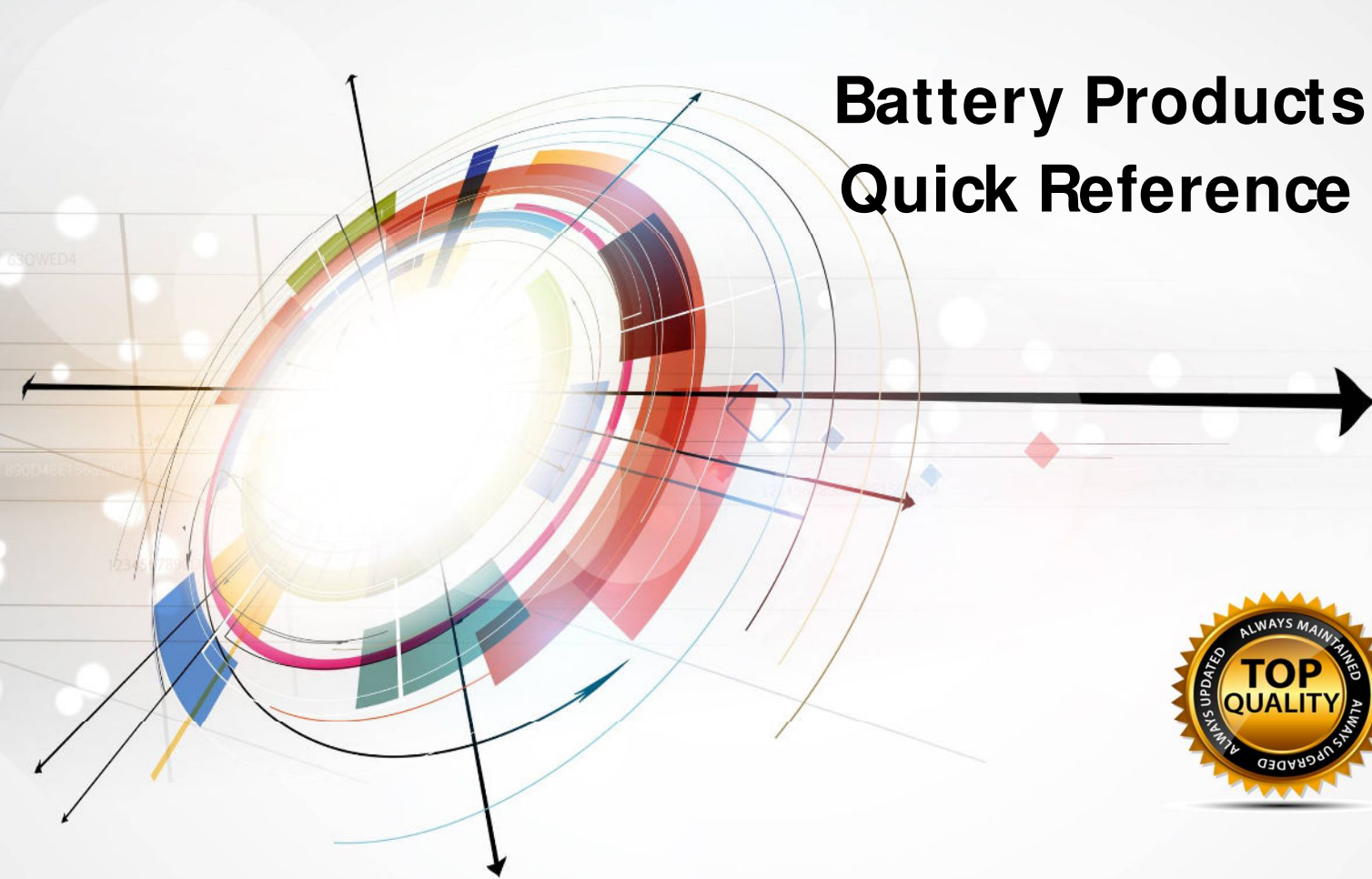




Engineered with Care. Built with Vision.



## Battery Products Quick Reference



# PowerHub VRLA-AGM Battery

## Introduction

Choosing the correct standby battery can be confusing especially when there are so many different kind of batteries and applications. PowerHub has years of experiences in providing industries with backup batteries that suits your requirement. This makes us the perfect choice if you want impartial advice on which standby batteries would be best for your application.

We have backup batteries or standby batteries for a variety of applications like UPS, Green Energy solutions, etc. for use in Data Centers, factories, hotels and so on. Whatever be your application, we have the perfect backup battery and charger solution you need and we'll make sure our products will keep running for years to come.



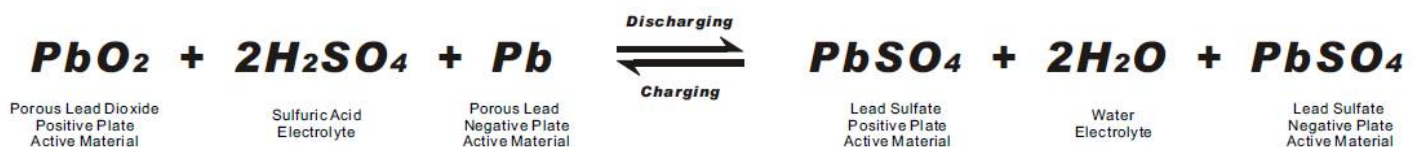
## Definition of VRLA-AGM Battery

**A VRLA-AGM battery is an electric storage lead-acid battery**

- Sealed with special compound epoxy and using pressure controlled vent valves.
- Starved electrolyte design - acid solution is absorbed in separators .
- Using a recombination reaction to prevent the escape of hydrogen and oxygen gases.
- Non spill-able - can be operated in any position.
- Maintenance free. But connections must be retorqued and the batteries should be cleaned periodically.

A VRLA-AGM battery uses recombinant technology. The oxygen produced from the positive plates of the battery is absorbed by the negative plates. This suppresses the generation of hydrogen at the negative plates. The recombination of oxygen and hydrogen leads to Water (H<sub>2</sub>O), retaining the electrolyte amount within the battery. Water filling is never required. Battery should never be opened as this would damage the battery with additional oxygen from the air. The warranty will be void if the battery is opened.

## Battery Operation Theory



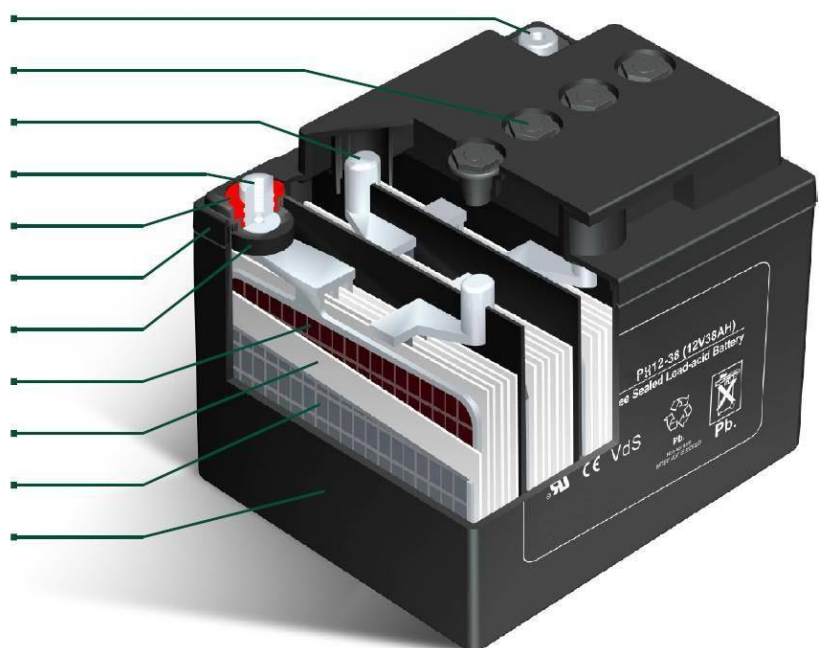


## FEATURES

- Maintenance-free, no water adding required.
- Sealed Valve-Regulated
- Spill proof / leak proof
- Deep discharge protection
- Plate grids from lead-calcium alloy, free of antimony
- No corrosion
- Installs vertically or horizontally
- Low gassing (unless overcharged)
- Good cycling and stationary performance
- Good high rate discharges
- Long shelf life
- Rugged and vibration-resistant

## VRLA Battery Construction

1. Negative Terminal Post
2. Safe Vent Valve
3. Inter-cell Connector
4. Positive Terminal Post
5. Sealing Compound Epoxy
6. Container Cover
7. Sealing O-Ring
8. Positive Plate
9. AGM Separator
10. Negative Plate
11. Case



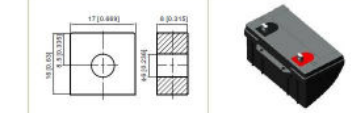
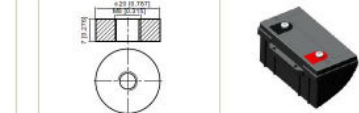



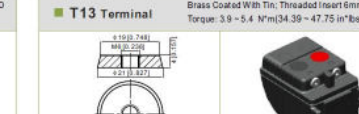


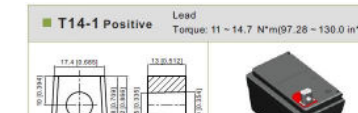
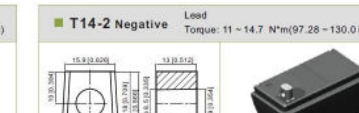

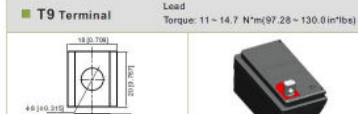
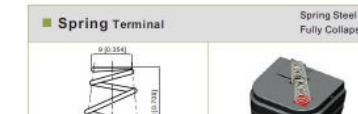
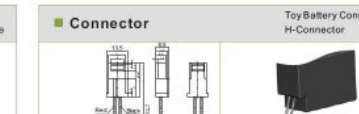


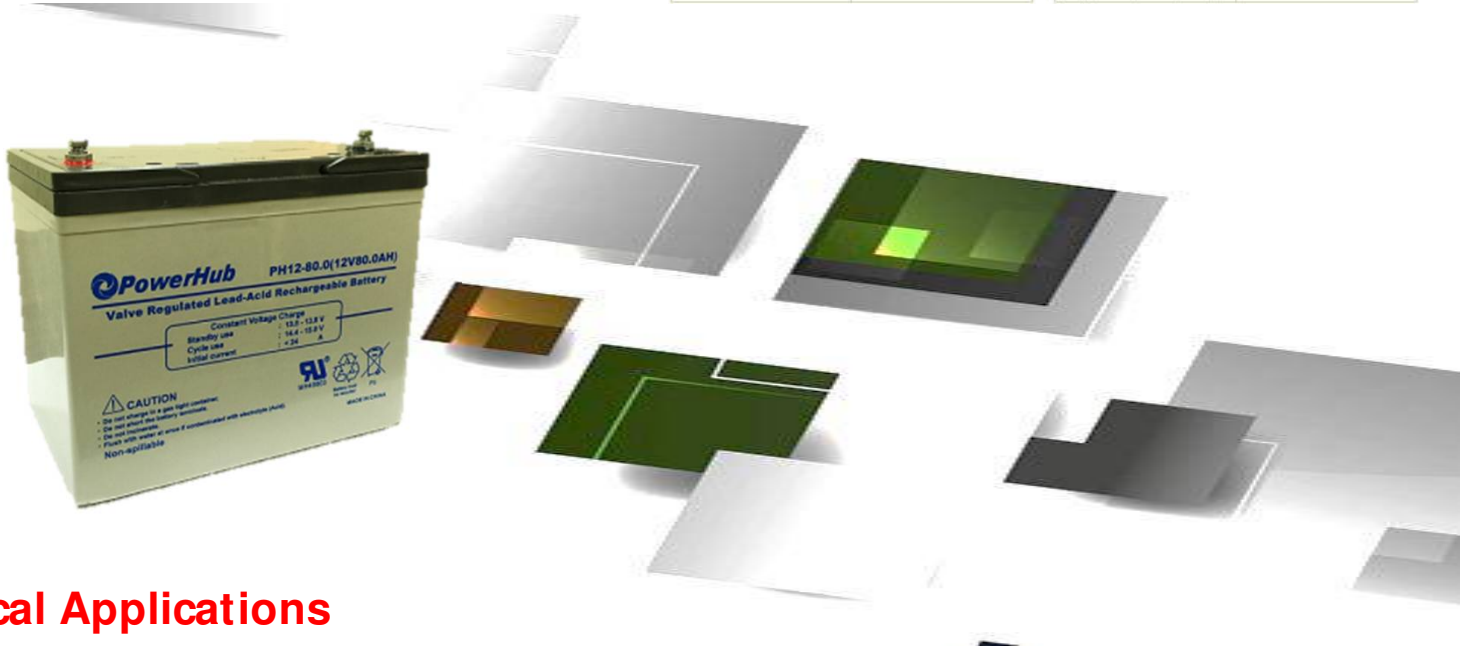
# VRLA-AGM Battery Terminal Options

Note: the figures below just show the appearance and dimension.

For the positioning on each battery model, please check the specification on [www.powerhub.com.sg](http://www.powerhub.com.sg)

Unit:mm[inch]

<b>T1 Terminal</b> FASTON TYPE (Copper) quick disconnect tabs; silver coating for better conductivity 	<b>T2 Terminal</b> FASTON TYPE (Copper) quick disconnect tabs; silver coating for better conductivity 	<b>T10 Terminal</b> Lead Torque: 3.9 ~ 5.4 N*m(34.39 ~ 47.75 in*lbs) 	<b>T11 Terminal</b> Brass Coated With Tin; Threaded Insert 6mm STUD Torque: 11~14.7 N*m(97.28 ~ 130.0 in*lbs) 
<b>T3 Terminal</b> Brass Coated With Tin Torque: 3.9 ~ 5.4 N*m(34.39 ~ 47.75 in*lbs) 	<b>T4 Terminal</b> Brass Coated With Tin 	<b>T12 Terminal</b> Brass Coated With Tin; Threaded Insert 5mm STUD Torque: 2.0 ~ 3.0 N*m(17.69 ~ 26.53 in*lbs) 	<b>T13 Terminal</b> Brass Coated With Tin; Threaded Insert 6mm STUD Torque: 3.9 ~ 5.4 N*m(34.39 ~ 47.75 in*lbs) 
<b>T5 Terminal</b> Lead Torque: 3.9 ~ 5.4 N*m(34.39 ~ 47.75 in*lbs) 	<b>T6 Terminal</b> Brass Coated With Tin; Threaded Insert 6mm STUD Torque: 3.9 ~ 5.4 N*m(34.39 ~ 47.75 in*lbs) 	<b>T14-1 Positive</b> Lead Torque: 11 ~ 14.7 N*m(97.28 ~ 130.0 in*lbs) 	<b>T14-2 Negative</b> Lead Torque: 11 ~ 14.7 N*m(97.28 ~ 130.0 in*lbs) 
<b>T7 Terminal</b> Brass Coated With Tin; Threaded Insert 6mm STUD Torque: 3.9 ~ 5.4 N*m(34.39 ~ 47.75 in*lbs) 	<b>T9 Terminal</b> Lead Torque: 11 ~ 14.7 N*m(97.28 ~ 130.0 in*lbs) 	<b>Spring Terminal</b> Spring Steel Fully Collapsible 	<b>Connector</b> Toy Battery Connector H-Connector 



## Typical Applications

1. All purpose battery needs	2. Uninterruptible Power Supply (UPS)	3. Electric Power System (EPS)
4. DC power supply	5. Emergency backup power supply	6. Auto control system
7. Communication power supply	8. Alarm and security system	9. Electronic device and equipment



### Application

- All purpose
- Uninterruptible Power Supply (UPS)
- Electric Power System (EPS)
- Emergency backup power supply
- Emergency light
- Railway signal
- Aircraft signal
- Alarm and security system
- Electronic apparatus and equipment
- Communication power supply
- DC power supply
- Auto control system
- Telecommunication
- Network Communication



### Product Description

■ Construction	
Positive Plate	Lead-calcium grids minimize corrosion & prolongs life
Negative Pate	Balanced lead-calcium grids optimize recombination efficiency
AGM Separator	Mechanically strong, low electrical resistance, micro porous glass fiber which completely absorbs the electrolyte into its structure
TerminalPost	Lead casting terminal or threaded copper insert alternative (some models), the copper one provides maximum conductivity.
Venting Valve	EPDM Rubber 10~49KPa release pressure. Resealing at 3~15KPa.
Container / Cover / Lid	ABS (UL-94 HB, UL-94 V0 optional)

■ Operation temperature range	
Nominal	20°C~25°C (68~77°F)
Discharge	-15°C ~ +50°C (5~122°F)
Charge	0°C ~ 40°C(32~104°F)
Storage	-15°C ~ +40°C (5~104°F)

■ Performance	
Recommended Maximum Charging Current Limit	Less than 0.3C
Float Charging Voltage	13.5V~13.8V at 25°C, Temp. Coefficient -20mV/°C
Maximum AC Ripple (Charger)	±0.02V/cell
Self-Discharge	Low self-discharge rate less than 3% / month @20°C
Equalize charge & cycle service life voltage	13.8~14.4V for equalize charge and 14.4~15.0V for cycle charge voltage @25°C

## Dimensions & Terminal Options

Unit:mm[inch]



## Specifications

Model	Nominal Voltage (V)	Approx. Dimension								Approx. Weight		Terminal Type
		Length		Width		Height		Total Height		kg	lbs	
		mm	in.	mm	in.	mm	in.	mm	in.			
PH12-7.2	12	151	5.95	65	2.56	93.5	3.68	99	3.9	2.35	5.18	T2
PH12-9.0	12	151	5.95	65	2.56	93.5	3.68	99	3.9	2.66	5.87	T1
PH12-18	12	181.5	7.15	77	3.03	167.5	6.59	167.5	6.59	5.4	11.9	T3
PH12-28	12	166	6.56	175	6.89	125	4.92	125	4.92	8.1	17.9	T3
PH12-33	12	195	7.68	130	5.12	164	6.46	178	7.01	10.5	23.2	T5
PH12-38	12	197	7.76	165	6.5	170	6.69	170	6.69	12.2	26.9	T6
PH12-40	12	255	10	97	3.82	203	7.99	203	7.99	12.5	27.6	T7
PH12-45	12	197	7.76	165	6.5	170	6.69	170	6.69	14.2	31.3	T6
PH12-55	12	229	9.02	138	5.43	205	8.07	226	8.9	16.5	36.4	T14
PH12-65	12	348	13.7	167	6.57	178	7.01	178	7.01	19.2	42.3	T6
PH12-75	12	259	10.2	168	6.61	208	8.19	214	8.43	22.3	49.2	T6
PH12-80	12	259	10.2	168	6.61	208	8.19	214	8.43	24	52.9	T6
PH12-90	12	330	13	173	6.81	212	8.35	220	8.66	28	61.7	T11
PH12-100	12	330	13	173	6.81	212	8.35	220	8.66	30.4	67	T11
PH12-120	12	408	16.1	177	6.97	225	8.86	225	8.86	35	77.2	T11
PH12-135	12	345	13.6	172	6.77	274	10.8	280	11	41.2	90.8	T11
PH12-150	12	483	19.1	170	6.69	240	9.45	240	9.45	43.5	95.9	T11
PH12-180	12	532	20.9	209	8.2	214	8.43	220	8.66	52.8	116.4	T11
PH12-200	12	522	20.6	240	9.45	218	8.58	224	8.82	61	134.5	T11
PH12-250	12	522	20.6	268	10.6	220	8.66	226	8.9	73	161	T11

## Compliant Standards

- IEC60896-21/22:2004
- BS 6290 Part 4
- UL recognized



## Discharge Performance

1.85V per cell - Constant Current (Amps) Discharge Characteristics @ 25°C

Model	5min	10min	15min	20min	30min	1 h	3 h	5 h	8 h	10h
PH12-38	65.0	51.1	43.5	36.4	28.9	17.9	9.02	5.94	4.20	3.59
PH12-45	77.0	60.6	51.5	43.1	34.2	21.2	10.7	7.03	4.97	4.25
PH12-55	94.1	74.0	62.9	52.6	41.8	25.9	13.1	8.60	6.08	5.19
PH12-65	114.0	87.6	75.5	65.6	50.8	30.6	14.2	10.04	7.11	5.98
PH12-75	128.4	100.9	85.8	71.8	57.1	35.4	17.8	11.7	8.29	7.08
PH12-80	136.9	107.6	91.5	76.6	60.9	37.7	19.0	12.5	8.84	7.55
PH12-90	154	121.1	103.0	86.1	68.5	42.4	21.4	14.1	9.95	8.50
PH12-100	173.6	146.4	130.2	115.3	87.5	52.4	23.5	16.4	11.6	9.65
PH12-120	250.4	161.5	137.3	114.9	91.3	56.6	28.5	18.8	13.3	11.3
PH12-135	231.1	181.7	154.5	129.2	102.7	63.6	32.0	21.1	14.9	12.7
PH12-150	256.7	201.8	171.6	143.6	114.1	70.7	35.6	23.5	16.6	14.2
PH12-180	/	242.2	206.0	172.3	136.9	84.9	42.7	28.1	19.9	17.0
PH12-200	/	278.4	240.0	204.6	154.8	94.3	46.2	31.3	22.1	18.9
PH12-250	/	336.4	286.1	239.3	190.2	117.9	59.4	39.1	27.6	23.6

1.75V per cell - Constant Current (Amps) Discharge Characteristics @ 25°C

Model	5min	10min	15min	20min	30min	1 h	3 h	5 h	8 h	10h
PH12-38	98.4	71.8	57.4	46.2	35.4	21.0	9.89	6.54	4.53	3.84
PH12-45	116.6	85.0	68.0	54.8	41.9	24.9	11.7	7.74	5.36	4.55
PH12-55	142.5	103.9	83.1	66.9	51.3	30.4	14.3	9.46	6.56	5.56
PH12-65	160.9	111.8	93.8	79.0	58.7	34.2	15.3	10.72	7.51	6.27
PH12-75	194.3	141.7	113.3	91.3	69.9	41.4	19.5	12.9	8.94	7.58
PH12-80	207.2	151.1	120.8	97.4	74.6	44.2	20.8	13.8	9.54	8.08
PH12-90	233.1	170.0	135.9	109.5	83.9	49.7	23.4	15.5	10.7	9.09
PH12-100	237.0	186.3	154.0	130.8	96.5	57.1	25.4	17.6	12.2	10.1
PH12-120	310.8	226.7	181.2	146.1	111.8	66.3	31.2	20.6	14.3	12.1
PH12-135	349.7	255.0	203.9	164.3	125.8	74.6	35.1	23.2	16.1	13.6
PH12-150	388.5	283.5	226.5	182.6	139.8	82.9	39.0	25.8	17.9	15.1
PH12-180	/	340.1	271.8	219.1	167.7	99.5	46.8	31.0	21.5	18.2
PH12-200	/	377.8	302.0	250.2	189.2	110.5	52.0	34.5	23.8	20.2
PH12-250	/	472.3	377.6	304.3	233.0	138.1	65.1	43.0	29.8	25.3

1.85V per cell - Constant Power (Watts/ cell) Discharge Characteristics @ 25°C

Model	5min	10min	15min	20min	30min	1 h	3 h	5 h	8 h	10h
PH12-38	118.9	94.5	81.1	68.6	55.1	34.6	17.6	11.6	8.29	7.10
PH12-45	140.8	111.9	96.1	81.2	65.2	40.9	20.8	13.8	9.82	8.41
PH12-55	172.1	136.7	117.4	99.2	79.7	50.0	25.5	16.9	12.0	10.3
PH12-65	208.5	161.7	140.9	123.6	96.8	59.1	27.7	19.7	14.04	11.83
PH12-75	234.7	186.4	160.1	135.3	108.7	68.2	34.7	23.0	16.4	14.0
PH12-80	250.3	198.8	170.8	144.3	116.0	72.7	37.0	24.5	17.4	14.9
PH12-90	281.6	223.7	192.2	162.4	130.5	81.8	41.6	27.6	19.6	16.8
PH12-100	322.5	274.9	247.1	220.5	168.5	102.2	45.7	32.2	22.9	19.1
PH12-120	375.5	298.3	256.2	216.5	174.0	109.1	55.5	36.8	26.2	22.4
PH12-135	422.5	335.6	288.3	243.6	195.7	122.8	62.5	41.4	29.5	25.2
PH12-150	469.4	370.8	320.3	270.6	217.5	136.4	69.4	46.0	32.7	28.0
PH12-180	/	447.4	384.3	324.7	261.0	163.7	83.3	55.2	39.3	33.6
PH12-200	/	514.3	447.8	385.7	295.0	181.9	90.1	61.3	43.6	37.4
PH12-250	/	621.4	533.8	451.0	362.5	227.3	115.7	76.6	54.5	46.7

1.75V per cell - Constant Power (Watts/ cell) Discharge Characteristics @ 25°C

Model	5min	10min	15min	20min	30min	1 h	3 h	5 h	8 h	10h
PH12-38	174.3	128.9	104.3	85.1	65.9	40.1	19.1	12.7	8.90	7.57
PH12-45	206.4	152.7	123.6	100.7	78.1	47.5	22.6	15.1	10.5	8.97
PH12-55	252.2	186.6	151.0	123.1	95.4	58.0	27.6	18.4	12.9	11.0
PH12-65	284.8	200.8	170.5	145.3	109.3	65.3	29.6	20.9	14.74	12.38
PH12-75	343.9	254.5	205.9	167.9	130.1	79.1	37.7	25.1	17.6	14.9
PH12-80	366.9	271.5	219.7	179.1	138.8	84.4	40.2	26.8	18.7	15.9
PH12-90	412.7	305.4	247.1	201.5	156.1	95.0	45.2	30.2	21.1	17.9
PH12-100	431.3	344.9	288.7	247.8	184.3	110.8	49.1	34.3	24.0	19.9
PH12-120	550.3	407.2	329.5	268.7	208.1	126.6	60.3	40.2	28.1	23.9
PH12-135	619.1	458.1	370.7	302.2	234.2	142.4	67.8	45.2	31.6	26.9
PH12-150	687.9	509.0	411.9	335.8	260.2	158.3	75.4	50.3	35.1	29.9
PH12-180	/	610.8	494.3	403.0	312.2	189.9	75.4	60.3	42.1	35.9
PH12-200	/	678.7	549.2	460.2	352.2	211.0	100.5	67.2	46.8	39.9
PH12-250	/	848.3	686.5	559.7	433.6	263.8	125.6	83.8	58.5	49.8

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