



Please see catalog and instruction manual before you use

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1. Before using our product

Warning

- ◆ When the product is in operation, inside there are components which have high voltage and high temperature. They may cause electrical shock or burn if you touch the internal components.
- ◆ Do not modify, disassemble or remove the enclosure of the product. This may cause electrical shock, burn or fire hazard.
- ◆ When the product is operating, keep your hands and face away from it. This may cause injury by accident.
- ◆ Install the product firmly in accord with the instruction manual. Inadequate installation may cause an electric shock, burn injury, or a fire hazard.
- ◆ The products should be installed by fully trained and experienced workers to avoid a possibility of electric shock or a fire hazard.
- ◆ Do not cover the product with things like cloth and paper. Do not put any flammable items around the products. It may cause a malfunction, an electric shock, or fire.

Attention

- ◆ It is necessary to read the instruction manual and catalog. Please confirm the content of the catalog and instruction manual before you use our products.
- ◆ Our products are designed and manufactured for the usage within ordinary industrial equipment, not for the usage requiring high safety (Such a high safety usage needs extremely high reliability. If neither reliability nor safety is secured, it will cause serious hazards on body or life directly). Although Cosel makes every effort to improve quality and reliability, the products may accidentally malfunction or fail. Therefore for your safety, consider to set up a safety measure such as the fail-safe function (a system that a protection circuit and protection device are built in or that a redundancy circuit is inserted in order to prevent the instable operation by the sole failure of the products) when using the products for the high safety use. If customers use the products for the high safety usage above mentioned, Cosel will not be responsible for any compensation requests claimed by the customers and/or third parties.
- ◆ Use the products within the specified input voltage, output current, output power, range of ambient temperature and ambient humidity. If the products are used beyond the specifications, it may damage the products or cause smoke or fire.
- ◆ Do not use the products in environments with direct sunlight, some conductive substances, dust, water, condensation, strong electromagnetic field, or corrosive gas (such as hydrogen sulfide and sulfur dioxide). It may cause a malfunction or failure of the products, smoke or fire at the worst case.
- ◆ If an internal fuse gets blown out, do not use the products by replacing the fuse. There may be some troubles in the products. Be sure to request us to repair the products.
- ◆ If the products do not have protection circuits such as protection elements and/or fuses, insert fuses in between our product and your equipment in order to prevent smoking and fire by abnormal operation of the products. An appropriate use of protection circuits is recommended even for the products with protection circuits since the internal protection circuit may not operate by some usage conditions. Also, be careful that internal fuses may not work depending on conditions of input line and input wiring.
- ◆ Use the only fuses designated or recommended by Cosel for external fuses.
- ◆ Make sure to take a protective measure against the surge voltage brought by lightning and so on. An

abnormal voltage may damage the products.

- ◆ Connect the frame ground terminal of the products to the safety ground terminal of your equipment for safety and reducing noise. If the ground connection is not made properly, it may cause an electric shock hazard.
- ◆ External abnormal voltage should not be applied to the output of the products. Especially, when reversed voltage or overvoltage beyond the actual output voltage is applied to the outputs, it may cause a failure, an electric shock, smoke, or fire.
- ◆ Components may remain high voltage and high temperature even in products without a cover. Do not touch them. Touching those components may cause an electric shock hazard or burn injury.
- ◆ Do not touch any components inside the products since they may remain high voltage and high temperature even though the products are not in operation. It can cause an electric shock hazard or burn injury.
- ◆ Do not modify, disassemble, or open the products. It may cause an electric shock hazard, burn injury, or a fire hazard. Cosel is not responsible for any damage caused by modifications, disassembles, or reworks.
- ◆ Stop using the products and cut off the power when unusual operations such as abnormal output, strange odor, peculiar sound, or smoke are found. It may cause an electric shock or a fire. Contact us when these abnormal incidents occur. Do not repair the products as it is very dangerous.
- ◆ Do not use the products when they are dropped or given an excessive shock. Dropping or giving shocks to the products may cause malfunction.
- ◆ When you export the product, please comply with all appropriate export-related laws, and procedures.

※ The content of the catalog may be changed without advanced notice.

If necessary, please request product specification from our representatives before ordering.



Disclaimer

- ◆ Regardless of whether or not the products are within the warranty period, Cosel will not be responsible for any damage that is not attributed to Cosel and for opportunity losses and lost earnings on customers caused by the products' failures. And regardless of whether or not Cosel could predict, we will not take the responsibilities for any damage, secondary damage, compensations for accidents, damage on any products other than Cosel products and other affairs caused by extraordinary conditions.

2. Environmentally Friendly Products and its Symbol

We have developed a new internal evaluation system on environmental burdens in order to provide our customers with information on our products and our efforts to promote the development of environmentally friendly products since 2010.

We are looking at the following 3 items in evaluating our products to reduce their environmental burdens.

- (1) Environmental burdens generated when our products are in operation at customers' site.
- (2) Environmental burdens generated when our products are manufactured at our factories.
- (3) Environmental burdens generated when materials and components we purchase are manufactured.

Based on the above 3 items, we set our own criteria to certify and register products which satisfy our criteria as “Eco Products.” These Eco Products are highly efficient in reducing environmental burdens. To promote Eco Products, we developed the following symbol which represent Eco Products.

We will proactively expand our Eco Products to create an environmentally friendly low-carbon recycling-oriented society and to continue to grow with our customers.



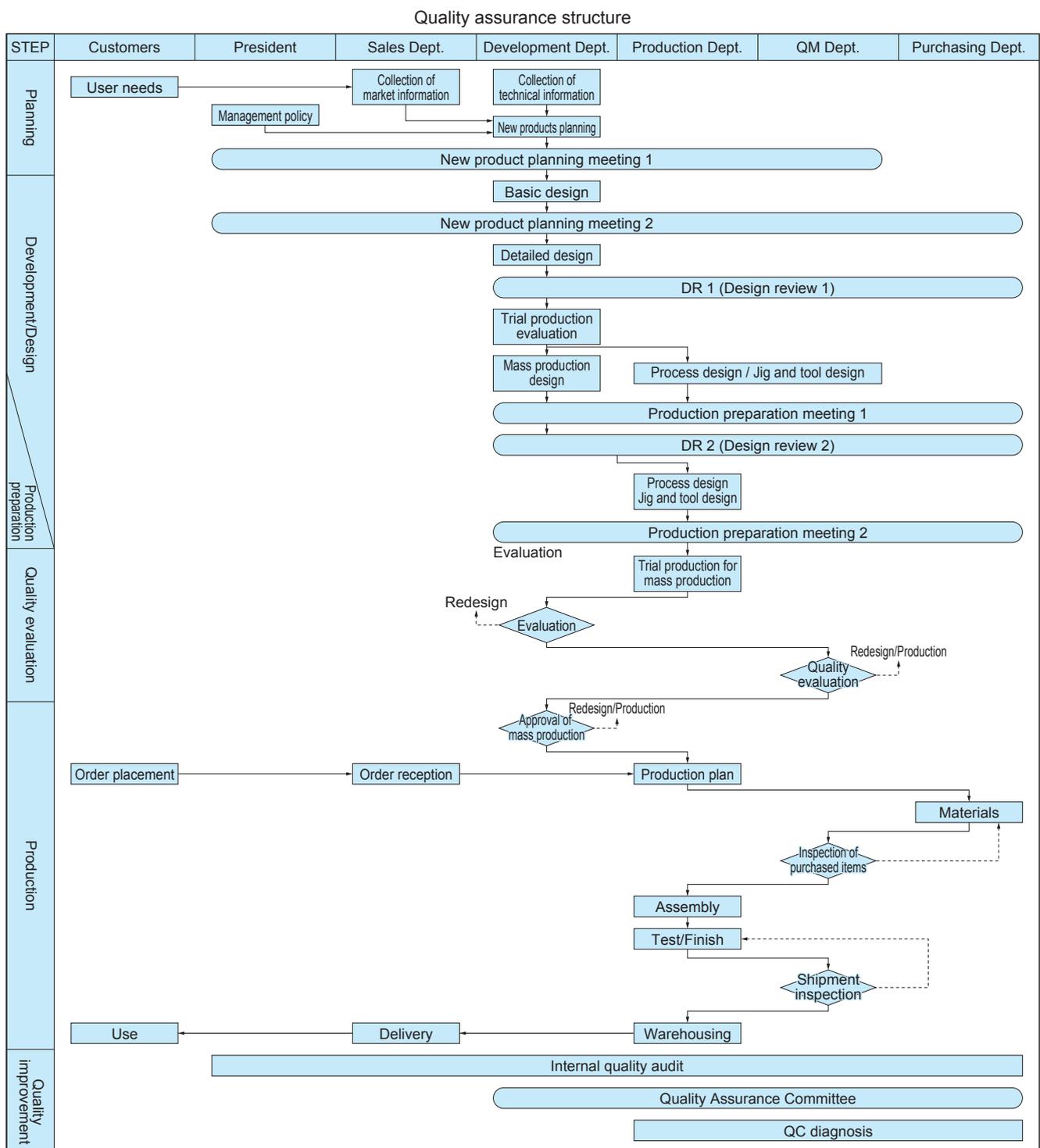
3. Quality assurance system

In order to ensure the implementation and maintenance of various processes, the quality management system has been established with the manager of the quality management department as the quality management supervisor.

We have established the quality assurance system by defining basic requirements in the processes from product planning, development and quality evaluation, to mass production, shipment and service, defining these requirements in the quality manual and developing and documenting the rules in each step in order to provide products that meet customer needs in a more timely manner.

Cosel's quality assurance structure is shown below.

We are striving to solve quality issues by holding regular meetings. The quality management supervisor and managers of the development department, production department, and quality management department attend the meeting and make efforts to reduce quality-related problems.



4. Repair and service

When a failure in product is found, contact our distributors or our sales subsidiaries.

1. Free Repair

Repair is free of charge when the following cases apply:

- (1) If the product returned is still within warranty period and damages are due to component failure.
- (2) Damages are due to Cosel's manufacturing and design errors.

2. Charged Repair

Repair is charged when the following cases apply:

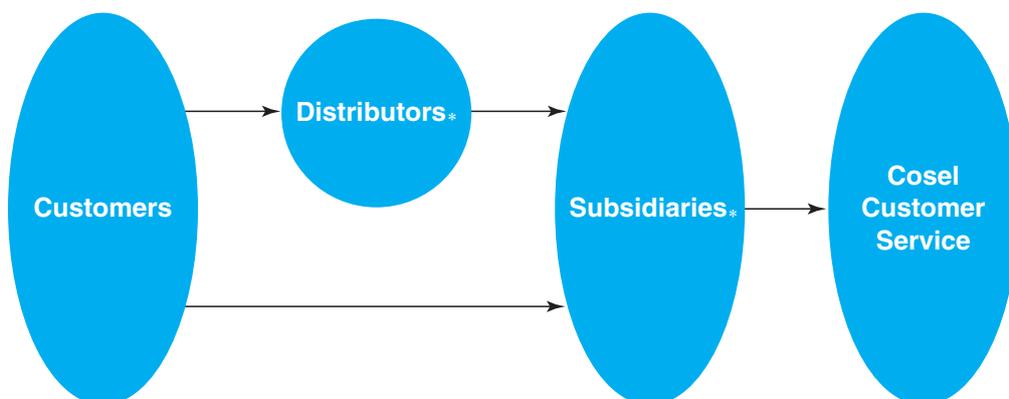
- (1) Products' warranty period has expired.
- (2) Electrical or physical damages are caused by customer.
- (3) The product returned is over 6 months from first operation but no problem is found after analysis.
- (4) Damages are due to use outside of our published specifications.
- (5) Damages are caused by Acts of God such as fire, flood, earthquake, etc.
- (6) Time-deteriorating parts such as electrolytic capacitors, cooling fans, etc. are replaced.

3. Warranty After Repair

- (1) As for the products whose regular warranty period has expired, the repaired products will have a 3-month warranty.

4. Repair and Service Network

When a failure in product is found, please return the products in the following way:



*Please refer to Sales Network in this catalog.

5. If you think a power supply is in failure

When power supplies do not function properly, please check the following troubleshooting table before returning a unit. If the power supply still has a problem, please contact the designated distributors or our customer service desk for information (a Return Merchandise Authorization (RMA) number in U.S.) about how to return the power supply to us.

(1) In case of No Output - what to check

| Input Side | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| Check Points | Solutions | Applicable Products |
| <p>Wrong AC voltage is applied. In case of dual input voltage power supply (AC85-132V and AC170-264V). Check to see if the power supply needs jumper selector for AC input and use it properly.</p> | Make sure to use the jumper for the following models in case of AC85-132V input. | PMC50E - PMC100E |
| <p>AC voltage is not applied to power supply correctly. - 1 Wrong input connection? For example, AC(L) or (N) is connected to FG terminal.</p> | Check and correct the input connection if necessary. | All Series |
| <p>AC voltage is not applied to power supply correctly. - 2 Is external fuse blown?</p> | 1)If the built-in fuse is blown, return the power supply to us for repair. 2)If the built-in fuse has no problem, change the external fuse to one that can withstand the inrush current of the power supply and has the same voltage/current rating as the built-in fuse. | |
| Output Side | | |
| Check Points | Solutions | Applicable Products |
| <p>1)Wrong connection. 2)Loosened terminal screws. - 1 Is the wiring to the load correct? (For example, +V and -V are connected reversely).</p> | Correct the connection. | All Series |
| <p>1)Wrong connection. 2)Loosened terminal screws. - 2 Check to see if the wiring to the load shorted together accidentally.</p> | Correct the problem by checking the wiring isolation. | |
| <p>1)Wrong connection. 2)Loosened terminal screws. - 3 Terminal screws have loosened?</p> | Tighten the terminal screws. | |
| <p>Overvoltage protection has been operated. - 1 Is output voltage adjuster (trim pot) excessively turned clockwise?</p> | Switch off the power supply, turn output voltage adjuster to its maximum counterclockwise, and wait for 5 minutes before switching on the power supply again. | LCA, LDC, LDA, LEA |
| <p>Overvoltage protection has been operated. - 2 Sensing terminal screws have loosened?</p> | Tighten the screws. | R100U, R150U |
| <p>Overvoltage protection has been operated. - 3 Is sensing wiring correct?</p> | Connect the sensing wires according to the instruction manual. | PBA300F - PBA1500F, R100U, R150U |
| <p>Overvoltage protection has been operated. - 4 Are sensing wires disconnected?</p> | Re-connected. | |
| <p>Overcurrent protection has been operated. Are there any chances that the drawing current has become greater than the rated output current?</p> | Check the rated output current of the power supply used and measure the current actually drawn from power supply. | All Series |
| <p>Remote ON/OFF is off. In case of DC-DC power supply: Is RC terminal connected to -V input?</p> | Connect (short circuit) RC terminal to -V input. | CES, CQS, CHS, CQHS, DBS, CDS, CBS, DHS, SUS, SUCS, SUW, SUCW, ZUS, ZUW, MG, DAS |
| <p>Power supplies used in series operation. Are the power supplies used allowed series operation?</p> | Change the power supplies to those allowed series operation. | Refer to instruction manuals. |

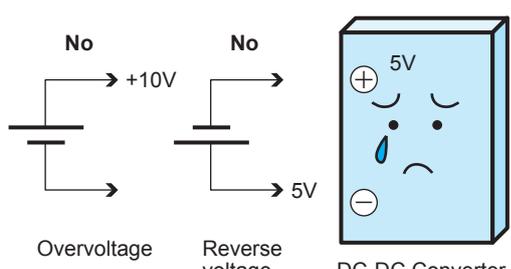
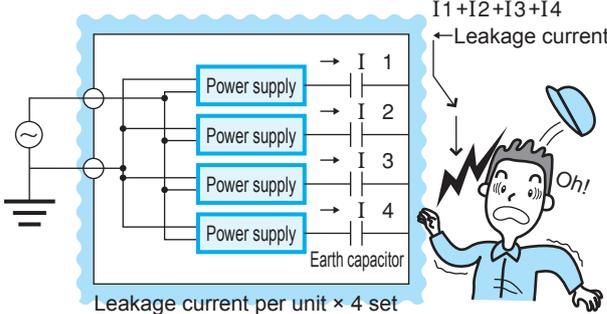
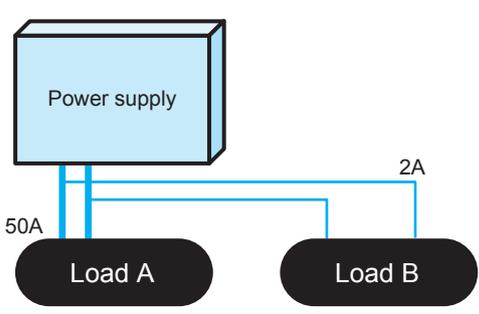
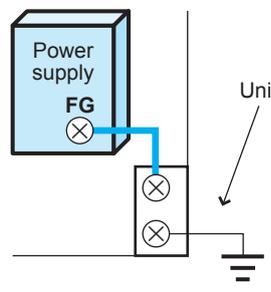
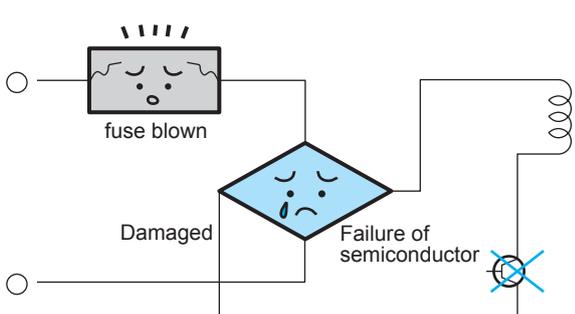
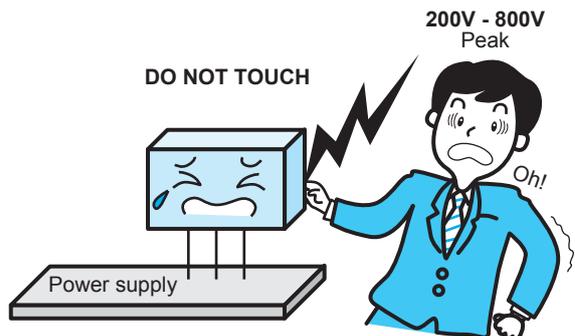
| Others | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| Check Points | Solutions | Applicable Products |
| Thermal protection has been operated. - 1 Is the ambient temperature higher than the specified maximum operating temperature? | Switch off the power supply and cool it down under at room temperature before switching on again. | CES, CQS, CHS, CQHS, DBS, DHS, CDS, CBS, DPF, DPG, PBA300F - PBA1500F, DPA, DAS, LDA300, KHNA120F - KHNA480F, KHEA120F - KHEA480F |
| Thermal protection has been operated. - 2 Are there any obstacles around the power supply that are physically stopping the built-in cooling fan or the air flow? | Remove the obstacles, switch off the power supply, and cool it down under at room temperature before switching on again. | PBA300F - PBA1500F, PLA300F, 600F |
| There is a condensing on power supply. - 1 Is there water splash on power supply? | Keep power supply away from water splash!! | All Series |
| There is a condensing on power supply. - 2 Are there any sudden changes in ambient temperature? | Use power supply where ambient temperature is stable. | |

(2) In case of Abnormal Output Voltage (Too High, Too Low, Unstable) - what to check

| When output voltage is too high. | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| Check Points | Solutions | Applicable Products |
| Output voltage is set too high. - 1 Is output voltage adjuster (trim pot) turned excessively clockwise? | Turn output voltage adjuster counterclockwise. | All Series |
| Output voltage is set too high. - 2 Is there any external voltage from another source applied to the same load? | Change the load circuit so that there will be no external voltage applied through the load to the power supply. | |
| Output voltage is set too high. - 3 Have the sensing terminal screw loosened? | Tighten the screws. | R100U, R150U, LDA300 |
| When output voltage is too low. | | |
| Check Points | Solutions | Applicable Products |
| Input voltage is too low. - 1 Is input voltage lower than the minimum specified? | Measure the input voltage. | All Series |
| Input voltage is too low. - 2 Is wave form of input voltage distorted? | If distorted, use AVR for input. | |
| Output voltage is set too low. Is output voltage adjuster (trim pot) turned excessively counterclockwise? | Turn output voltage adjuster clockwise. | |
| There is a voltage drop caused by output wires. - 1 Is voltage drop caused by long output wires to the load? | Make the output wires shorter. | |
| There is a voltage drop caused by output wires. - 2 Is voltage drop caused by thin (high-AWG) output wires to the load? | Use thicker (low-AWG) wires. | |
| There is a voltage drop caused by output wires. - 3 Is there any bad connection? | Check the connection. | |
| There is a voltage drop caused by output wires. - 4 Have the terminal screws loosened? | Tighten the screws. | |
| Overcurrent protection has been operated. Are there any chances that the drawing current has become greater than the rated output current? | Check the rated output current of the power supply used and measure the current actually drawn from power supply. | |
| When output voltage is unstable. | | |
| Check Points | Solutions | Applicable Products |
| There is oscillation caused by remote sensing. - 1 Are the sensing wires too long? | Use electrolytic capacitor between output terminal ($\pm V$, $\pm M$) and sensing terminal ($\pm S$). | PBA, R100U, R150U, LDA300 |
| There is oscillation caused by remote sensing. - 2 Are the sensing wires twisted? | Twist the wires. | |
| Minimum output current required is not drawn. In case of some Multiple output type power supply, a minimum drawing current is required on +5V output. Check to see if there is minimum load requirement for the power supply. | (1) Draw a minimum current required on +5V. (2) Use a power supply whose +5V output has no minimum drawing current requirement. | 1) PMC 2) RMC, LDC |

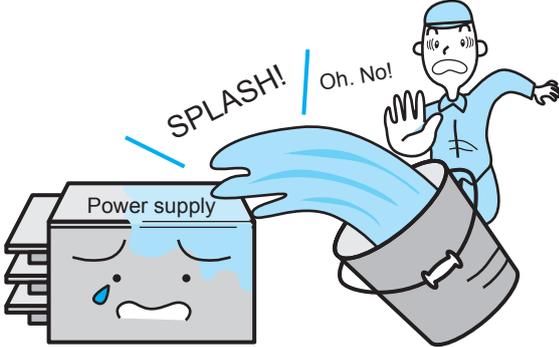
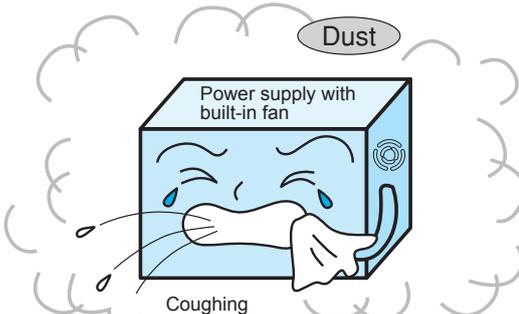
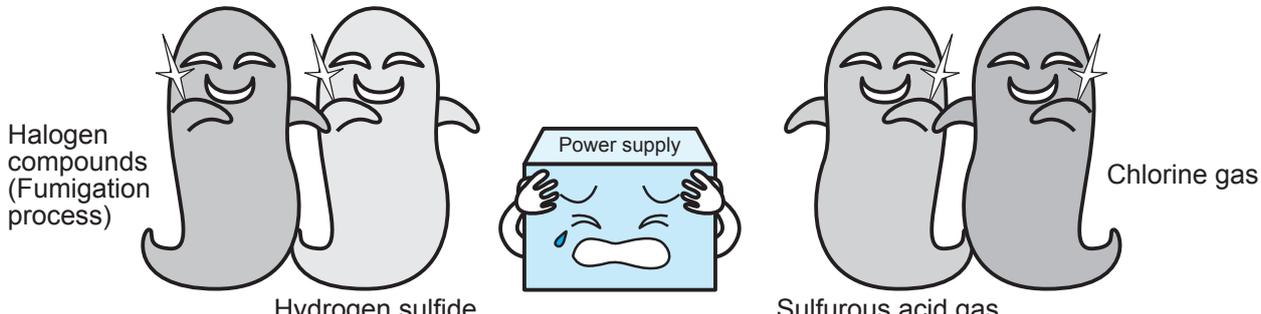
6. Caution For Safety And Products

Use the products within the specified input voltage, output current, output power, range of ambient temperature and ambient humidity. If the products are used beyond the specifications, it may damage the products or cause smoke or fire.

| | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>(1) Rated input voltage</p> <p>The range of input voltage is specified by products. If input voltage beyond the specification or reversed voltage to DC-DC converters is applied, it may cause smoke or a fire hazard.</p>  | <p>(2) Leakage current</p> <p>Leakage current flows between power supply wires and earth ground within the rated value. In case of the multiple operation, however, the total leakage current will be the sum of the leakage current flows from each power supply.</p>  |
| <p>(3) Wires</p> <p>Rated voltage and current varies depending on a wire. It is necessary to use thick wires, which cover the rated output current of a power supply.</p>  | <p>(4) Earth</p> <p>The earth terminal of power supply should be connected to the equipment where power supply is placed as thicker and shorter to protect electric shock or noise interference.</p>  |
| <p>(5) Fuse</p> <p>When the internal fuse is blown, a power supply is most likely damaged. If this happens, please ship the unit back to us for repair.</p>  | <p>(6) High voltage</p> <p>Some parts are generating high voltage inside the power supply. Please do not touch by hand.</p>  |

Generally, switch mode power supplies are designed to operate in controlled environments (e.g. inside the office). The products should have a special care because some operating conditions may cause a malfunction or failure of the products, smoke or fire at the worst case.

1. Environment where some measures need to be taken

| (1) Water/Humidity | (2) Dust |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>If the products are operated in environments where water drops into the products or condensation occurs, it may cause a malfunction or failure of the products, smoke or fire at the worst case. In this case, please consider to take a water proof measure.</p>  | <p>When the products are operated in a dusty place, components failures such as a fan may occur and dust with moisture may cause insulation breakdown. Be cautious that these may cause a malfunction or failure of the products, smoke or fire at the worst case. In this case, please consider to take a dust proof measure.</p>  |
| (3) Gas | |
| <p>When the products are operated in environments where a fumigation process (measures against insects when exporting) by halogen compounds such as methyl bromide is implemented or corrosive gas occurs, it may damage components and cause a malfunction or failure of the products, smoke or fire at the worst case.</p>  | |

2. Measures

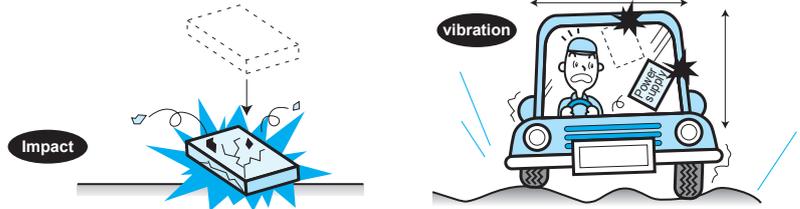
To take measures below is suggested when units are used in the environment above.

- 1. Using units in the environment where units get watered or humidity is very high.**
 - (1) Semi-standard C(coating)
 - (2) Stronger type than semi-standard C(Minor changed unit)
- 2. Using units in the environment where something conductive is dropped into a unit.**
 - (1) Install air filter to an exhaust part.
 - (2) Semi-standard C(coating)
 - (3) Stronger type than semi-standard C(Minor changed unit)
 1. Attaching tube and silicon rubber to high voltage part.
 2. Attaching isolation cover to high voltage part.
- 3. Using units in the environment where some gas get into units.**
 - (1) Some corrosive gas cause units to be failed. Please contact us.

The above may not be perfect measures. Please contact us about details.

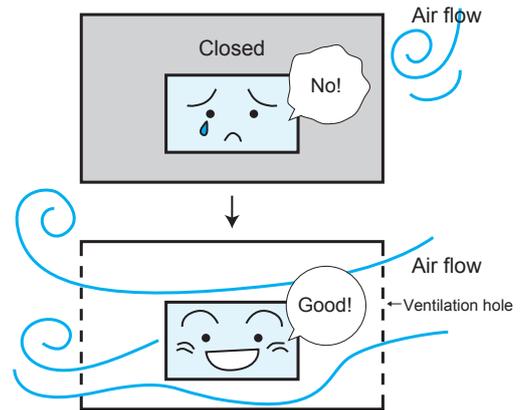
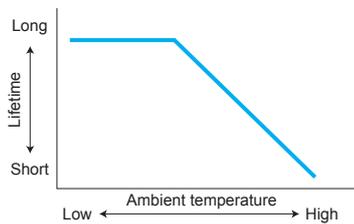
(4) Vibration/Impact

Please be careful when installing products in vibrating or high-impact locations. Components could be damaged and cause malfunctions, or even worse, cause smoke or fire.



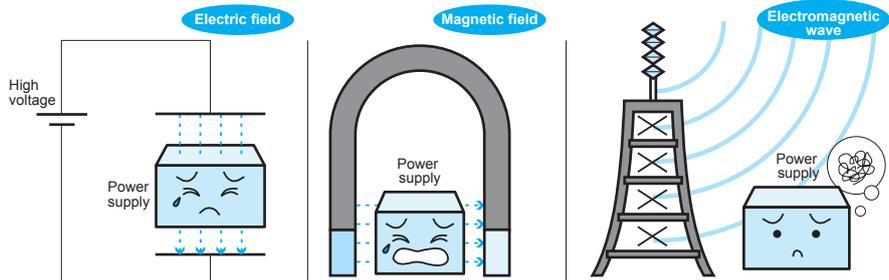
(5) Temperature

Switching power supplies have a finite life cycle, which is significantly affected by ambient temperature. Radical temperature changes can cause condensation, which could lead to product malfunction or failure, or possibly smoke or fire.



(6) Electromagnetic field

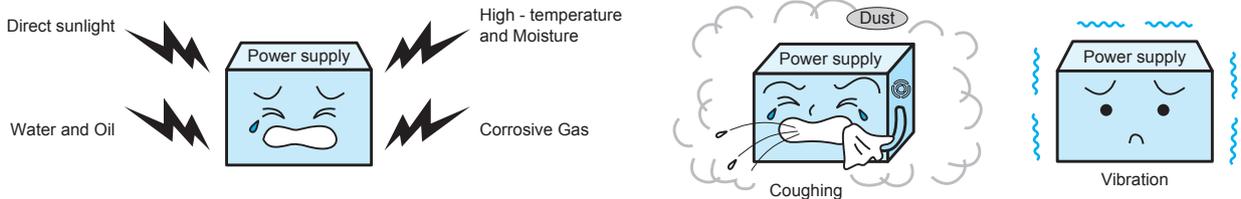
Environments with a strong electric field or electromagnetic waves can damage components and cause malfunction or failure, or cause smoke or fire.



(7) Storage

Avoid storing product in the following conditions or else product life may decrease and malfunction, deterioration or failure may occur. Avoid:

- Direct sunlight
- High temperature, moisture, dust, water, oil or corrosive gas
- Locations subject to vibration



If stored for more than 2 years, products using aluminum electrolytic capacitors should be run for at least 1 hour.

If stored in moisture proof bags, products should be stored in environments at 5-30°C, 60%RH and be used within 1 year, or otherwise be re-sealed.

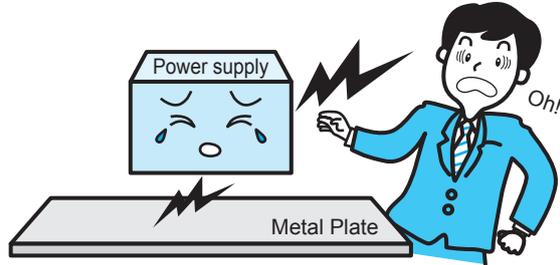
Surface treated steel plating is used for some products and optional attachments. Though the surface is plated, the end surface will be exposed after processing. Discoloration or oxidation may occur due to product storage conditions or placement, but this will not affect product performance or reliability. If this is a concern and protection of the end surface is required, please contact us.

7. Handling Of Rugged PCB Unit

Handling instruction of rugged PCB power supplies is different from that of unit type(with chassis) power supplies. Please keep in mind the following in handling the PCB type.

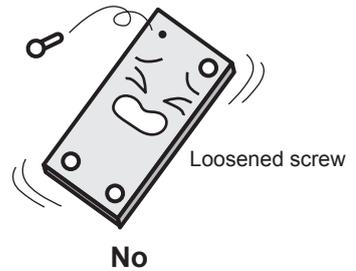
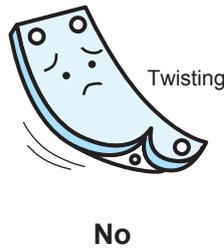
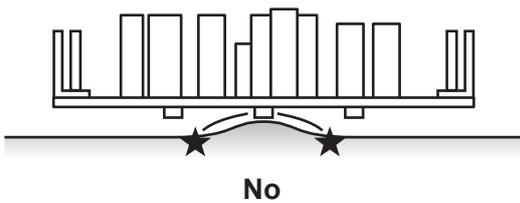
(1) After the load test

There remains high voltage inside the power supply after the load test or Hi-Pot test are performed. Therefore, if the power supply is put on the metal plate, it may cause short condition due to exposing solder part, and it will degrade the unit or cause an electric shock.



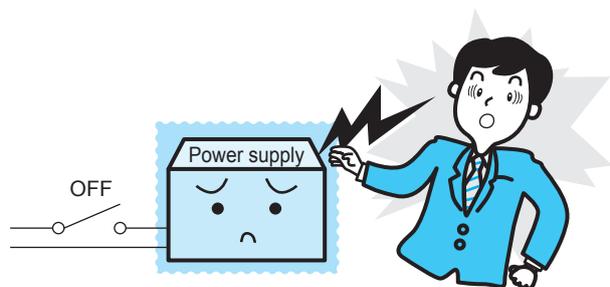
(2) Mechanical stress

When assembling the power supply on the table, avoid mechanical stress to the parts or solder joints. The power supply will be damaged by the stress.



(3) Notes when maintenance

At light load, there remains high voltage inside the power supply for several minutes after switch OFF. When maintenance is performed, pay special attention to electric shock.



(4) Insulation distance

When setting the power supply on metal chassis, keep the insulation distance between the lead of parts and metal chassis. The insulation distance is specified at each relative page of the unit. If the distance is not enough, it is preferable to keep the distance by inserting insulation sheet between the power supply and metal chassis.

