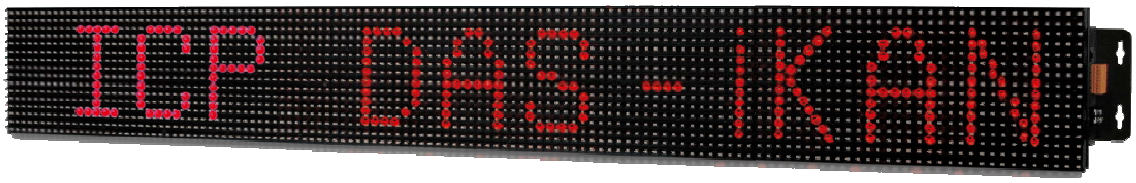
# iKAN Series

## User Manual

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**Edited by Sunny Chiu**

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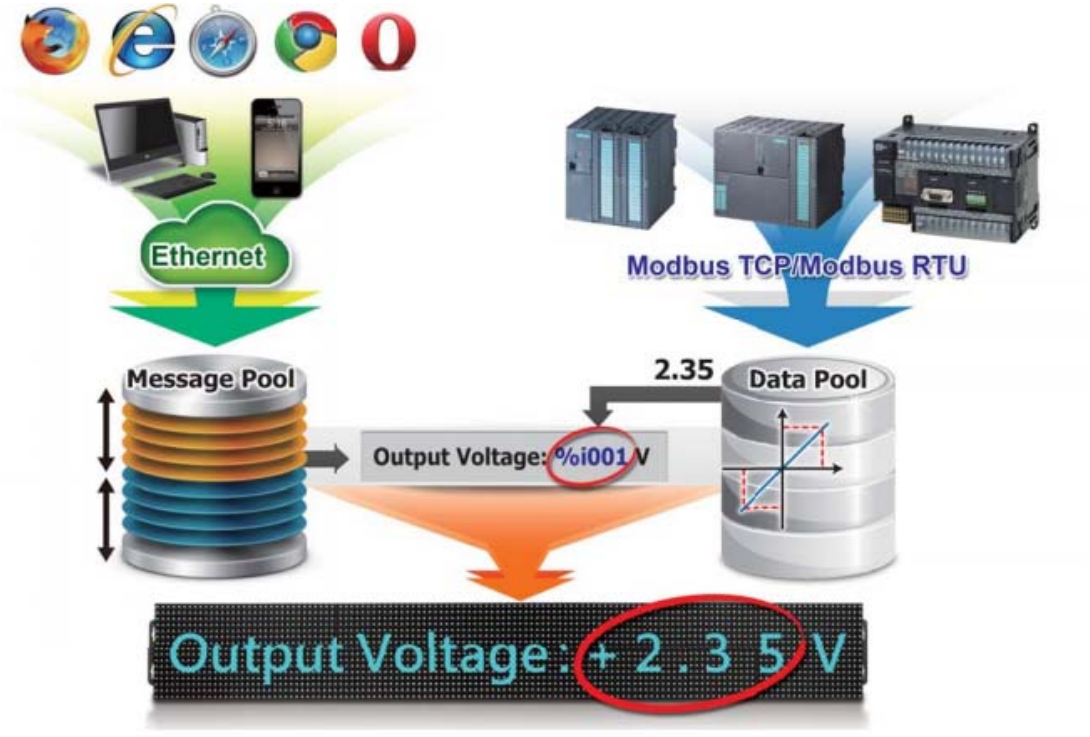
# 1. Introduction

The iKAN series is a family of industrial Modbus LED display devices that deliver industrial-grade anti-noise capabilities as well as reliability and stability. The series display device is highly suitable for presenting formatted messages in indoor areas using either Unicode characters, which can be used to display multiple languages, or ASCII characters. Support for the popular Modbus industrial protocol is provided meaning that iKAN display devices can be easily integrated into existing PLC and SCADA environments.

168 variables are provided to allow data written from a PC or a PLC to be displayed in a formatted message in real-time. Seven colors are available for the text, which can be used to indicate different degrees of importance of the message, as well as significantly increase the readability of the message in an industrial arena.

Messages can be edited using a standard web browser, such as Google Chrome, Firefox, or IE, etc., on a PC, mobile device, or smartphone without any limitations related to specific control tools or programs. The display of individual messages can also be remotely enabled or disabled as necessary using the same standard web browser. Each model in the iKAN series provides storage space for up to 64 common messages and 10 instant messages, each containing a maximum of 40 Unicode characters or 100 ASCII characters. With an open user interface and the ability to display real-time data, the iKAN series LED display can be installed in a variety of indoor spaces, including shopping malls, railway stations, and industrial areas.



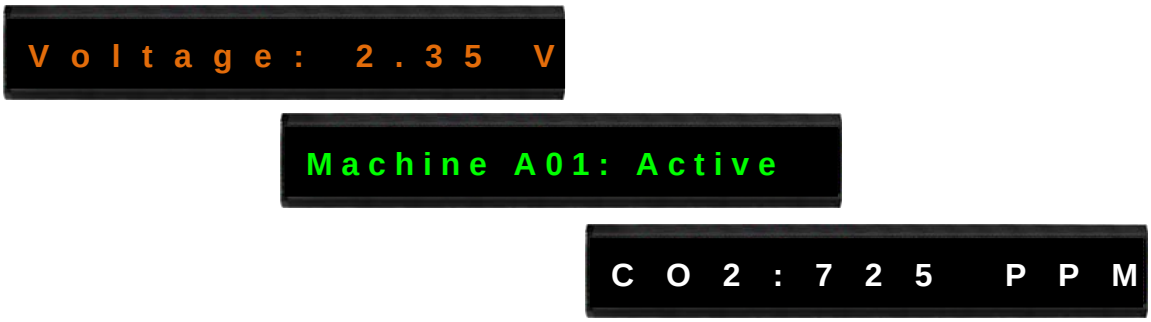
## Features:

- Supports multiple languages when using Unicode characters
- Text height of 16 cm
- 7 colors, including red, blue, yellow, green, light blue, purple and white
- Adjustable brightness and message motion speed
- Able to store up to 64 common messages and 10 instant messages
- Able to integrate both text and variables in a single message
- Supports the Modbus TCP/RTU Slave protocols
- Built-in RTC (Real Time Clock)
- Web-based User Interface
- Can be remotely controlled using a smartphone or other mobile device

## Function description

### PLC HMI

The iKAN series can be employed as a large HMI with a memory storage of up to 64 common messages and 10 instant messages, each of which can be used to display information generated by a PLC. Message text can be displayed in a range of seven colors, including red, blue, yellow, green, light blue, purple, and white, which can be used to indicate warnings or alarms, as well as increasing the readability of a message.




### Supports Multiple Languages

The iKAN series of display device supports Unicode input, meaning that messages can be configured to be displayed in multiple languages.

### Message Editing

A maximum of 64 common messages and 10 instant messages can be preconfigured from the first moment that the iKAN series display is switched on. When the display is in operation, the focus needs only be on message management rather than the need to frequently update the messages.

### Message Priority

Instant messages have a higher priority than common messages. Once an instant message is enabled, the common message currently being displayed will be suspended until the instant message is disabled. This feature allows the most important information to be displayed in an emergency situation.

### Integer-type variables enable data mapping

The iKAN series of display devices provide the ability to perform data mapping to translate a computer integer value to a readable physical value, such as the voltage, temperature, or relative humidity, etc. In the industrial field, this is a commonly performed task between the host computer and the data-acquisition devices via the Modbus protocol, enabling a reduction in the resources and programming required for the host computer

### Import/Export the message configuration

The iKAN series allows a message and the parameters of the variables to be saved as a configuration file, which can then be loaded onto another iKAN series device to avoid the need to repeat the configuration.

### Smartphone Application

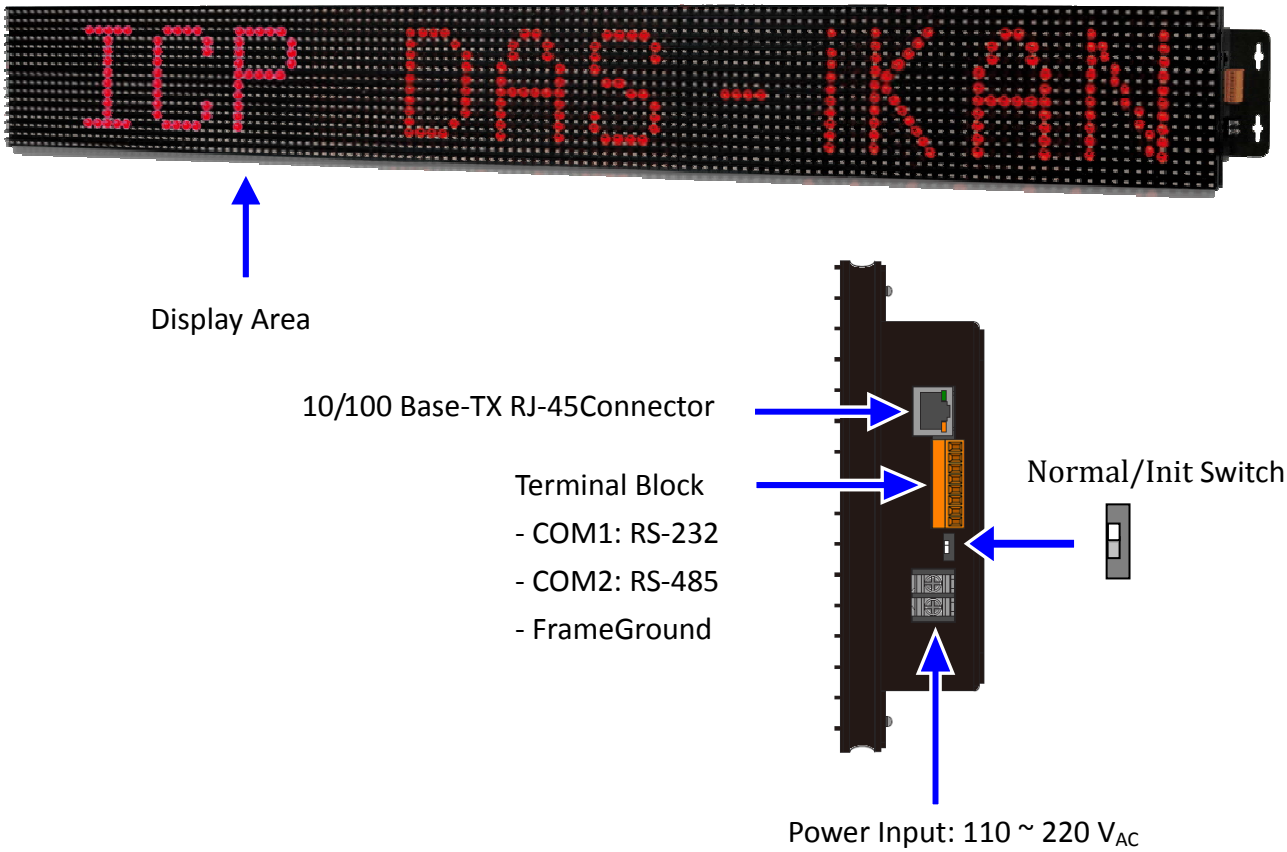
Users can manage messages via a regular smartphone without requirement of a specific connection device, meaning that emergency information can be quickly sent to the display using the smartphone.

# 2. Hardware Information

## Specifications

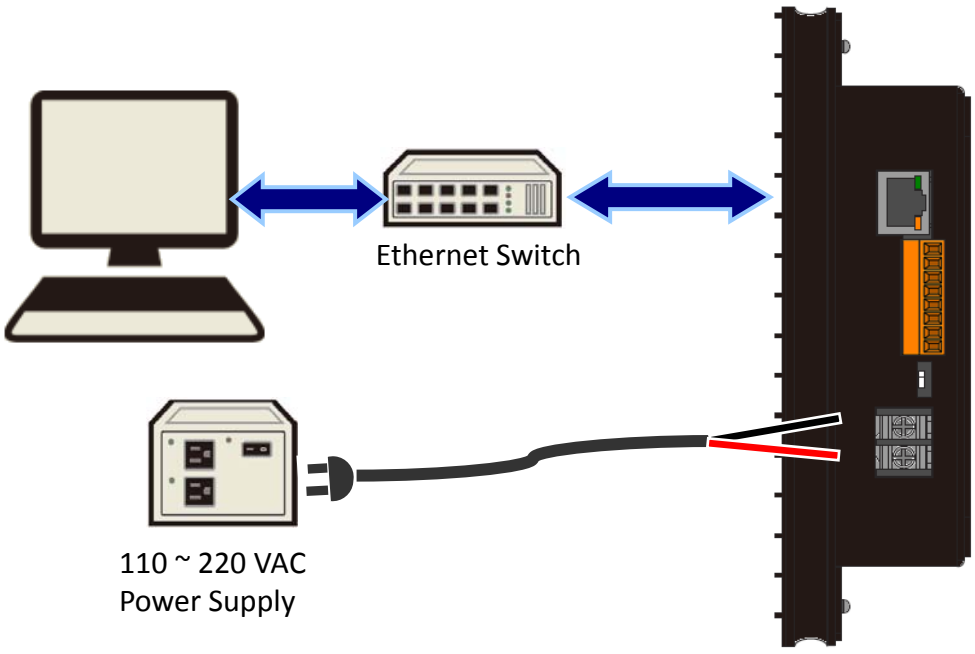
| Model | | iKAN-116 | iKAN-124 |
|---|---|---|---|
| **Display** | | | |
| Color | | Red, Blue, Yellow, Green, Light Blue, Purple or White | |
| Character Set | | 16-bit Unicode or 7-bit ASCII | |
| Display Size | ASCII | 16 characters | 24 characters |
| | Unicode | 8 characters | 12 characters |
| Message Pool | | 64 common messages and 10 instant messages<br>Up to 40 Unicode characters or 100 ASCII characters each | |
| Data Pool | | 40 Coil values, 64 Float values, and 64 Integer values | |
| RTC<br>(Real-time Clock) | | Date and time, 24 hour format, including hours, minutes, seconds, day of the week, date, month, year | |
| **Ethernet** | | | |
| Port | | 1 x RJ-45, 10/100 Base-TX | |
| Protocol | | Modbus TCP Slave, Max. 8 connections | |
| Configuration | | Web-based User Interface | |
| **COM Port** | | | |
| Interface | | RS-232 or RS-485. Note that the interfaces cannot be used simultaneously | |
| Baud rate (bps) | | 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 | |
| Data Format | | N81, E81, O81 | |
| Protocol | | Modbus RTU Slave | |
| **Power** | | | |
| Input Range | | 110 ~ 220 $V_{AC}$ | |
| Consumption | | 0.25 A @ 110 $V_{AC}$,<br>0.125 A @ 220 $V_{AC}$ | 0.3A A @ 110 $V_{AC}$,<br>0.15 A @ 220 $V_{AC}$ |
| **Mechanical** | | | |
| Dimensions (W x H x D) | | 1346 mm x 160 mm x 49 mm | 1986 mm x 160 mm x 49 mm |
| Installation | | Wall mounting | |
| **Environment** | | | |
| Operating Temperature | | 0 to 60°C | |
| Storage Temperature | | -10 to 75°C | |
| Humidity | | 10 to 90% RH, Non-condensing | |

## Appearance

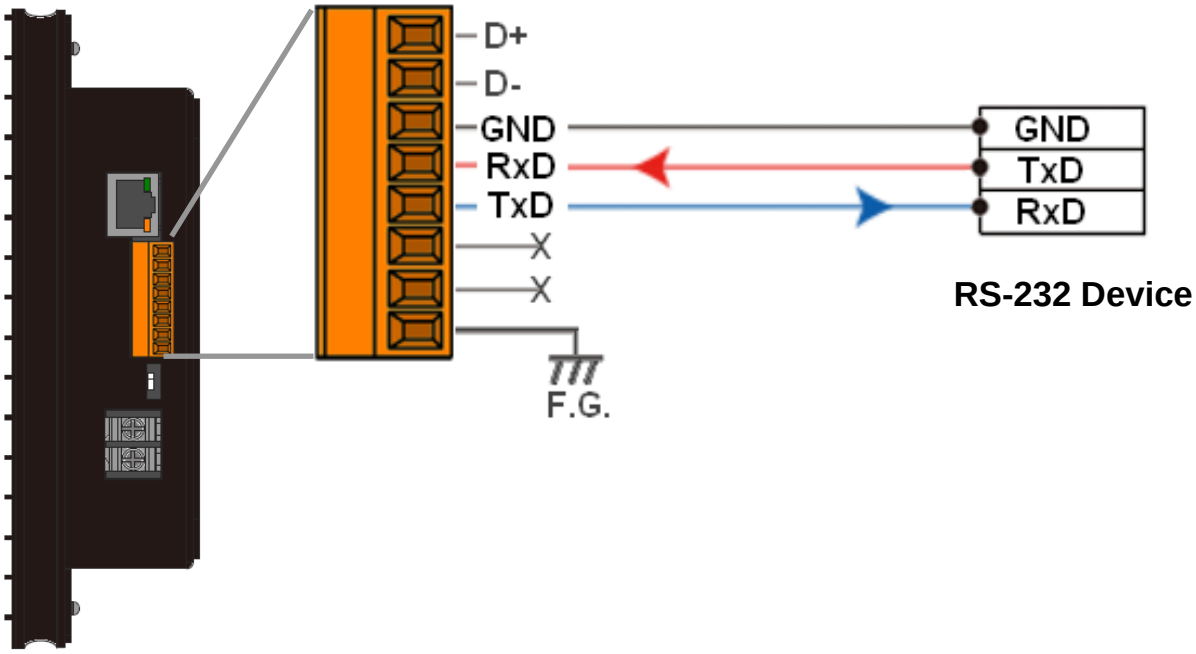



## Wiring

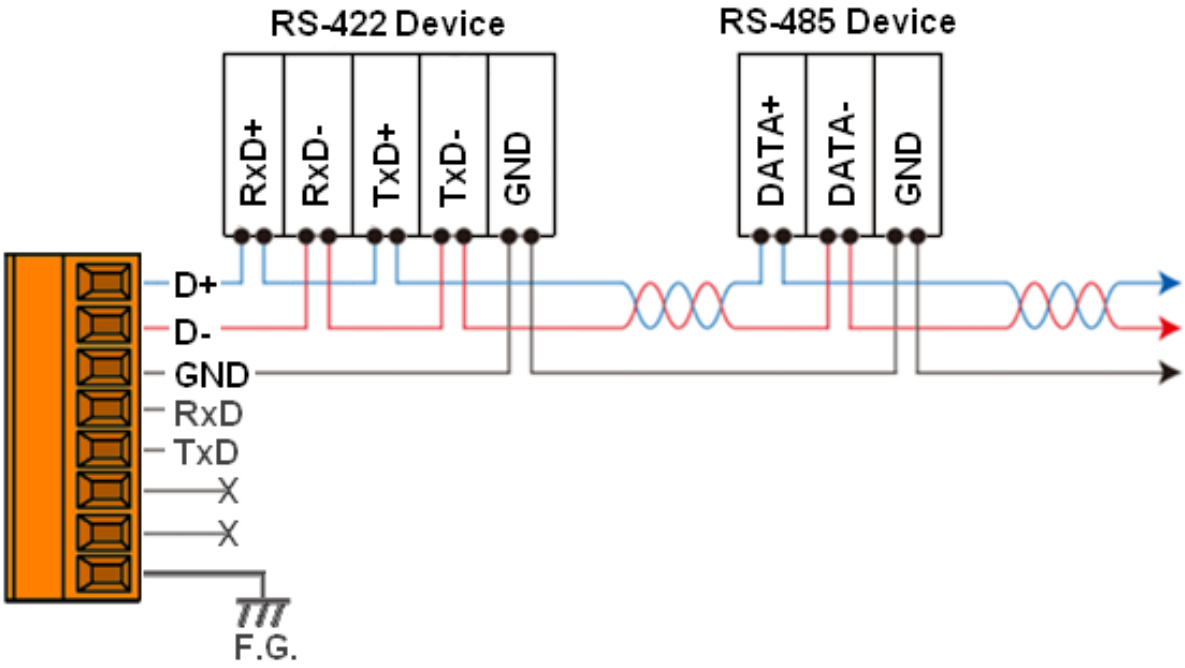
### Power and Ethernet Wiring



## RS-232 Wiring

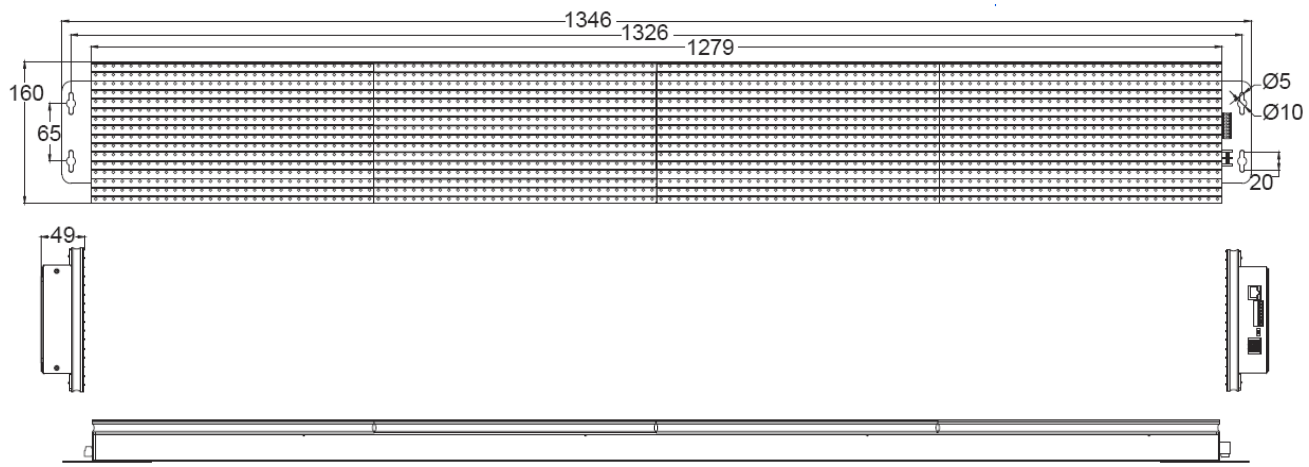



## RS-485 Wiring

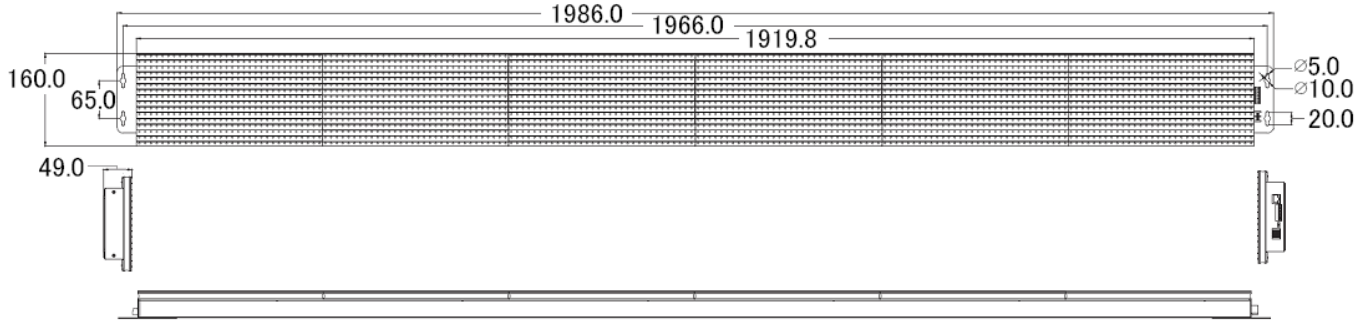


## Dimensions (Units: mm)

### iKAN-116




### iKAN-124



# 3. Configuration

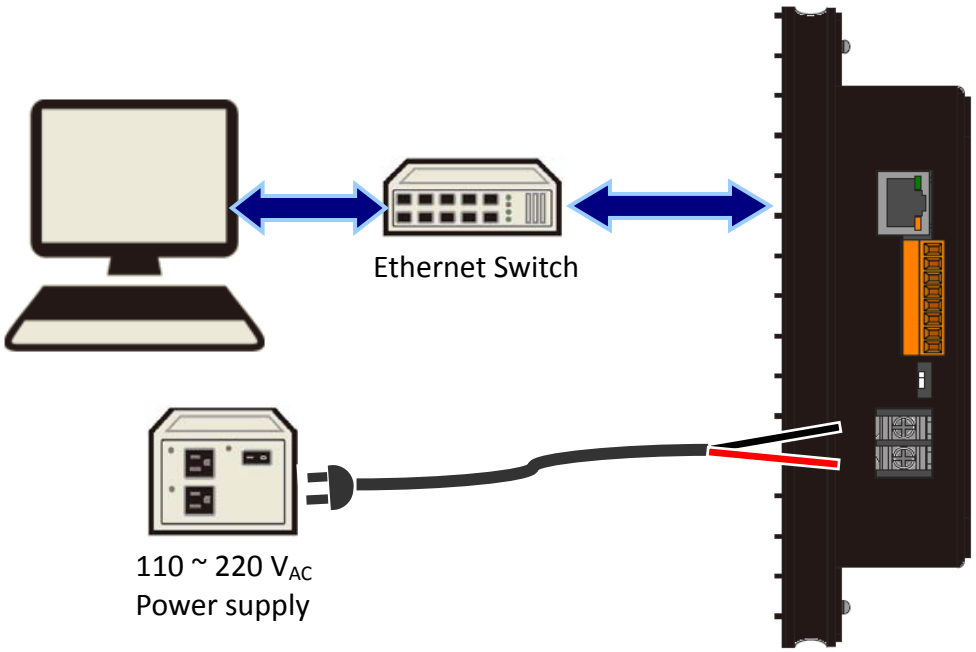
## 3.1. Ethernet configuration

The factory default IP address for each iKAN device is **192.168.255.1**. Before integrating an iKAN series display into your network, you should configure the IP, Mask, and Gateway addresses for the device by setting the values that are valid for your network system. To do this, follow the instructions given below.

**NOTE:**

- One iKAN device uses 2 adjacent IP addresses. Once an IP address is set for an iKAN device, the next IP address will be automatically set for the controller in the iKAN display. If the next IP address is already used for any other device, you will fail to communicate with the iKAN display.
- Details on how to change the IP address on your computer depend upon the type architecture and operating system you are using. Use the Help and Support functionality on your computer and search for "IP Addressing".
- **Remember the IP address on your computer for restoring it later.**

1. Connect the iKAN display to the Host PC, then power on all devices, as illustrated below.

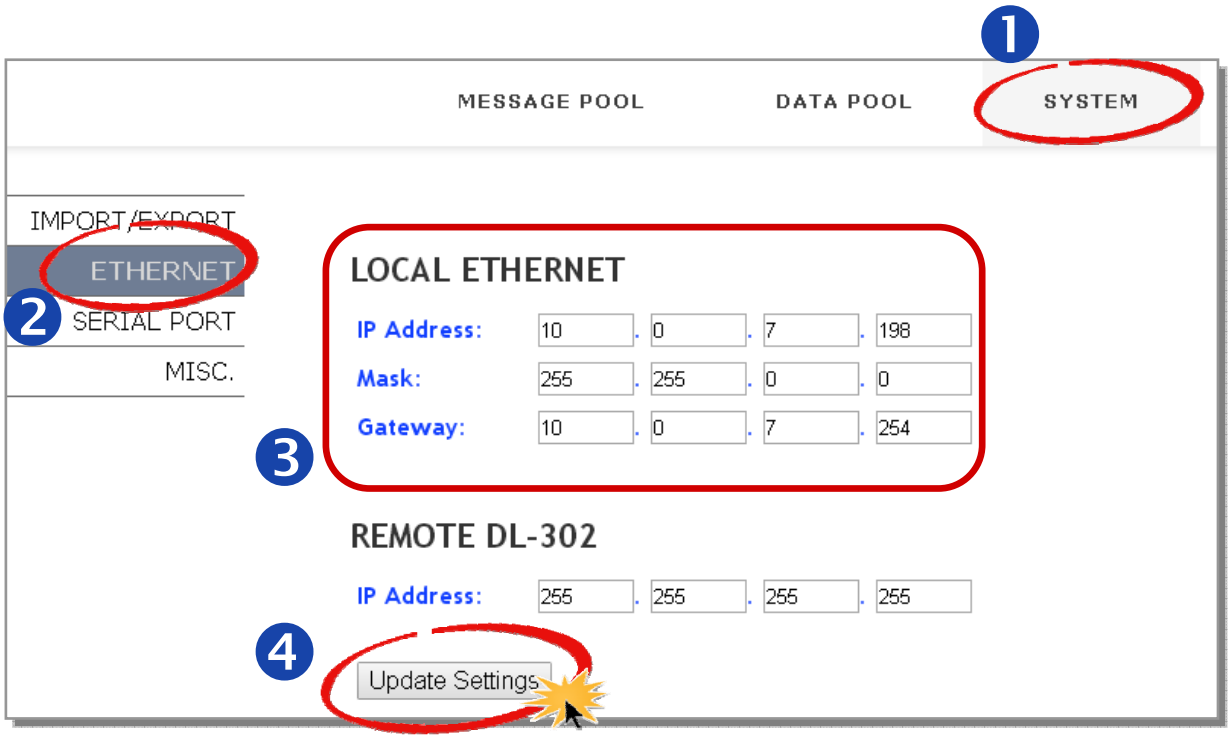



2. Set the IP address of your computer

The factory default IP address for the iKAN device is 192.168.255.1. Before attempting to connect to the built-in web configuration page on the iKAN device, ensure that the IP address of the Host PC is set to a valid address in the range 192.68.255.2 to 192.168.255.253. This address should be unique and should not be used by other Ethernet devices.

3. Enter the IP address of the iKAN display in the address bar of a browser, such as Google Chrome, Firefox, or IE, etc., and then press Enter. The web configuration page for the iKAN device will then be displayed.

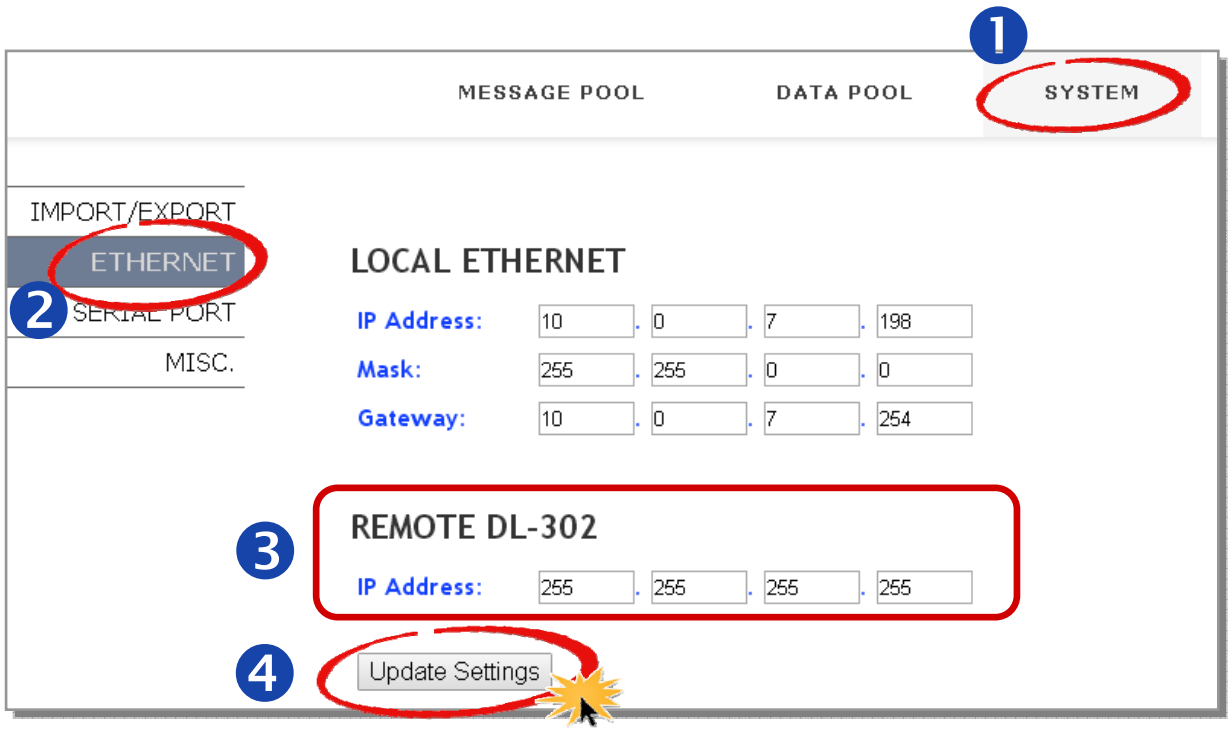

4. Configure the IP, Mask, and Gateway addresses for the iKAN device by following the instructions given below.



| | |
|---|---|
| 1 | Click the **System** tab at the top of the page. |
| 2 | Click the **ETHERNET** option from the menu on the left-hand side of the page. |
| 3 | Enter a valid value for the **IP**, **Mask**, and **Gateway** addresses in the fields in the **LOCAL ETHERNET** section. Note that the IP address must be unique and must not be duplicated with other Ethernet devices in the network. |
| 4 | Click the **Update Settings** button to save the new values and complete the configuration process.<br><br>Note that the iKAN device will be automatically reset once you click the Update Settings button. |
| 5 | Restore the IP address of the Host PC to the previous value.<br>Repeat step 3 above, but enter the new IP address of the iKAN device, and then press Enter to display the web user interface that allows messages to be pre-configured. |

## 3.2. Connecting to a remote DL-302 device

The iKAN series devices can be used to display data such as the temperature, humidity and CO2 values sourced from a specific remote DL-302 device that is connected to the same network as the iKAN device. Once the IP address for the DL-302 device has been configured, the data recorded by the DL-302 can be automatically obtained. To specify the IP address of the required DL-302 device, follow the instructions given below.




| | |
|---|---|
| 1 | Click the **System** tab at the top of the page. |
| 2 | Click the **ETHERNET** option from the menu on the left-hand side of the page. |
| 3 | Enter the IP address for the desired DL-302. |
| 4 | Click the **Update Settings** button to save the new values and complete the configuration process. |

## 3.3. Importing/Exporting pre-configurated messages

If your system contains more than one iKAN series device, it could take a lot of time to configure each one individually. To simplify this process, the Import/Export function that is found on the web configuration page can be used to pre-configure the contents of a message or variable on the iKAN series device before using Modbus TCP/RTU commands to manage the message pool, thereby reducing the need to repeat the configuration tasks multiple times.

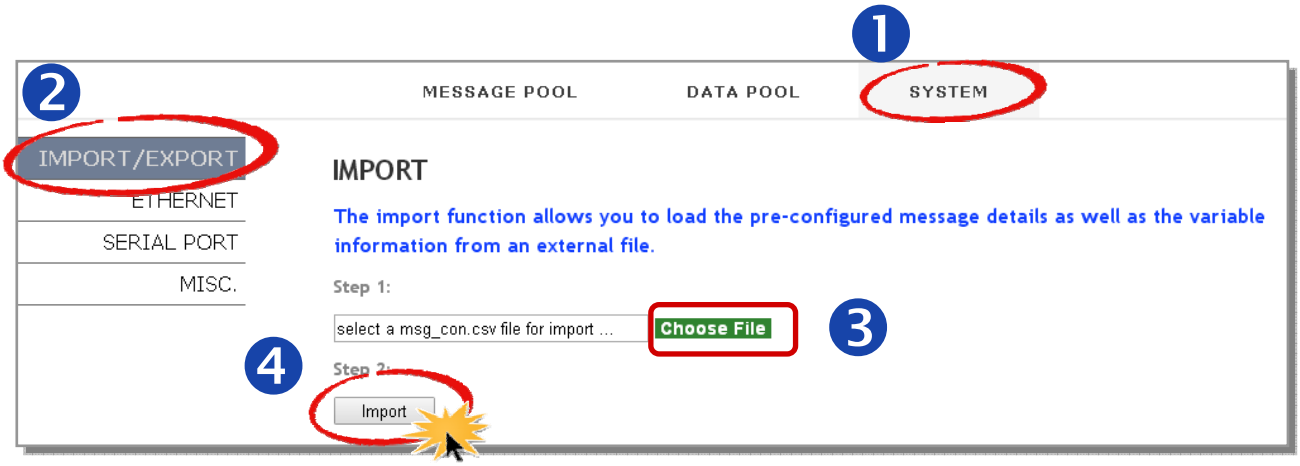
Once a message has been configured for the iKAN device, use the Export function to save the contents as a CSV file on the Host PC. This means that additional iKAN series display devices can be easily configured by importing the csv file to that device.

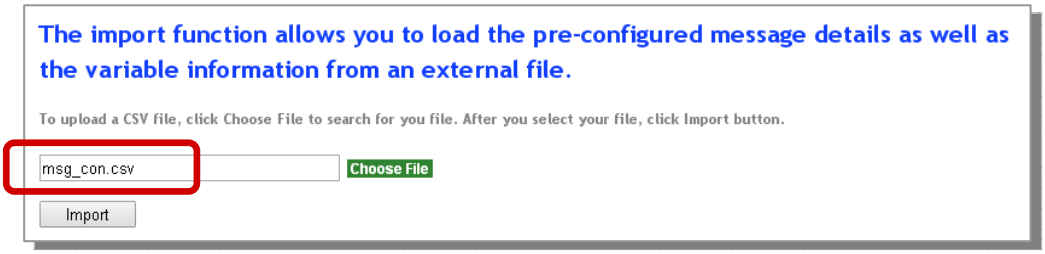
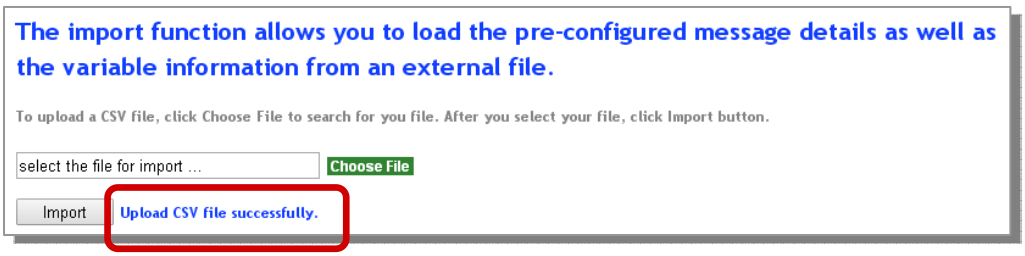
### 3.3.1. Exporting a configuration file

| | |
|---|---|
| 1 | Click the **System** tab at the top of the page. |
| 2 | Click the **IMPORT/EXPORT** option from the menu on the left-hand side of the page. |
| 3 | Click the **Save** button to save the current configuration as a CSV file.<br>A confirmation dialog will be displayed, click the **OK** button to save the file.<br>  |
| 4 | Click the **Export** button to save the configuration file to the Host PC.<br>The exported will be saved to the download folder location where your browser saves downloaded files. |

### 3.3.2. Importing a configuration file

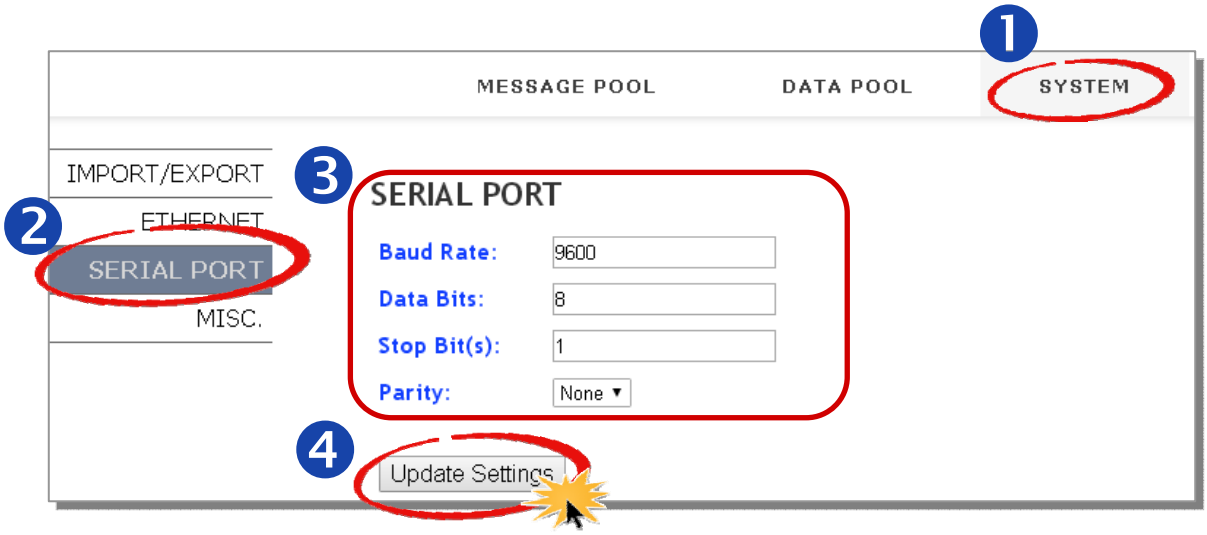
The following is a description of how to import a previously stored configuration file. Note that the Import function will only load configuration information related to messages and variables.




| | |
|---|---|
| 1 | Click the **System** tab at the top of the page. |
| 2 | Click the **IMPORT/EXPORT** option from the menu on the left-hand side of the page. |
| 3 | Click the **Choose File** button, and then select the desired CSV file, which is msg_con.csv in this case.<br>  |
| 4 | Click the **Import** button to load the contents of the configuration file, which is msg_con.csv in the illustration above. Once the file has been loaded, the message "CSV file successfully uploaded" will be displayed, as illustrated below.<br>  |

## 3.4. COM port configuration

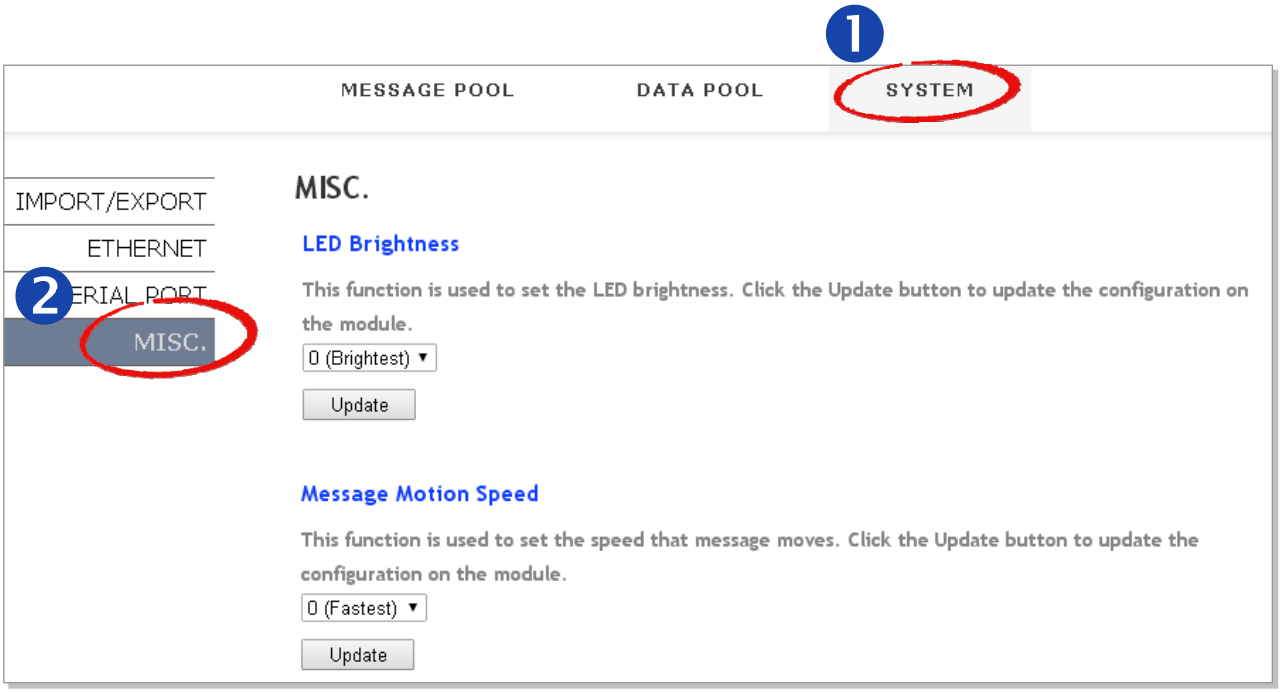
RS-232 and RS-485 are both provided to communicate with Modbus RTU devices. Both interfaces use the same configuration settings including Baud Rate, Data Bits, Stop Bit, and Parity, but only one interface can be used at the same time. Transmission data format is N81, E81 or O81 selectable on the iKAN device.




| | |
|---|---|
| 1 | Click the **System** tab at the top of the page. |
| 2 | Click the **SERIAL PORT** option from the menu on the left-hand side of the page. |
| 3 | Enter the Baud Rate, Data Bitts, Stop Bit(s) and Parity; all the settings need be identical with the parameters used on the Modbus RTU device(s) for transferring data correctly. |
| 4 | Click the **Update Settings** button to save the new values and complete the configuration process |

## 3.5. LED Brightness and Message Motion Speed adjustment

5 levels of brightness and 10 levels of message motion speed are adjustable on the iKAN series device. Smaller setting numbers are paired with brighter or higher scrolling speeds.

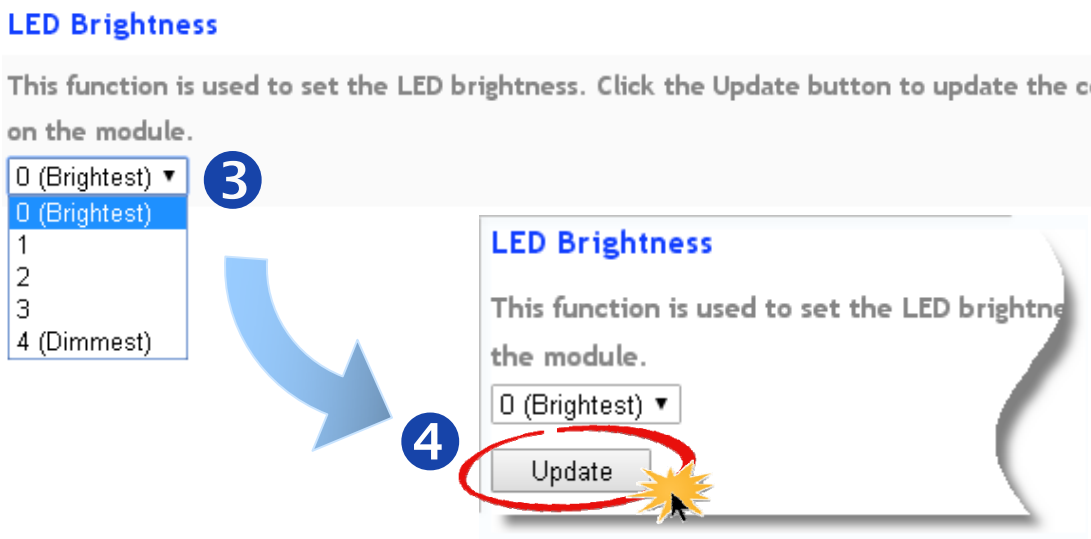



| | |
|---|---|
| 1 | Click the **System** tab at the top of the page. |
| 2 | Click the **MISC.** option from the menu on the left-hand side of the page. |

## LED Brightness adjustment

3 Select setting number from the drop and down menu.

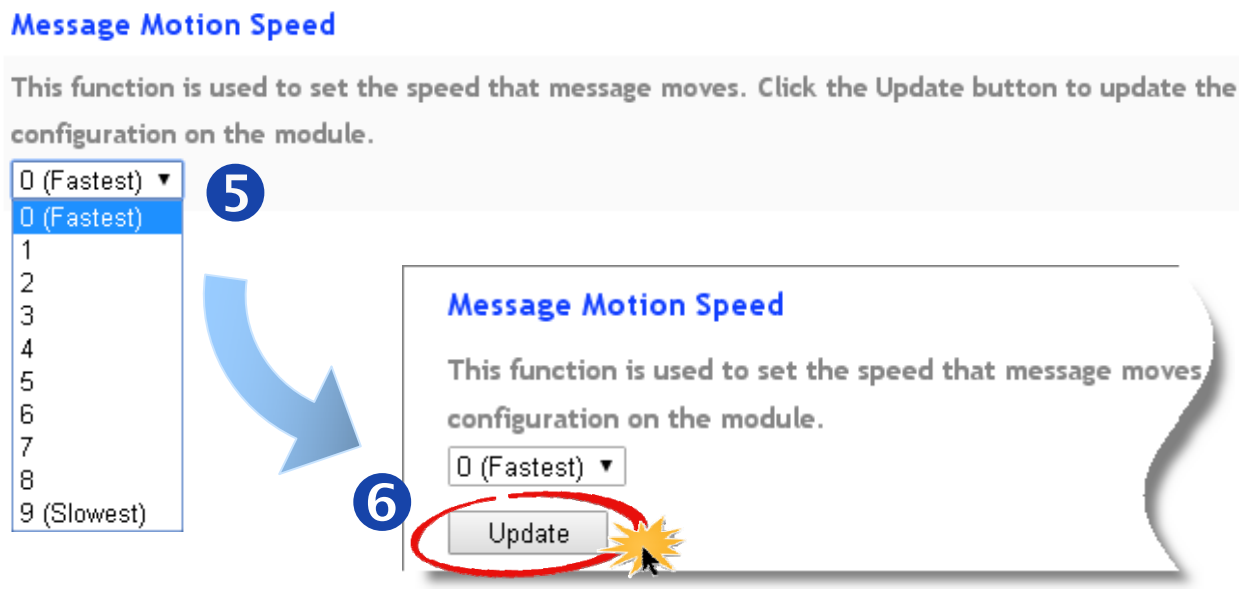
4 Click the Update button.




## Message Motion Speed adjustment

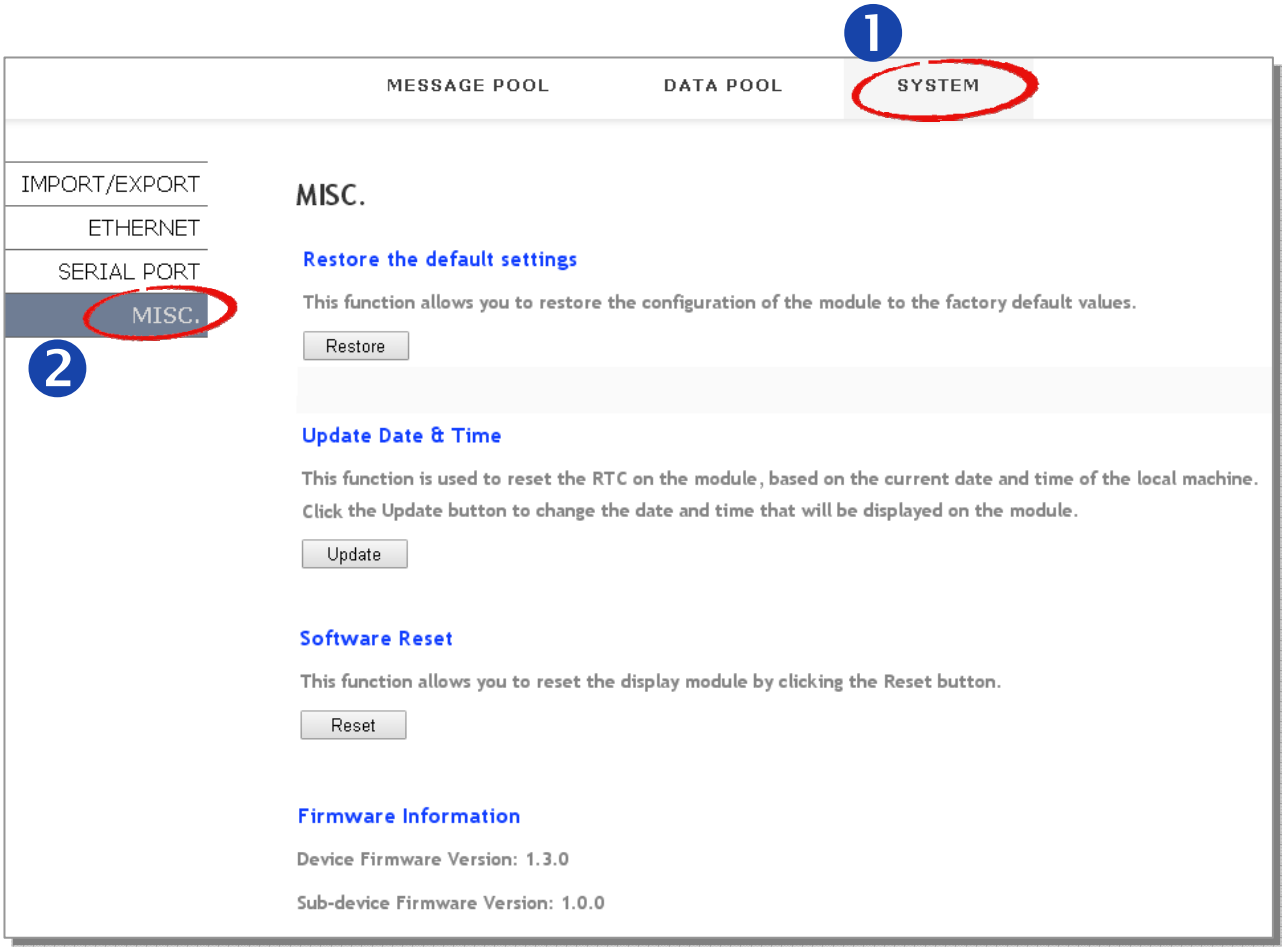
5 Select setting number from the drop and down menu.

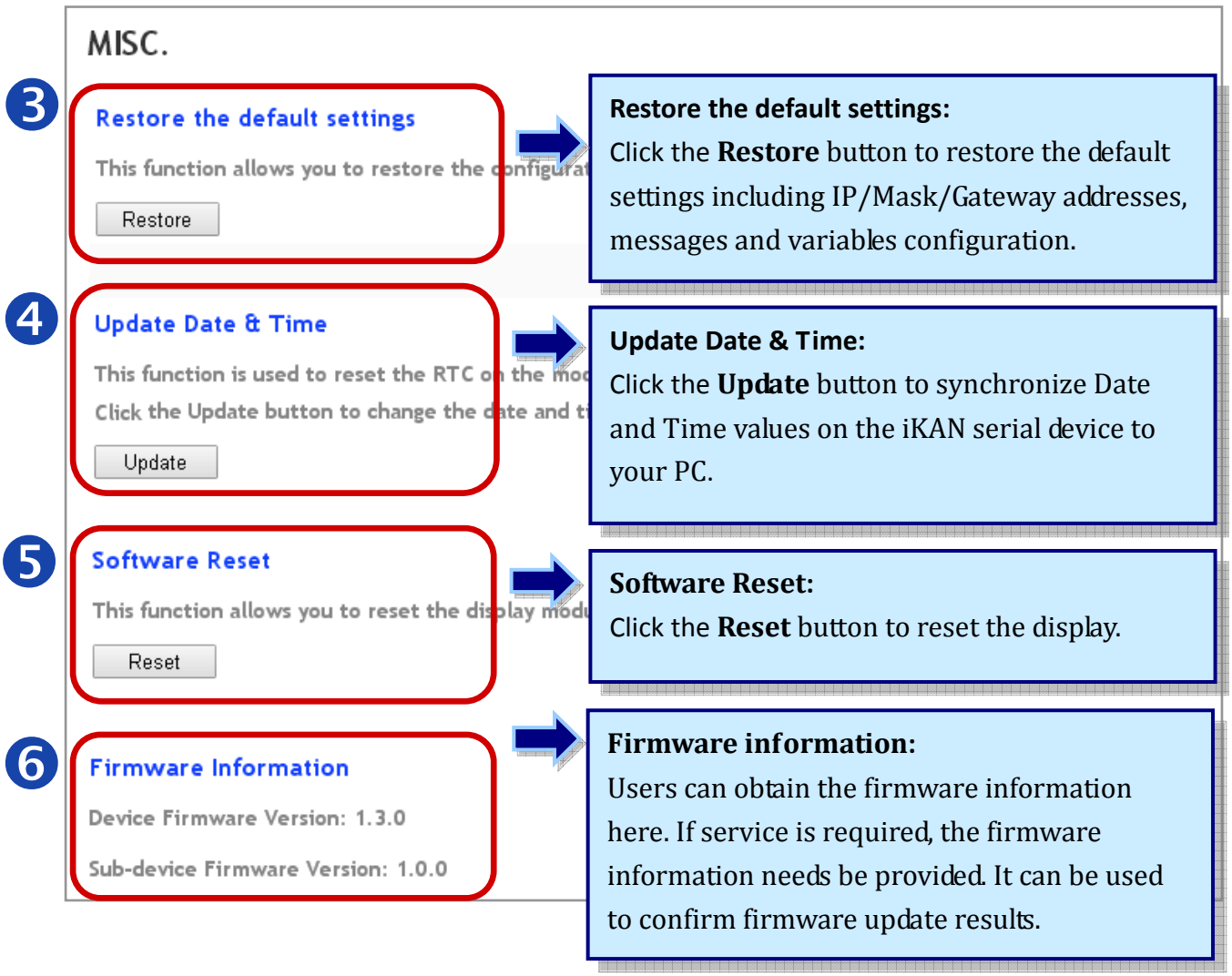
6 Click the Update button.



## 3.6. MISC.

In addition to brightness and scrolling speed adjustments, more functions including **Restore the default settings**, **Update Date & Time**, **Software Reset** and **Firmware Information** are provided on the MISC. page.

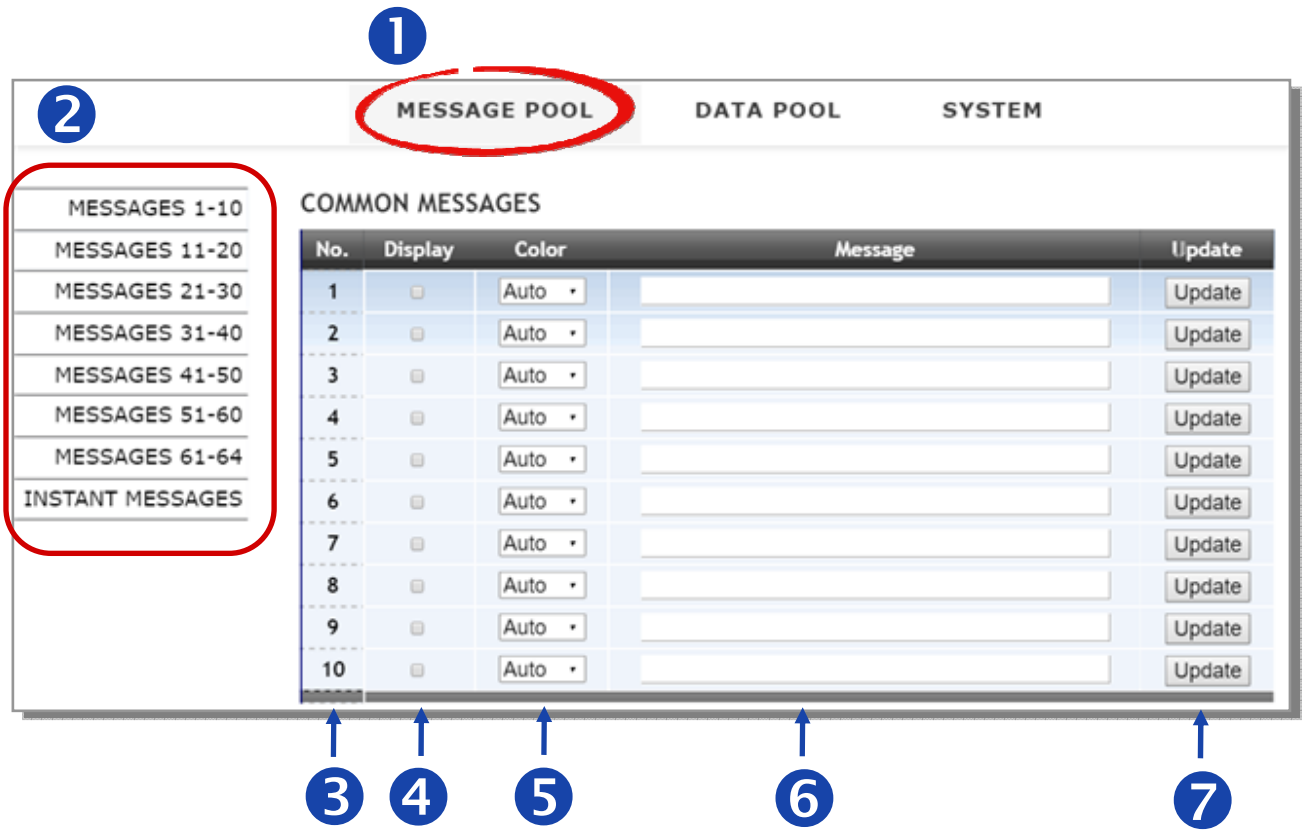




# 4. Messages

## 4.1. Editing and Managing messages

A maximum of 64 Common Messages and 10 Instant Messages can be stored on the iKAN series device, and each message can contain a maximum of 40 Unicode charcters or 100 ASCII characters. The contents of each message can be pre-configured via the Message Pool page on the web interface. The display of these messages can then be enabled or disabled using either the web interface or the Modbus TCP/RTU protocol. Note that instant messages have a higher priority than common messages, meaning that if any of the instant messages have been enabled, any scheduled common messages in the sequence will be ignored until all instant messages have been disabled.



| | |
|---|---|
| ❶ | Click the **MESSAGE POOL** tab at the top of the page. |
| ❷ | Select which message you wish to access by clicking the type of message and range from the relevant menu option on the left-hand side of the page. |
| ❸ | Select a vacant message slot for the message that you wish to configure. |
| ❹ | In the **Display** column, check the checkbox to enable the contents of the message to be displayed on the iKAN series device. |
| ❺ | From the **Color** column, select the desired color for the message. Note that the entire message will be formatted in this color on the iKAN display. |
| ❻ | Enter the contents of the message in the **Message** text field. |
| ❼ | Click the **Update** button to save the message settings to the iKAN series device. Note that each time the settings for a message are changed, you will need to click the respective Update button for that message. |

## 4.2. Inserting system variables into a message

The iKAN series device allows data related to items such as the Ethernet configuration, the RTC value, and other information, to be inserted into a message as a system variable. The format for using a system variable in a message has a length of 5 bytes as follows:

| 1 - 2 | | 3 - 5 | | |
|---|---|---|---|---|
| Delimiter character | | Modbus address: 3-digit decimal number | | |
| % | y | X | X | X |

The following is the Modbus register table for the system variables that can be used on the iKAN display. (Input Register, 3xxxx, 0 based)

| Modbus Address | | Length | Description | Value Range | Attribute |
|---|---|---|---|---|---|
| Decimal | Hex. | | | | |
| 30000 : 30003 | 0000 : 0003 | 4 | The local IP address for the iKAN series device | 0 ~ 256 | R |
| 30004 : 30007 | 0004 : 0007 | 4 | The local Mask address for the iKAN series device | 0 ~ 256 | R |
| 30008 : 30011 | 0008 : 000B | 4 | The local Gateway address for the iKAN series device | 0 ~ 256 | R |
| 30012 | 000C | 1 | Year | 0 ~ 9999 | R |
| 30013 | 000D | 1 | Month | 1 ~ 12 | R |
| 30014 | 000E | 1 | Date | 1 ~ 31 | R |
| 30015 | 000F | 1 | Abbreviated day of the week: SUN, MON, TUE, WED, THU, FRI, SAT. | 0 ~ 6 | R |
| 30016 | 0010 | 1 | Day of the week: Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday | 0 ~ 6 | R |
| 30017 | 0011 | 1 | Day of the week in Chinese characters: | 0 ~ 6 | R |

| | | | | | |
|---|---|---|---|---|---|
| | | | 日、一、二、三、四、五、六。 | | |
| 30018 | 0012 | 1 | Hours (24-hour format) | 0 ~ 23 | R |
| 30019 | 0013 | 1 | Minutes | 0 ~ 59 | R |
| 30020 | 0014 | 1 | Seconds | 0 ~ 59 | R |
| 30021 | 0015 | 1 | The CO2 value from a remote DL-302 | 1 ~ 9999 (Unit: ppm) | R |
| 30022 | 0016 | 1 | The humidity value from a remote DL-302 | 1 ~ 9999 (Unit: 0.01%) | R |
| 30023 | 0017 | 1 | The temperature value from a remote DL-302 in degrees Celsius | Unit: 0.01°C | R |
| 30024 | 0018 | 1 | The temperature value from a remote DL-302 in degrees Fahrenheit | Unit: 0.01°F | R |
| 30025 | 0019 | 1 | The dew point temperature value from a remote DL-302 in degrees Celsius | Units: 0.01°C | R |
| 30026 | 001A | 1 | The dew point temperature value from a remote DL-302 in degrees Fahrenheit | Units: 0.01°F | R |

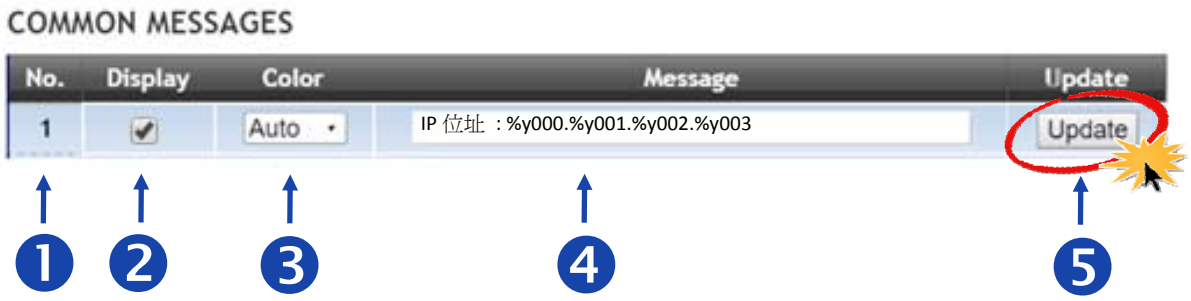
### 4.2.1. Displaying the IP Address

Modbus register addresses 30000 to 30011 can be used to read the current IP, Mask, and Gateway address values. The following is an overview of how to read these addresses.

| Modbus Address | | Length | Description | Data Range | Attribute |
|---|---|---|---|---|---|
| Decimal | Hex. | | | | |
| 30000 : 30003 | 0000 : 0003 | 4 | The IP address for the iKAN series device | 0 ~ 256 | R |
| 30004 : 30007 | 0004 : 0007 | 4 | The Mask address for the iKAN series device | 0 ~ 256 | R |
| 30008 : 30011 | 0008 : 000B | 4 | The Gateway address for the iKAN series device | 0 ~ 256 | R |

Refer to Section 4.1 for more information related to message configuration.

For example, the following explains how to configure a message to display the IP address for the iKAN series device in message 1.



| | |
|---|---|
| ❶ | Locate a vacant message slot. |
| ❷ | In the **Display** column, check the checkbox to enable the contents of the message to be displayed on the iKAN series device. |
| ❸ | From the **Color** column, select the desired color for the message. |
| ❹ | Enter the following string in the **Message** text field:<br>**IP: %y000.%y001.%y002.%y003** |
| ❺ | Click the **Update** button to save the message settings to the iKAN series device. |

The IP address for the iKAN series device will be shown on the display.

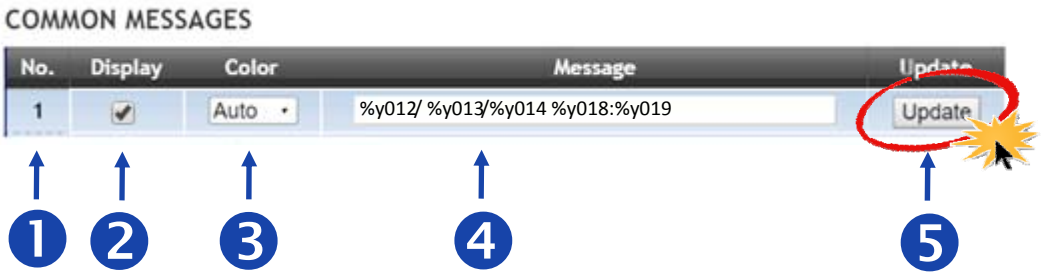
### 4.2.2. Displaying the current Date and Time

Modbus register addresses 30012 to 30020 can be used to read the current date and time value. The following is an overview of how to read these values.

| Modbus Address | | Length | Description | Value Range | Attribute |
|---|---|---|---|---|---|
| Decimal | Hex. | | | | |
| 30012 | 000C | 1 | Year | 0 ~ 9999 | R |
| 30013 | 000D | 1 | Month | 1 ~ 12 | R |
| 30014 | 000E | 1 | Day | 1 ~ 31 | R |
| 30015 | 000F | 1 | Abbreviated day of the week: SUN, MON, TUE, WED, THU, FRI, SAT. | 0 ~ 6 | R |
| 30016 | 0010 | 1 | Day of the week: Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday | 0 ~ 6 | R |
| 30017 | 0011 | 1 | Day of the week in Chinese characters: 日、一、二、三、四、五、六。 | 0 ~ 6 | R |
| 30018 | 0012 | 1 | Hours (24-hour format) | 0 ~ 23 | R |
| 30019 | 0013 | 1 | Minutes | 0 ~ 59 | R |
| 30020 | 0014 | 1 | Seconds | 0 ~ 59 | R |

Refer to Section 4.1 for more information related to message configuration.

For example, the following explains how to configure a message to display the current date for the iKAN series device in message 1:




| | |
|---|---|
| 1 | Locate a vacant message slot. |
| 2 | In the **Display** column, check the checkbox to enable the contents of the message to be displayed on the iKAN series device. |
| 3 | From the **Color** column, select the desired color for the message. |
| 4 | Enter the following string in the **Message** text field: **%y012/%y013/%y014 %y018 : %y019** |
| 5 | Click the **Update** button to save the message settings to the iKAN series device. |

The current date and time for the iKAN series device will be shown on the display.

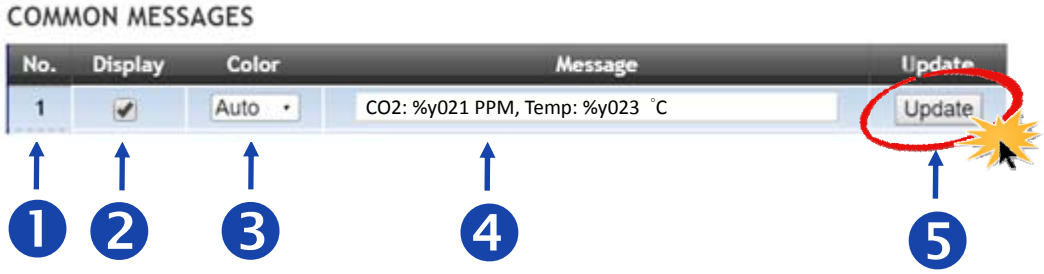
### 4.2.3. Displaying the CO2 and temperature values from a remote DL-302 module

Modbus register addresses 30021 to 30026 can be used to read data from a remote DL-302 module. The following is an overview of how to read these values.

| Modbus Address | | Length | Description | Value Range | Attribute |
|---|---|---|---|---|---|
| Decimal | Hex. | | | | |
| 30021 | 0015 | 1 | The CO2 value from a remote DL-302 module | 1 ~ 9999 (Units: ppm) | R |
| 30022 | 0016 | 1 | The humidity value from a remote DL-302 module | 1 ~ 9999 (Units: 0.01%) | R |
| 30023 | 0017 | 1 | The temperature value from a remote DL-302 module in degrees Celsius | Units: 0.01°C | R |
| 30024 | 0018 | 1 | The temperature value from a remote DL-302 module in degrees Fahrenheit | Units: 0.01°F | R |
| 30025 | 0019 | 1 | The dew point temperature value from a remote DL-302 module in degrees Celsius | Units: 0.01°C | R |
| 30026 | 001A | 1 | The dew point temperature value from a remote DL-302 module in degrees Fahrenheit | Units: 0.01°F | R |

Refer to Section 4.1 for more information related to message configuration.

For example, the following explains how to configure a message to display the CO2 and temperature data from a remote DL-302 module on the iKAN series device using message 1:




| | |
|---|---|
| 1 | Locate a vacant message slot. |
| 2 | In the **Display** column, check the checkbox to enable the contents of the message to be displayed on the iKAN series device. |
| 3 | From the **Color** column, select the desired color for the message. |
| 4 | Enter the following string in the **Message** text field:<br>**CO2: %y021 PPM, Temp: %y023** |
| 5 | Click the Update button to save the message settings to the iKAN series device. |

The current CO2 and temperature values from the remote DL-302 module will be shown on the iKAN display.

## 4.3. Inserting variables into a message

iKAN display devices provide Modbus registers for 40 coil variables, 64 integer variables, and 64 float variables, allowing the Host PC or a PLC to read or write data via the Modbus TCP/ RTU protocol. These values can also be inserted into a message. If these inserted values are modified via a remote Host or a PLC, the value will be automatically refreshed when it is displayed on the iKAN series device.

The format for using a variable in a message is a 5-byte string as follows:

| 1 | 2 | 3 to 5 | | |
|---|---|---|---|---|
| Delimiter Character | Variable Type | Modbus Address: 3-digit decimal number | | |
| % | b: Coil variable | X | X | X |
| | u: Unsigned integer variable (0 ~ 65535) | | | |
| | i: Signed integer variable (-32768 ~ 32767) | | | |
| | f: Float variable (-3.4E+38 ~ +3.4E+38) | | | |

### 4.3.1. Inserting a Coil variable into a message

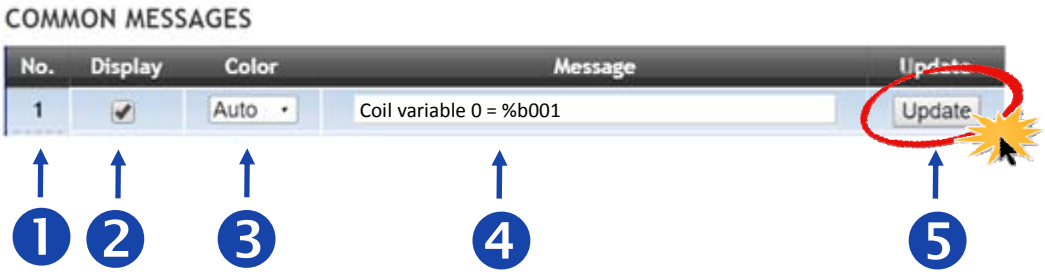
A maximum of 40 Coil type variables can be stored on the iKAN series device, and are accessed using Modbus register addresses 00000 to 00039.

Coil (0xxxx, 0 based)

| Modbus Address | | Length | Description | Value Range | Attribute |
|---|---|---|---|---|---|
| Decimal | Hex. | | | | |
| 00000 : 00039 | 0000 : 0027 | 40 | Coil variable registers | 0 or 1 | R/W |

Refer to Section 4.1 for more information related to message configuration.

For example, the following explains how to configure a message to display the current date for the iKAN series device in the message at address 1:



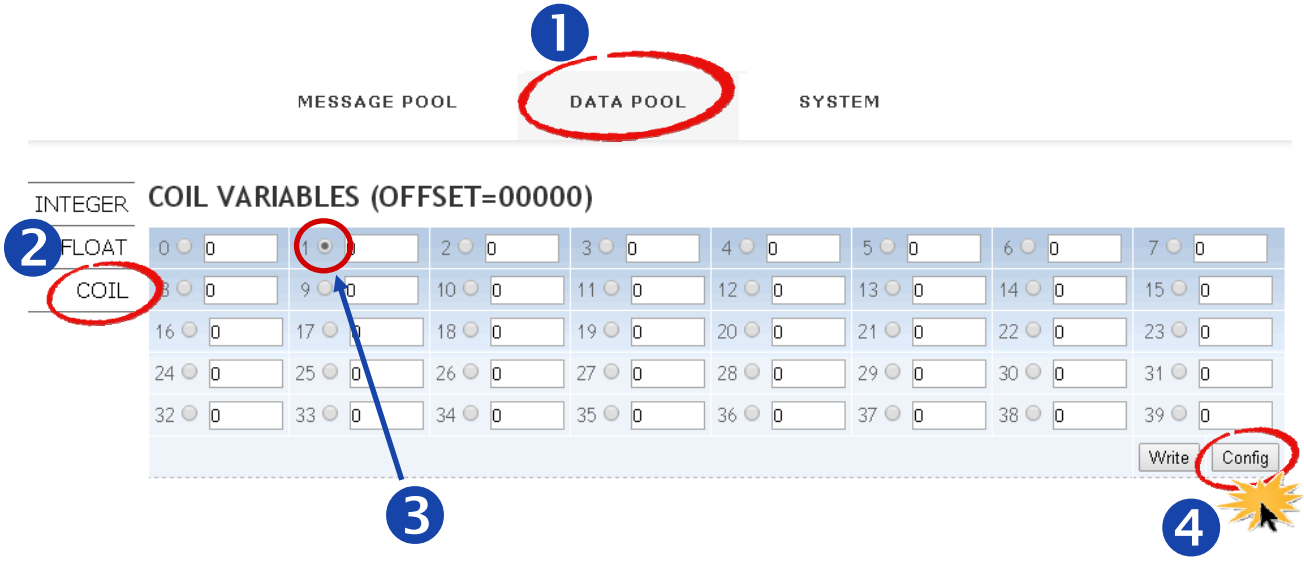

| | |
|---|---|
| ❶ | Locate a vacant message slot. |
| ❷ | In the **Display** column, check the checkbox to enable the contents of the message to be displayed on the iKAN series device. |
| ❸ | From the **Color** column, select the desired color for the message. |
| ❹ | Enter the following string in the **Message** text field:<br>**Coil variable 0 = %b001** |
| ❺ | Click the **Update** button to save the message settings to the iKAN series device. |

The value for Coil variable 1 will be shown on the iKAN display.

### 4.3.2. Displaying the value of a coil with replacement text

The contents of a coil variable can be either 0 or 1, which is usually used to indicate the status of the Digital Output, i.e., ON or OFF. iKAN series devices provide a string mapping function that allows the value of the coil variable to be mapped in order to make the coil value more meaningful when reading the message. The text mapping function allows a maximum of 10 Unicode characters or 30 ASCII characters to be entered to represent a value of 0 or 1.

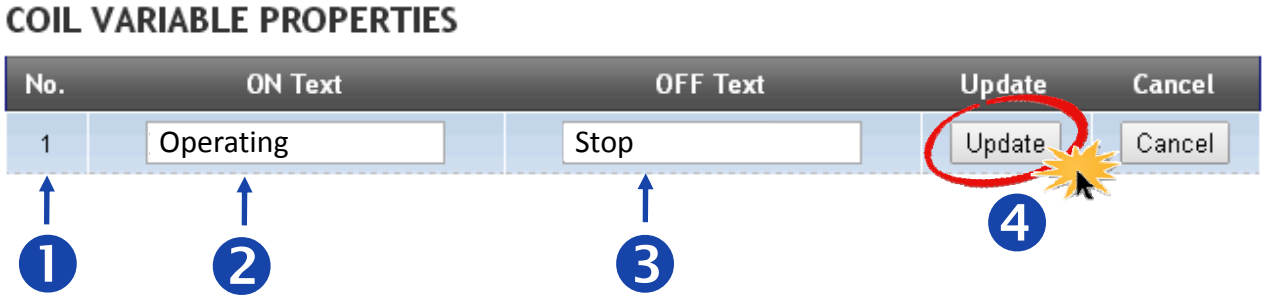
**1. Open the COIL VARIABLES page to access the data mapping function.**




For example, the following explains how to configure the text mapping for the Coil variable at address 1:

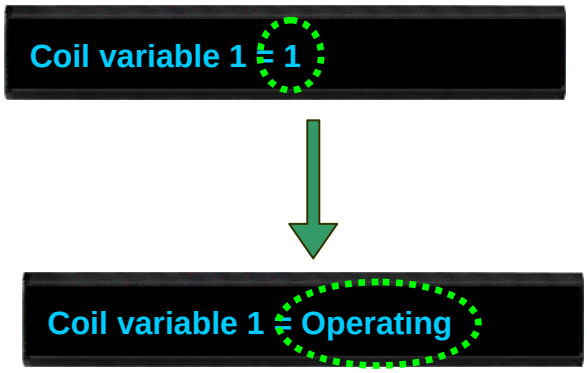
| | |
|---|---|
| 1 | Click the **DATA POOL** tab at the top of the page. |
| 2 | Click the **COIL** option from the menu on the left-hand side of the page. |
| 3 | Select address 1 by clicking the radio button for that address. |
| 4 | Click the **Config** button to open the configuration page. |

## 2. Configure the mapping text




| | |
|---|---|
| 1 | Confirm that the number for the coil-type variable is correct. |
| 2 | In the ON Text column, enter the mapping text in the text field for when the status of the coil-type variable is set to ON status. |
| 3 | In the OFF Text column, enter the mapping text in the text field for when the status of the coil-type variable is set to OFF. |
| 4 | Click the **Update** button to save the mapping settings to the iKAN series device. |

The value for coil variable 1 is now replaced by the mapping text on the display.



### 4.3.3. Inserting an integer-type variable into a message

iKAN series devices provide Modbus registers for 64 integer variables, which can be accessed via Modbus register addresses 40000 to 40063.

Holding Register (4xxxx, 0 based)

| Modbus Address | | Length | Description | Value Range | Attribute |
|---|---|---|---|---|---|
| Decimal | Hex. | | | | |
| 40000<br>:<br>40063 | 0000<br>:<br>003F | 64 | Integer-type variable registers. | 0 ~ 65535<br>or<br>-32768 ~ 32767 | R/W |

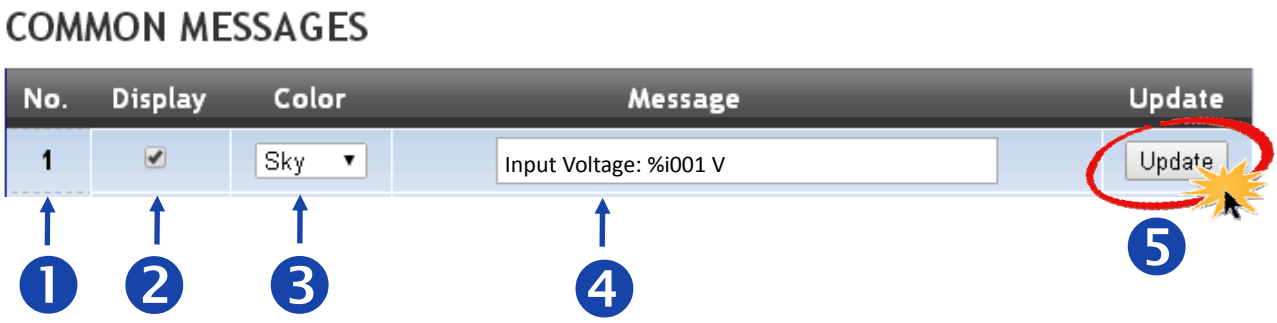
Two methods can be used to display the integer variables in a message. The first is via a signed integer, where the valid value range is from -32768 to +32767. The second is via an unsigned integer, where the valid value range is from 0 to 65535. The Modbus register addresses for both methods are the same, 40000 to 400063. To display a variable as an unsigned integer, the format is %uxxx, and to display a variable as a signed integer, the format is %ixxx. The valid formats for inserting an integer variable into a message are %u000 to %u063, or %i000 to %i063.

| 1-2 | 3 | 4 | 5 |
|---|---|---|---|
| Delimiter character | Modbus Address: 3-digit decimal number | | |
| %u: Unsigned integer (0 ~ 65535) | 000 ~ 063 | | |
| %i: Signed integer (-32768 ~ 32767) | | | |

Integer-type variables can be read from Modbus register addresses 40000 to 40063.

Refer to Section 4.1 for more information related to message configuration.

For example, the following explains how to insert a signed type integer variable into Modbus register 40001 using message address 1.




| | |
|---|---|
| 1 | Locate a vacant message slot. |
| 2 | In the **Display** column, check the checkbox to enable the contents of the message to be displayed on the iKAN series device. |
| 3 | From the **Color** column, select the desired color for the message. |
| 4 | Enter the following string in the **Message** text field:<br>**Input Voltage: %i001 V** |
| 5 | Click the **Update** button to save the message settings to the iKAN series device. |

The value for integer variable 1 will be shown on the iKAN display.

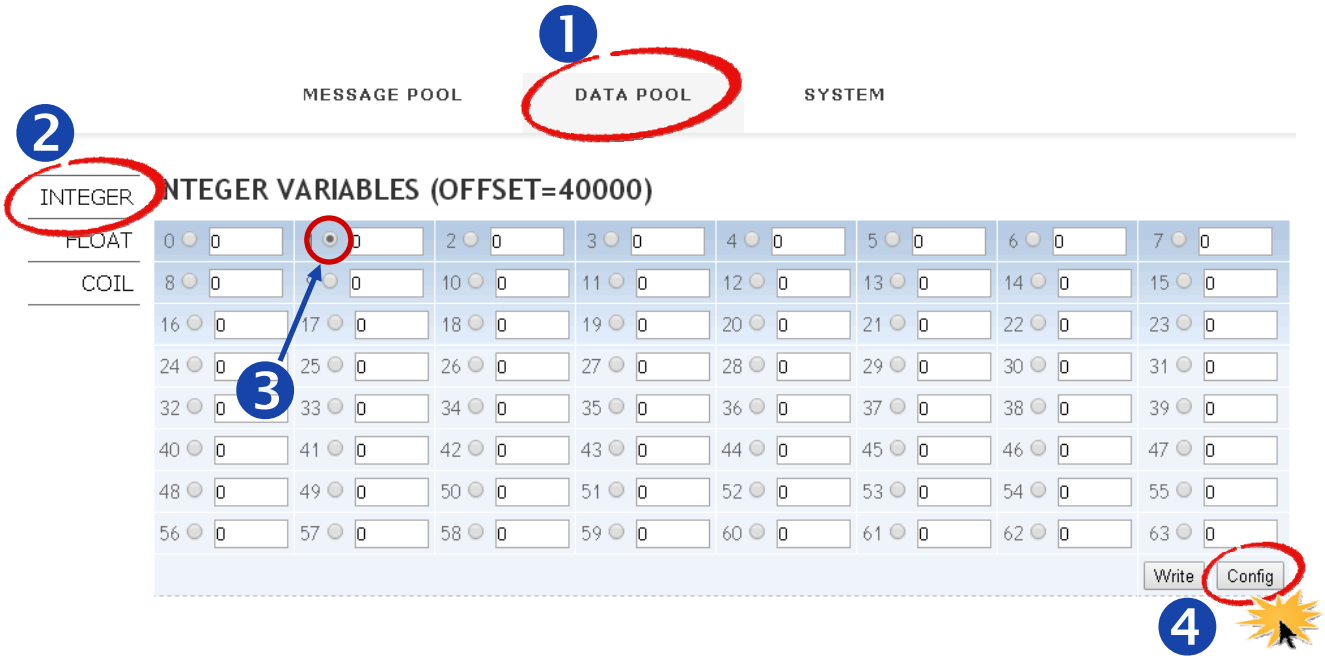

**NOTE**

- Refer to Section 4.3.4 for more details about the data mapping for integer-type variables.

## 4.3.4. Data Mapping for Integer-type Variables

Most industrial measuring devices use 16-bit integers to convert a value from a data source to a real physical value, such as the voltage, temperature, or relative humidity, etc. For example, using the range -32768 to 36767 to convert to -10V to +10V. The iKAN series device is able to perform data mapping to translate an integer value that has been read from a remote data source to a readable physical value.

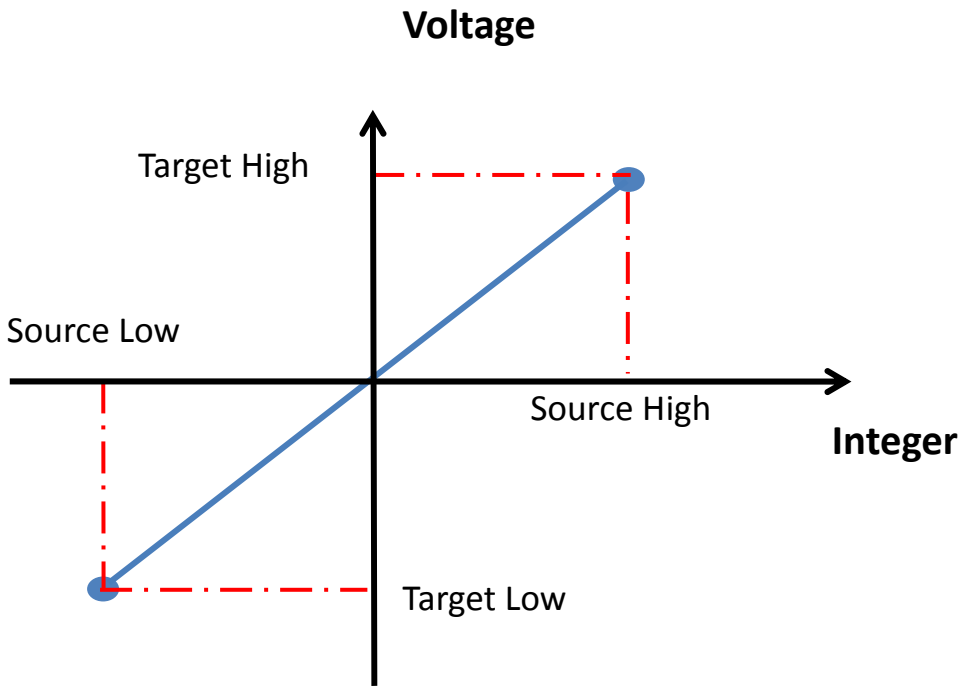
### 1. Open the COIL VARIABLES page to access the data mapping function.




For example, the following explains how to configure the data mapping function for an integer-type variable at address 1.

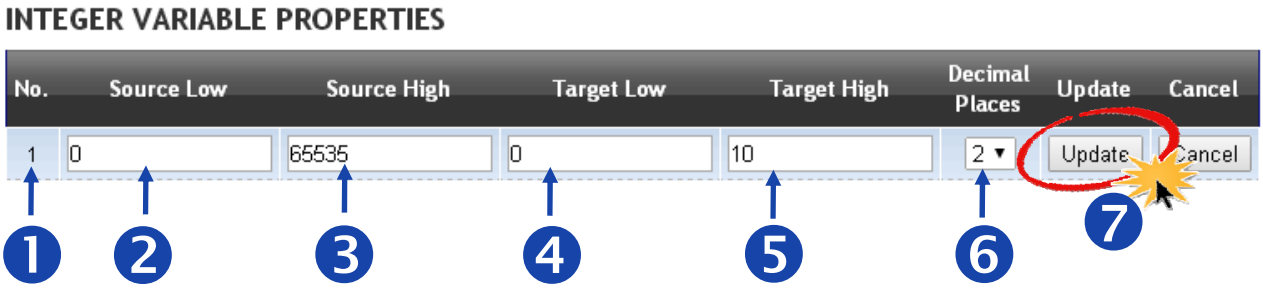
| | |
|---|---|
| 1 | Click the **DATA POOL** tab at the top of the page. |
| 2 | Click the **INTEGER** option from the menu on the left-hand side of the page. |
| 3 | Select address 1 by clicking the radio button for that address. |
| 4 | Click the **Config** button to open the configuration page. |

## 2. Configure the arguments for the data mapping.




For example, to convert a 16-bit unsigned integer (0 to 65535) to the voltage 0 to 10 V, set the following arguments:

| Argument | Value | Description |
|---|---|---|
| Source Low | 0 | The minimum value of the integer |
| Target Low | 0 | The minimum value of the physical value |
| Source High | 65535 | The maximum value of the integer |
| Target High | 10 | The maximum value of the physical value |
| Decimal Places | The number of decimal places to be used for the converted value | |



| | |
|---|---|
| ❶ | Confirm that the number for the integer-type variable is correct. |
| ❷ | In the **Source Low** column, enter the minimum value of the integer value. |
| ❸ | In the **Source High** column, enter the maximum value of the integer value. |
| ❹ | In the **Target Low** column, enter the minimum value of the physical value. |
| ❺ | In the **Target High** column, enter the maximum value of the physical value. |
| ❻ | From the **Decimal Places** column, select the desired number of decimal places to be used for the converted value. |
| ❼ | Click the **Update** button to save the mapping settings to the iKAN series device. |

The value for integer variable 1 will be shown on the iKAN display, but will now use the scaled value text rather than the integer value.

### 4.3.5. Inserting a float-type variable into a message

iKAN series devices provide Modbus registers for 64 float-type variables, which can be accessed via Modbus register addresses 40128 to 40255. Each register consists of two addresses, so the first register address is 40128 and the second register address is 40130, and so on.

Holding Register (4xxxx, 0 based)

| Modbus Address | | Length | Description | Value Range | Attribute |
|---|---|---|---|---|---|
| Decimal | Hex. | | | | |
| 40128 : 40255 | 0080 : 00FF | 64 | Float-type variable registers. | (-3.4E+38 ~ +3.4E+38) | R/W |

The format for using the float-type variables in a message is as follows:

| 1-2 | 3 | 4 | 5 |
|---|---|---|---|
| Delimiter character | Modbus Address: 3-digit decimal number | | |
| %f | 128 ~ 254 | | |

Float-type variables can be read from Modbus register addresses 40128 to 40254 with an increment of 2.

Refer to Section 4.1 for more information related to message configuration.

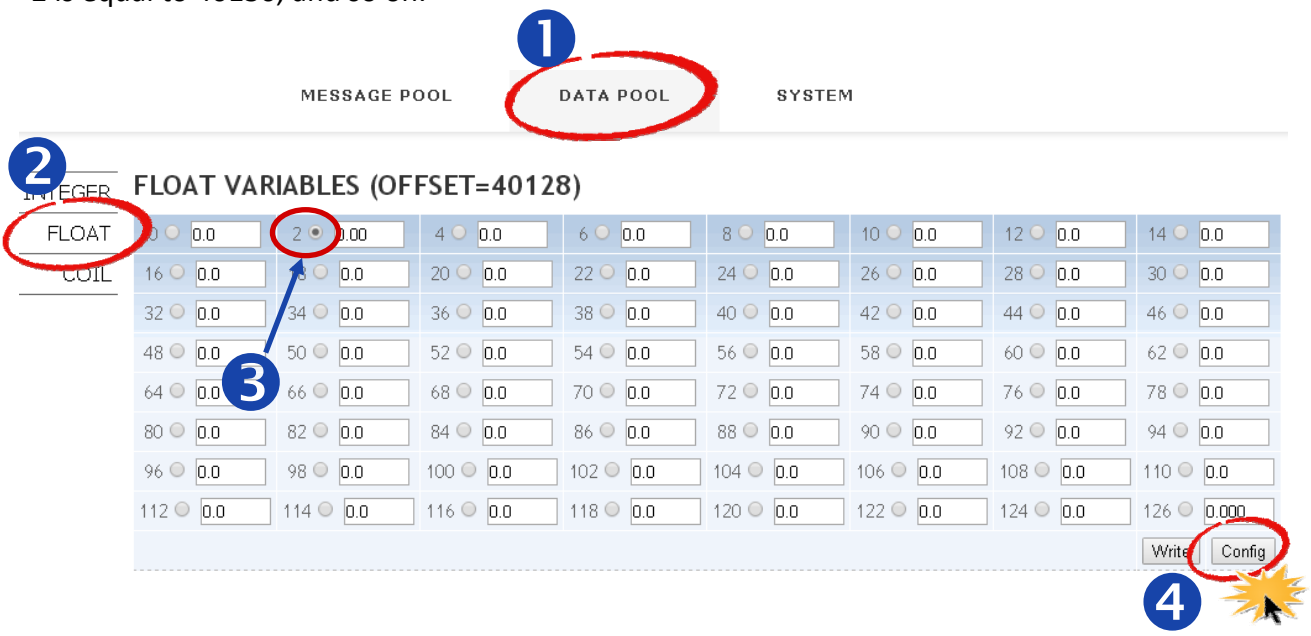
For example, the following explains how to insert a float-type variable into Modbus register 40130 using message 1:

| | |
|---|---|
| ❶ | Locate a vacant message slot. |
| ❷ | In the **Display** column, check the checkbox to enable the contents of the message to be displayed on the iKAN series device. |
| ❸ | From the **Color** column, select the desired color for the message color. |
| ❹ | Enter the following string in the **Message** text field:<br>**Pressure: %f130 bars** |
| ❺ | Click the **Update** button to save the message settings to the iKAN series device. |

The value for float-type variable 1 will be shown on the iKAN display.

## 4.3.6. Setting the number of decimal places for float-type variables

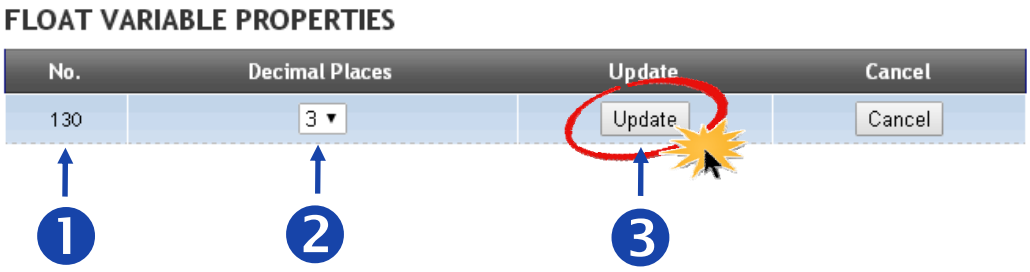
The number of the decimal places to be used for a float-type variable can be set from the **FLOAT VARIABLES** page. The offset value is 40128, which means variable 0 is equal to 40128 and variable 2 is equal to 40130, and so on.




For example, the following explains how to set the number of decimal places for float-type variable 40130.

| | |
|---|---|
| 1 | Click the **DATA POOL** tab at the top of the page. |
| 2 | Click the **FLOAT** option from the menu on the left-hand side of the page to open the **FLOAT VARIABLES** page. |
| 3 | Select address 2 by clicking the radio button for that address. |
| 4 | Click the **Config** button to open the configuration page. |

Set the number of decimal places on the **FLOAT VARIABLE PROPERTIES** page.




| | |
|---|---|
| 1 | Confirm that the address of the float-type variable is correct. |
| 2 | From the **Decimal Places** drop-down menu, select the desired number of decimal places to be used for the float-type variable. |
| 3 | Click the **Update** Button to save the variable settings to the iKAN series device. |

The value for float-type variable 1 will be shown on the iKAN display using the specified number of decimal places.

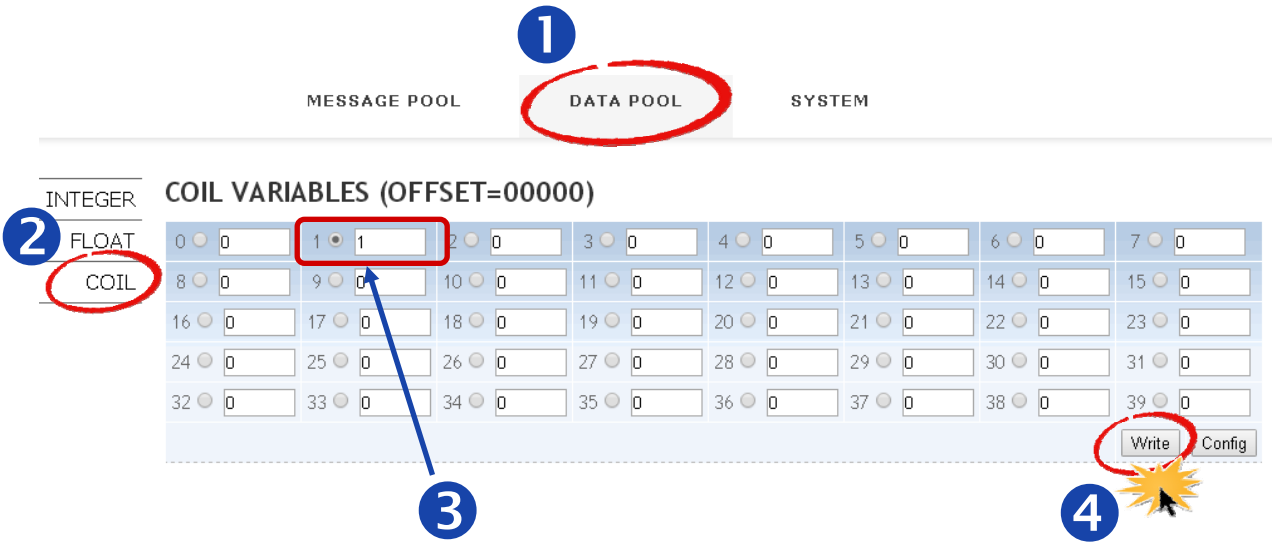
# 5. Writing Variable

## 5.1. Using the iKAN Web Configuration Page

The built-in configuration web page on the iKAN series device allows variable values to be accessed using either the Host PC or a smartphone.

### Writing a value to a coil-type variable

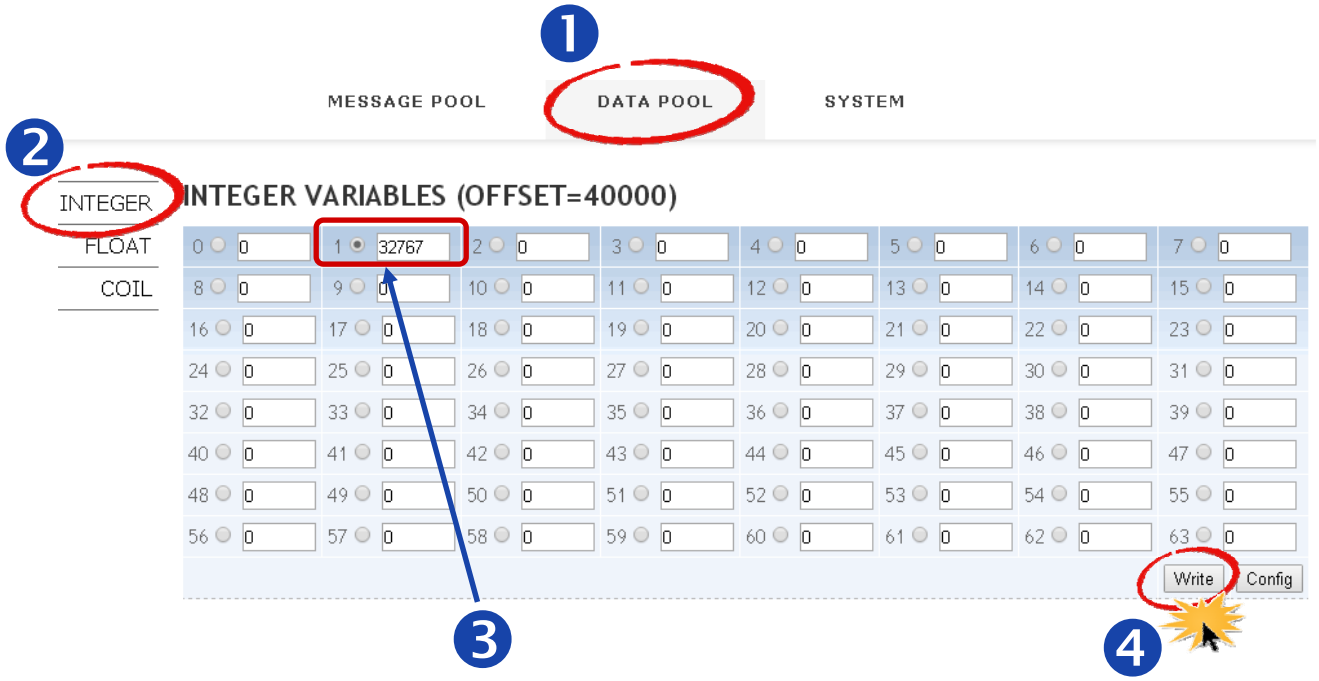
The following is a description of how to write the value 1 to register address 00001.




| | |
|---|---|
| 1 | Click the **DATA POOL** tab at the top of the page. |
| 2 | Click the **COIL** option from the menu on the left-hand side of the page to open the **COIL VARIABLES** page. |
| 3 | Select address 00001 by clicking the radio button for the address, and then enter the value 1 in the text field. |
| 4 | Click the **Write** button to write the value to the Modbus register. |

## Writing a value to an integer-type variable

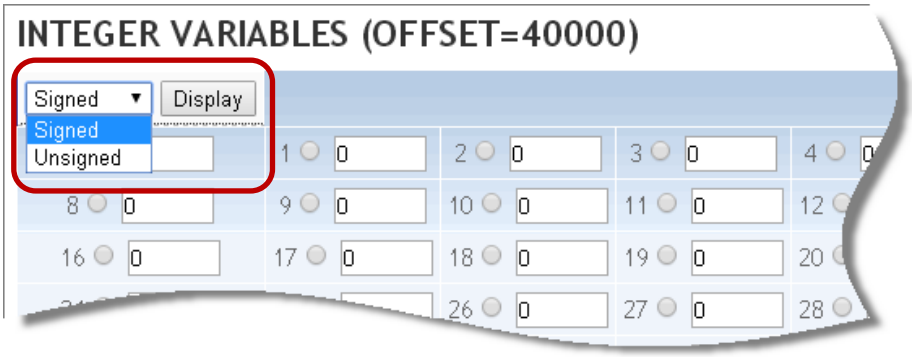
The following is a description of how to write the value 32767 to register address 40001.




| | |
|---|---|
| 1 | Click the **DATA POOL** tab at the top of the page. |
| 2 | Click the **INTEGER** option from the menu on the left-hand side of the page to open the **INTEGER VARIABLES** page. |
| 3 | Select address 40001 by clicking the radio button for the address and then enter the value 32767 in the text field. Note that the offset value for integer-type variables is 40000, which means address 0 is equal to 40000 and address 1 is equal to 40001, and so on. |
| 4 | Click the **Write** button to write the value to the Modbus register. |

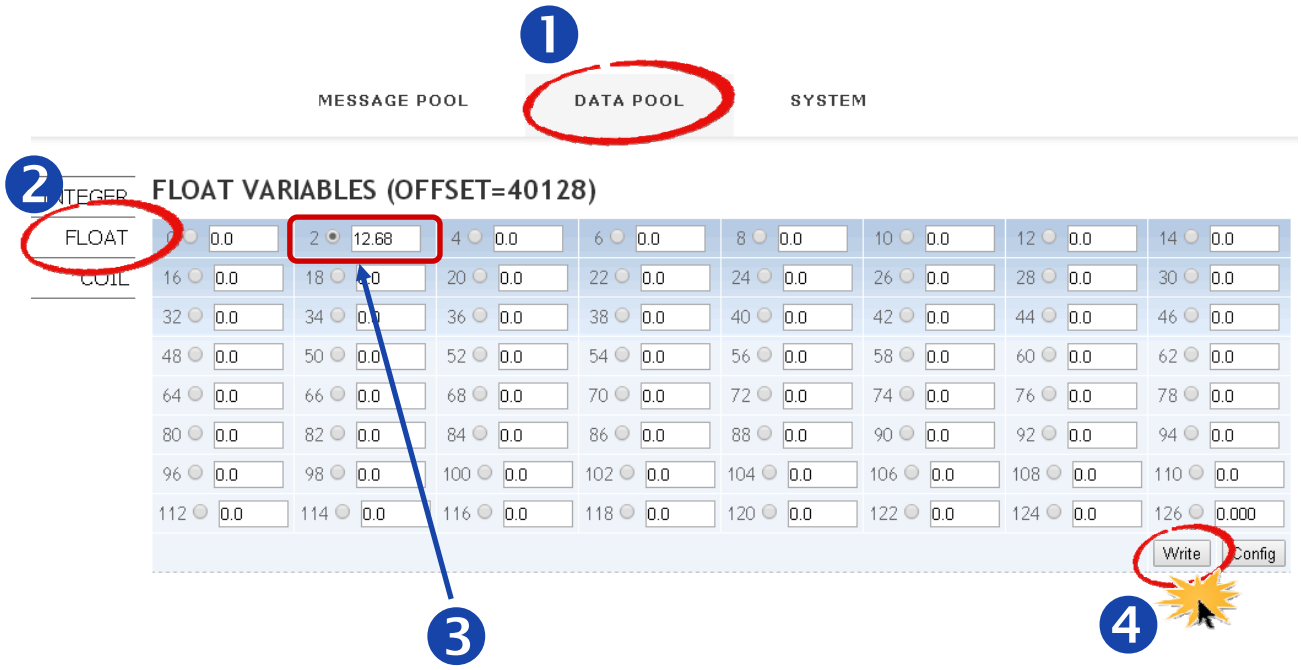
## Changing displaying range for integer-type variables

The value stored in integer variables can be displayed in signed or unsigned format on the page. Change the displaying format by selecting the Singed/Unsigned format from the drop and down menu, and then clicking the Display button.



## Writing a value to a float-type variable

The following is a description of how to write the value 12.68 to register address 40130




| | |
|---|---|
| 1 | Click the **DATA POOL** tab at the top of the page. |
| 2 | Click the **FLOAT** option from the menu on the left-hand side of the page to open the **FLOAT VARIABLES** page. |
| 3 | Select address 40130 by clicking the radio button for the address and then enter the value 12.68 in the text field. Note that the offset value for float-type variables is 40128, which means address 0 is equal to 40128 and address 1 is equal to 40129, and so on. |
| 4 | Click the **Write** button to write the value to the Modbus register. |

## 5.2. Using the Modbus TCP/RTU protocol

iKAN series devices allow coil-, integer-, and float-type variables to be accessed via a Host PC, PLC, or SCADA host using the Modbus TCP/Modbus RTU protocol. The following is an overview of the Modbus registers provided for the iKAN device:

The built-in configuration web page on the iKAN series device allows variable values to be accessed using either the Host PC or a smartphone.

**Coil-type Variables (0xxxx, 0 based )**

| Modbus Address | | Length | Description | Value Range | Attribute |
|---|---|---|---|---|---|
| Decimal | Hex. | | | | |
| 00000<br>:<br>00039 | 0000<br>:<br>0027 | 40 | Coil-type variable registers | 0 or 1 | R/W |

**Integer-type variables (4xxxx, 0 based)**

| Modbus Address | | Length | Description | Value Range | Attribute |
|---|---|---|---|---|---|
| Decimal | Hex. | | | | |
| 40000<br>:<br>40063 | 0000<br>:<br>003F | 64 | Integer-type variable registers | 0 ~ 65535<br>or<br>-32768 ~ +32767 | R/W |

**Float-type variables (4xxxx, 0 based)**

| Modbus Address | | Length | Description | Value Range | Attribute |
|---|---|---|---|---|---|
| Decimal | Hex. | | | | |
| 40128<br>:<br>40255 | 0080<br>:<br>00FF | 64 | Float-type variable registers | (-3.4E+38 ~<br>+3.4E+38) | R/W |

**NOTE**

- Refer to Appendix B for full details related to the Modbus register table.

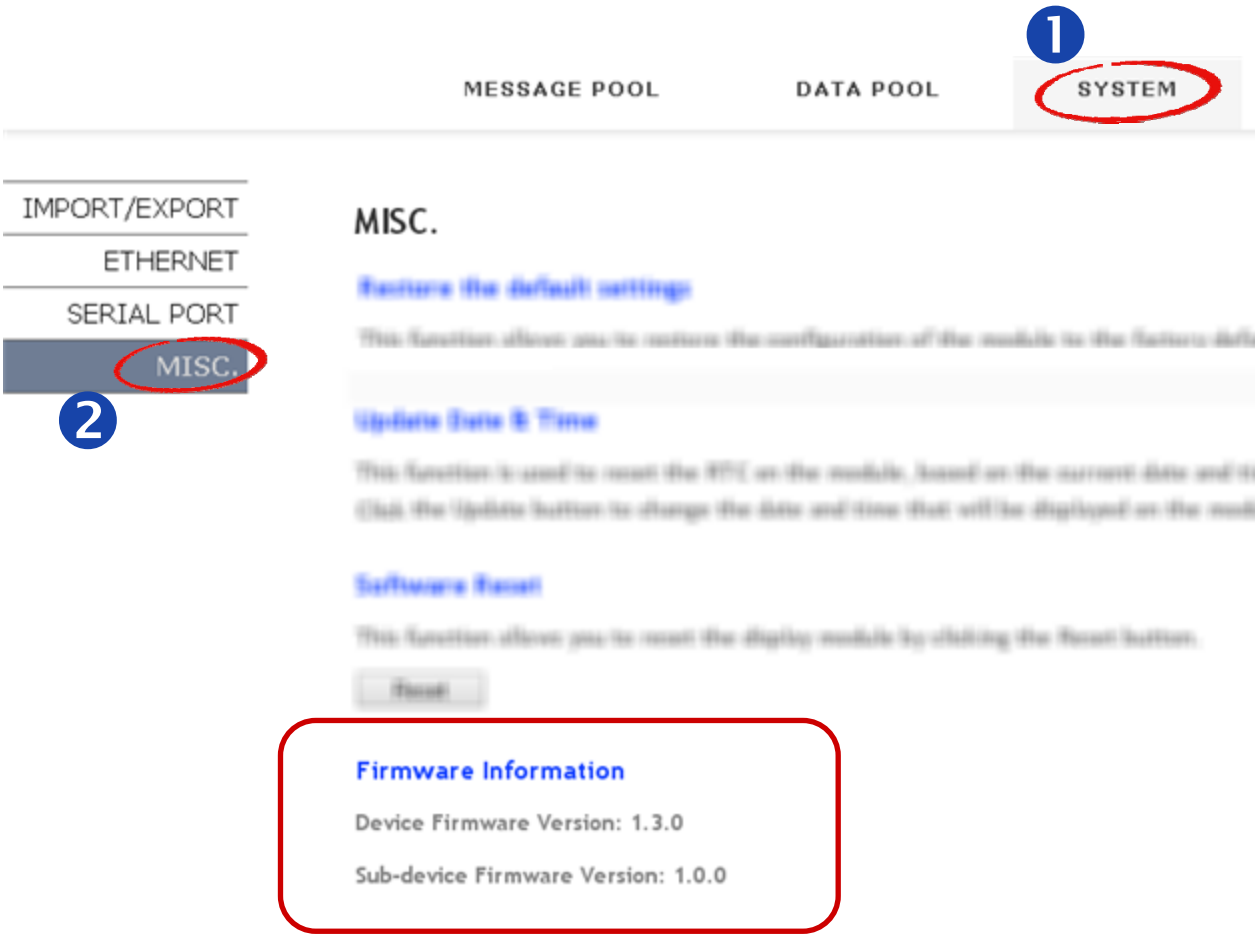
# 6. Firmware Update

## 6.1. Downloading the Latest Firmware

ICP DAS will continue to update the iKAN firmware for more useful functions and better performance. The latest firmware can be obtained from:

http://ftp.icpdas.com/pub/cd/ikan/firmware/

The firmware version is listed at the bottom of the MISC.page. You can check the version here to see if the iKAN series device needs a firmware update.



## 6.2. Installing eSearch utility

The eSearch Utility is developed for searching ICP DAS Ethernet I/O modules based-on MiniOS7 which are connected to the same subnetwork as the Host PC, configuring the Ethernet parameters such as IP address, subnet mask and gateway etc., or updating firmware. The eSearch Utility obtained either from the following link:

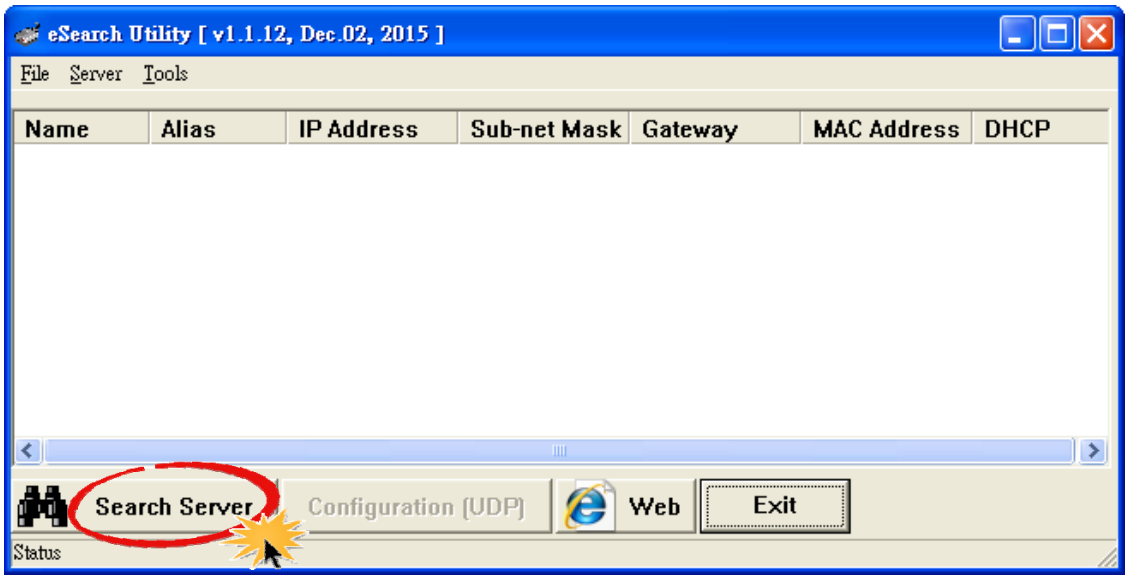
http://ftp.icpdas.com/pub/cd/tinymodules/napdos/software/esearch/

## 6.3. Updating firmware

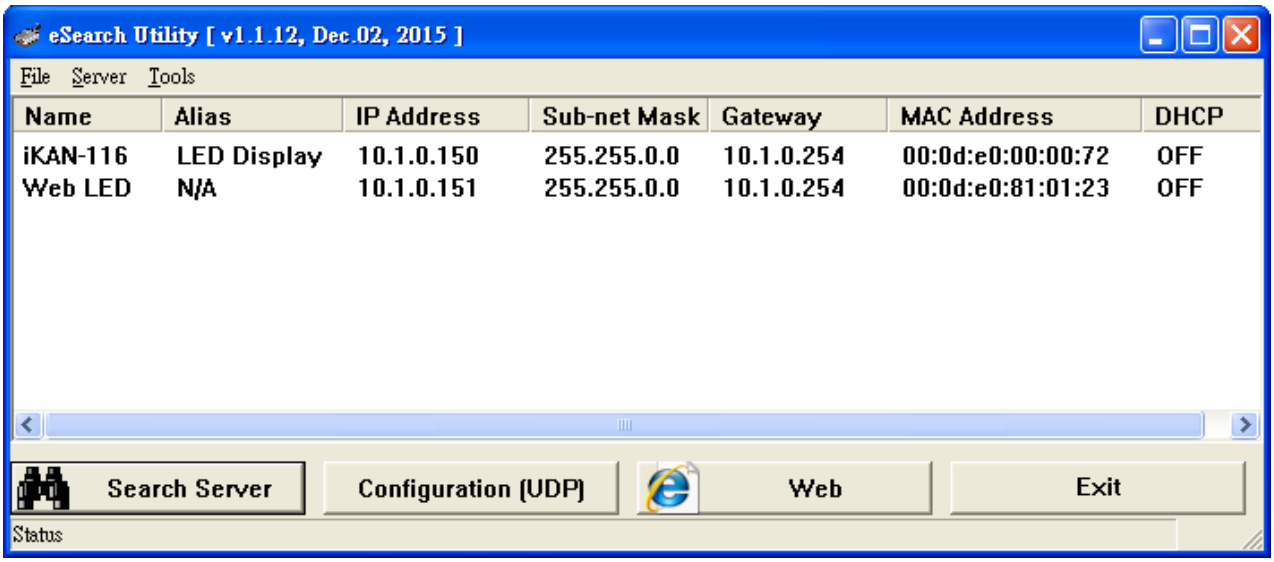
**NOTE**

- Before launching the eSearch Utility, remember to disable (turn off) the firewall to avoid searching error.
- The iKAN series device needs be connected to the same subnetwork as the Host PC; otherwise, the iKAN device can be searched, but not download firmware.

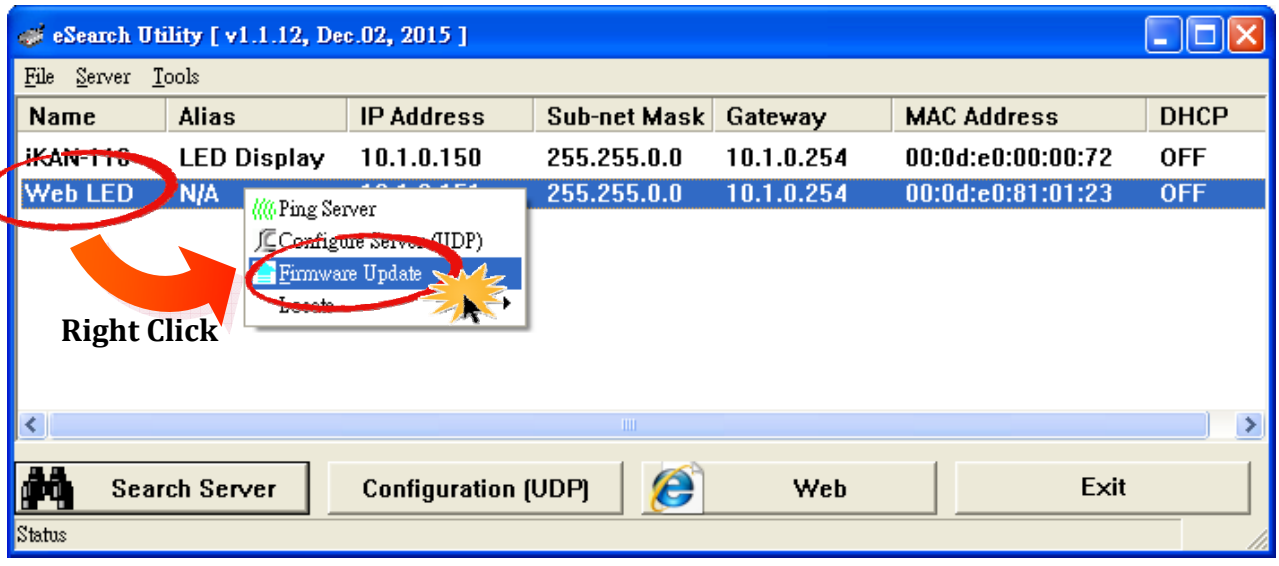
1. Launch eSearch utility and click the Search Server button.



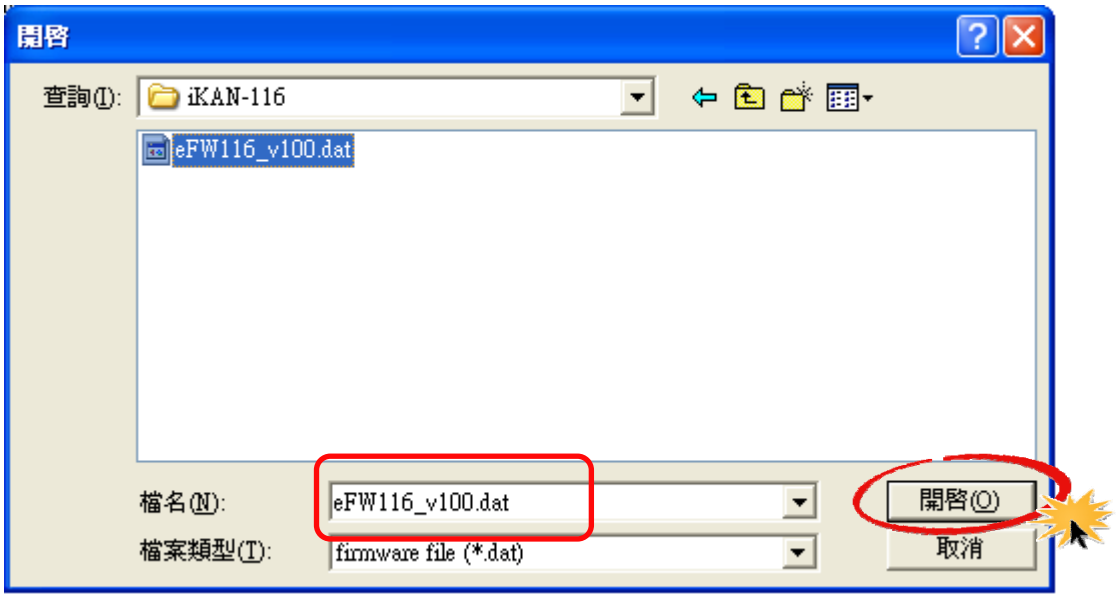
2. The search result will be listed on the utility. One iKAN series device has two components: the first one is the module name like iKAN-116, and the second one is the control unit in the display named as Web LED. The IP address for the Web LED control unit is auto set to the next IP address after the iKAN device.



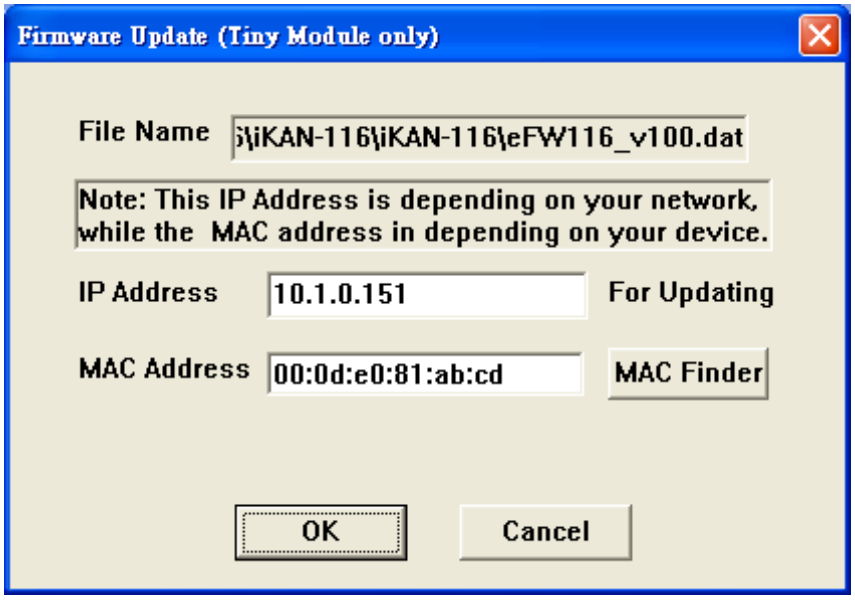

3. Right-click the item Web LED and select Firmware Update option on the pop-up menu.



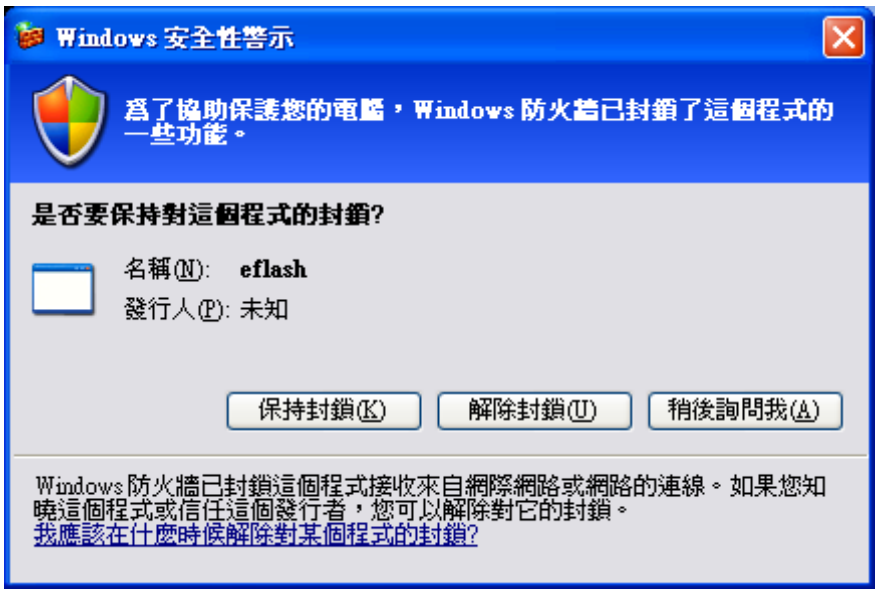
4. Select the firmware file and then click the Open button



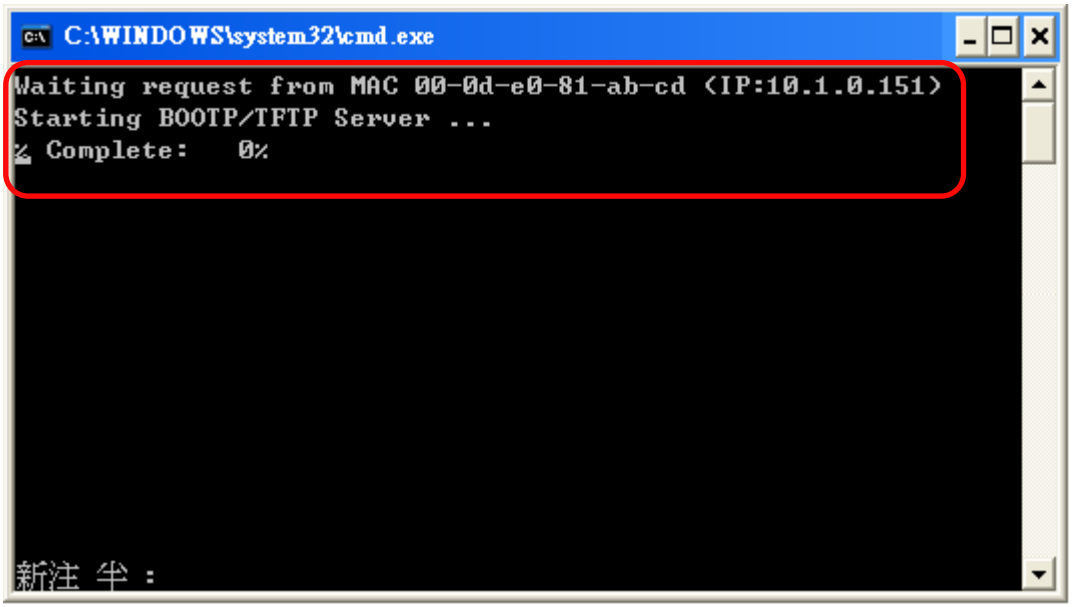

5. Confirm the update information and then click the OK button.



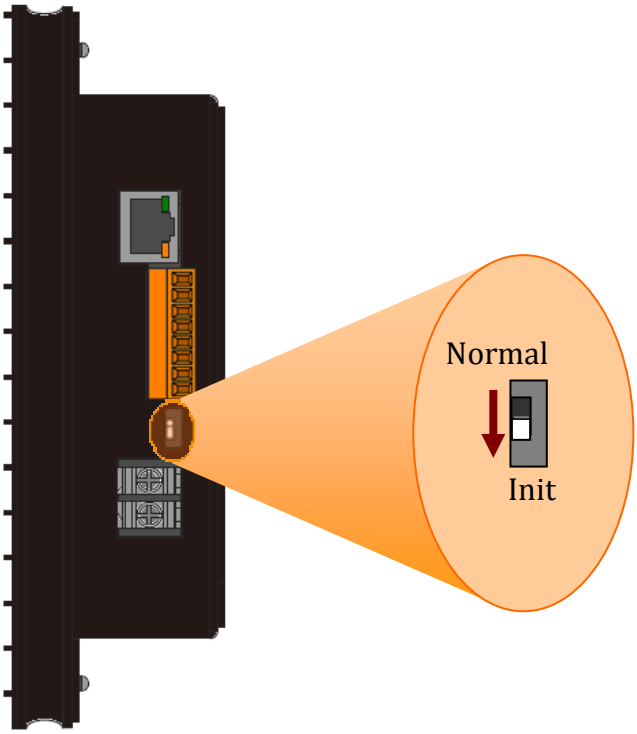
6. If you see a firewall warning, click the Unblock button.



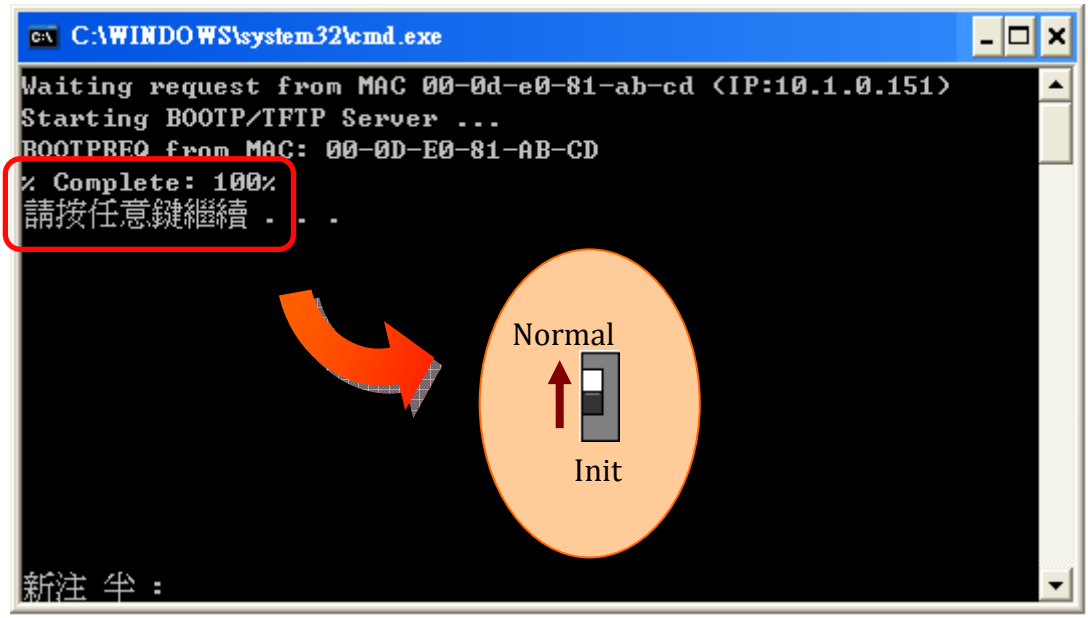

7. Wait for the download window to appear.



8. Set the Normal/Init switch to Init position and power cycle the iKAN device.



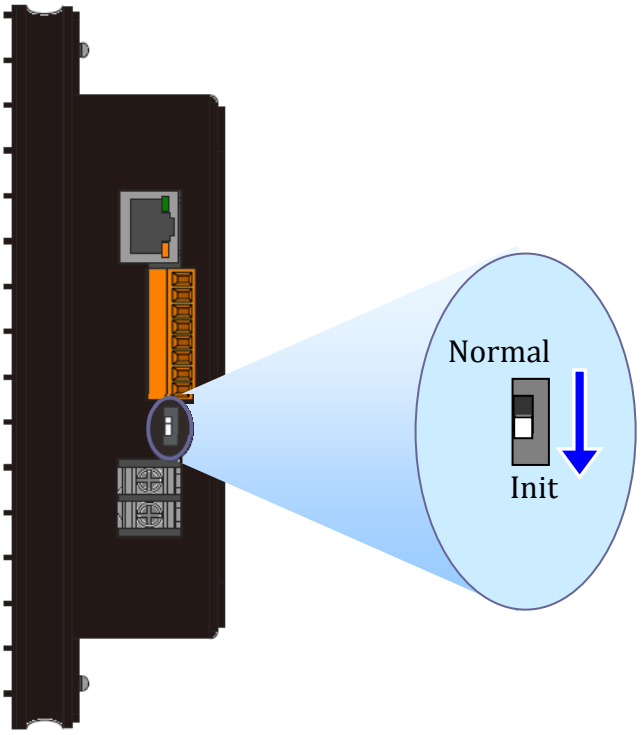

9. Wait until you see the **% Complete: 100 %** message, set the Normal/Init switch to **Normal** position and power cycle the iKAN device again. Now you can check the new fimeware version on the MISC. page.



# 7. FAQ

## 7.1. How to obtain the IP address for the iKAN device?

If you need to obtain the IP address for the iKAN when it is displaying messages, set the **Normal/Init** switch to **Init** position without power cycling the device, the IP address will be showed on the iKAN display.



# Appendix A: Instruction for Inserting Variable

Five types of instruction for inserting variables into a message are provided, each consists of 5 characters. The following is an overview of the format and valid value range for each type.

<table>
<tr><th>1</th><th>2</th><th colspan="3">3 to 5</th></tr>
<tr><th>Delimiter Character</th><th>Variable Type</th><th colspan="3">Modbus Address:<br>3-digit decimal number</th></tr>
<tr><td rowspan="5">%</td><td>b: Coil</td><td rowspan="5">X</td><td rowspan="5">X</td><td rowspan="5">X</td></tr>
<tr><td>u: Unsigned integer (0~65535)</td></tr>
<tr><td>i: Signed integer (-32768~32767)</td></tr>
<tr><td>f: Float (-3.4E+38 ~ +3.4E+38)</td></tr>
<tr><td>y: System</td></tr>
</table>

The valid range for each type of variable is:

| Variable type | Range |
|---|---|
| Coil Variables | %b000 to %b039 |
| Integer Variables | %u000 to %u063 |
| | %i000 to %i063 |
| Float Variables | %f128 to %f254 |
| System Variables | %y000 to %y026 |

# Appendix B: Modbus Register Tables

**Coil-type variables (0xxxx, 0 based)**

| Modbus Address | | Length | Description | Value Range | Attribute |
|---|---|---|---|---|---|
| Decimal | Hex. | | | | |
| 00000 : 00039 | 0000 : 0027 | 40 | Coil-type variables | - | R/W |
| 00100 : 00163 | 0064 : 00A3 | 64 | Enables or disables the display of common messages 0 ~ 63. | 0: Disabled<br>1: Enabled | R/W |
| 00228 : 00237 | 00E4 : 00ED | 10 | Enables or disables the display of instant messages 0 ~ 9. | 0: Disabled<br>1: Enabled | R/W |

**System variables (3xxxx, 0 based)**

| Modbus Address | | Length | Description | Value Range | Attribute |
|---|---|---|---|---|---|
| Decimal | Hex. | | | | |
| 30000 : 30003 | 0000 : 0003 | 4 | The IP address for the iKAN series device | 0 ~ 256 | R |
| 30004 : 30007 | 0004 : 0007 | 4 | The Mask address for the iKAN series device | 0 ~ 256 | R |
| 30008 : 30011 | 0008 : 000B | 4 | The Gateway address for the iKAN series device | 0 ~ 256 | R |
| 30012 | 000C | 1 | Year | 0 ~ 9999 | R |
| 30013 | 000D | 1 | Month | 1 ~ 12 | R |
| 30014 | 000E | 1 | Day | 1 ~ 31 | R |
| 30015 | 000F | 1 | Abbreviated day of the week: SUN, MON, TUE, WED, THU, FRI, SAT. | 0 ~ 6 | R |
| 30016 | 0010 | 1 | Day of the week: Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, | 0 ~ 6 | R |

| | | | | | |
|---|---|---|---|---|---|
| | | | Saturday | | |
| 30017 | 0011 | 1 | Day of the week in Chinese characters:<br>日、一、二、三、四、五、六。 | 0 ~ 6 | R |
| 30018 | 0012 | 1 | Hours (24-hour format) | 0 ~ 23 | R |
| 30019 | 0013 | 1 | Minutes | 0 ~ 59 | R |
| 30020 | 0014 | 1 | Seconds | 0 ~ 59 | R |
| 30021 | 0015 | 1 | The CO2 value from a remote DL-302 module | 1 ~ 9999 (Units: ppm) | R |
| 30022 | 0016 | 1 | The humidity value from a remote DL-302 module | 1 ~ 9999 (Units: 0.01%) | R |
| 30023 | 0017 | 1 | The temperature value from a remote DL-302 module in degrees Celsius | Units: 0.01%°C | R |
| 30024 | 0018 | 1 | The temperature value from a remote DL-302 module in degrees Fahrenheit | Units: 0.01%°F | R |
| 30025 | 0019 | 1 | The dew point temperature value from a remote DL-302 module in degrees Celsius | Units: 0.01%°C | R |
| 30026 | 001A | 1 | The dew point temperature value from a remote DL-302 module in degrees Fahrenheit | Units: 0.01%°F | R |

**Integer-type variables/Float-type variables/misc. (4xxxx, 0 based)**

| Modbus Address | | Length | Description | Value Range | Attribute |
|---|---|---|---|---|---|
| Decimal | Hex. | | | | |
| 40000 : 40063 | 0000 : 003F | 64 | Integer-type variables | 0 ~ 65535 | R/W |
| 40128 : 40255 | 0080 : 00FF | 64 | Float-type variables | -3.4E+38 ~ +3 .4E+38 | R/W |
| 40384 : 40447 | 0180 : 01BF | 64 | Data mapping arguments: Source Low | 0 ~ 65535 | R/W |
| 40512 : 40475 | 0200 : 023F | 64 | Data mapping arguments: Source High | 0 ~ 65535 | R/W |
| 40640 : 40703 | 0280 : 02BF | 64 | Data mapping arguments: Target Low | 0 ~ 65535 | R/W |
| 40768 : 40831 | 0300 : 033F | 64 | Data mapping arguments: Target High | 0 ~ 65535 | R/W |
| 40896 : 40959 | 0380 : 03BF | 64 | Data mapping arguments: Decimal Places | 0 ~ 2 | R/W |
| 41024 : 41087 | 0400 : 043F | 64 | Decimal Places for float-type variables | 1 ~ 3 | R/W |
| 41408 : 41471 | 0580 : 05BF | 64 | Color for common messages 0 ~ 63 | 1: Blue<br>2: Green<br>3: Sky Blue<br>4: Red<br>5: Purple<br>6: Yellow<br>7: White<br>8: Random | R/W |
| 41536 : 41545 | 0600 : 0609 | 10 | Color for instant messages 0 ~ 9 | | R/W |
| 41600 | 0640 | 1 | Brightness for the display, a smaller number means a brighter screen | 0 ~ 4 | R/W |
| 41601 | 0641 | 1 | Message scrolling speed, a smaller number means a higher speed | 0 ~ 9 | R/W |

# Revision Record

| Version | Date | Description |
|---|---|---|
| 1.0.0 | 2016/10 | Initial release |
| | | |