**Instruction for Use**

Issued: 2023–03–06

# Signal unit V4.0

## for mains-independent alarm with GSM module (5G)


To ensure safe and proper use, read the operating instructions and other literature supplied with the product carefully, provide end users with them and keep them safe throughout the service life of the product.

## Introduction

ACO Passavant GmbH (hereafter referred to as “ACO“) thanks you for your trust and hands over to you a product that is state of the art and has been checked for proper condition as part of the quality controls before delivery.

Illustrations in these instructions for use are provided for basic understanding and may vary depending on the system model and installation situation.

# ACO Service

Please feel free to contact ACO Service if you require further information.

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# Warranty

For information on warranties, see “General Terms and Conditions“,
http://www.aco-haustechnik.de/agb

# Table of Contents

## 1.0 Warning and safety instructions for installation and commissioning of the unit

Please read the safety instructions carefully before operating the to prevent damage to the product and possible injury. Keep these safety instructions or operating instructions to hand for all persons using this product.

The warnings and precautions described in this manual are indicated by the following symbols:


Attention, important information. (Should be read before commissioning).


Attention, voltage, danger to life!

## 1.1 Areas of application, intended use

The mains-independent alarm with GSM module is intended for combination with the compact switchgear PS1-LCD N, PS2-LCD and PS 2 System. ***The switchgear itself must be mounted outside potentially explosive atmospheres.*** Components with the appropriate approvals must be used when using external float switches mounted in potentially explosive atmospheres.

## 1.2 Personnel qualifications

The personnel responsible for the installation, commissioning and maintenance of the switchgear must have the appropriate qualifications.

## 1.3 Safety instructions for the operator

The existing regulations for the prevention of accidents, the VDE and the local power supply companies must be observed.

### 1.3.1 Electrical work


***DANGER due to dangerous electrical voltage!***

There is a risk of fatal electric shock when working on the open switchgear. Therefore, the unit must always be disconnected from the mains via a back-up fuse or a separate main switch and must be protected against being switched on again. To disconnect the battery, remove the red + connector and insulate the connection with the yellow cap. This work may only be carried out by a qualified electrician.


***Beware of moisture!***

Moisture penetration can damage the unit. During installation, pay attention to the permissible humidity and ensure a flood-proof installation.

For the connection, please refer to chapter 3.0 "Pin assignment". The technical specifications must be observed.

### 1.3.2 Safety and warning instructions for use of the battery.

- The battery may only be operated at temperatures between -10 °C and 50 °C.
- Do not expose the battery to heat or fire. Extreme heat development can cause the battery to explode.
- Do not open or disassemble the battery. Improper opening or wilful destruction of the battery may result in serious injury. In addition, opening the battery will void the warranty.
- Never connect the contacts of the battery with metallic objects and make sure that the contacts do not come into contact with metallic objects (e.g. tools, jewellery) under any circumstances.
- If the battery is damaged or defective, it must be removed and checked. Please contact your specialist dealer and clarify the further procedure with him.
- Battery contains diluted sulphuric acid (gel). Danger of chemical burns! If liquid leaks from a damaged battery and comes into contact with skin or clothing, rinse the affected areas immediately with plenty of water. If it comes into contact with the eyes, rinse immediately with plenty of clean water and contact a doctor.
- Damaged batteries must not be charged or used again.
- If the battery is disconnected from the control unit, it is essential that the protective caps are put back on the battery.

## 1.4 Operating instructions

The operating instructions must be observed during installation, commissioning and maintenance of the switchgear. The limit values listed there must be complied with under all circumstances.

## 1.5 Transport and storage

The switchgear must be stored and transported in such a way that damage due to impact, shock and temperatures outside the range of -10°C to +50°C can be ruled out.

## 1.6 Assembly and installation

The installation location should not be obscured by objects containing a lot of metal or water (steel and concrete walls, metal shelves, etc.). In addition, there should be no devices that generate strong electrical fields (radios, electric motors, etc.) in the vicinity of the ***module.*** These environmental conditions can have a very negative effect on the transmission and reception of the unit.
To avoid incorrect installation, we recommend checking the reception quality at the intended installation location of the ***module*** before installing it. This can be done with a mobile phone, for example. When checking, make sure to use the same network provider that is used for the ***module,*** as the signal strength can vary from provider to provider.

For safety reasons, the unused cable glands must be closed with blind caps or blind screw connections.

When commissioning, make sure that the battery is fully charged.

The length of all signal lines must not exceed 1.50 m and must not be laid together with lines that cause interference.

***DANGER due to dangerous voltage!***

Improper handling during electrical work may result in danger to life due to electrical voltage! This work may only be carried out by a qualified electrician.

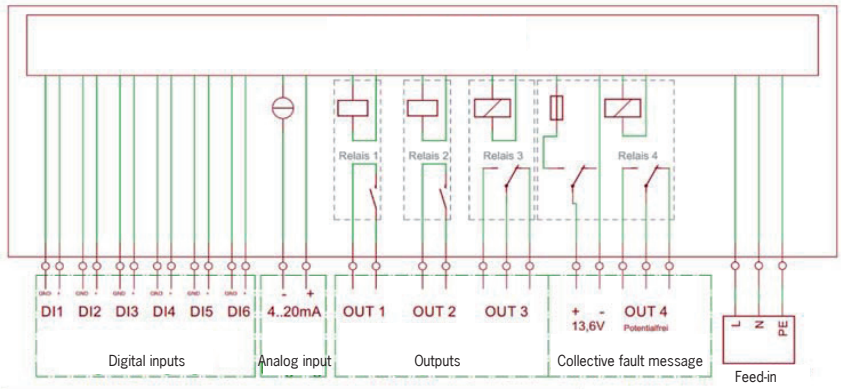
## 2.0 General product description

The ***module*** module is used to receive digital and analogue signals even in the event of a mains voltage failure. A 12V output (max. 1A) is available for operating external signal transmitters. The module can send various freely configurable messages to up to 4 telephone numbers for 6 digital and one analogue input value. In addition, it is possible to switch 3 relays or query the status via SMS.
The internal battery 12V 1.2 Ah (lead gel), to ensure operation in the event of mains failure, is charged automatically. In addition to stand-alone use, the module is also suitable for supplementing the PS1-LCD, PS2-LCD, PS2 system or other control systems with potential-free signalling contacts or 4..20mA outputs.
The control unit is configured conveniently via Bluetooth and the corresponding application. The operating states of the control unit can be read via status LEDs. (status of the radio networks; digital inputs and outputs; charging status; mains message; operating signal; fault signal).

## 2.1 General Functional description

If the mains voltage fails, the alarm relay in the ***module*** module drops out. The internal buzzer sounds and a notification of the power failure is sent via SMS.
If an alarm is triggered, 13.6 volts are applied to the "group alarm" terminal and terminal SSM OUT4 is closed. The alarm message can be stopped by pressing the acknowledgement button.
The module has 6 freely configurable digital inputs. Freely selectable SMS texts can be sent to change the switching status at these inputs.
An analogue input (4..20mA) can trigger a notification when selectable switching points are exceeded or not reached. Three relay outputs are available that can be switched via SMS text.

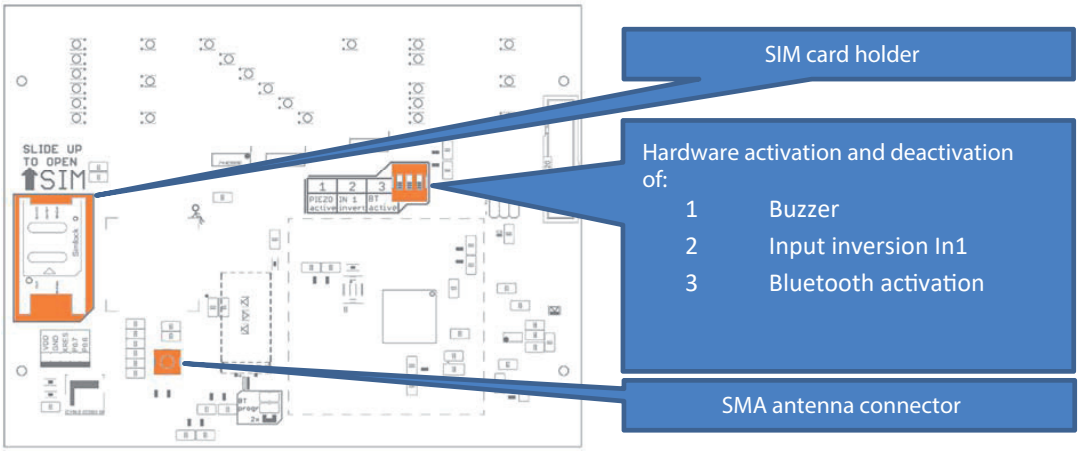
## 3.0 Pin assignments and assembly

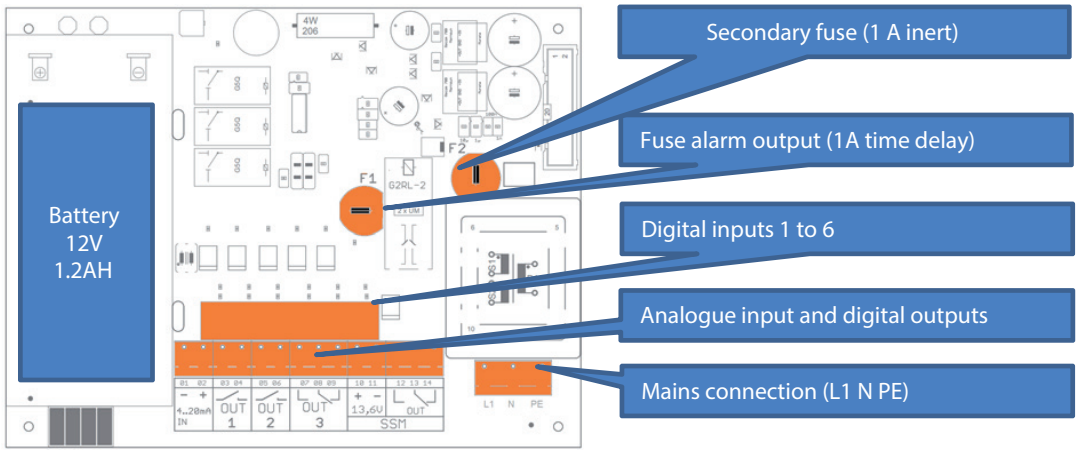



*Important!*

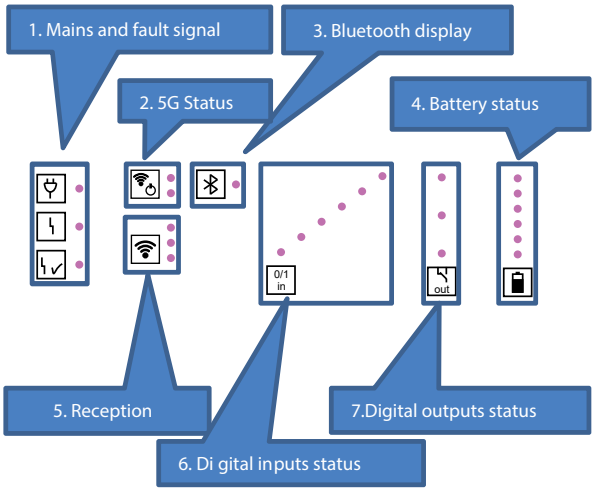
*Please make sure that the "interval alarm" of the control unit is not activated when the module is connected to a control unit.*

*The length of the cables for the analogue inputs and the digital inputs must not exceed 1.50m and must not be laid together with cables that cause interference.*



## 4.0 Display elements




## 4.1 Mains and fault signals

***Green LED*** =Mains voltage is present.

***Red LED*** =Mains voltage missing or SSM trigger

***Yellow LED*** = Flashes when the module is switched on. Lights up continuously until a power failure is acknowledged (active error).

## 4.2 5G Status

= LED 1
= LED 2

***No LED active:*** Hardware error

***LED 2 flashes quickly:*** SIM card error

***LED 2 flashes slowly:*** The SIM PIN is incorrect

***Both LEDs flash quickly:***
The SIM-PUK must be entered (SIM locked)
***LED 2 lights up and LED 1 flashes quickly:***
The SIM is initialised but no service is available/ reachable.
***Both LEDs light up:*** Mains operational/Everything OK

## 4.3 Bluetooth display

***LED off:*** Bluetooth error

***LED flashes slowly:*** BT is switched off

***LED flashes quickly:*** BT is active and waiting for connection

***LED is lit continuously:*** BT is successfully connected

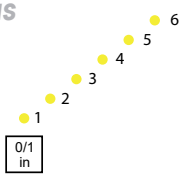
## 4.4 Battery status

Status display of the battery charge in battery mode. The top LED flashes during mains operation when in charging mode.

## 4.5 Reception strength

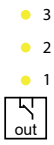
The LEDs that indicate the signal strength. If no LEDs are lit, the signal strength is not sufficient.

## 4.6 Digital inputs status




Here, the corresponding LED lights up when the respective digital input is closed. When inverted by means of the DIP switch (point 5.3), LED 1 lights up when the input is open.

## 4.7 Digital outputs status




Corresponding LED lights up when relay output is active

## 5.0 Commissioning

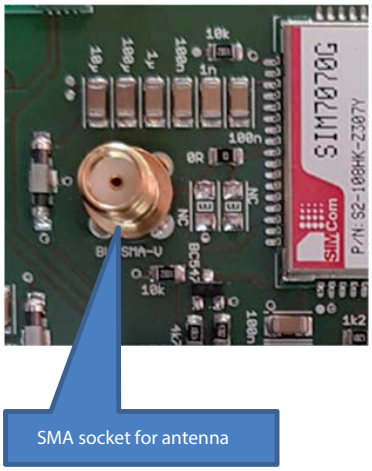
Please proceed according to the following steps for commissioning:

a.) Hardware preparation (points 5.1 - 5.5)
b.) Software preparation (point 6 onwards)

## 5.1 Pin assignment

Connection of all desired components of the control system for analogue input, digital inputs, analogue outputs and the antenna (SMA - screw connection).

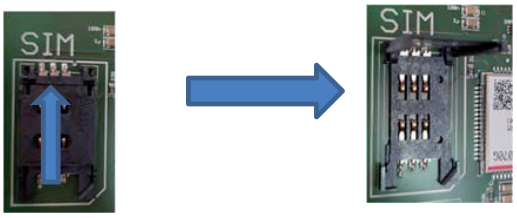
There are several options for the antenna. You can either screw a stub antenna directly onto the SMA socket inside the control unit or feed an antenna with a cable through one of the cable openings and then screw it onto the SMA socket.




## 5.2 Sim card

Now place your SIM in the card holder provided. The card holder is designed for mini SIM cards. You can see how to correctly open and close the card holder in the illustrations below.

Slide the cover of the card holder upwards and then flip it upwards.



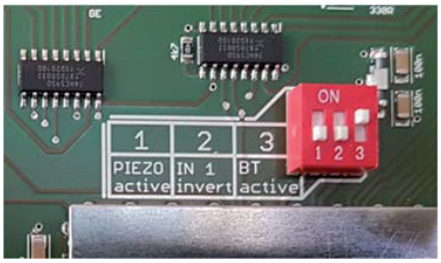

Insert the SIM card into the flap.
Close the lid again and push it down.

***!!! ATTENTION !!! IMPORTANT !!!***

Make sure that the sim card you have chosen supports SMS sending from ***terminal to terminal***.
Most IoT and M2M sim cards only support SMS sending from ***terminal*** to ***server***.

## 5.3 Hardware Activation/Deactivation/ Inversion

You can influence the respective functions on the DIP switch according to the imprint (ON - active - above).




1 -> Activation/deactivation of the acoustic alarm (internal buzzer)

2 -> Inversion of the digital input In1

3 -> Activation/deactivation of the Bluetooth function.
*As there is no password query for the Bluetooth connection in the module, this should be switched off after configuring the module for security reasons.*

## 5.4 Connection/disconnection of the lead gel battery

You can connect the battery when using mains power or without mains power. To do this, remove the yellow protective caps and connect the cables. Pay attention to the correct polarity.

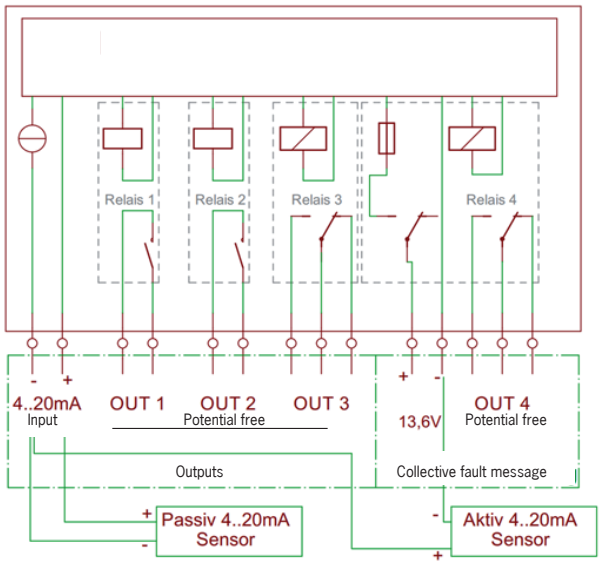
***If you want to disconnect the battery from the control unit, it is essential that you put the protective caps back on the battery.***

## 5.5 Connection of 4..20mA sensors or 4..20 mA outputs

You can evaluate active as well as passive 4..20mA sensors via the control unit. Depending on the sensor type, a different terminal assignment may be necessary.

You can simply connect ***passive sensors*** to the 4..20mA IN terminal according to the polarity.

***Active sensors*** as well as the 4..20mA outputs of our pump controls cannot simply be connected to the 4..20mA input terminal. You must connect the positive 4..20mA output of the control or the sensor to the negative terminal of the 4..20mA IN terminal. Connect the ground / negative output to terminal 13.6V -.




## 6.0 Control unit configuration

Please download the ACO MultiControl APP to your SmartDevice (smartphone/tablet). To do this, go to the Playstore (Android) and search for „ACO MultiControl". In your IOS system, search for the same term in your APP store as in the Android system.

QR Code for the APP

Apple Android

Please install the app.

Bluetooth must be switched on in order to be able to set the parameters of the control unit. Please refer to point 5.3. (When delivered, Bluetooth is activated via the hardware)

Search for your module now on your SmartDevice with the ACO MultiControl.

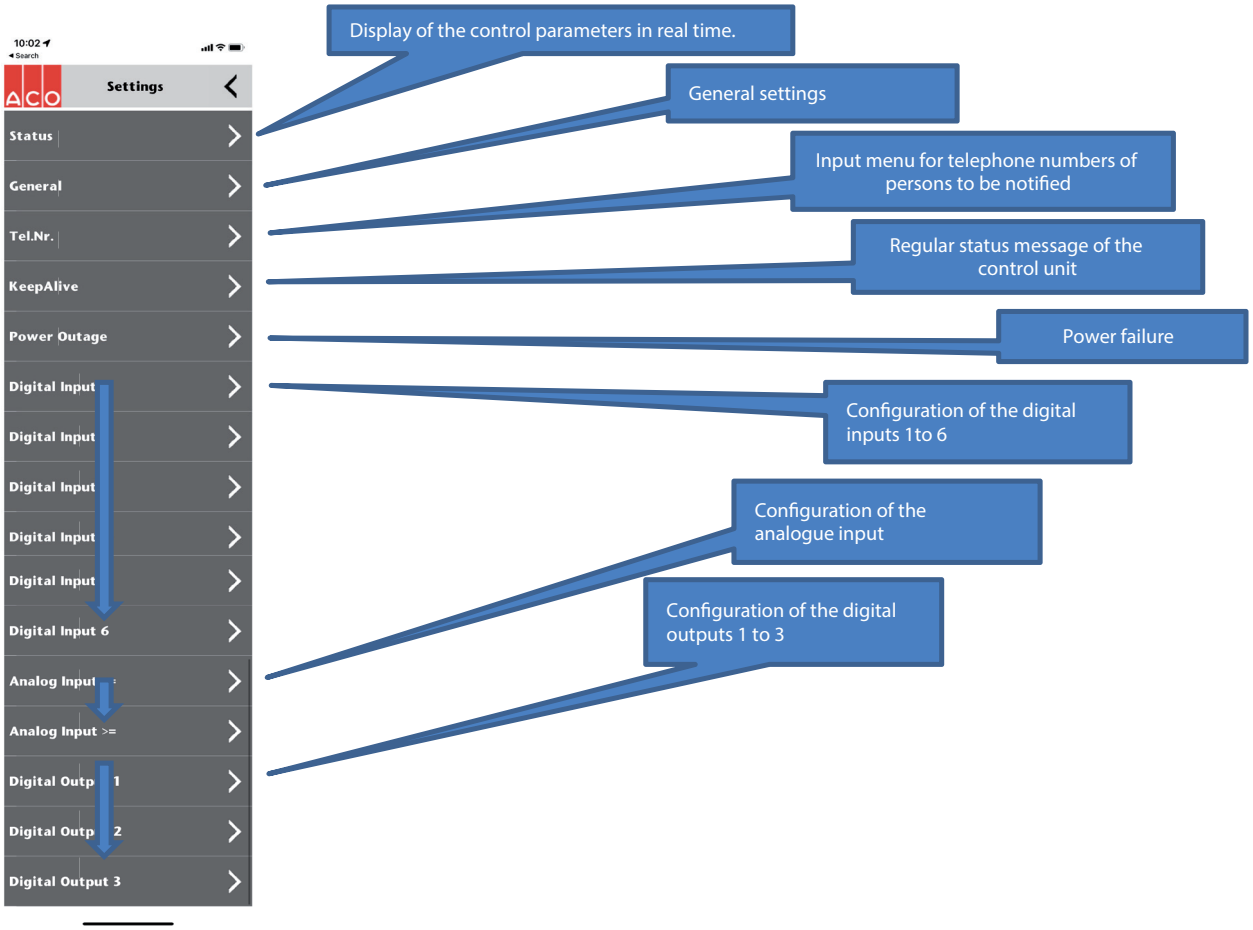
Available Bluetooth devices
are displayed after the search.


***Important! Since Bluetooth uses low energy, the location sharing must be activated.***

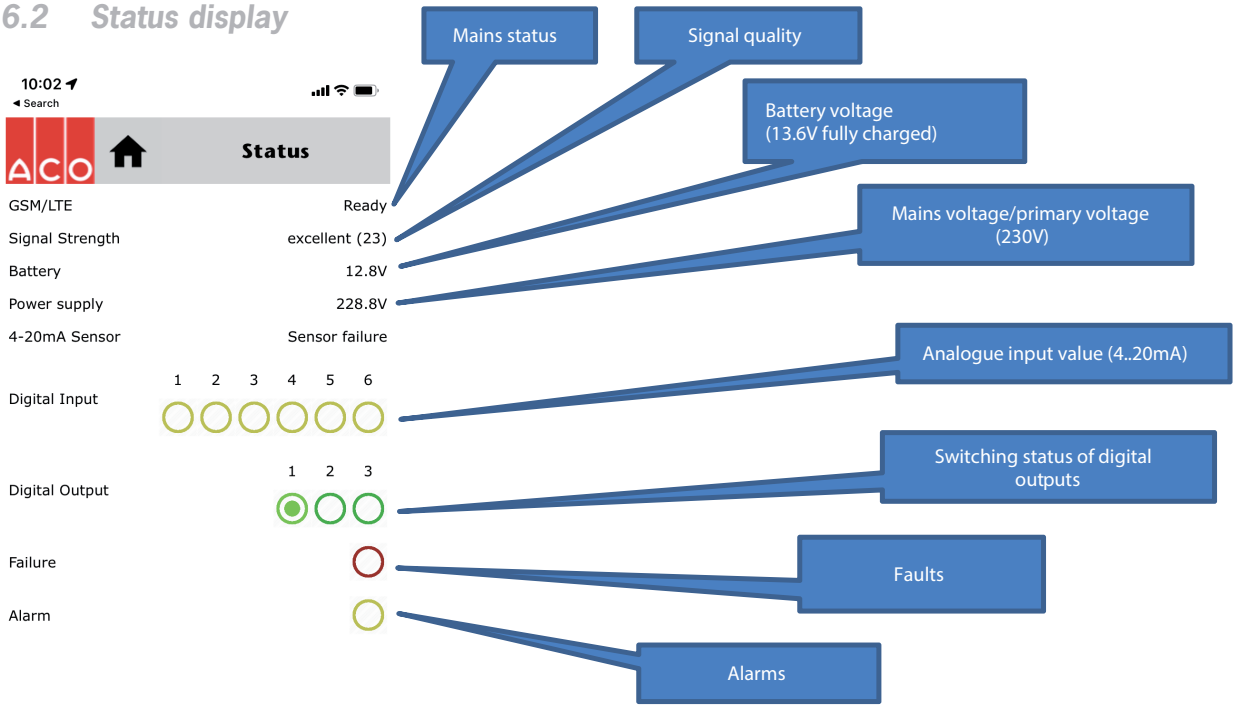
If the connection between your SmartDevice and the control unit has been successfully established, please configure the control unit according to the following points.

You will also find information on the correct entry of setting values for all points inside the application itself.

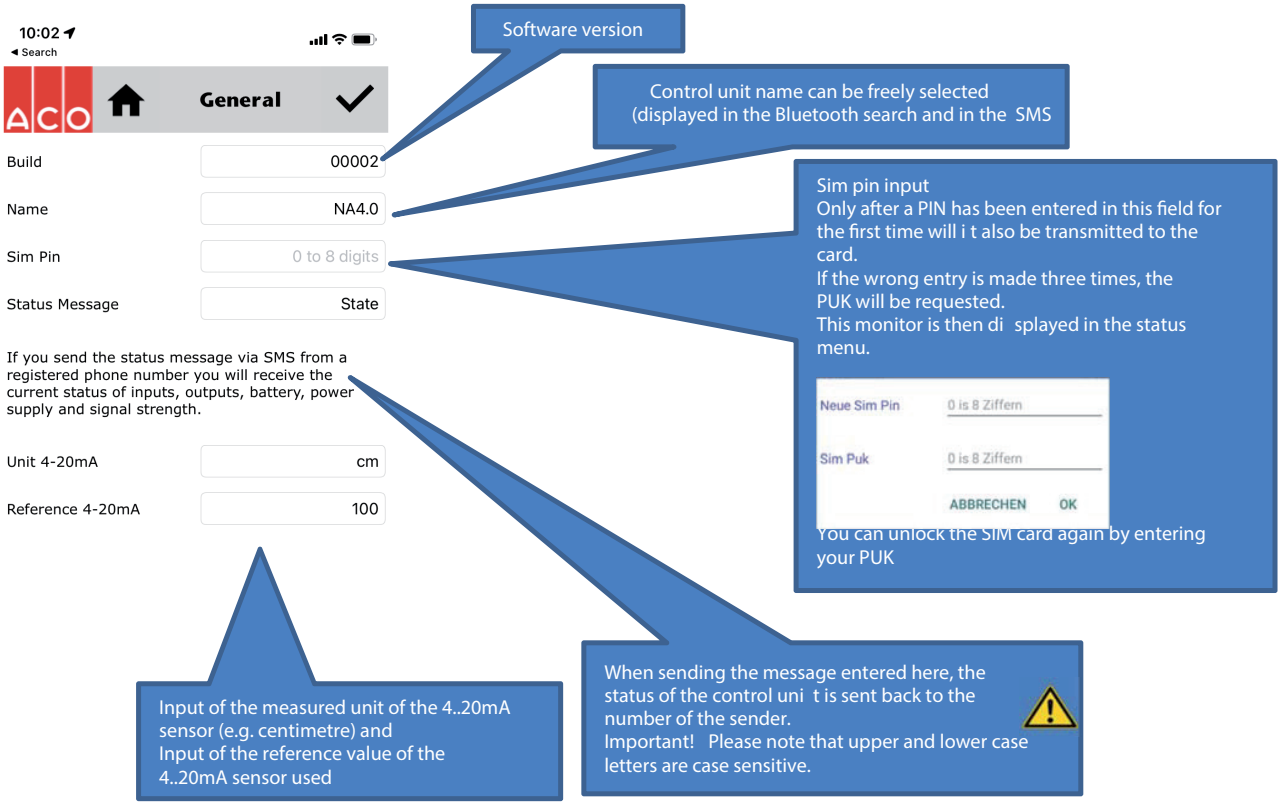
## 6.1 Menu overview



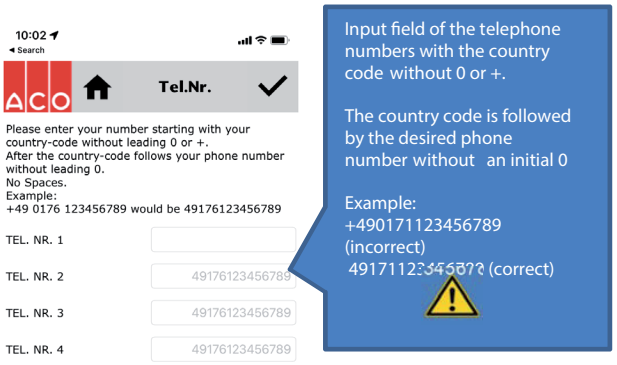
## 6.2 Status display



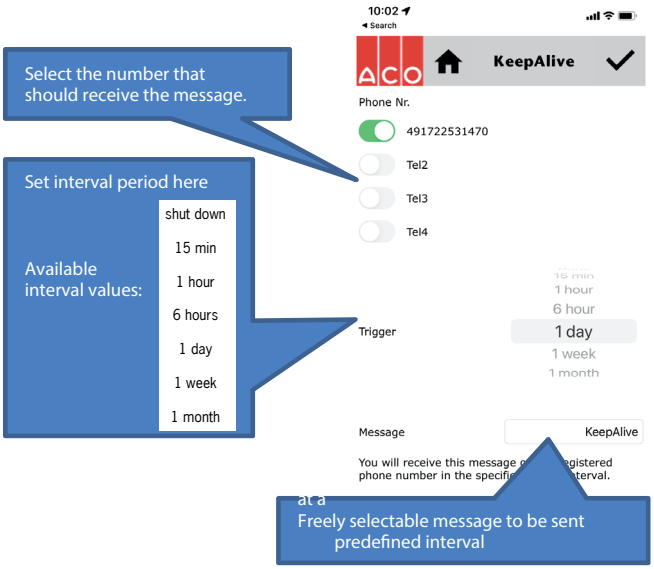

## 6.3 General Settings



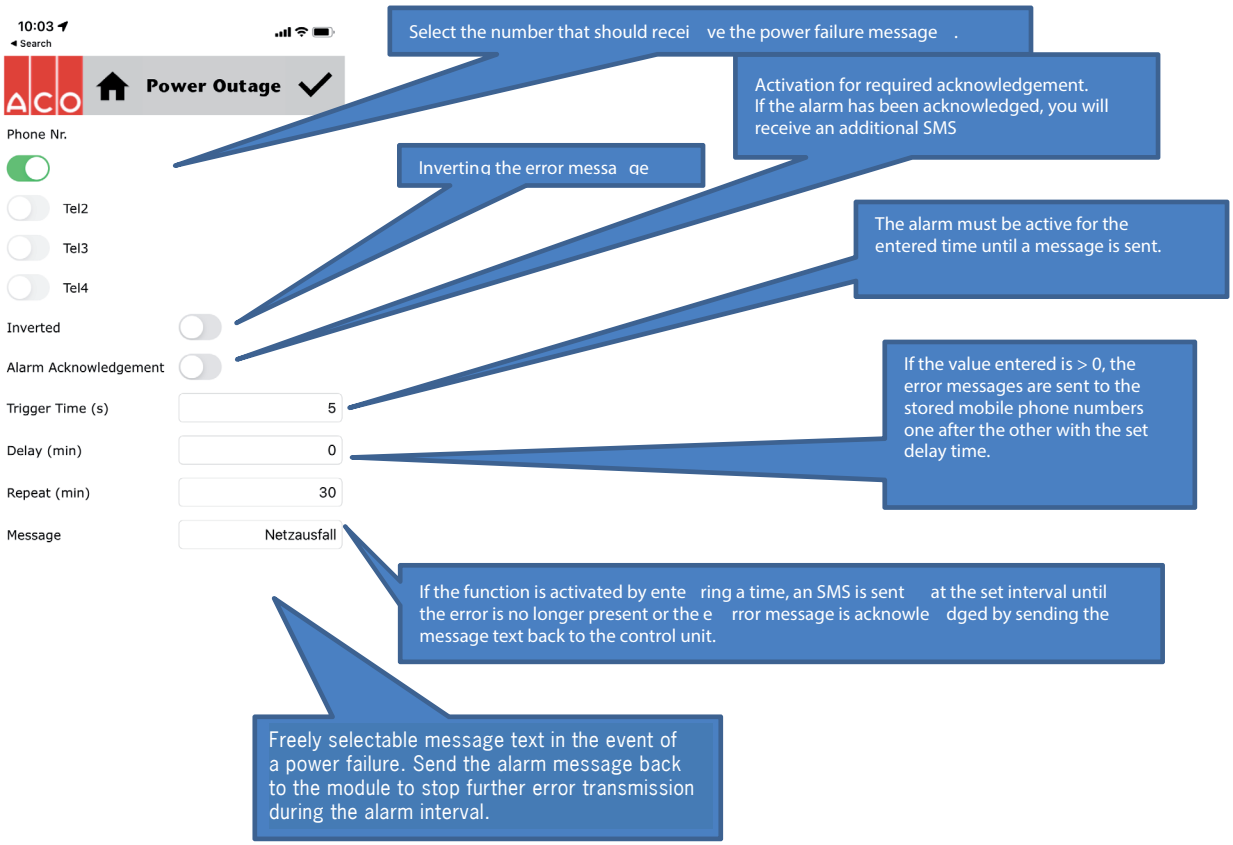
## 6.4 Telephone number input



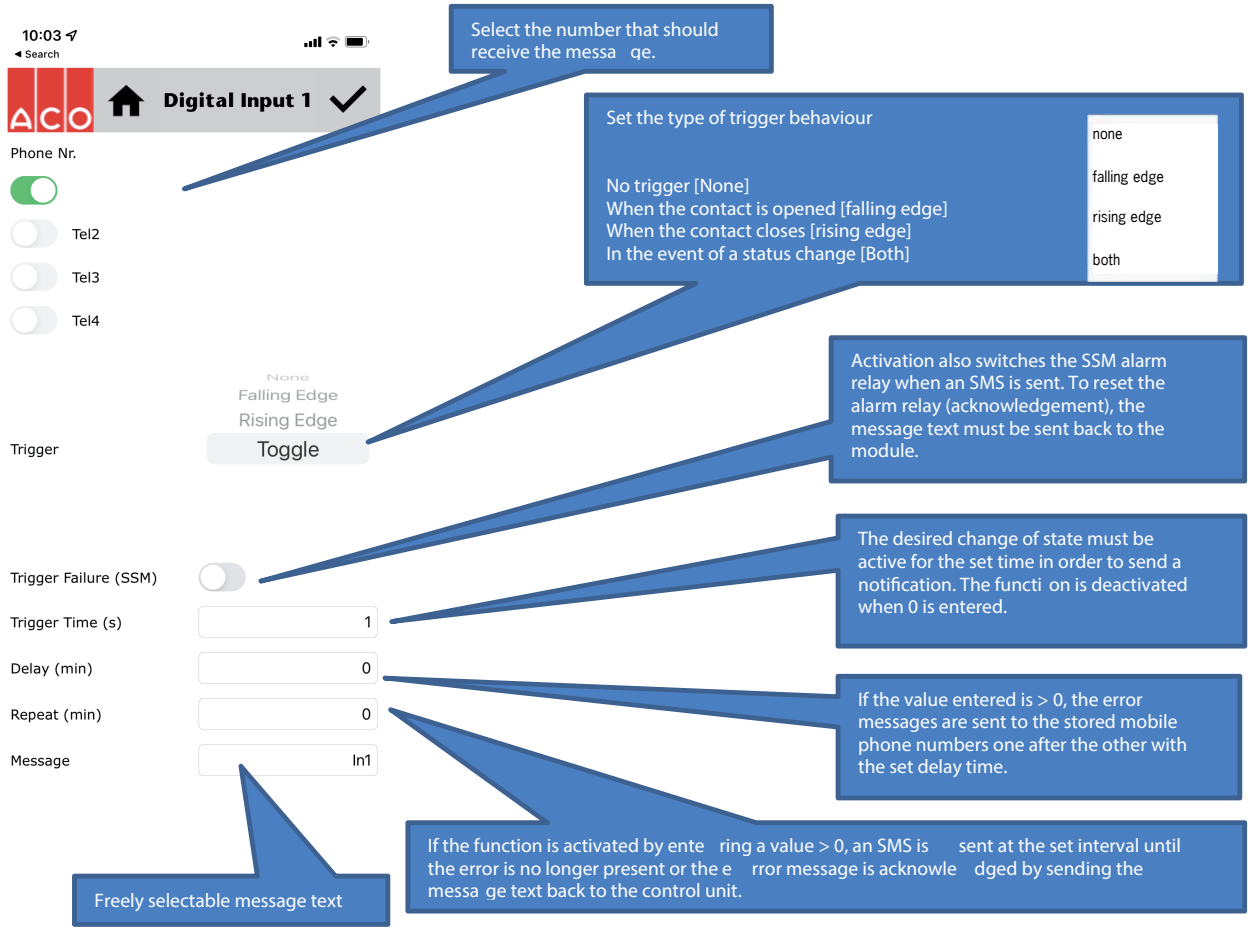

## 6.5 Regular status message / KeepAlive notification




## 6.6 Mains failure message Settings



## 6.7 Digital input configuration




### 6.7.1 Delay / Repetitions (Message with acknowledgement / relay message)

If the function is deactivated with 0 and a message is triggered, all specified telephone numbers are notified once and at the same time for each alarm.
If this function is activated, the messages are sent once to the different telephone numbers one after the other in the selected time delay (1-60min). Starting with No.1 up to max. No.4. The delayed message sequence repeats itself with the set repetition (1-60min). This repeats until one of the receivers sends a confirmation message to the module.

To confirm an alarm via ***SMS***, you must send back the same text that you received as an alarm message to the module.

Example:
Alarm message: "Group alarm"
Actuation: "Group alarm"

*If the time is set very low and none of the telephone numbers can be reached or the message is not acknowledged, high SMS costs may be incurred.*

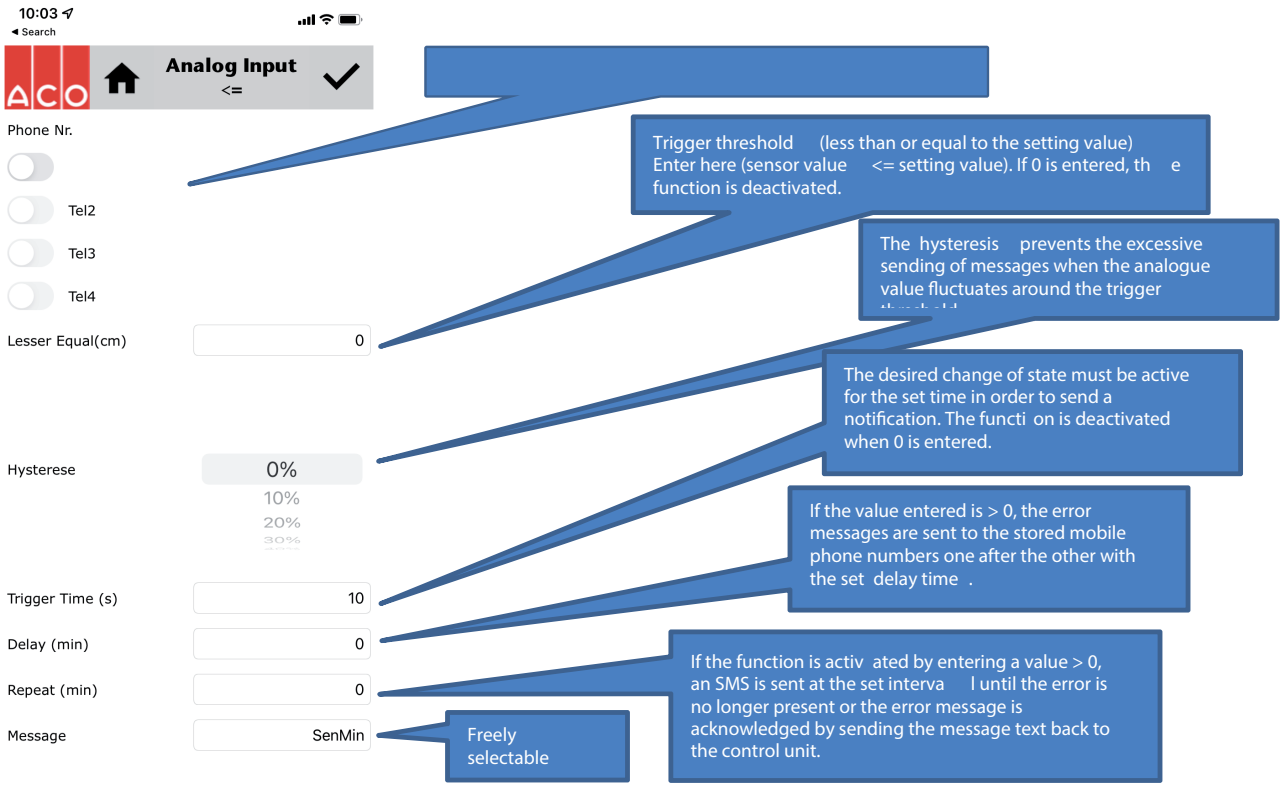
### 6.7.2 Fault triggering (SSM)

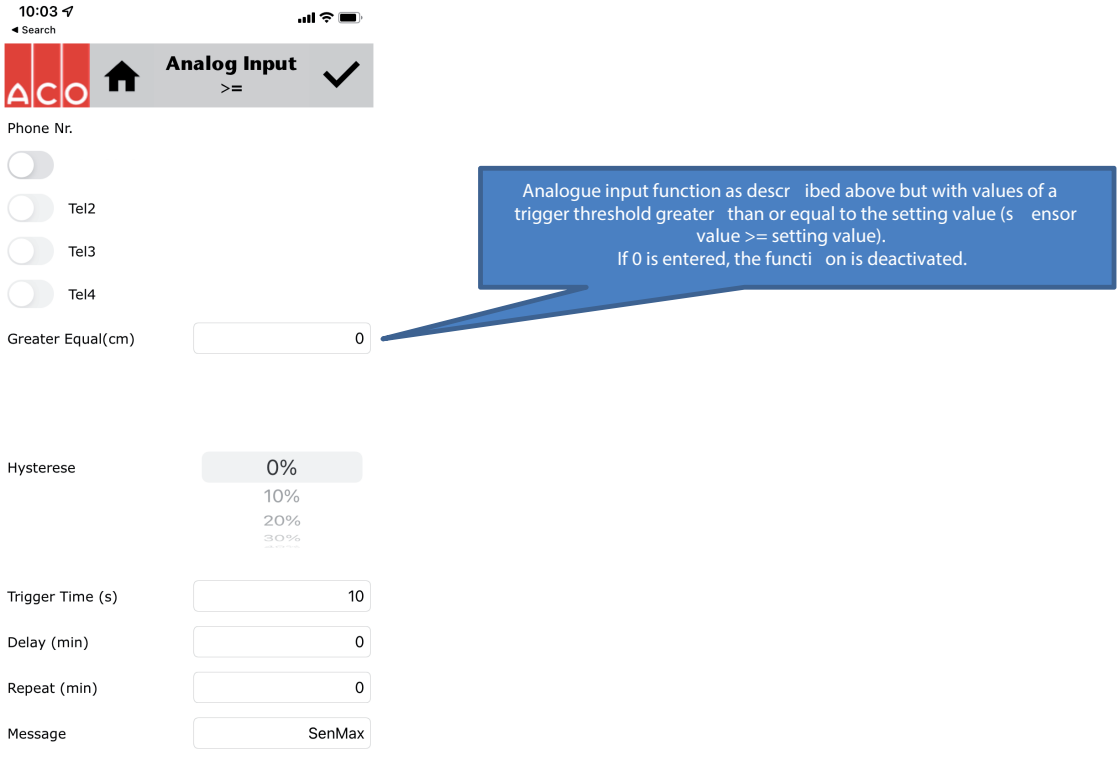
Only for digital input 1

When this function is activated, the relay SSM OUT is also switched when digital input 1 is triggered. The buzzer sounds and the red LED lights up (section 4.0, Mains and fault message). The alarm can be deactivated or acknowledged with the acknowledgement button on the unit or by sending the same message to the module.

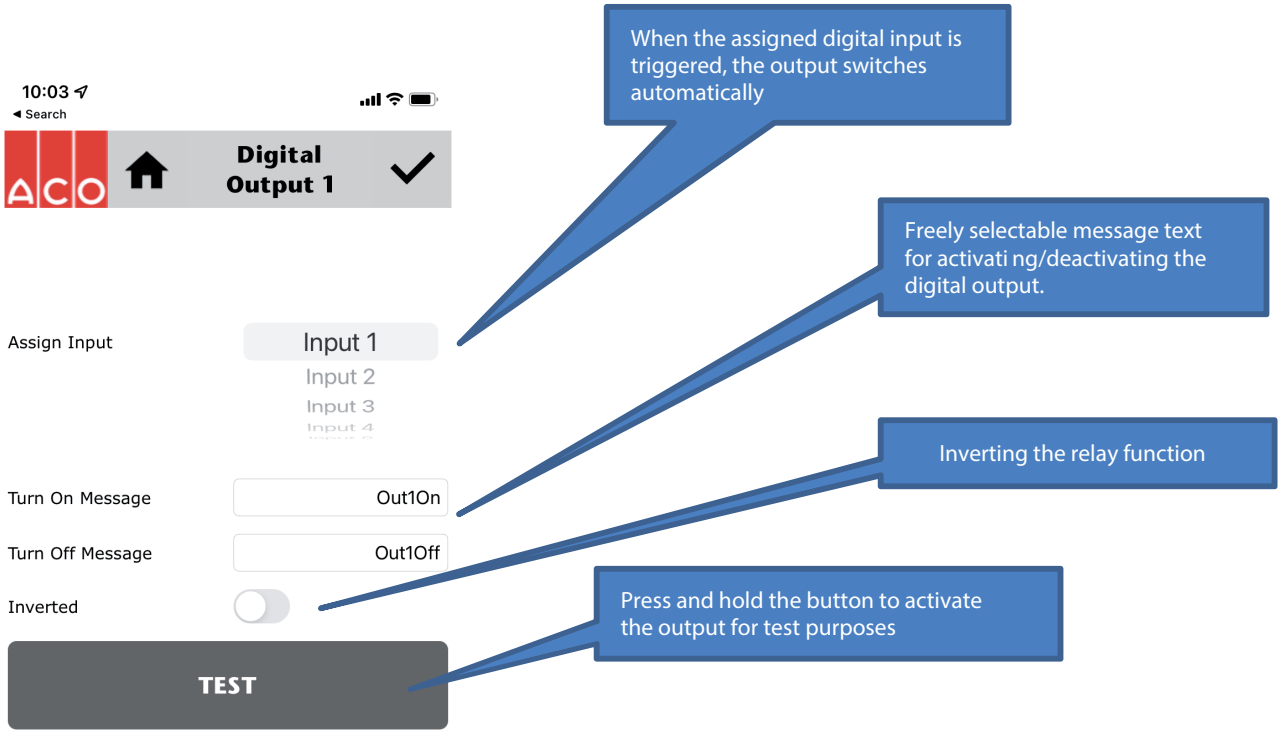
## 6.8 Analogue input 2..20mA

(Hardware connection please follow point 5.5)



## 6.9 Configuration of digital output parameters




The output can be switched by SMS with the text defined under "Switch-on message" and "Switch-off message".

If the output is assigned to an input, it always has the same state as the assigned digital input. This means that if, for example, the digital input In1 is closed, the assigned relay also closes. When inverted, it is the opposite state.

Even if the output is assigned to an input, the relay can be switched via SMS. Manual switching via SMS interrupts the automatic pairing. To return to automatic pairing, the same message must be sent to the module twice.

E.g. Digital output is coupled with digital input 1: Digital input 1 is closed and the Digital output relay closes. The message "DO 1 Off" is sent to the module - the relay switches.
Now the automatic coupling is deactivated and the relay no longer switches when In1 is triggered. To return to automatic pairing, "DO 1 Off" must be sent a second time.

It is recommended to extensively test combined switching operations by checking the realtime status in the app.

## Disposal

As the end user, you are legally obliged (Battery Ordinance) to return all used batteries and rechargeable batteries; it is prohibited to dispose of them in the household waste! The battery must be disposed of separately from the unit. The unit itself can be disposed of as electrical waste, the lead-gel battery must be disposed of separately at appropriate locations.

Batteries and rechargeable batteries containing harmful substances are marked with the previous symbol, which indicates that they must not be disposed of with household waste. The names for the relevant heavy metals are:

***Cd*** = cadmium, ***Hg =*** mercury, ***Pb*** = lead.

Used batteries, rechargeable batteries and button batteries can be returned free of charge to the collection points of your local authority, our branches or wherever batteries/rechargeable batteries/ button batteries are sold! They therefore comply with legal obligations and contribute to environmental protection.

## Technical data

| | |
|---|---|
| Operating voltage: | 230V/AC 50/60Hz |
| Power consumption during standby: | < 7 W |
| Housing dimensions: | 150 x 190 x 95 (HxWxD) |
| [with cable gland] | |
| Housing material: | Polycarbonat V0 |
| Protection class: | IP 54 |
| Battery: | 12 Volt 1.2 Ah lead gel |
| Temperature range: | -10 bis +50 °C |
| Switch contacts: | 4A / 250V / AC1 (SSM) |
| | 1A / 250V / AC1 (relay |
| outputs DO) | |
| Alarm output: | 12 V 1A max. |
| Cable glands: | 1 x M25 x1.5 |
| | 3 x M16 x 1.5 |
| | 4x M12 x 1.5 |
| Software version (BuildNo): | 2 |
| Hardware version: | 1v0 |
| Android version: | 6.0 |
| IOS version: | 12.0 |
| Frequency band: | Cat-M / Cat-NB / LTE / 5G / GSM |

## Standards

Applicable EC - Directives:

EC - Low Voltage Directive 2014/35/EC
EC - Electromagnetic Compatibility Directive 2014/30/EC

Applied harmonised standards, in particular:

EN 60204 - 1: 2019
EN 60730 - 1: 2021
IEC 61000 - 6 - 3: 2006 +A1:2010
IEC 61000 - 6 - 2: 2016

Applied harmonised standards GSM module, in particular:

Radio Equipment Directive 2014/53/EU
EN 301 511 V12.5.1
EN 301 908-1 V11.1.1
EN 301 908-13 V11.1.2
EN 303 413 V1.1.1

EN 301 489-1 V2.2.0
EN 301 489-3 V2.1.1
EN 301 489-19 V2.1.0
EN 301 489-52 V1.1.0
EN 55032: 2015
EN 62311: 2008
EN 60950-1: 2006 + A11: 2009 + A1: 2010 + A12: 2011 + A2: 2013

Subject to technical changes.

## SIM card

***!!! ATTENTION !!! IMPORTANT***

Make sure that the sim card you have chosen supports SMS sending from ***terminal to terminal***.
Most IoT and M2M sim cards only support SMS sending from ***terminal*** to ***server.***

## Additional options

These additional options are intended for maintenance purposes and service personnel

***Settings request***

To do this, send the term
*Settings*
To the module

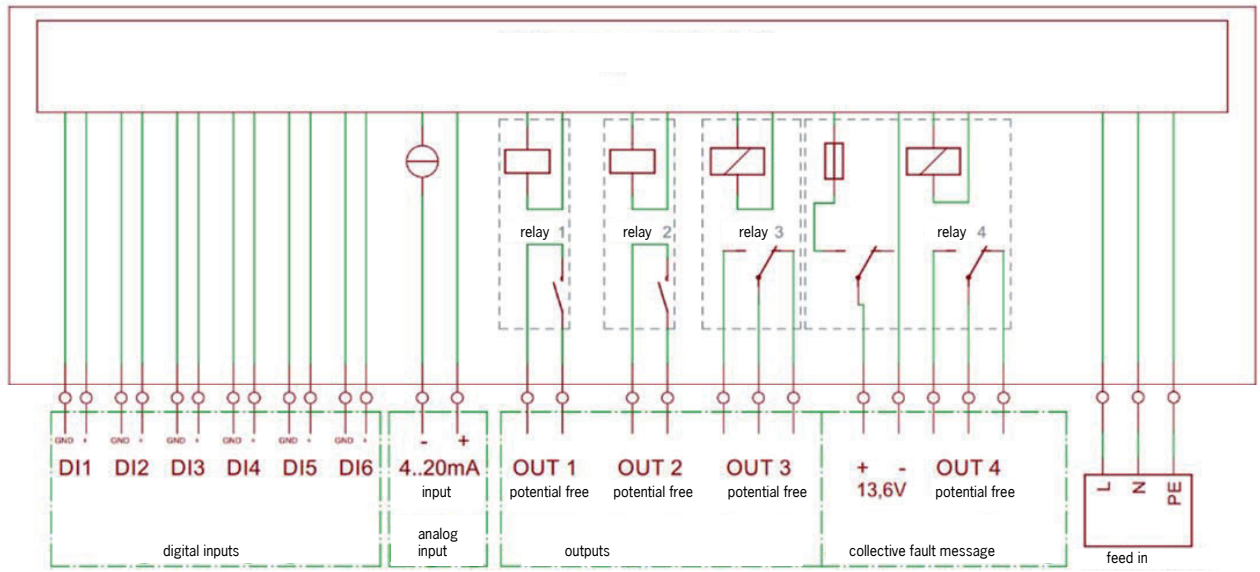
You will receive 6 ***SMS*** messages with the complete setting data of the module

Remote maintenance/change of telephone numbers via SMS:
To do this, send the command to change the respective telephone number from a "registered" mobile phone number
(In example no. 1):
$+phone1="Telephone number"!

Example:
$+phone1=49123012345678!

## Notice

## Connection diagram



## Appendix A

Basic requirements for the SIM card:

- The SIM must ensure sending and receiving of SMS from the terminal.
- A SIM that only supports sending from the terminal to the server is not sufficient.
- Most M2M (machine to machine) cards usually only support from the end device to the server and are therefore mesitens not to use.

Supported frequency standards:

- GSM and / or LTE-M (CAT-M) cards are supported.
- GSM: 850/900/1800/1900 MHz
- LTE-M: B1/B2/B3/B4/B5/B8/B12/B13/B14/B18/B19/B20/B25/B26/B27/B28/B66/B95
- NB-IOT cannot be used because most telecommunication providers have not implemented SMS sending via NB-IOT.
- NB-IOT cannot be used because most telecommunication providers have not implemented SMS sending via NB-IOT.

| SMS Fehlercode | Meaning |
|---|---|
| 300 | Mobile equipment (ME) failure. Mobile equipment refers to the mobile device that communicates with the wireless network. Usually it is a mobile phone or GSM/GPRS modem. The SIM card is defined as a separate entity and is not part of mobile equipment. |
| 301 | SMS service of mobile equipment (ME) is reserved. See +CMS error code 300 for the meaning of mobile equipment. |
| 302 | The operation to be done by the AT command is not allowed. |
| 303 | The operation to be done by the AT command is not supported. |
| 304 | One or more parameter values assigned to the AT command are invalid. (For PDU mode) |
| 305 | One or more parameter values assigned to the AT command are invalid. (For Text mode) |
| 310 | There is no SIM card. |
| 311 | The SIM card requires a PIN to operate. The AT command +CPIN (command name in text: Enter PIN) can be used to send the PIN to the SIM card. |
| 312 | The SIM card requires a PH-SIM PIN to operate. The AT command +CPIN (command name in text: Enter PIN) can be used to send the PH-SIM PIN to the SIM card. |
| 313 | SIM card failure. |
| 314 | The SIM card is busy. |
| 315 | The SIM card is wrong. |
| 316 | The SIM card requires a PUK to operate. The AT command +CPIN (command name in text: Enter PIN) can be used to send the PUK to the SIM card. |
| 320 | Memory/message storage failure. |
| 321 | The memory/message storage index assigned to the AT command is invalid. |
| 322 | The memory/message storage is out of space. |
| 330 | The SMS center (SMSC) address is unknown. |
| 331 | No network service is available. |
| 332 | Network timeout occurred. |
| 340 | There is no need to send message acknowledgement by the AT command +CNMA (command name in text: New Message Acknowledgement to ME/TA). |
| 500 | An unknown error occurred. |

## Notes

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