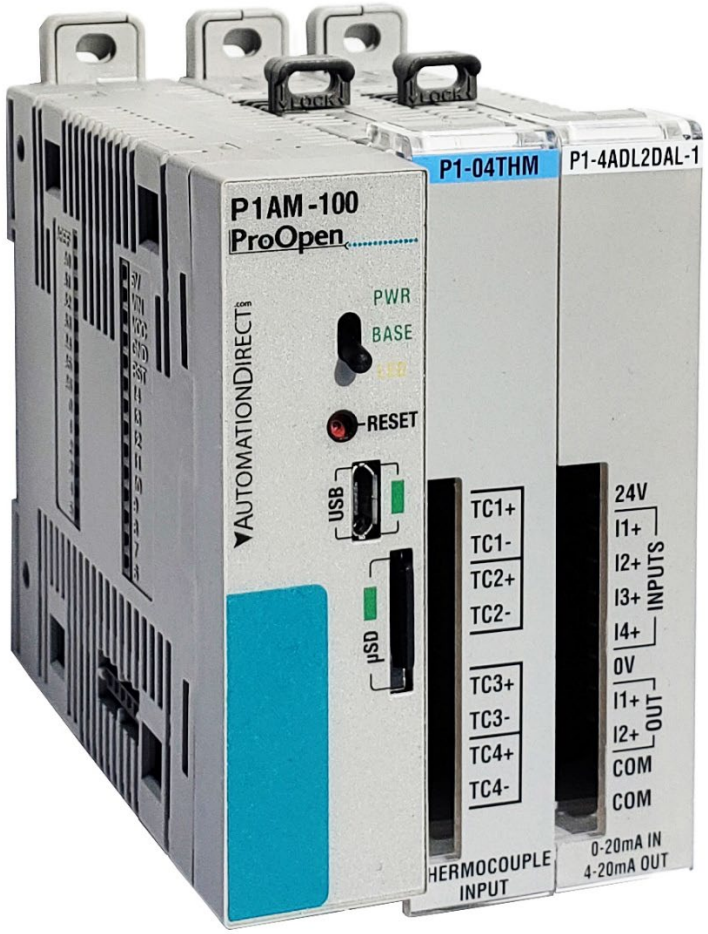
UPC·MARATHON

OXYMIT2™ TRANSMITTER
User Manual



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MANUAL#: 305

Revision	Date	Technician	Revision Description
R14	5/10/2021	MS	Firmware revision 2.40 and higher
R13	5/1/2015		Firmware revision 2.39 and higher

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TECHNICAL ASSISTANCE

For all questions or concerns regarding the operation of the **OXYMIT2™**, please consult the last page of this manual for contact information.

Table of Contents

1 GENERAL DESCRIPTION

The Oxymit2™ Transmitter has been updated with display interface connection and is available in several different configurations. The following table includes the part numbers for each type in transmitter.

Transmitter Part Number	Process	Monitor	Controller	Output Channels (4-20mA)
100 120 122	Oxygen	X		X
MODELS BELOW ARE NOT RELEASED YET				
	Carbon	X		X
	Dew Point	X		X
	Oxygen	X		
	Carbon	X		
	Dew Point	X		
	Oxygen		X	X
	Carbon		X	X
	Dew Point		X	X

The controllers use the two 4-20mA output channels to drive current actuators or SCR controls. There are no contact or ON/OFF outputs available.

The standard configuration is the monitor with re-transmit capability using the output channels.

All of these units can be fully configured in the field using the “SmartTransmitterCalibrator” software and the USB plug to plug connection cable.

NOTE:
Please specify the following parameters when ordering a transmitter; process type, process range, thermocouple type, temperature scale F/C, analog output 1 process and scale, analog output 2 process and scale. The following tables show the standard default settings.

Typical Oxygen Transmitter Calibration (°F)

Calibration Function	Measured Value or Input	Output / Units
Thermocouple min	1000° (B type) standard t/c type	°F
Thermocouple max	3200° (B type) standard t/c type	°F
Millivolt	0.0 – 1250	mV
Analog 1 Zero	0% O2 ± 0.1	4.0 mA ± 0.1
Analog 1 Span	20.9% O2 ± 0.1	20.0 mA ± 0.1
Analog 2 Zero	1000°F ± 13°	4.0 mA ± 0.1

Calibration Function	Measured Value or Input	Output / Units
Analog 2 Span	3200°F ± 13°	20.0 mA ± 0.1

Typical Oxygen Transmitter Calibration (°C)

Calibration Function	Measured Value or Input	Output / Units
Cold Junction	Room Temp	°C
Thermocouple min	540° (B type) standard t/c type	°C
Thermocouple max	1680° (B type) standard t/c type	°C
Millivolt	0.0 – 1250	mV
Analog 1 Zero	0% O2 ± 0.1	4.0 mA ± 0.1
Analog 1 Span	20.9% O2 ± 0.1	20.0 mA ± 0.1
Analog 2 Zero	540°C ± 8°	4.0 mA ± 0.1
Analog 2 Span	1680°C ± 8°	20.0 mA ± 0.1

The Oxymit2™ Transmitter has been designed to work as an analog or digital interface for any zirconia-based oxygen sensor used to track oxygen. The transmitter connects to the temperature and millivolts outputs of an oxygen sensor and can produce analog outputs proportional to the selected process value.

The features available are:

- Isolated inputs for thermocouple and sensor millivolt
- 24 bit Sigma-Delta ADC for two inputs and cold junction temperature.
- MicroSD memory card to store setup and calibration values.
- Two isolated externally powered 4-20mA outputs.

The transmitter makes an oxygen sensor an intelligent stand-alone analyzer. The transmitter is located near the probe, preferably mounted in an enclosure. The transmitter mounts onto a DIN rail and requires a 24VDC power supply. It measures the sensor temperature and millivolts. The transmitter must be ordered with the correct configuration. The results of any of the calculations are made available via two 4-20mA loop outputs. Typically, the first output is set up for the process value the second output transmits the sensor temperature.

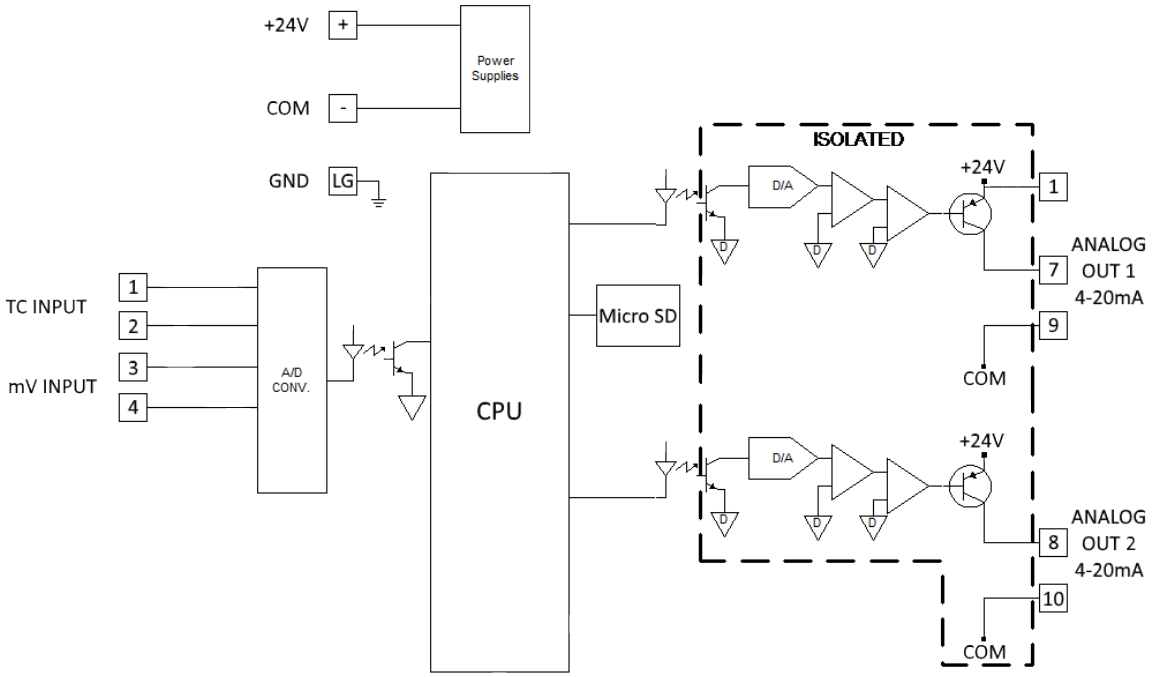

Figure 1 Block diagram

2 SAFETY SUMMARY

All cautions and instructions that appear in this manual must be complied with to prevent personnel injury or damage to the Oxymit2 Transmitter or connected equipment. The specified limits of this equipment must not be exceeded. If these limits are exceeded or if this instrument is used in a manner not intended by United Process Controls Inc., damage to this instrument or connected devices could occur.

Do not connect this device directly to AC motors, valves, or other actuators. The Oxymit2 Transmitter is not certified to act as a safety device. It should not be used to provide interlocking safety functions for any temperature or process functions. Alarm capabilities are provided for probe test and input faults via the digital interface and are not to be considered or used as safety information in any application.

3 CONNECTIONS

The Oxymit2 Transmitter has 3 removable terminal blocks. Each terminal is a wire clamp type with a standard slot screwdriver 0.1 inch (2.5 mm) maximum. Each clamp can accommodate

30–16 AWG (0.051–1.31 mm²) flexible stranded wire. Maximum torque on the terminal screws should not exceed 2.5 lb·in (0.28 N·m).

The figure shows the arrangement of the terminals. 24VDC power terminal block of the CPU located at the bottom of the unit.

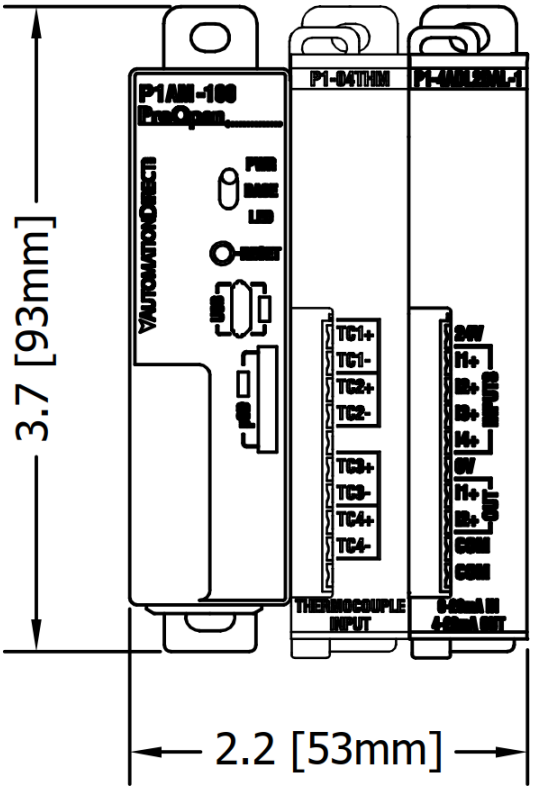

Figure 2 Terminal Layout

The next figure shows a schematic representation of the Oxymit2 Transmitter and typical connections required in the field.

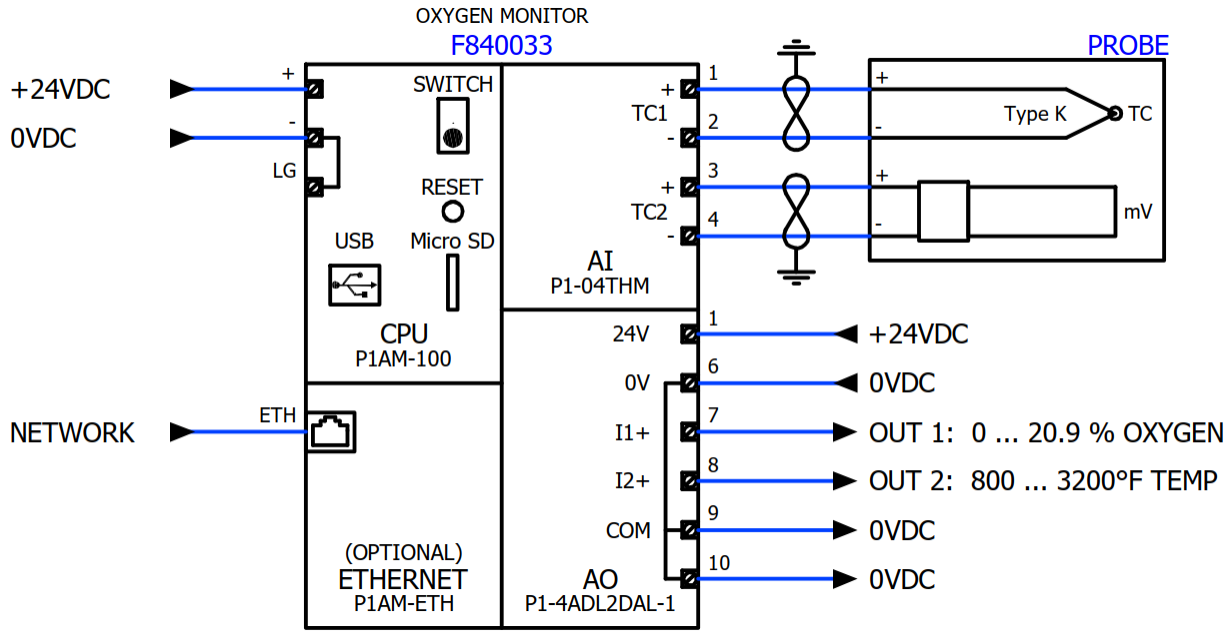

Figure 3 Schematic Connections

3.1 Grounding and Shielding

To minimize the pick-up of electrical noise, the low voltage DC connections and the sensor input wiring should be routed away from high-current power cables. Use shielded cables with the shield grounded at the Oxymit2 Transmitter enclosure ground.

4 OPERATIONAL SPECIFICATIONS

Power input 21.6 to 26.4 volts DC / 130mA

Thermocouple input

Thermocouple type	Zero ºF	Span ºF	Zero ºC	Span ºC
B	**800**	**3200**	420	1680
C	32	3000	0	1680
E	32	1300	0	700
J	32	1300	0	700
K	0	2000	0	1200
N	32	2300	0	1200
NNM	32	2000	0	1100
R	300	3000	150	1650
S	300	3000	150	1650
T	32	700	0	360

Bold shows default
Accuracy after linearization +/- 1°

Millivolt input 0 to 1250 millivolts +/- 0.1 millivolt

Input Impedance >5 Megaohm

DC outputs (Isolated) **4 to 20mA (650Ω max)**

Isolation 1800VAC applied for 1 second
Power input to signal inputs and to signal outputs

No Isolation Thermocouple input to Millivolt input, inputs must be differential.
Output 1 to output 2, one power for both outputs.

Calculations **Percent oxygen. 0 – 20.9% (default)**

Calibration Setups Thermocouple Null
Thermocouple Span
Millivolt Null
Millivolt Span

Weight 10 oz

Environmental Conditions

Operating Temperature 0° to 60°C (32° to 140°F)
Storage Temperature -20° to 70°C (-4° to 158°F)
Operating and Storage Humidity 5 to 95% (non-condensing)

Note: This instrument is designed for installation inside a grounded enclosure. Always observe anti-static precautions when installing or servicing any electronic device. Ground your body to discharge any static field before touching the body or terminals of any electronic device.

CAUTION
DO NOT CONNECT ANY AC SOURCE OR LOAD TO INSTRUMENT CONTACTS

CAUTION
DO NOT CONNECT OR DISCONNECT HOUSING PLUGS WHILE MODULE IS POWERED OR UNDER LOAD.

This specification can change without notification.

5 ANALOG OUTPUT CHANNELS

The analog outputs are factory configured to provide 4 to 20mA signals proportional to selectable process values.

NOTE
The Analog Output Channels are isolated and require an external supply.

If a chart recorder is to be used, it should have input specifications within 4 to 20 mA. If the recorder only responds to VDC inputs it will be necessary to add a 250 ohm dropping resistor across its input terminals.

The ideal location of the recorder is adjacent to the instrument but it may be located remotely if the connecting wires are properly shielded. For best results, the chart recorder input(s) should be isolated from ground.

The two analog output channels can be set to retransmit selectable process values. The Analog Output Offset and Range can be set to correspond to the process range. The default settings for these channels are 0 – 20.9% oxygen for channel 1 and 800°F to 3200°F temperature for channel 2.

These outputs are active meaning they provide the current for each loop. An external power supply for the P1-4ADL2DAL-1 module is required.

The Oxymit2 output channels can drive a chart recorder, PLC input, or actuators. The remote input should be configured for of 0 - 5 VDC or 4 - 20 mA. In case of DC voltage input, it will be necessary to add a 250 ohm dropping resistor across its input terminals.

The ideal location of the input device such as a recorder is adjacent to the instrument, but it may be located remotely if the connecting wires are properly shielded. For best results, the chart recorder input(s) should be isolated from ground with the cable shield grounded on one end of the cable.

6 SMART TRANSMITTER CONFIG SOFTWARE

The Smart Transmitter Config “STConfig” software connects to the transmitter by USB and used as a temporary configuration tool. The operator has full access to all of the setup and calibration functions of the instrument.

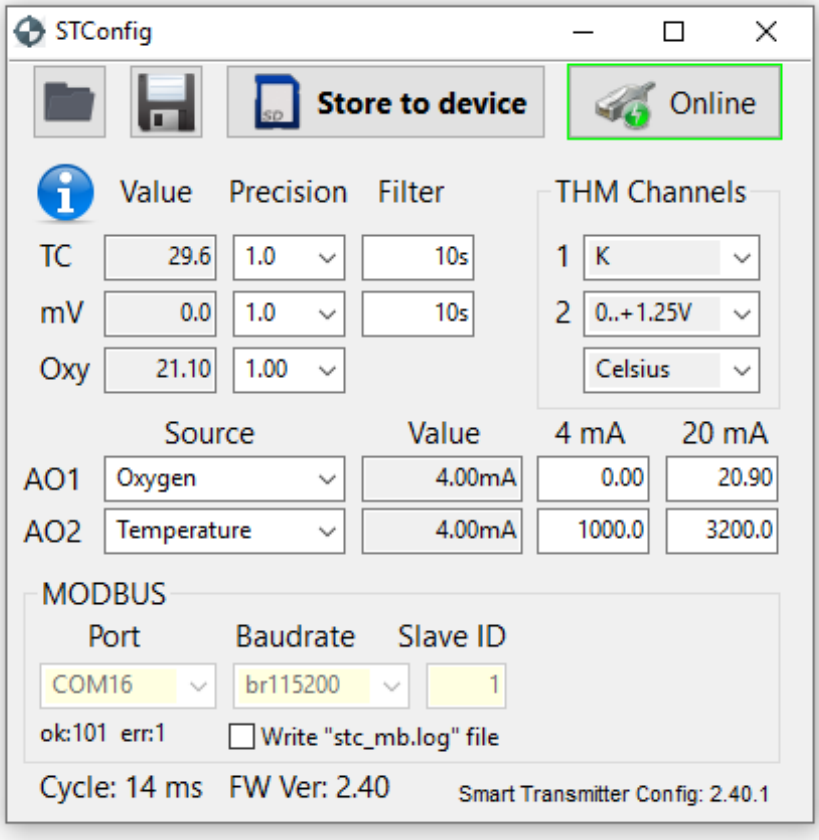

Figure 4 Smart Transmitter Config Software

The top bar contains four buttons:

- **Open**

This button allows you to open CFG file from the PC. The file can be used for restoring previously saved configuration or to change TC type including calibration.

- **Save**
  This button allows you to save CFG file to the PC. The file can be used for restoring configuration in the future.
- **Store to device**
  This button allows you to store actual CFG to the device micro SD card. This configuration will be used every time device boots-up.
- **Online**
  This button switches the actual mode – Offline/Online. The button border turns green when the device is Online.

STConfig designed as a table. Usually the row has a short name on the left, and column has a meaning (parameter name) on the top.

Short names:

- **TC** - Thermocouple input.
- **mV** - Millivolt input
- **Oxy** - Oxygen content, calculated value
- **AO1** - Analog output 1
- **AO2** - Analog output 2

Parameters:

- **Value**
  Actual value of corresponding line.
- **Precision**
  Desired precision of the value. Need to pay attention to modbus registers range and avoid overfills. Normal range is -32768 … +32767. For example, if you want to have maximum reading accuracy in the “Oxy” modbus register then 1.000 (3 digits after dot) is possible. In this case 20.9 %O2 will correspond 20900 value in the register, which is still in the range.
- **Filter**
  Averaging filter time. TC and mV readings goes to the input of the filter and the filter output goes to the column “Value”. Filter acceptable range 4 … 60 seconds.
- **THM Channels**
  It shows input configuration of the P1-04THM module channel as well as temperature units. These settings correspond to calibration parameters (hidden). Need to load appropriate CFG file in order to change any of these settings. Few different CFG files (calibrations/settings) could be provided with Oxymit2.
- **Source**
  This dropdown list allows to choose the signal to retransmit to appropriate output. In case of chose N/A user allowed to enter “Value” manually, for testing/calibrating reasons.
- **4 mA / 20 mA**
  The analog outputs are scaled as simple offset and span values. For example, if analog output were to be scaled for a 0 to 20.90% oxygen value, the offset value (4 mA) would be

0.00 and the span value (20 mA) would be 20.90. This assumes that the process oxygen value is also scaled for percent oxygen where the oxygen precision is set to 1.00 (2 digits after dot).
The range of the offset and span numbers depends on the range of the process value that has been selected for either analog output.
The resolution of analog output is fixed to 0 … 4096 (12 bit) and it's independent of precision parameter.

Modbus:

- **Port**
  Com port assigned to P1AM-100 CPU. In the dropdown list the last connected port will appear at the bottom. Usually it will be P1AM-100 CPU and this will be chosen by default.
- **Baudrate**
  For P1AM-100 CPU br115200 is default. Other speed will work as well.
- **Slave ID**
  For P1AM-100 CPU Slave ID = 1 is default. Other IDs can be used in case of communication to multiple Oxymit2 in one RS-485 network.

7 PROCESS VARIABLE CALCULATIONS

The transmitter has a selectable process calculation for percent carbon, percent oxygen, or dew point. The following equations are used to derive these values:

7.1 Percent Oxygen

$$\%O2 = \frac{20.95}{e^{(E/0.0215*Tk)}}$$

Where: E = probe millivolts, Tk = probe temperature in degrees Kelvin.

The 20.95 is the %O2 in air.

8 CUSTOMER SUPPORT

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