Overload Protection System

As designed, the system enables controlled exhaust between the seal and the piston rod via an integrated safety stopper and a specially engineered guide rail.

The benefits you bring

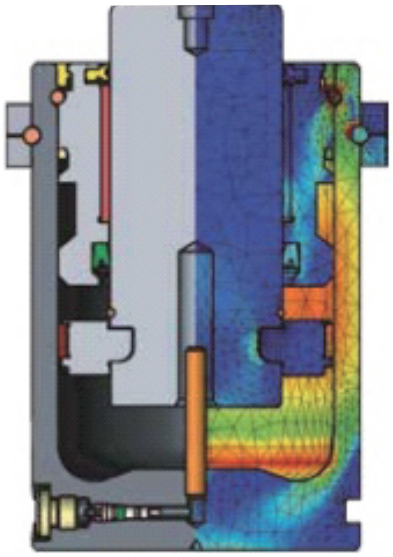
If the cam or mold part driven by the pneumatic spring becomes jammed, this feature reduces the risk of mold damage or personnel injury.

Overpressure Protection System

According to the design, the BBK-JINGBA overpressure protection system can discharge excess air pressure in a controlled manner.

The benefits you bring

When the internal pressure exceeds the maximum allowable limit, this feature reduces the risk of component damage or personnel injury.



The Principle That Has Been Consistently Upheld Since Its I ntroduction in 2008

BBK-JINGBA Training Program

Training

It is essential to understand the most fundamental knowledge of pneumatic spring technology, both theoretically and practically. This foundational knowledge, combined with training for more advanced products, constitutes the core of the BBK-JING BA training program.

The benefits you bring

Training is a tool for maintaining high quality, continuous improvement, and ensuring revenue. It is essential to fully understand and recognize the importance of safety and reliability performance; the training program of BB K-JING BA is undoubtedly the best and most innovative approach.

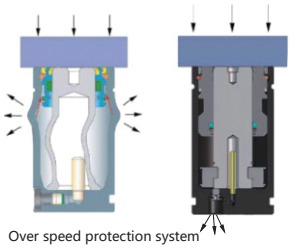
BBK-JINGBA Safety Application

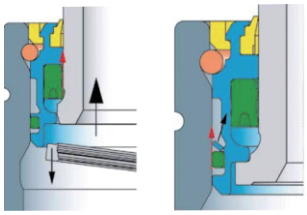
Safety App

Pseudo-defective products may pose hazards. By using the BB K-JING BA Safety Procedure, you can identify, verify, and manage your BB K-JING BA pneumatic springs, thereby avoiding unnecessary risks.

The benefits you bring

Our BB K-JING BA Safety Application can assist you in creating a safer work environment. For more information, please refer to the documentation.





The safety features of the BBK-JINGBA reduce the risk of product damage and personnel injury

Overload Protection System

According to the design, when an over travel phenomenon occurs, the air pressure spring deforms and releases pressure in a predefined manner.This provides you with the following benefits.

When the pneumatic spring exceeds its set limit, this feature reduces the risk of mold damage or personnel injury caused by component separation due to excessive pressure.

Certified by PED as Capable of Performing 2 Million Strokes

BB K-JING BA The pneumatic spring was designed, manufactured, and tested in accordance with PED 9 7/2 3/EC standards and can withstand 2 million complete strokes.

The benefits you bring

BB K-JING BA products are PED-certified to withstand 2 million strokes, a feature that ensures a safer component service life under maximum operating conditions.

G3 T System

Our G3T system
It can buffer the movement of the side actuator rod, reduce friction, and lower operating temperatures.

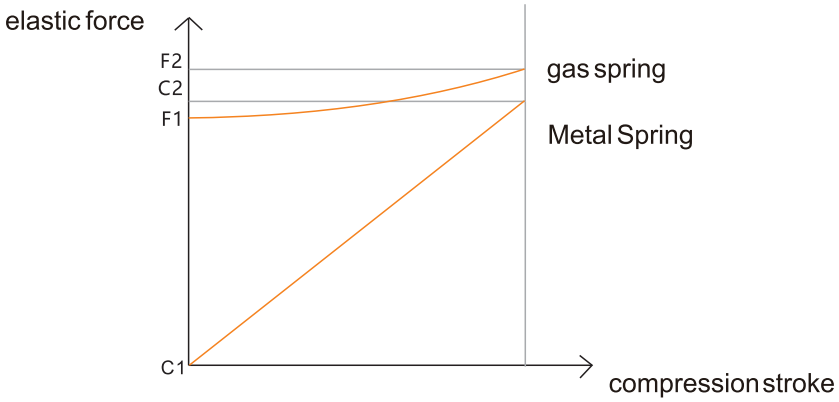
The benefits you bring

This extension increases the service life, allows for a higher number of strokes per minute, and enables greater lateral movement of the module.

Summarize

I. Mold-Specific – Nitrogen Spring

The specialized nitrogen spring for molds (abbreviated as punch mold nitrogen spring, nitrogen spring, nitrogen cylinder, or nitrogen cylinder) is a novel elastic component operating with high-pressure nitrogen as its working medium. It features compact size, high elastic force, long stroke, smooth operation, precision manufacturing, extended service life (up to one million cycles), and a smooth elastic force curve. Unlike conventional elastic components such as metal springs, rubber springs, or air cushions, this spring exhibits superior performance characteristics that compensate for their limitationsenabling it to perform tasks beyond the capabilities of traditional components. It simplifies mold design and manufacturing, facilitates mold installation and adjustment, prolongs mold service life, and ensures consistent product quality. The spring can be installed as an independent component within molds or integrated into a nitrogen spring system as part of the mold assembly, allowing precise control of constant elastic force and delayed actuation. Representing a new generation of ideal elastic components, it combines multiple advanced performance advantages.



Comparison chart of elastic curves

II. Basic Terminology for Mold-Specific Nitrogen Springs

1. Nominal spring pressure F: This refers to the initial pressure of this series of nitrogen springs at 20° C when the inflation pressure is 15 MPa. Unless otherwise specified by the user, all initial spring pressures are manufactured according to the nominal value. The nominal spring pressures for springs within the same series are identical.

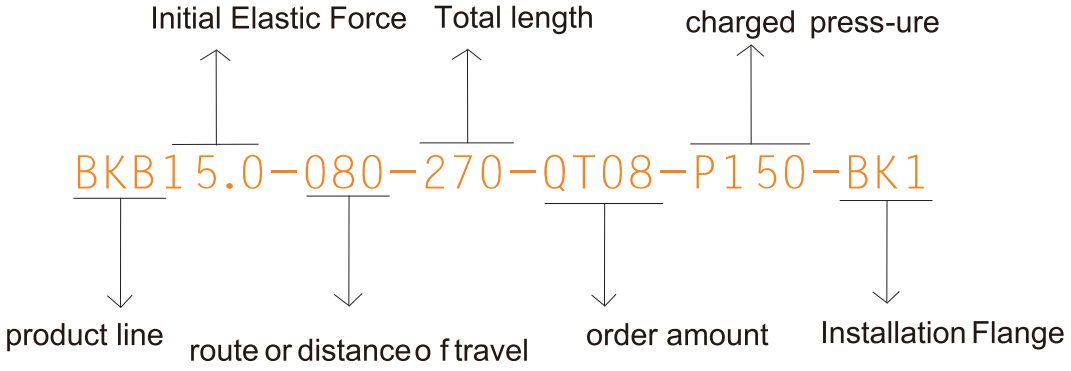
2. Stroke S: Refers to the working stroke of this nitrogen spring model. These strokes can be fully utilized; however, to prevent unexpected overload due to excessive travel during mold replacement or debugging, it is recommended to reserve a safety stroke of ≤5 mm or 10% S in the design.

3. Total length L: Refers to the manufacturing length of this nitrogen spring model, i.e., its maximum length in the natural state, which must meet the following requirements:

The total length L is greater than or equal to the base length J plus 2 times the stroke S.

4. Service Life: Under correct installation and proper use, the service life of a nitrogen spring (with stroke ≤50 mm) exceeds 1 million cycles. For strokes ≥50 mm, the lifespan is calculated based on the actual cumulative stroke of approximately 100,000 cycles, i.e.: Service life = 100,000 meters ÷ (actual travel distance × 2)

III. Method for Identifying Model Parameters of Nitrogen Springs



Example: BKB15.0-080-270-QT08-P150-BK1

This is a nitrogen spring specifically designed for the "ISO Standard Type" mold, with a nominal spring force of 15.0 KN (i.e., 1.5 T), a stroke of 80 mm, and a total length of 270 mm in its natural state. The piston rod diameter is 36 mm, and the working cylinder outer diameter is 75 mm. The nitrogen springs are connected into a system via piping (this specification may be omitted when used independently). The installation accessory used is the BK1 base groove pressure plate model (this specification may also be omitted if the installation accessory is not ordered or is ordered separately). The inflation pressure is 15 MPa (this specification may be omitted when using 15 MPa or when employed as part of a system).

IV. Characteristics of Nitrogen Springs

I.Durable

The product piston rod is precision-machined, featuring excellent wear resistance with a surface hardness exceeding HV1000 and an HRC hardness above 40, while achieving a surface finish accuracy below Ra0.02μm. The combination of high-quality piston rods and world-class TSS sealing components ensures the long service life of the nitrogen spring. The product has been tested by the National Automotive Quality Supervision Center and meets all quality standards; after completing its effective stroke, the pressure reduction rate remains below 5%, fully complying with international specifications.

II.Can reduce costs

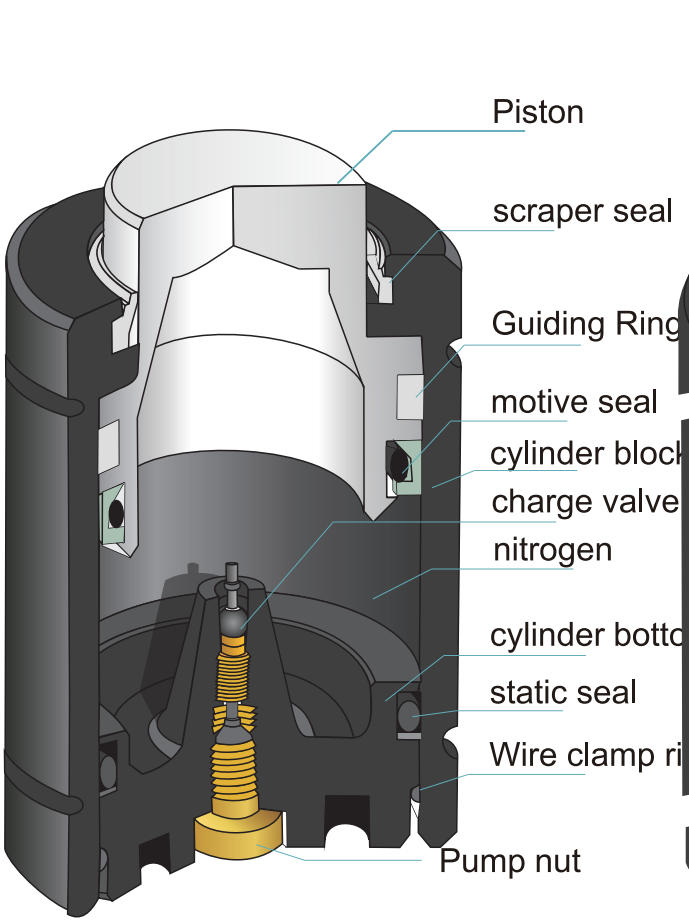
This nitrogen spring features compact size, high elastic force, long service life, and constant elastic pressure. Its compact size saves mold space, the high elastic force reduces the number of springs required, and its long service life decreases the frequency of mold maintenance, thereby lowering the overall mold cost.

III.Absolute Safety

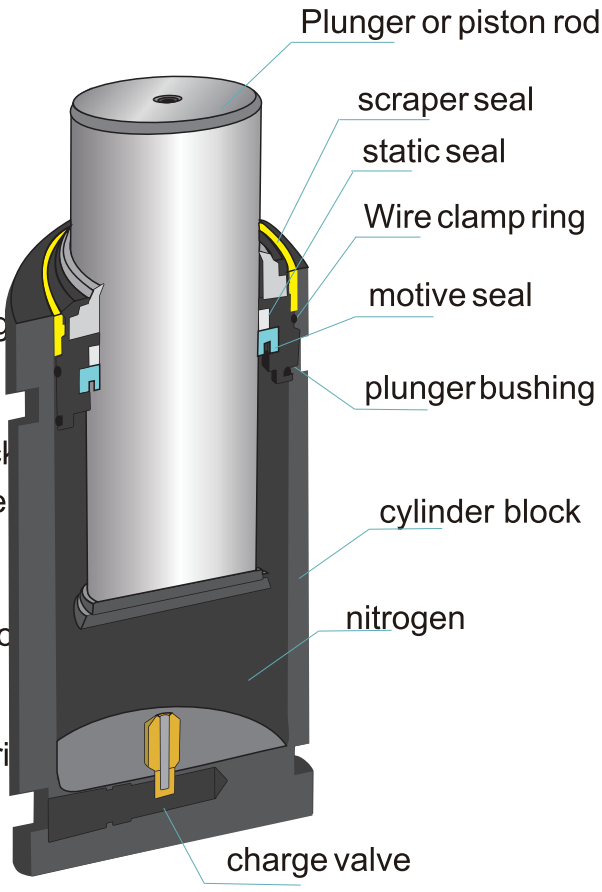
The product design prioritizes safety comprehensively, incorporating safety pressure relief grooves for improper use under unconventional conditions. Compared with the pipe welding molding process employed in other products, our company utilizes an integral cutting molding method and a fully automated proprietary welding process, ensuring the product's safety and reliability.

Nitrogen spring structure

They are mainly divided into two major categories: the plunger seal series and the piston seal series.



Piston-sealed nitrogen spring



Plunger-sealed nitrogen spring

Product Type

Nitrogen Gas Spring Product Type:

1. ISO International Type BKB: Initial compression force range —— BKB450N - 100KN
2. Compact Structure Type: Initial compression force range —— BKJ1700N - 75KN
3. Extremely Short and Powerful Type: Initial compression force range —— BKC1700N - 200KN
4. Slim and Powerful Type: Initial compression force range —— BKH5000N - 183KN
5. New High-Pressure Nitrogen Gas Spring Compatible with Mitsumi and Italian Bonti: —— BKN/BKQ6 - 80KN

Note: The above five series are the commonly used varieties internationally, especially in the automotive mold industry, they can basically meet the needs of various types of molds. The ISO standard type is fully in line with the ISO11901 helium gas spring international standard, and has complete interchangeability with foreign products such as Swedish KALLER, DADCO, HYSON, QUIRI, etc.

1. BKB Series:

This is the national standard type and also the world's first nitrogen gas spring series. All dimensions comply with the ISO 11901 standard for nitrogen gas springs.
Spring force: 45KGF - 1000KGF
Stroke: 10mm - 300mm
Maximum strokes per minute: approx. 15-40 (at 20°C)

2. BKJ Series:

This series is shorter than BKB, but can provide the same force as BKB.
Spring force: 170KGF - 7500KGF
Stroke: 10mm - 125mm
Maximum strokes per minute: approx. 30 (at 20°C)

3.BKC Series:

This is the world's shortest nitrogen gas spring with piston seal and the highest spring force. It features bottom mounting and a side gas charging port, which can be connected via a piping system.
Spring force: 250KGF - 20000KGF
Stroke: 10mm - 125mm
Maximum strokes per minute: approx. 20-80 (at 20°C)

4.BKH Series:

This series of nitrogen gas springs has a smaller cylinder outer diameter yet can deliver high spring force.
Spring force: 470KGF - 18300KGF
Stroke: 6mm - 50mm
Maximum strokes per minute: approx. 50 (at 20°C)

5.BKN High-Pressure Powerful New Series:

Spring force: 300KGF - 2000KGF
Stroke: 10mm - 100mm
Maximum strokes per minute: approx. 6-50 (at 20°C)

6.BKP High-Pressure Powerful New Series:

Spring force: 150KGF - 300KGF
Stroke: 10mm - 80mm
Maximum strokes per minute: approx. 6-50 (at 20°C)

7.BKQ High-Pressure Powerful New Series:

Spring force: 600KGF - 8000KGF
Stroke: 10mm - 80mm
Maximum strokes per minute: approx. 6-50 (at 20°C)

Type Comparison

BKB - ISO international standard type

1. It is the most commonly used typical type. All technical parameters comply with the ISO11901 nitrogen gas spring international standard and the national standard of our country, and also meet the standards of nitrogen gas springs of companies such as FORD-WDX3560 (Ford), GM-M-150 (General Motors), and Renault (Renault).
2. It has complete interchangeability with similar products from abroad, such as Kaller, Dadco, and Hyson.
3. It is usually used in a system, and the pressure adjustment is very convenient. It can also be used independently.
4. Regardless of the length of the working stroke, it shows very good stability.

BKJ - Compact Structure Type

1. It is a type that is highly favored by mold designers. It has a shorter base length compared to BKB, thus reducing the overall length and design height of the mold. It is the preferred variety for nitrogen gas springs specifically used in molds.
2. It has a high degree of interchangeability with similar products from abroad.
3. It is usually used independently in molds, and installation is very simple. When the elastic force is ≥ 5000N, it can also be used in a system.
4. When the working stroke is not too long, its performance in all aspects is no less than the BKB-ISO standard type.

Spring pressure N	Outer diameter of the working cylinder(mm)	Outer diameter of the piston rod(mm)	Base length(mm)	Stroke range(mm)	Outer diameter of the working cylinder(mm)	Outer diameter of the piston rod(mm)	Base length(mm)	Stroke range(mm)
450	12	6	42	10-100				
750	19	8	42	10-100				
1700	32	12	50	10-125	25	12	42	10-125
2500	38	15	50	10-125	38	15	40	10-125
5000	45	20	85	13-160	45	20	50	10-125
7500	50	25	95	13-200	50	25	50	10-125
10000	63	30	100	13-200	63	30	55	10-125
15000	75	36	110	15-250	75	36	60	10-125
24000	88	45	110	20-300	88	45	65	10-125
30000	95	50	120	20-300	95	50	70	10-125
42000	113	60	120	20-300	113	60	75	10-125
50000	120	65	140	25-300	120	65	80	10-125
66000	140	75	140	25-300	140	75	85	10-125
75000	150	80	155	25-300	150	80	95	75000
100000	195	95	160	25-300				

Total length L = Base length + 2X travel distance S Lmin = Base length + travel distance S

Interchangeable brands:
Kaller——TU
Dadco - 90.10 Hyson——T2ISO
Quiri——RG
Misumi——RGK

Interchangeable brands:
Kaller——K
Hyson——T2L
Quiri——RGH
Dadco - 90.9 and L

BKC\CG - Ultra-short high-strength type

1. It is a newly developed type, which is the shortest in length among all the current nitrogen spring models in the family. At the same time, it has a smaller outer diameter than other types of nitrogen springs (except BKH), so it is small in size but powerful. When the height space and the circumferential (radial) space of the mold design are both strictly limited, it is the preferred variety for mold designers.
2. It also has a high degree of interchangeability with similar products from abroad.
3. It is generally used independently and the installation is very simple.
4. When the working stroke is not too long, its performance in all aspects is not inferior to BKB - the ISO standard type.

BKH - Ultra Fine Strength Type

1. It is a piston-sealed type with an outer diameter that is even shorter than the ultra-short type. The output force is very large and it objectively exists. It is the preferred type when the designers are constrained by strict requirements in the circumferential (radial) space.
2. It has a high degree of interchangeability with similar products from abroad.
3. It is usually used independently and the installation is very simple. It can also be connected to form a system (an additional base is required).
4. The working stroke is generally no more than 50mm and its performance in all aspects is not inferior to the BKB-ISO standard type.

Spring pressure N	Outer diameter of the working cylinder(mm)	Outer diameter of the piston rod(mm)	Base length(mm)	Stroke range(mm)	Outer diameter of the working cylinder(mm)	Outer diameter of the piston rod(mm)	Base length(mm)	Stroke range(mm)
450								
750								
1700								
2500	32	15	30	10-100				
5000	38	20	30	10-125	25	15-20	45	6-50
7500	45	25	32	10-125	32	20-25	45	6-50
10000	50	30	38	16-125	38	20-30	70	6-50
15000	63	36	44	16-125	50	30-40	50-70	6-50
24000	75	45	45	16-125				
30000	88	50	55	16-125	63	45-52	55	10-50
42000	95	60	58	16-125				
50000	113	65	65	16-125	75	50-63	50-90	10-50
66000	120	75	68	16-125				
75000	140	80	75	16-125	95	60-80	60-105	10-50
120000					120	75-100	70-110	10-50

Total length L = Base length + 2X travel distance S Lmin = Base length + travel distance S
Total length L = Base length + 3X travel distance S Lmin = Base length + 2X travel distance S

Interchangeable brands:
Kaller——TU
Dadco - 90.10 Hyson——T2ISO
Quiri——RG
Misumi——RGK

Interchangeable brands:
Kaller——CU4
DADCO---SC
Hyson——T2SC
Quiri——RGC

Advantages Over Helical Springs

1.Providing Greater Force in a Smaller Space

A compact nitrogen spring BKH50.0-025-135 (with a cylinder diameter of 75mm and a stroke of 25mm) is equivalent to 14 SSWH50-300 heavy-duty helical springs (with a diameter of 50mm, 20mm preload K=16.7, preload force = 20mm x 16.7 = 334 kgf, 4700/334 = 14 helical springs)
Advantages:
Reduce installation area: The nitrogen gas spring requires 44.16 square centimeters, while the helical spring requires 247.75 square centimeters, which is approximately 6 times more.
Lower installation height: The nitrogen gas spring cylinder only needs 135 centimeters, while the helical spring requires 280 centimeters.
Reduce installation space: The nitrogen gas spring only requires 596.16 square centimeters, while the helical spring requires 7963 square centimeters.
Compared to installing 14 helical springs, 1 nitrogen gas spring does not require preloading, guiding and positioning operations.

2.Under the Same Working Stroke Conditions, the Overall Height Is Significantly Reduced.

A short nitrogen spring BKJ5.0-080-210 (with a diameter of 45mm, a stroke of 80mm, and a total height of 210mm, and a final pressure of 636kgf) is equivalent to a medium-load helical spring, with a diameter of 63mm, a working stroke of 80mm, a total height of 305mm, and a final spring force of 518kgf.
Advantages:
The same working stroke and elasticity, the height has been significantly reduced.
This makes the mold structure more compact and lowers the cost.

3.Has a Larger Initial Load

When the nitrogen gas spring comes into contact with the mold, it can provide a large known initial force ranging from 45 daN (for BKB0.45 with a cylinder diameter of 12mm) to 18300 daN (for BKB180.0 with a cylinder diameter of 150mm). However, a pre-load pressure is required for the helical spring to achieve this initial force.
Advantages:
Nitrogen springs do not require pre-load
The installation of nitrogen springs is simpler and faster, reducing costs

4.Balance and Control Elasticity

After the nitrogen gas springs are connected into a pipeline system through hoses, the pressure of the gas inside each nitrogen gas spring is the same,
thus achieving balance for the entire system. This cannot be achieved by using helical springs because the force provided by each helix cannot be exactly the same.
Advantages:
Each contact point exerts an equal force - a balanced mold
The ejection force of the nitrogen spring can be set as needed - facilitating production
The internal gas pressure of the system can be monitored at any time - resulting in high-quality parts
No need for mold repair, no production halt, prolonging the lifespan of the punch and other components, and reducing costs

5.Adjustable Pressure

The initial force of the nitrogen gas spring can be adjusted by changing the internal gas pressure. For pipe connections, the pressure can be controlled (with a maximum pressure of 150 bar) to achieve the adjustment. However, the force of the helical spring is not adjustable.

method of erection

The nitrogen springs specifically designed for molds are high-pressure sealed components that undergo rigorous inspection and testing before leaving the factory, ensuring zero gas leakage. Therefore, proper installation and usage by customers are essential to guarantee their safety, reliability, and optimal service life.

1. When the dedicated nitrogen spring for molds is used as an independent component, it generally requires no disassembly or maintenance during its service life after installation in the mold.

2. When nitrogen springs are used in a system, they generally require guidance from specially trained personnel or professionals. Special attention must be paid to ensuring that the nitrogen within the cylinder is not fully released before any disassembly or maintenance is performed, to prevent accidental incidents.

3. The screw at the lower end of the nitrogen spring dedicated to the mold primarily serves to protect and reinforce the seal; it must not be removed or struck arbitrarily.

4. Recommended working stroke ≤ 0.9 XS (manufacturing stroke)

5. The working base contact pressed by the upper end of the piston rod should not deviate from the piston rod axis by more than 1° (i.e., it must remain perpendicular; eccentric loading is strictly prohibited).

6. The direction of motion of the working part at the upper end of the piston rod must be parallel to the direction of piston rod movement.

7. After compressing the nitrogen spring, do not allow the piston rod to return freely to its original position, as this may cause internal damage to the nitrogen spring.

8. Maintain cleanliness on the cylindrical surface of the piston rod, avoid scratches, and strictly refrain from striking the magnetic impactor.

9. It is strictly prohibited to expose nitrogen springs to direct sunlight or high-temperature environments. The maximum allowable temperature is +80°C (with exceptions for specially designed heat-resistant nitrogen springs).

10. The nitrogen springs specifically designed for molds should be stored in a dry, well-ventilated environment free from corrosive gases, with proper packaging. After unpacking and installation, if the springs will not be used for an extended period, apply a protective grease coating to the surface to prevent corrosion.

pour：

The nitrogen gas springs specially designed for molds produced by our company have all undergone strict quality inspections. Under normal and reasonable usage conditions, within one year or for reciprocating motion (with a stroke of ≤ 50mm) of 1 million times, our company will be responsible for free warranty service. Moreover, we will provide lifetime maintenance for our mold-specific nitrogen gas spring products.