



CT02052E

## Nitrogen Gas Springs



**SHINWEON S&T CO.,LTD.**

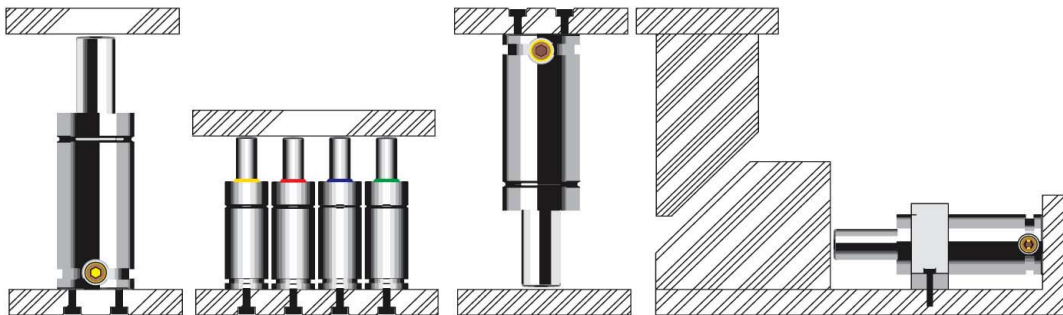


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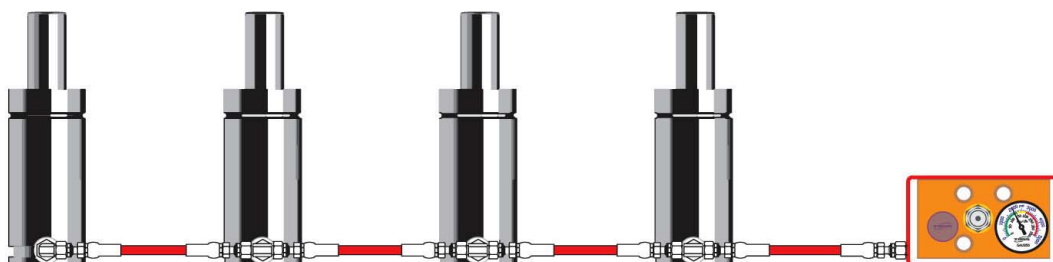
### Self-Contained Type

Already charged when shipped, it can be easily used, as it does not need extra space for installation of other parts. It may be recharged and discharged with a maximum charging pressure of 150kgf/cm<sup>2</sup>.



### Fitting System Type

Hoses connect a few gas springs together and each gas spring can be simultaneously charged and discharged. They are easily handled during operations as the control panel controls pressure for each gas spring.





All TOSS products are accurately manufactured with equipments of high precision such as CNC, M/C, etc., and have passed severe trial tests of over one million strokes under SPM 80 condition. Shinweon has received acknowledgement for their superior quality through the application test on the spot from domestic industries. Breaking from the conventional standard unit of inch, which is a fixed idea due to the high dependency on import, we have converted the standard unit to millimeters, which is more commonly used in the local industry. We have also developed the TSM series, which is more compact than the existing models and with this, we believe we can contribute to the development of the internal molding industries.

## □ Features

The standards of TOSS gas springs are as below :

- Initial load : 50kgf ~ 7,500kgf
- Stroke : 10mm ~ 300mm
- Maximum charging pressure : 150kgf/cm<sup>2</sup>.
- TOSS has a wide range to choose from, which are the TSM, TSS and TSL series.
- Easy to use in small moulds.
- Available in two types :
  - **Self Contained Type** : Individually used as an independent gas spring.
  - **Fitting Type** : Multiple gas springs that is connected by pipes. The pressure for each gas spring can be adjusted simultaneously.

Conversion between these two types is possible.

- Recharging and discharging is simple and pressure can be adjusted easily.

## □ Quality Assurance

All TOSS gas springs comes with a two years guarantee period from date of loading from the warehouse or one million strokes. Every troubleshooting service and (or) exchange of parts during this term is free of charge. However, should there arise any critical defects after the two years guarantee period, the products shall be replaced free of charge.

## □ Maintenance

All TOSS gas springs are manufactured based on a simple structure, which requires no repair throughout its useful life. TOSS gas springs, which are damaged during operations after its useful life may be easily repaired and revived by simply replacing the damaged parts. In addition, adequate load can be specified by directly adjusting the pressure at sites.



## □ Fast Delivery

In order to ensure fast delivery, Shinweon is equipped with requirements such as procurements of load testing facilities, gas charging facilities and a comprehensive inventory for all spare parts. We also carry sufficient stock for certain models to minimize lead-time and to reduce deadlocks in production. Models that are without stock can be delivered within ten days from day of order. However, this lead-time varies according to quantity and location.

## □ Installation & Operation

When installing the TOSS gas spring, the piston rods of the gas springs must be installed parallel to the operation direction and vertical to the installation ground. Failure to do so will result in the generation of odd load and abrasion of piston rods, bearings, and seals etc., which will reduce the life span of the gas spring.

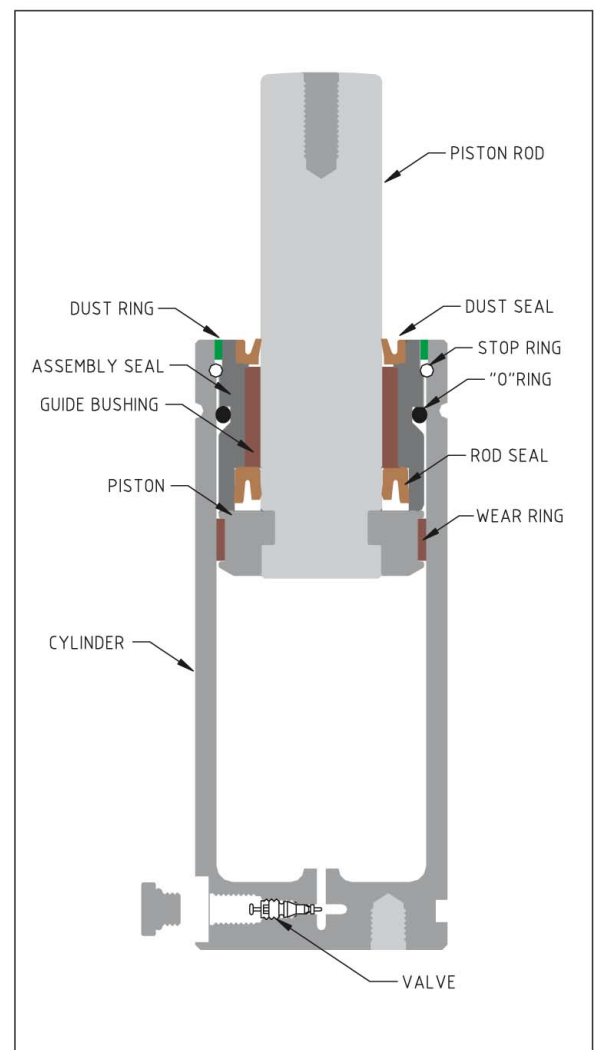
To prevent damage to the gas spring and to maximize its life span, please allow ten percent margin to the standard stroke to reduce shock that is caused by the compression of gas. Sometimes, gas springs can also be damaged when the piston rods touch the bottom surface.

Although a tap of M8 is used for the assembly and disassembly of the upper part of the piston rods, this should not be used to fix gas springs or any connecting devices.

During installation, please ensure that there is about 1MM of margin space between the contact surface and the upper part of the piston rods.

TOSS gas springs can be used just as it is. There is no need for pre-pressure because the initial pressure is strong enough. Any increase of pre-pressure can damage the molds.

Do not cut or grind the upper part of the piston rods or grind the lower part of the gas springs, as it is dangerous. When installing the TOSS, please ensure that the bottom surface of the TOSS touches the mold to absorb the load of gas spring. However, when assembling with mounts, there should be space between the mount and the bottom surface of the mold. This is to prevent the mold from breaking should heavy load breaks the mount.



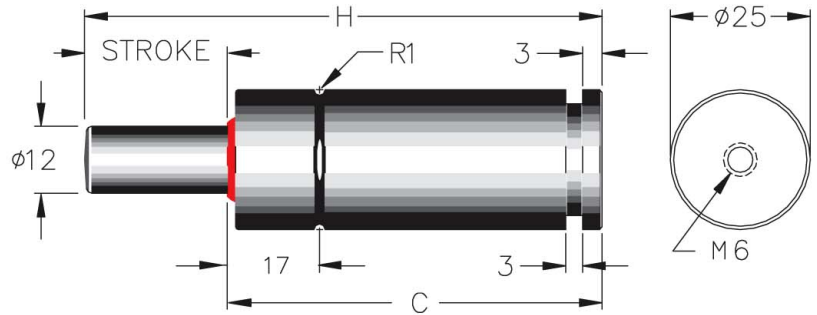


# TSM0150

# NITROGEN GAS SPRING



YELLOW RED BLUE GREEN



## | HOW TO SPECIFY |

**GAS SPRING**

**TSM0150**

×

**050**

**YELLOW**

MODEL

STROKE

COLOR CODE

**MOUNT**

**SP0150**

### TSM0150

STROKE	H	C
10	62	52
13	68	55
15	72	57
16	74	58
20	82	62
25	92	67
30	102	72
35	112	77
38	118	80
40	122	82
45	132	87
50	142	92
60	165	105
63	172	109
70	185	115
80	205	125

### TSM0150

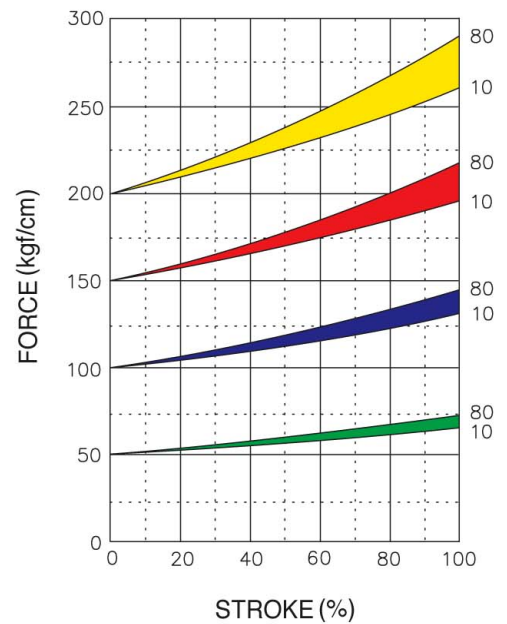
TSM0150 is pre-charged when shipped and comes in four types, depending on the force. The pressure cannot be adjusted but Nitrogen (N<sub>2</sub>) is rechargeable.

COLOR	FORCE(kgf)	PRESSURE(kgf/cm <sup>2</sup> )
YELLOW	200	175
RED	150	135
BLUE	100	90
GREEN	50	45

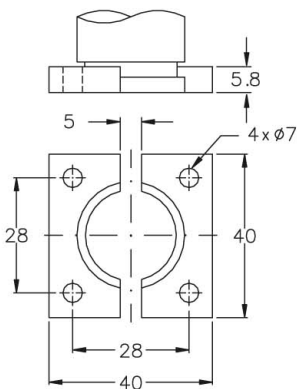
### Note:

- All of TOSS gas spring must be secured with a stroke reserved at least 10% of the length of the stroke.
- Not allowed disassembled in any case without manufacturer's instructions.

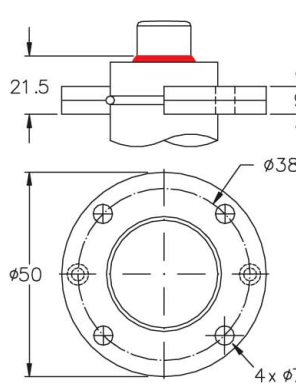
### FORCE CHART



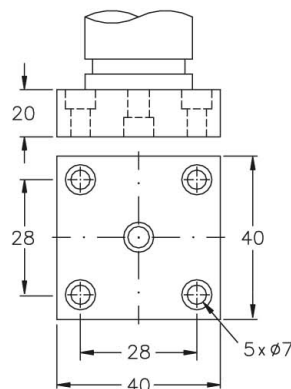
### SP0150 MOUNT



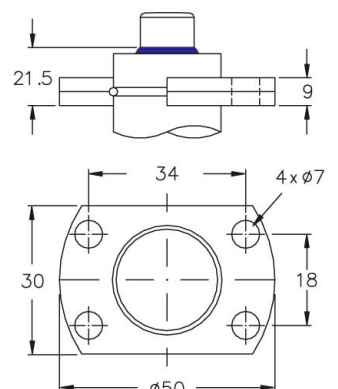
### SR0150 MOUNT

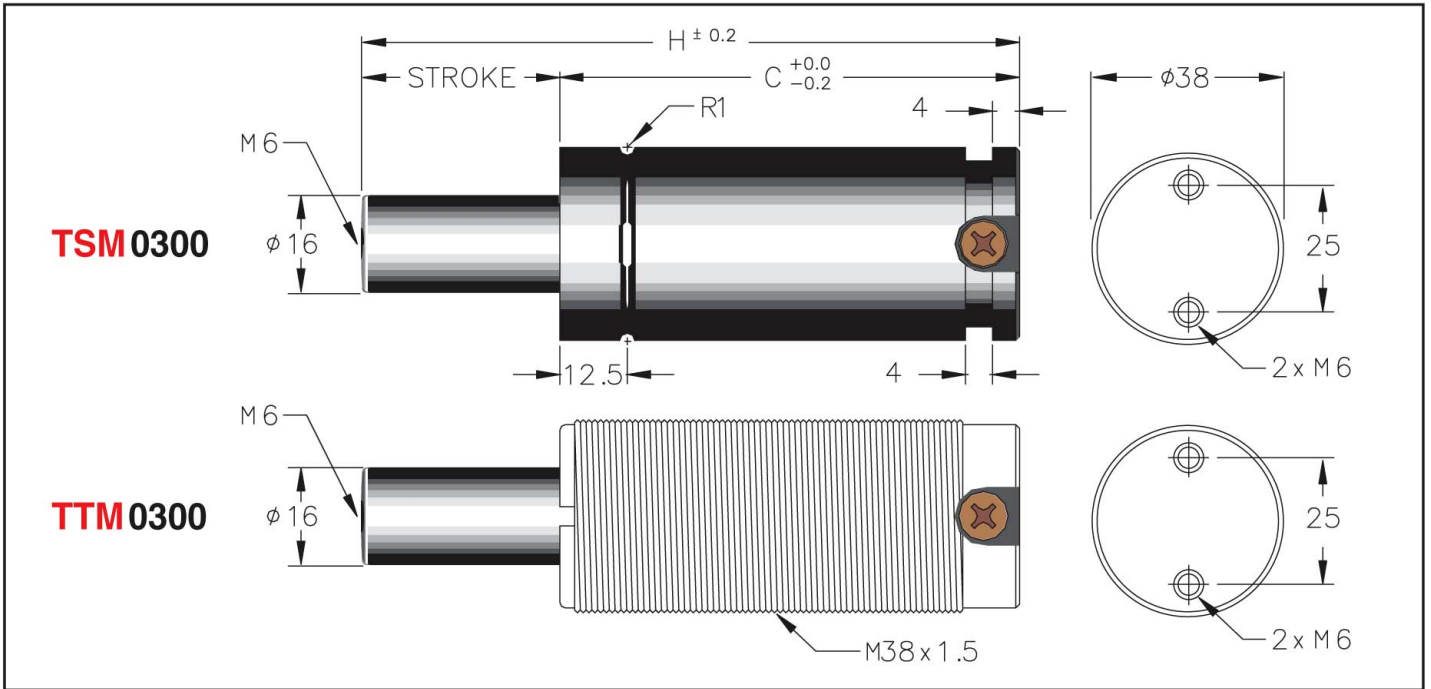


### SB0150 MOUNT



### SG0150 MOUNT

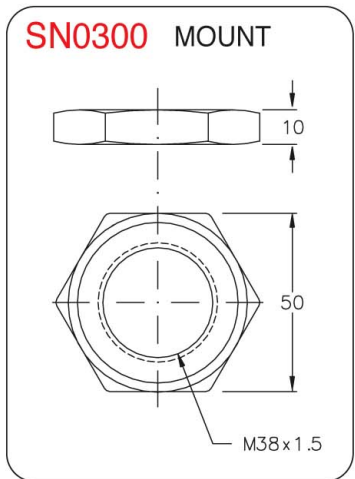
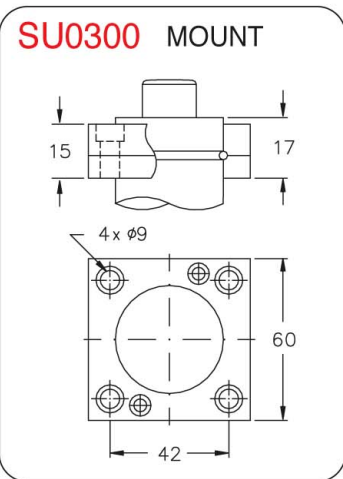
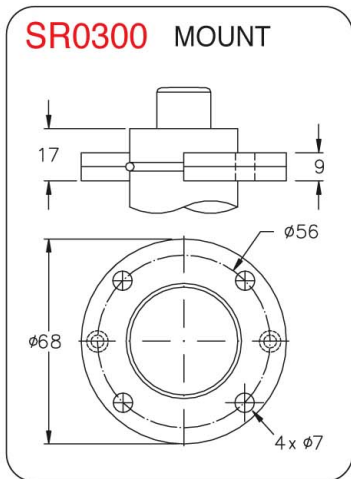
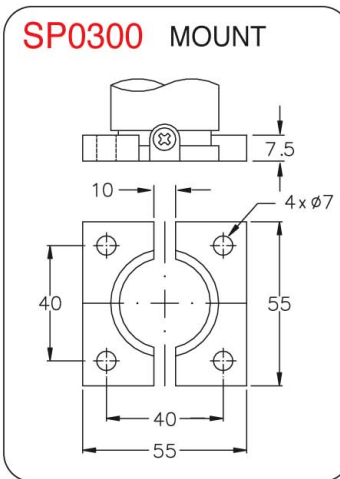
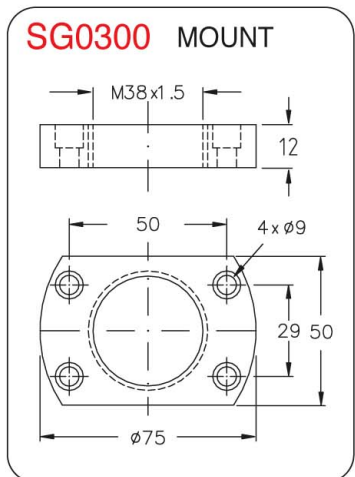
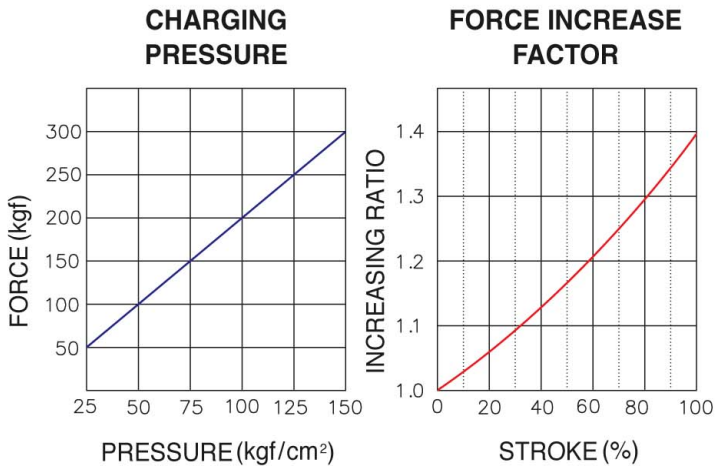




TSM, TTM0300		
STROKE	H	C
10	70	60
15	80	65
20	90	70
25	100	75
30	110	80
35	120	85
38	126	88
40	130	90
45	140	95
50	150	100
60	170	110
63	176	113
70	190	120
80	210	130
90	230	140
100	250	150
110	270	160
120	290	170
125	300	175

**HOW TO SPECIFY | GAS SPRING** **TSM0300 × 050 - 150**  
**MODEL**      **STROKE**      **CHARGING PRESSURE (kgf/cm<sup>2</sup>)**  
**MOUNT**      **SP0300**

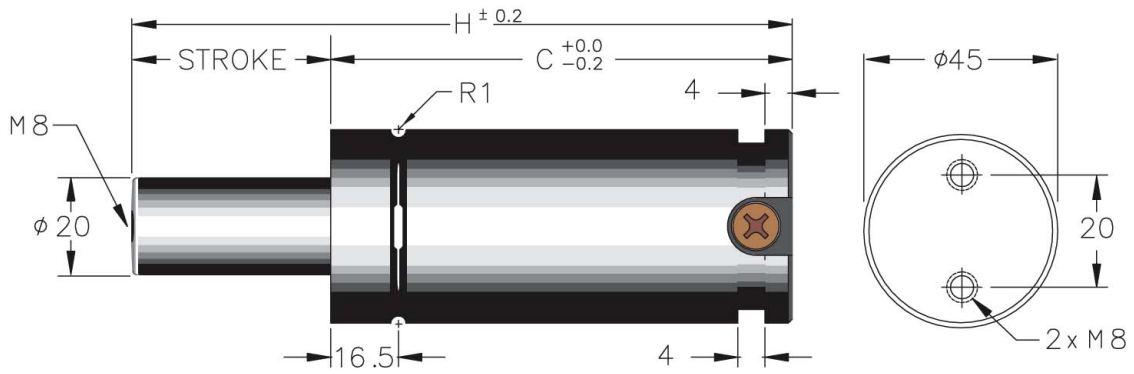
Charging pressure has to be specified. Otherwise, 150kgf/cm<sup>2</sup> will be automatically charged.





# TSM, TSL, 0500

# NITROGEN GAS SPRING



## | HOW TO SPECIFY |

## GAS SPRING

**TSM0500**  
MODEL

× **050**  
STROKE

- **150**  
CHARGING  
PRESSURE (kgf/cm<sup>2</sup>)

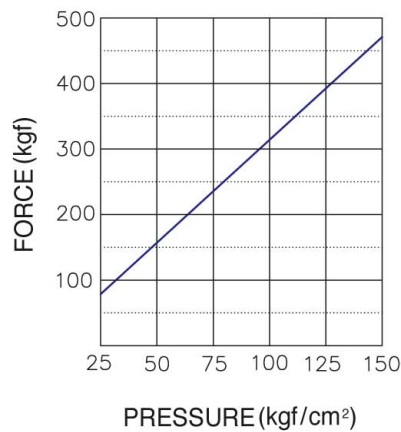
## MOUNT

**SP0500**

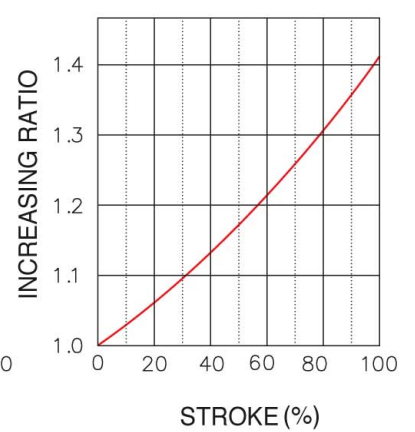
Charging pressure has to be specified. Otherwise, 150kgf/cm<sup>2</sup> will be automatically charged.

STROKE MM	TSM0500		TSL0500	
	H	C	H	C
10	70	60	105	95
15	80	65	115	100
20	90	70	125	105
25	100	75	135	110
30	110	80	145	115
35	120	85	155	120
38	126	88	161	123
40	130	90	165	125
45	140	95	175	130
50	150	100	185	135
60	170	110	205	145
63	176	113	211	148
70	190	120	225	155
80	210	130	245	165
90	230	140	265	175
100	250	150	285	185
110	270	160	305	195
120	290	170	325	205
125	300	175	335	210

## CHARGING PRESSURE



## FORCE INCREASE FACTOR

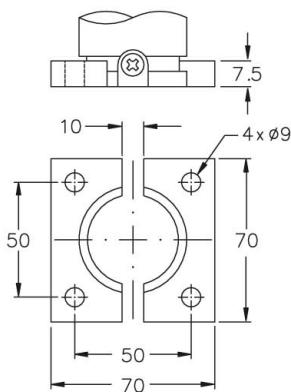


$$\text{Charging pressure (kgf/cm}^2\text{)} = \frac{\text{D demanded Force (kgf)}}{3.1}$$

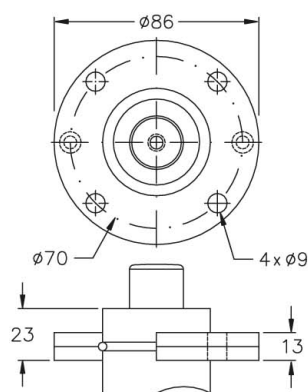
EX) What comes to the charging pressure of gas spring which demands force 350kgf ?

$$113 \text{ kgf/cm}^2 = \frac{350 \text{ kgf}}{3.1}$$

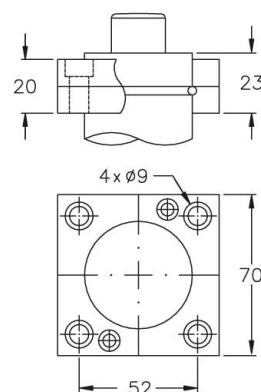
## SP0500 MOUNT



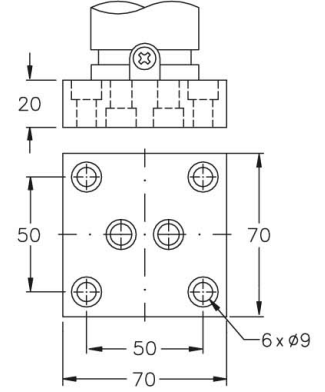
## SR0500 MOUNT



## SU0500 MOUNT



## SB0500 MOUNT

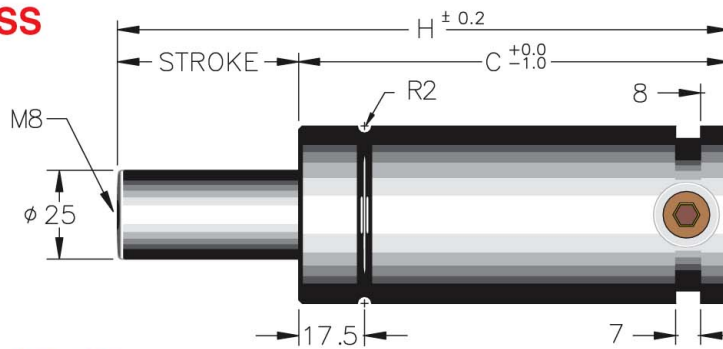




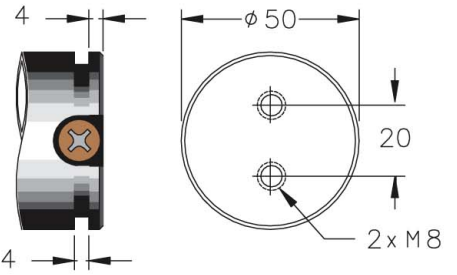
# TSM, TSS, TSL, 0750

## NITROGEN GAS SPRING

### TSL.TSS



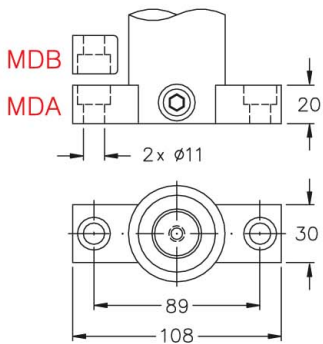
### TSM



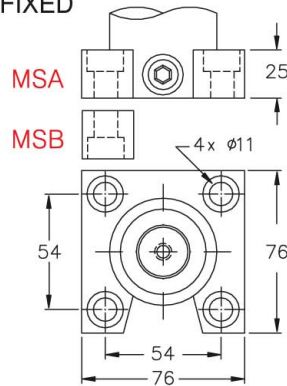
PORT SIZE: **TSL, TSS** 7/16-20  
**TSM** M6

\*TSM0750 AVAILABLE ONLY FOR SELF-CONTAINED TYPE.

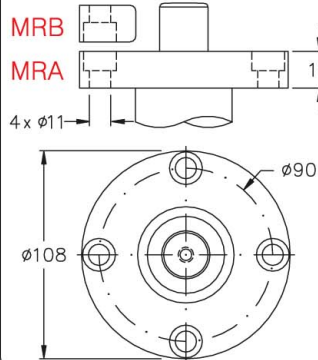
### MD MOUNT FIXED



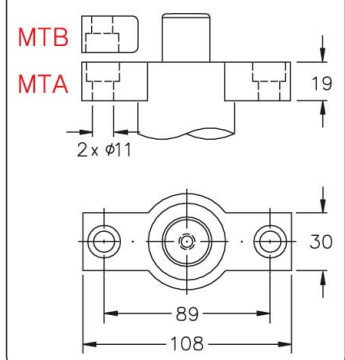
### MS MOUNT FIXED



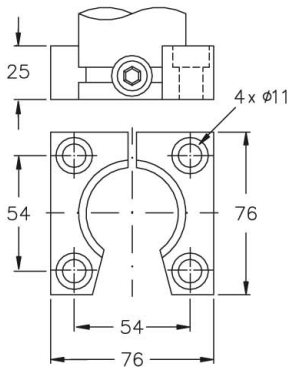
### MR MOUNT FIXED



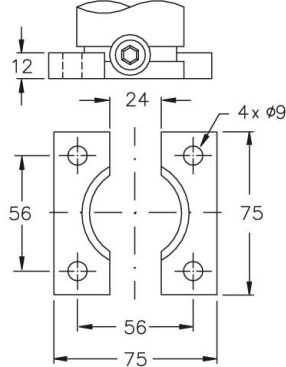
### MT MOUNT FIXED



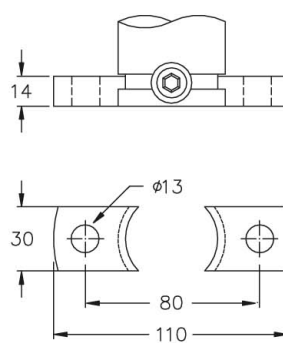
### SS0750 MOUNT ASSEMBLING



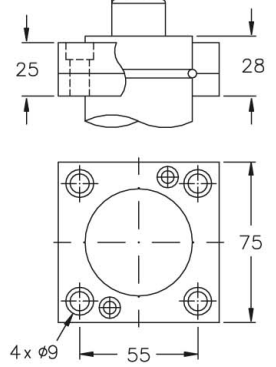
### SP0750 MOUNT ASSEMBLING



### SL0750 MOUNT ASSEMBLING



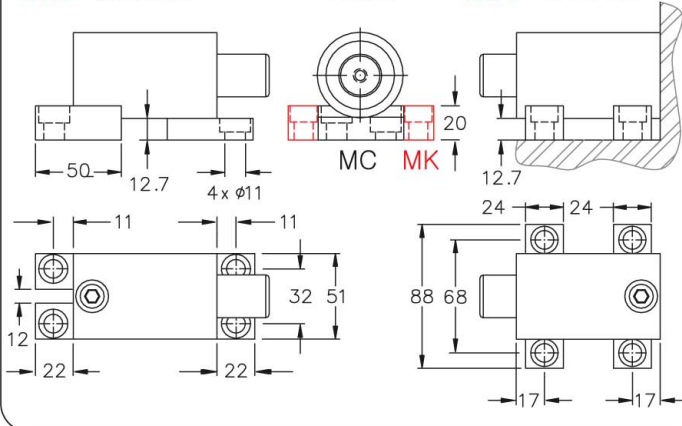
### SU0750 MOUNT ASSEMBLING



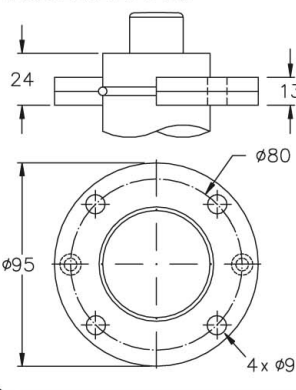
### MC MOUNT

### FIXED

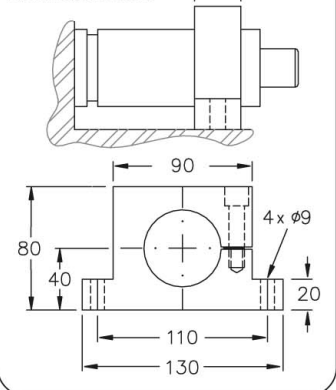
### MK MOUNT



### SR0750 MOUNT ASSEMBLING



### SC0750 MOUNT ASSEMBLING







## HOW TO SPECIFY

<b>STANDARD</b>	<b>TSS0750 × 50S(F) - 150</b>
<b>MOUNT</b>	<b>SS0750</b>
<b>MOUNT FIXED</b>	<b>TSS0750 × 50S(F) - MSA - 150</b>
	MODEL SELF-CONTAINED(S) MOUNT CHARGING PRESSURE (kgf/cm <sup>2</sup> ) FITTING-SYSTEM(F)

Charging pressure has to be specified. Otherwise, 150kgf/cm<sup>2</sup> will be automatically charged.

(UNIT: MM)

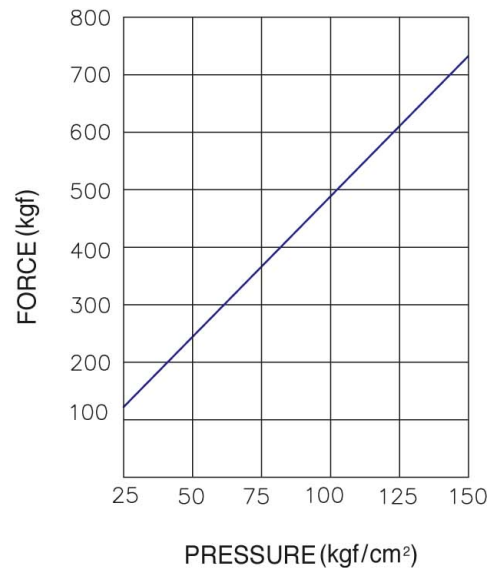
STROKE	TSM0750		TSS0750		TSL0750	
	H	C	H	C	H	C
10	70	60	90	80	115	105
12.7	75.4	62.7	95.4	82.7	120.4	107.7
15	80	65	100	85	125	110
20	90	70	110	90	135	115
25	100	75	120	95	145	120
30	110	80	130	100	155	125
35	120	85	140	105	165	130
38	126	88	146	108	171	133
40	130	90	150	110	175	135
45	140	95	160	115	185	140
50	150	100	170	120	195	145
60	170	110	190	130	215	155
63	176	113	196	133	222	158
70	190	120	210	140	235	165
75	200	125	220	145	245	170
80	210	130	230	150	255	175
90	230	140	250	160	275	185
100	250	150	270	170	295	195
125	300	175	320	195	345	220
150	-	-	370	220	395	245
160	-	-	390	230	415	255
175	-	-	420	245	445	270
200	-	-	470	270	495	295
250	-	-	-	-	595	345
300	-	-	-	-	695	395

(UNIT: INCH)

STROKE	TSM0750		TSS0750		TSL0750	
	H	C	H	C	H	C
0.50	3.00	2.50	3.74	3.24	4.74	4.24
0.75	3.50	2.75	4.24	3.49	5.24	4.49
1.00	4.00	3.00	4.74	3.74	5.74	4.74
1.50	5.00	3.50	5.74	4.24	6.74	5.24
2.00	6.00	4.00	6.74	4.74	7.74	5.74
2.50	7.00	4.50	7.74	5.24	8.74	6.24
3.00	8.00	5.00	8.74	5.74	9.74	6.74
3.50	9.00	5.50	9.74	6.24	10.74	7.24
4.00	10.00	6.00	10.74	6.74	11.74	7.74
4.50	11.00	6.50	11.74	7.24	12.74	8.24
5.00	12.00	7.00	12.74	7.74	13.74	8.74
5.50	-	-	13.74	8.24	14.74	9.24
6.00	-	-	14.74	8.74	15.74	9.74
6.50	-	-	15.74	9.24	16.74	10.24
7.00	-	-	16.74	9.74	17.74	10.74
7.50	-	-	17.74	10.24	18.74	11.24
8.00	-	-	18.74	10.74	19.74	11.74
8.50	-	-	-	-	20.74	12.24
9.00	-	-	-	-	21.74	12.74
10.00	-	-	-	-	23.74	13.74

\*For special type, please ask if available.

## CHARGING PRESSURE

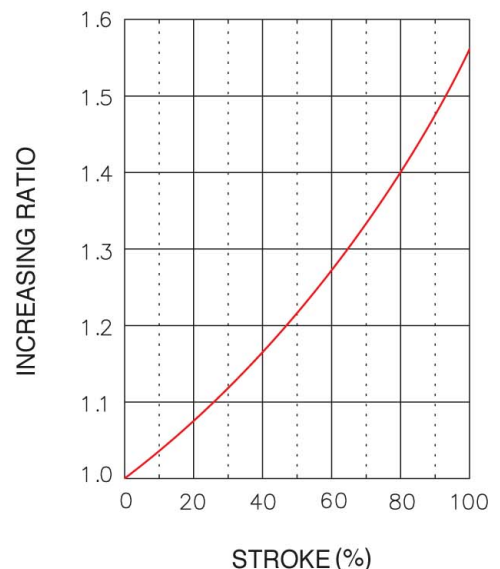


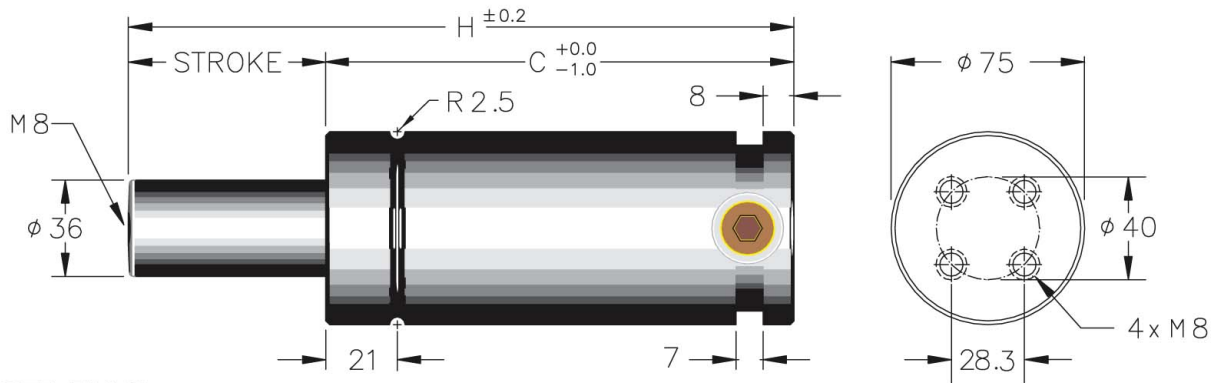
$$\text{Charging pressure (kgf/cm}^2\text{)} = \frac{\text{Demanded Force (kgf)}}{4.9}$$

EX) What comes to the charging pressure of gas spring which demands force 600 kgf ?

$$122 \text{ kgf/cm}^2 = \frac{600 \text{ kgf}}{4.9}$$

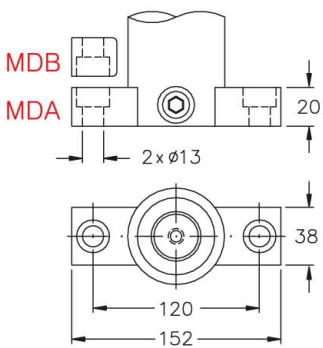
## FORCE INCREASE FACTOR



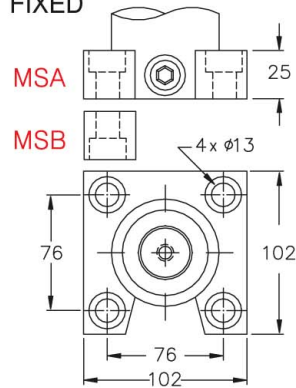


PORT SIZE: 7/16-20

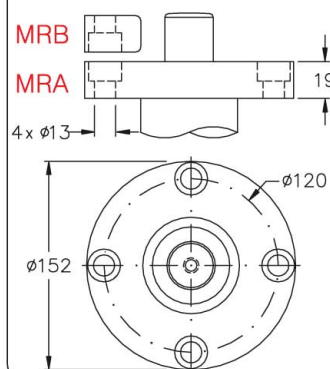
### MD MOUNT FIXED



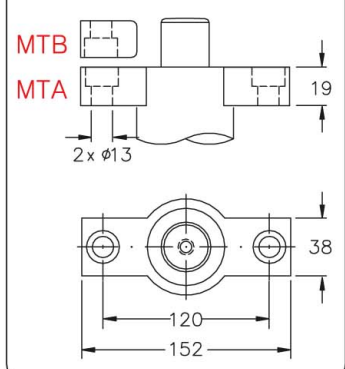
### MS MOUNT FIXED



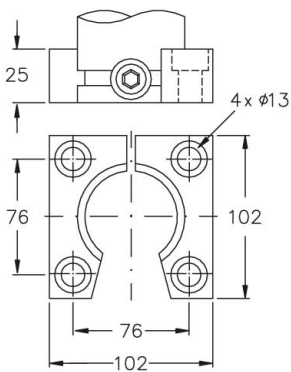
### MR MOUNT FIXED



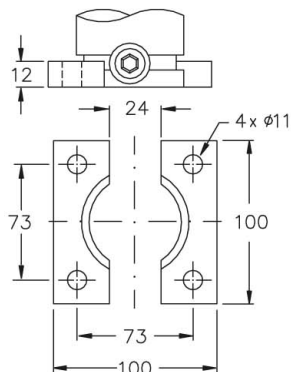
### MT MOUNT FIXED



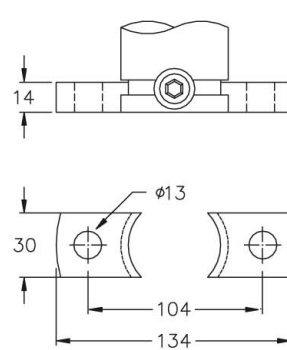
### SS1500 MOUNT ASSEMBLING



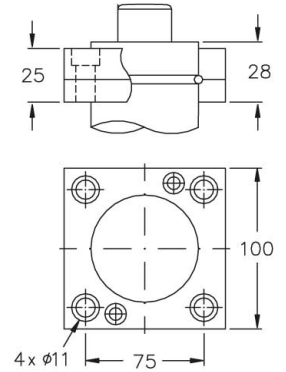
### SP1500 MOUNT ASSEMBLING



### SL1500 MOUNT ASSEMBLING



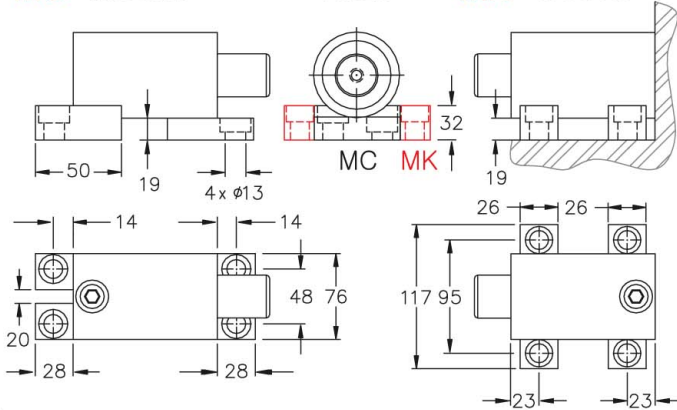
### SU1500 MOUNT ASSEMBLING



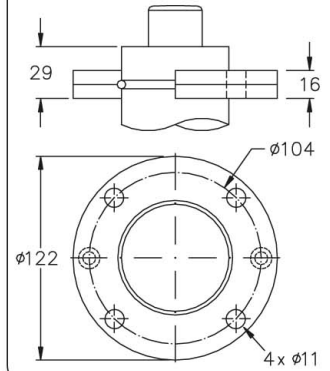
### MC MOUNT

### FIXED

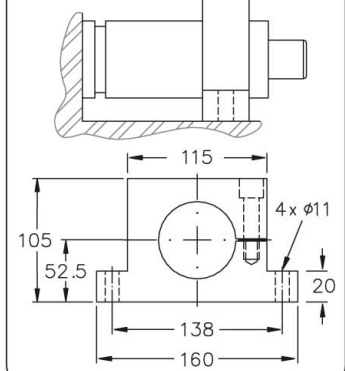
### MK MOUNT



### SR1500 MOUNT ASSEMBLING



### SC1500 MOUNT ASSEMBLING





## HOW TO SPECIFY

<b>STANDARD</b>	<b>TSS1500 × 50S(F) - 150</b>
<b>MOUNT</b>	<b>SS1500</b>
<b>MOUNT FIXED</b>	<b>TSS1500 × 50S(F) - MSA - 150</b>
	<b>MODEL SELF-CONTAINED(S) MOUNT CHARGING PRESSURE (kgf/cm<sup>2</sup>)</b>
	<b>FITTING-SYSTEM(F)</b>

Charging pressure has to be specified. Otherwise, 150kgf/cm<sup>2</sup> will be automatically charged.

(UNIT: MM)

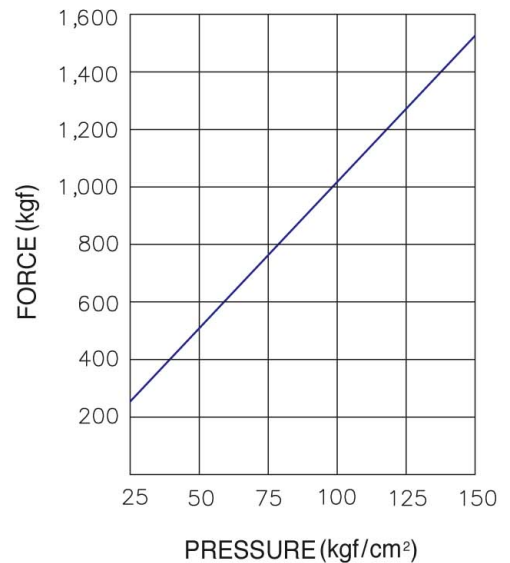
STROKE	TSM1500		TSS1500		TSL1500	
	H	C	H	C	H	C
10	114	104	122	112	130	120
13	120	107	127.4	114.4	135.4	122.4
15	124	109	132	117	140	125
20	134	114	142	122	150	130
25	144	119	152	127	160	135
30	154	124	162	132	170	140
35	164	129	172	137	180	145
38	170	132	178	140	186	148
40	174	134	182	142	190	150
45	184	139	192	147	200	155
50	194	144	202	152	210	160
60	214	154	222	162	230	170
63	220	157	228	165	237	174
70	234	164	242	172	250	180
75	244	169	252	177	260	185
80	254	174	262	182	270	190
90	274	184	282	192	290	200
100	294	194	302	202	310	210
125	344	219	352	227	360	235
150	394	244	402	252	410	260
160	414	254	422	262	430	270
175	444	269	452	277	460	285
200	494	294	502	302	510	310
250	-	-	602	352	610	360
300	-	-	702	402	710	410

(UNIT: INCH)

STROKE	TSM1500		TSS1500		TSL1500	
	H	C	H	C	H	C
0.50	4.70	4.20	5.00	4.50	5.28	4.78
0.75	5.20	4.45	5.50	4.75	5.78	5.03
1.00	5.70	4.70	6.00	5.00	6.28	5.28
1.50	6.70	5.20	7.00	5.50	7.28	5.78
2.00	7.70	5.70	8.00	6.00	8.28	6.28
2.50	8.70	6.20	9.00	6.50	9.28	6.78
3.00	9.70	6.70	10.00	7.00	10.28	7.28
3.50	10.70	7.20	11.00	7.50	11.28	7.78
4.00	11.70	7.70	12.00	8.00	12.28	8.28
4.50	12.70	8.20	13.00	8.50	13.28	8.78
5.00	13.70	8.70	14.00	9.00	14.28	9.28
5.50	14.70	9.20	15.00	9.50	15.28	9.78
6.00	15.70	9.70	16.00	10.00	16.28	10.28
6.50	16.70	10.20	17.00	10.50	17.28	10.78
7.00	17.70	10.70	18.00	11.00	18.28	11.28
7.50	18.70	11.20	19.00	11.50	19.28	11.78
8.00	19.70	11.70	20.00	12.00	20.28	12.28
8.50	20.70	12.20	21.00	12.50	21.28	12.78
9.00	21.70	12.70	22.00	13.00	22.28	13.28
10.00	23.70	13.70	24.00	14.00	24.28	14.28

\*For special type, please ask if available.

### CHARGING PRESSURE

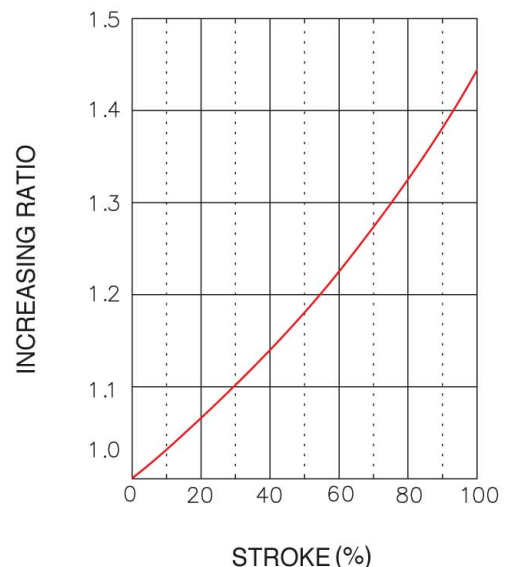


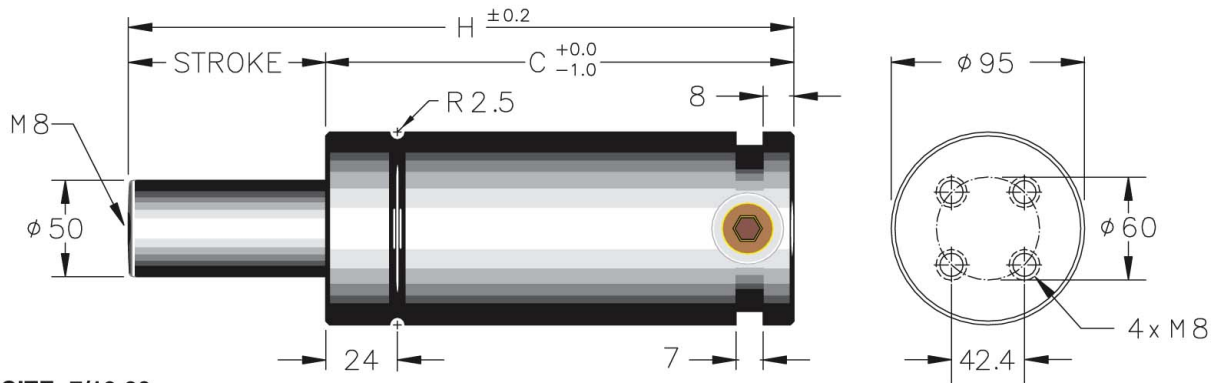
$$\text{Charging pressure (kgf/cm}^2\text{)} = \frac{\text{Demanded Force (kgf)}}{10.1}$$

EX) What comes to the charging pressure of gas spring which demands force 1200kgf ?

$$119 \text{ kgf/cm}^2 = \frac{1200 \text{ kgf}}{10.1}$$

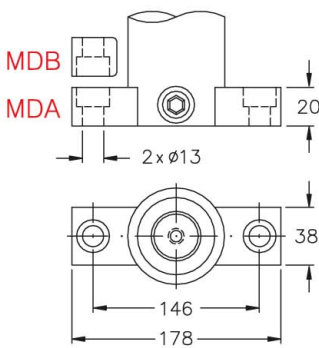
### FORCE INCREASE FACTOR



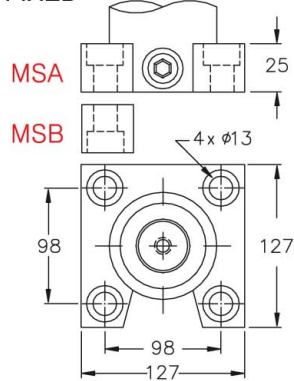


PORT SIZE: 7/16-20

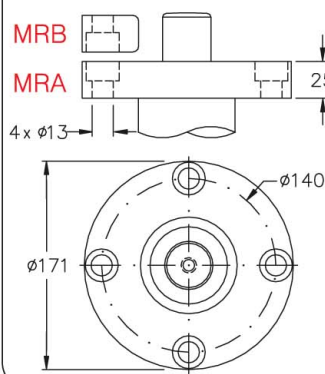
### MD MOUNT FIXED



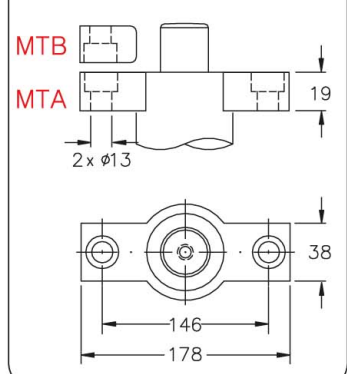
### MS MOUNT FIXED



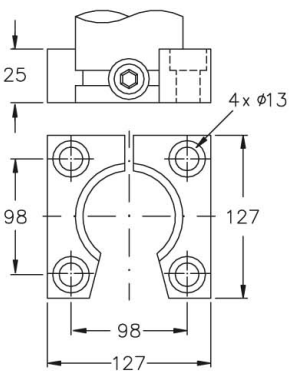
### MR MOUNT FIXED



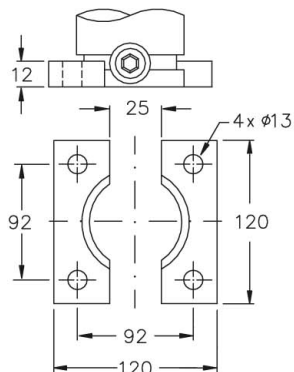
### MT MOUNT FIXED



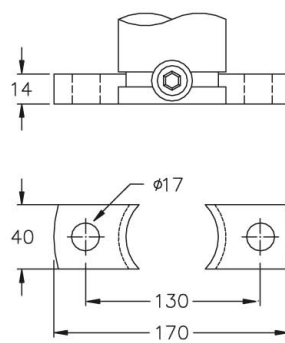
### SS3000 MOUNT ASSEMBLING



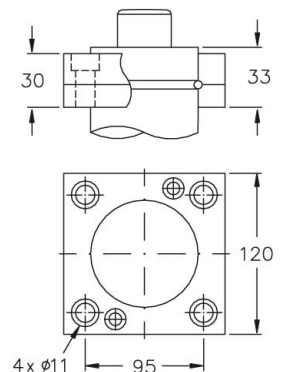
### SP3000 MOUNT ASSEMBLING



### SL3000 MOUNT ASSEMBLING



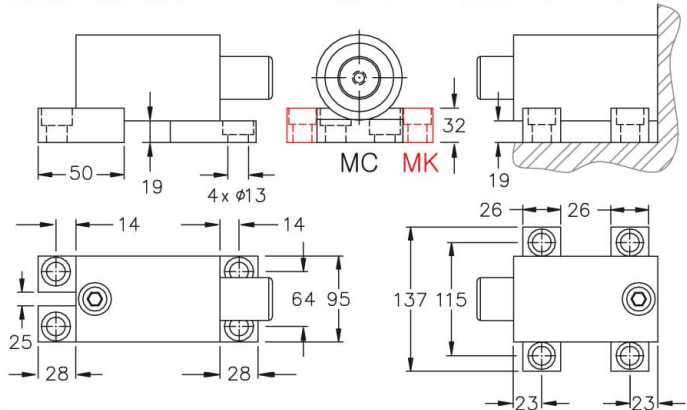
### SU3000 MOUNT ASSEMBLING



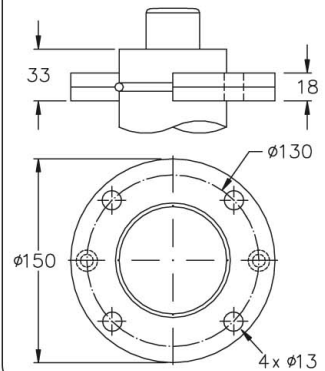
### MC MOUNT

### FIXED

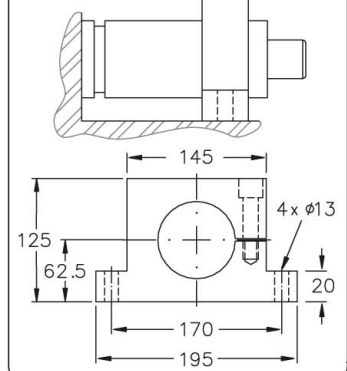
### MK MOUNT



### SR3000 MOUNT ASSEMBLING



### SC3000 MOUNT ASSEMBLING





## HOW TO SPECIFY

<b>STANDARD MOUNT</b>	<b>TSS3000 × 50S(F) - 150</b>
<b>MOUNT FIXED</b>	<b>SS3000</b>
	<b>TSS3000 × 50S(F) - MSA - 150</b>
	<b>MODEL SELF-CONTAINED(S) MOUNT CHARGING PRESSURE (kgf/cm<sup>2</sup>)</b>

Charging pressure has to be specified. Otherwise, 150kgf/cm<sup>2</sup> will be automatically charged.

(UNIT: MM)

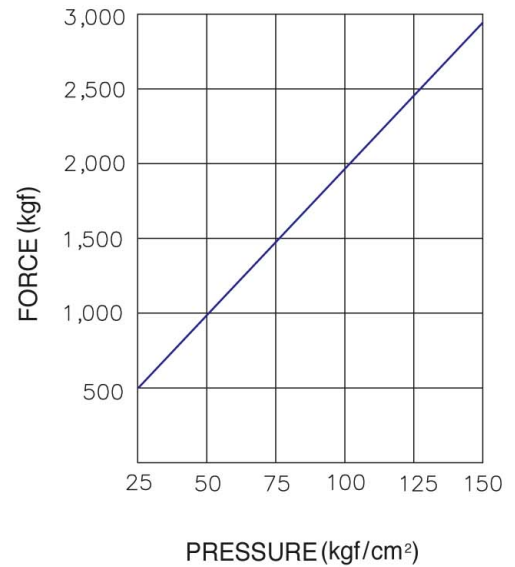
STROKE	TSM3000		TSS3000		TSL3000	
	H	C	H	C	H	C
10	114	104	122	112	140	130
13	120	107	127.5	114.5	145.5	132.5
15	124	109	132	117	150	135
20	134	114	142	122	160	140
25	144	119	152	127	170	145
30	154	124	162	132	180	150
35	164	129	172	137	190	155
38	170	132	178	140	196	158
40	174	134	182	142	200	160
45	184	139	192	147	210	165
50	194	144	202	152	220	170
60	214	154	222	162	240	180
63	220	157	228	165	247	184
70	234	164	242	172	260	190
75	244	169	252	177	270	195
80	254	174	262	182	280	200
90	274	184	282	192	300	210
100	294	194	302	202	320	220
125	344	219	352	227	370	245
150	394	244	402	252	420	270
160	414	254	422	262	440	280
175	444	269	452	277	470	295
200	494	294	502	302	520	320
250	-	-	602	352	620	370
300	-	-	702	402	720	420

(UNIT: INCH)

STROKE	TSM3000		TSS3000		TSL3000	
	H	C	H	C	H	C
0.50	4.70	4.20	5.00	4.50	5.68	5.18
0.75	5.20	4.45	5.50	4.75	6.18	5.43
1.00	5.70	4.70	6.00	5.00	6.68	5.68
1.50	6.70	5.20	7.00	5.50	7.68	6.18
2.00	7.70	5.70	8.00	6.00	8.68	6.68
2.50	8.70	6.20	9.00	6.50	9.68	7.18
3.00	9.70	6.70	10.00	7.00	10.68	7.68
3.50	10.70	7.20	11.00	7.50	11.68	8.18
4.00	11.70	7.70	12.00	8.00	12.68	8.68
4.50	12.70	8.20	13.00	8.50	13.68	9.18
5.00	13.70	8.70	14.00	9.00	14.68	9.68
5.50	14.70	9.20	15.00	9.50	15.68	10.18
6.00	15.70	9.70	16.00	10.00	16.68	10.68
6.50	16.70	10.20	17.00	10.50	17.68	11.18
7.00	17.70	10.70	18.00	11.00	18.68	11.68
7.50	18.70	11.20	19.00	11.50	19.68	12.18
8.00	19.70	11.70	20.00	12.00	20.68	12.68
8.50	20.70	12.20	21.00	12.50	21.68	13.18
9.00	21.70	12.70	22.00	13.00	22.68	13.68
10.00	23.70	13.70	24.00	14.00	24.68	14.68

\*For special type, please ask if available.

## CHARGING PRESSURE

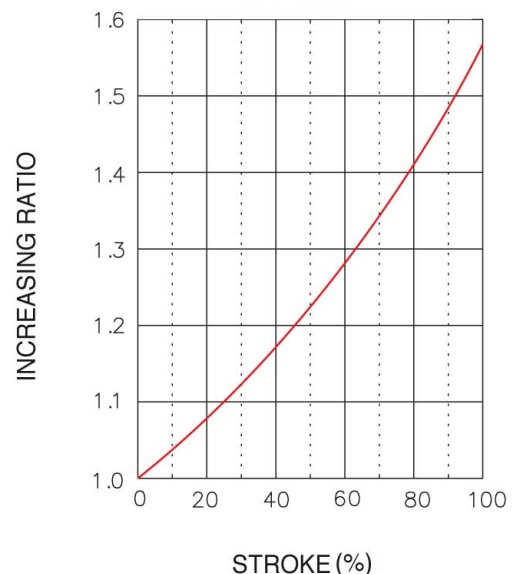


$$\text{Charging pressure (kgf/cm}^2\text{)} = \frac{\text{Demanded Force (kgf)}}{19.5}$$

EX) What comes to the charging pressure of gas spring which demands force 2500kgf ?

$$128 \text{ kgf/cm}^2 = \frac{2500 \text{ kgf}}{19.5}$$

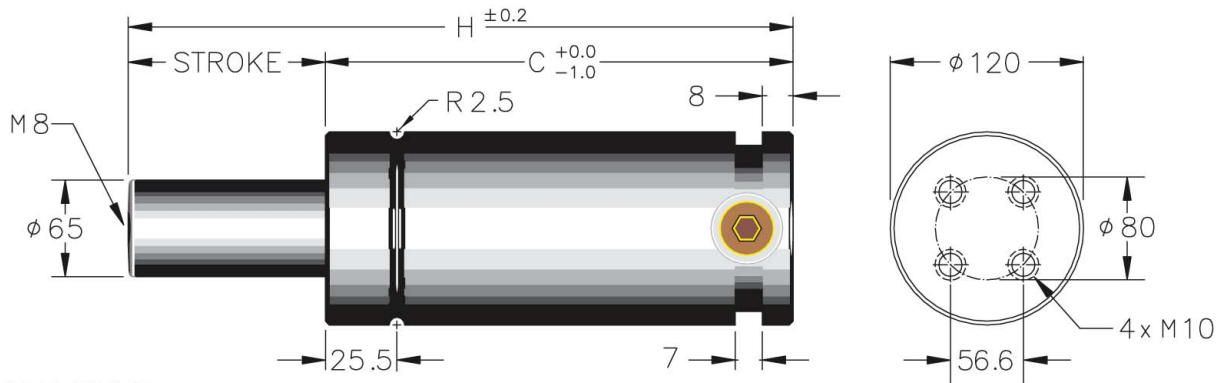
## FORCE INCREASE FACTOR





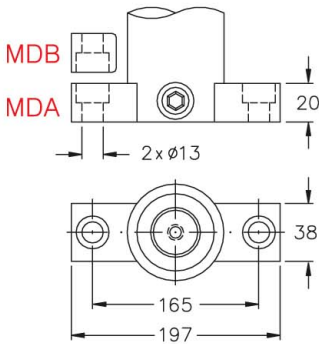
# TSM, TSS, TSL, 5000

# NITROGEN GAS SPRING

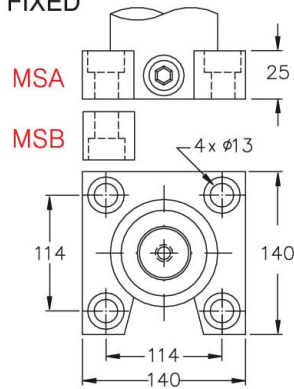


PORT SIZE: 7/16-20

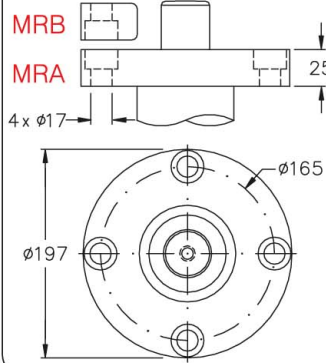
## MD MOUNT FIXED



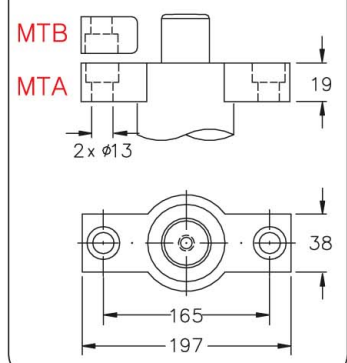
## MS MOUNT FIXED



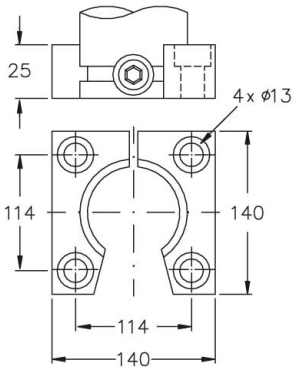
## MR MOUNT FIXED



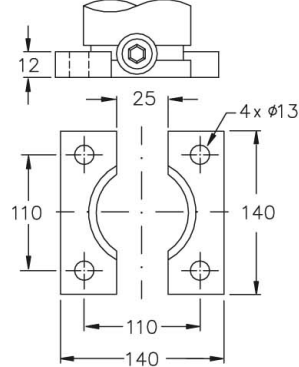
## MT MOUNT FIXED



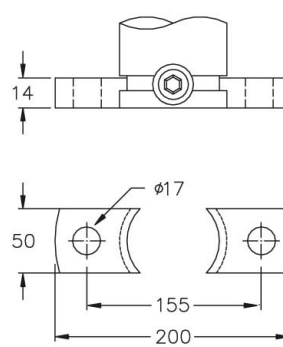
## SS5000 MOUNT ASSEMBLING



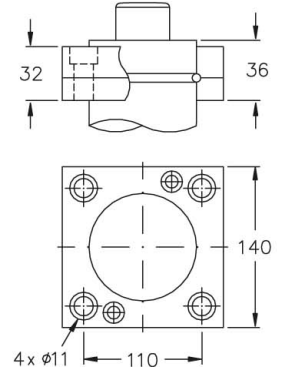
## SP5000 MOUNT ASSEMBLING



## SL5000 MOUNT ASSEMBLING



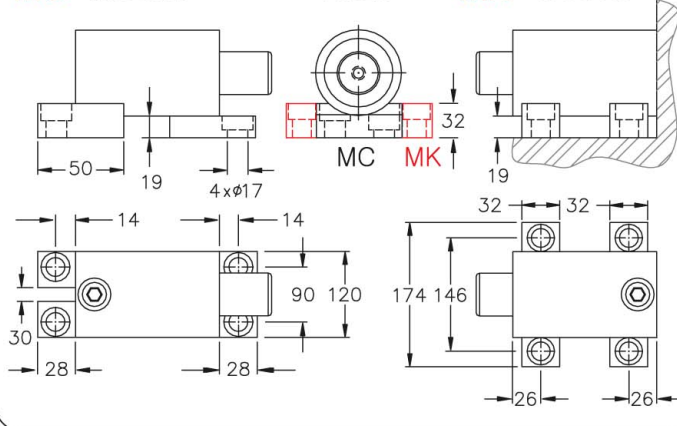
## SU5000 MOUNT ASSEMBLING



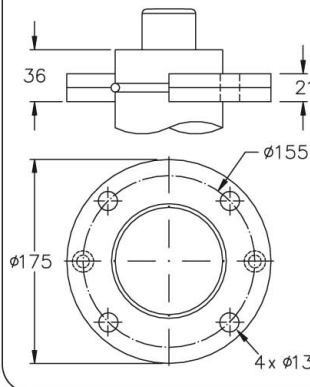
## MC MOUNT

## FIXED

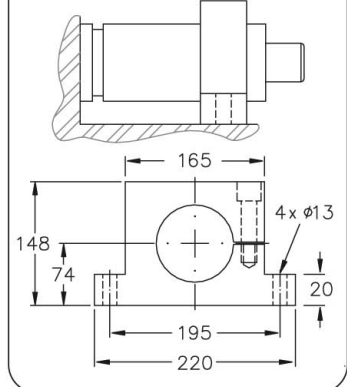
## MK MOUNT



## SR5000 MOUNT ASSEMBLING



## SC5000 MOUNT ASSEMBLING





## HOW TO SPECIFY

<b>STANDARD</b>	<b>TSS5000 × 50S (F) - 150</b>
<b>MOUNT</b>	<b>SS5000</b>
<b>MOUNT FIXED</b>	<b>TSS5000 × 50S (F) - MSA - 150</b>
	MODEL      SELF-CONTAINED(S) MOUNT      CHARGING PRESSURE FITTING-SYSTEM(F)      (kgf/cm <sup>2</sup> )

Charging pressure has to be specified. Otherwise, 150kgf/cm<sup>2</sup> will be automatically charged.

(UNIT: MM)

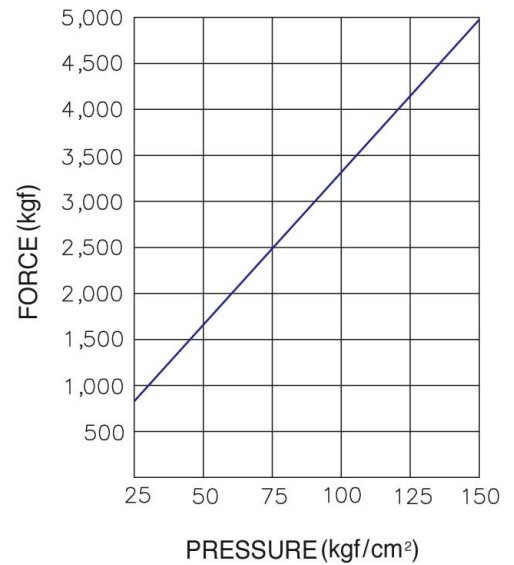
STROKE	TSM5000		TSS5000		TSL5000	
	H	C	H	C	H	C
13	123	110	127.5	114.5	165.5	152.5
15	127	112	132	117	170	155
20	137	117	142	122	180	160
25	147	122	152	127	190	165
30	157	127	162	132	200	170
35	167	132	172	137	210	175
38	173	135	178	140	216	178
40	177	137	182	142	220	180
45	187	142	192	147	230	185
50	197	147	202	152	240	190
60	217	157	222	162	260	200
63	223	160	228	165	266	203
70	237	167	242	172	280	210
75	247	172	252	177	290	215
80	257	177	262	182	300	220
90	277	187	282	192	320	230
100	297	197	302	202	340	240
125	347	222	352	227	390	265
150	397	247	402	252	440	290
160	417	257	422	262	460	300
175	447	272	452	277	490	315
200	497	297	502	302	540	340
250	-	-	602	352	640	390
300	-	-	702	402	740	440

(UNIT: INCH)

STROKE	TSM5000		TSS5000		TSL5000	
	H	C	H	C	H	C
0.50	4.80	4.30	5.00	4.50	6.45	5.95
0.75	5.30	4.55	5.50	4.75	6.95	6.20
1.00	5.80	4.80	6.00	5.00	7.45	6.45
1.50	6.80	5.30	7.00	5.50	8.45	6.95
2.00	7.80	5.80	8.00	6.00	9.45	7.45
2.50	8.80	6.30	9.00	6.50	10.45	7.95
3.00	9.80	6.80	10.00	7.00	11.45	8.45
3.50	10.80	7.30	11.00	7.50	12.45	8.95
4.00	11.80	7.80	12.00	8.00	13.45	9.45
4.50	12.80	8.30	13.00	8.50	14.45	9.95
5.00	13.80	8.80	14.00	9.00	15.45	10.45
5.50	14.80	9.30	15.00	9.50	16.45	10.95
6.00	15.80	9.80	16.00	10.00	17.45	11.45
6.50	16.80	10.30	17.00	10.50	18.45	11.95
7.00	17.80	10.80	18.00	11.00	19.45	12.45
7.50	18.80	11.30	19.00	11.50	20.45	12.95
8.00	19.80	11.80	20.00	12.00	21.45	13.45
8.50	20.80	12.30	21.00	12.50	22.45	13.95
9.00	21.80	12.80	22.00	13.00	23.45	14.45
10.00	23.80	13.80	24.00	14.00	25.45	15.45

\*For special type, please ask if available.

## CHARGING PRESSURE

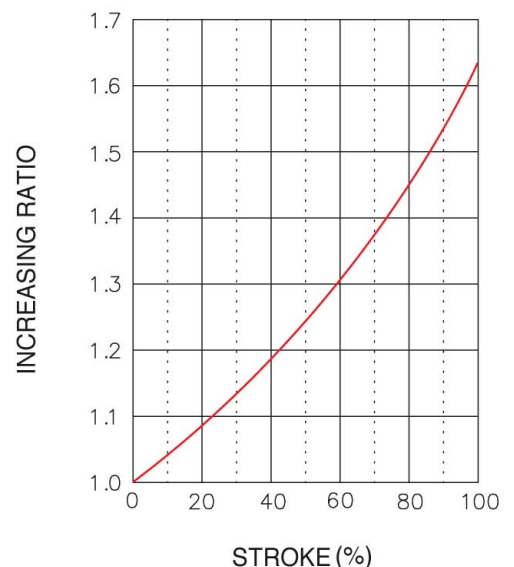


$$\text{Charging pressure (kgf/cm}^2\text{)} = \frac{\text{Demanded Force (kgf)}}{33.1}$$

EX) What comes to the charging pressure of gas spring which demands force 3800kgf ?

$$115 \text{ kgf/cm}^2 = \frac{3800 \text{ kgf}}{33.1}$$

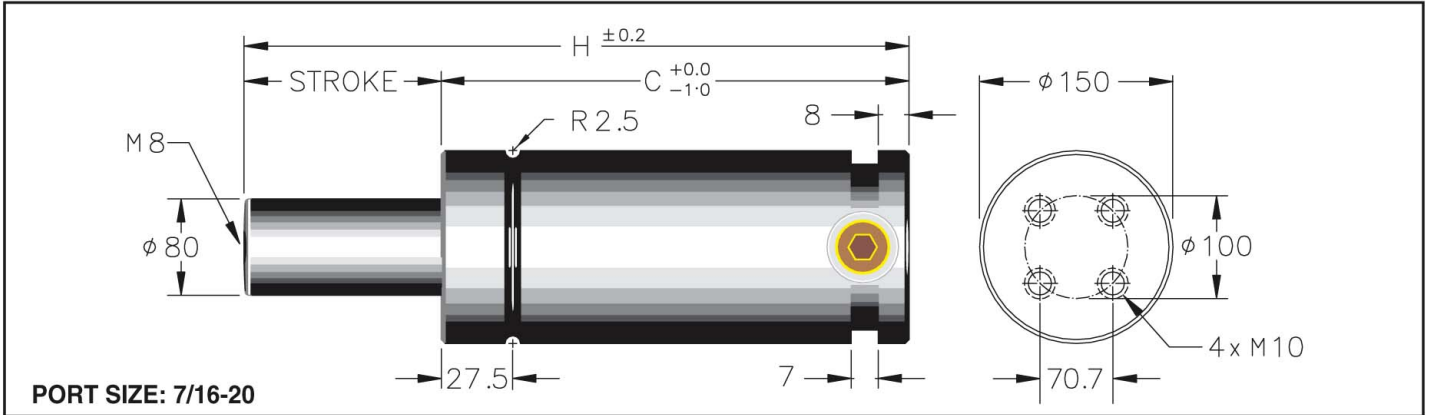
## FORCE INCREASE FACTOR





# TSL7500

# NITROGEN GAS SPRING



**| HOW TO SPECIFY |**

**GAS SPRING**      **TSL7500** × **050** - **150**

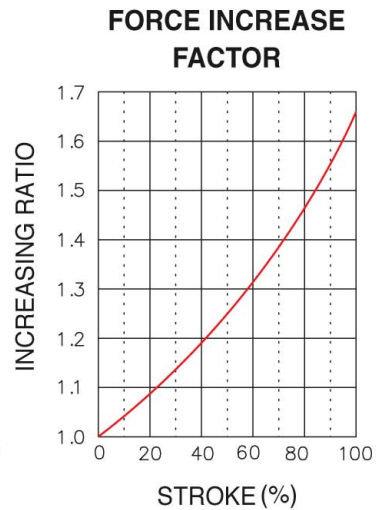
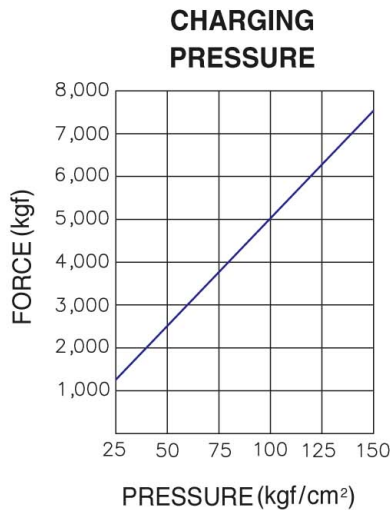
MODEL                      STROKE                      CHARGING PRESSURE (kgf/cm<sup>2</sup>)

**MOUNT**                      **SS7500**

STROKE	TSL7500	
MM	H	C
15	185	170
20	195	175
25	205	180
30	215	185
35	225	190
38	231	193
40	235	195
45	245	200
50	255	205
60	275	215
63	282	219
70	295	225
75	305	230
80	315	235
90	335	245
100	355	255
125	405	280
150	455	305
160	475	315
175	505	330
200	555	355
250	655	405
300	755	455

STROKE	TSL7500	
INCH	H	C
0.50	7.10	6.60
1.00	8.10	7.10
1.50	9.10	7.60
2.00	10.10	8.10
2.50	11.10	8.60
3.00	12.10	9.10
3.50	13.10	9.60
4.00	14.10	10.10
4.50	15.10	10.60
5.00	16.10	11.10
5.50	17.10	11.60
6.00	18.10	12.10
6.50	19.10	12.60
7.00	20.10	13.10
7.50	21.10	13.60
8.00	22.10	14.10
8.50	23.10	14.60
9.00	24.10	15.10
9.50	25.10	15.60
10.00	26.10	16.10
10.50	27.10	16.60
11.00	28.10	17.10
12.00	30.10	18.10

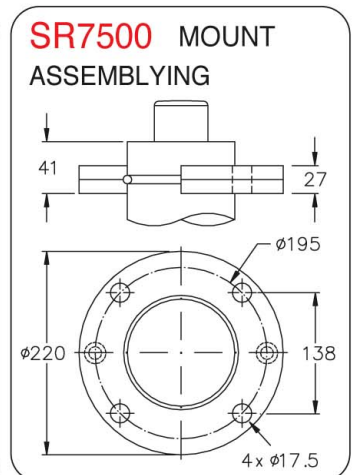
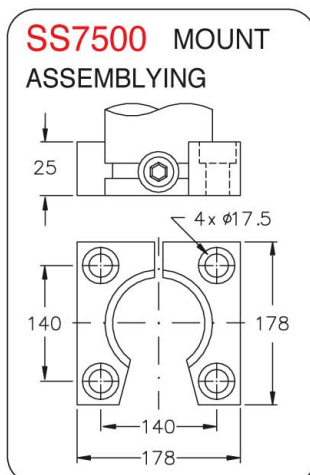
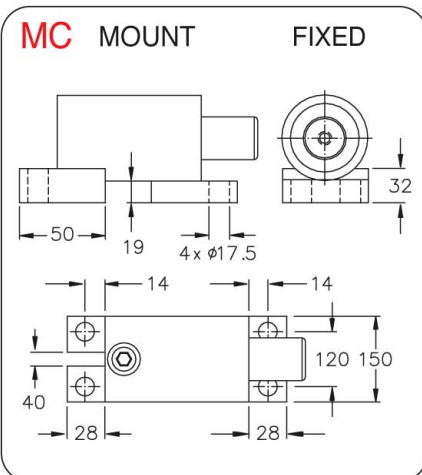
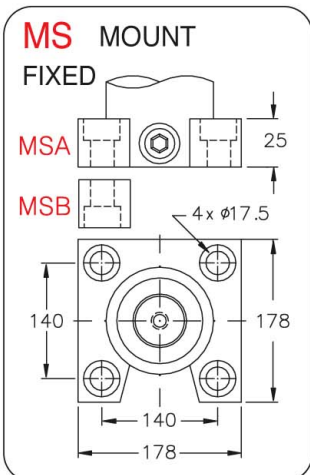
Charging pressure has to be specified. Otherwise, 150kgf/cm<sup>2</sup> will be automatically charged.



$$\text{Charging pressure (kgf/cm}^2\text{)} = \frac{\text{Demanded Force (kgf)}}{50.2}$$

EX) What comes to the charging pressure of gas spring which demands force 6500kgf ?

$$130 \text{ kgf/cm}^2 = \frac{6500 \text{ kgf}}{50.2}$$

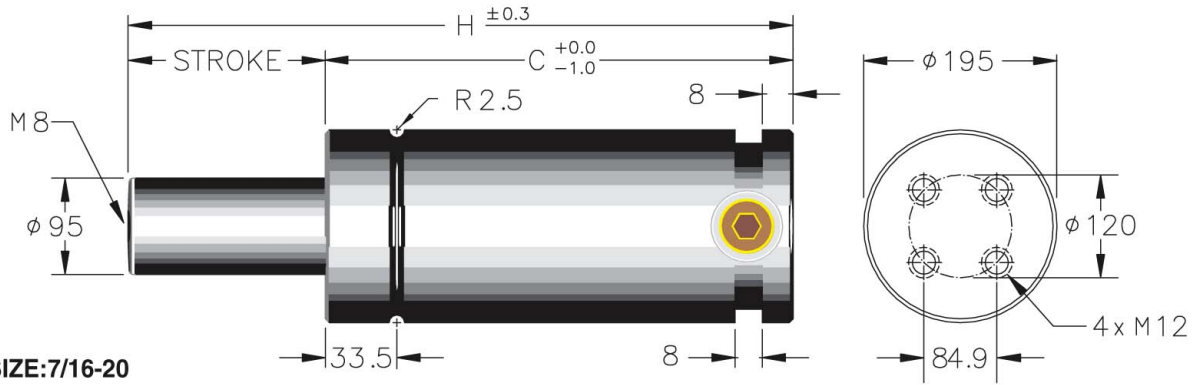






# TSL 10000

# NITROGEN GAS SPRING



PORT SIZE: 7/16-20

## | HOW TO SPECIFY |

**GAS SPRING**

**TSL 10000**  
MODEL

**× 050**  
STROKE

**- 150**  
CHARGING  
PRESSURE (kgf/cm<sup>2</sup>)

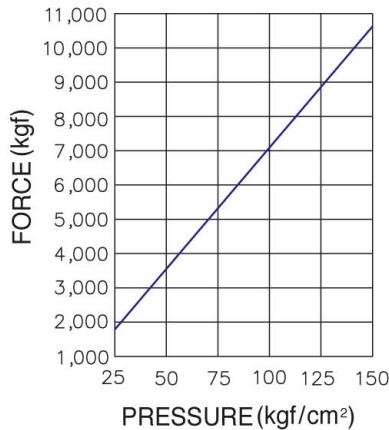
**MOUNT**

**SS 10000**

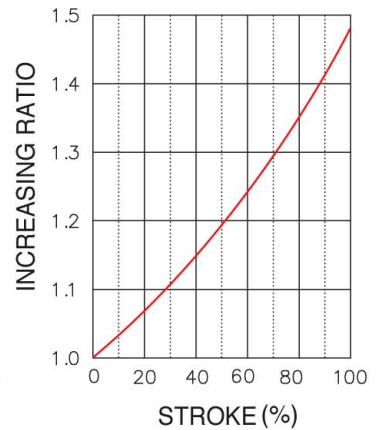
STROKE	TSL10000		STROKE	TSL10000	
MM	H	C	INCH	H	C
20	200	180	1.00	8.30	7.30
25	210	185	1.50	9.30	7.80
30	220	190	2.00	10.30	8.30
35	230	195	2.50	11.30	8.80
38	236	198	3.00	12.30	9.30
40	240	200	3.50	13.30	9.80
45	250	205	4.00	14.30	10.30
50	260	210	4.50	15.30	10.80
60	280	220	5.00	16.30	11.30
63	287	223	5.50	17.30	11.80
70	300	230	6.00	18.30	12.30
75	310	235	6.50	19.30	12.80
80	320	240	7.00	20.30	13.30
90	340	250	7.50	21.30	13.80
100	360	260	8.00	22.30	14.30
125	410	285	8.50	23.30	14.80
150	460	310	9.00	24.30	15.30
160	480	320	9.50	25.30	15.80
175	510	335	10.00	26.30	16.30
200	560	360	10.50	27.30	16.80
250	660	410	11.00	28.30	17.30
300	760	460	12.00	30.30	18.30

Charging pressure has to be specified. Otherwise, 150kgf/cm<sup>2</sup> will be automatically charged.

### CHARGING PRESSURE



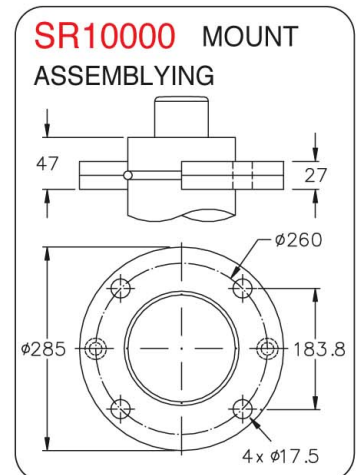
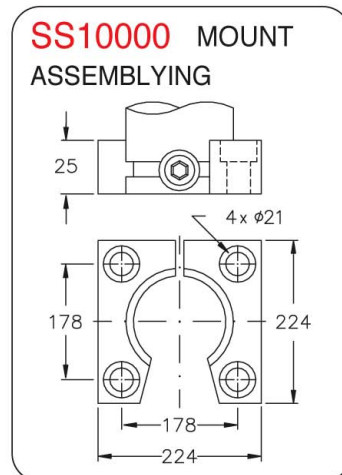
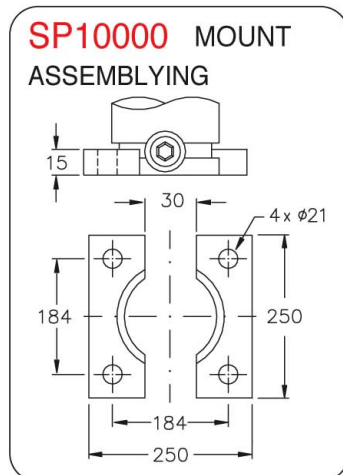
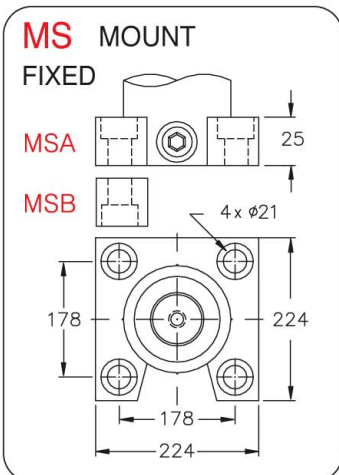
### FORCE INCREASE FACTOR



$$\text{Charging pressure (kgf/cm}^2\text{)} = \frac{\text{Demanded Force (kgf)}}{70.8}$$

EX) What comes to the charging pressure of gas spring which demands force 8500kgf ?

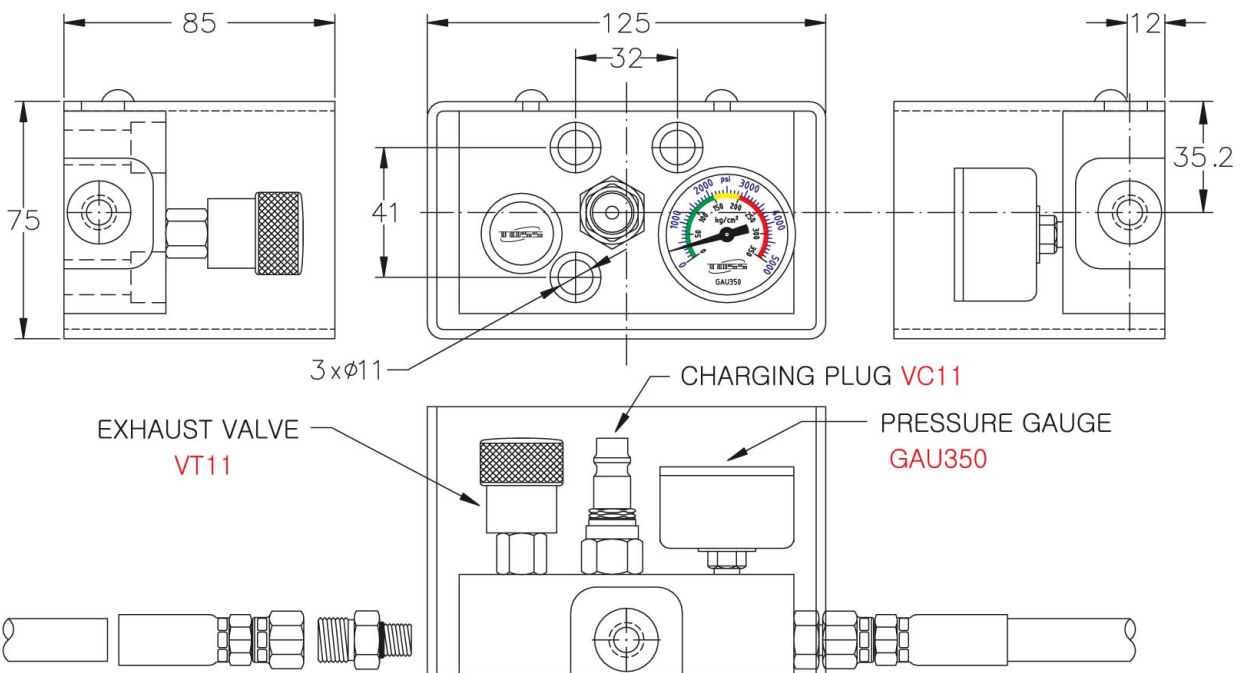
$$120\text{kgf/cm}^2 = \frac{8500\text{kgf}}{70.8}$$



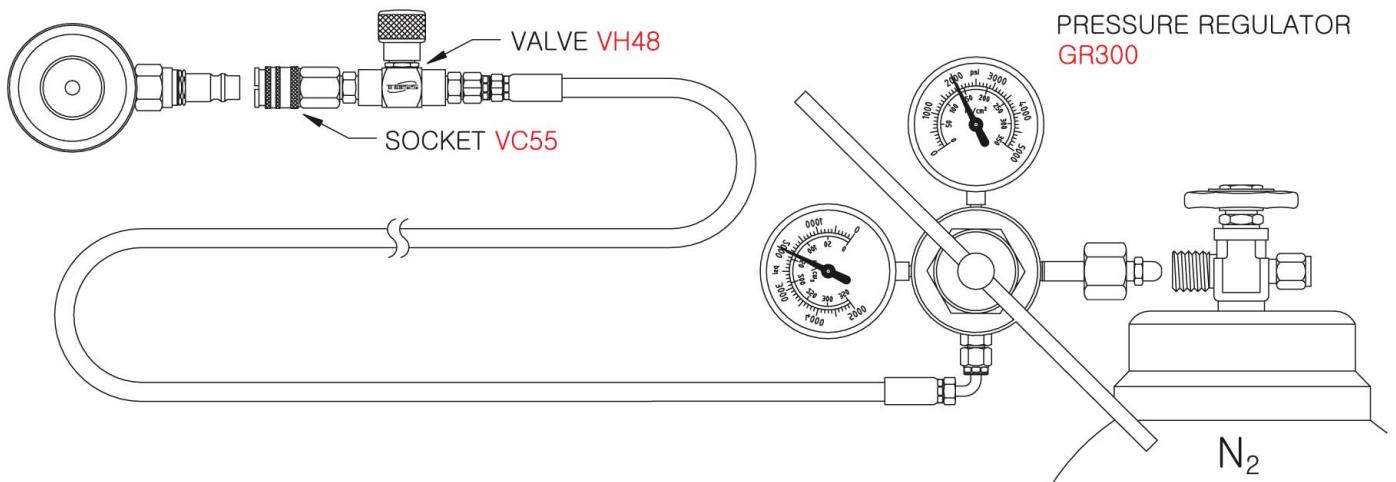
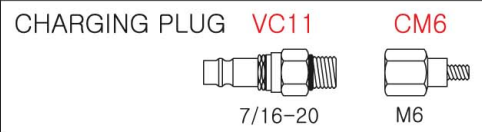


## PAN3

Toss Control Panel is used to check charging pressure, to charge gas and for discharging. It has three connection ports to gas spring. Gas should be charged through the charging plug. To discharge, gas should be gradually let out from the exhaust valve, on the view of the pressure gauge. Never charge with any gas other than Nitrogen (N<sub>2</sub>).



## NITROGEN GAS CHARGER GCH100 (LENGTH 3m)





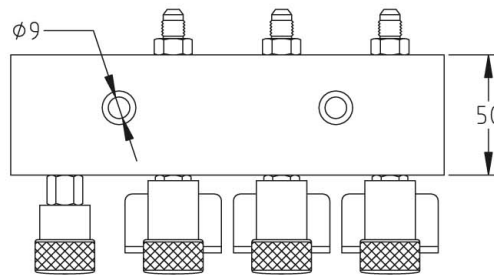
# MULTI PANEL

# NITROGEN GAS SPRING



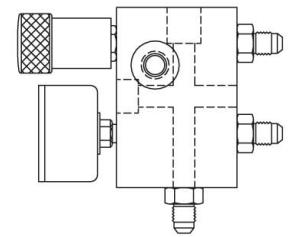
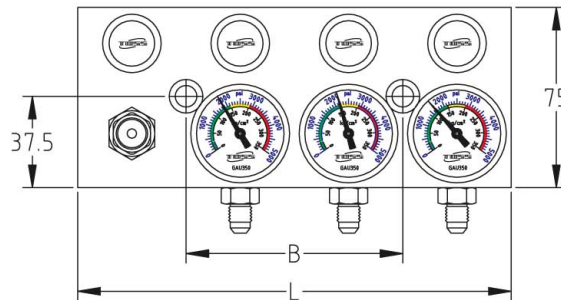
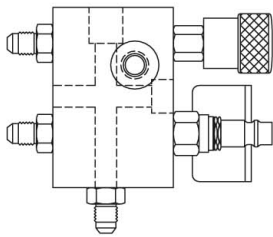
- PSS-2
- PSS-3
- PSS-4
- PSS-5
- PSS-6
- PSS-7
- PSS-8

MODEL	L	B
PSS-2	135	45
PSS-3	180	90
PSS-4	225	135
PSS-5	270	180
PSS-6	315	225
PSS-7	360	270
PSS-8	405	315



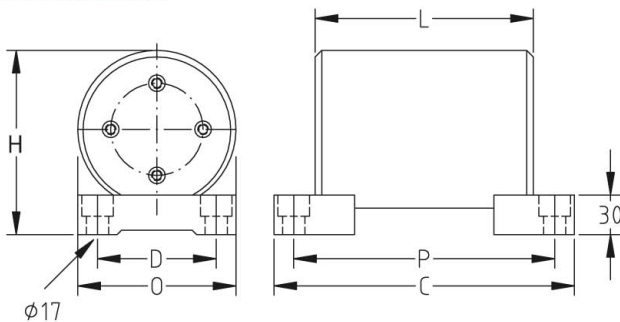
### HOW TO SPECIFY

**PSS - 3**  
MULTI PANEL      LINE NUMBER



## PRESSURE DISTRIBUTION TANK

### Accumulator



Connected with fitting system type, Toss Accumulator is applied to keep invariable force, minimizing the difference between the initial and final force of gas spring.

The formula for pressure ratio of Toss Accumulator System is seen on page 23.

DESCRIPTION	VOLUME cm <sup>3</sup>	L mm	C mm	P mm	H mm	O mm	D mm
TAN050-25	1,260	300	360	330	115	95	65
TAN050-50	2,510	550	610	580			
TAN050-75	3,770	800	860	830			
TAN080-25	1,960	300	360	330	135	120	90
TAN080-50	3,920	550	610	580			
TAN080-75	5,880	800	860	830			
TAN125-25	3,060	310	370	340	165	150	120
TAN125-50	6,130	560	620	590			
TAN125-75	9,200	810	870	840			
TAN210-25	5,340	310	370	340	215	200	170
TAN210-50	10,680	560	620	590			

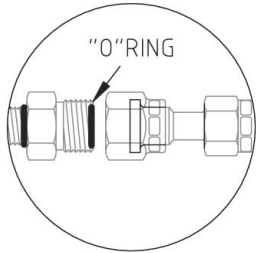
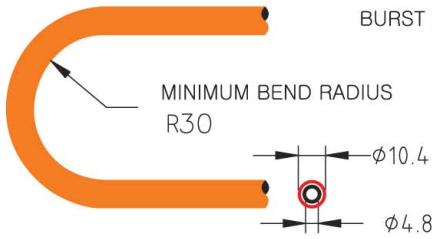


# FITTINGS

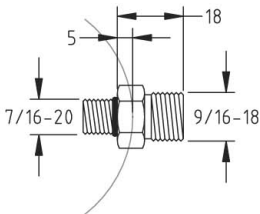
# NITROGEN GAS SPRING

## HOSE H0104

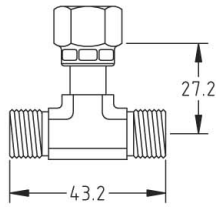
WORKING PRESSURE 200kgf/cm<sup>2</sup>  
BURST PRESSURE 700kgf/cm<sup>2</sup>



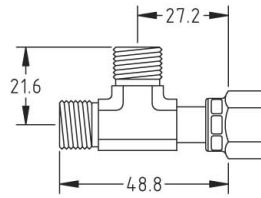
"O"RING SEAL FITTING



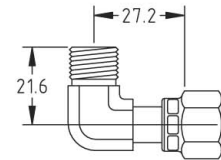
PORT ADAPTOR  
GF111



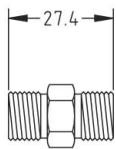
SWIVEL NUT BRANCH TEE  
FS094



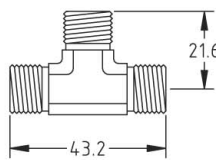
SWIVEL NUT RUN TEE  
FS093



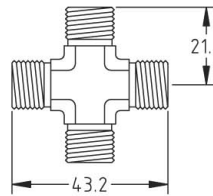
90° SWIVEL NUT ELBOW  
FS090



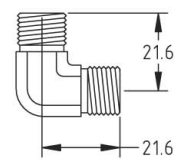
UNION  
HTH10



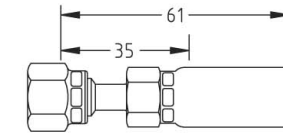
UNION TEE  
HTH93



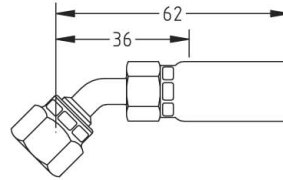
UNION CROSS  
HTH94



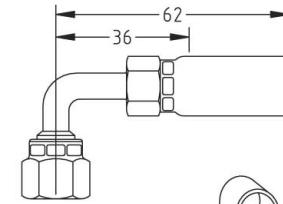
UNION ELBOW  
HTH90



STRAIGHT SWIVEL  
HF100



45° SWIVEL  
HF145

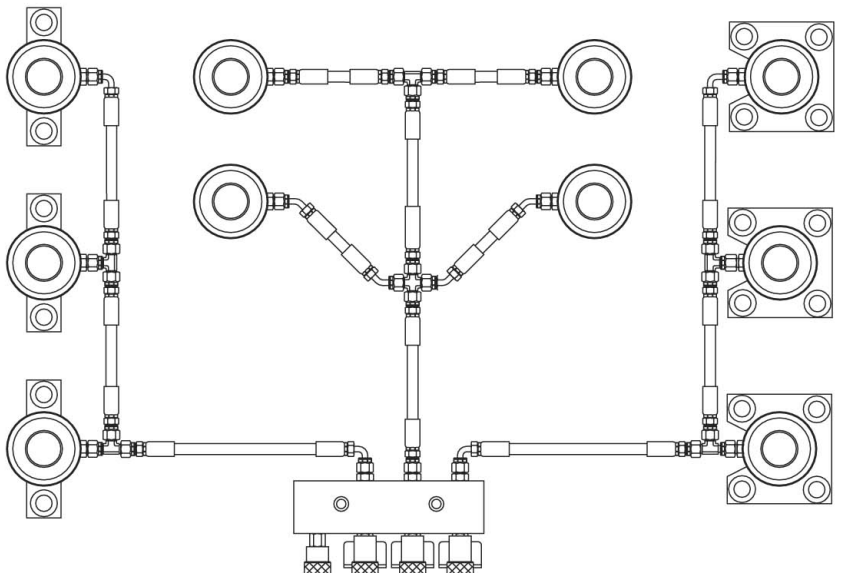
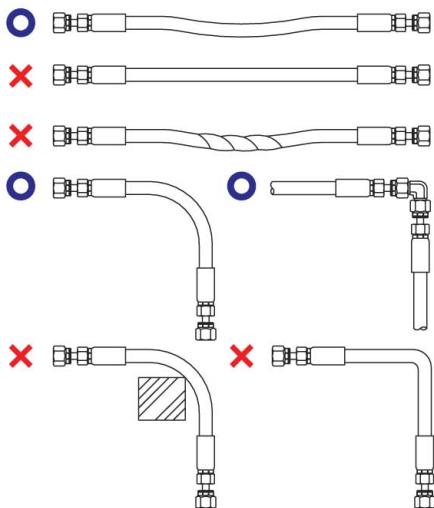


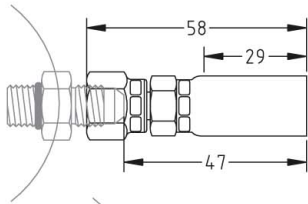
90° SWIVEL  
HF190



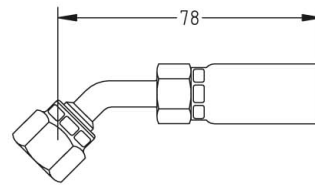
HOSE CLAMP  
HCL48

## FITTING EXAMPLE OF SYSTEM GAS SPRING

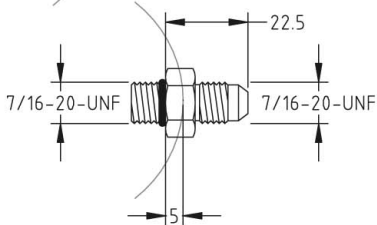




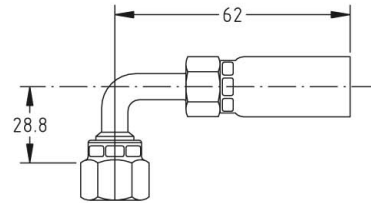
STRAIGHT SWIVEL  
VF100



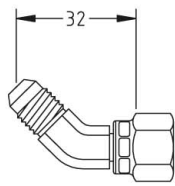
45° SWIVEL  
VF145



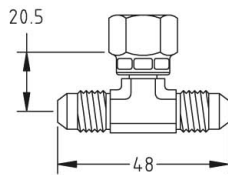
PORT ADAPTOR  
VG111



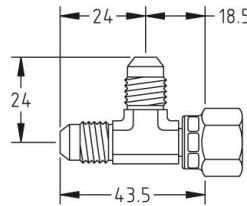
90° SWIVEL  
VF190



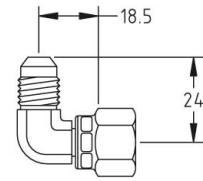
45° SWIVEL NUT ELBOW  
VS045



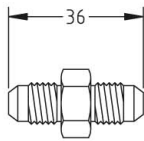
SWIVEL NUT BRANCH TEE  
VS094



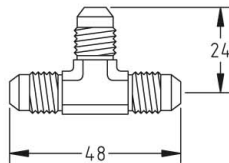
SWIVEL NUT RUN TEE  
VS093



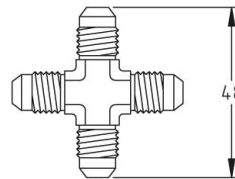
90° SWIVEL NUT ELBOW  
VS090



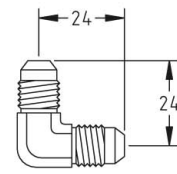
UNION  
VTH10



UNION TEE  
VTH93



UNION CROSS  
VTH94



UNION ELBOW  
VTH90

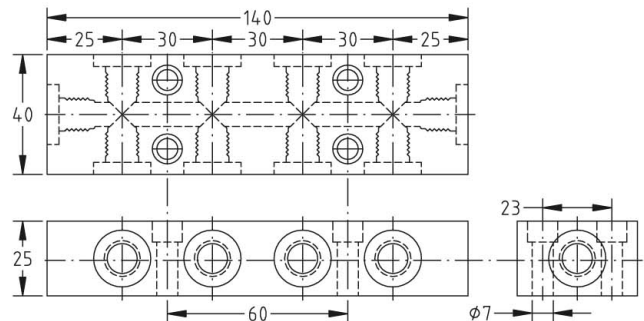
## KARRYKRIMP HK8201

Karrykrimp HK8201 is a portable equipment for connection of HO104 hose and Swivel Hose Adaptor.



## DISTRIBUTION BLOCK

### HB-10



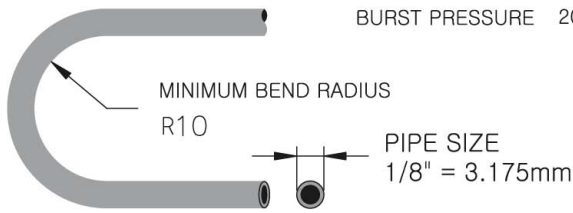
Distribution Block is able to be easily used for connection of different shaped and built gas springs. The model HB-10 is for 10 lines and other special model will be available too.



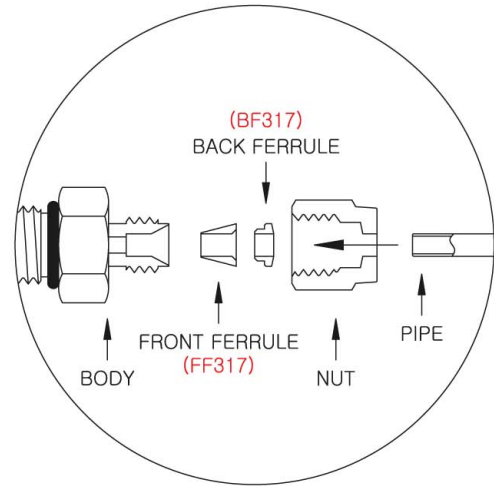
## PIPE P0317

WORKING PRESSURE 600kgf/cm<sup>2</sup>

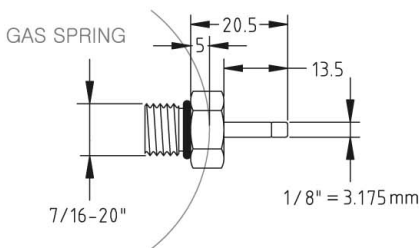
BURST PRESSURE 2000kgf/cm<sup>2</sup>



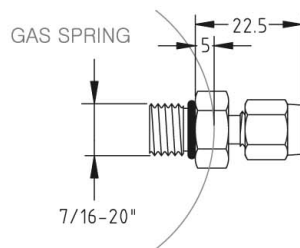
MATERIAL: STAINLESS STEEL TYPE 316



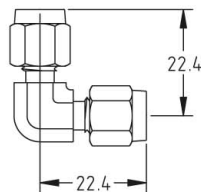
MINI FITTING ASSEMBLY



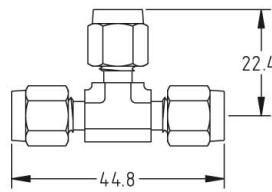
PORT ADAPTOR-MALE  
MA111



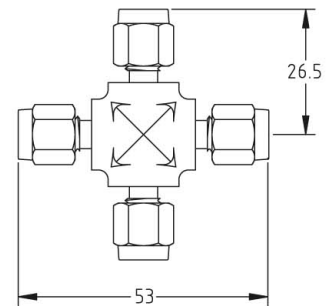
PORT ADAPTOR-FEMALE  
FA111



UNION-ELBOW  
PTP90



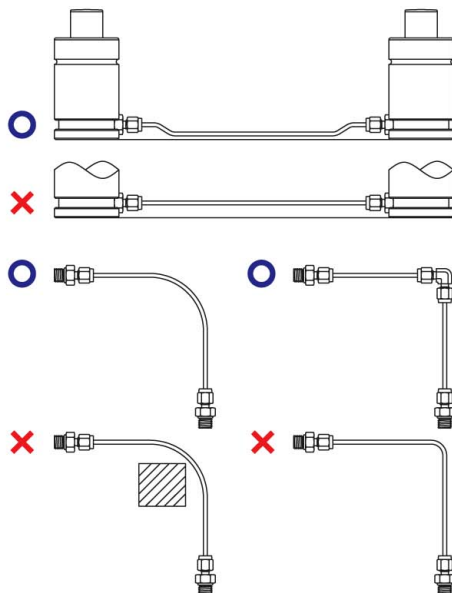
UNION-TEE  
PTP93



UNION-CROSS  
PTP94

## FITTING SYSTEM OF GAS SPRING

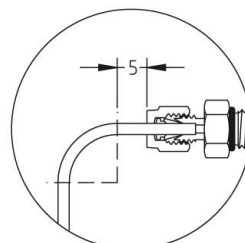
### • EXAMPLE



### • ASSEMBLY INSTRUCTION



Only 3/4 turns from finger tight is necessary to seal and will result in additional remakes of the fitting.



Please note, Considering the length of tubing from the end in the fitting body to the beginning of the bend.



# FORMULA OF PRESSURE RATIO NITROGEN GAS SPRING

## Formula for final pressure to initial

$$F = \frac{Vg}{Vg - S \times R}$$

F = pressure ratio

## Formula of using Accumulator

$$F = \frac{Va + Vg \times n}{Va + (Vg - S \times R) \times n}$$

Va = Volume of Accumulator (refer to Page 9) (cm<sup>3</sup>)

Vg = Volume of Gas Spring (cm<sup>3</sup>)

n = Numbers of Gas Spring

S = Real Used Stroke (cm)

R = Squared Area of Piston Rod (cm<sup>2</sup>)

Ex) If TSS 5000 × 60 with stroke 50mm, what is final pressure ratio to initial ?

$$1.54 = \frac{471.0}{471.0 - 5 \times 33.1}$$

Ex) If 12 pieces of TSS 5000 × 60 and 2 pieces of Accumulator TAN080-75 with stroke 50mm, what is final pressure ratio to initial ?

$$1.13 = \frac{(5,880 \times 2) + 471.0 \times 12}{(5,880 \times 2) + (471.0 - 5 \times 33.1) \times 12}$$

## Volume of Toss Gas Spring

STROKE	0750	1500	3000	5000	7500	10000
MM	cm <sup>3</sup>	cm <sup>3</sup>	cm <sup>3</sup>	cm <sup>3</sup>	cm <sup>3</sup>	cm <sup>3</sup>
10	13	31	50	-	-	-
12.7	16	40	64	100	-	-
15	19	47	75	118	184	-
20	25	62	100	157	245	427
25	31	78	126	196	307	534
30	38	93	151	236	368	641
35	44	109	176	275	429	748
38	48	118	191	298	466	812
40	50	125	201	314	491	855
45	57	140	226	353	552	962
50	63	156	251	393	613	1,069
60	75	187	301	471	736	1,282
63	79	196	317	495	773	1,346
70	88	218	352	550	859	1,496
75	94	234	377	589	920	1,603
80	100	249	402	628	981	1,710
90	113	280	452	707	1,104	1,923
100	126	312	502	785	1,227	2,137
125	157	389	628	981	1,533	2,671
150	188	467	754	1,178	1,840	3,206
160	201	499	804	1,256	1,963	3,419
175	220	545	879	1,374	2,146	3,740
200	251	623	1,005	1,570	2,453	4,274
250	314	779	1,256	1,963	3,066	5,343
300	377	935	1,507	2,355	3,680	6,411

STROKE	0750	1500	3000	5000	7500	10000
INCH	cm <sup>3</sup>	cm <sup>3</sup>	cm <sup>3</sup>	cm <sup>3</sup>	cm <sup>3</sup>	cm <sup>3</sup>
0.50	16	40	64	100	156	-
0.75	24	59	96	150	-	-
1.00	32	79	128	199	312	543
1.50	48	119	191	299	467	814
2.00	64	158	255	399	623	1,086
2.50	80	198	319	498	779	1,357
3.00	96	237	383	598	935	1,629
3.50	112	277	447	698	1,090	1,900
4.00	128	317	510	798	1,246	2,171
4.50	144	356	574	897	1,402	2,443
5.00	160	396	638	997	1,558	2,714
5.50	175	435	702	1,097	1,714	2,986
6.00	191	475	766	1,196	1,869	3,257
6.50	207	514	829	1,296	2,025	3,528
7.00	223	554	893	1,396	2,181	3,800
7.50	239	594	957	1,495	2,337	4,071
8.00	255	633	1,021	1,595	2,492	4,343
8.50	271	673	1,085	1,695	2,648	4,614
9.00	287	712	1,148	1,795	2,804	4,886
9.50	303	752	1,212	1,894	2,960	5,157
10.00	319	791	1,276	1,994	3,115	5,428
10.50	-	-	-	-	3,271	5,700
11.00	-	-	-	-	3,427	5,971
11.50	-	-	-	-	3,583	6,243
12.00	-	-	-	-	3,739	6,514

## Piston Rod Squared Area

UNIT	0750	1500	3000	5000	7500	10000
cm <sup>2</sup>	4.9	10.1	19.5	33.1	50.2	70.8



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