



EnerRocket™
CONTINUOUSLY SAFEGUARDING

ES 5-12

SMF VRLA RECHARGEABLE BATTERY

**LONG
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SERIES**

APPLICATIONS

UPS Systems
Telecommunication Systems
Fire Alarm Safety & Security Systems
Medical Equipment

COMPLIANCE STANDARDS

IEC 60896 PART 21 & 22
BS6290-4

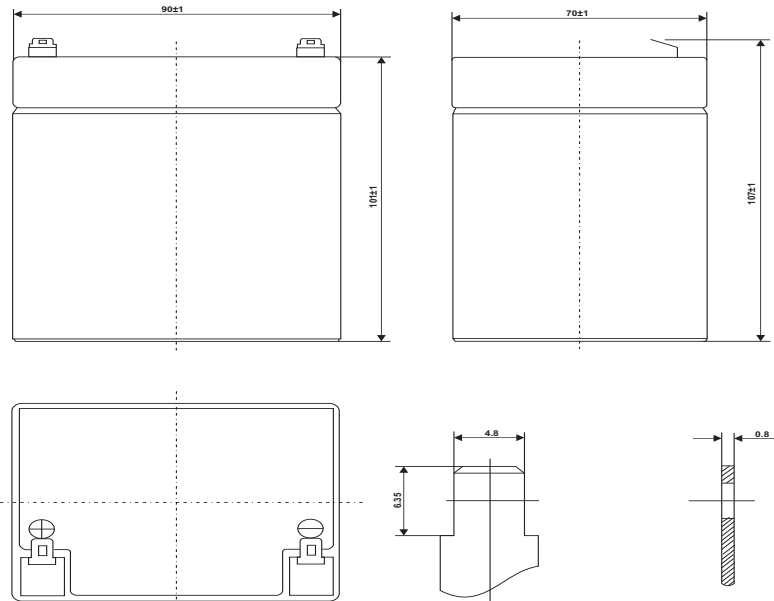
TECHNICAL FEATURES



- Non-Spillable Sealed Construction
- Seal Lead Acid Battery
- Absorptive Glass Mat System (AGM System)
- ABS (Acrylonitrile Butadiene Styrene) construction (FR optional)
- Gas Recombination
- Venting System for low internal pressure
- Low Self-Discharge
- Heavy-Duty, Highly Optimized Grids
- High Power Output
- Wide Operating Temperature
- Maintenance-Free Operation

CHARACTERISTICS

Nominal Voltage	12 V	
Design Life	10 Years	
Capacity 25°C (77°F)	20 Hour rate	5.0Ah
	10 Hour rate	5.0Ah
	5 Hour rate	4.8Ah
Internal Resistance (25°C, 100% Charge)		≤ 25mΩ
Self Discharge (20°C)	1 Month	Remaining Capacity 97%
Operating Temperature	Discharge	-20°C - 60°C
	Charge	-10°C - 60°C
	Storage	-20°C - 60°C
Normal Operating Temperature		25°C ± 3°C
Maximum Discharge current		75A (5sec)
Maximum Charging current		2.00A
Short Circuit Current		270A
Charge Methods		14.4 to 14.7 V
Constant Voltage Charge 77°F (25°C) - Cycle use		Temp. Compensation -30mV/°C
Charge methods		13.4 to 13.8V
Constant Voltage Charge 77°F (25°C) - Standby Use		Temp. Compensation -20mV/°C



SPECIFICATIONS

Length	Width	Height	Total Height	Weight (kg)
90 mm	70 mm	101 mm	107 mm	1.72 ± 5%

CONSTANT CURRENT DISCHARGE (Amperes) AT 25°C

End Voltage Volts/Cell	5min	10min	15min	30min	1h	3h	5h	10h	20h
1.60	26.5	17.5	13.0	7.30	4.10	1.55	1.01	0.52	0.27
1.65	25.4	17.2	12.7	7.20	4.02	1.51	0.98	0.51	0.26
1.70	24.3	17.0	12.4	7.13	4.00	1.48	0.97	0.50	0.26
1.75	23.1	16.5	12.1	7.10	3.99	1.44	0.96	0.50	0.25
1.80	21.8	15.8	12.0	7.02	3.98	1.40	0.95	0.50	0.25

CONSTANT POWER DISCHARGE (Watts) AT 25°C

End Voltage Volts/Cell	5min	10min	15min	30min	1h	3h	5h	10h	20h
1.60	49.5	35.2	25.7	14.60	8.05	3.05	2.01	-	-
1.65	47.1	34.0	25.2	14.40	8.03	2.99	1.98	-	-
1.70	44.8	33.5	25.0	14.30	8.00	2.93	1.95	-	-
1.75	42.3	32.5	24.3	14.30	7.99	2.86	1.91	-	-
1.80	39.8	31.6	23.5	14.20	7.97	2.80	1.88	-	-



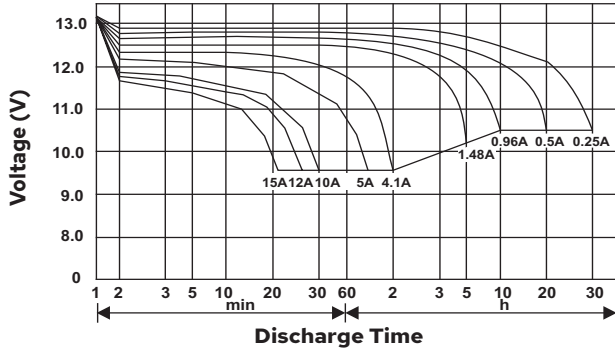
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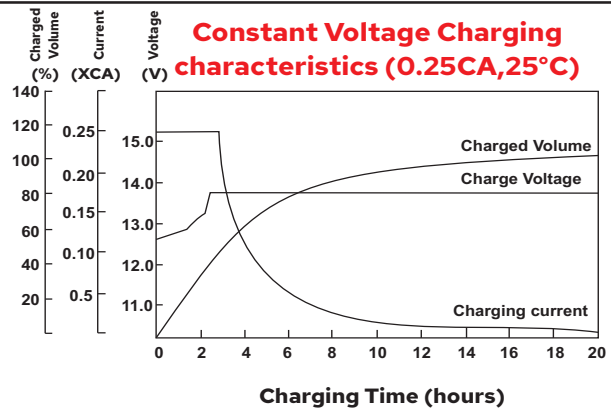
SMF VRLA RECHARGEABLE BATTERY

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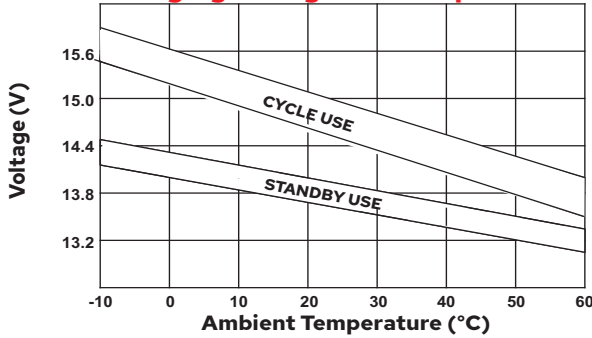
Discharge Characteristic (25°C)



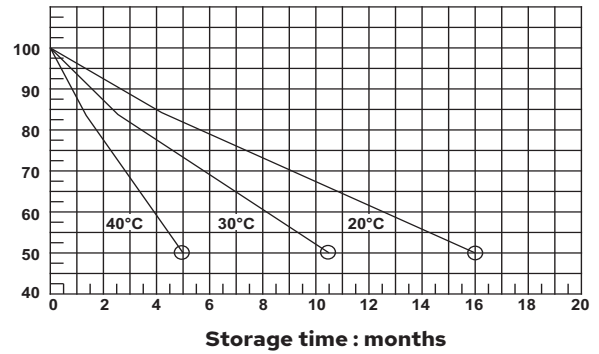
Constant Voltage Charging characteristics (0.25CA, 25°C)



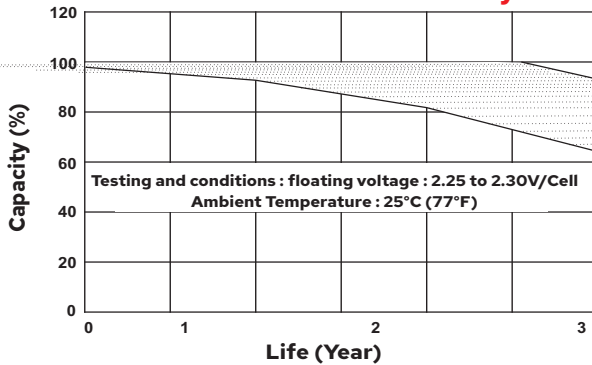
Relationship between charging voltage and temperature



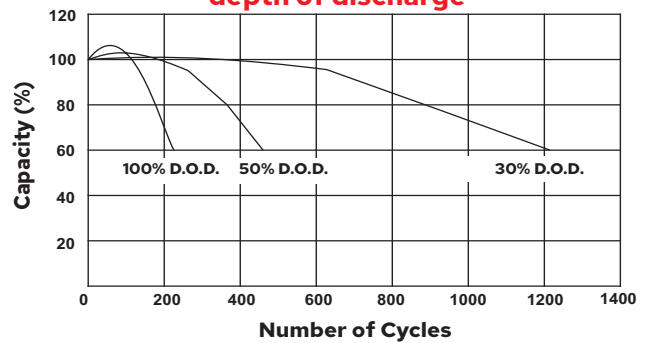
Self-discharge Characteristic



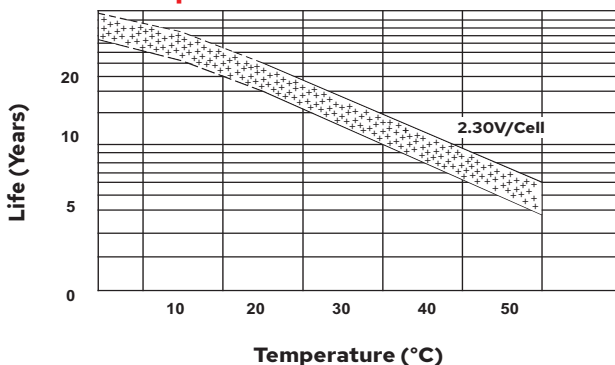
Life Characteristics of standby use



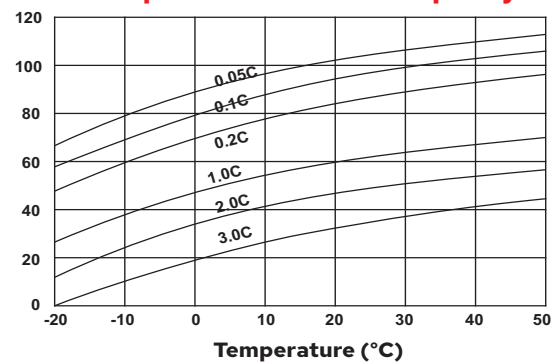
Cycle service life in relation on to depth of discharge



Temperature effect on float life



Temperature effect on capacity





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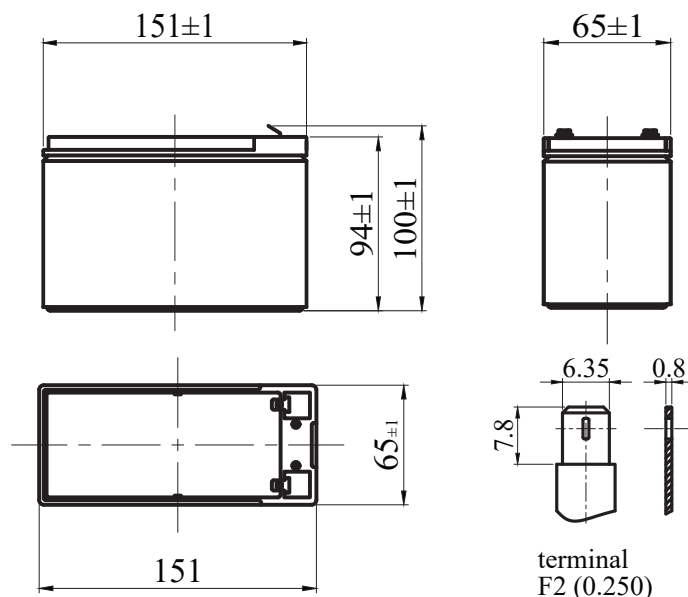
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- Absorptive Glass Mat System (AGM System)
- ABS (Acrylonitrile Butadiene Styrene) construction (FR optional)
- Gas Recombination
- Venting System for low internal pressure
- Low Self-Discharge
- Heavy-Duty, Highly Optimized Grids
- High Power Output
- Wide Operating Temperature
- Maintenance-Free Operation

CHARACTERISTICS

Nominal Voltage	12 V	
Design Life	10 Years	
Capacity 27°C (80.6°F)	20 Hour rate	7Ah
	10 Hour rate	6.7Ah
	5 Hour rate	5.6Ah
Internal Resistance (25°C, 100% Charge)		25mΩ
Self Discharge (20°C)	1 Month	Remaining Capacity 97%
Operating Temperature	Discharge	-20°C - 60°C
	Charge	-10°C - 60°C
	Storage	-20°C - 60°C
Normal Operating Temperature		25°C ± 3°C
Maximum Discharge current		105A (5sec)
Maximum Charging current		2.88A
Short Circuit Current		350A
Charge Methods		14.4 to 14.7 V
Constant Voltage Charge 77°F (25°C) - Cycle use		Temp. Compensation -30mV/°C
Charge methods		13.4 to 13.8V
Constant Voltage Charge 77°F (25°C) - Standby Use		Temp. Compensation -20mV/°C



SPECIFICATIONS

Length	Width	Height	Total Height	Weight (kg)
151 mm	65 mm	94 mm	100 mm	2.2 ± 5%

CONSTANT CURRENT DISCHARGE (Amperes) AT 25°C

End Voltage Volts/Cell	5min	10min	15min	30min	1h	3h	5h	10h	20h
1.60	30.0	18.8	15.3	8.50	4.80	1.88	1.25	0.66	0.38
1.65	28.4	17.9	14.6	8.15	4.63	1.82	1.20	0.65	0.38
1.70	26.8	17.0	13.9	7.86	4.44	1.76	1.16	0.64	0.37
1.75	25.2	16.0	13.2	7.56	4.25	1.69	1.12	0.63	0.36
1.80	23.5	15.1	12.5	7.18	4.04	1.64	1.10	0.60	0.35

CONSTANT POWER DISCHARGE (Watts) AT 25°C

End Voltage Volts/Cell	5min	10min	15min	30min	1h	3h	5h	10h	20h
1.60	53.3	35.8	28.1	15.50	9.30	3.68	2.38	1.34	0.70
1.65	50.7	34.0	27.0	14.90	8.90	3.59	2.34	1.32	0.69
1.70	48.1	32.2	25.9	14.30	8.53	3.49	2.30	1.30	0.68
1.75	45.6	30.4	24.8	13.70	8.28	3.38	2.25	1.28	0.66
1.80	43.1	28.6	23.8	13.20	7.90	3.27	2.19	1.26	0.64



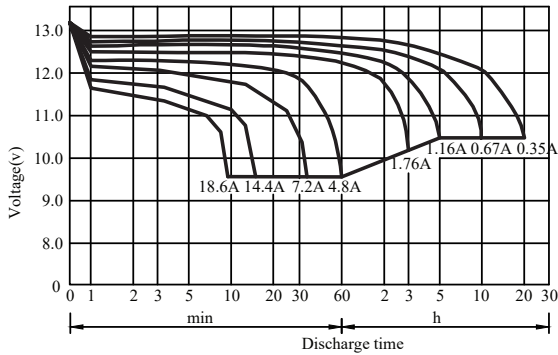
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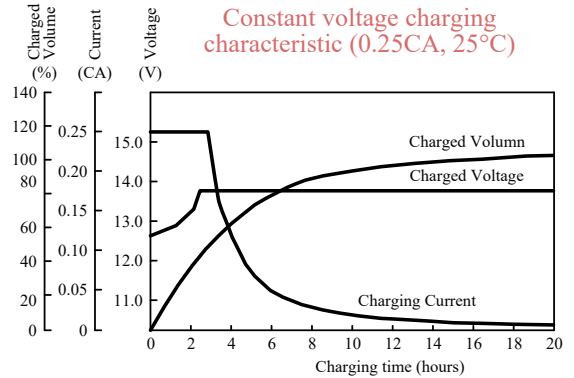
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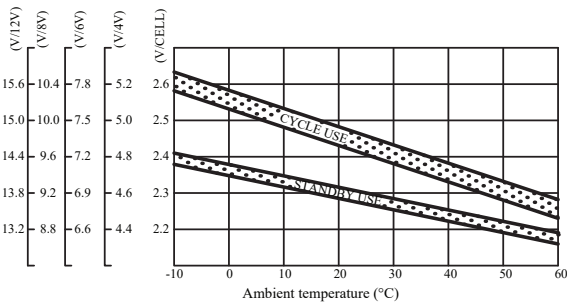
Discharge characteristic (25°C)



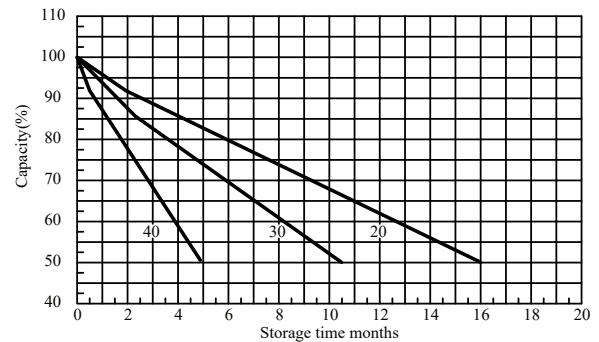
Constant voltage charging characteristic (0.25CA, 25°C)



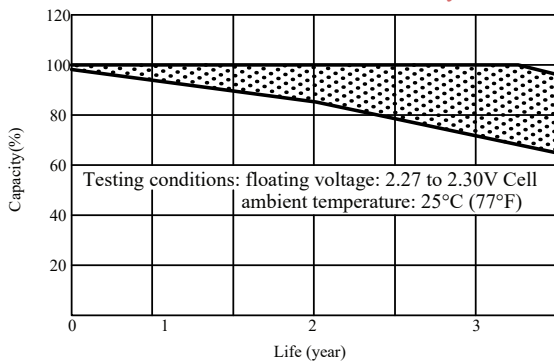
Relationship between charging voltage and temperature



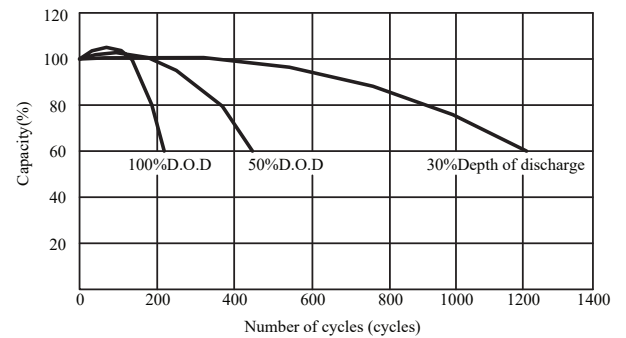
Self-discharge characteristic



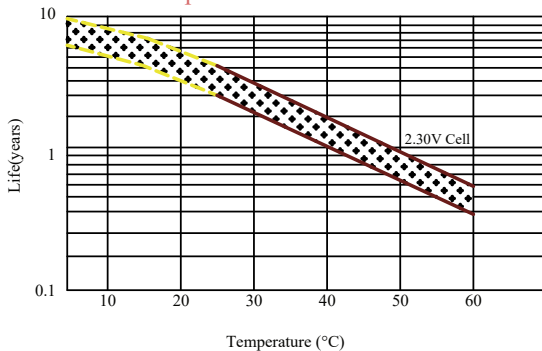
Life characteristics of Standby use



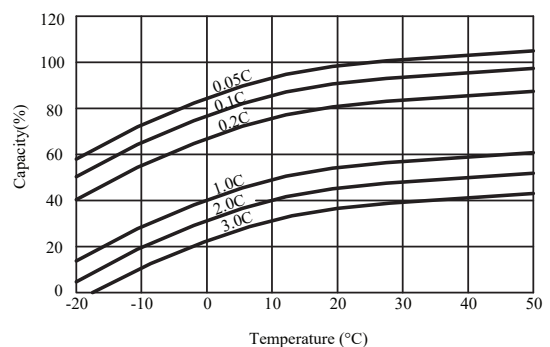
Cycle service life in relation to depth of discharge



Temperature effects on float life



Temperature effects on capacity



v205.2



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APPLICATIONS

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COMPLIANCE STANDARDS

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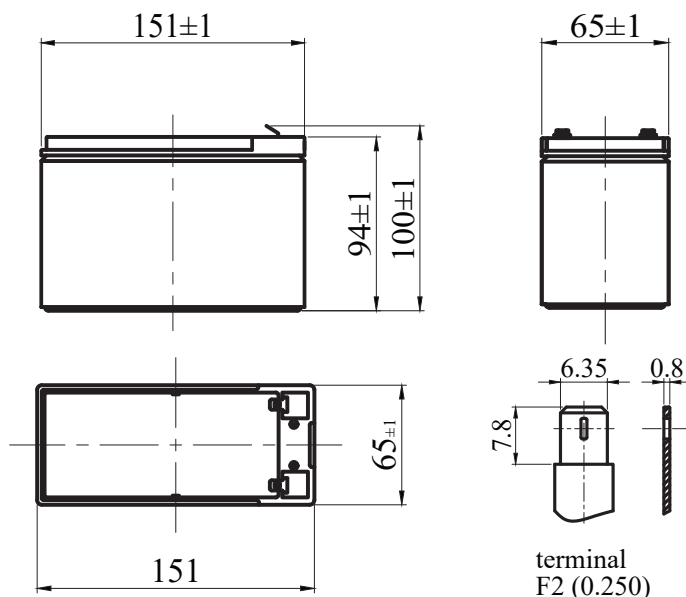
TECHNICAL FEATURES



- Non-Spillable Sealed Construction
- Seal Lead Acid Battery
- Absorptive Glass Mat System (AGM System)
- ABS (Acrylonitrile Butadiene Styrene) construction (FR optional)
- Gas Recombination
- Venting System for low internal pressure
- Low Self-Discharge
- Heavy-Duty, Highly Optimized Grids
- High Power Output
- Wide Operating Temperature
- Maintenance-Free Operation

CHARACTERISTICS

Nominal Voltage	12 V	
Design Life	10 Years	
Capacity 25°C (77°F)	20 Hour rate	9.0Ah
	10 Hour rate	8.2Ah
	5 Hour rate	7.7Ah
Internal Resistance (25°C, 100% Charge)		≤ 18 mΩ
Self Discharge (20°C)	1 Month	Remaining Capacity 97%
Operating Temperature	Discharge	-20°C - 60°C
	Charge	-10°C - 50°C
	Storage	-20°C - 60°C
Normal Operating Temperature		25°C ± 3°C
Maximum Discharge current		135A
Maximum Charging current		3.6A
Short Circuit Current		450A
Charge Methods		14.4 to 14.7V
Constant Voltage Charge 77°F (25°C) - Cycle use		Temp. Compensation -30mV/°C
Charge methods		13.4 to 13.8V
Constant Voltage Charge 77°F (25°C) - Standby Use		Temp. Compensation -20mV/°C



SPECIFICATIONS

Length	Width	Height	Total Height	Weight (kg)
151 mm	65 mm	94 mm	100 mm	2.8 ± 5%

CONSTANT CURRENT DISCHARGE (Amperes) AT 25°C

End Voltage Volts/Cell	5min	10min	15min	30min	1h	3h	5h	10h	20h
1.60	33.0	24.2	17.0	9.90	5.80	2.33	1.60	0.87	0.47
1.65	32.1	23.6	16.5	9.79	5.75	2.29	1.56	0.86	0.46
1.70	30.9	22.9	16.1	9.36	5.71	2.25	1.55	0.84	0.46
1.75	30.3	22.1	14.6	8.91	5.66	2.20	1.54	0.82	0.45
1.80	29.6	21.0	13.9	8.45	5.51	2.14	1.53	0.82	0.44

CONSTANT POWER DISCHARGE (Watts) AT 25°C

End Voltage Volts/Cell	5min	10min	15min	30min	1h	3h	5h	10h	20h
1.60	71.7	44.8	33.6	19.6	11.5	4.34	3.10	1.70	0.90
1.65	68.3	44.3	33.1	19.1	11.2	4.29	3.04	1.60	0.90
1.70	64.8	42.9	31.1	18.5	11.0	4.20	2.98	1.60	0.90
1.75	61.4	41.1	30.2	17.6	10.7	4.08	2.92	1.60	0.90
1.80	58.0	39.2	28.4	16.6	10.4	3.92	2.85	1.60	0.80



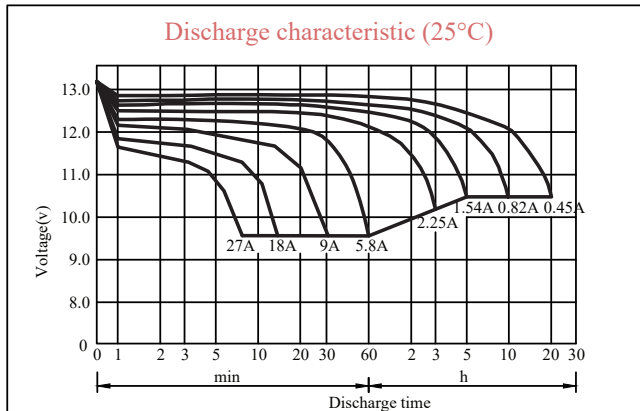
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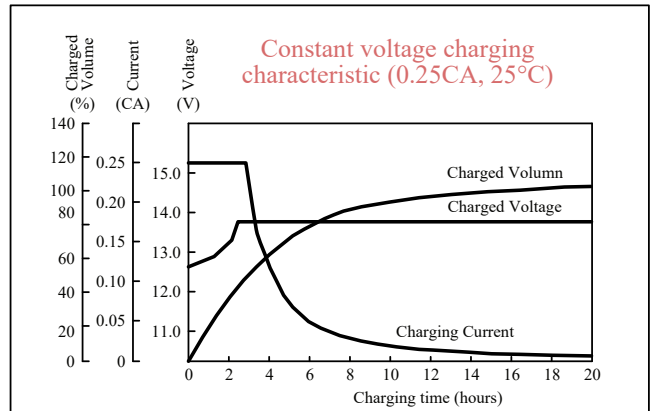
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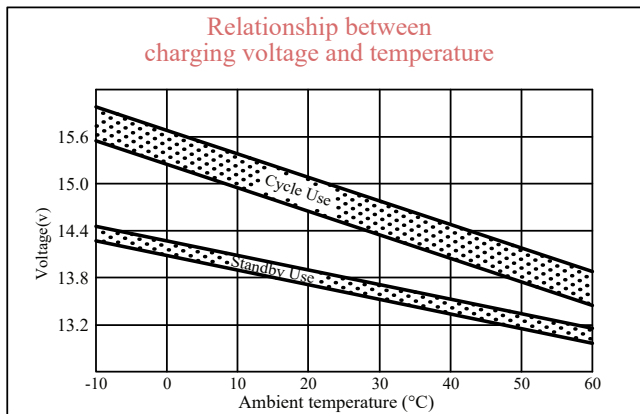
Discharge characteristic (25°C)



Constant voltage charging characteristic (0.25CA, 25°C)



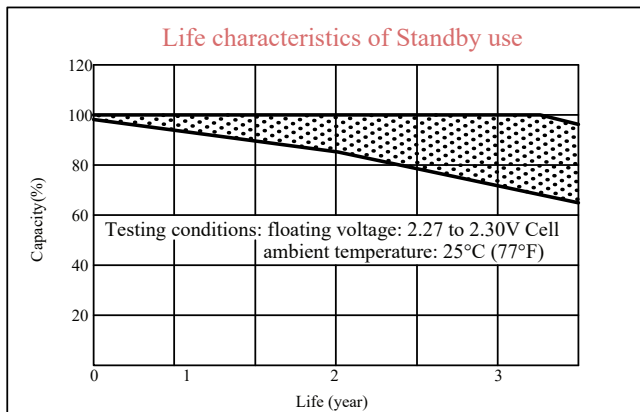
Relationship between charging voltage and temperature



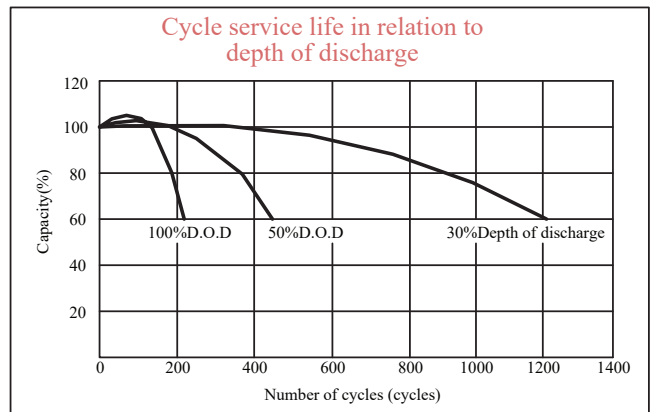
Self-discharge characteristic



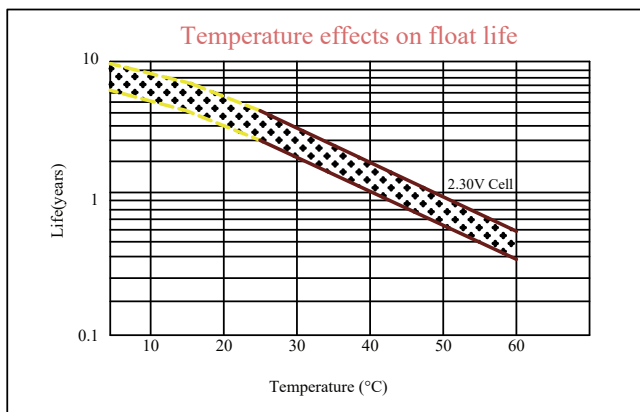
Life characteristics of Standby use



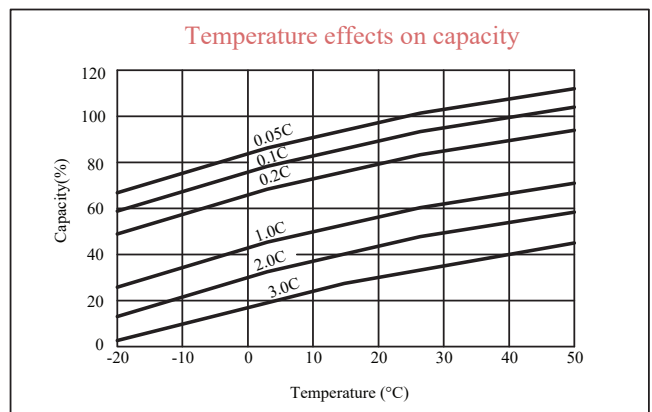
Cycle service life in relation to depth of discharge



Temperature effects on float life



Temperature effects on capacity



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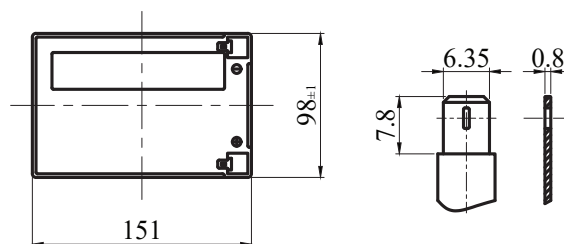
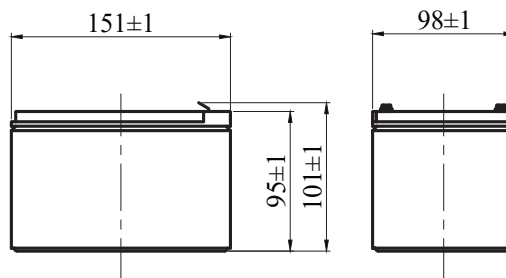
TECHNICAL FEATURES



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- Seal Lead Acid Battery
- Absorptive Glass Mat System (AGM System)
- ABS (Acrylonitrile Butadiene Styrene) construction (FR optional)
- Gas Recombination
- Venting System for low internal pressure
- Low Self-Discharge
- Heavy-Duty, Highly Optimized Grids
- High Power Output
- Wide Operating Temperature
- Maintenance-Free Operation

CHARACTERISTICS

Nominal Voltage	12 V	
Design Life	10 Years	
Capacity 25°C (77°F)	20 Hour rate	12Ah
	10 Hour rate	11.4Ah
	5 Hour rate	10.25Ah
Internal Resistance (25°C, 100% Charge)		≤ 19 mΩ
Self Discharge (20°C)	1 Month	Remaining Capacity 97%
Operating Temperature	Discharge	-20°C - 60°C
	Charge	-10°C - 60°C
	Storage	-20°C - 60°C
Normal Operating Temperature		25°C ± 3°C
Maximum Discharge current		180A (5sec)
Maximum Charging current		4.8A
Short Circuit Current		600A
Charge Methods Constant Voltage Charge 77°F (25°C) - Cycle use		14.4 to 14.7V Temp. Compensation -30mV/°C
Charge methods Constant Voltage Charge 77°F (25°C) - Standby Use		13.4 to 13.8V Temp. Compensation -20mV/°C



SPECIFICATIONS

Length	Width	Height	Total Height	Weight (kg)
151 mm	98 mm	95mm	101 mm	3.67 ± 5%

CONSTANT CURRENT DISCHARGE (Amperes) AT 25°C

End Voltage Volts/Cell	5min	10min	15min	30min	1h	3h	5h	10h	20h
1.60	46.4	31.7	24.8	13.8	8.14	3.18	2.12	1.18	0.61
1.65	45.0	30.8	24.3	13.5	8.04	3.15	2.10	1.17	0.61
1.70	43.5	29.9	23.7	13.3	7.94	3.12	2.07	1.16	0.61
1.75	42.1	29.0	23.2	13.0	7.85	3.09	2.05	1.14	0.60
1.80	40.6	28.2	22.6	12.7	7.75	3.06	2.02	1.12	0.59

CONSTANT POWER DISCHARGE (Watts) AT 25°C

End Voltage Volts/Cell	5min	10min	15min	30min	1h	3h	5h	10h	20h
1.60	86.2	58.7	46.7	27.0	16.1	6.50	4.20	2.36	1.22
1.65	84.1	57.7	46.0	26.6	16.0	6.44	4.17	2.33	1.21
1.70	81.9	56.6	45.3	26.2	15.8	6.37	4.14	2.31	1.20
1.75	79.8	55.6	44.6	25.8	15.7	6.31	4.11	2.29	1.18
1.80	77.6	54.6	43.9	25.4	15.5	6.24	4.08	2.26	1.17



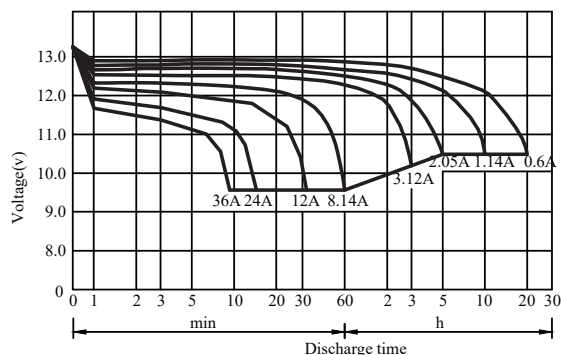
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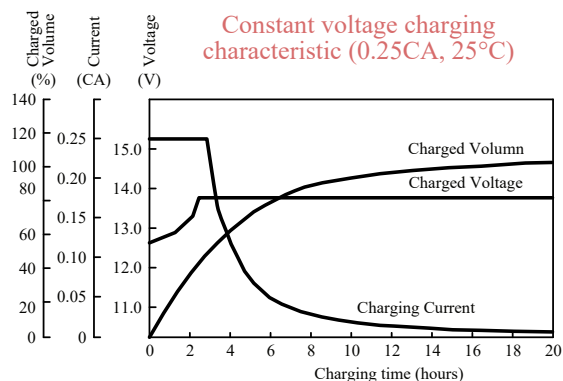
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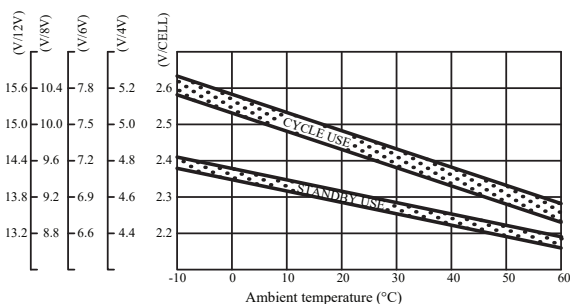
Discharge characteristic (25°C)



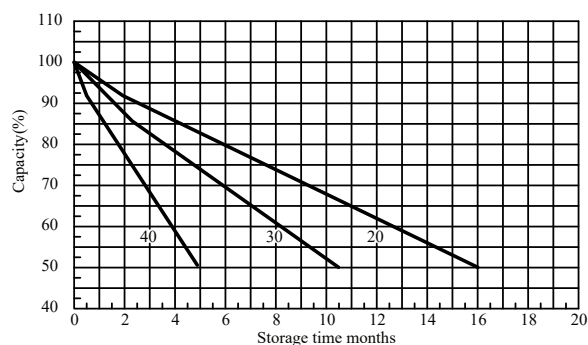
Constant voltage charging characteristic (0.25CA, 25°C)



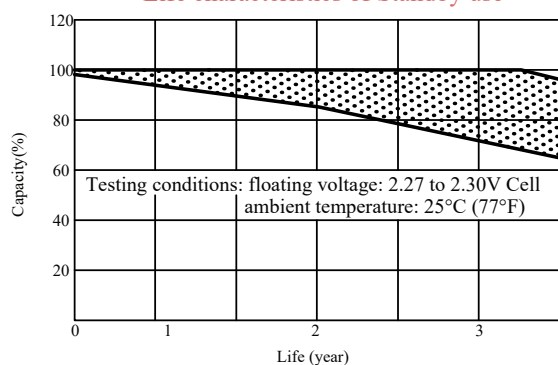
Relationship between charging voltage and temperature



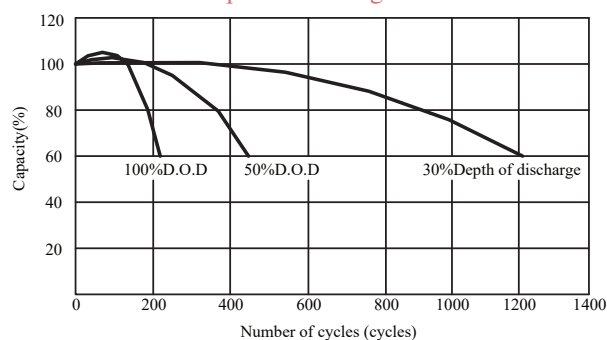
Self-discharge characteristic



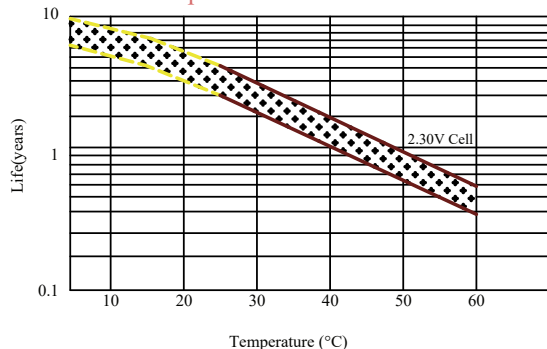
Life characteristics of Standby use



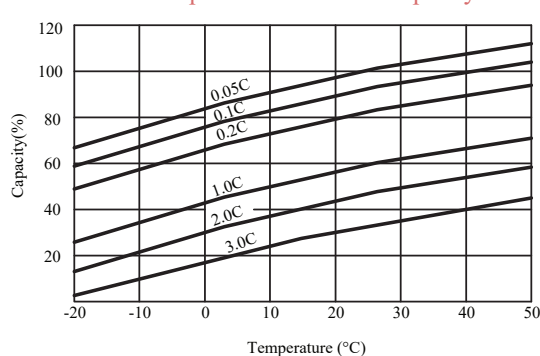
Cycle service life in relation to depth of discharge



Temperature effects on float life



Temperature effects on capacity



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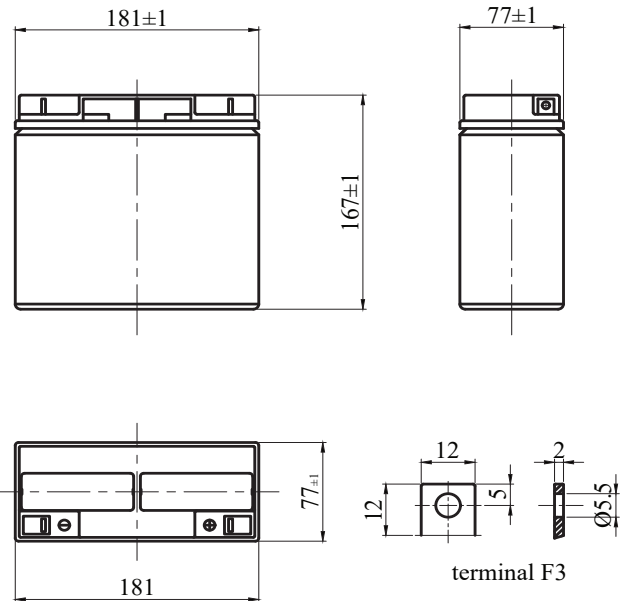
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CHARACTERISTICS

Nominal Voltage	12 V	
Design Life	10 Years	
Capacity 25°C (77°F)	20 Hour rate	17Ah
	10 Hour rate	16.8Ah
	5 Hour rate	15.05Ah
Internal Resistance (25°C, 100% Charge)		≤ 14 mΩ
Self Discharge (20°C)	1 Month	Remaining Capacity 97%
Operating Temperature	Discharge	-20°C - 60°C
	Charge	-10°C - 60°C
	Storage	-20°C - 60°C
Normal Operating Temperature		25°C ± 3°C
Maximum Discharge current		225A (5sec)
Maximum Charging current		6.8A
Short Circuit Current		850A
Charge Methods Constant Voltage Charge 77°F (25°C) - Cycle use		14.4 to 14.7V Temp. Compensation -30mV/°C
Charge methods Constant Voltage Charge 77°F (25°C) - Standby Use		13.4 to 13.8V Temp. Compensation -20mV/°C



SPECIFICATIONS

Length	Width	Height	Total Height	Weight (kg)
181 mm	77 mm	167 mm	167 mm	5.5 ± 5%

CONSTANT CURRENT DISCHARGE (Amperes) AT 25°C

End Voltage Volts/Cell	5min	10min	15min	30min	1h	3h	5h	10h	20h
1.60	67.0	45.1	34.3	20.2	12.0	4.65	3.10	1.70	0.89
1.65	64.6	44.0	33.5	19.8	11.8	4.57	3.05	1.68	0.88
1.70	62.2	42.9	32.6	19.3	11.6	4.49	3.00	1.65	0.87
1.75	59.8	41.7	31.8	18.9	11.3	4.40	2.94	1.63	0.85
1.80	57.4	40.6	30.9	18.4	11.1	4.32	2.89	1.60	0.84

CONSTANT POWER DISCHARGE (Watts) AT 25°C

End Voltage Volts/Cell	5min	10min	15min	30min	1h	3h	5h	10h	20h
1.60	117	79.0	61.0	36.0	22.0	9.10	6.16	3.52	1.82
1.65	113	77.4	59.8	35.5	21.8	9.01	6.10	3.49	1.80
1.70	110	75.8	58.5	35.0	21.5	8.92	6.04	3.45	1.78
1.75	106	74.1	57.3	34.5	21.3	8.83	5.98	3.42	1.77
1.80	102	72.5	56.0	34.0	21.0	8.74	5.92	3.38	1.75



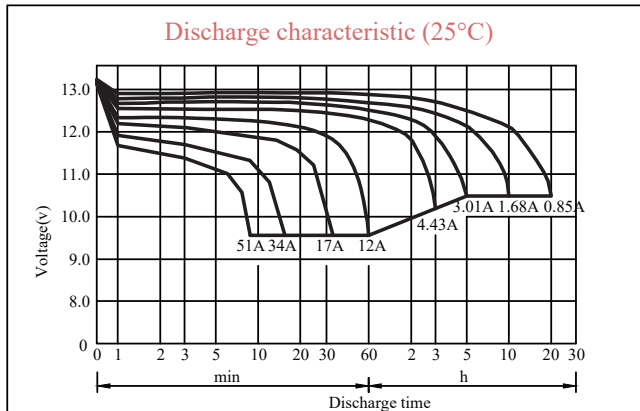
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ES 18-12

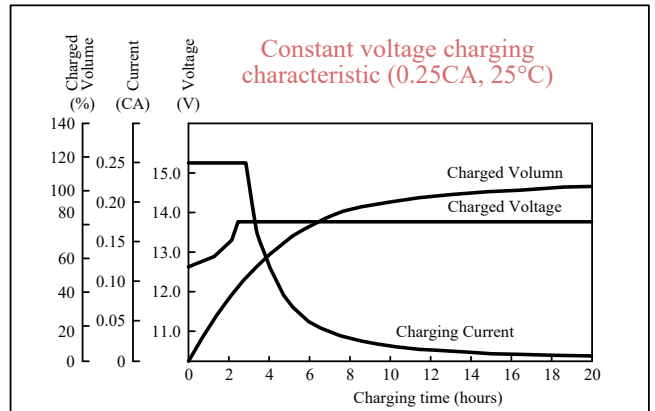
SMF VRLA RECHARGEABLE BATTERY

LONG
LIFE
SERIES

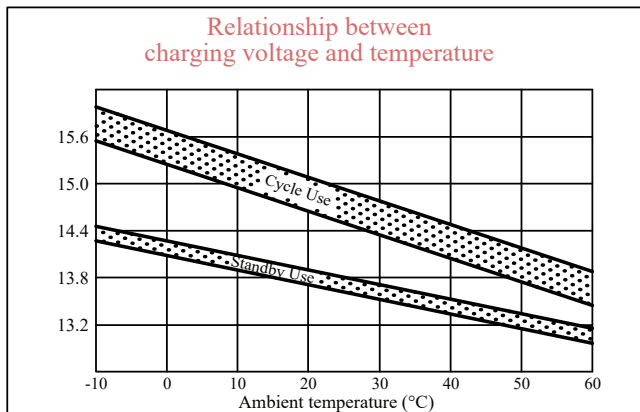
Discharge characteristic (25°C)



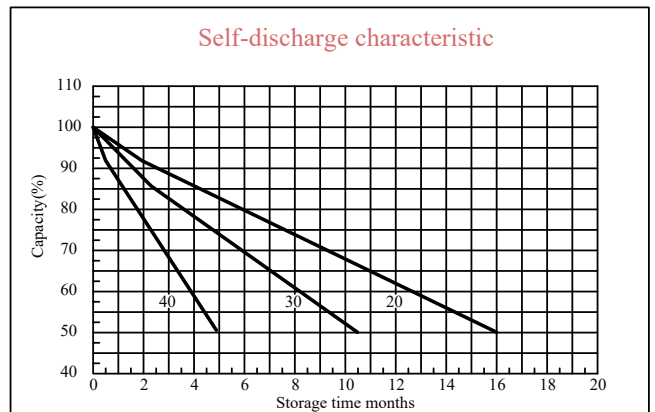
Constant voltage charging characteristic (0.25CA, 25°C)



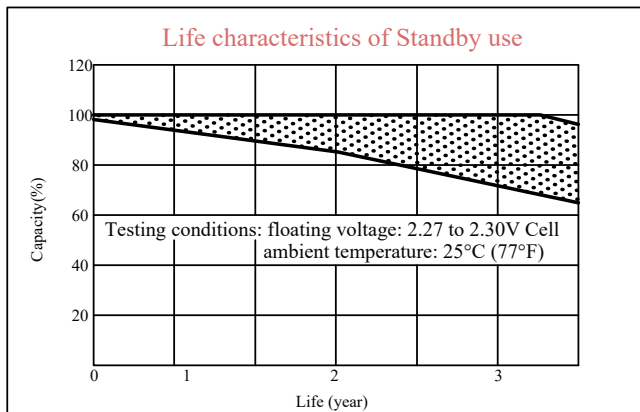
Relationship between charging voltage and temperature



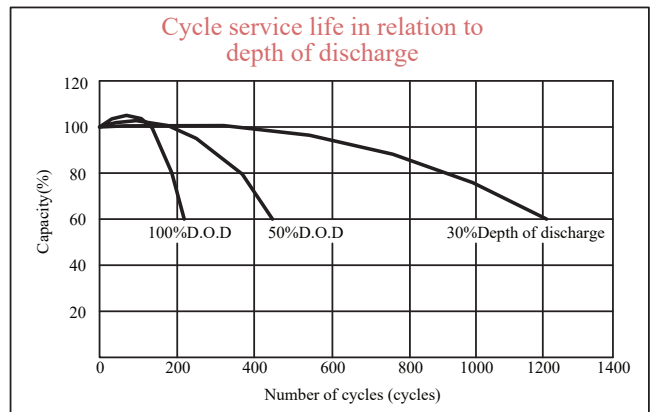
Self-discharge characteristic



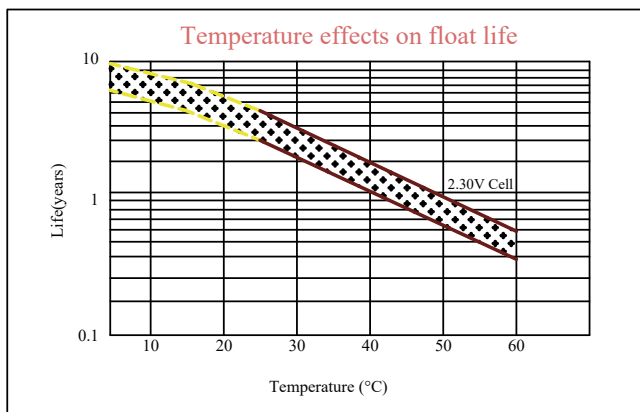
Life characteristics of Standby use



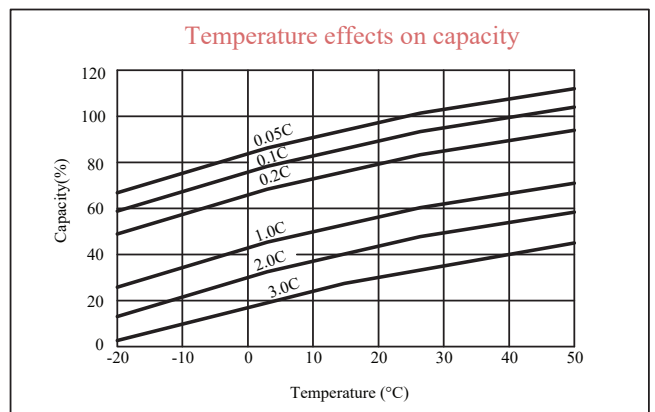
Cycle service life in relation to depth of discharge



Temperature effects on float life



Temperature effects on capacity



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ES 26-12

SMF VRLA RECHARGEABLE BATTERY

**LONG
LIFE
SERIES**

APPLICATIONS

UPS Systems
Telecommunication Systems
Fire Alarm Safety & Security Systems
Medical Equipment

COMPLIANCE STANDARDS

IEC 60896 PART 21 & 22
BS6290-4

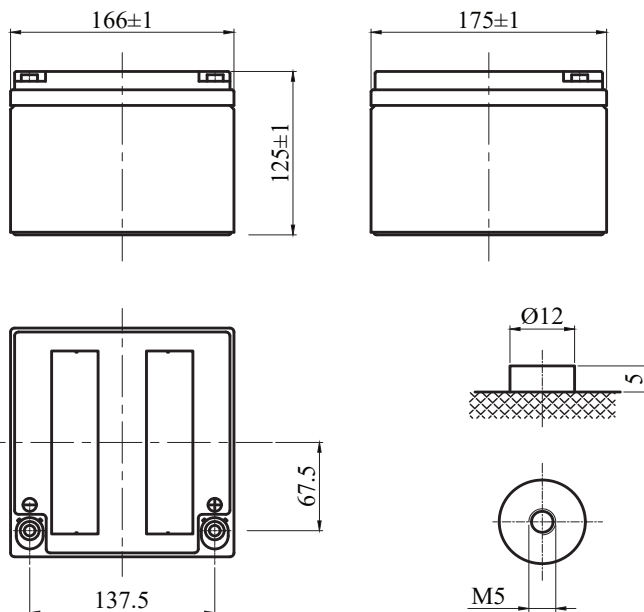
TECHNICAL FEATURES



- Non-Spillable Sealed Construction
- Seal Lead Acid Battery
- Absorptive Glass Mat System (AGM System)
- ABS (Acrylonitrile Butadiene Styrene) construction (FR optional)
- Gas Recombination
- Venting System for low internal pressure
- Low Self-Discharge
- Heavy-Duty, Highly Optimized Grids
- High Power Output
- Wide Operating Temperature
- Maintenance-Free Operation

CHARACTERISTICS

Nominal Voltage	12 V	
Design Life	10 Years	
Capacity 25°C (77°F)	20 Hour rate	24Ah
	10 Hour rate	23.7Ah
	5 Hour rate	20.5Ah
Internal Resistance (25°C, 100% Charge)		≤ 12 mΩ
Self Discharge (20°C)	1 Month	Remaining Capacity 97%
Operating Temperature	Discharge	-20°C - 60°C
	Charge	-10°C - 60°C
	Storage	-20°C - 60°C
Normal Operating Temperature		25°C ± 3°C
Maximum Discharge current		300A (5sec)
Maximum Charging current		9.6A
Short Circuit Current		1200A
Charge Methods Constant Voltage Charge 77°F (25°C) - Cycle use		14.4 to 14.7V Temp. Compensation -30mV/°C
Charge methods Constant Voltage Charge 77°F (25°C) - Standby Use		13.4 to 13.8V Temp. Compensation -20mV/°C



SPECIFICATIONS

Length	Width	Height	Total Height	Weight (kg)
166 mm	175 mm	125mm	125 mm	8.1 ± 5%

CONSTANT CURRENT DISCHARGE (Amperes) AT 25°C

End Voltage Volts/Cell	5min	10min	15min	30min	1h	3h	5h	10h	20h
1.60	95.0	64.0	48.0	28.5	16.0	6.74	4.47	2.52	1.24
1.65	90.1	60.9	45.9	27.4	15.4	6.53	4.36	2.47	1.23
1.70	84.9	57.8	43.7	26.2	14.8	6.30	4.24	2.42	1.22
1.75	79.7	54.5	41.1	24.9	14.2	6.05	4.10	2.37	1.20
1.80	74.3	51.3	39.1	23.6	13.5	5.78	3.95	2.31	1.18

CONSTANT POWER DISCHARGE (Watts) AT 25°C

End Voltage Volts/Cell	5min	10min	15min	30min	1h	3h	5h	10h	20h
1.60	185	121	90.0	55.0	31.7	13.4	8.54	5.38	2.78
1.65	173	114	85.1	52.3	30.3	13.1	8.39	5.35	2.77
1.70	161	107	80.2	49.4	28.9	12.5	8.22	5.30	2.73
1.75	151	99.7	75.2	46.6	27.5	12.0	8.03	5.18	2.68
1.80	139	92.7	70.3	43.7	26.0	11.4	7.83	5.12	2.62



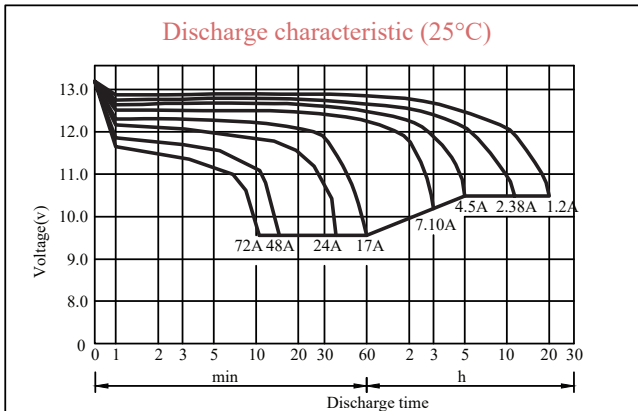
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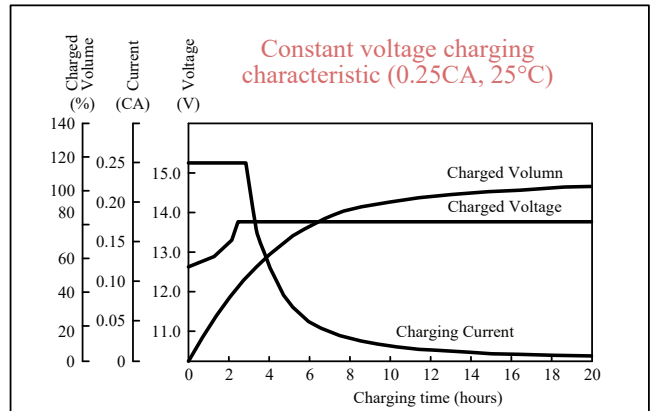
SMF VRLA RECHARGEABLE BATTERY

LONG
LIFE
SERIES

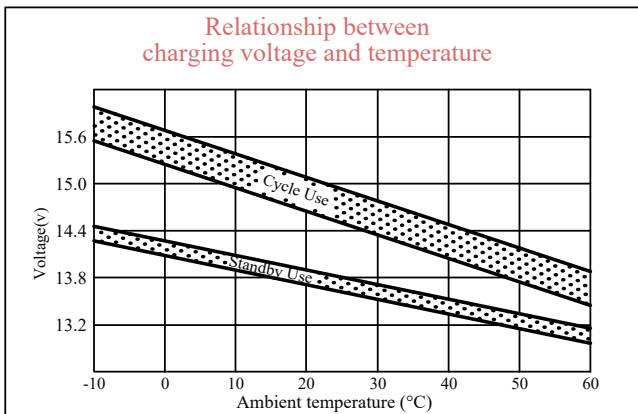
Discharge characteristic (25°C)



Constant voltage charging characteristic (0.25CA, 25°C)



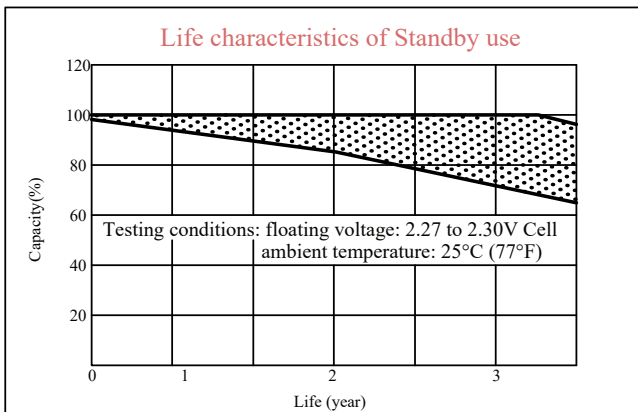
Relationship between charging voltage and temperature



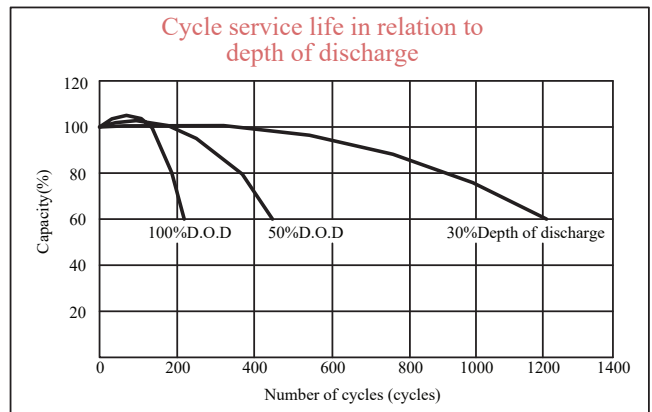
Self-discharge characteristic



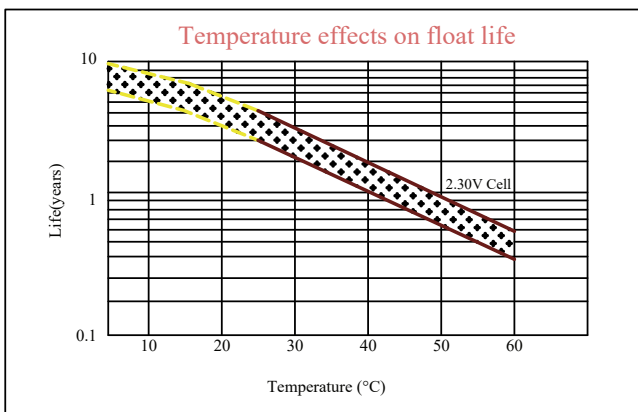
Life characteristics of Standby use



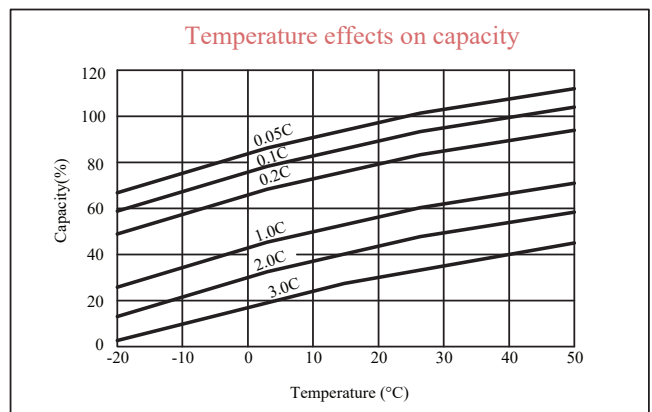
Cycle service life in relation to depth of discharge



Temperature effects on float life



Temperature effects on capacity



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ES 33-12

SMF VRLA RECHARGEABLE BATTERY

**LONG
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SERIES**

APPLICATIONS

UPS Systems
Telecommunication Systems
Fire Alarm Safety & Security Systems
Medical Equipment

COMPLIANCE STANDARDS

IEC 60896 PART 21 & 22
BS6290-4

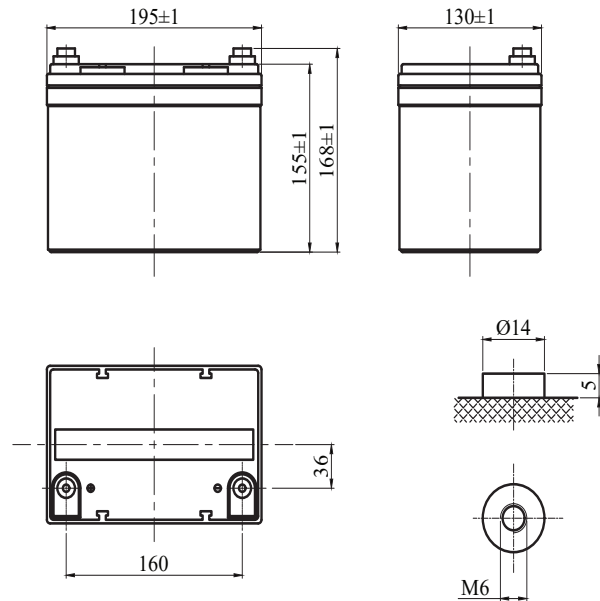
TECHNICAL FEATURES



- Non-Spillable Sealed Construction
- Seal Lead Acid Battery
- Absorptive Glass Mat System (AGM System)
- ABS (Acrylonitrile Butadiene Styrene) construction (FR optional)
- Gas Recombination
- Venting System for low internal pressure
- Low Self-Discharge
- Heavy-Duty, Highly Optimized Grids
- High Power Output
- Wide Operating Temperature
- Maintenance-Free Operation

CHARACTERISTICS

Nominal Voltage	12 V	
Design Life	10 Years	
Capacity 25°C (77°F)	10 Hour rate	33.0Ah
	5 Hour rate	27.9Ah
	1 Hour rate	22.3Ah
Internal Resistance (25°C, 100% Charge)		≤ 12mΩ
Self Discharge (20°C)	1 Month	Remaining Capacity 97%
Operating Temperature	Discharge	-20°C - 60°C
	Charge	-10°C - 60°C
	Storage	-20°C - 60°C
Normal Operating Temperature		25°C ± 3°C
Maximum Discharge current		330A (5sec)
Maximum Charging current		9.9A
Short Circuit Current		850A
Charge Methods		14.4 to 14.7V
Constant Voltage Charge 77°F (25°C) - Cycle use		Temp. Compensation -30mV/°C
Charge methods		13.4 to 13.8V
Constant Voltage Charge 77°F (25°C) - Standby Use		Temp. Compensation -20mV/°C



SPECIFICATIONS

Length	Width	Height	Total Height	Weight (kg)
195 mm	130 mm	155mm	168 mm	9.7 ± 3%

CONSTANT CURRENT DISCHARGE (Amperes) AT 25°C

End Voltage Volts/Cell	5min	10min	15min	30min	1h	3h	5h	10h	20h
1.60	90.0	69.3	57.1	32.6	22.3	9.08	6.3	3.36	1.81
1.65	81.0	65.0	54.1	31.3	21.9	8.97	6.25	3.35	1.79
1.70	79.0	60.0	51.4	30.4	21.2	8.45	6.15	3.32	1.78
1.75	67.0	56.1	47.8	29.4	20.3	8.25	5.58	3.31	1.78
1.80	59.5	51.4	44.8	28.8	19.8	8.18	5.50	3.30	1.76

CONSTANT POWER DISCHARGE (Watts) AT 25°C

End Voltage Volts/Cell	5min	10min	15min	30min	1h	3h	5h	10h	20h
1.60	144	122	100.0	65.3	40.9	17.4	12.2	6.0	3.2
1.65	140	116	98.6	61.7	40.5	17.3	11.9	5.9	3.2
1.70	135	110	95.7	60.0	39.9	16.8	11.5	5.8	3.2
1.75	126	104	92.0	58.0	39.1	16.0	11.3	5.8	3.1
1.80	119	97.7	89.0	56.0	38.3	15.2	11	5.7	3.1



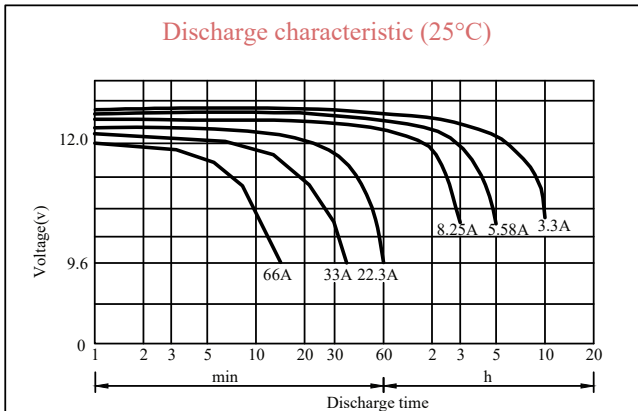
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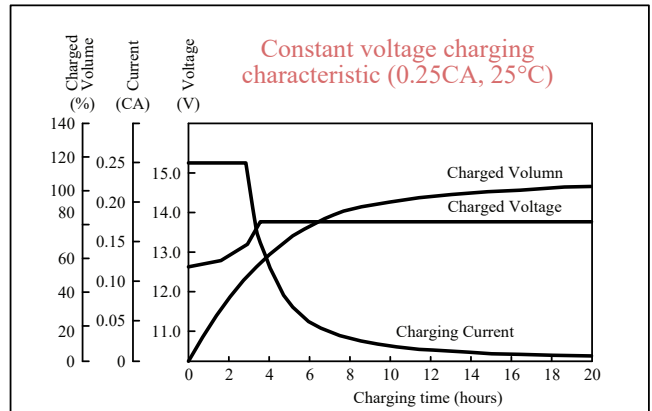
SMF VRLA RECHARGEABLE BATTERY

**LONG
LIFE
SERIES**

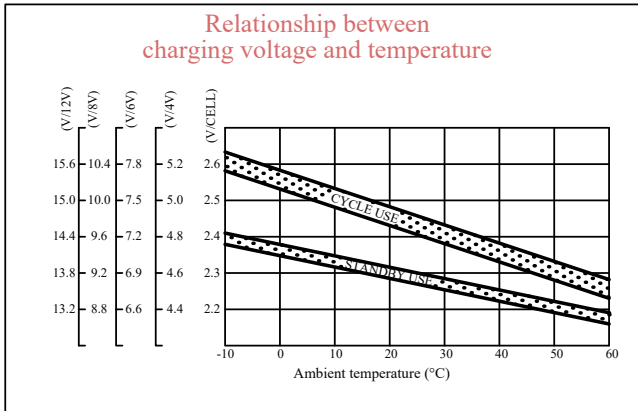
Discharge characteristic (25°C)



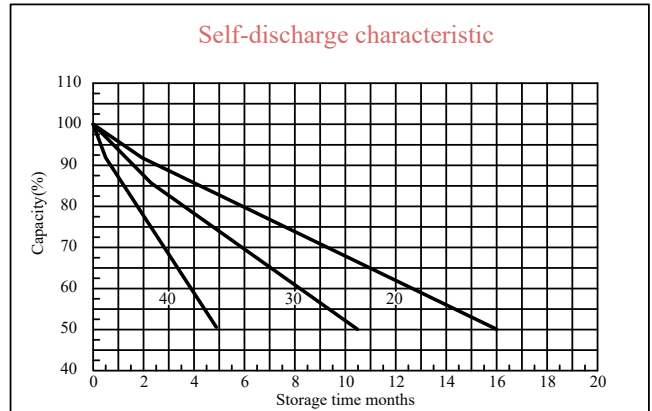
Constant voltage charging characteristic (0.25CA, 25°C)



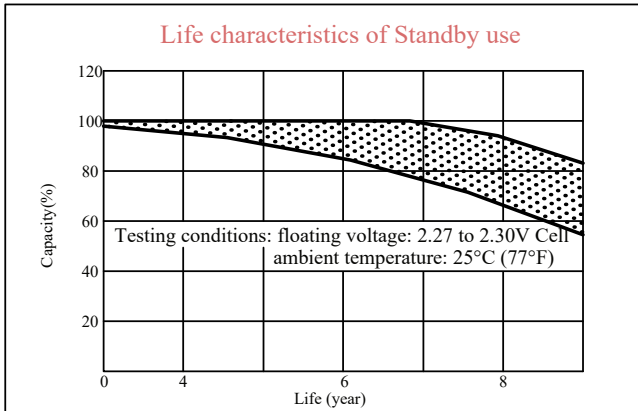
Relationship between charging voltage and temperature



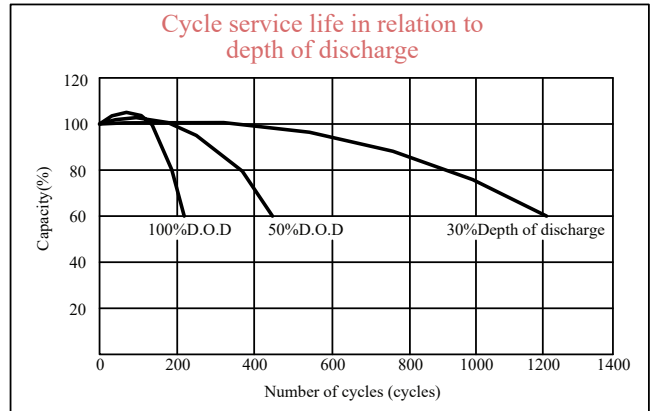
Self-discharge characteristic



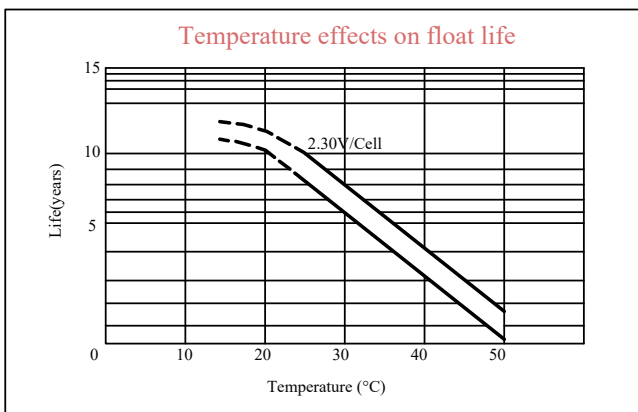
Life characteristics of Standby use



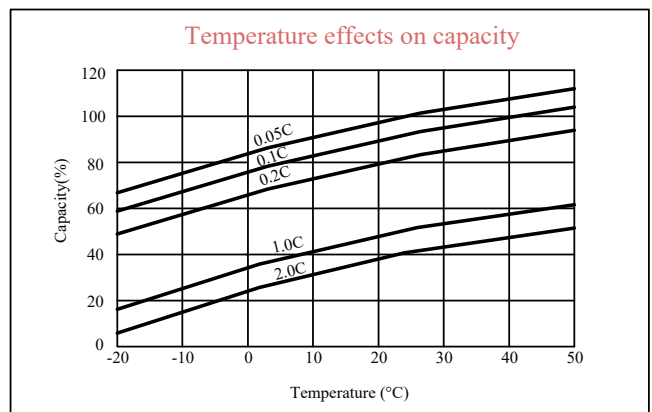
Cycle service life in relation to depth of discharge



Temperature effects on float life



Temperature effects on capacity



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ES 42-12

SMF VRLA RECHARGEABLE BATTERY

**LONG
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SERIES**

APPLICATIONS

UPS Systems
Telecommunication Systems
Fire Alarm Safety & Security Systems
Medical Equipment

COMPLIANCE STANDARDS

IEC 60896 PART 21 & 22
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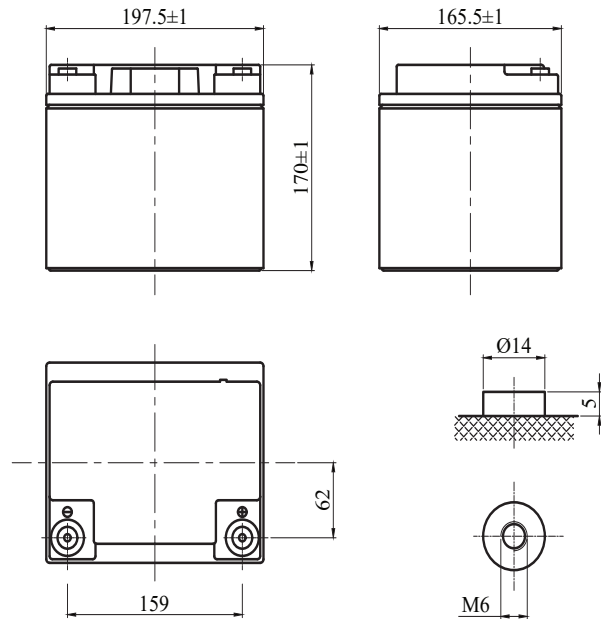
TECHNICAL FEATURES



- Non-Spillable Sealed Construction
- Seal Lead Acid Battery
- Absorptive Glass Mat System (AGM System)
- ABS (Acrylonitrile Butadiene Styrene) construction (FR optional)
- Gas Recombination
- Venting System for low internal pressure
- Low Self-Discharge
- Heavy-Duty, Highly Optimized Grids
- High Power Output
- Wide Operating Temperature
- Maintenance-Free Operation

CHARACTERISTICS

Nominal Voltage	12 V	
Design Life	10 Years	
Capacity 25°C (77°F)	20 Hour rate	42Ah
	10 Hour rate	40Ah
	5 Hour rate	37.55Ah
Internal Resistance (25°C, 100% Charge)		≤ 9.0 mΩ
Self Discharge (20°C)	1 Month	Remaining Capacity 97%
Operating Temperature	Discharge	-20°C - 60°C
	Charge	-10°C - 60°C
	Storage	-20°C - 60°C
Normal Operating Temperature		25°C ± 3°C
Maximum Discharge current		400A (5sec)
Maximum Charging current		16A
Short Circuit Current		950A
Charge Methods		14.4 to 14.7V
Constant Voltage Charge 77°F (25°C) - Cycle use		Temp. Compensation -30mV/°C
Charge methods		13.4 to 13.8V
Constant Voltage Charge 77°F (25°C) - Standby Use		Temp. Compensation -20mV/°C



SPECIFICATIONS

Length	Width	Height	Total Height	Weight (kg)
197 mm	165 mm	170mm	170 mm	12.8 ± 5%

CONSTANT CURRENT DISCHARGE (Amperes) AT 25°C

End Voltage Volts/Cell	5min	10min	15min	30min	1h	3h	5h	10h	20h
1.60	130	90.5	72.7	41.9	25.9	11.3	7.95	4.20	2.25
1.65	122	86.2	69.1	40.6	25.4	11.1	7.81	4.15	2.22
1.70	114	81.8	66.5	39.2	24.8	10.9	7.67	4.10	2.18
1.75	106	77.6	63.0	37.7	24.2	10.6	7.51	4.05	2.14
1.80	97	73.9	59.2	36.2	23.5	10.4	7.35	4.00	2.10

CONSTANT POWER DISCHARGE (Watts) AT 25°C

End Voltage Volts/Cell	5min	10min	15min	30min	1h	3h	5h	10h	20h
1.60	236	163	127	83.2	50.9	21.5	14.0	8.76	3.9
1.65	220	157	124	81.8	50.2	21.2	13.8	8.59	3.9
1.70	204	150	121	79.3	49.3	20.8	13.6	8.42	3.8
1.75	186	143	117	76.8	48.5	20.5	13.4	8.21	3.8
1.80	177	135	113	74.3	47.7	20.1	13.3	8.04	3.7



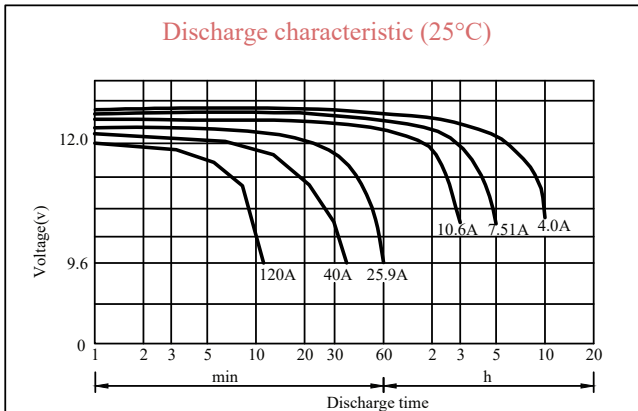
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ES 42-12

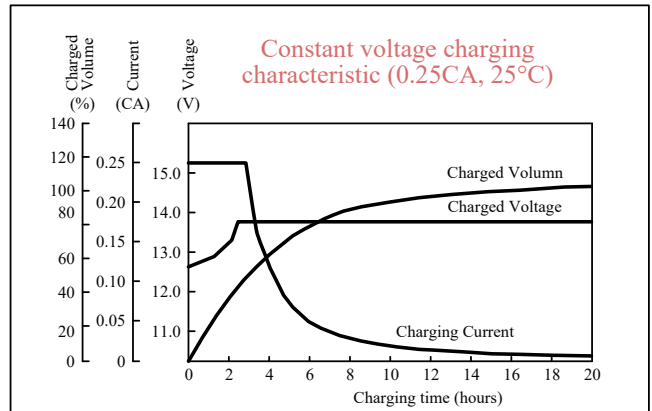
SMF VRLA RECHARGEABLE BATTERY

LONG
LIFE
SERIES

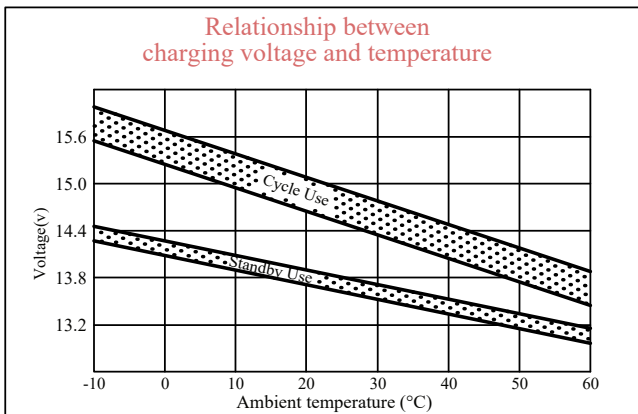
Discharge characteristic (25°C)



Constant voltage charging characteristic (0.25CA, 25°C)



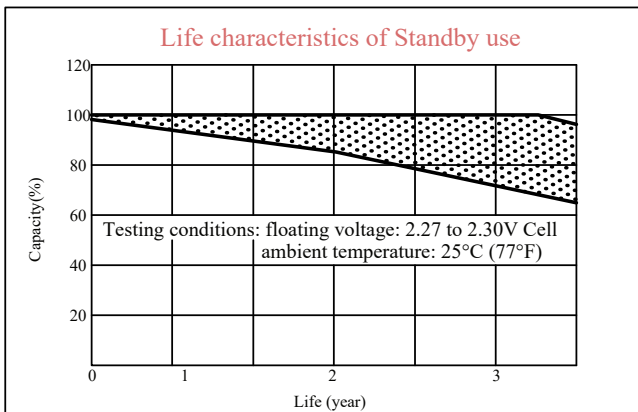
Relationship between charging voltage and temperature



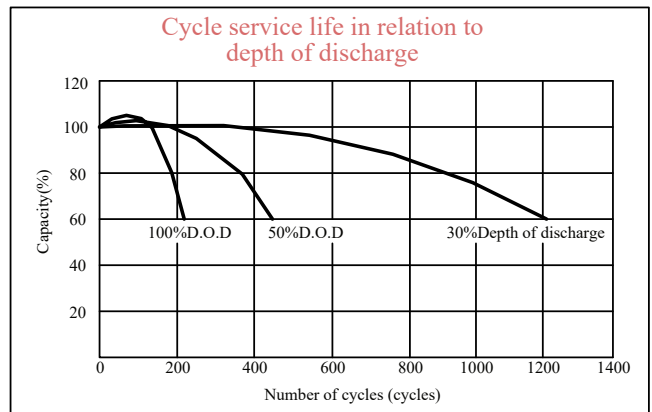
Self-discharge characteristic



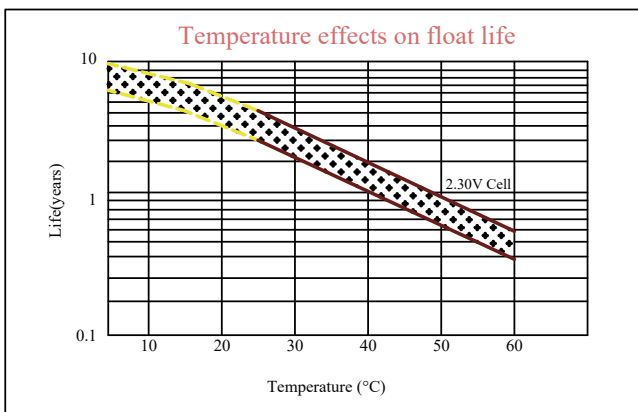
Life characteristics of Standby use



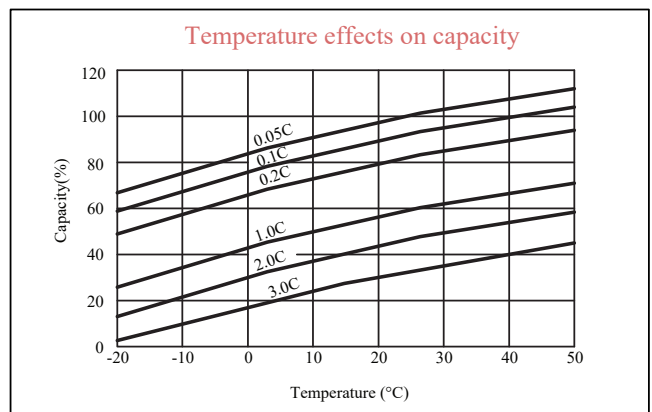
Cycle service life in relation to depth of discharge



Temperature effects on float life



Temperature effects on capacity



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ES 55-12

SMF VRLA RECHARGEABLE BATTERY

**LONG
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SERIES**

APPLICATIONS

UPS Systems
Telecommunication Systems
Fire Alarm Safety & Security Systems
Medical Equipment

COMPLIANCE STANDARDS

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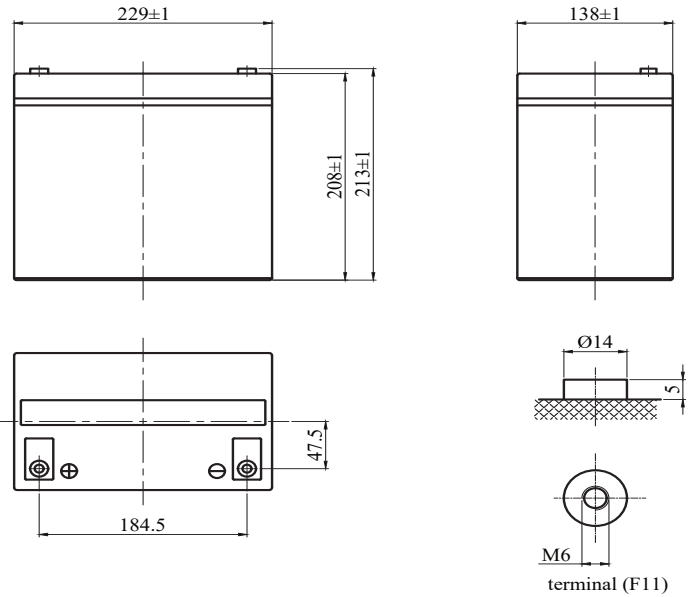
TECHNICAL FEATURES



- Non-Spillable Sealed Construction
- Seal Lead Acid Battery
- Absorptive Glass Mat System (AGM System)
- ABS (Acrylonitrile Butadiene Styrene) construction (FR optional)
- Gas Recombination
- Venting System for low internal pressure
- Low Self-Discharge
- Heavy-Duty, Highly Optimized Grids
- High Power Output
- Wide Operating Temperature
- Maintenance-Free Operation

CHARACTERISTICS

Nominal Voltage	12 V	
Design Life	10 Years	
Capacity 27°C (80.6°F)	10 Hour rate	55.0Ah
	5 Hour rate	46.2Ah
	1 Hour rate	35.1Ah
Internal Resistance (25°C, 100% Charge)		<7.2mΩ
Self Discharge (20°C)	1 Month	Remaining Capacity 97%
Operating Temperature	Discharge	-20°C - 60°C
	Charge	-10°C - 60°C
	Storage	-20°C - 60°C
Normal Operating Temperature		25°C ± 3°C
Maximum Discharge current		550A (5sec)
Maximum Charging current		16.5A
Short Circuit Current		1400A
Charge Methods		14.4 to 14.7V
Constant Voltage Charge 77°F (25°C) - Cycle use		Temp. Compensation -30mV/°C
Charge methods		13.4 to 13.8V
Constant Voltage Charge 77°F (25°C) - Standby Use		Temp. Compensation -20mV/°C



SPECIFICATIONS

Length	Width	Height	Total Height	Weight (kg)
229 mm	138 mm	208 mm	213 mm	18.0 ± 5%

CONSTANT CURRENT DISCHARGE (Amperes) AT 25°C

End Voltage Volts/Cell	5min	10min	15min	30min	1h	3h	5h	10h	24h
1.60	175	129	99.4	59.2	35.10	14.6	9.82	5.65	2.45
1.65	165	124	95.4	57.4	34.20	14.2	9.57	5.62	2.43
1.70	155	115	90.6	55.6	33.30	13.9	9.40	5.58	2.41
1.75	145	106	85.8	53.8	32.50	13.6	9.23	5.54	2.40
1.80	134	99.8	79.5	51.9	31.70	13.3	9.06	5.50	2.38

CONSTANT POWER DISCHARGE (Watts) AT 25°C

End Voltage Volts/Cell	5min	10min	15min	30min	1h	3h	5h	10h	24h
1.60	318	229	182	111	68.90	29.1	18.8	10.9	5.06
1.65	300	225	177	109	67.30	28.5	18.6	10.8	4.95
1.70	381	213	169	107	65.80	27.9	18.2	10.6	4.85
1.75	261	200	162	105	64.30	27.3	18.0	10.4	4.76
1.80	248	186	154	104	64.00	26.7	17.9	10.2	4.66



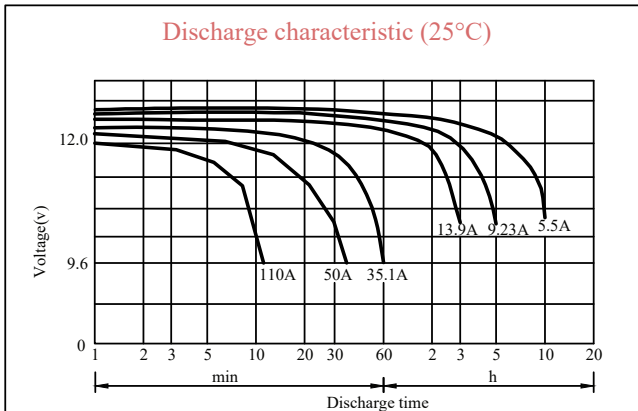
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ES 55-12

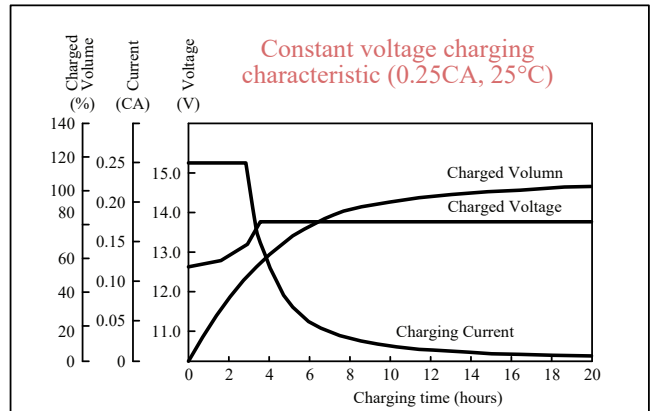
SMF VRLA RECHARGEABLE BATTERY

LONG
LIFE
SERIES

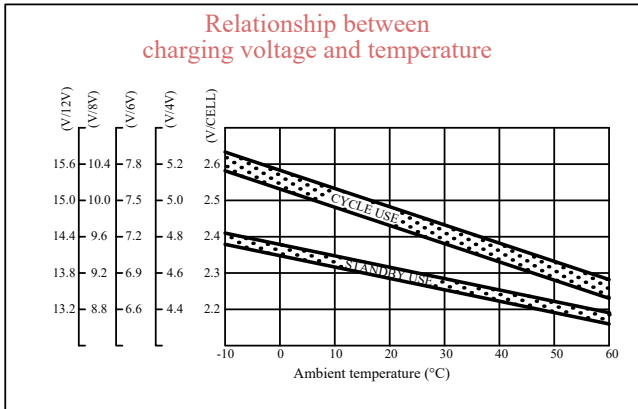
Discharge characteristic (25°C)



Constant voltage charging characteristic (0.25CA, 25°C)



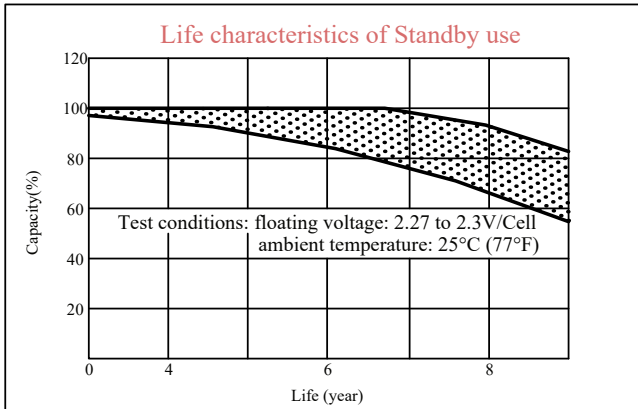
Relationship between charging voltage and temperature



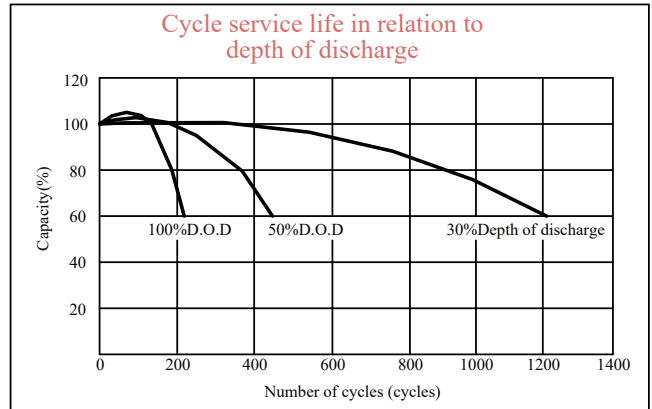
Self-discharge characteristic



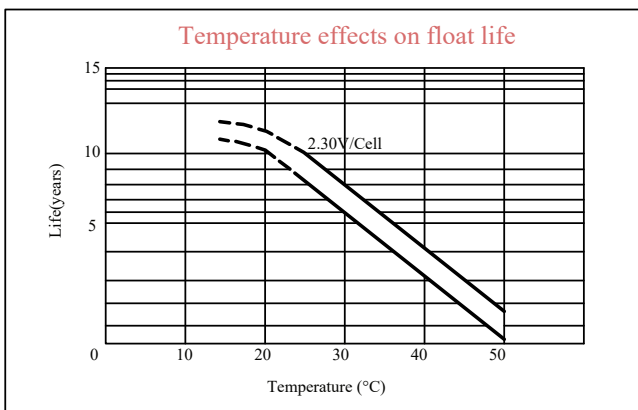
Life characteristics of Standby use



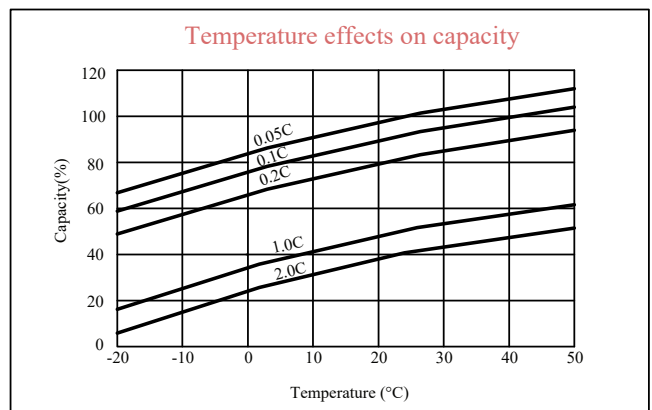
Cycle service life in relation to depth of discharge



Temperature effects on float life



Temperature effects on capacity



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SMF VRLA RECHARGEABLE BATTERY

LONG
LIFE
SERIES

APPLICATIONS

UPS Systems
Telecommunication Systems
Fire Alarm Safety & Security Systems
Medical Equipment

COMPLIANCE STANDARDS

IEC 60896 PART 21 & 22
BS6290-4

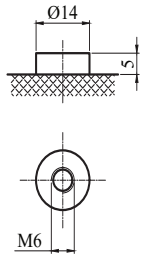
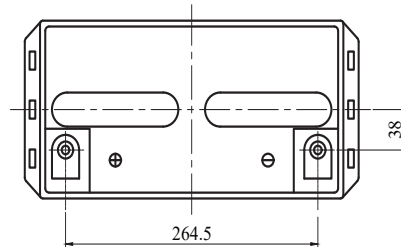
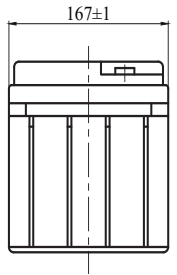
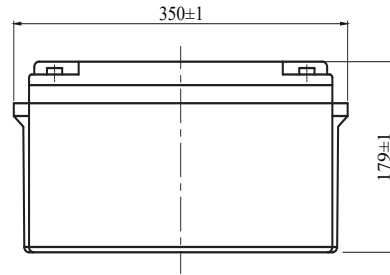
TECHNICAL FEATURES



- Non-Spillable Sealed Construction
- Seal Lead Acid Battery
- Absorptive Glass Mat System (AGM System)
- ABS (Acrylonitrile Butadiene Styrene) construction (FR optional)
- Gas Recombination
- Venting System for low internal pressure
- Low Self-Discharge
- Heavy-Duty, Highly Optimized Grids
- High Power Output
- Wide Operating Temperature
- Maintenance-Free Operation

CHARACTERISTICS

Nominal Voltage	12 V	
Design Life	10 Years	
Capacity 27°C (80.6°F)	20 Hour rate	68Ah
	10 Hour rate	65Ah
	5 Hour rate	55Ah
Internal Resistance (25°C, 100% Charge)		≤ 6.8 mΩ
Self Discharge (20°C)	1 Month	Remaining Capacity 97%
Operating Temperature	Discharge	-20°C - 60°C
	Charge	-10°C - 60°C
	Storage	-20°C - 60°C
Normal Operating Temperature		25°C ± 3°C
Maximum Discharge current		650A (5sec)
Maximum Charging current		26A
Short Circuit Current		1700A
Charge Methods		14.4 to 14.7V
Constant Voltage Charge 77°F (25°C) - Cycle use		Temp. Compensation -30mV/°C
Charge methods		13.4 to 13.8V
Constant Voltage Charge 77°F (25°C) - Standby Use		Temp. Compensation -20mV/°C



SPECIFICATIONS

Length	Width	Height	Total Height	Weight (kg)
350 mm	167 mm	179mm	179 mm	20.4 ± 5%

CONSTANT CURRENT DISCHARGE (Amperes) AT 25°C

End Voltage Volts/Cell	5min	10min	15min	30min	1h	3h	5h	10h	20h
1.60	212	151	126	75.4	45.10	18.4	11.8	6.7	3.48
1.65	201	144	121	73.3	44.00	18	11.6	6.58	3.46
1.70	189	137	115	71.3	43.00	17.6	11.3	6.56	3.44
1.75	177	129	109	69.2	41.90	17.2	11.0	6.53	3.42
1.80	164	120	102	66.9	41.00	16.9	10.7	6.50	3.40

CONSTANT POWER DISCHARGE (Watts) AT 25°C

End Voltage Volts/Cell	5min	10min	15min	30min	1h	3h	5h	10h	20h
1.60	378	275	207	129	81.80	33.8	22.5	11.7	6.40
1.65	356	261	203	128	80.00	33.2	22.3	11.6	6.30
1.70	335	246	200	127	78.30	32.5	22.0	11.5	6.20
1.75	314	231	196	124	76.50	31.8	21.7	11.4	6.20
1.80	302	215	187	122	75.70	31.1	21.4	11.3	6.00



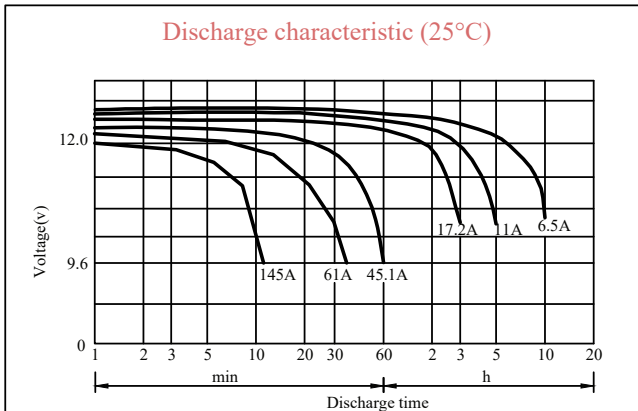
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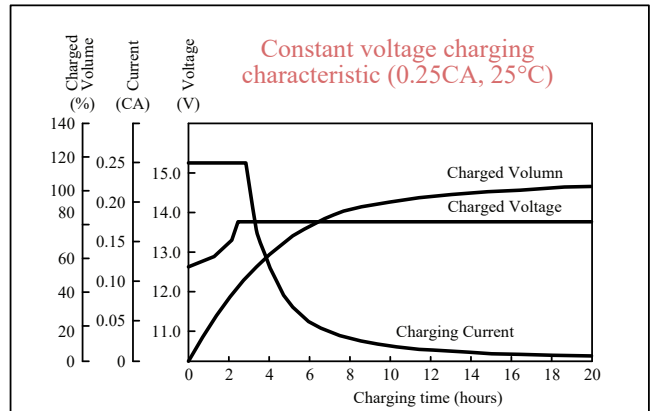
SMF VRLA RECHARGEABLE BATTERY

**LONG
LIFE
SERIES**

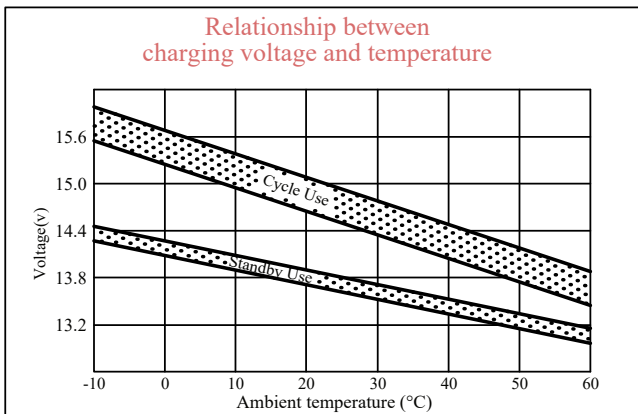
Discharge characteristic (25°C)



Constant voltage charging characteristic (0.25CA, 25°C)



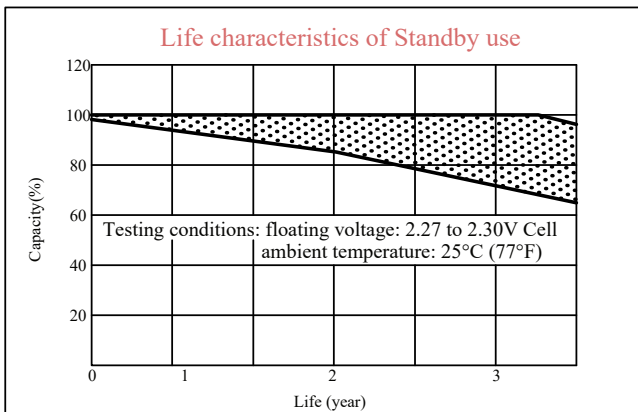
Relationship between charging voltage and temperature



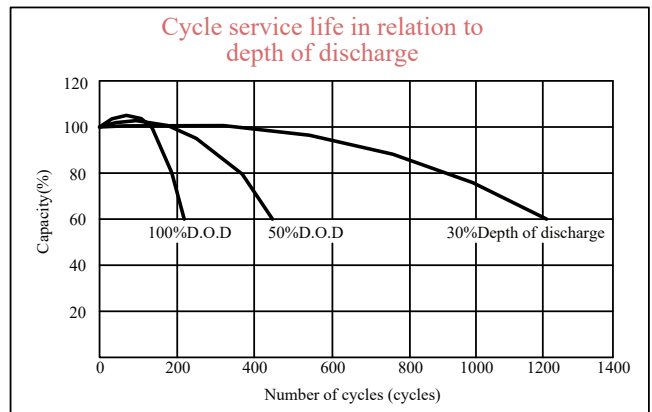
Self-discharge characteristic



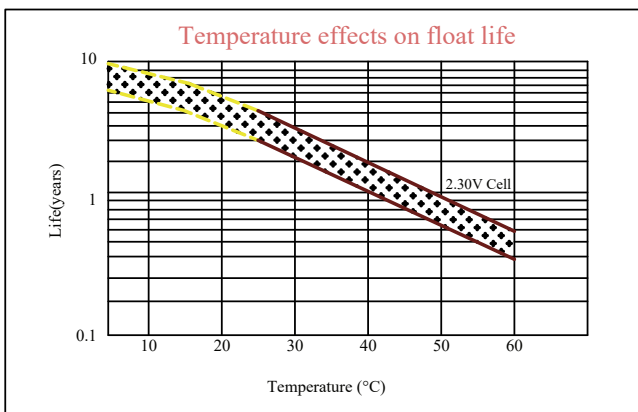
Life characteristics of Standby use



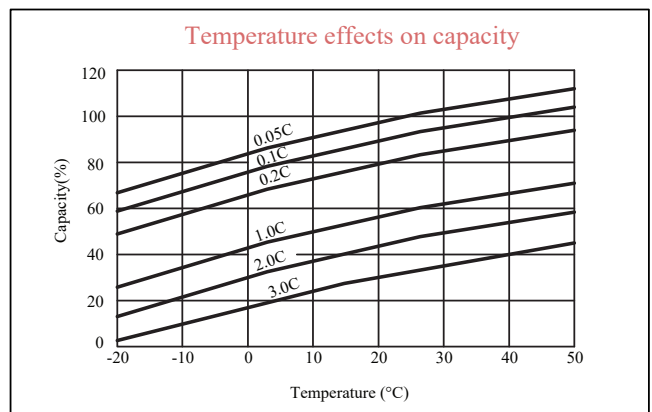
Cycle service life in relation to depth of discharge



Temperature effects on float life



Temperature effects on capacity



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ES 75-12

SMF VRLA RECHARGEABLE BATTERY

**LONG
LIFE
SERIES**

APPLICATIONS

UPS Systems
Telecommunication Systems
Fire Alarm Safety & Security Systems
Medical Equipment

COMPLIANCE STANDARDS

IEC 60896 PART 21 & 22
BS6290-4

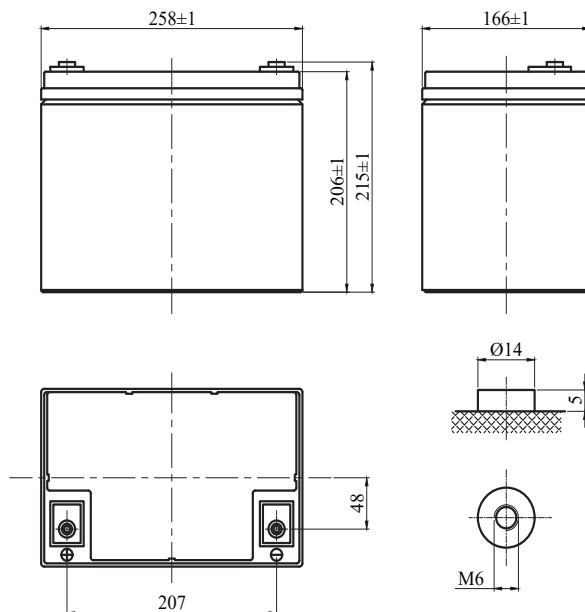
TECHNICAL FEATURES



- Non-Spillable Sealed Construction
- Seal Lead Acid Battery
- Absorptive Glass Mat System (AGM System)
- ABS (Acrylonitrile Butadiene Styrene) construction (FR optional)
- Gas Recombination
- Venting System for low internal pressure
- Low Self-Discharge
- Heavy-Duty, Highly Optimized Grids
- High Power Output
- Wide Operating Temperature
- Maintenance-Free Operation

CHARACTERISTICS

Nominal Voltage	12 V	
Design Life	10 Years	
Capacity 25°C (77°F)	20 Hour rate	80Ah
	10 Hour rate	75Ah
	5 Hour rate	67.5Ah
Internal Resistance (25°C, 100% Charge)		< 6.6 mΩ
Self Discharge (20°C)	1 Month	Remaining Capacity 97%
Operating Temperature	Discharge	-20°C - 60°C
	Charge	-10°C - 60°C
	Storage	-20°C - 60°C
Normal Operating Temperature		25°C ± 3°C
Maximum Discharge current		700A (5sec)
Maximum Charging current		22.5A
Short Circuit Current		1800A
Charge Methods		14.4 to 14.7V
Constant Voltage Charge 77°F (25°C) - Cycle use		Temp. Compensation -30mV/°C
Charge methods		13.4 to 13.8V
Constant Voltage Charge 77°F (25°C) - Standby Use		Temp. Compensation -20mV/°C



SPECIFICATIONS

Length	Width	Height	Total Height	Weight (kg)
258 mm	166 mm	206 mm	215 mm	22.5 ± 5%

CONSTANT CURRENT DISCHARGE (Amperes) AT 25°C

End Voltage Volts/Cell	5min	10min	15min	30min	1h	3h	5h	10h	24h
1.60	240	178	137	81.8	50.20	21.8	14.3	7.67	3.52
1.65	222	169	131	78.3	47.50	21.4	14.1	7.65	3.50
1.70	206	158	122	77.0	46.90	21.0	13.9	7.6	3.48
1.75	195	151	117	73.6	45.30	20.6	13.5	7.55	3.46
1.80	180	139	112	73.1	98.60	19.8	13.3	7.5	3.43

CONSTANT POWER DISCHARGE (Watts) AT 25°C

End Voltage Volts/Cell	5min	10min	15min	30min	1h	3h	5h	10h	24h
1.60	413	314	246	158.0	95.7	40.2	26.8	15.1	6.90
1.65	403	300	241	153	93.6	39.2	26.6	14.7	6.74
1.70	375	290	237	145	89.8	38.9	26.0	14.4	6.61
1.75	356	274	223	142	86.5	38.3	26.0	14.2	6.48
1.80	341	261	212	141	84.2	38.0	25.8	13.8	6.30



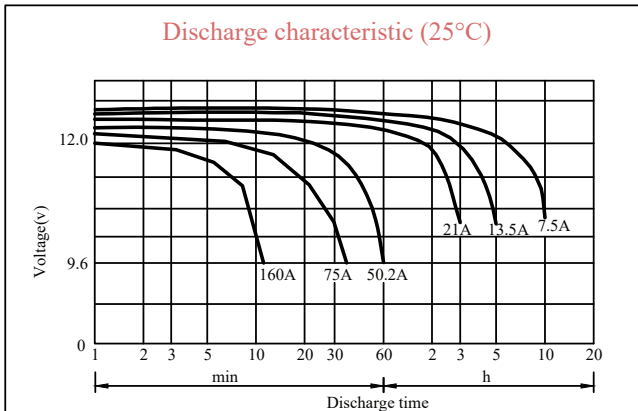
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CONTINUOUSLY SAFEGUARDING

ES 75-12

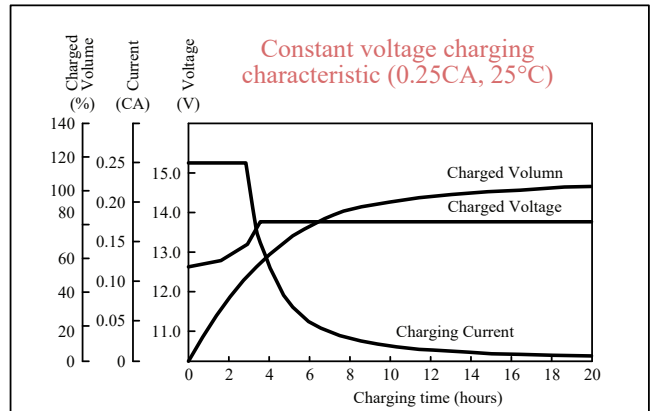
SMF VRLA RECHARGEABLE BATTERY

**LONG
LIFE
SERIES**

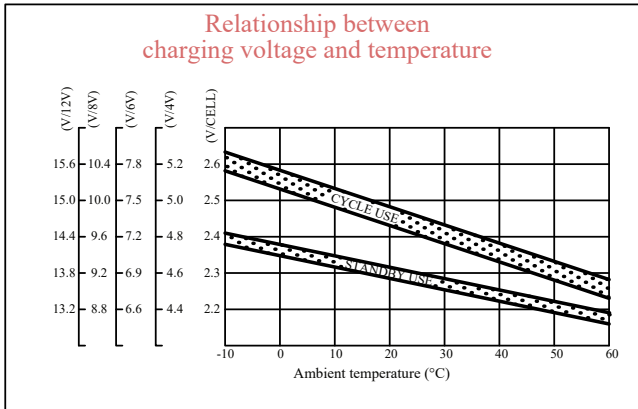
Discharge characteristic (25°C)



Constant voltage charging characteristic (0.25CA, 25°C)



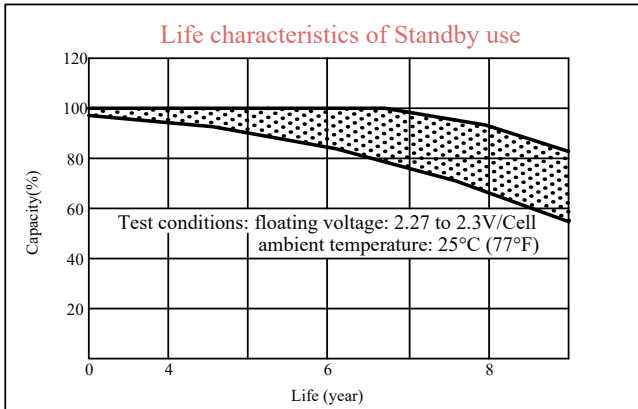
Relationship between charging voltage and temperature



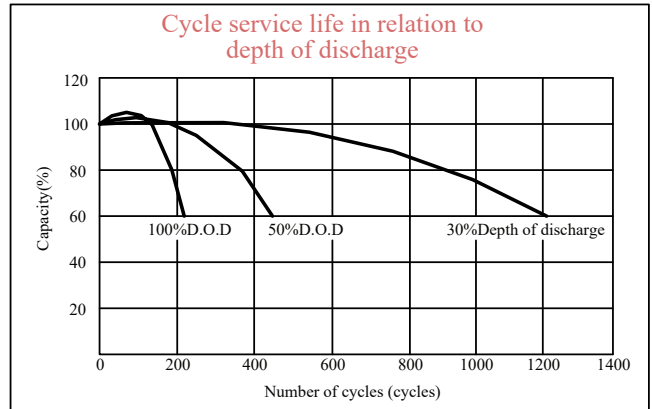
Self-discharge characteristic



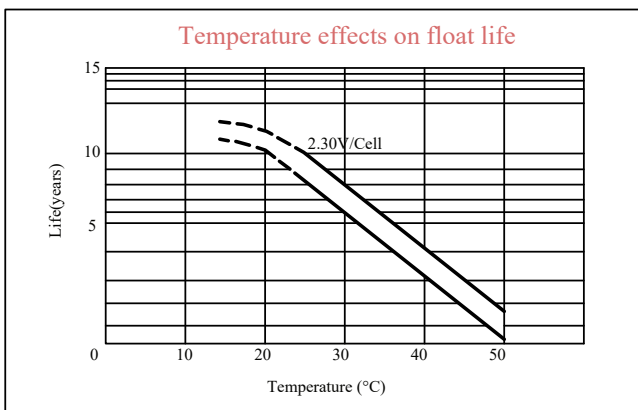
Life characteristics of Standby use



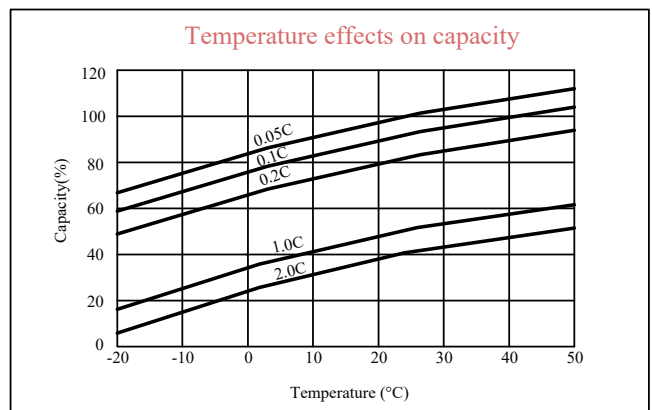
Cycle service life in relation to depth of discharge



Temperature effects on float life



Temperature effects on capacity



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SMF VRLA RECHARGEABLE BATTERY

**LONG
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SERIES**

APPLICATIONS

UPS Systems
Telecommunication Systems
Fire Alarm Safety & Security Systems
Medical Equipment

COMPLIANCE STANDARDS

IEC 60896 PART 21 & 22
BS6290-4

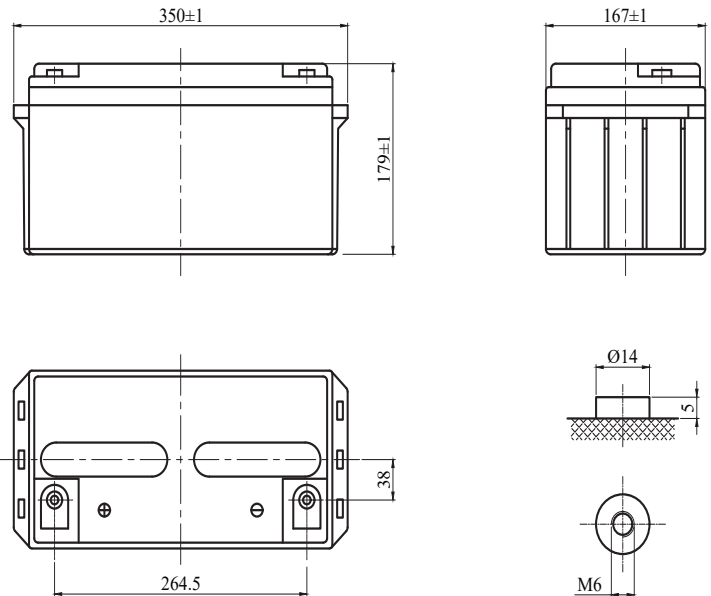
TECHNICAL FEATURES



- Non-Spillable Sealed Construction
- Seal Lead Acid Battery
- Absorptive Glass Mat System (AGM System)
- ABS (Acrylonitrile Butadiene Styrene) construction (FR optional)
- Gas Recombination
- Venting System for low internal pressure
- Low Self-Discharge
- Heavy-Duty, Highly Optimized Grids
- High Power Output
- Wide Operating Temperature
- Maintenance-Free Operation

CHARACTERISTICS

Nominal Voltage	12 V	
Design Life	10 Years	
Capacity 25°C (77°F)	10 Hour rate	80Ah
	5 Hour rate	72Ah
	1 Hour rate	53.7Ah
Internal Resistance (25°C, 100% Charge)		6.5mΩ
Self Discharge (20°C)	1 Month	Remaining Capacity 97%
Operating Temperature	Discharge	-20°C - 60°C
	Charge	-10°C - 60°C
	Storage	-20°C - 60°C
Normal Operating Temperature		25°C ± 3°C
Maximum Discharge current (25°C)		750A (5sec)
Maximum Charging current		24A
Short Circuit Current		1900A
Charge Methods		14.4 to 14.7V
Constant Voltage Charge 77°F (25°C) - Cycle use		Temp. Compensation -30mV/°C
Charge methods		13.4 to 13.8V
Constant Voltage Charge 77°F (25°C) - Standby Use		Temp. Compensation -20mV/°C



SPECIFICATIONS

Length	Width	Height	Total Height	Weight (kg)
350 mm	167 mm	179mm	179 mm	22.5 ± 5%

CONSTANT CURRENT DISCHARGE (Amperes) AT 25°C

End Voltage Volts/Cell	5min	10min	15min	30min	1h	3h	5h	10h	24h
1.60	247	188	149	87.3	53.70	22.7	15.0	8.20	3.72
1.65	233	178	137	83.0	51.60	22.5	14.7	8.15	3.70
1.70	218	168	132	80.3	49.80	22.4	14.7	8.1	3.65
1.75	204	159	126	77.6	47.10	21.8	14.4	8.05	3.63
1.80	190	149	118	75.0	46.30	20.7	14.1	8.00	3.61

CONSTANT POWER DISCHARGE (Watts) AT 25°C

End Voltage Volts/Cell	5min	10min	15min	30min	1h	3h	5h	10h	24h
1.60	433	323	258	165	98.60	42.5	27.9	16.1	7.30
1.65	420	310	250	157	97.80	41.1	27.4	15.7	7.20
1.70	390	299	246	151	93.80	40.4	27	15.4	7.10
1.75	368	287	232	149	92.30	39.9	26.8	15.1	7.00
1.80	349	275	218	146	88.50	39.0	26.4	14.8	6.90



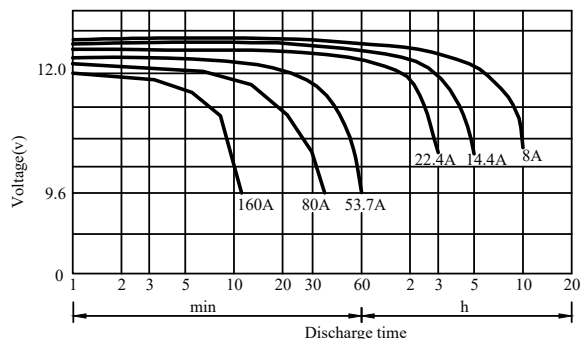
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ES 80-12

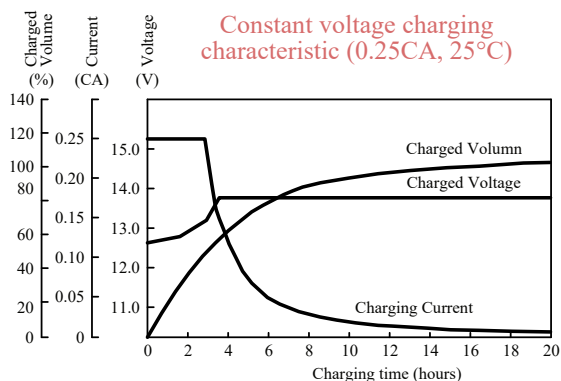
SMF VRLA RECHARGEABLE BATTERY

**LONG
LIFE
SERIES**

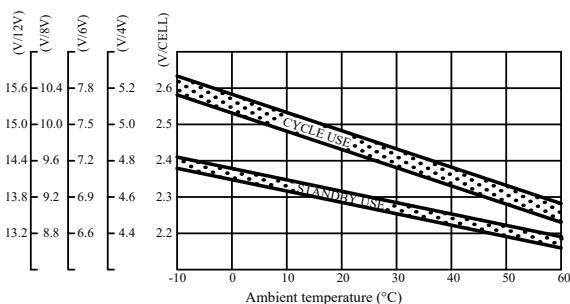
Discharge characteristic (25°C)



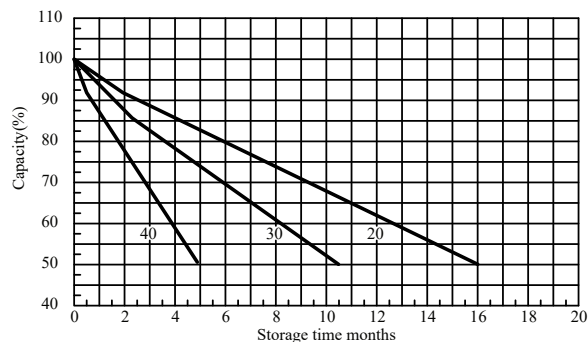
Constant voltage charging characteristic (0.25CA, 25°C)



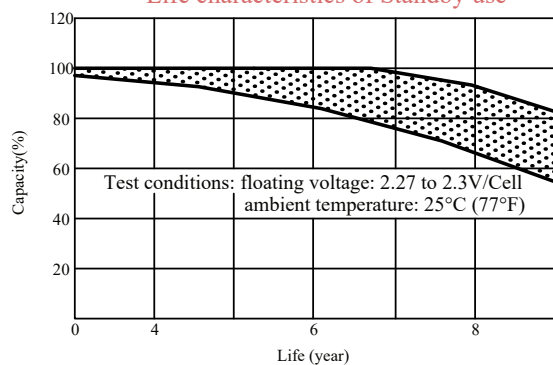
Relationship between charging voltage and temperature



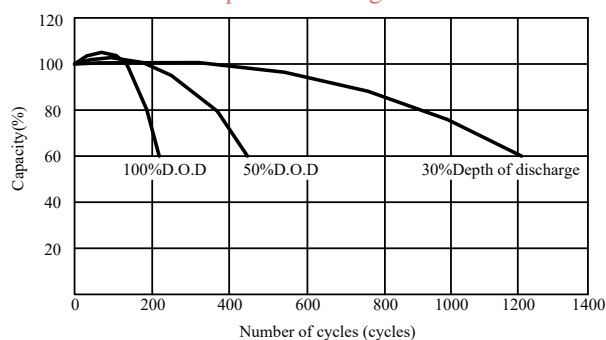
Self-discharge characteristic



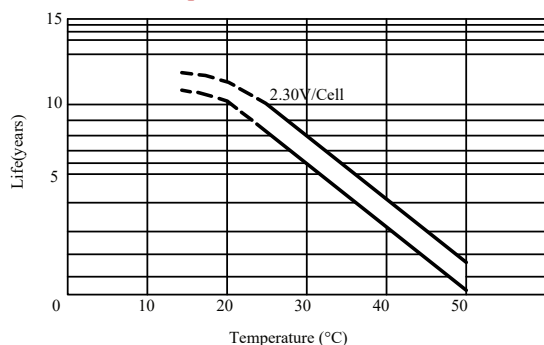
Life characteristics of Standby use



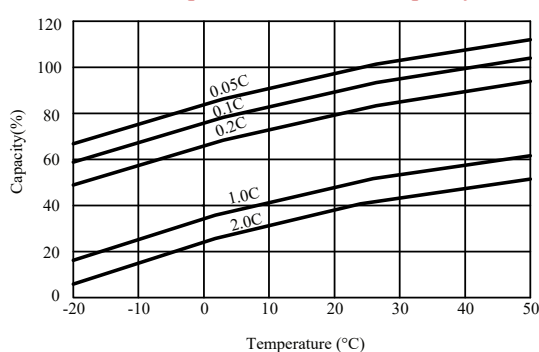
Cycle service life in relation to depth of discharge



Temperature effects on float life



Temperature effects on capacity



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