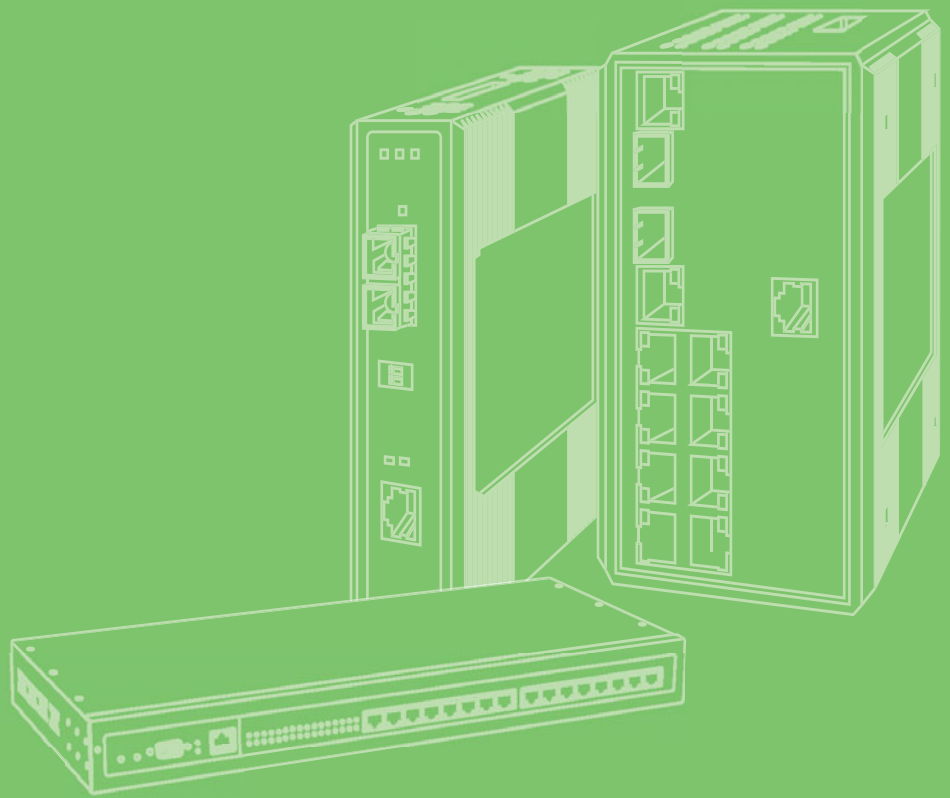


User Manual



EKI-1331

Cellular Gateway

ADVANTECH

Enabling an Intelligent Planet

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Product Warranty (5 years)

Advantech warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for five years from the date of purchase.

This warranty does not apply to any products which have been repaired or altered by persons other than repair personnel authorized by Advantech, or which have been subject to misuse, abuse, accident or improper installation. Advantech assumes no liability under the terms of this warranty as a consequence of such events.

Because of Advantech's high quality-control standards and rigorous testing, most of our customers never need to use our repair service. If an Advantech product is defective, it will be repaired or replaced at no charge during the warranty period. For out-of-warranty repairs, you will be billed according to the cost of replacement materials, service time and freight. Please consult your dealer for more details.

If you think you have a defective product, follow these steps:

1. Collect all the information about the problem encountered. (For example, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any onscreen messages you get when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, obtain an RMA (return merchandise authorization) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.
5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

Declaration of Conformity

CE

This product has passed the CE test for environmental specifications. Test conditions for passing included the equipment being operated within an industrial enclosure. In order to protect the product from being damaged by ESD (Electrostatic Discharge) and EMI leakage, we strongly recommend the use of CE-compliant industrial enclosure products.

Technical Support and Assistance

1. Visit the Advantech web site at <http://support.advantech.com.cn> where you can find the latest information about the product.
2. Contact your distributor, sales representative, or Advantech's customer service center for technical support if you need additional assistance. Please have the following information ready before you call:
 - Product name and serial number
 - Description of your peripheral attachments
 - Description of your software (operating system, version, application software, etc.)
 - A complete description of the problem
 - The exact wording of any error messages

Document Feedback

To assist us in making improvements to this manual, we would welcome comments and constructive criticism. Please send all such - in writing to: support@advantech.com.

Safety Instructions

1. Read these safety instructions carefully.
2. Keep this User Manual for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a reliable surface during installation. Dropping it or letting it fall may cause damage.
7. The openings on the enclosure are for air convection. Protect the equipment from overheating. **DO NOT COVER THE OPENINGS.**
8. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
9. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
12. Never pour any liquid into an opening. This may cause fire or electrical shock.
13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
14. If one of the following situations arises, get the equipment checked by service personnel:
 - The power cord or plug is damaged.
 - Liquid has penetrated into the equipment.
 - The equipment has been exposed to moisture.
 - The equipment does not work well, or you cannot get it to work according to the user's manual.
 - The equipment has been dropped and damaged.
 - The equipment has obvious signs of breakage.
15. **DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT WHERE THE STORAGE TEMPERATURE MAY GO BELOW -20° C (-4° F) OR ABOVE 60° C (140° F). THIS COULD DAMAGE THE EQUIPMENT. THE EQUIPMENT SHOULD BE IN A CONTROLLED ENVIRONMENT.**
16. **CAUTION: DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE RECOMMENDED BY THE MANUFACTURER, DISCARD USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.**
17. The sound pressure level at the operator's position according to IEC 704-1:1982 is no more than 70 dB (A).

DISCLAIMER: This set of instructions is given according to IEC 704-1. Advantech disclaims all responsibility for the accuracy of any statements contained herein.

Safety Precaution - Static Electricity

Follow these simple precautions to protect yourself from harm and the products from damage.

- To avoid electrical shock, always disconnect the power from your PC chassis before you work on it. Don't touch any components on the CPU card or other cards while the PC is on.
- Disconnect power before making any configuration changes. The sudden rush of power as you connect a jumper or install a card may damage sensitive electronic components.

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Chapter 1

Overview

Sections include:

- Introduction
- Features

1.1 Introduction

The EKI-1331 combines 3G networks, intelligent protocol conversion, and VPN technology to create a product designed for remote maintenance and management. The EKI-1331 features remote communication between the controller and data center, which provides an ingress (or gateway) for the remote diagnosis and maintenance of the machines. The controller technicians can construct large-scale networks for remote maintenance of equipment. The EKI-1331 can also be employed as a communication gateway for equipment to coordinate with each other.

With the EKI-1331, technicians in the office can remotely program field PLCs, monitor variables and receive alerts in real time. The EKI-1331 supports both communication via the PLCs Ethernet port and via the serial port. EKI-1331 also supports status queries, PLC controls and alarm message via SMS. The EKI-1331 series utilizes the ubiquitous cellular network to the fullest and opens new horizons in remote management and machine to machine communication.

1.2 Features

- Designed for the Communication of Industrial Equipment
 - SMS Function
 - SMS Alarm: users can receive timely alarm message when PLC exception occur in field.
 - SMS Check and Control: users can remotely monitor and control PLC.
 - PLC Collaboration: PLCs can communicate with each other via SMS, ensuring more PLCs work collaboratively.
- Remote Maintenance
 - Users can achieve PLC's remote programming via secure channel (serial/Ethernet port)
- Remote Monitoring
 - EKI-1331 can check real-time operating status (variable) and send it to data center regularly through 3G/2G network. Users can check PLC's operation and alarm messages anywhere via internet.
- Industrial Design
 - In the aspects of EMC, anti-static grade, anti-surge level and wide temperature range, EKI-1331 meet the requirements of industrial and operate easily under harsh environments.
 - Metal enclosure. IP30.
 - All EMC grade reach level 3.
 - Ethernet port supports 1.5kv isolation transformer protection
 - Serial port support 15kv ESD protection.
 - Wide temperature range: -20?~70?.
 - Wide voltage range: DC: 12-24V.
- Complete Security
 - Data Transmission Security
 - EKI-1331 uses encrypted channel to communicate with remote controller, enabling the process of updating PLC program enjoys high level of encryption, which is comparable to that of the financial industry.
 - Network Protection Security
 - With powerful firewall features, EKI-1331 supports SPI State Inspection, Secure Shell (SSH), Intrusion Protection, DDoS Defense, Attack Defense, IP-MAC binding, etc, protecting the equipment against external network attack.

- Equipment Management Security
Multi-level authorization security mechanism realizes centralized authentication and authorization management of equipment.

1.3 Physical Characteristics

- Housing: Steel, providing IP30 protection
- Dimensions (mm)

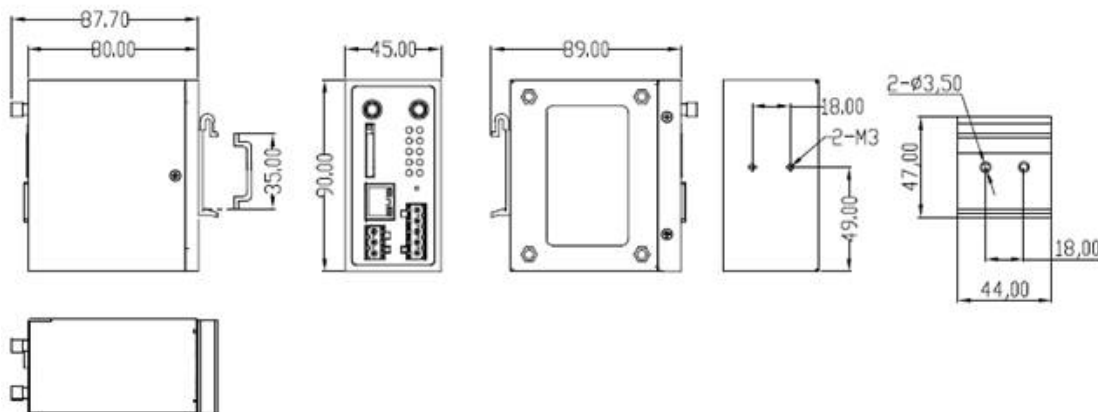


Figure 1.1 DIN-Rail Mount

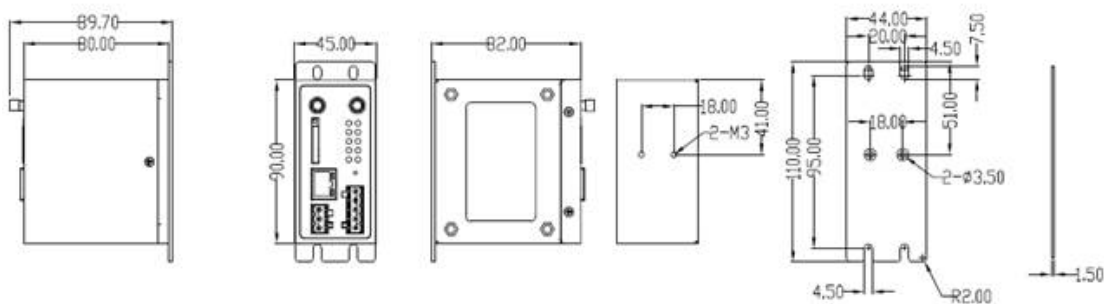


Figure 1.2 Wall Mount

Chapter 2

Login Gateway

Sections include:

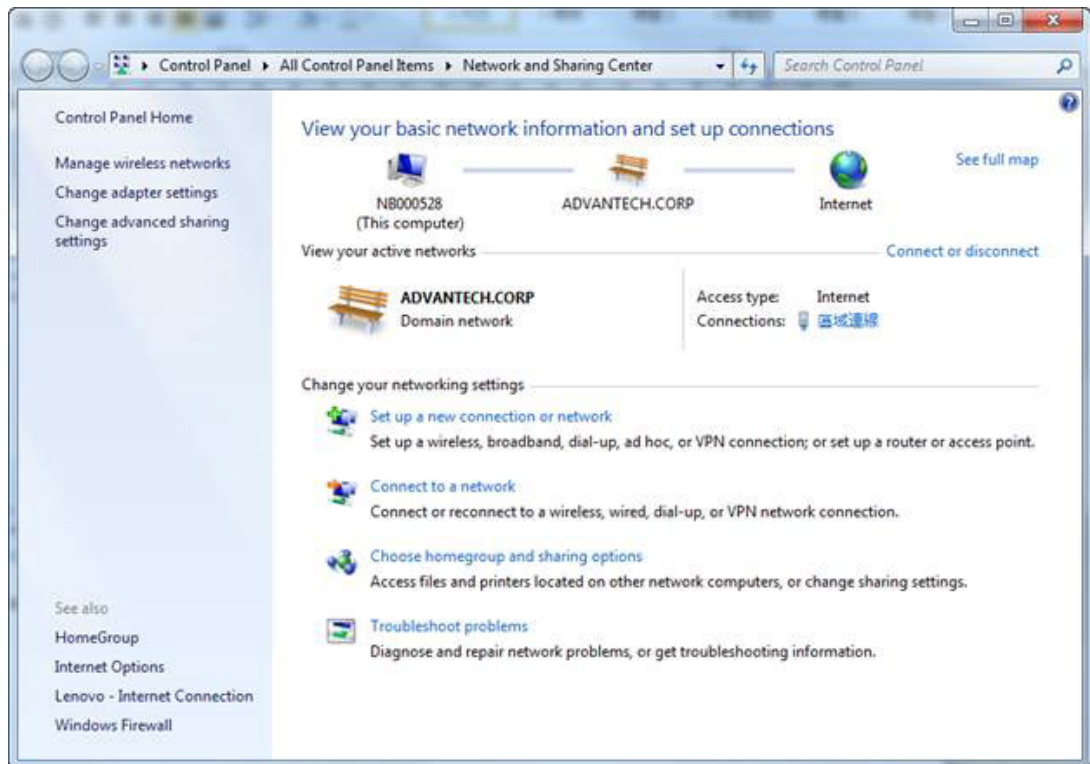
- Establish Network Connection
- Test the connection between supervisory PC and EKI-1331
- Cancel the Proxy Server

2.1 Establish Network Connection

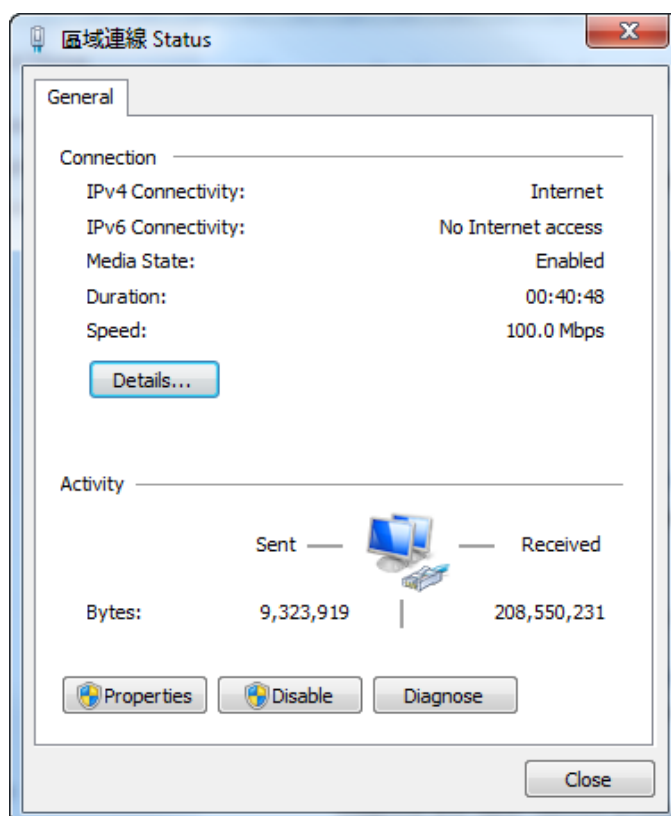
2.1.1 Automatic Acquisition of IP address

Please set the supervisory PC to “**automatic acquisition of IP address**” and “**automatic acquisition of DNS server address**”, which is the default configuration of Windows. This way, the EKI-1331 automatically assign an IP address to the supervisory PC using DHCP.

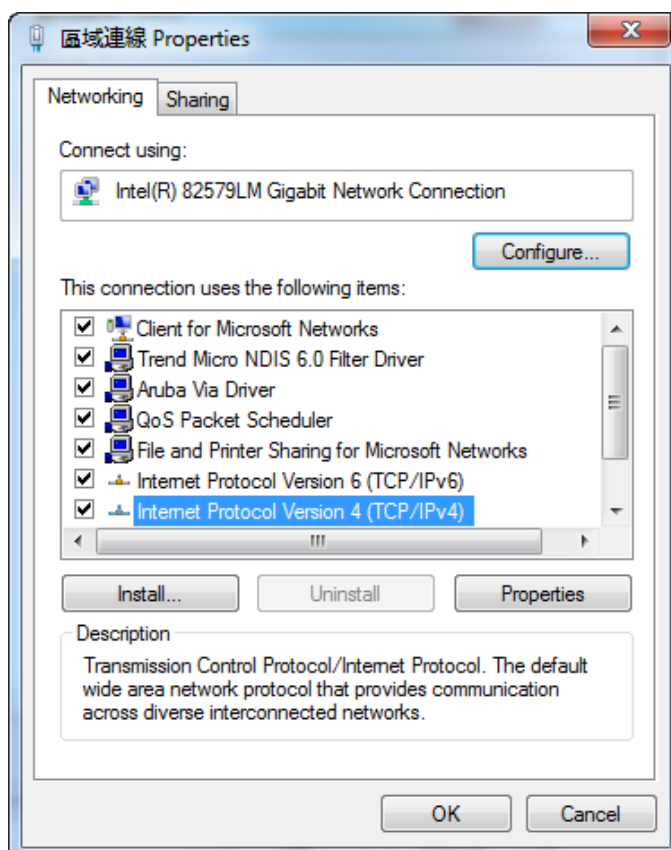
1. Open “**Control Panel**”, double click “**Network and Internet**” icon, and enter “**Network and Sharing Centers**”.



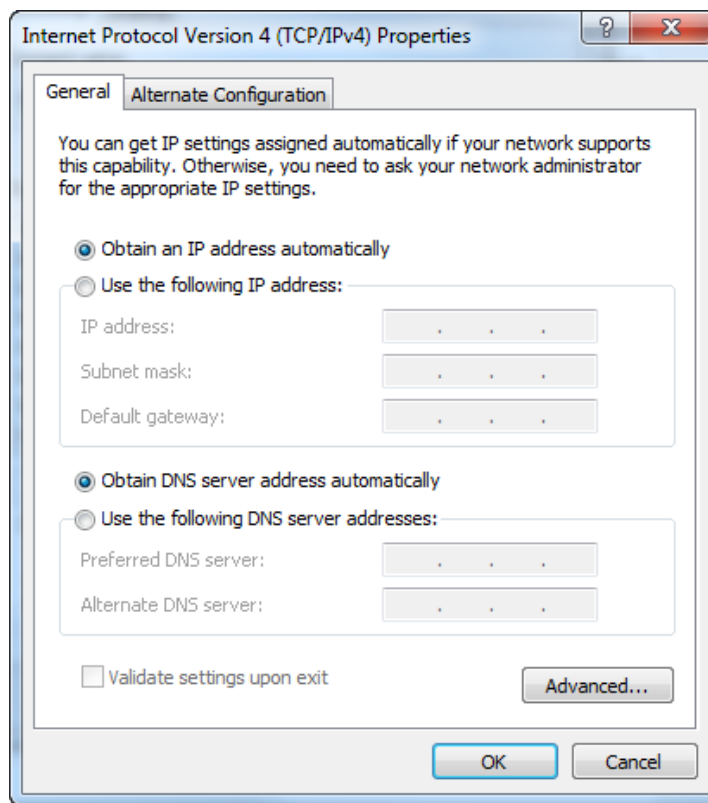
- Click the button <Local Connection> to enter the window “**Local Connection Status**”.



- Click <Properties> to enter the window “**Local Connection Properties**”, as shown below.

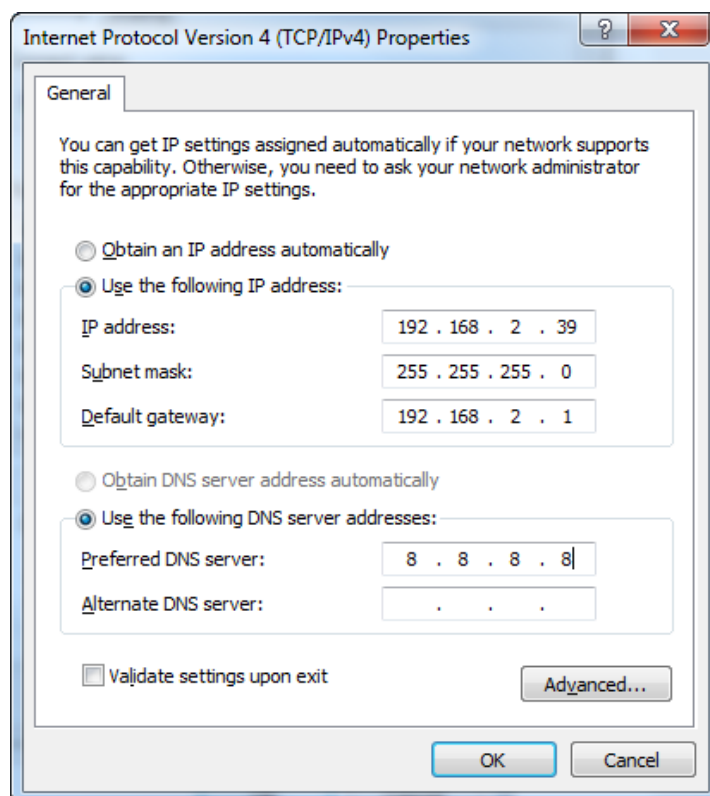


4. Select **“Internet Protocol Version 4 (TCP/IPv4).”** Click <Properties> to enter **“Internet Protocol Version 4(TCP/IPv4) Properties.”** Select **“Obtain an IP address automatically”** and **“Obtain DNS Server address automatically,”** then click <OK> to complete the process, as shown below.



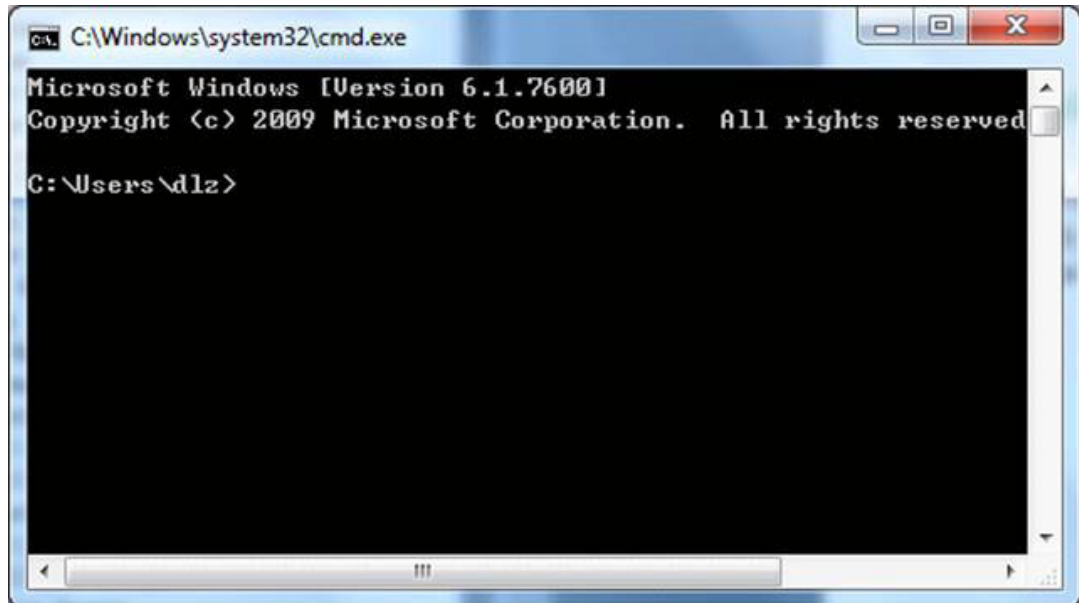
2.1.2 Set a Static IP Address

Please set the supervisory PC's IP address in the same subnet as the gateway FE (or fast Ethernet) port. In this example, the default IP address of gateway FE port is 192.168.2.1, and the subnet mask is 255.255.255.0. Enter the “**Internet Protocol Version 4 (TCP/IPv4) Properties**” window. Then, select “Use the following IP address”, type the IP address (arbitrary value between 192.168.2.2 - 192.168.2.254), subnet mask (255.255.255.0), and default gateway (192.168.2.1) into the text boxes. Finally, click <OK> to finish setting a static IP, as shown below.

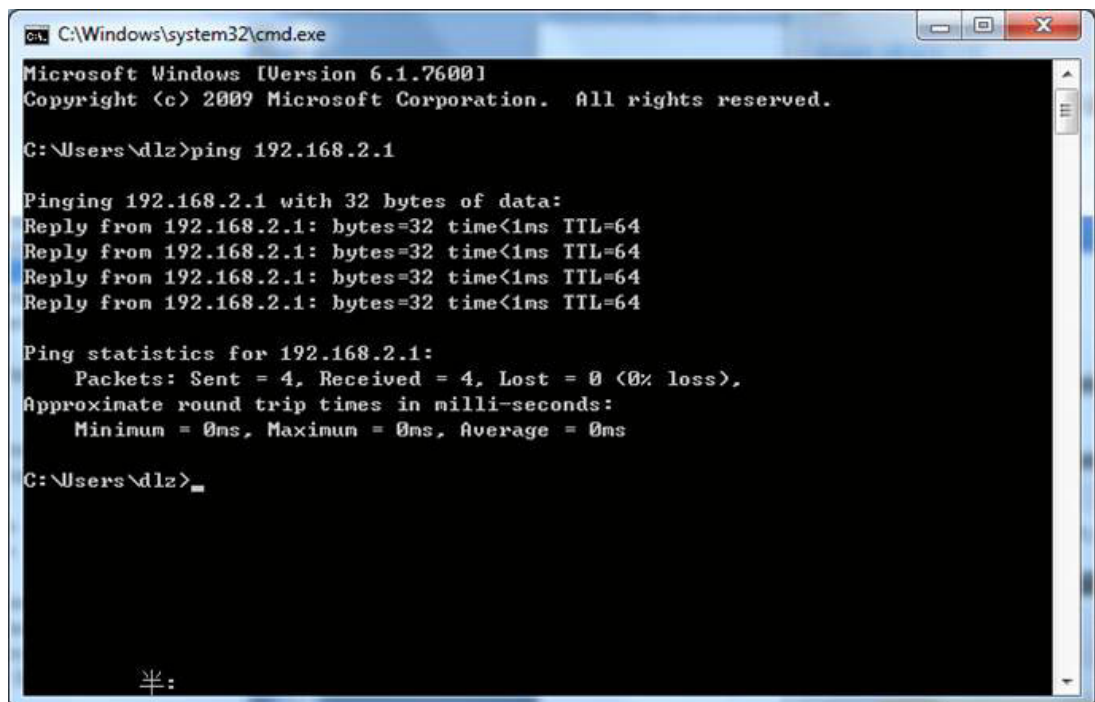


2.2 Test the Network Connection between the Supervisory PC and EKI-1331

1. Click the button <Start> at the lower left corner. Type “cmd” into the field, and run cmd.exe.



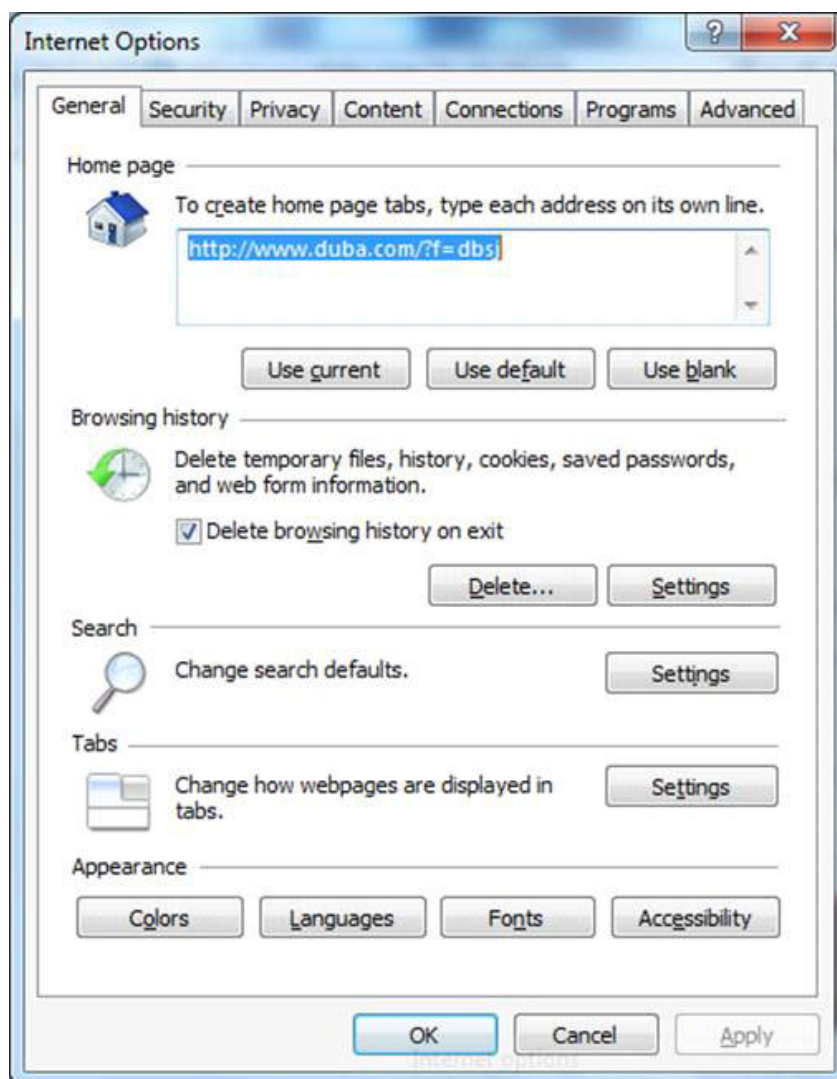
2. Enter “ping 192.168.2.1” and click the <OK> button. (192.168.2.1 is the default IP address of the EKI-1331). If the connection is good, you will see four returned packets. If there is no response, be sure to check your connection and your supervisory PC's network settings.



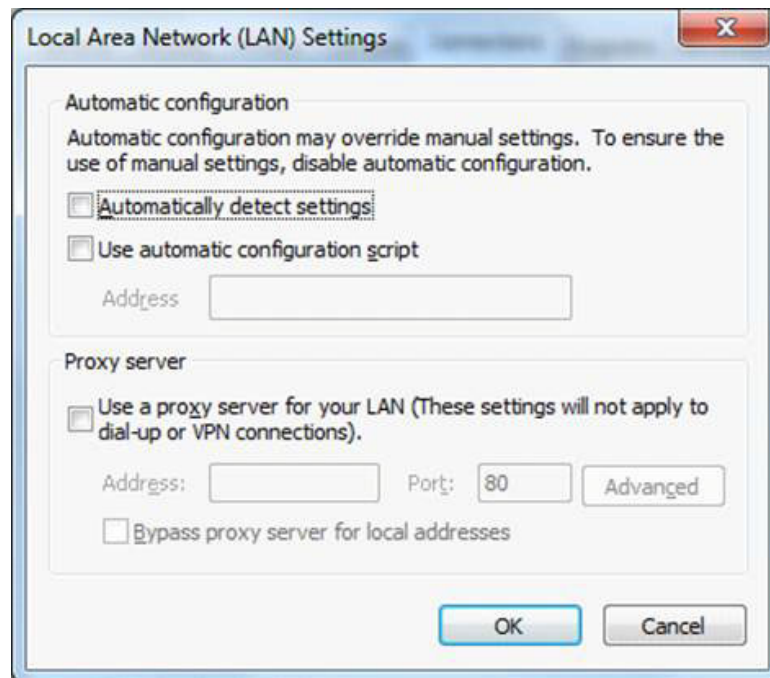
2.3 Disconnect from the Proxy Server

If the supervisory PC uses a proxy server to access the Internet, it is necessary to disconnect from the proxy and remove any proxy settings. The operating steps are as follows:

- Open Internet Explorer.
- Select **Tools>>Internet Options** to enter the window “Internet Options”.



- Select the tab “Connect” and click the button <LAN Setting (L)> to enter the window “**LAN Setting.**” If the option “**Use a Proxy Server for LAN**” is checked, *uncheck* it. Click the <OK> button and continue to the web configuration section of the manual.



Chapter 3

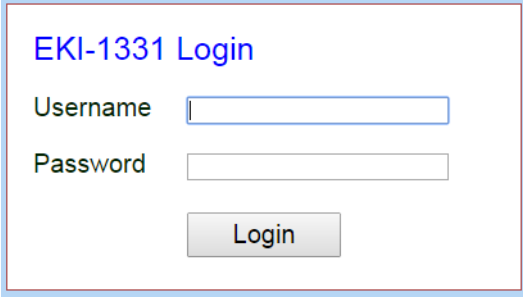
Configuration

Sections include:

- Logging in the Browser Interface
- System
- Network
- Service
- Firewall
- QoS
- Tools
- Status

3.1 Login the Web Configuration Page of Gateway

Run the Web browser, enter “http://192.168.2.1” in the address bar, and press Enter to skip to the Web login page, as shown below. Enter the “User Name” (default: adm) and “Password” (default: 123456).



The image shows a web login page titled "EKI-1331 Login". It contains two input fields: "Username" and "Password". Below these fields is a "Login" button.

Click button <Login> or directly press Enter to enter the Web configuration page, as shown below.

Caution! For security, it is highly recommended that you modify the default password after your first login. Store the password information in a secure location.



The image shows the Advantech web configuration page. At the top is the Advantech logo and the slogan "Enabling an Intelligent Planet". Below this is a navigation bar with tabs: System, Network, Services, Firewall, QoS, VPN, Tools, and Status. The "System" tab is selected, and the "System Status" section is displayed. It contains a table of system information and a "Sync Time" button.

System Status	
Name	EKI-1331
Model	EKI-1331
Serial Number	GP6011412250073
Description	www.advantech.com.tw
Current Version	1.2.0.r3558
Current Bootloader Version	1.1.3.r2777
Gateway Time	2029-09-13 18:27:35
PC Time	2015-02-16 17:02:20
Up time	0 day, 00:03:49
CPU Load (1 / 5 / 15 mins)	0.51 / 0.29 / 0.11
Memory consumption	28.88MB / 19.48MB (67.43%)
Total/Free	

Click <Sync Time> to synchronize the gateway's clock with the system time of the host.

3.2 System

The system configuration process involves nine steps:

- Basic Setup
- Time
- Serial Port
- Admin Access
- System Log
- Configuration Management
- Update
- Reboot
- Logout

3.2.1 Basic Setup

From the navigation panel, select System >> Basic Setup, then enter the “Basic Setup” page, as shown below.

Page description is shown below:

Parameters	Description	Default
Language	Select the language of configuration page	English
Hostname	Set the name of EKI-1331	Gateway

3.2.2 Time

In order to ensure the coordination of the gateway and other devices, users need to set the system time and time zone correctly. From the navigation panel, select **System >> Time** then enter the “**Time**” webpage, as shown below. Click <Sync Time> to synchronize the time of the gateway with the system time of the host.

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System Network Services Firewall QoS VPN Tools Status

Time

Gateway Time 2029-09-13 18:28:53
PC Time 2015-02-16 17:03:38

Timezone Custom
Custom TZ String CST-8

Auto Update Time Disabled

The terms are explained below:

Parameters	Description	Default
Gateway Time	Display the system time of Gateway	2000-01-01 08:16:47
PC Time	The current time of supervisory PC	N/A
Timezone	Set time zone	Custom
Custom TZ String	Set the time zone of the Gateway	CST-8
Auto update Time	Time Update Interval	Disabled

3.2.3 Serial Port

On the serial port settings config page, users need set the serial configuration of the gateway with the same parameters as the connected device. If users are using software similar to PuTTY, users should set their serial configs the same as the settings below.

From the navigation panel, select **System >> Serial Port**, then enter “**Serial Port**” page, as shown below.

Page description is shown below:

Parameters	Description	Default
Baud Rate	Serial baud rate	115200
Data Bit	Serial data bits	8
Parity	Set parity bit of serial data	None
Stop Bit	Set stop bit of serial data	1
Software Flow Control	Enable Software Flow Control	Disable
Mode	Select serial type	RS232

3.2.4 Admin Access

HTTP

HTTP (Hypertext Transfer Protocol) is used for transferring web pages on Internet. After enabling HTTP service on device, users can log on via HTTP and access the device using a web browser.

HTTPS

HTTPS (Secure Hypertext Transfer Protocol) supports SSL (Security Socket Layer) and encrypts data transfers. This prevents man-in-the-middle attacks when data passes either through the local network or across the internet.

TELNET

Telnet protocol provides telnet and virtual terminal functions through a network. The device supports both a client mode and a server mode. In client mode, the telnet client sends request to the telnet server, creating a session. While in server mode, the device supports Telnet connections for incoming clients, allowing for remote access.

Console

The console port, also called the access or serial port, refers for initial configuration and subsequent management of a device. It has the same terminal as the telnet client. From the navigation panel, select **System >> Admin Access**, then enter “**Admin Access**” page, as shown below.

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System Network Services Firewall QoS VPN Tools Status

Admin Access

Username / Password

Username:

Old Password:

New Password:

Confirm New Password:

Management

Enable	Service Type	Service Port	Local access	Remote access	Allowed addresses from WAN (Optional)	Description
<input checked="" type="checkbox"/>	HTTP	<input type="text" value="80"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="text"/>	<input type="text"/>
<input type="checkbox"/>	HTTPS	<input type="text" value="443"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="text"/>	<input type="text"/>
<input checked="" type="checkbox"/>	TELNET	<input type="text" value="23"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="text"/>	<input type="text"/>
<input checked="" type="checkbox"/>	Console					<input type="text"/>

Non-privileged users

Username	Password
<input type="text"/>	<input type="password"/>

Page description is shown below:

Parameters	Description	Default
Username	Username for configuration web login.	adm
Old Password	To change the password, users must input the old one.	N/A
New Password	Input new password.	N/A
Confirm New Password	Input the new password again.	N/A
Management: HTTP/HTTPS/TELNET/Console		
Enable	Select to enable HTTP.	Enabled
Service Port	Select management port.	80/443/23/N/A
Local Access	Enable—allow management of the EKI-1331 over the local network, or LAN. Disable—forbid management of the EKI-1331 over LAN.	Enabled
Remote Access	Enable—allow management of the EKI-1331 over the WAN, or internet. Disable—forbid management on a WAN connection.	Enabled
Allowed Access from WAN (Optional)	Set the range of IP address that is allowed access over a WAN connection. For example 192.168.2.1/30 or 192.168.2.1 - 192.168.2.10. (HTTP/HTTPS/TELNET)	N/A
Description	Describe the parameters of management (non-influence to EKI-1331)	N/A

Parameters	Description	Default
Non-privileged Users (Console login)		
Username	Technician defines a new username.	N/A
Password	User define the password	N/A
Other Parameters		
Log Timeout	Log Timeout	Log Timeout

- Caution!** ■ In “Username/Password” section users can modify username and password. However, these accounts will be non-privileged, meaning the new users cannot create new username. A non-privileged account may only do web logins. For security, it is highly recommended that you modify the default password after your first login. Store the password information in a secure location.
- In “Non-privileged Users” section, we can create multiple usernames. Technicians can utilize multiple usernames while logging on a EKI-1331 via serial port or Telnet.



3.2.5 System Log

A remote log server can be set through “System Log Settings,” and all system logs will be uploaded to the remote log server through the gateway. This makes remote log software, such as Kiwi Syslog Daemon, a necessity on the host.

Kiwi Syslog Daemon is free log server software for Windows, which can receive, record and display logs from host (such as gateway, exchange board and Unix host). After downloading and installing Kiwi Syslog Daemon, it must be configured through the menus “File >> Setup >> Input >> UDP.” From the navigation panel, select System >> System Log, then enter “System Log” page, as shown below.

Page description is shown below:

Parameters	Description	Default
Log to Remote System	Enable remote log server	Disable
IP address/Port (UDP)	Set the IP and Port of remote log server	N/A/Port: 514
Log to Console	Print the log to console.	Disable

3.2.6 Config Management


Users may import an old configuration or backup the current configuration.


From the navigation panel, select **System >> Config Management**, then enter the “**Config Management**” page, as shown below.



Page description is shown below:

Parameters	Description	Default
Gateway Configuration	Import/Backup configuration	N/A
Restore default configuration	Click to reset EKI-1331. To complete the reset, users need to reboot the EKI-1331.	N/A
Network Provider (ISP)	The technician must configure the local APN, username, password, and other configs the same as their ISP.	N/A

Caution!  Be sure to check imported configs for incorrect formats and completeness. When importing, the system will filter the improperly formatted commands and save the correct configuration. The good configs will later be serially executed in order after system reboot. The system will not get into expected state in the case that the imported configuration is not arranged according to an effective order.

Caution!  In order not to affect the operation of the current system, when performing an import configuration and restore default configuration, users need to restart the gateway to make the new configuration to take effect.

3.2.7 System Upgrade

From the navigation panel, select System >> Upgrade, then enter the “Upgrade” page, as shown below.

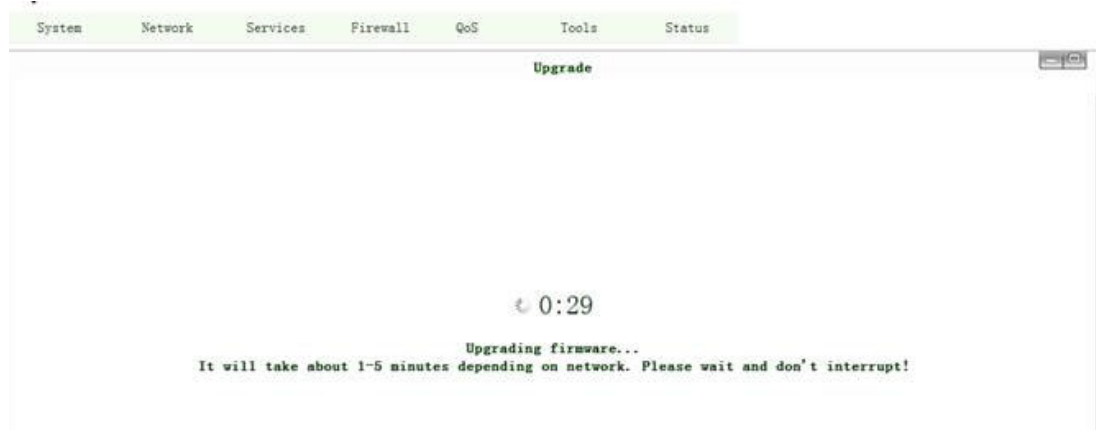


To upgrade the system, click the **System** tab then <**System upgrade**> to enter upgrade page, then follow the steps below:

1. Click <**Browse**> choose the upgrade file, and then click <Open>, as shown below:



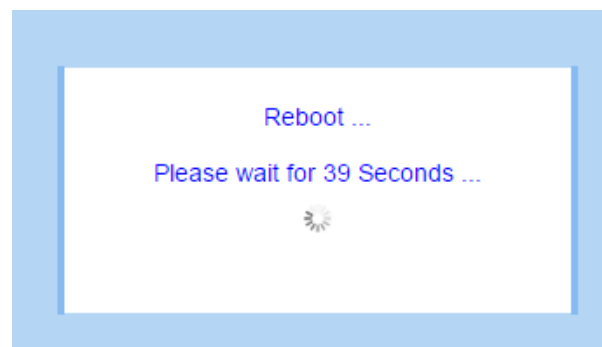
- Click <Update> and then click <OK> to begin updating. Make sure your screen matches the picture below.



- Upgrade firmware succeed, and click <Reboot> to restart the EKI-1331.

3.2.8 Reboot

If users need to reboot system, please click the System tab, then <Reboot> and click <OK> to restart the system.



3.2.9 Logout

If users want to logout, click **System >> Logout**, and then click <OK>.



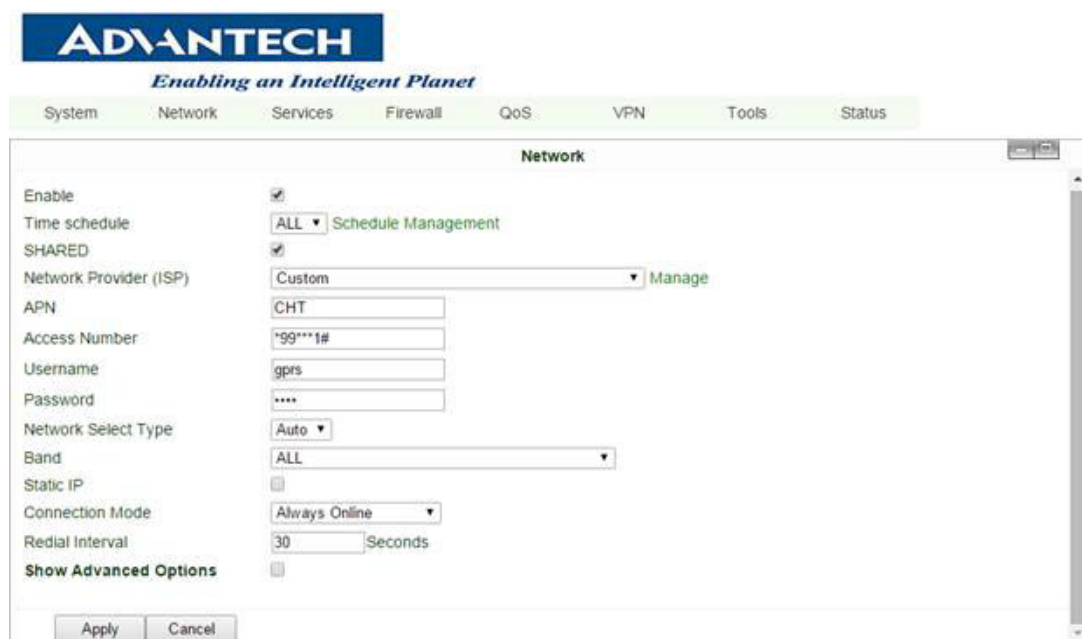
3.3 Network

This section covers network settings include Dialup/Cellular, LAN, DNS, DDNS, and Static Routes.

3.3.1 Dialup/Cellular Connection

With following configuration, EKI-1331 can access the internet through the wireless cellular network.

From the navigation panel, select **Network >> Dialup**, then enter the “**Dialup**” tab, as shown below.



Terminology is listed below:

Parameters	Description	Default
Basic Config		
Enable	Enable PPP dialup.	Enable
Time Schedule	Select timetable for online and offline. We need defined timetable through "Schedule Management" in advance.	ALL
SHARED	Enabled—enable "NAT," or network address translation. Local addresses can be translated to global WAN address on a one-to-many basis. Disable—disable "NAT."	Enable
ISP	Select local ISP, if not listed here, please select "Customer."	Customer
APN	APN provided by your Local ISP	Unicom
Access Number	Dialup phone number provided by your Local ISP.	"*99#" or "*99***1#"
Username	Some APNs need a username and password to complete the PPP connection, but not every APN needs a username.	GPRS
Password	Some APNs need a username and password to do the PPP connection, but not every APN needs a password.	GPRS
Network Select Type	Choose mobile network type. The available options are "auto", "2G only" and "3G only."	Auto/ 2G only / 3G only
Static IP	Enable a static IP if your SIM card can get a static IP address.	Disable
Connection Mode	It may be set to either "Always Online," "Connect On Demand," or "Manual."	Always Online
Redial Interval	When a dialup fails, EKI-1331 will redial after an interval.	30 seconds
Advanced Options		
Initial Commands	Used for advanced parameters.	N/A

PIN code	Set the use of the SIM card PIN code.	N/A
Dial Timeout	Set dialup timeout. The EKI-1331 will reboot after timeout.	120 seconds
MTU	Set max transmit unit, or max frame size. Set this number to 1500 for normal frames and larger for little big frames.	1500
MRU	Set max receive units.	1500
TX Queue Length	Set length of transmit queue.	64
Authentication Type	Select either Auto, PAP or CHAP. This is necessary for some ISP connections.	Auto
Enable IP header compression	Enable IP header compression	Enable
Use default asyncmap	Enable default asyncmap, and PPP advanced option.	Disabled
Use Peer DNS	Use the assigned DNS server.	Enable
Link Detection Interval	Set the Link Detection Interval.	55 seconds
Link Detection Max Retries	Set the max retries if a link detection failed.	3
Debug	Enable debug mode.	Disable
Expert Option	Provide extra PPP parameters, normally user don't need to set these. Options include: nomppe nomppc nodeflate nobsdcomp novj novjccomp noccp.	N/A
ICMP Detection Server	Set the ICMP Detection Server. Blank represents none.	Blank
ICMP Detection Interval	Set the ICMP Detection Interval.	30 seconds
ICMP Detection Timeout	Set ICMP Detection Timeout (IR6X1 will reboot if ICMP time out)	20 seconds
ICMP Detection Max Retries	Set the max number of retries if ICMP failed	5

Caution! Configure the device's schedule to set any downtime.



To set the devices schedule, go into the “**Dialup**” window, enter the “**Schedule Management**” page.

3.3.2 LAN

To create a static LAN connection, go into the navigation panel, select **Network >> LAN**, then enter the “LAN” page, as shown below.

ADVANTECH
Enabling an Intelligent Planet

System Network Services Firewall QoS VPN Tools Status

LAN

MAC Address: 00:D0:C9:13:24:F5 [Default]
IP Address: 192.168.2.1
Netmask: 255.255.255.0
MTU: Default 1500
LAN Mode: Auto Negotiation

Multi-IP Settings

IP Address	Netmask	Description

[Add]

[Apply] [Cancel]

The settings are explained below:

Parameters	Description	Default
MAC Address	The host MAC address in LAN, which is provided by the manufacturers.	00:D0:C9:13:24:F5
IP Address	Set the IP Address in LAN	192.168.2.1
Net mask	Set the subnet mask of a local network.	255.255.255.0
MTU	Set MTU length options to either Default or Manual. 1500 is the normal frame size for Ethernet v2.	1500
LAN Mode	100M Full/duplex,100M Half/duplex.	Auto Negotiation
Multi-IP Settings		
IP Address	Set additional IP Address of LAN	N/A
Netmask	Set netmask of LAN	N/A
Description	Description about this IP address	N/A

3.3.3 DNS

At the core of the internet lies DNS or the domain-name system. It employs a distributed database (DDB) to map domain names and IP addresses across the web. DNS makes it convenient to access the internet, so that instead of memorizing IP numbers, people can use words to make domain-names.

The device supports the following two functions through the domain name configuration service:

- DNS Server: the device can function as a local DNS Server.
- DNS relay: as a DNS agent, the device can transfer DNS request and response messages between the DNS client and server, while and executing domain name analysis in place of the DNS Client.

To begin setting up the DNS client, find the navigation panel, select **Network>>DNS** to enter into the “**DNS**” window and manually set the DNS information. If the DNS information is empty, it can be found via dialup. Generally, users will only need to set the dialup DNS settings if they have static routes on the gateway.

The screenshot shows the ADVANTECH web interface. At the top is the ADVANTECH logo with the tagline "Enabling an Intelligent Planet". Below the logo is a navigation bar with tabs: System, Network, Services, Firewall, QoS, VPN, Tools, and Status. The 'Network' tab is selected, and the 'DNS' sub-tab is active. The main content area shows 'Primary DNS' and 'Secondary DNS' fields, both set to '0.0.0.0'. There are 'Apply' and 'Cancel' buttons at the bottom.

Page description is shown below:

Parameters	Description	Default
Primary DNS	Set Primary DNS	N/A
Secondary DNS	Set Secondary DNS	N/A

3.3.4 DDNS

DDNS (Dynamic Domain Name Server) automatically adds DNS entries to a server in real time. DDNS automatically logs IP addresses and host-names to its database when hosts connect to the network. When hostnames have been recorded, they may be used in the place of IP addresses. DDNS will be particularly useful in an IPv6 environment.

To set up DDNS, go into the navigation panel, select **Network >> DDNS**, then enter “**DDNS**” page, as shown below.

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System Network Services Firewall QoS VPN Tools Status

Dynamic DNS ==> Dialup DDNS

Current Address

Service Type: DynDNS - Static

URL: <http://www.dyndns.com/>

Username:

Password:

Hostname:

Wildcard: ☐

MX:

Backup MX: ☐

Force Update: ☐

Last Update: -

Last Response: -

Apply Cancel

Page description is shown below:

Parameters	Description	Default
Current Address	Show the current IP address	Blank
Service Type	Select DDNS Provider	Disabled
URL	Automatically generate, users do not need to set	http://www.3322.org/
Username	Registered username for DDNS	N/A
Password	Registered password for DDNS	N/A
Hostname	Registered hostname for DDNS	N/A
Wildcard	Set whether the server supports wildcards	Disabled
MX	Whether to update the mailbox record	N/A
Backup MX	Whether to update the mailbox record	Disabled
Force Update	Force update records after modifying the settings	Disabled

3.3.5 Static Routes

Static routes are created manually and have many different uses. After the static route is set, packets will be transferred to appointed routes. Engineers can create simpler networks by using static routes in place of RIP or OSPF, and ensure greater network reliability. The proper setting and use of static routing can also improve the performance of a network and guarantee bandwidth for important network applications. The device supports up to 20 static route entries.

From the navigation panel, select **Network >> Static Route**, then enter “**Static Route**” page, as shown below.

Page description is shown below:

Parameters	Description	Default
Destination	Set IP address of the destination	0.0.0.0
Net Mask	Set subnet mask of the destination	255.255.255.0
Gateway	Set the gateway of the destination	N/A
Interface	Users can select which interface accesses the destination	N/A
Description	Describe a static route	N/A

3.4 Service

In the service section, this manual covers nine configurations, including DHCP service, DNS relay, VRRP, Device Manager, DTU, Modbus to SMS, SMS alarm rules, and Mbsms variable template.

3.4.1 DHCP Service

DHCP (Dynamic Host Configuration Protocol) is a network protocol for LAN utilizing UDP and TCP. DHCP automatically distributes IP addresses for either a local network or network service provider, and can aid network administrators in managing all the computers on a network. A DHCP server refers to a computer managing DHCP standard in a network. It distributes IP addresses once the work station logs on and ensures that no duplicate IP addresses are assigned. DHCP Server dramatically simplifies network management tasks, and is a necessity in today's network.

To enable the DHCP server, find the navigation panel, select **Services >> DHCP Service**, then enter “**DHCP Service**” page, as shown below. The DHCP server supports up to 20 addresses.

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Enabling an Intelligent Planet

System Network **Services** Firewall QoS VPN Tools Status

DHCP Service

Enable DHCP ☒

IP Pool Starting Address 192.168.2.2

IP Pool Ending Address 192.168.2.100

Lease 60 Minutes

DNS 192.168.2.1 Edit

Windows Name Server (WINS) 0.0.0.0

Static DHCP

MAC Address	IP Address	Host
00:00:00:00:00:00	192.168.2.2	

Apply Cancel

The page is described below:

Parameters	Description	Default
Enable DHCP	Check to enable DHCP.	Enable
IP Pool Starting Address	Set the starting IP address of DHCP pool.	192.168.2.2
IP Pool Ending Address	Set the ending IP address of DHCP pool.	192.168.2.100
Lease	Set the valid time lease of IP address obtained by DHCP	60 minutes
DNS	Set DNS Server	192.168.2.1
Windows Name Server (WINS)	Set the WINS binding.	0.0.0.0
Static DHCP		
MAC Address	Set the MAC address of a designated IP address.	00:00:00:00:00:00
IP address	Set the static IP address of the host.	192.168.2.2
Host	Set the hostname.	N/A

3.4.2 DNS Relay

DNS forwarding: DNS forwarding is open by default. You can set the specified [Domain Name <=> IP Address] to let IP address match with the domain name, thus allowing access to the appropriate IP through accessing to the domain name.

From navigation panel, select **Network >>DNS**, then enter “**DNS Relay**” page, as shown below.

The page description is shown below:

Parameters	Description	Default
IP Address	Map an IP to a hostname.	N/A
Host	Set the name of DNS entries.	N/A
Description	Describe DNS entry.	N/A

- Caution!** ■ When enabling DHCP, the DHCP relay is also enabled automatically. Relay cannot be disabled without disabling DHCP.
- While using dynamic DNS, the DNS relay service should be turned on.
- A maximum of twenty IP to domain-name pairs may be configured.



3.4.3 VRRP: Virtual Router Redundancy Protocol

VRRP is a protocol for allowing automatic failover and redundancy in routers. It creates a “virtual router,” meaning multiple physical routers can be assigned to one gateway or one host. The main gateway controls the IP of the virtual gateway and routes packets to virtual IP addresses. If the main gateway drops, a dynamic failover process elects a new gateway. The IP address of the virtual gateway can be set as the default gateway for hosts, because it is the first hop. The benefit of using VRRP is serviceability. The network administrator can avoid the configuration of dynamic routing or routing discovery protocol on each host.

To enable VRRP, go to the navigation panel, select **Services >> VRRP**, then enter “**VRRP**” page, as shown below.

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System Network Services Firewall QoS VPN Tools Status

VRRP

Enable VRRP-I ☒

Group ID

Priority (254: highest)

Advertisement Interval Seconds

Virtual IP

Authentication Type

Virtual MAC ☐

Monitor

Enable VRRP-II ☒

Group ID

Priority (254: highest)

Advertisement Interval Seconds

Virtual IP

Authentication Type

Virtual MAC ☐

Monitor

The page description is shown below:

Parameters	Description	Default
Enable	Check to enable VRRP.	Disable
Group ID	Select a group id of gateway (range 1-255).	1
Priority	Select a priority for the gateway (range 1 - 254).	20 (bigger number stands for higher priority)
Advertisement Interval	Set an advertisement interval.	60 sec
Virtual IP	Set a Virtual IP address.	N/A
Authentication Type	Choose between "None" or Password type.	None
Virtual MAC	Select to enable.	Disable
Monitor	Select WAN to start monitoring WAN interface traffic; select None do not monitor.	None

3.4.4 DTU (Serial Port)

If you connect a serial device to EKI-1331, you need enable the DTU converter. EKI-1331 can support a multi-protocol uplink to allow conversion of serial data and IP data. Users must select the correct serial mode on the window “Serial Port” from the navigation tab “System.”

To enable the DTU, go into top navigation panel, select Services >> DTU, then enter “DTU” page, as shown below.

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System Network Services Firewall QoS VPN Tools Status

DTU

Enable ☒

DTU Protocol Transparent ▾

Protocol UDP ▾

Mode Client ▾

Frame Interval 100 mseconds

Serial Buffer Frames 4

Multi-Server Policy Parallel ▾

Min Reconnect Interval 15 Seconds

Max Reconnect Interval 180 Seconds

DTU ID

Source IP

Multi Server

Server Address	Server Port
<input type="text"/>	<input type="text"/>

The page is described below:

Parameters	Description	Default
Enable	Check to enable the DTU.	Disable
DTU Protocol	Set the DTU protocol. Please see more in related Quick Guide.	Transparent
Protocol	TCP and UDP are both options.	UDP
Mode	Set the DTU as a client or server.	Client
Frame Interval	Set the frame interval.	100 mseconds
Serial Buffer Frames	Set the number of serial buffer frames.	4
Multi-Server Policy	Choose either parallel or poll options.	Parallel
Min Reconnect interval	Set the minimum reconnect interval.	15s
Max Reconnect interval	Set the maximum reconnect interval.	180s
DTU ID	Set the ID of the DTU. It's only available when using DC protocol.	N/A
Source IP	Set the Source IP.	N/A

3.4.5 Modbus to SMS

EKI-1331 inquires the variables status of the PLC every ten seconds and saves them into RAM. These variables will be the SMS response sent after a query. After receiving a control SMS, EKI-1331 sends the control command to the PLC and waits for a response. The response is sent from the PLC and then EKI-1331 sends the response to the user.

To enable SMS, find the navigation panel, select **Services >> Modbus to SMS** to enter into the “**Modbus to SMS**” page. After you add your PLC here, the daemon of EKI-1331 periodically queries the PLC variables and cache to memory.

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System Network Services Firewall QoS VPN Tools Status

Modbus To SMS

Enable ☒

PLC list

PLC1 ☒

Modbus type RTU ▼

Modbus ID 1

PLC name

Register address(base 1)	Type	Units	Register name
	BIT ▼		

Follow the five steps below to configure the PLC parameters:

1. Click 'Enable' in 'Service>>Modbus to SMS'
2. Unfold configuration item of "PLC List" and click the PLC to be used, and configure one by one. 8 PLCs could be added on this page.
3. Configure the specific parameters of PLC, each PLC can be added to 32 variables.
 - 1). Set the modbus type. Only RTU is available on this model.
 - 2). Configure the slave address of each PLC, namely the 'Modbus ID.' It may be assigned a value from 1 to 247.
 - 3). Configure name of the PLC, using a maximal length of 16 bytes. It is important to name PLCs to avoid confusion in a large scale operation.
 - 4). Enter the register address, or modbus variable address, in the first column. 0xxxxx is for discrete inputs. 1xxxxx is for a coil. 3xxxxx is for the incoming register, and 4xxxxx indicates a holding register.
 - 5). The second column is the variable type, supporting BIT, WORD, DWORD, FLOAT, INT16, INT32 and INT64.
 - 6). In the third column are the units of variable with maximum length of 8 bytes. This value will appear in SMS, and you can leave this field empty. The unit of BIT variables should be configured according to HH/LL format, HH represents the corresponding unit of "1," LL represents the corresponding unit of "0." The units of other types of variables will appear directly in SMS.
 - 7). Enter the register name in the fourth column. This is simply the name of the variable with a maximum length of eight bytes. Users can define names for

each variable and this field must be filled. The variable address will be replaced by variable name in SMS.

Caution! PLC ID in EKI-1331 can not be repeated, neither can PLC names.



Variable names can be repeated in one PLC variable list.

Each PLC should be defined with ID, name and at least one variable.

8. Repeat step 3 and add more PLCs.
9. Click <Apply> button, store and apply the new configuration.

3.4.6 SMS Alarm Rules

EKI-1331 supports the configuration of up to one-hundred alarm rules, that when triggered send an alarm message to user's mobile phone. User can set the alarm rules, and adjust the SMS receiver in the alarm menu. The EKI-1331 will collect different variables depending on the alarm rules set by the user. When a variable matches the criteria, EKI-1331 will send an SMS alarm to all users on the "alarm user list," along with a message.

From the navigation panel, select **Services >> SMS Alarm Rules**, then enter the "**SMS Alarm Rules**" window, as shown below. After setting SMS, click the **<Apply>** to save and apply the configuration.

3.4.6.1 Enable White list

The EKI-1331 is capable of receiving a control and inquiry SMS from any user. In order to improve security, users can enable the white list function. After the white list is set, the EKI-1331 only processes SMS from users on the white list, meaning any other SMS will be dropped.

- Up to 10 users may be whitelisted.
- The first column is a telephone number, with a length ranging from 1 to 16 bytes, and is mandatory.
- The second column is the user name, with a length ranging from 0 to 16 bytes, and is optional.

After enabling the “Modbus to SMS” function, EKI-1331 can identify two types of SMS commands sent by the users on the white list. The EKI-1331 performs an action corresponding to different commands and then sends a response to the SMS user.

Caution! *Users can send SMS to EKI-1331 via mobile phone or SMS modem. Two types of SMS formats and response message are as follows:*



The SMS to inquire state

Users can send the following SMS command to inquire the EKI-1331 operating status and the register values of the PLC.

Request	Response Message	Description
GET	plc1 connected plc2 disconnected	Inquire about the name and status of all PLCs connected to the EKI-1331.
GET plc1_name, plc2_name...	plc1 OUTPUT1=on OUTPUT2=off plc2 OUTPUT3=on OUTPUT4=on	Inquire about the PLC variables with names of plc1_name, plc2_name. The plcX_names are parameter. Users can query different PLC variables by modifying the plcX_name. Different PLCs are separated by a comma.
GET plc1_name register1 register2, plc2_name register3 register4,...	Plc1 register1=5 register2=6 plc2 register3=1.8 register4=2.2	This command finds the value of a variables under a PLC named plcX_name. The plcX_name and registerX are parameters. Users can find the name of corresponding variables by trying different parameter commands. By entering multiple registers, multiple variables can be found at the same time. Different PLCs are separated by comma.

Request	Response Message	Description
ALARM	Alarm total: 55, #53 date-time context1, #54 date-time context2, #55 date-time context3	Find a count of historical alarm records and return the latest three historical alarms.
ALARM 2-3	Alarm total: 55, #2 date-time context1, #3 date-time context2, #4 date-time context3	Inquire about historical records within the appointed number range. It can request maximum of five historical records each time.

NETSATU\$	Signal strength(dBm):xx, Network status: Registered to home network	Learn the network status.
MSGSTATUS	Received message: 10, Sent message: 15, Failed sent message: 0, Unauthorized message: 7	Inquire about the SMS statistics.
WHITELIST	WHITELIST ON OFF	Inquire about the startup status of the white list.

The SMS to perform actions

User can send the following SMS command to do the configuration via SMS.

Request	Response Message	Description
SET plc1_name register1=xxx register2=xxx, plc2_name register3=xxx register4=xxx...	Succeed: Set register1 to xxx set register2 to xxx set register3 to xxx set register4 to xxx	For a PLC named plc1_name, set the register value to xxx. The plcX_name and registerX are both parameters. User can set the corresponding variables by configuring these parameters in the command line. Such commands can set multiple variables synchronously. Different PLCs are separated by comma.
ALARM CLEAN ALL	Delete 1-55 alarm SUCCESS	Delete all the historical alarm records.
ALARM CLEAN xx-xx	Delete xx-xx alarm SUCCESS	Delete the historical records within the a range.
WHITELIST ON OFF	WHITELIST ON OFF	Start or stop using a white list.
ADD 13812345678	ADD 13812345678 OK	Add users to the alarm list.
DELETE 13812345678	DELETE 13812345678 OK	Delete users on an alarm list.

3.4.6.2 Alarm User List

Alarm user list

Phone number	Name
<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>

Up to ten alarm recipients can be added to the “alarm user list.”

- Mobile phone numbers are filled in the first column, and may range from 1 to 16 bytes long. This column must be filled, otherwise users cannot be added.
- User names are filled in the second column, and may range from 0 to 16 bytes long. This column may be left empty.
- Telephone numbers should be non-duplicated.

3.4.6.3 Alarm Rule List

Alarm rule list

PLC name	Register name	Rule1	Value1	Relation	Rule2	Value2	Dead zone	ACTION?	Receiver	Context
1	1	NONE	<input type="text"/>	OR	NONE	<input type="text"/>	<input type="text"/>	NO	-	<input type="text"/>

In this section of interface, the technician will create an "alarm rule list." Each line defines an alarm rule and a maximum of one-hundred alarm rules can be configured. The technician will match mathematical expressions and compare values to a variable in each rule. To set an alarm rule follow these steps:

- Select a PLC in the first column. Any PLC previously setup in the “Modbus to SMS” chapter of this manual will appear in a drop-down menu.
- Select a variable name in the second column, and the corresponding variable of the PLC will appear above it. The technician will compare values to this variable.
- Compare the variable to a value by selecting an operator in the third column. The available options are: NONE, >, >=, <, <=, = and !=.
- Define the first value in the fourth column. This value will be compared to the main variable. For example, temperature >= 200 means that when the temperature is greater than or equal to 200, an alarm will be sent.
- Define the relationship between the first expression and the second expression in the fifth column by selecting OR, AND or XOR.
- Select a second operator in the sixth column. The options that can be selected are: NONE, >, >=, <, <=, = and !=.
- Define a second value in the seventh column.
- In the eighth column, the user must define a dead zone, which acts as a buffer. After the alarm is trigger, it will not be sent until the variable exceeds the dead zone value. It is only effective for numerical, non bit-wise values. Set the value to zero to eliminate the dead zone.
- In the ninth column titled “ACTION?,” users may select “YES” to enable user-defined alarm message, user need define the alarm message on “Context” in the eleventh column. Otherwise, the default alarm message will be sent. The maximum length for a short message is 140 bytes.
- The mobile phone number of a recipient is input in the tenth column.
- A user-defined alarm message may be set in the eleventh column. When triggered, this message will be sent in the form of an SMS.

The alarm SMS are divided into two types:

- If the selection for “ACTION?” in the ninth column is NO, the system will send the automatically generated defaulted alarm short message. The message will be defined by the variable, for example: “Alarm plc2 OUPUT=on,” or “Alarm plc AB_VOLT=238V.”
- If the selection of “ACTION?” is YES, the system will send a user-defined alarm.

Below is an example of an alarm rule:

PLC name	Register name	Rule1	Value1	Relation	Rule2	Value2	Dead zone	ACTION?	Receiver	Context
PLC2	OUTPUT1	=	1	OR	=	0		NO	-	
PLC2	AB_VOLT	<=	20	OR	>=	230	5	YES	13810556243	plc2's AB_VOLT OUT of range 210-230

Caution! The first rule states that when the OUTPUT1 of plc2 changes from 1 to 0 or from 0 to 1, trigger the alarm and send the alarm SMS to all users in the “alarm user list.”



The second rule states that when the variable value of AB_VOLT in plc2 is less than or equal to 20 or greater than or equal to 230, trigger the alarm and send the user-define SMS to the user ‘13810556243.’ In other words, when AB_VOLT is between 20 and 230, plc2 is in normal operating conditions.

3.4.7 Mbsms Variable Template

Users can download a PLC variable template file which you might have added in section 3.3 “Modbus to SMS.” A template file is composed of all the variables in a PLC, and the EKI-1331 supports up to eight templates.

To configure the Mbsms template, go into the navigation panel, select **Services >> Mbsms Variable Template**, then enter “**Variable Template**” page, which is shown below.



3.4.8 SMS

User can do a status check and reboot the EKI-1331 through SMS. After setting a user-defined message in the SMS config window, users can see the device's status or reboot the device. Statistics like signal strength, IP address, and uptime, among others, may be used to analyze the device.

To configure SMS, find the navigation panel, select **Services >> SMS**, then enter “**SMS**” page, as shown below.



The page description is shown below:

Parameters	Description	Default
Enable	Click to enable SMS.	Disable
Status Query	This is user defined. After configuration, the user sends the pre-determined message to EKI-1331, which will send status information to user's mobile phone. The information include: Host: (SN); Uptime: (the uptime of router for this time of reboot); State: (Online/Offline); LAN: (Up) (LAN IP)	N/A
Reboot	This is user defined as well. After configuration, the user will send a user-defined message to the EKI-1331 which will then restart.	N/A

Default Policy	This accepts by default. If the mobile phone number is empty, the EKI-1331 will execute the SMS command from any mobile phone number. If a phone number is entered into the field, the EKI-1331 will execute SMS commands from the configured mobile phone number.	Accept
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3.5 Firewall

3.5.1 Basic

A firewall is necessary for blocking out malicious packets from the internet. On today's internet, security is more important than ever, which is why the EKI-1331 is well equipped to protecting the local network and provide a security barrier from external threats.

To configure the firewall, go to the navigation panel, select Firewall >> Basic, then enter the "Basic" config page, as shown below.

The page description is shown below:

Parameters	Description	Default
Default Filter Policy	Choose to either "Accept" or "Block" filtering.	Accept
Block Anonymous WAN Request (ping)	Check to deny anonymous ICMP ping requests.	Disable
Filter Multicast	Check to filter multicast packets.	Enable
Defend DoS Attack	Select to enable DoS attack prevention.	Enable

3.5.2 Filtering

Access control has the following functions:

- Prevent unwanted users from accessing network resources.
- Permitting staff to access network resources.
- Preventing staff from accessing the wrong network resources.

To enable Access Control From the navigation panel, select **Firewall >> Filtering**, then enter “**Filtering**” page, as shown below.

Page description is shown below:

Parameters	Description	Default
Enable	Check to enable filtering.	Enable
Protocol	The available options are: TCP, UDP, ICMP, and all.	All
Source IP address	Set the source IP address.	0.0.0.0/0
Source Port	Set the source port.	N/A
Destination IP	Set the destination IP address.	N/A
Destination Port	Set the destination port.	N/A
Action	Select either accept or block.	Accept
Log	log can print the access IP address	Disable
Description	Describe your configuration.	N/A

3.5.3 Port Mapping

The EKI-1331 support Network Address and Port Translation. It allows remote computers (for example, computers on the Internet) to connect to the local device that linked to LAN interface.

To configure port mapping, go into the navigation panel, select **Firewall >> Port Mapping**, then enter “**Port Mapping**” page, as shown below.

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System Network Services Firewall QoS VPN Tools Status

Port Mapping

Enable	Proto	Source	Service Port	Internal Address	Internal Port	Log	Description
<input checked="" type="checkbox"/>	TCP	0.0.0.0/0	8080		8080	<input type="checkbox"/>	

Apply Cancel

Page description is shown below:

Parameters	Description	Default
Enable	Check to enable port mapping.	Enable
Protocol	Select either TCP or UDP.	TCP
Source	Set an external source IP.	0.0.0.0/0
Service Port	Set the external port of service.	8080
Internal Address	Set the internal IP for mapping.	Blank
Internal Port	Set the mapping port.	8080
Log	Click to enable a log about port mapping.	Disable
Description	Write a description to avoid future confusion.	Blank

3.5.4 Virtual IP Mapping

After a PC in LAN has been assigned a virtual IP, external hosts can access it via a virtual IP.

The functions usually work with VPN.

To enable virtual IP mapping, go into the navigation panel, select **Firewall >> Virtual IP Mapping**, then enter the “**Virtual IP Mapping**” page, as shown below.

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Enabling an Intelligent Planet

System Network Services Firewall QoS VPN Tools Status

Virtual IP Mapping

Virtual IP for Gateway

Source IP Range

Enable	Virtual IP	Real IP	Log	Description
<input checked="" type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="checkbox"/>	<input type="text"/>

Apply Cancel

Page description is shown below:

Parameters	Description	Default
Virtual IP for Gate-way	Set a virtual IP for the EKI-1331.	Blank
Source IP Range	Set range of the external source IP addresses.	Blank
Virtual IP	Set an external virtual IP.	Blank
Real IP	Set a real IP.	Blank
Log	Enable a log of virtual IP events.	Disable
Description	Describe this configuration.	Blank

3.5.5 DMZ (All Port Mapping)

DMZ is like a virtual server, the all port of router map to the DMZ host

From the navigation panel, select **Firewall >> DMZ**, then enter “DMZ” page, as shown below.



The page description is shown below:

Parameters	Description	Default
Enable DMZ	Check to enable the DMZ.	Disabled
DMZ Host	Set the host IP of a DMZ.	Blank
Source Address Range	Set a range of restricted source IP addresses.	Blank

The EKI-1331's management port should never be mapped to a DMZ.

3.5.6 MAC-IP Bundling

When a firewall denies all access to the external network, only a PC with MAC-IP bundling can access the internet.

From the navigation panel, select **Firewall >> MAC-IP Bundling**, then enter the “MAC-IP Bundling” page, as shown below. The device supports up to 20 MAC-IP bundling entries.



The page description is shown below:

Parameters	Description	Default
MAC Address	Set the bundling PC's mac address.	00:00:00:00:00:00
IP Address	Set the bundling PC's IP address.	192.168.2.2
Description	Describe this configuration.	Blank

3.6 QoS

This chapter covers QoS, or Quality of Service. QoS is a set of services that ensures bandwidth availability for sensitive applications. These services includes bandwidth control and IP bandwidth limits.

3.6.1 Bandwidth Control

Bandwidth control set a limit on the upload and download speeds when accessing external networks.

To configure bandwidth control, go into the navigation panel, select **QoS >> Bandwidth Control**, then enter “**Bandwidth Control**” page, as shown below.

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System Network Services Firewall QoS VPN

Bandwidth Control

Enable ☒

Outbound Limit: Max BW kbit/s

Inbound Limit: Max BW kbit/s

Apply Cancel

The page description is shown below:

Parameters	Description	Default
Enable	Check to enable.	Disable
Outbound Limit Max Bandwidth	Set the maximum upload rate.	100000kbit/s
Inbound Limit Max Bandwidth	Set the download bandwidth limit.	100000kbit/s

3.6.2 IP Bandwidth Limit

Technicians may limit the bandwidth on individual hosts and devices by setting IP based bandwidth limits.

To configure the IP bandwidth limit, go to the navigation panel, select **Firewall >> IP BW Limit**, and then enter the “**IP BW Limit**” page, as shown below.

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System Network Services Firewall QoS VPN

IP BW Limit

Enable	IP Address	Rate(kbit/s)	Priority	Description
<input checked="" type="checkbox"/>		100	Medium ▼	

Apply Cancel

The page description is shown below:

Parameters	Description	Default
Enable	Check to enable an IP bandwidth limiter.	Enable
IP Address	Set the IP address to be limited.	N/A
Rate(kbit/s)	Set the bandwidth limit or rate.	100kbit/s
Priority	Set the priority.	Medium
Description	Describe the configuration.	N/A

3.7 Tools

The EKI-1331 comes with several tools to help admins diagnose network problems, including:

- Ping
- Trace route
- Link Speed Test

3.7.1 Ping

Ping is a tool many technicians are familiar with. It simply sends ICMP packets across the network to a remote host, and then retransmits an ICMP packet back to the original sender.

To do a ping, enter the navigation panel, select **Tools>>Ping**, then enter the “**Ping**” page, as shown below.

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System Network Services Firewall QoS VPN Tools Status

PING

Host Ping

Ping Count

Packet Size Bytes

Expert Options

Page description is shown below:

Parameters	Description	Default
Host	Destination IP for the ping.	N/A
Ping Count	Number of pings sent.	4 times
Packet Size	The size of the ping packet sent. 32B is recommended.	32 Bytes
Expert Options	Advanced parameters	N/A

3.7.2 Trace Route

The trace route tool sends an ICMP or UDP packet to a remote host. Each time the packet is routed onto a different network, that router will return a response. Trace route allows network engineers to diagnose routing problems.

To perform a trace route, go to the navigation panel, select **Tools>>Traceroute**, then scroll down to the “**Traceroute**” page, as shown below.



The page description is shown below:

Parameters	Description	Default
Host	The destination for trace route.	N/A
Max Hops	Set the maximum number of hops.	20
Time Out	Set the timeout for dropped packets.	3 sec
Protocol	Choose between ICMP and UDP protocol. ICMP may be blocked on some networks.	UDP
Expert Options	Advanced parameters	N/A

3.7.3 Link Speed Test

The EKI-1331 uses a simple upload and download to test the link speed.

To start the speed test, enter the navigation panel, select **Tools>>Link Speed Test**, then enter “**Link Speed Test**” page, as shown below.



3.8 Status

The status chapter covers the following:

- System
- Modem
- Network Connections
- Routing Table
- Device List
- ModbusPLC
- Event Logs

3.8.1 System

From navigation panel, select **Status >> System**, then enter the “**System**” page, as shown below. This page displays system statistics, including Name, Model, Current Version, Gateway Time, PC Time, UP Time, CPU Load, Memory Consumption, etc. Technicians may click the **<Sync Time>** button to synchronize the gateway with the system time of the host, as covered in the set-up chapter.

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System	Network	Services	Firewall	QoS	VPN	Tools	Status
Status							
Name	EKI-1331						
Model	EKI-1331						
Serial Number	GP6011412250073						
Description	www.advantech.com.tw						
Current Version	1.2.0.r3558						
Current Bootloader Version	1.1.3.r2777						
Gateway Time	2029-09-13 19:00:33						
PC Time	2015-02-16 17:35:18 <input type="button" value="Sync Time"/>						
Up time	0 day, 00:21:16						
CPU Load (1 / 5 / 15 mins)	0.15 / 0.03 / 0.01						
Memory consumption Total/Free	28.88MB / 19.30MB (66.84%)						

3.8.2 Modem

From navigation panel, select **Status >> Modem**, then enter “**Modem**” page, as shown below. This page shows Modem status, including Signal Level, Register status, etc.



Modem	
Dialup	
Modem Type	PHS8
Status	SIM/UIM card failure
Manufacturer	Siemens
Product	PHS8
Signal Level	(0)
Register Status	no registered
IMEI(ESN) Code	359998041685829
IMSI Code	
Network Type	
PLMN	
LAC	
Cell ID	

3.8.3 Network Connections

From navigation panel, select **Status >> Network Connections**, then enter “**Network Connections**” page, as shown below. This page shows the connection status of Dialup and LAN.



Network Connections	
Dialup	
Connection Type	Dialup
IP Address	0.0.0.0
Netmask	0.0.0.0
Gateway	0.0.0.0
DNS	0.0.0.0
MTU	1500
Status	Disconnected
Connection time	
<input type="button" value="Connect"/> <input type="button" value="Disconnect"/>	
LAN	
MAC Address	00:18:05:05:ED:0E
IP Address	192.168.2.1
Netmask	255.255.255.0
MTU	1500
DNS	

3.8.4 Route Table

From navigation panel, select **Status >> Route Table**, then enter “Route Table” page, as shown below. This page shows the route table of EKI-1331.



Route Table				
Destination	Netmask	Gateway	Metric	Interface
192.168.2.0	255.255.255.0	0.0.0.0	0	lan0
127.0.0.0	255.0.0.0	0.0.0.0	0	lo

3.8.5 Device List

From navigation panel, select **Status >> Device List**, then enter “Device List” page, as shown below. This page shows the device link of EKI-1331.



Interface	MAC Address	IP Address	Host
lan0	F0:DE:F1:54:13:8F	192.168.2.39	

3.8.6 Modbus PLC

From navigation panel, select **Status >> Modbus PLC**, then enter “Modbus PLC” page, as shown below. This page shows the parameters of Modbus PLC linked with EKI-1331.

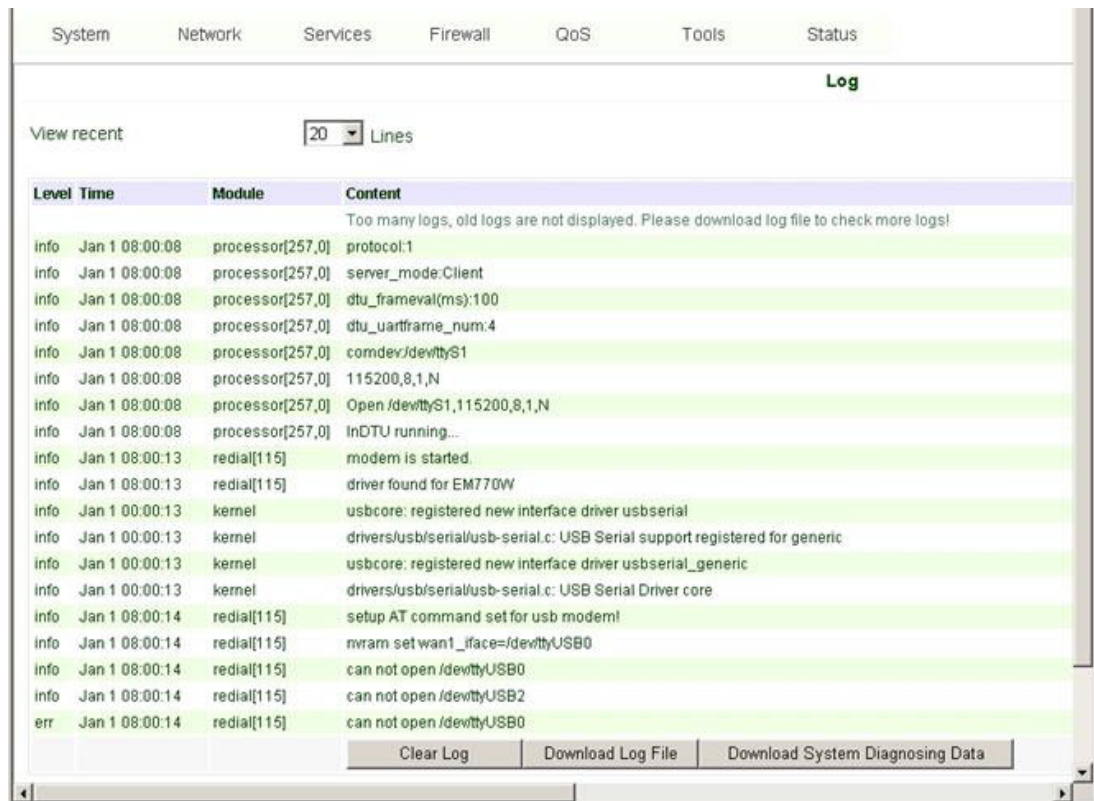


Register name	Register address(base 1)	Value	Units
OUTPUT1	19200	0	
AB_VCLT	11100	0	

Refresh 1 Minute Stop

3.8.7 Log

From navigation panel, select **Status >> Log**, then enter “**Log**” page, as shown below. This page show system log, including Download Log File.



The screenshot displays the 'Log' page within a network management interface. The top navigation bar includes tabs for System, Network, Services, Firewall, QoS, Tools, and Status. The 'Log' tab is selected, and the page title is 'Log'. Below the title, there is a 'View recent' section with a dropdown menu set to '20' and the text 'Lines'. The main content area is a table with the following columns: Level, Time, Module, and Content. The table contains several log entries, including information about processor status, modem startup, and USB serial driver registration. At the bottom of the table, there are three buttons: 'Clear Log', 'Download Log File', and 'Download System Diagnosing Data'.

Level	Time	Module	Content
Too many logs, old logs are not displayed. Please download log file to check more logs!			
info	Jan 1 08:00:08	processor[257,0]	protocol:1
info	Jan 1 08:00:08	processor[257,0]	server_mode:Client
info	Jan 1 08:00:08	processor[257,0]	dtu_frameval(ms):100
info	Jan 1 08:00:08	processor[257,0]	dtu_uartframe_num:4
info	Jan 1 08:00:08	processor[257,0]	comdev/dev/ttyS1
info	Jan 1 08:00:08	processor[257,0]	115200,8,1,N
info	Jan 1 08:00:08	processor[257,0]	Open /dev/ttyS1,115200,8,1,N
info	Jan 1 08:00:08	processor[257,0]	InDTU running...
info	Jan 1 08:00:13	redial[115]	modem is started.
info	Jan 1 08:00:13	redial[115]	driver found for EM770W
info	Jan 1 00:00:13	kernel	usbcore: registered new interface driver usbserial
info	Jan 1 00:00:13	kernel	drivers/usb/serial/usb-serial.c: USB Serial support registered for generic
info	Jan 1 00:00:13	kernel	usbcore: registered new interface driver usbserial_generic
info	Jan 1 00:00:13	kernel	drivers/usb/serial/usb-serial.c: USB Serial Driver core
info	Jan 1 08:00:14	redial[115]	setup AT command set for usb modem!
info	Jan 1 08:00:14	redial[115]	nvrw set wan1_iface=/dev/ttyUSB0
info	Jan 1 08:00:14	redial[115]	can not open /dev/ttyUSB0
info	Jan 1 08:00:14	redial[115]	can not open /dev/ttyUSB2
err	Jan 1 08:00:14	redial[115]	can not open /dev/ttyUSB0

Clear Log Download Log File Download System Diagnosing Data

Chapter 4

Installation Guide

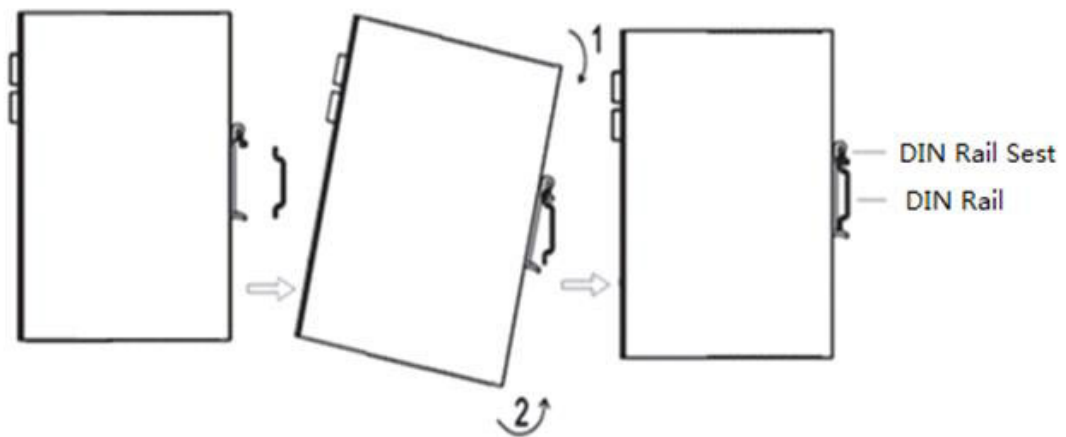
4.1 Precautions

- Power Requirements: 12/24 V_{DC}, Please note that the power supply voltage level.
- Environmental Requirement:
 - Working: 0 ~ 70° C (50 ~ 70° C permission)
 - Storage: -40 ~ 85° C
 - Humidity: 5 ~ 90% relative humidity (non-condensing)
- Avoid direct sunlight, away from heat sources or areas with strong electromagnetic interference.
- EKI-1331 need to be installed in an industrial DIN Rail.
- Please check whether installed the needed cables and connectors.

4.2 DIN Rail Mounting

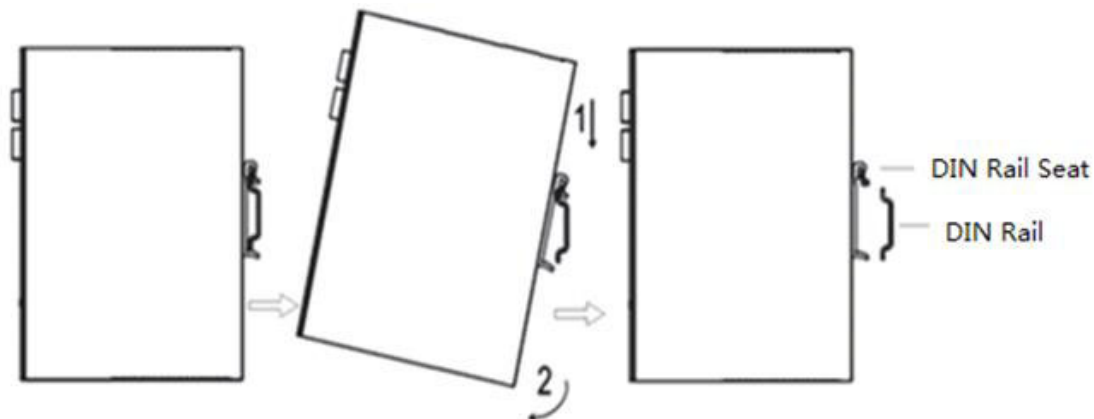
4.2.1 DIN Rail Installation

1. Selected installation position, and make sure there is enough space.
2. Fix the upper part of DIN rail seat on the DIN rail, Rotate the device from the bottom as shown by arrow 2 (please see the installation instruction bellow), then the DIN rail seat is installed on DIN rail.



4.2.2 DIN Rail Disassembly

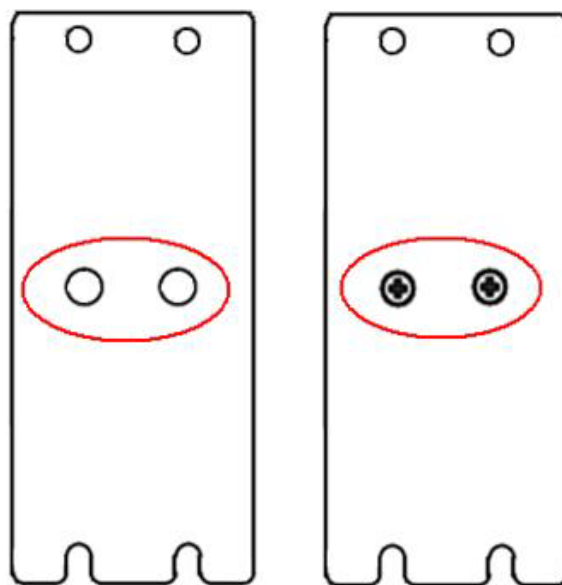
1. As shown the arrow 1 in the picture below, Press downward the EKI-1331 to make sure the bottom have the enough space to break away from the DIN rail.
2. Rotate EKI-1331 to the direction of arrow 2, and move outward the bottom of EKI-1331. Once the bottom break away from the rail seat, EKI-1331 can be removed from the DIN rail.



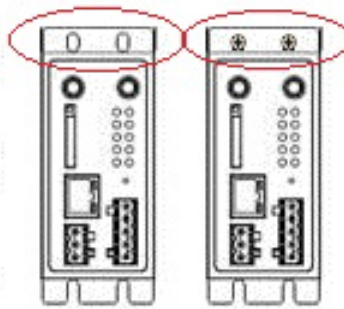
4.3 Wall Mounting

4.3.1 Wall Mounting Installation

1. Select the right installation location and make sure have enough space.
2. Use a screwdriver to install the wall mounting plate in the rear of the EKI-1331. As shown in picture below:



3. Take out the screws (packed with wall mounting plate), use a screwdriver to fix the screws to the mounting position, and drop down the EKI-1331 to make the EKI-1331 keep in a stable location, as shown in figure below.



4.3.2 Wall Mount Disassembly

Remove the all screws using a screwdriver. Then the EKI-1331 can be removed from the installation location.

4.4 SIM Card Installation

EKI-1331 support dual card. Press the SIM card eject button and will pop up the corresponding card slot. Insert a SIM card to the slot, as shown in figure below:



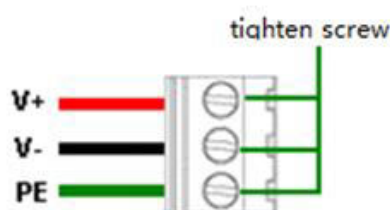
4.5 Antenna Installation

Gently rotate the movable part of the metal SMA interface until it cannot be rotated (the external thread of antenna cable cannot be seen at this point). Do not wring the antenna hardly by holding the black rubber. Please make sure the antenna was installed well before power on, or it may cause device damage.



4.6 Power Supply Installation

1. Remove the power terminal from the InGaaway.
2. Loosen the locking screw of the power terminal
3. Plug the power cable into the power terminal and lock the locking screw.



4.7 Ground Terminal Installation

1. Screwed down the ground terminal nut.
2. Fix the grounding ring of the ground wire to the grounding stud.
3. Tighten the ground terminal nut.

Caution! In order to improve anti-jamming capability of EKI-1331, the EKI-1331 must be grounded when using. According to the on-site environment, connect the ground wire to the ground stud of the EKI-1331.



4.8 Connect Cable

Connect EKI-1331 to PC directly with a network cable.

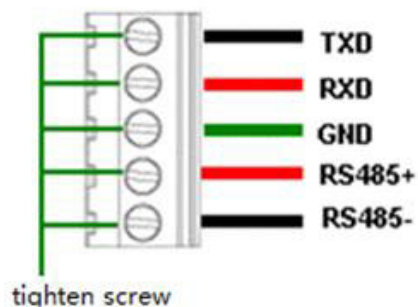


4.9 Terminal connection

The connection method of Serial interface are used industrial terminal connection, please connect the cable to the corresponding terminal inrerface before using.

EKI-1331 provide two serial interface modes - RS232/RS485.

When installing, remove the terminal from the device, loosen the locking screw on the terminal, and insert the corresponding cable into the terminal and then tighten the screw. The terminal interface description as the picture below:



Appendix **A**

FQA

A.1 FQA

1. EKI-1331 is powered on, but can't access Internet through it?

Please check?

- Whether the EKI-1331 is inserted with a SIM card.
- Whether the SIM card is enabled with data service, whether the service of the SIM card is suspended because of an overdue charge.
- Whether the dialup parameters, e.g. APN, dialup number, username and password are correctly configured.
- Whether the IP Address of your computer is the same subnet with EKI-1331 and the gateway address is EKI-1331 LAN address.

2. EKI-1331 is powered on, have a ping to detect EKI-1331 from your PC and find packet loss?

Please check if the network crossover cable is in good condition.

3. Forget the setting after revising IP address and can't configure EKI-1331 r?

Method 1: connect EKI-1331 with serial cable, configure it through console port.

Method 2: within 5 seconds after EKI-1331 is powered on, press and hold the Restore button until the ERROR LED flashes, then release the button and the ERROR LED should goes off, press and hold the button again until the ERROR LED blinks 6 times, the EKI-1331 is now restored to factory default settings. You may configure it now.

4. After EKI-1331 is powered on, it frequently auto restarts. Why does this happen?

Please check:

- Whether the module works normally.
- Whether the EKI-1331 is inserted with a SIM card.
- Whether the SIM card is enabled with data service, whether the service of the SIM card is suspended because of an overdue charge.
- Whether the dialup parameters, e.g. APN, dialup number, username and password are correctly configured.
- Whether the signal is normal.
- Whether the power supply voltage is normal.

5. Why does upgrading the firmware of my EKI-1331 always fail?

Please check:

- When upgrading locally, check if the local PC and EKI-1331 are in the same network segment.
- When upgrading remotely, please first make sure the EKI-1331 can access Internet.

6. After EKI-1331 establishes VPN with the VPN server, your PC under EKI-1331 can connect to the server, but the center can't connect to your PC under EKI-1331?

Please make sure the firewall of your computer is disabled.

7. After EKI-1331 establishes VPN with the VPN server, Your PC can't connect to the server?

Please make sure “Shared Connection” on “Network=>WAN” or “Network=>Dialup” is enabled in the configuration of EKI-1331.

8. EKI-1331 is powered on, but the Power LED is not on?
 - Check if the protective tube is burn out.
 - Check the power supply voltage range and if the positive and negative electrodes are correctly connected.
9. EKI-1331 is powered on, but the Network LED is not on when connected to PC?
 - When the PC and EKI-1331 are connected with a network cable, please check whether a network crossover cable is used.
 - Check if the network cable is in good condition.
 - Please set the network card of the PC to 10/100M and full duplex.
10. EKI-1331 is powered on, when connected with PC, the Network LED is normal but can't have a ping detection to the EKI-1331?
 - Check if the IP Address of the PC and EKI-1331 are in the same subnet and the gateway address is EKI-1331 LAN address.
11. EKI-1331 is powered on, but can't configure through the web interface?
 - Whether the IP Address of your computer is the same subnet with EKI-1331 and the gateway address is EKI-1331 LAN address.
 - Check the firewall settings of the PC used to configure EKI-1331, whether this function is shielded by the firewall.
12. The EKI-1331 dialup always fails, I can't find out why?
Please restore EKI-1331 to factory default settings and configure the parameters again.
13. How to restore EKI-1331 to factory default settings?
 - Press and hold the Restore button, power on EKI-1331;
 - Release the button until after the STATUS LED flashes and the ERROR LED is on;
 - After the button is released, the ERROR LED will go off, within 30s press and hold the Restore button again until the ERROR LED flashes;
 - Release the button, the system is now successfully restored to factory default settings.

Appendix **B**

Description of LED

B.1 Description of LED

Name	Color	Description
Power	Red	On Power on Off Power off
Status	Green	See the information below
Warn	Yellow	
Error	Red	
Modem	Green	On Modem works normally Off Modem works abnormally
Signal(weak)	Green	On $9 \geq \text{Signal} \geq 1$ Off No signal detected
Signal(medium)	Green	On $19 \geq \text{Signal} \geq 10$ Off $\text{Signal} \leq 9$
Signal(strong)	Green	On $31 \geq \text{Signal} \geq 20$ Off $\text{Signal} \leq 19$

Some of the indicators are defined below:

STATUS	WARN	ERROR	Definition
On	On	Off	Power on
Blink	On	Off	Initialization succeed
Blink	Blink	Off	Dialing
Blink	Off	Off	Dialing succeed
Blink	Blink	Blink	Upgrading
Blink	On	Blink	Reset Succeed

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