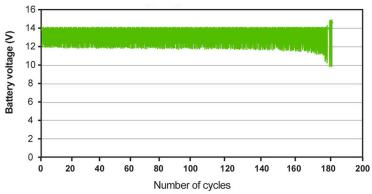


# Battery voltage in float service with daily discharge test

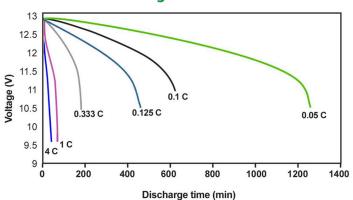
#### **Charge characteristic diagram**



#### **Cycling of UPS batteries**

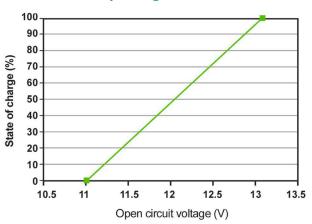


#### Discharge curves at 25 C

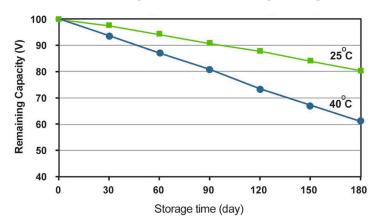




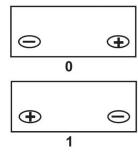
## Battery charge mode at 25 °C



### **Charge retention during storage**



### **Terminals Layout**







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