ROSSMA™

Switching device

ROSSMA IIOT-AMS Tilt Counter

OPERATION MANUAL

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. Designed for operation with devices and mechanisms, where it is necessary to check the presence of movable parts tilt (slope). The switching device operates offline and provides wireless communication in LoRaWAN or NBiOT network.

DATA ON THE DOCUMENT	
Title	Switching device ROSSMA IIOT-AMS TILT COUNTER
Document type	Operation manual
Document code	MAN-RIAP-TC-01
Last revision number and date	13.01.2020

THIS DOCUMENT IS VALID FOR THE FOLLOWING DEVICES

LINE NAME	DEVICE NAME
ROSSMA IIOT-AMS TILT COUNTER	ROSSMA IIOT-AMS TILT COUNTER ROSSMA IIOT-AMS TILT COUNTER Ex

HISTORY OF DOCUMENT EDITION

EDITION №	DATE	COMMENTS
01	13.01.2020	Date of document creation

ОГЛАВЛЕНИЕ

INTRODUCTION ..... ERROR! BOOKMARK NOT DEFINED.

1. DESCRIPTION AND OPERATION PRINCIPLE ..... ERROR! BOOKMARK NOT DEFINED.

SWITCHING DEVICE DESCRIPTION ..... **ERROR! BOOKMARK NOT DEFINED.**
DATA COLLECTION AND TRANSMISSION ALGORITHM ..... **ERROR! BOOKMARK NOT DEFINED.**
FUNCTIONALITY ..... **ERROR! BOOKMARK NOT DEFINED.**
MARKING ..... **ERROR! BOOKMARK NOT DEFINED.**
DATA ON CERTIFICATION ..... **ERROR! BOOKMARK NOT DEFINED.**

2. TECHNICAL CHARACTERISTICS ..... ERROR! BOOKMARK NOT DEFINED.

3. WORKING WITH THE SWITCHING DEVICE ..... ERROR! BOOKMARK NOT DEFINED.

CONTACTS DESCRIPTION ..... **ERROR! BOOKMARK NOT DEFINED.**
INITIAL START-UP ..... **ERROR! BOOKMARK NOT DEFINED.**

4. COMMUNICATIONS PROTOCOL ..... ERROR! BOOKMARK NOT DEFINED.

DATA PACKAGE FORMAT ..... **ERROR! BOOKMARK NOT DEFINED.**
SWITCHING DEVICE CONTROL AND CONFIGURATION ..... **ERROR! BOOKMARK NOT DEFINED.**

5. STORAGE AND TRANSPORTATION RULES ..... ERROR! BOOKMARK NOT DEFINED.

6. DELIVERY SET ..... ERROR! BOOKMARK NOT DEFINED.

7. WARRANTY ..... ERROR! BOOKMARK NOT DEFINED.

INTRODUCTION

This manual applies to ROSSMA IIOT-AMS TILT COUNTER measuring and switching device (hereinafter switching device) produced by ROSSMA LLC and defines installation and connection procedure, as well as control commands and functional description.

The manual is intended for specialists familiar with the installation rules in the field of various electronic and electrical equipment.

To ensure proper functioning, the switching device must be installed and adjusted by qualified personnel.

1. DESCRIPTION AND OPERATION PRINCIPLE

SWITCHING DEVICE DESCRIPTION

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 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 indifficult climatic and weather conditions..

ROSSMA IIOT-AMS TILT COUNTER switching device provides on-board power capability, allowing installation in hard-to-reach locations. It is also possible to connect an external power supply.

The switching deviceis delivered 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 a 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.

WARNING: The switching device is equipped with a built-in power cell - a non-rechargeable lithium-thionyl chloride (LiSOCL2) battery. **Attempts to charge the battery can cause fire!**

DATA COLLECTION AND TRANSMISSION ALGORITHM

Counting and summing of casing 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 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.

Data transmission period is configured by 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 3.6B 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 toLoRaWAN 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 "Aktivež" and "Warehouse"
- Measurement of temperature
- Measurement of built in battery charge in %
- Number of sensors for tilt detecting (slope): 2

MARKING

The switching device marking is made in the form of application on the housing, which contains information on the product name.

There is a label with the device number for its identification from the manufacturer in the housing. This number also serves as ID with the ratings of a particular switching device.

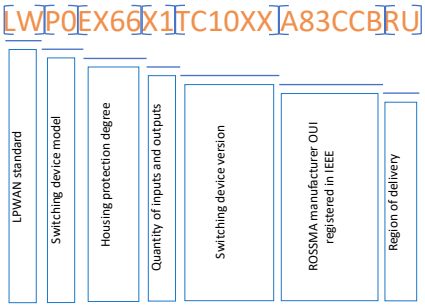
The switching device certificate contains the following information:

- Product name;
- Product version information;
- Keys required to log in the switching device in the network;
- DevEUI;
- Month and year of production.

The label with the device number is located in three places - on the switching device housing, on the electronic board inside the housing and on the packing box (the first digits before the separator: the device number - XXXXXXXXXX).

It is possible to identify the device certificate by the device number in the column "identifier" - the last digits in the number after the separator.

The ID is XXXXXXXXXXXXXXXXXXXXXXXXXX - XXXXXX. The first part of the identifier is the part number and the second part is the serial number of the switching device. Interpretation of part number:



LPWAN standard: LW – LoRaWAN, NB – NbiOT, 6LP-6LoWPAN, LWNB - both standards.
Switching device model ROSSMA IIOT-AMS: AN-Analog, MB-Modbus, MU-Modbus Utility, Pulse-P0, DC-Dry Contact, LD-Leak Detector, SD-Smoke Detector, AB-Alarm Button, CN-Can, UC-Universal Controller.
Degree of enclosure protection: IP56-0056, EX IP66-EX66, EX IP68- EX68,etc.
Number of inputs: X1-single channel, X4-four inputs, etc.
Switching device version: specifies the hardware platform and firmware version.
Manufacturer OUI: Unique identifier of ROSSMA in IEEE.
Region of delivery: RU-Russian Federation, EU-European Union.

DATA ON CERTIFICATION

Manufactured according to УАБИ.001.83301259.2017 ТУ specification.

Certificate of compliance No. РОСС RU.0001.21АВ90

Declaration ЕАЭС N RU Д-RU.АБ93.В.08697 on Compliance with the Technical Regulation Requirements of the Customs Union TP TC 020/2011 "Electromagnetic Compatibility of Technical Means" meets industrial safety requirements. Certificate of conformity NoC-RU.МТЭ.ОС.001.Н.0003

The housing complies with the Technical Regulation Requirements of the Customs Union TP TC 012/2011 "On Equipment Safety for Operation in Explosive Environments"

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

Housing dimensions	Depends on battery capacity (3 types)
Housing protection degree	Versions: IP 56 or IP 66+Ex 1ExeIICT4 Gb, IP66
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).

3. WORKING WITH THE SWITCHING DEVICE

CONTACTS DESCRIPTION

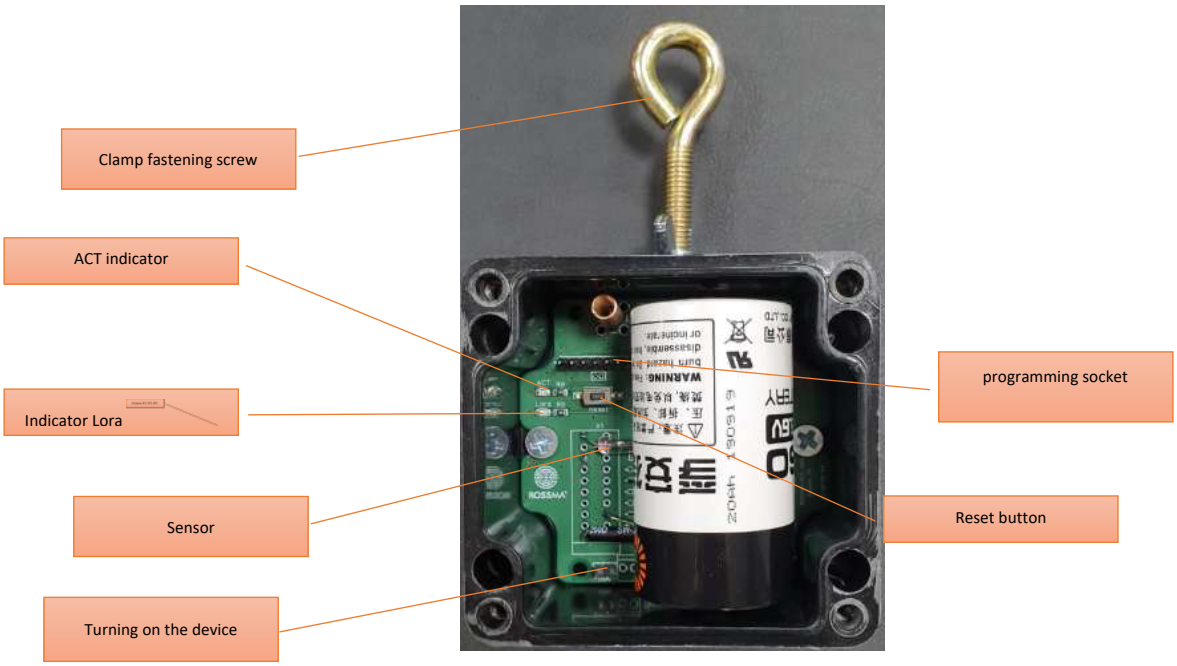


Fig.1 ROSSMA IIOT-AMS TILT COUNTER

Fig.2 ROSSMA IIOT-AMS TILT COUNTER Mounting type for tilt mechanism

INITIAL START-UP

Before using the switching device, you must connect the battery plug to the terminal on the board.

The switching device supports two methods of activation in the LoRaWAN network - ABP and OTAA. By default, the manufacturer sets the activation method to ABP. You can specify one way by using a special command sent to the switching device in LoRaWAN network.

4. COMMUNICATIONS PROTOCOL

DATA PACKAGE FORMAT

Data package format for ROSSMA IIOT-AMS TILT COUNTER :

cc000000000000000000000000000000000000000000000000000000000000000000000000000000
000de110
where:
cc - package type (0xCC = status)
0000 - Number of tilts after data transmission. Sensor 1.
0000 - Number of state changes after data transmission without processing. Sensor 1.
0000000000000000 - Number of tilts. Sensor 1.
0000000000000000 - Number of status changes without processing. Sensor 1.
0000 - Number of tilts after data transmission. Sensor 2.
0000 - Number of state changes after data transmission without processing. Sensor 2.
0000000000000000 - Number of tilts. Sensor 2.
0000000000000000 - Number of status changes without processing. Sensor 2.
0de1 - supply voltage
10 - temperature

SWITCHING DEVICE CONTROLLING AND PROGRAMMING

Port 1 (Controlling the device):
0x02 - The mode of confirmed messages (LoraWAN Confirmed messages on/off)
0x03 - Full frequency range for ABP (device restart required)
0xBB – Version request
Response: bb040400010001
Where:
bb – package type
0404 - Type of device (04 - pulse, 04 - tilt sensor)
0001 – SW verson (v0.1)
0100 – Card version (v1.0)
0xCE - Restart
0xF0 - Communication testing
Response: 2101f0ffa317
Where:
21 – package type (0x21 - response)
01 - Port on which the request was made
F0 - command
ffa3 - rssi (-92)
17 - snr (2.3)
Port 3 (Management of the current data):
0x01 - Change the polling interval for current data before restarting
request, option 1:
01003C
01 - Command
003C – time in seconds (60 s)

request, option 2:
010000003C
01 - Command
0000003C – time in seconds (60 s)
Response is not provided.

0x02 - Change the time of the next connection only
request, option 1:
01003C
01 - Command
003C - time in seconds (60 s)
request, option 2:
010000003C
01 - Command
0000003C - time in seconds (60 s)
Response is not provided.

0x03 - Change polling interval permanently (saved after restart)
request, option 1:
01003C
01 - Command
003C - time in seconds (60 s)
request, option 2:
010000003C
01 - Command
0000003C - time in seconds (60 s)
Response:
21030300
21 – package type (0x21 - Response)
03 – Request port
03 - Command
00 - Result (0 - success, 1 - error)

The switching device is supplied with built-in firmware that enables the switching device to operate with the characteristics specified in this document. The switching device is programmed using a special input for the programmer.
The switching device is configured using special control commands that are sent to the switching device in LoRaWAN network.

5. STORAGE AND TRANSPORTATION RULES

ROSSMA IIOT-AMS switching devices shall be stored in the factory package in heated rooms at temperature from 5 ° C to 40 ° C and with relative humidity not more than 85%.

The switching devices can be transported in covered cargo compartments of all types for any distances at temperature from -40 ° C to 85 ° C.

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6. DELIVERY SET

The standard delivery set of ROSSMA IIOT-AMS TILT COUNTER includes:

- ROSSMA IIOT-AMS TILT COUNTER in factory packaging – 1 pc.
- Certificate - 1 pc.

7. WARRANTY

The warranty period for the switching device is 12 months after the start of operation or 18 months from the date of delivery, whichever of these periods expires earlier (the "Warranty Period").

The Manufacturer will correct (by repair or supply of replacement parts) any defect which will appear in the Goods and which will be reported to the Manufacturer within the Warranty Period.

The manufacturer is obliged to provide repair services or replace the failed switching device within the entire warranty period.

The consumer is obliged to observe the conditions and rules of transportation, storage and operation specified in this user manual.

The Manufacturer shall not be liable for defects caused by normal wear, non-compliance with the Manufacturer's requirements in terms of storage, installation, operation or operating conditions; inadequate usage; any changes or repairs not previously authorized by the Manufacturer in writing.

Warranty is not subject to:

- Switching device power cells that have sent more than 80,000 packages

- switching devices with the mechanical, electric and/or other damages and defects which arose at violation of transportations, storage and operation condition;

- Switching devices with repair traces outside the manufacturer 's service center;

- Switching devices with traces of oxidation or other signs of liquids ingress into the device housing.

If a warranty case occurs, contact the service center of the ROSSMA manufacturer at:

614064, Perm, Chkalova Str., 9 Lit. "И".

Phone: 7 (342) 233-93-99.

Or fill out the form on the support page: https://rossma.ru/support/

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