1. CONTENTS

2. SAFETY PRECAUTIONS

Incorrect handling or installation of the unit may result in injury to personnel as well as damage to the unit or other equipment associated with the system.

Read the manual carefully prior to connecting the unit. Follow all installation and maintenance instructions throughout the unit's working life. Pay special attention to the installation standards of the National Electrical Code.

Do not use the device without the cover on.

Aonchip recommends using the original cables and accessories that are supplied with the device.

3. OVERVIEW

The RemoteControl is a smart electrical controller which in combination with a contactor is able to manage pumps, electrical motors and any kind of loads powered up to 480Vac. The RemoteControl switch the outputs according to a schedule defined by the user or according to the forced output command.

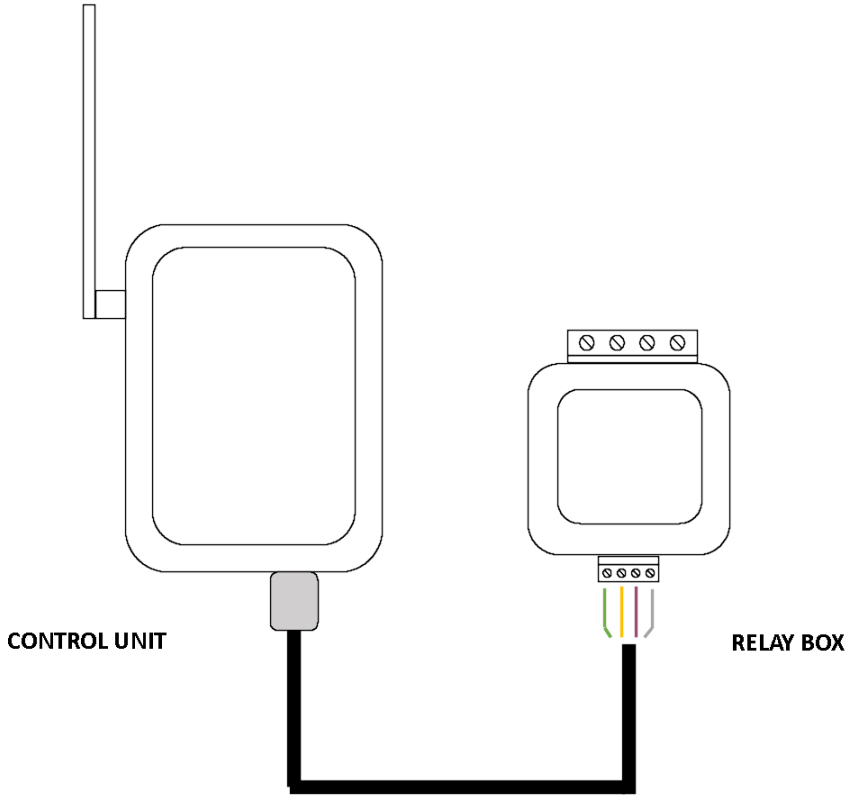


Figure 1.RemoteControl external appearance

The RemoteControl is composed by 2 modules

- Relay Box. This module contains the output relays to switch the electrical loads.
- Control Unit. This module performs the control of the outputs and handles the communication based on LoRaWAN protocol. The unit allows remote changes in settings and in outputs status.

LoRaWAN is a very extended internet of things (IOT) protocol, so it is possible to integrate the RemoteControl in many platforms to get and manage the data from the device.

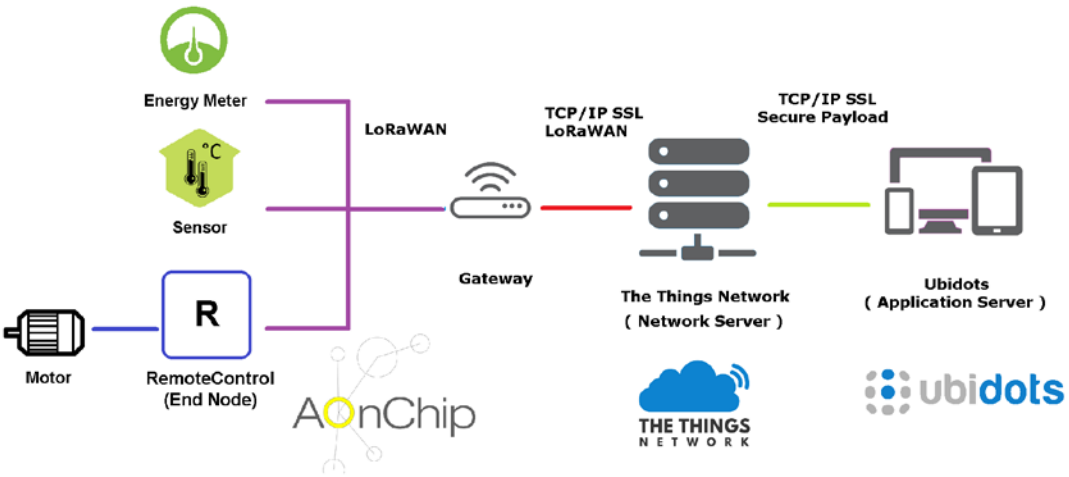


Figure 2. Example of RemoteControl integration in a LoRaWAN ecosystem

The RemoteControl is also provided with NFC technology. It means the commissioning process can be carried out in an easy and safe way through any smartphone with NFC technology and using the app RemoteControl Tool.

Figure 3. Status and configuration parameters can be obtained using the NFC technology in smartphones and RemoteControl Tool app

4. INSTALLATION

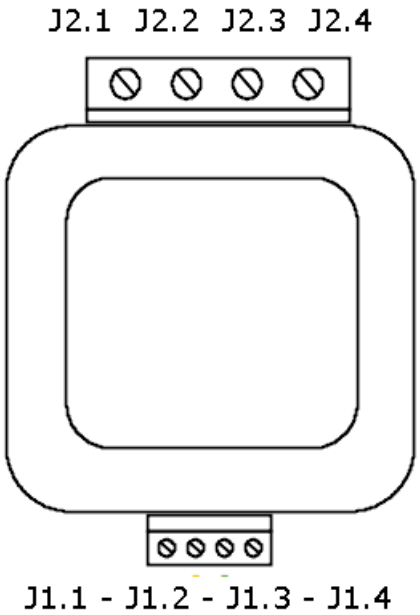
4.1. Relay Box connectors

Connector J2

Relay outputs to connecto to contactor

J2.1 - J2.2 - Stop output (N.C)

J2.3 - J2.4 - Start output (N.O)



Connector J1

Relay coils

J1.1 - J1.2 - Stop relay coil (green - yellow)

J1.3 - J1.4 - Start relay coil (brown - grey)

Figure 4. Detail of the connectors in the Relay Box

4.2. Connecting Relay Box with the electrical circuit

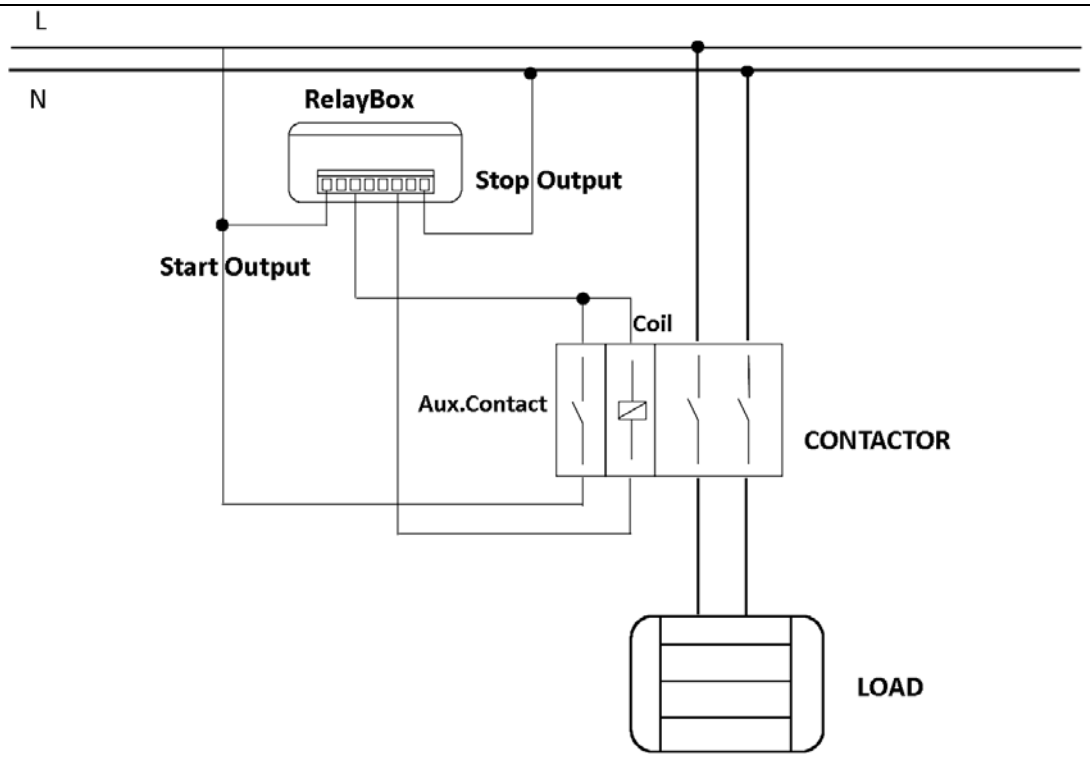


Figure 5. Connection of the relay box with the rest of the circuit

4.3. Electrical diagram

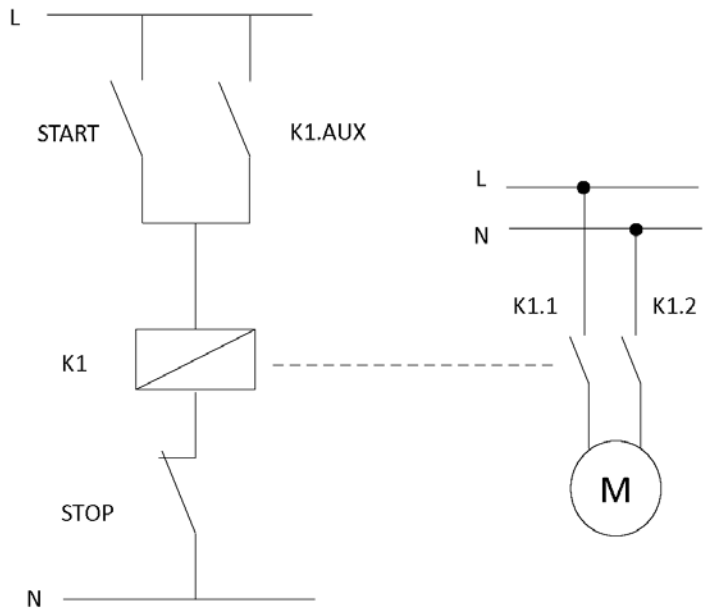


Figure 6.Electrical diagram of the RemoteControl + Contactor+ Load

5. COMMISSIONING

First step is configure the equipment to register it in the LoRaWAN network and define

the activation schedule. By default LoRaWAN communication and activation timetable are the values used during manufacturing process to guarantee RemoteControl works correctly for delivering to final customer.
It is possible to modify the default values via any smartphone with NFC communication. Tapping the cellular over the front of the housing the values can be read and modified with application RemoteControl Tool.

NOTE 1
NFC communication is very selective. It means the NFC antennas of the smartphone and the RemoteControl must be aligned. Please check the position of the NFC antenna in smartphone to find the best match position. The figure below shows the position of the NFC antenna in RemoteControl.

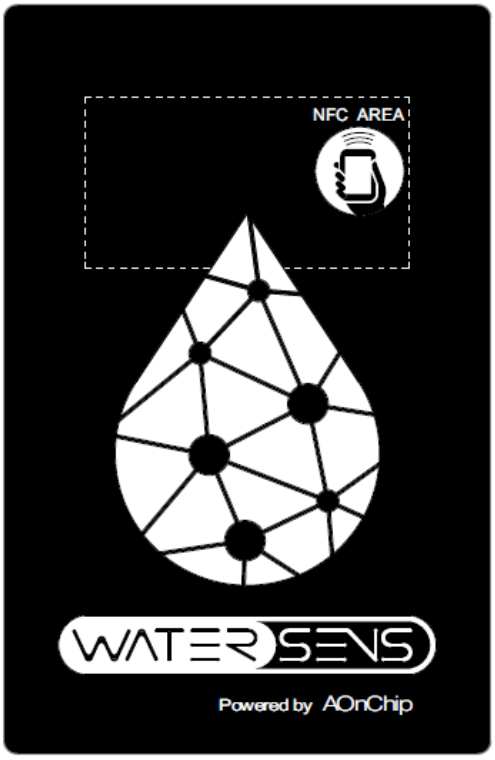


Figure 7. NFC antenna location - white dotted rectangle

NOTE 2

After manufacturing process RemoteControl is programmed in a deep sleep special mode. To wake up the RemoteControl from this mode only it is possible applying a NFC field (e.g. reading status or configuration via smartphone with RemoteControl Tool application). If this action is not performed, RemoteControl will remain without activity.

5.1. Understanding RemoteControl LoRaWAN profile class

RemoteControl can be integrated in a LoRaWAN network as a class A device. It means the device implement a bi-directional communication profile in which the data sent by

server only can be received by the node after performing an uplink transmission. Is in this moment when the node open two short downlink receive windows as it is shown in the figure below.

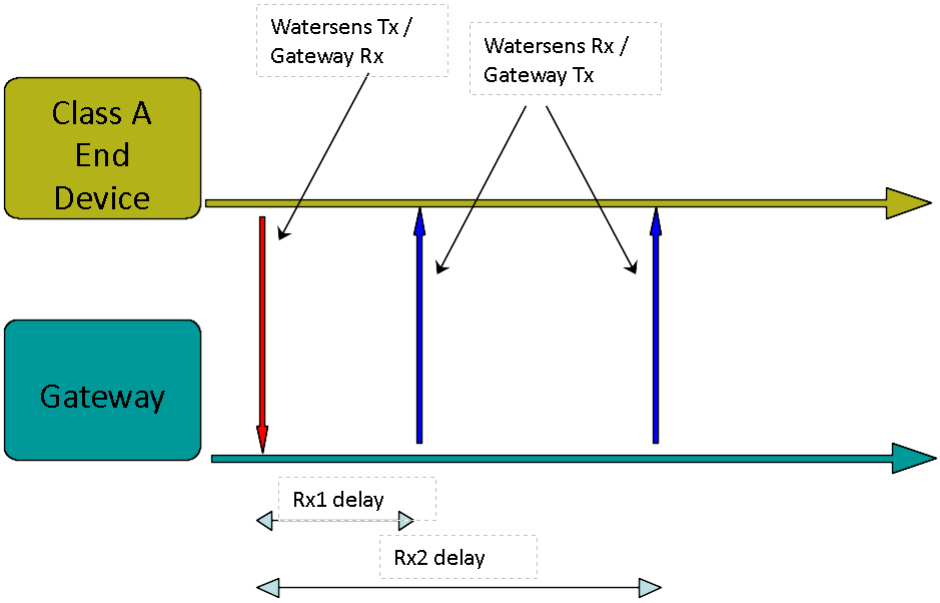


Figure 8. Uplink & Downlink diagram for a class A end device

This communication profile is the best option to preserve the battery life as it is the profile which the quantity of node transmissions are minimal.

Time to send data

The interval to perform each uplink is defined in minutes. The minimum slot time which can be adjusted is 3 minutes and the maximum is when a change in output status is detected (it could be once per day)

Must be taken into account as lower is the time to uplink less will be the battery life expected.

Activation method

RemoteControl can be configured in 2 different methods depending on user preferences (security, band occupancy time, etc)

- **OTAA** (Over The Air Activation Method). RemoteControl receive a device address and an authorization token from which to derive sessions keys in combination with AppKey parameter after sending a JOIN request to the server. This method provide high level of security.
- **ABP** (Activation By Personalization). Sessions keys and device network address are predefined. RemoteControl doesn't send a JOIN request to server but the security level is lower than OTAA method.

Application EUI (AppEUI)

This parameter is used in OTAA method. It identifies the application during JOIN request. The length is 8 bytes.

Application KEY (AppKey)
This parameter is used in OTAA method. It encrypts data during the JOIN request. The length is 16 bytes.

Device Address (DevAddr)
This parameter is used in ABP method. It is the address in the Lora Network. The length is 4 bytes

Device EUI (DevEUI)
This parameter is used in ABP and OTAA method. The value cannot be modified (predefined in factory) and it is used to identify the device in Lora Network (it's unique for each device). The length is 8 bytes

Application Session Key (AppSKey)
This parameter is obtained automatically in OTAA mode, but must be defined by user in ABP mode. The Application Session Key encrypts data during transmission and other applications which can access to the network cannot see the content of messages. The length is 16 bytes.

Network Session Key (NwkSKey)
This parameter is obtained automatically in OTAA mode, but must be defined by user in ABP mode. The Network Session Key encrypts data during transmission and other networks cannot see the content of messages. The length is 16 bytes.

Adaptive Rate
Data rate can be adapted automatically by the network (AUTO) or can be adjusted in a fix value by the user (OFF).

Data Rate
This parameter is the speed at data which is transferred. It can be adjusted by user if adaptive rate is configured as OFF.
Depending on the region (EU868, US915, AU915 or AS923) the data rate takes different values.

EU868 and AS923 regions

DataRate	Configuration	Indicative physical bit rate [bit/s]
0	SF12 / 125kHz	250
1	SF11 / 125kHz	440
2	SF10 / 125kHz	980
3	SF9 / 125kHz	1760
4	SF8 / 125kHz	3125
5	SF7/125kHz	5470

6	SF7 / 250kHz	11000

US915 region

DataRate	Configuration	Indicative physical bit rate [bit/s]
0	SF10 / 125kHz	250
1	SF9 / 125kHz	440
2	SF8 / 125kHz	980
3	SF7 / 125kHz	1760
4	SF8 / 500kHz	3125
5:7	RFU	
8	SF12 / 500kHz	980
9	SF11 / 500kHz	1760
10	SF10 / 500kHz	3900
11	SF9 / 500kHz	7000
12	SF8/500kHz	12500
13	SF7 / 500kHz	21900

AU915 region

DataRate	Configuration	Indicative physical bit rate [bit/s]
0	SF12 / 125kHz	250
1	SF11 / 125kHz	440
2	SF10 / 125kHz	980
3	SF9 / 125kHz	1760
4	SF8 / 125kHz	3125
5	SF7 / 125kHz	5470
6	SF8 / 500kHz	12500
7	RFU	
8	SF12 / 500kHz	980
9	SF11 / 500kHz	1760
10	SF10 / 500kHz	3900
11	SF9 / 500kHz	7000
12	SF8/500kHz	12500

13	SF7 / 500kHz	21900
14:15	RFU	

Tx Power

This parameter refers to EIRP (Equivalent Isotropically Radiated Power). The output power can be adjusted according to tables below depending on the region (EU868, US915, AU915 or US923).

EU868 and AS923 regions

TXPower	Configuration (EIRP)
0	Max EIRP
1	Max EIRP - 2dB
2	Max EIRP - 4dB
3	Max EIRP - 6dB
4	Max EIRP - 8dB
5	Max EIRP - 10dB
6	Max EIRP - 12dB
7	Max EIRP - 14dB

(*) By default Max EIRP is +16 dBm

US915 and AU915 regions

TXPower	Configuration (conducted power)
0	Max ERP
1	Max ERP - 2dB
2	Max ERP - 4dB
3	Max ERP - 6dB
4	Max ERP - 8dB
5	Max ERP - 10dB
6	Max ERP - 12dB
7	Max ERP - 14dB
8	Max ERP - 16dB
9	Max ERP - 16dB
10	Max ERP - 10dB

(*) By default Max ERP is +20 dBm

Tx Port
RemoteControl port for data transmission. Values from 1 to 223

Rx Port
RemoteControl port for data reception. Values from 1 to 223

5.2. Activation parameters settings

Start and Stop pulse time [ms]
The duration of the intervals for start and stop operations are defined in ms. The default value is 2s and it can be modified from 200ms to 10s. The figures below shows the start and stop sequence for the contacts of the outputs relays.

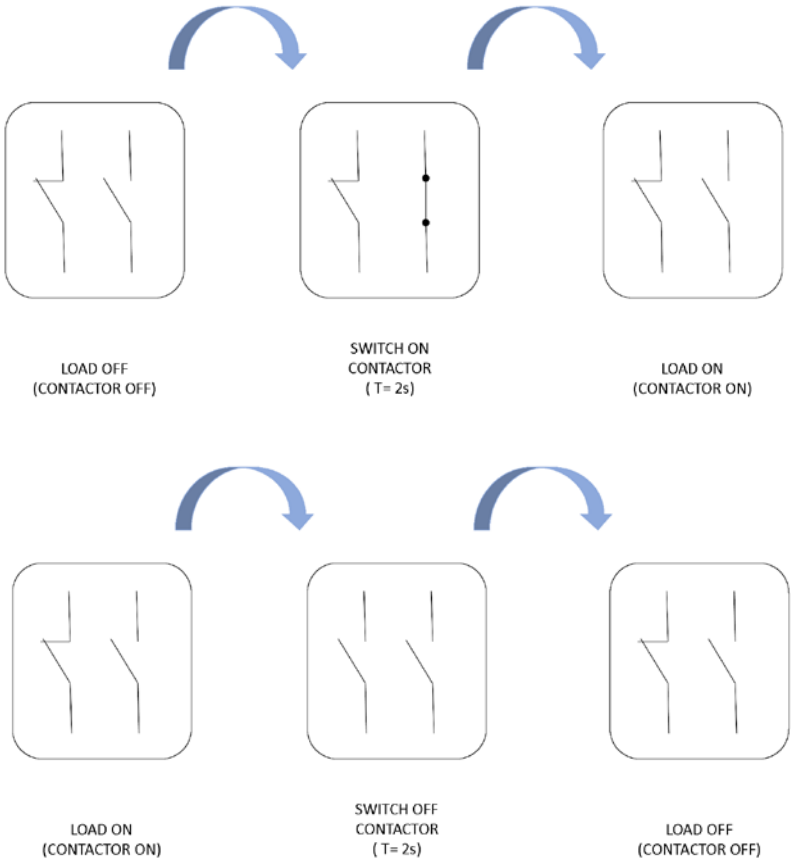


Figure 9. Start and Stop sequence for the output relays

Timetable activation identifier
To reduce the datalength of the communications between endnode and server it is necessary to assign an identification number to the timetable (from 0 to 65535). This parameter will be sent instead of the complete activation plan for each status uplink.

Setting the timetable

The timetable is defined along the day (24h) and it is divided in 15 minutes slots. This is the minimum time to carry out an activation operation. The number of operations is unlimited.

The timetable contains 12 bytes and each one defines an interval time for 2 hours. Bytes are divided in 8 bits and each bit is equivalent to 15 minutes.

Examples

Activation from 00:15 to 00:30 and from 21:00 to 21:45

byte 1	byte 2	byte 3	byte 4	byte 5	byte 6	byte 7	byte 8	byte 9	byte 10	byte 11	byte 12
0x02	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x70	0x00

Activation from 07:00 to 07:30 and from 20:30 to 21:00

byte 1	byte 2	byte 3	byte 4	byte 5	byte 6	byte 7	byte 8	byte 9	byte 10	byte 11	byte 12
0x00	0x00	0x00	0x30	0x00	0x00	0x00	0x00	0x00	0x00	0x0C	0x00

5.3. Checking the setup and establishing first communication

Once the equipment has been installed and the configuration parameters has been programmed according to user requirements, RemoteControl is ready to send and to receive data from server.
In most cases the coverage of the network is unknown and it depends on distance and relative height between node and gateway, the size and the quantity of obstacles in line transmission (as buildings), climatic conditions, etc. To ensure the success of data transmissions is recommended to initialize the RemoteControl communications at minimum data rate and maximum transmission power using the mobile application option «Reset COMs». On other hand configuring «Time slot uplink» at the minimum value (3 minutes) is also recommended to increase the quantity of transmissions performed by the equipment.
If adaptive data rate is configured as auto (network controls the data rate of the RemoteControl) after several communications, server and node will adapt the data rate to the value which the occupation of the band and the power transmission of the node will be lowest. In this case and if it is not necessary, user can modify the «Time slot uplink» to higher value to save energy from battery.

6. OPERATION

RemoteControl is a smart controller to manage electrical loads up to 480 Vac which is powered by batteries. To preserve the battery life, it is very important to reduce the power consumption when equipment is not carrying out any task, therefor the RemoteControl enters in deep sleep mode.
RemoteControl exits from deep sleep mode if internal alarm wakes up the equipment or if it is detected a NFC signal.

6.1. Internal alarm wakeup

RemoteControl wakes up periodically according to the time defined in «Time Slot uplink» with a random time deviation from 0s to +10s. This random time is performed by the control unit to avoid possible collisions for uplinks from other devices units which could send data periodically also.
After waking up RemoteControl carries out several tasks:

- Measures battery voltage
- Measures internal temperature
- Performs an activation operation if it is scheduled according to timetable and updates load operation counter
- Check if it is the end of the day (00:00h) to update in EEPROM counters (frame counters and other internal parameters)

All these tasks takes 30 seconds

6.2. NFC signal detection

When a NFC field is detected, RemoteControl wakes up and checks if it is received any command from mobile application. Commands available are:

- Read status parameters
- Read memory configuration (communication and activation parameters)
- Write memory configuration (communication and activation parameters)
- Time and date synchronization
- Reset communications

When the NFC field disappears RemoteControl enters again in deep sleep mode.

7. DATA FRAME FORMATS

7.1. UPLINK 00 (NODE => SERVER – RemoteControl device status)

byte 1	byte 2	byte 3	byte 4	byte 5	byte 6	byte 7	byte 8	byte 9	byte 10
tt	**bt**	**rr**	**sn**	**st**	**hh**	**mm**	**ss**	**ti_hi**	**ti_lo**

tt. Type of uplink frame (00 - RemoteControl status)

bt. Complex data -> low battery indicator + internal temperature

bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
b	**t**	**t**	**t**	**t**	**t**	**t**	**t**

b - low battery indicator (0-voltage OK / 1- low battery)
tttttt - internal temperature + 40 (range fro -40ºC to +80ºC)

Example 1 - low battery + 35ºC -> 203 (11001011b)

Example 2 - voltage ok + 0ºC ->40 (00101000b)

rr. RSSI of the last link received in dBm data (format signed int)

sn. SNR of the last link received in dB data (format signed int)

st. Load status (0 - Load OFF / 1 - Load ON)

hh. Hour in time format in 24H

mm. Minutes

ss. Seconds

ti_hi-ti_lo. Timetable identification. To avoid long transmissions transferring the timetable, only two bytes are required to know this setting.

Example - ti_hi = 02
ti_lo = 05
table_identifier = 2*256 + 5 = 517

7.2. UPLINK 01 (NODE => SERVER – activation schedule programmed)

byte 1	byte 2	byte 3	byte 4	byte 5	byte 6	byte 7	byte 8
tt	**ti_hi**	**ti_lo**	**sch1**	**sch2**	**sch3**	**sch4**	**sch5**

byte 9	byte 10	byte 11	byte 12	byte 13	byte 14	byte 15
sch6	**sch7**	**sch8**	**sch9**	**sch10**	**sch11**	**sch12**

tt. Type of uplink frame (01 - Update activation schedule)

ti_hi-ti_lo. Timetable identification.

Example - ti_hi = 02
ti_lo = 05
table_identifier = 2*256 + 5 = 517

sch1..sch12. Timetable in bytes:

- Each bit is a slot of 15 minutes.
- Each byte is a slot of 2 hours.

Timetable examples

Activation from 00:15 to 00:30 and from 21:00 to 21:45

byte 4	byte 5	byte 6	byte 7	byte 8	byte 9	byte 10	byte 11	byte 12	byte 13	byte 14	byte 15
0x02	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x70	0x00

Activation from 07:00 to 07:30 and from 20:30 to 21:00

byte 5	byte 6	byte 7	byte 8	byte 9	byte 10	byte 11	byte 12	byte 13	byte 14	byte 15	byte 16
0x00	0x00	0x00	0x30	0x00	0x00	0x00	0x00	0x00	0x00	0x0C	0x00

(*) REMARKS

- Take into account the length of this downlink frame in some regions in combination with low data rate (DR) are not allowed. Example, in US915 for DR0 the maximum payload length is 11. It is necessary a higher DR to send this downlink frame successfuly.

7.3. DOWNLINK 01 (SERVER => NODE – activation schedule to update)

byte 1	byte 2	byte 3	byte 4	byte 5	byte 6	byte 7	byte 8
tt	**ti_hi**	**ti_lo**	**sch1**	**sch2**	**sch3**	**sch4**	**sch5**

byte 9	byte 10	byte 11	byte 12	byte 13	byte 14	byte 15
sch6	**sch7**	**sch8**	**sch9**	**sch10**	**sch11**	**sch12**

tt. Type of downlink frame (01 - Update activation schedule)

ti_hi-ti_lo. Timetable identification.

Example - ti_hi = 00
ti_lo = 03
table_identifier = 0*256 + 3 = 3

sch1..sch12. Timetable in bytes:

- Each bit is a slot of 15 minutes.
- Each byte is a slot of 2 hours.

Timetable examples

Activation from 00:15 to 00:30 and from 21:00 to 21:45

byte 4	byte 5	byte 6	byte 7	byte 8	byte 9	byte 10	byte 11	byte 12	byte 13	byte 14	byte 15
0x02	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x70	0x00

Activation from 07:00 to 08:00 and from 20:00 to 21:00

byte 5	byte 6	byte 7	byte 8	byte 9	byte 10	byte 11	byte 12	byte 13	byte 14	byte 15	byte 16
0x00	0x00	0x00	0xF0	0x00	0x00	0x00	0x00	0x00	0x00	0x0F	0x00

(*) REMARKS

- After receiving the new schedule, it will be applied 3 minutes later

- Take into account the length of this downlink frame in some regions in combination with low data rate (DR) are not allowed. Example, in US915 for DR0 the maximum payload length is 11. It is necessary a higher DR to send this downlink frame successfuly.

7.4. DOWNLINK 02 (SERVER => NODE – Change load status)

byte 1	byte 2
tt	**ex**

tt. Type of downlink frame (02 - Change load status)

ex. (e) Output forced (variable type mask - hi nibble)
0x1X – load status forced
0x0X - load status not forced
(status according to schedule)

(x) Load status (variable type mask - low nibble)
0xX1 - Switch ON load
0xX0 - Switch OFF load

Examples

· Load forced to Switch Off
Frame - 02 10

· Load forced to Switch On
Frame - 02 11

· Load status according to schedule
Frame - 02 00

7.5. DOWNLINK 03 (SERVER => NODE –Configure Uplink period)

byte 1	byte 2	byte 3
tt	**tt_hi**	**tt_lo**

tt. Type of frame (03 - Configure uplink time period)

tt_hi. High part of the value to configure the slot time between uplinks

tt_lo. Low part of the value to configure the slot time between uplinks

Example - configure 180 minutes as slot time between uplinks

time = tt_hi *256 + tt_lo = 180

Payload frame -> 06 00 B4

7.6. DOWNLINK 04 (SERVER => NODE –Configure Time and Date for the RemoteControl)

byte 1	byte 2	byte 3	byte 4	byte 5	byte 6	byte 7	byte 8
tt	**hh**	**mm**	**ss**	**ww**	**dd**	**mn**	**yy**

tt. Link type of configuration (04 - Time and date adjustment)

hh. Hours in format in 24H

mm. Minutes

ss. Seconds

ww. Day of the week
01 – Monday
02 - Tuesday
...
07 –Sunday

dd. Day of the month (1..31)

mn. Month of the year
01 – January
02 – February
...
12 –December

yy. Two last digits of the year (2018 ☐ 18)

7.7. DOWNLINK 05 (SERVER => NODE –Next data request for uplink)

byte 1	byte 2
tt	**nd**

tt. Type of frame (05 - Next data request for uplink)

nd. Data Type for next uplink:

- 00 - RemoteControl status
- 01 - Activation schedule

NOTES

- By default the data sent for each uplink is the device status.
- If user needs other info different from device status, then user must send the next uplink type
- After sending another data (different from device status), the RemoteControl will send again the device status

8. TROUBLESHOOTING

Problem	Cause => Solution
Device doesn't work	· Low battery or defective batteries => Replace batteries · Wrong battery replacement => Ensure battery polarity · RemoteControl in deep sleep mode => Tap the RemoteControl with a smartphone with NFC interface enabled. The device should detect the NFC signal and it should to enter in running mode
Relay outputs do not work according to timetable	· Wrong activation parameters configured => Review timetable, ensure RemoteControl outputs are not in forced mode and check time and date. Verify activation time for contactor is correct. · Wrong relay connection => Check the output relay signals are properly connected to open/close relays (check connections in page 5)
RemoteControl cannot be commissioned by app	· NFC is not enabled in smart phone => Enable NFC communication through settings · Access code has not been entered before any read/write operation => Enter access code and check mobile can read status and configuration parameters
RemoteControl cannot send uplink frames	· Wrong communication parameters configured => Review all RF parameters and apply correct settings. · Data rate and transmission powers are not correct => Configure Data Rate parameter as AUTO and apply a reset in communication module via RemoteControl Tool. This action will initialize communication settings in maximum power transmission and lowest data rate to ensure maximum network coverage

9. MAINTENANCE AND TECHNICAL SERVICE

If the device is going to be switched off for a long time it is recommended to configure the LoRaWAN Parameter Time to update status as 100 (only a transmission when a change status is detected in the relay outputs). In this way the current consumption is minimum and battery life is preserved.

In case of battery replacement, replace them by batteries with same features (voltage, capacity, maximum output current, etc)

9.1. Battery replacement procedure

1. Disconnect Control Unit from the Relay Box module

2. Remove screws from housing

3. Remove housing from the cover. Be careful with internal antenna cable and wire connectors

4. Remove old batteries from holders and put new batteries

5. Make all connections and ensure all well done.

6. Ensure the O-ring is placed correctly to avoid humidity inside the housing in wet environments.

7. Fit the housing and the cover and screw them

8. Date and time were lost. Configure time and date through downlink frame time and date setup or via NFC with RemoteControl app (select synchronize date-time)

10. TECHNICAL FEATURES

Power supply	
Type	2x Type C battery
Voltage	3.6V
Maximum pulse current	2500mA
Capacity	2x 6000mAh
Expected battery life	10 years (*)

(*) Conditions:

- 2 activation operations per day
- Data Rate 0 (SF12) TxPower 0 in EU868 band

Environmental features	
Operating temperature	-10ºC...+50ºC
Storage temperature	-20ºC...+60ºC
Air humidity	15...+90 %rH non-condensing

Mechanical features	
Dimensions (WHD)	110x150x40mm (without antenna)
Weight	320g
IP class	Control Unit - IP67 Relay Box Unit - IP30
Housing material	ABS UL94 V-0

LoRaWAN communication	
LoRaWAN Specification	v1.0.2 (with Regional Parameters v1.0.2rB)
End device type	Class A
Frequency	EU863-870MHz ISM Band US902-928MHz ISM Band AU915-928MHz ISM Band AS923MHz ISM Band
Maximum transmit power (dBm)	EU863-870MHz +14dBm US902-928MHz + 20dBm AU915-928MHz + 20dBm AS923MHz +16dBm

Maximum sensitivity (dBm)	-136dBm
Antenna	1/2 Wave Whip SMA connector

NFC communication	
Frequency	13.56MHz
Interface	Passive NFC
Memory access	Read - allowed Write - restringed with password

Internal sensor	
Housing temperature	Range: -20ºC...+60ºC Resolution: 0.5ºC

Output Relay	
Max.switching voltage	480 V AC
Max.switching current	10 A AC
Max.switching power (resistive)	4800 VA (10A 480V AC)
Min. switching load	100mA 5V DC
Dielectric strength (between open contacts)	1500 Vrms for 1 min
Dielectric strength (between contacts and coil)	4000 Vrms for 1 min
Expected life (mechanical)	Min 1x106 (at 180 times/min)
Expected life (electrical)	Min 2x104 (at 10 A / 480 V AC Resistive)
Outputs contacts protection	Varistor (for inductive loads - voltage peaks)

11. PRODUCT REGULATIONS

RemoteControl is a product in conformity with the following directives

RED Directive (2014/53/EU)		
EMC	Emissions EN 301 489-3 V2.1.	Radiated Emissions EN 55032
	Immunity EN 301 489-3 V2.1.	Electrostatic discharges EN61000-4-2 Radiated immunity EN61000-4-3
Radiospectrum efficiency	Short Range Devices operating on 25MHz to 1000MHz EN 300 220-2 V3.1.1	Radiated spurious
	Short Range Devices operating on 9kHz to 30MHz EN 300 330 V2.1.1	Radiated spurious (<30MHz) Permitted range of operating frequencies Operating frequency ranges Modulation bandwidth Transmitter H-filed requirements
RoHS Directive (2011/65/EU)		
	Evaluation EN50581	

12. TRADEMARKS

All referenced brands, product names, services names and trademarks are the property of their respective owners.

13. GUARANTEE

AONCHIP guarantees its products against any manufacturing defect for two years after the delivery of the units.

AONCHIP will repair or replace any defective factory product returned during the guarantee period.

Pay attention

• No returns will be accepted and no unit will be repaired or replaced if it is not attached a report indicating the defect detected or the reason for the return.

•The guarantee will be void if the units has been improperly used or the storage, installation and maintenance instructions listed in this manual have not been followed. “Improper usage” is defined as any operating or storage condition not allowed in the national electrical code or that overcomes the limits indicated in the technical and environmental features of this manual.

• AONCHIP accepts no liability due to the possible damage to the unit or other parts of the installation, nor will it cover any possible sanctions derived from a possible failure, improper installation or “improper usage” of the unit. Consequently, this guarantee does not apply to failures as: - Excessive temperatures; - Improper installation and/or lack of maintenance; - Buyer repairs or modifications without the manufacturer’s authorization.

14. DOCUMENT HISTORY

Rev.	Date	Changes
A	05-Aug-2019	First edition

15. CONTACT INFORMATION

For more information, please visit: http://www.aonchip.com
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