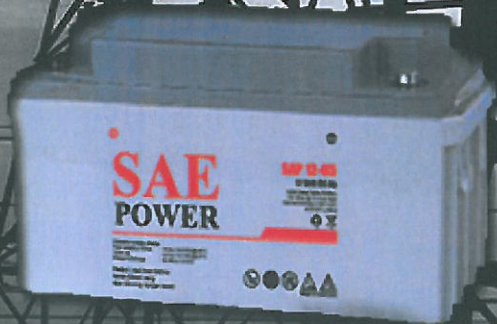


SAE®

POWER SYSTEM

Maintenance Free
Valve Regulated
Lead-Acid Batteries
Solutions



SAP 12 Series

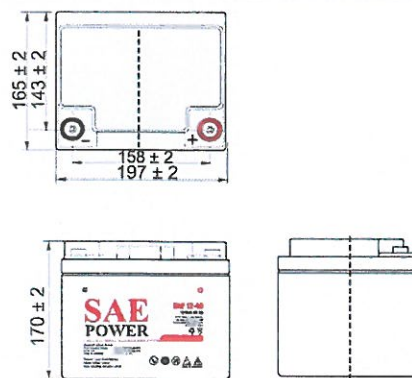
SAP 12-40

SAP 12-40 is a top terminal battery with AGM technology is specially designed for general purpose with over 6 years design life at 25 °C. SAP type also comply with IEC 60896-21/22, standard battery for Stationary lead-acid batteries. The adoption of centralized venting system make sure the battery can be installed in any location and guarantees high security and reliability.

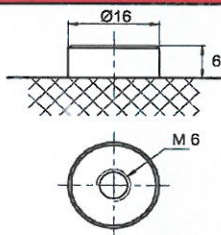
VIEW



DIMENSIONS



TERMINAL SIZE



WEIGHT AND DIMENSION

Battery Weight	:	Approximate	13.2	Kg
Length	:		197 ± 2	mm
Width	:		165 ± 2	mm
Height	:		170 ± 2	mm
Total Height	:		170 ± 2	mm

PERFORMANCE

Nominal Voltage	: 12 V
Capacity 10 h (C ₁₀)	: 40 Ah
Max Discharge Current	: 456 A (5 sec)
Internal Resistance	: Approx. 10.0 m Ω
Normal Operating Temp. Range	: 25°C ± 5°C
Float charging Voltage	: 13.5 to 13.8 VDC/unit@25°C
Recommended Maximum Charging Current Limit	: 11.4 A
Equalization and Cycle Service	: 14.4 to 15.0 VDC/unit@25°C
Self Discharge	: Self-discharge ratio less than 3% per month at 25°C. Please charge batteries before using.

COVER AND CONTAINER

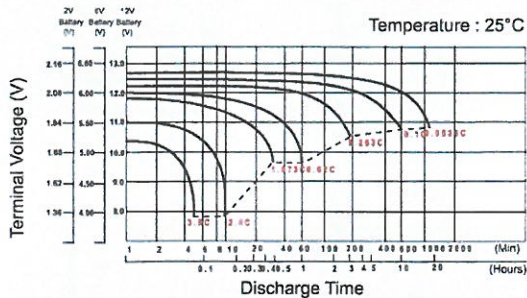
Material	: A.B.S. UL94-HB, UL94-V0 Optional.
Type	: SAP 12-40
Terminal	: T6

OTHER

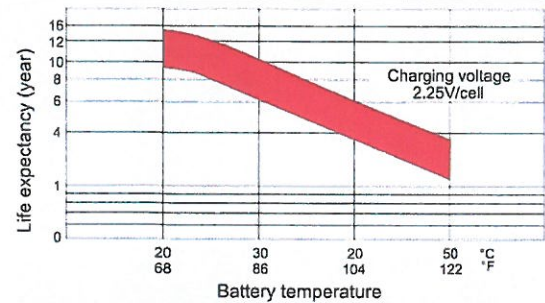
Operating Temperature Range	-15°C to 50°C	Discharge
	0°C to 40°C	Charge
	-15°C to 40°C	Storage

SAP 12-40

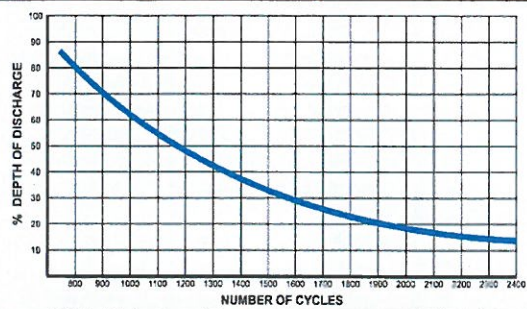
Discharge Characteristic Curve



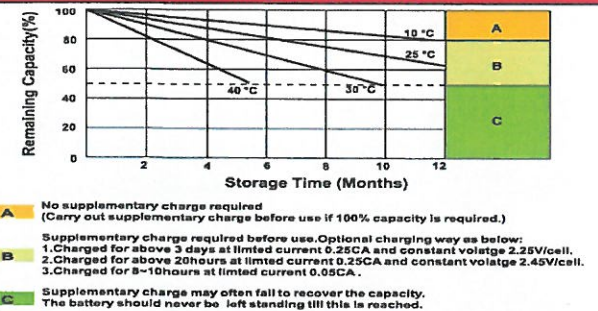
Effect of Temperature



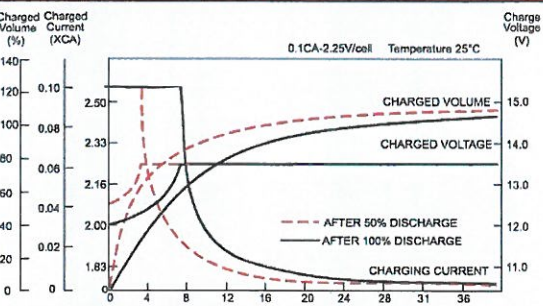
Graphic Life Cycle



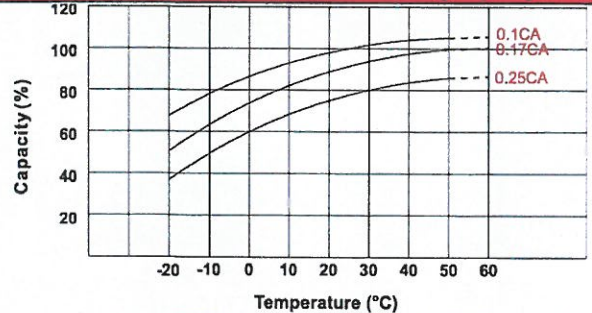
Self Discharge Characteristics



Float Charging Characteristics



Temperature Effects in Relation of Battery Capacity



Constant Current Discharge (Amperes) at 25 °C

F.V/Time	10 min	15 min	20 min	30 min	45 min	1 h	2 h	3 h	4 h	5 h	6 h	8 h	10 h	20 h
1.85 V/cell	46.84	39.37	34.95	28.95	22.32	19.16	12.42	9.30	7.62	6.41	5.62	4.51	3.87	2.06
1.80 V/cell	53.58	44.21	38.63	31.47	24.10	20.21	13.26	10.00	8.11	6.80	5.96	4.75	4.00	2.14
1.75 V/cell	60.84	49.79	42.63	34.21	26.32	22.00	13.79	10.40	8.39	6.96	6.14	4.91	4.11	2.19
1.70 V/cell	68.73	55.26	47.05	37.37	28.31	23.26	14.63	10.95	8.76	7.36	6.43	5.11	4.26	2.25
1.65 V/cell	73.79	59.16	50.10	39.37	30.00	24.10	15.16	11.37	9.10	7.59	6.66	5.28	4.39	2.32
1.60 V/cell	81.16	64.84	54.42	42.00	31.16	24.84	15.47	11.68	9.30	7.78	6.80	5.38	4.47	2.36

Constant Power Discharge (Watt/cell) at 25 °C

F.V/Time	10 min	15 min	20 min	30 min	45 min	1 h	2 h	3 h	4 h	5 h	6 h	8 h	10 h	20 h
1.85 V/cell	87.37	74.21	66.52	55.79	43.37	37.26	24.32	18.32	15.05	12.74	11.16	8.99	7.75	4.14
1.80 V/cell	98.84	82.21	72.52	59.68	46.42	39.16	25.89	19.58	15.89	13.37	11.79	9.43	7.98	4.27
1.75 V/cell	110.42	91.58	79.37	64.31	50.21	42.42	26.84	20.32	16.42	13.68	12.10	9.73	8.19	4.38
1.70 V/cell	122.00	100.21	86.94	69.79	53.89	44.74	28.21	21.26	17.16	14.42	12.63	10.13	8.49	4.48
1.65 V/cell	129.79	106.42	91.79	73.05	56.52	46.00	29.16	22.10	17.68	14.84	13.05	10.44	8.73	4.62
1.60 V/cell	139.57	114.73	98.63	77.47	58.42	47.16	29.68	22.53	18.10	15.16	13.26	10.63	8.89	4.68

All mentioned values are average values (Tolerance $\pm 2\%$)

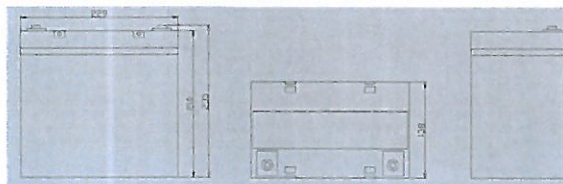
SAP 12-50

SAP 12-50 is a top terminal battery with AGM technology is specially designed for general purpose with over 10 years design life at 25°C. SAP type also comply with IEC 60896-21/22, standard battery for Stationary lead-acid batteries. The adoption of centralized venting system make sure the battery can be installed in any location and guarantees high security and reliability.

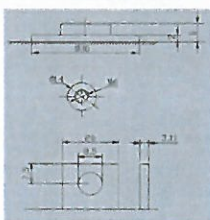
VIEW



DIMENSIONS



TERMINAL SIZE



WEIGHT AND DIMENSION

Battery Weight	: Approximate	18 Kg
Length	: 229 ± 2	mm
Width	: 138 ± 2	mm
Height	: 210 ± 2	mm
Total Height	: 235 ± 2	mm

PERFORMANCE

Nominal Voltage	: 12 V
Capacity 10 h (C ₁₀)	: 50Ah
Max Discharge Current	: 550A (5 sec)
Internal Resistance	: Approx. 6.0m Ω
Normal Operating Temp. Range	: 25°C±5°C
Float charging Voltage	: 13.5 to 13.8 VDC/unit@25°C
Recommended Maximum Charging Current Limit	: 16.5A
Equalization and Cycle Service	: 14.4 to 15.0 VDC/unit@25°C
Self Discharge	: Self-discharge ratio less than 3% per month at 25°C. Please charge batteries before using.

COVER AND CONTAINER

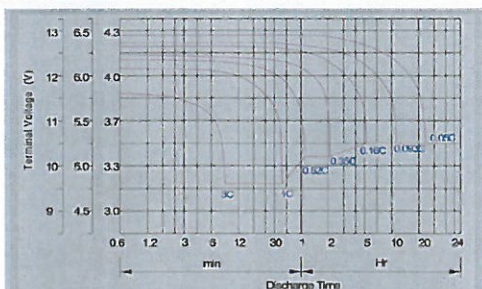
Material	: A.B.S. UL94-HB, UL94-V0 Optional.
Type	: SAP 12-50
Terminal	: T6

OTHER

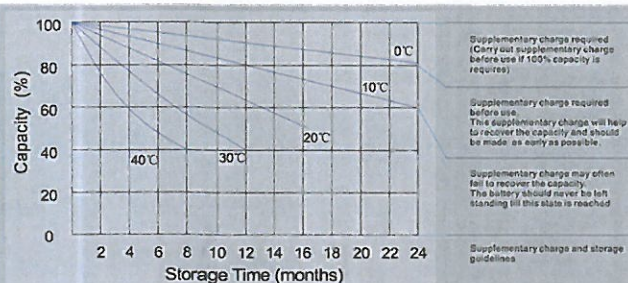
Operating Temperature Range	-15°C to 50°C	Discharge
	0°C to 40°C	Charge
	-15°C to 40°C	Storage

SAP 12-50

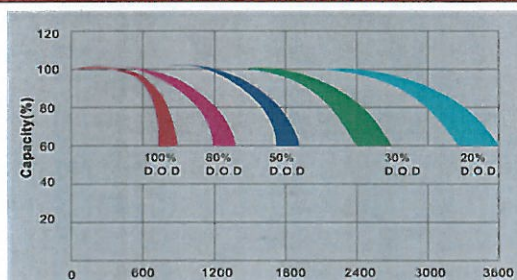
Discharge Characteristic Curve



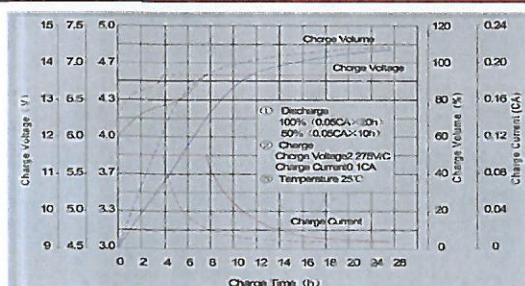
Storage Characteristic



Life Characteristic of cyclic use



Charge Characteristic curve for cyclic use



Constant current Discharge Characteristics: A (25°C)

F.V/Time	30min	1h	2h	3h	5h	8h	10h
1.80	50.51	32.68	20.11	13.73	9.37	6.19	5.50

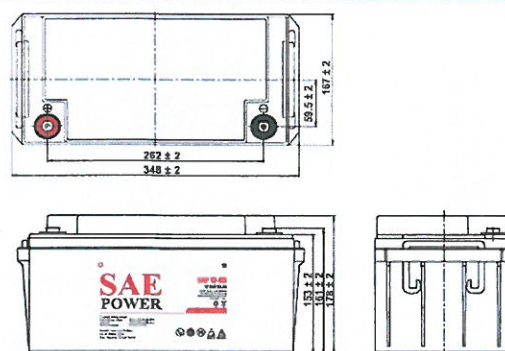
SAP 12-65

SAP 12-65 is a top terminal battery with AGM technology is specially designed for general purpose with over 10 years design life at 25 °C. SAP type also comply with IEC 60896-21/22, standard battery for Stationary Lead Acid batteries. The adoption of centralized venting system make sure the battery can be installed in any location and guarantees high security and reliability.

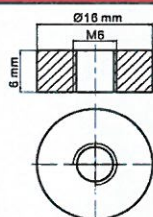
VIEW



DIMENSIONS



TERMINAL SIZE



WEIGHT AND DIMENSION

Battery Weight	: Approximate	19.2 Kg
Length	: 348 ± 2	mm
Width	: 167 ± 2	mm
Height	: 178 ± 2	mm
Total Height	: 178 ± 2	mm

PERFORMANCE

Nominal Voltage	: 12 V
Capacity 10 h (C ₁₀)	: 65 Ah
Max Discharge Current	: 780 A (5 sec)
Internal Resistance	: Approx. 7.3 m Ω
Normal Operating Temp. Range	: 25°C ± 5°C
Float charging Voltage	: 13.5 to 13.8 VDC/unit@25°C
Recommended maximum charging current limit	: 19 A
Equalization and Cycle Service	: 14.4 to 15.0 VDC/unit@25°C
Self Discharge	: Self-discharge ratio less than 3% per month at 25°C. Please charge batteries before using.

COVER AND CONTAINER

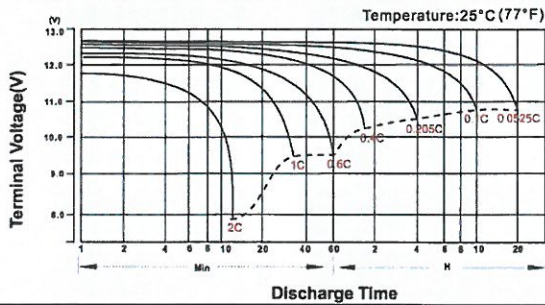
Material	: A.B.S. UL94-HB, UL94-V0 Optional.
Type	: SAP 12-65
Terminal	: T6

OTHER

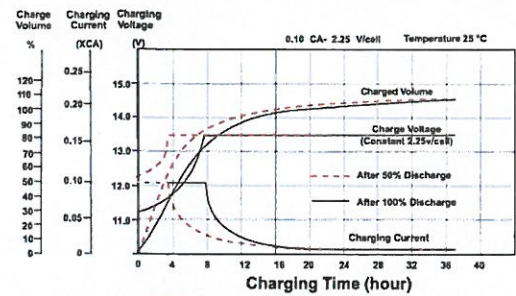
Operating Temperature Range	-15°C to 50°C	Discharge
	0°C to 40°C	Charge
	-15°C to 40°C	Storage

SAP 12-65

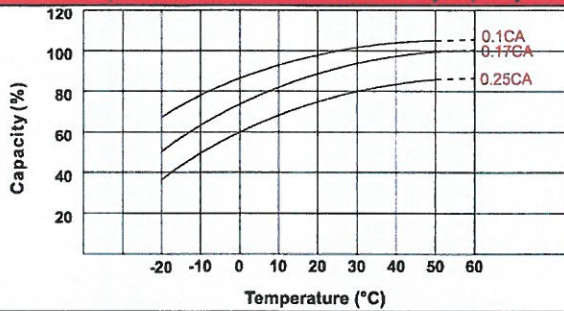
Discharge Characteristic Curve



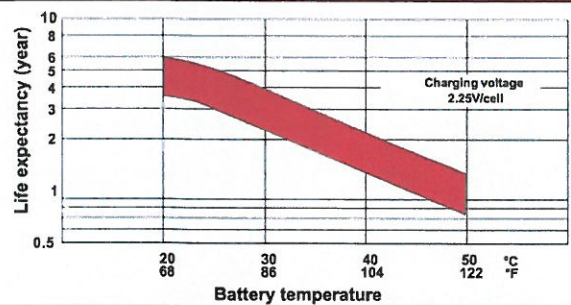
Float Charging Characteristics



Temperature Effects in Relation of Battery Capacity



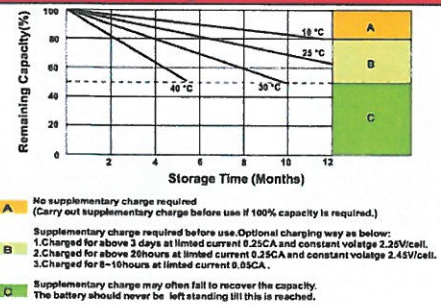
Effect of Temperature on Long Term Float Life



Graphic Life Cycle



Self Discharge Characteristics



Constan Current Discharge (Amperes) at 25 °C

F.V/Time	5 min	10 min	15 min	20 min	30 min	45 min	1 h	2 h	3 h	4 h	5 h	6 h	8 h	10 h	20 h
1.85 V/cell	119.51	91.83	79.15	68.77	53.25	39.63	32.08	19.39	14.89	12.35	10.52	9.21	7.45	6.27	3.35
1.80 V/cell	149.59	107.45	90.05	77.36	58.39	42.77	34.28	20.65	15.62	12.94	10.98	9.60	7.76	6.51	3.41
1.75 V/cell	168.67	117.20	98.33	82.82	61.54	44.87	35.85	21.39	16.04	13.26	11.24	9.80	7.87	6.57	3.45
1.70 V/cell	185.65	126.53	104.93	86.90	64.37	46.44	37.32	22.12	16.56	13.59	11.50	9.99	7.99	6.64	3.48
1.67 V/cell	203.16	136.28	110.18	90.26	66.36	48.01	38.37	22.64	16.98	13.87	11.72	10.17	8.10	6.71	3.53
1.60 V/cell	220.25	144.88	114.58	93.72	68.14	49.69	39.31	23.17	17.40	14.14	11.93	10.32	8.21	6.79	3.54

Constant Power Discharge (Watt/cell) at 25 °C

F.V/Time	5 min	10 min	15 min	20 min	30 min	45 min	1 h	2 h	3 h	4 h	5 h	6 h	8 h	10 h	20 h
1.85 V/cell	218.57	169.51	147.71	129.57	101.48	76.21	61.95	37.63	29.04	24.11	20.65	18.11	17.86	12.40	6.65
1.80 V/cell	270.57	196.03	165.74	143.62	109.65	81.66	34.38	39.73	30.40	25.16	21.39	18.80	15.26	12.86	6.74
1.75 V/cell	298.56	210.50	178.74	152.32	114.58	84.81	68.45	670.18	31.03	25.68	21.91	19.12	15.45	12.98	6.81
1.70 V/cell	319.63	222.13	188.17	158.71	119.09	87.43	70.97	42.35	31.87	26.31	22.33	19.48	15.66	13.09	6.88
1.67 V/cell	344.68	237.13	195.93	163.53	121.92	89.52	72.44	43.19	32.60	26.73	22.64	19.75	15.86	13.22	6.96
1.60 V/cell	365.23	246.35	200.43	168.04	124.12	92.15	73.91	43.92	33.13	27.15	22.96	19.99	16.04	13.36	6.98

All mentioned values are average values (Tolerance $\pm 2\%$)

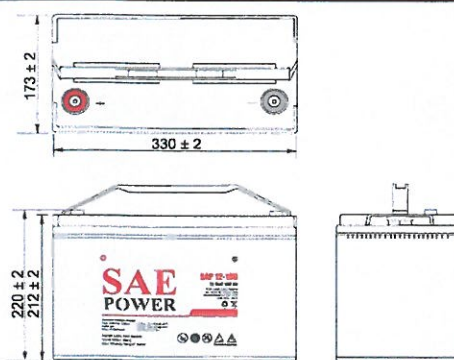
SAP 12-100

SAP 12-100 is a top terminal battery with AGM technology is specially designed for general purpose with over 10 years design life at 25 °C. SAP type also comply with IEC 60896-21/22, standard battery for Stationary Lead Acid batteries. The adoption of centralized venting system make sure the battery can be installed in any location and guarantees high security and reliability.

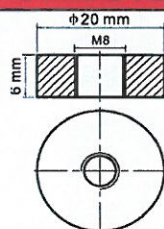
VIEW



DIMENSIONS



TERMINAL SIZE



WEIGHT AND DIMENSION

Battery Weight	:	Approximate	30.4	Kg
Length	:		330 ± 2	mm
Width	:		173 ± 2	mm
Height	:		212 ± 2	mm
Total Height	:		220 ± 2	mm

PERFORMANCE

Nominal Voltage	:	12 V
Capacity 10 h (C ₁₀)	:	100 Ah
Max Discharge Current	:	1200 A (5 sec)
Internal Resistance	:	Approx. 4.9 m Ω
Normal Operating Temp. Range	:	25°C ± 5°C
Float charging Voltage	:	13.5 to 13.8 VDC/unit@25°C
Recommended Maximum Charging Current Limit	:	30 A
Equalization and Cycle Service	:	14.4 to 15.0 VDC/unit@25°C
Self Discharge	:	Self-discharge ratio less than 3% per month at 25°C. Please charge batteries before using.

COVER AND CONTAINER

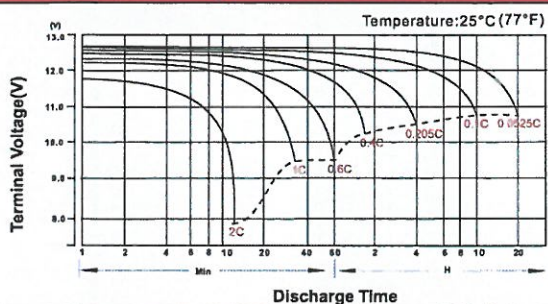
Material	:	A.B.S. UL94-HB, UL94-V0 Optional.
Type	:	SAP 12-100
Terminal	:	T11

OTHER

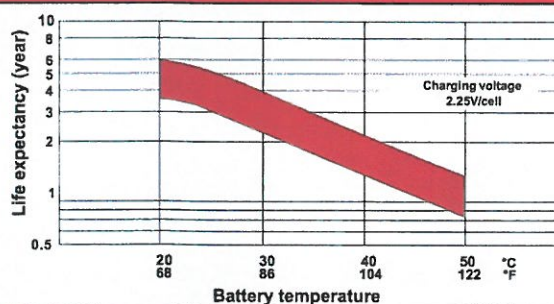
Operating Temperature Range	-15°C to 50°C	Discharge
	0°C to 40°C	Charge
	-15°C to 40°C	Storage

SAP 12-100

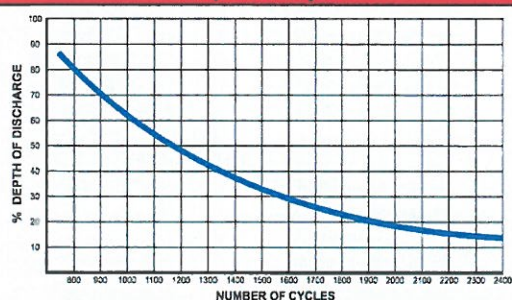
Discharge Characteristic Curve



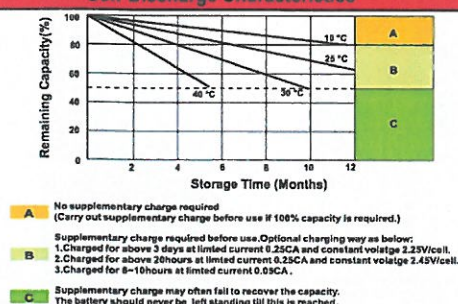
Effect of Temperature



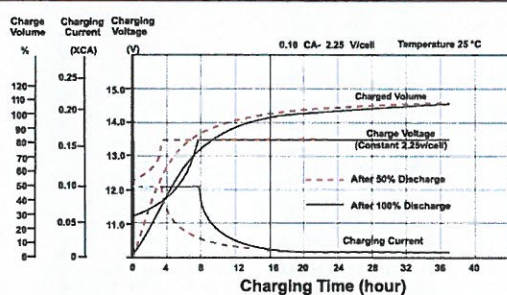
Graphic Life Cycle



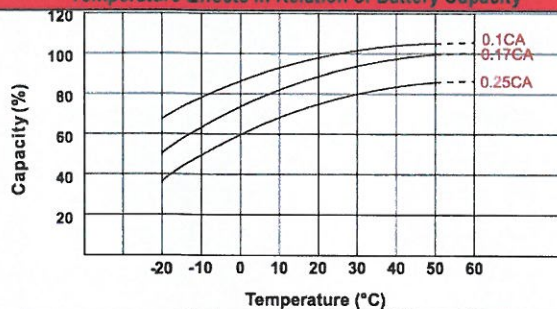
Self Discharge Characteristics



Float Charging Characteristics



Temperature Effects in Relation of Battery Capacity



Constan Current Discharge (Amperes) at 25 °C

F.V/Time	5 min	10 min	15 min	20 min	30 min	45 min	1 h	2 h	3 h	4 h	5 h	6 h	8 h	10 h	20 h
1.85 V/cell	173.60	146.40	130.20	115.30	87.50	65.20	52.40	31.30	23.50	19.20	16.40	14.40	11.60	9.65	5.13
1.80 V/cell	210.00	167.60	143.70	123.50	92.10	68.70	55.10	33.10	24.60	20.20	17.20	15.00	12.00	10.00	5.20
1.75 V/cell	237.00	186.30	154.00	130.80	96.50	71.30	57.10	34.40	25.40	20.70	17.60	15.30	12.20	10.10	5.29
1.70 V/cell	261.60	199.50	165.10	138.90	101.80	74.60	59.50	35.30	26.00	21.20	17.90	15.60	12.40	10.20	5.34
1.65 V/cell	291.70	215.10	178.50	146.60	106.70	77.40	61.90	36.30	26.70	21.70	18.30	15.90	12.60	10.30	5.40
1.60 V/cell	330.80	232.50	188.50	154.30	112.30	80.50	63.80	37.50	27.60	22.20	18.60	16.20	12.70	10.50	5.45

Constant Power Discharge (Watt/cell) at 25 °C

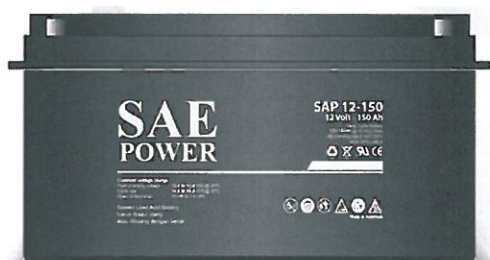
F.V/Time	5 min	10 min	15 min	20 min	30 min	45 min	1 h	2 h	3 h	4 h	5 h	6 h	8 h	10 h	20 h
1.85 V/cell	322.50	274.90	247.10	220.50	168.50	126.40	102.20	60.80	45.70	37.50	32.20	28.20	22.90	19.10	10.20
1.80 V/cell	386.40	312.20	271.00	235.10	176.80	132.70	107.20	63.80	47.70	39.20	33.60	29.40	23.70	19.80	10.30
1.75 V/cell	431.30	344.90	288.70	247.80	184.30	137.30	110.80	66.00	49.10	40.10	34.30	29.90	24.00	19.90	10.40
1.70 V/cell	470.90	366.50	307.70	261.80	193.60	143.00	115.00	67.60	50.10	41.00	34.80	30.40	24.30	20.10	10.50
1.65 V/cell	519.30	391.40	330.20	274.50	201.90	147.70	119.10	69.20	51.30	41.80	35.30	30.80	24.60	20.30	10.60
1.60 V/cell	578.90	418.20	345.10	286.60	211.10	152.90	122.40	71.10	52.70	42.60	35.90	31.30	24.80	20.50	10.70

All mentioned values are average values (Tolerance $\pm 2\%$)

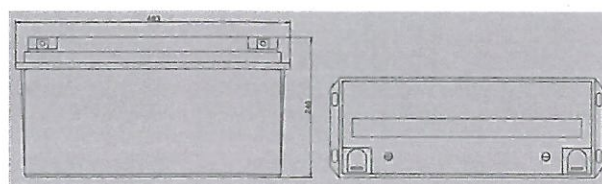
SAP 12-150

SAP 12-150 is a top terminal battery with AGM technology is specially designed for general purpose with over 10 years design life at 25°C. SAP type also comply with IEC 60896-21/22, standard battery for Stationary lead-acid batteries. The adoption of centralized venting system make sure the battery can be installed in any location and guarantees high security and reliability.

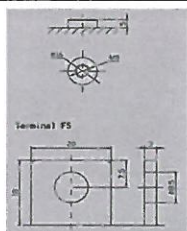
VIEW



DIMENSIONS



TERMINAL SIZE



WEIGHT AND DIMENSION

Battery Weight	: Approximate	44.5 Kg
Length	: 483 ± 2	mm
Width	: 170 ± 2	mm
Height	: 240 ± 2	mm
Total Height	: 240 ± 2	mm

PERFORMANCE

Nominal Voltage	: 12 V
Capacity 10 h (C ₁₀)	: 150 Ah
Max Discharge Current	: 1500 A (5 sec)
Internal Resistance	: Approx. 4.0 m Ω
Normal Operating Temp. Range	: 25°C±5°C
Float charging Voltage	: 13.5 to 13.8 VDC/unit@25°C
Recommended Maximum Charging Current Limit	: 45 A
Equalization and Cycle Service	: 14.6 to 14.8 VDC/unit@25°C
Self Discharge	: Self-discharge ratio less than 3% per month at 25°C. Please charge batteries before using.

COVER AND CONTAINER

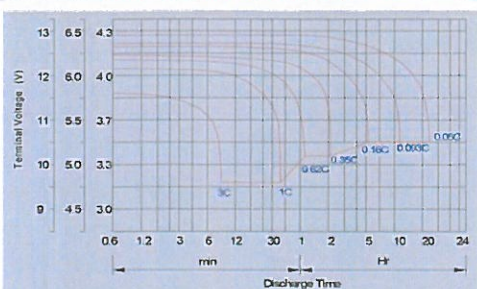
Material	: A.B.S. UL94-HB, UL94-V0 Optional.
Type	: SAP 12-150
Terminal	: T6

OTHER

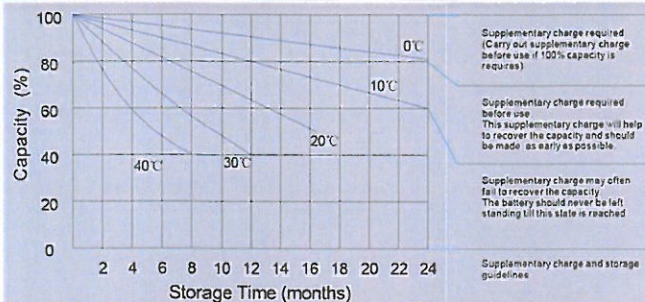
Operating Temperature Range	-15°C to 50°C	Discharge
	0°C to 40°C	Charge
	-15°C to 40°C	Storage

SAP 12-150

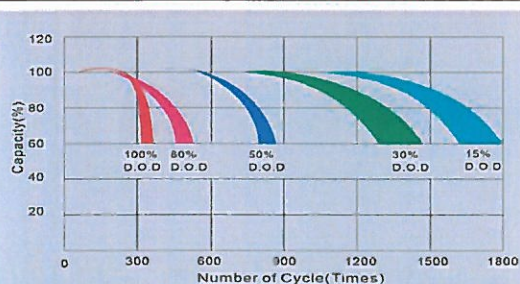
Discharge Characteristic Curve



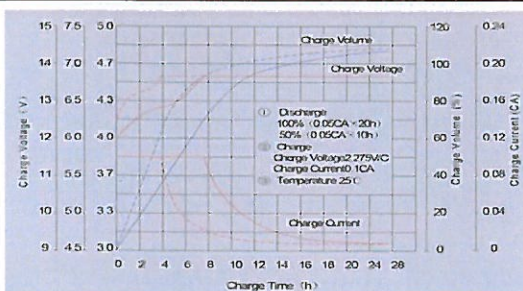
Storage Characteristic



Life Characteristic of cyclic use



Charge Characteristic curve for cyclic use



Constant current Discharge Characteristics: A (25°C)

F.V/Time	30MIN	1h	2h	3h	4h	5h	8h	10h	20h
1.80V/cell	153.6	93.00	56.00	38.63	31.67	25.94	17.88	15.15	8.035

PT. Sarana Andalan ElektriKA

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