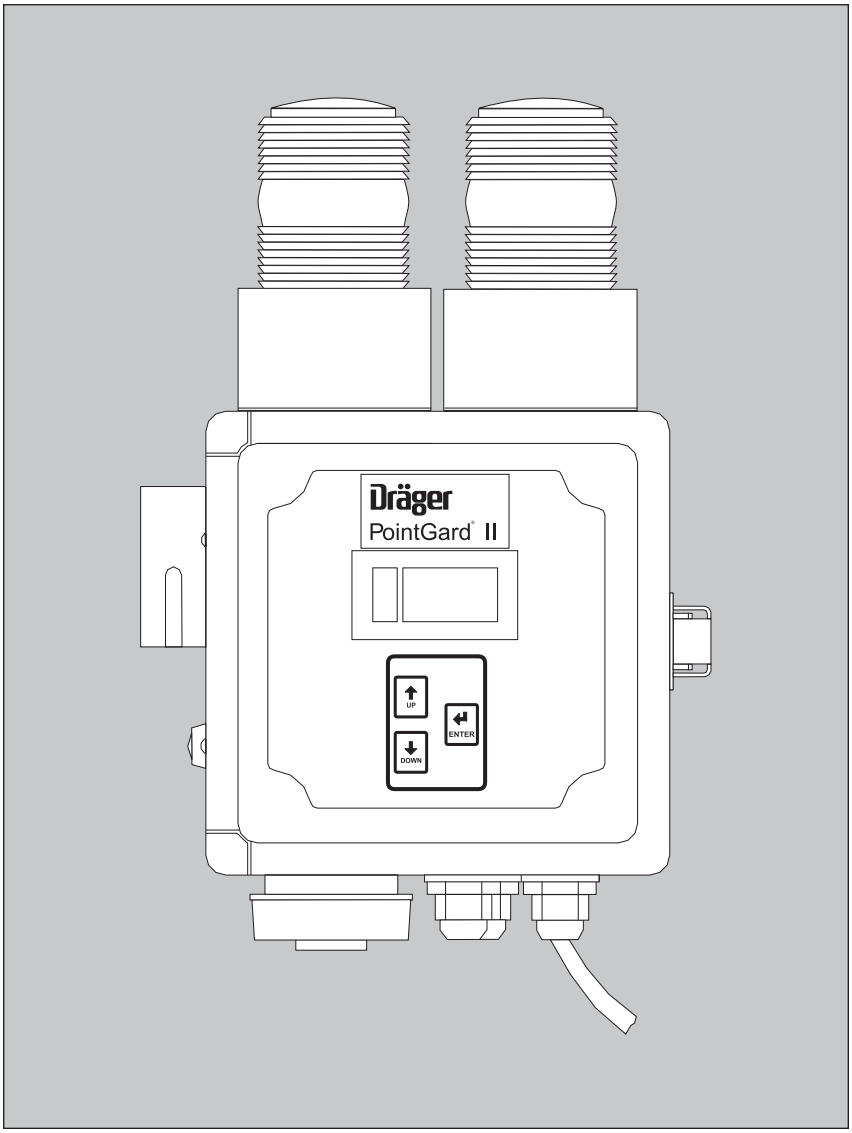
PointGard® II

Operating Manual



For Your Safety

Strictly follow the assembly and installation instructions
The instrument must be calibrated at intervals recommended in the operating manual or more frequently according to specific use and applications.

Do not calibrate the instrument in the presence of an operating radio transmitter.

Maintenance
Dräger warrants this instrument to be free of defects in material and workmanship for a period of one (1) year from date of purchase. Dräger warrants the sensor for a period of one (1) year from the date of purchase.

Use only in non-classified areas
PointGard II has no approvals for use in any classified hazardous area. Where combustion or explosion is a concern, consult the National Electrical Code and any applicable local safety codes before installation.

Liability for proper function or damage
The liability for the proper function is irrevocably transferred to the owner or operator to the extent that the transmitter is serviced or repaired by personnel not employed or authorized by Draeger Service or if the transmitter is used in a manner not conforming to its intended use.

Dräger cannot be held responsible for damage caused by noncompliance with the recommendations given above. The warranty and liability provisions of the terms of sale and delivery of Dräger are likewise not modified by the recommendations given above.

Draeger Safety, Inc.

Contents

1 Introduction

1.1 Intended Use

PointGard II is a general purpose stand-alone instrument that continuously monitors toxic gases or oxygen in ambient air. It is intended to be installed in unclassified areas only. It **must not be** installed in classified areas as defined by the National Electrical Code or applicable local safety codes.

1.2 Design

The PointGard II is designed to be a stand-alone instrument that is easy to use. The instrument is housed in a rugged NEMA-4X plastic enclosure, and has an easy-to-read LED display as well as audible and visual alarm indications. It is powered by 110 VAC or 24 VDC. The instrument comes with a standard 3-prong line cord which can be plugged into a standard U.S. wall outlet. Output signals are also available in the form of a 'sourcing' 4-20mA output and three (3) form C relay contacts.

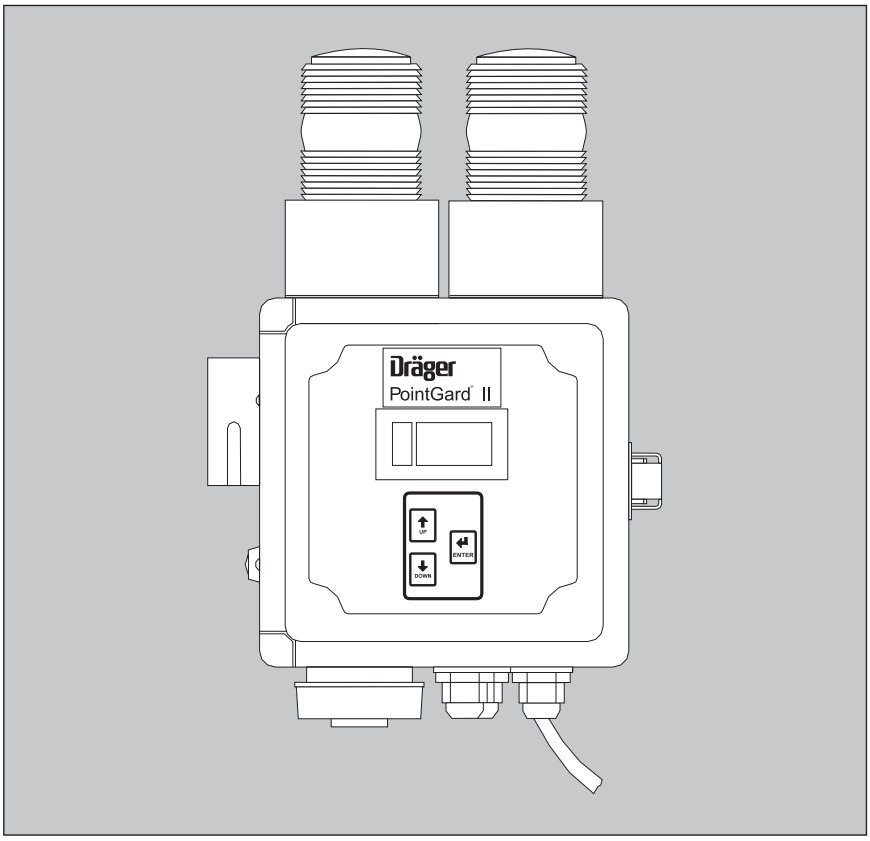


Figure 1: PointGard II

2 Operation

2.1 Installation

Using the mounting feet included with the PointGard II, mount the instrument at the appropriate height for the gas to be detected, taking into account the density of the gas, air flow patterns in the room, and personnel considerations. For most toxic gases, personnel protection is the main goal, so mounting the PointGard II at an average breathing height of about 5 feet is common practice. Responsibility for correct placement of the PointGard II rests with the end user; if in doubt about placement, consult with Draeger application engineers.

The PointGard II can be powered up by several different methods:

NOTE

Any additional wiring done by the customer should be routed using the cable glands provided with the PointGard II.

1. Plug the supplied 110 VAC power cord into a wall outlet.

OR

2. Connect the unit to a separate 24 VDC power supply. Using the existing plug connector, connect the power as shown in Figure 2. The 24 volt power supply must be a regulated supply capable of supplying 1 amp of current. Ensure that the cable from the PointGard II power supply is removed before attaching the external power supply.

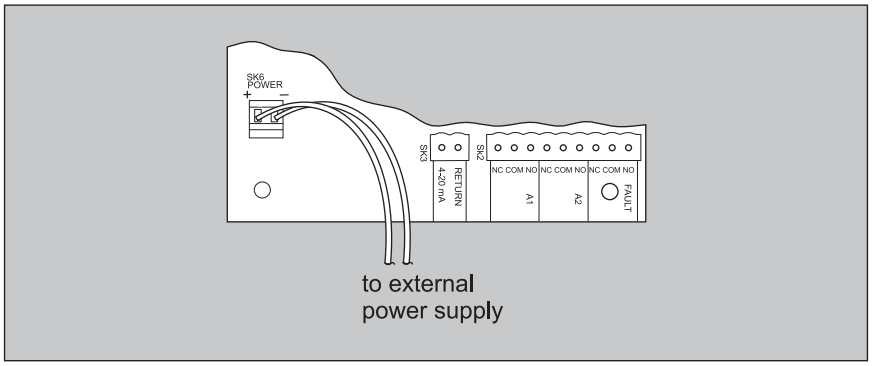


Figure 2: Connections for external 24 VDC power supply

2.2 Interface Connections

2.2.1 Relay Connections

To connect external apparatus to the relay contacts please refer to Figure 3. The contacts for each relay are as follows:

NC ..... normally closed
COM ..... common
NO ..... normally open

The contacts are defined in the normal powered-up non-alarm condition. See Section 6.5, Relay Specification.

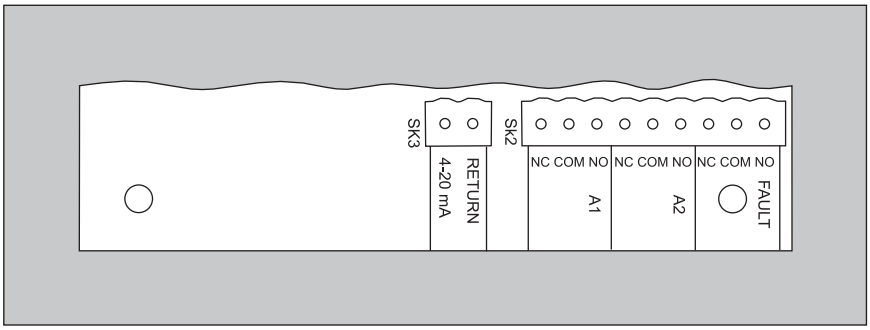


Figure 3: Connections for external 24V power supply

2.2.2 4-20mA Connections

The 4-20mA output is provided for users who want to transmit the gas concentration signal. The 4-20mA signal is capable of sourcing current into a maximum of 670 OHMs. Please refer to Figure 3 for the 4-20mA connections. The connector pin labeled '4-20mA' is the sourcing connection that transmits the signal. The connector pin labeled 'return' is the 4-20mA signal return.

2.3 Installing the Sensor

The PointGard II sensor is keyed and can only be installed one way. Use only DrägerSensors in this instrument. To install the sensor, see Figure 4 for details:

- Remove the bayonet ring from the housing. Remove and discard the cover plate.
- Unlock the enclosure clasp on the right side of the instrument, and open the front cover.
- Open the display panel by pulling on the black knob. This will allow you to see the sensor connector assembly for ease of installation.
- Remove the sensor from packaging and ensure that the sensor is a DrägerSensor.
- On the back of the sensor is a keyed connector. Insert the sensor into the sensor opening with the keying mark facing down and the Dräger logo facing up.
- Push the sensor into the sensor opening until the keyed connector mates with the connector located at the rear of the sensor opening. Since the

sensor connector is mounted rigidly to the base of the unit, ensure that the sensor is correctly aligned before pushing into place. Failure to do so could result in sensor damage. You should be able to feel when the two connectors engage.

- Reinstall bayonet ring over the front of the sensor, and turn clockwise until sensor is locked in place.
- Allow the sensor to warm up according to Table 1, Section 4, Maintenance.
- Always test a newly-installed sensor with target gas to verify proper operation.

The first time a sensor is installed, the A1 and A2 levels, latching parameter, and acknowledgeable parameters are downloaded from the sensor database. Please check these parameters after installing a new sensor, and modify as needed for your operation.

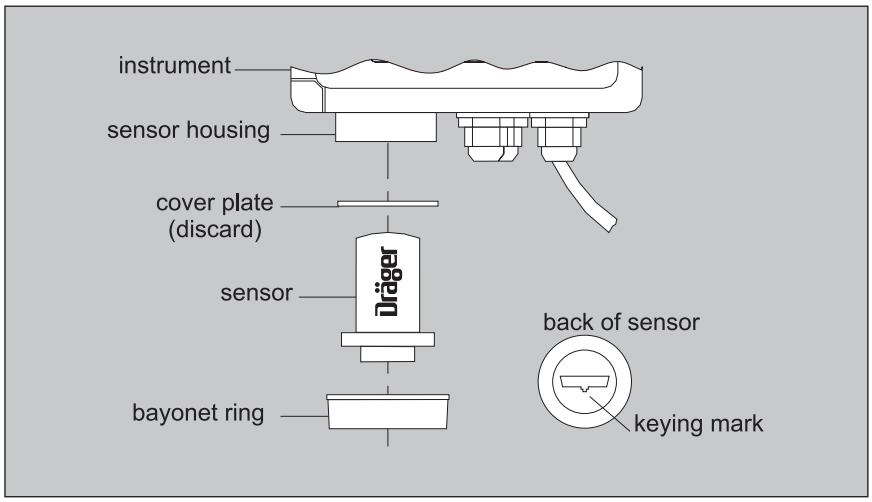


Figure 4: Installing the sensor

2.4 Replacing the Sensor

- Remove the old sensor by unscrewing the bayonet ring and pulling the sensor out of the connection socket.
- Follow instructions in Section 2.3, Installing the Sensor.
- Always test a newly-installed sensor with target gas to verify proper operation.

NOTE

When the replacement sensor has the same part number as the previously installed sensor, all user-modified values for alarm levels and modes are kept, as-is. But if the replacement sensor has a different part number, then, the alarm levels, latching parameters, and acknowledge parameters are downloaded from the sensor database. Any previous user-modified values will be overwritten. Please check these parameters after installing a new sensor, and modify as needed for your application.

2.4.1 Sensor Lock

Upon power up or sensor installation, the PointGard II checks to see if the sensor part number matches the one of the last installed sensor, in order to prevent accidental installation of an unintended sensor type. If the same sensor type is installed, the software goes directly to measurement mode, displaying the gas concentration as described in Section 3.4.1 Gas Conc. If the installed sensor differs from the sensor installed previously, the message 'Snr', 'Loc', 'On' (sensor lock on) will flash. You then have two choices: install a sensor of the previous type, or verify that you are purposely changing to a different sensor. To verify the switch to a different sensor, press and hold the Enter button. The flashing message will change to 'Snr', 'Loc', '5', then to 'Snr', 'Loc' '4', counting down from 5 to 1. You must hold the Enter button during the entire countdown. If you release the button at any time during the countdown, 'Snr', 'Loc', 'On' will begin flashing again. After counting down to 'Snr', 'Loc', '1', the instrument will switch to the measurement mode, accepting the new sensor type.

2.5 Adjusting the Horn Volume

The horn volume can be adjusted between 75 and 100 decibels, measured at a distance of one foot.

- To adjust the volume, open the enclosure by unlocking the latch on the right side of the unit.
- Lift the display panel by the black knob to access the electronics.
- Apply the target gas to the sensor using the calibration adaptor. The concentration of the target gas should be above the Alarm 1 (A1) setpoint. This should cause the horn to sound.
- Use a small slotted screwdriver to turn the horn volume potentiometer located on the back of the display board, as shown in Figure 5.
- When the volume is satisfactory, remove the gas flow, and close the display panel and the enclosure. The horn can be silenced by pushing the red button on the left side of the instrument.

NOTE

For safety, the horn should be tested during every calibration to ensure that it is operating properly.

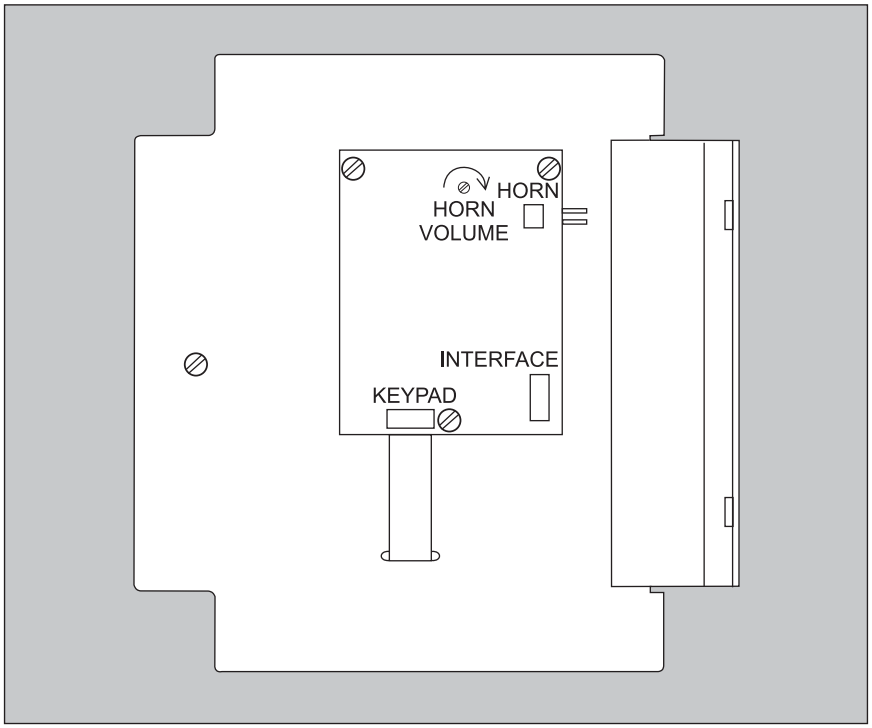


Figure 5: Adjusting the horn volume

3 Menu

In the standard operating mode, the Gas Concentration of the target gas will be displayed. Press the Down button on the display panel to access the software menu, see Figure 6. The Gas Concentration will begin flashing to indicate that you are in the menu. No password is needed to enter the menu.

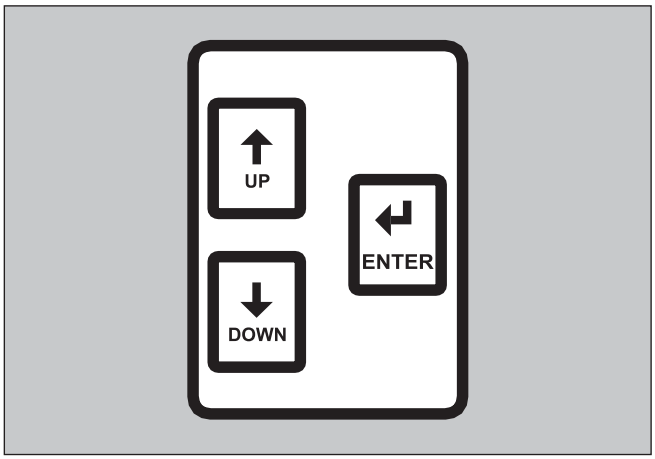


Figure 6: User interface buttons on front panel

3.1 Menu Navigation

Use the Up and Down arrow keys to scroll through the menu selections. When you reach the last item, the menu will bottom-out, and you will have to use the Up arrow to scroll back up through the menu. The active menu item as well as its current value or status will flash on the display.

3.2 Changing Parameter Values/Status

To enter a new value, or change a status, press the Enter Key when the desired menu item is displayed. The current value or status will flash to indicate a change to data entry mode. The Up and Down arrow keys allow you to adjust the value of a numerical parameter or to toggle between preset status choices (yes/no, on/off, etc.). Once the display shows the desired value or choice, press the Enter key to accept the new parameter. This will take you back to the main menu, where you can scroll to another menu item, if desired.

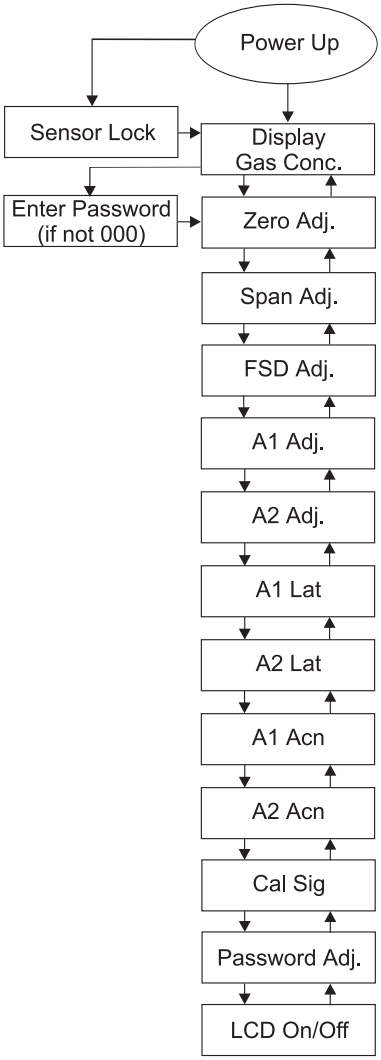
3.3 Exiting the Menu

To get back into the standard measurement mode, just scroll to Gas Concentration menu item at the top of the menu. The actual gas concentration will be displayed.

3.4 Menu Items

3.4.1 Gas Conc

Displays the current value of the concentration of the target gas in ppm. This field is read-only, and cannot be modified by the operator.



3.4.2 Password

The use of a password is optional with the PointGard II. A password consists of a 3-digit number from 000 to 999; a value of 000 disables password protection and allows anyone to access the software interface. The instrument is delivered with the password set to 000.

If a password has been set, it must be entered to gain access to the software menu. Press the Down arrow until the 'PAS' menu item is displayed. The 3-digit LCD will then show '000', with the first zero on the left blinking. Use the Up and Down arrows to increment or decrement this digit, then press Enter. The second (middle) digit will blink, and the correct value should be set using the Up and Down arrows as before. Repeat the process for the third digit. Press Enter when the full password is displayed. If the displayed value matches the set password, you will gain access to the rest of the menu. If an incorrect password is entered, the instrument will return to the measurement mode.

3.4.2.1 Password Adj

Use the Down arrow to scroll to Password Adjust. The display will show the message 'PAS', 'ADJ', '000'.

NOTE

If a password other than 000 has already been entered, that number will appear in place of '000'.

Pressing Enter causes the 3-digit display to flash. Press the Up or Down arrows to scroll the value to the desired new password. The display will stop scrolling at a maximum value of 999 or a minimum of 000; it will not roll over.

Press Enter when the desired password is displayed to accept this as the new password. Once a password is set, you will have to enter it to gain access to the menu.

3.4.3 Zero Adj

Allows you to adjust the zero reference point of the sensor when no target gas is present, such as during calibration. See Section 4.1.1, Calibration Procedure for Toxic Gases, for details.

NOTE

Zero Adjust is not active when an oxygen sensor is installed.

3.4.4 Span Adj

Allows you to adjust the displayed gas concentration to match the known concentration of an applied calibration gas. For example, if a 100 ppm calibration gas is applied to the sensor, the Span Adj value should be adjusted to 100 once the sensor reading has stabilized. See Section 4.1.1, Calibration Procedure for Toxic Gases, for details.

3.4.5 FSD Adj

Permits adjustment of the Full Scale Deflection, or range, of the instrument. Establishes the upper limit value of the 4-20mA output of the sensor. For example, if the FSD is set to 100 ppm, then 0 ppm of the target gas will produce a 4mA output, while 100 ppm will produce a 20mA signal.
Note: *This parameter is adjustable only for the CO, H_2S and NH_3 versions of the PointGard II. All other versions have a single preset FSD that cannot be modified*.

3.4.6 A1 Adj

Allows you to adjust the low level alarm setpoint. An alarm setpoint of zero disables the alarm.

3.4.7 A2 Adj

Allows you to adjust the high level alarm setpoint. An alarm setpoint of zero disables the alarm.

NOTE

For oxygen monitoring, A1 and A2 can be configured as two rising alarms, two falling alarms, or one rising/one falling alarm. A falling alarm is any setting below 20.9 vol.% oxygen; rising is any setting above 20.9 vol.% oxygen.

3.4.8 A1 Lat

Enables configuration of the low level A1 alarm to latching or non-latching status.

Latching means that once the alarm level is reached, the system will remain in alarm status even if the gas concentration subsequently drops below the alarm level.

In ***non-latching*** mode, the alarm status goes away if the gas concentration drops below the alarm level.

3.4.9 A2 Lat

Enables configuration of the high level A2 alarm to latching or non-latching status. See the definition of latching and non-latching in Section 3.4.8, A1 Lat.

3.4.10 A1 Acn

Allows you to configure the low level A1 alarm as acknowledgeable or non-acknowledgeable.

Acknowledgeable means that the alarm relay can be reset before alarm conditions clear.

Non-acknowledgeable means that the alarm relay cannot be reset until the alarm conditions clear.

3.4.11 A2 Acn

Allows you to configure the high level A2 alarm as Acknowledgeable or Non-acknowledgeable. See definitions in Section 3.4.10, A1 Acn.

3.4.12 Explanation of Latching and Acknowledgment of Alarms

Since the concepts of latching status and acknowledgment can be confusing, the following four combinations are offered for clarification:

1. Latching and acknowledgeable
   Relay must be reset manually and can be reset before the alarm condition clears.
2. Latching and non-acknowledgeable
   Relay must be reset manually. Relay cannot be reset before the alarm clears.
3. Non-latching and acknowledgeable
   Relay will reset automatically when the alarm clears or can be reset manually.
4. Non-latching and non-acknowledgeable
   Relay will reset automatically when the alarm clears. Relay cannot be reset manually before the alarm clears.

3.4.13 Cal Sig

Calibration signal is the signal that is transmitted by the 4-20mA output during calibration. It is user-selectable. The two possibilities are:

a steady 3mA signal

an oscillating 3-5mA signal with a frequency of 1 Hz

3.4.14 LCD On/Off

This feature allows you to turn the LCD output off if the desired, effectively turning the PointGard II into a non-display instrument. The horn, strobes, and 4-20mA output remain active no matter which state the LCD is in. If the LCD is Off, pressing the Down arrow when in measurement mode still gives you access to the software functions.

3.4.15 Alarm Acknowledgment/Horn Silencing

Alarm acknowledgment or clearing of the relay latch can be done two different ways:

via the Enter button on the face of the instrument

via the Reset button on the side of the instrument enclosure

4 Maintenance

Prior to calibration, each sensor must be allowed to warm up for the length of time specified in Table 1. During this time the sensor is capable of detecting the target gas, but its performance will deviate from specifications. Please see sensor data sheet for details.

Target Gas	Warm Up Time Before Calibration
Ammonia (NH3) HC	11 hours minimum
Ammonia (NH3) LC	11 hours minimum
Carbon Monoxide (CO)	10 hours minimum
Chlorine (Cl2)	1 hour minimum
Ethylene Oxide (EtO, C2H4O)	48 hours minimum
Hydrogen Peroxide (H2O2)	12 hours minimum
Hydrogen Sulfide (H2S)	12 hours minimum
Nitrogen Dioxide (NO2)	1 hour minimum
Oxygen (O2)	2 hours minimum
Sulfur Dioxide (SO2)	30 minutes minimum

Table 1

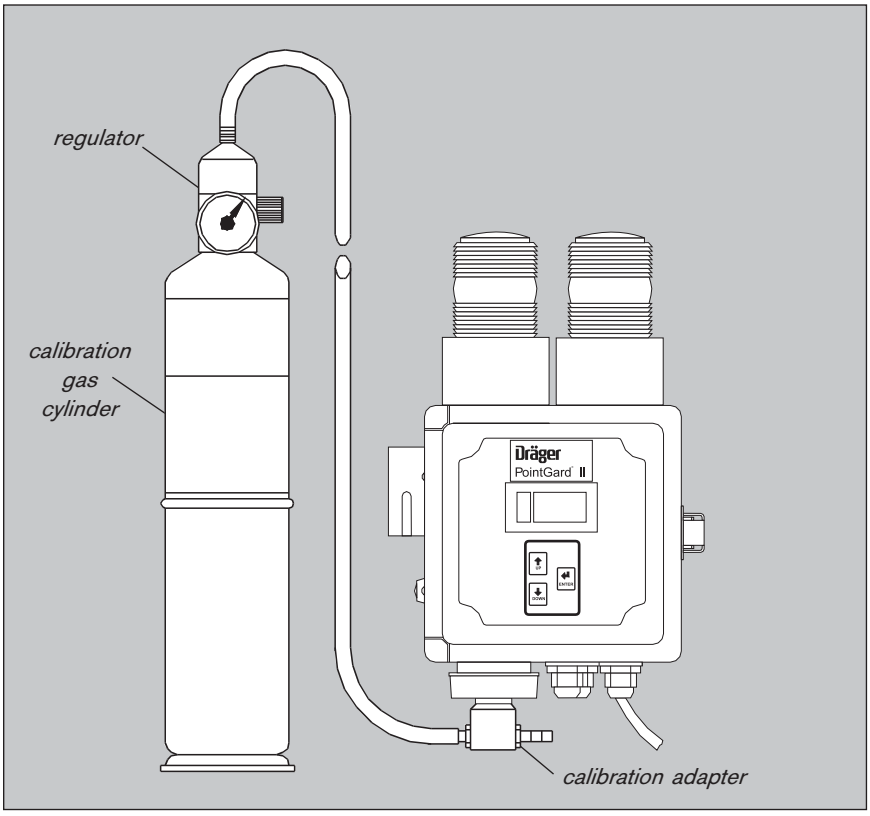


Figure 7: Calibration

4.1 Calibration

4.1.1 Calibration Procedure for Toxic Gases

For Oxygen Sensor, see Section 4.1.2, Calibration Procedure for Oxygen. Calibration of this unit must be performed at regular intervals as detailed in the sensor data sheet.

4.1.1.1 Zero Calibration

- Attach the pressure regulator to the nitrogen (N2) or Zero Air calibration gas cylinder.
- Fit the calibration adapter tightly to the end of the sensor.
- IMPORTANT: Turn the gas on and allow to flow for at least one minute before proceeding.
- Scroll through software menu to Zero Adj and press Enter. The current zero value will be displayed.
- Wait for the zero to stabilize.
- Trim the stabilized value to zero on the display using the Up and Down arrows.
- Accept the value using the Enter button.
- Turn off the gas flow and remove the calibration adapter from the sensor.

NOTE

Ambient air can be used to zero the sensor instead of nitrogen or Zero Air if the area is known to be free of the target gas or any gas to which the sensor may be cross-sensitive (as listed on the sensor data sheet). In this case, no cylinder or calibration adapter is needed for the zero calibration.

4.1.1.2 Span Calibration

- Attach the pressure regulator to the calibration gas cylinder.
- Fit the calibration adapter tightly to the end of the sensor.
- IMPORTANT: Turn the gas flow on and allow to flow for at least one minute before proceeding.
- Scroll through software menu to Span Adj and press Enter. The span value will be displayed.
- Wait for the span value to stabilize.
- Trim the stabilized value to the calibration gas concentration using the Up and Down arrows.
- Accept the value using the Enter button.
- Turn off the gas flow and remove the calibration adapter from the sensor.

4.1.2 Calibration Procedure for Oxygen

4.1.2.1 Zero Calibration

Zero calibration is not required for the oxygen version of the PointGard II.

4.1.2.2 Span Calibration

The span calibration of an oxygen sensor requires oxygen calibration gas or ambient air. Normally a cylinder containing 20.9% O2 is used to match the atmospheric concentration.

- Fit the calibration adapter tightly to the end of the sensor if calibrating with a cylinder containing oxygen. Alternatively, if you want to calibrate the span using ambient air, leave the adapter off and skip the next two steps.
- Attach the pressure regulator to the calibration gas cylinder containing 20.9% O2.
- IMPORTANT: Turn the gas flow on and allow to flow for at least two minutes before proceeding.
- Scroll through software menu to Span Adj.
- Wait for the signal to stabilize.
- Trim the stabilized value to the calibration gas concentration (normally 20.9 percent) using the Up and Down arrows.
- Accept the value using the Enter button.
- Turn off the gas flow and remove the calibration adapter from the sensor.

4.2 Error Codes

Error Code	Condition	Solution
Pls Con Snsr	No sensor is connected or sensor connection is bad	1) connect sensor 2) check to ensure sensor is seated in connector
Snr Err	Sensor EEPROM data is corrupted	1) re-install sensor 2) contact Draeger Safety technical personnel
Flt	Hardware fault or Config EEPROM on main board fails	Contact Draeger Safety technical personnel
AFE Error	Wrong software version installed in AFE; Defective AFE	Install most recent AFE software version; Replace AFE board
AFE Out	Main board is not receiving signals from AFE	Check connection to AFE board

5 Principle of Operation

The transmitter housing is made of conductive plastic which prevents electrostatic charge and is not affected by solvents or acids and alkaline solutions.

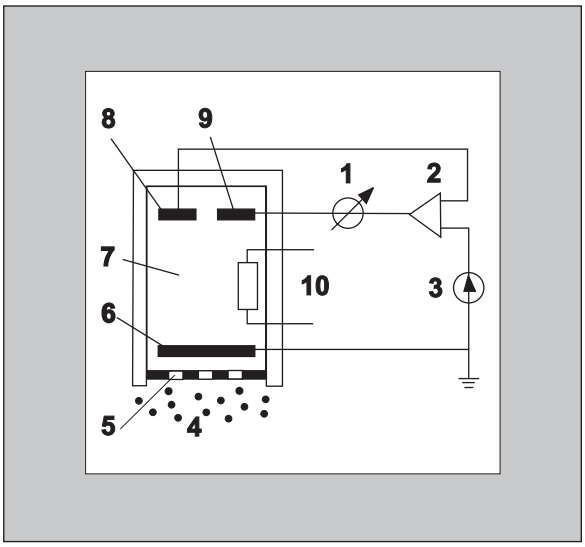
Dräger electrochemical sensors are electrochemical measuring transducers for measuring the partial pressure of gases under atmospheric conditions. The ambient air being monitored diffuses through a membrane into the liquid electrolyte in the sensor. The electrolyte contains a measuring electrode, a counter-electrode and a reference electrode. An electronic potentiostatic circuit ensures a constant electrical voltage between the measuring electrode and reference electrode. Voltage, electrolyte and electrode material are selected to suit the gas being monitored so that it is transformed electrochemically on the measuring electrode and a current flows through the sensor. This current is proportional to the gas concentration.

At the same time, oxygen from the ambient air reacts at the counter-electrode electrochemically.

The current flowing through the sensor is amplified electronically, digitized and corrected for several parameters (e.g. the ambient temperature). The resulting measured value is given as an analog, 4-20mA signal.

Design Principle

1 Meter
2 Potentiostat
3 Direct current supply
4 Measured gas
5 Membrane
6 Measuring electrode
7 Electrode
8 Reference electrode
9 Counter-electrode
10 Temperature sensor



6 Technical Information

6.1 Signal Transmission to Central Control Unit

Analog	Transmission by 3-core shielded cable
– Measurement current	4mA to 20mA
– Transmitter fault	<2mA
– Maintenance Signal	4mA ± 1mA, 1 Hz modulation or steady 3mA signal (user selectable)

6.2 Voltage of Power Supply

Operating Voltage	21.6 - 26.4 VDC, 110 VAC
Operating Current	120mA @ 24 VDC
Connector accepts 16 to 22 gauge wire AWG (0.4 to 1.5 mm^2)	

6.3 Physical Specifications

Enclosure	NEMA 4X (IP65)
Cable glands	accepts wire diameter up to .27 inches
Size (enclosure and strobes)	12.75 x 7.25 x 5.1 inches
Weight	6 lbs.

6.4 Environmental Parameters

Temperature	–4 to 122 °F, (–20 to 50 °C)
Pressure	20.7 to 38.4 in. of Hg (700 to 1300 mbar)
Humidity	5 to 95% r.h., non-condensing
Maximum Air Velocity	≤ 19.5 ft/s (≤ 6 m/s)

6.5 Relay Specification

Relays	Energized for Fail Safe Operation
Relay Contacts	3 SPDT (Single Pole Double Throw) for A1, A2 and Fault
Contact Rating	5A @ 30 VDC, 5A @ 250 VAC

6.6 Ambient Influences

See sensor data sheets.

7 Default Values

PointGard II Unit	FSD	A1	A2	A1 LAT	A2 LAT	A1 ACN	A2 ACN
CO	500 ppm	30	100	non	yes	yes	non
H_2S	100 ppm	10	20	non	yes	yes	non
EtO	100 ppm	10	20	non	yes	yes	non
O_2	25 vol%	19.0	23.0	yes	yes	non	non
NH_3HC	500 ppm	50	100	non	non	non	non
NO_2	100 ppm	5	10	non	non	non	non
SO_2	100 ppm	2	4	non	non	non	non
Cl_2	50 ppm	0.5	1.0	non	non	non	non
NH_3LC	100 ppm	12.5	25.0	non	non	non	non
H_2O_2	50 ppm	1.0	2.0	non	non	non	non

8 Order Information

Order #	Description
4543310	PointGard II (without sensor)

8.1 Replacement Sensors

Order #	Description
6809605	DrägerSensor CO
6809610	DrägerSensor H2S LC
6809615	DrägerSensor OV (for EtO)
6809630	DrägerSensor O2 LS
6809645	DrägerSensor NH3 HC
6809655	DrägerSensor NO2
6809660	DrägerSensor SO2
6809665	DrägerSensor Cl2
6809680	DrägerSensor NH3LC
6809705	DrägerSensor H2O2 LC

8.2 Accessories

Order #	Description
4594620	Calibration Kit (Contains pressure regulator, calibration adapter, 100% nitrogen (N2) zero gas, tubing, and carrying case)
Please note: calibration span gas is not included in the calibration kit. Consult with Dräger application engineers for required part number.	

8.3 Spare Parts

Order #	Description
4543362	Keypad Membrane
4543363	Strobe, Red
4543364	Strobe, Amber
4543365	Horn Assembly
4543366	Switch Harness Assembly
4543367	Cable Kit
4543368	PCB Main Assembly
4543369	Analog Front End PCB Assembly
4543370	PCB Interface Assembly
4543371	Power Supply w/Cover
4543373	Hardware Kit

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