

Phenomenon	Possible Causes	Solutions
The output voltage is lower than rating	<ol style="list-style-type: none"> <li>1. Start-up failure resulted from insufficient input power</li> <li>2. Low input voltage</li> <li>3. Large resistance of input filtering inductor, or improper fuse used</li> <li>4. Large wire loss caused by very thin input lead wire</li> <li>5. No capacitors are connected at the two ends of linear regulators (78L05 etc) or connected at the wrong position.</li> <li>6. Being a large voltage drop caused by forward linear regulator</li> <li>7. A large voltage drop of diode to block reverse current at the input end.</li> </ol>	<ol style="list-style-type: none"> <li>1. Use a higher-power input power supply instead.</li> <li>2. Adjust the input voltage into the recommend input voltage range.</li> <li>3. Reduce the filtering inductance or resistance of inductor, or reduce DCR of fuse.</li> <li>4. Enlarge the sectional area of lead or shorten lead length to reduce resistance.</li> <li>5. Connect sufficient capacitors closely to the two ends of linear regulators.</li> <li>6. Use LDO linear regulators to reduce the voltage drop.</li> <li>7. Use a diode with low voltage drop instead.</li> </ol>
	<ol style="list-style-type: none"> <li>1. Over-current in output circuit</li> <li>2. Too large an output external filtering capacitor</li> </ol>	<ol style="list-style-type: none"> <li>1. Check the external output circuit. If it consumes power over rating or is short-circuited, use a higher output power MORNSUN DC-DC converter module instead.</li> <li>2. The external output capacitor should be lower than maximum value showing on the datasheet. Capacitance is determined by the output current, according to the principle 1uF/100mA. (It's not suggested to connect external capacitors when the output power is lower than 0.5W and output voltage is higher than 20V.). If the output ripple is still requested to be lower, connect an LC filtering circuit at the output end. (Inductance: 4.7-10uH).</li> </ol>
Output voltage is higher than rating	The input voltage is too high	Adjust the input voltage into the recommend input voltage range
	<ol style="list-style-type: none"> <li>1. Output end is disconnected or without load</li> <li>2. The load is lower than 10% of rated load</li> </ol>	Make sure 8% of rated load is connected to the output end when operating. If there is no load in the application, connect in parallel 8% of rated load at the output end to ensure the load of module is up to 10% minimum.
Fails after a certain period of operation	<ol style="list-style-type: none"> <li>1. Over-voltage at the input end</li> <li>2. No capacitors are connected at the two ends of linear regulators (78L05 etc) or connected at wrong position.</li> <li>3. low input voltage</li> <li>4. Defectively soldered at the input end</li> </ol>	<ol style="list-style-type: none"> <li>1. Connect a TVS in parallel at the input end of module</li> <li>2. Connect sufficient capacitors closely to the two ends of linear regulators.</li> <li>3. Adjust the input voltage into the recommend input voltage range</li> <li>4. Make sure the soldering is well.</li> </ol>
	<ol style="list-style-type: none"> <li>1. The module operates under no load or the load is lower than 10% of rated load (large power margin)</li> <li>2. Too large an output external filtering capacitor</li> <li>3. The breakdown voltage of output external capacitor has a critical margin</li> <li>4. Overload at the output end</li> </ol>	<ol style="list-style-type: none"> <li>1. Make sure 10% of rated load is connected to the output end when operating. If there is no load or the load is too light in the application, connect in parallel 5% of rated load at the output end to ensure the load of module is no less than 10% minimum (or replace with a lower power module).</li> <li>2. The external output capacitor should be lower than maximum value showing on the datasheet. Capacitance is determined by the output current,</li> </ol>

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	<ol style="list-style-type: none"> <li>Ambient temperature is too high or bad cooling</li> <li>Defectively soldered at the input end</li> </ol>	<ol style="list-style-type: none"> <li>according to the principle 1uF/100mA. (It's not suggested to connect external capacitors when the output power is lower than 0.5W and output voltage is higher than 20V.).</li> <li>The breakdown voltage of the capacitor must be no less than 1.5 times of the highest actual voltage in the circuit.</li> <li>The actual load should be lower than 100% of rated load power.</li> <li>Make sure the ambient temperature is not higher than 85°C. (For an application of ambient temperature constantly at 70°C or above, please contact us to custom a high temperature product)</li> <li>Make sure the soldering is well.</li> </ol>
<ol style="list-style-type: none"> <li>The module is destroyed when powering.</li> <li>The damage rate is high when powering</li> </ol>	<ol style="list-style-type: none"> <li>Reverse polarity connection</li> <li>Output voltage is much higher than rating</li> <li>Reversed output capacitors connection</li> </ol>	<ol style="list-style-type: none"> <li>Connect a diode with low voltage drop to block reverse current at the input end.</li> <li>Adjust the input voltage into the recommend input voltage range</li> <li>Check phase of output capacitor</li> </ol>
	<ol style="list-style-type: none"> <li>External output capacitor is too large or the breakdown voltage of the capacitor is insufficient</li> <li>The output circuit is vulnerable to short-circuit</li> <li>no load at the output end of SMD package module</li> </ol>	<ol style="list-style-type: none"> <li>The external output capacitor should be lower than maximum value showing on the datasheet. Capacitance is determined by the output current, according to the principle 1uF/100mA. (It's not suggested to connect external capacitors when the output power is lower than 0.5W and output voltage is higher than 20V.). If the output ripple is still requested to be lower, connect an LC filtering circuit at the output end. (Inductance: 4.7-10uH) The breakdown voltage of the capacitor must be no less than 2 times of the highest actual voltage in the circuit.</li> <li>Connect a short-circuit protection circuit at the output end</li> <li>Add at least 1% of rated load at the output end</li> </ol>
	<ol style="list-style-type: none"> <li>For SMD products:</li> <li>The temperature of the reflow is too high.</li> <li>Use gas phase reflow.</li> <li>Process reflow soldering many times.</li> <li>Use heat gun when maintain.</li> </ol>	<ol style="list-style-type: none"> <li>For SMD products:</li> <li>The temperature of the reflow can not be higher than the recommendation by datasheet.</li> <li>The gas phase reflow temperature is lower 10°C than heat convection reflow.</li> <li>Process reflow soldering more than 2 times is not allowed.</li> <li>Do not use hot gun when maintain and the control the temperature(&lt;300°C) the time (&lt;10S).</li> </ol>
<ol style="list-style-type: none"> <li>The module becomes too hot.</li> <li>Fails after burin-in.</li> <li>Some fluidity</li> </ol>	<ol style="list-style-type: none"> <li>The input voltage is too high</li> <li>No capacitors are connected at the two ends of linear regulators (78L05 etc) or connected at the wrong position.</li> <li>Low input voltage.</li> <li>Defectively soldered at the input end</li> </ol>	<ol style="list-style-type: none"> <li>adjust the input voltage into the recommend input voltage range</li> <li>Connect sufficient capacitors closely to the two ends of linear regulators</li> <li>Adjust the input voltage into the recommend input voltage range</li> </ol>

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overflows from the module after burn-in.	<ol style="list-style-type: none"> <li>The module operates under no load or the load is lower than 10% of rated load</li> <li>Too large an output external filtering capacitor</li> <li>The breakdown voltage of output external capacitor has a critical margin</li> <li>Overload at the output end</li> <li>Ambient temperature is too high or bad cooling</li> <li>Defectively soldered at the input end</li> </ol>	<ol style="list-style-type: none"> <li>Make sure the soldering is well.</li> <li>Make sure 10% of rated load is connected to the output end when operating. If there is no load or the load is too light in the application, connect in parallel 5% of rated load at the output end to ensure the load of module is no less than 10% minimum.</li> <li>The external output capacitor should be lower than maximum value showing on the datasheet. Capacitance is determined by the output current, according to the principle 1uF/100mA. (It's not suggested to connect external capacitors when the output power is lower than 0.5W and output voltage is higher than 20V.).</li> <li>The breakdown voltage of the capacitor must be no less than 2 times of the highest actual voltage in the circuit.</li> <li>The actual load should be lower than 100% of rated load power.</li> <li>Make sure the ambient temperature is not higher than 85°C, for constant high temperature application</li> <li>Make sure the soldering is well.</li> </ol>
The output noise is quite large or the whole system is noise susceptible	<ol style="list-style-type: none"> <li>The distance between the module and noise susceptible components(A/D, D/A or MCU) in the main circuit is too critical.</li> <li>No decoupling capacitors are connected to the input end of noise susceptible components in the main circuit.</li> <li>Beat interference generated by separate single output modules in the multi-channel system.</li> <li>Earth wire is mishandled.</li> <li>The output noise interferes normal operation when the above problem doesn't exist.</li> </ol>	<ol style="list-style-type: none"> <li>Separate the module from the module and noise susceptible components in the main circuit as much as possible or isolate the module and noise susceptible components in the main circuit.</li> <li>Connect a 0.1μF decoupling capacitor at the input end of noise susceptible components (A/D, D/A or MCU) in the main circuit.</li> <li>Replace a few single output modules with one MORNSUN multi-channel output module so as to eliminate interference.</li> <li>Adopt remote one point earth.</li> <li>Use MORNSUN fixed input, isolated and regulated output series products instead.</li> </ol>
<ol style="list-style-type: none"> <li>Poor anti-interference performance</li> <li>Poor EMI characteristics.</li> </ol>	<ol style="list-style-type: none"> <li>Poor anti-common-mode-interference performance</li> <li>No shielding</li> <li>No safety capacitors are connected to the unit.</li> </ol>	<ol style="list-style-type: none"> <li>Connect a common mode choke and TVS at the input end.</li> <li>Shield the surface with metal entirely.</li> <li>Connect a 47-100pF safety capacitor between GND and (The breakdown voltage is determined by the actual demand, generally 1000-3000VDC).</li> </ol>

Phenomenon	Possible Causes	Solutions
Output ripple shows fuzzy on the oscilloscope	The oscillograph's grounding line is not well connected	Connect the grounding line well.

NOTE: Any other question, please feel free to contact our FAE department.

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