

AC-DC Series Product Common Failure Analysis

Applicable Models: QM,QO and PVDP Series

Failure Description	Causes	Corrective Measures
Module fails to start normally	<ol style="list-style-type: none"> 1. Excessive external capacitive load at output; 2. Insufficient input power; 3. Output load is too heavy, or the rear-end load has excessive inrush current during startup; 4. For QO series modules: External capacitor not added as required by the technical manual. 	<ol style="list-style-type: none"> 1. Ensure external output capacitance does not exceed the maximum capacitive load specified in the technical manual; 2. Increase the power capacity of the input source; 3. Use a higher-power module or reduce the output load; 4. Add external capacitor as per the technical manual parameters.
Module fails instantly during startup	<ol style="list-style-type: none"> 1. Surge current exists during module startup; 2. Output load is too heavy, or the rear-end load has excessive inrush current during startup; 3. Input voltage is too high. 	<ol style="list-style-type: none"> 1. Add a surge suppression circuit at the module input as recommended in the technical manual; 2. Use a higher-power module or reduce the output load; 3. Reduce input voltage to meet the requirements in the technical manual.
Output voltage too low	<ol style="list-style-type: none"> 1. Insufficient power from input source; 2. Output load (including capacitive/inductive loads) is too heavy; 3. Excessive wiring loss between the load and module output. 	<ol style="list-style-type: none"> 1. Increase the power capacity of the input source; 2. Use a higher-power module or reduce the output load (including capacitive/inductive loads); 3. Reduce wiring impedance between the load and module output.
No output after short-term use	<ol style="list-style-type: none"> 1. Output terminal has an external short circuit; 2. Input fuse blown or PTC thermistor overheated causing excessive resistance; 3. Input voltage does not meet specification requirements; 4. For DM120/240 series: Over-temperature causing the product to enter thermal shutdown. 	<ol style="list-style-type: none"> 1. Check for soldering errors on output pins; 2. Check fuse and PTC thermistor values to confirm specifications are adequate; 3. Ensure input voltage is within the technical specifications; 4. Investigate cause of overheating and improve heat dissipation.

Failure Description	Causes	Corrective Measures
Excessive output ripple/noise	<ol style="list-style-type: none"> 1. Inadequate external filtering at output; 2. Oscilloscope ground connection unreliable; 3. Inconsistent oscilloscope bandwidth selection; 4. System interference. 	<ol style="list-style-type: none"> 1. Add filtering circuits/parameters per recommendations in the technical manual; 2. Ensure oscilloscope ground connection is secure; 3. Use 20MHz bandwidth for standard noise measurement; 4. Test module separately to confirm system interference; Contact our FAE.
Module damaged after operating for a period	<ol style="list-style-type: none"> 1. Input voltage too high/too low during operation; 2. Reverse voltage (e.g., from inductive loads like relays) at module output; 3. Ambient temperature too high; 4. Output load too heavy; 5. Lightning/surge damage. 	<ol style="list-style-type: none"> 1. Strictly maintain input voltage within operating range; 2. Add diode and TVS at module output; 3. Derate power usage at high temps (use derating curve), improve heat dissipation, avoid enclosed spaces; 4. Use a higher-power module or reduce output load; 5. Implement protection circuit per technical manual; 6. Add surge suppression circuit at input per technical manual.
Triple-output module: Positive output accurate, but \pm outputs severely low	<ol style="list-style-type: none"> 1. Positive output terminal unloaded; 2. Positive output load too light while \pm outputs overloaded. 	<ol style="list-style-type: none"> 1. Use a \pm dual-output AC/DC, or add appropriate dummy load to positive output; 2. Add dummy load to positive output; or use a lower-power module; or use a single positive-output AC/DC plus a \pm dual-output DC/DC.
Dual-output (\pm) module: Positive voltage low, negative voltage high	Imbalanced load between positive and negative outputs (heavier load on one side causes lower voltage).	<ol style="list-style-type: none"> 1. Add dummy load to the lightly loaded output to balance loads (ratio $\leq 2:1$); 2. Use a single-output AC/DC plus a \pm dual-output DC/DC to provide balanced voltage.
Increased output ripple & inability to handle load after operating period	Ambient operating temperature too high.	<ol style="list-style-type: none"> 1. Mount module away from high-power heat sources; 2. Implement heat dissipation measures to lower ambient temperature; 3. Strictly follow derating curve in technical manual at high temperatures.

Failure Description	Causes	Corrective Measures
Module interferes with system / Fails EMC requirements	1. Module too close to system-sensitive components; 2. EMC circuit not added per technical manual.	1. Increase distance to sensitive components and add shielding; 2. Add recommended EMC protection circuit per technical manual.
Audible noise after power-on	1. Module in light-load skip-mode(frequency within audible range); 2. Impedance mismatch between module output and rear-end load.	1. Ensure rear-end load is $\geq 10\%$ or within recommended range; Noise is normal if function is unaffected; 2. Add external capacitor at output for debugging per application needs.
No output/low voltage when near walkie-talkie	Walkie-talkie RF interference (exceeds product immunity rating).	Keep product >10cm away from walkie-talkies.
Module functional, but system fails	System program timing conflicts with module power-up/startup delay time.	Optimize system software program timing.