Nitrogen Gas Spring Linked System Components

Everything You Need to Construct a Linked System
Introduction

Many customers recognize the benefits of linking nitrogen gas springs; linked systems allow users to easily monitor, control and adjust pressure from outside the die. In this catalog, DADCO has brought together all of the components necessary to easily configure a linked system. DADCO recommends choosing control panels and hose type based on port style, with complementary fittings and additional piping accessories, to design a linked system best suited for your application.

### Port Style

<table>
<thead>
<tr>
<th>M6 Mini Port</th>
<th>G 1/8 Large Port</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gas Springs with M6 Port:</strong></td>
<td><strong>Gas Springs with G 1/8 Port:</strong></td>
</tr>
<tr>
<td>Micro Series</td>
<td>U.4600 – U.20000</td>
</tr>
<tr>
<td>U.0175 – U.2600</td>
<td>UT / UH / UK Series</td>
</tr>
<tr>
<td>L / LJ Series</td>
<td>UX Series</td>
</tr>
<tr>
<td>SCR Series</td>
<td>90.8 Series</td>
</tr>
<tr>
<td>FCL Series</td>
<td>90.10.00500 – 90.10.10000</td>
</tr>
<tr>
<td>90.10.00170</td>
<td>SC Series</td>
</tr>
</tbody>
</table>

### Compatible Fitting Styles

- **Preferred**
  - DADCO MINILink® (M8 x 1)
  - D-24 Tapered (M12 x 1.5)
  - Zip (CNOMO) (S12.65 x 1.5)
  - O-Ring Face Seal (ORFS) (9/16-18)

### Hose System

- **Preferred**
  - 90.700 (Y700) Hose
  - 90.500 (Y500) Hose
  - 90.400 (Y400) Hose
  - 90.250 (Y250) Hose

- **PHASING OUT**
  - 90.705 (Y705) Hose
The DADCO Convertible Control Panel is used to fill, drain and monitor the pressure of linked DADCO nitrogen gas springs from outside the die. The panel consists of four G 1/8 BSPP ports, a high pressure 63 mm diameter gauge, a quick disconnect fill valve, a bleed valve and a rupture disk to prevent overpressurization. For maximum versatility, the panel is available with a variety of fitting connections. See below for information on the riser blocks available for use with the control panel.

**Ordering Example:**

Convertible Control Panel (90.406)
Control Panel w/ Vibration Resistant Valve (90.406V)

<table>
<thead>
<tr>
<th>Gauge Style</th>
<th>90.406. P 1 N</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSI/Bar Gauge (DPG-3RB) = P</td>
<td>Fitting Connection</td>
</tr>
<tr>
<td>Bar/MPa Gauge (DPG-3RM) = A</td>
<td>N = No Fitting Supplied,</td>
</tr>
<tr>
<td>When not specified, default is P.</td>
<td>M = Manifold Seal,</td>
</tr>
<tr>
<td>Guard</td>
<td>S = ORFS Fitting,</td>
</tr>
<tr>
<td>Top Guard = 1</td>
<td>D = D-24 Fitting,</td>
</tr>
<tr>
<td>Top and Bottom Guards = 2</td>
<td>B = Zip Fitting,</td>
</tr>
<tr>
<td>When not specified, default is 1.</td>
<td>L = MINILink® Fitting</td>
</tr>
</tbody>
</table>

*NOTE:* The 90.406.P2S is a direct replacement of DADCO’s 90.406.03.

**Riser Block for Convertible Control Panel**


![Shown with the 90.406.220 riser block](image-url)
Mini Convertible Control Panel

The DADCO Mini Convertible Control Panel is used to fill, drain and monitor the pressure of linked DADCO nitrogen gas springs from outside the die. The panel is compatible with SMS-® and traditional linked systems and has five M6 ports, two G 1/8 ports, a high pressure gauge, a quick disconnect fill valve, a bleed valve and a rupture disk to prevent overpressurization. To allow for maximum versatility when linking, the panel is available with a variety of fitting connections.

Ordering Example:

<table>
<thead>
<tr>
<th>Fitting Connection</th>
<th>Mini Control Panel (90.407)</th>
<th>90.407</th>
<th>P</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>G 1/4 Port</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M6 Port</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSIG/Bar Gauge</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bar/MPA Gauge</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Vibration Resistant Bleed Valve

DADCO's new vibration resistant bleed valve (BV-5G) prevents unintended system exhaust resulting from excessive in-die vibration. Our innovative design allows the valve to remain closed when the knob is loose, preventing loss of gas due to vibratory loosening. This bleed valve may be ordered as a replacement for existing control panels, or it may be included on a newly purchased Mini Convertible (90.407V), or Standard Convertible Control Panel (90.406V). **NOTE:** The knob will be free to spin when closed. To prevent damage to the assembly, do not over tighten or use a wrench to open or close the bleed valve.

Ordering Example:

<table>
<thead>
<tr>
<th>Fitting Connection</th>
<th>Control Panel with Vibration Resistant Valve (BV-5G)</th>
<th>90.406V</th>
<th>P</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guard</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSI/Bar Gauge</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bar/MPa Gauge</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Top Guard</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Top and Bottom Guards</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Components: Control Panels
Components: Control Panels

Linked Systems

Compact Control Panel

The smallest of our control panels, the DADCO Compact Control Panel is used to fill, drain and monitor the pressure of linked DADCO nitrogen gas springs from outside the die. The panel consists of two G 1/8 BSPP ports, a high pressure gauge, a quick disconnect fill valve, a bleed valve and a rupture disk to prevent overpressurization. To allow for connection to Electronic Pressure Monitors, the panel comes standard with a G 1/4 BSPP port.

Mini Control Panel

90.407.11G

The DADCO 90.407.11G Mini Control Panel is used to fill, drain and monitor the pressure of linked DADCO nitrogen gas springs from outside the die. The panel consists of a high pressure gauge, a quick disconnect fill valve, a bleed valve and a rupture disk to prevent overpressurization. To allow for maximum versatility when linking, the panel also contains eleven different port locations.

Ordering Example:

Compact Control Panel

Gauge Style
PSI/Bar Gauge = P
Bar/MPa Gauge = A
When not specified, default is P.

Pressure Monitor Sensor Options (optional)
EDS, DSK, DPS, DPT, SKN
More information on page 20.

Fitting Connection
N = No Fitting Supplied, S = ORFS Fitting,
D = D-24 Fitting, B = Zip Fitting,
L = MINILink® Fitting
When not specified, default is N.

Mounting Options
**Multi Panel**

The DADCO Multi Panel features modules that may be filled, monitored, adjusted and vented from outside the die, either commonly or individually. No other control panel offers the advantages of the DADCO Multi Panel. For replacement parts refer to bulletin B04105B.

**Features**

- Each module features a simple two position valve for easy operation.
- Three port locations on each module give maximum piping flexibility.
- Each module is supplied with a straight service fitting. (For unused ports, DADCO recommends closing the module off before filling or using tube end caps, 90.506.112, on the unused port.)
- The panel can be flush mounted on the bottom or back.
- An optional tilt-guard protects all control valves and gauges during operation.

**Mounting Options**

- Standard (No Guard) = 401
- Top = 402
- Bottom = 403
- Both = 404

For optional reversed mounting, add R.

**Number of Modules:**

- 2-6, 8 or 10

**Ordering Example:**

- 90.401
- 3.

**Guard Location:**

- Standard (No Guard) = 401, Top = 402,
- Bottom = 403, Both = 404

---

**Reversed Mounting**

**Linked Systems**

**Components: Control Panels**
Components: Distribution Blocks

DADCO’s distribution blocks are used with a control panel to simplify piping to multiple cylinders with a uniform system pressure. M6 and G 1/8 port options are available.

Mini M6 Distribution Blocks
The Mini Distribution Blocks feature four or eight M6 port locations. Plug unused ports with 90.607.110 Port Plug before charging the system.

Compact G 1/8 Distribution Blocks
The Compact Distribution Blocks have 7-12 G 1/8 ports. Plug unused ports with 90.505.110 Port Plug before charging the system.

Standard G 1/8 Distribution Blocks
90.411.04 / 90.411.10 / 90.411.12
The Standard Distribution Blocks feature 4, 10 or 12 G 1/8 ports. Plug unused ports with 90.505.110 Port Plug before charging the system. Refer to bulletin B03142B for more information.
Linked Systems

Components: Hose

MINIFLEX®
90.700 (Y-700) Hose
+ Offers the smallest possible bend radius available for flexible hose
+ Compatible with Mini, ORFS, D-24 and Zip style fittings
− Cannot be linked with a surge tank

DADCOFLEX®
90.400 (Y-400) Hose
ST
+ Can withstand high pressures while maintaining a good flow rate
+ Can be linked with a surge tank
− Least flexible bend radius

MINIFLEX®
90.705 (Y-705) Hose
+ Compatible with Zip style fittings
+ Alternate to 90.700
+ Matches Toyota Standards
− Cannot be linked with a surge tank

DADCOFLEX®
90.250 (Y-250) Hose
PHASING OUT
+ Assemble in field without additional tools using non-crimped adapters
− 190 bar (2750 psi) is maximum for surging pressure
− Difficult to assemble

DADCOFLEX®
90.500 (Y-500) Hose
Preferred
+ Higher working pressure than 90.250 (Y-250) without sacrificing bend radius or flow rate
+ Compatible with ORFS and D-24 style fittings
+ Assemble in field without additional tools using 90.504.343 non-crimped adapter

DF Tubing
DF
Length (mm)
+ Extremely durable and compact
− Dimensions critical, no flexibility
NOTE: To order straight lengths of DF Tubing, use the part number above. For curved pieces, it is necessary to provide a drawing. Refer to Bulletin B92118B for more information.

DADCO offers hydraulically or pneumatically operated crimping units, turn to page 26 for more information.

Hose Assembly
A DADCO hose assembly consists of a length of hose with a hose adapter on each end. Refer to bulletin B21102 for more information on ordering a hose assembly.

Hose Assembly Ordering Example:

<table>
<thead>
<tr>
<th>Hose Type</th>
<th>90.500, S843, S854, 600</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sealing Type</td>
<td>Example</td>
</tr>
<tr>
<td>ORFS</td>
<td>S943</td>
</tr>
<tr>
<td>D-24</td>
<td>D843</td>
</tr>
<tr>
<td>Mini</td>
<td>L943</td>
</tr>
<tr>
<td>Zip</td>
<td>B943</td>
</tr>
</tbody>
</table>

Reference appropriate sealing type prefix (S, D, L or B).
Components: ORFS Hose Adapters

DADCO was the first gas spring manufacturer to offer 9/16-18 O-Ring Face Seals (ORFS). DADCO’s ORFS fittings prevent any loss of high pressure nitrogen gas by providing elastomeric seals at every joint. DADCO recommends using DADCO brand hoses featured on page 8 with the adapters shown throughout this catalog. If the length of hose required is less than the H Value, use DF Tubing (page 8) or Solid Hose Fittings (page 11). DADCO also offers a variety of stainless steel fittings to be paired with Y-700 or Y-500 hose for linked operation in extreme condition environments.

Crimped Hose Adapters for 90.700 or 90.705 (Y-700 or Y-705)

\[ H \text{ Value} = 75 \ (2.95) \]

Crimped Hose Adapters for 90.500 (Y-500)

\[ H \text{ Value} = 80 \ (3.15) \]

Crimped Hose Adapters for 90.400 or 90.250 (Y-400 or Y-250)

\[ H \text{ Value} = 85 \ (3.35) \]

Non-Crimped Hose Adapters for 90.500 and 90.250 (Y-500 and Y-250)

\[ H \text{ Value} = 85 \ (3.35) \]
Compact ORFS Hose Adapters

DADCO offers compact O-ring Face Seal (ORFS) hose adapters with a 9/16-18 thread and elastomeric seals at each joint to prevent loss of high pressure nitrogen gas. These hose adapters are more compact than the 90.504.700 and 90.504.800 series fittings, but are compatible with the fittings used with these series. DADCO recommends using DADCO brand hoses with the adapters shown below when linking DADCO nitrogen gas springs.

**Compact Hose Adapters for 90.500 hose (Y-500)**

H Value = 70 (2.76)

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>90.504.543</td>
<td>Compact Swivel</td>
<td>9/16-18 TYP</td>
</tr>
<tr>
<td>90.504.551</td>
<td>Retractable Swivel</td>
<td>9/16-18 TYP</td>
</tr>
<tr>
<td>90.504.559</td>
<td>90° Swivel</td>
<td>9/16-18 TYP</td>
</tr>
</tbody>
</table>

**Compact Hose Adapters for 90.400 hose (Y-400)**

H Value = 75 (2.95)

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>90.504.443</td>
<td>Compact Swivel</td>
<td>9/16-18 TYP</td>
</tr>
<tr>
<td>90.504.451</td>
<td>Retractable Swivel</td>
<td>9/16-18 TYP</td>
</tr>
<tr>
<td>90.504.454</td>
<td>45° Female Face Seal</td>
<td>9/16-18 TYP</td>
</tr>
<tr>
<td>90.504.459</td>
<td>90° Swivel</td>
<td>9/16-18 TYP</td>
</tr>
</tbody>
</table>

**Hose Straps**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>90.504.701</td>
<td>for use with 90.700 and 90.705 hose types</td>
<td>9.5</td>
</tr>
</tbody>
</table>
Components: ORFS Fittings

Solid Hose Fittings
Solid hose fittings come in predetermined lengths and are ideal for limited space applications. They can replace traditional hose assemblies, particularly when the length of hose required is shorter than DADCO’s recommended minimum hose length (see H Values on page 9-10). For custom lengths of solid hose, see DF Tubing on page 8.

<table>
<thead>
<tr>
<th>Metric</th>
<th>Part No.</th>
<th>A</th>
<th>B</th>
<th>Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>90.503.xxx (S-9xxx)</td>
<td>mm</td>
<td>A − 43.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9075</td>
<td>75</td>
<td>31.8</td>
<td></td>
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<tr>
<td>9100</td>
<td>100</td>
<td>56.8</td>
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<tr>
<td>9120</td>
<td>120</td>
<td>76.8</td>
<td></td>
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<tr>
<td>9125</td>
<td>125</td>
<td>81.8</td>
<td></td>
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</tr>
<tr>
<td>9130</td>
<td>130</td>
<td>86.8</td>
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<tr>
<td>9140</td>
<td>140</td>
<td>96.8</td>
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<tr>
<td>9150</td>
<td>150</td>
<td>106.8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>English</th>
<th>Part No.</th>
<th>A</th>
<th>B</th>
<th>Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>90.503.xxx (S-8xx)</td>
<td>in.</td>
<td>A − 1.70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>830</td>
<td>3.00</td>
<td>1.30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>832</td>
<td>3.25</td>
<td>1.55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>835</td>
<td>3.50</td>
<td>1.80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>837</td>
<td>3.75</td>
<td>2.05</td>
<td></td>
<td></td>
</tr>
<tr>
<td>840</td>
<td>4.00</td>
<td>2.30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>845</td>
<td>4.50</td>
<td>2.80</td>
<td></td>
<td></td>
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<tr>
<td>850</td>
<td>5.00</td>
<td>3.30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>855</td>
<td>5.50</td>
<td>3.80</td>
<td></td>
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<tr>
<td>860</td>
<td>6.00</td>
<td>4.30</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Port Adapters

DADCO’s O-Ring Face Seal (ORFS) Fittings have elastomeric seals at every joint.

<table>
<thead>
<tr>
<th>Part No.</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>90.505.115 (S-115)</td>
<td>Straight</td>
<td></td>
</tr>
<tr>
<td>90.505.116 (S-116)</td>
<td>M6 → 9/16-18 Extended Straight</td>
<td></td>
</tr>
<tr>
<td>90.505.117 (S-117)</td>
<td>Swivel Straight</td>
<td></td>
</tr>
<tr>
<td>90.505.121 (S-121)</td>
<td>Swivel Straight</td>
<td></td>
</tr>
<tr>
<td>90.505.122 (S-122)</td>
<td>Swivel Straight</td>
<td></td>
</tr>
<tr>
<td>90.505.123 (S-123)</td>
<td>Swivel Straight</td>
<td></td>
</tr>
<tr>
<td>90.505.110 (G-109)</td>
<td>Flush Plug</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Part No.</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>90.506.230 (S-230)</td>
<td>90° Elbow</td>
<td></td>
</tr>
<tr>
<td>90.506.330 (S-330)</td>
<td>45° Elbow</td>
<td></td>
</tr>
<tr>
<td>90.505.438 (S-438)</td>
<td>Run Tee</td>
<td></td>
</tr>
<tr>
<td>90.506.439 (S-439)</td>
<td>Branch Tee</td>
<td></td>
</tr>
</tbody>
</table>

SS = Stainless Steel Option Available
Components: ORFS Fittings

Fittings

90.506.112 (S-112)  Tube End Cap
90.506.303 (S-303)  Union
90.506.201 (S-201)  Elbow
90.506.401 (S-401)  Tee
90.506.501 (S-501)  Cross

Standard Swivel Nut Fittings

90.506.221 (S-221)  90° Port Adapter Shown
90.506.433 (S-433)  Branch Tee
90.506.432 (S-432)  Run Tee

Compact Swivel Nut Fittings

90.507.221 (SJ-221)  90° Elbow
90.507.433 (SJ-433)  Branch Tee
90.507.321 (SJ-321)  45° Elbow
90.505.052 (S-52)    Swivel Adapter
90.505.054 (S-54)    Swivel Adapter

Retrofit Port Adapters

90.505.102 (S-102)  Straight Port Adapter
90.505.202 (S-202)  90° Port Adapter
90.505.120 (S-120)  Straight Port Adapter
90.505.104 (D-104)  Flush Plug
Components: D-24 Tapered Fittings

D-24 Hose System with 90.700 or 90.705 (Y-700 or Y-705)

D-24 Hose System with 90.500 (Y-500)

Port Adapters

Retrofit Only

Fittings
Linked Systems

Components: MINILink® Fittings

MINIFLEX® Hose System with 90.700 or 90.705 (Y-700 or Y-705)

Minimum recommended Hose Length (H) = 45 (1.77)
Components: Zip (CNOMO) Fittings

Zip Hose System with 90.700 or 90.705 (Y-700 or Y-705)

Minimum recommended hose length (H) = 75 (2.95)

Fittings

*New!*

90.804.943  
Straight Hose Adapter

90.804.954  
45° Hose Adapter

90.804.958  
90° Short Neck Hose Adapter

90.804.959  
90° Long Neck Hose Adapter

90.805.115  
Straight Port Adapter

90.805.122  
Straight Port Adapter

90.805.190  
Port Adapter with Valve

90.806.401  
Tee

90.806.501  
Cross

90.807.230  
90° Port Adapter

90.807.439  
Branch Tee Port Adapter

<table>
<thead>
<tr>
<th>Part No.</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>230</td>
<td>22</td>
</tr>
<tr>
<td>240</td>
<td>36</td>
</tr>
<tr>
<td>250</td>
<td>43</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Part No.</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>439</td>
<td>22</td>
</tr>
<tr>
<td>449</td>
<td>36</td>
</tr>
<tr>
<td>459</td>
<td>43</td>
</tr>
</tbody>
</table>
DADCO surge tanks are used with open-flow systems to increase the volume in the system thereby reducing the pressure rise when cylinders are stroked. The Surge Tank is offered in two Models: F – Free Flow Model has multiple open ports supplied as standard for maximum flexibility when piping; M1– SMS-i® Model has a bottom port to attach to a base plate. Gauges and shut-off ball valves are available upon request. For assistance in determining appropriate surge tank size for your system, see B14102 or use the DADCO Force Calculator from our website, www.dadco.net. 90.400 (Y-400) hose is the preferred hose to use with surge tanks. 90.700 (Y-700)/ 90.705 (Y-705) hose is not recommended for use with surge tanks due to restricted flow capability.

**F – Free Flow Model**

**M1 – SMS-i® Model**

<table>
<thead>
<tr>
<th>ST</th>
<th>30</th>
<th>50</th>
<th>75</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>95</td>
<td>120</td>
<td>150</td>
<td>195</td>
</tr>
<tr>
<td>X</td>
<td>1.17</td>
<td>1.37</td>
<td>1.52</td>
<td>1.57</td>
</tr>
<tr>
<td>Y</td>
<td>1.09</td>
<td>1.05</td>
<td>1.71</td>
<td>2.92</td>
</tr>
<tr>
<td></td>
<td>3.94</td>
<td>3.59</td>
<td>5.91</td>
<td>6.18</td>
</tr>
<tr>
<td></td>
<td>5.91</td>
<td>7.67</td>
<td>1.00</td>
<td>1.25</td>
</tr>
<tr>
<td></td>
<td>1.00</td>
<td>1.25</td>
<td>3.88</td>
<td>1.99</td>
</tr>
</tbody>
</table>

**Ordering Example:**

**Size:**
30, 50, 75, 100

**Length (Y):**
50, 100, 150, 200, 250, 300, 350, 400

**Operating System:**

F = Free Flow Fitting, M1 = SMS-i® (Bottom port + sealing component)

**Mount Option:**

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

See the 90.10 / 90.8 Series Catalog for mount details.
Surge Tank Recommendations

When piping to a Surge Tank, it is important to have a direct route from the gas spring port to a dedicated port on the Surge Tank. DADCO recommends using the Y-400 hose to maximize flow between gas spring and Surge Tank. When selecting fittings, it’s important to select fittings with the least amount of flow restriction. Follow the guidelines below to avoid an increase in the system’s operating temperature and pressure rise. For any questions, contact DADCO.

### Surge Tank Hose Selection

<table>
<thead>
<tr>
<th>Hose Type</th>
<th>Inner Diameter</th>
<th>Working Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>90.400 (Y-400)</td>
<td>6.5 mm (.25 inch)</td>
<td>345 bar (5000 psi)</td>
</tr>
</tbody>
</table>

### Fitting Recommendations

- **90.504.758**
- **90.504.759**
- **90.504.459**
- **90.507.221**
- **90.507.321**
- **90.506.221**
- **90.506.230**

### Operating Specifications

- **Charging Medium:** Nitrogen Gas
- **Charging Pressure Range:** 15 – 150 bar (220 – 2175 psi)
- **Operating Temperature:** 4°C – 71°C (40°F – 160°F)*

*Note: Surge Tank pressure should not exceed 264 bar (3828 psi) at maximum temperature.*
Electronic Pressure Monitors

DADCO offers two types of Electronic Pressure Monitors to monitor nitrogen gas pressure during operation: An Electronic Pressure Monitor or a Control Panel with Pressure Monitor. For maximum versatility both types have multiple configurations to best suit your application. DADCO offers a variety of pressure sensor options to alert press controllers to changes in system pressure. Pressure sensor options are detailed on pages 20 – 21.

Electronic Pressure Monitor Configuration

To customize your Electronic Pressure Monitor, select the base, sensor and cable accessory that best suits your application.

1) Cable Accessory

- **90.454.M12.S**
  - Attachment Orientation: S = Straight

- **90.454.M12.L**
  - Attachment Orientation: L = Elbow

2) Guard Option

- **G**
- **G2**

3) Pressure Sensor Options

- EDS
- DSK
- DPS
- DPT
- SKN

See pages 20-21 for details.

4) Base Options

- **JB**
- **C2**

GM specific option available, reference bulletin B16106. See next page for C2 details.

Example shown:

- **90.421.C2.S.EDS.G**
- With 90.454.M12.S Cable

**Ordering Example:**

- **Model Number**
- **Base Option**
  - JB = Block only (Bleed Valve, Filler Valve and Rupture Disk not included).
  - CP = Block with Bleed Valve, Filler Valve and Rupture Disk - PHASING OUT,
  - C2 = Block with Vibration Resistant Bleed Valve, Filler Valve and Rupture Disk
- **Guard Option**
  - G, G2
- **Pressure Sensor Options**
  - EDS = Electronic Pressure Switch, DSK = Piston Pressure Switch, DPS= Dial Pressure Switch, DPT = Electronic Pressure Transmitter
- **Fitting Connection**
  - N = No Fitting Supplied, S = 90.505.115 (ORFS), D = 90.508.115 (D-24), B = 90.805.115 (Zip), L = MINILink® Fitting. Default is N.
Components: Pressure Monitors

Electronic Pressure Monitor Components
Follow this step by step guide and choose the components that are applicable for your application needs.

1) Cable Accessories
DADCO’s Electric Pressure Monitors have two cable accessory options to choose from: the S, straight, or L, elbow. Review the details provided below to select the correct option for your application.

| 90.454.M12.S | Attachment Orientation: S = Straight |
| 90.454.M12.L | Attachment Orientation: L = Elbow |

Cable Length: 02 = 2 m, 05 = 5 m, 10 = 10 m
Applicable for EDS, DPS, DPT & SKN sensor options

2) Guard Options
DADCO’s Electric Pressure Monitors have two guard options available: G and G2. The G option is recommended to be used with our EDS and DSK Pressure Sensor Options. The G2 option is recommended to be used with our DPS, DPT and new SKN Pressure Sensor Options. Review the details provided below to select the correct option for your application.

<table>
<thead>
<tr>
<th>G</th>
<th>G2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guard Length: 95 mm</td>
<td>Guard Length: 83.1 mm</td>
</tr>
<tr>
<td>Width: 51 mm</td>
<td>Width: 51 mm</td>
</tr>
</tbody>
</table>

Recommended Electronic Pressure Sensors:
EDS, DSK | DPS, DPT, SKN
### 3) Pressure Sensor Options

DADCOS Electric Pressure Monitors have five sensor options available: EDS, DSK, DPS, DPT and SKN. Review the details provided below to select the correct option for your application.

<table>
<thead>
<tr>
<th></th>
<th>EDS</th>
<th>DSK</th>
<th>DPS</th>
<th>DPT</th>
<th>SKN</th>
</tr>
</thead>
</table>

#### EDS – Electronic Pressure Switch

The EDS switch features an LED digital display that reads pressure value in bar, psi or MPa. The EDS models display face rotates 270° while the body rotates 340° for added versatility, the sensor also features two switching outputs that can be easily set with face mounted push buttons. *Note: EDS uses 90.454.M12 style cable accessory.*

#### Features:
- Measuring Range: 0 – 400 bar (0 – 5800 psi)
- Supply Voltage: 9 – 35 VDC
- Switch Rating: 1.2 A max
- Output: (2) PNP Pin 2, 4
- Electrical Connection: 4 – Pole M12 x 1
- Current Consumption: 35 mA max

#### DSK – Piston Pressure Switch

The DSK switch uses a pressure input to operate a SPDT switch as the pressure rises or falls across a set value. The manually adjusted switch monitors a preset pressure. This switch can be manually adjusted and wired to shut down a press operation or activate an alarm once pressure is above or below the set-point. *Note: DSK includes a DIN 43650 field-attachable connector.*

#### Features:
- Max Pressure Rating: 600 bar (8700 psi)
- Output: SPDT Switch
- Electrical Connection: DIN 43650
- Range Tolerance: ± 5 bar (± 72.5 psi)
- Switch Adjustment Range: 50–200 bar (725–2900 psi)
- Switch Rating: 1 AMP at 250 VAC, 4 AMP at 24 VDC
Components: Pressure Monitors

**DPS – Dial Pressure Switch**

The DPS switch features two manually adjustable dials. The upper dial is the set pressure and the lower dial is the reset pressure. When the system pressure increases to the set value, Output 1 (pin 4) turns on, and Output 2 (pin 2) turns off. When the system pressure decreases to the Reset Pressure, Output 1 turns off and Output 2 turns on. *Note: DPS uses 90.454.M12 style cable accessory.*

<table>
<thead>
<tr>
<th>Pin</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brown</td>
</tr>
<tr>
<td>2</td>
<td>White</td>
</tr>
<tr>
<td>3</td>
<td>Blue</td>
</tr>
<tr>
<td>4</td>
<td>Black</td>
</tr>
</tbody>
</table>

**Features:**
- Measuring Range: 0 – 400 bar (0 – 5800 psi)
- Operating Voltage: 9.6 – 32 VDC
- Setting Point Range: 20–400 bar (290–5800 psi)
- Reset Point Range: 12–392 bar (175–5685 psi)
- Switch Rating: 500 mA

**DPT – Electronic Pressure Transducer**

DADCO’s DPT unit is a pressure transducer, producing an analog signal that provides a range of voltage. The DPT converts pressure input to a 0–10 V output, the voltage output can then be scaled by a press controller to read the pressure value. *Note: DPT uses 90.454.M12 style cable accessory.*

<table>
<thead>
<tr>
<th>Pin</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brown</td>
</tr>
<tr>
<td>2</td>
<td>White</td>
</tr>
<tr>
<td>3</td>
<td>Blue</td>
</tr>
<tr>
<td>4</td>
<td>Black</td>
</tr>
</tbody>
</table>

**Features:**
- Supply Voltage: 12 – 32 VDC
- Accuracy: 0.5% Full Scale
- Output Signal: Analog (0-10 Volts)
- Max Pressure Rating: 600 bar (8700 psi)
- Electrical Connection: 4 – Pin M12 x 1
- Current Consumption: < 15 mA

**SKN / SKP – Electronic Pressure Switch**

The SKN / SKP pressure switch features an LED digital display that reads pressure value in bar, psi or MPa. The SKN / SKP models blue LED display is highly visible and is easily configured to control press operations when set pressure limits are exceeded. *Note: SKN uses 90.454.M12 style cable accessory.*

<table>
<thead>
<tr>
<th>Pin</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brown</td>
</tr>
<tr>
<td>2</td>
<td>White</td>
</tr>
<tr>
<td>3</td>
<td>Blue</td>
</tr>
<tr>
<td>4</td>
<td>Black</td>
</tr>
</tbody>
</table>

**Features:**
- Measuring Range: 0 – 400 bar (0 – 5800 psi)
- Voltage: 9 – 35 VDC
- Output Signal: SKN – (2) NPN Pin 2, 4
- SKP – (2) PNP Pin 2, 4
- Accuracy: ≤ ± 1% Full Scale
- Electrical Connection: 4 – pin M12 x 1
- Current Consumption: 45 mA
### Components: Pressure Monitors

**4) Base Options**

DADCO’s Electric Pressure Monitors have three base options to choose from: JB, block only; CP, Block with Bleed Valve, Filler Valve and Rupture Disk - PHASING OUT; C2, Block with Vibration Resistant Bleed Valve, Filler Valve and Rupture Disk. DADCO recommends using the C2 Base Option with the SKN Pressure Monitor Sensor Option. Review the details provided below to select the correct option for your application.

<table>
<thead>
<tr>
<th>JB Block</th>
<th>C2 Block</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height: 38 mm</td>
<td>Height: 38 mm</td>
</tr>
<tr>
<td>Width: 51 mm</td>
<td>Width: 51 mm</td>
</tr>
</tbody>
</table>

### 90.406.421 Control Panel with Pressure Monitor

The 90.406.421 Control Panel with Pressure Monitor is used to fill and monitor the pressure of linked nitrogen gas springs from outside the die. The panel is adjustable to read pressure in bar or MPa and includes a digital pressure sensor with programmable output to signal if pressure drops below a preset level. This panel conforms to Toyota standard number D-PACPS-B. Reference B10143B for additional information.

**Ordering Example:**

<table>
<thead>
<tr>
<th>Plate Style</th>
<th>90.406.421. B.</th>
<th>Fitting Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>B = English plate style</td>
<td>CP = Block with Bleed Valve, Filler Valve and Rupture Disk</td>
<td></td>
</tr>
<tr>
<td>A = Japanese plate style</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Output:** SPST N.O. (Normally Open)
- **Supply Voltage:** 12 – 24 VDC, 80 – 130 VAC (50 – 60 Hz)
- **Max Pressure Rating:** 350 bar (5076 psi)
- **Electrical Connection:** M12 (B – Code), 5 Wire, Reverse Key

---

**Cable Accessory**

<table>
<thead>
<tr>
<th>90.405.421.B.</th>
<th>90.454.M12B.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attachment Orientation: S = Straight</td>
<td>S = Straight</td>
</tr>
<tr>
<td>Attachment Orientation: L = Elbow</td>
<td></td>
</tr>
</tbody>
</table>

Cable Length: 02 = 2 m, 05 = 5 m, 10 = 10 m

This product is Listed to applicable UL Standards and requires by UL.
Compact Digital Pressure Sensor

The new 90.422.D is our smallest digital pressure monitor. The 90.422.D offers an even more compact sensor option for challenging space constraints. The 90.422.D is available with a digital sensor display output in either Bar or MPa or with an analog gauge display. Fully integrated fill and bleed valves on the same face of the panel allow for easy access. DADCO’s patent pending vibration resistant BV-5G comes standard on the 90.422.D, ensuring reliable performance in demanding press environments.

Performance Specifications:

ANALOG OUTPUT (1-5Vdc):
- Analog Scaling: User may configure analog output scaling to any range within Full Scale of sensor
- Accuracy: ± 1.0% Full Scale (includes effects of linearity, hysteresis and repeatability)
- Full Scale: 0 – 35 MPa / 0 – 350 bar
- Output Resolution: 25 mV
- Response time: 50 m/sec

PRESSURE SWITCH OUTPUT:
- Type: PNP open collector up to 30 Vdc/ 80mA
- Switch Setting: User may adjust switch actuation & deadband to any points within Full Scale sensor range
- Setting Accuracy: ± 1.0% Full Scale
- Response Time: 5 – 20 m/sec
- Number of Contacts: 2
- Hysteresis: Variable

Ordering Code:


Fitting Connection: N = No Fitting Supplied, S = 90.505.115 (ORFS), D = 90.508.115 (D-24), B = 90.805.115 (Zip), L = MINILink® Fitting (90.607.115).

Electrical Connection: M12 = 5 pin M12, PT = pigtail

Guard Option

G 1/8 BSPP 3X
80.5 0.53
13.5 0.53
3X

BD-400G - 0.56
Rupture Disk
(BP = 400 bar)
88.9 3.50
14.3
Filler Valve 90.310.110

BV-5G
Vibration Resistant
Bleed Valve
90.422.D

M12 5-pin

Digital Pressure Switch

G 1/8 BSPP 3X
80.5 0.53
13.5 0.53
3X

M12 Circuit Diagram

<table>
<thead>
<tr>
<th>Pin</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brown</td>
</tr>
<tr>
<td>2</td>
<td>White</td>
</tr>
<tr>
<td>3</td>
<td>Blue</td>
</tr>
<tr>
<td>4</td>
<td>Black</td>
</tr>
<tr>
<td>5</td>
<td>Orange</td>
</tr>
</tbody>
</table>

1 - 27 VDC

ANALOG OUTPUT (1-5V)

PNP OUTPUT 1

PNP OUTPUT 2

Model Number 90.422. D. S. G. M12

Electrical Connection:

M12 = 5 pin M12

PT = pigtail
Linked Systems

Components: Pressure Monitors

The 90.421.1 and 90.421.2 models visually alert the user whether the pressure is at good standing or low while the 90.421.2D model is capable of shutting the press down if it drops below the minimum operating pressure.

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Supply Voltage</th>
<th>Switch Rating</th>
<th>Output</th>
<th>Electrical Connection</th>
<th>Pressure Range</th>
<th>Cable Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>90.421.1</td>
<td>120 VAC</td>
<td>–</td>
<td>Indicator Light</td>
<td>1/2 NPS</td>
<td>15 – 200 bar</td>
<td>–</td>
</tr>
<tr>
<td>90.421.2</td>
<td>24 VDC</td>
<td>–</td>
<td>Indicator Light</td>
<td>1/2 NPS</td>
<td>15 – 200 bar</td>
<td>–</td>
</tr>
<tr>
<td>90.421.2D</td>
<td>24 VDC</td>
<td>0.4 A</td>
<td>Indicator Light + SPST</td>
<td>4-Pin Mini-Change Connector</td>
<td>15 – 200 bar</td>
<td>AZ54MC4PM02 – 6 ft</td>
</tr>
</tbody>
</table>

The DPM-1 and DPM-2 models both visually inform the press operator of their Nitrogen Gas Spring system’s pressure status. See table for supply voltage.

The DPM-2D model visually informs the press operator of the system status, and can be wired into the press controller to automatically shut down or alert the operator when pressure drops below a set point.

Ordering Example:

Model Number
90.421.1, 90.421.2 or 90.421.2D

Connector
BH1 = Right
BH2 = Left
BH3 = Straight Connector

(*Connector options are for 90.421.2D Model only.)
Piping Specifications

Converting from Self-Contained to Linked Mode

The following basic steps show how to easily convert DADCO gas springs from self-contained to linked mode. For more detailed instructions, refer to the relevant product catalog. *(Mini series gas spring with M6 port shown below.)*

**CAUTION**
Always wear safety goggles when performing maintenance on nitrogen gas springs.

1. Remove Protective Screw
2. Safely Exhaust Gas Spring
3. Remove Valve
4. Install Port Adapter

Recommendations for Linked Systems

- Allow ample space to secure hoses to plate. It is preferred that hoses rest side by side.
- Arrange gas springs to provide uniformity and balance within the die. Use multiple panels for large systems to allow faster filling and discharging.
- When linking cylinders allow for ample hose to avoid taut connections.

**Torque Specifications**

Tighten fittings to the following torque specifications to prevent damage and loosening from vibration during operation.

<table>
<thead>
<tr>
<th>Type</th>
<th>Thread</th>
<th>lb-in</th>
<th>lb-ft</th>
<th>N-m</th>
</tr>
</thead>
<tbody>
<tr>
<td>M6 Port Adapter</td>
<td>M6 x 1</td>
<td>25</td>
<td>2.1</td>
<td>3</td>
</tr>
<tr>
<td>MINILink® Hose Adapter</td>
<td>M8 x 1</td>
<td>25</td>
<td>2.1</td>
<td>3</td>
</tr>
<tr>
<td>G 1/8 Port Adapter</td>
<td>BSPP</td>
<td>168</td>
<td>14</td>
<td>19</td>
</tr>
<tr>
<td>ORFS Hose Adapter</td>
<td>9/16-18</td>
<td>204</td>
<td>17</td>
<td>23</td>
</tr>
<tr>
<td>D-24 Hose Adapter</td>
<td>M12 x 1.5</td>
<td>Hand-tight then ¼ turn with wrench</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zip Hose Adapter</td>
<td>S12.65 x 1.5</td>
<td>Hand-tight</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Use two wrenches, one on the port adapter and one on the hose adapter, to avoid over-tightening. The drawings below depict the importance of torque specifications in common port and hose adapter combinations.

- **Mini Port Adapter + MINILink® Hose Adapter**
  Mini fittings and hose adapters have low torque values. Refer to the chart above to avoid possible damage from over-tightening.

- **Mini Port Adapter + 9/16-18 ORFS Hose Adapter**
  The torque requirement for the Mini Port Adapter is smaller than the ORFS Hose Adapter. Refer to the chart above. Do not torque port fitting with larger hose adapter nut.

**NOTE:** It is important to adhere to these guidelines for the following fittings: 90.505.116 and 90.508.116.
Tools for Hose Assembly Construction
DADCO carries a variety of tools for Hose Assembly Construction, please refer to bulletin B11110A for more information on the selection shown below.

**Mini Hose Cutter**
90.320.7
Used to cut hose to appropriate length. The 90.320.7 works with all hose sizes.

**Portable Crimping Unit**
90.720
Used with appropriate die ring to create permanent hose assemblies. For more information, request bulletin B04112B.

**Crimp Dies**
Used in Portable Crimping Unit to construct hose assemblies. For information on constructing hose assemblies, refer to bulletin B00120D.

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Crimp Die</th>
<th>Crimp Diameter (mm / inch)</th>
</tr>
</thead>
<tbody>
<tr>
<td>90.700 / 90.705 (Y700 / Y705)</td>
<td>Mini-Crimp 90.710.8, No Ring Required</td>
<td>7.00 – 7.25, .276 – .285</td>
</tr>
<tr>
<td>90.500 (Y500)</td>
<td>80C-P03 Gray Die, 82C-R01 Ring</td>
<td>12.19 – 12.70, .480 – .500</td>
</tr>
<tr>
<td>90.400 (Y400)</td>
<td>80C-P04 Red Die, 82C-R01 Ring</td>
<td>14.22 – 14.73, .560 – .580</td>
</tr>
<tr>
<td>90.250** (Y250)</td>
<td>80C-P04J Red Die, 82C-R01 Ring</td>
<td>13.59 – 14.10, .535 – .555</td>
</tr>
</tbody>
</table>

**Hose Assembly Clamp**
Used to secure hose while installing hose adapters. The 90.320.9 is for use with the 90.700 / 90.705 (Y700 / Y705) hoses, and the 90.320.6 is compatible with all hose sizes.

**Using DADCO’s Mini-Crimp**
1. Place the Mini-Crimp 90.710.8 into the crimping machine. No die ring is required.
2. Insert the hose assembly from below through the center of the Mini-Crimp (F.1). For instructions on constructing a Mini Hose Assembly request bulletin B11110A.
3. Activate the hydraulic or pneumatic crimping machine to permanently crimp fitting to the hose (F.1).
4. As the DADCO Mini-Crimp begins to close, position the fitting to ensure the entire length of the ferrule is crimped (F.2).
5. Remove completed hose assembly from the Mini-Crimp.
6. Measure the crimped ferrule diameter across the flats to verify it is within the crimp dimension range (F.3).
Charging Accessories

Quick Disconnect Charging Hardware

Use the DADCO Quick Disconnect Charging Assembly, 90.310.040, with the 90.310.143 or 90.310.111 Charging Nipple or the 90.315.5 Pressure Analyzer to charge self-contained gas springs. The 90.310.040 can also be used with a DADCO control panel to charge linked systems.

The 90.310.044 Quick Disconnect Filling Assembly with self-venting capabilities releases residual pressure after charging self-contained or linked nitrogen gas spring systems for easy decoupling between the filling assembly and charging nipple or filler valve.

DADCO also offers the 90.310.041 High Pressure Charging Assembly to charge Micro Series, SCR Series and U.0175 – U.0400 nitrogen gas springs to maximum pressure. For more information, reference B16118B.

Quick Disconnect Charging Nipple

90.310.143 (M6 Port)
90.310.111 (G 1/8 Port)

Use the appropriate Quick Disconnect Charging Nipple to charge DADCO Nitrogen Gas Springs.

Safety Plates

DADCO recommends customers identify tools containing high pressure nitrogen gas springs to ensure proper handling of the cylinders. DADCO offers several caution tags to meet specific application needs. For more information request bulletin B01130D.

Compact Nitrogen Gas Booster

DGB.100

DADCO’s Compact Nitrogen Gas Booster System, DGB.100, is a lightweight, cost-effective way to extend the life of your nitrogen supply tanks. Using the DGB.100, tanks with low pressure can be boosted to a higher pressure that is suitable for charging the gas spring. For more information refer to bulletin B13105.

Nitrogen Gas Booster System

DGB.150

DADCO’s Nitrogen Gas Booster System, DGB-150, is an all-in-one solution to the problems of low pressure supply tanks and lost nitrogen gas during discharge. For more information on the booster, refer to bulletin B07101.
Complete Linked System Solutions

**SMS®**

For those instances where a customer prefers to have DADCO provide a ready-to-install finished system, DADCO offers several options. DADCO’s Sectional Mounting System (SMS®) includes a custom plate manufactured to customer’s specifications with a custom arrangement of DADCO nitrogen gas springs, control panel, hose and fittings. Systems are delivered completely assembled, tested and ready to install. For more information on DADCO’s SMS® request catalog C13106D.

**SMS-i®**

DADCO’s Sectional Mounting System – Internal (SMS-i®) is a potentially space saving custom system with internal piping allowing for tight configurations of DADCO nitrogen gas springs. The internal piping design eliminates the external hose and fittings allowing for a robust alternative to traditional manifold systems. For more information on DADCO’s SMS-i® request catalog C13106D.