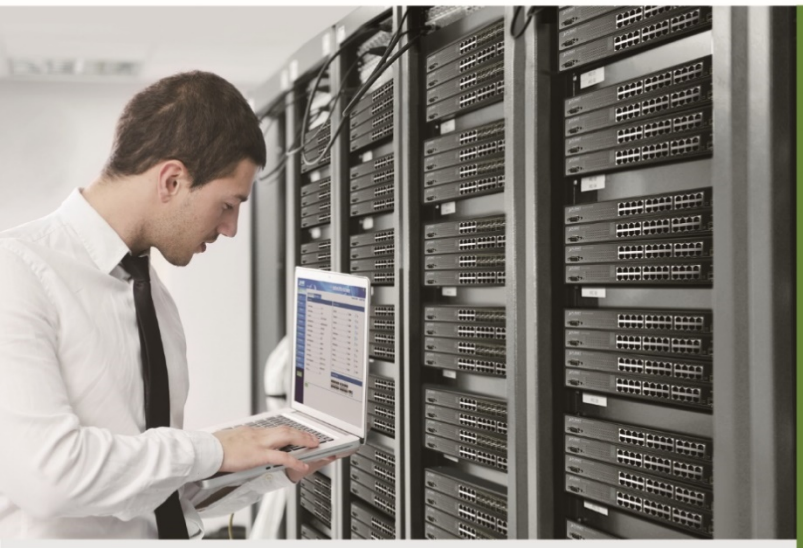
PLANET
Networking & Communication

User's Manual

LoRa Node Controller

- **LN1130 and LN1140**



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This Equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.

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

CE mark Warning

The is a class A device, In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

WEEE

To avoid the potential effects on the environment and human health as a result of the presence of hazardous substances in electrical and electronic equipment, end users of electrical and electronic equipment should understand the meaning of the crossed-out wheeled bin symbol. Do not dispose of WEEE as unsorted municipal waste and have to collect such WEEE separately.

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Revision

User's Manual of PLANET LoRa Node Controller
Model: LN1130 and LN1140
Rev.: 1.0 (March, 2023)
Part No. EM-LN1130_LN1140_v1.0

Table of Contents

Chapter 1. Product Introduction

Thank you for purchasing PLANET LoRa Node Controller, LN series. The descriptions of these models are as follows:

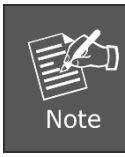
LN1130	Industrial IP30 LoRa Node Controller (Modbus RS232, RS485, EU868/US915 Sub 1G)
LN1140	Industrial IP30 LoRa Node Controller (2 DI, 2 DO, EU868/US915 Sub 1G)

"**LoRa Node**" mentioned in the manual refers to the above models.

1.1 Package Contents

The package should contain the following:

LN1130	LN1140
■ LoRa Node Controller x 1 ■ QR Code Sheet x 1 ■ LoRa Antenna x 1 ■ Wall Mounting Kit x 1	■ LoRa Node Controller x 1 ■ QR Code Sheet x 1 ■ LoRa Antenna x 1 ■ Wall Mounting Kit x 1



If any of the above items are missing, please contact your dealer immediately.

1.2 Overview

Build a Smart IoT Environment

PLANET LN1130 and LN1140 Industrial LoRa Node Controllers are used for data acquisition from multiple sensors. The LN1130 contains one RS232 interface and one RS485 interface while the LN1140 contains two digital input interfaces and two digital output interfaces to simplify the deployment and replacement of LoRaWAN networks. They can be used to monitor and control embedded devices such as temperature sensors, access control systems, security systems, and more. With its industrial design and IP30 metal case, the LN1130 and LN1140 are widely used in indoor applications like smart industries, building automation, etc.

LoRaWAN-based Controller with Rich Industrial Interfaces

The LoRa Node Controller with built-in multiple industrial interfaces connects to all types of sensors, meters and other appliances. It also bridges Modbus data between serial and Ethernet network via LoRaWAN. The LN1130 and LN1140 support LoRaWAN class C protocol to be in full compatibility with standard LoRaWAN gateways including PLANET LCG-300 series. It is ideal for large-scale IoT application deployments, such as projects for building automation, smart metering, HVAC system, etc. With multiple interfaces, LoRaWAN Controller can perfectly help retrofit legacy assets into IoT enablement.

LN1130

- RS232
- RS485

LN1140

- 2 Digital Input
- 2 Digital Output

LoRa and LoRaWAN Wireless Technology

LoRa or long range is a physical proprietary radio communication technique. It is based on spread spectrum modulation techniques derived from chirp spread spectrum (CSS) technology. LoRa is a long range, low power wireless platform that has become the de facto wireless platform of Internet of Things (IoT). LoRaWAN defines the communication protocol and system architecture. The LN1130, supporting Modbus protocol and serial communication, is ideal for LoRa-enabled devices in the IoT system.

Multiple LoRa Frequency Bands

The LN1130 and LN1140 support the following license-free sub-gigahertz radio frequency bands,

- **EU868** (863 to 870 MHz) in Europe
- **AU915/AS923-1** (915 to 928 MHz) in South America
- **US915** (902 to 928 MHz) in North America
- **IN865** (865 to 867 MHz) in India
- **AS923** (915 to 928 MHz) in Asia
- **KR920** (920 to 923 MHz) in South Korea
- **RU864** (864 to 870 MHz) in Russia.

Easy Installation in Limited Space

The compact-sized LN1130/LN1140 is specially designed to be installed in a narrow environment, such as wall enclosure. It can be installed by fixed wall mounting or DIN rail, thereby making its usability more flexible and easier in any space-limited location.

Environmentally Hardened Design

With the IP30 metal industrial case, the LN1130 and LN1140 provide a high level of immunity against electromagnetic interference and heavy electrical surges which are usually found on plant floors or in curb-side traffic control cabinets without air conditioning. It features a ventilated construction in which a cooling fan is not necessary, thereby making its operation noiseless. Being able to operate under the temperature range from -40 to 75 degrees C, the LN1130 and LN1140 can be placed in almost any difficult environment.

1.3 Features

Key Features

LN1130

- One RS232 serial interface and one RS485 serial interface
- Compliant with standard LoRaWAN gateways and network servers
- Ultra-wide-distance transmission up to 10km with line of sight
- Wide input voltage range (9 ~ 48 VDC) or 24V AC input
- Industrial metal case design with wide operating temperature range
- Compact size and DIN-rail mounting

LN1140

- Two digital input interfaces and two digital output interfaces
- Compliant with standard LoRaWAN gateways and network servers
- Ultra-wide-distance transmission up to 10km with line of sight
- Wide input voltage range (9 ~ 48 VDC) or 24V AC input
- Industrial metal case design with wide operating temperature range
- Compact size and DIN-rail mounting

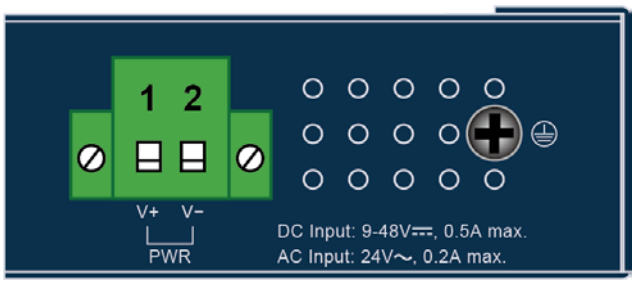
1.4 Product Specifications

Product	LN1130		
Wireless Transmission			
Technology	LoRaWAN		
Antenna Connector	1 × 50 Ω SMA Connectors (Center Pin: SMA Female)		
Frequency	IN865, EU868, RU864, US915, AU915, KR920, AS923		
Work Mode	OTAA/ABP Class A/B/C		
Data Interfaces			
Interface Type	6-pin removable terminal block		
Serial Port	RS232	Pin 1	TxD
		Pin 2	RxD
		Pin 3	GND
	RS485	Pin 4	D-(A)
		Pin 5	D+(B)
		Pin 6	GND
	Baud Rate	600~256000 bps (RS232)/600~256000 bps (RS485)	
	Protocol	Transparent (RS232), Modbus RTU (RS485)	
Others			
Configuration Port	1 × Micro USB		
LED Indicators	1 × PWR, 1 × LoRa		
Built-in	Temperature sensor		
Physical Characteristics			
Power Connector	2-pin removable terminal block		
Power Supply	9 ~ 48V DC/ 24V AC		
Ingress Protection	IP30		
Operating Temperature	-40°C to +75°C		
Relative Humidity	5% to 95% (non-condensing)		
Dimensions	33 x 70 x 104 mm		
Installation	DIN-rail or wall mounting		
Standards Conformance			
Regulatory Compliance	CE, FCC		

Product	LN1140		
Wireless Transmission			
Technology	LoRaWAN		
Antenna Connector	1 × 50 Ω SMA Connectors (Center Pin: SMA Female)		
Frequency	IN865, EU868, RU864, US915, AU915, KR920, AS923		
Work Mode	OTAA/ABP Class A/B/C		
Data Interfaces			
Interface Type	6-pin Removable Terminal Block		
IO Ports	Digital Input	Pin 1 **(DI 0)**	Level 0: **-24V~2.1V** (±0.1V) Level 1: **2.1V~24V** (±0.1V)
		Pin 2 **(DI 1)**	
	Digital Output	Pin 3 **(DO 0)**	Input Load to **24V DC**, 10mA max. Open collector to 24V DC, 100mA (max.)
		Pin 4 **(DO 1)**	
	GND	Pin 5, 6	
Others			
Configuration Port	1 × Micro USB		
LED Indicators	1 × PWR, 1 × LoRa		
Built-in	Temperature sensor		
Physical Characteristics			
Power Connector	2-pin removable terminal block		
Power Supply	9 ~ 48V DC, 24V AC		
Ingress Protection	IP30		
Operating Temperature	-40°C to +75°C		
Relative Humidity	5% to 95% (non-condensing)		
Dimensions	33 x 70 x 104 mm		
Installation	DIN-rail or wall mounting		
Standards Conformance			
Regulatory Compliance	CE, FCC		

Chapter 2. Hardware Introduction

2.1 Physical Descriptions

<table>
<tr><th></th><th colspan="2">LN1130</th><th colspan="2">LN1140</th></tr>
<tr><td>Front View</td><td colspan="2"> 
</td><td colspan="2"> 
</td></tr>
<tr><th>PIN</th><th>Definition</th><th>Description</th><th>Definition</th><th>Description</th></tr>
<tr><td>1</td><td>TxD</td><td rowspan="3">RS232</td><td>DI0</td><td rowspan="2">DI</td></tr>
<tr><td>2</td><td>RxD</td><td>DI1</td></tr>
<tr><td>3</td><td>GND</td><td>DO0</td><td rowspan="2">DO</td></tr>
<tr><td>4</td><td>D-(A)</td><td rowspan="3">RS485</td><td>DO1</td></tr>
<tr><td>5</td><td>D+(B)</td><td>GND</td><td rowspan="2">Ground</td></tr>
<tr><td>6</td><td>GND</td><td>GND</td></tr>
<tr><td>Top View</td><td colspan="4"> 
</td></tr>
</table>

LED Definition:

LED	Color	Function	
PWR	Green	Lights	Power is activated.
		Off	Power is inactivated.
LoRa	Green	Lights	LoRa module is connected and ready.
		Blinks	LoRa module is sending or receiving.
		Off	LoRa module is not able to connect.

2.2 Hardware Installation

Refer to the illustration and follow the simple steps below to quickly install your **LoRa Node**.

2.2.1 LoRa Antenna Installation

Step 1: Rotate the antenna into the antenna connector accordingly.

Step 2: The external LoRa antenna should be positioned vertically for a good signal.

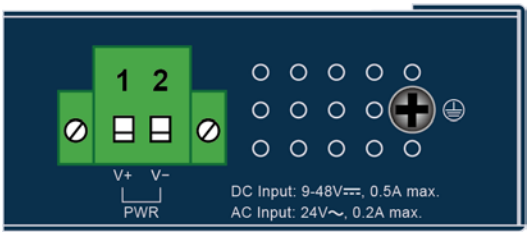
2.2.2 Wiring Power Input

The 2-contact terminal block connector on the top panel of **LoRa Node** is used for one DC power input or one AC power input. Please follow the steps below to insert the power wire.

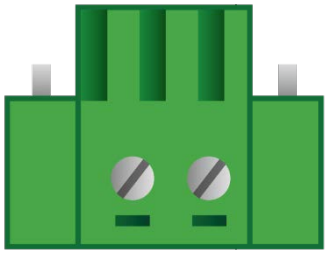
Note

When performing any of the procedures like inserting the wires or tightening the wire-clamp screws, make sure the power is OFF to prevent from getting an electric shock.

Insert positive and negative DC power wires into contacts 1 and 2 for POWER.



Tighten the wire-clamp screws for preventing the wires from loosening.



1 2

Power 1

V+ V-

Note

The DC power input range is 9-48V DC or 24V AC.

The device provides input voltage polarity protection.

Note

For industrial applications, it's suggested not to release the metal case and use an independent power supply.

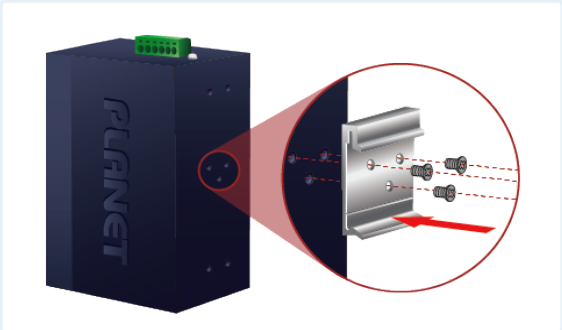
2.2.3 Mounting Installation

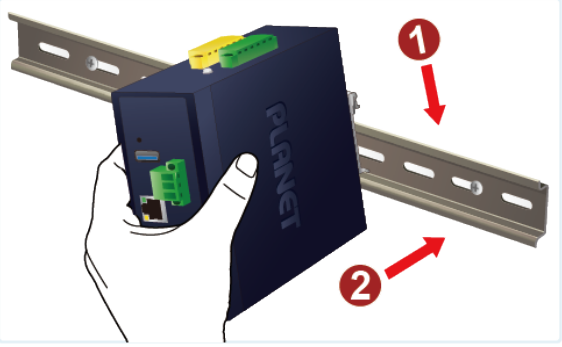
This section describes the functionalities of the Industrial **LoRa Node** and guides you to installing it on the DIN-rail and wall. Please read this chapter completely before continuing.

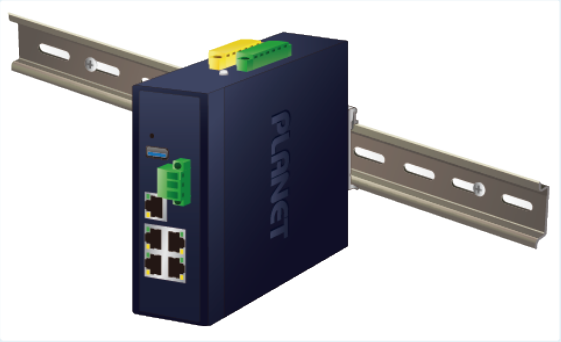
Note

This following pictures show the user how to install the device, and the device is not LN1130 or LN1140.

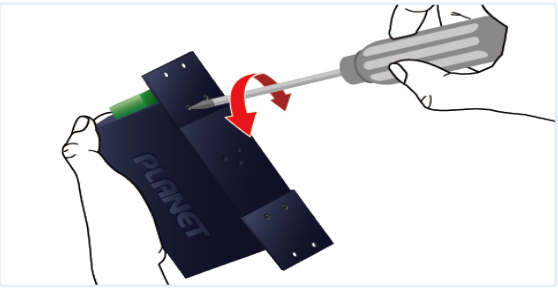
2.2.3.1 DIN-rail Mounting Installation



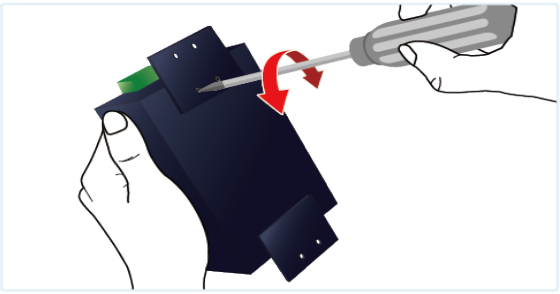




2.2.3.2 Wall-mount Plate Mounting



2.2.3.3 Side Wall-mount Plate Mounting

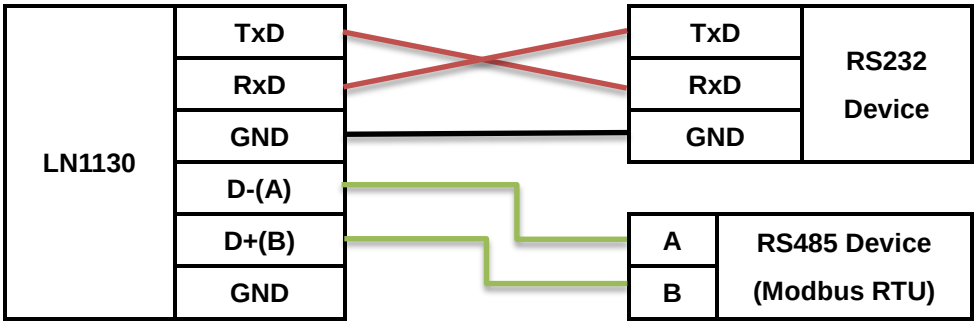


Caution:

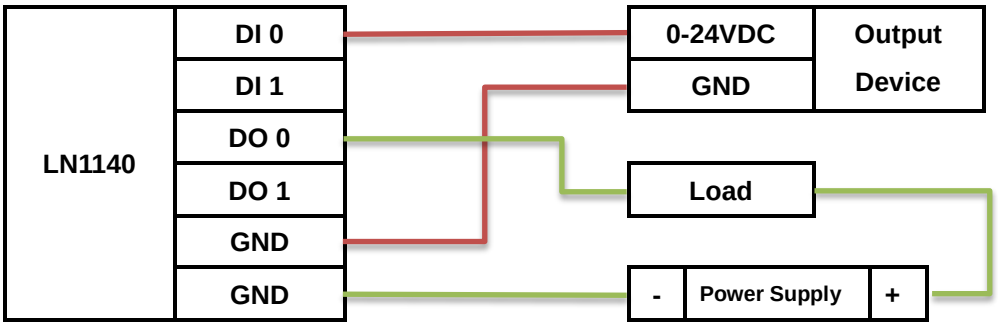
You must use the screws supplied with the wall-mounting brackets. Damage caused to the parts by using incorrect screws would invalidate your warranty.

2.2.3.4 Application Wiring

RS232 & RS485:



Digital Input/ Digital Output:



Chapter 3. Preparation

Before accessing the LoRa node controllers, user has to install utility tool for operation.

3.1 Requirements

- Workstations running Windows 10/11.
- **Micro USB** cable

3.2 Managing LoRa Node

Download PLANET LoRa Node Controller Tool software from Planet web site.
https://www.planet.com.tw/en/support/downloads?&method=keyword&keyword=LN&view=6#list
Power on the **LoRa Node** device and then connect it to computer via **micro USB port**.

Note

The box of the LN1130/LN1140 does not contain any USB cable.

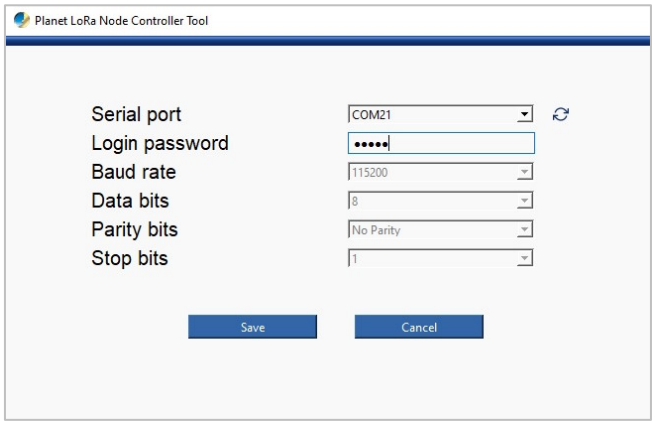
Open the Tool and select "**Serial port**", and then enter password to log in Utility. (Default password: **admin**)

Chapter 4. Operations Management

This chapter provides operations details of the LoRa node controller.

4.1 Managing LoRa Node

Open the Tool and select "**Serial port**", and then enter password to log in Utility. (Default password: **admin**)

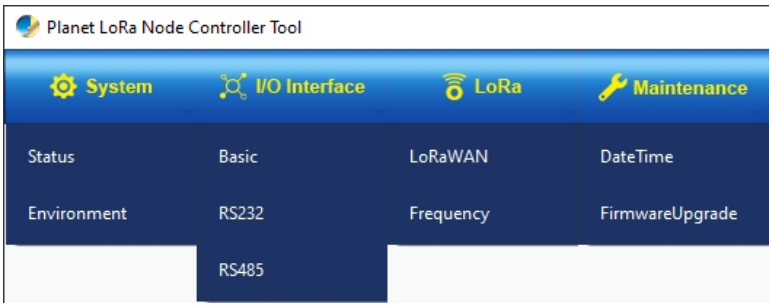


Note

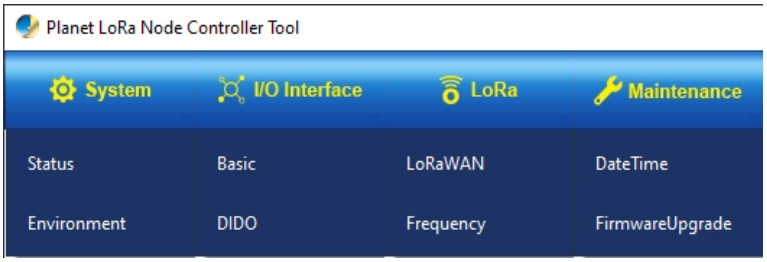
For security reason, please change and memorize the new password after this first setup.

After entering the password, the main screen appears as shown below.

The function menu on the top of the tool lets you access all the commands and configuration the LoRa Node Controller provides.



LN1130 Function Menu



LN1140 Function Menu

Now, you can use the LoRa Node Controller Tool software to continue the LoRa Node Controller management.

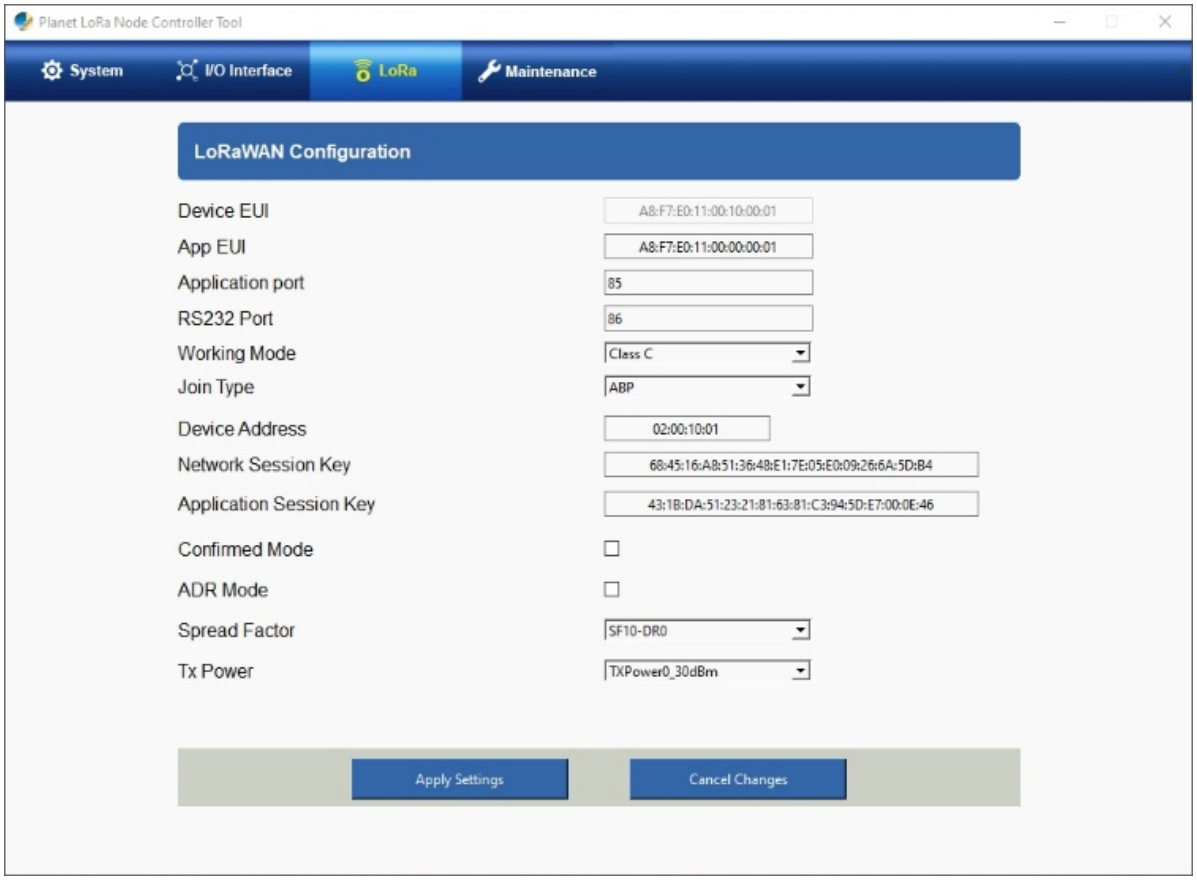
Please select the correct Frequency for LoRaWAN by country or in a location you stay before doing the LoRaWAN setting.

4.2 LoRaWAN setting

LoRaWAN setting is used for configuring the transmission parameters in LoRaWAN ® network.

Basic LoRaWAN Settings:

Go to "**LoRa > LoRaWAN**" of PLANET LoRa Node Controller Tool to configure join type, App EUI, Application Key and other information. You can also keep all settings by default.

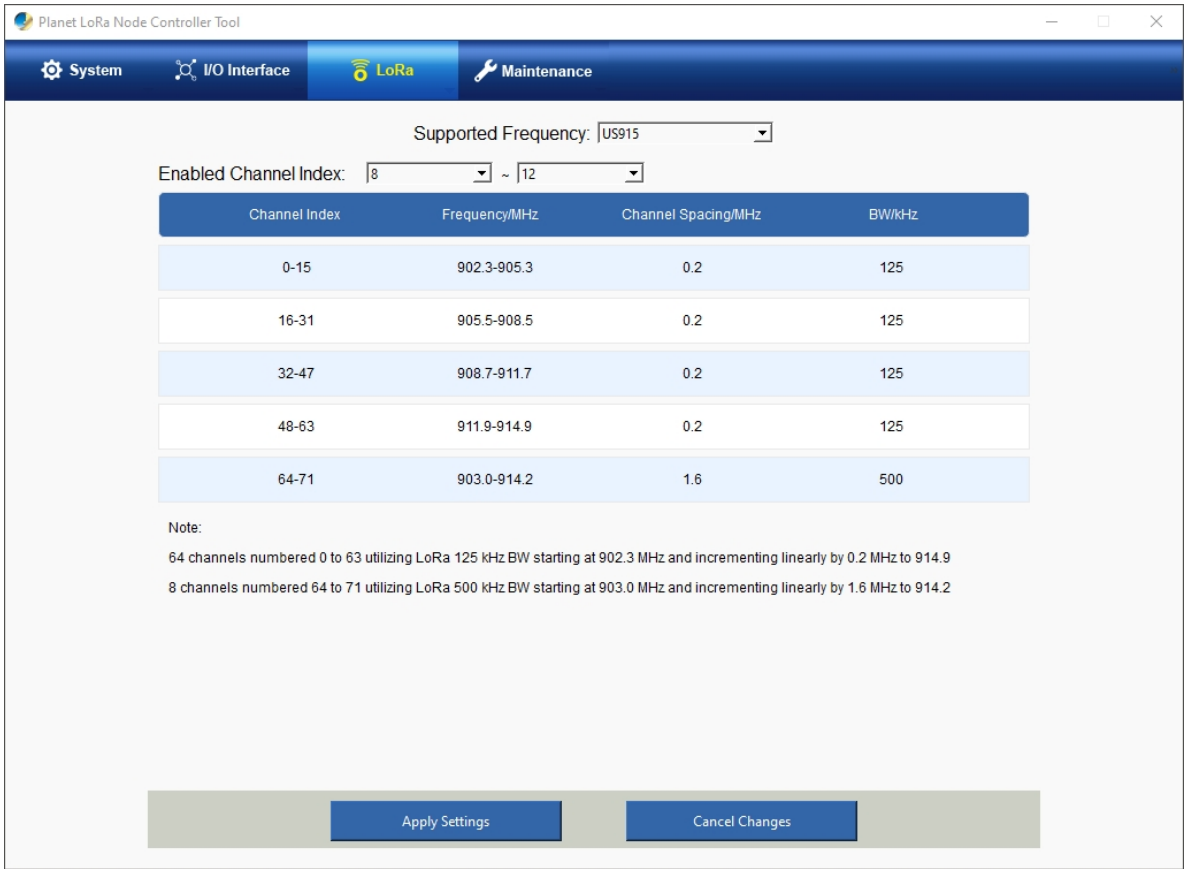


Object	Description
Device EUI	Unique ID of the device which can also be found on the label.
App EUI	LN1130: Default App EUI is A8:F7:E0:11:00:00:00:01 LN1140: Default App EUI is A8:F7:E0:12:00:00:00:01
Application Port	The port is used for sending and receiving data; default port is 85. Note: RS232 data will be transmitted via another port.
RS232 Port	The port is used for RS232 data transmission.
Working Mode	Class A, Class B and Class C are available
Join Type	OTAA and ABP modes are available
Application Key	Appkey for OTAA mode

Device Address	DevAddr for ABP mode
Network Session Key	NwkSKey for ABP mode
Application Session Key	AppSKey for ABP mode
Confirmed Mode	If the device does not receive ACK packet from network server, it will resend data 3 times at most.
ADR Mode	Allow network server to adjust datarate of the device.
Spread Factor	If ADR is disabled, the device will send data via this spread factor.
Tx Power	Tx power of the device.

LoRaWAN Frequency Settings:

Go to "**LoRa** > **Frequency**" of PLANET LoRa Node Controller Tool to select supported frequency and select channels to send uplinks. Make sure the channels match the LoRaWAN gateway.

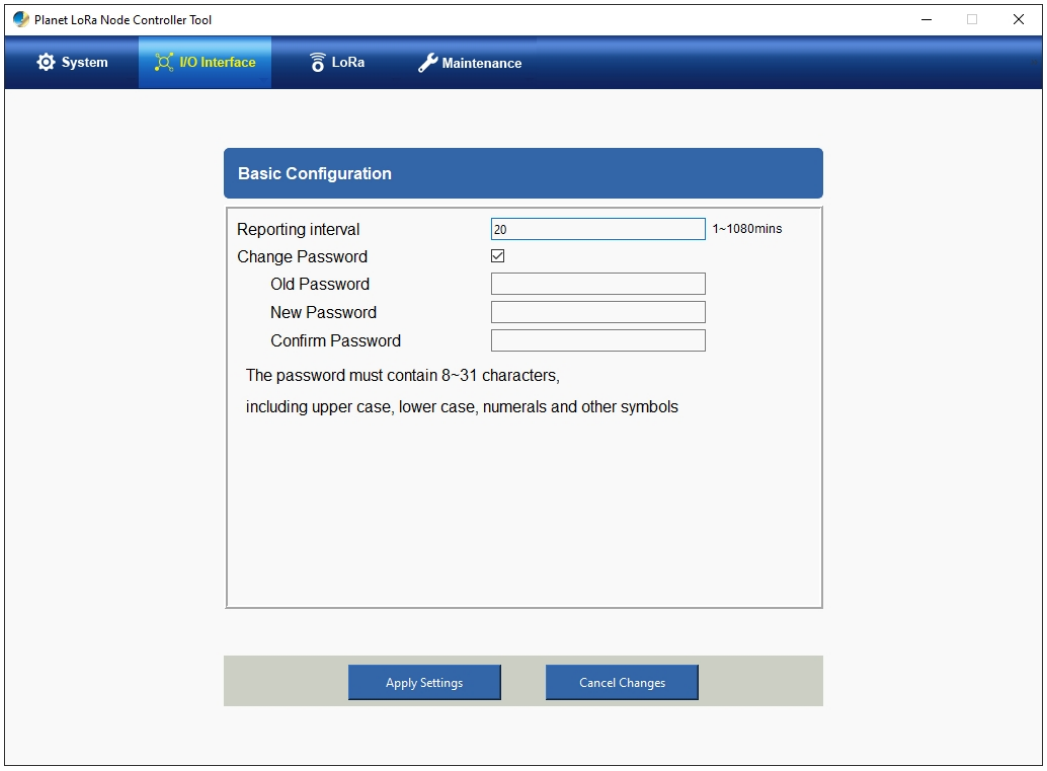


If frequency is one of AU915/US915, you can enter the index of the channel that you want to enable in the selection box, making them separate by commas.

4.3 Interface Setting

The LN1130 and LN1140 support data collection by multiple interfaces including serial ports or digital input/digital output. Besides, they can also power the terminal devices by power output interfaces. Basic settings are as follows:

Go to "**General** > **Basic**" of PLANET LoRa Node Controller Tool to change the reporting interval.

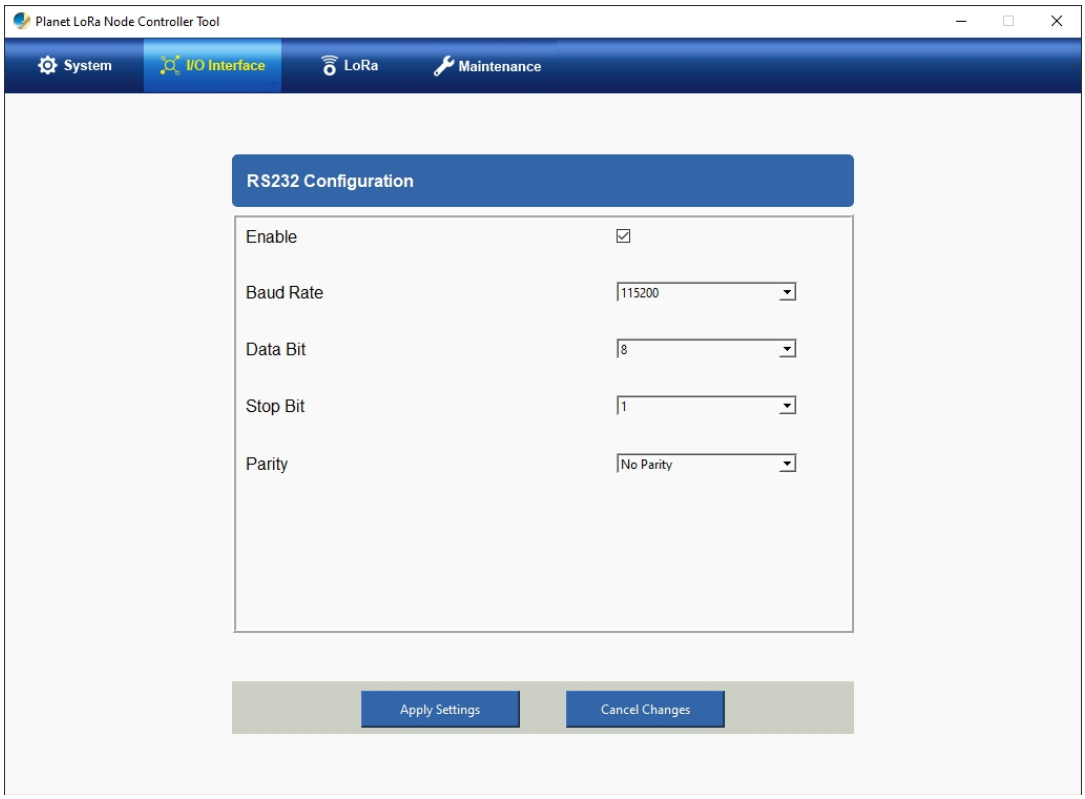


Object	Description
Reporting Interval	Reporting interval of transmitting data to network server. Default: 20 mins, Range: 1-1080 mins. Note: RS232 transmission will not follow the reporting interval.
Change Password	Change the password for PLANET LoRa Node Controller Tool to read/write this device.

4.3.1 RS232 Settings

1. Connect RS232 device to RS232 port on the interface of LN1130.

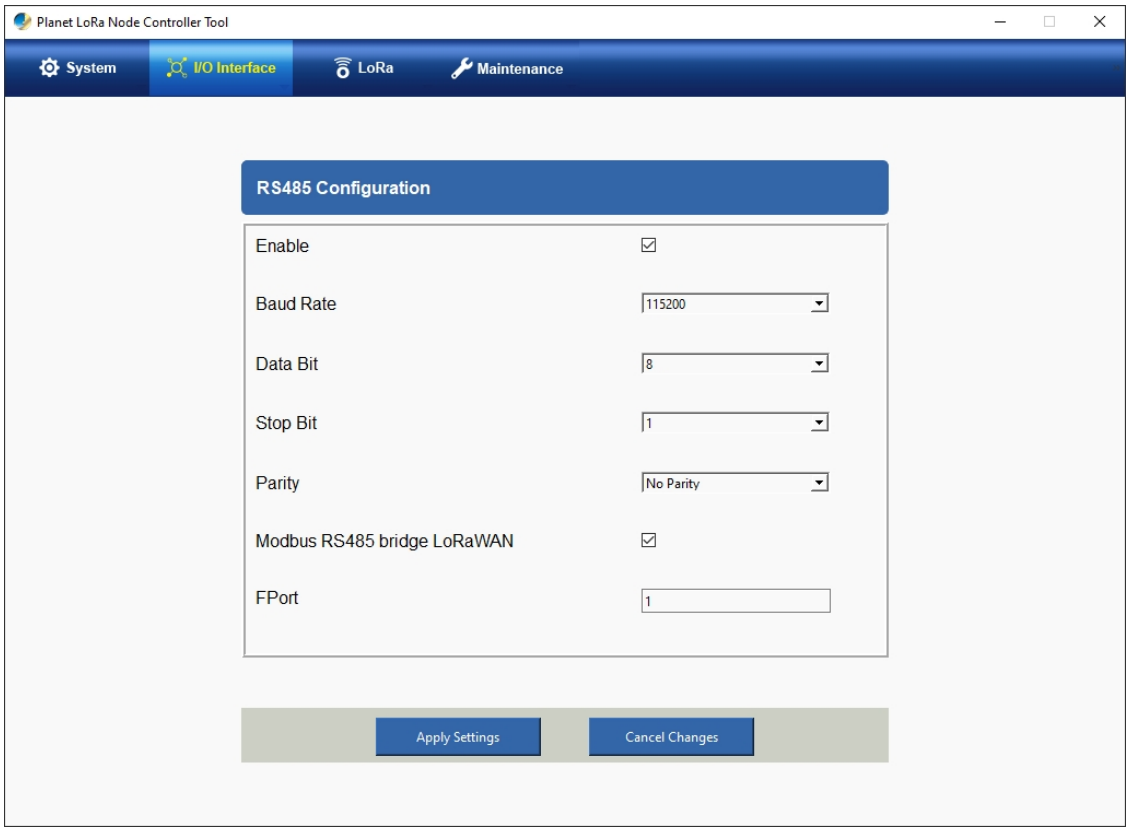
2. Go to "**I/O Interface > RS232**" of PLANET LoRa Node Controller Tool to enable RS232 and configure serial port settings. Serial port settings should be the same as RS232 terminal devices.



Object	Description
Enabled	Active RS232 function
Baud Rate	600/1200/2400/4800/9600/19200/38400/57600/115200/128000/256000 are available.
Data Bit	7 bit and 8 bit is available.
Stop Bit	1 bit and 2 bit are available.
Parity	None, Odd and Oven are available.

4.3.2 RS485 Settings

1. Connect RS485 device to RS485 port on the interface of LN1130.
2. Go to "**I/O Interface > RS485**" of PLANET LoRa Node Controller Tool to enable RS485 and configure serial port settings. Serial port settings should be the same as RS485 terminal devices.



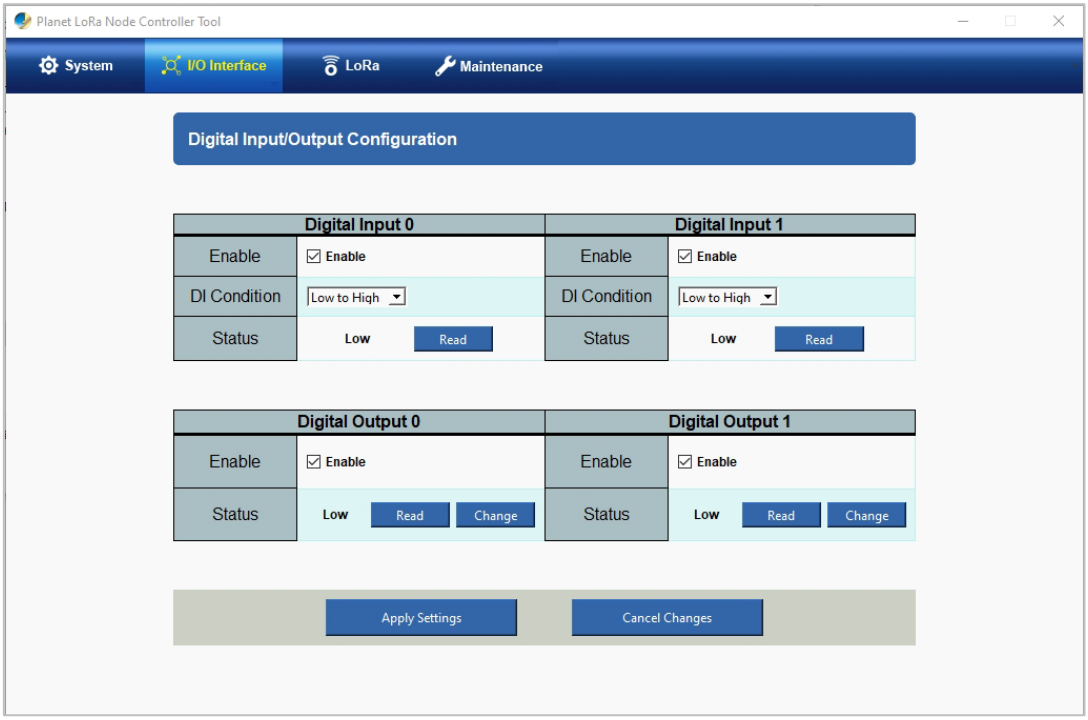
Object	Description
Enabled	Active RS485 function
Baud Rate	600/1200/2400/4800/9600/19200/38400/57600/115200/128000/256000 are available.
Data Bit	7bit and 8 bit is available.
Stop Bit	1 bit and 2 bit are available.
Parity	None, Odd and Oven are available.
Modbus RS485 Bridge LoRaWAN	If transparent mode is enabled, LN501 will convert Modbus RTU commands from network server to RS485 terminal devices and send Modbus reply originally back to network server.
FPort	The port is used for RS485 transmission port

Note	When you use power output to power RS485 Modbus slave devices, it only supplies power when reporting interval is coming. It's suggested to power slave devices with external power during the PoC test.

4.3.3 DI/DO Settings

1. Connect DI/DO device to I/O port on the interface of LN1140.

2. Go to "**I/O Interface > DIDO**" of PLANET LoRa Node Controller Tool to enable RS232 and configure serial port settings. Serial port settings should be the same as RS232 terminal devices.

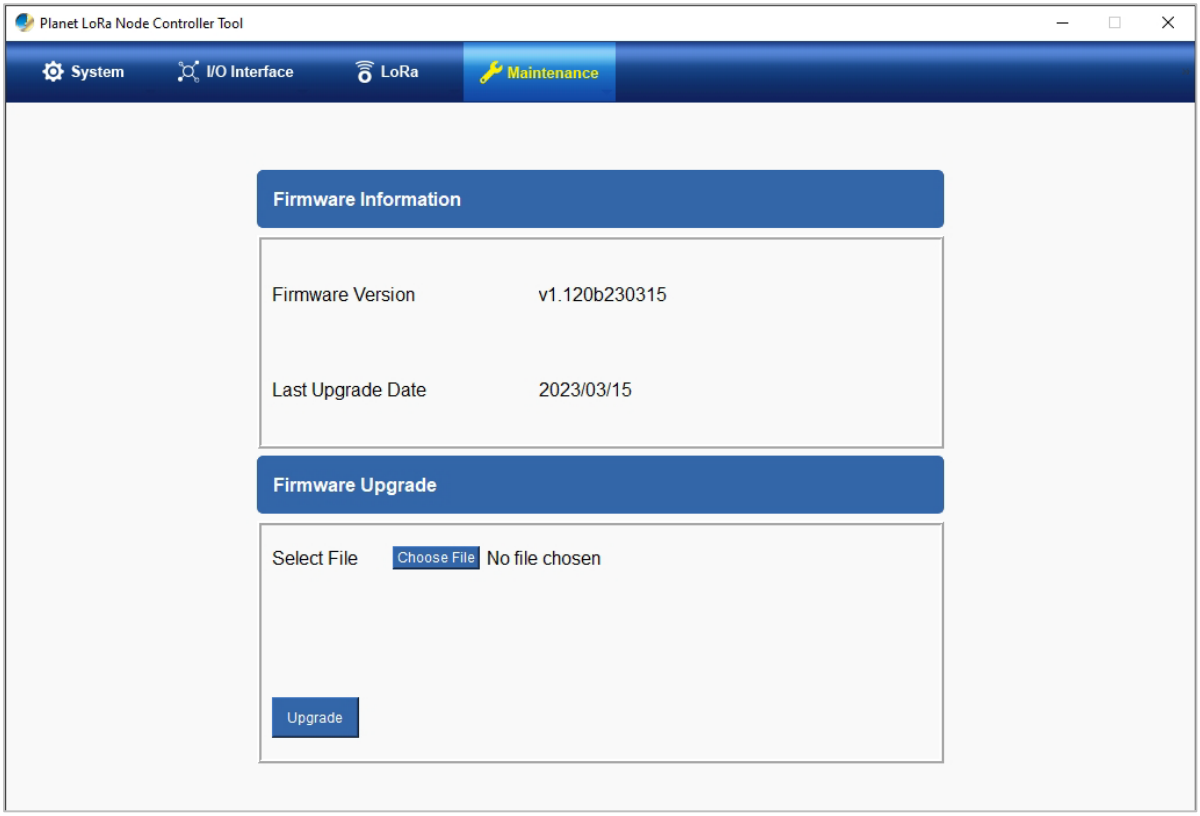


Object	Description
Enabled	Activate digital input / output function
Condition	**As Digital Input:** Allows user to select High to Low or Low to High. This means a signal received by system is from High to Low or from Low to High. It will trigger an action that logs a customize message or issue the message from the switch. **As Digital Output:** Allows user to select High to Low or Low to High. This means that when the switch is power-failed or port-failed, then system will issue a High or Low signal to an external device such as an alarm.
Status	Click the **Read** button to show the current DI/DO status.

4.4 Maintenance

4.4.1 Upgrade

Go to “**Maintenance** > **Firmware Upgrade**” of PLANET LoRa Node Controller Tool, click “Choose File and Upgrade” to import firmware and upgrade the device



4.4.2 Reset to Factory Default

Please select one of following methods to reset device:

- Hardware: Hold on the Reset button for more than 5s.

Chapter 5. Customer Support

Thank you for purchasing PLANET products. You can browse our online FAQ resource and User's Manual on PLANET Web site first to check if it could solve your issue. If you need more support information, please contact PLANET switch support team.

PLANET online FAQs:

https://www.planet.com.tw/en/support/faq

Switch support team mail address:

support@planet.com.tw