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PROlog and EasyLogGSM User Manual

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1. Introduction

In today's instrumentation it is often necessary to measure signals which are weak and measuring system should be low noise, high resolution and low power consumption. This User Manual is presenting our series of dataloggers. EasyLogGMS and PROlog dataloggers are universal measuring devices, configurable by software, suitable for mobile as well as permanent installation used in laboratory and in the field. They differ in number of analog and digital inputs. EasyLogGSM offers up to 8 analog inputs and 4 digital inputs, PROlog offers upto 20 analog inputs and 8 digital inputs. Both versions are almost identical in other parameters.

Datalogger series was designed by team of professionals with long time experience in low level and noise signals, software microprocessor programming and oriented to datalogger and sensors for extreme weather conditions in professional use. Employing latest high technology we are proud to present you measuring system, which is simple in use, but offers high precision measurement and all features which are expected from today's dataloggers. It is configurable by the user by simple set of commands or PC configuration software. The applications range covers meteorology, metrology, environmental monitoring, industry, research, at schools and laboratory.

2. Notes

Before starting to work with datalogger it is recommended to read this manual!
Manufacturer reserves the right to upgrade specifications without prior notice.
In the case you have questions or comments, please, contact manufacturer at the following address:

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3. Overview

EasyLogGSM and PROlog are high-end instruments designed for measuring, processing, recording (datalogging) to the memory of measured data in real time for industrial applications. The instrument is designed especially with intention to precision, low power consumption and comfortable, user-friendly operation. Both versions are almost identical except number of analog and digital inputs.

EasyLogGSM employs four single ended analog unipolar inputs with 12 bit resolution and additional four differential unipolar/bipolar inputs with 24 bit resolution. Additionally, logger has 4 digital inputs.

PROlog has more inputs and employs eight single ended analog unipolar inputs with 12 bit resolution and additional twelve differential unipolar/bipolar inputs with 24 bit resolution.

Additionally, logger has 8 digital inputs.

Digital inputs are configurable by software for measuring frequency, time (logical level) or as counters. Dataloggers have internal inputs (measuring for example battery voltage, excitation voltage for sensors, GSM signal strength....) and serial inputs (two physical interfaces are available COM1 and COM2). Upto 8 serial sensors can be defined. With definition of polynomial coefficients (of the 3-rd order) measured values are converted to engineering units and logged to 4MB of FLASH memory. Main data logging medium is SD memory card for long time data storage.

One more serial port is designed as service port (over USB connection) and can be used for basic setup and check of measured data on serial line.

Remote data transfer is available by on board GSM/GPRS modem - quad band modem for worldwide operation. Datalogger sends measured data in the form of email or FTP files. Real time clock circuit is keeping time all the time. There is a lithium battery of standard size and with low power design operational life is more than five years.

On the board there is available switched power supply for sensors, or direct output from battery for continuously powered sensors. Additionally, reference voltage of 2.5Vdc is available.

Simple power management system is provided. One input for minimum power consumption with range 4Vdc to 20Vdc is used in only battery operation. Second universal input with range 5Vdc to 12Vdc is provided with support to Pb 12V battery charging feature. One more input for 12Vdc solar panel is provided with support to Pb 12V battery charging. Battery charger controls overcharge and deep discharge to protect battery from damage.

Three LED indicators are used to indicate the operation.

EasyLogGSM and PROlog is built on professional solution. Therefore all hardware components are designed for wide temperature range operation. Software solution includes multitasking real time operating system with time synchronization over the internet. This makes the device robust, stable and easy to use.

4. Quick start

Prior to starting work with EasyLogGSM , please, read this user manual carefully. All following procedures will be described on EasyLogGSM. Only different parts will be showed for PROlog.

After unpacking open the box unscrewing four screws.



Fig 1. Opening the box

Connect battery to the datalogger. Connect supplied USB cable from datalogger to PC. For proper installation of USB driver, please, follow these steps.

1. connect power to datalogger
2. connect USB cable from datalogger to PC (Windows 7 and higher are supported)
3. when PC recognizes new hardware, it will ask for a driver. Navigate to msp430_ti_signed.inf file located on supplied CD.
4. rest of the installation is automatic.

Once the installation is done, user can check new device in Device Manager/SerialPorts.

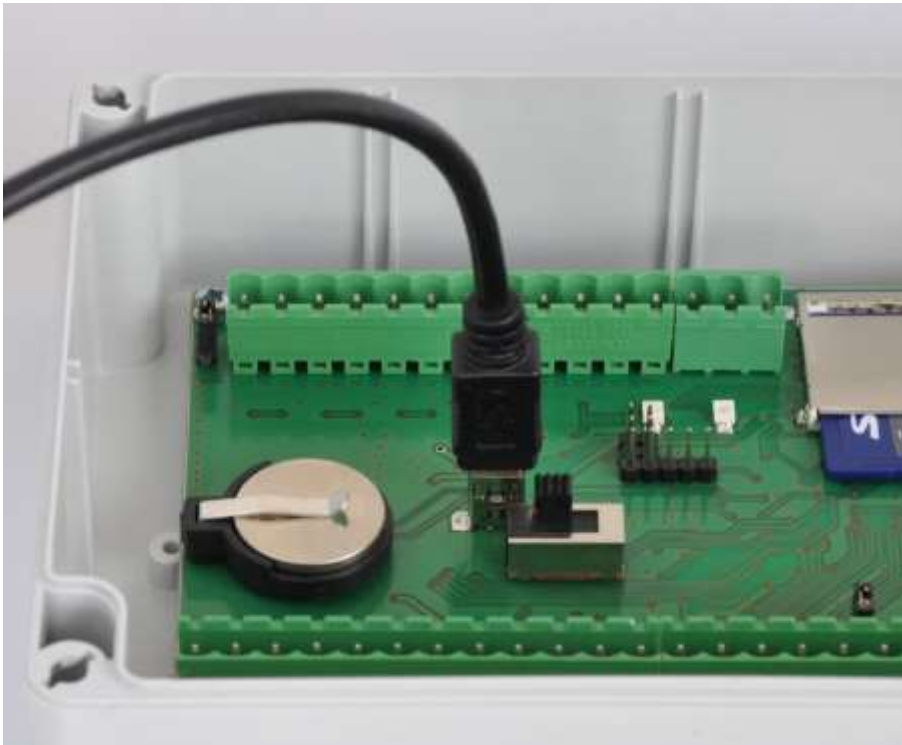


Fig 2. Connecting service USB cable

Start EasyLogSetup.exe (or PROlogSetup.exe) software supplied on the CD. On the right top corner select COM port where datalogger has enumerated. Then press Retrieve button to download actual configuration.

Now your datalogger is working.

Turn on power (position ON on power switch). EasyLogGSM is equipped with three LED indicators. Green is indicating processor is busy. Red indicator is blinking every 5 seconds and special flashing sequence when sending data over modem. Red LED indicates also SD memory card access. Blue indicator shows charging battery operation.

Turn off the switch (position OFF). Now connect all sensors you will use. Send appropriate configuration to the datalogger. Turn on the switch and datalogger starts to measure data.

Before starting to send data over internet you will need SIM card with internet connection enabled. SIM card holder is located on upper right corner.



Fig 3. Location of SIM cardholder

Turn off datalogger. Open SIM card doors.



Fig 4. Opening the holder

Observe orientation of SIM card and insert into the slot



Fig 5. Observe correct orientation and insert SIM card

Close the door.



Fig 6. After SIM card installation

Next you need to connect antenna.



Fig 7. Antenna connection

Now datalogger is ready for the operation. For correct modem operation, you need to setup following parameters (according your actual settings): ModemPIN, APN and EmailTo address.

5. Hardware

Mechanical solution of EasyLogGSM and PROlog is based on single board design with small dimensions and weight.



Fig.8 Front view

For EasyLogGSM outer dimensions 170mm (width), 140mm (height) and 50mm (depth) and for PROlog outer dimensions 220mm (width), 170mm (height), and 50mm (depth) makes them suitable for permanent installations as well as for mobile applications. Connectors inside are located on top and bottom side, from the bottom there are cable glands for sensor cables. Thanks to clear layout the user can connect relatively large number of sensors with easy. For better access to input connections, connectors are divided by two or three pins according to the function.

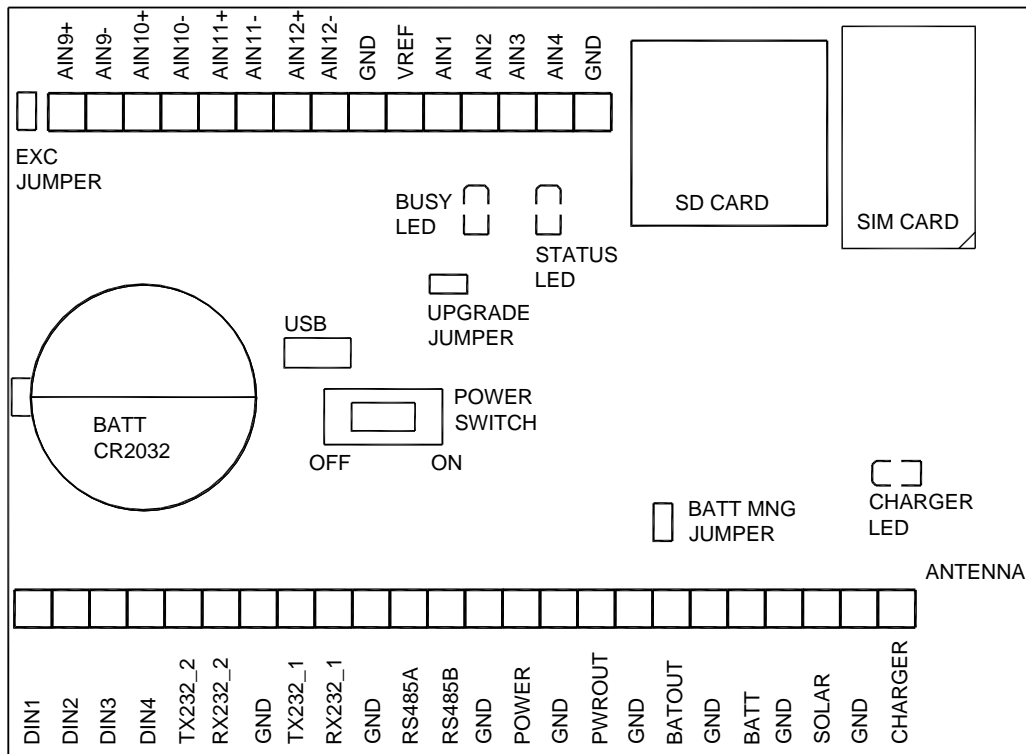


Fig.9a EasyLogGSM inside view – description of connectors

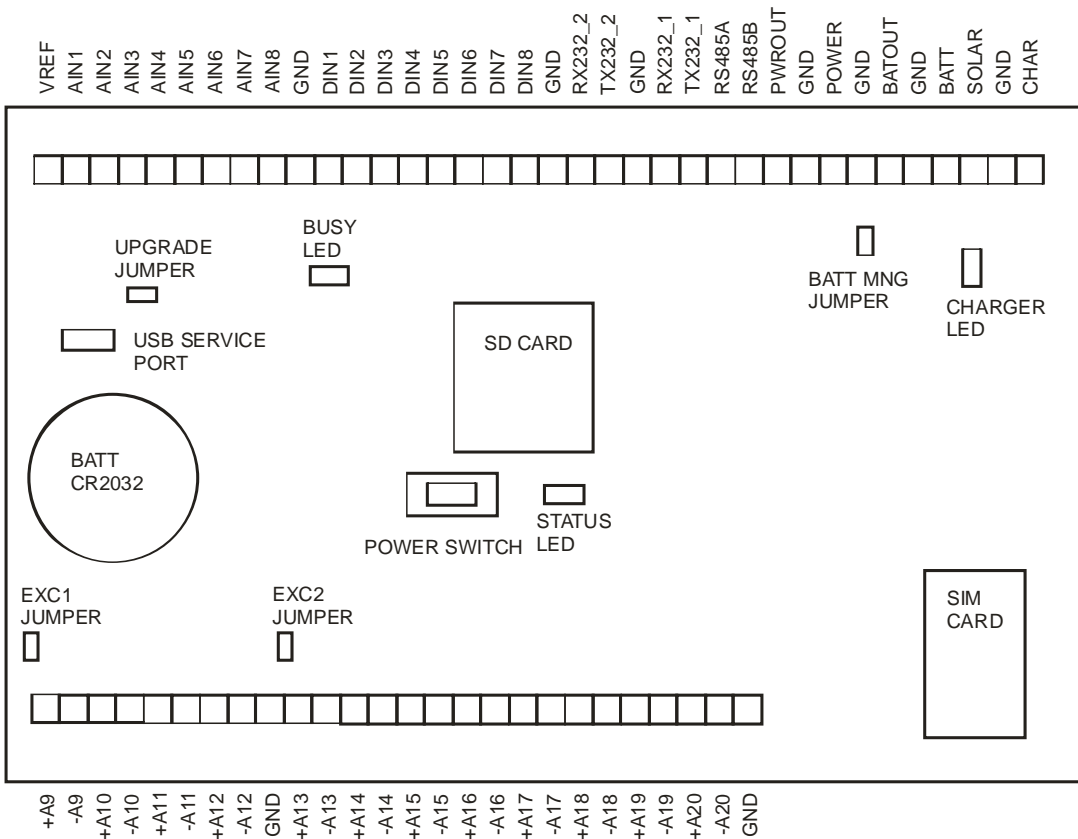


Fig.9b PROlog inside view – description of connectors

Box can be mounted on the wall by four screws M4 with IP65 class protection for all weather conditions.

EasyLogGSM and PROlog boards have the following components:

ON / OFF switch – power switch. It is used primary during transportation for saving main battery or when datalogger is not used.

BUSY, STATUS and SOLAR LED indicators – optical indicators of datalogger operation. BUSY LED color is green. Whenever datalogger is busy (measuring, calculating, sending data to serial line...) this LED is on. If the logger is only waiting between measuring intervals, green LED is off. This is primary indication of busy state. STATUS LED has red color. It has three indication functions:

1. whenever data are read or written to SD card, LED is ON. During this time it is not possible to remove or insert the card.
2. STATUS LED flashes every 5 seconds to indicate datalogger operation. This feature is useful when long time between measurements is selected and the user has the indication that logger is operating.

SOLAR LED indicates charging of battery. Its color is blue. When charging is performed from CHARGER input, it is still on. During charging from SOLAR input when battery voltage reaches its maximum value indicator will flash, otherwise it will light on. If there is no power on CHARGER nor SOLAR this indicator will be off.

Lithium battery - CR2032. The battery is reserved for real time clock.

EXC jumper – this jumper serves as excitation source for PT100 sensors. It connects 3.9kohm resistor from 2.5V reference to AIN9+. On PROlog board EXC1 and EXC2 are present. EXC1 connects 3.9kohm resistor to AIN9+ and EXC2 connects 3.9kohm resistor to AIN13+. Therefore two independent loops could be created. If PT100 is not used, do not connect it.

SD memory card – any SD memory card can be used. Software supports both SD and SDHC cards. The card is used only for data storage and is not intended for more manipulation (deleting files or other operations). Deleting and moving files are much faster on PC computer.

BATT MNG jumper - this jumper is used when power supply is 12Vdc solar panel or charger input (5Vdc to 12Vdc). If this jumper is removed, the only power source input is POWER and control circuitry of charger is disconnected. This will lead to minimum power consumption operation.

SIM card holder – if GPRS data transfer is needed, there must be inserted SIM card with valid data services.

Description of terminals:

AIN1 to AIN4 – analog single ended inputs with 12 bit resolution. Input range is 0V to 2.5V for AIN1, AIN2, AIN3 and AIN4.

AIN5 to AIN8 – on PROlog board only. Analog single ended inputs with 12 bit resolution. Input range is 0V to 2.5V for AIN5, AIN6, AIN7 and AIN8.

A9 to A12 – differential input pairs with 24 bit resolution. It can be selected as unipolar or bipolar inputs with range from 0...19mV (-19mV ... +19mV) to 0...2.5V (-2.5V ... +2.5V) by software.

AIN13 to AIN20 – on PROlog board only. differential input pairs with 24 bit resolution. It can be selected as unipolar or bipolar inputs with range from 0...19mV (-19mV ... +19mV) to 0...2.5V (-2.5V ... +2.5V) by software.

VREF – reference output of 2.5V for excitation of sensors (potentiometric sensors).

GND – ground pins. All GND pins are electrically connected on the board. For analog inputs GND pins are separately routed for best low noise performance.

DIN1 to DIN4 – digital inputs. Can be selected as frequency input, counter input or time of logical one input by software.

DIN5 to DIN8 – on PROlog board only. Can be selected as frequency input, counter input or time of logical one input by software.

RX232_1 and TX232_1 – Serial line COM1 signals. Software configurable serial port for communication with serial sensors. This COM1 is shared with RS485 port (software serial driver).

RS485A and RS485B – Serial line COM1 signals for RS485. Software configurable serial port for communication with serial sensors. This COM1 is shared with RS232 port (software serial driver).

RX232_2 and TX232_2 – Serial line COM2 signals. Software configurable serial port for sending reports. It can be used for communication with serial sensors.

POWER – power supply input with input range 4Vdc to 20Vdc. It is used for lowest power consumption. In this case BATT MNG jumper should be removed and battery is not charged or protected from deep discharge.

PWROUT – output of power supply switched only for period of measurement. It is used to power sensors, which do not need continuous power (e.g. relative humidity probe).

BATOUT – output of power supply backed up by connected battery. This output is used for powering devices or sensors which needs continuous power (e.g. wind speed sensor). It has deep discharge protection feature.

BATT – input for connecting 12Vdc lead acid battery. The battery is conditioned (charged by cca 350mA and protected from deep discharge condition at about 10.5V). BATT MNG jumper must be inserted.

SOLAR – input for solar panel with nominal 12Vdc output. BATT MNG jumper must be inserted.

CHAR – input for charger source with 5Vdc to 12Vdc output. BATT MNG jumper must be inserted.

ANTENNA – GSM/GPRS antenna for remote data transfer.

Electronic design of datalogger is oriented to precision measurements with high resolution. For this purpose it is equipped with two types of analog to digital converters. They differ in resolution (12 bits or 24 bits), configuration options, speed of conversion and applications for which they are used. There are 4 (EasyLogGSM) or 8 (PROlog) single ended unipolar inputs with 12 bit resolution with input range 0-2.5Vdc and 4 (EasyLogGSM) or 12 (PROlog) differential unipolar/bipolar inputs with 24 bit resolution with input range 0-19mVdc to 0-2.5Vdc (+/- 19mVdc to +/-2.5Vdc). Differential inputs are configurable by software. Additionally, datalogger provides excitation source enabled by jumper EXC (EasyLogGSM) or EXC1 and EXC2 (PROlog). It is used for PT100 sensors, for example. Several inputs are measured internally – system 3.3V supply voltage, RTC battery voltage, power supply voltage on POWER input, power supply on PWROUT, internal pressure sensor, GSM signal strength. After defining polynomial coefficients of the 3-rd order measured value (in mV) is converted to engineering units.

Datalogger has one ground potential referenced to power supply GND. There are more connectors with GND potential – all are internally connected and allow comfortable connection of power sources, RS232 serial lines, analog and digital inputs.

Digital inputs - 4 (EasyLogGSM) or 8 (PROlog) - can be configured for measuring frequency (in Hz), time (when digital input is in high logical state; in seconds) or as a counter (in counts). After defining polynomial coefficients of the 3-rd order it is converted to engineering units.

For calculation to engineering units there are available 16 polynomials for analog and digital inputs together.

$$\text{OutputValue} = a_0 + a_1 * \text{Input} + a_2 * \text{Input}^2 + a_3 * \text{Input}^3$$

Where a_0 , a_1 , a_2 , and a_3 are coefficients of polynome

For sensors, which require current excitation, there is EXC jumper. It produces about 600uA excitation and are primary intended for current loops for PT100 sensors. Additionally, there is buffered Vref output (2.5Vdc) for potentiometric sensors.

The main memory medium is SD memory card. EasyLogGSM can accept any card (SD or SDHC). If the user wants to remove the card, it is recommended to switch off datalogger first and wait until indication LEDs turn off. Then, file is correctly closed and card can be removed. It is possible to read it directly with card reader on PC. In the case the user will remove the card during ON position of the switch (but STATUS LED must be off), files on the card will remain, but the last file will be not correctly closed but still readable on the PC. It is not allowed to remove card from the slot if red LED is on! Files are stored in EASYLOG or PROLOG directory.

Serial lines COM1 and COM2 are RS232 with selectable parameters: number of bits (7,8), parity (None, Even, Odd) and stop bit (1 or 2). Communication speed is software selectable from 300bps up to 115200bps. COM1 is designed primary for communication with intelligent sensors. It is shared with RS485 interface too. Serial driver (built in datalogger) cares for all communication. The user needs to setup only mentioned serial line parameters. COM2 serial line is designed for reports of measurements for future extensions. If needed, it can be used for serial line communication too. It is mostly used, when the user has on COM1 RS485 serial sensor and on COM2 there is another RS232 serial sensor. RS485 interface is non isolated due to power consumption requirement. If there is a need to use optical or galvanic isolation, it is strongly recommended to use external RS232/485 converter.

USB connection offers one more serial line interface. After connecting service cable from datalogger to PC, it will enumerate as serial port. This is service port - for setting configuration.

There are various power supply options. Simple battery management (controlled charging and protection from deep discharge) is provided.

For minimum power consumption there is POWER input. It is connected directly before power stabilizer, without any charging or battery management option. Only PWR0UT output is enabled. POWER input is used in systems where very small power consumption is expected and there is not available any charging source (neither wall adapter, nor solar panel...). Jumper BATT MNG must be removed. In this scenario it is possible to use 6xAA batteries with GPRS data transfer.

If there is mains power supply available, it is recommended to use CHARGER input. It's input voltage range is from 7Vdc to 12Vdc. In this configuration, 12V lead acid battery can be connected with power management. Jumper BAT MNG must be inserted. If correct CHARGER input is connected, SOLAR blue LED will light on indicating battery charging.

Very similar input is for solar panels - SOLAR. It has the same features as CHARGER input. Maximum output current from solar panel is cca 1A. Jumper BAT MNG must be inserted. If solar panel is connected SOLAR blue LED will indicate charging. Once the battery is full, it will only flash.

Battery management cares for deep discharge condition. If this happens, battery is disconnected. BAT0UT output is available for powering sensor, which must be all time powered (like wind speed sensors or rain gauges).

Overall system operation is as follows: if main switch is in OFF position, only real time clock is running. Most of other tasks are disabled. User can enter service mode and communicate with datalogger over USB service cable. If main switch is in ON position, full performance follows.

Every measurement is made at MeasInterval. It can be set in the range 1...3600 seconds. At that time physical measurements are performed on analog, digital, internal and serial inputs. Then, at LogInterval all data are processed and saved to the memory. It can be set in the range 1...3600 seconds. For all inputs it is possible to measure average, minimum and maximum value. These statistical values are calculated at LogInterval. Between MeasInterval and LogInterval datalogger is in power save mode. For switching power supply for sensor (at output PWR0UT) sometimes it is necessary to leave delay to stabilize output from sensors. For this purpose there is MeasDelay. It can be set in the range 0...60 seconds.

At LogInterval data are written to SD memory card. On the card every day one file is created. File is in text format and directly readable on PC. Format is described in software description.

If there is GSM modem configured, at ModemInterval periods modem is powered on, attached to GSM/GPRS network and data are sent. Then, power is removed to save battery. ModemInterval is in the range 0...24 hours. If 0 is set, no modem data transfer is performed. For the real time circuit there is clock battery. It is a lithium battery with 3V nominal voltage, type CR2032. Exchange is simple for the user. After change of the battery, it is necessary to set up correct time and date.

Dataloggers are designed with simplicity for the user. It is based on multitasking real time operating system, which ensures robustness. The main tasks are measuring, statistical processing, producing reports, data storage, serial ports communication, modem communication and output control. During measuring, all selected inputs are measured and values are stored in a buffer. At MeasInterval, analog measured data are converted to milivolts, digital measured data are converted to hertz, seconds or counts. Serial inputs are measured and data are in original format from the sensor. There are several exceptions, where serial driver converts these values to user readable values. Finally, calculation to engineering units is performed with polynomial of the 3-rd order. At LogInterval statistics is processed for average, minimum and maximum value (if configured). Next step is data saving to SD memory card and sending report to serial line. If modem is configured, further task follows: power supply for modem is turned on. After some delay, modem is ready and configured, then attached to GSM/GPRS network. If successfully attached to network, data transfer follows. Once data are sent, modem is detached from network, powered down and task stopped (waiting for next ModemInterval period).

With multitasking system, most of those tasks are performed in parallel.

There are more modem settings for dataloggers:

Standard operation of the logger is that data will be sent to the user's email address on regular predefined intervals. It is possible to setup FTP data transfer. For correct connection to the internet there are several settings dependent on your local GSM/GPRS provider.

ModemPIN is a mandatory parameter. It is due to protection from misuse of the SIM card. The PIN number must be at least 4 digits and maximum 8 digits.

APN is access point of your GSM/GPRS provider. It is a string parameter and user needs to make correct setting (please, ask your network provider). Predefined value is internet.

Sending emails can be done by two different ways: first one is with predefined settings and second with user own settings.

Predefined settings means that data will be sent from the address sender@physicus.eu using manufacturer's email account. It uses smtp server smtp.webglobe.sk (IP address) with authorization (UserName sender@physicus.eu and Password Sender39). It is the best way for fast testing of communication and is accessible worldwide. The disadvantage for the user is that account is not in his control. The manufacturer will make his best effort to keep this account working unlimited time, but cannot guarantee that.

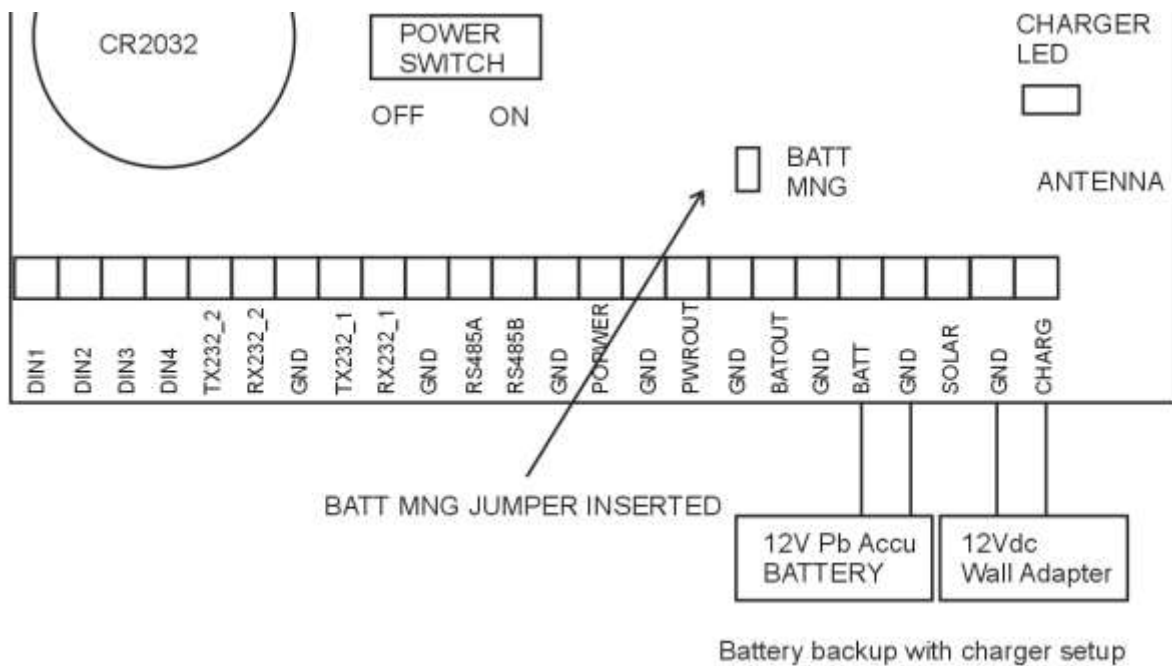
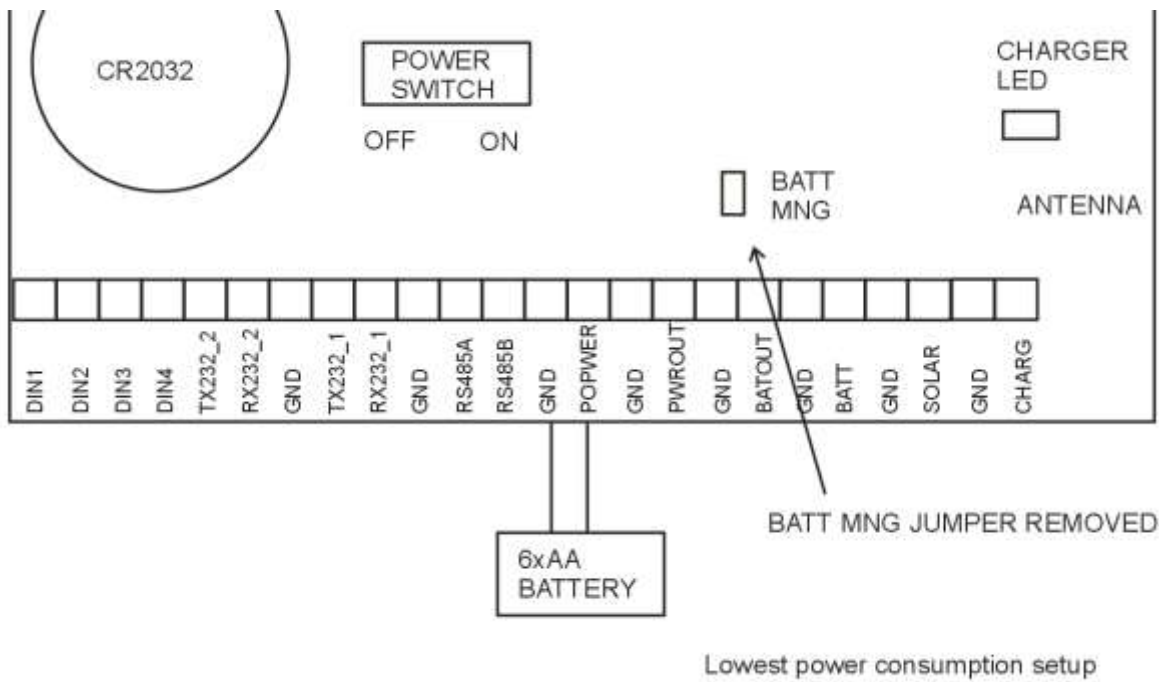
User own settings require valid email account. Then IP address should be set to smtp server of that account. Sntp server may not require secure connection or secure authentication. Many GSM/GPRS providers offer access to their smtp servers. Please, check for compatibility. In some cases smtp server does not require authentication. Then in settings leave fields UserName and Password blank. (At the time of manufacturer testing there was created email account at smtp.mail.yahoo.com and with properly set UserName and Password correct email data were sent. This can change in time.) The advantage of user own settings is that user has full control on functionality of email account for the future.

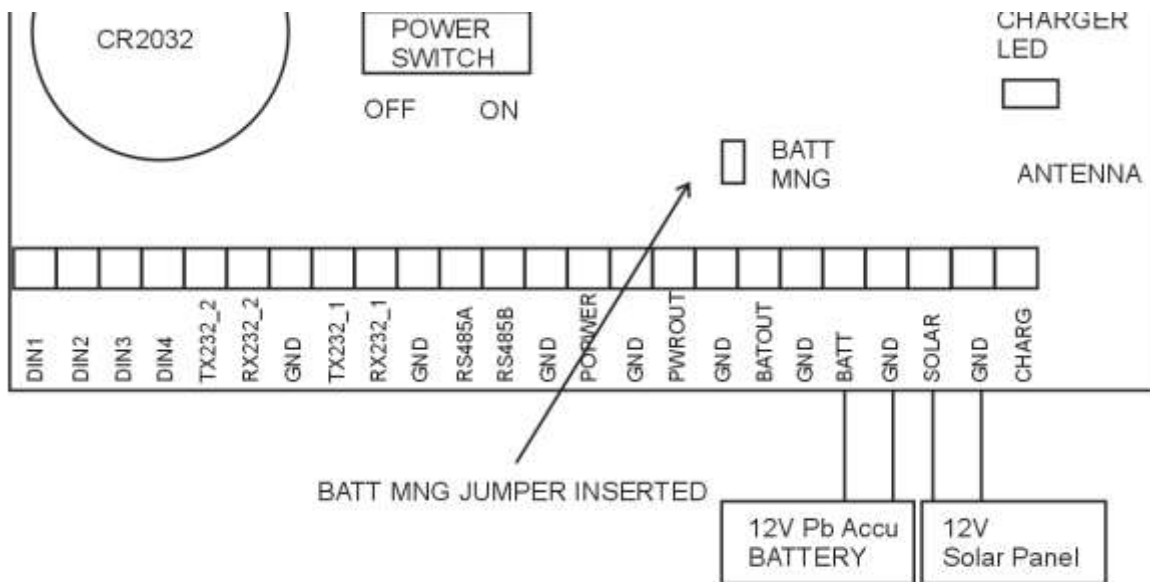
For sending data to FTP server, it is necessary to setup IP address of the FTP server and correct UserName and Password for FTP access. Also, user rights on the server must be set correctly (to allow to write a file). In this case other email settings are ignored.

For remote service it is valuable feature that the user can call datalogger for service purpose (change LogInterval, ModemInterval, ...). ModemOnTime is the time, when modem will register to the GSM network and will wait for service call. ModemOnDuration is time duration in minutes how long datalogger will wait for service call. It must be understood that during this time power consumption is increased and battery life will be shorter. Recommended ModemOnDuration is 5-10 minutes. For this feature SIM card must be able to receive CSD calls. Please, check with your GSM/GPRS provider availability of this feature.

Instruments in the field tend to have real time clock shift (due to temperature change and basic inaccuracy of clock source). For this reason dataloggers have automatic time synchronization every midnight. (ModemInterval must be greater than zero). This is TimeServer setting. Time is synchronized from port 123, which is for network time protocol. The user can setup whatever time server. Examples are time.nist.gov, time.windows.com...

The following diagrams show typical connection of various power supply options.





Battery backup with solar panel setup

6. Software

For setting configuration to EasyLogGSM or PROlog, it is necessary to connect USB service cable between datalogger and PC. On PC you need to use terminal software (can be Hyperterminal). Serial line setting is not important. Then type command "Service" (all commands are case sensitive)

You will receive following answer:

Service mode started

Now all setup commands are available.

Summary of setup commands:

Analog and digital input numbers are datalogger type dependent. Refer to actual version of your hardware.

a x, M=y, G=y, U=y, R=y

where:

a x [1... 8] – analog input number (a 1 ...a 8)

M=y [0,1] – if M=1, activate measurements on this input

G=y [1...8] – gain for differential inputs (a 9 ... a 20)

U=y [0,1] – unipolar setting (U=1) or bipolar setting (U=0) for differential inputs (a 9 ... a 20)

R=y [0,1] – calculating ratio to a9 for inputs a10 ... a12

example

a 1,M=1

(analog input 1 is configured for measuring)

a 9,M=1, G=8, U=1, R=0

(analog input 9 is configured for measuring, input gain 8, unipolar and no ratio calculation)

Command format for configuring digital inputs:

d x, M=y, F=y, T=y, C=y

where:

d x [1...8] – digital input number (d 1 ... d 8)

M=y [0,1] – if M=1, activate measurements on this input

F=1 – frequency measurement

T=1 – time measurement

C=1 – counter

example

d 5, M=1, F=1

(digital input 5 is configured for measuring, input is frequency measuring)

Command format for configuring serial inputs:

s x, M=y, C=y, S=y, B=y, P=y, T=y, D=z, A=z

where:

s x [1...8] – serial input number (s 1 ... s 8)

M=y [0,1] – if M=1, activate measurements on this input

C=y [1, 2] – COM port selection

S=y [300, 1200, 2400, 9600, 19200, 38400, 57600, 115200] – communication speed bps

B=y [7, 8] – number of bits

P=y [N, E, O] – parity None, Even, Odd

T=y [1, 2] – number of stop bits

D=z [PHYSICUS_HUMIAIR, ...]– serial driver name. This name identifies type of serial sensor connected

A=z [1, ...] – address of serial sensor (mostly used for sensors communicating on the RS485 bus)

example

s 5, M=1, C=1, S=19200, B=8, P=N, T=1, D=BARANI_ANEM485, A=1

(serial sensor 5, connected on COM1 with 19200bps 8N1 settings; type of sensor is anemometer with RS485 and bus address is 1)

Command format for configuring outputs:

o x, l=y, L=y, N=y, X=y, S=y, V=y, P=y, A=z

where:

o x [1...32] – output number (o 1 ... o 32)

l=z [A1...A20, D1...D8, S1...S8, I1...I14] – map to measured input

L=y [0, 1] – logging

N=y [0, 1] – logging minimum value

X=y [0, 1] – logging maximum value

S=y [0, 1] – logging standard deviation value

V=y [0, 1] – vector calculation

P=z [1 ... 16] – polynomial number for calculation

A=z – alias – name of logged variable

example

o 1, l=A1, L=1, N=0, X=0, S=0, V=1, P=5, A=WD

(output 1 maps to AIN1 input channel with logging mean value, vector calculation is used with polynome nr. 5. Variable alias is WD)

o 5, l=I1, L=1, N=1, X=0, S=0, V=0, P=16, A=VPOWER

(output 5 maps to internal input 1 – voltage on POWER terminal with logging mean and minimum value with polynome 16. Variable alias is VPOWER.)

o 9, I=S1_RAD, L=1, N=0, X=0, S=1, V=0, P=1, A=GlobalRadiation

(output 9 maps to serial input 1 with logging mean and standard deviation value with polynome 1. Variable alias is GlobalRadiation.)

Command format for configuring polynomials:

p x, 0=a, 1=a, 2=a, 3=a

where:

p x [1...16] polynomial number

0=a, coefficient a0

1=a, coefficient a1

2=a, coefficient a2

3=a, coefficient a3

example

p 2, 0=-0.035, 1=0.1, 2=0, 3=0

(coefficients to polynomials are: a = -0.035, b = 0.1, c = 0, d = 0)

Command format for system settings:

MeasInterval [1...3600] – interval between measurements in seconds

example

MeasInterval 60

(configuring measuring interval to 60 seconds)

MeasDelay [0...60] – delay after MeasInterval to start measurements in seconds

example

MeasDelay 5

(configuring delay between beginning of measuring interval and actual measurement to 5 seconds)

LogInterval [0...3600] – interval between logging in seconds

example

LogInterval 600

(configuring logging interval to 600 seconds)

ReplInterval [0...3600] – interval between reports in seconds on COM2 serial port. If ReplInterval is zero, there is no report on Serial2 and it can be used for communication with serial sensors. If ReplInterval is non zero equal to LogInterval, reports on COM2 will be the same as logged data (averaged, min, max... according to configuration). If ReplInterval is non zero and different from LogInterval, reports on COM2 are generated from last measured data (without min, max, stdev).
example

ReplInterval 600
(configuring report interval to 600 seconds)

Vref [2450...2550] – set reference voltage

example

Vref 2500.3
(setting reference voltage to 2500.3mV)

Serial2 [300,1200,2400,9600,19200,38400,57600,115200] – set communication speed on COM2 (report port)

example

Serial2 9600
(setting Serial2 baud rate to 9600 bps)

Date dd.mm.yyyy – set current date – day.month.year

example

Date 10.1.2009
(setting date to 10.1.2011)

Time hh:mm:ss – set current time - hours: minutes: seconds

example

Time 10:30:45
(setting time to 10:30:45)

Command format for modem settings:

ModemInterval [0 ... 24] – interval between sending data over modem in hours. Parameter 0 means no modem sending.

example

ModemInterval 24
(configuring modem data transfer to every 24 hours)

ModemDelay [0 ... 1439] – delay after ModemInterval to start sending data.

example

ModemDelay 5
(configuring modem delay to 5 minutes)

ModemOnTime [hh:mm:ss] – time at which modem should connect to GSM network and waits for a call

example

ModemOnTime 09:00:00

ModemOnDuration [0...30] – interval how long modem will wait connected to GSM network for a call; in minutes.

example

ModemOnDuration 30

ModemPIN [number] – modem PIN number (max 10 digits)

example

ModemPIN 485351

(configuring PIN number of inserted SIM card into the GSM modem to 485351)

ModemNumber [number] – number of remote modem where GSM data will be transferred (if ModemGPRS 0 was set)

example

ModemNumber 0265428834

APN [string]– access point of GSM/GPRS provider

example

APN internet

(configuring APN to string internet)

IP [string]– IP address for sending emails or IP address of FTP server

example

IP 213.151.208.170

(configuring IP to 213.151.208.170)

EmailFrom [string]– sender address for the email

example

EmailFrom Testing@physicus.eu

(configuring sender address to Testing@physicus.eu)

EmailTo [string]– recipient address for the email. Here data will be received.

example

EmailTo physicus@physicus.eu

(configuring recipient address to physicus@physicus.eu)

UserName [string]– user name for authorization on smtp server or FTP server. Minimum 5 characters. If less than 5 characters are used, access without authorization is activated (UserName and Password are not used)

example

UserName data@physicus.eu

(configuring user name to data@physicus.eu)

Password [string]– password for authorization on smtp server or FTP server. Minimum 4 characters.

If less than 4 characters are used, access without authorization is activated

example

Password data

(configuring password to data)

TimeServer [string]– time server for time synchronization.

example

TimeServer time.nist.gov

(configuring time server to time.nist.gov)

TimeZone [-12...12]– local time zone.

example

TimeZone -5

(configuring time zone to -5 hours from TimeServer)

Ftp [0,1]- enable/disable FTP data transfer.

example

Ftp 0

(configuring data transfer to email)

ModemDetail [0,1] – enables detailed messages from modem. Used only for problem solving with remote data transfer.

Other commands:

? – displays current settings

example

?

SN 002/0115

Name PROlog

MeasInterval 5 sec

MeasDelay 0 sec

ReplInterval 0 sec

LogInterval 10 sec
Vref 2498.650 mV
Serial1 115200 bps
Serial2 115200 bps
RS485 0
EWS 0
Date 01.02.2015
Time 08:12:26
OK

Config? – displays current inputs and polynomials settings

example

Config?

a 1, M=0, V=0, P=1, O=0
a 2, M=0, V=0, P=1, O=0
a 3, M=0, V=0, P=1, O=0
a 4, M=0, V=0, P=1, O=0
a 5, M=0, V=0, P=1, O=0
a 6, M=0, V=0, P=1, O=0
a 7, M=1, V=0, P=1, O=0
a 8, M=1, V=0, P=1, O=0
a 9, M=0, G=1, U=1, P=1, O=0
a 10, M=0, G=1, U=1, P=1, O=0
a 11, M=0, G=1, U=1, P=1, O=0
a 12, M=0, G=1, U=1, P=1, O=0
a 13, M=0, G=1, U=1, P=1, O=0
a 14, M=0, G=1, U=1, P=1, O=0
a 15, M=0, G=1, U=1, P=1, O=0
a 16, M=0, G=1, U=1, P=1, O=0
a 17, M=0, G=1, U=1, P=1, O=0
a 18, M=0, G=1, U=1, P=1, O=0
a 19, M=0, G=1, U=1, P=1, O=0
a 20, M=0, G=1, U=1, P=1, O=0
d 1, M=0, F=1, P=1, O=0
d 2, M=0, F=1, P=1, O=0
d 3, M=1, C=1, P=1, O=5
d 4, M=0, F=1, P=1, O=0
d 5, M=0, F=1, P=1, O=0
d 6, M=0, F=1, P=1, O=0
d 7, M=0, F=1, P=1, O=0
d 8, M=0, F=1, P=1, O=0
i 1, P=2, O=1
i 2, P=1, O=0
i 3, P=2, O=2
i 4, P=2, O=3
i 5, P=2, O=4
i 6, P=2, O=5
i 7, P=1, O=0
i 8, P=1, O=0

i 9, P=1, O=0
i 10, P=1, O=0
i 11, P=1, O=0
s 1, M=1, C=1, S=9600, B=8, P=N, T=1, D=PHYSICUS_HUMIAIR, A=1
s 2, M=1, C=1, S=115200, B=8, P=0, T=1, D=BARANI_ANEM485, A=0
s 3, M=0, C=1, S=9600, B=1, P=1, T=1, D=0
s 4, M=0, C=1, S=9600, B=1, P=1, T=1, D=0
s 5, M=0, C=1, S=9600, B=1, P=1, T=1, D=0
s 6, M=0, C=1, S=9600, B=1, P=1, T=1, D=0
s 7, M=0, C=1, S=9600, B=1, P=1, T=1, D=0
s 8, M=0, C=1, S=9600, B=1, P=1, T=1, D=0
o 1, I=S1_TA, N=0, X=0, V=0, S=0, P=1, A=TA
o 2, I=S1_RH, N=0, X=0, V=0, S=0, P=1, A=RH
o 3, I=I6, N=0, X=0, V=0, S=0, P=1, A=PA
o 4, I=S2_WS, N=0, X=0, V=0, S=0, P=3, A=WindSpeed
o 5, I=S2_WD, N=0, X=0, V=1, S=0, P=3, A=WindDirection
o 6, I=D3, N=0, X=0, V=0, S=0, P=1, A=RG
o 7, I=0, N=0, X=0, V=0, S=0, P=1
o 8, I=0, N=0, X=0, V=0, S=0, P=1
o 9, I=0, N=0, X=0, V=0, S=0, P=1
o 10, I=I1, N=0, X=0, V=0, S=0, P=2, A=3V3
o 11, I=I2, N=0, X=0, V=0, S=0, P=2, A=VRTC
o 12, I=I4, N=0, X=0, V=0, S=0, P=2, A=VPOWER
o 13, I=I5, N=0, X=0, V=0, S=0, P=2, A=VOUT
o 14, I=I6, N=0, X=0, V=0, S=0, P=16, A=GSM
o 15, I=0, N=0, X=0, V=0, S=0, P=1, A=
o 16, I=0, N=0, X=0, V=0, S=0, P=1, A=
o 17, I=0, N=0, X=0, V=0, S=0, P=1
o 18, I=0, N=0, X=0, V=0, S=0, P=1
o 19, I=0, N=0, X=0, V=0, S=0, P=1
o 20, I=0, N=0, X=0, V=0, S=0, P=1
o 21, I=0, N=0, X=0, V=0, S=0, P=1
o 22, I=0, N=0, X=0, V=0, S=0, P=1
o 23, I=0, N=0, X=0, V=0, S=0, P=1
o 24, I=0, N=0, X=0, V=0, S=0, P=1
o 25, I=0, N=0, X=0, V=0, S=0, P=1
o 26, I=0, N=0, X=0, V=0, S=0, P=1
o 27, I=0, N=0, X=0, V=0, S=0, P=1
o 28, I=0, N=0, X=0, V=0, S=0, P=1
o 29, I=0, N=0, X=0, V=0, S=0, P=1
o 30, I=0, N=0, X=0, V=0, S=0, P=1
o 31, I=0, N=0, X=0, V=0, S=0, P=1
o 32, I=0, N=0, X=0, V=0, S=0, P=1
p 1, 0=0, 1=1, 2=0, 3=0
p 2, 0=0, 1=0.001, 2=0, 3=0
p 3, 0=0, 1=0.01, 2=0, 3=0
p 4, 0=0, 1=0, 2=0, 3=0
p 5, 0=0, 1=0, 2=0, 3=0
p 6, 0=0, 1=0, 2=0, 3=0
p 7, 0=0, 1=0, 2=0, 3=0

p 8, 0=0, 1=0, 2=0, 3=0
p 9, 0=0, 1=0, 2=0, 3=0
p 10, 0=0, 1=0, 2=0, 3=0
p 11, 0=0, 1=0, 2=0, 3=0
p 12, 0=0, 1=0, 2=0, 3=0
p 13, 0=0, 1=0, 2=0, 3=0
p 14, 0=0, 1=0, 2=0, 3=0
p 15, 0=0, 1=0, 2=0, 3=0
p 16, 0=-113, 1=2, 2=0, 3=0
OK

Modem? – displays modem settings

example

Modem?

ModemInterval 0 hr
ModemDelay 0 min
ModemOnTime 14:00:00
ModemOnDuration 30 min
ModemPIN 253116
ModemNumber 0265428834
APN internet
IP 213.151.208.170
EmailFrom Testing@physicus.eu
EmailTo data@physicus.eu
UserName
Password
TimeServer sk.pool.ntp.org
TimeZone 1
Ftp 0
OK

TestEmail – start to send testing email or FTP file

TestGprs – start to test GPRS connection

TestSocket – start to test socket connection

System? – displays actual firmware version

example

System?

EasyLogGSM Version 9.1 Jan 17 2016
SystemOnTime (1329123) 1.0 Days
OK

SaveConfig – saves current settings to nonvolatile memory

example
SaveConfig

LogVariables – displays all logged variables as they appear in log files

example
LogVariables
(01) WD1 Avg;
(010) PT100 Avg;
(01) WS1 Avg;
(03) WS3 Avg;
OK

ReadData [1...200] – reads last 1...200 records from memory.

example
ReadData 5
16.07.2009 12:09:00 264.887 239.766 267.539 7.702 55.770 0.000 600.366 0
.061 13.743 0.320 0.000 161.728 0.029 258.572 0.078 258.574 0.079
16.07.2009 13:00:00 267.189 267.188 267.539 0.018 54.427 1.252 600.366 0
.051 13.753 0.320 0.000 161.728 0.028 258.573 0.078 258.573 0.078
16.07.2009 14:00:00 267.190 267.188 267.539 0.028 53.390 1.010 600.366 0
.026 13.758 0.320 0.000 161.728 0.028 258.573 0.078 258.573 0.078
16.07.2009 15:00:00 267.192 267.188 267.539 0.040 54.976 0.113 600.366 0
.055 13.748 0.320 0.000 161.728 0.028 258.573 0.078 258.573 0.078
16.07.2009 16:00:00 267.188 267.188 267.539 0.012 55.465 0.103 600.366 0
.058 13.758 0.320 0.000 161.728 0.028 258.573 0.078 258.573 0.078

ActualData – displays actual data from measured inputs

example
ActualData
(01) HUMIAIR 34.183
(08) Vbatt 20.053
(09) Ref100 100.000
(010) PT100 22.344
(01) Rain 0.000
(02) Wspeed 1.320
(04) SD 0.000

OK

SD? /easylog – displays all data files in /easylog directory on SD memory card. For PROlog datalogger type SD? /prolog

example
SD? /easylog
Directory listing...

```
<dir> .  
<dir> ..  
ELOG0000.TXT    26 2000/01/01 00:00  
ELOG0001.TXT    158 2000/01/01 00:00  
ELOG0002.TXT    389 2000/05/13 11:56  
ELOG0003.TXT    643 2000/05/13 11:56  
ELOG0004.TXT    389 2000/05/12 08:00  
Total Space 497888 kB  
Free Space 495808 kB  
Actual File /EASYLOG/ELOG0005.TXT  
OK
```

RS485 [0...1] – configures if using RS485 port. For future extension
example
RS485 1

ReadFile /easylog/elog0001.txt – displays requested file saved on SD memory card
example

```
ReadFile /easylog/elog0040.txt
```

```
#Name Location Bratislava
```

```
#SN 001/0211
```

```
 #(O1) HUMIAIR Avg;
```

```
 #(O8) Vbatt Avg;
```

```
 #(O9) Ref100 Avg;
```

```
 #(O10) PT100 Avg;
```

```
 #(O1) Rain Avg;
```

```
 #(O2) Wspeed Avg;
```

21.02.2010 06:06:00	0.183	20.053	100.000	-5.480	0.000	0.320
21.02.2010 06:07:00	0.183	20.053	100.000	26.270	0.000	0.320
21.02.2010 06:08:00	0.193	20.053	100.000	45.238	0.000	0.320
21.02.2010 06:09:00	0.183	20.053	100.000	22.355	0.000	0.320
21.02.2010 06:10:00	0.183	20.053	100.000	38.935	0.000	0.320
21.02.2010 06:11:00	0.193	20.053	100.000	34.128	0.000	0.320
21.02.2010 06:12:00	0.193	20.053	100.000	69.841	0.000	0.320
21.02.2010 06:13:00	0.183	20.053	100.000	49.170	0.000	0.320
21.02.2010 06:14:00	0.193	20.053	100.000	35.775	0.000	0.320

```
OK
```

ReadConfig – reads current settings from nonvolatile memory

```
example
```

```
ReadConfig
```

Help – displays short help screen

example

Help

setup commands

a 1..8, Measure

a 9..20, Measure, Gain, Unipolar, Ratio

d 1..8, Measure, Frequency, Counter, Time

s 1..8, Measure, Comport, Speed, Bits, Parity, sTop, Driver, Address

o 1..32, Input, Log, miN, maX, Stdev, Vector, Polynome, Alias

e 1..16, Input, Type, Logint, Modemint, Alarm, Bitmask

p 1..16, 0..3=

Vref [mV]

Date 1.2.2007

Time 11:45:20

MeasInterval [sec]

MeasDelay [sec]

LogInterval [sec]

ReplInterval [sec]

ModemInterval [hr]

ModemDelay [min]

ModemOnTime [09:00:00]

ModemOnDuration [min]

ModemPIN

APN

IP

EmailFrom

EmailTo

UserName

Password

TimeServer

TimeZone

Ftp 0/1

IPConnect

IPConfig

UserNameConfig

PasswordConfig

ModemDetail 0/1

SaveConfig - save configuration to Flash

ReadConfig - read configuration from Flash

? - show actual settings

Modem? - show actual modem settings

Config1?..5? - show actual configuration

SD? /prolog - show actual files on SD card

System? - show sw version

Serial1 300, 1200, 2400, 9600, 19200, 38400, 57600, 115200bps

Serial2 300, 1200, 2400, 9600, 19200, 38400, 57600, 115200bps

RS485 0/1

EWS 0/1

LogVariables - show all logged variables with names

ReadData 10 - read last 10 records

ActualData - show actual measured data

Measure - execute one measurement
ReadFile /prolog/plog0001.txt - read file from SD card
TestEmail
Upgrade - upgrade firmware
Service - enter service mode
Exit - exit from service mode
Reset - reboot datalogger
OK

Exit – exit from Service mode

Service – enter Service mode

Reset – software reset of EasyLogGSM

Upgrade – starts upgrade procedure for firmware. Follow EasyLogGSM messages.

7. PC configuration software

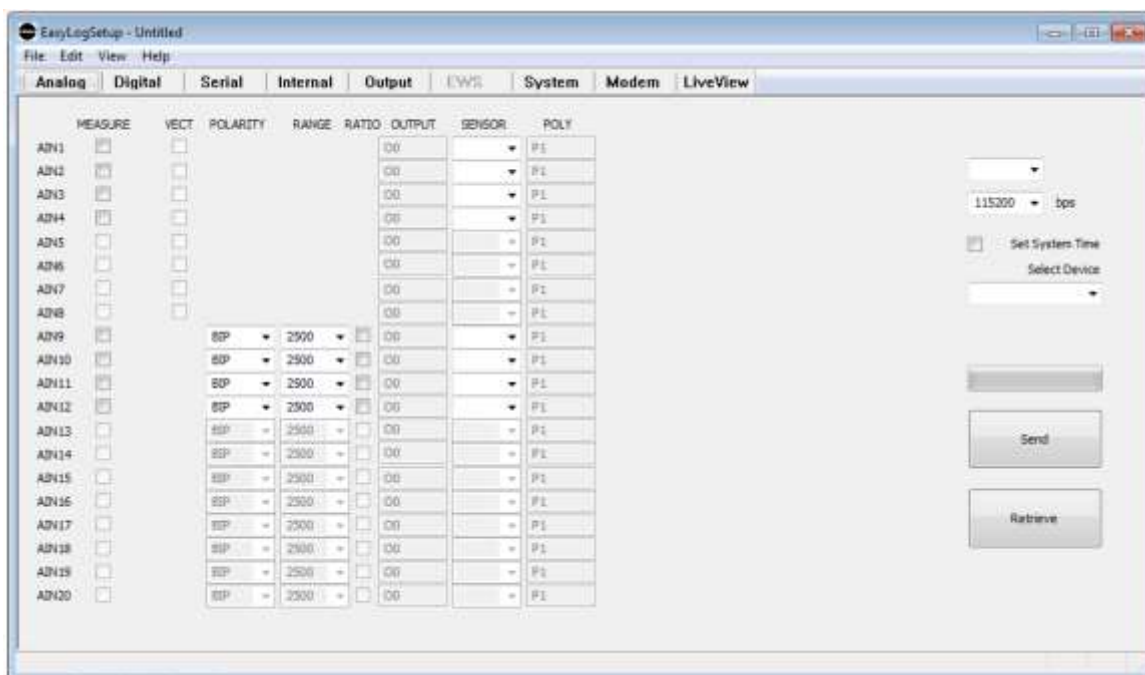
PC Configuration software is designed for user who wants to make his/her own configurations. It is written to be as much as possible intuitive for use and the user can make full configuration in just a few minutes. Setup software is simple executable file, without any need for further installation, compatible with Win7 and higher operating systems.

First of all it is necessary to copy EasyLogSetup.exe (or PROlogSetup.exe) and sensor.ini files on to your computer. Open supplied CD in window. Select both files (EasyLogSetup.exe and sensor.ini). Select the location on your local computer where you want to save EasyLog files and copy them there. There is no need for further installation. For maximum confort it is possible to create shortcut on your desktop. (click right mouse button on EasyLogSetup.exe and drag to the desktop. Then release button and select Create Shortcuts Here option.

Double click on the shortcut will start the software.

NOTE: it is recommended to turn off datalogger during setup.

After starting the software, following screen will appear.

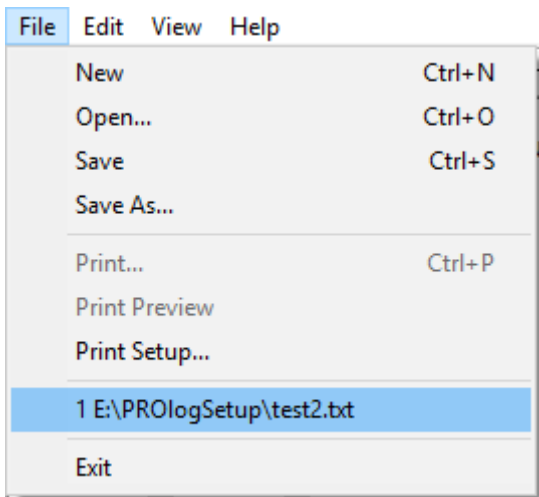


Please, note that all configuration screens are divided into several main sections Analog, Digital, Internal, Serial, Output, EWS, System and Modem. The user can switch between them by clicking on appropriate button.

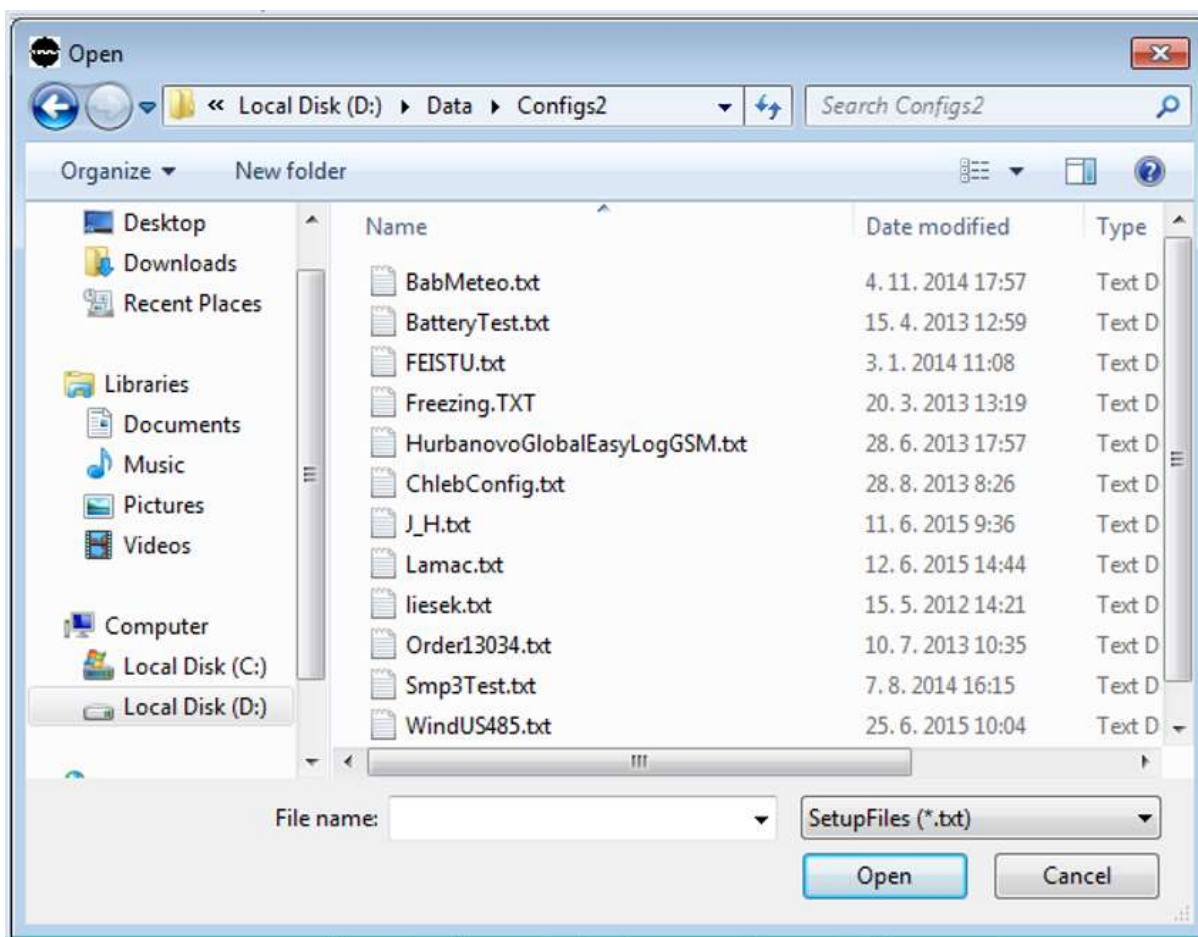


The user can create new configuration, save it to the disk or read already saved configuration from disk. This way it is easy to archive individual configurations for various stations. Software can send created (red) configuration to datalogger or read actual configuration form datalogger. Also, the user can read names of files on the card.

The simplest task is to open an existing configuration. Navigate to File/Open

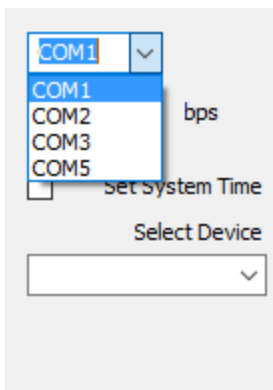


and standard dialog will appear for selecting required configuration file.



In the case of saving actual configuration, navigate to File/Save or File/SaveAs. If new configuration is to be created, navigate to File/New.

At the initialization of setup software there is recognition of free serial ports on computer. This will make the user easy interface to select which one is he using. (In the case that some other application is using serial port, it will not appear in offered ports. It is due to system keeps this port for another application. If the user wants to use it, it is necessary to close other application and restart EasyLogGSMSetup software again.)



If using USB service cable, communication speed is no important. It is necessary to set up correct bps settings only for RS232 serial ports on logger (this feature is reserved for future versions).

For reading actual configuration in datalogger, press Retrieve button. For saving configuration to datalogger, press Send button.

NOTE: it is recommended to turn off datalogger during sending configuration to datalogger.

Now this manual will guide you through setting each part of setup software. First we will start with analog settings.

	MEASURE	POLARITY	RANGE	RATIO	OUTPUT	SENSOR	POLY
AIN1	<input checked="" type="checkbox"/>		2500mV		O15	▼	P1
AIN2	<input type="checkbox"/>		2500mV		O0	▼	P1
AIN3	<input type="checkbox"/>		2500mV		O0	▼	P1
AIN4	<input type="checkbox"/>		2500mV		O0	▼	P2
AIN5		<input type="checkbox"/>	2500mV		O0		P1
AIN6		<input type="checkbox"/>	2500mV		O0		P1
AIN7		<input type="checkbox"/>	2500mV		O0		P1
AIN8		<input type="checkbox"/>	2500mV		O0		P1
AIN9	<input type="checkbox"/>	BIP ▼	19 ▼	<input type="checkbox"/>	O0	▼	P3
AIN10	<input type="checkbox"/>	BIP ▼	19 ▼	<input type="checkbox"/>	O0	▼	P3
AIN11	<input type="checkbox"/>	BIP ▼	19 ▼	<input type="checkbox"/>	O0	▼	P3
AIN12	<input type="checkbox"/>	BIP ▼	19 ▼	<input type="checkbox"/>	O0	▼	P3
AIN13					O0		P1
AIN14					O0		P1
AIN15					O0		P1
AIN16					O0		P1
AIN17					O0		P1
AIN18					O0		P1
AIN19					O0		P1
AIN20					O0		P1

In Analog page user needs to setup input channels which will be enabled for measuring. It is MEASURE check box. This setting will ensure that on selected inputs physical measurements will be performed.

Inputs AIN1 ... AIN8 have 12 bit unipolar A/D converter. Setting vector measurements is set in Output page. (here it is only for user better orientation)

Inputs AIN9...AIN20 have 24 bit A/D converters with differential inputs. So, they offer more options for precise measurements.

For AIN9...AIN20 it is possible to set POLARITY to UNIPOLAR or BIPOLAR. Also RANGE can be from 19mV to 2500mV.

Inputs AIN9...AIN20 offer ratio measurements by checking RATIO box. It is designed for PT100 measurements, where on AIN9 is connected reference resistor (high precision 100ohm) and AIN9...AIN12 are connected to PT100 sensor. This way the user can measure temperature with 4 wire method (for highest precision). On PROlog version datalogger has additional AIN13...AIN20

inputs. AIN13 is connected to second reference resistor and AIN14...AIN20 offer additional inputs for PT100 4 wire connected sensors.

Finally, SENSOR setting is the name of analog input sensor. It is used to identify measured quantity by name. User can setup his own name or he can use predefined sensor (from sensor.ini file). If used predefined sensor, software will automatically adjust ratio, polarity and range settings.

All other fields are copied from Output page.

Second part is Digital page. It is accessible by clicking Digital button:

	MEASURE	TYPE	OUTPUT	SENSOR	POLY
DIN1	<input type="checkbox"/>		O0		P1
DIN2	<input checked="" type="checkbox"/>	FREQ	O0		P1
DIN3	<input type="checkbox"/>	FREQ	O0		P1
DIN4	<input type="checkbox"/>	COUNT	O0		P1
DIN5	<input type="checkbox"/>		O0		P1
DIN6	<input type="checkbox"/>		O0		P1
DIN7	<input type="checkbox"/>		O0		P1
DIN8	<input type="checkbox"/>		O0		P1

On Digital page user needs to setup input channels which will be enabled for measuring. It is MEASURE check box. This setting will ensure that on selected inputs physical measurements will be performed.

DIN1...DIN8 can measure frequency, they can be used as a counter or time measurements. At all times only one option is allowed.

Finally, SENSOR setting is the name of digital input sensor. It is used to identify measured quantity by name. User can setup his own name or he can use predefined sensor (from sensor.ini file). If used predefined sensor, software will automatically adjust type settings.

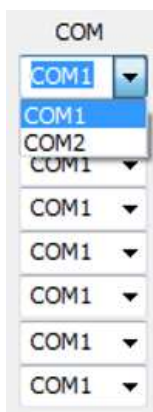
All other fields are copied from Output page.

Next settings are on Serial page:

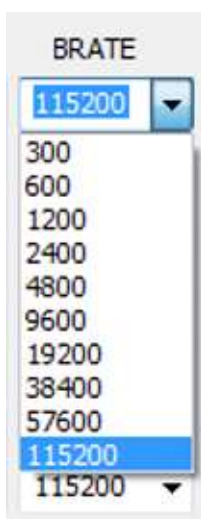
MEASURE	COM	BRATE	BITS	PARITY	STOPB	DRIVER	ADDRESS
SIN1	COM1	115200	8	None	1		
SIN2	COM1	115200	8	None	1		
SIN3	COM2	115200	8	None	1		
SIN4	COM1	115200	8	None	1		
SIN5	COM1	115200	8	None	1		
SIN6	COM1	115200	8	None	1		
SIN7	COM1	115200	8	None	1		
SIN8	COM1	115200	8	None	1		

On Serial page user needs to setup input channels which will be enabled for measuring. It is MEASURE check box. This setting will ensure that on selected inputs physical measurements will be performed.

There are up to 8 serial sensors. They can be connected to Serial1 or Serial2 port on datalogger. (Serial2 port is also designed for reports. Therefore it is recommended to do not share these functions.)



For each serial input it is possible to setup additional parameters: bit rate



number of bits

BITS

8	▼
7	
8	
8	▼
8	▼
8	▼
8	▼
8	▼
8	▼

parity

PARITY

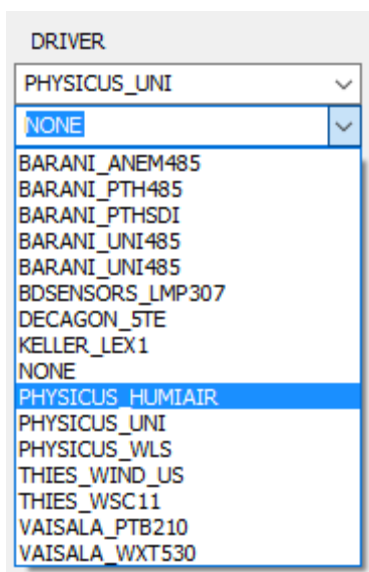
None	▼
None	
Even	
Odd	
None	▼
None	▼
None	▼
None	▼
None	▼

number of stop bits

STOPB

1	▼
1	
2	
1	▼
1	▼
1	▼
1	▼
1	▼
1	▼

Finally, it is necessary to set up one of available drivers.



Serial drivers are part of datalogger software, which will care for correct request sent to the sensor and processing the answer. If this driver is not correctly set, mostly, there will be no answer from the sensor and such a measurement will not produce output data. For certain kind of sensor (RS485 bus, or sensors polled with address) user has to set sensor address.



Please, note that serial sensors can produce more than one output parameters. It is a part of serial driver which parameters are available from the sensor. Then, in output settings user will set up which parameters will be used for output string. In Appendix A there is a summary of actual serial driver sensors with available parameters.

Datalogger can supply the information what kind of serial sensor is available. First retrieve configuration from datalogger and SerialSensor field will be populated automatically.

Next part is Internal page:

	INPUT1	INPUT2	OUTPUT	SENSOR
IIN1			00	V3V
IIN2			00	VRTC
IIN3			00	VPOWER
IIN4			00	VOUT
IIN5			00	VMAIN
IIN6			00	PA
IIN7			00	GSM
IIN8	<input type="text"/>		00	RG10M
IIN9	<input type="text"/>		00	RG1H
IIN10	<input type="text"/>		00	RG6H
IIN11	<input type="text"/>		00	RG24H
IIN12	0	0	00	A-B
IIN13	0		00	IIN13
IIN14	0		00	IIN14

There is nothing to select on Internal page. It only shows which internal measured parameters are available and what output will be populated with this data.

As it is obvious from the screenshot, datalogger offers following internally measured parameters:

V3V – system voltage 3.3V

VRTC – voltage on CR2032 lithium battery

VMAIN – voltage on CHARGER or SOLAR input

VPOWER – voltage on POWER input

VOUT – voltage on PWROUT output (power supply for sensors)

PA – atmospheric pressure. On the board there is a simple barometer. If the box is closed and pressure needs to be measured, it is necessary to place pressure port in one position of cable gland.

GSM – signal strength of GSM network. It is directly proportional to dBm value.

RG10M, RG1H, RG24H, IN12.... – these parameters are for future extensions

All outputs are configured on Output page:

INPUT	MIN	MAX	SDEV	VECT	POLY	ALIAS	A0	A1	A2	A3	
OUT1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	P1		P1	0	1	0	0
OUT2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	P1		P2	0	0	0	0
OUT3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	P1		P3	0	0	0	0
OUT4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	P1		P4	0	0	0	0
OUT5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	P1		P5	0	0	0	0
OUT6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	P1		P6	0	0	0	0
OUT7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	P1		P7	0	0	0	0
OUT8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	P1		P8	0	0	0	0
OUT9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	P1		P9	0	0	0	0
OUT10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	P1		P10	0	0	0	0
OUT11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	P1		P11	0	0	0	0
OUT12	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	P1		P12	0	0	0	0
OUT13	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	P1		P13	0	0	0	0
OUT14	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	P1		P14	0	0	0	0
OUT15	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	P1		P15	0	0	0	0
OUT16	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	P1		P16	0	0	0	0
OUT17	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	P1						
OUT18	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	P1						
OUT19	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	P1						
OUT20	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	P1						
OUT21	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	P1						
OUT22	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	P1						
OUT23	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	P1						
OUT24	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	P1						
OUT25	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	P1						
OUT26	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	P1						
OUT27	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	P1						
OUT28	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	P1						
OUT29	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	P1						
OUT30	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	P1						
OUT31	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	P1						
OUT32	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	P1						

$P_n = A_0 + A_1*x + A_2*x^2 + A_3*x^3$

As the first parameter is INPUT. It is possible to select from the list A1...A20, D1...D8, I1...I14 or type a serial input. In the case of serial input there is necessary to specify which parameter will be mapped to the particular output. Serial driver description is in Appendix A. Final result can be as follows:

	INPUT
OUT1	A1
OUT2	I1
OUT3	D1
OUT4	S1_RAD
OUT5	S1_TEMP
OUT6	I6
OUT7	0
OUT8	0

For each output it is possible to set logging also minimum, maximum values, standard deviation value and vector or scalar calculation.

MIN	MAX	SDEV	VECT
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

For each output it is necessary to set polynomial. It will be used for calculation to engineering units.

POLY
P2 ▼
P3 ▼
P4 ▼
P1 ▼
P1 ▼
P3 ▼
P1
P2
P3
P4
P5
P6
P7
P8
P9
P10
P11
P12
P13
P14
P15
P16
P1 ▼

Finally, for each output it is possible to setup ALIAS – name of the parameter. It is used in all logged files for faster identification. It is up to the user to use descriptive names.

On Output page there are also polynomial definitions. User has up to 16 polynomials of the 3rd order.

	A0	A1	A2	A3
P1	0	1	0	0
P2	0	0.37	0	0
P3	0	0.001	0	0
P4	0	0.1	0	0
P5	0	0	0	0
P6	0	0	0	0
P7	0	0	0	0
P8	0	0	0	0
P9	0	0	0	0
P10	0	0	0	0
P11	0	0	0	0
P12	0	0	0	0
P13	0	0	0	0
P14	0	0	0	0
P15	0	0	0	0
P16	0	0	0	0

Some of the parameters defined on Output page are copied to other pages. It is for better overview how the calculations and mapping inputs to outputs will be performed during operation.

Next section is System page:

SN	<input type="text" value="125/0217"/>
Firmware	<input type="text" value="Version 11.6 Nov 1 2017"/>
Name	<input type="text" value="EasyLogGSM"/>
MeasInterval	<input type="text" value="1"/> sec
MeasDelay	<input type="text" value="0"/> sec
LogInterval	<input type="text" value="60"/> sec
RepInterval	<input type="text" value="0"/> sec
Vref	<input type="text" value="2500.21"/> mV
Serial1	<input type="text" value="115200"/> <input type="button" value="v"/> bps
Serial2	<input type="text" value="115200"/> <input type="button" value="v"/> bps
DataFormat	<input type="text" value="Default"/> <input type="button" value="v"/>
RS485	<input type="checkbox"/>
RS485Address	<input type="text"/>
Echo	<input type="checkbox"/>
Poll	<input type="checkbox"/>
EWS	<input type="checkbox"/>
Date	<input type="text"/> <input type="text"/> <input type="text"/>
Time	<input type="text"/> <input type="text"/> <input type="text"/> <input type="checkbox"/> Set Time

First two parameters SN and Firmware and Vref are read only. They will appear after Retrieve configuration from datalogger.

Then user can set the following parameters to the station:

Name – represents the name of station. It is used to identify individual stations, if there are more installed in the field.

MeasInterval – interval which is used for periodical measurements on inputs

MeasDelay – delay to stabilize outputs from sensors

LogInterval – interval which is used for statistical calculation and then saving data to internal memory and SD card

ReplInterval – interval for report generation on Serial2 communication line

RS485, RS485Address, Echo, Poll and EWS are reserved for future extensions

EWS – check to activate EarlyWarningSystem (firmware version dependent)

SetTime – set time and date on logger with user written time and date

Serial1 – sets baud rate on Serial1 port. This feature is reserved for future extension.

Serial2 – sets baud rate on Serial2 port during report generation. Please, note that if there are configured serial sensors on COM2 – this port will be shared. Therefore, it is not recommended to set different communication speeds on Serial2 and serial sensor using COM2 on Serial page.

Serial number (S/N), Firmware and reference voltage Vref parameters are not available for the user from setup software. Serial number with Firmware is set during production and can not be modified any more. Reference voltage can be set only from Hyperterminal (see section 6). It is a protection of accidental overwriting already calibrated datalogger.

Last setup section is Modem page:

ModemInterval	1	hr
ModemOnTime	14	0
ModemOnDuration	10	min
ModemPIN	12345	
APN	internet	
IP	smtp.webglobe.sk	
EmailFrom	sender@physicus.eu	
EmailTo	physicus@physicus.eu	
UserName	sender@physicus.eu	
Password	Sender39	
TimeServer	sk.pool.ntp.org	
TimeZone	0	hr
ModemMode	EMAIL ▼	
SMS Center		
IPConnect		
IPConfig		
UserNameConfig		
PasswordConfig		

All settings are described in detail in chapter 6. Settings SMS Center is used for EarlyWarningSystem . IPConnect, IPConfig, UserNameConfig, PasswordConfig are settings for IP communication with datalogger (future extension).

Setting system time and date in datalogger can be simplified by checking SetSystemTime box in PC COM window.

COM44	▼	
115200	▼	bps
<input type="checkbox"/>	Set System Time	
	Select Device	
	▼	

Select Device option is reserved for future extension.

To download actual configuration from datalogger to setup software click Retrieve button. To upload configuration from setup software to datalogger click Send button. During both of them, progress bar indicates the operation.

It is highly recommended to turn off datalogger during reading or writing configuration. In the case of very low communication speeds (1200bps) it can take several tens of seconds to get complete this commands. LEDs on datlogger hardware are good indicators of the operation.

8. Technical specifications

single ended analog inputs	(EasyLogGSM): 4 inputs, 2.5V range, 12 bit resolution (PROlog): 8 inputs, 2.5V range, 12 bit resolution
differential analog inputs	(EasyLogGSM): 4 inputs, 19mV to 2.5V range, 24 bit resolution (PROlog): 12inputs, 19mV to 2.5V range, 24 bit resolution
accuracy	0.1% @ single ended inputs 0.05% @ differential inputs
offset on differential inputs	< 0.5uV max
noise on differential inputs	60nV typ
digital inputs	(EasyLogGSM): 4 inputs, 0...1500Hz, max +15V (PROlog): 8 inputs, 0...1500Hz, max +15V
internal inputs	various. Measuring 3.3V system voltage, 3V RTC battery, POWER supply, PWROUT supply, CHARGER supply, atmospheric pressure and various calculated inputs
serial inputs	8 inputs with SerialDriver. Supported serial sensors vary and are constantly increasing
outputs	32 maximum
calculation to engineering units	polynomial $A_0+A_1x+A_2x^2+A_3x^3$
max nr. of polynomes	16
MeasInterval range	1...3600 s
LogInterval range	1...3600 s
ModemInterval range	0...24 hr
internal modem	quad band GSM/GPRS modem
data transfer method	email, FTP
internal memory	cca 4MB for data
memory card	SD or SDHC card
communication	1 x RS232/485 port for sensors 1 x RS232 for report or sensors (customized) 1 x USB serial line (service port)
communication speed	Serial1 up to 115200bps, 8N1
nr. of controlled outputs	1 x switching power supply for sensors 1 x 2.5V switched for wind direction sensors
power supply inputs	
POWER	4V _{DC} ... 24V _{DC}
SOLAR	12V _{DC} ... 20V _{DC}
BATT	12V _{DC}
CHARGER	6V _{DC} ... 13V _{DC}
RTC back up battery	CR2032
power consumption (not including sensors)	
without SD card	7 mA _{typ} measuring (BATT)
with SD card	tbd uA _{typ} OFF (POWER) 50 mA _{max} measuring (BATT)
RTC	with lithium battery
RTC accuracy (without synchronization)	10ppm
time synchronization	once a day over internet if ModemInterval is not zero
dimensions	(EasyLogGSM) 170mm x 140mm x 50mm (PROlog) 220mm x 170mm x 50mm
temperature range	-40 ... +60°C
protection	IP65

9. Quick Reference

Commands summary

Command	parameter	description
A	see text	analog inputs setup
D	see text	digital inputs setup
S	see text	serial inputs setup
O	see text	output setup
Name	string	station name
MeasInterval	1...3600	measuring interval in seconds
MeasDealy	1...60	measuring dealy in seconds
LogInterval	0...3600	logging interval in seconds
RepInterval	0...3600	report interval on COM2
Vref	2450...2550	reference voltage in mV
Serial1	300, 1200, 2400, 9600, 19200, 38400, 57600, 115200	baud rate for Serial1 in bps
Serial2	300, 1200, 2400, 9600, 19200, 38400, 57600, 115200	baud rate for Serial2 in bps
Date	dd.mm.yyyy	
Time	hh:mm:ss	
DataFormat	0...2	output data format
ModemInterval	0...24	period for modem to send data in hours
ModemDelay	0...1434	delay from modem period in seconds
ModemOnTime	hh:mm:ss	time, when modem will wake up and wait for a call every day
ModemOnDuration	0...30	duration of modem waiting for a call in minutes
ModemPIN	number	
APN	string	GPRS provider access point
IP	string	smtp server IP address or FTP server IP address
EmailFrom	string	
EmailTo	string	
UserName	string	user name for authorized access to smtp server or FTP server
Password	string	password for authorized access to smtp server or FTP server
TimeServer	string	
TimeZone	-12...12	time shift from UTC in hours
Ftp	0..1	modem mode email or FTP
SmsCenter	number	Sms center operator number. International format
IPConnect	string	IP address to send logger's IP address
IPConfig	string	IP address of FTP server, where configuration file is located

UserNameConfig	string	User name for config FTP server
PasswordConfig	string	password for config FTP server
RS485	0..1	using RS485 line
TestGprs		start GPRS session for testing purposes
TestSync		start time synchronization over modem
TestEmail		start sending test email
TestSocket		start socket session
TestSms		start SMS session
Latitude	-90...+90	location of installation
Longitude	-180...+180	location of installation
Altitude	0...10000	location of installation [m]
PSLevel	-100...+100	location of installation [m]
?		show system parameters
Config?		show full inputs configuration
Config	1...5?	show partial configuration
Modem?		show modem parameter
SD?	/easylog	show files on SD card
System?		show actual firmware version
SerialDriver?		show supported serial sensors
EarlyWarning?		show EWS settings
ReadFile	/easylog/elog0001.txt	type one file from SD card
LogVariables		show format of logged variables
ReadData	1...200	read last nr. Of records in memory
ActualData		show last measured data
SaveConfig		save current configuration to nonvolatile memory
ReadConfig		read configuration from nonvolatile memory
ModemDetail	0...1	enable / disable modem details messages
EWS	0...1	enable / disable Early Warning System
SmsNumber	1...16 Number	set Sms numbers for EWS
SetDefaultConfig		set factory default configuration
Help		print all commands
Exit		exit from Service mode
Reset		reboot datalogger
Upgrade		start firmware upgrade procedure

Appendix A

Serial driver description

Note: SensorDriver is hardware (and firmware version) dependent. SensorDriver is constantly extending with new firmware version.

Nr.	Serial page name	Output page parameter	Description
0	NONE		
1	Not available		
2		LW	Water Depth
3		TW	Water Temperature
4		CW	Water Conductivity
5		LWCOMP	Compensated Water Depth
6		BATT	Battery Capacity
7			
8	PHYSICUS_HUMIAIR		
9		TA	Air Temperature
10		RH	Relative Humidity
11		TD	Dew Point Temperature
12	THIES_WIND_US		
13		WS	Wind Speed
14		WD	Wind Direction
15	BARANI_PTHSDI		Not available
16		TA	Air Temperature
17		RH	Relative Humidity
18		PA	Atmospheric Pressure
19	BARANI_ANEM485		
20		WS	Wind Speed
21		WD	Wind Direction
22	BARANI_PTH485		
23		AT	Air Temperature
24		DP	Dew Point Temperature
25		PA	Air Pressure
26		RH	Relative Humidity
27			
28	Not available		
29		RAD	Radiation
30		TEMP	Sensor Temperature
31		RAW	Raw Data
32	Not available		
33		RAD	Upward Radiation
34		DOWNRAD	Downward Radiation
35		TEMP	Sensor Temperature
36		RAW1	Raw1 Data
37		RAW2	Raw2 Data
38	Not available		

39		RAD	Radiation
40		TEMP	Sensor Temperature
41		RAW	Raw Data
42	Not available		
43		RAD	Radiation
44		TEMP	Sensor Temperature
45	DECAGON_5TE		
46		EVWC	Dielectric E for volume water content
47		COND	Soil conductivity
48		TEMP	Soil temperature
49	PHYSIUS_UNI		
50		OUT1	Output1
51		OUT2	Output2
52		OUT3	Output3
53		OUT4	Output4
54		OUT5	Output5
55		OUT6	Output6
56		OUT7	Output7
57		OUT8	Output8
58		OUT9	Output9
59		OUT10	Output10
60		OUT11	Output11
61		OUT12	Output12
62		OUT13	Output13
63		OUT14	Output14
64		OUT15	Output15
65		OUT16	Output16
66		OUT17	Output17
67		OUT18	Output18
68		OUT19	Output19
69		OUT20	Output20
70		OUT21	Output21
71		OUT22	Output22
72		OUT23	Output23
73		OUT24	Output24
74		OUT25	Output25
75		OUT26	Output26
76		OUT27	Output27
77		OUT28	Output28
78		OUT29	Output29
79		OUT30	Output30
80		OUT31	Output31
81		OUT32	Output32
82	KELLER_LEX1		
83		P1	Pressure
84	THIES_WSC11		
85		TA	Air Temperature
86		RH	Relative Humidity

87		DP	Dew Point Temperature
88		WS	Wind Speed
89		WD	Wind Direction
90		PA	Air Pressure
91		QNH	QNH Pressure
92		ILUM	Illumination
93		GL	Global Radiation
94		SUNEL	Sun Elevation
95		SUNAZ	Sun Azimuth
96		PRECI	Precipitation
97	VAISALA_WXT530		
98		WS	Wind Speed
99		WD	Wind Direction
100		PA	Air Pressure
101		TA	Air Temperature
102		RH	Relative Humidity
103		RAC	Rain Accumulation
104		RD	Rain Duration
105		RI	Rain Intensity
106		HAC	Hail Accumulation
107		HD	Hail Duration
108	BDESENSORS_LMP307		
109		PW	Water Pressure
110		TW	Water Temperature
111	BARANI_UNI485		
112		TA	Air Temperature
113		DP	Dew Point Temperature
114		PA	Air Pressure
115		RH	Relative Humidity
116		WSINST	Wind Speed Instantaneous Value
117		WDINST	Wind Direction Inst. Value
118		WSAVG	Wind Speed Average
119		WSMAX	Wind Speed Maximum
120		WDAVG	Wind Direction Average
121		RAD	Global Radiation
122		ILUM	Illumination
123		UVA	Ultraviolet A Radiation
124		UVB	Ultraviolet B Radiation
125		UVD	Ultraviolet D Radiation
126	PHYSICUS_WLS		
127		LW	Water Level
128		TW	Water Temperature
129		BATT	Battery Voltage
130	Not available		
131		RAD	Radiation
132		TPANEL	Panel Temperature
133	VAISALA_PT210		
134		PA	Air Pressure

USER NOTES:

Logger S/N User Description		Sensor ID (MODBUS SLAVE ID)	SENSOR DESCRIPTION	SENSOR OUTPUT UNITS	SENSOR DATA ADDRESS (INPUT REGISTER)
	1				
	2				
	3				
	4				
	5				
	6				
	7				
	8				
Notes:					

Logger S/N User Description		Sensor ID (MODBUS SLAVE ID)	SENSOR DESCRIPTION	SENSOR OUTPUT UNITS	SENSOR DATA ADDRESS (INPUT REGISTER)
	1				
	2				
	3				
	4				
	5				
	6				
	7				
	8				
Notes:					