

# DADCO®

## Compact High Tonnage Nitrogen Gas Springs

## 90.9 Series



**The 90.9 Series is 63 mm – 77 mm (2.5" – 3") shorter than ISO Standard Nitrogen Gas Springs yet provides comparable life length.**



The global leader in nitrogen gas spring technology

Since 1958, DADCO has taken pride in being the cylinder source people turn to for both quality and service. DADCO's company motto, "Whatever It Takes To Satisfy Our Customers" serves as a guide for everything from product improvements and technological innovations to superior customer service. Headquartered in Plymouth, Michigan USA, DADCO has affiliates worldwide. This extensive range of coverage allows DADCO to assist in any way possible to ensure that customers are completely satisfied.

DADCO's products are approved and widely used in global operations for many industries including metal stamping, automotive, and plastic injection molding.



### Numerous Piping Options

Many customers have recognized the benefits of linking gas springs to monitor, control and adjust pressure from outside the die. With DADCO's 90.9 Series, piping gas springs is easy because every necessary tool or component is readily available. For additional information, refer to DADCO's Nitrogen Gas Spring Linked System Components Catalog.

### SMS®

For those instances where a customer prefers to have DADCO provide a finished system, several options are available. A popular option, DADCO's Sectional Mounting System (SMS®) includes cylinders mounted to a SMS® plate and linked using hose, fittings and a control panel. Shipped ready to install, customers find the SMS® to be a trouble free, cost-effective option. For additional information, refer to bulletin B09114.

### SMS-i®

Another option from DADCO is the Sectional Mounting System – Internal (SMS-i®). The SMS-i® consists of an internally piped plate with mounted cylinders. DADCO recommends using the SMS-i® as a cost-effective alternative to traditional manifold systems. For more information, request bulletin B07104A.

### Guaranteed Long Life

In factory testing and field experience, the service life of DADCO's 90.9 Series consistently exceeds one million strokes. This is supported by DADCO's written One Year / One Million Stroke *Gold Guarantee*. Contact DADCO for a customized copy.

### Warranty

DADCO warrants its 90.9 Series Nitrogen Gas Springs to be free from defects in workmanship or materials for a period of one year from date of manufacture.

### CAD Templates

DADCO's entire product line is available for download on-line and on DVD or CD-ROM in solid models and in several 2D CAD formats. For more information, visit our website [www.dadco.net](http://www.dadco.net) or contact DADCO.



### 90.9 Series

DADCO's 90.9 Series is 63 mm – 77 mm (2.5" – 3") shorter than the ISO Standard Nitrogen Gas Springs commonly used by industry. It offers the same flexibility found throughout the DADCO product line including a wide range of stroke lengths, five mount options, various piping methods, and a complete assortment of accessories. For smaller diameter compact springs refer to DADCO's LJ Series or U Series Catalogs.

Model	Diameter	Maximum Force on Contact
90.9.01500	75 mm (2.953")	15 kN (3432 lb.)
90.9.03000	95 mm (3.740")	30 kN (6619 lb.)
90.9.05000	120 mm (4.724")	50 kN (11187 lb.)
90.9.07500	150 mm (5.906")	75 kN (16946 lb.)

### Rapid Delivery

DADCO's modern 11,600 m<sup>2</sup> main production facility as well as satellite facilities permit the fastest deliveries in the industry. Products are available both directly and through a network of stocking distributors, providing worldwide support.

Application Examples

DADCO offers a variety of mount options to meet specific customer applications. Installation and fastening of the gas springs should take into consideration load support, fastener selection and torque values. For additional information on installation requirements see page 15. Cylinder and mount dimensions are shown on pages 4-11.

**TO Basic Model** in a flat bottom pocket. The pocket must be bored with a flat bottom, or a spacer must be used to create a flat surface.

**TO Basic Model** mounted inverted requires back-up to support the full load. Retain inverted cylinders tight in the pocket with the appropriate length cap screw to eliminate movement.

**TO Basic Model** mounted to a plate. Linked cylinders require clearance for the hose and fittings.

**B12** mounts must be fastened to the bottom groove only. Back-up is required to support the full load.

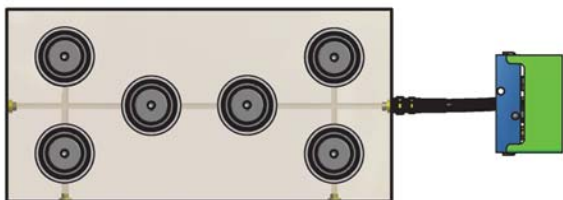
**B11** mounts may be attached from the top or base. Back-up is required to support the full load.  
*NOTE: Mount 90.11.07500 from top only.*

**B19** mounts require back-up to support the load.

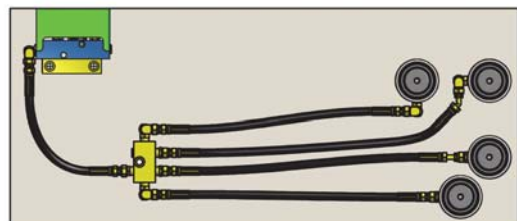
**B21/B25** mounts must be fastened to the top groove only. The wire ring supplied with mounts supports the full load.

**TO Basic Model** mounted in a horizontal pocket. Allow clearance in the rod pocket to avoid contacting the body of the cylinder during operation. Allow the rod to locate freely.

**SMS® / SMS-i®** DADCO offers customized Sectional Mounting Systems (SMS® and SMS-i®) which are fabricated to customer specifications, pressure tested and shipped ready to install.



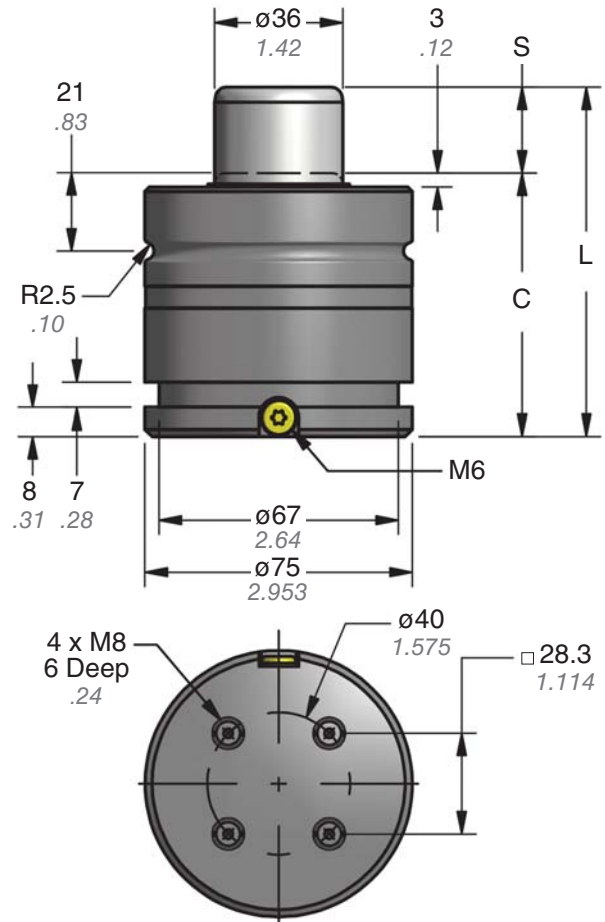
DADCO SMS-i® with (6) 90.9.05000 gas springs plumbed internally and connected to a control panel.



DADCO SMS® with (4) 90.9.03000 gas springs linked using 90.400 (Y-400) hose, fittings and a control panel.



TO – Basic Model



Part No.	S mm inch	C	L $\pm 0.25$ $\pm .010$
• 90.9.01500.025	25 0.98	73 2.87	98 3.858
• 90.9.01500.038	37.5 1.48	85.5 3.37	123 4.842
• 90.9.01500.050	50 1.97	98 3.85	148 5.827
90.9.01500.063	62.5 2.46	110.5 4.35	173 6.811
• 90.9.01500.080	80 3.15	128 5.04	208 8.189
90.9.01500.100	100 3.94	148 5.83	248 9.764
90.9.01500.125	125 4.92	173 6.81	298 11.732

• Preferred Sizes

### Ordering Example:

**90.9.01500.025. TO. C. 150**

**Part Number:**

Includes Series, Model and Stroke Length.

**Mount Option:**

TO = Basic Mount. *When not specified, default is TO.* Mounts ordered with cylinder will be attached at the factory.

**Mount Only Ordering Example:** 90.12.01500

**Charging Pressure:**

15–150 bar (220–2175 psi). *When not specified, default is 150 bar.*

**Operating System:**

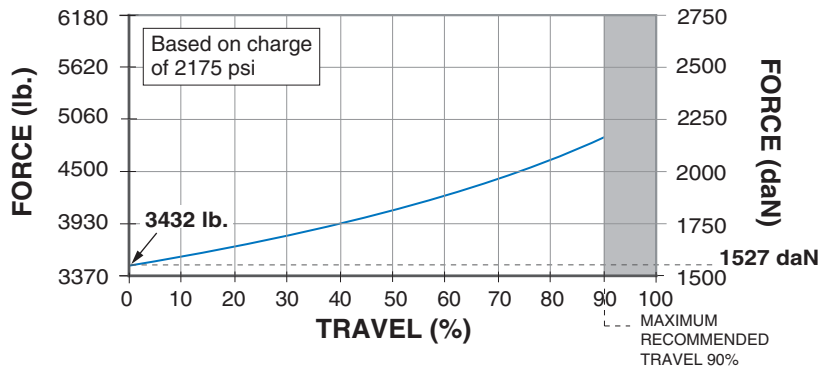
C = Self-contained, F = Open Flow Fitting. *When not specified, default is C, self-contained.*

## 90.9.01500 – 15 kN / 1.5 ton

### Force Charts

#### On-Contact Force

psi	lb.
2175	3432
2000	3155
1750	2761
1500	2367
1000	1578
500	789
250	394



#### On-Contact Force

bar	daN
150	1527
125	1272
100	1018
75	763
50	509
25	254
20	204

### Mount Options

#### B11 90.11.01500

MOUNT FROM TOP OR BASE

#### B12 90.12.01500

4 x M10 SHCS  
3/8 SHCS

#### B21 90.21.01500

4 x M10 SHCS  
3/8 SHCS

ø104 BOLT CIRCLE  
4.094

#### B25 90.25.01500

4 x M10 SHCS  
3/8 SHCS

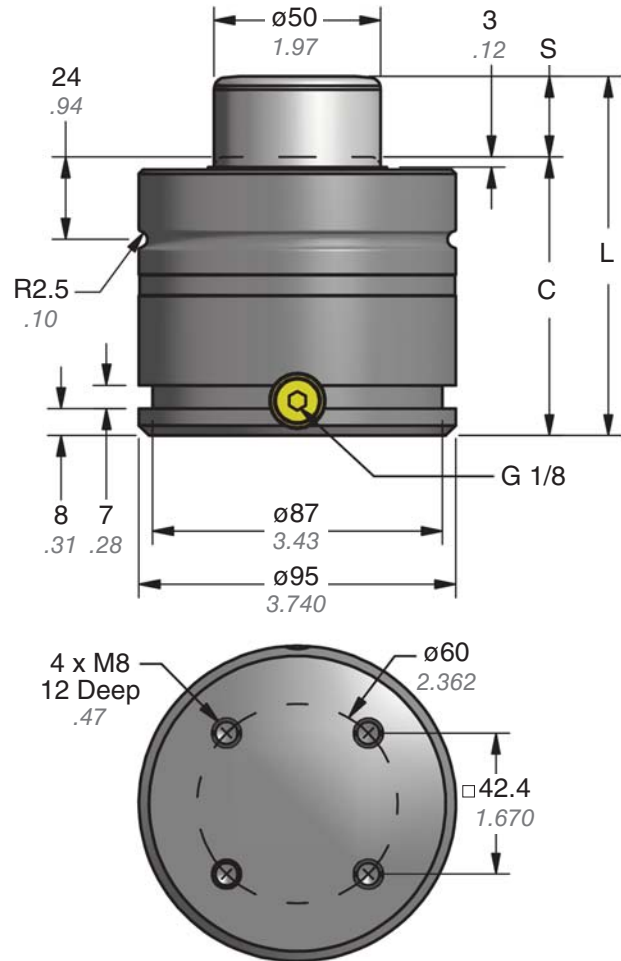
#### B19 90.19.01500

2 x M10 SHCS  
3/8 SHCS

DADCO offers a wide variety of mounts. If the mounts above are not suitable for the application, contact DADCO.



**TO – Basic Model**



Part No.	S mm inch	C	L ±0.25 ±.010
• 90.9.03000.025	25 0.98	83 3.27	108 4.252
• 90.9.03000.038	37.5 1.48	95.5 3.76	133 5.236
• 90.9.03000.050	50 1.97	108 4.25	158 6.220
90.9.03000.063	62.5 2.46	120.5 4.74	183 7.205
• 90.9.03000.080	80 3.15	138 5.43	218 8.583
90.9.03000.100	100 3.94	158 6.22	258 10.157
90.9.03000.125	125 4.92	183 7.20	308 12.126

• Preferred Sizes

### Ordering Example:

**90.9.03000.025. TO. C. 150**

**Part Number:**

Includes Series, Model and Stroke Length.

**Mount Option:**

TO = Basic Mount. *When not specified, default is TO.* Mounts ordered with cylinder will be attached at the factory.

**Mount Only Ordering Example:** 90.12.03000

**Charging Pressure:**

15–150 bar (220–2175 psi). *When not specified, default is 150 bar.*

**Operating System:**

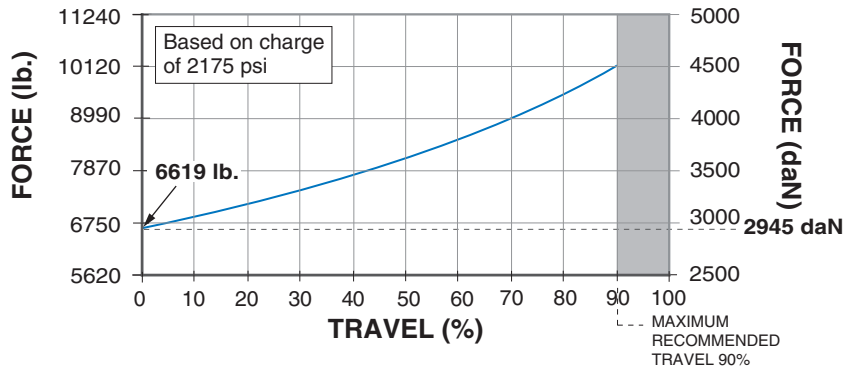
C = Self-contained, F = Open Flow Fitting. *When not specified, default is C, self-contained.*

**90.9.03000 – 30 kN / 3 ton**

**Force Charts**

**On-Contact Force**

psi	lb.
2175	6619
2000	6087
1750	5326
1500	4565
1000	3043
500	1522
250	761



**On-Contact Force**

bar	daN
150	2945
125	2454
100	1963
75	1473
50	982
25	491
20	393

**Mount Options**

**B11** **90.11.03000**

MOUNT FROM TOP OR BASE

**B12** **90.12.03000**

**B21** **90.21.03000**

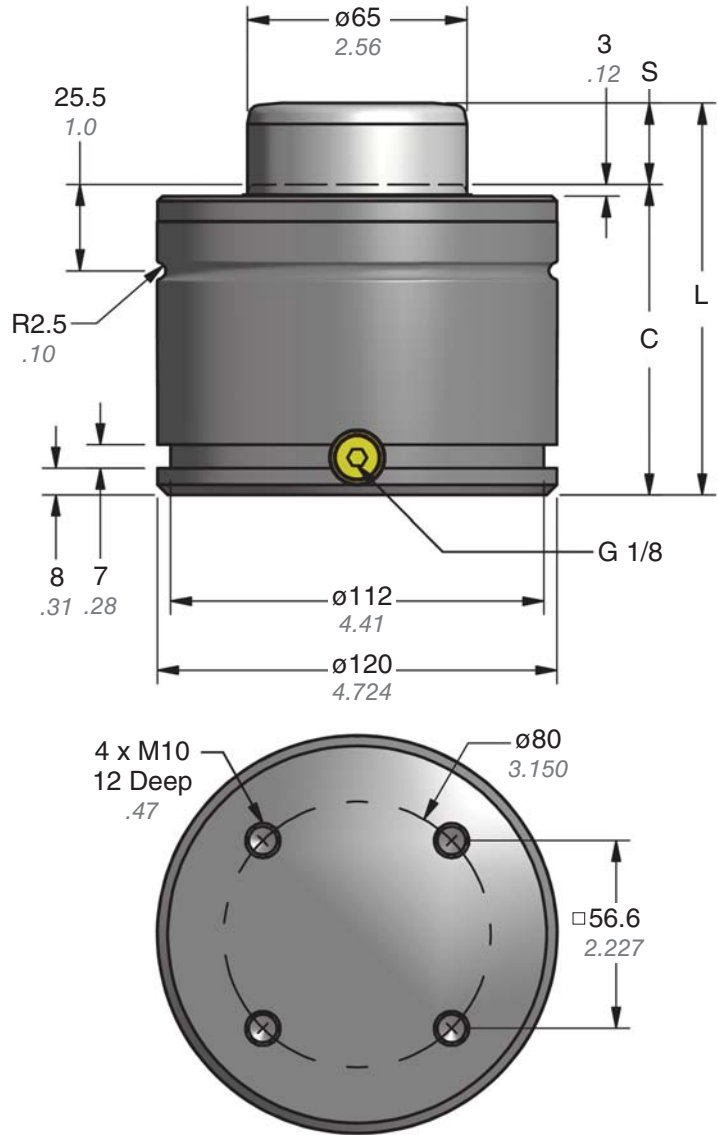
**B25** **90.25.03000**

**B19** **90.19.03000**

DADCO offers a wide variety of mounts. If the mounts above are not suitable for the application, contact DADCO.



**TO – Basic Model**



Part No.	S mm inch	C	L ±0.25 ±.010
• 90.9.05000.025	25 0.98	93 3.66	118 4.646
• 90.9.05000.038	37.5 1.48	105.5 4.15	143 5.630
• 90.9.05000.050	50 1.97	118 4.65	168 6.614
90.9.05000.063	62.5 2.46	130.5 5.14	193 7.598
• 90.9.05000.080	80 3.15	148 5.83	228 8.976
90.9.05000.100	100 3.94	168 6.61	268 10.551
90.9.05000.125	125 4.92	193 7.60	318 12.520

• Preferred Sizes

### Ordering Example:

**90.9.05000.025. TO. C. 150**

**Part Number:**

Includes Series, Model and Stroke Length.

**Mount Option:**

TO = Basic Mount. *When not specified, default is TO.* Mounts ordered with cylinder will be attached at the factory.

**Mount Only Ordering Example:** 90.12.05000

**Charging Pressure:**

15–150 bar (220–2175 psi). *When not specified, default is 150 bar.*

**Operating System:**

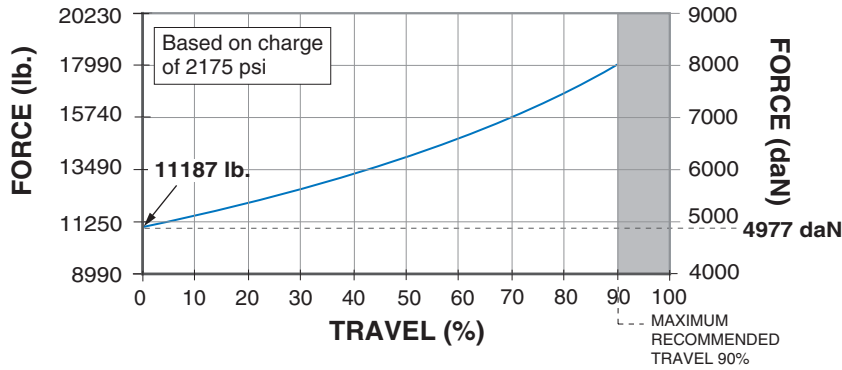
C = Self-contained, F = Open Flow Fitting. *When not specified, default is C, self-contained.*

**90.9.05000 – 50 kN / 5 ton**

**Force Charts**

**On-Contact Force**

psi	lb.
2175	11187
2000	10287
1750	9001
1500	7715
1000	5143
500	2572
250	1286



**On-Contact Force**

bar	daN
150	4977
125	4148
100	3318
75	2489
50	1659
25	830
20	664

**Mount Options**

**B11** **90.11.05000**

MOUNT FROM TOP OR BASE

4 x M12 SHCS  
1/2 SHCS

M20

4 x M10 SHCS  
M10 x 14 SHCS  
RECOMMENDED

**B12** **90.12.05000**

4 x M12 SHCS  
1/2 SHCS

**B21** **90.21.05000**

4 x M12 SHCS  
1/2 SHCS

**B25** **90.25.05000**

4 x M12 SHCS  
1/2 SHCS

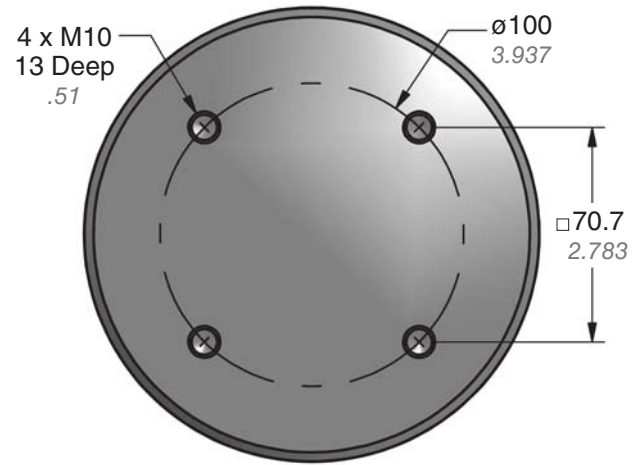
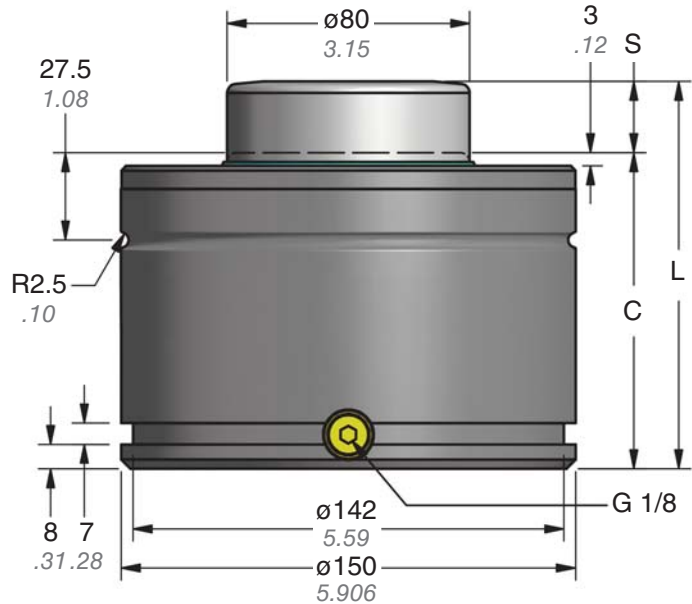
**B19** **90.19.05000**

2 x M12 SHCS  
1/2 SHCS

DADCO offers a wide variety of mounts. If the mounts above are not suitable for the application, contact DADCO.



**TO – Basic Model**



Part No.	S mm inch	C	L ±0.25 ±.010
• 90.9.07500.025	25 0.98	103 4.06	128 5.039
• 90.9.07500.038	37.5 1.48	115.5 4.55	153 6.025
• 90.9.07500.050	50 1.97	128 5.04	178 7.008
90.9.07500.063	62.5 2.46	140.5 5.53	203 7.992
• 90.9.07500.080	80 3.15	158 6.22	238 9.370
90.9.07500.100	100 3.94	178 7.01	278 10.945
90.9.07500.125	125 4.92	203 7.99	328 12.913

• Preferred Sizes

### Ordering Example:

**90.9.07500.025. TO. C. 150**

**Part Number:**

Includes Series, Model and Stroke Length.

**Mount Option:**

TO = Basic Mount. When not specified, default is TO. Mounts ordered with cylinder will be attached at the factory.

**Mount Only Ordering Example:** 90.12.07500

**Charging Pressure:**

15–150 bar (220–2175 psi). When not specified, default is 150 bar.

**Operating System:**

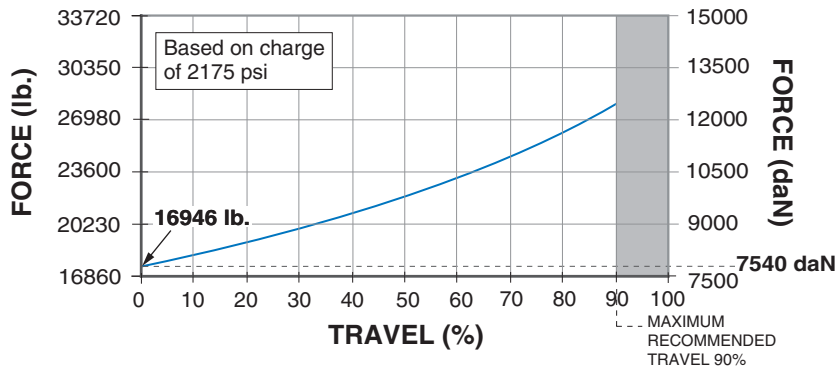
C = Self-contained, F = Open Flow Fitting. When not specified, default is C, self-contained.

**90.9.07500 – 75 kN / 7.5 ton**

**Force Charts**

**On-Contact Force**

psi	lb.
2175	16946
2000	15582
1750	13635
1500	11687
1000	7791
500	3896
250	1948



**On-Contact Force**

bar	daN
150	7540
125	6283
100	5027
75	3770
50	2513
25	1257
20	1005

**Mount Options**

**B11 90.11.07500**

MOUNT FROM TOP ONLY

**B12 90.12.07500**

**B21 90.21.07500**

**B25 90.25.07500**

**B19 90.19.07500**

DADCO offers a wide variety of mounts. If the mounts above are not suitable for the application, contact DADCO.

### Standard Load Cell

**90.300.**\_\_\_\_\_

(01500, 03000, 05000, 07500)

When used with a Portable Test Stand, the Standard Load Cell gives precise measurement of gas spring charging pressure. For additional information, request bulletin 97B119G.



### Digital Load Cell

**90.305.BG (Meter)**

**90.305.LC.50 (222 kN Load Cell)**

The DADCO Digital Load Cell Meter can display force in Newtons, Kg or lbs. The 90.305.LC.50 Load Cell (supplied with connector) may be used to measure gas spring force up to 50,000 lbs. Other digital load cell units are available, for more information request bulletin B04106A.



### DADCO Pressure Analyzer

**90.315.5**

Use the DADCO Pressure Analyzer to easily charge, discharge, and gauge the pressure in DADCO's 90.9 Series Nitrogen Gas Springs. For additional information request bulletin B01133D.



### DADCO Pressure Monitor

**90.421.1 (120 VAC)** – Bulletin B00136

**90.421.2 (24 VAC)** – Bulletin B01115A

**90.421.2D (24 VDC, SPDT)** – Bulletin B00134

The DADCO Pressure Monitor indicates if pressure drops below a pre-set level, alerting the press controller to shut down the press. The shutdown point is adjustable between 15 and 200 bar (200 – 3000 psi). For additional information request the appropriate bulletin.



### Portable Test Stand

**90.305.3**

Use the Portable Test Stand in conjunction with a Standard Load Cell for precise measurement of gas spring force. For more information request bulletin 97B121.



### Repair Kit

Includes a fully assembled cartridge, dust cover, bottle of assembly oil and a maintenance manual.

**Model**

**Kit Number**

90.9.01500 90.109.01500

90.9.03000 90.109.03000

90.9.05000 90.109.05000

90.9.07500 90.109.07500



Service Tools

**C-Ring Installation Tool**  
**90.352**

To insert the C-style retaining ring into the retaining ring groove.



**C-Ring Removal Tool**  
**90.356**

To remove the C-style retaining ring safely in a single controlled motion.



**Removal Sleeve**  
**90.340.**\_\_\_\_\_

(01500, 03000, 05000, 07500)

To position the cartridge below the C-ring groove when assembling or disassembling a gas spring.



**Assembly Cap**  
**90.330.**\_\_\_\_\_

(01500, 03000, 05000, 07500)

Used to hold the rod and position the cartridge below the C-ring groove when assembling the gas spring.



**T-Handle**  
**90.320.2 (M8)**

To remove the piston rod when disassembling and position correctly when reassembling.



**Charging Assembly**  
**90.310.040**

Use the DADCO Quick Disconnect Charging Assembly with the Charging Nipple or Pressure Analyzer to charge self-contained gas springs. This can also be used with a control panel for linked systems.



**Port Servicing Tool**  
**90.320.8**

To perform all necessary servicing to the valve compartment. Request bulletin B05110 for additional information.



**Valve Bleed Tool**  
**90.360.4**

Use the DADCO Valve Bleed Tool to slowly discharge a spring to the desired pressure.



**Quick Disconnect Charging Nipple**  
**90.310.143 (M6: 01500)**  
**90.310.111 (G 1/8: 03000, 05000, 07500)**

Use the DADCO Quick Disconnect Charging Nipple to charge the 90.9 Series.



90.310.143



90.310.111

### Converting from Self-Contained mode to Linked mode

#### CAUTION

Always wear safety glasses when maintaining nitrogen gas springs. When exhausting pressure, place the gas spring horizontally with the port up for safety.

#### 90.9.03000 – 90.9.07500 (G 1/8 port)



**1. Remove Port Plug**  
Remove port plug (F.1).

**2. Exhausting the Spring**  
Keeping face and hands clear of the port depress the valve stem using one

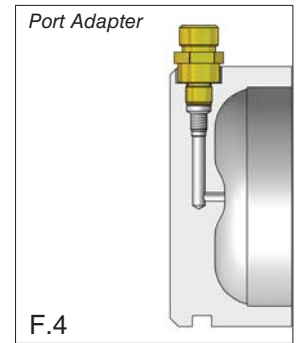
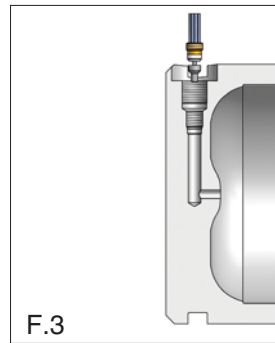
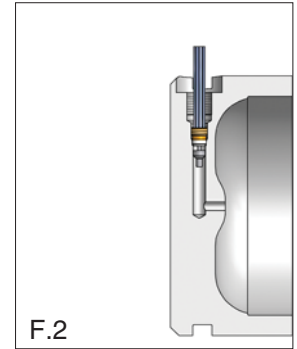
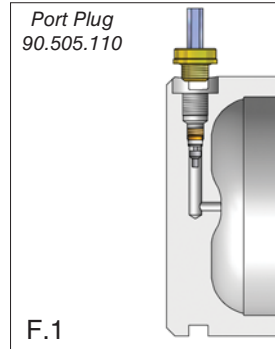
of the appropriate tools detailed on page 13. A small screwdriver or allen wrench may also be used to depress the valve stem (F.2). **After all the gas pressure is exhausted, be sure that the piston rod will retract into the tube manually. If not, try depressing the valve stem again. If still unsuccessful STOP and contact your DADCO Service Representative.**

**3. Remove Compact Valve**

Remove the compact valve by unscrewing it using the appropriate tool (F.3)

**4. Ready to Pipe**

Install port adapter into the open port (F.4). A wide variety of port adapters are available, refer to DADCO's Linked System Components Catalog.



#### 90.9.01500 (M6 port)



**1. Remove Screw**  
Remove the protective screw from the M6 port (A.1).

**2. Exhausting the Spring**

Keeping the face and hands clear of the port, depress the valve stem using one of the appropriate tools detailed on page 13. A small screwdriver or allen wrench may also be used to depress the valve stem (A.2).

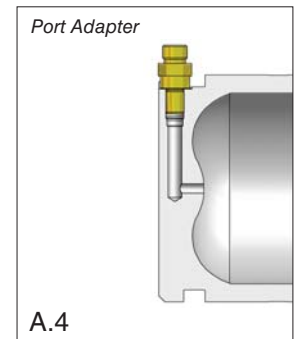
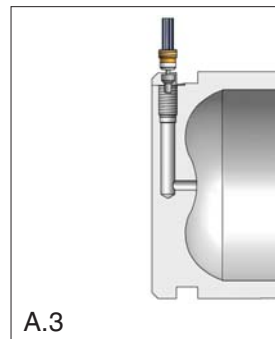
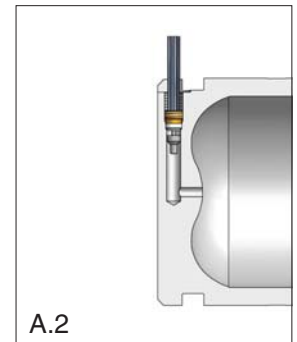
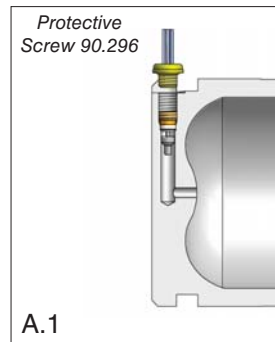
**After all the gas pressure is exhausted, be sure that the piston rod will retract into the tube manually. If not, try depressing the valve stem again. If still unsuccessful STOP and contact your DADCO Service Representative.**

**3. Remove Compact Valve**

Remove the compact valve by unscrewing it using the appropriate tool (A.3).

**4. Ready to Pipe**

Insert a port adapter into the open M6 port (A.4). A wide variety of port adapters and fittings are available, refer to DADCO's Linked System Components Catalog.



**CAUTION**  
DO NOT attempt maintenance on spring until internal pressure is exhausted.

**Operating Specifications**  
 Charging Medium: Nitrogen Gas  
 Charging Pressure Range: 15 – 150 bar (220 – 2175 psi)  
 Operating Temperature: -6°C – 71°C (20°F – 160°F)  
 Maximum Speed: .5 m/sec (20 in/sec)

### Installation Requirements

#### Provide Stroke Reserve

- DADCO's 90.9 Series Gas Springs will permit travel of the full nominal stroke; however, at least a 10% stroke reserve is recommended to achieve optimal performance and safety (T.1, T.2).

#### Avoid Side Loading

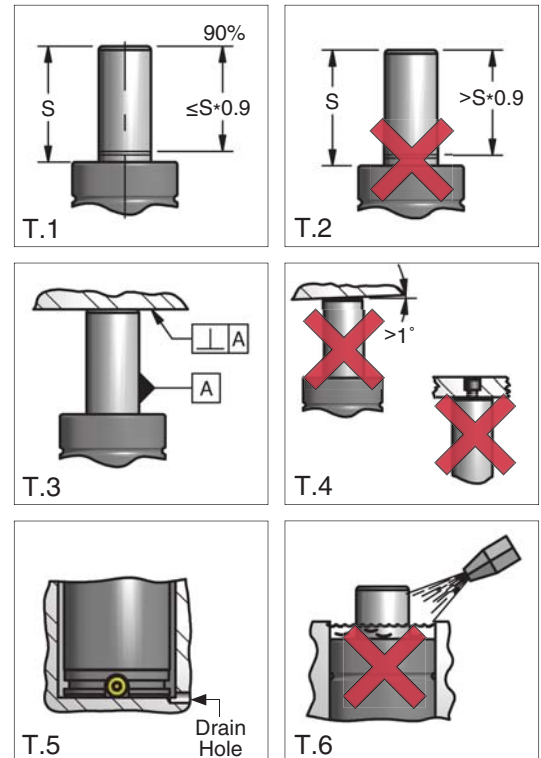
- Side loading resulting from press action or die construction causes increased wear on the bearing, seal and piston rod (T.4). Therefore, avoid side loading when possible (T.3).

#### Rod End Thread

- The end of the piston rod has a construction thread intended for assembly and disassembly only and should never be used to mount or secure the gas spring (T.4). Die vibration and/or misalignment will damage the spring.

#### Protect From Fluids

- Direct contact with certain die lubricants and cleaners should be avoided (T.6). Protect gas springs by providing adequate drainage in gas spring pockets (T.5).



### Discharging and Recharging

#### Discharging Self-Contained Gas Springs

- The DADCO Pressure Analyzer, 90.315.5, shown on page 12 allows for charge, discharge and gauging the pressure in the 90.9 Series Gas Springs (D.1).

#### Recharging Self-Contained Gas Springs

- Hold the spring vertically at all times during filling. Never compress the gas spring in a vice or clamp outside of the die or application as damage to the gas spring can result (D.2).
- Never fill a gas spring unless the rod is in the fully extended position (D.4). Filling a gas spring with its rod down can result in improper retaining ring seating. Thread the T-handle, 90.320.2, into the rod end and depress the valve stem with the appropriate tool, then pull the rod cartridge assembly up until it is seated firmly against the retaining ring (D.3).
- Charge the gas spring to the desired pressure. Refer to DADCO's Maintenance Instructions for complete step-by-step instructions.

