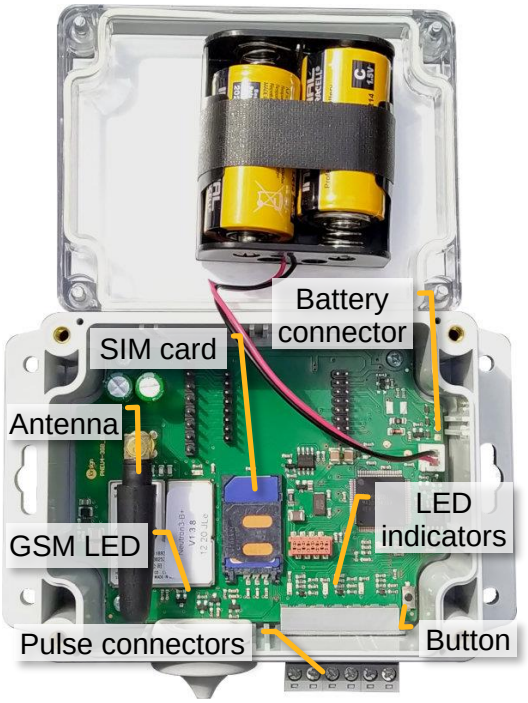
Quick Manual

Neutron3-B+ Remote Pulse Collector

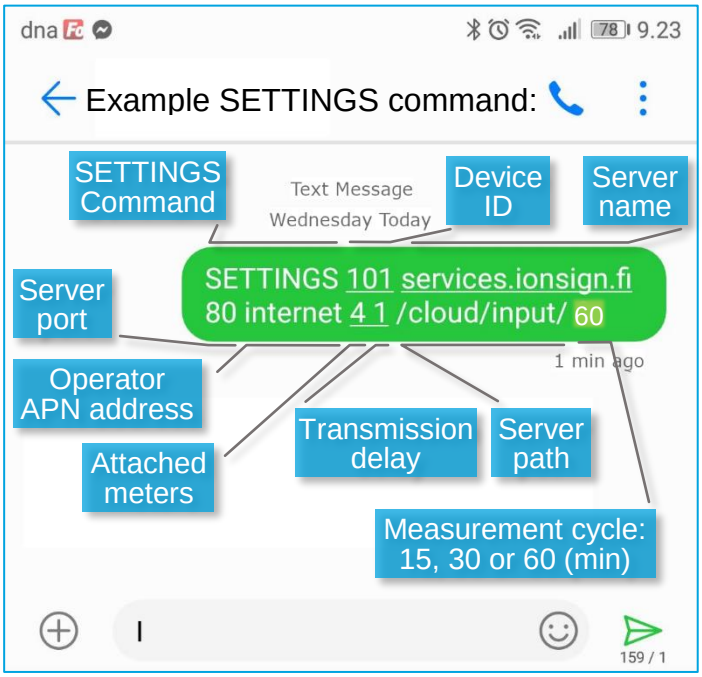


Introducing Neutron3-B:

1. Insert SIM card to its slot, PIN query disabled.
2. Connect the measuring device(s).
3. Insert the battery or remove the battery cover. The red led lights up for 10 seconds.
4. Enter the installation mode by pressing the button inside the device or activating it with a magnet from the outside. The device wakes up for five minutes to receive SMS messages. The red GSM led double blinks when GSM network search is active, and blinks when a GSM connection is established.
5. Send a SETTINGS command to the device as an SMS. When the command is received, the yellow led starts blinking and the device starts to establish a server connection. The yellow led remains lit when the device is in operation.
6. Securely close the lid and mount the device e.g. to a wall.

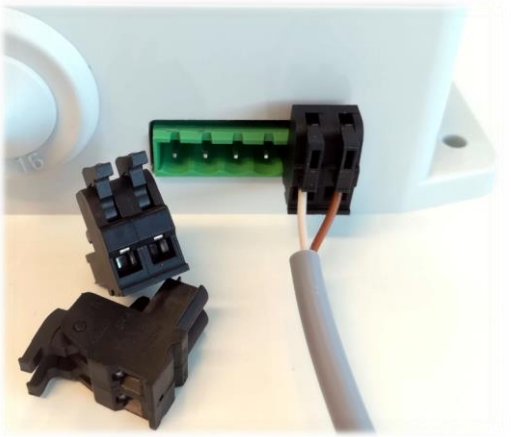
When the installation mode times out, all leds switch off. This is normal.

The below example command sets device 101 to start collecting hourly pulse data and send it to server services.ionsign.fi, path /cloud/input/ and port 80, using internet as APN. Device 101 has 4 inputs and data is sent one minute after 24 readings have been collected. In this case, with hourly data, at 00:01.



Refer to section 4 on the next page to compile your specific SETTINGS command. Always establish your specific SETTINGS parameters from your reseller, service provider or ionSign.

E.g. JAMAK 2x(2+1)x0,5mm2 instrumentation cable can be used between Neutron3-B+ and the meter. Connect the cable to the connector and snap it in place to the terminal block. Cable polarity has no significance.



User's Manual

Neutron3-B+ Remote Pulse Collector

1 General

Neutron3-B+ is a battery operated remote pulse collector for pulsed utility meters, e.g. water or gas meters. Pulses are collected autonomously, stored locally and sent to the server as set up by the user.

2 Indicator lights

Battery life is managed by only powering up the led indicators;

- when the battery is inserted (pulses are not indicated)
- when entering the installation mode
- when sending the daily data package

Yellow led OFF	Device not configured. See SETTINGS
Yellow led ON	Device has settings and is in operation
Yellow led blinks	Device has settings, communicates to server
Green led OFF	Device is not in a GSM network
Green led ON	Device is in a GSM network
Green led blinks	Device has a poor GSM signal quality
GSM led blinks twice	Device is looking for a GSM network
GSM led blinks	Device is in a GSM network
Red led toggles	Device recorded a pulse from a meter

3 Installation mode

The device receives SMS message commands immediately when in installation mode. The installation mode is entered by pressing the button inside the device, or by placing a magnet next to the button outside of the device enclosure.

4 Commands

The device is controlled with SMS messages sent to the SIM card's number. The message is delivered only at the next scheduled data transmission, unless installation mode is activated. Except for the STATUS command, the device doesn't send replies. In the messages, commands and parameters are separated by one space character (␣ in examples).

SETTINGS␣<Device identifier>␣<Server address>␣<Server port>␣<APN>␣<Input count>␣<Transmission delay>␣<Server path>[␣<Step>]

With the SETTINGS command all required parameters for collecting and sending of pulse data are given and logging starts.

Device identifier is a unique device ID. Range: 1-1 000 000.
Server address is the server's IP address or a domain name server name. Maximum length 50 characters.
Server port is the port number where the server application waits for transmissions.
APN is the Access Point Name for the GPRS/3G connection. Your operator provides this. Maximum length 30 characters.
Input count is the number of connected meters. Range: 1-3.
Transmission delay helps to avoid a large number of devices clogging the server with simultaneous transmissions. Range is 0-1000 minutes. With value zero (0) the data is sent immediately when 24 readings have been collected.
Server path is the path in the server where data is saved. Maximum length 50 characters.
Step defines the measurement cycle length, 15, 30 or 60 min. For legacy server interfaces, may be omitted, defaults to 60.

STEP␣*<Time>*

The measurement cycle set using the SETTINGS command can be changed with the STEP command. The ***Time*** parameter defines the cycle length in minutes. Values 15, 30 or 60.

STATUS

The STATUS command has no parameters. The device replies to it with an SMS, including the following general information:

- Device settings validity: [Yes | No] (If Yes, also device ID)
- Data sending to server initialized: [Yes | No]
- Most recent device IP connection initialized: [Yes | No]
- Most recent TCP/IP connection to server: [Yes | No]
- Most recent server reply to device: [No | Success | Error]
- GSM operator name
- GSM signal strength: [dBm value | Unknown]

Signal strength -113 dBm indicates a value of -113 dBm or less. Signal strength -51 dBm indicates a value of -51 dBm or greater.

5 Leak Guard Configuration

The device constantly monitors for leaks, using the configured leak limits. The leak alarm triggers immediately when observed, regardless of scheduled data transmission. Leak Guard is not activated by default, it's activated with the command:

LEAKLIMITS␣<*Channel*>[␣<*Pulse constant*>]

Channel is the measurement channel to be configured, 1, 2 or 3.
Pulse constant of the meter, in pulses/litre. Zero value, "0" inactivates the Leak Guard. If omitted, current settings are returned.

Limit factory settings	Flow, l/h	Span, pulses
1. Seeping leak	1	10
2. Dripping leak	10	100
3. Flowing leak	200	400
4. Burst leak	2000	50

Limits may be changed with the below command. Prior to change, it's a good idea to query the current settings with LEAKLIMITS␣<*Channel*>. All parameters need to be given, also the unchanged.

LEAKLIMITS␣<*Channel*>␣<*Pulse constant*>␣<*Flow-1*>␣<*Flow-2*>␣<*Flow-3*>␣<*Flow-4*>␣<*Span-1*>␣<*Span-2*>␣<*Span-3*>␣<*Span-4*>

Flow-1…4 flow limit for leak guards 1-4.
Span-1…4 minimum duration of this flow as pulses before alarm.

6 Failure recovery

For GSM network failures, the device has a built-in local buffer for keeping collected data stored for later transmission. The buffer capacity is 3 years for hourly data, 18 months for half-hourly data and 9 months for quarterly data, for each channel. When the GSM network resumes service, all buffered data is sent to the server without any need for user intervention. If the GSM signal strength is weak and the device often needs to buffer data, battery life will be shorter than expected.

7 Neutron3-B+ technical specifications

- Inputs: 3 inputs for pulses.
- Replaceable battery.
  - One C cell Li battery: 3,6V 6Ah min 1500mA peak. Compatible types e.g. SAFT LSH14, ULTRALIFE ER26500M and EVE ER26500M. Expected battery life 10 years.
  - Two C cell LR 14 alkaline 1,5V batteries. Expected battery life 6 years.
- Real-time clock.
- Size: WxHxD 145x90x55 mm (flanged PC plastic enclosure).
- Protection class: IP43.
- Operating temperature: -25 °C...+55 °C.
- RH: 5 % - 95 % non-condensing.
- Data communication: Integrated 3G/GSM/GPRS module. Conforming the following directives and standards:
  - R&TTE Directive 1999/5/EC (Radio & Telecommunications Terminal Equipment)
  - Low Voltage Directive 73/23/EEC, Product Safety Directive 89/336/EEC
  - GSM (Radio Spectrum): EN301 511, 3GPP 51.010-1
  - EMC (Electromagnetic Compatibility): EN301 489-1, EN301 489-7
  - LVD (Low Voltage Directive): EN 60 950
- Antenna: internal, SMA connector.

8 Warranty

ionSign grants a warranty of two (2) years for all delivered devices and software services. The warranty starts on the date of the delivery and it covers material and manufacturing defects. The warranty does not cover defects caused by improper use or installation nor does it cover defects caused by factors out of ionSign's control. These would be for instance grid malfunction or service changes of network operators' services. ionSign delivers a new device to replace the defected one, without cost. Alternatively, ionSign may repair the defected device. The defected device must be returned to ionSign, if required, at ionSign's cost. The warranty does not cover dismantling, installation, and introduction costs and the like. ionSign warrants that the provided software essentially manage with their designed tasks, at the time of delivery. All significant software defects are covered by the warranty. The defects will be resolved without unnecessary delay. The resolution may be an instruction to circumvent the defect. If the delivery includes third party products or services, these are only covered by the applicable warranty provided by that third party. Title to the delivered goods transfers to the client, when the invoiced price is paid in full. All immaterial rights related to devices and services remain the property of ionSign. If the service was a design assignment, the client assumes the right to use and further develop the assignment results. ionSign is eligible to use the client's name as a reference in its marketing. ionSign is not eligible to disclose the order details without prior consent. In case of a force majeure, preventing to act according to the purchase agreement, the affected party will start immediate negotiations to assess the effects of the obstacle on the scope and schedule of the purchase agreement. ionSign appropriately backs up client's data residing on its servers. In spite of this, ionSign assumes no responsibility of possible damage due to loss of data. ionSign assumes no responsibility of direct or indirect damage to property or people, nor work or travel expenses, caused by using its services or devices, unless due to gross negligence. ionSign's financial liability is always limited to the value of the delivered goods and services, unless otherwise inflicted by the Finnish law.

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