GOSSEN METRAWATT
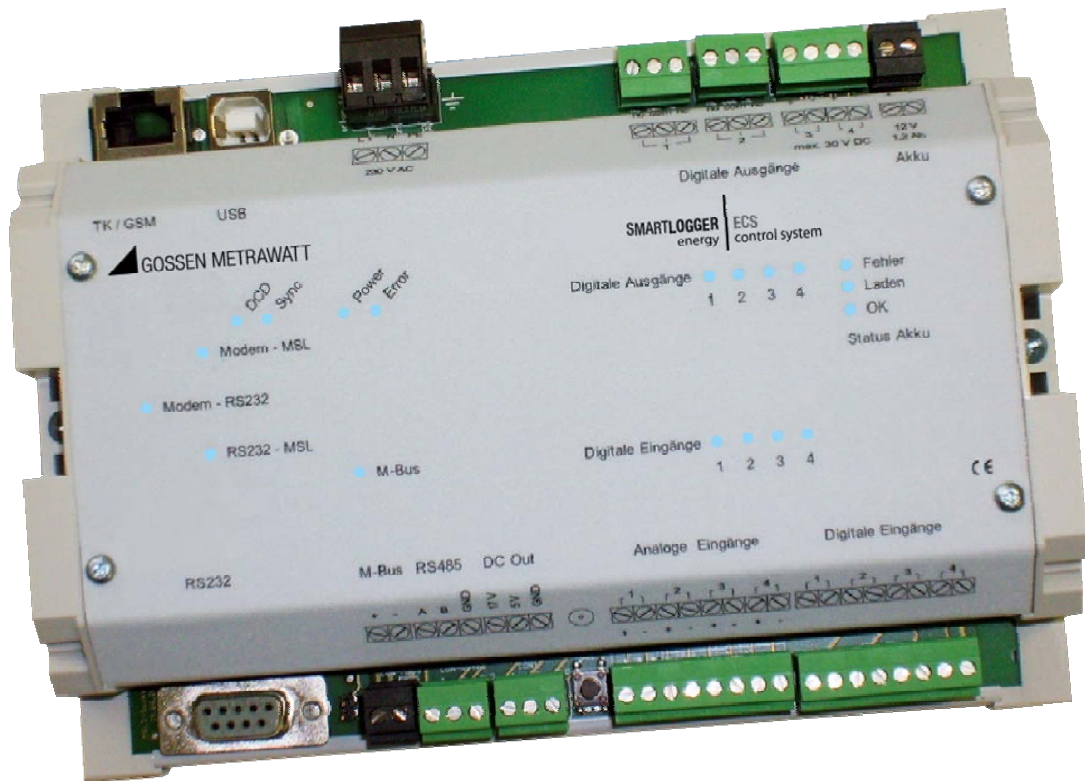
SMART**LOGGER**│ECS

Multifunctional Data Logger with Integrated Modem

TABLE OF CONTENTS

I. INTRODUCTION

WHAT CAN THE SMARTLOGGER ECS DO?

The SMART**LOGGER** ECS (multi-service logger) is a universal data acquisition device which collects and monitors data from digital and analog inputs. These data are transmitted to a central control station as cyclically acquired measured values, or as spontaneous, event-controlled values. Furthermore, values from third party devices can also be polled, stored to memory and monitored. An M-Bus interface and an RS 485 port are provided to this end. Third party devices, for example a heating controller, can use the SMART**LOGGER** ECS as a transparent modem via an additional serial port. Beyond this, relay outputs are also available.

Thanks to the integrated communications module, the SMART**LOGGER** ECS is suited for decentralized data acquisition and monitoring of systems and buildings. The system can be equipped as desired with GSM, analog or ISDN modem, or an Ethernet adapter.

Faults can be reported either directly by SMS, fax or e-mail, or via intrusion to a fault messaging unit. As a data logger, the SMART**LOGGER** ECS stores data from the input channels to memory at freely selectable intervals. Data are saved to a ring buffer. Saved data can be accessed and further processed with the help of SMART**LOGGER** MANAGER parameters configuring software or with convenient SMART**LOGGER** OFFICE data management software.

SMART**LOGGER** MANAGER software is included with the device as an input and analysis tool.

And thus the device is a combination system comprising:

- Data logger for digital and analog measured quantities
- Fault messaging system
- M-Bus repeater
- Telecontrol system

BASIC FUNCTIONS / HIGHLIGHTS

- Digital and analog data logging
- Data storage
- Measured value monitoring, fault messaging system
- Telecontrol
- GSM, ISDN or analog modem / Ethernet
- Integrated UPS
- M-Bus repeater for ten M-Bus slave modules

Schematic Diagram
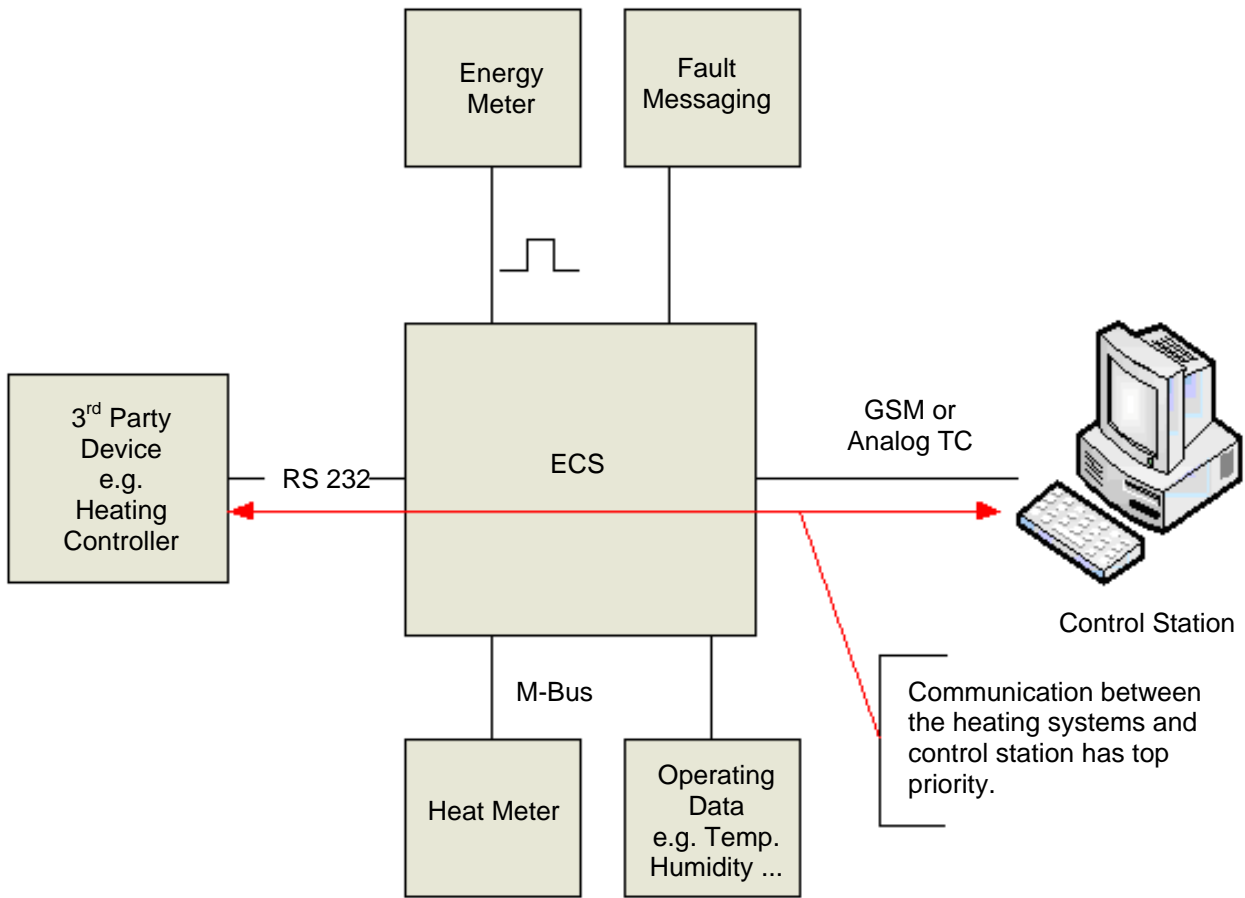
Figure 1:   Schematic System Layout

II. SMARTLOGGER ECS IN ACTUAL PRACTICE

1. SYSTEM DESCRIPTION

1.1. DATA COMMUNICATION AND INTERFACES

One of the special features of the SMART**LOGGER** ECS is transparent data transmission between third party devices, in this case a heating controller, and a control station.
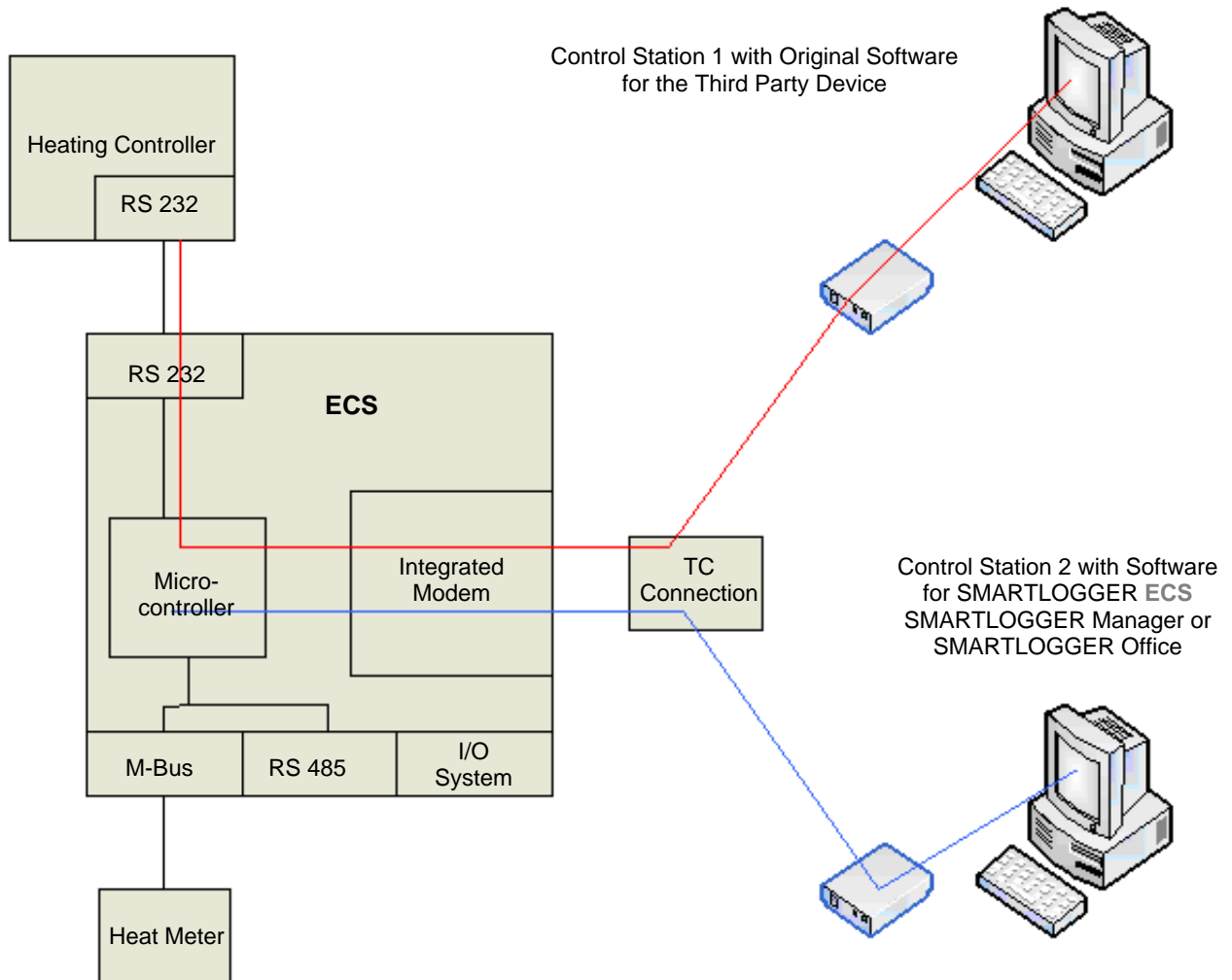
Figure 2: *Data Transmission Between Third Party Device and Control Station*

The various communication channels are represented in a simplified fashion in the schematic diagram. Communication with the system takes place from two different locations in this case. For example, communication only takes place with the third party device via control station 1 (red communication channel). On the one hand, parameter settings need to be transferred to the device, and on the other hand, the third party device needs to be able to transmit fault messages to control station 1. It has to be possible to query stored data from the SMART**LOGGER** ECS via control station 2, and the SMART**LOGGER** ECS should also be able to transmit fault messages to control station 2.

For this reason, the following conditions must be observed with regard to data communication:

- Communication between the third party device (heating system) and control station 1 always has precedence.

- As regards communication with the heating unit, the system must be compatible with equipment from any manufacturer. The transmission protocol is for the most part insignificant in this respect. The physical interface is an RS 232 port.

- The system must automatically detect whether any given data packet is intended for the third party system (heating system or M-Bus system), or for itself. This applies to both transmission directions, because the third party system is itself capable of dispatching fault messages to the control station.

1.2. INPUTS AND OUTPUTS

The following I/O structure is provided for the acquisition of fault messages and operating data:

- 4 digital inputs
- 4 analog inputs (4 to 20 mA, 0 to 10 V, NTC)
- 2 fault message outputs via relays (for extra-low voltage)
- 2 fault message outputs via semiconductor outputs

1.3. INTERFACES

- RS 232 port for communication with the third party device
- USB port for communication with the microcontroller system (currently in preparation)
- RS 485 port for communication with expansion modules
- M-Bus interface for communication with M-Bus terminal devices, for up to ten units

1.4. AUXILIARY VOLTAGES

The device provides an unregulated voltage of approximately 17 V DC and a regulated voltage of 5 VD C as supply power for S0 inputs or sensors.

1.5. POWER SUPPLY / UPS

The system is supplied with 230 V AC. Integrated standby power system switching is combined with an external rechargeable battery (12 V DC 2.1 Ah).

1.6. HARDWARE LAYOUT

The system is laid out in a consistently modular fashion and can thus be varied nearly unrestrictedly with reference to communication, as well as the number of I/Os, and can be adapted to the respective project. The device is enclosed in an extruded profile housing to this end. Two standard lengths are available at the moment, and this can of course be varied depending upon project requirements.

Basically, the SMART**LOGGER** ECS consists of:

- Communication module
- Main board
- Microcontroller board

Expansion options with up to 4 expansion modules in an extruded profile housing:

- Expansion module with 4 digital outputs
- Expansion module with 8 digital inputs
- Expansion module with 8 analog inputs

Step 1:

Select the communication module.
- GSM modem (shown in figure)
- Analog modem
- ISDN terminal adapter
- Ethernet interface
- Always on-board: interface for 3rd party devices

Step 2:

Add the main board.
- Switched-mode power supply
- 4 digital inputs
- 4 analog inputs
- 4 digital outputs
- M-Bus, RS 485

Step 3:

Add the microcontroller board.
- Programming interface

After completing this step, the SMART**LOGGER** ECS has been equipped with all of its basic features.

Step 4:

Install expansion modules.
- In this case, 4 digital outputs via bistable relays

Also available:
- 8 digital inputs
- 8 analog inputs

Step 5:

Attach the right-hand side cover.

1.7. Memory System

Due to the fact that the SMART**LOGGER ECS** is equipped with a variable number of inputs and outputs, the memory system has to be laid out in a correspondingly variable manner. To a great extent, the parameter settings for the memory system depend on the respective project. In the case of standardized tasks, for example 12-channel fault messaging, the system's parameters can be configured at the factory and the unit is thus ready for immediate use. Parameter settings can of course be changed at any time.

The other extreme would involve, for example, a complex individual project, as is common in the field of facility management, for which the SMART**LOGGER ECS** has been equipped with several internal expansion modules and additional data needs to be queried via the M-Bus, as well as external expansion modules. In cases of this sort, the memory system has to be individually configured by assigning a separate memory location to each internal and external data source. The respective parameters are configured with the help of SMART**LOGGER** MANAGER software.

At its current stage of development, the system is capable of managing up to 20 digital inputs, 12 analog inputs and 32 data sources in the form of M-Bus devices. Memory depth depends on the respective parameter settings and can be calculated as follows:

One measuring period consists of:

4 bytes UTC + 2 bytes length   +
4 bytes x number of digital inputs   +
2 bytes x number of analog inputs   +
6 bytes x number of M-Bus values

Sample calculations:

Twelve digital inputs, four analog inputs and three M-Bus values need to be saved:

With 2,000,000 bytes of MP memory, 80 bytes per measuring period result in 25,000 MP.

A 15 minute MP results in a memory depth of **260** days!

Twelve analog inputs need to be saved:

With 2,000,000 bytes of MP memory, 30 bytes per measuring period result in 66,666 MP.

A 15 minute MP results in a memory depth of **694** days!

The measuring period can be set to 1, 5, 15 or 60 minutes.

2. HARDWARE

2.1. CONNECTOR PIN ASSIGNMENTS
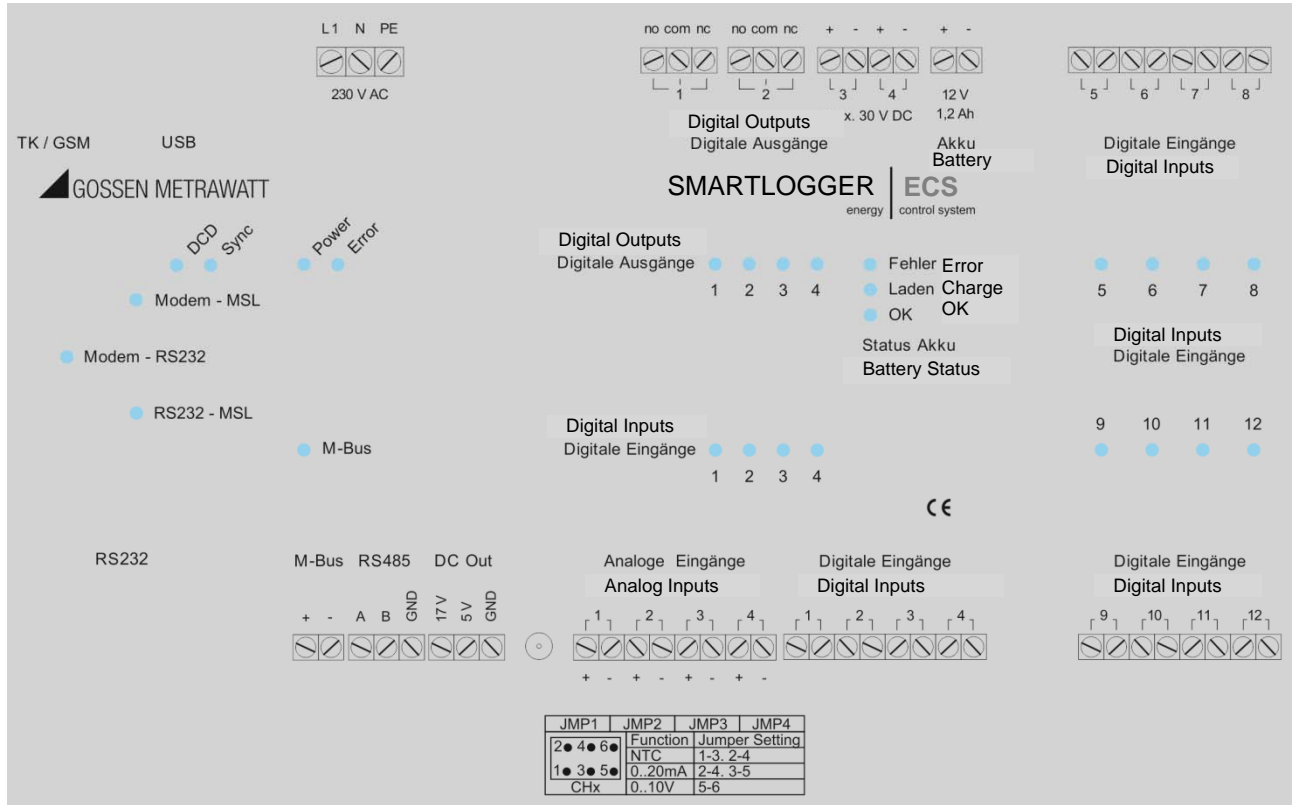

Figure 3:   Connector Pin Assignments for the SMARTLOGGER ECS

2.2. MAINS CONNECTION

The SMART**LOGGER** ECS is typically supplied with 230 V AC, 50 Hz, via terminals L1, N and PE. Due to the fact that the device is equipped with a switched-mode power supply, other supply voltages are also permissible, for example 110 V, 60 Hz.
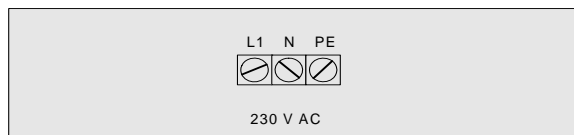

Figure 4:   Power Supply

2.3. DIGITAL INPUTS

Four digital inputs are available. **Potential-free connection** must be assured. Each input can be used as either:

- Alarm input (event)
- Pulse input for recording load profiles

This selection is made with the help of SMART**LOGGER** MANAGER parameters configuring software.

2.4. ANALOG INPUTS

Four analog inputs are available. A physical unit of measure can be assigned to each of these inputs by means of a jumper field:

- Temperature measurement with a 5 K NTC within a measuring range of -25 to 105° C
- 0 to 20 mA standard signal
- 0 to 10 V standard signal

The jumper field is located underneath the housing cover directly above the terminals for the analog inputs.

Jumper Field,
Analog Inputs

Temperature
Measurement

0 to 20 mA
Standard Signal

0 to 10 V
Standard Signal
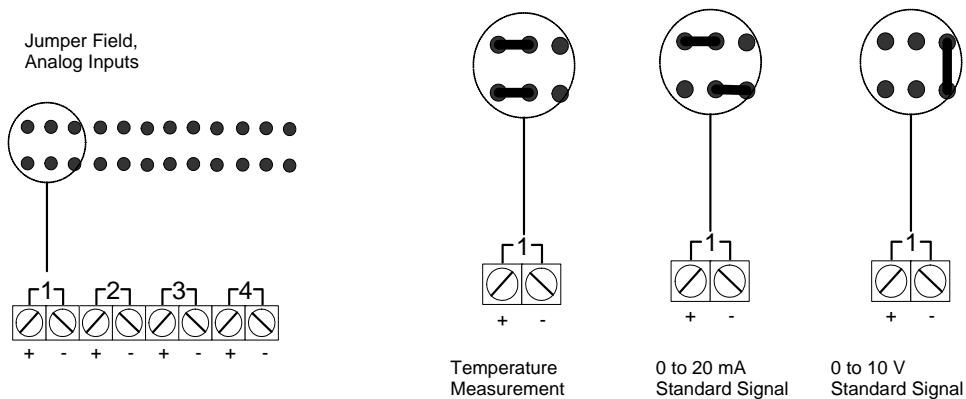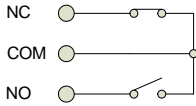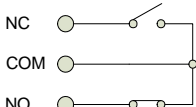
A schematic diagram showing the correct jumper positions is included on the housing cover, as well as on the PCB in the SMART**LOGGER ECS**. Measured values acquired via the analog inputs can be recorded as alarm values, and saved to a memory profile as well. Parameters are configured with the help of SMART**LOGGER** MANAGER software.

2.5. DIGITAL OUTPUTS

Digital outputs 1 and 2 are laid out as relay outputs, and outputs 3 and 4 in semiconductor technology (open collectors).
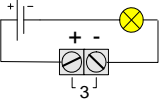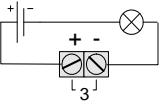
- Relay outputs (digital outputs 1 and 2)

Remote Relay Status	LED Relay	Wiring Diagram
Relay not switched	◯ off	NC ◯ COM ◯ NO ◯
Relay switched	🟡 yellow	NC ◯ COM ◯ NO ◯

The data sheet for the utilized relay is included in the appendix.

- Semiconductor relay outputs (digital outputs 3 and 4)

Potential must be applied to these outputs (max. 30 V DC).

Semiconductor Relay Status	Output LED	Wiring Diagram
Output switched	🟡 yellow	Max. 30 VDC + - 3 Consumer switched
Output not switched	◯ off	Max. 30 VDC + - 3 Consumer not switched

2.6. RECHARGEABLE BATTERY

The device is equipped with an integrated battery recharging circuit for an external 12 V lead-gel battery, typically with 1.2 Ah. The system detects power failures and power recoveries, records both events to event memory and, depending upon wiring, keeps all functions intact for up to 24 hours. The condition of the rechargeable battery is indicated by three LEDs.

Designation	Output LED	Cause
Error	Red	No battery or voltage less than 11 V DC
Charge	Yellow	Battery is being charged or voltage continuously less than 12 V DC
OK	Green	Voltage greater than 11 V DC

2.7. AUXILIARY VOLTAGES

The SMART**LOGGER** **ECS** makes 17 and 5 V DC auxiliary voltages available for supplying power to external sensors, optical probes and other similar devices.

- 17 V DC, max. 50 mA
- 5 V DC, max. 50 mA

2.8. RS 485 INTERFACE

The RS 485 interface is used to connect add-on modules.

- Maximum spread: 1200 m
- Maximum number of users: 32 (addresses 02 to 33)
  [0 not allowed; 1 = standard address SMART**LOGGER** **ECS**]

2.9. M-BUS INTERFACE

The M-Bus interface is used to connect M-Bus meters.

Data from the meters can be stored at the SMART**LOGGER** **ECS**. The respective parameters are configured with the help of SMART**LOGGER** MANAGER software.

- Maximum number of M-Bus devices: 10

Flow of data via the M-Bus interface is indicated by the M-Bus LED.

2.10. VISUALIZATION OF DATA FLOW

Due to the fact that the SMART**LOGGER** ECS is equipped with an integrated modem by means of which communication with the SMART**LOGGER** ECS microcontroller system is possible, and with which third party systems can be called up, further explanation is required. The respective instances of data flow are indicated by the corresponding LEDs.

Variant 1: Call-up with GMC-I Messtechnik software. Access to alarm or memory system at the ECS.

Control Station with GMC-I Messtechnik Software — ECS Modem — ECS Memory and Alarm System

● Modem – ECS
○ Modem – RS 232
○ RS 232 – ECS

Variant 2: Call-up with 3rd part device software. Function as transparent modem.

Control Station with 3rd Party Device Software — ECS Modem — 3rd Party Device to RS 232

○ Modem – ECS
● Modem – RS 232
○ RS 232 – ECS

Variant 3: Access with GMC-I Messtechnik software via RS 232 to the microcontroller system at the ECS.

On-Site Parameters Configuration

GMC-I Messtechnik GmbH Software — ECS Memory and Alarm System

○ Modem – ECS
○ Modem – RS 232
● RS 232 – ECS

Figure 5: Schematic Diagram, Data Flow

2.11. DCD, SYNC AND ERROR LEDS

DCD LED
Data carrier
detection indicates
all data transfer via
the modem.

Error LED
Lights up continuously during
system start-up and goes out
after successful completion of
internal system check.
Blinks in the event that the
modem has not been initialized.

○ DCD   ○ Sync   ○ Power   ○ Error

Sync LED
Only relevant for GSM modem.
This LED provides information regarding the status of the integrated
GSM modem. When first switched on, it lights up continuously
(initialization). After a short moment it starts to blink steadily (network
search). As soon as the modem is logged on, the LED is switched to
flash mode (75 ms on, 3 seconds off).

2.12. GSM MODEM

The GSM module is equipped with a Siemens TC 35 i-GSM modem. An FME socket is provided for connection.

2.13. ANALOG/ISDN MODEM

The analog module is equipped with a socket modem. Different modem types, including ISDN terminal adapters, are available for various requirements profiles. A 56 K modem is used as a standard feature.

2.14. ETHERNET

The Ethernet module is equipped with a Lantronix X-Port module.

2.15. EXPANSION MODULE, 8 DIGITAL INPUTS

Various expansion modules can be integrated into the overall system via the internal system bus. The 8 digital inputs included with this module can be managed just like the 4 inputs on the main board.

The respective parameters are configured with the help of SMART**LOGGER** MANAGER software.

ATTENTION!
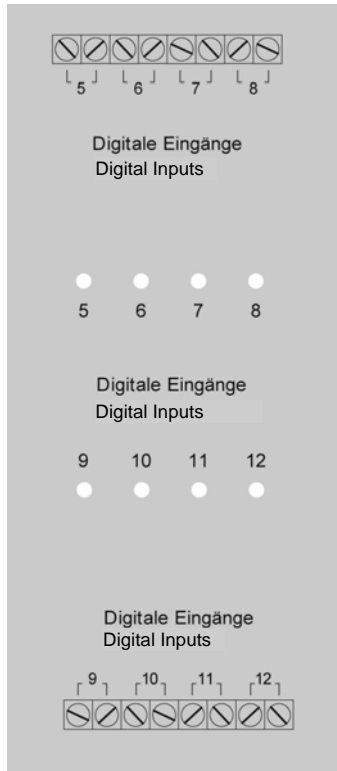
The expansion modules can only be installed at the factory, because each device necessitates a different housing length and a special label.

2.16. EXPANSION MODULE, 8 ANALOG INPUTS

Various expansion modules can be integrated into the overall system via the internal system bus. The 8 analog inputs included with this module can be managed just like the 4 inputs on the main board.

The respective parameters are configured with the help of SMART**LOGGER** MANAGER software.

2.17. EXPANSION MODULE, 4 RELAY OUTPUTS

This module is equipped with four additional relay outputs. The outputs are laid out as bistable, pulse-controlled relays. Maximum switching current is 16 A.

The respective parameters are configured with the help of SMART**LOGGER** MANAGER software.

3. Software

As an input and analysis tool, SMART**LOGGER** MANAGER software allows for convenient operation and monitoring of interconnected devices by means of remote call-up, or directly on-site.

3.1. General

3.1.1. System Requirements

- Windows 2000, 2003, XP, Vista or 7

3.1.2. Starting the Program

The program is started by clicking the *SMARTLOGGER MANAGER* icon (after successful installation as a link on the desktop).

The following window appears after the program has been started:

Figure 6:   User Interface after Starting the Program

3.2. OPERATION

3.2.1. MENU BAR

The menu bar includes three menus with different functions:

- *File*:   Exit the program by clicking *Exit*.

- *Connection*:   Select the desired type of connection.

- *Modem*:   Modem connection settings can be managed with
                 the help of this function.

- *Devices*:   This menu is used to configure parameters for
                 SMART**LOGGER** ECS devices.

- *Options*:   Language selection

3.2.2. MODEM

After clicking *Modem* in the *Connection* menu, a window appears at which the modem parameters used to dial up the SMART**LOGGER** ECS can be configured:
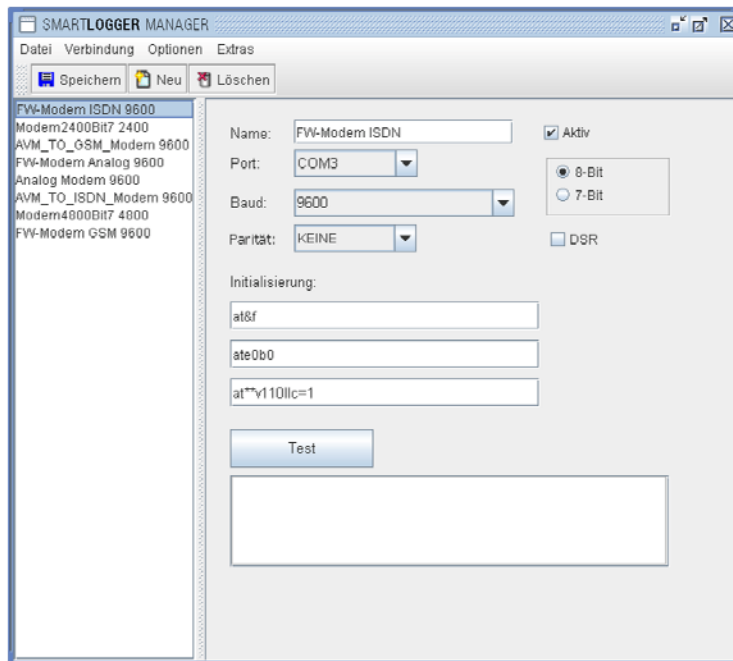
Figure 7:   Adding a New Modem

The following options are available here:

- *Save*:   Save selected parameter settings which are required for establishing
                 connection with the modem.

- *New*:   Add a new modem.

- *Delete*:   Delete a modem from the list.

- *List*:   List of all included modems (the settings for any given modem can be
                 displayed by clicking the respective entry)

- *Name*: Freely selectable designation for the modem, 30 characters (for easy subsequent identification, the designation should indicate the type of modem, e.g. "ISDN-AVM-Modem 9600")

- *Port*: COM port at the computer for serial connection to the modem.

- *Baud*: Speed at which the serial port will exchange data.

- *Active:* If this checkbox is activated, the program automatically looks for the next available modem from the list, and uses it to establish a connection.

- *Data Bits*: Number of transmitted/received data bits per data packet (8 data bits are usually used).

- *DSR*: If this checkbox is activated, the modem transmits the DSR signal (data set ready) after connection has been correctly established (this flag only needs to be set in rare cases, because some modems – in particular cell phones – require this signal).

- *Initialization*: AT commands for configuring the modem connected to the PC.

- *Test:* Establishes a test connection to the modem.

3.3. DEVICES

The following window appears after clicking **Devices** in the **Connection** menu.

Figure 8:   Addresses

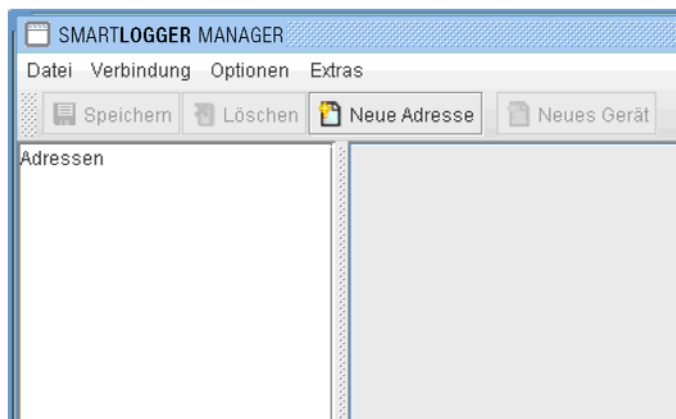**A**ny number of customers, along with associated data, can be entered here.

A new window for entering customer data appears after clicking the **New Address** button.
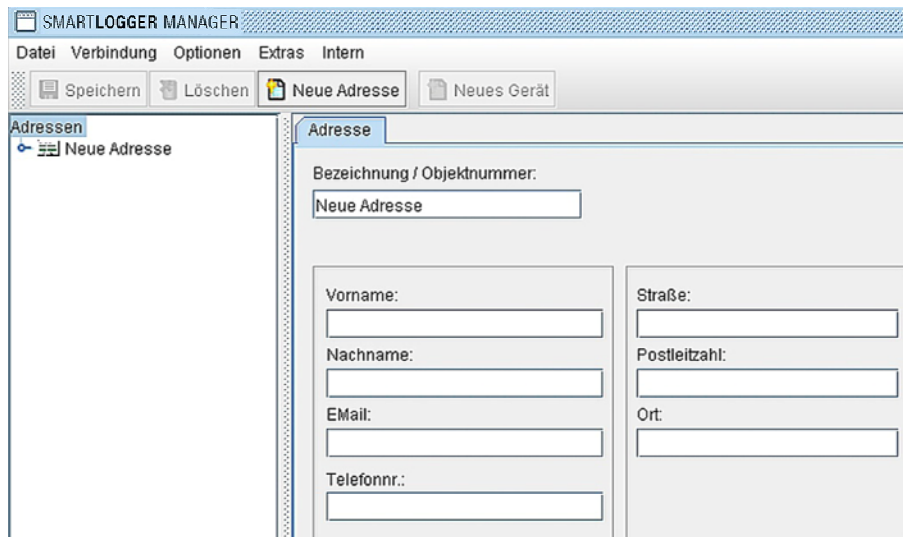
Figure 9:   Entering a New Address

"New Address" appears as a default entry. An individualized structure can now be set up with any number of customers with the help of the entry window.
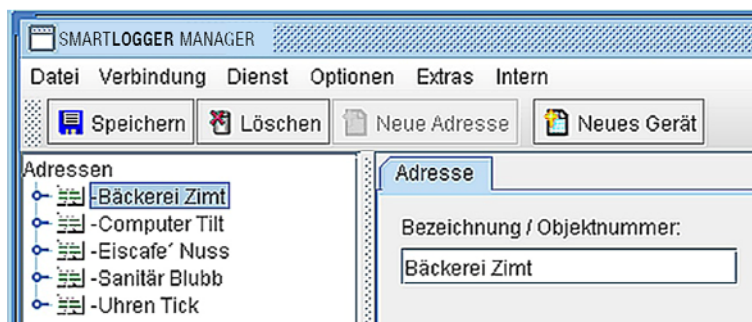
Figure 10:   Address Structure

3.4. SETTING UP A NEW DEVICE

A new window for device selection appears after clicking the **New Device** button.
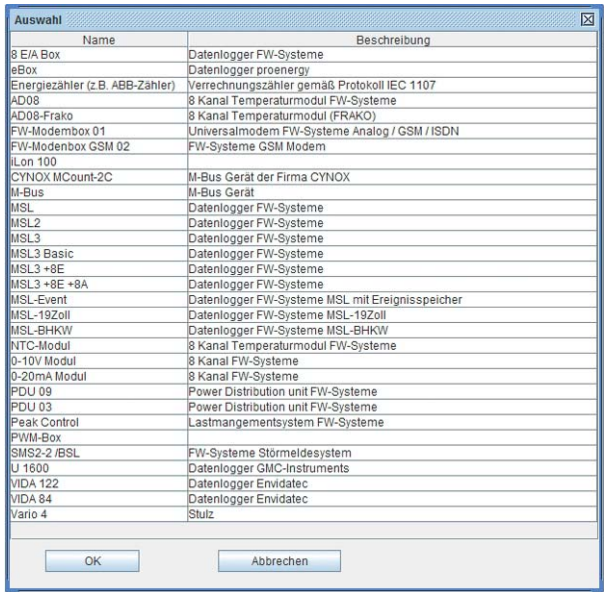
Figure 11:   Device Selection

A device can be selected here, and subsequently set up for use. In this case, the SMART**LOGGER** **ECS** Basic device must be selected. The SMART**LOGGER** **ECS** Basic is then assigned to the customer address.

A new window for configuring device parameters then appears.

Figure 12:   Device Tab

Location-specific data for the device can be entered to the **Device** tab.

- *Name*: Freely selectable device designation, 30 characters (the default name, "New SMART**LOGGER** ECS device", is initially assigned to the device)

- *Connection*: Three different options for establishing a connection with the device:
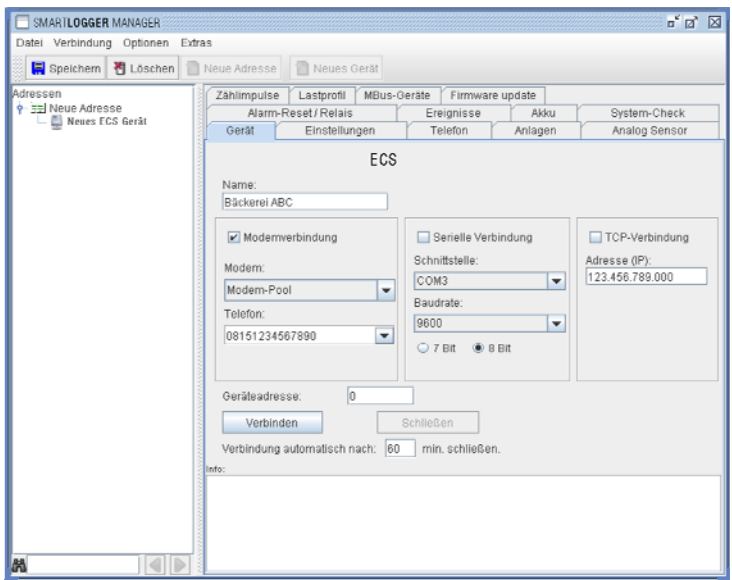
- **Modem connection**: Connection established via analog, ISDN or GSM modem

  - *Modem*: Modem by means of which connection will be established

  - *Phone no.*: Phone number of the SMART**LOGGER** ECS

- **Serial connection**: Direct connection via a serial cable connected to the device, or indirect connection via a virtual serial port which must be set up previously

  - *Port*: COM port which is connected to the device

  - *Baud*: Selection of a valid baud rate A transmission speed of 9600 baud is required in order to establish connection with the SMART**LOGGER** ECS.

  - *Bits*: Select the number of data bits per data packet. 8 bits are required in order to establish connection with the SMART**LOGGER** ECS.

- **TCP connection**: Establish connection via the Ethernet network (TCP/IP)

  - *Address (IP)*: Valid IP address of the SMART**LOGGER** ECS plus port number, for example: IP: 123.456.789.100, port: 10001 => entry: 123.456.789.100:10001

- *Device address*: Address of the device within a range of 1 to 31

- *Connect*: Establish connection to the SMART**LOGGER** ECS.

  Depending on the type of connection, the connect procedure can be observed in the information window:

  Modem connection:

  The dial-up procedure can be observed. As soon as connection has been established, "connected" appears at the window. The software is now connected with the internal modem at the SMART**LOGGER** ECS.

  Serial and TCP/IP connection:

  As soon as connection has been established, "open serial" appears at the window. The software checks communication up through the interface.

- *Disconnect*: End connection

- **End connection automatically after x min**

  Number of minutes after which connection to the device is automatically ended. If a "0" is entered, connection is not ended automatically.

After connection to the SMART**LOGGER** ECS has been established, device parameters can be configured.

3.5. Parameters Configuration

Within the individual parameters configuration dialog boxes, values can be read out by clicking the **Read** button or, if permissible, transferred to the device by clicking the **Write** button.

Attention: Always read out currently selected parameter settings before reconfiguring the device!

3.5.1. Settings

Parameters configuration is started by clicking the **Settings** tab:
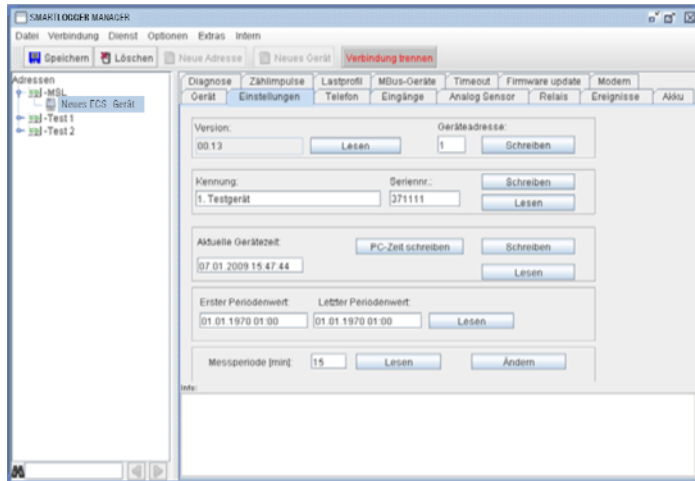

Figure 13:   Settings Tab

- **Version**:   Version number of the device

- **Device address**:   Unique device ID number within a range of 1 to 31

- **Designation**:   Device designation, name, 30 characters

- **Serial no.**:   Serial number assigned by the manufacturer

- **Current device time**:   Internal clock time at the device (if date and time are set very accurately at the PC, device time can be set directly by clicking the **Write PC time** button.

- **First period value /
  last period value**   Date of the first and last period values stored to the device

- **Measuring period**:   Measuring period duration in minutes (memory cycles)

Caution: If this value is changed, all saved period values are deleted.

3.5.2. Phone

Basic settings required for the fault messaging function at the SMART**LOGGER** ECS are entered to the *Phone* tab.
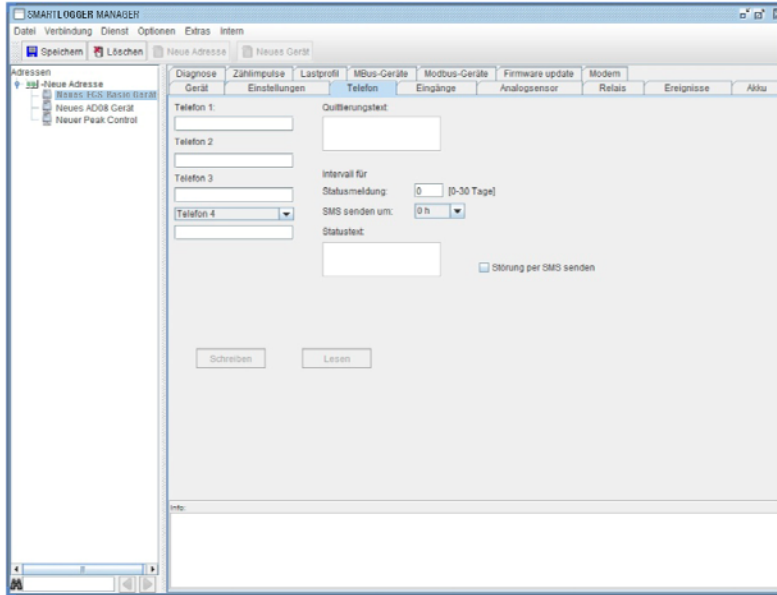

Figure 14:   Phone Tab

The following type of fault message transmission is used:

Stand-alone – operation with GSM engine (SMS)

In this operating mode, the SMART**LOGGER** ECS dials a preprogrammed number when a fault occurs and sends a fault message as an SMS.

There are two different alarm procedures:

- Alarm procedure 1 – without acknowledgment
- Alarm procedure 2 – with acknowledgment

Alarm Procedure 1 – Without Acknowledgment

In this case, no acknowledgment text is read out, i.e. the field remains blank. All SMS messages (including OK messages) are sent, one after the other, to all phone numbers.

Alarm Procedure 2 – With Acknowledgment

In this case, an acknowledgment text is read out, with which the recipient can acknowledge receipt of the fault message.

The SMS message is initially sent to the first phone number only. If no return SMS is received within 10 minutes containing exactly the same acknowledgment text as was sent to the recipient, the next phone number is called and so forth (escalation procedure). All further messages are sent to the participant (phone number) from which the first return SMS was received.

The alarm system is reset each day at midnight, i.e. fault messaging mechanisms are returned to their initial values (phone number 1 is notified first).

The following fields are used in order to configure alarm procedure parameters:

- ***Phones 1 to 3***

Phone numbers, to which an SMS should be sent in the event of a fault, can be entered to the first three entry fields. As a rule, these are cell phone numbers.

- ***Acknowledgment text***

Text by means of which the recipient can acknowledge receipt of the fault message and acceptance of responsibility.

- ***Phone 4***

The fourth field offers two possible options: As an alternative to entering a phone number, the "Send e-mail" option can be selected.

Phone number

In addition to the 3 previous phone numbers, a fourth is entered to this field.

Send e-mail (SMS as e-mail)

In addition to sending fault messages via SMS, they can also be sent to an e-mail address. The address is entered to the field which is provided for this purpose.

IMPORTANT: The @ symbol must be replaced with an asterisk (*) in the e-mail address.

Example: info*my_company.com

NOTE: A phone number must be entered here in addition to an e-mail address. This (abbreviated dialing) number is specified by the respective cell phone service provider. For example, the D1 abbreviated dialing number specified by T-Mobile is 8000. It's only possible to send an SMS as an e-mail in combination with this number.
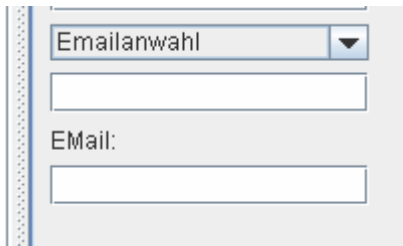
Figure 15:   Send e-mail

The following list includes the relevant abbreviated dialing numbers for the usual cell phone service providers (revision level: 8 December 2008):

- **D1 T-Mobile**   Abbreviated dialing number: 8000

- **D2 Vodafone**   Abbreviated dialing number: 3400

- **E-plus**   Abbreviated dialing number: 7676245

- **O2 Germany**   Abbreviated dialing number: 6245

- *Status message interval*

  Interval in days (0 to 30) at which the SMART**LOGGER** ECS transmits a status message

- *Send SMS at*

  Time of day at which the status message is sent

- *Status text*

  The text to be sent, 30 characters

3.5.3. INPUTS

The parameters for the inputs at the SMART**LOGGER ECS** are configured in the *Inputs* tab.
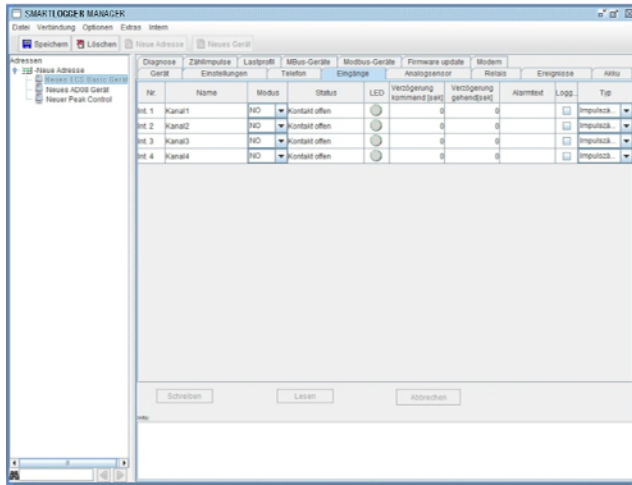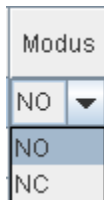

Figure 16:   Inputs Tab

4 internal input channels are configured in the table, as well as the number of external inputs in accordance with the housing layout:

- *No.*:   Input number assigned by the system

- *Name*:   Freely selectable input designation, 30 characters

- *Mode*:

> NO – contact is open in the neutral position
> (normally open)
>
> NC – contact is closed in the neutral position
> (normally closed)

- *Status*:   Contact status display

- *LED*:   Visual contact status indication

- *Inbound delay*:
> Duration in seconds for which the fault must persist before an "inbound" fault message is sent

- *Outbound delay*:
> Duration in seconds within which the fault must cease before an "outbound" fault message is sent

- *Alarm text*:
> The transmitted fault message (only in combination with a text entry)

- *Log*: Flag indicating whether or not input values/states should be stored to memory (data logger function).
  In the case of pulse meters, for example, data are stored to memory for subsequent evaluation.

- *Type*:
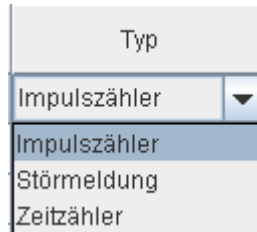
Input type:

- Pulse counter:
  Input is used to acquire load profiles

- Fault message:
  Input for acquiring fault messages

- Timer:
  Operating minutes counter, number of minutes during which the channel is active

3.5.4. ANALOG SENSORS

The parameters for the analog sensors at the SMART**LOGGER** ECS are configured in the ***Analog Sensors*** tab.

The analog inputs at the SMART**LOGGER** ECS are also capable of receiving and forwarding important status messages. This is based on continuous monitoring of analog values with regard to limit value violations.

Example: If the temperature in a cold storage facility has risen to above the specified maximum value, this is detected by the SMART**LOGGER** ECS via the correspondingly configured input and the responsible party is notified via SMS.

Measured values acquired via the analog inputs can be saved to a memory profile as well.

Figure 17:   Analog Sensors Tab

4 internal, analog input channels are configured in the table, as well as the number of external inputs in accordance with the housing layout:

- **No.**: Input number assigned by the system

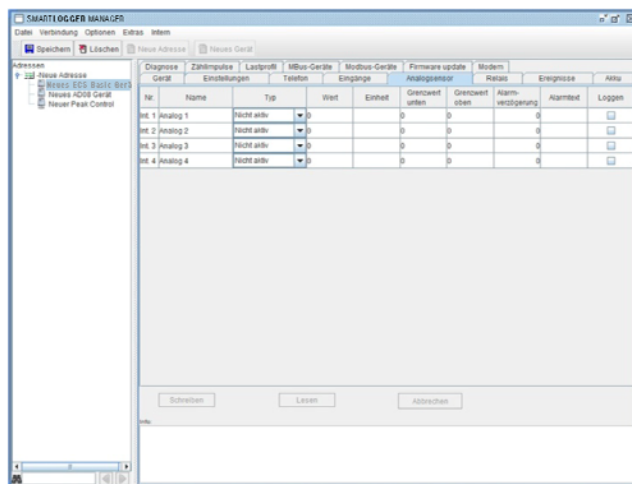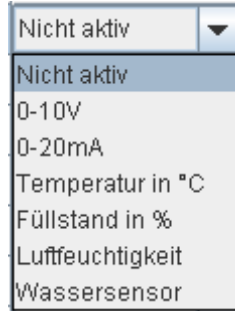- **Name**: Freely selectable input designation, 30 characters

- **Type**: Input type

Nicht aktiv ▼
Nicht aktiv
0-10V
0-20mA
Temperatur in °C
Füllstand in %
Luftfeuchtigkeit
Wassersensor

- Inactive: Input is not active

- 0 - 10 V: Standard 0 to 10 V signal is read out for conversion to a value

- 0 - 20 mA: Standard 0 to 20 mA signal is read out for conversion to a value

- Temperature in °C:
  Temperature measurement by means of a sensor within a measuring range of -25 to 125° C

- Fill-level as %: Fill-level measurement

- Atmospheric humidity: Humidity measurement

- Water sensor: Water sensor connected

- **Value**: Momentary measured analog value

- **Unit of measure**: Text field for unit of measure for the analog value, dictated by type, 30 characters

- **Lower limit value**: Lower limit value for monitoring the analog value

- **Upper limit value**: Upper limit value for monitoring the analog value

- **Alarm delay**: Duration in seconds for which the limit value violation must persistbefore a fault message is sent

- **Alarm text**: The transmitted fault message (only in combination with a text entry)

- **Log**: Flag indicating whether or not input values/states should be stored to memory (data logger function)

NOTE: Settings in the **Analog Sensors** tab must necessarily be matched to the utilized hardware, because the device cannot otherwise function correctly!

3.5.5. **RELAYS**

The *Relays* tab provides functions for monitoring and switching the relays at the SMART**LOGGER** **ECS**.
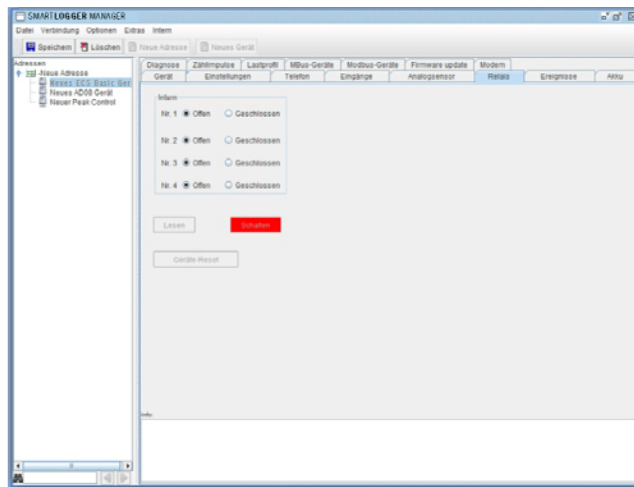
Figure 18:   Relays Tab

Differentiation is made amongst 4 internal relays and up to 8 optional, externally connected relays.

Each respective relay for devices using up to 230 V can be remote switched at the SMART**LOGGER** **ECS** after activating **Open** or **Closed**. The **Switch** button is clicked to this end.

The current statuses of all available relays are displayed after clicking the **Read** button.

All device functions can be returned to their original states by clicking the **Device Reset** button.

3.5.6. EVENTS

Stored (logged) events can be read out of memory and viewed in the **Events** tab.
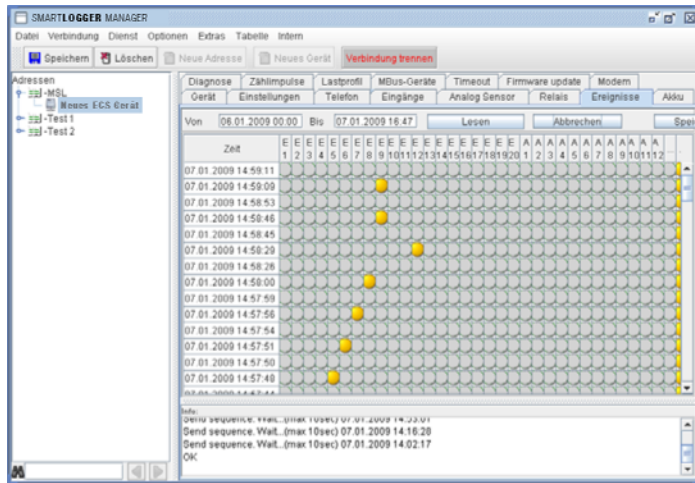
Figure 19:   Events Tab

All status changes are written to an events memory by the SMART**LOGGER** **ECS**.

The following events are documented:

- Error inputs
- Analog Inputs
- Power failure
- Operation (power on/off)

- ***From / to***: Time span to be covered by the events list generated by the device

The read operation is started by clicking the ***Read*** button. The read operation can be interrupted by clicking the ***Abort*** button. Data which have been read out can be saved to a file which can be opened in Excel by clicking the **Save** button.

3.5.7. RECHARGEABLE BATTERY

The SMART**LOGGER** ECS allows for the read-out of an alarm message when operating power is drawn from the rechargeable battery.

This function can be configured in the *Battery* tab.
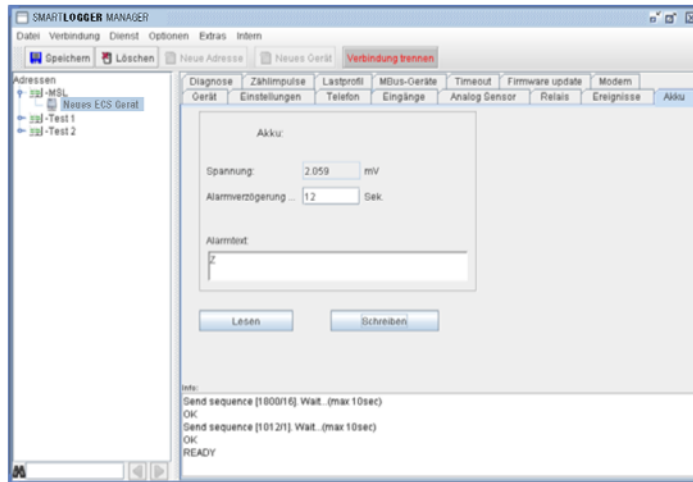
Figure 20:   Battery Tab

- *Voltage*:   Momentary battery voltage in mV
- *Alarm delay*:   Duration in seconds for which power failure must persist before a fault message is sent
- *Alarm text*:   The transmitted fault message, 30 characters

3.5.8. DIAGNOSIS

A device assessment can be executed in the **Diagnosis** tab.
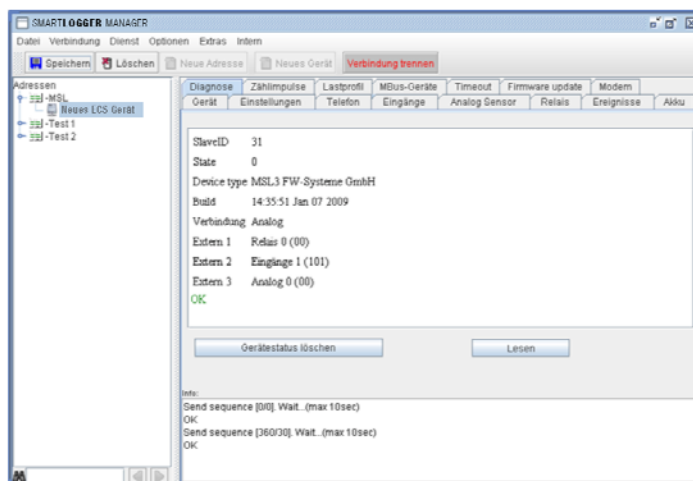
Figure 21:   Diagnosis Tab

All fault messages generated for the device are saved to the internal status register at the SMART**LOGGER** ECS.

• **Read**:	Status query, polling of the status register
• **Clear device status**:	Sets device status to 0, clears all status registers

3.5.9. COUNTING PULSES

Momentary meter readings for the pulse input channels can be displayed in the **Counting Pulses** tab.

Figure 22:   Counting Pulses Tab

• **Read**:	One-time only read-out of meter readings
• **Read Sec.**:	Cyclical read-out time interval
• **Start**:	Cyclical read-out
• **Clear meter readings**:	Set all meter readings to 0

3.5.10. **LOAD PROFILE**

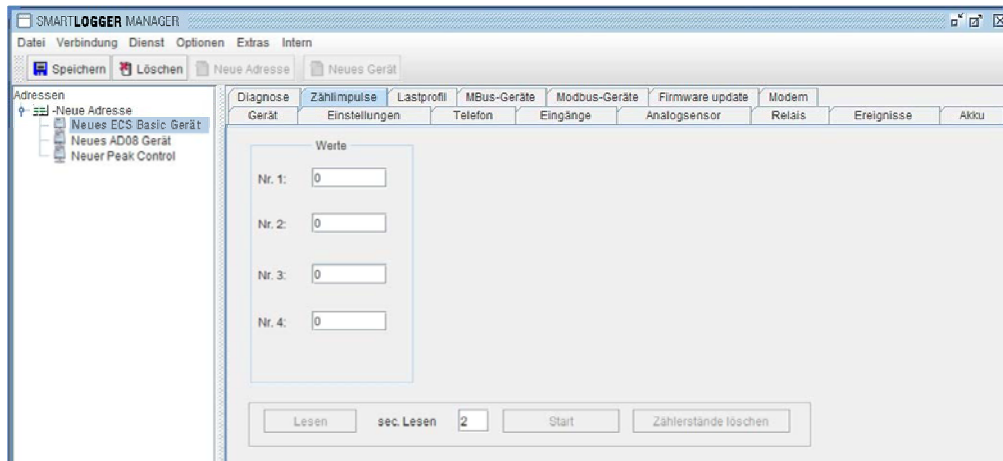**D**ata display for all 8 channels is possible in the *Load Profile* tab.
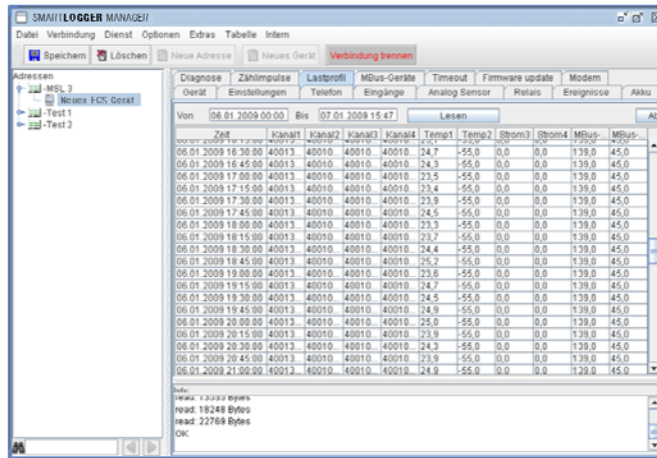

Figure 23:   Load Profile Tab

- *From / to*:   Time span to be covered by the load profile generated by the device

The read operation is started by clicking the **Read** button. The read operation can be interrupted by clicking the **Abort** button.

This tab includes a special function that makes it possible to export data which has been read out for subsequent visualization. The data can be visualized in, for example, Microsoft Excel. The procedure is as follows:

- Read out the data.

- Right click into the data table.

- A selection window appears.

- You can now choose either "Copy" or "Save".

- Start Excel.

- Open the data record or paste to Excel via the clipboard.

- Imported data records can now be processed –
  for example converted in to a bar graph diagram.

In this way, consumption and temperature profiles, as well analog data, can be visualized.

3.5.11. **M-Bus Devices**

When the *M-Bus Devices* tab is selected, the M-Bus configuration is read out automatically.
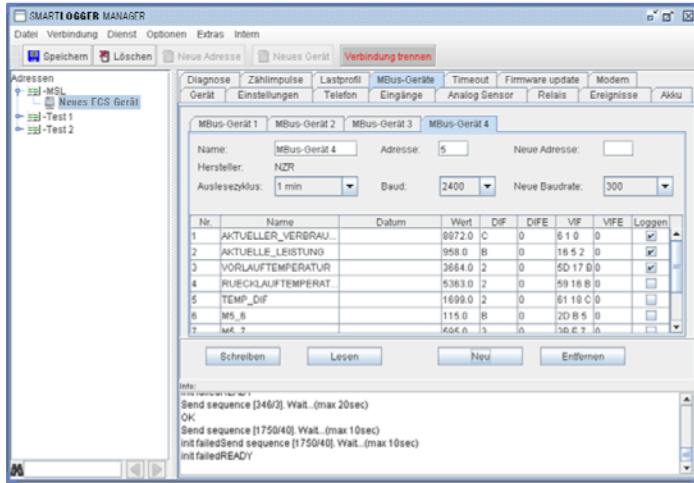

Figure 24:   M-Bus Devices Tab

- *Name*:   Freely selectable name for the M-Bus device

- *Address*:   Current device address within a range of 0 to 254

- *New address*:   New address which will replace the old one within a range of 0 to 254

- *Change*:   Change the address

- *Manufacturer*:   Displays the manufacturer of the device

- *Read-out cycle*:   Time interval in minutes for reading out M-Bus data

- *Baud*:   Momentary baud rate for communication with the M-Bus device

- *New baud rate*:   New baud rate which will replace the old one

- *Change*:   Change the baud rate

The M-Bus device's channels are displayed in the table. (*Note:* All interconnected M-Bus devices whose data need to be logged have to have the same baud rate!)

- *No.*:   Channel number

- *Name*:   Channel designation

- *Date*:   If the channel contains a date, the stored date is displayed here.

- *Value*:   If the channel contains a value, the stored value is displayed here.

The following hexadecimal entries offer protocol-specific information required for interpreting values which have been read out.

- *DIF*:   Data information field
- *DIFE*:   Data information field extended
- *VIF*:   Value information field
- *VIFE*:   Value information field extended
- *Log*:   Flag indicating whether or not the value should be stored to memory

3.5.12. MOD-BUS DEVICES

When the *Mod-Bus Devices* tab is selected, the Mod-Bus configuration is read out automatically.
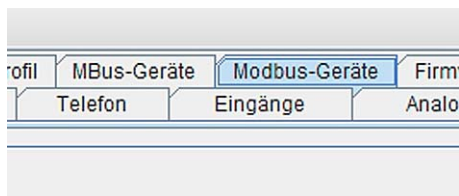

Figure 25:   Selecting the Mod-Bus Devices Tab

3.5.13. FIRMWARE UPDATE

An updated software version can be uploaded to the SMART**LOGGER** **ECS** with the help of the *Firmware Update* tab. The update can be executed by GMC-I Messtechnik employees, or by the user.
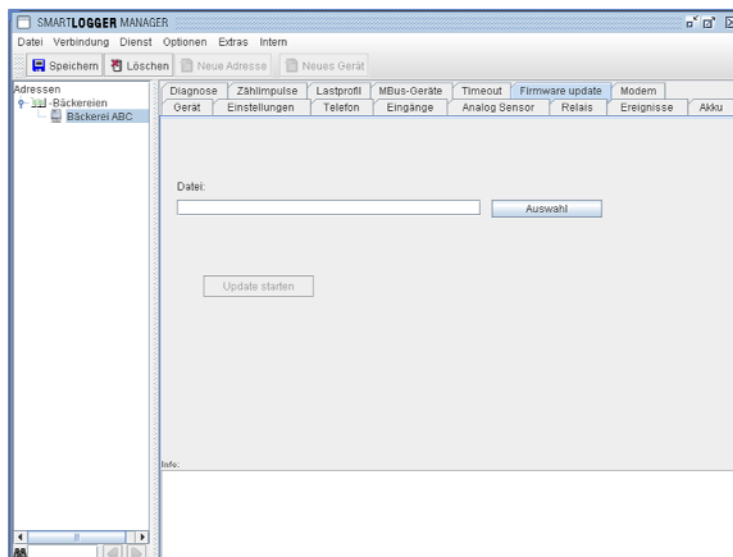

Figure 26:   Updating the Software Version

3.5.14. MODEM

If an integrated GSM modem is available, certain SMART**LOGGER** **ECS** functions can be remote controlled and values can be queried via SMS.

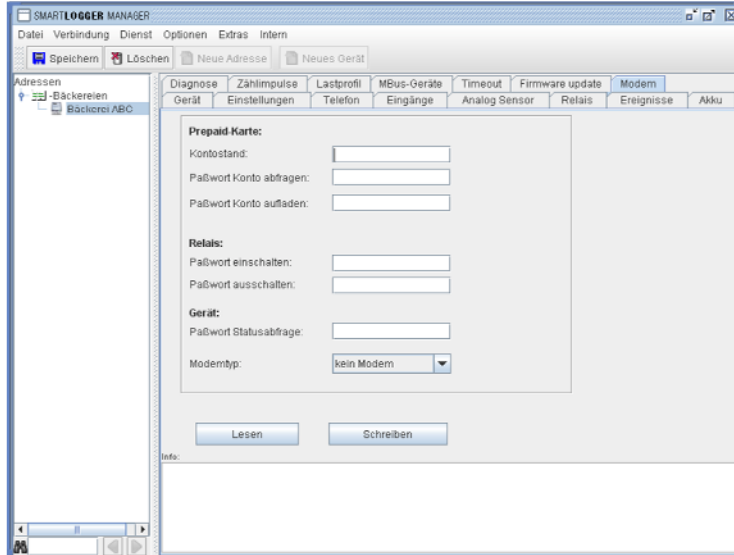**T**he SMS texts (flags) required to this end can be set up with the help of the *Modem* tab.

Figure 27:   Modem Tab

- *Account balance*:   Display of current SIM card credit,
                                      for example "4.63":
                                      The SIM card has a current balance of €4.63.

- *SMS text, check account*:   Text to be sent in order to query the current account balance
                                      For example, Send SMS   "Account balance"
                                      Response: "Your balance is: €4.63"

- *SMS text, increase balance*: Text to be sent along with the credit number in order to load a prepaid card

                                      For example Send SMS   "Load account #<no.>"
                                                                   No. – cash number for
                                                                   loading a prepaid card

   SMS text, switch relay on: Text to be sent along with the relay number, in order to switch a relay on

                                      For example Send SMS   "Switch on#<no.>"
                                                                   No. – relay number

   SMS text, switch relay off: Text to be sent along with the relay number, in order to switch a relay off

                                      For example Send SMS   "Switch off#<no.>"
                                                                   No. – relay number

- **SMS Text, status query:**   Text to be sent in order to query the device status
                                  The response contains information regarding the current status of
                                  the SMART**LOGGER** ECS (input statuses, relay statuses, account
                                  balance).

  For example Send SMS   "Status"
  Response   "Status
                           Inputs
                           1:on
                           2:off
                           3:off
                           4:on
                           Outputs
                           1:off
                           2:on
                           3:off
                           4:on
                           4.63"

- ***Modem type*:**   Display of the current modem type

Product Support

If required please contact:

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Fax   +49 911 8602-709
E-Mail support@gossenmetrawatt.com

Service Center

Repair and Replacement Parts Service
Calibration Center *
and Rental Instrument Service

When you need service, please contact:

GMC-I Service GmbH
Service Center
Thomas-Mann-Strasse 20
90471 Nürnberg • Germany
Phone   +49 911 817718-0
Fax   +49 911 817718-253
E-Mail   service@gossenmetrawatt.com
www.gmci-service.com

This address is only valid in Germany.
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*DKD **Calibration Laboratory**
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        accredited per DIN EN ISO/IEC 17025:2005

Accredited measured quantities: direct voltage, direct current -values, DC -resistance, -alternating voltage, -alternating current -values, AC active power, AC apparent power, DC power, -capacitance, -frequency and temperature

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