

## Autonomous measuring and switching device ROSSMA® IIOT-AMS TILT COUNTER Ex

Switching device ROSSMA IIOT-AMS Tilt Counter registers the slope of the switching device casing to an angle more than 15 degrees and performs slope counting. The switching device operates in autonomous mode and provides wireless communication in LoRaWAN or NB-IoT network.



Designed for operation with devices and mechanisms, where it is necessary to check the presence of swing (slope) of movable parts.

The composition has two sensitive elements for slope recording.

The switching device can be used in industrial enterprises, infrastructure of housing and communal facilities, in hard-to-reach places (wells, basements). The switching device gives a possibility to install control measuring instruments in places with no power supply, operates in difficult climatic and weather conditions.

### Features

The switching device is supplied with a 3.6 V power supply.

The power cell of the ROSSMA IIOT-AMS TILT COUNTER switching device is a built-in battery with capacity of 1200/6000/9000/14000/19000/20000 mAh, designed for a service life of up to 10 years when counting readings and transmitting data once a day.

### DATA COLLECTION AND TRANSMISSION ALGORITHM

Counting and summing of tilts number is performed constantly. The package with the counted data is transmitted in wireless network with 1 minute period (it is not recommended to set the discreteness less than 1 minute for a long autonomous operation mode). The read data are stored in the switching device memory.

Data transmission period is configured using special commands in wireless network. By default, the manufacturer sets the data transmission discreteness to 1 time per 15 minutes. The data is transmitted according to the specified timer, which is installed in the internal memory of the switching device.

The switching device is powered by a built-in 3.6 V power supply. 20A/h cell capacity designed for 10 years.

When Prompt for Confirmation option is disabled, the switching device sends the current data to the network with the specified discreteness. There is no package delivery check in this mode. There are no untransmitted packages in the switching device memory.

The switching device communication time is controlled by LoRaWAN network server and can be set by command.

## **FUNCTIONALITY**

The switching device is designed for operation with devices and mechanisms, where it is necessary to monitor the presence of movable parts tilts (slope).

The switching device is a class A device (according to LoRaWAN classification) and provides the following functionality:

- ADR (Adaptive Data Rate) support
- Wireless adjustable LoRaWAN activation type in the LoRaWAN network - OTAA, APT. By default: AVR
- Adjustable communication period from 1 minute and more (adjusted remotely in LoRaWAN network). By default 1 time/15 minutes
- Support for sending confirmation packages (adjustable)
- Two operating modes "Active" and "Warehouse"
- Measurement of temperature
- Measurement of built in battery charge in %

- Number of sensors for tilt detecting (slope): 2

## TECHNICAL CHARACTERISTICS

### THE MAIN

Number of sensitive sensors	Up to 6 – option (by default- 2)
Range of operating temperatures	-55...+85°C
Built-in temperature sensor	yes (sends data every time you connect)
Charge measurement of the built-in power supply	yes (sends data every time you connect)

### LoRaWAN

Class of LoRaWAN device	A
Frequency plan	RU868, EU868, IN865, AS923, AU915, KR920, US915, KZ865, any (on the basis of EU868)
Activation method in LoRaWAN network	ABP or OTAA (adjustable), by default- ABP
Communication Period	Adjustable in LoRaWAN network, by default - 1 time/15min
LoRa antenna type	internal
Sensitivity	-138 dBm
Radio communication range in dense development	Up to 5 km
Radio communication range in non-urban area	Up to 15 km
Default transmitter power	25 milliwatt (adjustable)

### POWER SUPPLY

Built-in battery capacity	specified when ordering (20 Ah by default)
External power supply capability	yes
Power supply of connected instrumentation from switching device	no

### Housing

<b>Housing dimensions</b>	Depends on battery capacity (3 types)
<b>Housing protection degree</b>	Versions: IP 65 or IP 66+Ex 1ExeIICT4 Gb, IP66
<b>Mounting</b>	The housing has holes for stationary fastening to any surface. The housing can be completed with a plate with for DIN rail adapter(it is specified when ordering).

## Autonomous measuring and switching device ROSSMA® IIOT-AMS ANALOG

The ROSSMA IIOT-AMS ANALOG switching device is intended for independent data measurement from control and measuring devices (CMD) with 4-20 mA current interface and/or with resistive interface pt1000, Ni1000, TK5000, with the subsequent transfer of the obtained data in LoRaWAN® and/or NBiOT network at 860-1000 Mhz range frequencies.

The switching device provides non-volatile operation of control and measuring devices connected to the switching device inputs.

The switching device can be used in industrial enterprises, infrastructure of housing and communal facilities, in hard-to-reach places (wells, basements). The switching device provides the possibility to install control and measuring devices in places with no power supply, operates in difficult climatic and weather conditions.

ROSSMA IIOT-AMS ANALOG switching device provides instrument functionality from the built-in power supply, allowing to install sensors with the switching device in hard-to-reach locations where no power supply is available.

The switching device can have single channel and multichannel modifications. The multichannel modification of the switching device can have up to 8 inputs.



## ROSSMA® IIOT-AMS ANALOG Ex (single channel)



## ROSSMA® IIOT-AMS ANALOG Ex (Multichannel)

The switching device supports two operation modes:

- For operation with active control and measuring devices, which are powered from an external power supply source and outputs an analog signal to the switching device input.
- For operation with passive control and measuring devices, which are powered directly from the switching device and outputs an analog signal to the switching device input.

The switching device is manufactured with an integrated 3.6 V power supply. At the same time, the switching device can be powered using an external DC source with a voltage of 3 to 5 V.

The power cell of the ROSSMA IIOT-AMS ANALOG switching device is a 14000 mAh battery designed for up to 10 years of service life when measuring instrument readings and transmitting data once a day.

### DATA COLLECTION AND TRANSMISSION ALGORITHM

Data are read from a control and measuring device with a configurable period of 1 minute (it is not recommended to set the measurement frequency to less than 1 minute to ensure a long non-volatile mode of operation). The read data are stored in the switching device memory and transmitted at a predetermined discrete session with the LoRaWAN network.

The data transmission period can be configured from 1 minute. By default, the manufacturer sets the data transmission frequency to 1 time/hour.

The data is transmitted on the specified timer, which is installed in the internal memory of the switching device.

The switching device operates from a 3-5V DC power supply or a built-in power supply. The 14A/h power cell capacity is designed for operation life according to the table:

	Data read frequency			
	1 time/min.	1 time/2min.	1 time/10min.	1 time/hour
<b>When connecting passive CMD</b>				
<i>Autonomous operation time of ROSSMA IIOT-AMS Analog</i>	90 days	180 days	300 days	3 years
<b>When connecting active CMD</b>				
<i>Autonomous operation time of ROSSMA IIOT-AMS Analog</i>	110 days	220 days	2,5 years	10 years

If the Request Confirmation parameter is enabled, the switching device will send the next package only after receiving delivery confirmation of the previous package. If you do not receive such an acknowledgement after three replays, the switching device ends the session until the next scheduled session. At the same time, the switching device stores the untransmitted data to the memory. Non-transmitted packages remain in the switching device memory and are sent during the next communication session.

If the Request Confirmation parameter is disabled, the switching device sends the current data to the network with the specified frequency. There is no package delivery check in this mode. Untransferred packages do not remain in the switching device memory.

The communication time of the switching device is controlled by the LoRaWAN network server and can be adjusted by command.

## FUNCTIONALITY

The switching device is designed for operation with the following control and measuring devices:

- Pressure sensors;
- Temperature sensors;
- Level sensors;
- Vibration sensors;
- Gas sensors (gas analysis);
- Luminance sensors;
- Humidity sensors;
- Current and voltage/battery sensors.

The switching device is class A device (LoRaWAN classification) and provides the following functionality:

- Support of both active and passive control and measuring devices;
- ADR (Adaptive Data Rate) support
- Wireless configurable LoRaWAN activation type in LoRaWAN network - OTAA, AVP;
- Configurable communication period from 1 minute and more (configured remotely over LoRaWAN network). The default value is 1 times per hour;
- Support for sending confirmation packages (configurable)
- Two operating modes "Active" and "Warehouse";
- Frequency plan: EU-868\RU-868 (to switch remotely in LoRaWAN network). Default is RU- 868;
- Temperature measurement;
- Measurement of built in battery charge in %.

## TECHNICAL CHARACTERISTICS

### THE MAIN

Analog inputs (current, resistive):	
Single-channel	1
Multichannel	Up to 8 - on-request (default 3)
connection interface	Current loop 4-20 mA or resistance pt1000, Ni1000, TK5000
Operation temperature range	-55...+85°C
Built-in temperature sensor	Yes (sends data every time you connect)
Built-in power supply charge measuring	Yes (sends data every time you connect)

### LoRaWAN

Class of LoRaWAN device	A
Frequency plan	RU868, EU868, IN865, AS923, AU915, KR920, US915, KZ865, any (on the basis of EU868)
Activation method in LoRaWAN network	ABP или OTAA (adjustable)
Communication Period	Adjustable in LoRaWAN network
LoRa antenna type	internal
Sensitivity	-138 dBm
Radio communication range in dense development	Up to 5 km
Radio communication range in non-urban area	Up to 15 km
Default transmitter power	25 milliwatt (adjustable)
Maximum transmitter power	100 milliwatt

### POWER SUPPLY

Built-in battery capacity	14000 mAh
External power supply capability	yes
Power supply of connected instrumentation from switching device	yes

### HOUSING

Housing dimensions	
Housing protection degree	<p>Versions:</p> <p>IP 65</p> <p>1ExeIICT4 Gb, IP66 (for single channel model)</p> <p>0Ex ia IIC T4 Ga, IP66 (for multichannel model)</p> <p>0Ex ia 1ExeIICT4 Gb, IP68 (for multichannel model)</p>
Mounting	<p>The housing has holes for stationary fastening to any surface.</p> <p>The housing can be completed with a plate with for DIN rail adapter(it is specified when ordering).</p> <p>The ROSSMA IIOT-AMS ANALOG (single channel) housing provides attachment directly to the instrument using a coupling with H3B 20x1,5 fitting.</p>



## Switching device ROSSMA® IIOT-AMS Modbus

Switching device ROSSMA IOT-AMS MODBUS is designed to independently poll devices using RS-485 interface with subsequent received data in wireless network LoraWAN. Setting the RS-485 interface and setting the Modbus polling registers is performed using ROSSMA DEVICE CONFIGURATOR software.

The device includes 1 RS-485 input , 1 5V DC output to provide power to external devices and 3 discrete inputs (opto isolated) to obtain additional sensors status with "dry contact" type output ( "seal switch" type protective sensors, water, gas, electric power meters, etc., relays, starters, etc.)



### FUNCTIONALITY

The switching device is designed for operation with the following control and measuring devices

- Controllers of various oil and gas pumping stations: centrifugal pumps, screw pumps, downhole rod pumps, other type of pump station.
- Automatic-frequency control stations;
- Controllers of automated group measure unit for gas measuring in oil, pump stations controllers;
- Controllers of pipeline electrochemical protection;
- Reagent dosing station;
- Units for oil wells purifying;

- Control and measuring instruments with RS-485 interface;
- Any controller with Modbus protocol.

## Features

- Simultaneous operation with up to 64 RS-485, RS-422 devices;
- Simultaneous operation with up to 16 RS-232 devices;
- Control of automatic external devices.

## DATA COLLECTION AND TRANSMISSION ALGORITHM

When the device is turned on, it logs in LoRaWAN network. After registration, it is necessary to use "ROSSMA DEVICE CONFIGURATOR" or using individual commands over LoRaWAN network configure (configure) the RS-485 interface (address, speed, etc.) and set Modbus registers that the device will poll in self-polling mode and send received data packages to the network server with the specified frequency.

List of commands with examples:

opt 8 (Profile Management):

0x01 - Get list of current data requests

Request:

01C1

01 - command

C1 - profile number (available C1 and C2)

Response (short if less than 51 bytes):

210801C10001000101012704

21 - package type (0x21 - response)

08 - request port

01 - request command

C1 - profile number

00 - request number

0100 - First request register

01 - number of registers to request

01 - request number

0127 - First Request Register

04 - number of registers to request response (long if more than 51 bytes):  
210801C11200010001010127040201600103012001040100010501270406010001070  
1270408010001090127040A010001  
21 - package type (0x21 - response)  
08 - request port  
01 - request command  
C1 - profile number  
12 - 4 high bits - package number, 4 low bits - total packages (1 package of  
2)  
00 - request number  
0100 - First Request Register  
01 - number of registers to request  
01 - request number  
0127 - First Request Register  
04 - number of registers to request  
...  
0A - request number  
0100 - First Request Register  
01 - number of registers to request  
210801C1220B0127040C0100010D0127040E0100010F012704100100011  
1012704  
21 - package type (0x21 - response)  
08 - request port  
01 - request command  
C1 - profile number  
22 - 4 high bits - package number, 4 low bits - total packages (2 of 2  
packages)  
0B - request number  
0127 - First Request Register  
04 - number of registers to request  
0C - request number  
0100 - First Request Register  
01 - number of registers to request  
...  
10 - request number  
0127 - First Request Register  
04 - number of registers to request  
0x02 - Set Current Data Request List  
Request:  
02C1000100010101270402086508

02 - command  
C1 - profile number  
00 - request number  
0100 - First Request Register  
01 - number of registers to request  
01 - request number  
0127 - First Request Register  
04 - number of registers to request  
02 - request number  
0865 - First Request Register  
08 - number of registers to request  
Response:  
210802C1010002000300  
21 - package type (0x21 - response)  
08 - request port  
02 - request command  
C1 - profile number  
01 - request number  
00 - result (0 - success, otherwise - error code)  
02 - request number  
00 - result (0 - success, otherwise - error code)  
03 - Request No.  
00 - result (0 - success, otherwise - error code)  
0x03 - Delete all current data requests  
Request:  
03C1  
01 - command  
C1 - profile number (available C1 and C2)  
Response:  
210803C100  
21 - package type (0x21 - response)  
08 - request port  
03 - request command  
C1 - profile number  
00 - result (0 - success, otherwise - error code)  
0x11 - Get set point request list  
Request:  
11C1  
11 - command  
C1 - profile number (available C1 and C2)

Response (short if 51 bytes):

210811C10001000101012704

21 - package type (0x21 - response)

08 - request port

11 - request command

C1 - profile number

00 - request number

0100 - First Query Register

01 - number of registers to request

01 - request number

0127 - First Request Register

04 - number of registers to request

Response (long if more than 51 bytes):

210811C1120001000101012704020160010301200104010001050127040

60100010701270408010001090127040A010001

21 - package type (0x21 - response)

08 - request port

11 - request command

C1 - profile number

12 - 4 high bits - package number, 4 low bits - total packages (1 package of 2)

00 - request number

0100 - First Request Register

01 - number of registers to request

01 - request number

0127 - First Request Register

04 - number of registers to request

...

0A - request number

0100 - First Request Register

01 - number of registers to request

210811C1220B0127040C0100010D0127040E0100010F012704100100011012704

21 - package type (0x21 - response)

08 - request port

11 - request command

C1 - profile number

22 - 4 high bits - package number, 4 low bits - total packages (2 of 2 packages)

0B - request number

0127 - First Request Register  
04 - number of registers to request  
0C - request number  
0100 - First Request Register  
01-number of registers to request  
...  
10 - request number  
0127 - First Request Register  
04 - number of registers to request  
0x12 - Set Preset Value Request List  
Request :  
12C1000100010101270402086508  
12 - command  
C1 - profile number  
00 - request number  
0100 - First Request Register  
01- number of registers to request  
01 - request number  
0127 - First Request Register  
04- number of registers to request  
02 - request number  
0865 - First Request Register  
08 - number of registers to request  
Response:  
210812C1010002000300  
21 - package type (0x21 - response)  
08 - request port  
12 - request command  
C1 - profile number  
01 - request number  
00 - result (0 - success, otherwise - error code)  
02 - request number  
00 - result (0 - success, otherwise - error code)  
03 - Request Number  
00 - result (0 - success, otherwise - error code)  
0x21 - Get parameters 485  
Request:  
21C1  
21 - command  
C1 - profile number (available C1 and C2)

Response:

210821C100002580000000

21 - packet type (0x21 - response)

08 - request port

21 - request command

C1 - profile number

00002580 - port speed (9600)

00 - operation mode (0 - 8 bits, 1 - 9 bits)

00 - parity (0 - no, 1 - EVEN, 2 - ODD)

00 - stop bits (0 - 1 bit, 1 - 0.5 bits, 2 - 2 bits, 3 - 1.5 bits)

0x22 - Set parameters 485

Request:

22C100002580000000

22 - command

C1 - profile number (available C1 and C2)

00002580 - port speed (9600)

00 - operation mode (0 - 8 bits, 1 - 9 bits)

00 - parity (0 - no, 1 - EVEN, 2 - ODD)

00 - stop bits (0 - 1 bit, 1 - 0.5 bits, 2 - 2 bits, 3 - 1.5 bits)

Response:

210822C100

21 - package type (0x21 - response)

08 - request port

22 - request command

C1 - profile number

00 - result (0 - success, otherwise - error code)

0x23 - Get modbus parameters

Request:

23C1

23 - command

C1 - profile number (available C1 and C2)

Response:

210823C1010403061005

21 - package type (0x21 - response)

08 - request port

23 - request command

C1 - profile number

01 - device address

04 - Current data reading function

03 - preset value reading function

06 - 1 preset value recording function  
10 - function of recording several preset value (including double)  
05 - control function  
0x24 - Set modbus parameters

Request:

24c1010403061005

24 - command

C1 - profile number (available C1 and C2)

01 - device address

04 - Current data reading function

03 - preset value reading function

06 - 1 preset value recording function

10 - function of recording several preset values (including double)

05 - control function

Response:

210824C100

21 - package type (0x21 - response)

08 - request port

24 - request command

C1 - profile number

00 - result (0 - success, otherwise - error code)

0xC0 - Save profile to memory

Request:

C0C1

C0 - command

C1 - profile number (available C1 and C2)

Response:

2108C0C100

21 - package type (0x21 - response)

08 - request port

C0 - request command

C1 - profile number

00 - result (0 - success, otherwise - error code)

0xC1 - Reload profile from memory without saving settings

Request:

C1C1

C1 - command

C1 - profile number (available C1 and C2)

Response:

2108C1C100



21 - package type (0x21 - response)  
08 - request port  
C1 - request command  
C1 - profile number  
00 - result (0 - success, otherwise - error code)  
0xCE - Delete profile

Request:

CEC1

CE - Command

C1 - profile number (available C1 and C2)

Response: 2108CEC100

21 - package type (0x21 - response)

08 - request port

CE - request command

C1 - profile number

00 - result (0 - success, otherwise - error code)

Request to request the current data register:

1101000101 (port 3)

where:

0x11: function code

0x0100: address of the first register

0x0101: address of the second register

response:

2103110100000001011234

0x21: response code

0x03: request port

0x11: function code

0x0100: address of the first register

0x0000: first register value

0x0101: address of the second register

0x1234: second register value

in a value for a particular register can be FF01, for example, if there was no response

settings request:

CC (port 1)

response:

2101cc000927c0000927c0c1000100

0x21: response code

0x01: request port

0xCC: function code

0x000927c0: current interval in ms  
 0x000927c0: interval stored in EEPROM in ms  
 0xc1: current devtype  
 0x00: whether confirmed messages are used (0 - no, 1 - yes)  
 0x01: whether full frequency plan is used (0 - no, 1 - yes)  
 0x00: whether JOIN (OTAA) is used (0 - no, 1 - yes)

## TECHNICAL CHARACTERISTICS

### THE MAIN

<b>Connection interface</b>	
	RS-485
	1 5V DC output , 3 "dry contact" type inputs optoisolated
<b>Operation temperature range</b>	-40...+85°C

### LoRaWAN

<b>Class of LoRaWAN device</b>	C
<b>Frequency plan</b>	RU868, EU868, IN865, AS923, AU915, KR920, US915, KZ865, any (on the basis of EU868)
<b>Activation method in LoRaWAN network</b>	ABP или OTAA (adjustable)
<b>Communication Period</b>	Adjustable in LoRaWAN network
<b>LoRa antenna type</b>	internal
<b>Sensitivity</b>	-138 dBm
<b>Radio communication range in dense development</b>	Up to 5 km
<b>Radio communication range in non-urban area</b>	Up to 15 km
<b>Default transmitter power</b>	25 milliwatt (adjustable)
<b>Maximum transmitter power</b>	100 milliwatt

### POWER SUPPLY

	220V AC
--	---------

### HOUSING

<b>Housing dimensions</b>	
<b>Housing protection degree</b>	Versions:  IP 65

**Mounting**

The housing has holes for stationary fastening to any surface.

The housing can be completed with a plate with for DIN rail adapter(it is specified when ordering).

The ROSSMA IIOT-AMS ANALOG (single channel) housing provides attachment directly to the instrument using a coupling with HЭB 20x1,5 fitting.

## Autonomous measuring and switching device ROSSMA® IIOT-AMS Dry Contact

Switching device ROSSMA IOT-AMS DRY CONTACT is designed to track status changes (closed/open) on six (6) inputs and to transmit the inputs status in wireless network LoraWAN.

Sensors (devices) can be connected to the switching device input with a dry contact type output (seal switch type safety sensors, water, gas, electric power meters, etc., relays, starters, etc.). When the status changes on any of the inputs, the switching device sends a data package that indicates which input has a pin closure and which has a pin open. If there are no changes on the inputs, the switching device sends the data package once a day by default (you can change the default connection period using a command in the LoRaWAN network).



### FUNCTIONALITY

- Opening/closing of doors, shutters, valves;
- Control switching on/off of electric installations (electric devices);
- Detection of sensors operation;
- Control of transition processes.

The switching device is class A device (LoRaWAN classification) and provides the following functionality:

- Support of both active and passive control and measuring devices;
- ADR (Adaptive Data Rate) support

- Wireless configurable LoRaWAN activation type in LoRaWAN network - OTAA, ABP;
- Configurable communication period from 1 minute and more (configured remotely over LoRaWAN network). The default value is 1 times per hour;
- Support for sending confirmation packages (configurable)
- Two operating modes "Active" and "Warehouse";
- Frequency plan: EU-868\RU-868 (to switch remotely in LoRaWAN network). Default is RU- 868;
- Temperature measurement;
- Measurement of built in battery charge in %.

## TECHNICAL CHARACTERISTICS

### THE MAIN

<b>inputs (current, resistive):</b>	
<b>channel</b>	6
<b>connection interface</b>	«dry contact»
<b>Operation temperature range</b>	-55...+85°C
<b>Built-in temperature sensor</b>	Yes (sends data every time you connect)
<b>Built-in power supply charge measuring</b>	Yes (sends data every time you connect)

### LoRaWAN

<b>Class of LoRaWAN device</b>	A
<b>Frequency plan</b>	RU868, EU868, IN865, AS923, AU915, KR920, US915, KZ865, any (on the basis of EU868)
<b>Activation method in LoRaWAN network</b>	ABP или OTAA (adjustable)
<b>Communication Period</b>	Adjustable in LoRaWAN network
<b>LoRa antenna type</b>	internal
<b>Sensitivity</b>	-138 dBm
<b>Radio communication range in dense development</b>	Up to 5 km
<b>Radio communication range in non-urban area</b>	Up to 15 km
<b>Default transmitter power</b>	25 milliwatt (adjustable)
<b>Maximum transmitter power</b>	100 milliwatt

### POWER SUPPLY

<b>Built-in battery capacity</b>	14000 mAh
<b>External power supply capability</b>	yes
<b>Power supply of connected instrumentation from switching device</b>	no

## HOUSING

<b>Housing dimensions</b>	
<b>Housing protection degree</b>	<p>Versions:</p> <p>IP 65</p> <p>1ExeIICT4 Gb, IP66 (for single channel model)</p> <p>0Ex ia IIC T4 Ga, IP66 (for multichannel model)</p> <p>0Ex ia 1ExeIICT4 Gb, IP68 (for multichannel model)</p>
<b>Mounting</b>	<p>The housing has holes for stationary fastening to any surface.</p> <p>The housing can be completed with a plate with for DIN rail adapter (it is specified when ordering).</p> <p>The ROSSMA IIOT-AMS ANALOG (single channel) housing provides attachment directly to the instrument using a coupling with HЭB 20x1,5 fitting.</p>

## Autonomous measuring and switching device ROSSMA® IIOT-AMS Dry Contact Relay

ROSSMA IOT-AMS DRY CONTACT RELAY switching device for remote control of power equipment using commands received in LoRaWAN or NB-IoT network and for additional monitoring of 4 discrete inputs status with subsequent transmission of the inputs status in wireless LoRaWAN or NB-IoT network.

Switching device receives commands for relay control (close/open) via LoRaWAN or NB-IoT network. Using relays, it is possible to control lighting, drives, valves, automation systems, etc.

As a part of the device there is in addition 1 5V DC output for providing power supply of external devices and 4 discrete inputs (2 are optoisolated) for receiving additional sensors status with "dry contact" outputs (seal switch security sensors, counters of water, gas, the electric power, etc., relay, actuators, etc.). The switching device can switch on/off the relay not only by command via LoRaWAN or NB-IoT network, but also by changing the status of any input.



### TECHNICAL CHARACTERISTICS

#### THE MAIN

connection interface	
	Power relay (NO, NC)

	1 5V DC output , 4 "dry contact" type inputs 2 are optoisolated
Operation temperature range	-40...+85°C

### LoRaWAN

Class of LoRaWAN device	C
Frequency plan	RU868, EU868, IN865, AS923, AU915, KR920, US915, KZ865, any (on the basis of EU868)
Activation method in LoRaWAN network	ABP или OTAA (adjustable)
Communication Period	Adjustable in LoRaWAN network
LoRa antenna type	internal
Sensitivity	-138 dBm
Radio communication range in dense development	Up to 5 km
Radio communication range in non-urban area	Up to 15 km
Default transmitter power	25 milliwatt (adjustable)
Maximum transmitter power	100 milliwatt

### POWER SUPPLY

	220V AC
--	---------

### HOUSING

Housing dimensions	
Housing protection degree	Versions:  IP 65
Mounting	<p>The housing has holes for stationary fastening to any surface.</p> <p>The housing can be completed with a plate with for DIN rail adapter(it is specified when ordering).</p> <p>The ROSSMA IIOT-AMS ANALOG (single channel) housing provides attachment directly to the instrument using a coupling with HЭВ 20x1,5 fitting.</p>



## Autonomous measuring and switching device ROSSMA® IIOT-AMS 1-Wire

ROSSMA IIOT-AMS 1-WIRE autonomous measuring and switching device is designed to poll digital DS18B20 temperature sensor independently using 1-Wire bus and transmit the received data in LoRaWAN® or NB-IoT network.

The switching device can be used in industrial enterprises, infrastructure of housing and communal facilities, in hard-to-reach places (wells, basements). The switching device provides the possibility to install control and measuring devices in places with no power supply, operates in difficult climatic and weather conditions.

ROSSMA IIOT-AMS 1-WIRE switching device provides instrument functionality from the built-in power supply, allowing to install sensors with the switching device in hard-to-reach locations where no power supply is available.



The switching device is manufactured with a 3.6 V power supply. The power cell of the ROSSMA IIOT-AMS 1-WIRE switching device is a built-in battery with a capacity of 1200/6000/9000/14000/19000 mAh, designed for up to 10 years service life when counting readings and transmitting data once a day.

### DATA COLLECTION AND TRANSMISSION ALGORITHM

Data acquisition via 1-Wire bus is performed discretely according to the specified interval. The package with the received data is transmitted in wireless network with a period of 1 minute (it is not recommended to set the discreteness to less than 1 minute for long-term autonomous operation mode of ). The read data is stored in the switching device memory.

The data transmission period can be configured from 1 minute. By default, the manufacturer sets the data transmission frequency to 1 time/hour. The data is transmitted on the specified timer, which is installed in the internal memory of the switching device.

The switching device is powered by a built-in 3.6V power supply. The capacity of the 13A/h power supply is calculated for the service life according to the table (for example):

	Data read frequency			
	1 time/min.	1 time/2 min.	1time/10 min.	1time/hour
<i>When connecting active CMD</i>				
<i>Autonomous operation time of ROSSMA IIOT-AMS 1-Wire</i>	55 days	110 days	1,5 days	9 days

If the Request Confirmation parameter is disabled, the switching device sends the current data to the network with the specified frequency. There is no package delivery check in this mode. Untransferred packages do not remain in the switching device memory.

The communication time of the switching device is controlled by the LoRaWAN network server and can be adjusted by command.

## FUNCTIONALITY

The switching device is designed for operation with the following control and measuring devices:

- Temperature sensors
- Water leak sensors
- Voltage sensors
- Water and gas pressure sensors

The switching device is class A device (LoRaWAN classification) and provides the following functionality:

- ADR (Adaptive Data Rate) support

- Wireless configurable LoRaWAN activation type in LoRaWAN network - OTAA, ABP. By default: ABP
- Configurable communication period from 1 minute and more (configured remotely over LoRaWAN network). The default value is 1 times per hour
- Support for sending confirmation packages (configurable)
- Two operating modes "Active" and "Warehouse";
- Temperature measurement
- Measurement of built in battery charge in %.
- Number of inputs 1

## TECHNICAL CHARACTERISTICS

### THE MAIN

<b>Connection interface</b>	1-Wire bus
<b>Sensor operating range DS18B20</b>	-55...+125°C
<b>Range of operating temperatures</b>	-55...+85°C
<b>Built-in temperature sensor</b>	Yes (sends data every time you connect)
<b>Built-in power supply charge measuring</b>	Yes (sends data every time you connect)

### LoRaWAN

<b>Class of LoRaWAN device</b>	A
<b>Frequency plan</b>	RU868, EU868, IN865, AS923, AU915, KR920, US915, KZ865, any (on the basis of EU868)
<b>Activation method in LoRaWAN network</b>	ABP или OTAA (adjustable)
<b>Communication Period</b>	Adjustable in LoRaWAN network
<b>LoRa antenna type</b>	internal
<b>Sensitivity</b>	-138 dBm
<b>Radio communication range in dense development</b>	Up to 5 km
<b>Radio communication range in non-urban area</b>	Up to 15 km
<b>Default transmitter power</b>	25 milliwatt (adjustable)

### POWER SUPPLY

<b>Built-in battery capacity</b>	specified when ordering (13000 mAh by default)
<b>External power supply capability</b>	yes
<b>Power supply of connected instrumentation from switching device</b>	no

### HOUSING

<b>Housing dimensions</b>	Depends on battery capacity (3 sizes)
<b>Housing protection degree</b>	Versions:

	IP 65 or IP 66+Ex 1ExeIICT4 Gb, IP66
<b>Mounting</b>	The housing has holes for stationary fastening to any surface. The housing can be completed with a plate with for DIN rail adapter(it is specified when ordering).

## Autonomous measuring and switching device ROSSMA® IIOT-AMS Pulse

ROSSMA IIOT-AMS PULSE switching device is designed for independent pulse counting (including frequency more than 300 Hz) coming from instrumentation and transmission of received data in LoRaWAN® or NBiOT network.

The switching device can be used in industrial enterprises, infrastructure of housing and communal facilities, in hard-to-reach places (wells, basements). The switching device provides the possibility to install control and measuring devices in places with no power supply, operates in difficult climatic and weather conditions.

ROSSMA IIOT-AMS PULSE switching device provides instrument functionality from the built-in power supply, allowing to install sensors with the switching device in hard-to-reach locations where no power supply is available.



The switching device is manufactured with a 3.6 V power supply. The power cell of the ROSSMA IIOT-AMS PULSE switching device is a built-in battery with a capacity of 1200/6000/9000/14000/19000 mAh, designed for up to 10 years service life when counting readings and transmitting data once a day.

### DATA COLLECTION AND TRANSMISSION ALGORITHM

Counting and summing of pulses is performed from monitoring and metering instrument continuously. The package with the counted data is

transmitted in the wireless network with a period of 1 minute (it is not recommended to set the frequency less than 1 minute to ensure long autonomous operation). Read data are stored in the switching device memory.

The data transmission period can be configured from 1 minute. By default, the manufacturer sets the data transmission frequency to 1 time/hour. The data is transmitted on the specified timer, which is installed in the internal memory of the switching device.

The switching device is powered by a built-in 3.6V power supply. The capacity of the 9A/h power supply is calculated for the service life according to the table (for example):

	Data read frequency			
	1 time/min.	1 time/2 min.	1time/10 min.	1time/hour
<i>When connecting active CMD</i>				
<i>Autonomous operation time of ROSSMA IIOT-AMS Pulse</i>	55 days	110 days	1,5 days	9 days

If the Request Confirmation parameter is disabled, the switching device sends the current data to the network with the specified frequency. There is no package delivery check in this mode. Untransferred packages do not remain in the switching device memory.

The communication time of the switching device is controlled by the LoRaWAN network server and can be adjusted by command.

## FUNCTIONALITY

The switching device is designed for operation with the following control and measuring devices:

- Operation with liquid, gas, steam meters
- Pulse output of electric meter
- Operation with flowmeters and mass meters

The switching device is class A device (LoRaWAN classification) and provides the following functionality:

- ADR (Adaptive Data Rate) support
- Wireless configurable LoRaWAN activation type in LoRaWAN network - OTAA, ABP. By default: ABP

- Configurable communication period from 1 minute and more (configured remotely over LoRaWAN network). The default value is 1 times per hour
- Support for sending confirmation packages (configurable)
- Two operating modes "Active" and "Warehouse";
- Temperature measurement
- Measurement of built in battery charge in %.
- Number of inputs 6.

## TECHNICAL CHARACTERISTICS

### THE MAIN

<b>Multichannel</b>	Up to 6 – upon request (by default 1)
<b>Connection interface</b>	Pulse (frequency) input
<b>Operation temperature range</b>	-55...+85°C
<b>Built-in temperature sensor</b>	Yes (sends data every time you connect)
<b>Built-in power supply charge measuring</b>	Yes (sends data every time you connect)

### LoRaWAN

<b>Class of LoRaWAN device</b>	A
<b>Frequency plan</b>	RU868, EU868, IN865, AS923, AU915, KR920, US915, KZ865, any (on the basis of EU868)
<b>Activation method in LoRaWAN network</b>	ABP или OTAA (adjustable)
<b>Communication Period</b>	Adjustable in LoRaWAN network
<b>LoRa antenna type</b>	internal
<b>Sensitivity</b>	-138 dBm
<b>Radio communication range in dense development</b>	Up to 5 km
<b>Radio communication range in non-urban area</b>	Up to 15 km
<b>Default transmitter power</b>	25 milliwatt (adjustable)
<b>Maximum transmitter power</b>	100 milliwatt

### POWER SUPPLY

<b>Built-in battery capacity</b>	specified when ordering (9000 mAh by default)
<b>External power supply capability</b>	yes
<b>Power supply of connected instrumentation from switching device</b>	no

### HOUSING

<b>Housing dimensions</b>	Depends on battery capacity (3 sizes) 82 * 80 * 55, 64 * 58 * 35, 80 * 75 * 55
<b>Housing protection degree</b>	Versions: IP 65 or IP 66+Ex (1ExeIICT4 Gb, IP66)
<b>Mounting</b>	The housing has holes for stationary

fastening to any surface.

The housing can be completed with a plate with for DIN rail adapter(it is specified when ordering).



## Autonomous measuring and switching device ROSSMA® IIOT-AMS Smoke Detector

The device is built into the housing of the smoke sensor ИП212-50M manufactured by LLC "RUBEZH" (<http://td.rubezh.ru/products/detail.php?ID=1694>) and is designed to record the change of smoke sensor state and to initialize the communication session with the transmission of the alarm event when switching to the "Fire" mode.

The switching device can be used in industrial enterprises, infrastructure of housing and communal facilities, in hard-to-reach places (wells, basements).



### DATA COLLECTION AND TRANSMISSION ALGORITHM

The device monitors the current state of the smoke sensor and transmits data according to predetermined frequency communication session in LoRaWAN network.

The transmission period of the current state can be set from 1 minute. By default, the manufacturer sets the data transmission frequency to 1time a day.

If the Request Confirmation parameter is enabled, the switching device will send the next package only after receiving delivery confirmation of the previous package. If you do not receive such an acknowledgement after three replays, the switching device ends the session until the next scheduled session. At the same time, the switching device stores the untransmitted data to the memory. Non-transmitted packages remain in the switching device memory and are sent during the next communication session.

If the Request Confirmation parameter is disabled, the switching device sends the current data to the network with the specified frequency. There is

no package delivery check in this mode. Untransferred packages do not remain in the switching device memory.

The communication time of the switching device is controlled by the LoRaWAN network server and can be adjusted by command.

The smoke detector ИП212-50M is powered by 9 V Krona power supply and the switching device is powered by 3.6V power supply.

## FUNCTIONALITY

The switching device can be class A device (according to LoRaWAN classification) and provides the following functionality:

- ADR (Adaptive Data Rate) support
- Wireless configurable LoRaWAN activation type in LoRaWAN network - OTAA, AVP;
- Configurable communication period from 1 minute and more (configured remotely in LoRaWAN network). The default value is 1 time a day;
- Support for sending confirmation packages (configurable)
- Frequency plan: EU-868\RU-868 (to switch remotely in LoRaWAN network). Default is RU- 868;
- Temperature measurement.

## TECHNICAL CHARACTERISTICS

### THE MAIN

<b>Connection interface</b>	<b>To outputs on the ИП212-50M board</b>
<b>Operation temperature range</b>	-10...+55°C
<b>Built-in temperature sensor</b>	Yes (sends data every time you connect)
<b>Built-in power supply charge measuring</b>	Yes (sends data every time you connect)

### LoRaWAN

<b>Class of LoRaWAN device</b>	A
<b>Frequency plan</b>	RU868, EU868, IN865, AS923, AU915, KR920, US915, KZ865, any (on the basis of EU868)
<b>Activation method in LoRaWAN network</b>	ABP или OTAA (adjustable)
<b>Communication Period</b>	Adjustable in LoRaWAN network
<b>LoRa antenna type</b>	internal
<b>Sensitivity</b>	-138 dBm
<b>Radio communication range in dense development</b>	Up to 5 km
<b>Radio communication range in non-urban</b>	Up to 15 km

<b>area</b>	
<b>Default transmitter power</b>	25 milliwatt (adjustable)
<b>Maximum transmitter power</b>	100 milliwatt

**POWER SUPPLY**

<b>Built-in battery</b>	using replaced battery 3.6 V
<b>External power supply capability</b>	yes

## Autonomous measuring and switching device ROSSMA® IIOT-AMS Leak Detector

Switching device ROSSMA IOT-AMS LEAK DETECTOR is designed to send alarm messages in LoraWAN wireless network upon contact of the sensor located on the device housing with liquid (water).



### TECHNICAL CHARACTERISTICS

#### THE MAIN

<b>Connection interface</b>	<b>Dry Contact, Built-in leak sensor</b>
<b>Operation temperature range</b>	+5...+85
<b>Built-in temperature sensor</b>	Yes (sends data every time you connect)
<b>Built-in power supply charge measuring</b>	Yes (sends data every time you connect)

#### LoRaWAN

<b>Class of LoRaWAN device</b>	A
<b>Frequency plan</b>	RU868, EU868, IN865, AS923, AU915, KR920, US915, KZ865, any (on the basis of EU868)
<b>Activation method in LoRaWAN network</b>	ABP or OTAA (adjustable)
<b>Communication Period</b>	Adjustable in LoRaWAN network
<b>LoRa antenna type</b>	internal
<b>Sensitivity</b>	-138 dBm
<b>Radio communication range in dense development</b>	Up to 5 km
<b>Radio communication range in non-urban area</b>	Up to 15 km
<b>Default transmitter power</b>	25 milliwatt (adjustable)
<b>Maximum transmitter power</b>	100 milliwatt

#### POWER SUPPLY

<b>Built-in battery</b>	using replaced battery 3.6 V
<b>External power supply capability</b>	yes

## FEATURES

- Sound alarm when activating (can be switched off)
- Sending message when activating
- Sending messages in duty mode about parameters of working capacity and air temperature
- Constant control of leaks

**BODY:** Indoor

**POWER:** Autonomous, up to 5 years

## Autonomous measuring and switching device ROSSMA® IIOT-AMS Alarm Button

Switching device ROSSMA IOT-AMS ALARM BUTTON is designed to send alarm messages in LoraWAN or NB-IoT wireless network when pressing the button located on the device housing.



### FEATURES

- Sending message when activating
- Sending messages in duty mode about parameters of working capacity and air temperature

### TECHNICAL CHARACTERISTICS

#### THE MAIN

<b>Connection interface</b>	<b>Dry Contact</b>
<b>Operation temperature range</b>	+5...+85
<b>Built-in temperature sensor</b>	Yes (sends data every time you connect)
<b>Built-in power supply charge measuring</b>	Yes (sends data every time you connect)

#### LoRaWAN

<b>Class of LoRaWAN device</b>	A
<b>Frequency plan</b>	RU868, EU868, IN865, AS923, AU915, KR920, US915, KZ865, any (on the basis of EU868)
<b>Activation method in LoRaWAN network</b>	ABP or OTAA (adjustable)
<b>Communication Period</b>	Adjustable in LoRaWAN network
<b>LoRa antenna type</b>	internal
<b>Sensitivity</b>	-138 dBm
<b>Radio communication range in dense development</b>	Up to 5 km
<b>Radio communication range in non-urban area</b>	Up to 15 km

<b>Default transmitter power</b>	25 milliwatt (adjustable)
<b>Maximum transmitter power</b>	100 milliwatt

**POWER SUPPLY**

<b>Built-in battery</b>	using replaced battery 3.6 V
<b>External power supply capability</b>	yes

**BODY: Indoor**

**POWER: Autonomous, up to 5 years**