Монитор кислорода
G22

Руководство по эксплуатации

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Россия +7(495)268-04-70
Казахстан +(727)345-47-04
Беларусь +(375)257-127-884
Узбекистан +998(71)205-18-59
Киргизия +996(312)96-26-47

эл.почта: axq@nt-rt.ru || сайт: https://analox.nt-rt.ru/

Contents

*** WARNING ***

These instructions should be read and understood by all individuals who will be responsible for operation of this analyser. The actions taken as a result of the measured oxygen levels must be in strict accordance with the Company and Government Regulations.

1.0 Introduction

Figure 1 : G22 Front Panel View

1.1 The G22 Oxygen Analyser is designed to provide continuous display of Oxygen levels in the range 0.01-99.99% O2.

1.2 The analyser is normally supplied with a temperature compensated (-5°C to + 50°C) electro-chemical oxygen sensor providing approximately 3 year sensor life at normal atmospheric oxygen levels. The sensor is mounted remotely, exposed to the atmosphere being monitored.

1.3 The G22 has a large digital display which is illuminated for approximately 20 seconds after operating any of the front panel switches. By switching off the backlight, power consumption is minimised.

1.4 The G22 operates from either AC or DC supplies as follows:

a) an a.c. power source in the range 105 volts to 240 volts (50/60 Hz) WITHOUT switching or selecting
b) a d.c. power source in the range 9v to 26v d.c. The unit is protected against reverse polarity connection.

1.5 The instrument is easy to calibrate, using the 'ZERO' and 'CAL' adjustments on the front panel.

1.6 User adjustable high and low audio/visual alarms are fitted. These are adjusted via large lockable pots on the front panel, and may be adjusted over the range 0.10% to 99.99% O2. The alarms are latching, and must be accepted by pressing the Mute switch on the front panel.

1.7 The Mute switch, in addition to accepting the alarms, can be used to perform an indicator/buzzer test. In the absence of any alarms, pressing the Mute switch for approximately 2 seconds will cause the indicators to flash four times, as they do at power on.

1.8 An alarm relay is provided which is permanently energised in the absence of a high or low alarm condition.

1.9 An analogue output is provided. This is scaled 0-2.5v over the range 0-100% O2.

2.0 Installation

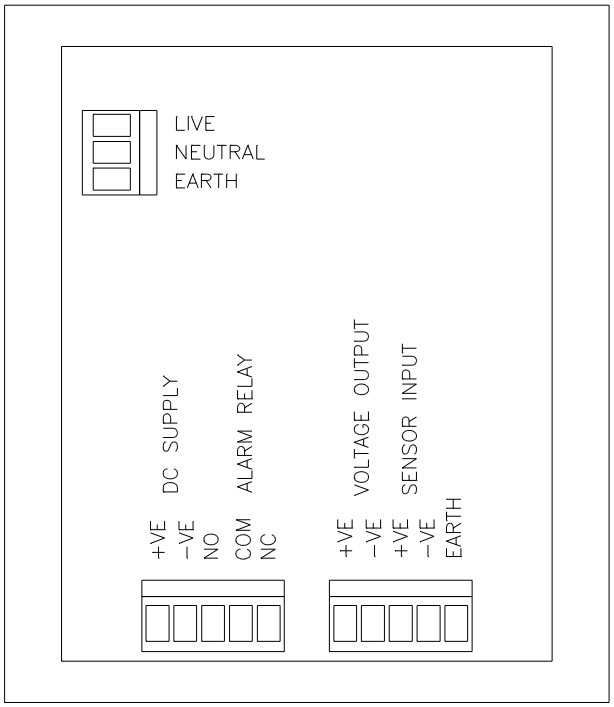


Figure 2 : Rear Panel Connections to G22 Instrument

2.1 The instrument is designed to be panel mounted using the four mounting screws provided. It is designed to offer IP20 protection, and should therefore be mounted in a clean, dry area.

2.2 The instrument requires a fused power supply connected to the rear panel. This may be either

a) an a.c. power source in the range 105 volts to 240 volts (50/60 Hz). Note that NO voltage selection is required when using this input - the instrument will operate from any voltage within the stated range.

The supply should be fused with a 500mA 'T' type fuse.

An Earth connection is provided with the mains input to allow the case to be earthed.

b) a d.c. power source in the range 9v to 26v d.c. The unit is protected against reverse polarity connection.

The supply should be fused with a 500mA 'T' type fuse.

2.3 The Oxygen Sensor must be connected to the rear panel terminals. Note that the sensor is polarity sensitive and must be connected correctly. The inner wire of the screened cable is the negative signal line, whilst the screen/braid is the positive signal line. No harm to the instrument will occur if the sensor is reverse connected - it will only result in a display of '-Neg' on the display and operation of the Low Alarm.

The Earth terminal adjacent to the signal input is provided for applications where additional signal screening is required.

2.4 The Common Alarm relay has a single pole change-over contact arrangements, rated to switch up to 1A at 30V DC, 0.3A at 110V DC or 0.5A at 125V AC.

The contacts of the relay are accessible on the rear panel. Three terminals are provided, Common, Normally Open and Normally Closed. Internal connections between the terminals are as per the following detail:

Condition	NC-COM	NO-COM
Switched Off	Short Circuit	Open Circuit
Switched On No Alarms	Open Circuit	Short Circuit
Switched On Hi or Lo Alarm	Short Circuit	Open Circuit

2.5 The Analogue Voltage output is accessible on the rear panel. The output voltage is 0 to +2.5V corresponding to the 0-100% oxygen signal.

The Voltage output should NOT be connected to a load less than 10,000 0hms.

3.0 Controls

3.1 The analyser is fitted with an on/off switch located on the front panel. Push the switch down to turn the unit on and return it to the up position to turn it off. When it is switched on an indicator test is performed. Each of the indicators will flash four times and the horn will sound. The analyser's display will show the manufacturers' name (AST), and then revert to displaying the oxygen reading. Alarms are disabled for the first ten seconds of operation. The display backlight is illuminated for the first twenty seconds after switching on. The green 'System OK' indicator will flash briefly every few seconds to indicate that the instrument is operating.

3.2 The display select switch is labelled 'Set Hi' and 'Set Lo'. It will return by spring bias action to the centre position, when the oxygen level will be displayed. By pressing the switch to 'Set Hi', the user may interrogate the present setting of the High alarm. By pressing the switch to 'Set Lo', the user may interrogate the present setting of the Low alarm.

The instrument continues to monitor the oxygen input when either of these actions are being performed, therefore if either of the settings is taken into alarm, an alarm will be annunciated.

3.3 The two rotary controls marked 'Set Hi Alarm' and 'Set Lo Alarm' allow the user to set the high and low alarm setpoints. The user will normally adjust these whilst viewing the current setting on the display using the display select switch (Section 3.2). Rotating either control anticlockwise reduces the alarm setpoint, whilst clockwise rotation increases the alarm setpoint.

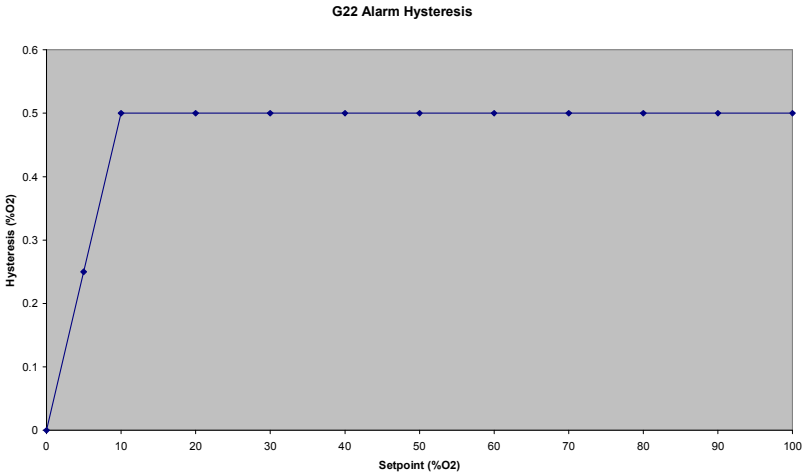
These controls remain active even when the display select switch is not used.

Before any Adjustments are made to these controls, the operator should release the locks on the knobs. This is done by moving the small lever located at the edge of the control until the knob turns freely. After adjustment, the locks should be reset in order to prevent accidental movement.

NOTE: The Mechanical locking action may move the Set point very slightly (less than 0.05%) and will result in the set point being moved slightly lower than the desired value. If necessary, this can be overcome by observing the error when locking the control and then resetting the adjustment to the desired point PLUS the error before locking. e.g. if the desired setpoint is 23.00 and the observed error on locking is 0.03 then adjust the control to read 23.03 and on locking, the setpoint will be moved to 23.00.

3.4 The indicators marked HI and LO show the presence or otherwise of a high or low alarm condition. Alarms are latched, such that an operator will be made aware of any alarm occurrence whilst the instrument was unattended. The alarms have a built-in Hysteresis to overcome 'nuisance' triggering when measuring near the set points. The level of hysteresis applied depends upon the magnitude of the alarm setpoint:

i) for setpoints < 10.00%, the hysteresis is calculated as 5% of setpoint value
ii) for setpoints >10.00% the hysteresis is fixed at 0.50% oxygen



This means that if a high alarm occurs with a set point of 23%, then having been acknowledged by pressing the MUTE button, the alarm will not clear until the oxygen level drops below 22.5%.

The HI indicator will start to flash when the oxygen signal is equal to, or greater than the High alarm setpoint. The indicator will continue to flash until the Mute switch has been pressed AND the oxygen signal is lower than the alarm setpoint by the hysteresis amount.

The LO indicator will start to flash when the oxygen signal is equal to, or less than the Low alarm setpoint. The indicator will continue to flash until the Mute switch has been pressed AND the oxygen signal is higher than the alarm setpoint by the hysteresis amount.

The common alarm relay will be de-energised whenever either HI or LO indicator is flashing.

3.5 Whenever an alarm is newly annunciated, the horn will sound. It sounds at a fast rate for a High alarm condition, and a slower rate for a Low alarm condition. A yellow indicator is also provided on the front panel to indicate which instrument is sounding in situations where several instruments are mounted on the same panel.

3.6 Pressing the Mute switch will silence the horn. If the oxygen signal is still deemed to be in an alarm condition, the alarm indicators will continue to flash. If the signal is no longer in alarm, the indicators will stop flashing when the Mute switch is pressed. The common alarm relay will be energised when the alarm indicators stop flashing.

3.7 Two calibration adjusters are provided on the front panel. 'Zero' controls the zero setting of the oxygen signal, whilst 'Cal' adjusts the span of the oxygen signal. Refer to Section 4 for details regarding calibration.

4.0 Calibration

NOTE: The performance of the instrument within its specification limits is dependant upon correct calibration, and the accuracy of calibration gases used. The accuracy of the instrument is 'only as good as it's last calibration'.

4.1 Zero Adjust/Check

Pass pure Nitrogen or Helium across the sensor at a flow rate of approximately 50 litres/hour for 3 minutes. Using the trimming tool provided with the instrument or a small Instrument screwdriver, adjust the 'ZERO' control until the display reading flickers between a display of -0.00 and 00.00. If the display flashes between '-Neg' and 00.00, the unit is indicating that the Zero Control has been adjusted more than required. Note: The low alarm will trip during the Zero setting process, and may be muted if desired.

4.2 Span Adjustment/Check

The analyser span adjustment can be done in two ways:

a) Expose the sensor to normal ambient atmosphere. When the reading is steady, adjust the 'CAL' control on the instrument front panel until the display reads 20.95%. Turning the control clockwise will increase the reading. This completes the calibration process.

b) Expose the sensor to a known accurate oxygen concentration gas, at a flow rate

of approximately 50 litres/hour for 3 minutes across the sensor. When the displayed reading is steady, adjust the 'CAL' control on the front panel until the reading agrees with the known gas concentration. Turning the control clockwise will increase the reading. This completes the calibration process. If the desired readings cannot be obtained, then the sensor capsule is probably exhausted and should be replaced.

5.0 Troubleshooting

SYMPTOM	REASON	SOLUTION
No display	Switched off No Supply	Switch on Check supply fuse
Zero reading	Sensor disconnected Sensor expired	Check connection Change sensor
Reading erratic	Pressure on sensor Excessive Radio transmission Sensor old or faulty Condensation on sensor	Check flow Move unit away from source Change sensor Dry sensor face
Reading does not change when calibration adjusted	Sensor failure Internal Fault	Change sensor Contact manufacturer
Display segments missing	Display faulty	Return to dealer
Will not calibrate	Sensor faulty Sensor not subjected to calibration gas	Change sensor Check flow adapter

6.0 Maintenance

6.1 Sensor replacement (9212-2 Type)

When the instrument can no longer be calibrated by adjustment of the 'CAL' control, it is probable that the Oxygen Sensor Capsule is exhausted and should be replaced.

To replace the sensor module proceed as follows:

a) switch off the instrument
b) unscrew the electrical signal plug from the sensor assembly
c) pull the sensor module from the flow adapter housing
d) remove the new sensor from its packaging and ensure that the O ring is fitted on the threaded bush
e) push the new sensor into the flow adaptor housing,
f) screw the electrical signal plug into the sensor assembly
g) switch the instrument on
h) allow a period of approximately one hour for the new sensor to settle
i) recalibrate the instrument as detailed in Section 4
j) record details of the sensor change in the space provided in Section 11.

7.0 Care Of The G22

7.1 The G22 is not designed to be used in wet conditions.

7.2 To clean the G22 use a damp soft cloth.

7.3 The sensor in the G22 is an electrochemical device and contains a caustic electrolyte. Always check to make sure that it is not leaking and do not allow it onto any part of your body or clothing. In the event that you do come into contact with the electrolyte wash the contaminated part with copious amounts of water -see Safety Information.

WARNING
If after handling the sensor your fingers or other part of your body feels slippery or stings wash with a lot of water.
If stinging persists get medical attention!

8.0 Safety Information G22

8.1 When the life of the sensor has expired or it is leaking or otherwise damaged it must be disposed of safely in accordance with local regulations.

8.2 The sensor contains Potassium Hydroxide (KOH) solution which is hazardous and can have the following effects:

Skin	Potassium Hydroxide is corrosive - skin contact could result in a chemical burn.
Ingestion	Can be harmful or FATAL if swallowed.
Eye	Contact can result in the permanent loss of sight.

First Aid Procedures.

Skin	Wash the affected part with a lot of water and remove contaminated clothing. If stinging persists get medical attention.
Ingestion	Drink a lot of fresh water. Do not induce vomiting. Get medical attention.
Eye	Wash with a lot of water for at least 15 minutes and get medical help immediately.

8.3 Sensor Handling Information.

Replacement sensors for the G22 are normally supplied in sealed bags. Before the bag is opened, check that the sensor has not leaked. The sensors are themselves sealed and do not under normal circumstances present a health hazard however if leakage of the Potassium Hydroxide electrolyte has occurred use rubber gloves and wear chemical splash goggles to handle and clean up. Rinse contaminated surfaces with water.

9.0 Repair Of The G22

Apart from periodic sensor capsule replacement, the instrument has been designed to provide long, trouble-free service. However, in the event of a fault condition arising, contact your local distributor or Divex, whose address, telephone and fax numbers appear on the front page of this handbook.

The Instrument contains complex, precision circuitry which requires special test equipment to ensure correct internal set-up and calibration. Internal repairs or adjustments by the user are therefore NOT recommended.

THE MANUFACTURER
WILL NOT ACCEPT RESPONSIBILITY
FOR ANY EVENTS OCCURRING
AS A RESULT OF UNAUTHORISED ADJUSTMENTS
OR REPAIRS TO THE INSTRUMENT.

10.0 G22 Specifications

Range	0.01 - 99.99% Oxygen
Accuracy	+/- 1% of readout
Resolution	0.01% Oxygen
Response time	90% in less than 15 seconds
Temperature Effect	+/- 0.1% of readout per °C
Sensor Type	Analox 9212-2
Sensor Life	More than 36 months in air
Operating temperature	-5 to 50° C
Storage temperature	-5 to 50° C
Pressure	Sensitive to the partial pressure of oxygen.
Relative Humidity	95% at 40°C non-condensing.
Power Supply	105v to 240v A.C. 50/60 Hz (Universal input) 9v to 26v D.C. Max Ripple 1v.
Analogue Output	
Output Voltage	0-2.5V for Chart Recorder or similar
Output Impedance	must drive into resistance greater than 10KΩ
Relay Output	Single pole change-over contact
Contact Rating	1A at 30V DC 0.3A at 110V DC 0.5A at 125V AC
Alarms	1x Low Alarm, 1x High Alarm
Range	0.10 - 99.99% O2
Resolution	0.01%
Hysteresis	Fixed at 0.50% O2
Dimensions	19" Rack Mount (1/4 x 3U)
Depth behind panel	75 mm
Height	128 mm
Width	106 mm
Weight	0.5 kg

11.0 Sensor Replacement Record

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