NOVODOSER

Liquid Nitrogen Dosing

BEVERAGE I FOOD I PERSONAL CARE I CHEMICAL

ISO 9001:2015 119601/1

ISO 14001:2015 119601/1

Dosing for a Greener World

www.novodoser.com

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NovoDoser® Applications

How it works

The dosing process involves supplying LN2 to the NovoDoser® through a vacuum-insulated pipe/hose, directing it into the dosing head. A sensor detects the presence of a container and sends pulses to the controller. Upon receiving these signals, the controller activates the dosing head to dispense the required amount of LN2 into the container.

As the LN2 droplets enter the container, they rapidly evaporate and expand by approximately 700 times, converting into gaseous N2. This process effectively fills the container's headspace with inert N2 gas, displacing residual oxygen and achieving the desired pressure.

Why Liquid Nitrogen Dosing?

PRESSURIZATION

- ☑ PET and PP bottles
- ☑ Aluminum cans
- ☑ Aluminum bottles
- ☑ Non-carbonated drinks

Enhanced Container Rigidity: Strengthen bottles or cans to eliminate paneling issues, particularly during the hot filling process.

Container Light weighting: Reduce packaging costs and minimize the environmental carbon footprint by using lighter packaging materials.

NovoDoser® Applications

NITRO-INFUSED BEVERAGE

- ☑ Beer
- ☑ Coffee
- ☑ Tea

Nitro-Infused Beverage: Infusing the beverage with nitrogen creates a luxurious, thick, and creamy texture, enhancing the mouthfeel and flavor of the drink, along with a beautiful cascade of nitrogen bubbles in your glass.

INERTING

- ☑ Nuts
- ☑ Wine
- ☑ Fruit Juice
- ☑ Vegetable Oil
- ☑ Vitamin Drink
- ☑ Sauces
- ☑ Snack
- ☑ Automobile Oil
- ☑ Beer
- ☑ Tea
- ☑ Coffee Seed

Oxygen Exclusion: Minimize residual oxygen in the product's headspace to prevent oxidation and maintain product quality.

Extended Product Shelf Life: Incorporating N2 gas in packaging significantly prolongs the product's shelf life.

Alternative to Traditional Modified Atmosphere Packaging (MAP): Using inert gas, such as N2, offers a more efficient and effective solution than traditional inert gas flushing for preserving product freshness.

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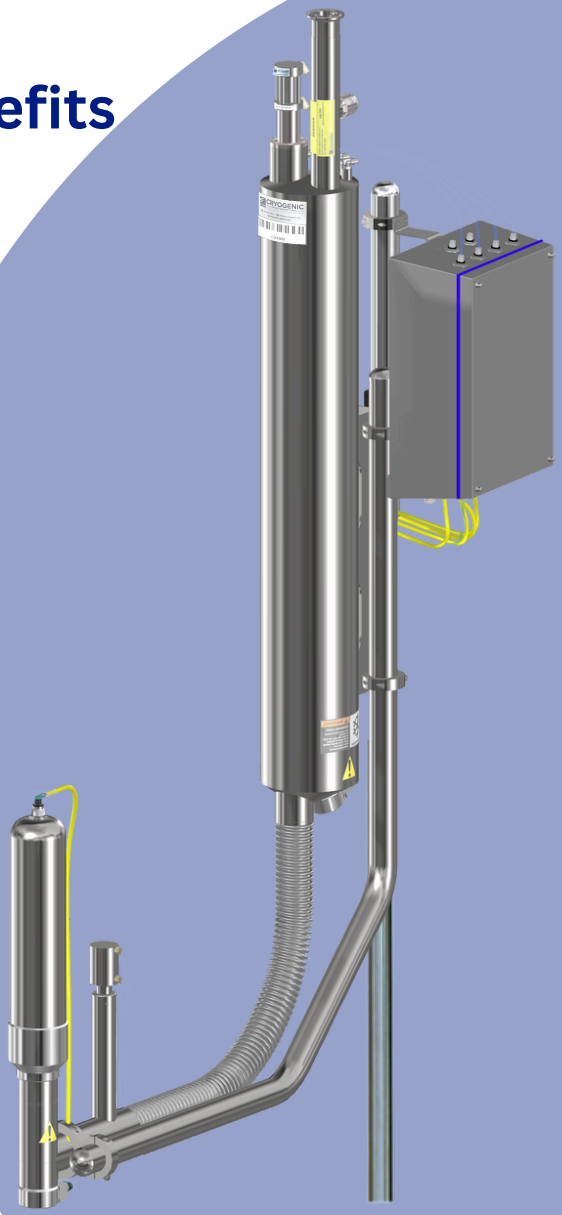
Liquid Nitrogen Dosing

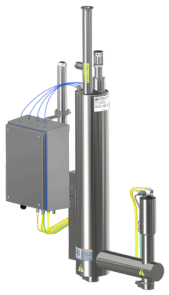
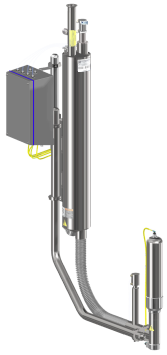
Ergonomic Features And Benefits



•**Frost-free Nozzle** – Self-generating GN2 for dosing head blanketing
•**Consistent Container Pressure** – Delivers accurate dosing with ± 2% precision
•**Lowest LN2 Consumption** – Discrete dosing for speeds up to 2000* containers per minute
•**Lowest LN2 Losses** – Proprietary vacuum insulation with lowest heat leak of 0.1 LPH
•**Minimized Product Splash** – Lowest dose pressure in its class,0.3 psi
•**Sub-cooled LN2** – Ensures constant LN2 density for accurate dosing
•**Corrosion Resistant** – Optional 316L material grade for the Doser body
•**Highest Hygiene Design** – All external surface features rounded corners and sloped design for easy wash-down
•**Lowest Maintenance** – Ultra long life cycle dosing valve (> 60 million cycles); Superior to IP65 rated sensors & electrical cables
•**Ease of Installation** – Compact size and flexible dosing head for easy installation in limited space
•**Applications Flexibility** – Compatible with soft-dose and micro-dose technology for hot fill, powder, and granular applications
•**Multi-lingual HMI** – Available in English, Spanish, Chinese, etc.
•**5 Years Vacuum Warranty** – Lowest cost of ownership

*Controller Specific

Selection Guide *Specifications*

Series	L	H	Q
NovoDoser Body			
Material	Stainless Steel 300 Series ①		
Head Pressure	0.3 psi	0.3 - 0.55 psi	0.5 - 1.05 psi
Dose Accuracy	± 3%	± 2%	± 2%
Dose Volume, mg/dose	10 to 1400	10 to 1400	10 to 1400
Subcooling	Yes	Yes	Yes
Nozzle Blanketing	Self-Generated N2	Self-Generated N2	Self-Generated N2
Steady State Consumption	< 0.026 gal / hour (< 0.1 liter / hour)	< 0.029 gal / hour (< 0.11 liter / hour)	< 0.035 gal / hour (< 0.13 liter / hour)
Body Dimension	33” H x 5” W (840 x 129 mm)	42” H x 5” W (1070 x 129 mm)	58” H x 5” W (1474 x 129 mm)
Dosing Head Dimension	EA Head 13.8” H x 2.3” W (351.5 x 57mm)	HS Head 14” H x 2.5” W (354 x 63.5 mm) ES Head 21” H x 3.1” W (534.6 x 78 mm)	ES Head 21” H x 3.1” W (534.6 x 78 mm)
Dosing Head Arm Reach	18” (457 mm)	18” (457 mm)	31” (788 mm)
Weight	30 lbs (14 kg)	35 lbs (16 kg)	44 lbs (19 kg)
Liquid Nitrogen Supply **Gaseous Nitrogen Supply** **Electrical**	≤ 100 psi (≤ 6.8 bar) 100 psi (6.8 bar) 110-220 VAC	≤ 100 psi (≤ 6.8 bar) 100 psi (6.8 bar) 110-220 VAC	≤ 100 psi (≤ 6.8 bar) 100 psi (6.8 bar) 110-220 VAC

Note:

① *SS316/316L for external material*

② ***NovoDoser Aseptic*** *– Sterilization / Sanitization through steam or chemicals*

③ *To operate with Phase Separator*

④ ***NovoDoser UltraClean Aseptic Dosing Head*** *- Dosing head height (H) is customizable according to filler manufacturers*

NOVODOSER
Liquid Nitrogen Dosing

P (Petite)	C (UltraClean)	A (Aseptic) ②
		
Stainless Steel 300 Series ①	SS316/316L	
0.4 - 3 psi ③	0.3 psi	0.4 psi
± 2%	± 2%	± 2%
10 to 1400	10 to 1400	10 to 1400
Yes	Yes	Yes
Self-Generate N2	Self-Generate N2	Self-Generate N2
< 0.03 gal (0.11 liter) / hour	< 0.03 gal (0.11 liter) / hour	< 0.12 gal (0.40 liter) / hour
13”H x 2.5”W (340 x 63mm)	Customized to Filler Machine	Customized to Filler Machine
EA Head 13.8” H x 2.3” W (351.5 x 57mm)	Aseptic Head ④ 8”H x 4.5”W (203 x 114.3 mm)	Aseptic Head 24.1”H x 2”W (611.4 x 50.8 mm)
3.7” (93mm)	Customized to Filler Machine	Customized to Filler Machine
6 lbs (3kg)	Approx. 52 lbs (24 kg)	Approx. 170 lbs (80 kg)
≤ 22 psi (≤ 1.5 bar) 100 psi (6.8 bar) 110 - 220 VAC	≤ 100 psi (≤ 6.8 bar) 100 psi (6.8 bar) 110 - 220 VAC	≤ 100 psi (≤ 6.8 bar) 100 psi (6.8 bar) 110 - 220 VAC

Controller Selection Guide

Controller *Specifications*

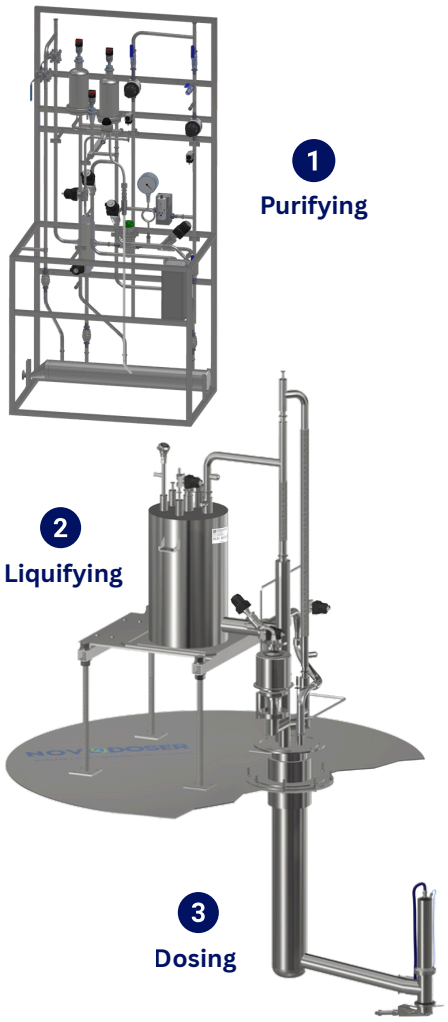
Controller Model	250FD	500SC	1000DSC	2000DSC
Controller Diagram				
PLC Platform	Siemens S7-1200	Siemens S7-1200	Siemens S7-1200	Siemens S7-1200
HMI (LCD touch screen)	4.3" Color	7.0" Color	7.0" Color	10.0" Color
Max. Discrete Dosing	500 CPM	1000 CPM	2000 CPM	2000 CPM
Dosing Head	Electric Actuator (EA)	Electric Actuator (EA)	Electro-Pneumatic (HS) Electro-Servo (ES)	Electro-Servo (ES)
Dynamic Dose	✓			
Fixed Delay	✓	✓	✓	✓
Dose Timing Synchronization		✓	✓	✓
Dose Volume Synchronization		✓	✓	✓
Encoder Compatibility			✓	✓
Quick System Purging ①	✓	✓	✓	✓
Thermo-Purging ①		✓	✓	✓
Rapid Nozzle Defrosting ①	✓	✓	✓	✓
Nozzle Pre-Cooling	✓	✓	✓	✓
User's Filler Signal Interface			Option	✓
Modbus RTU User Interface			Option	✓
Mobile Remote Monitoring (Wi-Fi / LAN)				✓
Smart Maintenance				✓
Recipe Storage	5	5	12	20
Certifications	CE	CE	CE	CE

Note:

① *Designed for CIP protection against reservoir and nozzle frosting*

NovoDoser® *Aseptic*

Dosing with Ultra-hygienic Confidence



Features and Benefits

Aseptic LN_2 Dosing

Ultimate Aseptic Doser that delivers **sterile LN_2 dosing** with advanced **SIP (Steam-in-Place)** functionality, achieving *log 9 purity* for high-sterility applications in food & beverage, pharma and biotech

Chemo-Sanitization

The nozzle is sanitize-able during filler **CIP (Clean-in-Place)** interval using customizable recipes and duration settings, helping maintain ultra-high hygienic performance

CIP Protection

Prevents nozzle freeze up during or after filler CIP or wash down, by keeping moisture out of the dosing head. Built to handle high-pressure washdowns and harsh chemicals for longer service life and less downtime

Continuous Low Pressure Dosing

Supports uninterrupted, low-pressure LN_2 dosing for smooth, efficient, and consistent packaging pressure or inerting

Precise Dosage Control

± 2% dosing accuracy to ensure packaging pressure stability and consistent product quality

Process Monitoring with Data Logging, History Records and Alarms

Advanced process monitoring with data logging system ensure compliance to GAMP 5 requirements. The real time monitoring alerts operators for system faults via on-screen text messages, buzzer and light beacon alarms

Advanced HMI Control

Features high performance Siemens PLC S7-1200 and a 10" color touchscreen, designed with intuitive display for easy setup and process monitoring

NovoDoser® *UltraClean*

A new generation of NovoDoser® UltraClean with a frost-free nozzle, corrosion-resistant 316L material construction, and hygienic wash-down design in compliance with stringent ultra-clean bottling line requirements.

Specifications

- *Continuous dose mode with option of discrete dose*
- *Controller with Siemens S7-1200 PLC platform*
- *NEMA 4X IP65 stainless steel enclosure*
- *HMI comes with a TFT color touch screen*
- *Accurate dose weight: ±2%*
- *Smart maintenance allows users to plan the maintenance schedule*
- *Direct LN2 feed pressure up to 100 psi (6.8 bar)*
- *ModBus user interface*
- *Alarm log to assist system troubleshooting and performance monitoring*
- *Recipe storage for 10 recipes or more*
- *316L material construction for higher corrosion resistance*
- *Hygienic Dosing Head wash-down design, IP65 rated*

System Solutions

Benefits to Customer

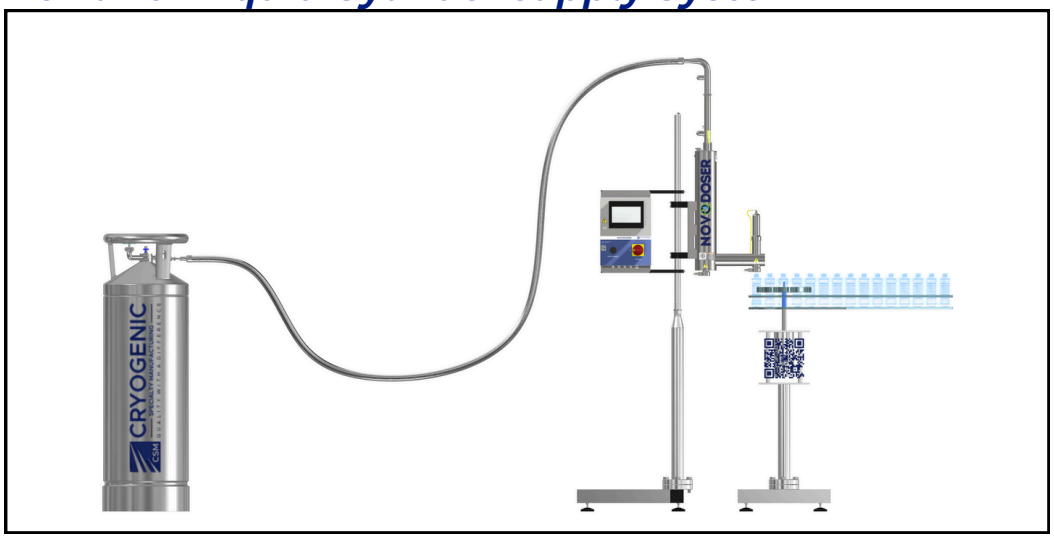
Single Source, Single Responsibility: End-to-end solutions covering system design, manufacturing, installation, testing, and commissioning.

System Level Engineering Approach: Our system level engineering approach ensures minimal heat loss, reduced cooling waste, lowest LN_2 consumption, shorter project lead times, and fastest ROI - delivering unmatched efficiency and cost savings.

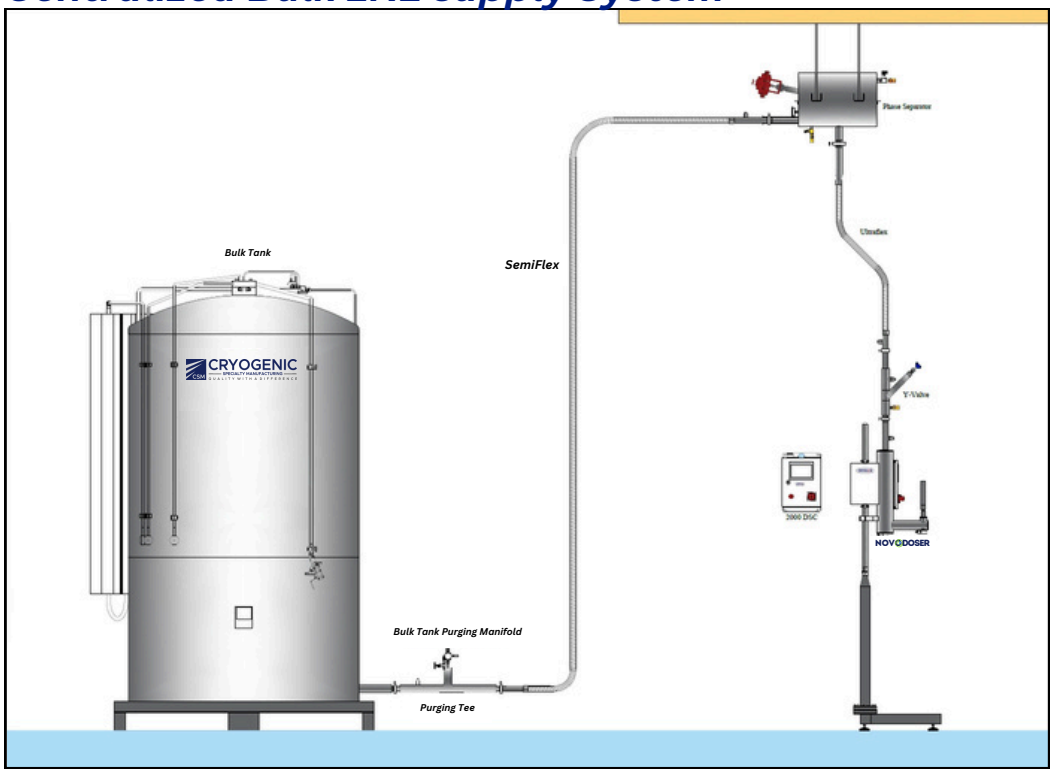
Seamless Safety & Performance Integration: Incorporates critical safety functions and performance monitoring, e.g. O_2 monitoring, emergency shutdown systems, thermo, pressure, and flow monitoring.

Effortless FMCS Integration: Seamless FMCS integration using standard MODBUS TCP/IP communication protocols.

Dewar or Liquid Cylinder supply System



Centralized Bulk LN2 supply System

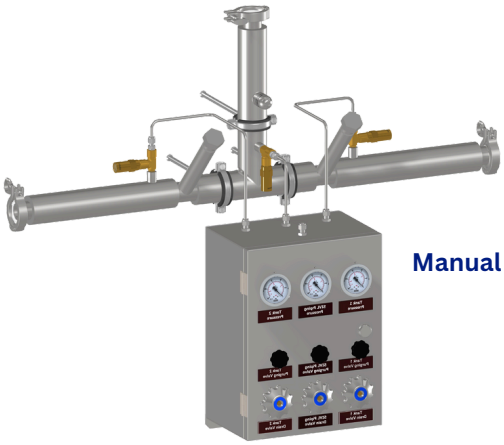


Dewar Changeover

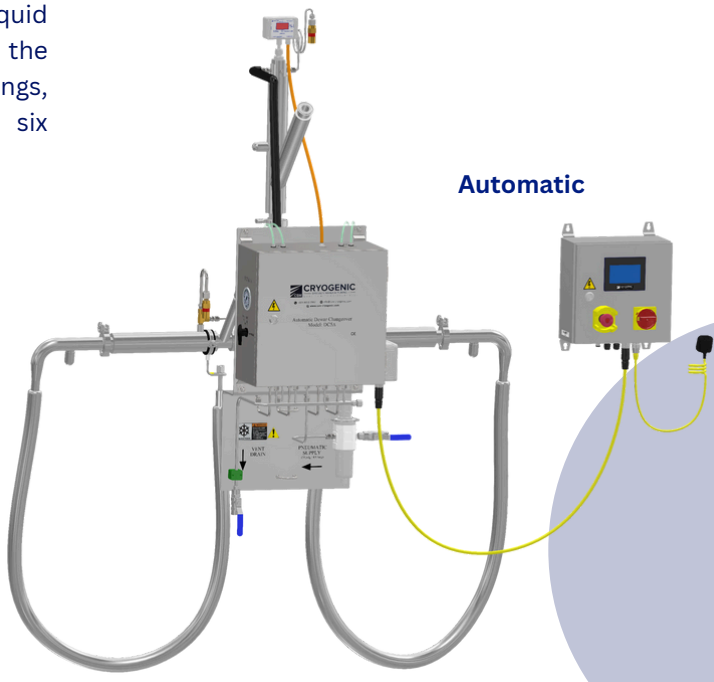
How it works?

An uninterrupted liquid nitrogen supply with LGC is achievable using a dewar changeover system. The station consists of two sides: one active supply and one standby. When the active supply is depleted, the operator simply switches over to the standby tank manually. For unattended operation, an automatic changeover option is available.

CSM's dewar changeover system is fully vacuum-insulated, ensuring exceptionally low heat loss—at least 20 times lower than foam-insulated stations. This results in minimal liquid boil-off, maintaining consistent liquid supply quality at the point of use. Reduced boil-off leads to significant LN2 savings, enabling equipment capital payback within at least six months.



Manual

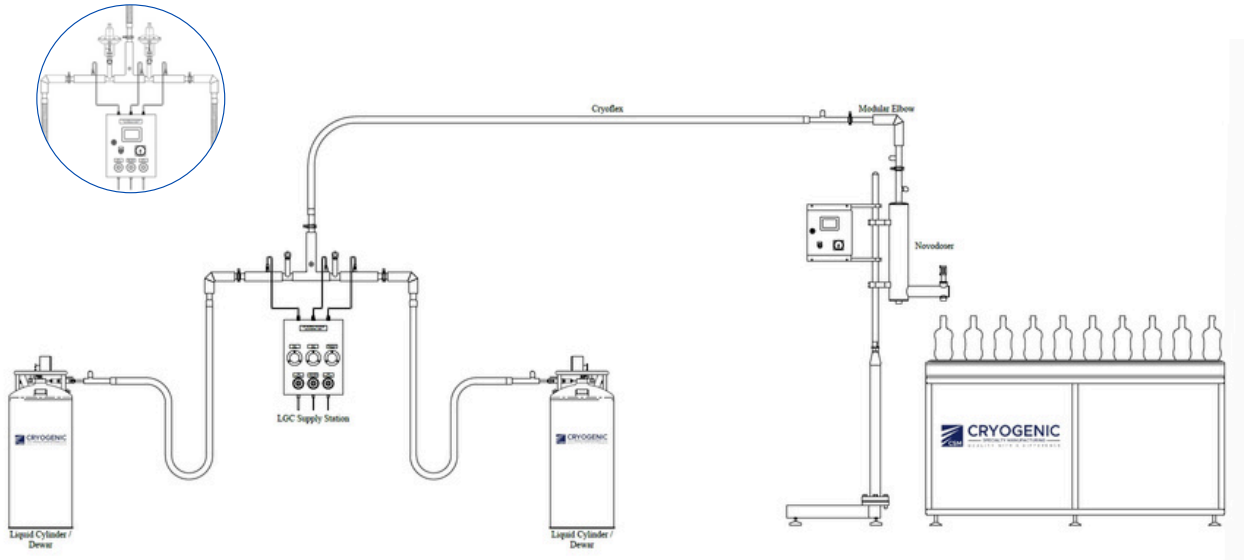


Automatic

Features and Benefits

- Minimal liquid supply downtime for higher productivity
- Available in 1x1, 2x2, 4x4 liquid cylinder configurations
- Frost-free and condensation-free operation with vacuum insulation system
- Prevent premature liquid cylinder changeouts through proper monitoring
- Compact size enables ease of installation in limited spaces

Typical Dewar Changeover System® for LN2 Supply

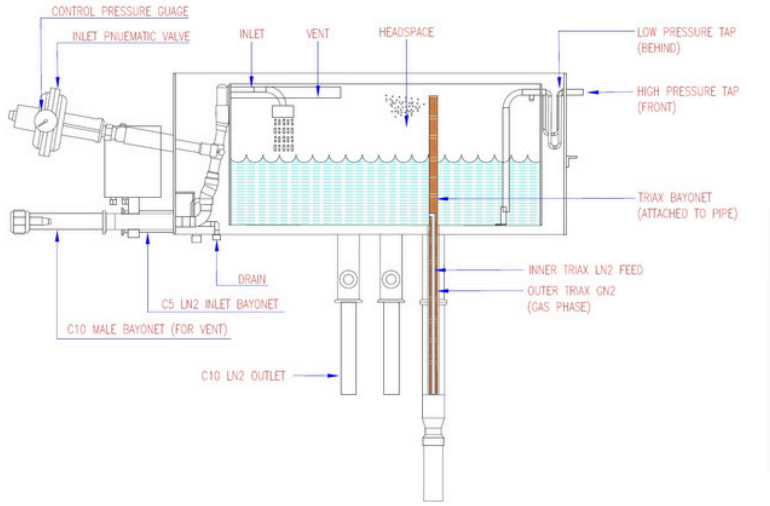


Phase Separator

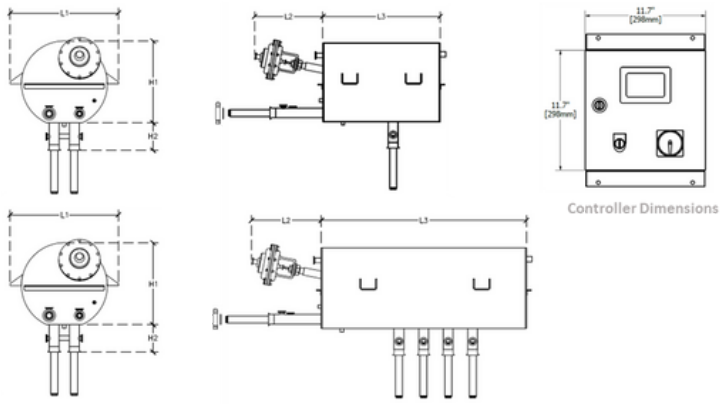
Atmospheric Pressure

The atmospheric-type Phase Separator is primarily used in specialized applications that demand extremely high-quality, low-pressure liquid nitrogen. CSM's Phase Separator is a vacuum-insulated reservoir holding tank for liquid nitrogen, equipped with a differential pressure level control system that operates with a proportional inlet valve.

The Phase Separator is continuously filled with liquid nitrogen under atmospheric conditions. Typical applications include direct feed to a LN2 doser or a closed-loop liquid nitrogen circulation system, typically found in MBE (Molecular Beam Epitaxy) system applications.



Model	H1	H2	L1	L2	L3
C22	16.4" (417mm)	5.5" (140mm)	21.6" (549mm)	14.2" (361mm)	24.4" (620mm)
C46	16.4" (417mm)	5.5" (140mm)	21.6" (549mm)	14.2" (361mm)	41.7" (1060mm)



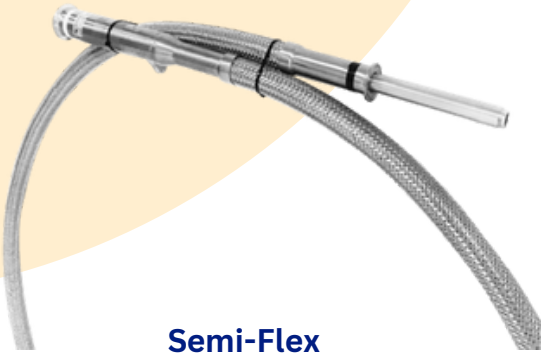
Controller Dimensions

Features and Benefits

- Differential pressure controls and a proportional inlet valve help to maintain a constant liquid level within +/- 5%
- Provides a ready supply of vapor free, pure liquid nitrogen for critical applications
- Available in 22 and 46-liter operating capacities, with bottom outlets ranging from 2 to 12 outlets. Higher capacities for custom application are available.
- Equipped with specially designed universal outlet connections, allowing compatibility with both liquid feed Triax pipes and vapor return Coax pipes. This feature enhances installation flexibility in multiple pairs of closed-loop piping systems.

Cryogenic Transfer Hoses

Semi-Flex Vacuum Insulated Transfer Hoses



Semi-Flex

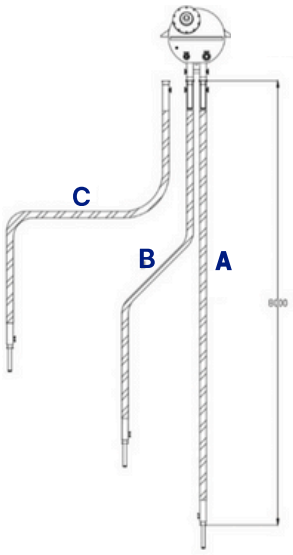
Semi-Flex is a semi-rigid, bendable pipe with optimal flexibility, making it suitable for long-distance piping system applications as an alternative to traditional rigid piping. Its lightweight stainless steel construction reduces cool-down losses to an absolute minimum. Available in sizes of DN16 (1/2”), DN25 (1”), DN32 (1.25"), and lengths ranging from 6m to 18m.

- Semi-Flex can be coiled for shipment by air freight, eliminating the need for expensive logistics.
- Tees, elbows, bayonets, and valves can be incorporated with Semi-Flex transfer hoses for a customized LN2 piping system application.
- Selected hoses are kept in stock for immediate delivery.
- Super insulation and proprietary chemical getters ensure long-lasting vacuum integrity.
- Each hose is evacuated (10^{-6} torr), helium leak checked (1 x 10^{-9} std cc/sec), and liquid nitrogen cold-shock tested before shipping.
- Vacuum insulation eliminates frost, ice, and related safety hazards.

Semi-Flex Specifications

Model	SF16	SF25	SF32
Inner Diameter	DN 16 ⅝” (16.2 mm)	DN 25 1” (25.1 mm)	DN 32 1⅜” (34.2 mm)
Outer Diameter	DN 40 (52.1 mm)	DN 50 (62.8 mm)	DN 65 (81.2 mm)
Steady State Heat Leak	1.4 btu/hr/ft (1.3 watts/m)	1.5 btu/hr/ft (1.4 watts/m)	1.6 btu/hr/ft (1.5 watts/m)
Bayonet Heat Leak	4.0 btu/hr (1.2 watts)	8.1btu/hr (2.4 watts)	8.1 btu/hr (2.4 watts)
Max. Operating Pressure	200 psig (13.8 bar)	200 psig (13.8 bar)	200 psig (13.8 bar)
Weight	1.0 lbs/ft (1.4 kg/m)	1.3 lbs/ft (1.9 kg/m)	3.0 lbs/ft (4.5 kg/m)
Min. Bend Radius (Static)	12” (30 cm)	16” (40 cm)	18” (45 cm)
Vacuum Insulation Type	Static or Dynamic Vacuum		
Maximum Length	Single Spool 59 ft (18.00 m)		
Protective Outer Covering	RFB - Regular Flex Braid		
Material Construction	Stainless Steel Series 300		
Standard Testing	Dimensional Check He leak checked 1 x 10 - 9 cc/s		
Optional	Pneumatic pressure test, Vacuum retention testing, LN2 cold shock, pre-material certs., X-ray, ASME B31.3 certification, CFOS cleaning for O2 services		

CSM Cryogenic Transfer Hoses



Hoses Selection Guide

Installation Method	Hose Type	
	Triax-Flex	Ultra-Flex
A	✓	✗
B	✓	✓
C	✓	✗

Hose Type	ID	OD	Bending Radius
Triax-Flex	DN16	DN40	300mm.
Ultra-Flex	DN8	DN25	152mm.
	DN12	DN32	203mm.

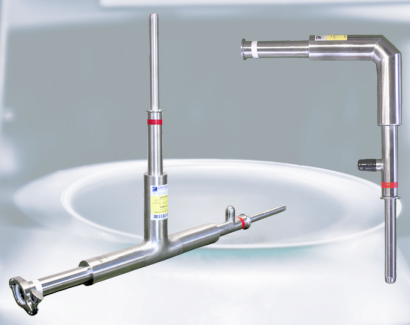
Ultra-Flex transfer hose is an ultra-flexible, vacuum-insulated LN2 transfer hose with high flexibility and the lowest dynamic bend radius among all cryogenic hoses on the market. Due to its lightweight stainless steel construction, cool-down loss is reduced to an absolute minimum. Ultra-Flex hoses are protected by a tough, anti-kink stainless steel spiral wrap outer covering. Its non-wire braid prevents potential operator injuries caused by sharp wires found in traditional braided sleeves.
Typical hoses are manufactured with pipe thread ends or female flare 1/2" JIC/CGA fittings, or C5 bayonets. These hoses are used in a wide variety of applications, including tool connections with portable dewars supplying LN2 to test handlers, LN2 dosers, or any moving reservoirs, custom OEM applications.

Ultra-Flex

Triax-Flex ® transfer hose, when used with an atmospheric Phase Separator system, delivers liquid nitrogen (LN2) in pure liquid form at atmospheric pressure. This system eliminates two-phase flow to use points by continuously venting gaseous vapor to the atmosphere through the phase separator. By separating and venting vapor before liquid delivery, only sub-cooled LN2 is supplied to each use point via gravity. Triax-Flex® is commonly used in applications where single-phase liquid is critical to the production process, such as MBE, LN2 dosers, cryopreservation, or any process requiring pure LN2 supply.
Triax-Flex® is available in static or dynamic vacuum insulation. The dynamic version requires an external pump to continuously evacuate its vacuum annular space, maintaining insulation integrity. Both static and dynamic systems feature Triax female bayonet connections, elbows, tees, valves, or custom connections (e.g., A5, A10, TAL) to the point of use.

Triax-Flex

RELATED PRODUCT :



Modular Fittings

Modular Valves

Worldwide Sales & Service

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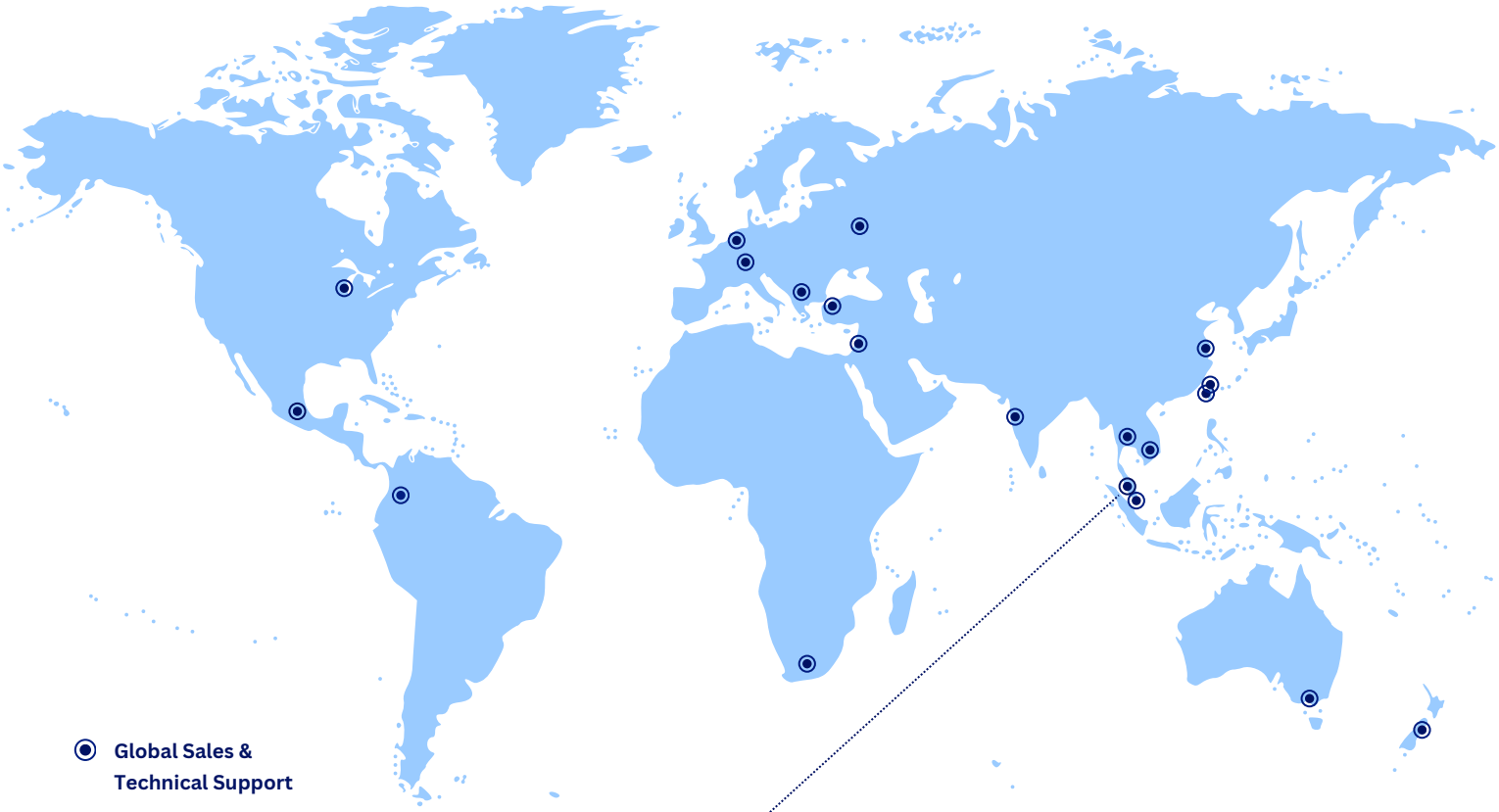

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