

User manual



GEKKO

ACOWA
INSTRUMENTS

User manual

GEKKO datalogger / AcowaZoo

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GEKKO datalogger

About GEKKO

GEKKO datalogger has a robust industrial design.

GEKKO is designed for use in wastewater and water supply applications and can, by means of external equipment, be used for H₂S detection, level measurement, overflow recordings and the recording of rainfall events.

GEKKO can communicate via standard MODBUS TCP/IP, SMS commands or SigFox IOT protocol. Communication is via the built-in 4G or SigFox modem on its own PCB board. This allows for upgrading the communication platform to future communication forms without replacing the entire data logger.

GEKKO has a USB interface for programming and downloading of data. GEKKO can gather and log various types of data.

GEKKO is a Danish developed and produced product, and comply with all specifications for electronics components, for installation in harsh environments.

AcowaCore

Om AcowaCore

AcowaCore is a data processing program, used to collect data from both our SigFox based FireFly and our 4G and SigFox based GEKKO data loggers, and transform it into a standard ModBus protocol. This data can hereby be returned directly to the user's own SCADA system, without any need for specified driver configuration.

As something quite unique, AcowaCore can process event-based logging from our GEKKO datalogger and return this data in a standard ModBus format that can be used in all SCADA systems. At the same time, AcowaCore allows all data on stormflow installations, profiles and conditions to be processed directly in AcowaCore. Therefore, the user only needs to make changes in the AcowaCore and not in the device itself.

What makes AcowaCore truly unique is the visualization platform AcowaDash. AcowaDash enables a custom interface that is intuitive and easy to understand. The individual users can be divided into different levels, so everyone is comfortable using AcowaDash.

Installation

Power supply

GEKKO must be connected to a supply voltage according to the specifications below

Voltage supply	2 x Lithium SAFT LSH20 or 12-30V DC
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Psychical measurements

For installation of the GEKKO, the following specifications may be required.

Dimensions	L=186mm, W=156mm, H= 60mm
Weight	620g without batteries
Cable connections	0.5–2,5 mm ²
Vibrations (sinus shaped)	10-500Hz, 1G
Free fall drop	30 cm
Enclosure class	IP 67

Installation environments

Humidity	10% - 95% non-condensing air.
Operation temperature	-20°C til +50°C
Storage temperature	-20°C til +60°C
Maximum operation elevation	Maximum of 2000m above sea level
Start-up time total	20-120 seconds (depending on the GSM network)

Build-in power supply

GEKKO has an internal power supply designed for supplying sensors and input and output signals. Power supply output + V:

Output voltage	15V DC
Output current	Max 100mA
Tolerance	+ / - 20%

Analog output

GEKKO is designed with two analog inputs 0-20 mA / 4-20 mA.

Numbers of analog mA inputs	2
Electrically isolated	No
Measuring range	0 / 4–20mA
Input impedance	Approx. 100 Ω
Measuring accuracy	+/- 1% of FS
Signal area	0-24mA / 0–30V DC
Signal frequency	Maximum of 100 Hz
Kabel / signal lenght	Maximum of 100m

Digital inputs with the option of 0-10V analog

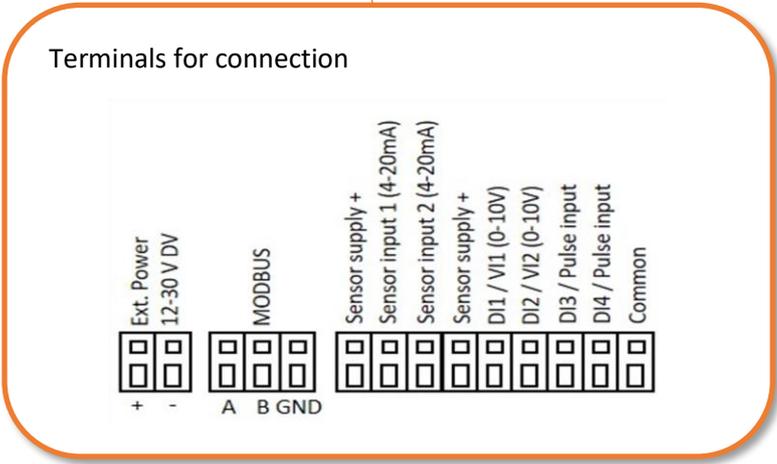
GEKKO is designed with 4 digital inputs of which 2 can be selected as 0-10V analog voltage inputs.

Numbers of digital inputs	4
Electrically isolated	No
Digital signal	Low < 5V / < 1mA High > 12V / > 4mA
Analog measuring range	0–10V DC
Analog signal impedance	Approx. 20KΩ

Measuring accuracy	+/- 1% of FS
Signal range (min / max)	0–30V DC
Signal frequency	Maximum of 100 Hz
Cable / signal length	Maximum of 100m

Operation

Overview



AcowaZoo

Connecting to a PC

USB connection

GEKKO connects to the PC via a Micro-USB connector on the side of the device. The AcowaZoo will then connect to the device for configuration. When the AcowaZoo program starts, it will continuously try to establish contact with a GEKKO device via USB connection.

AcowaZoo Installation

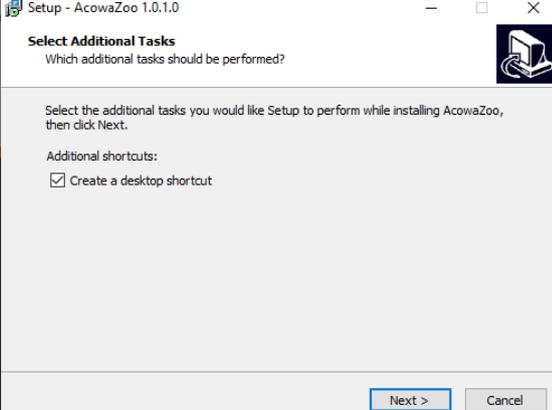
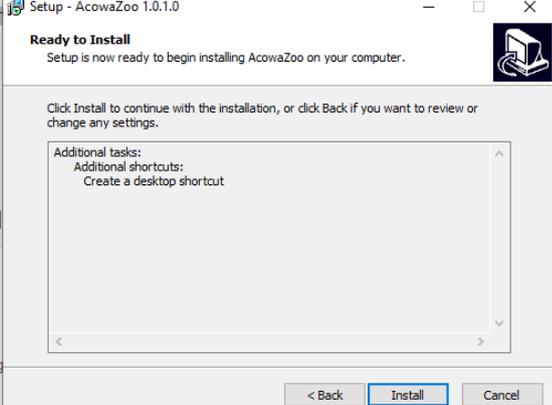
Driver installation

Before installing AcowaZoo on a computer running Windows 7 or Windows 8, an additional driver file for communication via the USB port must be installed.

Right-click on the file "fsl_ucwxp.inf" and select "install". Windows will ask for permission to install. The file is located in the "driver" folder under the " AcowaZoo" folder.

Program installation

AcowaZoo can be installed on computers running Windows 7, 8, or 10 or newer. Run the program "**AcowaZooSetup.exe**" ("AcowaZooSetup_32bit.exe" on 32-bit operating systems) and follow the on-screen instructions:

	<p>Choose if you want to create a desktop shortcut Then choose "Next"</p>
	<p>Choose "Install"</p>

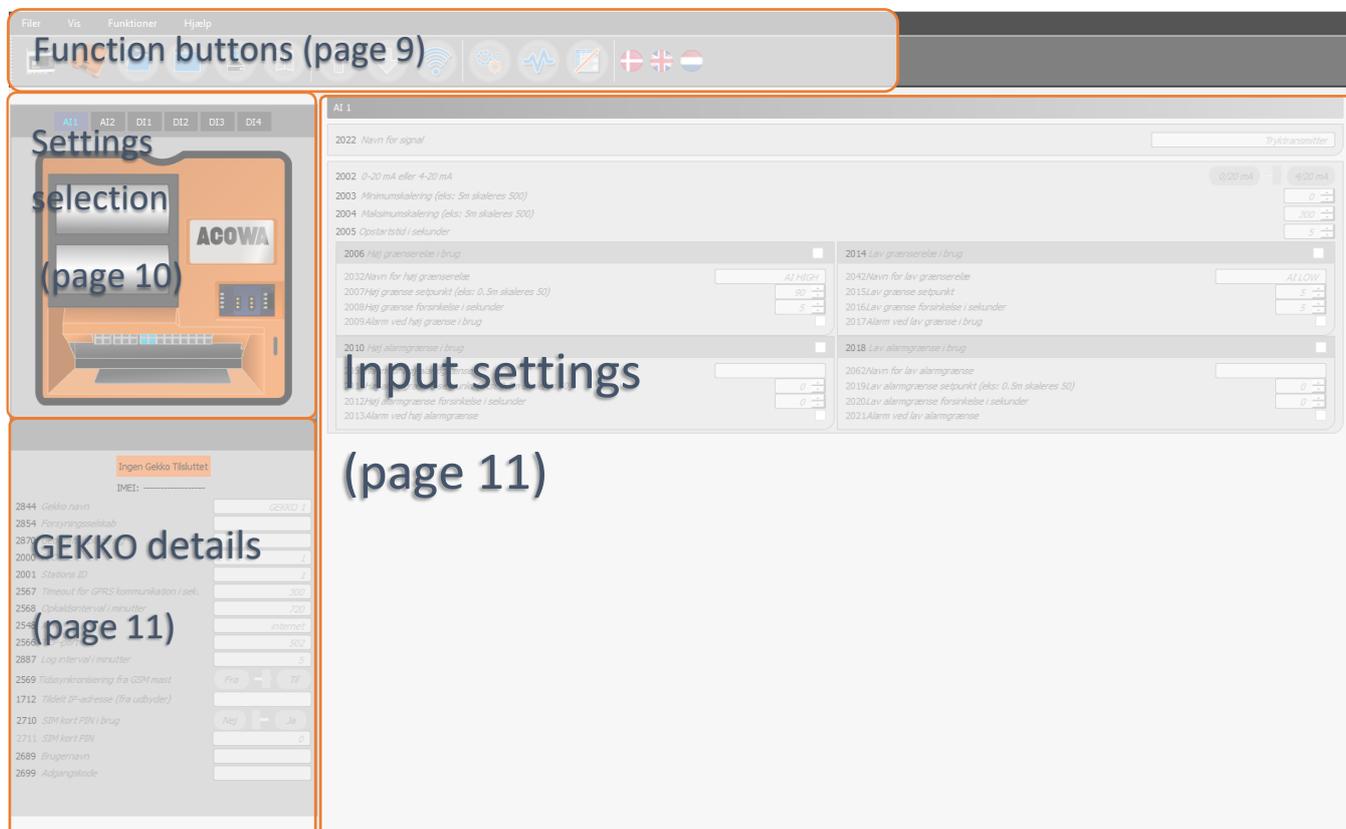


Choose whether to start ACOWA ZOO-Tool after installation.
Then choose **"Finish"**

Setup

AcowaZoo user interface

Overview



Function buttons

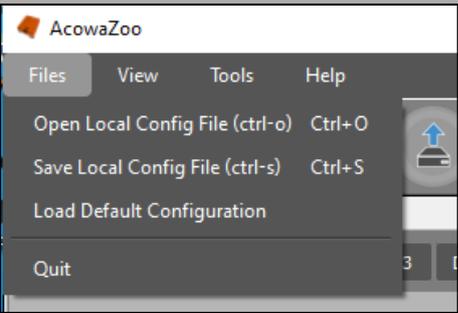
Functions associated with writing and reading from GEKKO og disk.

	Open Local Config File Load configuration from hard drive, USB drive, etc.
	Save Local Config File Save configuration on hard drive, USB drive, etc.
	Load Default Configuration Select and load a typical GEKKO configuration
	Backup function Mirrors the counters etc. in the GEKKO

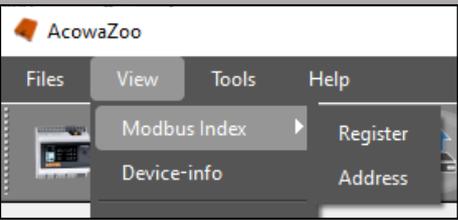
	<p>Load Config from Device. Load settings from the connected GEKKO device.</p>
	<p>Write Config to Device. Writes the current settings to the connected GEKKO device</p>
	<p>Device settings Advanced settings. (Further description on page page 13.)</p>
	<p>Show status. Supervision and status bits. (Further description on page 14.)</p>
	<p>Toggle Graphical and Schematic view Toggle between displaying graphical menu settings and displaying schematic settings (overview of ModBus registers in the GEKKO device)</p>
	<p>New AcowaZoo version available. Update AcowaZoo firmware (Is only shown when a newer version is available)</p>

Function menu

Files

	<p>Open local config file: Ability to load previously saved configurations.</p> <p>Save local config file: Ability to store configurations locally.</p> <p>Load default configuration: Retrieves a default file that you can continue working on.</p>
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View

	<p>ModBus index: Here it is possible to choose either register view or address view. The selected parameters will then appear next to each function. See the example below.</p> <p>Device info: Displays the firmware version</p>
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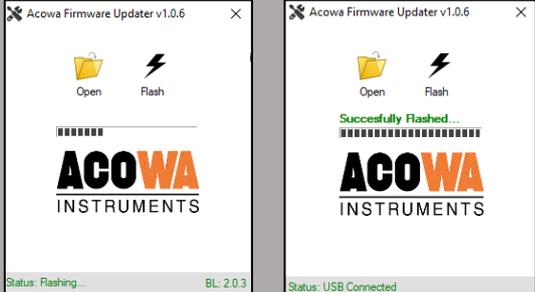
	<p>ModBus registries: The selected parameters are displayed next to each function. The figures change in relation to the choice of address or register view</p>
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Tools

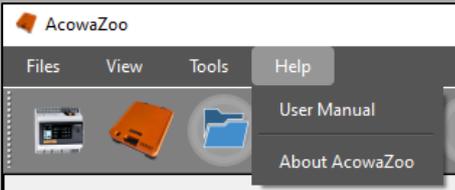
	<p>Update Device Firmware: Here, device firmware is updated. See below for further instructions.</p> <p>Adjust font size: Here, font size can be enlarged or reduced.</p> <p>Start TCP. Rev. Com. server:</p>
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Update device firmware

	<p>Acowa firmware updater: When choosing the firmware update, AcowaZoo shuts down and opens the Acowa firmware updater instead. Connect the desired device to update via the USB port.</p> <p>The status will change to: USB connected.</p> <p>Then press the folder "Open"</p>
	<p>Select the desired firmware file and choose "Open"</p>

 <p>Acowa Firmware Updater v1.0.6</p> <p>Open Flash</p> <p>ACOWA INSTRUMENTS</p> <p>Status: Firmware loaded</p>	<p>The status is then changed to: Firmware loaded.</p> <p>Then click on the "Flash" icon</p>
 <p>Acowa Firmware Updater v1.0.6</p> <p>Open Flash</p> <p>ACOWA INSTRUMENTS</p> <p>Status: Flashing... BL: 2.0.3</p> <p>Acowa Firmware Updater v1.0.6</p> <p>Open Flash</p> <p>Successfully Flashed...</p> <p>ACOWA INSTRUMENTS</p> <p>Status: USB Connected</p>	<p>The status is then changed to: Flashing.</p> <p>When the device is updated, it will state: Successfully flashed. The program must then be shut down and AcowaZoo reopened.</p>

Help

 <p>AcowaZoo</p> <p>Files View Tools Help</p> <p>User Manual</p> <p>About AcowaZoo</p>	<p>User Manual: Opens user manual</p> <p>About AcowaZoo: Displays the software version of AcowaZoo</p>
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Settings selection

 <p>AI1 AI2 DI1 DI2 DI3 DI4</p> <p>ACOWA</p>	<p>Here you select which part of the GEKKO device's settings to display in the settings window on the right</p> <p>AI and AI2: Settings for the analog inputs 1-2</p> <p>DI1 – DI4: Settings for the digital inputs 1-4</p>
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GEKKO details

No Gekko Connected

IMEI: -----

Gekko Name:

Company:

Geographic position:

Modbus/Comli ID:

Station ID:

GPRS timeout in secs.:

Call interval in minutes:

APN:

TCP-port:

Log interval in minutes:

Time-sync (gsm net): Off On

UTC or local time: UTC Loc

Assigned IP address (from ISP):

SIM card PIN enabled: No Yes

SIM card PIN:

Username:

Password:

Here you are notified if a GEKKO is connected and what types of connection are involved:

- USB on COM port
- TCP at Ip address / port
- IMEI number is used in conjunction with the ACOWA Core connection

Details for the GEKKO device's name and location are also displayed and set, as well as communication settings is typed here.

Here you also choose the standard log- and call intervals Further information about event-based logging (page 15.)

Input and output Settings

This section describes the settings for inputs and outputs as well as other logic in the GEKKO unit. The individual pages are selected in Settings selection (see above)



AI 1

Signal Label:

0-20 mA or 4-20 mA 0/20 mA 4/20 mA

Minimum scaling (eg: 5m scaled 500)

Maximum scaling (eg: 5m scaled 500)

Start-up time in seconds

<p><input type="checkbox"/> High limit in use</p> <p>High Limit Label: <input type="text" value="AI1 HIGH"/></p> <p>High limit set point (eg: 0.5m scaled 50): <input type="text" value="90"/></p> <p>High limit delay in secs.: <input type="text" value="5"/></p> <p>High limit alarm call: <input type="checkbox"/></p>	<p><input type="checkbox"/> Low limit in use</p> <p>Low Limit Label: <input type="text" value="AI1 LOW"/></p> <p>Low limit set point: <input type="text" value="5"/></p> <p>Low limit delay in secs.: <input type="text" value="5"/></p> <p>Low limit alarm call: <input type="checkbox"/></p>
<p><input type="checkbox"/> High alarm limit in use</p> <p>High Alarm Limit Label: <input type="text"/></p> <p>High alarm limit set point: <input type="text" value="0"/></p> <p>High alarm limit delay in secs.: <input type="text" value="0"/></p> <p>High alarm limit alarm call: <input type="checkbox"/></p>	<p><input type="checkbox"/> Low alarm limit in use</p> <p>Low Alarm Limit Label: <input type="text"/></p> <p>Low alarm limit set point: <input type="text" value="0"/></p> <p>Low alarm limit delay in secs.: <input type="text" value="0"/></p> <p>Low alarm limit alarm call: <input type="checkbox"/></p>

Analog Inputs (AI1 and AI2)

The analog inputs in the GEKKO is a standard 0-20/4-20mA input to which a pressure transmitter or other measuring equipment can be connected.

The input functions can be set in AcowaZoo when AI1 or AI2 is selected in the Settings selection. AI1 and AI2 contains the following settings:

Settings for AI1 and AI2	Function	Description
0-20mA OR 4-20mA	Scaling input defined by measurement equipment	
Minimum scaling	Minimum measurement reading value	With 2 decimals (500 = 5,00)
Maximum scaling	Maximum measurement reading value	With 2 decimals (500 = 5,00)
High limit in use	Activates high limit functions	0=disabled, 1=activated

Settings for AI1 and AI2	Function	Description
High limit label	Naming the high limit value	Used in alarm list and SMS
High limit Set point	Defines high limit value	
High limit delay in secs.	Signal delay	Stated in seconds
High limit alarm call	Activates alarm signal	0=Local signal, 1=alarm signal
Low limit in use	Activates low limit functions	0=disabled, 1=activated
Low limit label	Naming the low limit value	Used in alarm list and SMS
Low limit Set point	Defines low limit value	
Low limit delay in secs.	Signal delay	Stated in seconds
Low limit alarm call	Activates alarm signal	0=Local signal, 1=alarm signal

The scaling of AI1 and AI2

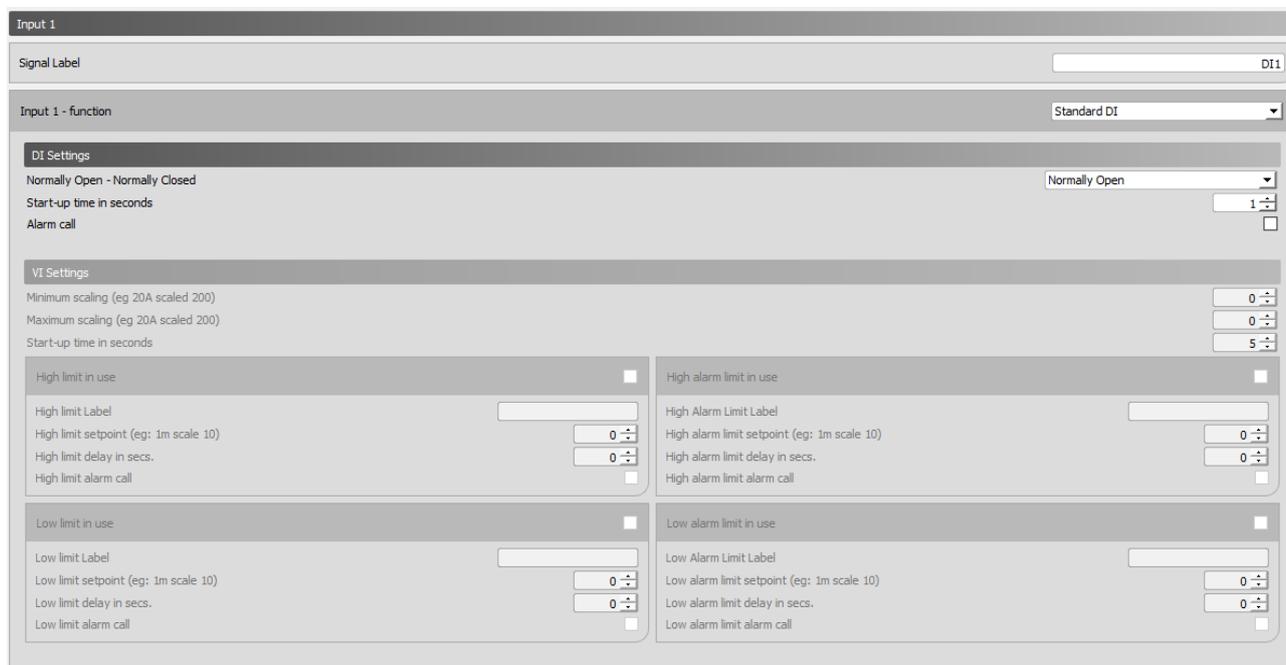
It is possible to choose between 2 types of mA measurements. Either "0-20 mA" or the most common "4-20 mA". Min./Max. scaling points is entered at the desired resolution. For example, if a pressure transmitter with a measuring range of 0-5m is used, and you need to read the level in cm. Enter min. = 0 and max. = 500.

Limit relay values

Limit relay values can be configured for high/low limit levels. For both types of limits the function can be activated/deactivated, and the limit relay can be named with a label used as text in an alarm list and in SMS alerting.

Values can be set to which level the high/low limit relays are activated, and a delay can be attached, so that a limit value must be exceeded for a given time before the signal is registered as active. It is possible to choose whether to send the signal as an alarm or to act as a local alarm.

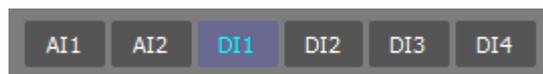
Digital Input (I1-I4)



I1-2 input on the GEKKO logger can be used as either standard 0-10 V inputs, or standard DI where "0" <5V and "1" > 12V.

DI3-4 is either standard DI where "0" <5V and "1" > 12V or pulse inputs.

The input functions can be set in AcowaZoo when I1-4 is selected in the Settings selection. VI1-2 contains the following settings:



Settings for VI1-2	Function	Description
Signal label	Name of the signal	Used in alarm list and SMS
Input 1/6 - function	Selection of predefined functions	
Normally open / closed	The polarity of the signal	
Delay for ON-state in secs.	Signal delay	Stated in seconds
Delay for OFF-state in secs.	Signal delay	Not in use
alarm signal	Activates alarm signal	0=Local signal, 1=alarm signal
VI settings		
minimum scaling	Minimum measurement reading value	With 1 decimal. (20 = 2,0)
maximum scaling	Maximum measurement reading value	With 1 decimal. (20 = 2,0)
Middling in seconds	middling of the measurement reading value	
High limit in use	Activates high limit functions	0=disabled, 1=activated
High limit label	Naming the high limit value	Used in alarm list and SMS
High limit Set point	Defines high limit value	
High limit delay in secs.	Signal delay	Stated in seconds
High limit alarm call	Activates alarm signal	0=Local signal, 1=alarm signal
High alarm limit in use	Activates high Alarm limit functions	0=disabled, 1=activated
High alarm limit label	Naming the high limit alarm	Used in alarm list and SMS
High alarm limit Set point	Defines high limit alarm value	
High alarm limit delay in secs.	signal delay	0=Local signal, 1=alarm signal
High alarm limit alarm call	Activates alarm signal	0=Local signal, 1=alarm signal
Low limit in use	Activates low limit functions	0=disabled, 1=activated
Low limit label	Naming the low limit value	Used in alarm list and SMS
Low limit Set point	Defines low limit value	
Low limit delay in secs.	Signal delay	Stated in seconds
Low limit alarm call	Activates alarm signal	0=Local signal, 1=alarm signal
Low alarm limit in use	Activates low limit alarm functions	0=disabled, 1=activated
Low alarm limit label	Naming the low limit alarm value	Used in alarm list and SMS
Low alarm limit Set point	Defines low limit alarm value	
Low alarm limit delay in secs.	Signal delay	Stated in seconds
Low alarm limit alarm call	Activates low limit alarm signal	0=Local signal, 1=alarm signal

The following functions for DI-2 can be selected:

Standard DI function: Can be used to check the state of a desired digital signal.

Standard VI function (0-10V): Can be scaled, the scaled value can be displayed. High/low limits are attached to the signal, which can trigger an alarm if the limits are exceeded.

The following functions for D3-4 can be selected:

Standard DI function: Can be used to count pulses or check the state of a desired digital signal.

Device settings / advanced settings

To activate the Device settings, click on the following symbol:
This results in the following window.



Reports and alarms:

If the GEKKO is used as a stand-alone device that is not connected to a SCADA system via ACOWA Core, it is possible to receive a daily status SMS and alarm SMS in case of an alarms.

For daily status SMS, the following parameter must be used: "Daily status SMS in use" to activate the function.

"Receivers Phone Number." There is only one user who can receive a status SMS.

"Time of day (in full hours)" you want a status SMS for example 9:00 pm. enter the value 9.

Alarms can be sent to 4 different recipients. You can use SMS or standard dial-up. You must enter a delay between each alert in the list. For SMS, a typical delay of 60 sec. When using dial-up, it will typically be 300 seconds.

Reverse Comm:

TCP-port

Enter the IP address and TCP port of the server on which ACOWA Core is installed. The GEKKO logger will then be a TCP client and connect to the SCADA system via ACOWA Core.

Stormflow registration:

Values for stormflow applications, overflow edges, and levels are entered into the ACOWA Core. After that, data about "true" and "conditional" overflow can be displayed on either ACOWA DASH or returned to the SCADA system.

Show Status

Online status

To activate the Online window, click on the following symbol:
This results in the following window.



1. It is possible to switch the power supply for the analog inputs to on status, thereby making it possible to read a momentarily value from the measuring equipment which is connected (Point 4.).
2. By pressing start, the GEKKO data logger starts up its modem, thereby making it possible to test the signal strength, as well as see the assigned IP address (4G only) (Point 3.).
3. Here you find the status picture of with the GEKKO datalogger's time, date and communication status. You will also find information about IP address (4G only), GSM signal strength, as well as the time and date in the GEKKO. GEKKO data loggers synchronize automatically with the GSM mast at 4G, if SigFox modem is used, time and date can be set via synchronization with PC. This is done by clicking on the box showing the time and saying yes to synchronization. Communication information is only available when the data logger is awake and communicating.
4. Overview of the analog and digital inputs. Here you can find the status of your inputs on the GEKKO data logger.

Event-based logging

Toggle Graphical and Schematic view

To activate the event-based logging, click on the following symbol:
This results in the following window.



Register	Register Name	Min	Max	Description	Value
1 2001	Modbus/Comli ID	0	247	Modbus/Comli ID	1
2 2002	Station ID	1	65535	Station ID	1
3 2003	AI - 0/20 mA or 4/20 mA	0	1	0-20 mA or 4-20 mA	1
4 2004	AI - 0% scale	-30000	30000	Minimum scaling (eg: 5m scaled 500)	0
5 2005	AI - 100% scale	-30000	30000	Maximum scaling (eg: 5m scaled 500)	500
6 2006	AI - Start-up time in seconds	0	60	Start-up time in seconds	5
7 2007	AI - high limit in use	0	1	High limit in use	0
8 2008	AI - high limit set point	-30000	30000	High limit set point (eg: 0.5m scaled 50)	90
9 2009	AI - high limit delay in secs.	0	60000	High limit delay in secs.	5
10 2010	AI - high limit alarm call	0	1	High limit alarm call	0
11 2011	AI - high alarm limit in use	0	1	High alarm limit in use	0
12 2012	AI - high alarm limit set point	-30000	30000	High alarm limit set point	0
13 2013	AI - high alarm limit delay in secs.	0	60000	High alarm limit delay in secs.	0
14 2014	AI - high alarm limit alarm call	0	1	High alarm limit alarm call	0
15 2015	AI - low limit in use	0	1	Low limit in use	0
16 2016	AI - low limit set point	-30000	30000	Low limit set point	5

Event-based logging enables a differentiated log- and call interval compared to standard log- and call interval (page 10.)

For quick access to the registers regarding event-based logging, type "event" in the search box "filter".

Register	Register Name	min	max	Beskrivelse	Onsket Værdi
173 2443	Event Signal	0	8	Event Signal	
175 2445	Event Call Interval (unit in minutes)	0	1440	Event Call Interval	
348 2889	Event Log Interval (unit in minutes)	0	60	Event Log Interval	

Register	Description	Options
2443	Event signal - triggers the event-based log sequence	1 = High limit in use AI1 2 = High limit in use AI2 3 = High limit in use VI1 4 = High limit in use VI2 5 = DI1 6 = DI2 7 = DI3 8 = DI4
2445	Call interval in minutes event-based log	Must be determined, otherwise the function doesn't work
2889	Log interval in minutes event-based log	Set to the desired log interval (typically 1 minute.)

Register list AcowaCore "quick-guide"

Analogue	Signal	INT32	INT32	INT32	INT32	INT32
		Actual value	Setpoint for High limit	Setpoint for Low limit	Alarm for High limit	Alarm for Low limit
AI 1	4-20mA	20	22	24	8:0	8:2
AI 2	4-20mA	30	26	28	8:1	8:3
VI 1	0-10V DC	32	42	44	6:0	6:8
VI 2	0-10V DC	34	46	48	6:1	6:9
Description			"READ ONLY"	"READ ONLY"	"READ ONLY"	"READ ONLY"

Input	Signal	INT32
		Status/Alarm
DI 1	DI1 – VI1	4:0
DI 2	DI2 -VI2	4:1
DI 3	DI3 - Pulse	4:2
DI 4	DI4 - Pulse	4:3

Log input	IR:INT16	INT32
Log interval		2887
Log interval (Event)		2889
Description		(Minutes) "Read only"
Analog log A1 10.000 points	0	
Analog log A2 10.000 points	10000	
Analog log V1 10.000 points	20000	
Analog log V1 10.000 points	30000	
Digital log DI1 10.000 points	40000:0	
Digital log DI2 10.000 points	40000:1	
Digital log DI3 10.000 points	40000:2	
Digital log DI4 10.000 points	40000:3	
Pulse counter log DI3 10.000 points	50000-59999	
Description	(Read on input registers)	

Counters	UINT32	UINT32	UINT32	UINT32	UINT32	UINT32	UINT32	UINT32	UINT32
	Amount today	Amount yesterday	Amount total	Duration today	Duration yesterday	Duration total	Volume today	Volume yesterday	Volume total
True overflow	100	128	156	108	136	164	116	144	172
Conditional overflow	102	130	158	110	138	166	118	146	174
Description	(PCS.)	(PCS.)	(PCS.)	(Seconds)	(Seconds)	(Seconds)	(m³)	(m³)	(m³)

System information	UINT32
Id number	0
GSM-signal	94
Description	0-100% (0 decimal)
Battery 1 voltage	58
Battery 2 voltage	60
Description	(2 decimals)

Time / Date stamping for data exchange	UINT32
Seconds since 1970-01-01 (Unix time)	78
Seconds	80
Minutes	82
Hour	84
Day	86
Month	88
Year	90



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