

NO₂ Converter

2B *Technologies, Inc.*

QUICK START MANUAL

Model 401

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IDENTIFICATION RECORDS

Record the following information for future reference:

Unit serial number: _____

Warranty start date: _____
(date of receipt)

PRINTING HISTORY

New editions are complete revisions of the manual and incorporate all previous update pages and write-in instructions. This manual will be revised as necessary. Revisions can be in the form of new editions, update pages, or write-in instructions.

Revision A.....January 2007
Revision B.....January 2010

TRADEMARKS & PATENTS

2B Technologies™, 2B Tech™, 2B™, NO Monitor™, Nitric Oxide Monitor™ and NO₂ Converter™ are trademarks of 2B Technologies, Inc.

CONFIDENTIALITY

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WARRANTY STATEMENT

2B Technologies, Inc. warrants its products against defects in materials and workmanship. 2B Technologies will, at its option, repair or replace products which prove to be defective. The warranty set forth is exclusive and no other warranty, whether written or oral, is expressed or implied. 2B Technologies specifically disclaims the implied warranties of merchantability and fitness for a particular purpose.

Warranty Periods

The warranty period is one (1) year from date of receipt by the purchaser, but in no event more than thirteen (13) months from original invoice date from 2B Technologies, Inc.

Warranty Service

Warranty Service is provided to customers through phone support, Monday - Friday, from 9:00 a.m. to 5:00 p.m., Mountain Time USA. Phone support is for trouble-shooting and determination of parts to be shipped from 2B Technologies to the customer in order to return the product to operation within stated specifications. If phone support is not efficient and effective, the product may be returned to 2B Technologies for repair or replacement. Prior to returning the product, a Repair Authorization Number (RA) must be obtained from the 2B Technologies Service Department.

Shipping

2B Technologies will pay freight charges for replacement or repaired products shipped to the customer site. Customers shall pay freight charges for all products returning to 2B Technologies.

Conditions

The foregoing warranty shall not apply to defects resulting from improper or inadequate maintenance, adjustment, calibration or operation by customer. Maintenance, adjustment, calibration or operation must be performed in accordance with instructions stated in the NO₂ Converter Quick Start Manual. Usage of maintenance materials purchased from suppliers other than 2B Technologies will void this warranty.

Limitation of Remedies and Liability

The remedies provided herein are the Customer's sole and exclusive remedies. In no event shall 2B Technologies be liable for direct, indirect, special, incidental or consequential damages (including loss of profits) whether based on contract, tort or any other legal theory. The NO₂ Converter Quick Start Manual is believed to be accurate at the time of publication and no responsibility is taken for any errors that


may be present. In no event shall 2B Technologies be liable for incidental or consequential damages in connection with or arising from the use of the NO₂ Converter Quick Start Manual and its accompanying related materials. Warranty is valid only for the country designated on the 2B Technologies quote or invoice.

ENGLISH



WARNING:
Any operation requiring access to the inside of the equipment, could result in injury. To avoid potentially dangerous shock, disconnect from power supply before opening the equipment.

WARNING:

This symbol,  on the instrument indicates that the user should refer to the manual for operating instructions.

WARNING:


If this instrument is used in a manner not specified by 2B Technologies, Inc. USA, the protection provided by the instrument may be impaired.

ESPAÑOL



ATENCIÓN:
Cualquier operación que requiera acceso al interior del equipo, puede causar una lesión. Para evitar peligros potenciales, desconectarlo de la alimentación a red antes de abrir el equipo.

ATENCIÓN:

Este símbolo,  en el instrumento indica que el usuario debería referirse al manual para instrucciones de funcionamiento.

ATENCIÓN:


Si este instrumento se usa de una forma no especificada por 2B Technologies, Inc., USA, puede desactivarse la protección suministrada por el instrumento.

FRANÇAIS



ATTENTION:
Chaque opération à l'intérieur de l'appareil, peut causer du préjudice. Afin d'éviter un choc qui pourrait être dangereux, déconnectez l'appareil du réseau avant de l'ouvrir.

ATTENTION:

Le symbol,  indique que l'utilisateur doit consulter le manuel d'instructions.

ATTENTION:


Si l'instrument n'est pas utilisé suivant les instructions de 2B Technologies, Inc., USA, les dispositions de sécurité de l'appareil ne sont plus valables.

DEUTSCH



WARNHINWEIS:
Vor dem Öffnen des Gerätes Netzstecker ziehen!

WARNHINWEIS:

Dieses,  auf dem Gerät weist darauf hin, daß der Anwender zuerst das entsprechende Kapitel in der Bedienungsanleitung lesen sollte.

WARNHINWEIS:


Wenn das Gerät nicht wie durch die Firma 2B Technologies, Inc., USA, vorgeschrieben und im Handbuch beschrieben betrieben wird, können die im Gerät eingebauten Schutzvorrichtungen beeinträchtigt werden.

ITALIANO



ATTENZIONE:
Qualsiasi intervento debba essere effettuato sullo strumento può essere potenzialmente pericoloso a causa della corrente elettrica. Il cavo di alimentazione deve essere staccato dallo strumento prima della sua apertura.

ATTENZIONE:

Il simbolo,  sullo strumento avverte l'utilizzatore di consultare il Manuale di Istruzioni alla sezione specifica.

ATTENZIONE:


Se questo strumento viene utilizzato in maniera non conforme alle specifiche di 2B Technologies, Inc. USA, le protezioni di cui esso è dotato potrebbero essere alterate.

DUTCH



OPGELET:
Iedere handeling binnenin het toestel kan beschadiging veroorzaken. Om iedere mogelijk gevaarlijke shock te vermijden moet de aansluiting met het net verbroken worden, vóór het openen van het toestel.

OPGELET:

Het symbool,  geeft aan dat de gebruiker de instructies in de handleiding moet raadplegen.

OPGELET:

Indien het toestel niet gebruikt wordt volgens de richtlijnen van 2B Technologies, Inc., USA gelden de veiligheidsvoorzieningen niet meer.

1. NO₂ CONVERTER INTRODUCTION

When used in conjunction with the Model 400 Nitric Oxide Monitor™, the 2B Technologies NO₂ Converter™ allows measurements of NO_x (NO_x = NO + NO₂) in addition to NO. By subtraction, one can then obtain the NO₂ concentration (NO₂ = NO_x – NO). The most common application is the measurement of NO and NO₂ in urban and regional air pollution where the concentration is a few ppb or higher. NO_x measurements are achieved by passing the air stream through a molybdenum converter prior to entering the NO Monitor™. In addition to providing for NO_x measurements, the NO₂ Converter™ has a built in NO scrubber which can be used to zero the Nitric Oxide Monitor™. Software residing in the NO Monitor™ allows one to varying the cycling times between NO, NO_x and zero measurements.

NO₂ CONVERTER™ SPECIFICATIONS

Power Requirements Configured for either 110 V or 220 V (not both)

Dimensions.....3.8" x 7.5" x 9.5"

Weight 4.9 lb

Data Transmission..... 4800 baud, 8 bits, no parity, 1 stop bit

2. OPERATION

Please read all the following information before attempting to install the NO₂ Converter™. For assistance, please call 2B Technologies at (303)273-0559 or email techsupport@twobtech.com.

NOTE:

Save the shipping carton and packing materials that came with the Nitric Oxide Monitor. If the Nitric Oxide Monitor must be returned to the factory, pack it in the original carton. Any repairs as a result of damage incurred during shipping will be charged.

Shipping Box Contents

Open the shipping box and verify that it contains the following:

1. Model 401 NO₂ Converter™
2. Power Cord
3. Connecting Tube
4. Accessory Cable
5. Serial Port Cable
6. CD Containing NO₂ Converter Quick Start Manul
7. Birth Certificate

If anything is missing or obviously damaged, contact 2B Technologies immediately.

Operation of the NO₂ Converter™

Use the accessory cable to connect the output of the Model 401 NO₂ Converter™ to the input of the Model 400 NO Monitor™. This cable allows the NO Monitor™ to control the solenoid valves inside the NO₂ Converter™ so as to measure either NO, NO_x or NO-scrubbed air (instrument zero). The accessory cable also passes serial data from the NO Monitor™ and through the NO₂ Converter™, which is then output on the serial data port on the back side of the NO₂ Converter™.

If you wish to collect data with your computer, connect the serial cable (a “straight through” cable) between the back of the NO₂ Converter™ and your computer. If your computer does not have a serial port, you can use a serial-to-USB adapter and collect the data from over your computer’s USB port. Please see the NO Monitor Manual or the 2B Technologies website for details on collection of data from your serial port. Instructions for the use of Tera Term Pro and Hyperterminal for collection of serial port data are given in Tech Note No. 007:

http://www.twobtech.com/tech_notes/TN007.pdf

To operate the NO₂ Converter™, use the power cord to connect it to AC power and turn the instrument on by flipping the front panel power switch. The instrument requires either 110 V or 220 V AC, as indicated on the back of the instrument. **Use only the correct AC voltage for your NO₂ Converter™.**

The target temperature should be set to 325 °C on the temperature controller on the front of the instrument. This target temperature will have been preset at the factory and there should be no reason to change it. However, if for some reason it is necessary to reset the target temperature, please see the instructions for the temperature controller included with the instrument.

Flow through the NO₂ Converter™ should be at a volumetric flow rate of 1 L/min or less in order to assure complete conversion of NO₂. The sample flow rate into the NO Monitor™ should be in excess of 700 cc/min in order to assure an overflow within the internal overflow sampling tee. A needle valve inside the NO Monitor may be adjusted to bring this flow into the correct range of 700-1,000 cc/min. If you purchased both an NO Monitor™ and a NO₂ Converter™, this flow will have already been adjusted.

Setting the Frequencies of NO, NO_x and Zero Measurements

If you purchased the NO₂ Converter™ along with a NO Monitor™, special software will have be placed on the NO Monitor™ for operation of the NO₂ Converter™. This software will allow you to choose the frequencies of NO, NO_x and Zero measurements. The main menu, which is accessed by holding the Select Button in, will now appear as:

Dat Avg Cfg Mol

The submenu **Mol** replaces the service menu, **Svc**, described in the NO Monitor Manual. If you wish to enter the service menu, hold in the Select

Button while flipping the power switch to on. You may then perform all of the same service functions described in the NO Monitor Manual.

Selecting the **Mol** (for “molybdenum” or “moly” converter) submenu gives the following additional choices:

Zer NOx Dur

The **Zer** submenu allows you to turn the zeroing function to always off, always on or to scheduled zero measurement frequencies of 30 min, 1 hr or 4 hr.

The **Dur** submenu allows you set the period of the scheduled zeroing cycle to either 5 min, 15 min or 1 hr.

The **NOx** submenu allows you to set the NO_x measurement function to always off (i.e., only measure NO), always on (only measure NO_x) or to cycle between NO and NO_x measurements at frequencies of 5 min, 15 min and 1 hr.

Status Bytes

When using the NO₂ Converter™, data are output over the serial port and logged to internal memory in the same way as described in the NO Monitor Manual with the exception that the data line is appended with an additional “Status Byte” at the end. These Status Bytes indicate what measurement is being reported (NO, NO_x or Zero) and how the instrument is currently set for measurements of NO, NO_x and Zero). The meaning of each Status Byte follows:

Status Byte	Meaning
0	NO being measured, NOx not scheduled, Zero not scheduled
1	NOx being measured, NO scheduled, Zero not scheduled
2	Zero being measured, NO scheduled, NOx not scheduled
4	NO being measured, NOx scheduled, Zero not scheduled
6	Zero being measured, NO and NOx scheduled
8	NO being measured, NOx not scheduled, Zero scheduled
9	NOx being measured, NO scheduled, Zero scheduled
12	NO being measured, NOx scheduled, Zero scheduled
16	NOx measured all the time
32	Zero measured all the time

