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Introduction to the wRemote

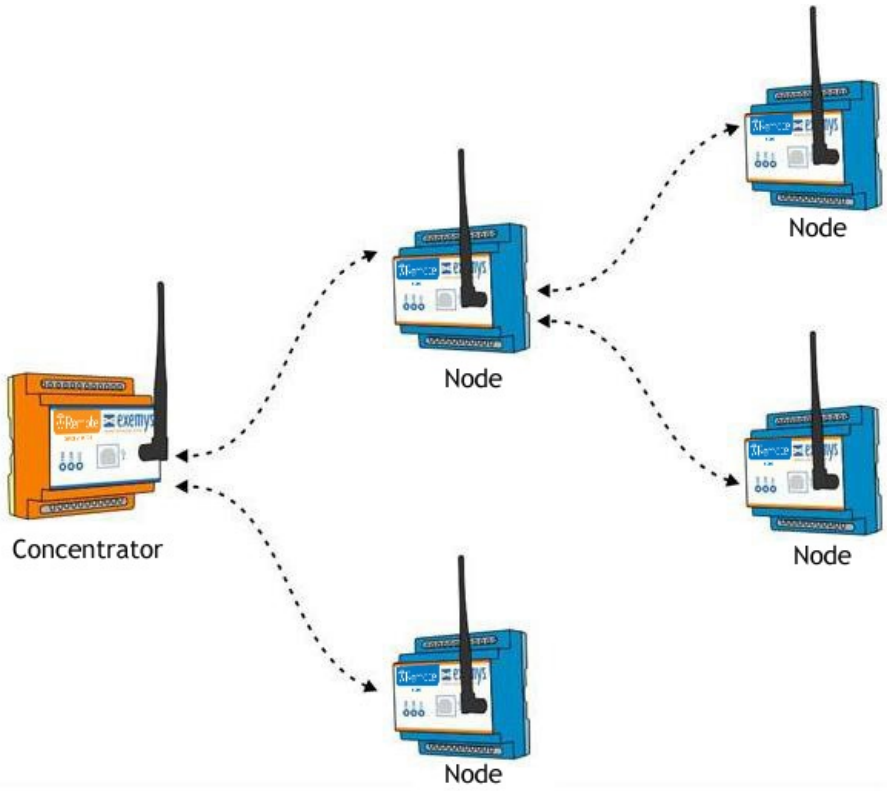
wRemote devices allow management of inputs/outputs and remote serial ports over 802.15.4 wireless connection, accessing them from control device using Modbus protocol. This eliminates cables and simplifies the installation process further by including inputs/outputs on the same equipment.

Purpose of this Manual

The purpose of this manual is to provide instructions to install and operate the wRemote device quickly and easily.

Telemetry Wireless Solutions

The wRemote assembly is based on a mesh-type wireless network according to 802.15.4, for this device there is a concentrator in charge of forming the network and other nodes that connect the same with an ID number and repeats increasing the scope.

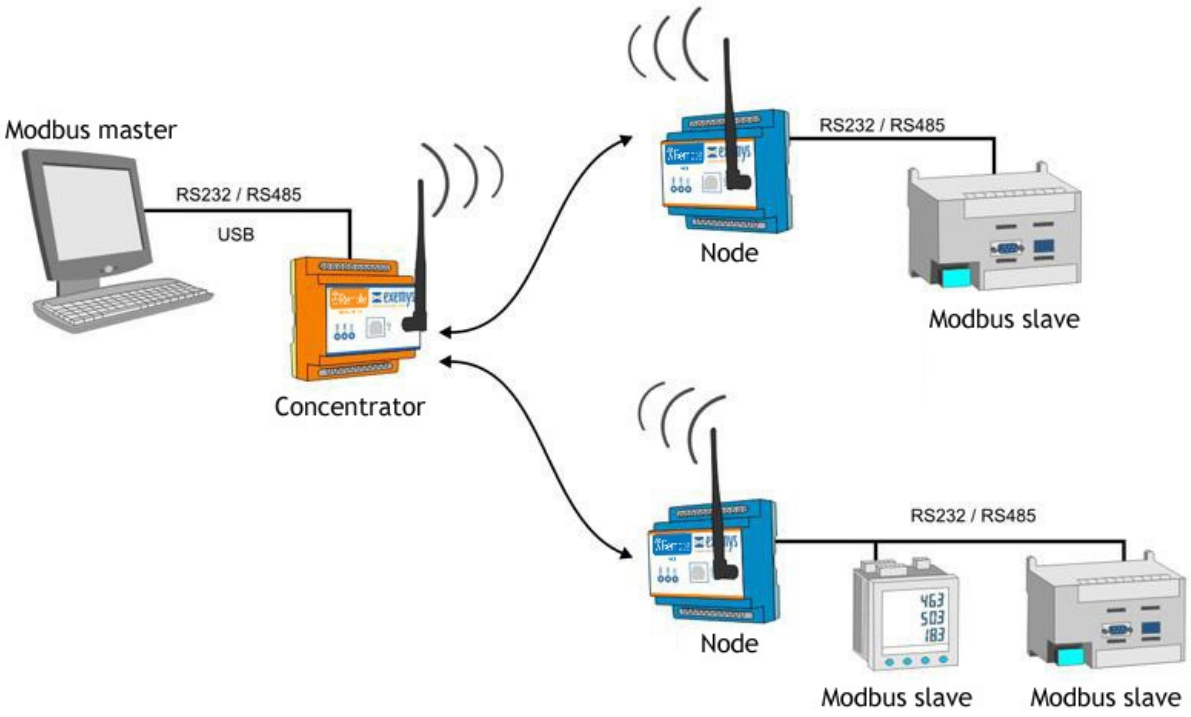


The device has two modes of configuration that are able to function at the same time:

- **Wireless access to MODBUS slaves**
- **Wireless Inputs/Outputs using MODBUS protocol**

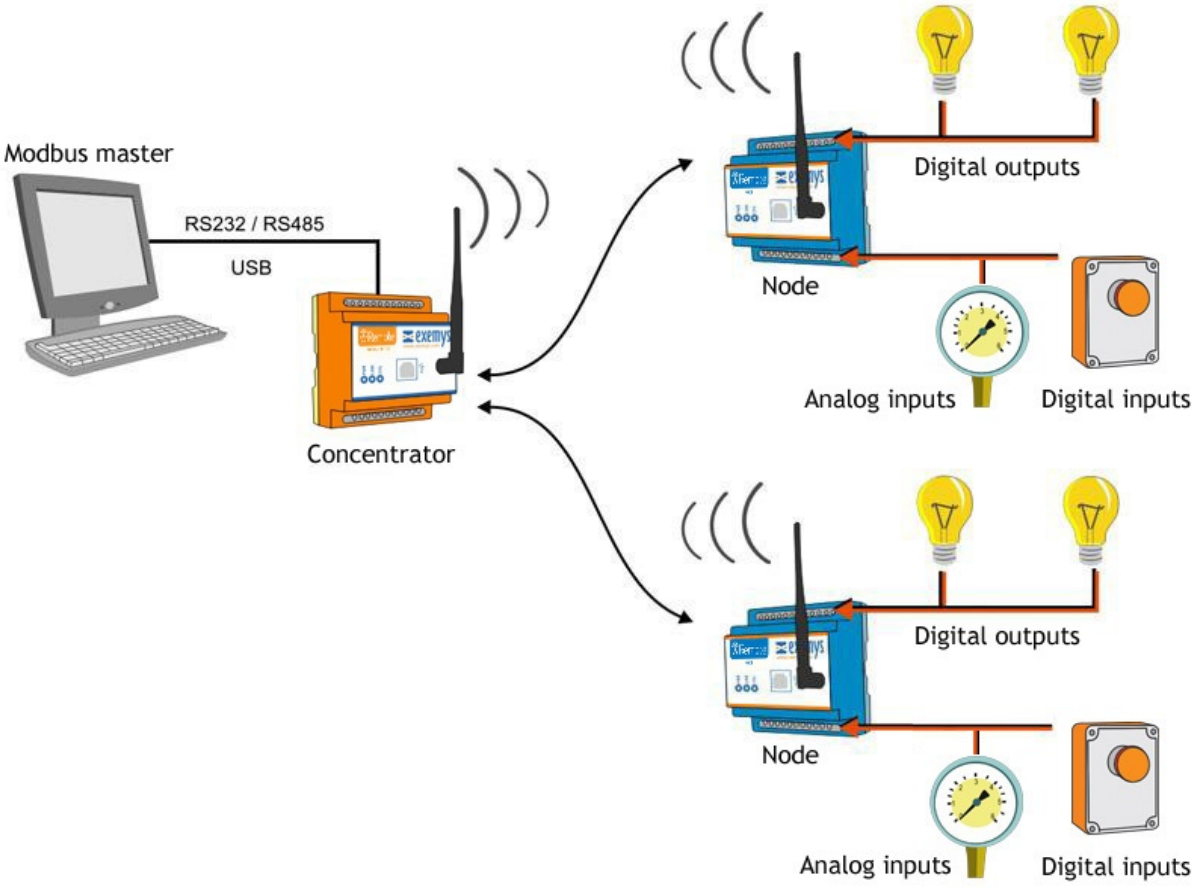
Wireless access to MODBUS slaves

This solution allows us to connect Modbus devices to the remote nodes with the RS232 or RS485 ports and access them through the concentrator.



Wireless Inputs/Outputs using MODBUS protocol

This solution allows us to monitor the physical inputs/outputs of the nodes, by reading the internal Modbus slave on the concentrator.



Models of wRemote – Installation

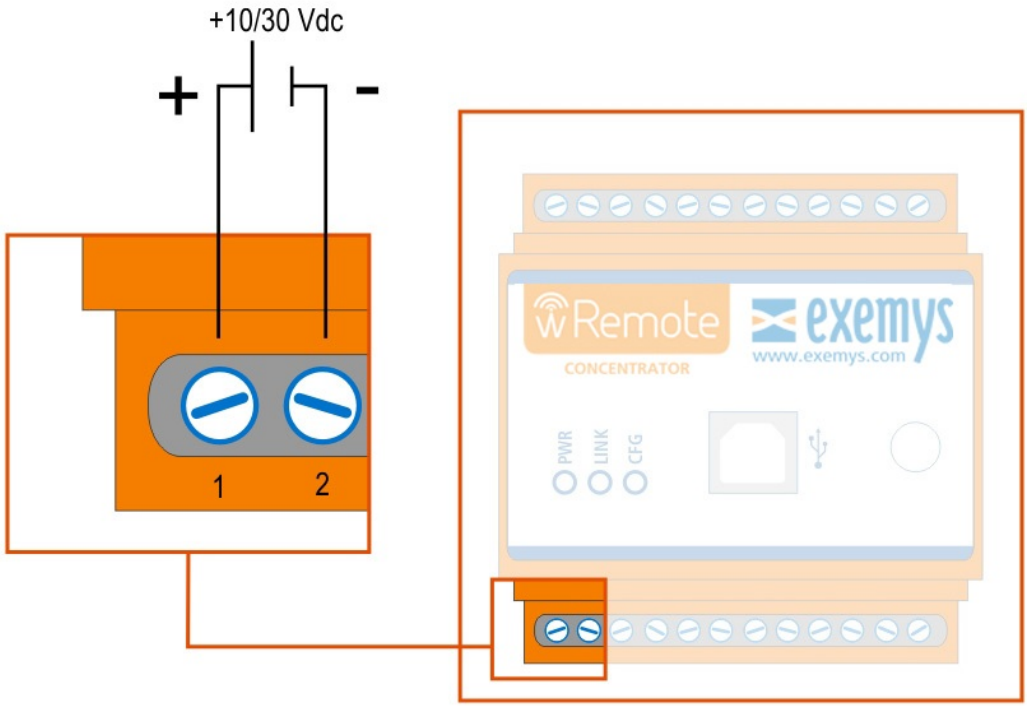
Table of Models

Model	Serial Port	Digital Inputs	Digital Outputs	Analog Inputs	Analog Outputs	Count Inputs (1)	Power Supply
wRemote-1000-CN	RS232/RS485	-	-	-	-	-	10 to 30Vdc (external)
wRemote-3004-ND	RS232/RS485	4	2	2	-	-	10 to 30Vdc (external)
wRemote-3005-ND	RS232/RS485	4	2	4	-	4	10 to 30Vdc (external)
wRemote-5005-ND	RS232/RS485	4	2	2	2	4	10 to 30Vdc (external)

(1) The count inputs are shared with the digital inputs

Connection

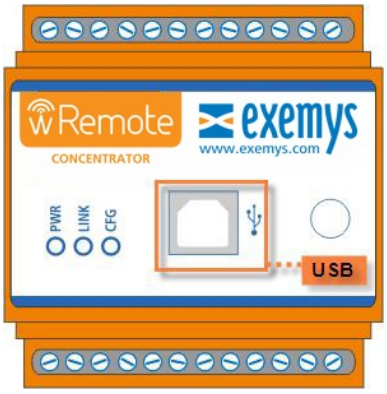
Connection- Power Supply



The terminals 1 and 2 correspond to the power source.

Connection – USB Configuration Port

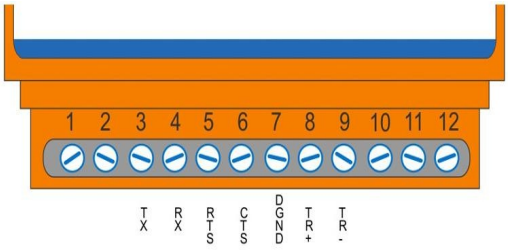
All of the wRemote models have a USB communication port. This port is used to configure or in the case of a concentrator also used for Modbus inquiries. For a connection with a PC a standard type “B” USB cable is used.



⚠	*Attention, if you connect the USB port will be disabled RS232/485 serial ports.*

Connection –RS232 port –RS485 port

The RS232 port is a DTE type 5 wires (TX, RX, RTS, CTS, GND) and have a terminal block for your connection, the terminal blocks are TR+ and TR- for RS485.

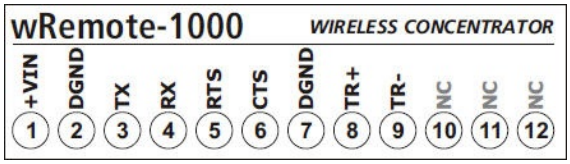


If you are going to use flow control there is no need to connect the CTS and RTS pins

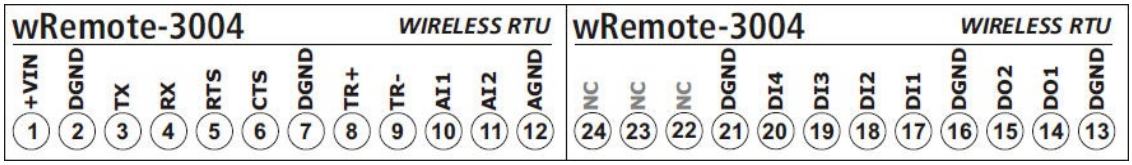
Connection – Inputs / Outputs

Below are the terminals for the I/O and wRemote power supply depending on each model.

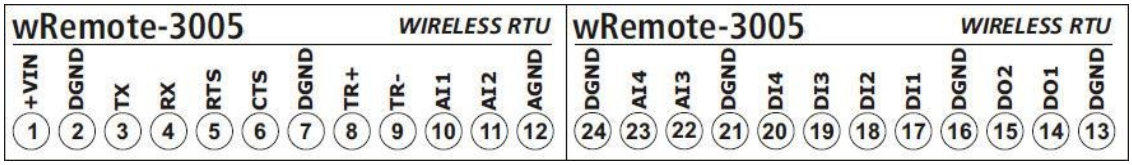
- ***wRemote-1000***



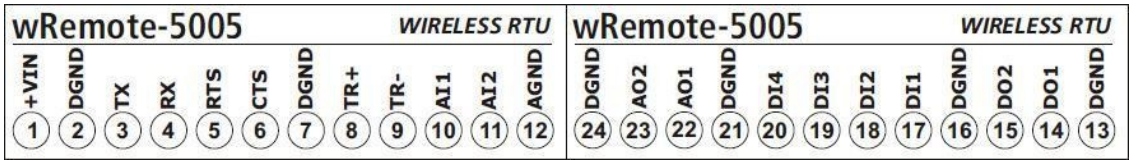
- ***wRemote-3004***



- ***wRemote-3005***

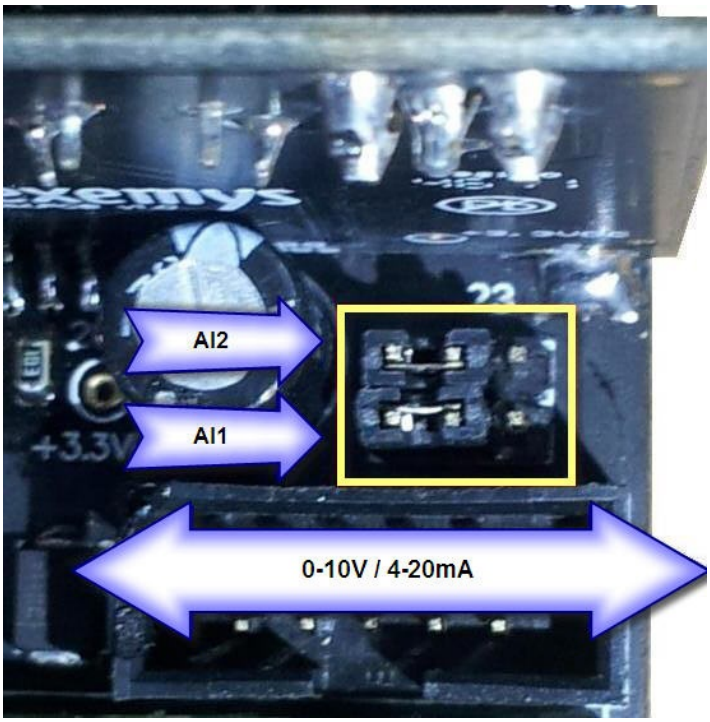


- ***wRemote-5005***



4-20 mA / 0-10V analog input jumper configuration on wRemote-3004

On **wRemote-3004** analog inputs are to be set to 0-10V or 4-20mA with the internal jumper. Carefully disassemble the wRemote and place the jumpers to the right for 4-20mA or to the left for 0-10V as indicated in the figure. Remember, then you must configure to the wRemote through the configuration software indicating the type of input you are using.



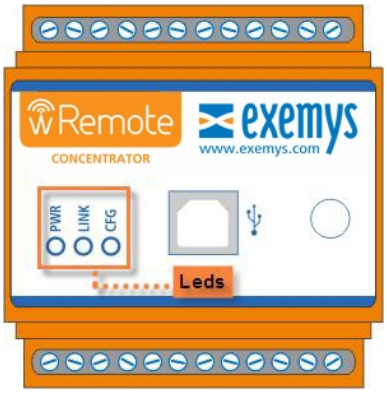
All other models can be configure by software and you don't need to open the unit

⚠	*Attention, if a voltage is injected directly into an analog input and it is configured as 4-20mA, it may cause damage.*

LEDs Indicators

The wRemote has 3 LEDs indicators.

POWER: Power applied to wRemote
LINK: Network Status
CFG: Configuration Mode



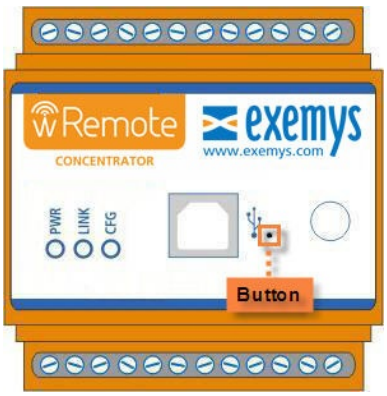
Continued below is a detailed chart of what each LED means independently and in combination.

PWR LED	LINK LED	CFG LED	Description
On	-	-	Device on
On	Slow blinking		Creation or connection of a network
On	Fast blinking		Connected to the network but not linked*
On		-	Connected and linked to the network
On	-	On	Configuration
Fast blinking	Fast blinking	Fast blinking	Critical Failure
Fast blinking	Off	Fast blinking	Serial Number not configured
Fast blinking	Slow blinking	Fast blinking	Model not configured

* This state only occurs in the "Nodes".

Reset Button

The wRemote has a reset button; to operate it you must have a cylindrical item with the correct diameter to enter the device whose location can be viewed in the figure below.



The button fulfills different functions depending on the type of device:

In the **concentrators** it restarts the network.

In the **nodes**, it resets the network but disassociates from it. It then searches for another network it can

connect to that it may or may not have been connected to previously.

2016-09-26

wRemote Configuration Software – wRemote config

The wRemote Config is provided by the application program that is used to configure wRemote devices.

This application was developed with an easy-to-use philosophy and allows for the configuration and monitoring of wRemote devices. The configuration program can be installed on Windows 2003, 2008, Vista, XP, 7 and 8.

Installation

To install it follow these steps:

- Insert the CD that came with your device and select install the configuration program
- Follow the installation instructions that appear on the screen, completing the needed information, Click “Next” to continue.
- Destination folder, select the folder where you want the application program installed
- Wait until the installation has finished copying all necessary files to your hard drive and press “Finish” to finish the installation.

Once installed you will see in the programs menu a folder titled Exemys, inside this folder there will be another titled wRemote Config; it contains program icons and the manual to uninstall.

Note: With the installation of the configuration program other wRemote USB drivers are installed for different operating systems.

USB Driver Installation

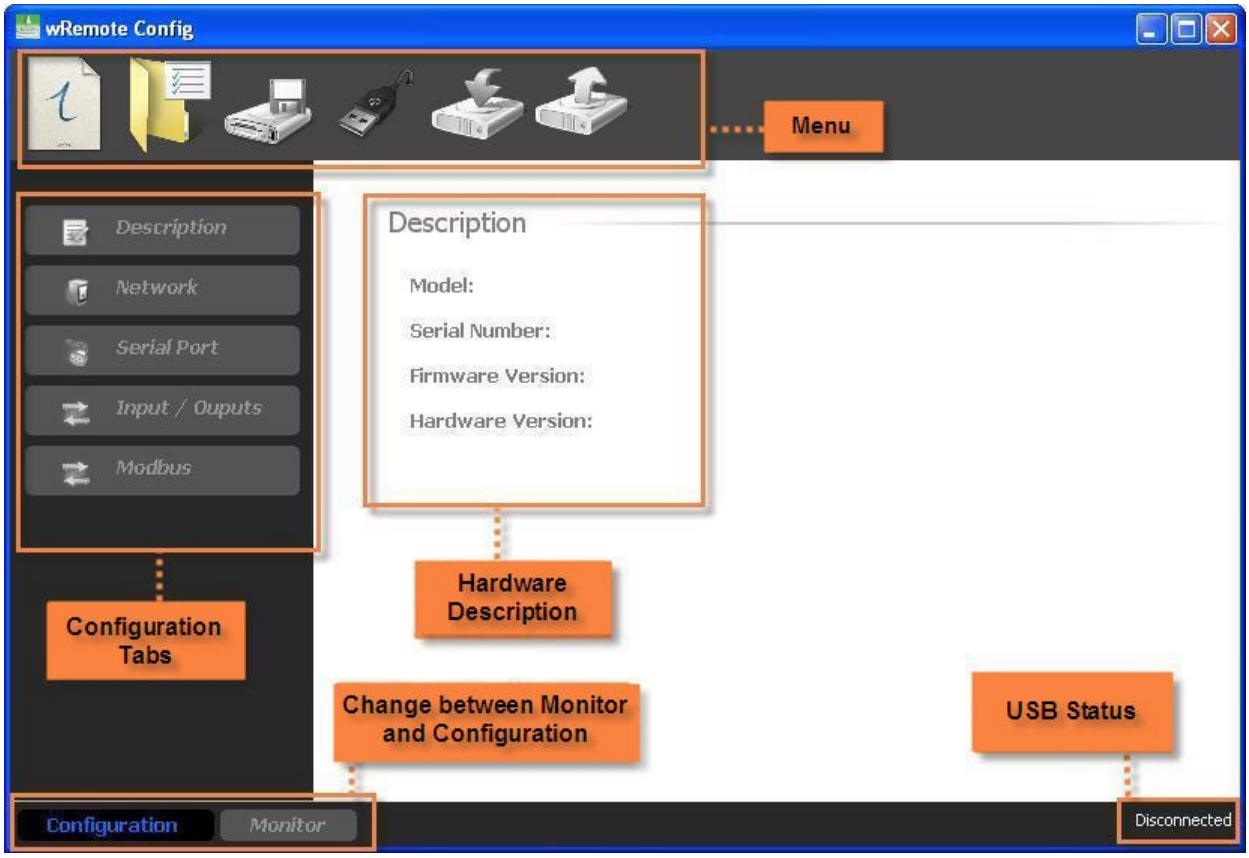
he driver installation is performed in conjunction with the “wRemote Config”; in other words to connect to the PC, the wRemote should be recognized automatically.

If for some reason this does not happen, and the requested operating system folder can be located manually.

“C:\Program Files\Exemys\wRemote Config\Drivers\"

General Description of the Configurator

The image below shows the main screen for the software.



USB Configuration

Once installed, the software should not configure any parameter from the USB port as this automatically recognizes the COM in the connected wRemote.

Establishing Connection with the wRemote

In order to connect with wRemote the computer should be connected with the equipment using the cable described in “wRemote models installation”.

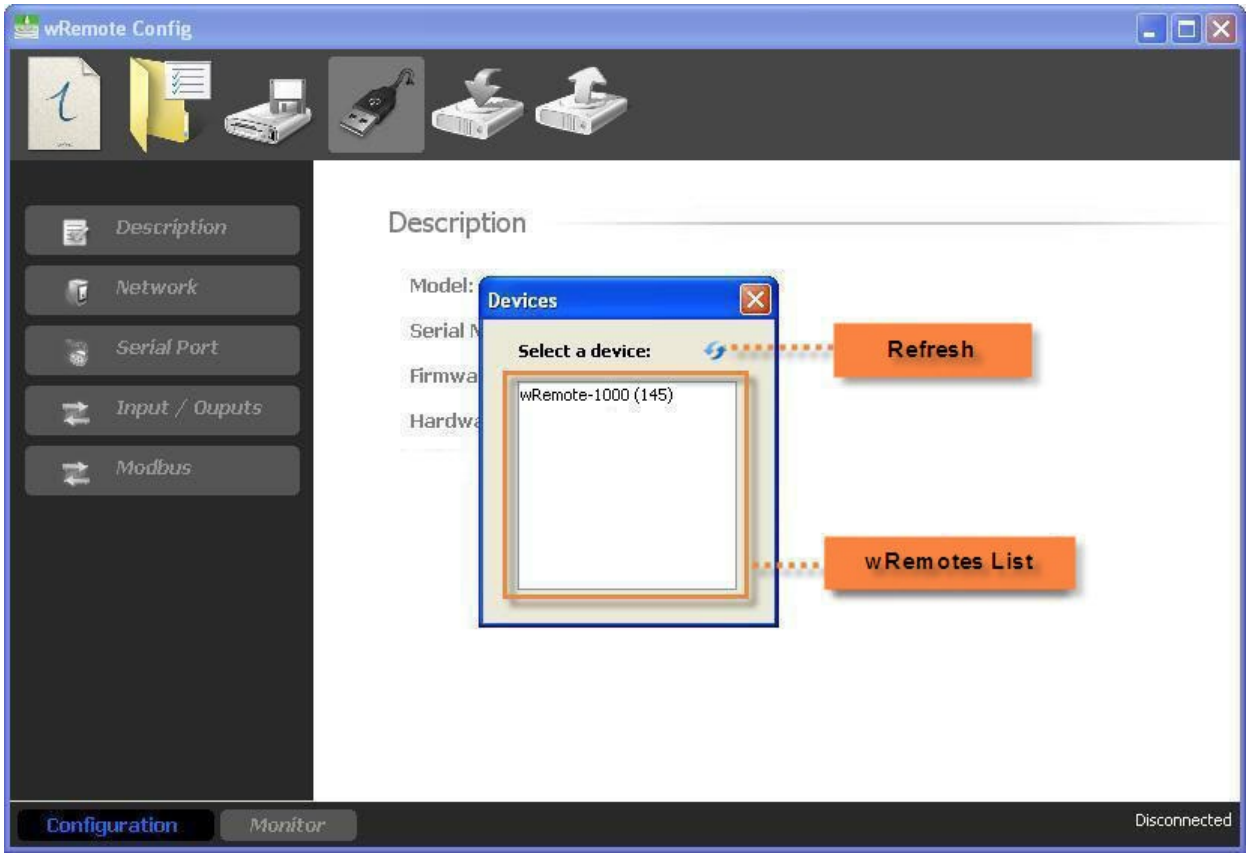
To establish the connection select the “Open Connection” option on the menu represented by the USB icon. .

If the communication fails check that:

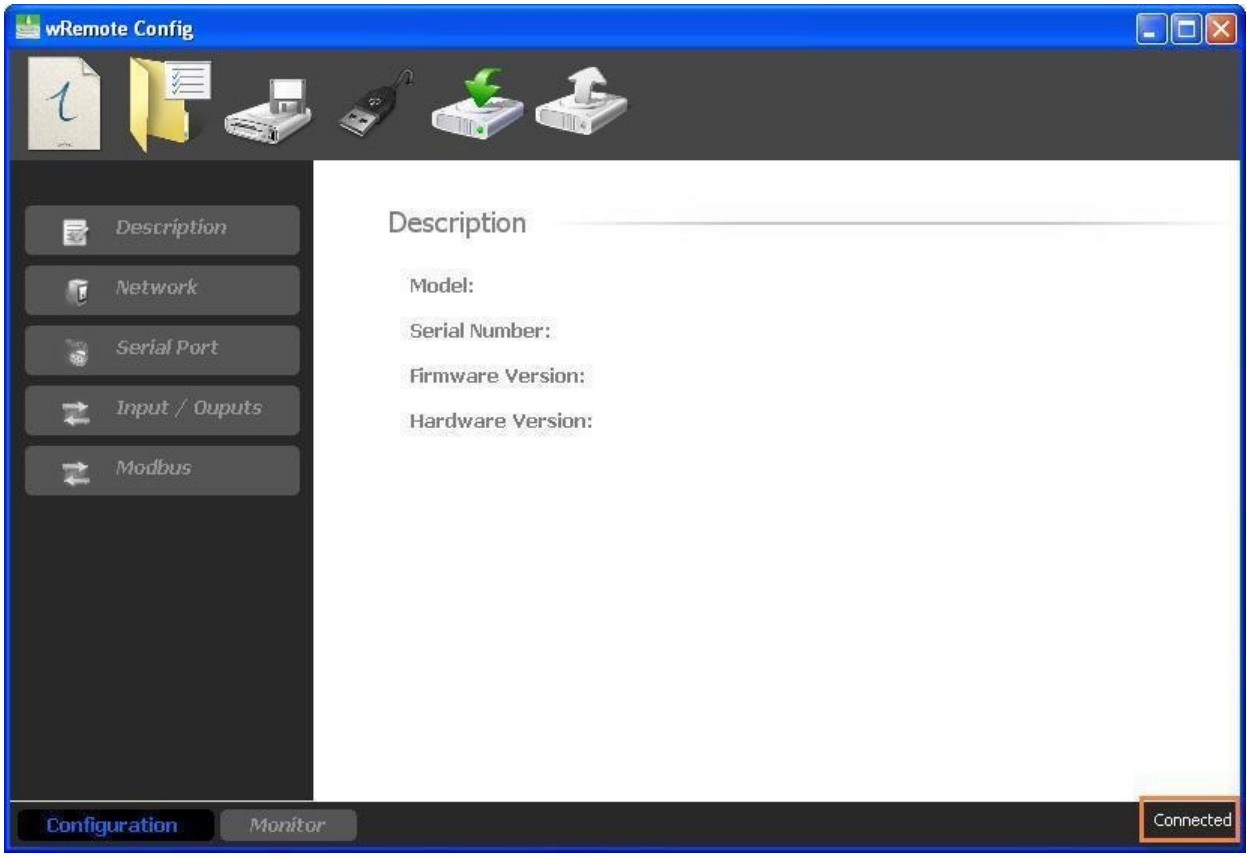
- The cable connecting the computer to the wRemote is correct.
- The wRemote is on.
- The driver is installed correctly.

After a while you will be able to see on screen a list of devices that have connected, quoting the model and serial number. To connect we just have to double click on which ever device you want.

If the list is blank and you are sure that the wRemote is connected properly you can refresh the list by pressing clicking “refresh”.



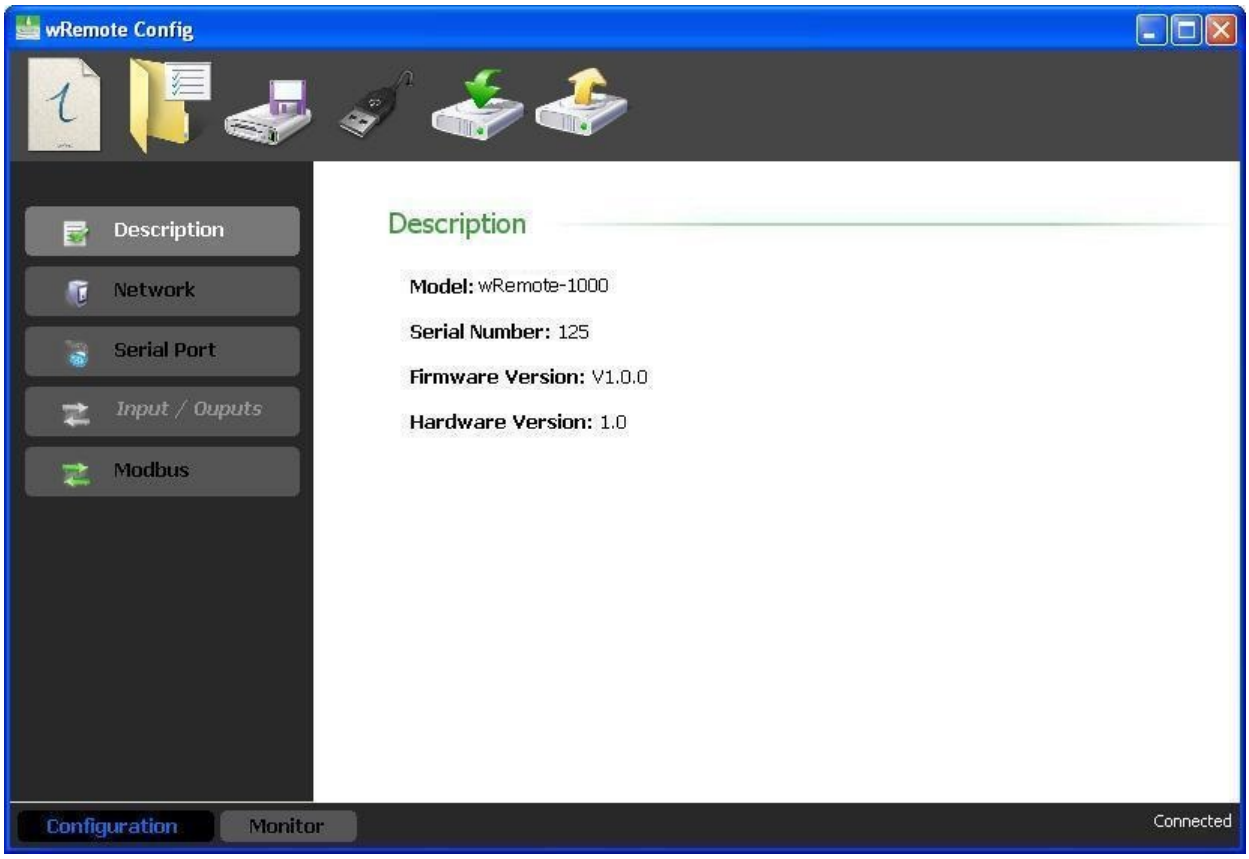
After double clicking on the wRemote, see in the lower right corner, the state of the software will change to “Connected”.



Reading the wRemote configuration

In order to obtain the parameters from the equipment you must press the “Read Configuration” button

.doing so will download all of the data from the wRemote indicated on the first model screen, etc You should always make a reading of the wRemote parameters in order to modify or monitor them.



⚠	*If the Configurator detects an unknown model it will not enable any of the tabs. In that case, contact us at support@exemys.com to obtain the updated version of the software or download it from here: www.exemys.com/grdconfig*

Writing the wRemote configuration

If you want to send any configuration change to the wRemote, you should press the “Write Configuration” button

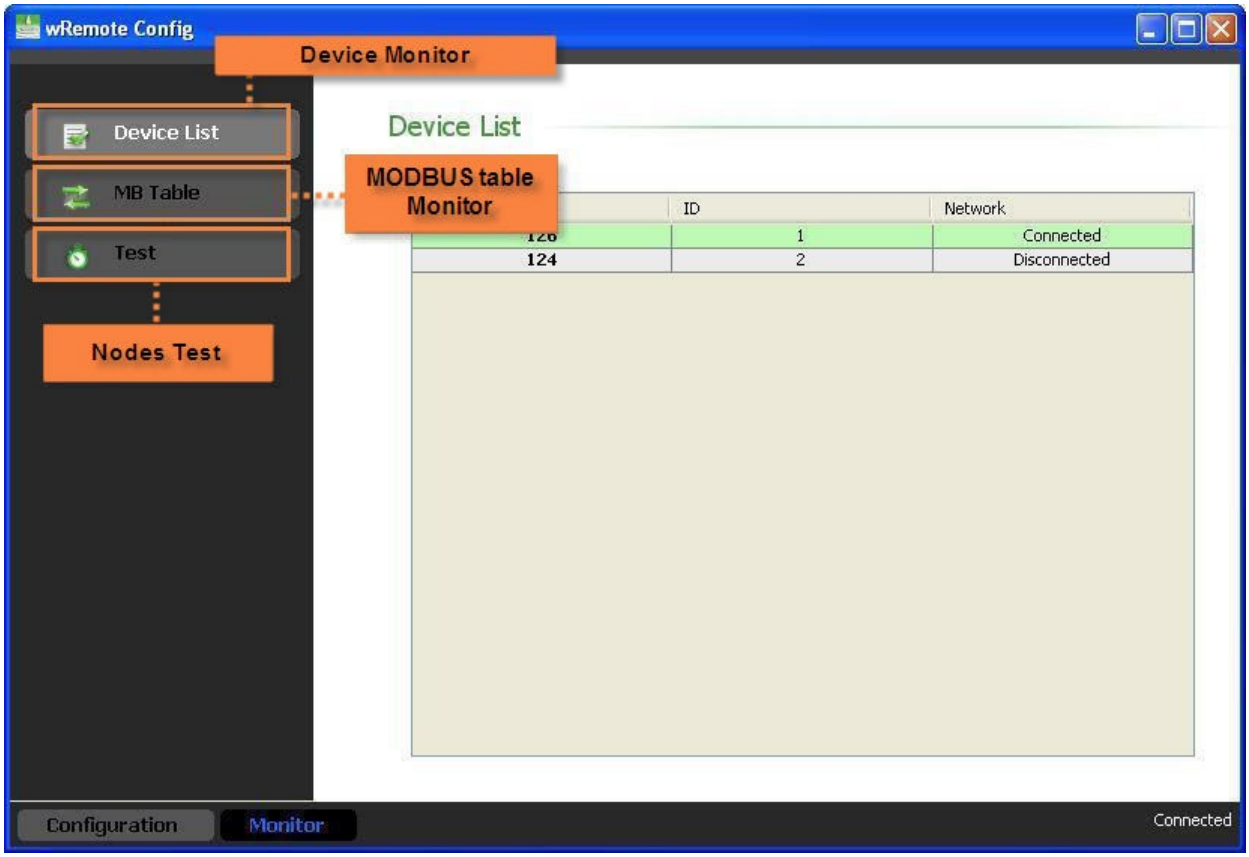
Monitoring

To access the monitoring in which the state of all wRemote parameters are located, you must press the ‘Monitor’ button. To return to the setup screen press the button with the same name.

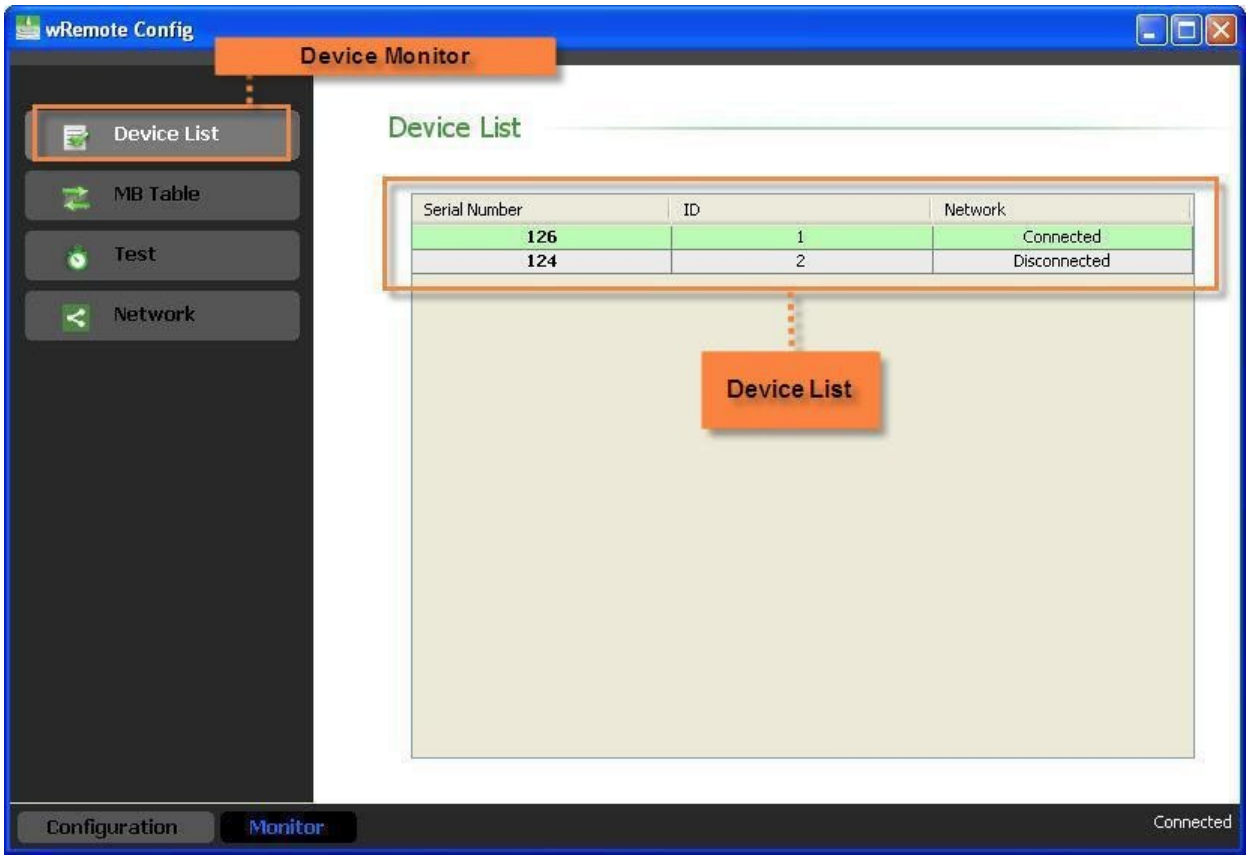
The monitoring screen that will appear depends on the equipment you have connected; this means that when connecting a computer “hub” the screen will display certain parameters and others if we were to connect a “Node”.

- **Monitoring of a "Concentrator"**

  If we have connected a “Concentrator” we see the following screen:

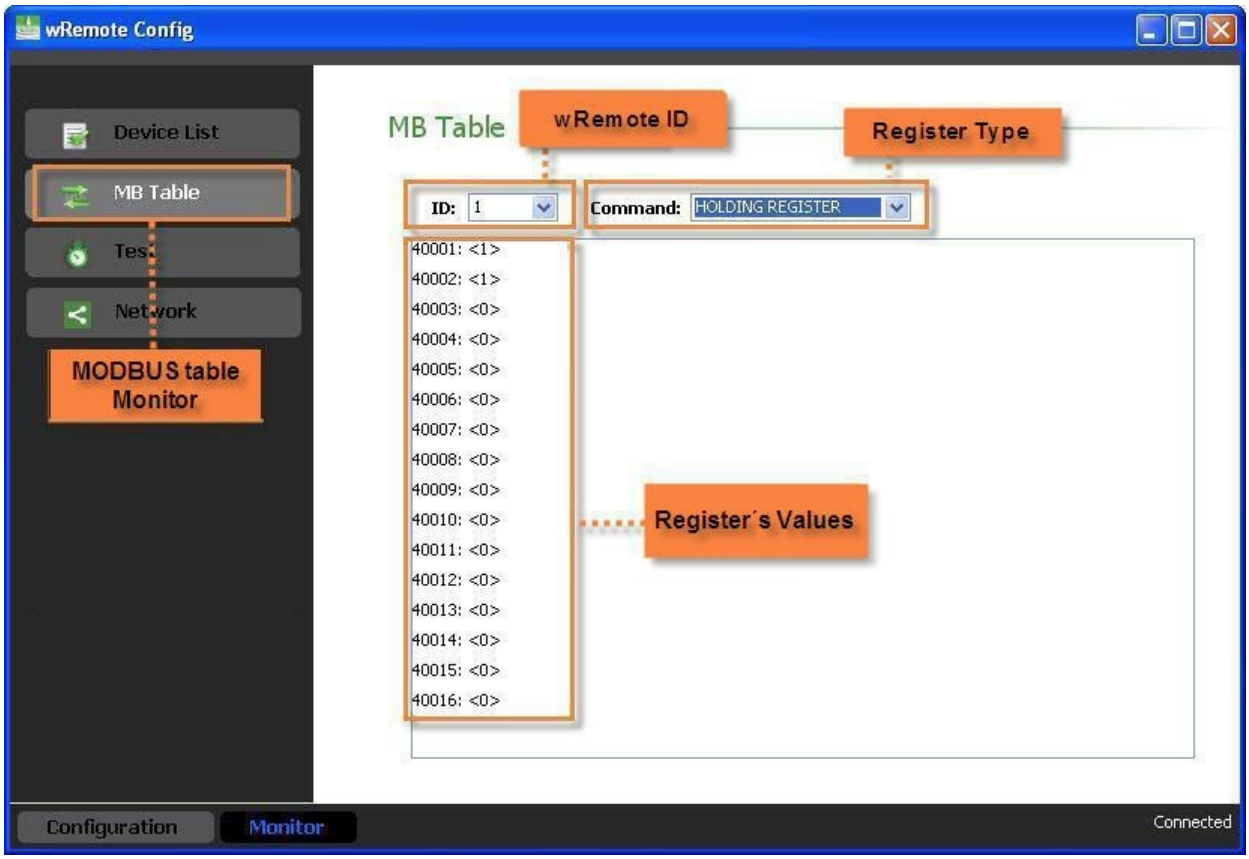


On this screen we will have 2 types of monitoring; one will be “Device List” where we see the “Nodes” equipment connected to this “Concentrator” and their state. You will also be able to connect and disconnect by assigning them an ID. Double click on any of the devices that are connected and access the configuration remotely the same.



The other type of monitoring is “MB Table”, in this table we are able to see the Internal Modbus

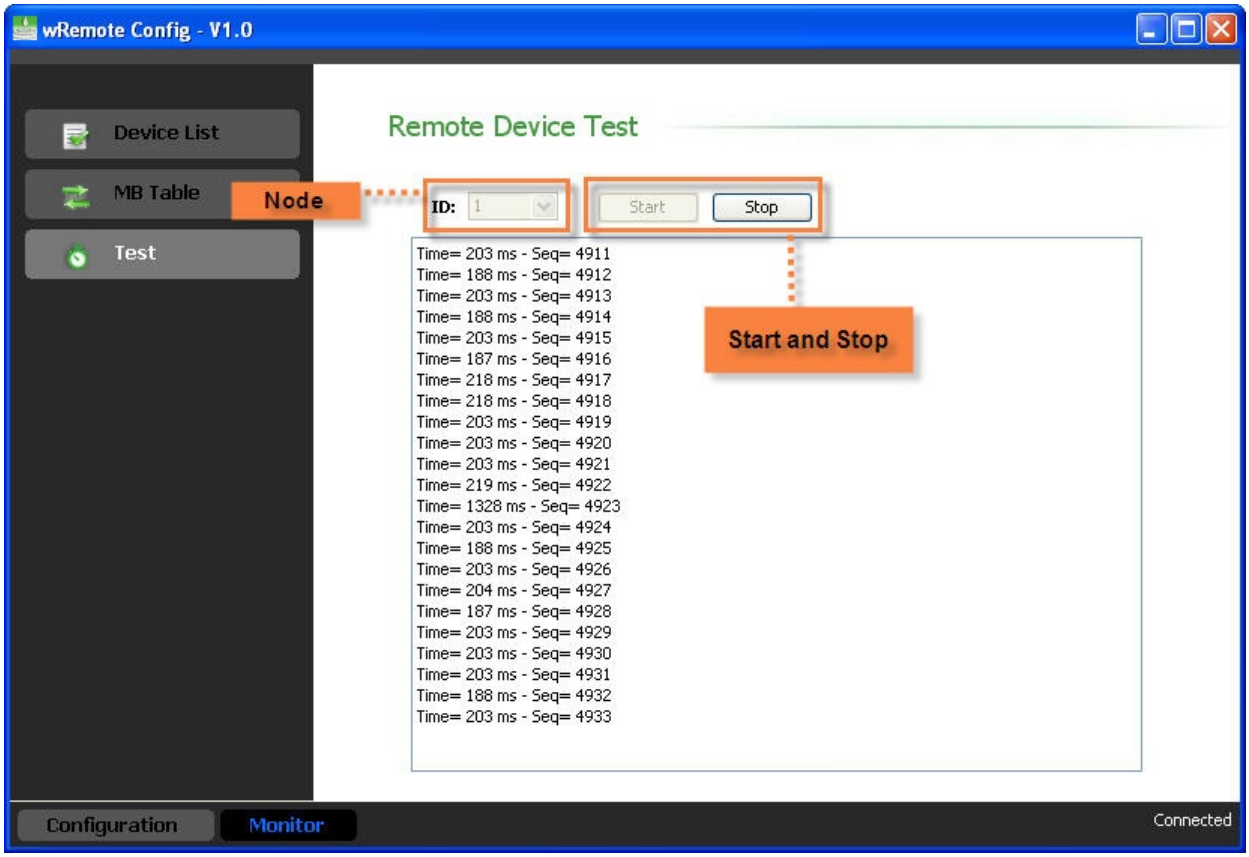
table of the “Concentrator” which contains the status of the inputs / outputs and connect the “Nodes” by “ID” divided into Input Status, Coil Status, and Holding Registers.



The Input Status belongs to the digital inputs, the Coil Status to digital outputs, and Holding Register to Connection State. The digital inputs and outputs are mapped to a 16-bit log and the analog inputs and outputs in a separate log, one for each.

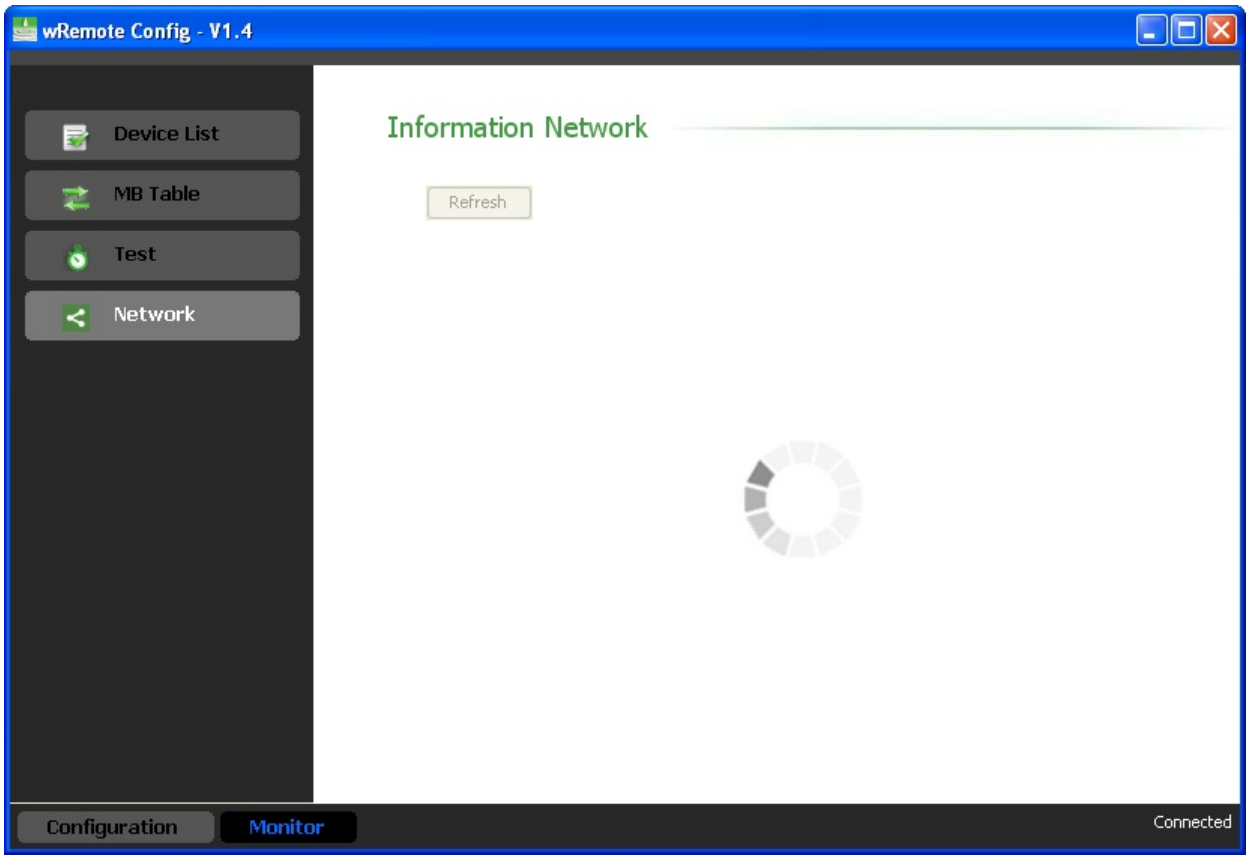
We also have the option to test, this allows us to verify the quality of connection to a particular “node” that sends and receives packets by measuring the time it takes to return a response.

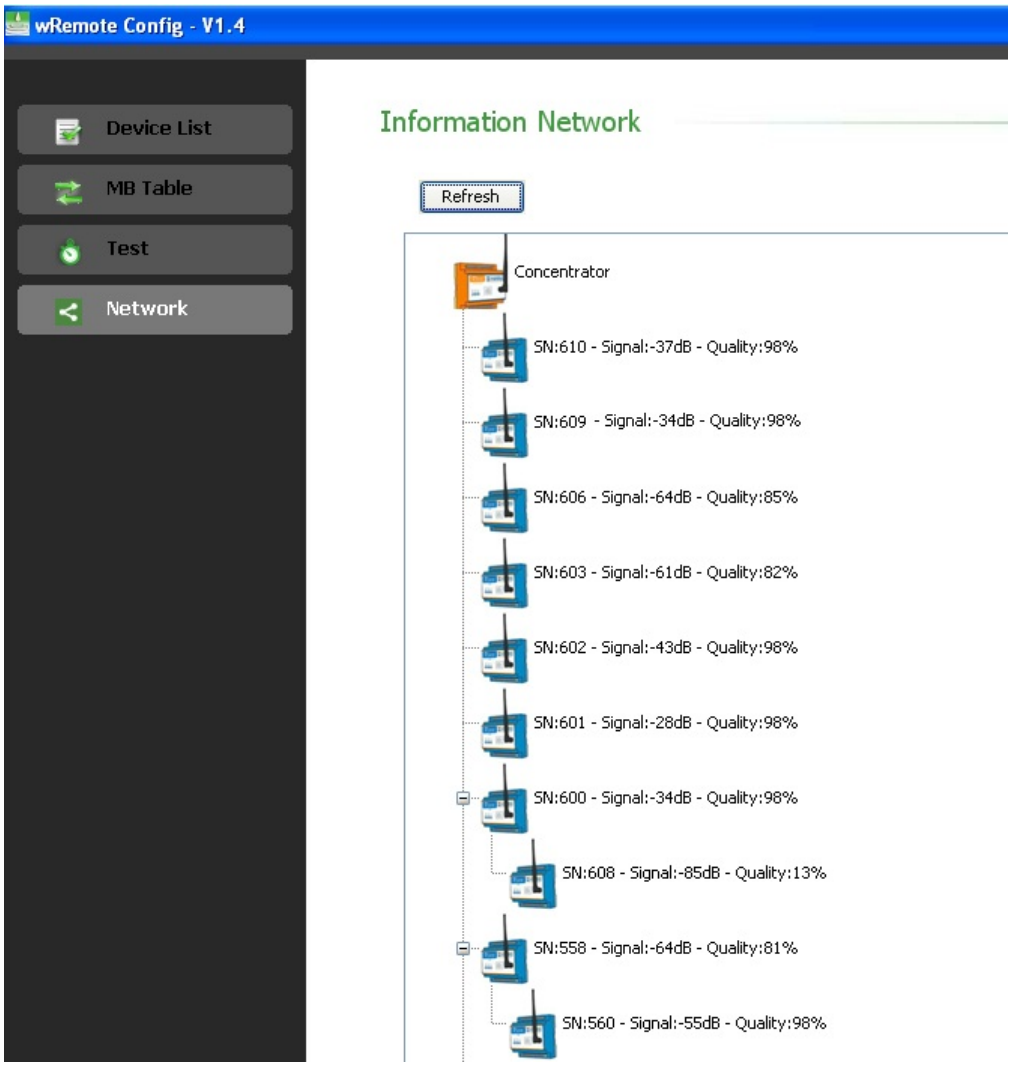
To do this we need only select the “Node” and click “Start”, after that we will se packets arrive identified with a sequence number and response time, to stop click “Stop”.
In case of a lost packet we should look at the label “Request Timeout”.



We also have the opportunity to see how the network is formed, the signal level and quality of the Nodes; this is done from the network tab.

Here we have to click on the “Refresh” button, the Concentrator the queries remotely the parameters of the Nodes, this process may take a while depending on the number of devices.

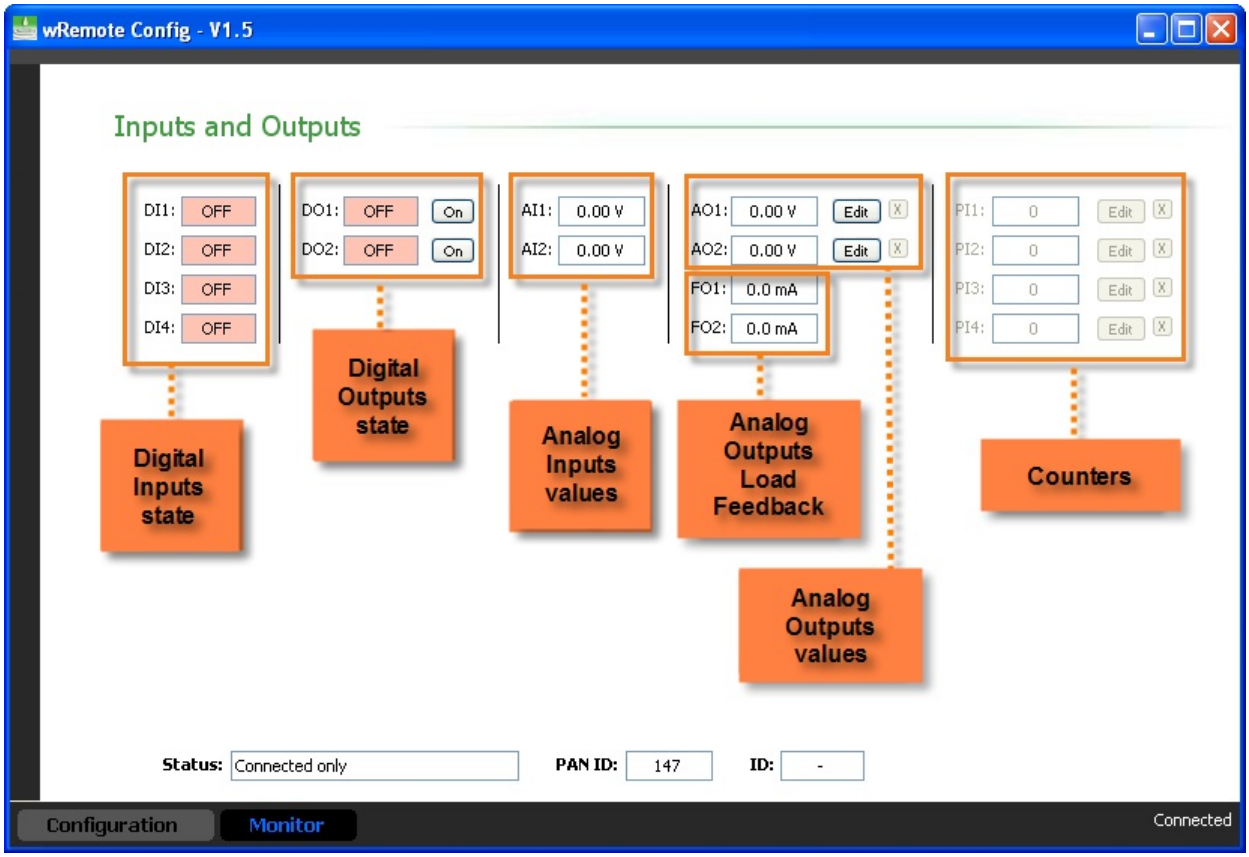




Finally we will see a tree that represents that the equipment is connected, and show the signal levels and quality. As we can see in the picture above, not all nodes are connected directly to the Concentrator but pass through another node, because the equipment has the ability to form mesh network.

- **Monitoring of the "Node"**

  As for the nodes to connect locally or via the “Concentrator” and enter the monitoring option, we will see the connection status and the inputs / outputs.

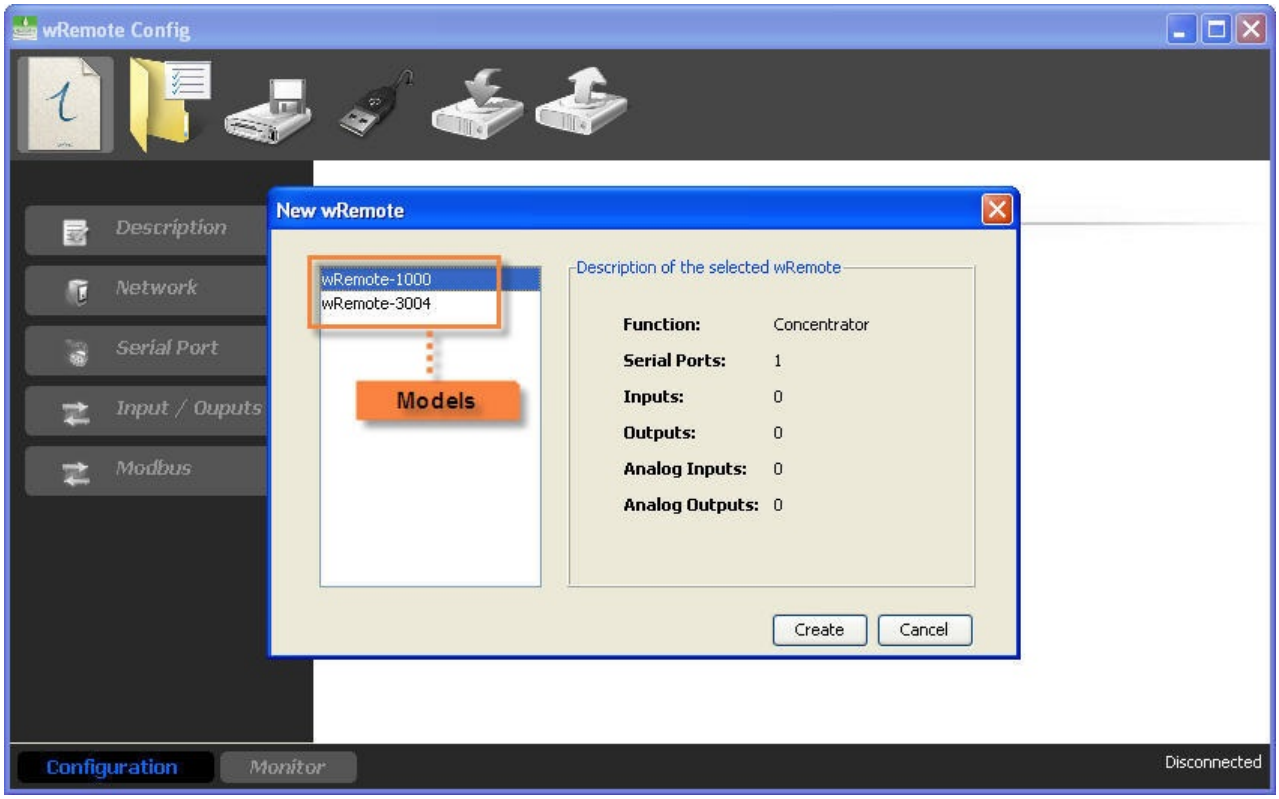


Each analog output has an indicator box (Input Feedback) associated that lets us know the state of the output. The voltage indicates to us the current that is delivered to the load whose maximum is 20mA and if you exceed this it will read “Over Load”. It acts the same way with current but will indicate the load connected to be high (depending on supplied voltage) and display “Open Loop”.

From here we are also able to modify the value of both digital and analog outputs and counters.

Saving Configurations

The “wRemote Config” allows us to save the configuration of a wRemote so that if we need to setup more equipment in the same way, we do not have to reload the parameters one by one.
To create and save a configuration it is not necessary to have a connected wRemote, just click on “New” represented by the icon , a list of models that you can configure will appear.



Then configure the parameters and save with “Save” and then when we have our wRemote loaded and connected, the type of file to be saved is “*.wre”.

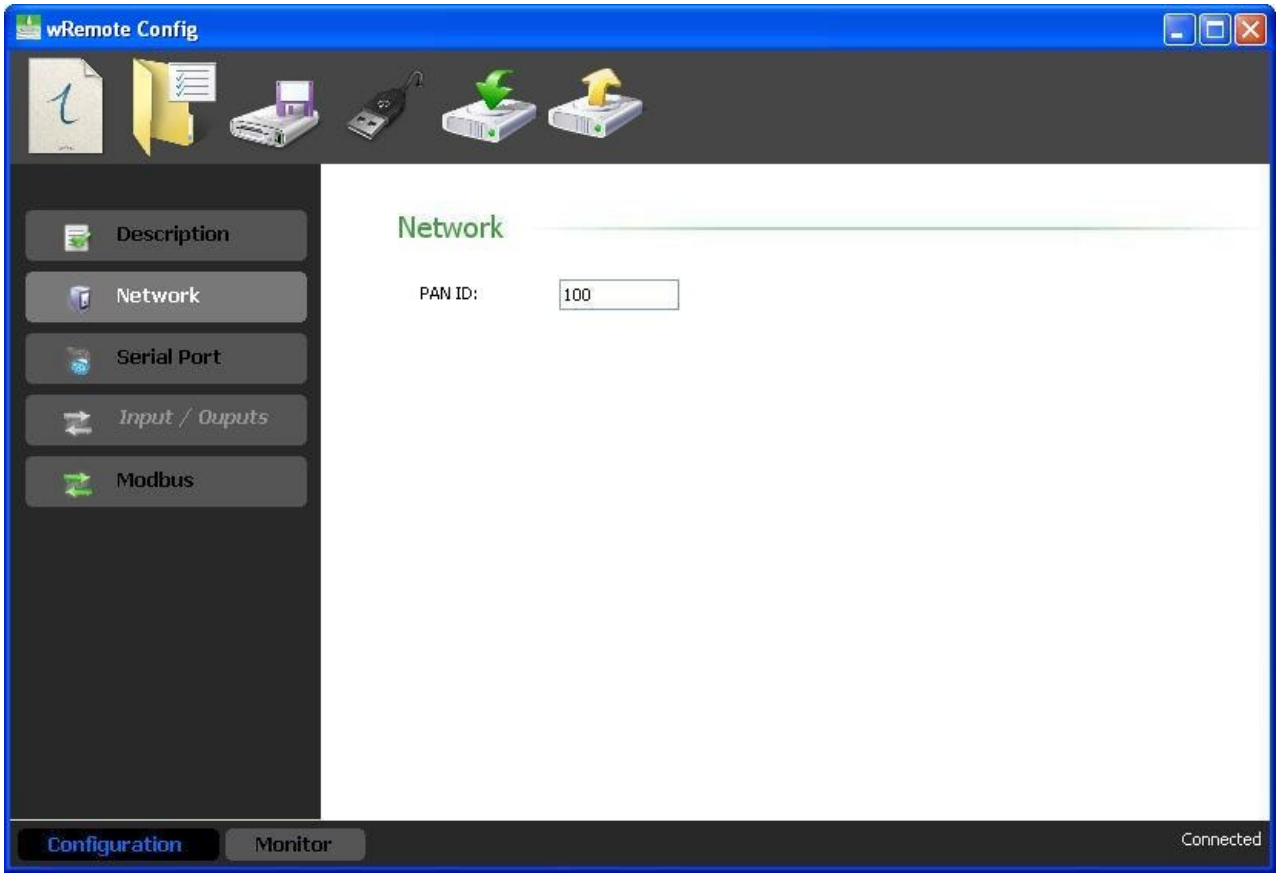
Once you save the configuration we can open and load multiple wRemotes entering “Open”. .

In the same way we can read an existing configuration and save a wRemote then upload it to another.

Assembling the Network

Configuration of the Concentrator and the Nodes

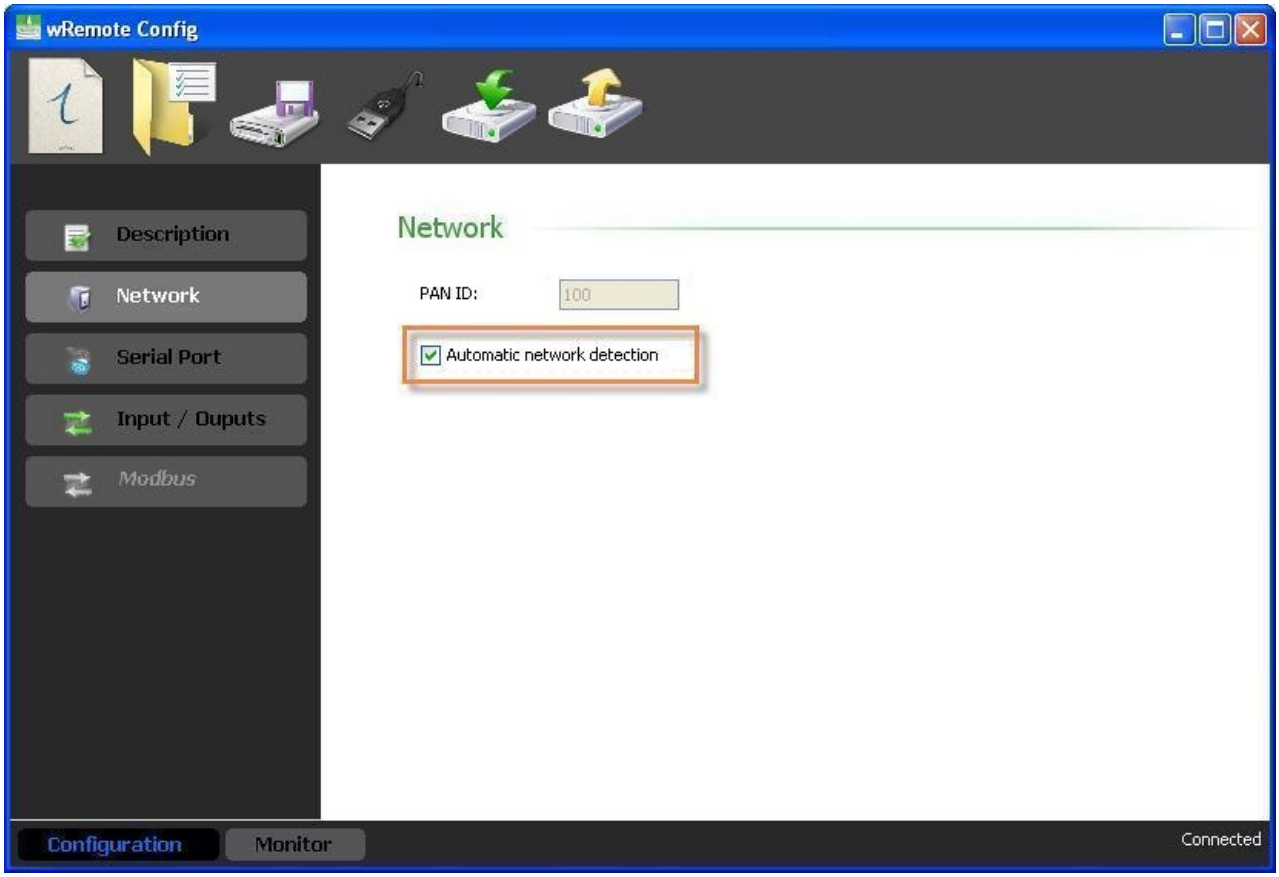
The assistant to form the network is the concentrator, if you connect to “wRemote Config” and read the configuration and go to the tab “Network”, we will see a parameter called “PAN ID”. This number is between 1 and 65534 and is the number it will take to the network, the default value is 100; this means that if you boot the computer for the first time and did not configure it will also form a network with the number 100.



Once the “Concentrator” has formed the network, we will see that the LED link will stop flashing and stay lit.

Now see how to connect the “Nodes”:

These have the option to automatically detect the network which is enabled on the same tab “Network”. This is the value that comes from the factory, so if we turn it on and there is a “Concentrator” that has formed a network; it will automatically connect and can also be manually configured.



Once you have connected the “Nodes”, you will be able to link them to the “Concentrator”.

Then we will see an example from the beginning of how to form a network and link “Nodes” devices to a “Concentrator”

We suppose the following devices:

1. ***wRemote-1000 - "Concentrator"***

   Serial Number : 125

2. ***wRemote-3002 - "Node"***

   Serial Number : 126

3. ***wRemote-3002 - "Node"***

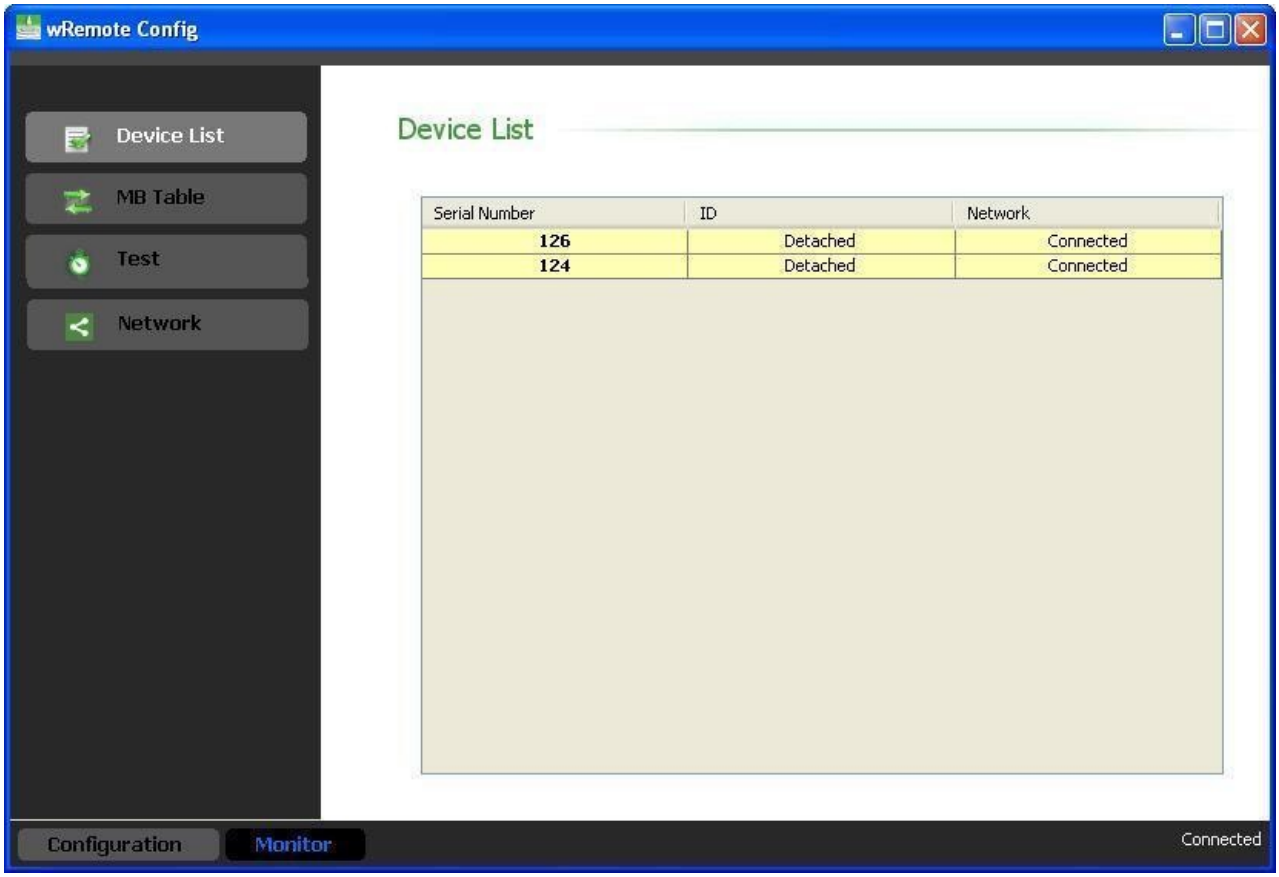
   Serial Number : 124

All the devices have factory settings

First turn on the equipment, then connect the “Concentrator” to a PC via USB and open the “wRemote Config”. Read the parameters and decide whether to leave the “PAN ID” at 100 or place another, in this case we leave it at 100 and we hope that it will form a network, remember that this happens when the “Link” LED keeps flashing.

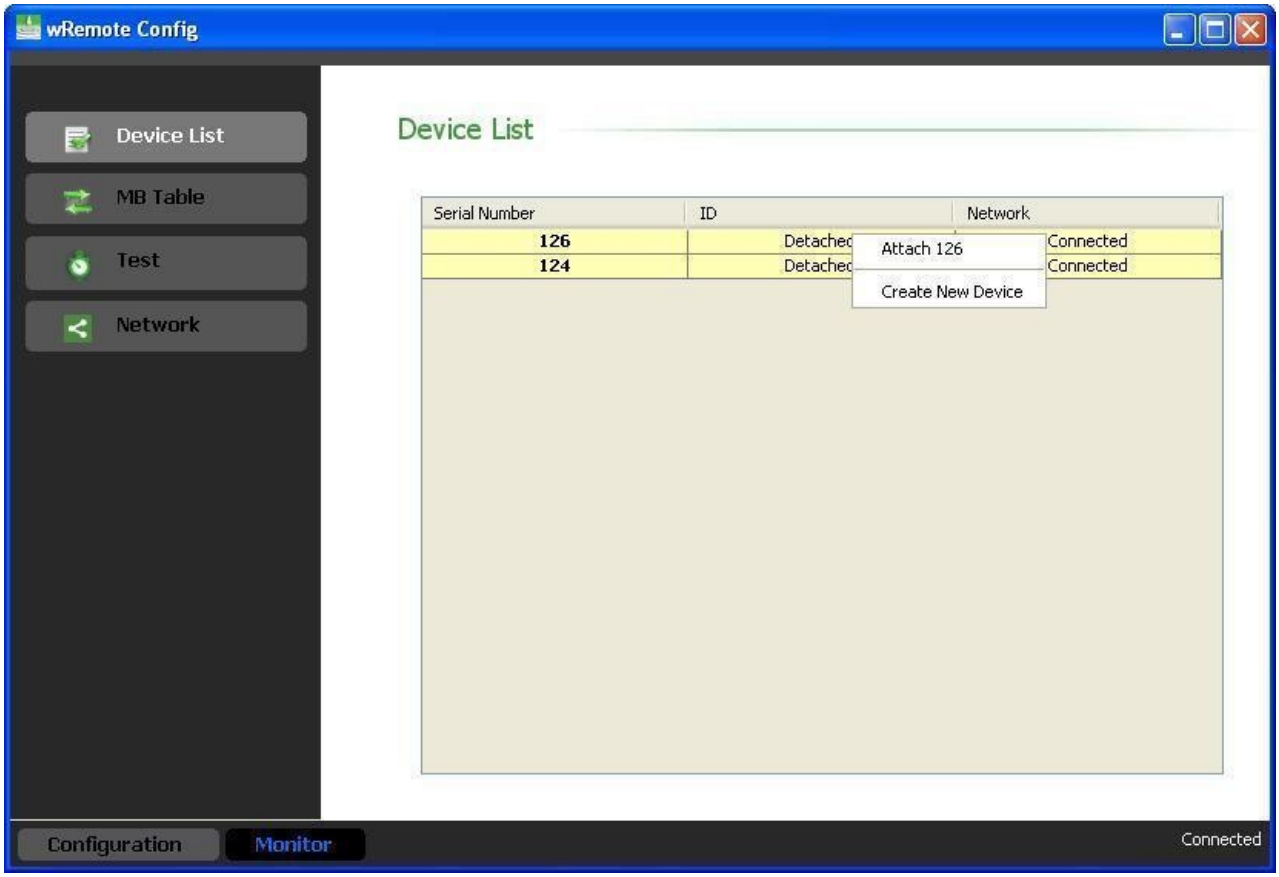
Once the network is formed the “Nodes” will connect to the same network because they are set to auto detect. We will realize this because the slow blinking “Link” LED will begin to blink rapidly.

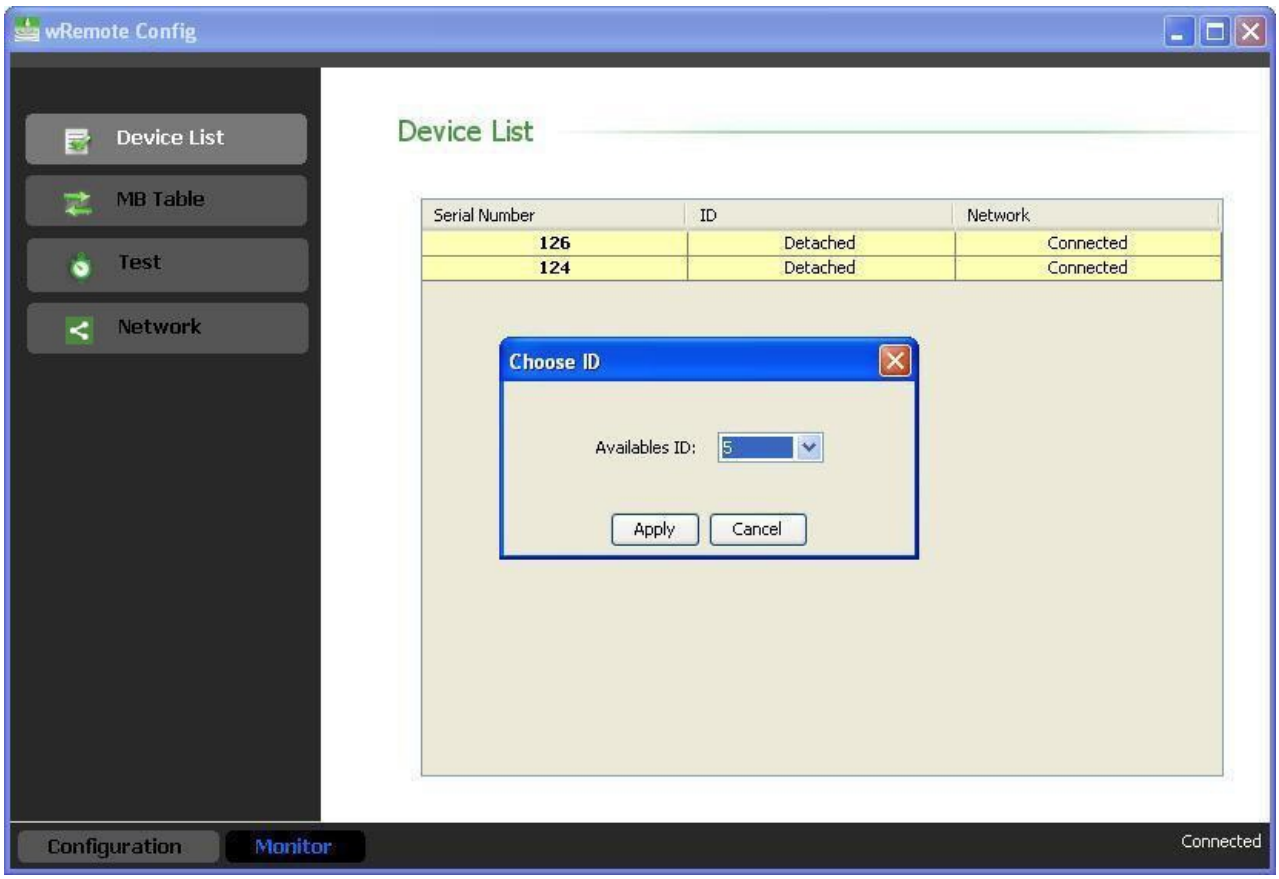
In the “wRemote Config” that is connected to the “Concentrator”, we go to the “Monitoring” and “Device List” screen, if the “Nodes” are already connected we will see something like this:



As we can see in this table the 2 “Nodes” in yellow with “Detached” in the “ID” parameter and “Connected” in the “Network” parameter, means that they are connected but not linked to the “concentrator”. The relationship implies that the “Nodes” began sending parameters to the “Concentrator” and when it is turned off and turned back on it will connect to the new “PAN ID” because auto detection is disabled. Otherwise they only connect without transmitting your data and if you go out and come back on they search for a new network automatically.

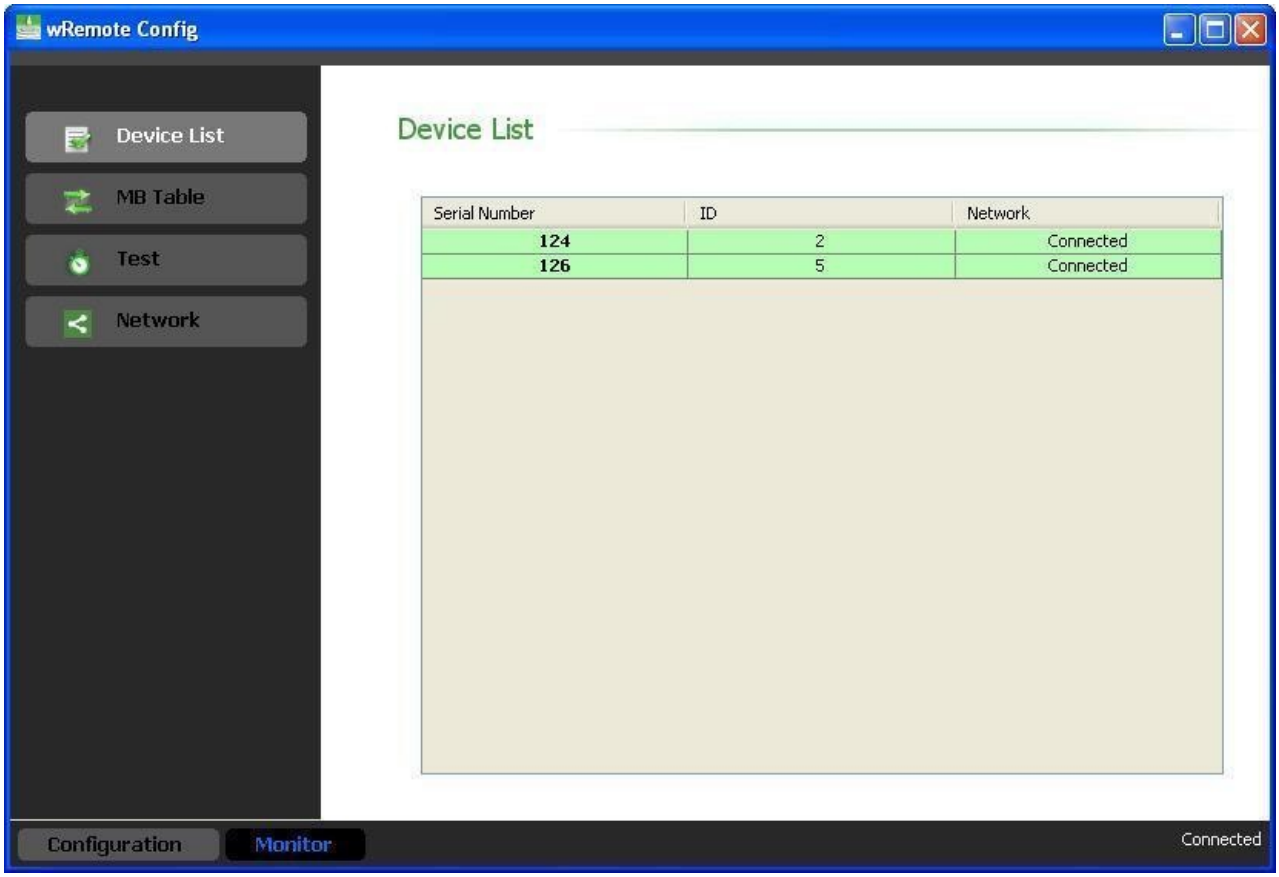
To link you must click the right mouse button on the one you want and will see the option to “Attach ***” where *** is the serial number of the equipment. We click and it will open a window where you can select the “ID” number for that “Node”.





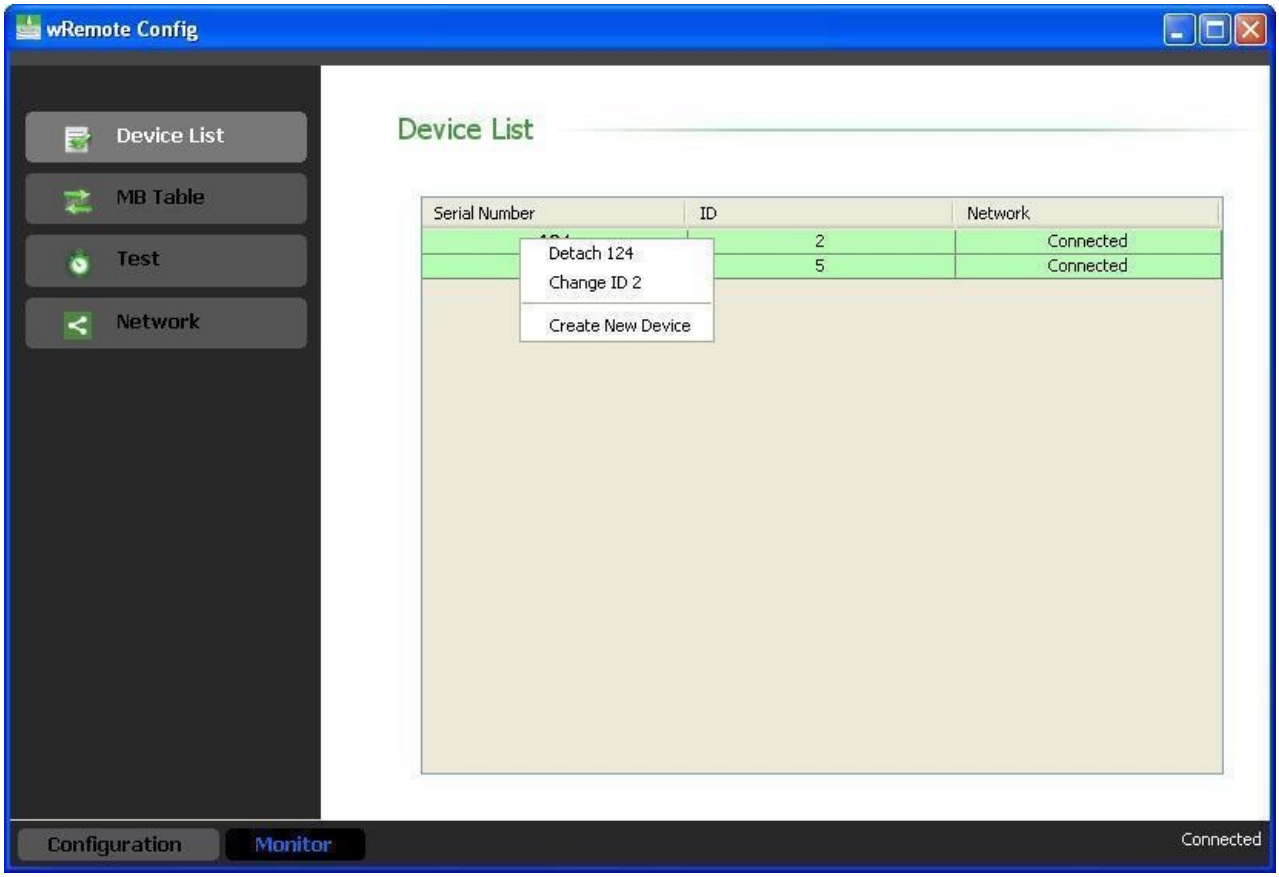
We link the two “Nodes” and see that the parameter “ID” changes in “Detached” and select the number you designated in green. In this case the, select the ID = 2 for serial number 124 and ID = 5 for 126.

In the “Nodes” we can see that the “Link” LED stop flashing quickly and stay lit indicating linkage.



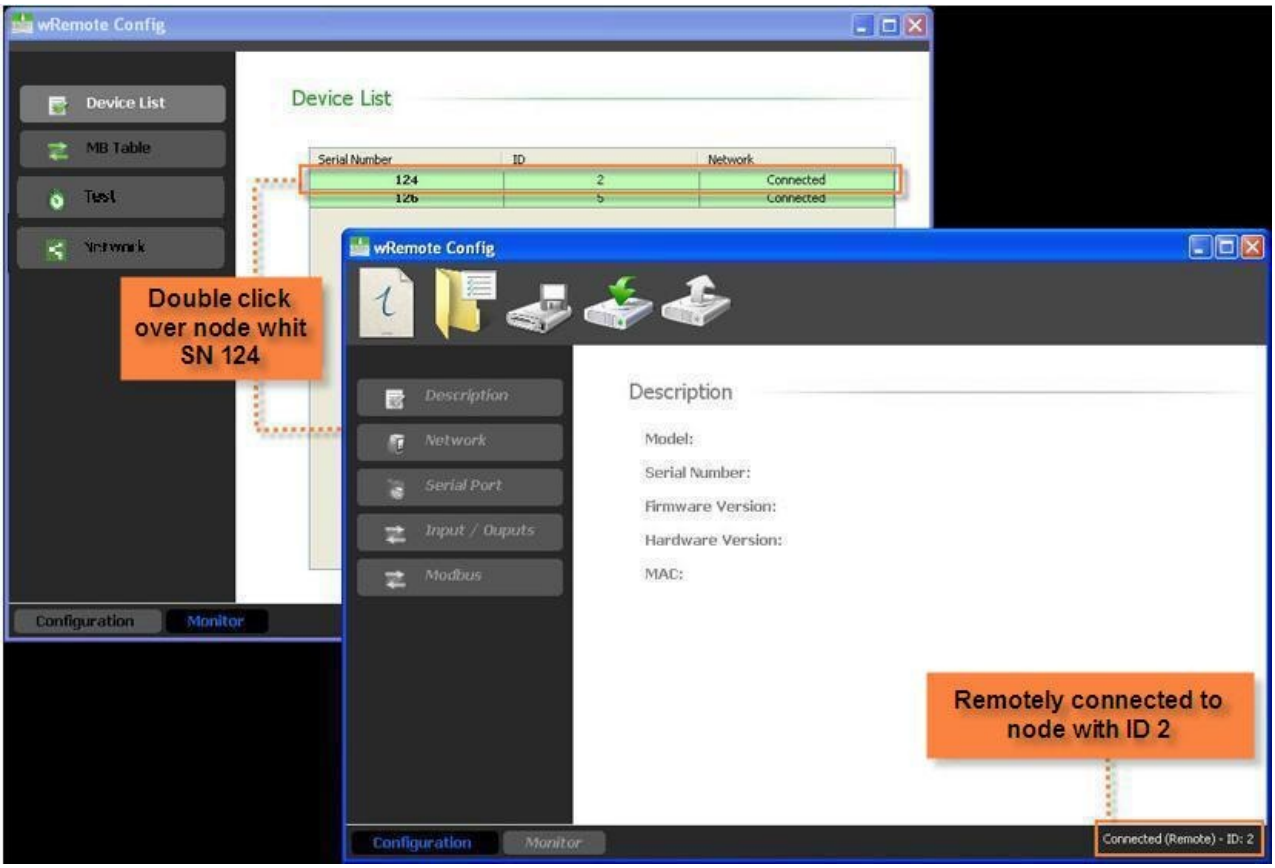
⚠	*It is important to note that to link the "Nodes" they will fix their "PAN ID" meaning network autodetection will be disabled.* *If for some reason you change the "PAN ID" of the "Concentrator" and want the "Nodes" to connect to it again, we will have to change their "PAN ID" locally or press the "Reset" switch.* *The "Reset" switch releases the "Node" device and places it back in autodetect mode.*

Once linked, we can unlink in the same way that we linked, by clicking the right mouse button on the one that we want, but now selecting "Detach ***" or rename the "ID" with the "Change ID".



	It is important to note that we can also link a "Node" before it is connected with the "Create New Device", but all we need to know is the machine's serial number and assign it an ID.

If you double click on a "Node" that is connected, we enter the setup remotely. Doing so will open another window "wRemote Config" as if it was connected locally giving us access to all parameters.



	When we disassociate one "Node" from the "PAN ID" that was configured and re-enabled into automatic network detection, this means that it will connect to the nearest network, which may or may not be the same network it was connected with.

Once we have the "Nodes" equipment linked we can begin to use them in any mode of operation.

Simultaneous Networks

Suppose that we have 2 "Concentrators", this means that they form 2 networks, for this to happen it is mandatory that we set the "PAN IDs" up different from one another.

Now we will have "Nodes" that we will want connected to one "Concentrator" and others connected the other "Concentrator". In this case it is important to pay close attention to the "PAN IDs"; if the "Nodes" are configured for automatic detection then they were connected to the network with a stronger signal which may not be what we want. To resolve this dilemma continue with the following:

The method consists in turn to separate networks. This means we change the "Concentrator" and "Nodes" that we want connected and from the configuration of the "Concentrator", to link them just reconnect it. We can do the same with the other network as well.

It is important to note that if we disassociate one "Node", this will disconnect and reconnect but may not be to the same network if it detects another with a better signal.

Wireless access to Modbus Slaves

In this mode the wRemote concentrator behaves as a de-multiplexer Modbus, this means that it will derive serial Modbus queries that are made in the “Concentrator” and travel through the network to “Node” devices, and then returning the answers back to the “Concentrator”.

This mode has the advantage of being able to use protocols and distinct serial port speeds and baud rates on each side.

Then we will see the settings in the “Concentrator” and “Node”.

Connecting

The Modbus Master can be connected to the “Concentrator” by RS232 / RS485 ports or USB and slaves can be connected to the “Nodes” using RS232 / RS485 ports.

Configuration

Concentrator Configuration:

Assuming the network formed and the “Node” devices linked as we saw in “Assembling the Network”, proceed to configure in the “Concentrator” with “wRemote Config”. The destination of Modbus queries that arrive by the serial port are done in the following way:

For example if we have:

1. ***wRemote-1000 - "Concentrator"***

   Serial Number: 125

   Connected to the Master MODBUS that performs queries in mode Modbus ASCII at 115200 baud.

2. ***wRemote-3002 - "Node"***

   Serial Number: 126

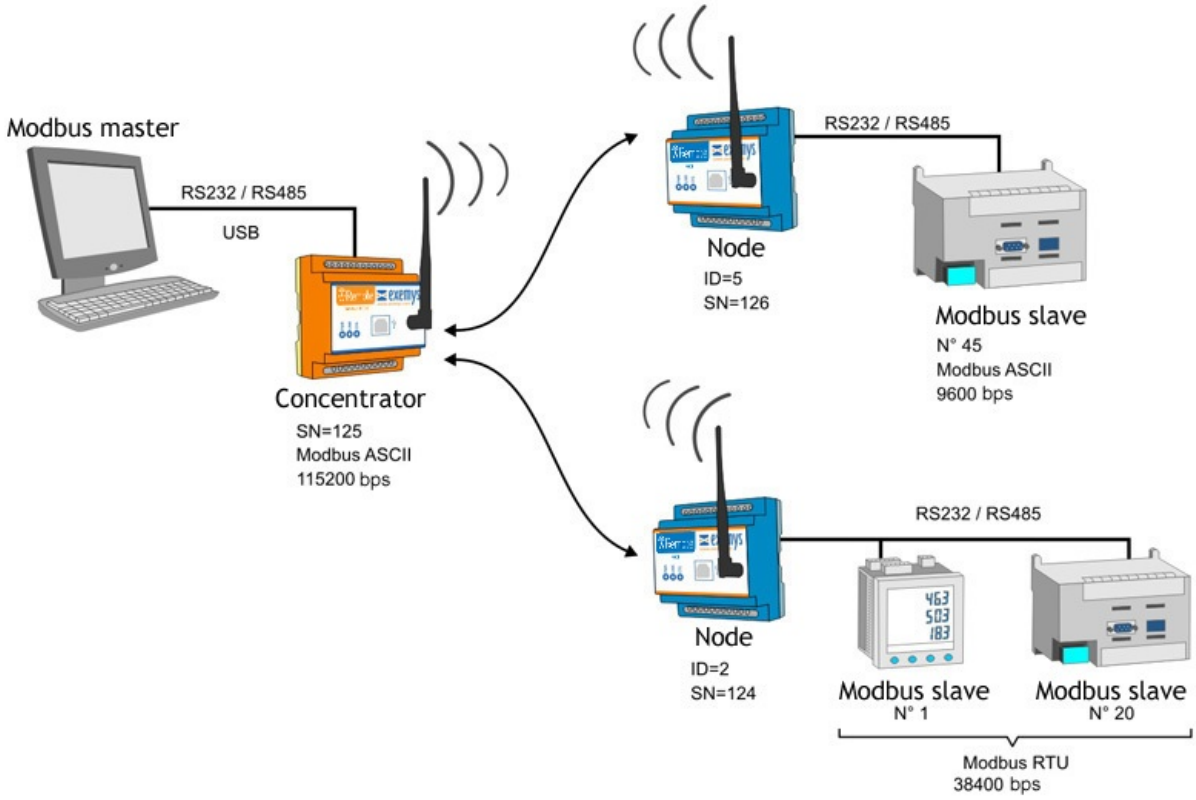
   Connected to the MODBUS slave that operates in Modbus ASCII at 9600 baud, Slave = 45

3. ***wRemote-3002 - "Node"***

   Serial Number: 124

   Connected 2 MODBUS slaves that operate in Modbus RTU at 38400 baud, Slave = 1 and Slave = 20

The topology of this example would be as follows:

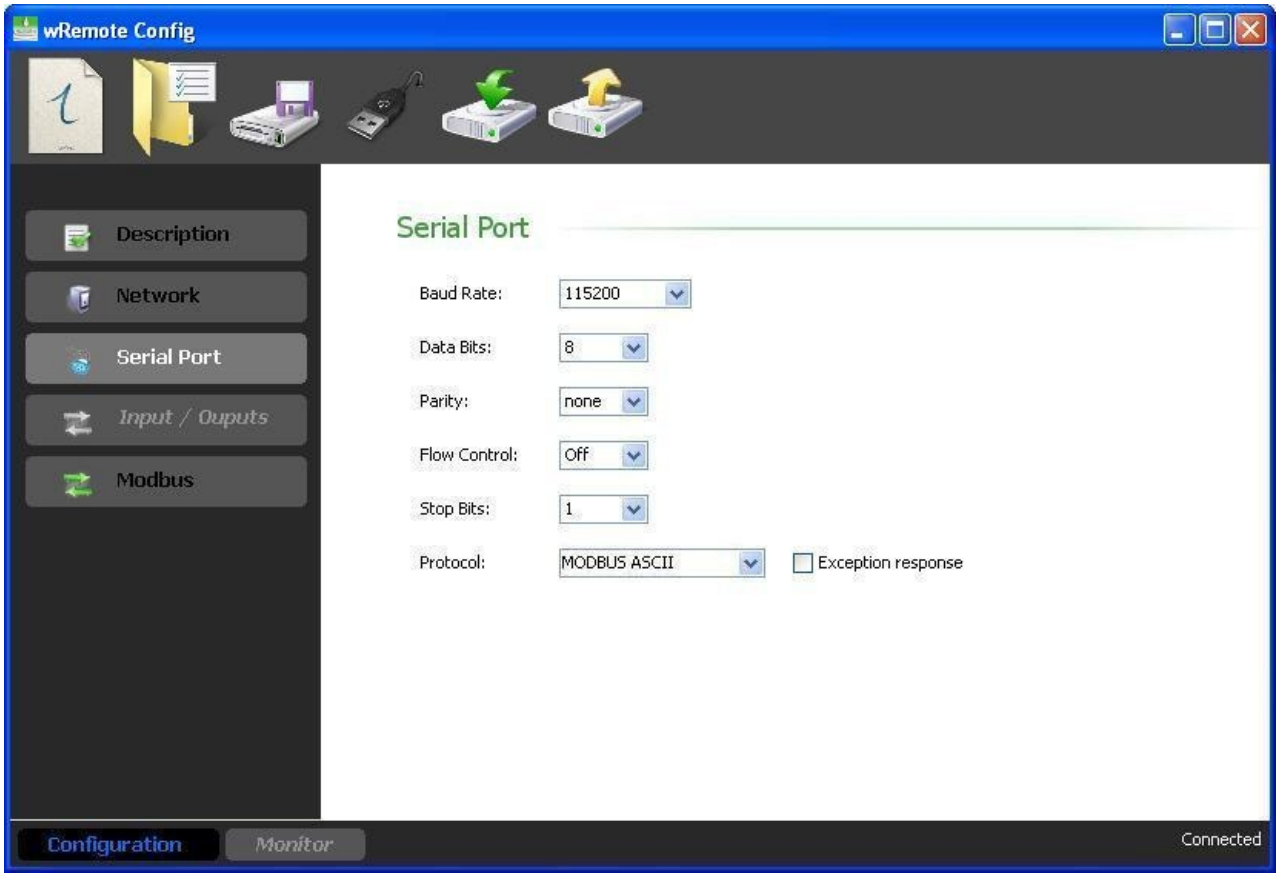


As we saw earlier each “Node” has an “ID” number that is used to relate the query. First we must identify that the “ID” are connected slaves, we do this in the image above:

The “Node” with serial number 126 has the “ID” 5, and we know that it is connected with slave 45

The “Node” with serial number 124 has the “ID” 2, and we know that it is connected with slaves 1 and 20

First we connect with the “wRemote Config” to the “Concentrator” and configure the serial port parameters. Go to the tab “Serial Port”, as specified in the example we place it in Modbus mode ASCII at 115200 baud, we must also take into account flow control, parity, etc…

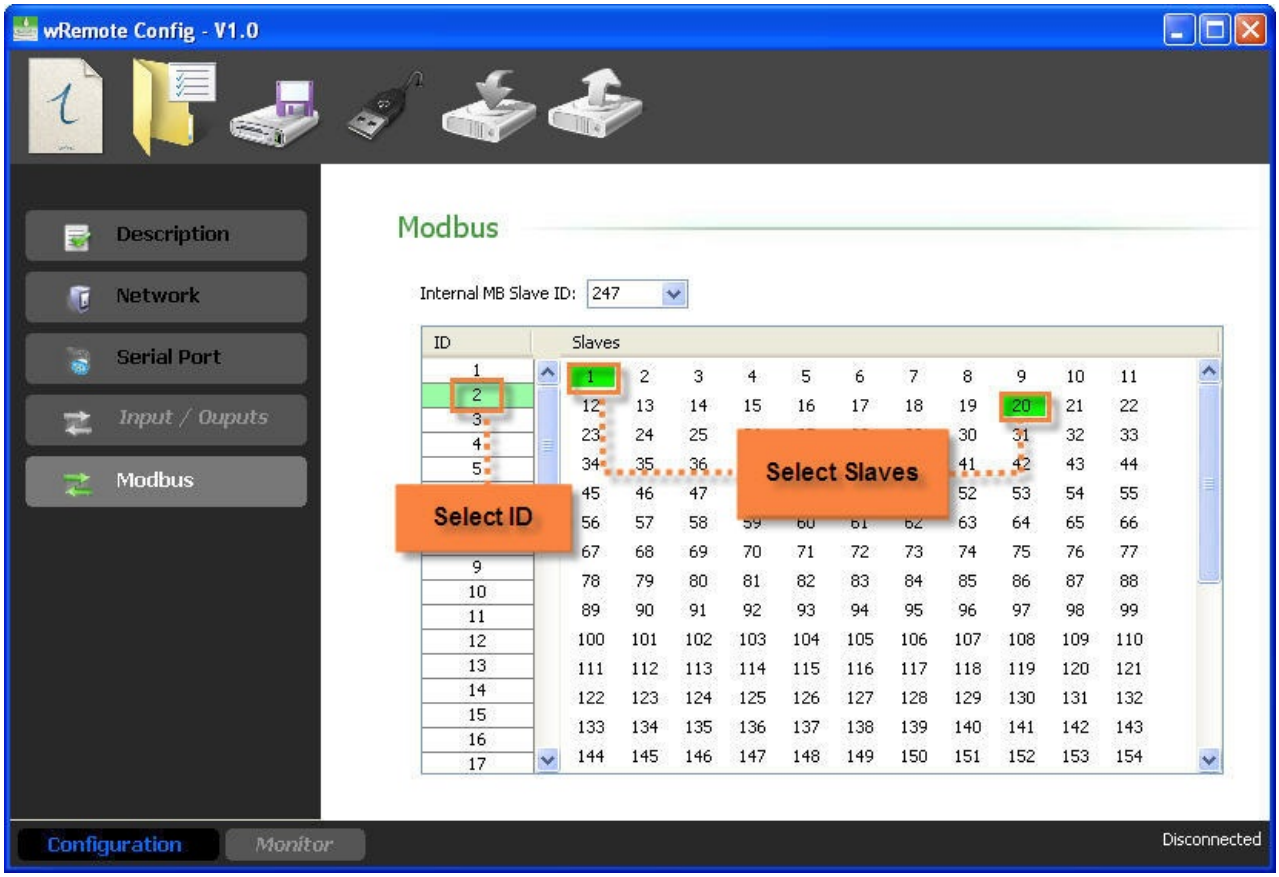


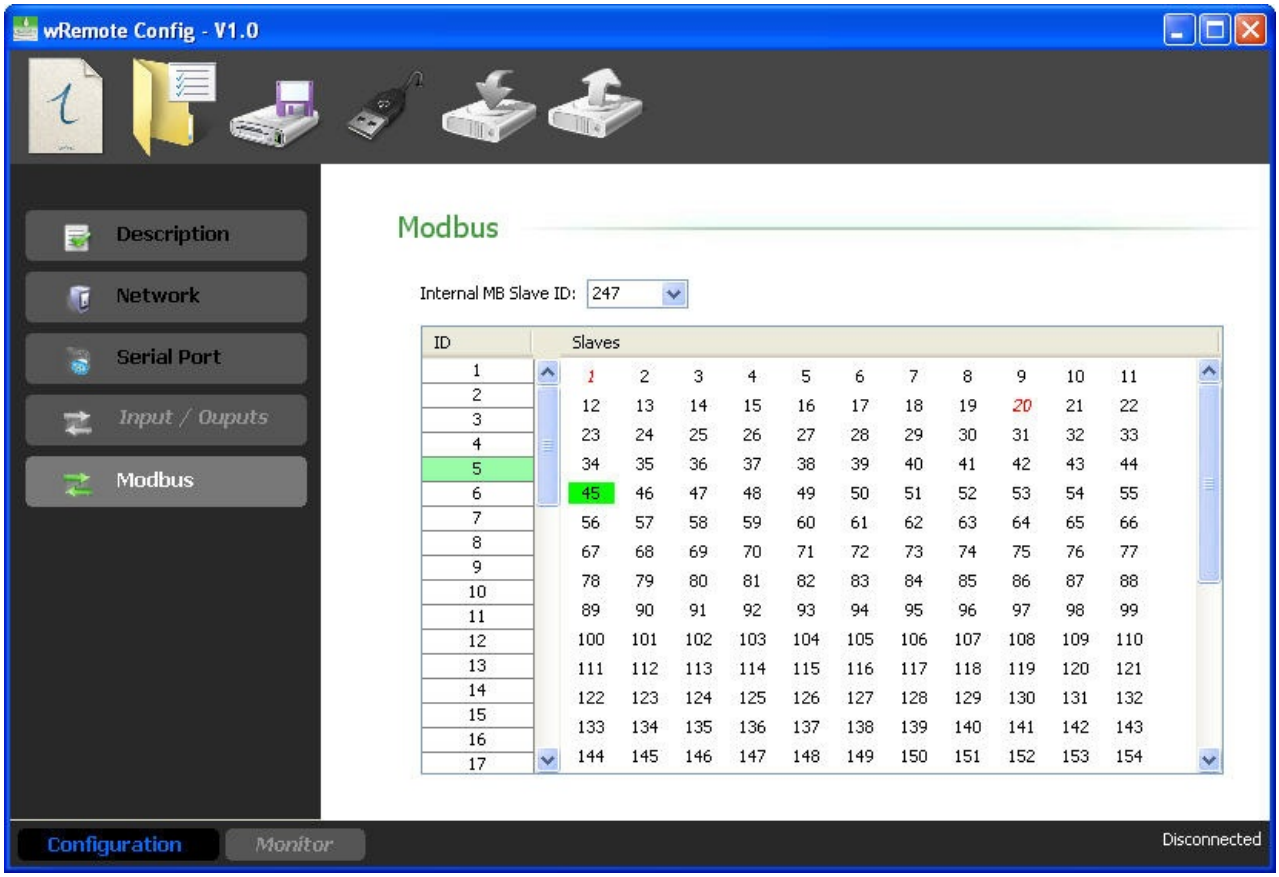
As we can see in the image, we have the “Exception Response” option; this enables or disables the response with exceptions from the “Concentrator” and can be helpful to us in the following case:

If the “Concentrator” is in a RS485 bus with parallel slaves and queries an ID that is not its own and neither is connected remotely but is of a slave that is in the bus, the wRemote will respond as an exception or not depending on how this option is configured. Obviously in this case we disable it to avoid a conflict in communication.

After that we go to the tab “Modbus” where we configured the derivation of individual “ID” queries that are connected slaves.

To do this select the “ID” in the left column and then the slaves in the “slaves” table on the right.



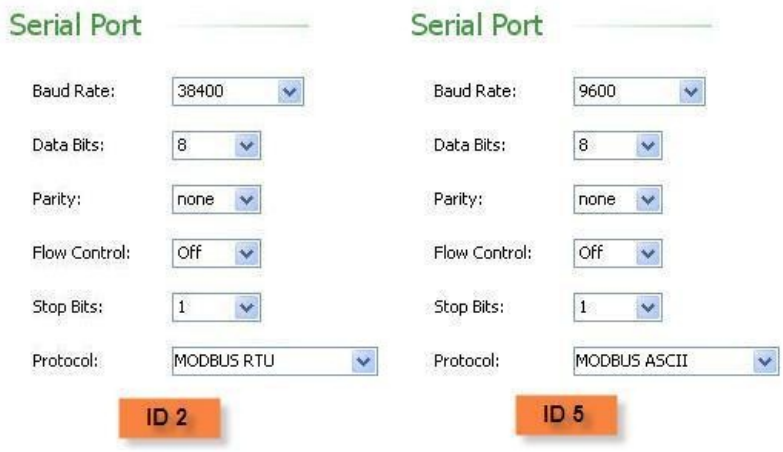


As we see the ID 5, we assign it slave 45 and for ID 2 we assign slaves 1 and 20. So any queries that reach RS232 / RS485 or the USB ports of the “Concentrator” and is intended for slave 45 is transmitted to wRemote “Node” with the ID 5 and if they are intended for slave 1 or 20, they will be routed to ID 2.

When finished we send the configuration to the “Concentrator”

Configuration of the Nodes:

In the “Nodes”, we only have to configure the tab “Serial Port” as required by the slaves. We can do this both locally and remotely.



nce configured, the “Concentrator” and “Nodes” can begin to perform queries.

	The maximum length of a MODBUS query for HOLDING REGISTERS or INPUT REGISTERS is 37 records.

Wireless Inputs / Outputs using MODBUS

The “Concentrador” has an internal Modbus slave containing the value of the inputs and outputs of the equipment “Nodes” connected to it. The values that are read from the slave are only those that correspond to reports from wRemote “Nodes”. Later we will see when and what reports are, that are generated.

In the same way in which queries are performed, external slaves also perform internally; the ID of the latter is configurable. The slave has on your map the values of “Connection Status”, “Digital Inputs”, “Digital Outputs”, “Analog Inputs”, and “Analog Outputs”. We are also able to change the value of the outputs written to corresponding registers. If you enter a record pertaining to an input that will give us an exception, we are unable to make the entry.

Queries can be conducted for example from a SCADA or any Modbus Master that connects to the “Concentrator”.

Then we will see the configuration in the “Concentrator” and “Nodes”

Connection

The Modbus master can be connected to the “Concentrator” using Port Series 232 / 485 or a USB.

The “Nodes” have digital inputs and outputs as well as analog inputs that can be connected to different devices, as we saw in “Installation”.

Configuration

Configuration of the Concentrator:

Assuming the network is formed and the “node” devices are linked we look at the following example:

1. ***wRemote-1000 - "Concentrator"***

   Serial Number: 125

   Internal Slave Number 230

   Connected to the master that sends queries in MODBUS RTU at 115200 baud.

2. ***wRemote-3002 - "Node"***

   Serial Number:: 126

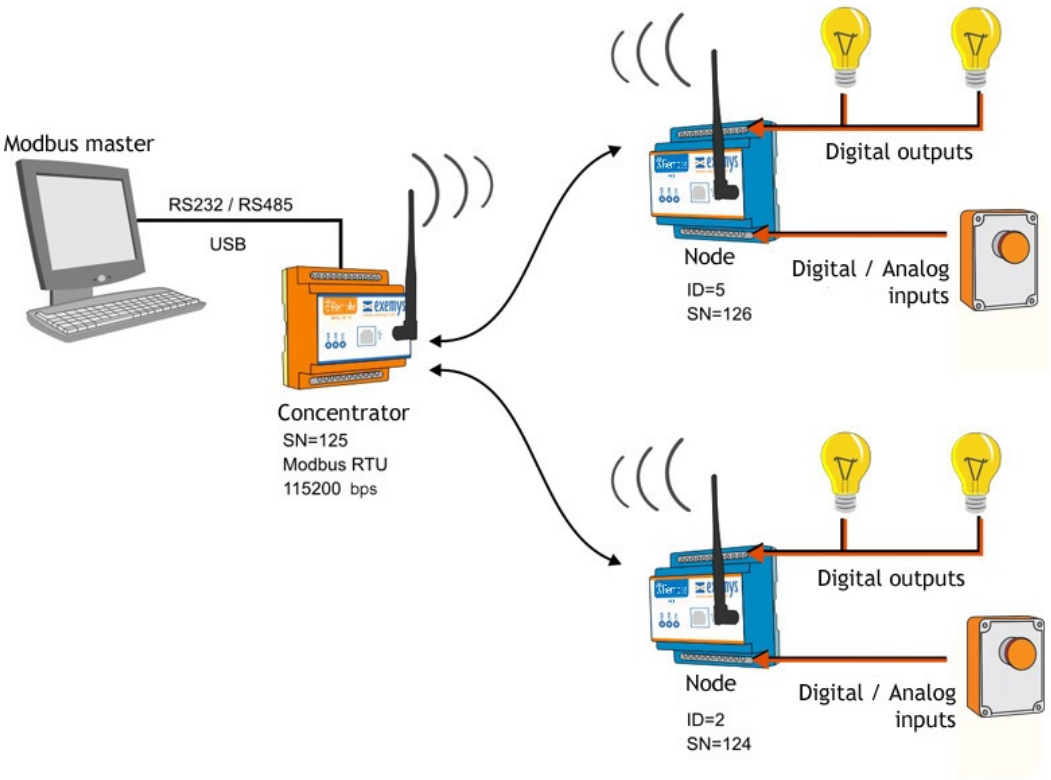
   ID: 5

3. ***wRemote-3002 - "Node"***

   Serial Number:: 124

   ID: 2

The topology of this example would be as follows:

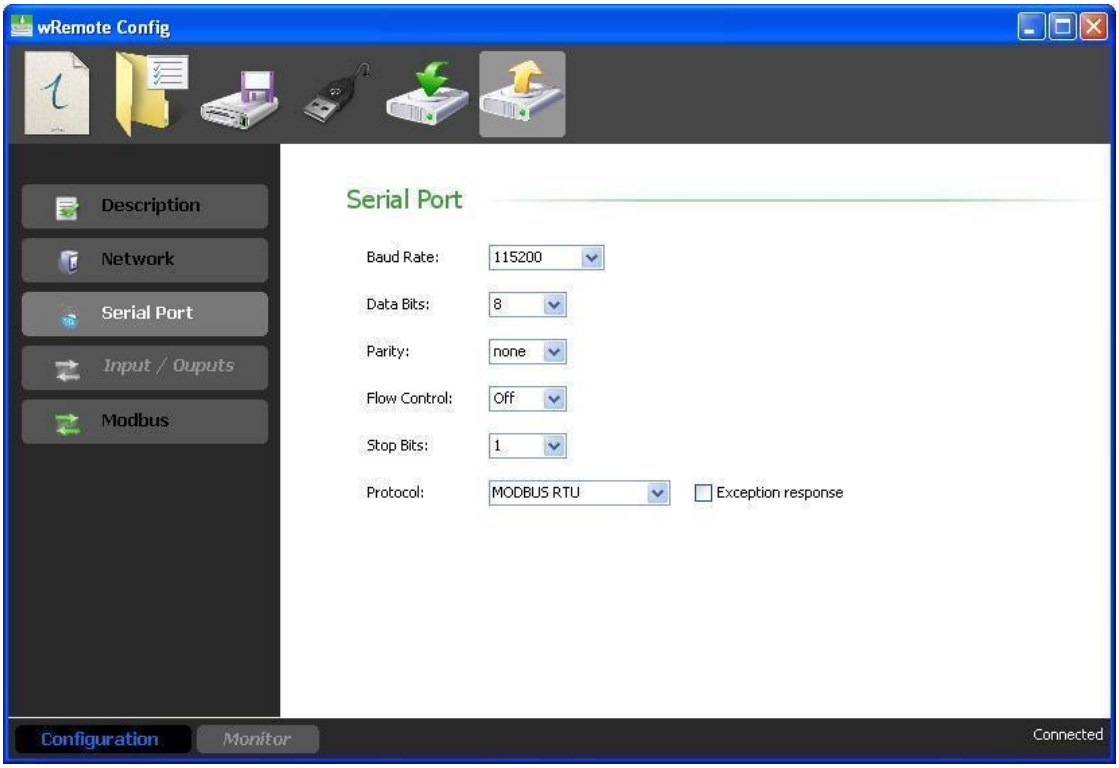


As we saw above, each “node” has an “ID” number that is used to locate the values of their inputs / outputs on the internal Modbus slave table.

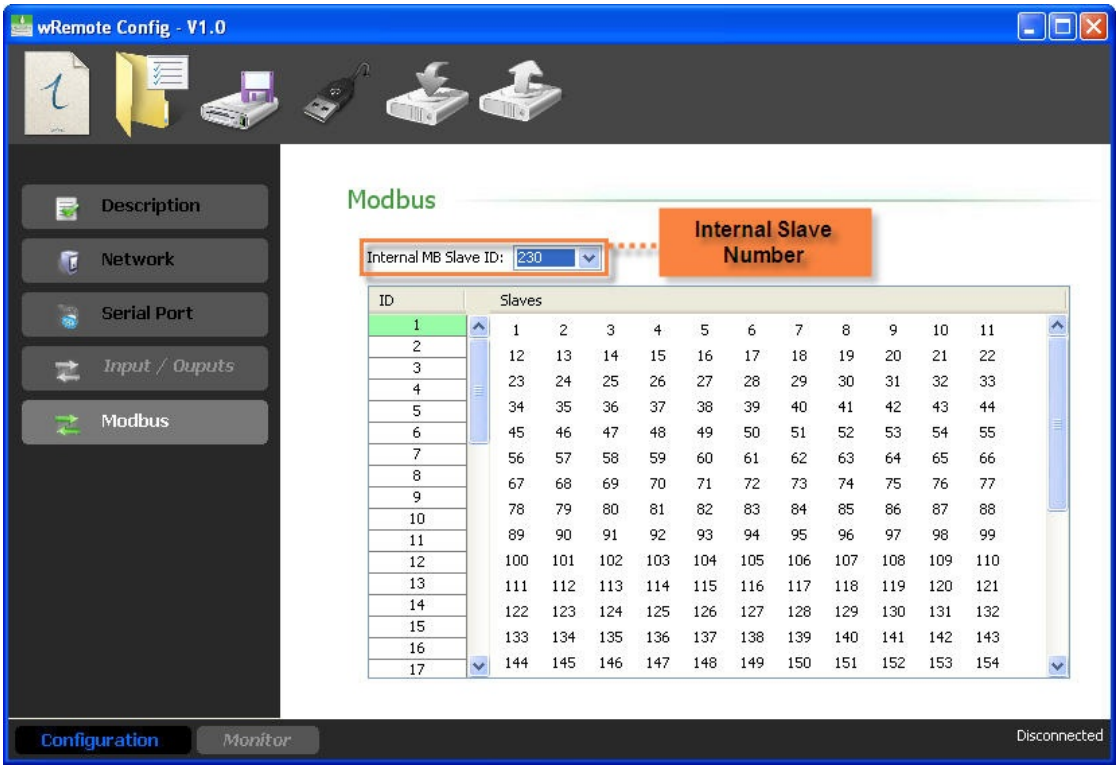
The “Node” with serial number 126 has the “ID” 5

The “Node” with serial number 124 has the “ID” 2

Now go to the tab “Serial Port” in the “Concentrator” and configure it as we specified in the Modbus RTU example, 115200 bauds, we must also take into account flow control, parity, etc.



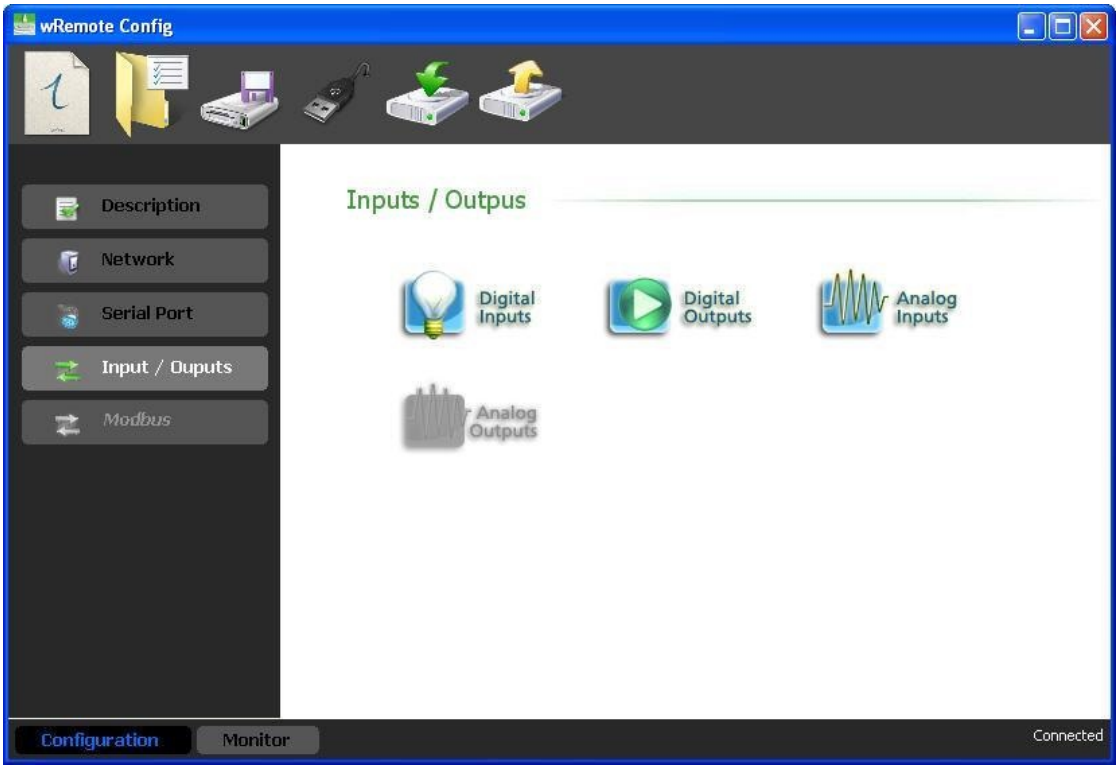
After that, go to the Modbus tab where we configure the internal slave number which for this example is 230.



Once finished, send the configuration to the “Concentrator”.

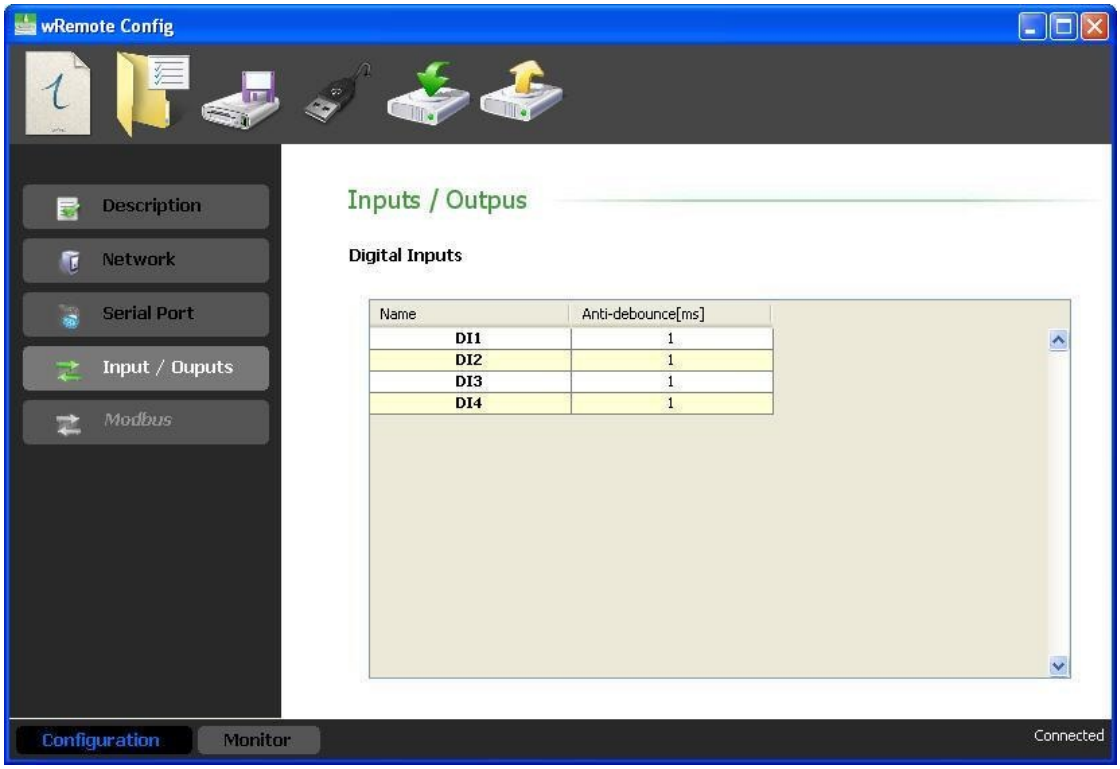
Configuration of the Nodes:

In the “Nodes” we have to configure the inputs / outputs according to our needs. For this we must connect locally or remotely to the “Node” device with the “wRemote Config”. Read the configuration and in the tab “Inputs / Outputs” we will find the different types to configure.



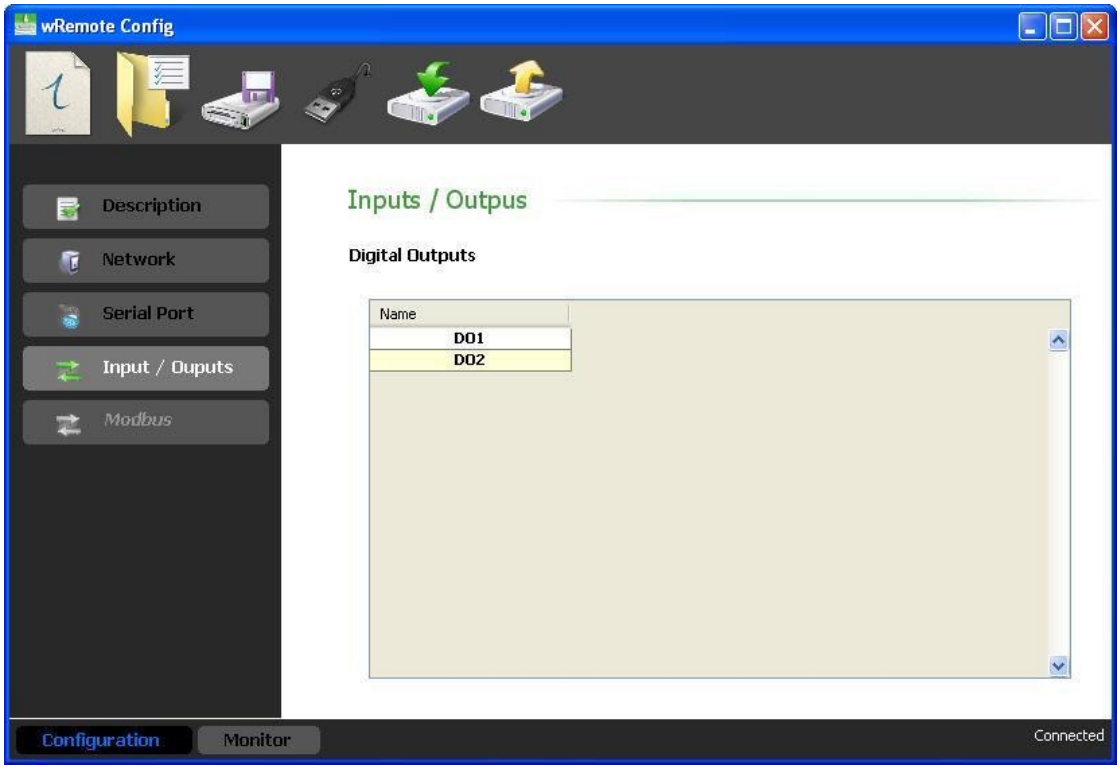
- **Digital Inputs**

  In this case, if the device orders a count entry we can configure if we want it to be reported or leave it without change. We can also select the count divider and define how often we want the counters to report.



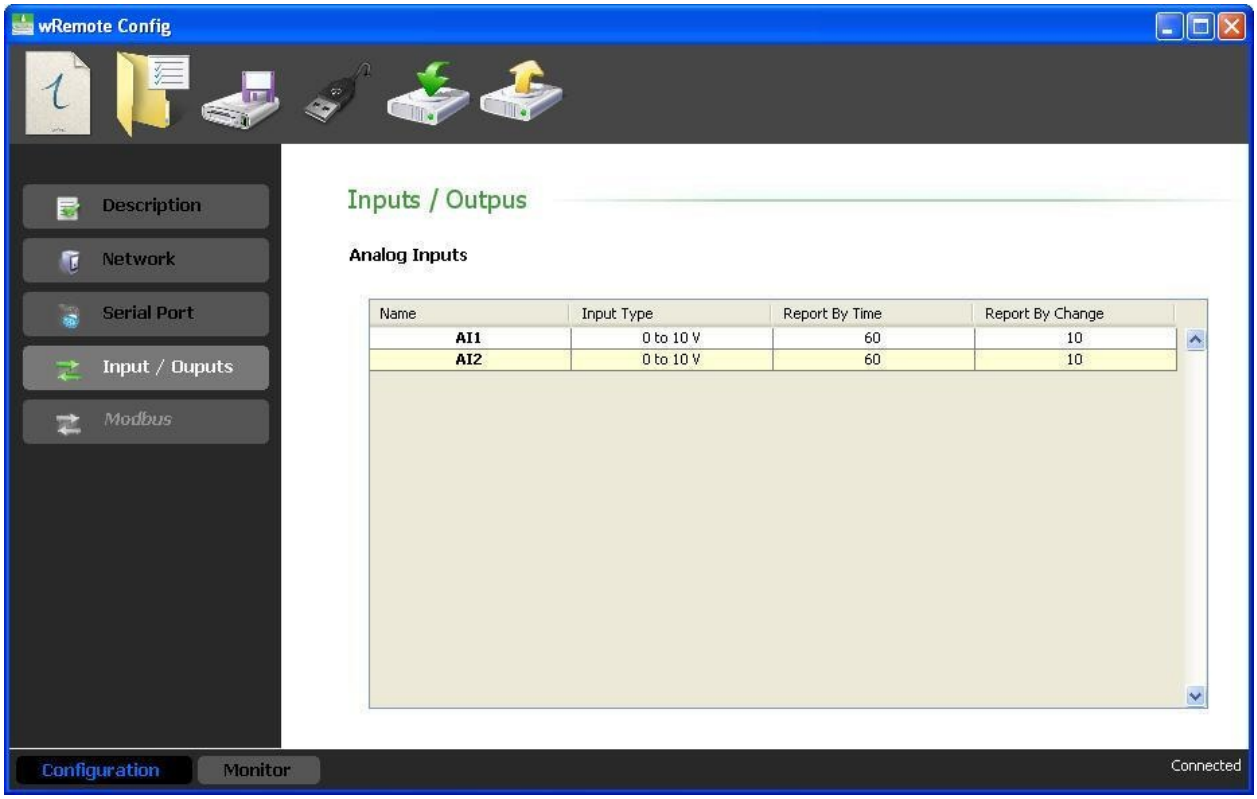
- **Digital Outputs**

  In this case we do not have anything to configure and the criteria reported is also for change.



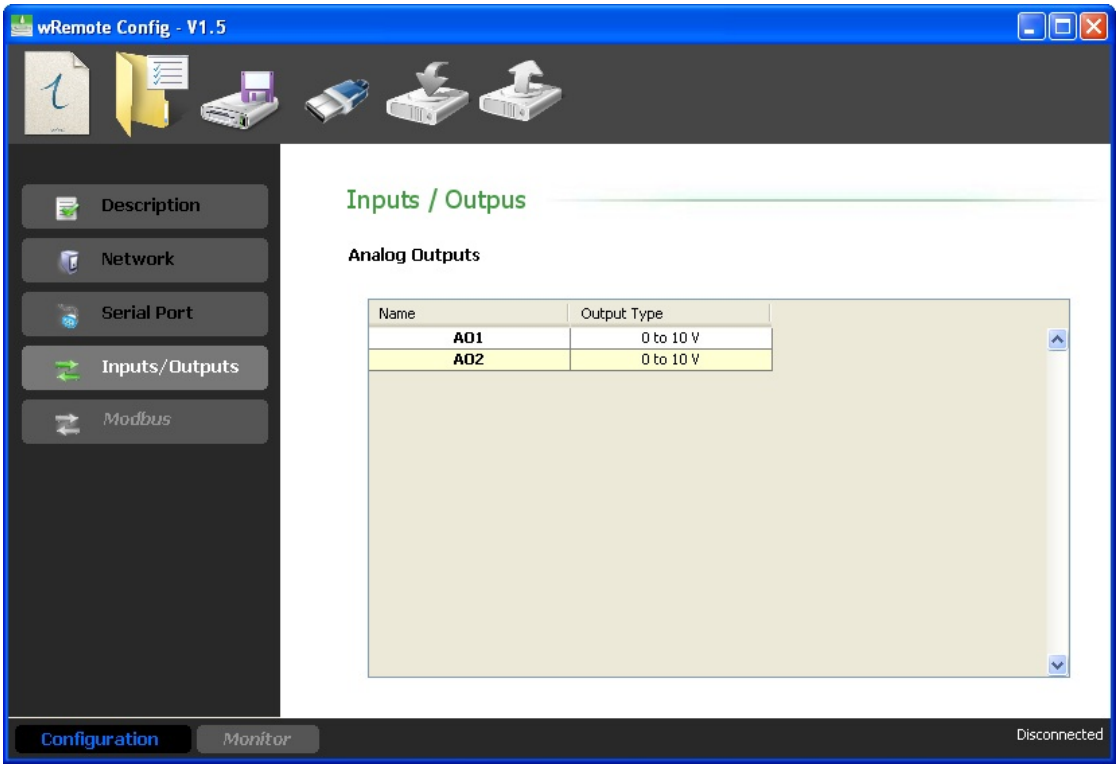
- **Analog Inputs**

  Here we must configure the type of input 0-10 V or 4-20 mA. Now we are able to select the report criteria, one of which is time in seconds which disables making 0 the time and another is by percentage of change with respect to the full scale and disables placement in 100 percent.



- **Analog Outputs**

  Here we must configure the type of output 0-10 V or 4-20 mA, the value of these reports to the "Concentrator" every time that they change.



Once configured the inputs / outputs and the "node" device report criteria, they will begin to send them to the "Concentrator" for the updated values in the internal slave table..

	It is important to know that all of the "Nodes'" parameters report to the "Concentrator" every time they connect, beyond the

	configured criteria report.

Organization of the Internal Slave Table

Already having configured all devices, we will see how to query the values of inputs / outputs to the internal slave of the “concentrator” and how they are organized.

Organization of the HOLDING REGISTERS:

Register Number	Information
Register 1	State of connection
Register 2	Digital Inputs
Register 3	Digital Outputs
Register 4 to 11	Analog Inputs / Counters
Register 12 to 16	Analog Outputs

In each operation we are able to query with a maximum of 64 records if we query more we will obtain a Modbus exception response.

The calculation to determine the address of a record for a given remote is as follows:

Register X = 40000 + (wRemote_ID – 1) * 16 + Register Number (1 to 16)

As an example suppose we want to read the analog input 3 from the wRemote “Node” that has the ID=5. Therefore the analog input 3 corresponds to the record 6.

Register 6 (wRemote 5) = 40000 + (5 - 1) * 16 + 6

In order to meet the desired value we must access the 40070 record.

The inputs and outputs are grouped into two records, 2 for the inputs and 3 for outputs, which contain in bits the corresponding values. Knowing that the wRemote input 1 corresponds to bit 0 of the register and input 4 corresponds to bit 3, we can determine each one in the same manner that exits are located.

To know the status of the connection allows us to read register 1 at bit 0. If this is found in 1 it indicates that the device is connected, while if set to 0 indicates that the device is offline.

Depending on how they are configured the values of analog inputs that take records will be from 0-1000 voltage and 400-2000 current. In these records we also have the values of the counters which depend on the configuration of the “Node” or if the node was configured to transmit the analog input or counter. For example if you have a model with 4 analog inputs and 4 counter inputs we can only transmit 4 of these 8. So in the “Node” you can enable one or the other particularly if we transmit the AN1, we cannot send the PI1 and if we enable the PI2, we cannot do it with the AN2 and so on.

The pulse counter value range is 0 to 49999. After 49999 it will roll over to 0.

From here you can change the value of the analog and digital outputs.

Organization of the INPUT STATUS:

In the Input Status we can also find out the status of digital inputs for all of the wRemotes.

In every operation we can query at most 64 inputs, if we query more we will get a Modbus exception response.

Each wRemote occupies 16 positions and the calculation to read the values of one input is as follows:

Input X = 10000 + (wRemote_ID – 1) * 16 + Register Number (1 to 16)

For example if we wish to know the wRemote input value 4 having the ID = 2, the calculation is as follows:

Input 4 (wRemote 2) = 10000 + (2 - 1) * 16 + 4

Equivalent to Modbus address 10020.

Organization of the COIL STATUS:

In the coil status registers we visualize the digital outputs of the equipment.

In every operation we can query at most 64 coil, if we consult more we will get the Modbus exception response.

To determine the address of the outputs for each wRemote calculated.

Output X = (wRemote_ID – 1) * 16 + Output Number (1 to 16)

For example, if you want to access the wRemote output 2, that has the ID = 10 the calculation is as follows

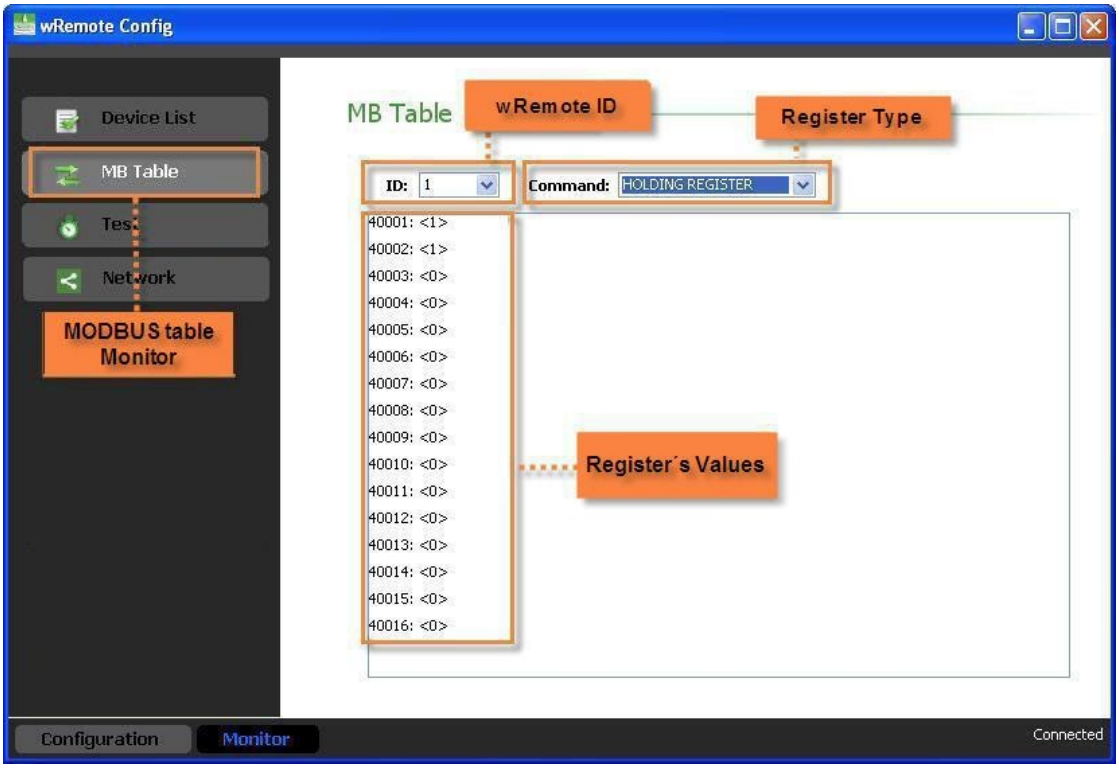
Output 2 (wRemote 10) = (10 – 1) * 16 + 2 = 146

Equivalent to the 00146 Modbus address of the coil status.

If we write about these records amending the output status of wRemote “Nodes”.

Reading the Modbus Table from the wRemote Config

Another way we display the values of the inputs / outputs of the “Node” equipment is to connect with the “wRemote Config” to the “Concentrator”. Read their parameters and then go to the “Monitor” window, there we will click on “MB Table” and we will see:



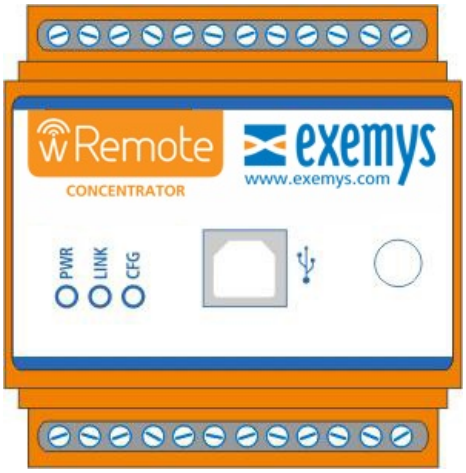
Here we can consult the Holding Registers, Input Status, Coil Status by selecting each ID as seen in the image.

2018-02-21

wRemote-1000

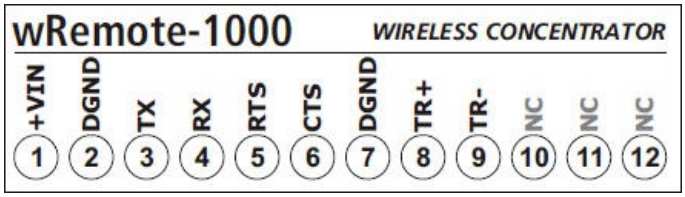
General Description of the Product

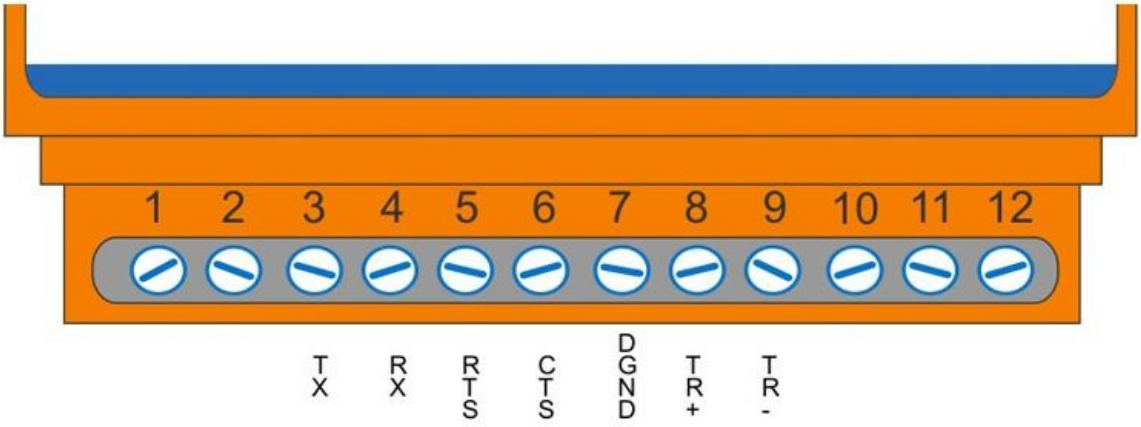
The wRemote-1000 is a “Concentrator” model that does not have physical inputs or outputs. It is solely responsible for developing the network and concentrating the information from the “node” devices



Connections

The device has an RS232 and an RS485 port; both are used by the Modbus. It also has a USB port that can be used for Modbus and for device configuration.



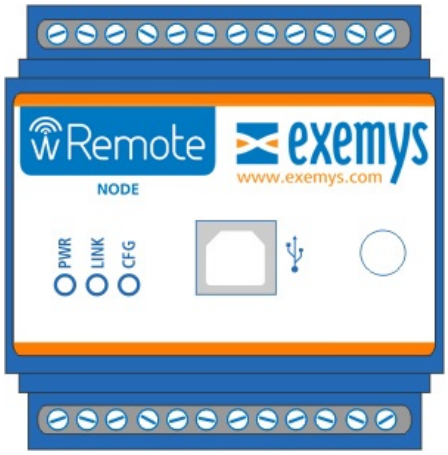


wRemote-3004

General Description of the Product

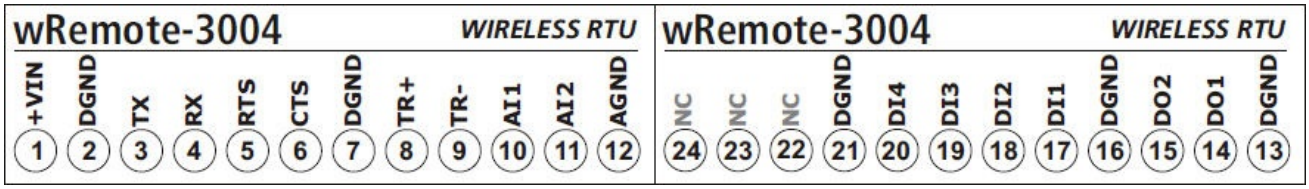
The wRemote-3004 is a "Node" model, and has physical inputs/outputs:

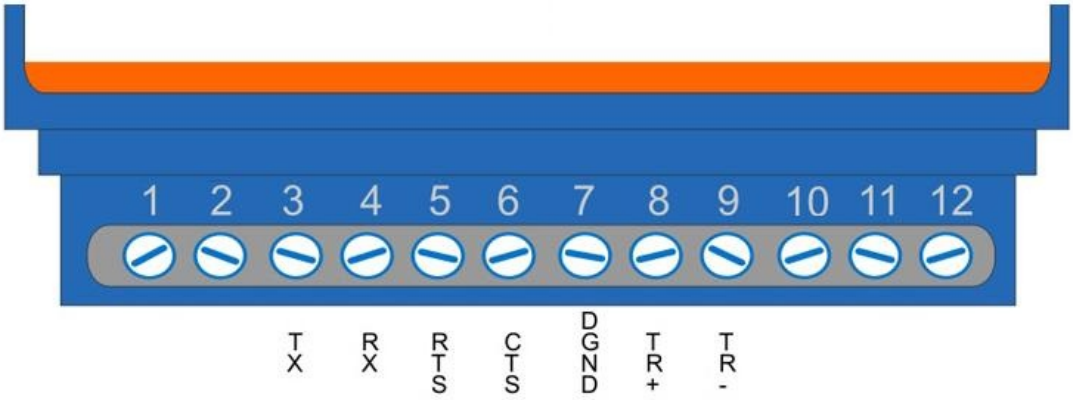
- 4 Digital Inputs
- 2 Digital Outputs
- 2 Analog Inputs 0-10V/4-20mA



Connections

The device also has a port RS232, a RS485 both for MODBUS use and a USB port for device configuration.





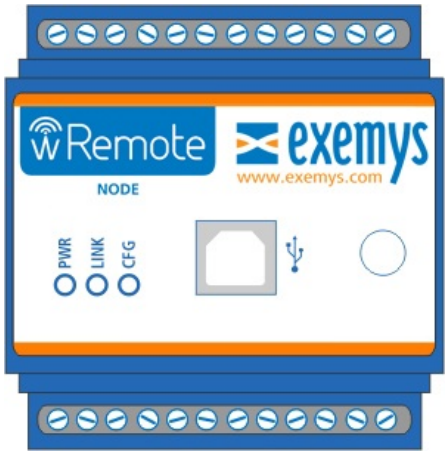
⚠	*4-20mA / 0-10V analog input configuration must be done by software and hardware as described on section "Installation"*

wRemote-3005

General Description of the Product

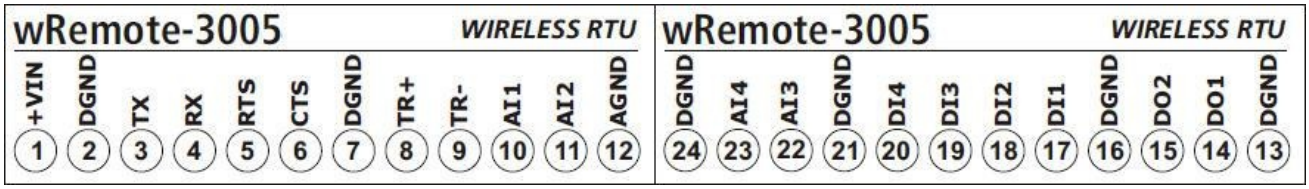
The wRemote-3005 is a "Node" device, and has physical inputs/outputs:

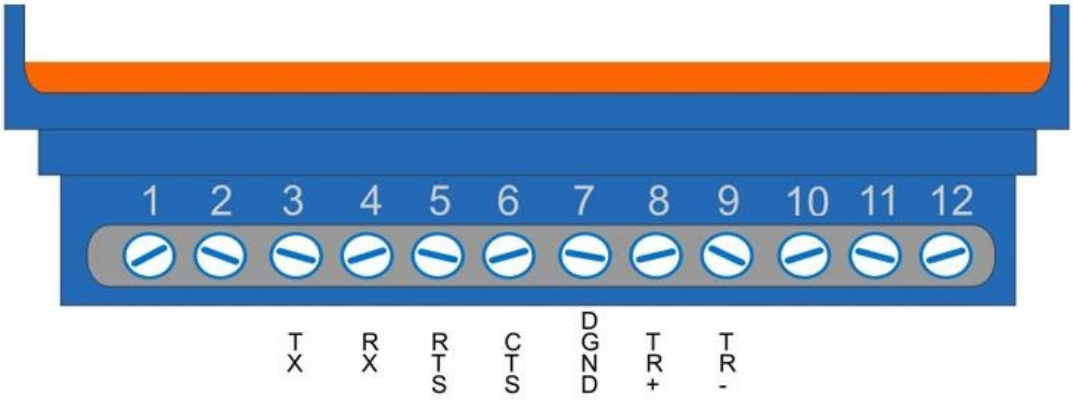
- 4 Digital Inputs/Count Inputs
- 2 Digital Outputs
- 4 Analog Inputs from 0-10V or 4-20mA



Connections

The device has an RS232 and RS485 ports, both are used by Modbus. It also has a USB port that is used for the configuration of the device.



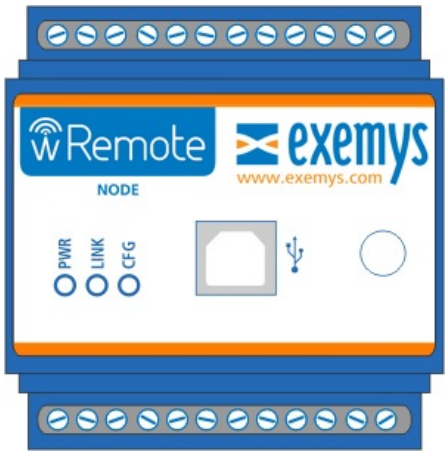


wRemote-5005

General Description of the Product

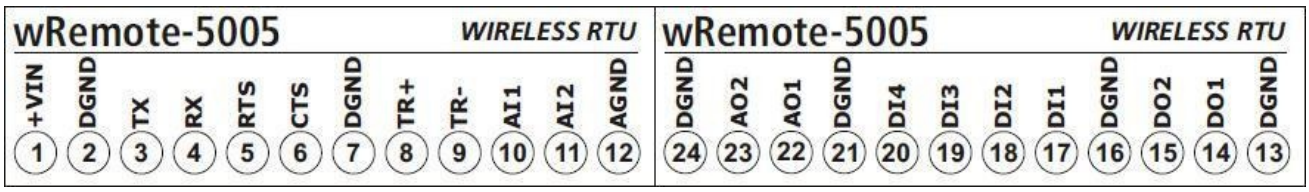
The wRemote-5005 is a “Node” model that has physical inputs and outputs:

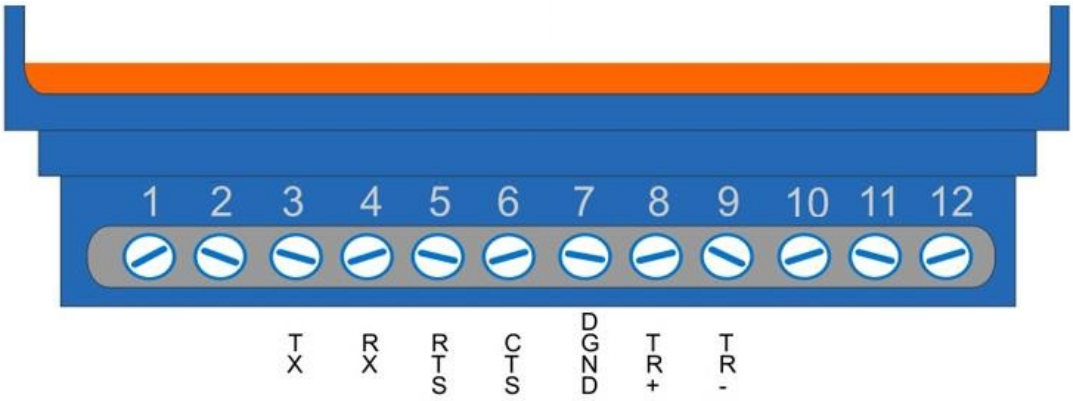
- 4 Digital Inputs/Count Inputs
- 2 Digital Outputs
- 2 Analog Inputs from 0-10V or 4-20mA
- 2 Analog Outputs from 0-10V or 4-20mA



Connections

The device has an RS232 and RS485 ports, both are used by Modbus. It also has a USB port that is used for the configuration of the device.





Power Supply, RF Characteristics and Inputs/Outputs

Below are the details for the minimum and maximum allowable values in both digital inputs and outputs and analog inputs for current and voltage, as well as power consumption of the wRemote.

Power Supply

Parameter	Condition	Minimum	Maximum	Units
Input Voltage		10	30	Vdc
Average Current	wRemote @ 24 Vdc wRemote @ 12 Vdc		15 25	mA
Maximum Current	wRemote @ 24 Vdc wRemote @ 12 Vdc		20 30	mA

RF Characteristics

Parameter	Minimum	Maximum	Units
Frecuency	2.4000	2.4835	GHz
Channels		16	
Channel Separation		5	MHz
Tx Power	+10	+20	dBm
Sensitivity		-104	dbm

Digital Inputs

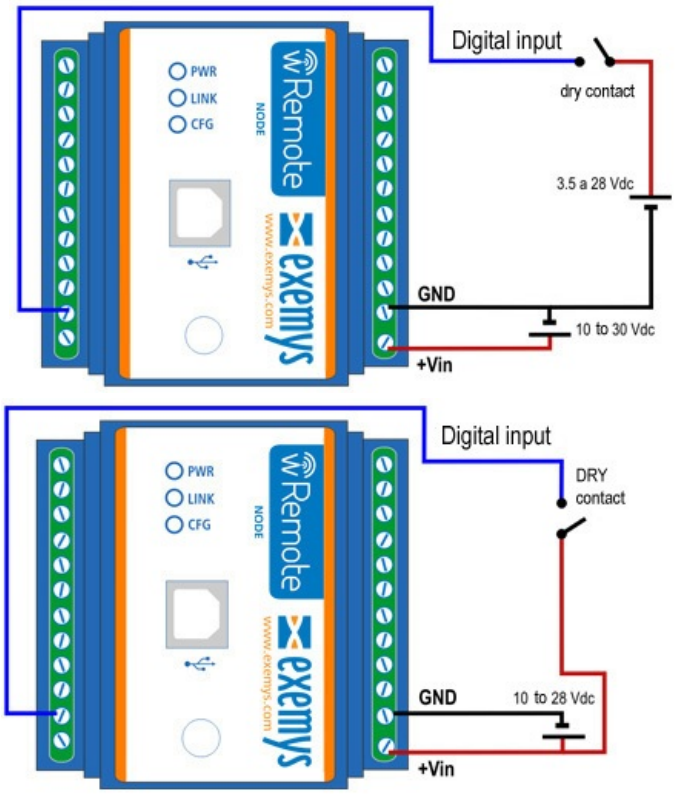
In order to activate the digital inputs the voltage must be applied externally. This power supply has to share the GND terminal with the device power supply. If necessary you can use the same source used to power the wRemote. The input type is Sinking and accepts sensors or PNP sourcing type devices.

Parameter	Minimum	Maximum	Units

Activated Input	3.5	25	Vdc
Input Impedance	2		KΩ
Count frequency*		1	kHz

*Check "Instalation" section to see models with count feature.

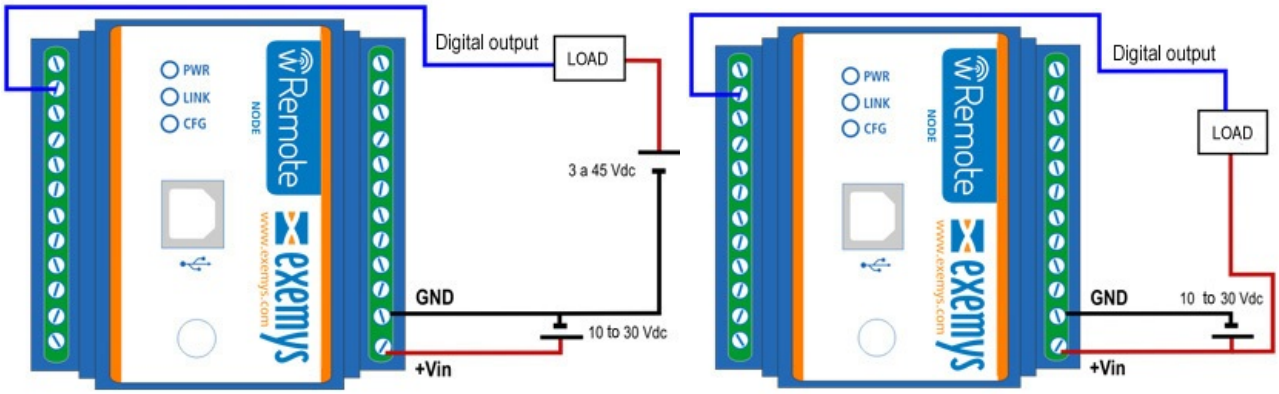
Below are two examples of how to connect an input either directly from the same source that powers the device or as an external source where it is clear that they must share the common terminal.



Digital Outputs

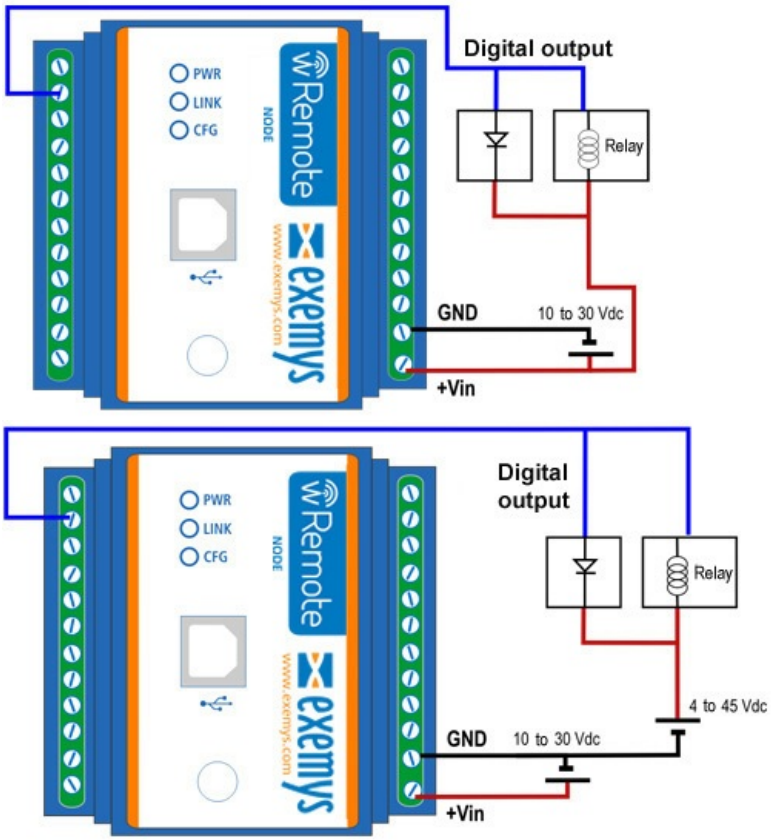
The digital outputs are of the open collector type. The load to be connected must be supplied with an external voltage source. They have to share the GND terminal to the device power supply. If necessary you can use the same source that is used to power the device. The output type is NPN Sourcing (Open Collector).

Parameter	Minimum	Maximum	Units
Voltage Support		45	Vdc
Current		50	mA



Digital Outputs to Activate a Relay

When digital output is used to drive a relay coil, it is necessary to add a protection diode to the connection in order to prevent damage to the device output. This must be connected in reverse. This means the anode connects to the output terminal of the equipment and the cathode to the positive terminal that feeds the relay. The relay must be powered using an external power source, sharing the GND terminal with the device supply. If necessary the same source that feeds the wRemote can be used. Shown in the image below is the connection of a relay to a digital output of the device.



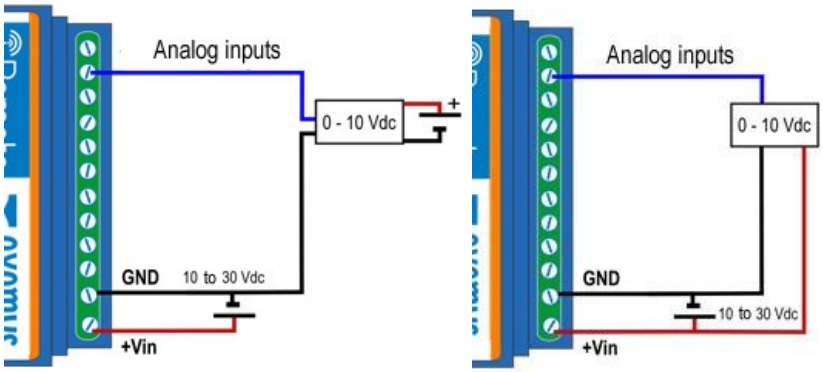
Analog Inputs

The analog inputs are referenced to the GND device terminal so that the source used to power the sensor must share with the GND device terminal.

Analog Input Voltage (0-10V / 0-1V)

Parameter	Value	Units
Full Scale	10.00	Vdc
Precision	0.01	Vdc
Input Impedance	10.7	KΩ

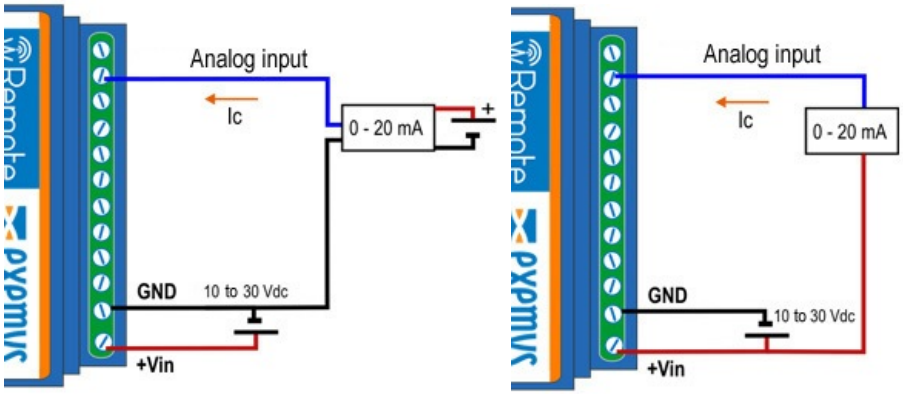
Below are two example of how to connect an analog input voltage for both a simple source and for an independent source.



Current Analog Inputs (4-20mA)

Parameter	Value	Units
Full Scale	20.00	mA
Precision	0.01	mA
Shunt	68	Ω

Below are two examples where you can see the connection of a 4-20mA sensor sharing power with the device for passive sensors or active sensors with an independent source.



Analog Outputs

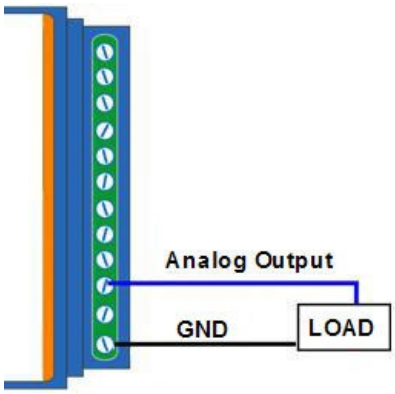
The analog outputs refer to the GND device terminal.

Voltage Analog Outputs (0-10V)

The analog outputs in the voltage mode have the limitation that we place the charge on should not be less than 500R. If we use the full range of the output voltage then the output can deliver a maximum of 20mA.

You should always follow **VoutMAX / LOAD <= 20mA.**

Type of connection:

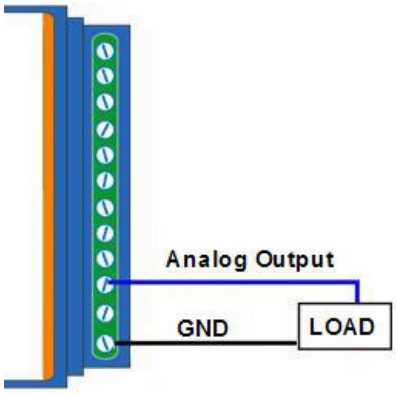


Current Analog Outputs (4-20mA)

In this case the maximum charge that we can connect an analog output in the current mode depends on the power supply voltage, as this should be enough to deliver up to 20mA to the load.

Power source (V)	Max. Load (Current Mode)
13	650R
15	750R
24	1,2K
30	1,5K

Connection form



2018-01-25

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