



Remote IO Controller Manual

UC1214/1314/1414



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1. Preface

Thank you for choosing Ursalink Remote I/O Controller. This user manual will present in detail all the functions and features of the product. Ursalink Remote I/O Controller is designed for both industrial and commercial applications. The product should be used under the guidance of this user manual, referring to parameters and technical specifications. The UC1214/1314/1414 is a compact, high-performance device that offers SMS/USSD services for remote control and easy management of machines and equipment over the cellular network.

We bear no liability for property loss or bodily injury arising from abnormal or incorrect usage of this product.

2. Introduction

Ursalink Remote I/O Controller is designed as a cost-effective industrial machine monitoring device. The unit monitors and controls up to 2 DC signals and 2 drivable relay outputs.

User-defined SMS/USSD messages are sent to a pre-configured phone number or an USSD gateway when a pre-defined alarm condition has been met. With the aid of Ursalink Remote I/O Controller, the alarm condition brings attention to engineering personnel immediately. Also, it allows engineering personnel to trigger any relay outputs by sending out SMS/USSD message. The outputs can be connected with an alarm indication device, such as a light or a horn.

The device can give immediate response to the status of both input and output conditions. A cellular modem is embedded in the Ursalink Remote I/O Controller .

This user manual is intended to provide detailed technical specifications and explanations to the basic user as well as the technically-minded person. It is a live document, and will be updated from time to time. Please ensure that you have the latest version, by checking our website at: <https://www.ursalink.com>

2.1 Features

- 2 digital inputs, connected with up to 2 DC signals
- 2 relay drivable outputs
- Reliable performance with built-in watchdog
- Automatically timing report of device condition via SMS/USSD
- Customizable conditions & programmable actions
- Editable alarm message
- Status monitoring available and automatic switch of field devices at set times
- Command with authorized number available
- Sending and receiving message via SMS/USSD

2.2 Parameters

Parameter Item	Reference Scope
DC Power Supply	5-24 VDC
SIM Card	Micro SIM
Antenna	50 Ω SMA Antenna Interface
Operating Temperature	-40 °C to +70 °C
Relative Humidity	0% to 95% (non- condensing)
Digital Input	Opto-isolated depending on voltage DC Voltage (3-24 V) High Voltage: +3V ~ +24V Low Voltage: +1V Max
Digital Output	2 x SPDT Relay Contact Rating: 3 Amp DC (Max: 30 V) or 3 Amp AC (Max: 250 V)
IO Connector type	Screw Terminals
Dimensions	79 x 60 x 24 mm

2.3 LED Indicator Description

Status:

Solid On: Equipment starts

On for 500ms, off for 500ms: All OK

On for 100ms, off for 100ms: The device cannot send out USSD

ACT:

Off: GSM engine registration fails

On for 75ms, off for 3000ms: GSM engine registered OK

On for 500ms, off for 500ms, blinking three times: Sending/Receiving USSD

3. Installation

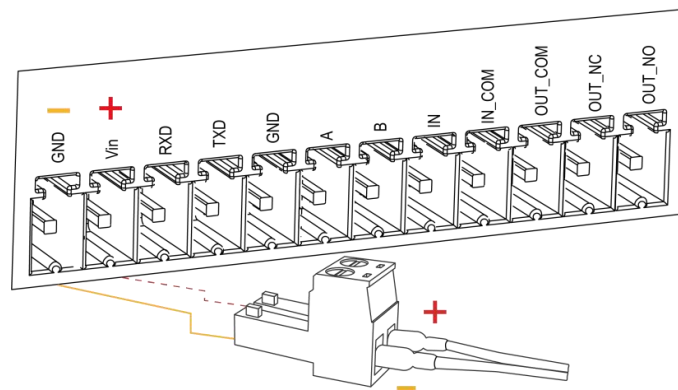
3.1 Environment

Due to the product properties of Ursalink Remote I/O Controller, we **STRONGLY** advise that it should not be installed in proximity to a variable speed drive or with any other electrically noisy equipment. **DO NOT** install the Ursalink Remote I/O Controller into a metal enclosure unless an antenna is mounted on the outside of the enclosure.

3.2 Power Supply

The Ursalink Remote I/O Controller features a 2 pin 3.5mm terminal block where a power supply can be connected. The power supply should have the following specifications:

- Output Voltage: 12V nominal
- Output Current: 0.5A



A suitable power supply comes with the retail product.

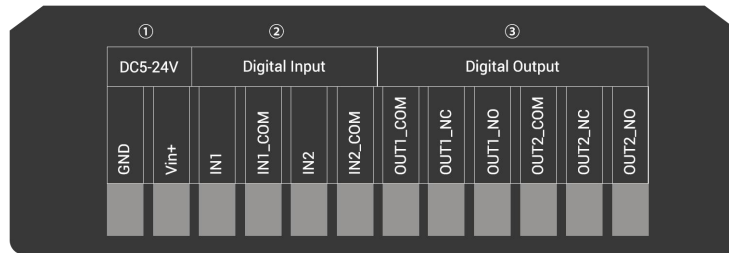
For industrial applications, it is advised that the Ursalink Remote I/O Controller should be installed into its own metal housing and be powered from a separate power supply (as opposed to sharing one with other equipment) .

Please Note: While the Ursalink Remote I/O Controller has fairly rugged internal power supply circuitry, no special provision for lightning protection is well in place. If the Ursalink Remote I/O Controller is used in an area where thunderstorm is about to occur, it is advisable to use a commercially available lightning suppressor (the same applies to inputs or outputs that are connected to wires longer than 2 or 3 meters). The guarantee does not cover damage resulting from lightning strikes! The Ursalink Remote I/O Controller can operate reliably from voltages in the range of 5 to 24 VDC.

3.3 Micro USB Port

The Ursalink Remote I/O Controller provides a micro USB port to connect to a PC via USB cable which allows the PC to configure the unit.

3.4 Terminal Description



① [DC 5-24V]

Terminal	Description
Vin+	Positive terminal of the DC power supply (+)
GND	Negative terminal of the DC power supply (-)

② [Digital Input]

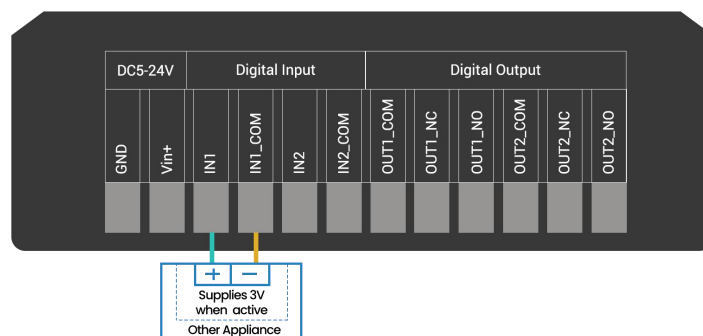
Opto-isolated depending on voltage DC voltage (3-24V)

③ [Digital Output]

Driving relay to connect NC or NO

3.5 Digital Input

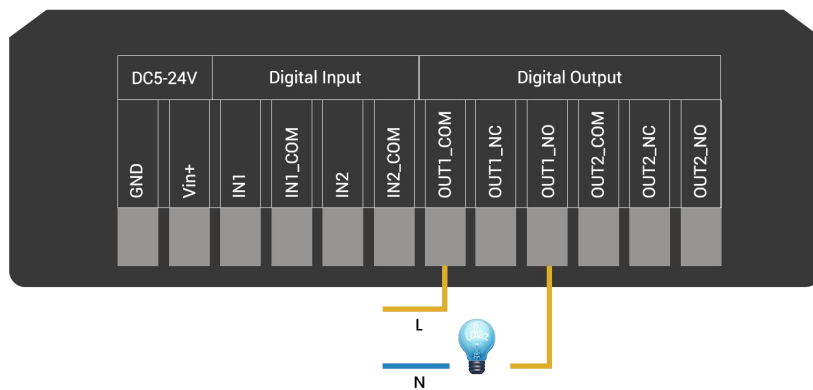
- When the input is triggered either as high or low, it will send an alarm message if you have pre-configured related command.
- Terminal "IN1" or "IN2" is internally pulled high. Leaving the connection open or connecting it to "0 -1 V" will indicate an "Input-De-activate" state.
- When terminal "IN1" or "IN2" is connected to "3-24 V", it will indicate an "Input-Activate" state.
- Trigger voltage: Minimum = 3 VDC, Maximum = 24 VDC.



3.6 Relay Output

- The output is used to switch circuits on and off and can be controlled by sending a USSD from your USSD gateway to the Ursalink Remote I/O Controller
- The output terminals are internally connected to a 3 Amp SPDT relay
- OUT_NC = Normally Closed
- OUT_COM = Common
- OUT_NO = Normally Open

Maximum Current	3 Amp
Maximum Voltage	250VAC, 30 VDC



4. Configuration

4.1 Configuration via PC

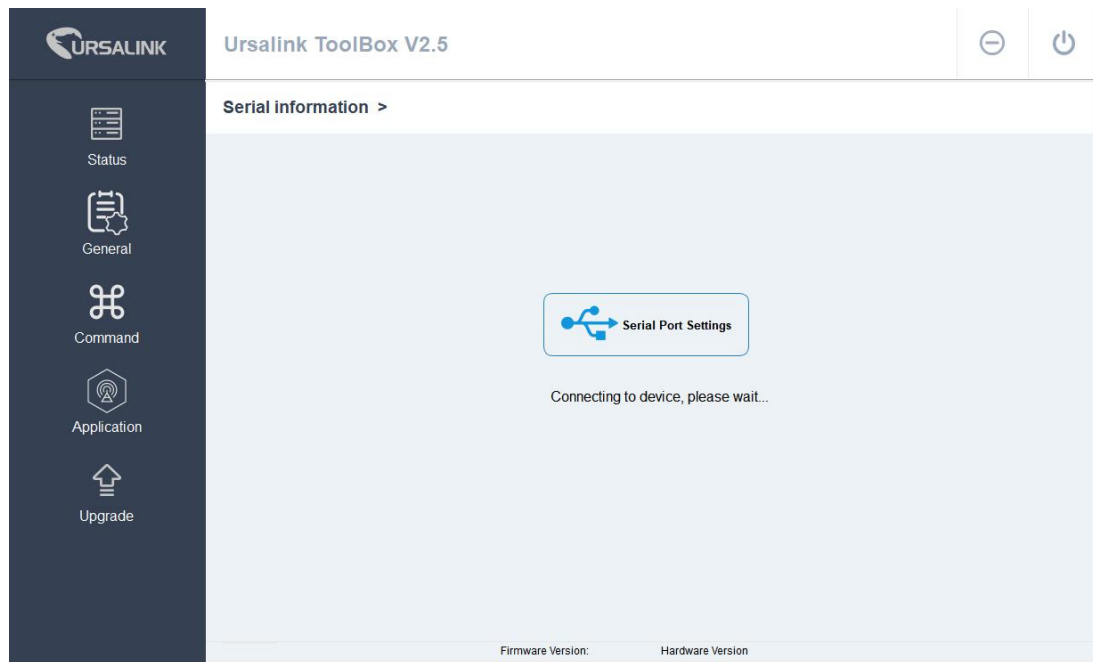
Follow these steps:

Step 1: Insert SIM card into the unit.

Step 2: Connect the Ursalink Remote I/O Controller to PC via the micro USB cable.

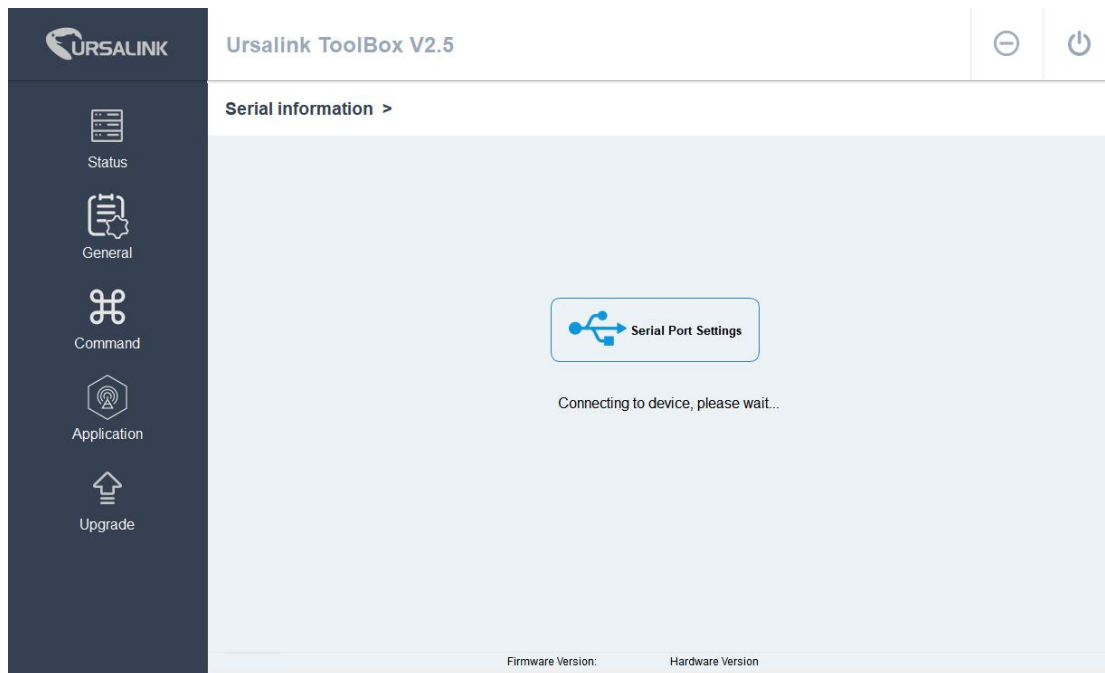
Step 3: Power on the Ursalink Remote I/O Controller.

Step 4: Run the Ursalink ToolBox.



The software will display this interface when getting started. Here you can create a new setup, import an existing setup from your PC, or retrieve the current setup from the Ursalink Remote I/O Controller.

4.1.1 Serial Port Settings



When the Ursalink ToolBox displays: **Connecting to device, please wait...**

You can click **Serial Port Settings** to set the correct serial port parameters.

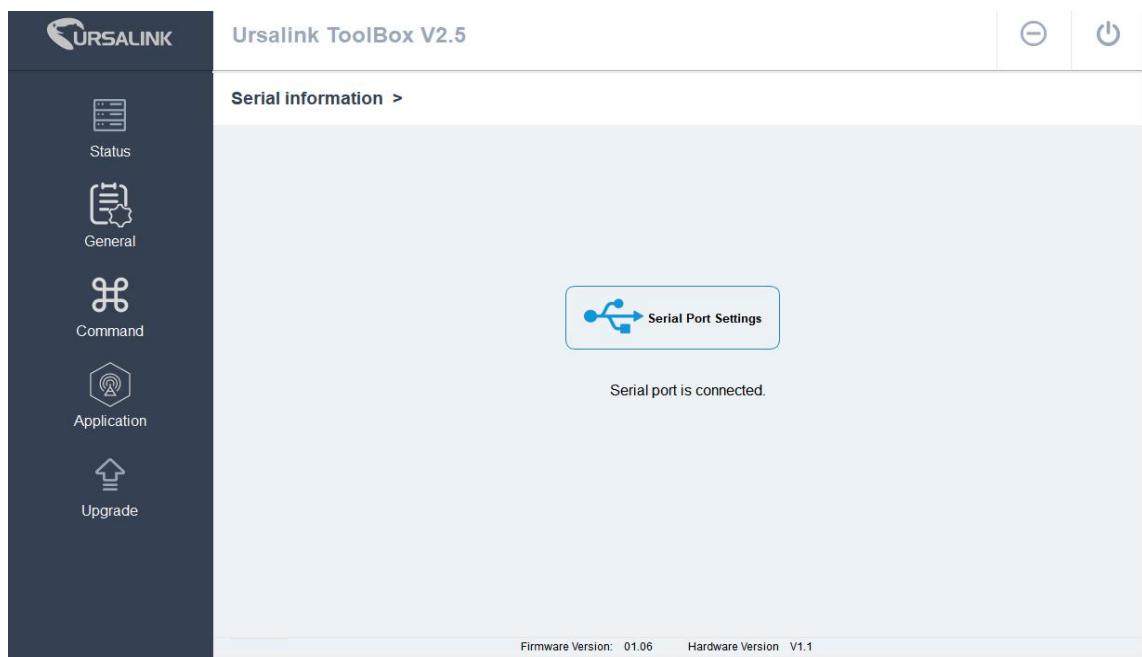
The 'Serial Port Settings' dialog box has a blue header with a close button (X). It contains the following settings:

Serial port	COM3
Login password	●●●●●●●●
Baud rate	115200
Data bits	8
Parity bits	None
Stop bits	1

At the bottom, there are two blue buttons: 'Save' and 'Cancel'.

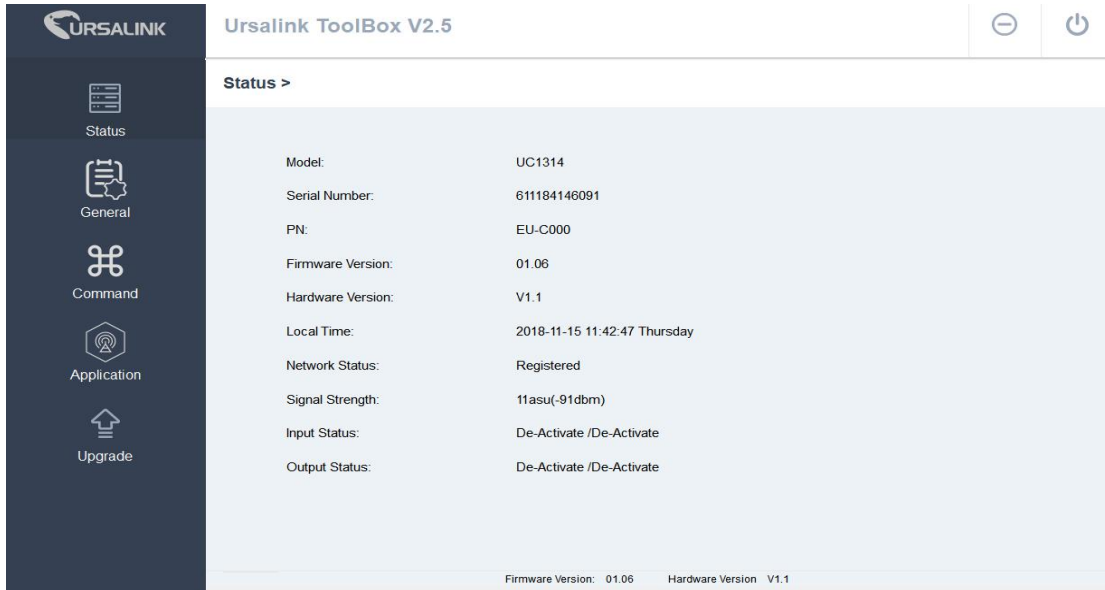
Serial Port Settings		
Item	Description	Default
Serial Port	Select the serial port for data transmission.	Null
Login Password	Enter the login password.	123456
Baud Rate	Select from "9600", "57600", "115200".	115200
Data Bits	Select from "5", "7", "8".	8
Parity Bits	Select from "Even", "Odd", "None".	None
Stop Bits	Select from "1", "2".	1

If both the serial port parameters and the login password are correct, it will display: **Serial port is connected.**



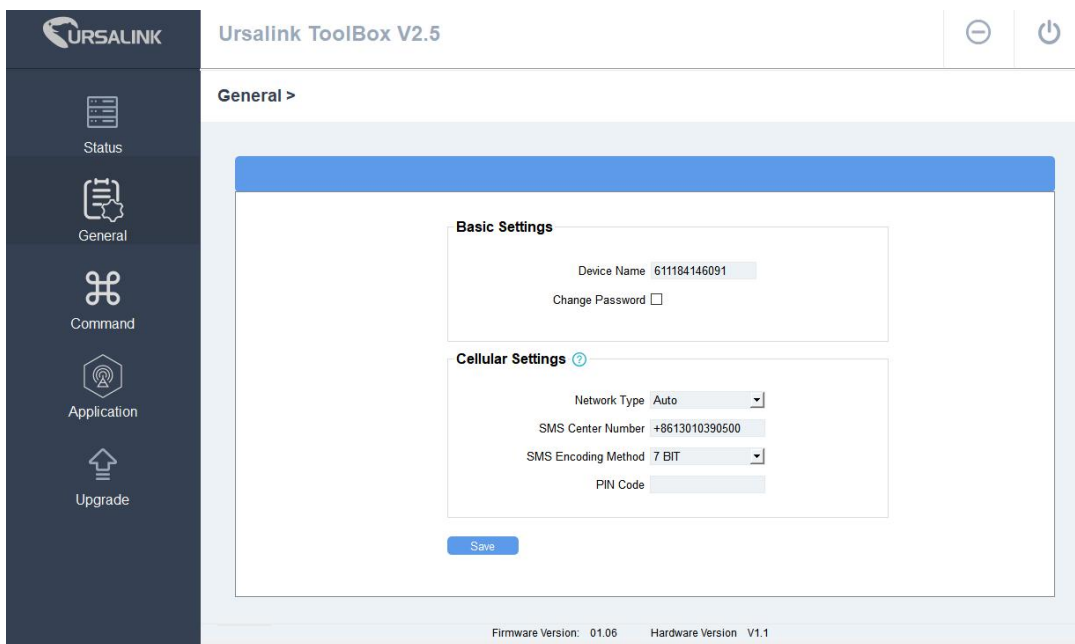
4.2 Status

Click "Status" to see the basic status information of this device.



4.3 General

Click "General" to set the general settings of this device.



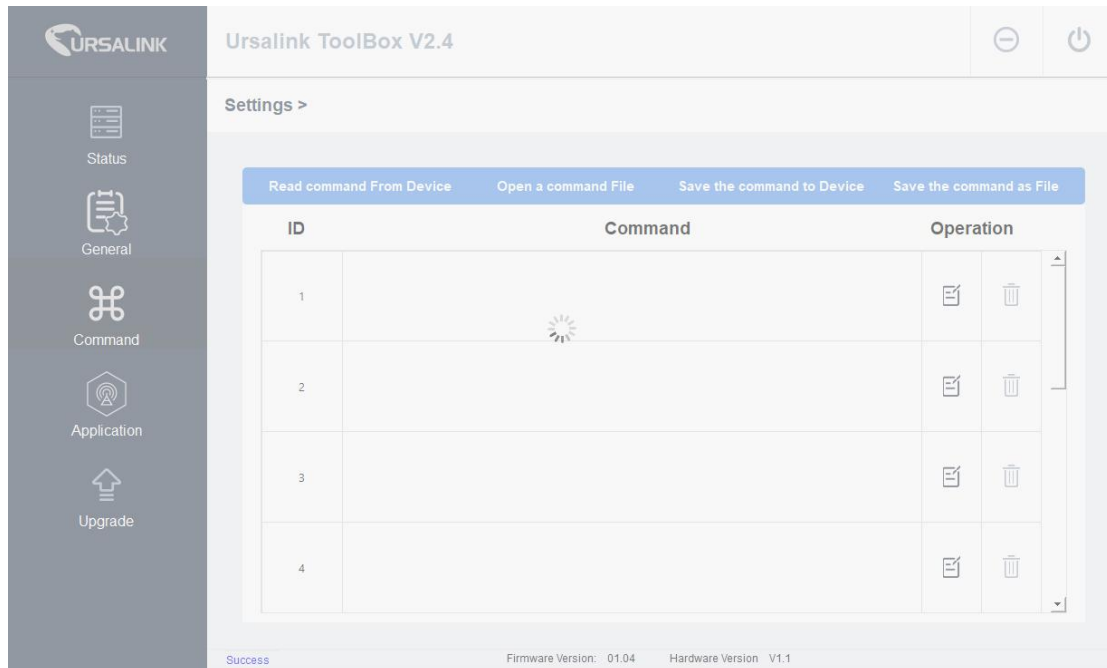
Basic Settings		
Item	Description	Default
Device Name	Enter the device name which is the device identification.	SN
Change Password	Click to change password.	Null
Old Password	Enter the old password.	Null
New Password	Enter the new password.	Null

Confirm Password	Enter the new password again.	Null
Cellular Settings		
Item	Description	Default
Network Type	Choose the types of cellular network for Internet access priority. When you change the network type, you need to restart the device to make the change take effect.	Depending on the cellular modem
SMS Center Number	A SMS center is responsible for forwarding the SMS message towards the destination. Different regions may have different numbers.	Null
SMS Encoding Method	There are 3 types of SMS encoding method: 7-bit, 8-bit and UCS-2. 7-bit: Standard SMS contains 160 characters. 8-bit: Allows you to insert binary data within a SMS, 8-bit messages are not viewable as text messages by mobile phones. UCS-2: Characters are represented by a 16 fixed-length bits (2 bytes). It is used as a fallback on many GSM/3G/4G networks when a message cannot be encoded using GSM-7 (7-bit) or when a language requires more than 128 characters to be rendered.	7 bit
PIN Code	Please enter a PIN code for locking your SIM card. The length is 4 - 8.	Null

4.4 Command

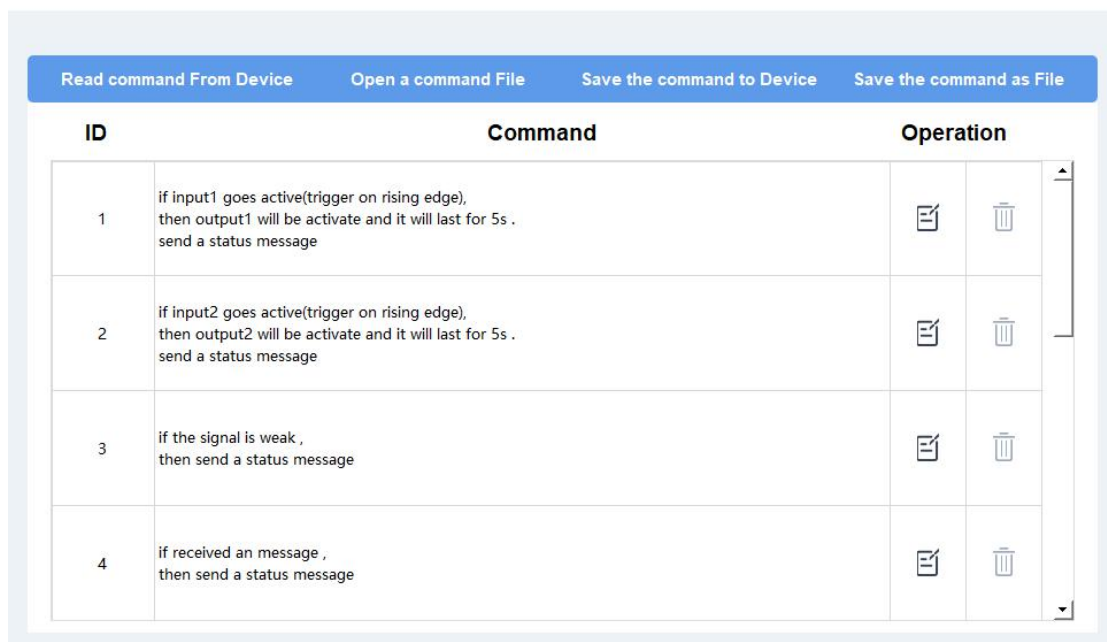
4.4.1 Read Command from Device

Click "Command" to go to the configuration page. Ursalink ToolBox will read command from the connected device automatically. The whole process takes about 5 seconds.



Then the command saved in this device will be displayed on this page:

Settings >

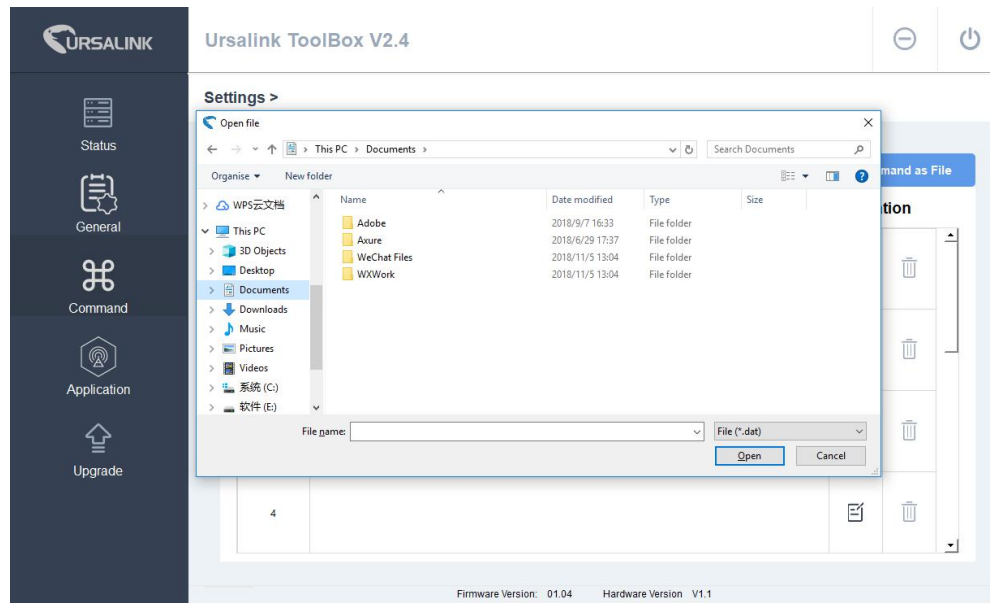


4.4.2 Open a Command File

You can import the existing command file from your PC with following steps.

Step One: Click "Read Command from Device".

Step Two: Select the command file.

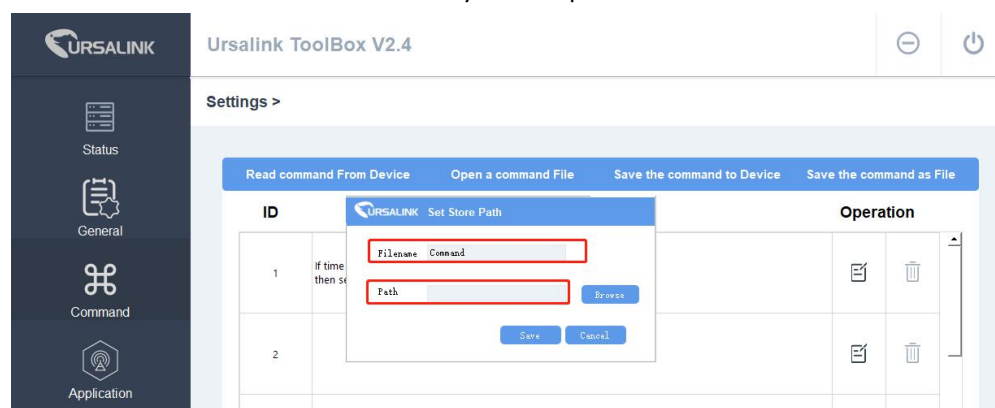


4.4.3 Save the Command to Device



You can click "Save the Command to Device" to save the command having been configured on the URSalink Toolbox. The device will restart automatically to apply this configuration.

4.4.4 Save the Command as File

You can click "Save the Command as File" to save the command having been configured on the URSalink Toolbox as a file and save it on your computer.



You can re-edit the file name and determine the storage path, the command will be saved as two types of files.

Name	Date modified	Type	Size
 Command.dat	11/6/2018 4:11 PM	DAT File	4 KB
 Command.txt	11/6/2018 4:11 PM	Text Document	2 KB

The ".dat" file can be recognized by Ursalink ToolBox only.

The ".txt" file is an editable text file for user.

4.5 IF-THEN Behaviour Command

The Ursalink Remote I/O Controller is running with a number of defined behaviour commands. Each command takes the form of an IF-THEN statement pair. You are thus able to select certain trigger conditions to cause desired actions. The Ursalink Remote I/O Controller allows up to 8 separate behaviour commands with some models.

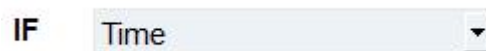
Users can select time or input constraints for any IF-THEN statement pairs, so that an action will only be triggered during certain period within a day, or only if certain input/output conditions are met.

The user can enter the edit page by clicking  , or delete the command by clicking .

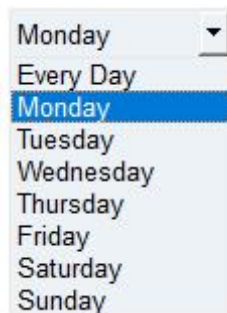
4.5.1 Supported IF Condition

4.5.1.1 IF the Time Is ...

A command containing this IF condition will be triggered at a specific time every day within a specified range of dates, or on every selected day of the week.



The user can choose the day of the week from:



The user can also set the time from 00:00 to 23:59 on certain day.

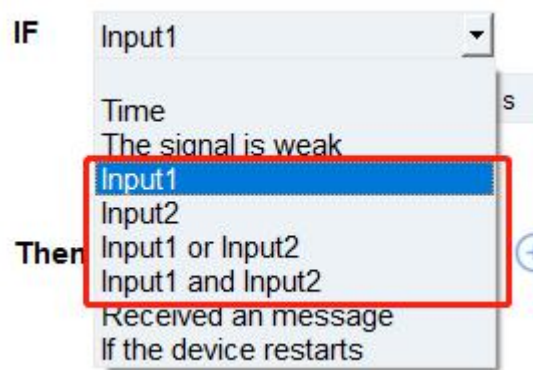
4.5.1.2 IF Received a Specific Message

A command containing this IF condition will be triggered by certain message defined by users.



4.5.1.3 IF Input

A command containing this IF condition will be triggered if the selected input changed according to the specified option.



The user can setup multiple combinations; however, input 1 and input 2 must be activated before action is taken.

The logic options available includes:

- AND: ALL the selected signals become active or ANY of the selected signals become inactive
- OR: ANY of the selected signals become active or ALL of the selected signals become inactive

Then the user can choose from the following options.

- Goes Active (Triggered on rising edge)
- Goes Inactive (Triggered on falling edge)
- Changes State (Triggered on rising or falling edge)
- Is Active (Triggered on high level)
- Is Inactive (Triggered on low level)

Thus, if the user chooses "Goes Active", then as soon as the specified input changes from inactive to active, the command will be triggered. Also, it applies to the remaining options when the preset conditions are met.

The user is also able to specify a "Continued time" for this command, which will not be triggered until it remains Active or Inactive longer than the time specified. Moreover, the user can specify a "Lockout time" for this command. After the command has been triggered, it will not be allowed to be triggered again until the time specified has elapsed.

When you set the time, you can choose the time unit:

Msec: 0-86400000

sec: 0-86400

min: 0-1440

Only integers are allowed. You can't use the decimal point.

Note: There are 3 single actions at most to be executed for a single trigger condition.

4.5.1.4 IF Signal Is Weak

A command containing this IF condition will be triggered once the signal strength meets the specified requirements: the value of asu is 1-10.

IF The signal is weak ▾

4.5.1.5 IF the Device Restarts

A command containing this IF condition will be triggered once the device has finished restarting.

IF If the device restarts ▾

4.5.2 Supported THEN Actions

4.5.2.1 THEN Change Output

A command containing this Action will change the selected output according to specified actions.

Then Output2 ▾

Delay Time 6 s ▾

will be activate ▾

will be activate

will be de-activate

will follow the input to change

+

The user can choose from the following actions:

- Will be activated
- Will be de-activated
- Will follow the input to change: When the triggering condition is the input changes state, you can then select change state as the action.

IF Input1 ▾ changes state(trigger on rising or falling edge) ▾

is continued for 0 s ▾

Set lockout time 0

Then Output1 ▾ will follow the input to change ▾ +

If the user has configured:

- "Delay Time", the selected output will be activated after the specified time.
- "Duration", the output will remain current state for a certain period of time.

4.5.2.2 THEN Send A Status Message

A command containing this Action will send a status message via USSD if the condition is met. The message contains: Local Time, GSM Status, Signal level, Input Status , Output Status.

Then Send a status message ▾

If the Application Mode is USSD, then the message will be sent to the pre-configured USSD receiver.

If you have enabled "Report by SMS as well", the message will be sent to the pre-configured phone number.

4.5.2.3 THEN Send A Custom Message

A command containing this Action will send a custom text message via USSD if the condition is met. Only letter, number, comma, period, separator, space and exclamation mark are allowed in the message, and the maximum character length is 60.

Then Send an custom message ▾

content is

Only letter, number, comma, period, separator,blank and exclamation mark are allowed, and the maximum character length is 60.

If the Application Mode is USSD, then the message will be sent to the pre-configured USSD receiver.

If you have enabled "Report by SMS as well", the message will be sent to the pre-configured phone number.

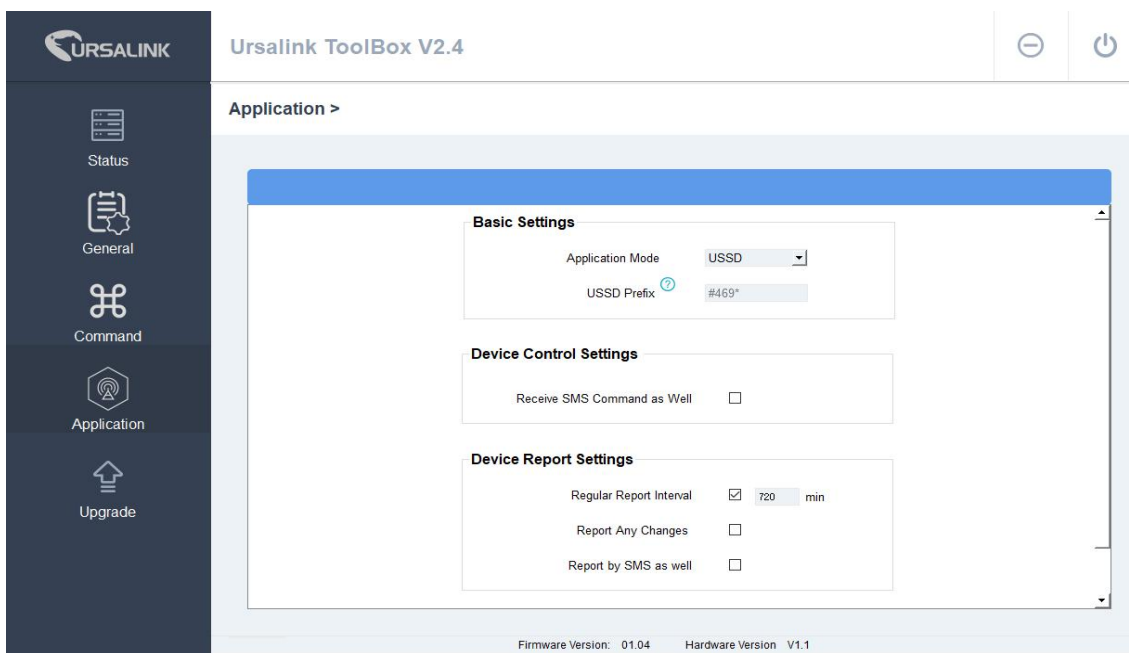
4.5.2.4 THEN Restart the Device

A command containing this Action will restart the Ursalink Remote I/O Controller if the condition is met.

Then Restart the device ▾

4.6 Application

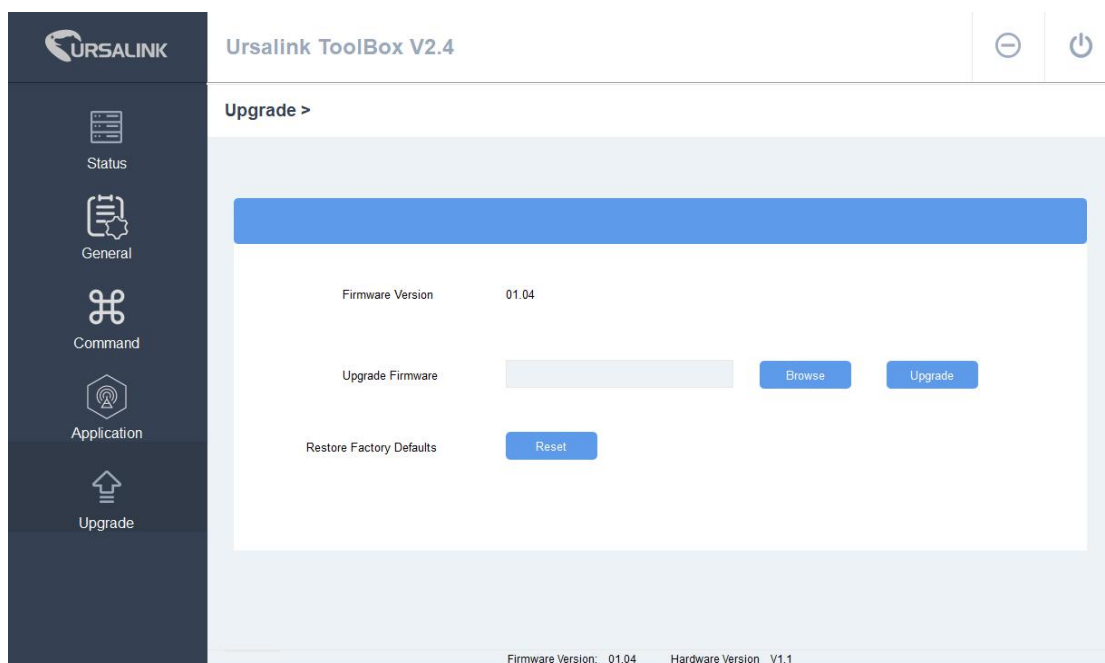
Click "Application" to configure as needed.



Basic Settings		
Item	Description	Default
Application Mode	Choose the control method.	USSD
USSD Prefix	Enter the USSD prefix when using the USSD service. E.g. #469*. Message will be failed to send without the prefix.	Null
Device Control Settings		
Receive SMS Command as Well	Enable this function to allow the device receiving commands via SMS.	Disabled
Control Center Number	The device only accept SMS message from control center.	Null
Successful Setup Confirmation	The device will send a message if the command applied successful.	Enabled
Setup Failure Confirmation	The device will send a message if the command failed to apply.	Disabled
Device Report Settings		
Regular Report Interval	Set the regular report interval, the starttime refers to the time when the device has been powered on. Range: 1-1440	720min
Report Any Changes	The device will send out a status report message if detecting any changes among Input1, Input2, Output1 and Output2.	Disabled

Report by SMS as well	Enable this function to allow the device sending report message via SMS.	Disabled
SMS Messaging Format	Select from "Normal" and "UCP". Normal: The content of SMS report message is in general format. Such as De-Active/Active. UCP: The content of SMS report message is in binary format. Such as 7e061100000000000000000000000007e	Normal
Number	Enter the phone number used for receiving SMS.	Null

4.7 Upgrade



Step 1:

Connect Ursalink Remote I/O Controller to PC via the debug port.

Step 2:

Power on the Ursalink Remote I/O Controller.

Step 3:

Run the Ursalink Toolbox, go to "Upgrade".

Step 4:

Click "Browse" and select the correct firmware file from the PC.

Step 5:

Click "Upgrade" and the device will check if the firmware file is correct. If it's correct, the firmware will be imported to the device, and the device will restart after upgrading is completed.

Note: Any operation on Ursalink Toolbox is not allowed during upgrading, otherwise the upgrading will be interrupted, or even the device will break down.

Click "Reset", and the device will restore to the factory default settings.

5. Application Examples

5.1 Periodic Status Report

Configuration:

Using the ToolBox, we create a behaviour statement that displays as follows:

IF

Then

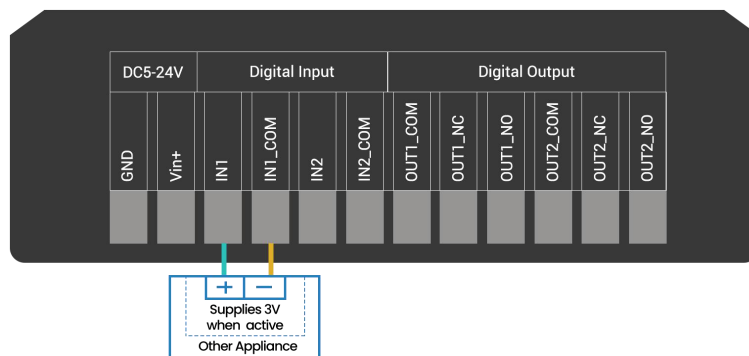
The Ursalink Remote I/O Controller will send a status message at 8 a.m. every Monday.

5.2 Monitoring Alarm

In this case we need to monitor an alarm sensor, such as a manhole covers sensor or a water pressure sensor, the Ursalink Remote I/O Controller will send out a message when any alarm occurs.

Hardware:

We connect the alarm output (12V signal that drives the siren) to one of the device's inputs. The positive wire from the alarm panel is connected to the IN1 terminal, and the negative wire is connected to IN1_COM.



Software:

IF goes active(trigger on rising edge)
 is continued for s
 Set lockout time

Then content is

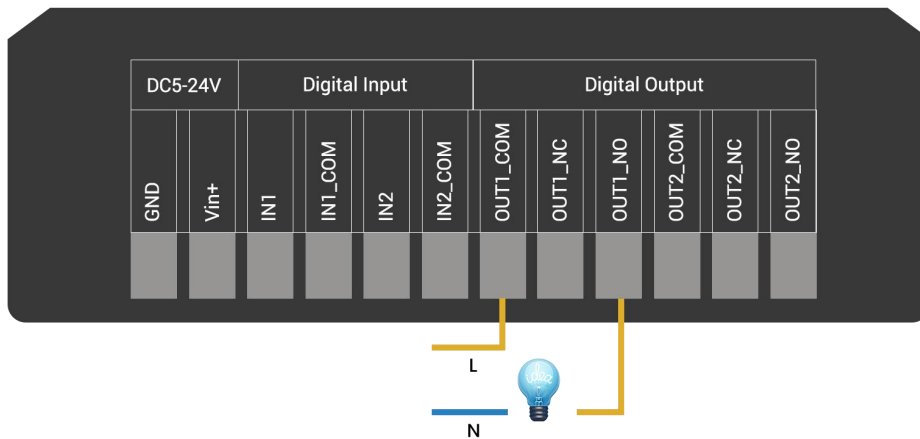
5.3 Control Appliances

5.3.1 Control a Bulb by Sending a Message

In this case we need to turn on or off a 220 V light bulb via a suitable SMS/USSD message.

Hardware:

We connect light bulb to a 220V power source via the output 1 contact on the Ursalink Remote I/O Controller.



Software:

IF containing

Then will be activate
 Delay Time s Duration s

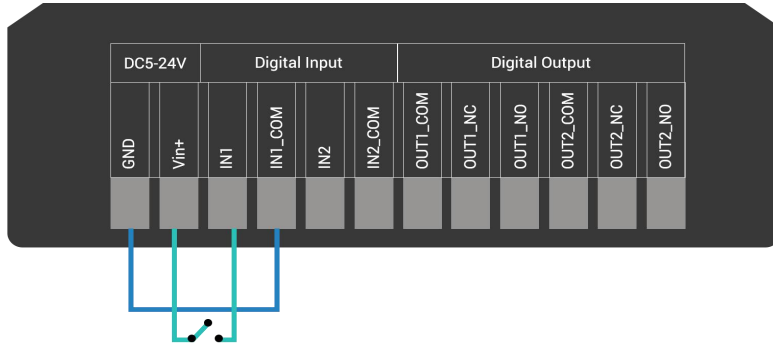
5.3.2 Remotely Control a Door with a Local Button

In this case we need to open the door remotely with a local switch button. We need to deploy

two Ursalink Remote I/O Controllers, one is connected to the button, and the other is connected to the door.

Configuration for one Ursalink Controller that connects to the button

Hardware:



Software:

IF goes active(trigger on rising edge)

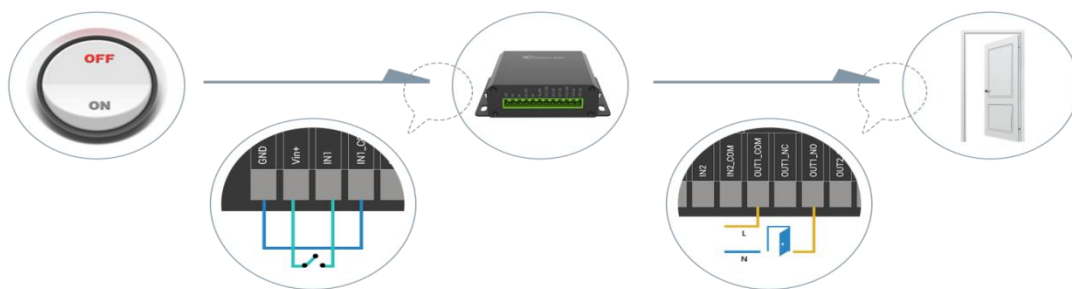
is continued for s

Set lockout time

Then content is

Configuration for the one Ursalink Controller that connects to the door

Hardware:



Software:

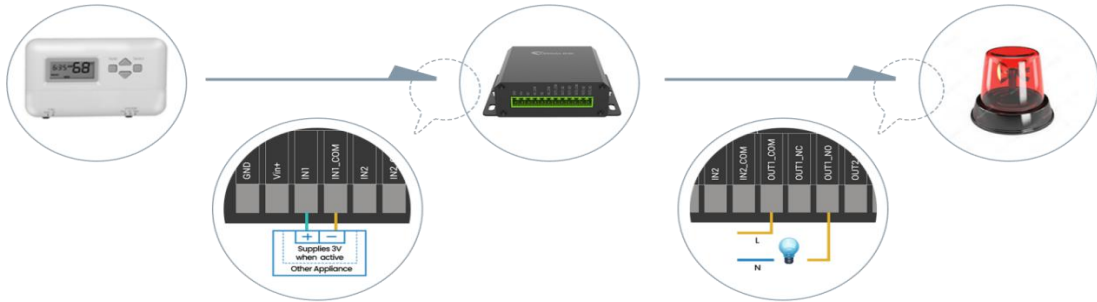
IF containing

Then will be activate

Delay Time s Duration s

5.3.3 Send an Alert When Overtemperature Occurs

Hardware:



Software:

IF goes active(trigger on rising edge)

is continued for s

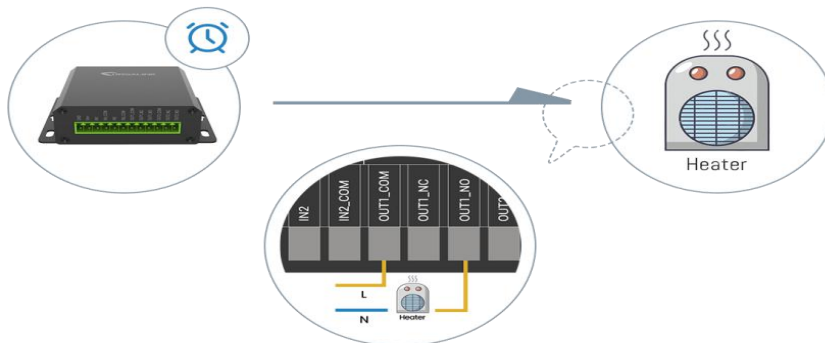
Set lockout time

Then will be activate

Delay Time s Duration s

5.3.4 Turn on the Heater Regularly

Hardware:



Software:

IF Time
Every Day
08:00

Then Output1
will be activate

Delay Time
Duration

-END-