VBS SPRL
Rue de l'atelier 4
B-1480 Tubize, Belgium
Tel. +32 2 354 7177 – Fax +32 2 354 7222 – Email sales@vbseurope.com

Quote attachment VBC NITRODOSE®
Liquid nitrogen injection system

MINI DOSE®

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Features and benefits

Precision liquid nitrogen dosing system named for its size and cost.

Discrete dosing for speeds up to 12.000 containers/hour.

Dosing accuracy: *5%*

Minimum dosing valve opening time: *25ms*.

Base unit including

- Fully vacuum jacketed, stainless steel dosing unit. Internal reservoir with mechanical fill level control. Electrical dosing valve. Safety relief valve.
- Heated nozzle and gas vent
- Integrated self generating nozzle purge system. No dedicated nitrogen gas supply required.
- Remote Siemens S7-1200 control panel with Siemens KTP400, 4" touch screen HMI (230V/50Hz or 115V/60Hz) in stainless steel NEMA 4x rated housing.
- 6 meter electrical cables. 15 meter cable sets are optionally available.
- Speed compensation capabilities
- Speed sensor (proximity).
- Infrared sensor for bottle detection (Dosing enabled only when container is present)
- Complete operation- and service manual

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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

With NITRODOSE®

Without NITRODOSE®

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.

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

Long shelf life

Short shelf life

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

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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.

Installation

- Stainless steel (height adjustable) support

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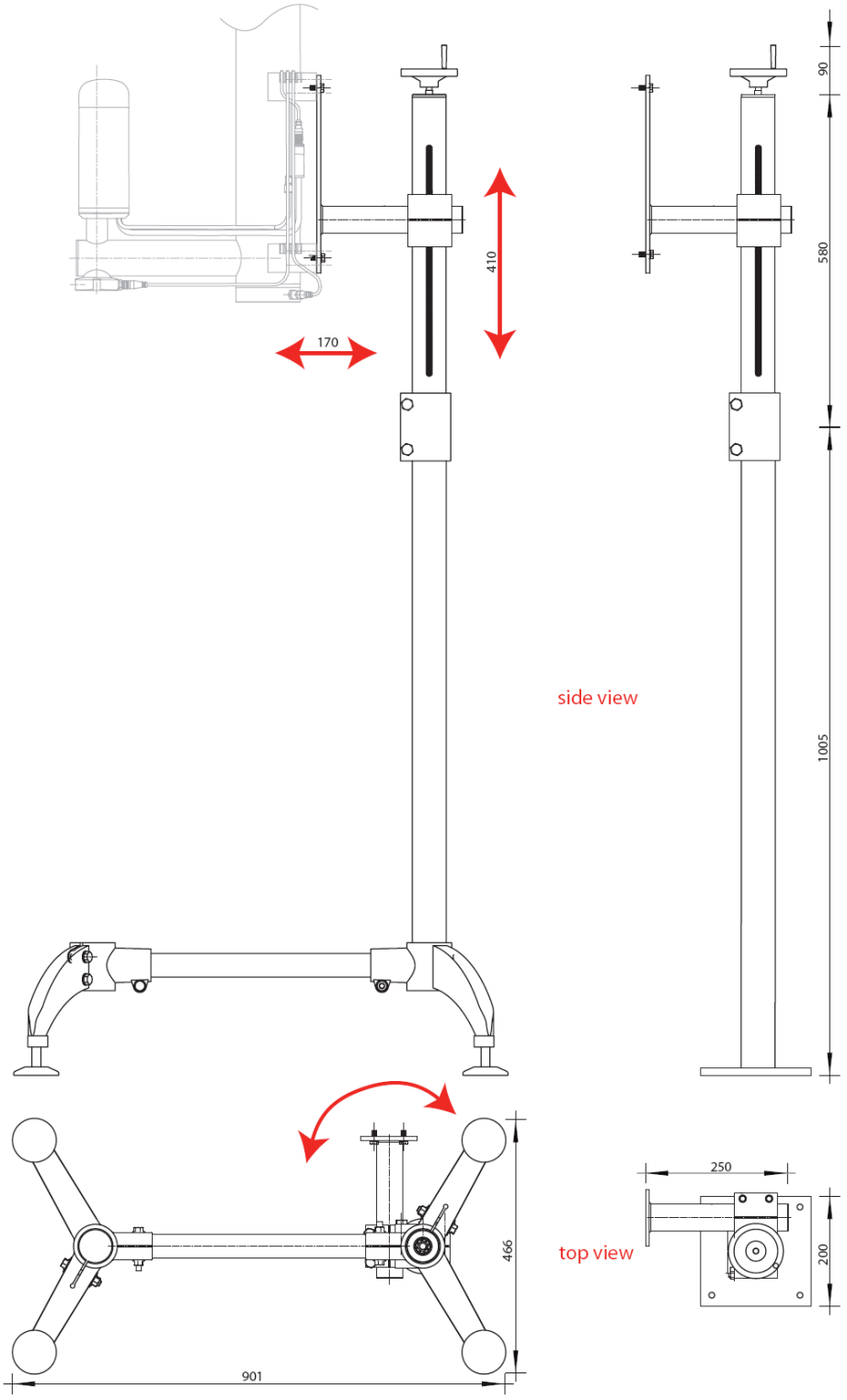
Options: Installation

Mounting support: with 2 x 2pod or bottom plate



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Frequently asked questions concerning a VBC NITRODOSE® Mini Dose System

Which utilities have to be provided by the user for a NITRODOSE® Mini Dose?

1. Liquid nitrogen between 0,5 – 1,5 bar. The vacuum insulated hose (COBRAFLEX) that comes with the NITRODOSE® Mini Dose as a standard is 3 meters long and connects a dewar (mobile tank) with the inlet of the NITRODOSE® Mini Dose. Please, check if this is long enough for your application. The connection on the dewar should be a male 45° CGA 295 (male ½" 37° swivel thread - see attachment). For uninterrupted use of the NITRODOSE® Mini Dose 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 a NITRODOSE® Mini Dose be placed?

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

The enclosed drawing shows the dimensions of a NITRODOSE® Mini Dose.

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 NITRODOSE® Mini Dose must be adjustable horizontally and vertically for fine adjustment.

The customer may want to swing the NITRODOSE® Mini Dose out of the filling line when it is not in use.

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

At the bottom of the NITRODOSE® Mini Dose, 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 NITRODOSE® Mini Dose 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.

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How much nitrogen does a NITRODOSE® Mini Dose 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 12.000 bottles per hour the total consumption of LN2 including dewar and connection losses should be about 6 litres per hour.

LN2 supply tank specification

Tank volume: 200 l
Tank pressure: 1,5 bar

Container (bottle/can) specification

Headspace in the container: 50 ml
Desired pressure in the container: 1 bar

Evaporation losses

Nitrodose Mini Dose: 0,45 kg/hour
3m Cobraflex feed line: 0,05 kg/hour
1 bayonet coupling: 0,03 kg/hour
Tank connection: *ESTIMATED* 2,65 kg/hour
Tank loss rate (1,3% per day, half capacity): *ESTIMATED* 0,04 kg/hour
Purge gas: 0,16 kg/hour

Use rate

Filler line speed: 12.000 containers per hour
Dose size: 0,10g per container
Total dispensed in containers: 1,20 kg/hour

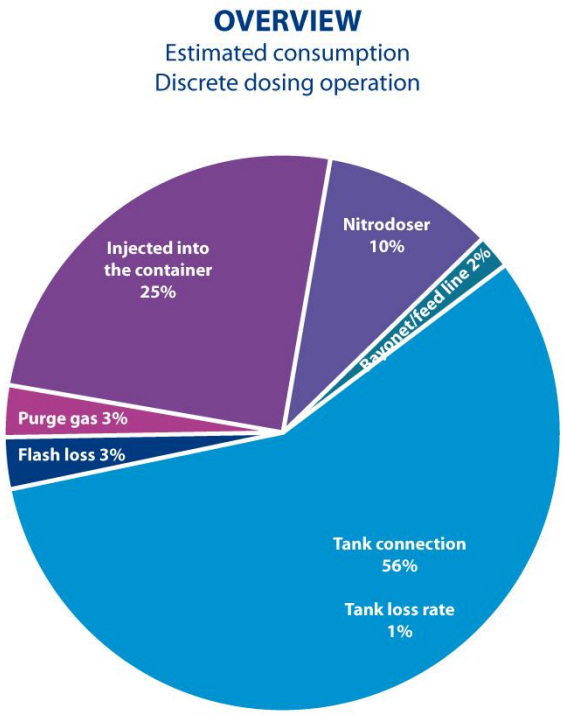
Time between LN2 dosing and
closure of the container: 1 second

Flash loss

LN2 evaporation loss
due to pressure release: 0,17 kg/hour

Total system consumption

4,8 kg/hour or 5,9 l/hour



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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 NITRODOSE® Mini Dose 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.

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 NITRODOSE® Systems comply with CE regulations?

Yes, NITRODOSE® Systems are in accordance with CE regulations.

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Attachments

45° CGA 295 (UNF16) connection

Utility connections

Installation/mounting schematic VS setup

Installation/mounting schematic FS setup

Outline drawing

Comparison of our different systems

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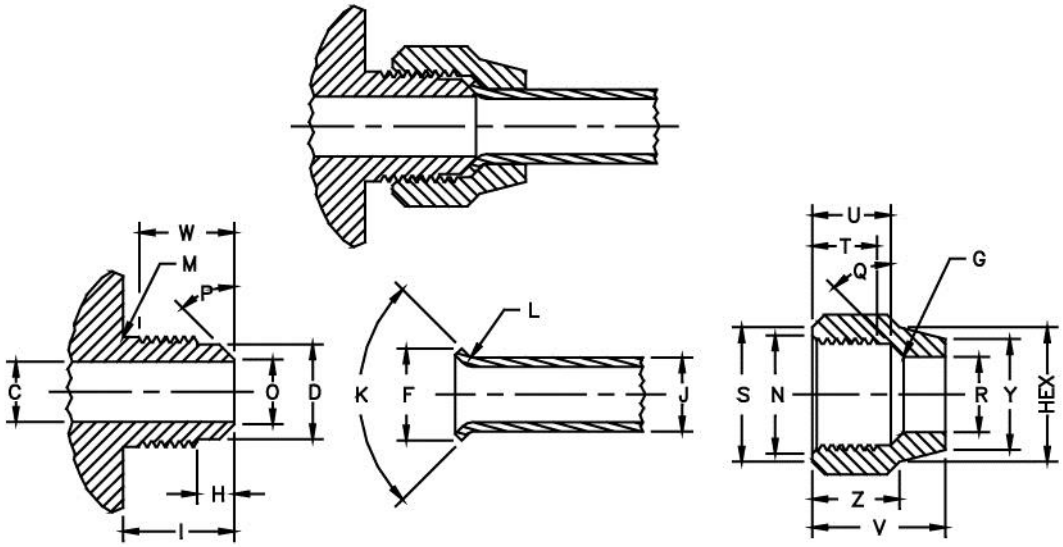
45° CGA 295 (UNF16) connection

COMPRESSED GAS ASSOCIATION, INC.

CONNECTION NO. 295

.750-16UNF-2A-RH-EXT (½" SAE Flare)①

STANDARD CYLINDER VALVE OUTLET CONNECTION FOR
PRESSURES UP TO 500 psig (3450 kPa) FOR
Cryogenic Liquid Withdrawal, Filling, and Venting of
Argon 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	.403–.412	(10.23–10.46)
RELIEF DIA.	D	.641 ±.010	(16.28 ±0.25)
CUTBACK	H	.25	(6.4)
LENGTH	I	.75	(19.1)
UNDERCUT	M	OPTIONAL	
CHAMFER DIA.	O	.438 ±.010	(11.13 ±0.25)
ANGLE	P	45° ±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	.015–.031	(0.38–0.79)

HEXAGON NUT			
THREAD		.750–16UNF–2B–RH–INT (MOD.)	
MINOR DIA.		.6820–.6908(3B)	(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).

① Complies with ANSI/SAE J513f.

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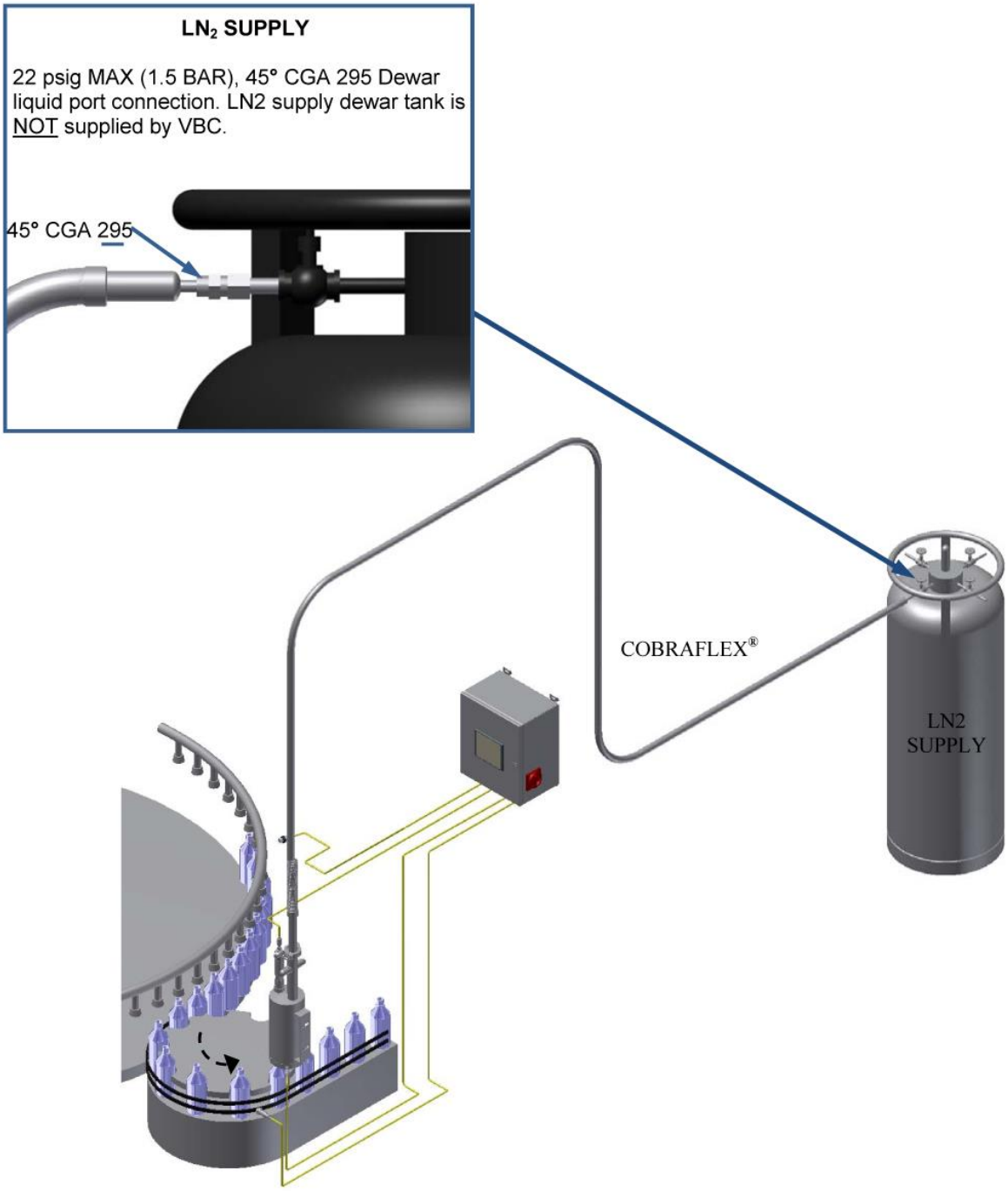
Utility connections



ELECTRICAL INPUT POWER

Grounded main electrical supply required. It is the CUSTOMERS responsibility to supply a fusible disconnect rated at 15 amps, which breaks both legs of input power.

See VBC wiring diagram 60774 (p. 25) for input power hook-up

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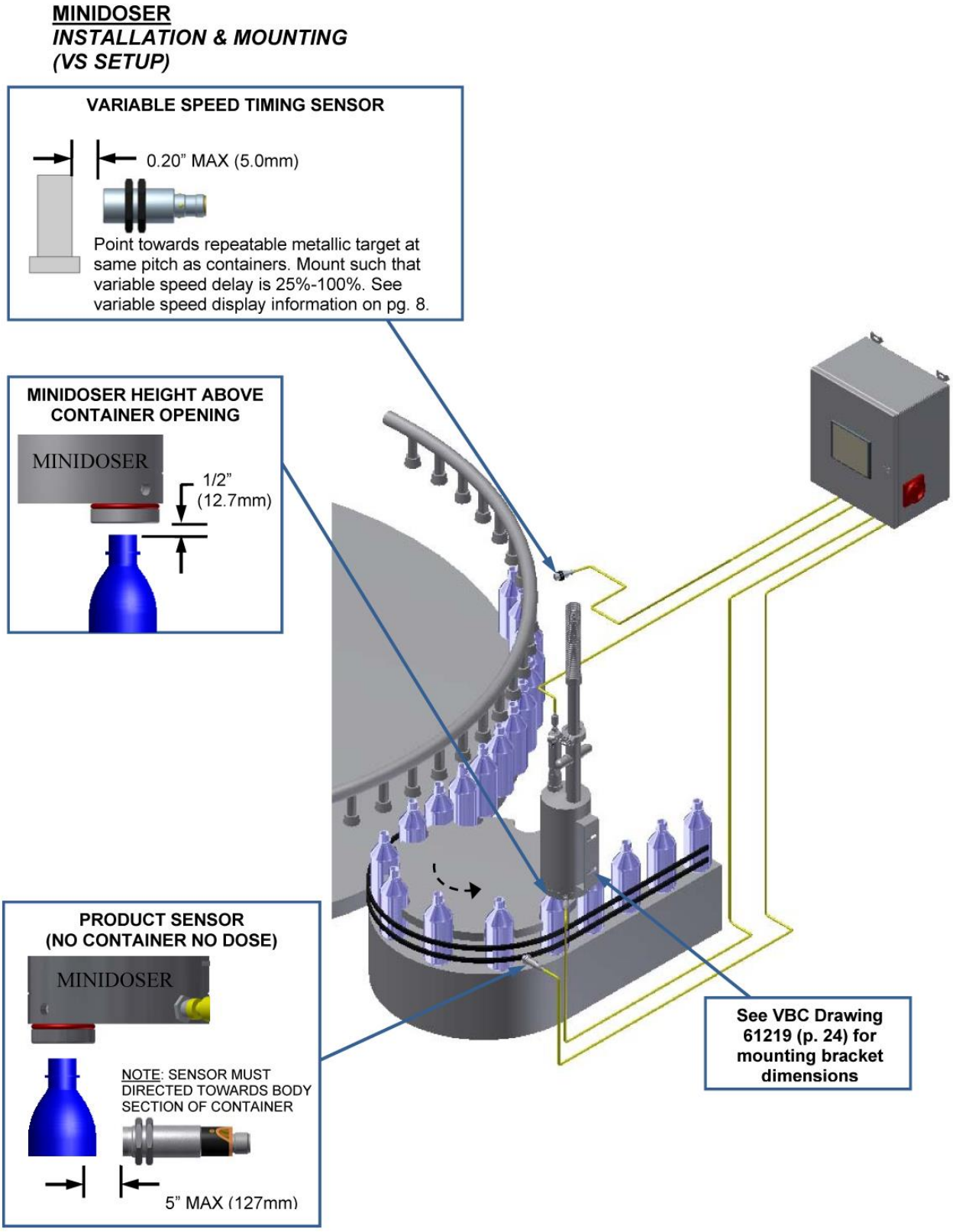
Installation/mounting schematic VS setup



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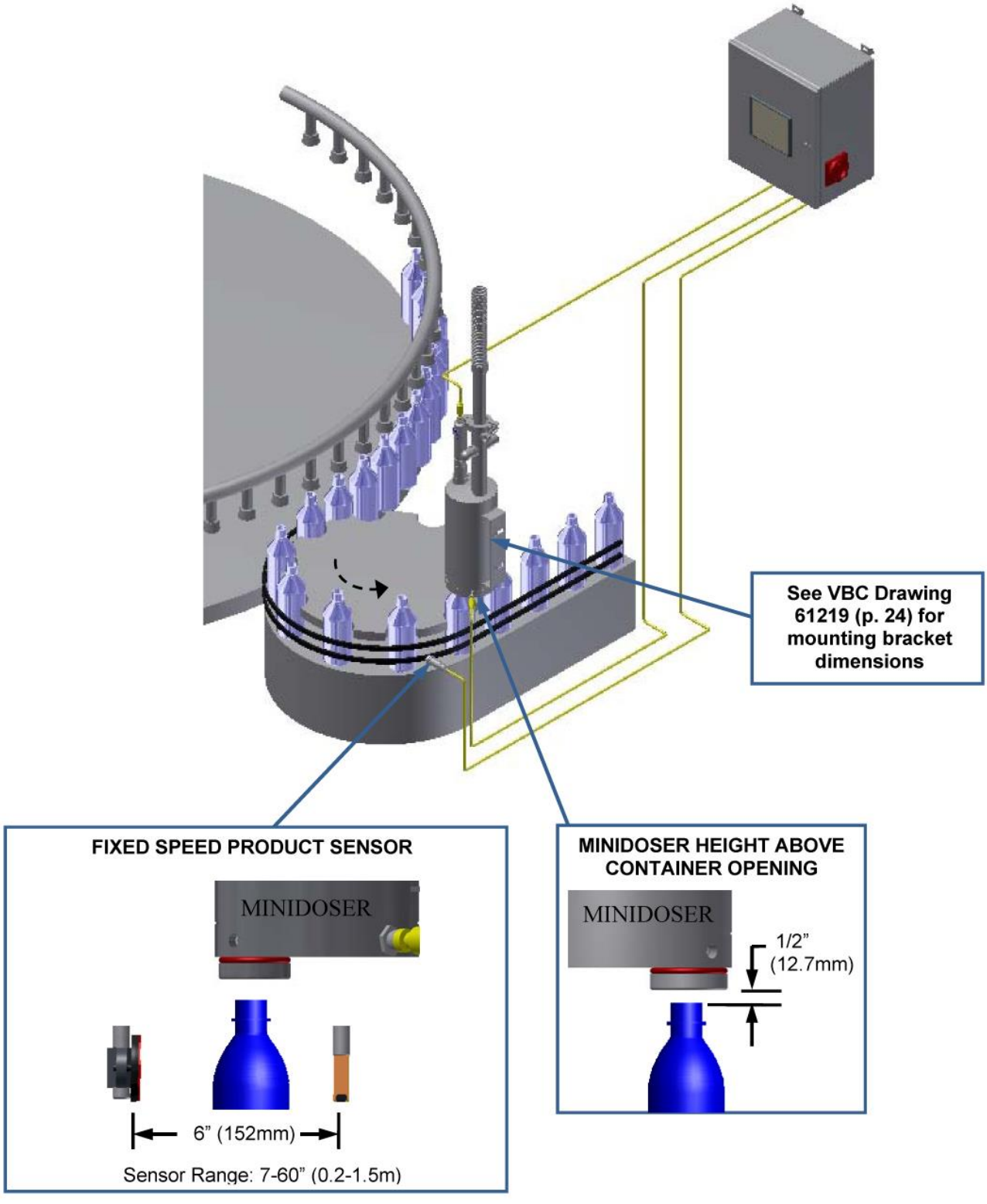
Installation/mounting schematic FS setup

MINIDOSER
INSTALLATION & MOUNTING
(FS SETUP)



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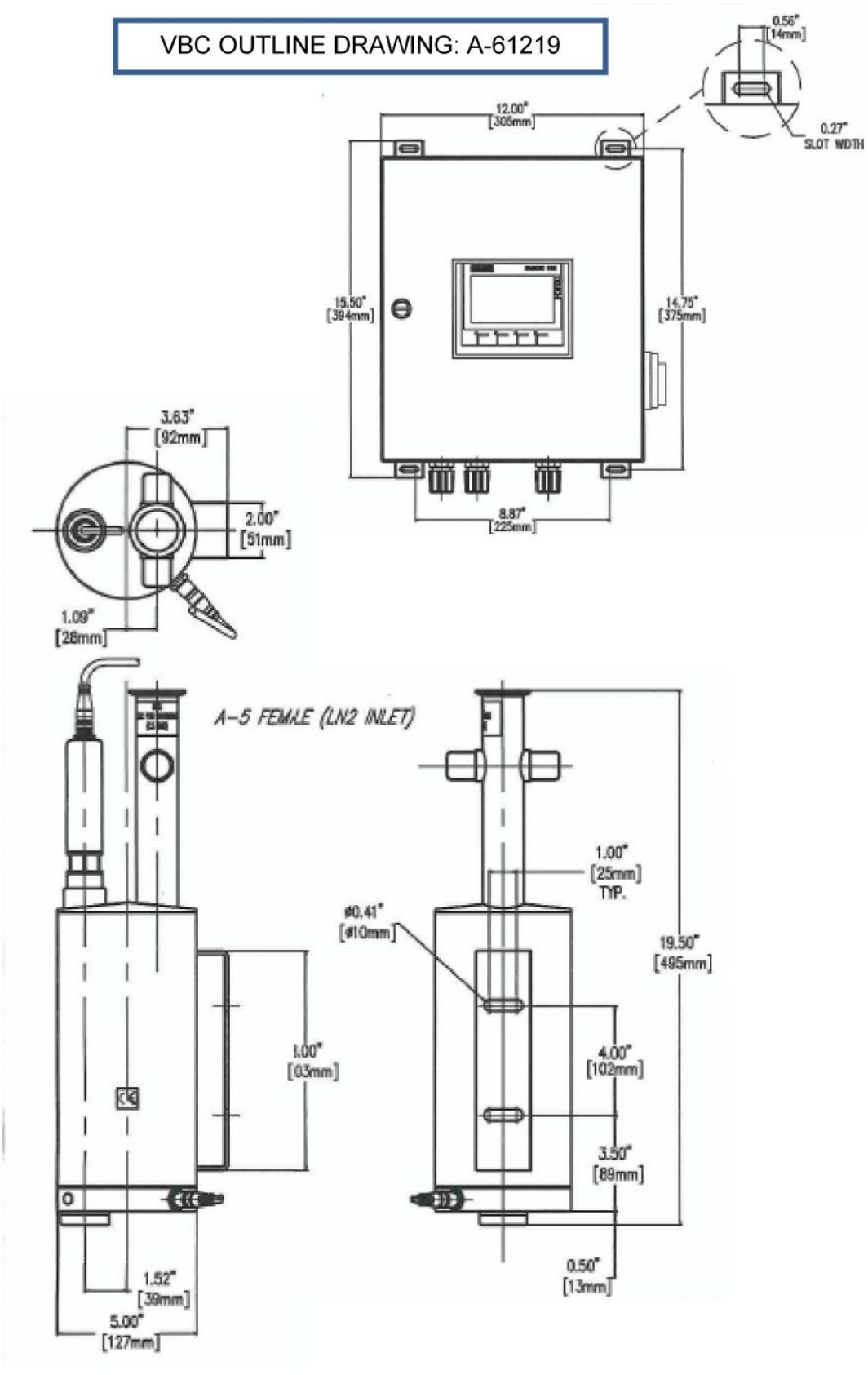
Outline drawing



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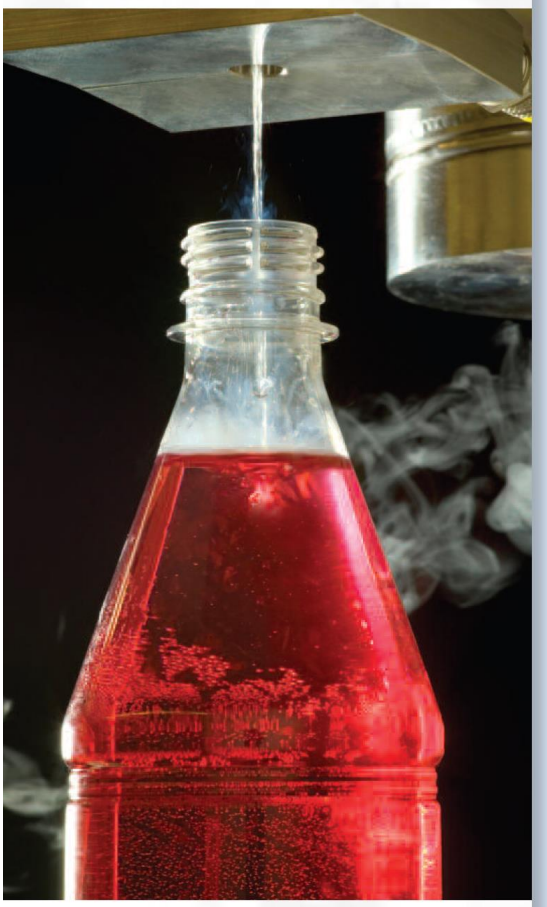
NITRODOSE®

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

VACUUM BARRIER VBC CORPORATION

4 Barten Lane, Woburn, MA 01801
Tel 1-781-933-3570
Fax 1-781-932-9428
email: sales@vacuumbarrier.com
www.vacuumbarrier.com

VacuumBarrierSystems

Rue de l'Atelier, 4
B-1480 Tubize - Belgium
Tel +32 2 354 71 77
Fax +32 2 354 72 22
email: sales@vbseurope.com
www.vbseurope.com

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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