User Manual

expert net control 2190 GSM
expert net control 2110

GUDE

Manual Ver. 1.0.3
valid from Firmware Ver. 1.1.0

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GUDE

Table of contents

Chapter 1 Device Description 5

1.1 Security Advice 5
1.2 Content of Delivery 5
1.3 Description 5
1.4 Installation 6
1.5 Status LED 7
1.6 Bootloader Mode 7
1.7 Firmware-Update 8
1.8 Technical Specifications 9
1.9 Sensor 9

Chapter 2 Operating 11

2.1 Operating the device directly 11
2.2 Operating by Webinterface 12
2.3 GSM 13
2.3.1 SMS 14
2.3.2 Voice Call 20
2.3.3 Power Port Commands 24
2.3.4 Security 26

Chapter 3 Configuration 26

3.1 Configuration by Software 27
3.2 Configuration via Webinterface 28
3.2.1 Configuration - Output Ports 29
3.2.2 Configuration - Watchdog 30
3.2.3 Configuration - Input Ports 32
3.2.4 Configuration - IP Address 32
3.2.5 Configuration - IP ACL 33
3.2.6 Configuration - HTTP 34
3.2.7 Configuration - Sensors 35
3.2.8 Configuration - SNMP 36
3.2.9 Configuration - Syslog 37
3.2.10 Configuration - E-Mail 37

3.2.11 Configuration - GSM 38

Chapter 4 Protocols 41

4.1 SNMP 41

4.2 Syslog 42

4.3 Email 42

Chapter 5 Support 43

5.1 Contact 43

5.2 Declarations of conformity 44

1 Device Description

1.1 Security Advice

- The device must be installed only by qualified personnel according to the following installation and operating instructions.
- The manufacturer does not accept responsibility in case of improper use of the device and particularly any use of equipment that may cause personal injury or material damage.
- The device contains no user-maintenable parts. All maintenance has to be performed by factory trained service personnel.
- The device may only be connected by a low voltage power supply (12V) to 230V AC (50Hz or 60Hz).
- Always connect the device to properly grounded power sockets. To connect a Power-over-Ethernet device, use only certified and CE marked hardware.
- The device is intended for indoor use only. Do NOT install them in an area where excessive moisture or heat is present.
- Because of safety and approval issues it is not allowed to modify the device without our permission.
- Please note the safety advises and manuals of connected devices, too.
- The device is NOT a toy. It has to be used or stored out or range of children.
- Care about packaging material. Plastics has to be stored out of range of children. Please recycle the packaging materials.
- In case of further questions, about installation, operation or usage of the device, which are not clear after reading the manual, please do not hesitate to ask our support team.
- Please, never leave connected equipment unattended, that can cause damage.
- The human head should always be kept more than 30cm away from the built-in GSM modem (expert net control 2190 GSM).
- Connect only electrical devices that do not have limited on-time. I.e. in case of failure, all connected appliances have to cope with a continuous on-time without causing damage.

1.2 Content of Delivery

The package includes:

- Expert Net Control (ENC) 2110 or 2190
- CD-ROM and manual
- GSM antenna (only 2190)
- for the ENC2110/2190_SET a wall plugged power supply 230V to 12V (500mA)
- PCB terminals 1*5 block, 2*4 block

What you still need to use all the features of the ENC 2190

- SIM Card (prepaid or contract)

1.3 Description

The Expert Net Control (ENC) 2110/2190 is a multipurpose device that is suitable for switching low voltages and to monitor passive inputs. It has the following features:

- Switching of low voltages (24V) with 4 relay outputs.
- Monitoring of 4 passive inputs suitable for eg Door contacts, level indicators, etc.
- Connects up to 2 external sensors to measure temperature and humidity values.

- Control and monitor the device via Ethernet with an integrated web server and SNMP (v1 and v2c).
- The ENC 2190 also has a built-in GSM modem, which allows the control of the device. One can thus control the ENC2190 via SMS, Data Call and Voice Call with DTMF tones.
- When switching the relays, change to the passive inputs, and reaching the limits of the external sensors messages are generated. These messages can be sent by e-mail, syslog, SNMP traps and SMS (ENC2190).

All images in this manual are always based on the ENC 2190 model. The ENC 2110 is missing all the points related to GSM.

1.4 Installation

1. Sensor connector
2. Button for OK, Select or Bootloader mode
3. Status LED
4. Ethernet connector (RJ45)
5. Connector for AC Adaptor (included in SET) 12V 500mA
6. four relay outputs
7. four passive inputs
8. Status LED output indicator (green - output switched)
9. Status LED GSM connection (only 2190)
10. SIM card slot (only 2190)
11. GSM antenna connector (only 2190)

Start-up the device

- Connect the device to the AC Adaptor (12V DC, 0,5A).
- Plug the network cable into the Ethernet (RJ45).
- Make contact between the devices that should be monitored and the input sockets (**IN 1** or **IN 2**). To generate an input signal you have to make contact between the common ground (GND) and the respective input socket (**IN 1** or **IN 2**).

1.5 Status LED

The Status LED shows different states of the device:

- red: Device is not connected to the Ethernet
- orange: Device is connected to the Ethernet, TCP/IP settings are not allocated
- green: Device is connected to the Ethernet, TCP/IP settings allocated
- periodic blinking: Device is in Bootloader mode.

The GSM status LED describes the reception situation of the GSM module:

- off: The GSM module is switched off.
- red: The GSM module is switched on but has no GSM reception.
- flashing red: The module has poor reception.
- flashing orange: The module has moderate reception.
- flashing green: The module has good reception.

1.6 Bootloader Mode

Certain actions can, for safety reasons, only be carried out if the device is in bootloader mode. The following operations are possible only in Bootloader Mode:

- Firmware Update
- Configuration with GBL_Conf.exe
- Factory Reset

Activation of the Bootloader Mode

via push button:

- Hold both buttons for 3 seconds (only if the device has 2 buttons)

or

- Remove the power supply
- Hold down the button (or the "Select" button for devices with 2 buttons). If the push button is recessed, use a pin or paper clip
- Connect the operating voltage

by Software: (only if "Enable FW to BL" was previously activated in GBL_Conf.exe)

- Start GBL_Conf.exe
- Do a network search with the *"Search"* menu action
- Activate in menu *"Program Device"* the item *"Enter Bootloader"*

Whether the device is in bootloader mode, is indicated by the flashing of the status LED, or it is shown in GBL_Conf.exe, after a renewed device search, with the appendix "BOOT-LDR" after the device name. In bootloader mode the program GBL_Conf.exe can disable the password and the IP ACL, perform a firmware update, and restore the factory settings.

Activation of the bootloader mode and an abandonment of the bootloader does not change the state of the power or output ports as long as the supply voltage is maintained.

Abandonment of the Bootloader Mode

via push button:

- Hold both buttons for 3 seconds (only if the device has 2 buttons)

or

- Remove and connect the power supply without operating a button

by Software:

- Start GBL_Conf.exe
- Do a network search with the *"Search"* menu action
- In menu *"Program Device"* activate the item *"Enter Firmware"*

Factory Reset

If the device is in bootloader mode, it can always be put back to its factory default. All TCP / IP settings are reset in this operation.

via push button:

- Activate the Bootloader Mode of the device
- Hold down the button (or the "Select" button for devices with 2 buttons) for 6 seconds. If the push button is recessed, use a pin or paper clip
- The status LED will blink in a fast rhythm, please wait until the LED blinks slowly (about 5 seconds)

by Software:

- Activate the Bootloader Mode of the device
- Start GBL_Conf.exe
- In menu *"Program Device"* activate the item *"Reset to Fab Settings"*
- The status LED will blink in a fast rhythm, please wait until the LED blinks slowly (about 5 seconds)

1.7 Firmware-Update

To perform a firmware update, the program GBL_Conf.exe and the latest firmware is needed.

Enable the bootloader mode (see Chapter Bootloader Mode)
Start GBL_Conf.exe
Select the device for which a firmware update is to be performed
Click "Program Device" and then select there "Firmware Update"
Specify the firmware file that should be uploaded

Upon completion of the update process, please start the new firmware of the device. You can do this by simply leaving the bootloader mode.

A firmware update, unlike other functions, is not sent as a network broadcast. Therefore, the device must have a valid IP address and a valid netmask before the firmware update. If necessary, please correct the entries in GBL_Conf.exe in bootloader mode and save them with *"Save Config"*.

1.8 Technical Specifications

Interfaces	1 x Ethernet port (RJ45) 1 x Connector for AC Adaptor 1 x 5 pcb terminal block with 4 inputs and common ground 2 x 4 pcb terminal blocks with 2 relay outputs (24V, 1A) 2 x RJ45 for external sensor 1 x SMA Connector for GSM antenna (2190) 1 x SIM card slot (2190)
Network connectivity	10/100 MBit/s 10baseT Ethernet
Protocols	TCP/IP, HTTP, DHCP, ICMP, SNMP v1/v2c + traps, Syslog, SMTP
GSM Modem (2190)	Triband GSM Module (900/1800/1900 MHz)
SIM Card	Mini-SIM
Power Supply	AC Adaptor (12V DC, 0.5A)
Environment • Operating temperature • Storage temperature • Humidity	 0°C - 50°C -15°C - 60°C 10% - 85%
Case	Aluminium anodized
Measurements	104mm x 104mm x 28mm (L x H x W)
Weight	approx. 250g

1.9 Sensor

Two external sensors can be connected to the ENC 2110/2190. The following sensors are currently available

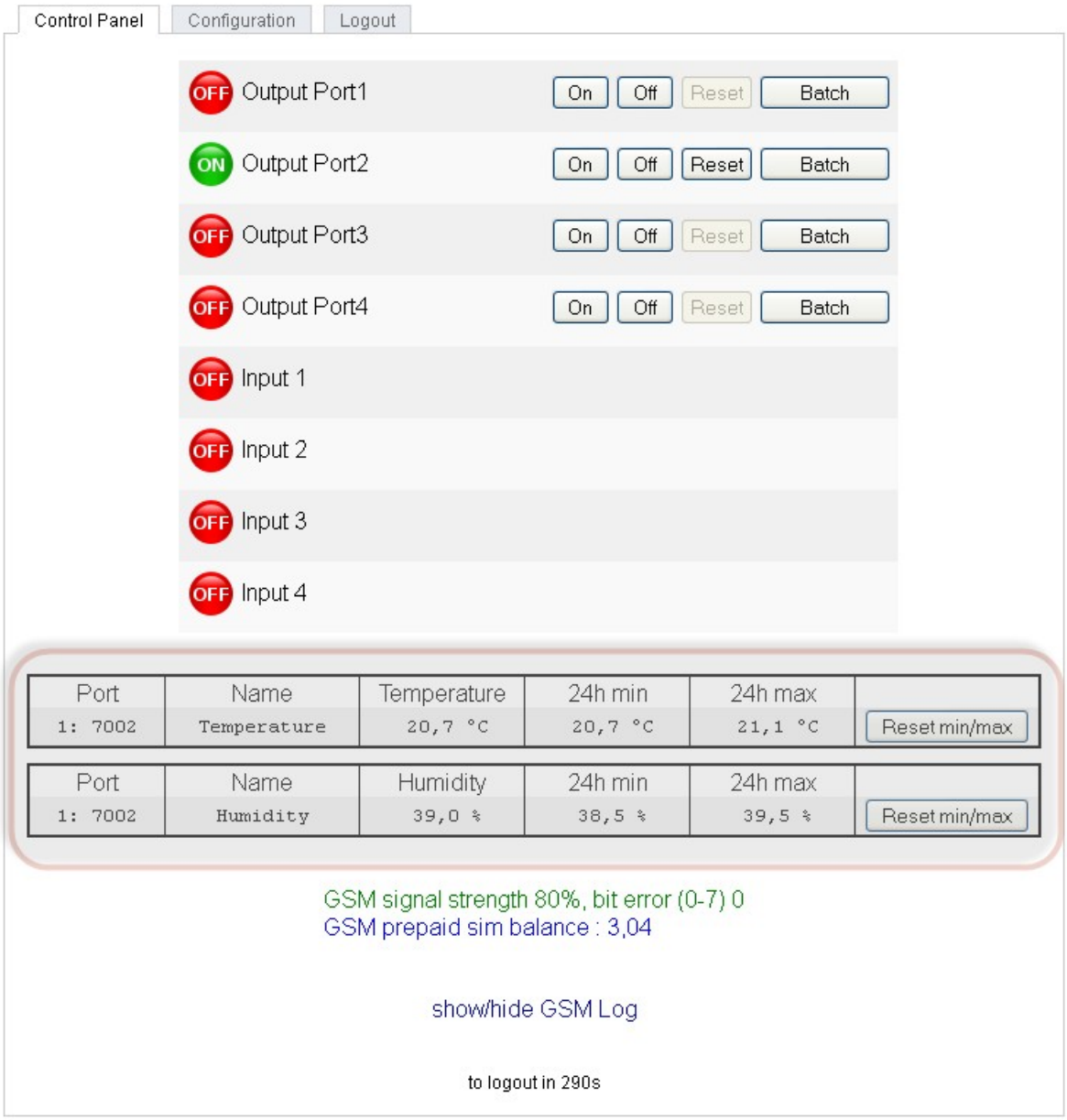
Temperature-Sensor 7101	
Cable length	~ 2m
Connector	RJ45
Measurement range	-20°C to +80°C at ±2°C (maximum) and ±1°C (typical)

Humidity/Temperature-Sensor 7102	
Cable length	~ 2m
Connector	RJ45
Measurement range	Temp: -20 to +80°C, ±0,5°C (maximum) and ±0,3°C (typical) Humidity: 0-100%, ±3% (maximum) and ±2% (typical)

Temperature-Sensor 7201	
Cable length	max. 30m
Connector	RJ45 Socket for CAT5 cable
Measurement range	-20°C to +80°C at ±2°C (maximum) and ±1°C (typical)

Humidity/Temperature-Sensor 7202	
Cable length	max. 30m
Connector	RJ45 Socket for CAT5 cable
Measurement range	Temp: -20 to +80°C, ±0,5°C (maximum) and ±0,3°C (typical) Humidity: 0-100%, ±3% (maximum) and ±2% (typical)

The sensors are automatically detected after connect. This is indicated by the green LED on the sensor port that is lit permanently.



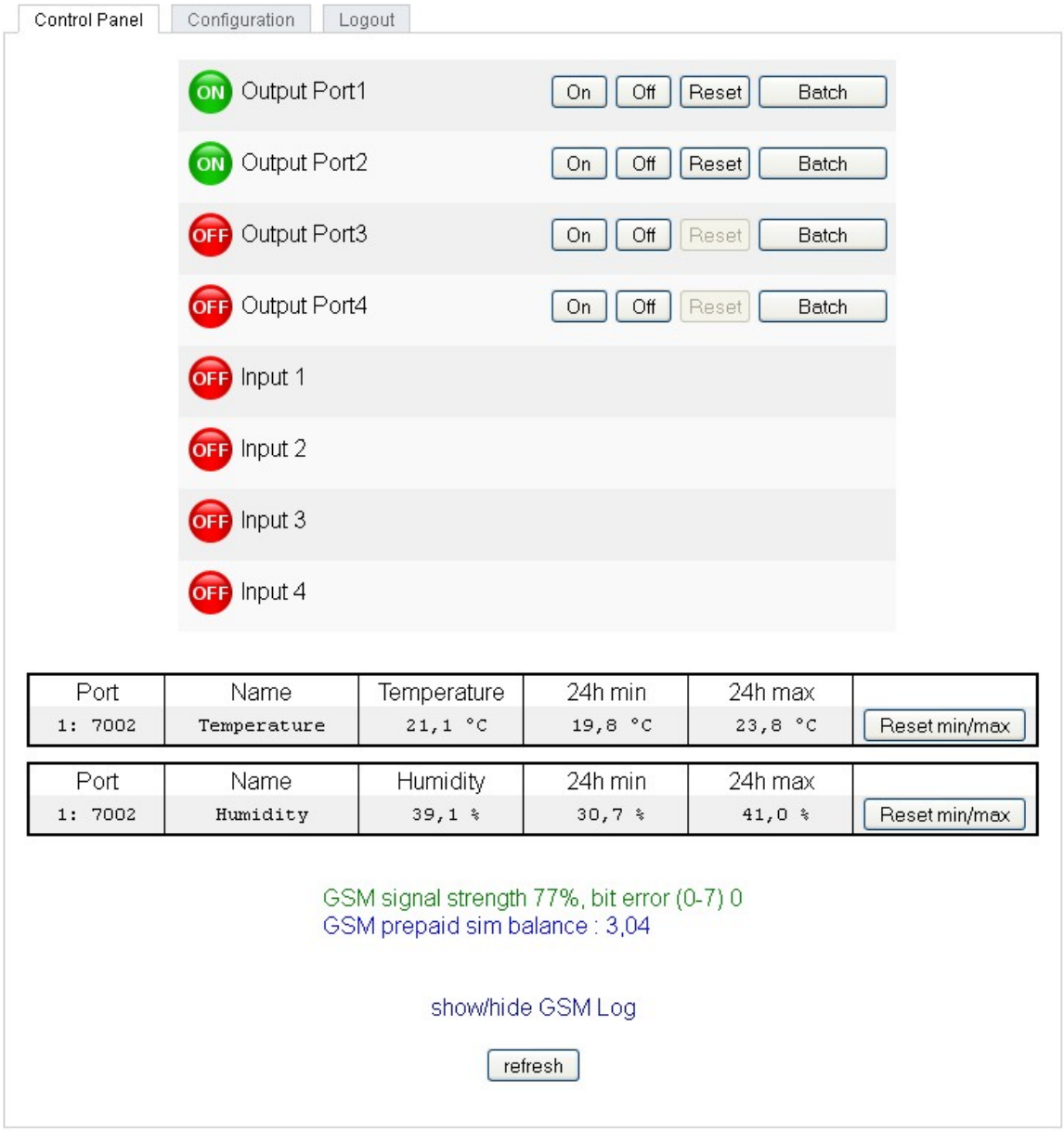
2 Operating

2.1 Operating the device directly

The current status of the output is indicated by the color of the LED. Red indicates that the output is off, green shows that the output is on. On the device are the buttons "**select**" and "**ok**". If you press "**select**", the LED will blink for the first output, ie the output is selected. Press "**select**" again to select the next output. Hold down the button "**ok**" for two seconds, then the status of the selected output is toggled.

2.2 Operating by Webinterface

Access the web interface: http://"IP-address" and log-in.



The website offers an overview of the port status, measurements and sensors, if they are connected. Furthermore, here are buttons to control the state of the ports. The ports can be switched manually with the "On" and "Off" buttons. If the port is turned on, it can be turned off by pressing the "*Reset*" button, until after a delay it turns itself on again. The delay time is determined by the parameter Reset Duration, which is described in the chapter about configuration via web interface.

Batchmode

Each individual port can be set for a selectable period of time to the state "switch on" or "switch off". After the selected time they are automatically switched to the second preselected state.

Optionally the device can be switched via a Perl script or external tools like wget. More information is available on our support wiki at www.gude.info / wiki.

2.3 GSM

To use the GSM functions, there must be an activated SIM card in the SIM card slot located on the front of the unit.

If the SIM card is inserted, and the device is enabled, the integrated GSM module searches automatically for a connection to the GSM network. If this connection works, you can control and configure the device via SMS or by call.

When operating via SMS, send defined SMS commands to the device. The device executes these commands and confirms them with reply SMS.

When operating via phone call, you can perform commands by FreeCall, that allow the unit to perform preconfigured commands, when it is called from a particular phone number. There is no connection established and there are no call charges. Another possibility is the voice call. Here, the device menu is operated using DTMF codes. This type of operation can also be carried out automatically.

Preparing for GSM operation

If you are using a new SIM card, please take note:

1. **Preparing the SIM card**
   - If you are using a contracted SIM card, please start with step 2
   - If you are using a prepaid SIM card, please take care:
     - o There has to be a positiv balance on the card
     - o The card has to be activated. New prepaid cards need some manual operation at the start of usage. These requests have to be made from a user with a cellphone.

2. **SIM-card pin code**
   - The device awaits the SIM card pin code 1234 first. Enter this PIN to the SIM card, by using a cellphone. In case you are using another pin code, you have to configure the EPC NET GSM before you activate the GSM part of the device! Otherwise this may lead to a lock of the SIM card.
   - You can disable the need to enter the PIN code on the SIM card with a mobile phone. In this case the EPC NET GSM accepts the SIM card without checking the code.

3. **Install SIM card**
   - Switch off the device or deactivate the GSM module. Alternatively, you can just turn off the GSM module in the EPC NET GSM via software. Never install a SIM card, when GSM module is active. Otherwise the SIM card may be destroyed.
   - Release the SIM card holder by pressing the yellow button with a fine stick. Insert the SIM card in the ejected plastic tray and slide it back inside until it stops.

4. **Connect Antenna**
   - Take the GSM antenna from the box and screw it to the EPC NET GSM by turning clockwise. It is enough to attract the connection hand-tight. Never use pliers to tighten or similar to the antenna, thus inevitably destroying the antenna connection.

5. Activate the EPC NET GSM

- Power up the device. In factory default state, the GSM module is deactivated. This is a security setting in delivery to avoid accidentally locking a SIM card with the wrong code.
- Log in on the web interface.
- Switch to Configuration / GSM / SIM.
- Here the button "Enable GSM" is set to "No", that is the GSM module is turned off. Set the button to "yes", then press the button "Apply" to transmit the data to the EPC NET GSM.
- Wait some minutes, until the device has logged into the GSM. You can see the status change from the flashing GSM status LED or in the web interface.

GSM Status LED

The GSM status LED displays different states of the GSM module.

LED off
GSM module is deactivated.

LED permanent red
GSM module activated, looking for GSM signal.

LED blinks red
GSM module activated, bad receive quality.

LED permanent orange
GSM module activated, medium receive quality.

LED blinks green
GSM module activated, good receive quality.

The quality of the GSM signal can also be checked in the web interface in the Control Panel.

2.3.1 SMS

2.3.1.1 SMS Commands

Description of the SMS format to send commands to the device:

Format

%[cmd-name] [param 1] [...] [param N] {param 1} {...} {param N}
[param x] = mandatory parameter
{param x} = optional paramater

If activated, a port code or master code will be required. Entering these codes is initiated by p (for Port code) or m (for Master code).

2.3.1.1.1 Powerport: Query Power Port State

Format

%port state [portnumber] {Portcode/Mastercode}

Command:

Request of status of Power Port 1, Portcode 1111

%port state 1 p1111

Answer:
Device name: epc007
Powerport state: Port 1 on
Account credit: Credit: 130.50 Eur

2.3.1.1.2 Powerport: Simple Switching

Format

%port [on, off, toggle] [portnumber] {Portcode/Mastercode}

Examples:

Switch off Power Port 2, Mastercode 2222
%port off 2 m2222

Toggle Power Port 8, Portcode 1238
%port toggle 8 p1238

Reset Power Port 6, Portcode 0123
%port reset 6 p0123

Switch on Power Port 1, without Portcode
%port on 1

Answer (example):
Device name: epc007
Power switch: Port 1 off -> on
Account Credit: Credit: 130.50 Eur

2.3.1.1.3 Powerport: Advanced Switching (Batchmode)

Format

%port batchmode [portnumber] [batch-sequence-number] {Portcode/Mastercode}

[batch-sequence-number]
'11' .. '19' off, wait [t1 .. t9]s, on
'21' .. '29' on, wait [t1 .. t9]s, off
'31' .. '39' toggle, wait [t1 .. t9]s, toggle

Note: Sequence numbers are identical to the DTMF codes for voice calls.

tn	Time in seconds
t1	1
t2	2
t3	5
t4	10
t5	20
t6	60
t7	120
t8	240
t9	480

Example:
%port batchmode 1 13 m0123

Answer:
Device name: epc007
Switch sequence: Port 1 off -> t3 -> on
Account Credit: Credit 130.50

2.3.1.1.4 Powerport: Advanced Switching (coldstart)

The command '**coldstart**' turns off all Powerports at once. Then it switches the ports temporally delayed on again (according to the current power port configuration), as if the device performs a cold start.

Format

%coldstart {mastercode}

Example:
%coldstart m0123

Answer:
Device name: epc007
Switch sequence: coldstart
Account Credit: Credit: 130.50 Eur

2.3.1.1.5 Configuration: Read

Format

%config get [config-name] {mastercode}

[config-name 17]:
all
code
telbook
gsmstatus
temp
response
error
portname
adminnum
tempmin
tempmax
gsm

Example:
%config get code m1234

Answer:
Config: code = on

Example:
%config get all

Answer:
Config: code = on
telbook = off
[...]
adminnum = 0161123456
gsm = on

2.3.1.1.6 Configuration: Write

Format

%config set [config-name] [config-value] {Mastercode}

[config-name] 17:
code
telbook
gsmstatus
temp
response
error
portname
adminnum
tempmin
tempmax
gsm

Example:
%config set code off m1234

Answer:
Config: code = off

2.3.1.1.7 Configuration: All Parameter

Description	SMS [config-name]	SMS [config-value]	default
Master/Port Code enabled?	code	on, off	off
Check of phone book?	telbook	on, off	off
Send GSM Status SMS to 'adminnum'	gsmstatus	on, off	off
Send SMS to 'adminnum' if tempmin / temp-max are changed	temp	on, off	off
Send SMS reply on SMS com-mands to recent SMS user	response	on, off	on
Send SMS reply with error mes-sage, if SMS command was malformed	error	on, off	on
States con-figured Port name instead of Power Port n in SMS replies	portname	on, off	off
Allow deactiva-tion of GSM module via SMS	gsm	on, off	off
Phone number	email	max. 15 chars	

Description	SMS [config-name]	SMS [config-value]	default
for e-mail mes-sages			
Access only for admin	mastergsm	on, off	off
Autosync	autosync	on, off	off
DTMF for VoiceCall	calltone	on, off	off
Voice for VoiceCall	callvoice	on, off	on
Phone number for SMS mes-sages	adminnum	max. 15 chars	
Minimum value for temperature alerts	tempmin	'-20' .. '0'	0
Maximum value for temperature alerts	tempmax	'0' .. '90'	50
Allows freecall operation	freecall	on, off	off

2.3.1.1.8 Inputport: Query State

Format

%input state [portnumber, all] {Portcode/Mastercode}

Example:

Query state of Input Port 1
%input state 1

Answer:
Device name: epc007
Inputport state: Port 1 on
Account credit: Credit: 130.50 Eur

Example:

Query the state of all Input Ports, Mastercode 0000
%input state all m0000

Answer:
Device name: epc007
Inputport state: Port 1 on, Port 2 off, [...], Port N off
Account credit: Credit: 130.50 Eur

Note: For the command %input state all only the Mastercode will be accepted.

2.3.1.1.9 Sensors: Query State

Format

%sensor state [portnumber, all] {Mastercode}

Example:

Query the state of all sensors, Mastercode 0000
%sensor state m0000

Answer:
Device name: epc007
Port: Sensor port 1
Sensor name: Temperature
Value: NC
Port: Sensor port 2
Sensor name: Temperature
Value: T=22.79C
Value: RH= 76.64%
Account credit: Credit: 130.50 Eur

2.3.1.1.10 Query Device State

Format

%all state {Mastercode}

Example:

Query the state of the device:
%all state

Answer:
Device name: epc007: Status
Outputport state: outp: 1=On 2=On 3=On 4=Off
Inputport state: dinp: 1=Off 2=Off 3=Off 4=Off
Sensor Port 1: senp 1: NC
Sensor Port 2: senp 2: T=22.79C RH= 76.64%
Account credit: Credit: 130.50 Eur

2.3.1.2 SMS replies

2.3.1.2.1 SMS command replies

A command reply SMS looks like:

Device name: [name]	prefix
[response text]	Command specific reply
Account credit: [x]	

[response text]

Device name: [name]

Power switch: [powerport] [s] -> [s]
[powerport] = Port 1 .. Port 99 (or Config:portname)
[s] = on .. off

Powerport state: [powerport] is [s], [...], [powerport] is [s]
[powerport] = Port 1 .. Port 99 (or Config:portname)
[s] = on .. off

Switch sequence: [s]
[s]

[powerport] [c] -> wait t -> [c]
[powerport] = 'Port 1' .. 'Port 99' (or Config:portname)
[c] = on, off, toggle, coldstart

Account credit: [x]

Config: name = value, [...], name = value

or

command parse error

2.3.1.2.2 Status Change Report SMS

A SMS status change request reply looks like:

Device name: [name]	Prefix
[response text]	Status change request specific reply
Account credit: [x]	

[response text]

Device name: [name]

[powerport] -> [s]
[powerport] = 'Port 1' .. 'Port 99' (or Config:portname)
[s] = 'on' .. 'off'

[powerport] [s]
[powerport] = 'Port 1' .. 'Port 99' (or Config:portname)
[s] = batchmode, toggled, Coldstart

Temperature state: [val]
[val] = 'over the MAX limit', 'under the MIN limit'

Account credit: [x]

2.3.2 Voice Call

2.3.2.1 Menu

For operating with VoiceCall, simply call the phone number of the SIM card of the GSM module. When connection is established the device replies with the announcement: "Main menu" and a DTMF tone
In the menu the navigation works via DTMF commands.

Each command starts with # and ends with *.

Numbers	Men
*1#	Power Port
*2#	Input Port
*8#	Status

You can combine multiple commands into a command. Just type the commands one after another and terminate it as a whole with #.

*[Command 1][Command 2]...[Command n]#

Some commands may require the Port or MasterCode. These codes have to be added at end of the command

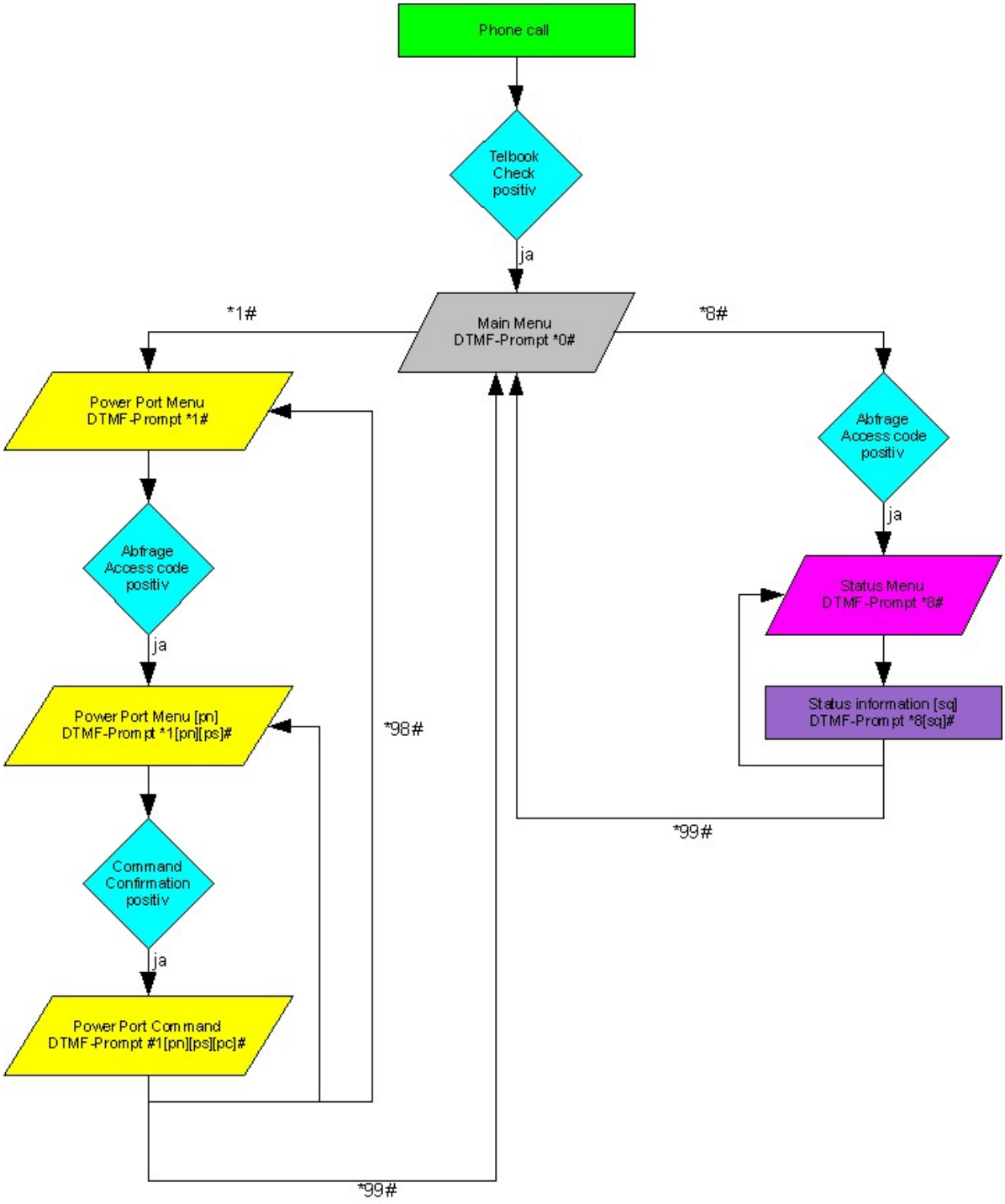
Eample:

Navigate from Main Menu into the Status Menu using mastercode 1111

*8# - enter Status Menu
1111 - Mastercode

For the navigation in menus the following commands are required:

*99# - Jump to Main Menu
*98# - Return to prev Menu
*97# - Help



2.3.2.1.1 Power Port Menu

Here you can choose and switch Power Ports or request the status of a Power Port.

Example:

*1# - Switch to Power Port menu
*5# - Choose Power Port 5

*01# - Switch on

Or connected into one command: *1501#

Example:

*7# - Choose Power Port 7
*23# - Activate Batchmode No.23 for Power Port 7 - Powerport 7 on, wait t3, off

Example:

*3# - Choose Power Port 3
*03# - Request state of Power Port 4

Or as one command: *303#

Please check the Power Port commands [pc] for further information

2.3.2.1.2 Input Port Menu

There you can select the desired input port [in] and announce the status [is] of the input port.

Example:
Navigate from Main Menu into the Input Port Menu and announce the state of Input Port 5

*2# - Switch to Input Port menu
*5# - Choose Input Port 5

Combined into one command: *25#

2.3.2.1.3 Status Menu

Different states of the device can be requested

*00#	Value of the account of the PrePaid card
*01#	Request of an SMS with all power port information, announcement "SMS sent"
*02#	Request of an SMS with all input port information, announcement "SMS sent"
*03#	Request of an SMS with configuration information, announcement "SMS sent"
*04#	Request of actual sensor information (a sensor has to be connected)
*10#	Request of the state of all Power Ports
*20#	Request of the state of all Input Ports

2.3.2.1.4 Parameter Description

[pn]
Power-Port Nummer
- Values: '1' .. '9'

[ps]
- Power-Port State
- Values: '0' .. '1'
(on/off)

[pc]
- Power-Port Command
- Values: '00' .. '89'

[in]
- Input-Port Number
- Values: '1' .. '9'

[is]
- Input-Port State
- Values: '0' .. '1'
  (on/off)

[sq]
- Status Query
- Values '01' .. '89'

Special Menu Commands (90 .. 00)
- 99 : Jump to Main Menu
- 98 : return to prev Menu
- 97 : Help

2.3.3 Power Port Commands

List of possible Power Port commands (pc)

Port Command	Command	Description
00	off	Switch off
01	on	Switch on
02	toggle	Toggle
03	state info	Request of state of Power Port
04	reset	Switch off, wait 30 seconds, switch on

Port Command	Command	Description
11	Batchmode: off, wait t1, on	Powerport off, wait t1, Power Port on
12	Batchmode: off, wait t2, on	Powerport off, wait t2, Power Port on
13	Batchmode: off, wait t3, on	Powerport off, wait t3, Power Port on
14	Batchmode: off, wait t4, on	Powerport off, wait t4, Power Port on
15	Batchmode: off, wait t5, on	Powerport off, wait t5, Power Port on
16	Batchmode: off, wait t6, on	Powerport off, wait t6, Power Port on
17	Batchmode: off, wait t7, on	Powerport off, wait t7, Power Port on
18	Batchmode: off, wait t8, on	Powerport off, wait t8, Power Port on
19	Batchmode: off, wait t9, on	Powerport off, wait t9, Power Port on

Port Command	Command	Description
21	Batchmode: on, wait t1, off	Powerport on, wait t1, Power Port off
22	Batchmode: on, wait t2, off	Powerport on, wait t2, Power Port off
23	Batchmode: on, wait t3, off	Powerport on, wait t3, Power Port off
24	Batchmode: on, wait t4, off	Powerport on, wait t4, Power Port off
25	Batchmode: on, wait t5, off	Powerport on, wait t5, Power Port off
26	Batchmode: on, wait t6, off	Powerport on, wait t6, Power Port off
27	Batchmode: on, wait t7, off	Powerport on, wait t7, Power Port off
28	Batchmode: on, wait t8, off	Powerport on, wait t8, Power Port off
29	Batchmode: on, wait t9, off	Powerport on, wait t9, Power Port off

Port Command	Command	Description
31	Batchmode: toggle, wait t1, toggle	Power Port toggle, wait t1, Power Port toggle
32	Batchmode: toggle, wait t2, toggle	Power Port toggle, wait t2, Power Port toggle
33	Batchmode: toggle, wait t3, toggle	Power Port toggle, wait t3, Power Port toggle
34	Batchmode: toggle, wait t4, toggle	Power Port toggle, wait t4, Power Port toggle
35	Batchmode: toggle, wait t5, toggle	Power Port toggle, wait t5, Power Port toggle
36	Batchmode: toggle, wait t6, toggle	Power Port toggle, wait t6, Power Port toggle
37	Batchmode: toggle, wait t7,toggle	Power Port toggle, wait t7, Power Port toggle
38	Batchmode: toggle, wait t8, toggle	Power Port toggle, wait t8, Power Port toggle
39	Batchmode: toggle, wait t9, toggle	Power Port toggle, wait t91, Power Port toggle

tn	Time in seconds
t1	1
t2	2
t3	5
t4	10
t5	20
t6	60
t7	120
t8	240
t9	480

2.3.4 Security

Please note that the device has no security options set in the delivery settings, in order to allow a quick start. For a later use we strongly recommend that you activate the phone book check and code queries. The phone book check provides pretty high security, because only phone book members can operate the device. Unfortunately, there are mobile carriers that allow to simulate any number with some technical effort. These numbers will be marked with a special bit and can only be identified by the police as forged. Unfortunately the GSM network has no possibility to identify this fake numbers. For this reason we recommend the code query.

Access	Phonebook Check	Port/ Master-Code	Security
Anybody	off	off	Very low
Phonebook Check	on	off	Normal
Code Check	off	on	High
Phonebook and Code Check	on	on	Very high

3 Configuration

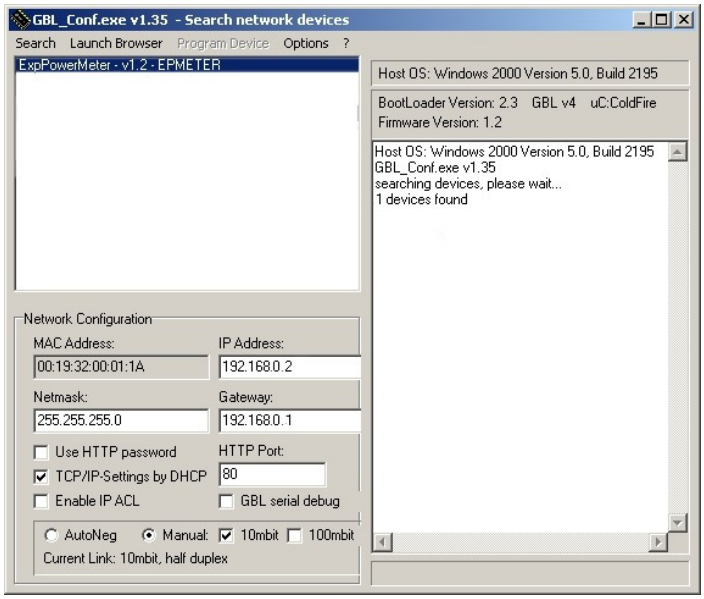
TCP/IP configuration by DHCP

After switching on the device is scanning on the Ethernet for a DHCP server and requests an unused IP address. Check the IP address that has been assigned and adjust if necessary, that the same IP address is used at each restart. To turn off DHCP use the software GBL_Conf.exe or use the configuration via the web interface.

To check the network settings with GBL_Conf.exe, start the program and choose *"All Devices"* in the *"Search"* menu. From the list select the appropriate device. The lower part of the left half of the window now shows the current network settings of the device. If the IP address is displayed with the default settings (192.168.0.2), either no DHCP server is present on the network, or there could be no free IP address assigned to it.

3.1 Configuration by Software

To view and change the network settings, you can use the program GBL_Conf.exe. The program is available for free on our website www.gude.info and is also available on the accompanying CD-ROM. You can also use GBL_Conf.exe to install firmware updates and trigger a reset to factory defaults.



Interface GBL_Conf

To check the network settings with GBL_Conf.exe, start the program and choose *"All Devices"* in the *"Search"* menu. From the list select the appropriate device. The lower part of the left half of the window now shows the current network settings of the device. If the IP address is displayed with the default settings (192.168.0.2), either no DHCP server is present on the network, or there could be no free IP address assigned to it.

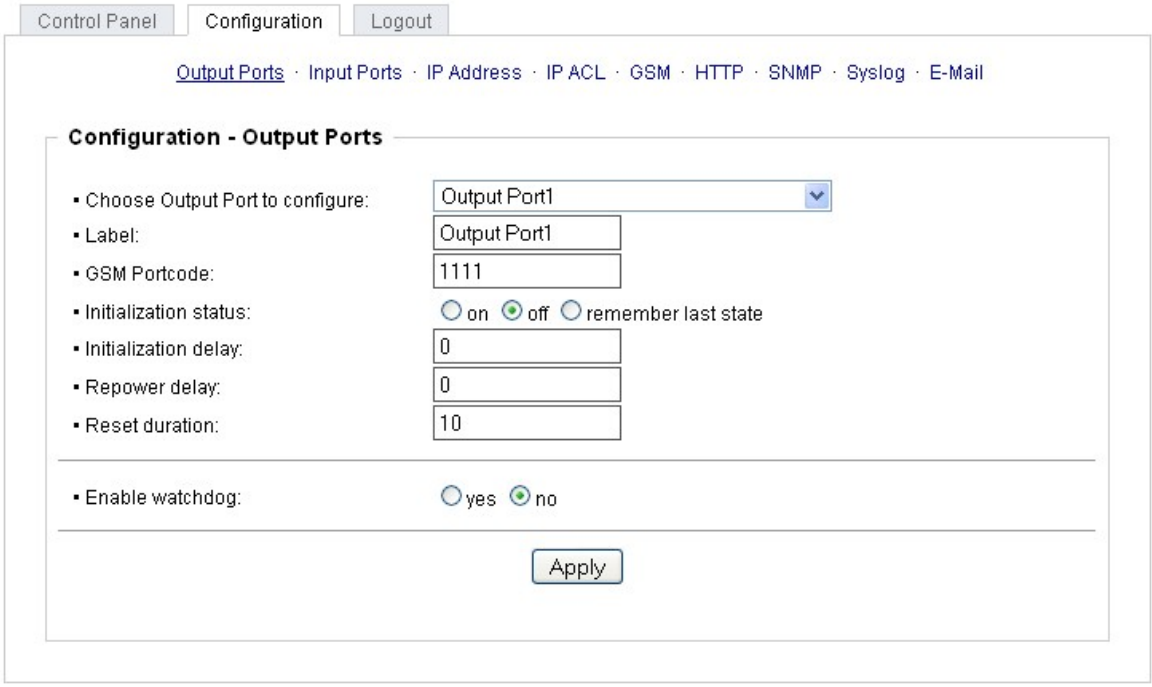
- Activate the Bootloader Mode (see Chapter Bootloader Mode) and choose in menu *"Search" the item "Bootloader-Mode Devices only"*
- Enter the desired settings in the edit window and save them with *"Save Config".*
- Deactivate the boot loader mode for the changes to take effect. Select again *"All Devices"* in the *"Search"* menu of GBL_Conf.exe. The new network configuration is now displayed.

3.2 Configuration via Webinterface

Access the web interface: http://"IP-address" and log-in.

Use the "**Configuration**" Tab to enter the configuration menu.

3.2.1 Configuration - Output Ports



Choose Output Port to configure: This field is used to select the output ports to be configured.

Label: You can assign a name up to 15 characters for each of the output ports. Using the name, an identification of the the device connected to the port can be facilitated. This name is also shown on the status page.

Start-up Monitoring

It is important, that if necessary the condition of the output ports can be restored after a power failure. Therefore each port can be configured with Initialization status to a specific start-up state. This start-up sequence can be carried out delayed by the parameter Initialization Delay. There is in any case a minimum one-second delay between switching of ports.

Initialization status: This is the port state (on, off, remember last state) the port should be set when the device is turned on. The setting "remember last state" saves the last manually set state of the output port in the EEPROM.

Initialization delay: Here can be configured how long the port should wait to switch to its defined state after the device is turned on. The delay may last up to 8191 seconds. This corresponds to a period of approx. two hours and 20 minutes. A value of zero means that the initialization is off.

Repower delay: When this feature is enabled (value greater than 0), the output port will switch itself on again a specified time after it has been disabled. Unlike the "*Reset*" button this function applies to all switch actions, including SNMP, or an optional serial interface.

Reset Duration: When the "*Reset*" button is triggered, the device turns the output port off, waits for the time entered here (in seconds) and turns the output port on.

3.2.2 Configuration - Watchdog

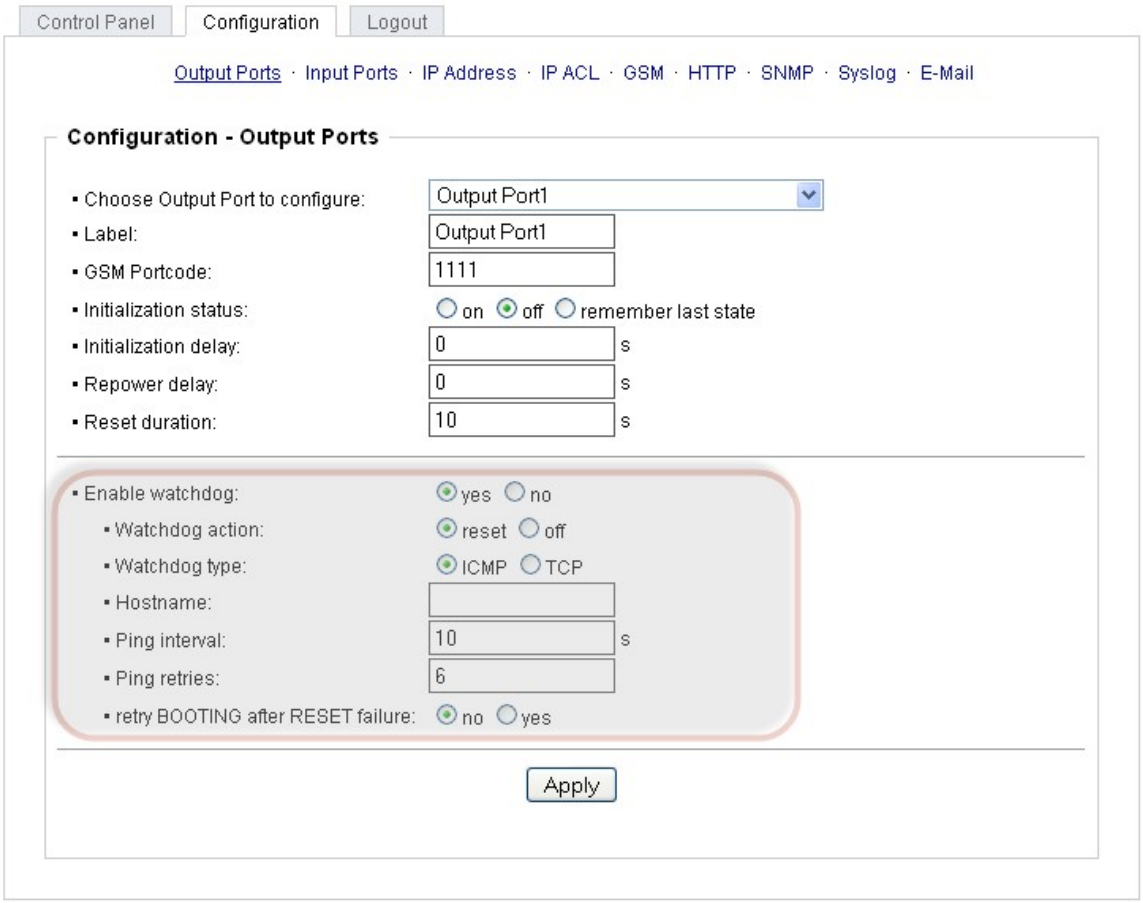
The watchdog feature enables to monitor various remote devices. Therefore either ICMP pings or TCP pings are sent to the device to be monitored. If these pings are not answered within a certain time (both the time and the number of attempts can be set), the port is reset. This allows e.g. to switch other devices that are connected via the relay.

When a watchdog is activated it presents various information in the Control Panel. The information is color-coded.

Green text: The watchdog is active and regularly receives ping replies.
Orange text: The watchdog is currently enabled, and waits for the first Ping response.
Red text: The watchdog is active and receives no ping replies anymore from the configured IP address.

After the watchdog has been enabled, the display remains orange until the watchdog receives a ping response for the first time. Only then the watchdog is activated. Even after triggering a watchdog and a subsequent Output Port reset, the display will remain orange until the device is rebooted and responds again to ping requests. This will prevent a premature watchdog reset of the port, e.g. when a server needs a long time for a file check.

You can monitor devices on your own network, as well as devices on an external network, e.g. the operating status of a router.



Enable watchdog: Enables the watchdog function for this Output Port.

Watchdog action: When selecting *reset,* the Port will be turned off and switched on again after a Reset Duration. The setting *off* leaves the Port in the off state.

Watchdog type: Here you can choose between the monitoring by ICMP pings or TCP pings.

- ICMP Pings: The classic ping (ICMP echo request). It can be used to check the accessibility of network devices (for example, a server).
- TCP Pings: With TCP pings, you can check if a TCP port on the target device would accept a TCP connect. Therefore a non-blocked TCP port should be selected. A good choice would be port 80 for http or port 25 for SMTP.

Hostname: The name or IP address of the monitored network device.

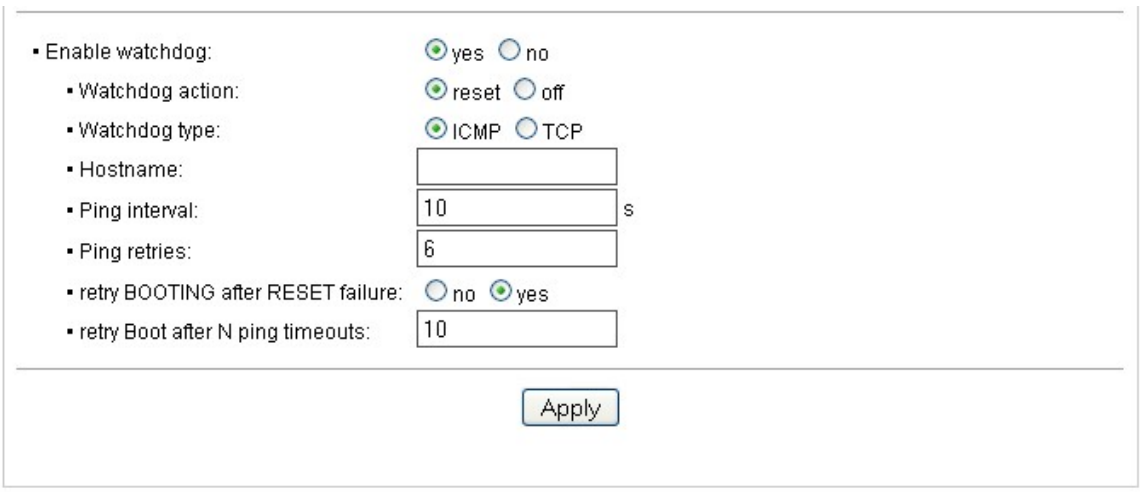
TCP port: Enter the TCP port to be monitored. When using ICMP pings this is not needed.

Ping interval: Select the frequency (in seconds) at which the ping packet is sent to each network device to check its operating status.

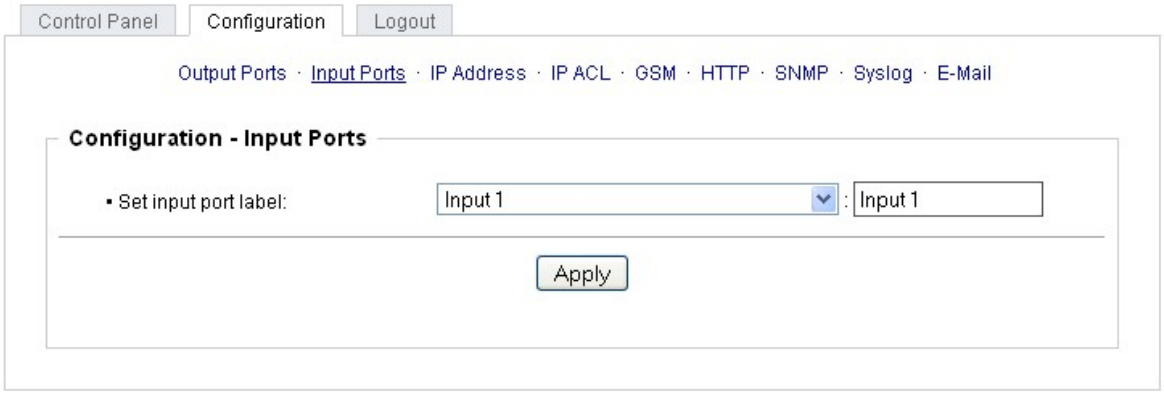
Ping retry: After this number of consecutive unanswered ping requests the device is considered inactive.

retry BOOTING after RESET failure:
Normally (this option no selected) the watchdog monitors the connected device. When the watchdog is activated, because the device is not answering, the pre-selected watchdog action is executed. Now the watchdog waits until the monitored device is answering to pings again. After this the watchdog is armed again. When you select the option retry BOOTING after RESET failure, the watchdog is armed **directly** after the watchdog action is executed.

retry Boot after N ping timeouts: If retry BOOTING after RESET failure is enabled, when there is no answer the device waits N Ping intervals until the Output Port is switched off and on again.

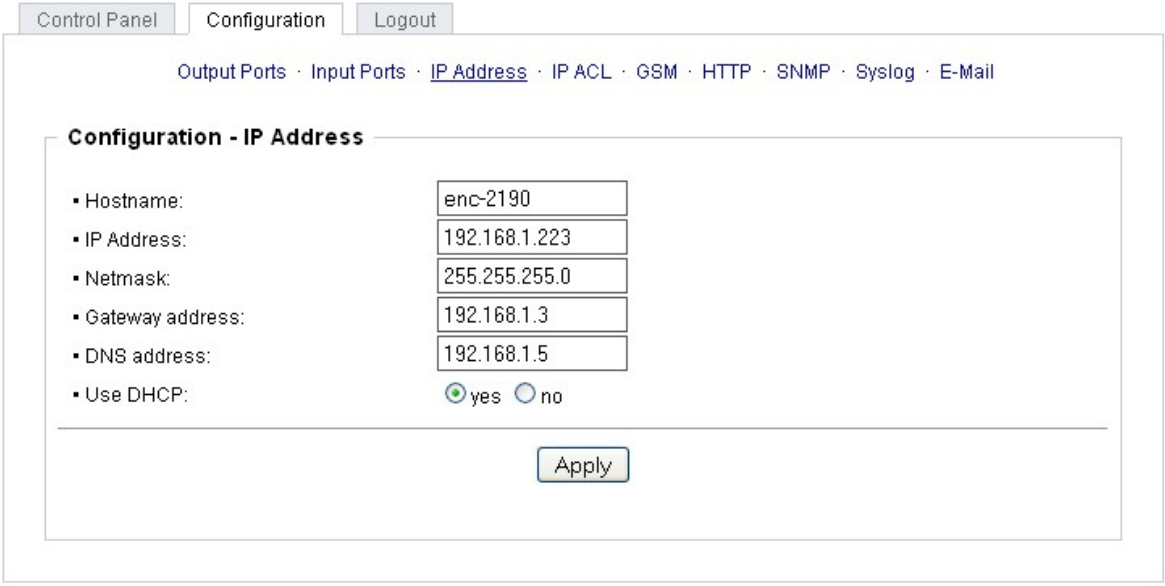


3.2.3 Configuration - Input Ports



Set Input port label: In this input form an individual name for the digital input can be assigned, that is easier to remember, such as "Input" or "basement window" etc.

3.2.4 Configuration - IP Address



Hostname: Here you can enter a name with up to 15 characters. This name will be used for registration on the DHCP server. Special characters and umlauts can cause problems in the network.

IP Address: The IP address of the device.

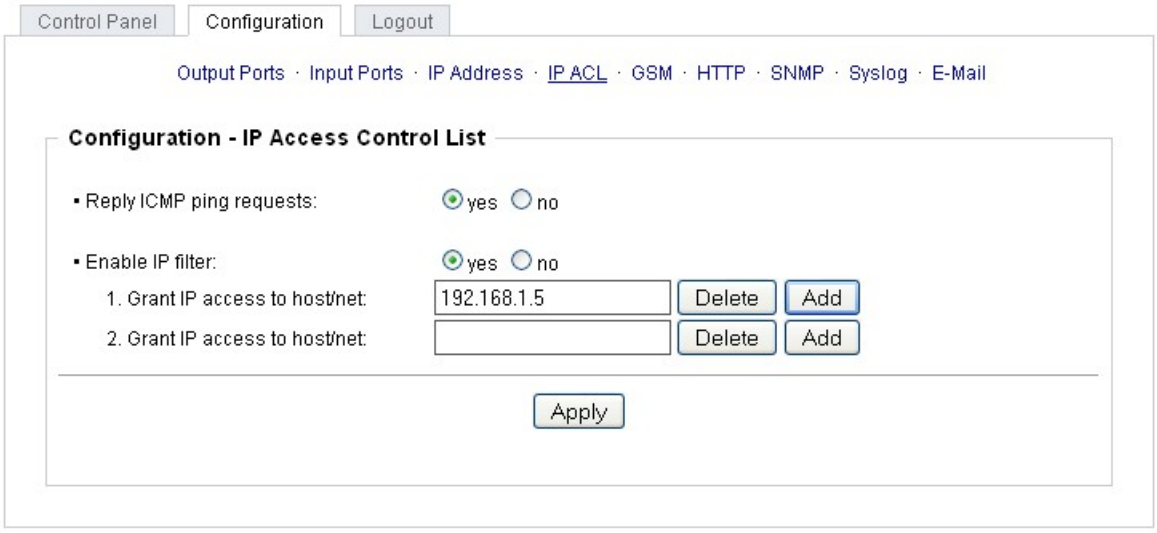
Netmask: The network mask used in the network.

Gateway address: The IP address of the gateway.

Use DHCP: Select "yes" if the TCP/IP settings should be obtained directly from the DHCP server: When the function is selected, each time the device powers up it is checked if a DHCP server is available on the network. If not, the last used TCP/IP setting will be used further.

All IP changes will take effect directly, there is no need for a restart of the firmware.

3.2.5 Configuration - IP ACL



Reply ICMP ping requests: If you enable this feature, the device responds to ICMP pings from the network.

Enable IP filter: Enable or disable the IP filter here. The IP filter represents an access control for incoming IP packets.

Please note that when IP access control is enabled DHCP and SNMP only work if the appropriate servers and clients are registered in the IP access control list.

IP Access Control List

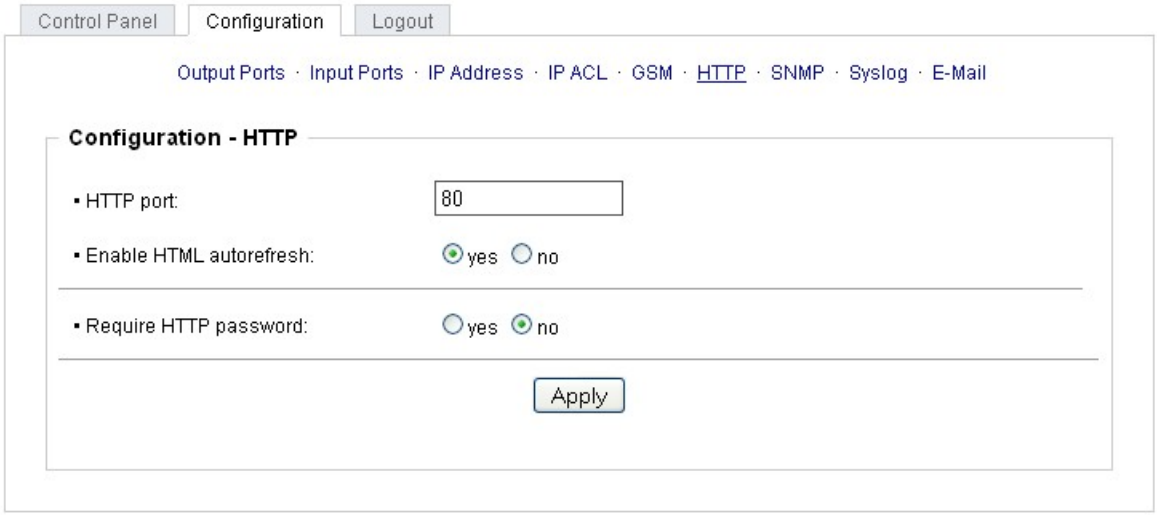
The IP Access Control List (ACL IP) is a filter for incoming IP packets. If the filter is active, you can only connect to hosts and subnets whose IP addresses are entered in the list.

Examples:

Entry in the IP ACL	Meaning
192.168.0.123	the PC with IP Address „192.168.0.123" can access the device
192.168.0.1/24	all devices of subnet „192.168.0.1/24“ can access

If you choose a wrong IP ACL setting and locked yourself out, please activate the Bootloader Mode and use GBL_Conf.exe to deactivate the IP ACL.

3.2.6 Configuration - HTTP



HTTP port: Here can be set the port number of the internal HTTP. Possible values are from 1 to 65534 (default: 80). If you do not use the default port, you must append the port number to the address with a colon to address the device from a web browser. Such as: "http://192.168.0.2:800"

Enable auto refresh HTML: If this is activated, the information of the status page is automatically updated via http request (AJAX).

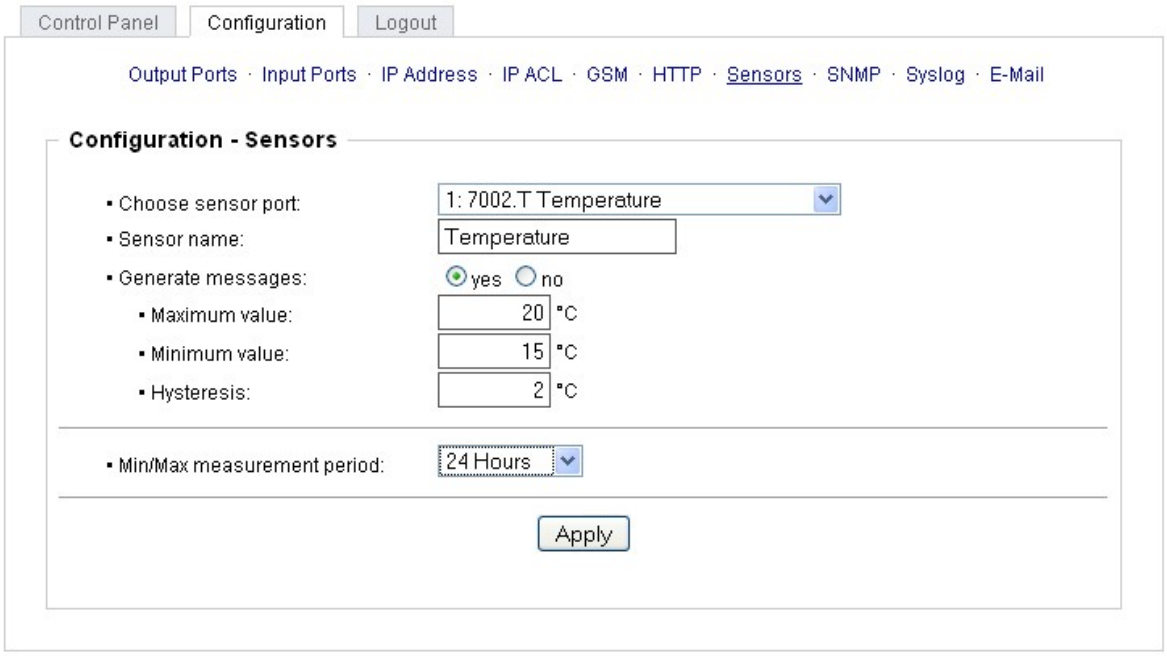
Require HTTP password: If desired, a http password protection can be enabled. In this case, an admin password and a user password can be assigned. The password can have up to 15 characters. User can log in by entering the user's password to query the status information and make changes to ports (if applicable). Admins have the privileges of a User and can change the Configuration settings.

Check password on start page: When this feature is enabled, the password will be queried before displaying the login page.

If you have forgotten your password, please activate the bootloader mode and then turn off the password prompt in GBL_Conf.exe.

All changes will be effective after a reboot of the firmware.

3.2.7 Configuration - Sensors



Choose sensor port: Selects a type of sensor to configure it. The first digit "1" indicates the number of the sensor port (only important for devices with more than one sensor port). This is followed by the sensor name (eg 7002 for the hybrid sensor), a letter for the sub-type sensor and the changeable sensor name. The sensor subtypes are defined as: "T" = temperature, "H" = humidity, "I" = sensor input.

Sensor Name: Changeable name for this sensor. Temperature and humidity can have different names, even if they are from the same sensor.

Generate messages: Enables the generation of messages.

Maximum/Minimum value: Here you can choose whether, and at what Maximum/Minimum temperature or humidity measurements limits the alerts are send via SNMP traps, syslog or email.

Hysteresis: This is the distance between the value that is signaling an overrun of a limit and the value that signals an underrun of the same limit.

Min/Max measurement period: Selects the time range for the sensor min / max values on the overview web page.

Hysteresis Example:

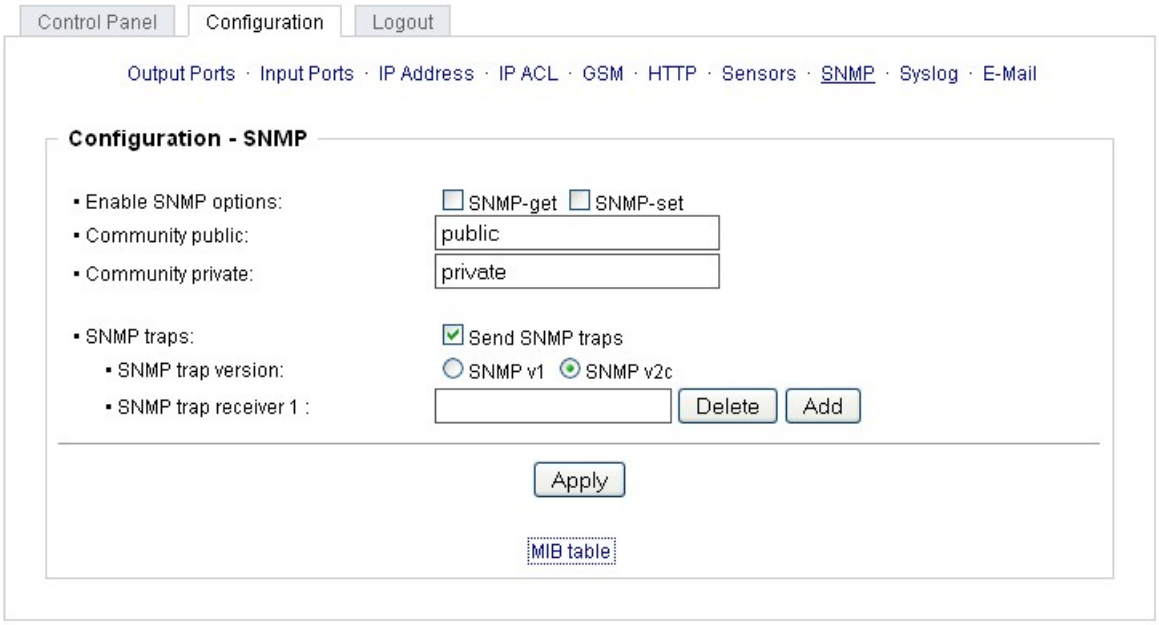
A Hysteresis value prevents that too much messages are generated, when a sensor value is jittering around a sensor limit. The following example shows the behavior for a temperature sensor and a hysteresis value of "1". An upper limit of "50 °C" is set.

Example:

49.9 °C - is below the upper limit
50.0 °C - a message is generated for reaching the upper limit
50.1 °C - is above the upper limit
...

49.1 °C - is below the upper limit, but in the hysteresis range
49.0 °C - is below the upper limit, but in the hysteresis range
48.9 °C - a message is generated for underrunning the upper limit inclusive hysteresis range
...

3.2.8 Configuration - SNMP



SNMP-get: Enables the acceptance of SNMP-GET commands.

Community public: The community password for SNMP GET requests.

SNMP-set: Enables the acceptance of SNMP-SET commands.

Community private: The community password for SNMP SET requests.

MIB table: The download link to the text file with the MIB table for the device.

Send SNMP traps: Activates the usage of SNMP traps.

SNMP v1: SNMP traps are sent in SNMP v1 format.

SNMP v2c: SNMP traps are sent in SNMP v2c format.

SNMP trap receiver: You can insert here up to eight SNMP trap receiver.

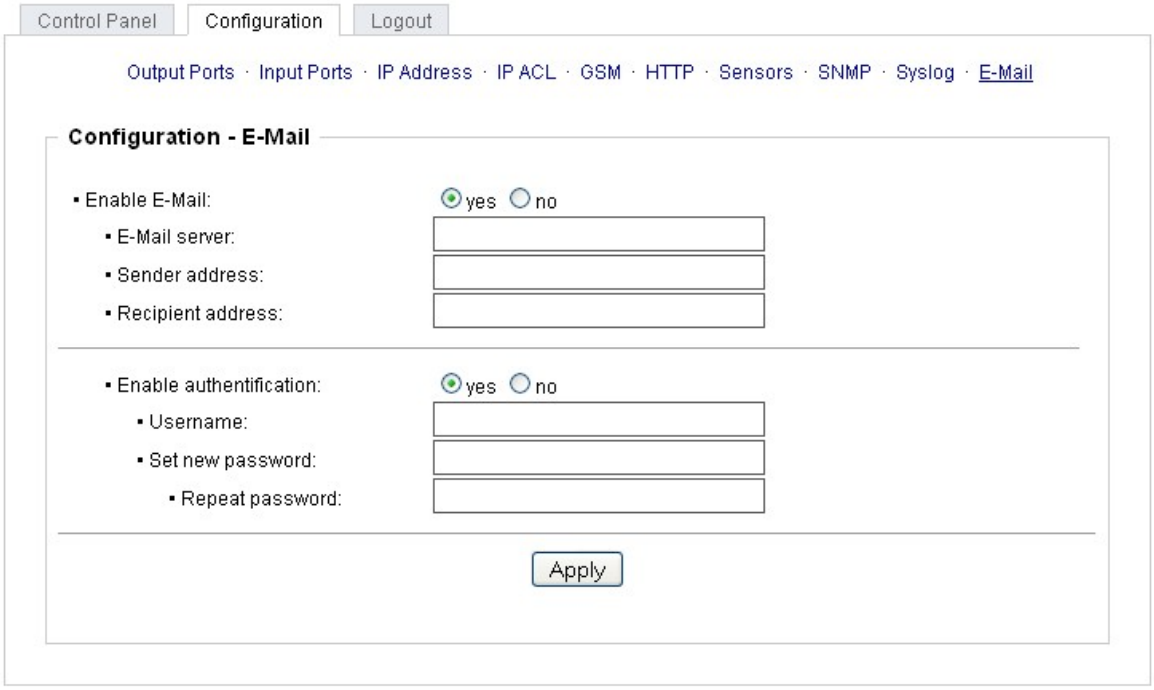
More information about SNMP settings are available from our support or can be found on the Internet at www.gude.info/wiki.

3.2.9 Configuration - Syslog

Enable Syslog: Enables the usage of Syslog Messages.

Syslog Server: If you have enabled Syslog Messages, enter the IP address of the server to which the syslog information should be transmitted.

3.2.10 Configuration - E-Mail



Enable E-Mail: Activates the email dispatch of messages.

E-Mail Server: The SMTP IP-address of the e-mail server. Either as FQDN, e.g: "mail.gmx.net", or as IP-address, e.g: "213.165.64.20". If required, attach a designated port, e.g: "mail.gmx.net:25".

Sender address: The e-mail address of the sender.

Recipient address: The e-mail address of the recipient.

Enable authentification: Select this option if the e-mail server requires authentication.

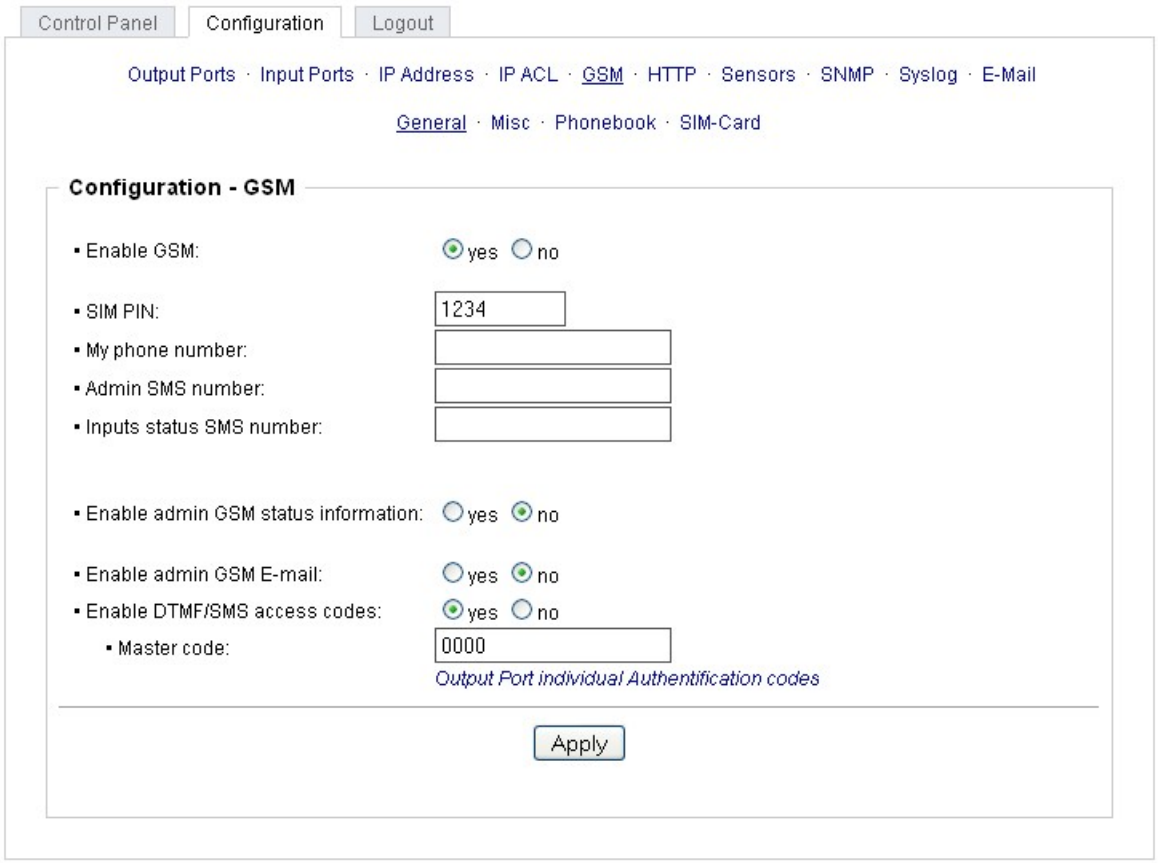
Username: User name that is registered with the SMTP e-mail server.

Set new password: Enter the password for the login to the e-mail server.

Repeat password: Enter the password again to confirm it.

3.2.11 Configuration - GSM

3.2.11.1 Configuration - GSM General



Enable GSM: Activates the built-in GSM module

SIM PIN: Switches the PIN request of the SIM card on. A wrong Pin leads to a blocking of the SIM card. You **cannot** change the PIN of the SIM card via this menu option.

My phone number: Please enter here the phone number of the inserted SIM card

Admin SMS number: All device changes are sent via SMS to this mobile number.

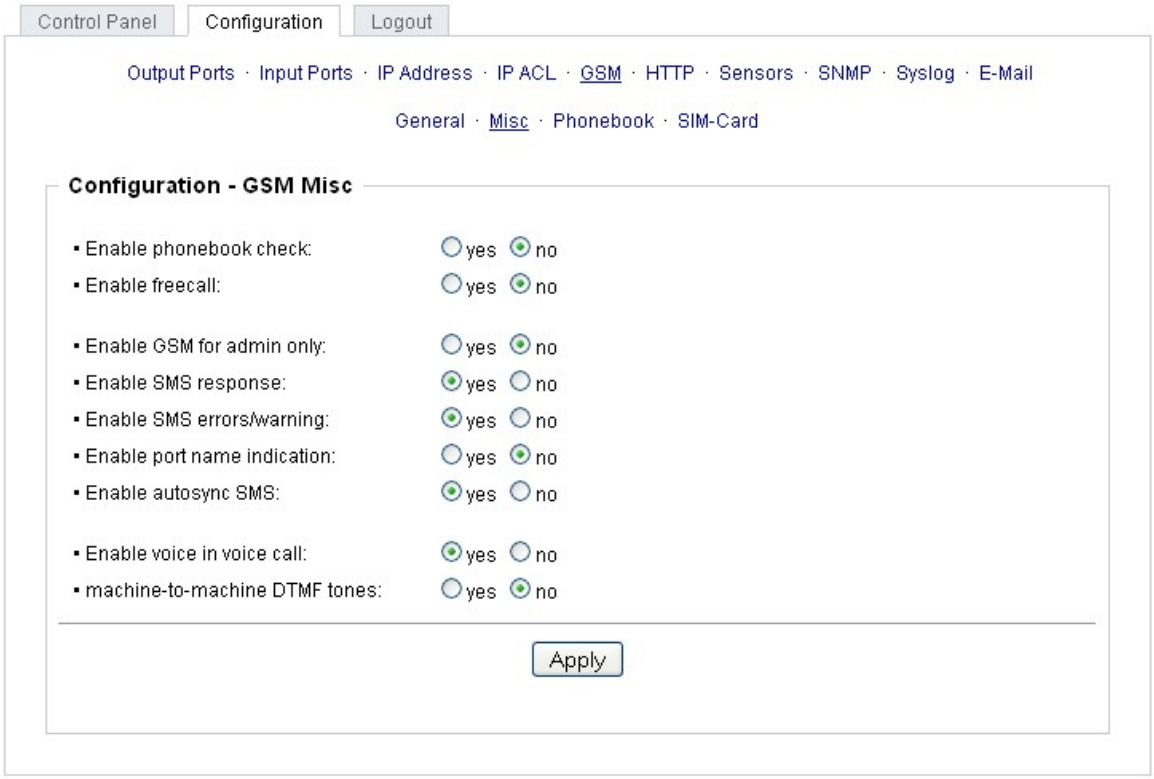
Input status SMS number: All changes at the input ports are sent via SMS to this mobile number.

Enable admin GSM status information: When active, all GSM status changes are sent via SMS to the Admin.

Enable admin GSM E-mail: When active, all GSM status changes are sent via email to the Admin.

Enable DTMF/SMS access codes: When activated, the mastercode or portcode is needed to switch a port.

3.2.11.2 Configuration - GSM Misc



Enable phonebook check: If selected, only numbers registered to the phonebook can access the GSM module. All other numbers are ignored.

Enable freecall: When active, without accumulating phone charges, the functions assigned to a dialed number can be triggered.

Enable GSM for admin only: If enabled, the GSM functions can only be used when activated from the entered GSM Admin number.

Enable SMS response: When activated, every command SMS is acknowledged from an answer SMS.

Enable SMS errors/warning: Enables the sending of an error SMS when a defective command SMS was received.

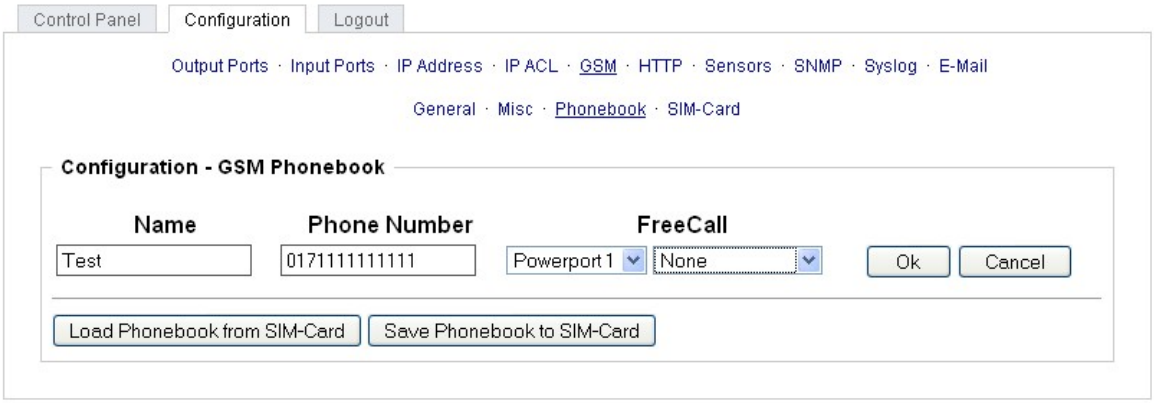
Enable port name indication: If selected, the complete portname is sent via SMS. E.g., instead of "Port 1" the name "server 1. floor". This can lead to longer SMS with higher costs.

Enable autosync SMS: When this options is enabled, the EPC tries to request date and time information from the GSM network after power-up.

Enablevoice in voice call: If enabled, you hear voice samples when a call is coming an (Voicecall).

machine-to-machine DTMF tones: Enables DTMF tones in voice steering.

3.2.11.3 Configuration - GSM Phonebook

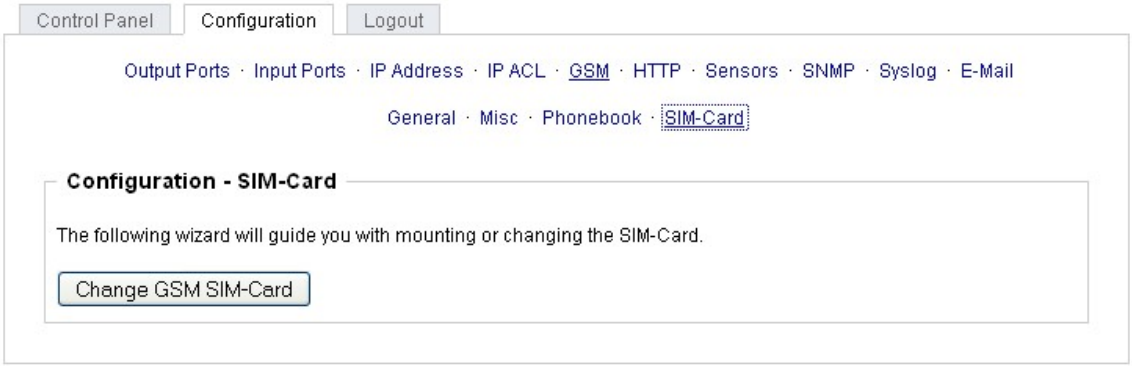


The phonebook can be used to store telephone numbers under a name. When the phonebook is activated only stored numbers can access the device.

Furthermore, the "FreeCall" option can be assigned to every number in the phone book. If this number is recognized, a preselected action is executed without accepting the call.

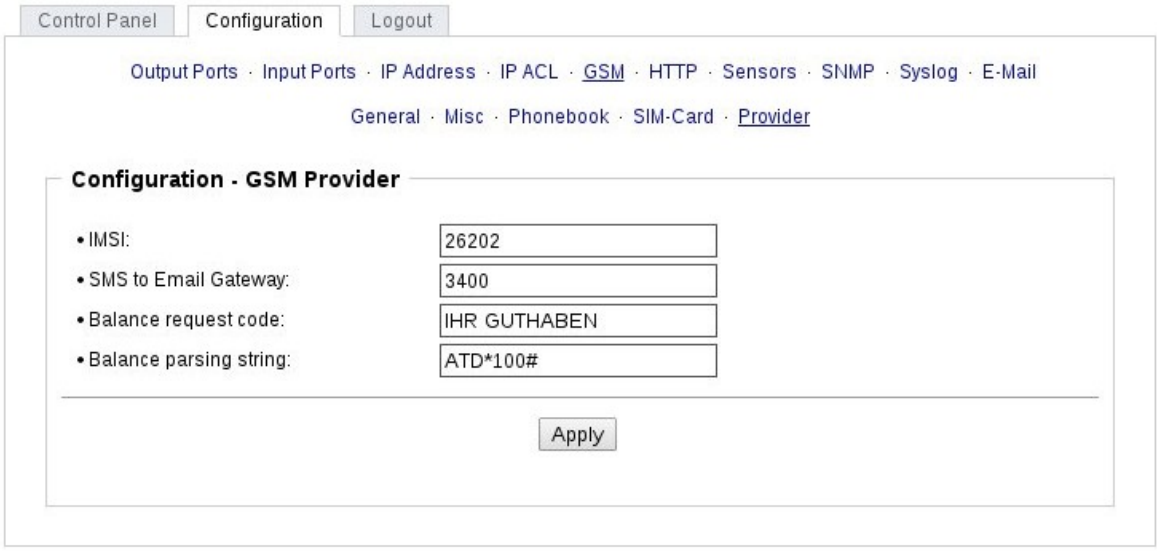
An active "FreeCall" number cannot activate other functions via "Voicecall". If you want to use the voice menu with a "FreeCall" number, you have to suppress the phone number.

3.2.11.4 Configuration - GSM SIM Card



To enter a new SIM card, please press the button "Change GSM SIM-card".

3.2.11.5 Configuration - GSM Provider



This menu only appears when you insert a SIM card from a phone company that operates outside of Germany. To receive necessary information, contact your wireless service provider.

IMSI: Your IMSI number.

The International Mobile Subscriber Identity (IMSI) is used in GSM and UMTS mobile networks to uniquely identify network nodes (internal subscriber identity). Among other data, the IMSI is stored in a special smart card, the so-called SIM (Subscriber Identity Module). A worldwide unique IMSI number is awarded every customer of a mobile network. While the IMSI has nothing to do with the telephone number that is assigned to the SIM card.

SMS to Email Gateway: The number of the SMS to email gateway for your network provider.

Balance request code: Please enter the word that names the prepaid balance: e.g. "balance", "conto", "balances".

You will find this word in the news of your provider when you query your prepaid balance. The correct spelling is important to help the device recognizing whether the current balance is communicated in a message.

Balance parsing string: Enter the query that you send to your provider to access your prepaid balance: E.g. *101#

4 Protocols

4.1 SNMP

SNMP can be used to obtain status information via UDP (port 161). Supported SNMP commands are:

- GET
- GETNEXT
- GETBULK
- SET

To query via SNMP you need a Network Management System, such as HP OpenView, OpenNMS, Nagios, etc., or the command line tools of the Net-SNMP software.

SNMP-communities

SNMP authenticates requests by communities. A community is a string that acts like a password for a read or a write SNMP access. Since these passwords are sent unencrypted and are easily intercepted with IP sniffers, it is recommended to use a safe network structure (DMZ) when security is required.

MIB

The values that can be read from the device or changed, the so-called "Managed Objects", are described in Management Information Bases (MIBs). The MIB table is build of substructures that are called OIDs (Object Identifiers). An OID number indicates the location of a value within the MIB tree. Each OID may alternatively be referred to with its symbol name (subtree name).

SNMP Traps

SNMP Traps are system messages that are sent via the SNMP protocol to different recipients. SNMP traps are triggered by the following events:

- Switching of digital output ports
- State change of digital input ports
- Exceeding of the max / min values of attached sensors

4.2 Syslog

Syslog messages are simple text messages that are sent via UDP to a syslog server. Under Linux, normally a syslog daemon is already running (eg. syslog-ng), for Microsoft Windows systems some freeware programs are available on the market. The syslog messages are sent for the following events:

- Switching of digital output ports
- State change of digital input ports
- Exceeding of the max / min values of attached sensors

4.3 Email

Currently, only SMTP servers are supported, that are offering no authentication (open-relay) or unencrypted authentication (PLAIN). An encrypted authentication to the SMTP server is not possible.

One way to learn whether the desired SMTP server understands the PLAIN authentication, is to enter the string "EHLO localhost" in telnet. Here's an example:

```
$ telnet smtp.1und1.com 25
Trying 212.227.15.129...
Connected to smtp.1und1.com.
Escape character is '^]'.
220 smtp.1und1.com (mreu3) Welcome to Nemesis ESMTP server
EHLO localhost                  <---- *TYPE* *THIS*
250-smtp.1und1.com
250-STARTTLS
250-AUTH LOGIN PLAIN        <---- *PLAIN* *SUPPORTED!*
250-AUTH=LOGIN PLAIN
```

250-SIZE 120000000
250 HELP

5 Support

You will find the latest product software on our website at www.gude.info available for download. If you have further questions about installation or operation of the unit, please contact our support team. Furthermore, we present in our support wiki at www.gude.info/wiki FAQs and configuration examples.

5.1 Contact

Gude Analog- und Digitalsysteme GmbH
Eintrachtstraße 113
50668 Cologne
Germany

Phone: +49-221-912 90 97
Fax: +49-221-912 90 98
E-Mail: mail@gude.info
Internet: www.gude.info

Managing Director: Dr.-Ing. Michael Gude

District Court: Köln, HRB-Nr. 17 7 84
WEEE-number: DE 58173350
Value added tax identification number (VAT): DE 122778228

5.2 Declarations of conformity

EG Konformitätserklärung

EC Declaration of Conformity

Der Hersteller **The manufacturer**	Gude Analog- und Digitalsysteme GmbH Eintrachtstr. 113 50668 Köln (Deutschland)

erklärt hiermit, dass die folgenden Produkte / hereby declares that the following products

Produktbezeichnung **Product name**	Expert Net Control 2190
Beschreibung Description	IP und GSM gesteuertes Ein- und Ausgabegerät IP and GSM remote controlled input / output device

mit den Bestimmungen der nachstehenden EU-Richtlinien übereinstimmen / are in accordance with the following European directives

1999/5/EG 1999/5/EC	R&TTE Richtlinie R&TTE Directive
2011/65/EU	zur Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten (RoHS) on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS)

und dass die nachstehenden harmonisierten Europäischen Normen zur Anwendung gelangt sind. / and comply with the following harmonised European standards.

EN 60950-1:2006 / AC:2011	Einrichtungen der Informationstechnik – Sicherheit / Information technology equipment – Safety - - Article 3.1.a
EN 55022:2010	Einrichtungen der Informationstechnik – Funkstöreigenschaften / Information technology equipment – Radio disturbance characteristics
EN 55024:2010	Einrichtungen der Informationstechnik - Störfestigkeitseigenschaften / Information technology equipment - Immunity characteristics
EN 301 489-1 V1.8.1	Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) - Article 3.1.b
EN 301 489-7 V1.3.1	Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services - Article 3.1.b
EN 301 511 V9.0.2	Harmonized EN for mobile stations in the GSM 900 and GSM 1800 bands covering essential requirements under article 3.2 of the R&TTE directive (1999/5/EC) - Article 3.2
EN 50385:2002	Produktnorm zur Konformitätsüberprüfung von Mobilfunk-Basisstationen und stationären Teilnehmergeräten / Product standard to demonstrate the compliance of radio base stations and fixed terminal stations for wireless telecommunication - Article 3.1.a
EN 50581:2012	Technische Dokumentation zur Beurteilung von Elektro- und Elektronikgeräten hinsichtlich der Beschränkung gefährlicher Stoffe / Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

Köln, 01.03.2013

Dr. Michael Gude, Geschäftsführer / General manager, CEO

EG Konformitätserklärung

EC Declaration of Conformity

Der Hersteller **The manufacturer**	Gude Analog- und Digitalsysteme GmbH Eintrachtstr. 113 50668 Köln (Deutschland)

erklärt hiermit, dass die folgenden Produkte / hereby declares that the following products

Produktbezeichnung **Product name**	Expert Net Control 2110
Beschreibung Description	IP gesteuertes Ein- und Ausgabegerät IP remote controlled input / output device

mit den Bestimmungen der nachstehenden EU-Richtlinien übereinstimmen / are in accordance with the following European directives

2004/108/EG 2004/108/EC	Elektromagnetische Verträglichkeit (EMV) Electromagnetic Compatibility (EMC)
2011/65/EU	zur Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten (RoHS) on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS)

und dass die nachstehenden harmonisierten Europäischen Normen zur Anwendung gelangt sind. / and comply with the following harmonised European standards.

EN 55022:2010	Einrichtungen der Informationstechnik – Funkstöreigenschaften – Grenzwerte und Messverfahren / Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement
EN 55024:2010	Einrichtungen der Informationstechnik - Störfestigkeitseigenschaften - Grenzwerte und Prüfverfahren / Information technology equipment - Immunity characteristics - Limits and methods of measurement
EN 50581:2012	Technische Dokumentation zur Beurteilung von Elektro- und Elektronikgeräten hinsichtlich der Beschränkung gefährlicher Stoffe / Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

Köln, 01.03.2013

Dr. Michael Gude, Geschäftsführer / General manager, CEO