Quick Guide

Neutron4-3G Remote Pulse Collector

For example JAMAK 2x(2+1)x0,5mm2 instrumentation cable can be used between the meter and Neutron4-3G. The open collector or relay output of a single meter is connected to Neutron4-3G as shown above.

Introducing Neutron4-3G:

1. Insert SIM card to its slot, PIN query disabled.

2. Connect the meter(s), antenna and power supply to the device and plug it to the mains.

3. Within 15 s, the GSM led starts to double blink to indicate the device is looking for network. When connected, the GSM led blinks once in intervals.

4. A lit Signal led indicates a good GSM signal. If it blinks or remains off, try to find a better place for the antenna.

5. Send the **SETTINGS** command; an SMS to the SIM subscriber number. A blinking Stat led indicates a received command and starting to establish the server connection. With a lit Stat led, the device is in operation.

When in operation, the Pulse led toggles between ON/OFF with every pulse received.

Always establish your specific parameters for SETTINGS from your reseller!

APN is operator specific and can usually be found in their web site: Search for "[your operator] APN settings".

The example SETTINGS command on the left 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 3 on the next page** to compile your specific SETTINGS command.*

* Setting "0" for servers that only support hourly data. Ignoring parameter sets 60 minute cycle.
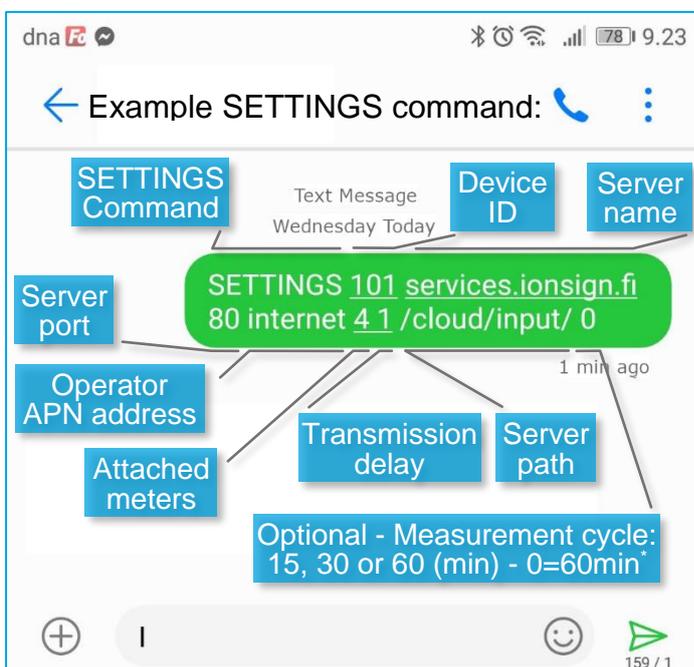
1 General

Neutron4-3G collects and reports pulses from utility consumption meters with a pulse output, e.g. electricity, gas, heat or water meters. Pulses are collected, locally stored and sent to the server as set up by the user.

2 Indicator lights

Stat led is OFF	The device has no settings. Send a SETTINGS command as an SMS
Stat led is ON	The device has settings and is in operation
Stat led blinks	The device has settings and is starting communication to the server
Signal led is OFF	The device is not in the GSM network
Signal led is ON	The device is in the GSM network
Signal led blinks or off	The device has poor GSM signal strength
GSM led double blinks	The device is looking for a GSM network
GSM led blinks	The device is in the GSM network
Pulse led toggles	The device registered an incoming pulse

3 Commands

The device is controlled with SMS messages sent to the SIM card's subscriber number (not serial or IMEI). 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 ID>* ␣*<Server>* ␣*<Port>* ␣*<APN>* ␣*<Inputs>* ␣*<Transmission delay>* ␣*<Path>[*␣*<Step>]*

> With the SETTINGS command all required settings are given and collecting and sending of pulse data is started.
> **Device ID** is a unique device identification. Range is 1-1000000.
> **Server** is the IP address to the server. Also a domain name server (DNS) name can be used. Maximum length is 50 characters.
> **Port** is the port number of server that waits for transmissions.
> **APN** is the Access Point Name of your SIM card operator for the GPRS/3G data connection. Maximum length is 30 characters.
> **Inputs** is the number of connected meters. Range is 1-4.
> **Transmission delay** sets the number of minutes after collecting 24 readings, to make the transmission. The delay can be used to avoid a large number of devices sending pulse data to the server at the same time. Range is 0-1000 minutes. With value zero (0) the data is sent immediately when 24 readings have been collected.
> **Path** is the server folder to save data. Max. length is 50 characters.
> **Step** defines the length of the measurement cycle. If the parameter is omitted, the default value is zero (0). See also STEP command.

STEP ␣*<Time>*

> If only the measurement cycle needs to be changed from the one set using the SETTINGS command, the STEP command is used. The **Time** parameter defines the cycle length in minutes. Values: 0, 15, 30 or 60 minutes.
> - 0: Hourly data, for servers only supporting hourly data.
> - 15: Quarterly data collection and sending.
> - 30: Half-hourly data collection and sending.
> - 60: Hourly data collection and sending.

INTERVAL ␣*<Time>*

> With the INTERVAL command the device can be set to send <u>momentary</u> pulse data, in addition to the hourly, half-hourly or quarterly pulse data. The **Time** parameter defines the interval between consecutive transmissions. Range is 60-65535 seconds. With a zero value (0), momentary data sending is stopped.

SPAN ␣*<Time>*

> With the SPAN command the device can be set to send pulse data collected during a defined <u>time period</u>, in addition to the hourly, half-hourly or quarterly pulse data. The **Time** parameter defines the span length and sending interval. Range is 60-65535 seconds. With a zero value (0), periodical data sending is stopped.

SENDNOW

> With the SENDNOW command the device sends incomplete pulse data to the server immediately. This command has no parameters.

STATUS

> To the STATUS command, the device replies with an SMS of general status information. STATUS command has no parameters.
>
> Status information includes the following:
> - Device settings validity: [Yes | No].
>   (Also device ID, if the device has valid settings).
> - 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 data: [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.

USER ␣*<Username>* ␣*<Password>* / **USER** ␣clear

> The USER command can be used to set user credentials for the APN, if the operator requires them. Command without parameters replies with current settings. 'Clear' parameter erases user settings.

AUTH ␣*<String>*

> With the AUTH command a Base64 encoded string for Basic HTTP authentication can be set. Empty setting disables authentication. The string may have up to 50 characters.

4 Failure recovery

The device has no built-in backup power, so pulses are not collected nor sent during power failures. When power supply resumes however, the device assumes all prior settings and starts collecting and sending data without any need for user intervention. 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, 1,5 years for half-hourly data and 9 months for quarterly data. When the GSM network resumes service, all buffered data is sent to the server without any need for user intervention.

5 Neutron4-3G technical specifications

- Inputs: 4 pulse inputs for open collector or relay outputs of meters. Open collector or relay output sourcing voltage 12 VDC, maximum sourcing current 5mA.
- Operating voltage: 11…13 VDC. 2,5mm DC socket.
- Real-time clock: 4 days backup.
- Size: WxHxD 125 x 51 x 25 mm (flanged ABS plastic enclosure).
- Protection class: IP20.
- Operating temperature: -25 °C...+55 °C.
- RH: 5 % - 95 % non-condensing.
- Local data storage capacity, for each input channel:
  - 3 years for hourly data
  - 1,5 years for half-hourly data
  - 9 months for quarterly data
- Data communication: Integrated GSM/GPRS module. Conforming the following directives and standards:
  - R&TTE Directive 1999/5/EC (Radio Equipment & Telecommunications terminal Equipment)
  - Low Voltage Directive 73/23/EEC and product safety Directive 89/336/EEC for conformity for EMC
  - GSM (Radio Spectrum). Standard: EN 301 511 and 3GPP 51.010-1
  - EMC (Electromagnetic Compatibility). Standards: EN 301 489-1 and EN 301 489-7
  - LVD (Low Voltage Directive) Standards: EN 60 950
- Antenna: external, SMA connector.

6 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.