MIVO

CONFIGURATION OF PULSE COUNTER

OUTDOOR PULSE COUNTER:

Lansen Configurator 0.5.2.0 – 0.5.6.3

OMS® M-Bus wireless

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Introduction

The Lansen outdoor pulse counter transmitter, LAN-WMBUS-O-P, is highly configurable and is used together with wired meters that monitor consumption of, for example, water, gas, electricity, or heat. By using our pulse counter, a wired meter can be turned into a wireless meter.

The device is configured with our Lansen configuration USB-dongle together with our program, Lansen Configurator.

The device is powered by a non-rechargeable and non-replaceable internal battery. Once the battery is depleted, the device must be replaced.

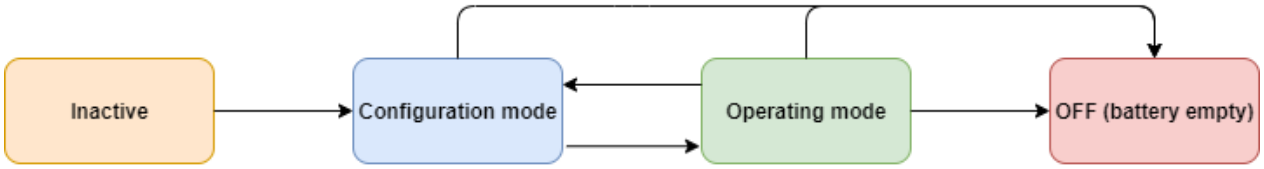
General knowledge

Waking the pulse counter for configuration

To enter this mode, a magnet needs to be held against the device on the LANSEN-label for one second and then removed. The device indicates this with a red LED (only visible if the casing is open) and it will be in this mode for four minutes. During this time, it is possible to configure the device.

Device modes

The device operates in different modes, as illustrated below. Each mode is described in greater detail in coming chapters.



Inactive

The device is idle, the power consumption is minimal, and this is how the device is delivered by Lansen. To power up the device, simply hold a magnet on the casing at the LANSEN-label for 10 seconds and then remove the magnet.

Note: Once a pulse counter has been turned on, it cannot be turned off.

Configuration mode

To enter this mode, a magnet needs to be held against the LANSEN-label on the device for one second and then removed. The device indicates this with a red LED (only visible if casing is open) and it is in this mode for four minutes. During this time, it is possible to configure the device. While the device is in this mode, it will repeatedly send out wMBUS-data packets. When the time is up, the device will go into *Operating mode*.

Note: If the battery is depleted while in this mode, the device will be turned *OFF*.

Operating mode

The device will be in this mode after being in *Configuration mode*. In this mode, the device will perform according to how the device has been configured.

From this mode, there are two options:

- A magnet is held at the device, thus returning is to *Configuration mode*
- The battery is depleted, and the device is turned *OFF*

OFF

The battery is depleted, and the device is turned off. The device is to be removed and disposed of according to local law.

Setup a pulse counter using Lansen Configurator

Our program, *Lansen Configurator*, can be used to configure a pulse counter to fit specific needs. The program can be downloaded from our website, www.lansensystems.com.

The following chapters will describe how to use this tool to connect and configure a pulse counter. Refer to **Figure 1** for an overview for what Lansen Configurator looks like at startup.

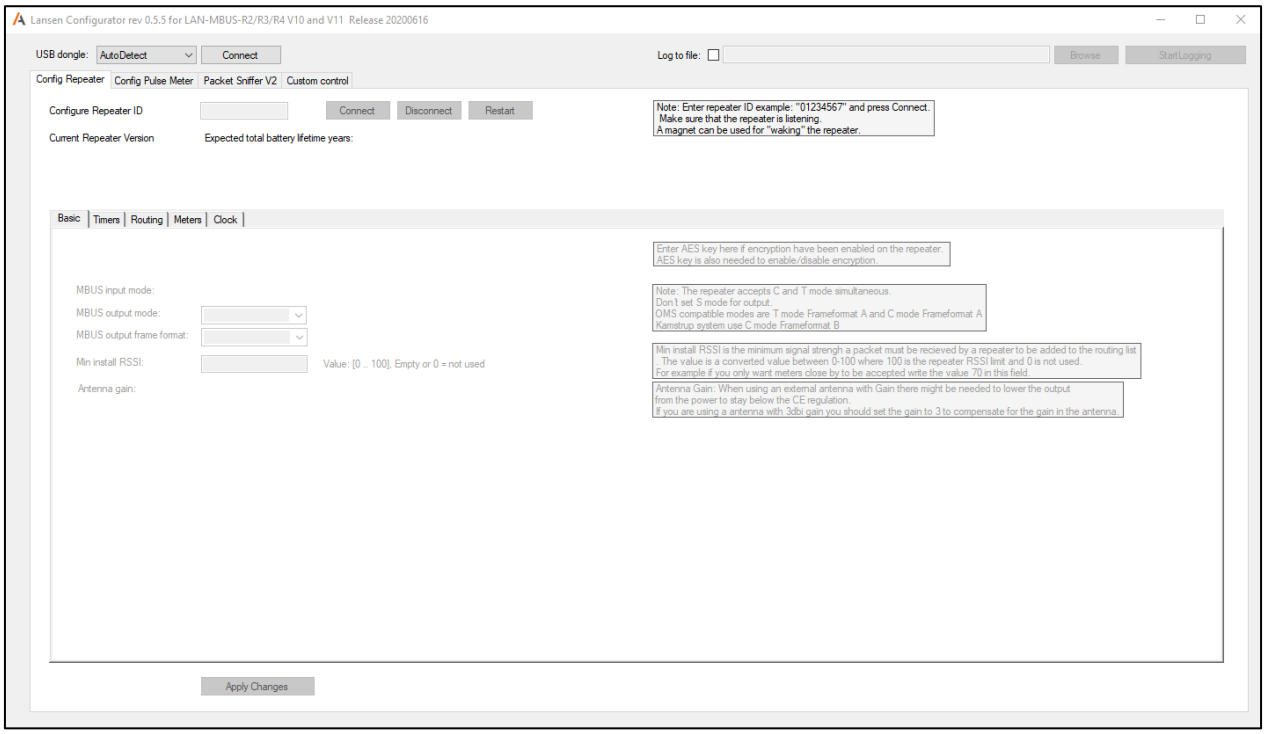


Figure 1: Overview of Lansen Configurator without any repeater connected.

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Setup computer tool Lansen Configurator

Step	Action	Troubleshooting
1	Go to https://www.lansensystems.com/download/ and download the software Lansen Configurator. Extract the downloaded zip-file (*LansenConfigurator*) to a folder on your computer.	
2	Open the folder and double-click on the program file called LansenConfigurator to start the program. The program shall open up like **Figure 1**.	
3	To configure a pulse counter, a Lansen configuration USB-dongle is needed (called LAN-WMBUS-D1-TC). Connect the USB-dongle to a port on your computer. In the upper left corner, select AutoDetect and click on the button Connect. The text "Identified/connected" is shown to the right of the button if the dongle is found.	• The dongle was not found or recognized by your computer. Unplug and plug in the USB, then try again. • AutoDetect does not find the correct COM-port within five minutes. In this case, close and reopen the program and manually select a COM-port, click the button Connect and wait a minute. If a popup with the text "Failed finding dongle on any of the known serial ports" is shown, select the next port and try again. If it wasn't found and no popup is shown after two minutes, close and reopen program then select the next COM-port and try again.

Connect to a pulse counter using Lansen Configurator

Step	Action	Troubleshooting
1	Make sure the program Lansen Configurator is running and that the USB-dongle is connected according to chapter **Setup computer tool Lansen Configurator**.	
2	In the field *Configure Meter ID*, enter the ID of the pulse counter that is to be configured. The ID can be found on the label with the text LAS.XXXXXXXX.YY.ZZ, where the numbers marked with X is the ID. The pulse counter needs to be in *Configuration mode* to be configured. To enter this mode, hold a magnet on the label for one second and then remove the magnet.	• Device has not entered *Configuration mode*. To be certain the device enters this mode, open the lid. When the device senses a magnet, a red LED turns on • The pulse counter is too close to the USB-dongle. Make sure the distance is at least 1m and not too far away, i.e., 100m.
3	In the program, press **Connect** and wait up to a minute for all data to be transferred. The pulse counter is fully connected when the fields in Lansen Configurator are filled with green.	• A popup with the text "Timeout awaiting data response" is shown if the program failed to connect to the pulse counter. Check the following and then try to reconnect: o ID is correct o Pulse counter is in Configuration mode (see previous step) o Pulse counter is within range

Configure a pulse counter

Step	Action	Troubleshooting
1	Make sure *Lansen Configurator* is running and that the USB-dongle is connected according to chapter **Setup computer tool Lansen Configurator**.	
2	A pulse counter must be connected according to chapter **Connect to a pulse counter using Lansen Configurator**. When a pulse counter is connected, it looks like **Figure 2.**	
3	For information about each individual parameter, check chapter **Pulse counter parameters**.	
4	To change a parameter, click in the required field and update the value. To apply changes, click on the button *Apply Changes Pulse*.	• If any error is received after the button *Apply Change Pulses* has been pressed, make sure that the following conditions are met: ○ The pulse counter is in *Configuration mode* ○ The pulse counter is close enough ○ The pulse counter is more than 1m away from USB-dongle ○ The correct encryption key is entered
5	After the changes have been successfully transferred to the pulse counter, the updated fields will turn from red to green.	

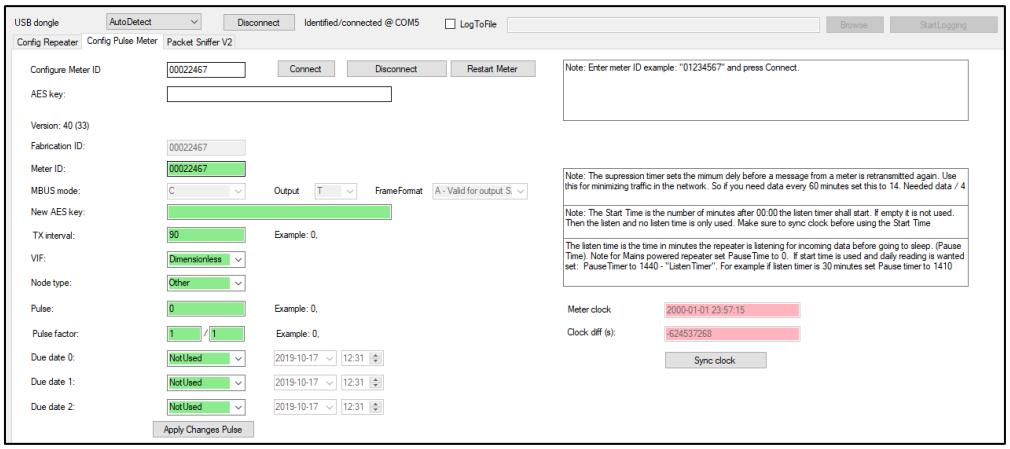


Figure 2: Overview of Lansen Configurator when a pulse counter is connected. A red field means that the parameter in the program does not match the value read from the pulse counter. Press "Apply Changes Pulse" to transmit the changes to the pulse counter.

Pulse counter parameters

Once the pulse counter is installed and connected to a meter, it will start sending out wMBUS-packets with information. However, to get the most out of the information, some parameters should be changed depending on the connected meter. In the following chapters, all parameters will be explained in greater detail.

Fabrication ID

During production, each pulse counter is given a unique serial number, and this number is displayed in this field.

Meter ID

This field can be used to set the serial number, also called ID, of the meter which is connected to the pulse counter.

MBUS mode

These fields, from left to right, show the input mode, output mode, and what frame format is set on the device as it was programmed.

New AES key

This parameter can be used to change the AES-key, which is useful if the key for each device should follow a certain pattern or maybe to set the same AES-key for all pulse counters in the same building.

Note: Having the same AES-key for multiple devices reduces the security.

TX interval

This parameter sets how long the time shall be between two transmission (TX) from the pulse counter, for example, 300 seconds. This means that 300 seconds, the pulse counter will transmit data.

Note: A shorter interval lowers the battery life.

Note: Minimum value of this parameter is 10s and maximum value is 1000s.

VIF

This parameter is used for setting the unit for what is being monitored, for example, *Energy (Wh)* or *Power (W)*. For all options, except for *Dimensionless*, the user can choose a resolution of the value. See the table below for available options and the respective minimum/maximum value.

VIF	Value	
	Minimum	Maximum
Energy (Wh)	0.001	10000
Energy (J)	1	10000000
Volume (m^3)	0.000001	10
Mass (kg)	0.001	10000
On time	Seconds	Days
Operating time	Seconds	Days

Power (W)	0.001	10000
Power (J/h)	1	10000000
Volume flow (m^3/h)	0.000001	10
Volume flow (m^3/min)	0.0000001	1
Volume flow (m^3/sec)	0.000000001	0.01
Mass flow (kg/h)	0.001	10000
Flow temperature (°C)	0.001	1
Return temperature (°C)	0.001	1
Temperature difference (°K)	10	10000
External temperature (°C)	0.001	1
Pressure (bar)	1	1000
Dimensionless	Not applicable	

Node type

This parameter is used to specify the type of meter that is connected to the pulse counter. Simply select the meter type in the dropdown list.

Pulse

This parameter can be set to synchronize a pulse counter to the pulse value of the meter it is connected to. In other words, the pulse counter can be started on the same value as the meter instead of starting from pulse counter value 0.

Pulse factor

If scaling (or pulse conversion) of the pulse value is required, then this is the parameter to be set. For example, if 1000 pulses equal 1 kWh, then the pulse value can be scaled by 1/1000 so it is.

Due date

This parameter is used if historic data is wanted and the pulse counter supports up to three different due dates. If this parameter is used, then the historic data will be added at the end of the transmitted wMBUS-packets. For more details about each option, refer to the table below. The due dates can be configured to fit specific needs.

Note: If a due date is set in the future, then the pulse counter will not be saving pulses until the configured due date has passed.

Update interval	Details
Daily	This is used if data needs to be updated daily. **Example:** Every day at 12:30.
Weekly	This is used if data needs to be updated once a week. **Example:** Every Wednesday at 13:25.

Monthly	This is used if data needs to be updated once a month. **Example:** The 25th of each month at 23:55. **Note:** If a date is selected and the current month does not contain the date, then an update will not occur that month. Therefore, if data is needed every month of the year, this value should be 28 or earlier.
Yearly	This is used if data needs to be updated on a specific day once a year. **Example:** 28th of April at 10:10. **Note:** If the 29th of February (leap year) is chosen, then data will only be updated once every four years, i.e., next leap year.
Not used	The pulse counter will not attach historic data to the WMBUS-data packets.

Meter clock / Clock diff

These two fields depend on each other.

The field called **Meter clock** shows the current date and time of the pulse counter in UTC, while the field called **Click diff (s)** shows how many seconds the pulse counter differs from the current time on the computer.

To synchronize the clock on the pulse counter, simply click on the button **Sync clock** and it will set the time to the current time on the computer.

Example configurations

Installation with no configuration on new meter

If the pulse counter is connected to a new meter, i.e., pulse value is 0, then no configuration is needed if information about the meter isn't wanted in the wMBUS-packet. Simply connect the pulse counter to the meter, activate the device and then it is finished.

Installation with minimum configuration

If the pulse counter is installed to a meter with a pulse value, then it is advantageous to set the same pulse value on the pulse counter so they are synchronized. The only parameter which needs to be set in this case is the pulse value, as seen in the table below.

Parameter	Example value	Details
Pulse	12002	Number of pulses for the pulse counter

Full configuration without historic data

This configuration can be used if data is needed periodically and historic values are unwanted or not needed. For this configuration to work, set the parameters described in the table below to your needs.

Parameter	Example value	Details
Meter ID	10203040	Serial number of the meter connected to the pulse meter
TX interval	300	Time, in seconds, between two transmissions
VIF	Mass flow (kg/h)	Selected unit of what is being measured
Node type	Warm water	Selected type of meter that is connected to the pulse counter
Pulse	12002	Number of pulses for the pulse counter
Pulse factor	1/10	Scaling factor for the pulse counter value

Full configuration with historic data

This configuration can be used if data is needed periodically and historic values is wanted. For this configuration to work, set the parameters described in the table below so they fit your needs.

Note: In this case it is important to synchronize the internal clock to get the correct historic values.

Parameter	Example value	Details
Meter ID	55551111	Serial number of the meter connected to the pulse meter
TX interval	300	Time, in seconds, between two transmissions
VIF	Power (W)	Selected unit of what is being measured
Node type	Gas	Selected type of meter that is connected to the pulse counter
Pulse	127	Number of pulses for the pulse counter
Pulse factor	1/100	Number of pulses for the pulse counter
Due date 0	Daily, 2020-02-02 02:02	Select when and how often to update historic value
Due date 1	Daily, 2000-01-05 12:00	Select when and how often to update historic value
Due date 2	Weekly, 2010-05-20 12:30	Select when and how often to update historic value

Check routed messages with Packet Sniffer V2

Our program, Lansen Configurator, also includes a sniffer tab called *Packet Sniffer V2*. This page is seen in **Figure 3**. By using *Packet Sniffer V2*, henceforth called the Sniffer, one can observe all packets sent in the area, both by meters and repeaters.

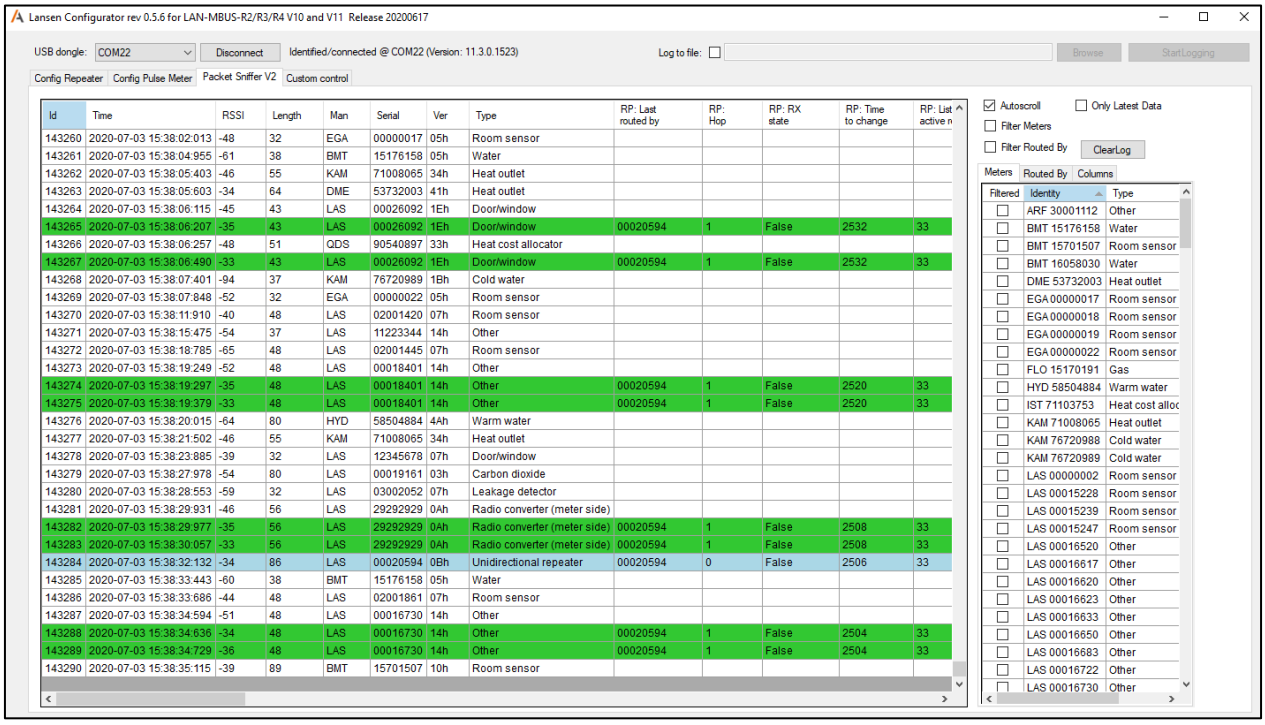


Figure 3: Overview for the page Packet Sniffer V2.

Overview of the Sniffer

The Sniffer-view, as seen in the picture above, contains two lists – *Primary list* (left side) and *secondary list* (right side). The *primary list* shows information about the packets which the USB-dongle picks up while the *secondary list* contains some tabs which change what is shown in the list.

Furthermore, there are a couple of options in **Figure 3**, located in the upper right corner, that can be used to sort out or filter out necessary data in the *primary list*.

Sniffer options

The Sniffer has some options in the upper right corner which can be used to change what is shown in the *primary list*. Each option is explained below in greater detail.

Note: It is advantageous to disconnect the USB-dongle if the options are going to be changed to quicken up the process.

Autoscroll

While active, the Sniffer will automatically scroll down to the bottom of the *primary list* every time a new packet is received. This option can be disabled so the user can scroll up in the *primary list* to observe older packets while still receiving new packets.

Filter Meters

When this option is enabled, then data will be filtered by the devices chosen in the tab *Meters* in the *secondary list*. By using this option, one can see packets from one (or more) specific meter which makes it easy to see if a meter is being retransmitted by a repeater or if packets from a repeater is being retransmitted by another repeater in a multihop setup. Simply mark the checkboxes of the meters which should be filtered in the *secondary list*.

Note: This option filters on the serial numbers visible in the column called **Serial** in the *primary list*.

Filter Routed By

This option is similar to the previous option, *Filter Meters*, but instead of filtering data which has been sent by selected meters, this option filters out data which has been transmitted from the specific repeater chosen in the tab *Routed by* in the *secondary list*.

Note: This option filters on the serial number in the column called **Last Routed By** in the *primary list* in **Figure 3**.

Only Latest Data

By using this option, the latest packet which has been picked up, whether it is a message transmitted from a meter or retransmitted from repeaters, will be shown. For example, if there is one meter and two repeaters in a setup, then there will be three rows in total. The values in the rows is updated whenever the Sniffer picks up a new packet.

This option can be used to minimize the number of rows shown in the program to get a better overview of all meters and repeaters in the area. If all packets need to be displayed in the Sniffer, then this option must be disabled.

ClearLog

This button is used to clear all the packets read so far with the program and will therefore clear the *primary list*.

Primary list

This list, shown on the left side of the program, displays all the packets which has been received so far by the USB-dongle. How the packets and information for each packet is shown depends on the options selected in chapter **Sniffer options** and

Columns. One thing to note in **Figure 3** is that each row is colored, and each color has a meaning. This is described in **Table 1** below. The reception depends on the *RP: RSSI*-column, i.e., how strong the signal is between the repeater and a meter.

It is also possible to sort the rows in this list by clicking on the top row of the columns which is going to be sorted. For example, all meters and repeaters will be sorted by serial number, from low to high, when clicking on **Serial**.

Table 1: Meanings of each color observable in the Sniffer. The reception is measured between repeater and meter.

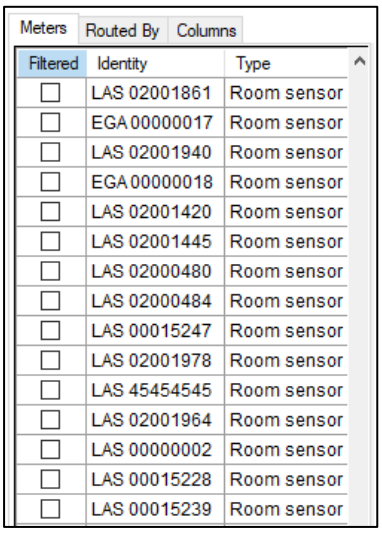
Color meaning	Color
Good reception between meter and repeater	
Okay reception between meter and repeater	
Medium reception between meter and repeater	
Bad reception between meter and repeater	
Really bad reception between meter and repeater	
Meter packet picked up directly by USB-dongle	
Status packet sent by a repeater (not meter data)	

Secondary list

This list is used as a complement to the options in chapter **Sniffer options** and changes what is displayed in the *primary list*. As seen in **Figure 3**, there are three tabs in this list: *Meters*, *Router By*, and *Columns*.

Meters

This tab, as seen by the picture on the right, contains three columns. For each new meter which has been received by the program, a new row is created, and each row contain the meter manufacturer code, serial number, and type.



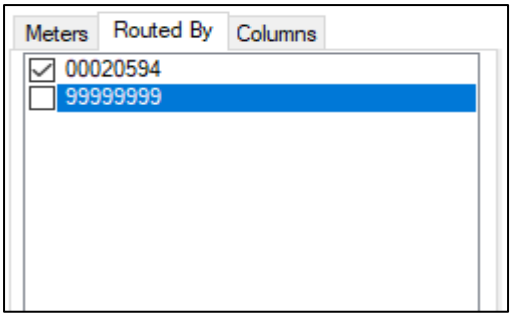
The first columns, *Filtered*, is used together with the option *Filter Meters*. If the option *Filter Meters* is enabled, then only the meters marked in this tab will be displayed in the *primary list*. This is useful if there are a lot of meters in the area and only a couple of meters are of interest.

The next columns, *Identity*, contains the manufacturer code and serial number for each meter received. By clicking on the test *Identity*, the list will be sorted alphabetically (A to Z), and numerically (low to high) for each manufacturer code.

The third column, T*ype*, shows which type of meter it is. This column can also be used to sort the list by clicking on the name *Type* which then will sort the list alphabetically (A to Z).

Routed By

This tab, seen in the picture on the right, only contains a checkbox and a serial number. For each new repeater received by the Sniffer, a new checkbox is created with the corresponding serial number of the received repeater.



This tab is used together with the option *Filter Routed By*. If the option is enabled, then only packets transmitted or retransmitted by the selected repeaters will be shown in the *primary list*.

Columns

This tab is used to change which columns are shown in the *primary list*. Each available option is displayed in the table below.

Column name	Meaning
Id	When a packet is received, it is assigned an ID number. Each time a new packet is received, the ID is incremented by 1.
Time	Timestamp when the packet was received by the computer.
RSSI	Signal strength of the packet sent by a repeater/meter and received by the USB-dongle. Value goes from 0 (strong signal) to larger negative values (weaker signal).
Length	Number of bytes in the received data packet.
Man	Manufacturer ID of the device, either repeater or meter, which sent the packet.
Serial	Serial number of the device, either repeater or meter, which first sent out the packet.
Version	Version of the device, either repeater or meter, which first sent out the packet.
Type	Shows what type of device, either repeater or meter, which first sent out the packet.
RP: Last routed by	Shows the serial number of the repeater which retransmitted the data most recently.
RP: Hops	Number of times the data has been retransmitted by repeaters.
RP: RX state	Shows which transmission state the repeater is currently in. TRUE=Listening and FALSE=Pausing. **Note**: If a magnet has been used to wake up the repeater, then it is possible for the repeater to transmit data even if this column is FALSE.
RP: Time to change	Indicates how many seconds it is left until the repeater changes the RX-state.
RP: Current time	Shows the current time on the repeater.
RP: Start time	Shows the time set for the parameter *Start time* if it is active.
RP: Listen days	Shows the selected weekdays for the parameter *Start time* if it is active.
RP: Microrepeater	Shows if the repeater is a microrepeater (1) or a normal repeater (0).
RP: Mains connected	Shows if it is a mains-operated (1) or battery-operated (0) repeater.
RP: Listen active reason	Shows what the current listening reason is. See **Table 2** for more details. Note that multiple reasons can be active at the same time.
RP: RSSI	Signal strength of the packet sent by a repeater/meter and received by the repeater. Value goes from 0 (strong signal) to larger negative values (weaker signal).
Raw packet	Shows all bytes in the received packet.

Table 2: Description of the different values in columns RP: Listen active reason.

Bit	Meaning
0 (0x01)	Listen timer running
1 (0x02)	Short listen window (60 seconds) for parameter *Start time* is running
2 (0x04)	Long listen window (time set in parameter *Listen/pause timer*) and parameter *Start time* is running
3 (0x08)	Monthly listen timer running
4 (0x10)	NOT USED
5 (0x20)	Magnet/reed timer running

Logging data to file

The Sniffer allows the user to log the received packets in the program onto a file on the computer. To do this, follow the steps below:

1. Click in the checkbox so it is marked. This will enable the button **Browse**.
2. Click on the button **Browse** and navigate to a place on your computer where you want to save the file. Give the file a name in the field called *File name* and click on **Save**. This will activate the button **StartLogging**.
3. Click on the button **Start logging**. The program will now save all packets with all columns shown in the *primary list*.

Revision history

Updated (date)	Revision	Updated by	Comments
2020-12-07	0a	Martin Stanic	Document created.
2020-12-18	0b	Martin Stanic	Updated all chapters according to the new Lansen Configurator (from 5.2.0 and newer).
2021-01-25	1	Martin Stanic	Document released