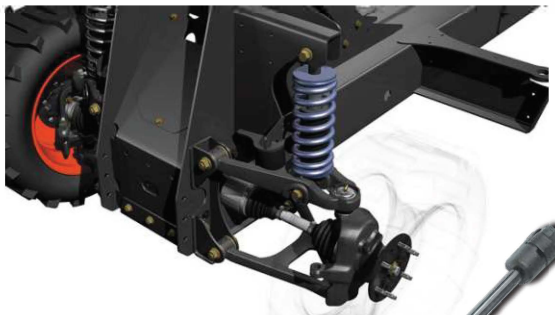
LiftMatic

FULL LINE CATALOG

Shock Absorbers
Gas/Air Springs
Dampers &
Custom
Parts



2019

LiftMatic

MOTION CONTROL EXPERTS

Gas Springs • Dampers • Shock Absorbers • Air Springs

LiftMatic is located in Fort Myers, Florida comprising of Engineering, Test labs, product assembly and warehousing. **LiftMatic** provides motion control assemblies including, Gas spring lift supports, Dampers, Shock absorbers and Air springs.

LiftMatic specializes in engineering products to fit customer requirements. With onsite CAD design, prototype build and testing facilities, we can develop high quality products and deliver them to the customer in quick succession.

LiftMatic provides motion control assemblies as a Tier 1 supplier to OE manufacturers. These OE customers include some of the largest Automotive, Construction and Farm equipment companies in the world. Products are designed in the USA at our Fort Myers, FL Engineering center.

This catalog will supply you with a complete list of **LiftMatic** standard parts and custom engineered parts for higher volumes.

Phone: 239-322-3919 - Ext. 3 • E-Mail: Sales@LiftMatic.com

13361 Saddle Road • Suite 109 • Fort Myers, FL 33913

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Gas Springs Design

Gas springs are used to lift or counter balance an object but are also used to resist or decelerate a moving object. They are used extensively on automobiles to lift hoods, trunks, lift gates, etc. along with trucks, buses, farm equipment to name a few.

Gas springs are often used to replace mechanical springs because they offer several major advantages:

- Gas springs provide force at their extended length position; mechanical springs provide zero force in their free length position and need to be compressed to a pre-load position often making assembly difficult.
- Gas springs can achieve very low spring rates and require half the packaging space of mechanical springs.
- Gas springs can extend at a velocity designed for the application, something that a mechanical gas spring cannot do.
- Using groove tube technology the shaft velocity can have multiple extension rates throughout its travel. The biggest use of this technology is to decelerate an object towards the end of travel and have the object come to a controlled stop.
- You can also dampen standard gas springs by increasing the amount of oil in the tube, but there are requirements of the application angle to make this work.

How is this all possible? Gas springs are energy storage devices as are mechanical springs. Mechanical springs store energy as the material is strained during operation, a gas spring provides force via compressed gas. This force increases as the shaft is pushed inside the tube compressing the gas further and storing more energy. We have identified the Advantages of gas springs, but there are also a couple of disadvantages that have to be over come.

- *Temperature* - As the temperature changes the pressure inside the gas spring also changes. At low temperatures the pressure drops and at high temperatures the pressure increases. When specifying the force output of the spring this should be taken into account.
- *Force Loss* - Gas springs will lose pressure over time, in general 1% - 2% per year, the actual amount is dependent on the spring design. The loss is due to gas molecules permeating through the rubber seal, the more gas you have inside the gas spring the lower the effect on force.

In general you should design the spring at the lowest temperature it will be required to work in and add 2% additional force for every year the product is designed to function.

With this additional force you need to check the gas spring at its highest working temperature to ensure it does not provide too much force for the design to function correctly.

Testing Capabilities

Liftmatic has a state-of-the-art test lab used to both develop gas spring designs and to test the durability of the finished design. In addition to the items below **Liftmatic** has vibration test equipment, Durability testing and a Linear motor dynamometer

Instron 3367

- Automatic recognition and calibration of load and strain transducers
- Preloaded ball screws, precision guidance columns, and a symmetrical drive system improve frame stiffness and alignment

Singleton SCCH20

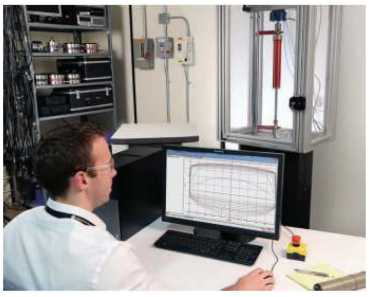
Singleton SCCH accelerated corrosion test chamber for Salt, Fog, Humidity, Water fog, CASS to name a few. Standard operating temperatures from Ambient to 120° for 49° C.

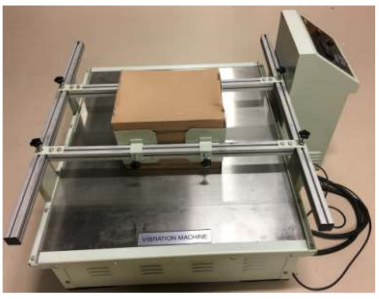
Capable of performing to
- ASTM B117
- ASTM B368 (CASS)
- ASTM D1735
- ASTM D2247
- ISO 9227
- ASTM G85 (A1 THROUGH A4)

Over 9 cubic feet test envelope

Cincinnati sub-zero Z8Plus

- Both a temperature and Humidity tester
- -34°C to +190°c (-30°f to +375°n
- Humidity range 10% to 98%
- Unlimited number of profiles with up to 99 steps and 1000 cycles
- Alarm notification sends email or texts
- Control the chamber remotely from any device

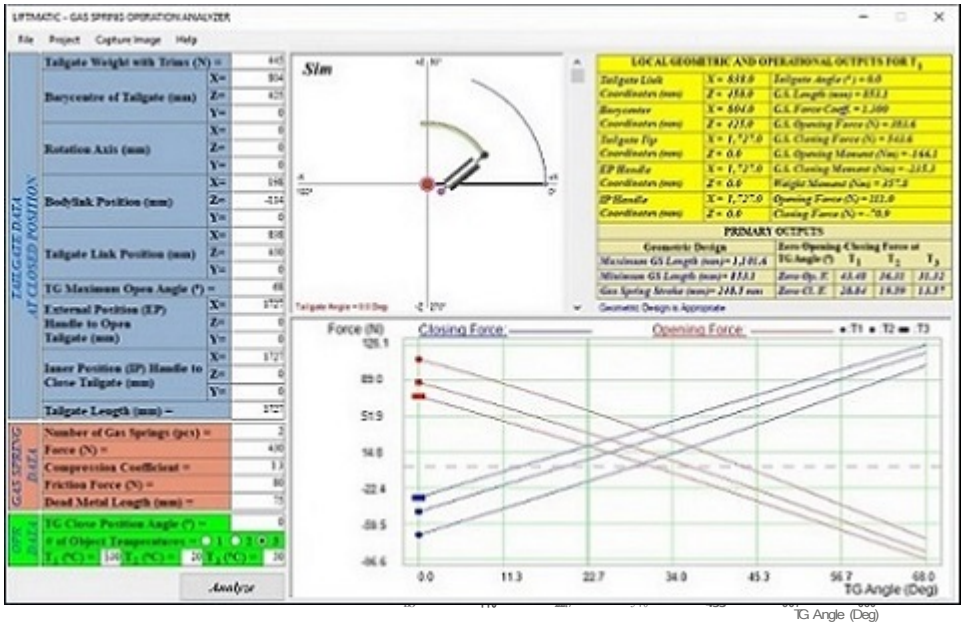




Smipo ST-500

- 50,000 Kgf.cm or 4,903 Nm torque capacity
- +/- 0.5% of reading up to 50,000 Kgf.cm or 4,903 Nm
- Anti torsion 10,000Nm
- Resolution 1/100,000
- Used for Fatigue test, strength test, Torque wrench calibration
- Used for end cap strength and fatigue
- Connector strength and fatigue
- Sub assembly strength and fatigue

Analysis



LiftMatic can run a simulation of the design at 3 different temperatures to understand how the system will function in hot and cold conditions.

We can provide the force required to open and close, at what angle the lid will self-rise and if it will hold open at the desired angle. Running this analysis during the initial design stage can save a lot of headaches down the road.

LiftMatic requires basic information about the system, weight, center of gravity, attachment points, operating angle and handle location. With this we can run simulations of the system and identify the optimum mounting locations.

Force Measurement

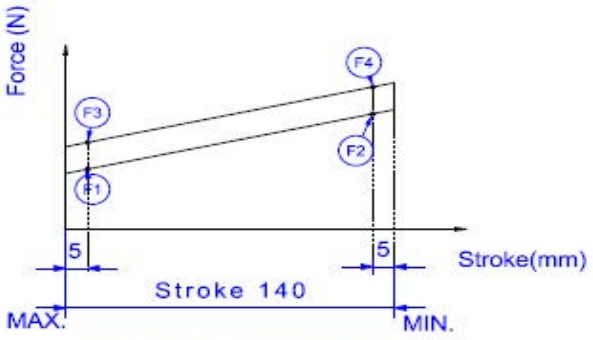


Fig 1. Force - Stroke Graph

FORCE @ 20°C			
F1 (N) Static	F2 (N) Static	Fr 1/3 MAX (N) Static	Ext. Time (s)
156 ± 22	(211)	60	0,5 – 3

The load cell is set to zero and the parts are then compressed at a speed of 200/min then held at a static point, 5mm into the stroke (P3 or F3 and 5mm before the end of stroke, (P4 or F4) for 5 seconds, then the test resumes. On the return or extension stroke the process repeats, but in reverse order (P2 or F2) then P1 or F1 Dynamic Fr: This refers to the amount of friction between the seals and the shaft while the shaft is motion, taken at the midpoint (FC), on both the compression and extension stroke, without stopping.

Static Fr: This refers to the amount of friction between the seals and the shaft while the shaft is at a static position, taken 5mm into the compression stroke (P3 or F3) and 5mm from full extension (P1 or F1).

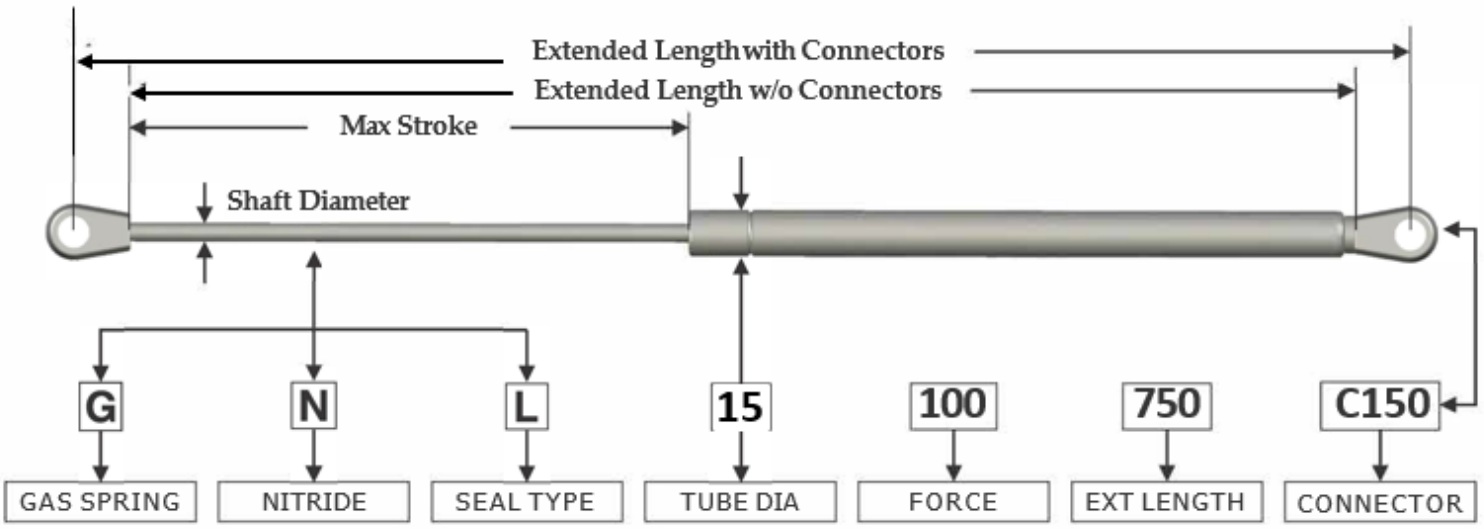
Dynamic FC: This is the comparison of the amount of force being applied by the gas spring itself, at the mid point (FC), while it is being compressed and then allowed to extend in motion and not static.

Sample rate is 500hz or 500 data points per second.

Standard Gas Springs 6 by 15

Part Number

GNL15100750C150



Base Part Number	Stroke (mm's)	Diameter (mm's)	Force (lbs)	Extended Length (inch)				
				No connectors 6mm threads	C10X-C11X C12X-C13X short C14X-C15X	C13Xlong 22mm	C160	C170
GNL1515608	2.00"	15	15-100	6.08	7.50	7.81	7.59	7.89
GNL1515858	3.00"	15	15-100	8.58	10.00	10.31	10.09	10.39
GNL1515819	3.15"	15	15-100	8.19	9.61	9.92	9.70	10.00
GNL1515105	3.50"	15	15-100	10.59	12.01	12.32	12.10	12.40
GNL1515957	4.00"	15	15-100	9.57	10.98	11.30	11.08	11.38
GNL1515130	5.00"	15	15-100	13.07	14.49	14.80	14.58	14.88
GNL1515135	5.50"	15	15-100	13.54	14.96	15.28	15.06	15.35
GNL1515157	6.18"	15	15-100	15.75	17.17	17.48	17.26	17.56
GNL1515155	6.75"	15	15-100	15.59	17.01	17.32	17.10	17.40
GNL1515170	7.25"	15	15-100	17.09	18.50	18.82	18.60	18.90
GNL1515177	7.75"	15	15-100	17.76	19.17	19.49	19.27	19.57
GNL1515182	8.00"	15	15-100	18.27	19.69	20.00	19.78	20.08
GNL1515185	8.12"	15	15-100	18.58	20.00	20.31	20.09	20.39

Base Part Number	Stroke (mm's)	Diameter (mm's)	Force (lbs)	Extended Length (mm)				
				No connectors 6mmthreads	C10X-C11X C12X-C13X short C14X-C15X	C13Xlong 22mm	C160	C170
GNL1515608	51	15	15-100	154	190	198	193	200
GNL1515858	76	15	15-100	218	254	262	256	264
GNL1515819	80	15	15-100	208	244	252	246	254
GNL1515105	89	15	15-100	269	305	313	307	315
GNL1515957	102	15	15-100	243	279	287	281	289
GNL1515130	127	15	15-100	332	368	376	370	378
GNL1515135	140	15	15-100	344	380	388	382	390
GNL1515157	157	15	15-100	400	436	444	438	446
GNL1515155	171	15	15-100	396	432	440	434	442
GNL1515170	184	15	15-100	434	470	478	472	480
GNL1515177	197	15	15-100	451	487	495	489	497
GNL1515182	203	15	15-100	464	500	508	502	510
GNL1515185	206	15	15-100	472	508	516	510	518

Available Connectors for 15mm gas springs


C100


C110


C121


C130 & C133


C140


C150 to C156

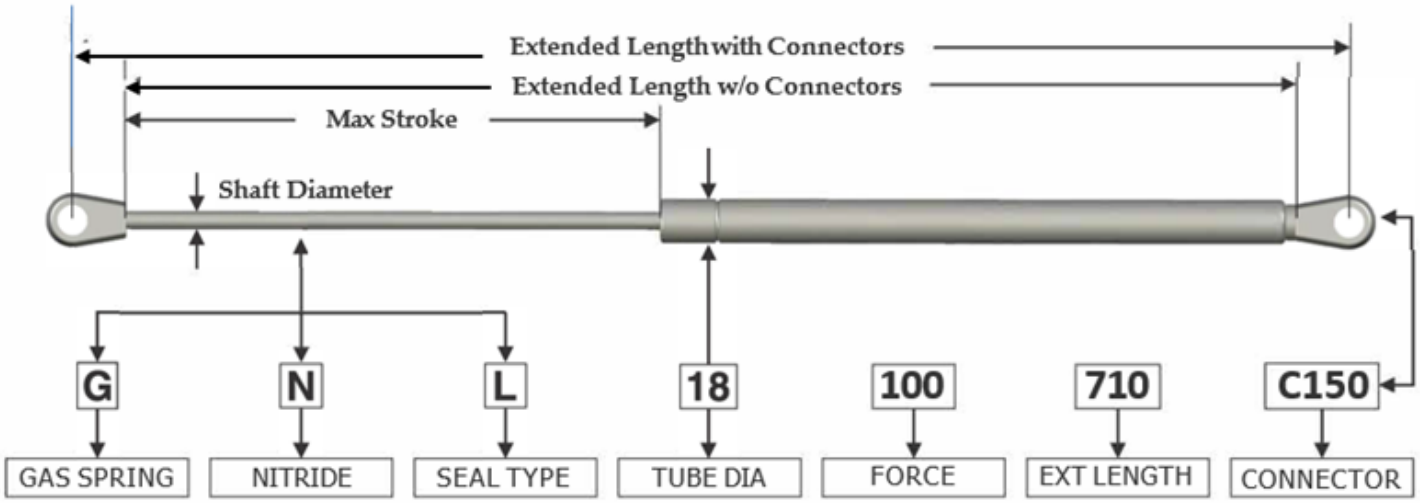

C160


C170

Standard Gas Springs 8 by 18

Part Number

GNL18100710C150



Base Part Number	Stroke (mm's)	Diameter (mm's)	Force (lbs)	Extended Length (inch)				
				No connectors 6mm threads	C10X-C11X C12X-C13X short C14X-C15X	C13X long 22mm	C160	C170
GNL1820568	2.00"	18	20-160	5.68	7.10	7.41	7.19	7.49
GNL1820758	2.80"	18	20-160	7.58	9.00	9.31	9.09	9.39
GNL1820818	3.25"	18	20-160	8.18	9.60	9.91	9.69	9.99
GNL1820104	3.50"	18	20-160	10.48	11.90	12.21	11.99	12.29
GNL1820107	4.00"	18	20-160	10.79	12.21	12.52	12.30	12.60
GNL1820138	5.00"	18	20-160	13.83	15.25	15.56	15.34	15.64
GNL1820130	5.25"	18	20-160	13.08	14.50	14.81	14.59	14.89
GNL1820139	5.50"	18	20-160	13.90	15.32	15.63	15.41	15.71
GNL1820145	5.75"	18	20-160	14.58	16.00	16.31	16.09	16.39
GNL1820155	6.00"	18	20-160	15.58	17.00	17.31	17.09	17.39
GNL1820157	6.30"	18	20-160	15.71	17.13	17.44	17.22	17.52
GNL1820198	6.50"	18	20-160	19.80	21.22	21.53	21.31	21.61
GNL1820182	7.00"	18	20-160	18.21	19.63	19.94	19.72	20.02
GNL1820170	7.25"	18	20-160	17.08	18.50	18.81	18.59	18.89
GNL1820185	8.00"	18	20-160	18.58	20.00	20.31	20.09	20.39
GNL1820200	8.25"	18	20-160	20.08	21.50	21.81	21.59	21.89
GNL1820216	8.50"	18	20-160	21.61	23.03	23.34	23.12	23.42
GNL1820229	10.00"	18	20-160	22.98	24.40	24.71	24.49	24.79
GNL1820249	10.50"	18	20-160	24.90	26.32	26.63	26.41	26.71

Available Connectors for 18mm gas springs


C100


C110


C121


C130 & C133


C140


C150 to C156

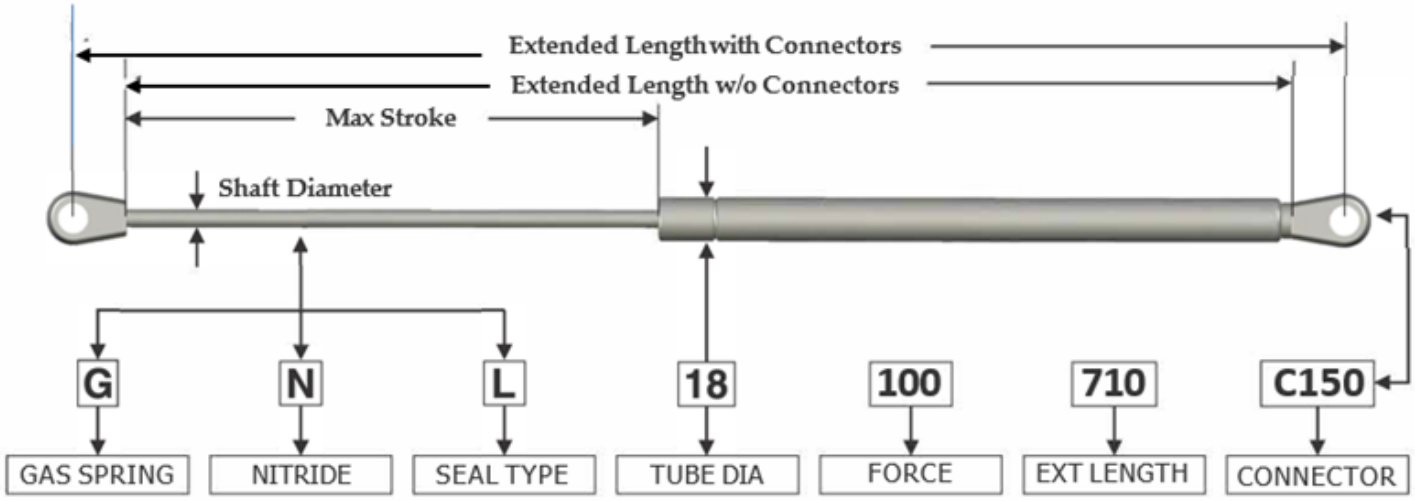

C160


C170

Standard Gas Springs 8 by 18

Part Number

GNL18100710C150



Base Part Number	Stroke (mm's)	Diameter (mm's)	Force (lbs)	Extended Length (mm)				
				No connectors 6mm threads	C100 - C110 C121 - C130 C140 C150 - C156	C13X long 22mm	C160	C170
GNL1820568	51	18	20-160	144	180	188	183	190
GNL1820758	71	18	20-160	193	229	237	231	239
GNL1820818	83	18	20-160	208	244	252	246	254
GNL1820104	89	18	20-160	266	302	310	305	312
GNL1820107	102	18	20-160	274	310	318	313	320
GNL1820138	127	18	20-160	351	387	395	390	397
GNL1820130	133	18	20-160	332	368	376	371	378
GNL1820139	140	18	20-160	353	389	397	391	399
GNL1820145	146	18	20-160	370	406	414	409	416
GNL1820155	152	18	20-160	396	432	440	434	442
GNL1820157	160	18	20-160	399	435	443	437	445
GNL1820198	165	18	20-160	503	539	547	541	549
GNL1820182	178	18	20-160	463	499	507	501	509
GNL1820170	184	18	20-160	434	470	478	472	480
GNL1820185	203	18	20-160	472	508	516	510	518
GNL1820200	210	18	20-160	510	546	554	548	556
GNL1820216	216	18	20-160	549	585	593	587	595
GNL1820229	254	18	20-160	584	620	628	622	630
GNL1820249	267	18	20-160	633	669	677	671	679

Available Connectors for 18mm gas springs


C100


C110


C121


C130 & C133


C140


C150 to C156

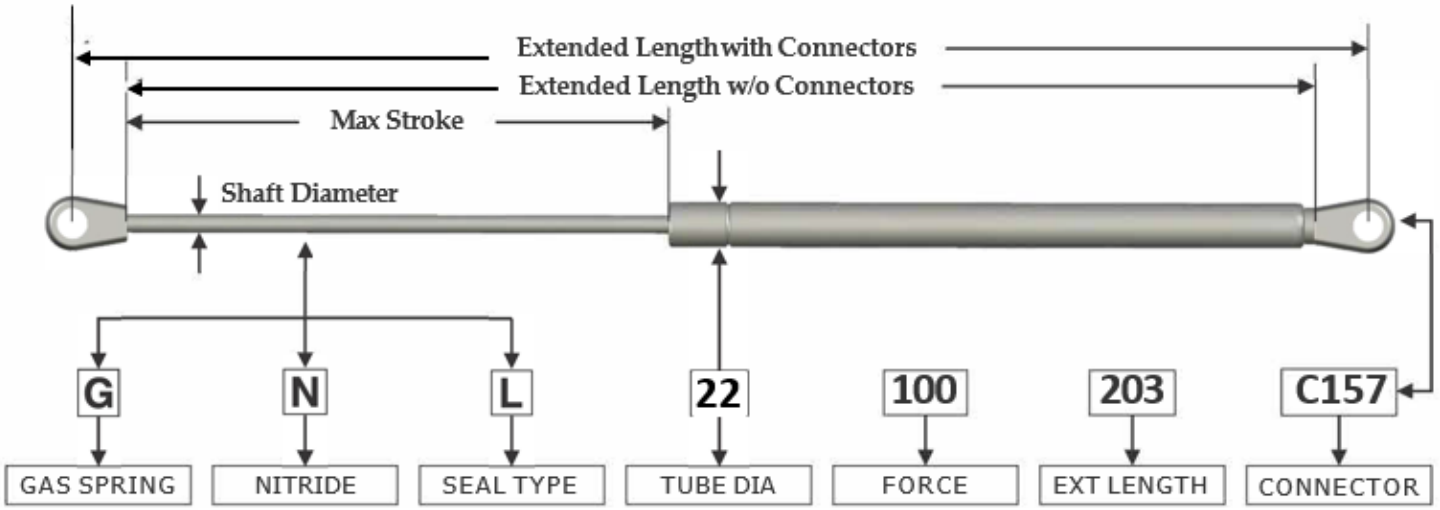

C160


C170

Standard Gas Springs 10 by 22

Part Number

GNL22100203C157



Base Part Number	Stroke (mm's)	Diameter (mm's)	Force (lbs)	Extended Length (inch)				
				No connectors 8mm threads	C120 -C157-C158	C161	C180	C190
GNL2245188	6.50"	22	45-250	18.9	20.3	21.0	21.1	21.2
GNL2245181	7.75"	22	45-250	18.1	19.6	20.3	20.3	20.5
GNL2245206	8.50"	22	45-250	20.7	22.1	22.8	22.9	23.0
GNL2245254	10.00"	22	45-250	25.4	26.9	27.6	27.6	27.8
GNL2245239	10.24"	22	45-250	24.0	25.4	26.1	26.2	26.3
GNL2245246	10.50"	22	45-250	24.6	26.1	26.8	26.8	27.0
GNL2245261	11.50"	22	45-250	26.1	27.6	28.3	28.3	28.5
GNL2245271	12.00"	22	45-250	27.1	28.6	29.3	29.3	29.5
GNL2245331	15.00"	22	45-250	33.1	34.6	35.3	35.3	35.5

Base Part Number	Stroke (mm's)	Diameter (mm's)	Force (lbs)	Extended Length (mm)				
				No connectors 8mm threads	C120 -C157-C158	C161	C180	C190
GNL2245188	165.10	22	45-250	479.04	515.04	533.04	535.04	539.04
GNL2245181	196.85	22	45-250	460.76	496.76	514.76	516.76	520.76
GNL2245206	215.90	22	45-250	525.02	561.02	579.02	581.02	585.02
GNL2245254	254.00	22	45-250	646.18	682.18	700.18	702.18	706.18
GNL2245239	260.10	22	45-250	608.58	644.58	662.58	664.58	668.58
GNL2245246	266.70	22	45-250	625.86	661.86	679.86	681.86	685.86
GNL2245261	292.10	22	45-250	663.96	699.96	717.96	719.96	723.96
GNL2245271	304.80	22	45-250	689.36	725.36	743.36	745.36	749.36
GNL2245331	381.00	22	45-250	841.76	877.76	895.76	897.76	901.76

Available Connectors for 22mm gas springs


C120

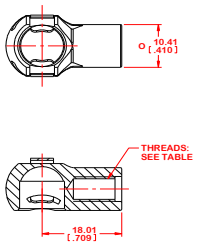

C157 & C158


C161


C180


C190

STANDARD CONNECTOR LIST

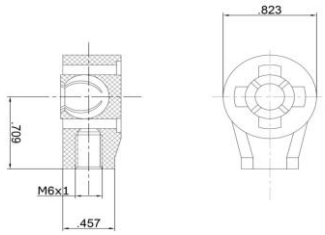


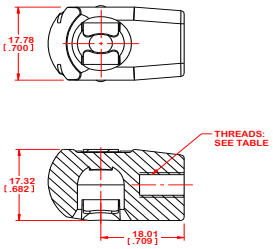
CAST BALL SOCKET CONNECTOR

PART #	BAND	THREADS	BALL SOCKET
C100	STEEL	M6	10MM

PLASTIC BALL SOCKET CONNECTOR & LOCKING CAP

PART #		THREADS	HOLE SIZE
C110		M6	Ø.405
C111		M6	Ø.325
C112		M6	Ø.260





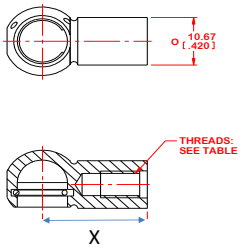
PLASTIC BALL SOCKET CONNECTOR

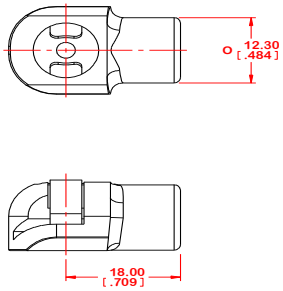
PART #	BAND	THREADS	BALL SOCKET
C120	STEEL	M8	10MM PLASTIC
C121	STEEL	M6	10MM PLASTIC

Security Ring Required

10MM METAL BALL SOCKET CONNECTOR

PART #	RING PART #	THREADS	X dimension
C130	C131	M6	18MM
C132	C131	M8	18MM
C133	C131	M6	22MM
C134	C131	M8	22MM



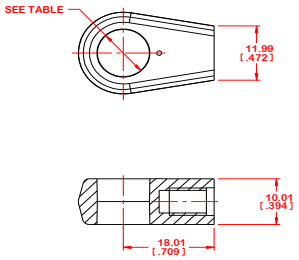


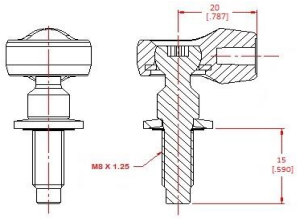
PLASTIC BALL SOCKET CONNECTOR

PART #	BAND	THREADS	BALL SOCKET
C140	STEEL	M6	10MM PLASTIC

DIECAST BLADE CONNECTOR

PART #		THREADS	HOLE SIZE
C150		M6	13.2 mm
C151		M6	Ø.405
C152		M6	Ø.325
C153		M6	6.67 mm
C154		M6	Ø.205
C155		M6	Ø.510
C156		M6	8.1 mm
C157		M8	13.2 mm
C158		M8	12.67 mm



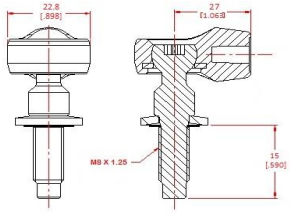


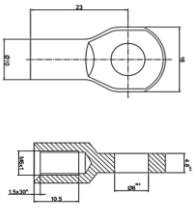
PLASTIC CAPTIVE BALL CONNECTOR

PART #	STUD THREADS	THREADS	BALL SOCKET
C160	M8	M6	10MM CAPTIVE

PLASTIC CAPTIVE BALL CONNECTOR

PART #	STUD THREADS	THREADS	BALL SOCKET
C161	M8	M8	13MM CAPTIVE



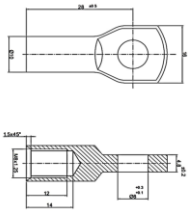


METAL BLADE CONNECTOR

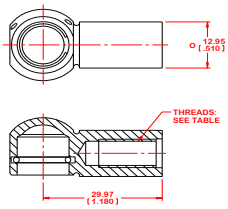
PART #		THREADS	HOLE SIZE
C170		M6	8MM DIA

METAL BLADE CONNECTOR

PART #		THREADS	HOLE SIZE
C180		M8	8MM DIA



Security Ring Required



METAL BALL SOCKET CONNECTOR

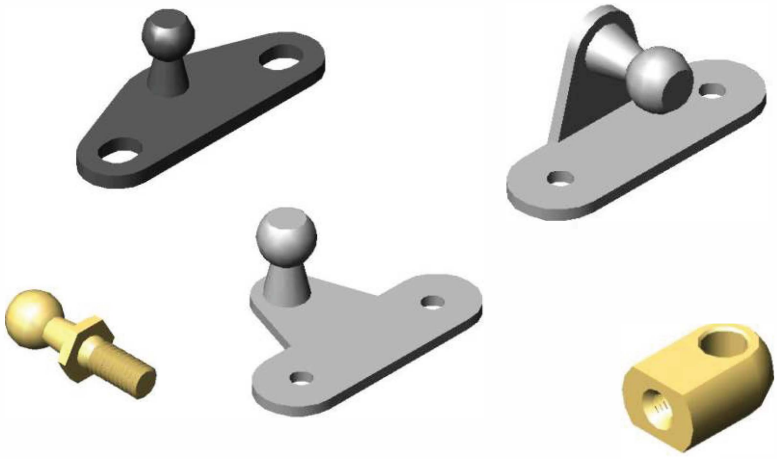
PART #	RING PART #	THREADS	BALL SOCKET
C190	C191	M8	13MM

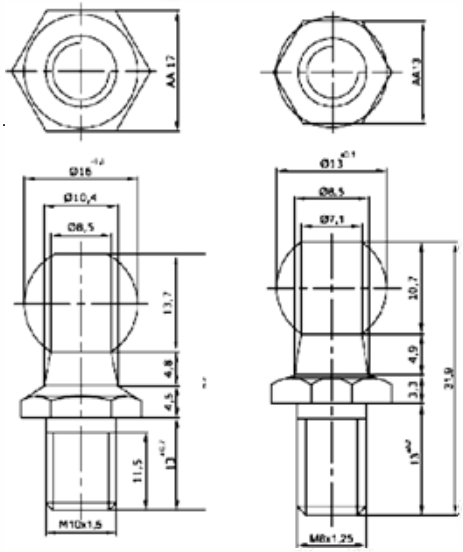
Standard Connectors - can be used with any of Liftmatic's standard gas springs and dampers.

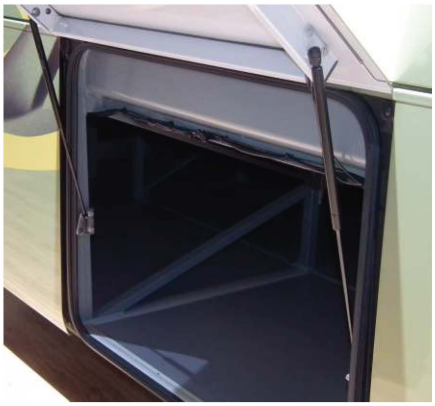
Liftmatic has over 100 different types of connectors for use with non-standard Gas springs and dampers.

Accessories

LOCKING TUBES
Liftmatic has a number of standard length tubes. Call or email for information.







Ball Studs and Brackets
Brackets are designed for custom applications.

Damper Options

Dampers convert the kinetic energy of the shaft being pushed or pulled into thermal energy by forcing oil through a narrow opening. It takes energy to force the oil through the small opening shearing the oil in the process creating heat.

Based on this there are 3 main features that define how much force it will take to move the shaft of the damper.

Size of the passage for the oil to pass through - the smaller the passage the more resistance to movement will be developed.

Oil viscosity - the thicker the oil the more resistance the damper will develop for a given opening, and this is where temperature plays a big part in choosing the correct oil viscosity. If the damper is to function in subzero temperatures you will need lighter oil, hot temperatures, heavier oil.

Velocity of the shaft, as the shaft speed is accelerated the damper will generate more force resisting the acceleration. This makes it difficult to specify the required dampening force unless it will only ever operate at a single speed. The best way to define the design requirements for a damper is to provide the force required at 2 different speeds. If this is not possible measure the time it takes for a known load to travel a set distance i.e. 15 1bs travels 3 inches in 2 seconds.

Another important design requirement of dampers is how we compensate for the shaft volume as it is pushed inside the tube. With gas springs you compress the gas, but dampers use oil which is non-compressible. This requirement separates all dampers into 2 broad categories.

Cavitating-Standard dampers

The tube is filled with a mixture of oil and air, as the shaft is compressed the volume is taken up by compressing the air. This design works well in vertical or near vertical applications where the oil and air stay separated due to gravity. If these dampers are used horizontally the air and oil mix causing cavitation when the shaft is moved (thus Cavitating damper) resulting in irregular dampening forces throughout the travel. This would show up as a jerky movement of the shaft as it's moved in and out.

Non-Cavitating

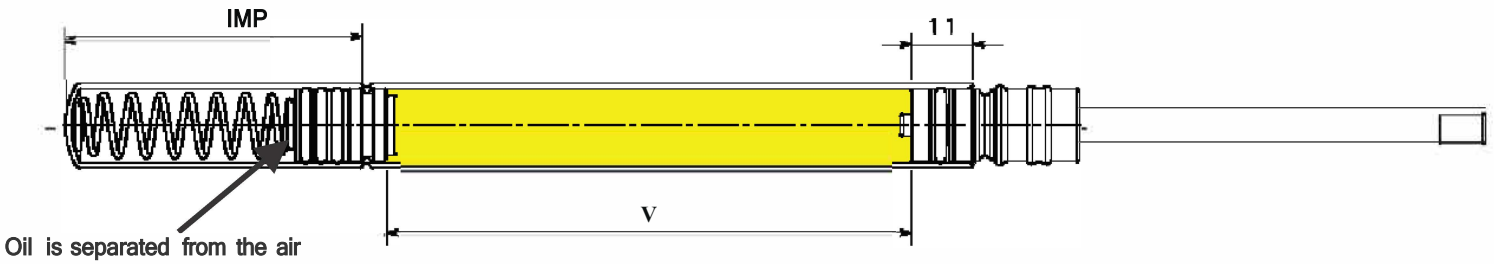
In a Non-Cavitating damper the oil and air are prevented from mixing with the use of floating pistons, air bags and foam. This allows for a consistent force and smooth operation regardless of its mounting orientation.

Self-Centering

Liftmatic can offer dampers that return to the mid-point of travel from both directions or from one or the other. This is achieved with mechanical springs that are tailored to the customers' requirements.

Twin Tube

Tube in a tube dampers provide excellent cycle life durability and can be supplied with either foam or air bags. They are very compact in length but a little larger diameter.

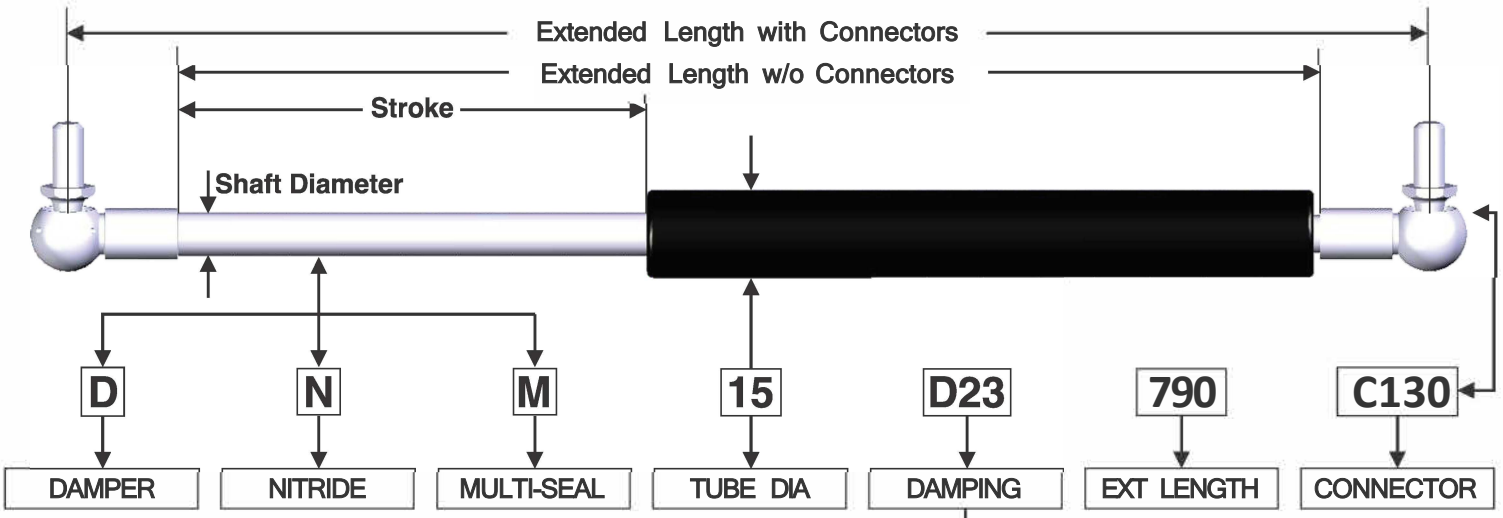


Oil is separated from the air with a floating piston and IMP valve.

How to specify a Standard Damper

Part Number

DNM15D23D790C130



Dampers come with 3 valve options

D: Damping in both directions
E: Damping in Extension only
C: Damping in Compression only

Damping	Type	Force	#
Dual	D	Heavy	3
Extension	E	Medium	2
Compression	C	Light	1

Each option can be purchased with light, Medium or Heavy damping. For Dual damped parts you can have different forces in each direction.

Type	Diameter (mm's)	Stroke (inches)	Extended Length (inches)			
			No connectors	C100 C110 C121 C130 C140 C150 - C156	C160	C170
DNM	15	2	6.5	7.9	8.0	8.3
DNM	15	3	8.6	10.0	10.2	10.4
DNM	15	4	11.1	12.5	12.7	12.9
DNM	15	5	13.6	15.0	15.2	15.4
DNM	22	4	10.8	12.2	12.4	12.6
DNM	22	5	13.1	14.5	14.6	14.9
DNM	22	6	15.6	17.0	17.2	17.4
DNM	22	7	18.2	19.6	19.8	20.0

Available Connectors for 15 and 22mm dampers

C100 C110 C121 C130 & C133 C140 C150 to C156 C160 C170

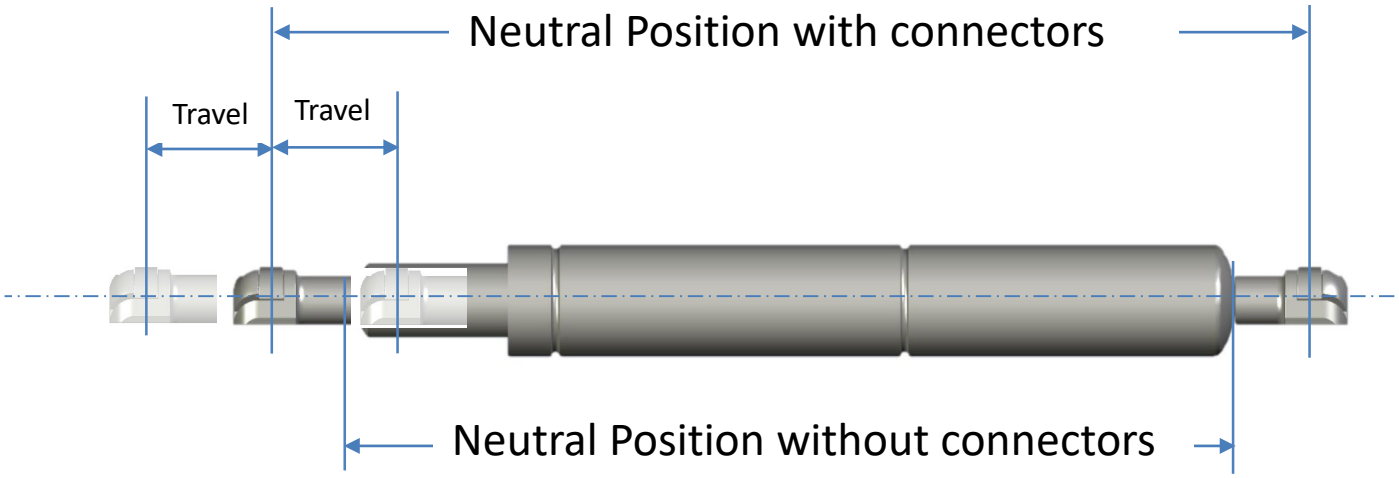
How to specify a Self-Centering Damper

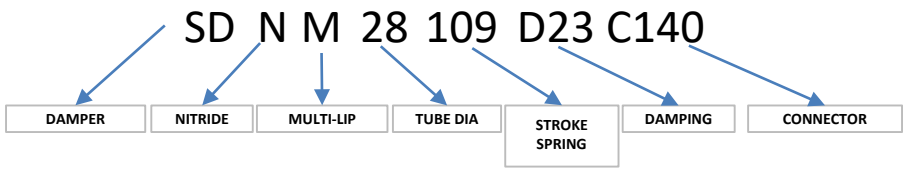
Part Number

SDNM28109D23C140

Self-centering dampers provide all the options of a non-cavitating damper with the added capability of returning the shaft to a neutral position (mid-stroke). Springs provide the force to return the shaft and can be configured to operate as follows.

Return to neutral from both the extension and compression stroke Return to neutral from the compression stroke
Return to neutral from the extension stroke





Note - the first number after the damping type is compression followed by extension

Damping	Type	Force	#
Dual	D	Heavy	3
		Medium	2
		Light	1

Type	Diameter (mm's)	Stroke (inches)	SPRING FORCE	SPRING FORCE	SPRING FORCE	SPRING FORCE
SDNM	28	1	09	12	16	25
SDNM	28	2			16	25
SDNM	28	1	16	25		
SDNM	28	2	18			

Self Centering Dampers
Liftmatic can offer dampers that return to the mid-point of travel from both directions with the following requirements
1. The spring force is the same in both directions
2. The damping force can be different in compression and extension
3. The connector is the same on both ends
4. All self centering dampers have an 8mm shaft

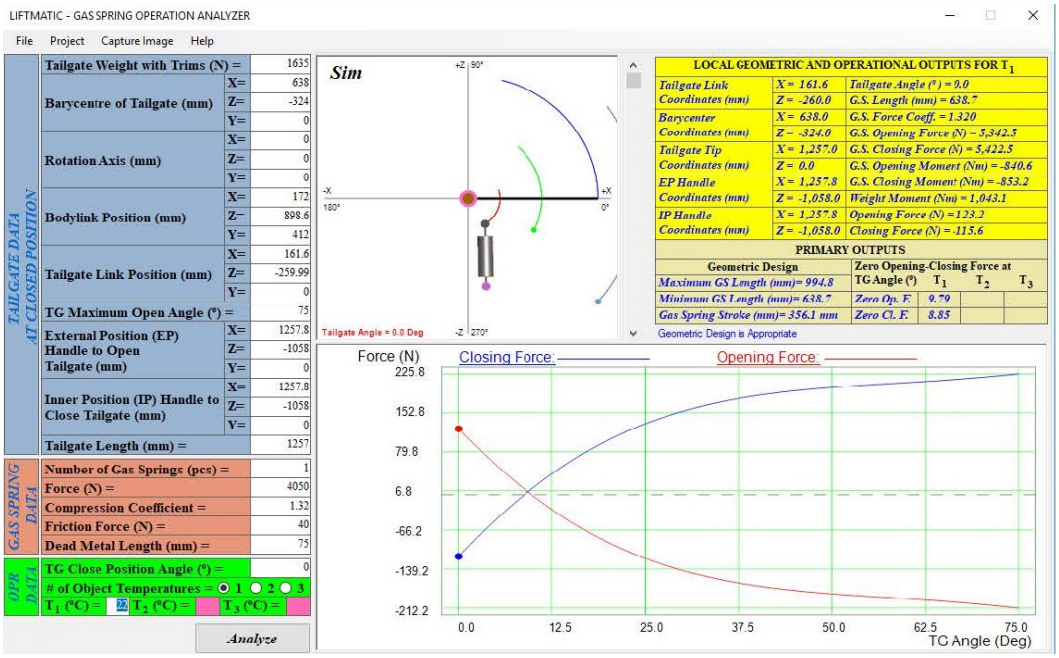
Custom parts Gas Springs

Gas spring nomenclature

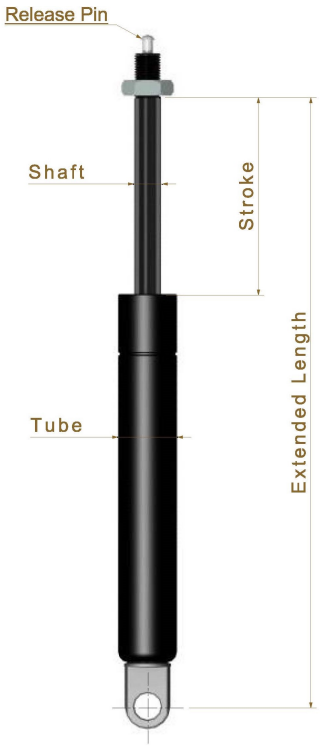
Gas springs are often referred to by the shaft diameter followed by the tube diameter i.e. 8 by 18 This would be an 8mm shaft with an 18mm body.

Gas Spring	Shaft Dia	Tube Dia	Description
Liftmatic 4 by 13	4mm	13mm	Standard
Liftmatic 6 by 15	6mm	15mm	Standard
Liftmatic 8 by 18	8mm	18mm	Standard
Liftmatic 8 by 19	8mm	19mm	High pressure, high force
Liftmatic 8 by 22	8mm	22mm	Standard
Liftmatic 10 by 22	10mm	22mm	High force
Liftmatic 14 by 27	14mm	27mm	Standard
Liftmatic 14 by 28	14mm	28mm	High pressure, high force
Liftmatic 20 by 34	20mm	34mm	High Force

All of the sizes in the table above are manufactured by **LiftMatic** and can be designed to meet customer specifications including analysis of the system geometry including open and close forces at multiple temperatures.



Custom parts available
Locking Gas Springs

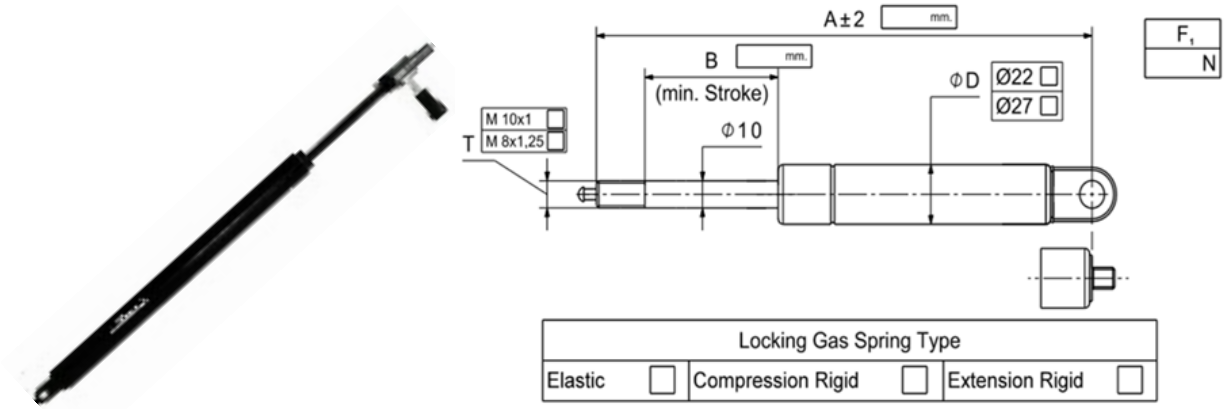


Locking Gas Springs:
Locking gas springs allow the user to lock the unit in any position during operation of the gas spring. This is achieved by depressing a control pin, inside the shaft, that actuates a valve inside the assembly. When the control pin is depressed, the valve inside of the tube allows gas on the flexible gas spring and oil in the rigid gas springs to flow through the valve. When the control pin is released, the valve closes and prevents the flow of gas or oil locking the shaft in place. Locking gas springs can be manufactured with several different functions.

Elastic (Flexible) Locking Gas Springs:
This type of lockable gas spring will allow some small movement of the shaft when a load is applied in either direction. The amount of movement will be proportional to the load applied. When the load is removed the shaft will return to the position at which it was locked. Locking gas springs are designed to mount vertically but they can also be manufactured to be mounted horizontally.

Locking Gas Springs Rigid in Extension:
As the name implies this type of lockable gas spring will be rigid in the locked position when force is applied in the extension direction. In compression there will be some small movement of the shaft based on the amount of load applied. When the load is removed the shaft will return to the position at which it was locked. The gas spring can be mounted vertically or horizontally.

Locking Gas Springs Rigid in Compression:
This type of lockable gas spring is the reverse of the extension locking gas spring. When the mechanism is locked the gas spring will resist force trying to compress the shaft. In the extension direction there will be some small movement of the shaft based on the amount of load applied. When the load is removed the shaft will return to the position at which it was locked. The gas spring can be mounted vertically or horizontally locked. The gas spring can be mounted vertically or horizontally.



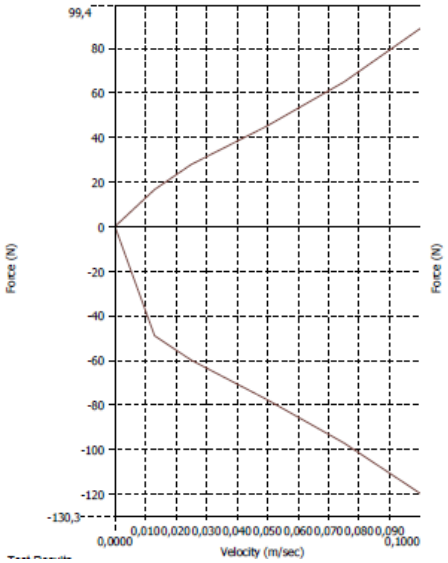
Custom parts - Dampers

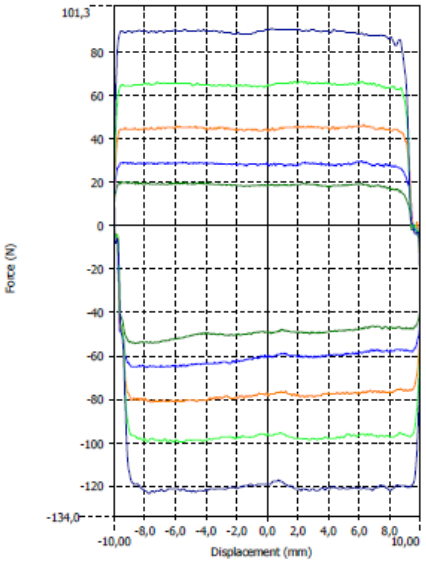
Damper nomenclature

Dampers are often referred to by the shaft diameter followed by the tube diameter and then the type of damper. I.e. 6 by 15 cavitating damper.

Damper	Shaft Dia	Tube Dia	Description
Liftmatic 6 by 15	6mm	15mm	Cavitating
Liftmatic 6 by 15	6mm	15mm	Non-cavitating (NC)
Liftmatic 8 by 18	8mm	18mm	Cavitating
Liftmatic 8 by 18	8mm	18mm	Non-cavitating (NC)
Liftmatic 8 by 22	8mm	22mm	Cavitating
Liftmatic 8 by 22	8mm	22mm	Non-cavitating (NC)
Liftmatic 8 by 28	8mm	28mm	Twin tube damper NC
Liftmatic 8 by 22	8mm	22mm	Self-centering (NC)
Liftmatic 8 by 28	8mm	28mm	Self-centering (NC)

The faster you move the shaft in and out of a damper the more force you generate. When designing a custom damper we need to know the force required at 2 different speeds so we can develop the correct force vs velocity curve. Many customers are unable to generate these values and it often requires some trial and error to get the desired forced curves.





The Graph on the left shows the damper force output at different speeds 0-1 00mm/sec.
And the right side shows the force throughout the travel at specific speeds

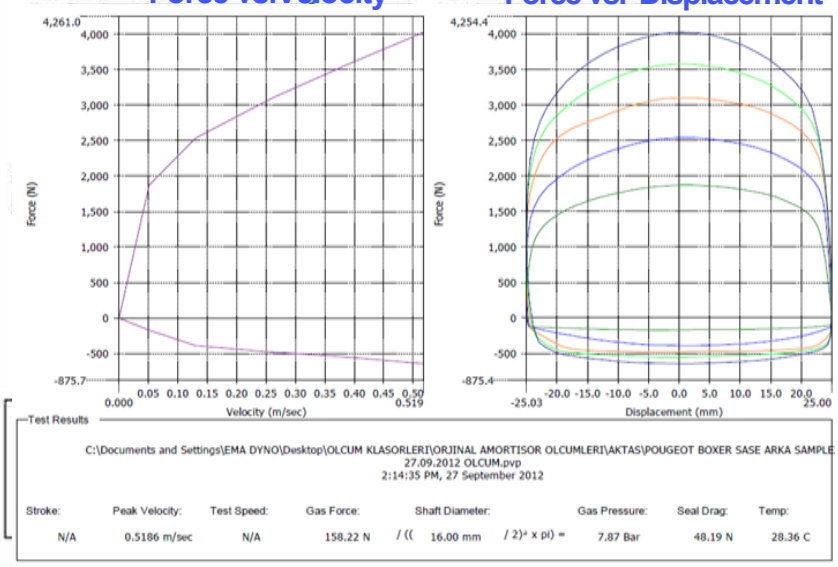
Custom parts – Shock Absorbers

There are two categories of shock absorber designs today; Twin tube and mono tube. As the name suggests the mono tube consists of a single tube with a floating piston, the twin tube (tube in a tube) has a variety of options to suit multiple applications.
LiftMatic only offers the twin tube design in a variety of sizes and configurations.

TYPE	OUTER TUBE	SHAFT	INNER TUBE	APPLICATIONS
B	038	013	027/025	Passenger, commercial
C	040	013	027	Passenger, commercial
C	043,7	013	027 / 025	Passenger, commercial
C	044,5	013	027 / 030	Passenger, commercial
C	049,5	013	027 / 030	Passenger, commercial
D	045	018	030	Passenger, commercial, light commercial
E	045	020	030	Passenger, commercial, light commercial
F	049,5	014	027	Passenger, commercial, light commercial
G	052	020	030	Passenger, commercial, light commercial
H	055	016	035	Commercial, light commercial
K	045	016	030	Passenger, commercial, light commercial
L	063	020	045	Commercial, heavy duty
M	070	022	050	Heavy duty

When we design a Shock Absorber there are a number of things we have to know to provide the right product for the application. The critical items to understand are the faster the velocity of the shaft the higher the resistive force to move it. This force can be tuned at different velocities and can be different in extension and compression. The graphs below show a typical shock absorber curve for:

Force vs.Velocity



Force vs. Displacement

1. Application - describe the vehicle or equipment it will be used on
2. Do you have a calculated force velocity curve or know the forces you require at specific velocities
3. What is the maximum extended length
4. What is the required stroke
5. What is the annual volume
6. Where will the parts be shipped
7. Contact information

LiftMatic

MOTION CONTROL EXPERTS

www.LiftMatic.com

Phone: 239-322-3919 - Ext. 3 • E-Mail: Sales@LiftMatic.com

13361 Saddle Road • Suite 109 • Fort Myers, FL 33913