SERIES 200PN

PERCENT OXYGEN ANALYZER
OPERATIONS MANUAL

INDEX

APPENDIX

1. INTRODUCTION

Your O_2 monitor is capable of measuring the concentration of oxygen in the range of 0 to 30% by volume (ppm).

The O_2 monitor features two adjustable alarm contacts, an output signal with adjustable zero and span values and, in addition to these features, an auto-calibration function.

2. INSTALLATION

Here is how to place your O_2 analyzer into service:

a) Connect a regulated source of sample gas to the1/8" FNPT connection on the side of the instrument. Inlet pressure should be 5 psig with a recommended sample flow rate of 200 to 500 cc/min.

b) Connect the instrument to a power source 115 VAC, 50/60Hz, 220V or 12 VDC in some units. On NEMA-4 enclosures, it will be necessary to remove the plastic cover to access the switches beneath the front panel.

c) Turn the POWER switch to ON. The switch is located on the left side of the enclosure. The O_2 analyzer will cycle through its diagnostic routine.

d) The startup routine is complete when a LED above the display comes on and the O_2 concentration is indicated in units of %.

c) If the alarm LED's, AL-1 or AL-2, above the display illuminate the instrument is alerting you that the O_2 concentration is outside a factory programmed band of 17-22%. These settings are easily changed from the front panel. To accomplish this, refer to Section 7, SETTING ALARM POINTS.

3. THE SENSOR

The O_2 sensor is an electrochemical cell designed to be maintenance free and stable over long periods of time. The expected life for continuous operation should be at least two (2) years.

4. THE ELECTRONICS

The electronics section of the NYAD Series 200PN Oxygen Analyzers, is microprocessor based. The various NYAD sensors all produce a millivolt output. The signal enters the receiver section of the main electronic board which then shapes and amplifies the incoming signal and directs it to the microprocessor.

The signal is amplified and converted to engineering units using memory-resident tables containing the relationship between signal and engineering units. The end product of this electronic process is displayed in terms of percent.

At this point, the processor performs three functions:

a) Activates the two adjustable alarm contacts (SPDT relays).

b) Analog or Digital (optional) output signals.

c) Displays the measured values on a 4-digit LCD display.

Nyad offers two analog outputs, either a 0-5 volt DC or a 4-20mA current output. Other analog outputs and digital outputs are available and can be factory set as 0-1VDC or 0-10VDC and RS232 or RS485). The zero point and span of these outputs are adjustable in software over the full range of engineering units being measured.

In summary, the microprocessor-based system for all NYAD Analyzers has the function of measuring and amplifying the signals from whichever sensor is being used then converting to engineering units, displaying the value, controlling the adjustable alarm circuitry, and driving the analog output.

5. STARTUP DISPLAY

After the analyzer has been installed, all electrical connections have been made and power turned on, the instrument will proceed through its power-up routine with the display and indicators stepping through the following sequence:

a) Displays all segments ON and all LED indicators ON for one second. This step verifies the operation of those devices.

b) Displays the word NYAD for one second.

c) The display indicates the version of the current operating system software. All LED indicators are off followed by EE1.

d) The last step in the startup routine is the display of the current measurement in the units indicated by the LED located directly above the display. In Approximately six seconds, any alarm conditions will be shown by a red LED alarm indicator.

6. FRONT PANEL CONTROLS

The NYAD Model 250PN Percent Oxygen Analyzer has two front panel controls that allow the operator to interact with the instrument.

1) UP/UNITS-DOWN—This two-position momentary switch located to the left of the display has three functions:

   a) Changes the value of set point, outputs, and constants.
   b) Changes the calibration values.
   c) Changes toggle function “Hi and Lo”

2) MODE— Momentarily pressing and releasing this switch allows the operator to access, interrogate, and reset the other major functions incorporated into this analyzer, namely, Alarm 1, Alarm 2, Output, Toggle , and Calibration.

3) POWER— Press to power ON/OFF.

The second control is a square, momentary push button located to the right of the display and is labeled MODE. Momentarily pressing and releasing this switch allow the operator to access, interrogate and reset the other major functions incorporated into this analyzer, namely, Alarm 1, Alarm 2, output and calibration.

7. SETTING ALARM POINTS

This monitor has two adjustable alarm set points and relays as factory standard. When the measured value of O2 percent concentration exceeds the set point for a sustained period of about 6 seconds, the alarm condition is activated, the SPDT relay (Alarm 1) is energized as well as the red front-panel LED indicator, Al 1.

To determine the current setting for ALARM 1, press the MODE button. The display will show Al 1 and then default to the current value. If this value is acceptable, the unit will momentarily in about 6 seconds flash “DISP” and return to the current measured O2 value.

If the current setting for ALARM 1 is not acceptable, proceed as follows:

a) Press the UP/DOWN button. You can cycle up or down through the numbers one digit at a time

to the desired values or hold for several seconds and the rate will shift to fast.

To set ALARM 2, proceed exactly as described above after pressing the MODE button to display Al 2 and its current value.

If the measured value of O2 concentration is higher than the ALARM 1 or ALARM 2 setting, the corresponding LED will illuminate above the display and energize the alarm relay thus activating any warning devices connected to it.

The Nyad oxygen analyzer is equipped with a toggle function (A1 1T and A2 2T). Set these for Hi when alarm is to detect increasing O2 and Lo when detecting decreasing O2.

To determine the current setting for A1 1T, press the MODE button until A1 1T is displayed (Hi or Lo). If this value is acceptable, unit will time out and return to display.

To set A2 2T, proceed exactly as described above after pressing the MODE button to display A2 2T (Hi or Lo).

8. SETTING OUTPUT

The NYAD Series 200PN Analyzer features a 0-5 VDC and 4-20mA analog output as factory standard. This signal is linearly proportional to % O2. To change span
values from those set at the factory, these values must first be displayed.

EXAMPLE:

As an example, assume we wish to set the output span to range as follows:

Output	**% O2**
(oPHi) 5 volts	30
(oPLo) 0 volts	0

a) Display the current settings by pressing the MODE switch and cycling through Al 1, Al 2, A1 1T, A2 2T to OUTPUT. The display will read "oPLo" and then show the current value of O2 concentration corresponding to the Lo end of the analog output when the MODE button is pushed.

b) If this displayed value is 0, you may accept it by ressing MODE switch. If you wish to change the setting, proceed as described in Section 7, SETTING ALARM POINTS. Set the desired value using the UP/DOWN switch to cycle the numbers.

c) Press the MODE switch. The display will now read "oPHi" and then show the O2 concentration corresponding to the Hi end (5 VDC) of the analog output scale when the MODE is pushed. If this is the desired value, 20.0 %, the unit will momentarily in 6 seconds return to display.

d) If you wish to change the setting, set the desired value by using the UP/DOWN switch as previously described.

9. DEFAULT VALUES

Series 200PN Oxygen Analyzers are preset at the factory with the following standard values:

Function	**% O2**
Al 1	17
Al 2	23
Output (oPHi)	50
Output (oPLo)	0

These setting have been shown by experience to be most used by our customers. However, any of them can be changed from the front panel of the analyzer to values most suitable for your application.

10. CALIBRATION PROCEDURE

The procedure described here is for calibrating the O_2 sensor with a span gas of known O_2 concentration – For Example: Air @ 20.9%. To calibrate the O_2 sensor, A CERTIFIED SAMPLE OR AIR can be used. A cylinder of certified calibration gas can be purchased from your specialty gas supplier. The span gas should be specified as to the O_2 concentration and to the carrier or balance of the gas.

To calibrate the O_2 analyzer, proceed as follows:

a) Connect the analyzer to a certified gas sample at a flow rate of about 200 cc/min.

b) Next, press the MODE button until CAL is displayed. The CAL led light will illuminate indicating the monitor is in CAL mode. Note: If O2 gas is not detected, the unit will display “No O2”.

c) The display will now show the current O2 value. After the value equilibrates, enter the concentration of your span gas by pressing the UP/DOWN switch. The displayed value should be the value of the span gas concentration.

d) Press the MODE button, ‘DISP” will display and in 5 seconds the unit will return to the current O2 value.

e) Turn off and disconnect the span gas.

The monitor is now calibrated and ready to be placed into service.

11. REFERENCE TABLE

REFERENCE TABLE	
AL 1	Dry Relay Contact - Alarm 1
AL 2	Dry Relay Contact - Alarm 2
A1 1t	Toggle AL 1 “Hi or Lo”
A2 2t	Toggle AL 2 “Hi or Lo”
oPHi	Analog Output “Hi”
oPLo	Analog Output “Lo”
CAL	Calibration Function
No O2	Sensor not detecting O2
EroP	Operator Error

12. REPLACING THE SENSOR

DANGER

Disconnect power to the unit before performing any maintenance to the control board.

WARNING

The oxygen sensor contains corrosive acid. Do not attempt to open. Before disposing of sensor place it in a polyethylene bag and tie securely. Dispose of sensor in accordance with all applicable regulations.

a) Remove the plastic cover (6 captive screws).

b) Remove the front panel (two thumb screws).

c) Turn the complete sensor module counter clock wise until it is free of the input fitting.

d) Remove the electronic board from the assembly by pulling it away from the sensor where it is held by three connector pins. Next remove the sensor from its flow chamber by unscrewing the three small screws holding it in place. Discard the depleted cell and replace it with the new one.

e) Reassemble the cell by following the above instructions in reverse.

SPECIFICATIONS

Model Numbers	OA-220PN (OEM), OA-230PN (Rack Mount, OA-240PN (Panel Mount), OA-250PN (Nema 4), OA-270PN (Nema 7X)
Units	PPM (Parts Per Million)

Standard

Display	4 Digit LCD, 0.5" High
Alarm	Dual Dry Relay Contacts (SPDT 1A@120V)
Analog Output	0-5VDC or 4-20mA (Adjustable zero and span)
Power	120VAC 50/60 Hz, 1W Max, 220V
Memory	Non-Volatile Data Memory
Inlet	1/8" FNPT
Calibration	Auto Calibration

Options

Audible Alarm	
Digital Output	RS232, RS485
Power	12V

Sensor

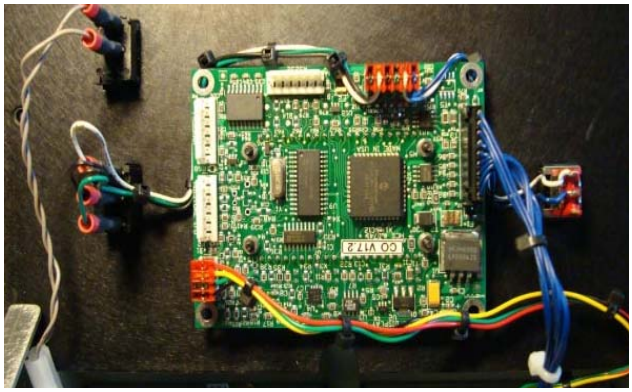
Minimum Range	0-1% 02
Maximum Range	0-100% 02
Signal Output	7-13mV
Response Time 90%	6 seconds
Accuracy Full Scale	±1
Drift % Signal/Month	<1%
Linearity	±1
Repeatability	±0.5
Temperature Coefficient	Compensated
Operation Temperature	0 to 50 ºC
Pressure	Ambient
Humidity	0-99% RH
Expected Life	24 months
Storage Temperature	0 to 30 ºC
Recommended Storage	<6 months
Warranty	12 months

Enclosures

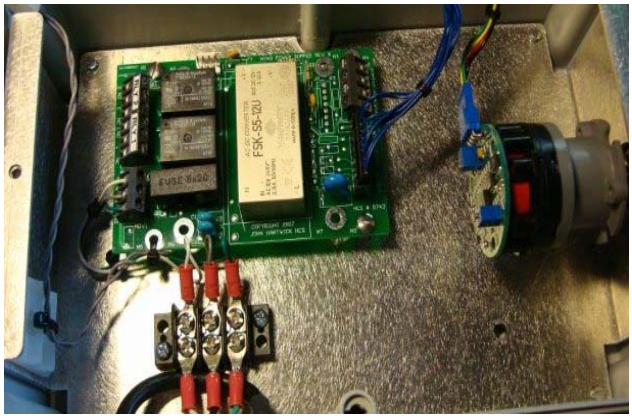
OEM	**5.75"WX6.75"Hx2.4"D**
NEMA-4	**9.5"W x 6.25"H x 3.5"D**
Panel	**10"W x 5.25"H x 11.5"D**
Rack	**19"W x 5.25"H x 11.5"D**
Portable	**8.5"Wx3"Hx9**

Troubleshooting Guide

Symptoms	Remedy
ELECTRONICS	
Unit will not cycle Startup routine not normal	Replace Electronics (Send unit to Nyad)
Display is blank with power on Display has missing segments	Replace Display (Send unit to Nyad)
ERROR CODES	
ErOp (Error Operator)	Output out of range. Set output Lo and Hi. See Section 10 Setting Output.
E-Lo	Replace O2 sensor or 02 electronics.
No O2	Sensor not detecting 02 Gas. Replace Percent O2 sensor.

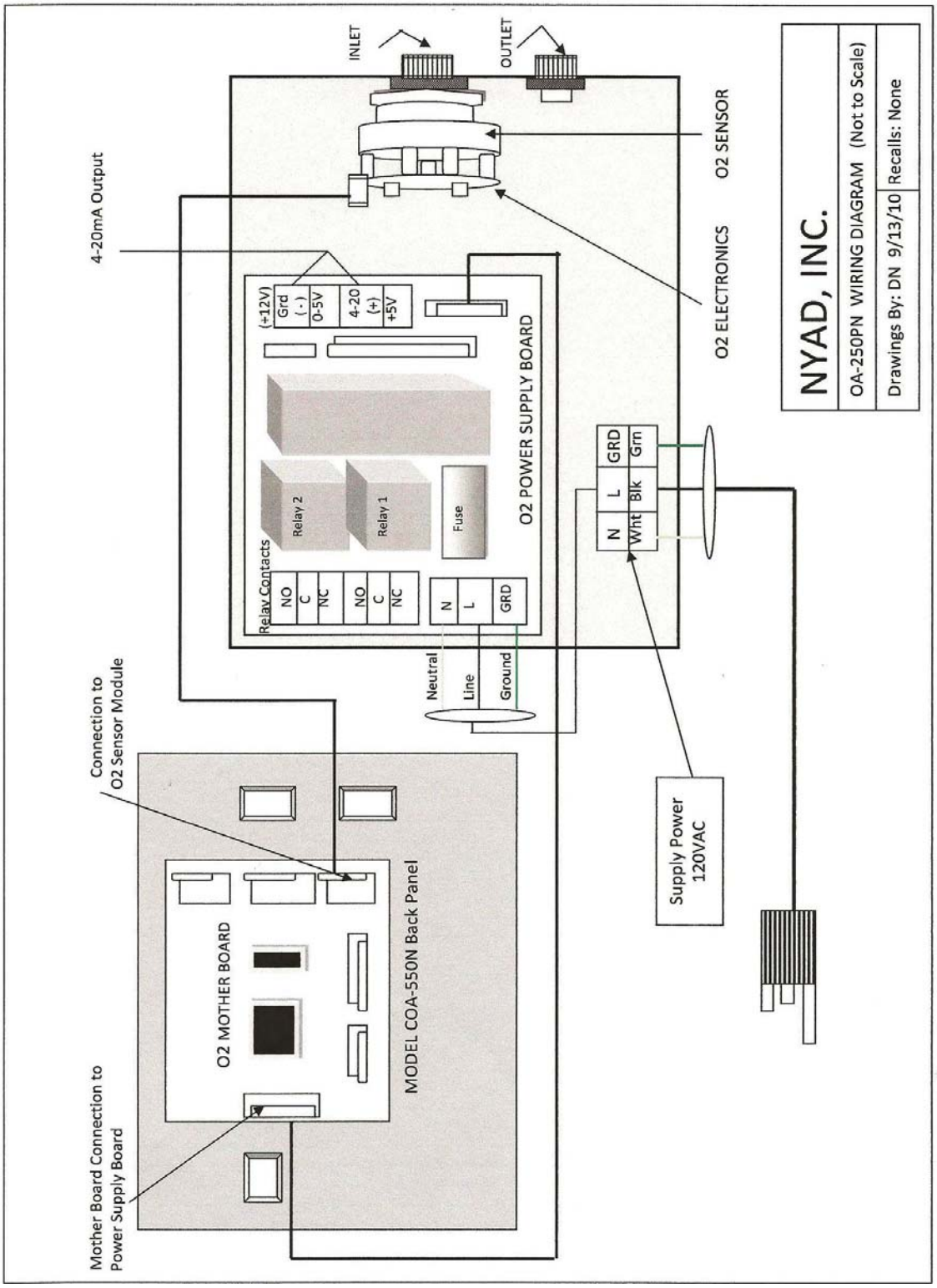


O2 MOTHER BOARD

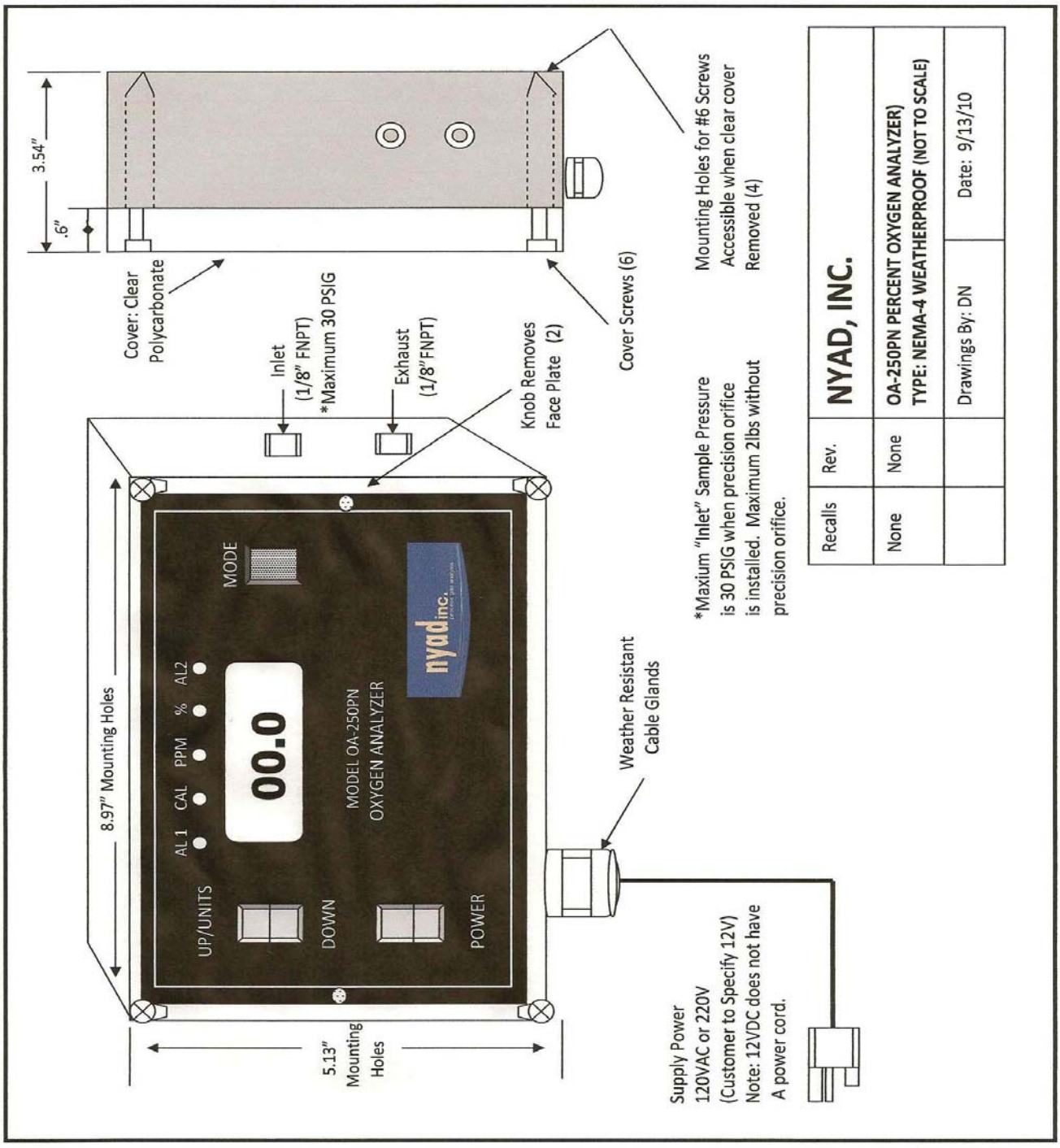


O2 POWER SUPPLY BOARD
(A.1)

1. **O2 connection to mother board**
2. **Relay 1 and Relay 2**
3. **Output0-5VDC or 4-20mA**
4. **Power 110VAC—220VAC(Brown, Blue, Green)**
5. **02 Sensor**
6. **O2 Electronics**
7. **Digital Output RS232 or RS485 (Optional)**

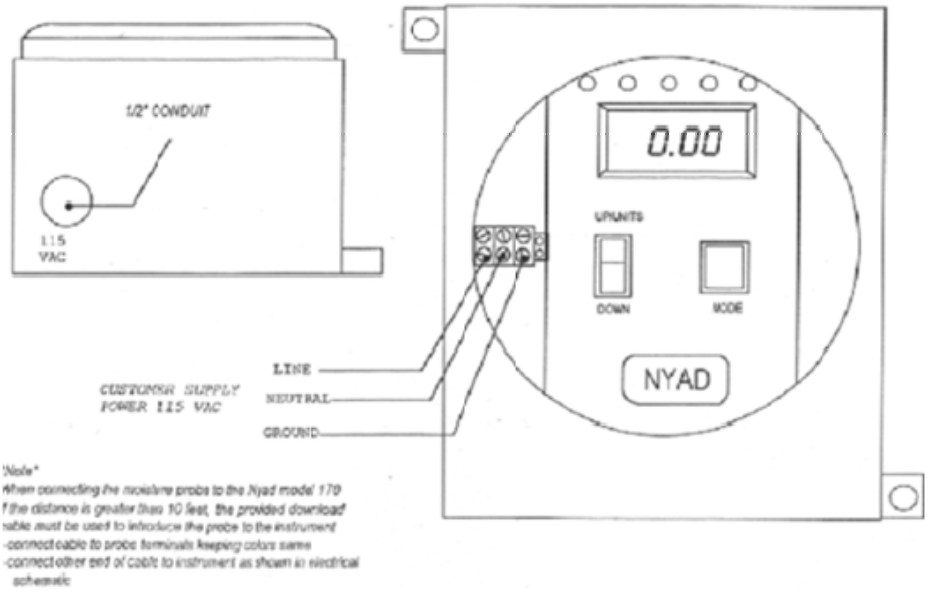


OA-250PN Wiring Diagram
(A.2)


3.54"
.6"
Cover: Clear Polycarbonate
Inlet (1/8" FNPT) *Maximum 30 PSIG
Exhaust (1/8" FNPT)
Knob Removes Face Plate (2)
Cover Screws (6)
Mounting Holes for #6 Screws Accessible when clear cover Removed (4)
8.97" Mounting Holes
MODE
AL1 CAL PPM % AL2
00.0
MODEL OA-250PN
OXYGEN ANALYZER
nyad inc.
UP/UNITS
DOWN
POWER
Weather Resistant Cable Glands
*Maxium "Inlet" Sample Pressure is 30 PSIG when precision orifice is installed. Maximum 2lbs without precision orifice.
5.13" Mounting Holes
Supply Power 120VAC or 220V (Customer to Specify 12V) Note: 12VDC does not have A power cord.
Recalls
None
Rev.
None
NYAD, INC.
OA-250PN PERCENT OXYGEN ANALYZER)
TYPE: NEMA-4 WEATHERPROOF (NOT TO SCALE)
Drawings By: DN
Date: 9/13/10

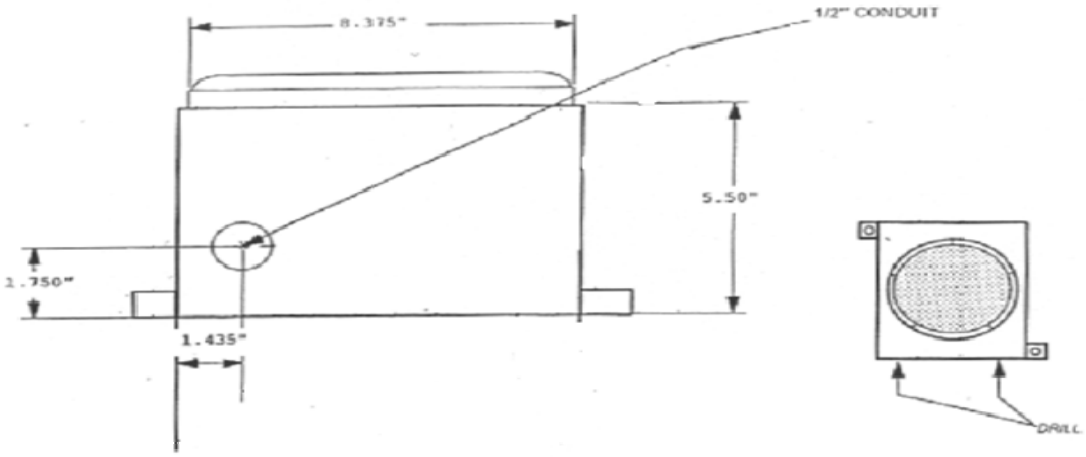
OA-250PN
(A.3)

NYAD, INC
MODEL:
EXPLOSION PROOF ENCLOSURE



'Note"
When connecting the moisture probe to the Nyad model 170
f the distance is greater than 10 feet, the provided download
able must be used to introduce the probe to the instrument
-connect cable to probe terminals keeping colors same
-connect other end of cable to instrument as shown in electrical
schematic

NYAD, INC



"END VIEW"
KILLARK ENCLOSURE

KILLARK ENCLOSURE

OA-270PN
(A.4)

RETURN POLICY

Before returning any items (except for recalibration service and repairs)
you must call 925 270-3971 8:30 a.m. – 5:00 p.m. PST. Monday through Friday for approval.

Product may be returned for a full refund/credit within 30 days from the date that Nyad originally shipped and must be returned in their original new condition.. Exceptions for special order. Returns for special orders will have 30% restocking fee and must be approved.

Items returned in damaged or altered conditions which cannot be resold as new will have a 30% restocking fee.

All returned items are subject to inspection for use and damage before credit is issued. Returns may incur additional charges if product is returned in damaged conditions.

Manufacture Warranty/Defective Claims - You may return product to us for rework, exchange and/or request a full refund/credit. Request must be made from the original purchaser. Upon receipt of a returned item, Nyad will evaluate and determine the warranty claim.

Damaged Items – It is your responsibility to inspect your packages for damages/defect on delivery. If product is damaged in transit to you, we must be notified immediately (within 24 hours) so that we can submit a claim the our freight carrier.

Lost Packages – Lost Packages must be reported within 30 days of shipment date and verification from the freight carrier that product has not been delivered.

Please contact or email us for further important instructions on filing a lost
or damaged package claim.

TECHNICAL SUPPORT

Nyad, Inc. will offer Technical Support via telephone or email. All technical support shall be related to the Nyad Equipment only. Any other technical issues involving other products and services to the Nyad Equipment will not be the responsibility of Nyad, Inc.; however, our technical support team will offer their best knowledge and support involved in the Nyad Equipment.

Warranty/Technical Support:

Ph (925) 270-3971 ext 4
Contact: Dorothy Natividad
Email: Dorothy@nyad.com

WARRANTY

WARRANTY TERMS

Nyad, Inc. warrants to the original consumer purchaser that all parts used in the construction or fabrication of the Nyad Equipment will be free from defects in materials and factory workmanship, under normal use and service for ***five years*** from the date of delivery.

Warranty coverage provides the necessary repairs or parts replacement found by Nyad, Inc. to be defective due to bad workmanship or faulty materials.

LIMITATIONS OF WARRANTY

The Nyad Equipment is restricted to inspection (FOB the Factory) before warranty is determined, unless other arrangements have been made by Nyad and the original consumer purchaser.

This warranty does not apply to routine service/maintenance, calibrations, repairs and replacement of the percent O2 sensor every twenty-four (24) months in accordance with manufacturer's recommendation, or replacements made necessary by fire or water damage, or accident to or improper installation by others, alteration, misuse or abuse to the Nyad Equipment.

This warranty does not cover labor charges or cost incurred for time and expense by other service agencies or personnel involved in maintaining the Nyad Equipment.

Application of this Warranty is further conditioned upon the following:

Installation. The Nyad Equipment must be properly installed in accordance with Nyad's installation procedures and instructions.

Proper Maintenance and Operation. The Nyad Equipment must be properly maintained and operated in accordance with Nyad's maintenance and operating procedures. All service parts must be acquired from Nyad or its authorized representative.

No Alteration. The Nyad Equipment must not have been modified or altered from its original conditions at the date of delivery or installation.

Failure to comply with any of these conditions will void this Warranty.