GPU-45A

Instruction and Maintenance Manual



geopal®

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PENDING ITS-I 23ATEXQ36745 DBI reg. no 233.301 DIC444QMS

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1 Safety

Important

Please read this Instruction and Maintenance Manual carefully before the GPU-45A is put into operation.

To ensure a safe installation of the GPU-45A the installation must be carried out only by qualified personnel who are familiar with the relevant national and international legislation, directives, and standards.

Always make sure that the mains voltage corresponds with the voltage indicated on the type label.

Warning
Never remove the lid in an explosive atmosphere.
Beware of electrostatic charging. For cleaning use a damp cloth only.

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2 Declaration of conformity

The producer **Geopal System A/S**
Bygmarken 19
DK-3520 Farum

declares that the specified product

Name: GPU-45A
Type: Gas Alarm Monitor

conforms to the following directives and standards:

Low Voltage Directive 2014/35/EU
Electromagnetic Compatibility Directive (EMC) 2014/30/EU

EN 61 000-6-2 (2019)
EN 61 000-6-4 (2019)
EN 50 270 (2015)

This declaration is given in compliance with Article 7, subsection 1 of the EMC directive. For specifications of the acceptable EMC level, refer to the electrical data of the product.

Farum, 1 June 2025

Christian Møller (*Producer's signature)*

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3 Functions of control and power unit

3.1 Application

Geopal Control & Power Unit for gas detectors is part of Geopal's new generation of gas alarm monitors for the detection of gases in a range of applications.

The output relay circuit facilitates the operation of external functions like ventilation systems, magnet valves, cutting off the power supply, etc.

- The unit is available with 8 and 16 channels of 4-20 mA, or 0-10 Volts detector signal.
- Supply voltage 100-120 VAC or 200-500 VAC, 240 W.
- Detector supply 24 VDC, max 2 Amp.
- Metal cabinet (HxWxD) 400 x 400 x 210 mm for 8 lines.
  Metal cabinet (HxWxD) 500 x 500 x 210 mm for the 16 lines.
- Relay contacts. Low and high alarm levels and system faults.
  Max. Load 230 VAC, 6 Amp.
- User-friendly 5.7" TFT touch display with meter status and levels.
- Service function for easy calibration and maintenance.
- Two Security Levels. A User Password and an Admin Password.
- Modbus RTU (optional Modbus TCP) Server.

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4 Connections

All sizes of GPU-45A have standardized input and output blocks.

4.1 Input mA

Detectors can be connected to the input terminal in blocks of 8 channels up to 16 channels. Each channel has two power supply wires and two signal wires.



One block	Ch1	Ch2	Ch3	Ch4	Ch5	Ch6	Ch7	Ch8

Ch 1	1	Ain +
	2	Ain -
	+	+24VDC
	-	0VDC
Ch 2	3	Ain +
	4	Ain -
	+	+24VDC
	-	0VDC
Ch 3	5	Ain +
	6	Ain -
	+	+24VDC
	-	0VDC
Ch 4	7	Ain +
	8	Ain -
	+	+24VDC
	-	0VDC

Ch 5	9	Ain +
	10	Ain -
	+	+24VDC
	-	0VDC
Ch 6	11	Ain +
	12	Ain -
	+	+24VDC
	-	0VDC
Ch 7	13	Ain +
	14	Ain -
	+	+24VDC
	-	0VDC
Ch 8	15	Ain +
	16	Ain -
	+	+24VDC
	-	0VDC

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4.2 Input Volt.

Detectors can be connected to the input terminal in blocks of 8 channels up to 16 channels. Each channel has power supply wires and a single signal wire.



Ch 1	A	0VDC
	A	0VDC
	B	+5VDC
	C	Ain +
Ch 2	A	0VDC
	A	0VDC
	B	+5VDC
	C	Ain +
Ch 3	A	0VDC
	A	0VDC
	B	+5VDC
	C	Ain +
Ch 4	A	0VDC
	A	0VDC
	B	+5VDC
	C	Ain +

Ch 5	A	0VDC
	A	0VDC
	B	+5VDC
	C	Ain +
Ch 6	A	0VDC
	A	0VDC
	B	+5VDC
	C	Ain +
Ch 7	A	0VDC
	A	0VDC
	B	+5VDC
	C	Ain +
Ch 8	A	0VDC
	A	0VDC
	B	+5VDC
	C	Ain +

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4.3 Digital Inputs

There 2 different digital inputs that are used for connecting switches for instance Call Points.

In the software, it is possible to change the positioning of the switch. Whether it is Normally Closed (NC) contacts or Normally Open (NO) contacts. See page 16.

Each input can be set up to activate one or several Output relays if activated.

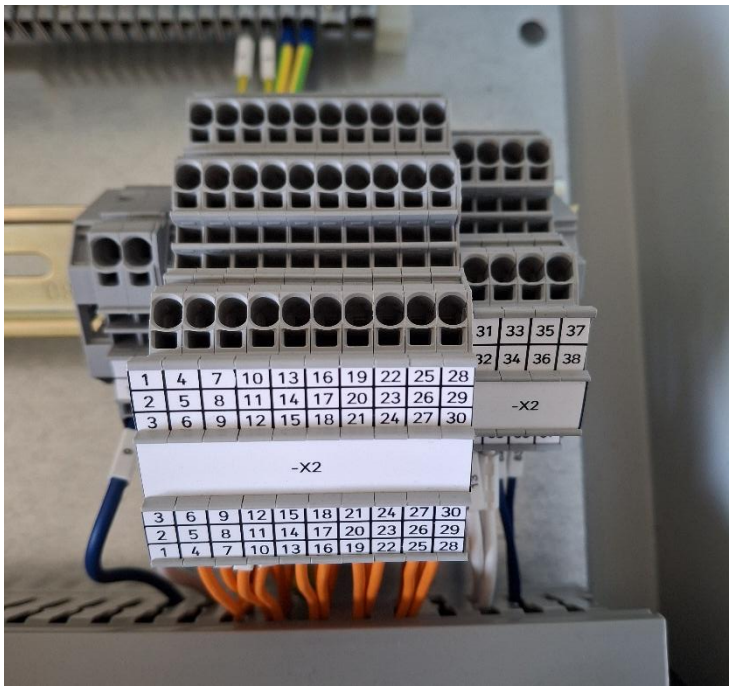


Digital Input 1	1	24VDC
	2	Digital input
Digital Input 2	3	24 VDC
	4	Digital Input

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4.4 Output

The output from the controller consists of several fully configurable relays.
The GPU-45A8 and GPU-45A16 both have 10 output relays; they are configured the same way for all versions.
Please also refer to the Schematic documentation available when ordering GPU-45A.



Relay output	
1	NO
2	COM
3	NC
4	NO
5	COM
6	NC
7	NO
8	COM
9	NC
10	NO

Relay output	
11	COM
12	NC
13	NO
14	COM
15	NC
16	NO
17	COM
18	NC
19	NO
20	COM

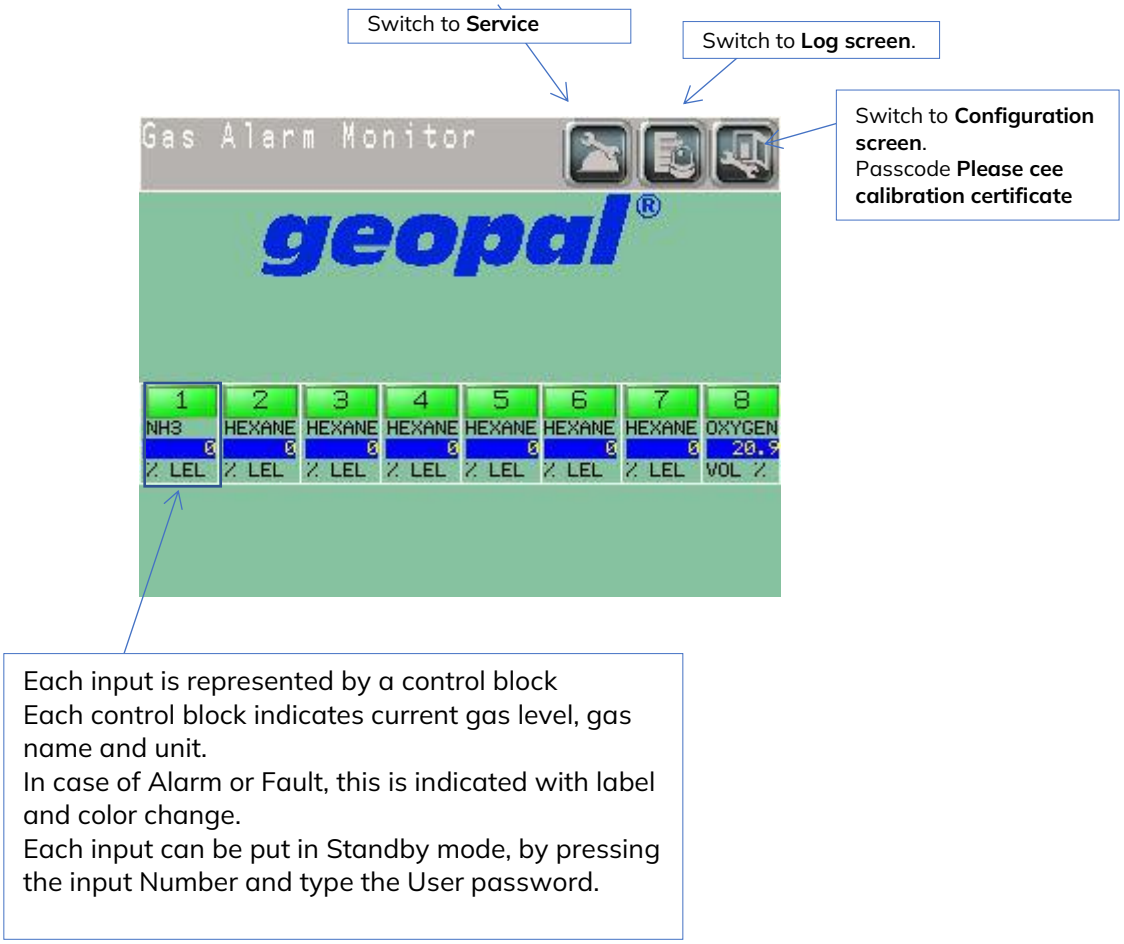
Relay output	
21	NC
22	NO
23	COM
24	NC
25	NO
26	COM
27	NC
28	NO
29	COM
30	NC

24VC Supply			
31	+24VDC	35	+24VDC
32	0VDC	36	0VDC
33	+24VDC	37	+24VDC
34	0VDC	38	0VDC

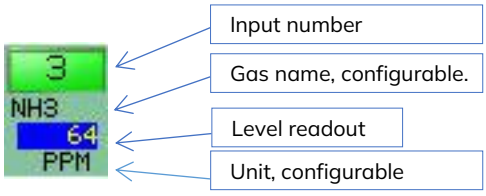
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5 GPU-45A 8 / GPU-45A16

5.1 Base screen



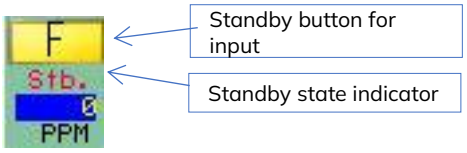
Normal State
no Alarms or Faults



Alarm/Fault state



Standby State
(Passcode **Please see calibration certificate**)
The input is not active and the input will register a fault



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5.1.1 Security Levels

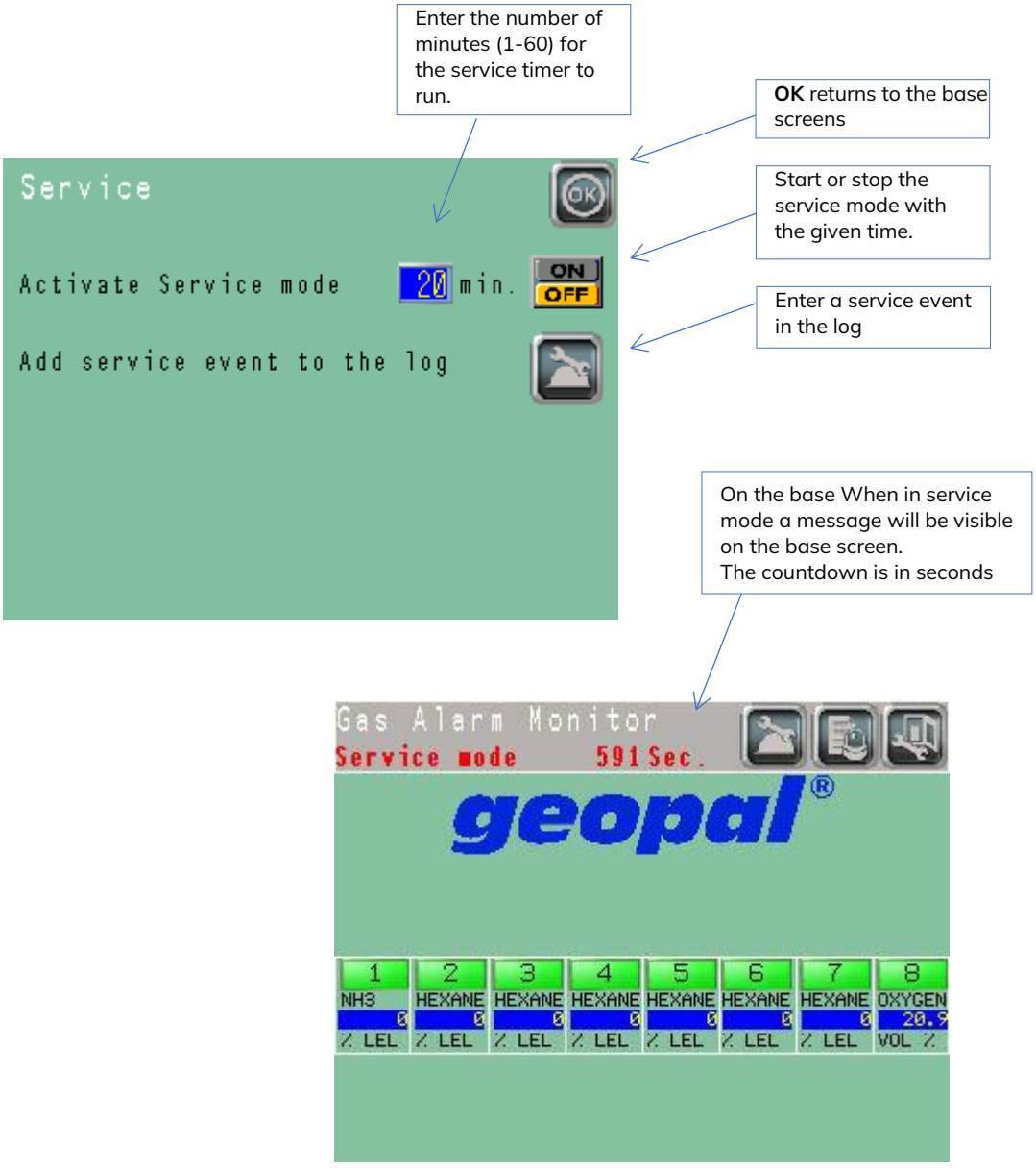
There are two security levels. **Please cee calibration certificate for passcodes for level 1 (user) and 2 (admin).**

- This allows setting detector lines in a Standby state. Note. Automatically logs out after 10 seconds.
- This gives access to all functions including the above-mentioned.

5.2 Service screen

The service screen gives access to start the service mode and enter a service event in the log.

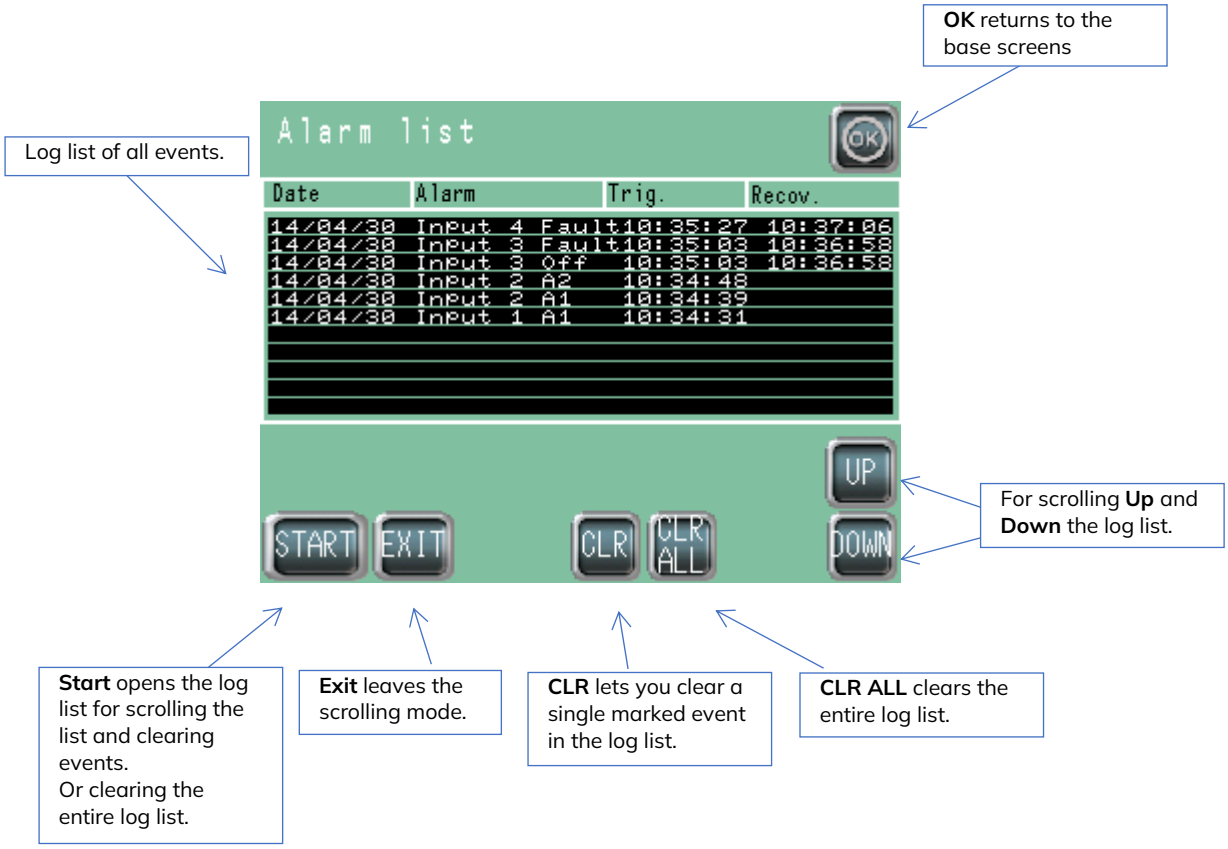
The service mode will disable the output relays, to allow for calibration and general service of the detectors.



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5.3 *Log screen*

The log screen contains a log of all events in the system.



The events that are logged in the system are listed below:

- Alarms 1 and 2 for all inputs.
- Fault events for all inputs.
- Standby events for all inputs.
- Service visit, when the service event button is pressed on the service screen.
- Service mode starts and stops.

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6 Configuration screen

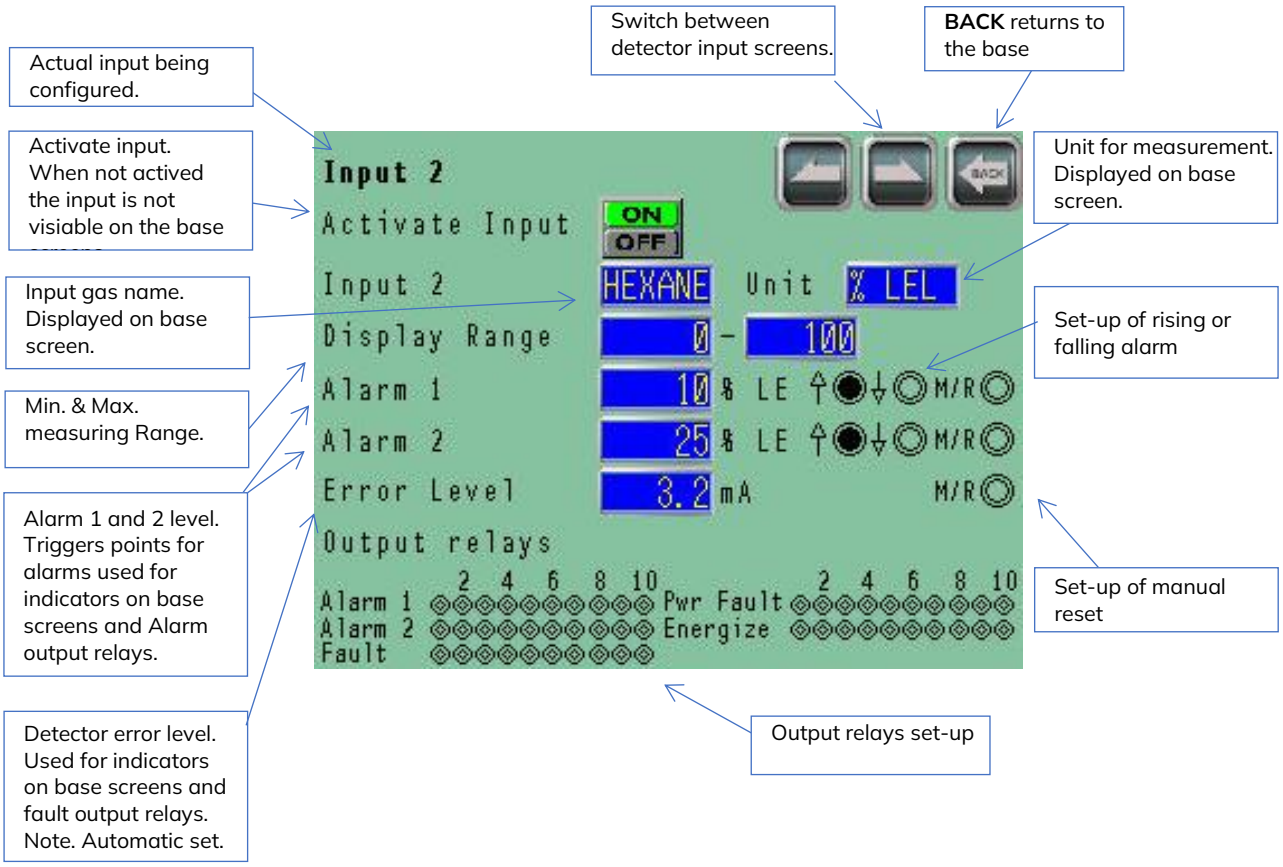
The configuration screens are passcode protected (**Please cee calibration certificate**).
The configuration screens consist of 1-8 and 9-16 input configuration screens, A Overview screen of the input/relays setup, a Digital Input configuration screen and a general configuration screen. And gives access to the Calibration Screen. Note, only for qualified personnel.



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6.1 Configure Inputs 1-8 and/or 9-16

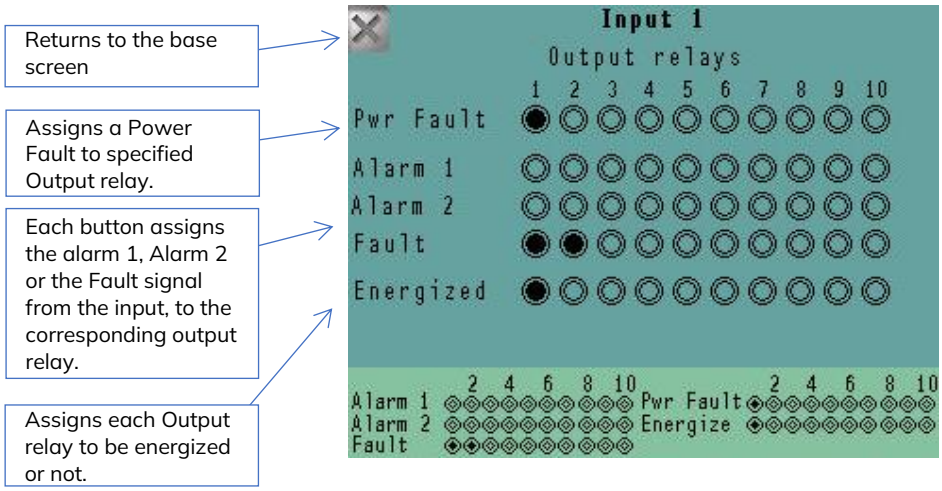
The input configuration screens all have the same layout and contain the same set of settings for each input.



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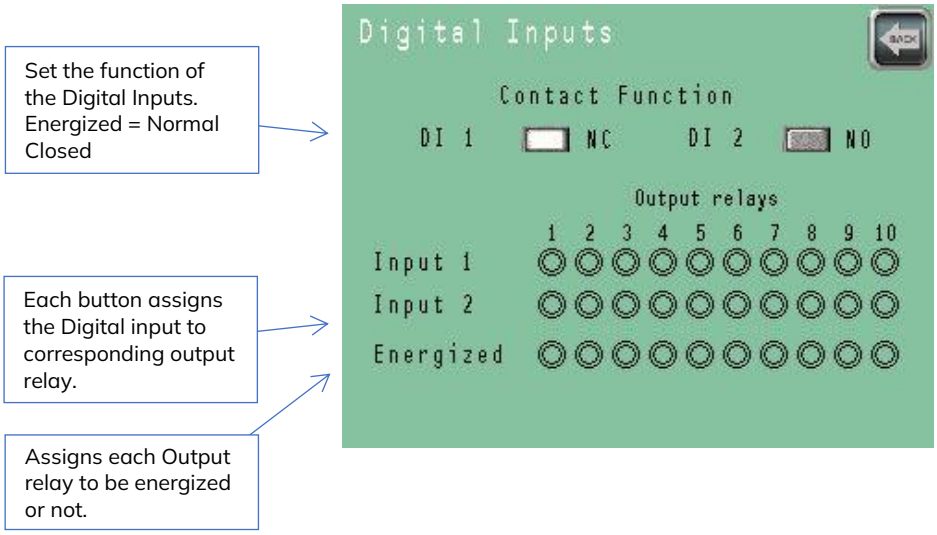
6.1.1 Configure Output relays

Configuration screen for relay matrix.



6.2 Configure Digital Inputs.

Configuration screen for the Digital Inputs.
These 2 digital inputs are used for connecting Contacts, Switches etc. for instance Call Points.



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6.3 Configure general settings



BACK returns to the base screens

Change language by selecting in the list and confirm by pressing **OK**

Displays the current time and date for the system.

Toggles the detector input signal between mA & Volt.
ONLY QUALIFIED PERSONNEL

Current software version.

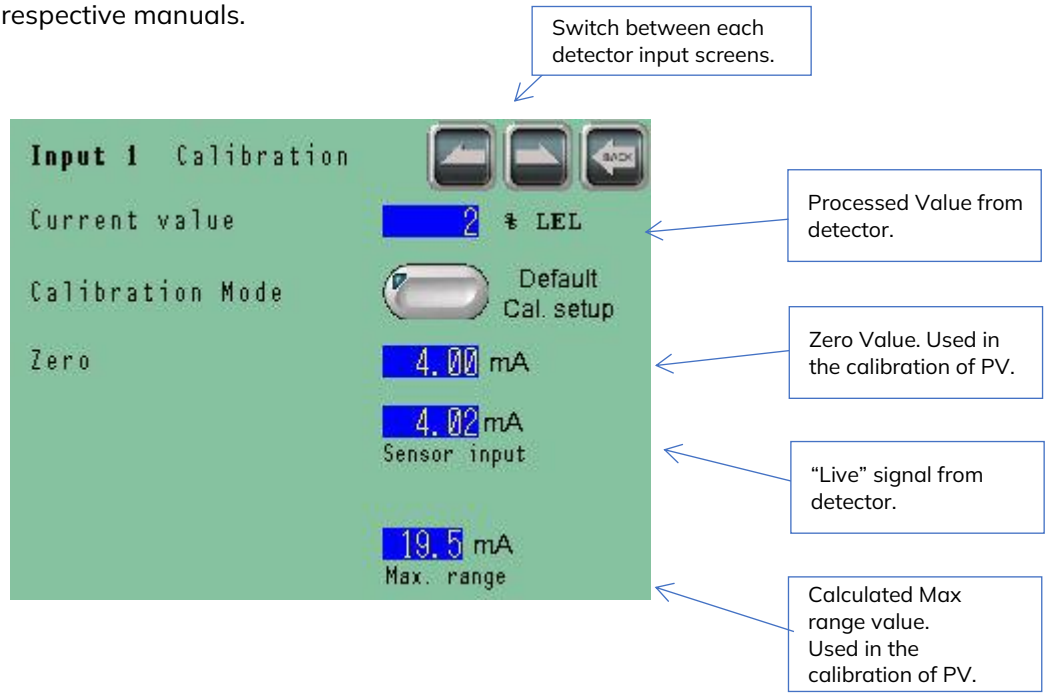
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7 Calibration. ONLY FOR QUALIFIED PERSONNEL

The Calibration menu is used for the calibration of the detector to a certain Gas type and concentration. The Monitor will be calibrated from the factory.

7.1 Calibration screen. Default Cal. setup

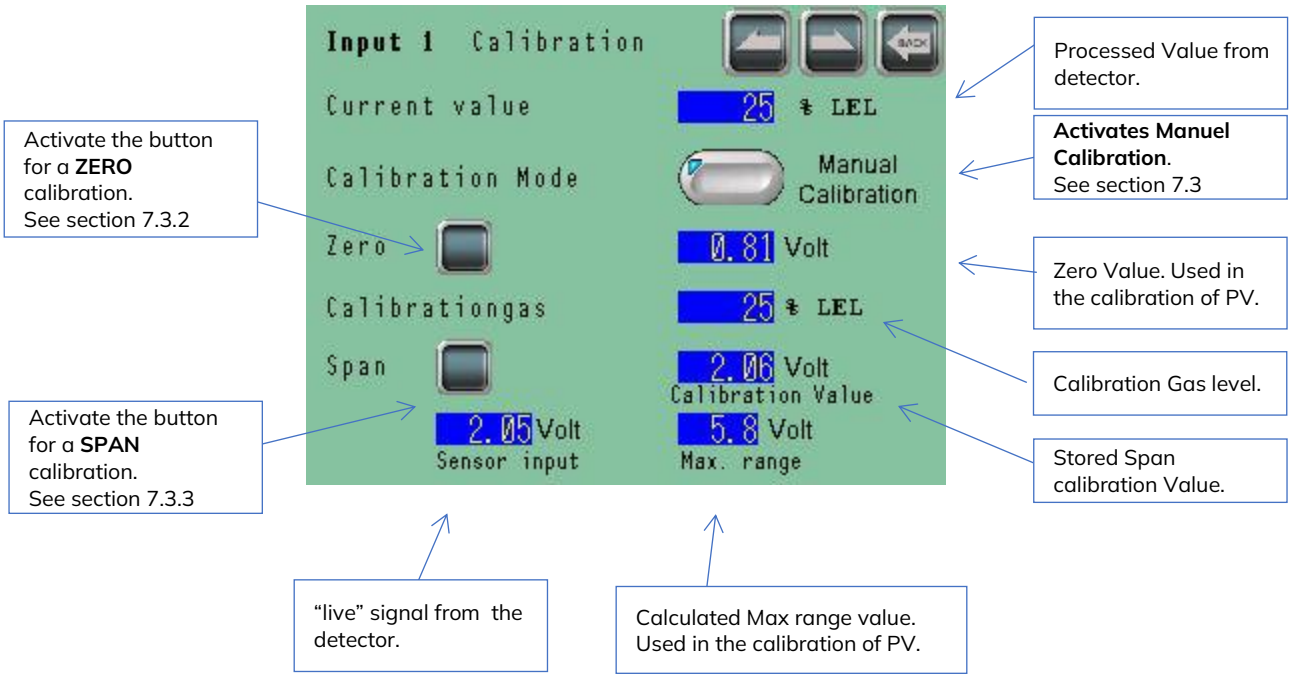
Note:
Under normal conditions, it is not advisable to calibrate a 4-20mA detector signal in the Monitor. Any calibration should be performed in the detector itself. For calibration of individual detectors, please see respective manuals.



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7.2 Calibration screen. Manual Calibration

Note:
The following menu will be shown after activating the Manual Calibration Button.

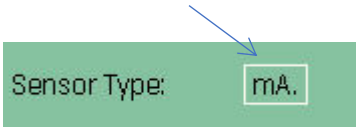


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7.3 Calibration procedure

WARNING: to avoid any alarms (Sound & Lights), set the Monitor into Service Mode. Page 12.

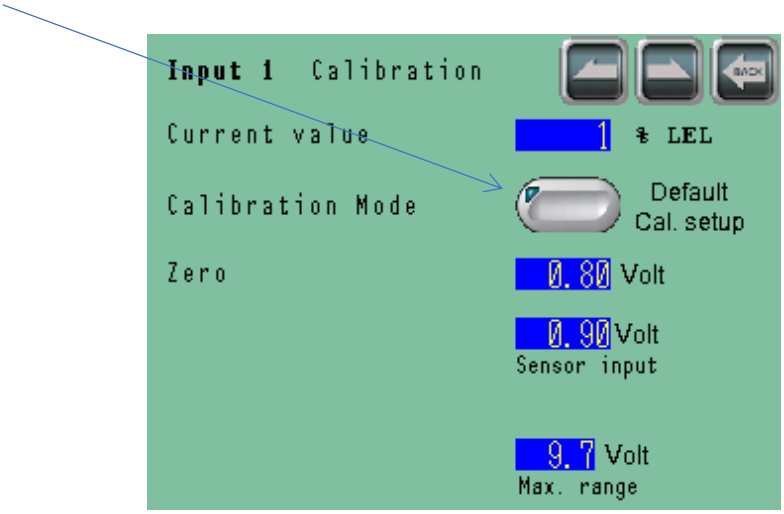
In the General Settings menu Section 6.3, Set the units according to the detector input signal (mA or Voltage)



Return to the Calibration menu, and select the detector input to be calibrated.

7.3.1 Set the Calibration Mode.

Activate the **Manual Calibration** by tapping the button.

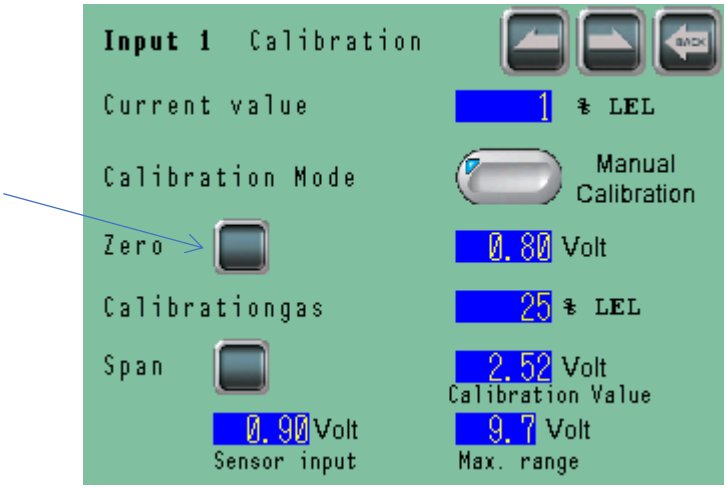


Please note.
By changing back to **Default Cal. Setup** all stored calibration data will be erased.

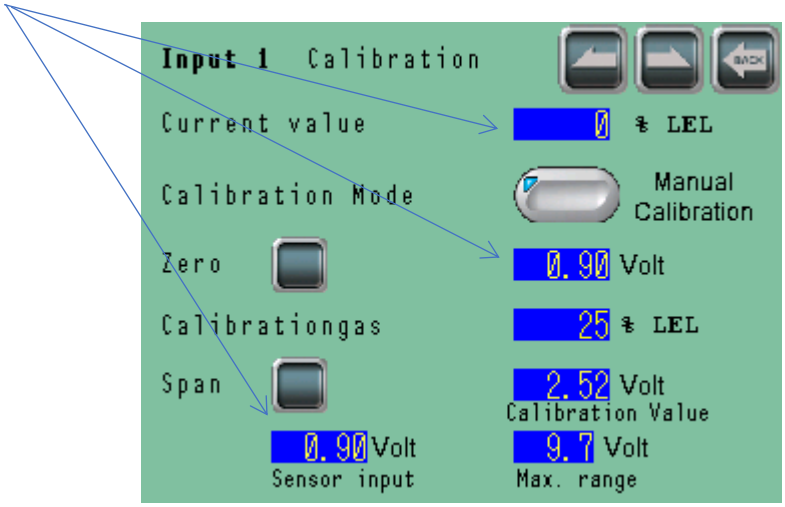
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7.3.2 ZERO Calibration

Ensure that the air surrounding the detector in question is “clean” assuring no strong smell from paint etc. is present.
Tap the **ZERO** button once, and the Zero calibration will be performed and data stored.



The display will change and show the same value as shown in the Sensor input display. And the Processed Value will be zeroed.

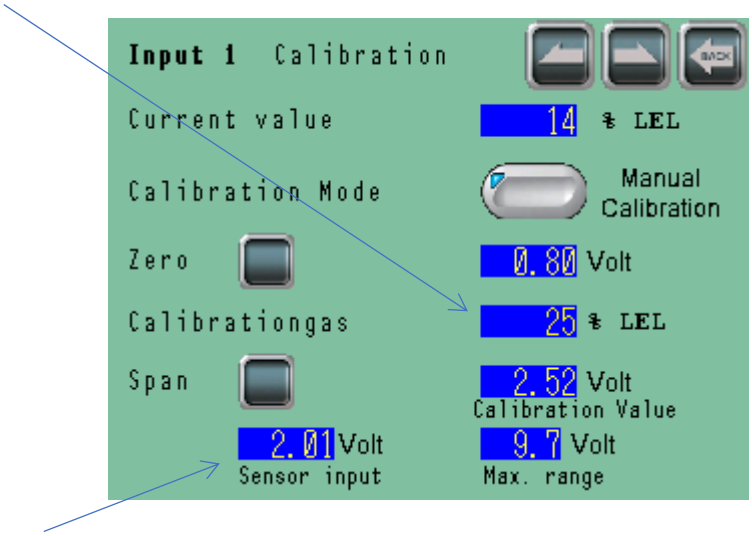


Note: The Error level, Section 6.1, will automatically be set to 80% of the Zero value.

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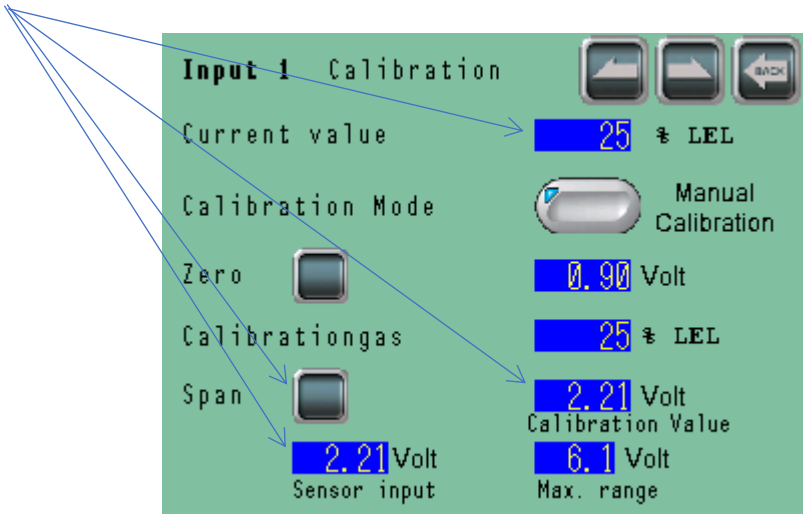
7.3.3 SPAN Calibration

Set the Calibration Gas by tapping in the blue area and typing the value.
The concentration must be below the max. Display Range. Section 6.1



When the detector starts to react to the gas concentration, it's possible to follow the reaction in the Sensor Input display.

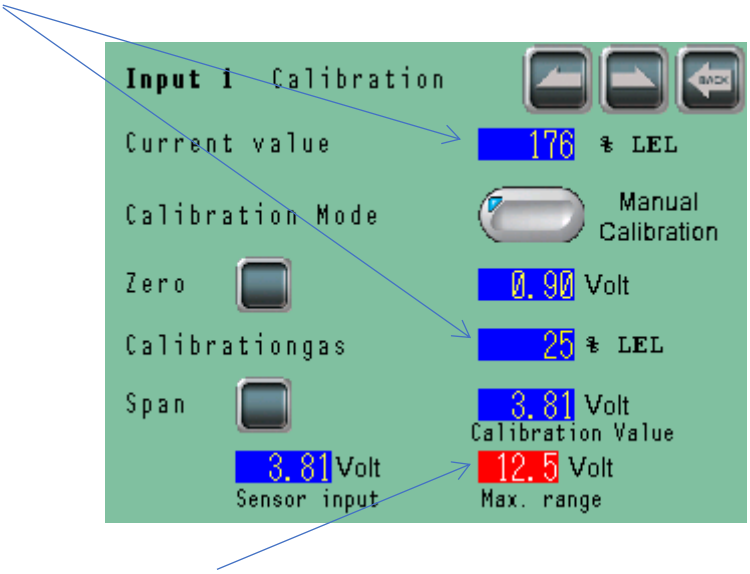
When the value is at the most, tap the SPAN button once, and the SPAN calibration will be performed and data stored.
Notice that the Calibration Value display changes to show the same value as shown in the Sensor input display.
Also, the Processed Value will be set to equal the calibration gas.



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7.3.4 Failed Calibration.

The calibration can sometimes fail in the process, showing a Processed Value that is not equal to the Calibration Gas.



This is mainly because the GPU-45 Monitor is unable to handle Input signals greater than 20 mA and 10 Volt. If this happens the Max. range display will change colour to show the cause of the failed calibration.

The Calibration equation is as followed:

$$\left(\frac{Max.Range}{Cal.Gas} \cdot (SPAN\ Cal\ Value\ - Zero\ Cal.Value)\right) + Zero\ Cal.Value$$

If the result of this equation is larger than the limit (20mA or 10V) the calibration will fail.

In this case

$$\left(\frac{100\ \%\ LEL}{25\ \%\ LEL} \cdot (3.81V\ - 0.90V)\right) + 0.90V = 12.54Volt$$

As seen the result is over the limit of 10V and therefore the cause of the failure.

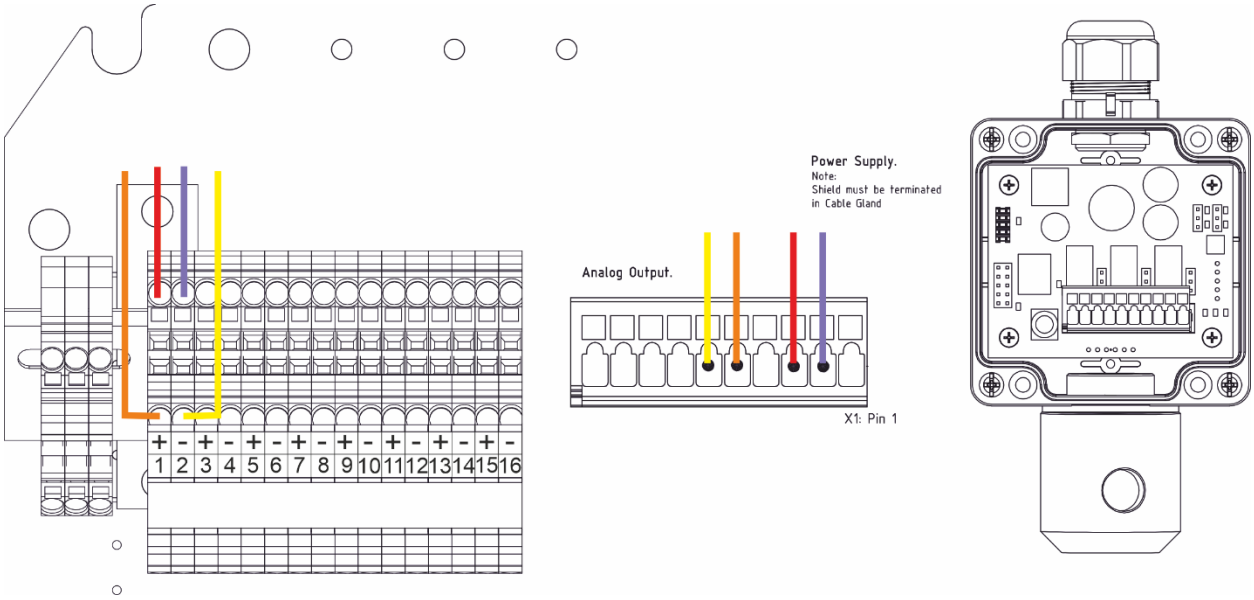
A solution to this could, for instance, be reducing the Max. measuring range, thereby reducing the multiplication factor.

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8 Connection

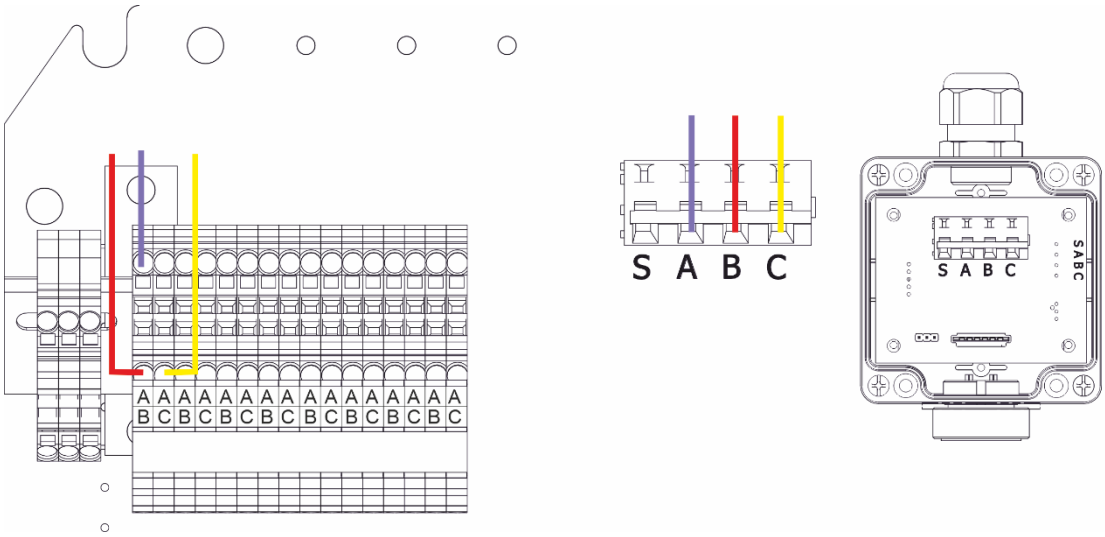
8.1 GP-SA connection

Each GP-SA detector is connected as described below.



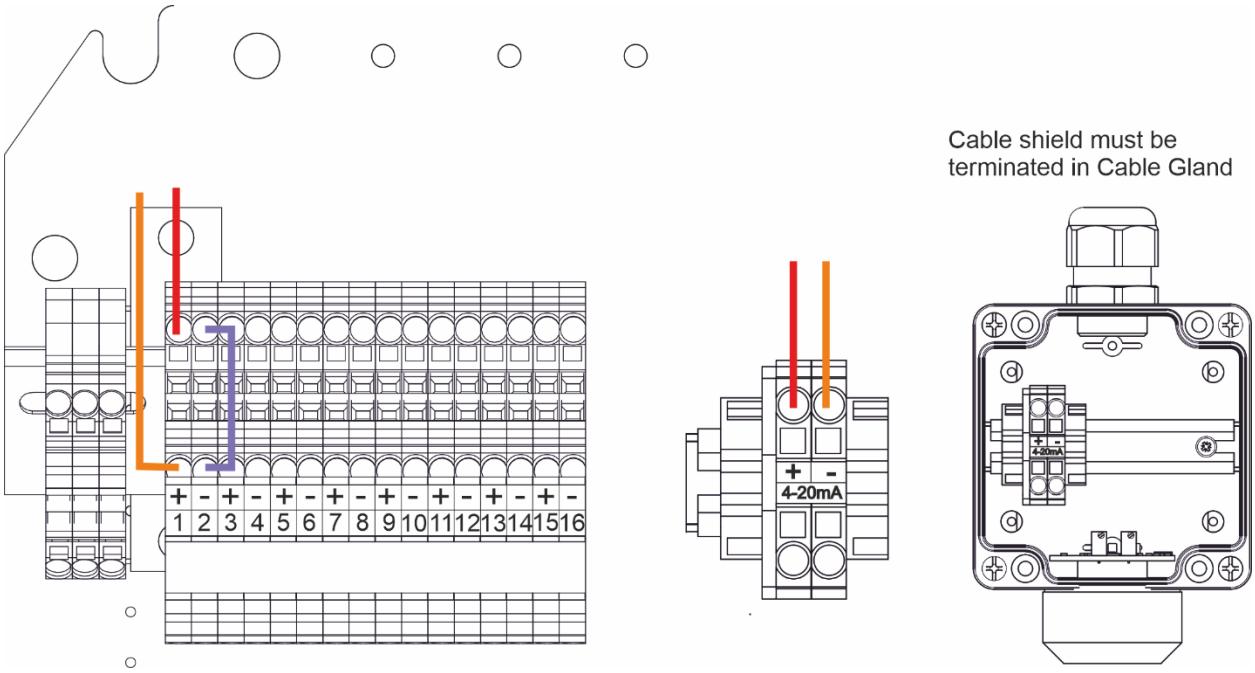
8.2 GJ-C / GJ-EX Connection

Each GJ-C or GJ-EX detector is connected as described below.



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8.3 4-20mA connection for a passive detector



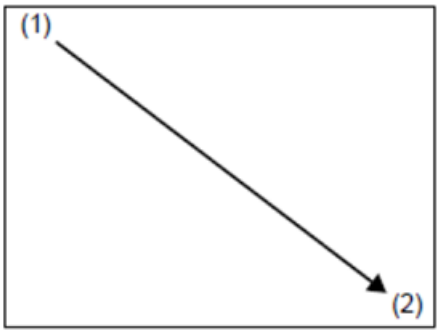
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9 General settings

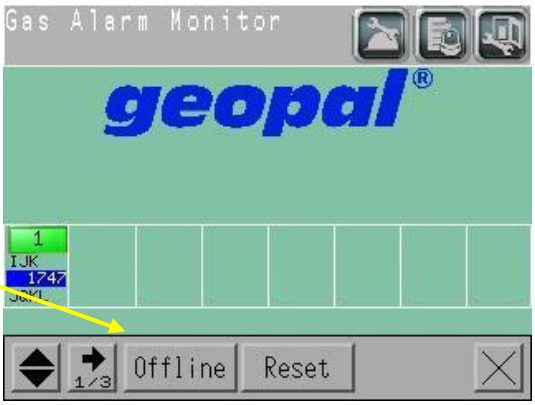
9.1 Setting the date and time

It is possible to change the date and time settings in GPU-45A if necessary. Follow the below instructions to make the changes.

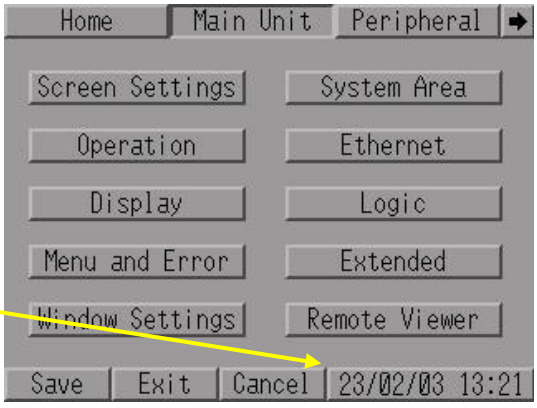
Open the Offline menu by tapping the upper left and lower right corner within 2 seconds.



Tap the **Offline** Button.



This opens the main Setting of the PLC.



tapping the lower right menu (Date/time field) the Date Setup menu appears

You will then be able to correct the date and/or time



When done Press SAVE and the Exit.

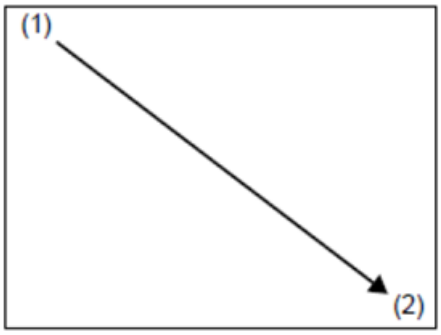
Thereafter the PLC will reboot and the date/Time setting has been changed

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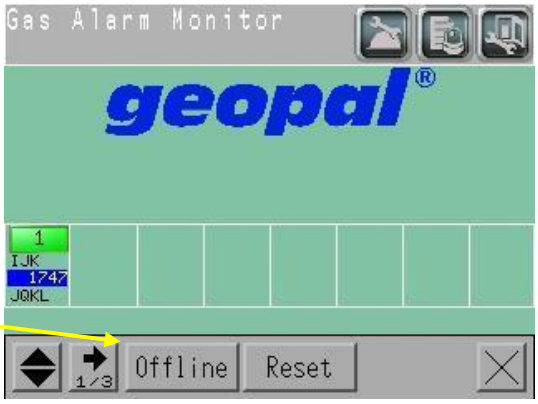
9.2 Modbus Settings

It is possible to change the Modbus Server Node address and the RTU / RS-485 communication settings in GPU-45A if necessary. Follow the below instructions to make the changes.

Open the Offline menu by tapping the upper left and lower right corner within 2 seconds.

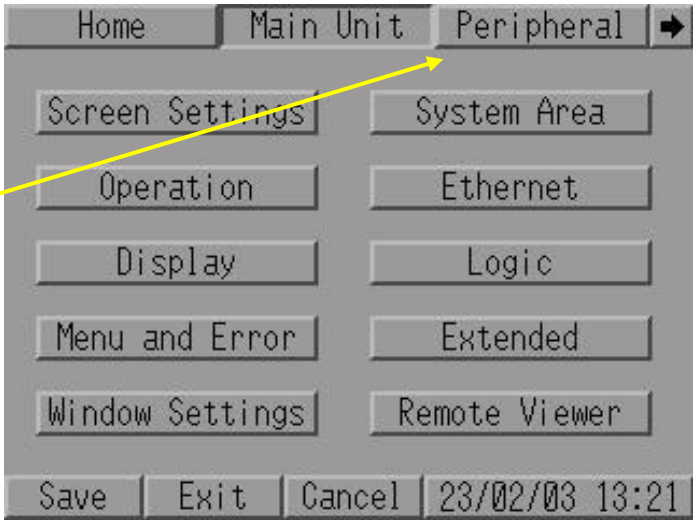


Tap the **Offline** Button.



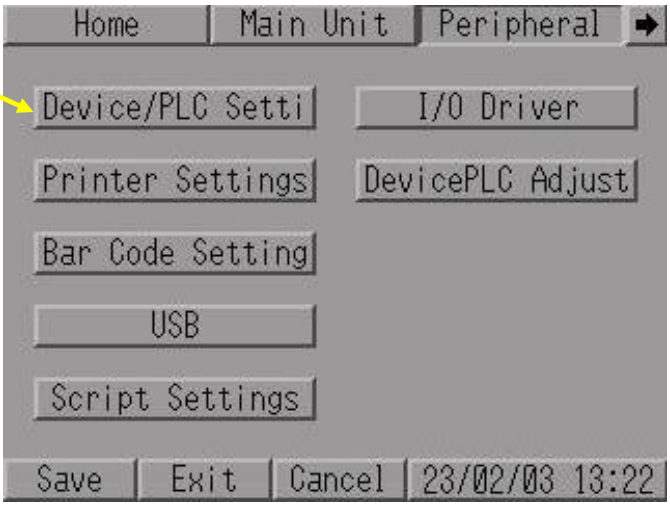
This opens the main Setting of the PLC.

Tap the **Peripheral** tab at the top of the screen.

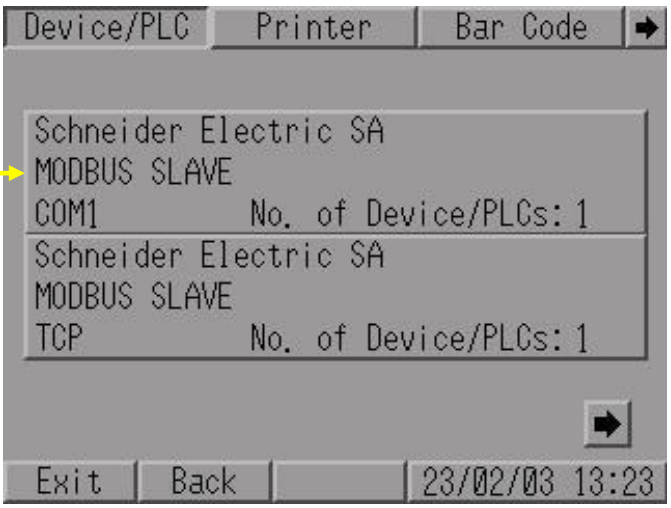


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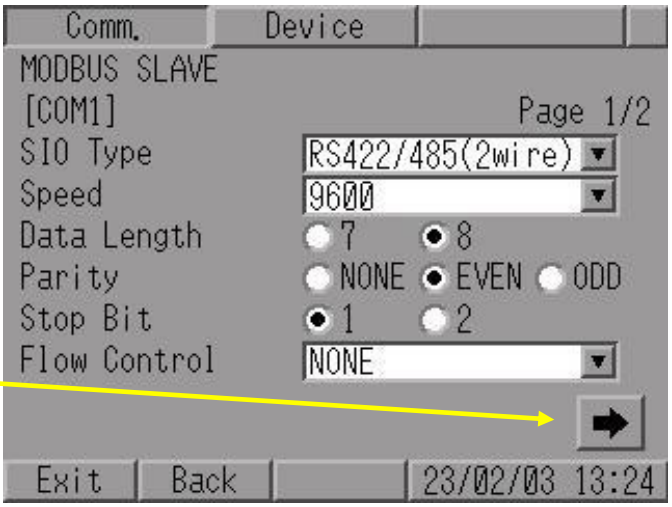
Tap the Device/PLC Setti Button.



Tap the **Modbus Slave COM1** Button.

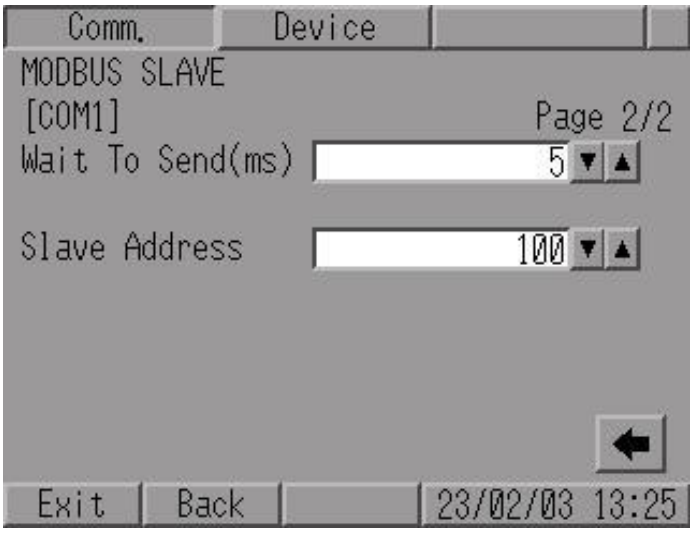


Tap the **arrow** in the lower right corner.



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Set the Modbus Slave address to whatever is needed.



Tap Exit when done.

Tap **Save Changes and exit**.

The system will now reboot and load the new data.

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10 Warranty and Disposal

10.1 Warranty

Warranty coverage
Geopal System A/S provides a 1-year warranty, starting from the date of sale to the end-user. The warranty period must be documented with the original invoice or receipt. The warranty covers defects attributable to the materials and/or workmanship.

Warranty period
The warranty period begins on the date of delivery of the product to the first end-user. If the date of purchase cannot be documented, the warranty period will start at the date of production, as indicated on each product.

Warranty is void if production labels are altered, modified, or missing.

Warranty scope
The warranty does not cover labour costs for the installation of replacement products or components, whereas Geopal System A/S chooses not to repair the product. The provision of replacement products or accessories does not extend the original warranty period. Geopal System A/S reserves the right to offer a similar replacement product or component if the original is no longer available at the time of the complaint.

Coverage according to the warranty requires that the end-user can demonstrate that defects or damages have not directly or indirectly occurred because of:

a) Faulty installation, i.e. installation contrary to the installation instructions or (in the absence of such instructions) contrary to good craftsmanship,
b) Installation outside recommended installation areas,
c) Misuse or abuse,
d) Use of incompatible spare parts or accessories,
e) Transportation, installation, or other types of handling,
f) Product modifications,
g) Other defects or damage not caused by material, production, or structural faults if the preceding enumeration is not exhaustive.

Moreover, coverage according to the warranty is conditional on the end-user demonstrating that defects or damages are not directly or indirectly attributable to failure (or that defects, damages and defects could not be prevented by) performing maintenance as prescribed in the instructions and maintenance manual.

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Written complaints
To invoke this warranty, the end-user must submit a written complaint during the warranty period to Geopal System A/S or the retailer where the product was purchased. This must occur within two months of when the end-user discovered, or ought to have discovered the defect.

Geopal System A/S shall then determine whether the product will be repaired, replaced or whether to refund the purchase price.

Repairs under the warranty
Unless Geopal System A/S provides otherwise, the end-user is responsible for the repair. The warranty covers the free supply of spare parts/materials necessary for the end-users repair of the defect.

Replacement
Redelivery will occur by replacement free of charge of the old product with a new product of the same kind, type, and quality. If, at the time of the complaint, the product is no longer produced or is not produced in the exact same version, Geopal System A/S shall be entitled to exchange it for a similar product.

Transportation/shipping to and from Geopal System A/S and/or the dealer and any dismantling and reassembly of the product shall be agreed with Geopal System A/S before implementation, and if this occurs, the customer shall cover the costs.

The warranty does not cover the following
This warranty does not apply to products other than those listed under "Coverage of the warranty". For accessories, including pre-installed accessories, refer to the manufacturer's warranty, where available. Other Geopal System A/S products, regardless of whether these are pre-installed, are covered by the separate conditions stipulated in this warranty, including those relating to the warranty period referred to under "Warranty coverage".

Geopal System A/S accepts no liability for consequential damages, including consequential loss, or product liability other than what may follow from mandatory legislation.

Geopal System A/S accepts no liability for losses resulting directly or indirectly from circumstances over which Geopal System A/S has no control, including eg. strike, lockout, fire, war, blockades, import restrictions, political unrest, unusual natural occurrences, vandalism or other force majeure.

Geopal System A/S accepts no responsibility for products that are not produced by Geopal System A/S, regardless of whether they are sold or displayed together with the products listed under "Warranty coverage".

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10.2 Disposal of electrical and electronic products

This product is electrical and electronic equipment (EEE) and shall not be disposed of as unsorted municipal waste. At end of life, the equipment shall be collected separately and disposed of in accordance with Directive 2012/19/EU on waste electrical and electronic equipment (WEEE) and the applicable national regulations. Equipment marked with the crossed-out wheeled bin symbol is subject to separate collection requirements. For further information on return, collection and treatment, contact the manufacturer, distributor or the relevant local waste management authority.



11 Technical specifications

11.1 General Specifications

Model	GPU-45A
Available gasses	Depends on the detector
Response time T90	Please refer to the detector datasheet
Calibration	Performed in the Monitor or the detectors
Cabinet	Steel (standard)
Front panels	Dull green label with print
Indicators	Green, red and yellow indicators on the LCD screen
IP rating	IP65 DIN60529
Mechanical dimensions	GPU-45A8 400x400x210 cm (HxWxD) GPU-45A16 500x500x210 cm (HxWxD)
Operating conditions	-10°C to +50°C
Humidity	0 %RH to 95 %RH not condensing
Pressure	1013 mbar ±10 %
Standard versions available	8 inputs (GPU-45A8) (4-20 mA 0-10V) 16 inputs (GPU-45A16) (4-20 mA / 0-10V)
UPS	Available as an option
Configurable settings	Settings for each input: • Gas Name or tag name • Gas unit • Measuring range • Alarm 1 level, selectable rising or falling alarm • Alarm 2 level, selectable rising or falling alarm • Fault level Assignment to output relays
Suitable detectors	GP-SA / GP-SA-V GP-CO GP-CO2 / GP-CO2-V GP-ELK GP-O2 Etc.

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11.2 Electrical specifications

Supply voltage	110 – 240VAC 50/60 Hz
Detector input	4-20 mA (active or passive) / 0-10 volt input signal
Detector supply voltage	24VDC, 500 mA (per detector)
The relay outputs	10 programmable relays, with options for Low and High alarm levels and detector faults. Max. load is 230VAC 6A
Connection Outputs	Standard: Modbus RTU (RS-485 2-wire) Optional: Modbus TCP[1]
Cable between detector and monitor	2-4 conductors 0,75/1 or 1.5 mm2 shielded

11.3 Approvals

Approvals	**Low Voltage Directive 2014/35/EU** **Electromagnet Compatibility Directive** 2014/30/EU **EN 61 000-6-2** (2019) **EN 61 000-6-4** (2019) **EN 50 270** (2015)
Quality	ISO 9001:2015

[1]Default TCP Address IP:192.168.127.1 (Internally used IP:192.168.127.2, IP:192.168.127.3)

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12 Appendix 1

12.1 Modbus RTU / TCP Server Register setup for up to 16 detectors AGA System

Default Node address 100	Status Codes, Detectors	
	1	Low Alarm (A1)
NOTE:	2	High Alarm (A2)
With measuring ranges 0-50 and below, the Measured Value should be divided by 10 for the correct Measured Value.	3	Fault state
	4	OK
	5	Detector Offline

Call to Holding Registers (Function Code 3, 16bit UNIT)

General Status	Description	Register No.	Note:
Power Failure	Set if Error	40001.00	
Digital Inputs Activated	Set if activated	40001.01	
Service Mode	Set if activated	40001.02	

Detector/channel	Description	Register No.	Note:
1	Measured Value:	400101	
	Status Codes:	400102	
2	Measured Value:	400201	
	Status Codes:	400202	
3	Measured Value:	400301	
	Status Codes:	400302	
4	Measured Value:	400401	
	Status Codes:	400402	
5	Measured Value:	400501	
	Status Codes:	400502	
6	Measured Value:	400601	
	Status Codes:	400602	
7	Measured Value:	400701	
	Status Codes:	400702	
8	Measured Value:	400801	
	Status Codes:	400802	
9	Measured Value:	400901	
	Status Codes:	400902	
Continue in the same order			
13	Measured Value:	4001301	
	Status Codes:	4001302	
14	Measured Value:	4001401	
	Status Codes:	4001402	
15	Measured Value:	4001501	
	Status Codes:	4001502	
16	Measured Value:	4001601	
	Status Codes:	4001602	

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