IMM (Intelligent Manager of Midea)

4th generation network control system

Technical Manual

CONTENTS

1. IMM introduction

1.1 System overview

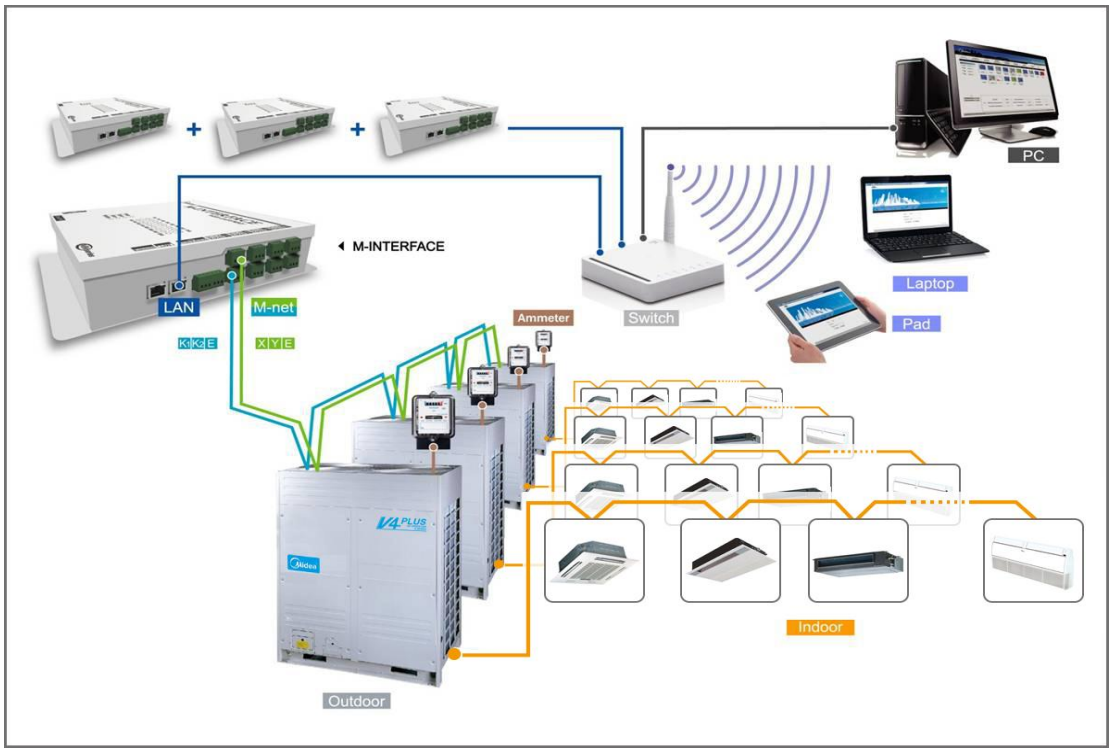
IMM is the short name for Intelligent Manager of Midea. It designs specifically to control VRF systems and includes four parts: IMM software, M-INTERFACE web gateway (can be connected Max. 4 gateways), air conditioner system and softdog.

IMM is based on a centralized format and dedicated to the complete control and monitoring of all the system's functions. It can be used as a flexible multi-purpose system and applied to a variety of needs, according to the scale, purpose and control method of each building. IMM software provides user different operation function and the software must be installed in the PC.

M-INTERFACE gateway can be connected to Midea Central Air conditioner through the M-net port (XYE and K1K2E ports). Under the auto topology mode, one M-INTERFACE gateway can be connected up to 4 refrigerant systems (Max. 256 indoor units and 16 outdoor units); under the manual topology mode, one M-INTERFACE gateway can be connected up to 16 refrigerant systems (Max. 256 indoor units and 64 outdoor units).

1.2 System structure figure

Refrigerant systems must be correctly connected to the M-net port of M-INTERFACE gateway and the gateway can connect to the PC which has installed IMM software through LAN terminal. Users can access the M-INTERFACE's WEB function through the Internet from like PC, Pad or Laptop. IMM software can monitor and control the air conditioners and the system structure figure as following:



The router is optional if you want to use more than one computer to control the system. The IMM can connect up to 4 M-INTERFACE gateways, totally could join up 64 refrigerant systems, amount to 1024 indoor units and 256 outdoor units.

1.3 Connect models

1) Can freely connect all VRF models. If the projects need the electricity charge distribution function, you need to use the V4 plus series indoor/outdoor units, and the M-net ports communication wire need to connect from the outdoor units.

2) If Mini VRF will be connected to the project and need the electricity charge distribution function, MD-NIM10 module must be used.

3) The new outdoor units and the old outdoor units cannot be mixed connected to the same M-net port of the M-INTERFACE.

1.4 Multiple languages

IMM software and M-INTERFACE gateway can be supported 7 different languages: Simple Chinese, English, Russian, French, Italian, German and Spanish. Customers can switch freely according to their own needs.

1.5 IMM network introduction

IMM software includes three parts: server software, IMM cline-side software and database software. The server software and the database software must be installed in the same computer, the computer and the M-INTERFACE gateway should be in the same subnet segment (for details, please refer to 5.1). The IMM cline-side software can connect to the server through the local or remote network.

1.5.1 Local network connection

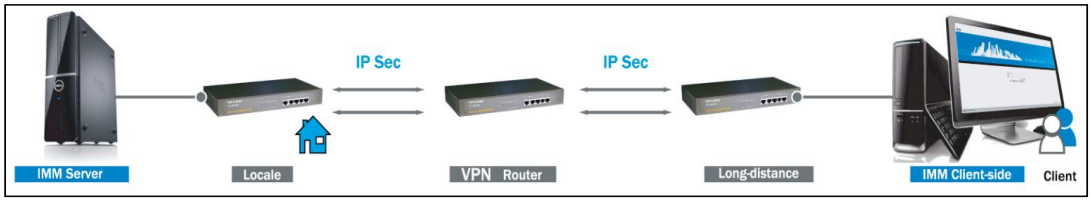
The IMM cline-side software can be connected to the server through the local network, the local network connection as the following display:

1.5.2 VPN network connection

The IMM client-side software and server can use the remote network (VPN) connection. There are two VPN connection methods: router establishing and computer establishing methods. The remote network connection needs some IT knowledge and needs the IT professionals to assist.

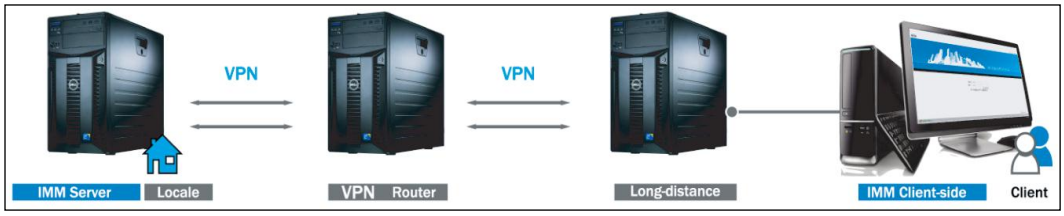
1) Router establishing methods

VPN tunnel is established between router and router, and then it can visit WEB page through VPN tunnels. VPN Server can be established by yourself and also can be rented. The topology structure as follow display:



2) Computer establishing methods

Use VPN client-side software and VPN Server to establish VPN tunnel, then user can visit the server through VPN tunnel. VPN client-side software and VPN Server can be achieved by commercial ways. The topology structure as follow display:



2. Functions

2.1 Function introduction

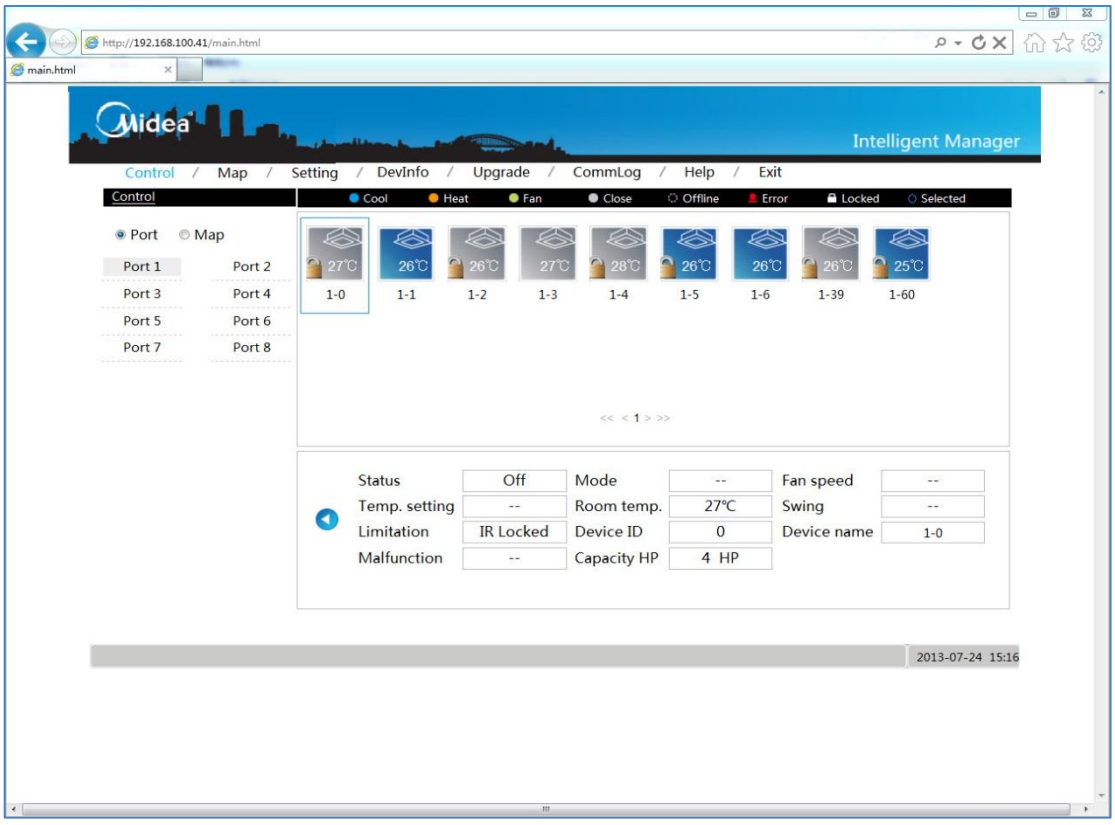
User can control and manage the air conditioner system through the WEB page and IMM software. WEB page and IMM software can provide different functions and meet the market requirements. In order to ensure the IMM system can be operational normally, you need to check and maintain regularly.

2.1.1 WEB Function

There are "Control", "Map", "Setting", "DevInfo", "Upgrade", "CommLog" and "Help" and so on functions on the WEB page of M-INTERFACE gateway.

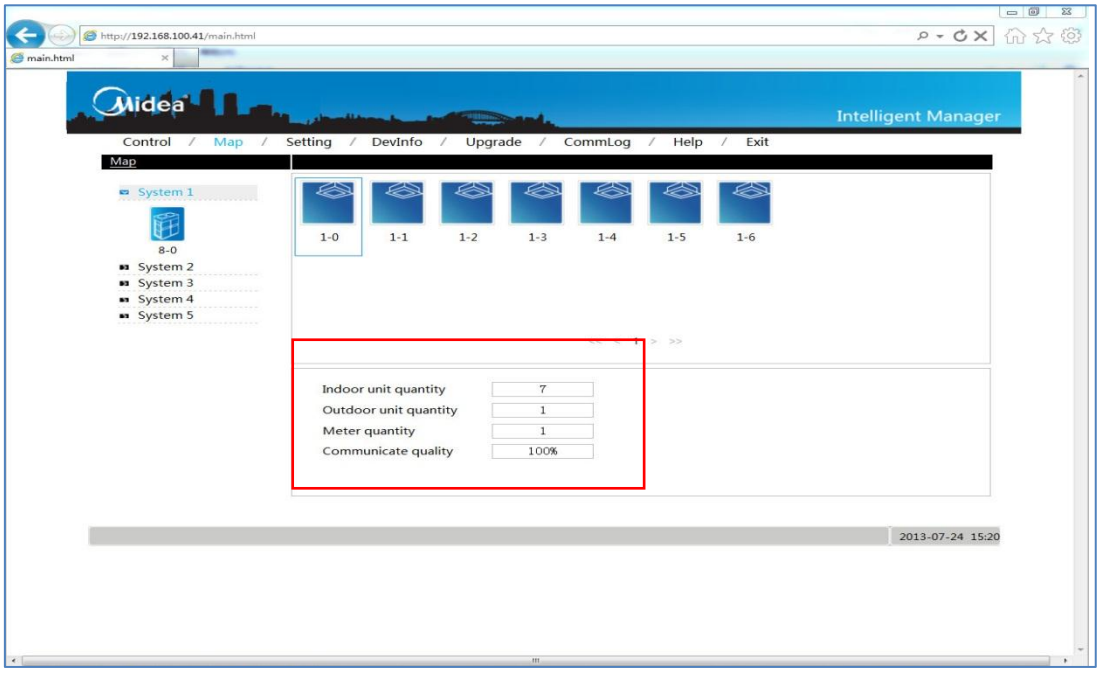
- **Control (Device monitoring)**

Provides the operating details information of indoor and outdoor units, and it can control indoor units.



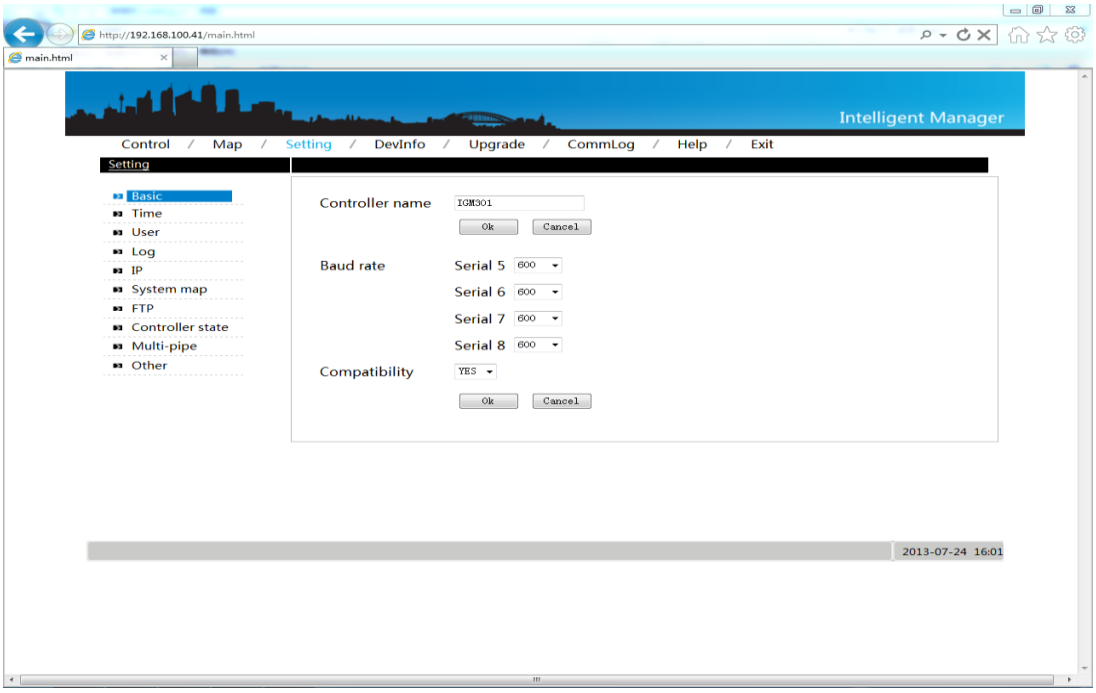
- **Map (Visual navigation)**

Can display all situations of refrigerant systems; include quantities of indoor and outdoor units in refrigerant system, power meter quantity and communication quality between single device and M-INTERFACE gateway.



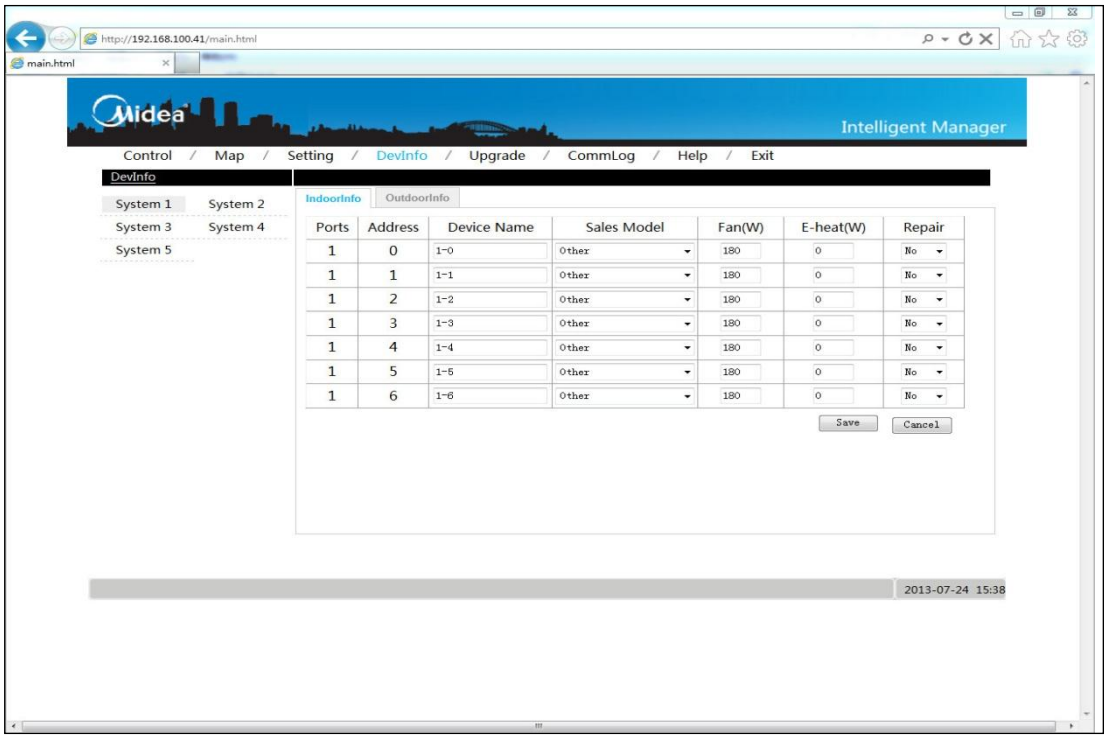
- **Setting function**

It can set the basic configuration of the, time setting, IP setting, user management and other functions.



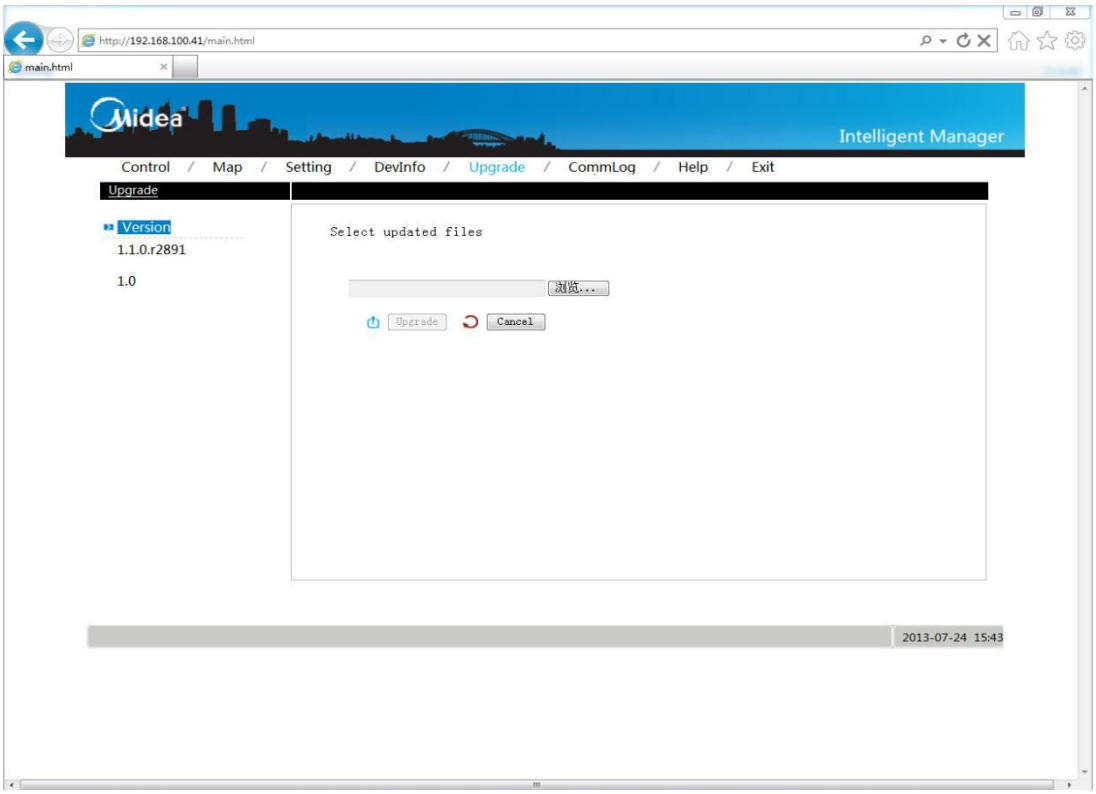
- **DevInfo (Device information)**

Can display and modify the information of indoor and outdoor units.



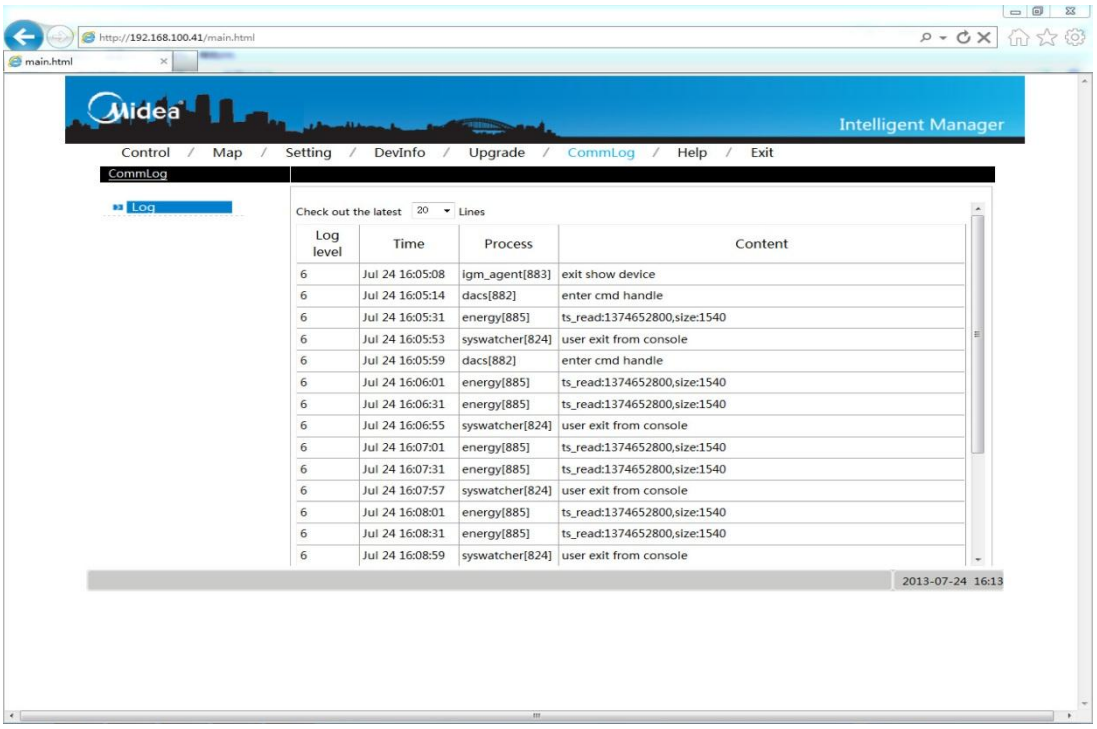
- **Upgrade (Software upgrade)**

The function provides for upgrade the software of M-INTERFACE gateway.



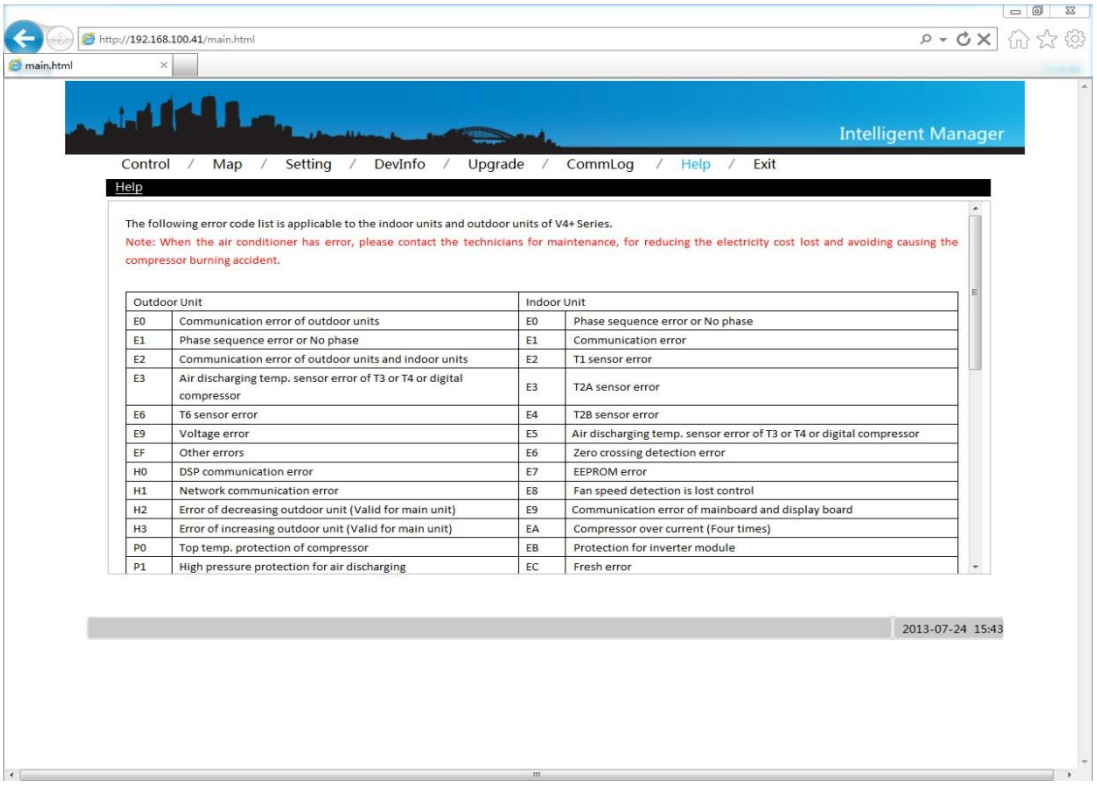
➢ CommLog (Communication log)

Provide communication fault log information of M-INTERFACE gateway.



➢ Help function

Provide error codes of Web page for user.

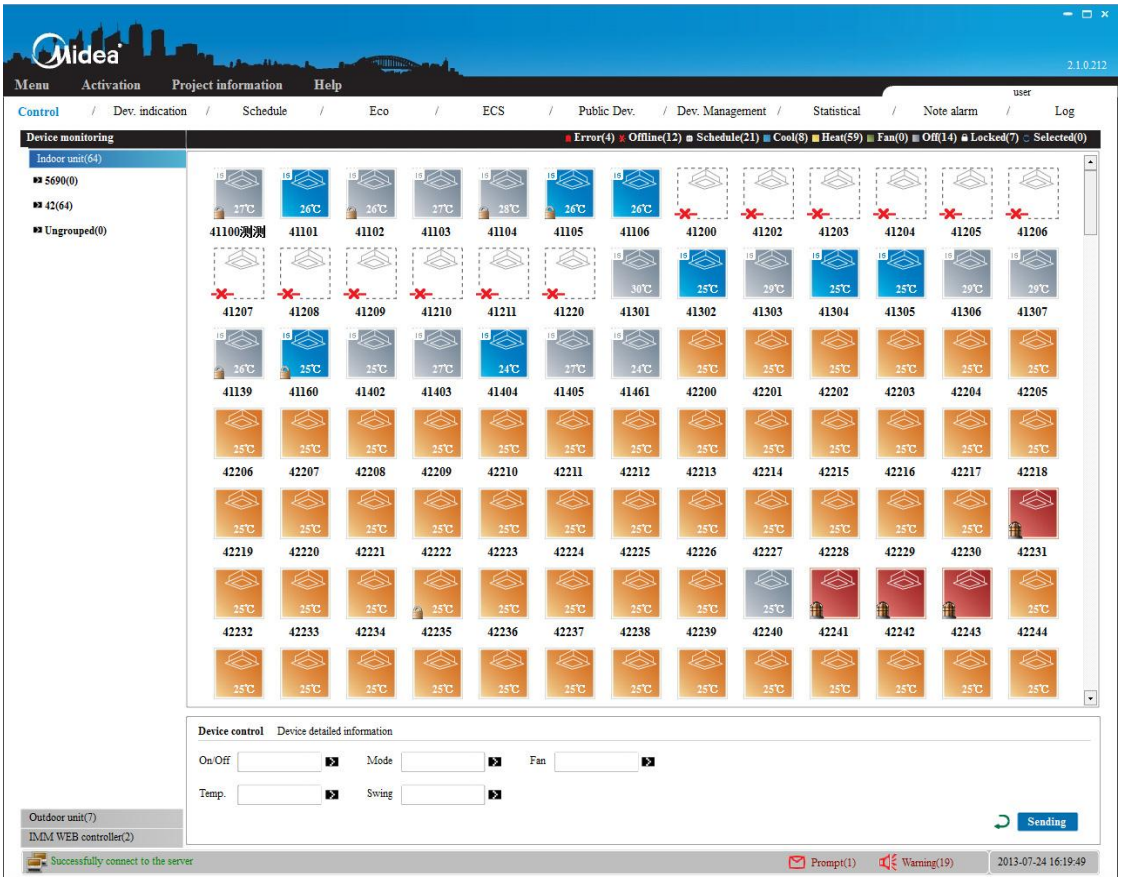


2.1.2 IMM Software function

IMM software can provide the main functions to control and modify the units.

- **Control (Device monitoring)**

Can control and management the indoor and outdoor units.

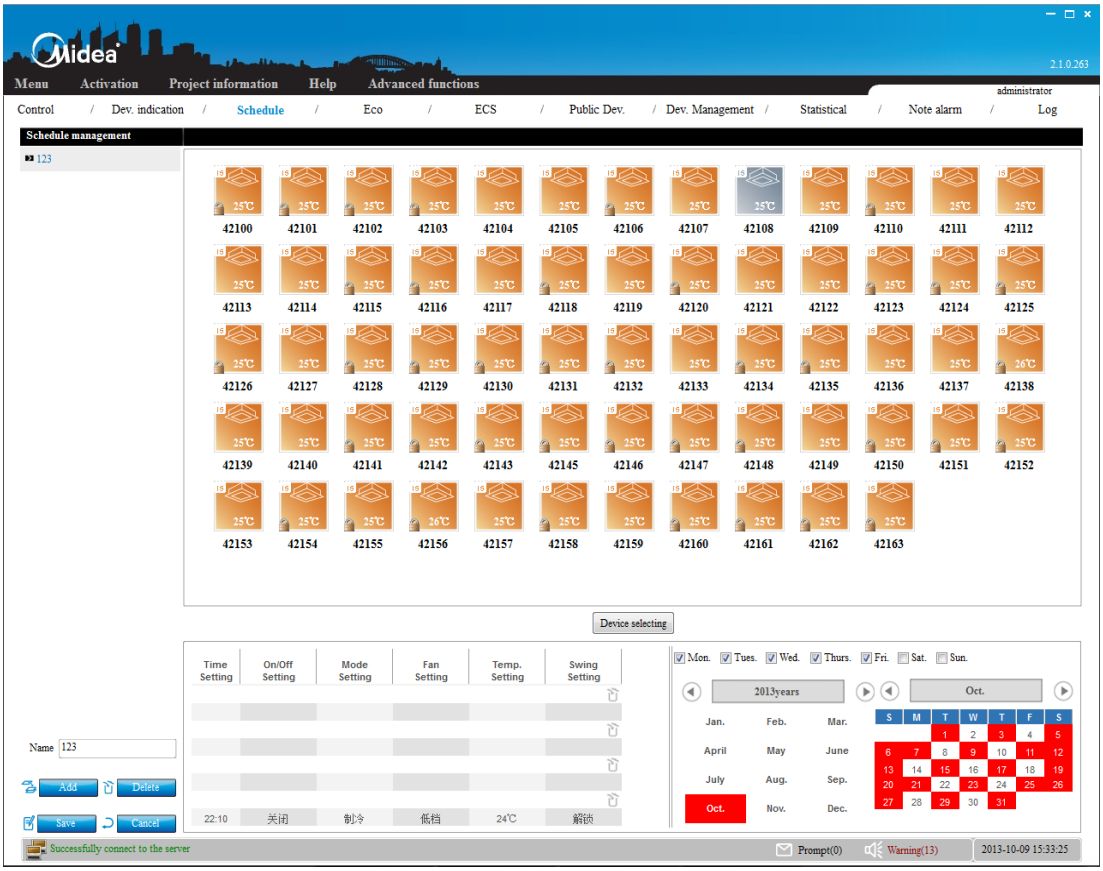


- **Dev.indication (Device indication)**

User can see the location A/C which unit you want to check. IMM supports the traditional display, and can be combined with the building structure, rapid positioning monitors and controls A/C state.

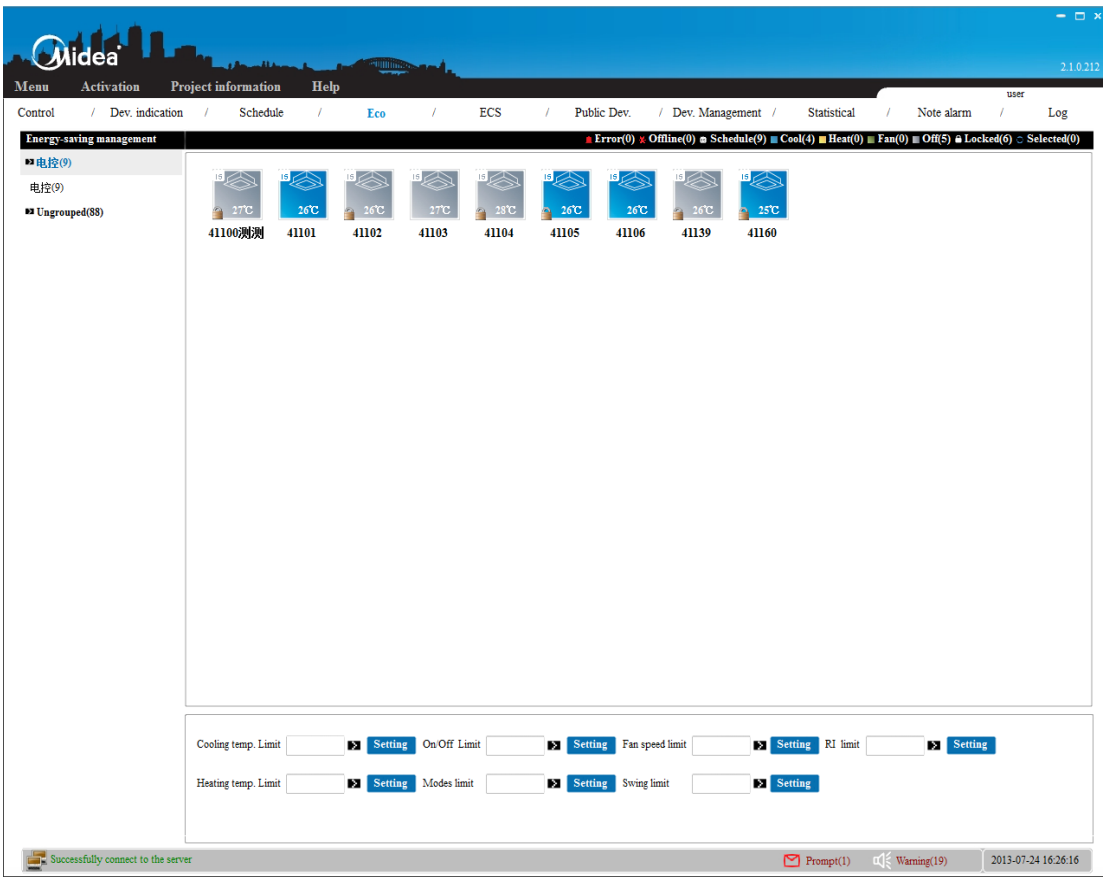
➢ Schedule (Schedule management function)

Provides the schedule control function and uses can set the running schedule for every day. There are 4 sections and 10 actions per section in each day for each single unit or group. Automatically performs facility start/stop control, switching the operating mode, setting temperatures and enabling/disabling the remote control according to the present time schedule.



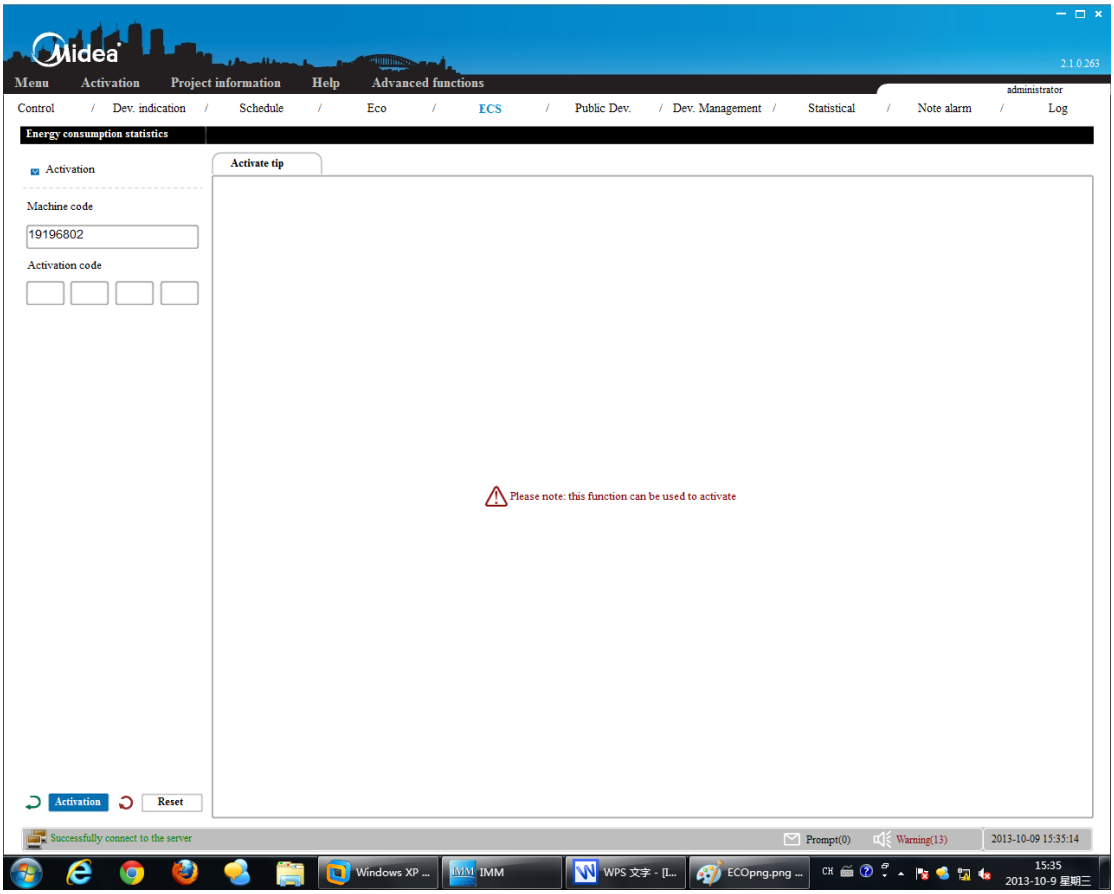
➢ Eco (Energy saving management)

IMM provides the energy saving management function. User can set limit to any running unit, any parameter, such as cooling temp., heating temp., fan speed, running mode and so on.



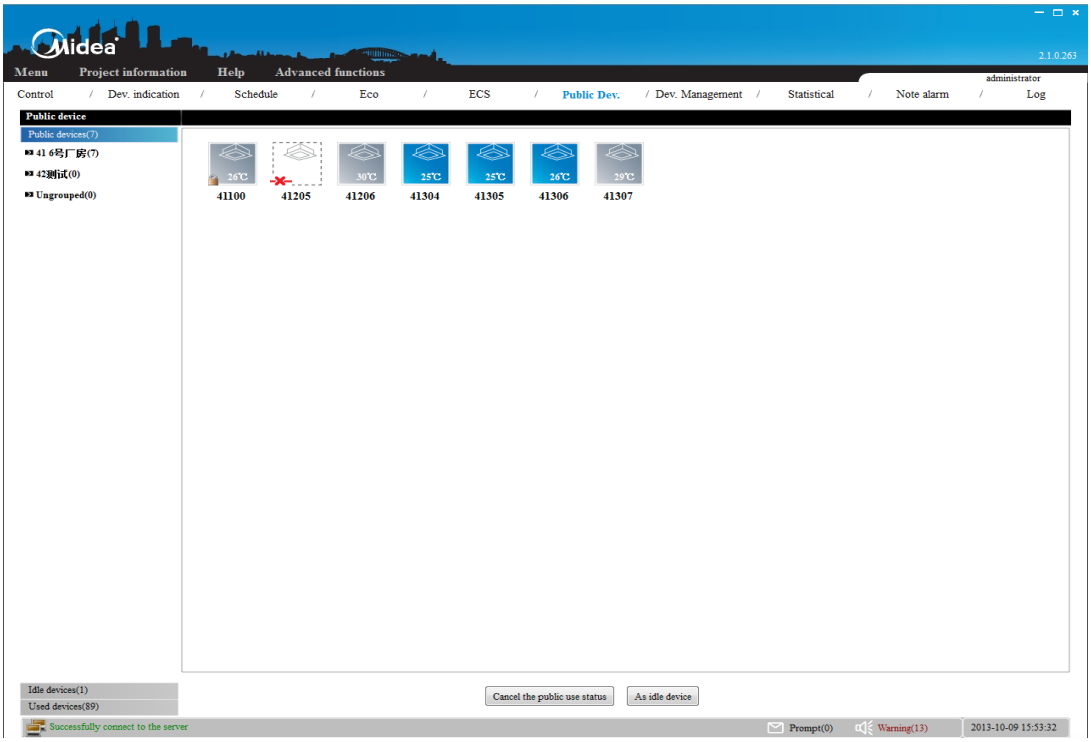
- **ECS (Statistics of energy consumption)**

Statistics of energy consumption function is the electricity charge distribution function. Electricity charge apportionment can be performed easily for the power consumed when billing users for air conditioner power charges, such as tenants in a commercial building, offices in a rental building, or rooms in a hotel.



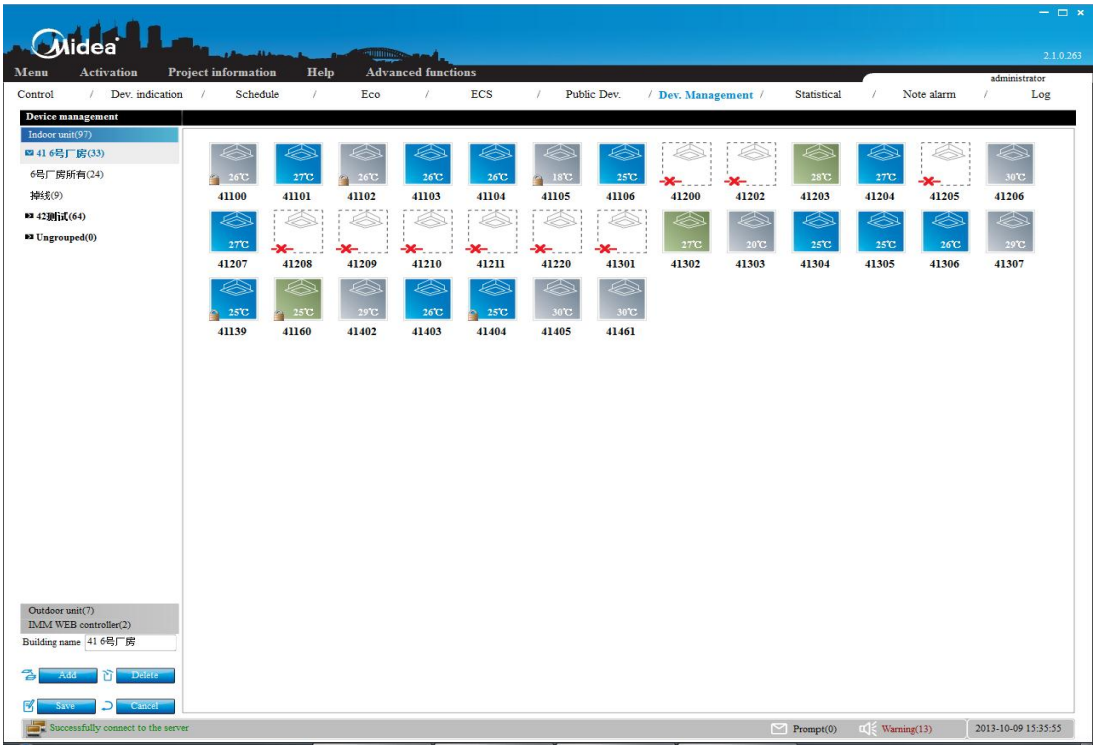
➢ Public Dev. (Public device)

IMM software provide the public device management, users can set the unit as the public device for free, and it is convenient to manage the energy charge of the public devices.



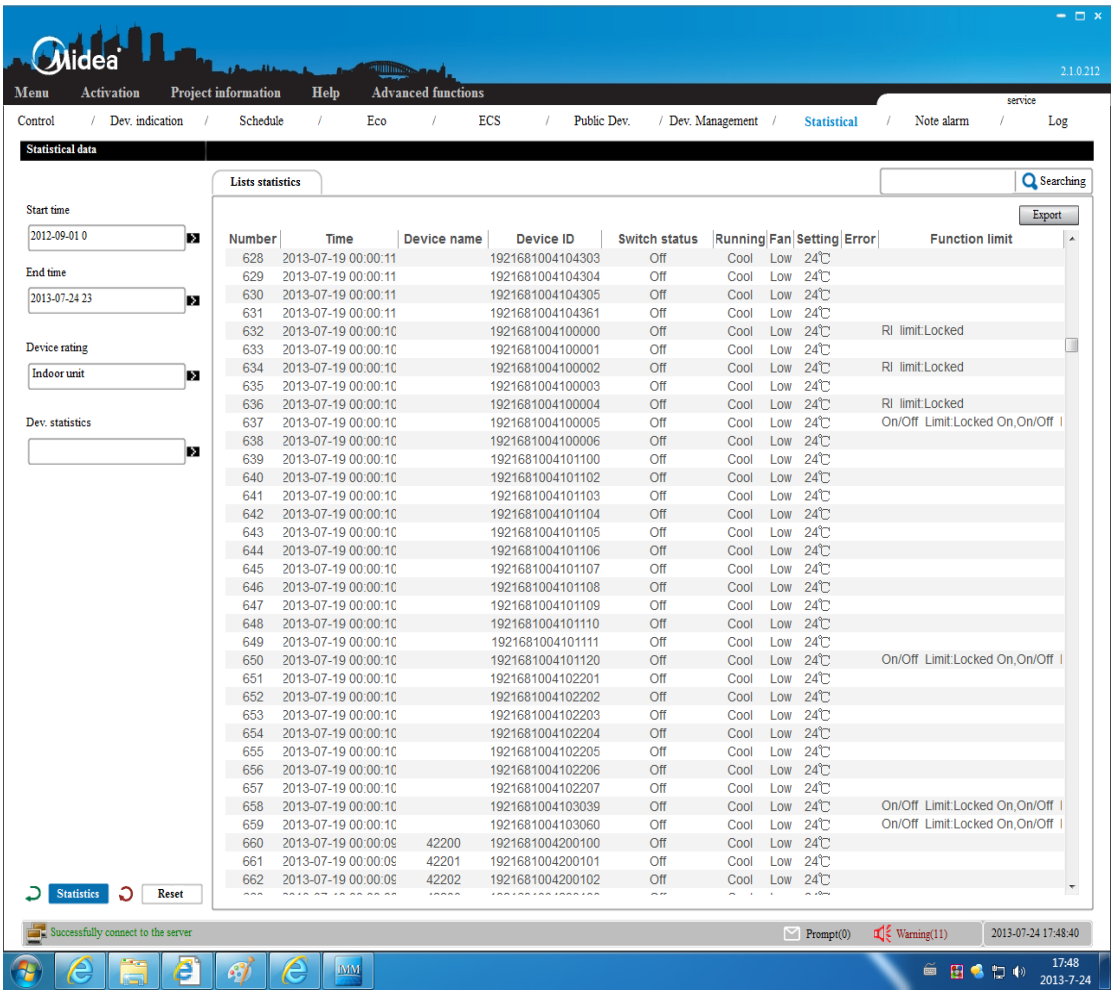
➢ Dev.Management (Device management)

Offers the group divisions function of air-conditioner device.



- **Statistical (Data statistics)**

IMM system provides the state changing records of indoor unit, outdoor unit and M-INTERFACE gateway.



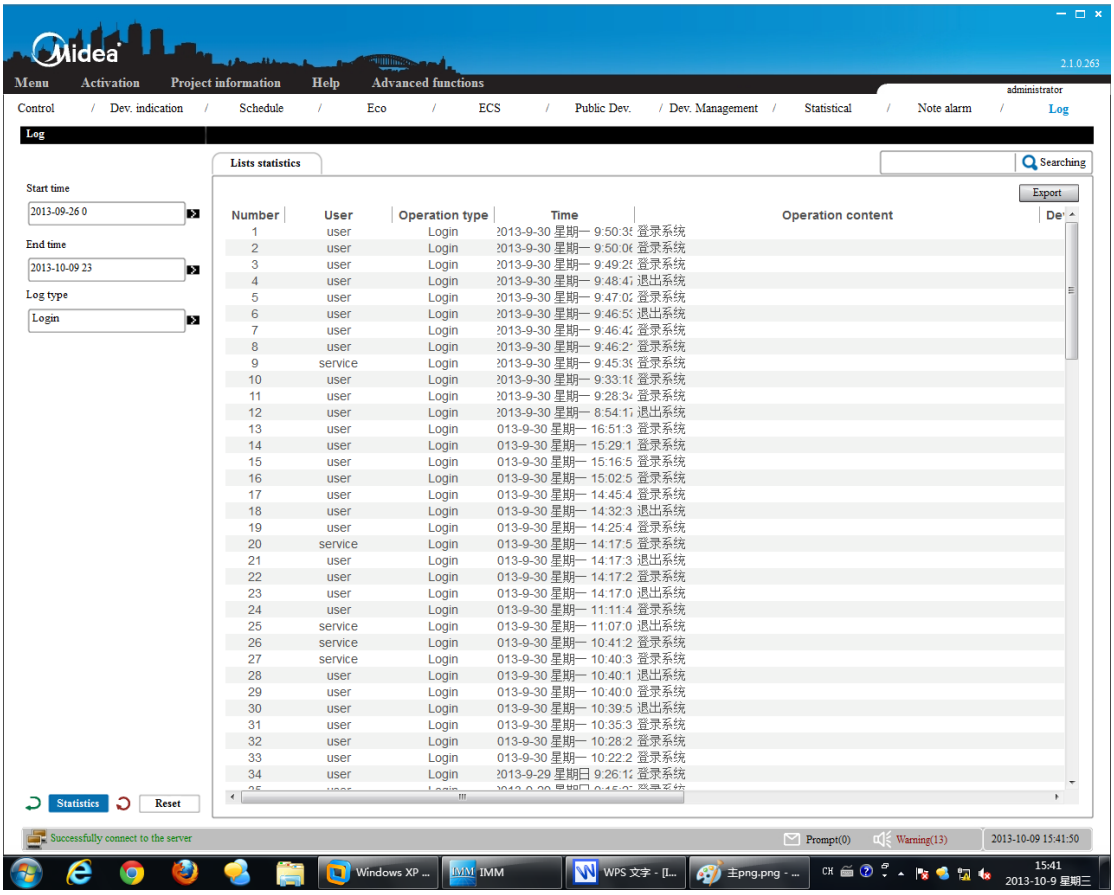
- **Note alarm (Warning message)**

If error occurs, it will be notified with warning message. The system is able to send error messages to designated mobile phone number automatically via public phone lines and SMS Modem .(* optional)

Notes: It is necessary to purchase an additional piece of equipment named "SMS Modem" from Midea.

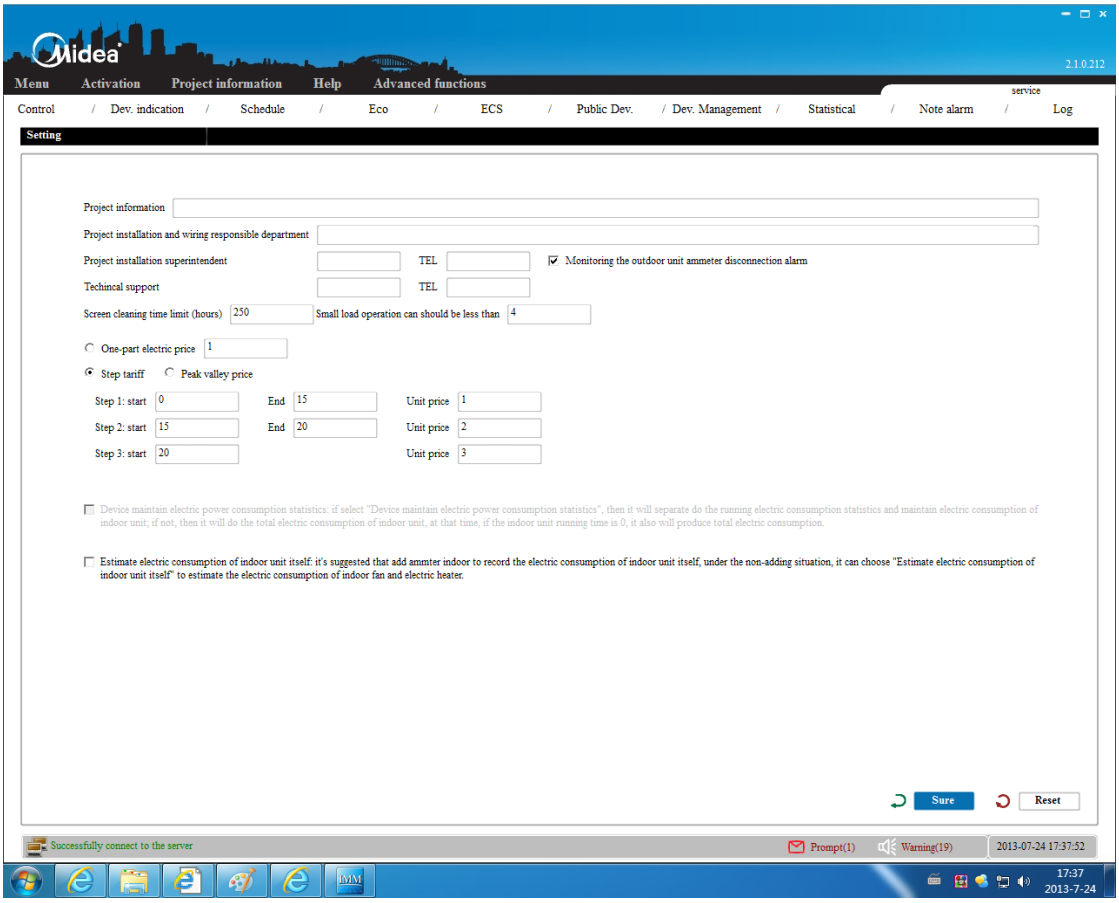
➢ Log

It can offer all the operations records of the IMM client-side.



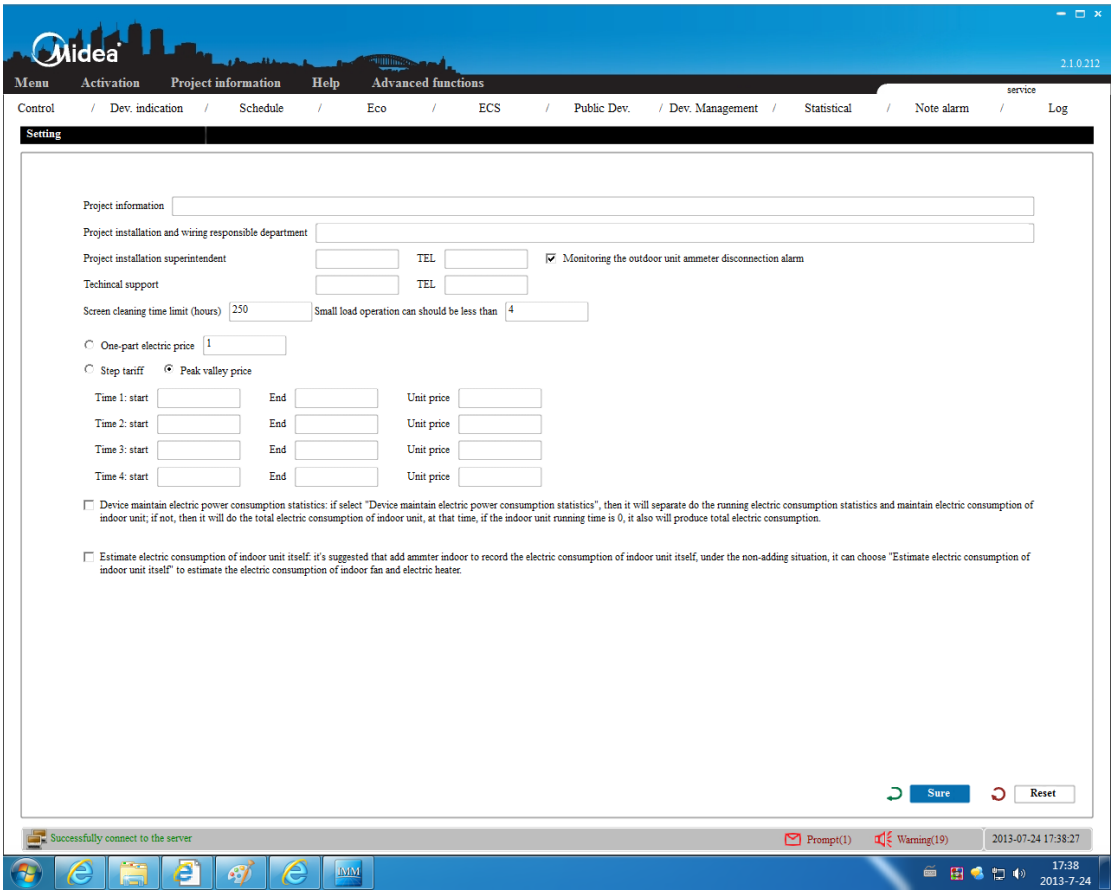
➢ Setting

It offers project information configuration and electricity price configuration functions.



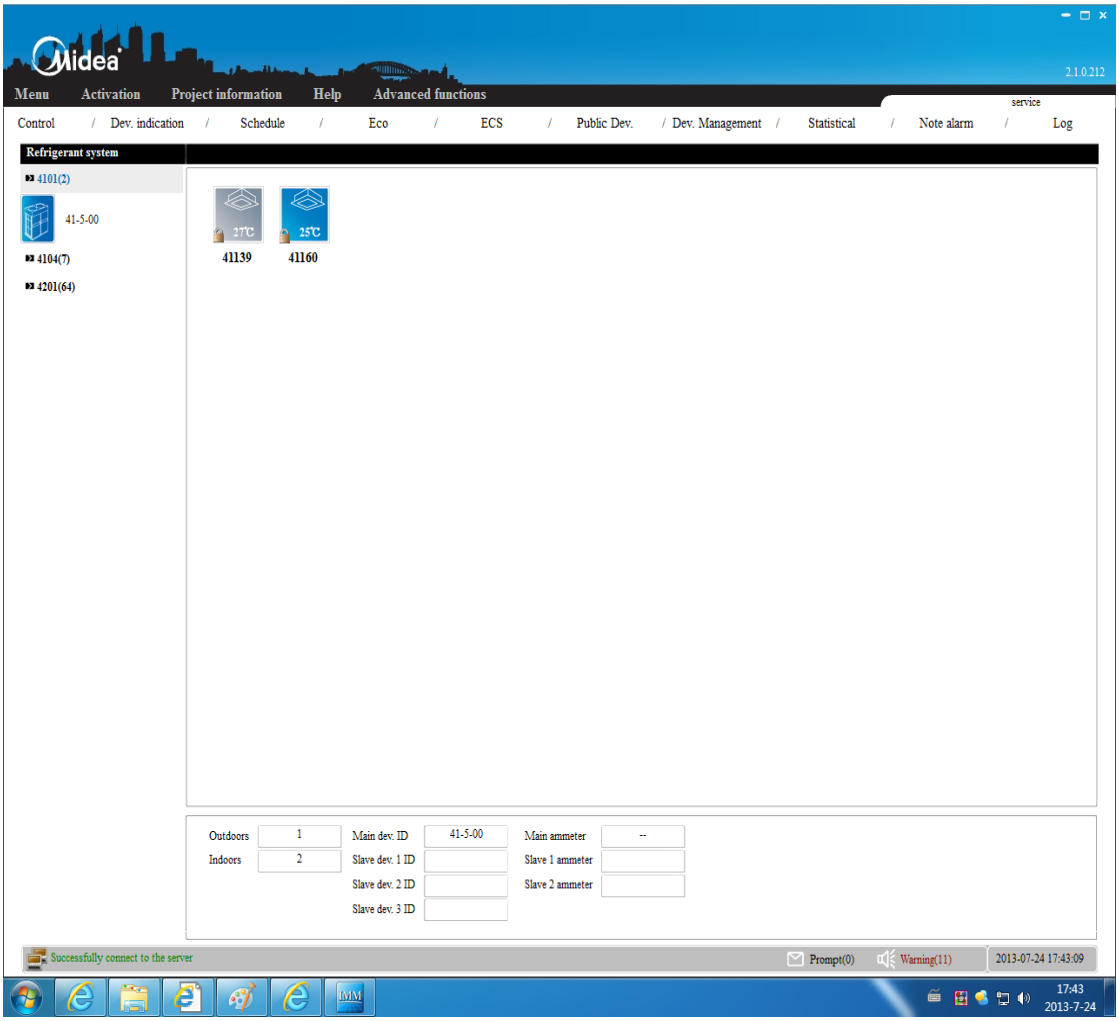
➢ Account management

It can change the account password.



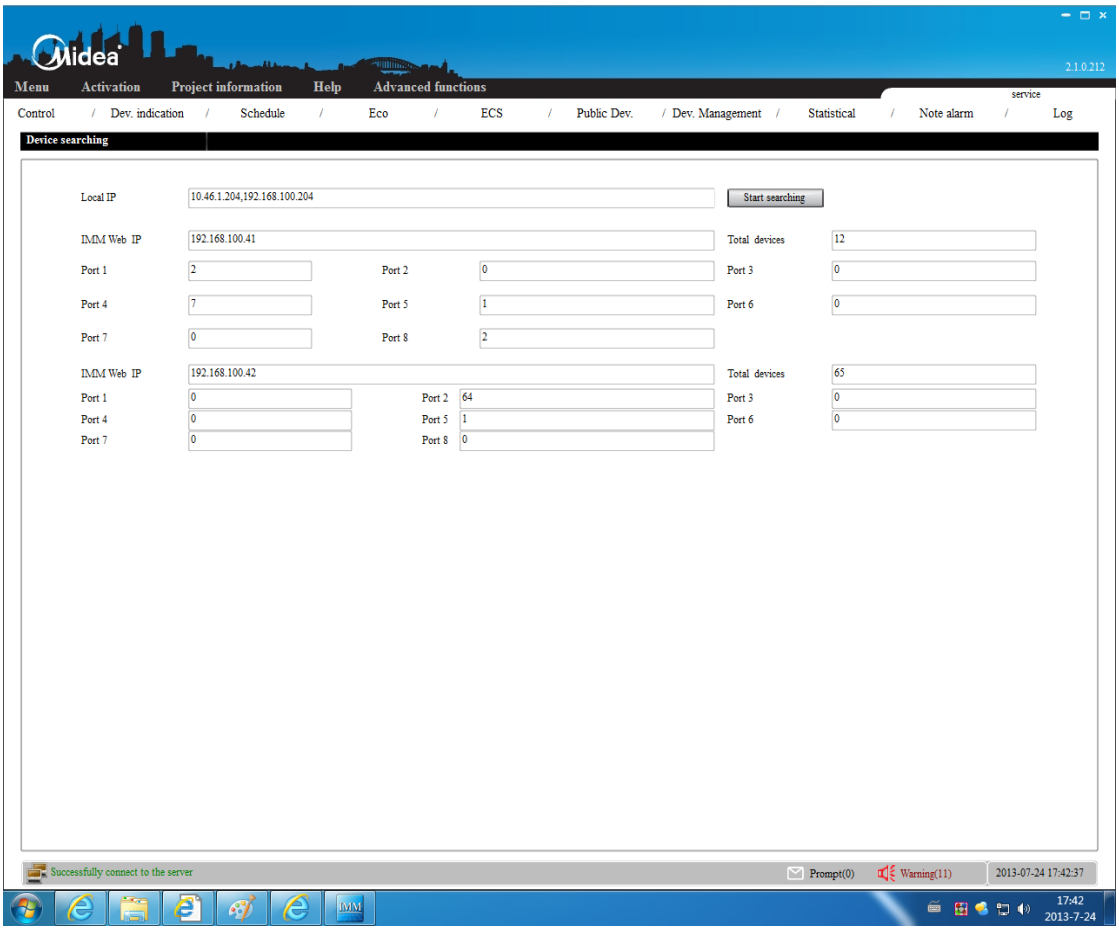
➢ **Refrigerant system**

It can display the indoor and outdoor units' information in the refrigerant system, and respond the system mapping relation.



➢ Device searching

It can search the air conditioners and gateway devices in the same network.

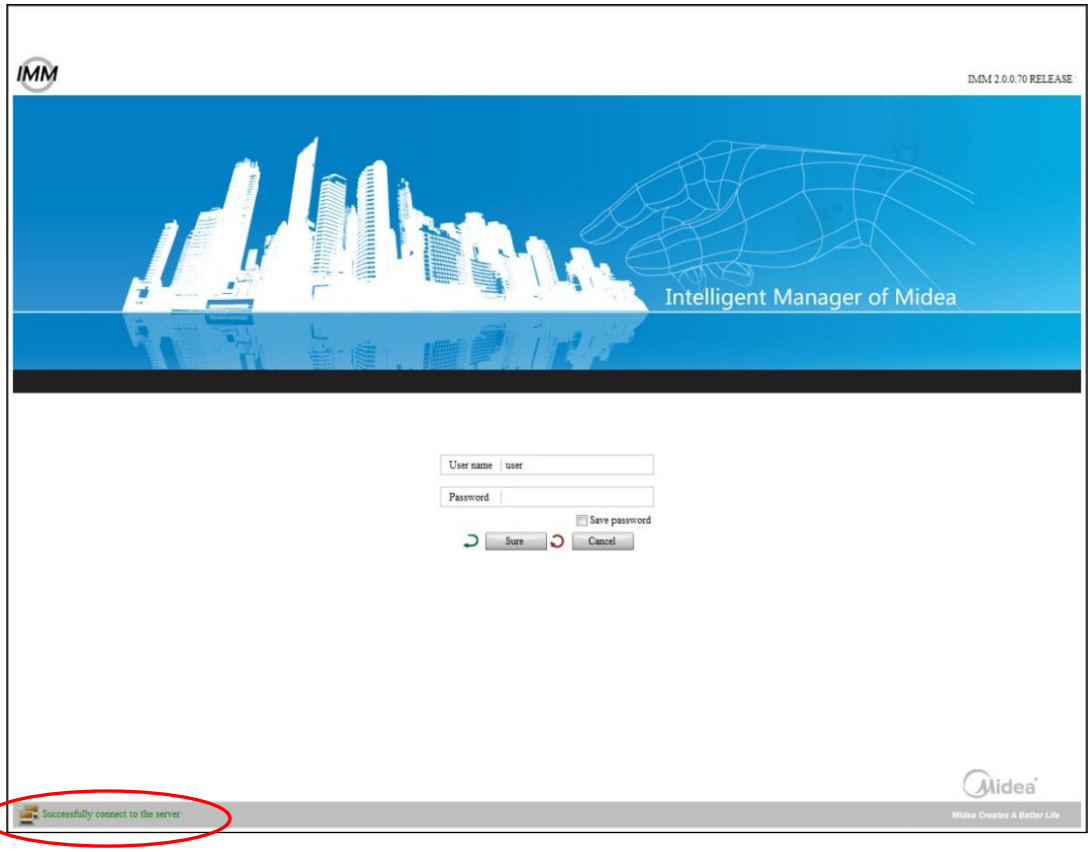


3. Operation introduction

3.1 IMM software login (general user login)

There are two login methods for IMM software: general user login and administrator login. Now introduction the general user login first.

Operate the IMM client-side software and it will enter the following page:



When display "Connect to the server successfully" at the lower left of the login page, then you can carry out the login operations. The login operations steps as follow:

1) Input user name and password, the defaults are "user";

2) Choose whether save the password;

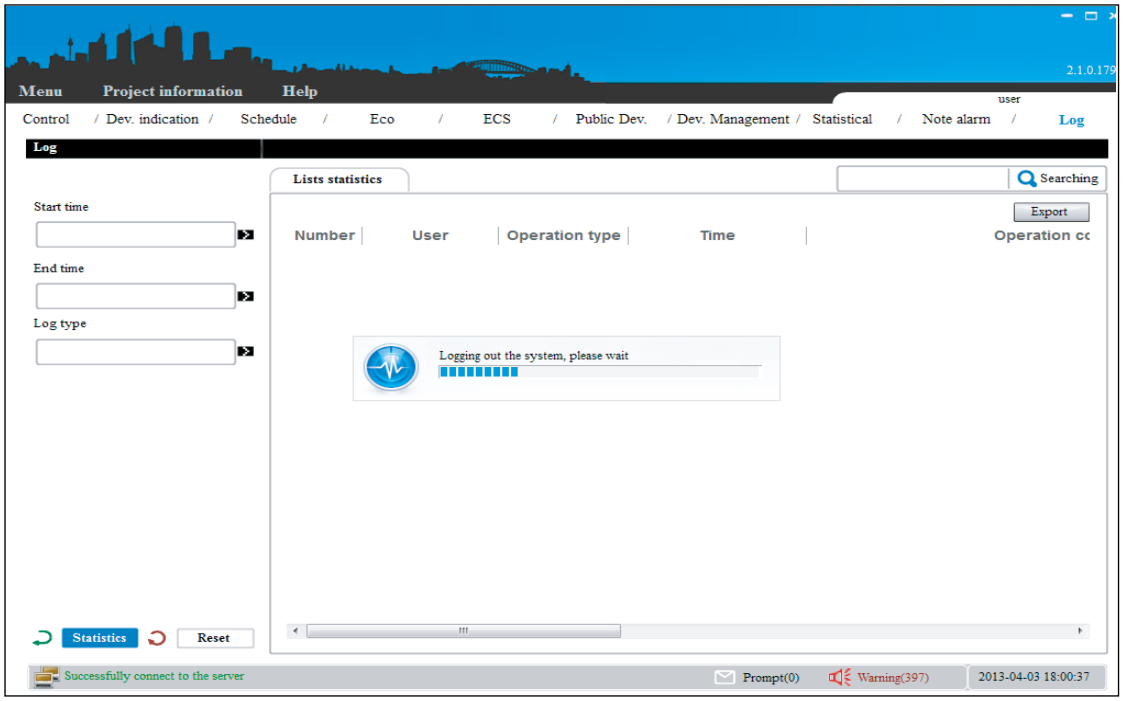
3) Click "OK" button to carry out login;

4) Click "Cancel" button to exit;

When clicked the "OK" button and login successfully, it will enter the system home page.

3.2 log out

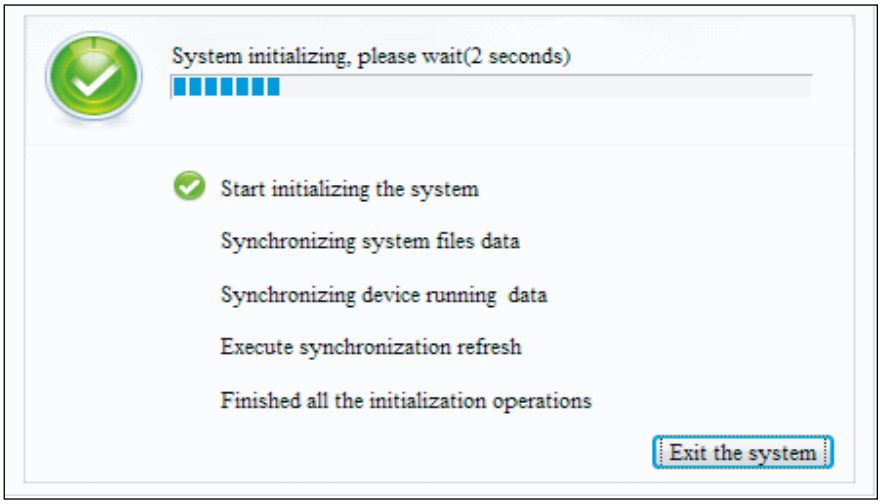
Click the icon on upper-right corner, and it will display "Logging out the system, please waiting" and exit the system.



3.3 System initialization

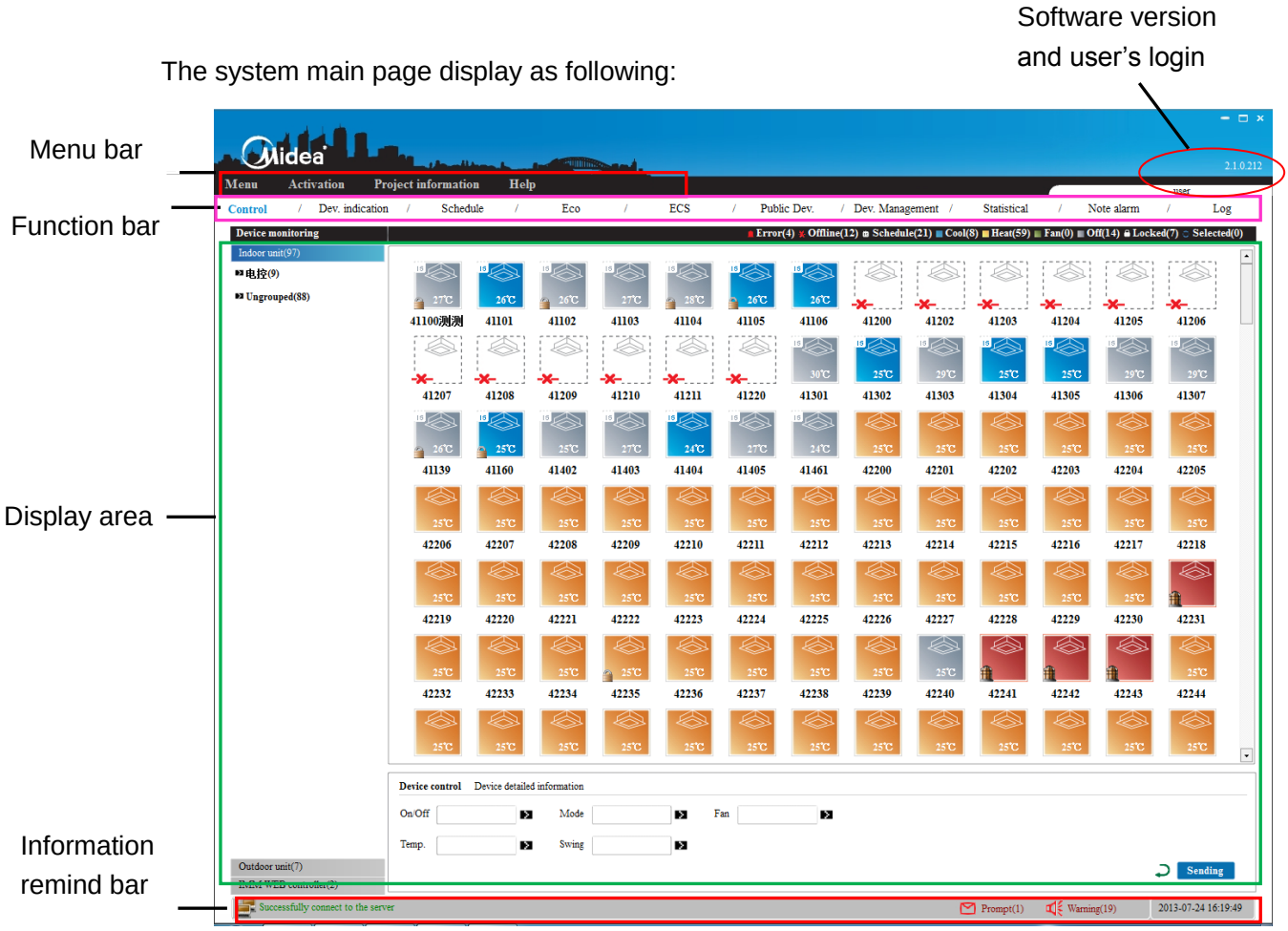
When user login is successful, it will display the system initialization dialogue frame as following, and carry out the system initialization to update the system information.

Click the "Exit the system" button, it will stop the initialization work and exist the system.



3.4 Main page introduction

The system main page display as following:



Menu bar: provide the system function menu.

Function bar: include the device monitoring, device indication (visual navigation), schedule management, Eco (energy saving management), ECS (electricity charge distribution), public device, device management, data statistics, note alarm (warning message) and log function.

Display area: display the detailed information of each function.

Information remind bar: can display the prompt message and alarm information.

The upper-right corner of the interface will display the software version and user's login name.

3.5 Device monitoring function

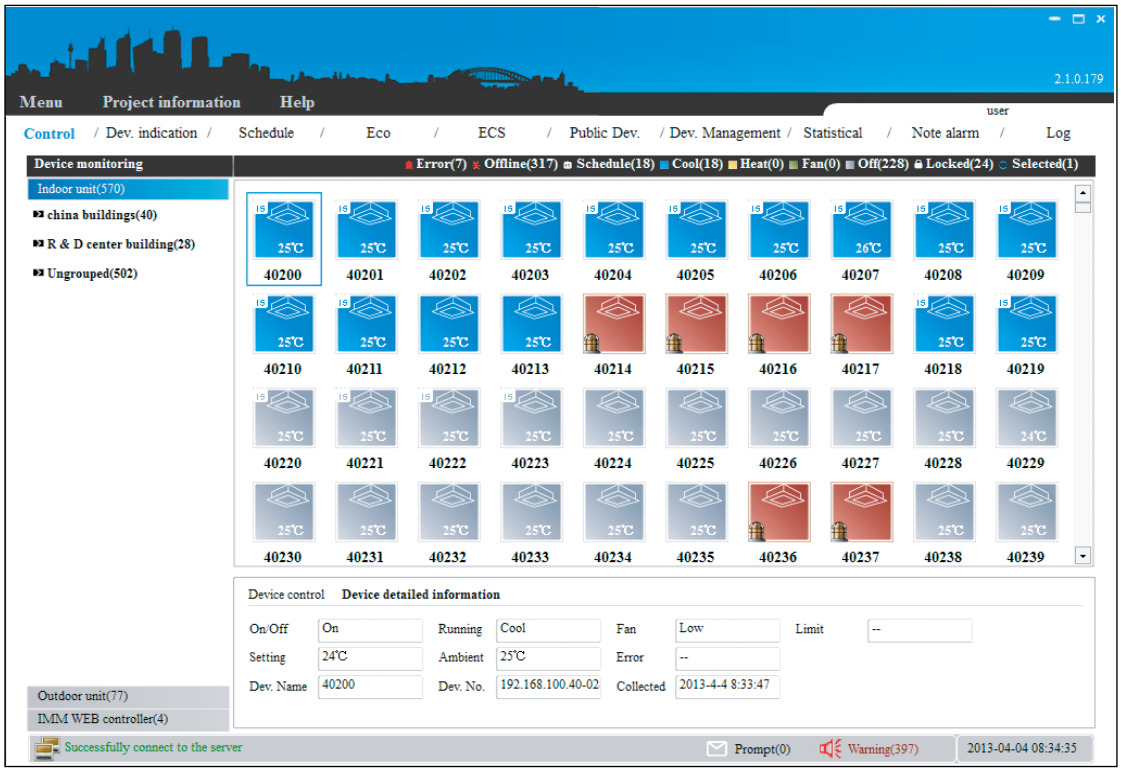
There are three parts can be operation: indoor units monitoring class, outdoor units monitoring class and the M-INTERFACE gateway monitoring class. Each part can be divided primary group and the secondary group display. For example, under the indoor unit, it will display the primary group: Buildings; and under the primary group it will display secondary group: first floor, second floor, third floor etc.

3.5.1 Indoor unit monitoring

Selecting "indoor unit" class, the left side of page will display the group information of the indoor unit, and the right will display all the indoor units in the IMM system. Select the "device control" can control single or more sets indoor units; select the "device details information" can check the operating detail information of a single device.

1) Check the operating state of indoor unit

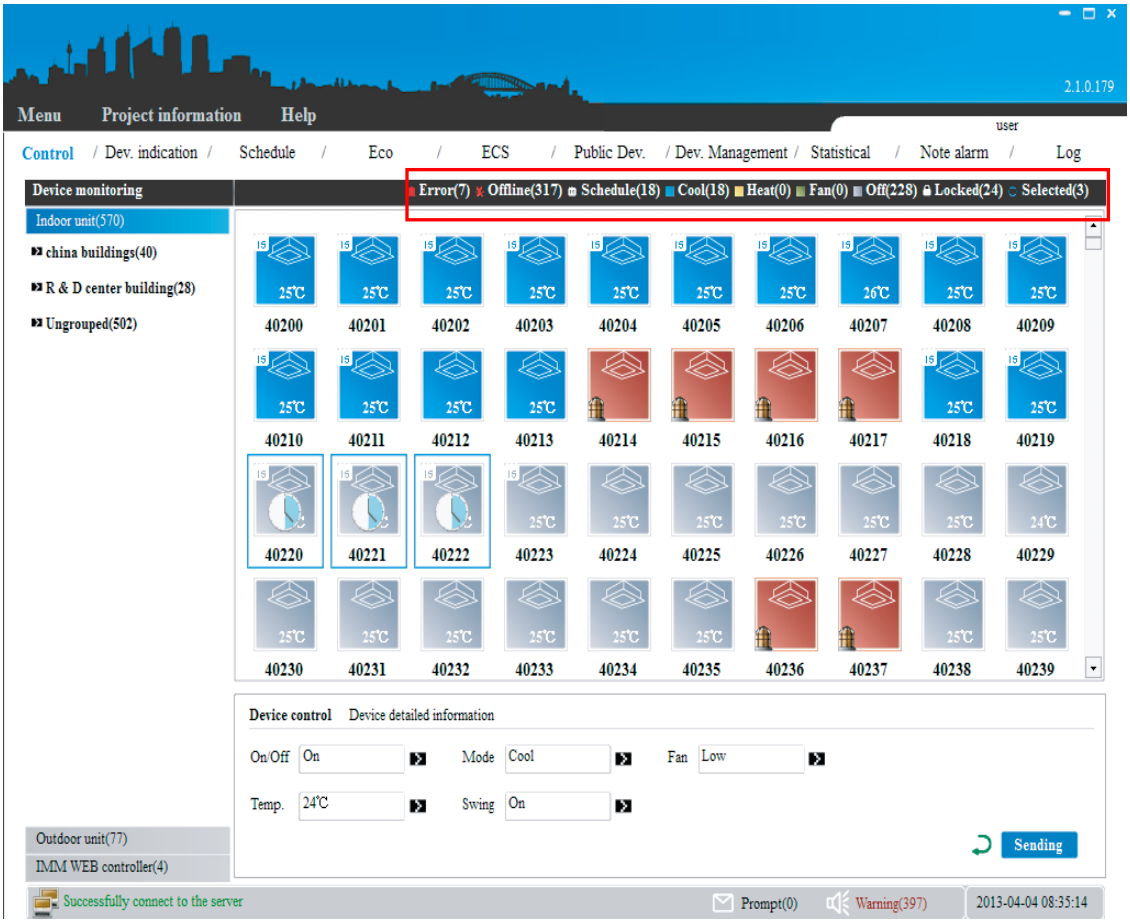
Choose the "device detail information" and select any one indoor unit, then the bottom of the page will display the operating detail information of this device.



Displayed detail information: on and off state, operating mode, device's name and device number and so on.

2) Control the operating state of indoor unit

Choose the "Device control", select the single or more sets indoor units (selecting method refers to 3.5.4) to configure parameters: on and off setting, operation mode, fan speed, temperature and swing setting, and click "send" button after setting, it will display as following dialog:



After click "send" button ,the page will display the icons which waiting for being sent, and after the order is finished, the send waiting icons will disappear, the page will be refresh, then we can check the running state of air conditioner. If the control is failed, the "Prompt message" will display the control failed information on the page bottom.

Notes: double click the digit below the icon can change the device's name, and then press ENTER key to confirm.

3) Indoor icon introduction

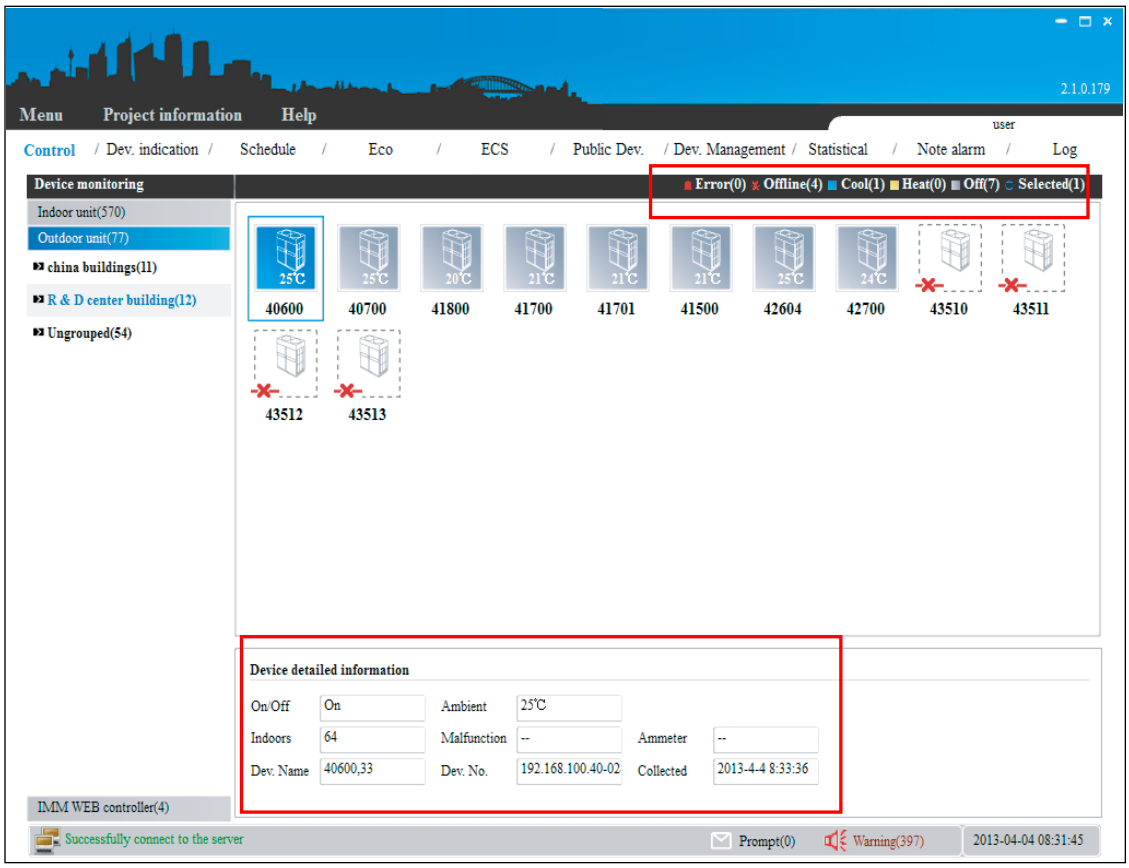
Icon	Remark	Icon	Remark	Icon	Remark
	Cooling mode (Blue)		Heating mode (Orange)		Fan only (Green)
	Error (Red)		Locking		Power off (Gray)
	Offline (White)		Selected unit		The control order is running, please waiting

States selection:

There are some display states of the indoor unit: error (Error), Offline (Offline), schedule (Schedule), cooling (Cool), heating (Heated), fan only (Fan), power off (Off), locked (Locked) and selected (Selected). Click the above icons, and it will display all the corresponding state of each unit. Right-click the "selected" icon, and it will "All select/cancel all select", if selection "All select", it will select all the icons; if selection "cancel all select", it will cancel selecting all the icons. Right-click the "locked" icon, it will display the locked lists, and click the corresponding list will display the corresponding devices.

3.5.2 Outdoor unit monitoring

Selecting "outdoor unit" class, it will display the group information of the outdoor unit on the left side page, and the right side of page will display the corresponding outdoor units.



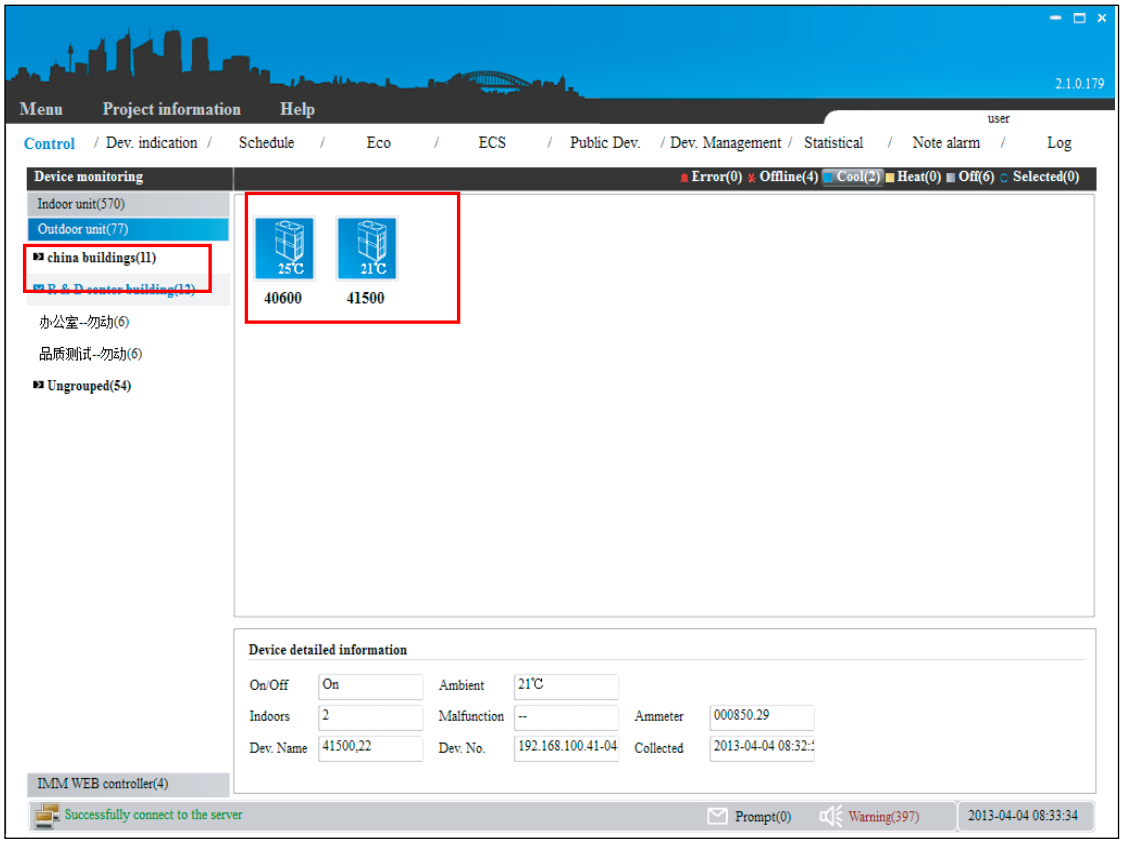
There are some display states of the outdoor unit: error, offline, cooling, heating and selected. Selected or right-click the single outdoor unit can check the on and off state, ambient temperature, power meter information etc. under the "Device details information".

Outdoor icon introduction

Icon	Remark	Icon	Remark	Icon	Remark
	Cooling mode (Blue)		Error (Red)		Selected unit
	Heating mode (Orange)		Power off (Gray)		Offline (White)

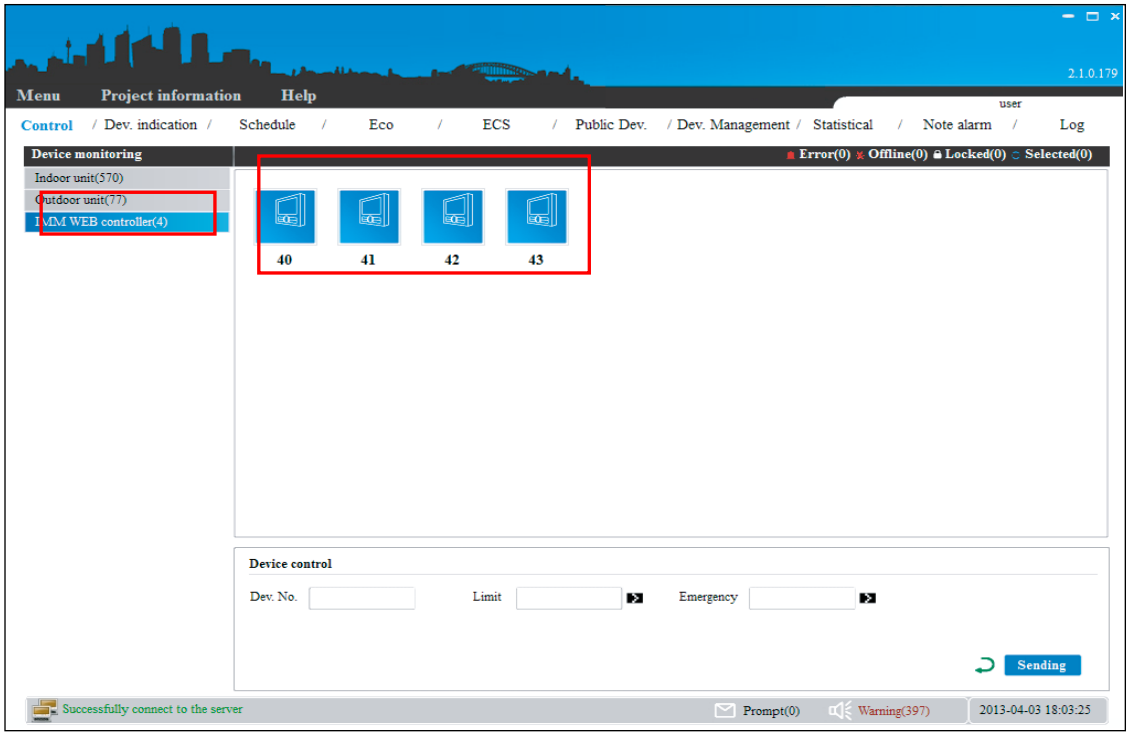
States selection:

The outdoor unit display state: error (Error), offline (Offline), cooling (Cool), heating (Heated), power off (Off) and selected (Selected). Click above icons, and it will display all the corresponding state of each unit. E.g.: click the cooling icon on the central building, and then it will display all units which under the cooling state as following dialog:

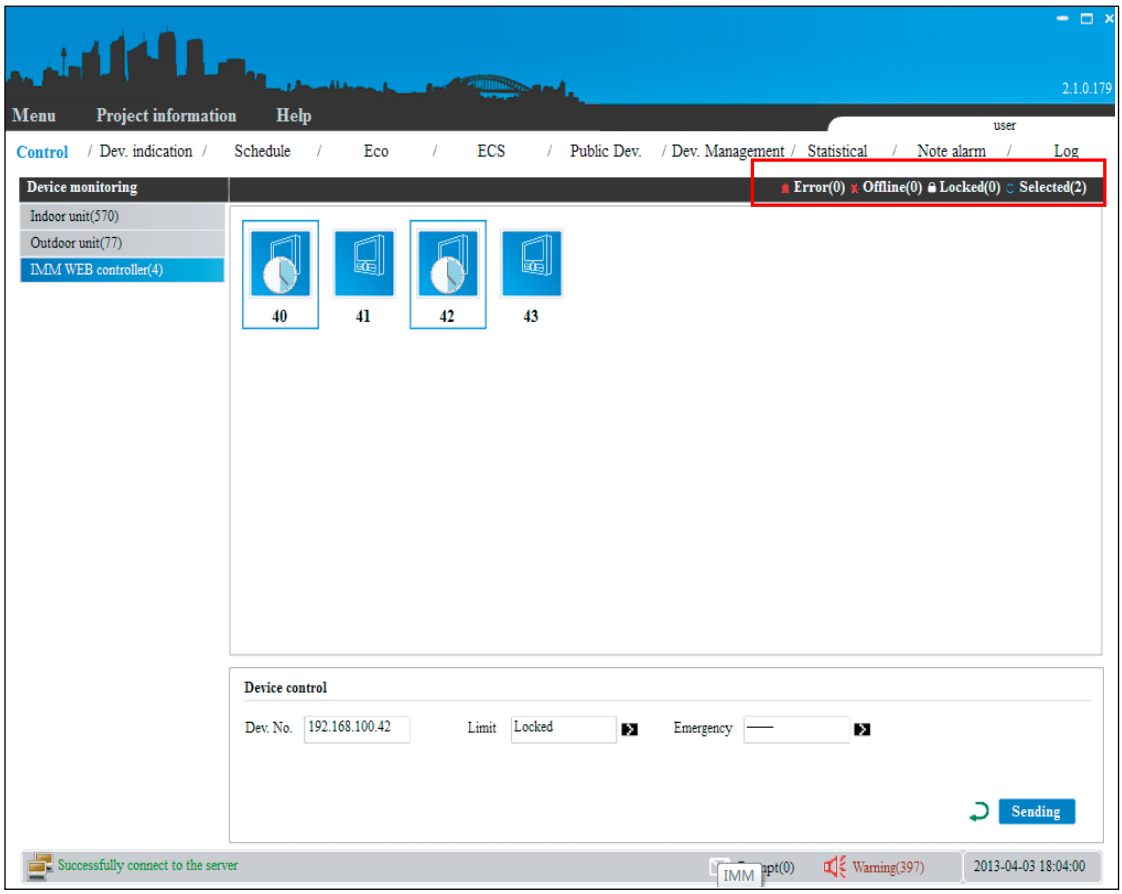


3.5.3 M-INTERFACE gateway monitoring

Selecting "IMM WEB controller" (M-INTERFACE gateway) menu, the page will display all the M-INTERFACE gateways in the IMM system.



There are 3 display states of M-INTERFACE gateway: off-line, locked and selected. When selecting or right-click one M-INTERFACE gateway, the bottom of page will display gateway's IP address and with the limit mode or not, and users can control the M-INTERFACE gateway through setting the limit mode parameters, emergency stop parameters and then click "send" button. Double-click the device name can change the gateway's name, and press enter key to save. E.g.: selecting the M-INTERFACE gateway named 40 and 42 (selecting method refers to 3.5.4), and select the "limit mode" parameters, and then click the "send" button, the page display as following dialog:



After setting "Limit mode" successfully, the device icon will add a lock icon.

Parameters specifications:

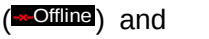
Parameters	Remark
Limit mode	Lock: cannot operate in the WEB page of M-INTERFACE gateway Unlock: can unlock the M-INTERFACE gateway
Emergency stop	----: cannot operate the emergency stop function Stop: can operate the emergency stop function and turn off all the unit which under the same M-INTERFACE gateway

Icon specification

Icon	Remark	Icon	Remark
	M-INTERFACE gateway work normally		M-INTERFACE gateway offline
	M-INTERFACE gateway locked		M-INTERFACE gateway selected

States selection:

There are 3 states of M-INTERFACE gateway: locked (

), offline (

) and selected (

). Clicking above state icons can check the corresponding state of each gateway. If clicking the offline icon, it will display all the gateways which are offline. Right-click the "selected" icon and it will display "All select/cancel all select" frame, if choosing "All select", and then all the icons will be selected in the same page; if choosing "cancel all select" all the icons will be cancel selected in the same page.

3.5.4 Shortcut keys operation

◆ **The mouse shortcut keys operation**

The system offers shortcut keys operations, it convenient for user to select/cancel one or more sets devices quickly.

1. Select single icon

Left-click the icon, if the icon has been framed, it means this device is selected.

2. Select several icons

There are two methods for selecting several icons:

1) Use the same way as selecting single icon to choose the device icons which you want to choose.

2) Left-click outside the frame in the page and drag a dotted line frame to select the corresponding icons.

3. Cancel single selected icon

Left-click the selected icon again, it will cancel selecting the icon

4. Cancel several selected icons

There are two methods for canceling several selected icons:

1) Cancel several selected icons way is the same as canceling single selected icon.

2) Double-click the left/middle/right key of the mouse in the blank place of the page, to cancel several selected icons.

◆ **Function shortcut keys operations**

Right-click the 

icon, it will display the selection frame "All select/cancel all select", if choosing "All select" or "Cancel all selected" can select and cancel quickly. The operation steps as follow:

1) Select the "indoor unit" or "outdoor unit" class (or primary group or secondary group).

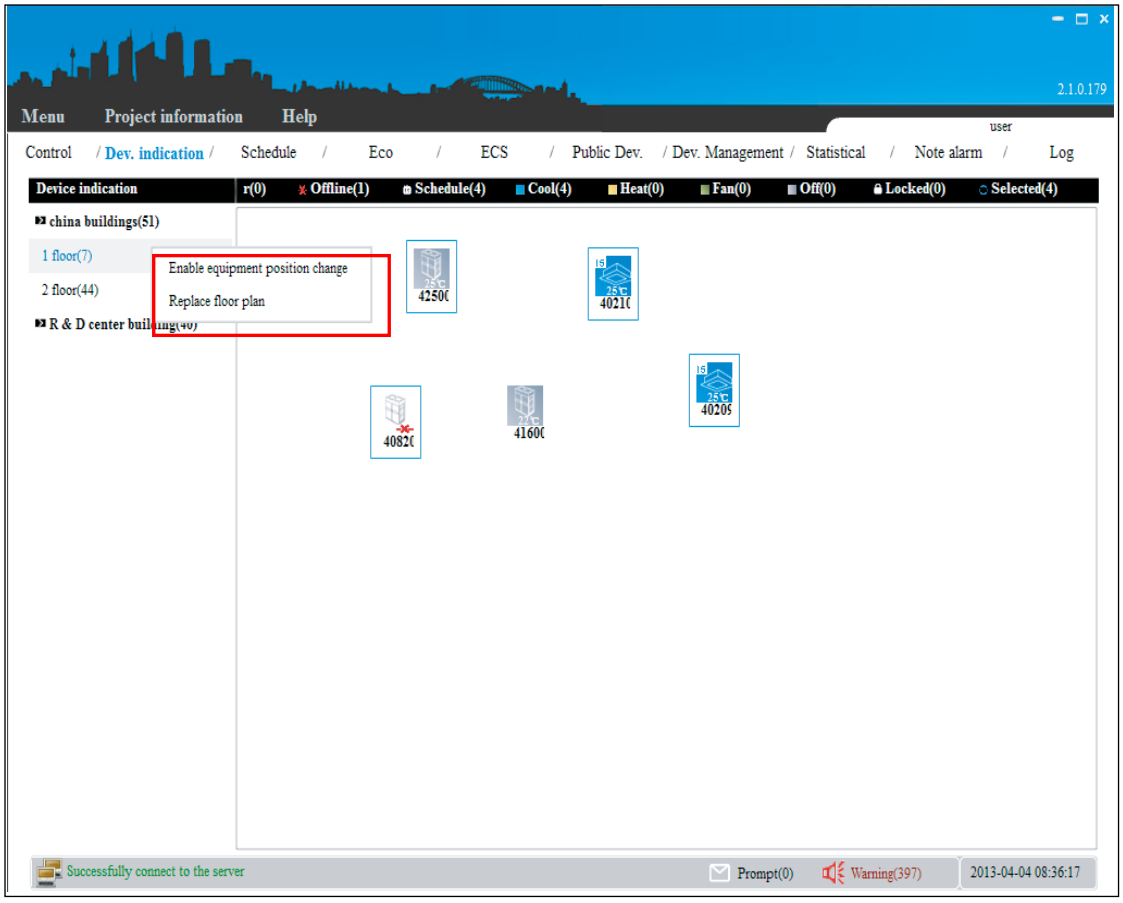
2) Click any one state display icon (cooling, heating, error, off unit etc.), for example, click the cooling state icon, all the cooling units will be display.

3) Click the "select all" option, then all the cooling units will be selected in the same page, and if clicking the "cancel the selected all", all the selected icons will be canceled selecting.

3.6 Visual navigation

IMM system provide the visual navigation function and users can be combined with the building structure, rapid positioning, monitors and controls A/C state.

Right-click any one secondary group, it will display "Enable equipment position change" and " Replace floor plan" frame, and click "Replace floor plan", then it display as following dialog:

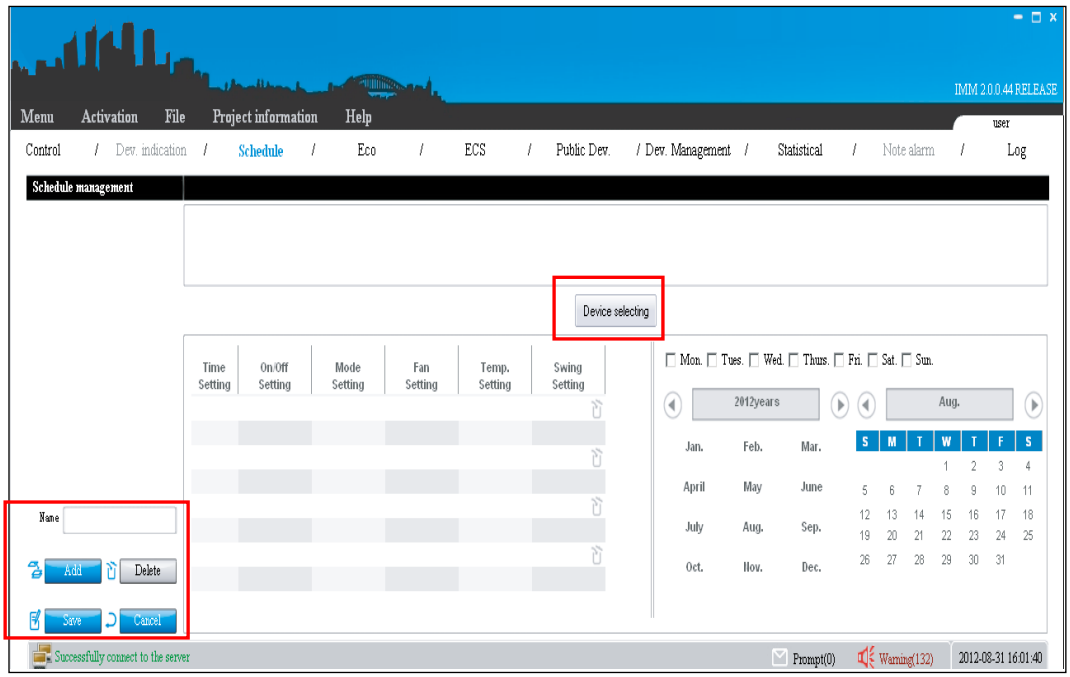


User selects the corresponding floor plan (the picture will be in JPG format stored in the map folder of the IMM client-side installation menus) and click "Save" button, and click "Close" button after operation.

After selecting the floor plan, then click "Start changing device's location", user can select any one device and drag it on the page to change its location.

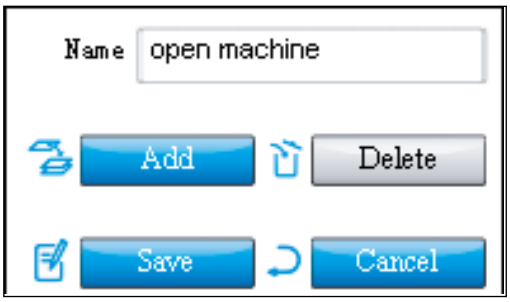
3.7 Schedule Control

IMM system provide the schedule control function, users can operate schedule management of the indoor unit.



Schedule control steps are as follows:

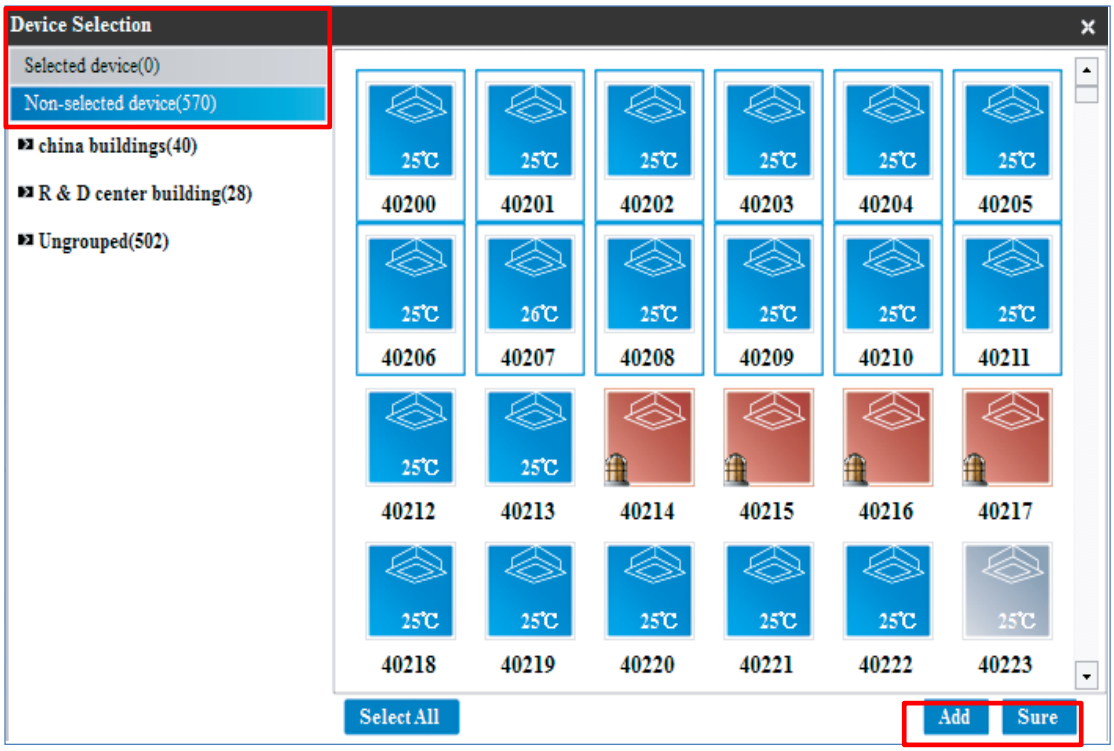
◆ **Add the name**



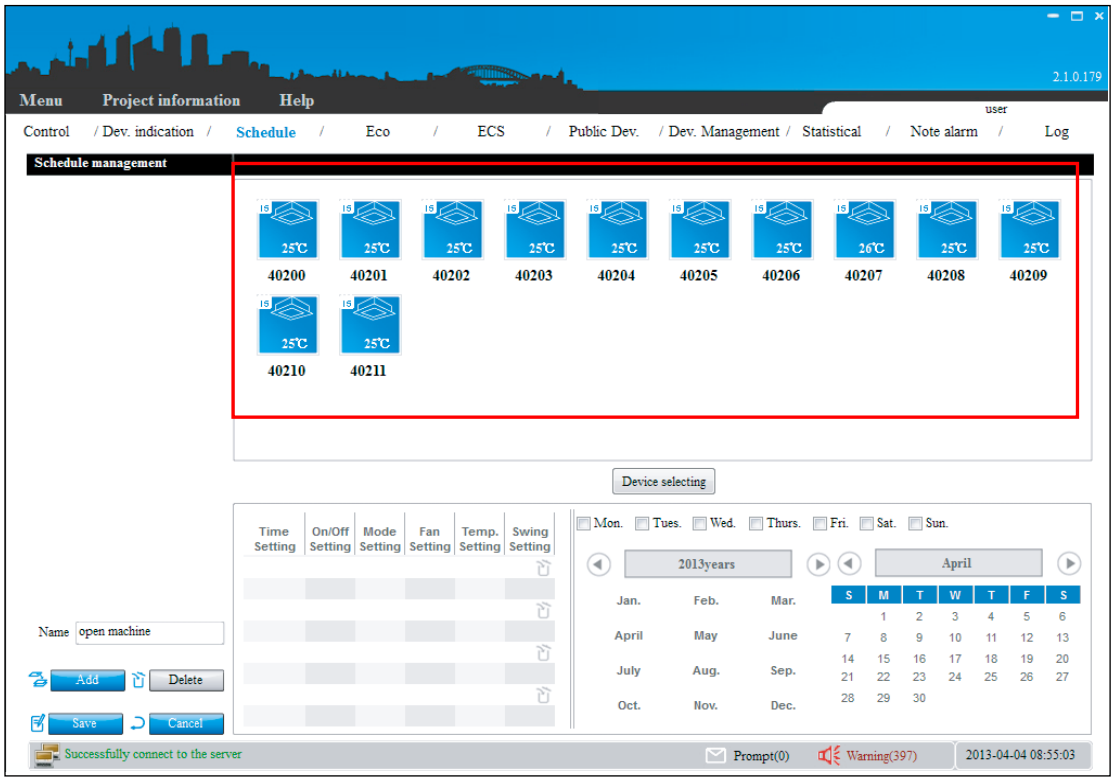
Click the "Add" button and input the schedule name

◆ **Add device**

Click the "Device selection" button on the page, then it will display the add device frame as the following display:

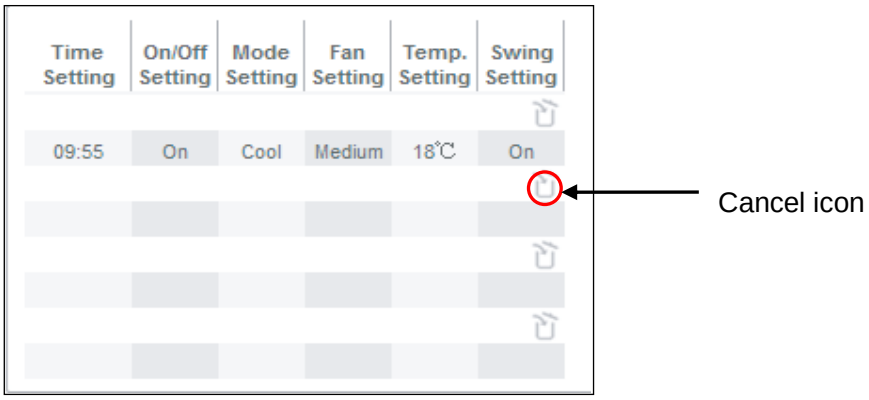


Click the "Non-selected device" option, select the device and click the "add" button. Click the "Selected device" option, and then it shows up the selected devices. Choose the relative devices, and click "Move" to move the devices into "Non-selected device". After selection, click "OK" and then close the selection frame. The page will display the selected devices.



◆ Control parameters setting

In the control parameters setting page, users can set time, on /off state, operation mode, fan speed, temperature, swinging parameters. Click the cancel icon to cancel the setting.



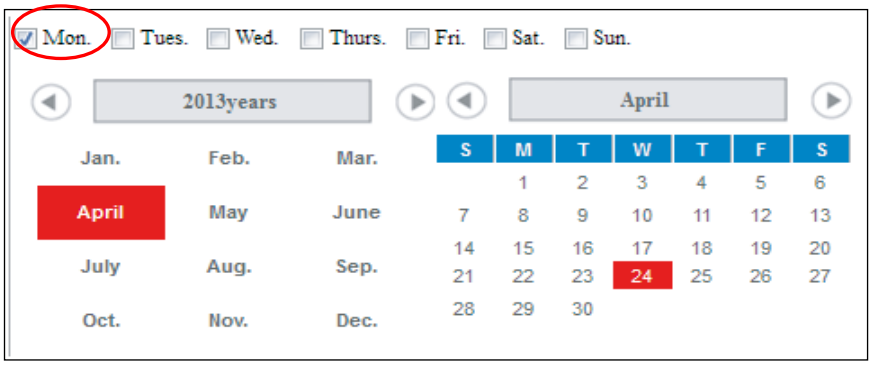
◆ **Time selecting**

There are two ways can add time: date and week.

Date: select corresponding month and date and they will change to red.

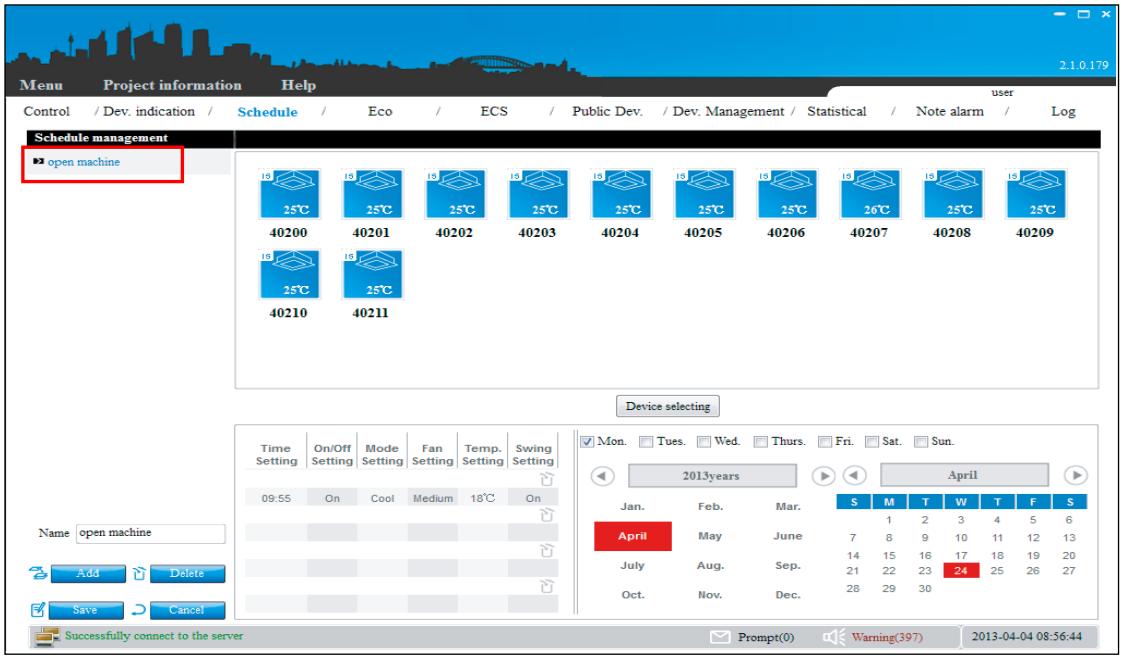
Week: select corresponding week, then the day of each week will be listed in the schedule.

For example, selected Monday, then every Monday will run this schedule which you setting.



◆ **Save**

After setting, click the save button and display as the following:

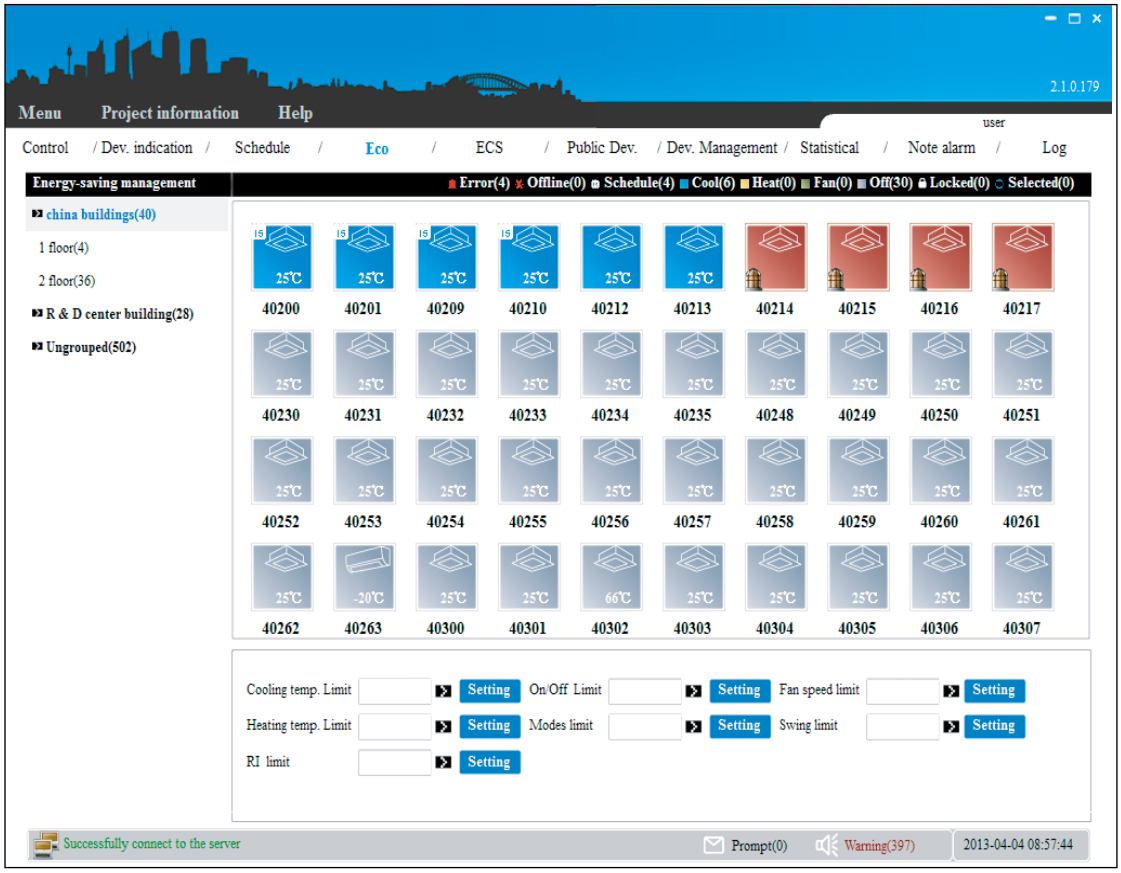


The upper left corner of the page will display the schedule name and the right page will display the added device. If device is the first time setting schedule, then the icon will add the schedule icon.

Use the "Data statistics" function can check the schedule operating state. About the important timing plan, you should set it again after 5 minutes.

3.8 Energy saving management

IMM software provides the Energy saving management for indoor units and the function just only available for the new type indoor unit series (V4 plus series), the old type indoor series (V4 series) do not support the function.



The left side will display the indoor units information, and select single or more sets indoor units, and choose the energy saving option, click the "Setting" button. After setting each parameter, the indoor unit icon will display the locked icon. If it needs to unlock the limit, then choose the "Unlocked" and "Setting" button will unlock the limit and the locked icon disappear. If the control failure, check the failed information in the "Prompt message". Click the right key of the mouse on an indoor unit, and then the bottom of the interface will display the locking detail information of this device.

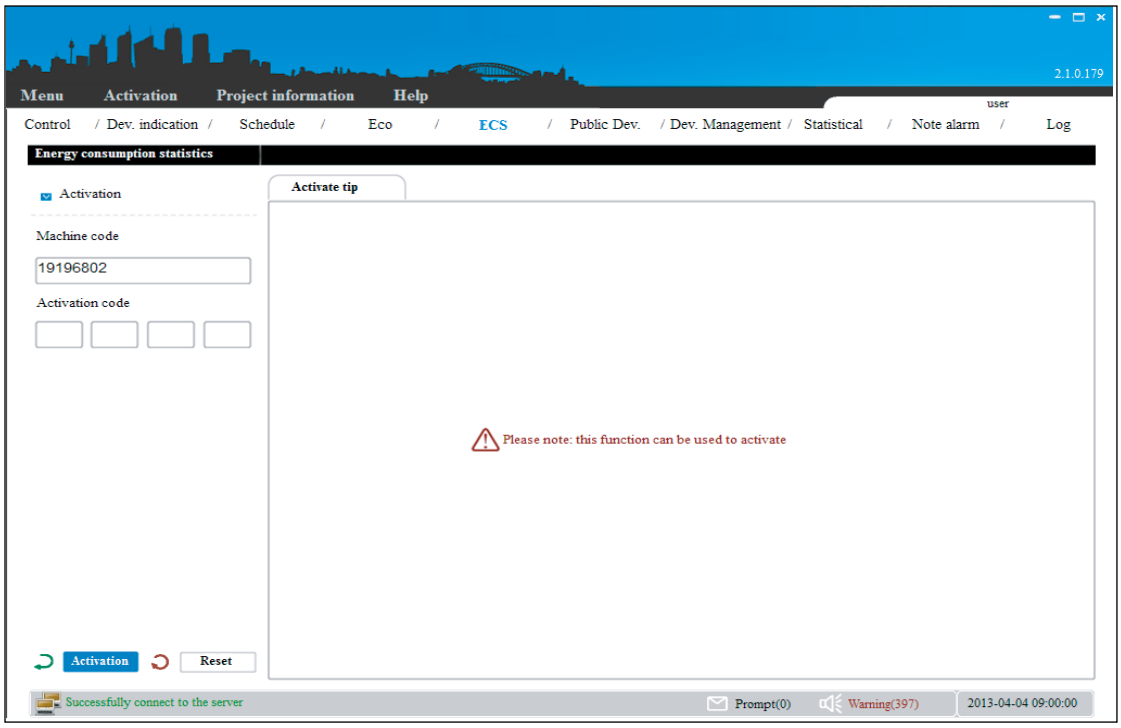
Selection specifications:

There are seven elements to be limited, such as cooling temp, heating temp, on/off control, running mode, fan speed, swinging and remote control. Users can set each parameter of them to save energy. It's very convenient to manage the IDU operation state.

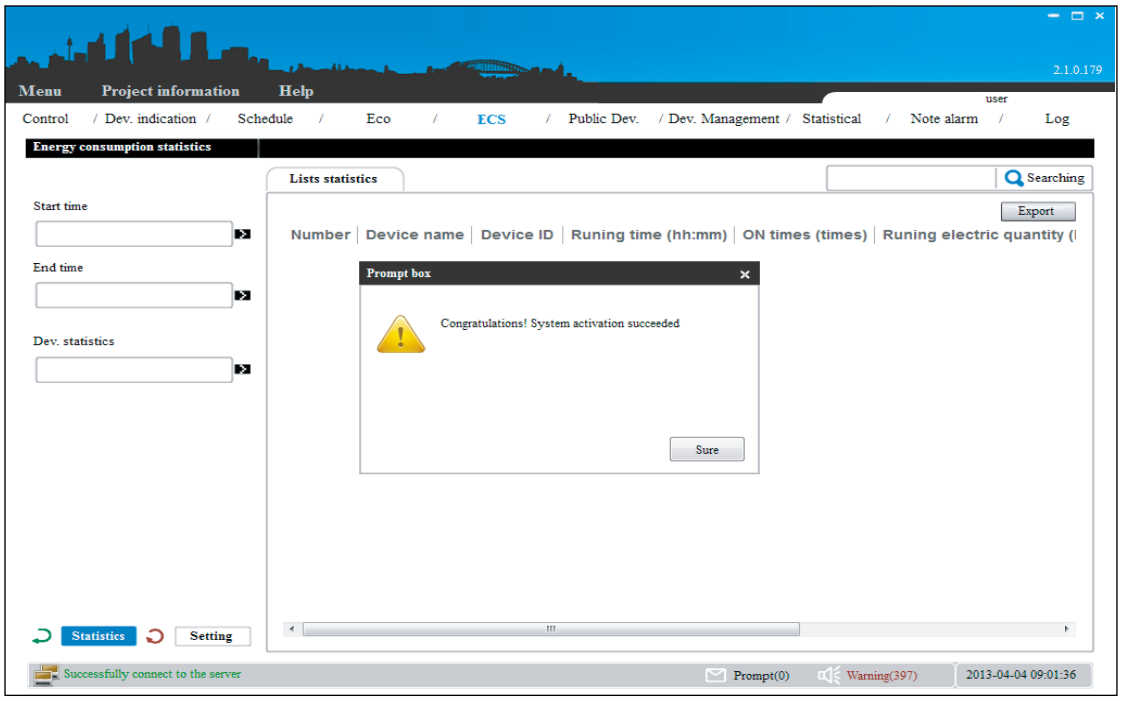
Selection	Specifications
Cooling temp. limit	Set the lowest limit of cooling temp, and limit the remote controller control
Heating temp. limit	Set the lowest limit of heating temp, and limit the remote controller control
Turn on and off unit limit	Limit the indoor unit turn on and off operations by the remote controller
Mode limit	Limit the unit cooling or heating mode operations
Fan speed display	Limit the fan speed control by the remote controller
Swinging limit	Limit the swinging control by the remote controller
Remote controller limit	Limit the air conditioner operations by the remote controller

3.9 Electricity charge distribution (Patented)

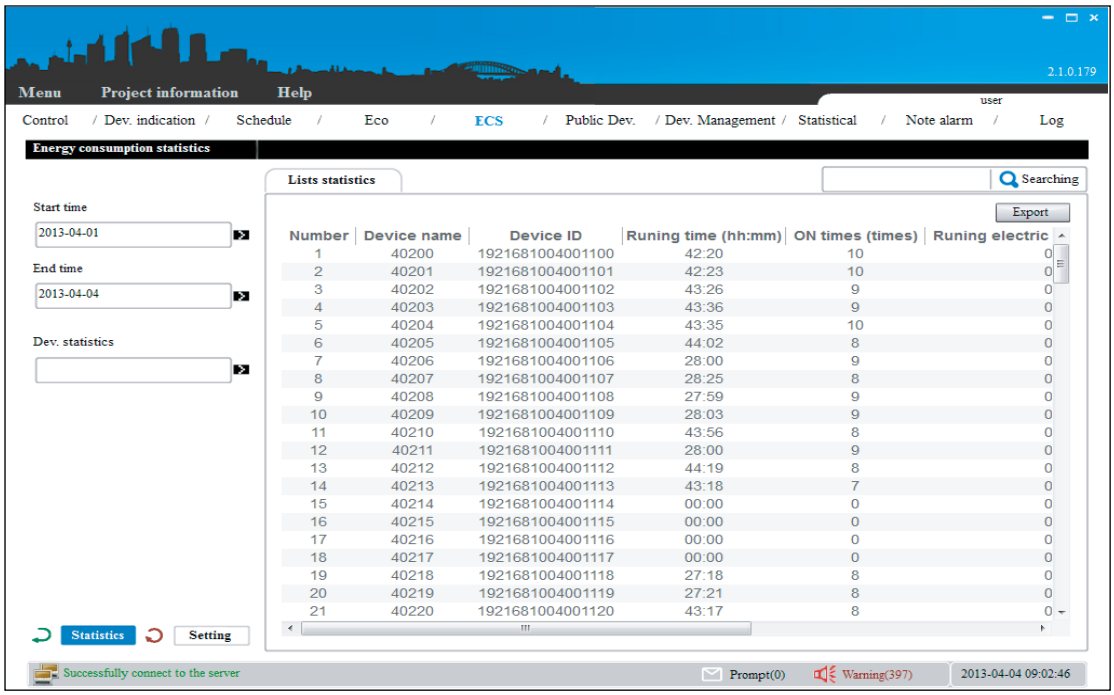
Electricity charge distribution function can be performed easily for the power consumed when billing users for air conditioner power charges, such as tenants in a commercial building, offices in a rental building, or rooms in a hotel. The M-INTERFACE gateway collects the energy used by outdoor units and capacity demand of each indoor unit, apportions the energy to each indoor unit, report the hourly power consumption of each indoor unit to the IMM, the 24 hours electricity charges by tenant are calculated by IMM system. After technicians set the pricing standards, the IMM system automatically assigned energy using situation, users can view the electricity discharge directly. It is the Midea patented technology.



The function needs to be activated before use and users need to send the activate code back to our company for activation. After activation, the page as shown in the figure below:



Select the "Start time", "End time" and "Dev. statistics" parameters, and then click the "statistics" button, the page will display all the statistics result. If not select the "Dev. statistics ", it default selects all the devices.

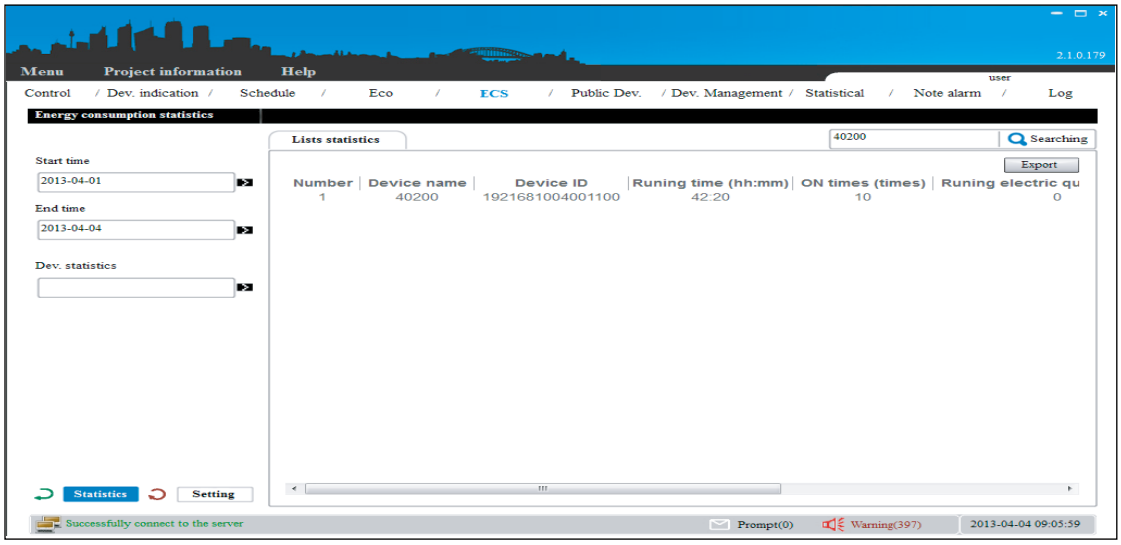


Click the "Setting" button, and it will display the dialogue frame to set the calculation method of electricity statistics.

Click the "Export" button and it will export the displayed results in the xls/txt/csv format. The xls format displays are as follows.

Number	Device name	Device ID	Runing time (hh:mm)	ON times (times)	Runing
1	40200	1921681004001100	42:20	10	0
2	40201	1921681004001101	42:23	10	0
3	40202	1921681004001102	43:26	9	0
4	40203	1921681004001103	43:36	9	0

Input the unit's name and click the "Searching" button can search the unit and check the parameters. Such as input in "40200" and searching, then the page will display the searching results as following.



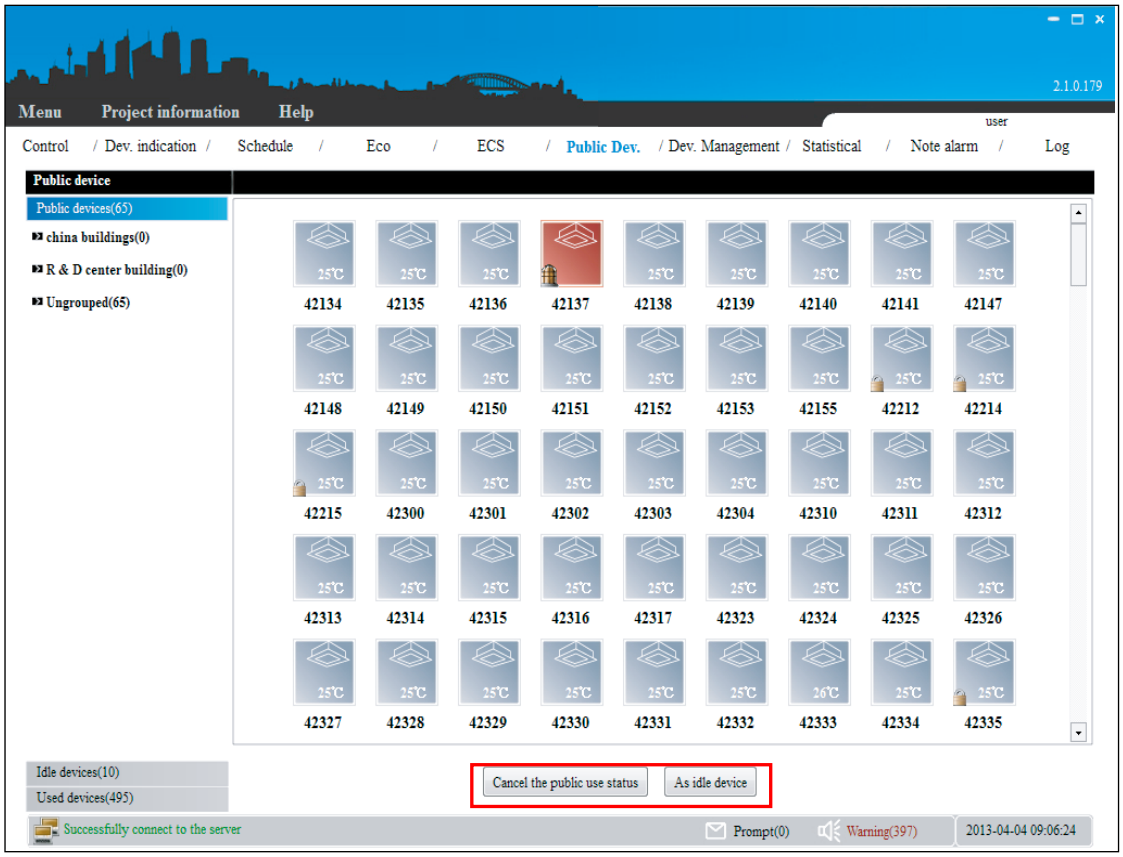
Notes:

1. Power statistics results only as for a reference, cannot use for commercial calculating record.

2. IMM software can backup data automatically, and you'd better export the report per month.

3.10 Public device

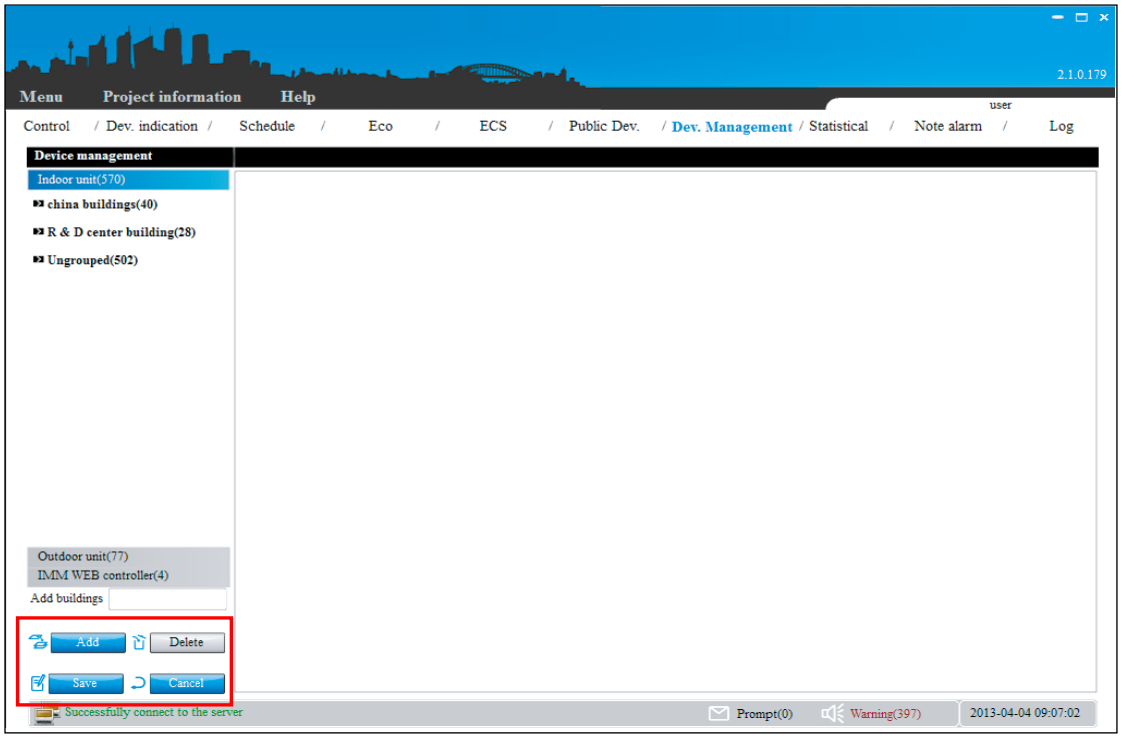
For the commercial office building or apartment-style hotel, in order to ensure the power distribution reasonability, it's necessary to divide the power of public device for each user. The power rate of the idle device and public device will be divided into other using device in IMM system and it does not appear in export report.



Find the corresponding device in the operated device, click "As public device" or "As idle device" button, and divide it to the public device or idle device. Idle device means the devices are not used; public device means the devices in the public place, such as the unit on the hall or the corridor etc. You can also click "Cancel the public use state" button cancel.

3.11 Device management

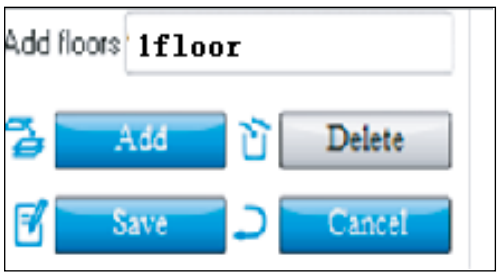
IMM software provides the group division function, it convenient for device management.



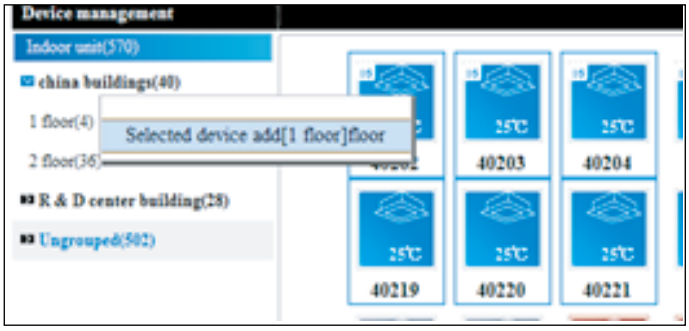
Click the corresponding group option, the corresponding device in the group will be displayed in the right of the page.

✓ **Add group**

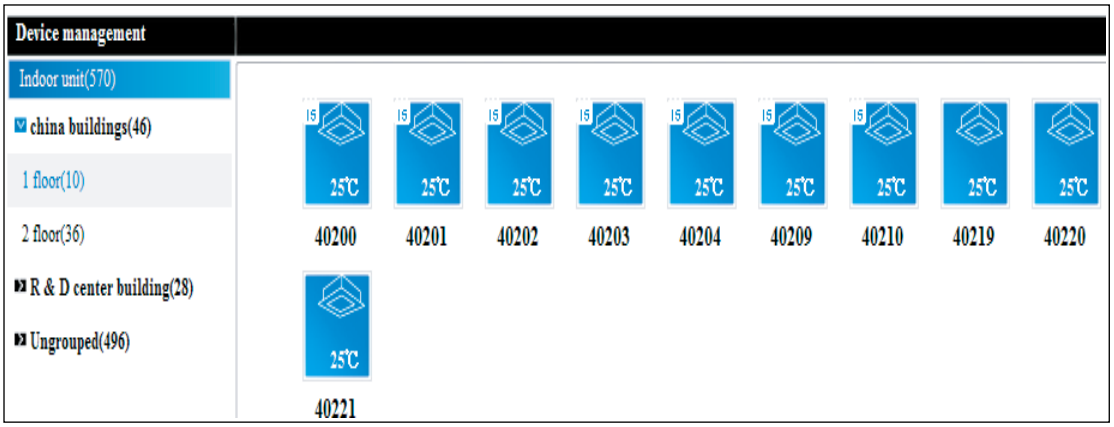
The adding group method of the outdoor/indoor unit is in the same way (Take adding the secondary group of indoor unit for example):



Selecting the primary group "China buildings (40)" first, and then click the "Add" button to input the secondary group name (1 floor). And click "Save" button, then it will build a secondary group (4 floor) under the indoor and outdoor unit, and select the devices which you want to add to the "1 floor", left-click the "4 floor" and choose the "Selected device add [1 floor] floor".



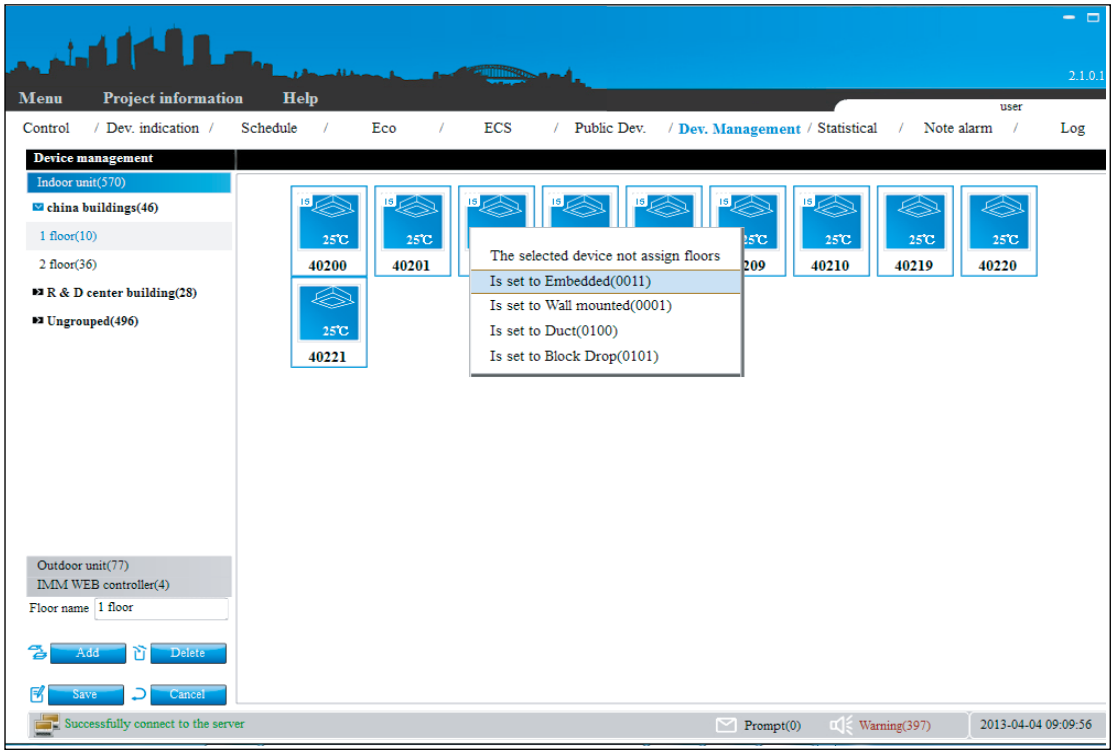
After adding the device successfully, the 1 floor group will display the added devices. Devices can only be added in the secondary group.



✓ Change the indoor unit model

IMM can access the indoor unit according to the actual type to select the appropriate icon display. Users can more easily grasp the system information

Select single or more set units under the secondary group and right-click on the unit, it will display as the following option to change the indoor unit model.



When select the corresponding model, the indoor unit picture will change.

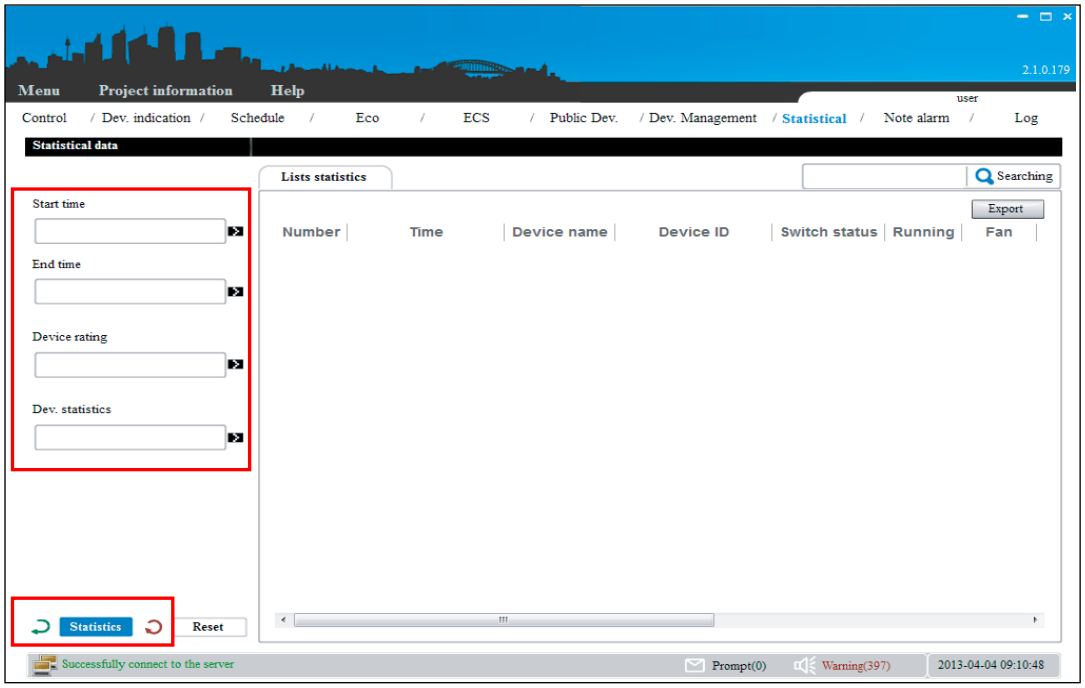
✓ M-INTERFACE gateway display

Click the "IMM WEB controller", the page display as following:

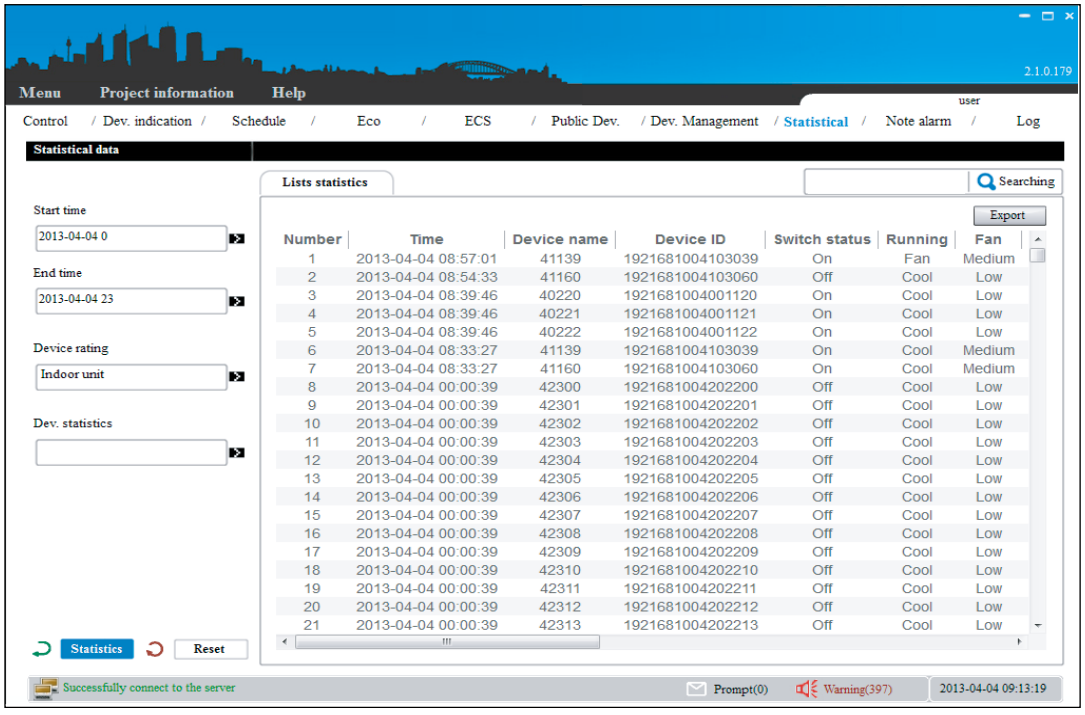
The left of page will display all gateways and their terminals (40, 41, 42, and 43), click the corresponding terminals, the right of page will display the air conditioner device under the terminal; 1-4 terminals are indoor unit terminals, 5-8 terminals are outdoor unit terminals.

3.12 Data statistics

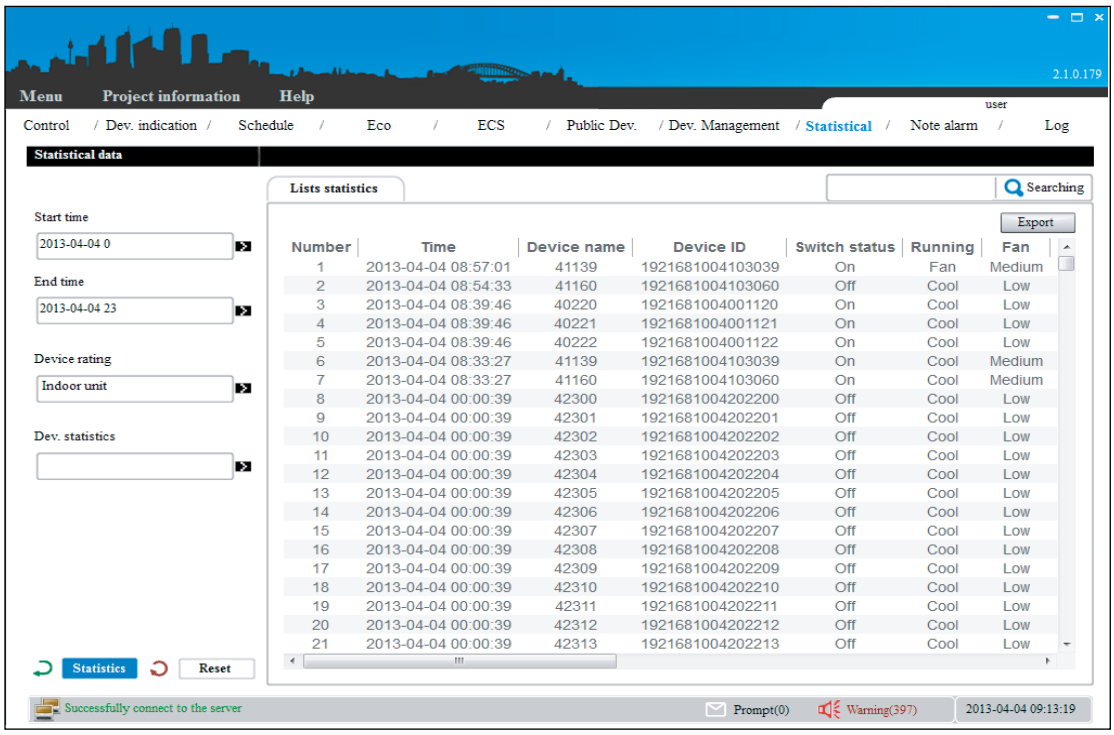
Statistical the operation changing records of indoor unit, outdoor unit and M-INTERFACE gateway. Through this function can check the operation state of the schedule and the changing state of the device.



Select the "Start time", "End time", "Device rating" and "Dev. statistics" parameters, and then click the "Statistics" button, it will display as follows:



Click the search button in the statistics page, and the statistics result will be displayed in the page. Such as input "41139", then the page will display the searching results as follows:



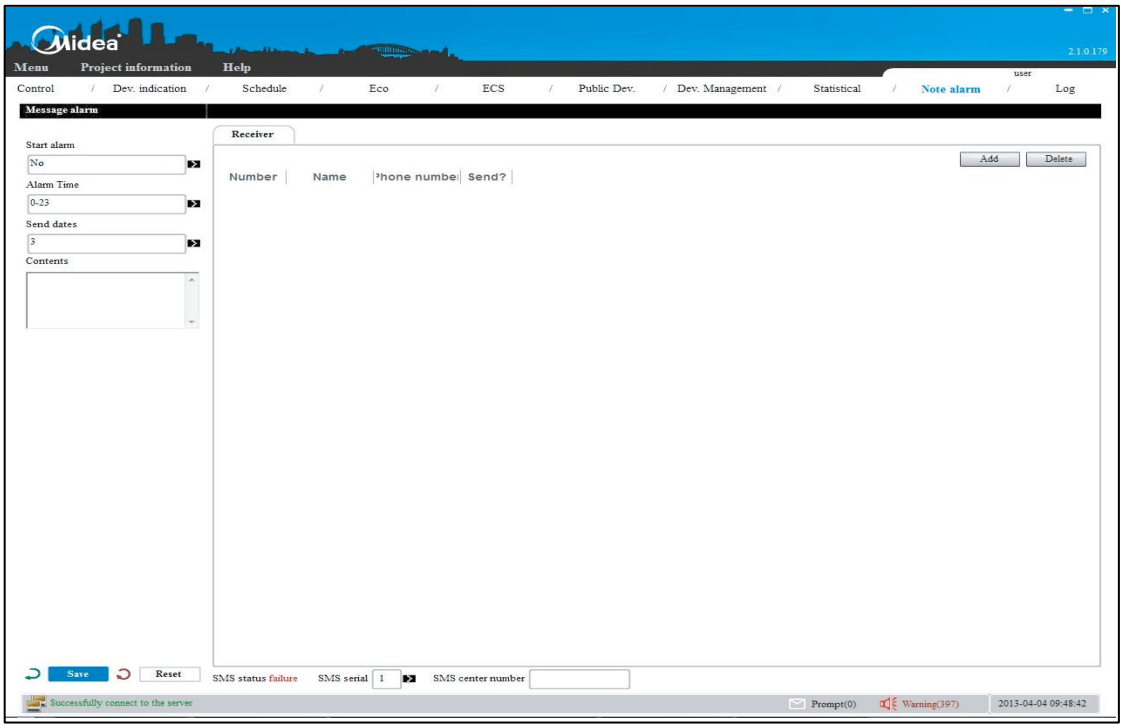
Click the "Export" button and it will export in the xls/txt/csv format, the xls format display as follows:

Number	Time	Device name	Device ID	Switch status	Running	Fan
1	2013-04-04 08:57:01	41139	1921681004103039	On	Fan	Medium
2	2013-04-04 08:33:27	41139	1921681004103039	On	Cool	Medium
3	2013-04-04 00:00:32	41139	1921681004103039	Off	Cool	Low

3.13 Warming message (Optional)

The system can receive error message from air conditioner units in more than one building or structures and the system is able to send error messages to designated mobile phone number automatically via public phone lines and SMS Modem. It is easy to monitor the state of air conditioner.

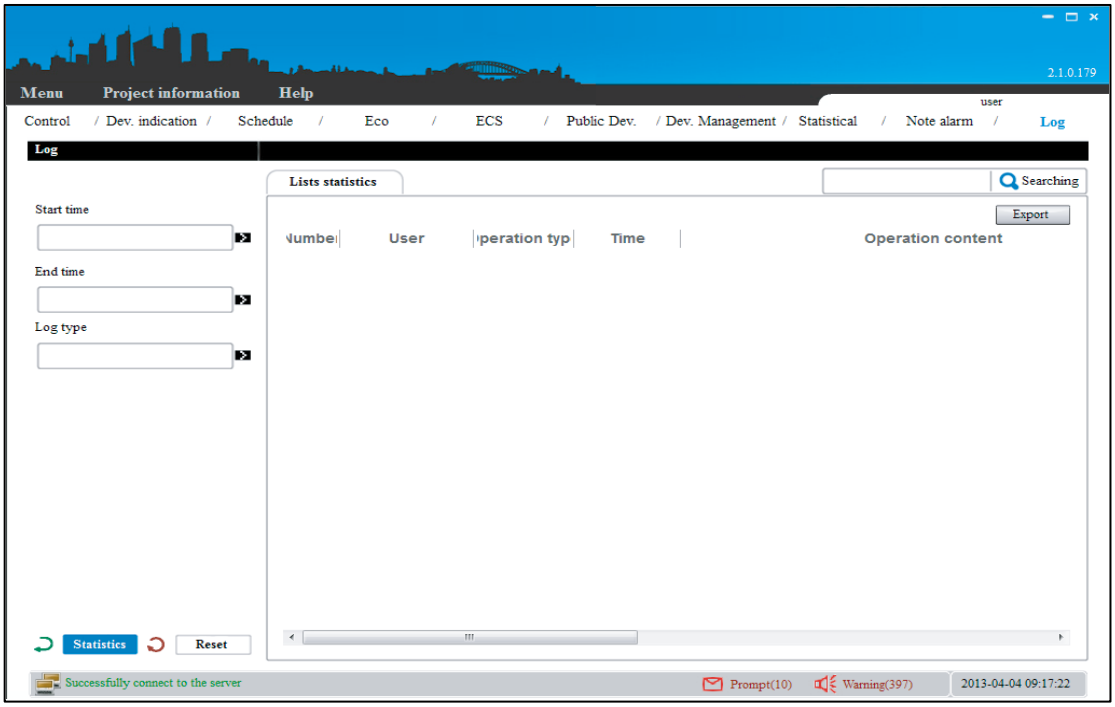
Notes: It is necessary to purchase an additional piece of equipment named '*SMS* Modem' from Midea.



Connection the SMS Modem correctly at first, and then add the recipient phone number, configuration parameters. If error occurs, the system will send the warning messages to the recipient automatically.

3.14 Log function

It can display the IMM system operation records by all users.

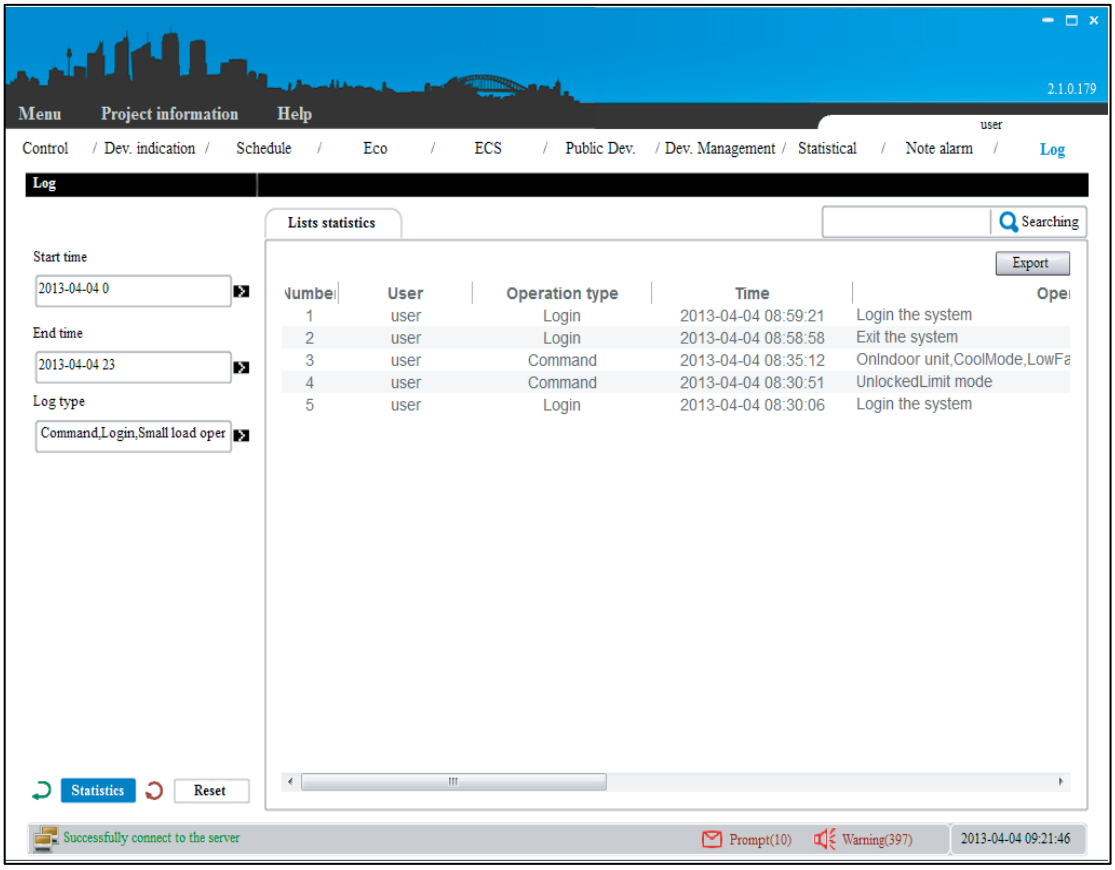


Select the "Start time", "End time" and "Log type" parameters, there are five types in Log type: command, schedule, energy saving, login and low-load operation reminding. And then click the "Statistics" button, the page will display the statistics result. Click the "Reset" button, the selection frame will be cleared.

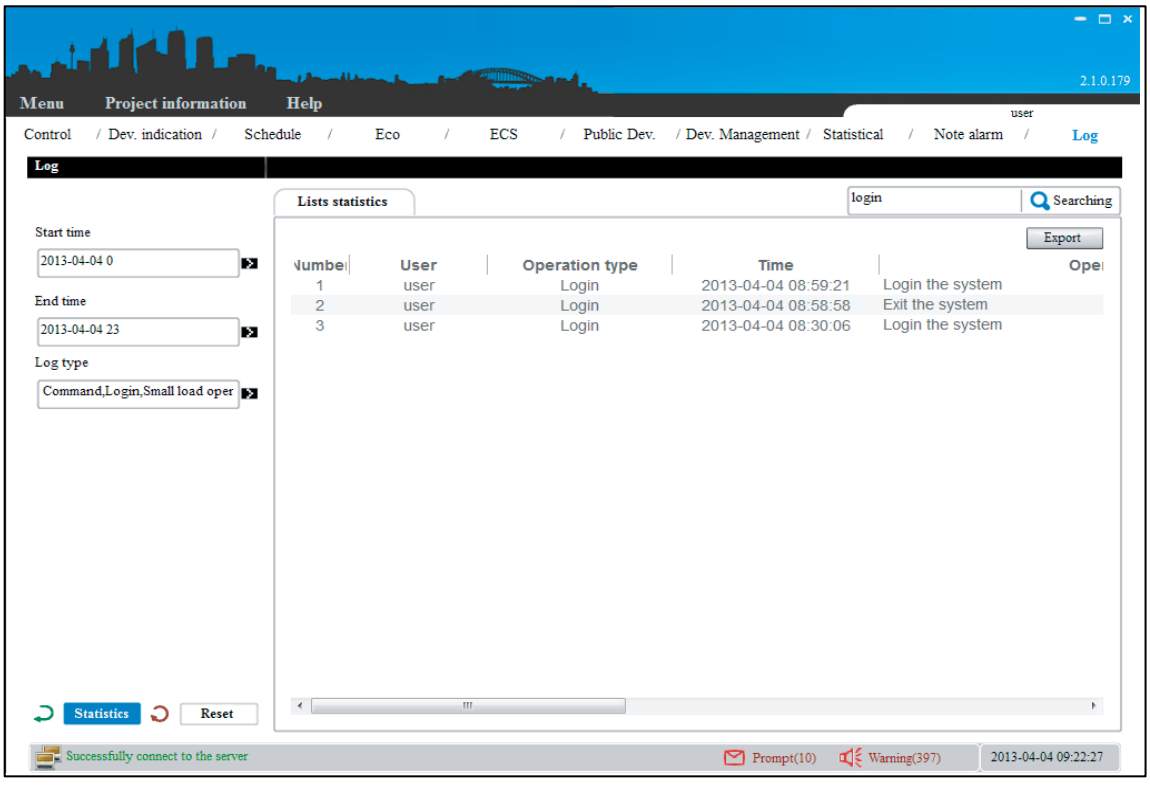
Notes:

1. Low-load operation reminding function means energy-requiring is lower the setting value when the outdoor unit is operated.

2. IMM can run low-load operation reminding according to the total capacity, the reminding value can set as you need. It helps users understand the system and energy saving better, and achieve centralized control management conveniently.



Input the search content and click the "searching" button, it will carry out the searching function. Such as input "login", then the page will display the searching results as following:

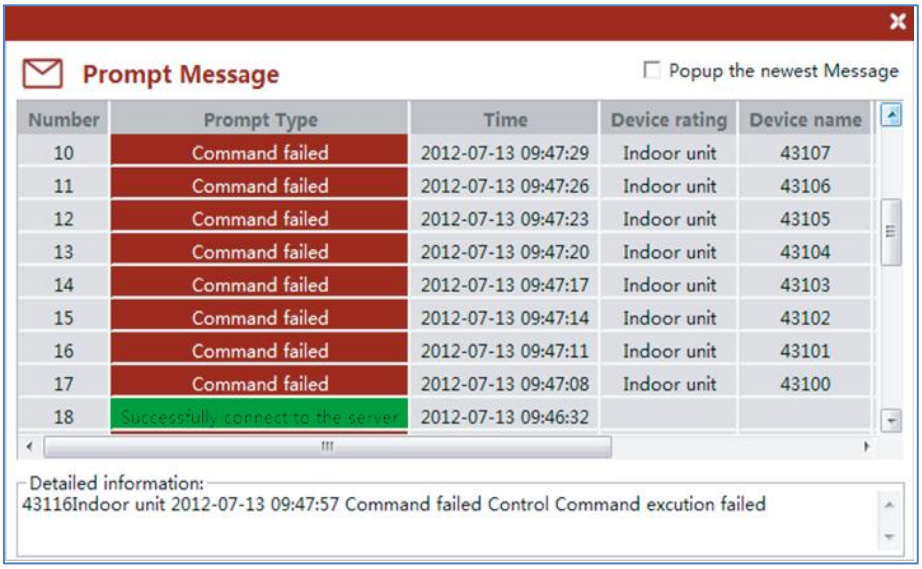


Click the "Export" button and the result will be exported in xls/txt/csv format, the xls form display as following:

Number	User	Operation type	Time	Operation content
1	user	Login	2013-04-04 08:59:21	Login the system
2	user	Login	2013-04-04 08:58:58	Exit the system
3	user	Login	2013-04-04 08:30:06	Login the system

3.15 Prompt message

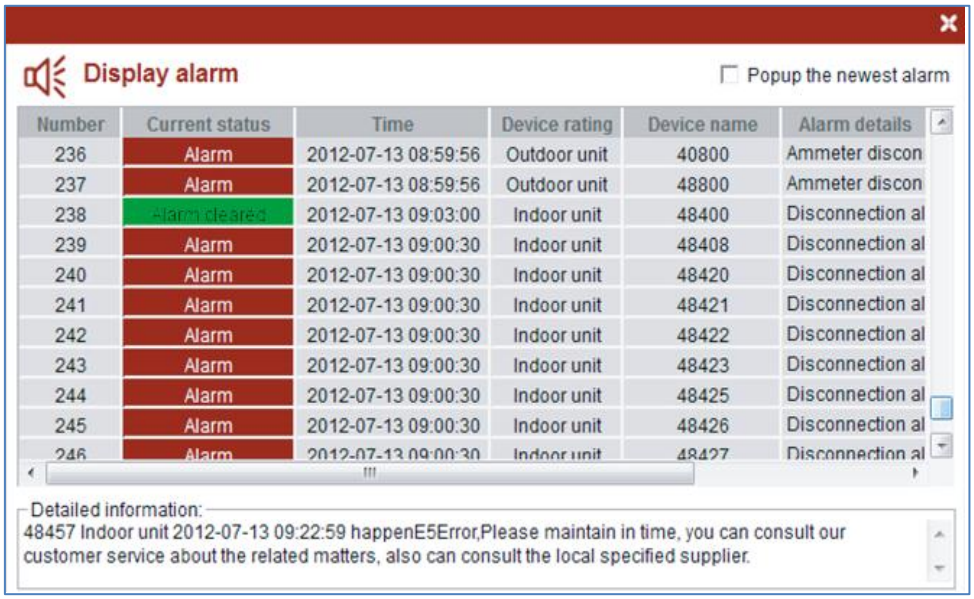
If there are some prompt messages, the prompt message icon will be change to red, and click the "Prompt message" icon can check the corresponding information.



Prompt types include: air filter cleaning reminding function, low-load operation indicate, operate failed and the server connection failed. Click a prompt message, the bottom of the page will display detailed information. If checked "Popup the newest Message", then the prompt dialogue frame will be popped-up automatically when there is any prompt message.

3.16 Alarm message

When a fault occurs, the connection failed, the system will give an alarm message. The alarm frame display as follows:

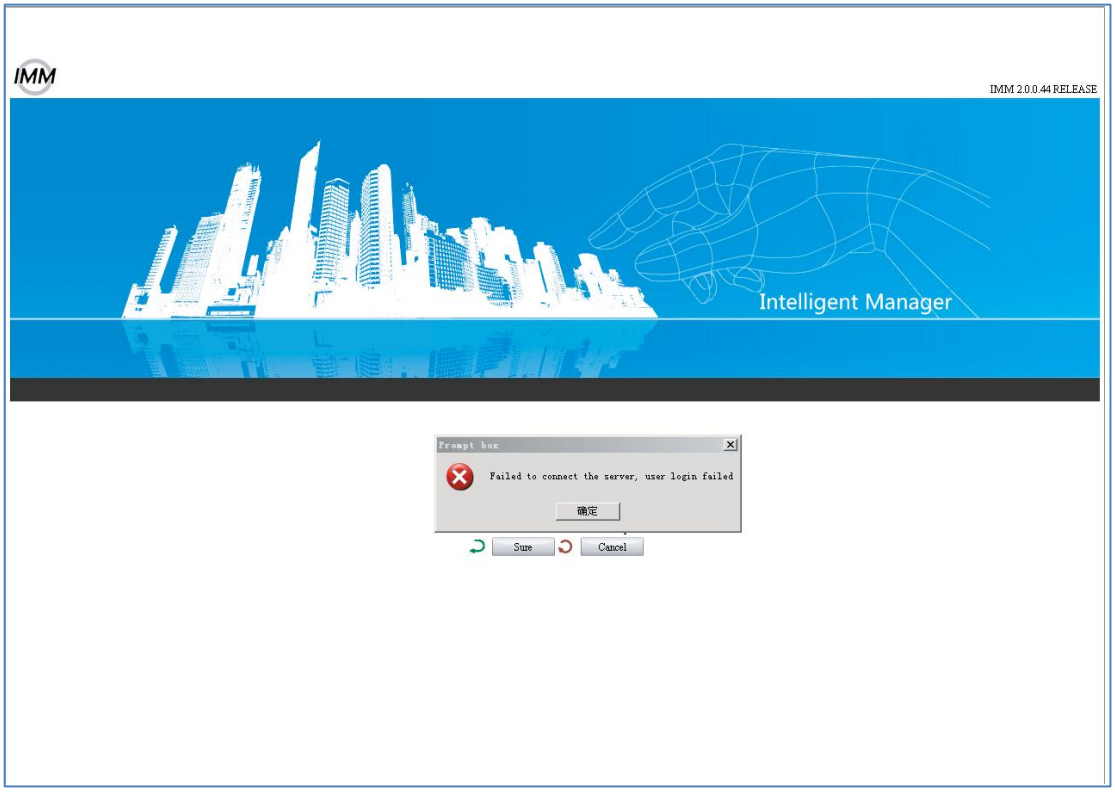


When the alarm condition is removed and the alarm dialog will display the "Alarm cleared". Click a massage will display the detailed massage on the bottom of page. If checked the "Popup the newest alarm", it will popup the prompt frame automatically when there is prompt message. When there was alarm message, it should be maintained immediately.

3.17 Troubleshooting

3.17.1 Login failed

1) The server connection failed



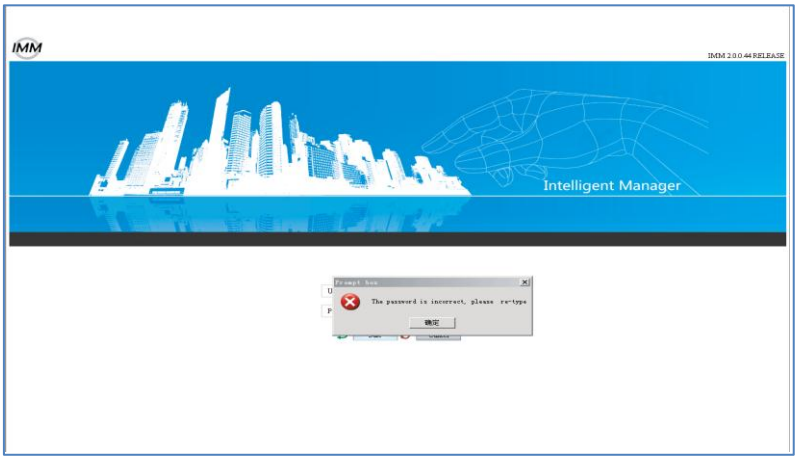
Login before connected to the server, it will display "Fail to connect the server". The solution is: check whether the configuration information of IMM client-side setting is right, whether the network between the server and the IMM client-side is smooth and whether the IMM client-side can connect to the database or not.

2) Wrong password

There may be two reasons for login WEB page failure:

01 .No input password: If the user does not input the password, and click "OK", then it will display "Please input the password". Type the correct password and then login again.

02. Wrong Password: When the password is wrong, it will display "login failed". Type the correct password again.



3) Control failed

1).When setting the mode lock, it might cause control failed. For example, locking the heating mode, then open the cooling mode, it will cause control failed, and the failed information will display in the prompt message frame. It needs to unlock the air conditioner, and do the mode setting again.

2). If setting the remote controller lock, then when using remote controller to control the air conditioner, it will cause control failure.

3). When controlling the indoor unit, if it is failed, then find out the reason through the prompt message.

4) No respond in operate page

1) As for the IMM control page, if the page cannot be operated, then should check the connecting icon in the lower left of the page to judge, whether it was normally connected to the server, if the connection failed, then it needs to contact the local dealer or technicians to maintain the network.

3.17.2 Error code analysis of IMM client-side interface

The following error code tables are suitable for the V4 plus series indoor and outdoor units.

Indoor unit error codes table:

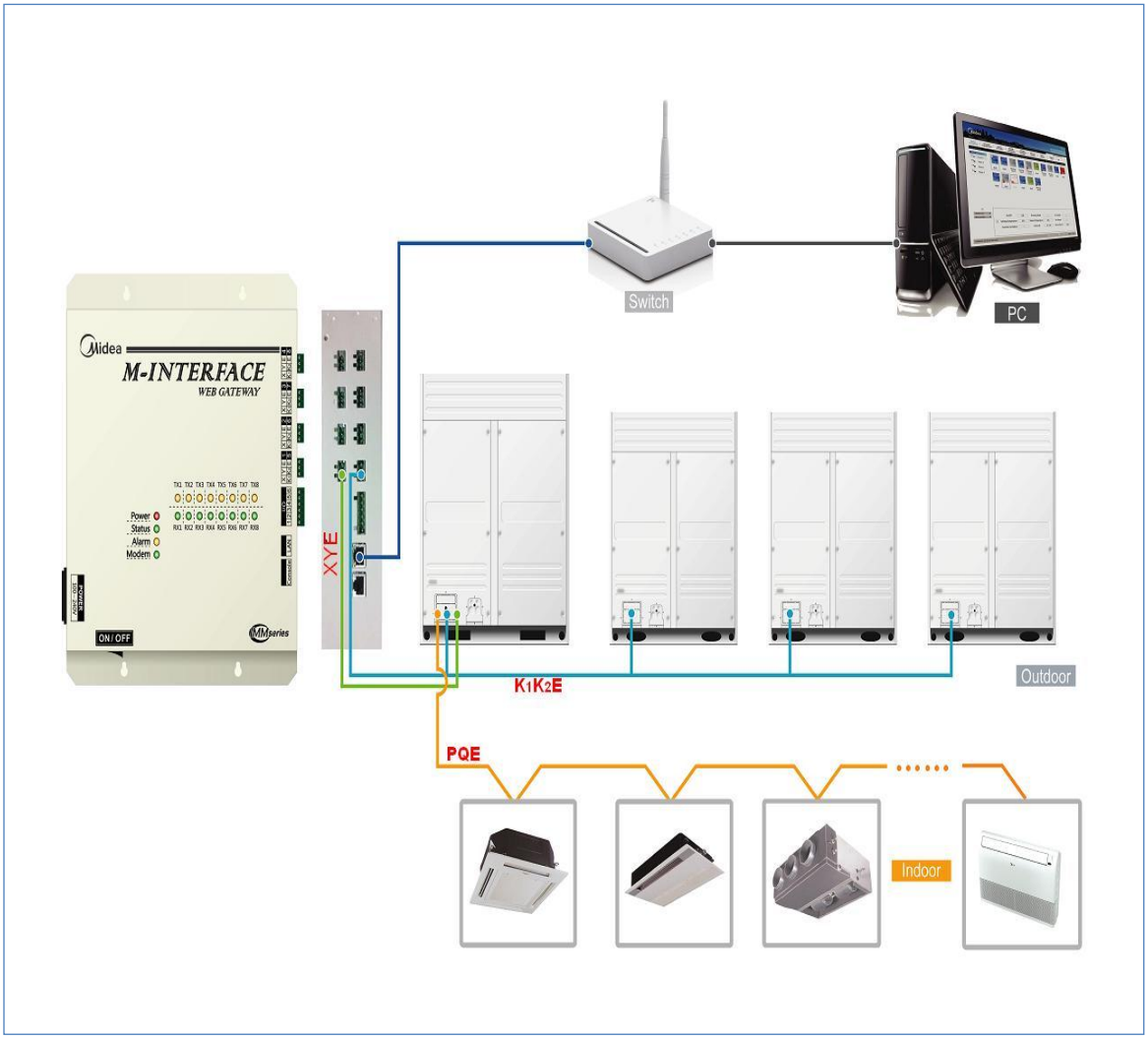
Codes	Error protection	Codes	Error or protection
E0	Phase sequence error or lack of phase	P1	Anti-cold or defrost protection
E1	Communication error	P2	Condenser high temp. protection
E2	Room temp. T1 sensor error	P3	Compressor temp. protection
E3	Middle evaporator temp. T2 sensor error	P4	Discharge pipe temp. protection
E4	Evaporator outlet temp. T2B sensor error	P5	Discharge high pressure protection
E5	T3/T4/digital compressor discharge temp. sensor error	P6	Discharge low pressure protection
E6	Zero crossing detection error	P7	Over voltage or under voltage protection
E7	EEPROM error	P8	Compressor over current protection
E8	Fan speed detection out of control error	PF	Other protections
E9	Communication error between main board and display board	0#	Communication error between network connect module and mainboard
EA	Compressor over current error (4 times)	1#	Communication error between centralized controller and network connect module
EB	Inverter module error	2#	Communication error between centralized monitor and function module
EC	Fresh error	3#	Communication error between centralized monitor and computer (gateway)
ED	Outdoor unit error	4#	Order limit execution
EE	Water level checking error	5#	Order timeout, no execution
EF	Other errors	6#	Excepted address not exist
P0	Evaporator temp. protection	7#	Error (unsupported) order

Outdoor unit error code table:

Codes	Error or protection	Codes	Error or protection
E0	Communication error between outdoor units	P2	Discharge low pressure protection
E1	Phase sequence error or lack of phase	P3	Compressor current protection 1
E2	Indoor units and master unit communication error	P4	Discharge temp. protection
E3	Ambient temp. T4/pipe temp.T3 or digital compressor discharge sensor error	P5	Condenser high temp. protection
E6	T6 sensor error	P6	Inverter module protection
E9	Voltage error	P7	Compressor current protection 2
EF	Other errors	P8	Compressor current protection 3
H0	DSP communication error	P9	Over voltage or under voltage protection
H1	Network communication error	PA	Defrosting protection
H2	Quantity of outdoor units decrease error (only display on master unit)	PD	Oil return
H3	Quantity of outdoor units increase error (only display on master unit)	PE	Oil balance
P0	Top temperature protection of inverter compressor	PF	Other protections
P1	Discharge high pressure protection	/	/

4. Hardware introduction

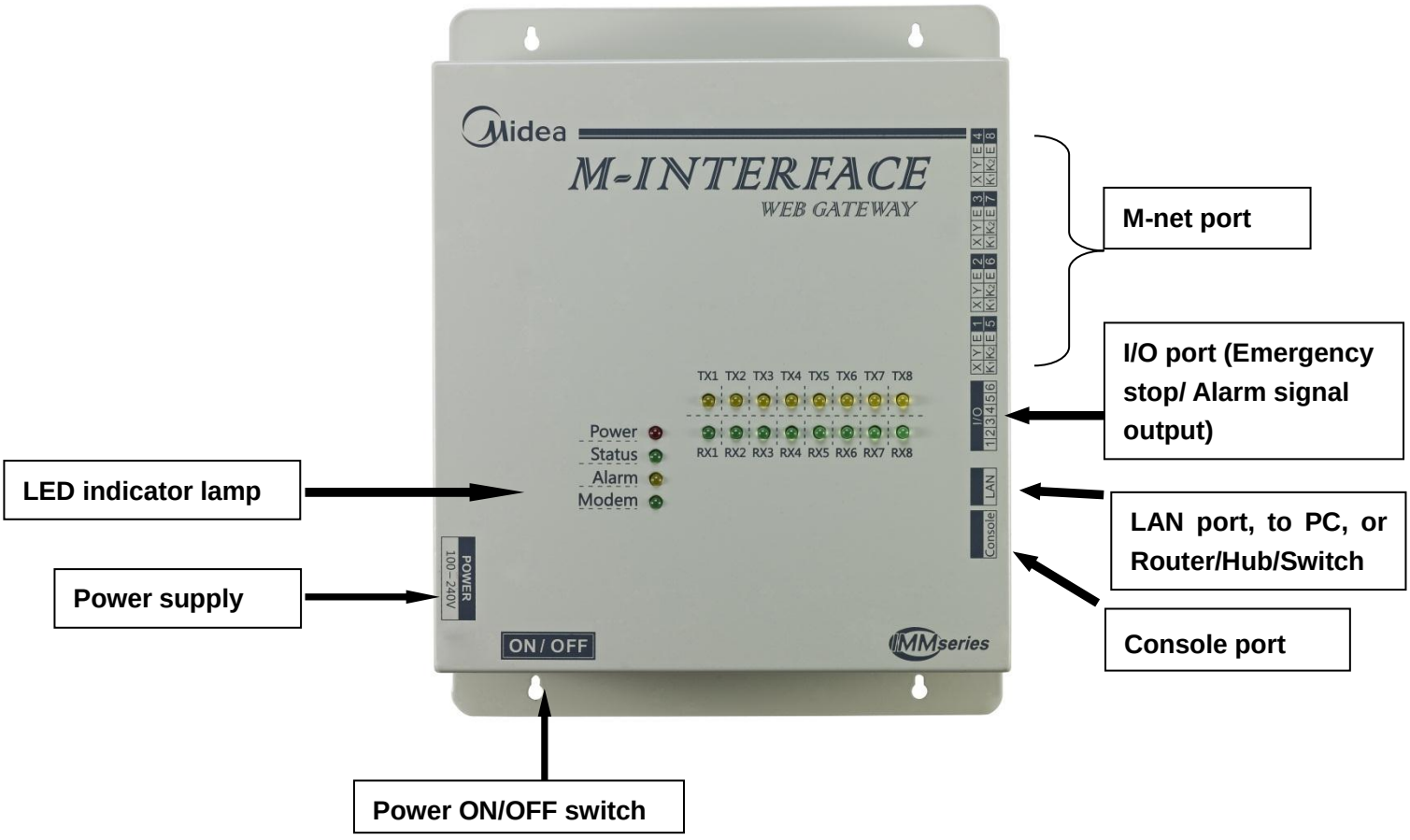
4.1 System structure overview



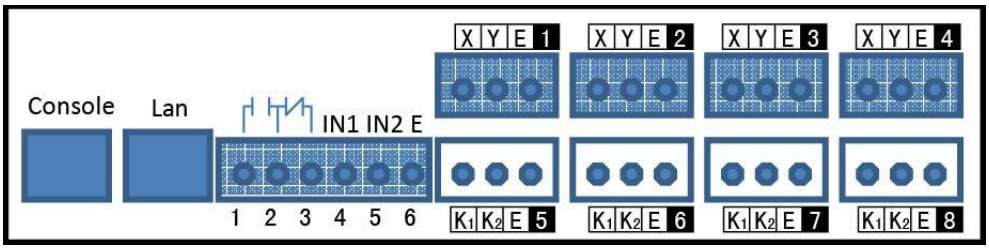
- ✧ M-INTERFACE gateway is used to query and control indoor unit, and transmits the state information of indoor unit to the computer and the controlling and querying orders from the computer to the indoor unit.
- ✧ The air conditioner should be connected to the M-net ports of the M-INTERFACE gateway, and the gateway can communicate with IMM software through the LAN port.
- ✧ The longest of Network cable should be 100 meters. Communication wire must use the 3-core shielded wire, and the 485 communication wire can be up to 1000 meters between each Web controller and the outdoor unit

- ✧ Under the auto topology mode, one M-INTERFACE gateway can be connected Max. 4 refrigerant systems, insert 16 outdoor units and 256 indoor units, the wiring should be polarity connection: indoor/outdoor units of No.1 system must be connected to the No.1 and No.5 port of M-INTERFACE; the indoor /outdoor units of No.2 system must be connected to the No.2 and No.6 port; indoor/outdoor units of No.3 system must be connected to the No.3 and No.7 port; indoor/outdoor units of the No.4 system must be connected to the No.4 and No.8 port.
- ✧ Under the manual topology mode, one M-INTERFACE gateway can be connected Max.16 refrigerant systems, insert 64 outdoor units and 256 indoor units. Indoor units belong to the same refrigerant system cannot connect to different M-net ports, but the M-net port can connect indoor units from different systems and the indoor units' address must be different; outdoor units belong to the same system cannot connect to different M-net ports, but the M-net port can connect outdoor units from different systems and the outdoor units' address must be different.
- ✧ M-INTERFACE gateway controller can only be installed at the end of the XYE or K1K2E communication wire, cannot be installed at the middle of the XYE or K1K2E communication wire. And need to add matched resistance120 Ω if necessary.

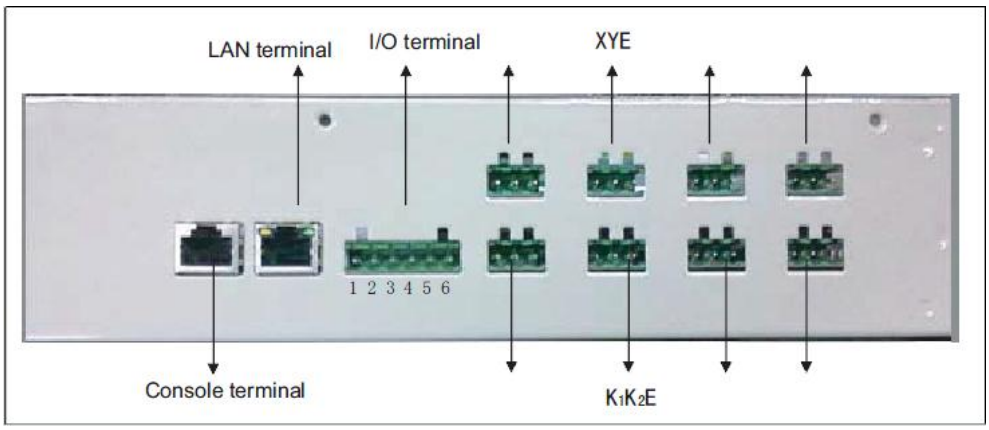
4.2 Side view of M-INTERFACE gateway



4.2.1 M-INTERFACE gateway ports



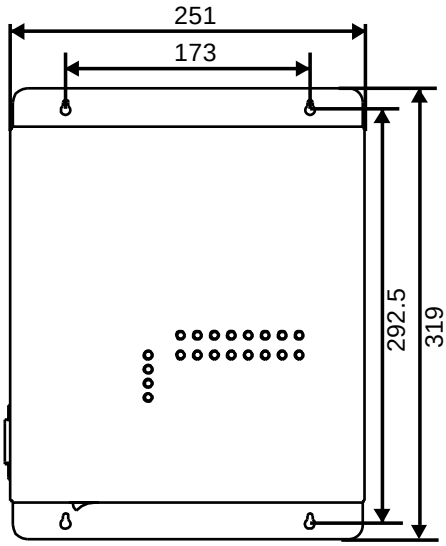
Physical product picture



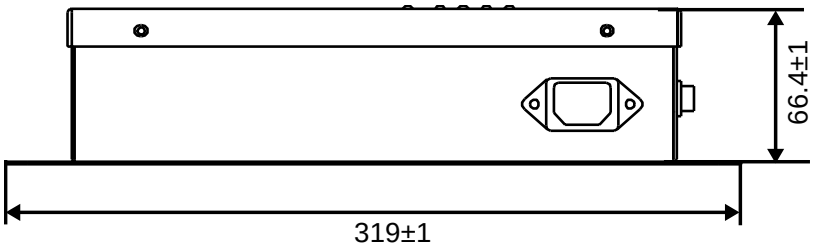
There are 8 M-net ports on the M-INTERFACE gateway, and the1 to 4 port are the indoor unit communication ports, they can only connect to XYE ports of the indoor units; 5 to 8 port are the outdoor units communication ports, can only connect the K1K2E ports of the outdoor units.

4.2.2 Dimensional design (319*251*67.5mm)

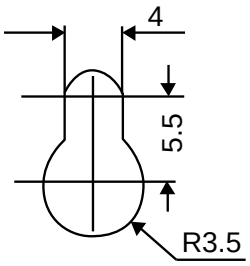
1) Front view of M-INTERFACE gateway controller (Unit: mm)



2) Side view of M-INTERFACE gateway controller (Unit: mm)



3) Detailed drawing of installation holes (Unit: mm)



Installation precautions:

1. Must be installed indoors, guarantee the gateway controller installation must be higher than the ground 50 cm;

2. Install at a place where should not affect by electromagnetic wave or dust;

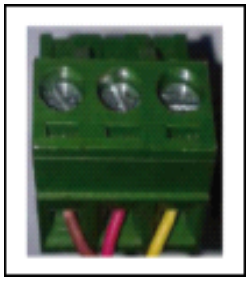
3. Avoid installation place where affects by sunshine or heat source device etc.

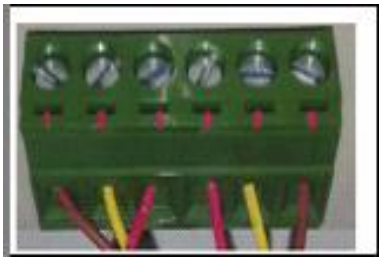
4. Avoid installation place where has high humidity or can contact the water;

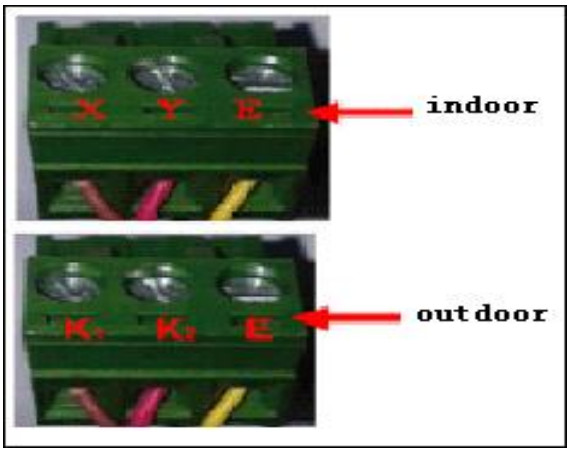
5. Avoid installation place where will produce corrosive or flammable gas.

4.2.3 Communication wiring diagram

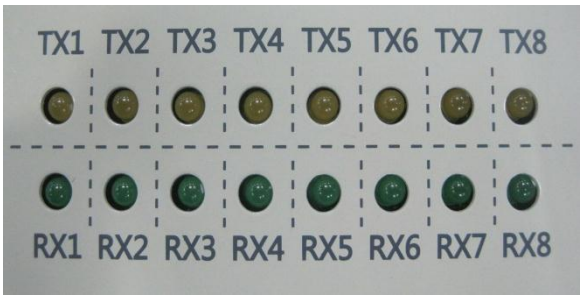
M-INTERFACE gateway need to install at the end of the XYE or K1K2E communication wire, it cannot be installed at the middle of the XYE or K1K2E communication wire. Connection needs to use 0.7mm^2~1.0mm^2 three cores shielded communication wire.







4.2.4 LED indication lamp



Indication lamp	Color	Specifications
TX1~TX8	Yellow	1 to 8 lamp is the sending ports indication lamps
RX1~RX8	Green	1 to 8 lamp is the receiving ports indication lamps
Power	Red	Power indication lamp
States	Green	States indication lamp
Alarm	Yellow	Alarm indication lamp
Modem	Green	Reserve indication lamp

LED States：

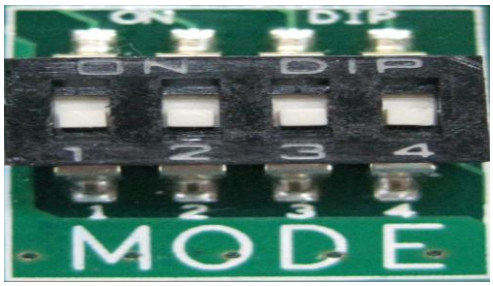
Under the normal situation, state lamp will be flashed with 1Hz and the alarm lamp will lights off.

With error situation, state lamp and alarm lamp will be flashed with 1Hz at the same time.

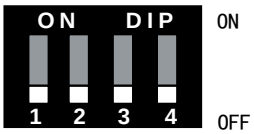
4.2.5 M-INTERFACE gateway specifications

Power supply	Voltage	AC 100-240V~1P,50/60 Hz
	Consumption power	Max. 15W
Using conditions	Voltage fluctuation	Rated value ±10%
	Ambient temp.	-10~50℃
	Ambient humidity	0~95%
	Storage temp.	-20~60℃
Capacity	Insulate resistance	When it is DC 500VM,it will over 50MΩ
Weight	4.4kg	
Dimension(W*H*D)	319*67.5*251(mm)	

4.2.6 Dial switch definition



Dial code switch locates on the display lamp panel

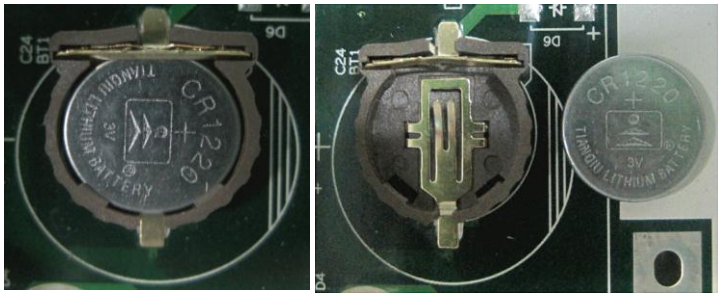
Dial name	ON	OFF(Factory default)	
SW1-1	No electricity charge distribution function	With electricity charge distribution function	
SW1-2	Dial code setting IP	WEB setting IP	
SW1-3	Manual topology mode	Auto topology mode	
SW1-4	Reserve		

When dial SW- 2 set to OFF and SW-3 set to ON means that the system can use WEB function to set the IP and apply the manual topology mode.

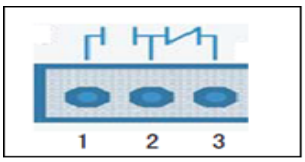
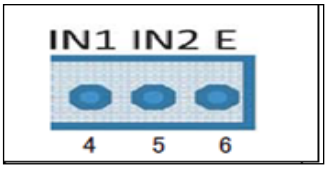
*Notes: when manual adjusts the dial code switch, it needs to take off the top cover plate of M-INTERFACE gateway. There are 4 bolts on the cover plate, please take them down and keeping properly.

4.2.7 Battery installation

After setting the dial code switch, take out the battery from the accessory bag, and the positive pole of battery must be upward side and install on the mainboard as the following. System time synchronization refers to 5.2.3 synchronization time.



4.2.8 I/O Port

Gateway	Name	Note
Pin1		Error output port.
Pin2		When the device operates normally, Pin1 and Pin2 will be broken, and Pin2 and Pin3 will be connected. If there are some errors, Pin1 and Pin2 will be connected, Pin2 and Pin3 will be broken.
Pin3		When A/C is powered off, the device still output error.
Pin4		Emergency stop input signal. If the signal is high level (12~36V DC), then means emergency stop; if the signal is low level (0~0.7V DC), then means operate normally.
Pin5		Reserve
Pin6		Ground wire of emergency signal.

Installation notes:

1). Avoid to sunlight exposure

2). Do not close to the heating source.

3). Do not install in places with high humidity or water.

4). Do not install in the place where is easy to produce corrosion or flammable gas.

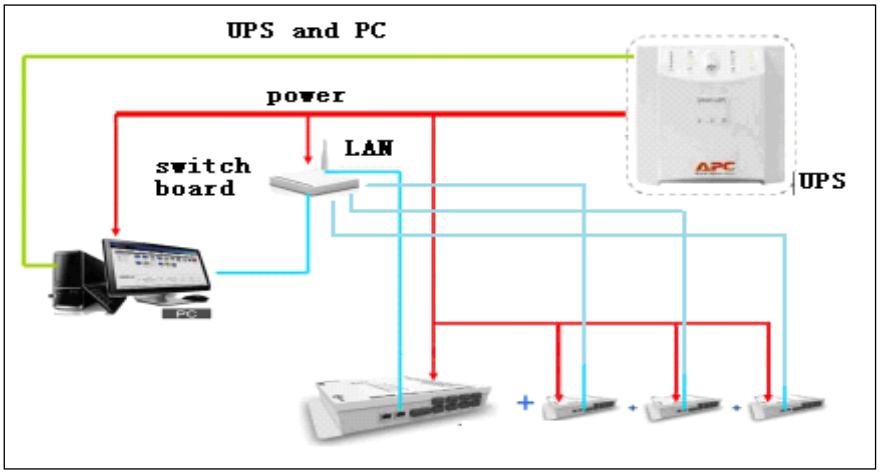
4.3 UPS installation instruction(Optional)

UPS model	BK650-CH
Capacity	650 VA/400 Watt
Output voltage	220V±8%(Battery)
Output power	50Hz±1Hz(Battery)

Notes: When turnoff the power, please turn off the computer safely.

4.3.1 UPS wiring figure

One UPS can only provide power supply for one computer, one switchboard and 4 M-INTERFACE gateways.



4.3.2 UPS installation

According to UPS BA650-CH operation instruction, power wire and signal wire separately connect to the power and computer. Install UPS BK650-CH power management software.

Notes: please carefully read the UPS operation instruction, and safely shut down the computer when power-off.

4.4 Softdog

Softdog must be inserted to the server PC first, and then operate the server software. The softdog can be inserted to any USB ports of PC. Softdog will be sent with the device and it is only used by Midea.

5. M-INTERFACE gateway introduction

M-INTERFACE gateway has 8 M-net ports, 1 LAN port, 8 M-net ports indication lamps, 4 state display lamps (Power, States, Alarm, and Modem) and a power switch.

5.1 M-INTERFACE network

M-INTERFACE gateway can connect the local area network or Internet network through LAN port. M-INTERFACE gateway can connect to the LAN network through switch or router. IP address of computer or other similar devices must be in the same subnet area as the IP address of M-INTERFACE gateway,

5.1.1 IP configuration

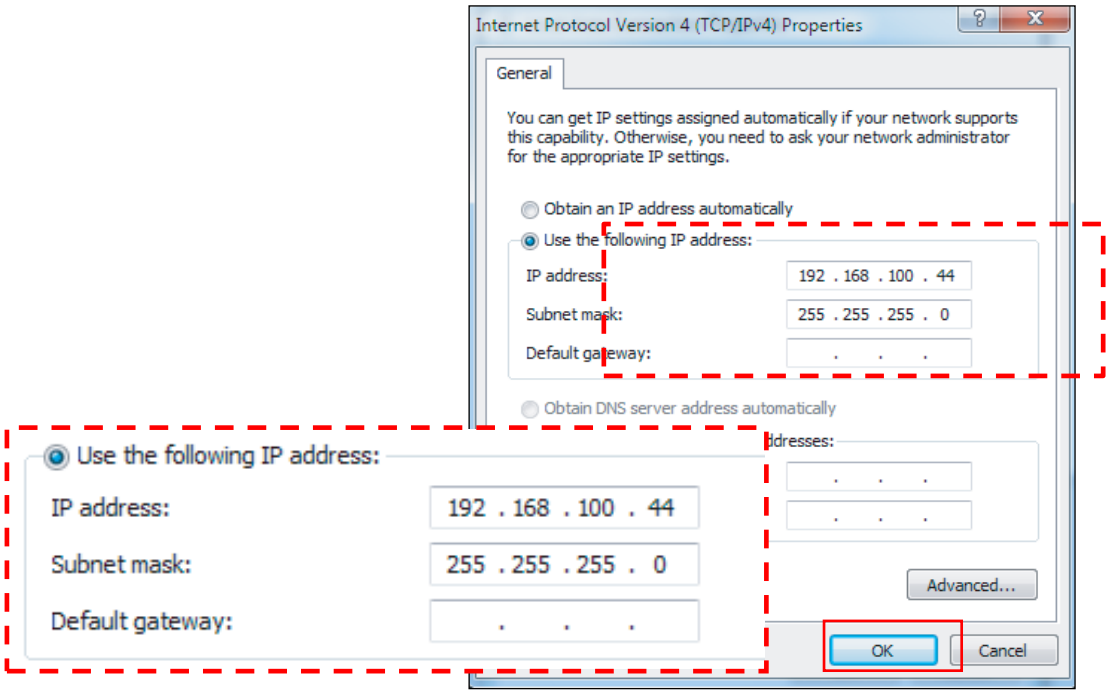
Default IP of M-INTERFACE gateway is 192.168.100.40, subnet mask is 255.255.255.0. M-INTERFACE gateway's IP address and IMM server must be in the same subnet area.
If you want to modify the gateway's IP address through the WEB page, you need to manually configure static IP address of the PC or other similar devices (Pad, Laptop), and static IP must be meet the following requires: within 192.168.100 segment, subnet mask is 255.255.255.0. The single IP is the general configuration, if the PC IP address is not easy to modify, can be used to configure multiple IP ways. Now take Windows 7 for an example.

5.1.1 PC configure the statistic IP

- **Configure single IP**

Open the protocol attribute dialogue box to configure the IP address and subnet mask. For example: IP address is 192.168.100.44, subnet mask is 255.255.255.0.

After configuration, click the "OK" button to finish single IP configuration.



- **Configure several IP**

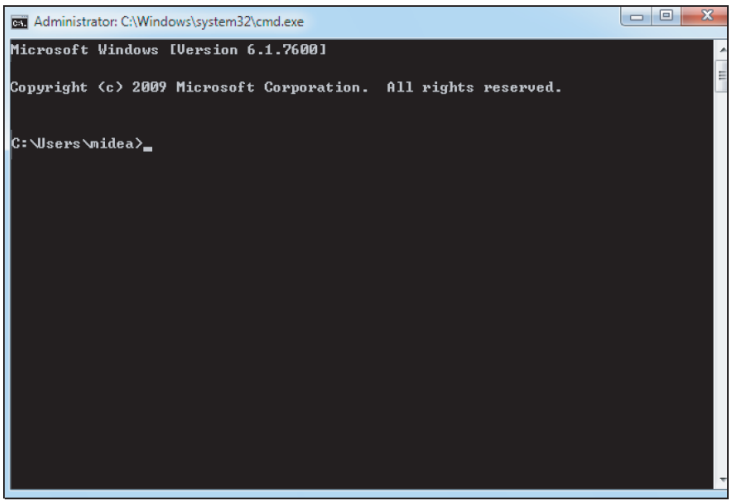
It needs to configure a statistic IP address before configure several IP.

1) Check the local IP

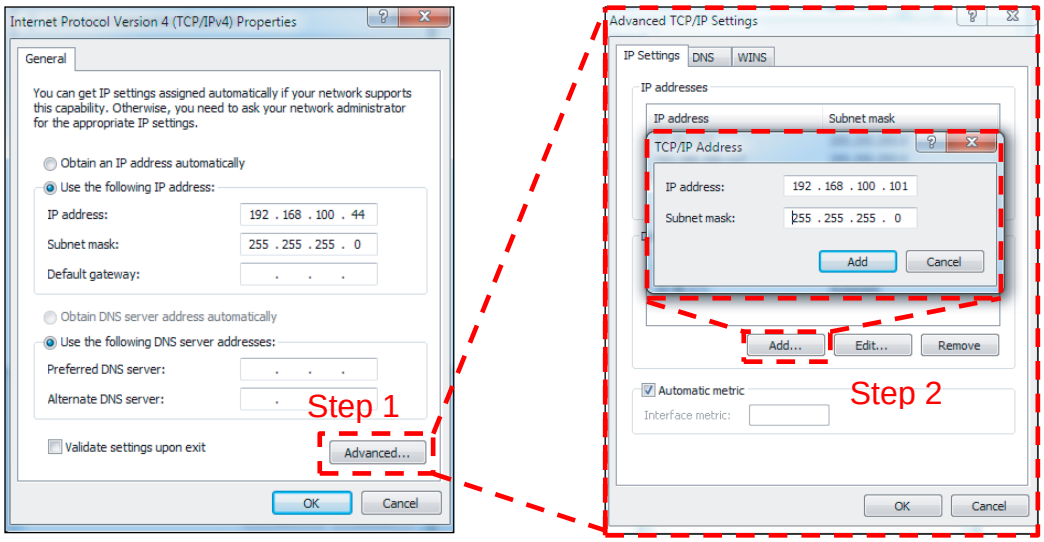
Open the property dialogue box, if the option "uses the following IP address" is selected, and the display page with an IP address, then the local IP is a static IP address, otherwise it is a dynamic IP address, and then it needs to configure a statistic IP address.

2) Configuration static IP address

Open the "start" menu, and input "cmd" in the search box, the dialog box as following:



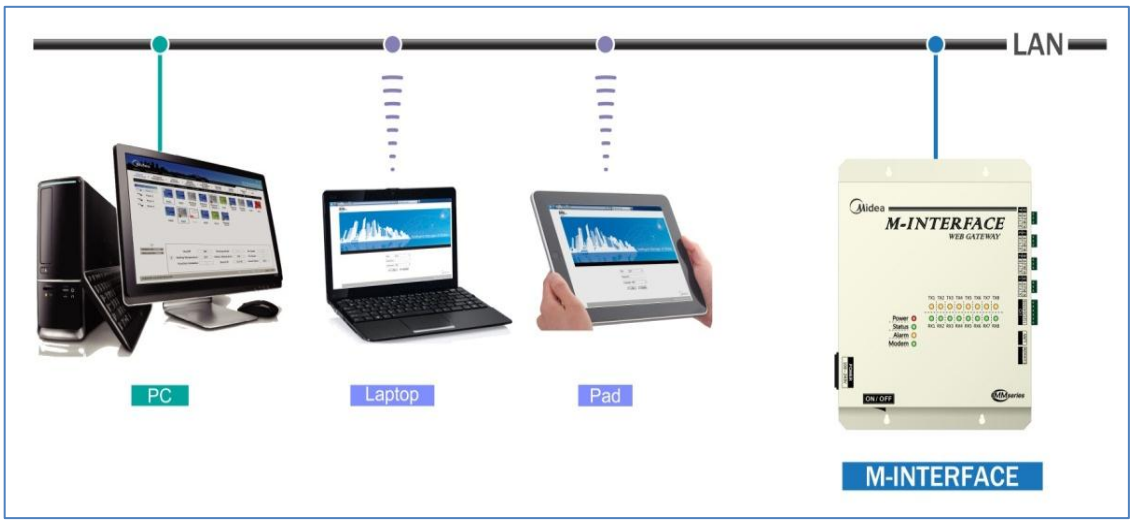
Input "ipconfig" on the above diagram, the page will display local dynamic IP address; fill in the IP address to the properties dialog box, static IP address configuration is completed. Open the property dialogue box again, select the "Advanced", you will enter the "Advanced TCP/IP settings". Click "add" button in the IP address bar, add an IP address in the same net area with "192.168.100.40", such as IP is192.168.100.101, subnet mask is 255.255.255.0, and click the "Add" button complete setting, the dialog box as following:



*Notes: do not set the gateway IP to be: 192.168.100.0/255, if not the server will be error during operation. You can ask the IT engineer to configure IP address.

5.1.2 Web local connection

M-INTERFACE gateway can connect to the LAN network through switch or router. IP address of computer or other similar devices must be in the same subnet area as the IP address of M-INTERFACE gateway, and input the address of M-INTERFACE gateway in the browser(e.g.: http://192.168.100.40) then you can access the M-INTERFACE WEB to control the air conditioner. The topology structure of local access as following:



5.1.3 Remote network connection

Under the environmental permit conditions, M-INTERFACE gateway can be set up in the public network. Users can control air conditioner via computer or other similar devices anytime and anywhere. There are 3 remote network connection ways:

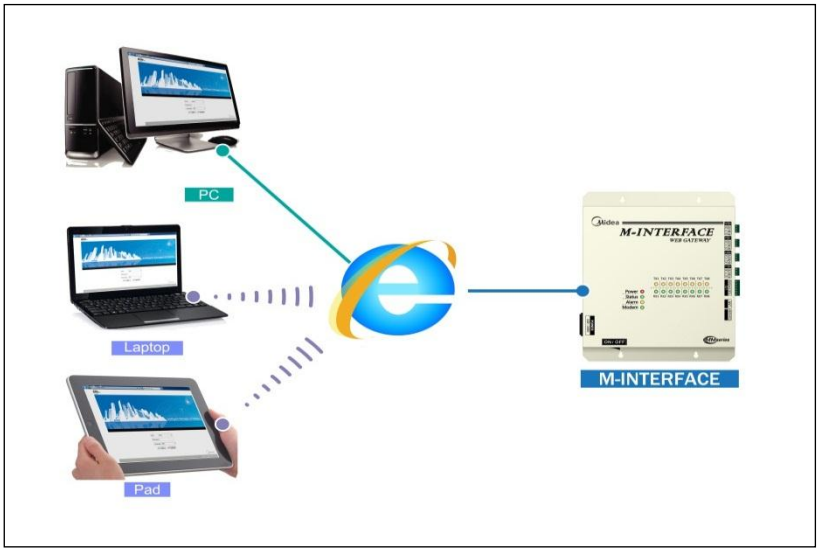
Notes: Remote connection needs the help from the network administrator.

- **Statistic IP**

Configure the public network statistic IP address for M-INTERFACE gateway, and set it in the internet, we can visit the public network address (visit WEB page) directly.

It needs to consult and get the public network address from the local network operator.

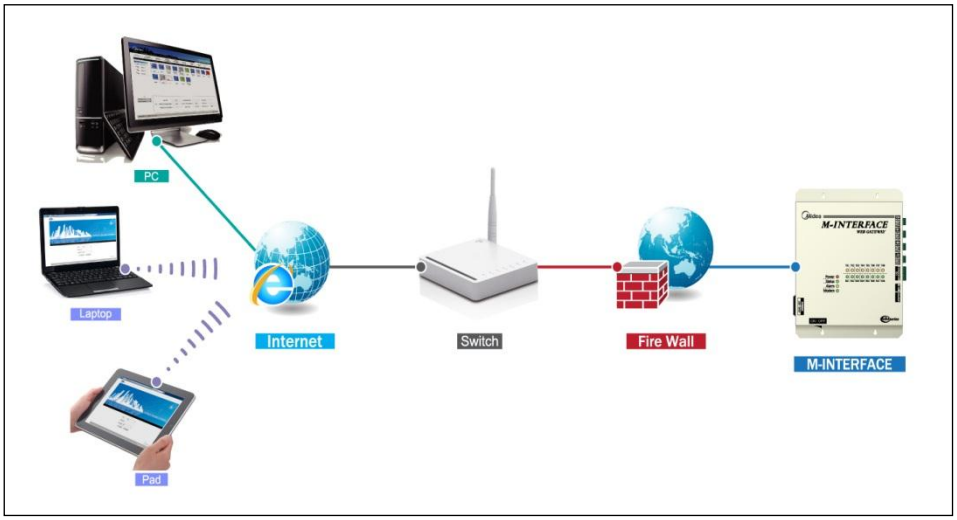
The corresponding cost of the public access will be charged by the operator and need to consider the problem of network security at the same time.



➢ Network port mapping

If there is a public network address shared in a company, it needs to map a port for M-INTERFACE gateway from fire wall.

When the PC or other similar devices access M-INTERFACE gateway, they visit it like http:// public network IP: port. For example: http:// 203.208.60.72:6080.



➢ VPN access

The IMM client-side and server also can use the remote network (VPN) connection. VPN has router establishing and PC establishing methods.

1) Router establishing method

M-INTERFACE gateway may use the same public IP address with other devices and cannot map a port to the M-INTERFACE gateway, and then can use VPN for remote visiting.

VPN tunnels achieve connection by routers, or using VPN client-side software and VPN server in the computer, and then we can visit the M-INTERFACE gateway from long-distance. VPN Server can be established by oneself and also can be rented. The topology structure as following display:

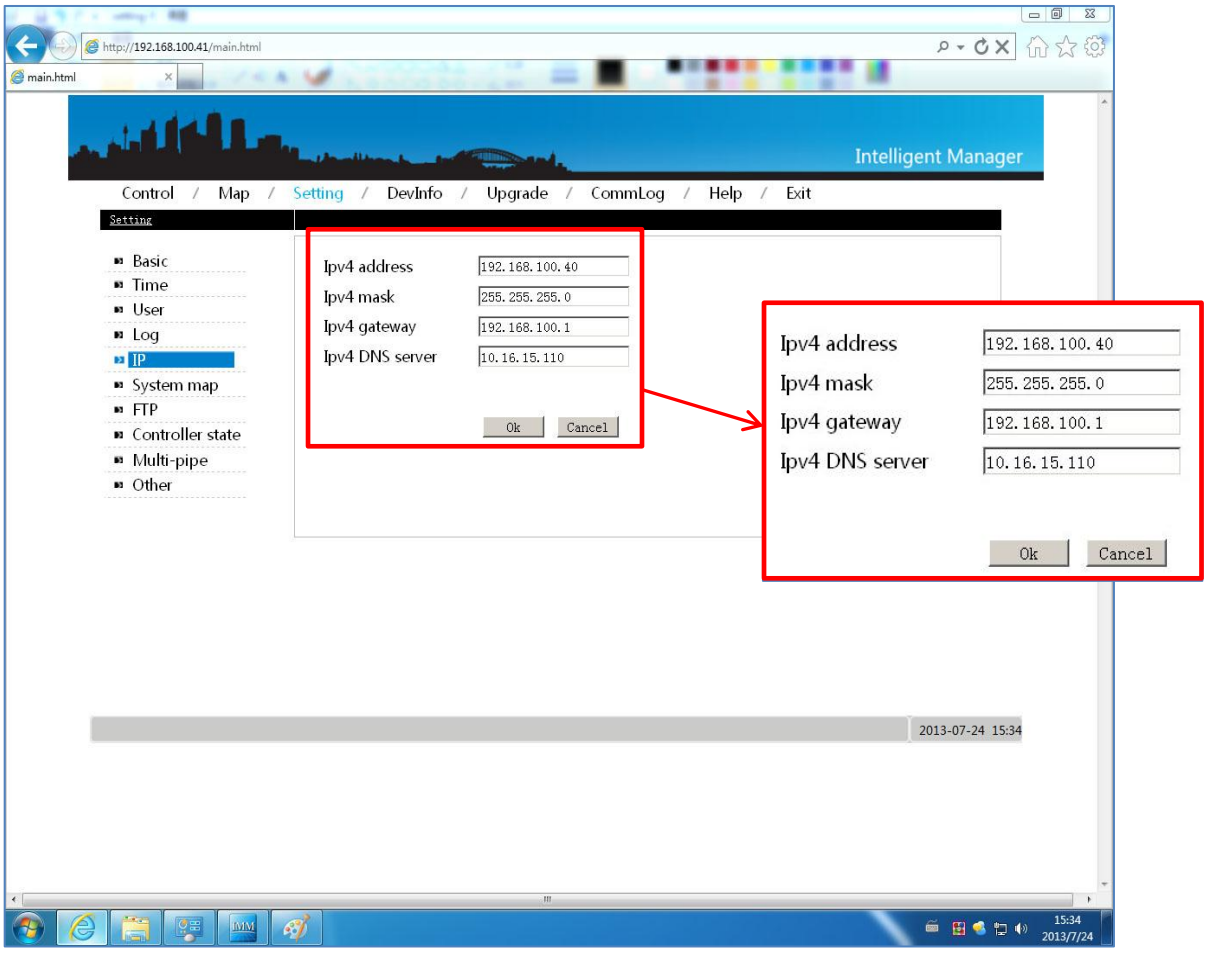
2) PC establishing method

It is difficult to establish VPN tunnel by PC for ordinary users

Use VPN client-side software and VPN Server to establish VPN tunnel together on the user's computer, then user can visit the server through VPN tunnel. VPN client-side software and VPN Server can be achieved by commercial ways. The topology structure as follow display:

5.1.4 Setting the gateway IP address

In PC which is configured with a static IP via a browser (for example: Internet Explorer 9) to enter the IP configuration page of the WEB system and as an administrator to operate the WEB system, WEB page will display as following:



After setting and click the "OK" button. If there are several M-INTERFACE gateways in the same network segment, and then the IP addresses cannot be repeated.

5.2 M-INTERFACE configuration

5.2.1 Administrator login

Input the IP address of the M-INTERFACE gateway in the browser and press Enter key, then the page will enter the web login page (take Window 7 and IE for example):

1). Double-click logo on the page  , it will display the login frame (figure 1 and figure 2), and the default user name is "adm".

2). Input your password in the login fields (default: 123456).

3) Select language

4) Click the [Ok] button will enter the M-INTERFACE WEB page.

5) Click the [Cancel] button will cancel login.

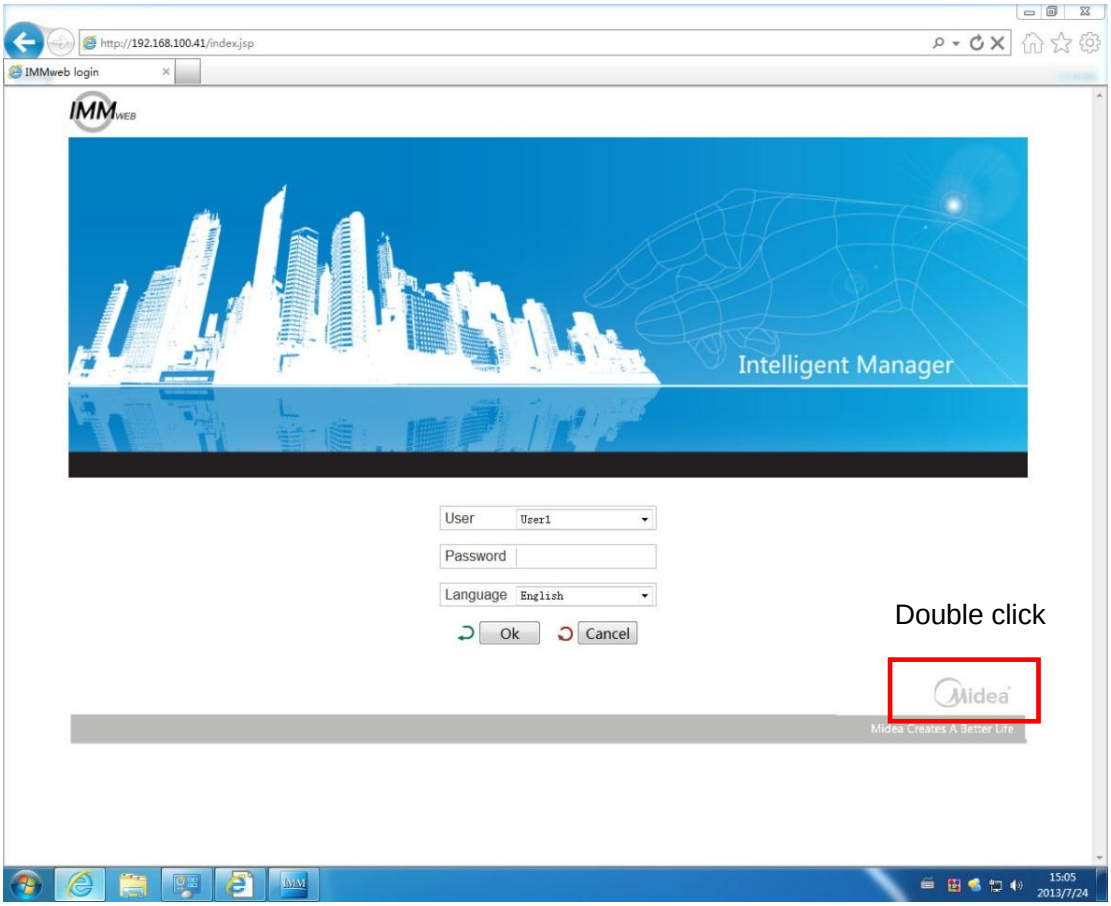


Fig.1

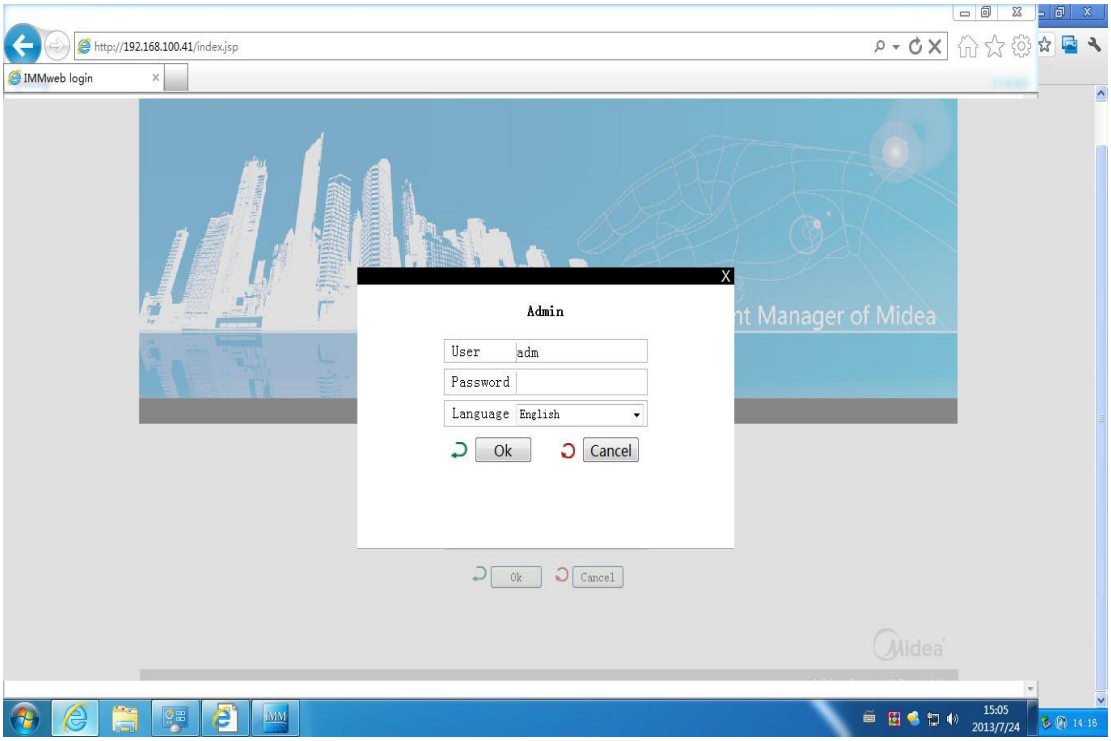
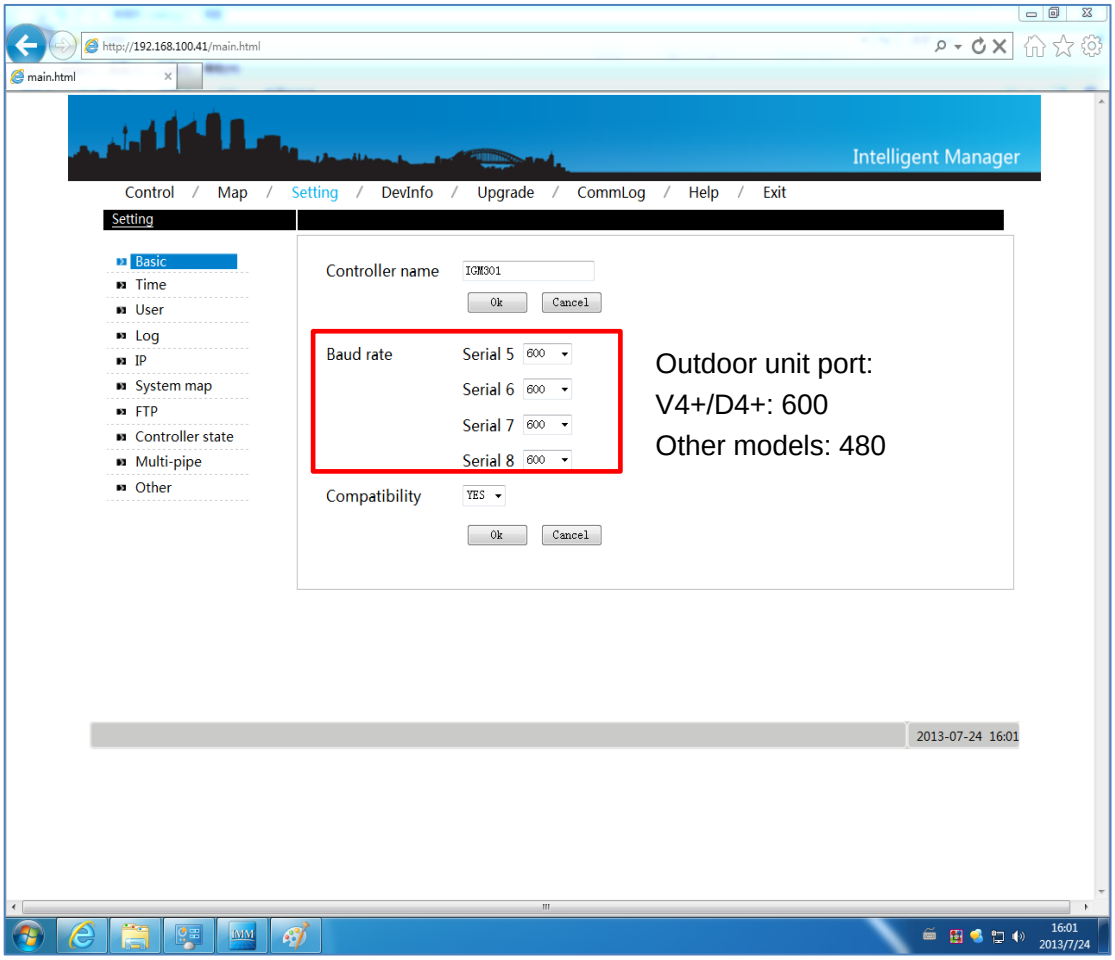

http://192.168.100.41/index.jsp
IMMweb login
Admin
User
adm
Password
Language
English
Ok
Cancel
Manager of Midea
Midea
15:05
2013/7/24

Fig.2

5.2.2 Serial port setting

After login, select "Setting" and click "Basic" can set the serial port as following:

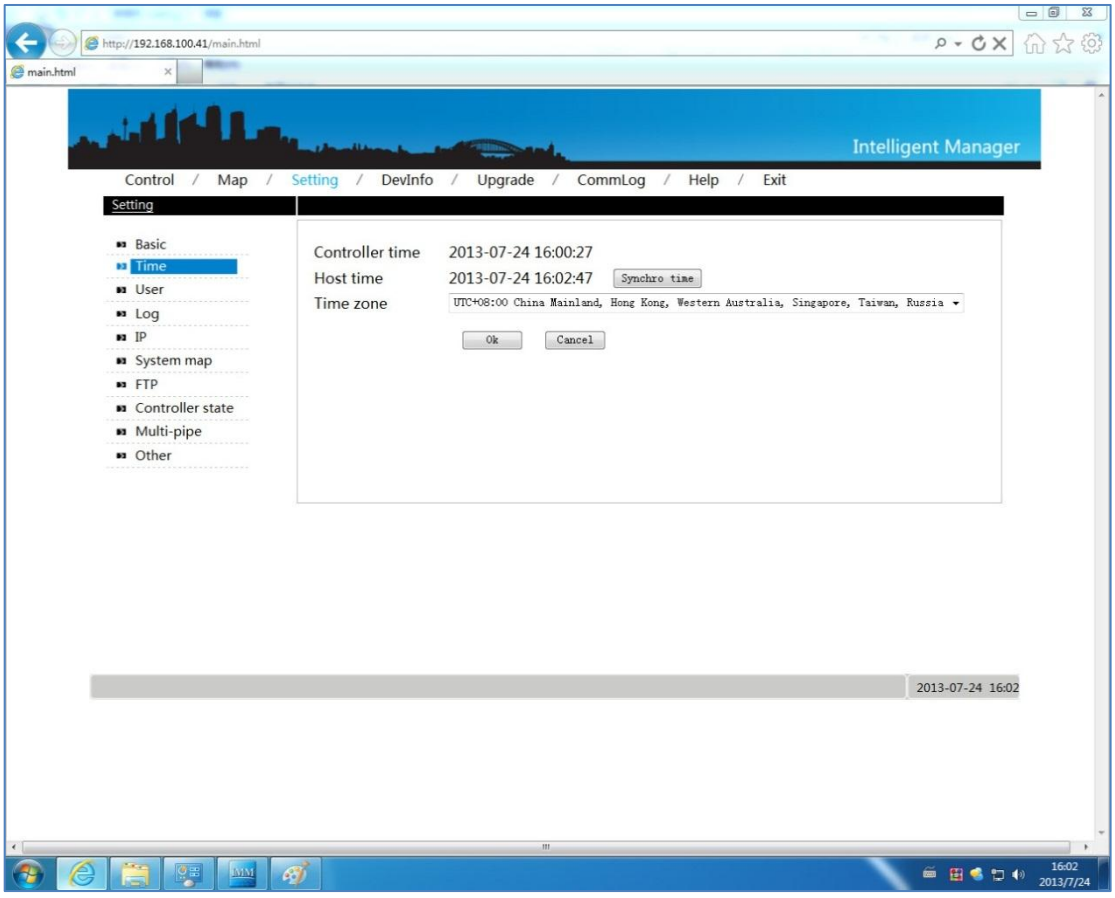


The baud rate of 5 to 8 serial ports should be set to be the communication baud rate of outdoor units (V4 plus and D4 plus outdoor units' baud is 600, other models' baud is 480). If the indoor units cannot compatibility (0533 chip indoor units cannot compatibility), the option of "compatibility" should be selected "yes", and then the gateway controller will distribute the capacity to the indoor units automatically. It needs to be restarting the unit after modification, otherwise it will fail. If the setting baud rate was different from the outdoor unit communication baud rate, then it cannot search outdoor units which connected to the port.

5.2.3 Synchronization time

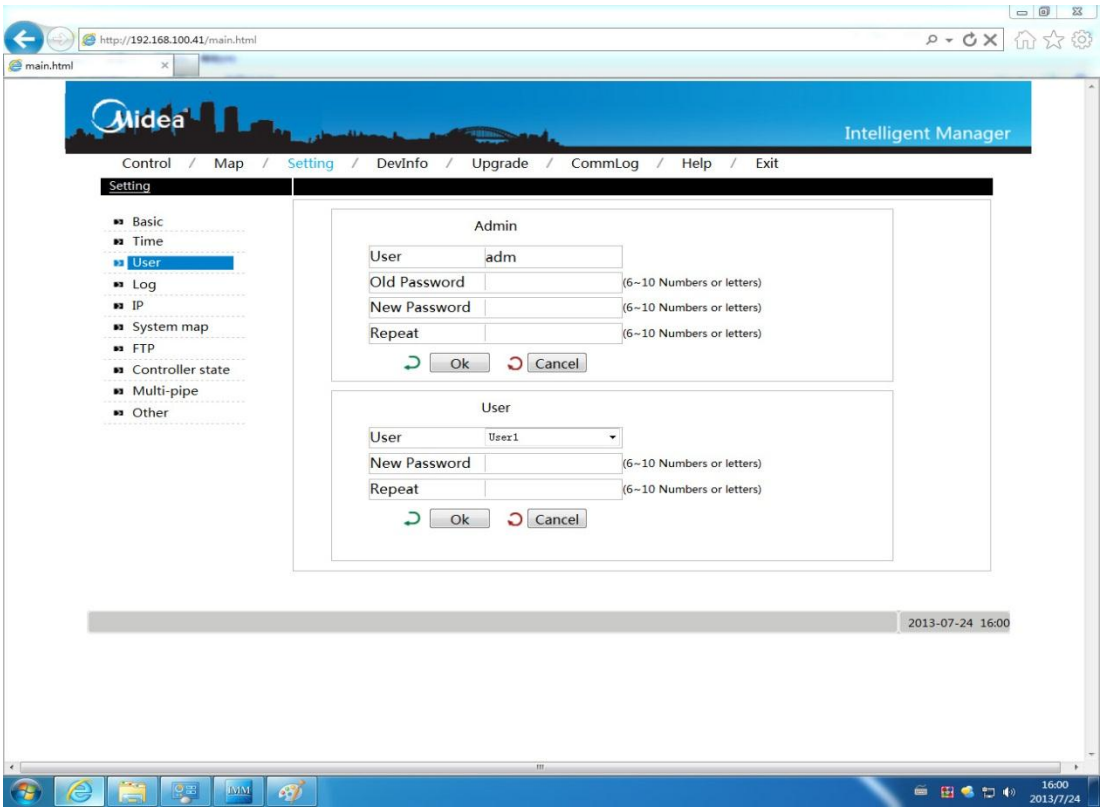
Synchronous the M-INTERFACE gateway's time as following:

Select "Time zone", and click the "OK" button, and then click "Synchro time" button to complete synchronous time setting function.



5.2.4 User's password management

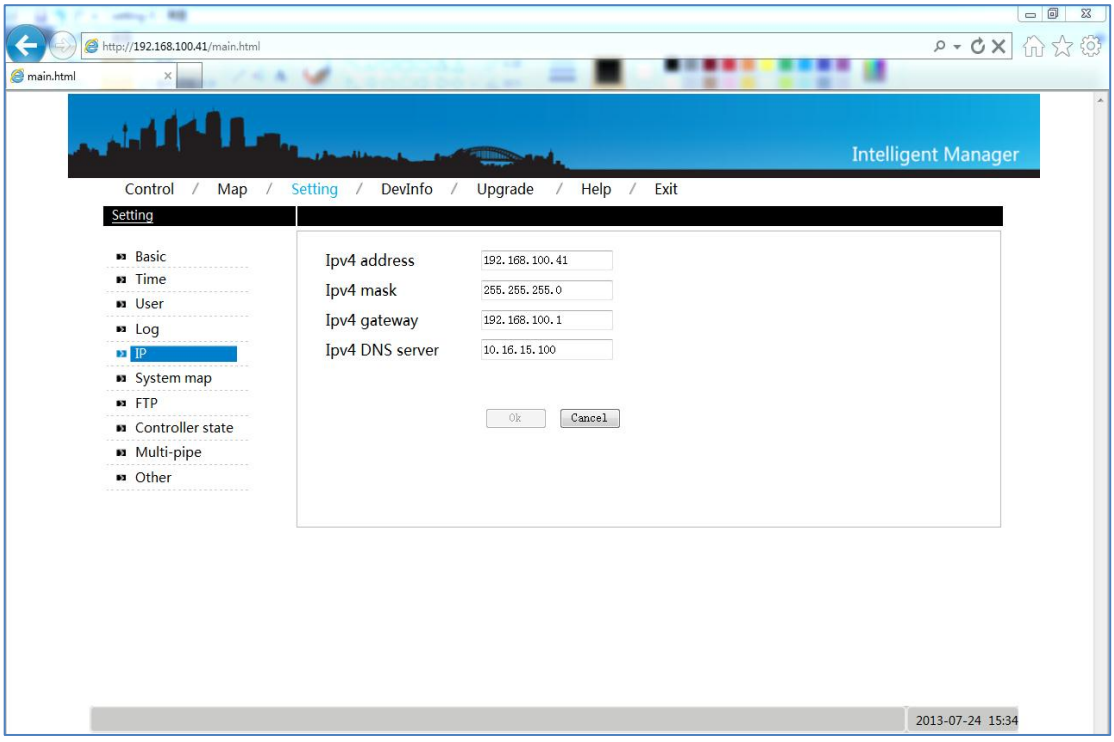
The administrator can modify their own password and 4 common user's password, the page will display as following:



After modifying and click "Ok" button.

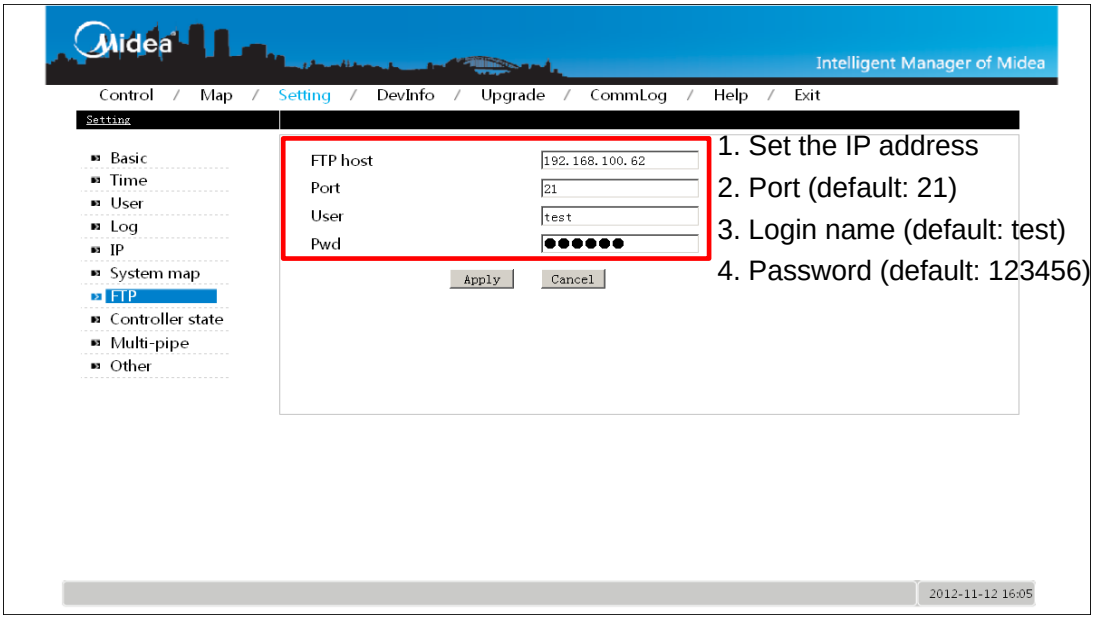
5.2.5 IP setting

If you want to connect the M-INTERFACE gateway to the local network, then it needs to reset the M-INTERFACE IP address. After setting and click "OK" button. If there are many M-INTERFACE gateways in the same network area, then the IP address cannot be repeated.



5.2.6 FTP setting

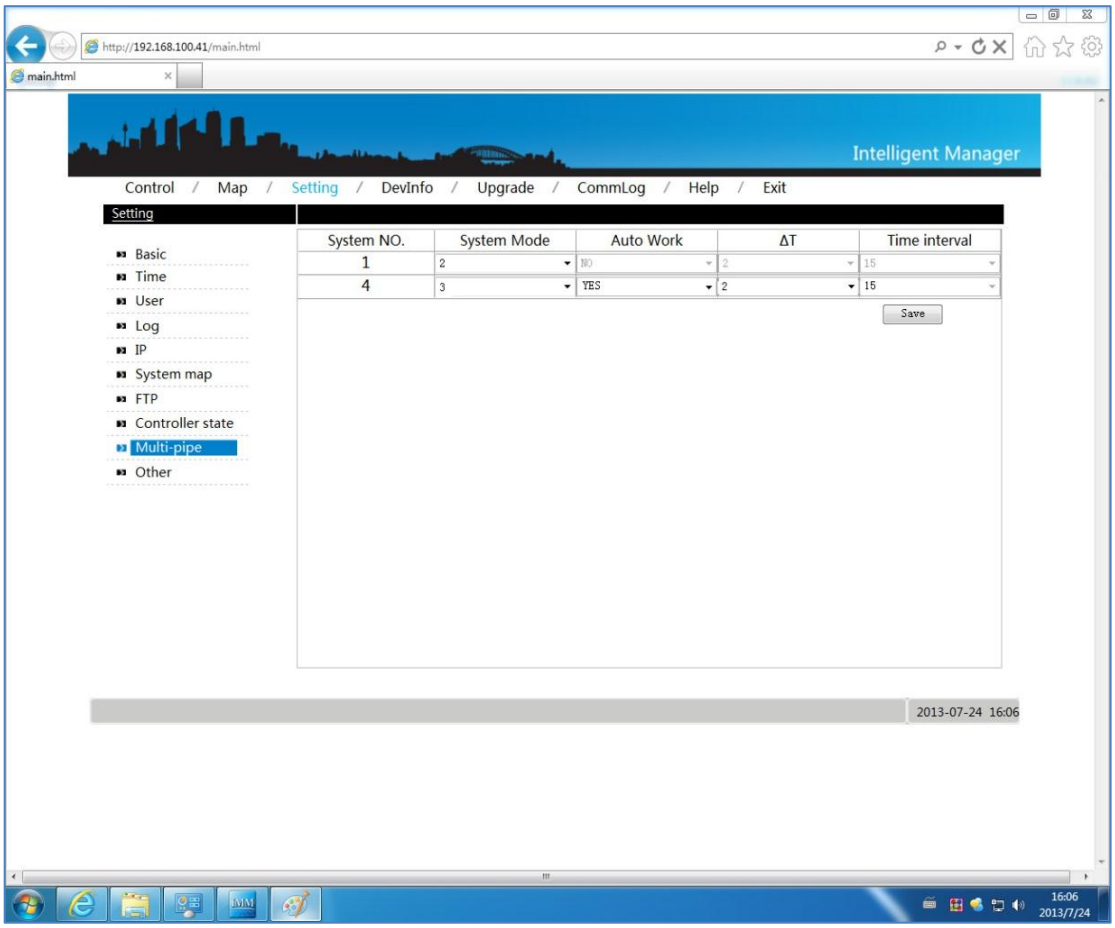
FTP setting page as following:



It needs to set the IP address of the FTP server (the PC address of the server software installation), and the default port is 21, user's name default "test" and the login password default 123456. Click "Apply" button will complete the setting.

5.2.7 Multi-pipe system configuration

The function is only available for three-pipe system (V4+R system). It can set system mode (3: three-pipe system), auto cooling and heating mode (YES: auto mode setting), ΔT (Room temperature (T1) - Setting temperature (Ts) = ΔT), time interval (interval of indoor unit modes changing).



After setting and click "Save" button, auto mode of three-pipe system will be set completely in the setting page.

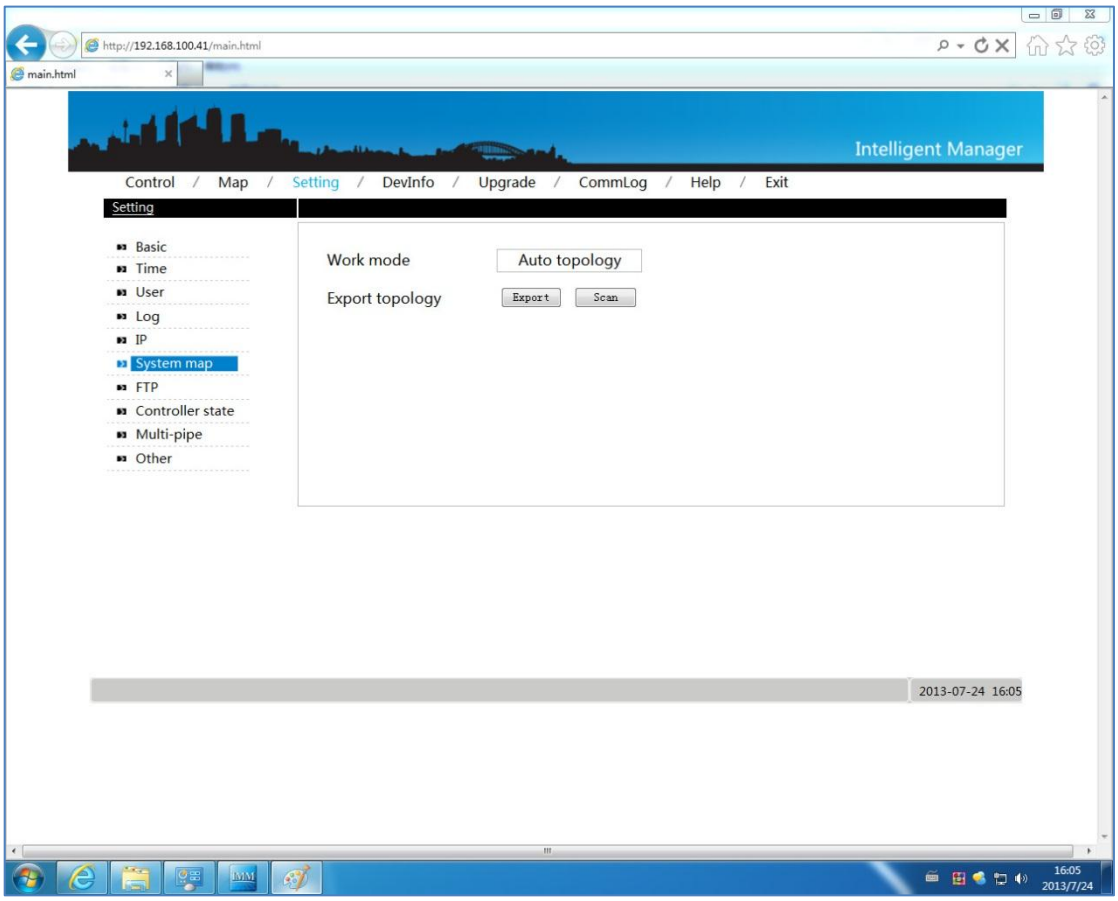
5.2.8 Search device

Under the system map function can operate device search through auto topology and manual topology mode

5.2.8.1 Auto topology mode

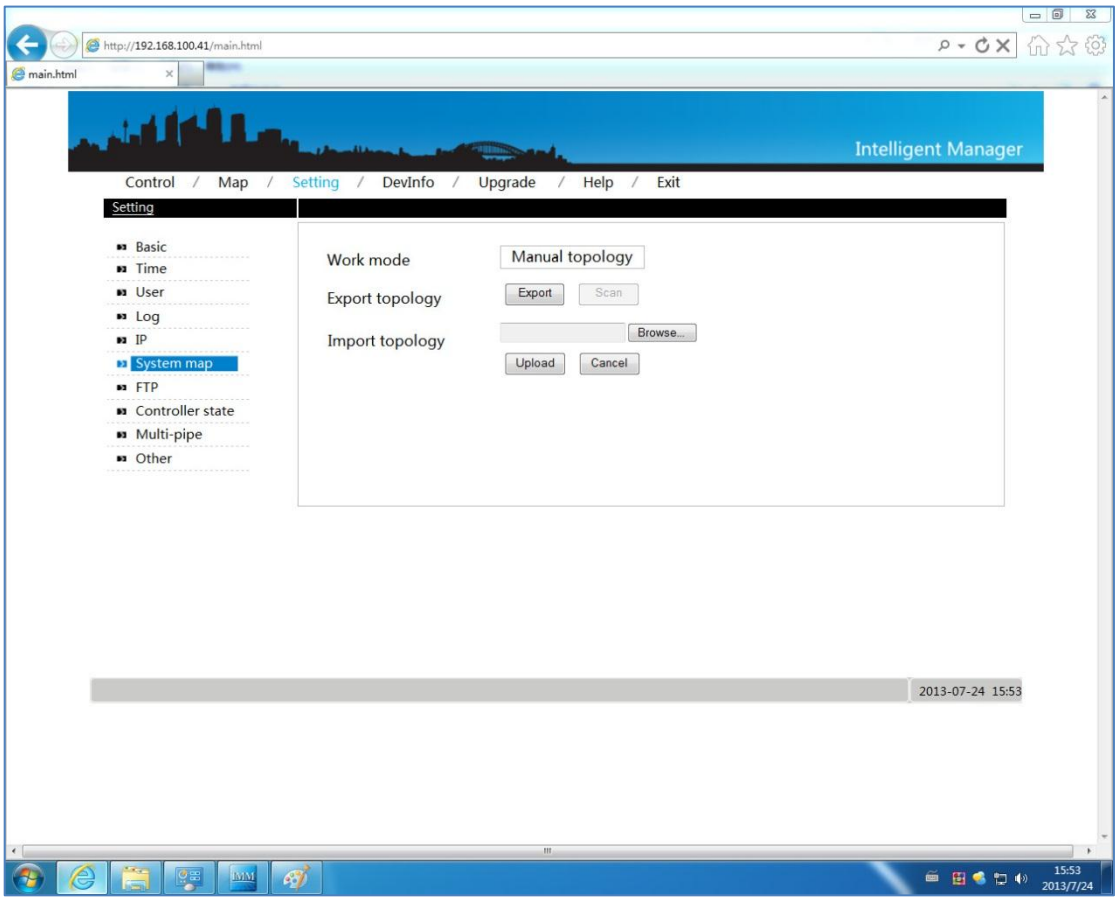
Under the auto topology mode, you can operate the device search function through the WEB page.

On the setting page, click "system map" and enter the refrigerant system mapping page to click the "Scan" button. M-INTERFACE gateway can search the air conditioners automatically.



5.2.8.2 Manual topology mode

Under the manual topology mode, it needs to manual import the system topology documents (topology document refers to 9.1), and during the importing process, M-INTERFACE gateway will operates device search function automatically. Importing system topology documents page as following:

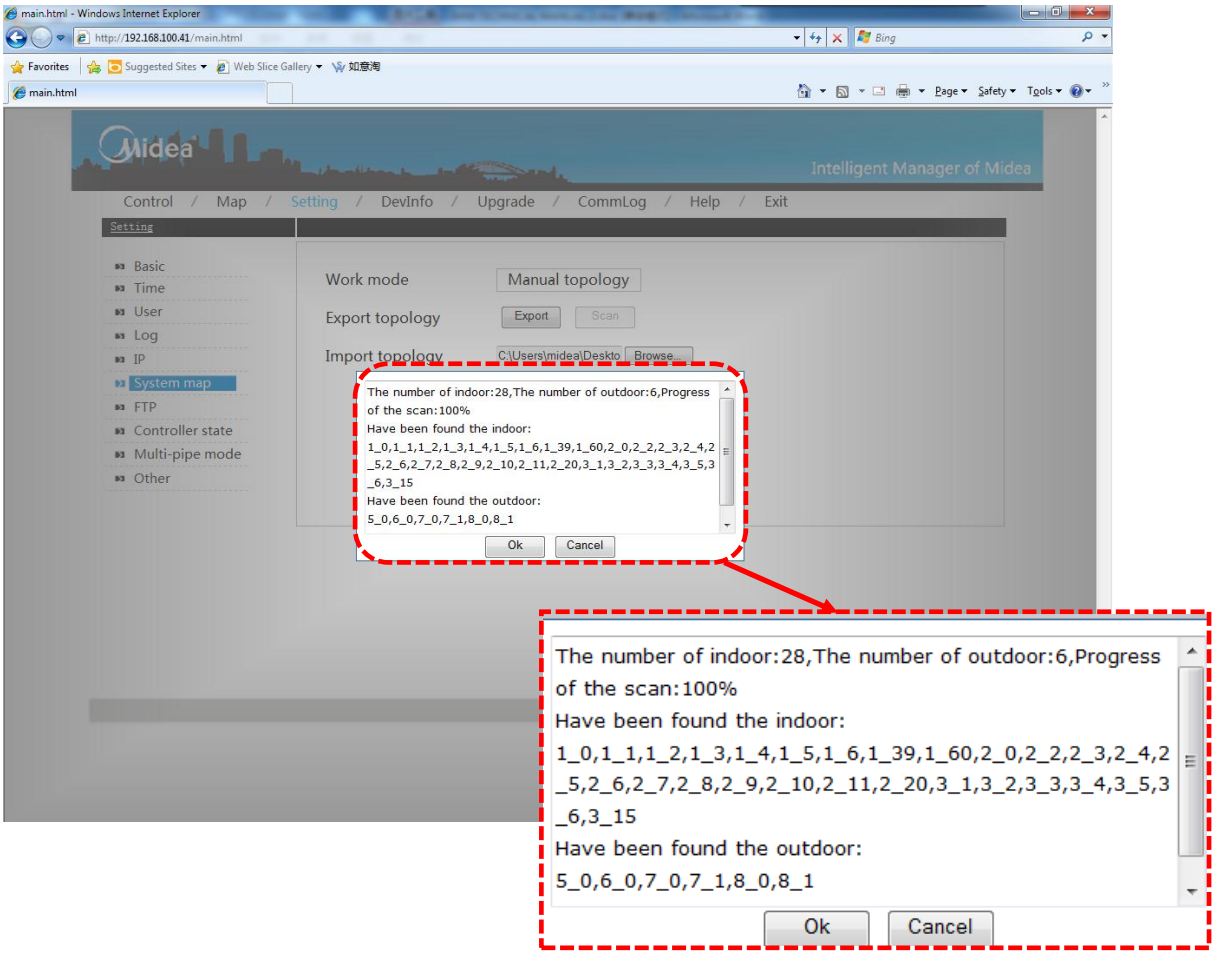


Notes: During the device searching process, it will check the indoor and outdoor devices automatically.

5.2.9. Device verification

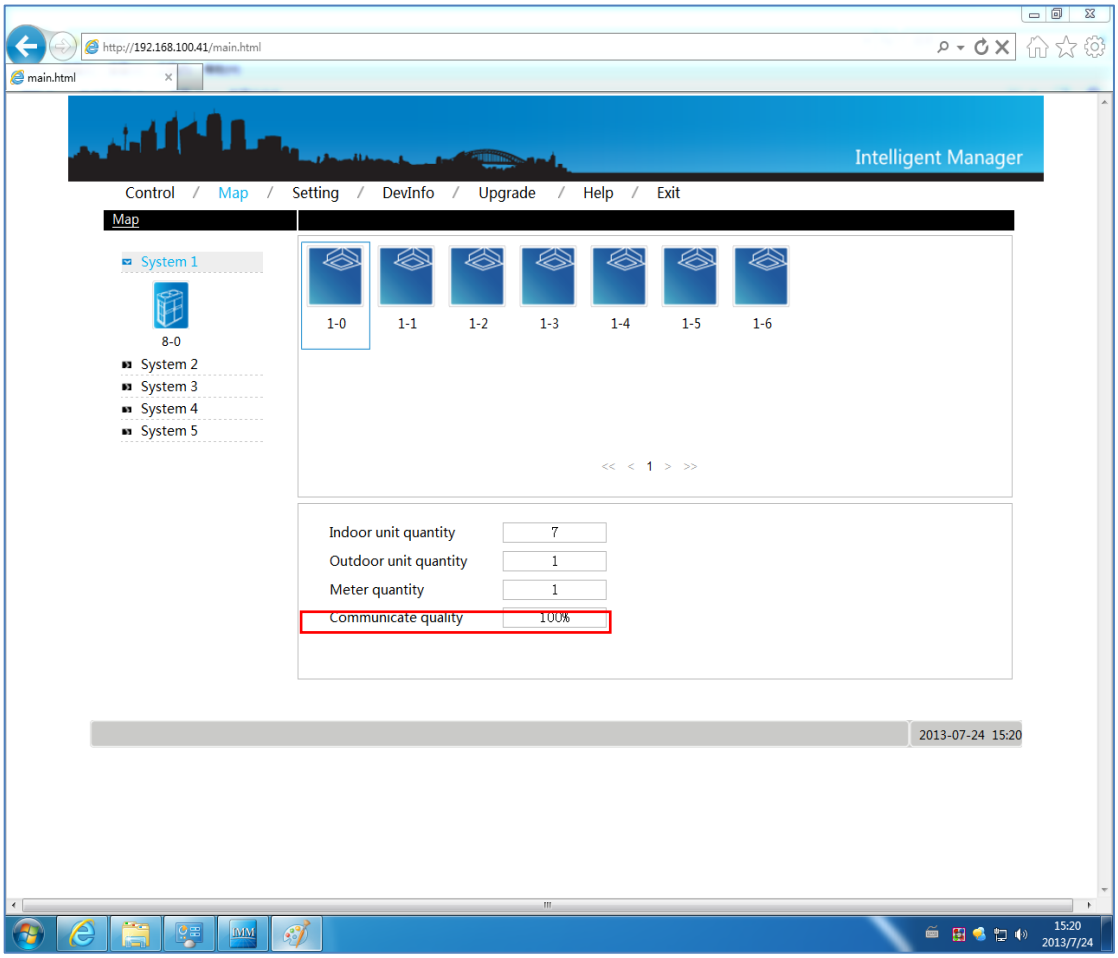
5.2.9.1 Search results check

After searching, WEB page will display this information: quantity of the indoor and outdoor units, serial number of indoor and outdoor units and so on.



5.2.9.2 Communication quality inspection

WEB function will give out the communication quality between gateway and single air conditioner, display as following:

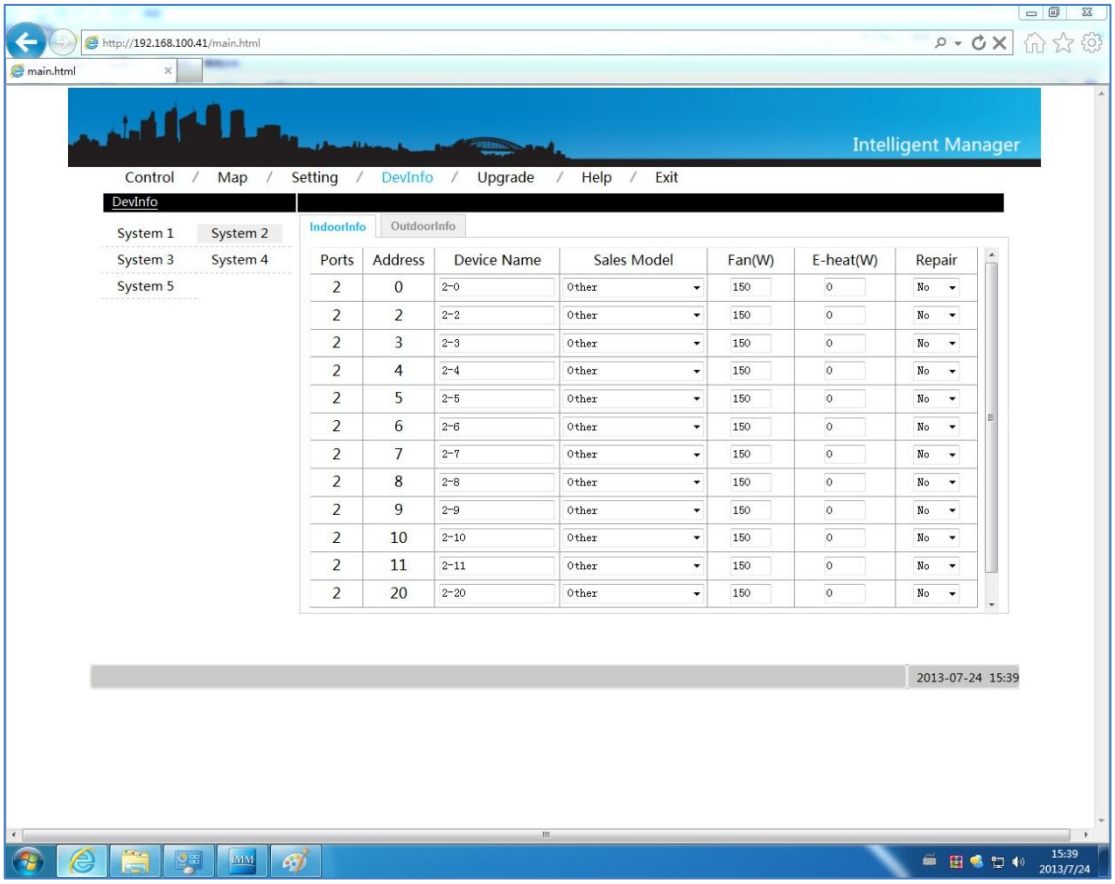


Click single device, the communication quality bar will display the communication quality between this device and gateway.

5.2.10 Device information setting

5.2.10.1 Indoor unit information setting

Select the refrigerant system, click the "IndoorInfo", and then the indoor unit information will display as following:



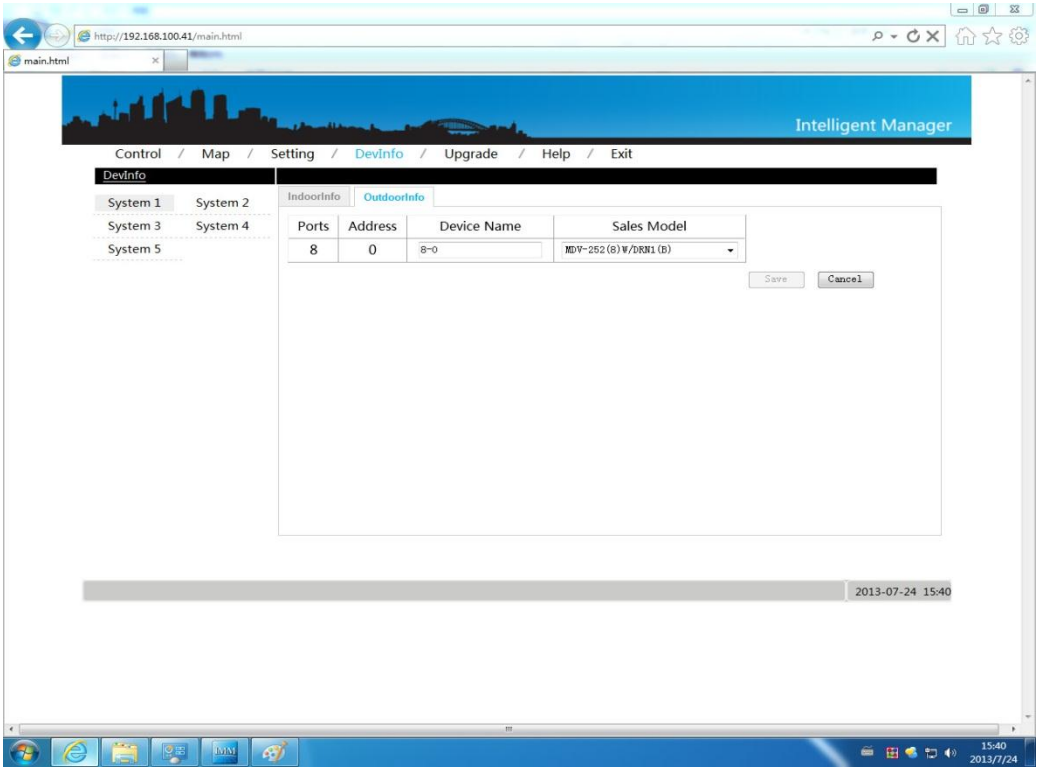
The display contents include: port (terminal number which connected to the M-net port), indoor or outdoor units' address, physics location (device name), sales model, fan power, E-heater power and maintenance state information. Administrator can modify the physical location, sales model, fan power (when the sales model is others can modify only), electrical heating power (when the sales model is others can modify only) and maintenance state. After modifying the physical location, the corresponding device name will be modified, and if other options will be modified, it will affect the electricity charge distribution function. After modifying and then click the "Save" button.

If setting the maintenance state to "yes", devices will not participate in electricity charge distribution, and it needs to restart the M-INTERFACE gateway. Under the maintenance

state, devices will not display in the WEB page. And if modify the maintenance state property of the device, IMM software needs to search again. Otherwise, it fails to control, and user can see "Didn't find the indoor unit address information" in the prompt message frame. After searching the IMM software again, the devices which under the maintenance state will not display in the IMM software control page.

5.2.10.2 Outdoor unit information setting

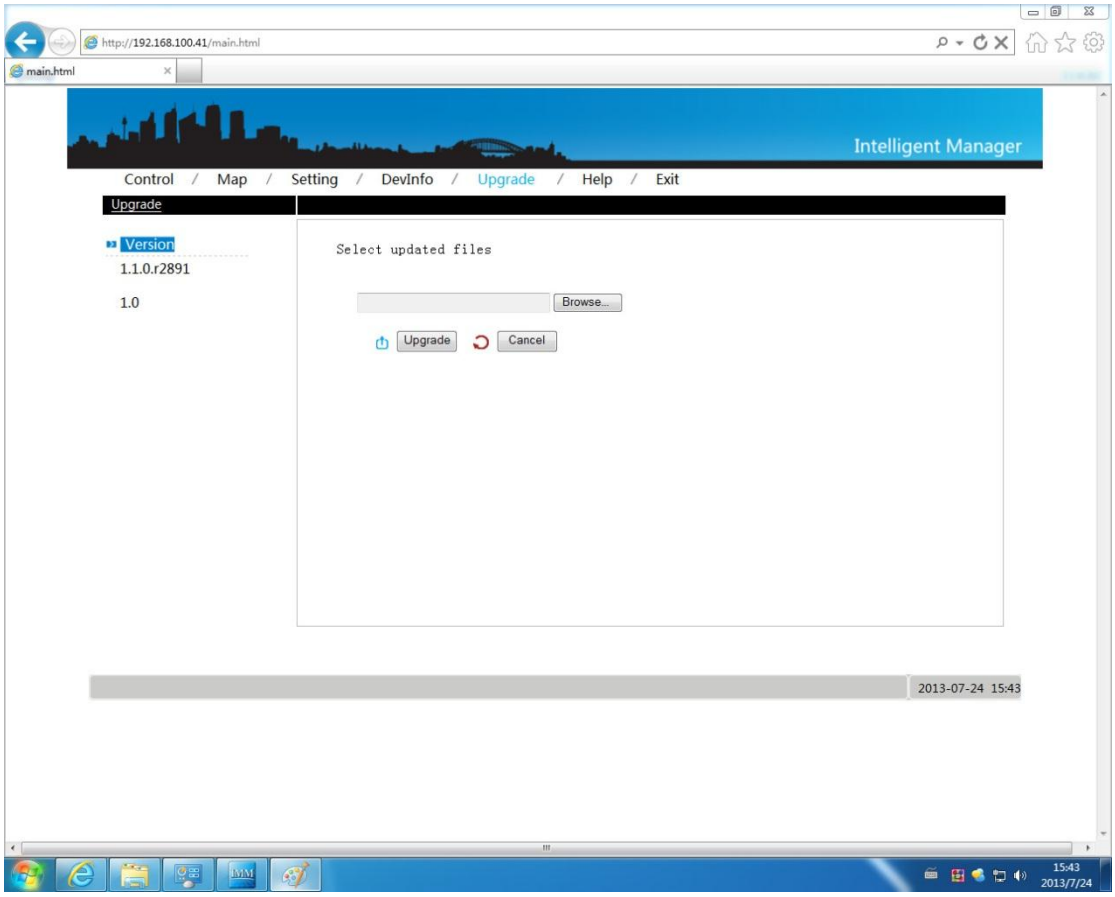
Select the refrigerant system to click the "OutdoorInfo", and then outdoor unit information will display as following:



The display contents include: port, address, device name and sales model. Administrator can modify the "Device Name" and "Sales Model" parameters, and click the "Save" button will be OK. After modifying the device name, the corresponding device name will be changed.

5.2.11 Software upgrade

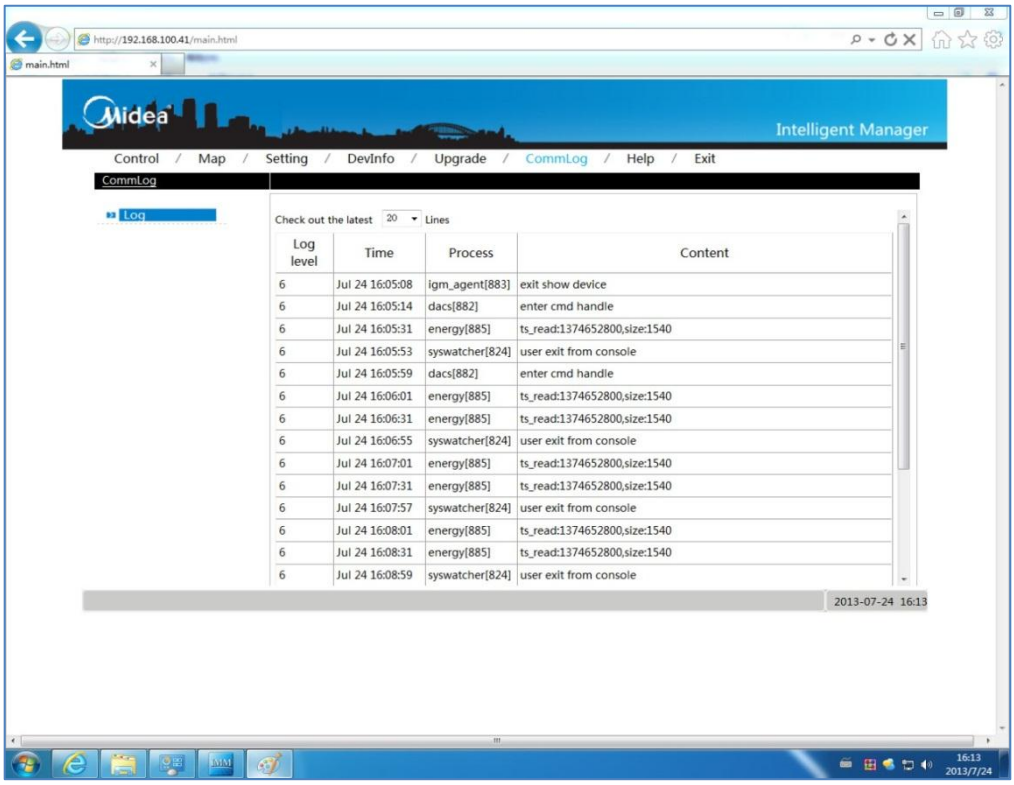
M-INTERFACE gateway can be upgraded through WEB page. When administrator logins the WEB page and enter to the software upgrade page, the display as following:



Select the "Upgrade" and click "Browse" button in the page to select the upgrade program, and then click the "Upgrade" button will perform the upgrade command. After upgrade, the page will prompt "Re-start the M-INTERFACE" message. After restarting the gateway and upgrade finish. Upgrade time is about 10 minutes, and during the upgrade process cannot cut-off the power.

5.2.12 Communication diagnosis

Administrator can login WEB page to check the communication diagnosis information.



Administrator can clear the logs, download the logs and download the diagnosis information in this page.

5.2.13 Precautions

1). When change the auto/manual modes of M-INTERFACE gateway, user must be set the dial code first.

2). If cannot use the sending button in the WEB page, it means the M-INTERFACE gateway was locked in the IMM software. It needs to be un-locked in the state page of M-INTERFACE gateway.

3).After change the system inserted port number, it must to search M-INTERFACE again.

4).In I/O port, Pin4 and Pin6 ports' input voltage are higher than 3V and last for 3 seconds, M-INTERFACE will send emergency stop command and all the devices which connected to the M-INTERFACE gateway will be stopped.

5). Install the battery before use the M-INTEFACE gateway.

5.3 Web operation introduction

5.3.1 User login

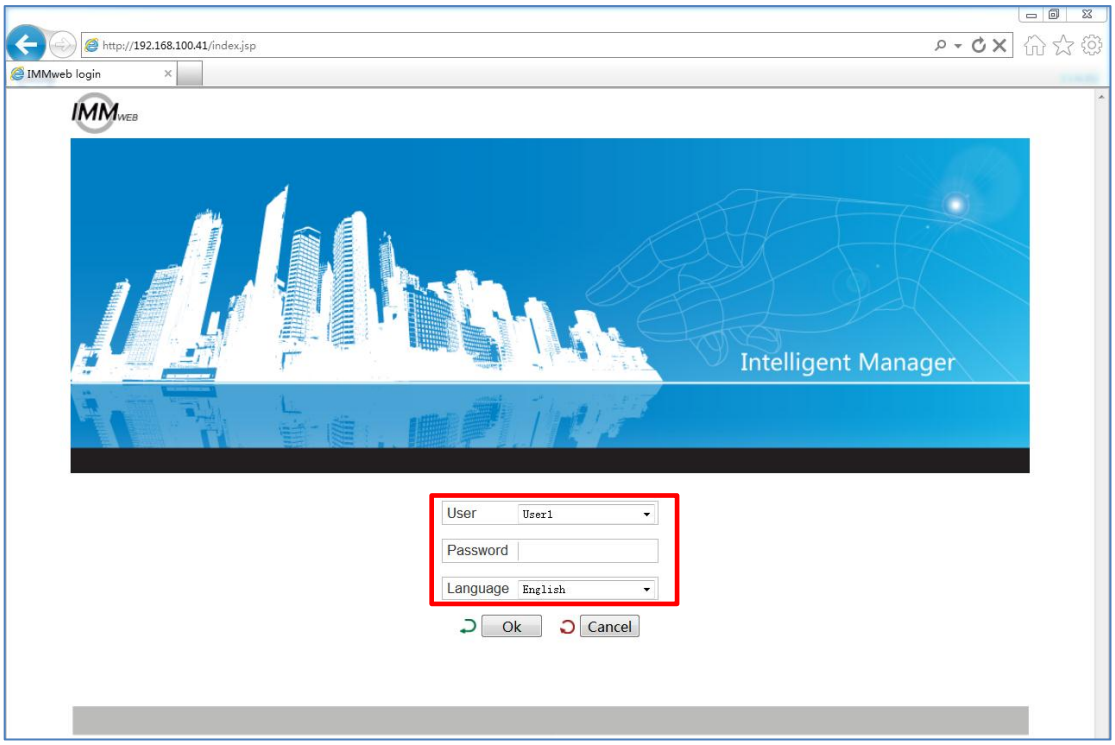
Input the IP address of the M-INTERFACE gateway in the browser and press Enter key, then the page will enter the web login page (take Window 7 and IE for example):

1) Select the user's name and input your password (default password: 123456).

2) Select language

3) Click the [Ok] button will enter the M-INTERFACE WEB page.

4) Click the [Cancel] button will cancel login.

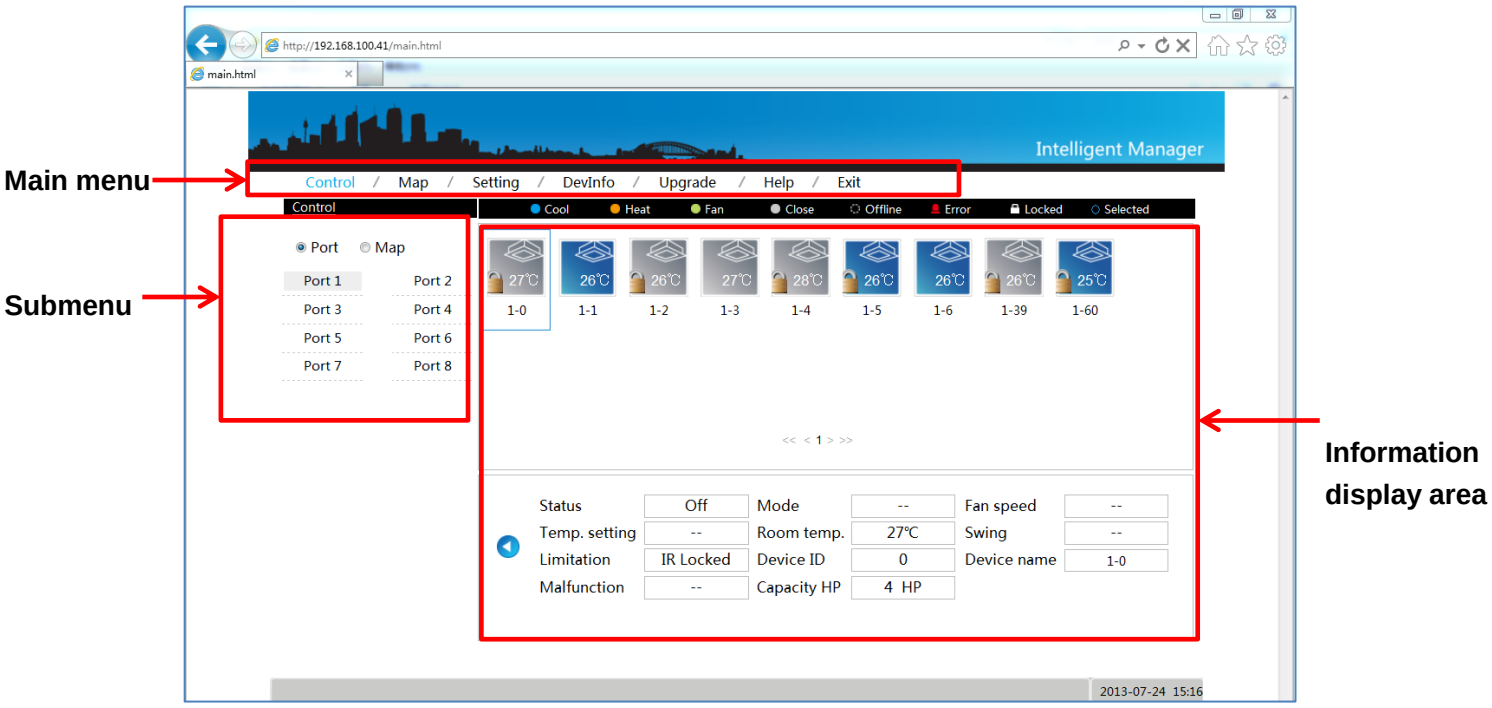


Notes:

For safety, each user name is allowed only login in one place, if there is repeated login (even 2 different browsers on the same computer), the first login users name will be forced back to the login page. After login system, if there is not operation about 5 minutes, then operation again, the page will return to the login page automatically.

5.3.2 WEB home page

Web home page consists of three parts: main menu, submenu and information display page. Main menu can display all functions, include "Device monitoring", "System mapping", "Setting", "Device information" and "Help" etc. Submenu: simple divide the main menu. Information display: display information of a function.



5.3.3 Devices monitoring

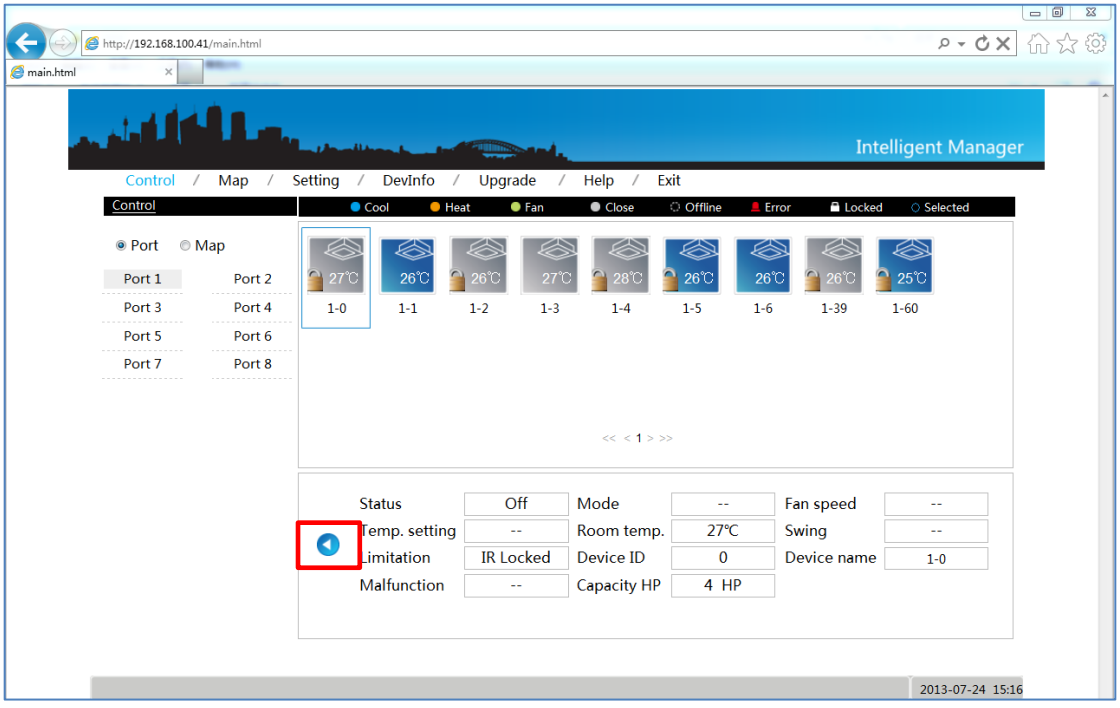
It can display the operation states of indoor/outdoor units according to the ports and system way. You can control the indoor units and check the operation/error states of indoor/outdoor units. The detailed display page will refresh automatically for per 10 seconds.

- **Ports monitoring**

Under the device monitoring function to select the port, the page will display the corresponding units which connect to the 8 m-net ports. The 1 to 4 ports are connected to the indoor units and it can check and modify the indoor units' running state. The 5 to 8 ports are connected to the outdoor units and it can check the outdoor units' running state.

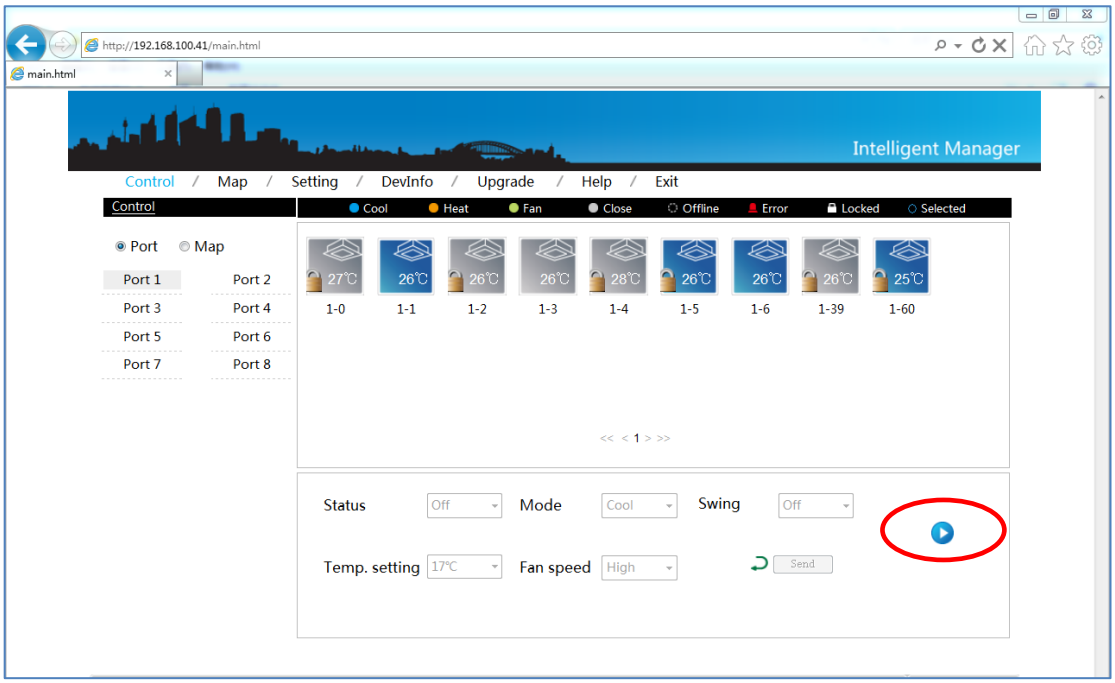
1) Check the running states of indoor unit

Indoor running states: cooling, heating, fan only, turn off, offline, error and locking. Different running state will correspond to different images. Click a single indoor unit, it will display the operating state information of the indoor unit on the bottom of page, including on/off state, running mode, units' name and HP etc. information.



2) Control the running states of indoor unit

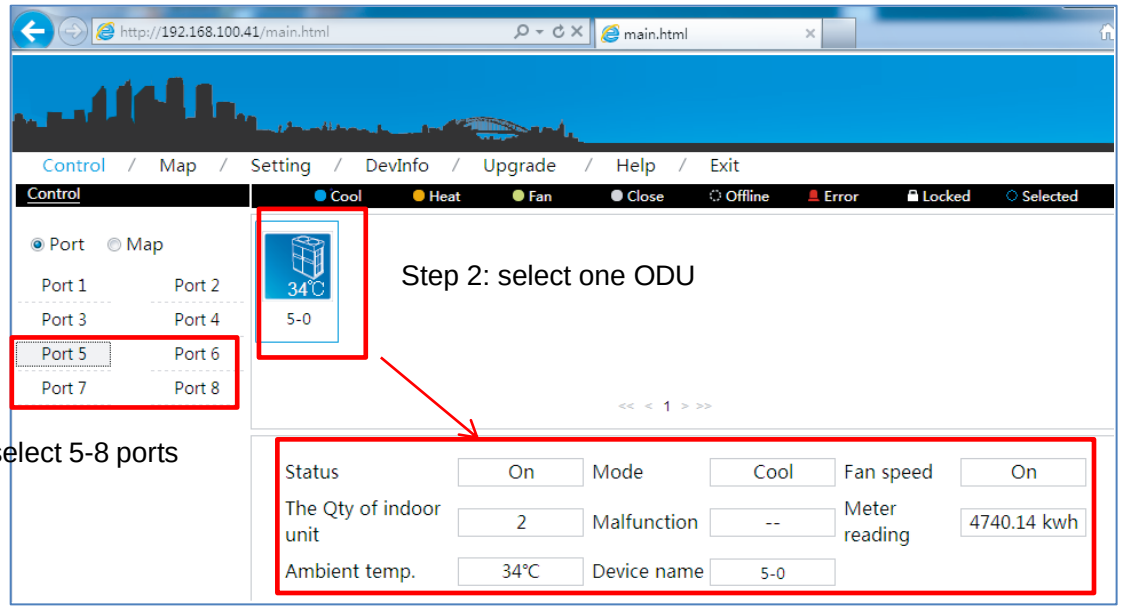
Click the "⊙"button, and then will enter the control page.



We can select the single or multi units to control and set the control parameters, including "ON/OFF setting", "running mode", "Swing setting", "Temp setting" and "Fan speed setting". And then click the "Send" button and after that the page will display the information to send success or failure. You can check the execution state of order through the change icons on the page.

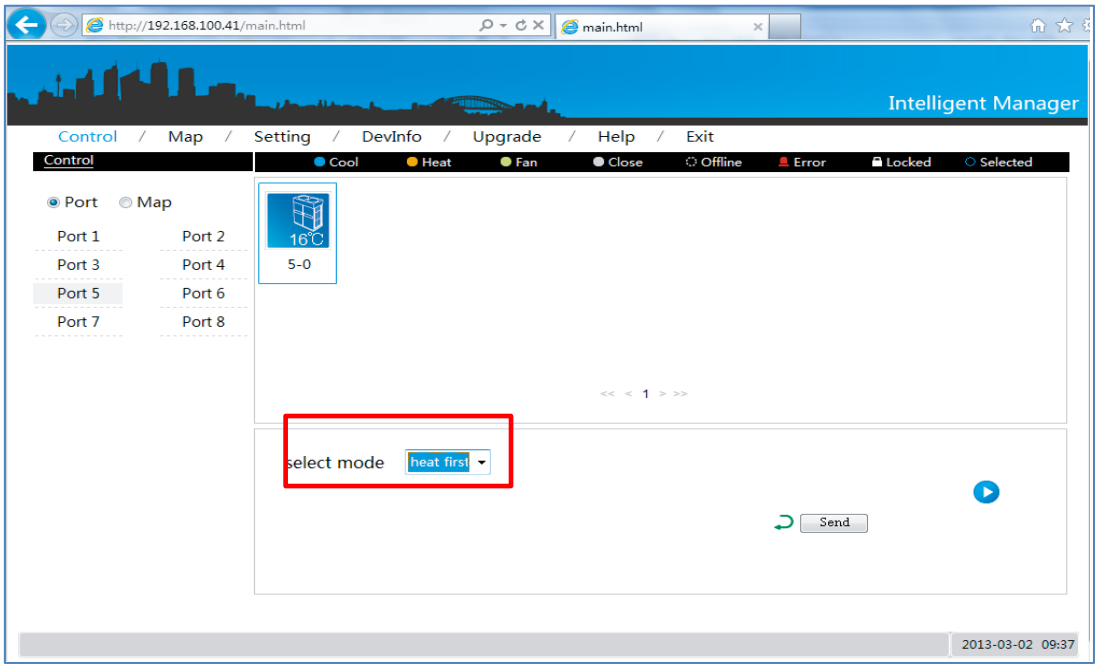
3) Check the running states of outdoor unit

Select the 5-8 ports, the page will display the corresponding outdoor unit, and then click one outdoor unit, it will display the operating states, include ON/OFF state, running mode, fan state, indoor unit quantity, error /protection states, ammeter readings etc.



4) Control the running states of outdoor unit

There are 5 priority running modes can be selected: heating priority, cooling priority, Voting priority (larger capacity requirement), heating mode only and cooling mode only. The function is only available for V4+W series

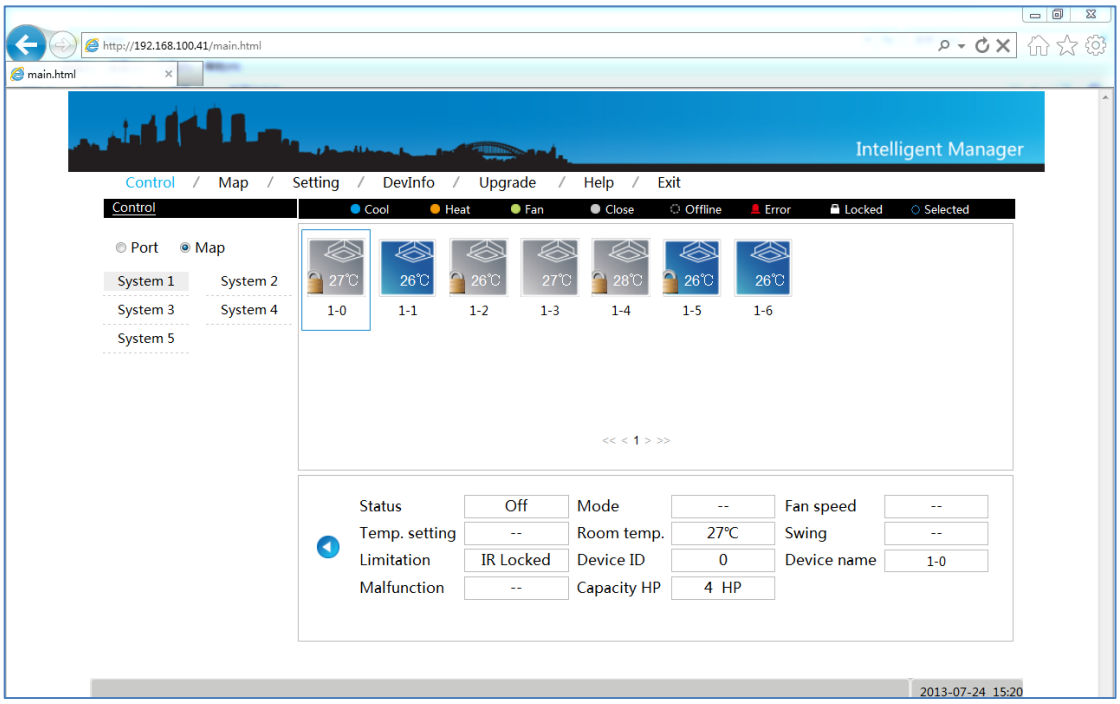


➢ System monitoring

Click "System map" under the device monitor function. The function can be in accordance with the refrigerant system to display all indoor units of each system and it can check and control the operating states of all indoor units.

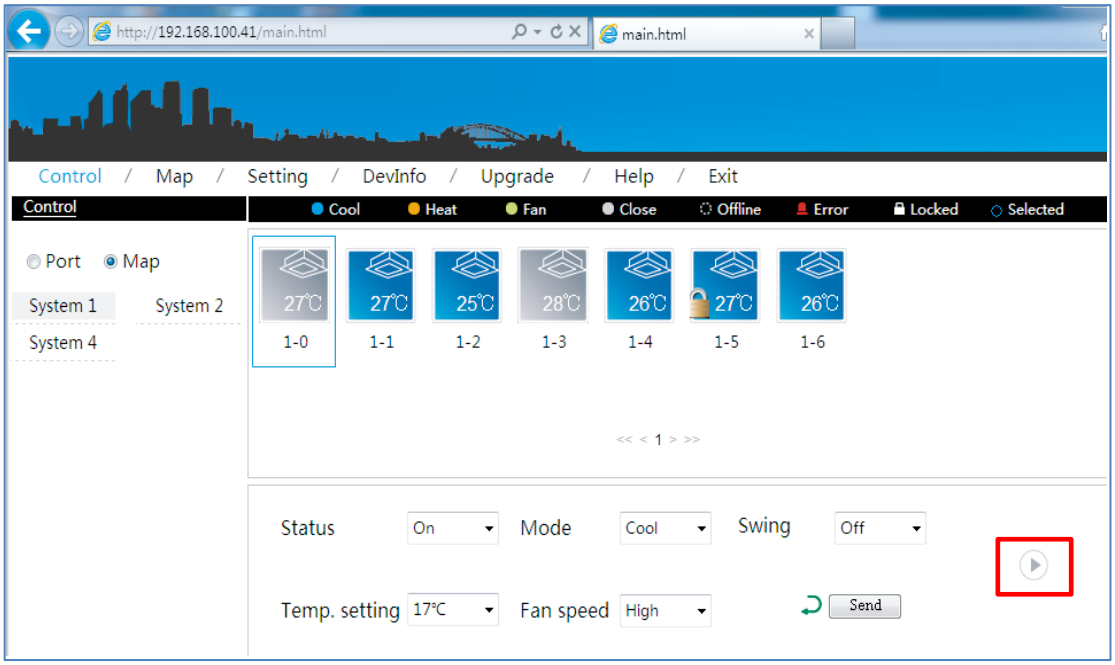
1）Check the detailed information of indoor units

Select one refrigerant system, the page will display all the indoor unit of the refrigerant system, and then click one indoor unit, it will display the operating states, including ON/OFF state, running mode, fan speed, indoor unit quantity, error/protection states, ammeter readings etc.



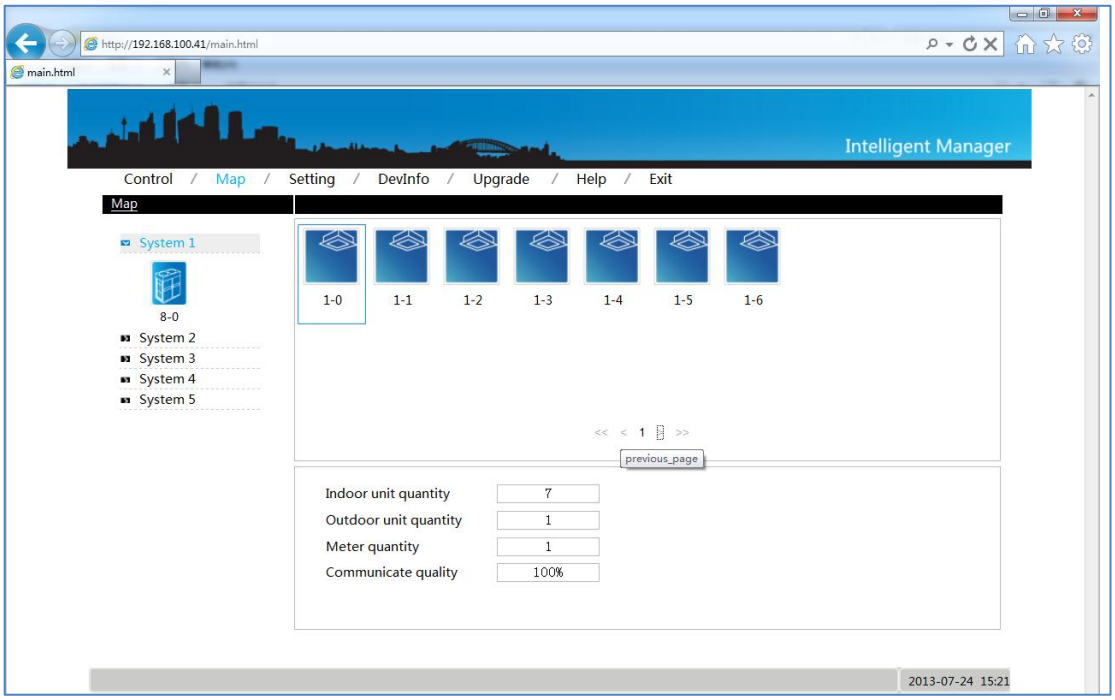
2) Control the running states of indoor unit

Click the "⊙"button, and then will enter the control page. Select the single or multi units can control and set the control parameters, including "ON/OFF setting", "running mode", "Swing setting", "Temp setting" and "Fan speed setting". And then click the "Send" button and after that the page will display the information to send success or failure. You can check the execution state of order through the change icons on the page.



5.3.4 System mapping

It can display entire situation of the refrigerant system and to reflect the mapping relationship between the indoor and outdoor units.



Select a single refrigerant system, the page display all indoor units icon which under this refrigerant system, and then the bottom of the page will display the indoor unit quantity, outdoor unit quantity and ammeter quantity. Click the single indoor unit to check the communication quality between this device and the M-INTERFACE gateway.

Characters instruction:

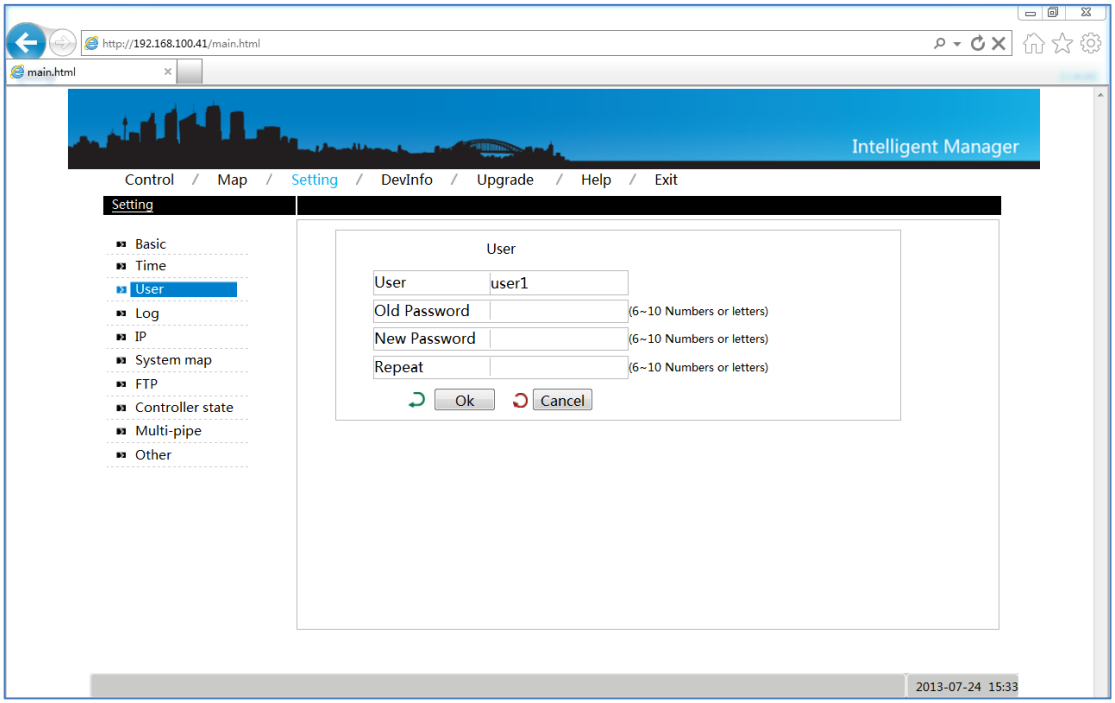
Indoor unit quantity	Calculate all the indoor unit quantity of refrigerant system
Outdoor unit quantity	Calculate all the outdoor unit quantity of refrigerant system
Outer ammeter quantity	Calculate all the ammeter quantity of refrigerant system
Communication quality	Communication quality between single device and M-INTERFACE gateway

5.3.5 Setting function

In order to ensure the M-INTERFACE gateway can operation safety, normal users can only operation the "user management" function and other function operational method refer to the administrator login.

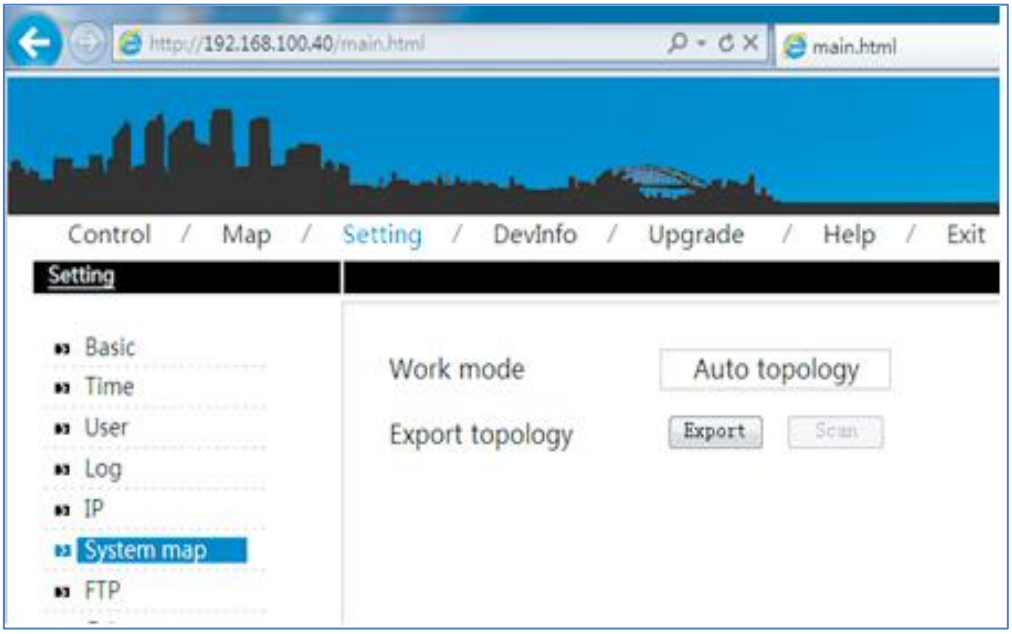
- **User management**

It can change the account password of this user' name and click "OK" button after changing.



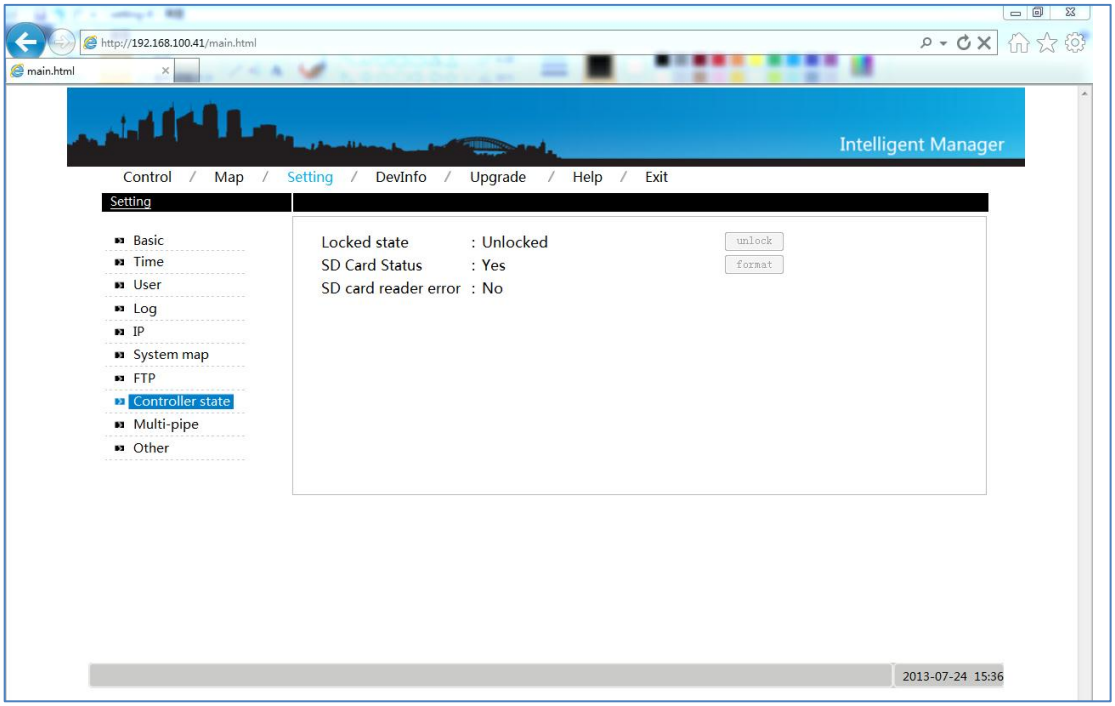
➢ **Refrigerant system mapping**

Output the topology document, the auto topology structure as follow display:



➢ **Gateway controller state**

It can display the states information of gateway controller, including lock or unlock the gateway controller, SD card state, SD card reader error.

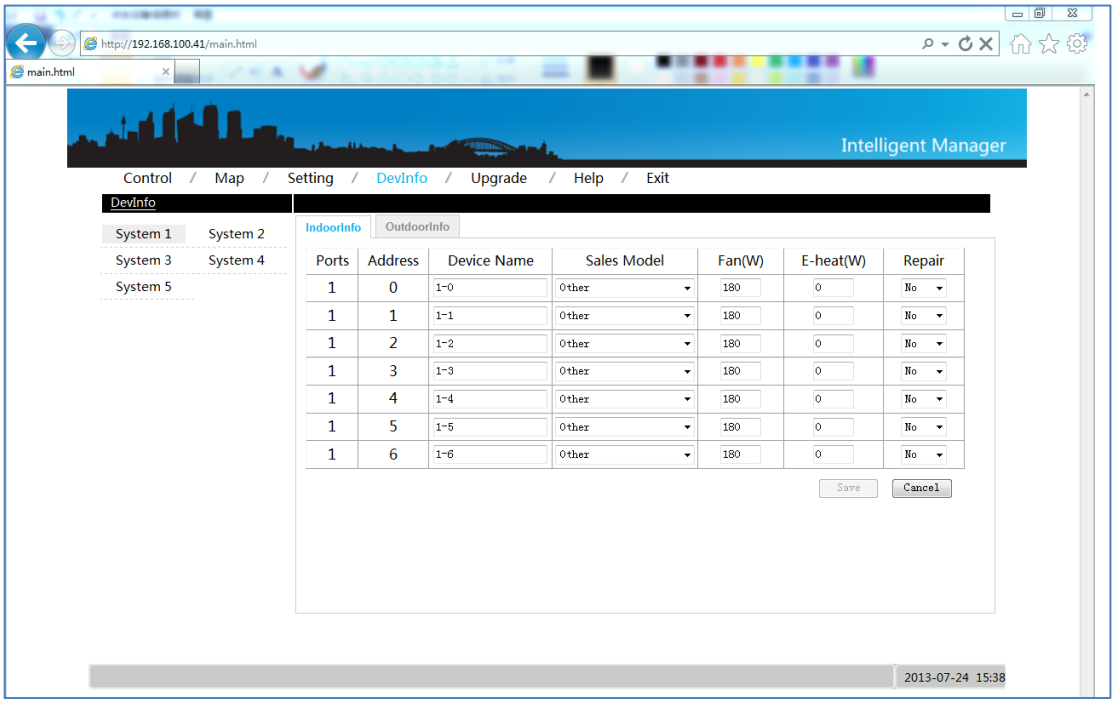


5.3.6 Device information

It can check the indoor/outdoor units' information in the refrigerant system.

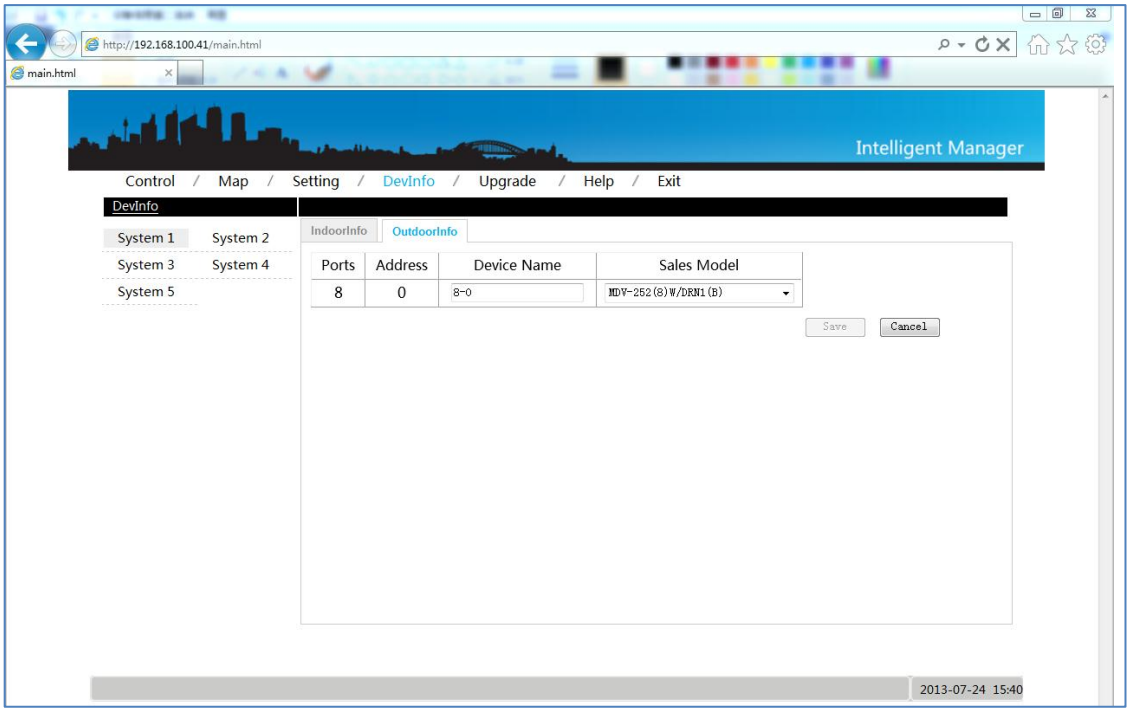
➢ Indoor units information

Select one refrigerant system and click the "Indoor Info", it will display the indoor units' information as following. The display contents including: serial port (the number of M-net ports), address, physics location, sales model, fan power, E-heater power and maintenance states etc. information.



➢ **Outdoor units' information**

Select one refrigerant system and click the "Outdoor Info", it will display the outdoor units' information as following. The display contents including: serial port, address, physics location, sales model.



5.3.5 Help function

The function offers error code table for analyze, to help user to check the malfunction and the error code may differ from the display contents in the display board, please refer to the corresponding technical manual for the product

5.3.6 Exit function

The function can operate back to the login page when click the "Exit" menu, and the system will back to the login page automatically.

5.3.7 Troubleshooting

1) Unable to enter the login page

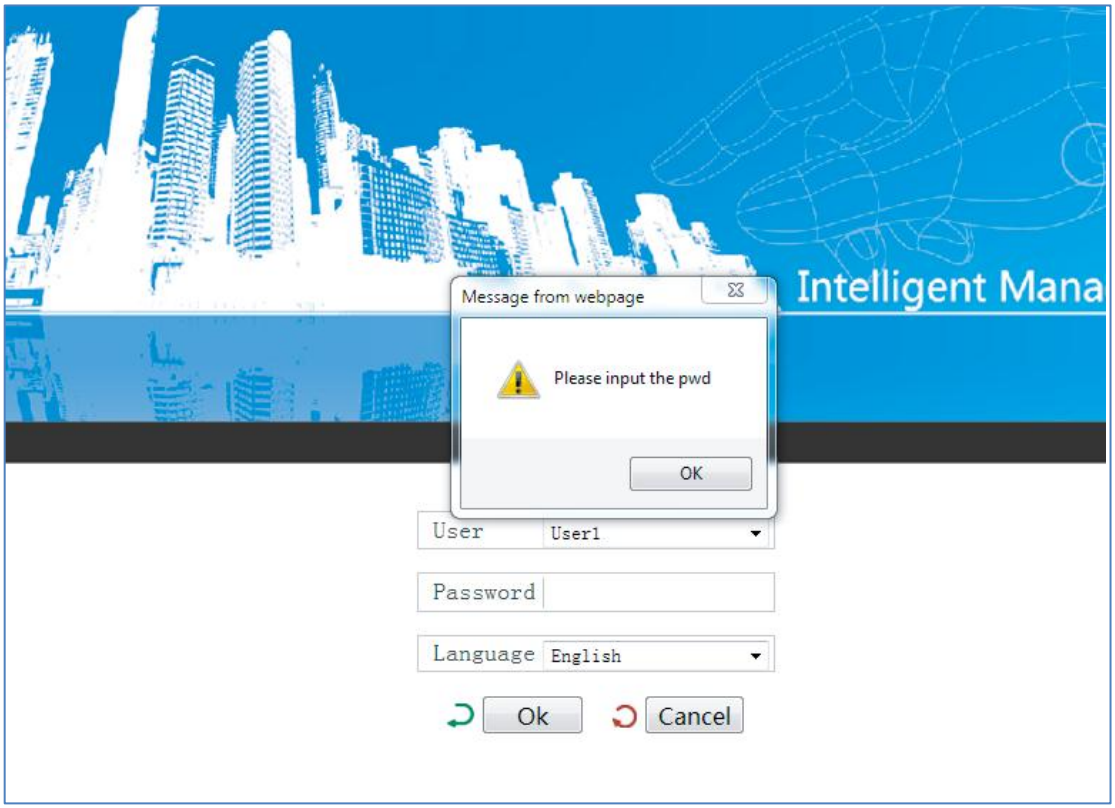
Input IP address of M-INTERFACE gateway in the browser will enter the login page. If it cannot display the login page, then may be error of network; if necessary, you can ask the IT administer to check the local network. Check the computer whether stay the same network area with the N-INTERFACE gateway.

2) Login failed

There may be two reasons for login gateway WEB page failure:

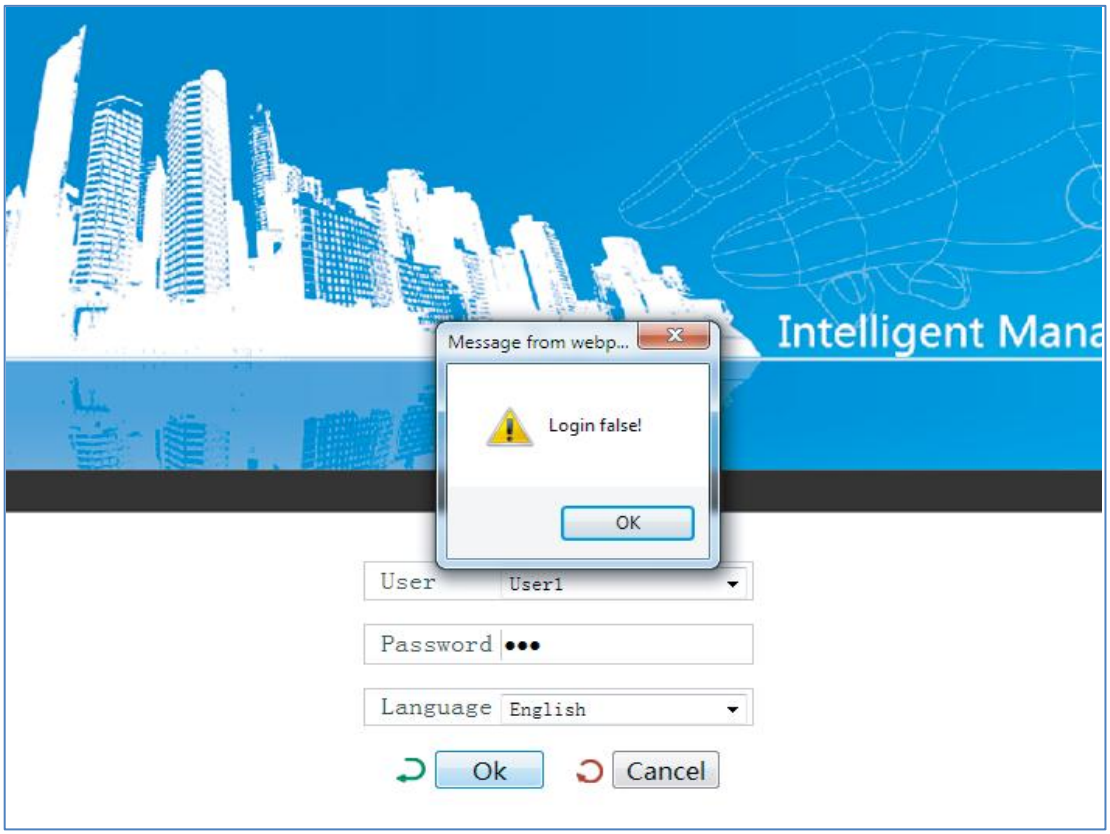
✓ No password

If the user does not input a password and then clicked "OK", it will display as following dialog box. Input the correct password and then login again.



2) Wrong password

When the password is wrong, it will display "Login failed". Input correct password again.



3) No device display

If login successful, but there is no data display on the home page, please check whether the wiring of M-net communication port is correct, whether the air conditioner system has been connected with M-INTERFAVE gateway correctly.

4) Control failed

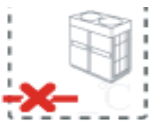
When changing the operating states of indoor units, it may be prompt message of "Setting failed", means the current operation failed. Please check whether the communication between the device and M-net terminal was correct, and also the Ethernet.

5) No respond in operate page

As for the M-Interface gateway control page, when operating the page and no respond or display "No connection" message, that means the network communication between computer and M-Interface gateway is broke off, and it needs to check the computer network card, IP setting, and the switch board, as well as the IP of the M-Interface gateway and LAN port network card indication lamp of M-Interface gateway whether have the right set up.

5.3.8 Icon specification

User friendly icon-based unit control, color indication and icon make it easy to recognize unit state.

Icon	specification	Icon	specification
	Indoor unit error (red)		Indoor unit is selected, ambient temp. 25℃(blue)
	Indoor unit is offline (white)		Outdoor unit operates cooling, ambient temp. 25℃(blue)
	Indoor unit runs cooling mode, ambient temp. 25℃(blue)		Outdoor unit is turn off, ambient temp. 25℃(grey)
	Indoor unit runs heating mode, ambient temp. 25℃(croci)		Outdoor unit runs heating mode, ambient temp. 25℃(croci)
	Indoor unit runs fan only, ambient temp. 25℃(green)		Outdoor unit error (red)
	Indoor unit is powered off, ambient temp. 25℃(grey)		Outdoor unit is selected, ambient temp. 25℃(blue)
	Indoor unit is locked, ambient temp. 25℃(grey)		Indoor unit is offline (white)

6. Software

6.1 Software installation

6.1.1 Preparation

Before installation the 4th generation of VRF network control software, it needs to meet the following requirements:

- **System requirements**

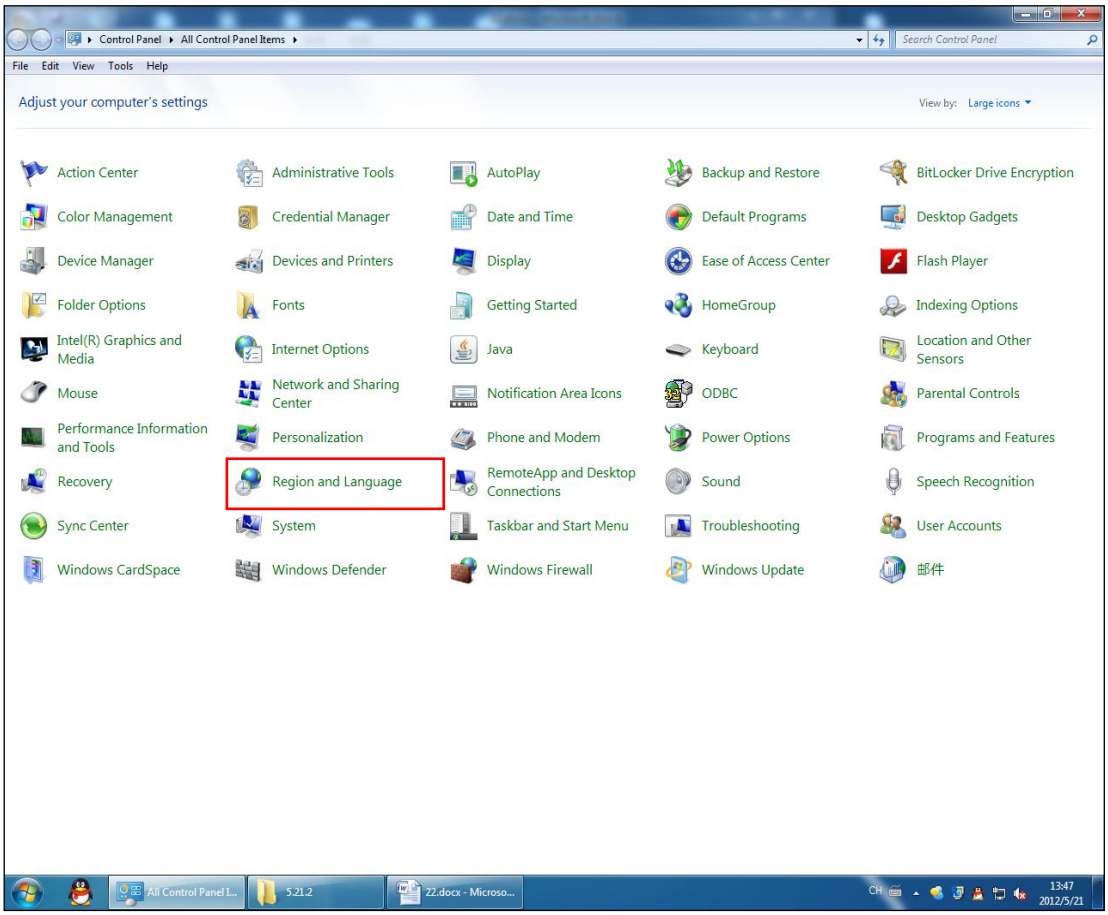
	Specification	Suggestions	Remark
PC	CPU: i3 or more Internal storage: 2G or above Hard disk: 120G or more Keyboard/Mouse with middle roller Network: 108ASE-T Display: Screen resolution should over 1024*768 and screen size should over 17 inch	Use the IBM or DELL products	Must be use the desktop PC, and make sure computer can work normally before installing the software. laptop is not available.
System	Microsoft Windows XP ; Professional Service Pack 3; Windows 7 Home/ Ultimate / Official version 32-bit system Windows 8 official version 32/64-bit. Windows 8 Ultimate /win 8 pro 64 bit		
Document form	NTFS document form		

1. Make sure that the fire wall of server and IMM software PC has been closed.

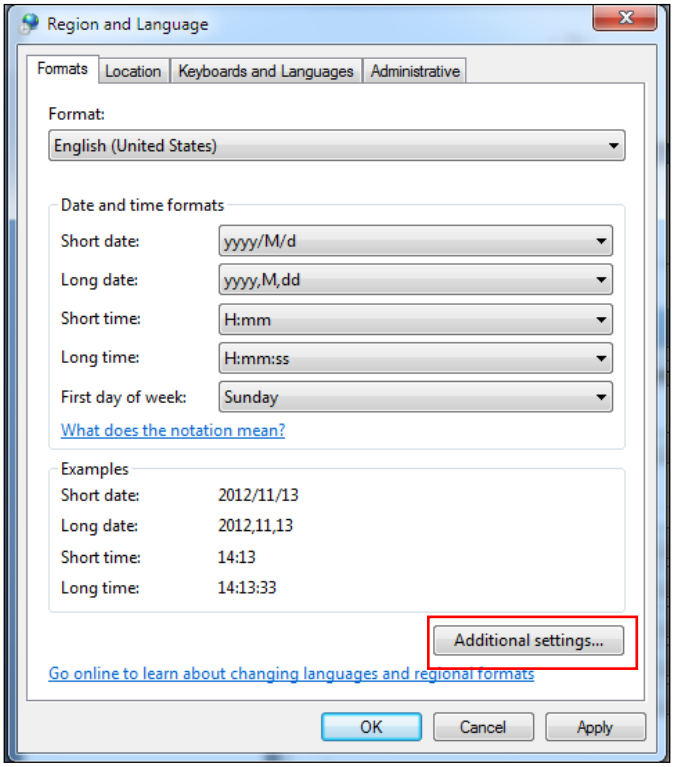
2. In non-English system area, change PC's system region and language form setting when the IMM software and database installation is complete. (Take windows 7 English system for example):

➢ **Languages setting (take Win 7 for example)**

Open the control panel, the display as following:

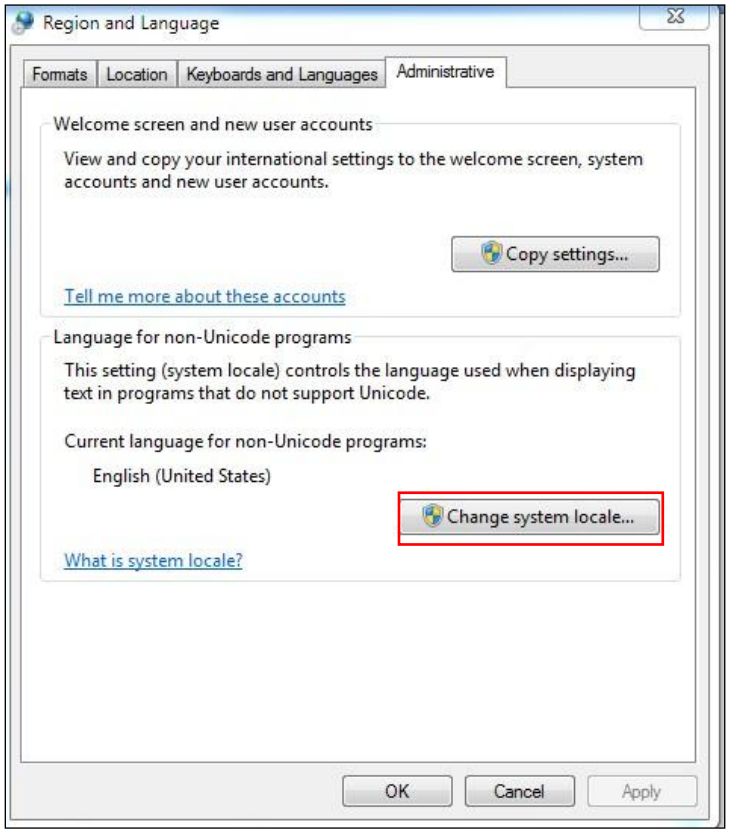


Double click "Region and Language", and it will display the dialog as following:

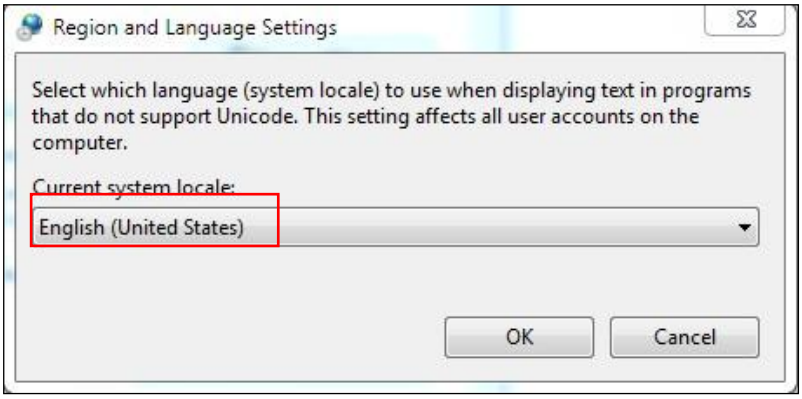


Setting the time form as the above frame, after setting and then click "OK" button to save.

Select "Administrative" and then display as following:



Click "Change system locale…", then it will display the following figure:



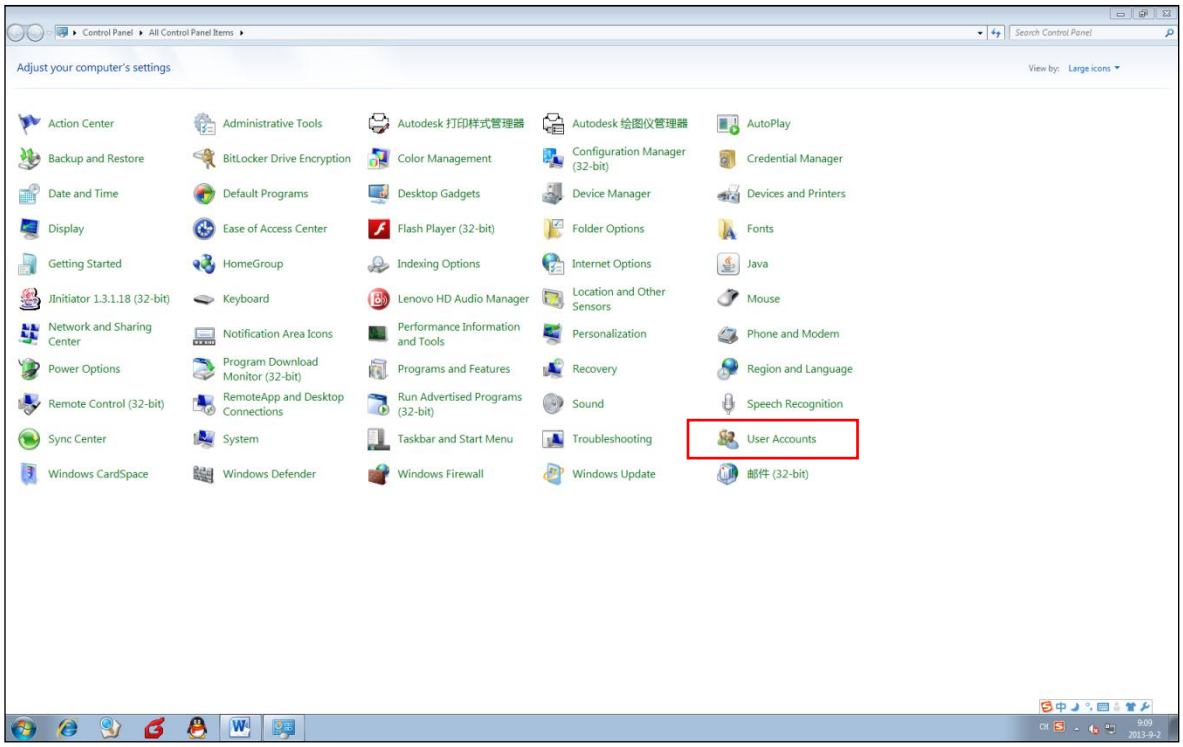
Select "English (United States)", click "OK". And re-start the computer after modification.

Note: during the IMM software operating process, do not change the region and language setting; otherwise it will lead the electricity charge distribution error.

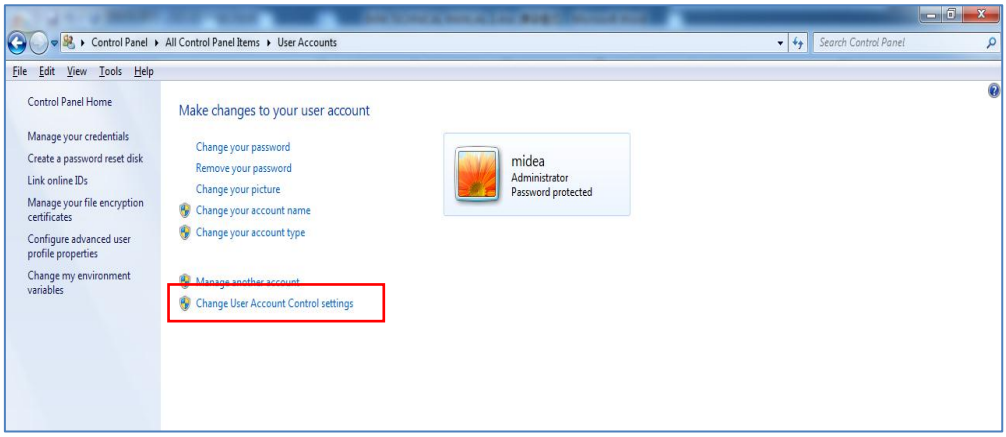
- **Accounts setting**

If server and IMM software install on the windows7 system, then it need to set as following:

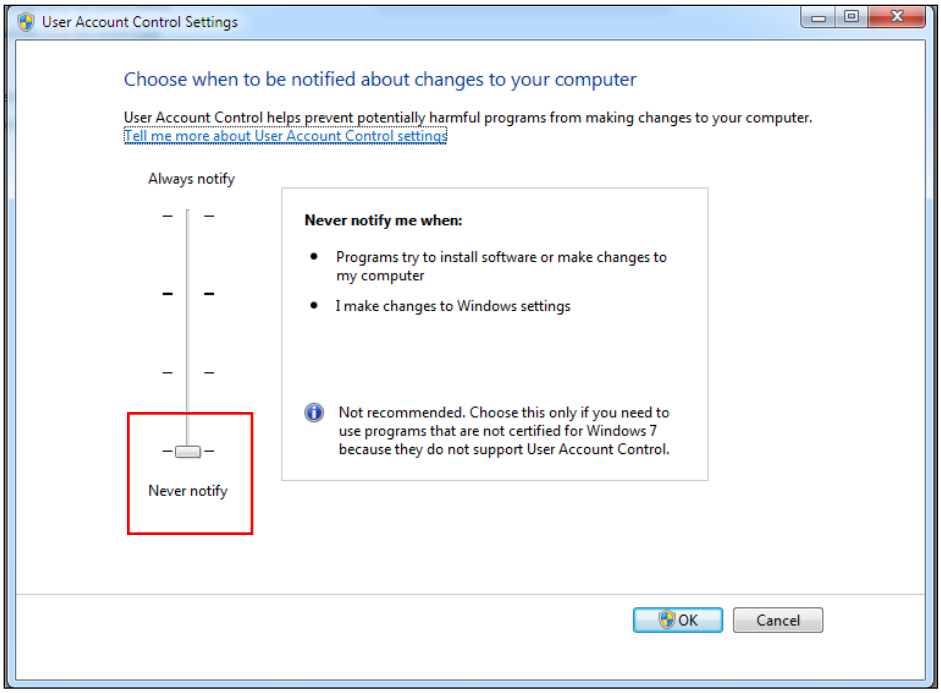
Open the control panel will enter the following figure:



Select the "User account", and enter the following figure:



Click the "Change user account control setting" on the above interface and it will enter the following figure:

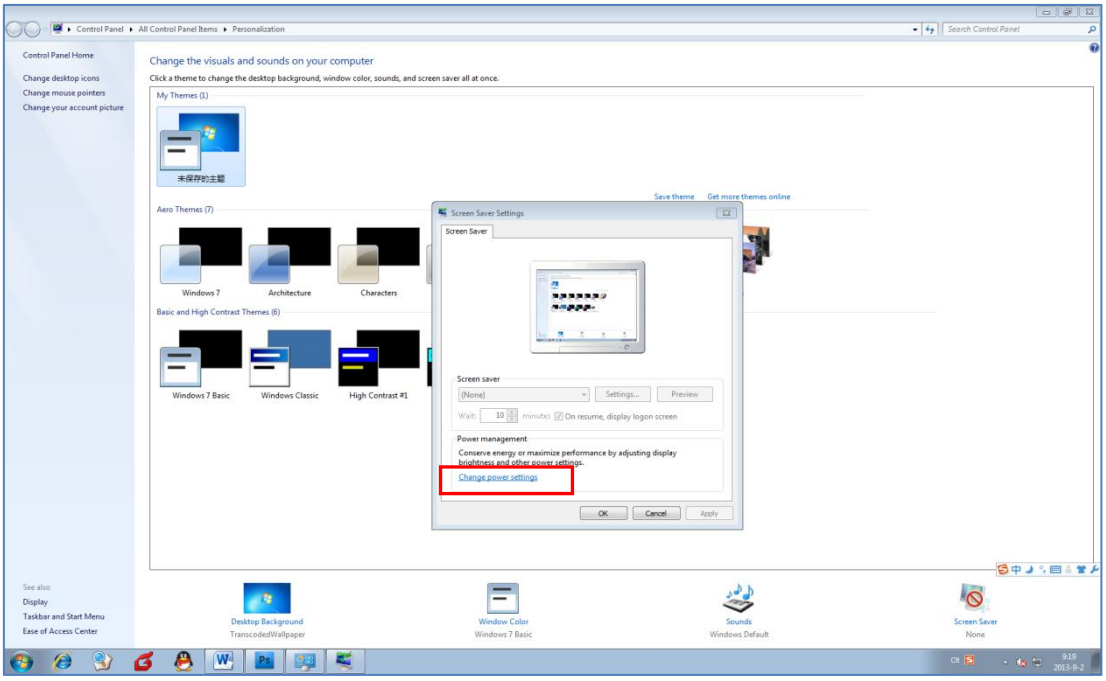


Setting to the "Never notify" as the above figure and click "OK" button, and then it needs to restart the computer after modification.

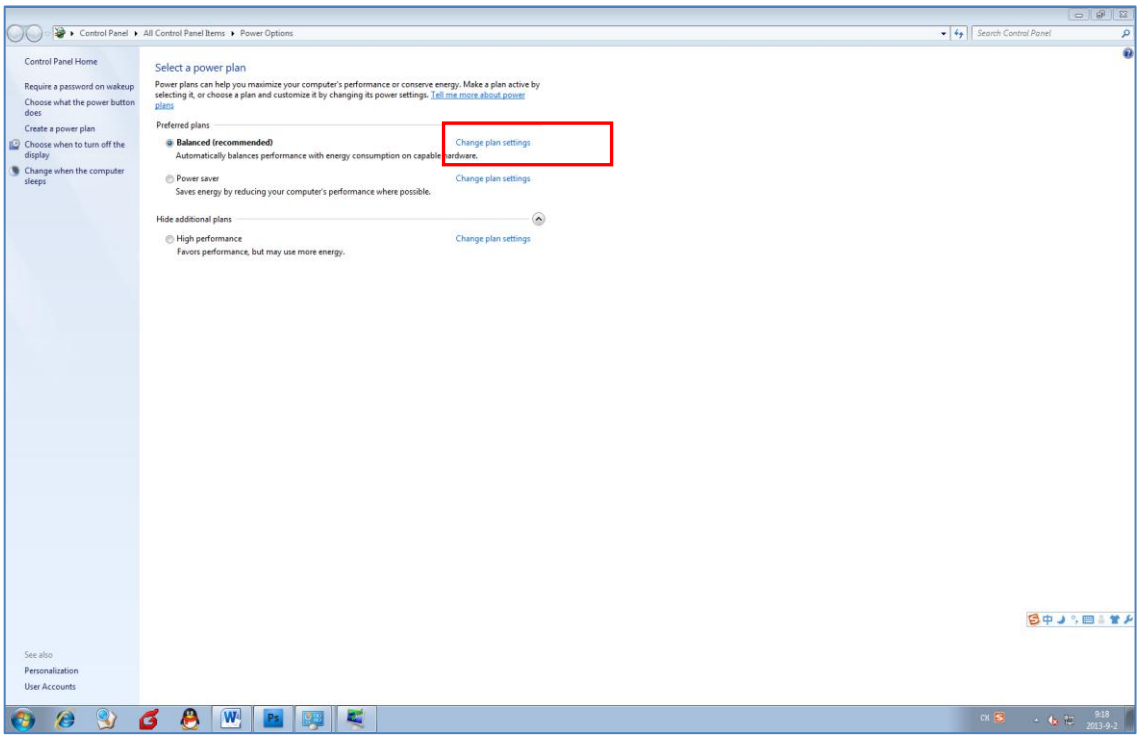
When install the server and IMM software, you need to set as following:

Take Windows 7 system for example:

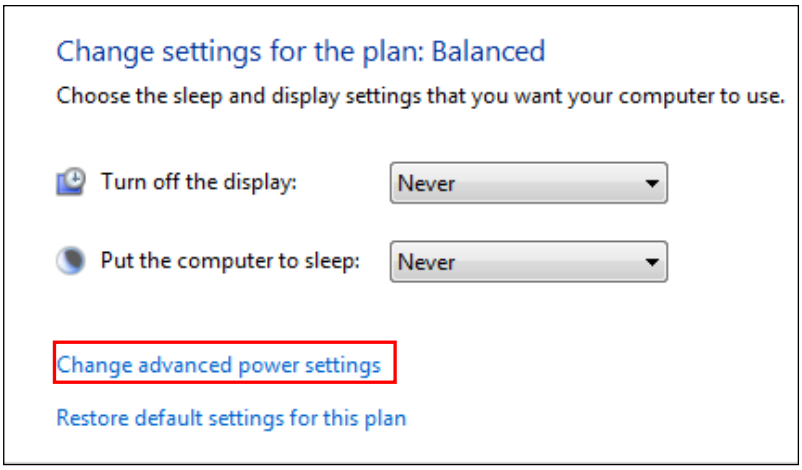
Open the "Power option" in the control panel and it will enter the following interface:



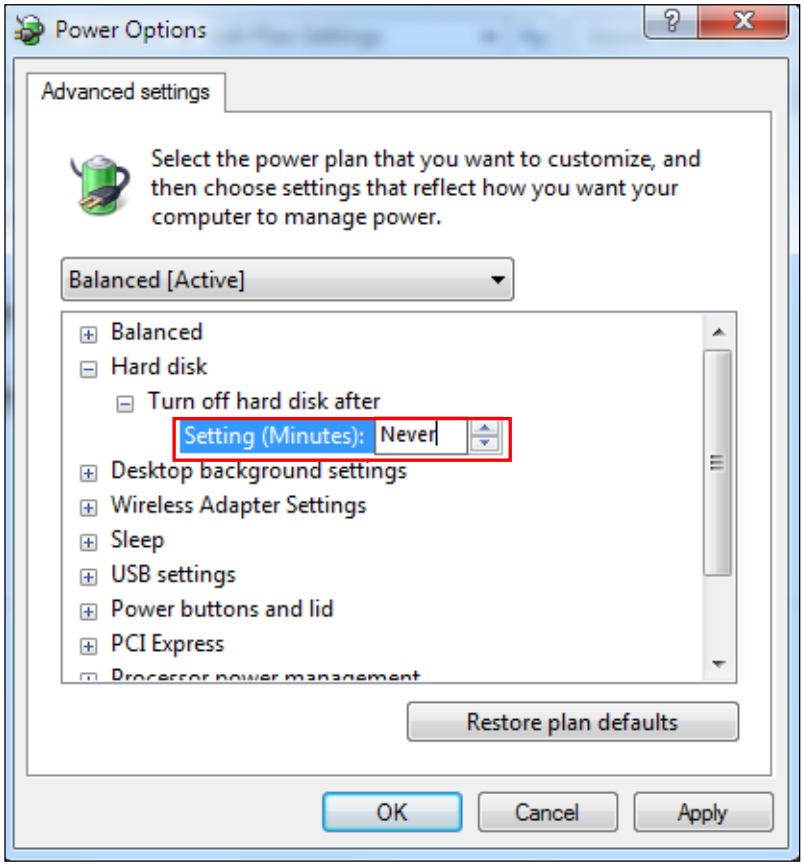
Click "Change power settings" as the above figure, and it will enter the following interface:



Click "Change plan settings" as the above interface, and it will enter the following figure:



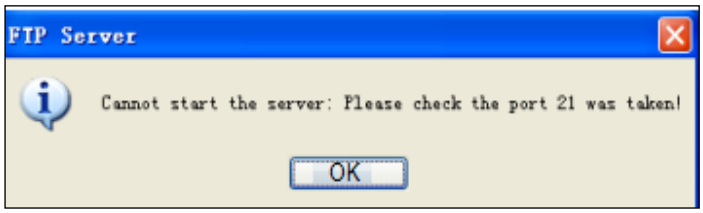
Setting the "Turn off the display" and "Put the computer to sleep" to "Never" state, and click the "Change advanced power settings". It will display as following:



Setting the "Turn off hard disk after" to "Never" state, after setting and clicks "OK" button.

- **Port setting**

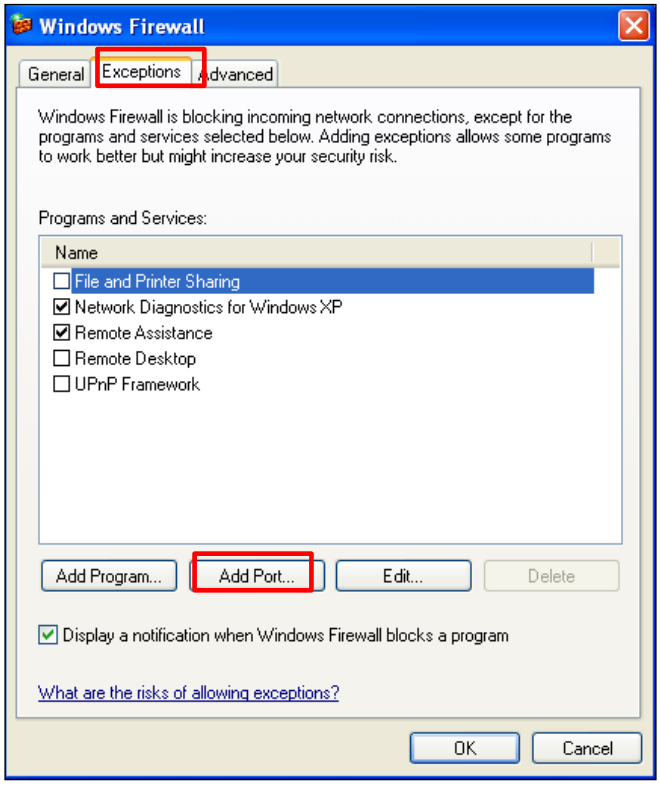
It needs to ensure that the 21 port of the server has been open. If the server PC doesn't open the port 21, then it will display prompt information about opening port 21 when starts Energy FTP software, displays as following:



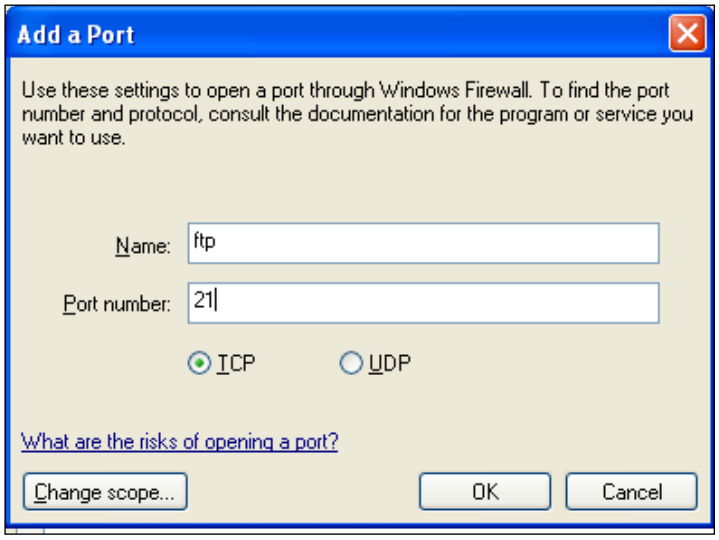
Operation method:

Take windows XP system for example:

"Start"→ "Control panel"→ "Windows fire wall", select "Exception" and it will enter the following interface:



Select "Add port" and it will enter the following interface:



Please input the name "ftp" and port number "21" as the above figure, and then click the "OK" button.

Notes: do not change the region and language setting of the system before install the software on other language system.

6.1.2 System components installation

Database software, server software and dogsoft driver must be installed on the same computer. The IMM software can be installed on the other computer. If the server is Microsoft Windows XP system, you must install the program first:

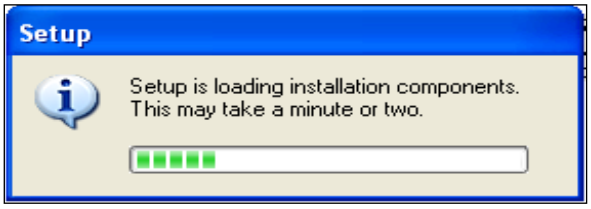
NET Framework 3.5 SP1, Microsoft Windows Installer 4.5, Windows PowerShell 1.0 and dotNetFx40_Full_x86_x64.exe.

If IMM software is Microsoft Windows XP system, then it needs to previous install the program NET Framework 3.5 SP1 and dotNetFx40_Full_x86_x64.exe assembly. IMM software and server which with Microsoft Windows 7 systems do not need to install the system components. Take Microsoft Windows XP system for example:

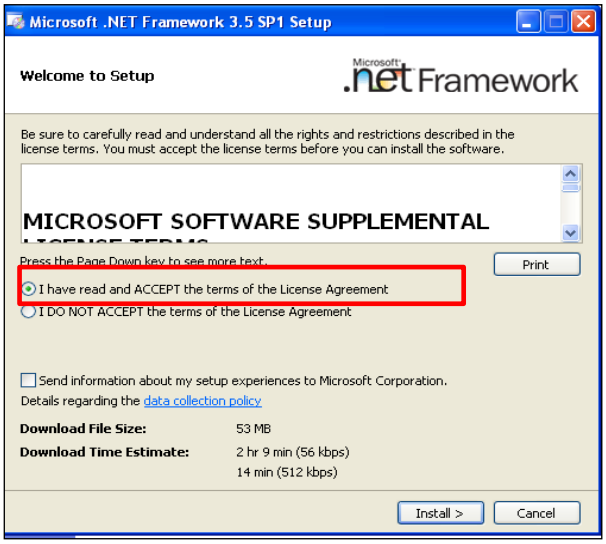
- **NET Framework 3.5 SP1 installation**

You need to find out the program called dotNetFx35setup.exe, under the disk menu of Windows XP components\NET Framework 3.5\ dotnetfx35\ wcu\ dotNetFramework, Installation steps are as following.

1. Double click the program called dotNetFx35setup.exe, it will display as following:

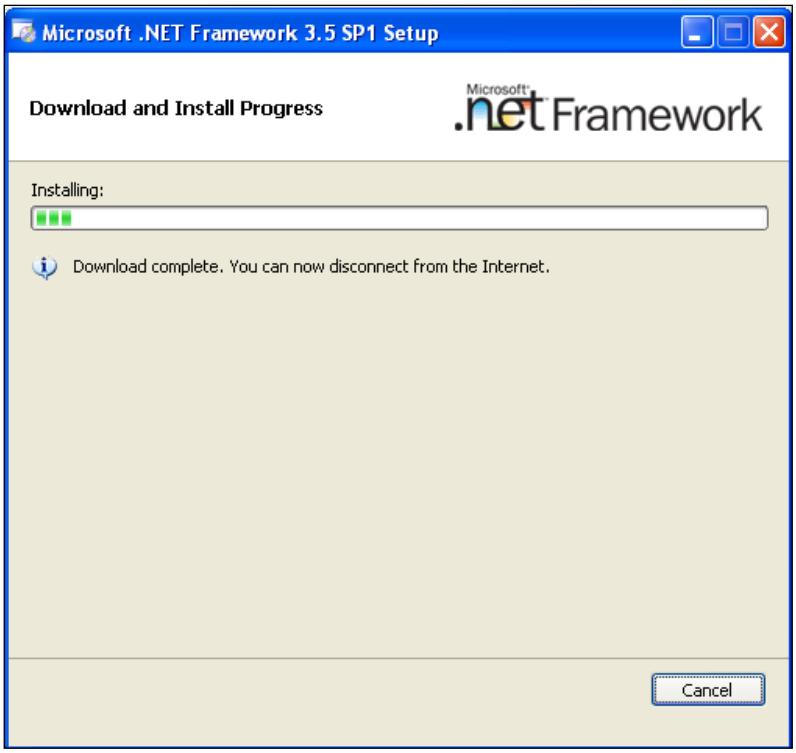


2. After installing components, it will enter the following interface:

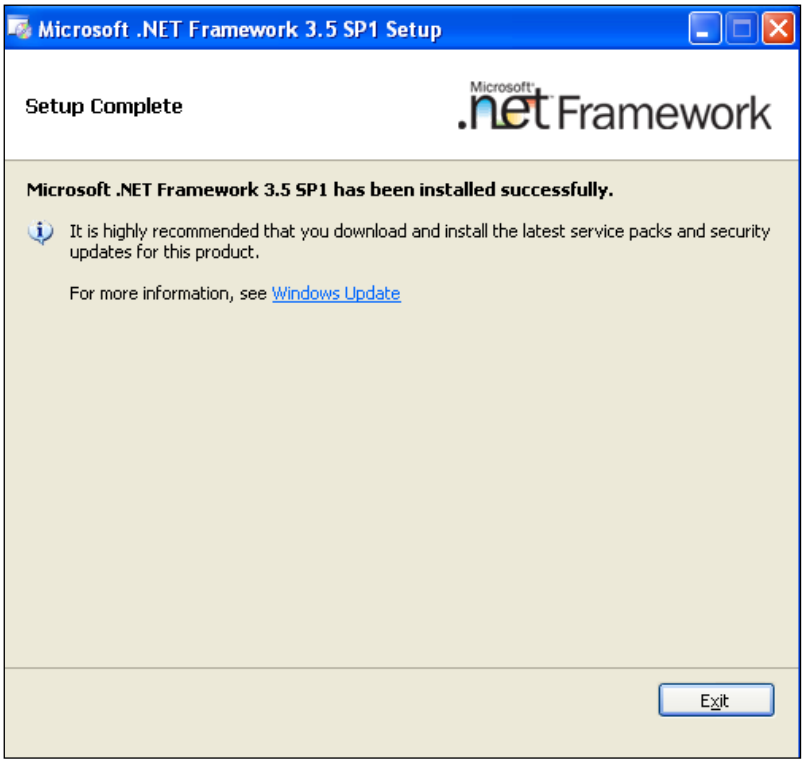


Then select "I have read and ACCEPT the terms of the License Agreement", and click "Install" button.

3. "Download and installation process" as following:

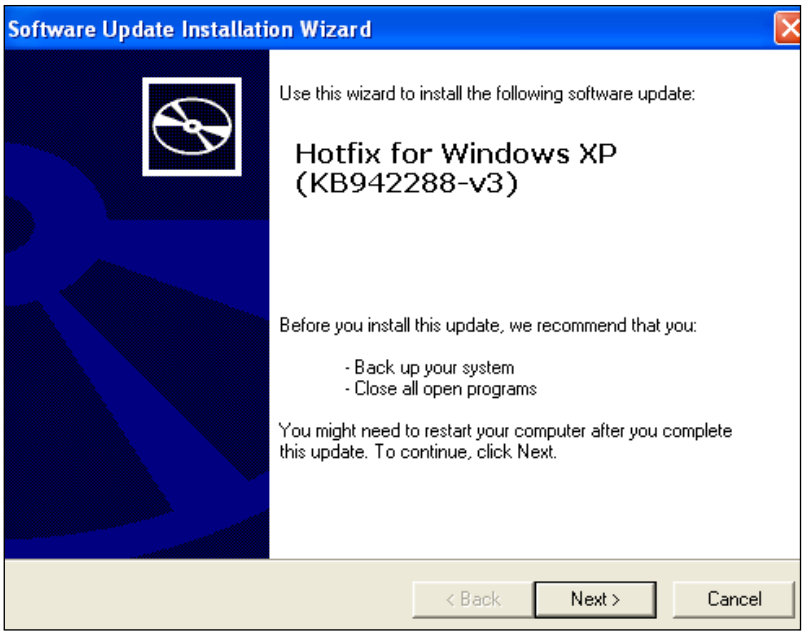


4. After installation and click exit.

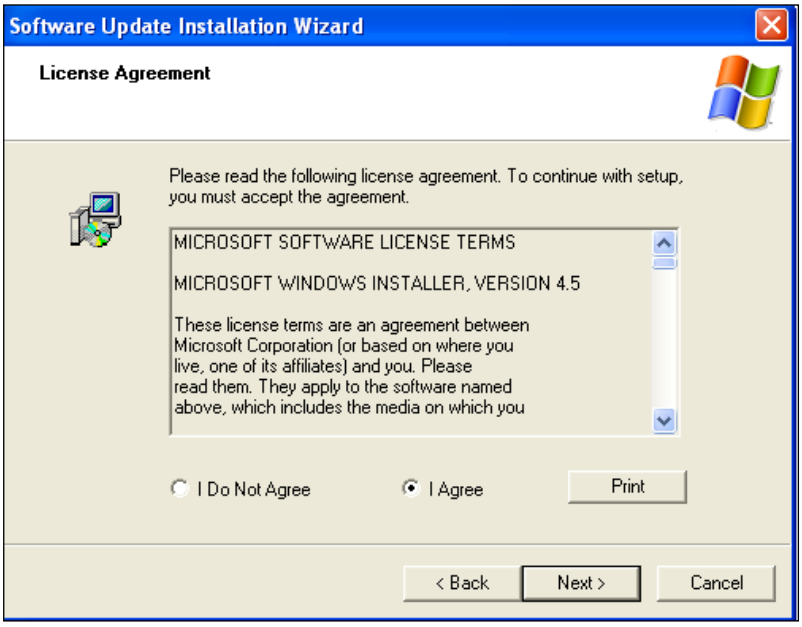


➢ **Microsoft Windows Installer 4.5 installation**

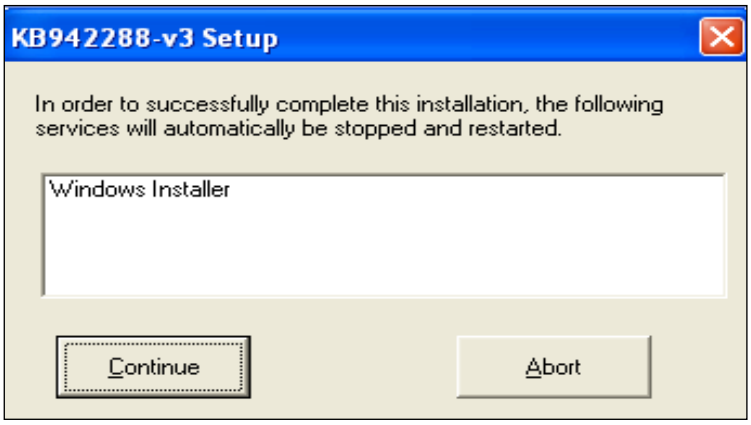
1. Under the Windows XP components\Windows Installer 4.5 menu, you need to find out the program called WindowsXP-KB942288-v3-x86.exe and double-click it.



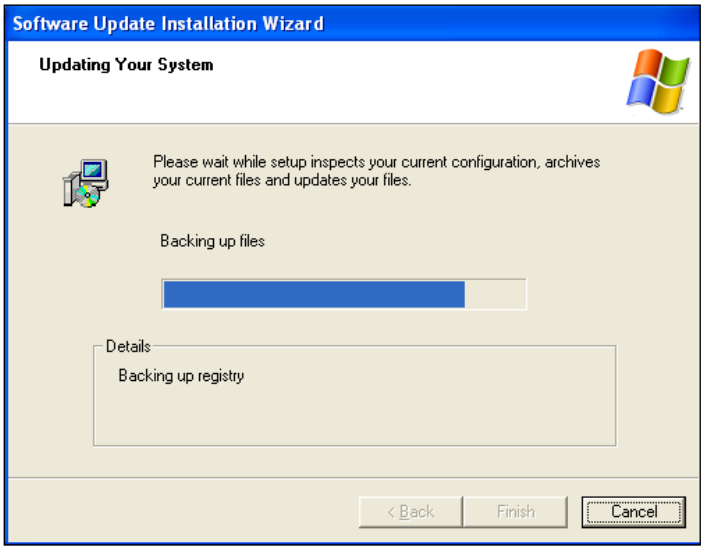
2. Click the "Next" button and runs as the following figure.



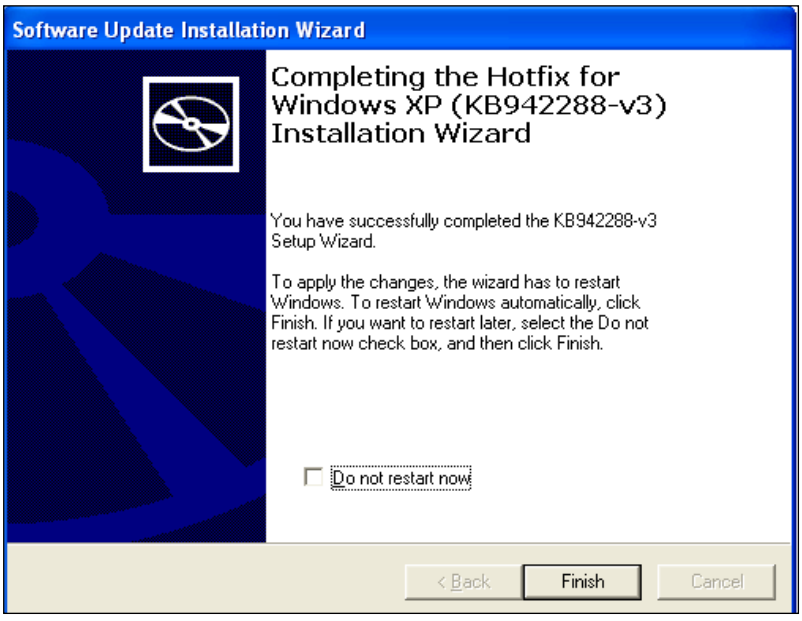
3. Select "I Agree" and click "Next" button then will display as following:



4. Click "Continue" and will display as following:



5. After installation, then click "Finish" to re-start the computer.

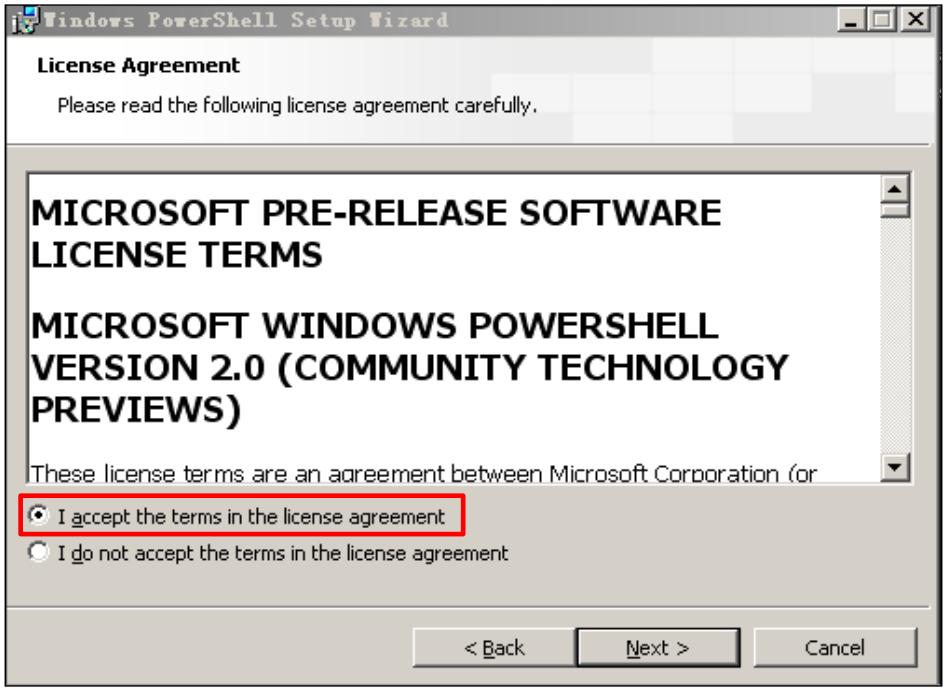


➢ **Windows PowerShell 1.0 installation**

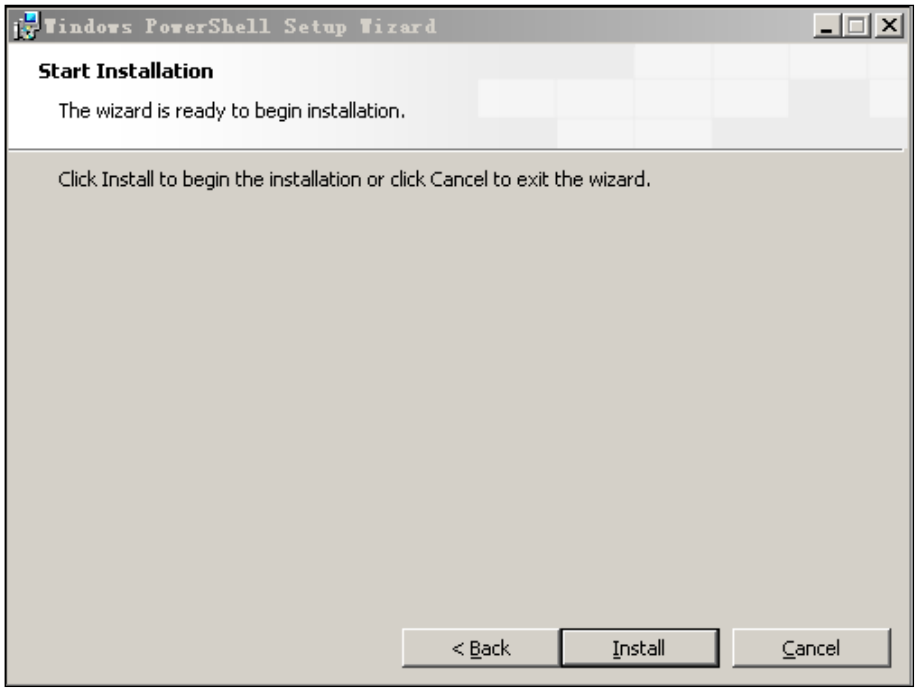
Under Windows XP components\Windows PowerShell 1.0 menu, you need to find out the program called PowerShell_Setup_x86.msi.

1. Double-click the program called "PowerShell_Setup_x86.msi", and it will display the following dialog:

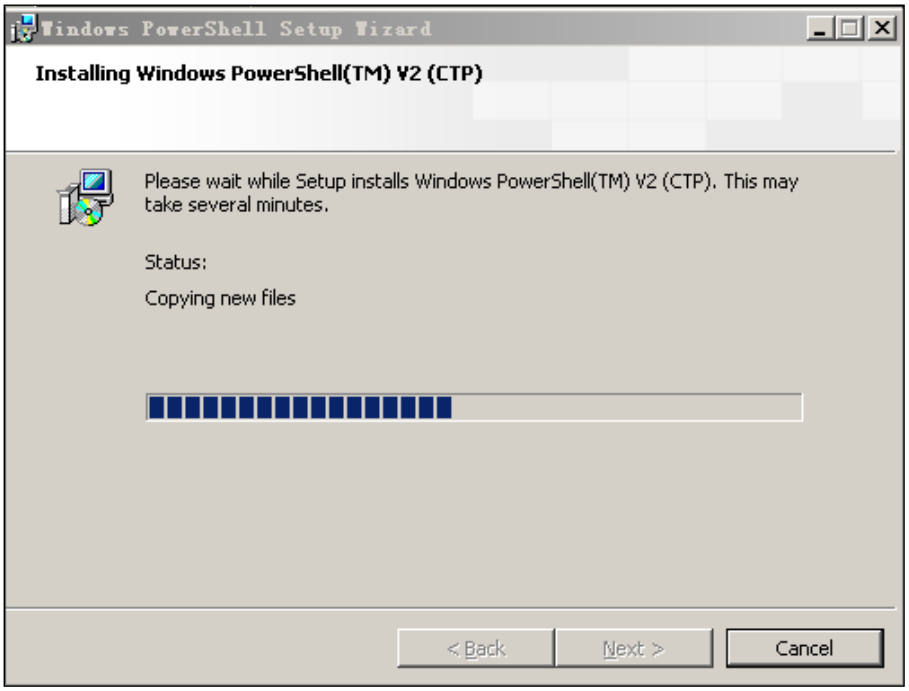
2. Click the "Next" button on the above dialog, and it will display the following:

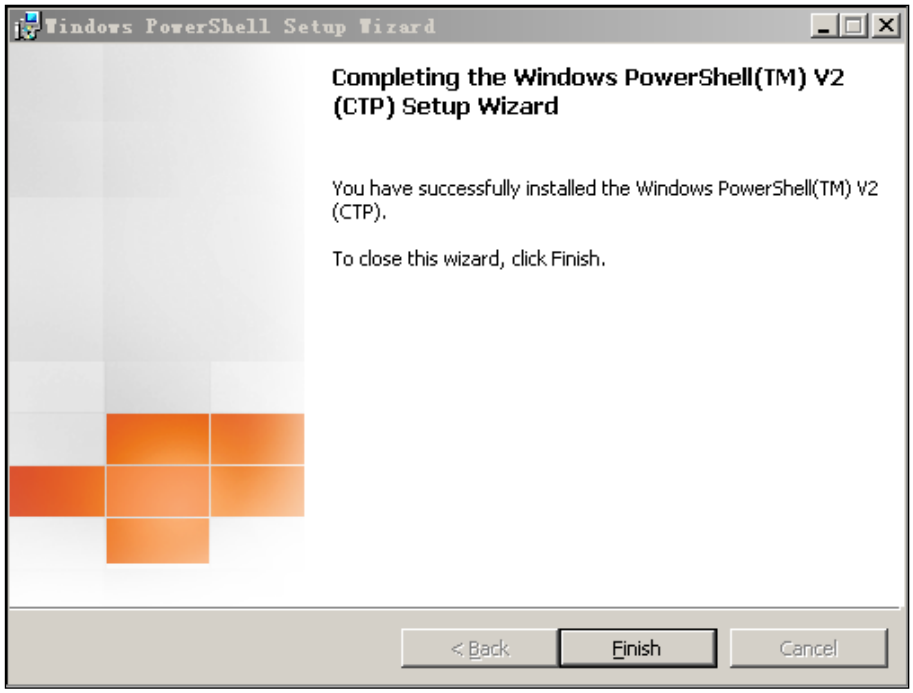


3. Select "I accept the ……. "on the above dialog, and click the "Next" button.



4. Click "Install" button on the above dialog, it will be installation automatically.



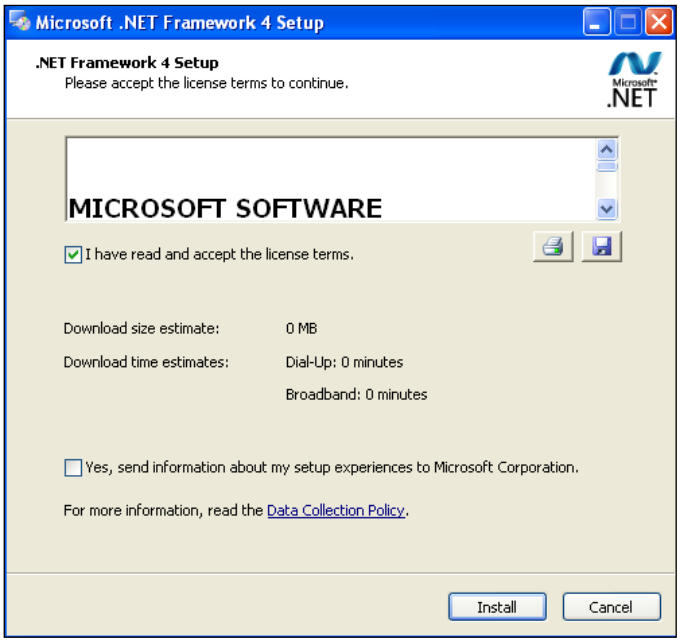


5. After installation and click "Finish" button will be OK.

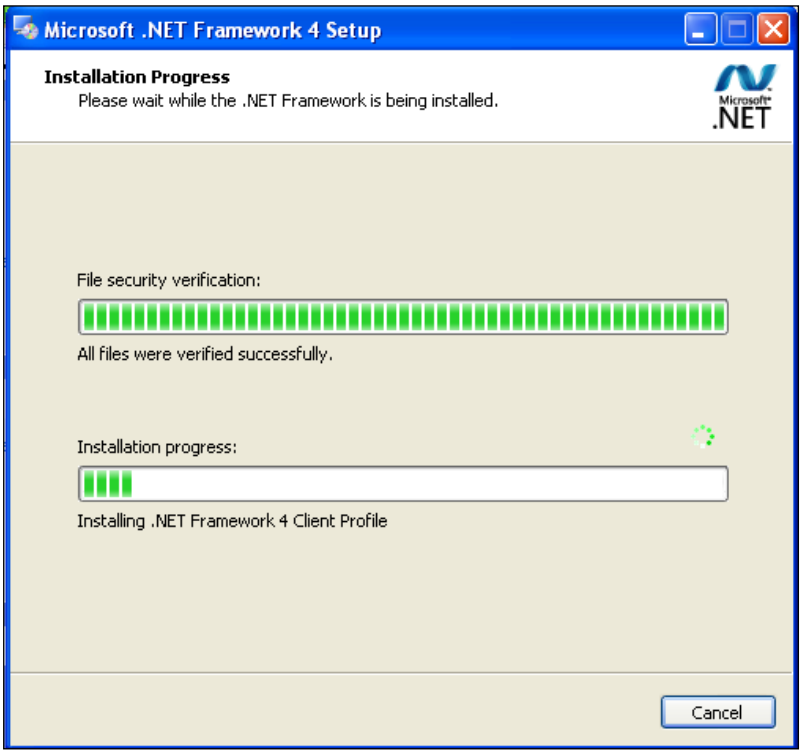
- **DotNetFx40_Full_x86_x64.exe installation**

Under the Windows XP components\NET Framework 4.0 menu, you need to find out the program called dotNetFx40_Full_x86_x64.exe, installation steps are as follows.

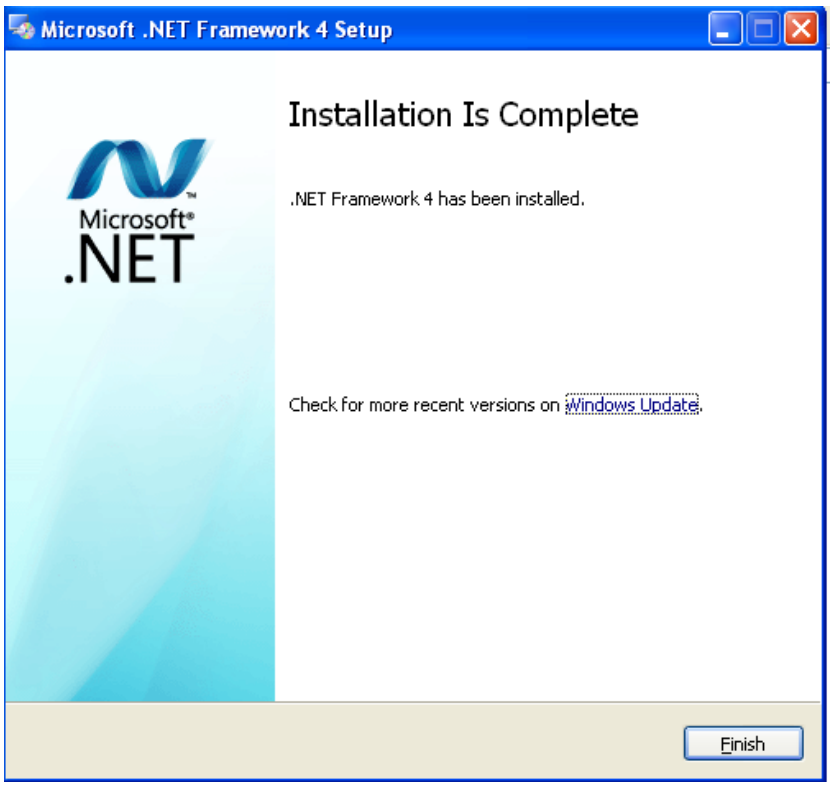
1. Double-click the program called dotNetFx40_Full_x86_x64.exe, it will display as following dialog.



2. Select "I have read and …..", and click "Install (I)" button, it will be installation automatically.



3. After installation, it will display as the following frame.

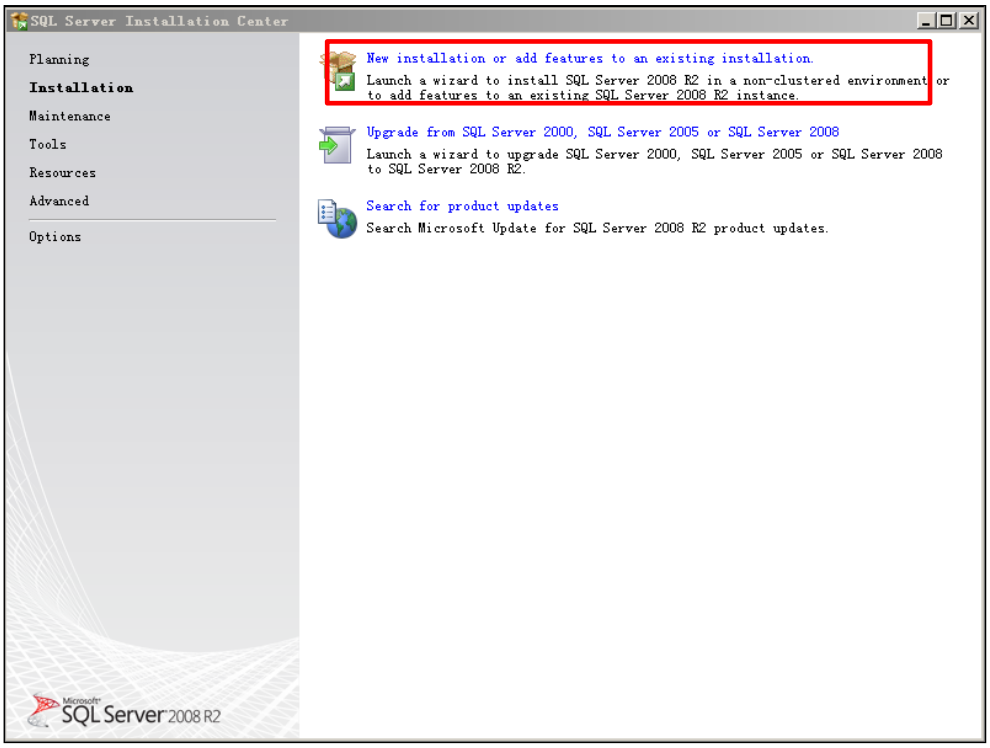


4. After installation and click "Finish" button will be OK.

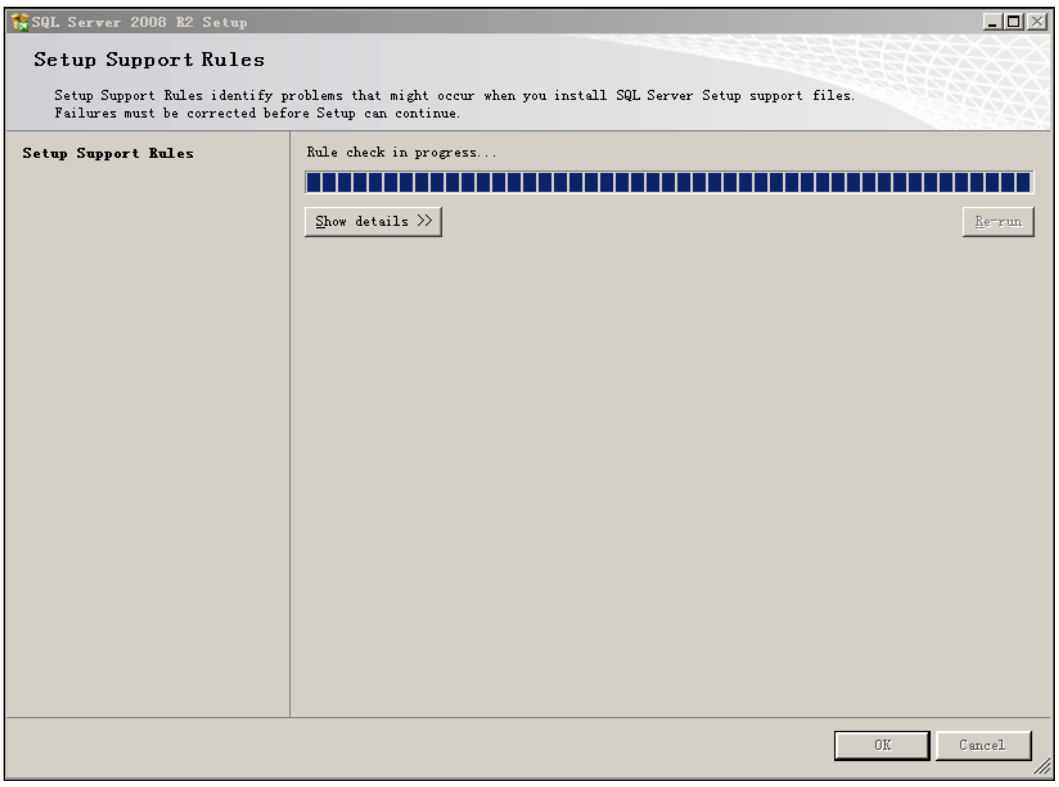
6.1.3 Database installation

Under the DataBase menu to find out the program called "SQLEXPRWT_x86_ENU.exe", installation steps are as follows.

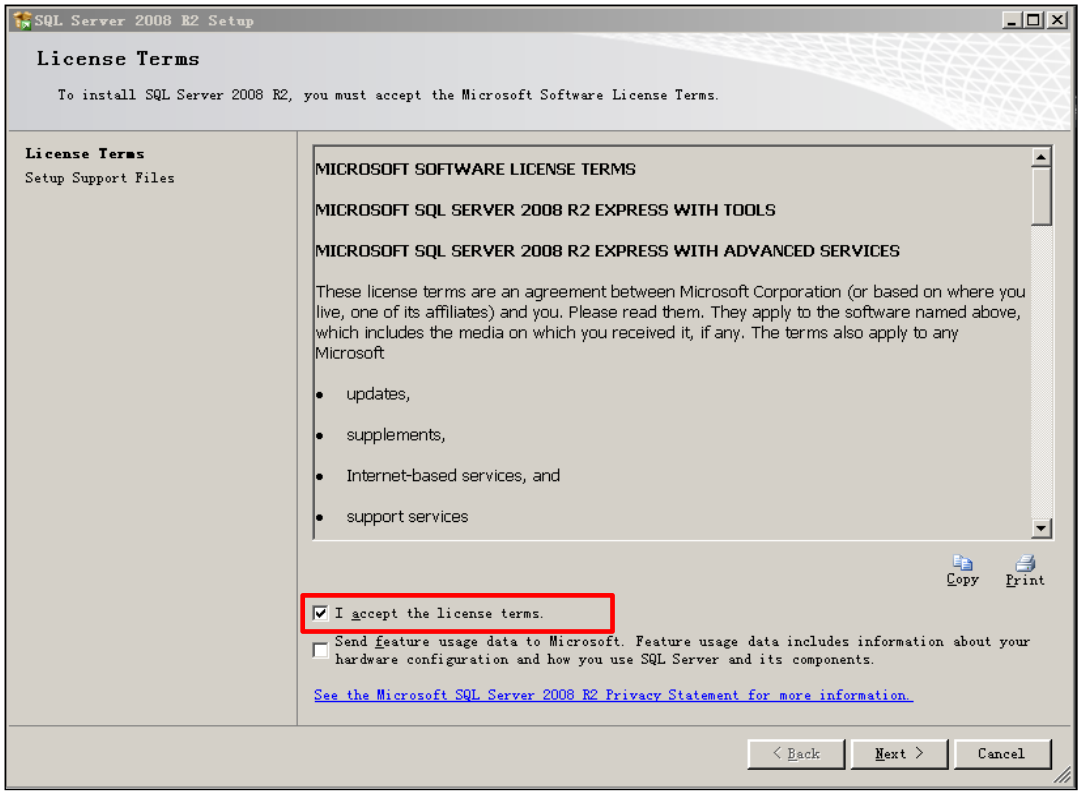
1. Double click the program called "SQLEXPRWT_x86_ENU.exe", it will display as following dialog.



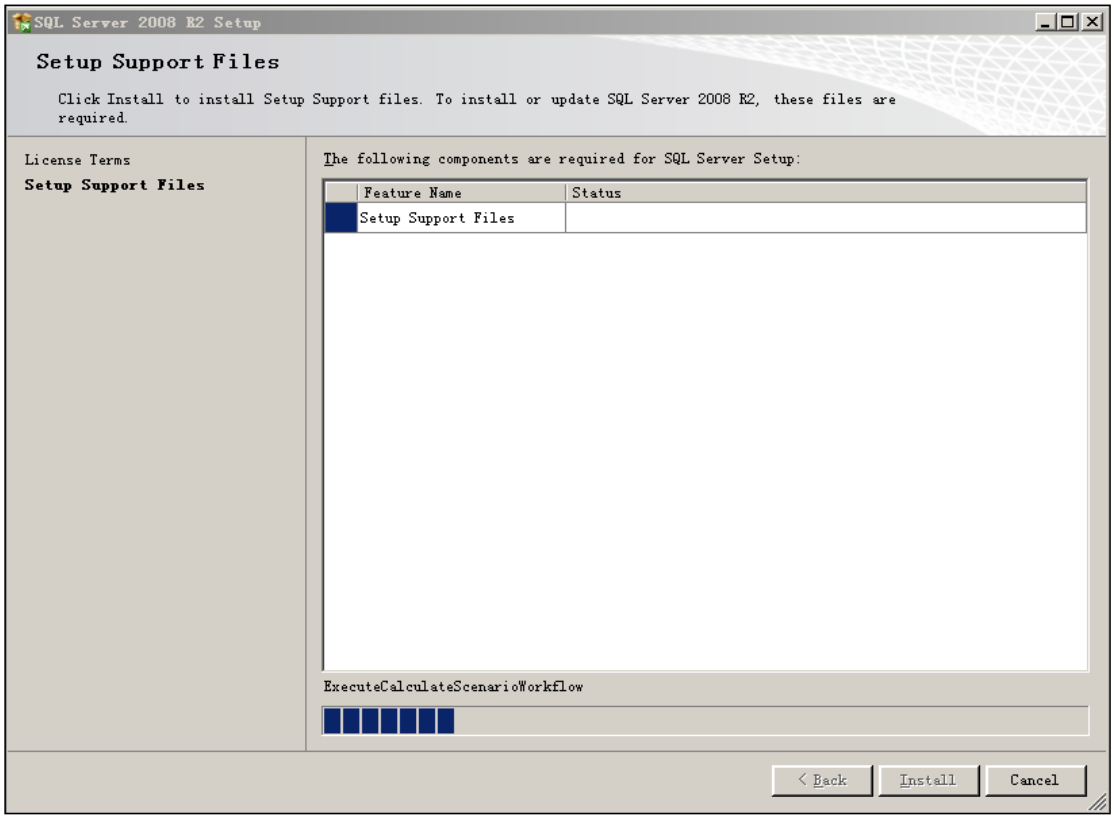
2. Click the "New installation or add ….." on the above dialog and it will be installation automatically as following dialog.



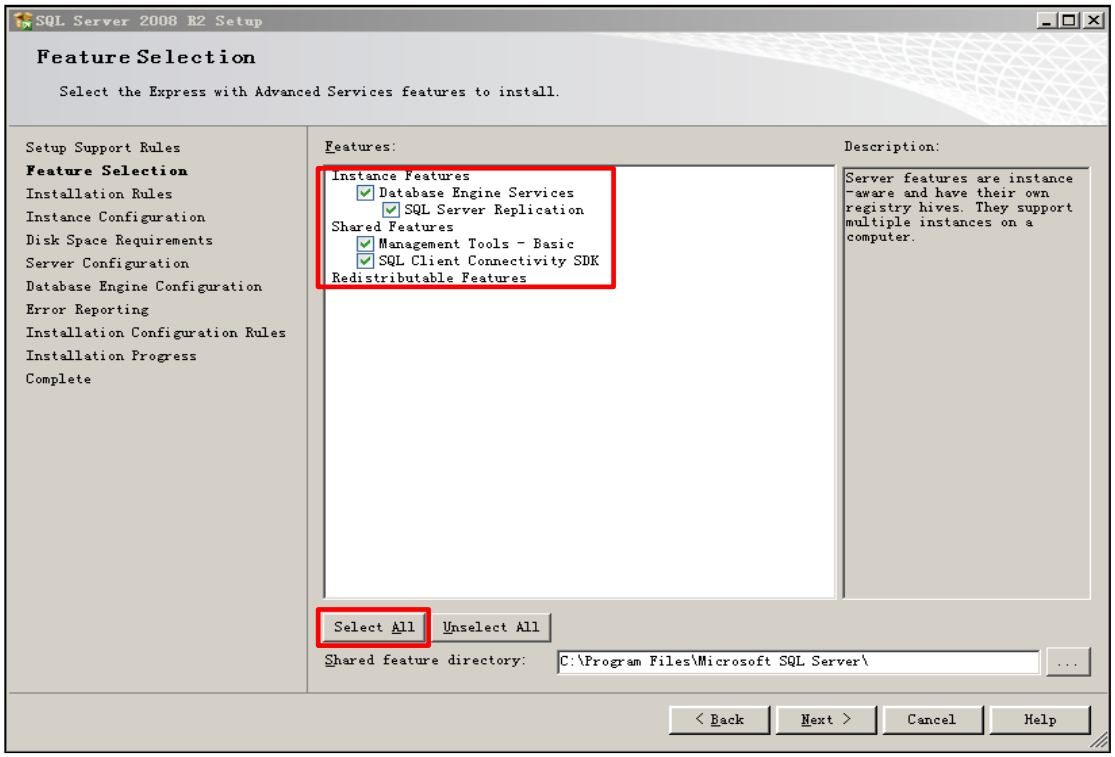
3. After installation and click "OK" button, it will enter the next step.



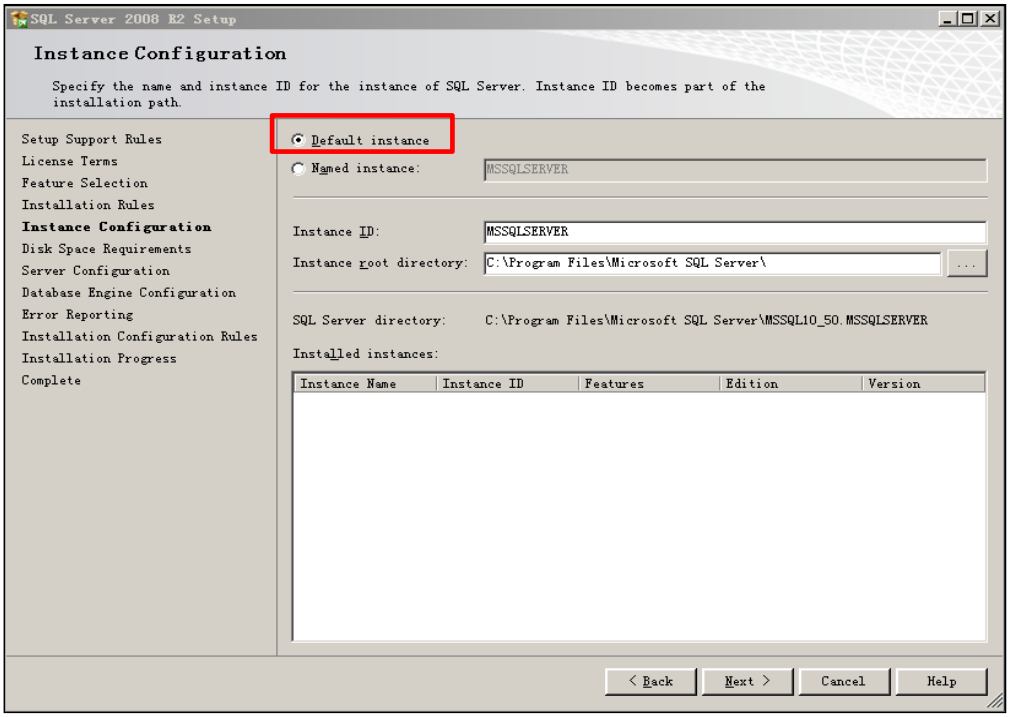
4. Select "I accept the license terms" and click "Next" button, it will be installation automatically as following dialog.



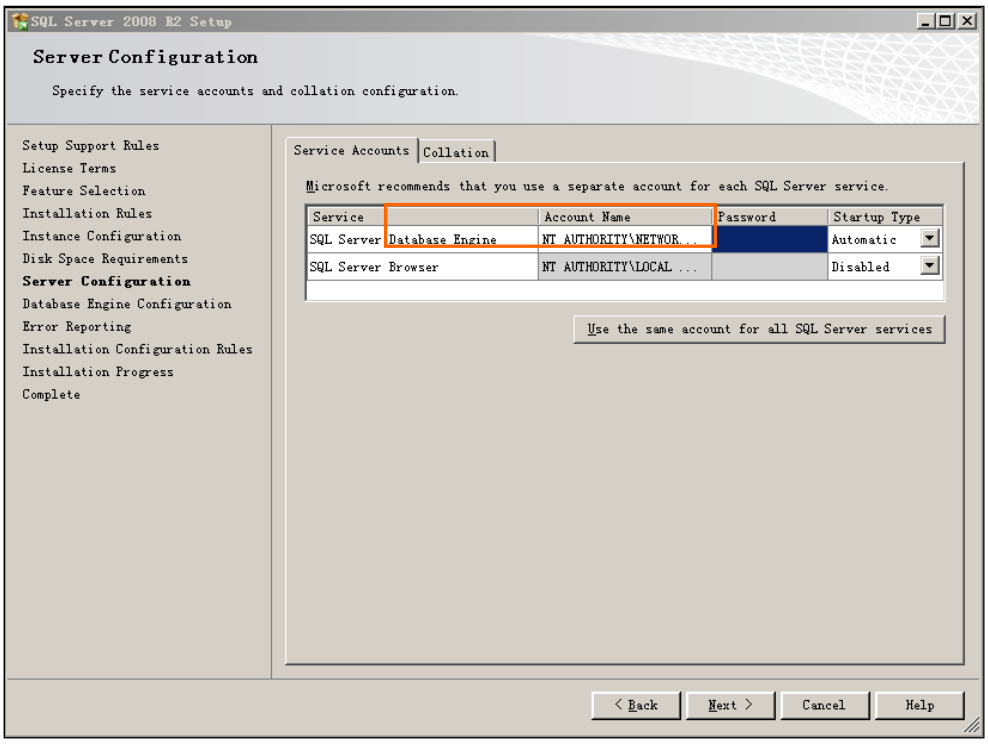
5. After installation and click the "Install" button on the above dialog, it will display as following dialog.



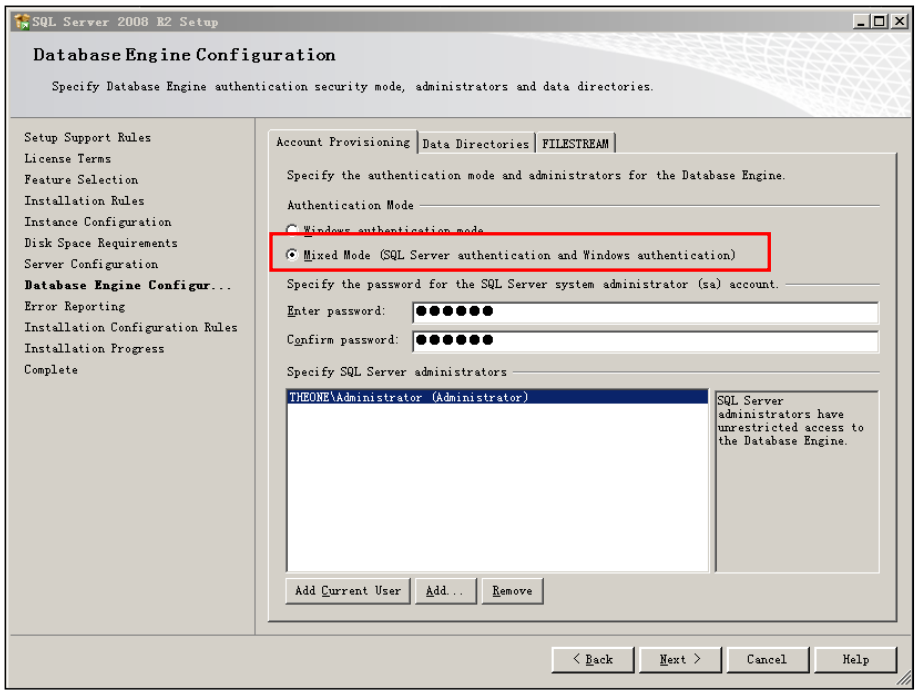
6. Select all the options on the above content, and click the "Next" button, it will display as following dialog.



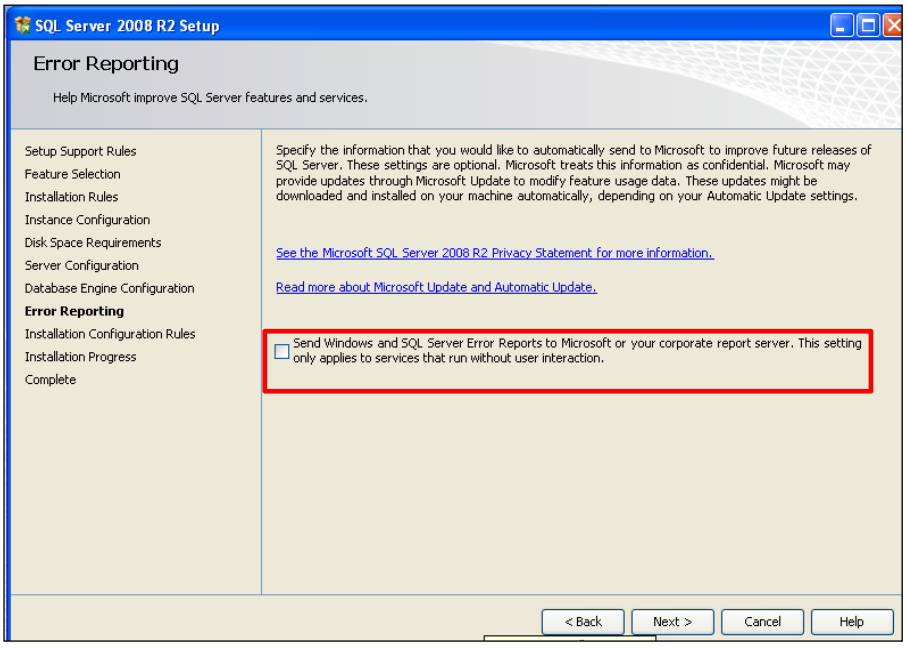
7. Select "Default instance" on the above dialog and click "Next" button, it will display as following dialog.



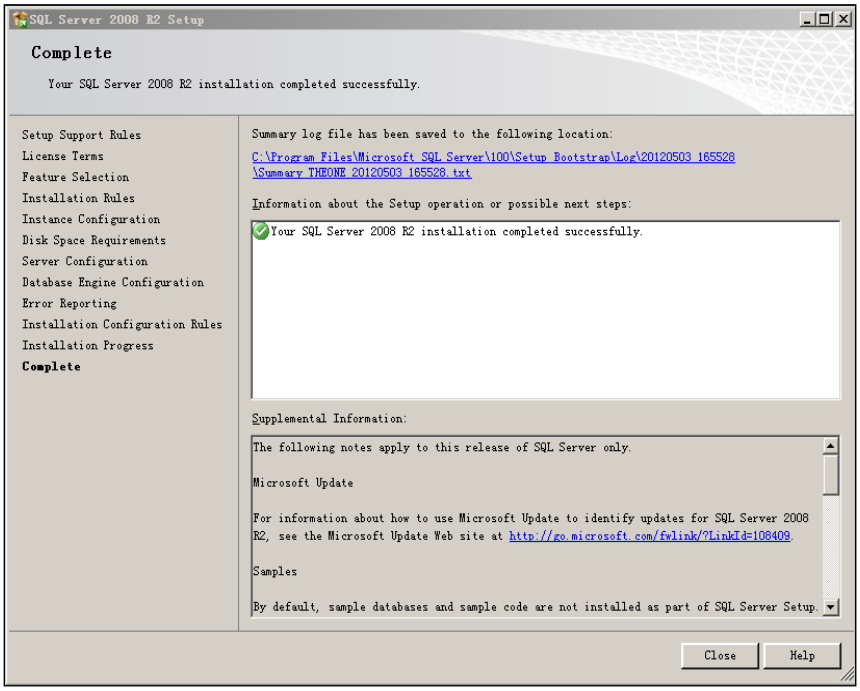
8. Select "NT AUTHORITY/SYSTEM" on the above dialog and click "Next" button, it will display as following dialog.



9. Select "Mixed Mode……. "on the above dialog, and input the sa user's password, default password is 654321. Click "Next" button, it will display as following dialog.



10. Do not select "Send Windows and SQL Server…. "on the above dialog, and click "Next" button, it will display as following dialog.

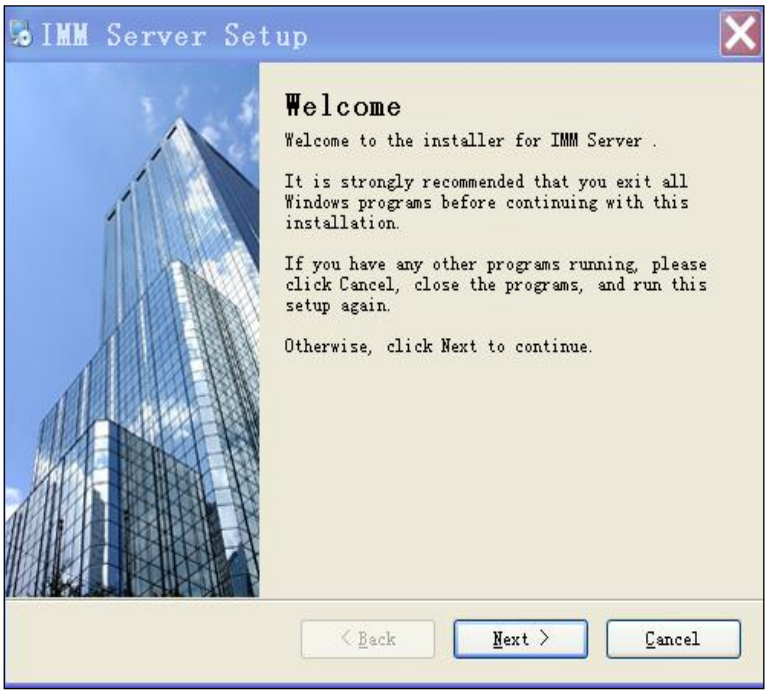


11. After installation and click "Close" button.

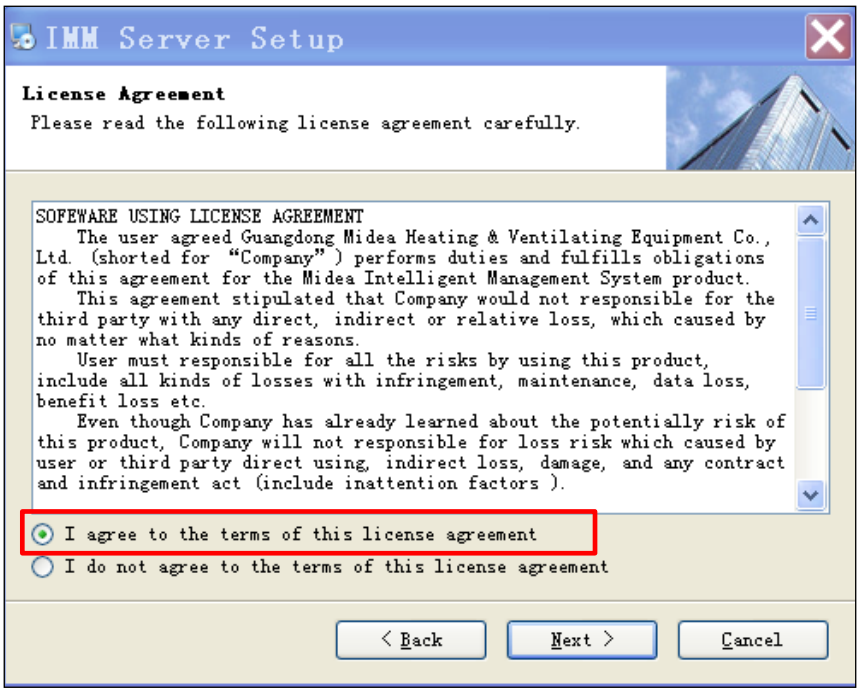
6.1.4 Server installation

Under the IMM menu to find out the program called IMMServer_Vx.exe (server installation program). The installation steps are as following.

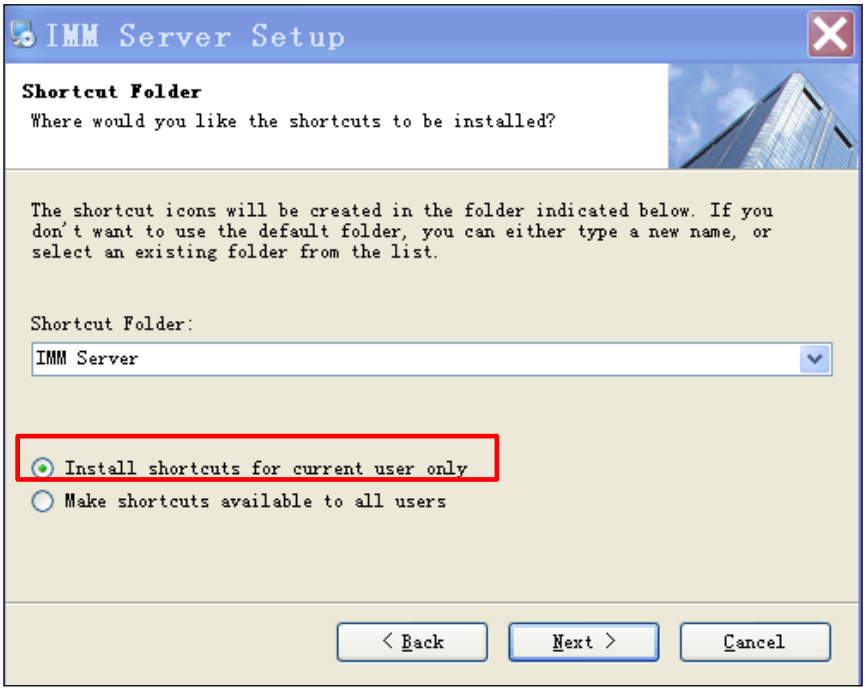
1. Double-click the installation program, it will display as following dialog.



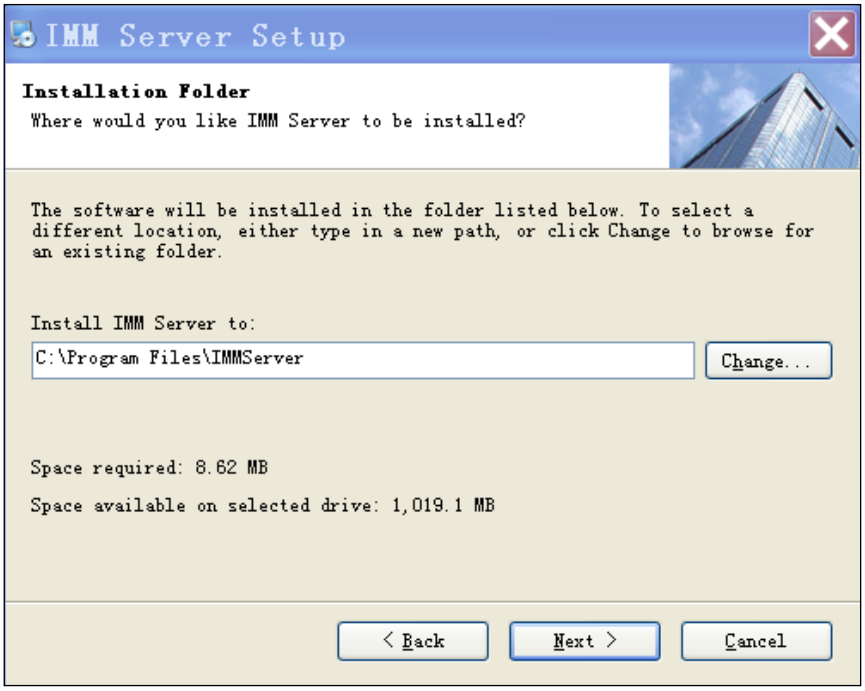
2. Click the "Next" button and it will enter the next step.



3. Select "I agree to the terms of this license agreement" on the above dialog and click "Next" button, it will enter the next step.



4. Click the "Next" button on the above dialog, and it will enter the next step.



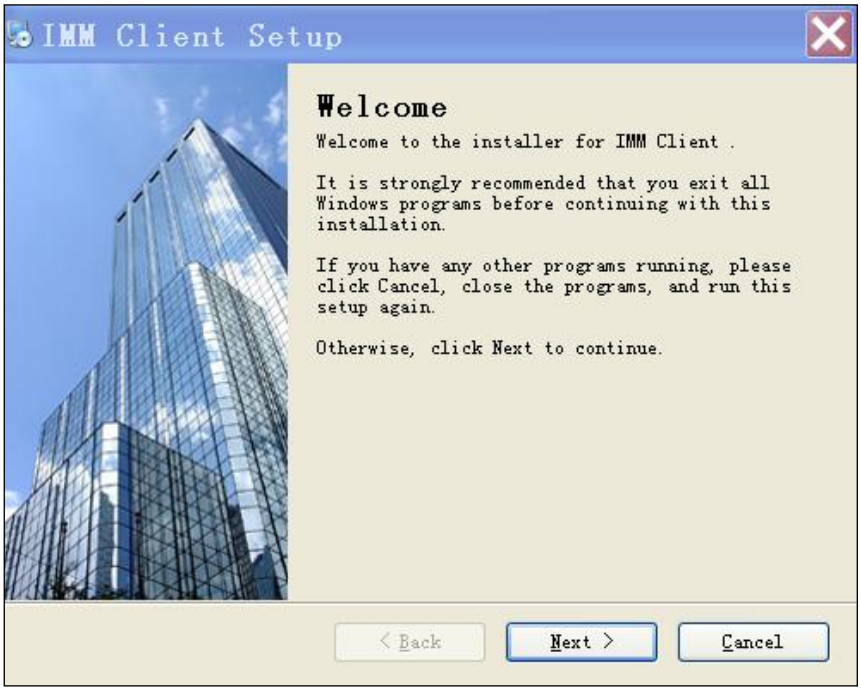
6. You can change the software installation menu. In order to ensure the safety of the system, you'd better install in a non-system disk. Such as the operating system can be installed in the C disk, then the software can be installed in D or E disk. Click the "Next" button.

After installation, click "Finish" button and exit installation. You can find out the "IMM Client" software under the "start" "all programs".

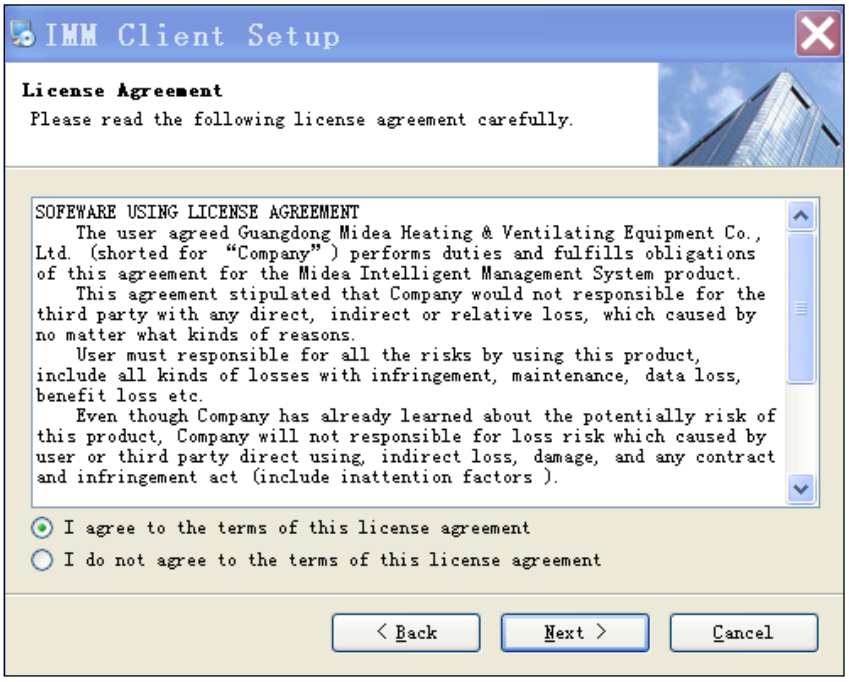
6.1.5 IMM client-side software installation

Under the IMM menu to find out the program called IMMClient_Vx.exe, and the installation steps are as following.

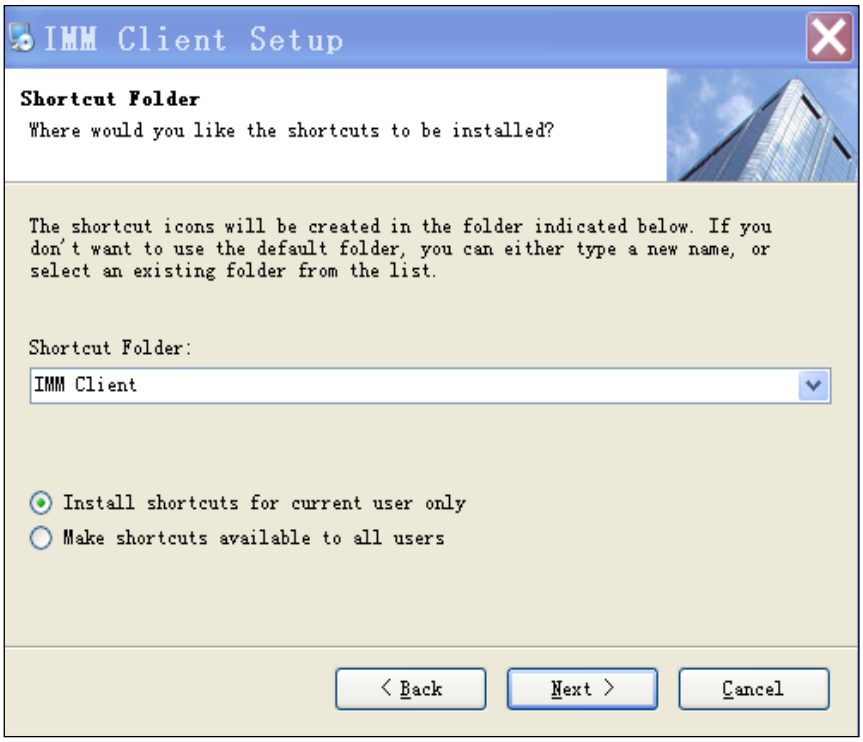
1. Double-click the program called IMMClient_Vx.exe, and it will display as following dialog.



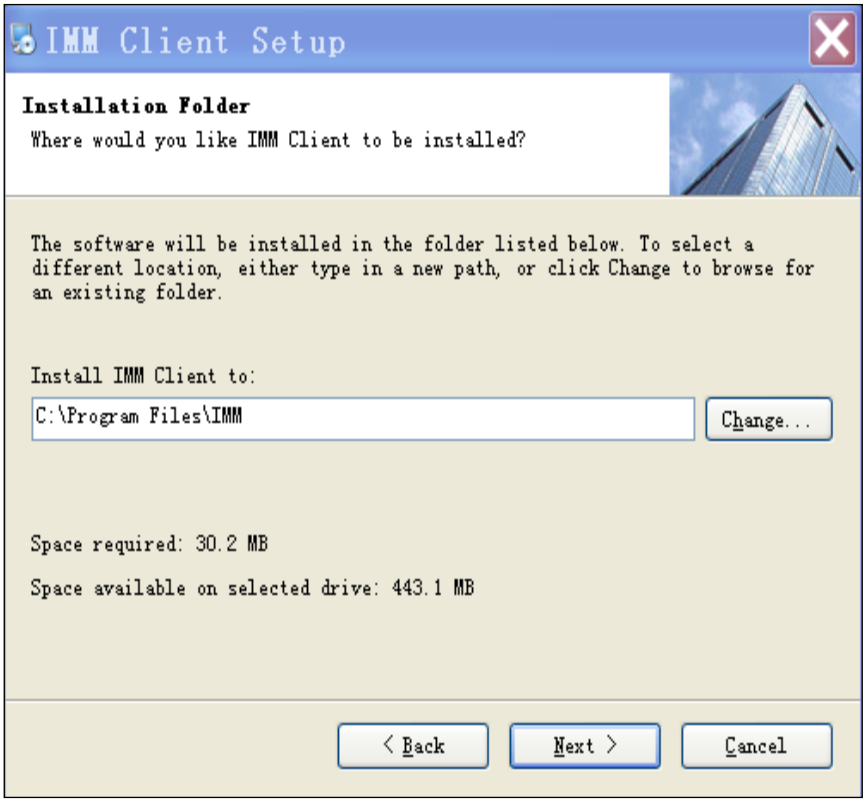
2. Click the "Next" button and it will enter the next step as following dialog.



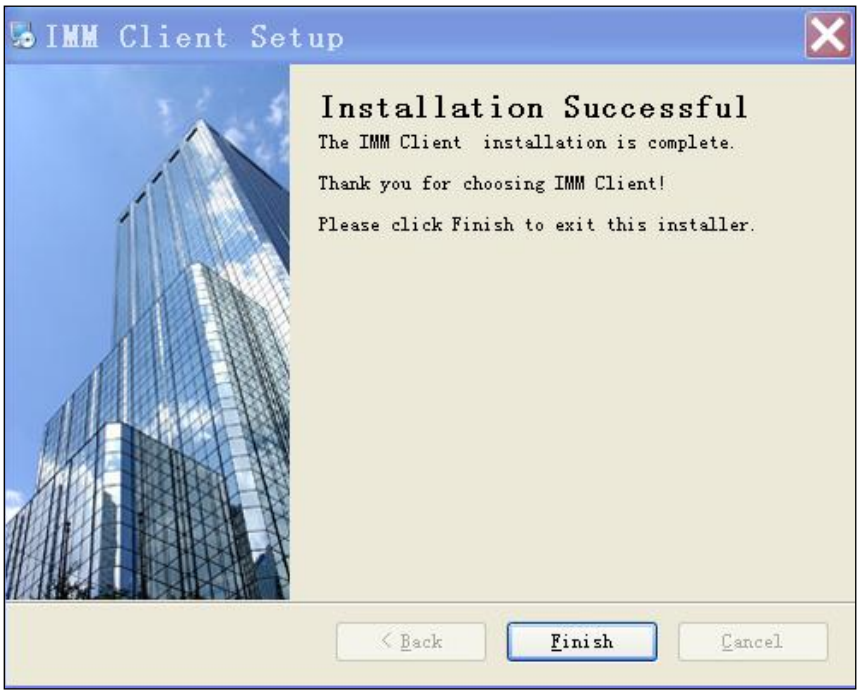
3. Select "I agree to the terms of this license agreement" and click "Next" button. It will enter the next step as following dialog.



4. Click the "Next" button on the above dialog.



5. You can change the software installation menu and you'd better install in a non-system disk, and then click "Next" button.



6. After installation, click "Finish" button and exit installation.

6.1.6 Softdog driver installation

Under Dog Driver menu to find out the softdog driver program (MicroDogInstdrv.exe), and double-click this program to install (take Windows 7 system for example). It will enter the next step as following dialog.

1. Select the "USB dog driver" and click the "Install Driver" button on the following dialog.

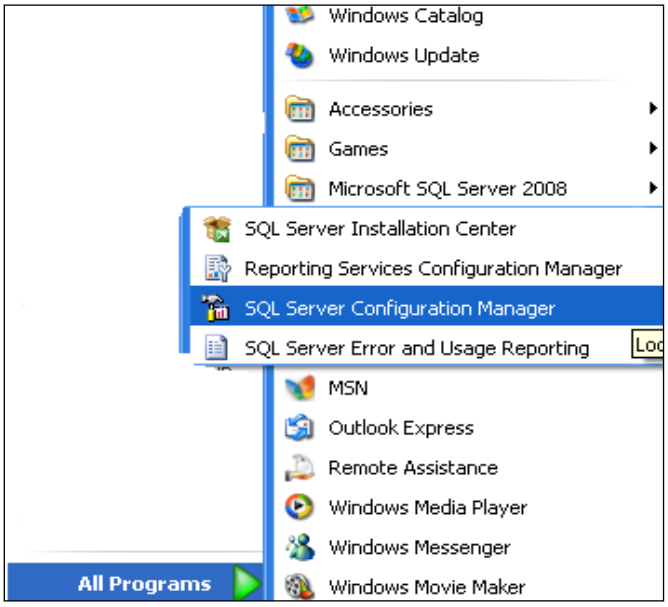
2. After installation and click the "Exit" button on the following dialog.

6.2 IMM software configuration

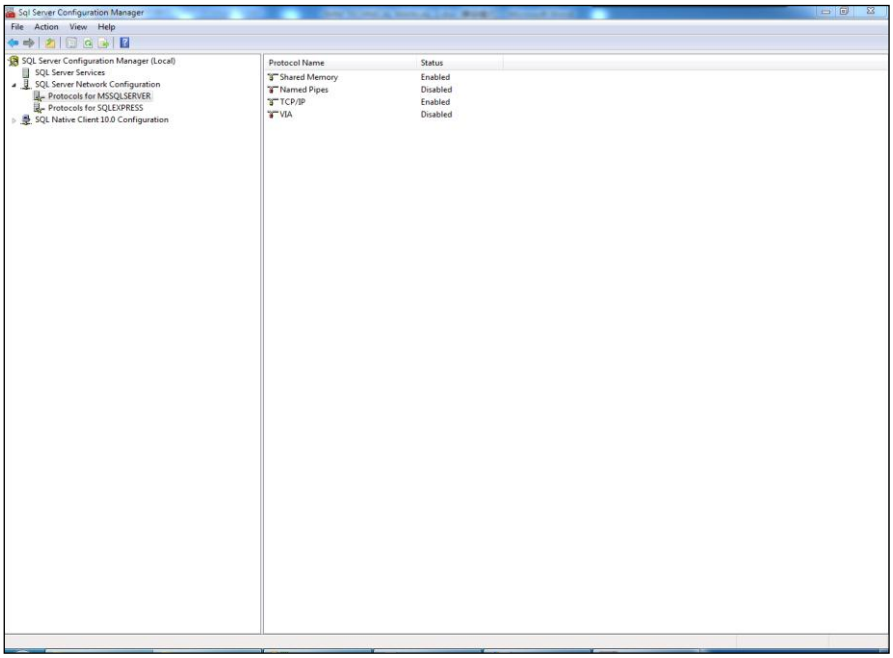
6.2.1 Server and client-side operation configuration

6.2.1.1 Database operation

1. Under "Start" menu and select "All programs" to open the "SQL Server Configuration Manager".

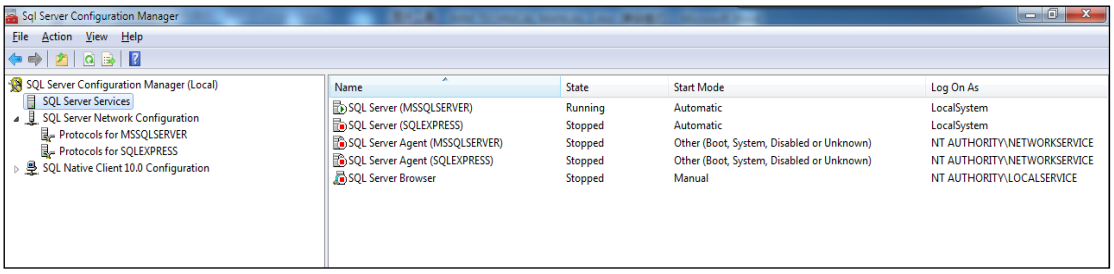


2. Operate TCP/IP in the SQL Service network configuration.

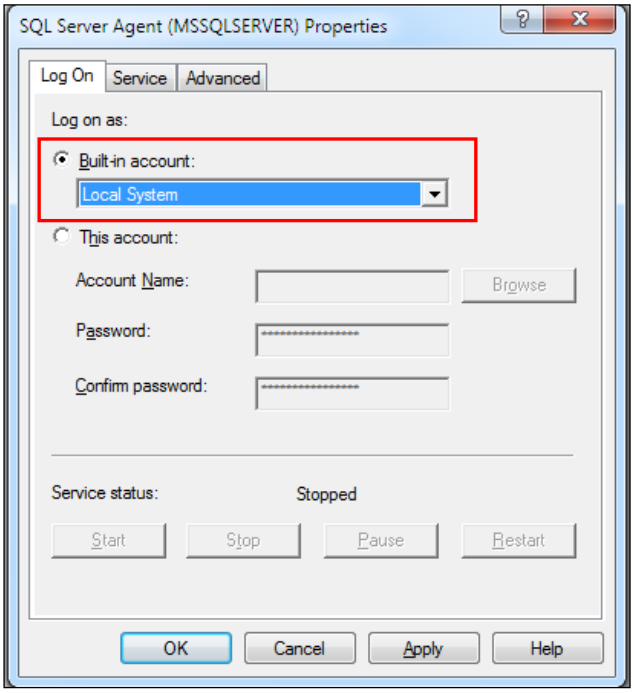


On the above dialog, the "TCP/IP" must be set to "Enabled".

3. Change Sql Server property.

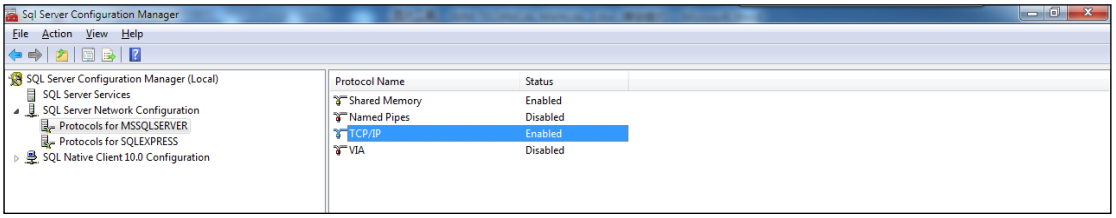


On the above dialog, right-click on the "SQL Server (MSSQLSERVER) and select the "Property", it will enter the following dialog.

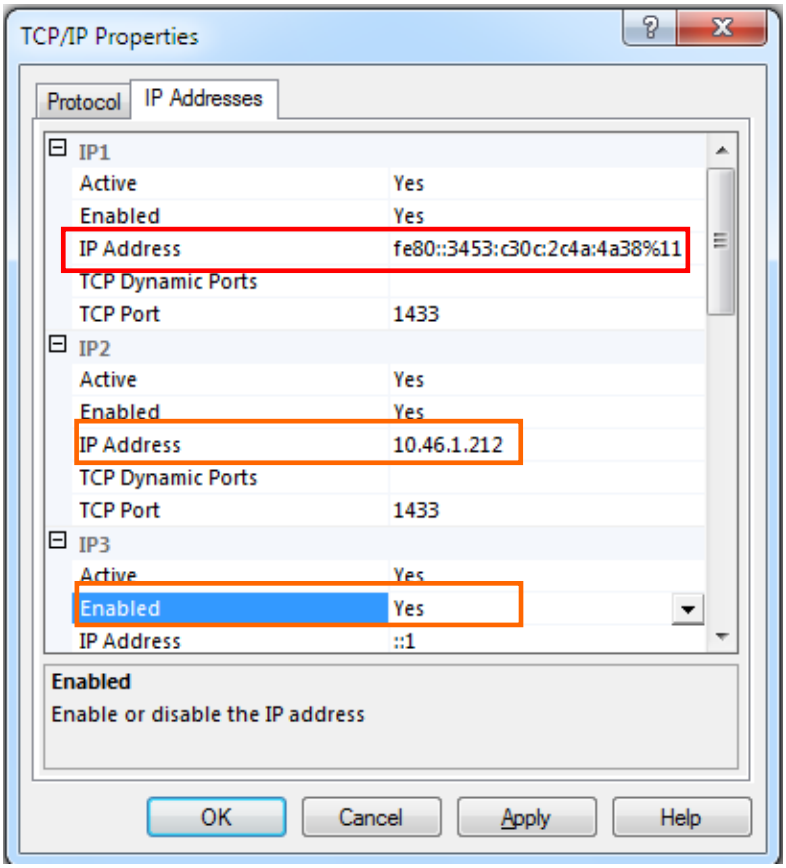


Select "Built-in account" and "Local System", and then click "OK" button.

4. Open the connected IP address

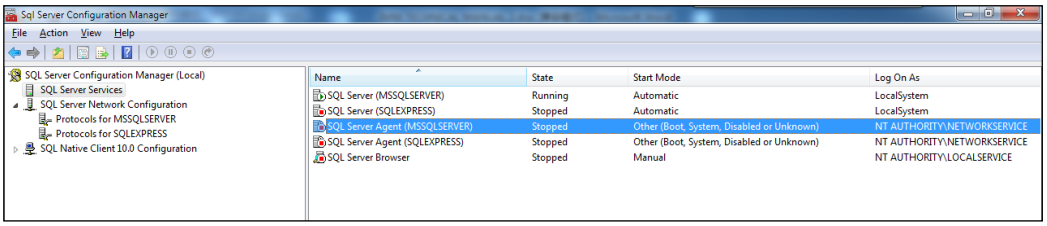


Right-click the "TCP/IP" on the above dialog, select the "Property", it will enter the following dialog.



Select the "IP Addresses" on the above dialog, and it will open the corresponding IP address. You need to change the "Enabled" set to" Yes" and TCP Port need to set to 1433 (127.0.0.1 address must be open). And then click the "OK" button.

5. Re-start the SQL Service server

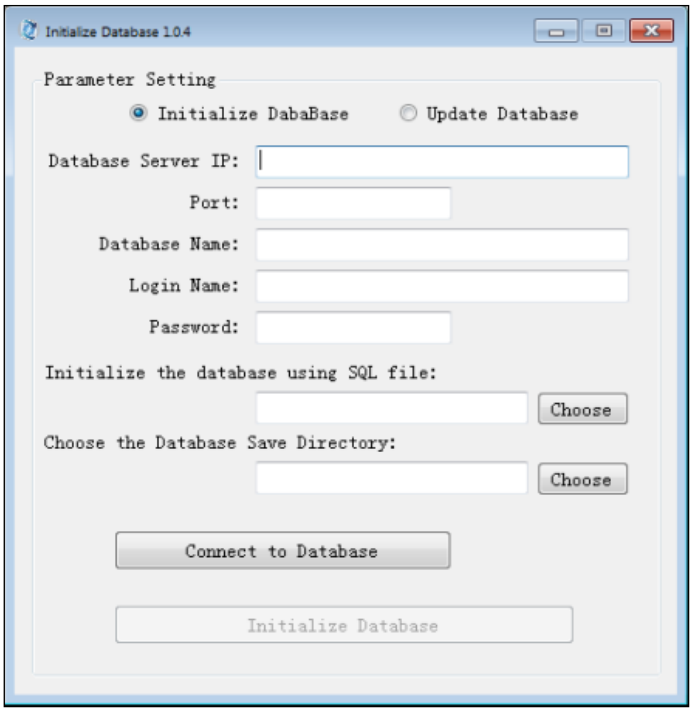


Right-click the "SQL Server (MSSQLSERVER)" on the above dialog, and select the "start/restart", and then it will re-start the database server.

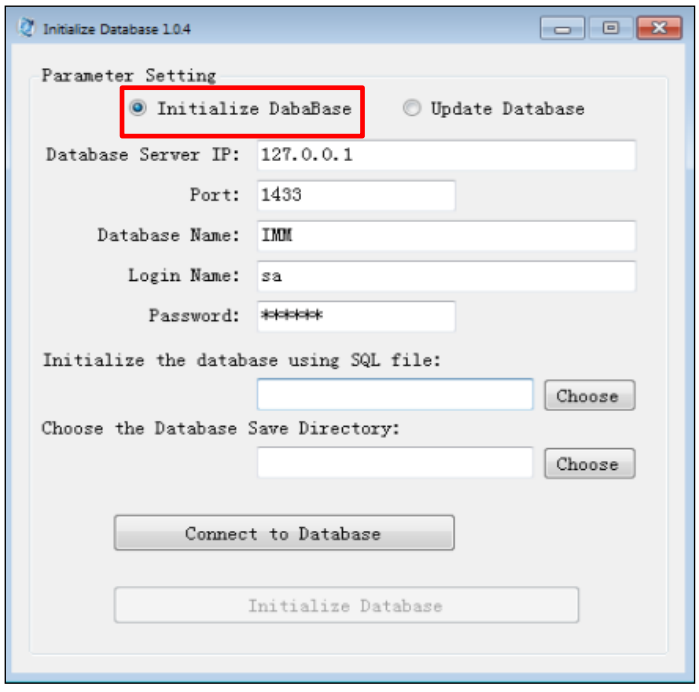
6.2.1.2 Database initialization

The purpose of database initialization is created an IMM database in the database, and it can operation initialization. The operation steps are as following:

1. Double-click InitializationDB.exe in the server software installation menu (E.g.: D:\Program Files\IMMServer), it will display as following dialog.



2. Select the "Initialize DabaBase" and input the initialization parameters.



Parameter specifications:

Database Server IP: 127.0.0.1 local default IP

(Make sure to set "Yes" for the "Enabled" of address 127.0.0.1 in the step four sated in 6.2.1.1)

Port: 1433 TCP/IP default port number: 1433

Database Name：IMM

To be set up a database name (through the program to create, default is IMM)

Login Name：sa (Default user)

Password：*** (default 654321)

Initialize the database using SQL file: IMM.sql

The SQL script files to initialize the database, it is in the directory of D:\Program Files\IMMServer.

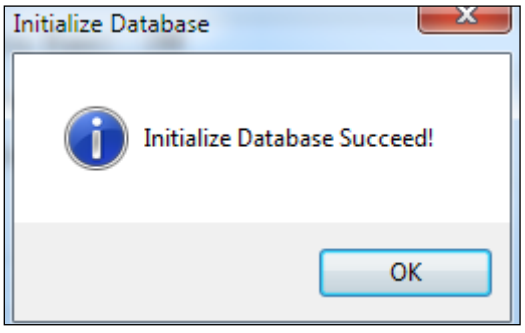
Choose the Database Save Directory:

D:\IMM_Server menu stored the database document, it's recommended to be none-system disk.

After the above parameters, click the "Connect to Database" button; if the button turns to be gray and display "Connect Successfully", means to connect the database successfully. Then can continue to operate.

3. Initialize the IMM database

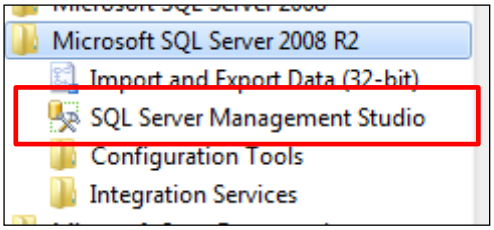
After connecting to the database successfully and the "Initialize Database" have been activated, click "Initialize Database" button again to initialization operation. If initialize database succeeds, it will display as following.



If the database initialization failed, please check whether there is the IMM sql file exists in the server installation menu (e.g. D:\Program Files\IMMServe) or the IMM database has already existed in database.

6.2.1.3 Establish database user

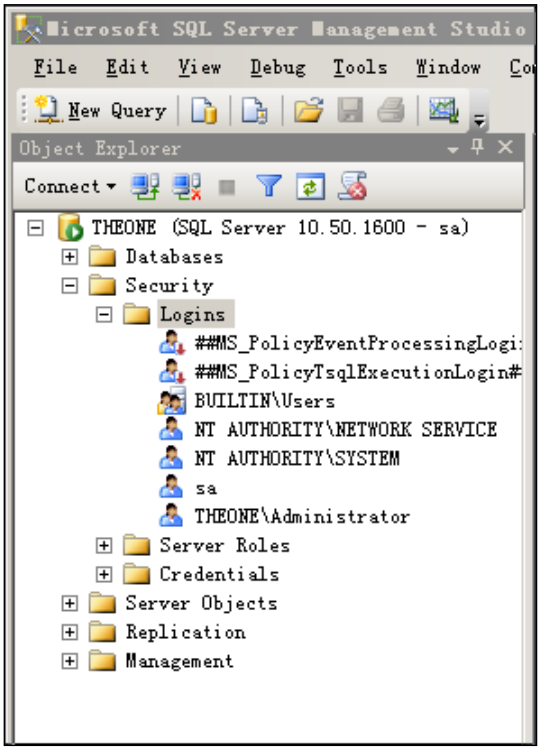
1. Open SQL Server Management studio under the "Start" →"All programs" menu.



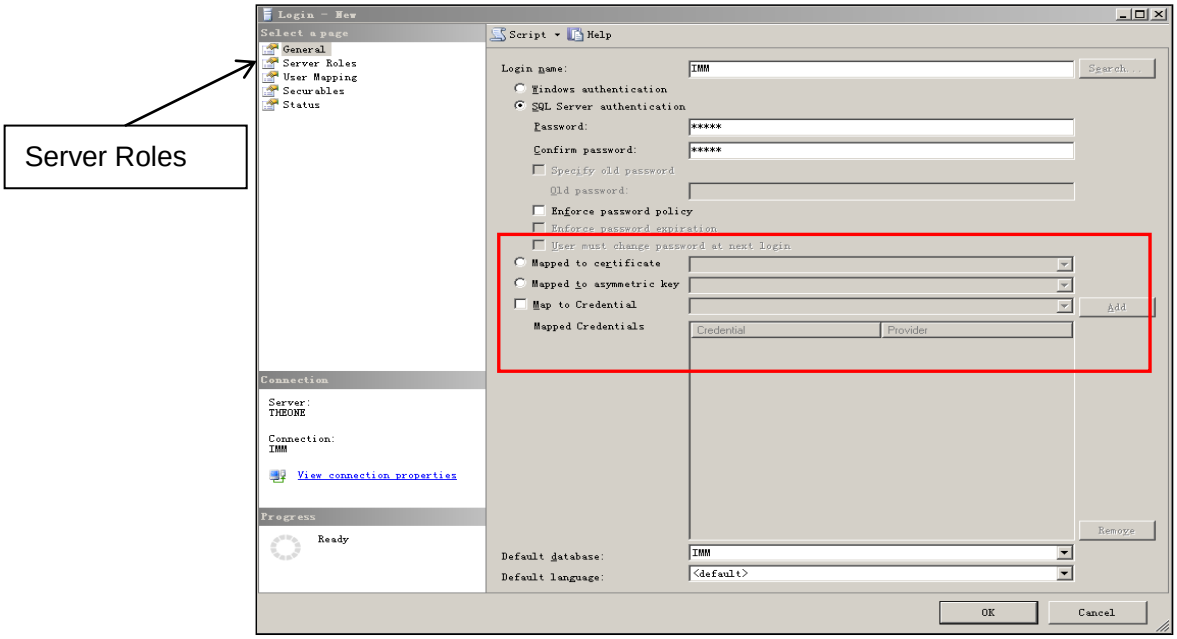
2. Select the SQL Server authentication, and use sa account to login the database.

Login: sa
Password: 654321

3. After login, it will display the following dialog:

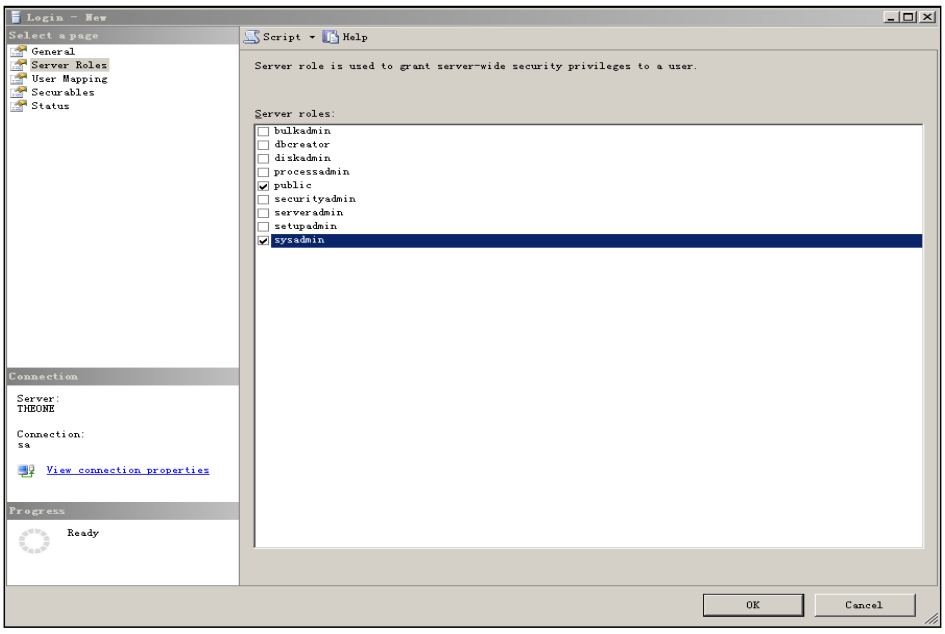


4. Right-click "Logins" and select "New Login" in the popup dialog, it will display the following dialog



Input "IMM" in the Login name and choose "SQL Server authentication", and then input IMM user password (default: IMMV4).Do not choose anything in the red dialog on the above, and choose "IMM" in the default database.

5. Left-click the "Server Roles" on the above dialog, it will display the following dialog:



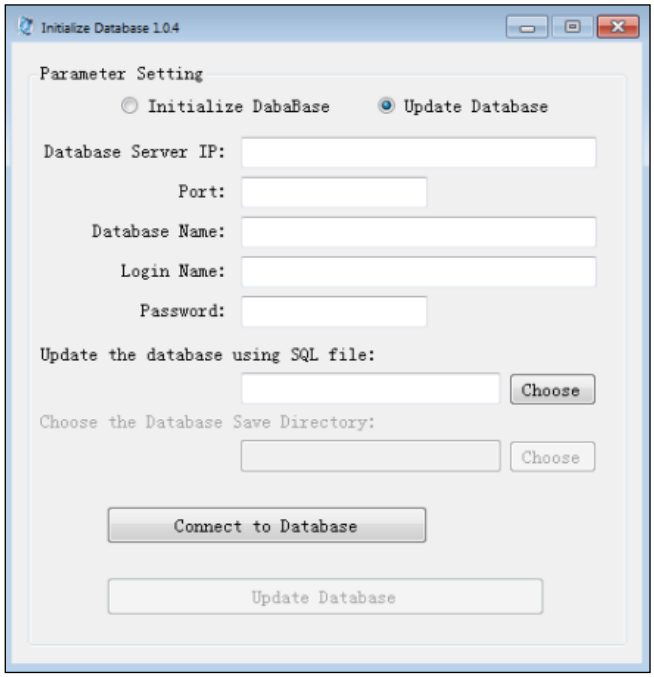
Select "sysadmin" on the above dialog and click “OK” button. It will be set up the database user successfully.

6.2.1.4 Update the database

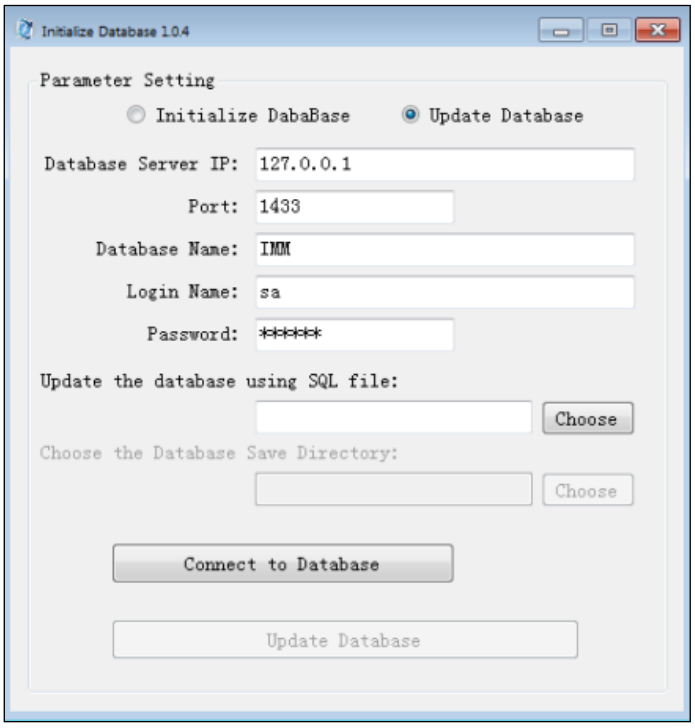
The function is only used for IMM software upgrade from the first phase to the II phase.

The operation steps as following:

1. Double-click "InitializationDB.exe" in the server software installation menu (E.g.: D:\Program Files\IMMServer), it will display the following dialog:



1. Choose the "Update Database" and input the update parameters



Parameter specifications:

Database Server IP: 127.0.0.1 Local default IP

(Make sure to set "Yes" for the "Enabled" of address 127.0.0.1 in the step four sated in 6.2.1.1)

Port：1433

TCP/IP default port number: 1433

Database Name：IMM

To be set up a database name (through the program to create, default is IMM)

Login Name：sa (Default user)

Password：***

You need to input the password (default 654321) when installing the database software.

Initialize the database using SQL file: IMM.sql

The SQL script files to initialize the database, it is in the directory of D:\Program Files\IMMServer.

Choose the Database Save Directory:

D:\IMM_Server menu stored the database document, it’s recommended to be none-system disk.

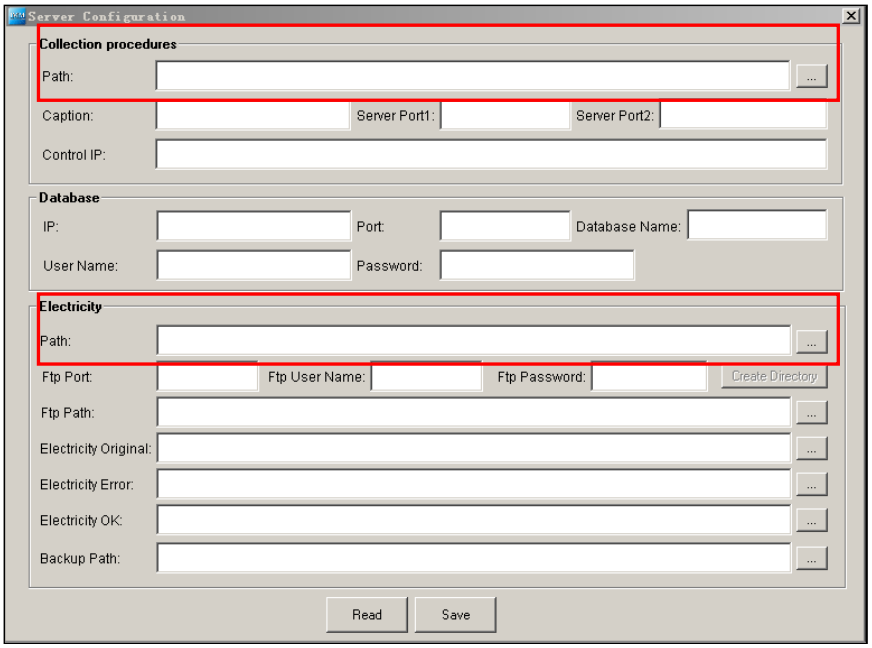
After the above parameters, click the "Connect to Database" button; if the button turns to be gray and display "Connect Successfully", means to connect the database successfully. Then can continue to operate.

3. Initialize the IMM database

After connecting to the database successfully and the "Initialize Database" have been activated, click "Initialize Database" button again to carry out initialization operation.

6.2.1.5 Server operation configuration

Under server installation menu (e.g.: D:\Program Files\IMMServer), you can open the program name called IMMServerSet.exe, and it will display the following dialog:



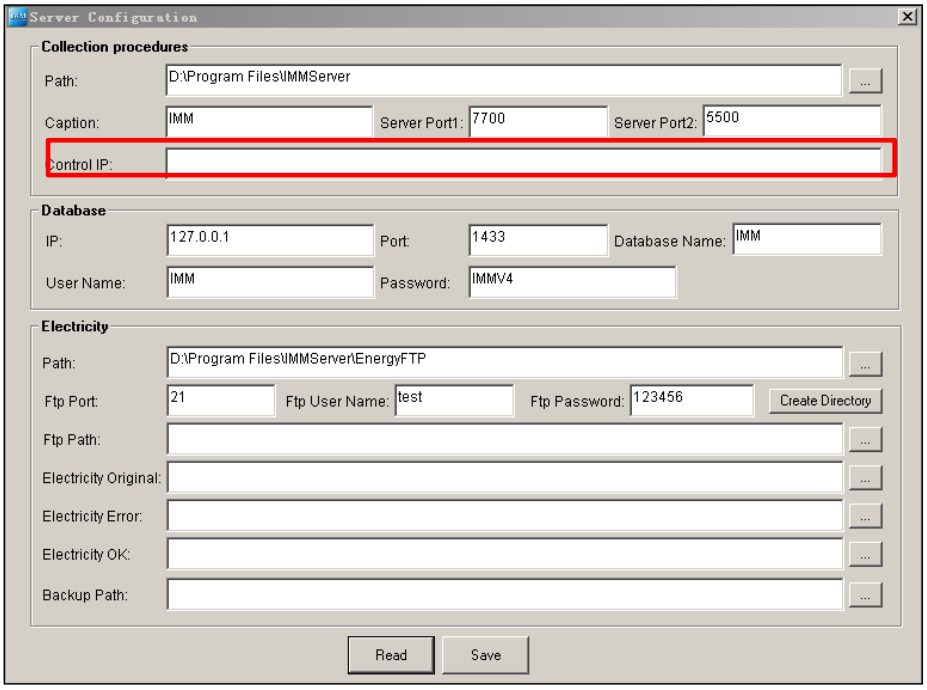
Operation steps:

1. Click the button on the right side of Path in option "Collection procedures", and choose the server's installation menu, e.g.:\Program Files\IMMServer.

2. Click the button on the right side of Path in option "Electricity", and choose the electricity analysis program installation menu, e.g.:

D: \Program Files\IMMServer\EnergyFTP.

3. Click "Read" button, it will display the following dialog:



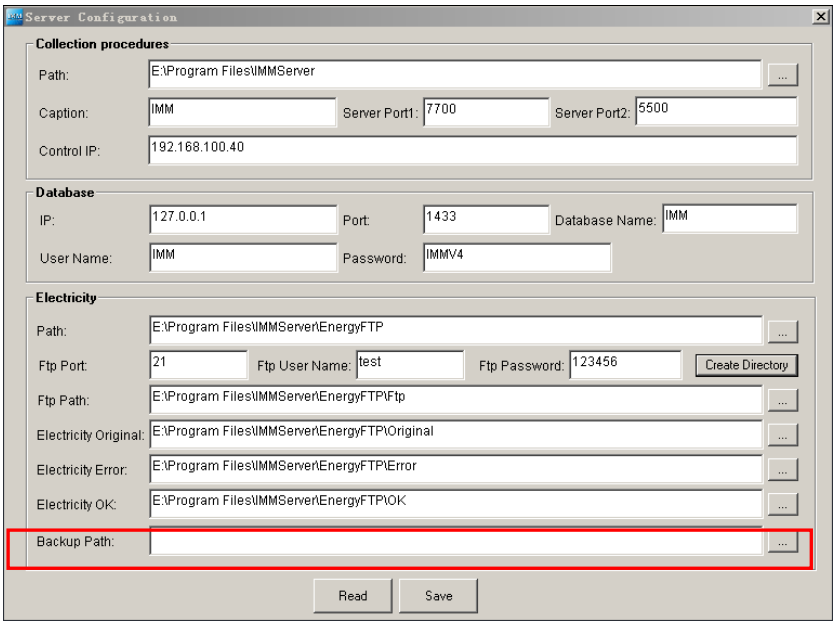
Input Control IP (M-INTERFACE gateway IP which needs to be searched), e.g.: 192.168.100.40; several IP should separate by English comma and make sure the form is right.

4. Select Ftp Path, Electricity Original, Electricity Error, Electricity OK path.

There are two methods can be selected:

1). Click the right button (...) to select the exiting path in the corresponding frame.

2). Click the "Create Directory" button, auto select the path for it. The follow is the interface of clicking the "Create Directory" (default selects the method):

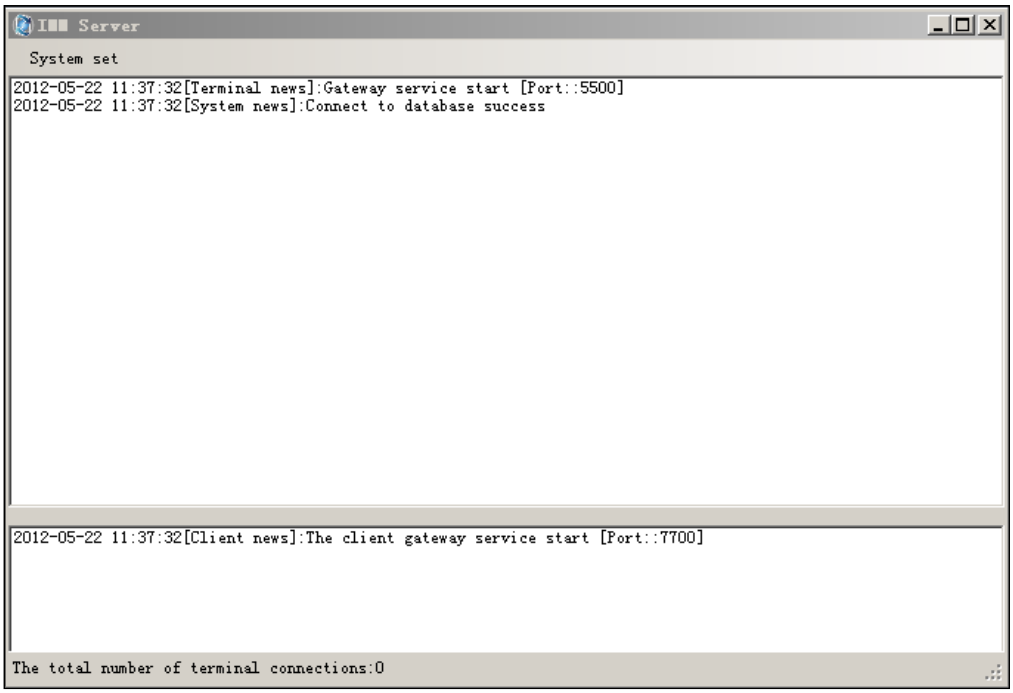


5. Click the button on the right side of Path in option "Backup Path", and select the backup document storage path.

Notes: The database file must be stored in the same menu when initialize the database (refer to the second step in 6.2.1.2).

6. Click the "Save" button and close the dialogue frame.

7. After configuration, double-click the program "IMMServer.exe" in the server software installation menu (softdog must be inserted first), and you need to build a show.txt document, it will display the following dialog:

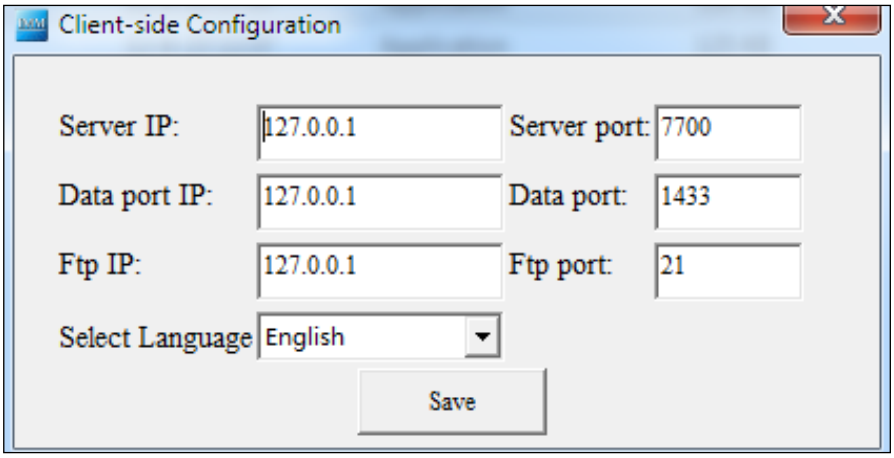


When it displays "Connect to database success" and it means that the configuration was successfully.

Notes: If you change IMMServerSet configuration, the server must be re-started

6.2.1.6 IMM software client-side operation configuration

1. Under the IMM Client-side software installation menu (e.g.: D:\Program Files\IMM), you can open the program "IMMIp.exe" and it will display the following dialog:



Parameter specifications:

Server IP: Server IP address

Data port IP: Database IP address

Ftp IP: FTP server IP address (server IP address)

Server port: Default 7700, must be same with Server port1 of Server Configuration in 5.2.1.4.

Data port: Default 1433 and cannot be changed normally.

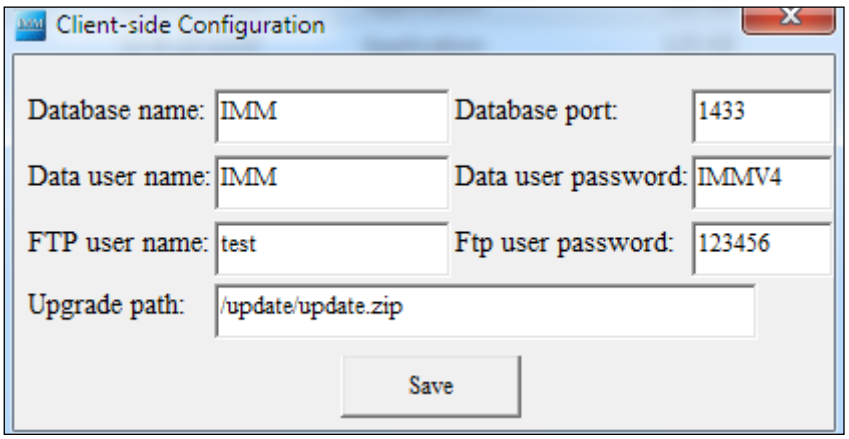
Ftp port: Default 21 and cannot be changed normally.

Select language: Can change client-side interface language.

After configuration and click "Save" button.

Notes: Default Server IP, Data port IP and Ftp IP data terminal are the same.

2. Double-click the cursor middle key on the blank place of the above dialog, and it will display the following dialog:



Parameter specifications:

Database name: Refer to 6.2.1.2 in the name of the database you have built, default IMM.

Database port: Default 1433 and cannot be changed normally.

Database user name: Refer to 6.2.1.2 in the name of the database you have built, default IMM.

Database password: Refer to 6.2.1.2 and the user (IMM) default password is IMMV4.

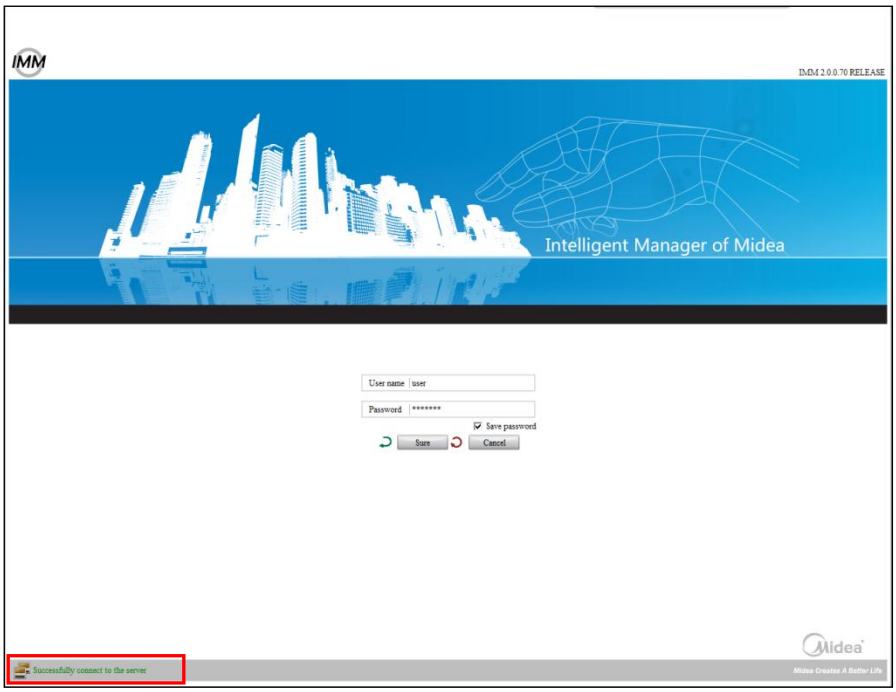
FTP user name: Default test and cannot be changed normally.

FTP password: Default 123456 and cannot be changed normally.

Upgrade path: Default/ update/update.zip, and cannot be changed normally.

After configuration and click "Save" button.

3. In the "Start" menu bar, click "All Programs" to run "Midea intelligent management system", or in the client installation menu to run IMM.exe program, it will display the following dialog:



If the left side of the interface displays "Connect the server successfully", it means that configure is correctly.

Notes: If it is the first time to run the software, you need to select the language which you need.

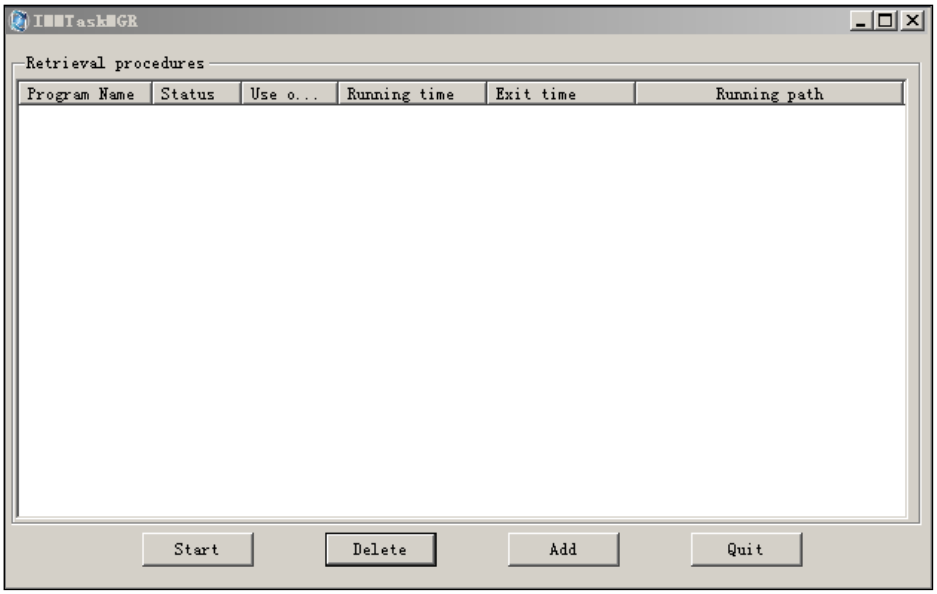
6.2.2 Process management configuration

The process management is for make sure the program can be operated again after exit program process. E.g.: the IMMServer is in the process management range, if IMMServer process stops, then the process management program can make the IMMServer process start again.

6.2.2.1 Operate IMMTaskMGR software

Under the "Start" →"All Programs" → "Midea intelligent management system –service side" to run the IMMTaskMGR software, it will display the following dialog:

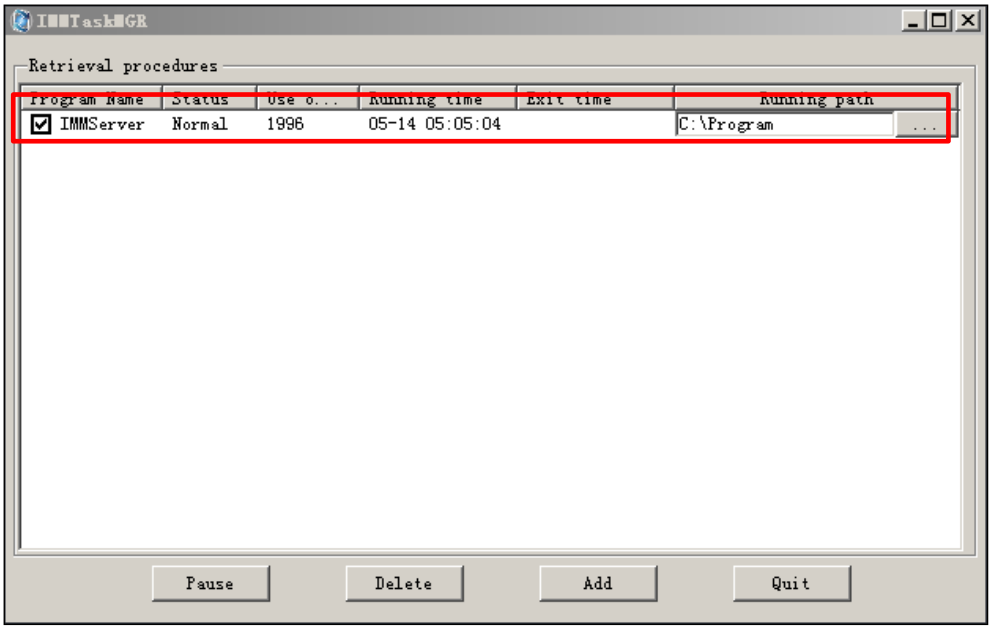
Notes: if did not display, need to establish a show.txt document in IMMTaskMGR software installation directory, e.g.: D:\Program Files\IMMServer\TaskMGR):



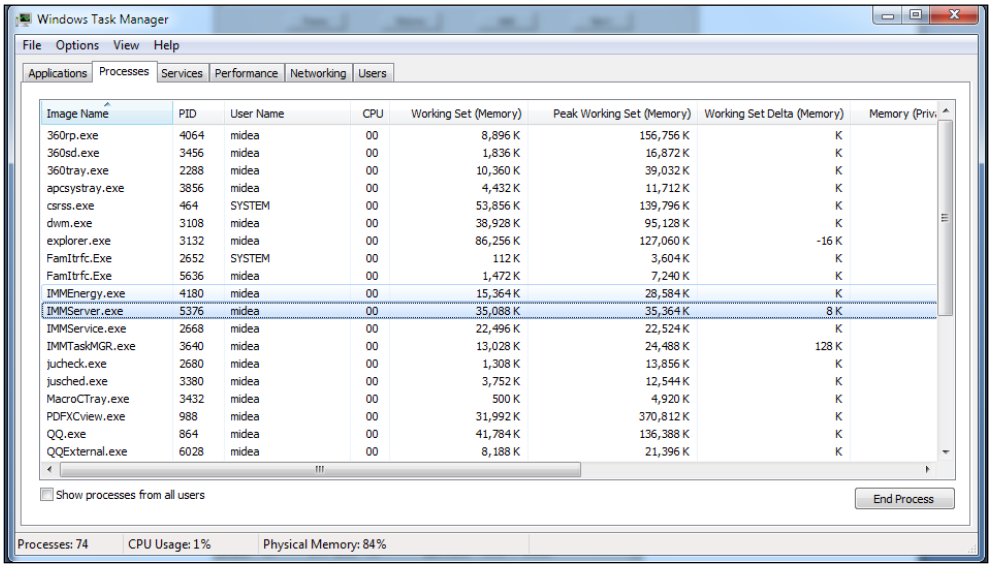
6.2.2.2 IMMTaskMGR software operation

1. Add monitor program

Click "Add" button on the above, it will display a row letter, and then click "Running path" to select the path where installed the monitoring program. E.g. add IMMServer process, the interface will display as following (It need to add the IMMServer.exe and IMMEnergy.exe, separately in the D:\Program Files\IMMServer and D:\Program Files\IMMServer\EnergyFTP menu, operate server as this method):



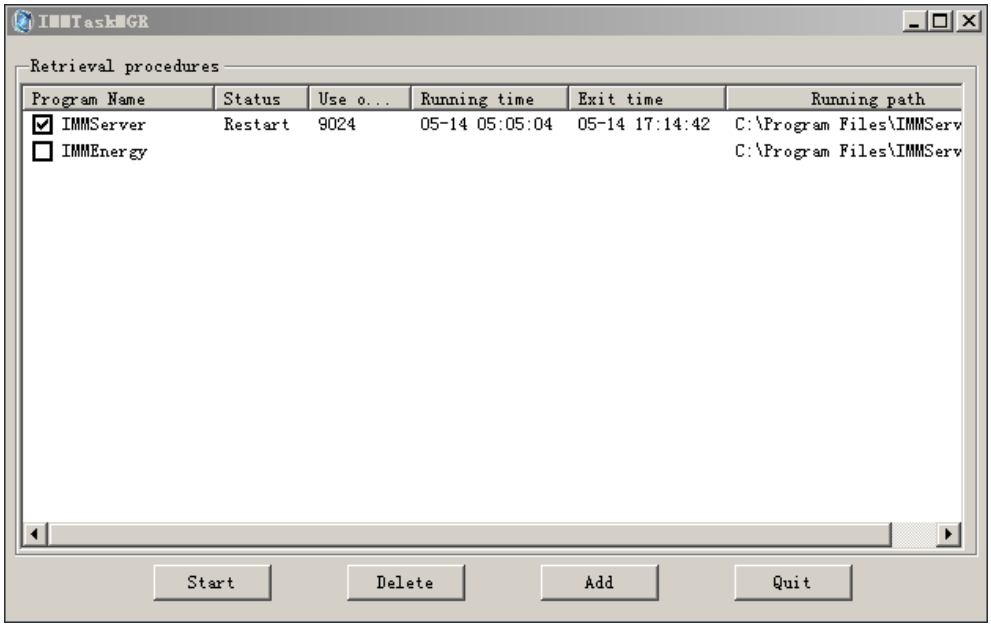
After adding, you can check the corresponding process operating from task manager as following dialog:



If you want to display IMMServer and IMMEnergy operating interfaces, you need to set up a new document called "show.txt" in the corresponding menu.

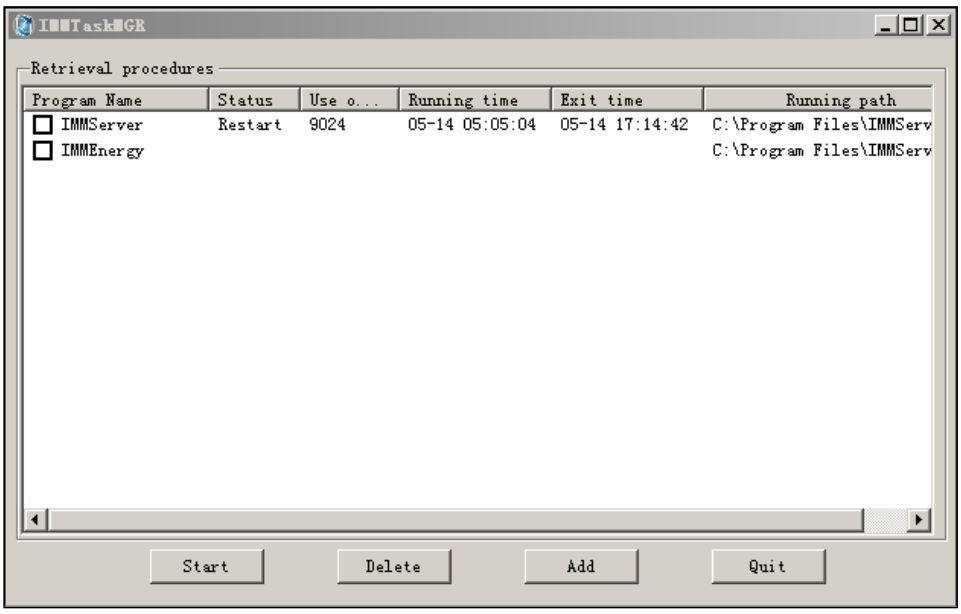
2. Delete monitor program

Choose the program which you want to delete and click "Delete" button, the corresponding program will be deleted from the interface and the corresponding program will stop monitoring.



3. Pause all the monitored programs

Click "Pause" button and it will pause all the programs monitoring; click "Start" button and it will operate the monitor function again. If click "Quit" button will be stopped IMMTadkMGR process.



6.3 software operates

Operate steps as following:

1. Insert softdog in the server PC.

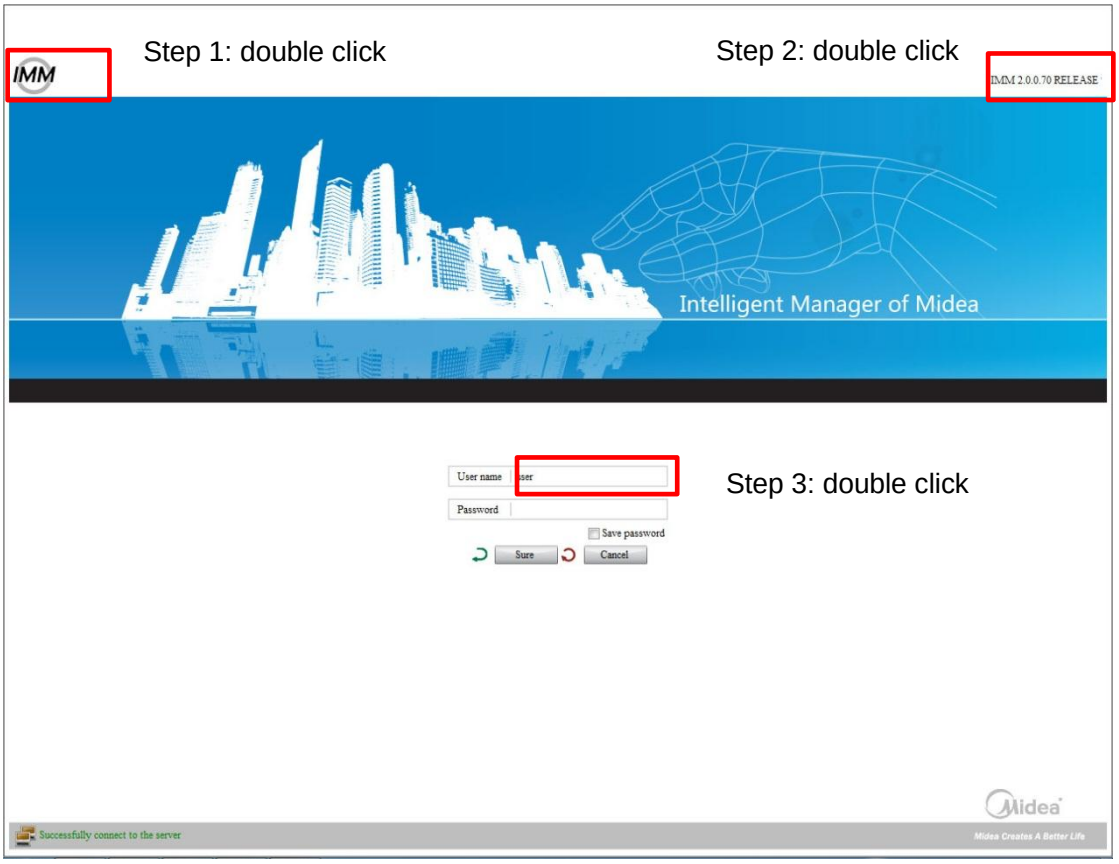
2.In the "Start" menu bar, click "All Programs"→"Midea intelligent management system – service side" to run IMMTaskMGR software, and according to the monitor program method in 6.2.2.2 to add "IMMServer" and "IMMEnergy" processes in the IMMTaskMGR interface.

3. Click the client-side software in "Start"→"All programs"→"Midea intelligent management system", and then enter the client-side login interface.

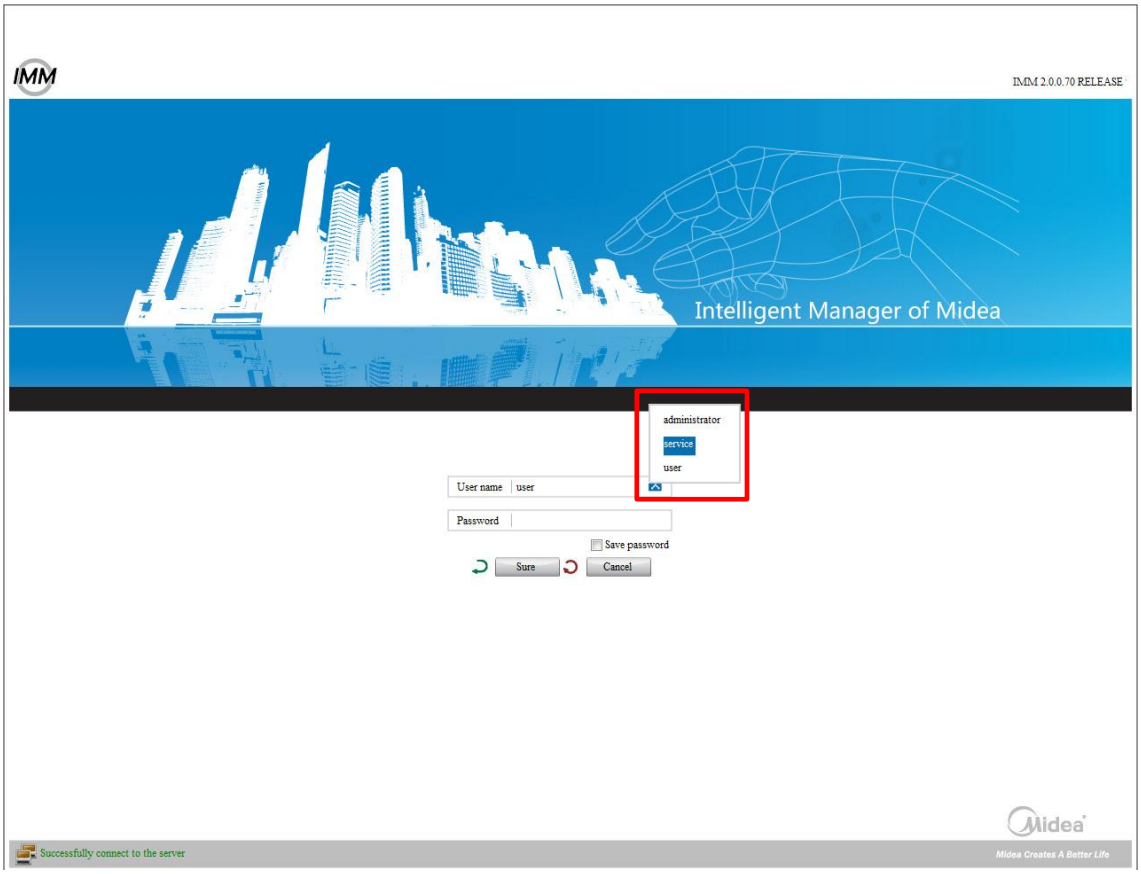
6.4 Aadministrator login

Administrator can use the following method to login.

1. Open the IMM client-side software and it will enter the following dialog:



2. Double-click the icon "IMM" in the upper left corner, and then double-click in the upper right corner of the version information (e.g.: IMM2.0.0.70RELEASE), double-click on the right side of the "user" option to choose the "service".



1. User's name: Service

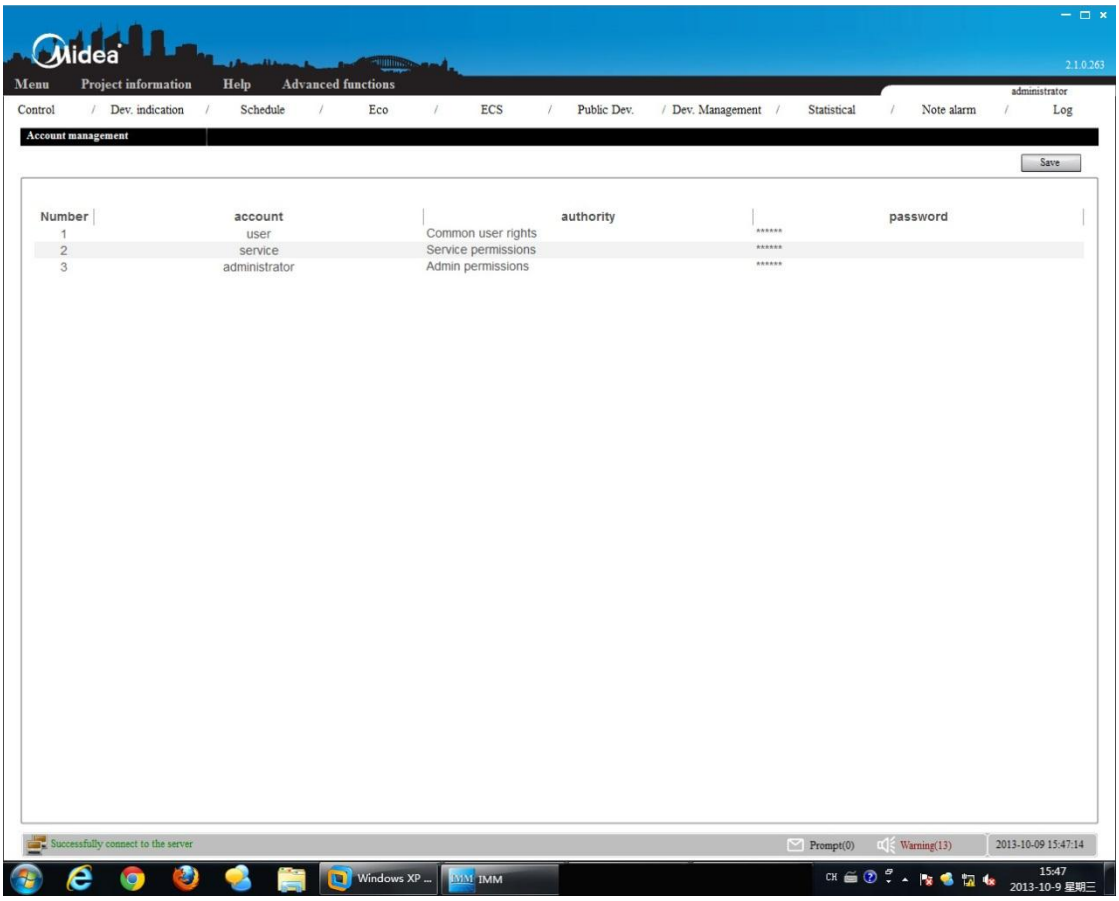
2. The default password is "service".

3. You can save the password or not.

4. Click "OK" button can be login.

6.5 Account management

When the administrator login the IMM client-side, select "Account management" under the "Advance function" and it will enter the following dialog:



Click the corresponding account and input the new password and click "Save" button.

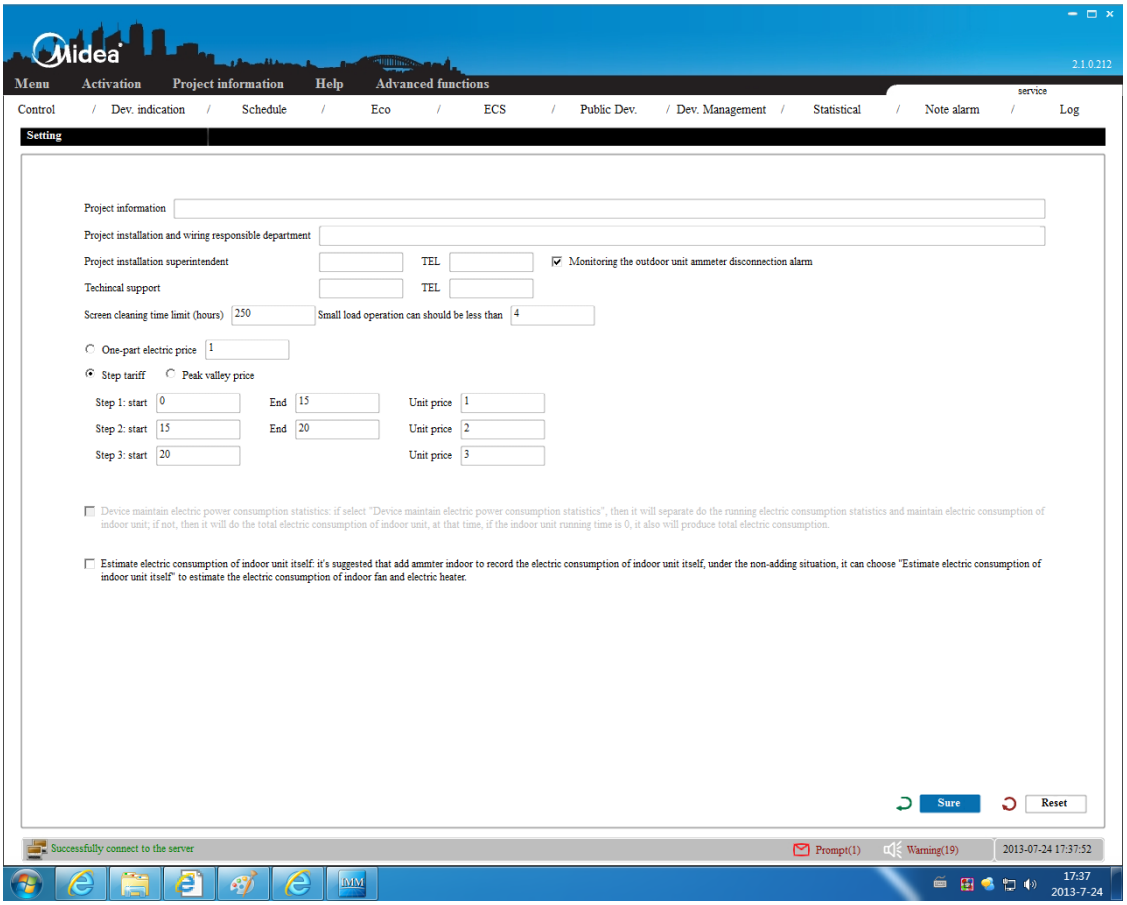
Notes:

User name "user" default password is "user".

User name "service" default password is "service".

6.6 Setting

When the administrator login the IMM client-side, select "Setting" under the "Advance function" and it will enter the following dialog:



Configure the report display forms of program information, electricity price and electricity partition.

Screen cleaning time limit (hours) is the air filter cleaning reminding function. It records the total running time of the indoor unit. When the accumulated running time reaches the pre-set value, click warning message can see the air filter cleaning reminding message, to remind users that the air filter of the indoor unit needs to be cleaned.

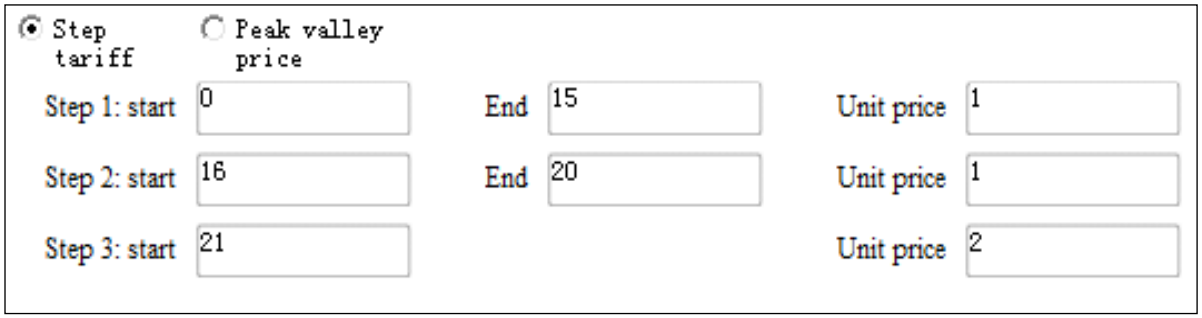
Small load operation (low-load operations indicate): When the outdoor unit is running and the capacity requirements are lower than the set value.

Electricity price calculation methods

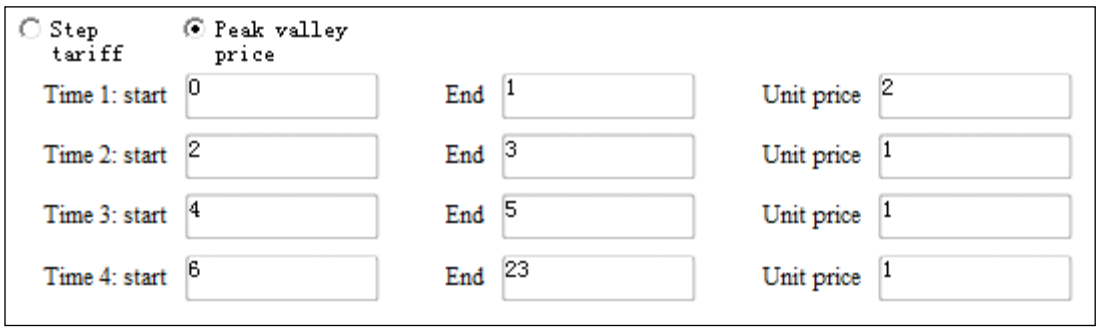
There are three kinds of electricity price calculation methods: one-part electric price (the single price), Step tariff (the multi-stage price) and Peak valley price (the peak-valley price, the setting steps as following:

1. Select the "one-part electric price" frame and input the price value, and then all the cost will be calculate according to the price.

2. Select the "Step tariff price" and setting the load-point and price. The electricity charge will be calculated according to the stage price of the power consumption.



3. Select "Peak-valley price", input the load-point and price in each period. It offers four periods in one day to calculate in “peak valley price”. For example: the first stage is setting as 0-1, and the unit electric price is 2, which means from 0:00 to 02:00, the power consumption is calculated by the unit electric charge of 2.

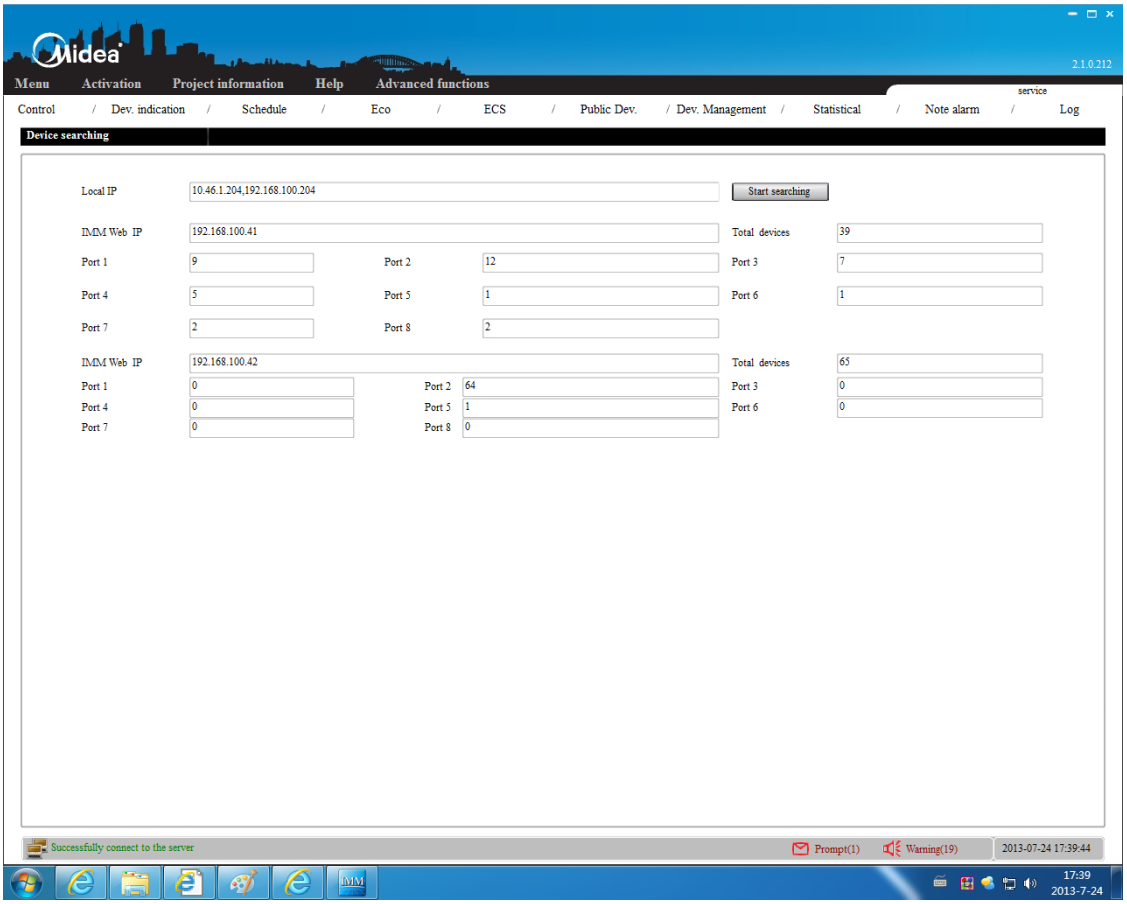


After configuration and click the "OK" to save.

6.7 Device searching

After administrator login the client-side and select "Device search" under "Advance function", it will display the following dialog:

Notes: After first installation or reinstall, IMM software must be operated the device searching.

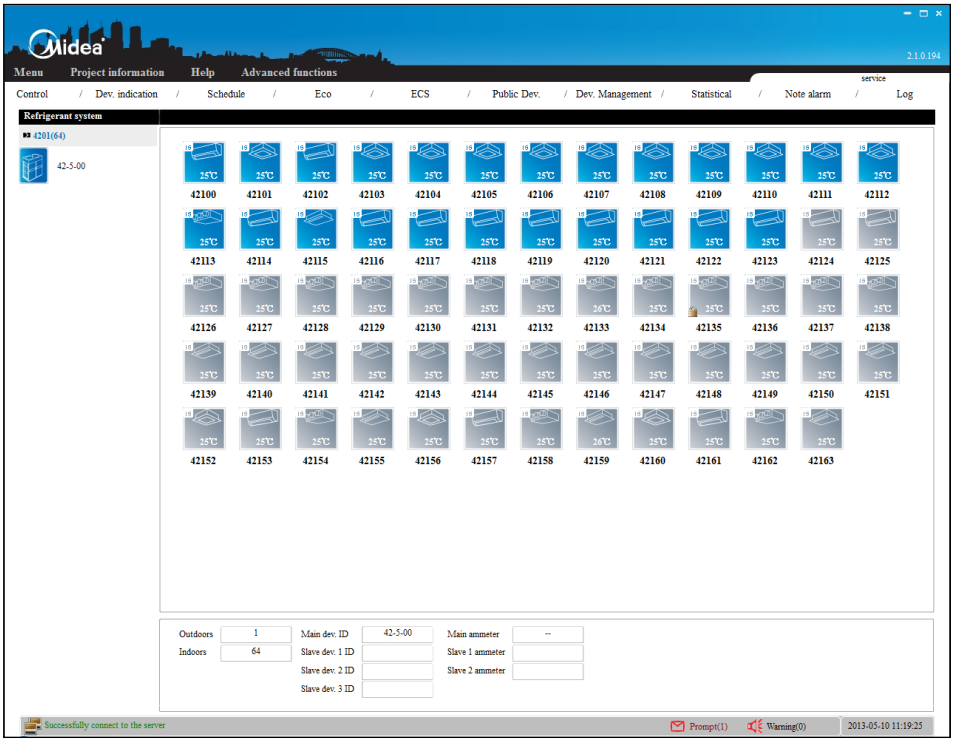


Local IP frame displays the server IP address. Click "Start searching" button, server will search specified IP address of M-INTERFACE gateway. (The specified IP address can be set in 6.2.1.4).

If there is server connection or database failures during running the device reaching function, it needs to search the devices again. After system installed, you need to run the device reaching function as an administrator.

6.8 Refrigerant system

After administrator login the IMM client-side software, select "Refrigerant system" under "Advance function" menu, it will enter the following dialog:



The interface can search all M-INTERFACE gateway and refrigerant system, the left side of page can display the refrigerant system and the system, the upper right display the indoor units under corresponding refrigerant system, the lower side display the outdoor unit quantity, indoor unit quantity, outdoor main/slave units' ID number, outdoor unit corresponding ammeter readings.

7. Electricity charge distribution

7.1 Electricity charge distribution overview

The algorithm of electricity charge distribution is Midea patented technology.

M-INTERFACE gateway collects the data from indoor units, outdoor units and ammeter's data with a cycle of 30 seconds through M-net terminal. Every hour (120 sampling periods) take refrigerant systems as a unit to configure the electricity consumed by outdoor unit, and report the result documents to the IMM software. IMM software will gather the electricity documents and create the user report.

7.1.1 Distribution factor

Indoor units' distribution factor calculation:

M-INTERFACE gateway will sum 120 "capacity requirements" of one indoor unit in the refrigerant system, and then divide the summation of all the indoor units' "capacity requirements" of refrigerant system to get the unit partition factor β.

Notes: "capacity requirement" of indoor unit is calculated by setting temperature, ambient temperature, mode and horsepower etc. parameters, the actual display to be electrical expansion valve opening etc.

7.1.2 Electricity distribution

M-INTERFACE gateway will divide the outdoor unit consumed electricity gathered by every hour to be: outdoor unit operating electricity P1, outdoor unit standby electricity P2 and outdoor unit malfunction electricity P3. The distribution factor β multiply by P1 to get the indoor unit operating electricity X, P2 divide indoor unit quantity to get the indoor unit operating electricity Y. M-INTERFACE gateway will turn X, Y, P1, P2, P3 to be electricity documents then upload to IMM software.

7.1.3 Electricity settlement

IMM software will gather the received electricity documents, and accord to the user selection to produce report of electricity price output in the specified hour.

Settlement 1: IMM software gathered electricity documents, add the indoor unit's X, Y and all the outdoor unit abnormal electricity P3, and this summation divide the effective indoor unit quantity get the value, then to get the consumed electricity W.

Settlement 2: IMM software gathered electricity documents, add all indoor units' X to get indoor unit operating electricity W1; all the outdoor unit standby electricity P2 and normal electricity P3's summation divide the effective indoor unit quantity get the indoor unit maintenance electricity W2.

7.1.4 Method of settlement

Settlement 1 can get the indoor unit consumed electricity W, even if the indoor unit didn't operate, W cannot be 0. For indoor unit standby electricity Y cannot be 0.

Settlement 2 can get the indoor unit operating electricity W1 and maintenance electricity W2. If indoor unit didn't operate then W1 is 0. W2 can get through "Air-conditioner maintenance cost".

7.2 Factors affect the electricity distribution error

7.2.1 Power meter sampling error

Ammeter precision has different class. Class 1 is 1% error. Class 2 is 2% error.

7.2.2 Calculation error

Electricity partition calculation error is 1%, that's two decimal places.

7.2.3 Safeguard system under malfunction situations

When the device cannot collect the data for power-off, off-line, safeguard system is necessary to avoid electricity loss or serious phenomenon. At that time the reasonableness of electricity distribution will be decreased. It should be handled the device error as soon as possible. If the following situations came out, the safeguard system will be operated:

1. When total indoor unit quantity of a refrigerant system were 1~5 sets, and disconnected indoor units in an hour were more than 1 set, classify P1 as P3 power;

2. When total indoor unit quantity of a refrigerant system were 6~10 sets, and disconnected indoor units in an hour were more than 2 sets, classify P1 as P3 electricity;

3. When total indoor unit quantity of a refrigerant system were 11~64 sets, and disconnected indoor units in an hour were more than 3 sets, classify P1 as P3 electricity;

4. When there has produced P1 electricity, but total indoor unit capacity requirements in an hour were zero, classify P1 as P3 electricity;

5. When it changed the ammeter and the first readings of changed ammeter was larger than the readings of the former ammeter, and then it will produce P3 electricity;

Increase the reasonableness of electricity partition under this situation is: calculate the electricity report before changing the ammeter and use a new day (begin with 00:00) as the start time of the next calculation.

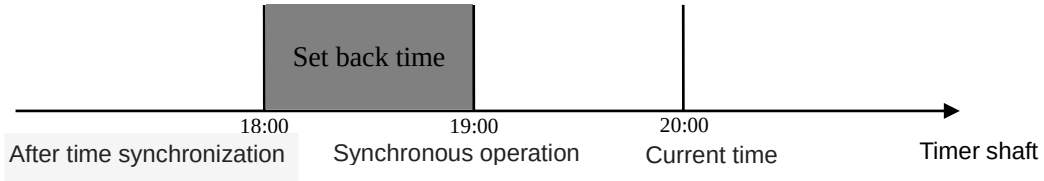
6. When the outdoor unit off-line, the produces electricity during off-line period will as P3 electricity;

7. When the ammeter was disconnected, the produces electricity during the disconnected will as P3 electricity;

8. When the M-INTERFACE gateway powered off (disconnected, switchboard power-off error etc.), classify the produced electricity during this period as P3 electricity;

9. When the M-INTERFACE gateway system time was synchronized back to the past, as the follow display, supposed M-INTERFACE gateway was operating till 19:00, at this time point, synchronized the M-INTERFACE gateway system time back to 18:00, and continued to operate 2 hours to the current time 20:00. And the timestamp between

18:00~19:00 will come out twice. Under this situation, the electricity of the set back time will be lost.



If came out this situation, it needs to find out the electricity readings records of 19:00 and 20:00 in IMM database and manual share the electricity for indoor units to avoid lose.

10. The ammeter readings continue to change, produce P4 electricity. Communication between outdoor unit and ammeter met the ammeter communication rules, the correctness of the data transmission was protective, but under some disturbed or ammeter error situations, sampled ammeter readings may be changed. For low down the correctness of electricity partition, filter the ammeter changed situation, and the filtering value P4 will be recorded in the electricity document but not in electricity partition.

11. Electricity produced during IMM WEB software upgrade period (about 8 minutes) will be classified as P3 electricity.

Notes:

P3 electricity will be shared to indoor units according to the effective indoor unit quantity;

Generally it should not use an old ammeter for changing;

When the customer reads ammeter and finds out the ammeter reading is abnormal, that may cause by ammeter readings changed, it needs to correct the ammeter.

7.3 indoor unit power consumption estimation

7.3.1 Estimation method

The fan and electrical heater of the indoor unit will consume electricity. The consumed electricity of indoor unit is the sum of the fan and E-heater's consumed electricity.

Fan consumed electricity: fan's operating hour multiply the fan's rated power.

E-heater consumed electricity: electrical heater's operating hour multiply the electrical heater's rated power.

7.3.2 Estimation error

The fan and electrical heater might be outputted not as the rated power during operating process, e.g.: AC fan may be operated high/med/low three speeds. This situation will cause error. The estimation value will be more than the actual value. If cannot accept this error, then can choose to install the ammeter at the indoor unit power supply side.

7.4 User report selection

After install the IMM software, through administrator rights to select user report way:

1. Output/not output maintenance cost
2. Estimate/not estimate indoor unit consumed electricity

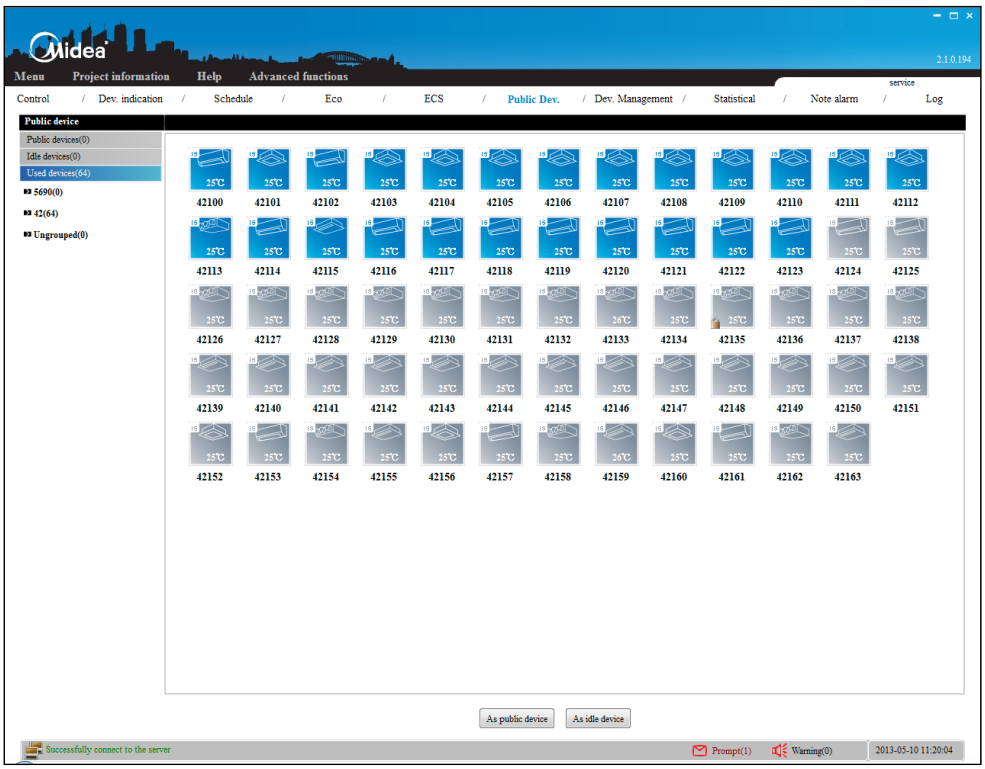
Notes:

If the customer does not accept the non-operating air-conditioner might cause output cost, it's suggested that select "Output maintenance cost";

If the customer does not accept the error caused by indoor unit consumed electricity estimation, it's suggested that select not estimate indoor unit consumed electricity, and install the ammeter at the indoor unit power supply side.

7.5 Public air conditioner and idle air conditioner setting

IMM software can divide the air conditioners to be public air conditioner and idle air conditioner, this function is suitable for the situations of commercial office building or apartment-style hotel. The setting interface is as follow:



IMM software will calculate the consumed electricity of public and idle air-conditioner, and share to the effective indoor units.

7.6 Full heat exchanger and new fan insert

Under the full heat-exchanger and new fan requirements situations, these two air-conditioners cannot mix with V4+ indoor units to connect into the refrigerant system. Under auto topology mode, needs to separate insert to M-net indoor unit communication connector; under manual topology mode, needs to establish a single refrigerant system in CSV document (refer to 8.1).

7.7 Electricity partition situation

Under the following situations, will share electricity:

1. Indoor unit standby.

2. Indoor unit operates the fan, the report display the device operating time not less than 0, but still has cost.

3. Outdoor unit produces abnormal electricity; at this time, no matter what modes the indoor unit operates, the abnormal electricity will be shared.

7.8 Precautions

1. Midea electricity partition method is not through the calculation tools, but through collecting the data and analysis and calculate the data, then get the result, so this cost report is only for reference, and should not use for commercial calculation basis.

2. If M-INTERFACE gateway's topology structure changes (air-conditioner quantity change), then use the changing time as separate point to print the report separately.

3. Indoor unit operation time specification

E.g.: 10 sets indoor units, one indoor unit operation time is not 0, other units are 0(select not estimate indoor unit electricity), why shares the electricity?

Reason: Operate the fan, or reach the setting temperature, indoor unit operation time will not be 0, but at that time the indoor unit state is the same with other standby indoor units, so share the electricity.

8. IMM software upgrade

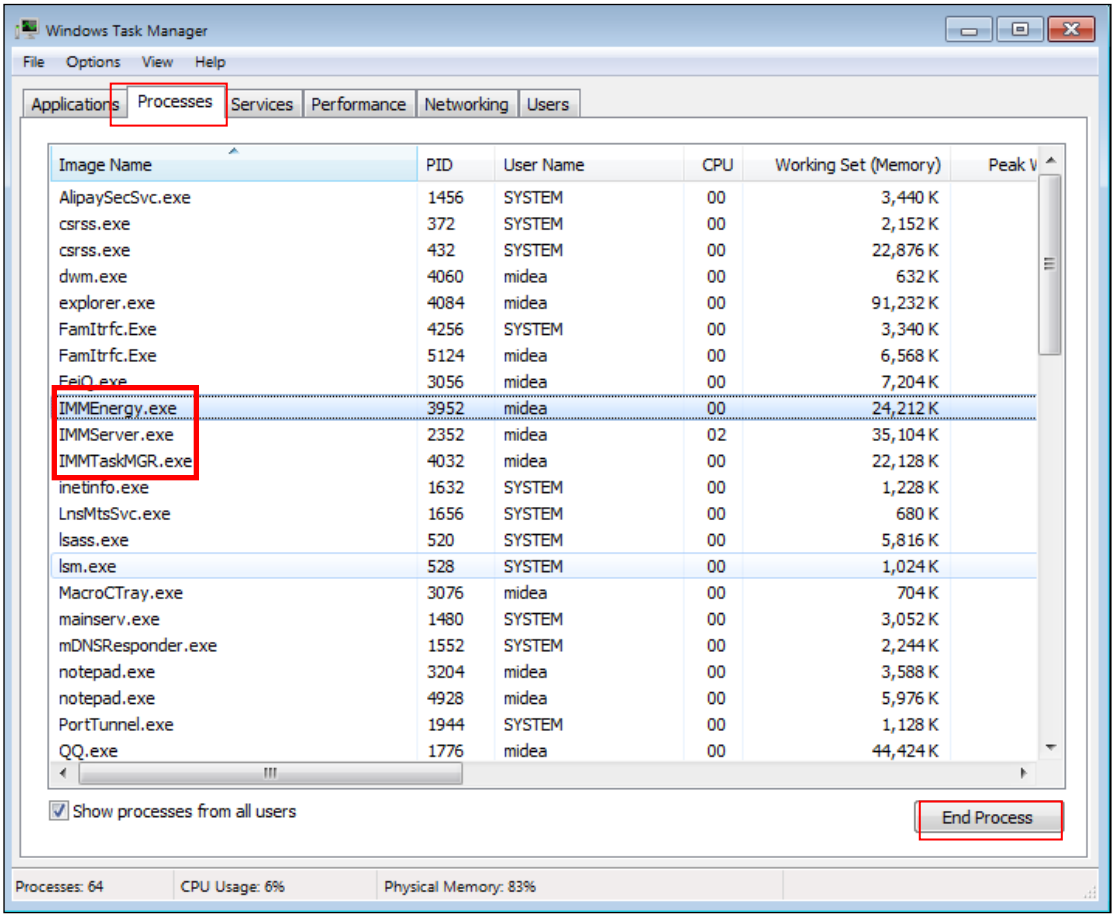
8.1 Database backup

Before the IMM software upgrade, the database must be backup. And before the backup, it need to choose a directory that the backup file storage. For example, D: \ IMM_DB_BACK. Before backup the database, be sure to disconnect all database connection, close the IMM client side software and server.

8.1.1 Close the client and server applications

Close the IMM client software interface directly, shut down the server can follow the steps below:

At the same time, press "CTRL + ALT + Delete" key on the keyboard, select "Start Task Manager", as below:



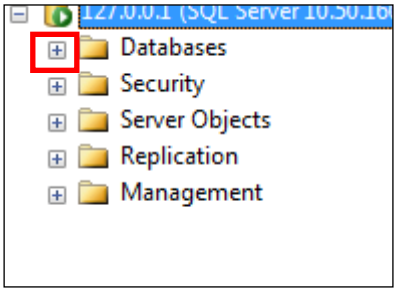
You must be in accordance with the order to close the IMMTaskMGR. exe process, IMMEnergy. exe program and IMMServer. exe.

Take closing IMMEnergy. exe program for example:

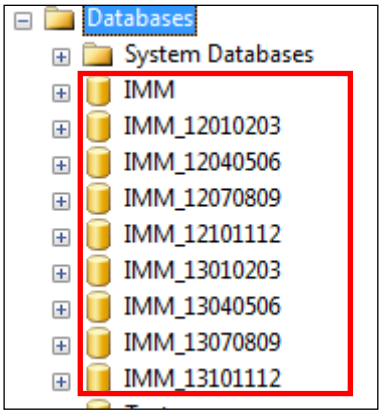
Selected IMMEnergy. exe in the bar, and then click "End Process" button. Choose "end process" in the pop-up box, then IMMEnergy. exe program was shut down.

8.1.2 Database backup

"Start" → "all programs" → Microsoft Sql server 2008 R2→sql server Management Studio. On the pop-up login box to input sa password (set in the database be installed, default: 654321), access the database, find the below part.



Click the red box to expand the Database option, the diagram below:



Please backup database of the red box. The backup steps reference to 9.3.1.

8.2 Backup the power file

Find the server installation directory (for example: D:\Program Files\IMMServer\ EnergyFTP), Backup the entire OK folders which stores the power data files.

8.3 Uninstall the client and the server software

8.3.1 Uninstall the client software

Before uninstall the client software, the client software must be closed. Then click: start→ all the procedures →IMM Client →Uninstall IMM Client

Select "Next" button will display as following:

Click "Finish" button and Uninstall complete.

8.3.2 Uninstall the server software

Before uninstall the server, all the server software should be closed. Then click:

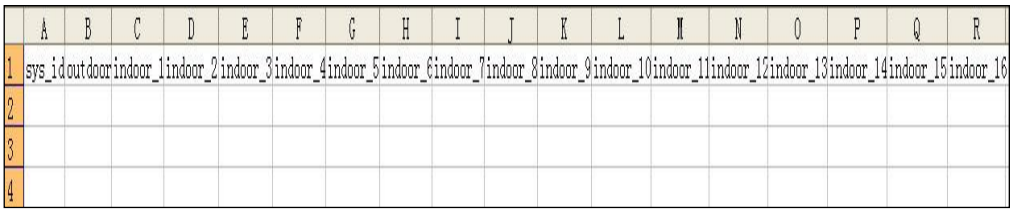
Start→Control Panel→Programs and Features → Right click the IMM Server →Uninstall

9.Appendix

9.1 Topology documents specification

System topology document reflects the system mapping relation, the topology document use CSV form, under manual topology mode, needs manual fill the CSV document.

1. Document structure



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	sys_id	outdoor	indoor_1	indoor_2	indoor_3	indoor_4	indoor_5	indoor_6	indoor_7	indoor_8	indoor_9	indoor_10	indoor_11	indoor_12	indoor_13	indoor_14	indoor_15	indoor_16
2																		
3																		
4																		

2. Column name specifications

Column name	Specifications
sys_id	System number(range 1,2,…….15,16)
outdoor	Outdoor unit
Indoor_x(x=1,2.3…..15,,16)	Indoor unit

3. Form

sys_id form: 1.2…..16.

Outdoor form: "Port No." _ "Outdoor unit address" (Display as two number, not enough number then add 0 in front of it)

Indoor_x form: "Port No." _ "Indoor unit address" (Display as two number, not enough number then add 0 in front of it)

4. Specifications

There are max. 16 systems in a CSV document, that is sys_id value's range is (1,2,…….16).

There are max. 4 outdoor units in a system, each outdoor unit in a row, and fill 16 indoor units behind it.

Indoor units in the same system cannot come out in several ports, but a port can has several indoor units (different indoor unit addresses) of several systems. That means indoor unit port number of the same system is the same.

Outdoor units in the same system cannot come out in several ports, but a port can has several outdoor units (different outdoor unit addresses) of several systems. That means

outdoor unit port number of the same system is the same.

Outdoor unit address range: 00~31, outdoor main unit address must find the value from (0,4,8,12,16,20,24,28).

Indoor unit address range: 00~63 (use two number display)

Port number range: 01~08 (use two number display)

5. Examples

System 1 concludes one outdoor unit (address: 00) and 64 indoor units (address: 00~63), outdoor unit connect to the No.5 port, indoor unit connect to No.1 port.

System 2 concludes one outdoor unit (address: 04) and 12 indoor units (address: 00~11), outdoor unit connect to the No.8 port, indoor unit connect to No.4 port.

System 3 concludes one outdoor unit (address: 08) and 12 indoor units (address: 12~23), outdoor unit connect to the No.8 port, indoor unit connect to No.4 port.

system 4 concludes one outdoor unit (address: 20) and 40 indoor units (address: 24~63), outdoor unit connect to the No.8 port, indoor unit connect to No.4 port.

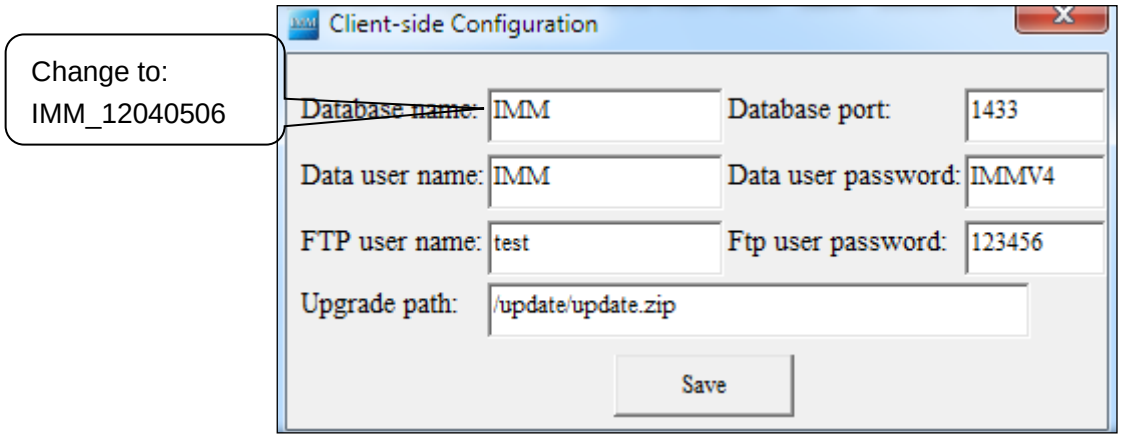
CSV document filling as follow:

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	sys_id	outdoor	indoor_1	indoor_2	indoor_3	indoor_4	indoor_5	indoor_6	indoor_7	indoor_8	indoor_9	indoor_10	indoor_11	indoor_12	indoor_13	indoor_14	indoor_15	indoor_16
2	1	05_00	01_00	01_01	01_02	01_03	01_04	01_05	01_06	01_07	01_08	01_09	01_10	01_11	01_12	01_13	01_14	01_15
3	1		01_16	01_17	01_18	01_19	01_20	01_21	01_22	01_23	01_24	01_25	01_26	01_27	01_28	01_29	01_30	01_31
4	1		01_32	01_33	01_34	01_35	01_36	01_37	01_38	01_39	01_40	01_41	01_42	01_43	01_44	01_45	01_46	01_47
5	1		01_48	01_49	01_50	01_51	01_52	01_53	01_54	01_55	01_56	01_57	01_58	01_59	01_60	01_61	01_62	01_63
6	2	08_04	04_00	04_01	04_02	04_03	04_04	04_05	04_06	04_07	04_08	04_09	04_10	04_11				
7	3	08_08	04_12	04_13	04_14	04_15	04_16	04_17	04_18	04_19	04_20	04_21	04_22	04_23				
8	4	08_20	04_24	04_25	04_26	04_27	04_28	04_29	04_30	04_31	04_32	04_33	04_34	04_35	04_36	04_37	04_38	04_39
9	4		04_40	04_41	04_42	04_43	04_44	04_45	04_46	04_47	04_48	04_49	04_50	04_51	04_52	04_53	04_54	04_55
10	4		04_56	04_57	04_58	04_59	04_60	04_61	04_62	04_63								

9.2 The history power data query

1. Database will auto backup the data of previous 3 months, and carries out backup operation at 02:30 every day. E.g.: Database IMM_12010203 backup is the data of Jan, Feb and Mar in 2012.

2. If carry out database backup query operation, it only needs configure the database to need connected database in the client-side IMMIP.exe dialogue frame. E.g.: if needs to query Apr, May and Jun of 2012's data, then do the following setting in IMMIP.exe:



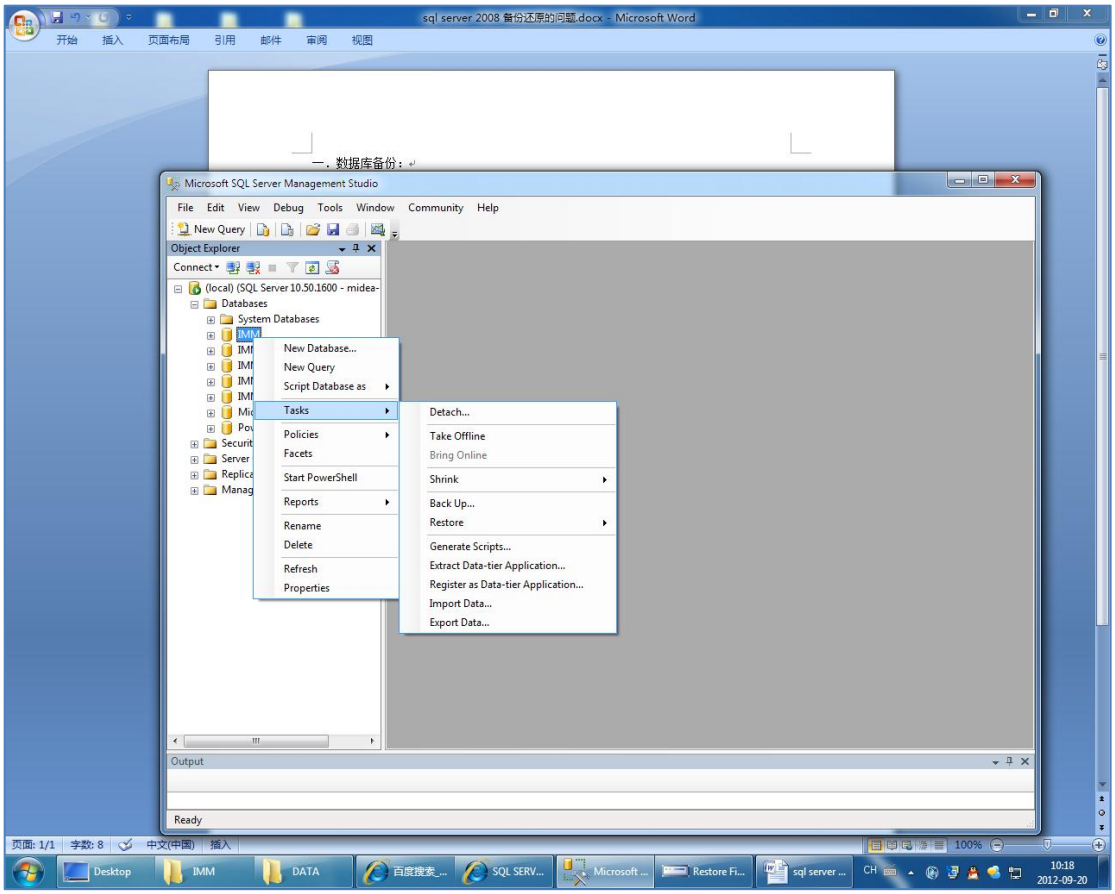
Set the database name to be IMM_12040506, and then click "Save" button to finish.

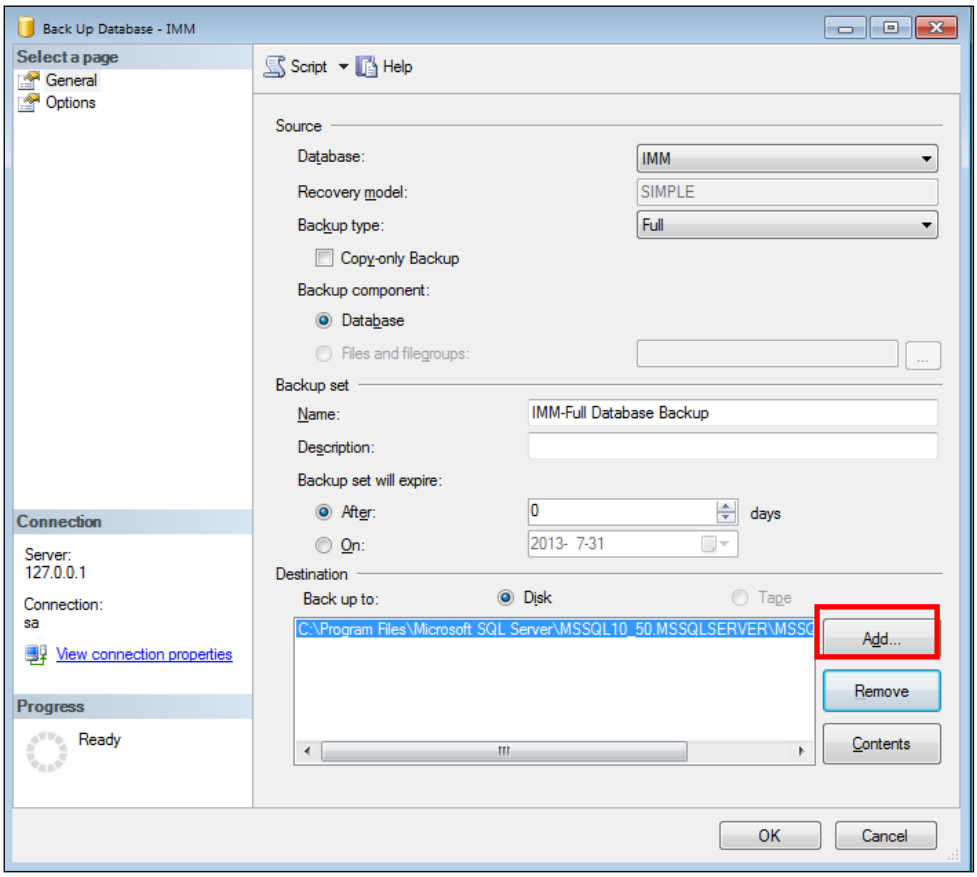
9.3 Database backup and restore

9.3.1 Backup the database

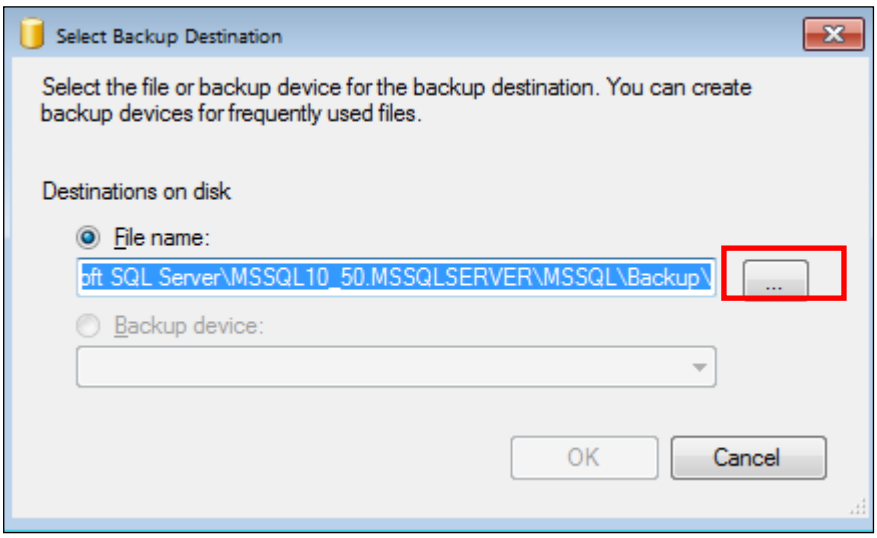
Taking IMM database for example:

1) Right click the IMM database, "Tasks" → "Back Up..." , as below:

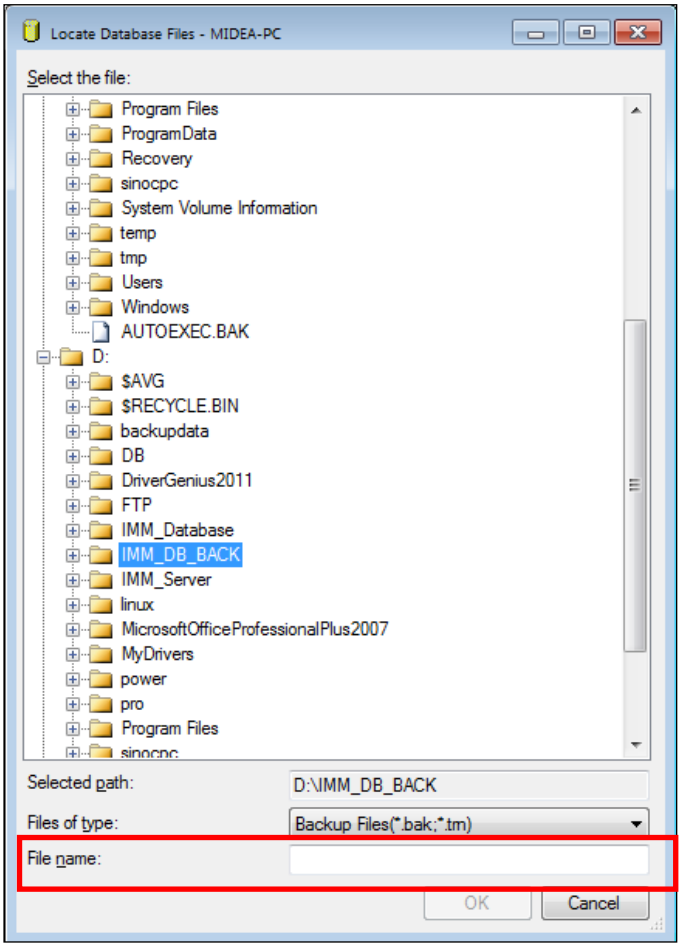




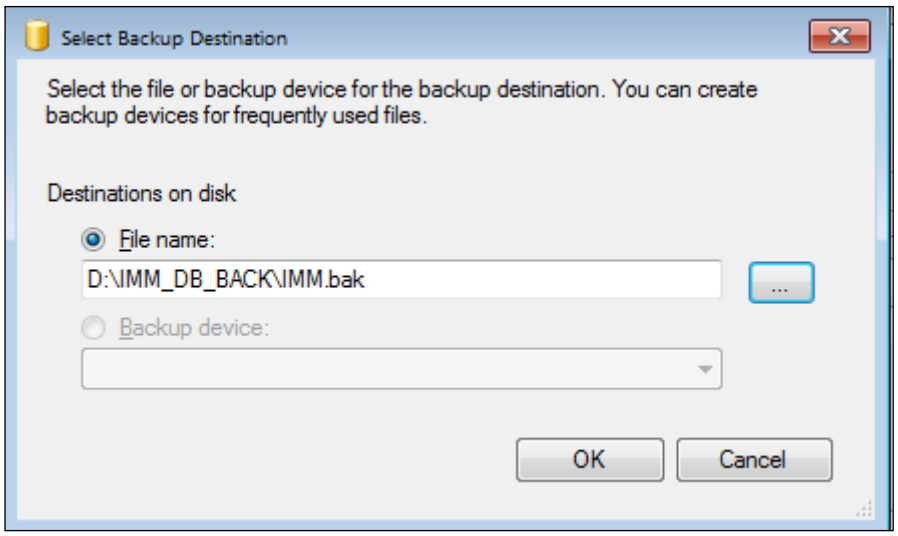
2) Click the "Add" button will enter the following page:



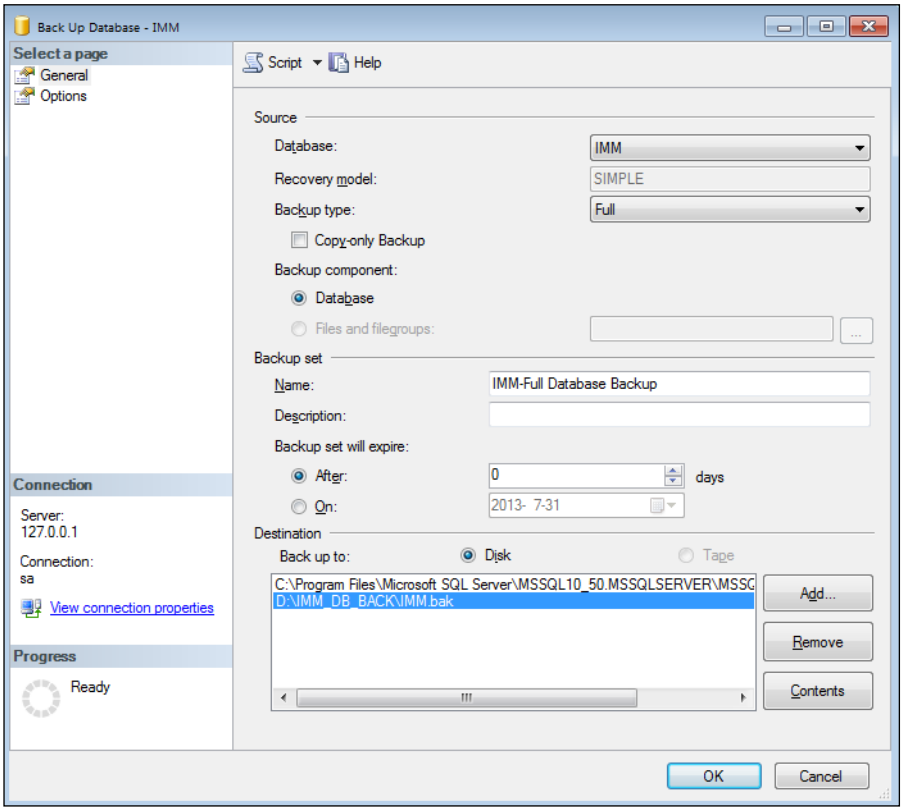
3) Click the button in the red box, select the directory used to save backup files in the pop-up box:



4) Click the backup directory, type the name of the backup in the red box: IMM. bak (the same with the database name, Take. Bak suffix). Click "OK" button.

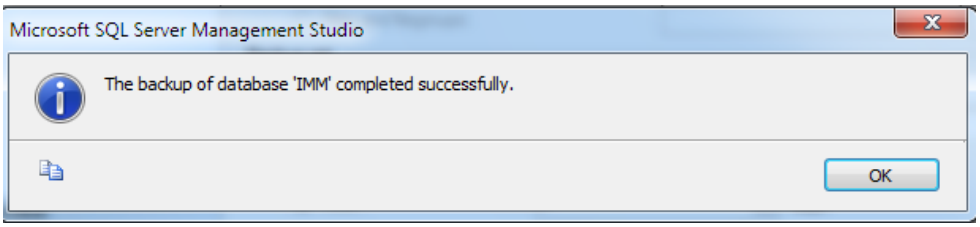


5) Click "OK " button in the above image.



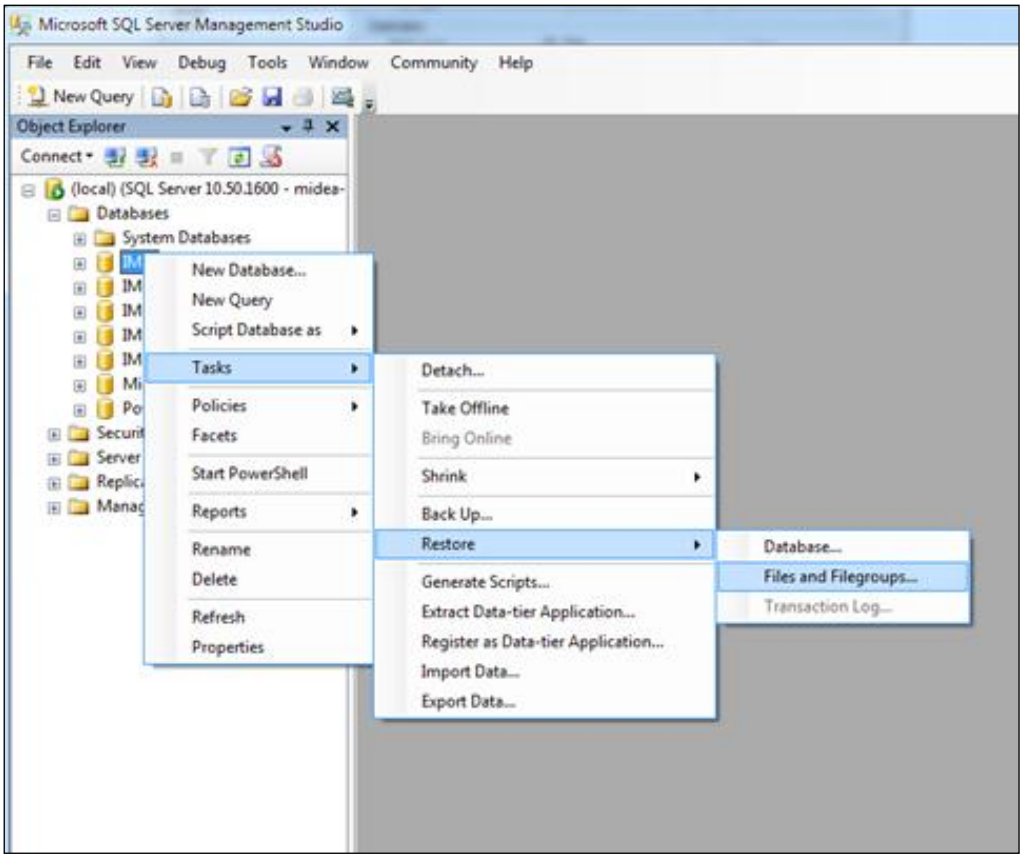
6) Choose backup file in the picture above , click "ok" button.

After backup is completed, the successful message will be popuped, as follow:

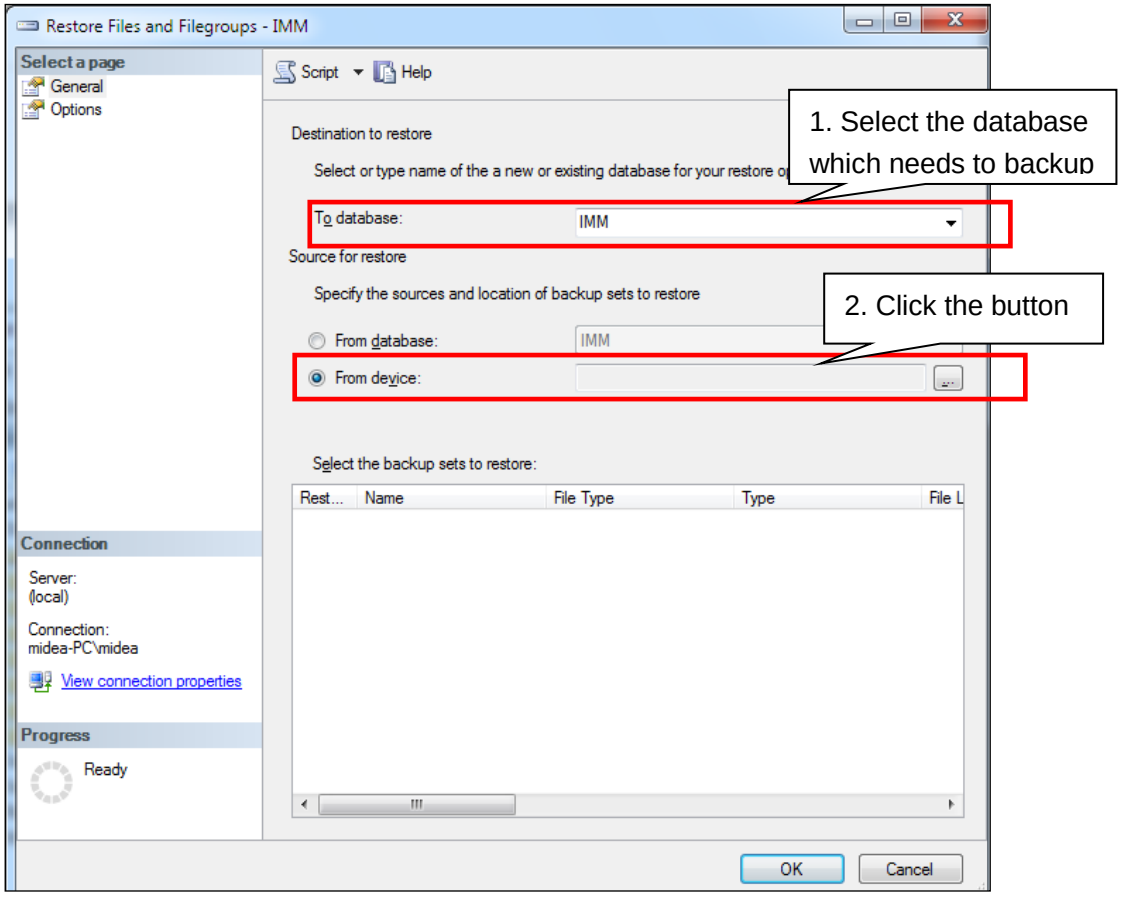


9.3.2. Restore the database

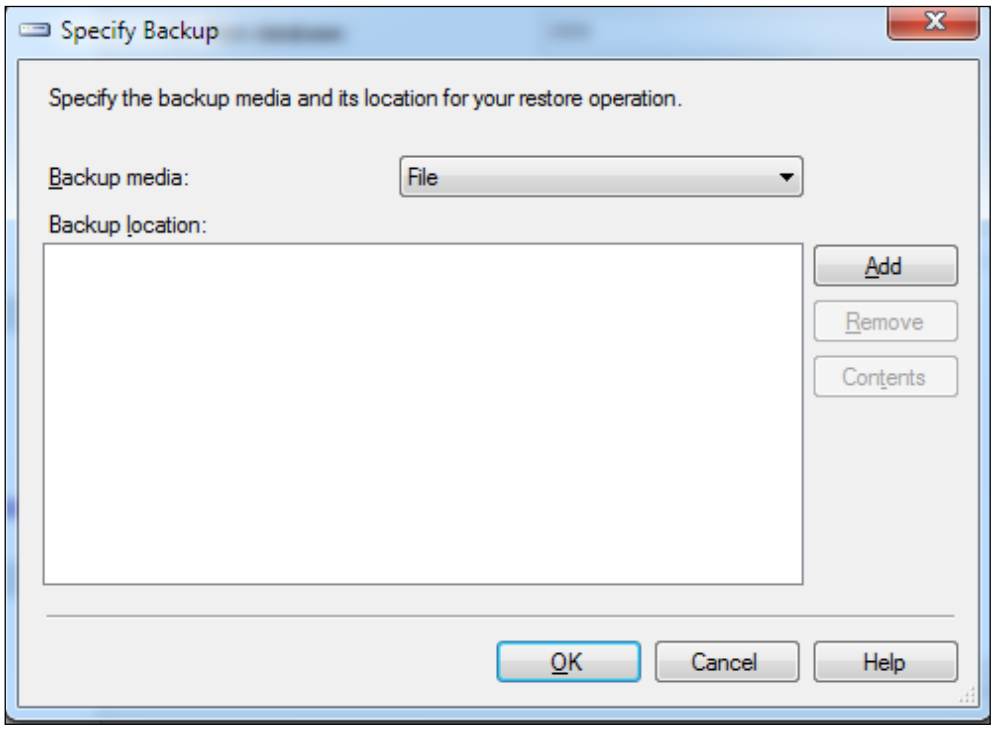
Close all the connections before restore the database (include IMM client-side and server), and delete the data and log documents of waiting restored database (IMM.mdf and IMM_log.ldf), e.g.: D:\DB\IMM.mdf and D:\DB\IMM_l og.ldf



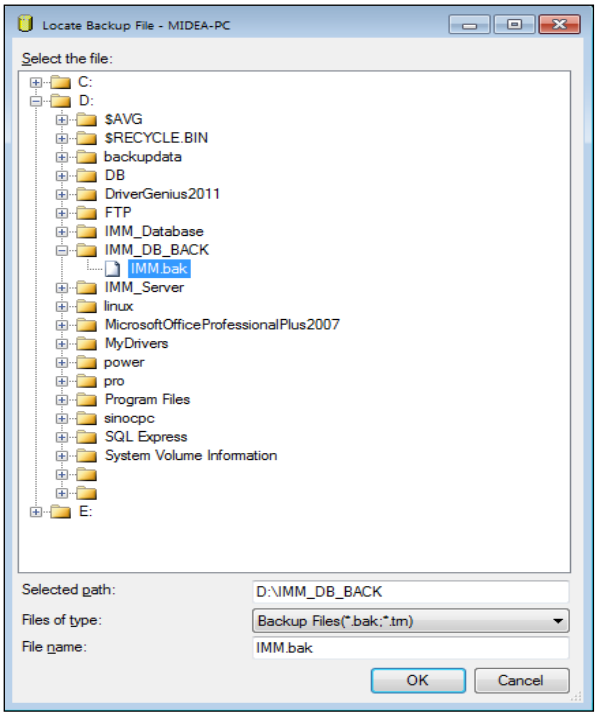
Select the database which needs to backup on the above figure, and right click on the database which needs to backup, select "Tasks" →"Restore" →"File and Filegroups", then display as the following:



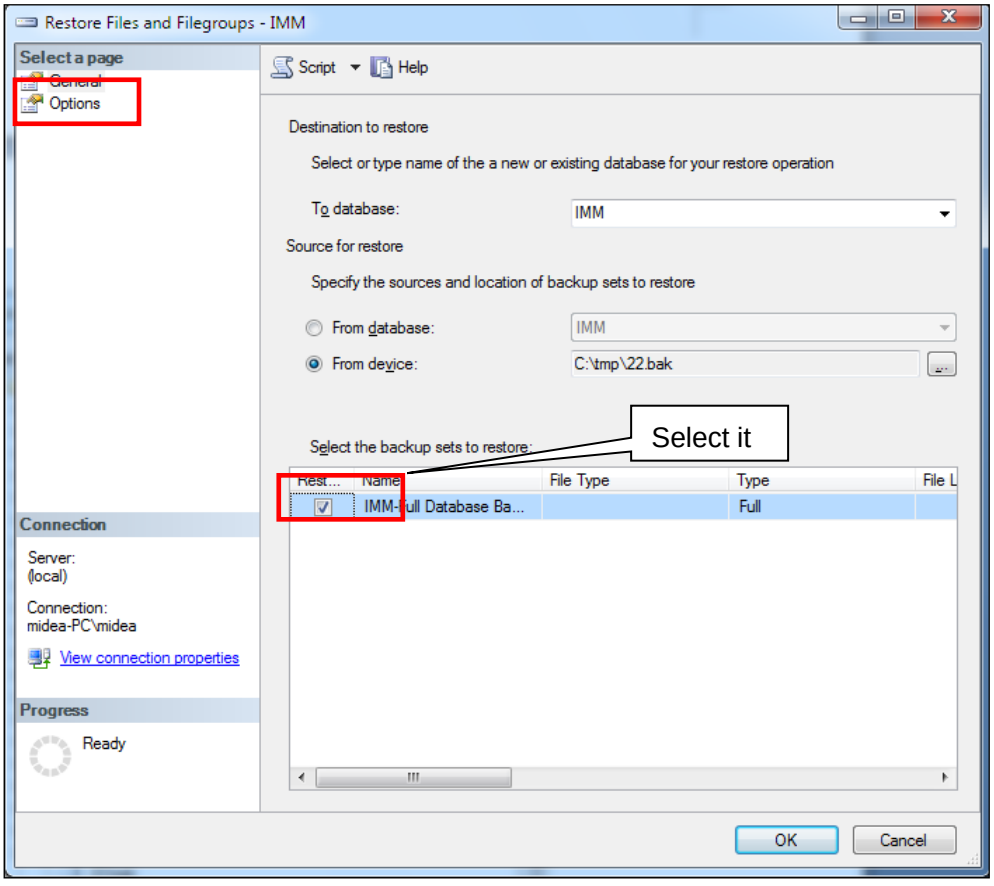
After click the right side button of "From device", then display as following:



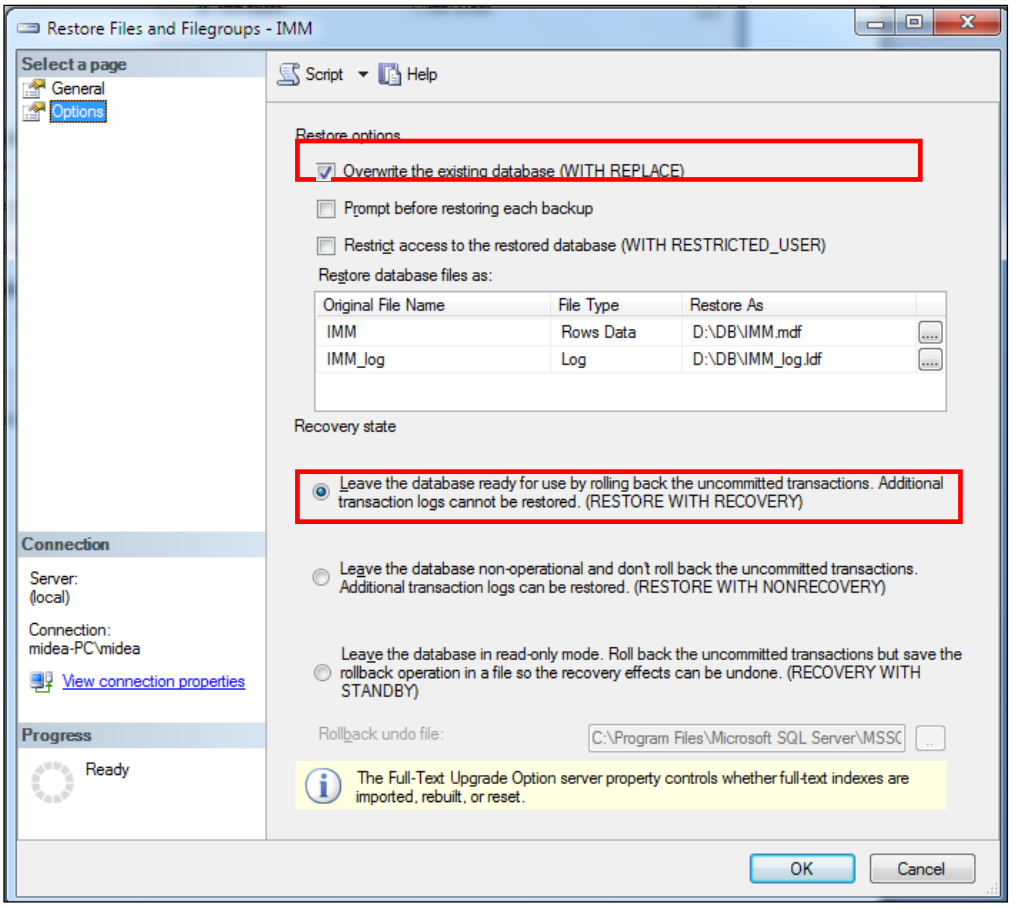
Click the "Add" button of the above, then display as follow:



Select the document used for restoring, click "OK" button.



Click the "Option" of the above image, then displays as following:



Selected the red box section on the above image and click "ok" button. Restore operation is complete.

9.4 Power meter installation (Customized)

9.4.1 Power meter installation solution

At present there are two kinds of power meter wiring schemes in engineering:

A refrigerant system can be connected to three-phase digital power meter of low current only used by Midea (can connect to the external current transformer). The external current transformer power meter can be installed directly on the power of the air conditioner system bus, implement a refrigerant system with one meter.

Code	Name	Overload current
DTS634-M	three-phase digital power (380V,50Hz,6A)(CHINT)(RoHS)	180A
BH-0.66-30IB	current transformer (150A/5A)	

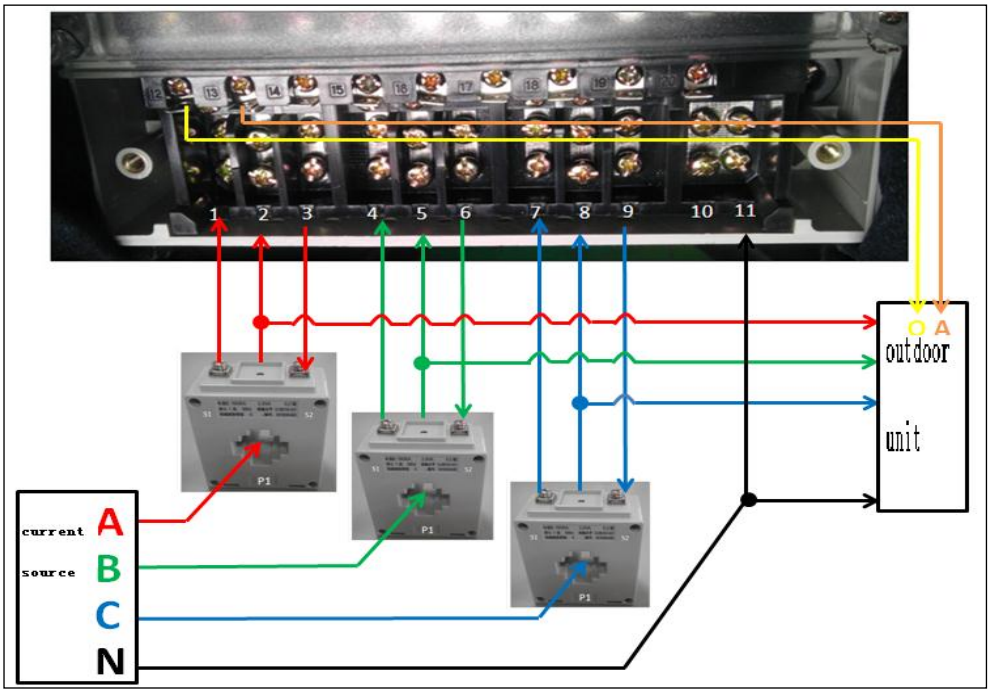
2. A outdoor unit connects to three-phase digital power meter of large current, at present there are two kinds of meter in using, details are as follows:

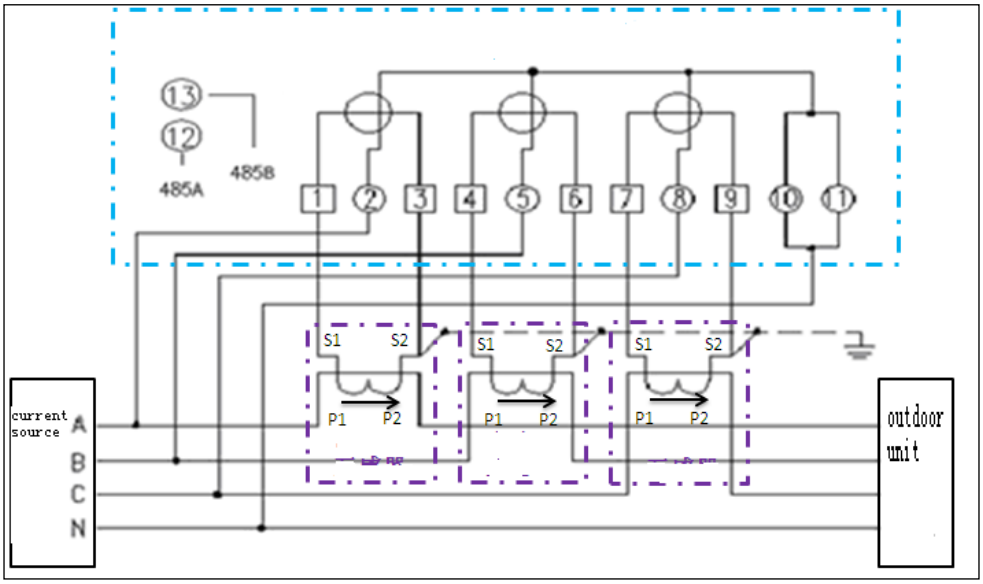
Code	Name	Overload current
DTS634-F	three-phase digital power meter (380V,50Hz,100A)(RoHS)	180A
DTS634/DTS636	three-phase digital power (60A)(RoHS)	60A

9.4.2 Wiring instructions

1. The wiring between current transformer and power meter

The power meter installed is DTS634-M. In the wiring diagram, the 1, 4 and 7 ports of the power meter need to connect to current transformer's S1 terminal; the 3, 6 and 9 ports of the power meter need to connect to current transformer's S2 terminal. The 2, 5 and 8 ports of the power meter need to connect to three-phase power supply. The 10 and 11 ports of the power meter need to connect to ground. In sure to safety，it's necessary to connect current transformer's S2 terminal before connecting the ground.





2. The connection of meter and outdoor unit

In the above figure 485A connects to the O terminal of power meter. 485B connects to A terminal of power meter. The length of communication wire should less than 100m. Communication cable is isolated to high voltage.

3. Notes:

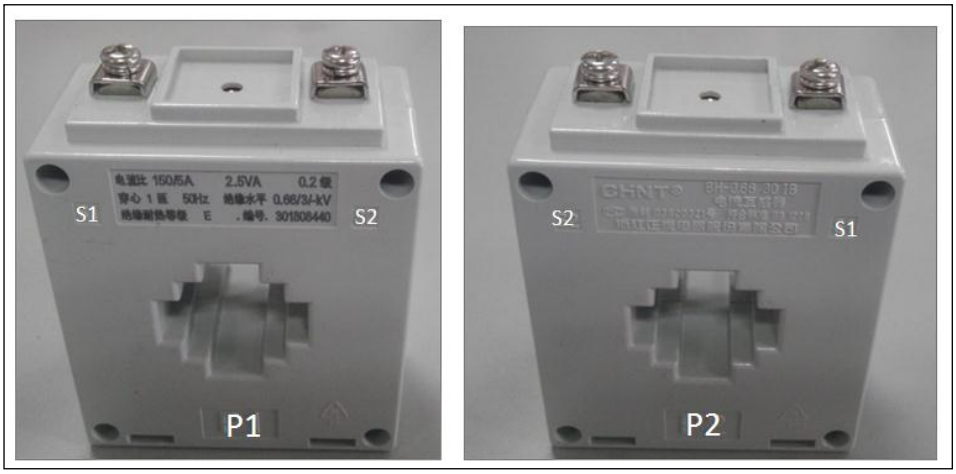
(1) The power meter is customized by Midea, it has been set the percentage of 30:1, and if it is bought from the market, it will not normally use

(2) DTS634-M meters' current specifications:

1.5 (6) A is used with BH-0.66-30IB current transformer, and the current specifications will change into: 45 (180) A, so the power meter's maximum current is 180 A.

(3) We only offer DTS634-M power meter and BH-0.66-30IB current transformer. The connection line from current transformer output to the electricity meter should be offered by installer. We suggest that the line diameter should ≥2.5mm².

Current transformer of BH-0.66 30IB：



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