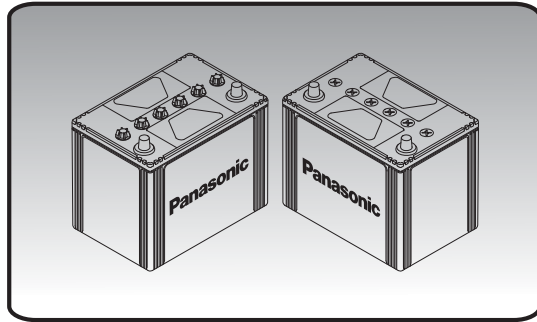


Panasonic

คู่มือการใช้งาน แบตเตอรี่รถยนต์พานาโซนิค

ผู้จำหน่ายโปรดมอบและแนะนำให้ลูกค้าของท่าน
อ่านคู่มือก่อนการใช้งานให้ละเอียดและเก็บรักษาไว้



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English Automotive Starting Battery Instruction Manual



Always follow the instructions contained in this manual and those given in the Owner's Manual for your vehicle.
• Misusing the battery could cause the battery to get hot, ignite, explode, or leak electrolyte, leading to serious injury such as burns or loss of eyesight.



Shield eyes and face. Use protective eyewear, rubber gloves and so on whenever you handle the battery.
• If not followed, it could cause a burn or loss of eyesight due to inflammation, explosion or leak of electrolyte.



Keep the battery out of reach of children.
• If not followed, it could cause a burn or loss of eyesight due to inflammation, explosion or leak of electrolyte.



Beware of battery explosion.
• A highly explosive mixture of hydrogen and oxygen is produced when batteries are charged.



Keep all sparks, flames, and cigarettes away from battery.
Avoid short circuits between positive (+) and negative (-) terminals with conductive materials such as metal tooling.
• Short-circuit and loose connection could cause sparks.
Before handling the battery, be sure to discharge static electricity by touching a metallic object (your vehicle).
Never use a dry cloth. Clean the battery with a damp cloth.
• A dry cloth may cause static electricity, which could result in an explosion.

1



Electrolyte contains sulfuric acid. Avoid contact with skin, eyes or clothing.
• If not followed, it could lead to serious burns, loss of eyesight or damage to clothing or property.



Rinse off acid splashed in the eyes immediately for several minutes with clear water! Then consult a doctor immediately.
In case of ingestion or swallowing of electrolyte, rinse mouth sufficiently with water. Then drink a plenty of water or milk. Then consult a doctor immediately.
In case of contact of electrolyte with skin or clothing, immediately flush skin/clothing with plenty of running water.



Never charge and/or use the battery when electrolyte level is lower than the lower level line.
• If not followed, it could result in a shortened service life or cause the battery to explode.
Avoid direct connection of an electric device to the battery.
• If not followed, it could burn the cable, leading to a fire of your vehicle.
Do not block the battery's vent hole.
• If not followed, it could lead to a burst.
Avoid attempting to modify or disassemble the battery.
• If not followed, it could cause inflammation, explosion or leak of electrolyte.
Do not exceed upper level line purified water (replenishing battery fluid) is added.
• If not followed, it could cause a fire or damage to your vehicle due to leak of electrolyte.
Do not tip the battery.
• If not followed, it could cause leak of electrolyte.
Immediately stop use of the battery if, it emits an unusual smell, electrolyte, changes shape, or appears abnormal in any other way.
• If not followed, it could cause a fire, inflammation or explosion.

2

Before Use

(1) Application

This battery is specifically designed for start up vehicle engines. It should not be used for other applications such as agricultural machinery, construction equipment, marine vessels, electric vehicles, and welding machines, etc.
Do not allow the battery to get wet with water or seawater. Do not use the battery under airtight condition.

(2) Storage

Store the battery in a well-ventilated, cool and dry place.
Keep away from dust, wind, rain, or direct sunlight.
Keep the battery out of reach of children.
Store the battery away from fires or heat sources. Avoid short circuits.
Discharged batteries may freeze up, therefore store in an area free from frost.

(3) Transportation

Avoid hold the battery upside down, overturn, tilt, strong impacts or shocks such as drop.
The battery is a heavy object. Handle with care and do not drop the battery. Otherwise, you may get a crick in the back or get injured, or may cause damage to property.
Do not shake the battery.

(4) Battery for Replacement

Use a battery having the same terminal positions as those of the original battery installed in your vehicle. It should have the same size as the original battery installed in your vehicle.
If two batteries are used in a vehicle, replace them at once with the ones of same type and same history.
Be sure to check that the battery for replacement has no leak of electrolyte deformation, or any other defects or problems.

Installation in the Vehicle and Removal from the Vehicle

(1) Handling

Before handling the battery, be sure to discharge static electricity by touching a metallic object (your vehicle).
Use protective eyewear and rubber gloves whenever you handle the battery.

3

(2) Removing the Battery

Follow the steps below to remove the battery:

- Stop the engine and remove the ignition key.
 - Turn all light switches off.
- Disconnect the negative terminal of the cable.
- Disconnect the positive terminal of the cable.
- Remove the battery clamps.

(If the disconnect cable terminals are dirty, please clean them with sandpaper or a wire brush.)

If your vehicle is equipped with electronic devices with memory functions, such as a power seat system, the data stored in the memory may be cleared when you remove the battery. To prevent such a situation, be sure to read the Owner's Manual for your vehicle before you get to work on battery replacement.

(3) Installing a Replacement Battery

Follow the steps below to install a replacement battery:

- Place a battery on the mount. Securely fix the battery with clamps.
 - If the battery has a handle, bands, etc., remove them before installation.
 - If a protective cover is equipped, put it back as it was.
- Connect the positive terminal of the cable to the positive terminal of the battery. Tighten the nut securely to fix the terminals.
- Connect the negative terminal of the cable to the negative terminal of the battery. Tighten the nut securely to fix the terminals.
- Put the cover for positive terminal of the cable back in its place.
 - Some vehicle models are not provided with this terminal cover. (Application of anticorrosive grease is recommended to protect metallic portions of the cable terminals from rusting.)
 - Do not leave the tools you used for replacement of the battery in the engine room.

(4) Disposal of the Removed Battery

The removed battery still retains some residual electric energy. Be careful to dispose it.
Never dispose of old batteries in household waste!
Dispose of old batteries at an authorized collection point.

4

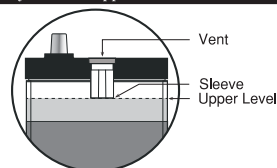
Check and Maintenance

(1) Check of Electrolyte Level and Water Addition

- Check of electrolyte level

- Checked electrolyte level at least every **6 month and/or 10,000 kms.** whichever come first, and top up distilled water if required for safety purpose and long life usage.
- The proper electrolyte level shown as picture below, and/or observed by indicator shown blue color. (In cases upper and lower line indicated, the proper level must be stand on between both line)

Battery without Upper and Lower Level line



- To ensure the electrolyte level constantly maintained over the lower level line, Water addition is recommended whenever the electrolyte level is lower than the midway between the upper and lower level lines.
- If the electrolyte level is maintained below the lower level line while using the battery, it may accelerate deterioration of internal metallic portion and reduction of electrolyte, the situation which could lead to explosion. Prompt replacement of the battery is recommended.
- Once the plates are exposed due to the reduced electrolyte, water addition cannot compensate, leading to a risk of explosion. Immediately replace the battery.
- A piece of white paper may be seen at the inside bottom of the battery. This piece of paper does not affect the battery quality in any way.

- Water addition
- Have purified water (replenishing battery fluid) ready at hand.
 - You can buy purified water at car battery stores.
 - Loosen and remove the battery's vent plug.
 - Add purified water to the upper level line.
 - Do not add water (replenishing battery fluid) over the upper level line.
 - Do not use any water other than that purified, specific for battery fluid.

5

- Turn and take off all vent cap, lighting required by torch light if not clearly see while look at inside the vent hole.
- Wipe off the fluid adhered to the battery surface using a damp cloth.

(2) Cleaning the Battery

Clean the battery with a damp cloth.

- Do not use a dry cloth.
- Never use benzine, thinner, gasoline or other organic solvents or detergents for cleaning.

(3) Checking the Fitting of Clamps and Cable Terminals

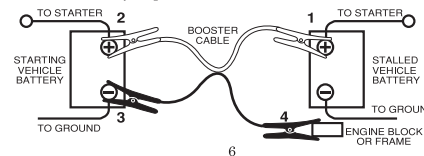
- Check that there are no loose battery clamps and cable terminals.
- Retighten loose nuts, if any, to securely fix the clamps and terminals.

When the Battery Is Dead

(1) Jump Starting by Booster (Jumper) Cables

Call a rescue car having the same voltage (12 V or 24 V) and capacity as those for the vehicle in battery trouble. Booster (jumper) cables are used for jump starting.

- For information on the specific case of your vehicle, see the Owner's Manual for your vehicle.
- Turn off the ignition switches of both vehicles.
 - Check the electrolyte level of your vehicle (in trouble). Add water if the electrolyte level is below the lower level line. (See the section describing "check of Electrolyte Level and Water Addition" of this manual.)
 - Connect booster (jumper) cables in the order of (1)-(2)-(3)-(4) as illustrated in the chart below.
 - Make sure to connect terminal ④ with the engine block (its hook, etc.) or frame, which is at a distance from the battery.
 - Beware that the booster (jumper) cables are not caught into the cooling fan belt.
 - Do not use the booster (jumper) cables with tensile load.
 - Start up the rescue car engine and slightly increase the engine speed.
 - Start up the engine of your vehicle (vehicle in trouble).
 - Disconnect the booster (jumper) cables in the order reverse to when connected.



6

(2) Recharge with Battery Charger

First remove the battery from your vehicle (vehicle in trouble) if you use a battery charger for recharge. Then remove all the vent plugs to diffuse gases to be emitted from the battery during charging. Charge the battery properly in a well-ventilated area, following the steps given in the charger manual.

Recommended values of charge current according to the battery size are as given in the table below.
Apply constant voltage of 14.4 V while charging the battery.
If the electrolyte temperature exceeds 55°C (131°F), suspend charging.

Table Battery Charging

Battery size	Charge current (A)	Remark
B19,B20	3.5	JIS
B24	4.5	
D23	6.0	
Q-90	6.5	
D26	6.5	
D31	8.0	
E41	10.0	
F51	12.0	
G51	15.0	
H52	20.0	
4DLT	15.0	DIN / LN
H21,L21 / LN1,LBN1	4.5	
H25,L25 / LN2,LBN2	6.0	
H28,L28 / LN3,LBN3	6.5	
H32 / LN4	8.0	
DIN88(588,600) / LN5	10.0	

7