

# OPS Module Installation

**Document Version: V2.0**

**Applicable Scenarios:** New installation, replacement and maintenance of OPS computer modules in education interactive flat panel, conference flat panels and smart blackboard etc.

**Execution Requirements:** All on-site installation and maintenance personnel must strictly comply with this specification.

## 1. Scope of Application

This specification applies to the full installation process of pluggable OPS computer modules with a standard 80-pin JAE connector into education interactive flat panel, conference flat panels and smart blackboard equipped with a dedicated OPS slot. It covers all operation scenarios, including new-unit installation, OPS replacement of existing units, disassembly and re-installation after failure, and routine maintenance inspection, so as to standardize on-site installation practice and prevent installation failures, device burnout, poor contact and other problems.

## 2. General Safety Operation Requirements (Mandatory Red Lines)

This chapter sets out mandatory requirements that must be followed first in all operations. Any violation that causes equipment damage or safety incidents will be held accountable.

### 2.1 Power-off and Discharge Requirements

1. Hot-plugging of the OPS module is strictly prohibited throughout the operation. Plugging or unplugging the module while it is powered can directly burn out the OPS mainboard and the pins of the display slot, causing irreversible damage.
2. Standard power-off procedure: shut down the display system → turn off the AC power switch of the device → unplug the power cord of the unit → allow the device to stand for discharge for at least 30 seconds, until the residual charge in the capacitors is fully released, and only then proceed with disassembly.
3. While the device is running, never disconnect the main power supply directly, to avoid hardware damage caused by power impact.

### 2.2 ESD Protection Requirements

1. On-site operators must wear an anti-static wrist strap and anti-static gloves, and the workbench must be properly grounded.

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2. Never touch precision components such as the OPS gold fingers, mainboard chips, capacitors or slot pins with bare hands, as human body static electricity can break down precision circuits.
3. In humid or dry environments with high static electricity, perform static discharge treatment in advance before starting the work.

## **2.3 Working Environment Requirements**

1. Ambient temperature: 0 °C to 40 °C; the work area must be free from high-temperature exposure, open flames and heat-source blockage.
2. Ambient humidity: 20% to 80%; no condensation or accumulated water; disassembly or installation in humid environments is prohibited.
3. The work area must be free of large amounts of dust, debris, strong vibration and strong electromagnetic interference, so as to ensure stable installation of the equipment.

## **3. Pre-installation Inspection of Equipment and Tools**

All inspections must be completed before installation. Equipment that fails the inspection is prohibited from installation, so as to prevent faults from the source.

### **3.1 The Screen Display Inspection**

1. Check that the OPS slot of the display is intact in appearance, free from deformation, burn marks, oxidation or foreign-object blockage, and that the slot pins are straight, without bending or breakage.
2. Check that the OPS slot cover plate and mounting screws are complete, without missing parts or stripped threads.
3. Confirm that the native Android system of the display runs normally, that power-on/off, display and touch functions are fault-free, and that the unit's power supply is normal.

### **3.2 OPS Module Inspection**

1. Appearance inspection: the unit body must be free from dents, deformation and damage; the interfaces must be intact; the cooling fan and heat sink must be free from dust accumulation or foreign-object obstruction.
2. Gold-finger inspection: the 80-pin gold fingers must be free from oxidation, blackening, scratches or bending, and clean without foreign matter.
3. Specification matching: confirm that the OPS dimension and power supply rating (12 V / 19 V) match the display device.

### **3.3 Tools and Accessories Inspection**

1. Required tools: Phillips screwdriver, flat-head screwdriver, anti-static wrist strap and anti-static gloves.
2. Auxiliary accessories: insulating tape, cable ties, and dedicated mounting screws for the device (standard M3×6 / M3×8 anti-loosening screws).

3. All tools must be free of metal burrs, to avoid scratching the device interfaces and the unit body.

## 4. Standardized Installation Procedure (SOP)

### 4.1 Power-off and Protection

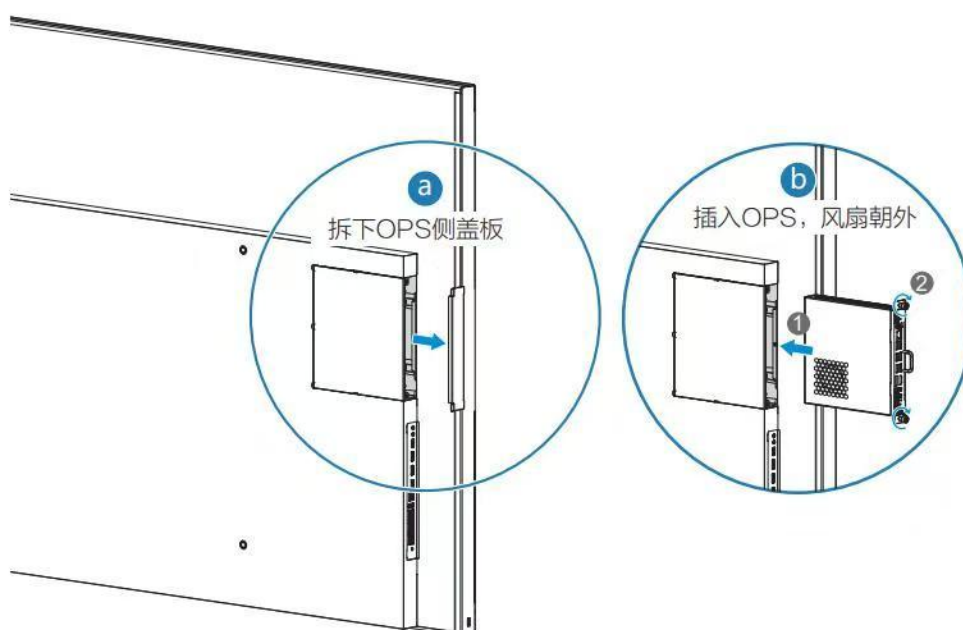
Strictly follow the power-off and discharge procedure: unplug the power cord and allow the device to stand for at least 30 seconds. Floor-standing or wall-mounted displays do not need to be disassembled; for desktop displays, lay a soft cloth on the work surface and place the unit gently with the LCD screen facing down, to prevent screen breakage or scratching.

### 4.2 Removing the Slot Cover Plate

Use a screwdriver to steadily unscrew the mounting screws of the OPS slot cover plate, keep the screws in a safe place to avoid loss, and after removing the cover plate, fully expose the standard 80-pin JAE slot and clean dust and foreign objects from inside the slot.

### 4.3 Aligning and Inserting the OPS Module

1. Remove the OPS slot cover plate (screws or snap fasteners) on the back of the display.
2. Identify the keying notch and the orientation mark on the OPS body to confirm the correct installation direction and prevent reverse installation.
3. Hold the OPS body with both hands, keep it horizontal and level, align it with the slot, and push it in slowly and evenly.
4. Push until the module body is fully seated against the display body and a clicking sound indicates that the latch has engaged; the module is properly installed when there is no looseness or offset.
5. Oblique insertion, one-sided force or forced insertion with excessive force is strictly prohibited, to prevent bending or breakage of the slot pins and wear on the gold fingers.



#### **4.4 Securing with Screws**

1. Use the factory-supplied mounting screws and align both screw holes on the left and right sides; single-screw mounting or mounting without screws is prohibited.
2. Tighten the screws evenly in a diagonal sequence, with the torque controlled at 0.8-1.2 N·m and proper tightness, to avoid crushing the unit body from over-tightening or poor contact from under-tightening.
3. After fastening, check that the OPS body is free from wobble or offset, is snugly seated, and that the left-right gaps are even ( $\leq 1$  mm).

#### **4.5 Power-on Debugging and Signal Switching**

1. After confirming that all installation steps are correct, plug the power cord back in, turn on the AC power switch and start the display.
2. Manually switch the display input source to [OPS/PC] mode.
3. Observe the running status: the OPS power LED lights up normally, the fan runs smoothly, and there is no abnormal noise or error message; the display shows the computer desktop normally.

### **5. Core Installation Technical Requirements**

#### **5.1 Fastening Requirements**

All OPS modules must be fixed with two screws in a symmetrical arrangement and tightened to prevent loosening; loose or incomplete contact is prohibited. Long-term operation with vibration can easily loosen the module, causing faults such as black screen, disconnection and system freeze; therefore, the fastening step must never be omitted.

#### **5.2 Heat Dissipation Requirements**

1. Keep the OPS cooling vents and fan position free from any blockage, and reserve at least 50 mm of clearance around the unit body for heat dissipation.
2. For wall-mounted displays, keep a gap of at least 100 mm between the back panel and the wall, to ensure air convection cooling.
3. Do not place objects on the OPS body or its cooling vents, and do not enclose the cooling area of the device, to prevent overheating, system freeze or automatic restart caused by high temperature.

#### **5.3 Interface Compatibility Requirements**

1. Only standard 80-pin JAE interface modules are allowed for installation; modifying or adapting non-standard interface devices is prohibited.

### **6. Acceptance Criteria**

After installation, each item below must be verified; the installation can only be judged qualified when all items pass.

1. Self-check status: the OPS indicator lights are normal, the fan starts and stops smoothly, and there is no abnormal noise, alarm or abnormal heat.
2. Display quality: the picture is clear, free from black screen, distorted image, flickering or color cast, and the resolution adjusts automatically as normal.
3. Function verification: display touch control, external keyboard/mouse and USB interfaces function normally, without malfunction or latency.
4. Network function: wired and wireless network connections are normal, an IP address can be obtained, and network transmission is stable.
5. Operational stability: after continuous powered operation for 2 hours, the device shows no faults such as system freeze, restart, overheating or disconnection.

## **7. Prohibited Operations (Mandatory)**

1. Hot-plugging the OPS module while it is powered and touching the slot gold fingers while powered are strictly prohibited.
2. Forced installation, oblique insertion with excessive force, and twisting the OPS module up/down, which damage the interface pins, are strictly prohibited.
3. Mounting the OPS module without screws or with a single screw is strictly prohibited, to eliminate the risk of looseness.
4. Blocking or clogging the cooling vents and enclosing the cooling area of the device are strictly prohibited.
5. Directly cutting off the main power supply while the device is running is strictly prohibited, to avoid hardware damage caused by power impact.
6. Mixing OPS modules with different power supply ratings or non-standard interfaces with the display device is strictly prohibited.

## **8. Routine Maintenance and Removal Requirements**

1. Before disassembly or replacement, strictly follow the power-off and standing-discharge procedure (at least 30 seconds) and take ESD protection measures.
2. When removing the module, unscrew the mounting screws and pull the OPS module out with both hands evenly and horizontally; prying the module up/down or rocking it side-to-side is prohibited.
3. Routine maintenance: check screw tightness, fan dust accumulation and cooling vent clearance once every quarter, and promptly clean dust and re-tighten loose parts, to ensure long-term stable operation of the device.

## **9. Supplementary Provisions**

This specification is the standardized operation document for OPS installation on the screen displays. All on-site installation and maintenance personnel must strictly comply with it. Any equipment damage or engineering quality problems caused by failure to comply with this specification shall be borne by the responsible operator.

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