O2IO-2200 Oxygen Controller Current & Voltage Source

Oxygen Controller Current & Voltage Source

1   Description

The O2IO-2200 product connects and translates O_2 and thermocouple voltage readings to current or voltage outputs. It provides a configurable current or voltage output, proportional to the probe millivolt output and/or temperature. The product employs patented interface circuitry allowing longer life time use of the Oxygen Probe, and monitoring of sensor impedance for advance warning of when the sensor requires replacement.

Features

- Two input channels:
    - O_2 Sensor input (differential)
    - Thermocouple input (differential)
- Two configurable output channels:
    - O_2 Sensor mV to 4-20, or 0-24mA
    - O_2 Sensor mV to 0-5, or 0-10 VDC
    - Temperature °C / °F to 4-20, or 0-24mA
    - Temperature °C /°F to 0-5, or 0-10 VDC
- Linear or S-Curve transfer function for mA or V
- Configurable slope, thresholds, and curve.
- Differential thermocouple input
- Differential Oxygen sensor input
- Supports all Zirconia sensor types
- Ethernet remote viewing and configuration
- Sensor impedance checking
- 2 kV Isolated control outputs
- DIN Rail mounting
- PWM/PID controller

Applications

- Remote environment monitoring
- Oxygen control systems
- Temperature control systems
- Flue gas monitoring
- Single zone kiln control
- Heated oxygen probe control

2   Specifications

Environmental				
Parameter	Minimum	Typical	Maximum	Unit
Operating Temperature	-20	30	60	°C
Storage Temperature	-20	30	80	°C

Electrical				
Parameter	Minimum	Typical	Maximum	Unit
Supply Input Voltage	12	24	36	V DC
Supply Input Current	–	100	–	mA
Input Power	–	1.2	–	Watts

Measurement Inputs (2 kV Isolation) – ESD sensitive inputs				
Parameter	Minimum	Typical	Maximum	Unit
Oxygen Input	-2.0	–	2.0	VDC
Oxygen Input Impedance	–	0.1	–	TΩ
Temperature Input	-2.0	–	2.0	VDC
Temperature Input Impedance	–	10		MΩ
Samples Per Second	1	2	4	SPS
Cold Junction Input	-1	–	1	VDC
Cold Junction Impedance	–	10	–	MΩ

Interface				
Parameter	Minimum	Typical	Maximum	Unit
Ethernet	10	100	100	Mbps

Mechanical				
Parameter	Minimum	Typical	Maximum	Unit
Height	–	70	–	mm
Width	–	89.6	–	mm
Depth	–	31.25	–	mm
Weight	–	100	–	g
Material (top)	–	PC (UL 94 V-0)	–	
Material (bottom)	–	PPO (UL 94 V-0)	–	
Color (top)	–	Grey RAL 7035	–	
Mounting	–	DIN Rail	–	

Compliant to

- RoHS Compliant (product)
- DIN EN60715 TH35 (case)
- DIN VDE 0470-1 (case)
- DIN 43880 unit 1 (case)
- REACH Compliant (product)
- VBG 4 (case)
- IEC 529 (case)

3   Electrical Connections and Characteristics

J6 - Power Input		
Pin	Type	Description
1	Power	12 - 36 VDC
2	Power	Ground

J1 - Control signal inputs and outputs				
	Pin	Type	Description	Symbol
GND2	1	Power	Analog ground	GND2
	2	Output	Voltage or Current output	IV1
	3	Output	Voltage or Current output	IV2
	4	Power	Analog ground	GND2
GND1	5	Output	Pulse width modulator output	PWM
	6	Output	Cold junction 5 VDC supply	5V
	7	Input	Cold junction reference input	CJ
	8	Power	Analog ground	GND1
	9	Input	Thermocouple positive leg input	TP
	10	Input	Thermocouple negative leg input	TN
	11	Input	Positive oxygen sensor input	OP
	12	Input	Negative oxygen sensor input	ON

Thermocouples			
Type	Minimum	Maximum	Unit
B	250/482	1820/3308	°C/F
E	-200/-328	1000/1832	°C/F
J	-210/-346	1200/2192	°C/F
K	-200/-328	1372/2501.6	°C/F
N	-200/-328	1300/2372	°C/F
R	-50/-58	1768.1/3214.58	°C/F
S	-50/-58	1768.1/3214.58	°C/F
T	-200/-328	400/752	°C/F

J1 - Pin descriptions and use				
	Pin	Type	Description	Symbol
	1, 4	Power	Pins 1, and 4 are isolated grounds for IV1, and IV2. These grounds are specifically for the Current and Voltage ouputs, and are completely isolated to all other grounds.	GND2
GND2	2,3	Output	The Voltage or Current output 1 or 3 is a software configurable output, allowing the user to set current, voltage, and ranges. The outputs are set in concert with the user preferences for either the oxygen mV level, Oxygen concentration according to the Nernst equation, or the temperature. The user may configure the transfer function for: 1. Oxygen mV (or Nernst) to mA or V, positive or negative slope, and range; 2. Temperature to mA or V, positive or negative slope, and range.	IV1, IV2
	5	Output	Pulse width modulator output – 5 V max output self driving, and isolated, referenced to GND1. Emitter follower output with 10KΩ pull down.	PWM
	6	Output	Cold junction 5 VDC supply	5V
GND1	7	Input	Cold junction reference input. This input allows for the user to fit a range of different temperature sensors, that form the basis of the cold junction calculations. The recommended (and supplied) temperature sensor is manufactured by Texas Instruments, and is a precision centigrade temperature sensor. Offering an external temperature sensors allows the installer to select a local or remote (to the cabinet) temperature sensing option. The part supplied with the product as standard, is the LP TO-92 package. The terminals on the O2IO-2200 are designed to align with the LM35LP package. See Figure 1 for more information.	CJ
	8	Power	Analog ground	GND1
	9	Input	Thermocouple positive leg input (differential input – referenced to GND1)	TP
	10	Input	Thermocouple negative leg input (differential input – referenced to GND1)	TN
	11	Input	Positive oxygen sensor input (differential input – referenced to GND1)	OP
	12	Input	Negative oxygen sensor input (differential input – referenced to GND1)	ON

O2IO-2200		LM35 Pin	
Pin	Description	Pin	Description
6	5VDC	1	+Vs
7	CJ	2	Vout
8	GND1	3	GND

Figure 1: Connecting the LM35 part to the O2IO-2200 (TO-92 Package only)

4 Configuration

The following O2IO-2200 configuration options are available to the user:

Input	Response
Sensor mV	4 – 20 mA
	20 – 4 mA
	0 – 5 VDC
	5 – 0 VDC
	0 – 10 VDC
	10 – 0 VDC
	4 – 20 mA
Temperature - °C	4 – 20 mA
	20 – 4 mA
	0 – 5 VDC
	5 – 0 VDC
	0 – 10 VDC
	10 – 0 VDC

5   Connectivity

The O$_2$ concentration can be monitored and controlled via the desktop application over a network connection, when the O2IO-2200 is connected via ethernet to an appropriate router. Monitoring and control via a mobile application, for portable devices like phones or tablets, is available as an optional extra.
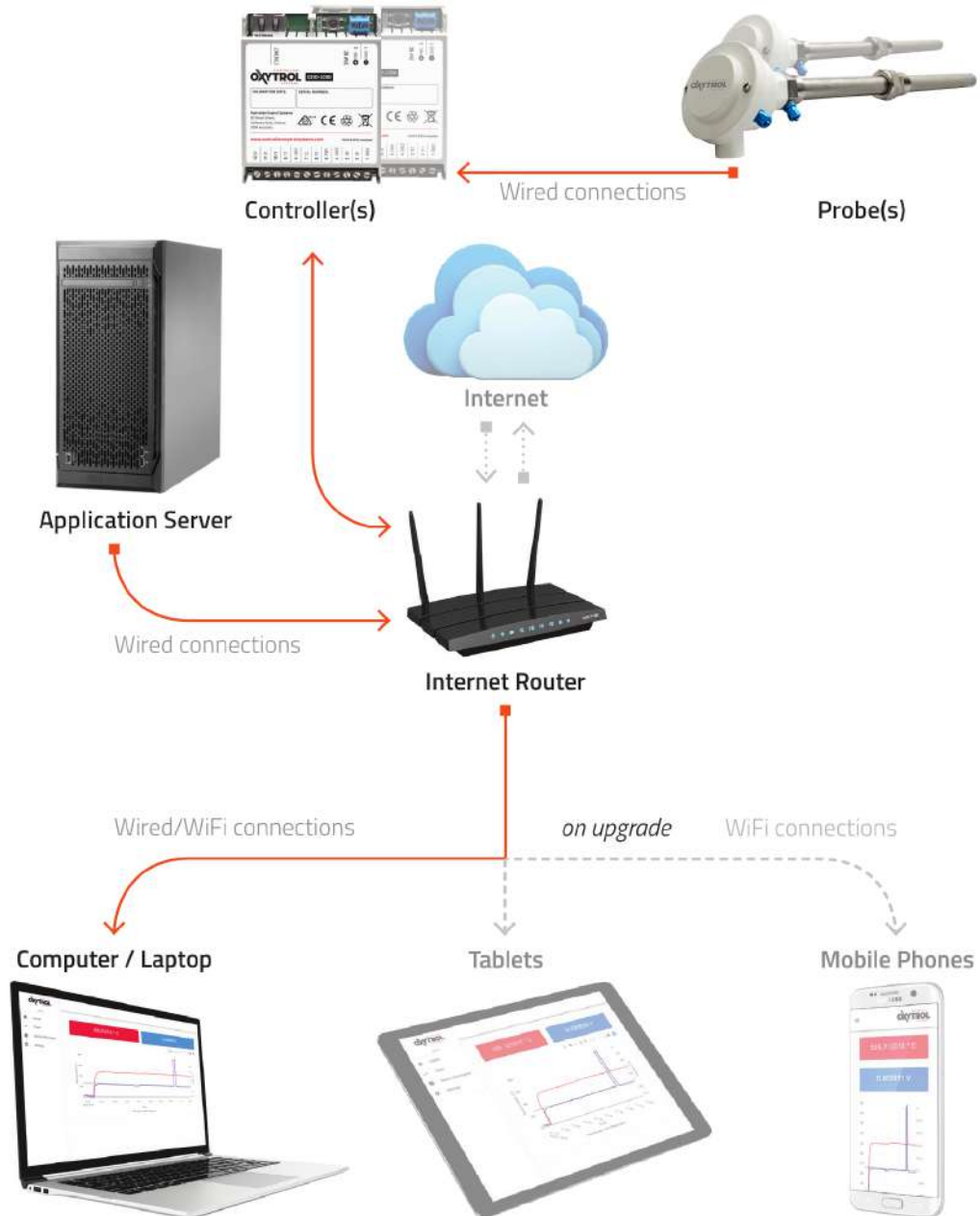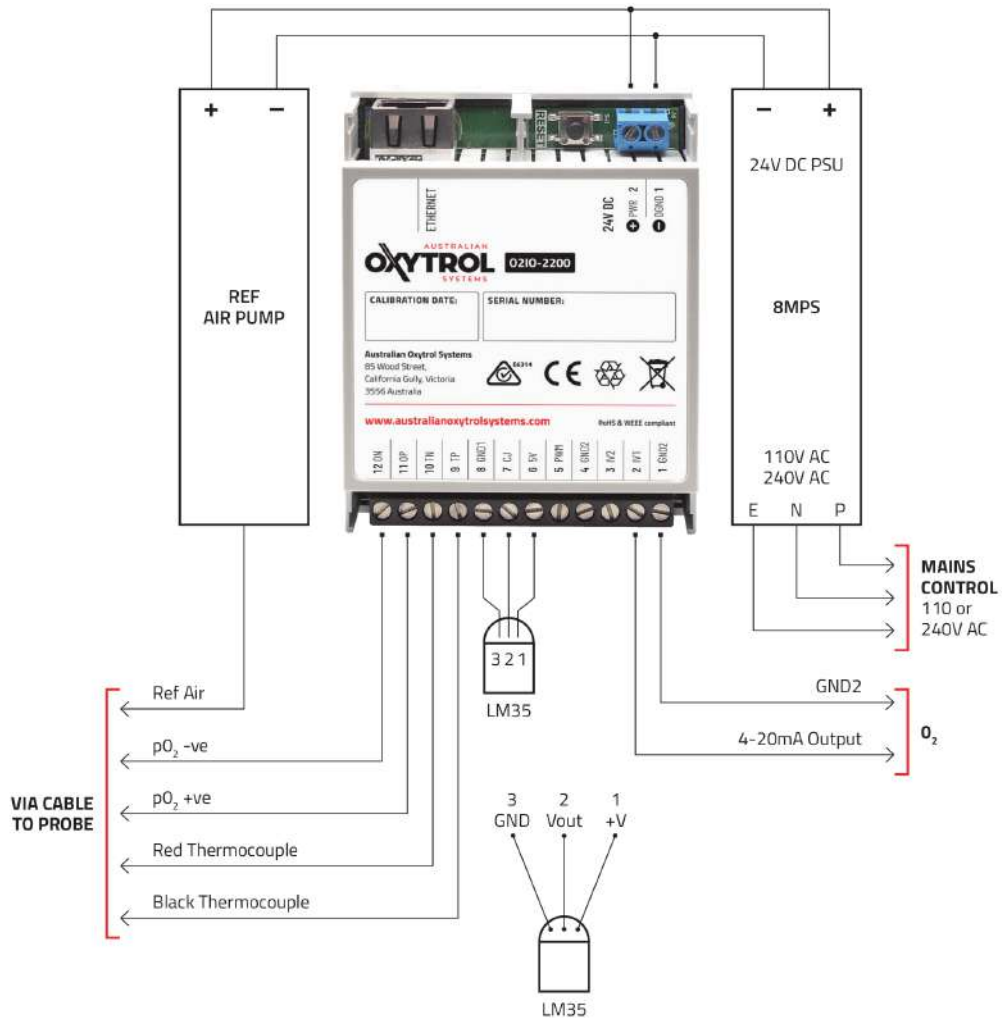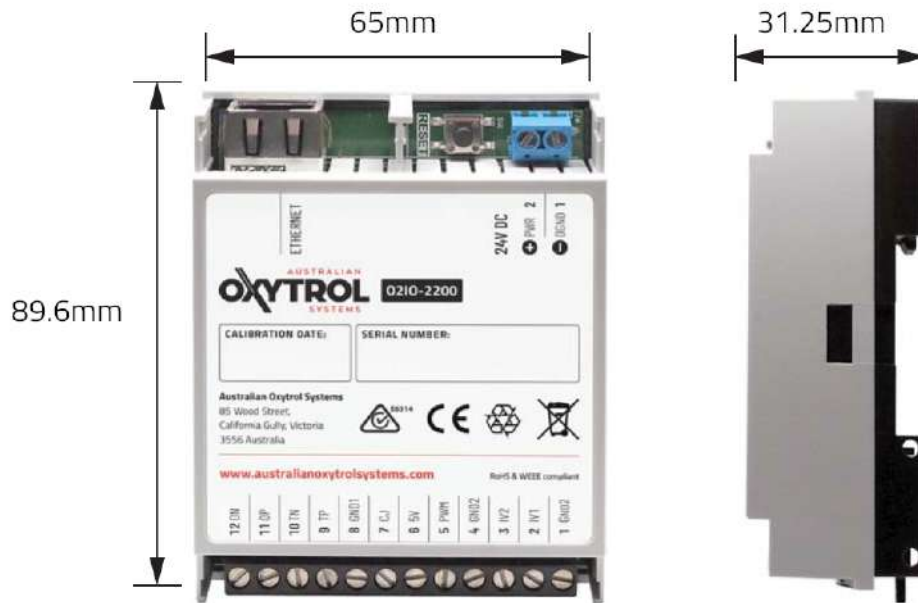
6   Typical installation

Below is an example of a PID controller for a heated probe monitoring exhaust gas concentration. This configuration controls the temperature and provides drive for impulse air.
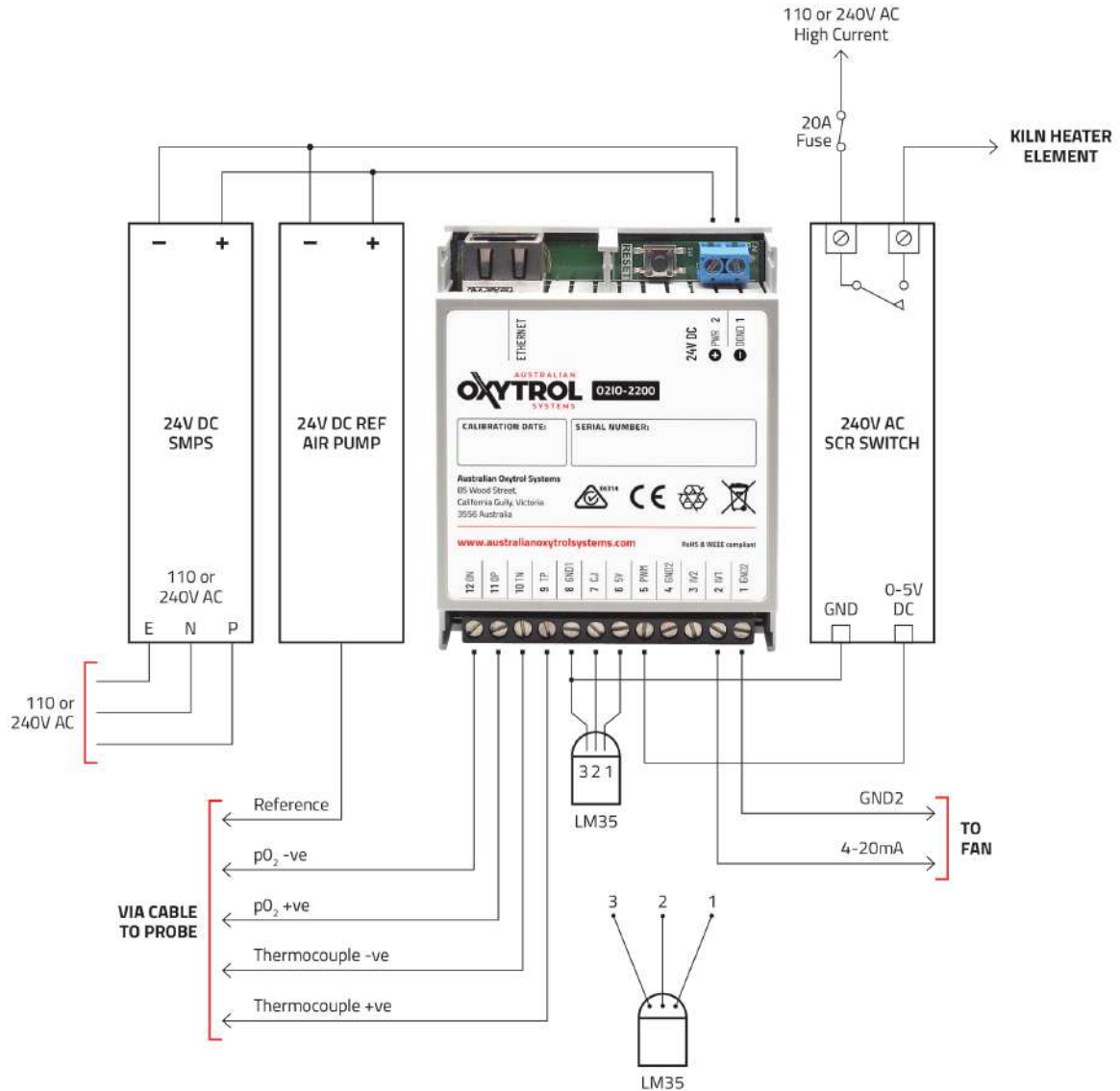
Below is an example of an O_2 controller providing a current source to control oxygen concentration.

7   Mechanical

8   Ordering information

To order an AOS O2IO-2200, please contact Australian Oxytrol Systems via the details listed below. We also offer a variety of oxygen probes, all compatible with the O2IO-2200 controller and O2TA-2200 oxygen analyzer.

9   Contact information

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Australia

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