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HUATO

CULTURAL RELICS TECHNOLOGY PROTECTION EQUIPMENT

Sensor · Environment control equipment · Cultural relics display showcase · Storage equipment Disinfection equipment • Environment monitoring cloud platform



HUATO ELECTRIC CO.,LTD



PROTECT CULTURAL RELICS AND INHERITING HISTORY

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COMPANY PROFILE

HUATO ELECTRIC CO.,LTD was established in 2008 and located in Bao'an District, Shenzhen City, which is a top industral district in China, we have more than 500 employees, more than 150 R&D technicians, sales revenue of more than 300 million RMB. It has been rated as "contract-abiding and creditworthy enterprise"

HUATO business scope includes: Preventive protection of cultural relics, Digital protection, Display showcase improvement, Cultural relics protection and restoration, Intelligent libraries, electrical intelligence, precision instrument, IoT cloud platform services, etc. We are a top cultural relices protection technology company in China. Since 2018, the performance of cultural relics technology protection-related projects has ranked Top1 in the country for four consecutive years.

HUATO has built three professional factories in Shenzhen for cultural relic display cabinets, electrical equipment and packaging box. The factory covers an area of more than 12,000 m², with an annual production of 8,000 linear meters of display cabinets, 6,000 units (sets) of micro-environment control equipment and 40,000 units (sets) of acid-free capsules.

In order to provide better services to customers, HUATO has established branches in Beijing, Nanjing, Jinan, Chengdu, Xi'an, Wuhan and Shenyang to serve our clients in a timely manner and provide clients with high-quality products.



Sheet metal workshop



Electrical equipment production line



Packaging box



R&D Center



Company exhibition hall





In 2016, HUATO was recognized as a national high-tech enterprise.

SHENZHEN Reserve Level Talents

In 2020, Technical leader Dr. Zhang Lizhi was rated as a reserve-level professional and technical talent in Shenzhen.

2020 & 2022 Chinese Top Ten Museum Technology and Service Award

Huato constant temperature and humidity storage cabinet and environment monitoring cloud platform won Chinese Top Ten Museum Technology and Service Award in 2020 and 2022 accordingly.

National Specialty and Innovation "Little Giant" Enterprise

In 2021, HUATO was recognized as a specialized and Innovation "little giant" enterprise by the Ministry of Industry and Information Technology.

Guangdong Micro-Environment Measurement and Control Engineering Technology Research Center

In 2021, Guangdong Provincial Department of Science and Technology approved HUATO to establish "Guangdong Provincial Micro-Environment Measurement and Control Engineering Technology Research Center".

Shenzhen Local Leading Talent

In 2021, the founder Mr. Zhang Lixiong was rated as a professional and technical talent in Shenzhen-local leading talent.

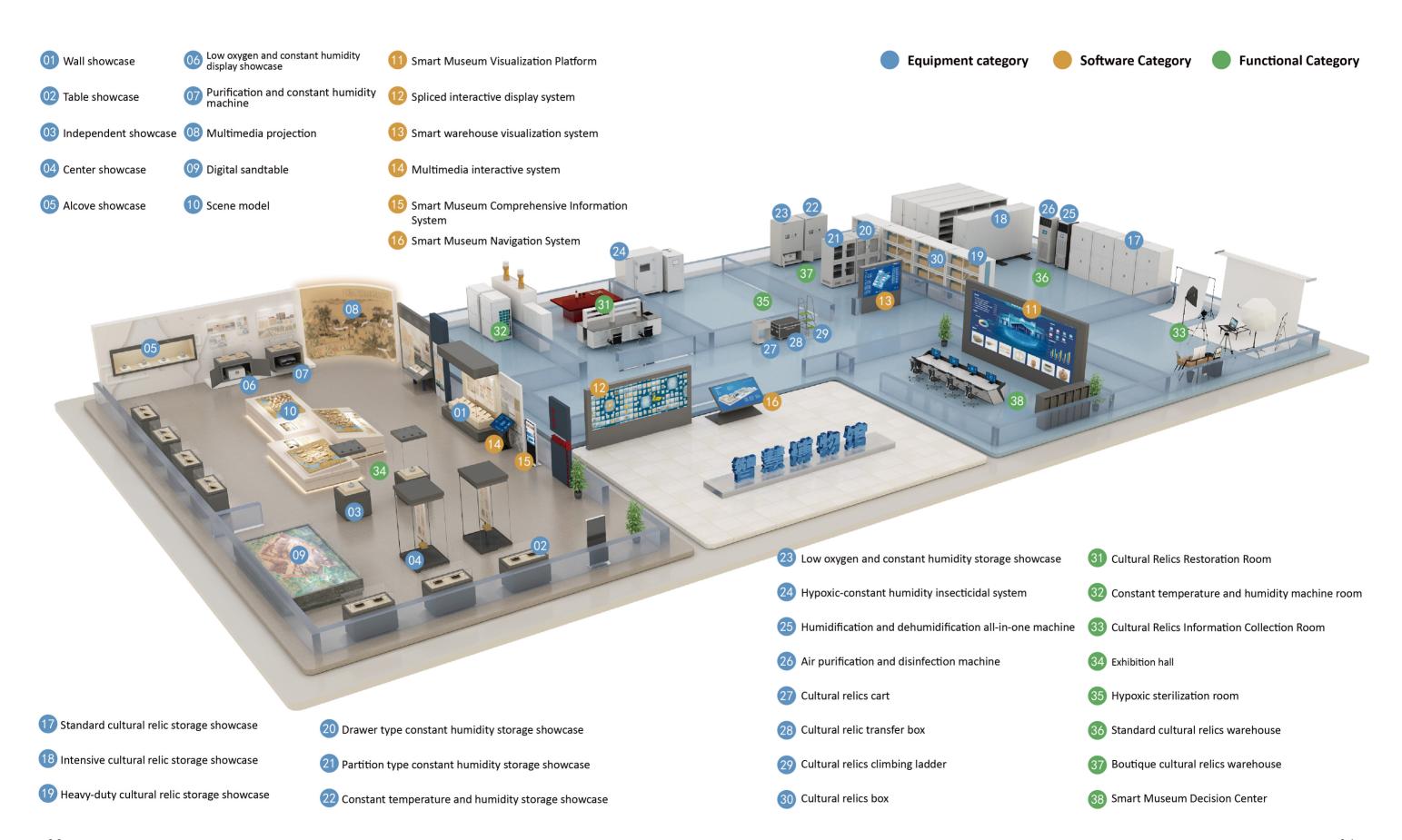
Class A Qualification of Museum Display and Exhibition Design Construction

In 2022, the China Museum Association issued Class A qualification certificates for museum display and exhibition design and Class A construction.





HUATO Business Scope

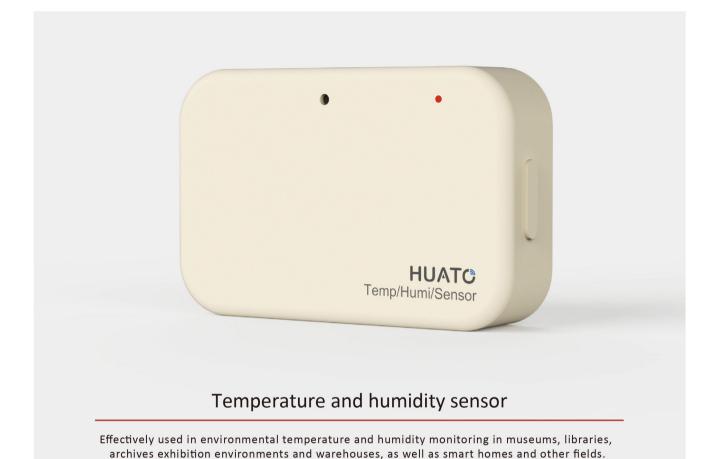


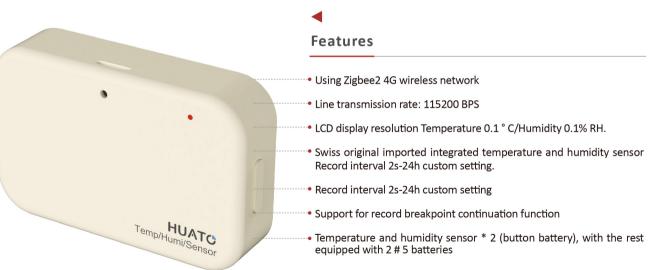


Sensor

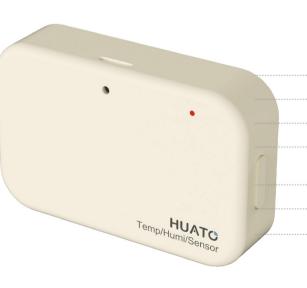
UNIT 2

- Environment control equipment
- Cultural relic display showcase
- Storage equipment
- Disinfection equipment
- Environment monitoring cloud platform





Temperature range	-40∼85°C	Humidity range	0~100%RH
Temperature resolution	0.1℃	Humidity resolution	0.1%RH
Temperature accuracy	±0.3°C	Humidity accuracy	± 2%RH





Effectively used in environmental temperature, humidity and light intensity monitoring in museums, libraries, archives exhibition environments and warehouses, as well as smart homes and other fields.



Features

- It adopts imported high-precision and high-sensitivity temperature and humidity sensors with fast response and high accuracy.
- · Using (NDIR) non-dispersive infrared technology to measure illumination ensures low power consumption of the product.
- Ultra-low power consumption design, the instrument is powered by two 3.6V lithium batteries, and can last for more than 12 months under normal operation.
- Professional temperature and humidity gas circuit circulation structure design makes temperature and humidity sampling more sensitive and accurate.
- The compact and exquisite appearance design and carefully selected color combinations allow the instrument to form an organic unity with various exhibition environments.
- Wireless IoT data monitoring can centrally and effectively monitor the changes in temperature, humidity and light intensity of each placed node.
- TYPE-C USB communication interface and built-in multi-point accuracy calibration algorithm ensure the accuracy of the instrument.
- The professional analysis software is easy to use and provides multiple data protections to ensure that data will never be lost.
- It has the function of resuming transmission after power outage. As long as the network is restored, historical data can be effectively resumed to the server, effectively ensuring the continuity and integrity of data monitoring.

illumination range	0∼30001x	Temperature range	-40∼85°C	Humidity range	0~100%RH
illumination resolution	0.11x	Temperature resolution	0.1°C	Humidity resolution	0. 1%RH
illumination accuracy	±4%rdg	Temperature accuracy	±0.3°C	Humidity accuracy	±2%RH



CO2 temperature and humidity sensor

This instrument adopts wireless data transmission to collect and record data, and can achieve remote real-time monitoring of temperature and humidity in indoor environments such as intelligent.



Features

- · Adopt imported high-precision and high-sensitivity temperature and humidity sensors, with fast response and high accuracy.
- Use (NDIR) non-dispersive infrared technology to measure carbon dioxide, ensuring low power consumption of the product.
- Ultra-low power consumption design, the instrument is powered by two 3.6V lithium batteries, which can last for more than 12 months under normal operation.
- Professional temperature and humidity air circuit structure design makes temperature and humidity sampling more sensitive and more accurate.
- The compact and exquisite appearance design and carefully matched color combinations allow the instrument to form an organic unity with various exhibition environments.
- Wireless IoT data monitoring can centrally and effectively monitor the temperature, humidity and carbon dioxide concentration changes of each placed node.
- TYPE-C USB communication interface, built-in multi-point precision calibration algorithm, making the instrument accuracy more guaranteed.
- Professional analysis software is easy to use and provides multiple data protections to ensure that data will never be lost.
- It has the function of resuming transmission after power outage. As long as the network is restored, historical data can be effectively resumed to the server, effectively ensuring the continuity and integrity of data monitoring.

C02 range	0~5000ppm	Temperature range	-40∼85°C	Humidity range	0∼100%RH
C02 resolution	1ppm	Temperature resolution	0.1°C	Humidity resolution	0.1%RH
C02 resolution	3%±60ppm	Temperature accuracy	±0.3°C	Humidity accuracy	±2%RH

VOC Temperature and Humidity Sensor

Temp/Humi/VOC Sensor

Widely used for monitoring environmental temperature, humidity, and VOC concentration in museums, libraries, archives, exhibition environments, warehouses, and smart homes.



Features

- · Adopting imported high-precision and high sensitivity temperature and humidity sensors, it has fast response and high accuracy.
- The use of non dispersive infrared (NDIR) technology to measure VOC ensures low power consumption of the product.
- Designed with ultra-low power consumption, the instrument is powered by two 3.6V lithium batteries, and can operate normally for more than 12 months.
- Professional design of temperature and humidity air circulation structure makes temperature and humidity sampling more
- . The compact and exquisite exterior design, with carefully blended color combinations, allows the instrument to form organic unity with various exhibition environments.
- Wireless IoT data monitoring can centrally and effectively monitor the temperature, humidity, and VOC concentration changes of each placement node.
- The TYPE-C USB communication interface is equipped with a built-in multi-point accuracy calibration algorithm to ensure the accuracy of the instrument.
- · Professional analysis software is simple and easy to use, with multiple data protections to ensure that data is never lost.
- · Equipped with power outage continuation function, as long as the network is restored, historical data can be effectively transmitted to the server, effectively ensuring the continuity and integrityof data monitoring.

VOC range	0~20ppm	Temperature range	-40∼85°C	Humidity range	0∼100%RH
VOC resolution	0.01ppm	Temperature resolution	0.1°C	Humidity resolution	0. 1%RH
VOC accuracy	±3% FS	Temperature accuracy	±0.3°C	Humidity accuracy	± 2%RH

Intelligent control, precise constant humidity

Small size/low noise/low power consumption/no need to add water/no need to drain water



Purification and constant humidity machine

01 Wide humidity control range

The effective humidity control range is 25%~70%RH, which can better meet the requirements of cultural relics made of different materials for various humidity environments.

No drainage

Equipped with fans and automatic control systems, the dehumidified condensed water can be automatically evaporated into the air, eliminating the need for manual drainage (pouring) of water.

02 High humidity control accuracy

The micro-positive pressure air transmission method is used to maintain the micro-positive pressure in the showcase relative to the outside world, ensuring the uniformity of air humidity in the showcase, and the control accuracy is ≤±3%RH.

05 No need to add water

Equipped with an automatic water intake module, under applicable environmental conditions, it automatically condenses water vapor in the air and replenishes it in the constant humidity machine.Liquid level, provides water source for humidification function, No need to manually add (replenish) water.

03 Wireless communication

Built-in 2.4GHz wireless communication module; staff can remotely monitor the operating status of the purification and humidifier and remotely modify parameters as needed.

06 Small and beautiful

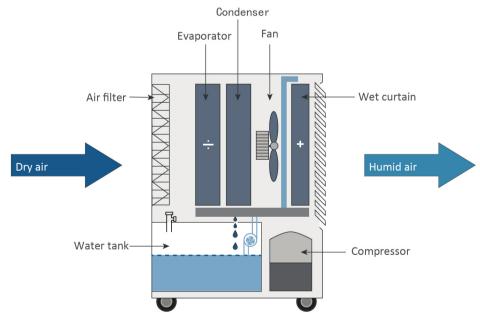
The equipment is small in size, low in power consumption, and easy to install. It can be installed on the base of various showcases and only requires certain ventilation requirements.

Regulating volume	≥8m³	Humidity control accuracy	≤±3%RH		
power supply	AC220V/50Hz	rated power	≤145W		
air distribution	Micro positive pressure air supply	Purification method	Activated carbon filter screen adsorption		
Installation method	Install the bottom of the display cabinet and secure it with brackets		450x305x150mm		
Humidity control range	When the temperature inside the exhibition cabinet is below 30 ° C, the effective humidity control range is 25%~70% RH.				
Communication method	Reserved communication port RS485/RJ45, built-in 24GHZ wireless communication module				
Safety protection performance	Equipped with automatic and remote diagnosis functions, multiple security protection systems				



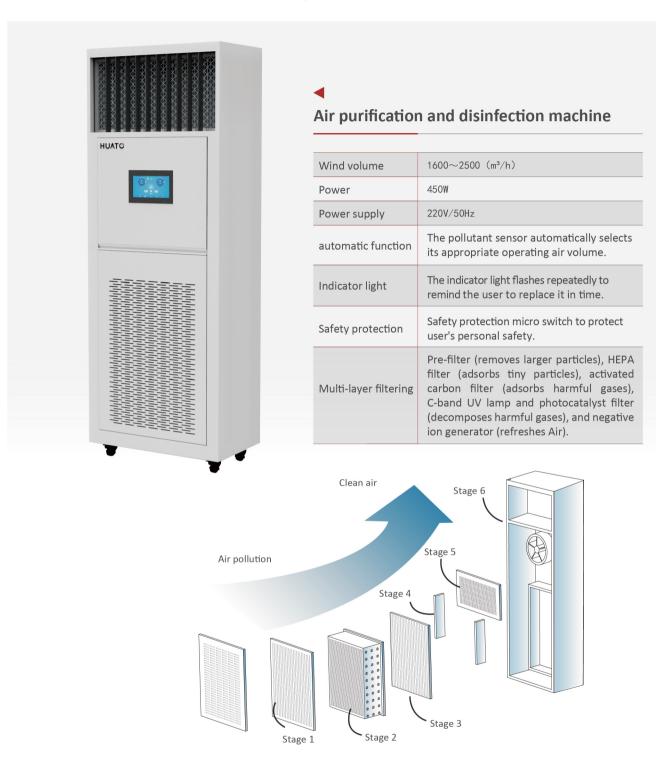
Humidification and dehumidification all-in-one machine

Humidification amount	7~9kg/h
Dehumidification capacity	60~120L/24h
Scope of application	90~150m²
Air volume	1600/2200m³/h
Power	200/1300 (W)
Power supply	220V/50Hz
Purification module	G4 metal filter-wet membrane
Add water method	Manual/automatic, optional large-capacity 90L external water tank.
Drainage method	Water tank/automatic, optional large-capacity 90L external water tank
Control Panel	8-inch color touch screen control panel



Humidification:

Start the water pump to add water and pour it down from the upper part of the curtain. The fan starts, allowing dry air to enter and moist air to exit; The compressor is not working.



Working principle diagram of air purification and disinfection machine

The air purifier equipment is equipped with a wireless intelligent environmental sensor module to detect the air quality status in the warehouse in real time. It can effectively and quickly purify the air, ensure the clean air quality of the environment where cultural relics are preserved, and truly automate and balance the management of air quality inside the warehouse. Humanized design with rollers, convenient for staff to use, efficient purification, can remove a variety of harmful indoor gases, and provide a clean environment for cultural relics preservation.

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This product uses capacitive meter touch and OLED high-definition display for the first time. The combined technical route perfectly solves the problem of OLED electromagnetic interference, improves touch sensitivity and enhances user experience.



Features

- OLED high-definition display with high color reproduction.
- Clear display, light transmittance ≥95%.
- Touch response speed: 8 milliseconds/frame second.
- The cabinet has strong sealing performance.
- The cabinet dissipates heat evenly and is suitable for long-term operation.
- Constant temperature and humidity, suitable for storage of cultural relics.
- Comply with environmental safety standards for cultural relic storage











Wireless communication function

The showcase has a wireless communication function and can exchange data with peripheral wireless communication equipment. It uses 2.4G free and open frequency band which is specified by the State Radio Commission.

25%RH ~ 70%RH, accuracy ≤±2%RH.





Parameter setting function

The display cabinet has parameter setting functions according to different situations and objects. It can also be remotely controlled by staff, and this makes it highly operable.



Air quality purification function

It can purify formic acid, formaldehyde, acetic acid and volatile compounds, etc., and the purification efficiency after purification by the device is greater than 50%.



Lighting control function

The display cabinet has the function of filtering ultraviolet and infrared rays, and the ultraviolet radiation intensity is $\leq 10\mu w/lm$. The illumination of the showcase is adjustable, and the adjustment range is: $151x \sim 4501x$. The color temperature of the display cabinet is adjustable, the color temperature adjustment range is 2700K ~ 5000K, and the angle of the display cabinet lamps is adjustable.



Power-down data storage function

The showcase should have a power-down data storage function. When the power is off, the data and dynamic operating parameters in the showcase should be automatically saved. After powering on again, it should be able to automatically restore the data parameters before the power failure and work normally.



Real-time monitoring function

The display cabinet has the function of real-time data monitoring of environmental parameters. Monitoring parameters include: temperature, relative humidity, illumination, ultraviolet intensity, total volatile organic compounds (VOC), etc. All data can be viewed and saved in real time through the ToClient, and necessary analysis can also be carried out by it.



Anti-theft alarm function

The display cabinet has an anti-theft alarm function. When the alarm device is triggered, the device can automatically sound an alarm and at the same time alert the preset personnel through phone calls, text messages, etc. according to the settings.



Partition type constant humidity storage showcase

Structure	One-sided double-door, 4-layer storage platform			
Load bearing	Each layer reaches more than 100Kg			
Display	Embedded color display			
No need to replenish water	Equipped with an intelligent automatic water intake module, no need to manually add (replenish) water			
Humidity module	Self-developed constant humidity purification equipment			
Humidity control range	25%RH~70%RH, accuracy±3%RH			
Usage environment	5~45°C, 5~95%RH			
Using electric	220VAC, 1A/24V			



Drawer type constant humidity storage cabinet

10-layer drawer storage box
Each layer reaches more than 100Kg
Embedded color display
Equipped with an intelligent automatic water intake module, no need to manually add (replenish) water
Self-developed constant humidity purification equipment
25%RH~70%RH, accuracy±3%RH
5~45°C, 5~95%RH
220VAC, 1A/24V



Constant temperature and humidity storage cabinet

It is widely used in the long-term constant temperature and humidity storage of Chinese medicinal materials, museum and art gallery collections, and the maintenance of warehouse collections.



Features

- Improve the overall air-tightness and thermal insulation performance, and reduce the disturbance of the external environment to the micro-environment inside the cabinet.
- Solve the uniformity of the temperature field and humidity field in the cabinet.
- The refrigeration and constant humidity module is newly upgraded to provide stable and reliable temperature and humidity control effects.
- The air circulation in the cabinet adopts innovative methods such as uniform air, air supply, and return air, which effectively improves the uniformity of the temperature field and humidity field in the cabinet.
- When the fan blows air at the maximum air volume, the air flow speed in the cabinet is stable and the temperature and humidity flow, Remain stable with small fluctuations.
 Make it less disruptive to items.

Internal volume of storage showcase	0.85m³	Temperature control stability	Set temperature value ±2°C
Air exchange rate of showcase	≤0. 15/d	Humidity control stability	Set humidity value ±3%RH
Temperature control range of showcase	15°C∼30°C	Showcase temperature uniformity	≤2 °C
Humidity control range inside the showcase	40%RH~70%RH	Humidity uniformity inside the showcase	≤5%RH



Energy-saving constant humidity storage showcase

"Can be used for calligraphy and painting, books, archival silk fabrics, leather products, animal and plant specimens, lacquerware, engravings, bronzes, Long-term storage of luxury goods and other collections to achieve preventive protection of collections"



Features

Active and passive regulation, energy conservation and environmental protection

- Support a combined humidity control method of constant humidity module (active) and fiber humidity control sheet (passive)
- Support the humidifying method of pure fiber humidifying sheets (passive)
- Compared to pure active regulation, the energy-saving rate of active and passive joint regulation is much greater than 50%

Constant humidity and long-term stability

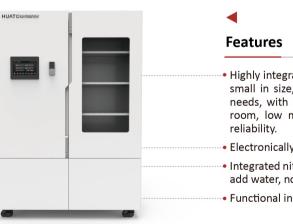
- Customizable humidity control pads with any humidity value within the range of 30% to 70% RH
- The humidity inside the cabinet remains constant for a long time, with daily fluctuations less than ± 2%
- The humidity inside the cabinet exceeds the limit, the constant humidity module is activated, and the humidifying pad is activated, with a lifespan of more than 5 years

High air tightness and clean air

- The air change rate inside the cabinet is \leq 0.05 times/day, with high air tightness and little external interference
- Clean the air inside the cabinet, effectively removing particulate matter, gaseous pollutants, microorganisms, etc
- Unattended, power outage, constant humidity, safety



Through gas replacement, the purity of clean and constant-humidity nitrogen in the storage cabinet can reach 99.5%, effectively preventing oxidation and insect damage of items stored in the cabinet.



- Highly integrated integrated design, the system is compact and small in size, suitable for a small amount of hypoxic storage needs, with low initial cost and no need to build a machine room, low maintenance, low energy consumption and high
- Electronically controlled adjustable light transmittance glass
- Integrated nitrogen and constant humidity machine, no need to add water, no need to drain water
- Functional industrial-grade high-reliability electronic control

Specification	$1\sim 2m^3$	Oxygen content control	0.5%~21%	Humidity stability	Set humidity value ±3%RH
Nitrogen purity	99. 5%	Humidity control	20%~70%RH	Noise	Operating noise 1m directly in front 50dB(A)
operating system	One-touch operation, simple and convenient				

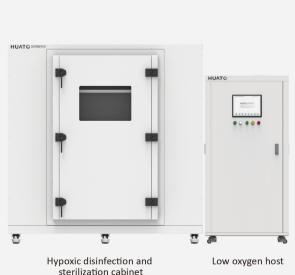
Hypoxic-constant humidity insecticidal system HUATO

High system integration, low power consumption, and low operating noise

Constant humidity and oxygen reduction/high efficiency air tightness/intelligent control/green environmental protection

The new environmentally friendly low-oxygen and constant-humidity sterilization system uses the principle of physical separation to produce nitrogen with a purity of up to 99.99%. It accurately regulates humidity and effectively filters out external air.Impurities such as insect eggs, mold spores, and harmful dust in the external environment are then sent into the nitrogen-filled cabinet to establish a long-term low-oxygen and constant-humidity environment in the nitrogen-filled cabinet, which can effectively prevent cultural relics from being infested by insects, mildew, and bacteria, and prevent biological The role of infringement.





Features

Oxygen reduction and humidity control performance

- Oxygen content control range: 0.1%~21%
- Normal pressure nitrogen filling, constant humidity and oxygen reduction, with a precision of constant humidity control within 2.5%

High airtightness of the cabinet body

 High airtightness cabinet design and process, with a ventilation rate less than 0.02d⁻¹

Remote monitoring/multi machine linkage

- Supports wireless communication methods such as ZIGBEE, LORA, and 4G, making networking more convenient and flexible
- Can display oxygen content, nitrogen purity, humidity, temperature data, and operating status in the system
- Information can be uploaded to the cloud and remotely monitored through mobile devices
- Support multi host linkage to expand host nitrogen production capacity

Easy to use and maintain

- The entire series of products adopt oil-free air compressors, greatly reducing maintenance workload
- The operation interface is simple and easy to use
- The nitrogen generating humidity machine in the low oxygen and constant humidity display and storage system has functions of no drainage and no water addition

Technical Parameter	
Working environment conditions	Ambient temperature: 5°C~35°C, good ventilation; Ambient humidity: ≤80%RH;
Regulate volume	1 ~ 10m³
Cabinet pressure control range	±200Pa (gauge pressure)
Nitrogen supply flow	2 ~ 5m³/h
Nitrogen purity	99.99%
Cabinet ventilation rate	≤0.02d ⁻¹
Oxygen content control range	0.1%~21%
Oxygen reduction time	≤8h (oxygen content dropped from 21% to 0.5%)
Relative humidity control range	30% ~ 65%RH (ambient temperature: 20°C; control space tightness ≤0.02d ⁻¹)
Humidity control stability	Set humidity value ±2.5% RH
Cleanliness of the cabinet environment	Effectively filter out oxygen, harmful gases, dust particles, mold spores, insect eggs, etc. in the air.
Air flow purification method	Adsorption and filtration of nitrogen production systems.
humidification water tank	The water tank has a capacity of 10L, with liquid level indicator and liquid level switch, and manual water addition.
Humidification water tank liquid level detection	Side-mounted liquid level switch provides water shortage alarm.
Power supply	AC380V±10%/3-phase/50Hz±2Hz
Power consumption	3200W (single host)
Noise	Operating noise 1m directly in front is 56dB(A)







High airtight nitrogen-filled cabinet

Highly integrated systems and controls

Ultra-low operating noise on site

- The self-developed highly integrated system adopts internationally renowned brand oil-free air compressors. The structure is compact and the power consumption is only 50% of competing products. It releases less waste heat and waste water to the environment and requires very little maintenance.
- Low operating noise, leading the industry.
- All electrical components adopt industrial grade and industrial automation wiring technology.



The 8th National Top Ten Cultural Museum Technology Products and Services Promotion Event Final Review Meeting

Clairvoyance cloud platform system







Data optimization and integration



Data query

8 Environmental information is processed in a timely manner



Early warning system

Measurement and control linkage

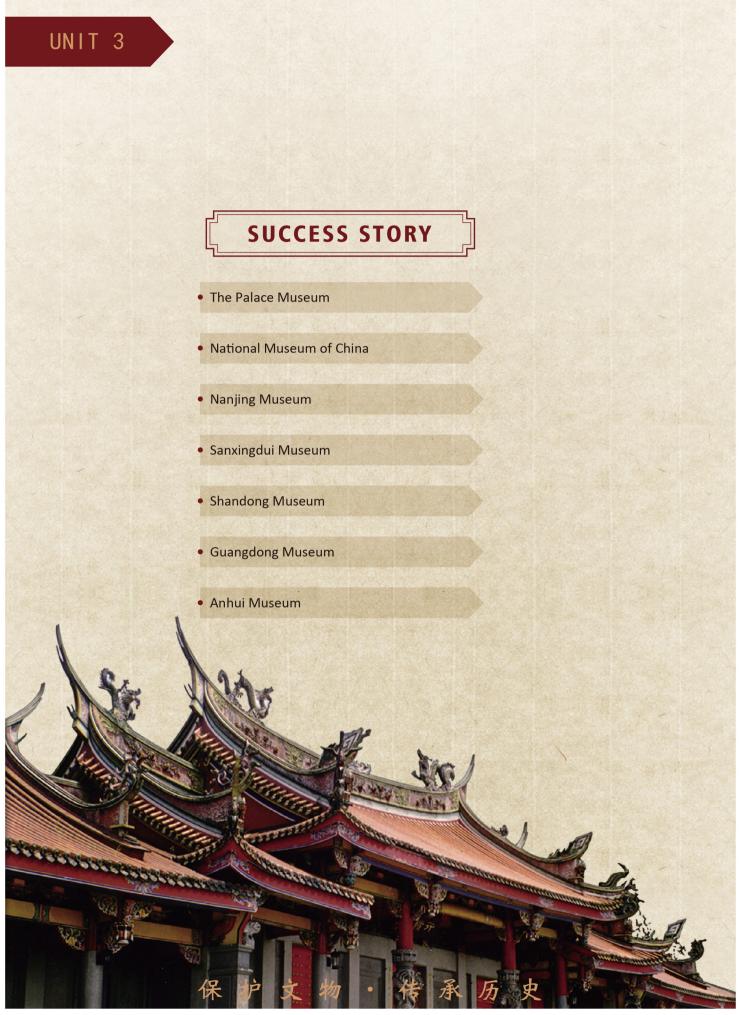


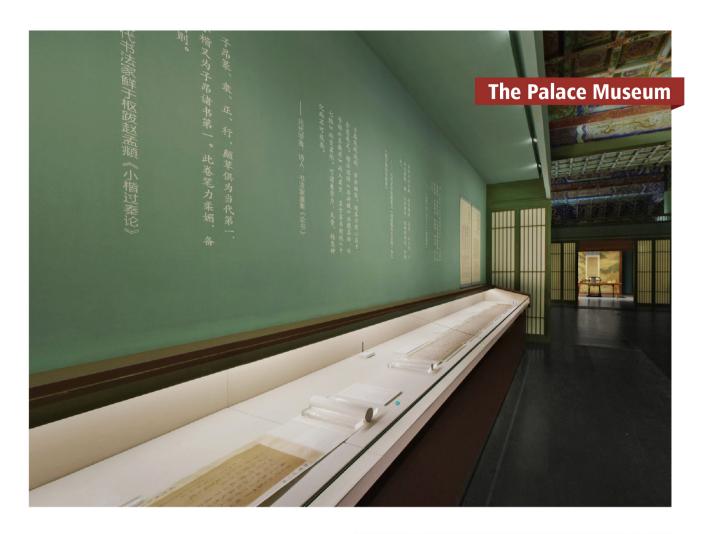
Environmental measurement and control

Data fusion analysis



Analysis and evaluation









In October 2015, the western area of the Palace Museum, where Cining Palace and Kangshou Palace are located, was opened to the public for the first time. 91 of them were national treasure-level cultural relics. HUATO provided real-time monitoring of the exhibition environment of this batch of precious cultural relics.

In September 2017, the Palace Museum successfully held "A Thousand Miles of Rivers and Mountains - Special Exhibition of Green Landscape Paintings of Past Dynasties" and "Special Exhibition of Zhao Mengfu's Calligraphy and Paintings". HUATO provided purification and humidity control equipment for these eye-catching exhibitions to display precious cultural relics and created a stable and clean environment for them.













In 2011, when the National Museum of China added a new building, HUATO completed the construction of a wireless temperature and humidity monitoring system which is able to cover the entire museum.

In 2016, an equipment update was carried out. HUATO ToMonitor distributed software system saves collected data information in real time and establishes a large-capacity "museum environment historical database".











In 2013, HUATO built a comprehensive real-time environmental monitoring system for the exhibition halls and warehouses of Nanjing Museum.

In 2015, HUATO built a humidity environment control system for the calligraphy and painting hall of Nanjing Museum to provide continuous constant humidity control for key exhibition halls and showcases.

In 2016, HUATO purification and constant humidity machines performed constant humidity control on key cultural relics in the "Pharaoh King" exhibition to meet the strict requirements of precious cultural relics for a low-humidity environment.

























In 2017, HUATO reinforced and upgraded the wall display cabinets in the temporary exhibition hall of the Guangdong Provincial Museum.

In 2019, HUATO equipped the warehouse of the Guangdong Provincial Museum with constant humidity cabinets and cultural relic capsules.

In 2020, HUATO modified and reinforced the airtightness of the display cabinets in the wood carving exhibition hall of the Guangdong Provincial Museum.

In 2021, HUATO will provide constant humidity machine assembly services for the temporary exhibition hall of the Guang-dong Provincial Museum.



In 2015, HUATO conducted comprehensive real-time monitoring of the cultural relics preservation environment in the warehouses and exhibition halls of Anhui Museum, and equipped it with advanced environment control equipment and laboratory-related supporting equipment.

In 2018, HUATO provided showcase purification and constant humidity machines for several exhibitions such as Anhui Museum's "Anhui Civilization History Exhibition" to purify and control the humidity in some precious cultural relic showcases.

In 2020, HUATO supplied constant humidity storage cabinets for cultural relics to Anhui Museum.







