



DESIGN-TITE® Nitrogen Gas Springs

They truly are ... Better by Design



We are proud to offer our new and expanded line of nitrogen gas springs.

Now the manufacturer of the world's finest die spring, *SuperSpring®*, can supply you with the world's finest nitrogen gas spring, *DESIGN-TITE®*.

Like *SuperSpring®*, *DESIGN-TITE®* is completely engineered by us. We gave our engineers the following mission:

1. Simplify the design to improve performance and ease repair,
2. Design a more solid construction to extend life and increase safety,
3. Research and incorporate only the finest materials to offer the highest quality product on the market.

We believe a better design produces a better product, and we are confident we have met our design goals.

Try *DESIGN-TITE®* and experience for yourself the benefits of this superior line of nitrogen products.

**They truly are ...
Better by Design.**



Take A Closer Look...

DANLY Now Offers Five Distinct Lines of Nitrogen Gas Springs

NEW!

The Performance Line RLP Series

Greater initial force in a
smaller diameter body.



NEW!

The Sub Compact Line RLSC Series

Short stroke, high force
in a compact body.



NEW!

The North American Line RLS Series

Our proven ISO gas spring
redesigned for the
North American market.



IMPROVED!

The ISO Line RL Series

Our original gas spring now
meets ISO and VDI requirements.



NEW!

The Micro Line RLM Series

All new, all rebuildable.



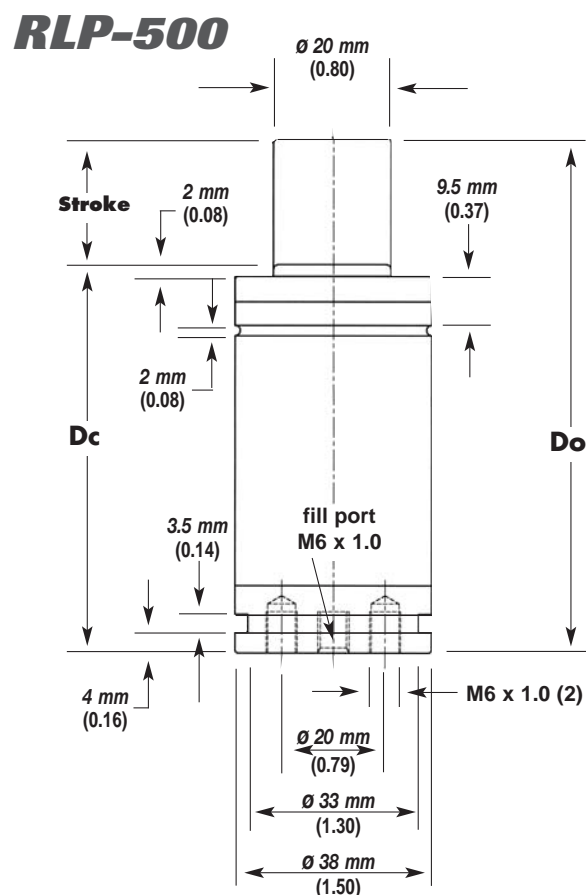
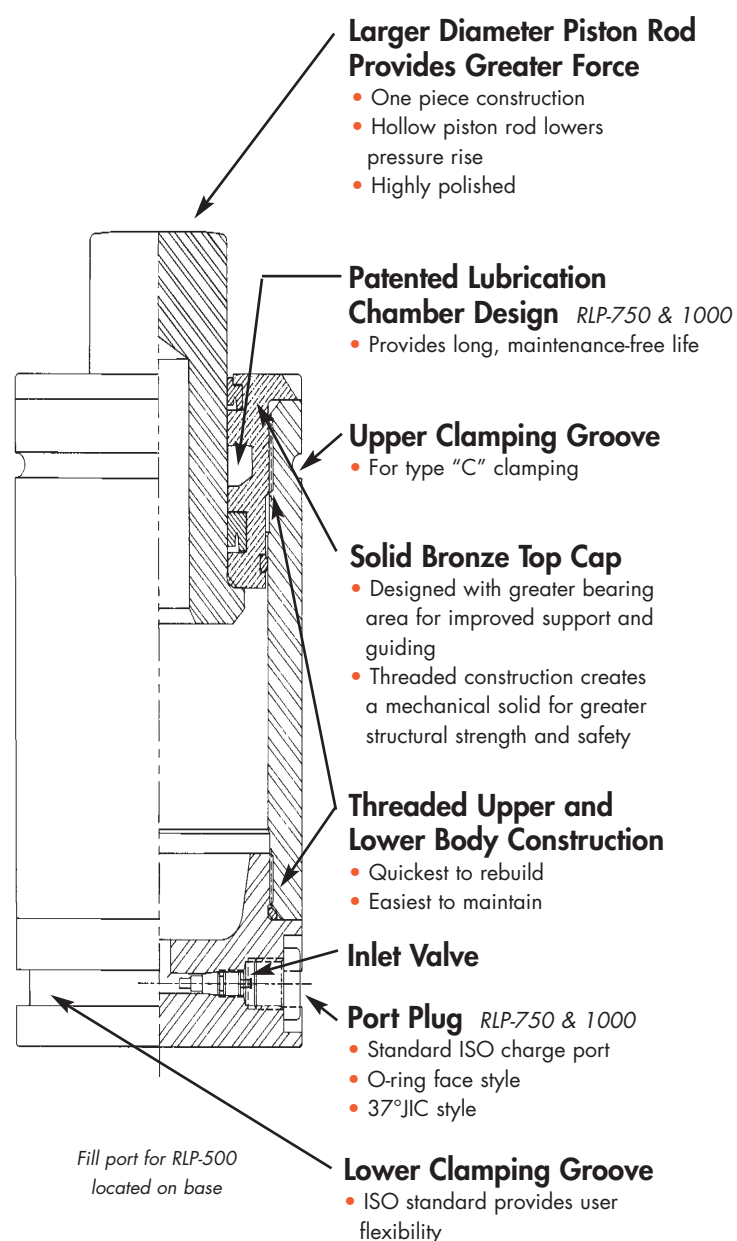
Performance Gas Springs	
• RLP-500	4
• RLP-750, 1000	5
Sub Compact Gas Springs	
• RLSC-1000	6
• RLSC-1800, 4700	7
North American Gas Springs	
• RLS-500,	8
• RLS-750, 1500	9
ISO Gas Springs	
• RL-750, 1500.....	10
• RL-3000, 5000.....	11
Micro Gas Springs	
• RLM-90	12
• RLM-180	13
• RLM-230	14
• RLM-300	15
Pre-mounted Systems	16
Assembling Fittings	17
Control Panels	18
Assembly Hose	18
Fittings	19
Junction Block	20
Good Design	21
Accessories	22
Service Gauge Assembly	22
Ease of Repair.....	22
Better by Design	23

The Performance Line (RLP Series)

- Every DESIGN-TITE® Performance gas spring provides greater force in a smaller body than the RLS and RL series gas springs.
- RLP gas springs are shipped charged at 150 bar (2175 psi).

Better by Design...

RLP gas springs are designed for easy service and safety



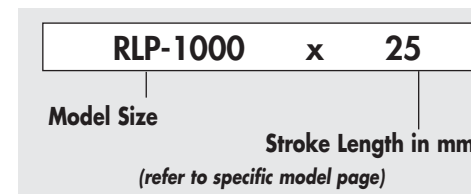
RLP-500 Stroke Lengths

PART NO. Model x Stroke mm (inch)	Dc Die Closed	Do Die Open
RLP-500 x 13 mm (0.51 inch)	63 (2.48)	76 (2.99)
RLP-500 x 25 mm (0.98 inch)	75 (2.96)	100 (3.94)
RLP-500 x 38 mm (1.50 inch)	88 (3.47)	126 (4.96)
RLP-500 x 50 mm (1.97 inch)	100 (3.94)	150 (5.91)
RLP-500 x 63 mm (2.48 inch)	113 (4.45)	176 (6.93)
RLP-500 x 80 mm (3.15 inch)	130 (5.12)	210 (8.27)

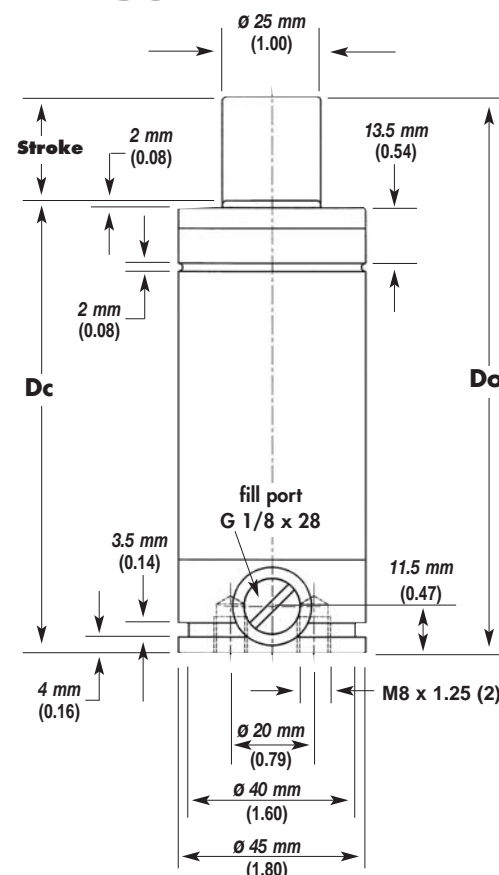
RLP-500 Die Forces

DIE OPEN FORCE 473 daN (1063 lbs)	DIE CLOSED FORCE 780 daN (1753 lbs)
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Here's How To Order The RLP:



RLP-750



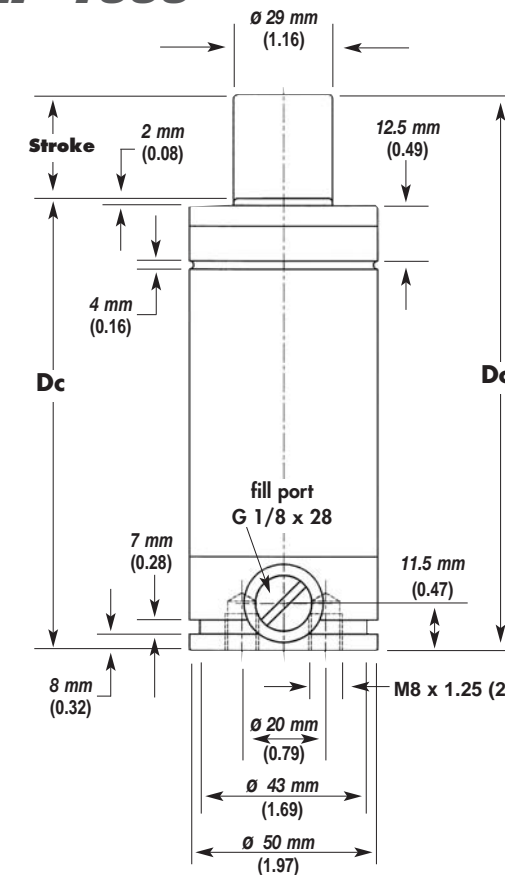
RLP-750 Stroke Lengths

PART NO. Model x Stroke mm (inch)	Dc Die Closed	Do Die Open
RLP-750 x 13 mm (0.51 inch)	63 (2.48)	76 (2.99)
RLP-750 x 25 mm (0.98 inch)	75 (2.96)	100 (3.94)
RLP-750 x 38 mm (1.50 inch)	88 (3.47)	126 (4.96)
RLP-750 x 50 mm (1.97 inch)	100 (3.94)	150 (5.91)
RLP-750 x 63 mm (2.48 inch)	113 (4.45)	176 (6.93)
RLP-750 x 80 mm (3.15 inch)	130 (5.12)	210 (8.27)

RLP-750 Die Forces

DIE OPEN FORCE 739 daN (1661 lbs)	DIE CLOSED FORCE 1350 daN (3033 lbs)
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RLP-1000



RLP-1000 Stroke Lengths

PART NO. Model x Stroke mm (inch)	Dc Die Closed	Do Die Open
RLP-1000 x 13 mm (0.51 inch)	63 (2.48)	76 (2.99)
RLP-1000 x 25 mm (0.98 inch)	75 (2.95)	100 (3.94)
RLP-1000 x 38 mm (1.50 inch)	88 (3.47)	126 (4.96)
RLP-1000 x 50 mm (1.97 inch)	100 (3.94)	150 (5.91)
RLP-1000 x 63 mm (2.48 inch)	113 (4.45)	176 (6.93)
RLP-1000 x 80 mm (3.15 inch)	130 (5.12)	210 (8.27)

RLP-1000 Die Force

DIE OPEN FORCE 994 daN (2236 lbs)	DIE CLOSED FORCE 1930 daN (4337 lbs)
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Die Closed Force is based on longest stroke. Force increase is less with shorter strokes.
All dimensions and forces are nominal unless otherwise stated. Based on a charge pressure of 150 bar (2175 psi).
Maximum available travel is 100% of stroke. Design should not exceed 90% of available stroke.

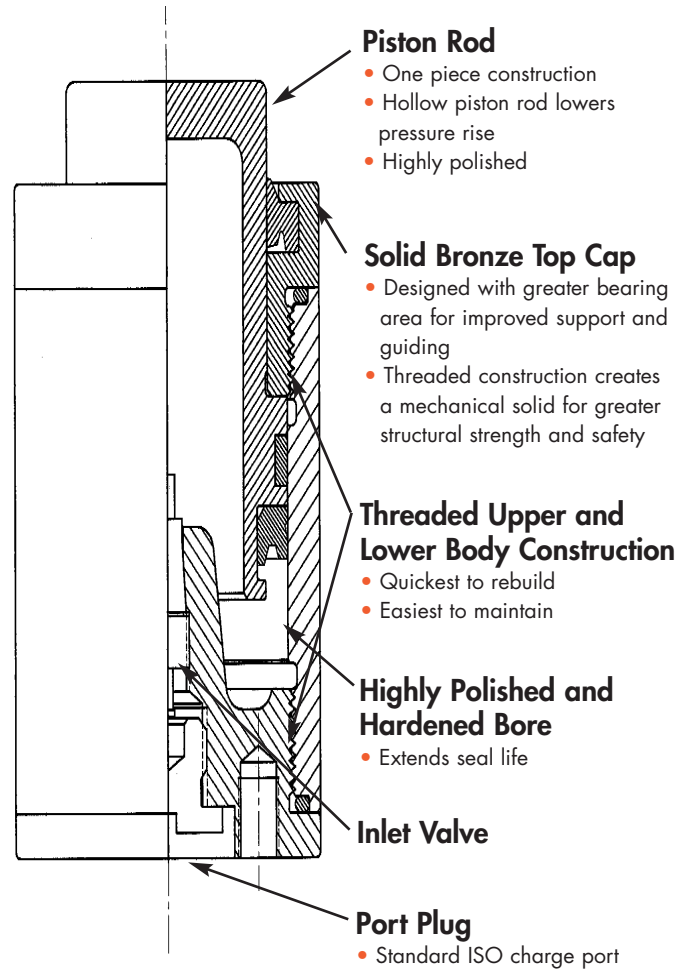
Die Closed Force is based on longest stroke. Force increase is less with shorter strokes.
All dimensions and forces are nominal unless otherwise stated. Based on a charge pressure of 150 bar (2175 psi).
Maximum available travel is 100% of stroke. Design should not exceed 90% of available stroke.

The Sub Compact Line (RLSC Series)

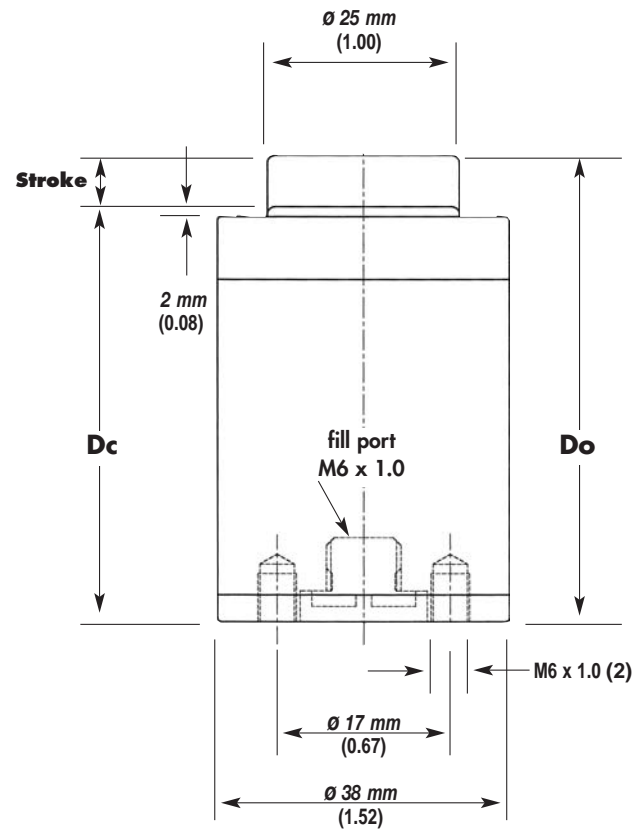
- Every DESIGN-TITE® Sub Compact gas spring combines the convenience of a self-contained gas spring with the increased on-contact force and shorter body height of a bore seal cylinder.
- RLSC gas springs are shipped charged at 150 bar (2175 psi).

Better by Design...

RLSC gas springs are designed for easy service and safety



RLSC-1000



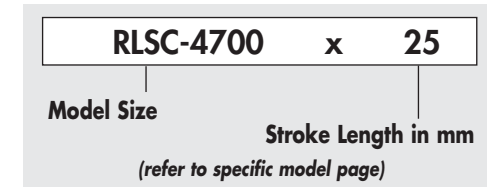
RLSC-1000 Stroke Lengths

PART NO. Model x Stroke mm (inch)	Dc	
	Die Closed	Die Open
RLSC-1000 x 6 mm (0.24 inch)	55 (2.17)	61 (2.40)
RLSC-1000 x 10 mm (0.39 inch)	68 (2.68)	78 (3.07)
RLSC-1000 x 16 mm (0.63 inch)	84 (3.31)	100 (3.94)
RLSC-1000 x 25 mm (0.98 inch)	110 (4.33)	135 (5.32)
RLSC-1000 x 32 mm (1.26 inch)	135 (5.31)	167 (6.57)
RLSC-1000 x 40 mm (1.57 inch)	155 (6.10)	195 (7.68)
RLSC-1000 x 50 mm (1.97 inch)	180 (7.09)	230 (9.06)

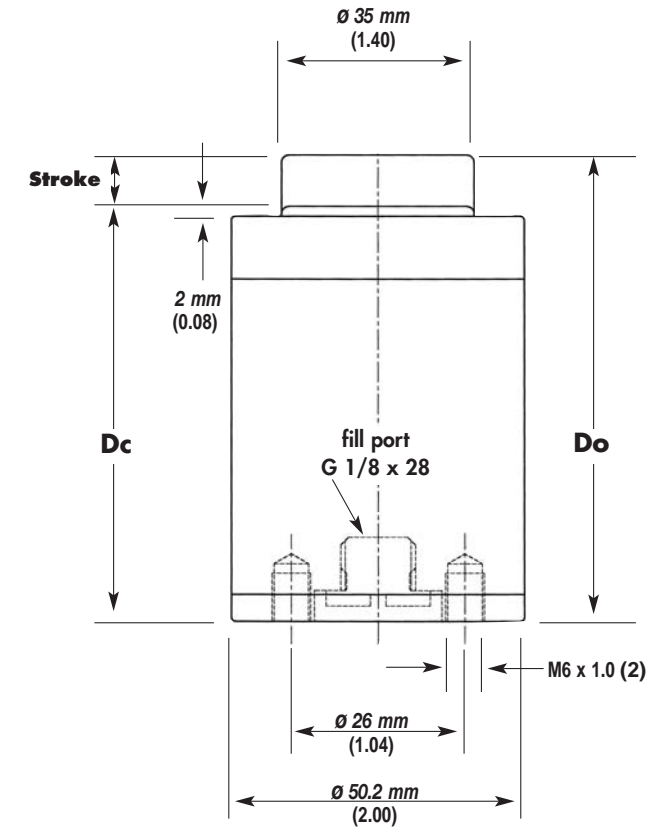
RLSC-1000 Die Force

DIE OPEN FORCE 1063 daN (2389 lbs)	DIE CLOSED FORCE 1590 daN (3572 lbs)
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Here's How To Order
The RLSC:



RLSC-1800



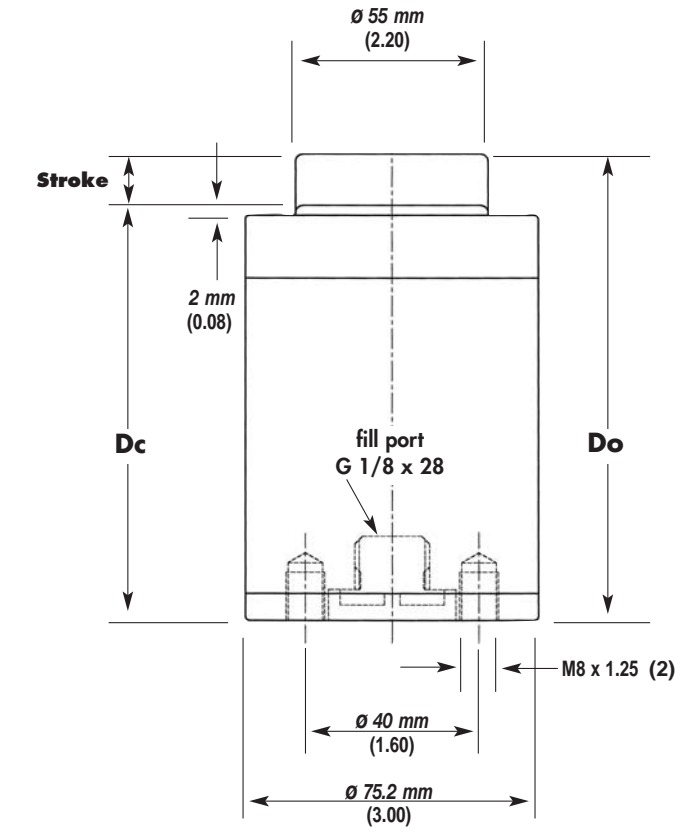
RLSC-1800 Stroke Lengths

PART NO. Model x Stroke mm (inch)	Dc	
	Die Closed	Die Open
RLSC-1800 x 6 mm (0.24 inch)	60 (2.36)	66 (2.60)
RLSC-1800 x 10 mm (0.39 inch)	70 (2.76)	80 (3.15)
RLSC-1800 x 16 mm (0.63 inch)	90 (3.54)	106 (4.17)
RLSC-1800 x 25 mm (0.98 inch)	110 (4.33)	135 (5.32)
RLSC-1800 x 32 mm (1.26 inch)	130 (5.12)	162 (6.38)
RLSC-1800 x 40 mm (1.57 inch)	150 (5.91)	190 (7.48)
RLSC-1800 x 50 mm (1.97 inch)	170 (6.69)	220 (8.66)

RLSC-1800 Die Force

DIE OPEN FORCE 1803 daN (4051 lbs)	DIE CLOSED FORCE 3251 daN (7305 lbs)
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RLSC-4700



RLSC-4700 Stroke Lengths

PART NO. Model x Stroke (mm, inch)	Dc	
	Die Closed	Die Open
RLSC-4700 x 10 mm (0.39 inch)	70 (2.76)	80 (3.15)
RLSC-4700 x 16 mm (0.63 inch)	90 (3.54)	106 (4.17)
RLSC-4700 x 25 mm (0.98 inch)	110 (4.33)	135 (5.32)
RLSC-4700 x 32 mm (1.26 inch)	135 (5.31)	167 (6.57)
RLSC-4700 x 40 mm (1.57 inch)	160 (6.30)	200 (7.87)
RLSC-4700 x 50 mm (1.97 inch)	190 (7.48)	240 (9.45)

RLSC-4700 Die Force

DIE OPEN FORCE 4767 daN (10711 lbs)	DIE CLOSED FORCE 7179 daN (16131 lbs)
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Die Closed Force is based on longest stroke. Force increase is less with shorter strokes.

All dimensions and forces are nominal unless otherwise stated. Based on a charge pressure of 150 bar (2175 psi).
Maximum available travel is 100% of stroke. Design should not exceed 90% of available stroke.

Die Closed Force is based on longest stroke. Force increase is less with shorter strokes.

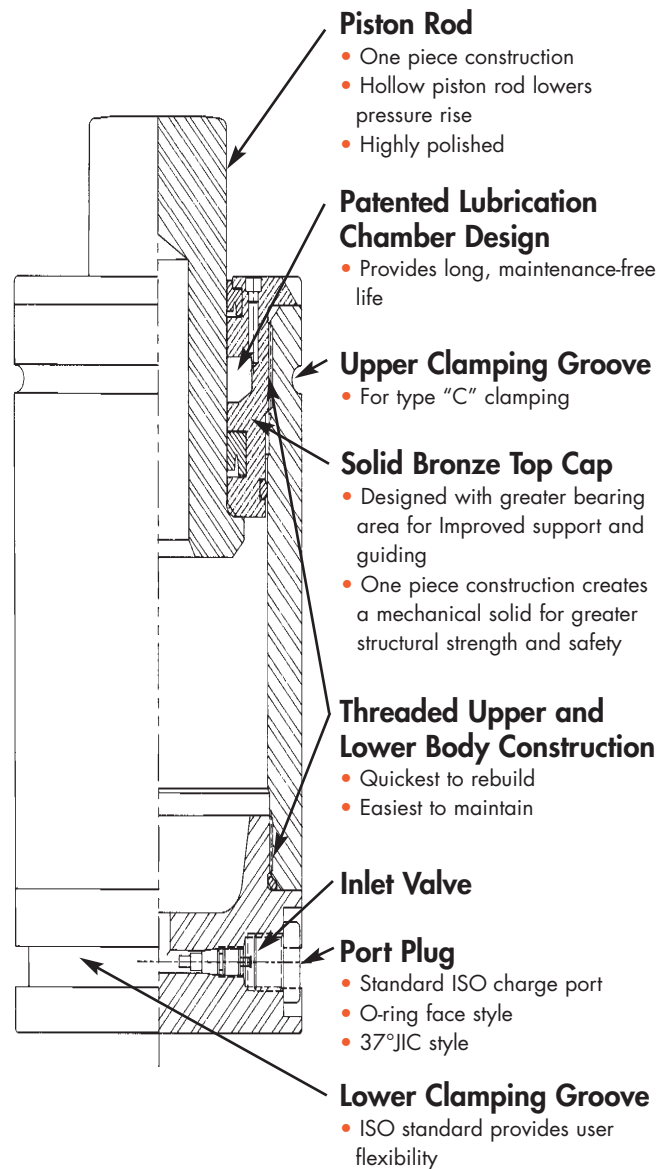
All dimensions and forces are nominal unless otherwise stated. Based on a charge pressure of 150 bar (2175 psi).
Maximum available travel is 100% of stroke. Design should not exceed 90% of available stroke.

The North American Line (RLS Series)

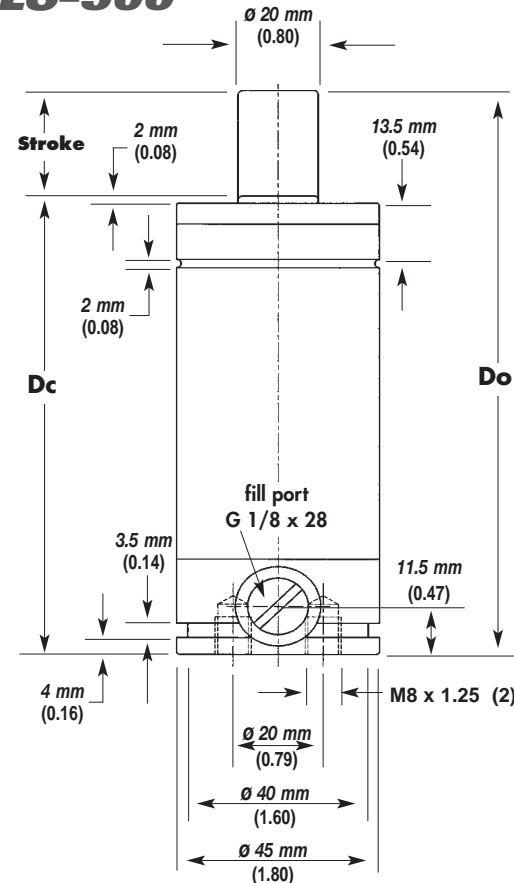
- Every DESIGN-TITE® North American gas spring meets all ISO and VDI piston rod and body diameter standards, in addition to mounting and charge port specifications and features the shorter body height common in North America.
- RLS gas springs are shipped charged at 150 bar (2175 psi).

Better by Design...

RLS and RL gas springs are designed for easy service and safety



RLS-500



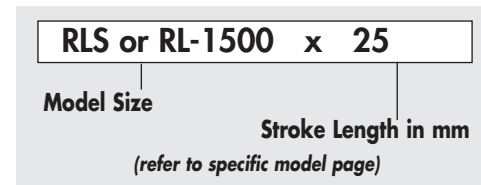
RLS-500 Stroke Lengths

PART NO. Model x Stroke mm (inch)	Dc	
	Die Closed	Die Open
RLS-500 x 13 mm (0.51 inch)	63 (2.48)	76 (2.99)
RLS-500 x 25 mm (0.98 inch)	75 (2.95)	100 (3.94)
RLS-500 x 38 mm (1.50 inch)	88 (3.47)	126 (4.96)
RLS-500 x 50 mm (1.97 inch)	100 (3.94)	150 (5.91)
RLS-500 x 63 mm (2.48 inch)	113 (4.45)	176 (6.93)
RLS-500 x 80 mm (3.15 inch)	130 (5.12)	210 (8.27)

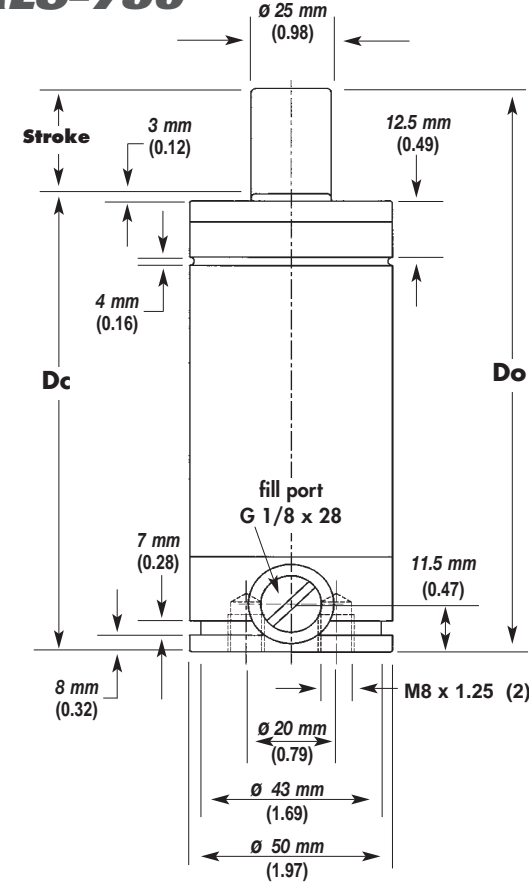
RLS-500 Die Force

DIE OPEN FORCE 473 daN (1063 lbs)	DIE CLOSED FORCE 681 daN (1530 lbs)
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Here's How To Order
The RLS and RL:



RLS-750



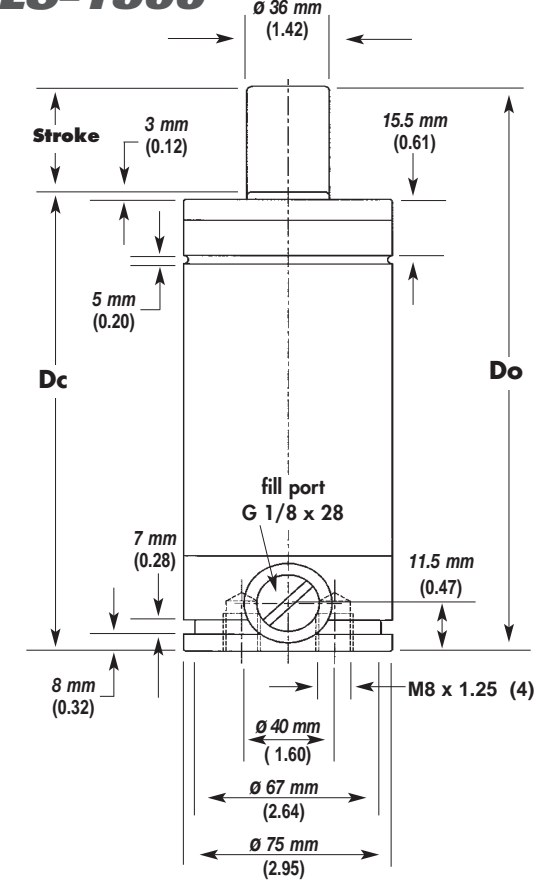
RLS-750 Stroke Lengths

PART NO. Model x Stroke mm (inch)	Dc	
	Die Closed	Die Open
RLS-750 x 13 mm (0.51 inch)	63 (2.48)	76 (2.99)
RLS-750 x 25 mm (0.98 inch)	75 (2.96)	100 (3.94)
RLS-750 x 38 mm (1.50 inch)	88 (3.46)	126 (4.99)
RLS-750 x 50 mm (1.97 inch)	100 (3.94)	150 (5.91)
RLS-750 x 63 mm (2.48 inch)	113 (4.45)	176 (6.93)
RLS-750 x 80 mm (3.15 inch)	130 (5.12)	210 (8.27)
RLS-750 x 100 mm (3.94 inch)	150 (5.90)	250 (9.84)

RLS-750 Die Force

DIE OPEN FORCE 739 daN (1661 lbs)	DIE CLOSED FORCE 1180 daN (2651 lbs)
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RLS-1500



RLS-1500 Stroke Lengths

PART NO. Model x Stroke mm (inch)	Dc	
	Die Closed	Die Open
RLS-1500 x 25 mm (0.98 inch)	126.6 (4.98)	151.6 (5.97)
RLS-1500 x 38 mm (1.50 inch)	139 (5.47)	177 (6.97)
RLS-1500 x 50 mm (1.97 inch)	151.6 (5.97)	201.6 (7.94)
RLS-1500 x 63 mm (2.48 inch)	164 (6.46)	227 (8.94)
RLS-1500 x 80 mm (3.15 inch)	181.6 (7.15)	261.6 (10.30)
RLS-1500 x 100 mm (3.94 inch)	201.6 (7.94)	301.6 (11.87)
RLS-1500 x 125 mm (4.92 inch)	226.6 (8.92)	351.6 (13.84)

RLS-1500 Die Force

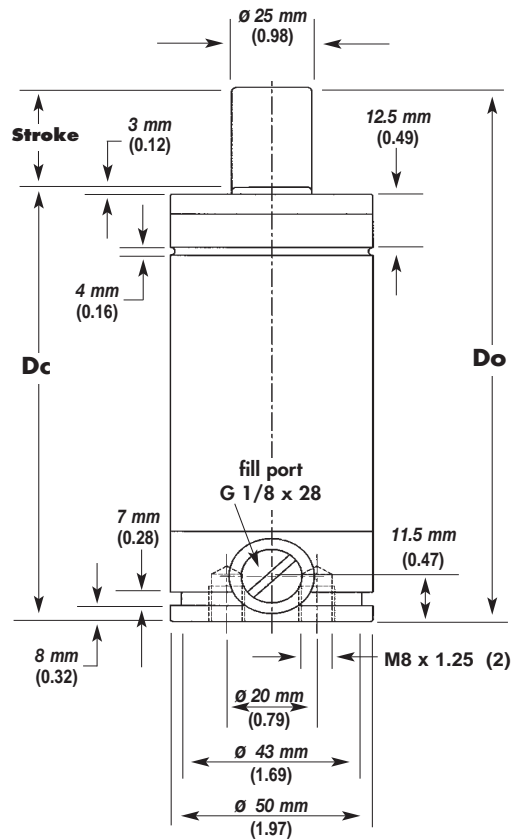
DIE OPEN FORCE 1532 daN (3442 lbs)	DIE CLOSED FORCE 2240 daN (5033 lbs)
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Die Closed Force is based on longest stroke. Force increase is less with shorter strokes.
All dimensions and forces are nominal unless otherwise stated. Based on a charge pressure of 150 bar (2175 psi).
Maximum available travel is 100% of stroke. Design should not exceed 90% of available stroke.

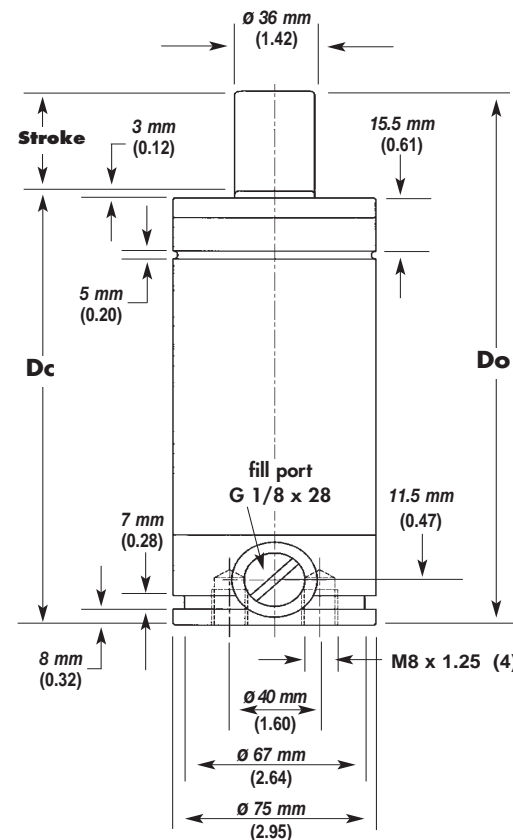
Die Closed Force is based on longest stroke. Force increase is less with shorter strokes.
All dimensions and forces are nominal unless otherwise stated. Based on a charge pressure of 150 bar (2175 psi).
Maximum available travel is 100% of stroke. Design should not exceed 90% of available stroke.

The ISO Line (RL Series)

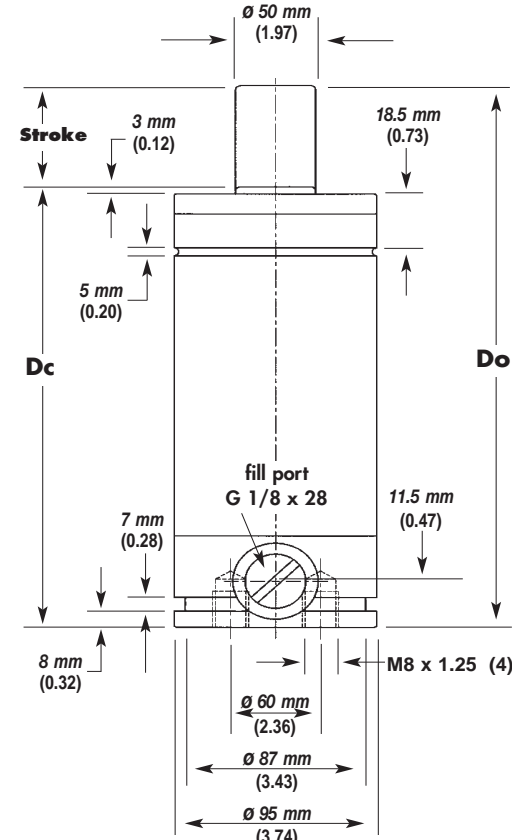
RL-750



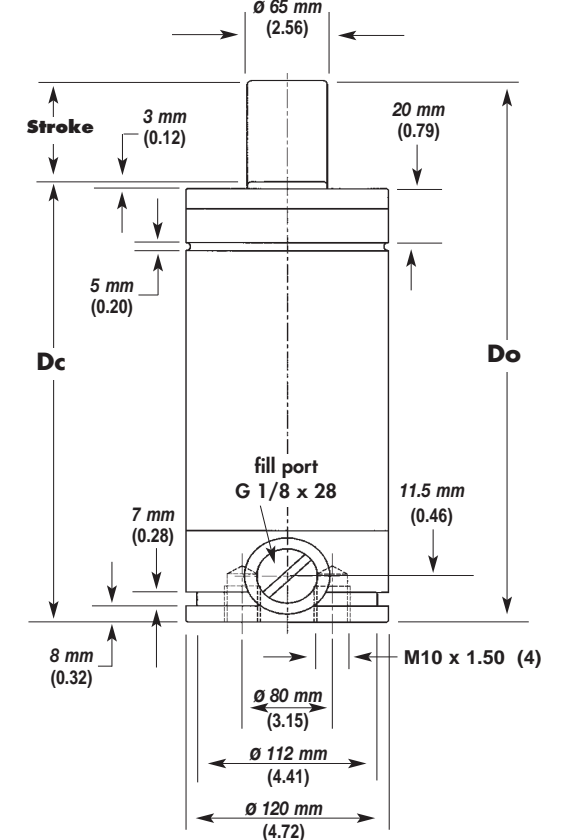
RL-1500



RL-3000



RL-5000



RL-750 Stroke Lengths

PART NO. Model x Stroke mm (inch)	Dc Die Closed	Do Die Open
RL 750 x 25 mm (0.98 inch)	120 (4.72)	145 (5.70)
RL 750 x 38 mm (1.50 inch)	133 (5.24)	171 (6.73)
RL 750 x 50 mm (1.97 inch)	145 (5.70)	195 (7.68)
RL 750 x 63 mm (2.48 inch)	158 (6.22)	221 (8.70)
RL 750 x 80 mm (3.15 inch)	175 (6.88)	255 (10.03)
RL 750 x 100 mm (3.94 inch)	195 (7.67)	295 (11.60)
RL 750 x 125 mm (4.92 inch)	220 (8.65)	345 (13.57)
RL 750 x 160 mm (6.30 inch)	255 (10.03)	415 (16.32)

RL-1500 Stroke Lengths

PART NO. Model x Stroke mm (inch)	Dc Die Closed	Do Die Open
RL 1500 x 25 mm (0.98 inch)	135 (5.31)	160 (6.29)
RL 1500 x 38 mm (1.50 inch)	148 (5.83)	186 (7.32)
RL 1500 x 50 mm (1.97 inch)	160 (6.29)	210 (8.26)
RL 1500 x 63 mm (2.48 inch)	173 (6.81)	236 (9.29)
RL 1500 x 80 mm (3.15 inch)	190 (7.47)	270 (10.62)
RL 1500 x 100 mm (3.94 inch)	210 (8.26)	310 (12.19)
RL 1500 x 125 mm (4.92 inch)	235 (9.24)	360 (14.16)
RL 1500 x 160 mm (6.30 inch)	270 (10.62)	430 (16.91)

RL-3000 Stroke Lengths

PART NO. Model x Stroke mm (inch)	Dc Die Closed	Do Die Open
RL 3000 x 25 mm (0.98 inch)	145 (5.70)	170 (6.69)
RL 3000 x 38 mm (1.50 inch)	158 (6.22)	196 (7.72)
RL 3000 x 50 mm (1.97 inch)	170 (6.69)	220 (8.65)
RL 3000 x 63 mm (2.48 inch)	183 (7.27)	246 (9.69)
RL 3000 x 80 mm (3.15 inch)	200 (7.87)	280 (11.01)
RL 3000 x 100 mm (3.94 inch)	220 (8.65)	320 (12.59)
RL 3000 x 125 mm (4.92 inch)	245 (9.64)	370 (14.55)
RL 3000 x 160 mm (6.30 inch)	280 (11.01)	440 (17.31)

RL-5000 Stroke Lengths

PART NO. Model x Stroke mm (inch)	Dc Die Closed	Do Die Open
RL 5000 x 25 mm (0.98 inch)	165 (6.49)	190 (7.47)
RL 5000 x 38 mm (1.50 inch)	178 (7.01)	216 (8.51)
RL 5000 x 50 mm (1.97 inch)	190 (7.47)	240 (9.44)
RL 5000 x 63 mm (2.48 inch)	203 (7.99)	266 (10.47)
RL 5000 x 80 mm (3.15 inch)	220 (8.65)	300 (11.80)
RL 5000 x 100 mm (3.94 inch)	240 (9.44)	340 (13.37)
RL 5000 x 125 mm (4.92 inch)	265 (10.42)	390 (15.34)
RL 5000 x 160 mm (6.30 inch)	300 (11.80)	460 (18.10)

RL-750 Die Force

DIE OPEN FORCE	DIE CLOSED FORCE
739 daN (1661 lbs)	1059 daN (2372 lbs)

RL-1500 Die Force

DIE OPEN FORCE	DIE CLOSED FORCE
1532 daN (3442 lbs)	2142 daN (4813 lbs)

RL-3000 Die Force

DIE OPEN FORCE	DIE CLOSED FORCE
2955 daN (6640 lbs)	4289 daN (9637 lbs)

RL-5000 Die Force

DIE OPEN FORCE	DIE CLOSED FORCE
4994 daN (11222 lbs)	7296 daN (16394 lbs)

Die Closed Force is based on longest stroke. Force increase is less with shorter strokes.
All dimensions and forces are nominal unless otherwise stated. Based on a charge pressure of 150 bar (2175 psi).
Maximum available travel is 100% of stroke. Design should not exceed 90% of available stroke.

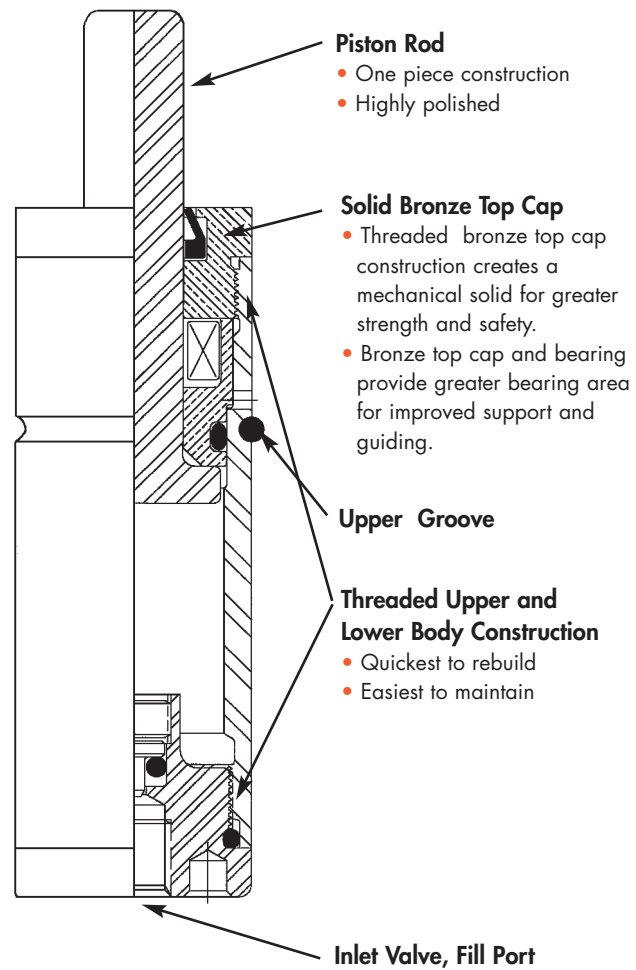
Die Closed Force is based on longest stroke. Force increase is less with shorter strokes.
All dimensions and forces are nominal unless otherwise stated. Based on a charge pressure of 150 bar (2175 psi).
Maximum available travel is 100% of stroke. Design should not exceed 90% of available stroke.

The Micro Line (RLM Series)

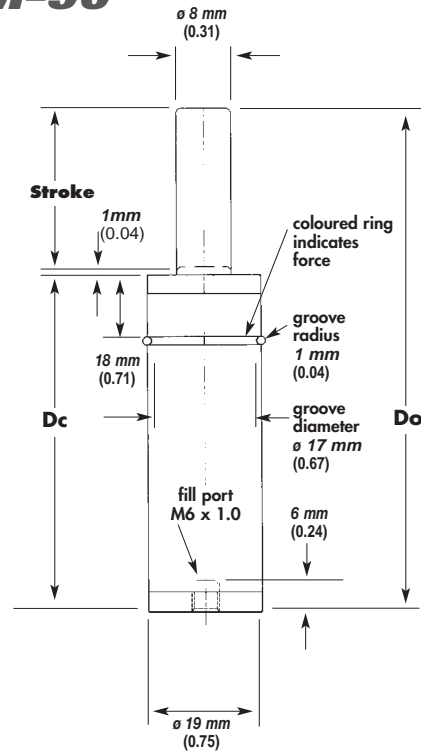
- Every DESIGN-TITE® Micro 90 and 180 gas spring is adjustable, rechargeable and rebuildable.
- All RLM Series Gas Springs meet all ISO piston rod, body and height standards, in addition to mounting specifications.
- RLM-90 and 180 gas springs are shipped at full charge unless otherwise specified.
- See adjacent page for ordering information.

Better by Design...

RLM gas springs are designed for easy service and safety



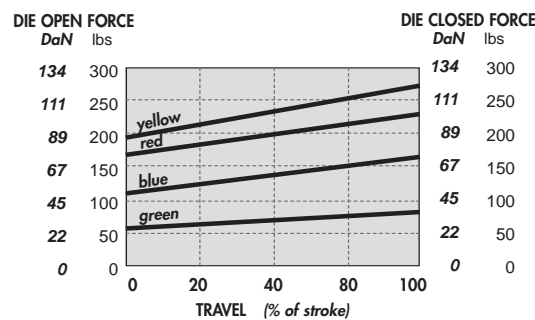
RLM-90



RLM-90 Stroke Lengths

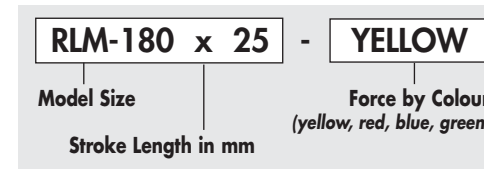
PART NO. Model x Stroke mm (inch)	Dc Die Closed	Do Die Opened
RLM-90 x 15 mm (0.59 inch)	57 (2.24)	72 (2.83)
RLM-90 x 25 mm (0.98 inch)	67 (2.64)	92 (3.62)
RLM-90 x 38 mm (1.50 inch)	80 (3.15)	118 (4.65)
RLM-90 x 50 mm (1.97 inch)	92 (3.62)	142 (5.59)
RLM-90 x 80 mm (3.15 inch)	125 (4.93)	205 (8.07)

RLM-90 Force Chart

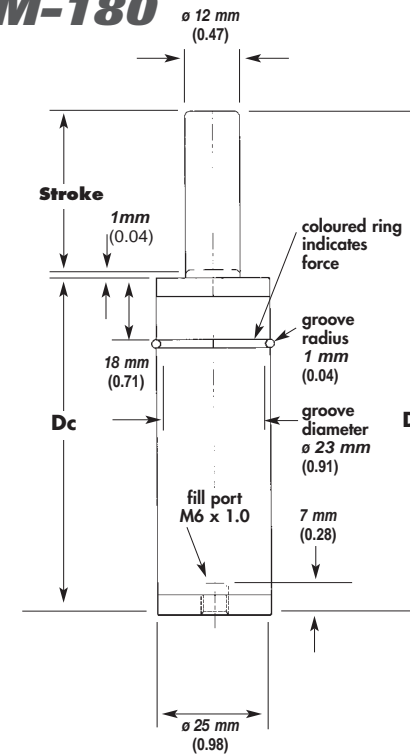


Die closed force is based on longest stroke. Force increase is less with shorter stroke.
All dimensions and forces are nominal unless otherwise stated.
Maximum available travel is 100% of stroke. Design should not exceed 90% of available stroke.

Here's How To Order
The RLM-90 and 180:



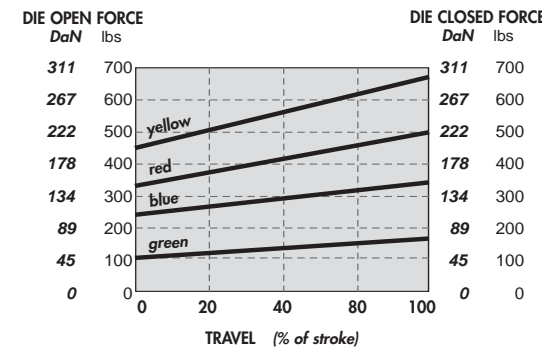
RLM-180



RLM-180 Stroke Lengths

PART NO. Model x Stroke mm (inch)	Dc Die Closed	Do Die Open
RLM-180 x 15 mm (0.59 inch)	57 (2.24)	72 (2.83)
RLM-180 x 25 mm (0.98 inch)	67 (2.64)	92 (3.62)
RLM-180 x 38 mm (1.50 inch)	80 (3.15)	118 (4.65)
RLM-180 x 50 mm (1.97 inch)	92 (3.62)	142 (5.59)
RLM-180 x 80 mm (3.15 inch)	125 (4.92)	205 (8.07)

RLM-180 Force Chart



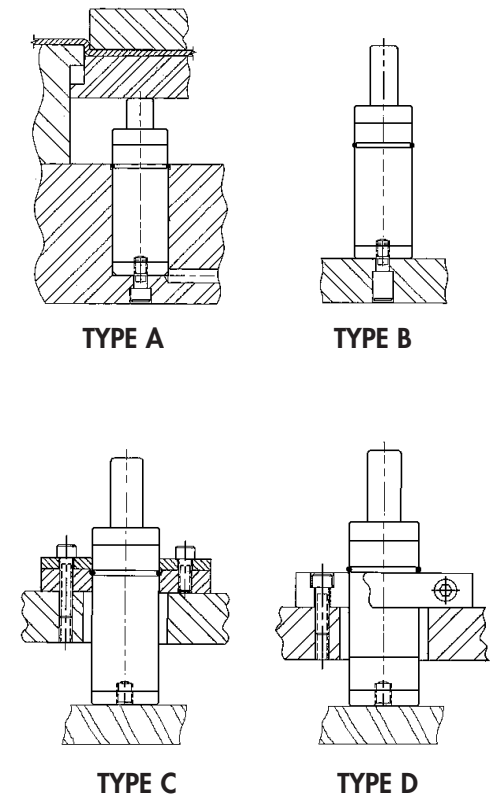
Die closed force is based on longest stroke. Force increase is less with shorter stroke.
All dimensions and forces are nominal unless otherwise stated.
Maximum available travel is 100% of stroke. Design should not exceed 90% of available stroke.

Contact Forces - RLM-90, 180

CONTACT FORCE		Yellow	Red	Blue	Green	
RLM-90 x	die contact force	daN lbs	87.5 197	75 169	50 112	25 56
	charged pressure	bar psi	175 2538	150 2175	100 1450	50 725
RLM-180 x	die contact force	daN lbs	200 450	150 337	100 225	50 112
	charged pressure	bar psi	177 2567	133 1922	89 1284	44 639

Mounting Styles - RLM-90, 180

Shown are examples of some typical mounting configurations for the Micro line - designed to be interchangeable with standard micro gas spring mountings.

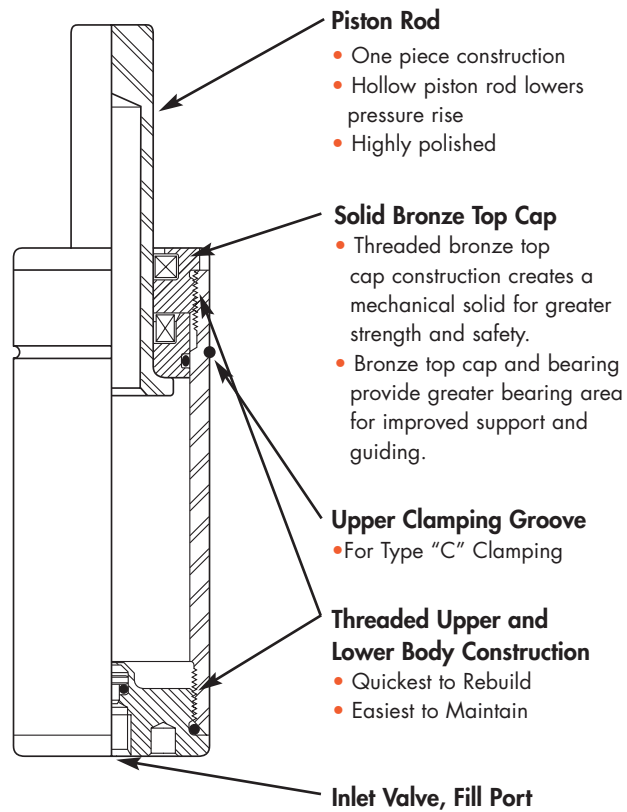


The Micro Line (RLM Series)

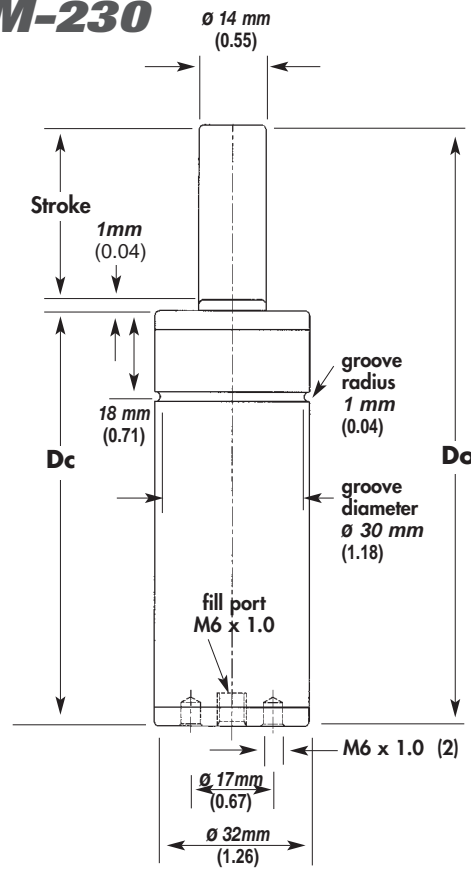
- Every DESIGN-TITE® Micro 230 and 300 gas spring is adjustable, rechargeable and rebuildable.
- All RLM Series Gas Springs meet all ISO piston rod, body and height standards, in addition to mounting specifications.
- RLM-230 and 300 gas springs are shipped charged at 150 bar (2175 psi).

Better by Design...

The RLM-230 is designed for easy service and safety



RLM-230



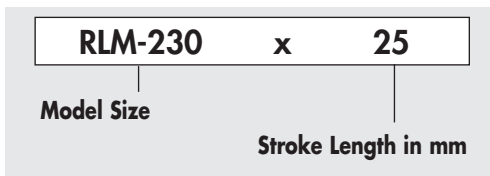
RLM-230 Stroke Lengths

PART NO. Model x Stroke mm (inch)	Dc Do	
	Die Closed	Die Open
RLM-230 x 10 mm (0.39 inch)	60 (2.36)	70 (2.76)
RLM-230 x 15 mm (0.59 inch)	65 (2.56)	80 (3.15)
RLM-230 x 25 mm (0.98 inch)	75 (2.95)	100 (3.94)
RLM-230 x 38 mm (1.50 inch)	88 (3.47)	126 (4.97)
RLM-230 x 50 mm (1.97 inch)	100 (3.94)	150 (5.91)
RLM-230 x 63 mm (2.48 inch)	113 (4.45)	176 (6.93)
RLM-230 x 80 mm (3.15 inch)	130 (5.12)	210 (8.27)

RLM-230 Die Force

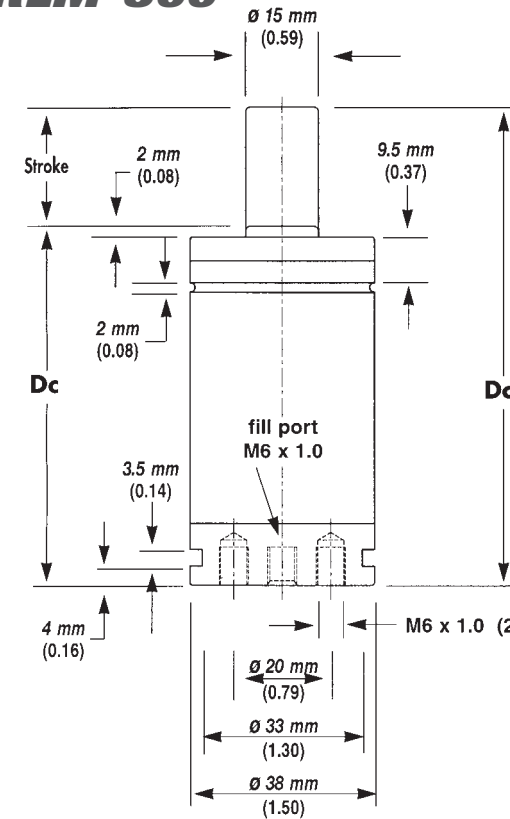
DIE OPEN FORCE 232 daN (521 lbs)	DIE CLOSED FORCE 303.2 daN (681 lbs)
--	--

Here's How To Order The RLM-230:



Die Closed Force is based on longest stroke. Force increase is less with shorter strokes.
All dimensions and forces are nominal unless otherwise stated. Based on a charge pressure of 150 bar (2175 psi).
Maximum available travel is 100% of stroke. Design should not exceed 90% of available stroke.

RLM-300



RLM-300 Stroke Lengths

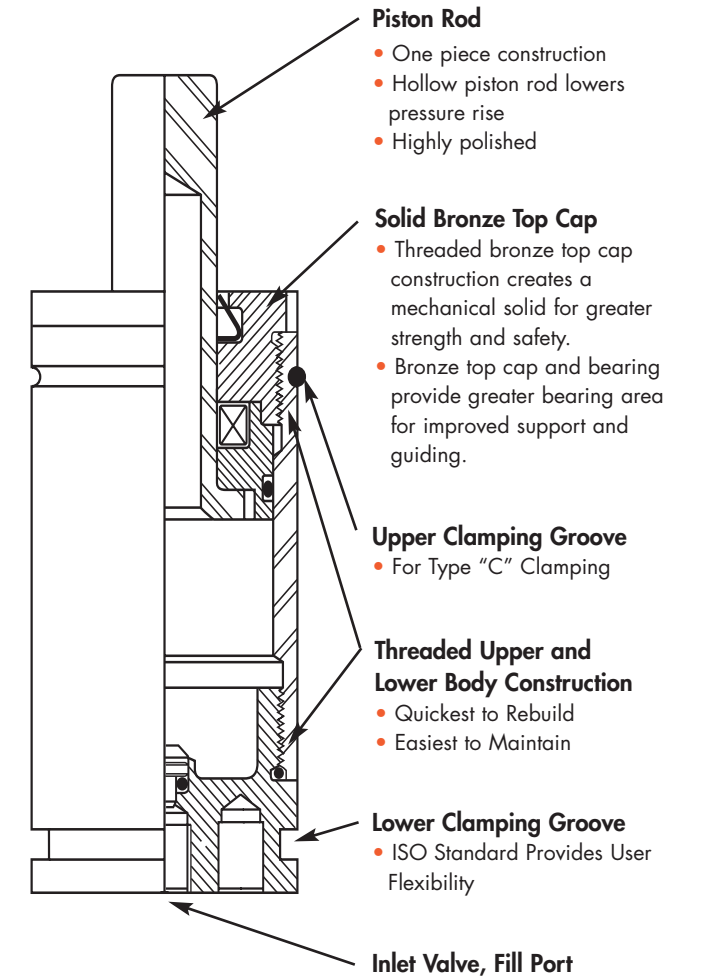
PART NO. Model x S (mm, inch)	Dc Do	
	Die Closed	Die Open
RLM-300 x 13 mm (0.51 inch)	63 (2.48)	76 (2.99)
RLM-300 x 16 mm (0.63 inch)	66 (2.60)	82 (3.23)
RLM-300 x 25 mm (0.98 inch)	75 (2.96)	100 (3.94)
RLM-300 x 38 mm (1.50 inch)	88 (3.47)	126 (4.96)
RLM-300 x 50 mm (1.97 inch)	100 (3.94)	150 (5.91)
RLM-300 x 63 mm (2.48 inch)	113 (4.45)	176 (6.93)
RLM-300 x 80 mm (3.15 inch)	130 (5.12)	210 (8.27)

RLM-300 Die Force

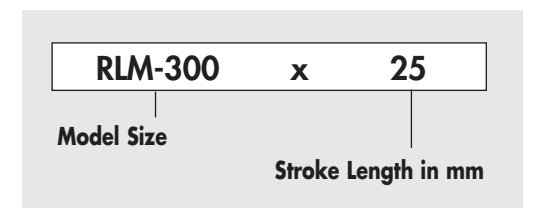
DIE OPEN FORCE 267 daN (598 lbs)	DIE CLOSED FORCE 336.4 daN (756 lbs)
--	--

Better by Design...

The RLM-300 is designed for easy service and safety

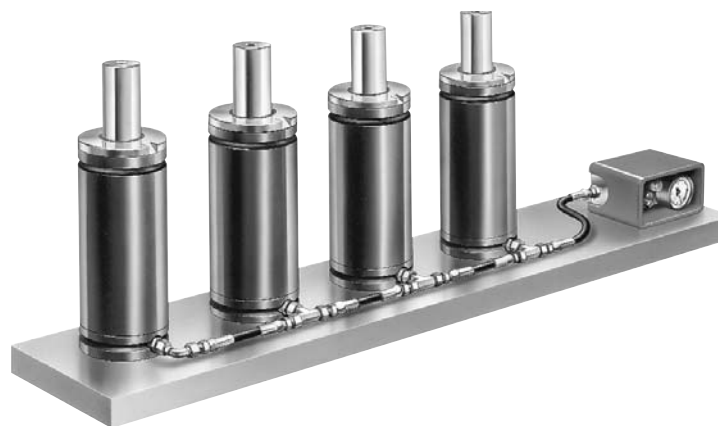


Here's How To Order The RLM-300:



Die Closed Force is based on longest stroke. Force increase is less with shorter strokes.
All dimensions and forces are nominal unless otherwise stated. Based on a charge pressure of 150 bar (2175 psi).
Maximum available travel is 100% of stroke. Design should not exceed 90% of available stroke.

Pre-mounted Systems



- An affordable and flexible alternative to nitrogen manifold systems.
- All pre-mounted systems are assembled and supplied danly for installation in your die.
- All gas springs are pre-mounted, pre-hosed and pressure tested prior to shipping, saving both time and money.
- All RLS, RL, and RLP-750 & 1000 gas springs can be made part of a pre-mounted system.

How To Order a Pre-mounted System:

When specifying a pre-mounted system the following information is necessary to ensure proper application and fit:

1. The finished plate length, width, and plate thickness including specific tolerances.
2. The location, size and stroke, preferred mounting, and quantity of each DESIGN-TITE® gas spring.
3. The location of the control panel in relation to the plate. If remote mounting is desired, please specify hose length.
4. Provide a plan drawing for nitrogen hose routings, and specify the style of fittings (O-ring face or 37° JIC). The plan drawing must include the hose routing to ensure proper fit in your application.
5. The size and exact location of all plate mounting holes must be specified. If counterbored holes are required, please detail.



Gas Spring General Operating Conditions

Pressure Medium:	Nitrogen Gas
Maximum Charged Pressure: 150 bar (2175 psi).	RLP, RLSC, RLS, RL and RLM Micro 230 & 300
180 bar (2610 psi).	RLM Micro 90 & 180
Minimum Charged Pressure: 50 bar (725 psi)	RLP, RLSC, RLS, RL and RLM Micro Gas Springs
Maximum Operating Temperature:	+80C° (+176°F)
Maximum Piston Rod Velocity:	15m/min.
Maximum Utilized Stroke:	100% of the stroke (Design should not exceed 90%)
Maximum Rod Misalignment:	0.15°

Assembling Fittings to Gas Springs

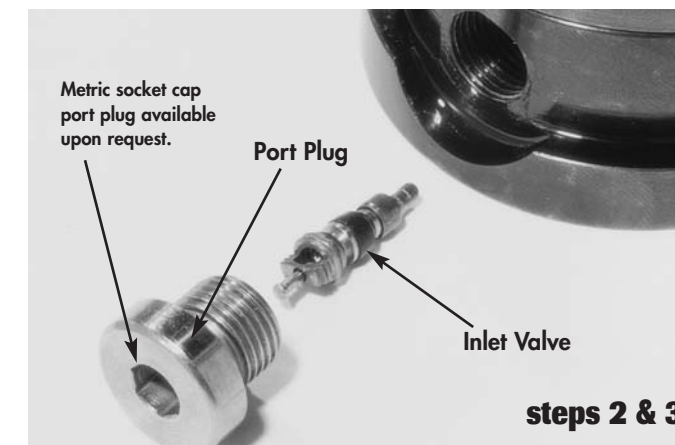
We offer two distinctly different types of fittings. Both are available from stock, O-ring face style and 37° JIC flared fittings. For use with all RLS, RL, and RLP-750, 1000 gas springs.

Torque Specifications:		
	O-Ring Face	37° JIC
Nm	24	16
Lbf/ft	18	12

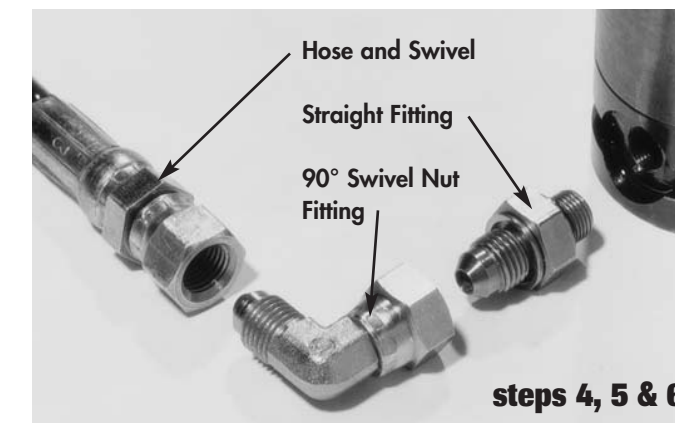
Fitting Type:	O-Ring Face DANLY Part #	37° JIC DANLY Part #
Hose swivel	RT1JC55-4-4	RT10655-4-4
BSPP Male 45°	RT42V40MLO-S	RT4V40MX-S
BSPP Elbow 90°	RT42C40MLO-S	RT4C40MX-S
Branch tee swivel nut	RT4S6MLO-S	RT4S6X-S
Run tee swivel nut	RT4R6MLO-S	RT4R6X-S
Straight fitting	RT42F40MLO-S	RT4F40MX-S
Charge port plug	RTVSTI-R 1/8 ED socket cap	H2-XXXXX-XXX-13 slot style

Important Steps When Hosing Gas Springs Together

1. Always discharge all nitrogen pressure before working on any gas spring. Follow service instructions.
2. Using a slot screw driver, **slowly** remove port plug found on base of spring. A small amount of gas pressure may be present behind installed plug and an audible "wisp" of gas may be heard.
3. Discharge all nitrogen pressure and then remove nitrogen inlet valve located within port. It is helpful to remove the valve while the gas spring is in an upside down or rod down position. This will keep the lubricating oil from oozing out of the spring.
4. Install the appropriate straight or angle fitting, O-ring or 37°JIC face, using a 14 mm (9/16") open-end wrench. Please take care not to over-torque the fitting (refer to torque specification chart).
5. Attach the hose swivel nut fitting. We recommend that you wait to fully torque all fittings until the hose is in proper position.



steps 2 & 3



steps 4, 5 & 6

NOTE: For best results, minimize the number of fittings used in the system. Use only approved hose and fittings.

37° JIC fittings pictured

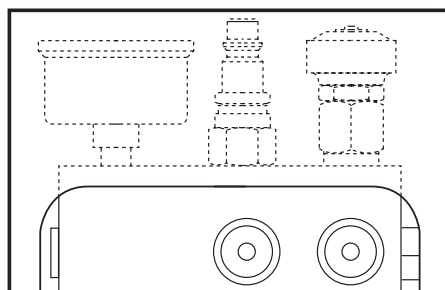
All dimensions and forces are nominal unless otherwise stated.

Control Panel

Part # RT-2175-CP

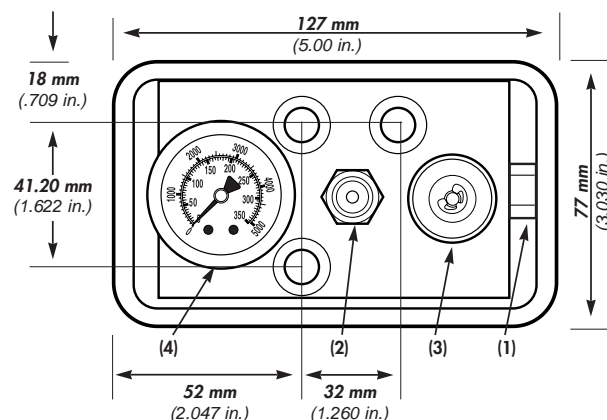
A control panel is mandatory with all hosed systems. The control panel is designed for remote mounting and is used to monitor and adjust nitrogen pressure. The panel is also equipped with a rupture plug for added safety.

Bottom View

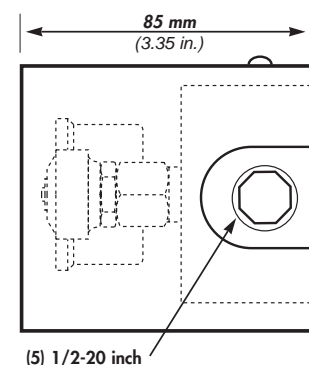


Suggested drilling pattern for customer to mount the NAAMS standard control panel.

Front View



Side View



- (1) Rupture plug
- (2) Inlet valve
- (3) Exhaust valve
- (4) Pressure gauge
- (5) Straight fitting (one supplied)
G-1/8 BSSP inlet port

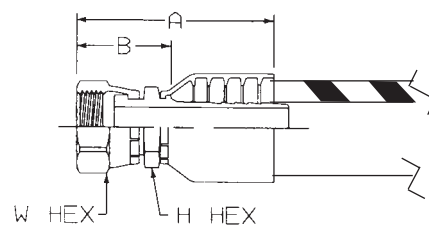
Assembly Hose

Important:

The hose length should be a minimum of 5% longer than the actual measured length. The additional length provides for the contraction of the hose length when pressurized.

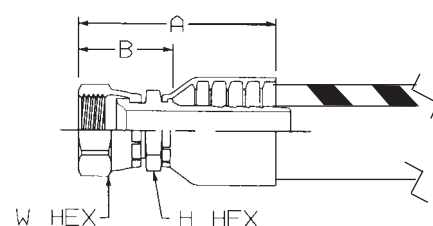
Note: The inlet valve must be removed prior to hosing.

O-Ring Face Seal Hose



Part # RT52041JC55-(*
(* = specify required hose length)

37° JIC Hose



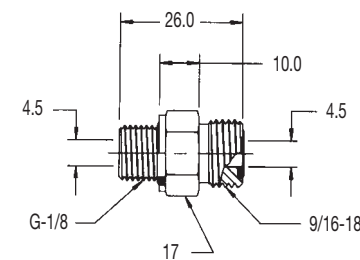
Part # RT520410655-(*
(* = specify required hose length)

Part No.	Hose I.D.	Hose O.D.	Max. Operating Pressure MPa	Burst Pressure MPa	Min Bend Radius	Thread Size	A	H Hex	W Hex	B
O-ring Face RT52041JC55	mm inch	6.4 .26	13 .50	345 1380	51 2	9/16-18	50 2	18 .71	16 .63	27 1
37° JIC RT520410655	mm inch	6.4 .26	13 .50	345 1380	51 2	1/16-20	64 2.5	16 .63	16 .63	35 1.4

All dimensions and forces are nominal unless otherwise stated.

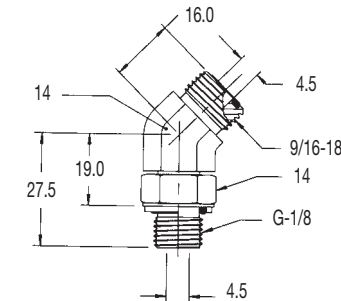
O-Ring Face Seal Fittings

BSSP Male Straight Connector



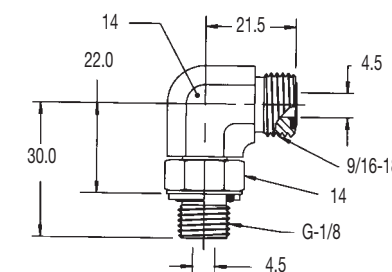
Part # RT42F4OMLO-S

BSSP Male 45° Elbow



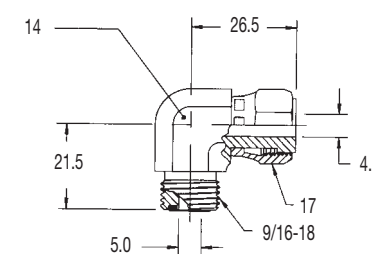
Part # RT42V4OMLOS-S

BSSP Male 90° Elbow



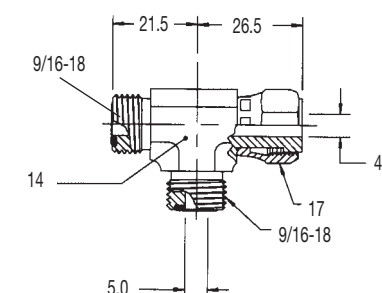
Part # RT42C4OMLO-S

90° Swivel Nut Elbow



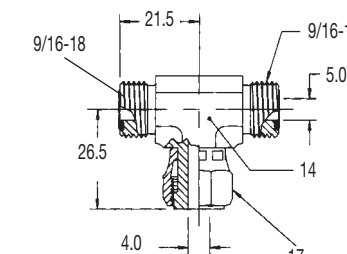
Part # RT4C6MLO-S

Swivel Nut Run Tee



Part # RT4R6MLO-S

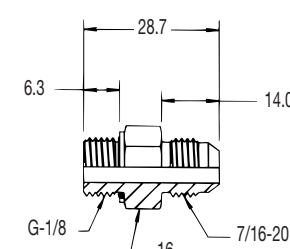
Swivel Nut Branch Tee



Part # RT4S6MLO-S

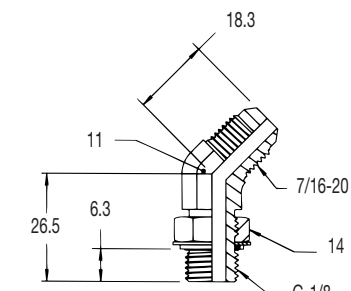
37° JIC Fittings

BSSP Male Straight Connector



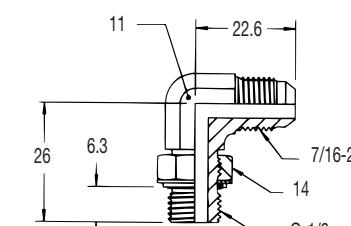
G-1/8 Male Straight Connector
Part # RT4F40MX-S

BSSP Male 45° Elbow



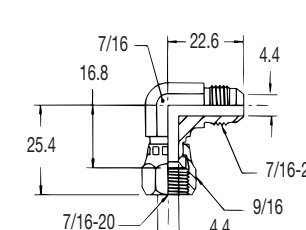
Part # RT4V40MX-S

BSSP Male 90° Elbow



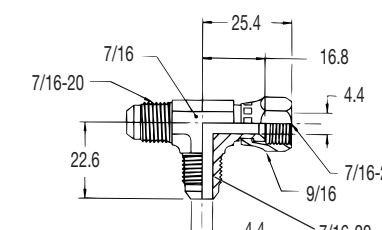
Part # RT4C40MX-S

90° Swivel Nut Elbow



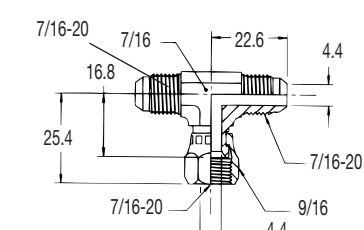
Part # RT4C6X-S

Swivel Nut Run Tee



Part # RT4R6X-S

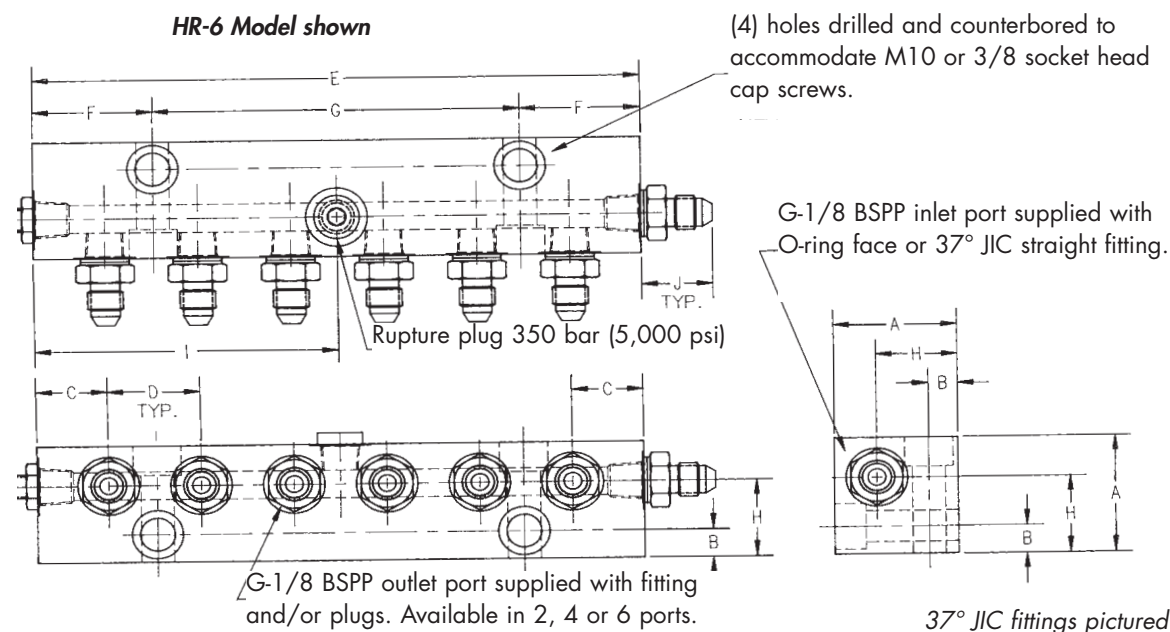
Swivel Nut Branch Tee



Part # RT4S6X-S

All dimensions and forces are nominal unless otherwise stated.

Junction Block



Model		A	B	C	D	E	F	G	H	I	J
HR-2	mm inch	38 1.50	9 0.35	22 0.87	29 1.14	73 2.87	9 0.35	55 2.17	25 0.98	36.5 1.44	22 0.87
HR-4	mm inch	38 1.50	9 0.35	22 0.87	29 1.14	131 5.16	37 1.46	57 2.24	25 0.98	65.5 2.58	22 0.87
HR-6	mm inch	38 1.50	9 0.35	22 0.87	29 1.14	187 7.36	37 1.46	114 4.49	25 0.98	93.5 3.68	22 0.87

General Notes

- We recommend that all gas springs are supported on the base at all times.
- No stock removal permitted from any surface of the gas springs.
- All hoses and fittings are available individually, as assemblies, or in bulk upon request.
- We reserve the right to change the design, specifications, dimensions, force and offering without notice.
- All dimensions and forces are nominal unless otherwise stated.

Measurement Converter

For conversion of metric and US measurements, use these conversion factors;

Length:

1 inch = 25.4 millimeters
1 millimeter = 0.03937 inches

Pressure Ratings:

PSI to BAR = PSI x 0.06894757 = BAR

Volume:

1 cubic inch = 16378.06 cubic millimeters
1 cubic millimeter = 0.000061023 cubic inches

Liquid Capacities:

1 milliliter = 0.03381 fluid ounces

Area:

1 square inch = 645.16 square millimeters

Weight:

1 pound = 0.4535924 kilograms
1 ton = 907.1847 kilograms
1 kilogram = 2.204622 pounds
1 metric ton = 2204.622 pounds
1 metric ton = 1.1023114 tons

Good Performance Begins With Good Design

Self-Contained:

When placed in a die pocket, gas springs should always be secured with bolts.

Unlike pre-loaded die springs, gas springs operate at less than maximum efficiency when inserted into a pocket, in either an upper or lower application. This is true because the clearance fit between the gas spring and the pocket provides space for the gas spring to move off center as the press cycles. Over time, this can damage the gas spring and ultimately shorten its life.

By securing a gas spring with bolts, it remains perpendicular to the pad or kiss block, and can no longer shift inside the die pocket. In addition, this eliminates the accumulation of metal chips or other debris under the gas spring. When grit and grime build up under a self-contained gas spring, it can become tilted or overstroked.

Hose Systems:

Gas springs can be hosed together into a system. However, the gas spring's inlet valve must be removed and a fitting installed to permit the attachment of hoses. Note: Always secure gas springs with bolts.

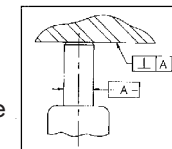
The benefits of this method:

- Gas springs are always balanced in force and pressure.
- A control panel connected to the system provides the flexibility to adjust the force from outside the tool.
- Pressure monitors can be connected to the system. They automatically alert the user and/or shut down the press should changes occur in the pressure level.
- Production can continue should a leak develop. A nitrogen bottle with a regulator can be connected to the control panel to feed a leak until the die is released from production.

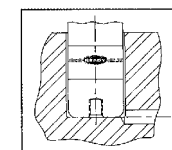
NOTE: For best results, minimize the number of fittings used in the system. Use only approved hose and fittings.

Installation Guidelines:

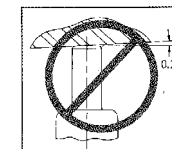
- The pocket diameter for a DESIGN-TITE® gas spring should be approximately 2 mm (.08 in.) larger than the body diameter. For optimum performance, the gas spring must be secured in place with an appropriate fastener to ensure that it remains perpendicular to the contacting surface. This eliminates possible debris from building up around the gas spring, leading to side loading or overstroking.



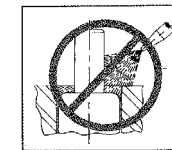
- When possible, machine drain slots or holes to allow die lubricants to flow away from the gas spring. This prevents flooding of the spring pockets and will keep die lubricants from contaminating the gas spring.



- It is very important that the piston rod contact a flat, smooth surface. Never allow the top of a piston rod to contact a counter-bored hole, casting or bolt head.



- Use of a stop block is helpful in preventing the gas spring from being overstroked. The stop block should be equivalent to or greater than the "Dc" (Die Closed) dimension.



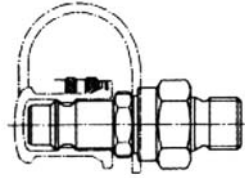
- Maximum available travel is 100% of stroke. Design should not exceed 90% of available stroke.

Charging & Discharging

- When a gas spring has been in service for a long period of time, it may begin to lose force. DESIGN-TITE® gas springs have the additional feature allowing customers to recharge the pressure by using an optional quick disconnect.
- To adjust or exhaust pressure, use the optional service gauge assembly with DESIGN-TITE® gas springs.

Accessories

To fill or recharge a *DESIGN-TITE*[®] nitrogen gas spring quickly and easily, order the quick disconnects shown to the right.



RLP-750 & 1000, RLSC, RLS, RL:
Part #RT-QDM-6251-A

RLM-90, 180, 230, 300 & RLP-500:
Part #RT-QDM-6-A

On Hose Line: Quick Disconnect Female
Part #RTQDF-0402

Service Gauge Assembly

Part # RTUAL-04.0-QDM

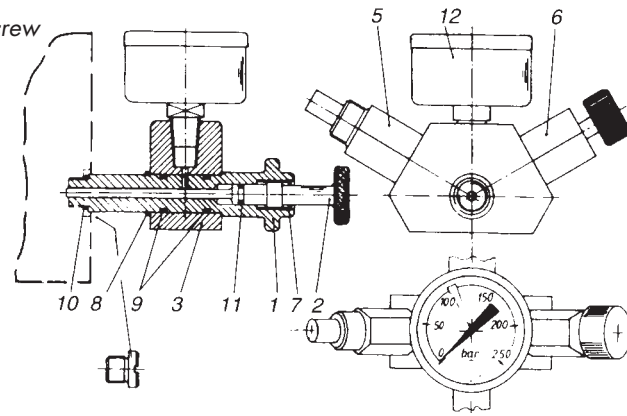
This assembly is multi-functional. Use it to fill, empty, or adjust pressure in the gas spring. Installation of this device will result in a nominal loss of pressure.

The charge port fitting must be changed when working with the RLM-90, 180, 230, 300 and RLP-500 gas springs.

Part # RTUAL-G1/8 x M6:

Fitting used with RTUAL-04.0-QDM to fill RLM and RLP-500 gas springs.

- 1 Casing/Spool
- 2 Pressure Adjusting Screw
- 3 Body
- 4 Threaded Plug
- 5 Inlet Valve
- 6 Outlet Valve
- 7 Retainer Ring
- 8 Circlips
- 9 O-ring
- 10 O-ring
- 11 O-ring
- 12 Gauge



To adjust or exhaust pressure of a *DESIGN-TITE*[®] gas spring, order the service gauge assembly shown above.

DESIGN-TITE[®] is “Better by Design”

Ease of Repair

DESIGN-TITE[®] provides for quick, safe and simple repairs with our single piece piston rod and threaded bronze top cap. With *DESIGN-TITE*[®], gas spring repair is as simple as 1, 2, 3...

1. Unthread the bronze top cap from the spring body and push the piston rod out the bottom of the top cap. Discard the top cap.
2. Lubricate the piston rod and the three seals contained in the replacement top cap with assembly lubrication. Install the piston rod into the bottom of the replacement top cap and push it up to the lubrication chamber. Add lubrication over the top of the piston rod, filling the chamber. Push the piston rod completely through the top cap.

3. Thread the top cap to the spring body and tighten. With the piston rod fully extended, recharge the gas spring.

That's all there is to it, and you're back in production! *DESIGN-TITE*[®] makes repairs simple and safe. No more hammering out C-style retaining rings. No more fighting to keep the multi-piece cartridge assembly together during handling and installation. No more concerns about installing the cartridge assembly upside down. Most important of all, no more fears that the C-Style retaining ring was damaged or installed improperly.

All dimensions and forces are nominal unless otherwise stated.

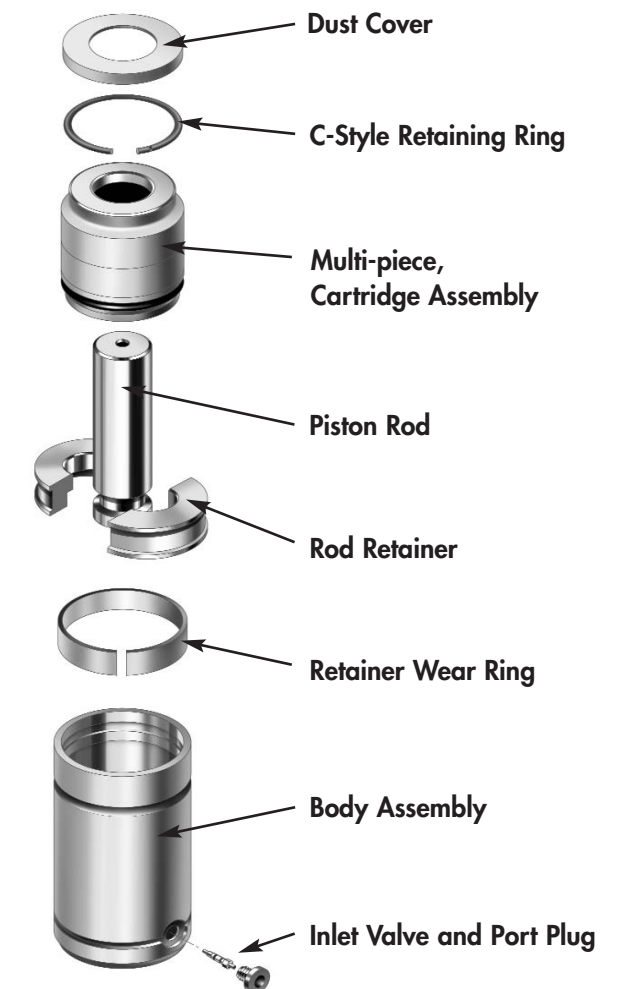
DESIGN-TITE[®] Gas Springs

- Piston Rod**
 - One piece construction
 - Hollow piston rod lowers pressure rise
- Solid Bronze Top Cap With Patented Lubrication Chamber**
 - Designed with greater bearing area for improved support and guiding
 - One piece construction creates a mechanical solid for greater structural strength and safety
 - Lubrication chamber provides long, maintenance-free life
- Threaded Upper and Lower Body Construction**
 - ISO standard clamping groove on body
- Threaded Bottom Cap**
 - ISO standard clamping groove
 - ISO standard mounting and charge port



Other Gas Springs

- Dust Cover
- C-Style Retaining Ring
- Multi-piece, Cartridge Assembly
- Piston Rod
- Rod Retainer
- Retainer Wear Ring
- Body Assembly
- Inlet Valve and Port Plug



DESIGN-TITE[®] is “Better by Design”

Simple, Solid Construction, Safe, Made of Superior Materials

1. **Simple.** Our design replaces the many components found on other brands with a one-piece piston rod and a threaded one-piece bronze cap. Our design thus eliminates problems associated with stack-up tolerance affecting overall height and life of the spring. Assembly is simple. The top cap and bottom cap screw into the body, and both are held securely in place with high pressure SEA threads.
2. **Solid Construction.** By eliminating the retaining ring, our design provides not only structural stability in the upper portion of the gas spring, but precise concentricity and minimum misalignment between the piston rod, top cap and the spring body, all of which extend life. Our patented lubrication system located between the rod seal and rod wiper further extends life. This degree of stability, precision and seal lubrication is only available with *DESIGN-TITE*[®].
3. **Safe.** With a threaded one-piece bronze top cap, we eliminate the retaining ring altogether, and hence, any concern whether the retaining ring is set correctly.
4. **Superior Materials.** We only use the best and have spared no cost to provide the highest quality. Examine a *DESIGN-TITE*[®] gas spring and see the difference for yourself. *DESIGN-TITE*[®] a true advancement in the technology of nitrogen gas springs. With all these features and more, is this not the gas spring you've always wanted?



The Innovator of Our Industry SM

Our factories and offices:

U.S.A. • U.K. • France • Belgium • Germany • Sweden • Netherlands • Singapore

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