Pascal N2 gas springs
N2 gas

Ensures high grade of the parts
springs

with high degree of accuracy
N2 gas springs model list at a glance

**Standard model**
- Model DNK
- Model DNK4200-50
  - Initial force 42.4 kN

**Compact body**
- Model DNR
- Model DNR4200-50
  - Initial force 42.4 kN
High power, short stroke

model DNP

model DNP4700-25
Initial force 46.8 kN

Long stroke

model DNA

model DNA3000-200
Initial force 29.5 kN
mini gas springs model list at a glance

Large diameter rod  High initial force

model DSD

model DSD38-25
Initial force 10.3 kN

Piston rod
Dust seal
Rod guide
Rod seal
Check valve

Rod seal
Rod guide
High durability against side-load

model **DSA**

model **DSA38-25**
Initial force 7.98 kN

Compact body

model **DSC**

model **DSC38-25**
Initial force 7.98 kN
micro hose system

It is high pressure gas piping system that is developed exclusively for N2 Gas spring. The micro hose system enables to install gas springs easily, securely and quickly.

micro hose

The hose is connectable just by tightening with fingers.

- Tools are not required for connecting micro hose. (Tool less)
- It can be tightened easily and quickly by hand.
**Structure of micro hose**

The hose will not loose even under high to vibration environments and maintains a secured sealing for a long term by adopting buttress thread and locking O-ring.

**Specification of micro hose**

<table>
<thead>
<tr>
<th>Fluid used</th>
<th>N2 (Nitrogen) gas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proof pressure</td>
<td>42MPa (50°C)</td>
</tr>
<tr>
<td>Operating</td>
<td></td>
</tr>
<tr>
<td>temperature</td>
<td>0 ~ 70°C</td>
</tr>
<tr>
<td>Inside diameter</td>
<td>ø2mm</td>
</tr>
<tr>
<td>of hose</td>
<td></td>
</tr>
<tr>
<td>Outside diameter</td>
<td>ø5mm</td>
</tr>
<tr>
<td>of hose</td>
<td></td>
</tr>
<tr>
<td>Minimum bending</td>
<td>R20mm</td>
</tr>
<tr>
<td>radius</td>
<td></td>
</tr>
</tbody>
</table>

| Material         | Hose core, outer coating :  |
|                  | Polyamide resin             |
|                  | Reinforcing layer : Aramid  |
|                  | fiber                       |

Proof pressure varies according to the temperature of hose:

- 0°C : 51 MPa
- 30°C : 46 MPa
- 50°C : 42 MPa
- 70°C : 38 MPa

- Sealing tape or agent should not be used for hose adaptor (gas pressure shall be sealed by packing).
- The hose adapter must be installed by the tools.
- The hose nut must be tightened till O-ring (for lock) is securely compressed.

**O-ring**

Built-in O-ring can positively seal the fluid and sealing ability can stably maintained regardless of the quality of operator or circumstances. Also sealing performance will not change even after repetitive connection/disconnection work.

**Buttress thread**

The buttress thread with an unique inclination has a strong resistance against the strong vibration and the nut will not easily loosen even by the vibration of press machine.

**Steel ball**

Steel balls in the nut can reduce the friction and enable the nut tighten/loosen smoothly.
Swivel adapter

Finger adjustable hose adapter without applying any excessive force to the hose.
Tips for swivel adapter mounting

1. Mount a swivel adaptor on gas spring.

2. Mount a hose on swivel adaptor. The angle of hose is adjustable easily by turning a adaptor.

Other Piping parts

- micro hose
- Straight adapter
- Swivel adapter
- Multi coupling block
- Control panel
- Hose clip, Plug
Practical example of N₂ gas springs

Model **DNK** in the steel die

For die (Press machine)

Mini N₂ gas spring in the upper die

Mini N₂ gas spring in the lower die

Mini N₂ gas spring

Workpiece

Upper

Lower

Up

Upper

Lower

Mini N₂ gas spring

Workpiece
Practical example of N₂ gas springs

Model DNK in the casting die with piping

Mini N₂ gas spring in the upper and lower die

Ejector Plate for quick reaction
Pascal N₂ gas spring contains a stronger force rather than an ordinary coil spring and exhibits excellent characteristics and durability on the application that requires a large load and stroke.

<table>
<thead>
<tr>
<th></th>
<th>Initial deflection</th>
<th>Initial force</th>
<th>Stroke</th>
<th>Durability</th>
<th>Maintenance</th>
<th>Space-saving</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas springs</td>
<td>○ (Not required)</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○ (Easy)</td>
<td>○</td>
</tr>
<tr>
<td>Coil springs</td>
<td>× (Required)</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>× (It takes effort)</td>
<td>×</td>
</tr>
</tbody>
</table>

**Mini N₂ gas spring**

* DSD38-20 × 1 unit

**Coil springs**

* ø40 × 150 × 10 units

Load comparison between model DSD and coil spring
Pascal traveling clamp

A die clamping system which has changed considerably the stamping style in the world.
34,000kN (3,400 tonf) Transfer press

23,000kN (2,300 tonf) Transfer press

6,000kN (600 tonf) Transfer press

Pascal traveling clamp model TRA

- Sprocket
- Roller chain
- Hydraulic hose
- Air cylinder
- Base block
- Backward end detection proximity switches
- Die detection proximity switch
- Clamp plate
- Hydraulic clamp
Press mag clamp MGP

The magnet clamp enables the die change in one minute.

Pascal mag clamp is a die clamping system which absorbs and fixes the die with strong everlasting magnets (Neodymium magnet and Alnico magnet).
It is unnecessary to unify the die size and it can clamp instantly at one touch operation. Applying current is only when switching on and off. The electric power is not consumed during clamping and the die will not be fall down due to the power blackout. The clamping force works against the entire die surface, so it prevents the deflection and improves the quality of machined parts.
**Clamp (Magnetized)**

- Neodymium magnet: Super strong permanent magnet
- Alnico magnet: Polarity is inverted by electromagnetic coil
- Electromagnetic coil: Inverts the polarity of alnico magnet
- Magnet core: Powerfully adheres mold

**Unclamp (Demagnetize)**

- Electromagnetic coil is energized for 0.5 sec.
- Polarity of alnico magnet is inverted.
- Neodymium magnet and alnico magnet become homopolar.
- Magnet core becomes strong magnet to adhere the mold.

1. Electromagnetic coil is energized for 0.5 sec.
2. Polarity of alnico magnet is inverted.
3. Neodymium magnet and alnico magnet become homopolar.
4. Magnet core becomes strong magnet to adhere the mold.

---

2,000kN (200tonf) High velocity press machine
Press mag clamp

800kN (80tonf) Press Press mag clamp

4,000kN (400tonf) Transfer press
Press mag clamp & TXA
The Proposal instead of moving bolster

1,000 unit sales
For space and cost saving

Stamping Die changer
3,000kN press  5 ton × 2 dies
Roller table with swing arm, independent pusher

- Roller arm
- Roller table
- Stopper pin
- Guide
- Cableveyor
- Die stopper
- Pusher head
- Pusher stand
Stamping Die changer
3,000kN press  4 ton × 2 dies
With roller table and independent pusher

Die stage
6,300kN press  10 ton × 1 dies
With pusher and swing roller arm
Slide lock **PAT.**

The electric slide-fall protection system which eliminates the risk of physical injury accident or damages on the dies.
Distance to the slide at T.D.C with position upper limit

Limit switch for lock confirmation

Pin

Cam

Gear

Nut

Drive Motor with brake

Hydraulic Cylinder

Proximity switch for 90° rotation

Proximity switch for rod overstroke

Slide at T.D.C with position adjusted upper limit

Proximity switch for unlocking position

Screw rod (trapezoidal thread)

Stopper for rod overstroke

Stroke for head rotation

Head

VIEW: A

Lock stroke
JAPAN DOMESTIC LOCATIONS

**Head office / R & D center**
- Itami, Hyogo

**Plant**
- Oita
- Yamagata

**Sales office**
- Osaka, Hyogo
- Kumagaya, Saitama
- Atsugi, Kanagawa
- Nagoya, Aichi
- Yamagata
- Hiroshima

Oita plant

Yamagata plant
Pascal products are supporting...
automotive production lines in the world.