

# Liquid Nitrogen Injection

**N E W**

*Delivery of Low Pressure **Liquid Nitrogen***



**Precise dosing of liquid nitrogen up to  
750 containers per minute – continuous stream thereafter  
for all PET and thin wall can lines**

- Lowest liquid nitrogen consumption with high efficiency vacuum insulation
- Advanced dosing valve that delivers pure, single phase liquid nitrogen
- Lowest delivery pressure to minimize splashing
- Frost free operation
- Allows fine adjustments of dose amount and timing during operation
- Continuously self monitored system with Remote Alarm Indicator
- PLC controlled
- Connects directly with VBC SEMIFLEX® or Triax liquid nitrogen piping providing complete supply system from storage tank to filling line
- Slim profile and simple mounting adapts to any filling line
- Additional units to meet all line speeds

## **Our service – Your guarantee**

Engineered, designed and fabricated cryogenic equipment since 1958.  
Highly skilled team of engineers with an average of 15 years experience.  
Trained worldwide service staff with extended hours.

**VACUUM  
BARRIER VBC**  
CORPORATION

**NITRODOSE® MS**

# Pressurization

## PET bottles, thin wall cans and other package types

### Controlled, high purity liquid nitrogen dosing provides

- Package strength to eliminate paneling and palletizing problems
- Vending machine compatibility
- Firm packaging for customer appeal
- Manufacturer cost savings with use of lighter weight plastic

### NITRODOSE® at work

A precisely timed drop of liquid nitrogen is dosed into the headspace. The cold liquid nitrogen (-320°F) turns into nitrogen gas at room temperature and expands rapidly – 1g of liquid nitrogen yields 850 ml of nitrogen gas. With the bottle being capped at a certain time after dosing, this process creates a defined internal pressure in the package.



With NITRODOSE®



Without NITRODOSE®

### Applications

Non-carbonated beverages, wine, vegetable oil, juices, beer and others

# Inerting

## Bottles, thin wall cans and other package types

### Inerting delicate products in modified atmosphere applications

- Extends product shelf life
- Maintains product taste, color and freshness
- Reduces oxygen absorption by product
- Eliminates paneling

### NITRODOSE® at work

A precisely timed drop of liquid nitrogen is dosed into the package before and/or after filling. The cold liquid nitrogen (-320°F) rapidly turns into nitrogen gas at room temperature and expels the air from empty package and/or headspace – 1g of liquid nitrogen yields 850 ml of nitrogen gas. This process provides reduced oxygen content to the package.

### Applications

Vegetable oil, nuts, fruit juices, dairy products and other snack items



Long shelf life



Short shelf life

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## **Frequently asked questions concerning the VBC NITRODOSE MS System**

### **Which utilities have to be provided by the user for a NITRODOSER MS ?**

1. Liquid nitrogen at 1 to 3.4 bar. The vacuum insulated hose (COBRAFLEX) that comes with the NITRODOSER as a standard is 3 meters long and connects a dewar (mobile tank) with the inlet of the NITRODOSER. Please, check if this is long enough for your application. The connection on the dewar should be a male ½" 37° JIC swivel thread (standard cryogenic connection).  
For uninterrupted use of the NITRODOSER a second dewar should be available.  
For connection to an outdoor LN2 tank contact VBS Europe.
2. Compressed air or nitrogen gas from separate source to operate the dosing valve and the inlet valve: pressure: 4-6 bar. Tubing to be supplied by the customer (diam. 1/4").
3. Electrical power: 230 VAC - 50 Hz +/- 10% (one plug)  
Current: 5 Amps maximum

### **Where and how should the NITRODOSER MS be placed ?**

If the NITRODOSER is used for pressurizing, it should be placed as near as possible to the capper. If the NITRODOSER is used for inerting the position should be determined together with VBS Europe.

The enclosed drawing shows the dimensions of a NITRODOSER MS.

The user will have to provide a rigidly mounted post with bracket ( see drawing for dimensions of bracket) which has to be fixed to the floor or to an upper part of the filling / capping station. VBS Europe can supply a support as an option. The elevation of the nozzle relative to the rim of the bottle opening is shown on the drawing.

The NITRODOSER must be adjustable horizontally and vertically for fine adjustment.

The customer may want to swing the NITRODOSER out of the filling line when it is not in use.

Above the NITRODOSE body should be a free space of 0,5m in height ( for connecting the COBRAFLEX hose to the inlet of the NITRODOSER).

At the bottom of the NITRODOSER, below the vent, there should be a free space of about 30 to 40 cm for the separated gas coming out.

## **Which amount of liquid nitrogen is required for my application ?**

Depending on the head space, the required pressure in the bottle/can and the distance between dosing of LN2 and capping, the amount of LN2 for each dose and the size of the dosing nozzle will be calculated by VBS Europe.

Fine tuning of the dosing size is done by regulating the dosing time.

## **Which parameters of a production line have an influence on the resulting pressure?**

The LN2 dosing of the NITRODOSER is very precise with a maximum variation of +/- 5%.

Other parameters of the production line do however have an influence on the pressure:

Variations of the product fill level and of the filling temperatures as well as splashing of the product and inconsistent capping techniques will result in pressure variations.

## **How much nitrogen does a NITRODOSE- System consume?**

As every application is different there can only be given an example and a rough indication.

For pressurizing a PET bottle with a typical head space volume and a production speed of 30.000 bottles per hour the total consumption of LN2 including dewar and connection losses should be about 8-10 litres per hour.

If nitrogen gas is used for operating the pneumatic valves the consumption of gas is about 1.5m<sup>3</sup>

## **How to change the dewar ?**

When a dewar is empty and has to be replaced, the manual supply valves on the dewar and on the inlet hose have to be closed. Then the flexible hose on the empty dewar has to be disconnected. Before disconnecting completely loosen it first and make sure that no LN2 is left inside the hose. Then connect immediately to the replacement dewar. This quick change over will prevent air and moisture getting into the hose.

If no quick change can be guaranteed, an optional purge assembly can be obtained.



## **What are the precautions required working with liquid nitrogen ?**

Liquid nitrogen is extremely cold (minus 196°C), clear colourless and non flammable. The vacuum jacketed NITRODOSER and supply line have a temperature on the outside which is only slightly below ambient temperature. The equipment is free of frost. The system is equipped with special devices to permit continuous safe operation.

It is possible that individuals may at some time encounter liquid nitrogen in the open. It will freeze skin on contact and may cause severe burns. Extreme care must be taken to avoid liquid nitrogen splashing on clothing, into shoes or into gloves.

The regulations concerning safety and precautions from your gas supplier must be followed.

## **What is the warranty on a NITRODOSE System ?**

VBS Europe guarantees to replace or, at its sole option, repair any products or parts thereof which are found defective in material or workmanship within two years for VBC fabricated parts and one year for purchase parts from date of shipment.

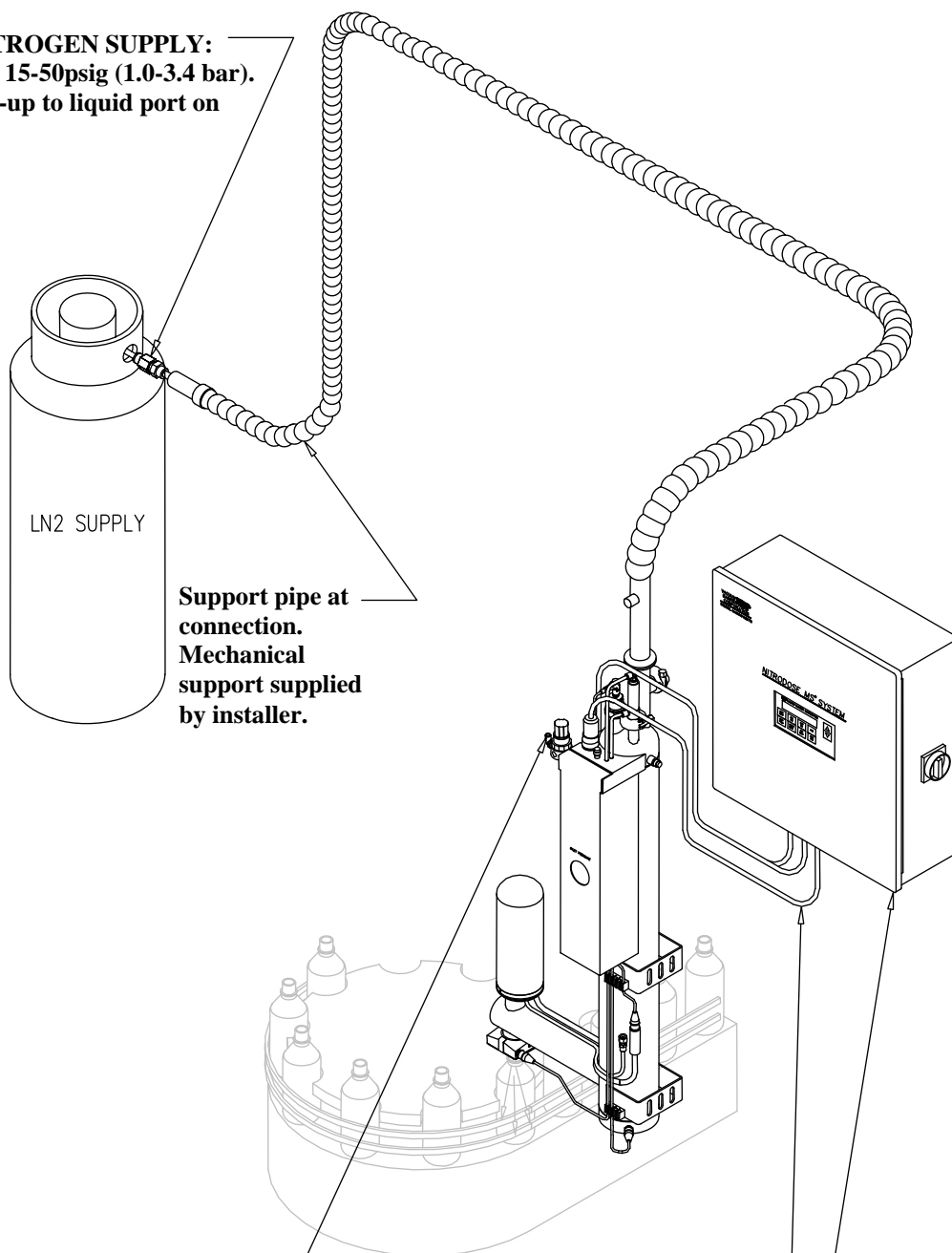
These guarantees do not apply to damage resulting from misuse of the products. The guarantees will be voided if components other than VBC products are used in connection with VBC equipment without the express consent of VBS Europe. See also our terms of sale for complete warranty terms.

## **Do the NITRODOSE Systems comply with CE regulations ?**

Yes, NITRODOSE Systems are in accordance with CE regulations.

**NITRODOSE® MS UTILITY CONNECTIONS:**

**LIQUID NITROGEN SUPPLY:**  
Regulated to 15-50psig (1.0-3.4 bar).  
Ensure hook-up to liquid port on supply.



Support pipe at connection.  
Mechanical support supplied by installer.

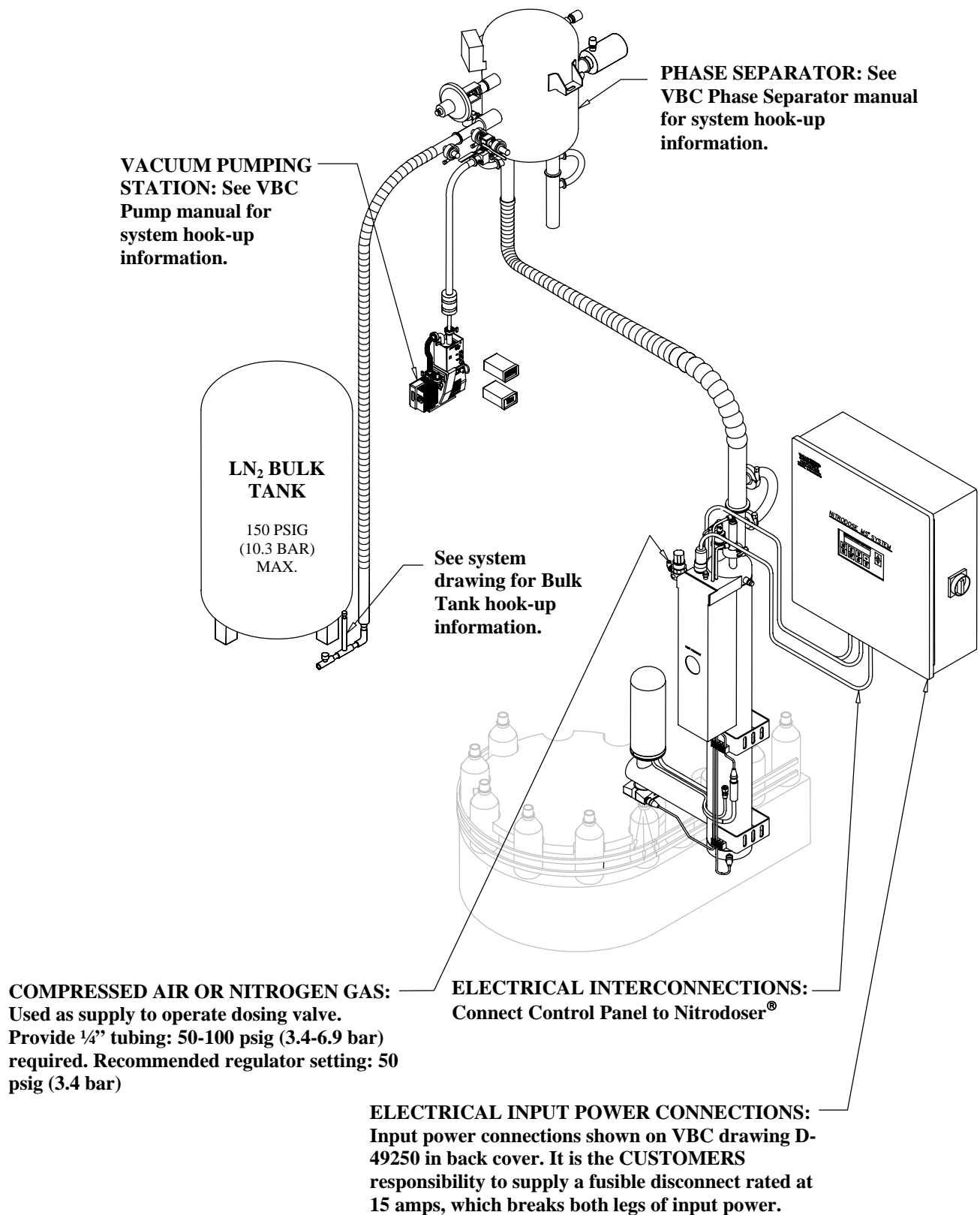
**COMPRESSED AIR OR NITROGEN GAS:**  
Used as supply to operate dosing valve.  
Provide 1/4" tubing at 50-100 psig (3.4-6.9 bar) required. Regulator set at 50 psig (3.4 bar).

**ELECTRICAL INTERCONNECTIONS:**  
Connect Control Panel to Nitrodoser.

**ELECTRICAL INPUT POWER CONNECTIONS:**  
Input power connections shown on VBC drawing D-49250 in back cover. It is the CUSTOMERS responsibility to supply a fusible disconnect rated at 15 amps, which breaks both legs of input power.

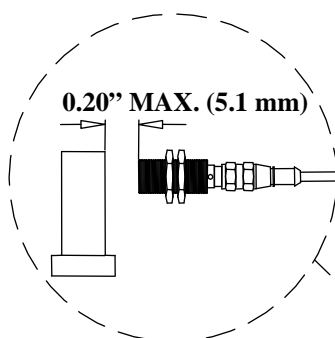
# **NITRODOSE® MS UTILITY CONNECTIONS:** **BULK TANK FED**

US Patent No. 5,743,096



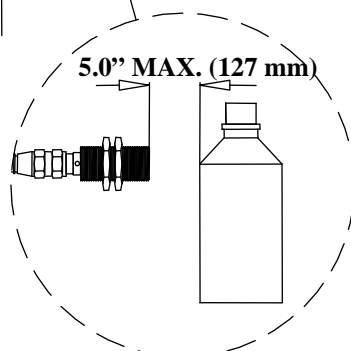
## **NITRODOSE<sup>®</sup> MS SYSTEM** **INSTALLATION/MOUNTING SCHEMATIC**

**TURCK NPN REMOTELY MOUNTED TIMING SENSOR: 0.20" (5.1 mm) maximum distance from repeating metallic object (fill valves or capping heads) at filling line pitch. Sensor must be positioned to see object when container is at least 1/3 of a pitch upstream of the NITRODOSER outlet. The customer may substitute other types of sensors, but they must be a compatible NPN, current sinking type sensor with a response time of 1 ms or less.**



**IFM EFECTOR PNP PRODUCT (NO CONTAINER NO DOSE) SENSOR: Mounted 5" maximum (127 mm) from container. Sensor should be mounted within 5 seconds upstream of the NITRODOSER. See appendix for sensor sensitivity adjustment and programming. The customer may substitute other types of sensors, but they must be a compatible PNP, current sourcing type sensor with a response time of 1 ms or less.**

**0.5" (12.7 mm) FROM DOSING OUTLET TO TOP OF CONTAINER**



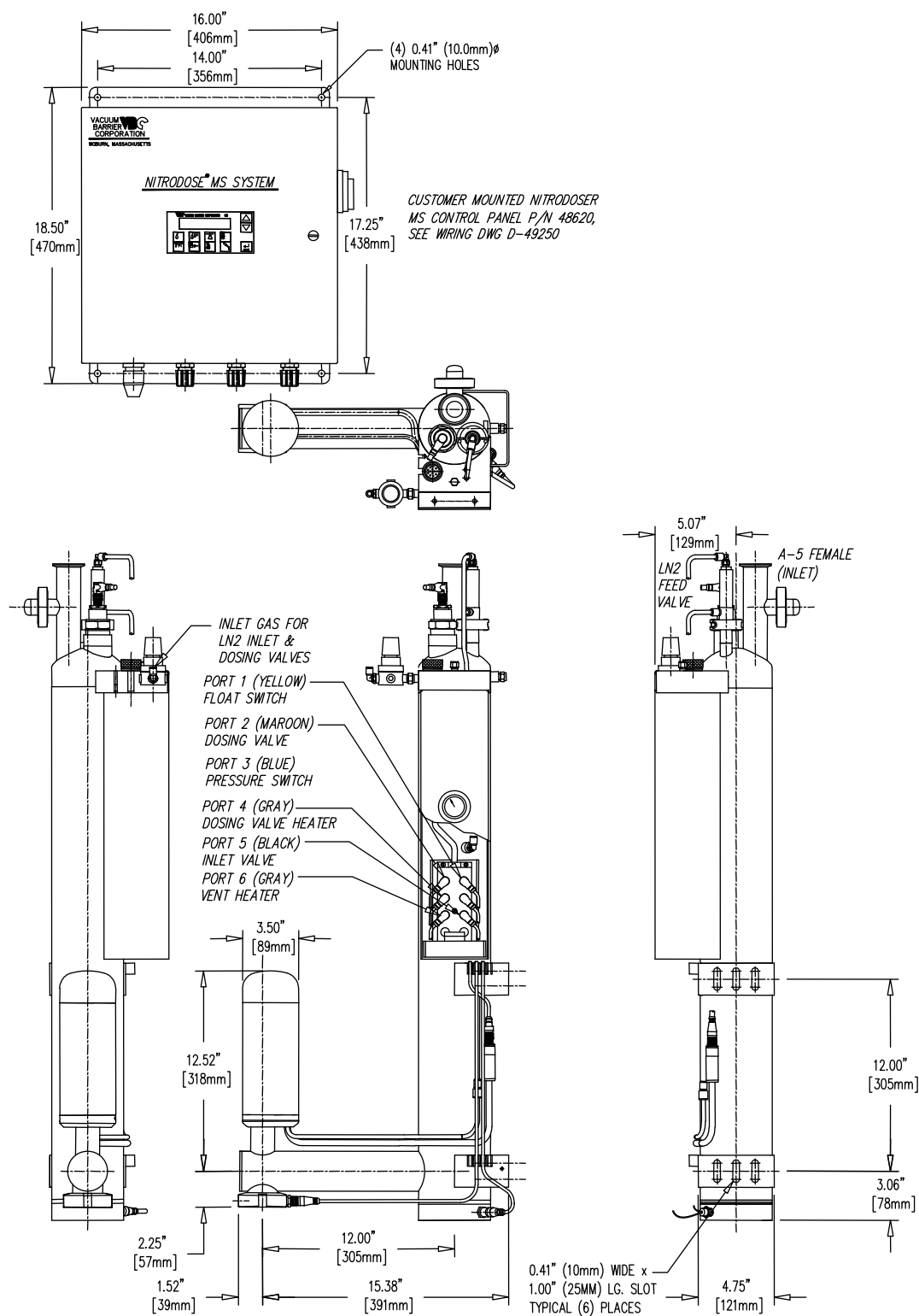
**REMOTELY MOUNTED CONTROL PANEL**

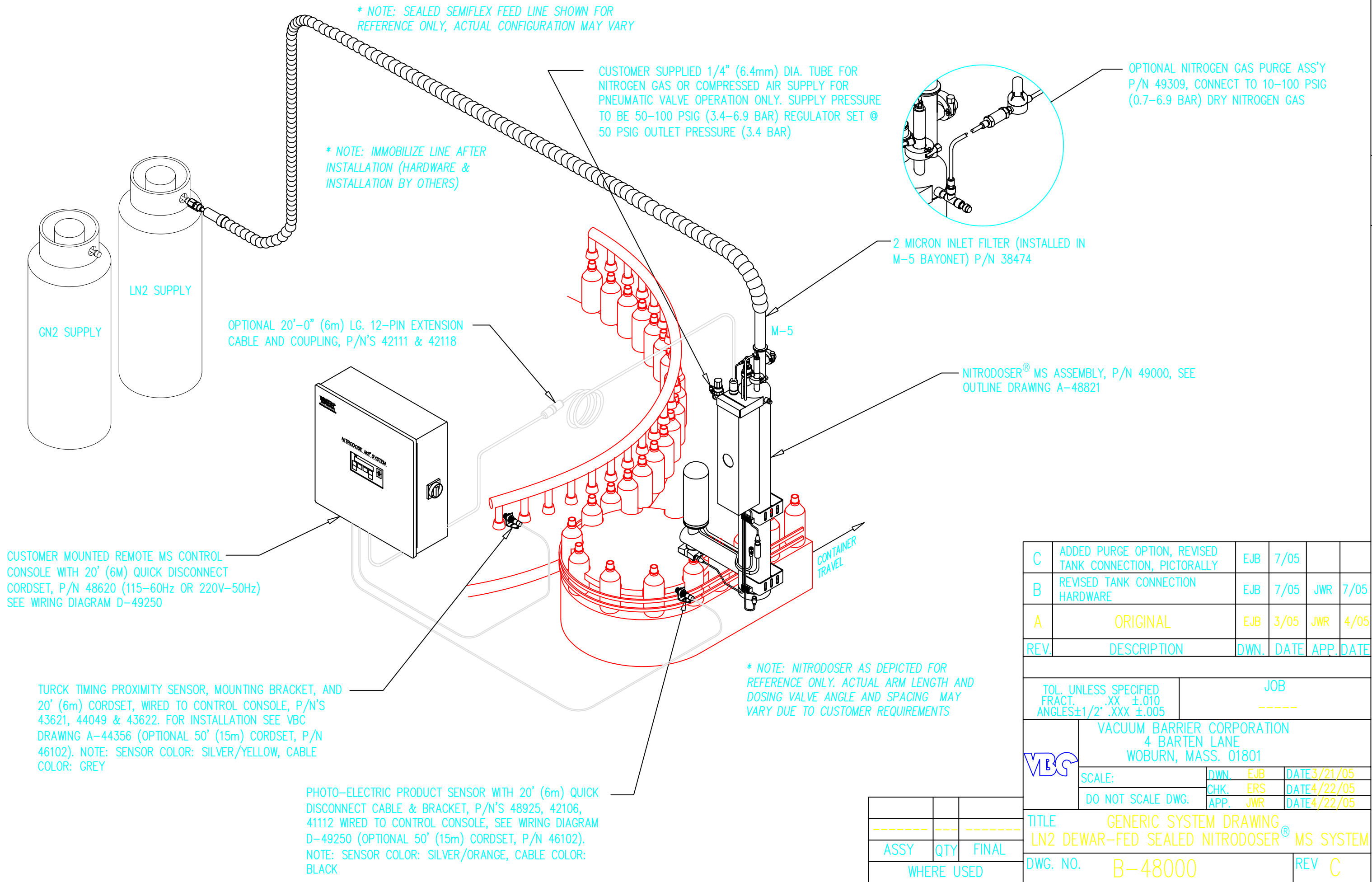
**SEE VBC DRAWING 48821 IN APPENDIX FOR MOUNTING BRACKET HOLE PATTERN**

**SUPPORT BRACKET FABRICATED BY CUSTOMER**



## NITRODOSE<sup>®</sup> MS OUTLINE DRAWING



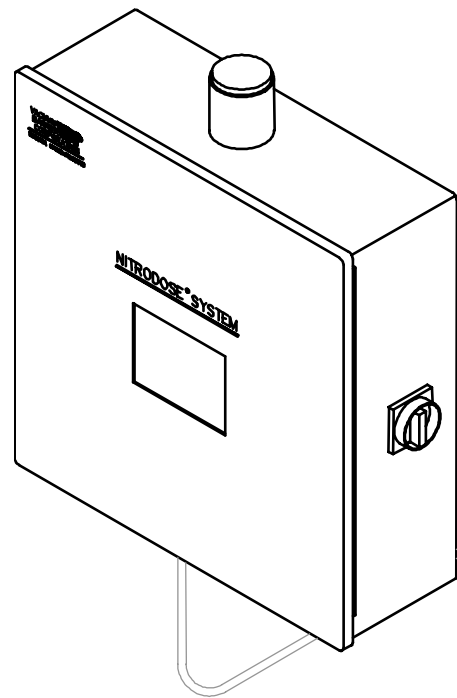


# FEATURES AND BENEFITS OF THE NITRODOSER<sup>®</sup> MS SYSTEM

US Patent No. 5,743,096

## ♦ SAFETY/CLEANLINESS

- Lowest LN<sub>2</sub> consumption with high efficiency vacuum insulation
- Slim profile/streamlined clean design
- 2-micron inlet filter to protect from foreign particles.
- Fully CE compliant
- Totally frost-free operation.
- Can withstand chemical wash-down & CIP processes
- Quick connect modularity, NEMA 4X rated



## ♦ ACCURACY

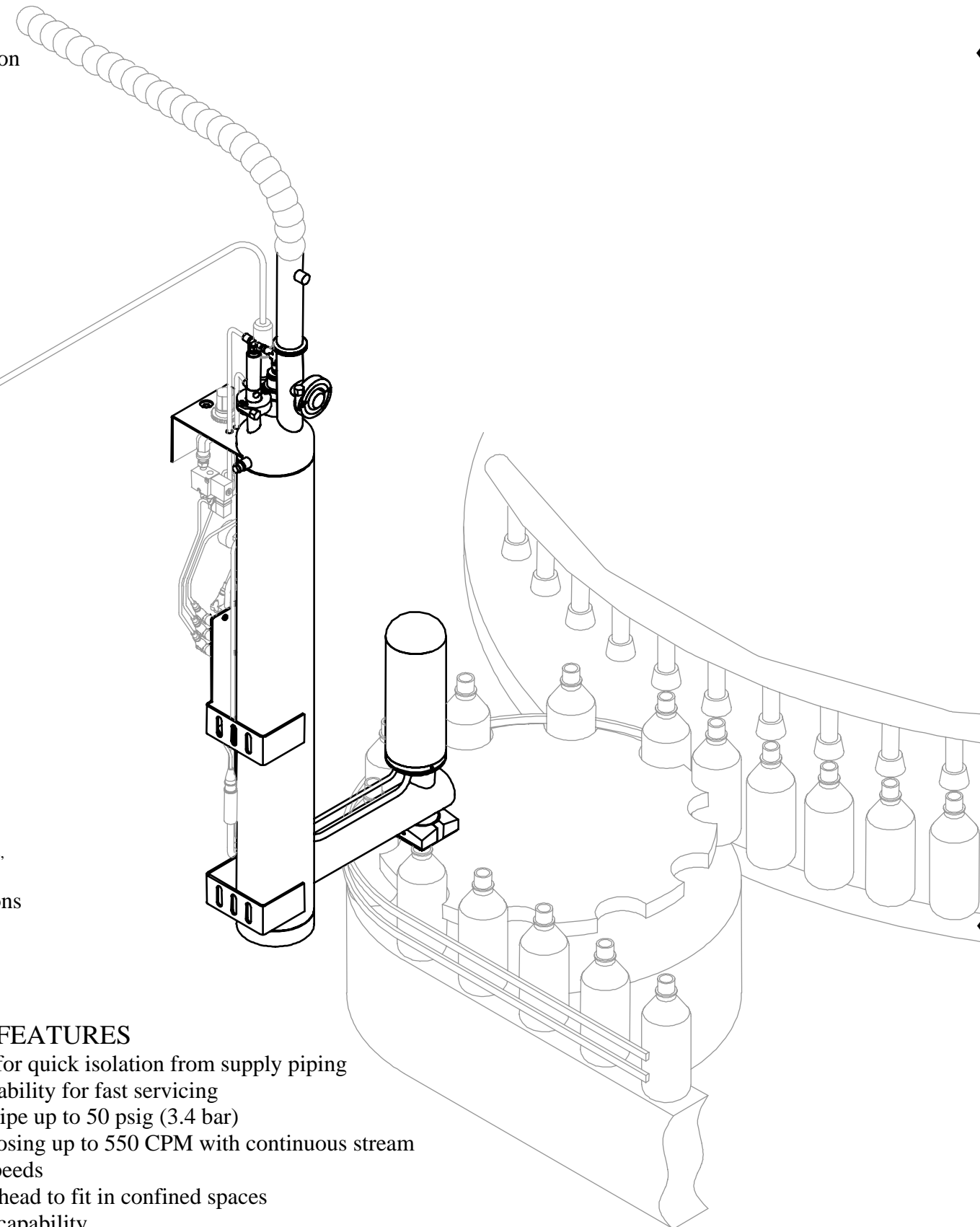
- New advanced dosing valve design
- The only unit available that delivers pure, single phase LN<sub>2</sub>, ensuring highest accuracy
- Precision dosing for meeting the most stringent specifications
- Lowest delivery pressure available to minimize splashing

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## ♦ CONSTRUCTION FEATURES

- Integral inlet valve for quick isolation from supply piping
- Rapid warm-up capability for fast servicing
- Operational direct pipe up to 50 psig (3.4 bar)
- Precision discrete dosing up to 550 CPM with continuous stream for all higher line speeds
- Low profile dosing head to fit in confined spaces
- Fast nozzle change capability



## ♦ CONTROLS

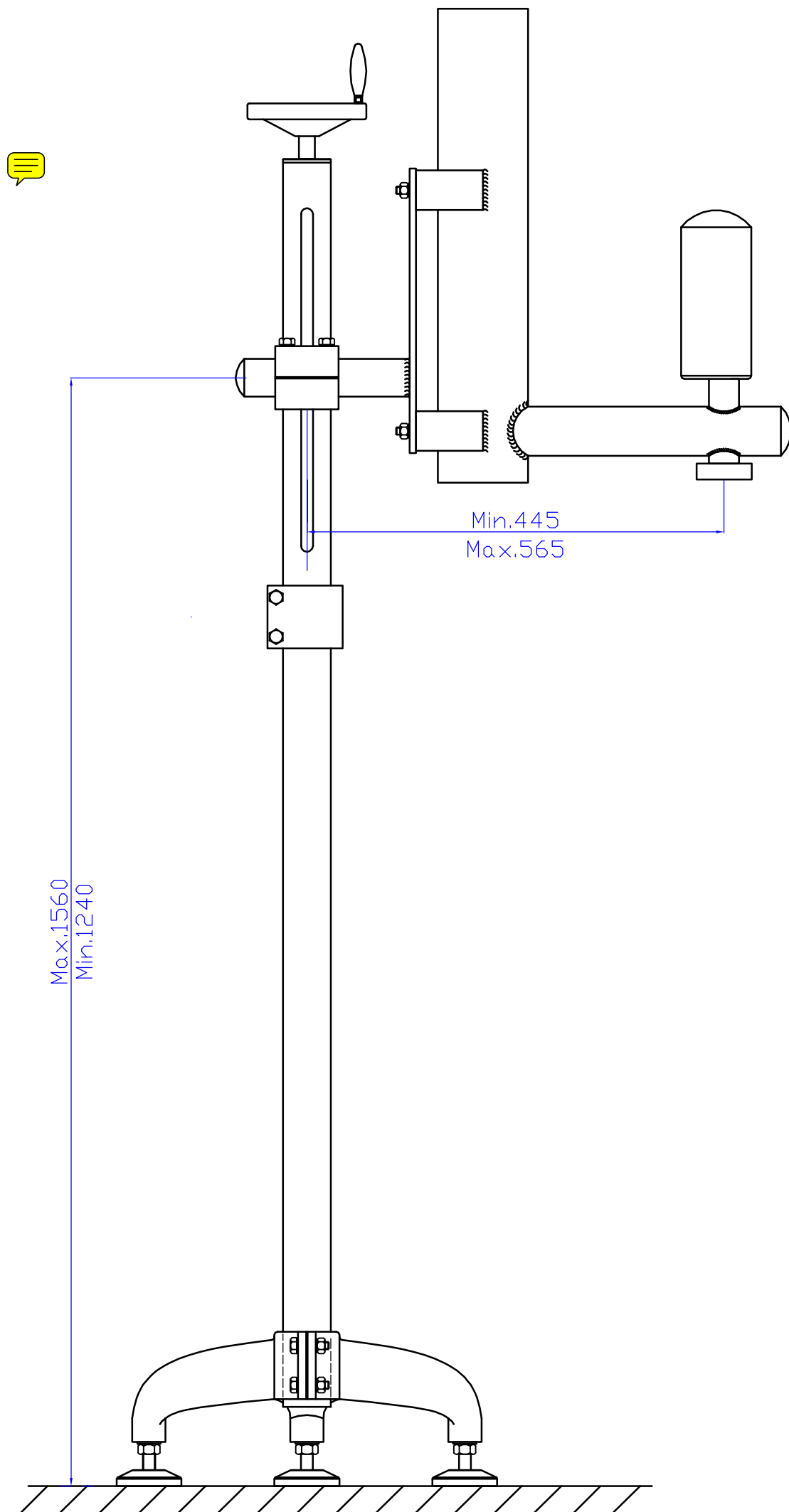
- New simplified PLC controller with touch pad controls for ease of operation
- Allows fine adjustments of dose amount and timing during operation
- Continuously self monitored system with Alarm outputs for:
  - Low LN<sub>2</sub> Level in unit
  - Power fault
  - Dosing valve disabled
  - Inlet valve disabled
  - Low air pressure supply
  - Dose duration too long or too short
  - Dose delay too long or too short
- Ethernet capabilities that can be used with a centralized computer system
- Push-button draining feature for quick and easy nozzle changes
- Available in a variety of language formats
- Single dose capability for lab testing
- All equipment has NEMA 4X quick connects
- No Bottle/no dose function standard
- Continually displays current production rate
- Valve cycle counter with automatic notification at service intervals

## SERVICE AND EXPERIENCE

- Vacuum Barrier Corporation is the only supplier who engineers and manufactures all of their own sealed and dynamic vacuum insulated cryogenic equipment VBC has been doing this since 1958
- Pioneered cryogenic injection technology, which others have attempted to copy
- Four different models available to cover a broad variety of applications
- Trained service staff worldwide with extended hours.
- Team of experienced professionals

## ♦ AVAILABILITY

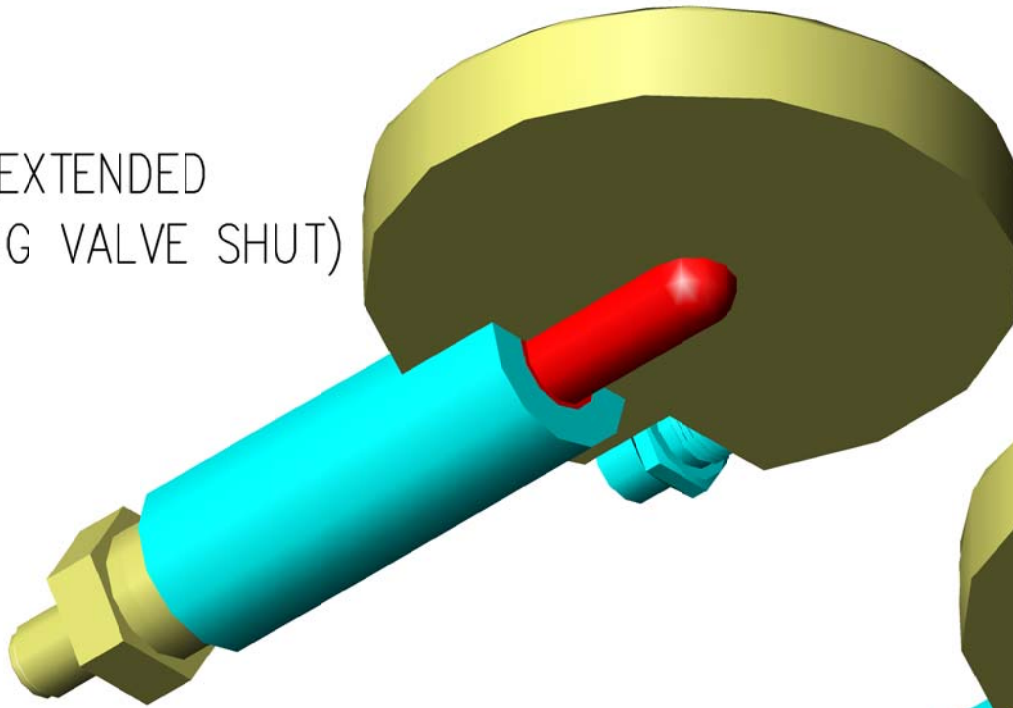
- Standard units available from stock



AUTOMATIC SHUT-OFF HEATER BLOCK ASSEMBLY  
VBC P/N 52850



EXTENDED  
(DOSING VALVE SHUT)



RETRACTED  
(DOSING VALVE OPEN)

