

Quote attachment VBC NITRODOSE® Liquid nitrogen injection system



Easy Dose G2 Plus

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Features and benefits

Precision liquid nitrogen dosing system for high speed lines.

Discrete dosing for speeds up to 75.000 bottles/hour and 120.000 cans/hour, continuous flow for higher speeds.

Dosing accuracy: 3%

Minimum dosing valve opening time of 6ms for easy adjustability of dosed quantity at all line speeds.

Base unit including

- Fully vacuum jacketed, stainless steel dosing unit. Internal reservoir with mechanical fill level control. Dosing arm with electrical dosing valve. Safety relief valve.
- Heated nozzle and gas vent
- Integrated self generating nozzle purge system. No dedicated nitrogen gas supply required.
- Control panel
 - Remote Siemens S7-1200 control panel with monochrome Siemens KTP600, 6” touch screen HMI (230V/50Hz or 115V/60Hz) in stainless steel NEMA 4x rated housing and alarm beacon.
 - or alternatively*
 - Allen Bradley AB1100 control panel with monochrome AB Panelview Component 600, 6” touch screen HMI (230V/50Hz or 115V/60Hz) in stainless steel NEMA 4x rated housing and alarm beacon.
- 6 meter electrical cables. 15 meter cable sets are optionally available.
- Self diagnostics logics with standard 1 alarm relay output (Profibus optionally available) - Alarm for the level control not included.
- Encoder ready (in case of extreme accelerations and decelerations and/or to ensure the first three bottles to be dosed)
- Speed- and dose compensation capabilities (for regular speed variations)
- 5 recipe storage
- Speed sensor (proximity).
- Infrared sensor for bottle detection (Dosing enabled only when container is present)
- Available languages for HMI and operation manuals: English, German, French, Spanish, Italian
- Complete operation- and service manual

Applications

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

Options

- Additional LN2 feed line : standard length is 3 meters from tank to doser. Any additional meter should be ordered in this option. Bayonet couplings will be needed in case of lengths longer than 12 meters.
- A standard 6 meter cables set from the doser to the PLC is included. Instead, a 15 meter set can be ordered optionally.
- Profibus communication utility between doser and filler
- Encoder with 10 m cable & shaft coupling (bracket not included).
Shaft coupling for 10mm shaft sizes
Amount of containers/revolution to be specified.
This encoder is required in 2 cases :
 - In case of extreme accelerations or decelerations
 - To avoid that the first three bottles are not dosed
- Additional languages for HMI and operation manuals upon request. The following languages are standard : English, German, French, Spanish, Italian.

Specialties (for more information see further)

- LDV (Low Dose Velocity) heater block e.g. for hot fill applications (P/N : 56882N)
- CIP heater block: automatic nozzle protection (P/N : 55103N)
- Combi LDV/CIP heater block: combines both benefits of the LDV and CIP heater block (P/N : 55300)
- 3D/CIP heater block (P/N : 55907N)

Installation

- Stainless steel (height adjustable) support in AISI 304 material (also available in AISI 316 on request).
For more stability, the height adjustable support with a bottom plate is advised.
It is delivered with a plate in standard but it can be ordered with a 2x2 pod basis.
Please see drawings and dimensions on page 8.
- Technical assistance: Daily rate for weekdays (Mo.- Fr.) is mentioned, for assistance during start-up and commissioning. Saturdays: 1200€ or 1440\$ per day. Sundays: 1600€ or 1920\$ per day. Travel expenses are not included.
Field service outside Europe should be discussed with us.
Please also consult us if supervision during the installation or a turnkey project is needed. In case of a turnkey project, a preliminary visit on site is required.

NITRODOSER® HEATER BLOCK OPTIONS

The **standard NITRODOSER® Heater Block**: Permits direct, vertical dosing and is very effective for **high speed lines with small openings**. It is all 316 stainless steel construction and kept in a warm condition by a simple 10 watt heater. An upper O-ring seals keep out moisture from the interior. A snap-on cover is furnished that must be applied before washdowns. This configuration is supplied standard on all Nitrodosers, no extra charge.



The **CIP (Clean In Place) Heater Block**: Incorporates an **automatic** shutter that closes each time dosing ceases. This provides excellent **protection from water** and sanitizing sprays in heavy wash-down environments. Dosing is direct, vertical injection. Heating and sealing characteristics are the same as the standard unit. The logic for actuating the shutter resides in the standard Nitrodoser PLC controls.



The **LDV (Low Dose-Velocity) Heater Block**: Serves to reduce the velocity and disperse the charge into a pattern that will land gently over the surface of the product. It should be specified for **aluminum can hot-fill applications where speeds are less than 750 cpm and all hot fill PET applications**. Also, applications involving solid food products will benefit by reducing the chance of LN2 splashing out of the container. Use it for dosing any powder products in order to prevent disrupting or displacing product. Use this component for pressurization of beverage bottles with headspace depths less than ¼" (6 mm) to assure the charge does not bounce out. A 16 watt heater is included in this unit.



The **3D – CIP Heater Block**: **combines the protection of the automatic shutter and the dispersion of the stream**. This is suitable for heavy wash-down environments where splashing must be reduced. Does not include velocity reduction. **For use on all cold filled aluminum can lines and on hot filled can lines at speeds greater than 750 cpm.**

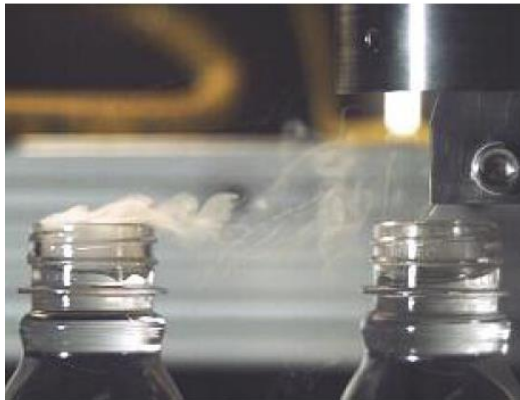


Options: Specialties

Precise discrete dosing of liquid nitrogen using 3-D Technology (Directional Dose Dispersion) eliminates splashing

Liquid Nitrogen Injection for Hot Fill Beverages

NEW 3-D Technology Directional Dose Dispersion



Precise delivery of liquid nitrogen to pressurize hot fill beverages in PET and lightweight aluminum cans

- One solution for precise gentle discrete dosing with any size container opening – problems associated with shallow headspace eliminated
- Only liquid nitrogen injection system able to discrete dose at all hot fill beverage line speeds
- The only liquid nitrogen injection system available able to provide target pressure of +/- 1 psi easily – even during times of extreme acceleration and deceleration
- Rugged, hygienic design that can be used with automatic CIP protection available on all NITRODOSE® models

Our service – Your guarantee

Engineered, designed and fabricated cryogenic equipment since 1958.

Trained worldwide service staff.

VACUUM BARRIER VBC
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HOT FILL

Options: Specialties (continued)

Automatic nozzle protection during CIP

Automatic Nozzle Protection during CIP



Dosing valve shut



- Prevents moisture from entering the dosing head to eliminate potential freeze ups
- Immediate closure after dosing stops
- Hands free operation to eliminate potential contamination
- Withstands high pressure wash down or aggressive chemical clean up
- Eliminates potential wash down operator error
- No lost dosing valve covers

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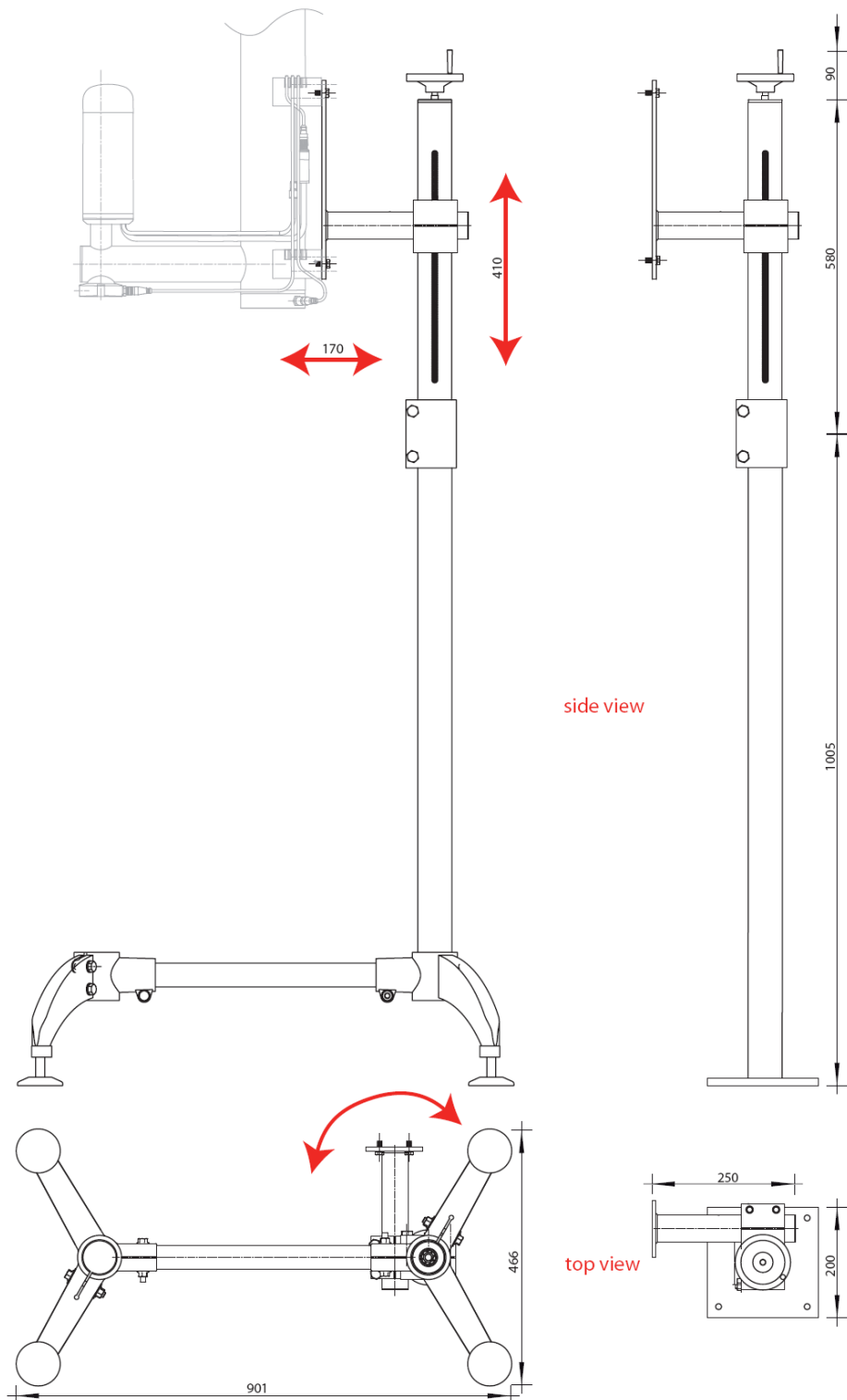
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AUTOMATIC NOZZLE PROTECTION

Options: Installation

Mounting support: with 2 x 2pod or bottom plate



Frequently asked questions concerning a VBC Easy Dose G2 Plus System

Which utilities have to be provided by the user for an Easy Dose G2 Plus?

1. Liquid nitrogen between 0,5 – 1,5 bar. The vacuum insulated hose (COBRAFLEX) that comes with the Easy Dose G2 Plus as a standard is 3 meters long and connects a dewar (mobile tank) with the inlet of the Easy Dose G2 Plus. Please, check if this is long enough for your application. The connection on the dewar should be a male 1/2" 37° swivel thread (see attachment). For uninterrupted use of the Easy Dose G2 Plus a second dewar should be available.
For connection to an outdoor LN2 tank contact VBS Europe.
2. Electrical power: 230 VAC - 50 Hz +/- 10% (one plug)
Current: 0,5 Amps maximum
Power: 110 Watts

Where and how should an Easy Dose G2 Plus be placed?

If the Easy Dose G2 Plus is used for pressurizing, it should be placed as near as possible to the capper. If the Easy Dose G2 Plus is used for inerting the position should be determined together with VBS Europe.

The enclosed drawing shows the dimensions of an Easy Dose G2 Plus.

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. Optionally VBS Europe can also supply this support.

The elevation of the nozzle relative to the rim of the bottle opening is shown on the drawing.

The Easy Dose G2 Plus must be adjustable horizontally and vertically for fine adjustment.

The customer may want to swing the Easy Dose G2 Plus out of the filling line when it is not in use.

Above the Easy Dose G2 Plus body should be a free space of 0,5m in height (for connecting the COBRAFLEX hose to the inlet of the Easy Dose G2 Plus).

At the bottom of the Easy Dose G2 Plus, below the vent, there should be a free space of about 30 to 40 cm for the 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 estimated 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 Easy Dose G2 Plus is very precise with a maximum variation of 3%.

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.

What is the speed compensation?

The speed compensation allows adapting the dosing to regular speed variations. In case of extreme accelerations or decelerations, an encoder is required. It will give 300 to 1500 pulsed per bottle and make sure to dose correctly, even the first bottles in case of an emergency line stop.

The encoder will ensure that the first 3 bottles are dosed.

How much nitrogen does an Easy Dose G2 Plus 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 20.000 bottles per hour the total consumption of LN₂ including dewar and connection losses should be about 6 litres per hour.

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 Easy Dose G2 Plus 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 an Easy Dose 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.

What maintenance is required?

The system is designed with very low maintenance in mind:

- The valve stem assembly needs to be relubricated every 25 million cycles;
- The dosing valve solenoid and stem need to be changed every 50 million cycles.

Do the Easy Dose Systems comply with CE regulations?

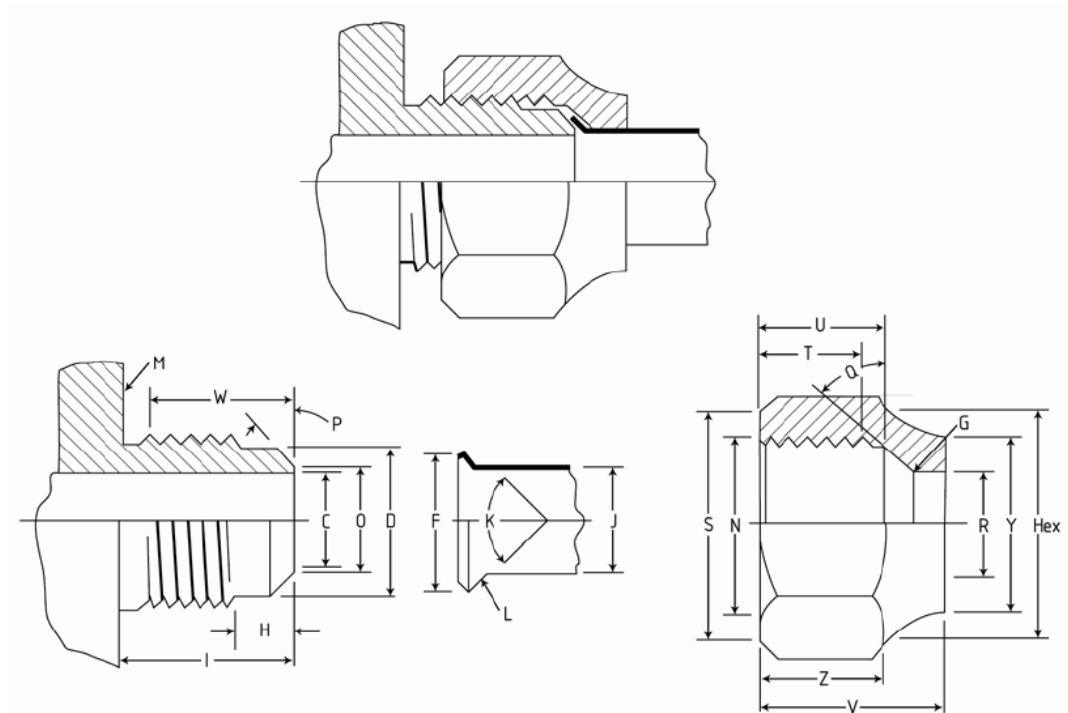
Yes, Easy Dose Systems are in accordance with CE regulations.

Attachments***UNF16 connection******Utility connections******Installation/mounting schematic******Outline drawing******Comparison sheet of the different dosing systems***

UNF 16 connection

.750-16UNF-2A-RH-EXT (1/2" SAE Flare)

Standard cylinder valve outlet connection for pressures up to 500 psig 3450 kPa
for cryogenic liquid withdrawal, filling and venting of nitrogen



VALVE OUTLET

THREAD .750-16UNF-2A-RH-EXT

MAJOR DIA.	.7485-.7391	(19.011-18.774)
PITCH DIA.	.7079-.7029	(17.980-17.854)
MINOR DIA.	.6718 Max.	(17.063) Max.
BORE DIA.	C .406	
RELIEF DIA.	D .641 ± .010	(16.28 ± 0.25)
CUTBACK	H .25	(6.4)
LENGTH	I .75	(19.1)
UNDERCUT	M OPTIONAL	
CHAMFER	O .438 ± .010	(11.13 ± 0.25)
ANGLE	P 37° ± 1°	
FULL THREAD	W .66 Min.	(16.8) Min.

TUBE

FLARE DIA.	F .607-.623	(15.42-15.82)
DIAMETER	J .500 ± .002	(12.70 ± 0.05)
ANGLE	K 90° ± 1/2°	
RADIUS	L .031-.015	(0.79-0.38)

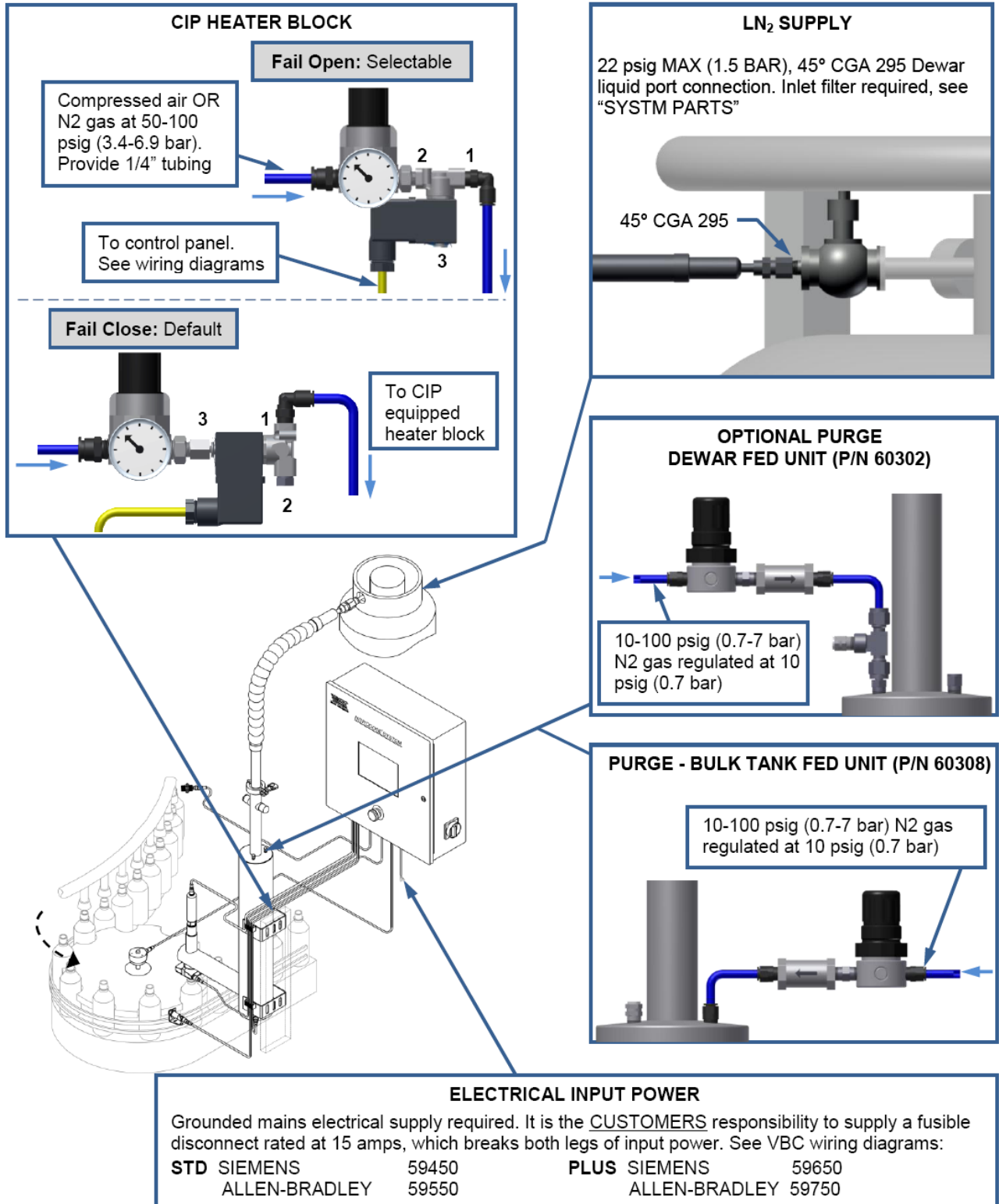
HEXAGON NUT

THREAD .750-16UNF-2B-RH-INT (MOD.)

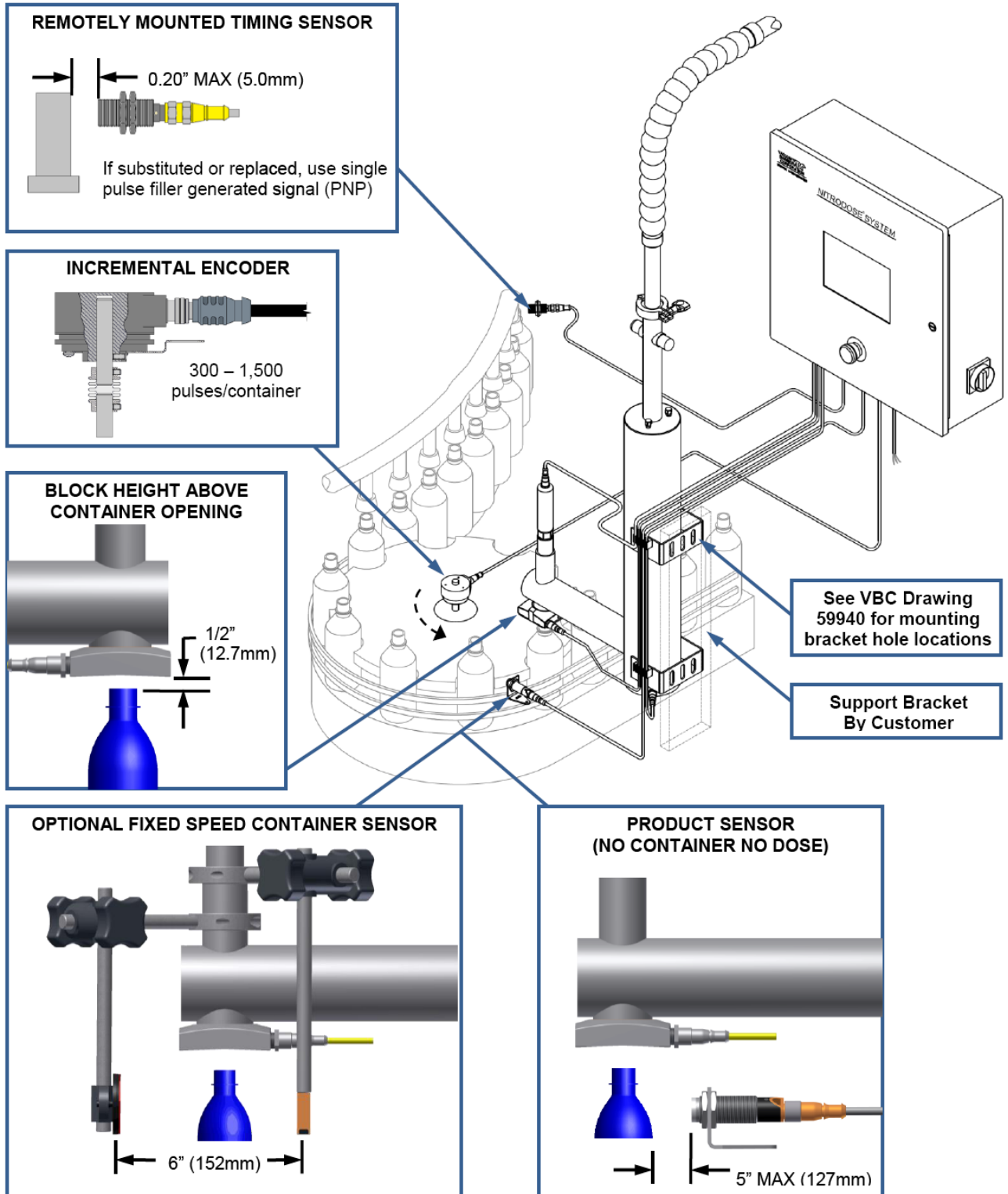
MINOR DIA.	.6820-.6908 (38)	(17.323-17.546)
PITCH DIA.	.7094-.7159	(18.019-18.183)
MAJOR DIA.	.7500 Min.	(19.050) Min.
HEX	15/16	(23,8)
RADIUS	G .047 ± .010	(1.19 ± 0.25)
C'SINK DIA.	N 90° x .77-.80	(19.6-20.3)
ANGLE	Q 43°-45°	
HOLE DIA.	R .505-.510	(12.83-12.95)
CHAMFER DIA.	S 45° x .94-.91	(23.9-23.1)
FULL THREAD	T .44 Min.	(11.2) Min.
DEPTH	U .53	(13.5)
LENGTH	V .90-.81	(22.9-20.6)
DIAMETER	Y .75 Min.	(19.1) Min.
LENGTH	Z .59-.53	(15.0-13.5)

All dimensions are in inches (millimeters)
Complies with ANSI/SAE J5131

Utility connections



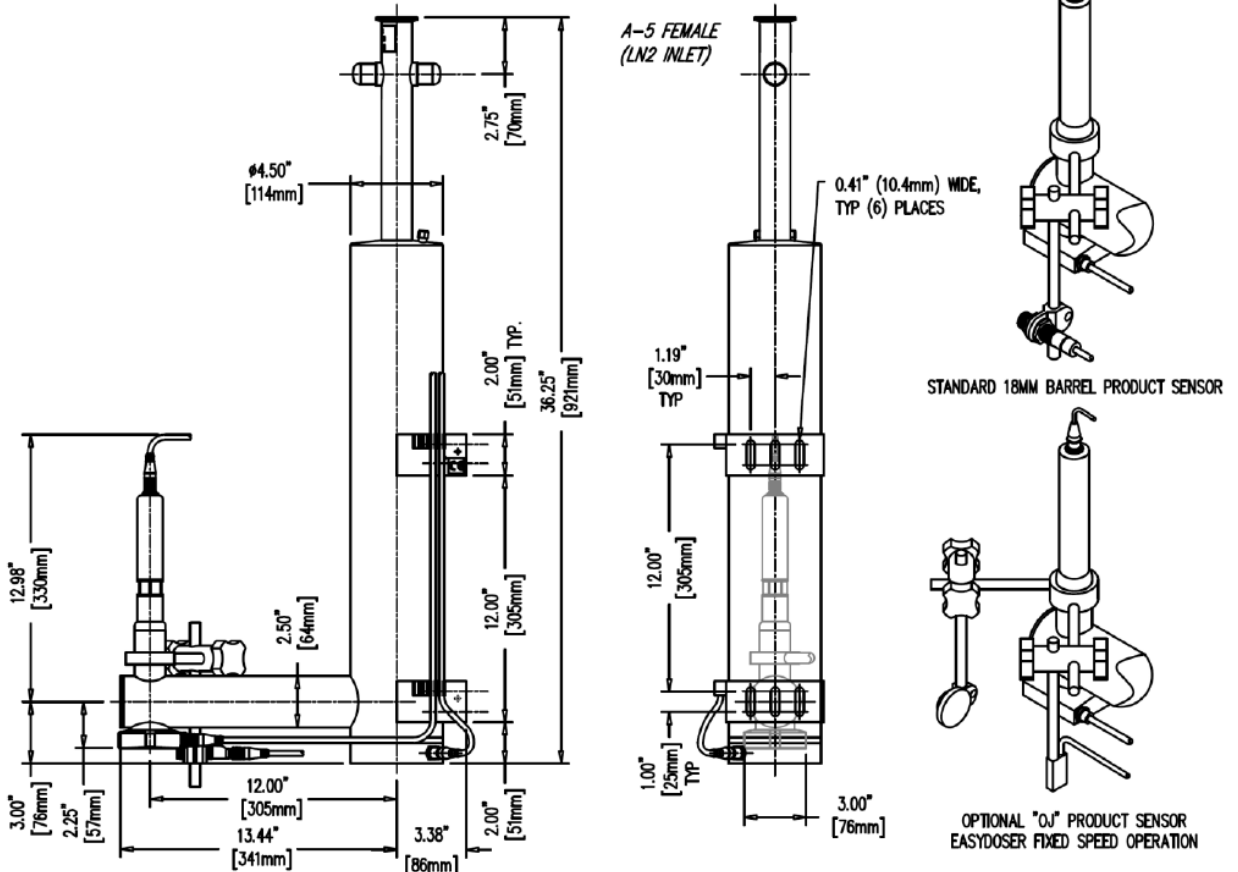
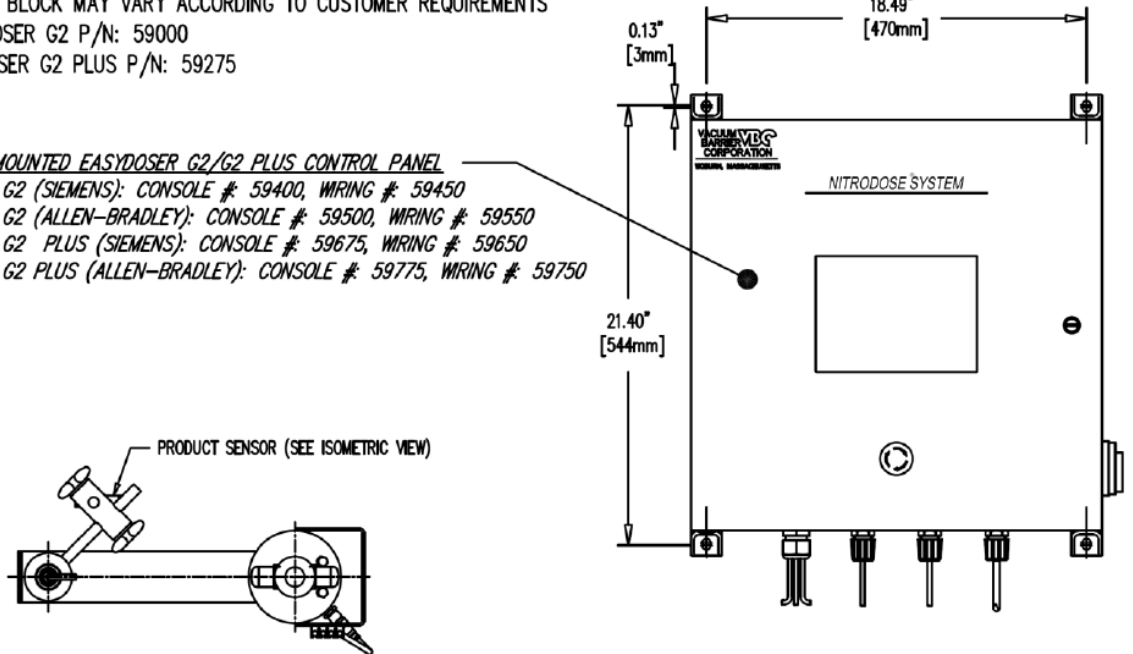
Installation/mounting schematic



Outline drawing

1. EASYDOSER SHOWN AS REFERENCE ONLY, ACTUAL ARM LENGTH AND HEATER BLOCK MAY VARY ACCORDING TO CUSTOMER REQUIREMENTS
2. EASYDOSER G2 P/N: 59000
EASYDOSER G2 PLUS P/N: 59275

CUSTOMER MOUNTED EASYDOSER G2/G2 PLUS CONTROL PANEL
 EASYDOSER G2 (SIEMENS): CONSOLE # 59400, WIRING # 59450
 EASYDOSER G2 (ALLEN-BRADLEY): CONSOLE # 59500, WIRING # 59550
 EASYDOSER G2 PLUS (SIEMENS): CONSOLE # 59675, WIRING # 59650
 EASYDOSER G2 PLUS (ALLEN-BRADLEY): CONSOLE # 59775, WIRING # 59750



NITRODOSE®



LIQUID NITROGEN INJECTION SYSTEMS

Vacuum Barrier's NITRODOSE® liquid nitrogen injection systems provide the most precise liquid nitrogen dosing to add strength to non-carbonated beverages for light-weight packaging and displace oxygen to extend shelf life.

EasyDose G2 precisely delivers low pressure liquid nitrogen at line speeds up to 450 BPM

EasyDose G2 Plus precisely delivers low pressure liquid nitrogen at line speeds up to 2000 BPM

NITRODOSE® G2 precisely delivers low pressure liquid nitrogen at line speeds up to 450 BPM and is continuously self-monitored with alarm outputs and beacon

NITRODOSE® G2 PRO precisely delivers low pressure liquid nitrogen at line speeds up to 2000 BPM and is continuously self-monitored with alarm outputs and beacon

MiniDose precisely delivers low pressure liquid nitrogen at line speeds up to 200 BPM

LINERTER II delivers moderate pressure liquid nitrogen at line speeds up to 500 BPM to greatly reduce oxygen levels in large volume containers

HS Aseptic precisely delivers sterile, low pressure liquid nitrogen for all aseptic filling lines and is continuously self-monitored with alarm outputs and beacon

Our Service – Your Guarantee

- Engineered, designed and fabricated our own cryogenic equipment since 1958
- Trained worldwide staff
- Different models available to cover a wide variety of applications
- Standard models available from stock

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VBC NITRODOSE® SYSTEMS

	Easy Dose G2	Easy Dose G2 Plus	NITRODOSE G2	NITRODOSE G2 Pro	MiniDose	Linerter II	HS Aseptic
Maximum Discrete Dosing Speed	450	2000	450	2000	200	500	750
Allen Bradley PLC	ML1100	ML1400	ML1100	ML1400	n/a	ML1100	ML1400
Siemens PLC	S7-1200	S7-1200	S7-1200	S7-1200	S7-1200	S7-1200	S7-1200
AB Panelview Component 600, 6" touchscreen HMI	Mono	Mono	Mono	Color	n/a	Mono	Color
Siemens KTP 600, 6" touchscreen HMI	Mono	Mono	Mono	Color	Mono (4")	Mono	Color
Minimum Dose Duration	25 ms	6 ms	25 ms	6 ms	25 ms	n/a	12 ms
Smartsync Technology	std	std	std	std	n/a	std	std
Real-Time Graphical User Interface (GUI)	std	std	std	std	std	std	std
Speed & Dose Compensation	std	std	std	std	speed only	std	std
Ethernet Communication Port	std	std	std	std	n/a	std	std
5 Recipe Storage	std	std	std	std	n/a	std	std
5 On-Board Languages	std	std	std	std	n/a	std	std
Accurate to +/- 3% Dose Weight	std	std	std	std	+/- 5%	std	std
Continuously self-monitored for alarm conditions	std	std	std	std	std	std	std
Number of built-in alarm relays	1	1	2	2	n/a	1	2
Maximum direct LN ₂ feed pressure, psi (bar)	22 (1.5)	22 (1.5)	100 (6.9)	100 (6.9)	22 (1.5)	9 (0.6)	175 (12)
Required air pressure, psi (bar)	n/a	n/a	50 – 100 (3.4 – 6.9)	50 – 100 (3.4 – 6.9)	n/a	50 (3.44)	75 (5.2)
Rapid warm-up feature	n/a	n/a	std	std	n/a	n/a	n/a
Electronic dosing valve	std	std	std	std	std	pneumatic	pneumatic
Lowest profile dosing head to fit confined spaces	std	std	std	std	n/a	std	n/a
Improved clean hygienic design	std	std	std	std	std	std	std
Improved durability	std	std	std	std	std	std	std
Lowest dosing pressure, 0.3 psi (0.02 bar)	std	std	std	std	std	n/a	std
Self-Generating N ₂ purge	std	std	std	std	std	std	n/a
Sub-cooled LN ₂ to improve dosing accuracy	std	std	std	std	std	std	std
Automatic CIP Protection	opt	opt	opt	opt	n/a	n/a	n/a
Directional Dose Dispersion blocks	opt	opt	opt	opt	n/a	n/a	n/a

Industry Standard 2-year warranty on all systems.

4/9/13