



Parker Hannifin Corporation
Precision Fluidics Division
Porter Instrument
245 Township Line Road
Hatfield, PA 19440
Office 215-723-4000/Fax 215-723-5106
www.PorterInstrument.com

2 CYLINDER MOBILE CART USER'S MANUAL / INSTRUCTIONS

Important: Read the 2 Cylinder Mobile Cart User's Manual / Instructions FM-1346 & applicable Nitrous Oxide and Oxygen Delivery System User's Manual, which includes these topics:

- **Warnings and Precautions**
- **Delivery Technique**
- **Safety Checks**
- **Maintenance and Troubleshooting**
- **Proper Use of Cylinders**
- **Connection to Flow Devices**

Use FM-1345 Assembly Instructions Examination of Contents


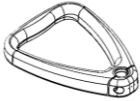

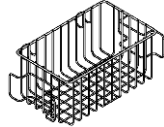
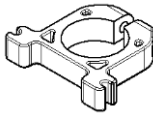
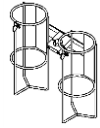


- **Examine shipping carton for signs of external damage.**
- **Remove contents from carton and inspect for visible damage or missing components. See page 2 for complete list.**
- **If damage is discovered or suspected and/or parts are missing, notify Porter or authorized distributor immediately.**


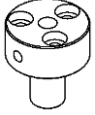
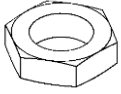


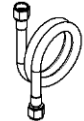




2 Cylinder Mobile Cart shown with Nitronox System. Cylinders not included. Medical Breathing Circuit, Nitronox, & Scavenger System sold separately.

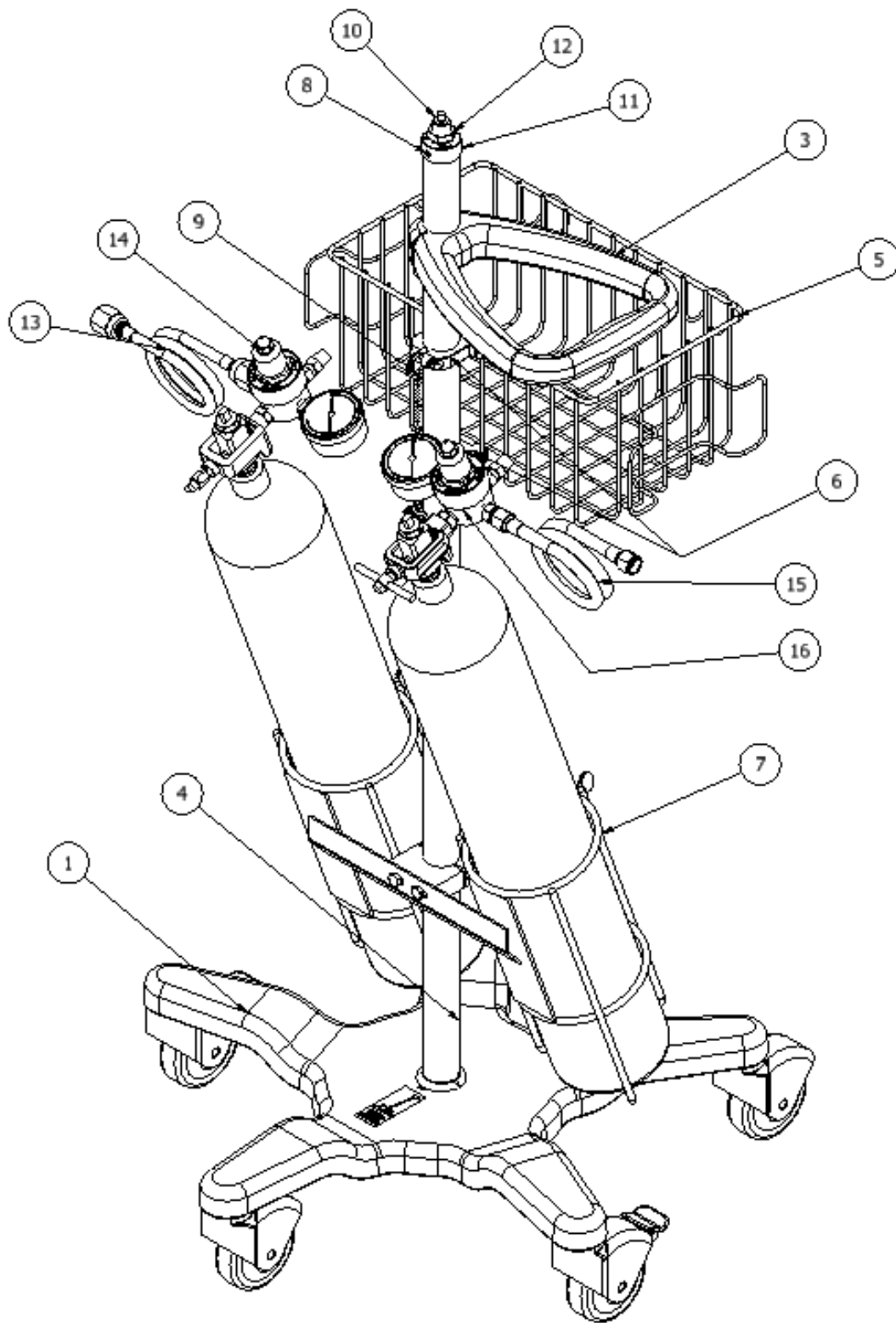
PORTER CUSTOMER SERVICE: 215-723-4000
www.porterinstrument.com

2 CYLINDER MOBILE CART COMPONENTS

Item	Component Description	Qty	Image
1	Wheel Base	1	
2	Pole Hardware Kit *	1	Hex Screw Washer Lock Washer Wrench
3	Handle w/ 2 Screws	1	
4	Pole	1	
5	Basket	1	
6	Basket Clips	2	
7	Cylinder Holder	1	
8	Set Screw	1	
9	Cylinder Wrench w/ Chain	1	

Item	Component Description	Qty	Image
10	Mounting Adapter	1	
11	End Cap w/ 3 Screws	1	
12	Hex Nut Adapter	1	
13	N2O Hose (Blue) (included w/ models 2100-N & 2100-2)	1	
14	N2O Regulator & Washer (included w/ models 2100-N & 2100-2)	1	
15	O2 Hose (Green**) (included w/ model 2100-2)	1	
16	O2 Regulator & Washer (included w/ model 2100-2)	1	
17	5/32" Hex Key *	1	

* Items not shown in diagram
 ** Color is white for –ISO model





Warnings and Precautions

These warnings and precautions are to help you to understand how to safely operate a 2-Cylinder Mobile Cart with a nitrous oxide & oxygen delivery System. A **WARNING** alerts you to a possible hazard to people. A **CAUTION** alerts you to the possibility of equipment damage.

WARNING: Protect against crossed lines at the 2 Cylinder Mobile Cart regulator assembly. Verify gas indexing pin locations, color coding of gauges, seal washer, & orientation of regulator assembly. Follow instructions in Regulator Check page 6.

WARNING: New or modified installations – properly connected gas pipelines (external gas supply) are absolutely essential to patient safety. The ultimate responsibility of assuring that lines are not crossed rests with the user.

WARNING: Do not allow crossed lines to defeat the safety features of the Mobile Cart, with any external gas supply, and/or central gas supply manifold systems. Crossed lines will create a dangerous and hazardous condition where, under a loss of oxygen supply, 100% nitrous oxide will be delivered through the oxygen delivery path and subsequently to the patient.

Use patient observation to prevent over sedation in the event of an oxygen failsafe malfunction or crossed lines. If a patient becomes over sedated when being delivered 100% oxygen [during an apparent loss of nitrous oxide supply], it is a definite indication of crossed lines or a failsafe malfunction. Remove the mask immediately and encourage mouth breathing. Deliver pure oxygen from an oxygen demand valve only if the oxygen source is independent from the suspected crossed lines area.

WARNING: Porter Instrument equipment utilizes the **cross+protection** system. The flexible hose and connectors that connect to the Regulator Assembly and the Flowmeter or Nitronox inputs are diameter indexed; 3/8" O.D. for Nitrous Oxide and 1/2" O.D. for Oxygen. The **cross+protection** system is designed to prevent misconnection of Oxygen and Nitrous Oxide hoses. **DO NOT ATTEMPT TO CHANGE THE DIAMETERS OR CONNECTORS OF THE REGULATOR ASSEMBLY!** Tampering with the **cross+protection** system constitutes acceptance of liability by the installer.

WARNING: The Mobile Cart within a nitrous oxide & oxygen delivery system, with Flowmeter or Nitronox, is intended to be used by medical personnel trained in the device use and the use of nitrous oxide and oxygen for medical applications. Do not use for other intended uses. Use approved Porter Flowmeter or Nitronox.

WARNING: Do not use the Flowmeter or Nitronox device for the administration of general anesthesia or as a part of, or in conjunction with, a general anesthesia administration system.

WARNING: Inspect and maintain the analgesia delivery system to prevent N₂O leaks in all hoses, connections and fittings. This includes the delivery system (Mobile Cart is mounting accessory) and the hoses and connections to the Regulator Assembly. Have all leaks repaired immediately.

WARNING: Use Scavenging: Medical workers are exposed to N₂O during administration of N₂O/O₂. Controls are effective in the patient treatment area to achieve low levels of ppm (parts per million) exposure. Controls include System Maintenance, Ventilation and Work Practices. Your accessory Scavenger System is an important part of the system of controls in medical settings.

WARNING: External gas supplies may range from 40 to 65 psi line pressure. Follow safe connection protocol in this order: **Connect external gas supply hoses to DISS (Diameter Indexed Safety System) fittings of Flowmeter or Nitronox (O2 first); then connect to external supply source. Do not disconnect with supply line pressurized. Disconnect at supply source first, per appropriate safe protocol.**

WARNING: During any power outage, remember to turn OFF the flowmeter and manually turn OFF the cylinder valves (or external supplies). With centralized, electrically powered gas systems, if gas was flowing when the power went out and the flowmeter is left ON, gas will be flowing when the power is restored.

WARNING: Always use clean, dry medical grade gases. Do not introduce moisture or other contaminants into the system and flowmeter device. **Never oil or grease any part of this system (minimize fire or explosion potential). Cylinder mount: Do not clean check valve entrance or sealing washer (replace as needed) with disinfectant.** User should ensure that the cylinder valve is clear of dust or dirt which may be carried to regulator and cause damage or accident. One clearing technique is to “crack” [secure] cylinder valve before installing cylinder to E-Block. Open valve slightly and then close. Do not discharge flow of gas at any person or flammable material.

CAUTION: Do not attempt to repair, alter or calibrate the system or device (except as directed in Porter User’s Manuals). Unauthorized repair, alteration or misuse of the Flowmeter or Nitronox device is likely to adversely affect the performance and will void the warranty.

CAUTION: Always lock casters in place when 2 Cylinder Mobile Cart is not being transported to prevent cart from moving during use or maintenance. Protect against tip over and potential damage to high pressure gas cylinders. A Loaded Mobile Cart must return to vertical when tipped 10°. Do not roll cart aggressively. For hardware protection, follow Regulator Assembly configuration and location of nitrous oxide cylinder within Cylinder Holder as described in Proper Attachment of Gas Cylinders.

INTENDED USE:

Flowmeter or Nitronox for a nitrous oxide & oxygen delivery system:

The device is intended for patient use and delivers a mixture of nitrous oxide and oxygen gases for a procedure in a medical healthcare setting by trained medical personnel. Porter Instrument recommends the user be thoroughly familiar with the use of Nitrous Oxide - Oxygen delivery for patient analgesia and be properly trained in its administration prior to using this product.

INTENDED USE: (Accessory)

A nitrous oxide & oxygen delivery system with Mobile Cart:

The Porter 2-Cylinder Mobile Cart is for use with one “E” cylinder of O2 and one “E” cylinder of N2O, or two cylinders of N2O when using other O2 gas supply. The two pressure gauges reflect cylinder pressure only. When the gas supply is opened, gas will flow through the portable regulatory assembly and be regulated down to 53 PSIG at the output of the regulators, out through the hoses to the Flowmeter or Nitronox device. A check valve within the N2O regulator assembly assists to minimize trapped gas venting out into the room after procedures are completed. Each Mobile Cart has a fixed 44" height (w/o Flowmeter or Nitronox attached) for use or storage.

⚠ WARNING: Protect against crossed lines at the 2 Cylinder Mobile Cart regulator assembly. Verify gas indexing pin locations, color coding of gauges, seal washer, & orientation of regulator assembly. Follow instructions below.

⚠ WARNING: New or modified installations – properly connected gas pipelines (external gas supply) are absolutely essential to patient safety. The ultimate responsibility of assuring that lines are not crossed rests with the user.

REGULATOR ASSEMBLY CHECK

1. Verify that a single sealing washer was supplied with each regulator, place on yoke above indexing pins. See Figs. 2, 4.
2. Check the color of the regulator gauges to ensure the O2 gauge is green (white for ISO model) & the N2O gauge is blue.
3. Check the indexing pins on each regulator to ensure they're indexed for the correct gases. The pins are indexed to prevent incorrect cross connection of regulators & cylinders.



Fig. 1



Fig. 2

Washer

O2



Fig. 3

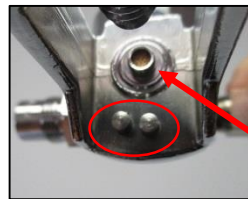


Fig. 4

Washer

N2O

4. Check the “LP” (low pressure) & “HP” (high pressure) label engravings near the fitting connections on the back of the regulators. The “HP” engravings should be in line with the yoke (right for O2; left for N2O) & gauge (top). The “LP” engravings should be in line with the relief valve (left for O2; right for N2O) and the male DISS (bottom). See Figure 5 for O2 configuration & Figure 6 for N2O configuration.

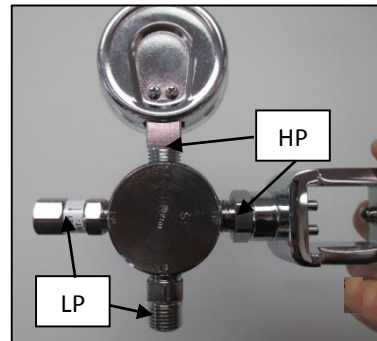


Figure 5 - O2

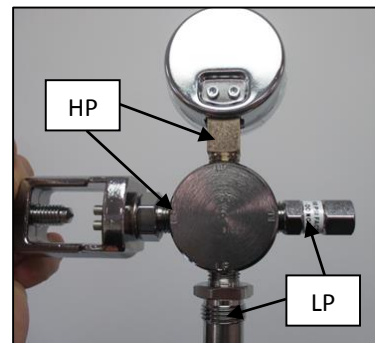


Figure 6 – N2O

⚠ WARNING
Do not remove or alter gas indexing pins.

Attachment of Flowmeters or Nitronox



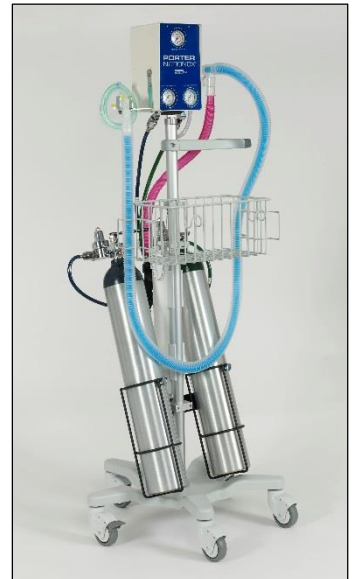
Matrix D-MDM



Matrix MDM



Porter MXR 3000



Nitronox

The 2 Cylinder Mobile Cart allows attachment of various Porter devices, illustrated above for the Matrix D-MDM, Matrix MDM, Porter MXR 3000, and Nitronox.

1. For all device attachments to the Cart Pole, use the Mobile Cart Mounting Adapter (Item 10) and Hex Nut Adapter (Item 12) screwed into the device mounting feature (See Fig. 7 illustration for mounting feature of Nitronox).
2. Tighten the Hex Nut Adapter to lock the Mounting Adapter into place.
3. Place the Mounting Adapter extension into the Cart End Cap (Item 11). (See Fig. 7)
4. Rotate the device to the preferred position as illustrated above, with the front face of the flowmeter on the same side as the Utility Basket.
5. Tighten Set Screw (Item 8) into End Cap (Item 11) to secure the device in place. Do not over tighten.



Fig. 7

Proper Attachment of Gas Cylinders

Caution: When removing cylinders, always be sure valves are closed tightly.

1. Cylinder Preparation: Remove any plastic wrap/washer from the top of cylinder. Keep cylinder top clean.
2. Lock casters. Facing from the back of Mobile Cart, place cylinders into angled Cylinder Holders, allowing bottom of cylinders to rest on bottom of Holders (Fig. 8). See Warning below.
Warning: Use the following cylinder / regulator assembly positioning to minimize risk of hardware damage during transport or use (Fig. 11). When using one oxygen and one nitrous oxide cylinder, place nitrous oxide cylinder in left Holder (when facing from the back of Cart) and oxygen cylinder in right Holder. Note: Figures and Illustrations in Manual show nitrous oxide cylinder in left Holder.
3. Verify each Regulator Assembly (Items 16 & 14) has had a Regulator Assembly Check performed (Page 6). Verify sealing washer (replace once/yr. or as needed) is on yoke above indexing pins.
4. Rotate the cylinder to align the cylinder post and mounting holes to correspond with the appropriate pin-indexed Regulator Assembly. Pressure gauge should be to "inside" of Cart Assembly (see Fig. 11).
5. Slide the Regulator Assembly into place by lining up the pins and pin holes on the cylinder. Push into place. Properly placed, the Regulator Assembly should be supported on the pins (Figs. 9 & 10). Attach gas supply hoses to Regulator DISS output connections.
6. Tighten the Yoke Tee Handle **securely**, assuring washer is in flat sealing position and yoke pins are in place in cylinder post holes.
Warning: Tee Handle not tightened securely may result in cylinder gas leakage to room (possible loud hissing or popping sounds). Close cylinder valve and follow procedures to correctly align yoke and washer and pins and tighten Tee Handle.
7. Secure the cylinder in place by tightening the Thumb Screws of Cylinder Holder.
8. Using the DISS hose connections, connect the proper nitrous oxide and oxygen gas delivery hose (Items 13 & 15) to the corresponding input locations on the mounted Flowmeter or Nitronox.
9. Note: If two cylinders of N₂O are used, only one Regulator Assembly is used at a time (The "In-Use" cylinder should always be placed into the left Holder as described for one each gas; empty or full cylinders stored in right Holder).



Fig. 8



Fig. 9



Fig. 10



Fig. 11

Cylinder Operation / Maintenance

Cylinder Pressure Readings: Oxygen is a true compressed gas, while in the cylinder, thus the cylinder pressure gauge can be used to determine the amount of gas remaining in the cylinder. For example, 2000 psi indicates full, 1000 psi indicates half full, etc. Nitrous Oxide is a liquefied compressed gas that vaporizes in the cylinder, thus the cylinder pressure gauge cannot be used to determine the amount of gas remaining in the cylinder until all liquid in the cylinder vaporizes. While liquid remains in the cylinder, the cylinder pressure gauge indicates the vapor pressure which depends on and varies with the temperature of the liquid. For example, at 68°F, the vapor pressure is about 750 psi; at 20°F, it drops to about 400 psi; while at 90°F, it increases to about 1000 psi. After all the liquid vaporizes, the pressure will decrease normally as the gas is withdrawn, and the cylinder pressure gauge can then be used to determine the amount of gas remaining in the cylinder.

Caution

- **NEVER ATTEMPT TO LOOSEN cylinder valve packing nut. If valve stem is tight, return cylinder to supplier.**



Warning: Do not remove or alter gas indexing pins

Warning: Always turn on CYLINDER VALVES slowly and fully (minimize fire or explosion potential).

Good Practices: Cylinders with Mobile Cart

1. Two cylinders of N₂O, or one cylinder of O₂ and one cylinder of N₂O are typically connected.
2. Minimize leak risks: Confirm Yoke Washers are in place before replacing/mounting cylinders. Use Porter #A-3399-000 replacement washers (once/yr. or as needed). Have spare washers.
3. Minimize leak risks: Tighten Tee Handle securely, assuring washer is in flat sealing position and yoke pins are in place in cylinder post holes.
4. **Warning:** Keep the cylinder top clean while performing attachment so as to minimize possibility of any foreign substance entering the regulator cavities (minimize fire or explosion potential).
5. Assure Mobile Cart is populated with cylinders of N₂O, or O₂ and N₂O with adequate degree of fill before starting any procedure.

6. Label cylinders with a tag or sticker indicating “In-Use” and “Full” (“Full” is reserve), if appropriate.
7. Use Cylinder Wrench to open the “In-Use” cylinders. Verify wrench is attached to Cart (at Utility Basket).
8. Cylinder pressure gauges on Regulator Assemblies provide a visual indication of cylinder status (see details on Cylinder Pressure Readings)
9. When “In-Use” cylinder is depleted, close valve, bleed gas by slowly loosening Tee Handle, and replace empty cylinder. Connect the Regulator Assembly to “Full” cylinder and open valve.
10. When “In-Use” O₂ cylinder is depleted, the Oxygen Fail Safe will stop N₂O flow through Flowmeter or Nitronox automatically.
11. When “In-Use” N₂O cylinder is depleted, the Flowmeter or Nitronox will deliver 100% O₂.
12. After each use, turn off cylinder valves.
13. Method to use trapped nitrous oxide: Turning off cylinder valves and turning Flowmeter or Nitronox flow valves to off positions (or turning on/off valve to off) will trap a small amount of nitrous gas in the gas supply hose (assisted by check valve in nitrous gas Regulator Assembly). Starting the next procedure by turning on cylinder valves and starting flow through the Flowmeter will use this trapped gas (as opposed to venting the gas to the environment).

Cleaning Methods

We recommend the use of an approved disinfectant for the healthcare patient environment for cleaning the outside of the device. Do not spray disinfectant directly onto parts. Spray disinfectant into disposable towel, or use disinfectant surface wipe (avoid excess disinfectant liquid), and wipe unit thoroughly removing excess disinfectant to eliminate buildup. Follow the disinfectant manufacturer’s directions for use.

Introduction of moisture or other contaminants into this device may result in defective operation. Never oil or grease any part of this system (minimize fire or explosion potential). Cylinder mount: Do not clean yoke regulator entrance or sealing washer (replace as needed) with disinfectant.

Attachment of Medical Breathing Circuit Scavenger System

The Scavenger Interface attaches to the pole of the Mobile Cart, with the bottom of the Interface nesting between the two Cylinder Holders and the top behind the Utility Basket.



Note: If location dimensions of the Utility Basket and Cylinder Holder were not strictly followed (see FM-1345 2-Cylinder Mobile Cart Assembly Instructions), the Scavenger Interface may not fit properly with clearance. If this occurs, reposition the Basket and Cylinder Holder per FM-1345.

Refer to FM-1330 for Assembly and Installation of Medical Breathing Circuit Scavenger System for medical applications.

Monthly Check

Flowmeter Leak Test. Attach the gas supply Hoses to a Flowmeter and turn the flow control knobs to the OFF position and the ON / OFF switch to the OFF position.

Turn cylinders ON. Pressurize the gas supply lines and Mobile Cart Regulator Assemblies with cylinder pressure. Turn cylinders OFF. Apply masking tape to both gauge faces. Tap lightly on gauges and mark gauge needle positions on the masking tape. There should be little or no movement of the gauge needles after 15 minutes.

Nitronox Leak Test: Leave O2 supply on, close N2O cylinder valve off, and apply tape only on N2O gauge as above and watch for movement of gauge needle after 15 minutes.

CERTIFICATE OF WARRANTY

THIS WARRANTY IS GIVEN IN PLACE OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OTHERWISE.

Under no circumstances shall Parker Hannifin Corporation be liable for incidental or consequential damages as those terms are defined in the uniform commercial code.

Parker Hannifin Corporation, Porter Instrument Division warrants that each product or part shall be free from defects in workmanship and materials, under normal use and with appropriate maintenance, for one (1) year from the date of delivery to customer unless otherwise specified in writing. All rubber and plastic parts and accessories are warranted under the same conditions for a period of ninety (90) days from date of purchase.

No statement or claim about the product by any employee, agent, representative, or dealer of Parker Hannifin Corporation shall constitute a warranty by Parker Hannifin Corporation or give to rise to any liability or obligation of Parker Hannifin Corporation.

Parker Hannifin Corporation shall not be liable for any damage, injury or loss arising out of the use of the product, whether as a result of a defect in the product or otherwise, if, prior to such damage, injury or loss, the product was (1) damaged or misused; (2) repaired, altered or modified by persons other than Parker Hannifin Corporation; (3) not installed in strict compliance with applicable codes and ordinances; or (4) not installed by an authorized Parker Hannifin Corporation dealer. Parker Hannifin Corporation's obligation for breach of this warranty, or for negligence or otherwise, shall be strictly and exclusively limited to the repair or replacement of the product or part. This warranty shall be void on any product on which the serial number has been altered, defaced or removed.

ORDERS All orders are to be made through authorized Parker Hannifin Corporation distributors. All billing will be done through said distributors. Direct orders will be handled through the authorized local dealer as determined by Parker Hannifin Corporation.

RETURNS All returned merchandise will be handled through the local Parker Hannifin Corporation distributor. No returns will be accepted unless authorized in writing by Parker Hannifin Corporation and accompanied by the original shipping invoice. All returns are subject to restocking charge.

Policies subject to change without notice.

The Quality System for Porter Instrument is certified to ISO 13485. The scope of our registration is: "The design, manufacture, distribution and servicing of fluidic components and integrated systems for use in the Medical Equipment, Diagnostic, Biopharmaceutical, Agent Detection, Analytical Instrumentation and Industrial markets and Nitrous Oxide – Oxygen Sedation Flowmeters, Gas Scavenging Systems and Gas Distribution products for use by a physician, dentist or licensed healthcare professionals."