



## SWL Series

VALVE REGULATED LEAD-ACID BATTERIES

SWL

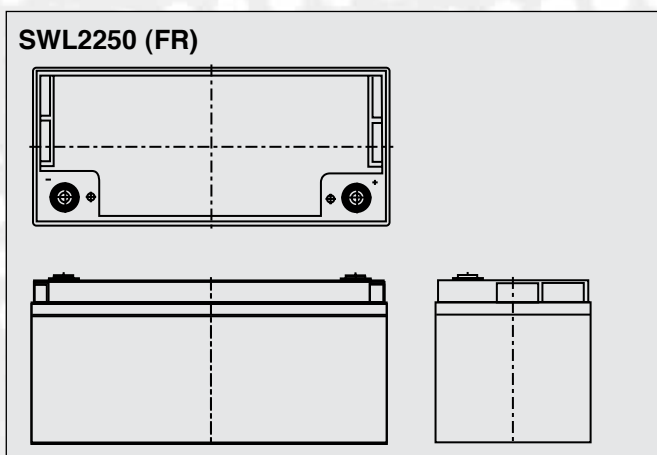
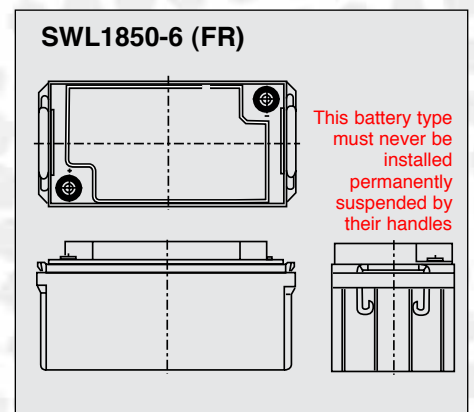
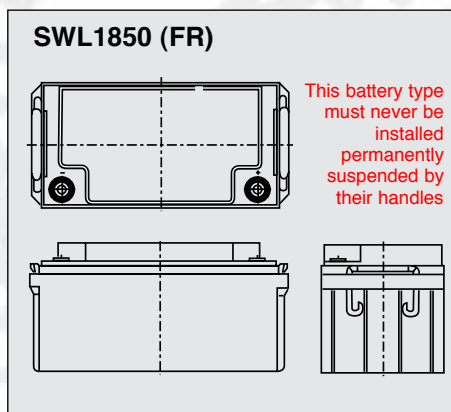
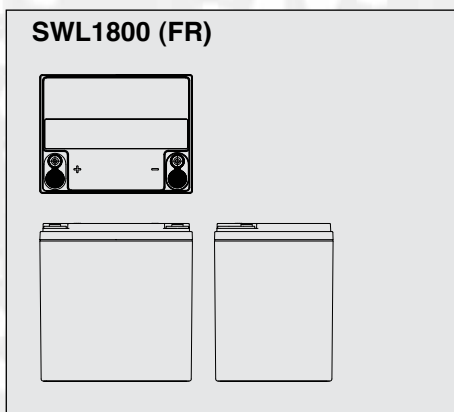
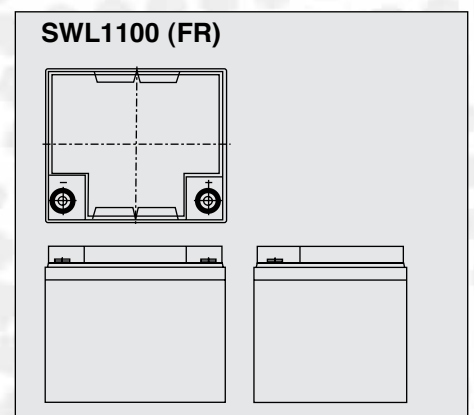
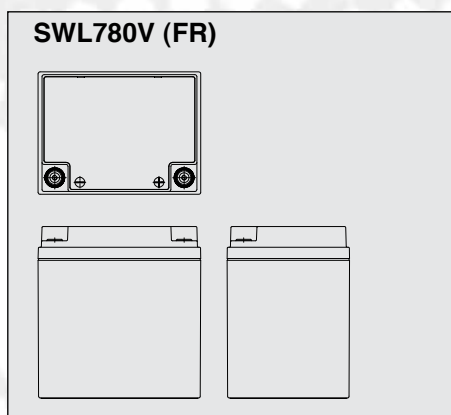
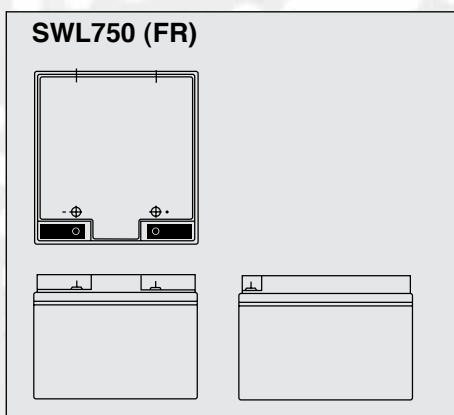
# SWL VALVE REGULATED LEAD-ACID BATTERIES (VRLA)

The SWL range is an enhanced NPL design resulting in an improved energy to density ratio, giving up to 40% extra discharge capacity. All other attributes and operational characteristics are the same, thereby maintaining the benefit of a common mechanical and electrical design for users of both products.

## FEATURES

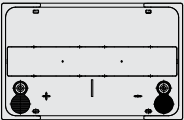
- Yuasa VRLA batteries can be used in any orientation excluding continuous use inverted.
- Standard case material is flame retardant to (UL94) HBØ.
- FR option case material is flame retardant to UL94:VØ (oxygen index 30).
- SWL batteries are manufactured in factories that comply with ISO9001:2000.
- FR option SWL's comply with BS6290 Part 4 (1997).
- SWL batteries comply with IEC 60896-21+22.

## Layouts

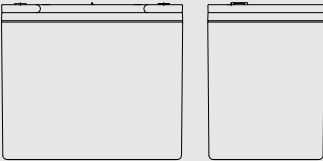


Layouts continued

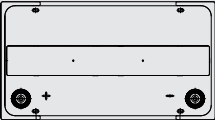
**SWL2300E (FR)**



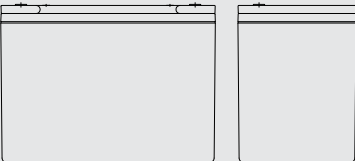
This battery type must never be installed permanently suspended by their handles



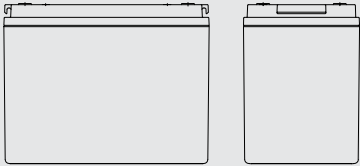
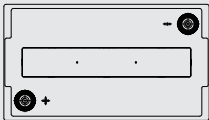
**SWL2500E (FR)**



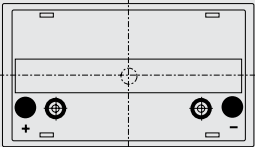
This battery type must never be installed permanently suspended by their handles



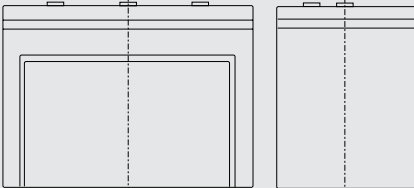
**SWL2500-6 (FR)**



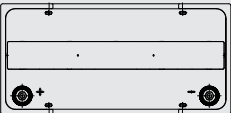
**SWL2500T (FR)**




This battery type must never be installed permanently suspended by their handles



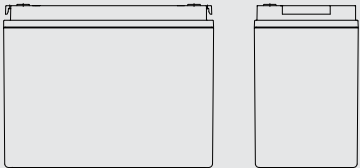
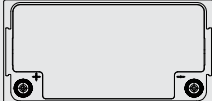
**SWL3300 (FR)**



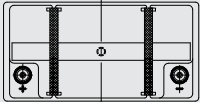
This battery type must never be installed permanently suspended by their handles



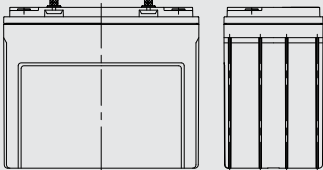
**SWL3800 (FR)**



**SWL4250 (FR)**

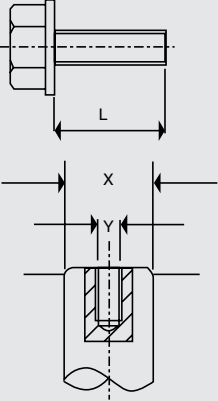


This battery type must never be installed permanently suspended by their handles



**Terminals (mm)**

Terminal	X	Y	L
B	17mm	M5	10
C	20mm	M6	16
D	20mm	M8	16



## General Specifications

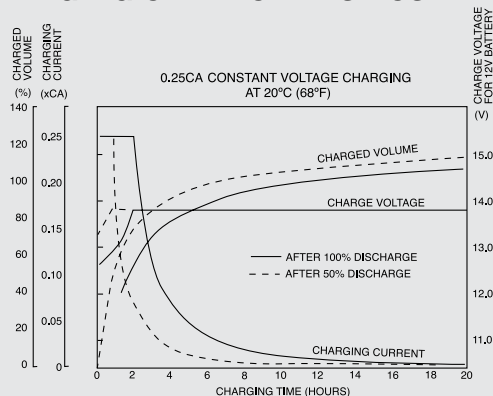
Specifications	SWL750 (FR)	SWL780V (FR)	SWL1100 (FR)	SWL1800 (FR)	SWL1850 (FR)	SWL1850-6 (FR)	SWL2250 (FR)
Nominal Voltage	12V	12V	12V	12V	12V	6V	12V
10-min rate Constant Power 9.6V at 20°C	768W	816W	1200W	1974W	1914W	1152W	2250W
10-min rate Constant Power 1.6V/Cell at 20°C	128W	136W	200W	329W	319W	384W	375W
10-hr rate Capacity to 10.8V at 20°C	22.9Ah	27.1Ah	39.6Ah	55Ah	66Ah	132Ah	76Ah
Dimensions / mm							
Length	166 (± 0.5)	166 (± 1)	197 (± 0.5)	216 (± 0.7)	350 (± 0.7)	350 (± 0.7)	380 (± 0.7)
Width	175 (± 0.5)	125 (± 1)	165 (± 0.5)	168 (± 0.5)	166 (± 0.5)	166 (± 0.5)	166 (± 0.5)
Height	125 (± 0.5)	175 (± 2)	170 (± 0.5)	223 (± 0.7)	174 (± 0.5)	174 (± 0.5)	174 (± 0.5)
(height over terminals)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mass (typical) Kg	9.0	10.1	14.0	23.0	23.0	23.0	27.5
Terminal Type							
Female threaded terminal	M5	M5	M5	M6	M6	M6	M8
Torque	2.5Nm	2.5Nm	2.5Nm	4.8Nm	4.8Nm	4.8Nm	6Nm
Operating Temperature Range							
Storage (in fully charged condition) °C	-20 to +60	-20 to +60	-20 to +60	-20 to +50	-20 to +50	-20 to +50	-20 to +50
Charge °C	-15 to +50	-15 to +50	-15 to +50	-15 to +50	-15 to +50	-15 to +50	-15 to +50
Discharge °C	-20 to +60	-20 to +60	-20 to +60	-20 to +60	-20 to +60	-20 to +60	-20 to +60
Storage							
Capacity loss per month at 20°C (approx)	3%	3%	3%	3%	3%	3%	3%
Case Material							
Standard Option	ABS (UL94:HB)	ABS (UL94:HB)	ABS (UL94:HB)	ABS (UL94:HB)	ABS (UL94:HB)	ABS (UL94:HB)	ABS (UL94:HB)
Flame retardant option (FR)	ABS (UL94:VO)	ABS (UL94:VO)	ABS (UL94:VO)	ABS (UL94:VO)	ABS (UL94:VO)	ABS (UL94:VO)	ABS (UL94:VO)
Charge Voltage							
Float charge voltage at 20°C	13.65 (± 1%) V	13.65 (± 1%) V	13.65 (± 1%) V	13.65 (± 1%) V	13.65 (± 1%) V	6.825 (± 1%) V	13.65 (± 1%) V
	2.275 (± 1%) V/cell	2.275 (± 1%) V/cell	2.275 (± 1%) V/cell	2.275 (± 1%) V/cell	2.275 (± 1%) V/cell	2.275 (± 1%) V/cell	2.275 (± 1%) V/cell
Float Charge voltage temperature correction factor (for variations from the standard 20°C)	-3 mV/cell/°C	-3 mV/cell/°C	-3 mV/cell/°C	-3 mV/cell/°C	-3 mV/cell/°C	-3 mV/cell/°C	-3 mV/cell/°C
Cyclic (or Boost) charge at 20°C	14.5 (± 3%) V	14.5 (± 3%) V	14.5 (± 3%) V	14.5 (± 3%) V	14.5 (± 3%) V	7.25 (± 3%) V	14.5 (± 3%) V
	2.42 (± 3%) V/cell	2.42 (± 3%) V/cell	2.42 (± 3%) V/cell	2.42 (± 3%) V/cell	2.42 (± 3%) V/cell	2.42 (± 3%) V/cell	2.42 (± 3%) V/cell
Cyclic Charge voltage temperature correction factor (for variations from the standard 20°C)	-4 mV/cell/°C	-4 mV/cell/°C	-4 mV/cell/°C	-4 mV/cell/°C	-4 mV/cell/°C	-4 mV/cell/°C	-4 mV/cell/°C
Charge Current							
Float charge current limit	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit
Cyclic (or Boost) charge current limit	11.45A	6.78A	9.90A	13.75A	16.50A	33.00A	19.00A
Maximum Discharge Current							
1 second	500A	500A	500A	800A	800A	500A	800A
1 minute	150A	150A	200A	500A	500A	260A	500A
Short-circuit Current & Internal Resistance (according to EN IEC 60896-21)							
Internal resistance	20.47mΩ	N/A mΩ	14.4mΩ	10.09mΩ	9.35mΩ	2.96mΩ	10.49mΩ
Short-circuit current	714A	N/A A	1005A	1437A	1529A	2408A	1442A
Impedance							
Measured at 1 kHz	9.5mΩ	8.5mΩ	7.5mΩ	4mΩ	5mΩ	2.5mΩ	3.6mΩ
Design Life							
EUROBAT Classification: High Performance Years	10 to 12	10 to 12	10 to 12	10 to 12	10 to 12	10 to 12	10 to 12
Yuasa design life (at 20°C) Years	up to 10	up to 10	up to 10	up to 10	up to 10	up to 10	up to 10



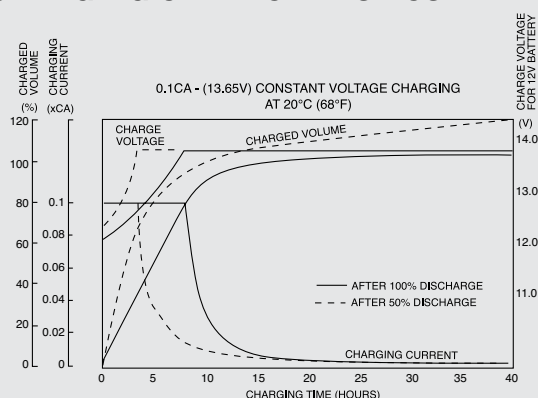
## General Specifications continued

Specifications	SWL2300E (FR)	SWL2500-6 (FR)	SWL2500E (FR)	SWL2500T (FR)	SWL3300 (FR)	SWL3800 (FR)	SWL4250 (FR)
Nominal Voltage	12V	6V	12V	12V	12V	12V	12V
10-min rate Constant Power 9.6V at 20°C	2400W	2766W	2940W	2940W	3300W	4206W	4266W
10-min rate Constant Power 1.6V/Cell at 20°C	400W	922W	490W	490W	550W	701W	711W
10-hr rate Capacity to 10.8V at 20°C	78Ah	180Ah	90Ah	90Ah	105Ah	124Ah	140Ah
Dimensions / mm							
Length	261 (± 0.7)	297 (± 1)	305 (± 0.7)	305 (± 3)	350 (± 0.7)	350 (± 1)	341 (± 3)
Width	168 (± 0.5)	168 (± 1)	168 (± 0.5)	173 (± 3)	168 (± 0.5)	173 (± 1)	173 (± 3)
Height	225 (± 0.7)	231.5 (± 2)	225 (± 0.7)	220 (± 3)	225 (± 0.7)	272 (± 2)	281 (± 3)
(height over terminals)	N/A	N/A	N/A	223 (± 3)	N/A	N/A	N/A
Mass (typical) Kg	27.0	32.5	32.0	31.0	38.0	48.0	49.0
Terminal Type							
Female threaded terminal	M6mm	M8mm	M6mm	M6mm	M8mm	M8mm	M8mm
Torque	4.8Nm	6Nm	4.8Nm	4.8Nm	6Nm	6Nm	6Nm
Operating Temperature Range							
Storage (in fully charged condition) °C	-20 to +50	-20 to +50	-20 to +50	-15 to +40	-20 to +50	-20 to +50	-20 to +50
Charge °C	-15 to +50	-15 to +50	-15 to +50	-15 to +50	-15 to +50	-15 to +50	-15 to +50
Discharge °C	-20 to +60	-20 to +60	-20 to +60	-15 to +50	-20 to +60	-20 to +60	-20 to +60
Storage							
Capacity loss per month at 20°C (approx)	3%	3%	3%	3%	3%	3%	3%
Case Material							
Standard Option	ABS (UL94:HB)	ABS (UL94:HB)	ABS (UL94:HB)	ABS (UL94:HB)	ABS (UL94:HB)	ABS (UL94:HB)	ABS (UL94:HB)
Flame retardant option (FR)	ABS (UL94:VO)	ABS (UL94:VO)	ABS (UL94:VO)	ABS (UL94:VO)	ABS (UL94:VO)	ABS (UL94:VO)	ABS (UL94:VO)
Charge Voltage							
Float charge voltage at 20°C	13.65 (± 1%) V	6.825 (± 1%) V	13.65 (± 1%) V	13.65 (± 1%) V	13.65 (± 1%) V	13.65 (± 1%) V	13.65 (± 1%) V
	2.275 (± 1%) V/cell	2.275 (± 1%) V/cell	2.275 (± 1%) V/cell	2.275 (± 1%) V/cell	2.275 (± 1%) V/cell	2.275 (± 1%) V/cell	2.275 (± 1%) V/cell
Float Charge voltage temperature correction factor (for variations from the standard 20°C)	-3 mV/cell/°C	-3 mV/cell/°C	-3 mV/cell/°C	-3 mV/cell/°C	-3 mV/cell/°C	-3 mV/cell/°C	-3 mV/cell/°C
Cyclic (or Boost) charge at 20°C	14.5 (± 3%) V	7.25 (± 3%) V	14.5 (± 3%) V	14.5 (± 3%) V	14.5 (± 3%) V	14.5 (± 3%) V	14.5 (± 3%) V
	2.42 (± 3%) V/cell	2.42 (± 3%) V/cell	2.42 (± 3%) V/cell	2.42 (± 3%) V/cell	2.42 (± 3%) V/cell	2.42 (± 3%) V/cell	2.42 (± 3%) V/cell
Cyclic Charge voltage temperature correction factor (for variations from the standard 20°C)	-4 mV/cell/°C	-4 mV/cell/°C	-4 mV/cell/°C	-4 mV/cell/°C	-4 mV/cell/°C	-4 mV/cell/°C	-4 mV/cell/°C
Charge Current							
Float charge current limit	No Limit A	No Limit A	No Limit A	No Limit A	No Limit A	No Limit A	No Limit A
Cyclic (or Boost) charge current limit	19.50A	45A	22.50A	22.5A	26.25A	31.00A	35.00A
Maximum Discharge Current							
1 second	800A	1500A	1000A	598A	1100A	1200A	840A
1 minute	400A	800A	500A	276A	550A	600A	420A
Short-circuit Current & Internal Resistance (according to EN IEC 60896-21)							
Internal resistance	7.71mΩ	N/A mΩ	6.5mΩ	5.64mΩ	5.64mΩ	4.8mΩ	N/A mΩ
Short-circuit current	1857A	N/A A	2258A	2547A	2547A	3000A	N/A A
Impedance							
Measured at 1 kHz	5.5mΩ	3mΩ	5mΩ	6mΩ	4mΩ	4mΩ	2.7mΩ
Design Life							
EUROBAT Classification: High Performance Years	10 to 12	10 to 12	10 to 12	10 to 12	10 to 12	10 to 12	10 to 12
Yuasa design life (at 20°C) Years	up to 10	up to 10	up to 10	up to 10	up to 10	up to 10	up to 10

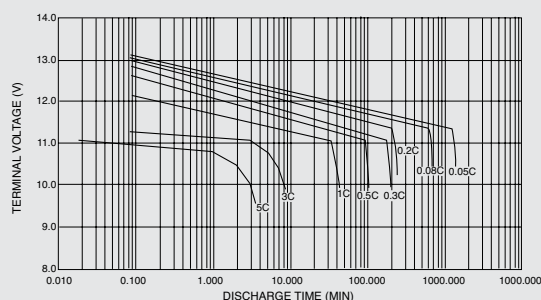
## CHARGING CHARACTERISTICS



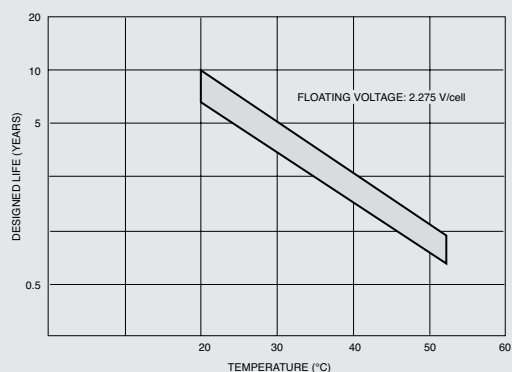
## CHARGING CHARACTERISTICS



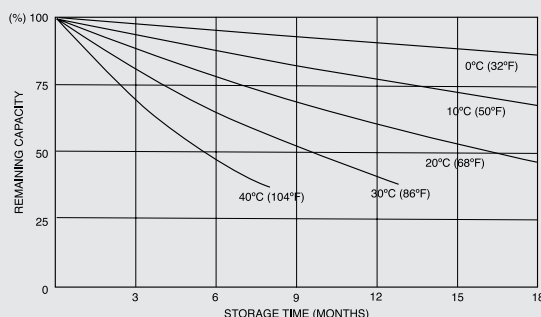
## DISCHARGE CHARACTERISTIC CURVES



## TEMPERATURE/LIFE CHARACTERISTIC



## SELF DISCHARGE CHARACTERISTICS



## Charging Methods (At 20°C)

Standby use: Float charging voltage 2.275vpc

## CAUTION

- Avoid short circuit.
- Do not charge in a sealed container.
- Service life and operational characteristics will be affected by temperature.
- AC Ripple reduces service life.

## WARNING!

SWL (Standard) and (FR) battery types SWL1850; SWL1850-6; SWL2500, must never be installed permanently suspended by their handles; they are not designed for this purpose.



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