

White Paper on IEC 61000 Electromagnetic Compatibility (EMC) Standards

I. What is IEC 61000?

IEC 61000 is a globally unified electromagnetic compatibility (EMC) standard formulated by the International Electrotechnical Commission (IEC). It is designed to ensure that electronic and electrical equipment operates in complex electromagnetic environments with the following performance:

1. No interference to the normal operation of other equipment
2. Immunity to external electromagnetic interference
3. Stable, safe and reliable operation

One-sentence summary: IEC 61000 is the certification for equipment's *electromagnetic immunity and non-interference*.

II. Why Comply with IEC 61000?

1. **Global universality:** A mandatory requirement for domestic and export sales, serving as an industry access threshold
2. **Stability and reliability:** Reduction of crashes, restarts, packet loss and signal anomalies

3. **Safety and compliance:** Prevention of malfunctions and accidents caused by electromagnetic interference
4. **Quality improvement:** A mark of products meeting international industrial–grade standards

III. Core Components of IEC 61000

IEC 61000 is divided into two core categories:

1. Immunity

The ability of equipment to withstand external electromagnetic interference, including:

Electrostatic Discharge (ESD)

Electrical Fast Transient (EFT)

Surge

Voltage dips

Radiated electromagnetic field interference

2. Emission Limits

The requirement for equipment to avoid excessive electromagnetic emission to the external environment (non–interference to other devices), including:

- Conducted disturbance
- Radiated disturbance

IV. Commonly Used IEC 61000 Standards for Industrial Products (Key Standards)

- IEC 61000–4–2: Electrostatic discharge immunity
- IEC 61000–4–3: Radiated immunity
- IEC 61000–4–4: Electrical fast transient/burst immunity
- IEC 61000–4–5: Surge immunity (lightning strike)
- IEC 61000–6–2: EMC immunity standards for industrial environments
- IEC 61000–6–4: EMC emission standards for industrial environments

V. Value for Customers

1. **More stable equipment:** No packet loss or crashes in industrial sites
2. **More reliable networking:** Immunity to interference from frequency converters, motors and high-voltage equipment
3. **Long-term maintenance-free operation:** Lower failure rate and reduced on-site debugging
4. **Compliance:** Meeting the requirements of global markets