

GAS SPRINGS AND DAMPERS

GUDEN GAS SPRINGS

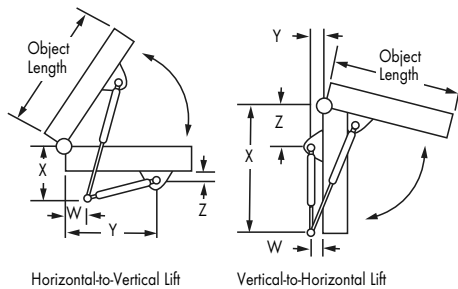
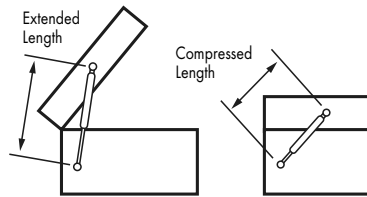
ABOUT GAS SPRINGS

Gas springs are typically used to assist in opening lids, covers, windows, conveyors, and seats – similar to a hatchback opening on a car. If you want to close an object, you will need a close-assist gas spring.

Note: All gas springs contain pressurized nitrogen gas as well as hydraulic fluid that lubricates the seal and provides slam-resistant damping at the end of the stroke. To avoid loss of force, you should store and install gas springs rod-end down.

CHOOSING THE RIGHT EXTENDED AND COMPRESSED LENGTH

To determine the extended length that is right for your application, open your lid as wide as you need and measure the distance between the two mounting points. For compressed length, close your lid (or lower it to where you need it) and measure the distance between the two mounting points.



Horizontal-to-Vertical Lift

Vertical-to-Horizontal Lift

CHOOSING THE RIGHT FORCE

Your gas spring must have enough force to lift your object and hold it open, yet not too much force that you can't push it back to its original position. To determine the right amount of force, you'll need to know the weight of the object you're moving. One way to do this is to use a force or tension gauge.

Estimating Force - If you cannot weigh your object, use the following chart to help determine its weight so you can estimate the force you will need:

	Material Weight per Square Foot (12" x 12")		
	Steel	Aluminum	Plastic
1/16" Thick	2.65 lbs	0.83 lbs	0.17 lbs
1/8" Thick	5.21 lbs	1.71 lbs	0.58 lbs
1/4" Thick	10.46 lbs	3.61 lbs	1.10 lbs

A GUIDE TO CHOOSING THE CORRECT GAS SPRINGS

The examples below illustrate how the length, weight, and opening direction of your object as well as the mounting position of the springs can affect which gas springs are right for your application. Find an example that is similar to your application and use it as a guide to select your springs. The specifications are based on using two gas springs, a 90° opening, and the center of gravity at the middle of the object.

Object Length	Object Weight	Recommended Gas Spring			Recommend Mounting Position				
		Force Rating	Extend. Length	Comp. Length	(W)	(X)	(Y)	(Z)	
Horizontal-to-Vertical Lift									
12"	20 lbs.	40 lbs.	10.71"	6.77"	1.00"	1.00"	11.19"	0.89"	
12"	40 lbs.	40 lbs.	10.71"	6.77"	1.00"	1.50"	10.69"	0.89"	
18"	60 lbs.	70 lbs.	13.74"	8.27"	1.00"	2.50"	12.72"	0.89"	
18"	100 lbs.	100 lbs.	13.74"	8.27"	1.25"	3.00"	12.22"	0.89"	
30"	40 lbs.	50 lbs.	18.22"	10.35"	2.00"	3.50"	16.18"	0.89"	
Vertical-to-Horizontal Lift									
12"	20 lbs.	40 lbs.	10.71"	6.77"	2.50"	12.22"	0.89"	2.00"	
12"	40 lbs.	50 lbs.	10.71"	6.77"	2.50"	11.77"	0.89"	3.00"	
18"	60 lbs.	100 lbs.	13.74"	8.27"	2.50"	15.09"	0.89"	3.00"	
18"	100 lbs.	130 lbs.	13.74"	8.27"	2.50"	14.66"	0.89"	4.00"	
30"	40 lbs.	70 lbs.	18.22"	10.35"	1.50"	19.32"	0.89"	5.50"	

CUSTOM GAS SPRINGS

We can custom make almost any size or pressure gas spring to suit your application. Damping or double damping can also be incorporated into the gas spring. In addition to our stock end connectors, there is a wide variety of end connectors available on custom order.

CUSTOM ORDER GAS SPRING P1 PRESSURE RANGES

Series	Min.	Max.
GG2X / GGN2X	10	150
GG3X / GGN3X	75	250
GG4X / GGN4X*	15	100

Note: Custom forces (and sizes) may be specified for the GGN or GGS 20, 30 & 40 series by using these P1 pressure ranges.

* GGN pressure range is 10 - 90 lbs



GGN BLACK NITRATE ROD GAS SPRINGS

- Superior Corrosion Resistance • Attractive "All Black" Appearance • Lower Cost • 2-Year Warranty



STOCK PART NUMBERS AND SIZES

Rod Dia. (in.) .315 Tube Dia. (in.) .748

Stock Part No.	Extended Size (in.)	Compressed Size (in.)	Stroke Size (in.)	Standard End Fittings	P1 Force (lbs) Standard Stock Sizes
GGN20	9.6	6.35	3.25	K	20
GGN21	11.9	8.4	3.5	I	20, 30, 60, 80, 90, 120
GGN21	11.9	8.4	3.5	K	20, 30, 40, 60, 90, 120
GGN22	15.25	10.25	5	I	20, 30, 60, 85, 90, 110, 120
GGN22	15.25	10.25	5	K	20, 30, 40, 45, 60, 90, 120
GGN26	15.27	9.77	5.5	K	20, 30, 60, 90, 120, 150
GGN23	17	11	6	I	20, 30, 60, 90, 120
GGN23	17	11	6	K	20, 30, 40, 45, 60, 90, 120
GGN24	19.63	12.63	7	I	20, 30, 60, 90, 120
GGN24	19.63	12.63	7	K	20, 30, 45, 60, 90, 120
GGN203	23.03	14.53	8.5	K	20, 30, 90, 150

Rod Dia. (in.) .394 Tube Dia. (in.) .866

Stock Part No.	Extended Size (in.)	Compressed Size (in.)	Stroke Size (in.)	Standard End Fittings	P1 Force (lbs) Standard Stock Sizes
GGN31	27.8	17.8	10	C	200
GGN31	27.8	17.8	10	I	100, 150, 200, 250
GGN31	27.8	17.8	10	J	140, 200
GGN31	27.8	17.8	10	K	100, 120, 150
GGN35	26.32	15.85	10.5	K	75, 120
GGN36	28	16.5	11.5	I	110, 230
GGN38	35.30	20.30	15	C	200
GGN38	35.30	20.30	15	J	150, 200, 250

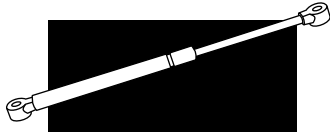
Rod Dia. (in.) .25 Tube Dia. (in.) .591

Stock Part No.	Extended Size (in.)	Compressed Size (in.)	Stroke Size (in.)	Standard End Fittings	P1 Force (lbs) Standard Stock Sizes
GGN40	7.5	5.5	2	I	20, 40, 60, 80, 100
GGN40	7.5	5.5	2	K	20, 30, 40, 60, 80, 100
GGN43	9.60	6.45	3.15	K	20, 30, 40, 50, 60, 80, 90, 100
GGN44	12	8.5	3.5	K	20, 40, 60, 70, 80, 100
GGN45	14.50	9.5	5	K	20, 30, 40, 60, 80, 90, 100
GGN47	17.18	11	6.18	I	60
GGN47	17.18	11	6.18	K	20, 30, 40, 60, 80, 100
GGN48	19.68	11.68	8	K	20, 30, 40, 50, 60, 70, 80, 90, 100
GGN49	20.00	11.88	8.12	K	40, 60

Notes:

1. Complete part number consists of stock part number plus the P1 force in lbs. plus the end fitting suffix, i.e., GGN21-060-K.
2. The P1 forces and end fittings listed are the standard sizes we normally stock.
3. See page 50 for ordering information on end fittings, ball studs, brackets and clips used for mounting.
4. End threads are 5/16-18 unc.
5. J fitting is available on GGN30 series springs only.
6. C fitting is available on all series.





GAS SPRINGS AND DAMPERS



GGG CHROME-PLATED ROD GAS SPRINGS

• Superior Lubrication for Potentially Longer Life • 2-Year Warranty



STOCK PART NUMBERS AND SIZES

Rod Dia. (in.) .315 Tube Dia. (in.) .748

Stock Part No.	Extended Size (in.)	Compressed Size (in.)	Stroke Size (in.)	Standard End Fittings	P1 Force (lbs) Standard Stock Sizes
GGGS20	9.6	6.35	3.25	K	20
GGGS21	11.9	8.4	3.5	I	20, 30, 60, 80, 90, 120
GGGS21	11.9	8.4	3.5	K	20, 30, 40, 60, 90, 120
GGGS22	15.25	10.25	5	I	20, 30, 60, 85, 90, 110, 120
GGGS22	15.25	10.25	5	K	20, 30, 40, 45, 60, 90, 120
GGGS26	15.27	9.77	5.5	K	20, 30, 60, 90, 120, 150
GGGS23	17	11	6	I	20, 30, 60, 90, 120
GGGS23	17	11	6	K	20, 30, 40, 45, 60, 90, 120
GGGS24	19.63	12.63	7	I	20, 30, 60, 90, 120
GGGS24	19.63	12.63	7	K	20, 30, 45, 60, 90, 120
GGGS203	23.03	14.53	8.5	K	20, 30, 90, 150

Rod Dia. (in.) .394 Tube Dia. (in.) .866

Stock Part No.	Extended Size (in.)	Compressed Size (in.)	Stroke Size (in.)	Standard End Fittings	P1 Force (lbs) Standard Stock Sizes
GGGS31	27.8	17.8	10	C	200
GGGS31	27.8	17.8	10	I	100, 150, 200, 250
GGGS31	27.8	17.8	10	J	140, 200
GGGS31	27.8	17.8	10	K	100, 120, 150
GGGS35	26.32	15.85	10.5	K	75, 120
GGGS36	28	16.5	11.5	I	110, 230
GGGS38	35.30	20.30	15	C	200
GGGS38	35.30	20.30	15	J	150, 200, 250

Rod Dia. (in.) .25 Tube Dia. (in.) .591

Stock Part No.	Extended Size (in.)	Compressed Size (in.)	Stroke Size (in.)	Standard End Fittings	P1 Force (lbs) Standard Stock Sizes
GGGS40	7.5	5.5	2	I	20, 40, 60, 80, 100
GGGS40	7.5	5.5	2	K	20, 30, 40, 60, 80, 100
GGGS43	9.60	6.45	3.15	K	20, 30, 40, 50, 60, 80, 90, 100
GGGS44	12	8.5	3.5	K	20, 40, 60, 70, 80, 100
GGGS45	14.50	9.5	5	K	20, 30, 40, 60, 80, 90, 100
GGGS47	17.18	11	6.18	I	60
GGGS47	17.18	11	6.18	K	20, 30, 40, 60, 80, 100
GGGS48	19.68	11.68	8	K	20, 30, 40, 50, 60, 70, 80, 90, 100
GGGS49	20.00	11.88	8.12	K	40, 60

Notes:

1. Complete part number consists of stock part number plus the P1 force in lbs. plus the end fitting suffix, i.e., GGS21-060-K.
2. The P1 forces and end fittings listed are the standard sizes we normally stock.
3. See page 50 for ordering information on end fittings, ball studs, brackets and clips used for mounting.
4. End threads are 5/16-18 unc.
5. J fitting is available on GGS30 series springs only.
6. C fitting is available on all series.



STS-316L STAINLESS STEEL GAS SPRINGS

The STS-316L is manufactured of 316L stainless steel, which offers increased corrosion resistance for industrial, marine and sterile environments. Our stainless steel gas springs have a polished tube, and the rods are hard-chrome-plated to give additional hardness and corrosion resistance.



STOCK PART NUMBERS AND SIZES

Rod Dia. (in.) .315 Tube Dia. (in.) .748

Stock Part No.	Extended Size (in.)	Compressed Size (in.)	Stroke Size (in.)	Standard End Fittings	P1 Force (lbs) Standard Stock Sizes
STS21	11.9	8.4	3.5	K	20, 30, 60, 90, 120, 150
STS22	15.25	10.25	5	K	20, 30, 60, 90, 120, 150
STS26	15.27	9.77	5.5	K	90, 120, 150
STS23	17	11	6	K	20, 30, 60, 90, 120, 150
STS208	18.5	11.25	7.25	K	120, 150
STS24	19.63	12.63	7	K	20, 30, 60, 90, 120, 150
STS201	20	12	8	K	90, 120, 150

Rod Dia. (in.) .394 Tube Dia. (in.) .866

Stock Part No.	Extended Size (in.)	Compressed Size (in.)	Stroke Size (in.)	Standard End Fittings	P1 Force (lbs) Standard Stock Sizes
STS31	27.8	17.8	10	K	100, 120, 150, 200
STS35	26.32	15.85	10.5	K	75, 120, 150, 200
STS36	28	16.5	11.5	J	100, 120, 150, 175, 200, 250
STS38	35.30	20.30	15	C	120, 150, 200, 250
STS38	35.50	20.50	15	J	120, 150, 200, 250

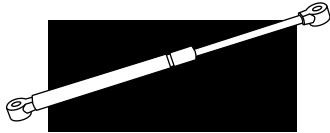
Rod Dia. (in.) .24 Tube Dia. (in.) .591

Stock Part No.	Extended Size (in.)	Compressed Size (in.)	Stroke Size (in.)	Standard End Fittings	P1 Force (lbs) Standard Stock Sizes
STS40	7.5	5.5	2	K	10, 20, 30, 60, 80, 100
STS43	9.6	6.45	3.15	K	20, 30, 60, 80, 100
STS42	10	7	3	K	20, 30, 40, 60, 90
STS44	12	8.5	3.5	K	20, 40, 60, 80, 100
STS45	14.5	9.5	5	K	20, 40, 60, 80, 100
STS46	15	9.5	5.5	K	20, 30, 40, 60, 80, 90
STS402	17	10.25	6.75	K	20, 30, 40, 50, 60, 75, 90
STS404	18.50	11.25	7.25	K	20, 30, 45, 60, 75, 90
STS48	19.68	11.68	8	K	20, 40, 60, 80, 100
STS49	20	12	8	K	20, 30, 40, 50, 60, 80, 90

Notes:

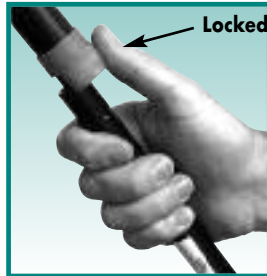
1. Complete part number consists of stock part number plus the P1 force in lbs. plus the end fitting suffix, i.e., STS21-060-K.
2. The P1 forces and end fittings listed are the standard sizes we normally stock.
3. See page 50 for ordering information on end fittings, ball studs, brackets and clips used for mounting.





GAS SPRINGS AND DAMPERS

ECL-SAFELOCK GAS SPRINGS



ECL-SafeLock Gas Springs eliminate the need for separate rods in critical lift-assist applications and protect the operator from potential injury in the unlikely event of gas spring failure through overload or misuse. When the ECL-SafeLock is fully extended, a spring-loaded locking shroud springs into place, preventing the gas spring from compressing. Applying thumb pressure to the locking shroud allows the gas spring to compress in a controlled manner.

STOCK PART NUMBERS AND SIZES

Rod Dia. (in.) .236 Tube Dia. (in.) .591

Stock Part No.	Extended Size (in.)	Compressed Size (in.)	Stroke Size (in.)	Standard End Fittings	P1 Force (lbs) Standard Stock Sizes
ECL40	7.5	5.5	2	K	20, 30, 40, 60, 80, 100
ECL42	10	7	3	K	20, 30, 40, 60, 80, 100
ECL46	15	9.5	5.5	K	20, 30, 40, 60, 90
ECL402	17	10.25	6.75	K	20, 30, 40, 50, 60, 75, 90
ECL404	18.50	11.25	7.25	K	20, 30, 45, 60, 75, 90
ECL49	20	12	8	K	20, 30, 40, 50, 60, 70, 80, 90

Rod Dia. (in.) .315 Tube Dia. (in.) .715

Stock Part No.	Extended Size (in.)	Compressed Size (in.)	Stroke Size (in.)	Standard End Fittings	P1 Force (lbs) Standard Stock Sizes
ECL21	11.9	8.4	3.5	K	90, 120, 150
ECL26	15.27	9.77	5.5	K	90, 120, 150
ECL23	17	11	6	K	60, 90, 120, 150
ECL208	18.5	11.25	7.25	K	120, 150
ECL201	20	12	8	K	90, 120, 150

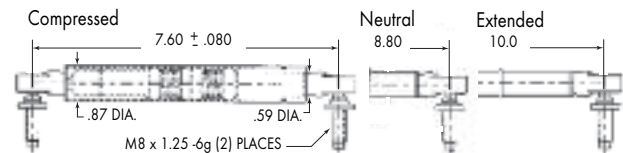
Rod Dia. (in.) .39 Tube Dia. (in.) .87

Stock Part No.	Extended Size (in.)	Compressed Size (in.)	Stroke Size (in.)	Standard End Fittings	P1 Force (lbs) Standard Stock Sizes
ECL31	27.8	17.8	10	J	200
ECL36	28	16.5	11.5	K	100, 120, 150, 175, 200

SELF-CENTERING DAMPERS



Guden's Self-Centering Dampers are a unique, patented damper that allows controlled movement in extension and compression while providing a controlled rate of return from either direction to a neutral position. The Self-Centering Damper replaces a combination of springs and dampers with a single, compact, cost-effective unit. The damping speed is controlled by the oil passing through an orifice while the return to neutral position is produced by the springs.



TWO STANDARD TYPES

There are two types of Self-Centering Dampers offered, the SCD09 and SCD12, providing centering forces of 9 lbs. and 12 lbs., respectively. Each type can be ordered with light or heavy damping. Both dampers extend or compress 1.20" from a neutral length of 8.80" between mounting centers.

STOCK PART NUMBERS AND SIZES

Stock Part Number	Centering Force	Body Diameter	Damping Rate	Damping Direction
SCD09-L	9 lbs.	.866	Light	Extension & Compression
SCD09-H	9 lbs.	.866	Heavy	Extension & Compression
SCD12-L	12 lbs.	.866	Light	Extension & Compression
SCD12-H	12 lbs.	.866	Heavy	Extension & Compression





DAMPERS



Gas springs apply a controlled force, and dampers control an external force. One or the other will satisfy any lid or door control situation.

Dampers are used primarily where a heavy load or door must be lowered or swung in a controlled motion at a constant speed. For example, dampers prevent a door from slamming shut or swinging wildly open.

TWO STANDARD TYPES

Two types of standard dampers are available, depending on the physical position in which they are to be used:

- Compression dampers provide controlled speed in the compressive direction.
- Extension dampers provide controlled speed in the extensive direction.

HOW DAMPERS WORK

Guden dampers are similar in appearance and construction to our Guden Gas Springs, except:

- (1) The tube is filled with hydraulic oil instead of non-hazardous nitrogen.
- (2) Dampers are force-absorbing instead of force-supplying. The oil inside the damper must pass through an orifice plate, thus controlling speed.

DAMPERS INSTALLATION/OPERATING TIPS

Compression dampers operate best in the shaft-up position so that the internal piston remains in the oil. The lid or door should be closed before full compression is reached.

Extension dampers work best in the shaft down-position. An extension damper is an excellent end-of-motion stop with appropriate end fittings: metal for heavier loads, plastic for lighter loads.

SELECTING THE RIGHT DAMPER

As with Guden Gas Springs, size of load, weight of load, direction of motion and location of mounting points determine the correct size. Guden dampers are available in rod/tube diameter sizes .24" x .59" and .32" x .87", with stroke lengths from 2" to 7", extended lengths from 7.89" to 19.65", and maximum load capacities from 50 lbs. to 100 lbs.

CUSTOM DAMPERS

We can custom-make almost any size damper to suit your application. Dampers are available on special order with custom damping rates, and also double damped in both compression and extension.

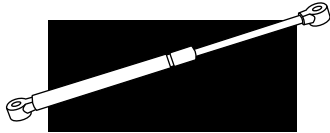
STOCK PART NUMBERS AND SIZES (See page 50 for end fittings)

Stock Part Number		Extended Length ¹ (Inches)	Stroke (Inches)	Rod Dia. (Inches)	Tube Dia. (Inches)	Minimum Load (lbs.)	Maximum Load (lbs.)	Orifice Plate Damping Identification				
Compression	Extension							Heavy Damping	Med. Heavy Damping	Medium Damping	Med.Light Damping	Light Damping
GDC50	GDE50	7.89	2	.24	.59	3	50	C	J	D	N	E
GDC51	GDE51	10.02	3	.24	.59	3	50	C	J	D	N	E
GDC52	GDE52	12.50	4	.24	.59	3	50	C	J	D	N	E
GDC53	GDE53	15.02	5	.24	.59	3	50	C	J	D	N	E
GDC60	GDE60	12.24	4	.315	.87	20	100	J	D	E	F	S
GDC61	GDE61	14.49	5	.315	.87	20	100	J	D	E	F	S
GDC62	GDE62	17.01	6	.315	.87	20	100	J	D	E	F	S
GDC63	GDE63	19.65	7	.315	.87	20	100	J	D	E	F	S

Note: The complete part number consists of the Stock Part Number (above) plus the Orifice Plate Damping Identification (above) and the end fitting you require (see page 50), i.e., GDC50-D-K. The I*, K and Fat Blade end fittings are stock.

* Extended length is .24" longer with the "I" end fitting.



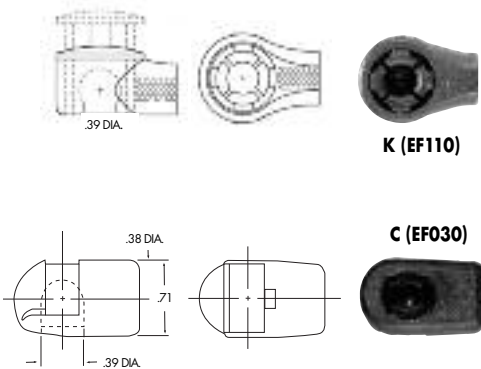


GAS SPRINGS AND DAMPERS

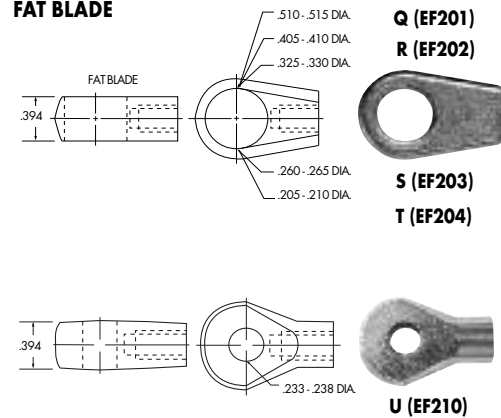
END FITTINGS FOR GAS SPRINGS AND DAMPERS

To complete the part number, specify the stock part number, P1 Pressure and then the end connector suffix, i.e., GGS21-060-K. Details on end connector applications and materials are available from Guden. All end fittings threaded for M6-1.0-6H thread except the "J" end fitting which is threaded for M8-1.25-6H. Units are in inches.

NEOPRENE PLASTIC

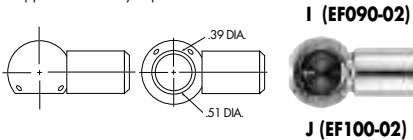


FAT BLADE



STEEL-ZINC-PLATED

Supplied with safety clip.

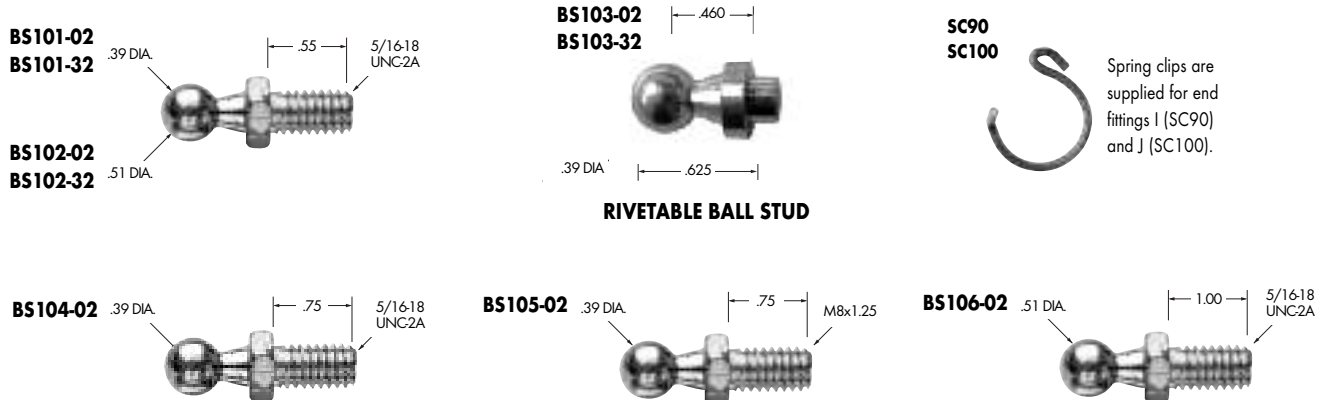


Maximum P1 Pressures:

- "I" end fitting - Max P1=200 lbs.
- "J" end fitting is only available on the GGN3 / GGS3 series
- "K" end fitting - Max P1=150 lbs.
- "C" end fitting - Max P1= 250 lbs.
- "P - U" end fittings - Max P1= 250lbs.

BALL STUDS & CLIPS FOR GAS SPRINGS AND DAMPERS

Specify part numbers for the brackets or ball studs required, including the material/finish suffix, as follows: -02 for steel with commercial zinc finish, or -32 for stainless steel.



BRACKETS for Gas Springs of 90 lbs Pressure or Less

Note: Supplied with a clear zinc finish.

"R" in part number indicates ball is opposite of what is shown. "O2B" finish indicates black powdercoat finish. Please see individual drawings for designation. All brackets have a .39 diameter ball.



BR201-02 (shown)
BR201-02B
BR201-32
BR201R-02



BR204-02 (shown)
BR204-02B
BR204-32
BR204R-02B
BR204R-02



BR202-02 (shown)
BR202-02B
BR202-32



BR205-02 (shown)
BR205-02B
BR205R-02
BR205-32
BR205R-02B

BRACKETS for All Pressures

Note: Supplied with a yellow zinc finish.



BR206-02



BR210-02*



BR213-02
BR213-26



BR208-02



BR211-02*

Please go to www.guden.com for individual drawings with sizes and hole placements.

* Fits with EF202 Fat Blade end fittings.