

About Nitrogen Gas

Compressed, industrial grade (97.2% pure) nitrogen gas is the pressure medium used in all Hyson Products' nitrogen gas spring systems.

Nitrogen is a non-toxic, inert gas. It is colorless, tasteless and odorless and does not support combustion nor will it ignite under high pressure or near an open flame. Nitrogen is also the least expensive of all inert gases.

Nitrogen is the only approved pressure medium for Hyson Products' nitrogen systems. The use of air and other gases may result in serious injury. Use Nitrogen in well ventilated areas only.

How to Purchase Nitrogen Gas

Nitrogen gases that are available from industrial gas suppliers are nitrogen pumped with oil and nitrogen pumped with water. Nitrogen pumped with water is a clean gas that is recommended by Hyson Products for all our gas springs and manifolds.

The Compressed Gas Association has developed a set of standard nitrogen bottle fittings they recommend.

| | | |
|---|-----------------------------------|---------|
| Recommended | 0-3000 Nitrogen Pumped w/Water | CGA-580 |
| Recommended | 3000-5500 Nitrogen Pumped w/Water | CGA-680 |
| <i>Contact local gas supplier for additional fittings</i> | | |

Please note that these are standard nitrogen bottle fittings in the United States and may vary in foreign countries.

For proper bottle fittings and gas, please contact your industrial gas supplier.

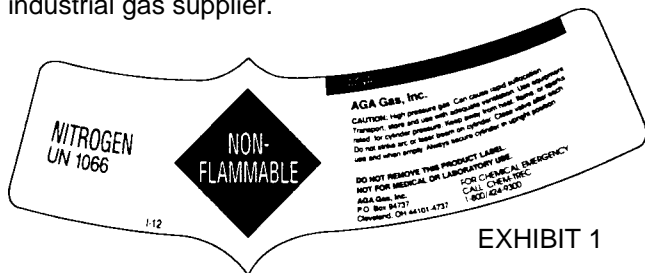


EXHIBIT 1

All bottles should be capped and have proper labels (see exhibit 1). Do not accept any nitrogen bottles that do not conform to these specifications.

Nitrogen Bottle Storage

Nitrogen bottles should be properly stored - capped, upright and secured to prevent falling - in an area designated for nitrogen gas bottles only. Nitrogen bottles should also be properly labeled by the supplier(see exhibit 2). All empty nitrogen gas bottles should be returned to your supplier in a timely manner.



EXHIBIT 2

If this label does not appear on your nitrogen gas bottle, contact your supplier.



Nitrogen System Safety

Safety Features

Safety Features

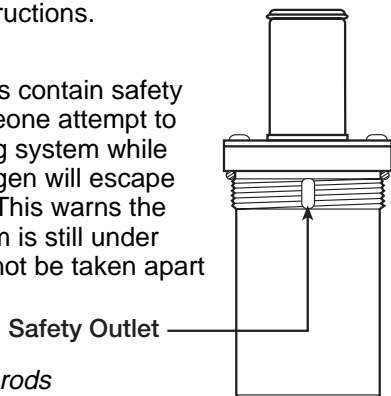
Safety is a key component in the design and production of all Hyson products. Safety features include:

1. Safety Factor

All nitrogen system components are designed and/or tested to assure an adequate structural factor of safety. As with all nitrogen systems, read and follow all operating and maintenance instructions.

2. Safety Groove

All gas springs threads contain safety grooves. Should someone attempt to dismantle a gas spring system while it is pressurized, nitrogen will escape through the grooves. This warns the person that the system is still under pressure and should not be taken apart until discharged.

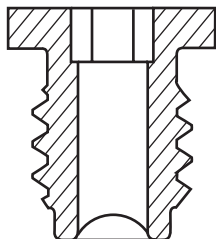


NOTE: All gas spring rods should be retracted before servicing.

3. Safety Rupture Discs

All Hyson Products manifold and hose & tank systems utilize safety rupture discs. They perform like a fuse in an electrical system. If the nitrogen system becomes over pressurized, the disc bursts open and safely exhausts all the pressure from the system.

To ensure safety, it is important to determine the cause of excessive pressure when a safety rupture disc bursts. Correcting the problem will prevent future ruptures and reduce safety risks.



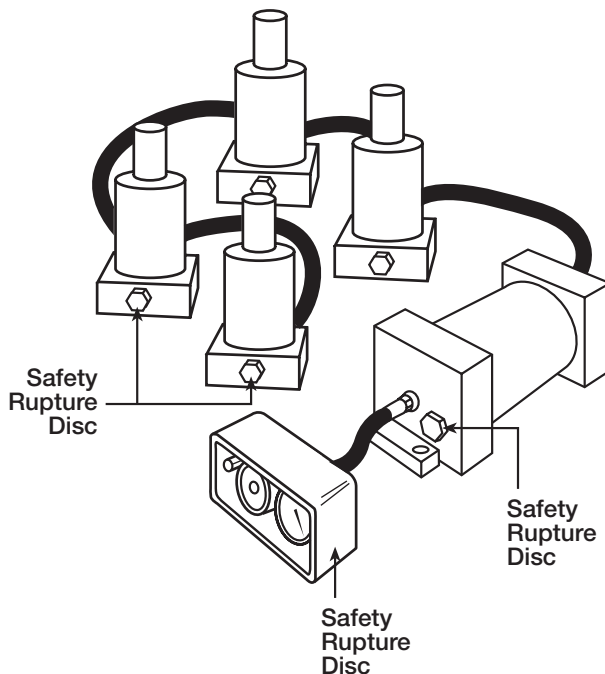
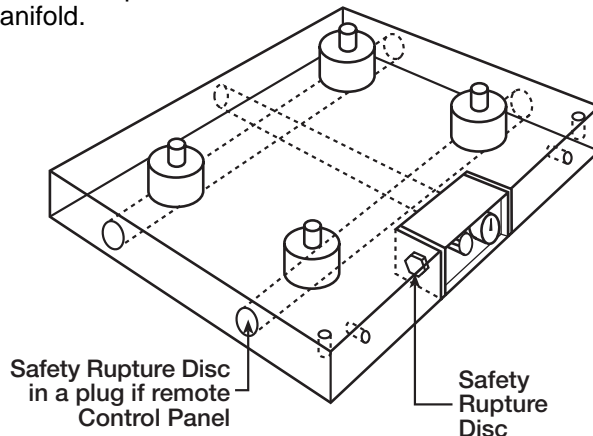
Never use a pipe plug or higher rated disc in place of a safety rupture disc. This could result in serious injury, as well as cause damage to the nitrogen gas spring system. Always remove a disc once it has ruptured and replace it with a new one.



Safety Rupture Disc Locations

Manifold System

The safety rupture disc is located on the control panel, when it is bolted to the manifold plate. When the control panel is mounted remotely, rupture discs are installed in both the control panel, and the manifold.



Hose and Tank System

In a hose and tank system, a rupture disc is located on each major component – the tank, the control panel and on each base mounted gas spring.

Nitrogen Manifold System Design

To ensure product safety, Hyson Products reviews all manifold designs prior to manufacturing. The following areas are reviewed:

1. Structural Integrity

All manifolds are reviewed to ensure the gas springs and volume drilling are designed to meet minimum distances for center to center and distance from an edge or die related machining. Also reviewed are the intersections to ensure appropriate thread engagement.

2. Pressure Rise

The manifold pressure rise is calculated to ensure it meets the customer specifications, if known. If the pressure rise is not specified, the system is designed to a pressure rise of 15-20% unless unachievable with the areas available for volume.

3. Control Panels

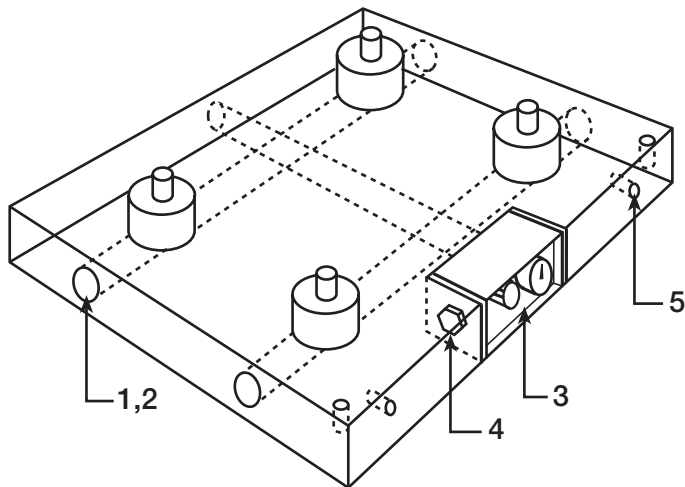
Hyson Products recommends recessing the control panel when possible. This is done to help protect the panels from potential damage when handling the manifold or die.

4. Rupture Discs

All manifolds have rupture discs incorporated into their design. The rupture disc is located in the control panel if mounted directly to the plate. It can be installed in a plug or its own port, if the control panel is remotely connected with a hose.

5. Handling Holes

Handling holes are included on all manifold designs and sized appropriately for the nitrogen system weight. Handling holes are not sized to handle the entire die weight unless specified.

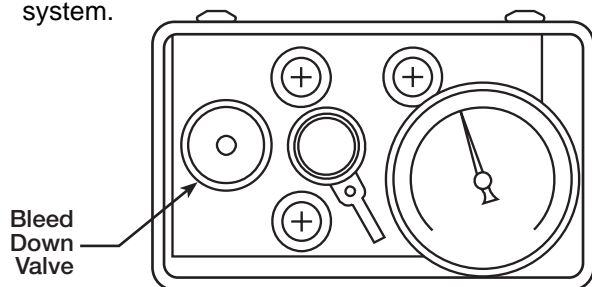


Nitrogen System Service

Before servicing a nitrogen system, exhaust all nitrogen.

If a control panel is directly connected to the pressure system (i.e. manifold system, hose and tank system, cushion, Tanker system mode), follow these steps:

1. Turn the bleed down valve on the control panel counter clockwise. Nitrogen should begin to exhaust from the system.



(This is a representative control panel)

2. When the gauge reads zero, manually depress gas spring piston rods. This ensures that all of the nitrogen gas has left the system. (see note.)

NOTE: *We do not recommend depressing the piston rod with your hand. Place a block of wood between the rod and your hand. The piston rods may pop up after being manually depressed. This is common with some gas springs, and does not indicate gas pressure inside the system.*

Nitrogen Gas Spring Installation

Prior to installing gas springs in a manifold plate, inspect the gas spring and plate threads to insure they are of the same size and type (Metric or English).

⚠ Warning: *Never mix thread types. The gas spring or plug could become damaged and be ejected from the port at high speed during gas charging which may cause equipment damage or serious injury.*

Manifold gas spring and port plugs are available in both English and Metric threaded versions and may appear to be very similar in size. If there is any doubt, please contact Hyson Products Customer Service.



Worker Education

Information is the key to safety. The more people know about the operation and maintenance of a nitrogen system, the safer their work environment.

Hyson Products can assist in educating workers through:

- Safety Seminars
- Nitrogen Gas Spring System Video Tapes
- Safety Posters

Product Labeling

Product labeling is used to communicate the importance of safety to users. Hyson Products labels all primary nitrogen system components (i.e. Tanker gas springs, manifold plates) with important safety instructions.

Labels are prominently displayed and are easily readable. The colors, titles and symbols comply with ANSI Z535.4-1991 and meet government safety regulations.



Nitrogen System Safety

*Charging/Exhausting/Shipping & Handling
a Nitrogen System*

Charging a Nitrogen System

Hyson Products recommends the use of the NCA-2000 regulator assembly which is approved for nitrogen systems. The NCA-2000 regulator assembly is provided with a CGA 580 bottle connection fitting.

NOTE: *When charging, adjusting, or exhausting any nitrogen system, eye and hearing protection are required. Also, when initially charging, open hose valve slowly until all rods are extended.*

After attaching the regulator assembly to the nitrogen supply bottle, close the charging hose valve. With the charging hose valve closed and with a firm grip on the charging hose, open the valve on the nitrogen bottle.

NOTE: *Prior to charging any nitrogen system inspect all components for damage, looseness and proper installation including gas springs, hose fittings, plugs, and connections.*

Check the control panel bleed down valve to insure it is closed. The nitrogen system is now ready to be charged. Set the pressure regulator to the correct pressure for your system prior to attaching the charging hose to the nitrogen system. If you are unsure of your system pressure rating, consult the product label, the Maximum Operating Pressure Table below or contact Hyson Products Customer Service (800-876-4976).

NOTE: *When charging a system, pressure should be applied to the system slowly by gradually opening the hose valve allowing all piston rods to extend slowly.*

Attach the charge hose to the nitrogen system and **slowly** open the hose valve. Caution should be observed for loose components, fittings, and leaks. When the desired pressure is reached close the valve on the charge hose and bottle. Grasp the charge hose firmly prior to disconnecting the hose. Exhaust pressure from the hose assembly after disconnecting it from the nitrogen system and the supply bottle by opening the bleed down valve. Store in a safe and secured area.

| Maximum Operating Pressure | PSI | BAR |
|--------------------------------|------------|-----|
| T2-90 | 2610 | 180 |
| T2-180 | 2610 | 180 |
| T2-750 thru T2-7500 | 2175 | 150 |
| T2SC | 2175 | 150 |
| TNK 400 thru TNK 9 | 2000 | 138 |
| *Low Pressure Manifolds | 1500 | 103 |
| *High Pressure Manifolds | 2000 | 138 |
| Hose/Tank Systems | 1500 | 103 |

** Please refer to manifold warning tags if assistance is required in determining manifold type.*

NOTE: *Refer to catalog sections for additional pressure information.*

Exhausting a System

Open exhaust valve on control panel slowly (hearing protection is required). When gas is exhausted manually cycle piston rods. Piston rods should move freely without much resistance. (Gas springs may have a vacuum between piston and rod scraper.) Removal of gas springs while under any pressure could result in serious injury.

Shipping and Handling

The manifold systems are carefully crated, to prevent damage. Gas springs and system components are shipped in sturdy packing boxes.

If a box or crate appears damaged, inspect the components carefully. Products that have been dented, cracked or damaged in some other fashion, should not be used. Contact Hyson Products for replacement. Also immediately check components against the packing list. Any discrepancies should be brought to the attention of Hyson Products Customer Service Department.

Once the gas spring or pressure system has been removed from its packaging, it must be properly stored. Hyson Products strongly urges users to store their nitrogen system uncharged, until it is ready to be installed in the die.

The storage area should be clean and well organized. It is important to protect the nitrogen system from damage.

Remember, if a gas spring or pressure system appears to be damaged in any way, contact Hyson Products before use.

