Hanshow ESL Controller HS_C09960 Product Manual

V1.0.5

HS-AP-GEN5001

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ABOUT THE MANUAL

This document mainly describes ESL controller HS_C09960, including features, specification, configuration and precautions. Help you quickly understand all information of this device.

Before using the product for the first time, please read this document carefully and retain the manual for subsequent use or for the next owner. If the instructions contained in this manual are insufficient to resolve issues that occur during device operation or maintenance, please contact Hanshow Technical Customer Service Center (China: 400-0365-305; Netherlands: 0800-022-5037; Belgium: 0800-71-335; France: 0800-91-7602; Thailand: 1800-011-185) directly, we will provide you with multi-channel technical services.

TARGET USERS

This document provides engineers with necessary data and related guidelines. Users have to master the basic knowledge on communication, DSP, network and so on. This manual is applicable for the below engineers:

- Testing Engineer
- Technical Support Engineer
- After Sales Engineer
- Installation Engineer

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SYMBOL DESCRIPTION

Icon	Description
⚠	Information indicated with this icon should be paid special attention and attached great importance by the reader.
🕮	Information indicated with this icon is the explanation on the formal text for the readers to comprehend the text better.
[X-X]	It means special noun definition is provided here.

EXPLANATION OF TERMS

Acronym	Expanded form	Description
ESL Controller	ESL Controller	Also called AP that is used for data interaction between ESL-Working and ESL Controller.
ESL	Electronic Shelves Label	Used for displaying product information like promotion information, price and grade, etc.
Wi-Fi	Wireless Fidelity	Wi-Fi
RF	Radio Frequency	Electromagnetic frequency that can radiate into space.

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1 Product Introduction

1.1 Appearance and naming

HS_C09960 is the fifth generation ESL controller developed by Hanshow. This new generation AP has such advantages as fast transmission speed, high performance and low power consumption etc. and can therefore deliver better user experiences in data businesses.

HS_C09960 is used for the data transmission and information exchange between ESL-Working and ESLs in the 2.4 GHz RF band. It utilizes modular and onboard omnidirectional antenna design and comes with 1 ARM Cotex-A7 processor. In addition, HS_C09960 has integrated RF etc. modules and can support all Hanshow ESL products. The appearance designs is as shown in *Figure 1-1* and *Figure 1-2*.

Figure 1-1 5th Generation AP (White)

Figure 1-2 5th Generation AP (Black)

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1.2 Product characteristics

1.2.1 Hardware characteristics

- Multiple power supply: Support power supply by POE and AC/DC power adapter.
- RF system: Four RF modules, each of which has independent antenna and supports parallel communication.
- LED indicator: Displays working status in real-time manner.
- Physical interfaces and indicators.

  Physical interfaces are shown in *Figure 1-3*; indicators are shown in *Figure 1-4*; functions of interfaces are shown in *Table 1-1*.

Figure 1-3 Physical interfaces of HS_C09960

Figure 1-4 Indicators of HS_C09960

NOTE: The above figures are only for reference and the actual AP shall prevail.

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Table 1-1 Interface function descriptions of ESL controller HS_C09960

No.	Interface name	Description
1	RESET	● Press and hold: Press it for more than 5s to restore factory settings. ● Press: HS_C09960 could switch between enabling DHCP and fixed IP (192.168.1.199). After triggering the function, it is invalid when pressing in 30s. For more detailed information, sees section of *4.1*.
2	POWER	Hanshow standard 12V/1A DC power adapter.
3	AUX	This interface is reserved for PSE OUT and CONSOLE..
4	POE IN	10M/100M adaptive Ethernet, it supports the IEEE 802.3at/af standard for powering network devices via Ethernet cable (POE).
5	USB INTERFACE 1	A USB2.0 interface whose output current is less than 5V/250mA.
6	USB INTERFACE 2	A USB2.0 interface whose output current is less than 5V/250mA.
7	LED INDICATOR	This is a system status indicator: 1. When the green light is on, the system is in normal operation state. 2. When the green light blinks, the system is in data transmission state. 3. When the red light is on, the system is in abnormal state.
8	LED INDICATOR	This is a network status indicator: 1. When the green light is on, Ethernet is connected, ESL-Working is disconnected. 2. When the green light blinks, Ethernet is connected, ESL-Working is also connected. 3. When the red light is on, Ethernet connection has an exception.
9	LED INDICATOR	This is a power supply status indicator: 1. When the green light is on, the device is powered on. 2. When the green light is off, the device is a power off.
10	2BIT LED NIXIES	Green 2bit digit tube: 1. The ID of HS_C09960 shall be displayed. This ID

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No.	Interface name	Description
		is obtained when accessing to ESL-Working (Text direction please refer to the “Hanshow” LOGO direction on the shell). The tube can display numbers ranged between 1~99. When accessed to ESL-Working, it shall display the device ID. In case the ID to be displayed is greater than 99, only the last 2 digits will be displayed. 2. When “--” is displayed: Ethernet connection exception. The AP is either not connected to ESL-Working or is not connect to AP administration center. 3. When “E1” is displayed: Ethernet is connected, the AP is neither connected to ESL-Working, nor is it connected to AP administration center (The IP of the administration center has been configured). 4. When “E2” is displayed: Ethernet is connected, ESL-Working is not connected, AP administration center is connected (The IP of the administration center has been configured). 5. When “DH” is displayed: the AP has switched to DHCP for over 5s. 6. When “ST” is displayed: the AP has switched to static IP for over 5s. 7. When anything else is displayed: an exception has taken place.

⚠ NOTICE: Once booted, the AP will enter self-checking status, all bicolor lights are supposed to flash alternatively and mono-color light shall be on. After this stage, the system will start to run, lights will stop flash. In case of exception, 2 red lights will be on for 5s, the LED nixies will display “Ex” (in which the “x” indicates the minimum abnormal sub-board number). 5s later, the system will enter normal status and the red lights will be off.

1.2.2 Software characteristics

- Operating System (OS): Embedded Linux handles data interaction with ESL-working system, including the registration of ESL controller system, heartbeat reception, data transmission and so on. The OS can be upgrade online.
- Smart dual system: support dual system and have automatic disaster recovery capacity.
- Compatibility: Support Hanshow’s 3rd and 5th generations ESLs.
- Administration configuration: Support Web configuration mode.

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1.3 Product specifications

Product specifications are shown in *Table 1-2*.

Table 1-2 HS_C09960 specifications

ITEM		DESCRIPTION
Power module	**Input voltage**	DC12V or POE 802.3af/at
	Rated current	350mA (adapter)/350mA (POE)
	Max. power	12W
	Others	Overload/over-voltage/over-temperature protection
RF module (2.4 GHz)	**Work frequency**	2402MHz ~ 2480MHz 2478MHz ~ 2493MHz (Only apply to Japan)
	Emitting frequency	Default as 6dBm
	Antenna gain	⩾1dBi
	Antenna characteristics	4-way omnidirectional onboard antenna
	Ultra-high sensitivity	-95dBm at 500Kbps -97dBm at 100Kbps
	System throughput	60,000 ESLs per hour
Ethernet module	**Connection rate**	10/100M (Adaptive)
	Auto-negotiation	support
	Automatic flip	support
	DHCP	support
POE module	**Input voltage**	36V ~ 57V DC
	Output voltage	12V
	Rate current	350mA
	Maximum power	12W
	Standard	IEEE 802.3af/at
Power consumption	**Idle state power**	12V/160mA
	Operating state power	12V/350mA

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ITEM		DESCRIPTION
Temperature	**Operating temperature**	0℃ ~ 50℃
	Storage temperature	-30℃ ~ 70℃
Humidity	**Relative humidity (%RH)**	10% ~ 90% (Non-condensing)
Dimension	**L*W*H（mm）**	249.5*264.5*44.9
Color	**N/A**	Black or white

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2 Ex-factory state description

2.1 Nameplate description

The information in the nameplate of HS_C09960 as shown in *Figure 2-1*.

- Default IP address and MAC address.
- IP address can be configured using the configuration page.
- 2 power supply modes: POE and DC. Only one option can be selected at a time.
- QR code contains MAC address and serial number information.

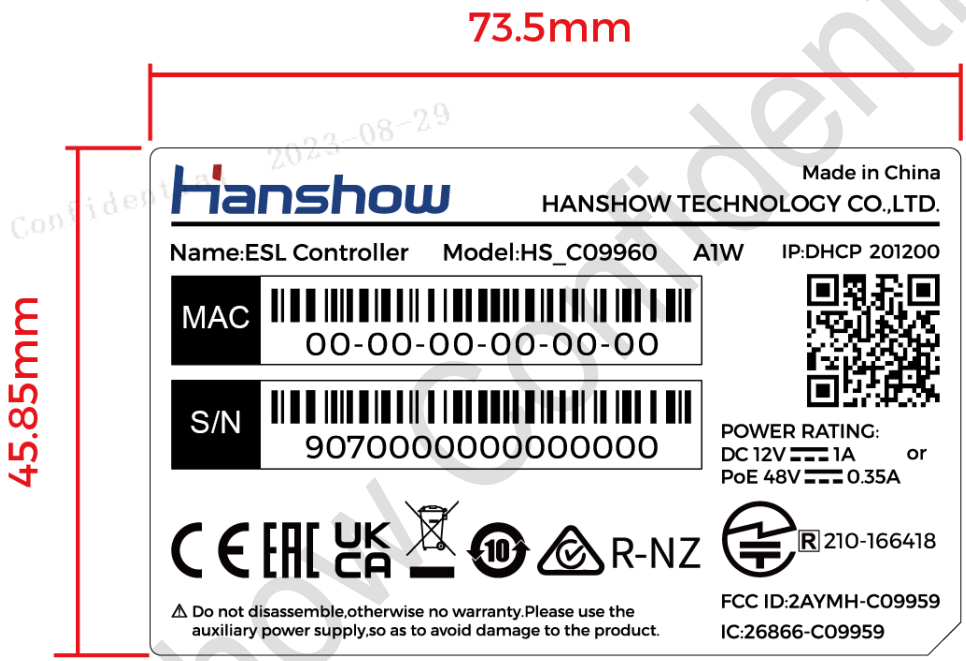

Figure 2-1 HS_C09960 nameplate

NOTE: The above nameplate is only for reference, the actual nameplate received shall prevail.

2.2 Ex-factory packaging

HS_C09960 ESL controller is packaged by brown paper. The package contains:

- ESL controller (HS_C09960) *1.
- Installation bracket *1
- Installation screws *4
- 304 stainless steel cable ties *2

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3 Product features

3.1 System architecture

Hanshow ESL system is composed by Electronic Shelves Label (ESL), ESL controller (AP), ESL-Working, PriSmart, databases, integration server, monitor system and Hand-hold Terminals (e.g. PDA, PAD, RC), as shown in *Figure 3-1*.

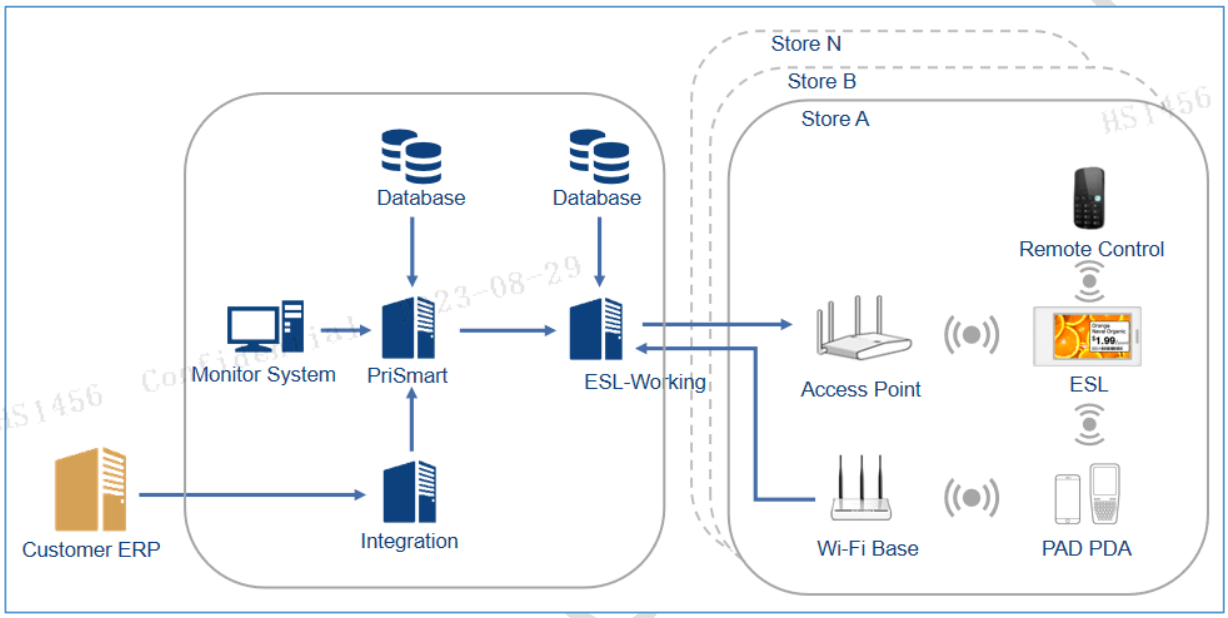

Figure 3-1 ESL system architecture diagram

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3.2 Product features

ESL controller is an integral part of Hanshow ESL system, which acts as data transmission links, it is responsible for data forwarding between ESL-Working and ESLs. ESL-Working implements ESL administration, business control and obtains ESL reported information via ESL controller.

HS_C09960 connects to ESL system and establish bidirectional RF communication at 2.4 GHz via Ethernet interface (POE). It has the following features:

- Downlink: ESL controller receives downlink packets from ESL-Working via wireless network, in order to execute updating, networking, fast flash and global etc. businesses on ESLs.
- Uplink: ESL controller forwards ESL heartbeat packet etc. information to ESL-Working based on the ESL wireless protocol standard.
- Monitor RF network quality in real-time manner.
- Utilize cellular networking technology, network radius can reach 15m.
- Financial grade security chip: support AES-256, AES-128 and RSA1024/2048 encryption algorithm, SHA digest algorithm, TRNG true random integers so as to guarantee system safety and reliability.
- Utilize multi-antenna technology to improve single AP capacity.
- Support remote upgrade.
- Support real-time status report and monitoring.
- Assisting ESL administration.

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3.3 Feature list

ESL system features are shown in *Table 3-1*.

Table 3-1 Feature list

NO.	FEATURE	DESCRIPTION
1	Webpage configuration	Users can configure network, set ESL-Working, reboot ESL controller, describe the device, set NTP server, change password, restore factory setting and upgrade system.
2	Heartbeat reception	Periodically collect ESL heartbeat. ESL heartbeat data contain ESL basic information, such as: ID, firmware version number, wake up cycle, work frequency point, battery volume etc.
3	Association/disassociation	Association feature is used to create the association between commodity and ESL and refresh ESL's preset screen in which contains various commodity information, e.g. commodity name, price, origin, promotion information, QR code etc.; while disassociation feature is used to remove the association between commodity and ESL and execute ESL screen refresh based on preset disassociation template.
4	Update	Once there is change(s) of commodity information, such as: price change, release of promotion information etc., update feature shall be enabled by the system in order to refresh corresponding ESL screen(s).
5	Global flash	This feature can make LEDs of all store ESLs flash using system interface. Flashing rules follow the preset configuration option values.
6	Global page switch	After multiple pages are stored into ESLs in advance, this feature allows all store ESLs to switch to the specified pages. Page number and retention time can be configured using the corresponding interface.
7	Timed task	This feature can send timed global flash command and timed global page switch command in advance, so that all those ESLs who received the commands will synchronously execute these commands at specified time.
8	Fast page switch	After multiple pages are stored into ESLs in advance, this feature allows the specified ESLs to switch to the specified pages. Page number and retention time can be configured using interface.
9	Fast flash	This feature can make specified LED of ESL flash quickly using system interface. Color of flashing LED, LED on/off time and number of flash time can be configured using the corresponding interface.
10	Fast network access	Scan ESL to accomplish fast network access using NFC device.
11	ESL upgrade	The APP and driver of ESL can be upgraded independently using broadcasting method.

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4 Product operation

4.1 Key operation

Reset hole supports press and hold and press, each owns different function.

4.1.1 Press

Press is used to switch IP address acquisition mode. This feature is strictly limited and just to operate when AP is not connected to network. AP address will switch between DHCP and static IP with each press.

- When the ESL controller is in DHCP client mode, device IP will be obtained from the DHCP server.
- When the ESL controller is in static IP mode, the default settings are as follows:

  IP--192.168.1.199, Subnet mask--255.255.255.0, Gateway--192.168.1.1.

The LED nixies shall display the work mode of ESL controller:

- “DH” shall be displayed by the LED nixies for 5s when ESL controller is switched to DHCP mode.
- “ST” shall be displayed by the LED nixies for 5s when ESL controller is switched to static IP mode.
- “--” shall be displayed by the LED nixies when ESL controller is not connected to ESL-Working.

NOTE: The protection interval between two operations should be at least 30s, that is, if you press again within 30s after last successful operation, your operation will be invalid.

4.1.2 Press and hold

Press and hold reset hole is more than 5s, AP will restore factory setting. And the nixie light and LED indicators on front panel lights on for about 2s, AP will restore factory setting and reboot. Restore factory setting contains the following contents:

- Restore to DHCP client mode.
- Restore to auto search mode of ESL-Working.
- Clear custom description.
- Restore web login password to “admin”.
- NTP restores to disabled by default.

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4.2 Parameter setting

HS_C09960 supports Web configuration mode. Users can manage AP configuration via Web.

4.2.1 Homepage

You can access HS_C09960 IP address to enter configuration page. For example: If HS_C09960 IP is 192.168.51.100, IP address is: *https://192.168.51.100*, that is, enter logon page and configuration homepage to configure HS_C09960. Default password is: admin.

A pop-up prompts you to change your password. The password includes 12 ~18 digits, letters and special symbols (~!@#) to enhance safety intensity. Click **OK** after resetting it, or click **Cancel**, as shown in *Figure 4-1* and *Figure 4-2*.

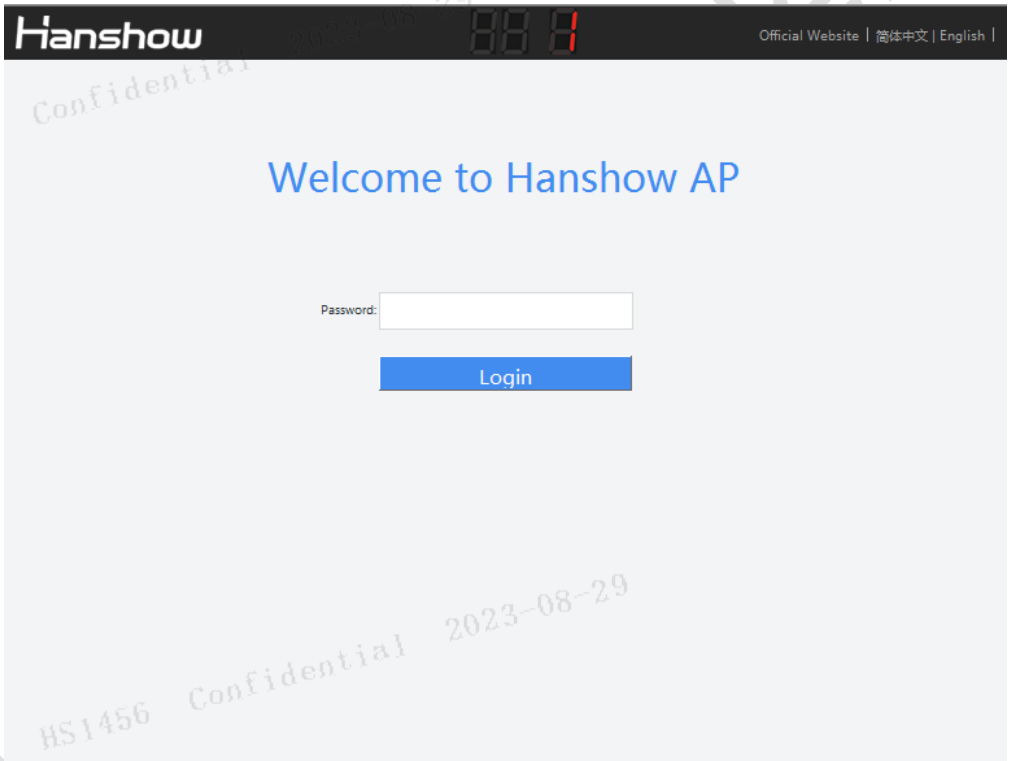

Figure 4-1 Login page

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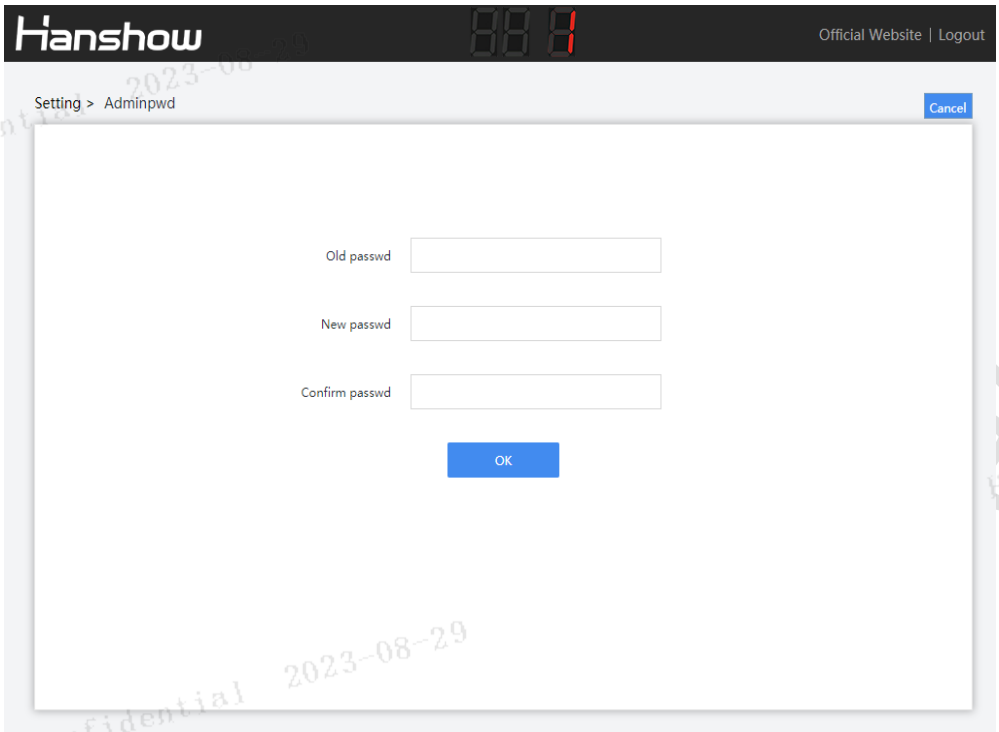

Figure 4-2 Password setting

If the password does not meet the security rules, a prompt message appears, as shown in *Figure 4-3*.

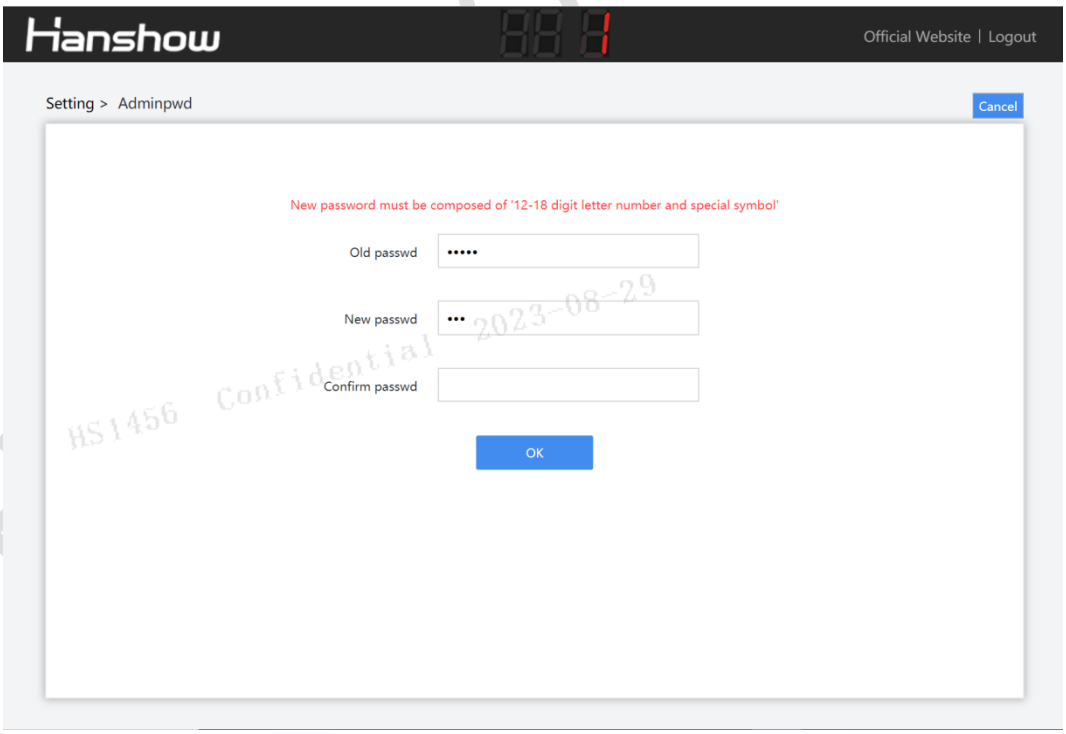

Figure 4-3 Password setting prompt 1

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If the password is set incorrectly, a prompt message appears, as shown in *Figure 4-4*.

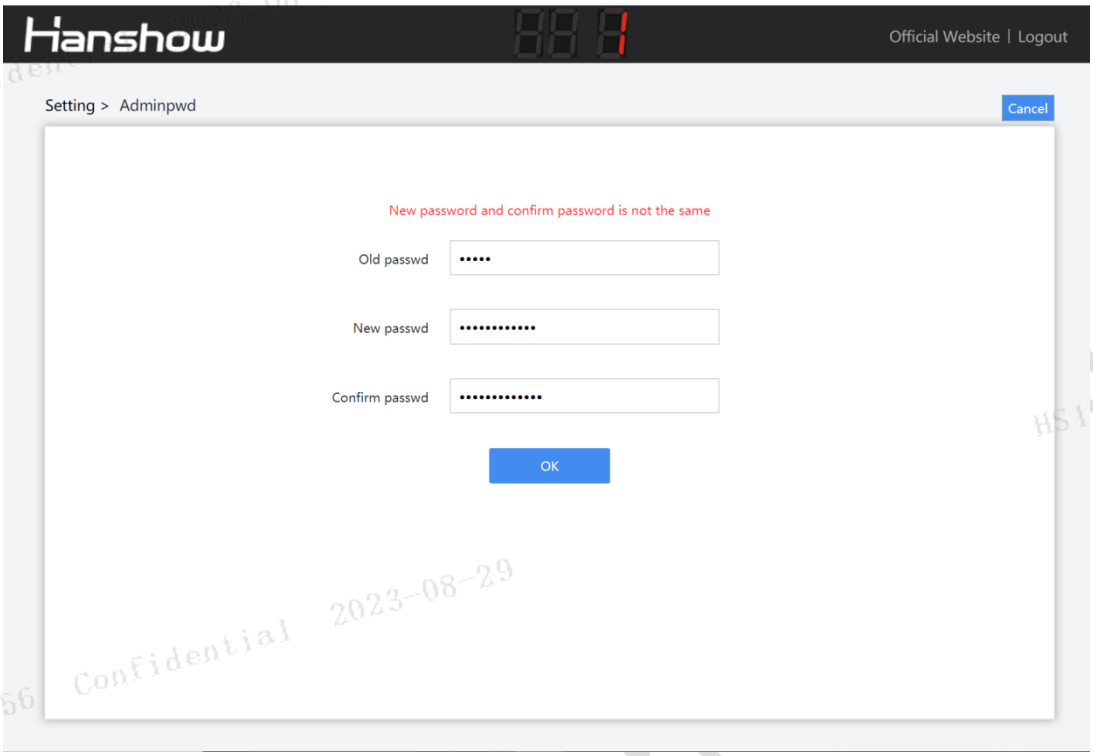

Figure 4-4 Password setting prompt 2

NOTE:

- **Both Chinese and English are supported, switch the language you want in upper-right corner.**
- **If the password strength is not strong enough, a pop-up prompts to reset your password. If you don't want to reset, click Cancel to skip.**

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HS_C09960's configuration homepage is as shown in *Figure 4-5*.

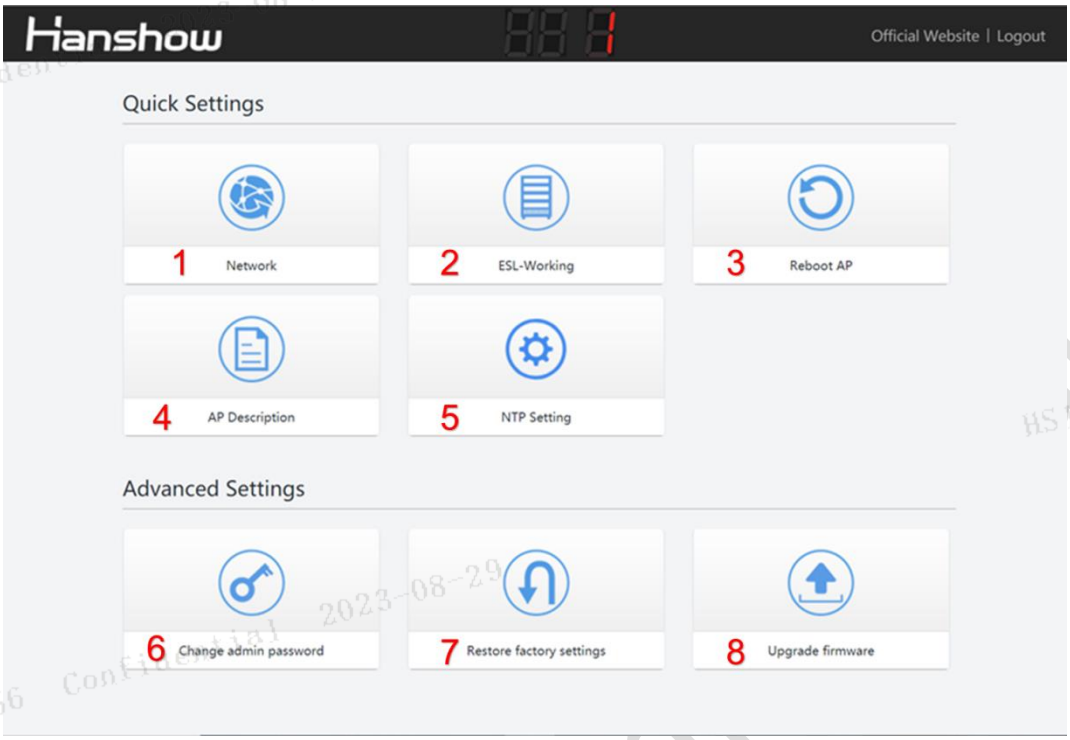

Figure 4-5 Configuration homepage

The configuration items are illustrated as shown in *Table 4-1*.

Table 4-1 Configuration option description

No.	Configuration item	Description
1	Network	Used to set network parameters.
2	ESL-Working	Used to configure ESL-Working parameter.
3	Reboot AP	Reboot AP device.
4	AP Description	To add description information.
5	NTP Setting	Used to configure NTP service.
6	Change admin password	Used to change the password.
7	Restore factory settings	Used to restore default settings.
8	Update firmware	Used to upgrade for main system and RF subsystem.

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4.2.2 Network setting

Network setting is used for setting network parameter of HS_C09960. It supports two IP types: IPv4 and IPv6; two IP address acquisition modes: DHCP or static IP.

If IP type is IPv4, the configuration page is shown in *Figure 4-6*.

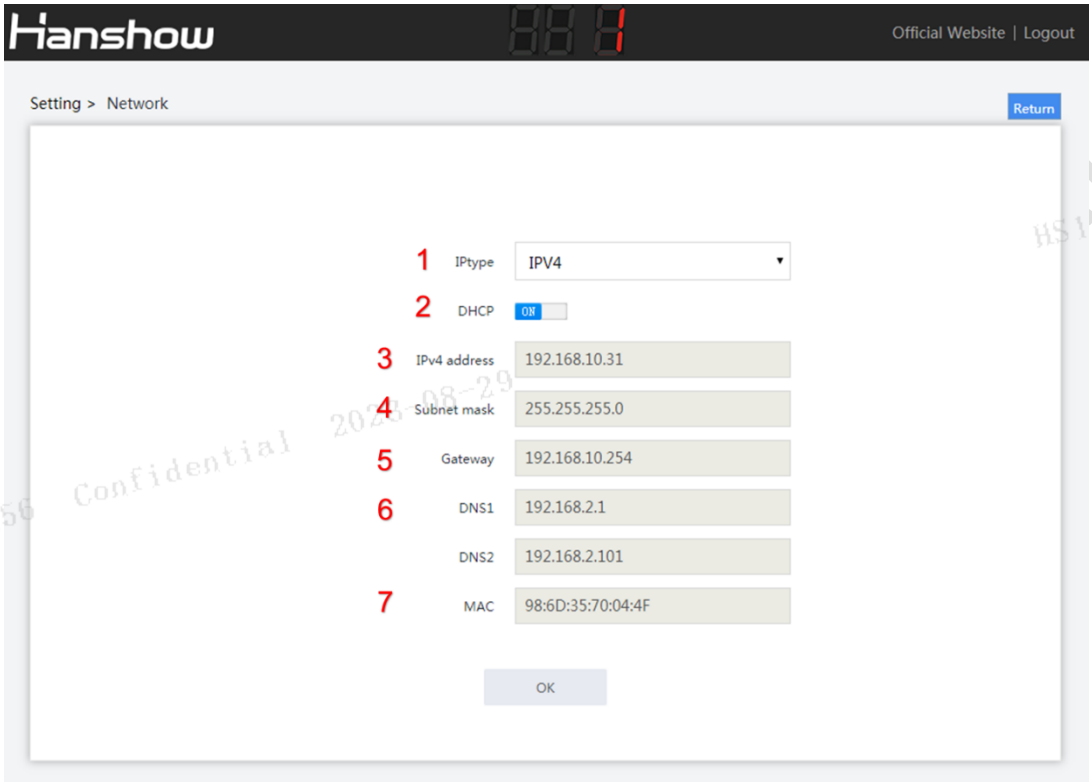

Figure 4-6 Network configuration page 1

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The configuration options are illustrated as shown in *Table 4-2*.

Table 4-2 Configuration option description

No.	Configuration option	Description
1	IP type	Support IPv6/IPv4 dual protocol stacks. To configure the parameters when selecting IPv4.
2	DHCP	● When set to OFF, IP address should be configured manually. ● When set to ON, the device is DHCP client, and IP address should be get from DHCP server.
3	IPv4 address	Configurable when DHCP is OFF.
4	Subnet mask	Configurable when DHCP is OFF.
5	Gateway	Configurable when DHCP is OFF.
6	DNS	Domain Name Server (DNS), DNS1: Primary DNS server; DNS2: Secondary server. Must be set when the ESL-Working address is configured as domain name address; Enable DHCP, to get DNS from DHCP.
7	MAC	Unique MAC address, refer to the nameplate.

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If IP type is IPv6, the configuration page is shown in *Figure 4-7*.

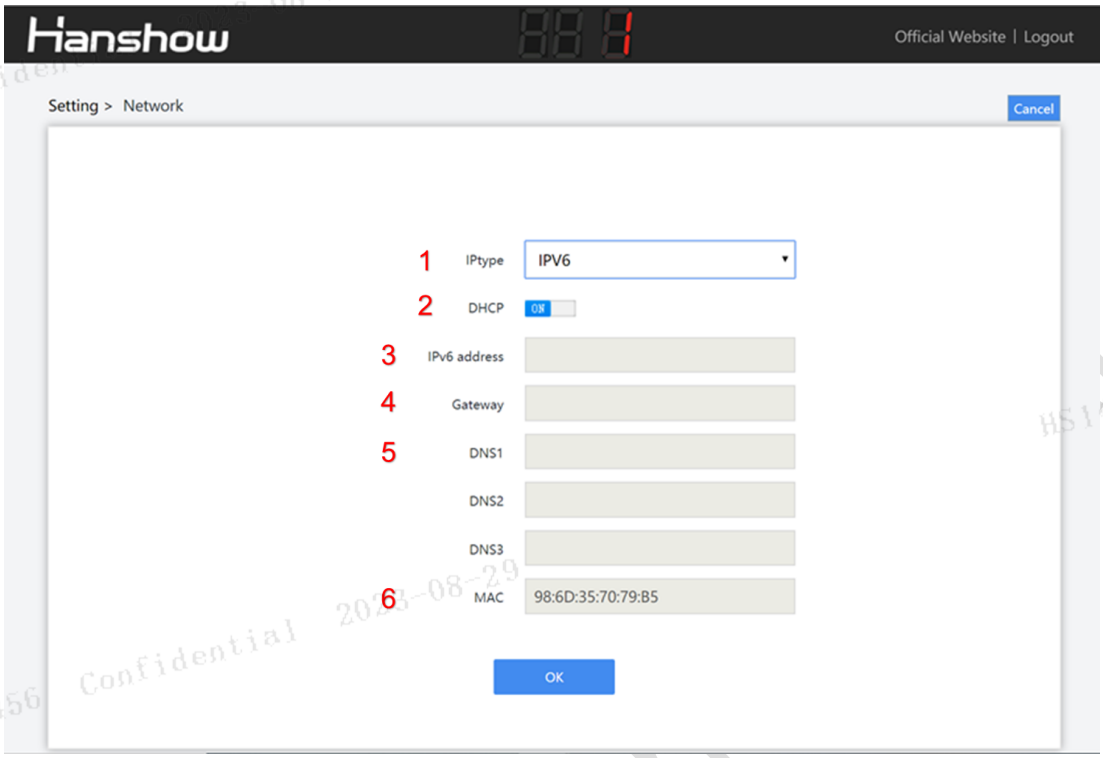

Figure 4-7 Network configuration page 2

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The configuration items are illustrated as shown in *Table 4-3*.

Table 4-3 Configuration option description

No.	Configuration item	Description
1	IP type	Support IPv6/IPv4 dual protocol stacks. To configure the parameters when selecting IPv6.
2	DHCP	● When set to OFF, IP address should be configured manually. ● When set to ON, the device is DHCP client, and IP address should be get from DHCP server.
3	IPv6 address	Configurable when DHCP is OFF.
4	Gateway	Configurable when DHCP is OFF.
5	DNS	Domain Name Server (DNS), DNS1: Primary DNS server; DNS2: Secondary server; DNS3: Secondary server. Must be set when the ESL-Working address is configured as domain name address; Enable DHCP, to get DNS from DHCP.
6	MAC	Unique MAC address, refer to nameplate.

🕮 NOTE: The modified network settings take effect immediately; you need to re-enter the set URL to access the web.

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4.2.3 ESL-Working setting

This can set IP address and port number of ESL-Working, as shown in *Figure 4-8*.

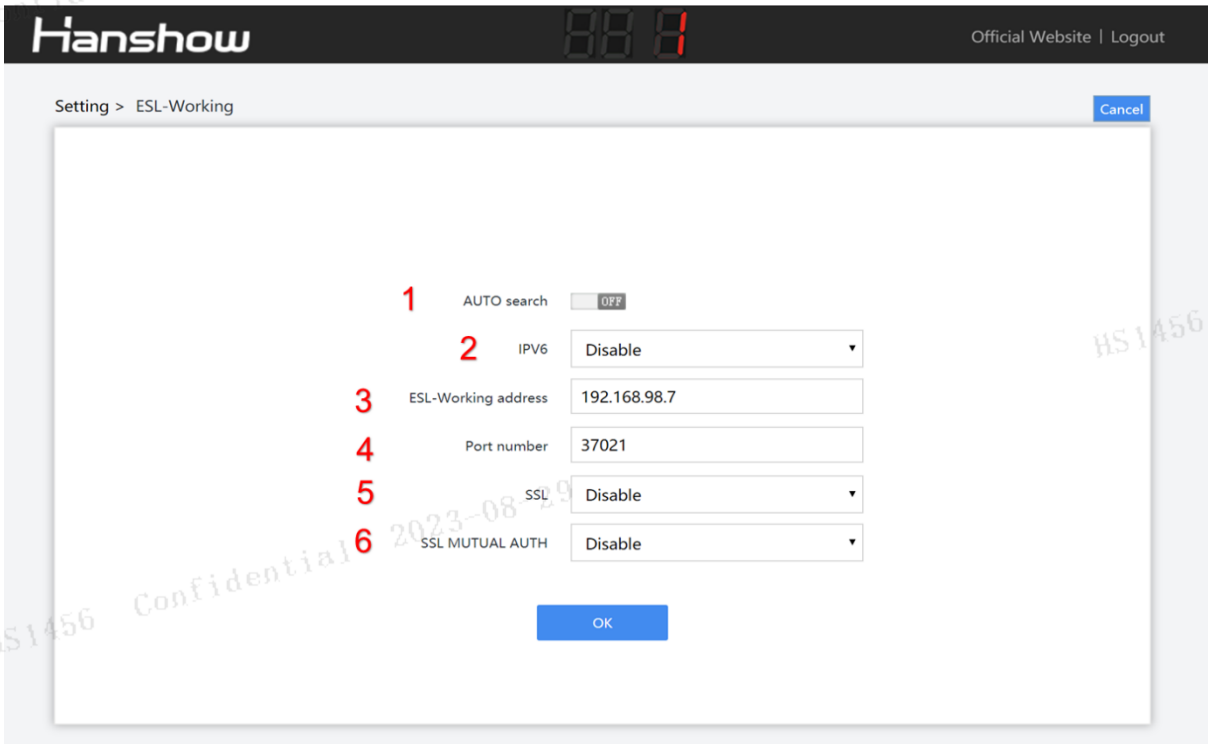

Figure 4-8 ESL-Working setting

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Each configuration item is illustrated as shown in *Table 4-4*.

Table 4-4 Configuration option description

No.	Configuration item	Description
1	AUTO search	● When set to OFF, you need to set the related ESL-Working parameters manually. ● When set to ON, the AP will automatically search and connect to ESL-Working address in local area network (LAN).
2	IPv6	● Disable represents ESL-Working address can be configured as IPv4 format address (It is configurable when AUTO search is off). And an error will be reported if the configuration format is incorrect. ● Enable represents ESL-Working address can be configured as IPv6 format address (It is configurable when AUTO search is off). And an error will be reported if the configuration format is incorrect.
3	ESL-Working address	The IPv4 or DNS in ESL-Working is configurable when AUTO search is OFF.
4	Port number	Port number of ESL-Working: ● When AUTO search is set to ON, it presents the target ESL-Working address searched by the AP. ● When AUTO search is set to OFF, it presents the target ESL-Working address accessed by the AP.
5	SSL	Whether to use SSL to connect to ESL-Working securely.
6	SSL MUTUAL AUTH	Whether to verify the ESL-Working certificate. This feature is valid only when SSL is enabled.

NOTE:

- **Confirm whether the DNS server in Network setting is correct after changing the DNS of ESL-Working.**
- **Confirm whether the port number is correct after SSL is enabled. Generally, the port number connected by SSL or non-SSL is different.**
- **The modified ESL-Working information will take effect about 30s later, no need to restart the AP.**

⚠NOTICE: You need to configure ESL-Working address manually when ESL controller and ESL-Working are used in different network.

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4.2.4 Reboot AP

Click **Reboot AP**, click **OK** on pop-up box, the device will reboot. Reboot AP takes about 1min, as shown in *Figure 4-9*.

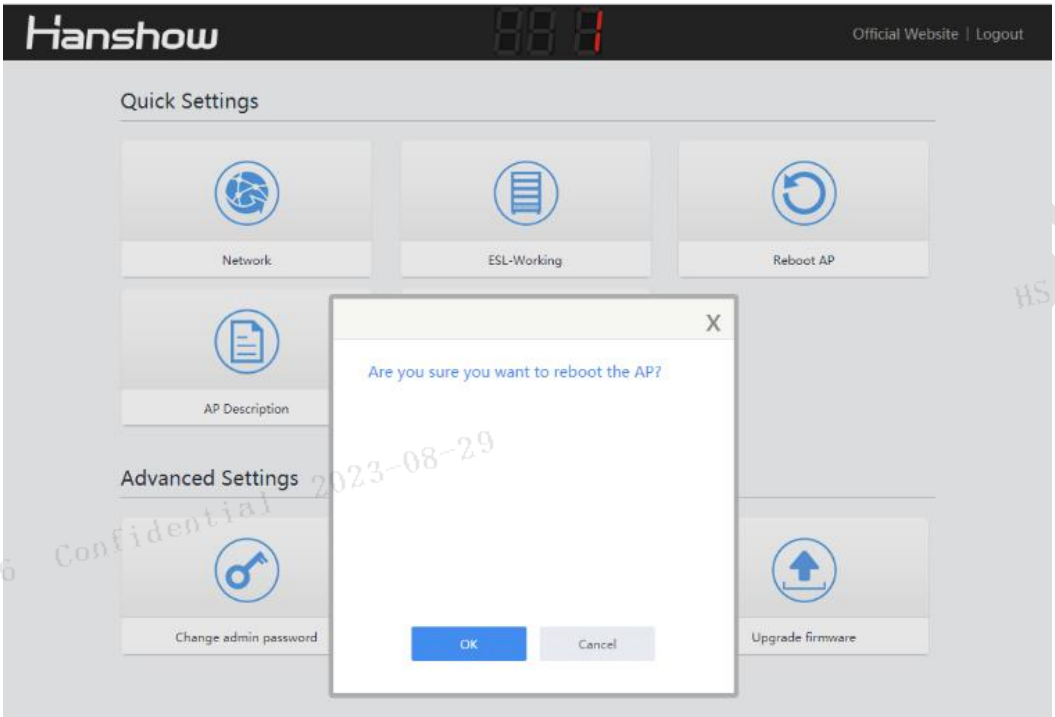

Figure 4-9 Reboot device

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4.2.5 AP description

This can add custom information for AP record and recognition, as shown in *Figure 4-10*.

Figure 4-10 AP description

4.2.6 NTP setting

NTP setting can add custom device acquisition time, easy to synchronize time in time zone, as shown in *Figure 4-11*.

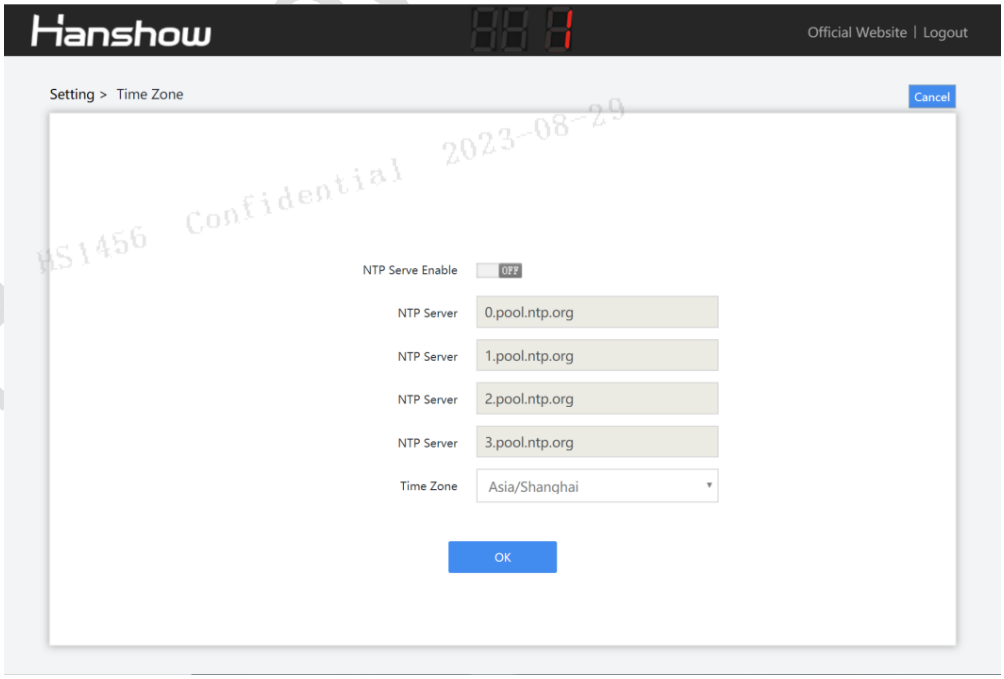

Figure 4-11 NTP setting

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4.2.7 Change admin password

This is used for changing login password, as shown in *Figure 4-12*.

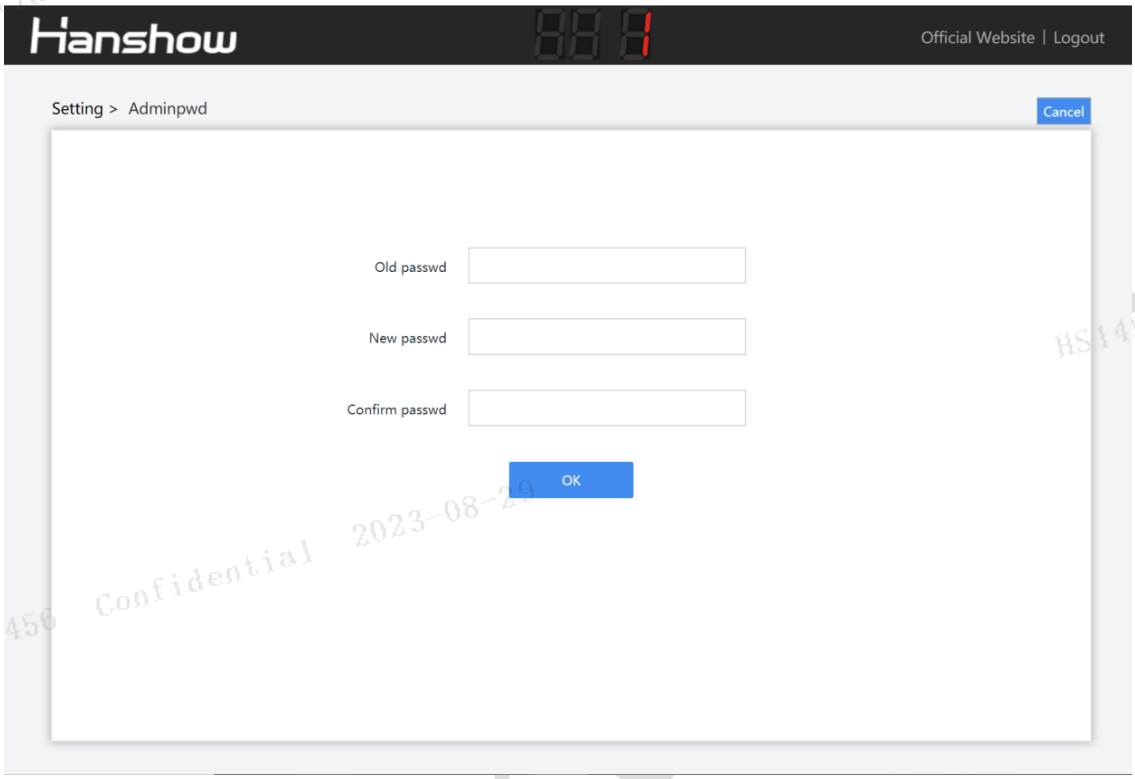

Figure 4-12 Change password

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4.2.8 Restore factory settings

Click **Restore factory settings**, click **OK** on pop-up box, the device will restore factory settings and reboot. Restore factory settings takes about 1min, as shown in *Figure 4-13*.

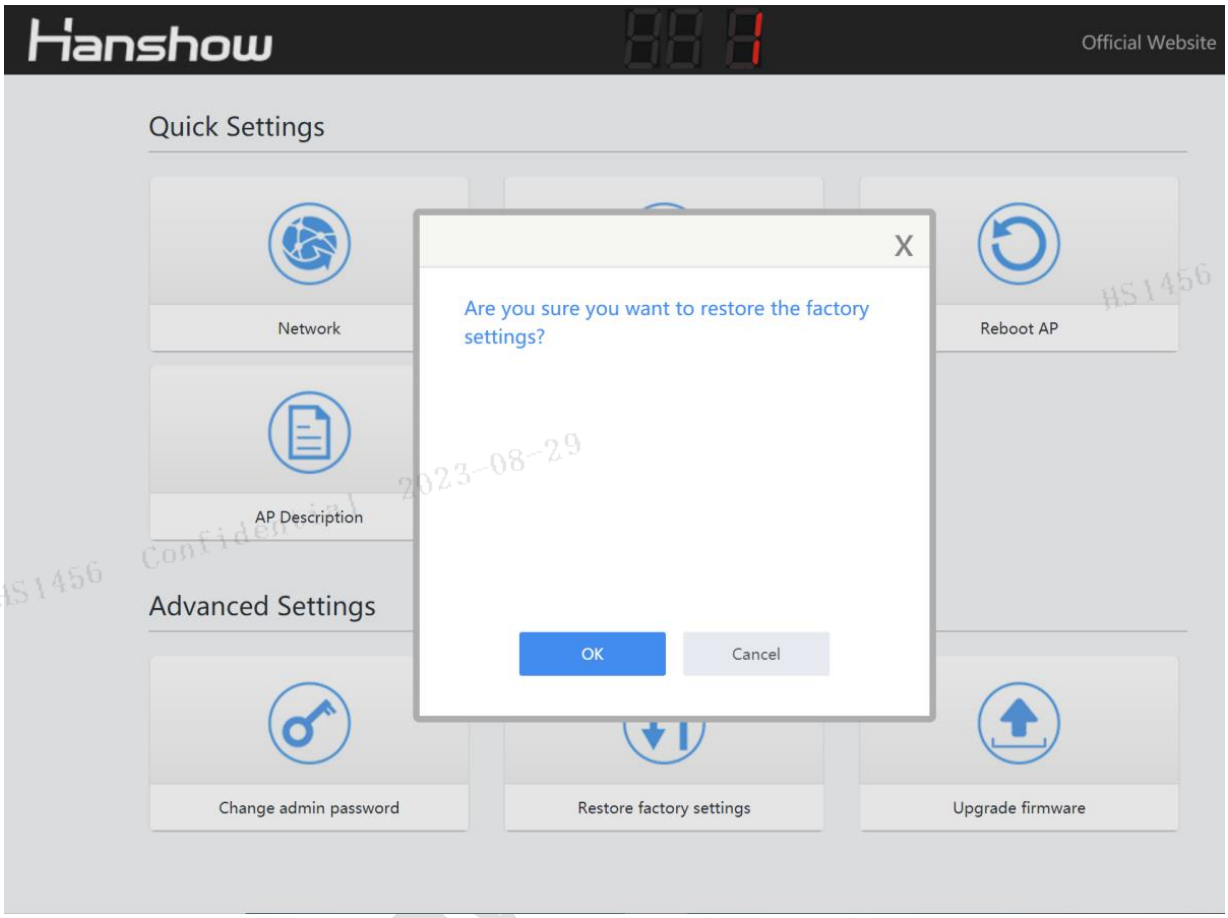

Figure 4-13 Restore factory setting

NOTE:

- **The effect is the same as the key action.**
- **Don't cut off the power during the process, otherwise the device will be damaged.**

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4.2.9 Upgrade firmware

HS_C09960 upgrade is used to online upgrade for main system and RF subsystem. It supports local upgrade and remote upgrade.

- Local upgrade: Do not use other AP models' upgrade package in our company for upgrade testing, avoiding incorrect upgrade.
- Remote upgrade: Currently, it is only available to LAN environment. If cross-network segment upgrade is required, you need to do port mapping in advance.

⚠**NOTICE:**

- **Don't cut off the power during the upgrade, otherwise the device can be damaged.**
- **To upgrade main PCB and four-way RF sub-PCB during the upgrade.**
- **The entire upgrade procedure takes about 5min.**

For more information, please refer to *(HP-AP-GEN5003) Hanshow ESL Controller HS_C09960 Upgrade Manual.*

4.3 Workflow

Specific workflow is as follows:

1. Check if power cable and network cable are connected properly before starting HS_C09960.
2. Confirm whether to use Hanshow standard 12V adapter or POE power supply.
3. The power indicator on front panel lights on after HS_C09960 powered-on, and then HS_C09960 system starts to take about 1min.
4. After successful startup, the system status indicator and network status indicator light on, the system enters working state.
5. Follow the section of *4.2* to configure relevant parameters accordingly.
6. HS_C09960 will automatically connect to ESL-Working after the correct configurations. If success, the indicators will flash green; if failed, the prompt messages appear. HS_C09960 will connect to ESL-Working regularly.
7. Two LED nixies will display HS_C09960 ID after successful connection in the previous step. HS_C09960 will perform data communications such as heartbeat packet reception, data transceiver and ESLs inquiry.

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5 FAQ

5.1 Hardware FAQ

5.1.1 ESL controller cannot be powered on, LED does not work

Handling procedure:

- Confirm whether the device is powered.
- Confirm whether the device power cable is firmly plugged.
- Check if the power source can support POE, if there is malfunction.
- Check if the POE IN cable is plugged into the AUX socket by mistake.
- Confirm where there are exceptions with POE cable or 12V adapter by replacing the POE cable(s) or 12 adapter(s) of those powered device(s).

If the device still cannot be powered on after all the above mentioned steps are confirmed, then it must be device exception. Please contact technical support personnel or the agent, so as to replace the device.

🕮 NOTE: as per the 802.3af standard, the output power of the PSE port is 15.4W; while as per the 802.3at standard, the output power of PSE port is 30W.

5.1.2 The red light of system indicator is constantly on or constantly off

Handling procedure:

1. Determine whether power supply is OK using cross validation method.
2. Once booted, the AP will enter self-checking status, all bicolor lights are supposed to flash alternatively and mono-color light shall be on. After this stage, the system will start to run, lights will stop flash. In case of exception, 2 red lights will be on for 5s, the LED nixies will display “Ex” (in which the “x” indicates the minimum abnormal sub-board number). 5s later, the system will enter normal status and the red lights will be off.

If the device still cannot be powered on after all the above mentioned steps are confirmed, then it must be device exception. Please contact technical support personnel or the agent, so as to replace the device.

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5.1.3 The red light of network indicator is constantly on

Handling procedure:

- The device supports 10M/100M adaptive Ethernet, please confirm the device capacity and configuration of your side.
- Check if the POE IN cable is plugged into the AUX socket by mistake.
- Determine the fault point using cross validation method.

If the device still fails to access to the network, please check the Ethernet cable, change the port of your network exchange and try again. If it still fails to access to the network, then it must be a single-board failure, please contact the technical support personnel for help.

5.1.4 What are the appropriate Ethernet cable type and power supply distance for POE power supply?

Select CAT5E or above.

According to the transmission distance rules in IEEE 802.3af and IEEE 802.3at standards, the length limit of CAT5E cable is 100m.

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6 Return and repair instruction

6.1 Return and repair process

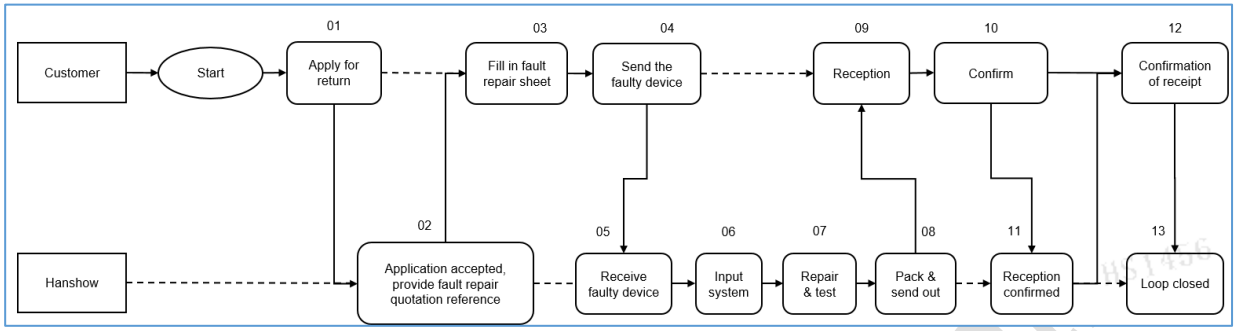

Figure 6-1 Return and repair process chart

6.2 Repair time limit

Repair of faulty device: since the faulty device is received by Party B and Party B confirms that the faulty device is within repair range; or since Party B receives repair expense, the faulty device shall be repaired within 30 days. After that, the repaired device shall be sent to the designated place by Party A. In case Party B fails to repair the faulty device, Party B shall provide substitute with the same capacities.

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7 Maintenance

Please follow below advices when installing and using HS_C09960 ESL controller.

Table 7-1 Precautions and suggestions

Items	Description
Environment requirements	● Keep AP operating in standard temperature and humidity. ● The AP operates best in normal indoor conditions. To prevent circuit damage, avoiding poor ventilation or other extreme conditions. ● Do not install the AP in an environment with dust, poisonous gases, flammable or explosive objects, or electromagnetic interference.
Safe precautions	● Take proper measures to avoid AP damaged and installer injuries. ● Keep the AP clean. ● Clean the device with a dry or damp soft cloth. Do not clean the device with wet cloth or liquid directly. ● Ensure the ventilation hole is not blocked. ● Unplug the power first when you need to move or clean the device. ● Place the AP in a dry and flat position away from any liquid. ● Keep the device away from water or damp places to avoid water or moisture entering the case.
Pre-installation check	● Use network cable tester to check the network cable is normal. ● All power cables are not short-circuited or reversely connected and must be intact with no damage. ● Labels on cables are clear and correct. ● Ensure the ground conductor is intact.
Installation scenario	● Try to reduce the number of obstacles such as walls between the AP and user terminals. ● Limit the metal shielding around the AP to prevent cage interference effect.

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Items	Description
Installation distance	● If the shelf height is ≤3m, it is recommended that the installation distance of two Hanshow APs is about 25m, and at least 5m. ● If the shelf height is 3m ~ 5m, it is recommended that the installation distance of two Hanshow APs is about 20m and at least 5m. ● If shelf height exceeds 5m, the installation height of AP is determined according to actual situation after on-site field investigation. ● Keep the distance more than 2m from operator 4G mobile communication antenna. ● The AP installation height should be higher than shelf to avoid signal shielding.
Network settings	● If Wi-Fi AP is 2.4GHz, recommended to set Wi-Fi channel to 1, 6 or 11. ● If Wi-Fi AP is 2.4GHz, recommended to stagger the update time with ESLs to achieve optimal performance. ● Hanshow AP may be limited or affected by other IoT devices that share the 2.4GHz frequency-band such as Wi-Fi, BT or Zigbee.
Post-installation check	● Install the AP firmly on the ceiling to avoid AP falling off and damaged. ● The power cable or network cable is intact and not spliced. ● The AP runs properly. ● It is prohibited to plug the **POE IN** cable into the **AUX** interface.

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8 Warranty policy

The product is guaranteed for 1 year since it is delivered. If you still need Hanshow's after sales services after the warranty period, please provide Hanshow with a warranty extension agreement in written form 1 month before warranty period expires.

9 Contact information

Table 9-1 Hanshow after-sales contact information table

Service method	Description
Hotline	● China: 400-0365-305； ● Netherlands: 0800-022-5037； ● Belgium: 0800-71-335； ● France: 0800-91-7602； ● Thailand: 1800-011-185；
Email	support@hanshow.com
Work order system	https://service.hanshow.online/
WeChat Official Account	

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10 FCC ID warning

10.1 Warning for nameplate

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation. (3) The distance between user and device should be no less than 20cm.

10.2 Warning for product manual

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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11 IC STATEMENT

This device complies with Industry Canada's licence-exempt RSSs. Operation is subject to the following two conditions:

(1) This device may not cause interference; and (2) This device must accept any interference, including interference that may cause undesired operation of the device. (3) The distance between user and device should be no less than 20cm.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils

radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

(1) l'appareil ne doit pas produire de brouillage, et

(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement

(3) la distance entre l'utilisation et l'appareil ne doit pas être inférieure à 20 cm.

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