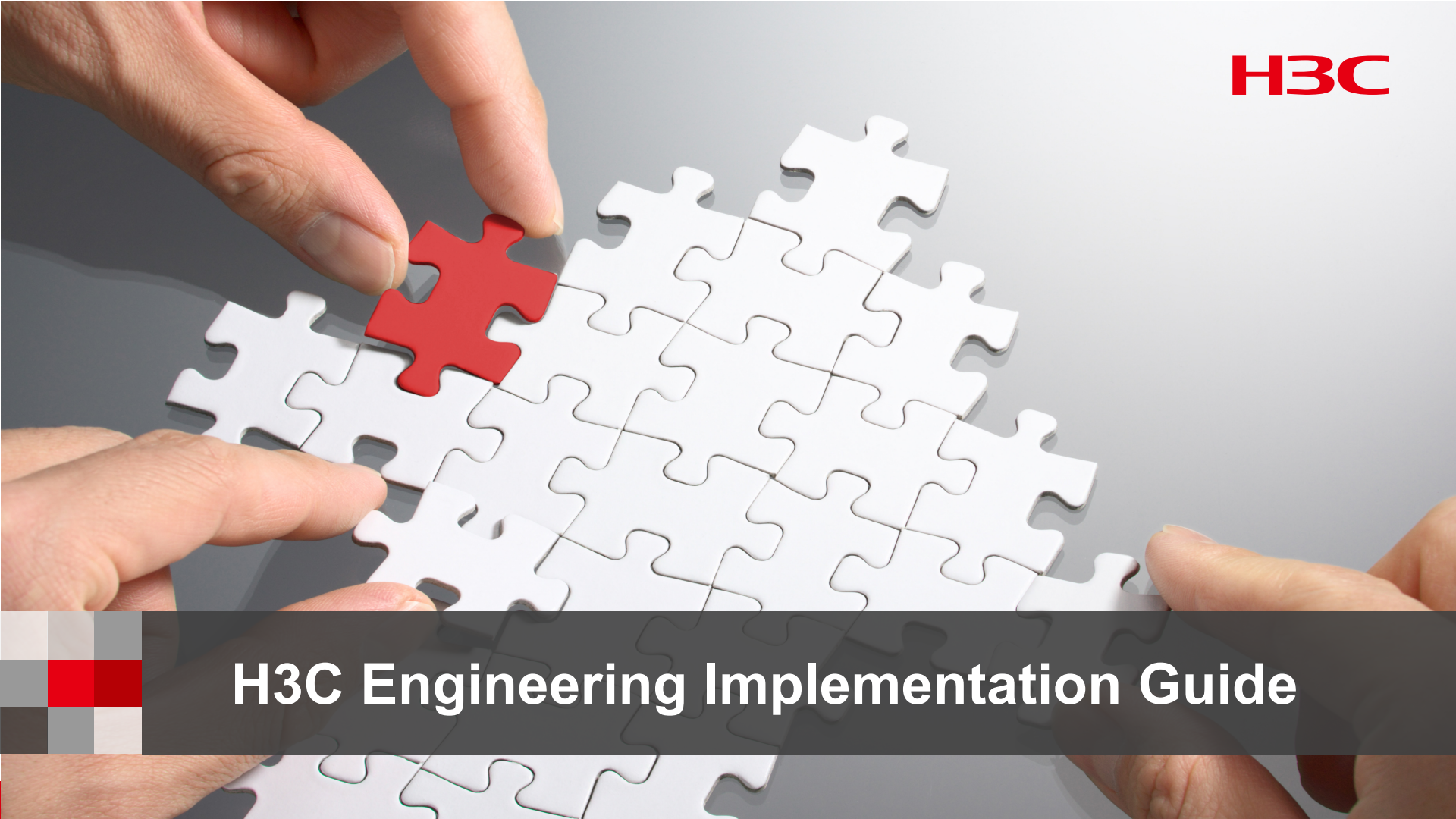


H3C Engineering Implementation Guide

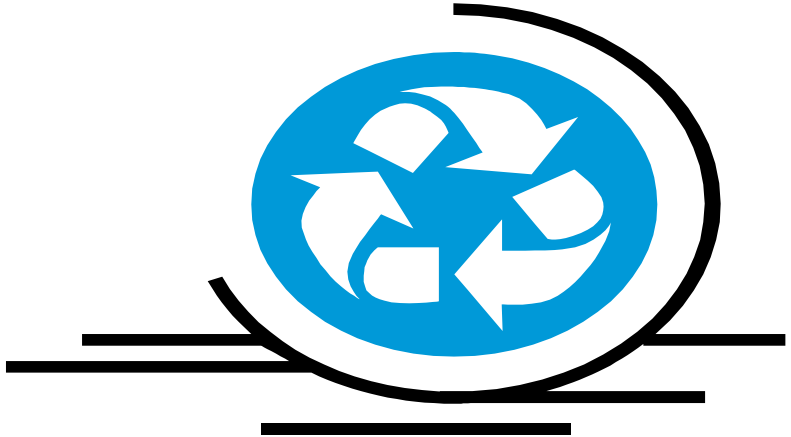
Target of H3C Engineering Implementation

Course targets

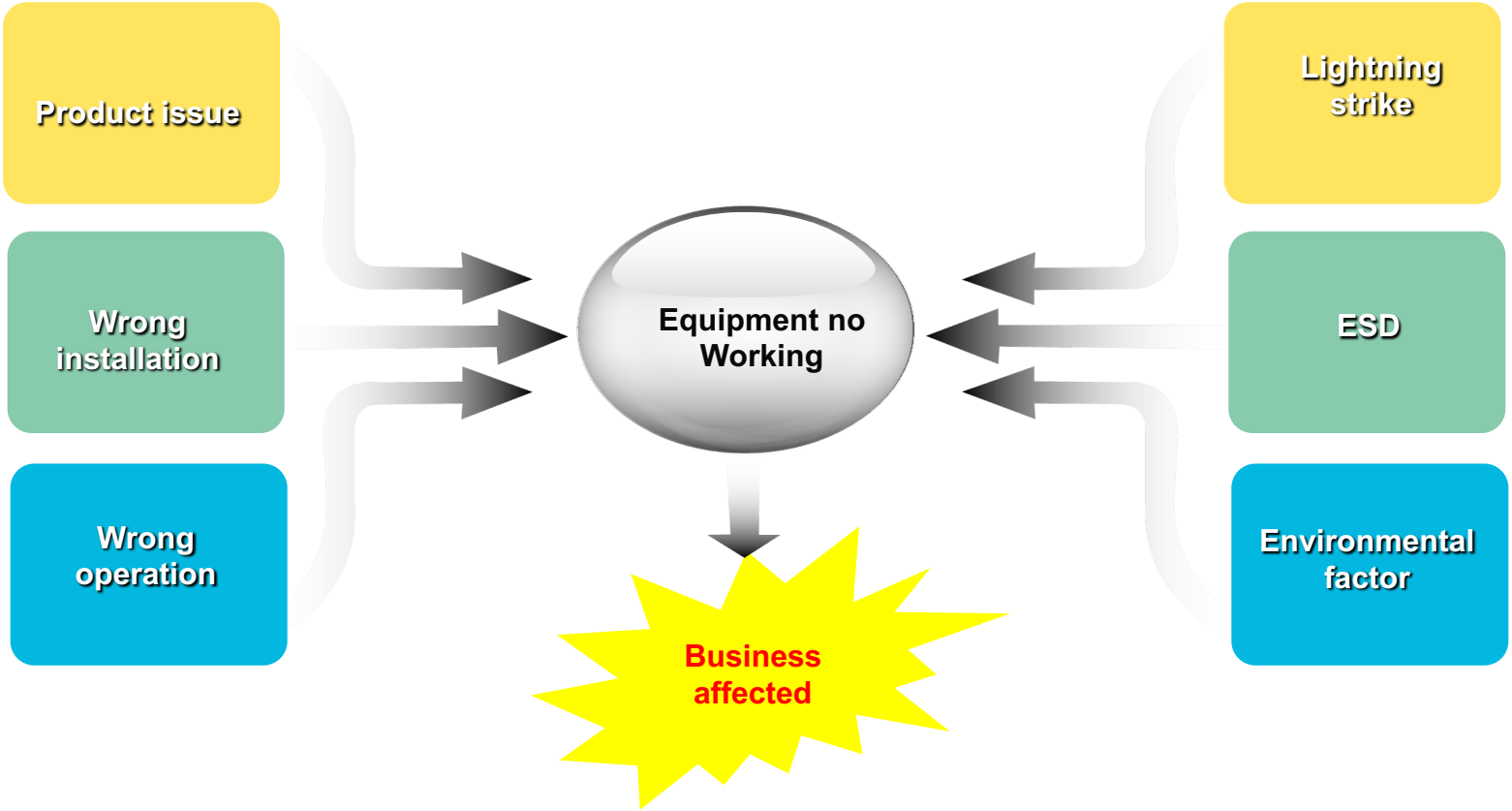
After taking this course, you will be able to

- H3C Project Engineering implementation key point

Catalog



Equipment No Working Scenarios



Definition of Engineering Quality

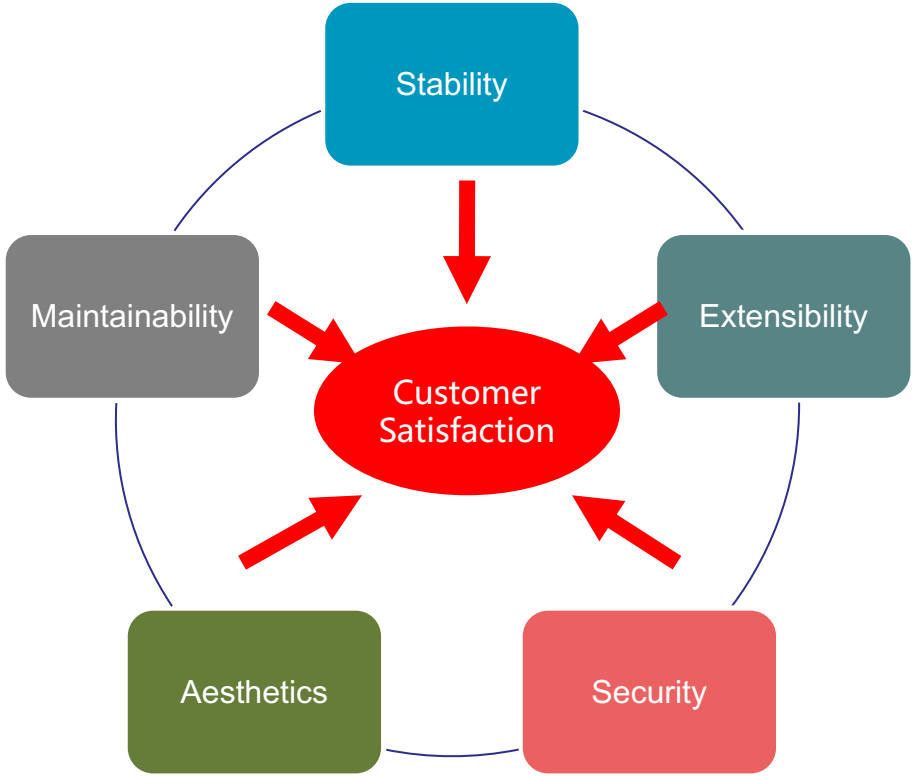
Engineering Quality：Project implementation process and results both meet customer requirements.

Key points of project quality：

- Engineering quality based on fulfillment process, not spot checking
- Equipment high quality will be have long-term stable operation
- Customer satisfaction due to high quality

High Quality Engineering

Engineering Technology Requirement



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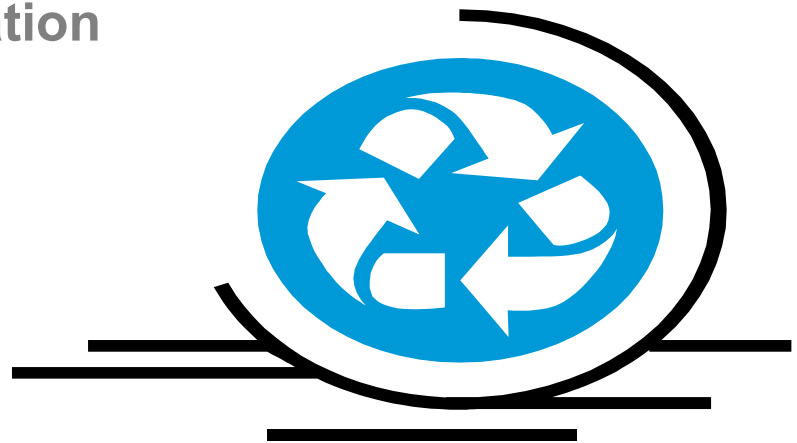


Purpose of Engineering Survey

Introduce:

On site engineering survey plays an important role in project implementation. An accurate, detailed and high-value engineering survey report can not only provide important basis for correct delivery, but also provide important data and reference information for later engineering construction, reduce blindness and waste in all links of the project, reduce project cost, improve efficiency, ensure project quality and improve customer satisfaction. At the same time, the engineering survey engineer shall put forward constructive improvement suggestions and measures to the customer, and actively and effectively track and cooperate with the customer to make preparations before construction to ensure that the preparations are fully done before construction.

Survey Tools

Two engineering survey tools according to different methods:

- ✓ On site survey, on-site survey at the equipment installation location;
- ✓ The questionnaire survey, communicated or confirmed with customers by telephone, written documents and e-mail.

Survey tools include survey table, handheld digital multimeter, pen, tape measure, impact drill, etc.

(Digital multimeter, tape measure, impact drill)

Content of Survey

- Installation environment
- Installation conditions
- Survey cabinet/rack
- Power and grounding
- Equipment power supply and socket

Survey Requirements-1

Sort	Survey object	Requirement	Survey method
Power and grounding	Power Supply	1. The completion time of power supply preparation and whether the power supply equipment is purchased according to the requirements? 2. Power supply for the machine room: AC: 100-240V, 50 / 60Hz, DC: - 42V ~ - 57V, and the power meets the power supply requirements of the equipment (the equipment power is calculated according to the maximum output power) 3. Place the power supply plug-in or wiring terminal at the installation position.	questionnaire Multimeter measurement
	power cord	1. Confirm whether there are special requirements for the length of equipment power cord; 2. Know the type of equipment and confirm whether 16A plug-in or adapter is ready (some equipment use 16A power cord and plug, and 10A plug-in cannot be inserted)	questionnaire and visualization
	Grounding conditions	1. The machine room should adopt the joint grounding mode, with the joint grounding resistance ≤ 1 ohm and the local power station with small capacity ≤ 5 ohm. 2. The AC power socket for equipment power supply shall be a single-phase three wire power socket with protective ground wire (PE), and the protective ground wire (PE) shall be reliably grounded.	questionnaire

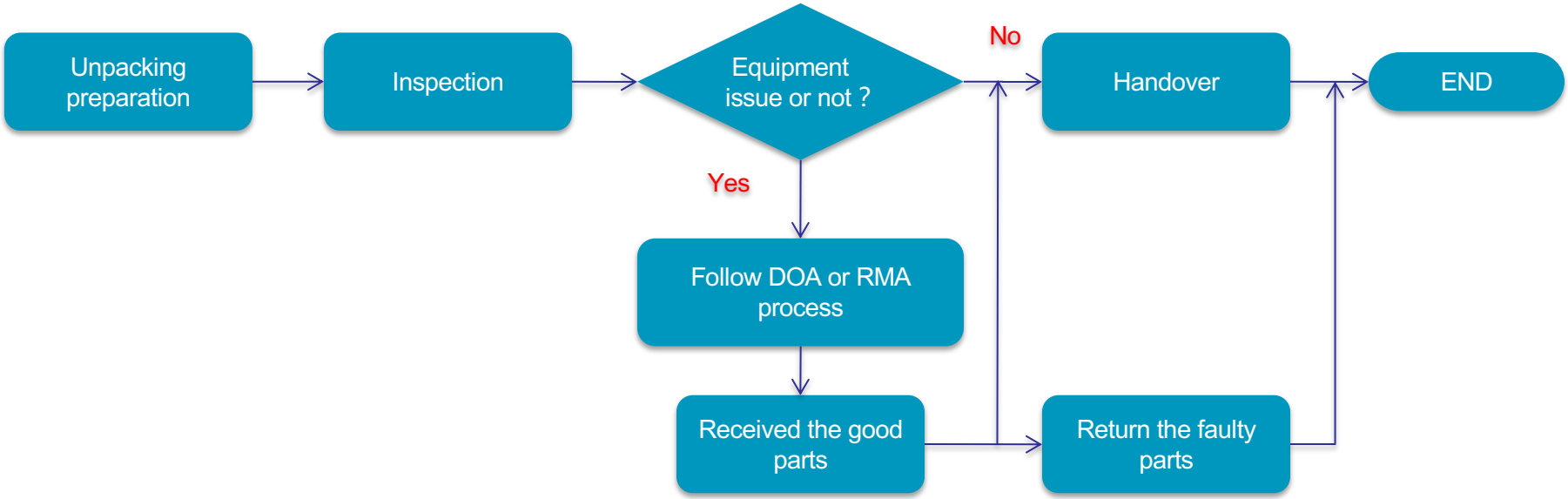
Survey Requirements-2

Sort	Survey Object	Requirement	Survey Method
Installation conditions	Optical fiber preparation plan	Specific plan and current progress of optical fiber introduction	questionnaire
	Optical fiber connector	Connector type of optical fiber	questionnaire and visualization
	Wire rack	The position of the wire management rack and the completion time of the installation and laying of the wire management rack	questionnaire and visualization
	Installation position	The specific location of equipment installation	Tape and marker pen
	Installation space	After the equipment is installed, at least 10cm heat dissipation space shall be reserved up and down, front and rear, left and right,	Tape measurement
Installation conditions	Cabinet height	1. If H3C cabinet is purchased, it is necessary to determine whether there is anti-static floor and floor installation height, which is used to confirm the height of support (i.e. base) required for N68 cabinet. 2. It is necessary to confirm whether the cabinet space is sufficient and whether the number of trays or slides in the cabinet meets the requirements.	Tape measurement
	Guide rail, lug and safety panel	Refer to the equipment installation manual. Does it match the overseas installation requirements?	questionnaire and visualization
	Floor bearing	The floor of the machine room bears ≥ 450 kg per square meter, and some equipment has higher requirements	questionnaire
	Anti interference and handling conditions	1. Anti interference: the installation position of the equipment shall be far away (at least 10 meters) from the equipment generating strong electromagnetic interference (such as elevator, high-power central air conditioner, etc.);	questionnaire and visualization
		2. Elevator load capacity: confirm whether the load capacity of the goods elevator required to transport the equipment to the installation site meets the equipment requirements	questionnaire and visualization
		3. Clear height of aisles and elevators: confirm whether the elevators and aisles that the equipment needs to pass to the installation site meet the equipment requirements	Tape measurement
		4. Lightning protection of buildings: confirm whether lightning protection measures are taken for buildings.	questionnaire
Installation environment	temperature	Working environment temperature: 0 ℃ ~ 45 ℃, recommended 20-24 ℃ Storage ambient temperature: - 40 ℃ ~ 70 ℃, recommended 20-24 ℃	Thermometer measurement
	humidity	Humidity of working environment: 10% ~ 90%, 40% - 60% recommended Humidity of storage environment: 5% - 95%, 40% - 60% recommended	Thermometer measurement
	Cleanliness	Number of dust particles per cubic meter ≤ 3 × 104 (no visible dust on the desktop within 3 days)	visualization

Catalog

- Project Quality Overview
- Engineering Survey Specification
- Specification for Unpacking Inspection
  - Unpacking Inspection Process
  - Handling of Equipment Problems
- Equipment Installation Specification
- ESD Protection
- Prevent And Remove Dust
- Summary and EHS requirement

Unpacking Inspection Process



Unpacking Preparation

Warehouse staff

Tools

Equipment List

Implementation manager /engineer

Customer Engineering director

Inspection Equipment

Logistic company signation

Verify box number

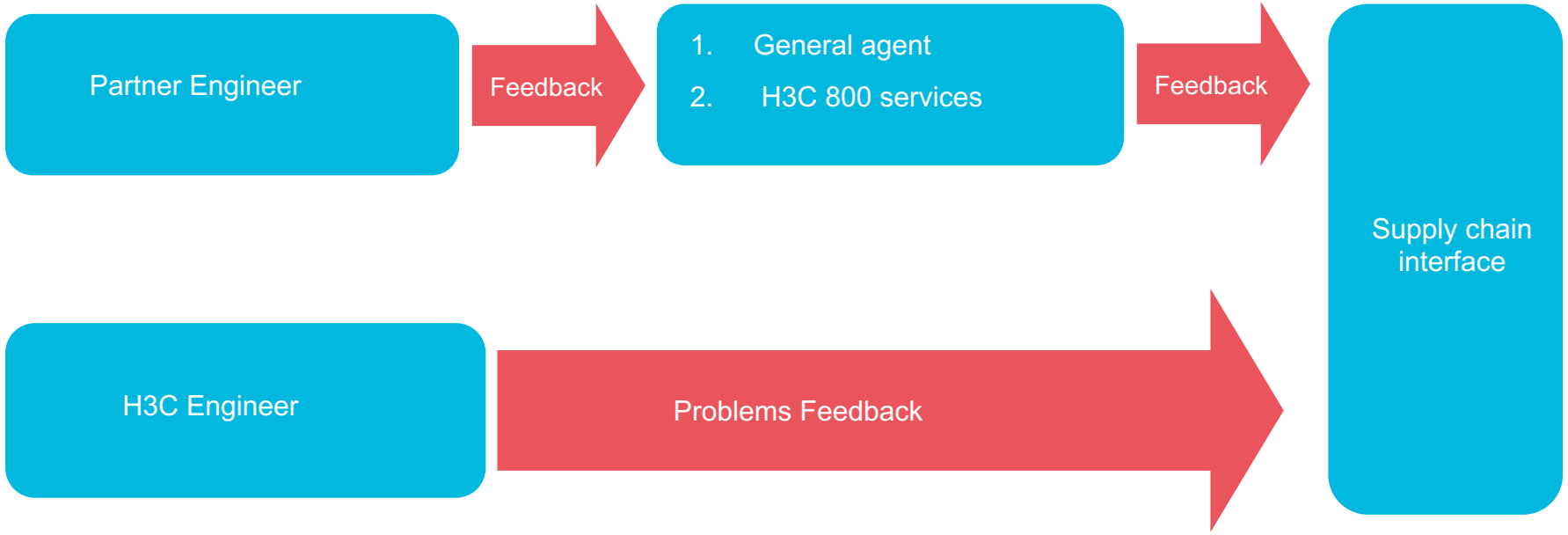
Open the box

Take the packing list

Verify materials

BOM code

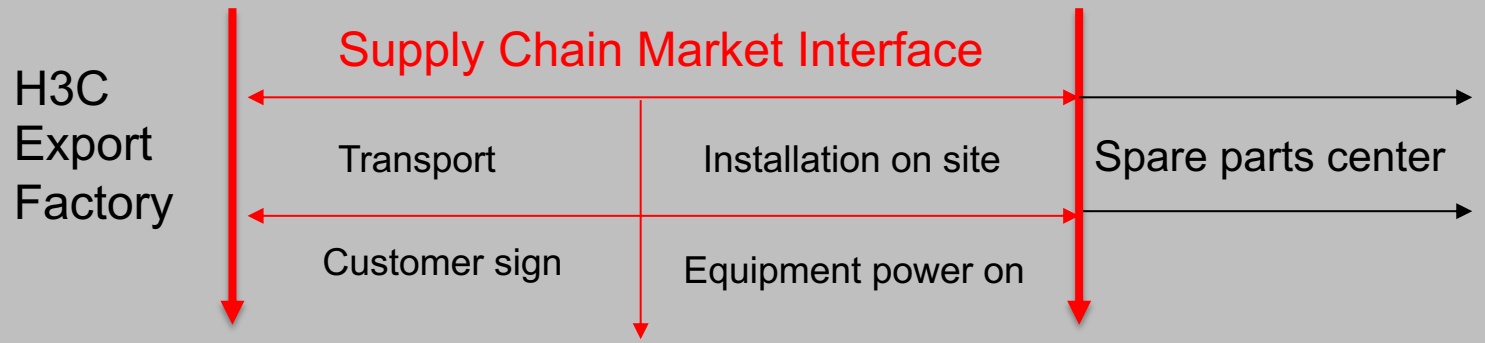
Claim way if unpacking have issue



Scope of Problems Accepted by Supply Chain Interface

Supply Chain Interface handle before equipment power on and shipment from factory.

Spare parts center deal with once equipment powered on.



H3C Equipment Problem Feedback Contact Information

1、H3C customer hotline：

Tel：400-810-0504

2、H3C Supply chain market interface：

Email：service@h3c.com

Tel：0571-86760999

Delivery of Equipment

Equipment confirmation

- After the inspection, the representatives of all parties participating in the inspection shall sign on the packing list for confirmation, and each party shall keep one copy. 《The inspection report》 can also be sorted out and output according to the needs of customers, and signed and confirmed by all parties.

Handover

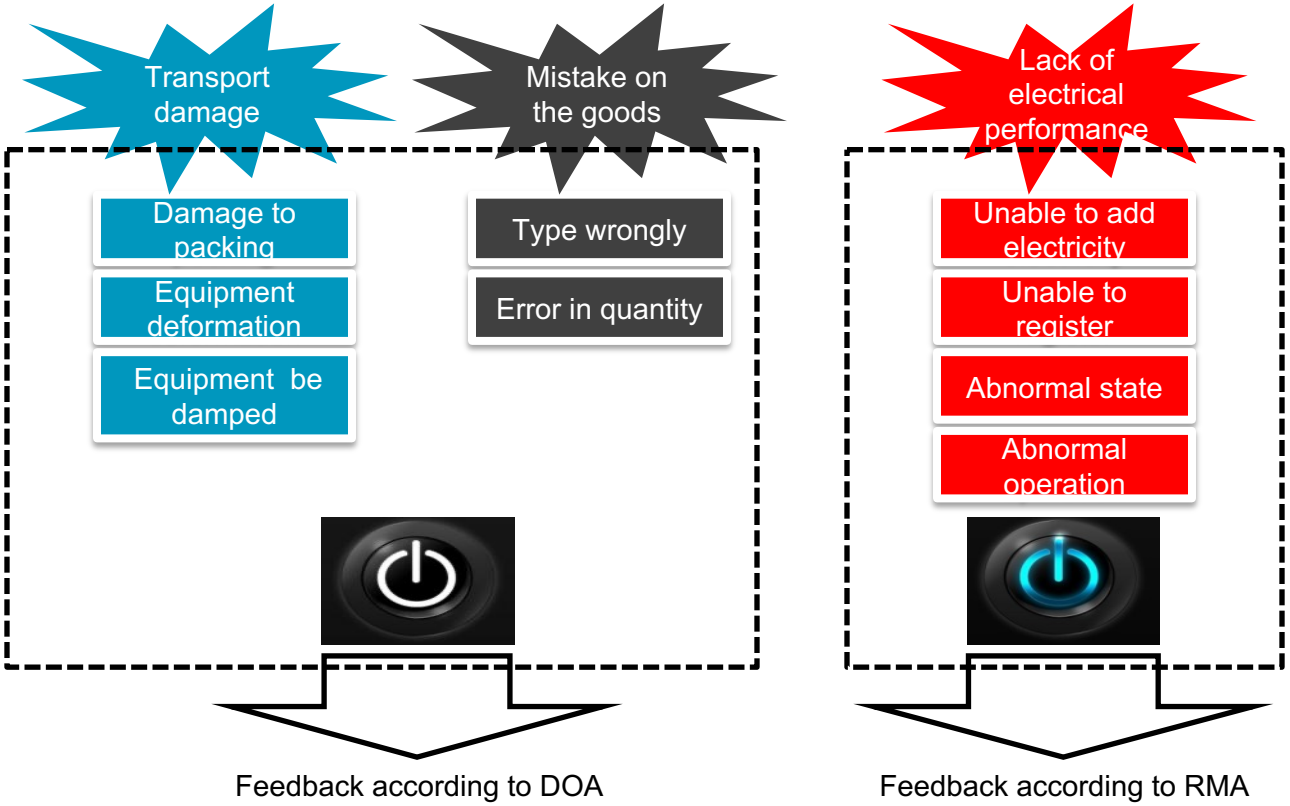
- After the packing list is signed and confirmed, the goods will be handed over to the customer for safekeeping. After the goods are handed over, if the goods are damaged or lost due to the customer's improper storage, the responsibility shall be borne by the customer.

Equipment delivery

- When using the goods, the Engineer shall submit an application to the customer's goods administrator, explain the type, quantity and purpose, and make records. The Engineer shall obtain the consent of relevant personnel of the client and keep records when carrying relevant goods into and out of the client's computer room.

Catalog

Equipment Problem Solve Solution



DOA

Take photos

Retain the original packaging

Submit the feedback form

H3C公司

货物问题反馈表

Catalogue

- Project Quality Overview
- Site Survey Requirement
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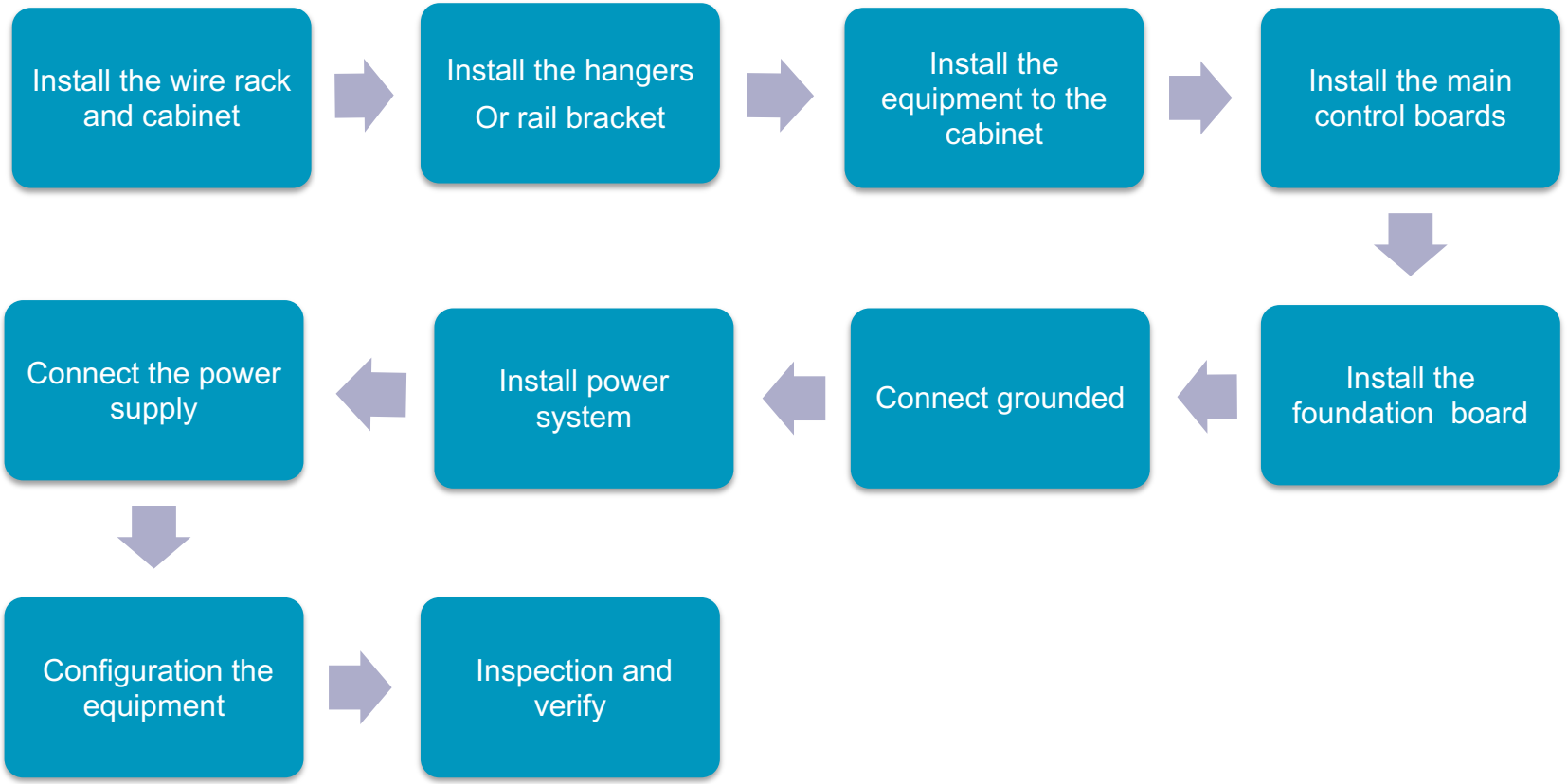
  - **Installation SOP**
  - Fixed rack position
  - Ventilation and heat dissipation
  - Grounding for lightening
  - Power requirement
  - Wiring requirement
  - Label requirement
  - ESD
  - Dustproof requirement
  - Summary and EHS requirement

Installation SOP



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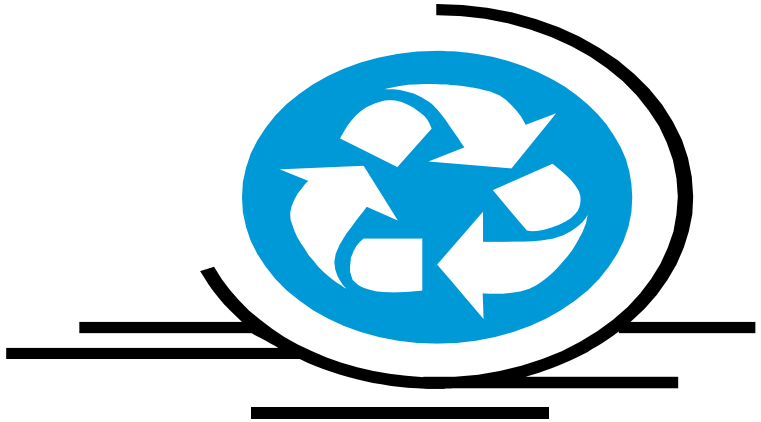

Fixed Rack Position

Fixed and reliable, arranged neatly

Used the pallet support equipment stable

Two equipment stack together

Without pallet that equipment unstable

Rack Installation Requirement

- Forbid stack equipment, make sure proper ventilation and heat dissipation;
- Must be installed the rail bracket , trays, hangers and pallet when installation equipment and boards in the rack. Make sure equipment and boards stable.

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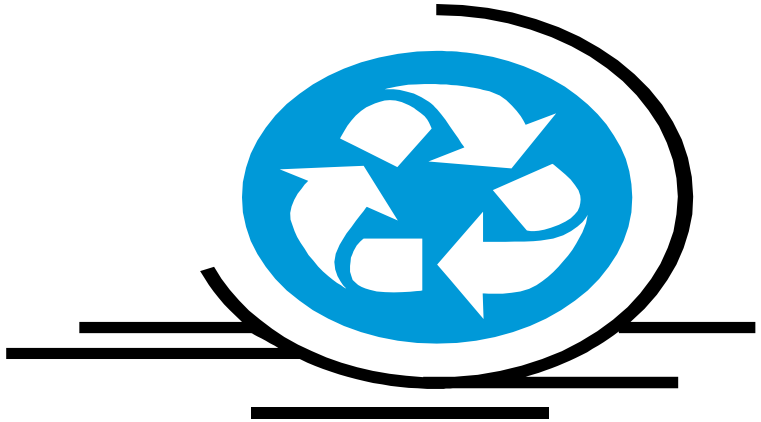

Ventilation and heat dissipation

Between equipment have 10CM space for heat dissipation

Stack two equipment that impact the heat dissipation

The wire blocked the fan that impact the heat dissipation

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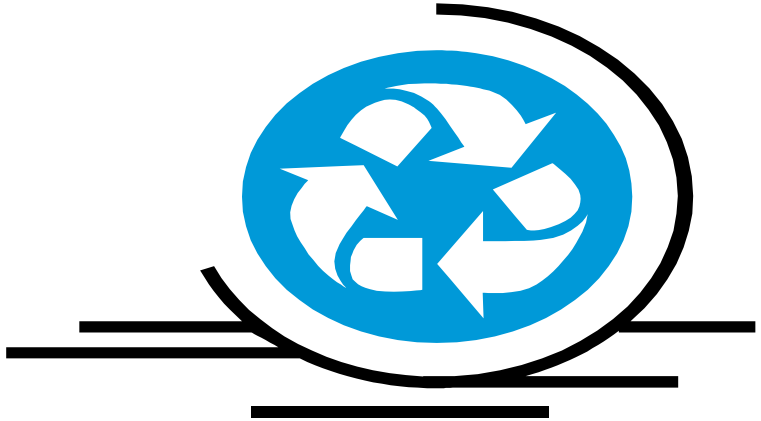
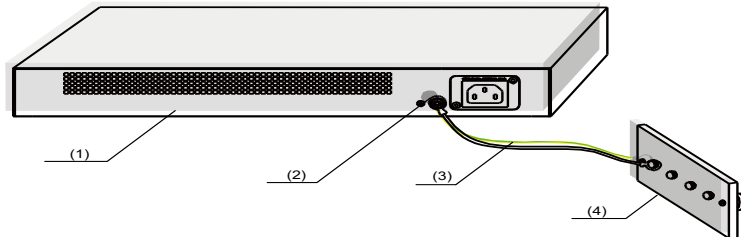
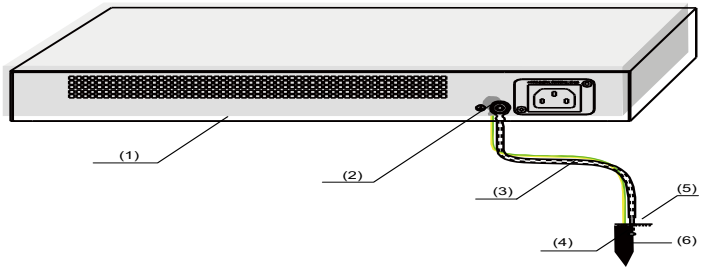


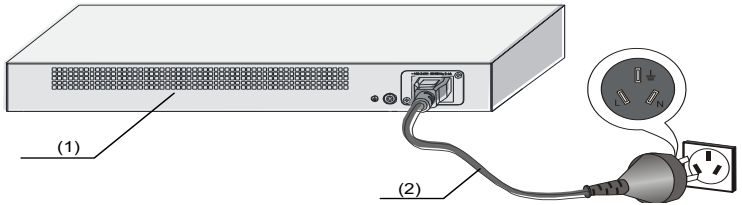
Grounding Protection Solution



Connect the grounding line bar

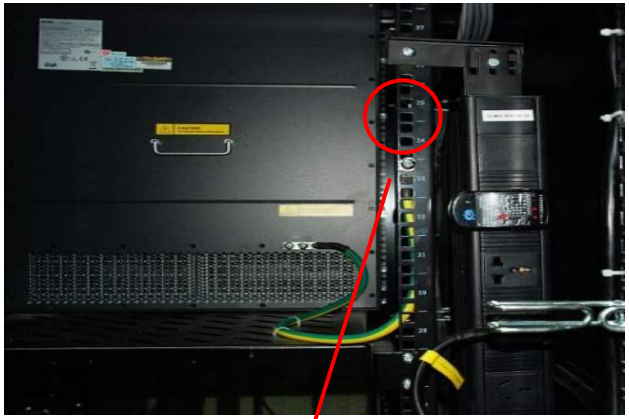


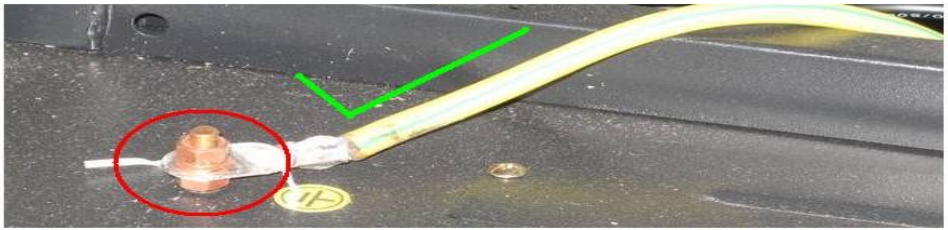
Connect the ground if have not grounding line bar

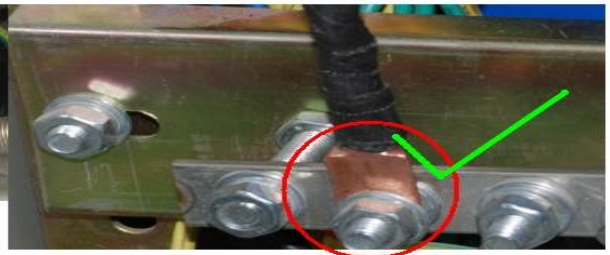


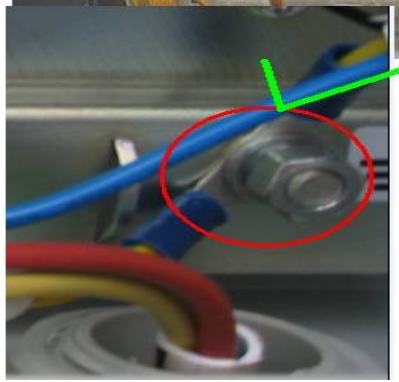
The equipment uses the AC power supply then we can be grounded through the PE cable

Correct Lightning Protection

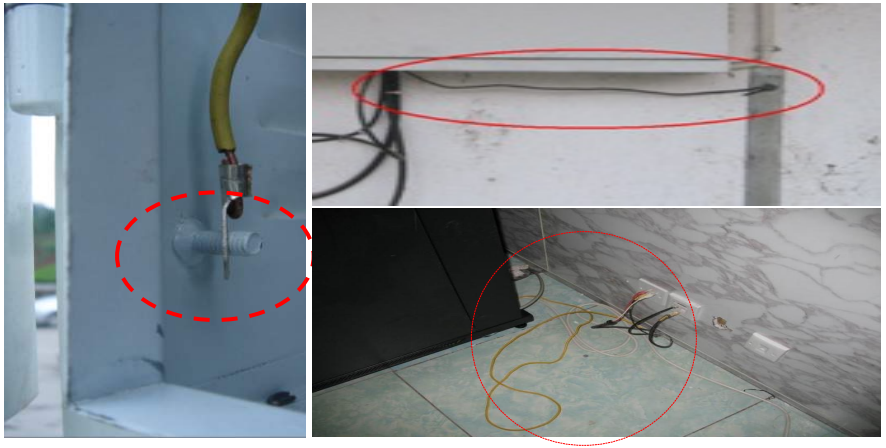




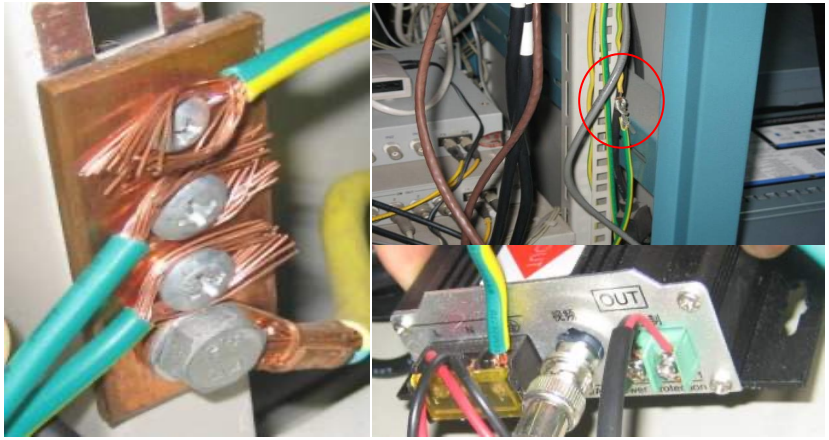




Wrong Lightning Protection

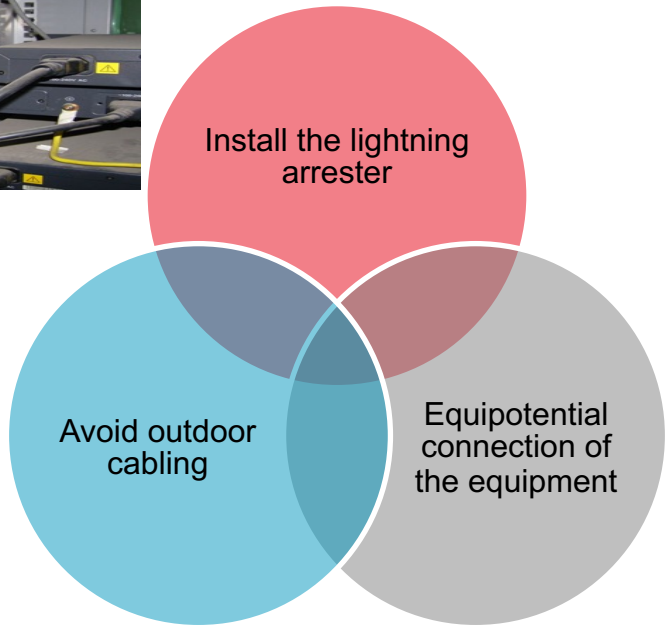


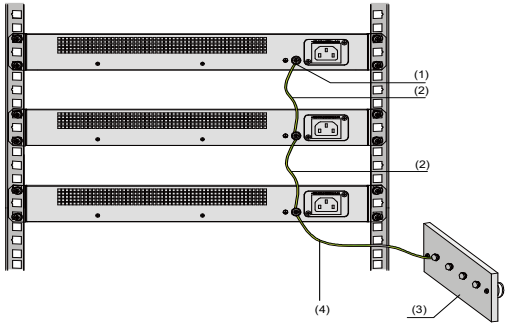
The grounding cable is too thin



Grounding cable installation copper nose is not standard

Other Lightning Protection solution





Grounding specification

- The equipment must be grounded;
- Forbidden to connect the protective ground line and install switches or fuses;
- Ground cables are not allowed to be introduced from outdoor overhead, they must be buried or routed indoors.;
- Do not route the ground cables parallel to or entangle the signal cables;
- The ground cable should be as short as possible and best exceed 30 meters ,If the length exceeds 30 meters, should be reset the ground bar nearby.

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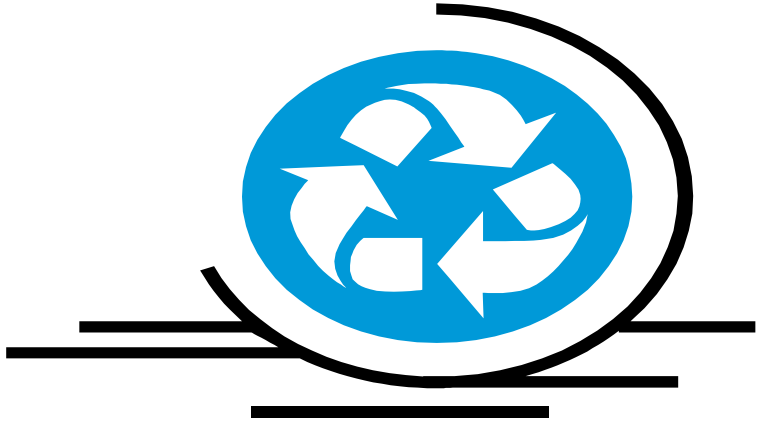
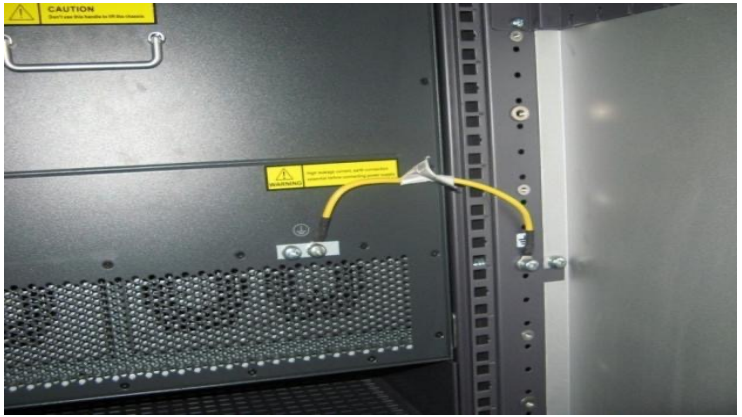


Used the UPS

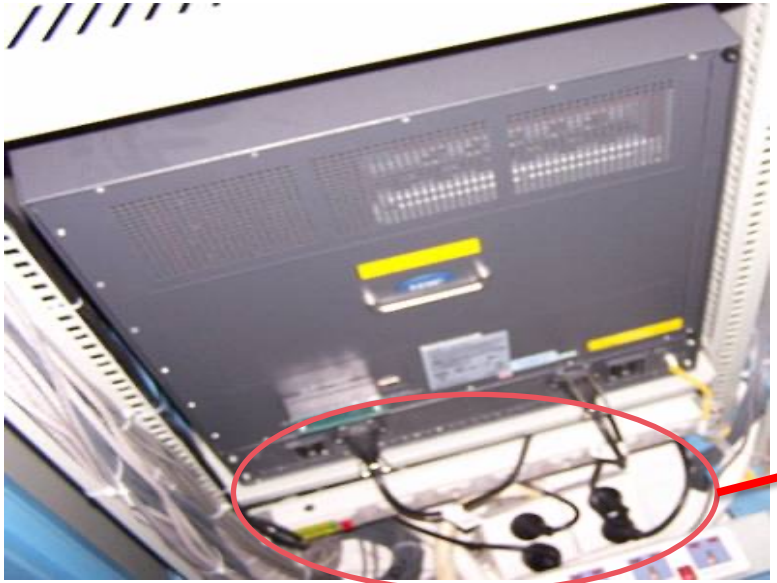
Use the UPS that can filter the fluctuations of the power grid and provide stable voltage and current for the equipment. In addition, when the mains supply fails, the UPS converts the DC power provided by batteries into AC power for temporary power supply.

Correct connect power and ground cable



The AC power socket of the equipment must use a single-phase three-wire power socket with ground cable , and the cable must be connect ground.

Wrong connect power cable



If multiple power modules are connected to one power line, they cannot be used as circuit backup.

Power Supply Specification

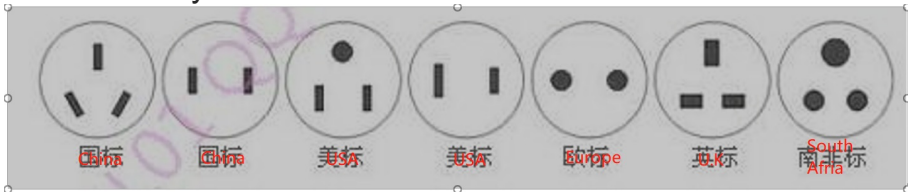
- Ensure each equipment are equipped with independent power, and the protection switches should be larger than those of the lower-level electrical devices;
- Ensure the supplied operating voltage and frequency are consistent with the input voltage and frequency specified on the device label;
- Ensure the power cables connect are correctly. For example, the positive (+) and negative (-) of the DC power supply cannot be connected inversely. The live wire (L), neutral wire (N), and PGND cable (PE) of the AC power cable are correctly connected;
- To avoid the danger of electric shock, do not open the shell of the equipment when it is working. Do not open the shell of the equipment even when it is not powered on;
- Do not place a non-waterproof equipment or external power supply near water or in a damp place, prevent water or moisture from entering the equipment or power supply;
- Installation the lightning protection at the power system if the power system connected to the outdoor, make sure the equipment to prevent damage caused by over-voltage and over-current caused by lightning;
- Try to provide independent and reliable dual grid power supply. Add a voltage regulator if the equipment power from the mains.

Add:

H3C equipment auxiliary package with China standard power socket by default, and the plug type is a 3-pin national standard that mismatch oversea PDU, should be shipment correct PDU according to differed from country requirement.

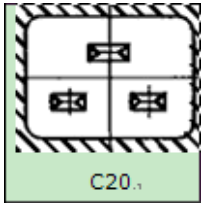
Power Socket Types

- Each country standard

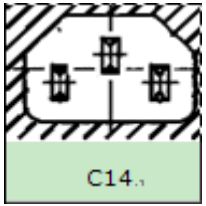


- IEC60320 standard can used in all countries.

- 16A PDU C20 socket



- 10A PDU C14 socket



China Power cable

- C13 input, 10A China standard three-hole input plug

- C19 input, 16A China standard three-hole input plug

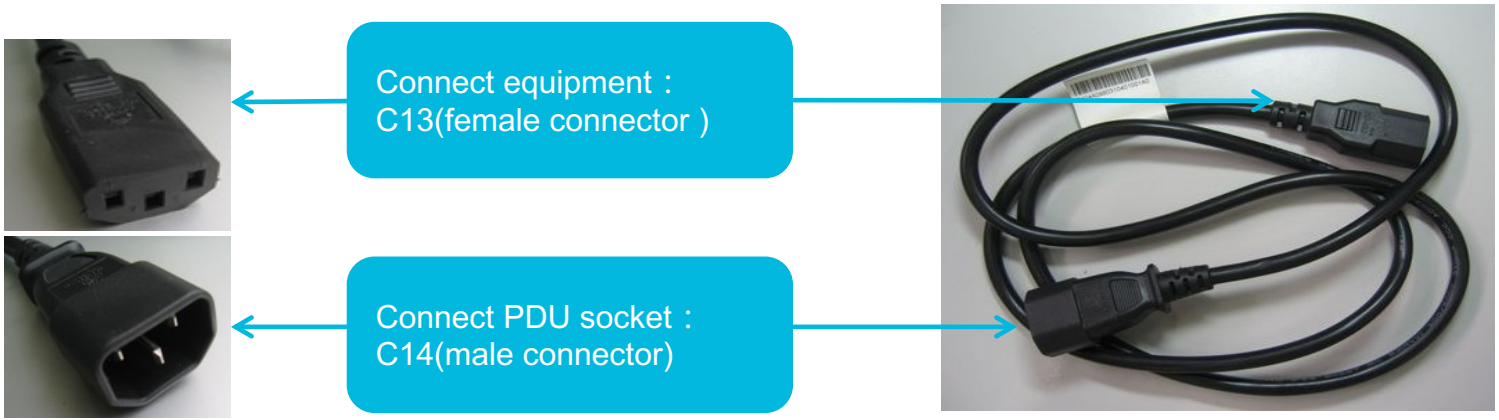
10A-PDU AC power cable

10A PDU AC power cable (BOM code:0404A02X)

Description： International AC 250V10A-2.0m-3*1mm^2-Black-(C13 female connector)-(227IEC53-1.0^2(3C))-(C14 male connector)

Explain：

- 250V10A：250V voltage 10A
- ① 2.0m-3*1mm^2 ： Cable length is 2 meters , the power cable combine with 3 wires and each wires have1 square millimeters;
- C13 female connector ：connect equipment；C14 male connector ： connect PDU socket bar 。
- Other BOM code： 0404A098（1.5M）、 0404A02W（1M）



16A-PDU AC power cable

16A PDU power cable (BOM code: 0404A0C2)

Description： International AC 220V16A-3m-3*1.5mm^2-Black-(C20male connector)-(227IEC53-1.5^2(3C))-(C19female connector)-PDU

Explain ：

① 220V16A：220V voltage 16A;

② 3m-3*1.5mm^2： Cable length is 3 meters , the power cable combine with 3 wires and each wires have1.5 square millimeters;

③ C19male connector ：connect equipment；C20female connector ：connect PDU socket bar;

④ Other BOM code： 0404A098（1.5M）、 0404A02W（1M)

16A PDU power cable，connect C20 types socket

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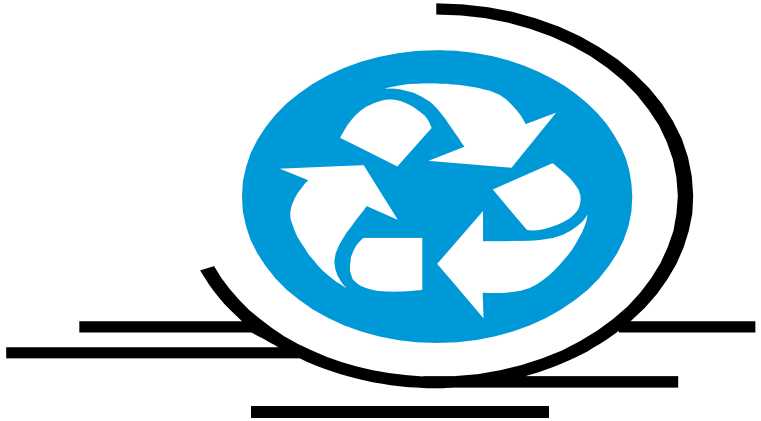
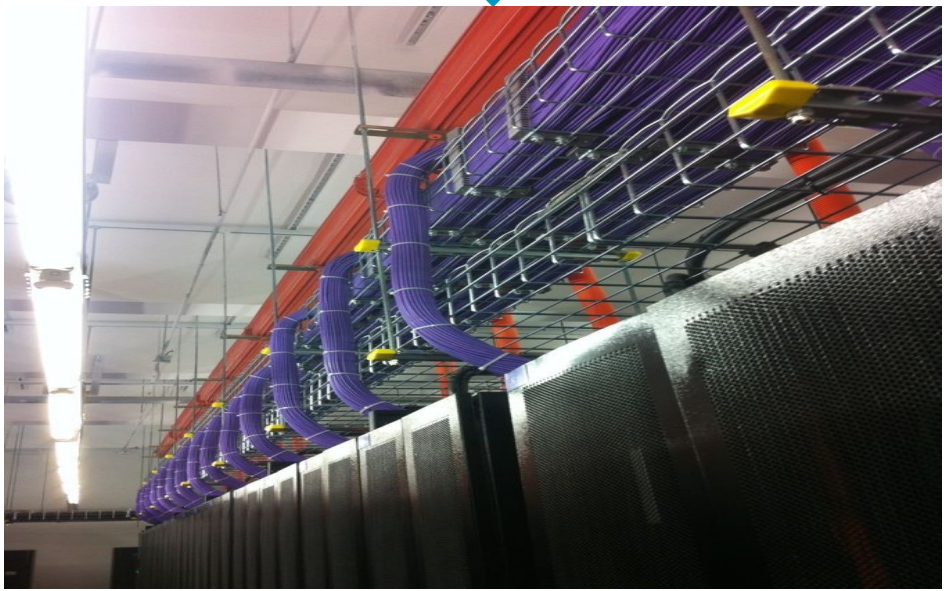


Indoor Wiring

Similar signal line classification, Cables are layered and fixed , neat discharge

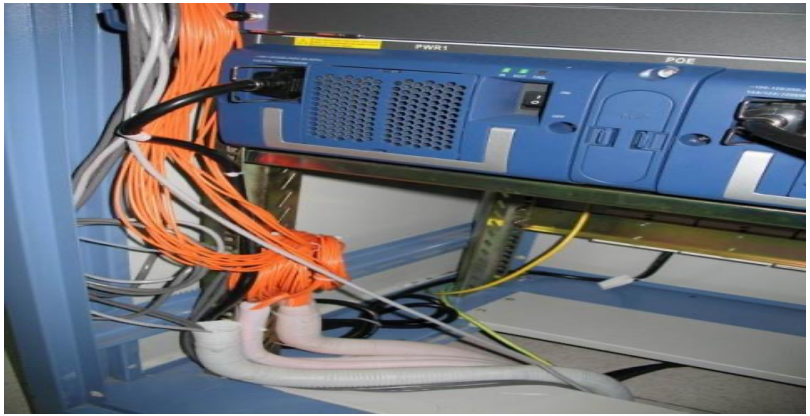


Cable Strapping

Cables are neatly laid, properly bent, and bundled

Wrong wiring will be signal interference

Cables are messy, and signal directions are mixed



Parallel strong and weak cables

Wiring Requirement

- Signal cables, fiber, power cables and grounding cables, between different cables should be have spaced and forbid bundle together.
- Must be bundle when wiring cables；The bundled cables should be close to each other, straight and neat in appearance, evenly spaced between the buckles, and moderately tight；
- Cables in the cabinet should be wiring according to the signal flow direction to avoid interleaving.

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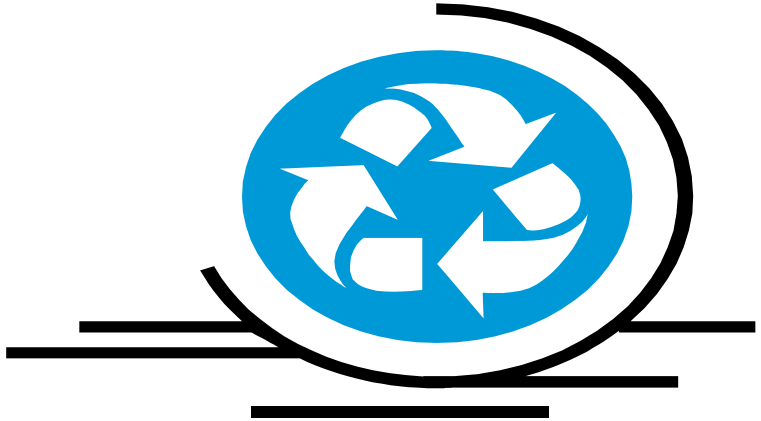
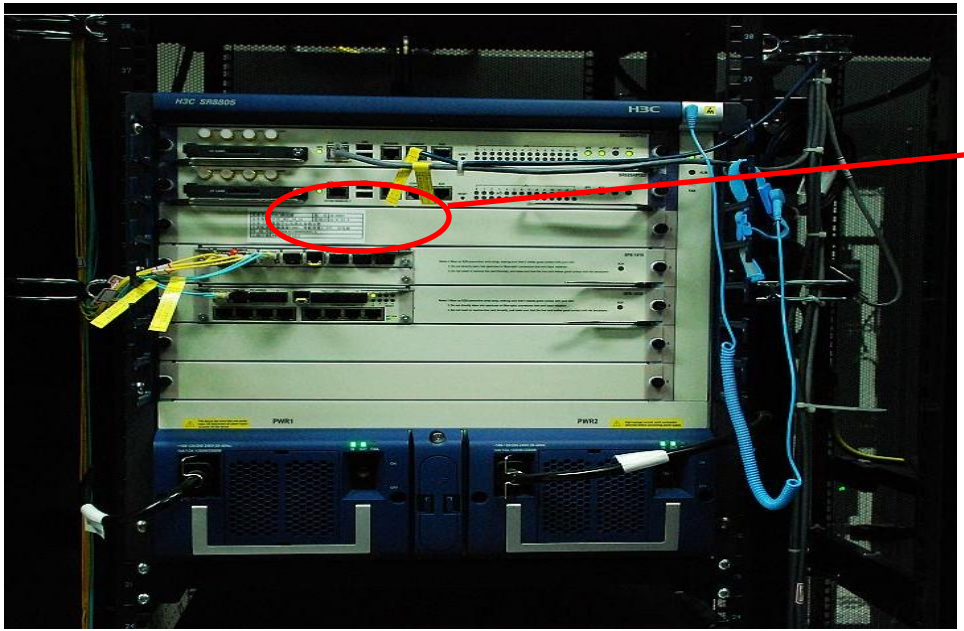
  - Power requirement
  - Wiring requirement
  - **Label requirement**
  - ESD
  - Dustproof requirement
  - Summary and EHS requirement

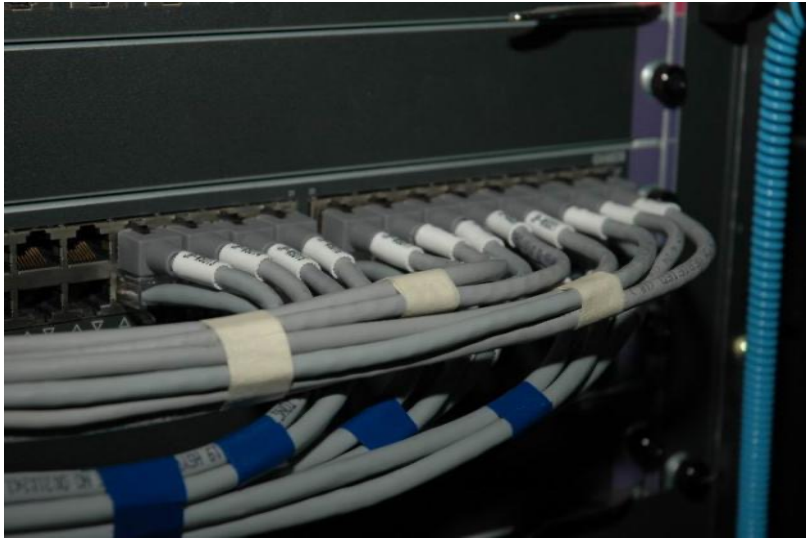


Standard Label Sticking

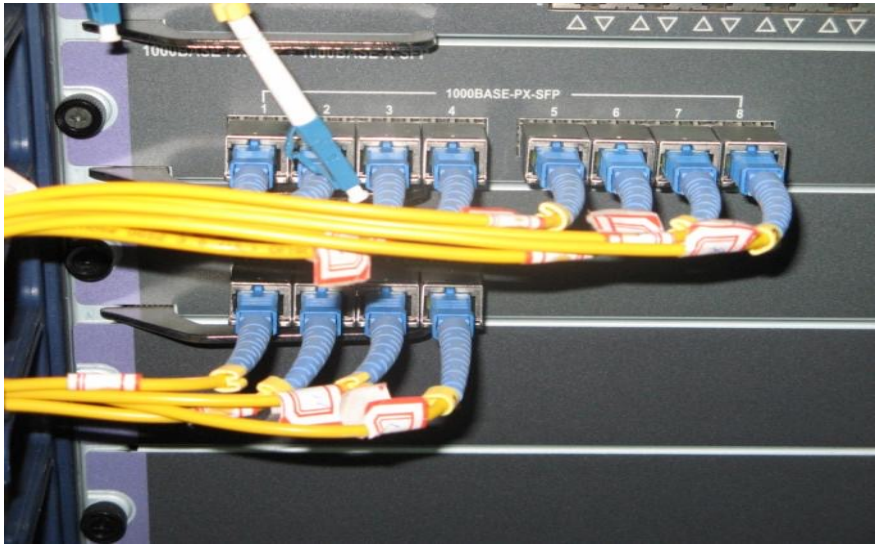


clear and regulated labels sticking

No-Standard Label Sticking



Wrong direction



Poor quality labels that easy to fall off

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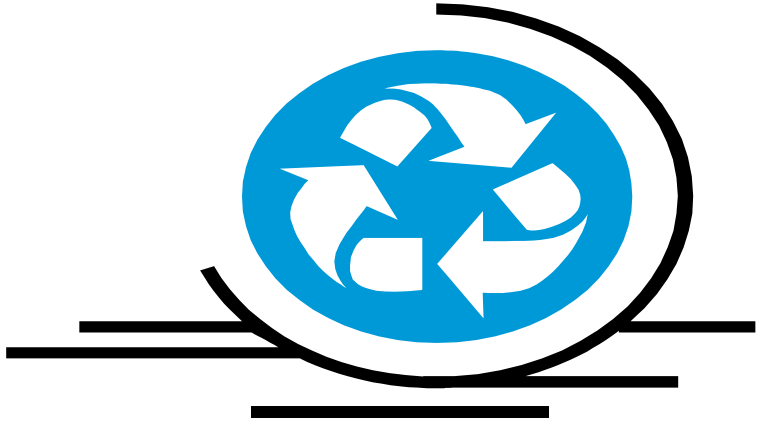
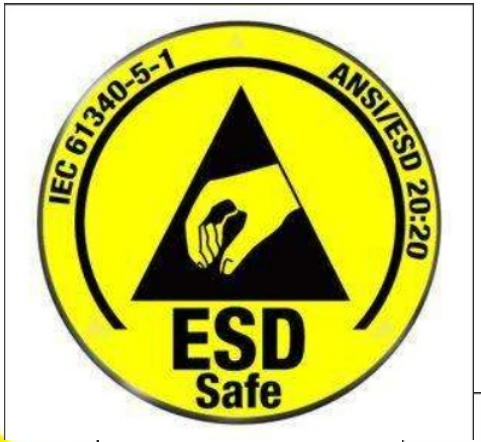
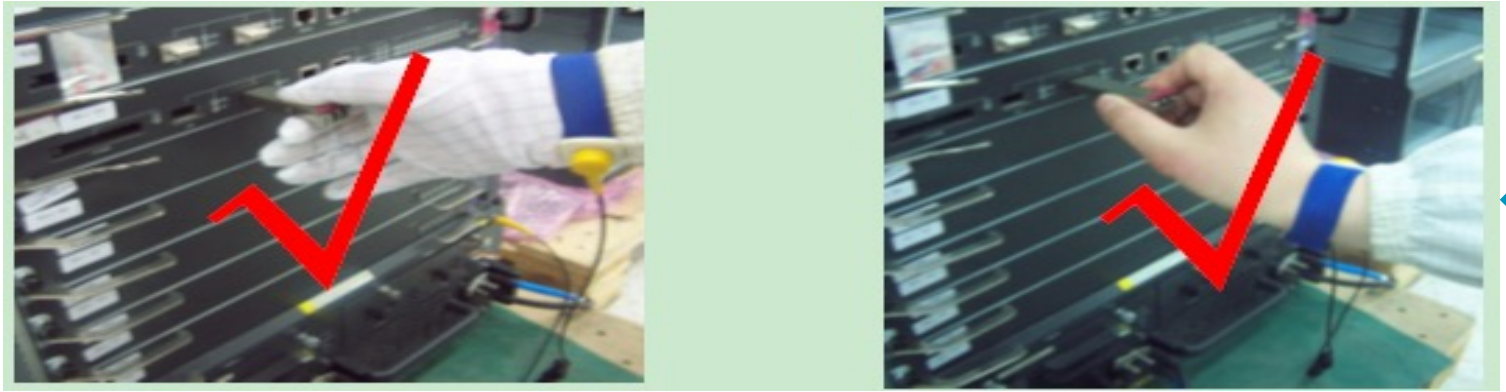


ESD（ Electro-Static Discharge ）



ESD Protection Standard Operation

ESD Protection Precautions for Optical



Anti-Static Gloves and Wristbands

Used the hand directly

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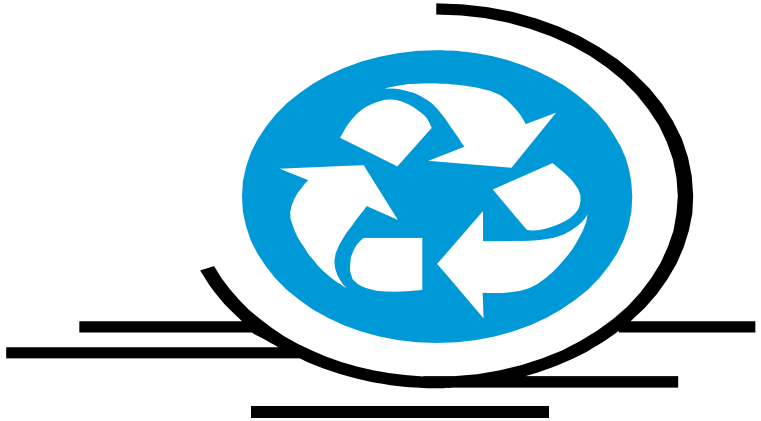
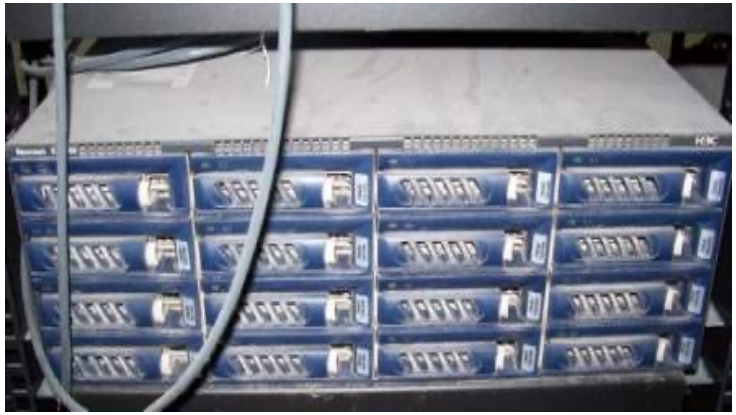
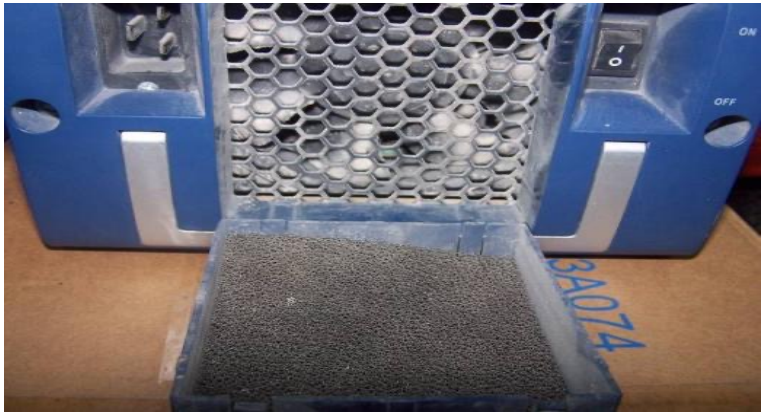


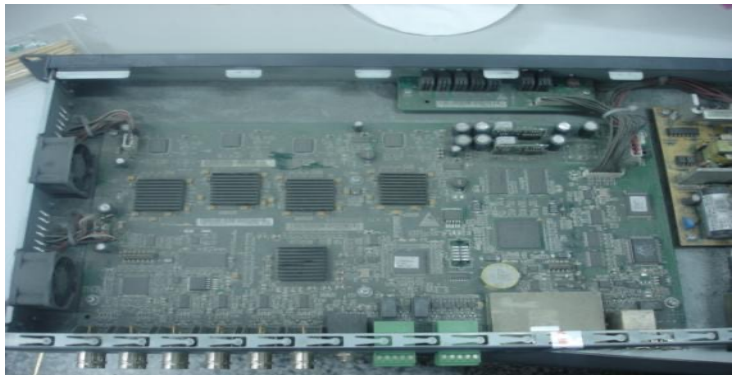
Surface dust that impact equipment function

- Impact heat dissipation, easy damaged equipment
- Corrosion inside equipment
- Equipment electrical safety regulations, easy short circuit

Surface Dust







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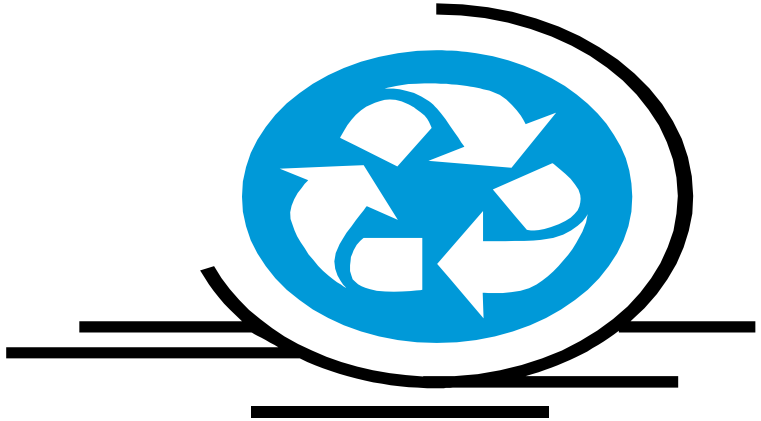
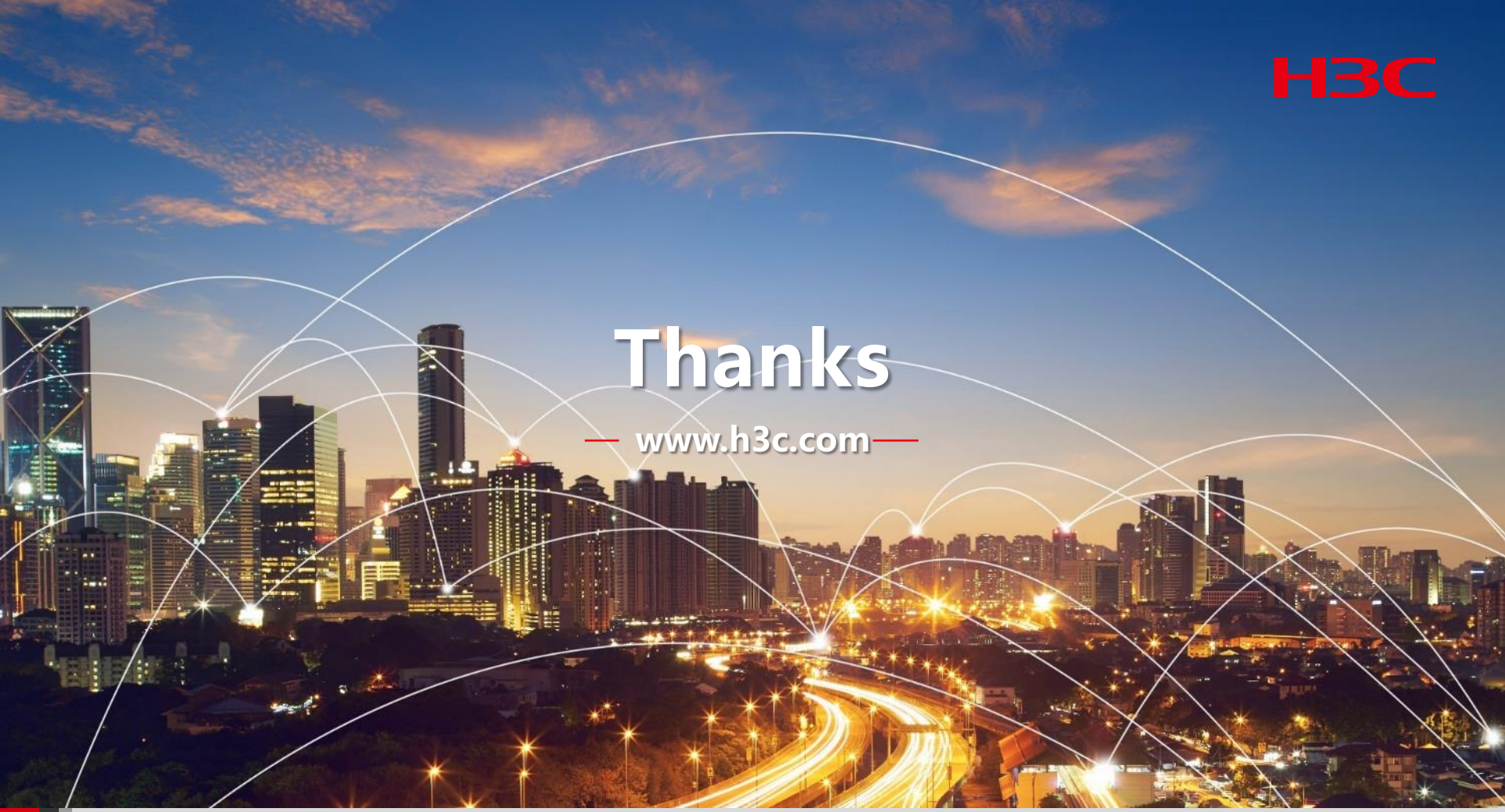


Engineering installation requirement

SN	Category	Requirement	Issue for un-compliance
1	Environmental	Indoor temperature 22℃±2℃, humidity 50%Rh±10%Rh	Too high or too low temperatures and humidity that can cause physical damage.
2		Indoor cleanliness: without dust on the surface of the equipment	Dust will be cause poor connectors, reduced heat dissipation efficiency, insulation damage and breakdown; Dust will be increase mechanical wear; Dust will be lead to drives and disks errors in reading and writing information.
3	Power System	The power supply socket of the equipment adopts a single-phase three-wire power socket with a protective ground wire (PE), and the protective ground wire (PE) is reliably grounded.	Will be easily lead to equipment failure and damage if the socket without a protective grounded.
4		Equipment, cabinets, power system should be grounded for lightning.	Will be easily lead to equipment failure and damage if they are not grounded or poorly grounded.
5		Outdoor wiring should be add the shielded twisted pair or the metal casing.	Lightning may be damage indoor equipment if outdoor wiring without the shielded twisted-pair cables or metal sleeves.
6		Equipment in the same room should be equipotentially connected.	The low-potential equipment may be damage when subjected to lightning.
7	Hardware installation	Should be install rack if equipment the depth greater than 36cm and the height greater than 1U.	May be cause the equipment unstable, the chassis to deform, and the internal circuit to be damaged.
8		Make sure between equipment have a cooling space of more than 10CM.	Little space may impact the equipment heat dissipation and function.
9		Each cables should be bundled neatly, and power cables and signal cables should be laid out separately	Impact signal interference if the power cables and signal cables are not separated,
10		The equipment, signal cable and power cable shoud be have clear lable and information.	Not sticking label or wrong label that impact maintenance in future.
11		Outdoor equipment make sure anti-mildew, moisture-proof, anti-corrosion, dust-proof and heat dissipation.	Will be easily lead to equipment failure or shortened equipment life cycle.
12		The equipment should be keep away from strong electrical device, such as elevators, high-voltage cables, transformers, electric motors etc.	Proximity to interference when equipment near the strong electrical device.
13		Indoor APs cannot be installed outdoors	Indoor APs cannot meet with outdoor environment requirements
14		Outdoor APs should be grounded for lightning	Will be easily lead to equipment failure and damage if have not installed lightning arrester.

EHS requirement


Thanks
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