

Platin Iran Products

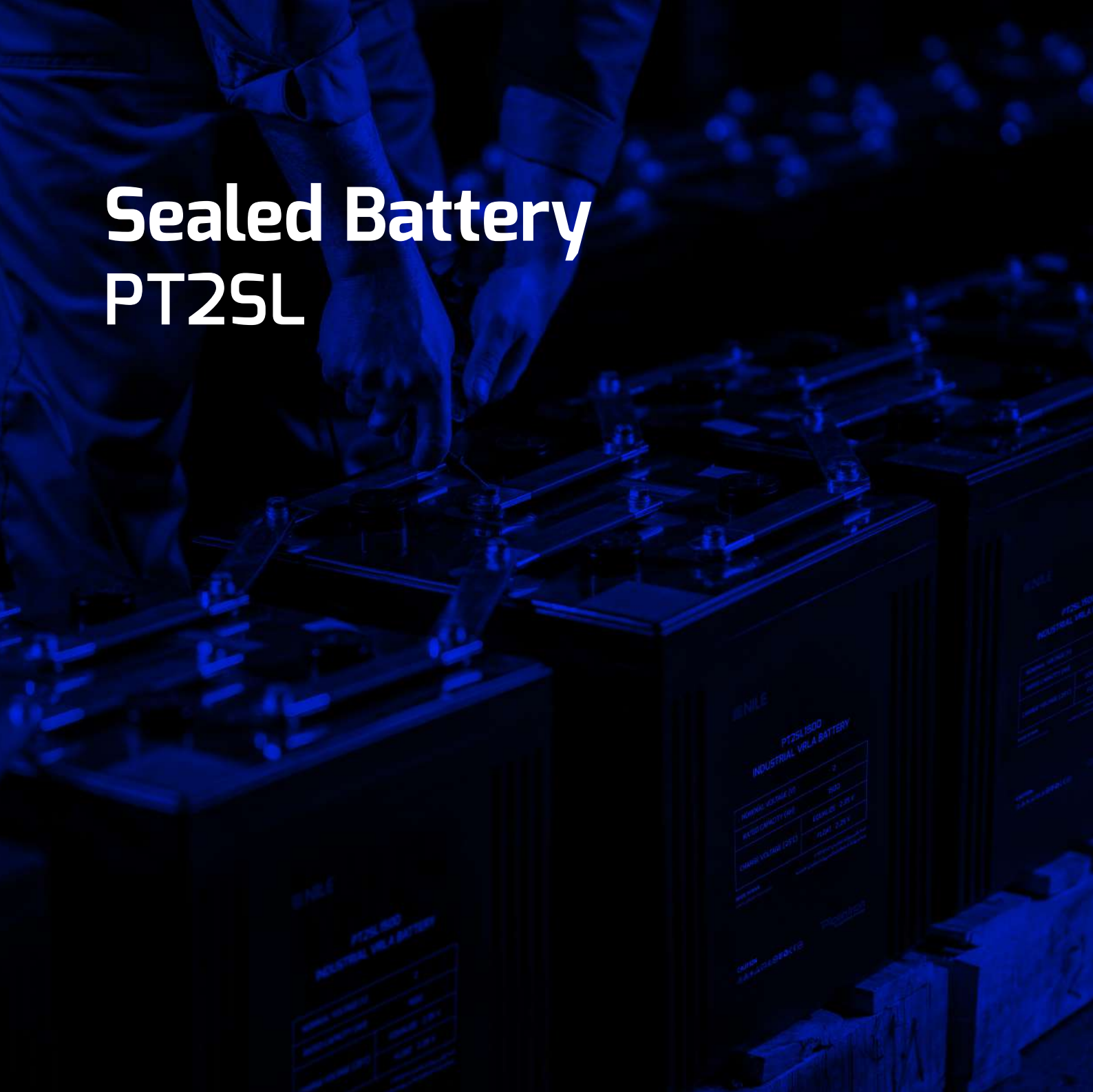
Battery type	Voltage	Capacity
Flooded Lead Acid	2V	130-3000 Ah
	4V	385 Ah
	8V	440 Ah
Sealed Lead Acid	2V	120-3000 Ah
	12V	UPS: 7-200 Ah
		Front Terminal: 100-200 Ah

Battery Type	Voltage	Maintenance	Type	Capacity
Flooded Nickel Cadmium	1.2V	Regular	L	10-1200 Ah
			M	10-1100 Ah
			H	10-500 Ah
Sealed Nickel Cadmium		Low	L	10-1200 Ah
			M	10-1100 Ah
			H	10-500 Ah
		Ultra - Low	L	10-1000 Ah
			M	10-800 Ah

Battery Type	Name / Brand	Voltage	Capacity	Application
Sealed Lead Acid	High Temperature (HT) Battery / NILE	2V	200-2000 Ah	-Renewable Energy Wind & Solar
				-Grid Frequency Leveling System
		12V	Front Terminal: 100-150-200 Ah	-All Back-up applications where grid reliability is poor
				-Oil, Gas, Refining & Petrochemical



Sealed Battery PT2SL

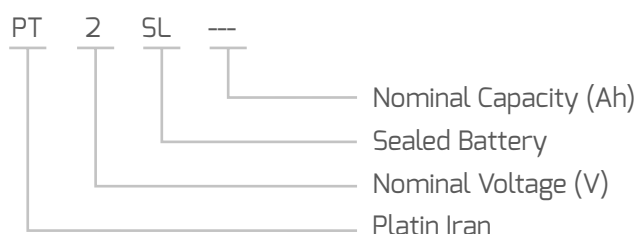




Compliant Standards

- IEC 60896-21 & 22
- INSO 4868-21 & 22
- BS 6290-4
- ISO 9001

Indication of type



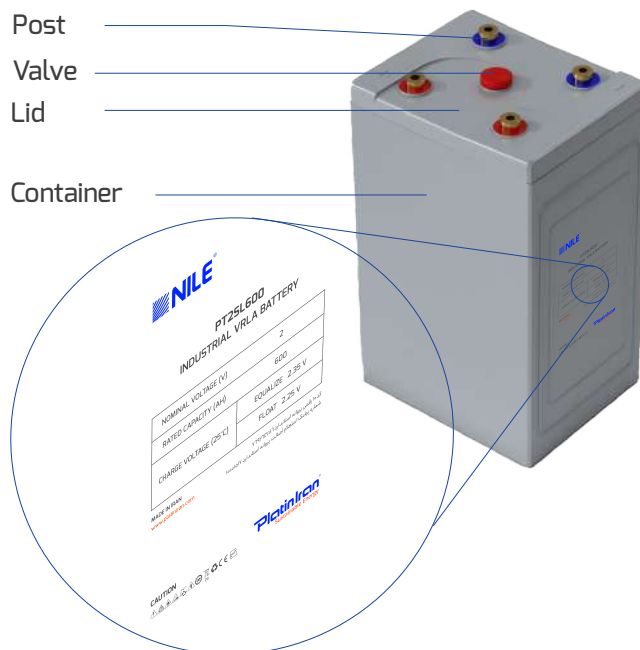
Main Applications

- Power and Utility
- UPS system
- Telecom
- Data Center
- Railway, Broadcast and Television system
- Emergency Power System

Features

- Grid alloy is corrosion proof, no pollution and less water loss.
- AGM technology is applied.
- Reliable seal performance, no acid spillage, recombination efficiency reaches 99%.
- The remaining capacity above 94% after storage for 3 months (25°C)
- Flexible connectors and convenient installation
- Better discharge characteristic than normal VRLA batteries
- Non-spillable construction design.
- Safety valve installation for explosion proof.
- Higher safety and reliable construction.
- Extra durability and deep cycle ability for heavy demand applications.
- Low self-discharge
- Flexible design for multiple installation

Construction



Product characteristics

- Nominal voltage: 2V
- Max charging current allowed: $0.2C_{10}$ (A)
- Cycle life: 1200 at 80% DOD (25°C)
- Float voltage: 2.25 V/Cell (25°C)
- Equalize voltage: 2.35 V/Cell (25°C)
- Self-discharge: $\leq 2\%$ per month (25°C)
- Terminal torque: 15 ± 1.0 N.m
- Temperature: -15°C to +45°C
- Container material: ABS (UL94-V0 optional)

Technical Information

Type	Nominal Voltage (V)	Nominal Capacity* (Ah) at 25°C	Float Voltage (25°C)	Equalize Voltage (25°C)	Charge Current (A) at 25°C		Internal Resistance ±0.05 (mΩ)	Dimension** (mm)				Weight ±2% (kg)
					Normal	Max		Length	Width	Height	Total Height	
PT2SL120	2	120	2.25 V/Cell	2.35 V/Cell	12	18	1	200	115	357	370	13.5
PT2SL200	2	200			20	30	0.65	200	115	357	370	16.4
PT2SL250	2	250			25	37.5	0.54	200	115	357	370	17.9
PT2SL300	2	300			30	45	0.49	185	165	342	355	22.2
PT2SL350	2	350			35	52.5	0.47	185	165	342	355	24.2
PT2SL420	2	420			42	63	0.35	185	165	342	355	27.5
PT2SL500	2	500			50	75	0.34	180	220	357	370	34
PT2SL600	2	600			60	90	0.33	180	220	357	370	38.5
PT2SL1000	2	1000			100	150	0.30	174	470	332	373	60
PT2SL1500	2	1500			150	225	0.20	350	400	374	394	108
PT2SL2000	2	2000			200	300	0.15	348	490	360	405	129
PT2SL3000	2	3000			300	450	0.10	348	705	360	405	197

*10-hour discharge nominal capacity (C₁₀)

**length of the battery is considered as parallel to the plates, while width of the battery is perpendicular to the plates.

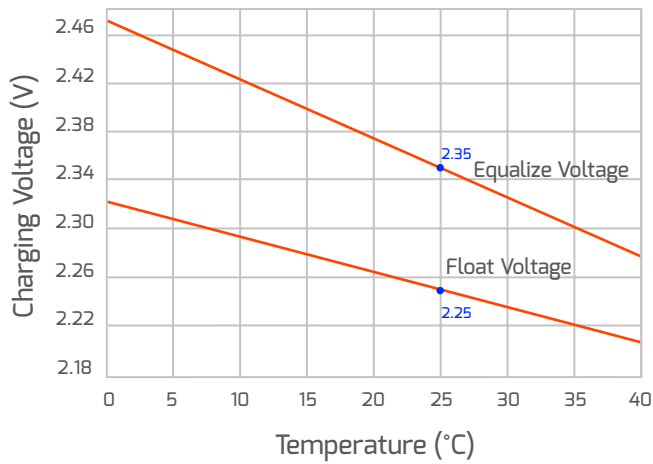
Discharge Current Rates - Amperes (25°C)

Type	1 Hour	3 Hour	5 Hour	8 Hour	10 Hour
PT2SL120	61.2	32	21.8	14.4	12
PT2SL200	121	53.5	37.1	24	20
PT2SL250	151.5	65.4	45.8	30	25
PT2SL300	181	83.4	53.7	36	30
PT2SL350	211	91.9	64.2	42	35
PT2SL420	254	111.2	74.5	50.4	42
PT2SL500	314	137	87.7	60	50
PT2SL600	366	160.6	107.4	72	60
PT2SL1000	610	273.6	180	120	100
PT2SL1500	905	410.4	269.7	180	150
PT2SL2000	1205	537.1	364.3	240	200
PT2SL3000	1810	810.3	556	360	300
End Voltage (V/Cell)	1.60	1.65	1.70	1.75	1.80

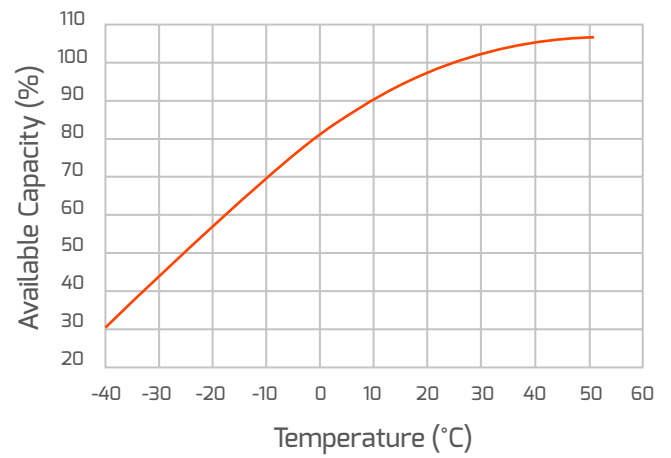
Charging Voltage at Different Temperatures

Temperature (°C)	Float Voltage (V/Cell)	Equalize Voltage (V/Cell)
1 - 5	2.31	2.45
6 - 10	2.30	2.43
11 - 15	2.28	2.40
16 - 20	2.27	2.38
21 - 25	2.25	2.35
26 - 30	2.24	2.33
31 - 35	2.22	2.30
36 - 40	2.21	2.28

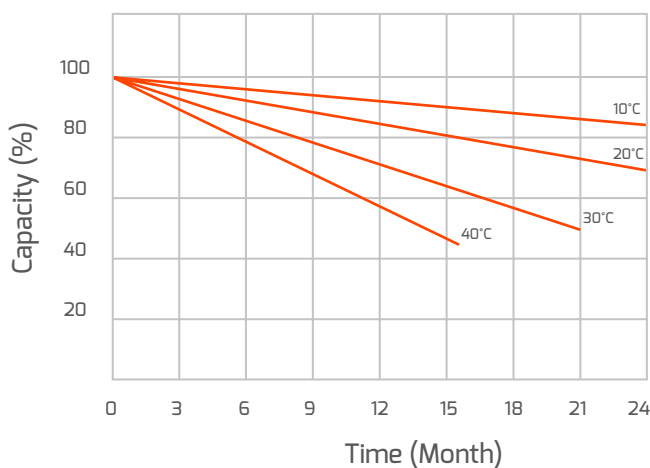
Float Voltage / Equalize Voltage Vs Temperature



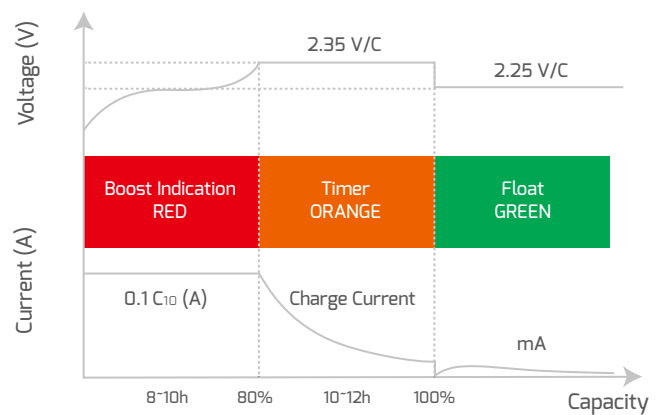
Available Capacity (10h rate and Voltage 1.80V) Vs Ambient Temperature



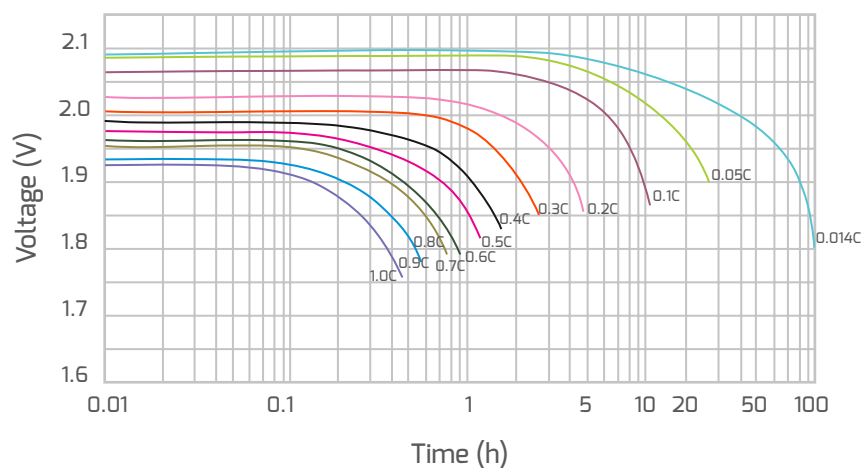
Self Discharge
Storage Time Vs Residue Capacity



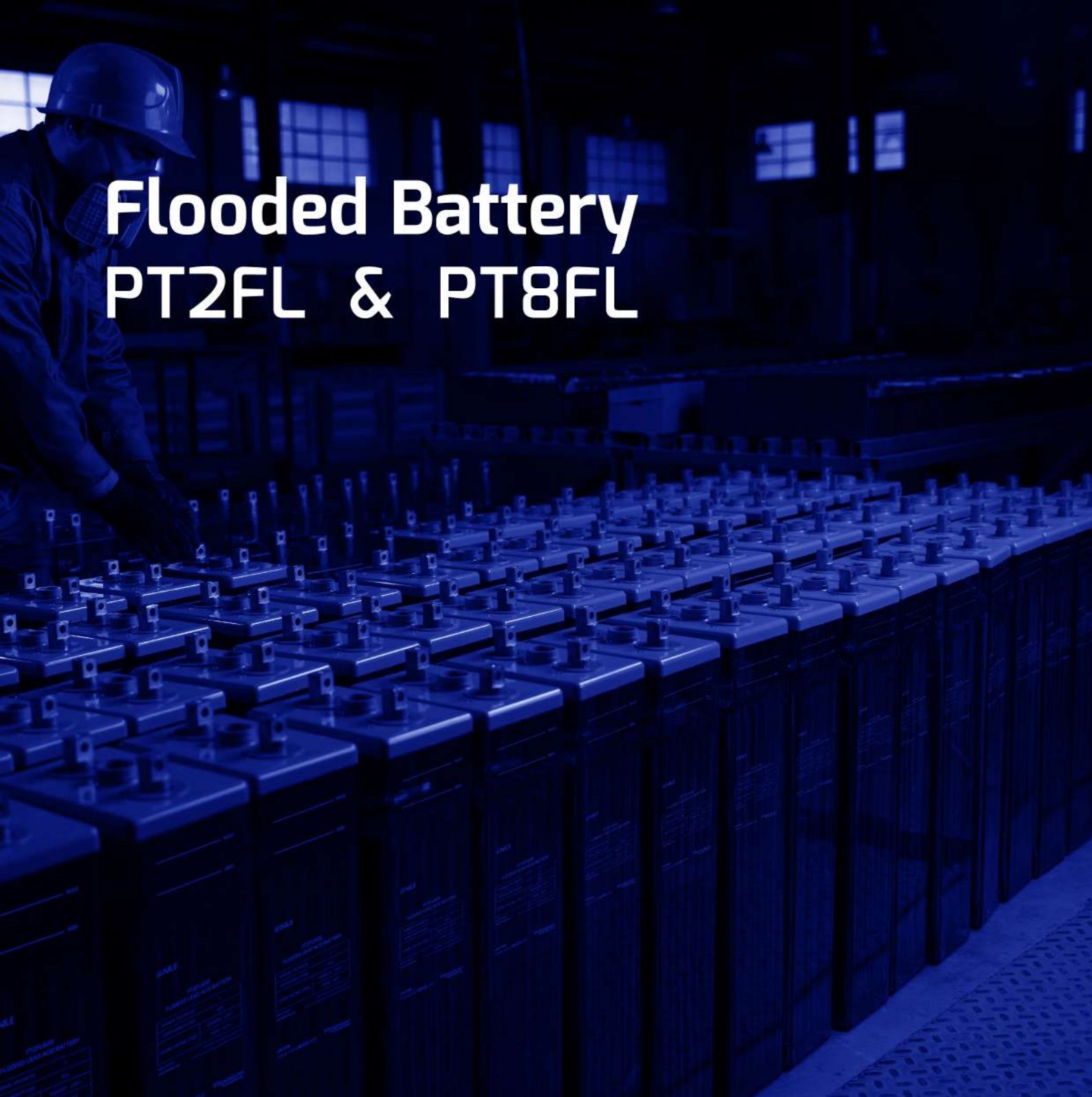
Charge Characteristics of 100% DoD with Current of 0.1C₁₀ (A) and Limit Voltage of 2.35 V/Cell (25°C)



Discharge performance Curves at Different Discharge Rates (25°C)







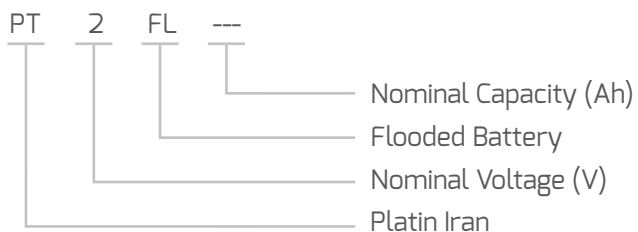
Flooded Battery PT2FL & PT8FL



Construction 2V Flooded



Indication of type



Features

- Flat plate technology
- PE separator
- Convenient installation
- Available in dry charged
- High quality and reliable construction
- Transparent container (SAN)
- Recombination vent plug (Aqua Master - optional)

Product characteristics

- Nominal voltage: 2V
- Max charging current allowed: $0.15C_{10}$
- Cycle life: 500 at 80% DOD (25°C)
- Float voltage (25°C): 2.20 V/Cell
- Equalize voltage (25°C): 2.35 V/Cell
- Electrolyte Density: $1.245 \pm 0.005 \text{ g/cm}^3$
- Terminal torque: $15 \pm 1.0 \text{ N.m}$
- Temperature: -15°C to +45°C
- Container material: SAN

Compliant Standards

- IEC 60896-11
- INSO 4868-11
- BS 6290-3
- ISO 9001

Main Applications

- Power & Utility
- Telecom
- UPS system
- Railway
- Oil & Gas
- Emergency Power System

Technical Information

Type	Nominal Voltage (V)	Nominal Capacity* (Ah) at 25°C	Charge Current (A) at 25°C		Weight ±2% (kg)		Dimension** (mm)		
			Normal	Max	Without electrolyte	With electrolyte	Length	Width	Total Height
PT2FL130	2	130	13	19.5	9.5	14	164	100	495
PT2FL150	2	150	15	22.5	10.5	15	164	100	495
PT2FL200	2	200	20	30	12.9	18.4	164	100	495
PT2FL250	2	250	25	37.5	13.2	18.7	164	100	495
PT2FL300	2	300	30	45	18.2	25.8	163	172	425
PT2FL350	2	350	35	52.5	19.1	26.6	163	172	425
PT2FL385	2	385	38	57.7	21.2	26.2	200	140	335
PT2FL400	2	400	40	60	19.8	26.8	163	172	425
PT2FL420	2	420	42	63	20.7	27.9	163	172	425
PT2FL440	2	440	44	66	23.3	30.9	165	185	390
PT2FL450	2	450	45	67.5	24.0	31.2	174	179	395
PT2FL480	2	480	48	72	25.1	32.6	174	179	395
PT2FL490	2	490	49	73.5	25.7	32.9	174	179	395
PT2FL600	2	600	60	90	30.8	46	206	145	673
PT2FL800	2	800	80	120	46	64.1	210	191	677
PT2FL1000	2	1000	100	150	55.6	75.4	210	233	677
PT2FL1200	2	1200	120	180	63.5	95.5	210	275	647
PT2FL1500	2	1500	150	225	83.9	117.9	210	275	835
PT2FL2000	2	2000	200	300	116.8	158.5	214	400	803
PT2FL2500	2	2500	250	375	141	213.5	210	575	815
PT2FL3000	2	3000	300	450	170.9	238.7	210	575	815

*10-hour discharge nominal capacity (C₁₀)

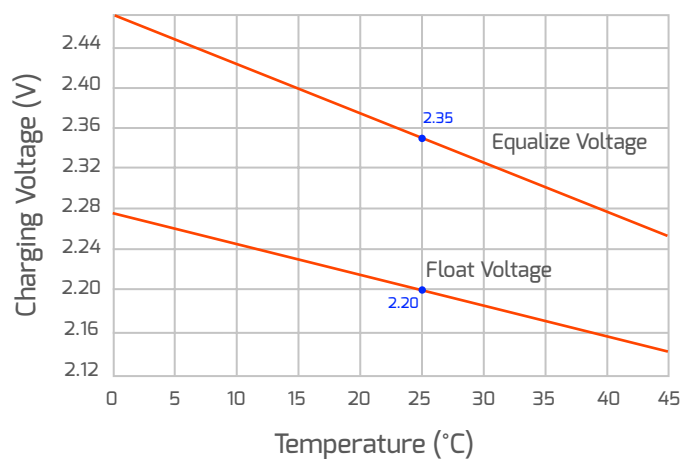
**length of the battery is considered as parallel to the plates, while width of the battery is perpendicular to the plates.

Type	Nominal Voltage (V)	Nominal Capacity* (Ah) at 25°C	Charge Current (A) at 25°C		Weight ±2% (kg)		Dimension(mm)		
			Normal	Max	Without electrolyte	With electrolyte	Length	Width	Total Height
PT8FL440	8	440	44	66	102.0	132.5	720	190	470

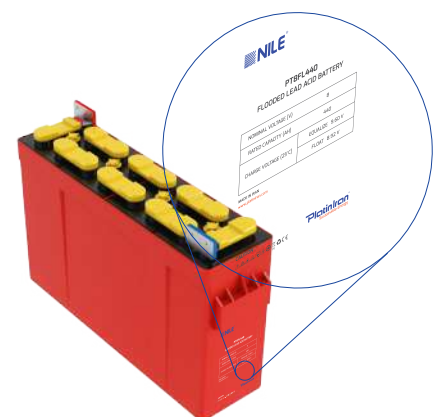
Discharge Current Rates - Amperes (25°C)

Type	1 Hour	3 Hour	5 Hour	8 Hour	10 Hour
PT2FL130	60.3	28.6	20.8	15.6	13
PT2FL150	69.5	33	24	18	15
PT2FL200	92.7	44	32	24	20
PT2FL250	116.4	55	40	30	25
PT2FL300	138.8	66	48	36	30
PT2FL350	155.5	77	56	42	35
PT2FL385	161.6	84.7	61.6	46.2	38.5
PT2FL400	175.7	88	64	48	40
PT2FL420	186.6	92.4	67.2	50.4	42
PT2FL440	191.5	96.8	70.4	52.8	44
PT2FL450	198.6	99	72	54	45
PT2FL480	211.7	105.6	76.8	57.6	48
PT2FL490	217	107.8	78.4	58.8	49
PT2FL600	253	138	96	72	60
PT2FL800	337	184	128	96	80
PT2FL1000	422.1	230	160	120	100
PT2FL1200	506.5	276	192	144	120
PT2FL1500	592.5	345	240	180	150
PT2FL2000	790	460	320	240	200
PT2FL2500	987	575	400	300	250
PT2FL3000	1185	690	480	360	300
End Voltage (V/Cell)	1.80				

The Voltage Setting Curve Vs. Ambient Temperature



Construction 8V Flooded





UPS Battery PT12UP





Construction

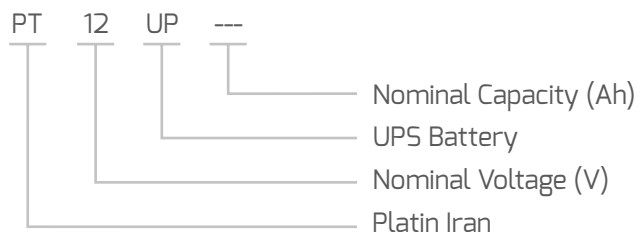
Compliant Standards

- IEC 60896-21 & 22
- INSO 4868-21 & 22
- BS 6290-4
- ISO 9001

Main Applications

- UPS System
- Data Center
- Emergency Power System
- Medical Equipment
- Alarm System

Indication of type



Features

- Grid alloy is corrosion proof, no pollution and less water loss.
- Impact proof and vibration proof strengthened ABS material
- Patent terminal sealing technology
- Higher assembly pressure, preventing active material shedding off the plates
- High sensible value, ensuring the reliability and safety during the operation
- Long life according to EUROBAT Classification
- Maximum charge efficiency
- High gas recombination efficiency
- Low self-discharge
- Easy installation and handling
- Flexible design for multiple installation



Product characteristics

- Nominal voltage: 12V
- Max charging current allowed: 0.2C₁₀ (A)
- Design life: 5~7 Years at 25°C
- Float voltage: 13.50 V/Block (25°C)
- Equalize voltage: 14.40 V/Block (25°C)
- Self-discharge: ≤ 2% per Month (25°C)
- Working temperature: -15°C to +45°C
- Recombination efficiency: > 98%
- Container material: ABS (UL94-V0 optional)

Technical Information

Type	Nominal Voltage (V)	Nominal Capacity* (Ah) at 25°C	Float Voltage (25°C)	Equalize Voltage (25°C)	Internal Resistance ±0.05 (mΩ)	Dimension (mm)				Weight ±2% (kg)
						Length	Width	Height	Total Height	
PT12UP7	12	7	13.50 V/Block	14.40 V/Block	30	150	65	94	97	2
PT12UP9	12	9			21	150	65	94	97	2.5
PT12UP12	12	12			19	150	98	94	97	4.2
PT12UP18	12	18			14	181	77	164	168	5.4
PT12UP28	12	28			12	175	165	125	125	8.4
PT12UP42	12	42			8.5	200	165	159	170	13.7
PT12UP65	12	65			7	350	165	175	175	20.9
PT12UP100	12	100			5	325	170	215	219	30
PT12UP150	12	150			4.5	485	170	231	242	46
PT12UP200	12	200			3	522	234	218	223	60

*10-hour discharge nominal capacity (C10)

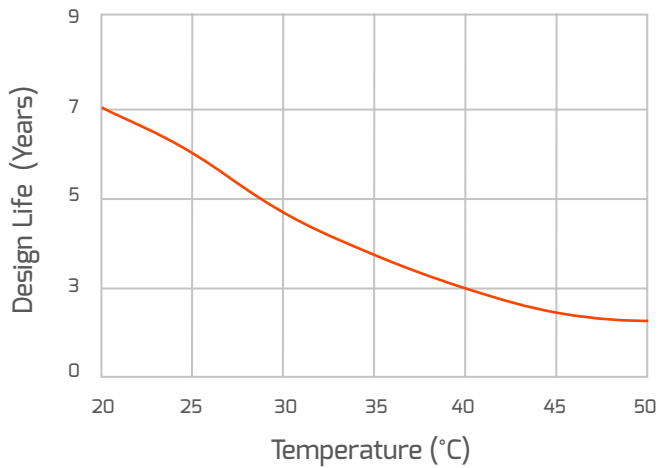
Discharge Current Rates - Amperes (25°C)

Type	1 Hour	3 Hour	5 Hour	8 Hour	10 Hour
PT12UP7	4.34	1.89	1.19	0.85	0.7
PT12UP9	5.58	2.43	1.53	1.09	0.9
PT12UP12	7.44	3.24	2.04	1.46	1.2
PT12UP18	11.16	4.86	3.06	2.18	1.8
PT12UP28	17.36	7.56	4.76	3.40	2.8
PT12UP42	26.04	11.34	7.14	5.09	4.2
PT12UP65	40.3	17.55	11.05	7.88	6.5
PT12UP100	62	27	17	12.13	10
PT12UP150	93	40.5	25.5	18.19	15
PT12UP200	124	54	34	24.25	20
End Voltage (V/Cell)	1.60	1.65	1.70	1.75	1.80

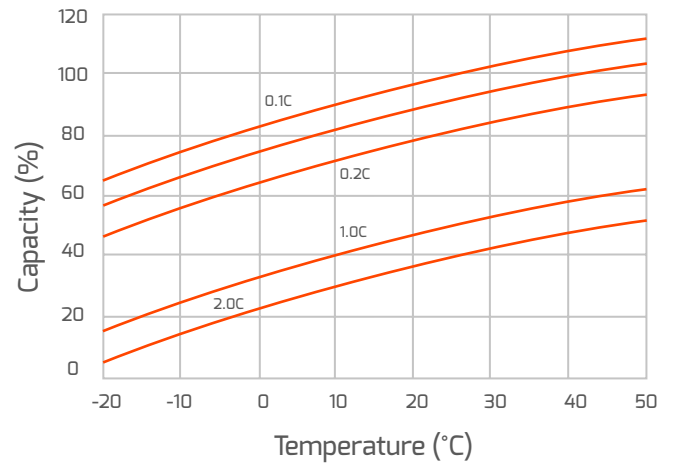
Charging Voltage at Different Temperatures

Temperature (°C)	Float Voltage (V/Block)	Equalize Voltage (V/Block)
1 - 5	13.86	15.00
6 - 10	13.77	14.85
11 - 15	13.68	14.70
16 - 20	13.59	14.55
21 - 25	13.50	14.40
26 - 30	13.41	14.25
31 - 35	13.32	14.10
36 - 40	13.23	13.95

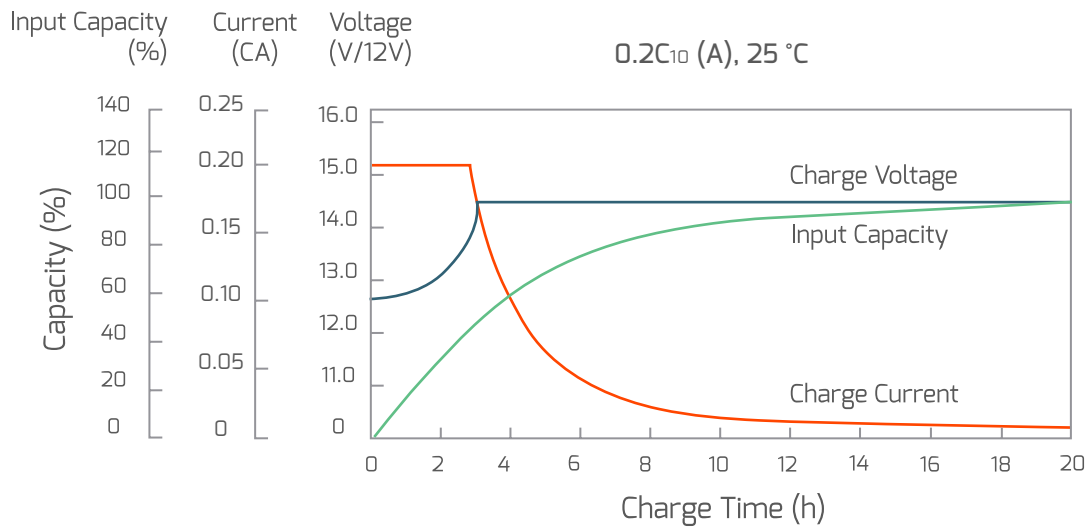
Design Life vs. Temperature



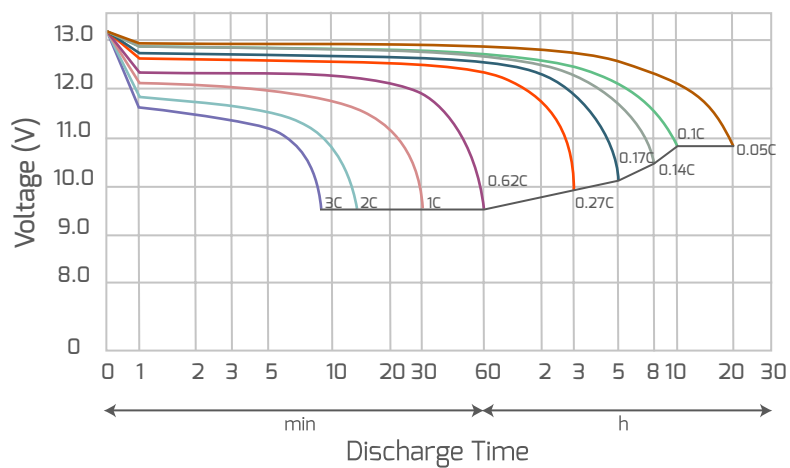
Discharge Capacity vs. Temperature



Charge Capacity vs. Charge Time



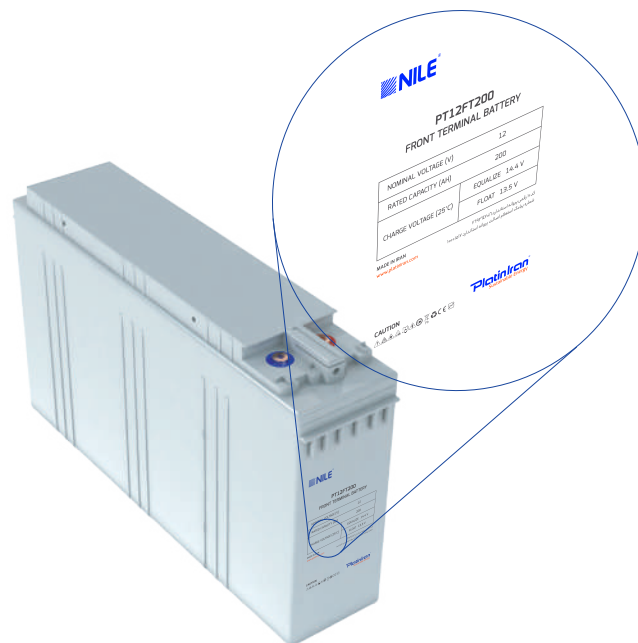
Discharge Voltage vs. Discharge Time







Front Terminal Battery PT12FT



Compliant Standards

- IEC 60896-21&22
- INSO 4868-21&22
- BS 6290-4
- ISO 9001

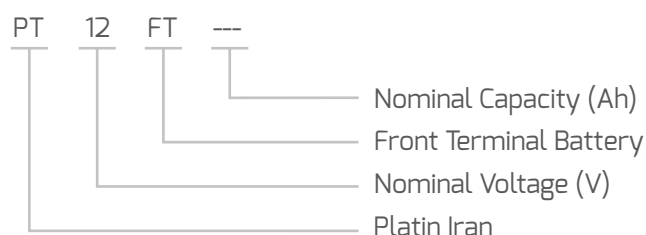
Product characteristics

- Nominal voltage: 12V
- Max charging current allowed: $0.2C_{10}$ (A)
- Design life: 8-12 years (25°C)
- Float voltage: 13.50 V/Block (25°C)
- Equalize voltage: 14.40 V/Block (25°C)
- Self-discharge: $\leq 2\%$ per month (25°C)
- Shelf life: 3 months at 25°C
- Terminal torque: 10 ± 1.0 N.m
- Working temperature: -15°C to +45°C
- Container material: ABS (UL94-V0 optional)

Main Applications

- Telecom
- UPS System
- Data Center
- Power System

Indication of type



Features

- Valve regulated system; no water addition needed.
- Real front-access terminal connections for fast and easy installation and maintenance.
- Easy-on easy-off multi-purpose design terminal protector.
- Suitable for 19", 23" racking or cabinet
- Proven excellent special lead-calcium-tin formula alloy for grids and plates
- Microporous absorbent glass mat in low resistance as separator
- Flame retardant ABS material container and cover compliant with UL94-V0 (optional)
- Self-regulating pressure relief valve

Technical Information

Type	Nominal Voltage (V)	Nominal Capacity* (Ah) at 25°C	Float Voltage (25°C)	Equalize Voltage (25°C)	Internal Resistance ±0.05 (mΩ)	Dimension (mm)				Weight ±2% (kg)
						Length	Width	Height	Total Height	
PT12FT100	12	100	13.50 V/Block	14.40 V/Block	6.31	390	110	270	270	29
PT12FT150	12	150			4.30	551	110	290	290	44.5
PT12FT155	12	155			4.27	551	110	290	290	45
PT12FT180	12	180			3.88	546	120	325	325	54
PT12FT200	12	200			3.70	546	120	325	325	59

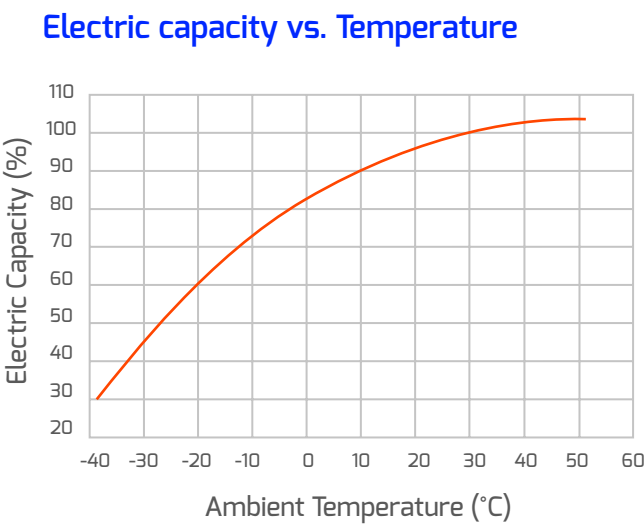
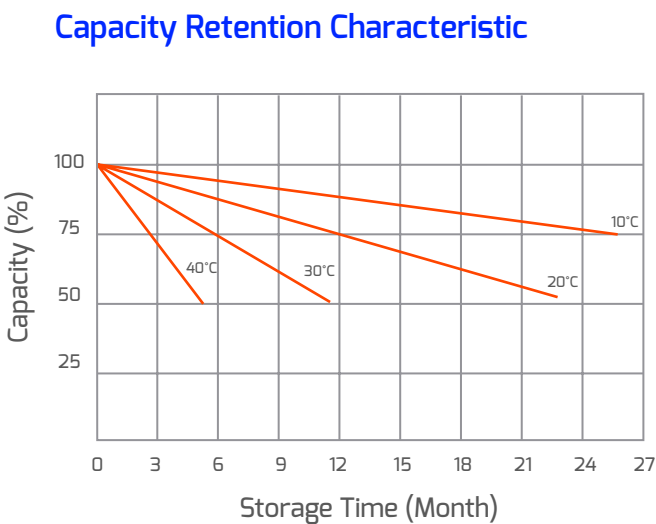
*10-hour discharge nominal capacity (C₁₀)

Discharge Current Rates - Amperes (25°C)

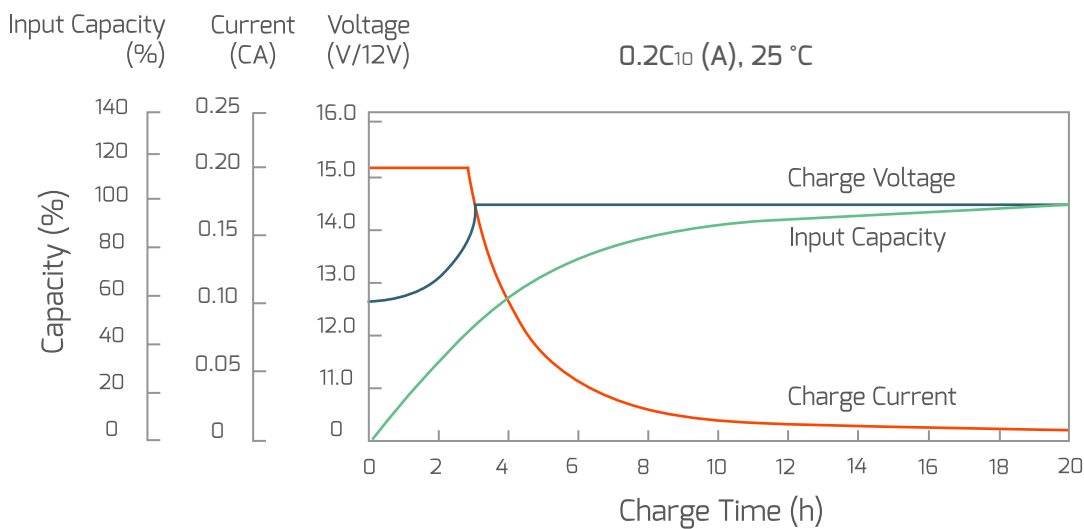
Type	1 Hour	3 Hour	5 Hour	8 Hour	10 Hour
PT12FT100	62	28	18	12	10
PT12FT150	93	42	27	18	15
PT12FT155	96.1	43.4	27.9	18.6	15.5
PT12FT180	111.6	50.4	32.4	21.6	18
PT12FT200	124	56	36	24	20
End Voltage (V/Cell)	1.60	1.65	1.70	1.75	1.80

Charging Voltage at Different Temperatures

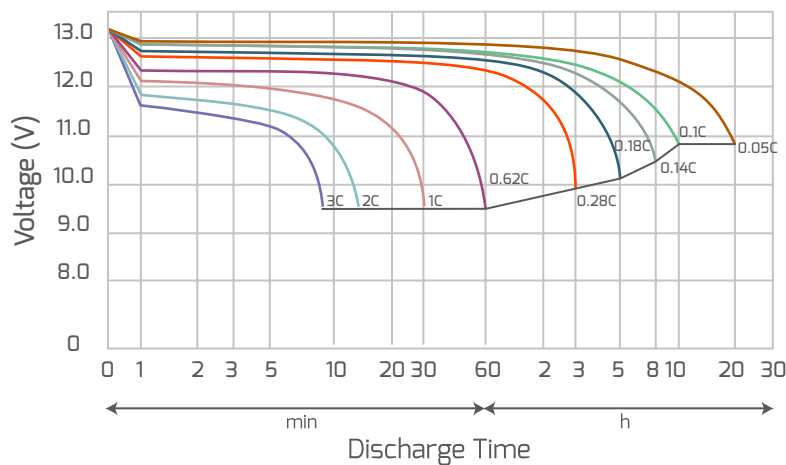
Temperature (°C)	Float Voltage (V/Block)	Equalize Voltage (V/Block)
1 - 5	13.86	15.00
6 - 10	13.77	14.85
11 - 15	13.68	14.70
16 - 20	13.59	14.55
21 - 25	13.50	14.40
26 - 30	13.41	14.25
31 - 35	13.32	14.10
36 - 40	13.23	13.95



Charge Capacity vs. Charge Time



Discharge Voltage vs. Discharge Time



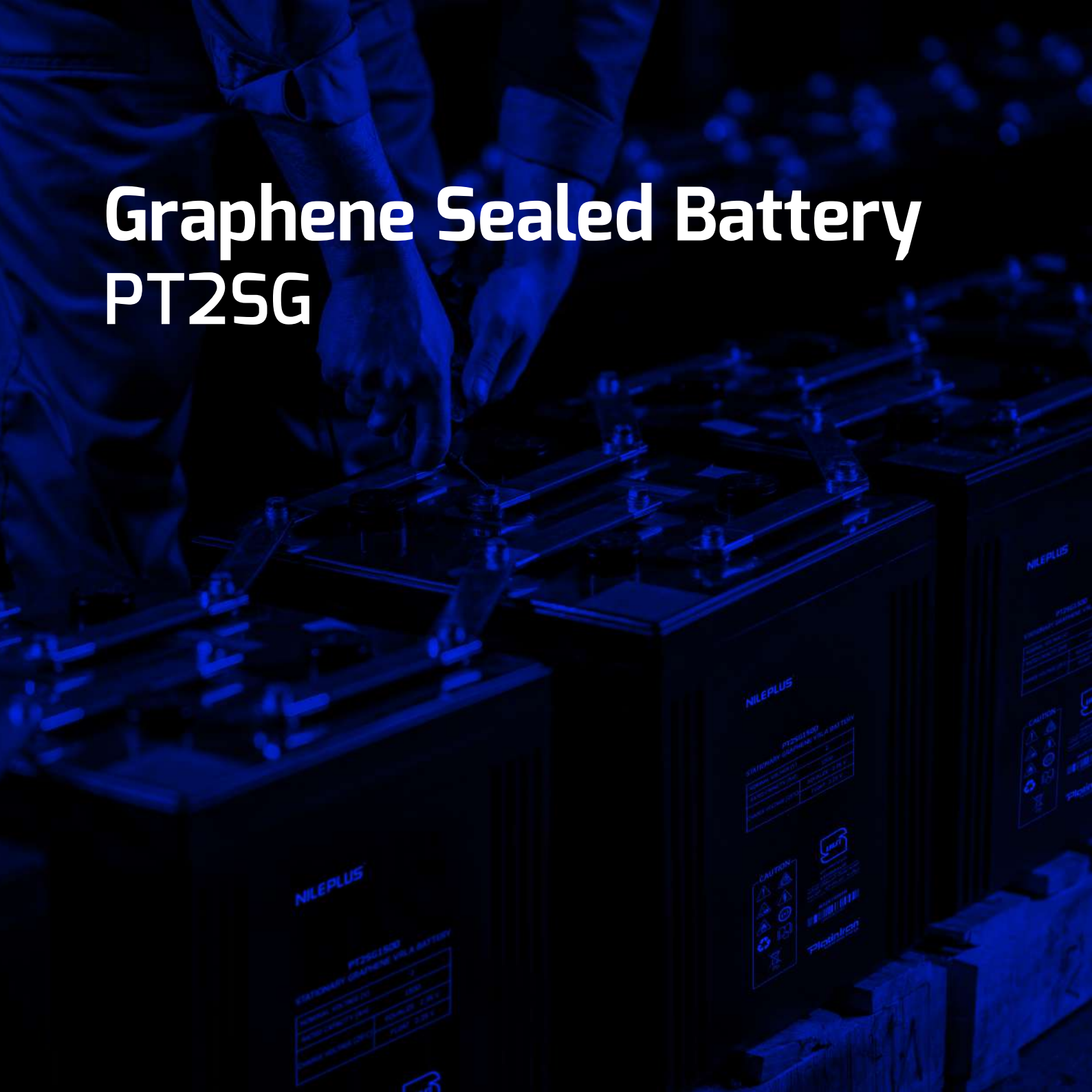
Construction



The terminal protector for PT12FT batteries is designed with special probe hole allowing safe and easier voltage testing and suitable for all connections means. The specially centralized venting system ensures the small gas be vented out of the closed cabinet.

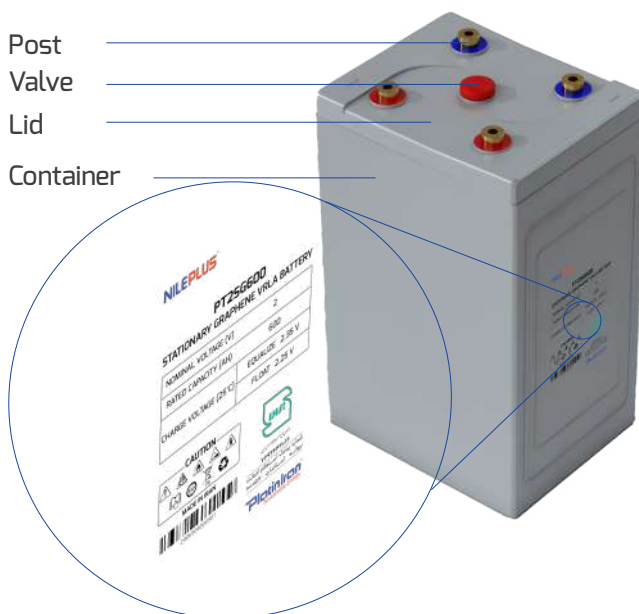


Graphene Sealed Battery PT2SG



Construction

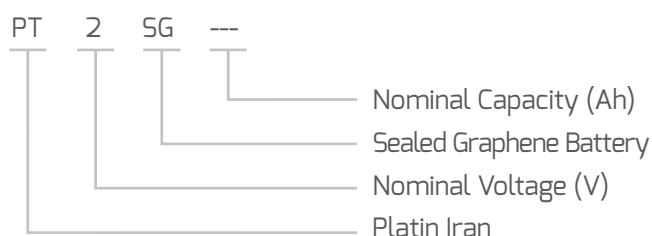
Post
Valve
Lid
Container



Compliant Standards

- IEC 60896-21 & 22
- INSO 4868-21 & 22
- BS 6290-4
- ISO 9001

Indication of type



Main Applications

- Power and Utility
- UPS system
- Telecom
- Data Center
- Railway, Broadcast and Television system
- Emergency Power System
- Renewable Energy Systems/Solar Energy Storage
- Oil, Gas and Petrochemicals Industry

Product characteristics

- Nominal voltage: 2V
- Max charging current allowed: $0.2C_{10}$ (A)
- Cycle life: Over 2000 cycles at 80% DOD (25°C)
- Float voltage: 2.25 V/Cell (25°C)
- Equalize voltage: 2.35 V/Cell (25°C)
- Self-discharge: $\leq 2\%$ per month (25°C)
- Terminal torque: 15 ± 1.0 N.m
- Temperature: -15°C to +45°C
- Container material: ABS UL94-V0

Features

- Advanced graphene-enhanced plates provide superior conductivity and lower internal polarization
- Reliable AGM technology with 99% recombination efficiency and no acid leakage
- The remaining capacity above 94% after storage for 3 months (25°C)
- Excellent performance under wide temperature conditions
- Flexible design for multiple installation orientations
- Better discharge characteristic than conventional VRLA batteries
- Non-spillable and explosion-proof design with high reliability
- Superior cycle life and durability for heavy demand applications
- Up to 50% longer service life than conventional VRLA batteries
- Low self-discharge for long shelf life

Technical Information

Type	Nominal Voltage (V)	Nominal Capacity* (Ah) at 25°C	Float Voltage (25°C)	Equalize Voltage (25°C)	Charge Current (A) at 25°C		Internal Resistance ±0.05 (mΩ)	Dimension** (mm)				Weight ±2% (kg)
					Normal	Max		Length	Width	Height	Total Height	
PT2SG120	2	120	2.25 V/Cell	2.35 V/Cell	12	18	1	200	115	357	370	13.5
PT2SG200	2	200			20	30	0.65	200	115	357	370	16.4
PT2SG250	2	250			25	37.5	0.54	200	115	357	370	17.9
PT2SG300	2	300			30	45	0.49	185	165	342	355	22.2
PT2SG350	2	350			35	52.5	0.47	185	165	342	355	24.2
PT2SG420	2	420			42	63	0.35	185	165	342	355	27.5
PT2SG500	2	500			50	75	0.34	180	220	357	370	34
PT2SG600	2	600			60	90	0.33	180	220	357	370	38.5
PT2SG1000	2	1000			100	150	0.30	174	470	332	373	60
PT2SG1500	2	1500			150	225	0.20	350	400	374	394	108
PT2SG2000	2	2000			200	300	0.15	348	490	360	405	129
PT2SG3000	2	3000			300	450	0.10	348	705	360	405	197

*10-hour discharge nominal capacity (C₁₀)

**length of the battery is considered as parallel to the plates, while width of the battery is perpendicular to the plates.

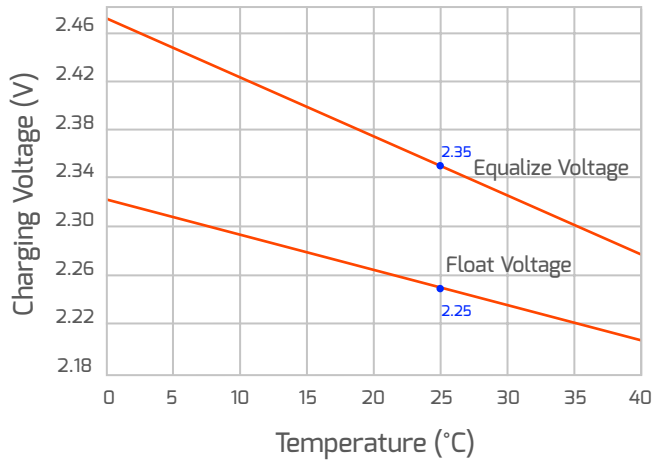
Discharge Current Rates - Amperes (25°C)

Type	1 Hour	3 Hour	5 Hour	8 Hour	10 Hour
PT2SG120	61.2	32	21.8	14.4	12
PT2SG200	121	53.5	37.1	24	20
PT2SG250	151.5	65.4	45.8	30	25
PT2SG300	181	83.4	53.7	36	30
PT2SG350	211	91.9	64.2	42	35
PT2SG420	254	111.2	74.5	50.4	42
PT2SG500	314	137	87.7	60	50
PT2SG600	366	160.6	107.4	72	60
PT2SG1000	610	273.6	180	120	100
PT2SG1500	905	410.4	269.7	180	150
PT2SG2000	1205	537.1	364.3	240	200
PT2SG3000	1810	810.3	556	360	300
End Voltage (V/Cell)	1.60	1.65	1.70	1.75	1.80

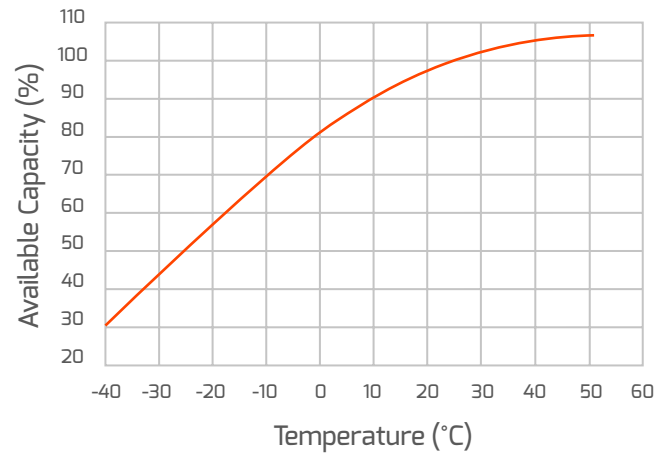
Charging Voltage at Different Temperatures

Temperature (°C)	Float Voltage (V/Cell)	Equalize Voltage (V/Cell)
1 - 5	2.31	2.45
6 - 10	2.30	2.43
11 - 15	2.28	2.40
16 - 20	2.27	2.38
21 - 25	2.25	2.35
26 - 30	2.24	2.33
31 - 35	2.22	2.30
36 - 40	2.21	2.28

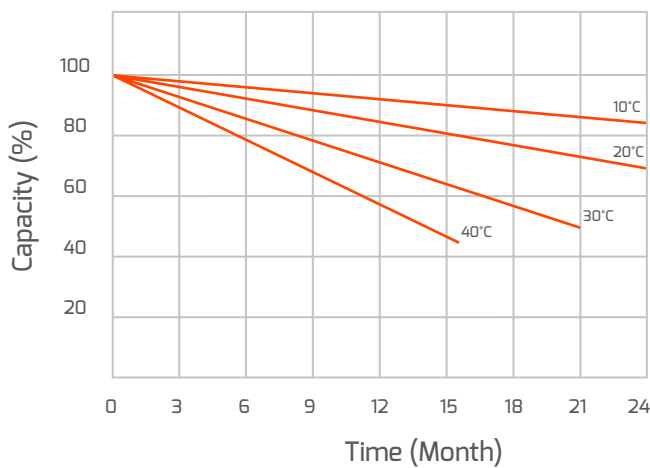
Float Voltage / Equalize Voltage Vs Temperature



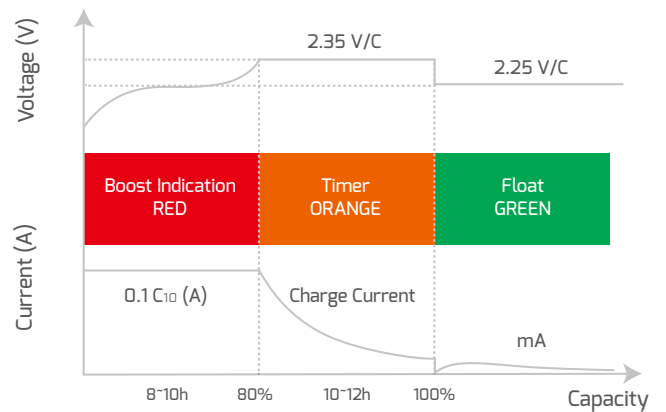
Available Capacity (10h rate and Voltage 1.80V) Vs Ambient Temperature



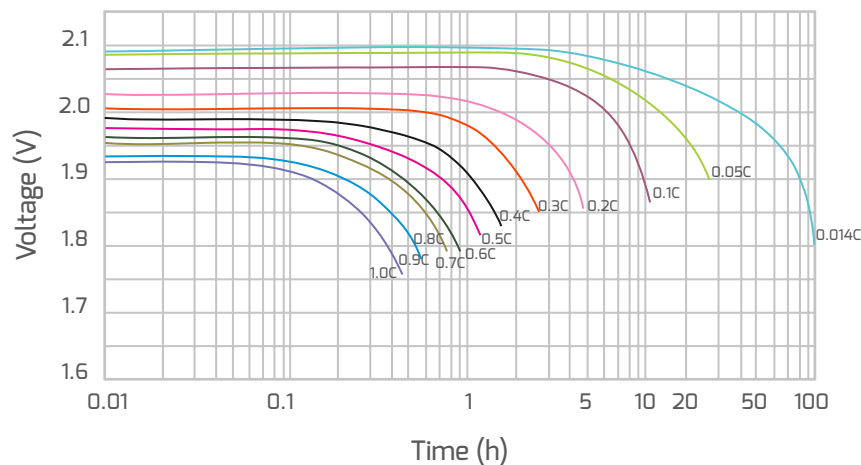
Self Discharge
Storage Time Vs Residue Capacity



Charge Characteristics of 100% DoD with Current of 0.1C₁₀ (A) and Limit Voltage of 2.35 V/Cell (25°C)



Discharge performance Curves at Different Discharge Rates (25°C)





Guarantee

NiCd Pocket Plate Range PT1.2FPL10-1200Ah



*»Premium quality for
uninterrupted communication«*





NiCd Pocket Plate Range
PT1.2FPL 10-1200Ah

The block battery - for dependability

The wide range of low, medium and high capacity types makes accurate selection easy, based on discharge time and end of discharge voltage. Robust construction and generous electrolyte reserve enable the battery to withstand wide temperature fluctuations in stationary cycling behavior over its 20+ years' life.

Built with a future Nickel-cadmium plates are completely reliable, with no risk of thermal runaway or sudden death.

Generally operating between temperatures of -20°C to +60°C (-4°F to +140°F), they can tolerate extremes of -50°C to +70°C (-58°F to +158°F) for short periods.

With only periodic checks, the block battery will provide up to 20+ years' completely faithful service.

Trouble-free long cycle life

The NILE nickel-cadmium block battery's unique electrochemistry enables it to regularly withstand any depth of discharge.

Following a deep discharge the block battery is designed to recharge very quickly and economically, using standard single or two-level charging equipment.

Be sure of a low overall cost

The Ni-Cd block battery is the most highly cost-efficient solution to stored power requirements.

- ☐ No downtime
- ☐ No replacement costs
- ☐ Minimal maintenance
- ☐ Ease of installation
- ☐ 20+ years' operating life

Easy storage and installation

Nickel-cadmium block batteries are quick and easy to install as original equipment and may be stored for many years in a discharged state under correct conditions.

On installation a simple bolted connector enables the battery to be rapidly commissioned.

Assured reliability

Ni-Cd is equally dependable in controlled city environments or harsh, unpredictable conditions in the world's most remote and unpopulated areas.

The Ni-Cd battery's block construction makes it highly resistant to electrical abuse and transport over rough terrain, precluding risk of subsequent failure.

Optimized for performance:

An electrolyte solution of potassium hydroxide and a small amount of lithium hydroxide acts only as an ion transfer medium, delivering optimum performance without causing base material degradation.

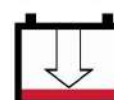
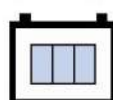
Good reserves and circulation of the electrolyte are achieved by a wide inter-plate space.

Injection molded plastic grids both separate plate and insulate plate edges. For extremely low temperatures a special high density electrolyte is available.

The block battery is fitted with a specially designed flame arresting flip top vent and does not produce corrosive vapors. The tough polypropylene casing ensures the battery's structural integrity throughout its long life.

Supports these Single Cell ranges with:

- ◆ Quality approved manufacture to ISO 9001 and the TUV certification.
- ◆ Single Cell batteries have been developed in line with the safety requirements of EN-50272-2 and components used (such as insulated cable connectors and end lug covers) are defined to ensure high protection against electric shocks (Ip2 level).
- ◆ Full recycling service to protect the environment.



Protective cover

- To prevent external short-circuits
- In line with EN 50272-2 (safety) with ip2 level

Plate group bus

- Connects the plate tabs with the terminal post.
- Plate tabs and terminal post are projection-welded to the plate group bus.

Plate

Horizontal pockets of double-perforated steel strips.

Cell container

Material: translucent/transparent polypropylene

Flame-arresting vents

Material: polypropylene.

Plate tab

Spot-welded both to the plate side-frames and to the upper edge of the pocket plate.

Separating grids

- These separate the plates and insulate the plate frames from each other.
- The grids allow free circulation of electrolyte between the plates.

Plate frame

Seals the plate pockets and serves as a current collector.

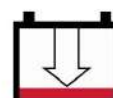
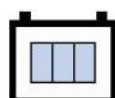
Application

PT1.2FPL Series nickel cadmium batteries are designed for general industrial applications where absolute reliability is a necessity. Service-proven pocket-plate technology ensures long uninterrupted battery life without the risk of sudden loss of power.

PT1.2FPL Series batteries are suitable for low discharge rate applications (between 1 hour to 100 hours) such as railroad signaling and control systems, photovoltaic, emergency lighting, telecommunications, etc.

Performance Data

- ☐ Proven pocket-plate nickel-cadmium technology 50 years of experience in developing and manufacturing nickel-cadmium batteries.
- ☐ High tolerance to electrical abuses such as overcharge and over discharge.
- ☐ High tolerance to rough handling and mechanical abuse due to strong components and robust construction.
- ☐ Trouble-free long cycle life .
- ☐ No risk of sudden death due to the chemistry and the cell structure.
- ☐ Wide operating temperature: -40°C to 60°C.
- ☐ Generous electrolyte reserve for long maintenance intervals.
- ☐ Clear (MBS) or translucent (PP) plastic cell case for easy electrolyte level inspection.
- ☐ Plastic grid spacers eliminate separator deterioration problem.
- ☐ Custom cell dimensions available.
- ☐ 20 years service life in stationary applications.
- ☐ Conforms to IEC60623.



Battery Charging

It is recommended to use Constant Voltage method of charging for Nickel Cadmium Batteries, usually with current limitation to C/5 or C/10. Charging voltages must be regularly checked. To optimize the battery performance, it is necessary to ensure that the voltage is kept within the following limits:

Batteries can be charged in:

- ♦ **constant voltage mode with load connected**
- or
- ♦ **constant current or declining current mode when load is isolated.**

High rate or over charge will not damage the battery.

Minimum float charging current: 2 mA per Ah.

- ♦ **Constant voltage mode:**

For continuous parallel operation:

- Float voltage: 1.40 - 1.45 V/cell for PT1.2FPL, PT1.2FPM & PT1.2FPH
- Boost Voltage:
 - PT1.2FPL : 1.60 - 1.70 V/cell
 - PT1.2FPM : 1.60 - 1.65 V/cell
 - PT1.2FPH : 1.60 - 1.65 V/cell

A higher voltage will reduce the charge duration and increase the efficiency of recharging but may increase water consumption.

Single stage charging (without boost):

PT1.2FPL : 1.47 - 1.50 V/cell
PT1.2FPM : 1.46 - 1.49 V/cell
PT1.2FPH : 1.45 - 1.48 V/cell

For starting application:

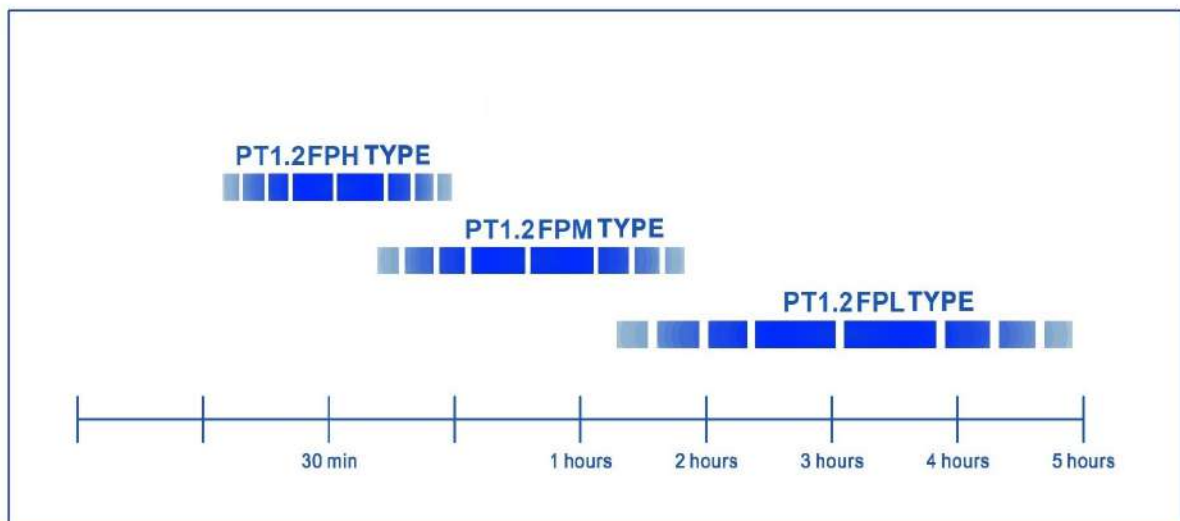
- Recommended charging voltage. 1.50 - 1.55 V/cell.

- ♦ **Constant current mode:**

- Normal charging: 0.2 C5 A for 8 hours
- Recommended for quick charging: 0.4 C5 A for 2.5 hours followed by 0.2 C5 A for 2.5 hours

Recommended Type Selection

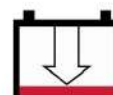
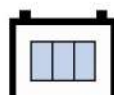
According to backup time required by application:



Initial Charging

The whole charge should preferably be carried out at constant current. The charging time is inversely proportional to the current which is set by the current limit of the charging equipment.

Recommended rates for the first charging: □ 0.2 C5A for 10 hours □ 0.1 C5A for 20 hours

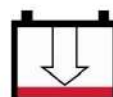
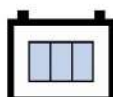


NiCd Pocket Plate PT1.2FPL Range Electrical Specifications & Dimensions

Cell Type	Nominal Voltage (V)	Capacity (C5 Ah)	Dimensions (mm/inch)						Weight (kg/lb.)				Terminal	Cell Case Material
			Length		Width		Height		Without Electrolyte		With Electrolyte			
PT1.2 FPL10	1.2	10	40	1.6	85	3.3	150	5.9	0.7	1.5	1.0	2.2	M8	PP
PT1.2 FPL20	1.2	20	55	2.2	134	5.3	270	10.6	1.1	2.4	1.8	4.0	M10	PP
PT1.2 FPL30	1.2	30	55	2.2	134	5.3	270	10.6	1.5	3.3	2.2	4.8	M10	PP
PT1.2 FPL40	1.2	40	55	2.2	134	5.3	270	10.6	1.8	4.0	2.6	5.7	M10	PP
PT1.2 FPL50	1.2	50	60	2.4	140	5.5	270	10.6	2.4	5.3	3.2	7.1	M10	PP
PT1.2 FPL60	1.2	60	60	2.4	140	5.5	270	10.6	2.8	6.2	3.8	8.4	M10	PP
PT1.2 FPL70	1.2	70	70	2.8	141	5.6	295	11.6	2.9	6.4	4.1	9.0	M10	PP
PT1.2 FPL80	1.2	80	70	2.8	141	5.6	295	11.6	3.4	7.5	4.6	10.1	M10	PP
PT1.2 FPL90	1.2	90	80	3.1	140	5.5	365	14.4	4.2	9.3	6.0	13.2	M10	PP
PT1.2 FPL100	1.2	100	80	3.1	140	5.5	365	14.4	4.5	9.9	6.2	13.7	M10	PP
PT1.2 FPL120	1.2	120	80	3.1	140	5.5	365	14.4	5.0	11.0	6.5	14.3	M10	PP
PT1.2 FPL150	1.2	150	105	4.1	165	6.5	345	13.6	6.9	15.2	9.5	20.9	M20	PP
PT1.2 FPL200	1.2	200	105	4.1	165	6.5	345	13.6	7.8	17.2	10.0	22.0	M20	PP
PT1.2 FPL250	1.2	250	165	6.5	167	6.6	345	13.6	10.2	22.5	14.2	31.3	M20	PP
PT1.2 FPL300	1.2	300	140	5.5	280	11.0	450	17.7	13.8	30.4	21.0	46.3	2 x M16	PP
PT1.2 FPL350	1.2	350	140	5.5	280	11.0	450	17.7	15.0	33.1	22.0	48.5	2 x M16	PP
PT1.2 FPL400	1.2	400	140	5.5	280	11.0	450	17.7	15.8	34.8	22.8	50.3	2 x M16	PP
PT1.2 FPL500	1.2	500	140	5.5	280	11.0	490	19.3	16.8	37.0	24.0	52.9	2 x M20	PP
PT1.2 FPL600	1.2	600	175	6.9	290	11.4	500	19.7	27.0	59.5	37.0	81.5	2 x M20	ABS
PT1.2 FPL700	1.2	700	175	6.9	290	11.4	500	19.7	29.0	63.9	39.0	86.0	2 x M20	ABS
PT1.2 FPL800	1.2	800	186	7.3	398	15.7	565	22.2	39.0	86.0	58.0	128	3 x M20	ABS
PT1.2 FPL900	1.2	900	186	7.3	398	15.7	565	22.2	41.0	90.4	60.0	132	3 x M20	ABS
PT1.2 FPL1000	1.2	1000	186	7.3	398	15.7	565	22.2	44.0	97.0	61.0	134	3 x M20	ABS
PT1.2 FPL1100	1.2	1100	186	7.3	398	15.7	565	22.2	45.0	99.2	62.0	137	3 x M20	ABS
PT1.2 FPL1200	1.2	1200	186	7.3	398	15.7	565	22.2	46.0	101	63.0	139	3 x M20	ABS

NiLE PT1.2FPL batteries fulfill all requirements specified by IEC publication 60623.

Transparent case optional.



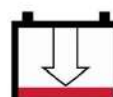
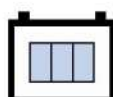
Discharge Data Table

Discharge performance data after fully charged by constant current according to IEC60623

Available amperes at +20°C ±5°C(+68°F ±9°F)

Final voltage: 1.14 V/cell

Cell Type	Capacity (C5 Ah)	Discharge Time in Hours							Discharge Time in minutes							Time in Seconds		
		10	8	5	3	2	1.5	1	45	30	20	15	10	5	1	30	5	1
PT1.2 FPL10	10	1.00	1.23	1.91	2.99	3.86	4.42	5.10	5.61	6.53	7.56	8.19	9.14	11.0	14.6	15.5	18.2	18.8
PT1.2 FPL20	20	1.98	2.42	3.64	5.45	7.14	8.30	10.2	11.2	13.1	15.1	16.7	17.6	20.2	29.0	33.5	44.0	50.3
PT1.2 FPL30	30	2.97	3.64	5.45	8.18	10.7	12.4	15.3	16.8	19.6	22.7	25.1	26.5	30.2	43.4	50.3	65.8	75.4
PT1.2 FPL40	40	3.96	4.85	7.27	10.9	14.3	16.6	20.4	22.4	26.1	30.2	33.4	35.3	40.3	57.9	67.0	87.8	101
PT1.2 FPL50	50	4.95	6.06	9.09	13.6	17.9	20.7	25.5	28.1	32.7	37.8	41.8	44.1	50.4	72.3	83.8	110	126
PT1.2 FPL60	60	5.94	7.27	10.9	16.3	21.4	24.9	30.6	33.7	39.2	45.3	47.6	54.6	58.8	81.1	89.8	115	130
PT1.2 FPL70	70	6.79	8.30	12.6	18.7	24.3	28.1	32.8	36.1	41.4	48.5	50.0	57.3	61.7	85.2	94.3	121	136
PT1.2 FPL80	80	7.92	9.70	14.5	21.0	26.5	30.5	35.9	39.5	45.7	50.4	53.8	60.5	70.6	91.1	100	124	137
PT1.2 FPL90	90	8.91	10.9	16.4	23.6	29.9	34.3	40.4	44.4	51.4	56.7	60.5	68.0	79.4	102	112	139	154
PT1.2 FPL100	100	9.73	11.8	18.0	26.6	34.7	40.2	46.9	51.6	59.2	69.3	71.4	81.9	88.2	121	135	173	195
PT1.2 FPL120	120	11.9	14.5	21.8	31.5	39.8	45.7	53.9	59.2	68.5	75.6	80.6	90.9	106	137	149	185	206
PT1.2 FPL150	150	14.8	18.2	27.3	39.4	49.7	57.2	67.3	74.1	85.7	94.5	101	114	133	171	187	232	258
PT1.2 FPL200	200	19.8	24.2	36.4	52.5	66.3	76.2	89.8	98.7	115	126	134	151	176	227	250	309	343
PT1.2 FPL250	250	24.8	30.3	45.5	65.7	82.9	95.5	112	123	143	158	168	189	221	284	312	387	429
PT1.2 FPL300	300	29.7	36.4	54.5	78.8	100	114	135	148	171	189	202	227	265	341	374	464	515
PT1.2 FPL350	350	34.7	42.4	63.6	92.0	116	133	157	173	200	221	236	265	309	398	437	541	600
PT1.2 FPL400	400	39.6	48.5	72.7	105	133	152	180	198	228	252	269	303	353	454	499	618	686
PT1.2 FPL500	500	49.5	60.6	90.9	132	166	191	224	246	286	315	336	378	441	568	623	773	858
PT1.2 FPL600	600	59.4	72.7	109	158	199	228	269	296	343	378	403	454	529	683	749	928	1029
PT1.2 FPL700	700	69.3	84.8	127	184	232	267	314	346	400	441	470	529	617	796	873	1082	1201
PT1.2 FPL800	800	79.1	97.0	145	210	265	305	359	395	457	504	537	605	705	910	998	1237	1372
PT1.2 FPL900	900	89.1	109	164	237	299	342	404	444	514	567	605	680	794	1024	1122	1391	1544
PT1.2 FPL1000	1000	99.0	121	182	262	332	381	449	494	571	630	672	756	882	1138	1247	1546	1716
PT1.2 FPL1100	1100	109	133	200	289	365	419	494	543	628	693	739	832	970	1251	1371	1701	1887
PT1.2 FPL1200	1200	119	145	218	315	398	457	539	592	685	756	806	907	1058	1365	1496	1855	2059



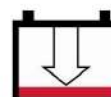
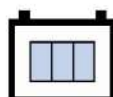
Discharge Data Table

Discharge performance data after fully charged by constant current according to IEC60623

Available amperes at +20°C ±5°C(+68°F ±9°F)

Final voltage: 1.10 V/cell

Cell Type	Capacity (C5 Ah)	Discharge Time in Hours							Discharge Time in minutes							Time in Seconds		
		10	8	5	3	2	1.5	1	45	30	20	15	10	5	1	30	5	1
PT1.2 FPL10	10	1.01	1.25	1.97	3.11	4.26	4.98	5.86	6.33	7.55	8.57	9.29	10.3	12.1	16.2	17.7	19.7	20.3
PT1.2 FPL20	20	2.02	2.50	3.87	5.92	7.98	9.55	11.8	12.7	15.5	17.4	18.7	21.4	25.7	32.9	37.8	49.4	56.2
PT1.2 FPL30	30	3.03	3.75	5.82	8.89	12.0	14.3	17.6	19.0	23.3	26.2	28.2	32.1	42.6	49.5	56.7	74.2	84.4
PT1.2 FPL40	40	4.04	5.00	7.76	11.8	16.0	19.1	23.4	25.3	31.0	34.9	37.5	42.8	51.4	65.9	75.6	98.8	112
PT1.2 FPL50	50	5.05	6.25	9.7	14.8	20.0	23.9	29.3	31.7	38.7	43.6	46.9	53.6	64.2	82.4	94.5	124	140
PT1.2 FPL60	60	6.06	7.50	11.6	17.8	23.9	28.6	35.2	38.0	46.5	52.3	56.3	64.3	70.1	90.7	104	134	149
PT1.2 FPL70	70	7.00	8.66	13.5	20.7	27.6	32.5	39.6	42.8	50.0	55.7	57.1	64.3	77.1	97.1	109	136	152
PT1.2 FPL80	80	8.08	10.0	15.5	23.1	30.7	35.6	43.6	47.1	53.9	58.8	65.3	73.4	78.3	104	113	138	151
PT1.2 FPL90	90	9.09	11.3	17.4	26.0	34.5	40.0	49.1	53.0	60.6	66.1	73.4	82.6	88.1	117	128	156	170
PT1.2 FPL100	100	10.0	12.4	19.2	29.7	39.4	46.5	56.6	61.1	71.4	79.6	81.6	91.8	110	138	155	194	218
PT1.2 FPL120	120	12.0	14.9	23.0	35.6	47.3	55.8	67.9	73.3	85.7	95.5	97.9	110	132	166	186	233	261
PT1.2 FPL150	150	15.2	18.7	29.1	43.4	57.6	66.7	81.8	88.4	101	110	122	138	146	195	212	259	283
PT1.2 FPL200	200	20.2	25.0	38.8	57.9	76.8	88.9	109	118	135	147	163	184	196	260	283	345	378
PT1.2 FPL250	250	25.3	31.2	48.5	72.4	96.4	111	137	148	169	184	204	230	245	325	353	431	472
PT1.2 FPL300	300	30.3	37.5	58.2	86.9	116	133	164	177	202	220	245	276	294	390	425	518	567
PT1.2 FPL350	350	35.4	43.7	67.9	102	135	156	191	207	236	257	286	322	343	454	495	604	662
PT1.2 FPL400	400	40.4	50.0	77.6	116	154	178	218	236	269	294	326	368	391	519	566	690	756
PT1.2 FPL500	500	50.5	62.5	96.9	145	192	222	272	294	337	367	408	459	490	649	707	862	945
PT1.2 FPL600	600	60.6	75.0	116	174	230	267	327	353	404	441	490	551	588	779	849	1035	1134
PT1.2 FPL700	700	70.7	87.5	135	203	269	311	382	412	471	514	571	643	685	909	990	1208	1323
PT1.2 FPL800	800	80.8	100	155	232	307	355	436	471	539	588	653	734	784	1039	1132	1380	1512
PT1.2 FPL900	900	90.9	112	175	260	346	400	491	531	606	661	734	827	881	1169	1273	1552	1701
PT1.2 FPL1000	1000	101	125	194	289	384	445	546	589	673	734	816	918	979	1298	1415	1725	1890
PT1.2 FPL1100	1100	111	137	213	318	422	489	600	648	741	808	898	1010	1077	1428	1557	1897	2079
PT1.2 FPL1200	1200	121	150	232	347	461	533	654	707	808	881	979	1102	1175	1559	1697	2070	2267



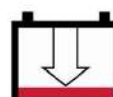
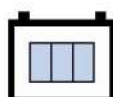
Discharge Data Table

Discharge performance data after fully charged by constant current according to IEC60623

Available amperes at +20°C ±5°C(+68°F ±9°F)

Final voltage: 1.05 V/cell

Cell Type	Capacity (C5 Ah)	Discharge Time in Hours							Discharge Time in minutes							Time in Seconds		
		10	8	5	3	2	1.5	1	45	30	20	15	10	5	1	30	5	1
PT1.2 FPL10	10	1.04	1.28	2.01	3.21	4.6	5.63	6.84	7.66	8.77	10.0	10.9	12.2	14.4	19.1	20.6	24.2	25.1
PT1.2 FPL20	20	2.06	2.55	3.96	6.26	8.8	10.8	14.0	15.7	18.7	22.3	24.3	27.2	29.7	40.1	45.0	59.9	67.4
PT1.2 FPL30	30	3.09	3.83	5.94	9.39	13.3	16.1	21.0	23.5	28.2	33.4	36.5	40.8	44.5	60.2	67.6	89.8	101
PT1.2 FPL40	40	4.12	5.10	7.92	12.5	17.6	21.5	27.9	31.3	37.5	44.5	48.6	54.4	59.3	80.2	90.0	120	134
PT1.2 FPL50	50	5.15	6.37	9.90	15.7	22.0	26.9	34.9	39.1	46.9	55.7	60.8	67.9	74.2	100	113	150	169
PT1.2 FPL60	60	6.18	7.65	11.9	18.8	26.5	32.3	42.0	47.0	56.3	66.8	73.0	81.5	89.0	121	135	180	202
PT1.2 FPL70	70	7.07	8.84	13.9	22.2	30.7	37.1	45.7	51.2	60.0	69.2	75.0	82.2	95.2	118	130	168	185
PT1.2 FPL80	80	8.08	10.1	15.8	25.3	35.1	42.4	52.2	58.5	68.5	79.1	85.7	93.9	109	135	148	192	212
PT1.2 FPL90	90	9.27	11.6	18.0	28.2	39.0	46.5	57.9	64.8	75.3	84.8	89.0	101	122	141	154	189	205
PT1.2 FPL100	100	10.3	12.9	20.0	31.4	43.4	51.6	64.3	72.0	83.6	94.2	98.9	112	136	156	171	210	228
PT1.2 FPL120	120	12.1	15.2	23.8	38.0	52.6	63.6	78.3	87.7	103	119	128	140	163	202	224	288	317
PT1.2 FPL150	150	15.5	19.3	30.0	47.0	65.0	77.5	96.4	108.0	126	141	148	167	204	235	257	314	341
PT1.2 FPL200	200	20.6	25.6	40.0	62.6	86.7	104	129	144.0	168	188	198	222	272	313	342	419	455
PT1.2 FPL250	250	25.8	32.0	50.0	78.3	108	129	160	179.7	210	236	247	278	340	391	428	524	569
PT1.2 FPL300	300	31.0	38.4	60.0	94.2	130	155	193	216.2	251	282	297	334	408	470	513	628	682
PT1.2 FPL350	350	36.1	44.9	70.0	109	151	181	225	251.6	293	330	346	389	476	548	599	733	796
PT1.2 FPL400	400	41.2	51.3	80.0	126	173	206	257	287.4	334	377	395	445	544	626	685	838	910
PT1.2 FPL500	500	51.5	64.1	100	156	217	258	321	359.5	418	472	495	556	680	783	856	1047	1138
PT1.2 FPL600	600	61.8	76.9	120	188	260	310	386	431.8	502	565	593	667	816	939	1028	1257	1365
PT1.2 FPL700	700	72.1	89.7	140	219	304	362	450	503.8	585	660	692	779	952	1096	1199	1467	1592
PT1.2 FPL800	800	82.5	102	160	250	347	414	514	575.9	670	754	791	890	1088	1253	1370	1676	1820
PT1.2 FPL900	900	92.8	115	180	282	390	465	579	648.0	753	848	890	1001	1224	1409	1541	1885	2047
PT1.2 FPL1000	1000	103	128	200	313	434	517	643	720.2	836	942	989	1113	1359	1565	1713	2095	2274
PT1.2 FPL1100	1100	113	141	220	344	477	568	707	791.7	920	1037	1088	1224	1496	1722	1884	2305	2502
PT1.2 FPL1200	1200	123	154	240	376	520	620	771	863.7	1004	1131	1187	1335	1632	1879	2055	2514	2729



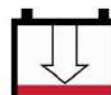
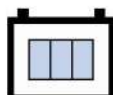
Discharge Data Table

Discharge performance data after fully charged by constant current according to IEC60623

Available amperes at +20°C ±5°C(+68°F ±9°F)

Final voltage: 1.00 V/cell

Cell Type	Capacity (C5 Ah)	Discharge Time in Hours							Discharge Time in minutes							Time in Seconds		
		10	8	5	3	2	1.5	1	45	30	20	15	10	5	1	30	5	1
PT1.2 FPL10	10	1.04	1.28	2.02	3.26	4.67	5.90	7.64	8.56	9.90	11.3	12.2	13.7	16.3	21.6	23.8	27.6	28.1
PT1.2 FPL20	20	2.08	2.58	4.04	6.46	9.2	11.6	15.5	17.3	22.1	25.4	27.7	30.8	37.1	46.0	51.7	67.9	76.4
PT1.2 FPL30	30	3.11	3.87	6.06	9.70	13.8	17.4	23.3	26.0	33.0	38.1	41.6	34.0	55.6	69.0	77.5	102	114
PT1.2 FPL40	40	4.14	5.15	8.08	12.9	18.4	23.1	31.0	34.7	44.1	50.8	55.5	46.4	76.2	92.0	103	135	153
PT1.2 FPL50	50	5.18	6.44	10.1	16.1	23.0	28.9	38.7	43.4	55.1	63.5	69.3	65.7	92.7	115	129	170	191
PT1.2 FPL60	60	6.22	7.73	12.1	19.4	27.6	34.7	46.5	52.1	66.1	76.2	83.2	70.3	112	138	155	203	230
PT1.2 FPL70	70	7.15	8.93	14.1	22.6	32.5	40.1	52.2	58.4	70.7	81.4	87.1	89.4	109	136	147	191	213
PT1.2 FPL80	80	8.33	10.3	16.2	25.9	36.4	44.7	58.0	64.9	79.2	90.2	97.9	85.9	119	144	157	192	206
PT1.2 FPL90	90	9.37	11.6	18.2	29.1	41.0	50.3	65.2	73.1	89.1	101	110	122	134	162	177	216	232
PT1.2 FPL100	100	10.4	12.9	20.2	32.3	45.5	55.9	72.5	81.2	99.0	113	122	136	149	180	196	240	258
PT1.2 FPL120	120	12.2	15.3	24.2	38.8	55.8	68.6	89.4	100	121	139	149	140	185	233	253	328	364
PT1.2 FPL150	150	15.6	19.4	30.3	48.5	68.2	83.9	109	122	149	169	184	160	223	270	294	359	386
PT1.2 FPL200	200	20.9	25.8	40.4	64.6	91.0	111	144	162	197	226	245	206	296	360	392	479	514
PT1.2 FPL250	250	26.0	32.2	50.5	80.8	114	139	181	202	247	283	306	273	371	450	489	598	644
PT1.2 FPL300	300	31.2	38.6	60.6	97.0	136	168	217	244	297	340	367	289	445	540	588	718	772
PT1.2 FPL350	350	36.4	45.1	70.7	113	159	196	253	284	347	396	428	412	519	631	685	838	901
PT1.2 FPL400	400	41.6	51.5	80.8	129	182	224	290	325	396	453	490	491	594	720	783	957	1029
PT1.2 FPL500	500	52.0	64.4	101	161	228	279	362	405	495	566	612	553	741	900	979	1197	1287
PT1.2 FPL600	600	62.4	77.3	121	194	273	335	435	487	594	679	734	693	890	1080	1174	1436	1545
PT1.2 FPL700	700	72.8	90.2	141	226	318	391	507	568	693	793	857	816	1038	1261	1370	1676	1802
PT1.2 FPL800	800	83.2	103	162	259	364	447	579	649	791	905	979	917	1186	1441	1566	1915	2059
PT1.2 FPL900	900	93.7	116	182	291	409	503	652	730	890	1019	1102	1098	1335	1620	1762	2155	2316
PT1.2 FPL1000	1000	104	129	202	323	455	558	724	811	989	1132	1224	1233	1483	1800	1957	2394	2574
PT1.2 FPL1100	1100	114	141	222	356	500	615	797	892	1088	1245	1346	1386	1632	1981	2153	2633	2831
PT1.2 FPL1200	1200	125	155	242	388	545	671	869	973	1187	1359	1469	1496	1780	2161	2348	2873	3088



Calculation Methods

Information required for battery capacity calculation

The following information needed for a precise battery capacity calculation:

- ☐ Nominal voltage of the system
- ☐ Load current required
- ☐ Backup time required
- ☐ Maximum voltage (for charging)
- ☐ Minimum voltage
- ☐ Temperature range
- ☐ Battery layout and available space
- ☐ Physical condition

Float Voltage Operation

In these conditions the float voltage, being the voltage at which the general load circuit will operate, then a decision will have to be reached on the cell float voltage needed to maintain the battery in the required condition.

$$\text{Number of cells required} = \frac{\text{Circuit voltage}}{\text{Cell Float voltage}} \quad \text{Minimum cell voltage} = \frac{\text{Minimum D.C. voltage}}{\text{Number of cells}}$$

The most commonly used float voltages are 1.40-1.48 voltage per cell, but the exact figure has to be related carefully to circumstances.

For Example

A NILE Nickel Cadmium battery is required to maintain an inverter load of 50KVA at 0.8 power factor for a backup time up time of 30 minutes, at 20~25°C temperature. The DC voltage to the inverter operates within the limit of 265 volts with the battery on float charge to a minimum of 202 volts at end of back up time. The inverter has an 85% efficiency rate.

-Number of Cells (at recommended float of 1.44VPC) = $265/1.44 \approx 184$ cells

-Minimum Cell Voltage = $202/184 \approx 1.10$ volts per cell

-Maximum Battery Current

$$= \frac{\text{Inverter load in KVA} \times \text{Power factor}}{\text{Min. cell voltage} \times \text{Number of cells} \times \text{Inverter efficiency}}$$

$$= \frac{50\text{KVA} \times 0.80}{1.10 \times 184 \times 0.85} = 232.5 \text{ Amps}$$

We shall choose the battery with capacity equal or just above 232.5Amps.

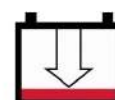
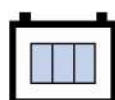
To meet the 30 minutes backup time requirement, we determine to choose the battery size from PT1.2FPL Range.

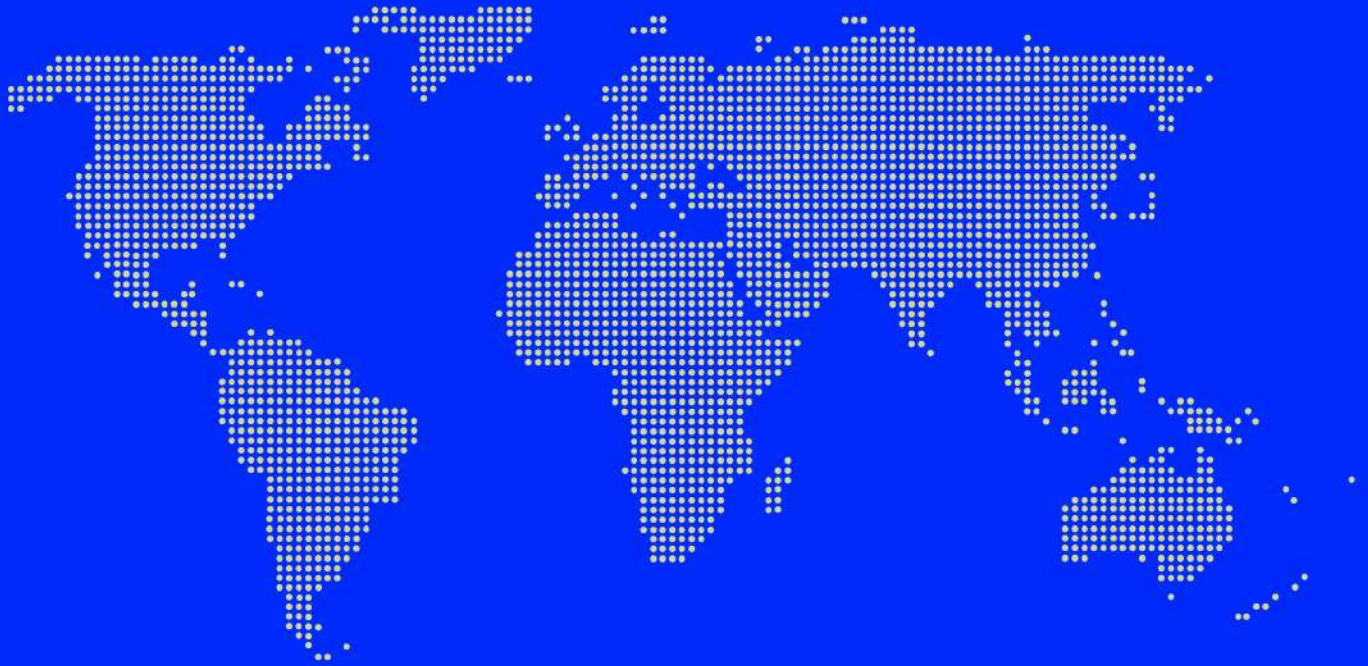
From our catalogue data, the cell type is PT1.2FPL300.

Battery shall comprise 184 cells of NILE Nickel Cadmium type PT1.2FPL300.

System Voltage	Number of Cells	Spread Range Number of Cells
24	20	18 ~ 21
36	30	27 ~ 31
48	40	36 ~ 41
110	92	88 ~ 93
220	184	180 ~ 186

The number of cells in a battery may be determined by simply dividing the nominal voltage of the system by the nominal voltage of a cell (1.2 Volts).





Guarantee

NiCd Pocket Plate Range PT1.2FPM10-1100



*»Premium quality for
uninterrupted communication«*





NiCd Pocket Plate Range
PT1.2FPM10-1100

The block battery - for dependability

The wide range of low, medium and high capacity types makes accurate selection easy, based on discharge time and end of discharge voltage. Robust construction and generous electrolyte reserve enable the battery to withstand wide temperature fluctuations in stationary cycling behavior over its 20+ years' life.

Built with a future Nickel-cadmium plates are completely reliable, with no risk of thermal runaway or sudden death.

Generally operating between temperatures of -40°C to $+60^{\circ}\text{C}$ (-40°F to $+140^{\circ}\text{F}$), they can tolerate extremes of -50°C to $+70^{\circ}\text{C}$ (-58°F to $+158^{\circ}\text{F}$) for short periods.

With only periodic checks, the block battery will provide up to 20+ years' completely faithful service.

Trouble-free long cycle life

The NILE nickel-cadmium block battery's unique electrochemistry enables it to regularly withstand any depth of discharge.

Following a deep discharge the block battery is designed to recharge very quickly and economically, using standard single or two-level charging equipment.

Be sure of a low overall cost

The Ni-Cd block battery is the most highly cost-efficient solution to stored power requirements.

- ☐ No downtime
- ☐ No replacement costs
- ☐ Minimal maintenance
- ☐ Ease of installation
- ☐ 20+ years' operating life.

Easy storage and installation

Nickel-cadmium block batteries are quick and easy to install as original equipment and may be stored for many years in a discharged state under correct conditions.

On installation a simple bolted connector enables the battery to be rapidly commissioned.

Assured reliability

Ni-Cd is equally dependable in controlled city environments or harsh, unpredictable conditions in the world's most remote and unpopulated areas.

The Ni-Cd battery's block construction makes it highly resistant to electrical abuse and transport over rough terrain, precluding risk of subsequent failure.

Optimized for performance:

An electrolyte solution of potassium hydroxide and a small amount of lithium hydroxide acts only as an ion transfer medium, delivering optimum performance without causing base material degradation.

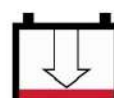
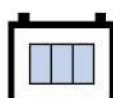
Good reserves and circulation of the electrolyte are achieved by a wide inter-plate space.

Injection molded plastic grids both separate plate and insulate plate edges. For extremely low temperatures a special high density electrolyte is available.

The block battery is fitted with a specially designed flame arresting flip top vent and does not produce corrosive vapors. The tough polypropylene casing ensures the battery's structural integrity throughout its long life.

Supports these Single Cell ranges with:

- ☐ Quality approved manufacture to ISO 9001 and the TUV certification
- ☐ Single Cell batteries have been developed in line with the safety requirements of EN-50272-2 and components used (such as insulated cable connectors and end lug covers) are defined to ensure high protection against electric shocks (Ip2 level).
- ☐ Full recycling service to protect the environment



Protective cover

- To prevent external short-circuits
- In line with EN 50272-2 (safety) with ip2 level

Plate group bus

- Connects the plate tabs with the terminal post.
- Plate tabs and terminal post are projection-welded to the plate group bus.

Plate

Horizontal pockets of double-perforated steel strips.

Cell container

Material: translucent/transparent polypropylene

Flame-arresting vents
Material: polypropylene.

Plate tab

Spot-welded both to the plate side-frames and to the upper edge of the pocket plate.

Separating grids

- These separate the plates and insulate the plate frames from each other.
- The grids allow free circulation of electrolyte between the plates.

Plate frame

Seals the plate pockets and serves as a current collector.

The cells are welded together to form rugged blocks of 1-6 cells depending on the cell size and type.

The NILE Single Cell ranges fully comply and exceed the IEC 60623 standard requirements.

Performance Data

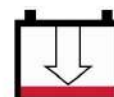
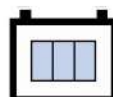
Many nickel-cadmium batteries are used in stationary standby power applications where discharges occur infrequently and the battery is continuously charged by a float or constant potential charge.

Under these circumstances there is a modification in the level of the discharge curve and allowances must be made for this when sizing the battery.

In order to simplify this process, the data NILE supplies in this publication has both the fully charged data to IEC 60623 and the fully charged data after prolonged float charge, which can be used directly in battery sizing calculations.

This phenomenon occurs with all nickel-cadmium batteries, but some other manufacturers of nickel-cadmium batteries may not take this effect into account in published data.

When calculating for deep discharges (0.65 V and 0.85 V) it is not necessary to take this effect into account.



Battery Charging

It is recommended to use Constant Voltage method of charging for Nickel Cadmium Batteries, usually with current limitation to C/5 or C/10. Charging voltages must be regularly checked. To optimize the battery performance, it is necessary to ensure that the voltage is kept within the following limits:

Batteries can be charged in:

- ♦ **constant voltage mode with load connected**
- or
- ♦ **constant current or declining current mode**
when load is isolated.

High rate or over charge will not damage the battery.

Minimum float charging current: 2 mA per Ah.

- ♦ **Constant voltage mode:**

For continuous parallel operation:

- Float voltage: 1.40 - 1.45 V/cell for PT1.2FPL,
PT1.2FPM & PT1.2FPH
- Boost Voltage:
 - PT1.2FPL: 1.60 - 1.70 V/cell
 - PT1.2FPM: 1.60 - 1.65 V/cell
 - PT1.2FPH: 1.60 - 1.65 V/cell

A higher voltage will reduce the charge duration and increase the efficiency of recharging but may increase water consumption.

Single stage charging (without boost):

PT1.2FPL: 1.47 - 1.50 V/cell
PT1.2FPM: 1.46 - 1.49 V/cell
PT1.2FPH: 1.45 - 1.48 V/cell

For starting application:

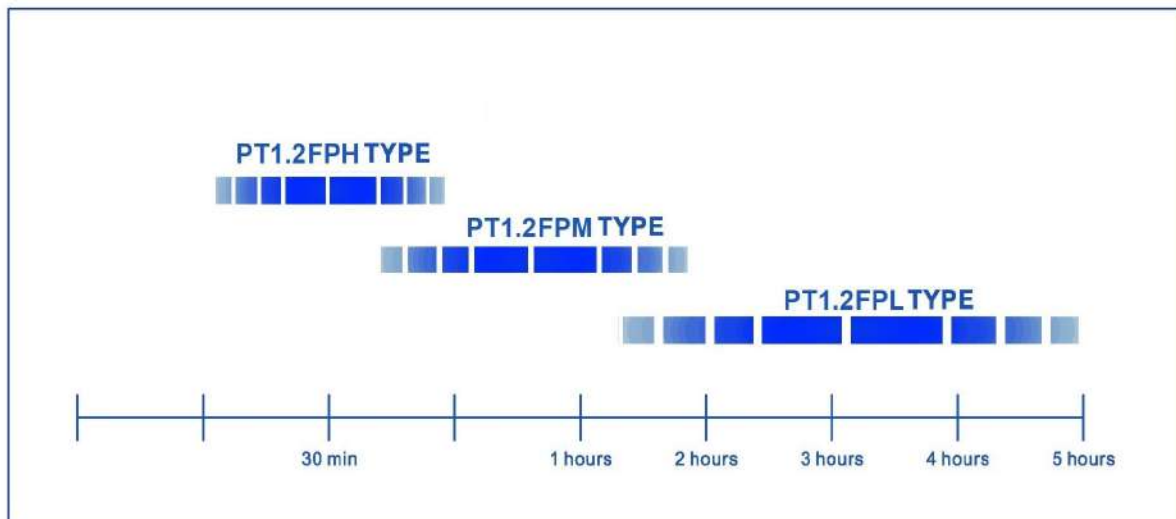
- Recommended charging voltage. 1.50 - 1.55 V/cell.

- ♦ **Constant current mode:**

- Normal charging: 0.2 C5 A for 8 hours
- Recommended for quick charging: 0.4 C5 A for 2.5 hours followed by 0.2 C5 A for 2.5 hours

Recommended Type Selection

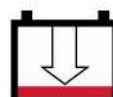
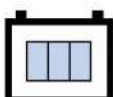
According to backup time required by application:



Initial Charging

The whole charge should preferably be carried out at constant current. The charging time is inversely proportional to the current which is set by the current limit of the charging equipment.

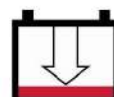
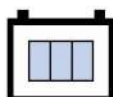
Recommended rates for the first charging: □ 0.2 C5A for 10 hours □ 0.1 C5A for 20 hours



NiCd Pocket Plate PT1.2FPM Range Electrical Specifications & Dimensions

Cell Type	Nominal Voltage (V)	Capacity (C5 Ah)	Dimensions (mm/inch)						Weight (kg/lb.)				Terminal	Cell Case Material
			Length		Width		Height		Without Electrolyte		With Electrolyte			
PT1.2FPM10	1.2	10	43	1.7	85	3.3	260	10.2	0.75	1.7	1.2	2.6	M10	PP
PT1.2FPM20	1.2	20	55	2.2	134	5.3	270	10.6	1.1	2.4	1.9	4.2	M10	PP
PT1.2FPM30	1.2	30	55	2.2	134	5.3	270	10.6	1.6	3.5	2.4	5.3	M10	PP
PT1.2FPM40	1.2	40	60	2.4	140	5.5	270	10.6	2.5	5.5	3.6	7.9	M10	PP
PT1.2FPM50	1.2	50	70	2.8	140	5.5	295	11.6	3	6.6	4.2	9.3	M16	PP
PT1.2FPM60	1.2	60	70	2.8	140	5.5	295	11.6	3.2	7.1	4.4	9.7	M16	PP
PT1.2FPM70	1.2	70	70	2.8	140	5.5	295	11.6	3.4	7.5	4.6	10.1	M16	PP
PT1.2FPM80	1.2	80	80	3.1	140	5.5	365	14.4	4.8	10.6	6.5	14.3	M16	PP
PT1.2FPM90	1.2	90	80	3.1	140	5.5	365	14.4	5.2	11.5	6.7	14.8	M16	PP
PT1.2FPM100	1.2	100	105	4.1	165	6.5	345	13.6	7	15.4	9.2	20.3	M20	PP
PT1.2FPM120	1.2	120	105	4.1	165	6.5	345	13.6	7.2	15.9	9.5	20.9	M20	PP
PT1.2FPM150	1.2	150	165	6.5	167	6.6	345	13.6	9.2	20.3	12.5	27.6	M20	PP
PT1.2FPM200	1.2	200	165	6.5	167	6.6	345	13.6	10.6	23.4	14	30.9	M20	PP
PT1.2FPM250	1.2	250	140	5.5	280	11.0	450	17.7	15.8	34.8	21.5	47.4	2 x M16	PP
PT1.2FPM300	1.2	300	140	5.5	280	11.0	450	17.7	16.5	36.4	22.5	49.6	2 x M16	PP
PT1.2FPM350	1.2	350	170	6.7	285	11.2	350	13.8	16.8	37.0	24	52.9	2 x M20	PP
PT1.2FPM400	1.2	400	175	6.9	285	11.2	500	19.7	23.6	51.9	32	70.4	2 x M20	PP
PT1.2FPM500	1.2	500	175	6.9	285	11.2	500	19.7	27.5	60.6	37	81.4	2 x M20	ABS
PT1.2FPM600	1.2	600	175	6.9	285	11.2	500	19.7	30	66.1	40	88.2	2 x M20	ABS
PT1.2FPM700	1.2	700	186	7.3	398	15.7	565	22.2	41	90.4	55	121	3 x M20	ABS
PT1.2FPM800	1.2	800	186	7.3	398	15.7	565	22.2	43	94.8	58	128	3 x M20	ABS
PT1.2FPM900	1.2	900	186	7.3	398	15.7	565	22.2	46	101	61	134	3 x M20	ABS
PT1.2FPM1000	1.2	1000	186	7.3	398	15.7	565	22.2	48	106	64	141	3 x M20	ABS
PT1.2FPM1100	1.2	1100	186	7.3	398	15.7	565	22.2	50	110	66	145	3 x M20	ABS

NiLE PT1.2FPM batteries fulfil all requirements specified by IEC publication 60623.
Transparent case optional.



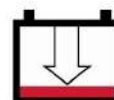
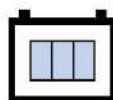
Discharge Data Table

Discharge performance data after fully charged by constant current according to IEC60623

Available amperes at +20°C ±5°C(+68°F ±9°F)

Final voltage: 1.14V/cell

Cell Type	Capacity (C5 Ah)	Discharge Time in Hours							Discharge Time in minutes							Time in Seconds		
		10	8	5	3	2	1.5	1	45	30	20	15	10	5	1	30	5	1
PT1.2FPM10	10	1.07	1.23	1.90	3.16	4.32	5.28	6.90	7.48	9.34	11.0	13.0	14.8	17.5	24.3	27.0	32.8	36.2
PT1.2FPM20	20	1.94	2.40	3.77	6.14	8.46	10.4	12.7	14.5	18.7	22.1	24.0	27.8	33.1	46.6	52.0	60.1	63.0
PT1.2FPM30	30	2.91	3.61	5.66	9.21	12.7	15.6	19.1	21.7	25.5	30.1	32.8	37.9	45.1	63.6	71.0	81.9	85.9
PT1.2FPM40	40	3.88	4.81	7.55	12.3	16.9	20.8	25.4	28.9	34.0	40.1	43.7	50.6	60.2	84.8	94.6	109	115
PT1.2FPM50	50	4.86	6.01	9.44	15.3	21.2	26.0	31.8	36.1	42.5	50.1	54.7	63.2	75.2	106	118	137	143
PT1.2FPM60	60	5.83	7.21	11.3	18.4	25.4	31.2	38.2	43.4	51.0	60.2	65.6	75.8	90.3	127	142	164	172
PT1.2FPM70	70	6.80	8.41	13.2	21.5	29.6	36.3	44.5	50.6	59.5	70.2	76.5	88.5	105	148	166	191	200
PT1.2FPM80	80	7.77	9.61	15.1	24.6	33.8	41.5	50.9	57.8	68.0	80.2	87.4	101	120	170	189	218	229
PT1.2FPM90	90	8.74	10.8	17.0	27.6	38.1	46.7	57.2	65.0	76.4	90.2	98.4	114	135	191	213	246	258
PT1.2FPM100	100	9.71	12.0	18.9	30.7	42.3	51.9	63.6	72.3	84.9	100	109	126	150	212	237	273	286
PT1.2FPM120	120	11.7	14.4	22.6	36.8	50.8	62.3	76.3	86.7	102	120	131	152	181	254	284	328	344
PT1.2FPM150	150	14.6	18.0	28.3	46.0	63.5	77.9	95.4	108	127	150	164	190	226	318	355	410	430
PT1.2FPM200	200	19.4	24.0	37.7	61.4	84.6	104	127	145	170	201	219	253	301	424	473	546	573
PT1.2FPM250	250	24.3	30.0	47.2	76.7	106	130	159	181	212	251	273	316	376	530	591	683	716
PT1.2FPM300	300	29.1	36.1	56.6	92.1	127	156	191	217	255	301	328	379	451	636	710	819	859
PT1.2FPM350	350	34.0	42.1	66.1	107	148	182	223	253	297	351	383	442	527	742	828	956	1002
PT1.2FPM400	400	38.8	48.1	75.5	123	169	208	254	289	340	401	437	506	602	848	946	1092	1145
PT1.2FPM500	500	48.6	60.1	94.4	153	212	260	318	361	425	501	547	632	752	1060	1183	1365	1432
PT1.2FPM600	600	58.3	72.1	113	184	254	312	382	434	510	602	656	758	903	1272	1419	1638	1718
PT1.2FPM700	700	68.0	84.1	132	215	296	363	445	506	595	702	765	885	1053	1483	1656	1911	2004
PT1.2FPM800	800	77.7	96.1	151	246	338	415	509	578	680	802	874	1011	1204	1695	1892	2184	2291
PT1.2FPM900	900	87.4	108	170	276	381	467	572	650	764	902	984	1138	1354	1907	2129	2457	2577
PT1.2FPM1000	1000	97.1	120	189	307	423	519	636	723	849	1003	1093	1264	1505	2119	2365	2730	2864
PT1.2FPM1100	1100	107	132	208	338	465	571	700	795	934	1103	1202	1390	1655	2331	2602	3003	3150



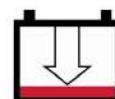
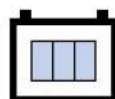
Discharge Data Table

Discharge performance data after fully charged by constant current according to IEC60623

Available amperes at +20°C ±5°C(+68°F ±9°F)

Final voltage: 1.10V/cell

Cell Type	Capacity (C5 Ah)	Discharge Time in Hours							Discharge Time in minutes							Time in Seconds		
		10	8	5	3	2	1.5	1	45	30	20	15	10	5	1	30	5	1
PT1.2FPM10	10	1.10	1.26	1.97	3.30	4.60	5.80	8.00	8.80	10.9	12.9	15.2	17.4	20.5	28.3	31.4	39.1	42.4
PT1.2FPM20	20	2.00	2.48	3.92	6.40	9.00	11.4	14.7	17.0	21.8	25.7	28.2	32.6	38.7	54.3	60.5	71.5	75.9
PT1.2FPM30	30	3.00	3.70	5.88	9.60	13.5	17.1	22.1	25.5	29.7	35.1	38.4	44.4	52.8	74.1	82.5	97.5	104
PT1.2FPM40	40	4.00	4.90	7.84	12.8	18.0	22.8	29.5	34.0	39.6	46.8	51.2	59.2	70.4	98.8	110	130	138
PT1.2FPM50	50	5.00	6.20	9.80	16.0	22.5	28.5	36.9	42.5	49.5	58.5	64.0	74.0	88.0	124	138	163	173
PT1.2FPM60	60	6.00	7.40	11.8	19.2	27.0	34.2	44.2	51.0	59.4	70.2	76.8	88.8	106	148	165	195	207
PT1.2FPM70	70	7.00	8.60	13.7	22.4	31.5	39.9	51.6	59.5	69.3	81.9	89.6	104	123	173	193	228	242
PT1.2FPM80	80	8.00	9.80	15.7	25.6	36.0	45.6	59.0	68.0	79.2	93.6	102	118	141	198	220	260	276
PT1.2FPM90	90	9.00	11.1	17.6	28.8	40.5	51.3	66.3	76.5	89.1	105	115	133	158	222	248	293	311
PT1.2FPM100	100	10.0	12.3	19.6	32.0	45.0	57.0	73.7	85.0	99.0	117	128	148	176	247	275	325	345
PT1.2FPM120	120	12.0	14.8	23.5	38.4	54.0	68.4	88.4	102	119	140	154	178	211	296	330	390	414
PT1.2FPM150	150	15.0	18.5	29.4	48.0	67.5	85.5	111	128	149	176	192	222	264	371	413	488	518
PT1.2FPM200	200	20.0	24.6	39.2	64.0	90.0	114	147	170	198	234	256	296	352	494	550	650	690
PT1.2FPM250	250	25.0	30.8	49.0	80.0	113	143	184	213	248	293	320	370	440	618	688	813	863
PT1.2FPM300	300	30.0	36.9	58.8	96.0	135	171	221	255	297	351	384	444	528	741	825	975	1035
PT1.2FPM350	350	35.0	43.1	68.6	112	158	200	258	298	347	410	448	518	616	865	963	1138	1208
PT1.2FPM400	400	40.0	49.2	78.4	128	180	228	295	340	396	468	512	592	704	988	1100	1300	1380
PT1.2FPM500	500	50.0	61.5	98.0	160	225	285	369	425	495	585	640	740	880	1235	1375	1625	1725
PT1.2FPM600	600	60.0	73.8	118	192	270	342	442	510	594	702	768	888	1056	1482	1650	1950	2070
PT1.2FPM700	700	70.0	86.1	137	224	315	399	516	595	693	819	896	1036	1232	1729	1925	2275	2415
PT1.2FPM800	800	80.0	98.4	157	256	360	456	590	680	792	936	1024	1184	1408	1976	2200	2600	2760
PT1.2FPM900	900	90.0	111	176	288	405	513	663	765	891	1053	1152	1332	1584	2223	2475	2925	3105
PT1.2FPM1000	1000	100	123	196	320	450	570	737	850	990	1170	1280	1480	1760	2470	2750	3250	3450
PT1.2FPM110	1100	110	135	216	352	495	627	811	935	1089	1287	1408	1628	1936	2717	3025	3575	3795



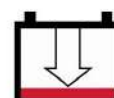
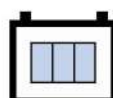
Discharge Data Table

Discharge performance data after fully charged by constant current according to IEC60623

Available amperes at +20°C ±5°C(+68°F ±9°F)

Final voltage: 1.05V/cell

Cell Type	Capacity (C5 Ah)	Discharge Time in Hours							Discharge Time in minutes							Time in Seconds		
		10	8	5	3	2	1.5	1	45	30	20	15	10	5	1	30	5	1
PT1.2FPM10	10	1.13	1.30	2.00	3.40	4.82	6.38	9.36	10.6	13.5	16.3	18.2	20.3	24.0	33.0	36.9	45.9	50.8
PT1.2FPM20	20	2.06	2.57	3.98	6.59	9.43	12.5	17.2	20.4	27.0	32.7	33.8	38.1	45.5	63.5	71.3	84.1	91.1
PT1.2FPM30	30	3.09	3.79	5.97	9.89	14.1	18.8	25.9	30.6	36.8	44.6	46.1	51.9	62.0	86.5	97.2	115	124
PT1.2FPM40	40	4.12	5.06	7.96	13.2	18.9	25.1	34.5	40.8	49.1	59.4	61.4	69.3	82.7	115	130	153	166
PT1.2FPM50	50	5.15	6.32	9.95	16.5	23.6	31.4	43.1	51.0	61.4	74.3	76.8	86.6	103	144	162	191	207
PT1.2FPM60	60	6.18	7.59	11.9	19.8	28.3	37.6	51.7	61.2	73.7	89.2	92.2	104	124	173	194	229	248
PT1.2FPM70	70	7.21	8.85	13.9	23.1	33.0	43.9	60.4	71.4	85.9	104	108	121	145	202	227	268	290
PT1.2FPM80	80	8.24	10.1	15.9	26.4	37.7	50.2	69.0	81.6	98.2	119	123	139	165	231	259	306	331
PT1.2FPM90	90	9.27	11.4	17.9	29.7	42.4	56.4	77.6	91.8	110	134	138	156	186	260	292	344	373
PT1.2FPM100	100	10.3	12.6	19.9	33.0	47.2	62.7	86.2	102	123	149	154	173	207	288	324	382	414
PT1.2FPM120	120	12.4	15.2	23.9	39.6	56.6	75.2	103	122	147	178	184	208	248	346	389	459	497
PT1.2FPM150	150	15.5	19.0	29.8	49.4	70.7	94.1	129	153	184	223	230	260	310	433	486	573	621
PT1.2FPM200	200	20.6	25.3	39.8	65.9	94.3	125	172	204	246	297	307	346	414	577	648	764	828
PT1.2FPM250	250	25.8	31.6	49.7	82.4	118	157	216	255	307	371	384	433	517	721	810	956	1035
PT1.2FPM300	300	30.9	37.9	59.7	98.9	141	188	259	306	368	446	461	519	620	865	972	1147	1242
PT1.2FPM350	350	36.1	44.3	69.6	115	165	219	302	357	430	520	538	606	724	1010	1134	1338	1449
PT1.2FPM400	400	41.2	50.6	79.6	132	189	251	345	408	491	594	614	693	827	1154	1296	1529	1656
PT1.2FPM500	500	51.5	63.2	99.5	165	236	314	431	510	614	743	768	866	1034	1442	1620	1911	2070
PT1.2FPM600	600	61.8	75.9	119	198	283	376	517	612	737	892	922	1039	1241	1731	1944	2293	2484
PT1.2FPM700	700	72.1	88.5	139	231	330	439	604	714	859	1040	1075	1212	1448	2019	2268	2675	2898
PT1.2FPM800	800	82.4	101	159	264	377	502	690	816	982	1189	1229	1385	1654	2308	2592	3058	3312
PT1.2FPM900	900	92.7	114	179	297	424	564	776	918	1105	1337	1382	1558	1861	2596	2916	3440	3726
PT1.2FPM1000	1000	103	126	199	330	472	627	862	1020	1228	1486	1536	1732	2068	2885	3240	3822	4140
PT1.2FPM1100	1100	113	139	219	363	519	690	949	1122	1350	1634	1690	1905	2275	3173	3563	4204	4554



Calculation Methods

Information required for battery capacity calculation

The following information needed for a precise battery capacity calculation:

- ☐ Nominal voltage of the system
- ☐ Load current required
- ☐ Backup time required
- ☐ Maximum voltage (for charging)
- ☐ Minimum voltage
- ☐ Temperature range
- ☐ Battery layout and available space
- ☐ Physical condition

Float Voltage Operation

In these conditions the float voltage, being the voltage at which the general load circuit will operate, then a decision will have to be reached on the cell float voltage needed to maintain the battery in the required condition.

$$\text{Number of cells required} = \frac{\text{Circuit voltage}}{\text{Cell Float voltage}} \quad \text{Minimum cell voltage} = \frac{\text{Minimum D.C. voltage}}{\text{Number of cells}}$$

The most commonly used float voltages are 1.40-1.48 voltage per cell, but the exact figure has to be related carefully to circumstances.

For Example

A NILE Nickel Cadmium battery is required to maintain an inverter load of 50KVA at 0.8 power factor for a backup time of 30 minutes, at 20~25°C temperature. The DC voltage to the inverter operates within the limit of 265 volts with the battery on float charge to a minimum of 202 volts at end of back up time. The inverter has an 85% efficiency rate.

-Number of Cells (at recommended float of 1.44VPC) = $265/1.44 \approx 184$ cells

-Minimum Cell Voltage = $202/184 \approx 1.10$ volts per cell

-Maximum Battery Current

$$= \frac{\text{Inverter load in KVA} \times \text{Power factor}}{\text{Min. cell voltage} \times \text{Number of cells} \times \text{Inverter efficiency}}$$

$$= \frac{50\text{KVA} \times 0.80}{1.10 \times 184 \times 0.85} = 232.5 \text{ Amps}$$

We shall choose the battery with capacity equal or just above 232.5Amps.

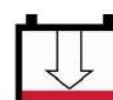
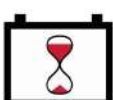
To meet the 30 minutes backup time requirement, we determine to choose the battery size from PT1.2FPM Range.

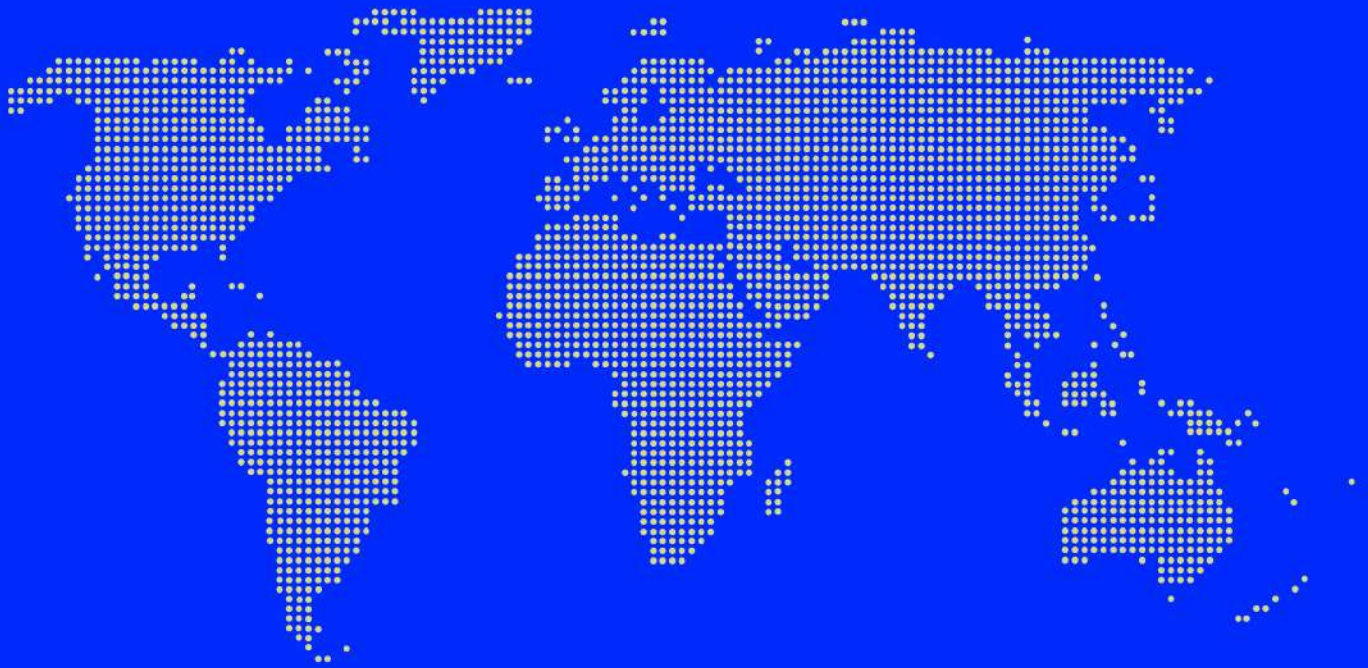
From our catalogue data, the cell type is PT1.2FPM300.

Battery shall comprise 184 cells of NILE Nickel Cadmium type PT1.2FPM300.

System Voltage	Number of Cells	Spread Range Number of Cells
24	20	18 ~ 21
36	30	27 ~ 31
48	40	36 ~ 41
110	92	88 ~ 93
220	184	180 ~ 186

The number of cells in a battery may be determined by simply dividing the nominal voltage of the system by the nominal voltage of a cell (1.2 Volts).





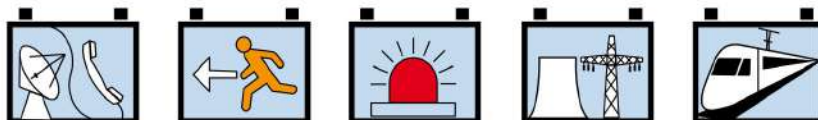
Guarantee

V4.0

NiCd Pocket Plate Range PT1.2FPH 10-500Ah



»Premium quality for
uninterrupted communication«



www.PlatinIran.com



NiCd Pocket Plate Range
PT1.2 FPH 10-500Ah

The block battery - for dependability

The wide range of low, medium and high capacity types makes accurate selection easy, based on discharge time and end of discharge voltage. Robust construction and generous electrolyte reserve enable the battery to withstand wide temperature fluctuations in stationary cycling behaviour over its 20+ years' life.

Built with a future Nickel-cadmium plates are completely reliable, with no risk of thermal runaway or sudden death.

Generally operating between temperatures of -40°C to +60°C (-4°F to +140°F), they can tolerate extremes of -50°C to +70°C (-58°F to +158°F) for short periods.

With only periodic checks, the block battery will provide up to 20+ years' completely faithful service.

Trouble-free long cycle life

The NILE nickel-cadmium block battery's unique electrochemistry enables it to regularly withstand any depth of discharge.

Following a deep discharge the block battery is designed to recharge very quickly and economically, using standard single or two-level charging equipment.

Be sure of a low overall cost

The Ni-Cd block battery is the most highly cost-efficient solution to stored power requirements.

- ☐ No downtime
- ☐ No replacement costs
- ☐ Minimal maintenance
- ☐ Ease of installation
- ☐ 20+ years' operating life

Easy storage and installation

Nickel-cadmium block batteries are quick and easy to install as original equipment and may be stored for many years in a discharged state under correct conditions.

On installation a simple bolted connector enables the battery to be rapidly commissioned.

Assured reliability

Ni-Cd is equally dependable in controlled city environments or harsh, unpredictable conditions in the world's most remote and unpopulated areas.

The Ni-Cd battery's block construction makes it highly resistant to electrical abuse and transport over rough terrain, precluding risk of subsequent failure.

Optimized for performance:

An electrolyte solution of potassium hydroxide and a small amount of lithium hydroxide acts only as an ion transfer medium, delivering optimum performance without causing base material degradation.

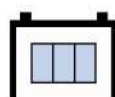
Good reserves and circulation of the electrolyte are achieved by a wide inter-plate space.

Injection moulded plastic grids both separate plate and insulate plate edges. For extremely low temperatures a special high density electrolyte is available.

The block battery is fitted with a specially designed flame arresting flip top vent and does not produce corrosive vapours. The tough polypropylene casing ensures the battery's structural integrity throughout its long life.

Supports these Single Cell ranges with:

- ☐ Quality approved manufacture to ISO 9001 and the TUV certification.
- ☐ Single Cell batteries have been developed in line with the safety requirements of EN-50272-2 and components used (such as insulated cable connectors and end lug covers) are defined to ensure high protection against electric shocks (Ip2 level).
- ☐ Full recycling service to protect the environment.



Protective cover

- To prevent external short-circuits
- In line with EN 50272-2 (safety) with ip2 level

Plate group bus

- Connects the plate tabs with the terminal post.
- Plate tabs and terminal post are projection-welded to the plate group bus.

Plate

Horizontal pockets of double-perforated steel strips.

Cell container

Material: translucent/transparent polypropylene

Flame-arresting vents
Material: polypropylene.

Plate tab

Spot-welded both to the plate side-frames and to the upper edge of the pocket plate.

Separating grids

- These separate the plates and insulate the plate frames from each other.
- The grids allow free circulation of electrolyte between the plates.

Plate frame

Seals the plate pockets and serves as a current collector.

The NILE Single Cell ranges fully comply and exceed the IEC 60623 standard requirements.

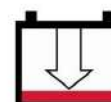
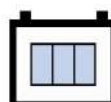
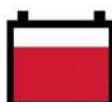
Application

PT1.2FPH Series cadmium batteries are designed for general industrial applications where absolute reliability is a necessity. Service-proven pocket-plate technology ensures long uninterrupted battery life without the risk of sudden loss of power.

PT1.2FPH Series batteries are suitable for high discharge rate applications (30 minutes and below) such as switchgear tripping, diesel engine starting, UPS, etc.

Performance Data

- ☐ High tolerance to electrical abuses such as overcharge and over discharge.
- ☐ High tolerance to rough handling and mechanical abuse due to strong components and robust construction.
- ☐ Trouble-free long cycle life.
- ☐ No risk of sudden death due to the chemistry and the cell structure.
- ☐ Wide operating temperature: -40°C to 60°C.
- ☐ Generous electrolyte reserve for long maintenance intervals.
- ☐ Clear (MBS) or translucent (PP) plastic cell case for easy electrolyte level inspection.
- ☐ Plastic grid spacers eliminate separator deterioration problem.
- ☐ Custom cell dimensions available.
- ☐ 20+ years service life in stationary applications.
- ☐ Conforms to IEC60623.



Battery Charging

It is recommended to use Constant Voltage method of charging for Nickel Cadmium Batteries, usually with current limitation to C/5 or C/10. Charging voltages must be regularly checked. To optimize the battery performance, it is necessary to ensure that the voltage is kept within the following limits:

Batteries can be charged in:

- ♦ **constant voltage mode with load connected**
or
- ♦ **constant current or declining current mode when load is isolated.**

High rate or over charge will not damage the battery.

Minimum float charging current: 2 mA per Ah.

- ♦ **Constant voltage mode:**

For continuous parallel operation:

- Float voltage: 1.40 - 1.45 V/cell for PT1.2FPL,
PT1.2FPM & PT1.2FPH
- Boost Voltage:
PT1.2FPL : 1.60 - 1.70 V/cell
PT1.2FPM : 1.60 - 1.65 V/cell
PT1.2FPH : 1.60 - 1.65 V/cell

A higher voltage will reduce the charge duration and increase the efficiency of recharging but may increase water consumption.

Single stage charging (without boost):

PT1.2FPL : 1.47 - 1.50 V/cell
PT1.2FPM : 1.46 - 1.49 V/cell
PT1.2FPH : 1.45 - 1.48 V/cell

For starting application:

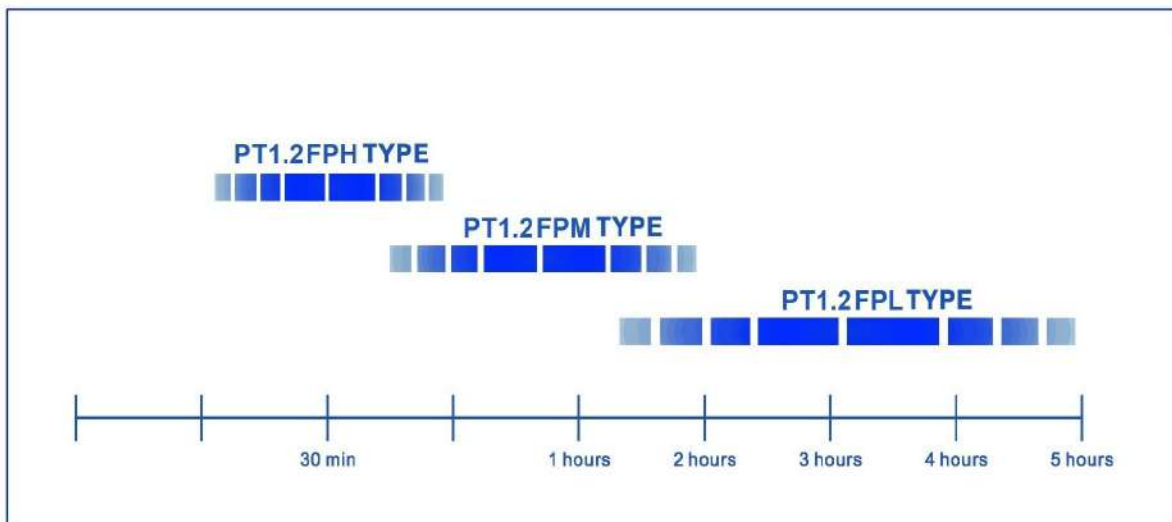
- Recommended charging voltage. 1.50 - 1.55 V/cell.

- ♦ **Constant current mode:**

- Normal charging: 0.2 C5 A for 8 hours
- Recommended for quick charging: 0.4 C5 A for 2.5 hours followed by 0.2 C5 A for 2.5 hours

Recommended Type Selection

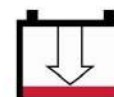
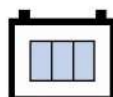
According to backup time required by application:



Initial Charging

The whole charge should preferably be carried out at constant current. The charging time is inversely proportional to the current which is set by the current limit of the charging equipment.

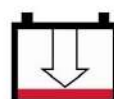
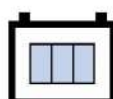
Recommended rates for the first charging: □ 0.2 C5A for 10 hours □ 0.1 C5A for 20 hours



NiCd Pocket Plate PT1.2FPH Range Electrical Specifications & Dimensions

Cell Type	Nominal Voltage (V)	Capacity (C5 Ah)	Dimensions (mm/inch)						Weight (kg/lb.)				Terminal	Cell Case Material
			Length		Width		Height		Without Electrolyte		With Electrolyte			
PT1.2 FPH10	1.2	10	55	2.2	134	5.3	270	10.6	1.2	2.6	2.2	4.8	M10	PP
PT1.2 FPH20	1.2	20	55	2.2	134	5.3	270	10.6	1.7	3.7	2.6	5.7	M10	PP
PT1.2 FPH30	1.2	30	70	2.8	140	5.5	295	11.6	2.8	6.2	4.3	9.5	M16	PP
PT1.2 FPH40	1.2	40	80	3.1	140	5.5	365	14.4	4.2	9.3	6	13.2	M16	PP
PT1.2 FPH50	1.2	50	80	3.1	140	5.5	365	14.4	4.5	9.9	6.2	13.7	M16	PP
PT1.2 FPH60	1.2	60	80	3.1	140	5.5	365	14.4	4.8	10.6	6.5	14.3	M16	PP
PT1.2 FPH70	1.2	70	105	4.1	165	6.5	345	13.6	6.8	15.0	9.2	20.3	M20	PP
PT1.2 FPH80	1.2	80	105	4.1	165	6.5	345	13.6	7.2	15.9	9.6	21.2	M20	PP
PT1.2 FPH90	1.2	90	105	4.1	165	6.5	345	13.6	7.8	17.2	10	22.0	M20	PP
PT1.2 FPH100	1.2	100	165	6.5	167	6.6	345	13.6	9.2	20.3	13.5	29.8	M20	PP
PT1.2 FPH120	1.2	120	165	6.5	167	6.6	345	13.6	9.8	21.6	14	30.9	M20	PP
PT1.2 FPH150	1.2	150	165	6.5	167	6.6	345	13.6	11	24.2	16	35.3	M20	PP
PT1.2 FPH200	1.2	200	170	6.7	285	11.2	350	13.8	18.5	40.8	26	57.3	2 x M20	ABS
PT1.2 FPH250	1.2	250	170	6.7	285	11.2	350	13.8	20	44.1	27.5	60.6	2 x M20	ABS
PT1.2 FPH300	1.2	300	175	6.9	290	11.4	500	19.7	25	55.1	36	79.3	2 x M20	ABS
PT1.2 FPH350	1.2	350	175	6.9	290	11.4	500	19.7	26	57.3	37	81.5	2 x M20	ABS
PT1.2 FPH400	1.2	400	186	7.3	398	15.7	565	22.2	41	90.4	55	121	3 x M20	ABS
PT1.2 FPH500	1.2	500	186	7.3	398	15.7	565	22.2	43	94.8	57	126	3 x M20	ABS

NiLE PT1.2FPH batteries fulfil all requirements specified by IEC publication 60623.
Transparent case optional.



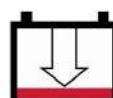
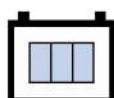
Discharge Data Table

Discharge performance data after fully charged by constant current according to IEC60623

Available amperes at +20°C ±5°C(+68°F ±9°F)

Final voltage: 1.14V/cell

Cell Type	Capacity (C5 Ah)	Discharge Time in Hours							Discharge Time in minutes							Time in Seconds		
		10	8	5	3	2	1.5	1	45	30	20	15	10	5	1	30	5	1
PT1.2 FPH10	10	1.00	1.18	1.87	3.05	4.45	5.83	8.16	9.14	12.0	14.7	16.8	19.7	25.2	39.6	46.2	57.3	68.8
PT1.2 FPH20	20	2.01	2.36	3.74	6.12	8.95	11.7	16.5	18.5	24.7	30.2	34.4	37.0	51.1	80.3	93.0	118	124
PT1.2 FPH30	30	3.01	3.54	5.61	9.18	13.4	17.5	24.8	27.8	37.0	45.3	51.6	56.5	76.6	120	140	177	187
PT1.2 FPH40	40	4.02	4.72	7.48	12.2	17.9	23.3	33.1	37.0	49.4	60.4	68.8	76.0	102	161	186	237	249
PT1.2 FPH50	50	5.02	5.91	9.35	15.3	22.4	29.2	41.3	46.3	61.7	75.5	86.0	95.5	128	201	232	296	311
PT1.2 FPH60	60	6.02	7.09	11.2	18.4	26.8	35.1	49.6	55.5	74.1	90.6	103	115	153	241	279	355	373
PT1.2 FPH70	70	7.03	8.27	13.1	21.4	31.4	40.9	57.8	64.8	86.4	106	120	135	179	281	325	414	435
PT1.2 FPH80	80	8.03	9.45	14.9	24.4	35.8	46.8	66.1	74.0	98.7	121	138	154	204	321	372	473	498
PT1.2 FPH90	90	9.04	10.6	16.8	27.6	40.3	52.6	74.4	83.3	112	136	155	172	230	361	418	533	559
PT1.2 FPH100	100	10.1	11.9	18.7	30.6	44.7	58.5	82.6	92.6	124	151	172	191	255	401	465	591	621
PT1.2 FPH120	120	12.0	14.2	22.4	36.8	53.7	70.1	99.2	111	148	182	206	230	307	482	558	710	745
PT1.2 FPH150	150	15.1	17.8	28.0	45.9	67.2	87.7	124	139	185	226	258	306	383	603	698	888	932
PT1.2 FPH200	200	20.1	23.6	37.4	61.2	89.5	117	165	185	247	302	344	382	511	804	930	1183	1243
PT1.2 FPH250	250	25.1	29.5	46.7	76.5	111	146	207	232	309	377	430	517	638	1005	1162	1479	1553
PT1.2 FPH300	300	30.1	35.5	56.1	91.8	134	175	248	277	371	453	516	573	766	1206	1395	1774	1864
PT1.2 FPH350	350	35.2	41.4	65.4	107	156	204	289	324	432	529	602	688	894	1406	1628	2071	2175
PT1.2 FPH400	400	40.2	47.3	74.7	122	179	234	330	370	494	604	688	766	1022	1607	1860	2366	2486
PT1.2 FPH500	500	50.2	59.0	93.4	153	224	292	413	463	617	755	860	957	1278	2010	2325	2958	3107



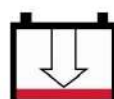
Discharge Data Table

Discharge performance data after fully charged by constant current according to IEC60623

Available amperes at +20°C ±5°C(+68°F ±9°F)

Final voltage: 1.10V/cell

Cell Type	Capacity (C5 Ah)	Discharge Time in Hours							Discharge Time in minutes							Time in Seconds		
		10	8	5	3	2	1.5	1	45	30	20	15	10	5	1	30	5	1
PT1.2 FPH10	10	1.01	1.22	1.93	3.18	4.67	6.11	8.69	10.4	14.2	17.4	19.8	23.5	29.7	46.0	53.6	69.1	72.7
PT1.2 FPH20	20	2.04	2.45	3.88	6.37	9.36	12.2	17.5	21.1	29.2	35.8	40.8	48.2	60.7	93.8	108	136	151
PT1.2 FPH30	30	3.06	3.67	5.82	9.55	14.0	18.4	26.3	31.6	43.9	53.7	61.2	72.3	91.0	141	163	203	228
PT1.2 FPH40	40	4.07	4.89	7.76	12.7	18.7	24.4	35.1	42.1	58.5	71.6	81.6	96.4	121	188	217	271	304
PT1.2 FPH50	50	5.09	6.11	9.70	15.9	23.4	30.6	43.9	52.7	73.2	89.5	102	121	152	234	271	339	379
PT1.2 FPH60	60	6.11	7.33	11.6	19.1	28.0	36.8	52.7	63.2	87.8	107	122	144	182	282	326	407	456
PT1.2 FPH70	70	7.13	8.56	13.5	22.2	32.7	42.8	61.5	73.8	102	125	142	169	212	328	379	474	532
PT1.2 FPH80	80	8.15	9.78	15.5	25.5	37.4	49.0	70.3	84.3	117	143	164	192	243	375	434	542	607
PT1.2 FPH90	90	9.12	10.9	17.5	28.6	42.0	55.1	79.1	94.9	132	161	184	217	273	422	488	610	683
PT1.2 FPH100	100	10.2	12.3	19.4	31.8	46.8	61.2	87.9	105	146	179	204	240	303	469	542	677	760
PT1.2 FPH120	120	12.2	14.7	23.3	38.2	56.1	73.4	106	127	176	215	245	289	364	562	650	813	911
PT1.2 FPH150	150	15.3	18.3	29.0	47.8	70.2	91.7	132	159	220	268	306	362	455	704	813	1016	1139
PT1.2 FPH200	200	20.4	24.4	38.8	63.6	93.5	123	176	211	293	358	408	482	606	938	1085	1354	1518
PT1.2 FPH250	250	25.5	30.6	48.5	79.6	117	153	220	264	366	447	511	602	758	1173	1356	1693	1898
PT1.2 FPH300	300	30.6	36.7	58.1	95.4	140	183	264	317	439	537	612	722	910	1407	1626	2031	2278
PT1.2 FPH350	350	35.6	42.8	67.9	111	163	214	307	369	513	626	715	842	1061	1641	1897	2371	2657
PT1.2 FPH400	400	40.8	48.9	77.6	127	187	245	352	422	586	715	816	963	1213	1875	2168	2709	3036
PT1.2 FPH500	500	50.9	61.1	97.0	159	233	306	439	527	732	895	1021	1204	1515	2344	2710	3386	3796



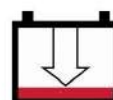
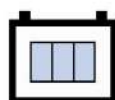
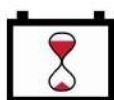
Discharge Data Table

Discharge performance data after fully charged by constant current according to IEC60623

Available amperes at +20°C ±5°C(+68°F ±9°F)

Final voltage: 1.05V/cell

Cell Type	Capacity (C5 Ah)	Discharge Time in Hours							Discharge Time in minutes							Time in Seconds		
		10	8	5	3	2	1.5	1	45	30	20	15	10	5	1	30	5	1
PT1.2 FPH10	10	1.03	1.25	2.00	3.27	4.83	6.4	9.3	11.0	16.5	20.8	23.6	27.9	35.3	54.4	63.9	78.8	85.9
PT1.2 FPH20	20	2.08	2.51	3.98	6.55	9.67	12.8	18.6	22.1	33.3	43.1	48.7	57.7	72.5	112	127	145	171
PT1.2 FPH30	30	3.12	3.76	5.97	9.82	14.5	19.2	27.9	33.2	49.9	64.6	73.1	86.5	109	167	191	221	257
PT1.2 FPH40	40	4.16	5.01	7.96	13.1	19.4	25.6	37.1	44.3	66.5	86.1	97.5	115	145	223	255	297	344
PT1.2 FPH50	50	5.19	6.27	9.95	16.4	24.2	32.1	46.4	55.3	83.2	107	122	145	181	279	317	373	430
PT1.2 FPH60	60	6.23	7.52	11.9	19.6	29.1	38.4	56.0	66.4	99.6	129	146	173	218	334	381	450	515
PT1.2 FPH70	70	7.27	8.77	13.9	23.0	33.9	44.5	65.2	77.5	117	151	171	202	254	391	445	526	601
PT1.2 FPH80	80	8.31	10.0	16.0	26.2	38.7	51.6	74.4	88.6	133	172	195	230	290	446	509	602	687
PT1.2 FPH90	90	9.31	11.3	17.9	29.4	43.6	57.4	83.5	100	150	194	219	260	327	501	572	671	772
PT1.2 FPH100	100	10.4	12.6	19.9	32.8	48.3	64.5	92.6	111	167	215	244	288	362	558	636	747	858
PT1.2 FPH120	120	12.5	15.0	23.8	39.2	58.0	76.8	111	133	199	258	293	346	435	669	763	899	1030
PT1.2 FPH150	150	15.6	18.8	29.8	49.1	72.6	96.5	139	167	249	323	365	433	544	836	954	1196	1288
PT1.2 FPH200	200	20.8	25.0	39.8	65.4	96.8	128	185	222	333	430	487	577	725	1115	1272	1494	1716
PT1.2 FPH250	250	26.0	31.3	49.7	81.8	121	161	232	277	416	538	609	721	906	1394	1590	2020	2147
PT1.2 FPH300	300	31.2	37.6	59.7	98.2	145	193	279	333	500	645	731	865	1088	1673	1908	2241	2576
PT1.2 FPH350	350	36.3	43.9	69.6	114.2	169	225	325	387	583	753	853	1009	1269	1952	2225	2690	3005
PT1.2 FPH400	400	41.6	50.1	79.6	130.6	193	256	372	443	665	861	975	1153	1450	2231	2543	2995	3434
PT1.2 FPH500	500	51.9	62.6	99.5	163.5	242	321	464	554	832	1076	1218	1442	1813	2789	3179	3742	4292



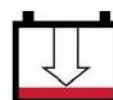
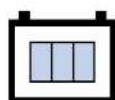
Discharge Data Table

Discharge performance data after fully charged by constant current according to IEC60623

Available amperes at +20°C ±5°C(+68°F ±9°F)

Final voltage: 1.00V/cell

Cell Type	Capacity (C5 Ah)	Discharge Time in Hours							Discharge Time in minutes							Time in Seconds		
		10	8	5	3	2	1.5	1	45	30	20	15	10	5	1	30	5	1
PT1.2 FPH10	10	1.05	1.27	2.02	3.32	5.0	6.55	9.59	11.2	17.3	23.3	27.2	32.1	41.1	64.2	72.4	91.7	98.4
PT1.2 FPH20	20	2.11	2.53	4.04	6.64	10.0	13.1	19.2	22.5	35.1	47.8	56.1	66.6	84.8	128	146	184	203
PT1.2 FPH30	30	3.17	3.79	6.06	10.0	15.0	19.6	28.8	33.8	52.7	71.7	84.1	99.7	127	192	218	275	305
PT1.2 FPH40	40	4.22	5.06	8.08	13.3	19.9	26.3	38.4	45.0	70.2	95.6	112	133	170	255	291	367	406
PT1.2 FPH50	50	5.27	6.32	10.1	16.6	24.9	32.8	48.0	56.3	87.7	120	140	166	212	319	364	458	508
PT1.2 FPH60	60	6.33	7.58	12.1	19.9	29.9	39.3	57.6	67.9	106	144	168	200	255	383	437	550	610
PT1.2 FPH70	70	7.38	8.84	14.1	23.3	34.9	45.9	67.1	79.0	123	167	196	233	297	446	510	641	712
PT1.2 FPH80	80	8.44	10.1	16.2	26.6	39.9	52.5	76.6	90.1	140	191	224	266	339	511	582	734	813
PT1.2 FPH90	90	9.48	11.4	18.2	30.0	44.8	59.0	86.3	101	158	215	252	299	381	574	655	825	915
PT1.2 FPH100	100	10.6	12.7	20.2	33.2	49.8	65.6	95.9	112	176	239	281	332	424	638	728	917	1017
PT1.2 FPH120	120	12.6	15.2	24.2	39.9	59.7	78.7	115	135	211	287	336	399	509	766	874	1101	1219
PT1.2 FPH150	150	15.8	18.9	30.3	49.9	74.6	98.4	144	169	263	358	420	499	636	957	1092	1375	1525
PT1.2 FPH200	200	21.1	25.3	40.4	66.5	99.5	131	192	225	351	478	560	665	848	1277	1457	1834	2033
PT1.2 FPH250	250	26.4	31.5	50.5	83.1	124	164	240	281	439	598	701	832	1060	1595	1821	2293	2541
PT1.2 FPH300	300	31.7	37.9	60.6	99.7	149	197	287	338	527	717	841	997	1272	1914	2185	2752	3049
PT1.2 FPH350	350	36.9	44.2	70.7	116	174	230	336	393	615	836	980	1164	1484	2233	2549	3210	3557
PT1.2 FPH400	400	42.1	50.5	80.8	133	199	263	383	450	702	956	1121	1330	1696	2553	2913	3669	4065
PT1.2 FPH500	500	52.7	63.2	101	167	249	328	479	563	878	1195	1401	1662	2121	3191	3641	4586	5081



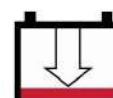
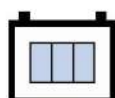
Discharge Data Table

Discharge performance data after fully charged by constant current according to IEC60623

Available amperes at +20°C ±5°C(+68°F ±9°F)

Final voltage: 0.85V/cell

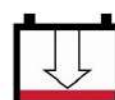
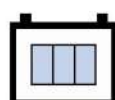
Cell Type	Capacity (C5 Ah)	Discharge Time in Seconds					
		90	60	30	10	5	1
PT1.2 FPH10	10	94	102	116	131	141	153
PT1.2 FPH20	20	189	205	228	261	284	308
PT1.2 FPH30	30	284	308	343	393	425	461
PT1.2 FPH40	40	376	409	457	524	566	615
PT1.2 FPH50	50	471	512	572	655	708	768
PT1.2 FPH60	60	565	614	685	785	850	921
PT1.2 FPH70	70	660	715	800	916	991	1076
PT1.2 FPH80	80	754	817	913	1047	1133	1229
PT1.2 FPH90	90	847	920	1028	1178	1275	1383
PT1.2 FPH100	100	941	1022	1142	1309	1416	1536
PT1.2 FPH120	120	1130	1226	1362	1571	1699	1844
PT1.2 FPH150	150	1414	1534	1713	1964	2124	2305
PT1.2 FPH200	200	1897	2004	2285	2619	2831	3073
PT1.2 FPH250	250	2355	2556	2856	3272	3540	3841
PT1.2 FPH300	300	2825	3066	3427	3927	4248	4608
PT1.2 FPH350	350	3297	3577	3975	4582	4957	5376
PT1.2 FPH400	400	3794	4088	4569	5236	5664	6145
PT1.2 FPH500	500	4708	5110	5710	6546	7080	7681



Discharge Data Table

Discharge performance data after fully charged by constant current according to IEC60623

Cell Type	Capacity (C5 Ah)	Discharge Time in Seconds					
		90	60	30	10	5	1
PT1.2 FPH10	10	94	103	110	133	146	158
PT1.2 FPH20	20	187	206	221	265	291	316
PT1.2 FPH30	30	281	310	331	398	437	474
PT1.2 FPH40	40	374	413	441	530	583	631
PT1.2 FPH50	50	469	516	552	663	729	789
PT1.2 FPH60	60	562	619	662	795	874	947
PT1.2 FPH70	70	656	723	772	928	1020	1105
PT1.2 FPH80	80	749	826	882	1061	1166	1263
PT1.2 FPH90	90	842	929	993	1193	1311	1421
PT1.2 FPH100	100	936	1032	1103	1326	1457	1579
PT1.2 FPH120	120	1123	1239	1324	1591	1749	1894
PT1.2 FPH150	150	1405	1548	1655	1989	2186	2368
PT1.2 FPH200	200	1872	2064	2206	2651	2915	3157
PT1.2 FPH250	250	2341	2581	2758	3314	3643	3947
PT1.2 FPH300	300	2808	3097	3309	3977	4372	4736
PT1.2 FPH350	350	3277	3613	3861	4640	5100	5526
PT1.2 FPH400	400	3744	4129	4412	5303	5829	6315
PT1.2 FPH500	500	4681	5161	5515	6629	7286	7894



Calculation Methods

Information required for battery capacity calculation

The following information needed for a precise battery capacity calculation:

- ☐ Nominal voltage of the system
- ☐ Load current required
- ☐ Backup time required
- ☐ Maximum voltage (for charging)
- ☐ Minimum voltage
- ☐ Temperature range
- ☐ Battery layout and available space
- ☐ Physical condition

Float Voltage Operation

In these conditions the float voltage, being the voltage at which the general load circuit will operate, then a decision will have to be reached on the cell float voltage needed to maintain the battery in the required condition.

$$\text{Number of cells required} = \frac{\text{Circuit voltage}}{\text{Cell Float voltage}} \quad \text{Minimum cell voltage} = \frac{\text{Minimum D.C. voltage}}{\text{Number of cells}}$$

The most commonly used float voltages are 1.40-1.48 voltage per cell, but the exact figure has to be related carefully to circumstances.

For Example

A NILE Nickel Cadmium battery is required to maintain an inverter load of 50KVA at 0.8 power factor for a backup time up time of 30 minutes, at 20~25°C temperature. The DC voltage to the inverter operates within the limit of 265 volts with the battery on float charge to a minimum of 202 volts at end of back up time. The inverter has an 85% efficiency rate.

-Number of Cells (at recommended float of 1.44VPC) = $265/1.44 \approx 184$ cells

-Minimum Cell Voltage = $202/184 \approx 1.10$ volts per cell

-Maximum Battery Current

$$= \frac{\text{Inverter load in KVA} \times \text{Power factor}}{\text{Min. cell voltage} \times \text{Number of cells} \times \text{Inverter efficiency}}$$

$$= \frac{50\text{KVA} \times 0.80}{1.10 \times 184 \times 0.85} = 232.5 \text{ Amps}$$

We shall choose the battery with capacity equal or just above 232.5Amps.

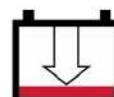
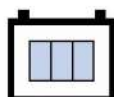
To meet the 30 minutes backup time requirement, we determine to choose the battery size from PT1.2FPL Range.

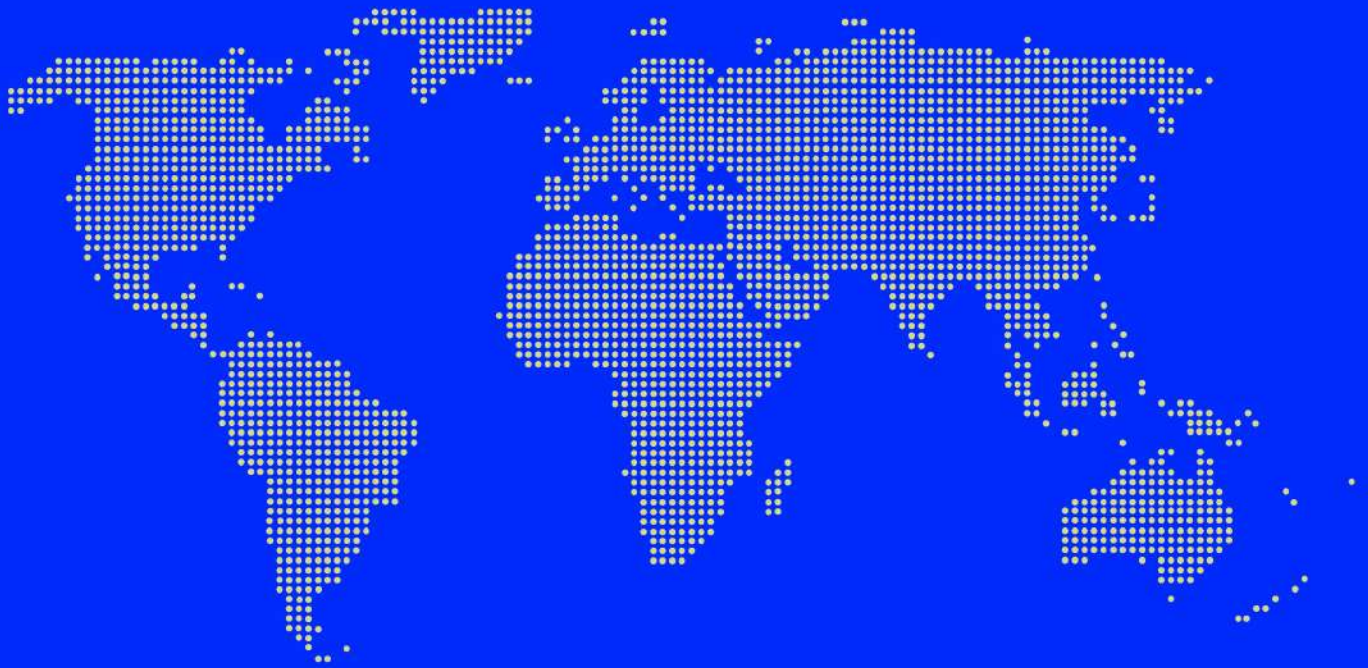
From our catalogue data, the cell type is PT1.2FPH300.

Battery shall comprise 184 cells of NILE Nickel Cadmium type PT1.2FPH300.

System Voltage	Number of Cells	Spread Range Number of Cells
24	20	18 ~ 21
36	30	27 ~ 31
48	40	36 ~ 41
110	92	88 ~ 93
220	184	180 ~ 186

The number of cells in a battery may be determined by simply dividing the nominal voltage of the system by the nominal voltage of a cell (1.2 Volts).



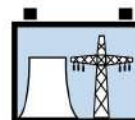


Guarantee

Sealed NiCd - Low Maintenance
PT1.2SPL Pocket plate Range
10-1200Ah



*»Premium quality for
uninterrupted communication«*





Sealed NiCd - Low Maintenance PT1.2SPL Pocket plate Range 10-1200Ah

This series of rechargeable battery is specially designed and developed for various operation environment conditions. Which not only has the characteristic of traditional batteries, but also the advantage of maintenance ultra-low. It is especially applied to electric power, telecommunication, railway, metallurgy, mining, lighting, UPS power supply and other devices as standby power supply, diesel engine and direct motor as starting power supply, and transportation tools as direct power supply.

Low maintenance

The rechargeable battery adopts "valve-regulated vent plug technology", therefore, the water consumption is low, the electrolyte is rich.

Within service life, the battery top up time up to 3~5 years due to NILE excellent valve-regulated.

High reliability

The positive and the negative plates of the battery adopt pocket type plates and pasted plates of high mechanical strength, and the container adopts semi-transparent engineering plastic materials of anti-impact and anti-aging. The container and the lid are welded together by intelligent heat welding machine, which is assuring the sealed structure reliability of battery.

The battery has the capability of over-charge, over-discharge and short circuit resistance, which can be installed on the present electric power systems of the customers.

High performance

The battery adopts the optimized design, which can produce high performance battery, and can be applied under the temperature of $-50^{\circ}\text{C}\sim 70^{\circ}\text{C}$ ($58^{\circ}\text{F}\sim 158^{\circ}\text{F}$).

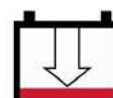
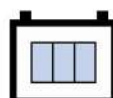
The service life can be more than 20 years according to the recommended maintenance and operation methods.

Applications

Valve-regulated vent plug with low pressure and fire prevention is installed on the battery. If its internal pressure is beyond the safety value, the hydrogen and the oxygen not combined by the negative pole are released through the valve of valve-regulated vent plug and the normal operating pressure is 0.2 bar; when the pressure falls below the releasing pressure, the valve of valve-regulated vent plug will re-close to prevent air entering, avoiding carbonization of the electrolyte.

High float-charge efficiency

The battery adopts high performance positive and negative active materials, improving the charging efficiency of positive and negative electrodes, reducing the float-charge voltage of the battery, under the lower float charge voltage; The consumes capacity of the battery will be highly recovered. After being float charged for 16h by 1.41V/cell $\pm 0.01\text{V/cell}$, the battery can be discharged by 80% of the rated capacity.



Protective cover

- To prevent external short-circuits
- In line with EN 50272-2 (safety) with ip2 level

Plate group bus

- Connects the plate tabs with the terminal post.
- Plate tabs and terminal post are projection-welded to the plate group bus.

Plate

Horizontal pockets of double-perforated steel strips.

Cell container

Material: translucent/transparent polypropylene

Flame-arresting vents

Material: polypropylene.

Plate tab

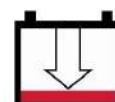
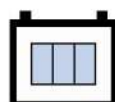
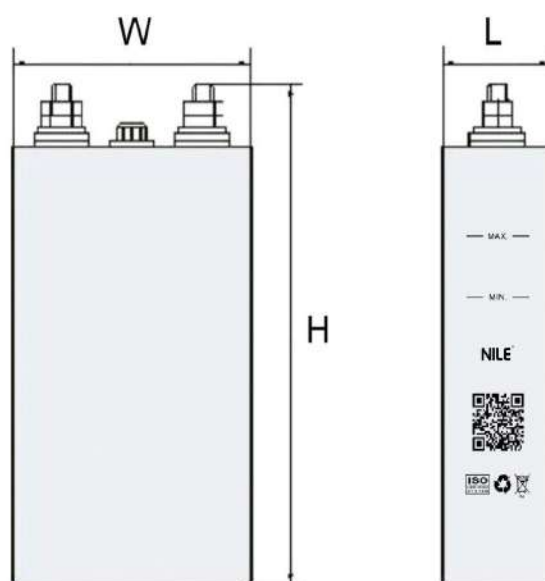
Spot-welded both to the plate side-frames and to the upper edge of the pocket plate.

Separating grids

- These separate the plates and insulate the plate frames from each other.
- The grids allow free circulation of electrolyte between the plates.

Plate frame

Seals the plate pockets and serves as a current collector.



Battery Charging

It is recommended to use Constant Voltage method of charging for Nickel Cadmium Batteries, usually with current limitation to C/5 or C/10. Charging voltages must be regularly checked. To optimize the battery performance, it is necessary to ensure that the voltage is kept within the following limits:

Batteries can be charged in:

- ◆ **constant voltage mode with load connected**
- or
- ◆ **constant current or declining current mode when load is isolated.**

High rate or over charge will not damage the battery.

Minimum float charging current: 2 mA per Ah.

◆ Constant voltage mode:

For continuous parallel operation:

- Float voltage: 1.40 - 1.45 V/cell for PT1.2SPL, PT1.2SPM & PT1.2SPH
- Boost Voltage:
 - PT1.2SPL : 1.60 - 1.70 V/cell
 - PT1.2SPM : 1.60 - 1.65 V/cell
 - PT1.2SPH : 1.60 - 1.65 V/cell

A higher voltage will reduce the charge duration and increase the efficiency of recharging but may increase water consumption.

Single stage charging (without boost):

PT1.2SPL : 1.47 - 1.50 V/cell
PT1.2SPM : 1.46 - 1.49 V/cell
PT1.2SPH : 1.45 - 1.48 V/cell

For starting application:

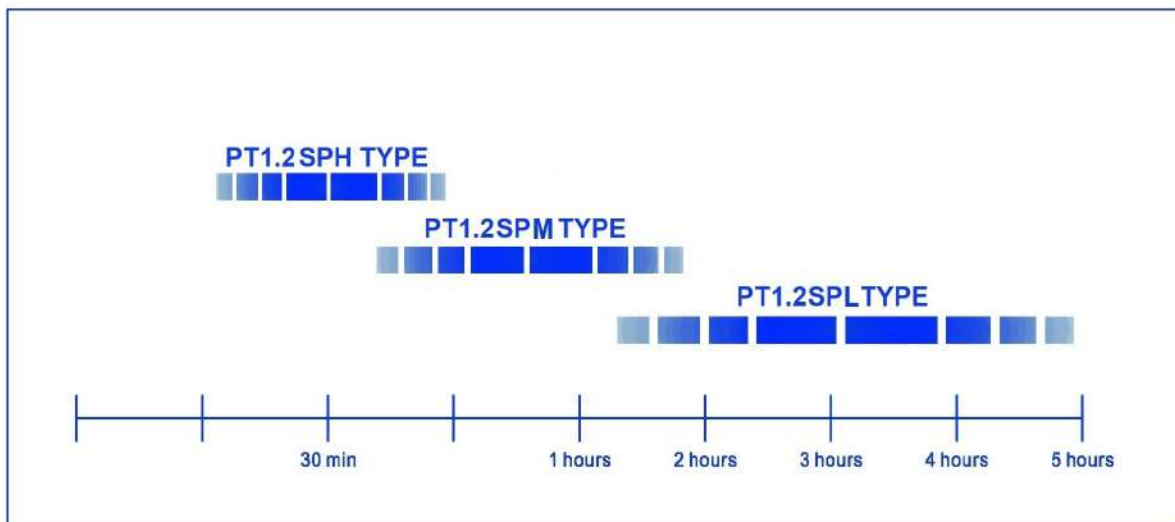
- Recommended charging voltage. 1.50 - 1.55 V/cell.

◆ Constant current mode:

- Normal charging: 0.2 C5 A for 8 hours
- Recommended for quick charging: 0.4 C5 A for 2.5 hours followed by 0.2 C5 A for 2.5 hours

Recommended Type Selection

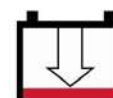
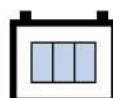
According to backup time required by application:



Initial Charging

The whole charge should preferably be carried out at constant current. The charging time is inversely proportional to the current which is set by the current limit of the charging equipment.

Recommended rates for the first charging: □ 0.2 C5A for 10 hours □ 0.1 C5A for 20 hours

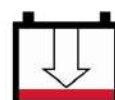
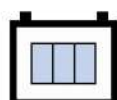


NiCd Pocket Plate PT1.2SPL Range Electrical Specifications & Dimensions

Model	Nominal Voltage (V)	Capacity (C5 Ah)	Dimensions (mm/inch)						Weight (kg/lb.)				Terminal	Cell Case Material
			Length		Width		Height		Without Electrolyte		With Electrolyte			
PT1.2SPL10	1.2	10	40	1.6	85	3.3	150	5.9	0.7	1.5	1.0	2.2	M8	PP
PT1.2SPL20	1.2	20	55	2.2	134	5.3	270	10.6	1.1	2.4	1.8	4.0	M10	PP
PT1.2SPL30	1.2	30	55	2.2	134	5.3	270	10.6	1.5	3.3	2.2	4.8	M10	PP
PT1.2SPL40	1.2	40	55	2.2	134	5.3	270	10.6	1.8	4.0	2.6	5.7	M10	PP
PT1.2SPL50	1.2	50	60	2.4	140	5.5	270	10.6	2.4	5.3	3.2	7.1	M10	PP
PT1.2SPL60	1.2	60	60	2.4	140	5.5	270	10.6	2.8	6.2	3.8	8.4	M10	PP
PT1.2SPL70	1.2	70	70	2.8	140	5.5	295	11.6	2.9	6.4	4.1	9.0	M10	PP
PT1.2SPL80	1.2	80	70	2.8	140	5.5	295	11.6	3.4	7.5	4.6	10.1	M10	PP
PT1.2SPL90	1.2	90	80	3.1	140	5.5	365	14.4	4.2	9.3	6.0	13.2	M10	PP
PT1.2SPL100	1.2	100	80	3.2	140	5.5	365	14.4	4.5	9.9	6.2	13.7	M10	PP
PT1.2SPL120	1.2	120	80	3.2	140	5.5	365	14.4	5.0	11.0	6.5	14.3	M10	PP
PT1.2SPL150	1.2	150	105	4.1	165	6.5	345	13.6	6.9	15.2	9.5	20.9	M20	PP
PT1.2SPL200	1.2	200	105	4.1	166	6.5	345	13.6	7.8	17.2	10.0	22.0	M20	PP
PT1.2SPL250	1.2	250	165	6.5	167	6.6	345	13.6	10.2	22.5	14.2	31.3	M20	PP
PT1.2SPL300	1.2	300	140	5.5	280	11.0	450	17.7	13.8	30.4	21.0	46.3	2 x M16	PP
PT1.2SPL350	1.2	350	140	5.5	280	11.0	450	17.7	15.0	33.1	22.0	48.5	2 x M16	PP
PT1.2SPL400	1.2	400	140	5.5	280	11.0	450	17.7	15.8	34.8	22.8	50.3	2 x M16	PP
PT1.2SPL500	1.2	500	140	5.5	280	11.0	490	19.3	16.8	37.0	24.0	52.9	2 x M20	PP
PT1.2SPL600	1.2	600	175	6.9	290	11.4	500	19.7	27.0	59.5	37.0	81.5	2 x M20	ABS
PT1.2SPL700	1.2	700	175	6.9	290	11.4	500	19.7	29.0	63.9	39.0	86.0	2 x M20	ABS
PT1.2SPL800	1.2	800	186	7.3	398	15.7	565	22.2	39.0	86.0	58.0	128	3 x M20	ABS
PT1.2SPL900	1.2	900	186	7.3	398	15.7	565	22.3	41.0	90.4	60.0	132	3 x M20	ABS
PT1.2SPL1000	1.2	1000	186	7.3	398	15.7	565	22.3	44.0	97.0	61.0	134	3 x M20	ABS
PT1.2SPL1100	1.2	1100	186	7.3	398	15.7	565	22.4	45.0	99.2	62.0	137	3 x M20	ABS
PT1.2SPL1200	1.2	1200	186	7.3	398	15.7	565	22.4	46.0	101	63.0	139	3 x M20	ABS

NILE PT1.2SPL batteries fulfil all requirements specified by IEC publication 60623.

Transparent case optional.



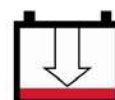
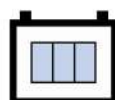
Discharge Data Table

Discharge performance data after fully charged by constant current according to IEC60623

Available amperes at +20°C ±5°C(+68°F ±9°F)

Final voltage: 1.14 V/cell

Cell Type	Capacity (C5 Ah)	Discharge Time in Hours							Discharge Time in minutes							Time in Seconds		
		10	8	5	3	2	1.5	1	45	30	20	15	10	5	1	30	5	1
PT1.2SPL10	10	1.00	1.23	1.91	2.99	3.86	4.42	5.10	5.61	6.53	7.56	8.19	9.14	11.0	14.6	15.5	18.2	18.8
PT1.2SPL20	20	1.98	2.42	3.64	5.45	7.14	8.30	10.2	11.2	13.1	15.1	16.7	17.6	20.2	29.0	33.5	44.0	50.3
PT1.2SPL30	30	2.97	3.64	5.45	8.18	10.7	12.4	15.3	16.8	19.6	22.7	25.1	26.5	30.2	43.4	50.3	65.8	75.4
PT1.2SPL40	40	3.96	4.85	7.27	10.9	14.3	16.6	20.4	22.4	26.1	30.2	33.4	35.3	40.3	57.9	67.0	87.8	101
PT1.2SPL50	50	4.95	6.06	9.09	13.6	17.9	20.7	25.5	28.1	32.7	37.8	41.8	44.1	50.4	72.3	83.8	110	126
PT1.2SPL60	60	5.94	7.27	10.9	16.3	21.4	24.9	30.6	33.7	39.2	45.3	47.6	54.6	58.8	81.1	89.8	115	130
PT1.2SPL70	70	6.79	8.30	12.6	18.7	24.3	28.1	32.8	36.1	41.4	48.5	50.0	57.3	61.7	85.2	94.3	121	136
PT1.2SPL80	80	7.92	9.70	14.5	21.0	26.5	30.5	35.9	39.5	45.7	50.4	53.8	60.5	70.6	91.1	100	124	137
PT1.2SPL90	90	8.91	10.9	16.4	23.6	29.9	34.3	40.4	44.4	51.4	56.7	60.5	68.0	79.4	102	112	139	154
PT1.2SPL100	100	9.73	11.8	18.0	26.6	34.7	40.2	46.9	51.6	59.2	69.3	71.4	81.9	88.2	121	135	173	195
PT1.2SPL120	120	11.9	14.5	21.8	31.5	39.8	45.7	53.9	59.2	68.5	75.6	80.6	90.9	106	137	149	185	206
PT1.2SPL150	150	14.8	18.2	27.3	39.4	49.7	57.2	67.3	74.1	85.7	94.5	101	114	133	171	187	232	258
PT1.2SPL200	200	19.8	24.2	36.4	52.5	66.3	76.2	89.8	98.7	115	126	134	151	176	227	250	309	343
PT1.2SPL250	250	24.8	30.3	45.5	65.7	82.9	95.5	112	123	143	158	168	189	221	284	312	387	429
PT1.2SPL300	300	29.7	36.4	54.5	78.8	100	114	135	148	171	189	202	227	265	341	374	464	515
PT1.2SPL350	350	34.7	42.4	63.6	92.0	116	133	157	173	200	221	236	265	309	398	437	541	600
PT1.2SPL400	400	39.6	48.5	72.7	105	133	152	180	198	228	252	269	303	353	454	499	618	686
PT1.2SPL500	500	49.5	60.6	90.9	132	166	191	224	246	286	315	336	378	441	568	623	773	858
PT1.2SPL600	600	59.4	72.7	109	158	199	228	269	296	343	378	403	454	529	683	749	928	1029
PT1.2SPL700	700	69.3	84.8	127	184	232	267	314	346	400	441	470	529	617	796	873	1082	1201
PT1.2SPL800	800	79.1	97.0	145	210	265	305	359	395	457	504	537	605	705	910	998	1237	1372
PT1.2SPL900	900	89.1	109	164	237	299	342	404	444	514	567	605	680	794	1024	1122	1391	1544
PT1.2SPL1000	1000	99.0	121	182	262	332	381	449	494	571	630	672	756	882	1138	1247	1546	1716
PT1.2SPL1100	1100	109	133	200	289	365	419	494	543	628	693	739	832	970	1251	1371	1701	1887
PT1.2SPL1200	1200	119	145	218	315	398	457	539	592	685	756	806	907	1058	1365	1496	1855	2059



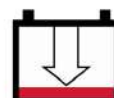
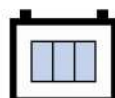
Discharge Data Table

Discharge performance data after fully charged by constant current according to IEC60623

Available amperes at +20°C ±5°C(+68°F ±9°F)

Final voltage: 1.10 V/cell

Cell Type	Capacity (C5 Ah)	Discharge Time in Hours							Discharge Time in minutes							Time in Seconds		
		10	8	5	3	2	1.5	1	45	30	20	15	10	5	1	30	5	1
PT1.2SPL10	10	1.01	1.25	1.97	3.11	4.26	4.98	5.86	6.33	7.55	8.57	9.29	10.3	12.1	16.2	17.7	19.7	20.3
PT1.2SPL20	20	2.02	2.50	3.87	5.92	7.98	9.55	11.8	12.7	15.5	17.4	18.7	21.4	25.7	32.9	37.8	49.4	56.2
PT1.2SPL30	30	3.03	3.75	5.82	8.89	12.0	14.3	17.6	19.0	23.3	26.2	28.2	32.1	42.6	49.5	56.7	74.2	84.4
PT1.2SPL40	40	4.04	5.00	7.76	11.8	16.0	19.1	23.4	25.3	31.0	34.9	37.5	42.8	51.4	65.9	75.6	98.8	112
PT1.2SPL50	50	5.05	6.25	9.7	14.8	20.0	23.9	29.3	31.7	38.7	43.6	46.9	53.6	64.2	82.4	94.5	124	140
PT1.2SPL60	60	6.06	7.50	11.6	17.8	23.9	28.6	35.2	38.0	46.5	52.3	56.3	64.3	70.1	90.7	104	134	149
PT1.2SPL70	70	7.00	8.66	13.5	20.7	27.6	32.5	39.6	42.8	50.0	55.7	57.1	64.3	77.1	97.1	109	136	152
PT1.2SPL80	80	8.08	10.0	15.5	23.1	30.7	35.6	43.6	47.1	53.9	58.8	65.3	73.4	78.3	104	113	138	151
PT1.2SPL90	90	9.09	11.3	17.4	26.0	34.5	40.0	49.1	53.0	60.6	66.1	73.4	82.6	88.1	117	128	156	170
PT1.2SPL100	100	10.0	12.4	19.2	29.7	39.4	46.5	56.6	61.1	71.4	79.6	81.6	91.8	110	138	155	194	218
PT1.2SPL120	120	12.0	14.9	23.0	35.6	47.3	55.8	67.9	73.3	85.7	95.5	97.9	110	132	166	186	233	261
PT1.2SPL150	150	15.2	18.7	29.1	43.4	57.6	66.7	81.8	88.4	101	110	122	138	146	195	212	259	283
PT1.2SPL200	200	20.2	25.0	38.8	57.9	76.8	88.9	109	118	135	147	163	184	196	260	283	345	378
PT1.2SPL250	250	25.3	31.2	48.5	72.4	96.4	111	137	148	169	184	204	230	245	325	353	431	472
PT1.2SPL300	300	30.3	37.5	58.2	86.9	116	133	164	177	202	220	245	276	294	390	425	518	567
PT1.2SPL350	350	35.4	43.7	67.9	102	135	156	191	207	236	257	286	322	343	454	495	604	662
PT1.2SPL400	400	40.4	50.0	77.6	116	154	178	218	236	269	294	326	368	391	519	566	690	756
PT1.2SPL500	500	50.5	62.5	96.9	145	192	222	272	294	337	367	408	459	490	649	707	862	945
PT1.2SPL600	600	60.6	75.0	116	174	230	267	327	353	404	441	490	551	588	779	849	1035	1134
PT1.2SPL700	700	70.7	87.5	135	203	269	311	382	412	471	514	571	643	685	909	990	1208	1323
PT1.2SPL800	800	80.8	100	155	232	307	355	436	471	539	588	653	734	784	1039	1132	1380	1512
PT1.2SPL900	900	90.9	112	175	260	346	400	491	531	606	661	734	827	881	1169	1273	1552	1701
PT1.2SPL1000	1000	101	125	194	289	384	445	546	589	673	734	816	918	979	1298	1415	1725	1890
PT1.2SPL1100	1100	111	137	213	318	422	489	600	648	741	808	898	1010	1077	1428	1557	1897	2079
PT1.2SPL1200	1200	121	150	232	347	461	533	654	707	808	881	979	1102	1175	1559	1697	2070	2267



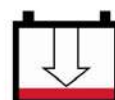
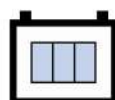
Discharge Data Table

Discharge performance data after fully charged by constant current according to IEC60623

Available amperes at +20°C ±5°C(+68°F ±9°F)

Final voltage: 1.05 V/cell

Cell Type	Capacity (C5 Ah)	Discharge Time in Hours							Discharge Time in minutes							Time in Seconds		
		10	8	5	3	2	1.5	1	45	30	20	15	10	5	1	30	5	1
PT1.2SPL10	10	1.04	1.28	2.01	3.21	4.6	5.63	6.84	7.66	8.77	10.0	10.9	12.2	14.4	19.1	20.6	24.2	25.1
PT1.2SPL20	20	2.06	2.55	3.96	6.26	8.8	10.8	14.0	15.7	18.7	22.3	24.3	27.2	29.7	40.1	45.0	59.9	67.4
PT1.2SPL30	30	3.09	3.83	5.94	9.39	13.3	16.1	21.0	23.5	28.2	33.4	36.5	40.8	44.5	60.2	67.6	89.8	101
PT1.2SPL40	40	4.12	5.10	7.92	12.5	17.6	21.5	27.9	31.3	37.5	44.5	48.6	54.4	59.3	80.2	90.0	120	134
PT1.2SPL50	50	5.15	6.37	9.90	15.7	22.0	26.9	34.9	39.1	46.9	55.7	60.8	67.9	74.2	100	113	150	169
PT1.2SPL60	60	6.18	7.65	11.9	18.8	26.5	32.3	42.0	47.0	56.3	66.8	73.0	81.5	89.0	121	135	180	202
PT1.2SPL70	70	7.07	8.84	13.9	22.2	30.7	37.1	45.7	51.2	60.0	69.2	75.0	82.2	95.2	118	130	168	185
PT1.2SPL80	80	8.08	10.1	15.8	25.3	35.1	42.4	52.2	58.5	68.5	79.1	85.7	93.9	109	135	148	192	212
PT1.2SPL90	90	9.27	11.6	18.0	28.2	39.0	46.5	57.9	64.8	75.3	84.8	89.0	101	122	141	154	189	205
PT1.2SPL100	100	10.3	12.9	20.0	31.4	43.4	51.6	64.3	72.0	83.6	94.2	98.9	112	136	156	171	210	228
PT1.2SPL120	120	12.1	15.2	23.8	38.0	52.6	63.6	78.3	87.7	103	119	128	140	163	202	224	288	317
PT1.2SPL150	150	15.5	19.3	30.0	47.0	65.0	77.5	96.4	108.0	126	141	148	167	204	235	257	314	341
PT1.2SPL200	200	20.6	25.6	40.0	62.6	86.7	104	129	144.0	168	188	198	222	272	313	342	419	455
PT1.2SPL250	250	25.8	32.0	50.0	78.3	108	129	160	179.7	210	236	247	278	340	391	428	524	569
PT1.2SPL300	300	31.0	38.4	60.0	94.2	130	155	193	216.2	251	282	297	334	408	470	513	628	682
PT1.2SPL350	350	36.1	44.9	70.0	109	151	181	225	251.6	293	330	346	389	476	548	599	733	796
PT1.2SPL400	400	41.2	51.3	80.0	126	173	206	257	287.4	334	377	395	445	544	626	685	838	910
PT1.2SPL500	500	51.5	64.1	100	156	217	258	321	359.5	418	472	495	556	680	783	856	1047	1138
PT1.2SPL600	600	61.8	76.9	120	188	260	310	386	431.8	502	565	593	667	816	939	1028	1257	1365
PT1.2SPL700	700	72.1	89.7	140	219	304	362	450	503.8	585	660	692	779	952	1096	1199	1467	1592
PT1.2SPL800	800	82.5	102	160	250	347	414	514	575.9	670	754	791	890	1088	1253	1370	1676	1820
PT1.2SPL900	900	92.8	115	180	282	390	465	579	648.0	753	848	890	1001	1224	1409	1541	1885	2047
PT1.2SPL1000	1000	103	128	200	313	434	517	643	720.2	836	942	989	1113	1359	1565	1713	2095	2274
PT1.2SPL1100	1100	113	141	220	344	477	568	707	791.7	920	1037	1088	1224	1496	1722	1884	2305	2502
PT1.2SPL1200	1200	123	154	240	376	520	620	771	863.7	1004	1131	1187	1335	1632	1879	2055	2514	2729



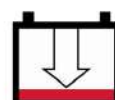
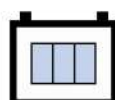
Discharge Data Table

Discharge performance data after fully charged by constant current according to IEC60623

Available amperes at +20°C ±5°C(+68°F ±9°F)

Final voltage: 1.00 V/cell

Cell Type	Capacity (C5 Ah)	Discharge Time in Hours							Discharge Time in minutes							Time in Seconds		
		10	8	5	3	2	1.5	1	45	30	20	15	10	5	1	30	5	1
PT1.2SPL10	10	1.04	1.28	2.02	3.26	4.67	5.90	7.64	8.56	9.90	11.3	12.2	13.7	16.3	21.6	23.8	27.6	28.1
PT1.2SPL20	20	2.08	2.58	4.04	6.46	9.2	11.6	15.5	17.3	22.1	25.4	27.7	30.8	37.1	46.0	51.7	67.9	76.4
PT1.2SPL30	30	3.11	3.87	6.06	9.70	13.8	17.4	23.3	26.0	33.0	38.1	41.6	34.0	55.6	69.0	77.5	102	114
PT1.2SPL40	40	4.14	5.15	8.08	12.9	18.4	23.1	31.0	34.7	44.1	50.8	55.5	46.4	76.2	92.0	103	135	153
PT1.2SPL50	50	5.18	6.44	10.1	16.1	23.0	28.9	38.7	43.4	55.1	63.5	69.3	65.7	92.7	115	129	170	191
PT1.2SPL60	60	6.22	7.73	12.1	19.4	27.6	34.7	46.5	52.1	66.1	76.2	83.2	70.3	112	138	155	203	230
PT1.2SPL70	70	7.15	8.93	14.1	22.6	32.5	40.1	52.2	58.4	70.7	81.4	87.1	89.4	109	136	147	191	213
PT1.2SPL80	80	8.33	10.3	16.2	25.9	36.4	44.7	58.0	64.9	79.2	90.2	97.9	85.9	119	144	157	192	206
PT1.2SPL90	90	9.37	11.6	18.2	29.1	41.0	50.3	65.2	73.1	89.1	101	110	122	134	162	177	216	232
PT1.2SPL100	100	10.4	12.9	20.2	32.3	45.5	55.9	72.5	81.2	99.0	113	122	136	149	180	196	240	258
PT1.2SPL120	120	12.2	15.3	24.2	38.8	55.8	68.6	89.4	100	121	139	149	140	185	233	253	328	364
PT1.2SPL150	150	15.6	19.4	30.3	48.5	68.2	83.9	109	122	149	169	184	160	223	270	294	359	386
PT1.2SPL200	200	20.9	25.8	40.4	64.6	91.0	111	144	162	197	226	245	206	296	360	392	479	514
PT1.2SPL250	250	26.0	32.2	50.5	80.8	114	139	181	202	247	283	306	273	371	450	489	598	644
PT1.2SPL300	300	31.2	38.6	60.6	97.0	136	168	217	244	297	340	367	289	445	540	588	718	772
PT1.2SPL350	350	36.4	45.1	70.7	113	159	196	253	284	347	396	428	412	519	631	685	838	901
PT1.2SPL400	400	41.6	51.5	80.8	129	182	224	290	325	396	453	490	491	594	720	783	957	1029
PT1.2SPL500	500	52.0	64.4	101	161	228	279	362	405	495	566	612	553	741	900	979	1197	1287
PT1.2SPL600	600	62.4	77.3	121	194	273	335	435	487	594	679	734	693	890	1080	1174	1436	1545
PT1.2SPL700	700	72.8	90.2	141	226	318	391	507	568	693	793	857	816	1038	1261	1370	1676	1802
PT1.2SPL800	800	83.2	103	162	259	364	447	579	649	791	905	979	917	1186	1441	1566	1915	2059
PT1.2SPL900	900	93.7	116	182	291	409	503	652	730	890	1019	1102	1098	1335	1620	1762	2155	2316
PT1.2SPL1000	1000	104	129	202	323	455	558	724	811	989	1132	1224	1233	1483	1800	1957	2394	2574
PT1.2SPL1100	1100	114	141	222	356	500	615	797	892	1088	1245	1346	1386	1632	1981	2153	2633	2831
PT1.2SPL1200	1200	125	155	242	388	545	671	869	973	1187	1359	1469	1496	1780	2161	2348	2873	3088



Calculation Methods

Information required for battery capacity calculation

The following information needed for a precise battery capacity calculation:

- ☐ Nominal voltage of the system
- ☐ Load current required
- ☐ Backup time required
- ☐ Maximum voltage (for charging)
- ☐ Minimum voltage
- ☐ Temperature range
- ☐ Battery layout and available space
- ☐ Physical condition

Float Voltage Operation

In these conditions the float voltage, being the voltage at which the general load circuit will operate, then a decision will have to be reached on the cell float voltage needed to maintain the battery in the required condition.

$$\text{Number of cells required} = \frac{\text{Circuit voltage}}{\text{Cell Float voltage}} \quad \text{Minimum cell voltage} = \frac{\text{Minimum D.C. voltage}}{\text{Number of cells}}$$

The most commonly used float voltages are 1.40-1.48 voltage per cell, but the exact figure has to be related carefully to circumstances.

For Example

A NILE Nickel Cadmium battery is required to maintain an inverter load of 50KVA at 0.8 power factor for a backup time of 30 minutes, at 20~25°C temperature. The DC voltage to the inverter operates within the limit of 265 volts with the battery on float charge to a minimum of 202 volts at end of back up time. The inverter has an 85% efficiency rate.

-Number of Cells (at recommended float of 1.44VPC) = $265/1.44 \approx 184$ cells

-Minimum Cell Voltage = $202/184 \approx 1.10$ volts per cell

-Maximum Battery Current

$$= \frac{\text{Inverter load in KVA} \times \text{Power factor}}{\text{Min. cell voltage} \times \text{Number of cells} \times \text{Inverter efficiency}}$$

$$= \frac{50\text{KVA} \times 0.80}{1.10 \times 184 \times 0.85} = 232.5 \text{ Amps}$$

We shall choose the battery with capacity equal or just above 232.5Amps.

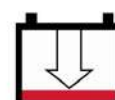
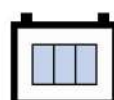
To meet the 30 minutes backup time requirement, we determine to choose the battery size from PT1.2SPL Range.

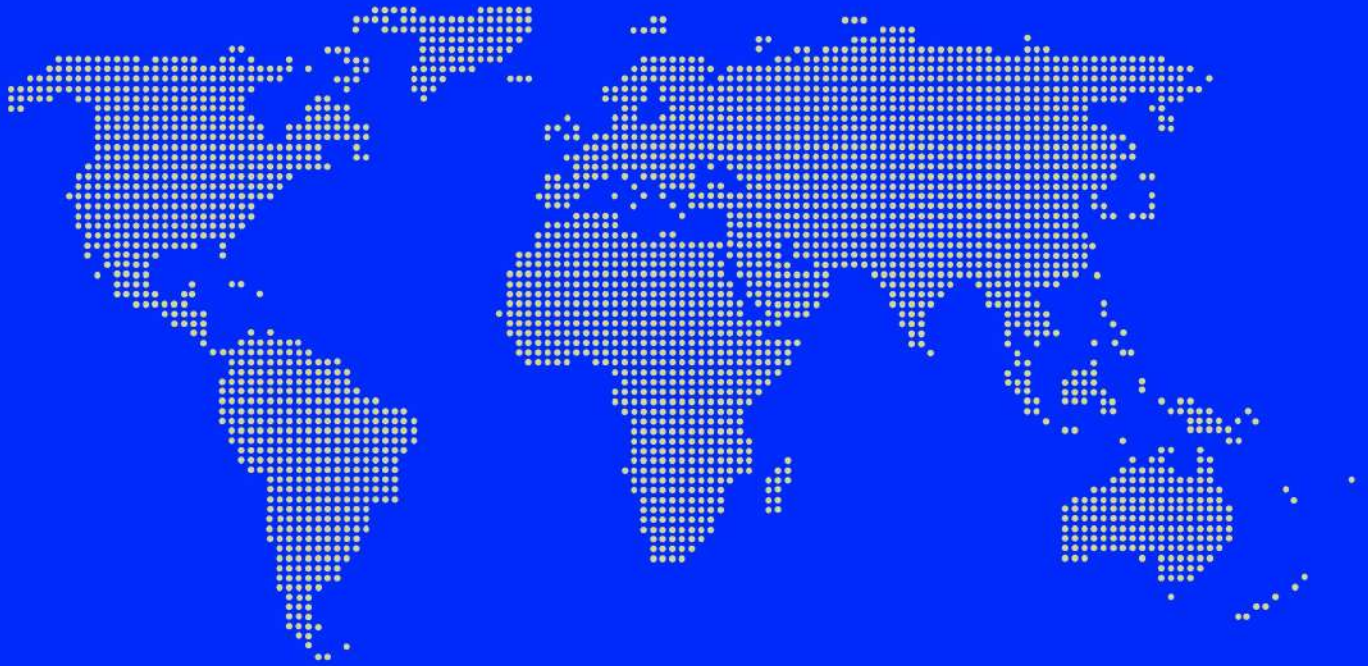
From our catalogue data, the cell type is PT1.2SPL300

Battery shall comprise 184 cells of NILE Nickel Cadmium type PT1.2SPL300

System Voltage	Number of Cells	Spread Range Number of Cells
24	20	18 ~ 21
36	30	27 ~ 31
48	40	36 ~ 41
110	92	88 ~ 93
220	184	180 ~ 186

The number of cells in a battery may be determined by simply dividing the nominal voltage of the system by the nominal voltage of a cell (1.2 Volts).

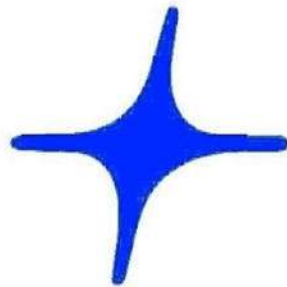




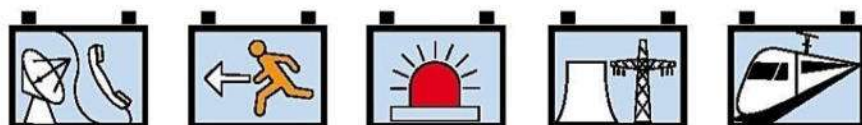
Guarantee

V4.1

**Sealed NiCd - Low Maintenance
PT1.2SPM Pocket plate Range
10-1100Ah**



**»Premium quality for
uninterrupted communication***





**Sealed Nicd - Low Maintenance
PT1.2SPM Pocket plate Range
10-1100Ah**

The block battery - for dependability

The wide range of low, medium and high capacity types makes accurate selection easy, based on discharge time and end of discharge voltage. Robust construction and generous electrolyte reserve enable the battery to withstand wide temperature fluctuations in stationary cycling behaviour over its 20+ years' life.

Built with a future Nickel-cadmium plates are completely reliable, with no risk of thermal runaway or sudden death.

Generally operating between temperatures of -40°C to $+60^{\circ}\text{C}$ (-40°F to $+140^{\circ}\text{F}$), they can tolerate extremes of -50°C to $+70^{\circ}\text{C}$ (-58°F to $+158^{\circ}\text{F}$) for short periods.

With only periodic checks, the block battery will provide up to 20+ years' completely faithful service.

Trouble-free long cycle life

The NILE nickel-cadmium block battery's unique electrochemistry enables it to regularly withstand any depth of discharge.

Following a deep discharge the block battery is designed to recharge very quickly and economically, using standard single or two-level charging equipment.

Be sure of a low overall cost

The Ni-Cd block battery is the most highly cost-efficient solution to stored power requirements.

- | | |
|----------------------------|----------------------|
| No downtime | No replacement costs |
| Minimal maintenance | Ease of installation |
| 20+ years' operating life. | |

Easy storage and installation

Nickel-cadmium block batteries are quick and easy to install as original equipment and may be stored for many years in a discharged state under correct conditions.

On installation a simple bolted connector enables the battery to be rapidly commissioned.

Assured reliability

Ni-Cd is equally dependable in controlled city environments or harsh, unpredictable conditions in the world's most remote and unpopulated areas.

The Ni-Cd battery's block construction makes it highly resistant to electrical abuse and transport over rough terrain, precluding risk of subsequent failure.

Optimized for performance:

An electrolyte solution of potassium hydroxide and a small amount of lithium hydroxide acts only as an ion transfer medium, delivering optimum performance without causing base material degradation.

Good reserves and circulation of the electrolyte are achieved by a wide inter-plate space.

Injection moulded plastic grids both separate plate and insulate plate edges. For extremely low temperatures a special high density electrolyte is available.

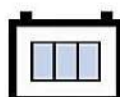
The block battery is fitted with a specially designed flame arresting flip top vent and does not produce corrosive vapours. The tough polypropylene casing ensures the battery's structural integrity throughout its long life.

Supports these Single Cell ranges with:

Quality approved manufacture to ISO 9001 and the TUV certification

Single Cell batteries have been developed in line with the safety requirements of EN-50272-2 and components used (such as insulated cable connectors and end lug covers) are defined to ensure high protection against electric shocks (Ip2 level).

Full recycling service to protect the environment



Protective cover

- To prevent external short-circuits
- In line with EN 50272-2 (safety) with ip2 level

Plate group bus

- Connects the plate tabs with the terminal post.
- Plate tabs and terminal post are projection-welded to the plate group bus.

Plate

Horizontal pockets of double-perforated steel strips.

Cell container

Material: translucent/transparent polypropylene

Flame-arresting vents

Material: polypropylene.

Plate tab

Spot-welded both to the plate side-frames and to the upper edge of the pocket plate.

Separating grids

- These separate the plates and insulate the plate frames from each other.
- The grids allow free circulation of electrolyte between the plates.

Plate frame

Seals the plate pockets and serves as a current collector.

The cells are welded together to form rugged blocks of 1-6 cells depending on the cell size and type.

The NILE Single Cell ranges fully comply and exceed the IEC 60623 standard requirements.

Performance Data

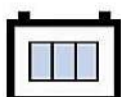
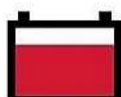
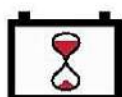
Many nickel-cadmium batteries are used in stationary standby power applications where discharges occur infrequently and the battery is continuously charged by a float or constant potential charge.

Under these circumstances there is a modification in the level of the discharge curve and allowances must be made for this when sizing the battery.

In order to simplify this process, the data NILE supplies in this publication has both the fully charged data to IEC 60623 and the fully charged data after prolonged float charge, which can be used directly in battery sizing calculations.

This phenomenon occurs with all nickel-cadmium batteries, but some other manufacturers of nickel-cadmium batteries may not take this effect into account in published data.

When calculating for deep discharges (0.65 V and 0.85 V) it is not necessary to take this effect into account.



Battery Charging

It is recommended to use Constant Voltage method of charging for Nickel Cadmium Batteries, usually with current limitation to C/5 or C/10. Charging voltages must be regularly checked. To optimize the battery performance, it is necessary to ensure that the voltage is kept within the following limits:

Batteries can be charged in:

- ◆ **constant voltage mode with load connected**
or
- ◆ **constant current or declining current mode when load is isolated.**

High rate or over charge will not damage the battery.

Minimum float charging current: 2 mA per Ah.

- ◆ **Constant voltage mode:**

For continuous parallel operation:

- Float voltage: 1.40 - 1.45 V/cell for PT1.2SPL, PT1.2SPM & PT1.2SPH
- Boost Voltage:

PT1.2SPL: 1.60 - 1.70 V/cell

PT1.2SPM: 1.60 - 1.65 V/cell

PT1.2SPH: 1.60 - 1.65 V/cell

A higher voltage will reduce the charge duration and increase the efficiency of recharging but may increase water consumption.

Single stage charging (without boost):

PT1.2SPL: 1.47 - 1.50 V/cell

PT1.2SPM: 1.46 - 1.49 V/cell

PT1.2SPH: 1.45 - 1.48 V/cell

For starting application:

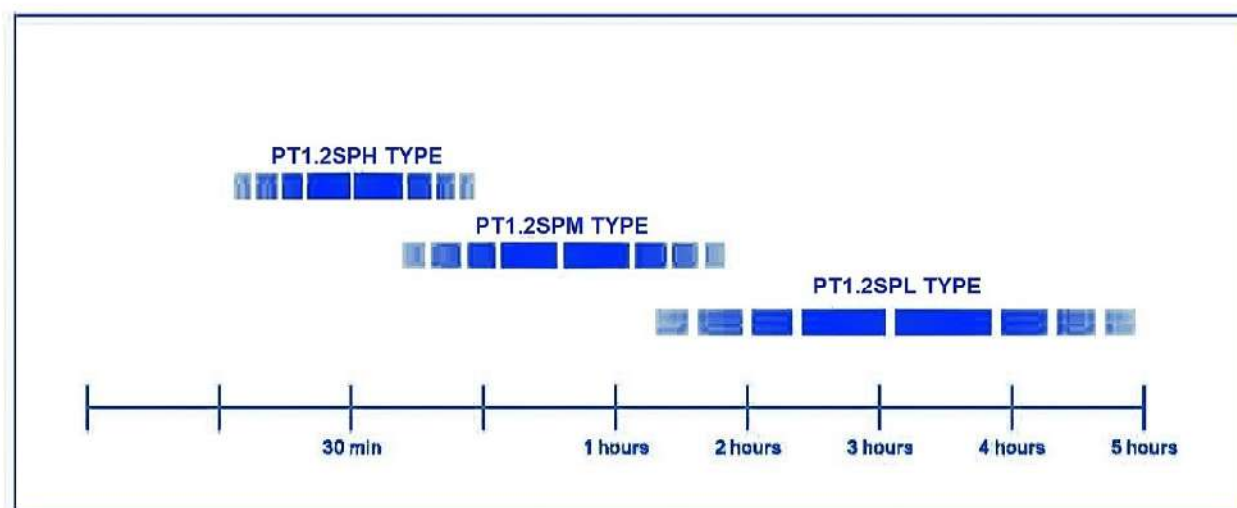
- Recommended charging voltage: 1.50 - 1.55 V/cell.

- ◆ **Constant current mode:**

- Normal charging: 0.2 C5 A for 8 hours
- Recommended for quick charging: 0.4 C5 A for 2.5 hours followed by 0.2 C5 A for 2.5 hours

Recommended Type Selection

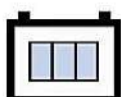
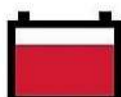
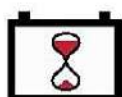
According to backup time required by application:



Initial Charging

The whole charge should preferably be carried out at constant current. The charging time is inversely proportional to the current which is set by the current limit of the charging equipment.

Recommended rates for the first charging: 0.2 C5A for 10 hours 0.1 C5A for 20 hours

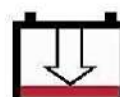
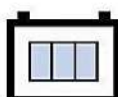


NiCd Pocket Plate PT1.2SPM Range Electrical Specifications & Dimensions

Cell Type	Nomial Voltage (V)	Capacity (C5 Ah)	Dimensions (mm/inch)						Weight (kg/lb.)				Terminal	Cell Case Material
			Width		Height		Height		Without Electrolyte		With Electrolyte			
PT1.2SPM10	1.2	10	43	1.7	85	3.3	260	10.2	0.75	1.7	1.2	2.6	M10	PP
PT1.2SPM20	1.2	20	55	2.2	134	5.3	270	10.6	1.1	2.4	1.9	4.2	M10	PP
PT1.2SPM30	1.2	30	55	2.2	134	5.3	270	10.6	1.6	3.5	2.4	5.3	M10	PP
PT1.2SPM40	1.2	40	80	2.4	140	5.5	270	10.6	2.5	5.5	3.6	7.9	M10	PP
PT1.2SPM50	1.2	50	70	2.8	140	5.5	295	11.6	3	6.6	4.2	9.3	M10	PP
PT1.2SPM60	1.2	60	70	2.8	140	5.5	295	11.6	3.2	7.1	4.4	9.7	M10	PP
PT1.2SPM70	1.2	70	70	2.8	140	5.5	295	11.6	3.4	7.5	4.6	10.1	M10	PP
PT1.2SPM80	1.2	80	80	3.1	140	5.5	365	14.4	4.8	10.6	6.5	14.3	M10	PP
PT1.2SPM90	1.2	90	80	3.1	140	5.5	365	14.4	5.2	11.5	6.7	14.8	M10	PP
PT1.2SPM100	1.2	100	105	4.1	165	6.5	345	13.6	7	15.4	9.2	20.3	M20	PP
PT1.2SPM120	1.2	120	105	4.1	165	6.5	345	13.6	7.2	15.9	9.5	20.9	M20	PP
PT1.2SPM150	1.2	150	165	6.5	167	6.6	345	13.6	9.2	20.3	12.5	27.6	M20	PP
PT1.2SPM200	1.2	200	165	6.5	167	6.6	345	13.6	10.6	23.4	14	30.9	M20	PP
PT1.2SPM250	1.2	250	145	5.7	280	11.0	450	17.7	15.8	34.8	21.5	47.4	2 x M16	PP
PT1.2SPM300	1.2	300	145	5.7	280	11.0	450	17.7	16.5	36.4	22.5	49.6	2 x M16	PP
PT1.2SPM350	1.2	350	145	5.7	280	11.0	490	19.3	19.5	43.0	25.5	56.2	2 x M20	PP
PT1.2SPM400	1.2	400	145	5.7	280	11.0	490	19.3	20.8	45.8	27	59.5	2 x M20	PP
PT1.2SPM500	1.2	500	175	6.9	290	11.4	500	19.7	27.5	60.6	38	83.8	2 x M20	ABS
PT1.2SPM600	1.2	600	175	6.9	290	11.4	500	19.7	30	66.1	40	88.2	2 x M20	ABS
PT1.2SPM700	1.2	700	186	7.3	398	15.7	565	22.2	41	90.4	55	121	3 x M20	ABS
PT1.2SPM800	1.2	800	186	7.3	398	15.7	565	22.2	43	94.8	58	128	3 x M20	ABS
PT1.2SPM900	1.2	900	186	7.3	398	15.7	565	22.2	46	101	61	134	3 x M20	ABS
PT1.2SPM1000	1.2	1000	186	7.3	398	15.7	565	22.2	48	106	64	141	3 x M20	ABS
PT1.2SPM1100	1.2	1100	186	7.3	398	15.7	565	22.2	50	110	66	145	3 x M20	ABS

NiLE PT1.2SPM batteries fulfil all requirements specified by IEC publication 60623.

Transparent case optional.



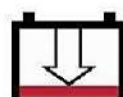
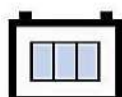
Discharge Data Table

Discharge performance data after fully charged by constant current according to IEC60623

Available amperes at +20°C ±5°C(+68°F ±9°F)

Final voltage: 1.14V/cell

Cell Type	Capacity (C5 Ah)	Discharge Time in Hours							Discharge Time in minutes							Time in Seconds		
		10	8	5	3	2	1.5	1	45	30	20	15	10	5	1	30	5	1
PT1.2SPM10	10	1.07	1.23	1.90	3.16	4.32	5.28	8.90	7.48	9.34	11.0	13.0	14.8	17.5	24.3	27.0	32.8	38.2
PT1.2SPM20	20	1.94	2.40	3.77	6.14	8.46	10.4	12.7	14.5	18.7	22.1	24.0	27.8	33.1	46.6	52.0	60.1	63.0
PT1.2SPM30	30	2.91	3.61	5.66	9.21	12.7	15.6	19.1	21.7	25.5	30.1	32.8	37.9	45.1	63.6	71.0	81.9	85.9
PT1.2SPM40	40	3.88	4.81	7.55	12.3	16.9	20.8	25.4	28.9	34.0	40.1	43.7	50.6	60.2	84.8	94.6	109	115
PT1.2SPM50	50	4.86	6.01	9.44	15.3	21.2	26.0	31.8	36.1	42.5	50.1	54.7	63.2	75.2	106	118	137	143
PT1.2SPM60	60	5.83	7.21	11.3	18.4	25.4	31.2	38.2	43.4	51.0	60.2	65.6	75.8	90.3	127	142	164	172
PT1.2SPM70	70	6.80	8.41	13.2	21.5	29.6	36.3	44.5	50.6	59.5	70.2	76.5	88.5	105	148	166	191	200
PT1.2SPM80	80	7.77	9.61	15.1	24.6	33.8	41.5	50.9	57.8	68.0	80.2	87.4	101	120	170	189	218	229
PT1.2SPM90	90	8.74	10.8	17.0	27.6	38.1	46.7	57.2	65.0	76.4	90.2	96.4	114	135	191	213	246	258
PT1.2SPM100	100	9.71	12.0	18.9	30.7	42.3	51.9	63.6	72.3	84.9	100	109	126	150	212	237	273	286
PT1.2SPM120	120	11.7	14.4	22.6	36.8	50.8	62.3	76.3	86.7	102	120	131	152	181	254	284	328	344
PT1.2SPM150	150	14.6	18.0	28.3	46.0	63.5	77.9	95.4	108	127	150	164	190	226	318	355	410	430
PT1.2SPM200	200	19.4	24.0	37.7	61.4	84.6	104	127	145	170	201	219	253	301	424	473	546	573
PT1.2SPM250	250	24.3	30.0	47.2	76.7	106	130	159	181	212	251	273	316	378	530	591	683	716
PT1.2SPM300	300	29.1	36.1	56.6	92.1	127	156	191	217	255	301	328	379	451	636	710	819	859
PT1.2SPM350	350	34.0	42.1	66.1	107	148	182	223	253	297	351	383	442	527	742	828	956	1002
PT1.2SPM400	400	38.8	48.1	75.5	123	169	208	254	289	340	401	437	506	602	848	946	1092	1145
PT1.2SPM500	500	48.6	60.1	94.4	153	212	260	318	361	425	501	547	632	752	1060	1183	1365	1432
PT1.2SPM600	600	58.3	72.1	113	184	254	312	382	434	510	602	656	758	903	1272	1419	1638	1718
PT1.2SPM700	700	68.0	84.1	132	215	296	363	445	506	595	702	765	885	1053	1483	1656	1911	2004
PT1.2SPM800	800	77.7	96.1	151	246	338	415	509	578	680	802	874	1011	1204	1695	1892	2184	2291
PT1.2SPM900	900	87.4	108	170	276	381	467	572	650	764	902	984	1138	1354	1907	2129	2457	2577
PT1.2SPM1000	1000	97.1	120	189	307	423	519	636	723	849	1003	1093	1264	1505	2119	2385	2730	2864
PT1.2SPM1100	1100	107	132	208	338	465	571	700	795	934	1103	1202	1390	1656	2331	2602	3003	3150



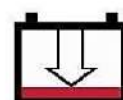
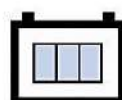
Discharge Data Table

Discharge performance data after fully charged by constant current according to IEC60623

Available amperes at +20°C ±5°C(+68°F ±9°F)

Final voltage: 1.10V/cell

Cell Type	Capacity (C5 Ah)	Discharge Time in Hours							Discharge Time in minutes							Time in Seconds		
		10	8	5	3	2	1.5	1	45	30	20	15	10	5	1	30	5	1
PT1.2SPM10	10	1.10	1.26	1.97	3.30	4.60	5.80	8.00	8.80	10.9	12.9	15.2	17.4	20.5	28.3	31.4	39.1	42.4
PT1.2SPM20	20	2.00	2.48	3.92	6.40	9.00	11.4	14.7	17.0	21.8	25.7	28.2	32.6	38.7	54.3	60.5	71.5	75.9
PT1.2SPM30	30	3.00	3.69	5.88	9.60	13.5	17.1	22.1	25.5	29.7	35.1	38.4	44.4	52.8	74.1	82.5	97.5	104
PT1.2SPM40	40	4.00	4.92	7.84	12.8	18.0	22.8	29.5	34.0	39.6	46.8	51.2	59.2	70.4	98.8	110	130	138
PT1.2SPM50	50	5.00	6.15	9.80	16.0	22.5	28.5	36.9	42.5	49.5	58.5	64.0	74.0	88.0	124	138	163	173
PT1.2SPM60	60	6.00	7.38	11.8	19.2	27.0	34.2	44.2	51.0	59.4	70.2	76.8	88.8	106	148	165	195	207
PT1.2SPM70	70	7.00	8.61	13.7	22.4	31.5	39.9	51.6	59.5	69.3	81.9	89.6	104	123	173	193	228	242
PT1.2SPM80	80	8.00	9.84	15.7	25.6	36.0	45.6	59.0	68.0	79.2	93.8	102	118	141	198	220	260	276
PT1.2SPM90	90	9.00	11.1	17.8	28.8	40.5	51.3	66.3	76.5	89.1	105	115	133	158	222	248	293	311
PT1.2SPM100	100	10.0	12.3	19.6	32.0	45.0	57.0	73.7	85.0	99.0	117	128	148	176	247	275	325	345
PT1.2SPM120	120	12.0	14.8	23.5	38.4	54.0	68.4	88.4	102	119	140	154	178	211	296	330	390	414
PT1.2SPM150	150	15.0	18.5	29.4	48.0	67.5	85.5	111	128	149	176	192	222	264	371	413	488	518
PT1.2SPM200	200	20.0	24.6	39.2	64.0	90.0	114	147	170	198	234	256	296	352	494	550	650	690
PT1.2SPM250	250	25.0	30.8	49.0	80.0	113	143	184	213	248	293	320	370	440	618	688	813	863
PT1.2SPM300	300	30.0	36.9	58.8	96.0	135	171	221	255	297	351	384	444	528	741	825	975	1035
PT1.2SPM350	350	35.0	43.1	68.6	112	158	200	258	298	347	410	448	518	616	865	963	1138	1208
PT1.2SPM400	400	40.0	49.2	78.4	128	180	228	295	340	396	468	512	592	704	988	1100	1300	1380
PT1.2SPM500	500	50.0	61.5	98.0	160	225	285	369	425	495	585	640	740	880	1235	1375	1625	1725
PT1.2SPM600	600	60.0	73.8	118	192	270	342	442	510	594	702	768	888	1056	1482	1650	1950	2070
PT1.2SPM700	700	70.0	86.1	137	224	315	399	516	595	693	819	896	1036	1232	1729	1925	2275	2415
PT1.2SPM800	800	80.0	98.4	157	256	360	456	590	680	792	938	1024	1184	1408	1976	2200	2600	2760
PT1.2SPM900	900	90.0	111	176	288	405	513	663	765	891	1053	1152	1332	1584	2223	2475	2925	3105
PT1.2SPM1000	1000	100	123	196	320	450	570	737	850	990	1170	1280	1480	1760	2470	2750	3250	3450
PT1.2SPM1100	1100	110	135	216	352	495	627	811	935	1089	1287	1408	1628	1936	2717	3025	3575	3795



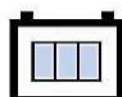
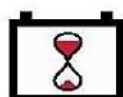
Discharge Data Table

Discharge performance data after fully charged by constant current according to IEC60623

Available amperes at +20°C ±5°C(+68°F ±9°F)

Final voltage: 1.05V/cell

Cell Type	Capacity (C5 Ah)	Discharge Time in Hours							Discharge Time in minutes							Time in Seconds		
		10	8	5	3	2	1.5	1	45	30	20	15	10	5	1	30	5	1
PT1.2SPM10	10	1.13	1.30	2.00	3.40	4.82	6.38	9.38	10.6	13.5	16.3	18.2	20.3	24.0	33.0	36.9	45.9	50.8
PT1.2SPM20	20	2.06	2.55	3.98	6.59	9.43	12.5	17.2	20.4	27.0	32.7	33.8	38.1	45.5	63.5	71.3	84.1	91.1
PT1.2SPM30	30	3.09	3.79	5.97	9.89	14.1	18.8	25.9	30.6	36.8	44.6	46.1	51.9	62.0	86.5	97.2	115	124
PT1.2SPM40	40	4.12	5.06	7.96	13.2	18.9	25.1	34.5	40.8	49.1	59.4	61.4	69.3	82.7	115	130	153	166
PT1.2SPM50	50	5.15	6.32	9.95	16.5	23.6	31.4	43.1	51.0	61.4	74.3	76.8	86.6	103	144	162	191	207
PT1.2SPM60	60	6.18	7.59	11.9	19.8	28.3	37.6	51.7	61.2	73.7	89.2	92.2	104	124	173	194	229	246
PT1.2SPM70	70	7.21	8.85	13.9	23.1	33.0	43.9	60.4	71.4	85.9	104	108	121	145	202	227	268	290
PT1.2SPM80	80	8.24	10.1	15.9	26.4	37.7	50.2	69.0	81.6	98.2	119	123	139	165	231	259	306	331
PT1.2SPM90	90	9.27	11.4	17.9	29.7	42.4	56.4	77.6	91.8	110	134	138	156	186	260	292	344	373
PT1.2SPM100	100	10.3	12.6	19.9	33.0	47.2	62.7	86.2	102	123	149	154	173	207	288	324	382	414
PT1.2SPM120	120	12.4	15.2	23.9	39.6	56.6	75.2	103	122	147	178	184	206	248	346	389	459	497
PT1.2SPM150	150	15.5	19.0	29.8	49.4	70.7	94.1	129	153	184	223	230	260	310	433	486	573	621
PT1.2SPM200	200	20.6	25.3	39.8	65.9	94.3	125	172	204	246	297	307	346	414	577	646	764	828
PT1.2SPM250	250	25.8	31.6	49.7	82.4	118	157	216	256	307	371	384	433	517	721	810	956	1035
PT1.2SPM300	300	30.9	37.9	59.7	98.9	141	188	259	306	368	446	461	519	620	865	972	1147	1242
PT1.2SPM350	350	36.1	44.3	69.6	115	165	219	302	357	430	520	538	606	724	1010	1134	1338	1449
PT1.2SPM400	400	41.2	50.6	79.6	132	189	251	345	408	491	594	614	693	827	1154	1296	1529	1656
PT1.2SPM500	500	51.5	63.2	99.5	165	236	314	431	510	614	743	768	866	1034	1442	1620	1911	2070
PT1.2SPM600	600	61.8	75.9	119	198	283	376	517	612	737	892	922	1039	1241	1731	1944	2293	2484
PT1.2SPM700	700	72.1	88.5	139	231	330	439	604	714	859	1040	1075	1212	1448	2019	2268	2675	2898
PT1.2SPM800	800	82.4	101	159	264	377	502	690	816	982	1189	1229	1385	1654	2308	2592	3058	3312
PT1.2SPM900	900	92.7	114	179	297	424	564	776	918	1105	1337	1382	1558	1861	2596	2916	3440	3726
PT1.2SPM1000	1000	103	126	199	330	472	627	862	1020	1228	1486	1536	1732	2068	2885	3240	3822	4140
PT1.2SPM1100	1100	113	139	219	363	519	690	949	1122	1350	1634	1690	1905	2275	3173	3563	4204	4554



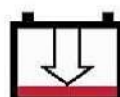
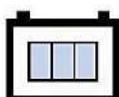
Discharge Data Table

Discharge performance data after fully charged by constant current according to IEC60623

Available amperes at +20°C ±5°C(+68°F ±9°F)

Final voltage: 1.00V/cell

Cell Type	Capacity (C5 Ah)	Discharge Time in Hours							Discharge Time in minutes							Time in Seconds		
		10	8	5	3	2	1.5	1	45	30	20	15	10	5	1	30	5	1
PT1.2SPM10	10	1.17	1.32	2.02	3.43	4.94	6.57	9.83	11.2	15.1	18.5	20.6	23.2	27.4	38.0	42.1	53.3	58.4
PT1.2SPM20	20	2.12	2.60	4.02	6.66	9.62	12.9	18.1	21.6	30.2	36.9	39.2	43.4	51.9	73.0	81.2	97.5	103.8
PT1.2SPM30	30	3.18	3.87	6.03	10.0	14.4	19.4	27.2	32.4	41.2	50.4	52.1	59.2	70.7	100	111	133	142
PT1.2SPM40	40	4.24	5.16	8.04	13.3	19.2	25.8	36.2	43.2	55.0	67.2	69.4	79.0	94.3	133	148	177	189
PT1.2SPM50	50	5.30	6.45	10.0	16.6	24.1	32.3	45.3	54.1	68.7	84.0	88.8	98.7	118	166	185	222	236
PT1.2SPM60	60	6.37	7.74	12.1	20.0	28.9	38.7	54.3	64.9	82.5	101	104	118	141	199	222	266	283
PT1.2SPM70	70	7.43	9.03	14.1	23.3	33.7	45.2	63.4	75.7	96.2	118	121	138	165	232	259	310	330
PT1.2SPM80	80	8.49	10.3	16.1	26.6	38.5	51.7	72.4	86.5	110	134	139	158	189	265	295	355	378
PT1.2SPM90	90	9.55	11.6	18.1	30.0	43.3	58.1	81.5	97.3	124	151	156	178	212	299	332	399	425
PT1.2SPM100	100	10.6	12.9	20.1	33.3	48.1	64.6	90.5	108	137	168	174	197	236	332	369	443	472
PT1.2SPM120	120	12.7	15.5	24.1	39.9	57.7	77.5	109	130	165	201	208	237	283	398	443	532	566
PT1.2SPM150	150	15.9	19.3	30.1	49.9	72.2	98.9	136	162	208	252	260	296	354	498	554	665	708
PT1.2SPM200	200	21.2	25.8	40.2	66.6	96.2	129	181	216	275	336	347	395	472	664	739	887	944
PT1.2SPM250	250	26.5	32.2	50.2	83.2	120	161	226	270	344	420	434	494	589	829	923	1108	1180
PT1.2SPM300	300	31.8	38.7	60.3	100	144	194	272	324	412	504	521	592	707	995	1108	1330	1416
PT1.2SPM350	350	37.1	45.1	70.3	117	168	226	317	378	481	588	607	691	825	1161	1293	1552	1652
PT1.2SPM400	400	42.4	51.6	80.4	133	192	258	362	432	550	672	694	790	943	1327	1477	1773	1888
PT1.2SPM500	500	53.0	64.5	100	166	241	323	453	541	687	840	868	987	1179	1659	1847	2217	2360
PT1.2SPM600	600	63.7	77.4	121	200	289	387	543	649	825	1007	1041	1184	1415	1991	2216	2660	2832
PT1.2SPM700	700	74.3	90.3	141	233	337	452	634	757	962	1175	1215	1382	1650	2322	2585	3103	3304
PT1.2SPM800	800	84.9	103	161	266	385	517	724	865	1100	1343	1389	1579	1886	2654	2954	3547	3776
PT1.2SPM900	900	95.5	116	181	300	433	581	815	973	1237	1511	1562	1777	2122	2986	3324	3990	4248
PT1.2SPM1000	1000	106	129	201	333	481	646	905	1081	1375	1679	1736	1974	2358	3318	3693	4434	4720
PT1.2SPM1100	1100	117	142	221	366	529	710	996	1189	1512	1847	1909	2171	2593	3649	4082	4877	5192



Calculation Methods

Information required for battery capacity calculation

The following information needed for a precise battery capacity calculation:

Nominal voltage of the system	Load current required	Backup time required
Maximum voltage (for charging)	Minimum voltage	Temperature range
Battery layout and available space	Physical condition	

Float Voltage Operation

In these conditions the float voltage, being the voltage at which the general load circuit will operate, then a decision will have to be reached on the cell float voltage needed to maintain the battery in the required condition.

$$\text{Number of cells required} = \frac{\text{Circuit voltage}}{\text{Cell Float voltage}} \quad \text{Minimum cell voltage} = \frac{\text{Minimum D.C. voltage}}{\text{Number of cells}}$$

The most commonly used float voltages are 1.40-1.48 voltage per cell, but the exact figure has to be related carefully to circumstances.

For Example

A NILE Nickel Cadmium battery is required to maintain an inverter load of 50KVA at 0.8 power factor for a backup time of 30 minutes, at 20~25°C temperature. The DC voltage to the inverter operates within the limit of 265 volts with the battery on float charge to a minimum of 202 volts at end of back up time. The inverter has an 85% efficiency rate.

-Number of Cells (at recommended float of 1.44VPC) = $265/1.44 \approx 184$ cells

-Minimum Cell Voltage = $202/184 \approx 1.10$ volts per cell

-Maximum Battery Current

$$= \frac{\text{Inverter load in KVA} \times \text{Power factor}}{\text{Min. cell voltage} \times \text{Number of cells} \times \text{Inverter efficiency}}$$

$$= \frac{50\text{KVA} \times 0.80}{1.10 \times 184 \times 0.85} = 232.5 \text{ Amps}$$

We shall choose the battery with capacity equal or just above 232.5Amps.

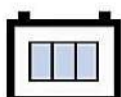
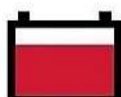
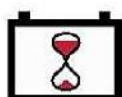
To meet the 30 minutes backup time requirement, we determine to choose the battery size from PT1.2SPMRange.

From our catalogue data, the cell type is PT1.2SPM300.

Battery shall comprise 184 cells of NILE Nickel Cadmium type PT1.2SPM300.

System Voltage	Number of Cells	Spread Range Number of Cells
24	20	18 ~ 21
36	30	27 ~ 31
48	40	36 ~ 41
110	92	88 ~ 93
220	184	180 ~ 188

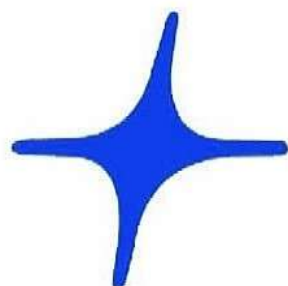
The number of cell in a battery may be determined by simply dividing the nominal voltage of the system by the nominal volt of a cell (1.2 volts).



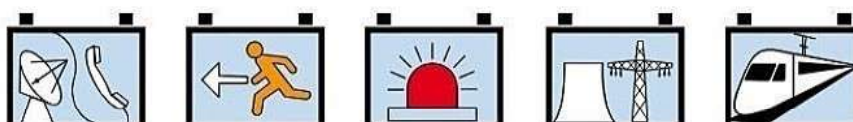
Guarantee

V4.0

Sealed NiCd - Low Maintenance PT1.2SPH Pocket plate Range 10-500Ah



**»Premium quality for
uninterrupted communication«**



www.PlatinIran.com



Sealed NiCd - Low Maintenance
PT1.2SPH Pocket plate Range
10-500Ah

The block battery - for dependability

The wide range of low, medium and high capacity types makes accurate selection easy, based on discharge time and end of discharge voltage. Robust construction and generous electrolyte reserve enable the battery to withstand wide temperature fluctuations in stationary cycling behaviour over its 20+ years' life.

Built with a future Nickel-cadmium plates are completely reliable, with no risk of thermal runaway or sudden death.

Generally operating between temperatures of -40°C to +60°C (-4°F to +140°F), they can tolerate extremes of -50°C to +70°C (-58°F to +158°F) for short periods.

With only periodic checks, the block battery will provide up to 20+ years' completely faithful service.

Trouble - free long cycle life

The NILE nickel-cadmium block battery's unique electrochemistry enables it to regularly withstand any depth of discharge.

Following a deep discharge the block battery is designed to recharge very quickly and economically, using standard single or two-level charging equipment.

Be sure of a low overall cost

The Ni-Cd block battery is the most highly cost-efficient solution to stored power requirements.

- | | |
|---------------------------|----------------------|
| No downtime | No replacement costs |
| Minimal maintenance | Ease of installation |
| 20+ years' operating life | |

Easy storage and installation

Nickel-cadmium block batteries are quick and easy to install as original equipment and may be stored for many years in a discharged state under correct conditions.

On installation a simple bolted connector enables the battery to be rapidly commissioned.

Assured reliability

Ni-Cd is equally dependable in controlled city environments or harsh, unpredictable conditions in the world's most remote and unpopulated areas.

The Ni-Cd battery's block construction makes it highly resistant to electrical abuse and transport over rough terrain, precluding risk of subsequent failure.

Optimized for performance:

An electrolyte solution of potassium hydroxide and a small amount of lithium hydroxide acts only as an ion transfer medium, delivering optimum performance without causing base material degradation.

Good reserves and circulation of the electrolyte are achieved by a wide inter-plate space.

Injection moulded plastic grids both separate plate and insulate plate edges. For extremely low temperatures a special high density electrolyte is available.

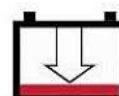
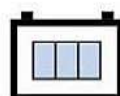
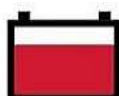
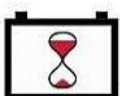
The block battery is fitted with a specially designed flame arresting flip top vent and does not produce corrosive vapours. The tough polypropylene casing ensures the battery's structural integrity throughout its long life.

Supports these Single Cell ranges with:

Quality approved manufacture to ISO 9001 and the TUV certification.

Single Cell batteries have been developed in line with the safety requirements of EN-50272-2 and components used (such as insulated cable connectors and end lug covers) are defined to ensure high protection against electric shocks (Ip2 level).

Full recycling service to protect the environment.



Protective cover

- To prevent external short-circuits
- In line with EN 50272-2 (safety) with ip2 level

Plate group bus

- Connects the plate tabs with the terminal post.
- Plate tabs and terminal post are projection-welded to the plate group bus.

Plate

Horizontal pockets of double-perforated steel strips.

Cell container

Material: translucent/transparent polypropylene

Flame-arresting vents

Material: polypropylene.

Plate tab

Spot-welded both to the plate side-frames and to the upper edge of the pocket plate.

Separating grids

- These separate the plates and insulate the plate frames from each other.
- The grids allow free circulation of electrolyte between the plates.

Plate frame

Seals the plate pockets and serves as a current collector.

The NiLE Single Cell ranges fully comply and exceed the IEC 60623 standard requirements.

Application

PT1.2SPH Series nickel cadmium batteries are designed for general industrial applications where absolute reliability is a necessity. Service-proven pocket-plate technology ensures long uninterrupted battery life without the risk of sudden loss of power.

PT1.2SPH Series batteries are suitable for high discharge rate applications (30 minutes and below) such as switchgear tripping, diesel engine starting, UPS, etc.

Performance Data

High tolerance to electrical abuses such as overcharge and over discharge.

High tolerance to rough handling and mechanical abuse due to strong components and robust construction.

Trouble-free long cycle life .

No risk of sudden death due to the chemistry and the cell structure.

Wide operating temperature: -40°C to 60°C.

Generous electrolyte reserve for long maintenance intervals.

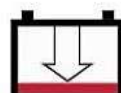
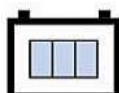
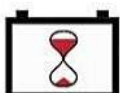
Clear (MBS) or translucent (PP) plastic cell case for easy electrolyte level inspection.

Plastic grid spacers eliminate separator deterioration problem.

Custom cell dimensions available.

20+ years service life in stationary applications.

Conforms to IEC60623.



Battery Charging

It is recommended to use Constant Voltage method of charging for Nickel Cadmium Batteries, usually with current limitation to C/5 or C/10. Charging voltages must be regularly checked. To optimize the battery performance, it is necessary to ensure that the voltage is kept within the following limits:

Batteries can be charged in:

- ◆ constant voltage mode with load connected
or
- ◆ constant current or declining current mode when load is isolated.

High rate or over charge will not damage the battery.

Minimum float charging current: 2 mA per Ah.

- ◆ Constant voltage mode:

For continuous parallel operation:

- Float voltage: 1.40 - 1.45 V/cell for PT1.2SPL, PT1.2SPM & PT1.2SPH
- Boost Voltage:

PT1.2SPL: 1.60 - 1.70 V/cell
PT1.2SPM: 1.60 - 1.65 V/cell
PT1.2SPHB: 1.60 - 1.65 V/cell

A higher voltage will reduce the charge duration and increase the efficiency of recharging but may increase water consumption.

Single stage charging (without boost):

PT1.2SPL: 1.47 - 1.50 V/cell
PT1.2SPM: 1.46 - 1.49 V/cell
PT1.2SPH: 1.45 - 1.48 V/cell

For starting application:

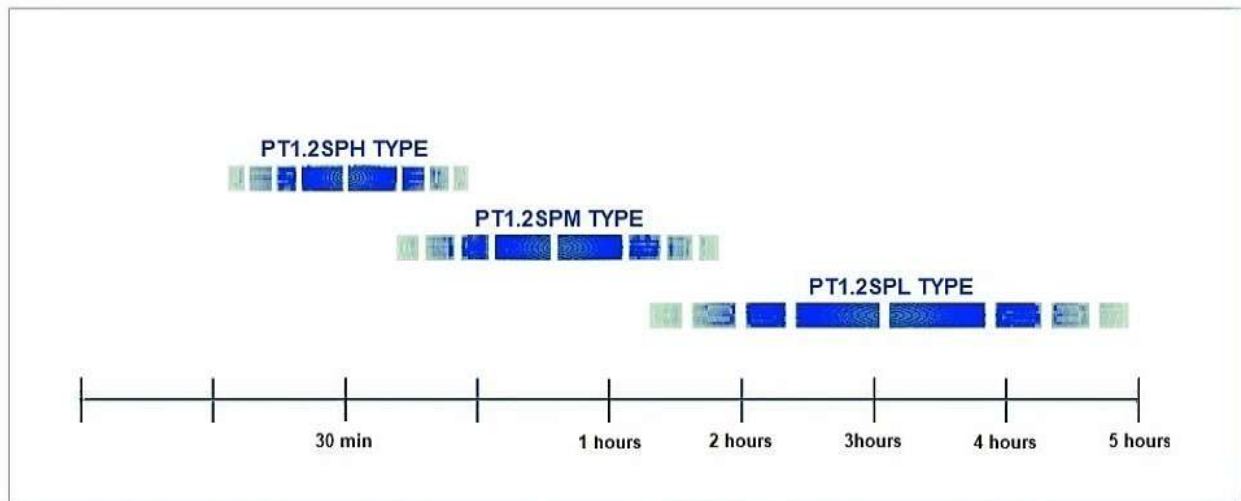
- Recommended charging voltage. 1.50 - 1.55 V/cell.

- ◆ Constant current mode:

- Normal charging: 0.2 C5 A for 8 hours
- Recommended for quick charging: 0.4 C5 A for 2.5 hours followed by 0.2 C5 A for 2.5 hours

Recommended Type Selection

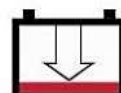
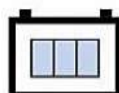
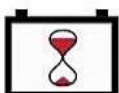
According to backup time required by application:



Initial Charging

The whole charge should preferably be carried out at constant current. The charging time is inversely proportional to the current which is set by the current limit of the charging equipment.

Recommended rates for the first charging: 0.2 C5A for 10 hours 0.1 C5A for 20 hours

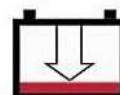
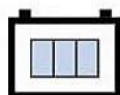
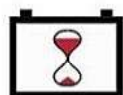


NiCd Pocket Plate PT1.2SPH Range Electrical Specifications & Dimensions

Cell Type	Nominal Voltage (V)	Capacity (C5 Ah)	Dimensions (mm/inch)						Weight (kg/lb.)				Terminal	Cell Case Material
			Length		Width		Height		Without Electrolyte		With Electrolyte			
PT1.2SPH10	1.2	10	55	2.2	134	5.3	270	10.6	1.2	2.6	2.2	4.8	M10	PP
PT1.2SPH20	1.2	20	55	2.2	134	5.3	270	10.6	1.7	3.7	2.6	5.7	M10	PP
PT1.2SPH30	1.2	30	70	2.8	140	5.5	295	11.6	2.8	6.2	4.3	9.5	M16	PP
PT1.2SPH40	1.2	40	80	3.1	140	5.5	365	14.4	4.2	9.3	6	13.2	M16	PP
PT1.2SPH50	1.2	50	80	3.1	140	5.5	365	14.4	4.5	9.9	6.2	13.7	M16	PP
PT1.2SPH60	1.2	60	80	3.1	140	5.5	365	14.4	4.8	10.6	6.5	14.3	M16	PP
PT1.2SPH70	1.2	70	105	4.1	165	6.5	345	13.6	6.8	15.0	9.2	20.3	M20	PP
PT1.2SPH80	1.2	80	105	4.1	165	6.5	345	13.6	7.2	15.9	9.6	21.2	M20	PP
PT1.2SPH90	1.2	90	105	4.1	165	6.5	345	13.6	7.8	17.2	10	22.0	M20	PP
PT1.2SPH100	1.2	100	165	6.5	167	6.6	345	13.6	9.2	20.3	13.5	29.8	M20	PP
PT1.2SPH120	1.2	120	165	6.5	167	6.6	345	13.6	9.8	21.6	14	30.9	M20	PP
PT1.2SPH150	1.2	150	165	6.5	167	6.6	345	13.6	11	24.2	16	35.3	M20	PP
PT1.2SPH200	1.2	200	170	6.7	285	11.2	350	13.8	18.5	40.8	26	57.3	2 x M20	ABS
PT1.2SPH250	1.2	250	170	6.7	285	11.2	350	13.8	20	44.1	27.5	60.6	2 x M20	ABS
PT1.2SPH300	1.2	300	175	6.9	290	11.4	500	19.7	25	55.1	36	79.3	2 x M20	ABS
PT1.2SPH350	1.2	350	175	6.9	290	11.4	500	19.7	26	57.3	37	81.5	2 x M20	ABS
PT1.2SPH400	1.2	400	186	7.3	398	15.7	565	22.2	41	90.4	55	121	3 x M20	ABS
PT1.2SPH500	1.2	500	186	7.3	398	15.7	565	22.2	43	94.8	57	126	3 x M20	ABS

NILE PT1.2SPH batteries fulfil all requirements specified by IEC publication 60623.

Transparent case optional.



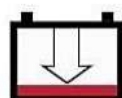
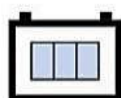
Discharge Data Table

Discharge performance data after fully charged by constant current according to IEC60623

Available amperes at +20°C ±5°C(+68°F ±9°F)

Final voltage: 1.14V/cell

Cell Type	Capacity (C5 Ah)	Discharge Time in Hours							Discharge Time in minutes							Time in Seconds		
		10	8	5	3	2	1.5	1	45	30	20	15	10	5	1	30	5	1
PT1.2SPH10	10	1.00	1.18	1.87	3.05	4.45	5.83	8.16	9.14	12.0	14.7	16.8	19.7	25.2	39.6	46.2	57.3	68.8
PT1.2SPH20	20	2.01	2.36	3.74	6.12	8.95	11.7	16.5	18.5	24.7	30.2	34.4	37.0	51.1	80.3	93.0	118	124
PT1.2SPH30	30	3.01	3.54	5.61	9.18	13.4	17.5	24.8	27.8	37.0	45.3	51.6	56.5	76.6	120	140	177	187
PT1.2SPH40	40	4.02	4.72	7.48	12.2	17.9	23.3	33.1	37.0	49.4	60.4	68.8	76.0	102	161	186	237	249
PT1.2SPH50	50	5.02	5.91	9.35	15.3	22.4	29.2	41.3	46.3	61.7	75.5	86.0	95.5	128	201	232	296	311
PT1.2SPH60	60	6.02	7.09	11.2	18.4	26.8	35.1	49.6	55.5	74.1	90.6	103	115	153	241	279	355	373
PT1.2SPH70	70	7.03	8.27	13.1	21.4	31.4	40.9	57.8	64.8	86.4	106	120	135	179	281	325	414	435
PT1.2SPH80	80	8.03	9.45	14.9	24.4	35.8	46.8	66.1	74.0	98.7	121	138	154	204	321	372	473	498
PT1.2SPH90	90	9.04	10.6	16.8	27.6	40.3	52.6	74.4	83.3	112	136	155	172	230	361	418	533	559
PT1.2SPH100	100	10.1	11.9	18.7	30.6	44.7	58.5	82.6	92.6	124	151	172	191	255	401	465	591	621
PT1.2SPH120	120	12.0	14.2	22.4	36.8	53.7	70.1	99.2	111	148	182	206	230	307	482	558	710	745
PT1.2SPH150	150	15.1	17.8	28.0	45.9	67.2	87.7	124	139	185	226	258	306	383	603	698	888	932
PT1.2SPH200	200	20.1	23.6	37.4	61.2	89.5	117	165	185	247	302	344	382	511	804	930	1183	1243
PT1.2SPH250	250	25.1	29.5	46.7	76.5	111	146	207	232	309	377	430	517	638	1005	1162	1479	1553
PT1.2SPH300	300	30.1	35.5	56.1	91.8	134	175	248	277	371	453	516	573	766	1206	1395	1774	1864
PT1.2SPH350	350	35.2	41.4	65.4	107	156	204	289	324	432	529	602	688	894	1406	1628	2071	2175
PT1.2SPH400	400	40.2	47.3	74.7	122	179	234	330	370	494	604	688	766	1022	1607	1860	2366	2486
PT1.2SPH500	500	50.2	59.0	93.4	153	224	292	413	463	617	755	860	957	1278	2010	2325	2958	3107



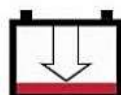
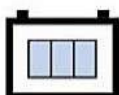
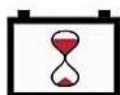
Discharge Data Table

Discharge performance data after fully charged by constant current according to IEC60623

Available amperes at +20°C ±5°C(+68°F ±9°F)

Final voltage: 1.10V/cell

Cell Type	Capacity (C5 Ah)	Discharge Time in Hours							Discharge Time in minutes							Time in Seconds		
		10	8	5	3	2	1.5	1	45	30	20	15	10	5	1	30	5	1
PT1.2SPH10	10	1.01	1.22	1.93	3.18	4.67	6.11	8.69	10.4	14.2	17.4	19.8	23.5	29.7	46.0	53.6	69.1	72.7
PT1.2SPH20	20	2.04	2.45	3.88	6.37	9.36	12.2	17.5	21.1	29.2	35.8	40.8	48.2	60.7	93.8	108	136	151
PT1.2SPH30	30	3.06	3.67	5.82	9.55	14.0	18.4	26.3	31.6	43.9	53.7	61.2	72.3	91.0	141	163	203	228
PT1.2SPH40	40	4.07	4.89	7.76	12.7	18.7	24.4	35.1	42.1	58.5	71.6	81.6	96.4	121	188	217	271	304
PT1.2SPH50	50	5.09	6.11	9.70	15.9	23.4	30.6	43.9	52.7	73.2	89.5	102	121	152	234	271	339	379
PT1.2SPH60	60	6.11	7.33	11.6	19.1	28.0	36.8	52.7	63.2	87.8	107	122	144	182	282	326	407	456
PT1.2SPH70	70	7.13	8.56	13.5	22.2	32.7	42.8	61.5	73.8	102	125	142	169	212	328	379	474	532
PT1.2SPH80	80	8.15	9.78	15.5	25.5	37.4	49.0	70.3	84.3	117	143	164	192	243	375	434	542	607
PT1.2SPH90	90	9.12	10.9	17.5	28.6	42.0	55.1	79.1	94.9	132	161	184	217	273	422	488	610	683
PT1.2SPH100	100	10.2	12.3	19.4	31.8	46.8	61.2	87.9	105	146	179	204	240	303	469	542	677	760
PT1.2SPH120	120	12.2	14.7	23.3	38.2	56.1	73.4	106	127	176	215	245	289	364	562	650	813	911
PT1.2SPH150	150	15.3	18.3	29.0	47.8	70.2	91.7	132	159	220	268	306	362	455	704	813	1016	1139
PT1.2SPH200	200	20.4	24.4	38.8	63.6	93.5	123	176	211	293	358	408	482	606	938	1085	1354	1518
PT1.2SPH250	250	25.5	30.6	48.5	79.6	117	153	220	264	366	447	511	602	758	1173	1356	1693	1898
PT1.2SPH300	300	30.6	36.7	58.1	95.4	140	183	264	317	439	537	612	722	910	1407	1626	2031	2278
PT1.2SPH350	350	35.6	42.8	67.9	111	163	214	307	369	513	626	715	842	1061	1641	1897	2371	2657
PT1.2SPH400	400	40.8	48.9	77.6	127	187	245	352	422	586	715	816	963	1213	1875	2168	2709	3036
PT1.2SPH500	500	50.9	61.1	97.0	159	233	306	439	527	732	895	1021	1204	1515	2344	2710	3386	3796



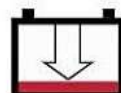
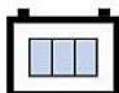
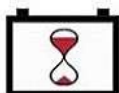
Discharge Data Table

Discharge performance data after fully charged by constant current according to IEC60623

Available amperes at +20°C ±5°C(+68°F ±9°F)

Final voltage: 1.05V/cell

Cell Type	Capacity (C5 Ah)	Discharge Time in Hours							Discharge Time in minutes							Time in Seconds		
		10	8	5	3	2	1.5	1	45	30	20	15	10	5	1	30	5	1
PT1.2SPH10	10	1.03	1.25	2.00	3.27	4.83	6.4	9.3	11.0	16.5	20.8	23.6	27.9	35.3	54.4	63.9	78.8	85.9
PT1.2SPH20	20	2.08	2.51	3.98	6.55	9.67	12.8	18.6	22.1	33.3	43.1	48.7	57.7	72.5	112	127	145	171
PT1.2SPH30	30	3.12	3.76	5.97	9.82	14.5	19.2	27.9	33.2	49.9	64.6	73.1	86.5	109	167	191	221	257
PT1.2SPH40	40	4.16	5.01	7.96	13.1	19.4	25.6	37.1	44.3	66.5	86.1	97.5	115	145	223	255	297	344
PT1.2SPH50	50	5.19	6.27	9.95	16.4	24.2	32.1	46.4	55.3	83.2	107	122	145	181	279	317	373	430
PT1.2SPH60	60	6.23	7.52	11.9	19.6	29.1	38.4	56.0	66.4	99.6	129	146	173	218	334	381	450	515
PT1.2SPH70	70	7.27	8.77	13.9	23.0	33.9	44.5	65.2	77.5	117	151	171	202	254	391	445	526	601
PT1.2SPH80	80	8.31	10.0	16.0	26.2	38.7	51.6	74.4	88.6	133	172	195	230	290	446	509	602	687
PT1.2SPH90	90	9.31	11.3	17.9	29.4	43.6	57.4	83.5	100	150	194	219	260	327	501	572	671	772
PT1.2SPH100	100	10.4	12.6	19.9	32.8	48.3	64.5	92.6	111	167	215	244	288	362	558	636	747	858
PT1.2SPH120	120	12.5	15.0	23.8	39.2	58.0	76.8	111	133	199	258	293	346	435	669	763	899	1030
PT1.2SPH150	150	15.6	18.8	29.8	49.1	72.6	96.5	139	167	249	323	365	433	544	836	954	1196	1288
PT1.2SPH200	200	20.8	25.0	39.8	65.4	96.8	128	185	222	333	430	487	577	725	1115	1272	1494	1716
PT1.2SPH250	250	26.0	31.3	49.7	81.8	121	161	232	277	416	538	609	721	906	1394	1590	2020	2147
PT1.2SPH300	300	31.2	37.6	59.7	98.2	145	193	279	333	500	645	731	865	1088	1673	1908	2241	2576
PT1.2SPH350	350	36.3	43.9	69.6	114.2	169	225	325	387	583	753	853	1009	1269	1952	2225	2690	3005
PT1.2SPH400	400	41.6	50.1	79.6	130.6	193	256	372	443	665	861	975	1153	1450	2231	2543	2995	3434
PT1.2SPH500	500	51.9	62.6	99.5	163.5	242	321	464	554	832	1076	1218	1442	1813	2789	3179	3742	4292



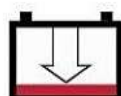
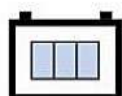
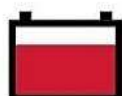
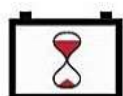
Discharge Data Table

Discharge performance data after fully charged by constant current according to IEC60623

Available amperes at +20°C ±5°C(+68°F ±9°F)

Final voltage: 1.00V/cell

Cell Type	Capacity (C5 Ah)	Discharge Time in Hours							Discharge Time in minutes							Time in Seconds		
		10	8	5	3	2	1.5	1	45	30	20	15	10	5	1	30	5	1
PT1.2SPH10	10	1.05	1.27	2.02	3.32	5.0	6.55	9.59	11.2	17.3	23.3	27.2	32.1	41.1	64.2	72.4	91.7	98.4
PT1.2SPH20	20	2.11	2.53	4.04	6.64	10.0	13.1	19.2	22.5	35.1	47.8	56.1	66.6	84.8	128	146	184	203
PT1.2SPH30	30	3.17	3.79	6.06	10.0	15.0	19.6	28.8	33.8	52.7	71.7	84.1	99.7	127	192	218	275	305
PT1.2SPH40	40	4.22	5.06	8.08	13.3	19.9	26.3	38.4	45.0	70.2	95.6	112	133	170	255	291	367	406
PT1.2SPH50	50	5.27	6.32	10.1	16.6	24.9	32.8	48.0	56.3	87.7	120	140	166	212	319	364	458	508
PT1.2SPH60	60	6.33	7.58	12.1	19.9	29.9	39.3	57.6	67.9	106	144	168	200	255	383	437	550	610
PT1.2SPH70	70	7.38	8.84	14.1	23.3	34.9	45.9	67.1	79.0	123	167	196	233	297	446	510	641	712
PT1.2SPH80	80	8.44	10.1	16.2	26.6	39.9	52.5	76.6	90.1	140	191	224	266	339	511	582	734	813
PT1.2SPH90	90	9.48	11.4	18.2	30.0	44.8	59.0	86.3	101	158	215	252	299	381	574	655	825	915
PT1.2SPH100	100	10.6	12.7	20.2	33.2	49.8	65.6	95.9	112	176	239	281	332	424	638	728	917	1017
PT1.2SPH120	120	12.6	15.2	24.2	39.9	59.7	78.7	115	135	211	287	336	399	509	766	874	1101	1219
PT1.2SPH150	150	15.8	18.9	30.3	49.9	74.6	98.4	144	169	263	358	420	499	636	957	1092	1375	1525
PT1.2SPH200	200	21.1	25.3	40.4	66.5	99.5	131	192	225	351	478	560	665	848	1277	1457	1834	2033
PT1.2SPH250	250	26.4	31.5	50.5	83.1	124	164	240	281	439	598	701	832	1060	1595	1821	2293	2541
PT1.2SPH300	300	31.7	37.9	60.6	99.7	149	197	287	338	527	717	841	997	1272	1914	2185	2752	3049
PT1.2SPH350	350	36.9	44.2	70.7	116	174	230	336	393	615	836	980	1164	1484	2233	2549	3210	3557
PT1.2SPH400	400	42.1	50.5	80.8	133	199	263	383	450	702	956	1121	1330	1696	2553	2913	3669	4065
PT1.2SPH500	500	52.7	63.2	101	167	249	328	479	563	878	1195	1401	1662	2121	3191	3641	4586	5081



Calculation Methods

Information required for battery capacity calculation

The following information needed for a precise battery capacity calculation:

Nominal voltage of the system	Load current required	Backup time required
Maximum voltage (for charging)	Minimum voltage	Temperature range
Battery layout and available space	Physical condition	

Floated Voltage Operation

In these conditions the float voltage, being the voltage at which the general load circuit will operate, then a decision will have to be reached on the cell float voltage needed to maintain the battery in the required condition.

$$\text{Number of cells required} = \frac{\text{Circuit voltage}}{\text{Cell Float voltage}} \quad \text{Minimum cell voltage} = \frac{\text{Minimum D.C. voltage}}{\text{Number of cells}}$$

The most commonly used float voltages are 1.40-1.48 voltage per cell, but the exact figure has to be related carefully to circumstances.

For Example

A NILE Nickel Cadmium battery is required to maintain an inverter load of 50KVA at 0.8 power factor for a backup time of 30 minutes, at 20~25°C temperature. The DC voltage to the inverter operates within the limit of 265 volts with the battery on float charge to a minimum of 202 volts at end of back up time. The inverter has an 85% efficiency rate.

-Number of Cells (at recommended float of 1.44VPC) = $265/1.44 \approx 184$ cells

-Minimum Cell Voltage = $202/184 \approx 1.10$ volts per cell

-Maximum Battery Current

$$= \frac{\text{Inverter load in KVA} \times \text{Power factor}}{\text{Min. cell voltage} \times \text{Number of cells} \times \text{Inverter efficiency}}$$

$$= \frac{50\text{KVA} \times 0.80}{1.10 \times 184 \times 0.85} = 232.5 \text{ Amps}$$

We shall choose the battery with capacity equal or just above 232.5Amps.

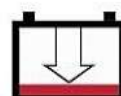
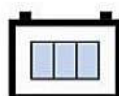
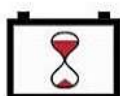
To meet the 30 minutes backup time requirement, we determine to choose the battery size from PT1.2 SPH Range.

From our catalogue data, the cell type is PT1.2 SPH 300.

Battery shall comprise 184 cells of NILE Nickel Cadmium type PT1.2 SPH 300.

Systm Vplage	Number of Cells	Spread Range Nnumber of Cells
24	20	18 ~ 21
36	30	27 ~ 31
48	40	36 ~ 41
110	92	88 ~ 93
220	184	180 ~ 186

The number of cells in a battery may be determined by simply dividing the nominal voltage of the system by the nominal voltage of a cell (1.2 Volts).

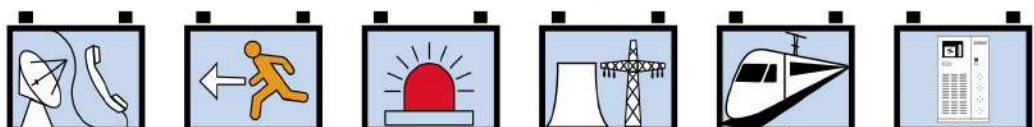


Guarantee

Ultra-low Maintenance Gas Recombination NiCd Battery



»Premium quality for
uninterrupted communication«





ULTRA-HIGH RELIABILITY ULTRA-LOW MAINTENANCE

NILE PT1.2UPL series is a powerful combination of proven pocket-plate construction and advanced design from the world leader in industrial nickel-cadmium battery technology. With a 20-year life and ultra-low maintenance requirements, NILE PT1.2UPL series has become the cost-effective first choice – worldwide – for trouble-free standby power in the most demanding applications.

More Reliable

PT1.2UPL can continue to supply power for 20 years or more thanks to its corrosion free construction and NILE PT1.2UPL tried and tested pocket-plate technology. No physical plate degradation and no sudden death with resulting costly downtime

Low life-cycle Cost

The cost of ownership of a battery system can be calculated across three distinct phases: the initial investment, including the cost of purchase and installation; on-going maintenance costs, including unexpected and expensive downtime periods; finally, the battery replacement costs, which include the expense of disposal as well as renewal. PT1.2UPL is the most cost-effective solution for any application – onshore or offshore where long battery life, low maintenance costs, resistance to corrosion and total reliability are prime operating requirements.



More Adaptable

Offshore oil and gas, emergency lighting, fire and security, telecoms, utilities, photovoltaics. You can depend upon PT1.2UPL for perfect peace of mind.

No Water Filling

No water filling is necessary during the PT1.2UPL 20-year service life because of the controlled recombination and the valve regulated venting system (topping-up is possible if required).

More Durable

PT1.2UPL will survive treatment which would destroy lead acid batteries. This battery accepts ripple currents up to 0.2 C5 A and can be over-discharged or reversed without damage. Prolonged abusive overcharge can easily be compensated by refurbishment with water.

More Environmentally Tolerant

PT1.2UPL performs in the most severe conditions and can operate over a temperature range from 0°C to +40°C (+32°F to +104°F). It can survive extremes of temperature from as low as -50°C to as high as +70°C (-58°F to as high as +158°F).

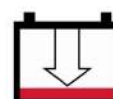
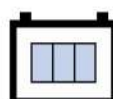
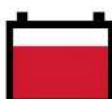
More Manageable

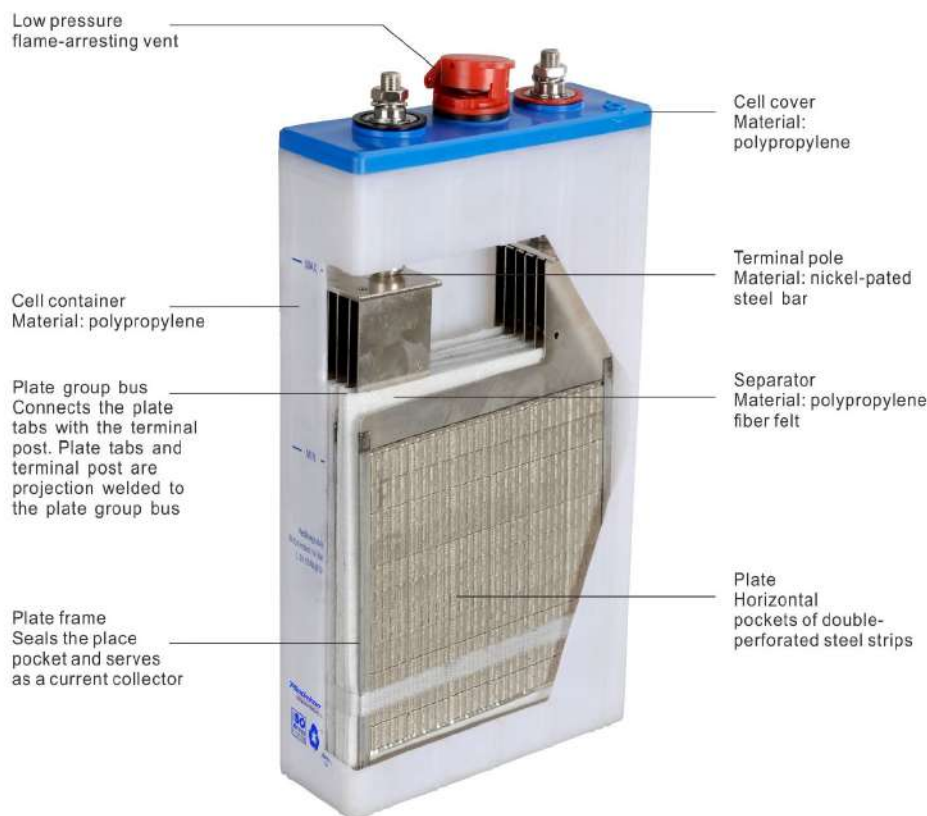
Compact and lightweight, PT1.2UPL is easy to transport and install. It can be stored for one year without need of refresher charges.

Float-corrected Data

Many nickel-cadmium batteries are used in stationary standby power applications where discharges occur infrequently and the battery is continuously charged by a float or constant potential charge. Under these circumstances there is a modification in the level of the discharge curve and allowances must be made for this when dimensioning the battery.

In order to simplify this process, the data NILE supplies in this publication takes into account this phenomenon. The data published by NILE is the performance after prolonged floating and it can be used directly to perform the battery calculation. This phenomenon occurs with all nickel cadmium batteries, but some other manufacturers of nickel-cadmium batteries may not take this effect into account in published data.





Meeting International Standards

NILE batteries are manufactured under a strict ISO 9001 regime. Highest quality materials and rigorous quality checking procedures ensure all relevant international standards are met, including IEC 60623-2001, IEC 62259-2003.

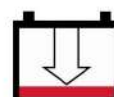
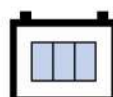
Technology Superiority

- ☐ The electrode use steel tape as the framework. No react with electrolyte and remain complete during the whole service life.
- ☐ The separator is made of polypropylene fiber felt.
- ☐ No electrolyte replacement within service life.
- ☐ Terminals are made of steel or copper which has excellent electric conductivity and high mechanical strength.
- ☐ Battery case is made of high strength, corrosion resisting, translucent engineering plastics.
- ☐ No sudden death risk.
- ☐ Gas recombination efficiency can reach 85%~95%.
- ☐ Ultra high gas recombination efficiency, which reduces 90% water consumption.

Conforms to IEC/EN 62259.

Application

- | | | | |
|--|--|---|--|
| ☐ Offshore oil and gas | ☐ Process control | ☐ Telecommunications | ☐ Wind/Solar energy |
| ☐ Fire and security systems | ☐ Switchgear | ☐ Mass transit | ☐ UPS |
| ☐ Railway signaling | | | |



Battery Charging

It is recommended to use Constant Voltage method of charging for Nickel Cadmium Batteries, usually with current limitation to C/5 or C/10. Charging voltages must be regularly checked. To optimize the battery performance, it is necessary to ensure that the voltage is kept within the following limits:

Batteries can be charged in:

- ◆ **constant voltage mode with load connected**
- or
- ◆ **constant current or declining current mode**
when load is isolated.

High rate or over charge will not damage the battery.

Minimum float charging current: 2 mA per Ah.

- ◆ **Constant voltage mode:**

A. Two level constant potential charging:

- Float voltage: 1.42 V/cell
- Boost Voltage: 1.45 V/cell

Alternatively, if a faster rate of recharge is required, a voltage limit of 1.55 V/cell with a current limit of 0.1 C5 Ampere can be used. However, if frequent recharges are required this will increase the rate of water loss and gas generation.

B. Single level float charging:

- Float voltage: 1.42 V/cell

For use at temperatures outside the range of +15°C to +25°C (+59°F to +77°F), the correcting factor for charge voltage is $-3 \text{ mV/}^{\circ}\text{C/cell}$ ($-1.7 \text{ mV/}^{\circ}\text{F/cell}$).

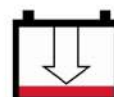
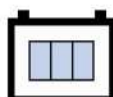
- ◆ **Constant current mode:**

- Normal charging: 0.1 C A for 16 hours

Initial Charging

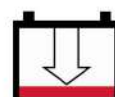
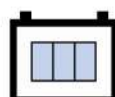
The whole charge should preferably be carried out at constant current. The charging time is inversely proportional to the current which is set by the current limit of the charging equipment.

Recommended rates for the first charging according to IEC 62259: □ □ 0.1 C5A for 16 hours



PT1.2UPL Series Electrical Specifications & Dimensions

Cell Type	Nominal Voltage (V)	Capacity (C ₅ Ah)	Max. External Dimensions (mm/inch)						Max. Weight (kg/lb.)		Electrolyte Volume (L)	Terminal	Container Material
			Length		Width		Height						
PT1.2UPL30	1.2	30	70	2.8	135	5.3	245	9.6	2.8	6.2	0.8	M10	PP
PT1.2UPL40	1.2	40	70	2.8	135	5.3	245	9.6	3.0	6.6	0.8	M10	PP
PT1.2UPL50	1.2	50	70	2.8	135	5.3	285	11.2	4.0	8.8	0.9	M16	PP
PT1.2UPL60	1.2	60	70	2.8	135	5.3	285	11.2	4.2	9.3	0.8	M16	PP
PT1.2UPL70	1.2	70	70	2.8	135	5.3	285	11.2	4.5	9.9	0.8	M16	PP
PT1.2UPL80	1.2	80	80	3.1	140	5.5	365	14.4	5.8	12.8	1.7	M10	PP
PT1.2UPL90	1.2	90	80	3.1	140	5.5	365	14.4	6.0	13.2	1.7	M10	PP
PT1.2UPL100	1.2	100	80	3.1	140	5.5	365	14.4	6.2	13.7	1.6	M10	PP
PT1.2UPL120	1.2	120	105	4.1	165	6.5	345	13.6	8.5	18.7	2.5	M20	PP
PT1.2UPL150	1.2	150	105	4.1	165	6.5	345	13.6	9	19.8	2.2	M20	PP
PT1.2UPL200	1.2	200	100	3.9	172	6.8	450	17.7	12.0	26.4	2.8	M20	PP
PT1.2UPL250	1.2	250	100	3.9	172	6.8	450	17.7	12.6	27.7	2.3	M20	PP
PT1.2UPL300	1.2	300	152	6.0	170	6.7	385	15.2	15.2	33.1	3.0	M20	PP
PT1.2UPL350	1.2	350	152	6.0	170	6.7	385	15.2	16.5	36.3	2.8	M20	PP
PT1.2UPL400	1.2	400	152	6.0	170	6.7	385	15.2	18	39.7	2.6	M20	PP
PT1.2UPL450	1.2	450	138	5.4	276	10.9	450	17.7	25.2	55.4	5.6	2 x M16	PP
PT1.2UPL500	1.2	500	138	5.4	276	10.9	450	17.7	26.5	58.3	5.0	2 x M16	PP
PT1.2UPL550	1.2	550	175	6.9	290	11.4	500	19.7	36.5	80.3	9.5	2 x M20	ABS
PT1.2UPL600	1.2	600	175	6.9	290	11.4	500	19.7	37.2	81.8	8.8	2 x M20	ABS
PT1.2UPL700	1.2	700	175	6.9	290	11.4	500	19.7	39.2	86.3	8.3	2 x M20	ABS
PT1.2UPL800	1.2	800	185	7.3	400	15.7	570	22.4	57.5	126.5	16.0	3 x M20	ABS
PL1.2UPL900	1.2	900	185	7.3	400	15.7	570	22.4	58.2	128.0	14.8	3 x M20	ABS
PT1.2UPL1000	1.2	1000	185	7.3	400	15.7	570	22.4	60.0	132.0	14.2	3 x M20	ABS



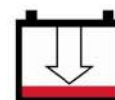
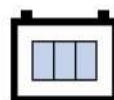
Discharge Data Table

Discharge performance data after fully charged by constant current according to IEC62259

Available amperes at +20°C ±5°C(+68°F ±9°F)

Final voltage: 1.14 V/cell

Cell Type	Capacity (C ₅ Ah)	Discharge Time in Hours							Discharge Time in minutes						Time in Seconds		
		10	8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
PT1.2UPL30	30	3.00	3.75	5.85	9.33	12.9	15.2	17.8	20.9	22.0	23.7	25.3	27.8	31.8	34.0	37.1	40.2
PT1.2UPL40	40	4.00	5.00	7.80	12.4	17.3	20.2	23.7	27.9	29.4	31.5	33.7	37.1	42.4	45.3	49.4	53.6
PT1.2UPL50	50	5.00	6.25	9.75	15.6	21.6	25.3	29.6	34.8	36.7	39.4	42.2	46.4	53.0	56.7	61.8	67.0
PT1.2UPL60	60	6.00	7.50	11.7	18.7	25.9	30.3	35.6	41.8	44.1	47.3	50.6	55.7	63.6	68.0	74.2	80.3
PT1.2UPL70	70	7.00	8.75	13.7	21.8	30.2	35.4	41.5	48.8	51.4	55.2	59.0	65.0	74.3	79.3	86.5	93.7
PT1.2UPL80	80	8.00	10.0	15.6	24.9	34.5	40.4	47.4	55.7	58.8	63.1	67.5	74.3	84.9	90.6	98.9	107
PT1.2UPL90	90	9.00	11.3	17.6	28.0	38.8	45.5	53.4	62.7	66.1	71.0	75.9	83.5	95.5	102	111	121
PT1.2UPL100	100	10.0	12.5	19.5	31.1	43.1	50.5	59.3	69.7	73.4	78.8	84.4	93	106	113	124	134
PT1.2UPL120	120	12.0	15.0	23.4	37.3	51.8	60.6	71.1	83.6	88.1	94.6	101	111	127	136	148	161
PT1.2UPL150	150	15.0	18.8	29.3	46.7	64.7	75.8	88.9	104	110	118	127	139	159	170	185	201
PT1.2UPL200	200	20.0	25.0	39.0	62.2	86.3	101	119	139	147	158	169	186	212	227	247	268
PT1.2UPL250	250	25.0	31.3	48.8	77.8	108	126	148	174	184	197	211	232	265	283	309	335
PT1.2UPL300	300	30.0	37.5	58.5	93.3	129	152	178	209	220	237	253	278	318	340	371	402
PT1.2UPL350	350	35.0	43.8	68.3	109	151	177	208	244	257	276	295	325	371	397	433	469
PT1.2UPL400	400	40.0	50.0	78.0	124	173	202	237	279	294	315	337	371	424	453	494	536
PT1.2UPL450	450	45.0	56.3	87.8	140	194	227	267	313	330	355	380	418	477	510	556	603
PT1.2UPL500	500	50.0	62.5	97.5	156	216	253	296	348	367	394	422	464	530	567	618	670
PT1.2UPL550	550	55.0	68.8	107	171	237	278	326	383	404	434	464	511	583	623	680	736
PT1.2UPL600	600	60.0	75.0	117	187	259	303	356	418	441	473	506	557	636	680	742	803
PT1.2UPL700	700	70.0	87.5	137	218	302	354	415	488	514	552	590	650	743	793	865	937
PT1.2UPL800	800	80.0	100	156	249	345	404	474	557	588	631	675	743	849	906	989	1071
PT1.2UPL900	900	90.0	113	176	280	388	455	534	627	661	710	759	835	955	1020	1112	1205
PT1.2UPL1000	1000	100	125	195	311	431	505	593	697	734	788	844	928	1061	1133	1236	1339



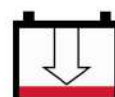
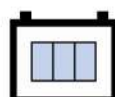
Discharge Data Table

Discharge performance data after fully charged by constant current according to IEC62259

Available amperes at +20°C ±5°C(+68°F ±9°F)

Final voltage: 1.10 V/cell

Cell Type	Capacity (C; Ah)	Discharge Time in Hours							Discharge Time in minutes						Time in Seconds		
		10	8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
PT1.2UPL30	30	3.02	3.65	5.35	7.70	10.3	11.8	12.5	17.2	20.8	22.5	24.5	28.5	30.2	33.8	36.8	40.3
PT1.2UPL40	40	4.03	4.87	7.13	10.3	13.7	15.7	16.7	22.9	27.7	30.0	32.7	38.0	40.3	45.1	49.1	53.7
PT1.2UPL50	50	5.03	6.08	8.92	12.8	17.2	19.7	20.8	28.7	34.7	37.5	40.8	47.5	50.3	56.3	61.3	67.2
PT1.2UPL60	60	6.04	7.30	10.7	15.4	20.6	23.6	25.0	34.4	41.6	45.0	49.0	57.0	60.4	67.6	73.6	80.6
PT1.2UPL70	70	7.05	8.52	12.5	18.0	24.0	27.5	29.2	40.1	48.5	52.5	57.2	66.5	70.5	78.9	85.9	94.0
PT1.2UPL80	80	8.05	9.73	14.3	20.5	27.5	31.5	33.3	45.9	55.5	60.0	65.3	76.0	80.5	90.1	98.1	107
PT1.2UPL90	90	9.06	11.0	16.1	23.1	30.9	35.4	37.5	51.6	62.4	67.5	73.5	85.5	90.6	101	110	121
PT1.2UPL100	100	10.1	12.2	17.8	25.7	34.3	39.3	41.7	57.3	69.3	75.0	81.7	95.0	101	113	123	134
PT1.2UPL120	120	12.1	14.6	21.4	30.8	41.2	47.2	50.0	68.8	83.2	90.0	98.0	114	121	135	147	161
PT1.2UPL150	150	15.1	18.3	26.8	38.5	51.5	59.0	62.5	86.0	104	113	123	143	151	169	184	202
PT1.2UPL200	200	20.1	24.3	35.7	51.3	68.7	78.7	83.3	115	139	150	163	190	201	225	245	269
PT1.2UPL250	250	25.2	30.4	44.6	64.2	85.8	98.3	104	143	173	188	204	238	252	282	307	336
PT1.2UPL300	300	30.2	36.5	53.5	77.0	103	118	125	172	208	225	245	285	302	338	368	403
PT1.2UPL350	350	35.2	42.6	62.4	89.8	120	138	146	201	243	263	286	333	352	394	429	470
PT1.2UPL400	400	40.3	48.7	71.3	103	137	157	167	229	277	300	327	380	403	451	491	537
PT1.2UPL450	450	45.3	54.8	80.3	116	155	177	188	258	312	338	368	428	453	507	552	604
PT1.2UPL500	500	50.3	60.8	89.2	128	172	197	208	287	347	375	408	475	503	563	613	672
PT1.2UPL550	550	55.4	66.9	98.1	141	189	216	229	315	381	413	449	523	554	620	675	739
PT1.2UPL600	600	60.4	73.0	107	154	206	236	250	344	416	450	490	570	604	676	736	806
PT1.2UPL700	700	70.5	85.2	125	180	240	275	292	401	485	525	572	665	705	789	859	940
PT1.2UPL800	800	80.5	97.3	143	205	275	315	333	459	555	600	653	760	805	901	981	1075
PL1.2UPL900	900	90.6	110	161	231	309	354	375	516	624	675	735	855	906	1014	1104	1209
PT1.2UPL1000	1000	101	122	178	257	343	393	417	573	693	750	817	950	1007	1127	1227	1343



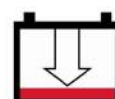
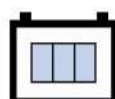
Discharge Data Table

Discharge performance data after fully charged by constant current according to IEC62259

Available amperes at +20°C ±5°C(+68°F ±9°F)

Final voltage: 1.05 V/cell

Cell Type	Capacity (C, Ah)	Discharge Time in Hours							Discharge Time in minutes						Time in Seconds		
		10	8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
PT1.2UPL30	30	3.03	3.78	5.94	9.64	13.6	17.0	20.3	25.2	26.9	28.2	29.4	31.8	37.3	40.2	45.4	49.7
PT1.2UPL40	40	4.04	5.04	7.92	12.8	18.2	22.6	27.1	33.6	35.9	37.5	39.2	42.4	49.8	53.6	60.6	66.3
PT1.2UPL50	50	5.05	6.30	9.90	16.1	22.7	28.3	33.8	42.0	44.9	46.9	49.0	53.0	62.2	67.0	75.7	82.9
PT1.2UPL60	60	6.06	7.56	11.9	19.3	27.3	33.9	40.6	50.4	53.9	56.3	58.8	63.6	74.7	80.3	90.8	99.5
PT1.2UPL70	70	7.07	8.82	13.9	22.5	31.8	39.6	47.4	58.8	62.8	65.7	68.5	74.3	87.1	93.7	106	116
PT1.2UPL80	80	8.08	10.1	15.8	25.7	36.4	45.2	54.1	67.2	71.8	75.1	78.3	84.9	99.6	107	121	133
PT1.2UPL90	90	9.09	11.3	17.8	28.9	40.9	50.9	60.9	75.6	80.8	84.5	88.1	95.5	112	121	136	149
PT1.2UPL100	100	10.1	12.6	19.8	32.1	45.5	56.6	67.7	83.9	89.8	93.8	97.9	106	124	134	151	166
PT1.2UPL120	120	12.1	15.1	23.8	38.5	54.5	67.9	81.2	101	108	113	118	127	149	161	182	199
PT1.2UPL150	150	15.2	18.9	29.7	48.2	68.2	84.8	102	126	135	141	147	159	187	201	227	249
PT1.2UPL200	200	20.2	25.2	39.6	64.2	90.9	113	135	168	180	188	196	212	249	268	303	332
PT1.2UPL250	250	25.3	31.5	49.5	80.3	114	141	169	210	224	235	245	265	311	335	379	415
PT1.2UPL300	300	30.3	37.8	59.4	96.4	136	170	203	252	269	282	294	318	373	402	454	497
PT1.2UPL350	350	35.4	44.1	69.3	112	159	198	237	294	314	328	343	371	436	469	530	580
PT1.2UPL400	400	40.4	50.4	79.2	128	182	226	271	336	359	375	392	424	498	536	606	663
PT1.2UPL450	450	45.5	56.7	89.1	145	205	255	305	378	404	422	441	477	560	603	681	746
PT1.2UPL500	500	50.5	63.0	99.0	161	227	283	338	420	449	469	490	530	622	670	757	829
PT1.2UPL550	550	55.6	69.3	109	177	250	311	372	462	494	516	539	583	684	736	833	912
PT1.2UPL600	600	60.6	75.6	119	193	273	339	406	504	539	563	588	636	747	803	908	995
PT1.2UPL700	700	70.7	88.2	139	225	318	396	474	588	628	657	685	743	871	937	1060	1161
PT1.2UPL800	800	80.8	101	158	257	364	452	541	672	718	751	783	849	996	1071	1211	1327
PL1.2UPL900	900	90.9	113	178	289	409	509	609	756	808	845	881	955	1120	1205	1363	1492
PT1.2UPL1000	1000	101	126	198	321	455	566	677	839	898	938	979	1061	1244	1339	1514	1658



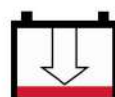
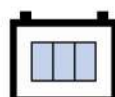
Discharge Data Table

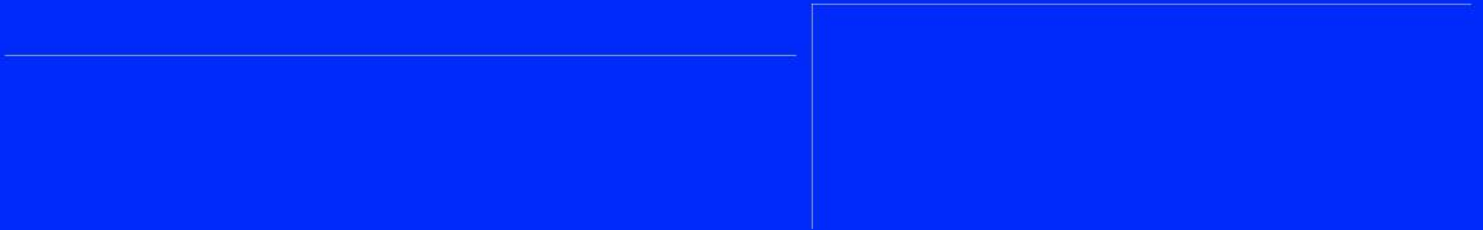
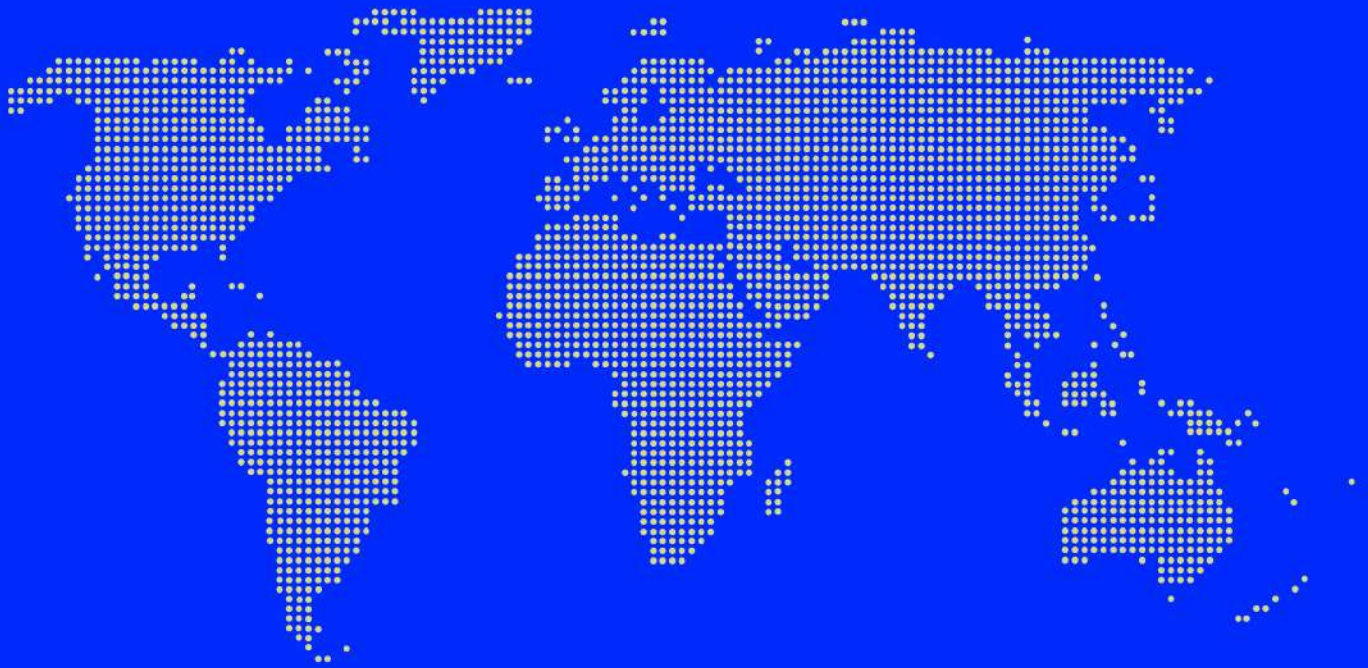
Discharge performance data after fully charged by constant current according to IEC62259

Available amperes at +20°C ±5°C(+68°F ±9°F)

Final voltage: 1.00 V/cell

Cell Type	Capacity (C ₅ Ah)	Discharge Time in Hours							Discharge Time in minutes						Time in Seconds		
		10	8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
PT1.2UPL30	30	3.06	3.81	6.00	9.79	14.0	18.5	23.8	28.7	30.6	32.1	34.3	36.4	41.9	44.5	50.4	56.9
PT1.2UPL40	40	4.08	5.08	8.00	13.0	18.7	24.6	31.8	38.2	40.8	42.8	45.7	48.6	55.9	59.3	67.2	75.8
PT1.2UPL50	50	5.10	6.35	10.0	16.3	23.4	30.8	39.7	47.8	51.0	53.6	57.1	60.7	69.9	74.2	83.9	94.8
PT1.2UPL60	60	6.12	7.62	12.0	19.6	28.1	37.0	47.7	57.3	61.2	64.3	68.5	72.8	83.8	89.0	101	114
PT1.2UPL70	70	7.14	8.89	14.0	22.8	32.7	43.1	55.6	66.9	71.4	75.0	80.0	85.0	97.8	104	118	133
PT1.2UPL80	80	8.16	10.2	16.0	26.1	37.4	49.3	63.6	76.5	81.6	85.7	91.4	97.1	112	119	134	152
PT1.2UPL90	90	9.18	11.4	18.0	29.4	42.1	55.4	71.5	86.0	91.8	96.4	103	109	126	133	151	171
PT1.2UPL100	100	10.2	12.7	20.0	32.6	46.8	61.6	79.5	95.6	102	107	114	121	140	148	168	190
PT1.2UPL120	120	12.2	15.2	24.0	39.1	56.1	73.9	95.4	115	122	129	137	146	168	178	201	227
PT1.2UPL150	150	15.3	19.1	30.0	48.9	70.1	92.4	119	143	153	161	171	182	210	222	252	284
PT1.2UPL200	200	20.4	25.4	40.0	65.2	93.5	123	159	191	204	214	228	243	279	297	336	379
PT1.2UPL250	250	25.5	31.8	50.0	81.6	117	154	199	239	255	268	286	303	349	371	420	474
PT1.2UPL300	300	30.6	38.1	60.0	97.9	140	185	238	287	306	321	343	364	419	445	504	569
PT1.2UPL350	350	35.7	44.5	70.0	114	164	216	278	335	357	375	400	425	489	519	588	663
PT1.2UPL400	400	40.8	50.8	80.0	130	187	246	318	382	408	428	457	486	559	593	672	758
PT1.2UPL450	450	45.9	57.2	90.0	147	210	277	358	430	459	482	514	546	629	667	756	853
PT1.2UPL500	500	51.0	63.5	100	163	234	308	397	478	510	536	571	607	699	742	839	948
PT1.2UPL550	550	56.1	69.9	110	179	257	339	437	526	561	589	628	668	769	816	923	1042
PT1.2UPL600	600	61.2	76.2	120	196	281	370	477	573	612	643	685	728	838	890	1007	1137
PT1.2UPL700	700	71.4	88.9	140	228	327	431	556	669	714	750	800	850	978	1038	1175	1327
PT1.2UPL800	800	81.6	102	160	261	374	493	636	765	816	857	914	971	1118	1187	1343	1516
PL1.2UPL900	900	91.8	114	180	294	421	554	715	860	918	964	1028	1092	1258	1335	1511	1706
PT1.2UPL1000	1000	102	127	200	326	468	616	795	956	1020	1071	1142	1214	1397	1483	1679	1895



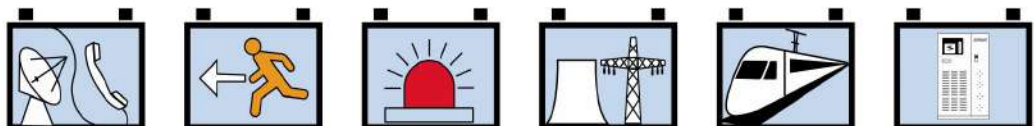


Guarantee

Ultra-low Maintenance Gas Recombination NiCd Battery



»Premium quality for
uninterrupted communication«





ULTRA-HIGH RELIABILITY ULTRA-LOW MAINTENANCE

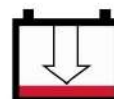
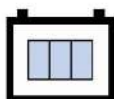
NILE PT1.2UPM series is a powerful combination of proven pocket-plate construction and advanced design from the world leader in industrial nickel-cadmium battery technology. With a 20-year life and ultra-low maintenance requirements, NILE PT1.2UPM series has become the cost-effective first choice – worldwide – for trouble-free standby power in the most demanding applications.

More Reliable

PT1.2UPM series can continue to supply power for 20 years or more thanks to its corrosion free construction and NILE's tried and tested pocket-plate technology. No physical plate degradation and no sudden death with resulting costly downtime

Low life-cycle Cost

The cost of ownership of a battery system can be calculated across three distinct phases: the initial investment, including the cost of purchase and installation; on-going maintenance costs, including unexpected and expensive downtime periods; finally, the battery replacement costs, which include the expense of disposal as well as renewal. PT1.2UPM series is the most cost-effective solution for any application – onshore or offshore – where long battery life, low maintenance costs, resistance to corrosion and total reliability are prime operating requirements.



More Adaptable

Offshore oil and gas, emergency lighting, fire and security, telecoms, utilities, photovoltaics. You can depend upon PT1.2UPM series for perfect peace of mind.

No Water Filling

No water filling is necessary during the PT1.2UPM series 20-year service life because of the controlled recombination and the valve regulated venting system (topping-up is possible if required).

More Durable

PT1.2UPM series will survive treatment which would destroy leadacid batteries. This battery accepts ripple currents up to 0.2C5 A and can be over-discharged or reversed without damage. Prolonged abusive overcharge can easily be compensated by refurbishment with water.

More Environmentally Tolerant

PT1.2UPM series performs in the most severe conditions and can operate over a temperature range from 0°C to +40°C (+32°F to +104°F). It can survive extremes of temperature from as low as -50°C to as high as +70°C (-58°F to as high as +158°F).

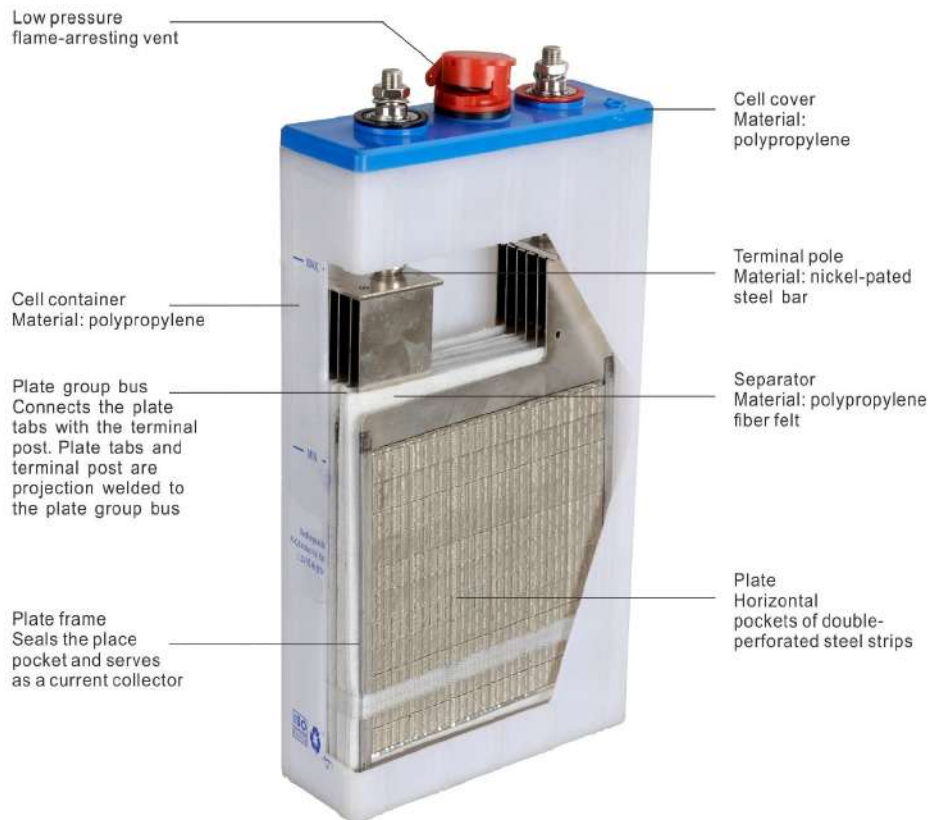
More Manageable

Compact and lightweight, PT1.2UPM series is easy to transport and install. It can be stored for one year without need of refresher charges.

Float-corrected Data

Many nickel-cadmium batteries are used in stationary standby power applications where discharges occur infrequently and the battery is continuously charged by a float or constant potential charge. Under these circumstances there is a modification in the level of the discharge curve and allowances must be made for this when dimensioning the battery.

In order to simplify this process, the data NILE supplies in this publication takes into account this phenomenon. The data published by NILE is the performance after prolonged floating and it can be used directly to perform the battery calculation. This phenomenon occurs with all nickel cadmium batteries, but some other manufacturers of nickel-cadmium batteries may not take this effect into account in published data.



Meeting International Standards

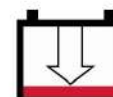
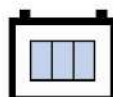
NILE batteries are manufactured under a strict ISO 9001 regime. Highest quality materials and rigorous quality checking procedures ensure all relevant international standards are met, including IEC 60623-2001, IEC 62259-2003.

Technology Superiority

- ☐ The electrode use steel tape as the framework. No react with electrolyte and remain complete during the whole service life.
- ☐ The separator is made of polypropylene fiber felt.
- ☐ No electrolyte replacement within service life.
- ☐ Terminals are made of steel or copper which has excellent electric conductivity and high mechanical strength.
- ☐ Battery case is made of high strength, corrosion resisting, translucent engineering plastics.
- ☐ No sudden death risk.
- ☐ Gas recombination efficiency can reach 85%~95%.
- ☐ Ultra high gas recombination efficiency, which reduces 90% water consumption.

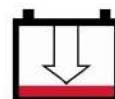
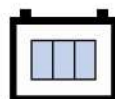
Application

- | | | | |
|--|--|---|--|
| ☐ Offshore oil and gas | ☐ Process control | ☐ Telecommunications | ☐ Wind/Solar energy |
| ☐ Fire and security systems | ☐ Switchgear | ☐ Mass transit | ☐ UPS |
| ☐ Railway signaling | | | |



PT1.2UPM Electrical Specifications & Dimension

Cell Type	Nominal Voltage (V)	Capacity (C ₅ Ah)	Max. External Dimensions (mm/inch)						Max. Weight (kg/lb.)		Electrolyte Volume (L)	Terminal	Container Material
			Length		Width		Height						
PT1.2UPM30	1.2	30	70	2.8	135	5.3	285	11.2	3	6.6	0.7	M10	PP
PT1.2UPM40	1.2	40	70	2.8	135	5.3	285	11.2	4	8.8	1	M16	PP
PT1.2UPM50	1.2	50	70	2.8	135	5.3	285	11.2	4.2	9.3	1	M16	PP
PT1.2UPM60	1.2	60	80	3.1	140	5.5	365	14.4	6	13.2	1.8	M16	PP
PT1.2UPM70	1.2	70	80	3.1	140	5.5	365	14.4	6.4	14.1	1.5	M16	PP
PT1.2UPM80	1.2	80	80	3.1	140	5.5	365	14.4	6.6	14.5	1.4	M16	PP
PT1.2UPM90	1.2	90	105	4.1	165	6.5	345	13.6	9	19.8	2.4	M20	PP
PT1.2UPM100	1.2	100	105	4.1	165	6.5	345	13.6	9.2	20.3	2.1	M20	PP
PT1.2UPM120	1.2	120	165	6.5	167	6.6	345	13.6	12	26.4	4	M20	PP
PT1.2UPM150	1.2	150	165	6.5	167	6.6	345	13.6	13	28.7	3.7	M20	PP
PT1.2UPM200	1.2	200	165	6.5	167	6.6	345	13.6	14.5	32.0	3.1	M20	PP
PT1.2UPM250	1.2	250	152	6.0	170	6.7	385	15.2	16.5	36.4	3.4	M20	PP
PT1.2UPM300	1.2	300	162	6.4	200	7.9	450	17.7	23	50.7	5.1	2 x M16	PP
PT1.2UPM350	1.2	350	162	6.4	200	7.9	450	17.7	24	52.9	5	2 x M16	PP
PT1.2UPM400	1.2	400	175	6.9	290	11.4	500	19.7	36	79.2	9.2	2 x M20	ABS
PT1.2UPM450	1.2	450	175	6.9	290	11.4	500	19.7	36.5	80.3	9.1	2 x M20	ABS
PT1.2UPM500	1.2	500	175	6.9	290	11.4	500	19.7	37.5	82.5	8.8	2 x M20	ABS
PT1.2UPM550	1.2	550	175	6.9	290	11.4	500	19.7	38.5	84.7	8.6	2 x M20	ABS
PT1.2UPM600	1.2	600	175	6.9	290	11.4	500	19.7	39.5	86.9	8.3	2 x M20	ABS
PT1.2UPM700	1.2	700	185	7.3	400	15.7	570	22.5	58.2	128	15.0	3 x M20	ABS
PT1.2UPM800	1.2	800	185	7.3	400	15.7	570	22.5	60.2	132	13.0	3 x M20	ABS



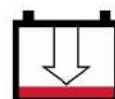
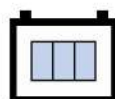
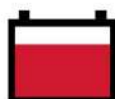
Discharge Data Table

Discharge performance data after fully charged by constant current according to IEC62259

Available amperes at +20°C ±5°C(+68°F ±9°F)

Final voltage: 1.14 V/cell

Cell Type	Capacity (C; Ah)	Discharge Time in Hours							Discharge Time in minutes						Time in Seconds		
		10	8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
PT1.2UPM30	30	3.00	3.66	5.64	8.88	11.8	13.6	17.9	22.7	27.0	29.0	30.3	35.5	47.4	55.9	66.7	87.1
PT1.2UPM40	40	4.00	4.88	7.52	11.8	15.8	18.2	23.8	30.3	36.0	38.6	40.4	47.3	63.2	74.6	89.0	116
PT1.2UPM50	50	5.00	6.10	9.40	14.8	19.7	22.7	29.8	37.9	45.0	48.3	50.5	59.2	79.1	93.2	111	145
PT1.2UPM60	60	6.00	7.32	11.3	17.8	23.6	27.3	35.8	45.5	54.0	58.0	60.6	71.0	94.9	112	133	174
PT1.2UPM70	70	7.00	8.54	13.2	20.7	27.6	31.8	41.7	53.1	63.0	67.6	70.7	82.8	111	131	156	203
PT1.2UPM80	80	8.00	9.76	15.0	23.7	31.5	36.4	47.7	60.6	72.1	77.3	80.8	94.7	126	149	178	232
PT1.2UPM90	90	9.00	11.0	16.9	26.6	35.5	40.9	53.6	68.2	81.1	86.9	90.9	106	142	168	200	261
PT1.2UPM100	100	10.0	12.2	18.8	29.6	39.4	45.5	59.6	75.8	90.1	96.6	101	118	158	186	222	290
PT1.2UPM120	120	12.0	14.6	22.6	35.5	47.3	54.5	71.5	90.9	108	116	121	142	190	224	267	349
PT1.2UPM150	150	15.0	18.3	28.2	44.4	59.1	68.2	89.4	114	135	145	151	177	237	280	334	436
PT1.2UPM200	200	20.0	24.4	37.6	59.2	78.8	90.9	119	152	180	193	202	237	316	373	445	581
PT1.2UPM250	250	25.0	30.5	47.0	74.0	98.5	114	149	189	225	241	252	296	395	466	556	726
PT1.2UPM300	300	30.0	36.6	56.4	88.8	118	136	179	227	270	290	303	355	474	559	667	871
PT1.2UPM350	350	35.0	42.7	65.8	104	138	159	209	265	315	338	353	414	553	653	779	1017
PT1.2UPM400	400	40.0	48.8	75.2	118	158	182	238	303	360	386	404	473	632	746	890	1162
PT1.2UPM450	450	45.0	54.9	84.6	133	177	205	268	341	405	435	454	532	711	839	1001	1307
PT1.2UPM500	500	50.0	61.0	94.0	148	197	227	298	379	450	483	505	592	791	932	1112	1452
PT1.2UPM550	550	55.0	67.1	103	163	217	250	328	417	495	531	555	651	870	1025	1224	1598
PT1.2UPM600	600	60.0	73.2	113	178	236	273	358	455	540	580	606	710	949	1119	1335	1743
PT1.2UPM700	700	70.0	85.4	132	207	276	318	417	531	630	676	707	828	1107	1305	1557	2033
PT1.2UPM800	800	80.0	97.6	150	237	315	364	477	606	721	773	808	947	1265	1491	1780	2324



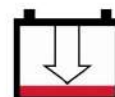
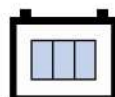
Discharge Data Table

Discharge performance data after fully charged by constant current according to IEC62259

Available amperes at +20°C ±5°C(+68°F ±9°F)

Final voltage: 1.10 V/cell

Cell Type	Capacity (C, Ah)	Discharge Time in Hours							Discharge Time in minutes						Time in Seconds		
		10	8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
PT1.2UPM30	30	3.15	3.75	5.82	9.36	13.5	16.6	21.6	27.4	30.9	33.0	34.9	41.0	56.6	64.9	76.6	97.3
PT1.2UPM40	40	4.20	5.00	7.76	12.5	18.1	22.1	28.8	36.6	41.2	44.1	46.5	54.7	75.5	86.5	102	130
PT1.2UPM50	50	5.25	6.25	9.70	15.6	22.6	27.6	36.0	45.7	51.5	55.1	58.1	68.3	94.4	108	128	162
PT1.2UPM60	60	6.30	7.50	11.6	18.7	27.1	33.1	43.2	54.9	61.8	66.1	69.8	82.0	113	130	153	195
PT1.2UPM70	70	7.35	8.75	13.6	21.8	31.6	38.7	50.4	64.0	72.1	77.1	81.4	95.7	132	151	179	227
PT1.2UPM80	80	8.40	10.0	15.5	25.0	36.1	44.2	57.6	73.2	82.4	88.1	93.0	109	151	173	204	260
PT1.2UPM90	90	9.45	11.3	17.5	28.1	40.6	49.7	64.8	82.3	92.7	99.1	105	123	170	195	230	292
PT1.2UPM100	100	10.5	12.5	19.4	31.2	45.1	55.2	72.0	91.5	103	110	116	137	189	216	255	324
PT1.2UPM120	120	12.6	15.0	23.3	37.5	54.2	66.3	86.4	110	124	132	140	164	226	260	307	389
PT1.2UPM150	150	15.8	18.8	29.1	46.8	67.7	82.9	108	137	155	165	174	205	283	324	383	487
PT1.2UPM200	200	21.0	25.0	38.8	62.4	90.3	110	144	183	206	220	233	273	377	433	511	649
PT1.2UPM250	250	26.3	31.3	48.5	78.0	113	138	180	229	258	275	291	342	472	541	639	811
PT1.2UPM300	300	31.5	37.5	58.2	93.6	135	166	216	274	309	330	349	410	566	649	766	973
PT1.2UPM350	350	36.8	43.8	67.9	109	158	193	252	320	361	386	407	478	660	757	894	1136
PT1.2UPM400	400	42.0	50.0	77.6	125	181	221	288	366	412	441	465	547	755	865	1022	1298
PT1.2UPM450	450	47.3	56.3	87.3	140	203	249	324	412	464	496	523	615	849	973	1149	1460
PT1.2UPM500	500	52.5	62.5	97.0	156	226	276	360	457	515	551	581	683	944	1082	1277	1622
PT1.2UPM550	550	57.8	68.8	107	172	248	304	396	503	567	606	640	752	1038	1190	1405	1784
PT1.2UPM600	600	63.0	75.0	116	187	271	331	432	549	618	661	698	820	1132	1298	1533	1947
PT1.2UPM700	700	73.5	87.5	136	218	316	387	504	640	721	771	814	957	1321	1514	1788	2271
PT1.2UPM800	800	84.0	100	155	250	361	442	576	732	824	881	930	1093	1510	1730	2044	2596



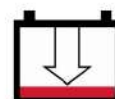
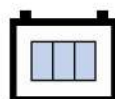
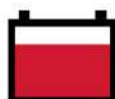
Discharge Data Table

Discharge performance data after fully charged by constant current according to IEC62259

Available amperes at +20°C ±5°C(+68°F ±9°F)

Final voltage: 1.05 V/cell

Cell Type	Capacity (C; Ah)	Discharge Time in Hours							Discharge Time in minutes						Time in Seconds		
		10	8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
PT1.2UPM30	30	3.30	3.93	6.06	9.48	14.2	18.2	24.9	31.8	37.6	40.4	42.8	50.5	67.9	77.3	90.2	114
PT1.2UPM40	40	4.40	5.24	8.08	12.6	18.9	24.2	33.2	42.4	50.2	53.9	57.1	67.3	90.6	103	120	152
PT1.2UPM50	50	5.50	6.55	10.1	15.8	23.6	30.3	41.6	53.0	62.7	67.3	71.4	84.2	113	129	150	191
PT1.2UPM60	60	6.60	7.86	12.1	19.0	28.3	36.4	49.9	63.6	75.3	80.8	85.7	101	136	155	180	229
PT1.2UPM70	70	7.70	9.17	14.1	22.1	33.0	42.4	58.2	74.3	87.8	94.2	100	118	159	180	211	267
PT1.2UPM80	80	8.80	10.5	16.2	25.3	37.7	48.5	66.5	84.9	100	108	114	135	181	206	241	305
PT1.2UPM90	90	9.90	11.8	18.2	28.5	42.5	54.5	74.8	95.5	113	121	129	151	204	232	271	343
PT1.2UPM100	100	11.0	13.1	20.2	31.6	47.2	60.6	83.1	106	125	135	143	168	226	258	301	381
PT1.2UPM120	120	13.2	15.7	24.2	37.9	56.6	72.7	100	127	151	162	171	202	272	309	361	457
PT1.2UPM150	150	16.5	19.7	30.3	47.4	70.8	90.9	125	159	188	202	214	252	340	386	451	572
PT1.2UPM200	200	22.0	26.2	40.4	63.2	94.3	121	166	212	251	269	286	337	453	515	602	762
PT1.2UPM250	250	27.5	32.8	50.5	79.0	118	152	208	265	314	337	357	421	566	644	752	953
PT1.2UPM300	300	33.0	39.3	60.6	94.8	142	182	249	318	376	404	428	505	679	773	902	1143
PT1.2UPM350	350	38.5	45.9	70.7	111	165	212	291	371	439	471	500	589	793	901	1053	1334
PT1.2UPM400	400	44.0	52.4	80.8	126	189	242	332	424	502	539	571	673	906	1030	1203	1524
PT1.2UPM450	450	49.5	59.0	90.9	142	212	273	374	477	565	606	643	757	1019	1159	1353	1715
PT1.2UPM500	500	55.0	65.5	101	158	236	303	416	530	627	673	714	842	1132	1288	1504	1906
PT1.2UPM550	550	60.5	72.1	111	174	259	333	457	583	690	741	785	926	1245	1416	1654	2096
PT1.2UPM600	600	66.0	78.6	121	190	283	364	499	636	753	808	857	1010	1359	1545	1805	2287
PT1.2UPM700	700	77.0	91.7	141	221	330	424	582	743	878	942	1000	1178	1585	1803	2105	2668
PT1.2UPM800	800	88.0	105	162	253	377	485	665	849	1004	1077	1142	1346	1812	2060	2406	3049



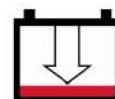
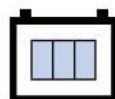
Discharge Data Table

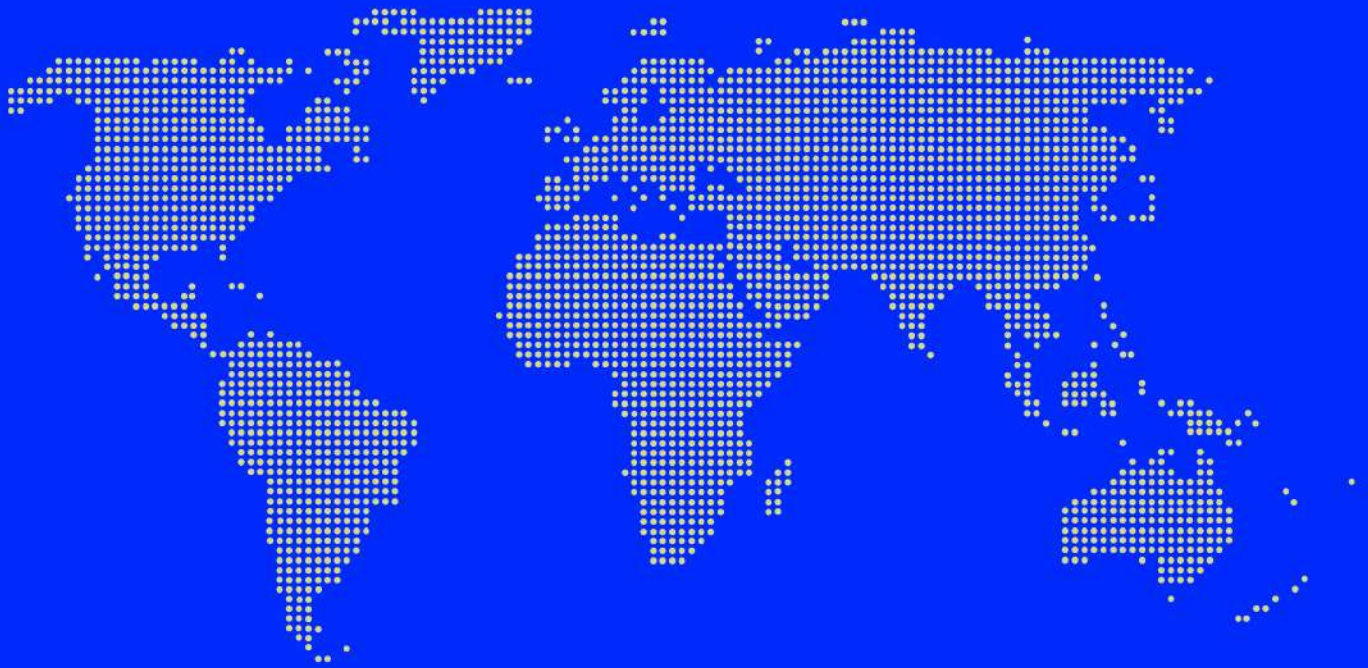
Discharge performance data after fully charged by constant current according to IEC62259

Available amperes at +20°C ±5°C(+68°F ±9°F)

Final voltage: 1.00 V/cell

Cell Type	Capacity (C ₅ Ah)	Discharge Time in Hours							Discharge Time in minutes						Time in Seconds		
		10	8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
PT1.2UPM30	30	3.45	4.05	6.30	9.85	14.8	19.2	26.6	37.3	44.1	48.0	52.0	58.4	77.4	86.5	102	124
PT1.2UPM40	40	4.60	5.40	8.40	13.1	19.7	25.6	35.4	49.8	58.8	64.1	69.4	77.9	103	115	136	165
PT1.2UPM50	50	5.75	6.75	10.5	16.4	24.6	32.0	44.3	62.2	73.4	80.1	86.7	97.4	129	144	170	206
PT1.2UPM60	60	6.90	8.10	12.6	19.7	29.5	38.4	53.1	74.7	88.1	96.1	104	117	155	173	204	247
PT1.2UPM70	70	8.05	9.45	14.7	23.0	34.4	44.8	62.0	87.1	103	112	121	136	181	202	238	288
PT1.2UPM80	80	9.20	10.8	16.8	26.3	39.3	51.1	70.9	99.6	118	128	139	156	206	231	272	330
PT1.2UPM90	90	10.4	12.2	18.9	29.5	44.3	57.5	79.7	112	132	144	156	175	232	260	306	371
PT1.2UPM100	100	11.5	13.5	21.0	32.8	49.2	63.9	88.6	124	147	160	173	195	258	288	340	412
PT1.2UPM120	120	13.8	16.2	25.2	39.4	59.0	76.7	106	149	176	192	208	234	310	346	408	494
PT1.2UPM150	150	17.3	20.3	31.5	49.2	73.8	95.9	133	187	220	240	260	292	387	433	510	618
PT1.2UPM200	200	23.0	27.0	42.0	65.7	98.4	128	177	249	294	320	347	390	516	577	680	824
PT1.2UPM250	250	28.8	33.8	52.5	82.1	123	160	221	311	367	400	434	487	645	721	850	1030
PT1.2UPM300	300	34.5	40.5	63.0	98.5	148	192	266	373	441	480	520	584	774	865	1020	1236
PT1.2UPM350	350	40.3	47.3	73.5	115	172	224	310	436	514	560	607	682	903	1009	1190	1442
PT1.2UPM400	400	46.0	54.0	84.0	131	197	256	354	498	588	641	694	779	1032	1154	1360	1648
PT1.2UPM450	450	51.8	60.8	94.5	148	221	288	399	560	661	721	780	877	1161	1298	1530	1854
PT1.2UPM500	500	57.5	67.5	105	164	246	320	443	622	734	801	867	974	1290	1442	1700	2060
PT1.2UPM550	550	63.3	74.3	116	181	271	352	487	684	808	881	954	1072	1419	1586	1869	2266
PT1.2UPM600	600	69.0	81.0	126	197	295	384	531	747	881	961	1040	1169	1548	1730	2039	2472
PT1.2UPM700	700	80.5	94.5	147	230	344	448	620	871	1028	1121	1214	1364	1806	2019	2379	2884
PT1.2UPM800	800	92.0	108	168	263	393	511	709	996	1175	1281	1387	1559	2064	2307	2719	3296

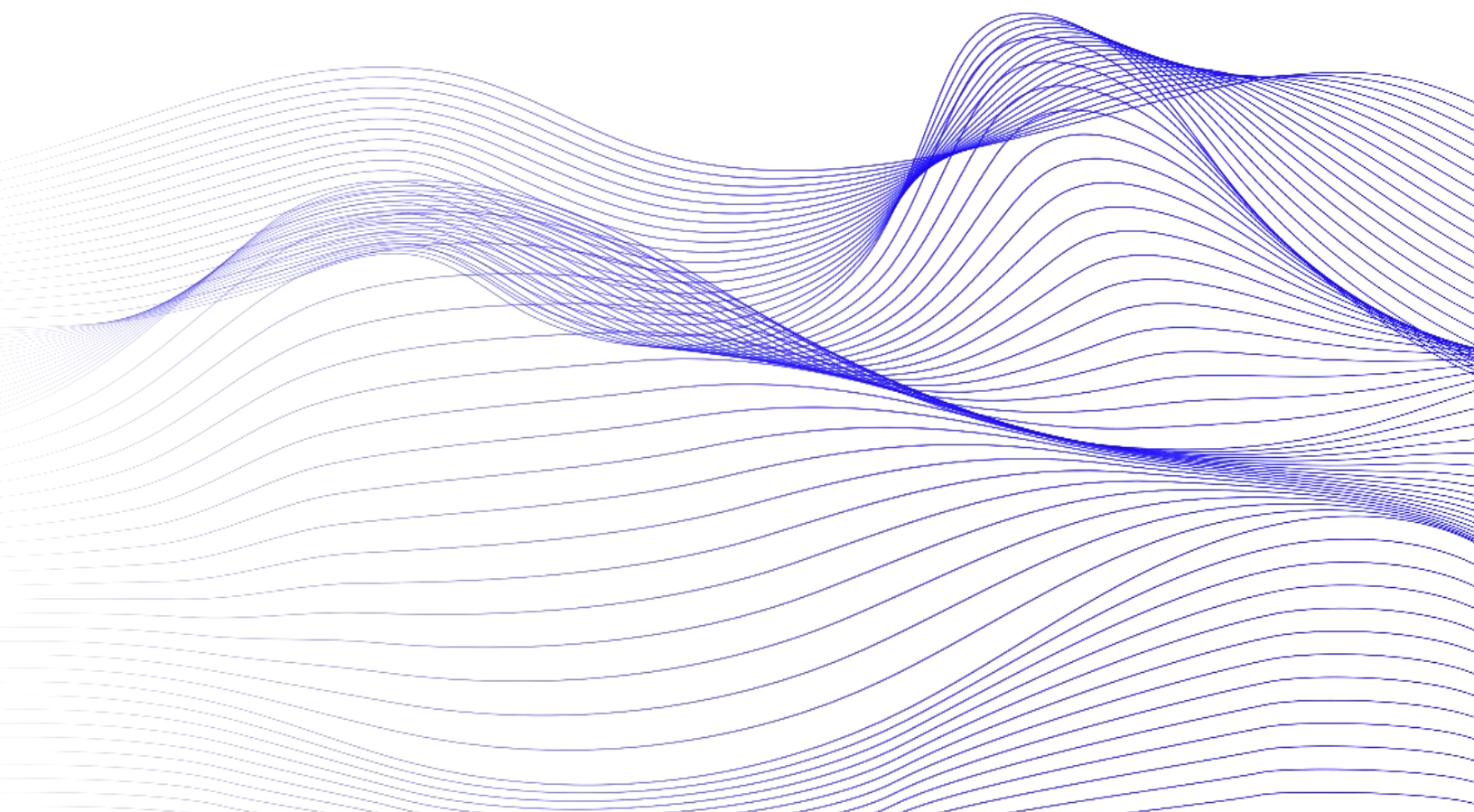




PlatinIran®

Sustainable Energy

دستور العمل "نصب"، "شارژ و راه اندازی" و "نگهداری"
باتری های نیکل-کادمیوم نیل



۱. مشخصات باتری نیکل - کادمیوم نیل ۱

۱-۱. الکتروشیمی باتری های نیکل کادمیوم نیل ۲

۲-۱. طول عمر سیکلی (Cycle Life) بالا ۲

۳-۱. طول عمر بسیار بالا ۲

۴-۱. محدوده دمایی گسترده ۳

۵-۱. نگهداری آسان ۳

۶-۱. شارژ سریع ۳

۷-۱. مقاومت مکانیکی و الکتریکی بالا ۳

۸-۱. هزینه نگهداری پایین ۳

۹-۱. مشخصات فنی انواع مختلف باتری های نیکل کادمیوم نیل ۳

۲. ساختار الکترولیت ۵

۱-۲. آماده سازی الکترولیت و نکات مهم ۶

۲-۲. محاسبه وزن الکترولیت ۶

۳-۲. آماده سازی ابزارها ۸

۴-۲. آماده سازی الکترولیت ۸

۵-۲. افزودن الکترولیت ۸

۶-۲. تنظیم سطح الکترولیت ۹

۳. نصب و راه اندازی ۱۰

۱-۳. تخلیه و بازرسی ۱۱

۱-۱-۳. تخلیه ۱۱

۲-۱-۳. بازرسی کالا ۱۱

۲-۳. شرایط اتاق باتری ۱۱

۳-۳. موقعیت نصب ۱۲

۴-۳. تهویه ۱۲

۵-۳. نصب جایگاه های باتری ۱۲

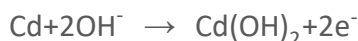
۱۳	۶-۳. قرارگیری باتری روی جایگاه
۱۳	۷-۳. روش اتصال
۱۳	۸-۳. شارژ اولیه
۱۴	۹-۳. تست ظرفیت (Capacity Test)
۱۵	۱۰-۳. شارژ در حین بهره برداری
۱۶	۴. سرویس و نگهداری
۱۷	۱-۴. شارژ
۱۷	۱-۱-۴. شارژ استاندارد
۱۷	۲-۱-۴. شارژ شناور (Floating Charge)
۱۸	۳-۱-۴. شارژ برابرکننده (Equalizing Charge)
۱۸	۲-۴. اثرات دما (Temperature Influences)
۱۹	۳-۴. افزودن مجدد الکترولیت (Electrolyte Refilling)
۱۹	۴-۴. تعویض الکترولیت
۲۰	۵-۴. سرویس دوره ای
۲۰	۶-۴. انبارداری
۲۱	۷-۴. تمیزکاری
۲۲	۸-۴. توصیه های مهم در بهره برداری باتری نیکل کادمیوم
۲۳	۵. مشکلات متداول و روش های عیب یابی

۱. مشخصات باتری نیکل - کادمیوم نیل

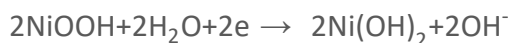
۱-۱. الکتروشیمی باتری های نیکل کادمیوم نیل

در عملیات دشارژ، یون های هیدروکسید نیکل سه ظرفیتی به هیدروکسید نیکل دو ظرفیتی احیا می شوند و کادمیوم در صفحه منفی، هیدروکسید کادمیوم را تشکیل می دهد (فرآیند اکسیداسیون).

الکتروود منفی:



الکتروود مثبت:



واکنش سلولی:



در واکنش شارژ، واکنش معکوس تا زمانی انجام می شود که پتانسیل سلول به سطحی برسد که هیدروژن در صفحه منفی و اکسیژن در صفحه مثبت آزاد شود که منجر به تبخیر آب می شود.

برخلاف باتری سرب اسیدی، تغییر کمی در چگالی الکترولیت در هنگام شارژ و دشارژ باتری های نیکل کادمیوم به وجود می آید و از نظر الکتروشیمی، رفتار پایدارتری نسبت به باتری سرب اسیدی دارد. این عوامل دلیلی بر عمر طولانی تر، ویژگی های منحصر به فرد و مقاومت بیشتر در شرایط دمایی بالا برای باتری های نیکل کادمیوم است.

۲-۱. طول عمر سیکلی (Cycle Life) بالا

باتری های نیکل کادمیوم نیل چرخه عمر (Cycle Life) طولانی دارند؛ حتی در زمانی که چرخه شارژ/دشارژ با عمق تخلیه (Depth of Discharge) بالا انجام گیرد.

	Depth of Discharge			
	۲۰%	۳۰%	۵۰%	۸۰%
Cycle Life	۹۰۰۰	۶۵۰۰	۳۵۰۰	۱۳۰۰

۳-۱. طول عمر بسیار بالا

طول عمر بیش از بیست سال در بسیاری از مصارف صنعتی

۴-۱. محدوده دمایی گسترده

باتری نیکل کادمیوم به دلیل نوع الکترولیت خاص، می‌تواند در محدوده دمایی ۲۰- درجه سانتیگراد تا ۵۰+ درجه سانتیگراد به کار گرفته شود. همچنین در دماهای بسیار بالا و بسیار پایین، از ۵۰- تا ۶۰+ درجه سانتیگراد تخریب نمی‌شود.

۵-۱. نگهداری آسان

باتری نیکل کادمیوم نیل با قابلیت ذخیره الکترولیت بالا، نیاز به اضافه کردن آب را کاهش می‌دهد و می‌تواند برای مدت طولانی بدون هیچ گونه عملیات نگهداری کارایی داشته باشد.

۶-۱. شارژ سریع

در مواردی که نیاز به شارژ مجدد بسیار سریع باشد، باتری‌های نیکل کادمیوم را می‌توان با جریان بالا شارژ کرد.

۷-۱. مقاومت مکانیکی و الکتریکی بالا

ساختار باتری نیکل کادمیوم نیل به گونه ای طراحی شده است که از استحکام مکانیکی لازم برای مقاومت در برابر ضربه‌های شدید در حین حمل و نقل و جابه جایی برخوردار باشد. همچنین عواملی که باعث تخریب باتری سرب-اسیدی می‌شود تاثیر چندانی بر باتری‌های نیکل کادمیوم ندارند. از جمله این عوامل می‌توان به شارژ بیش از حد (Overcharge)، دشارژ عمیق و جریان با نوسان بالا اشاره کرد.

۸-۱. هزینه نگهداری پایین

هنگامی که تمام فاکتورهای طول عمر بالا، شرایط نصب، انبارداری و نگهداری آسان و همچنین مقاومت در برابر خرابی در نظر گرفته شود، مشخص می‌شود باتری نیکل کادمیوم مقرون به صرفه ترین باتری برای بسیاری از کاربردهای صنعتی است.

۹-۱. مشخصات فنی انواع مختلف باتری‌های نیکل کادمیوم نیل

Ni-Cd Pocket Plate		
Cell Type	Capacity Range	Discharge Time
PT1.2FPL	10 - 1200 Ah	90-300 min
PT1.2FPM	10 - 1100 Ah	30-120 min
PT1.2FPH	10 - 500 Ah	15-45 min

Sealed Ni-Cd – Low Maintenance Pocket Plate		
Cell Type	Capacity Range	Discharge Time
PT1.2SPL	10 - 1200 Ah	90-300 min
PT1.2SPM	10 - 1100 Ah	30-120 min
PT1.2SPH	10 - 500 Ah	15-45 min

Ultra - Low Maintenance gas recombination Ni-Cd Battery		
Cell Type	Capacity Range	Discharge Time
PT1.2UPL	30 - 1000 Ah	90-300 min
PT1.2UPM	30 - 800 Ah	30-120 min

۲. ساختار الکترولیت

۱-۲. آماده سازی الکترولیت و نکات مهم

- برای آماده سازی الکترولیت باید از ظروف شیشه ای، چینی، پلاستیک مقاوم در برابر قلیا، نیکل یا فولاد ضد زنگ استفاده شود.
- هرگز از ظروف مسی، آلومینیومی، رزینی یا چوبی استفاده نکنید، زیرا این مواد توسط محلول قلیایی خورده می شوند.
- برای روش آماده سازی الکترولیت، به دستورالعمل ترکیب الکترولیت مراجعه نمایید.
- توجه ویژه داشته باشید که الکترولیت مورد استفاده باید با مشخصات فنی تعیین شده توسط شرکت پلاتین ایران مطابقت داشته باشد، در غیر این صورت باتری دچار آسیب دائمی خواهد شد.
- هنگام آماده سازی الکترولیت، باید چگالی ویژه (وزن مخصوص) را بر اساس دمای مایع تنظیم کرد.
- الکترولیت به راحتی دی اکسید کربن (CO_2) موجود در هوا را جذب کرده و باعث تشکیل پتاسیم کربنات (K_2CO_3) می شود که این امر منجر به کاهش ظرفیت باتری می گردد. بنابراین، الکترولیت آماده شده باید در ظرف دربسته نگهداری شود تا از جذب CO_2 جلوگیری گردد.
- الکترولیت می تواند باعث سوختگی پوست شده و به لباس ها آسیب بزند. اگر به درستی با آن کار نشود، ممکن است باعث التهاب پوستی شود.
- پاشش الکترولیت در چشم ها باید به طور جدی جلوگیری شود، زیرا اثرات آن از اسید سولفوریک نیز شدیدتر است و در صورت وقوع، باید فوراً اقدامات درمانی انجام شود.
- برای درمان سوختگی قلیایی پوست می توان از یک اسید ضعیف مانند سرکه یا محلول ۳٪ اسیدبوریک استفاده کرد.

۲-۲. محاسبه وزن الکترولیت

چگالی الکترولیت باتری (ρ) ۱/۲۰ گرم بر سانتی متر مکعب (gr/cm^3) است. بر این اساس، مقدار هر ماده در یک لیتر الکترولیت به شرح زیر است:

پتاسیم هیدروکسید (KOH): ۲۷۱ گرم

آب مقطر: ۹۳۹ گرم

لیتیوم هیدروکسید (LiOH): ۲۰ گرم

مدل باتری FPL200 :

وزن باتری با الکترولیت (W_1): ۱۰/۰ کیلوگرم

وزن باتری بدون الکترولیت (W_2): ۷/۸ کیلوگرم

وزن الکترولیت (W_3):

$$W_3 = W_1 - W_2 = 10\text{kg} - 7.8\text{kg} = 2.2\text{kg}$$

چگالی الکترولیت (ρ): ۱/۲ kg/L

حجم الکترولیت در هر سلول (V) :

$$V = W_3 / \rho = 2.2\text{ kg} / 1.2\text{ kg/L} = 1.833\text{ L}$$

مقدار کل مورد نیاز برای ۹۲ سلول باتری FPL200

هر باتری مدل FPL200 به ۱/۸۳۳ لیتر الکترولیت نیاز دارد.

بنابراین، برای ۹۲ سلول باتری:

$$92 \times 1.833\text{ لیتر} = 168.664\text{ لیتر الکترولیت}$$

مقدار کل هر ماده برای ۹۲ سلول باتری (۱۶۸/۶۶۴ لیتر الکترولیت):

پتاسیم هیدروکسید (KOH): ۲۷۱ گرم $\times$ ۱۶۸/۶۶۴ لیتر = ۴۵/۷ کیلوگرم

آب مقطر: ۹۳۹ گرم $\times$ ۱۶۸/۶۶۴ لیتر = ۱۵۸/۳۷۵ کیلوگرم

لیتیوم هیدروکسید (LiOH): ۲۰ گرم $\times$ ۱۶۸/۶۶۴ لیتر = ۳/۳۷ کیلوگرم

۲-۳. آماده سازی ابزارها

الف) ابزارهای افزودن الکترولیت و ایمنی (محافظتی)

ب) ظرف مخصوص الکترولیت

ج) پودر هیدروکسید پتاسیم و هیدروکسید لیتیوم

د) آب مقطر یا آب دیونیزه

نکته :

- ظرف مورد استفاده باید از پلاستیک، فولاد ضد زنگ، لعاب چینی یا سایر مواد مقاوم در برابر قلیا ساخته شده باشد.
- استفاده از آب لوله کشی، آب معدنی و آب دریا اکیداً ممنوع است!
- هنگام آماده سازی الکترولیت، پوشیدن لباس کار، عینک ایمنی، پیش بند لاستیکی، دستکش لاستیکی و کفش ایمنی لاستیکی الزامی است.

۲-۴. آماده سازی الکترولیت

مرحله اول : آب مقطر محاسبه شده را درون ظرف بریزید.

مرحله دوم : پودر KOH و LiOH را به آرامی داخل ظرف بریزید و به طور مداوم هم بزنید تا کاملاً حل شوند.

مرحله سوم : صبر کنید تا دمای الکترولیت کاهش یابد. وقتی دمای الکترولیت به دمای اتاق رسید، با استفاده از چگالی سنج، چگالی آن را اندازه گیری کنید که باید 1.05 ± 0.01 گرم بر سانتی متر مکعب باشد.

مرحله چهارم : اگر چگالی کمتر بود، مقداری پودر KOH به الکترولیت اضافه کنید و پس از حل شدن کامل، دوباره چگالی را اندازه گیری کنید تا به مقدار قابل قبول برسد. اگر چگالی بیشتر بود، به آن آب اضافه کنید و اندازه گیری را ادامه دهید تا چگالی به مقدار مطلوب برسد.

۲-۵. افزودن الکترولیت

هنگامی که دمای الکترولیت به زیر ۳۰ درجه سانتی گراد رسید، برای افزودن الکترولیت، دریچه ی هوا (transport air plug) را بردارید و الکترولیت را به آرامی تا بالاتر از خط حداقل (مینیمم) اضافه کنید.

۲-۶. تنظیم سطح الکترولیت

پس از افزودن الکترولیت به مدت ۳۰ دقیقه، بررسی کنید که آیا سطح الکترولیت در باتری کاهش یافته است یا خیر. در صورت کاهش، به آرامی الکترولیت را اضافه کنید تا به خط حداکثر (ماکزیمم) برسد. پس از اتمام شارژ اولیه به مدت ۲ ساعت، مجدد الکترولیت را تا خط حداکثر اضافه کنید. پس از افزودن، ۲ تا ۴ ساعت صبر کنید تا الکترولیت به طور کامل صفحات باتری را تر کند.

نکته:

محلول ۳٪ اسید بوریک باید در محل کار موجود باشد.

در صورت پاشیده شدن الکترولیت روی پوست، فوراً با محلول اسید بوریک (در صورت عدم وجود با آب) شستشو دهید؛ اگر الکترولیت به چشم‌ها پاشیده شد، بلافاصله با آب لوله‌کشی به مدت طولانی شستشو دهید و در صورت لزوم به بیمارستان مراجعه کرده و با پزشک مشورت کنید.

۳. نصب و راه اندازی

۱-۳. تخلیه و بازرسی

۱-۱-۳. تخلیه

- الف) باتری را با دقت از جعبه های چوبی تخلیه کنید تا از وارد شدن ضربه به آن جلوگیری شود.
- ب) حتماً باتری را در نزدیکی اتاق باتری تخلیه کنید و هنگام جابجایی، از قسمت پایین باتری را بگیرید.
- ج) باتری باید به گونه ای قرار گیرد که قطب ها به سمت بالا باشد، و هنگام قرار دادن، هیچ وسیله اضافی روی قسمت بالایی باتری قرار ندهید.

۲-۱-۳. بازرسی کالا

- بررسی کنید که کالاها با فهرست اقلام تحویلی (پیوست ۱) مطابقت داشته باشند.
- همچنین موارد زیر را بررسی کنید:
- الف) آسیب دیدگی جلد باتری در حین حمل و نقل
 - ب) زنگ زدگی یا خوردگی قطعات فلزی خارجی باتری
 - ج) شل بودن مهره زیر قطب های باتری و سایر نکات مربوطه
- در صورت مشاهده هرگونه مشکل، لطفاً با خدمات پس از فروش شرکت پلاتین ایران تماس بگیرید.

۲-۳. شرایط اتاق باتری

- اتاق باتری باید شرایط زیر را داشته باشد.
- الف) اتاق باتری باید از سایر فضاها جدا باشد. باتری های اسیدی نباید همراه با باتری های قلیایی در یک اتاق قرار گیرند.
 - ب) باتری باید از نور شدید دور باشد و از منابع آتش زا و حرارتی فاصله داشته باشد.
 - ج) اتاق باتری مجهز به کولر باشد و دمای آن در محدوده 20 ± 5 درجه سانتی گراد حفظ شود.
 - د) اتاق باتری باید تهویه مناسب (جهت خروج گاز های تولید شده) داشته باشد.

۳-۳. موقعیت نصب

- ❖ هنگامی که دمای محیط در محدوده 5 ± 20 درجه سانتی‌گراد باشد، باتری بهترین عملکرد الکتریکی و بیشترین طول عمر خود را خواهد داشت.
- ❖ باتری را می‌توان روی جایگاه باتری، داخل کابینت باتری، یا حتی روی زمین صاف نصب کرد. برای سهولت در نگهداری و تعمیرات بعدی، بهتر است بین ردیف‌های باتری، مسیر عبوری برای پرسنل در نظر گرفته شود.
- ❖ اگر باتری در اتاق دربسته نصب می‌شود، حتماً باید تجهیزات تهویه نصب شود تا گازهای تولیدشده در هنگام شارژ خارج شوند؛ در غیر این صورت، خطر انفجار وجود دارد.

۳-۴. تهویه

زمانی که باتری در اتاق کوچک یا محفظه بسته (مانند کانکس) نصب می‌شود، وجود سیستم تهویه الزامی است.

در مرحله نهایی عملیات شارژ، باتری شروع به تخلیه و انتشار گاز (ترکیبی از O_2 و H_2) می‌کند. هنگام طراحی و نصب سیستم تهویه مناسب در اتاق باتری، باید نرخ تولید گاز هیدروژن (H_2) محاسبه شده و اطمینان حاصل شود که غلظت گاز H_2 در محیط در محدوده ایمن باقی بماند. حد مجاز ایمن برای غلظت گاز H_2 برابر با ۴٪ است.

۳-۵. نصب جایگاه‌های باتری

- ❖ جایگاه‌های باتری برای نگهداری باتری‌ها استفاده می‌شوند، و نصب جایگاه‌ها باید پیش از نصب باتری‌ها به طور کامل انجام شود.
- ❖ هر جایگاه باتری باید به صورت افقی و تراز نصب شود تا هر باتری نیز بتواند به صورت افقی و صحیح قرار گیرد، در غیر این صورت، عملکرد باتری ممکن است مختل شود. در صورتی که جایگاه به صورت کاملاً افقی قرار نگیرد، می‌توان یک یا چند ورق نازک PVC یا صفحه‌ی تخت زیر آن قرار داد تا تراز شود.
- ❖ مرتب بودن قرارگیری باتری‌ها را می‌توان از هم‌راستایی خط سطح الکترولیت روی بدنه باتری تشخیص داد.
- ❖ اگر جایگاه باتری به صورت کاملاً تراز قرار نگرفته باشد، می‌توان یک یا چند ورق نازک PVC یا ماده‌ی صاف دیگر زیر آن قرار داد تا تراز شود.

۳-۶. قرارگیری باتری روی جایگاه

از آنجایی که باتری‌ها حاوی الکترولیت هستند و وزن مشخصی دارند، باید با احتیاط و دقت بالا روی جایگاه باتری قرار گیرند. باتری‌ها باید در حالتی جابجا شوند که قطب‌ها به سمت بالا باشند، سپس به صورت عمودی روی جایگاه قرار داده شده و طبق نقشه اتصال و چیدمان باتری (پیوست ۳)، با دقت نصب شوند تا از اشتباه در قطبیت جلوگیری شود.

۳-۷. روش اتصال

با استفاده از لوازم جانبی مناسب (مانند اتصالات یا کابل‌های رابط)، سلول‌های باتری را طبق نقشه اتصال به یکدیگر متصل کنید. با استفاده از آچار مناسب، مهره‌ها و پیچ‌های ترمینال را تا گشتاور توصیه شده سفت کنید:

- $M6 = 1 \pm 11$ نیوتن متر
- $M8 = 2 \pm 20$ نیوتن متر
- $M10 = 3 \pm 30$ نیوتن متر
- $M16 = 3 \pm 40$ نیوتن متر
- $M20 = 3 \pm 50$ نیوتن متر

پس از نصب، برای محافظت در برابر خوردگی و زنگ‌زدگی، یک لایه نازک روغن ضدزنگ یا وازلین روی اتصالات و ترمینال‌ها بزنید. پیش از انجام عملیات اتصال، اطمینان حاصل کنید که درپوش‌های حمل‌ونقل (transport seals) برداشته شده‌اند و دریچه‌های خروج گاز (Vents) بسته هستند و تهویه محیط به صورت مناسب برقرار است.

۳-۸. شارژ اولیه

شارژ باتری باید مطابق با استاندارد IEC 60623 انجام شود. شارژ به مدت ۸ ساعت با جریان ثابت برابر با $0.2C_{20}$ (آمپر) انجام گیرد. اگر محدوده جریان شارژ کمتر از $0.2C_{20}$ آمپر باشد، باید زمان شارژ به صورت متناسب افزایش یابد.

توجه:

پس از پر کردن الکترولیت، باید باتری به مدت ۴ ساعت بدون شارژ در محل قرار داده شود تا الکترولیت به خوبی در صفحات باتری نفوذ کند.

تذکر:

در پایان شارژ، ولتاژ هر سلول ممکن است به حدود ۱/۸۰ ولت برسد، بنابراین شارژر باید توانایی تأمین این ولتاژ را داشته باشد. اگر حداکثر ولتاژ تنظیم شده شارژر خیلی پایین باشد و نتواند شارژر با جریان ثابت را انجام دهد، باتری ها را به دو بخش تقسیم کرده و جداگانه شارژ کنید.

۳-۹. تست ظرفیت (Capacity Test)

آزمایش ظرفیت باید مطابق با استاندارد IEC 60623 انجام شود.

مراحل آزمایش:

الف) دشارژ (تخلیه) با جریان ۵/۲C_۵ آمپر تا ۱/۰ ولت به ازای هر سلول

ب) شارژ به مدت ۸ ساعت با جریان ثابت ۵/۲C_۵ آمپر

ج) دشارژ (تخلیه) با جریان ۵/۲C_۵ آمپر تا ۱/۰ ولت به ازای هر سلول (تست ظرفیت اصلی)

❖ زمان دشارژ باید بیش از ۵ ساعت باشد.

۳-۱۰. شارژ در حین بهره‌برداری

ولتاژ شارژ توصیه شده (در دمای ۲۰ تا ۲۵ درجه سانتی‌گراد):

برای شارژ دو مرحله‌ای (Two Level Charge) :

- شارژ شناور (Float Charging) :

- $1/42 \pm 0/01$ ولت به ازای هر سلول برای سلول‌های L و M

- $1/40 \pm 0/01$ ولت به ازای هر سلول برای سلول‌های H

- شارژ برابرکننده (Equalization Charging) :

- $1/55$ تا $1/70$ ولت به ازای هر سلول برای سلول‌های L

- $1/50$ تا $1/70$ ولت به ازای هر سلول برای سلول‌های M و H

برای شارژ تک مرحله‌ای (Single Level Charge) :

- شارژ شناور (Float Charging) :

- بین $1/45$ تا $1/50$ ولت به ازای هر سلول

۴. سرویس و نگهداری

۴-۱-۱ شارژ

در شارژ باتری های نیکل کادمیوم نکات زیر حائز اهمیت است:

۱. باتری به طور معمول با جریان مستقیم (DC) شارژ می شود.
۲. اتصال بین قطب مثبت و منفی شارژر و باتری ها باید به درستی برقرار شود (مثبت به مثبت، منفی به منفی).
۳. هنگامی که ولتاژ سلول ها در حین شارژ به طور پایدار بین ۱/۶۵ تا ۱/۸۰ ولت به ازای هر سلول و به مدت ۲/۵ تا ۳ ساعت حفظ شود، باتری کامل شارژ شده است.

در کاربردهای عملی، می توان یکی از حالت های زیر را انتخاب کرد:

- شارژ استاندارد
- شارژ شناور (Float)
- شارژ برابر کننده (Equalization)

۴-۱-۱-۱ شارژ استاندارد

در شرایط عادی، برای نگهداری باتری ها پیشنهاد می شود که باتری ها به روش زیر شارژ شوند:

- با جریان شارژ برابر با $0.2C_{50}$ یعنی ۲۰٪ جریان نامی آمپرساعت باتری
- به مدت ۸ ساعت

این روش به عنوان شارژ استاندارد توصیه می شود.

۴-۱-۲ شارژ شناور (Floating Charge)

زمانی که باتری با شارژر و بار مصرفی (Load) به صورت موازی متصل است و به عنوان منبع تغذیه پشتیبان عمل می کند، باید جریان کمی برای شارژ باتری اعمال شود تا کاهش ظرفیت ناشی از تخلیه خودبه خودی یا دشارژهای جزئی به طور خودکار جبران شود. این نوع شارژر را شارژ شناور می نامند.

در این حالت، باتری در وضعیت شارژ کامل باقی می ماند و فقط در مواقع قطع برق یا افت ولتاژ وارد مدار شده و به بار مصرفی برق رسانی می کند.

- ولتاژ شارژ شناور هر سلول باید بین ۱/۴۰ تا ۱/۵۰ ولت باشد.
 - جریان شارژ شناور معمولاً حدود C ۰/۰۰۵ تا C ۰/۰۰۲۵ است (بسیار کم).
 - تنظیم ولتاژ شارژ باید با توجه به نوع باتری و شرایط بهره‌برداری به درستی انجام شود:
 - تبخیر زیاد آب نشان‌دهنده ولتاژ شارژ بیش از حد است.
 - کاهش ظرفیت باتری ممکن است به دلیل تنظیم ولتاژ شارژ پایین‌تر از حد لازم باشد.
- هنگامی که باتری به صورت منبع تغذیه آماده به کار و به صورت موازی با بار مصرفی استفاده می‌شود، ولتاژ شارژ شناور به نوع باتری بستگی دارد و باید مطابق با توصیه‌های سازنده تنظیم شود.

۳-۱-۴. شارژ برابرکننده (Equalizing Charge)

اگر باتری برای مدت طولانی در حالت شارژ شناور (Float Charging) قرار داشته باشد، یا اگر تفاوت قابل توجهی در ولتاژ سلول‌ها مشاهده شود، باید شارژ برابرکننده به مدت ۱۲ ساعت انجام شود. ولتاژ شارژ برابرکننده بسته به نوع باتری متفاوت است، بنابراین ولتاژ شارژ باید مطابق با نوع باتری و شرایط عملکردی تنظیم شود. پس از انجام شارژ برابرکننده به مدت ۱۲ ساعت، باید ولتاژ دستگاه شارژ به ولتاژ شارژ شناور بازگردانده شود.

ولتاژ شارژ برابرکننده (به ازای هر سلول)	مدل باتری
۱/۶۰ - ۱/۷۰ V	FPL
۱/۶۰ - ۱/۶۵ V	FPM
۱/۶۰ - ۱/۶۵ V	FPH

۲-۴. اثرات دما (Temperature Influences)

دما یکی از عوامل مهمی است که می‌تواند بر عملکرد باتری تأثیر بگذارد. در زمان شارژ، مناسب‌ترین دما برای عملکرد مطلوب باتری، محدوده 20 ± 5 درجه سانتی‌گراد است (یعنی بین ۱۵ تا ۲۵ درجه). به طور معمول، دمای الکترولیت داخل باتری هنگام شارژ به تدریج افزایش می‌یابد. اما اگر این دما به ۴۵ درجه سانتی‌گراد برسد یا از آن فراتر رود، طول عمر باتری ممکن است کاهش یابد. بنابراین، دمای باتری باید در این محدوده کنترل شود.

با این حال، اگر دمای الکترولیت برای مدت کوتاهی بالاتر از ۴۵ درجه بماند، ولی به ساختار باتری آسیبی نرساند، باعث کاهش سریع ظرفیت باتری نخواهد شد.

۳-۴. افزودن مجدد الکترولیت (Electrolyte Refilling)

در داخل باتری، معمولاً فرآیند الکترولیز آب و تبخیر رخ می‌دهد، که منجر به کاهش سطح الکترولیت می‌شود. به همین دلیل، نیاز است به طور منظم سطح الکترولیت بررسی و در صورت نیاز پر شود تا سطح آن بین حداقل و حداکثر مجاز، یا بین بالای صفحات و خط حداکثر باقی بماند. روی هر سلول باتری، دو خط مشخص به عنوان سطح "حداکثر (Max)" و "حداقل (Min)" وجود دارد. این خطوط از بیرون سلول با چشم قابل مشاهده‌اند. سطح الکترولیت باید همیشه بین این دو خط باقی بماند؛ در صورت کاهش، تنها با آب مقطر (Distilled Water) یا آب دی‌یونیزه (Deionized Water) آن را پر کنید.

۴-۴. تعویض الکترولیت

در صورت بروز هر یک از شرایط زیر، باید بلافاصله الکترولیت باتری تعویض شود.

الف) چگالی ویژه (Specific Gravity) الکترولیت کمتر از ۱/۱۶ شود.

ب) باتری طبق دستورالعمل و جدول دشارژ استاندارد، به درستی کار نکند.

ج) میزان ناخالصی‌ها (به خصوص فلزات سنگین) در الکترولیت از حد مجاز فراتر رود.

نکته مهم پس از تعویض الکترولیت

پس از تعویض، نباید فوراً از باتری استفاده کرد. مراحل زیر باید رعایت شوند.

۱. تمیز کاری باتری انجام شود.

۲. باتری در همان ترتیب قبلی دوباره متصل گردد.

۳. سپس طبق روش زیر، شارژ ویژه برای بازیابی ظرفیت باتری انجام شود.

دستور شارژ ویژه (جهت احیای ظرفیت):

۱. شارژ با جریان ثابت $0.2C_h$ به مدت ۱۲ ساعت یا با جریان ثابت $0.1C_h$ به مدت ۲۴ ساعت

توجه: در پایان شارژ، ولتاژ سلول ممکن است تا 1.80 ولت افزایش یابد. بنابراین شارژر باید قابلیت تامین این ولتاژ را داشته باشد.

❖ مجموع شارژ برابر با 240% ظرفیت نامی خواهد بود.

۲. تخلیه (Discharge): با جریان $0.2C_h$ تا رسیدن به ولتاژ 1.0 ولت برای هر سلول دشارژ انجام شود.

۳. شارژ مجدد: مرحله ی شارژ را دوباره تکرار کنید.

نکته: پس از شارژ کامل همه باتری‌ها، اطمینان حاصل شود که غلظت الکترولیت در حد مناسب باشد و سطح الکترولیت بین خطوط تعیین شده (سطح نرمال) قرار داشته باشد.

۵-۴. سرویس دوره ای

توصیه می‌شود در فرآیند نگهداری باتری‌ها، از سیستم استاندارد شارژ و دشارژ برای چرخه‌های شارژ و دشارژ استفاده شود. برای باتری‌هایی که مدت طولانی در حالت شارژ شناور بوده‌اند، باید هر ۶ ماه یک بار شارژ برابرکننده انجام شود. همچنین هنگامی که اختلاف قابل توجهی در ولتاژ باتری‌ها در یک مجموعه باتری (سری) وجود داشته باشد، شارژ برابر کننده ضروری است.

دوره انجام	مورد بازرسی
هر ماه	ولتاژ شارژ شناور
هر سه ماه	ولتاژ هر باتری
هر دو ماه	سطح مایع الکترولیت
هر سه ماه	شل شدن و سفت کردن قطعات اتصال
هر سه ماه	ظاهر بیرونی درب و جلد و دریچه خروج گاز باتری
هر شش ماه	اعمال شارژ برابر کننده

۶-۴. انبارداری

باتری باید در فضای سرپوشیده، خشک، تمیز و خنک (0 تا 30 درجه سانتی گراد) و با تهویه مناسب روی جایگاه‌های باز نگهداری شوند. از قرار دادن در معرض نور مستقیم خورشید یا حرارت زیاد خودداری کنید.

سلول های پر و شارژ شده

- ❖ اگر سلول ها پر شده اند، باید پیش از انبارداری به طور کامل شارژ شوند.
- ❖ سلول ها می توانند به صورت پر و شارژ شده تا مدت زمان حداکثر ۱۲ ماه از تاریخ ارسال از کارخانه نگهداری شوند.
- ❖ انبارداری سلول پر در دمای بالاتر از ۳۰ درجه سانتی گراد می تواند منجر به کاهش ظرفیت شود. این کاهش ظرفیت می تواند تا ۵٪ به ازای هر ۱۰ درجه بالاتر از ۳۰ درجه سانتی گراد در سال باشد.

سلول های خالی و دشارژ شده

- ❖ توصیه می شود سلول ها به صورت خالی و دشارژ شده انبار شوند. این روش با استاندارد IEC 60623 بخش انبارداری مطابقت دارد.
- ❖ اقلامی که قرار است انبار شوند باید طبق دستورالعمل های سازنده آماده شوند. لازم به ذکر است دمای میانگین باید $20^{\circ}\text{C} \pm 5^{\circ}\text{C}$ باشد و رطوبت نسبی باید $20\% \pm 65\%$ حفظ گردد.
- ❖ در طول دوره ی انبارداری، دمای محیط نباید بیش از $20^{\circ}\text{C} \pm 5^{\circ}\text{C}$ نوسان داشته باشد.
- ❖ باتری ها می توانند به این صورت (خالی و دشارژ شده) برای سال ها نگهداری شوند. جعبه های حاوی باتری را بدون باز کردن، انبار کنید.

۷-۴. تمیزکاری

تمیزکاری باتری، به طور مؤثری موجب افزایش طول عمر عملیاتی و بهبود عملکرد آن می گردد. تبخیر الکترولیت و آزادسازی گازها موجب ایجاد رطوبت بر سطح باتری می شود. در صورت ترکیب این رطوبت با حرارت، احتمال بروز پدیده ی خز (Creepage) بین قطب های الکتریکی افزایش یافته و این امر می تواند منجر به نشستی جریان، افت راندمان و حتی خطر اتصال کوتاه گردد. از این رو، سطح خارجی باتری باید همواره تمیز و خشک نگه داشته شود.

در تمیزکاری اتصالات و قطعات فلزی آبکاری شده با نیکل، از استفاده ی کاغذ سنباده، پارچه ها و برس های زبر خودداری نمایید؛ چرا که موجب آسیب به لایه ی آبکاری نیکل می گردد و این آسیب منجر به اکسیداسیون، زنگ زدگی و افزایش مقاومت الکتریکی در ناحیه ی اتصال خواهد شد.

نگهداری پیشگیرانه باید بر اساس الزامات زیر و به صورت منظم انجام شود. انجام صحیح و دقیق این اقدامات نگهداری، هزینه های تعمیرات و خرابی های آتی را به میزان قابل توجهی کاهش خواهد داد:

۱. حداقل یک بار در ماه، سطح خارجی باتری—به ویژه قسمت فوقانی و قطب‌ها—را به دقت پاک‌سازی نمایید. پس از تمیزکاری، روی قطعات آبکاری شده با نیکل، یک لایه ی نازک از روغن ضد خوردگی یا وازلین صنعتی بمالید تا از اکسیداسیون جلوگیری شود.

۲. به صورت دوره‌ای، تمامی پیچ‌های ترمینال و اجزای اتصالات بین سلول‌ها را بررسی و در صورت نیاز با گشتاور مناسب مجدداً محکم نمایید.

۳. از وارد آوردن هرگونه ضربه ی مکانیکی، فشار بیش از حد یا آسیب فیزیکی به باتری اکیدا خودداری گردد؛ این موارد می‌توانند منجر به نشستی الکترولیت، ترک جلد یا کاهش ایمنی عملکرد باتری شوند.

۸-۴. توصیه های مهم در بهره برداری باتری نیکل کادمیوم

- هرگز اجازه ندهید شعله یا جرقه‌ای در نزدیکی باتری‌ها قرار گیرد، به ویژه هنگام شارژ کردن
- برای ایمنی، از دستکش لاستیکی، لباس آستین بلند و عینک محافظ ضد پاشش یا محافظ صورت مناسب استفاده کنید.
- الکترولیت برای پوست و چشم‌ها مضر است. در صورت تماس با پوست یا چشم، فوراً با مقدار زیادی آب بشویید. اگر چشم‌ها آسیب دیدند، با آب بشویید و بلافاصله به پزشک مراجعه کنید.
- پیش از کار کردن روی باتری، حلقه، ساعت و قطعات فلزی را از خود جدا کنید.
- از ابزارهای عایق شده استفاده کنید. از ایجاد الکتریسیته ساکن خودداری کرده و تدابیر لازم برای جلوگیری از شوک الکتریکی را رعایت کنید.
- پیش از آنکه روی باتری کار کنید، هرگونه الکتریسیته ساکن احتمالی در لباس یا ابزار را با تماس دادن آن‌ها به یک قسمت متصل به زمین (ارت) تخلیه کنید.
- در نزدیکی باتری‌ها به هیچ عنوان سیگار نکشید.

۵. مشکلات متداول و روش‌های عیب‌یابی

مشکلات متداول افت ولتاژ

علت بروز مشکل	راهکار فنی (اقدام اصلاحی)
ولتاژ پایین باتری هنگام دریافت به دلیل حمل باتری بدون الکترولیت	پس از افزودن الکترولیت و انجام شارژ اولیه مطابق دستورالعمل، ولتاژ سلول بازیابی خواهد شد.
عدم رعایت الزامات شارژ اولیه	شارژ اولیه باید طبق دستورالعمل انجام گیرد: اعمال جریان ثابت برابر با $0.2C$ مثلاً برای باتری 100 آمپر ساعت، جریان 20 آمپر به مدت 8 ساعت.
شارژ ناقص به علت ناتوانی شارژر در تأمین ولتاژ $1/8$ ولت بر سل	تعویض شارژر با مدل مناسب یا تقسیم بانک باتری به دو بخش مجزا جهت اطمینان از رسیدن ولتاژ شارژر به $1/8$ ولت بر سل.
استفاده از گیره فلزی به جای شینه مسی؛ تماس ضعیف در محل اتصالات	استفاده از شینه مسی با سطح مقطع مناسب به جای گیره؛ بررسی و اطمینان از صحت اتصالات، شامل کابل‌ها، رابط‌ها و پیچ‌ها.
کاهش ولتاژ چند سلول در حین بهره‌برداری	۱. بررسی اتصالات و محکم کردن پیچ‌ها ۲. شارژ کامل باتری با جریان ثابت $0.2C$ به مدت 8 ساعت یا شارژ با ولتاژ ثابت $1/65$ ولت بر سل و محدودیت جریان $0.2C$ به مدت 30 ساعت ۳. دشارژ تا $1/16$ ولت بر سل و تکرار مرحله شارژ مجدد
اتصال کوتاه، مدار باز داخلی یا نبود الکترولیت در باتری	بررسی دقیق باتری، پاک‌سازی، تعویض الکترولیت در صورت نیاز یا تعمیر سلول‌های معیوب و سپس پر کردن مجدد الکترولیت طبق دستورالعمل
اتصال کوتاه یا مدار باز در بخش خارجی باتری (محیطی)	خشک نگه داشتن کامل اطراف باتری، تقویت ایزولاسیون، حذف منابع ایجاد اتصال کوتاه یا مسیرهای نشتی الکتریکی

مشکلات متداول افت ظرفیت

علت بروز مشکل	اقدام اصلاحی (راهکار فنی)
استفاده طولانی مدت از الکترولیت و افزایش بیش از حد ترکیبات کربناته	الکترولیت قدیمی را به طور کامل تخلیه نموده، سیستم داخلی باتری را شست و شو کرده و الکترولیت تازه و مطابق مشخصات فنی جایگزین نمایید.
ساخت یا ترکیب نادرست الکترولیت و عدم انطباق با استانداردهای تولیدکننده	تنها از الکترولیتی استفاده نمایید که براساس فرمولاسیون و دستورالعمل رسمی تولیدکننده تهیه شده و تست کیفی آن تأیید شده باشد.
کاهش سطح الکترولیت به حدی که صفحات باتری به طور کامل غوطه ور نیستند	سطح الکترولیت را با افزودن آب مقطر تا محدوده تعیین شده افزایش داده، چگالی آن را تنظیم کرده و یک سیکل شارژ کامل برای یکنواخت سازی انجام دهید.
وجود ناخالصی های مضر یا افزایش غلظت فلزات سنگین در الکترولیت	محفظه داخلی باتری را شست و شو داده، الکترولیت آلوده را تخلیه کرده و نمونه الکترولیت استاندارد و تصفیه شده را جایگزین کنید.
انجام نادرست فرآیند شارژ یا دشارژ باتری	پروسه های شارژ و دشارژ را کاملاً منطبق با مشخصات فنی و دستورالعمل عملیاتی تولیدکننده اجرا کرده و تنظیمات شارژر را بازبینی نمایید.
بروز اتصال کوتاه در بخش های داخلی باتری	باتری را چک کرده، الکترولیت را تخلیه، محفظه داخلی را پاک سازی و الکترولیت نو را جایگزین نمایید. سپس یک شارژ جبرانی انجام داده و در صورت تداوم عیب، باتری را باز کرده و تعمیرات تخصصی روی سلول معیوب انجام دهید.
اتصال کوتاه یا نشتی جریان در بخش های خارجی باتری	محیط اطراف باتری را خشک و عاری از رطوبت نگه داشته، عایق بندی و ایزولاسیون اتصالات را تقویت کرده و کلیه منابع ایجاد اتصال یا نشتی جریان را حذف نمایید.
کالیبره نبودن یا خطای اندازه گیری در آمپر متر یا ولت متر	تجهیزات اندازه گیری را بررسی، تست و در صورت نیاز تنظیم مجدد نمایید تا دقت اندازه گیری پارامترها تضمین شود.

مشکلات بهره برداری

مشکل	علت	اقدام اصلاحی
کف یا حباب درون باتری ظاهر شده است.	ناخالصی های آلی در الکترولیت وجود دارد.	الکترولیت استاندارد را جایگزین نمایید.
جلد باتری متورم شده است.	پس از نصب، دریچه حمل و نقل مشکی با دریچه عملیاتی آبی جایگزین نشده است.	تعویض دریچه حمل و نقل مشکی با دریچه عملیاتی آبی (تورم بدنه سلول تأثیری بر عملکرد باتری ندارد)
	صفحات مثبت متورم شده اند.	امکان احیا باتری وجود ندارد، در صورت عدم کاهش ظرفیت می توان به بهره برداری ادامه داد.
	دریچه خروج گاز مسدود شده است.	دریچه خروج گاز را با آب گرم تمیز کنید تا منافذ باز شوند یا دریچه های جدید را جایگزین نمایید.
	اتصال کوتاه داخلی یا وجود ناخالصی بیش از حد در الکترولیت باعث تولید زیاد گاز شده و دریچه خروج گاز قادر به تخلیه به موقع آن نیست.	باتری را فوراً تمیز کرده، در محیطی خشک و با تهویه مناسب نگهداری نمایید.
خوردگی قلیایی	سطح الکترولیت بیش از حد بالا است	الکترولیت اضافه را خارج کرده و سطح الکترولیت را به ارتفاع مطلوب و استاندارد تنظیم نمایید.
	قطب های باتری و دریچه خروج گاز به خوبی آب بندی نشده اند.	قطعات یدکی مربوط به آب بندی را تعویض کرده و به طور کامل محکم کنید.
	نشت الکترولیت	باتری را فوراً تمیز کرده و در محیطی خشک و دارای تهویه مناسب نگهداری نمایید.
نشت الکترولیت	آب بندی ضعیف بین محفظه و دریچه یا ایجاد ترک/آسیب ناشی از حمل و نقل یا عملیات نادرست	قسمت های آسیب دیده را شست و شو داده و تمیز کنید، سپس محلول تتراکلرید استیلن حاوی ۵٪ رزین ABS را با استفاده از قلم مو روی سطح بمالید.

پیوست ۱

چک لیست کنترلی متعلقات باتری											
شماره: Rack: ۲۲۰۷۲۶۰Ah											
نام محصول: باتری نیکل کادمیوم کد محصول: ۱/۲۷۲۶۰Ah تایپ L			نوع جایگاه: زمینی			شماره محموله: تاریخ اعلام محموله:		نام مشتری: پخش فراروده های نفتی چابهار وزن خالص متعلقات:			
ردیف	شرح متعلقات	اندازه	تعداد/ مقدار	واحد	وزن gr	ردیف	شرح متعلقات	اندازه	تعداد/ مقدار	واحد	
۱	اتصال کابلی	۱*۹۵mm² L=۴۵۰mm±۱۰mm²	۱۹	عدد		۱۵	وازلین صنعتی	-	۳	قوطی	
۲	اتصال کابلی	۱*۹۵mm² L=۵۵۰mm±۱۰mm²	۱	عدد		۱۶	دماسنج میله ای	-	۱	عدد	
۳	اتصال کابلی	۱*۹۵mm² L=۱۳۰۰mm±۱۰mm²	۲	عدد		۱۷	دستکش لاستیکی	-	۱	عدد	
۴	اتصال کابلی	۱*۹۵mm² L=۳۰۰۰mm±۱۰mm²	۱	عدد		۱۸	دفترچه دستورالعمل	-	۲	جلد	
۵	اتصال مسی	۱۱۵*۴۰*۳mm	۱۵۲	عدد		۱۹	نقشه جایگاه	-	۱	برگ	
۶	اتصال مسی L شکل	۱۲۵*۵۰*۳mm	۴۸	عدد		۲۰	برچسب شماره سریال	۱-۱۷۶	۱	سری	
۷	عایق اتصالات	۱۲۵*۴۰*۴mm	۱۷۶	عدد		۲۱	کارت گارانتی	-	۱	برگ	
۸	دریچه خروج گاز	-	۱۷۶	عدد		۲۲	پارچ پلاستیکی	-	۱	عدد	
۹	پیچ رولبولت	۸mm	۱۶	عدد		۲۳	قیف پلاستیکی	-	۱	عدد	
۱۰	پیچ و رول پلاک (تلگرافی)	۸mm	۸	عدد		۲۴	غلظت سنج	-	۱	عدد	
۱۱	پیچ تخت به همراه واشر تخت و فنری و مهره	۸*۲۵mm	۵۸	عدد		۲۵	دماسنج اتاقی	-	۱	عدد	
۱۲	پیچ تخت به همراه واشر تخت و فنری و مهره	۸*۴۰mm	۲	عدد		۲۶	پیش بند	-	۱	عدد	
۱۳	آچار تخت	۲۷-۳۰	۱	عدد							
۱۴	آچار تخت یک سررینگی	۱۳	۱	جلد							

پیوست ۲

جدول تخلیه کامل (۱۰ ساعته) پس از پایان شارژ مرحله اول													
جدول ثبت ولتاژ باتری ها در حالت دشارژ													
نام اپراتور:		دمای محیط:			مدت دشارژ:			جریان دشارژ:		ساعت شروع:		تاریخ:	
	OCV	1h	2h	3h	4h	5h	6h	7h	8h	9h	10h	F/V	شماره سریال
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
ولتاژ کل													

پیوست ۳

