User Manual
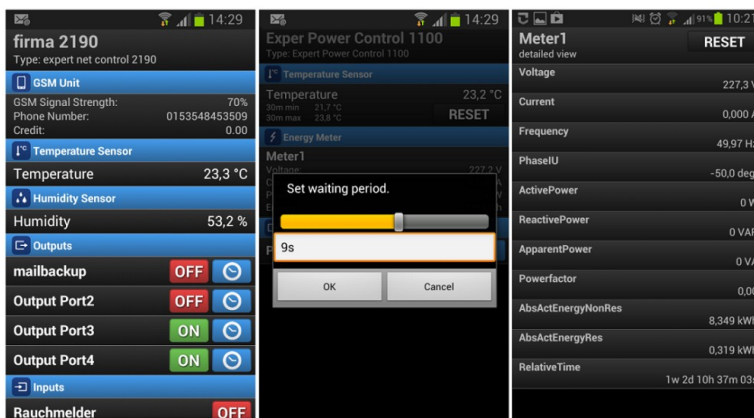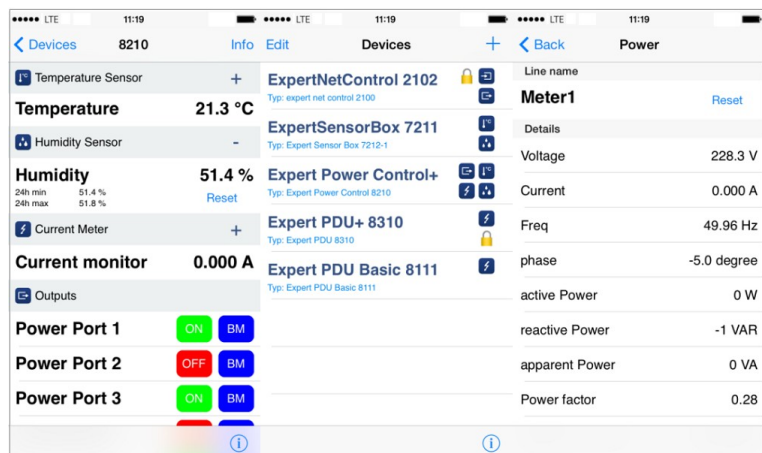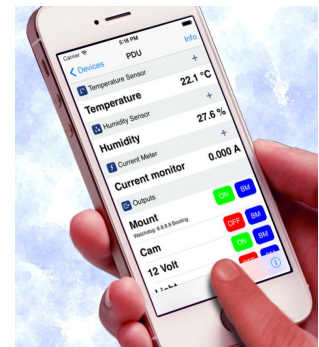
Expert Net Control 2312

Have your Gude devices always in view - and in control.

With the free Gude Control App you can retrieve all relevant information from your GUDE products regardless of their current whereabouts. Check with your smartphone the important operating figures of your server and rack environment like sensor values (max/min), energy consumption as well as state of inputs and outputs with watchdog functions. In particular, connected consumers can be switched remotely with Gude Control.

"Gude Control" is available for the Expert Net Control 2312 series and can be free downloaded from the Google Play Store and iTunes Store.

Table of contents

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 - 24V AC or DC) .
- 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.

1.2   Content of Delivery

The package includes:

- Expert Net Control 2312
- CD-ROM and manual

1.3   Description

The Expert Net Control 2312 is a multipurpose device that is suitable for switching and monitoring of voltages. It has the following features:

- Suitable for top hat rail mounting
- 2312: 3 switchable, potential-free relay outputs with 230V (AC 16A) switching voltage
- Measurement of current, voltage, phase angle, power factor, frequency, active power, apparent power and reactive power per output
- Two energy counter for each output, one counter counts continuously, the other counter is resettable
- Easy to read LED display to show the total current, IP-address, sensor values and error messages
- All outputs can be switched individually on the device via HTTP, via command line tool or via serial interface
- Switching state and delay (0 … 9999 seconds) adjustable for each output after power failure
- Simultaneous switching of multiple outputs is prevented by automatic latency of 1 second
- 1 or 3-channel watchdog to monitor the connected devices (ICMP/TCP)
- States of the relay outputs are displayed with bicolored LEDs on the front page
- Connection for an external sensor
- Programmable on / off sequence

- Possible firmware update in operation via Ethernet
- HTTP 1.1, E-Mail, DHCP, SNMPv1 (traps), SNMPv2c (traps), Syslog
- Access protection via IP-access control
- Access control with optional password
- Controllable via iOS and Android App
- Low own consumption
- Compatible to products of brand Solar-Log
- Developed and produced in Germany

1.4   Installation

1. Power supply (12V-24V AC oder DC)
2. Stop input for shutdown of all relays
3. ENC2312: 3 relay outputs
4. L1 - L3 indicator LED display
5. LED display for load or sensor display
6. 3 indicator LEDs for relay outputs
7. Status LED
8. Button for OK, Select or bootloader mode
9. Network connector RJ45
10. Connector for sensor
11. Neutral wire connection for measurement electronics

12. ENC2312: 3 relay inputs

Start-up the device

- Connect the device to an AC Adaptor (12V-24V AC or DC).
- Plug the network cable into the Ethernet socket (RJ45).
- Connect the neutral wire to the neutral wire connector (11).
- Connect the relay outputs to the loads that should be used.
- Connect the relay inputs with the corresponding phase
- Attach a switch (if any) to the stop input.
- Connect the sensor (if any) to the device.

1.5   Stop Input

Stop Input

If the Stop Input is set to LOW for a second, all relays are switched off immediately. If a shutdown was initiated, and the Stop Input goes back to HIGH for a second, the relay will re-activate as if the device is started again. See Initialization Initialization status and Initialization delay in the chapter "Configuration - Output Ports".

1.6   Block Diagram

If switch at Stop input is closed, all 3 relays are switched off. When opend again, they return to their state preset in configurations.

Power supply
AC or DC
12-24 V, 0.3 A

L1   L2   L3

18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35

⊥

12 - 24 V ≈   Stop

**G
GUDE** **Expert Net
Control 2312**

LAN   Sensor / RS232

N   N

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17

Neutral line has to
be connected for
metering electronics

N   L1   L2   L3

block diagram for Expert Net Control 2312

1.7   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.

1.8   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)

1.9   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"*.

If after a firmware update, the web page is not displayed correctly anymore, this may be related to the interaction of Javascript with an outdated browser cache. Not always helps a Ctrl-F5, it is recommended that you manually delete the cache in the browser options. Alternatively, you can test

start the browser in "private mode".

1.10   Technical Specifications

Interfaces	1 x Ethernet port (RJ45) ENC 2312: 6 x screw terminal with 3 x relay make contacts (230V AC 16A) 2 x screw terminal for power supply 2 x screw terminal with 1 x stop input 2 x screw terminal for neutral wire 1 x Mini-DIN socket for external sensor
Network connectivity	10/100 MBit/s 10baseT Ethernet
Protocols	TCP/IP, HTTP, DHCP, ICMP, SNMP v1/v2c + traps, Syslog, SMTP
Power Supply	12V to 24V AC or DC, 0.3 A
Environment • Operating temperature • Storage temperature • Humidity	 0°C to 50°C -15°C to 60°C 10% to 85%
Case	plastics black
Measurements	105mm x 70mm x 90mm (L x H x D)
Weight	approx. 280g

1.11   Energy Measurement

Electrical Measurement Specification				
Category	**Range**	**Unit**	**Resolution**	**Inaccuracy (typical)**
Voltage	110-265	V	0.01	< 1%
Current	0,1 - 16	A	0.001	< 1.5%
Frequency	45-65	Hz	0.01	< 0.03%
Phase	-180 - +180	°	0.1	< 1%
Active power	1 - 4000	W	1	< 1.5%
Reactive power	1 - 4000	Var	1	< 1.5%
Apparent power	1 - 4000	VA	1	< 1.5%
Power factor	0 - 1	-	0.01	< 3%
Energy Counter				
Active Energy (total)	9.999.999,999	kWh	0.001	< 1.5%
Active Energy (temporary)	9.999.999,999	kWh	0.001	< 1.5%

Due to design, only alternating currents can be measured, no direct currents.

1.12 Sensor

An external sensor can be connected to the Expert Net Control 2312. The following sensors are currently available:

Temperature-Sensor 7001	
Cable length	≈ 2m
Connector	Mini-DIN
Measurement range	-20°C to +80°C at ±2°C (maximum) and ±1°C (typical)

Humidity/Temperature-Sensor 7002	
Cable length	≈ 2m
Connector	Mini-DIN
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 sensor is automatically detected after connect.

Port	Name	Temperature	24h min	24h max	
1: 7002	Temperature	25,6 °C	25,4 °C	25,6 °C	Reset min/max

Port	Name	Humidity	24h min	24h max	
1: 7002	Humidity	50,2 %	50,2 %	50,3 %	Reset min/max

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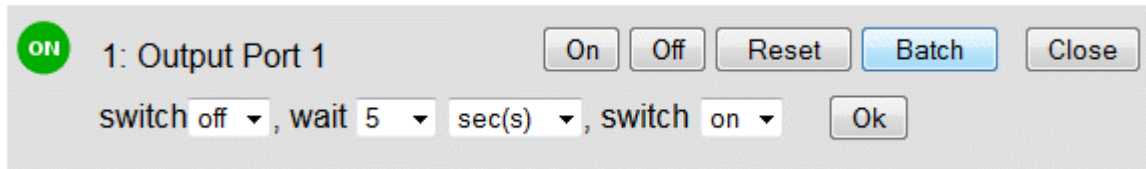
Optionally the device can be switched via a Perl script or external tools like wget. More information is available on our support wiki at www.gude.info/wiki.

2.3 Using the Serial Interface

There is a serial connection alternatively to the Ethernet port, where the power ports can be switched. You will need a terminal program such as the free supplied Windows HyperTerminal.

Connect your PC to the device via the serial cable 7990.

Serial Cable 7990	
Cable length	≈ 2m
Device Connector	Mini-DIN
PC Connector	D-Sub 9-pin socket

Start your terminal program and select the COM port to which the RS232 cable is connected. Use the following settings for the serial port:

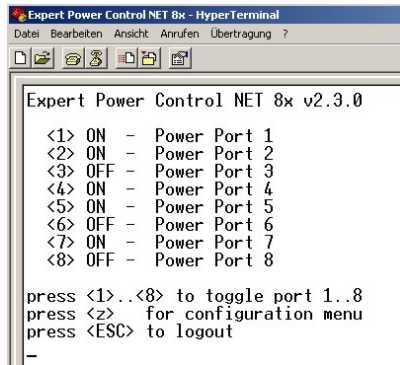| Baudrate	115200
Databits	8
Parity	No
Stoppbits	1
Flow Control	No

If you do not use HyperTerminal, please make sure that your terminal application supports VT100 commands.

If the connection is successful the device reports as in the figure below. Press ENTER to login.

The power ports can be toggled by pressing numerical keys in the terminal program. The character "Z" will show the network settings. To logout, press the Esc key.


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.
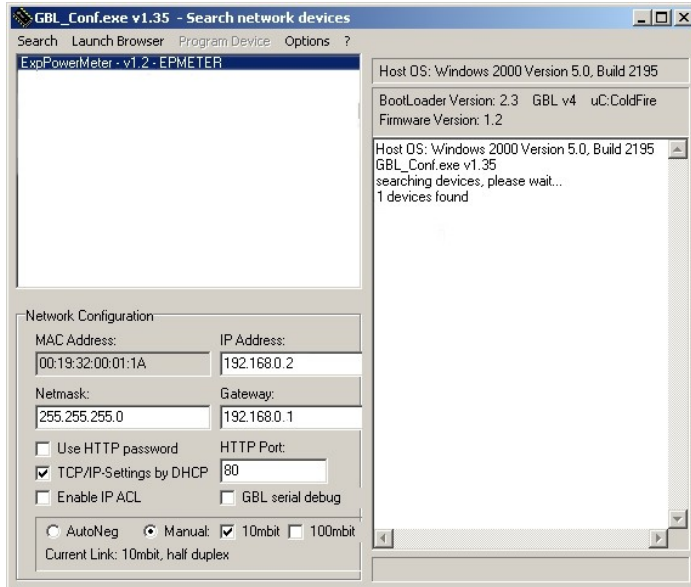
Interface GBL_Conf

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 automatically restart not responding server or NAS systems.

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 power 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 Power 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 retries: After this number of consecutive unanswered ping requests the device is considered inactive.

retry BOOTING after RESET failure: **!!! Be careful, only switch this setting to "yes", if the**

appliance to be monitored never requires a long boot time !!!
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 <u>retry BOOTING after RESET failure</u>, the watchdog is armed **directly** after the watchdog action is executed.

This option has the following pitfall: If at the Port to be monitored a server connected, that is in need for a long boot process, because it is doing a file system check, the server would probably exceed the tripping time of the watchdog. The server would be switched off and on again, and the file system check is restarted. This would be repeated endlessly.

<u>retry Boot after N ping timeouts</u>: If <u>retry BOOTING after RESET failure</u> is enabled, the device waits N Ping intervals until the connected device is switched off and on again.

• Enable watchdog:	⦿ yes ◯ no
• Watchdog action:	⦿ reset ◯ off
• Watchdog type:	⦿ ICMP ◯ TCP
• Hostname:	[ ]
• Ping interval:	[10] s
• Ping retries:	[6]
• retry BOOTING after RESET failure:	◯ no ⦿ yes
• retry Boot after N ping timeouts:	[10]

3.2.3　Configuration - IP Address

Control Panel	Configuration	Logout

Output Ports · <u>IP Address</u> · IP ACL · HTTP · Sensors · SNMP · Syslog · E-Mail

Configuration - IP Address

• Hostname:	[ENC-2312]
• IP Address:	[192.168.3.81]
• Netmask:	[255.255.240.0]
• Gateway address:	[192.168.1.3]
• DNS address:	[192.168.1.5]
• Use DHCP:	⦿ yes ◯ no

[Apply]

<u>Hostname</u>: 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.

3.2.4   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.

3.2.5   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. In the username field of the password input mask the names "admin" and "user" are supported. In the factory defaults the password for the admin is set to "admin" resp. "user" for the user password.

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

3.2.6   **Configuration - Sensors**

Control Panel   Configuration   Logout

Output Ports · IP Address · IP ACL · HTTP · Sensors · SNMP · Syslog · E-Mail

Configuration - Sensors

- Choose power meter: L1: Meter1 ▾
- Power meter name: Meter1
- Generate AC current messages: ○ yes ● no

- Default display: Current ▾

Apply

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
...

3.2.7   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.

3.2.8   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.

3.2.9   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.

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
- Exceeding of the max / min values of attached sensors
- State change of digital sensor input
- Exceeding of max / min values of the measured power consumption

4.1.1   Device MIB 2312

Below is a table of all device-specific OID 's which can be accessed via SNMP. In the numerical representation of the OID the prefix " 1.3.6.1.4.1.28507 " (Gude Enterprise OID) was omitted at each entry in the table to preserve space. The example for a complete OID would be "1.3.6.1.4.1.28507.48.1.1.1.1". A distinction is made in SNMP OID 's in between tables and scalars. OID scalar have the extension ".0" and only specify a value. In SNMP tables the "x" is replaced by an index (1 or greater) to address a value from the table.

Name		OID	Type	Acc.
	Description			
enc2312TrapCtrl		.48.1.1.1.1.0	Integer32	RW
	0 = off 1 = Ver. 1 2 = Ver. 2c			
enc2312TrapAddr		.48.1.1.1.2.1.2.x	OCTETS	RW
	DNS name or IP address specifying one Trap receiver slot. A port can optionally be specified: 'name:port' An empty string disables this slot.			
enc2312portNumber		.48.1.3.1.1.0	Integer32	RO
	The number of Relay Ports			
enc2312PortName		.48.1.3.1.2.1.2.x	OCTETS	RO
	A textual string containing name of a Relay Port.			
enc2312PortState		.48.1.3.1.2.1.3.x	INTEGER	RW
	current state a Relay Port			
enc2312PortSwitchCount		.48.1.3.1.2.1.4.x	Integer32	RO
	The total number of switch actions ocurred on a Relay Port. Does not count switch commands which will not switch the ralay state, so just real relay switches are displayed here.			
enc2312PortStartupMode		.48.1.3.1.2.1.5.x	INTEGER	RW
	set Mode of startup sequence (off, on , remember last state)			
enc2312PortStartupDelay		.48.1.3.1.2.1.6.x	Integer32	RW
	Delay in sec for startup action			
enc2312PortRepowerTime		.48.1.3.1.2.1.7.x	Integer32	RW
	Delay in sec for repower port after switching off			
enc2312ActivePowerChan		.48.1.5.1.1.0	Unsigned32	RO
	Number of suppported Power Channels.			
enc2312ChanStatus		.48.1.5.1.2.1.2.x	Integer32	RO
	0 = data not active, 1 = data valid			
enc2312AbsEnergyActive		.48.1.5.1.2.1.3.x	Unsigned32	RO
	Absolute Active Energy counter.			
enc2312PowerActive		.48.1.5.1.2.1.4.x	Integer32	RO
	Active Power			
enc2312Current		.48.1.5.1.2.1.5.x	Unsigned32	RO
	Actual Curent on Power Channel.			
enc2312Voltage		.48.1.5.1.2.1.6.x	Unsigned32	RO
	Actual Voltage on Power Channel			
enc2312Frequency		.48.1.5.1.2.1.7.x	Unsigned32	RO
	Frequency of Power Channel			
enc2312PowerFactor		.48.1.5.1.2.1.8.x	Integer32	RO
	Power Factor of Channel between -1.0 and 1.00			
enc2312Pangle		.48.1.5.1.2.1.9.x	Integer32	RO
	Phase Angle between Voltage and L Line Current between -180.0 and 180.0			
enc2312PowerApparent		.48.1.5.1.2.1.10.x	Integer32	RO
	L Line Mean Apparent Power			
enc2312PowerReactive		.48.1.5.1.2.1.11.x	Integer32	RO
	L Line Mean Reactive Power			
enc2312AbsEnergyReactive		.48.1.5.1.2.1.12.x	Unsigned32	RO
	Absolute Reactive Energy counter.			
enc2312AbsEnergyActiveResettable		.48.1.5.1.2.1.13.x	Unsigned32	RO
	Resettable Absolute Active Energy counter.			
enc2312AbsEnergyReactiveResettable		.48.1.5.1.2.1.14.x	Unsigned32	RO
	Resettable Absolute Reactive Energy counter.			
enc2312ResetTime		.48.1.5.1.2.1.15.x	Unsigned32	RO
	Time in seconds since last Energy Counter reset.			

enc2312ForwEnergyActive		.48.1.5.1.2.1.16.x	Unsigned32	RO
Forward Active Energy counter.				
enc2312ForwEnergyReactive		.48.1.5.1.2.1.17.x	Unsigned32	RO
Forward Reactive Energy counter.				
enc2312ForwEnergyActiveResettable		.48.1.5.1.2.1.18.x	Unsigned32	RO
Resettable Forward Active Energy counter.				
enc2312ForwEnergyReactiveResettable		.48.1.5.1.2.1.19.x	Unsigned32	RO
Resettable Forward Reactive Energy counter.				
enc2312RevEnergyActive		.48.1.5.1.2.1.20.x	Unsigned32	RO
Reverse Active Energy counter.				
enc2312RevEnergyReactive		.48.1.5.1.2.1.21.x	Unsigned32	RO
Reverse Reactive Energy counter.				
enc2312RevEnergyActiveResettable		.48.1.5.1.2.1.22.x	Unsigned32	RO
Resettable Reverse Active Energy counter.				
enc2312RevEnergyReactiveResettable		.48.1.5.1.2.1.23.x	Unsigned32	RO
Resettable Reverse Reactive Energy counter.				
enc2312TempSensor		.48.1.6.1.1.2.x	Integer32	RO
actual temperature, a value of -9999 indicates that data is not available				
enc2312HygroSensor		.48.1.6.1.1.3.x	Integer32	RO
actual humidity, a value of -9999 indicates that data is not available				
enc2312InputSensor		.48.1.6.1.1.4.x	INTEGER	RO
logical state of input sensor				

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
- Exceeding of the max / min values of attached sensors
- State change of digital sensor input ports
- Exceeding of max / min values of the measured power consumption

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.

An experienced user can learn whether the desired SMTP server understands the PLAIN authentication, by sending the string "EHLO localhost" with Telnet to the server. 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
```

Email messages are triggered by the following events:

- Switching of digital output ports
- Exceeding of the max / min values of the attached sensors
- State change of digital sensor input ports
- Exceeding of max / min value of the measured power consumption

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

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51149 Cologne
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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	Gude Analog- und Digitalsysteme GmbH
The manufacturer	Eintrachtstr. 113
	50668 Köln (Deutschland)

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

Produktbezeichnung	Expert Net Control 2312-1
Product name	

Beschreibung	IP gesteuertes Schaltgerät mit Energiemessung
Description	IP remote switching device with energy metering

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

2006/95/EG	Niederspannungsrichtlinie
2006/95/EC	Low Voltage Directive (LVD)
2004/108/EG	Elektromagnetische Verträglichkeit (EMV)
2004/108/EC	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 60950-1:2006 / AC:2011	Einrichtungen der Informationstechnik - Sicherheit / Information technology equipment - Safety
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 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, 29.9.2014

Dr. Michael Gude, Geschäftsführer / General manager, CEO