

**Battery Specifications**

**Model: LC-PA1212P1**

**Customer:PIE**

**Application: Trickle use**

**[Contents]**

1. Specifications for the rechargeable valve regulated lead-acid battery.
2. Drawings.
3. Precautions for handling the rechargeable valve regulated lead acid batteries.

Please return a copy of these specifications to PSBS {Panasonic Storage Battery (Shenyang) Co., Ltd.} with the customer's signature of approval.

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Signature for Approval: : Date  
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Written by : Checked by : Checked by  
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YangYanjiao : Hongwen.Li : Fujimori.Tomotaka  
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Panasonic Storage Battery (Shenyang) Co., Ltd.



**SPECIFICATIONS FOR THE RECHARGEABLE VALVE REGULATED LEAD-ACID BATTERY**  
**Model No. LC-PA1212P1**

**1. Scope**

These specifications pertain to Panasonic Storage Battery (Shenyang) Co.,Ltd.'s (PSBS`S) Rechargeable Valve Regulated Lead-Acid Battery, type LC-PA1212P1, hereafter referred to as the "battery" . This document only describes the performance of the battery. The price, delivery date and other matters should be dealt with in other mutual agreements.

**2. Requirements**

Voltage, capacity, mass and dimensions for this model are shown in Table1.

**Table 1 requirements**

<b>Model</b>	<b>LC-PA1212P1</b>
<b>Nominal Voltage</b>	<b>12V</b>
<b>Rated Capacity at 20 hour-rate</b>	<b>12Ah</b>
<b>Mass(approx.)</b>	<b>3.65Kg</b>
<b>Dimensions</b>	<b>shown in the attached drawing</b>

**3. Structure**

The battery consists mainly of positive plates, negative plates, separators, electrolyte, valves, a container and a cover. The electrolyte is absorbed in both positive/negative plates and separators. Here a container and a cover meet the requirements of UL 1778(UL94V-0).

**4. Characteristics**

The following characteristics are for the batteries, which are manufactured within 6 months, independently.

**4.1 Capacity**

If the battery is discharged at 3A to the end voltage of 10.5V per battery after a full charge, followed by standing of one hour at an ambient temperature of  $25 \pm 2^{\circ}\text{C}$ , the discharge duration time should exceed 3 hours within the first 3 times of the charge and discharge cycles.

**4.2 Shelf life characteristics**

The duration time should be more than 80 minutes when the battery, which has been stored at an ambient temperature of  $40 \pm 2^{\circ}\text{C}$  for 4 months, then stored at an ambient temperature of  $25 \pm 2^{\circ}\text{C}$  for 24 hours and is then discharged at 3A to the end voltage of 10.5V per battery.

**4.3 Trickle life**

If the battery is fully charged with a constant voltage charger with the controlled voltage of  $13.7 \pm 0.1\text{V}$  at an ambient temperature of  $25 \pm 2^{\circ}\text{C}$ , and every 3 months the battery is discharged at a constant current of 3A to 10.5V at an ambient temperature of  $25 \pm 2^{\circ}\text{C}$ , the battery shall have a trickle life of over 3 years with a discharge duration of over 1.5 hours.

**Note:** the expected life of the battery shall decrease by one-half with each rise in temperature of  $10^{\circ}\text{C}$ . In particular, the life of the battery will shorten remarkably at about  $40^{\circ}\text{C}$ . Therefore careful consideration must be taken not to use the battery at high temperature. Also, as mentioned in 4.3 above, the life of battery will vary depending on the charge/discharge conditions. For example, a non-flat current may shorten the life of the battery. Thus if special charge and/or discharge methods not described in this specification will be used, please

confirm the battery characteristics with the actual application equipment before designing the charger.

As the period of use of VRLA battery becomes longer, the run time of the battery gradually becomes shortened. While the battery reaches the end of life with the shortened run time, such phenomena as gradual decrease of electrolyte and corrosion of the positive grid occur inside of the battery. If the battery of this condition continues to be used, it may suffer from thermal runaway (a vicious circle of increasing charge current and rising temperature) and electrolyte leakage as its capacity reaches 0. We strongly recommend taking proper preventive measures such as replacing batteries before any of these phenomena are found. In addition, if the case is made of metal, please be sure that the battery is insulated against its metal case with acid-and heat-resistant insulating material so that the battery can not touch the metal case directly. If the battery continues to be used without proper replacement, or if it is not insulated properly, it may generate fire. In case you can not replace batteries for some serious reason, please take some other preventive actions such as stopping charging. Please see 'Recommended timing for battery replacement for backup applications' for more detailed information.

#### 4.4 Vibration Resistance Characteristics

Vibration resistance characteristics are tested such that a fully charged battery, being in a right side up position, is subjected to vibrations under the conditions given below. The battery is then checked visually for damage such as deformation or leakage of electrolyte, and checked electronically for existence of a short circuit or the terminal voltage being lower than the nominal voltage.

(1) Direction of vibration	∴ Vertical
(2) Peak to peak Amplitude	∴ 4 mm
(3) Vibration Frequency	∴ 16.7Hz
(4) Duration of Vibration	∴ Continuously for 1 hour
(5) Ambient temperature	∴ $25 \pm 2^{\circ}\text{C}$

Note: The battery being tested must be firmly fixed on the vibration board.

### 5. Usage Conditions

#### 5.1 Discharge

Discharge current range	∴ 0.6A to 36.0A
Temperature range	∴ $-15^{\circ}\text{C}$ to $50^{\circ}\text{C}$
Recommended cut-off voltage	∴ Shown in Table 2

Table 2 Recommended cut-off Voltage

Discharge Current	Recommended Cut-off Voltage
Below 0.2CA(2.4A)	10.5V
0.2CA to 0.5CA(2.4A to 6.0A)	10.2V
0.5CA to 1.0CA(6.0A to 12.0A)	9.90V
1.0CA to 2.0CA(12.0A to 24.0A)	9.30V
2.0CA to 3.0CA(24.0A to 36.0A)	8.70V

Do not allow the batteries to discharge below the recommended cut-off voltage.

#### 5.2 Charge

Current limited, constant voltage charge

Initial charge current for trickle use	less than 1.8A
Temperature range	0°C to 40°C
Charge voltage	shown in Table 3

**Table 3 Charge Voltage**

Ambient Temperature	Charge Voltage(a)	Trickle Type
0°C	14.0 to 14.2V	
25°C	13.6 to 13.8V	
40°C	13.3 to 13.5V	

**Notes:**

- (a) Charge voltage refers to the voltage remaining at the end of charge.  
 (b) When the initial charging current is bigger than 1.8A, please consult us.

**5.3 Ambient Temperature Range of Storage**

The ambient temperature range of storage shall be -15 to 40°C. But for the short-time (about 0.5month) storage, temperature range shall be -40 to 60°C. Also, for the long-time (about 12 months) storage, temperature range is desirably shall be -15 to 25°C.

**6. Limited Warranty**

(In condition of other detailed contracts on this made with PSBS, please base on that.)

The following limitations apply to PSBS`S warranty:

- (1) The battery is covered by warranty for a period of 1 year from the date of delivery from PSBS if defective materials or production mistakes originating from PSBS are the cause of any battery problem.
  - (2) PSBS will repair or replace batteries which are not conforming to the specification while PSBS is not responsible for the charges of recycle of the nonconforming batteries and installation of new batteries.
  - (3) The warranty does not apply if the problem has been caused by one of the following:
    - (a) The battery has been used for purposes not specified by PSBS; or
    - (b) The battery has been modified in any way.
  - (4) If the cause of the problem is not clear, PSBS reserves the right to investigate the actual application in which the battery was subjected.
- Please keep the next “Precautions in handling the Rechargeable Valve Regulated Lead-Acid Batteries”, to get full performances and operate them safety.
  - Making design especially recycle symbol will be changed by individual country recycle circumstances such as law and/or voluntary. If you intend to export this battery another country, please consult Panasonic sales person.

Commercial Tolerance	Sym. Date	Revision	Signed	Checked

**Panasonic**

Valve Regulated Lead-Acid Battery

Model No. LC-PA1212P1 (12V, 12Ah/20HR)

**FLAME RETARDANT**

Constant Voltage Charge

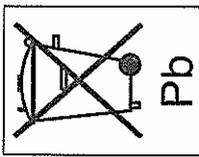
Voltage regulation

Standby use: 13.6V~13.8V (25°C)

**NONSPILLABLE**

IN THE U.S.A. CALL 1-800-SAV-LEAD

**BATTERY MUST BE RECYCLED.**



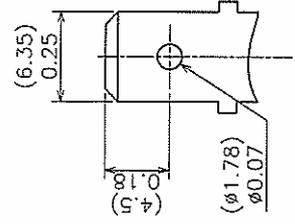
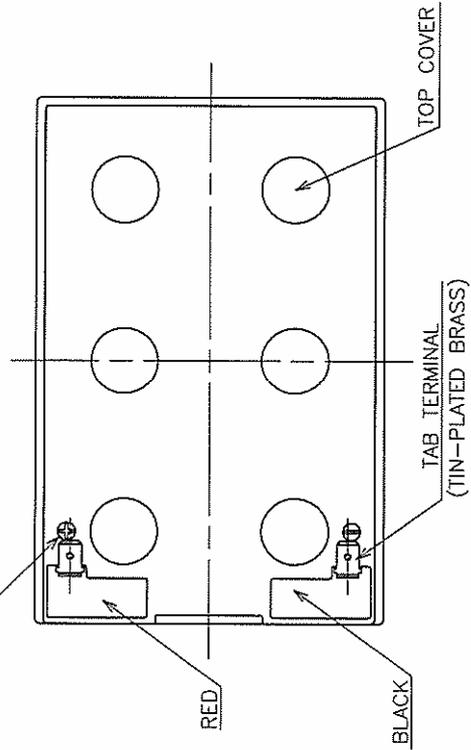
**CAUTION**

- Do not charge in a gas tight container.
- Do not short the battery terminals.
- Do not incinerate.
- Flush with water at once if contact is made with electrolyte (Acid).

Panasonic Corporation Made in China

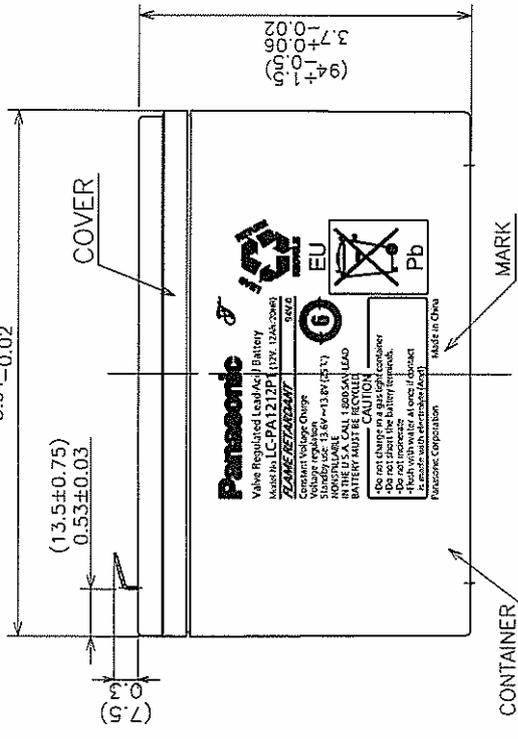
MARK DETAIL

POLARITY SYMBOL

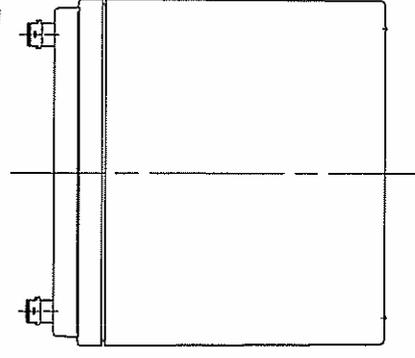
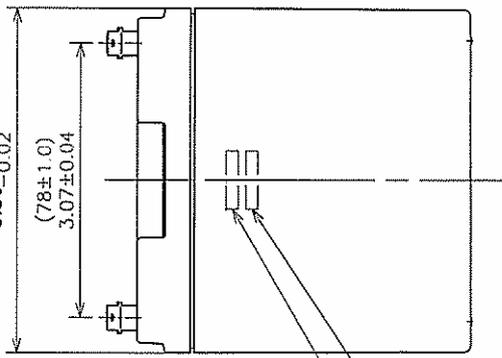


TAB TERMINAL(2/1)  
(EQUIVALENT AMP250)

(151<sup>+1.5</sup><sub>-0.5</sub>)  
5.94<sup>+0.06</sup><sub>-0.02</sub>



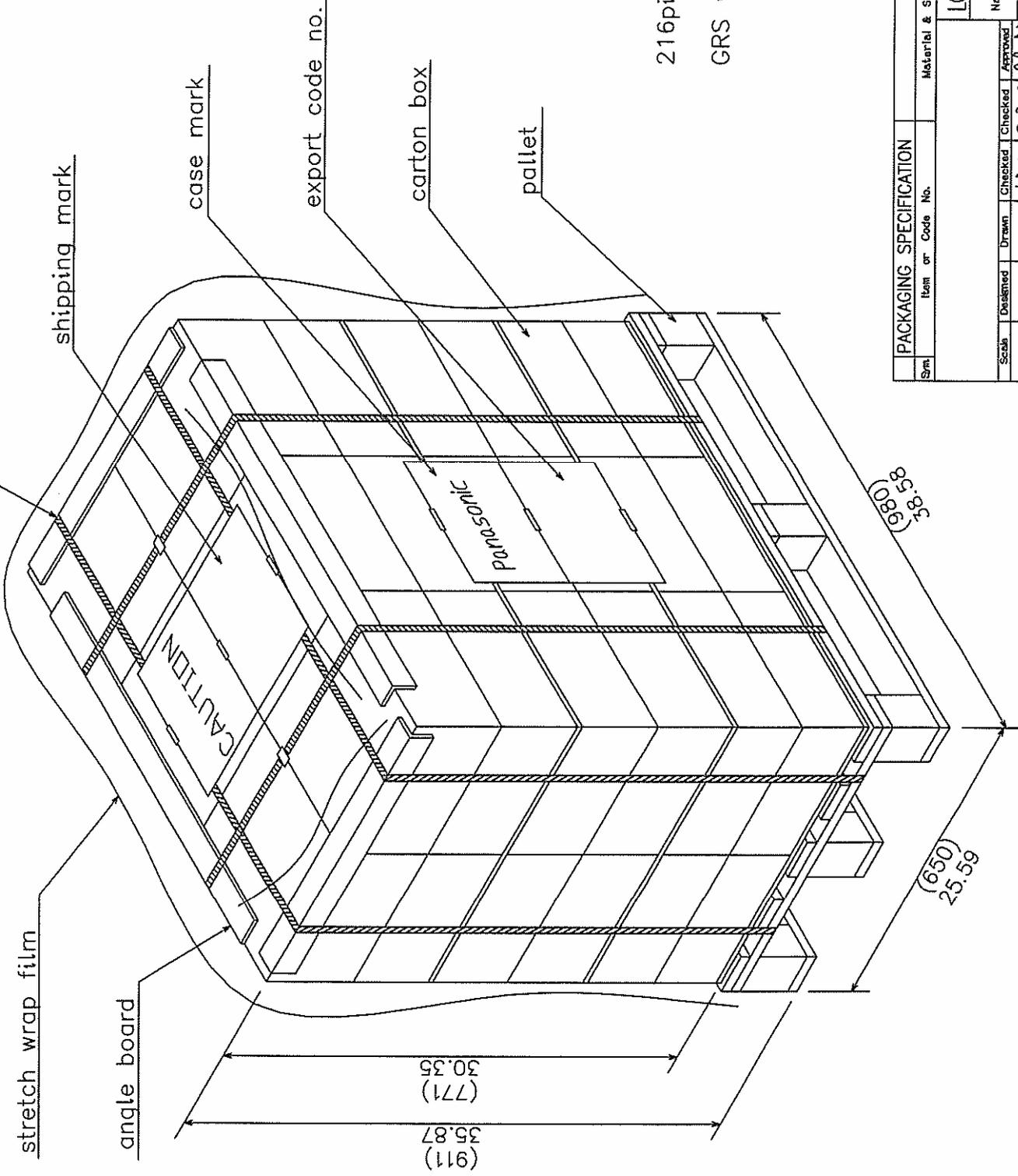
(98<sup>+1.5</sup><sub>-0.5</sub>)  
3.86<sup>+0.06</sup><sub>-0.02</sub>



Sym.	MSPA1212P1	Material & Size	ABS	Process	LC-PA1212P1	Remark
Item or Code No.						
Scale	~	Drawn	Jingli	Checked	C. Bai	Approved
Designed	Jingli	Checked		Approved		
Name	OUTWARD DRAWING					
No.	MSPA1212P1					



Commercial Tolerance	Sym.	Date	Revision	Signed	Checked



216pieces[36carton boxes]  
 (6pcs/carton box)  
 GRS weight:877kg

PACKAGING SPECIFICATION		Material & Size	qt.	Process	Remark
Sim	Item or Code No.				
					LC-RA1212,LC-CA1212,LC-PA1212(for PIE)
Name		PACKAGING SPECIFICATION			
No		PPRA1212C-E			
Scale	Designed	Drawn	Checked	Checked	Approved
~	Jing	Jing			C. Bai
	SEP-25-'05	SEP-14-'05	SEP-14-'05	SEP-14-'05	SEP-14-'05