



**Automations- und  
Steuerungstechnik GmbH**

# **enocean**

## **IP**

# **Gateway**

**RF-receiver and gateway to  
LAN**

**Order number: E001-H027000**



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This handbook describes also functions, which are options.  
Only qualified persons are allowed to install our units.

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## **Highlights enocean-IP-Gateway**

- Connects battery-less RFsensors to the PC network (LAN)  
no additional wiring needed
- Supports all enocean-Sensoren (Buttons, Windowcontacts, Temperature...)
- Easy integration into own applications by using the direct ASCII protocol
- OPCServer included
- contains RF-receiver and integrated LAN connector

## **Fields of application**

- Expansion without additional wiring
- Use in buildings with moveable walls
- Use in historical buildings where no additional wiring is allowed.
- Functions independent of fix mounted pushbuttons
- Individual controlling of rooms with removable walls
- Pushbuttons mountable even on Glass surfaces

## **Contents of delivery**

- 1 enocean-IP Gateway
- OPCServer software
- Documentation



## **Introduction**

As sensors may be used buttons (e.g. from PEHA or Omnio), temperaturesensors (e.g. from Thermokon), glass break detectors and many more. Those sensors dont need a battery, the needed energy is generated by pressing the button or by solarcells. The enocean-IP-gateway allows switching, dimmimg, shutters, temperature and brightness-measurement over the PC network (LAN), with the included OPCServer the integration of the Enocean values into your visualization software becomes easy.

## **Technical datas enocean-IP-gateway**

Main voltage:

Fitting:

Number of supported enocean-devices:



## **Software to configure the enocean-IP-Gateway**

The gateway needs just one configuration information: its IP address in the PC network. To change the IP address, the included OPCServer can be used, even if you do not want to use the OPC interface. The gateway stores the given IP address in its internal memory.

### **OPCServer**

The OPCServer allows an easy access to the gateway via the OPC interface. Many visualization softwares are offering the OPC interface, and can be used immediately with the gateway. The user interface of the OPCServer software can be used to change the gateway's IP address.

### **Internals of the OPCServer software**

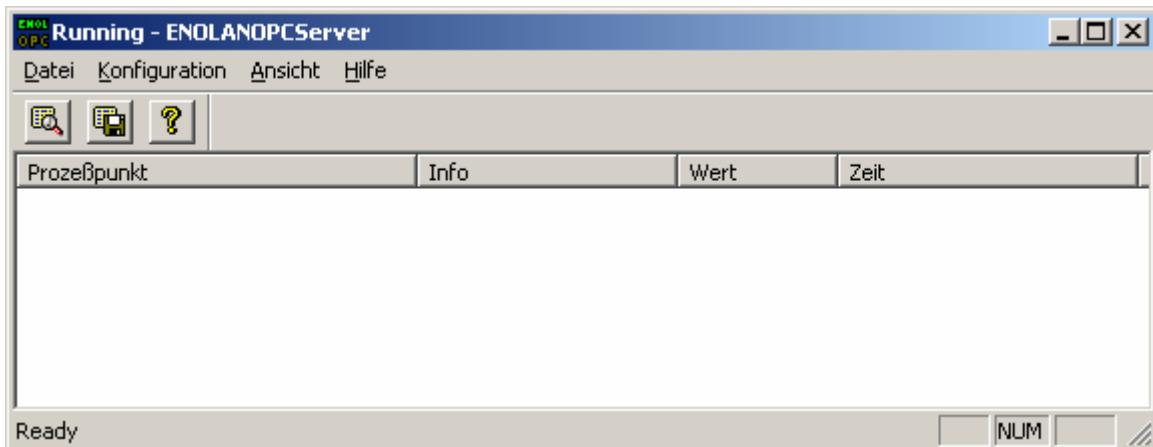
The software is based on two program files: ENOLANOPCServer.EXE (main application) and FSServer.dll (OPC helper library). All settings of the OPCServer will be stored in a local INI file (ENOLANOPCServer.INI) in the same folder as the main application.

If the OPCServer is only needed to change the gateway's IP address, it can be started manually by the desktop shortcut or by double-clicking the .EXE file. Visualizations and other OPC-Clients will start the OPCServer automatically, in this case the OPCServer will show a small icon in the Windows system tray. Double-clicking this icon will also show the OPCServer's main window.

OPCServers have to be registered into Windows to work properly with OPC-Clients. This registration is done by the setup application which installs the OPCServer. If you have copied the OPCServer manually to a new PC, you can register it without running the setup, by double-clicking the included „REGISTER.BAT“ file.

### **Main window**

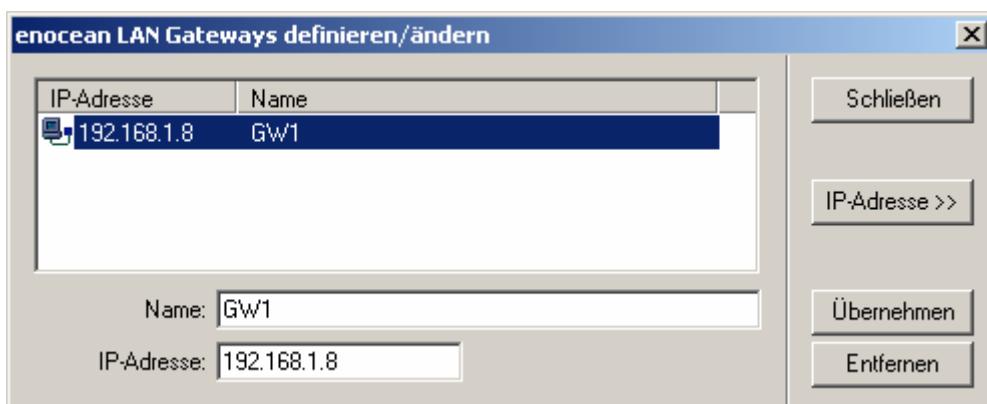
If the OPCServer has been started manually, or the user did a double-click at the system tray icon, the following window will be displayed:



The main window has menu items to configure the OPCServer, and a display list for all available process items and their current values.

## Define / change enocean IP gateways in the OPCServer

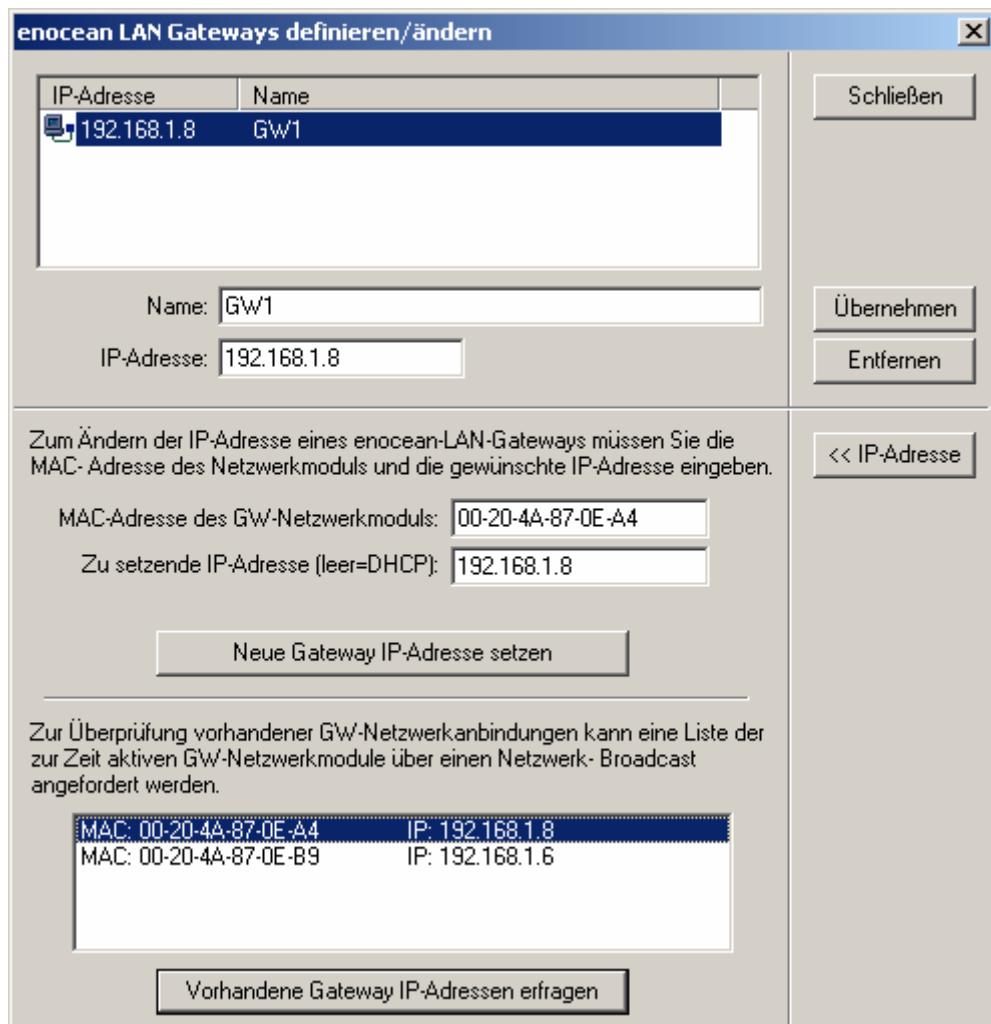
If you want to define gateways in the OPCServer (or if you want to change the IP address of a gateway), you can do that in the “Define gateways” window of the OPCServer (menu “configuration -> Define / change Enocean-LAN gateways...”):



In the lower two edit fields a user defined name and the associated IP address can be entered. “Take“ will take the settings, and store them in the upper list. Therefore you can also add more than one gateway into one OPCServer without problems, as long as the OPCServer PC can reach their individual IP addresses by network. “Remove“ will delete gateways from the upper list.

## Changing the IP address

By pressing the button „IP address >>“, the configuration window will expand:



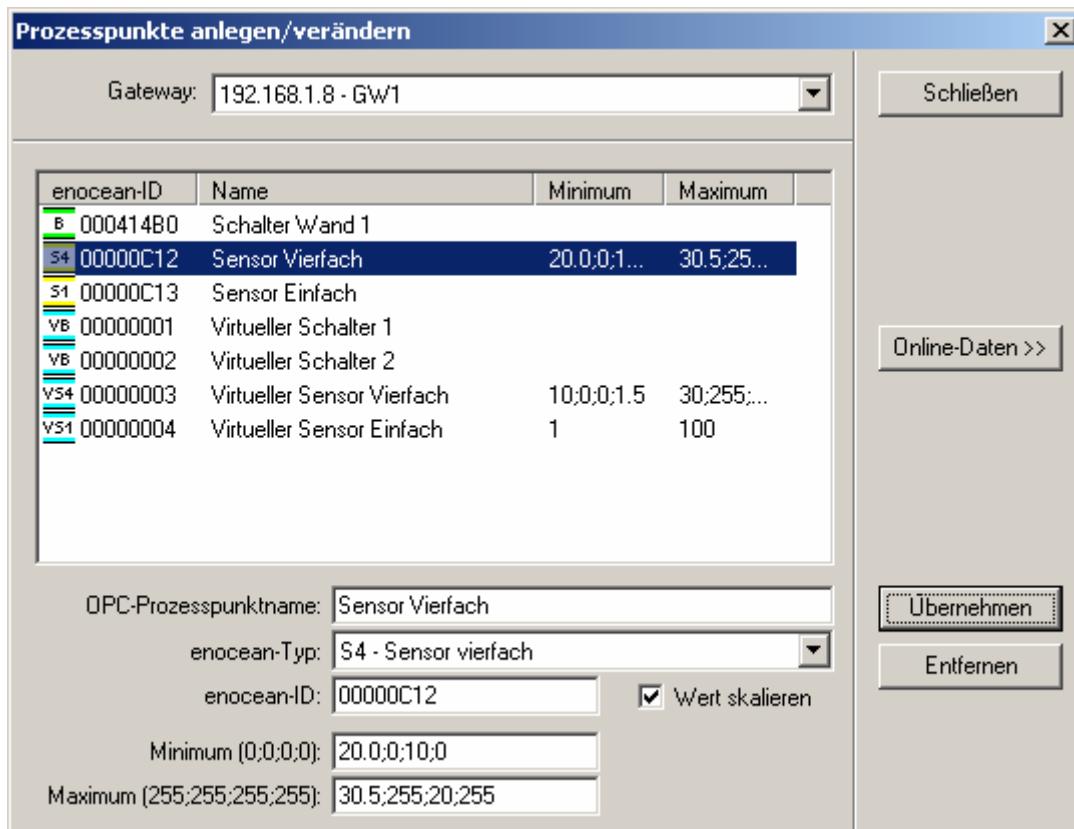
The button „Request existing gateway IP addresses“ can be used to find all existing gateways in a network. The PC will send a network broadcast, and all gateways which are answering to this message will be listed in the lower list. A double click in this list will set the current IP address and the hardware MAC address of the device into the middle edit fields. To change the IP address, simply enter the new one in the edit field, and press the “Set the new IP address“ button.

The gateway will get this information by network, and store the IP address internally. To check if the address has been set successfully, you can press „Request existing gateway IP addresses“ again, now the gateway should be listed with its new address.



## Define / change Enocean devices in the OPCServer

The OPCServer needs a list of existing Enocean devices to manage their values and to give this informations to OPC Clients. It is also possible to define "virtual" devices, which only exist inside of the gateway. The gateway can send values (button state informations, sensor values) by using this „virtual“ addresses. You can access the device configuration window by using the menu item „Configuration -> Define / change Enocean devices...“.



In the upper part of the window you have to select the gateway for which you want to define/change the Enocean devices. The lower list will show you all existing devices. Below the list there are edit fields to add/change Enocean devices. If the device type is a sensor, you can also parametrize to scale the incoming value.

### Type: B - buttons



Buttons just need a descriptive process item name, and the Enocean device ID (if you do not know the ID: we will show you an easy way to retrieve the ID in the chapter „Online data“).

#### **Type: S1 – sensor**

This sensors will deliver just one value, ranging from 0 to 255. Therefore you can give – beside the name and the ID – two scaling values, one for the minimum (0) value, and one for the maximum (255) value. The OPCServer will scale the incoming values automatically so it fits into the given range.

#### **Type: S4 – sensor**

This sensors will always deliver four values at the same time. You can define a special scaling minimum/maximum for each of the four values, by using the „;“ character. „0;10.5;-100;5“ as minimum and „255;29.0;100;10“ as maximum would not scale the first value (still in range 0-255), the second value would be scaled from 10.5 to 29.0, the third from -100 to 10, and the last from 5 to 10.

#### **Type: VB – virtual buttons**

Here you can only define the process item name, the button will automatically get one of the 128 internal Enocean IDs of the gateway.

#### **Type: VS1 – virtual sensor**

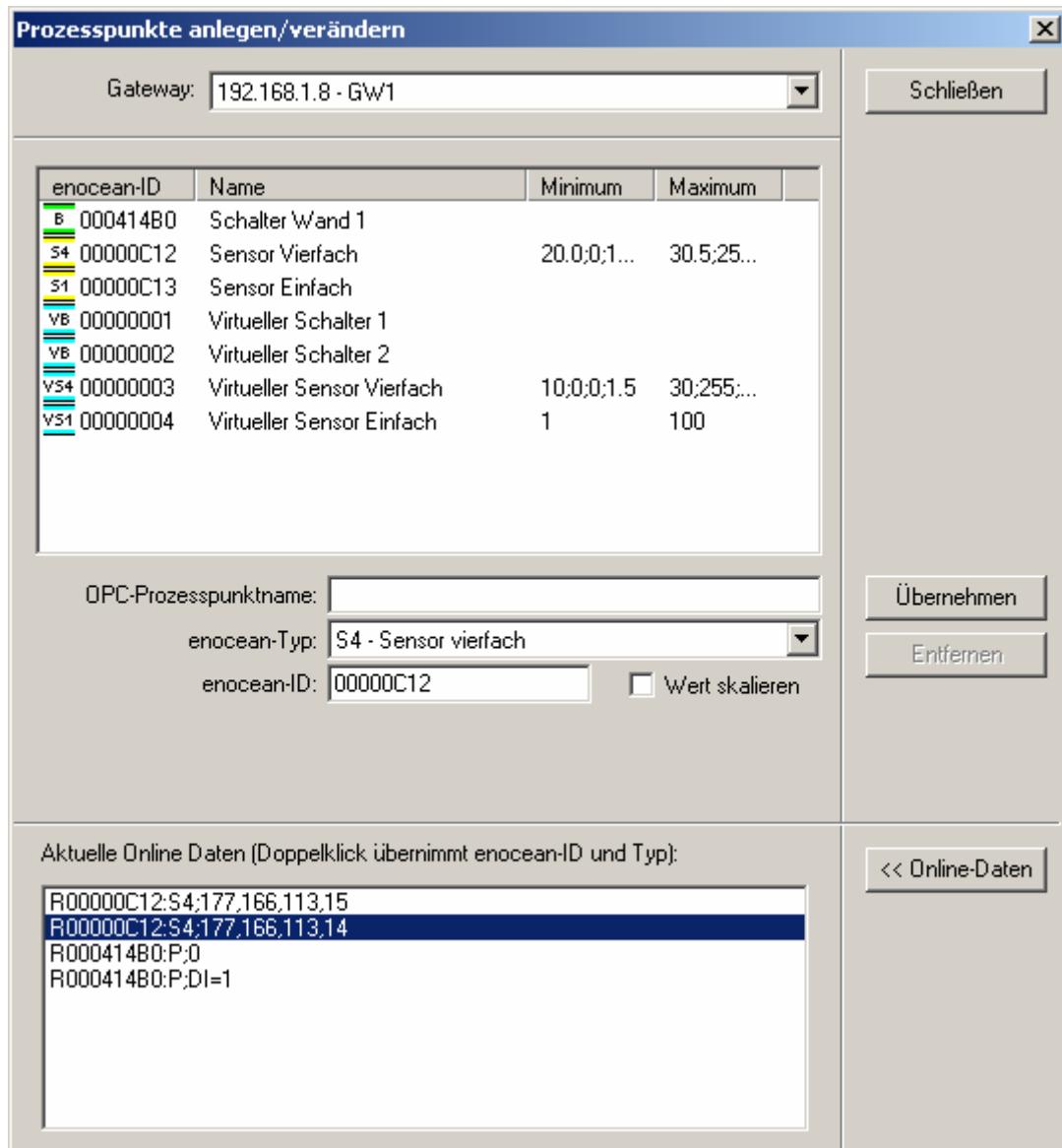
A process item name and an optional scaling minimum/maximum can be given. The scaling just work the other way round: the OPCClient's value will be scaled to the 0 to 255 range, and this scaled value will be send by the gateway.

#### **Type: VS4 – Virtual sensor**

A process item name and optionally four scaling min/max values can be defined.

#### **Using Online data to retrieve Enocean device IDs**

By pressing the „Online data“ button, the window will expand and show in the lower part of the window all current value telegrams of the gateway. This information can be used to retrieve the unknown IDs of Enocean devices::



The lower list will display an „R“ character, followed by the device ID, each time when the gateway will detect a new value. Therefore, if you want to get the ID of a special Enocean button: simply press one of the keys of this button, and a new entry should appear in the “Online data” list. A double click on a list entry will set this ID in the upper edit fields, so you do not have to enter this value manually.

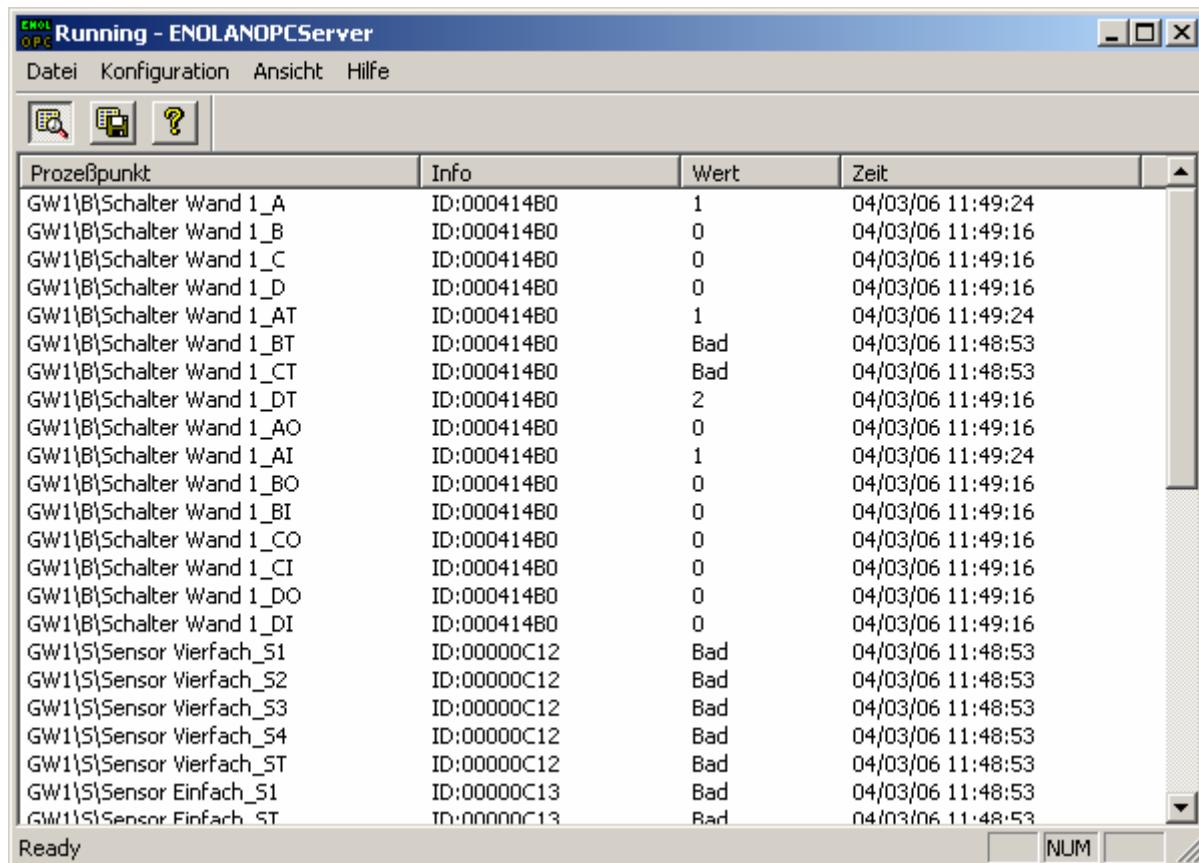
A detailed description of the „Online data“ command structure can be found in the chapter „enocean LAN Gateway networking protocol“, if you want to access this data without using the OPCServer.



## Show/use OPC process items

If you have defined the gateways and their process items, they will be available after a restart of the OPCServer software. Now every OPCClient can ask the OPCServer for this items and their values, and can write values to the "virtual" devices. You can also use the OPCServer's main window, to do a quick check if all values are available, and to look after their values, and to write new values.

To display the process items you can press the first button in the symbol bar, or use the menuitem „View -> View tags“:



The screenshot shows the main window of the ENOLANOPCServer application. The title bar reads "ENOLANOPCServer" and "Running". The menu bar includes "Datei", "Konfiguration", "Ansicht", and "Hilfe". The toolbar contains icons for "New", "Open", "Save", and "Help". The main area is a table with the following columns: "Prozeßpunkt", "Info", "Wert", and "Zeit". The table lists 32 process items, mostly starting with "GW1\B\" or "GW1\S\", with values ranging from 0 to 2 and timestamps from 04/03/06 11:48:53 to 04/03/06 11:49:24. The bottom of the window shows a status bar with "Ready" and a numeric keypad.

Prozeßpunkt	Info	Wert	Zeit
GW1\B\Schalter Wand 1_A	ID:00041480	1	04/03/06 11:49:24
GW1\B\Schalter Wand 1_B	ID:00041480	0	04/03/06 11:49:16
GW1\B\Schalter Wand 1_C	ID:00041480	0	04/03/06 11:49:16
GW1\B\Schalter Wand 1_D	ID:00041480	0	04/03/06 11:49:16
GW1\B\Schalter Wand 1_AT	ID:00041480	1	04/03/06 11:49:24
GW1\B\Schalter Wand 1_BT	ID:00041480	Bad	04/03/06 11:48:53
GW1\B\Schalter Wand 1_CT	ID:00041480	Bad	04/03/06 11:48:53
GW1\B\Schalter Wand 1_DT	ID:00041480	2	04/03/06 11:49:16
GW1\B\Schalter Wand 1_AO	ID:00041480	0	04/03/06 11:49:16
GW1\B\Schalter Wand 1_AI	ID:00041480	1	04/03/06 11:49:24
GW1\B\Schalter Wand 1_BO	ID:00041480	0	04/03/06 11:49:16
GW1\B\Schalter Wand 1_BI	ID:00041480	0	04/03/06 11:49:16
GW1\B\Schalter Wand 1_CO	ID:00041480	0	04/03/06 11:49:16
GW1\B\Schalter Wand 1_CI	ID:00041480	0	04/03/06 11:49:16
GW1\B\Schalter Wand 1_DO	ID:00041480	0	04/03/06 11:49:16
GW1\B\Schalter Wand 1_DI	ID:00041480	0	04/03/06 11:49:16
GW1\S\Sensor Vierfach_S1	ID:000000C12	Bad	04/03/06 11:48:53
GW1\S\Sensor Vierfach_S2	ID:000000C12	Bad	04/03/06 11:48:53
GW1\S\Sensor Vierfach_S3	ID:000000C12	Bad	04/03/06 11:48:53
GW1\S\Sensor Vierfach_S4	ID:000000C12	Bad	04/03/06 11:48:53
GW1\S\Sensor Vierfach_ST	ID:000000C12	Bad	04/03/06 11:48:53
GW1\S\Sensor Einfach_S1	ID:000000C13	Bad	04/03/06 11:48:53
GW1\S\Sensor Einfach_ST	ID:000000C13	Bad	04/03/06 11:48:53

For every defined Enocean device the OPCServer will create between 2 and 16 OPC processitems. The main window will display all processitems, of course an OPCClient only has to use the items which are of interesst of the client.

## Type: B - button

A button device will create 16 process items. The OPC processitem name is created by [gateway name]\B\[processitem name]\_[function sign]. The gateway name and the



processitem name are user defined (see previous chapters), the function sign is fixed:

“A“ : current value of the „A“ key (1, if I has been pressed,0, if O has been pressed)  
“B“ : current value of the „B“ key (1, if I has been pressed,0, if O has been pressed)  
“C“ : current value of the „C“ key (1, if I has been pressed,0, if O has been pressed)  
“D“ : current value of the „D“ key (1, if I has been pressed,0, if O has been pressed)  
“AT“ : number of state changes (0->1 or 1->0) of the „A“ key  
“BT“ : number of state changes (0->1 or 1->0) of the „B“ key  
“CT“ : number of state changes (0->1 or 1->0) of the „C“ key  
“DT“ : number of state changes (0->1 or 1->0) of the „D“ key  
“AO“ : current state of the „O“ part of the „A“ key (0 or 1)  
“AI“ : current state of the „I“ part of the „A“ key (0 or 1)  
“BO“ : current state of the „O“ part of the „B“ key (0 or 1)  
“BI“ : current state of the „I“ part of the „B“ key (0 or 1)  
“CO“ : current state of the „O“ part of the „C“ key (0 or 1)  
“CI“ : current state of the „I“ part of the „C“ key (0 or 1)  
“DO“ : current state of the „O“ part of the „D“ key (0 or 1)  
“DI“ : current state of the „I“ part of the „D“ key (0 or 1)

If the button has less than the maximum number (A – D), the processitems of the not existing parts can get ignored. Their “xT” counts will always stay “bad” (since there will never be a state change on them), but their main values will go from „bad“ to „0“ as soon, as the user has released one of the existing keys (since there is only a “everything is off” information from Enocean buttons).

### **Type: S1 – sensor with one value**

Sensor devices with one value will generate two OPC processitems: [gateway Name]\S\[processitem name]\_[function sign]. The following functions signs are possible:

“S1“: the (scaled) sensor value. If the value is not scaled, it will be an integer number from 0 to 255. If the value is scaled, it will be a floating point number in the given minimum/maximum range.

„ST“: Number of received values from the device. This number will increase each time the gateway receives a value, even if the value itself did not change.

### **Type: S4 – sensor with four values**



Sensor devices with four values will generate five OPC processitems: [gateway Name]\S\[processitem name]\_[function sign]. The following functions signs are possible:

“S1“: the first sensor value. If the value is not scaled, it will be an integer number from 0 to 255. If the value is scaled, it will be a floating point number in the given minimum/maximum range.

“S2“- “S4“ : the other three values of the sensor.

„ST“: Number of received value pairs from the device. This number will increase each time the gateway receives a value, even if all four values did not change.

## Type: VB – virtual buttons

The virtual buttons can be used to send button values from the gateway to other Enocean devices. The gateway will generate an “internal” Enocean button with A – D keys, you can teach other Enocean devices to react to this buttons. Up to 128 different virtual devices can be defined in the gateway.

The virtual buttons will generate 8 processitems in the OPCServer: [gateway name]\V\[processitem name]\_[function sign]. The following function signs are supported:

“AO“: part „O“ of the virtual key „A“  
“AI“: part „I“ of the virtual key „A“  
“BO“: part „O“ of the virtual key „B“  
“BI“: part „I“ of the virtual key „B“  
“CO“: part „O“ of the virtual key „C“  
“CI“: part „I“ of the virtual key „C“  
“DO“: part „O“ of the virtual key „D“  
“DI“: part „I“ of the virtual key „D“

An OPC-Client can write the following values to each of the 8 processitems

Value „1“ : this key is permanently pressed (until „0“ is written by the OPC-Client)

Value „0“ : this key is released

Value „> 1“ : a value bigger 1 will tell the OPCServer to “press” the virtual key for n (=given value) milliseconds. If the OPC-Client is writing “2000” as a value, the OPCServer will set the processitem value to “1” for two seconds.

Please note: the gateway will only send a „0“ if all keys of a button will be released.



### **Type: VS1 – virtual sensor with one value**

A virtual sensor with one value will generate just one processitem: [gateway name]\S\[processitem name]\_[function sign]. The following function sign exists:

“S1“: the value of the sensor. If scaling is active, the value will be scaled to 0 – 255 before the gateway will send the value.

### **Type: VS4 – virtual sensor with four values**

This sensor type will generate 4 processitems: [gateway name]\V\[processitem name]\_[function sign]. Function signs are:

“S1“: the first sensor value  
“S2“: the second sensor value  
“S3“: the third sensor value  
“S4“: the fourth sensor value

Scaling works in the same way as with single sensors.

Please also note: the gateway will send the values only, if all four parts of the sensor are „known“. Therefore an OPC-Client has to write on all four items once, before the values can be sent on each write.

## **Enocean IP gateway networking protocol**

The Enocean IP gateway communicates by LAN with a simple ASCII protocol. A PC just have to open a TCP network connection at port 10001 to the gateway, to receive and send this ASCII commands. A typical terminal application like the Windows Hyperterminal or the b+b Terminal can open such a connection as well. The „Online data“ mode in the OPCServer will also show all plain ASCII commands of the gateway.

### **Incoming Enocean data**

As soon as the gateway is receiving RF data from Enocean devices, it will send this informations as ASCII sequence to a PC by network.



R[device ID]:[device type]:[value][CR/LF]

The device type can be:

- "P" : push button
- "S1" : sensor with one value
- "S4" : sensor with four values

Depending on the device type the value may look differently:

Push button:

"AO=1" : key A, part O is pressed  
"AI=1" : key A, part I is pressed  
"BO=1" : key B, part O is pressed  
"BI=1" : key B, part I is pressed  
"CO=1" : key C, part O is pressed  
"CI=1" : key C, part I is pressed  
"DO=1" : key D, part O is pressed  
"DI=1" : key D, part I is pressed  
"0" : no key is pressed

Sensor with one values:

"0" - „255“ : unscaled value in the range from 0 to 255

Sensor with four values:

"0,0,0,0" - „255,255,255,255“ : the four values are divided by comma, each value ranges from 0 to 255.



Examples:

\* Part I of the B key of the button „000414B0“ is pressed:

R000414B0:P;Bl=1

\* Part I of the B key of button „000414B0“ is released:

R000414B0:P;0

\* Sensor „0000C123“ is sending the value „123“

R0000C123:S1=123

\* Sensor „1200B000“ is sending the values „123“ and „0“ and „5“ and „255“

R1200B000:S4=123,0,5,255

### **Sending values with the Enocean IP Gateway**

It is also possible to write values by the gateway, so you can teach other devices to react to the gateway.

W[0..127]:[device type]=[value][CR/LF]

Only up to 128 different „virtual“ Enocean IDs can be used by the gateway. The value „0 – 127“ will be added to the main Enocean ID of your gateway. If the gateway’s ID is – for example – „01234580“, and you are using the „W“ command with value „3“, the gateway will send the data using the Enocean ID „01234583“.

The device type is telling the gateway, what kind of device (and value) is used:

- “P“ : virtual push button
- “1“ : virtual sensor with one value
- “4“ : virtual sensor with four values



Depending on the device type, different values can be send:

Virtual push button:

“AO“ : key A, part O is pressed  
“AI“ : key A, part I is pressed  
“BO“ : key B, part O is pressed  
“BI“ : key B, part I is pressed  
“CO“ : key C, part O is pressed  
“CI“ : key C, part I is pressed  
“DO“ : key D, part O is pressed  
“DI“ : key D, part I is pressed  
“0“ : no key is pressed

Sensor with one value:

“0“ - „255“ : unscaled value from 0 to 255

Sensor with four values:

“0,0,0,0“ - „255,255,255,255“ : four unscaled values, divided by commas

Example:

\* Device „3“ sends an information „part I of the B key is pressed“:

W3:P=BI

\* All keys of device „3“ are released:

W3:P=0

\* Sensor „127“ is sending the value „54“

W127:1=54

\* Sensor is sending four values at once

W127:4=54,0,1,255

There is also one special command: R[CR/LF]. If you are sending this command by network to the gateway, it will answer by sending back its RFID:



RFID:[device ID][CR/LF].

This sequence will also be sent by the gateway each time a PC is connecting to it by LAN.