

*QuickStart*TM

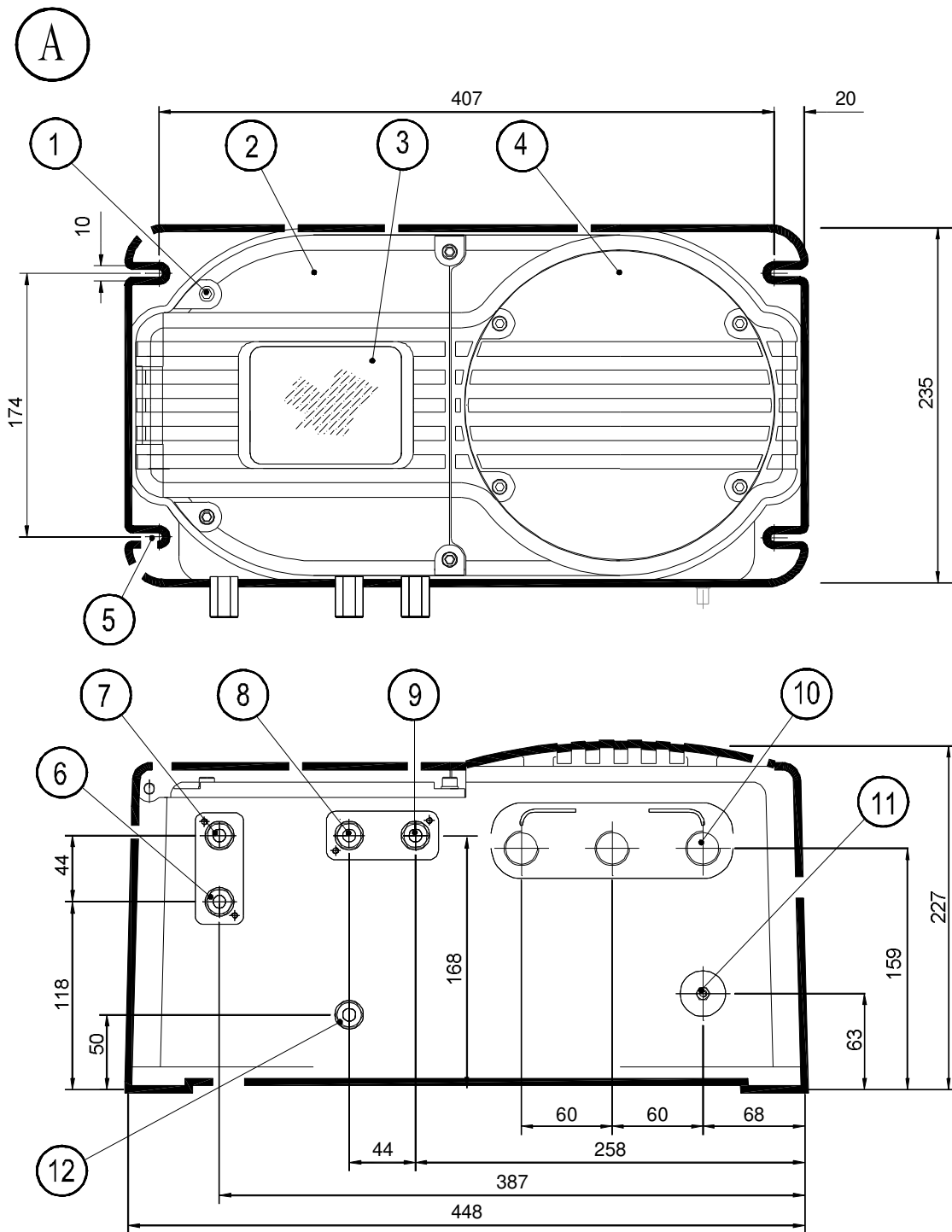
1800
Oxygen Analyser Safe Area

Please record your analyser details below

Part Number	
Serial Number	
Tag Number	

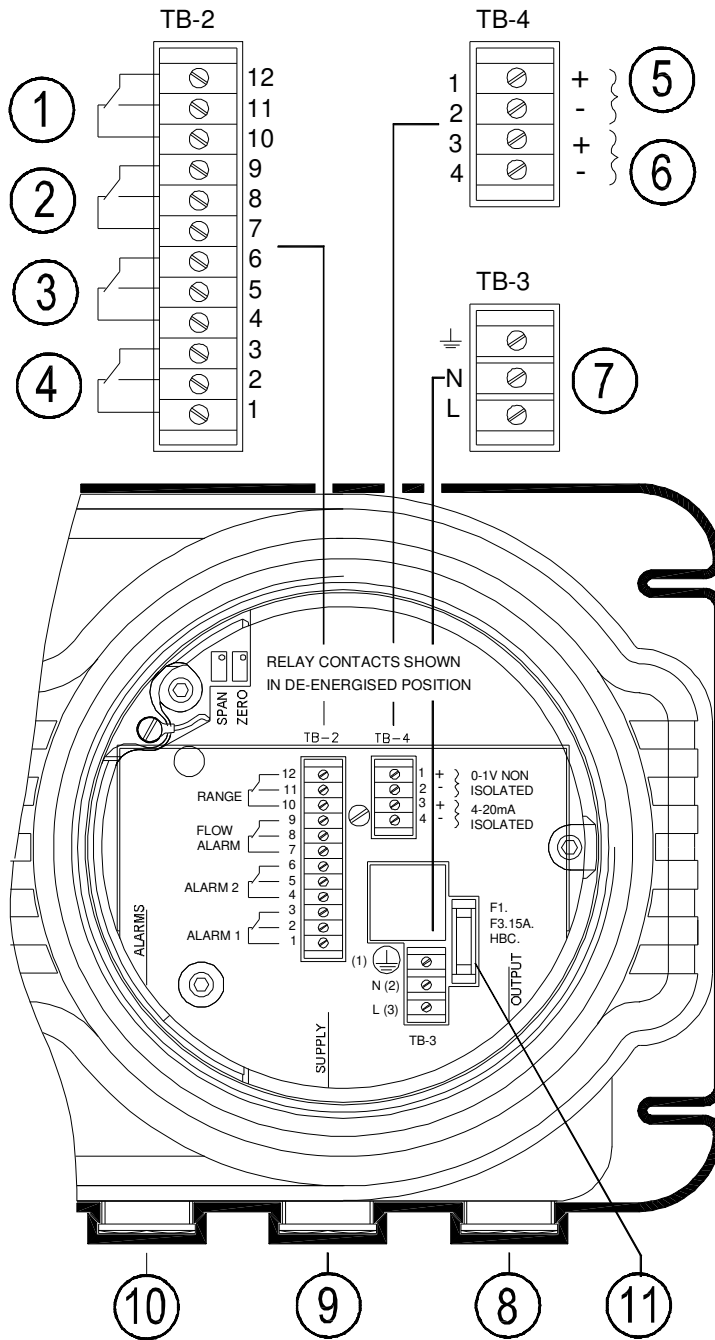
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| GB | OPERATING INSTRUCTIONS | <input type="checkbox"/> |
| I | ISTRUZIONI PER L'USO | <input type="checkbox"/> |
| D | BEDIENUNGSANLEITUNG | <input type="checkbox"/> |
| F | MODE D'EMPLOI | <input type="checkbox"/> |
| NL | HANDLEIDING | <input type="checkbox"/> |
| E | MANUAL DE INSTRUCCIONES | <input type="checkbox"/> |
| P | MANUAL DE INSTRUCOES | <input type="checkbox"/> |
| J | 運 轉 指 針 | <input type="checkbox"/> |
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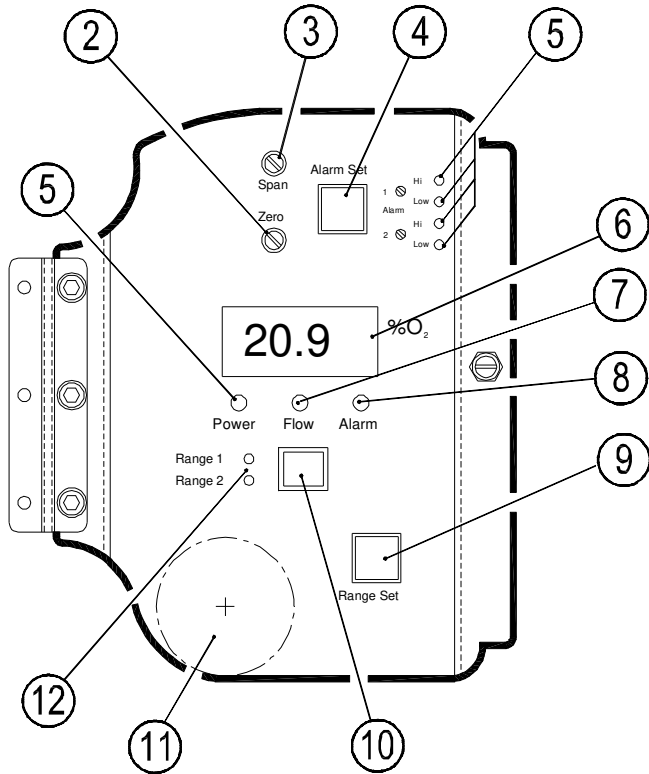


N.B. All dimensions are in millimetres (mm)

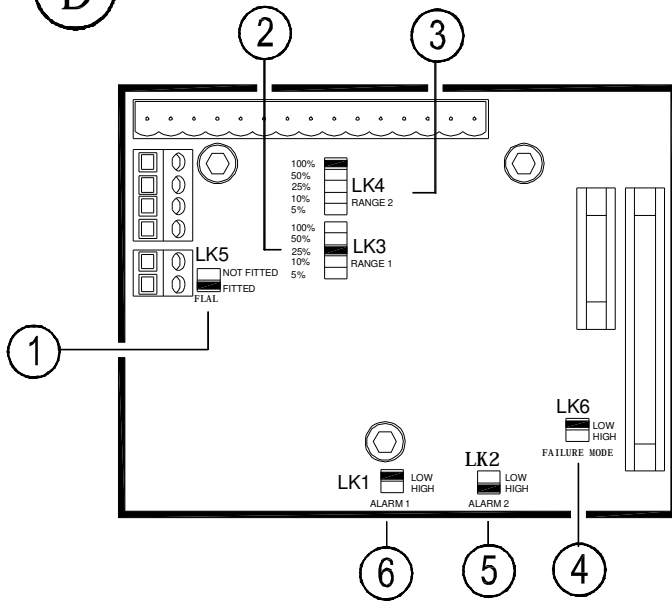
B



C



D



1 INTRODUCTION

1.1 Warnings, Cautions and Notes

This publication includes **WARNINGS**, **CAUTIONS** and **NOTES** which provide information relating to the following:

WARNINGS

Hazards which could result in personal injury or death.

CAUTIONS

Hazards which could result in equipment or property damage.

NOTES

Alert the user to pertinent facts and conditions.

1.2 Scope of this manual

This manual covers installation, normal operation and routine maintenance on xendos 1800 and xendos 1802 .

- For the latest technical specification refer to the Technical Data Sheet.
- References to the xendos 1800 also include the xendos 1802 unless otherwise stated.
- Addresses for technical assistance and spares are given on the rear cover.
- A service manual is available for use by qualified personnel, part number **01800002A**.

About this manual

Ref:01800/003A/2
Order as part 01800003A

KEY TO FIGURES

Figure A

Mounting details

- | | |
|----------------------------------|---------------------------|
| 1. M6 bolt (4 off) 5mm allen key | 7. Purge outlet (if used) |
| 2. LH cover (hinged) | 8. Sample outlet |
| 3. Display window | 9. Sample inlet |
| 4. RH cover | 10. Cable entries (3 off) |
| 5. M8 mounting slot (4 off) | 11. M6 earth stud |
| 6. Purge inlet (if used) | 12. Breather Port |
- (Sample, Purge Inlet / Outlet and Breather Port - ¼”NPT.INT)

Figure B

Electrical connections

- | | |
|---------------------------------------|---|
| 1. Range contacts | 7. Electrical supply terminals |
| 2. Flow Fail alarm contacts | 8. Output cable entry |
| 3. Alarm 2 contacts | 9. Supply cable entry |
| 4. Alarm 1 contacts | 10. Alarm cable entry |
| 5. Linear non isolated Output signals | (Cable entries - ¾”NPT, M20 or Pg13.5) |
| 6. Linear isolated Output signals | 11. Power Supply Fuse (F1) - F3.15A HBC |

Figure C

Control panel (hinged)

- | | |
|--|---|
| 1. Power On LED (green) | 7. Flow Failure LED (red) |
| 2. Set ZERO potentiometer | 8. Alarm LED (red) |
| 3. Set SPAN potentiometer | 9. Range change push button |
| 4. Set ALARM push button | 10. Range label (Slip In) |
| 5. Alarm LEDs (yellow) | 11. Sample filter (Screws in through control panel) |
| 6. Digital display (0.0 to 100.0% O ₂) | 12. Range LEDs (yellow) |

Figure D

Link settings on 1800/911 board

- | | |
|---------------------|-----------------------|
| 1. Flow alarm (LK5) | 4. Failure Mode (LK6) |
| 2. Range 1 (LK3) | 5. Alarm 2 (LK2) |
| 3. Range 2 (LK4) | 6. Alarm 1 (LK1) |

CE marking

The xendos 1800 / 1802 analysers carry the CE mark which indicates conformity with the European Community Directives on CE Marking (93/68/EEC), Electromagnetic Compatibility (EMC 89/336/EEC) and Low Voltage Directive (LVD 73/23/EEC).

1.3 Unpacking

WARNING

The xendos 1800 weighs approximately 26kg (57lbs) and care must be taken when handling. It is recommended that it is lifted with the fingers positioned underneath the rear casting.

- Remove the xendos 1800 from its packing and inspect it for damage.
- If damage has occurred, inform **Servomex** or its agent immediately.
- Please retain all packing and shipping information for future use.

2 INSTALLATION

2.1 Location

Select a location which allows convenient access for installation and maintenance and will minimise ambient temperature fluctuations and vibration.

The analyser must be mounted securely to a rigid vertical surface capable of supporting the weight of the analyser, using the four fixing lugs provided or the panel mounting option.

The xendos 1800 must be mounted horizontally with the sample connections and electrical entries on the underside.

The sample conditioning system where required should be located below the analyser to prevent possible carry-over of condensate into the measuring cell and please take careful note of the ambient temperature requirements.

The xendos 1800 is rated in accordance with IEC 644 for:

'INSTALLATION CATEGORY II' which is characterised as being local level (ie not distribution level), appliances and portable equipment with over-voltage impulse withstand up to 2500 V.

Ambient Operating Conditions:

Operating Temperature: -10°C to +50°C (+14°F to +122°F)

Storage Temperature: -20°C to +55°C (-4°F to +131°F)

Atmospheric pressure: 79 to 124 kPaa / 11 to 18 psia
(for operating altitudes to 2000m)

2.2 Panel Mounting

A panel mounting option is available, please consult **Servomex** for further details.

2.3 Conditions for Safe Use**WARNINGS**

- The xendos 1800 is only suitable for installation in a safe non-hazardous area. If the application requires the oxygen analyser to be installed in a hazardous area then the xendos 1900 / 1902 or xendos 1900EUR / 1902EUR must be used.
- The xendos 1800 is not suitable for use with flammable sample gases. If your sample is flammable then the xendos 1900 / 1902 or xendos 1900EUR / 1902EUR must be used.

2.4 Electrical installation

WARNINGS

- The installer must be satisfied that the xendos 1800 installation conforms to the relevant safety requirements, National Electrical Code and any other local regulations, and that the installation is safe for any extremes of conditions which may be experienced in the operating environment of the analyser.
- This appliance must be connected to a protective earth.
- The electrical installation must include a means of isolating electrical power by a switch or circuit breaker external to the analyser and within easy reach of the operator. It must be marked as the disconnecting device for the equipment.
- It is essential that only suitably trained and competent personnel are allowed to access hazardous live parts by removing or opening covers of the analyser.
- To comply with the European Community EMC Directives for industrial environments the interconnecting cables used for the mains supply, relay contact outputs and/or analogue output signals should be screened or provide equivalent protection.

CAUTION

Connections to TB-4, analogue output signal/s terminals should not exceed 30 V RMS (42.4 V peak) or 60 V dc to earth when connected to associated equipment.

- 1 Electrical terminations are suitable for 20 AWG (0.5 mm²) to 14 AWG (2.5 mm²) solid conductors or stranded conductors.
- 2 Gland entry sizes and positions are shown in Figure (A). Two of the three cable entries are fitted with appropriate blanking plugs.
- 3 Do not exceed the maximum current output load impedance of 600 Ohms.

- 4 Electrical power should be supplied at 100 V to 240 Vac \pm 10% - 50/60Hz.
(Note: The optional internal sample pumps are AC voltage dependant. Ensure that the correct AC input voltage is connected to analysers fitted with a sample pump. A green power on LED is illuminated when power is present at the analyser).
- 5 For compliance with the EMC standards, the external earth / ground connection must always be connected to a local earth / ground. Refer to Figure (A). In addition, the connections to TB2, TB3 and TB4 must always be made using a screened or shielded cable with the earth termination being made at the cable gland. Ensure good EMC practices are observed when making connections.
- 6 All electrical connections and access to the power supply fuse, F1, are made to the terminal board inside the right hand side of the analyser. Refer to Figure (B) for details and full specifications are given in the following table. To gain access refer to Figure (A) and remove the right hand cover by unbolting the four M6 bolts using a 5mm allen key. After electrical connections are complete ensure the lid is fully bolted down.

Power Connection		Terminal
Electrical Power, 100V to 240Vac \pm 10%, 50 / 60 Hz, 50VA maximum	Protective Earth Neutral Live	TB3-1 TB3-2 TB3-3
(See Section 2.4 Item 4 if sample pump fitted)		

Alarm Connection		Terminal
Alarm 1 250Vac, 3A 28Vdc, 1A	Closes on Alarm 1 or Power Fail Opens on Alarm 1 or Power Fail Common	TB2-1 TB2-2 TB2-3
Alarm 2 250Vac, 3A 28Vdc, 1A	Closes on Alarm 2 or Power Fail Opens on Alarm 2 or Power Fail Common	TB2-4 TB2-5 TB2-6
Flow Fail Alarm 250Vac, 3A 28Vdc, 1A	Closes on Flow Fail Alarm or Power Fail Opens on Flow Fail Alarm or Power Fail Common	TB2-7 TB2-8 TB2-9

Range Selected Output Connection		Terminal
Range 2 selected 250Vac, 3A 28Vdc, 1A	Closes on Range 2 or Power Fail Opens on Range 2 or Power Fail Common	TB2-10 TB2-11 TB2-12

Linear Analogue Output Signal Connection		Terminal
0 to 1 Vdc Oxygen output signal, (non isolated), output impedance 470 Ohms typical	+ ve - ve	TB4-1 TB4-2
4 to 20mA Oxygen output signal, (<22mA maximum) (isolated), maximum load impedance 600 Ohms	+ ve - ve	TB4-3 TB4-4
The full scale of the above outputs represents the range selected by the push button Range switch on the front panel.		

2.5 Sample and calibration gas connections

CAUTION

- The sample gas must not be admitted to the analyser until a period of 4 hours has been allowed for warm up, this will prevent condensation of the sample in the measuring cell.
- The inlet pressure and flow rate for the sample or calibration gas must not exceed the limits specified in the following table or damage could occur. If necessary an external pressure reducing device must be used to reduce the pressure to the stated limits.
- When pressurising the sample system for the purpose of leak testing ensure that pressure is increased and decreased slowly. High internal flow rates created when the pressure is changed rapidly will damage the measuring cell.

xendos 1800 and xendos 1802 - Sample and Calibration Gas Condition Requirements					
	xendos 1800 / xendos 1802		xendos 1800		
Sample	Base Analyser	S.Steel or C.Resistant By pass	AFCD	AFCD + Sample Pump	AFCD + BPR
Inlet Pressure	# 0.04 psig 0.3 kPag min	# 0.05 psig 0.4 kPag min	1 to 5 psig 7 to 35 kPag	-0.03 to 1 psig -0.2 to 7 kPag	17 to 22 psia 119 to 154 kPaa
Flow Rate	50 to 250 ml/min	60 l/hour maximum	1.2 to 3.5 l/min	1.6 to 1.8 l/min	1.0 to 2.0 l/min
Vent Pressure	11.5 to 18 psia (80.5 to 126 kPaa) - DO NOT RESTRICT ANALYSER VENT				
Dew Point	Non-condensing at ambient temperature				
Temperature	-10°C to +50°C (+14°F to +122°F)				
Particulates	< 3 µm (micro metres)				
Condition	Clean, non-flammable*, non-corrosive** and free from oil / condensate				
Connections	¼" NPT.INT Inlet / Outlet Connectors (See Figure A) (Female)				

Adjust pressure and flow externally to provide sample flow rate

* If the sample gas is flammable then use the xendos 1900 / 1900EUR

** If the sample gas is corrosive then use the xendos 1802 / 1902 / 1902EUR

AFCD - Automatic Flow Control Device BPR - Back Pressure Regulator

- If the automatic flow control device option is fitted no external flow control is necessary, the sample pressure must be between the limits specified in the previous table and/or the latest Technical Data Sheet.
- If the optional automatic flow control device option is not fitted it will be necessary to regulate the sample pressure / flow within the limits specified in the previous table to ensure stable operation and to prevent damage to the measuring cell.
- If an external sample pump is used it may be necessary to reduce pressure pulsing with a reservoir.
- The sample exhaust from the analyser should be vented freely to atmosphere.

WARNING

- Verify that connections are leak free at full operating pressure before applying sample or calibration gases. These gases may be toxic or asphyxiant.
- Consideration should be given to the toxicity, corrosiveness and asphyxiant nature of the sample and enclosure purging gas when selecting a vent location.

2.6 Enclosure purge connection

WARNING

If the sample gas is of a toxic or corrosive nature it is recommended that the enclosure purge option is fitted. If fitted the enclosure purge must be operational before removing any covers.

The enclosure purge inlet and outlet connection sizes and location are shown in Figure (A). Supply air or inert gas at 100 to 200 ml/minute. Vent the outlet freely to atmosphere.

2.7 Shut down procedure

Before removing power from the analyser disconnect the sample gas and flush the analyser sample pipework with dry nitrogen or good quality instrument air for 10 minutes.

3 SETTING UP

3.1 Configuration

The analyser is supplied with a digital display which is always ranged 0 - 100% Oxygen, an isolated current and non isolated voltage outputs. These outputs may be used simultaneously. The push button Range switch on the front panel and/or the settings of Link 3/4 selects the full scale range of both outputs.

The default analyser configuration is as follows:

Link	Parameter	Setting	Link	Parameter	Setting
LK 1	Alarm 1	Low = 0.0% O ₂	LK 4	Range 2	0 - 25% O ₂
LK 2	Alarm 2	High = 21.0% O ₂	LK 5	Flow Alarm	“Fitted” if option included
LK 3	Range 1	0 - 10% O ₂	LK 6	Failure Mode*	Low on Fault

* Failure Mode - If the sample flow fail alarm option is fitted and a low sample flow condition is detected then the isolated 4-20mA output signal (depending on the link setting selected) will go to either 0mA (default) or >20mA to indicate that this fault is present.

The red flow alarm indicator will flash if the sample flow falls below a satisfactory level and the flow alarm relay will go to the alarm condition. The alarm and relay are automatically cleared when the flow returns to normal.

To change the above configuration on **1800/911** board:

1. Switch off the analyser.
2. Open the hinged front left cover by undoing the four M6 bolts using a 5mm allen key.
3. Open the hinged display cover with the screw situated in the middle of the right hand side.
4. Set the links on the **1800/911** board to the required position with reference to Figure (D). The links should be removed and replaced using a pair of snipe nosed pliers.
5. Spare range labels are provided with the analyser that slip into the side of the front panel to indicate the new ranges selected.

6. Switch on the analyser, a yellow LED indicator on the front panel will show whether Range 1 or Range 2 has been selected, see Figure (C).

3.2 Alarm Set Point Adjustment

The alarm setpoint range is equal to the full scale range of the analyser and its digital display (0-100% O₂). The alarm level is set as an Oxygen concentration value. It is independent of the scaling selected for the analogue outputs. Changing the ranges of the output signals with the Range Change push button switch on the front panel does not effect the alarm setpoints. Adjusting the alarm setpoint does not effect the current or voltage output signals.

1. Open the hinged front left cover using an 5mm allen key.
2. Press the 'Alarm set' button; one of the yellow indicators will be illuminated. The setpoint for this alarm will be shown on the display. Adjust the alarm setpoint control adjacent to the illuminated indicator to achieve the desired alarm setpoint.
3. Press the 'Alarm set' button again, a yellow indicator for the other alarm will now illuminate. Adjust the alarm setpoint displayed to the desired level.

The yellow indicators also indicate whether the alarm is configured to be a High or Low alarm, they will flash if an alarm is present and will automatically clear when the oxygen concentration returns to normal. Refer Figure (C).

4 CALIBRATION

4.1 Zero and Span adjustment

CAUTION

The pressure and flow rates of the zero and span gases used to calibrate the xendos analysers must not exceed the values detailed in the table in **Section 2.5 Sample Gas Connection**.

The analyser should have been running for at least four hours before carrying out calibration. It is recommended that the sample outlet from the xendos analyser be vented directly to atmosphere.

In oxygen purity applications changes in atmospheric pressure can effect the measurement. Fitting the Back Pressure Regulator option will reduce this effect. (See the table in Section 7.1)

The zero and span calibration gas can be introduced into the analyser via a 3 way valve fitted into the sample inlet pipework or directly into the analyser sample inlet by disconnecting the sample pipework and isolating the sample flow elsewhere.

1. Open the hinged front left cover using a 5mm allen key.
2. To set the zero, introduce zero calibration gas, this should be high purity nitrogen (99.9% min.). Once the reading has stabilised, adjust the zero control so that the display reads 0.0 % oxygen.
3. To set the span, introduce span calibration gas, normally this can be good quality clean dry instrument air (nominally 20.9% oxygen) is recommended for all ranges except where the sample will have an oxygen content greater than 21%. For samples with oxygen content above 21%, a suitable certified calibration gas is essential. Once the reading has stabilised, adjust the span control so that the display reads 20.9 % oxygen or the actual level of oxygen in the calibration gas cylinder.

The calibration should be checked either weekly, monthly or 3 monthly depending on application.

4.2 Zero and Span adjustment of the Isolated 4-20mA analogue output signal

Located in the top left hand corner of the terminal compartment of the enclosure are two potentiometers for the Zero and Span adjustment of the isolated current output signal.

1. Connect a current meter with the range set to 0 to 100mA between Pin 3 (+ve) of TB4 and Pin 4 (-ve) of TB4.
2. Connect a voltage meter with the range set to 0 to 2Vdc between Pin 1 (+ve) of TB4 and Pin 2 (-ve) of TB4.
3. Set the output measurement range to 0 to 25% O₂.
4. Apply Nitrogen to the inlet of the analyser at the correct pressure and flow rate. When the analyser reading has stabilised adjust the Zero potentiometer on the analyser front panel so that the voltage output reads 0.000Vdc.
5. Then adjust the 4-20mA Zero potentiometer located in the terminal compartment to give an output current of 4.00mA. Then apply high quality clean instrument air (ie 20.95% O₂) to the inlet of the analyser at the correct pressure and flow rate.
6. When the analyser reading has stabilised adjust the Span potentiometer on the analyser front panel so that the voltage output reads 0.838Vdc.
7. Then adjust the 4-20mA Span potentiometer located in the terminal compartment to give an output current of 17.41mA.

5 ROUTINE MAINTENANCE

If the automatic flow control option is fitted, replace the filter element, located protruding through the front panel, Reference Figure C at 3 month intervals. This period may be extended for clean samples. The analyser must be isolated from the sample or calibration gas while the filter element is being changed. The filter element is removed by unscrewing the large filter cap on the front panel. The old element must be disposed of safely. If the element is wet or very dirty check that the sample conditioning is adequate. Once the filter cap is replaced the filter seal should be checked for leaks. The analyser must not be operated without the filter element in place as dust and other particulates may permanently damage the measuring cells.

6 SPARES

The following spares are required to maintain normal operation of the analyser.

Part Number	Description - xendos 1800	Quantity
S1800985	AFCD filter element kit (10 off)	1 pkt.
S1800986	Enclosure seals kit (1 set)	1 pkt.
S1800987	Fuse kit (F3.15A HBC) (10 off)	1 pkt.

Part Number	Description - xendos 1802	Quantity
S1800986	Enclosure seals kit (1 set)	1 pkt.
S1800987	Fuse kit (F3.15A HBC) (10 off)	1 pkt.

The following spares are required for comprehensive servicing of the analyser.

Part Number	Description - xendos 1800	Quantity
S1800422	Transducer Sample Inlet Tube (SS316)	1 off
S1800423	Transducer Sample Outlet Tube (SS316)	1 off
S1800911	Housekeeping pcb complete	1 off
S1800902	Display pcb complete	1 off
S1800913	Terminals pcb complete	1 off
S1800981	Sample Flow Alarm (xendos 1800)	1 off
S1800982	Sample pump 240Vac 50Hz	1 off
S1800983	Sample pump 110Vac 50Hz	1 off
S1800984	Sample pump 110Vac 60Hz	1 off
S1800988	Back Pressure Regulator	1 off
S1800989	xendos 1800 Paramagnetic O ₂ Transducer Assy.	1 off
00570915	AFCD for analysers without optional flow alarm	1 off
S1420935	AFCD for analysers fitted with optional flow alarm	1 off
2822-2028	Switch mode power supply module	1 off
3950-6087	Anti-static glass window	1 off

Part Number	Description - xendos 1802	Quantity
S1800436	Transducer Sample Inlet Tube (Hastelloy C-276)	1 off
S1800437	Transducer Sample Outlet Tube (Hastelloy C-276)	1 off
S1800911	Housekeeping pcb complete	1 off
S1800902	Display pcb complete	1 off
S1800913	Terminals pcb complete	1 off
S1902989	xendos 1802 Paramagnetic O ₂ Transducer Assy.	1 off
2822-2028	Switch mode power supply module	1 off
3950-6087	Anti-static glass window	1 off

7 TECHNICAL SPECIFICATION - xendos 1800 / xendos 1802

7.1 Analyser Performance

Performance Measurement	Units	Base Analyser	AFCD	AFCD + Sample Pump	AFCD + BPR	S.Steel or C.Resistant By pass
Intrinsic Error (accuracy)	% Span of selected output range	< 1	< 1	< 1	< 1	< 1
Linearity Error	% Span of selected output range	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Repeatability	% Span of selected output range	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Noise (peak to peak)	% Span of selected output range	< 0.1	< 0.15	< 0.3	< 0.2	< 0.2
Zero Drift / 3 months	% O ₂	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Span Drift / 3 months		< 1 % of Span or 500vpm O ₂ whichever is greater				
Response Time (T ₉₀)	Seconds	< 4	< 7	< 8	< 7.5	# < 5
Ambient Temperature Coefficient	% O ₂ / 10°C	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Ambient Pressure Coefficient		1	1	1	< 0.13	1
		% of reading for a 1% change in ambient pressure				
Sample Flow Rate Effect	% O ₂	< 0.1 over 50 to 250 mls / min	N/A	N/A	N/A	< 0.1 over 6 to 60 litres / hour

Response Time T₉₀ < 5 seconds at 60 l/hour Sample Flow Rate

The performance specification has been written, and verified, in accordance with the international standard IEC 1207-1:1994 "Expression of performance of gas analysers".

Measurement Range:	0.0 - 100.0% of Oxygen (O ₂)
Analogue Output ranges:	Two user configurable analogue output ranges selectable from 0 - 2.5, 5, 10, 25 and 100% O ₂
Analyser Outputs:	
Digital display -	3.5 digit backlit LCD (0.0 to 100.0% O ₂)
Display resolution -	0.1% O ₂
Current output - (Linear)	4-20mA, isolated, maximum 600 Ohms (< 22mA maximum) the current output signal corresponds to the full scale range selected
Voltage output - (Linear)	0-1Vdc, non-isolated, output impedance 470 Ohms typical the voltage output signal corresponds to the full scale range selected
Range indication -	Volt free relay outputs and yellow LED
Concentration alarms -	Two volt free relay outputs and red LED User configurable as High or Low. Set point field adjustable over range 0-100% O ₂
Concentration alarm hysteresis -	0.2 to 0.3% O ₂
Sample flow fail alarm -	Volt free relay output and red LED
Alarm relay contact - rating	250V a.c / 3A or 28V d.c / 1A (non-inductive) maximum and 5V / 10mA a.c/d.c minimum

Physical:

Size -	448mm W x 235mm H x 229 mm D (17¾" W x 9¼" H x 9" D approx.)
Weight -	26kg (57lbs)
Power Supply -	100 to 240Vac ±10%, 50/60Hz, 50VA maximum
Materials in contact with the sample -	(without any internal sample conditioning options fitted) borosilicate glass, nickel, platinum, platinum/iridium alloy, 316 stainless steel, Viton (standard O ₂ transducer) and Chemraz (solvent tolerant O ₂ transducer).
Installation category -	Category II. Local level power distribution with over voltage withstand up to 2500Volts. In accordance with IEC 664.
Ingress protection -	IP 66 to IEC 529:1989 and BS EN60529 (1992). NEMA 4X to NEMA standards publication No.250

Design standards:

Conforms to the following normalised European and International standards for product safety and electromagnetic compatibility:-

Electromagnetic compatibility -	for use in domestic, commercial and industrial environments
Emission	EN50081-1:1992
Immunity	EN50082-2:1995
Electrical safety -	EN61010-1:1993 IEC 1010-1:Amendment 1:1992

