MACURCO GAS DETECTORS

ND-1

INSTALLATION & OPERATING INSTRUCTIONS

WWW.MACURCO.COM

GENERAL INFORMATION

The ND-1 is a microcomputer controlled electronic sensor and controller for Nitrogen Dioxide (NO_2). The unit has a NO_2 sensor (electrochemical), digital display, status lights, buzzer and relays. Please see the ND-1 data sheet for more detailed information.

LOCATION

The unit, on average, can cover about 5000 sq. ft. (465 sq. meters). The coverage depends on air movement in the room or facility. Extra detectors may be needed near any areas where people work, or the air is stagnant. Normally, the unit mounts 5 feet (1.5 meters) above the floor in a central area where air movement is generally good. See the ND-1 data sheet for more information on location.

INSTALLATION

The ND-1 is housed in an electrical box that has mounting holes on the back. Conduit can be connected to the bottom three knock-out holes. Do NOT remove the four black vents in the case. They are necessary for adequate air flow into the unit. Remove the two small screws toward the **bottom** of the inside cover. The inside cover then swings up for access to internal circuitry.

Once the cover is open, you should notice a seven-screw terminal block. The first two screws, at the far left, are for power and are marked "POWER 12-24 V ac/dc". There is no polarity. The three middle terminals are for the Fan SPDT relay. They are marked from left to right N.O. (normally-open), COM (common), and N.C. (normally-closed). The Fan relay contacts can handle up to 5 amps. The two terminals at the far right are for the Alarm relay. They are both marked N.O. (normally-open). The Alarm relay contacts can handle up to 0.5 amps.

The relays have dry contacts. See the ND-1 data sheet for detailed schematics on wiring and other technical information.

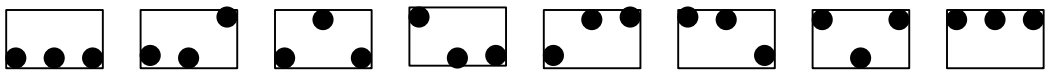
OPERATION

When power is first applied to the detector, it will go through a warm-up period of 30 seconds. The digital display will count down from 30 to 0 during the warm-up period. The Fan and Alarm relays will also actuate during the warm-up period.

The ND-1 is now operational. Set the Fan and Alarm PPM levels as needed for the job requirements. The current OSHA and ACGIH values for NO_2 are TWA of 3 ppm (parts per million) and STEL of 5 ppm. The suggested settings to meet those limits are a Fan setting of 3 ppm and an Alarm setting of 5 ppm.

The Fan turn-on delay can be set from 0 to 5 minutes by setting the 3-segment "FAN DELAY" switch (inside the unit just below the big blue buzzer). When the turn-on delay has been actuated by the NO_2 level exceeding the threshold settings, the amber light will flash. When the turn-on delay is over the amber light will come on solid and the Fan relay will actuate.

FAN DELAY SWITCH CHART



NONE 30 SEC. 45 SEC. 1 MIN. 2 MIN. 3 MIN. 4 MIN. 5 MIN.

The Alarm turn-on delay (flashing red) is fixed at 5 minutes. A solid red light indicates Alarm relay activation, and the buzzer will sound. Both Fan and Alarm relays have a minimum on-time of 30 seconds. This is to prevent short cycling devices connected to the relays.

TESTING

Testing the unit can be done by pressing the "TEST" switch located near the buzzer on the printed circuit board. This will initiate the test cycle. The display will read 88.8, both the Fan and Alarm relays will actuate, both Fan and Alarm status lights will be on solid, and the buzzer will sound. The test cycle will last approximately 30 seconds.

RESET

The reset feature is activated by pressing the switch labeled "RESET". The switch is mounted on the printed circuit board near the terminal block. Pressing the switch will initiate the warm-up cycle as mentioned above in "OPERATION".

STABILIZATION TIME

Although it will be operational within a few minutes of being first powered, the gas sensor in the ND-1 requires one hour to reach its final operating point. The ND-1 is intended to be continuously powered. If you are certain that the air is clean and the ND-1 indicates a small reading, the zero potentiometer (just above the sensor labeled "ZERO") may be adjusted. Turn the screw about a quarter of a turn CCW at a time, while waiting 30 seconds between turns. This is a 25-turn potentiometer.

ALARMS DUE TO OTHER GASES

Although the ND-1 is specifically calibrated with NO_2, the electro-chemical sensor will detect a variety of gases such as Hydrogen Sulfide, Sulfur Dioxide, Chlorine, and Hydrogen Chloride. These gases may cause a reading and relay actuations.

REPLACING THE SENSOR AND RECALIBRATING THE ND-1

Macurco provides a replacement sensor and a Field Calibration Kit for the ND-1. We recommend that the sensor be replaced, and the unit be re-calibrated at least once every two years. The Field Calibration Kit can be used to calibrate several units. The number of units that can be calibrated is determined by the gas quantity in the gas cylinder. This will vary due to calibration kit useage and gas flow rate. However, the gas mixture has a useful life of no more than one year.

SERVICING OF UNIT

The ND-1 does not require regular maintenance. The unit uses a self-purging electro-chemical sensor that has a two year life expectancy. This sensor acts somewhat like a battery in that its output will be reduced with time. The manufacturer of the sensor (City Technology Limited) indicates the sensor can be expected to have a reduced output of up to 2% per month, but not to normally exceed 5% per year.

All maintenance and repair of products manufactured by Macurco, Inc. are to be performed at the Macurco manufacturing facility. Macurco does not sanction any third-party repair facilities. Any attempted repair of a Macurco product will void the products limited warranty.

LIMITED WARRANTY

The ND-1 gas detectors are warranted to be free from defective material and workmanship for a period of one (1) year from the date of manufacture. If any component becomes defective during the warranty period, it will be replaced or repaired free of charge, if the unit is returned in accordance with the instructions below. This warranty does not apply to units that have been altered or had repair attempted, or that have been subjected to abuse, accidental or otherwise. The above warranty is in lieu of all other express warranties, obligations or liabilities. THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE ARE LIMITED TO A PERIOD OF ONE (1) YEAR FROM THE PURCHASE DATE. Macurco shall not be liable for any incidental or consequential damages for breach of this or any other warranty express or implied arising out of or related to the use of said gas detector. Manufacturer or its agents liability shall be limited to replacement or repair as set forth above. Buyer's sole and exclusive remedies are return of the goods and repayment of the price, or repair and replacement of non-conforming goods or parts. (The Uniform Commercial Code applicable in the State of Colorado shall govern.)

RETURN INSTRUCTIONS

Call (303) 781-4062 for a Return Authorization number. Then, carefully pack the gas detector with a written description of the nature of the return. Send the unit to the following address:

Macurco Inc.
3946 South Mariposa Street
Englewood, Colorado 80110
WWW.MACURCO.COM

REV. 5/99