

EOC Normalien

Nitrogen Gas Springs



PED
97/23/EC





DME:

a blend of manufacturing,
outsourcing and strategic partners



The DME offer Global service & distribution

DME, a global company, operating in over 100 countries **worldwide**. From automobiles and appliances to milk jugs and toothbrushes, *DME* technologies and services help the world's leading companies make your favorite products.

Success in today's global market starts with the best product, at the best price, in the required time frame. To achieve this, *DME* provides customers with the best blend of manufacturing, outsourcing and strategic partners, managed to be delivered right on time anywhere in the world using contemporary, sophisticated techniques.



EOC Normalien



DME's commitment:
to be an essential resource
to customers around the globe



The DME offer Always the right support

Customers of mold technologies face unprecedented demands for speed, cost reduction and performance. Every day, they are pressed to find new ways to do more with less. They need a provider with the resources to contribute to their success, every step of the way.

Almost seven decades ago, **DME** revolutionized the industry with its innovation in standard mold base. Since then, we have built upon our expertise to develop and offer the industry's most comprehensive portfolio of injection molding supplies.

EOC Normalien

Runnerless Solutions



Molds & Components



Surface Finishing





The DME offer Top quality products - at lower costs

We deliver a variety of mold components available in all regional standards. Thousands of high performance, off-the-shelf and engineered solutions let our customers spend more time on valuable cavity work. Along with a comprehensive line of equipment and supplies, we provide the high quality products you need to speed up assembly and simplify operations.

Only **DME** can provide customers with the worldwide resources required to compete in the markets of **Injection Molds & Components, Hot and Cold Runner Technologies as well as in Die Set Molds & Components or Surface Finishing Technologies.**

Our products:
designed to make molds
work more efficiently

DME NITROGEN GAS SPRING

All **DME** products are accurately manufactured with equipments of high precision such as CNC, M/C, etc., and have passed several trial tests of over one million strokes under SPM80 condition. **DME** looks forward to a big contribution to the die set industry by developing the TSP series which is compacter than existing gas springs.

Quality Assurance

DME gas springs come with a two-year warranty from date of shipping from the warehouse or one million strokes. Every troubleshooting service and (or) exchange of parts during this term is free. Also, should any critical defects arise after the two-year guarantee period, the products shall be replaced free of charge.

Maintenance

DME gas springs are manufactured based on a simple structure , which requires no repair throughout their lifetime. **DME** gas springs that are damaged during operations after use can be easily repaired by simply replacing the damaged parts . In addition, adequate load can be specified by directly adjusting the pressure on site.

Fast Delivery

In order to ensure fast deliveries and support parts for A/S, **DME** 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 dead-lock in production. Models that are out of stock can be delivered within 7 days. However, this lead-time varies according to quantity and location.

Notice

- Although there is a tap of M6 or M8 on top of the piston rod for assembly and a disassembly, this should not be used to fix the gas springs or for any connecting devices.
- During the installation, please ensure that there is about 1mm of margin space between the contact surface and the upper part of the piston rods, Also, there is no need for pre - pressure because the initial pressure is strong enough. Any increase of pre-pressure can damage the molds.
- **DME** gas springs must be used as is. 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. Any change on the gas spring can shorten its life and cause a malfunction.
- When installing the springs, please ensure that the bottom surface of the springs touch 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.



GAS SPRING



* TSP SERIES
* GAS SPRING
* P8~31



* TSM SERIES
* GAS SPRING
* P32~47



* TSS SERIES
* GAS SPRING
* P48~57



* TSL SERIES
* GAS SPRING
* P58~73



* PAN3
* CONTROL PANEL
* P74



* PAN6
* CONTROL PANEL
* P75



* PSS
* MULTI PANEL
* P76



* TSL SERIES
* DISTRIBUTION BLOCK
* P77



* COMPACT FITTING
* CONTROL PANEL
* P78



* GF FITTING
* FITTING
* P79



* PSS
* FITTING
* P80



* CHARGING DATA
* FITTING
* P81



* ACCUMULATOR
* PRESSURE DISPERSION TANK
* P82



* HOSE MANUAL
* FITTING
* P83



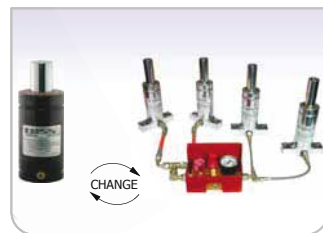
* FITTING EXAMPLE I,II
* MULTI PANEL
* P84~85



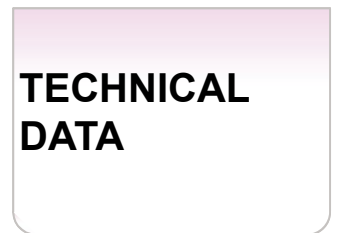
* CHARGING
* ACCESSORIES
* P86



* REPAIR TOOL
* TOOLS
* P87



* PIPING CHANGE PROCEDURE
* GAS SPRING
* P88



TECHNICAL DATA

* TECHNICAL DATA
* GAS SPRING
* P89~90



Info

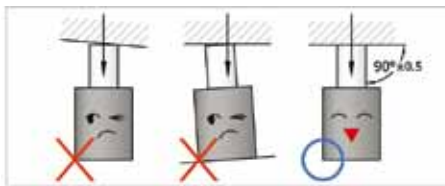
Installation and operation

When installing the **DME** 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.

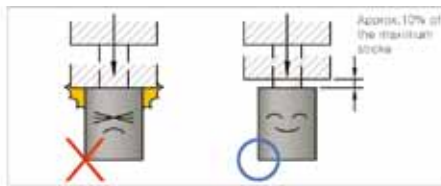
To prevent damage to the gas spring and to maximize its life span, please allow 10% margin to the standard stroke to reduce shock that is caused by the compression of gas. The margin can prevent damage on the gas spring when the piston rod touches the bottom surface and shortening a lifespan due to the impact by maximum gas pressure.

Warning

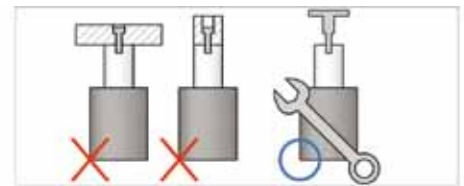
With gas spring fully charged with high pressure gas, non-compliance with this warning may lead to accidents , product damages , malfunctions , etc . Before using the spring , make sure to fully understand and observe the warning below.



1. Install the gas spring parallel to the working direction and void of inclined or lateral load.



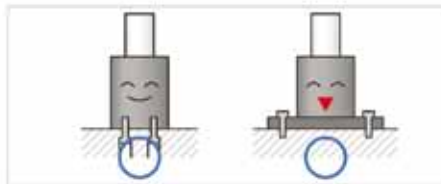
2. It may cause gas leakage or the piston rod not to return if gas spring is used exceeding the range of stroke length.



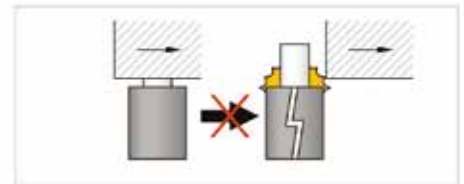
3. Do not use the Tap hole at the top of the rod for purpose other than repair and maintenance.



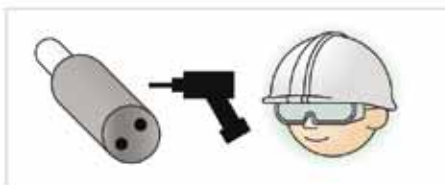
4. Do not cut, weld, heat tot the main body.



5. Unless, gas spring is secured by bolts, bottom base will be loosened.



6. Avoid using the spiring in a setting that it is released at the piston rod.



7. In disposing of gas spring, Be sure that Nz Gas spring has completely escaped. Please keep disposition procedure.



8. Keep gas spring from fluid.



9. For mold lapping and polishing, exercise caution against the adhesion of welding sparks, scraps, metallic contaminants, etc.



Model

Info

EOC gas springs are available from 500N to 100,000N of initial force and from 10mm to 300mm of stroke. Depending on total length, EOC Normalien gas springs provide a wide range to choose from TSP, TSM, TSS and TSL series, and they are easy to use in small molds.

Also, EOC Normalien gas springs are available for self contained type, individually used as an independent gas spring, and fitting system type, multiple gas springs that is connected by pipes to adjust gas pressure simultaneously for each gas spring. Conversion between those two types is possible.

Recharging and discharging are simple and pressure can be adjusted easily.

The maximum gas pressure for each model can be 150~180 bar.

System types

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 discharged and recharged with a maximum charging pressure of 150~180 bar.



Self-contained type

Hoses connect with 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. The maximum charging pressure is 150 bar.





Info

Certificate Status



1. SYSTEM

As EOC Normalien GAS SPRINGS are produced and controlled by a system of international standard. Quality places as PED , (European pressurized Module A1), ISO (Quality control system) and CE (Product Certificate).

2. Product Line-up

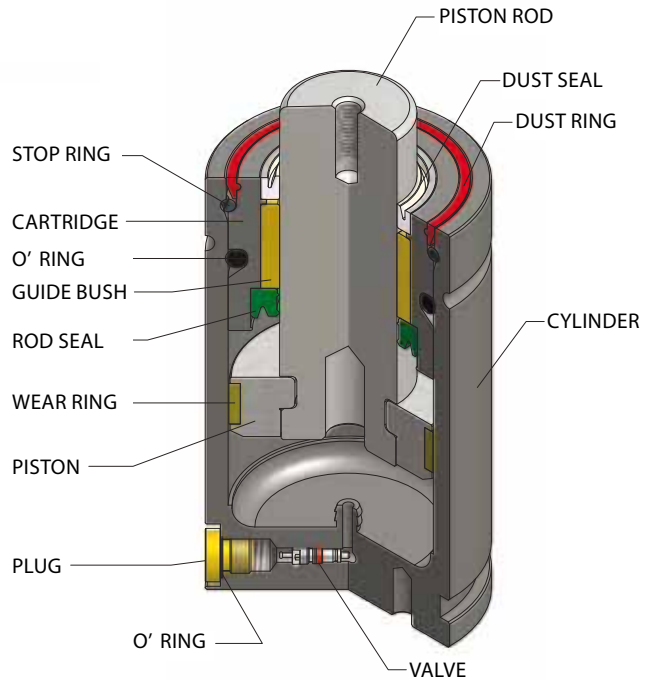
EOC Normalien gas springs provide a wide range to choose from 4 kinds of standards (TSP, TSM, TSS and TSL series), and more than 1,700 models are available.

3. Product Assessment

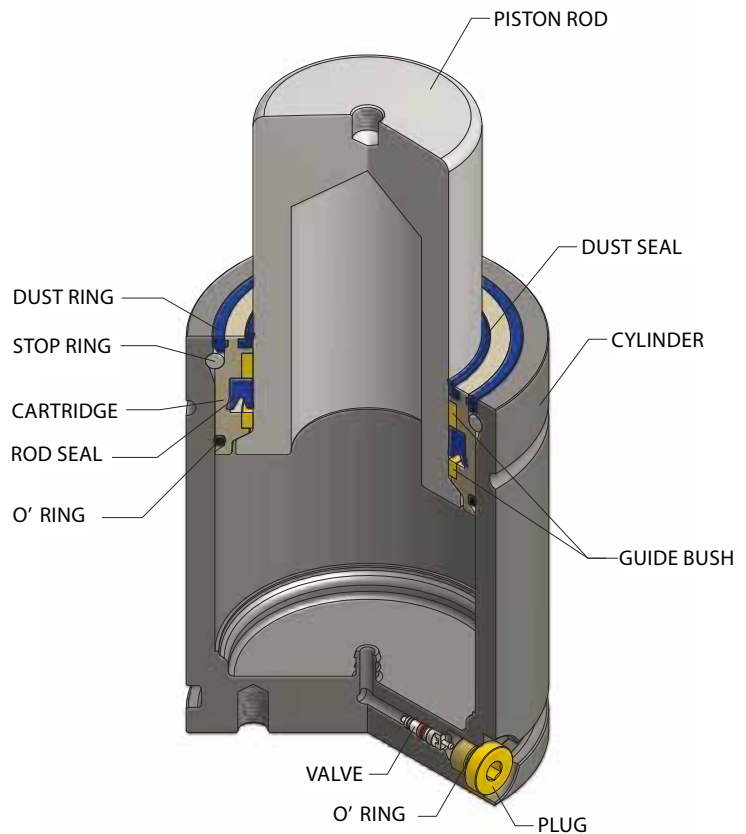
EOC Normalien Gas springs are exported to more than 30 countries and plans to expand our market abroad with a solid quality, fast delivery and good service.

4. Warranty

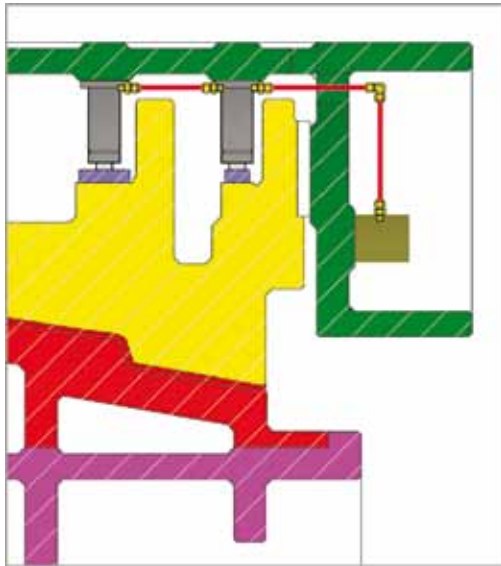
All EOC Normalien gas springs come with a two-year warranty form date of loading from the warehouse or 0.3 ~ 1 million strokes, depending on model.



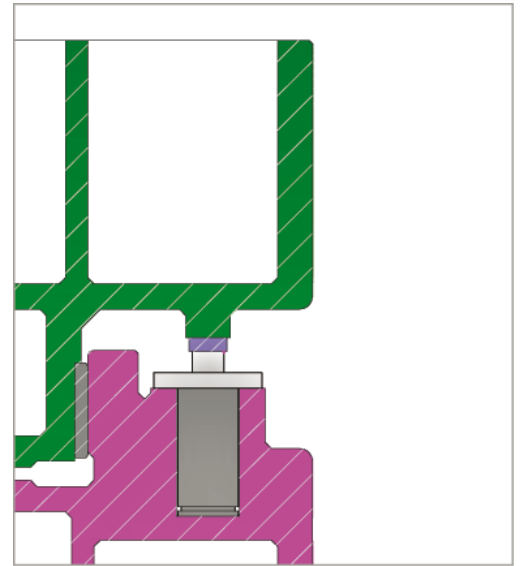
TSM, TSS, TSL



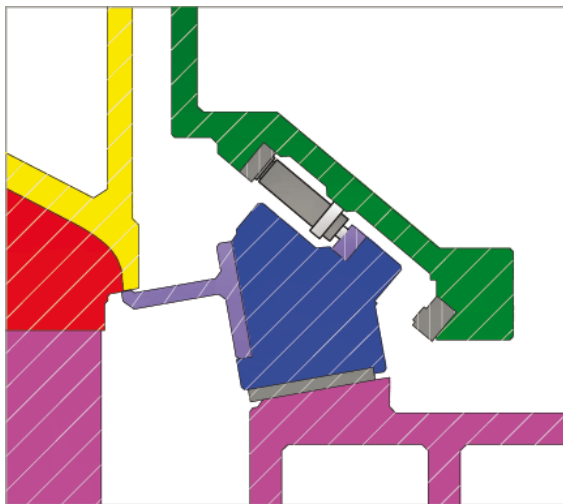
TSP



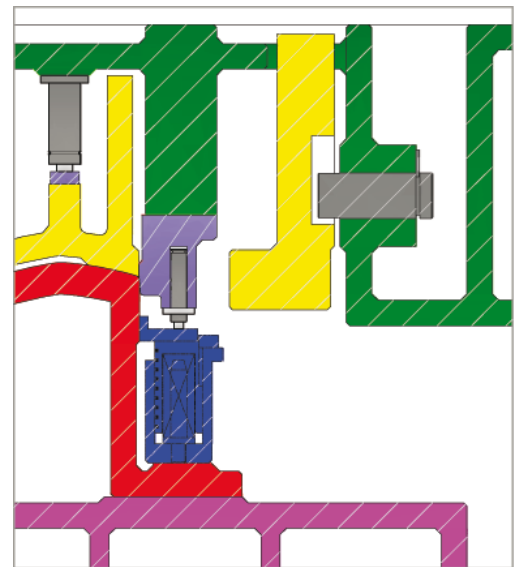
UPPER PAD FITTING TYPE



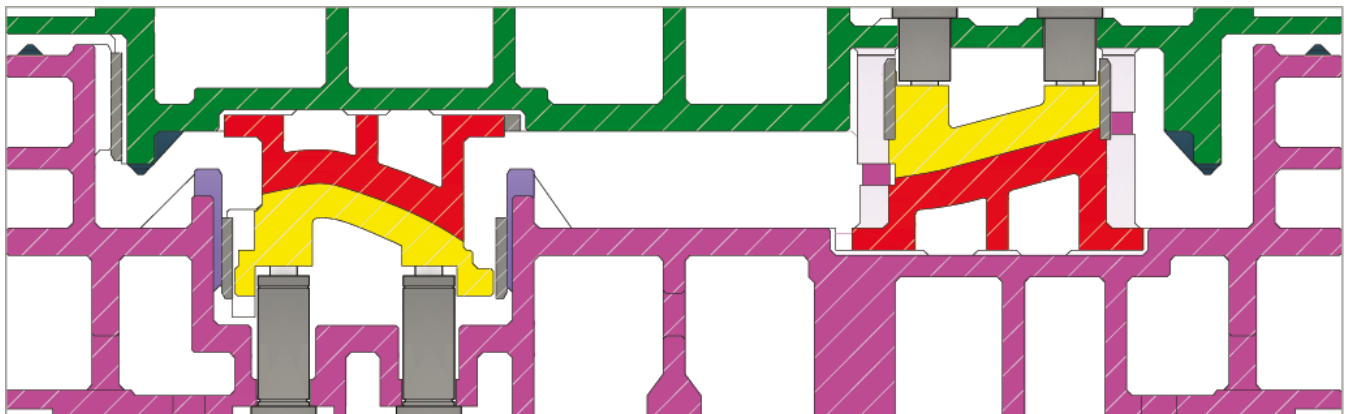
UPPER.LOWER MOLD LOADING TYPE



CAM RETURN TYPE



UPPER.PAD TYPE
FL. LIFTER PRECEDENCE
PRESSING TYPE



DRAW S/A TYPE

EOC Normalien

TSP Series



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CONTENTS

TSP-SERIES

TSP0170

TSP0320

TSP0350

TSP0500

TSP0750

TSP1000

TSP1500

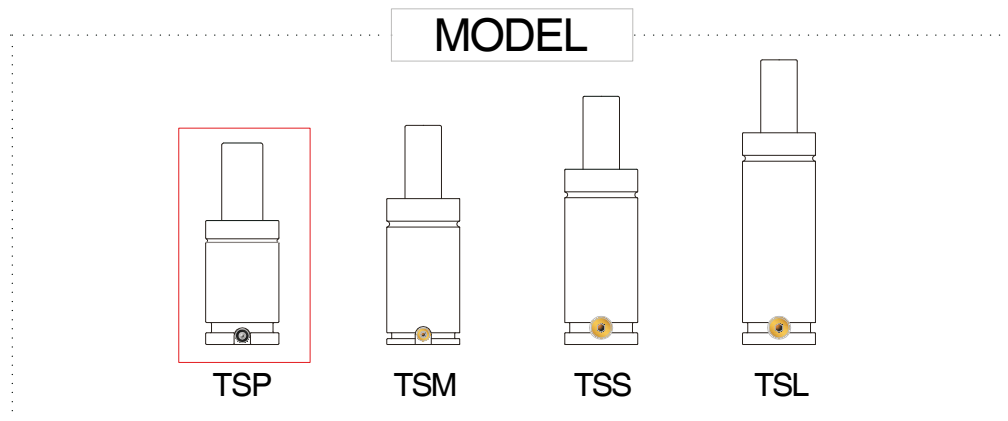
TSP2400

TSP4200

TSP6600

TSP9500

XTRA HIGH POWER



General Specification

- Filling Materials
Nitrogen GAs(N2)
- Maximum Filling Pressure
150~180 bar (at 20°)
- Minimum Filling Pressure
25 bar (at 20°)
- Operation Temperature
-5 to 80°
- Pressure Increase as per Temperature
±0.3% / °
- Maximum Stroke Rate Per Minute (Recommended)
~50 to 100 (at 20°)
- Piston Rod Speed
0.03~0.8 m/s
- Rod Surface Treatment
Nitrate Coating
- Cylinder Surface Treatment
Oxidized Black Coating

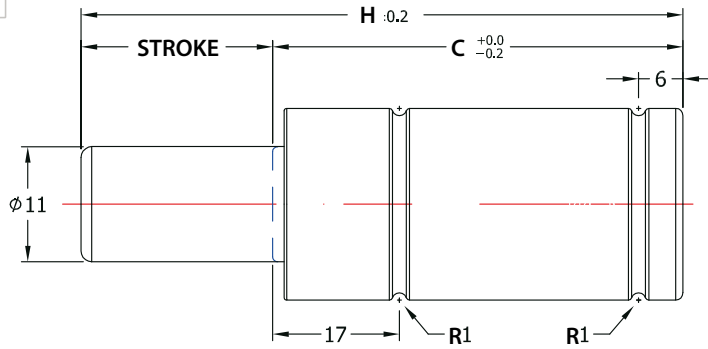
Specification

TYPE	Stroke (mm)	Cylinder Diameter Φ(mm)	Rod Φ(mm)	Initial Force (N)	End Force (N)	MAX. Charging Pressure
TSP0170	7~125	19	11	1,700	2,800	180Bar
TSP0320	7~125	25	15	3,200	5,500	180Bar
TSP0350	10~125	32	16	3,600	5,400	180Bar
TSP0500	10~125	38	20	4,700	7,200	150Bar
TSP0750	10~125	45	25	7,400	11,700	150Bar
TSP1000	13~125	50	28	9,200	14,900	150Bar
TSP1500	13~125	63	36	15,200	24,100	150Bar
TSP2400	16~125	75	45	23,800	38,400	150Bar
TSP4200	16~125	95	60	42,200	70,900	150Bar
TSP6600	16~125	120	75	66,000	108,700	150Bar
TSP9500	20~125	150	90	95,000	149,100	150Bar

* The above specification is subject to change without notice for performance improvement.



PED
97/23/2c



HOW TO SPECIFY

GAS SPRING

TSP 0170
MODEL

× 050
STROKE

— 180
CHARGING
PRESSURE
(Bar)

MOUNT

XP0170

REPAIR KIT

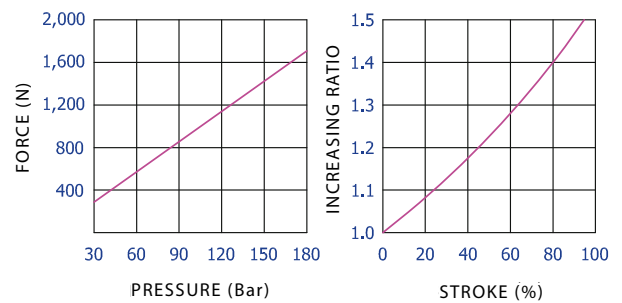
Non-repairable

[Caution!] Charging pressure has to be specified. Otherwise, 180Bar will be charged.

TSP0170							
Stroke		H	C	Force(N) (180 bar / =20°C)		Gas vol. (cm ³)	Weight (kg)
(mm)	(inch)			Initial	End force*		
7	0.28	44	37	1,700	2,500	2.2	0.06
10	0.39	50	40		2,500	2.9	0.06
13	0.51	56	43		2,600	3.6	0.07
16	0.63	62	46		2,600	4.4	0.07
20	0.79	70	50		2,700	5.3	0.08
25	0.98	80	55		2,700	6.5	0.08
30	1.18	90	60		2,700	7.7	0.09
35	1.38	100	65		2,700	8.9	0.10
38	1.50	106	68		2,700	9.6	0.11
40	1.57	110	70		2,700	10.1	0.11
45	1.77	120	75		2,800	11.3	0.12
50	1.97	130	80		2,800	12.5	0.12
60	2.36	150	90		2,800	14.9	0.14
63	2.48	156	93		2,800	15.6	0.14
70	2.76	175	105		2,800	17.3	0.15
75	2.95	185	110		2,800	18.5	0.15
80	3.15	195	115	2,800	19.7	0.16	
90	3.54	215	125	2,800	22.1	0.18	
100	3.94	235	135	2,800	24.5	0.20	
125	4.92	285	160	2,800	30.4	0.22	

* = at full stroke

■ CHARGING PRESSURE/FORCE INCREASE FACTOR



■ Calculation of charging pressure for TSP0170

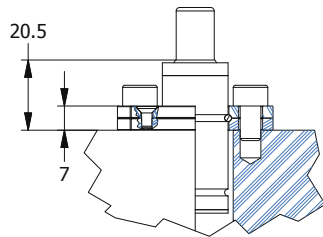
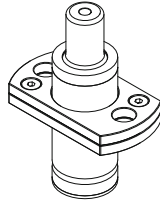
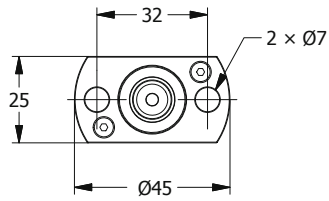
$$\text{Charging pressure(Bar)} = \frac{\text{Initial Force(N)}}{9.5}$$

ex) What comes to the charging pressure of gas spring which demands force 1,000N?

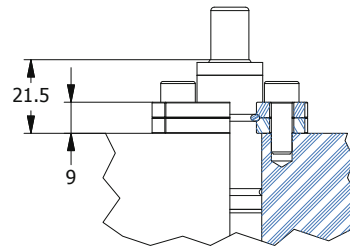
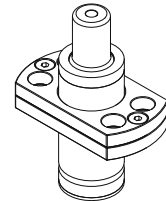
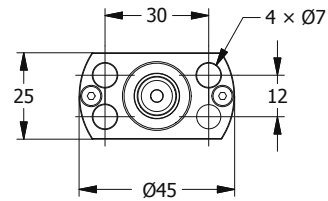
$$105(\text{Bar}) = \frac{1,000(\text{N})}{9.5}$$



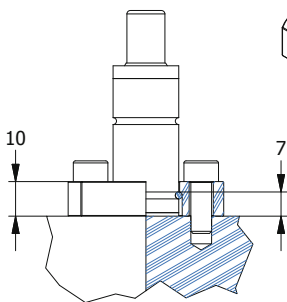
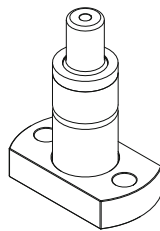
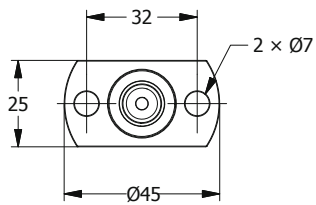
XG0170 MOUNT



XC0170 MOUNT

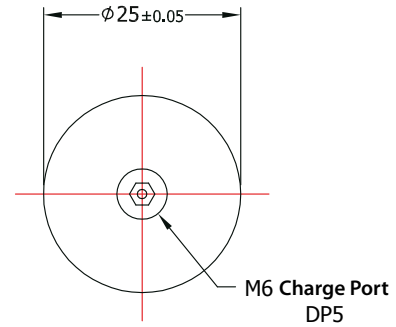
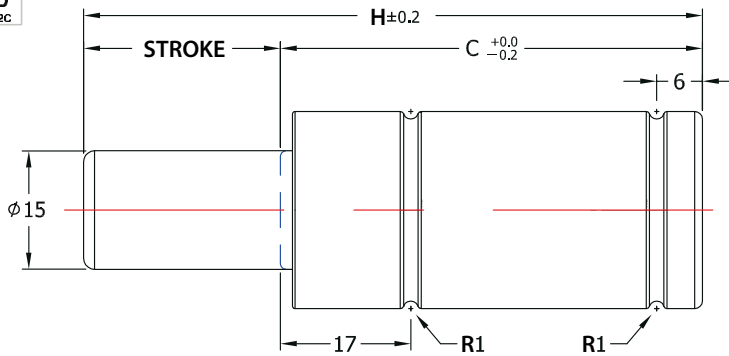


XP0170 MOUNT





PED 97/23/2c



HOW TO SPECIFY

GAS SPRING

TSP 0320 × 050 — 180
MODEL STROKE CHARGING PRESSURE (Bar)

MOUNT

XP0320

REPAIR KIT

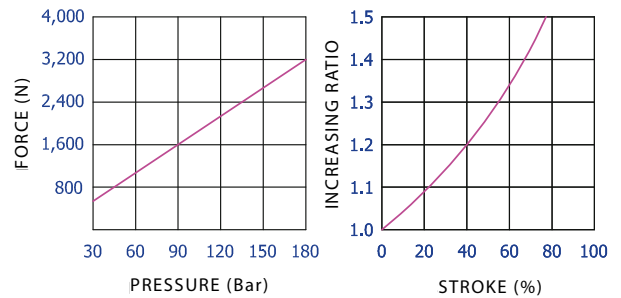
Non-repairable

[Caution!] Charging pressure has to be specified. Otherwise, 180Bar will be charged.

TSP 0320							
Stroke		H	C	Force(N) (180 bar / +20°C)		Gas vol. (cm ³)	Weight (kg)
(mm)	(inch)			Initial	End force*		
7	0.28	44	37	3,200	5,000	3.7	0.09
10	0.39	50	40		5,000	4.9	0.11
13	0.51	56	43		5,100	6.2	0.11
16	0.63	62	46		5,200	7.4	0.12
20	0.79	70	50		5,200	9.0	0.14
25	0.98	80	55		5,300	11.1	0.15
30	1.18	90	60		5,300	13.1	0.16
35	1.38	100	65		5,400	15.2	0.18
38	1.50	106	68		5,400	16.4	0.18
40	1.57	110	70		5,400	17.2	0.19
45	1.77	120	75		5,400	19.3	0.21
50	1.97	130	80		5,400	21.3	0.22
60	2.36	150	90		5,500	25.4	0.25
63	2.48	156	93		5,500	26.6	0.26
70	2.76	175	105		5,500	29.5	0.28
75	2.95	185	110		5,500	31.6	0.28
80	3.15	195	115	5,500	33.6	0.32	
90	3.54	215	125	5,500	37.7	0.33	
100	3.94	235	135	5,500	41.8	0.36	
125	4.92	285	160	5,500	52.0	0.43	

* = at full stroke

■ CHARGING PRESSURE/FORCE INCREASE FACTOR



■ Calculation of charging pressure for TSP0320

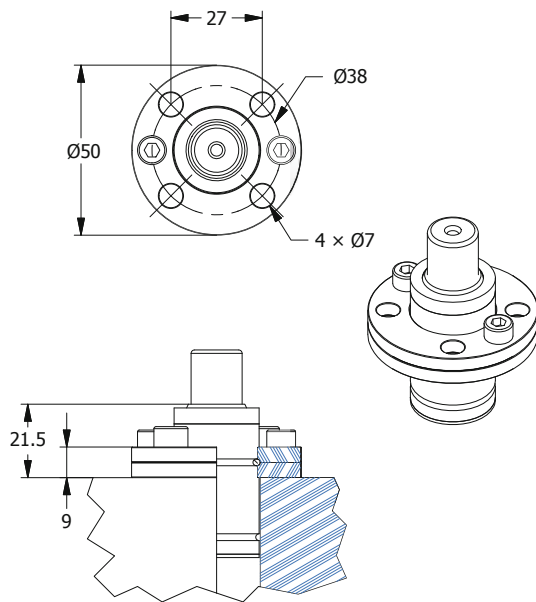
$$\text{Charging pressure(Bar)} = \frac{\text{Initial Force(N)}}{17.7}$$

ex) What comes to the charging pressure of gas spring which demands force 2,500N?

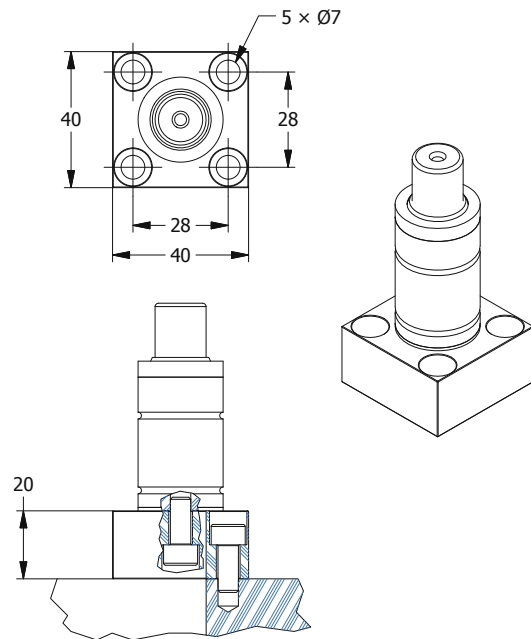
$$141(\text{Bar}) = \frac{2,500(\text{N})}{17.7}$$



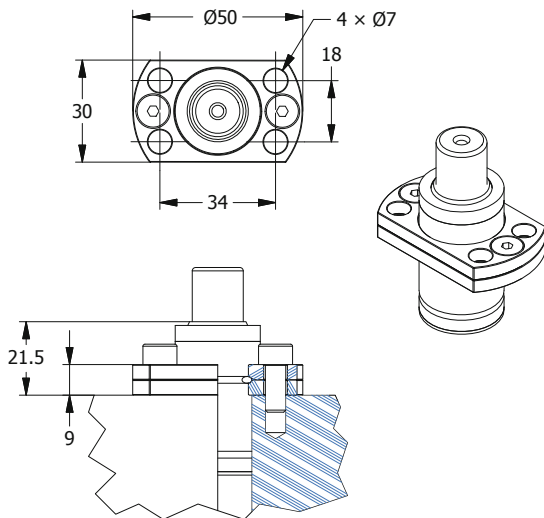
XR0320(SR0150) MOUNT

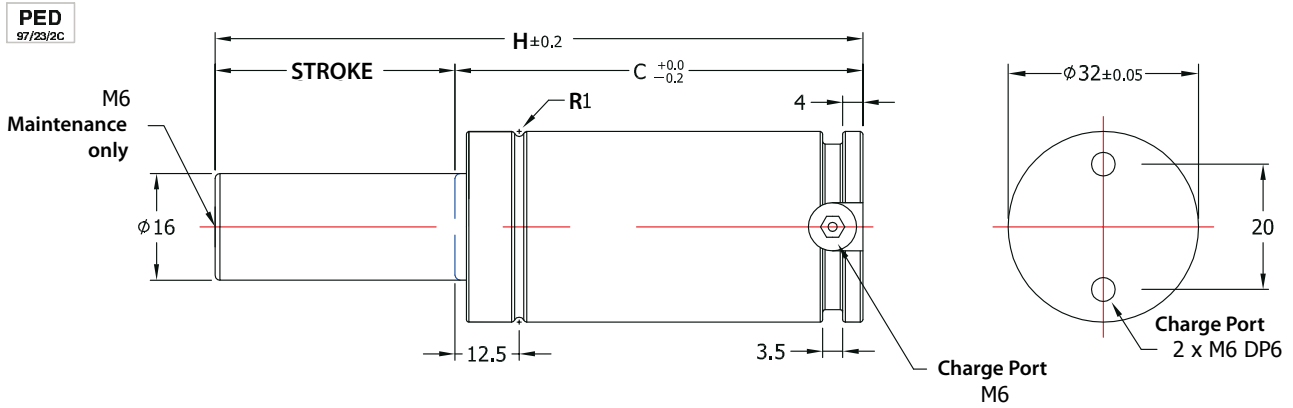


XB0320(SR0150) MOUNT



XG0320(SR0150) MOUNT





HOW TO SPECIFY

GAS SPRING

TSP 0350
MODEL

× 050
STROKE

S(F) —
SELF CONTAINED-S
FITTING SYSTEM-F

180
CHARGING
PRESSURE
(Bar)

MOUNT

XP0350

REPAIR KIT

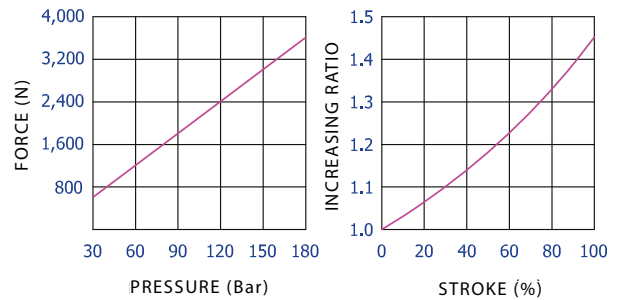
RCX0350

[Caution!] Charging pressure has to be specified. Otherwise, 180Bar will be charged.

TSP 0350							
Stroke		H	C	Force(N) (180 bar / +20°C)		Gas vol. (cm³)	Weight (kg)
(mm)	(inch)			Initial	End force*		
10	0.39	50	40	3,600	5,000	7.2	0.20
13	0.51	56	43		5,100	9.0	0.21
16	0.63	62	46		5,200	10.8	0.21
20	0.79	70	50		5,200	13.3	0.23
25	0.98	80	55		5,200	16.3	0.25
30	1.18	90	60		5,300	19.4	0.26
35	1.38	100	65		5,300	22.4	0.28
38	1.50	106	68		5,300	24.2	0.29
40	1.57	110	70		5,300	25.4	0.29
45	1.77	120	75		5,300	28.5	0.32
50	1.97	130	80		5,300	31.5	0.33
60	2.36	150	90		5,300	37.6	0.37
63	2.48	156	93		5,300	39.5	0.37
70	2.76	170	100		5,300	43.7	0.40
75	2.95	180	105		5,300	46.8	0.41
80	3.15	190	110	5,300	49.8	0.43	
90	3.54	210	120	5,300	55.9	0.46	
100	3.94	230	130	5,400	62.5	0.49	
125	4.92	280	155	5,400	77.2	0.58	

* = at full stroke

■ CHARGING PRESSURE/FORCE INCREASE FACTOR



■ Calculation of charging pressure for TSP0350

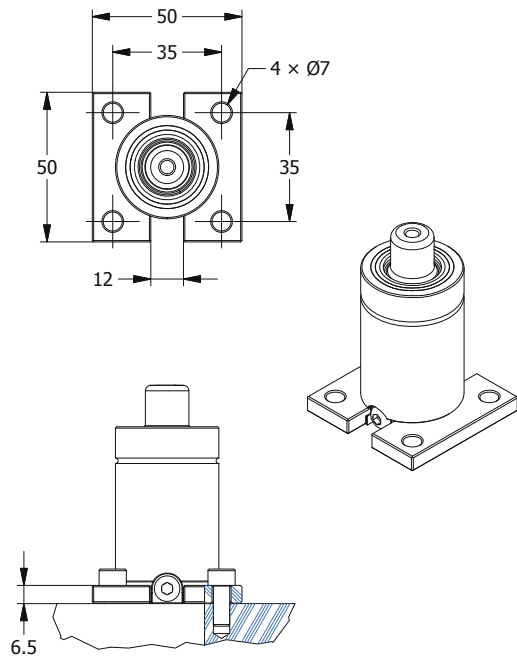
$$\text{Charging pressure(Bar)} = \frac{\text{Initial Force(N)}}{20.1}$$

ex) What comes to the charging pressure of gas spring which demands force 3,300N?

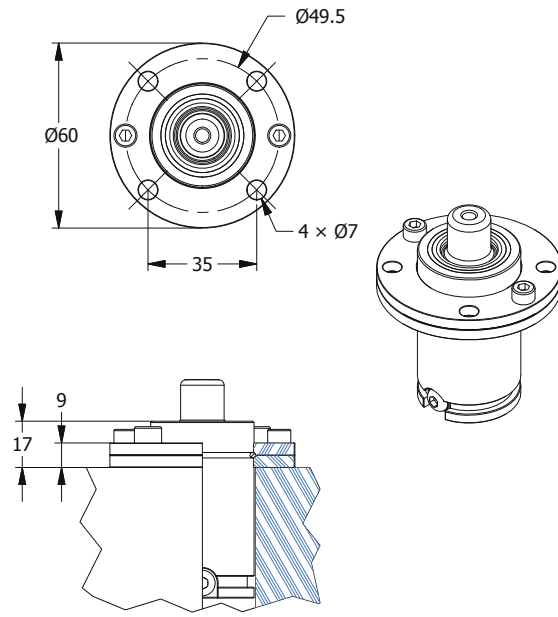
$$164(\text{Bar}) = \frac{3,300(\text{N})}{20.1}$$



XP0350 MOUNT

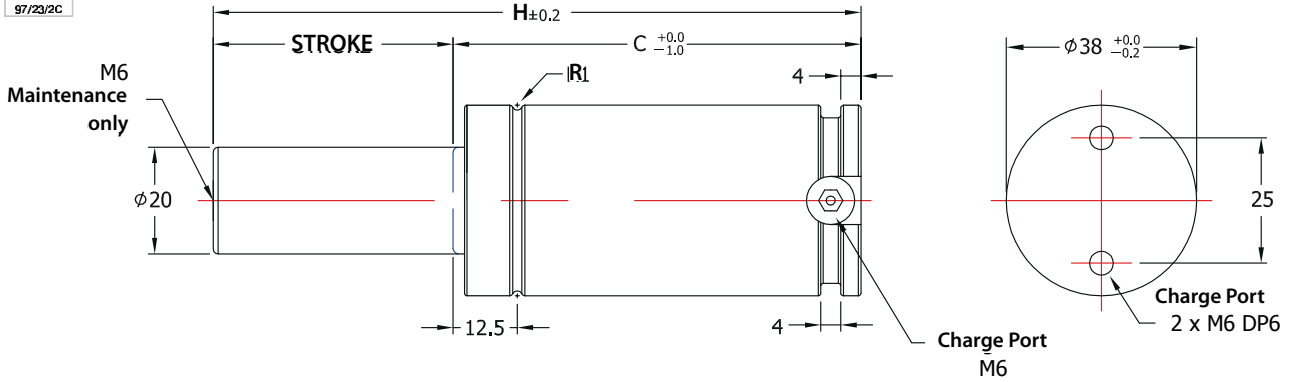


XR0350 MOUNT





PED 97/23/2C



HOW TO SPECIFY

GAS SPRING

TSP 0500 MODEL

× 050 STROKE

S(F) - SELF CONTAINED-S FITTING SYSTEM-F

150 CHARGING PRESSURE (Bar)

MOUNT

XP0500

REPAIR KIT

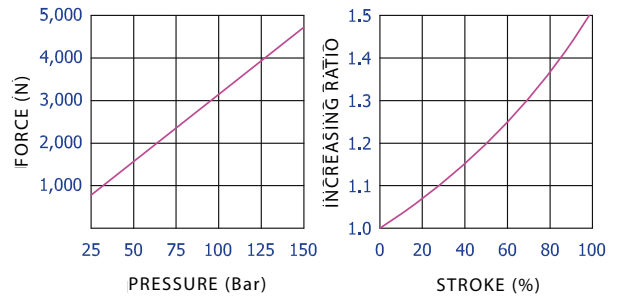
RCX0500

[Caution!] Charging pressure has to be specified. Otherwise, 150Bar will be charged.

TSP 0500							
Stroke		H	C	Force(N) (150 bar / +20°C)		Gas vol. (cm ³)	Weight (kg)
(mm)	(inch)			Initial	End force*		
10	0.39	50	40	4,700	6,700	10.4	0.26
13	0.51	56	43		6,800	13.1	0.28
16	0.63	62	46		6,900	15.7	0.29
20	0.79	70	50		7,000	19.3	0.31
25	0.98	80	55		7,000	23.7	0.33
30	1.18	90	60		7,100	28.2	0.36
35	1.38	100	65		7,100	32.6	0.38
38	1.50	106	68		7,100	35.3	0.39
40	1.57	110	70		7,100	37.0	0.41
45	1.77	120	75		7,100	41.5	0.43
50	1.97	130	80		7,200	45.9	0.46
60	2.36	150	90		7,200	54.8	0.51
63	2.48	156	93		7,200	57.4	0.52
70	2.76	170	100		7,200	63.6	0.55
75	2.95	180	105		7,200	68.1	0.57
80	3.15	190	110	7,200	72.5	0.60	
90	3.54	210	120	7,200	81.4	0.65	
100	3.94	230	130	7,200	90.3	0.70	
125	4.92	280	155	7,200	112.4	0.82	

* = at full stroke

■ CHARGING PRESSURE/FORCE INCREASE FACTOR



■ Calculation of charging pressure for TSP0500

Charging pressure(Bar) = Initial Force(N) / 31.4

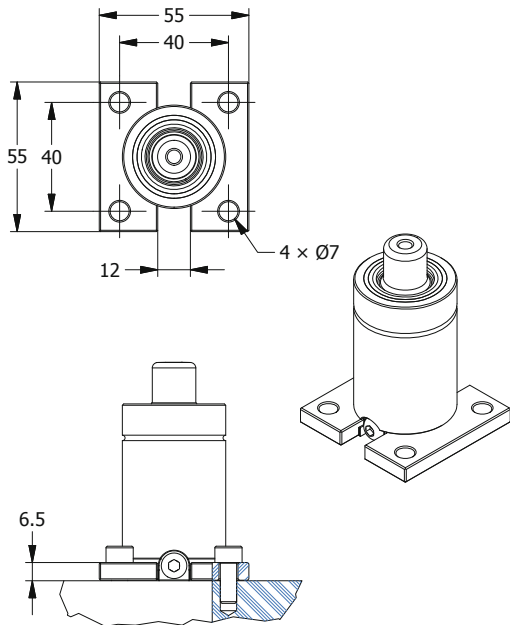
ex) What comes to the charging pressure of gas spring which demands force 4,000N?

127(Bar) = 4,000(N) / 31.4

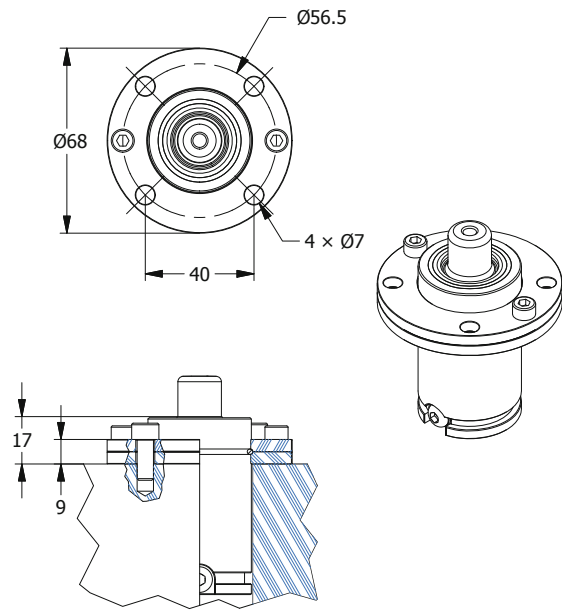




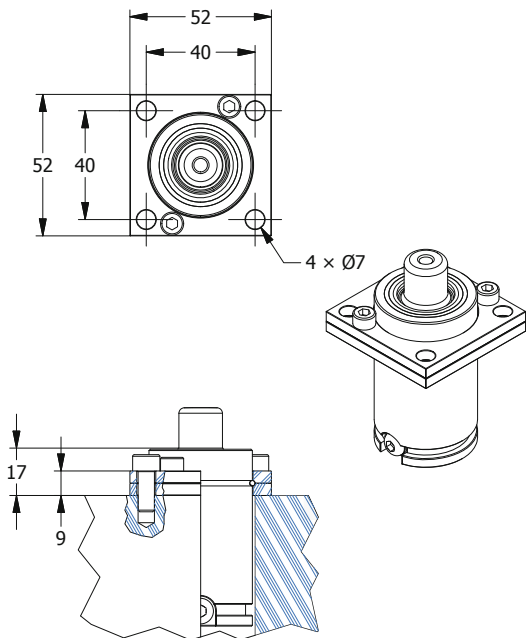
XP0500(SP0300) MOUNT



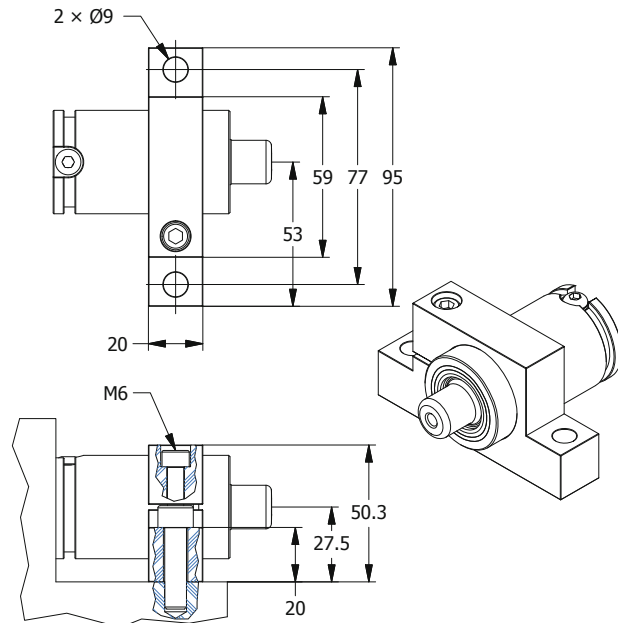
XR0500(SR0300) MOUNT

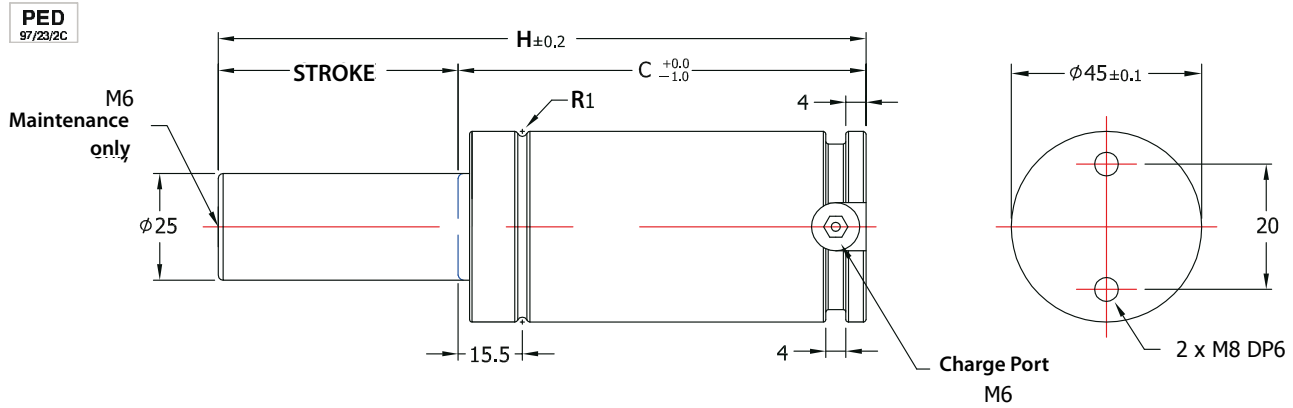


XT0500(ST0300) MOUNT



XR0500(SC0300) MOUNT





HOW TO SPECIFY

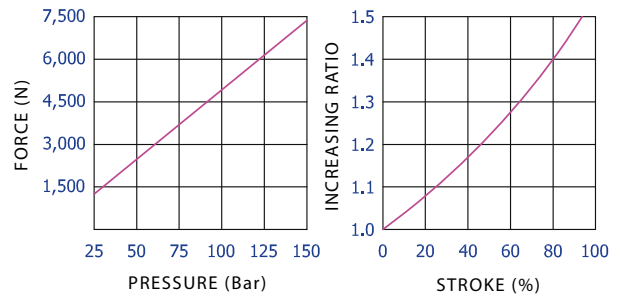
GAS SPRING TSP 0750 × 050 S(F) — 150
 MODEL STROKE SELF CONTAINED-S CHARGING
 FITTING SYSTEM-F PRESSURE
 (Bar)
 MOUNT XP0750
 REPAIR KIT RCX0750

[Caution!] Charging pressure has to be specified. Otherwise, 150Bar will be charged.

TSP 0750							
Stroke		H	C	Force(N) (150 bar / +20°C)		Gas vol. (cm³)	Weight (kg)
(mm)	(inch)			Initial	End force*		
10	0.39	52	42	7,400	10,600	15.9	0.40
13	0.51	58	45		10,900	19.8	0.42
16	0.63	64	48		11,000	23.7	0.44
20	0.79	72	52		11,100	28.9	0.47
25	0.98	82	57		11,300	35.4	0.50
30	1.18	92	62		11,300	41.9	0.53
35	1.38	102	67		11,400	48.4	0.56
38	1.50	108	70		11,400	52.3	0.58
40	1.57	112	72		11,400	55.0	0.59
45	1.77	122	77		11,500	61.5	0.63
50	1.97	132	82		11,500	68.0	0.66
60	2.36	152	92		11,600	81.0	0.72
63	2.48	158	95		11,600	84.9	0.74
70	2.76	172	102		11,600	94.0	0.79
75	2.95	182	107		11,600	100.5	0.82
80	3.15	192	112	11,600	107.0	0.85	
90	3.54	212	122	11,600	120.0	0.92	
100	3.94	232	132	11,700	133.0	0.98	
125	4.92	282	157	11,700	165.6	1.14	

* = at full stroke

■ CHARGING PRESSURE/FORCE INCREASE FACTOR



■ Calculation of charging pressure for TSP0750

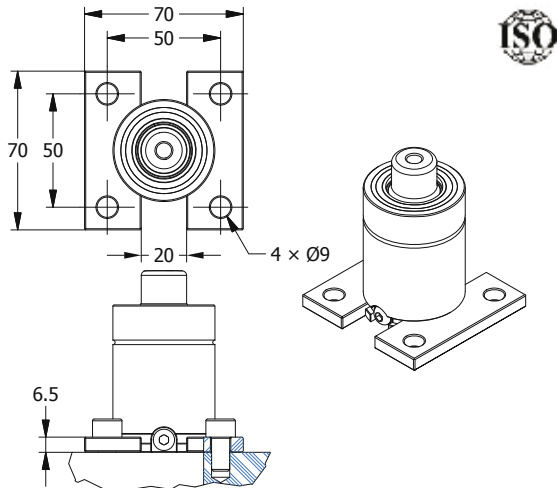
$$\text{Charging pressure(Bar)} = \frac{\text{Initial Force(N)}}{49.1}$$

ex) What comes to the charging pressure of gas spring which demands force 6,000N?

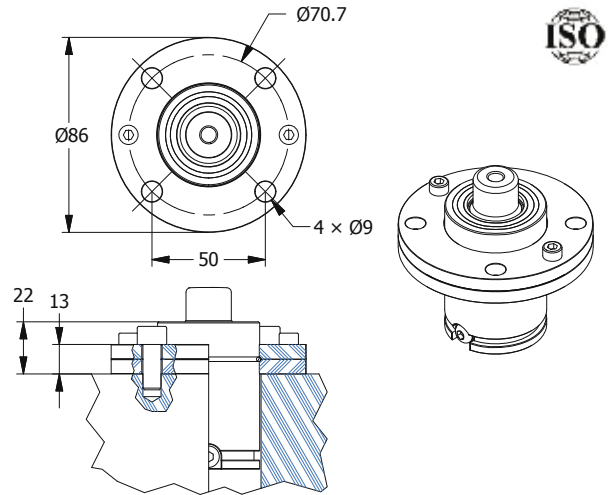
$$122(\text{Bar}) = \frac{6,000(\text{N})}{49.1}$$



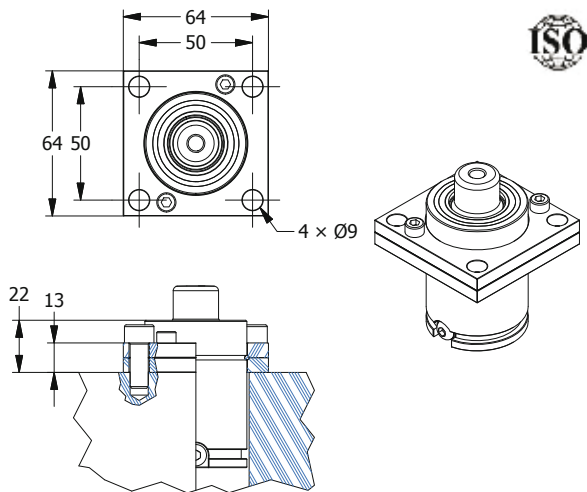
XP0750(SP0500) MOUNT



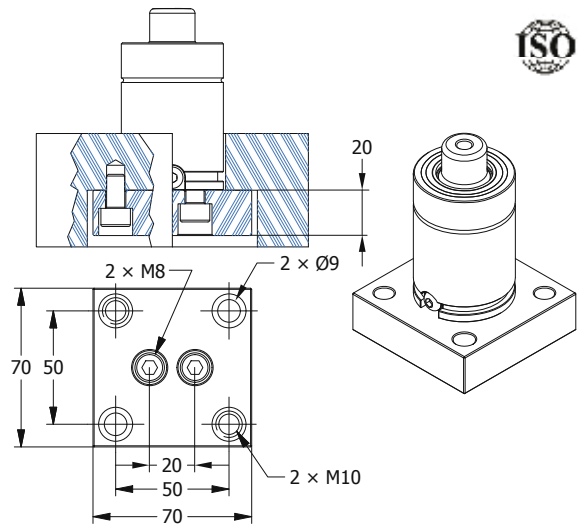
XR0750(SR0500) MOUNT



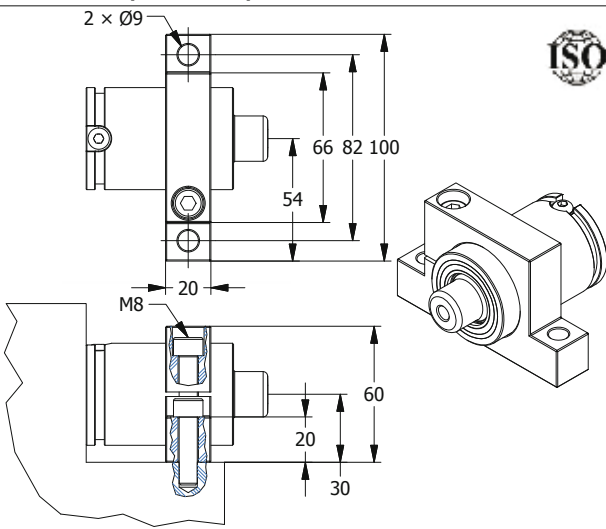
XP0750(ST0500) MOUNT



XB0750(SB0500) MOUNT

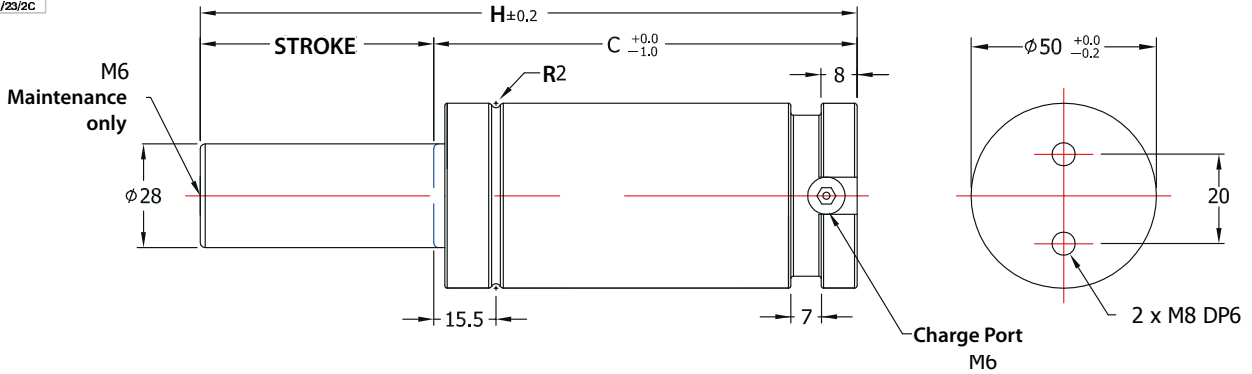


XC0750(SC0500) MOUNT





PED 97/23/2C



HOW TO SPECIFY

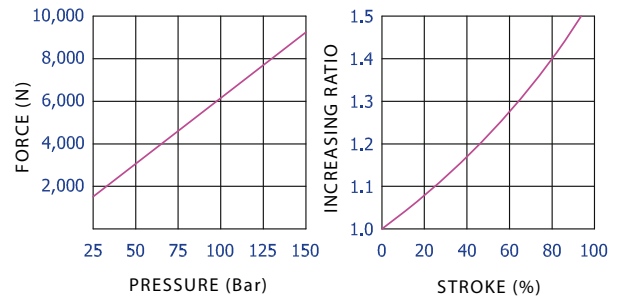
GAS SPRING TSP 1000 × 050 S(F) — (MSA) — 150
 MODEL STROKE SELF CONTAINED-S FITTING SYSTEM-F MOUNT CHARGING PRESSURE (Bar)
 MOUNT XP1000
 REPAIR KIT RCX1000

[Caution!] Charging pressure has to be specified. Otherwise, 150Bar will be charged.

TSP 1000							
Stroke		H	C	Force(N) (150 bar / +20°C)		Gas vol. (cm ³)	Weight (kg)
(mm)	(inch)			Initial	End force*		
13	0.51	64	51	9,200	13,300	27.3	0.58
16	0.63	70	54		13,600	32.0	0.61
20	0.79	78	58		13,800	38.3	0.64
25	0.98	88	63		14,000	46.2	0.68
30	1.18	98	68		14,200	54.0	0.72
35	1.38	108	73		14,300	61.9	0.76
38	1.50	114	76		14,400	66.6	0.78
40	1.57	118	78		14,400	69.7	0.80
45	1.77	128	83		14,500	77.6	0.84
50	1.97	138	88		14,600	85.4	0.89
60	2.36	158	98		14,600	101.1	0.96
63	2.48	164	101		14,700	105.8	0.98
70	2.76	178	108		14,700	116.8	1.04
75	2.95	188	113		14,700	124.7	1.09
80	3.15	198	118		14,800	132.5	1.12
90	3.54	218	128		14,800	148.2	1.21
100	3.94	238	138		14,900	163.8	1.29
125	4.92	288	163	14,900	203.2	1.49	

* = at full stroke

■ CHARGING PRESSURE/FORCE INCREASE FACTOR



■ Calculation of charging pressure for TSP1000

$$\text{Charging pressure(Bar)} = \frac{\text{Initial Force(N)}}{61.5}$$

ex) What comes to the charging pressure of gas spring which demands force 8,500N?

$$138(\text{Bar}) = \frac{8,500(\text{N})}{61.5}$$



MD MOUNT WELDED

2 x Ø11
89
111
30
20
MDB
MDA

MS MOUNT WELDED

76
54
4 x Ø11
25
MSB
MSA

MK MOUNT WELDED

24
4 x Ø11
68
89
17
12.7
20

XP1000(SP0750) MOUNT ISO

75
56.5
4 x Ø9
75
56.5
24
12

XB1000(SB0750) MOUNT ISO

20
2 x M8
2 x Ø9
75
56.5
2 x M10

XT1000(ST0750) MOUNT ISO

70
56.5
70
56.5
4 x Ø9
22
13

XR1000(SR0750) MOUNT ISO

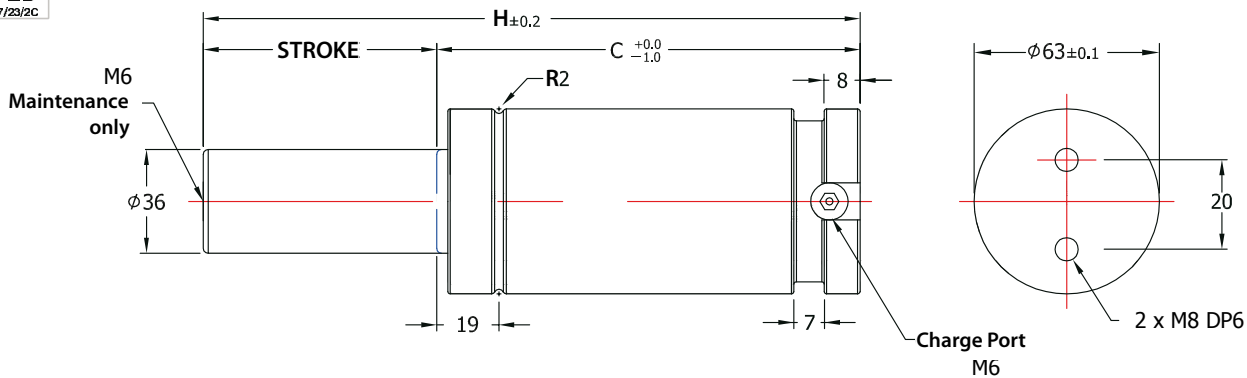
Ø80
Ø95
56.5
4 x Ø9
22
13

XC1000(SC0750) MOUNT ISO

2 x Ø9
90
110
130
70
M8
30
20
40
80



PED
97/23/2C



HOW TO SPECIFY

GAS SPRING

$$\frac{\text{TSP 1500}}{\text{MODEL}} \times \frac{050}{\text{STROKE}} \frac{\text{S(F)}}{\text{SELF CONTAINED-S FITTING SYSTEM-F}} - \frac{(\text{MSA})}{\text{MOUNT}} - \frac{150}{\text{CHARGING PRESSURE (Bar)}}$$

MOUNT

XP1500

REPAIR KIT

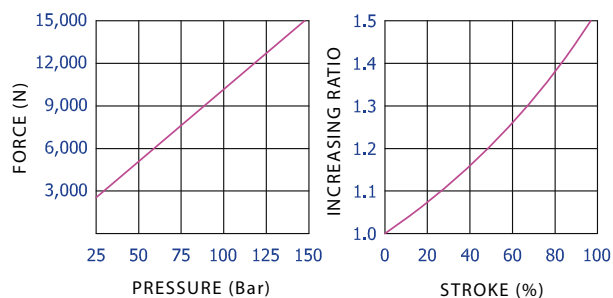
RCX1500

[Caution!] Charging pressure has to be specified. Otherwise, 150Bar will be charged.

TSP 1500							
Stroke		H	C	Force(N) (150 bar / +20°C)		Gas vol. (cm ³)	Weight (kg)
(mm)	(inch)			Initial	End force*		
13	0.51	70	57	15,200	20,900	48.8	1.04
16	0.63	76	60		21,400	56.8	1.08
20	0.79	84	64		21,900	67.4	1.13
25	0.98	94	69		22,300	80.7	1.20
30	1.18	104	74		22,600	93.9	1.27
35	1.38	114	79		22,900	107.2	1.34
38	1.50	120	82		23,000	115.2	1.37
40	1.57	124	84		23,000	120.5	1.40
45	1.77	134	89		23,200	133.7	1.47
50	1.97	144	94		23,300	147.0	1.58
60	2.36	164	104		23,500	173.5	1.66
63	2.48	170	107		23,600	181.5	1.71
70	2.76	184	114		23,700	200.1	1.80
75	2.95	194	119		23,800	213.3	1.87
80	3.15	204	124		23,800	226.3	1.93
90	3.54	224	134	23,900	252.9	2.07	
100	3.94	244	144	24,000	279.5	2.19	
125	4.92	294	169	24,100	346.0	2.53	

* = at full stroke

■ CHARGING PRESSURE/FORCE INCREASE FACTOR



■ Calculation of charging pressure for TSP1500

$$\text{Charging pressure(Bar)} = \frac{\text{Initial Force(N)}}{101.7}$$

ex) What comes to the charging pressure of gas spring which demands force 12,000N?

$$118(\text{Bar}) = \frac{12,000(\text{N})}{101.7}$$



MD MOUNT WELDED

2 × Ø11
102
122
30
MDB
MDA
20

MS MOUNT WELDED

85
64
4 × Ø11
MSB
MSA
25

MK MOUNT WELDED

26
26
4 × Ø13
83
105
21
20
17
30

XP1500 MOUNT

85
60
4 × Ø11
85
60
24
12

XB1500 MOUNT

20
2 × M8
2 × Ø11
100
73.5
20
2 × M12

XT1500 MOUNT

90
73.5
90
73.5
27
16
4 × Ø11

XR1500 MOUNT

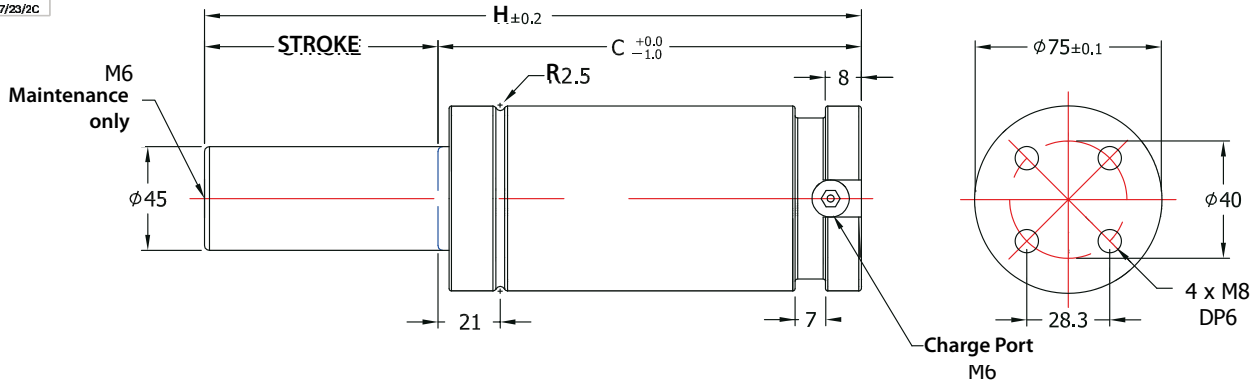
Ø85
Ø105
60.1
4 × Ø11
27
16

XC1500 MOUNT

2 × Ø11
102
123
146
85
M8
30
45
90
20



PED
97/23/2C



HOW TO SPECIFY

GAS SPRING

MOUNT

REPAIR KIT

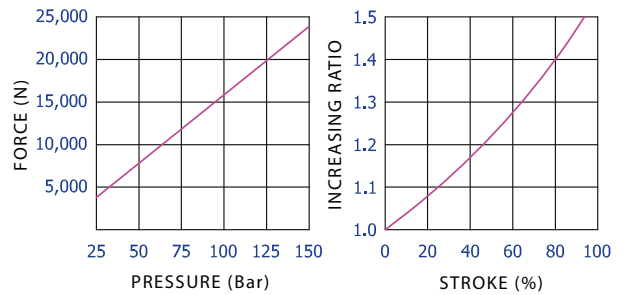
TSP 2400 × 050 S(F) - (MSA) - 150
 MODEL STROKE SELF CONTAINED-S FITTING SYSTEM-F MOUNT CHARGING PRESSURE (Bar)
 XP2400
 RCX2400

[Caution!] Charging pressure has to be specified. Otherwise, 150Bar will be charged.

TSP 2400							
Stroke		H	C	Force(N) (150 bar / +20°C)		Gas vol. (cm ³)	Weight (kg)
(mm)	(inch)			Initial	End force*		
16	0.63	77	61	23,800	33,800	86.3	1.58
20	0.79	85	65		34,600	102.4	1.65
25	0.98	95	70		35,300	122.5	1.73
30	1.18	105	75		35,800	142.6	1.81
35	1.38	115	80		36,200	162.7	1.89
38	1.50	121	83		36,400	174.8	1.94
40	1.57	125	85		36,600	182.8	1.97
45	1.77	135	90		36,800	203.0	2.05
50	1.97	145	95		37,000	223.1	2.13
60	2.36	165	105		37,400	263.3	2.30
63	2.48	171	108		37,500	275.4	2.34
70	2.76	185	115		37,600	303.5	2.47
75	2.95	195	120		37,700	323.6	2.55
80	3.15	205	125		37,800	343.8	2.63
90	3.54	225	135	38,000	384.0	2.79	
100	3.94	245	145	38,100	424.2	2.95	
125	4.92	295	170	38,400	524.8	3.37	

* = at full stroke

■ CHARGING PRESSURE/FORCE INCREASE FACTOR



■ Calculation of charging pressure for TSP1500

$$\text{Charging pressure(Bar)} = \frac{\text{Initial Force(N)}}{159.0}$$

ex) What comes to the charging pressure of gas spring which demands force 20,000N?

$$126(\text{Bar}) = \frac{20,000(\text{N})}{159.0}$$



MD MOUNT WELDED

2 x Ø13
120
152
38
20
MDB
MDA

MS MOUNT WELDED

102
76
4 x Ø13
25
MSB
MSA

MK MOUNT WELDED

26
26
95
117
23
23
19
32

XP2400(SP1500) MOUNT ISO

100
73.5
4 x Ø11
100
73.5
24
12

XB2400(SB1500) MOUNT ISO

20
4 x Ø11
4 x M8 - M20 THRU
100
73.5
28.3

XT2400(ST1500) MOUNT ISO

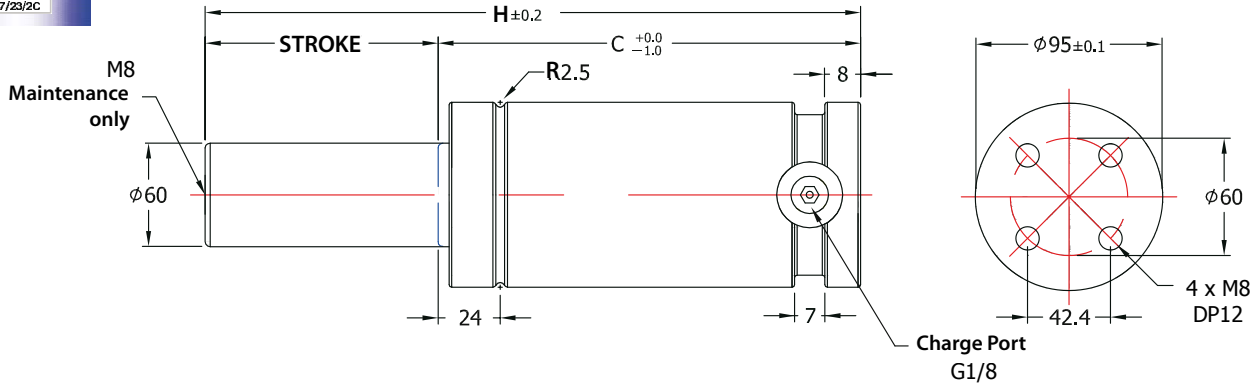
90
73.5
90
73.5
29
16
4 x Ø11

XR2400(SR1500) MOUNT ISO

Ø104
Ø122
73.5
4 x Ø11
29
16

XC2400(SC1500) MOUNT ISO

2 x Ø11
115
137
160
85
M10
30
52.5
20
105



HOW TO SPECIFY

GAS SPRING

TSP 4200
MODEL

× 050 S(F) — (MSA) —
STROKE SELF CONTAINED-S FITTING SYSTEM-F

150
CHARGING PRESSURE (Bar)

MOUNT

XP4200

REPAIR KIT

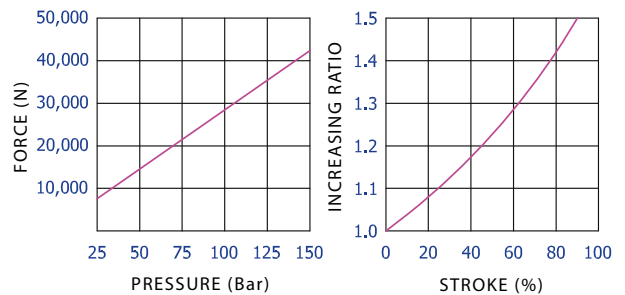
RCX4200

[Caution!] Charging pressure has to be specified. Otherwise, 150Bar will be charged.

TSP 4200							
Stroke		H	C	Force(N) (150 bar / +20°C)		Gas vol. (cm ³)	Weight (kg)
(mm)	(inch)			Initial	End force*		
16	0.63	90	74	42,200	60,600	150.5	3.21
20	0.79	98	78		62,300	177.8	3.32
25	0.98	108	83		63,800	212.0	3.46
30	1.18	118	88		65,000	246.2	3.60
35	1.38	128	93		65,900	280.3	3.75
38	1.50	134	96		66,400	300.8	3.82
40	1.57	138	98		66,600	314.5	3.88
45	1.77	148	103		67,200	348.7	4.02
50	1.97	158	108		67,700	382.8	4.16
60	2.36	178	118		68,500	451.2	4.44
63	2.48	184	121		68,700	471.7	4.52
70	2.76	198	128		69,100	519.5	4.72
75	2.95	208	133		69,400	553.6	4.86
80	3.15	218	138		69,600	587.8	5.00
90	3.54	238	148		70,000	656.1	5.27
100	3.94	258	158	70,300	724.5	5.56	
125	4.92	308	183	70,900	895.3	6.25	

* = at full stroke

■ CHARGING PRESSURE/FORCE INCREASE FACTOR

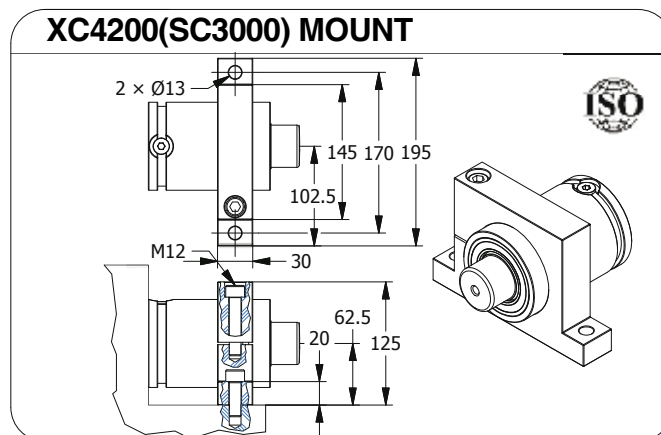
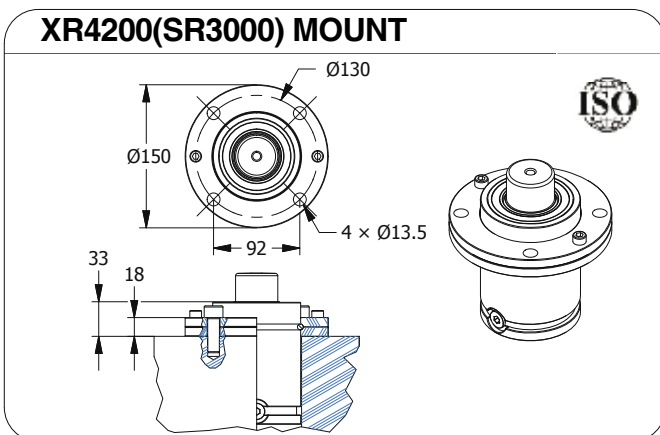
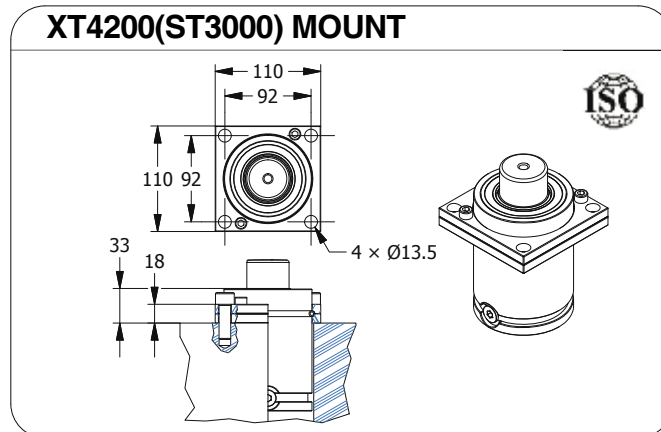
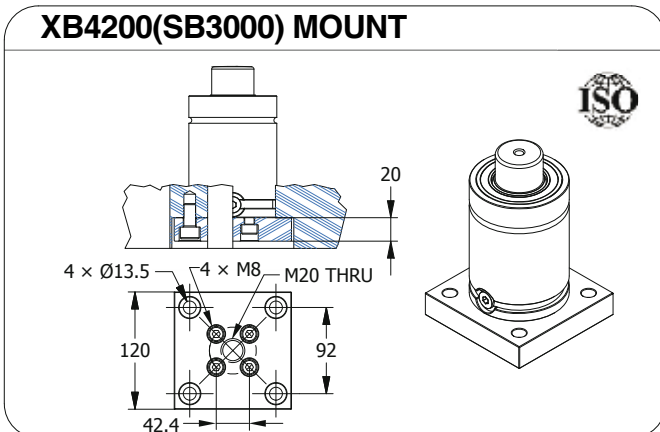
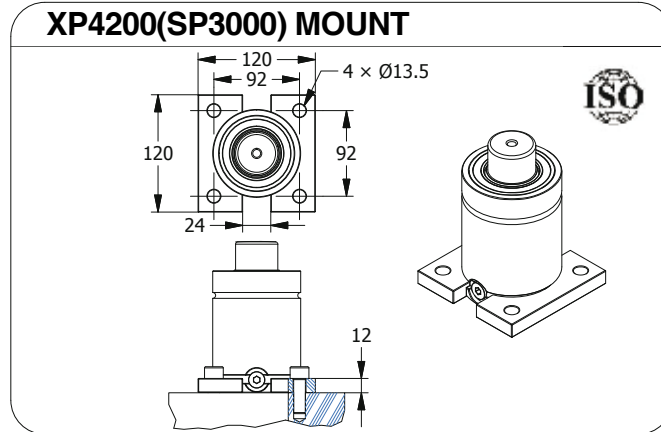
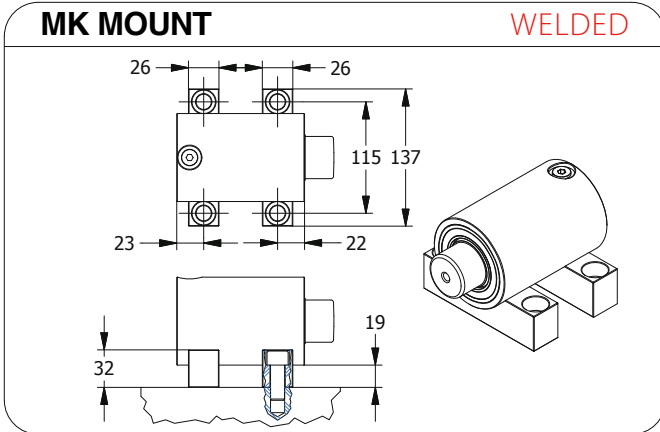
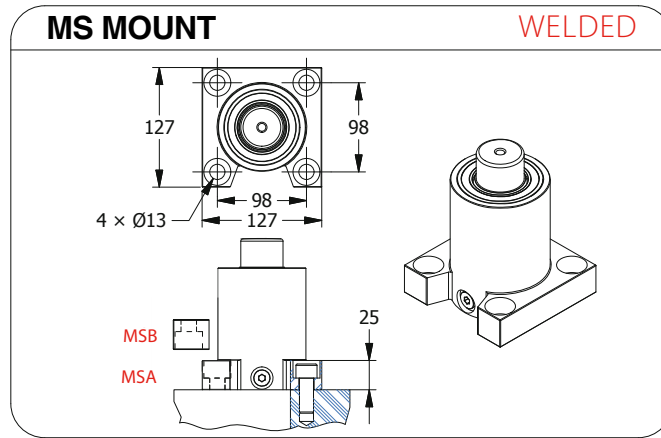
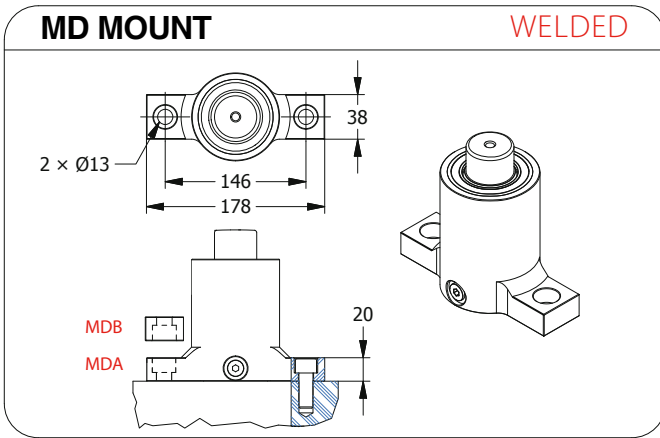


■ Calculation of charging pressure for TSP4200

$$\text{Charging pressure(Bar)} = \frac{\text{Initial Force(N)}}{282.6}$$

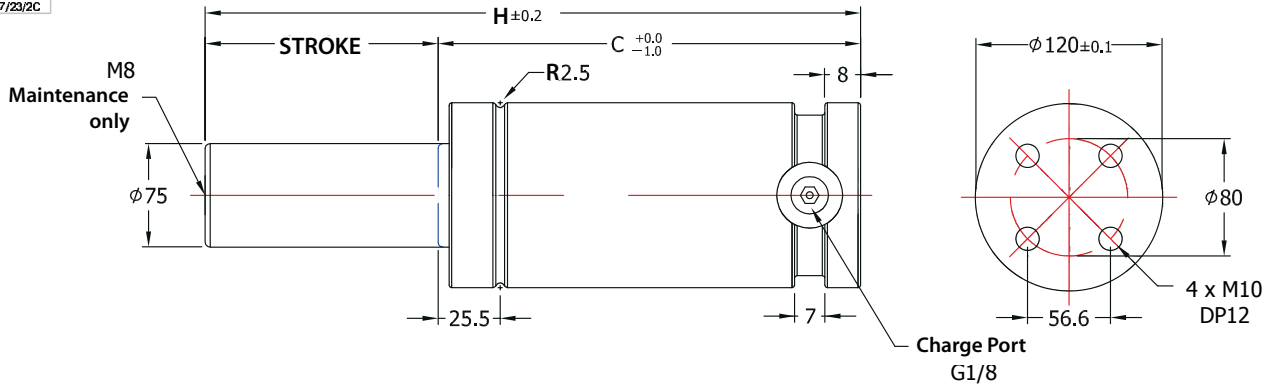
ex) What comes to the charging pressure of gas spring which demands force 35,000N?

$$124(\text{Bar}) = \frac{35,000(\text{N})}{282.6}$$





PED 97/23/2C



HOW TO SPECIFY

GAS SPRING

MOUNT

REPAIR KIT

TSP 6600
MODEL

XP6600

RCX6600

× 050 STROKE SELF CONTAINED-S FITTING SYSTEM-F

- (MSA) MOUNT

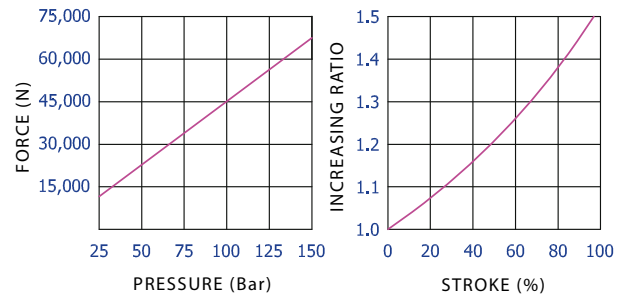
- 150 CHARGING PRESSURE (Bar)

[Caution!] Charging pressure has to be specified. Otherwise, 150Bar will be charged.

TSP 6600							
Stroke		H	C	Force(N) (150 bar / +20°C)		Gas vol. (cm³)	Weight (kg)
(mm)	(inch)			Initial	End force*		
16	0.63	100	84	66,000	91,900	272.3	6.01
20	0.79	108	88		93,700	315.7	6.19
25	0.98	118	93		96,200	370.1	6.42
30	1.18	128	98		98,200	424.4	6.65
35	1.38	138	103		99,700	478.7	6.87
38	1.50	144	106		100,500	511.3	7.01
40	1.57	148	108		101,000	533.1	7.11
45	1.77	158	113		102,100	587.4	7.33
50	1.97	168	118		103,000	641.8	7.56
60	2.36	188	128		104,400	750.4	8.01
63	2.48	194	131		104,800	783.0	8.15
70	2.76	208	138		105,500	859.1	8.47
75	2.95	218	143		105,900	913.4	8.70
80	3.15	228	148		106,400	967.8	8.93
90	3.54	248	158	107,100	1076.5	9.38	
100	3.94	268	168	107,600	1185.1	9.84	
125	4.92	318	193	108,700	1456.8	10.98	

* = at full stroke

■ CHARGING PRESSURE/FORCE INCREASE FACTOR



■ Calculation of charging pressure for TSP6600

$$\text{Charging pressure(Bar)} = \frac{\text{Initial Force(N)}}{441.6}$$

ex) What comes to the charging pressure of gas spring which demands force 60,000N?

$$136(\text{Bar}) = \frac{60,000(\text{N})}{441.6}$$



MD MOUNT WELDED

MS MOUNT WELDED

MK MOUNT WELDED

XP6600(SP5000) MOUNT ISO

XB6600(SB5000) MOUNT ISO

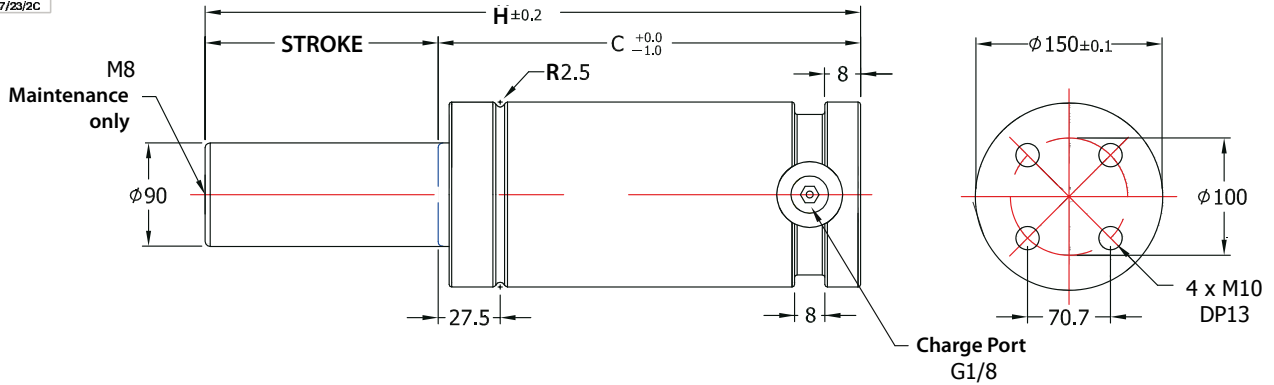
XT6600(ST5000) MOUNT ISO

XR6600(SR5000) MOUNT ISO

XC6600(SC5000) MOUNT ISO



PED
97/23/2C



HOW TO SPECIFY

GAS SPRING

TSP 9500
MODEL

× 050
STROKE

S(F) —
SELF CONTAINED-S
FITTING SYSTEM-F

(MSA) —
MOUNT

150
CHARGING
PRESSURE
(Bar)

MOUNT

XP9500

REPAIR KIT

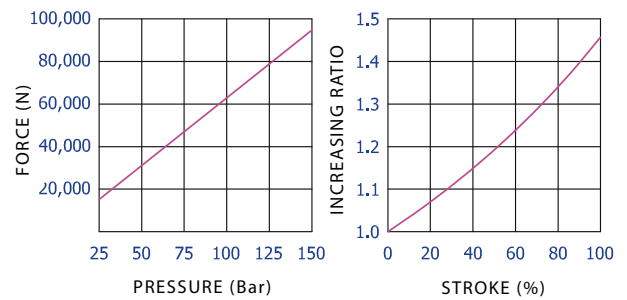
RCX9500

[Caution!] Charging pressure has to be specified. Otherwise, 150Bar will be charged.

TSP 9500							
Stroke		H	C	Force(N) (150 bar/ +20°C)		Gas vol. (cm ³)	Weight (kg)
(mm)	(inch)			Initial	End force*		
20	0.79	118	98	95,000	127,600	509.9	10.78
25	0.98	128	103		131,000	591.6	11.10
30	1.18	138	108		133,700	673.3	11.60
35	1.38	148	113		135,900	755.0	12.84
38	1.50	154	116		137,000	804.0	13.18
40	1.57	158	118		137,700	836.6	13.24
45	1.77	168	123		139,200	918.3	14.48
50	1.97	178	128		140,500	1000.0	14.70
60	2.36	198	138		142,600	1163.3	15.50
63	2.48	204	141		143,100	1212.3	15.64
70	2.76	218	148		144,200	1326.7	16.20
75	2.95	228	153		144,900	1408.4	17.30
80	3.15	238	158		145,500	1490.0	18.10
90	3.54	258	168		146,500	1653.4	19.60
100	3.94	278	178		147,400	1816.7	20.44
125	4.92	328	203	149,100	2225.1	21.20	

* = at full stroke

■ CHARGING PRESSURE/FORCE INCREASE FACTOR



■ Calculation of charging pressure for TSP9500

$$\text{Charging pressure(Bar)} = \frac{\text{Initial Force(N)}}{635.9}$$

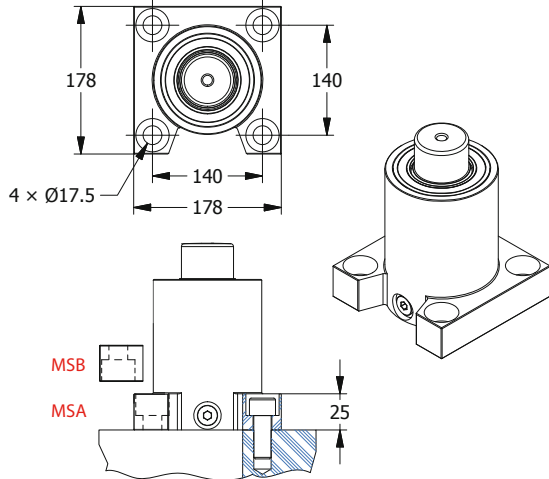
ex) What comes to the charging pressure of gas spring which demands force 85,000N?

$$134(\text{Bar}) = \frac{85,000(\text{N})}{635.9}$$

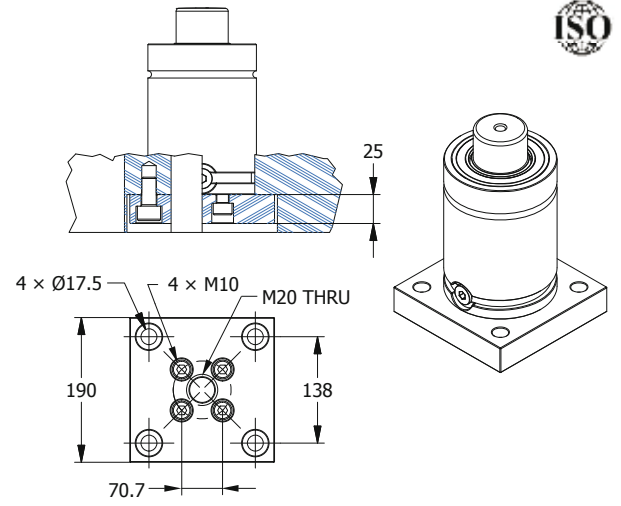


MS MOUNT

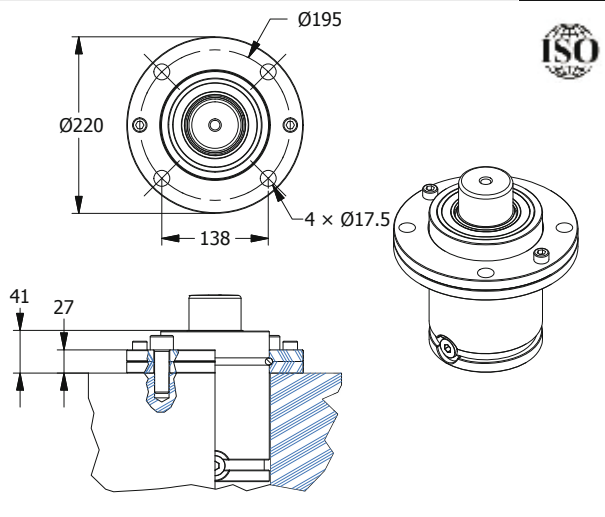
WELDED



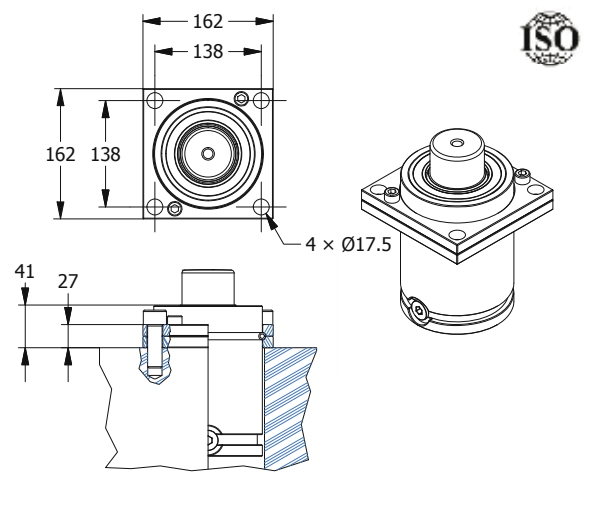
XB9500(SB7500) MOUNT



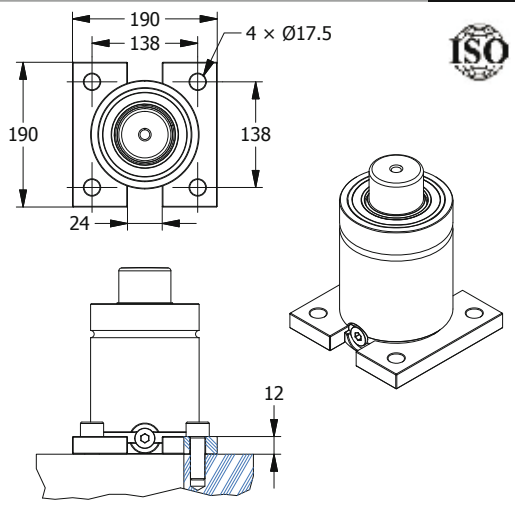
XR9500(SR7500) MOUNT



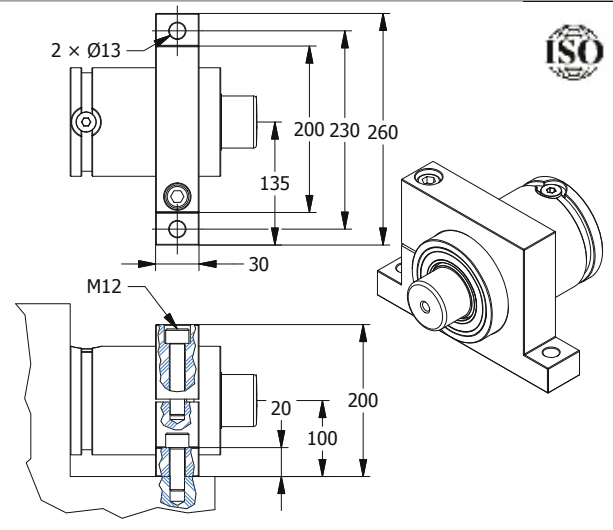
XP9500(ST7500) MOUNT



XP9500(SP7500) MOUNT



XC9500(SC7500) MOUNT



EOC Normalien

TSM Series





CONTENTS

TSM-SERIES

TSM0150

TSM0300

TSM0500

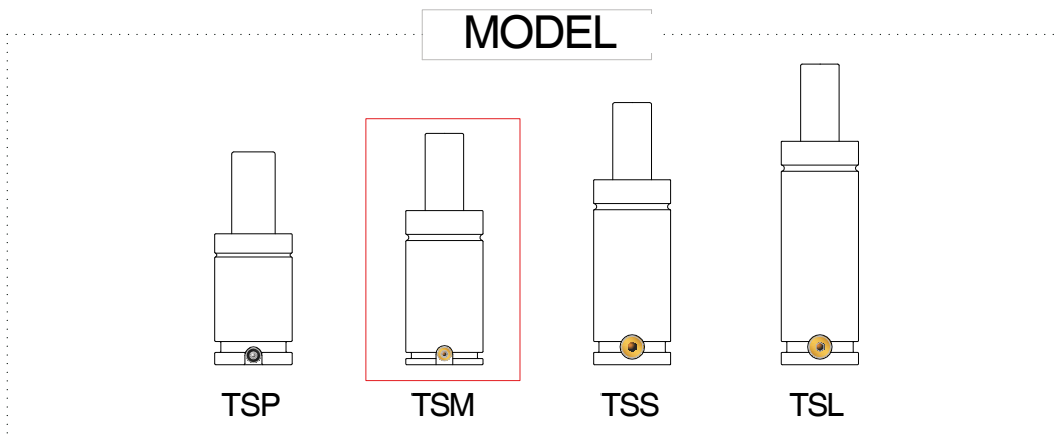
TSM0750

TSM1500

TSM3000

TSM5000

COMPACT TYPE



Specification

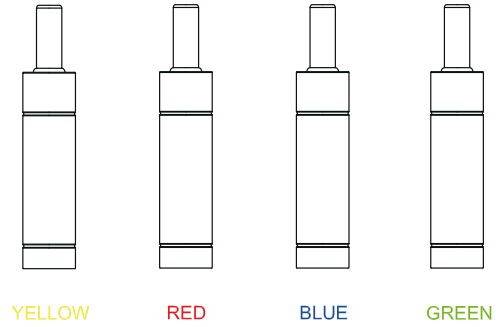
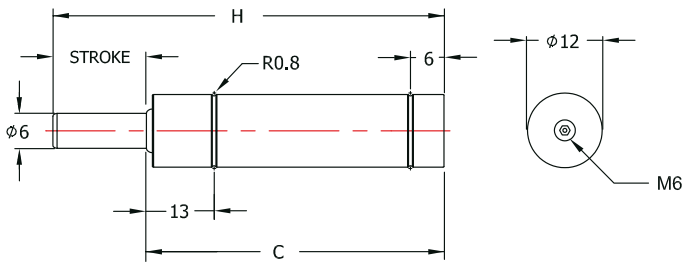
General Specification	
● Filling Materials Nitrogen GAs(N2)	● Maximum Stroke Rate Per Minute (Recommended) ~50 to 100 (at 20°)
● Maximum Filling Pressure 150~180 bar (at 20°)	● Piston Rod Speed 0.03~0.8 m/s
● Minimum Filling Pressure 25 bar (at 20°)	● Rod Surface Treatment Nitrate Coating
● Operation Temperature -5 to 80°	● Cylinder Surface Treatment Oxidized Black Coating
● Pressure Increase as per Temperature ±0.3% / °	

TYPE	Stroke (mm)	Cylinder Diameter Φ(mm)	Rod Φ(mm)	Initial Force (N)	End Force (N)	MAX. Charging Pressure
TSM0150	10~125	25	12	P34 Reference	P34 Reference	P34 Reference
TSM0300	10~125	38	16	3,000	4,200	150Bar
TTM0300		M38				
TSM0500	10~125	45	20	4,650	6,500	150Bar
TSM0750	10~125	50	25	7,350	12,000	150Bar
TSM1500	10~200	75	36	15,150	22,100	150Bar
TSM3000	10~200	95	50	29,400	47,600	150Bar
TSM5000	10~200	120	65	49,650	84,100	150Bar

* The above specification is subject to change without notice for performance improvement.



PED
97/23/2C



HOW TO SPECIFY

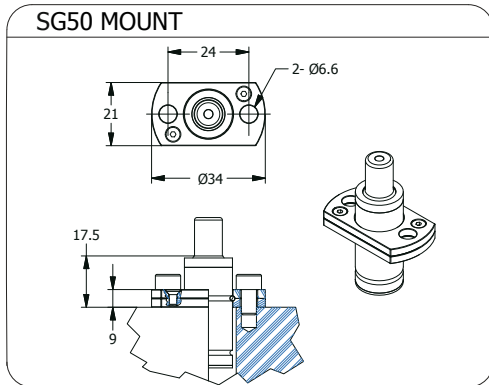
GAS SPRING
MOUNT
REPAIR KIT

TSM50 × 050 – 180(YELLOW)
MODEL STROKE CHARGING PRESSURE (Bar)
SG50
Non-repairable

TSM50									
Stroke		H	C	Force (N) (180•135•90•45 bar / +20 °C)				Gas vol. (cm ³)	weight (kg)
(mm)	(inch)			End force*	End force*	End force*	End force*		
7	0.28	56	49	700	500	400	200	0.8	0.03
10	0.39	62	52	700	600	400	200	1.1	0.03
12.7	0.50	67.4	54.7	800	600	400	200	1.3	0.03
15	0.59	72	57	800	600	400	200	1.5	0.03
19	0.75	80	61	800	600	400	200	1.8	0.04
25	0.98	92	67	800	600	400	200	2.2	0.04
38	1.50	118	80	800	600	400	200	3.3	0.04
50	1.97	142	92	800	600	400	200	4.2	0.05
63.5	2.50	172	108.5	800	600	400	200	5.5	0.06
75	2.95	195	120	800	600	400	200	6.4	0.06
80	3.15	205	125	800	600	400	200	6.8	0.07
100	3.94	245	145	800	600	400	200	8.4	0.07
125	4.92	295	170	800	600	400	200	10.3	0.09

* = at full stroke

※ Special type is available upon requested.



Note:

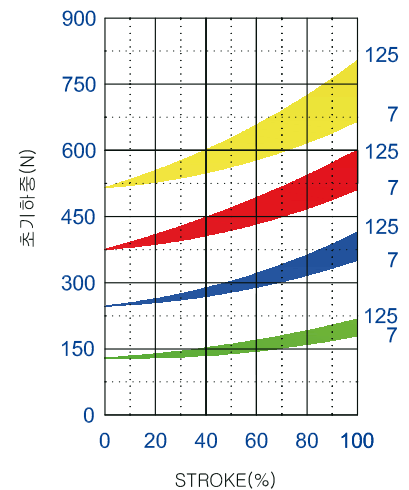
All of EOC Normalien gas spring must be secured with a stroke reserved at least 10% of the length of the stroke. Not allowed disassembled in any case without manufacture's instructions.



Bottom thread

only to be used for strokes 7–25mm

FORCE CHART

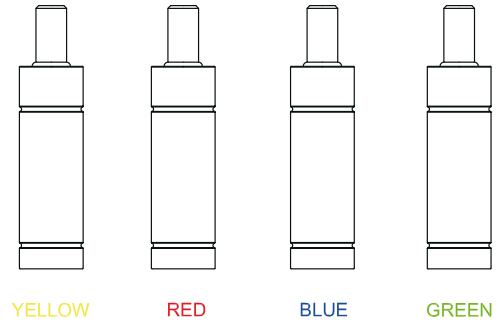
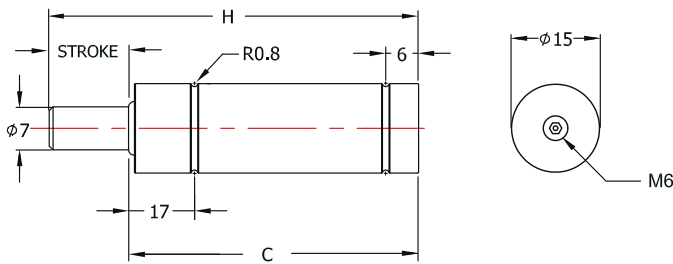


TSM50 is pre-charged when shipped and comes in four types, depending on the force. Pressure regulator and nitrogen gas recharging is not possible.

Color	Force (N)	Bar
YELLOW	500	180
RED	380	135
BLUE	250	90
GREEN	130	45



PED
97/23/2C



HOW TO SPECIFY

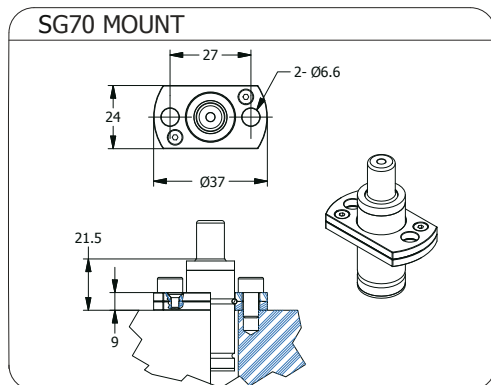
GAS SPRING
MOUNT
REPAIR KIT

TSM70 × 050 – 180(YELLOW)
MODEL STROKE CHARGING PRESSURE (Bar)
SG70
Non-repairable

TSM70									
Stroke		H	C	Force (N) (180•135•90•45 bar / +20 °C)				Gas vol. (cm ³)	weight (kg)
(mm)	(inch)			End force*	End force*	End force*	End force*		
7	0.28	56	49	900	700	500	200	1.2	0.05
10	0.39	62	52	1,000	700	500	200	1.5	0.05
12.7	0.50	68	55	1,000	700	500	200	1.9	0.05
15	0.59	72	57	1,000	800	500	300	2.1	0.05
19	0.75	80	61	1,000	800	500	300	2.5	0.05
25	0.98	92	67	1,000	800	500	300	3.2	0.06
38	1.50	118	80	1,100	800	500	300	4.7	0.07
50	1.97	142	92	1,100	800	500	300	6.0	0.08
63.5	2.50	172	108.5	1,100	800	500	300	7.9	0.09
75	2.95	195	120	1,100	800	500	300	9.2	0.10
80	3.15	205	125	1,100	800	500	300	9.8	0.11
100	3.94	245	145	1,100	800	500	300	12.0	0.12
125	4.92	295	170	1,100	800	500	300	14.9	0.14

* = at full stroke

* Special type is available upon requested.



Note:

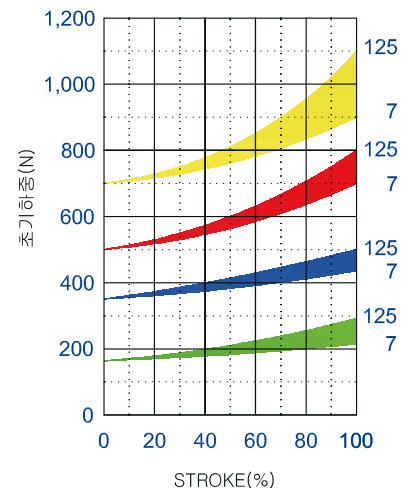
All of EOC Normalien gas spring must be secured with a stroke reserved at least 10% of the length of the stroke. Not allowed disassembled in any case without manufacture's instructions.



Bottom thread

only to be used for strokes 7–25mm

FORCE CHART

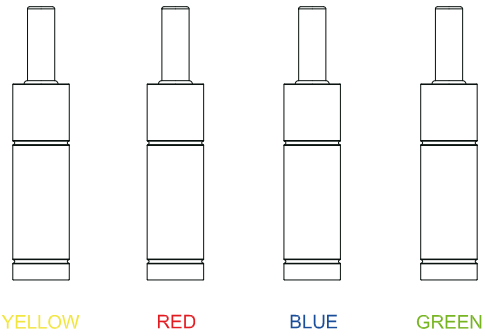
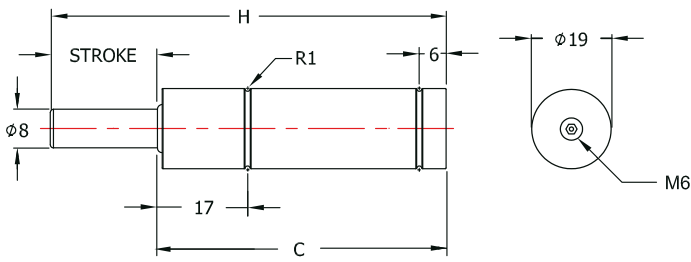


TSM70 is pre-charged when shipped and comes in four types, depending on the force. Pressure regulator and nitrogen gas recharging is not possible.

Color	Force (N)	Bar
YELLOW	700	180
RED	500	135
BLUE	350	90
GREEN	180	45



PED
97/23/2C



HOW TO SPECIFY

GAS SPRING
MOUNT
REPAIR KIT

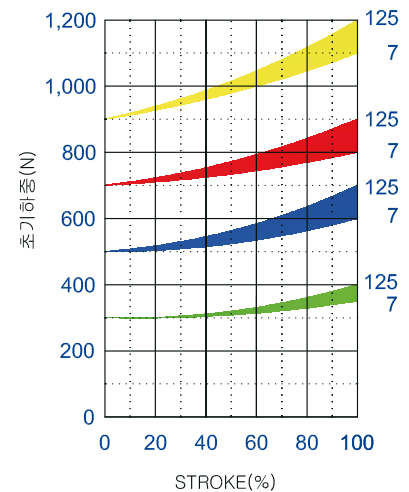
TSM90 × 050 – 180(YELLOW)
MODEL STROKE CHARGING PRESSURE (Bar)
SG90
Non-repairable

TSM90									
Stroke		H	C	Force (N) (180•135•90•60 bar / +20 °C)				Gas vol. (cm ³)	weight (kg)
(mm)	(inch)			End force*	End force*	End force*	End force*		
7	0.28	56	49	1,100	800	600	400	2.3	0.07
10	0.39	62	52	1,100	800	600	400	2.9	0.08
12.7	0.50	67.4	54.7	1,100	900	600	400	3.5	0.08
15	0.59	72	57	1,100	900	600	400	3.9	0.08
19	0.75	80	61	1,100	900	600	400	4.7	0.08
25	0.98	92	67	1,100	900	600	400	5.9	0.10
38	1.50	118	80	1,200	900	600	400	8.5	0.10
50	1.97	142	92	1,200	900	600	400	11.0	0.12
63.5	2.50	172	108.5	1,200	900	600	400	14.3	0.13
75	2.95	195	120	1,200	900	600	400	16.6	0.14
80	3.15	205	125	1,200	900	600	400	17.6	0.14
100	3.94	245	145	1,200	900	700	400	21.6	0.17
125	4.92	295	170	1,200	900	700	400	26.600	0.20

* = at full stroke

※ Special type is available upon requested.

FORCE CHART



TSM90 is pre-charged when shipped and comes in four types, depending on the force. Pressure regulator and nitrogen gas recharging is not possible.

Note:

All of EOC Normalien 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 manufacture's instructions.



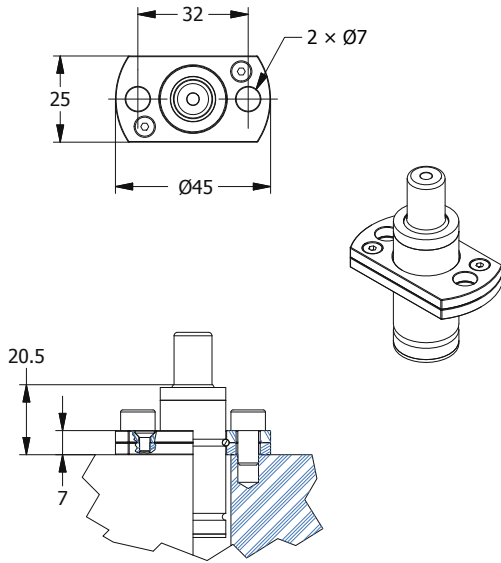
Bottom thread

only to be used for strokes 7–25mm

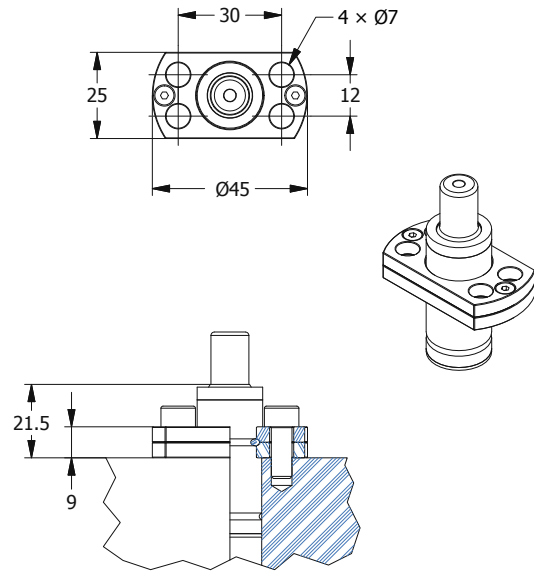
Color	Force (N)	Bar
YELLOW	900	180
RED	700	140
BLUE	500	100
GREEN	300	60



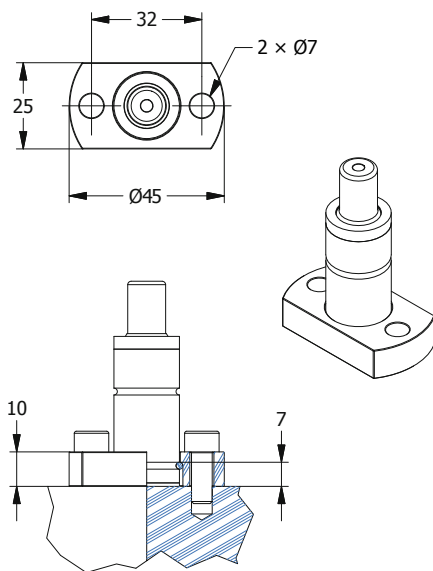
SG90 MOUNT



SC90 MOUNT

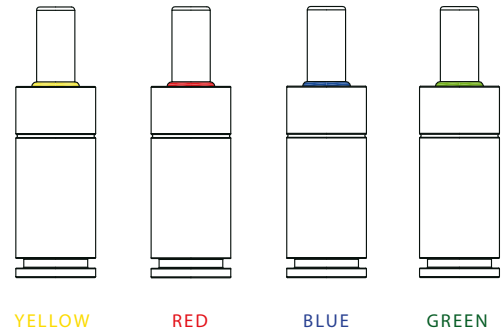
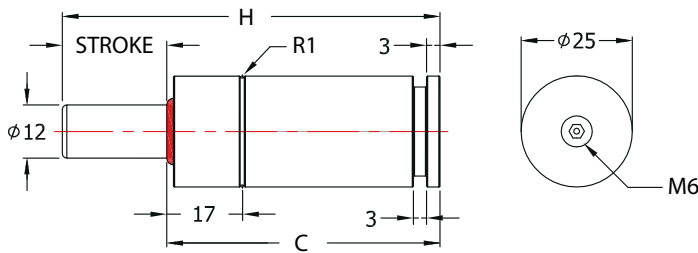


SP90 MOUNT





PED
97/23/2C



HOW TO SPECIFY

GAS SPRING

MOUNT

REPAIR KIT

TSP 0170 × 050 – 175(YELLOW)
MODEL STROKE CHARGING PRESSURE (Bar)
XP0170
Non-repairable

TSM0150									
Stroke		H	C	Force(N) (175 · 135 · 90 · 45 · bar / +20°C)				Gas vol. (cm ³)	Weight (kg)
(mm)	(inch)			End force*	End force*	End force*	End force*		
10	0.39	62	52	2,600	2,000	1,300	700	4.7	0.14
13	0.51	68	55	2,700	2,000	1,300	700	5.7	0.15
15	0.59	72	57	2,700	2,000	1,300	700	6.4	0.16
16	0.63	74	58	2,700	2,000	1,400	700	6.8	0.16
20	0.79	82	62	2,700	2,100	1,400	700	8.1	0.17
25	0.98	92	67	2,800	2,100	1,400	700	9.9	0.18
30	1.18	102	72	2,800	2,100	1,400	700	11.6	0.19
35	1.38	112	77	2,800	2,100	1,400	700	13.3	0.20
38	1.50	118	80	2,800	2,100	1,400	700	14.4	0.21
40	1.57	122	82	2,800	2,100	1,400	700	15.1	0.22
45	1.77	132	87	2,800	2,100	1,400	700	16.8	0.23
50	1.97	142	92	2,800	2,100	1,400	700	18.5	0.24
60	2.36	165	105	2,900	2,100	1,400	700	22.0	0.27
63	2.48	172	109	2,800	2,100	1,400	700	23.4	0.27
70	2.76	185	115	2,900	2,200	1,400	700	25.4	0.29
80	3.15	205	125	2,900	2,200	1,400	700	28.9	0.32
100	3.94	245	145	2,900	2,200	1,400	700	35.8	0.36
125	4.92	295	170	2,900	2,200	1,400	700	44.5	0.40

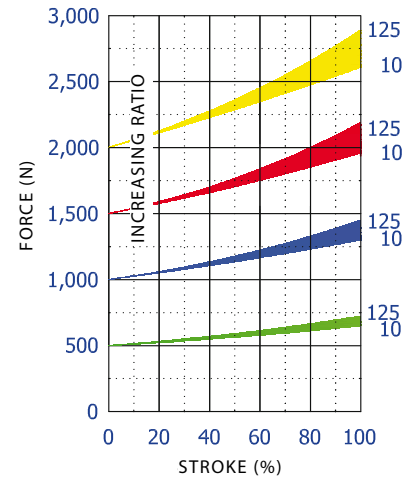
* = at full stroke

* Special type is available upon requested.

Note:

All of EOC Normalien 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 manufacture's instructions.

■ FORCE CHART

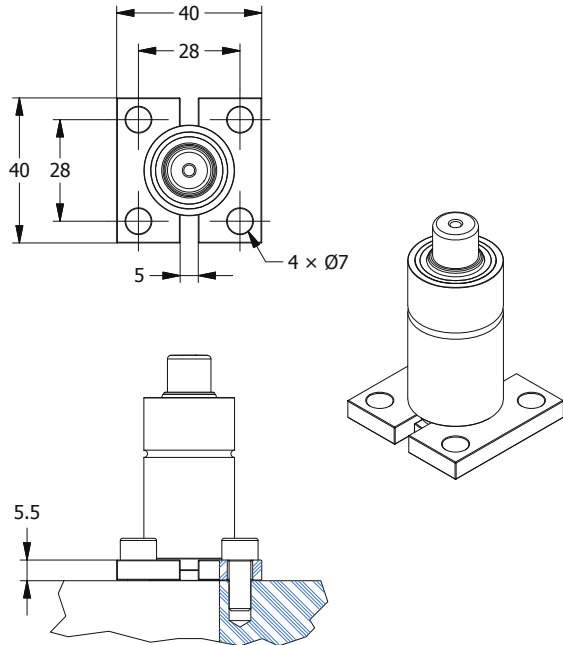


TSM0150 is pre-charged when shipped and comes in four types, depending on the force. The pressure cannot be adjusted but Nitrogen is rechargeable.

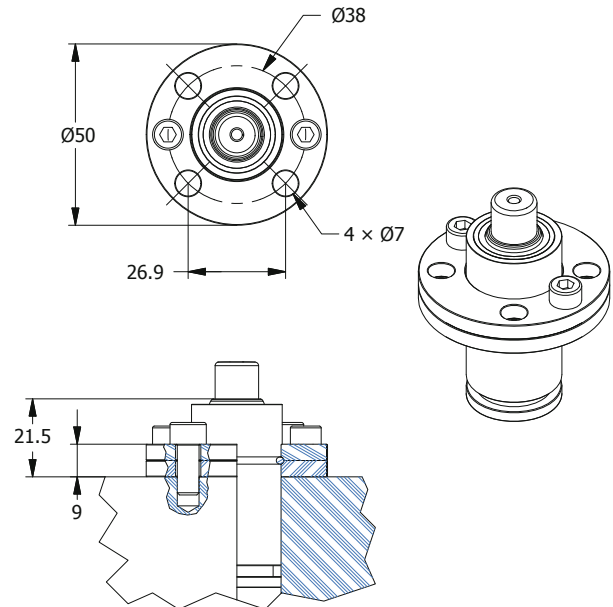
Color	Force (N)	bar
YELLOW	2,000	175
RED	1,500	135
BLUE	1,000	90
GREEN	500	45



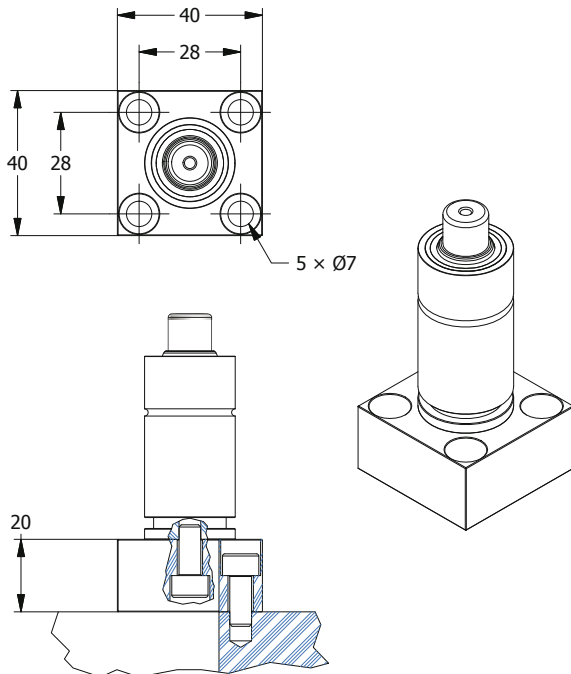
SP0150 MOUNT



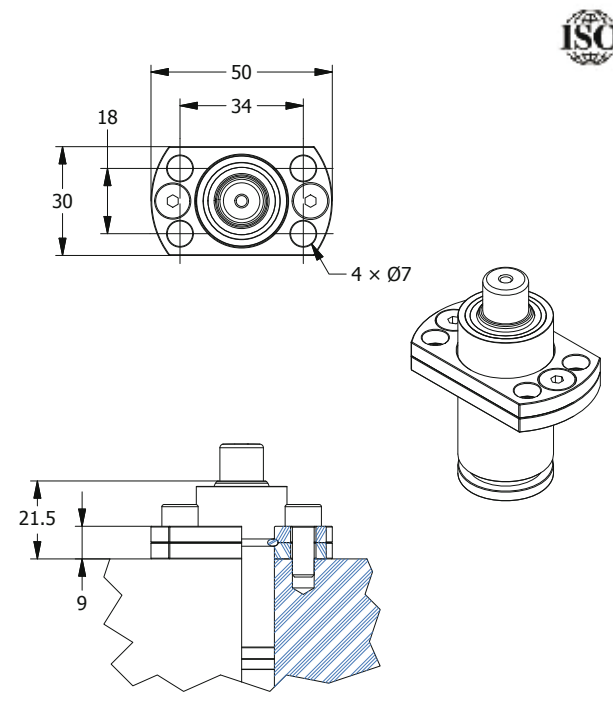
SR0150 MOUNT

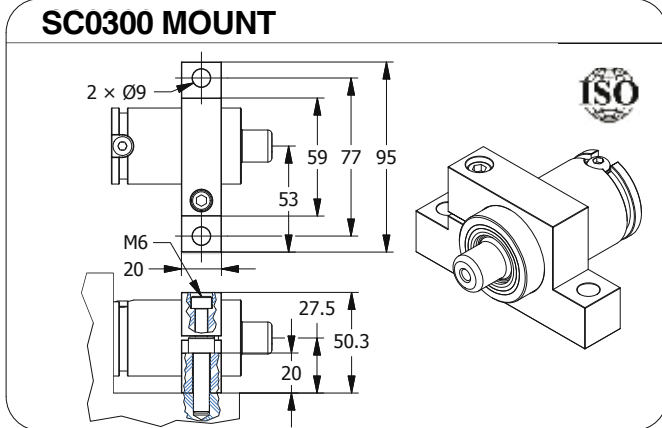
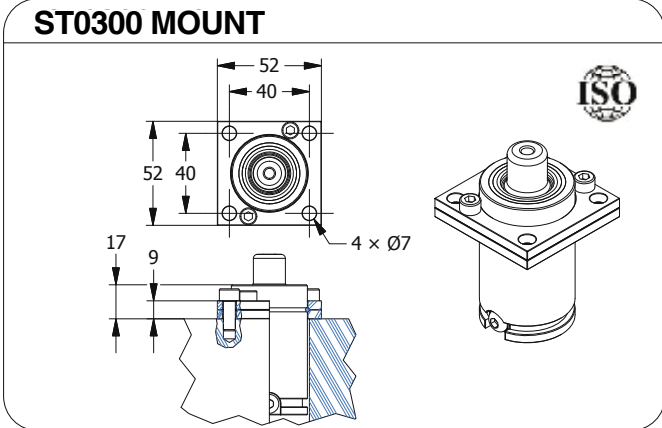
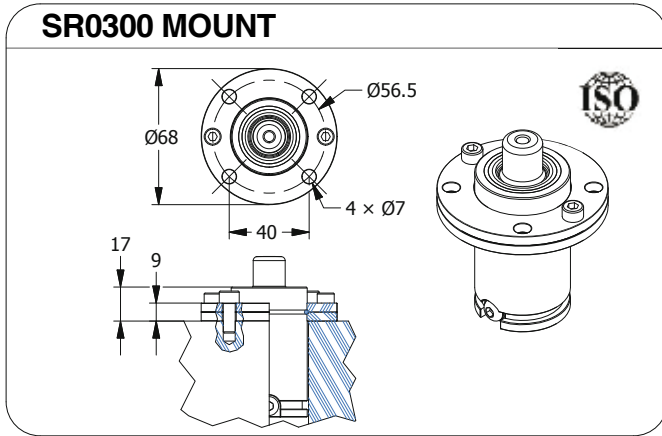
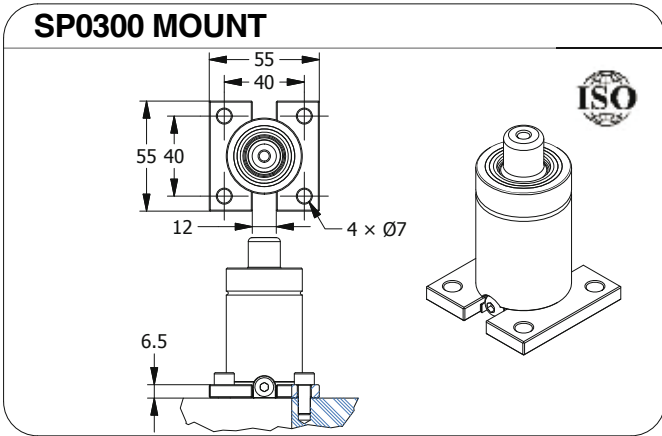


SB0150 MOUNT

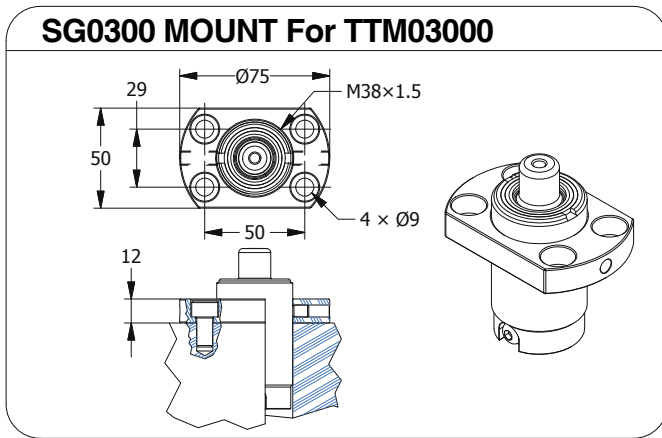
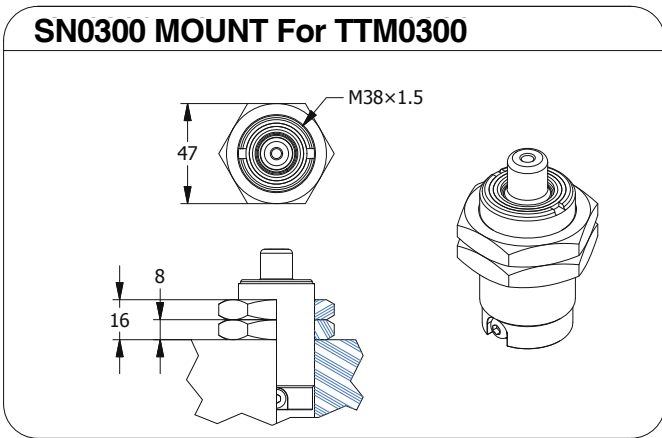
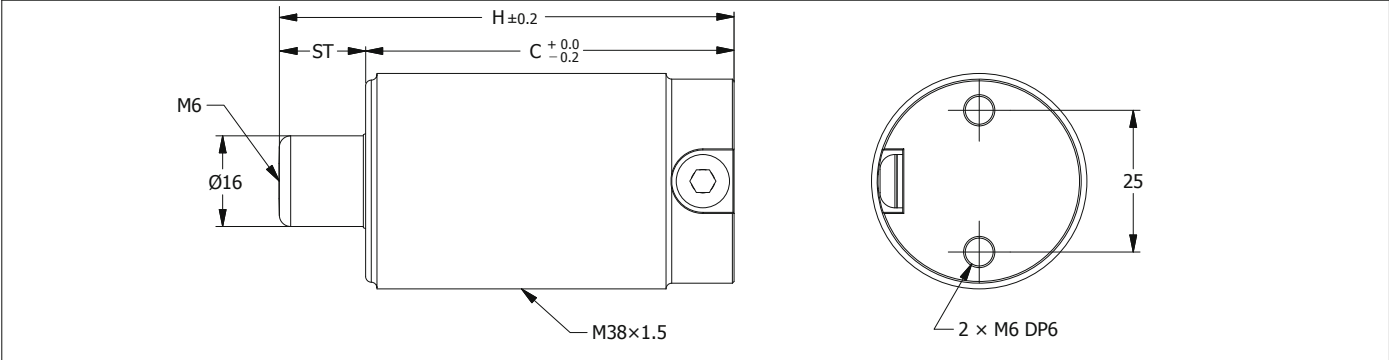


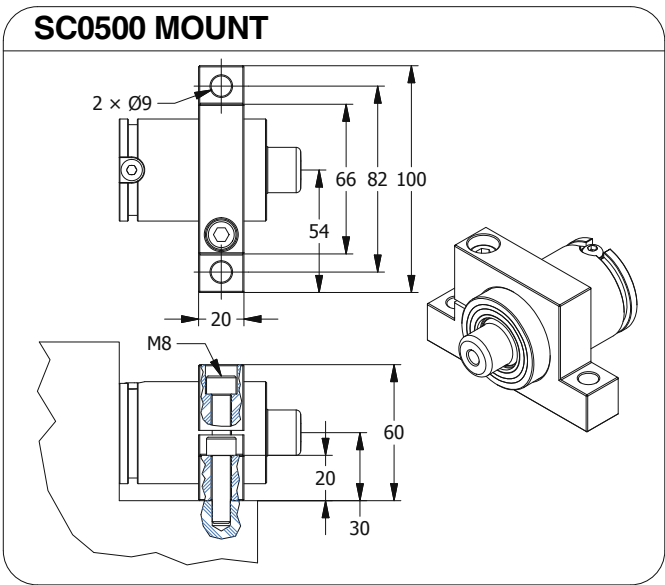
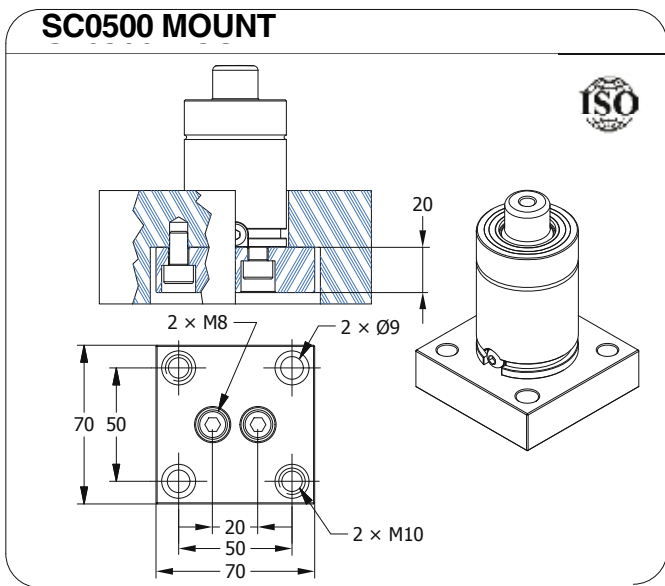
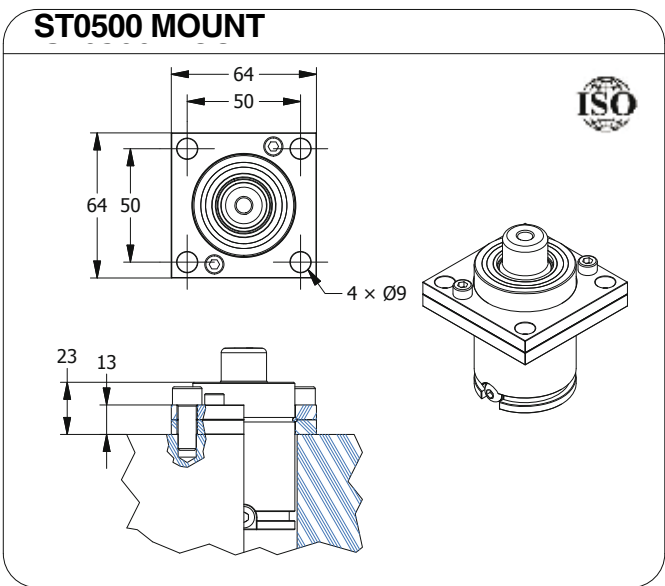
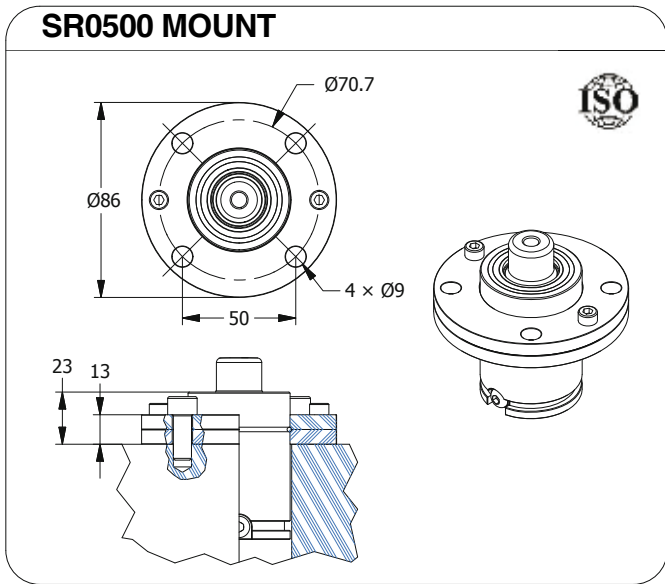
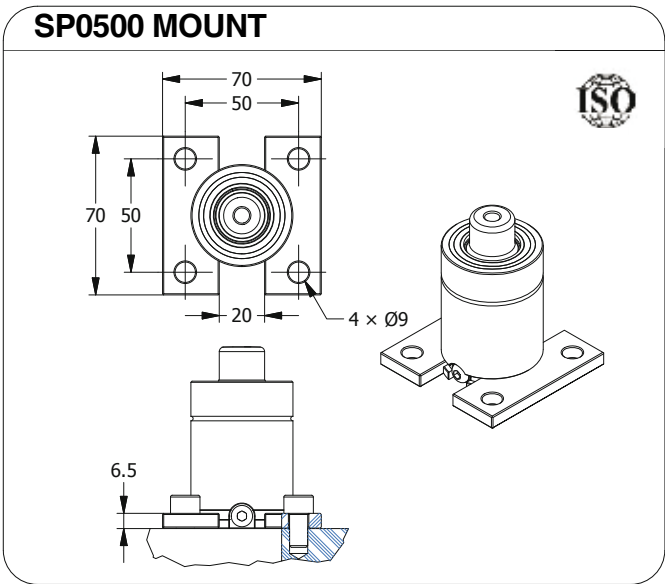
SG0150 MOUNT





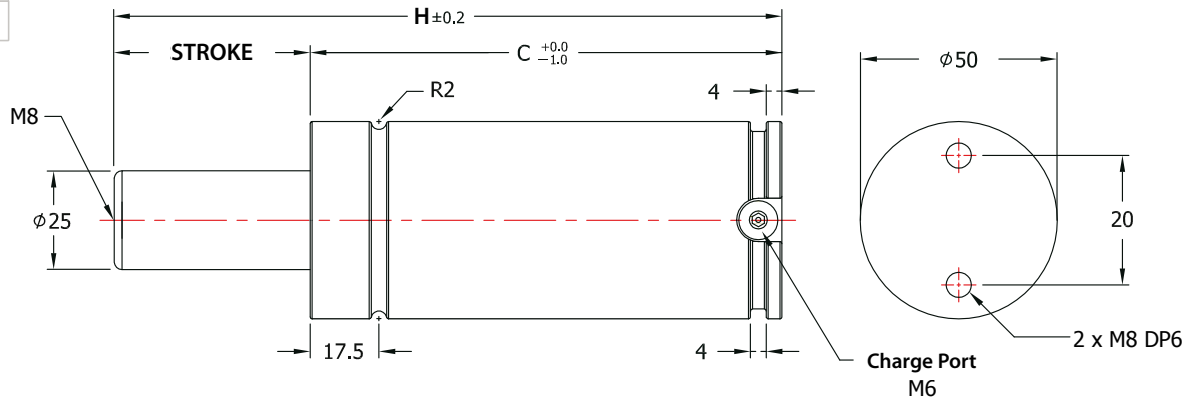
TTM0300 (Threaded Option)







PED 97/23/2C



HOW TO SPECIFY

GAS SPRING TSP 0750 × 050 $\frac{S(F)}{\text{SELF CONTAINED-S FITTING SYSTEM-F}}$ - $\frac{(MSA)}{\text{MOUNT}}$ - $\frac{150}{\text{CHARGING PRESSURE (Bar)}}$
 MOUNT SP0750
 REPAIR KIT RCM0750

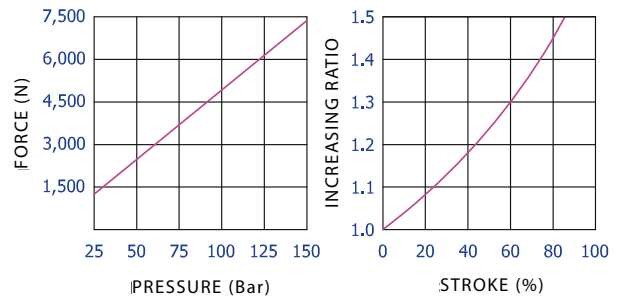
[Caution!] Charging pressure has to be specified. Otherwise, 150Bar will be charged.

TSM 0750							
Stroke		H	C	Force(N) (150 bar / +20°C)		Gas vol. (cm ³)	Weight (kg)
(mm)	(inch)			Initial	End force*		
10	0.39	70	60	7,350	11,700	13.2	0.75
12.7	0.50	75.4	62.7		11,800	16.6	0.78
15	0.59	80	65		11,800	19.5	0.80
20	0.79	90	70		11,900	25.7	0.86
25	0.98	100	75		11,900	32.0	0.92
30	1.18	110	80		11,900	38.3	0.94
35	1.38	120	85		11,900	44.6	1.02
38	1.50	126	88		12,000	48.4	1.04
40	1.57	130	90		12,000	50.9	1.06
45	1.77	140	95		12,000	57.1	1.10
50	1.97	150	100		12,000	63.4	1.14
60	2.36	170	110		12,000	76.0	1.24
63	2.48	176	113		12,000	79.8	1.26
70	2.76	190	120		12,000	88.5	1.34
75	2.95	200	125		12,000	94.8	1.38
80	3.15	210	130	12,000	101.1	1.43	
90	3.54	230	140	12,000	113.7	1.53	
100	3.94	250	150	12,000	126.2	1.62	
125	4.92	300	175	12,000	157.6	1.84	

* = at full stroke

* Special type is available upon requested.

■ CHARGING PRESSURE/FORCE INCREASE FACTOR

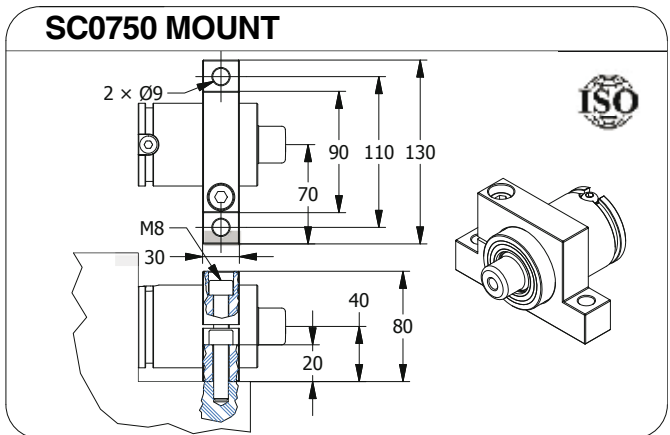
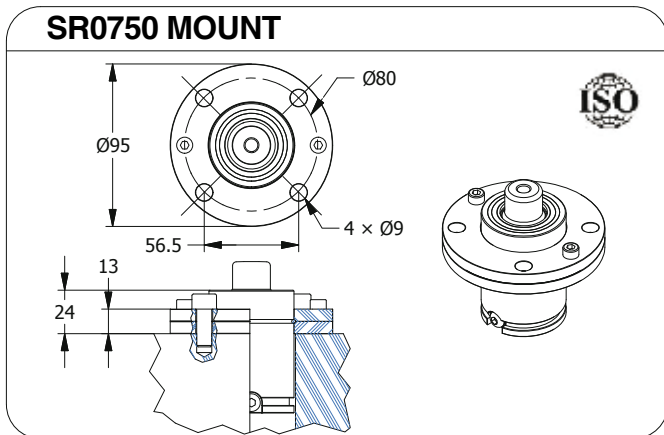
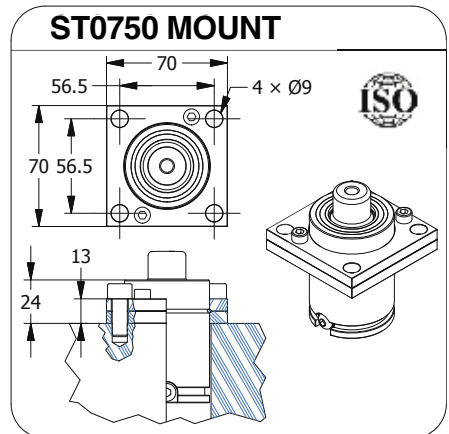
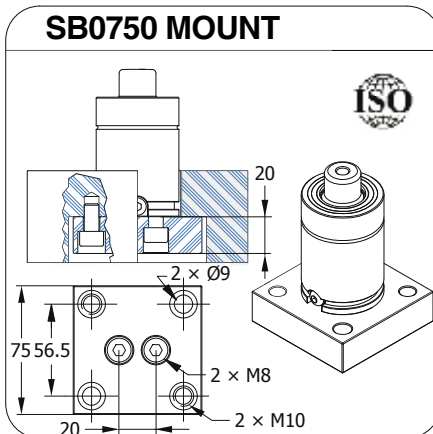
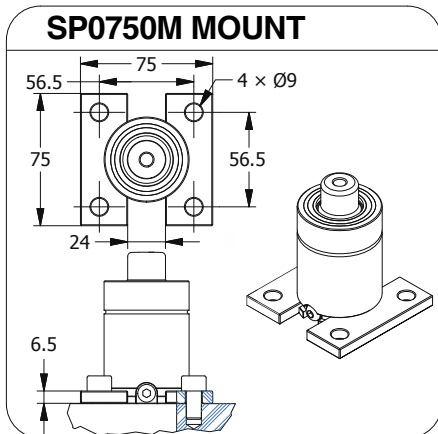
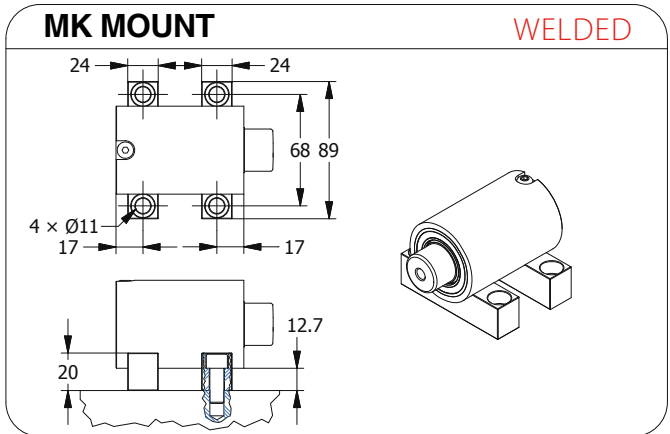
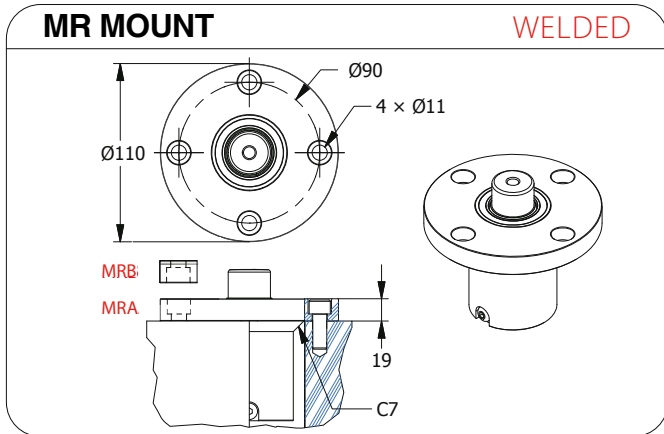
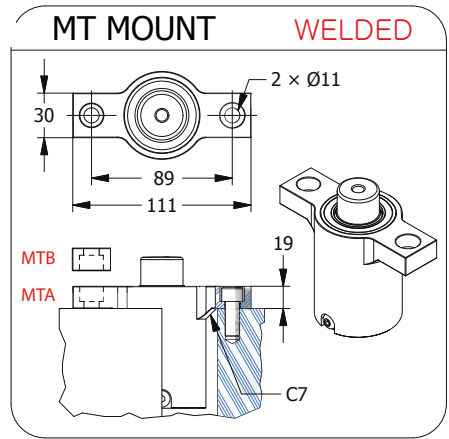
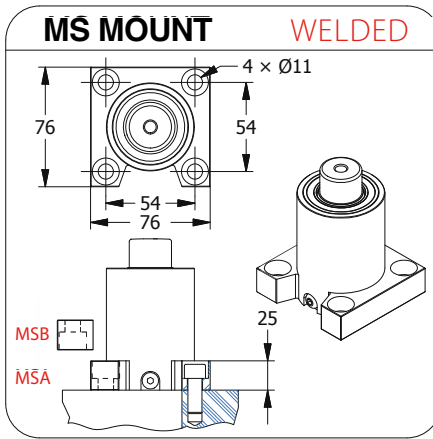
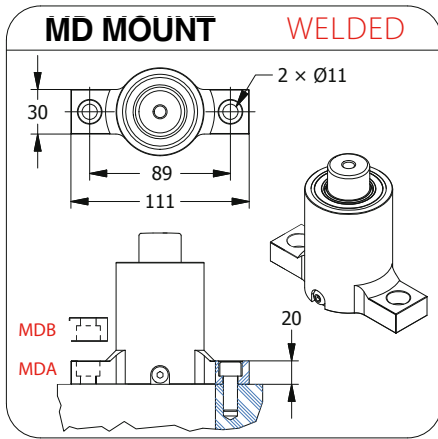


■ Calculation of charging pressure for TSM00750

$$\text{Charging pressure(Bar)} = \frac{\text{Initial Force(N)}}{49.1}$$

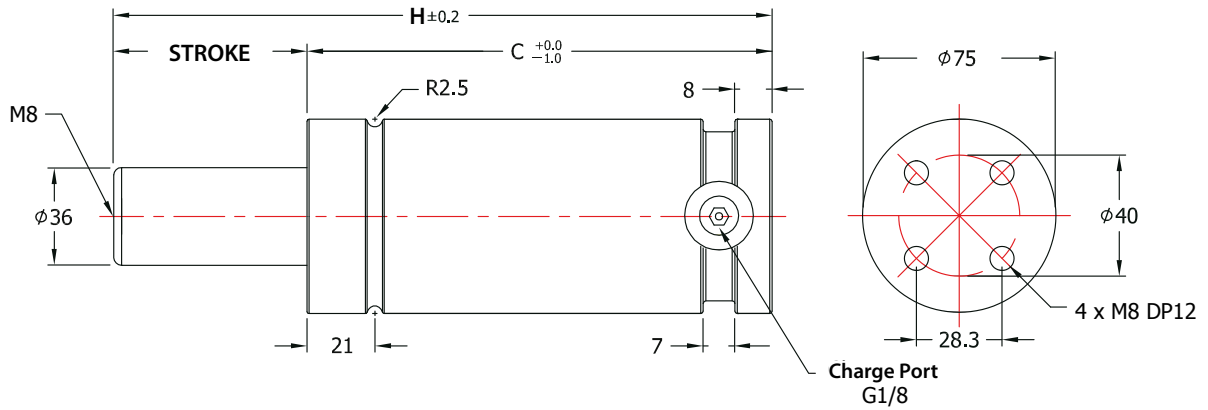
ex) What comes to the charging pressure of gas spring which demands force 6,000N?

$$122(\text{Bar}) = \frac{6,000(\text{N})}{49.1}$$





PED 97/23/2c



HOW TO SPECIFY

GAS SPRING

TSP 1500
MODEL

× 050
STROKE

S(F) —
SELF CONTAINED-S
FITTING SYSTEM-F

(MSA) —
MOUNT

150
CHARGING
PRESSURE
(Bar)

MOUNT

SP1500

REPAIR KIT

RCM1500

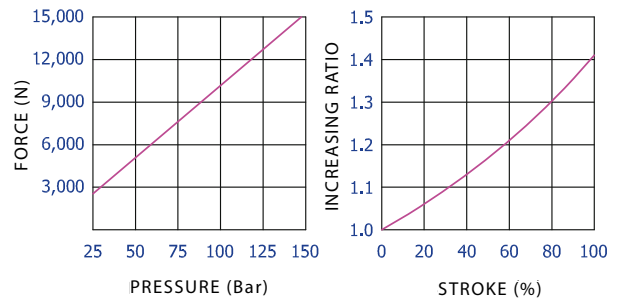
[Caution!] Charging pressure has to be specified. Otherwise, 150Bar will be charged.

TSM1500							
Stroke		H	C	Force(N) (150 bar / +20°C)		Gas vol. (cm ³)	Weight (kg)
(mm)	(inch)			Initial	End force*		
10	0.39	114	104	15,150	19,000	49.9	2.00
13	0.51	120	107		19,500	59.2	2.95
15	0.59	124	109		19,700	65.4	3.02
20	0.79	134	114		20,200	81.0	3.13
25	0.98	144	119		20,500	96.6	3.20
30	1.18	154	124		20,800	112.2	3.32
35	1.38	164	129		20,900	127.7	3.38
38	1.50	170	132		21,000	137.1	3.47
40	1.57	174	134		21,100	143.3	3.49
45	1.77	184	139		21,200	158.9	3.58
50	1.97	194	144		21,300	174.5	3.65
60	2.36	214	154		21,500	205.6	3.83
63	2.48	220	157		21,500	215.0	3.88
70	2.76	234	164		21,600	236.8	4.05
75	2.95	244	169		21,600	252.4	4.17
80	3.15	254	174		21,700	267.9	4.24
90	3.54	274	184		21,800	299.1	4.34
100	3.94	294	194		21,800	330.3	4.60
125	4.92	344	219		21,900	408.2	5.06
150	5.91	394	244		22,000	486.0	5.54
160	6.30	414	254	22,000	517.2	5.83	
175	6.89	444	269	22,100	563.9	6.11	
200	7.87	494	294	22,100	641.8	6.46	

* = at full stroke

* Special type is available upon requested.

■ CHARGING PRESSURE/FORCE INCREASE FACTOR

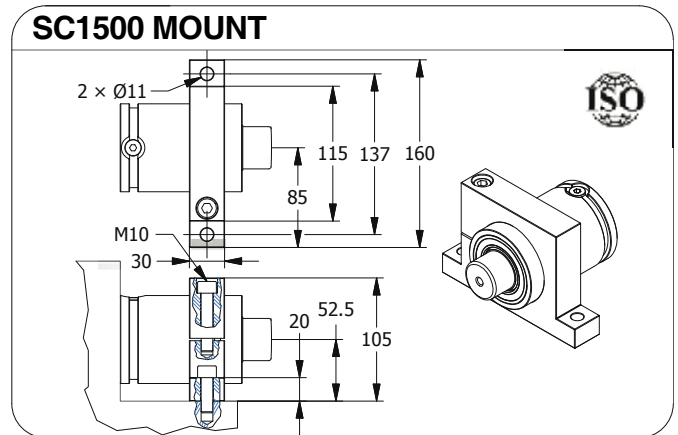
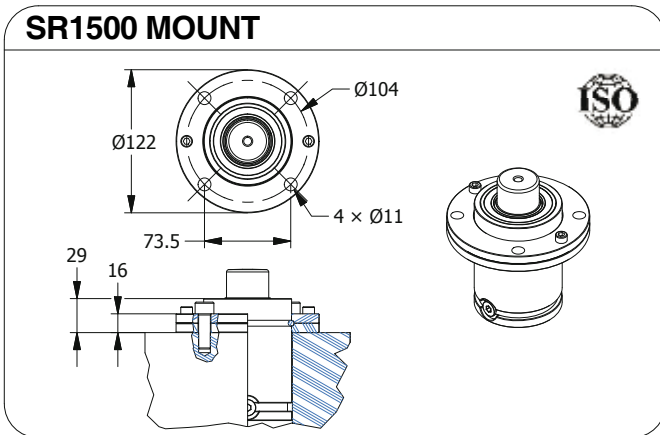
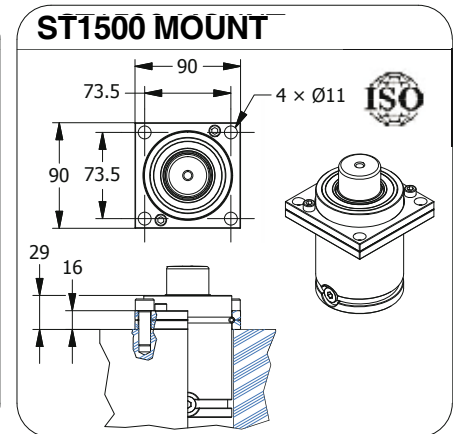
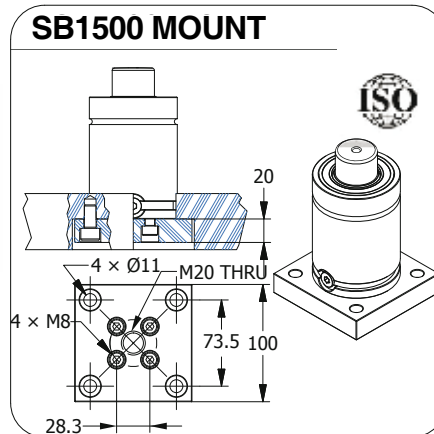
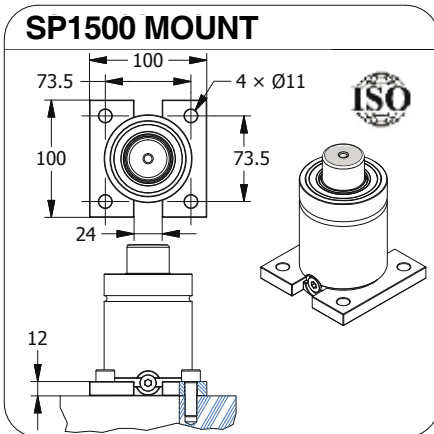
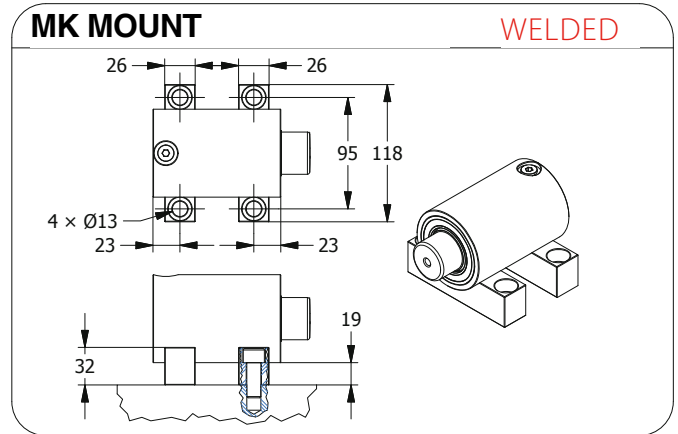
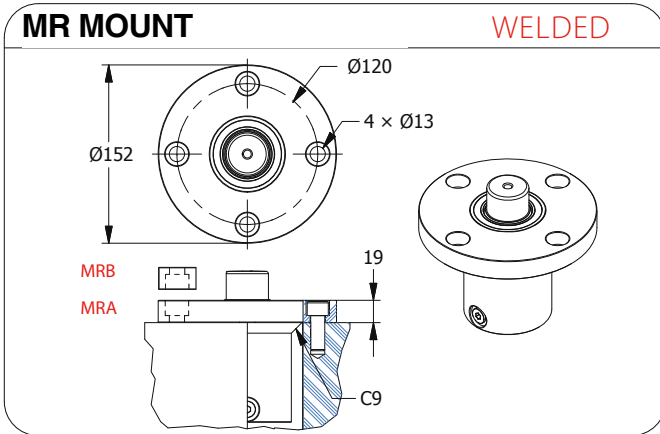
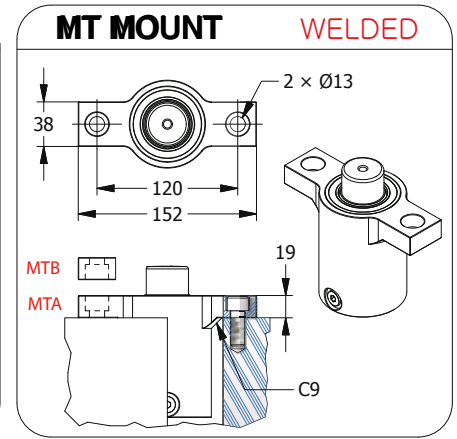
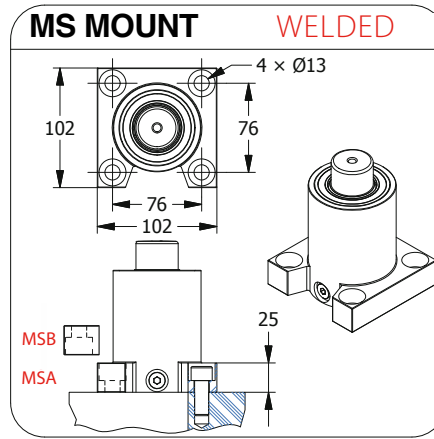
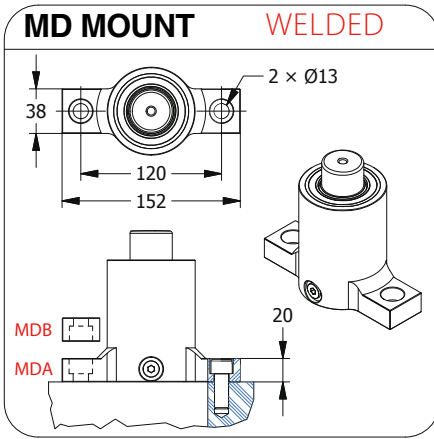


■ Calculation of charging pressure for TSM1500

$$\text{Charging pressure(Bar)} = \frac{\text{Initial Force(N)}}{101.7}$$

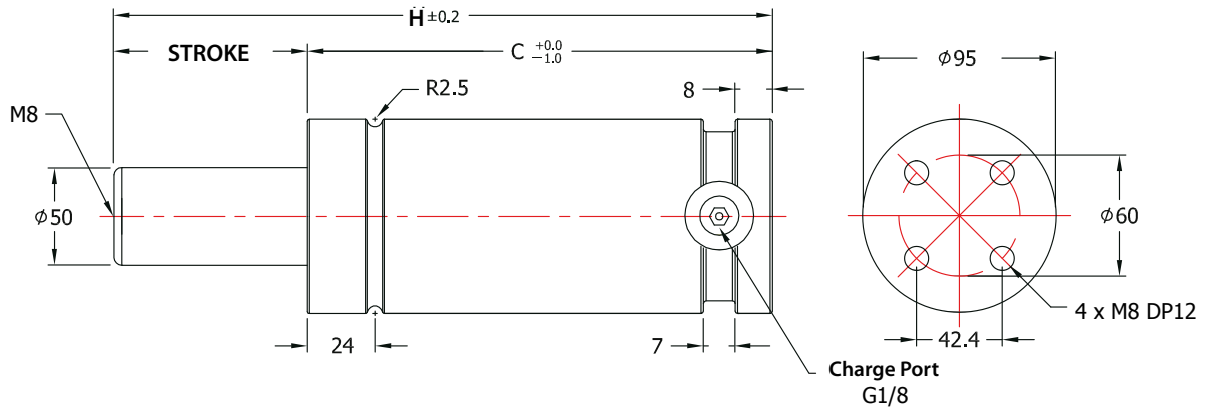
ex) What comes to the charging pressure of gas spring which demands force 12,000N?

$$118(\text{Bar}) = \frac{12,000(\text{N})}{101.7}$$





PED 97/23/2C



HOW TO SPECIFY

GAS SPRING TSP 3000 × 050 S(F) – (MSA) – 150
 MODEL STROKE SELF CONTAINED-S FITTING SYSTEM-F MOUNT CHARGING PRESSURE (Bar)
 MOUNT SP3000
 REPAIR KIT RCM3000

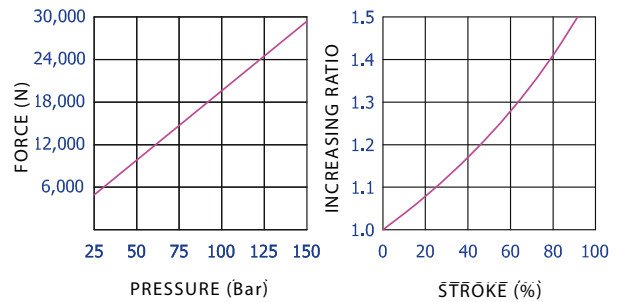
[Caution!] Charging pressure has to be specified. Otherwise, 150Bar will be charged.

TSM 3000							
Stroke		H	C	Force(N) (150 bar / +20°C)		Gas vol. (cm ³)	Weight (kg)
(mm)	(inch)			Initial	End force*		
10	0.39	114	104	29,400	40,800	70.3	4.79
13	0.51	120	107		41,900	85.4	4.96
15	0.59	124	109		42,500	95.5	4.96
20	0.79	134	114		43,600	120.6	5.09
25	0.98	144	119		44,300	145.7	5.29
30	1.18	154	124		44,800	170.8	5.38
35	1.38	164	129		45,200	195.9	5.53
38	1.50	170	132		45,400	211.0	5.62
40	1.57	174	134		45,600	221.1	5.68
45	1.77	184	139		45,800	246.2	5.83
50	1.97	194	144		46,000	271.3	5.98
60	2.36	214	154		46,400	321.5	6.27
63	2.48	220	157		46,400	336.6	6.36
70	2.76	234	164		46,600	371.8	6.57
75	2.95	244	169		46,700	396.9	6.72
80	3.15	254	174		46,800	422.0	7.07
90	3.54	274	184		46,900	472.3	7.40
100	3.94	294	194		47,000	522.5	7.76
125	4.92	344	219		47,300	648.1	8.48
150	5.91	394	244		47,400	773.7	8.93
160	6.30	414	254	47,500	823.9	9.23	
175	6.89	444	269	47,500	899.3	10.11	
200	7.87	494	294	47,600	1024.9	10.41	

* = at full stroke

* Special type is available upon requested.

■ CHARGING PRESSURE/FORCE INCREASE FACTOR

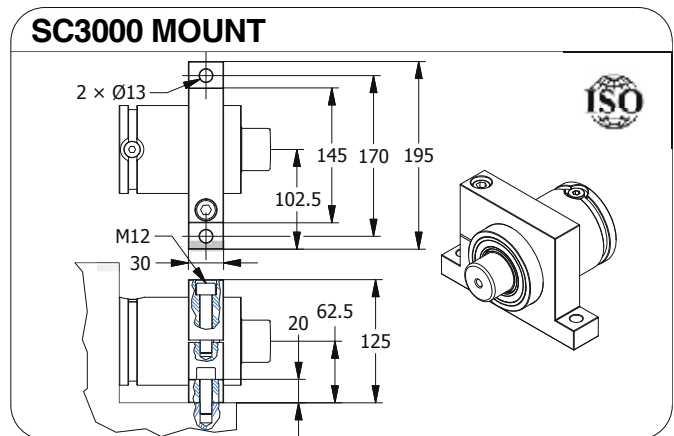
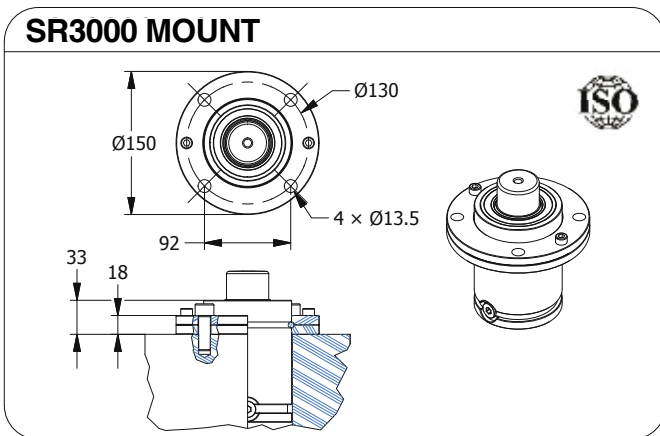
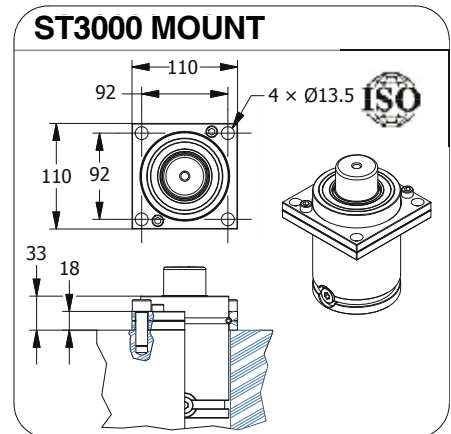
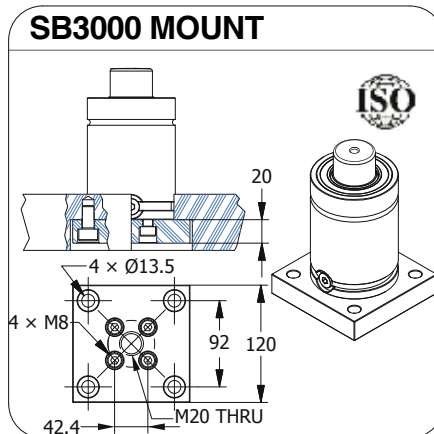
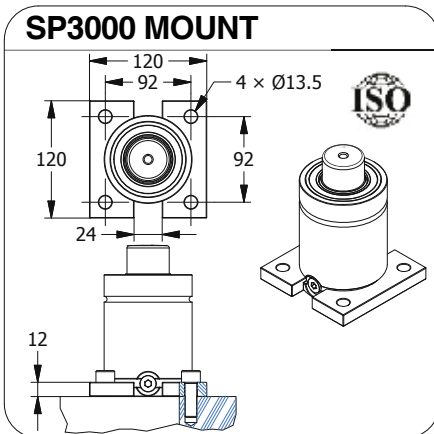
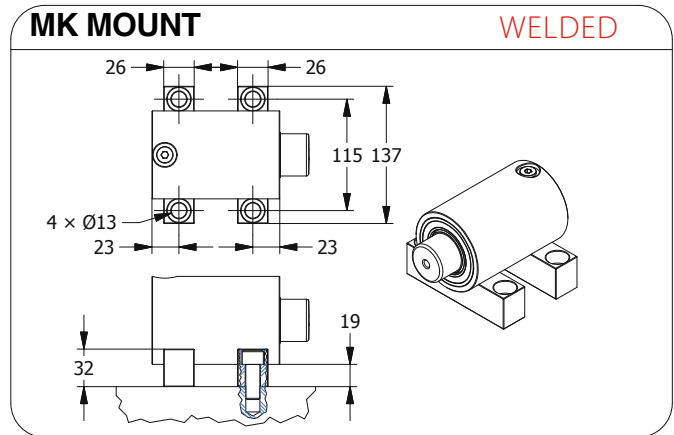
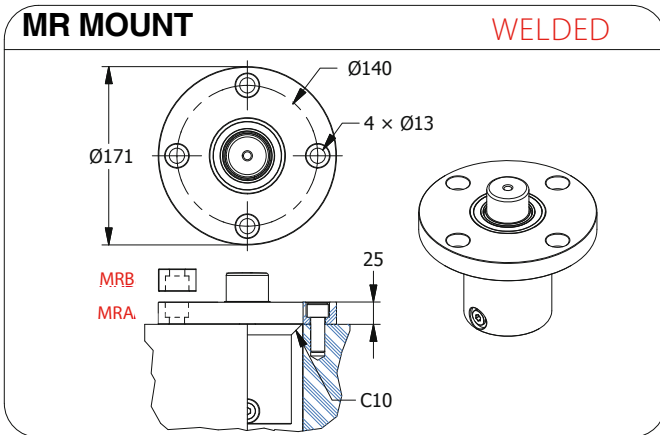
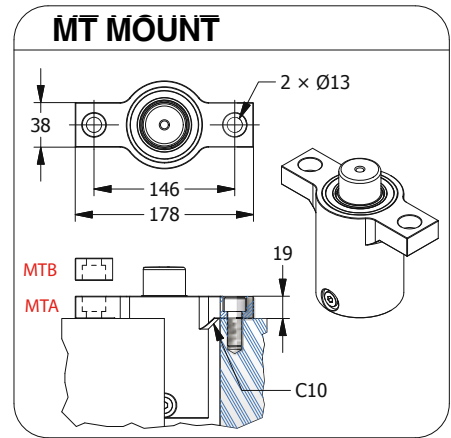
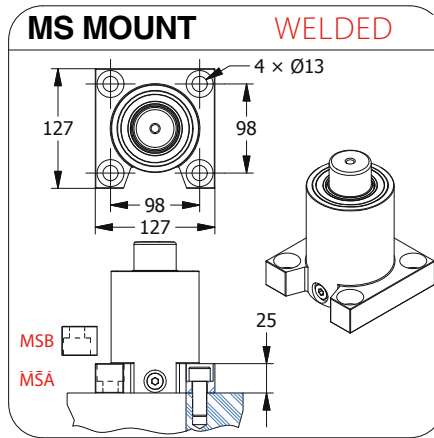
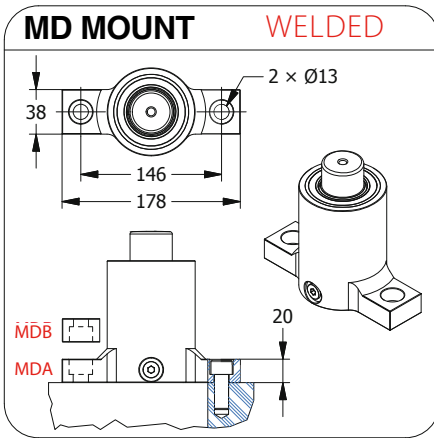


■ Calculation of charging pressure for TSM3000

$$\text{Charging pressure(Bar)} = \frac{\text{Initial Force(N)}}{196.2}$$

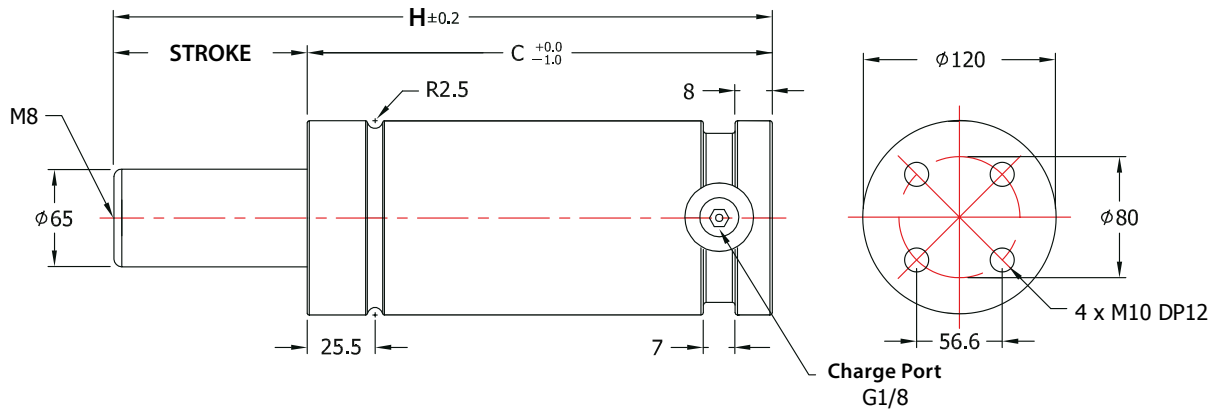
ex) What comes to the charging pressure of gas spring which demands force 25,000N?

$$127(\text{Bar}) = \frac{25,000(\text{N})}{196.2}$$





PED 97/23/2C



HOW TO SPECIFY

GAS SPRING

MOUNT

REPAIR KIT

TSP 5000
MODEL

SP5000

RCM5000

× 050 STROKE
SELF CONTAINED-S FITTING SYSTEM-F

— (MSA) MOUNT

— 150 CHARGING PRESSURE (Bar)

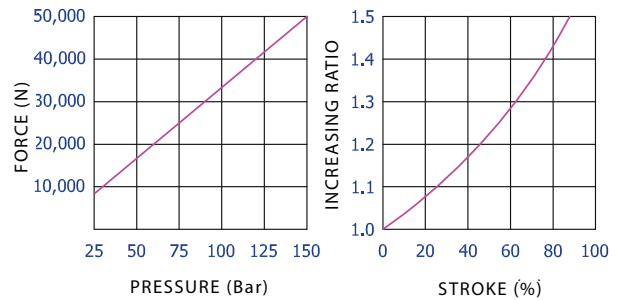
[Caution!] Charging pressure has to be specified. Otherwise, 150Bar will be charged.

TSM 5000							
Stroke		H	C	Force(N) (150 bar / +20°C)		Gas vol. (cm ³)	Weight (kg)
(mm)	(inch)			Initial	End force*		
10	0.39	117	107	49,650	67,400	125.6	7.78
13	0.51	123	110	49,650	69,800	149.2	7.92
15	0.59	127	112	49,650	71,000	164.9	8.01
20	0.79	137	117	49,650	73,500	204.1	8.24
25	0.98	147	122	49,650	75,200	243.4	8.48
30	1.18	157	127	49,650	76,500	282.6	8.71
35	1.38	167	132	49,650	77,600	321.9	8.95
38	1.50	173	135	49,650	78,100	345.4	9.09
40	1.57	177	137	49,650	78,400	361.1	9.18
45	1.77	187	142	49,650	79,100	400.4	9.41
50	1.97	197	147	49,650	79,600	439.6	9.65
60	2.36	217	157	49,650	80,500	518.1	10.11
63	2.48	223	160	49,650	80,700	541.7	10.25
70	2.76	237	167	49,650	81,200	596.6	10.58
75	2.95	247	172	49,650	81,400	635.9	10.81
80	3.15	257	177	49,650	81,700	675.1	11.05
90	3.54	277	187	49,650	82,100	753.6	11.51
100	3.94	297	197	49,650	82,400	832.1	11.98
125	4.92	347	222	49,650	83,100	1028.4	13.15
150	5.91	397	247	49,650	83,500	1224.6	14.32
160	6.30	417	257	49,650	83,600	1303.1	14.79
175	6.89	447	272	49,650	83,800	1420.9	15.49
200	7.87	497	297	49,650	84,100	1617.1	16.65

* = at full stroke

* Special type is available upon requested.

■ CHARGING PRESSURE/FORCE INCREASE FACTOR

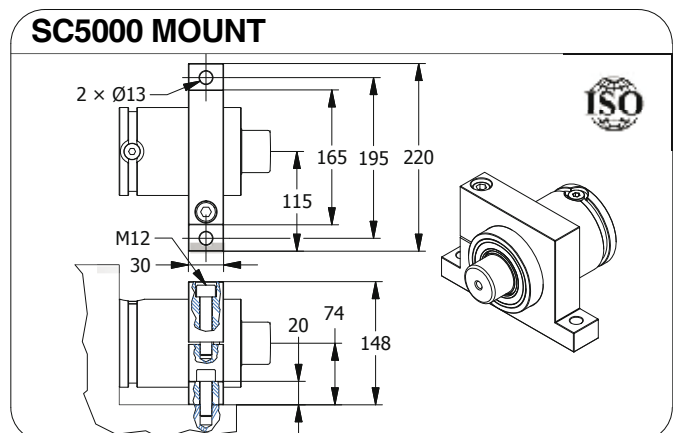
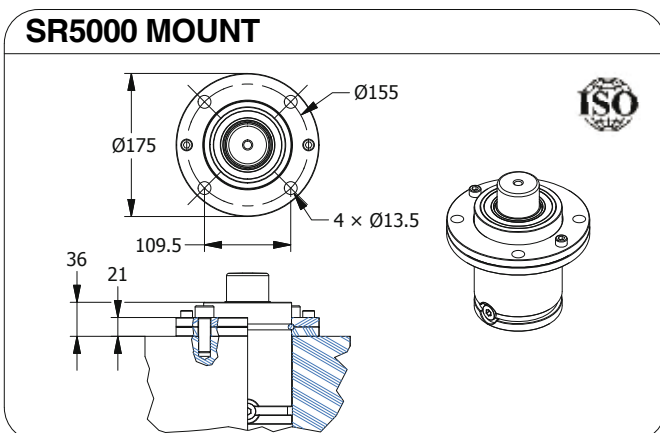
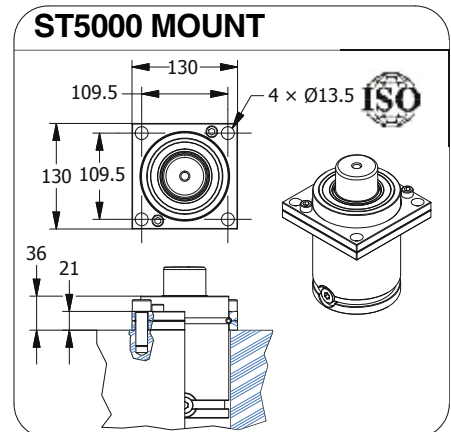
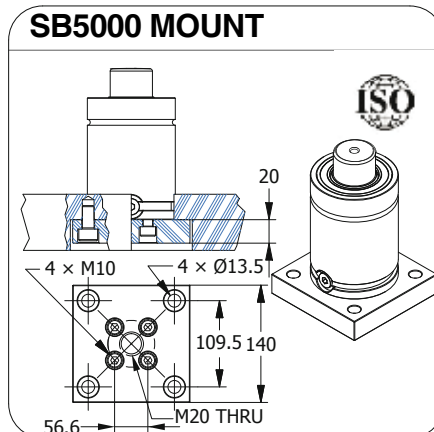
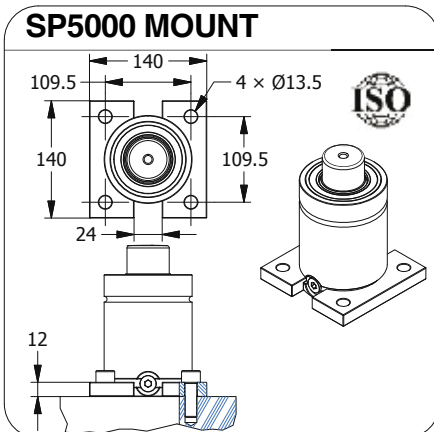
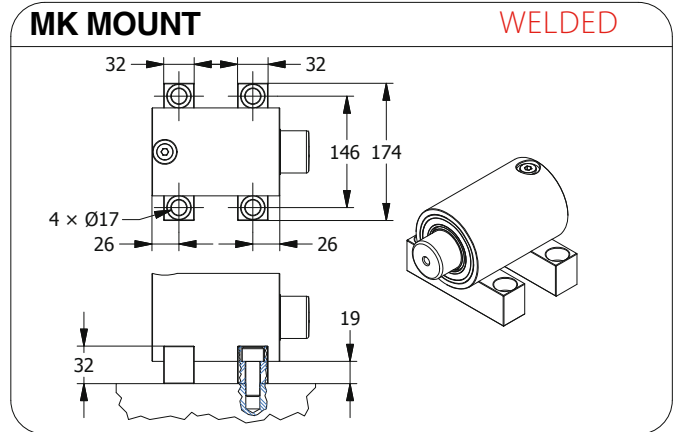
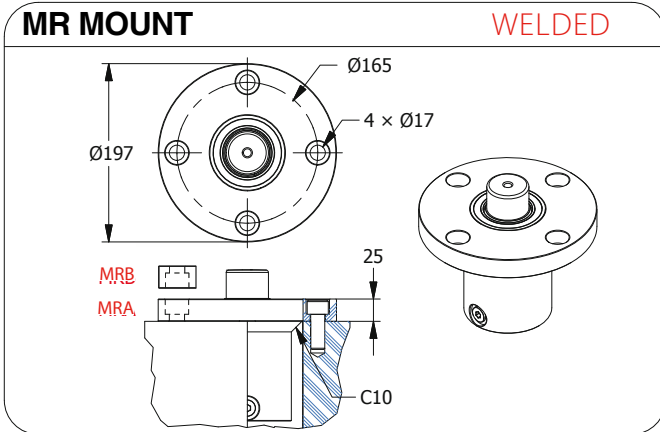
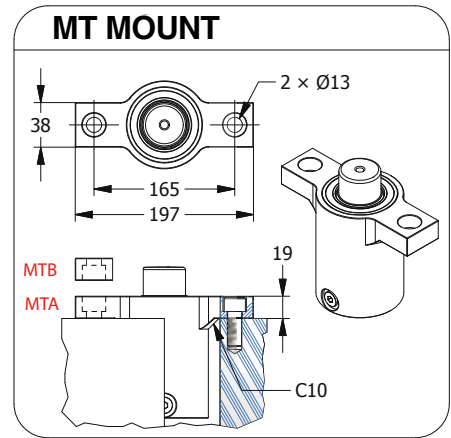
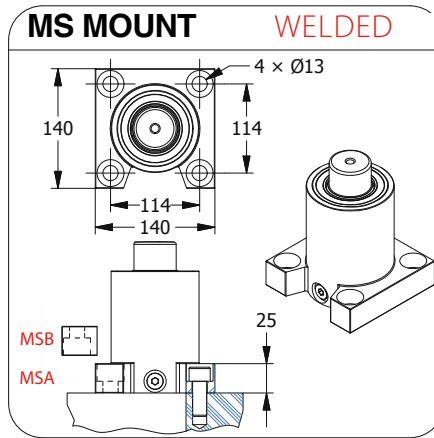
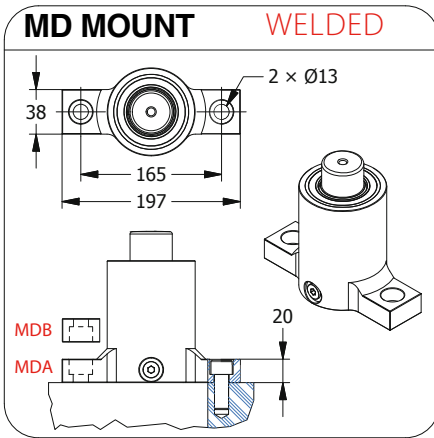


■ Calculation of charging pressure for TSM5000

$$\text{Charging pressure(Bar)} = \frac{\text{Initial Force(N)}}{331.7}$$

ex) What comes to the charging pressure of gas spring which demands force 38,000N?

$$115(\text{Bar}) = \frac{38,000(\text{N})}{331.7}$$



EOC Normalien

TSS Series





CONTENTS

TSM-SERIES

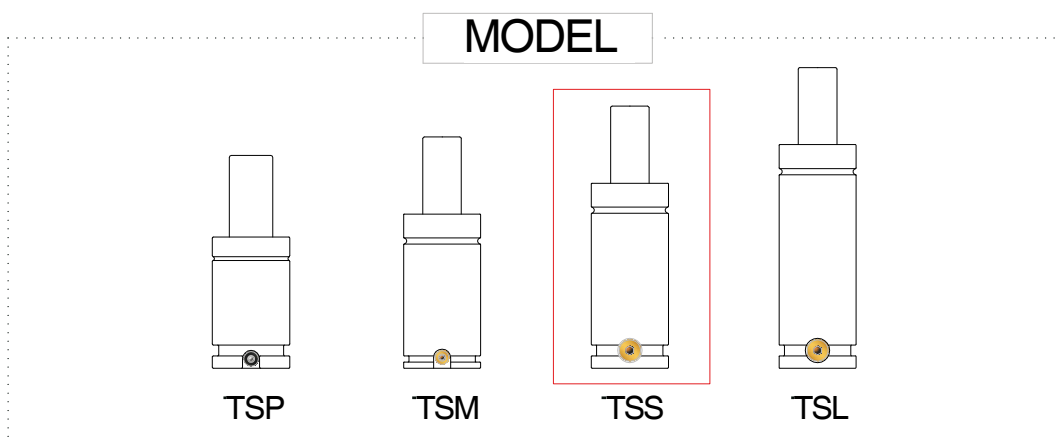
TSS0750

TSS1500

TSS3000

TSS5000

TSS STANDARD



Specification

General Specification

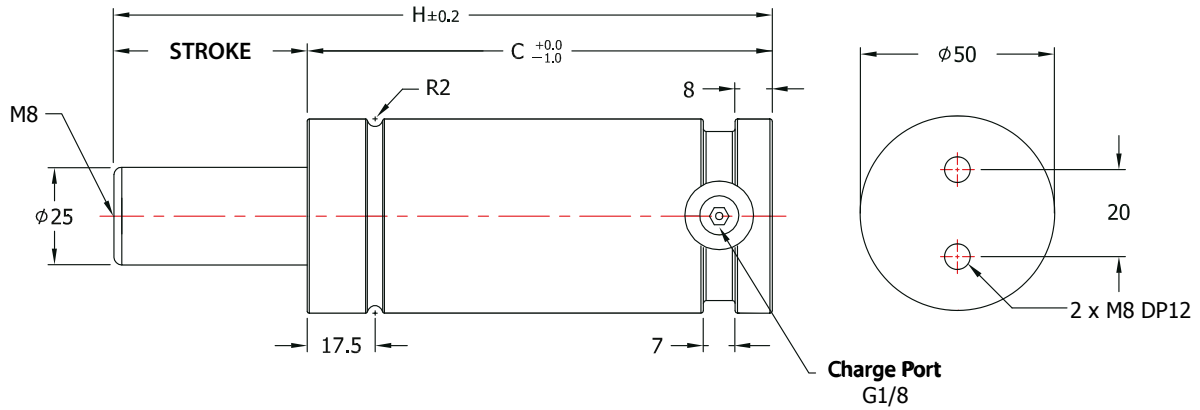
- Filling Materials
Nitrogen GAs(N2)
- Maximum Filling Pressure
150~180 bar (at 20°)
- Minimum Filling Pressure
25 bar (at 20°)
- Operation Temperature
-5 to 80°
- Pressure Increase as per Temperature
±0.3% / °
- Maximum Stroke Rate Per Minute (Recommended)
~50 to 100 (at 20°)
- Piston Rod Speed
0.03~0.8 m/s
- Rod Surface Treatment
Nitrate Coating
- Cylinder Surface Treatment
Oxidized Black Coating

TYPE	Stroke (mm)	Cylinder Diameter Φ(mm)	Rod Φ(mm)	Initial Force (N)	End Force (N)	MAX. Charging Pressure
TSS0750	10~200	50	25	7,350	11,800	150Bar
TSS1500	10~300	75	36	15,150	22,000	150Bar
TSS3000	10~300	95	50	29,400	47,000	150Bar
TSS5000	10~300	120	65	49,650	84,300	150Bar

* The above specification is subject to change without notice for performance improvement.



PED 97/23/2C



HOW TO SPECIFY

GAS SPRING TSM 1500 × 050 S(F) – (MSA) – 150
 MODEL STROKE SELF CONTAINED-S FITTING SYSTEM-F MOUNT CHARGING PRESSURE (Bar)

MOUNT SP0750

REPAIR KIT RCS0750

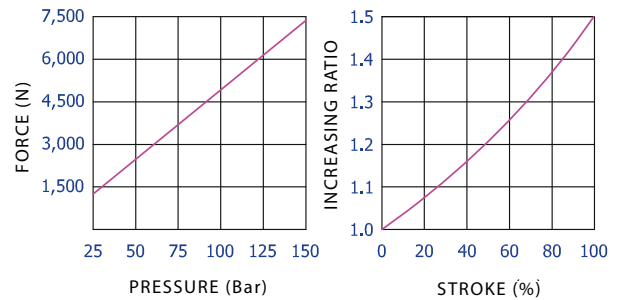
[Caution!] Charging pressure has to be specified. Otherwise, 150Bar will be charged.

TSS 0750							
Stroke		H	C	Force(N) (150 bar / +20°C)		Gas vol. (cm ³)	Weight (kg)
(mm)	(inch)			Initial	End force*		
10	0.39	90	80	7,350	9,500	21.4	1.00
12.7	0.50	95.4	82.7		9,800	24.7	1.00
15	0.59	100	85		10,000	27.6	1.02
20	0.79	110	90		10,300	33.9	1.06
25	0.98	120	95		10,600	40.2	1.12
30	1.18	130	100		10,800	46.5	1.16
35	1.38	140	105		10,900	52.8	1.20
38	1.50	146	108		11,000	56.5	1.24
40	1.57	150	110		11,000	59.0	1.26
45	1.77	160	115		11,100	65.3	1.30
50	1.97	170	120		11,200	71.6	1.36
60	2.36	190	130		11,300	84.2	1.45
63	2.48	196	133		11,300	87.9	1.48
70	2.76	210	140		11,400	96.7	1.52
75	2.95	220	145		11,400	103.0	1.60
80	3.15	230	150		11,500	109.3	1.64
90	3.54	250	160		11,500	121.8	1.74
100	3.94	270	170		11,600	134.4	1.82
125	4.92	320	195		11,700	165.8	2.04
150	5.91	370	220		11,700	197.2	2.30
160	6.30	390	230	11,700	209.8	2.37	
175	6.89	420	245	11,800	228.6	2.52	
200	7.87	470	270	11,800	260.0	2.76	

* = at full stroke

* Special type is available upon requested.

■ CHARGING PRESSURE/FORCE INCREASE FACTOR

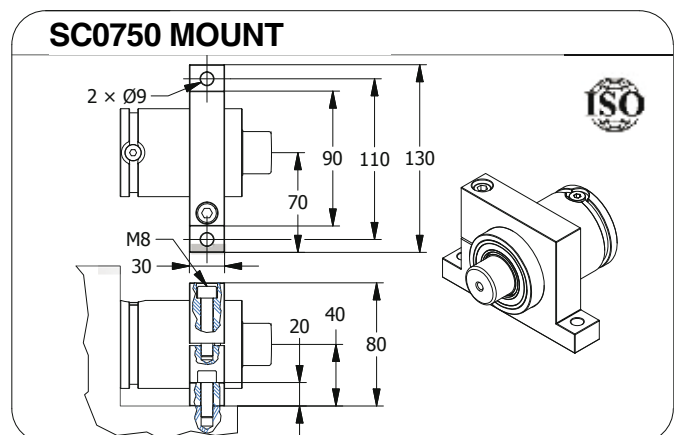
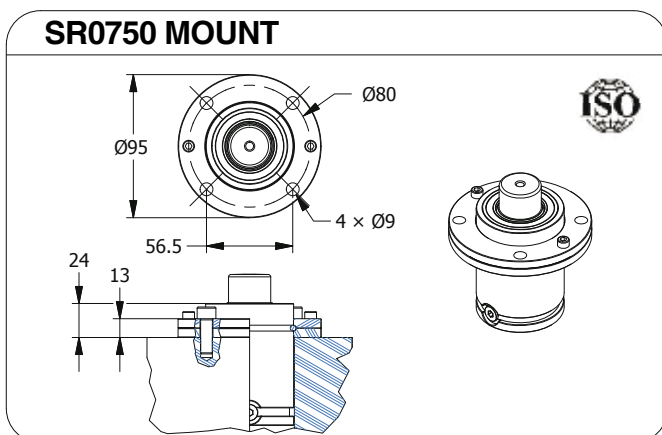
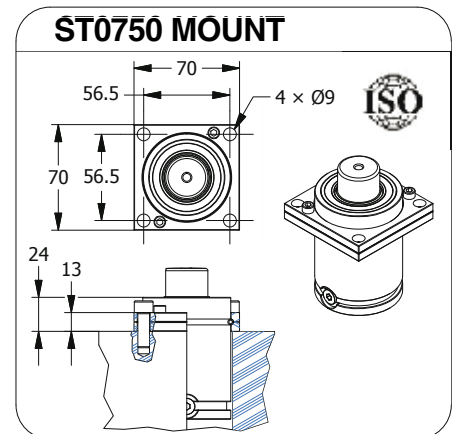
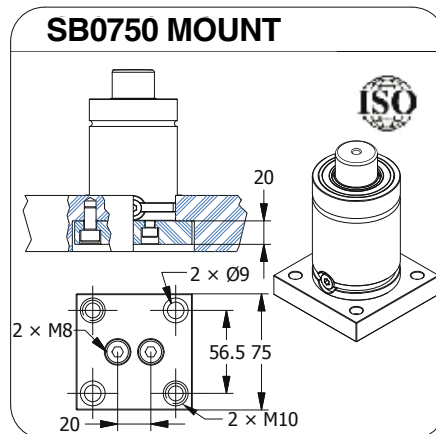
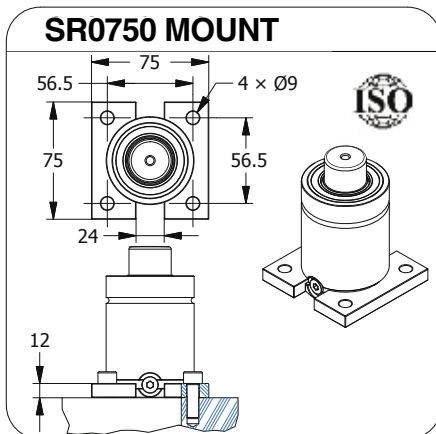
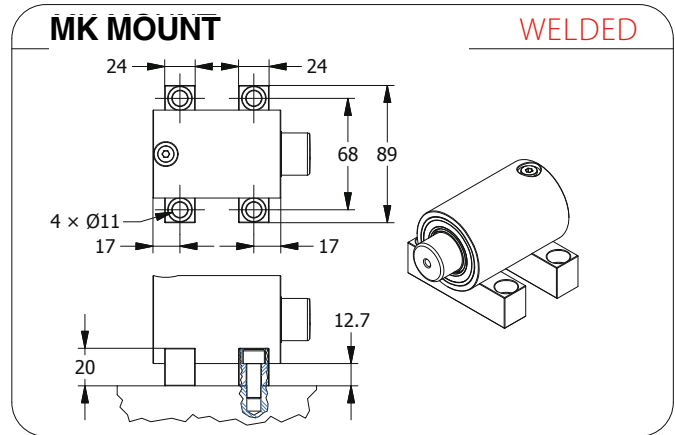
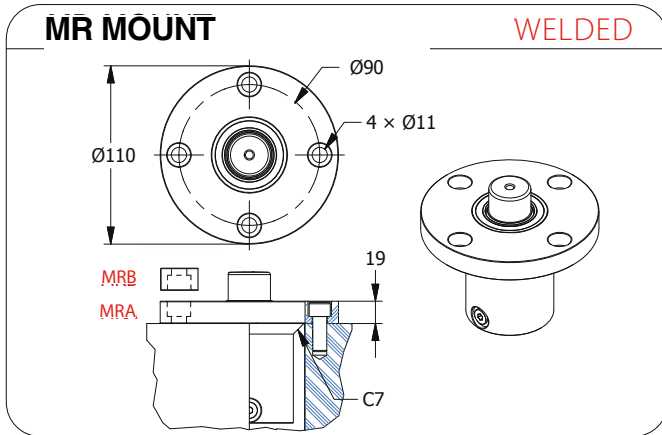
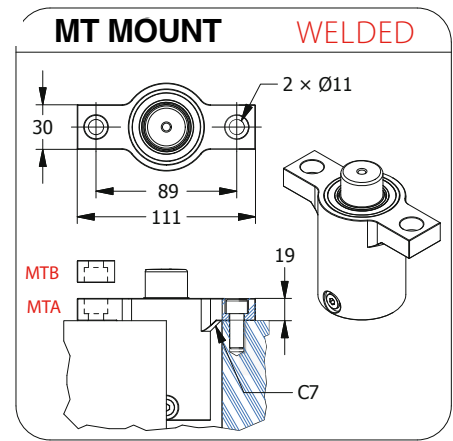
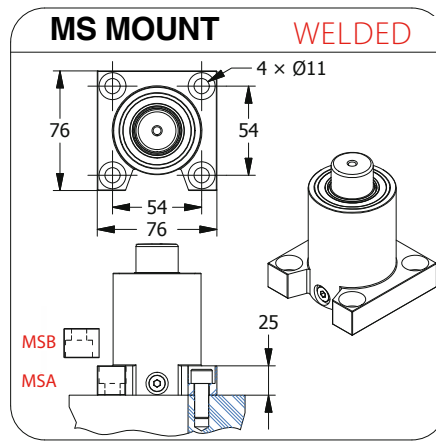
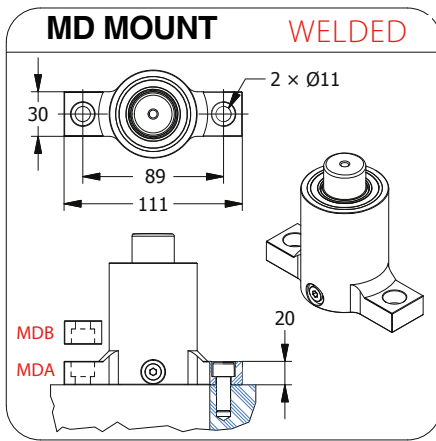


■ Calculation of charging pressure for TSS0750

$$\text{Charging pressure(Bar)} = \frac{\text{Initial Force(N)}}{49.1}$$

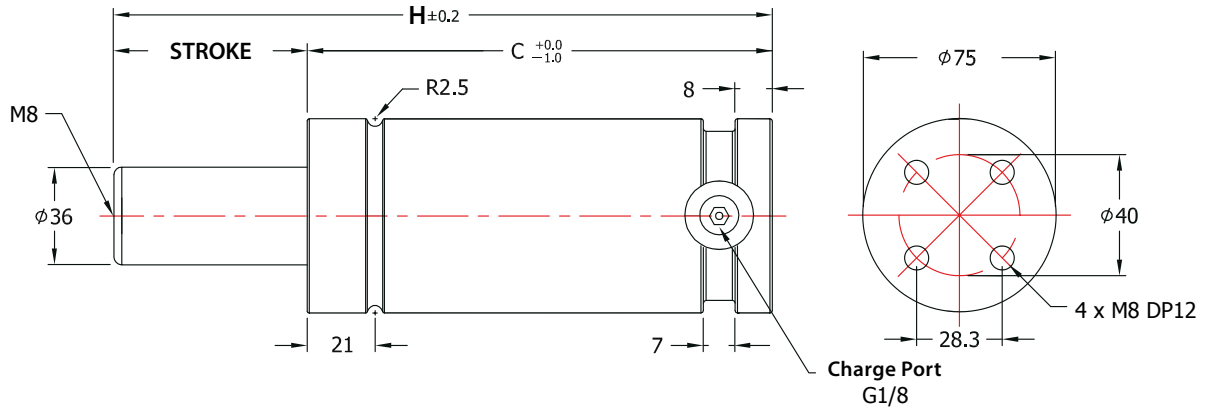
ex) What comes to the charging pressure of gas spring which demands force 6,000N?

$$122(\text{Bar}) = \frac{6,000(\text{N})}{49.1}$$





PED 97/23/2C



HOW TO SPECIFY

GAS SPRING

TSS 1500
MODEL

× 050
STROKE

S(F) —
SELF CONTAINED-S
FITTING SYSTEM-F

(MSA) —
MOUNT

150
CHARGING
PRESSURE
(Bar)

MOUNT

SP1500

REPAIR KIT

RCS1500

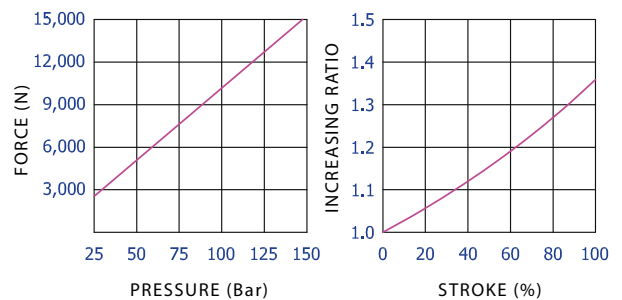
[Caution!] Charging pressure has to be specified. Otherwise, 150Bar will be charged.

TSS 0750							
Stroke		H	C	Force(N) (150 bar / +20°C)		Gas vol. (cm ³)	Weight (kg)
(mm)	(inch)			Initial	End force*		
10	0.39	122	112	17,800	68.5	3.06	
13	0.51	127.4	114.4	18,300	76.0	3.09	
15	0.59	132	117	18,500	84.1	3.13	
20	0.79	142	122	19,000	99.7	3.24	
25	0.98	152	127	19,400	115.3	3.33	
30	1.18	162	132	19,700	130.9	3.42	
35	1.38	172	137	20,000	146.4	3.50	
38	1.50	178	140	20,100	155.8	3.59	
40	1.57	182	142	20,200	162.0	3.62	
45	1.77	192	147	20,400	177.6	3.70	
50	1.97	202	152	20,500	193.2	3.80	
60	2.36	222	162	20,800	224.3	3.99	
63	2.48	228	165	20,800	233.7	4.06	
70	2.76	242	172	20,900	255.5	4.16	
75	2.95	252	177	21,000	271.1	4.28	
80	3.15	262	182	21,100	286.6	4.34	
90	3.54	282	192	21,200	317.8	4.56	
100	3.94	302	202	21,300	349.0	4.73	
125	4.92	352	227	21,500	426.8	5.20	
150	5.91	402	252	21,600	504.7	5.62	
160	6.30	422	262	21,700	535.9	5.80	
175	6.89	452	277	21,700	582.6	6.16	
200	7.87	502	302	21,800	660.5	6.50	
250	9.84	602	352	21,900	816.3	7.39	
300	11.8	702	402	22,000	972.1	8.27	

* = at full stroke

* Special type is available upon requested.

■ CHARGING PRESSURE/FORCE INCREASE FACTOR

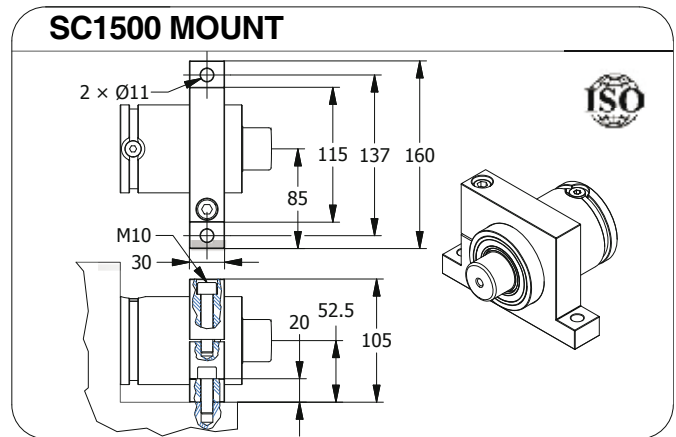
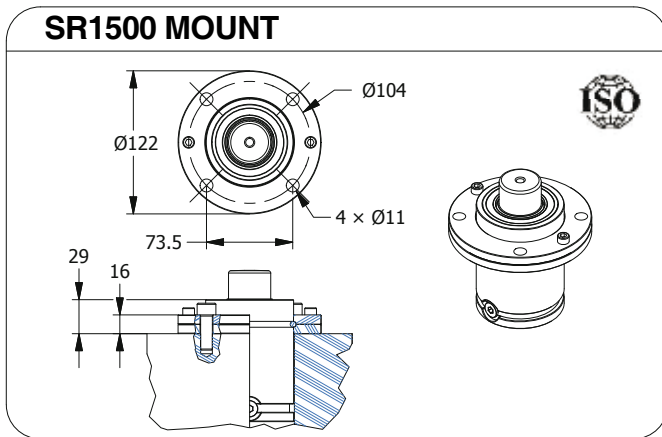
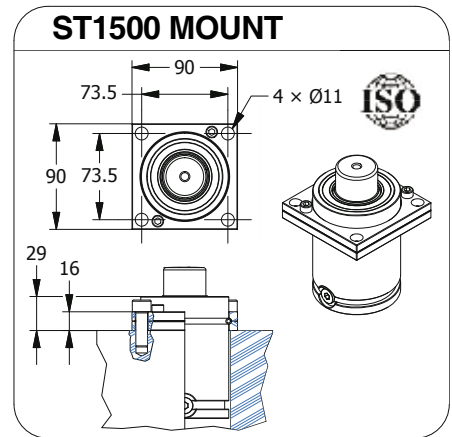
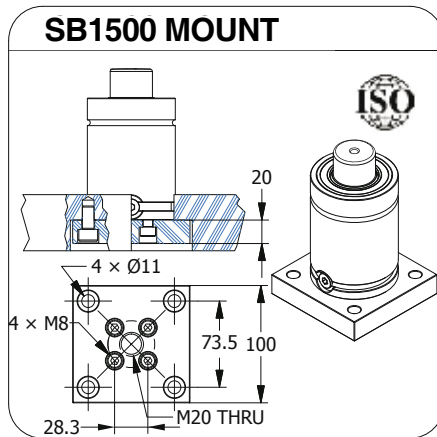
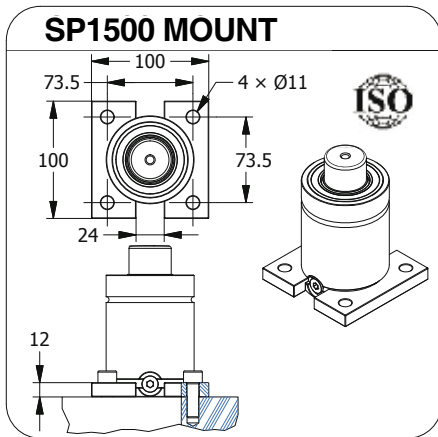
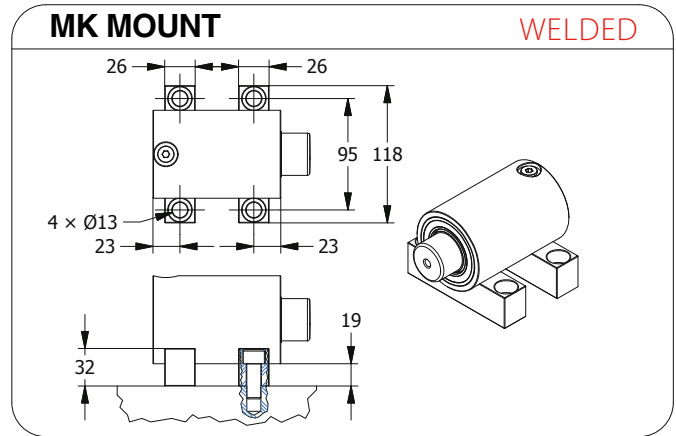
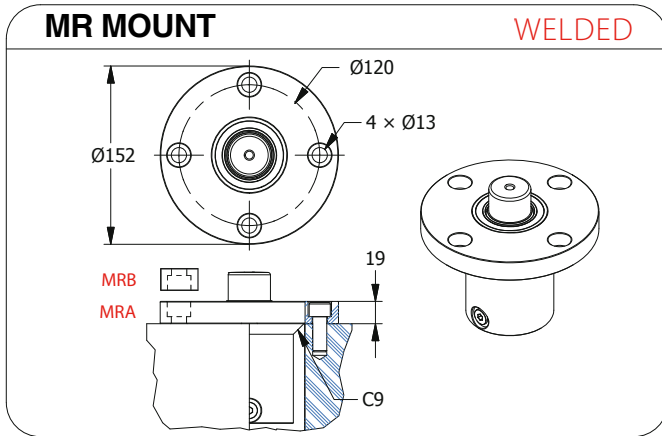
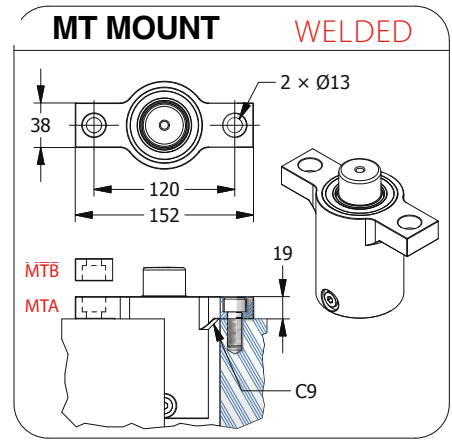
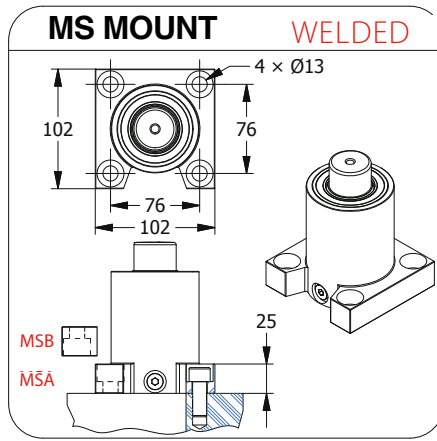
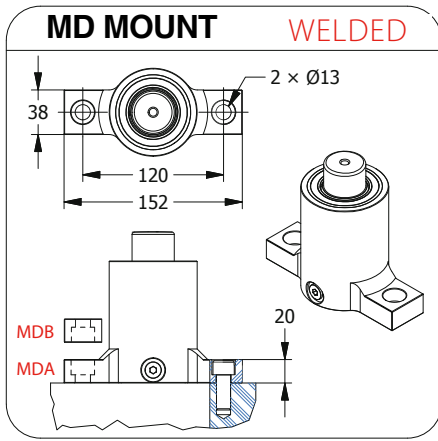


■ Calculation of charging pressure for TSS1500

$$\text{Charging pressure(Bar)} = \frac{\text{Initial Force(N)}}{101.7}$$

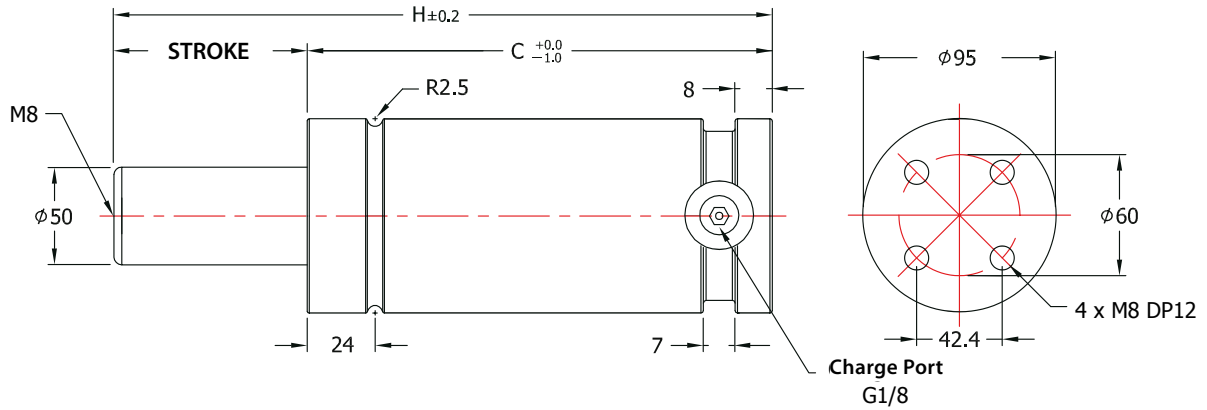
ex) What comes to the charging pressure of gas spring which demands force 12,000N?

$$118(\text{Bar}) = \frac{12,000(\text{N})}{101.7}$$





PED 97/23/2C



HOW TO SPECIFY

GAS SPRING

TSS 3000
MODEL

× 050
STROKE

S(F) —
SELF CONTAINED-S
FITTING SYSTEM-F

(MSA) —
MOUNT

150
CHARGING
PRESSURE
(Bar)

MOUNT

SP3000

REPAIR KIT

RCS3000

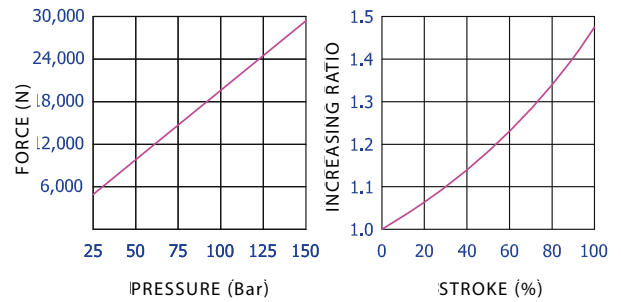
[Caution!] Charging pressure has to be specified. Otherwise, 150Bar will be charged.

TSS 0750							
Stroke		H	C	Force(N) (150 bar / +20°C)		Gas vol. (cm ³)	Weight (kg)
(mm)	(inch)			Initial	End force*		
10	0.39	122	112	29,400	35,700	110.5	5.07
13	0.51	127.5	114.5		37,100	123.1	5.08
15	0.59	132	117		37,500	135.6	5.18
20	0.79	142	122		38,900	160.8	5.38
25	0.98	152	127		39,900	185.9	5.54
30	1.18	162	132		40,800	211.0	5.69
35	1.38	172	137		41,400	236.1	5.85
38	1.50	178	140		41,800	251.2	5.90
40	1.57	182	142		42,000	261.2	5.93
45	1.77	192	147		42,500	286.4	6.16
50	1.97	202	152		42,900	311.5	6.22
60	2.36	222	162		43,600	361.7	6.52
63	2.48	228	165		43,700	376.8	6.70
70	2.76	242	172		44,100	412.0	6.94
75	2.95	252	177		44,300	437.1	7.10
80	3.15	262	182		44,500	462.2	7.26
90	3.54	282	192		44,800	512.4	7.51
100	3.94	302	202		45,100	562.7	7.86
125	4.92	352	227	45,600	688.3	8.66	
150	5.91	402	252	46,000	813.9	9.45	
160	6.30	422	262	46,100	864.1	9.76	
175	6.89	452	277	46,300	939.5	10.23	
200	7.87	502	302	46,500	1065.1	11.01	
250	9.84	602	352	46,800	1316.3	12.53	
300	11.8	702	402	47,000	1567.5	14.14	

* = at full stroke

* Special type is available upon requested.

■ CHARGING PRESSURE/FORCE INCREASE FACTOR

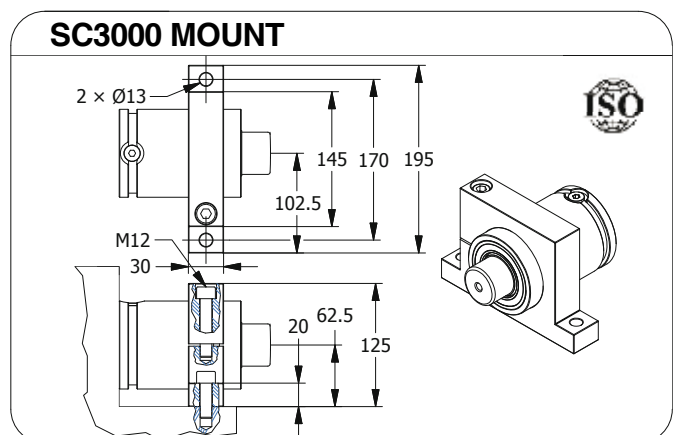
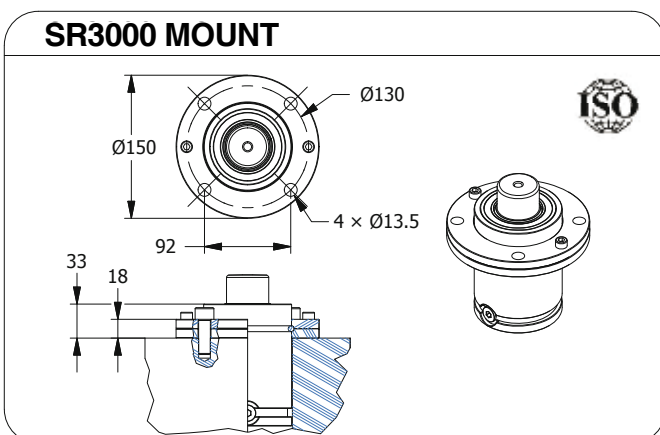
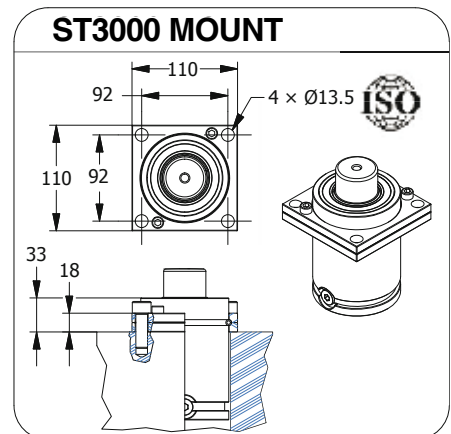
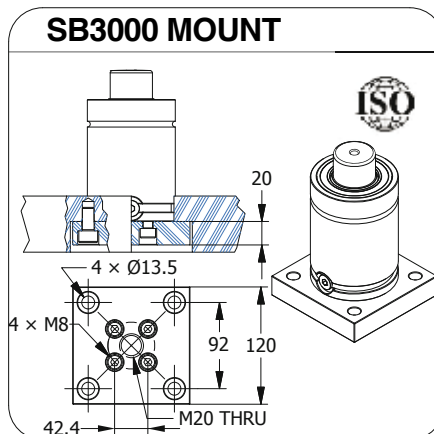
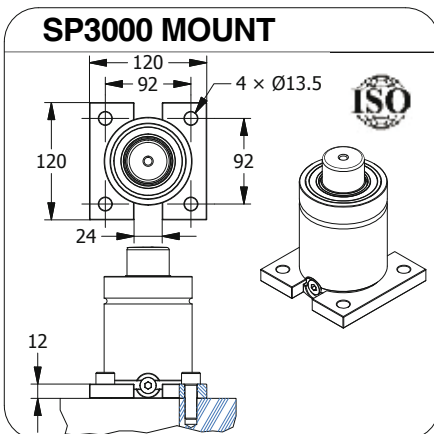
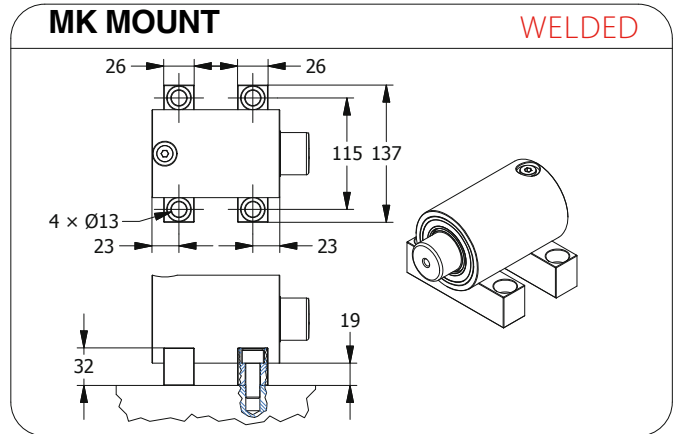
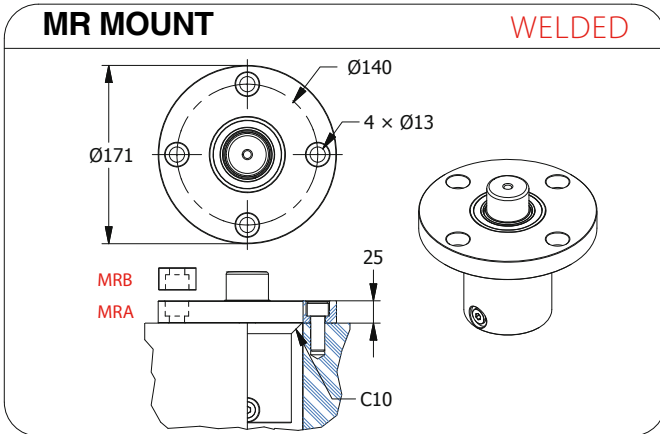
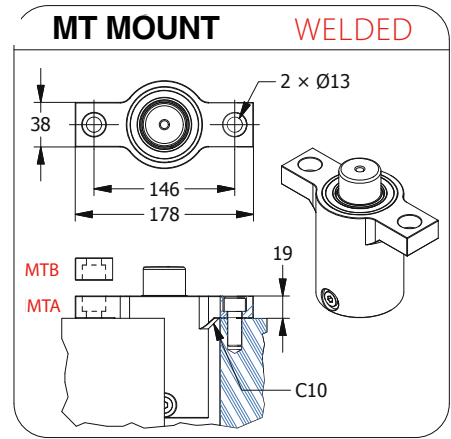
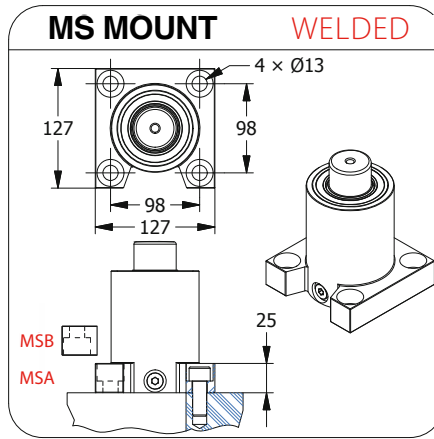
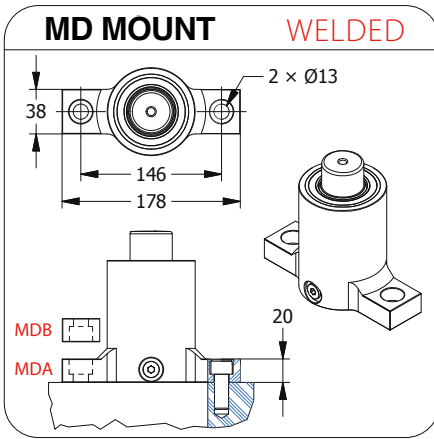


■ Calculation of charging pressure for TSS3000

$$\text{Charging pressure(Bar)} = \frac{\text{Initial Force(N)}}{196.2}$$

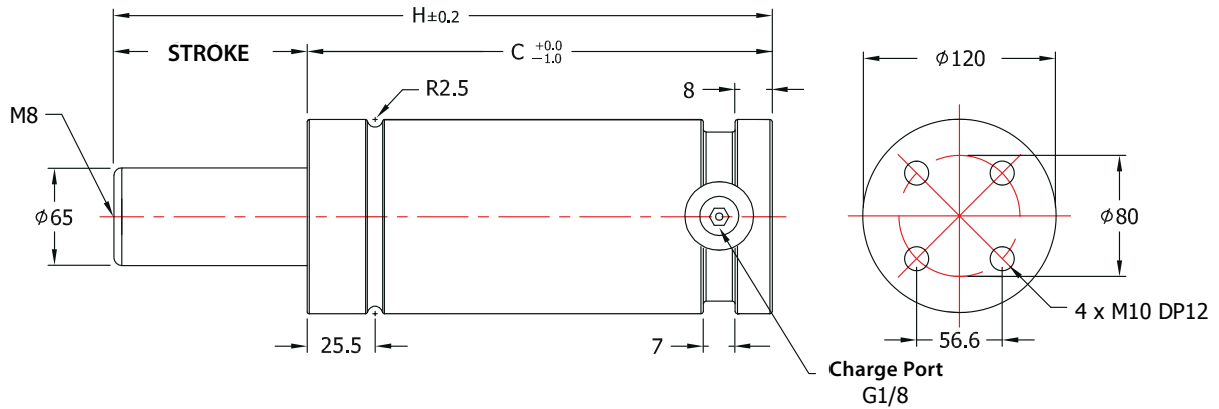
ex) What comes to the charging pressure of gas spring which demands force 25,000N?

$$127(\text{Bar}) = \frac{25,000(\text{N})}{196.2}$$





PED 97/23/2C



HOW TO SPECIFY

GAS SPRING TSS 3000 × 050 S(F) — (MSA) — 150
 MODEL STROKE SELF CONTAINED-S FITTING SYSTEM-F MOUNT CHARGING PRESSURE (Bar)

MOUNT SP5000

REPAIR KIT RCS5000

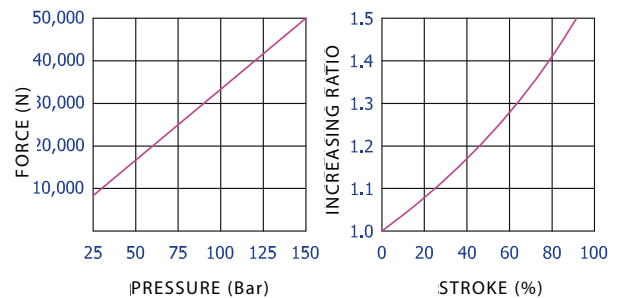
[Caution!] Charging pressure has to be specified. Otherwise, 150Bar will be charged.

TSS 5000							
Stroke		H	C	Force(N) (150 bar / +20°C)		Gas vol. (cm ³)	Weight (kg)
(mm)	(inch)			Initial	End force*		
10	0.39	121.5	111.5	65,400	137.4	8.22	
13	0.51	127.5	114.5	67,800	160.9	8.37	
15	0.59	132	117	68,500	180.6	8.47	
20	0.79	142	122	71,000	219.8	8.72	
25	0.98	152	127	73,000	259.1	9.00	
30	1.18	162	132	74,400	298.3	9.21	
35	1.38	172	137	75,600	337.6	9.68	
38	1.50	178	140	76,200	361.1	9.71	
40	1.57	182	142	76,500	376.8	9.71	
45	1.77	192	147	77,300	416.1	9.95	
50	1.97	202	152	78,000	455.3	10.34	
60	2.36	222	162	79,100	533.8	10.69	
63	2.48	228	165	79,300	557.4	10.84	
70	2.76	242	172	79,900	612.3	11.19	
75	2.95	252	177	80,200	651.6	11.44	
80	3.15	262	182	80,500	690.8	11.97	
90	3.54	282	192	81,000	769.3	12.18	
100	3.94	302	202	81,400	847.8	12.67	
125	4.92	352	227	82,200	1044.1	13.91	
150	5.91	402	252	82,800	1240.3	15.14	
160	6.30	422	262	83,000	1318.8	15.63	
175	6.89	452	277	83,200	1436.6	16.38	
200	7.87	502	302	83,500	1632.8	17.61	
250	9.84	602	352	84,000	2025.3	20.08	
300	11.81	702	402	84,300	2417.8	22.55	

* = at full stroke

* Special type is available upon requested.

■ CHARGING PRESSURE/FORCE INCREASE FACTOR

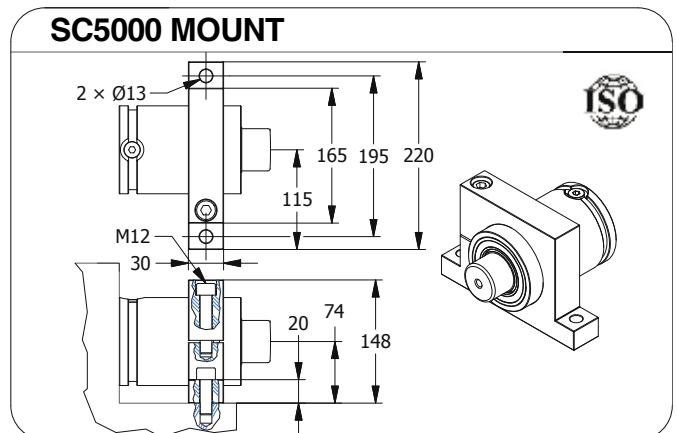
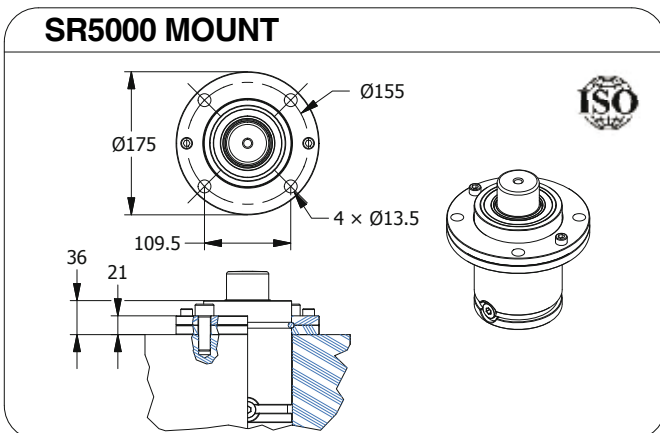
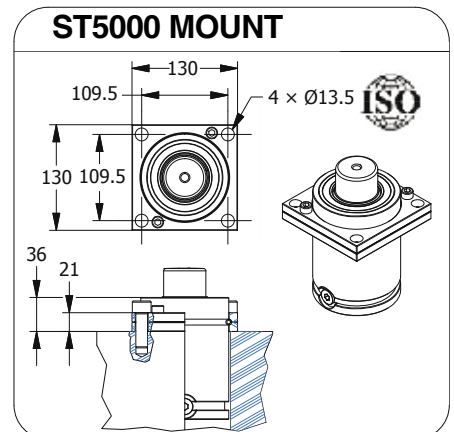
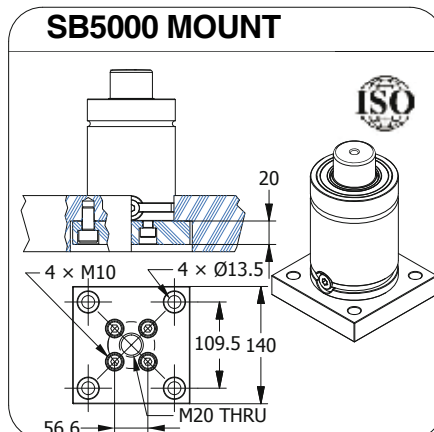
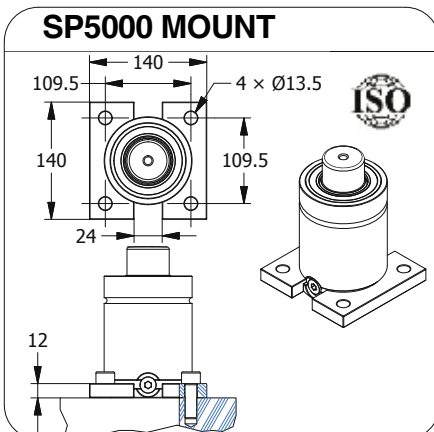
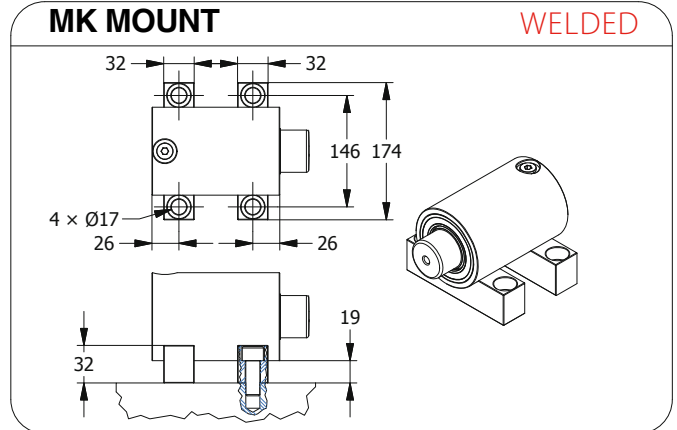
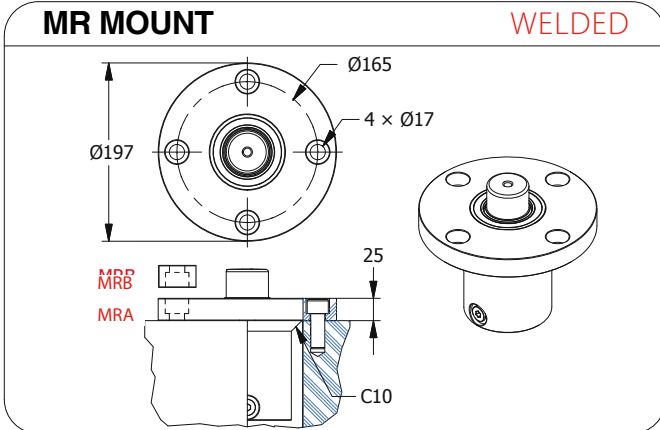
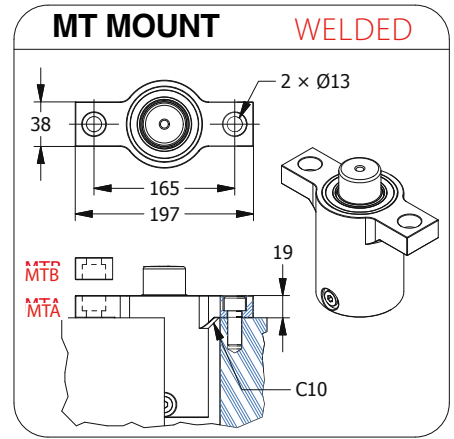
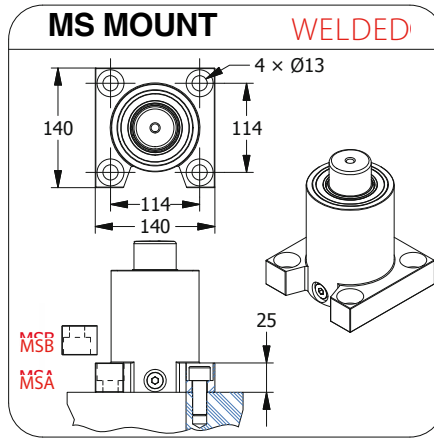
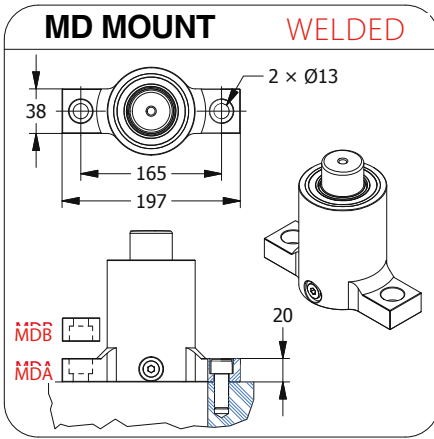


■ Calculation of charging pressure for TSS5000

$$\text{Charging pressure(Bar)} = \frac{\text{Initial Force(N)}}{331.7}$$

ex) What comes to the charging pressure of gas spring which demands force 38,000N?

$$115(\text{Bar}) = \frac{38,000(\text{N})}{331.7}$$



EOC Normalien

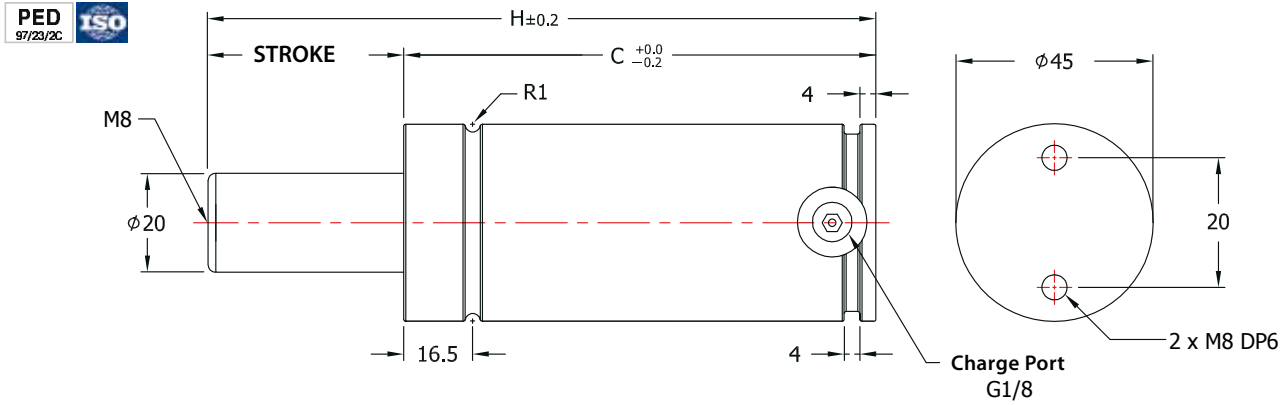
TSL Series



PED
97/23/EC



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HOW TO SPECIFY

GAS SPRING TSL0500 × 050 S(F) — 150
 MODEL STROKE SELF CONTAINED-S CHARGING
 FITTING SYSTEM-F PRESSURE
 (Bar)

MOUNT SP0500

REPAIR KIT RCL0500

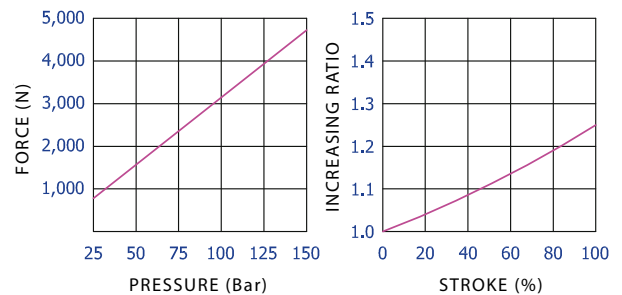
[Caution!] Charging pressure has to be specified. Otherwise, 150Bar will be charged.

TSL0500								
Stroke		H	C	Force(N) (150 bar / +20°C)		Gas vol. (cm ³)	Weight (kg)	
(mm)	(inch)			Initial	End force*			
10	0.39	105	95	4,650	5,100	33.9	0.89	
15	0.59	115	100		5,300	39.2	0.94	
20	0.79	125	105		5,400	44.6	0.98	
25	0.98	135	110		5,500	50.0	0.98	√
30	1.18	145	115		5,600	55.3	1.10	
35	1.38	155	120		5,700	60.7	1.13	
38	1.50	161	123		5,700	63.9	1.16	
40	1.57	165	125		5,700	66.1	1.16	
45	1.77	175	130		5,800	71.5	1.19	
50	1.97	185	135		5,800	76.8	1.21	√
60	2.36	205	145		5,900	87.6	1.23	
63	2.48	211	148		5,900	90.8	1.25	
70	2.76	225	155		6,000	98.3	1.31	
80	3.15	245	165		6,000	109.1	1.38	√
90	3.54	265	175		6,100	119.8	1.45	
100	3.94	285	185		6,100	130.6	1.51	
110	4.33	305	195	6,100	141.3	1.58		
120	4.72	325	205	6,200	152.1	1.64		
125	4.92	335	210	6,200	157.4	1.67		
160	6.30	405	245	6,200	195.1	1.89		

* = at full stroke

* Special type is available upon requested.

■ CHARGING PRESSURE/FORCE INCREASE FACTOR



■ Calculation of charging pressure for TSL0500

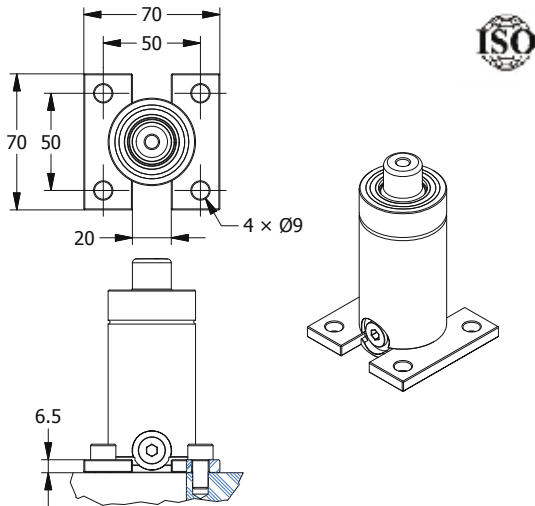
$$\text{Charging pressure(Bar)} = \frac{\text{Initial Force(N)}}{31.4}$$

ex) What comes to the charging pressure of gas spring which demands force 4,000N?

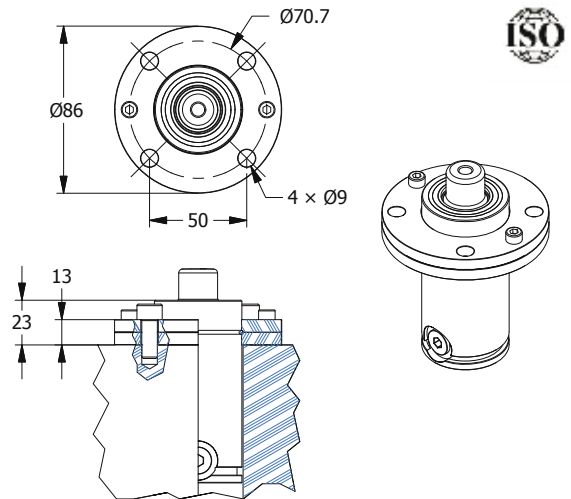
$$127(\text{Bar}) = \frac{4,000(\text{N})}{31.4}$$



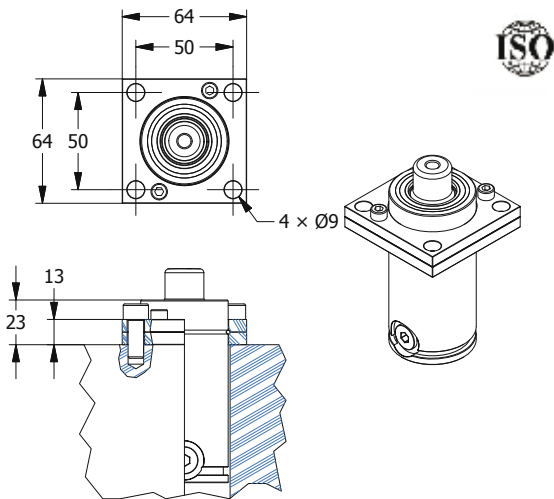
SP0500 MOUNT



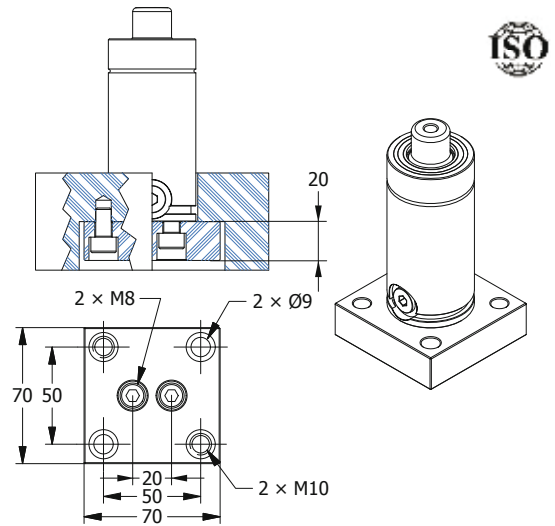
SR0500 MOUNT



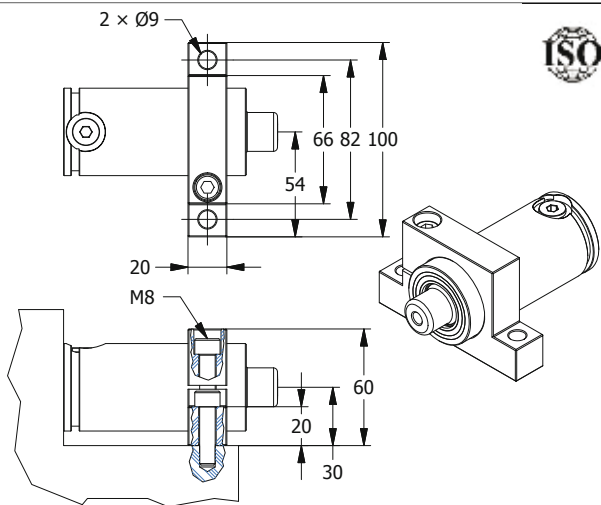
ST0500 MOUNT

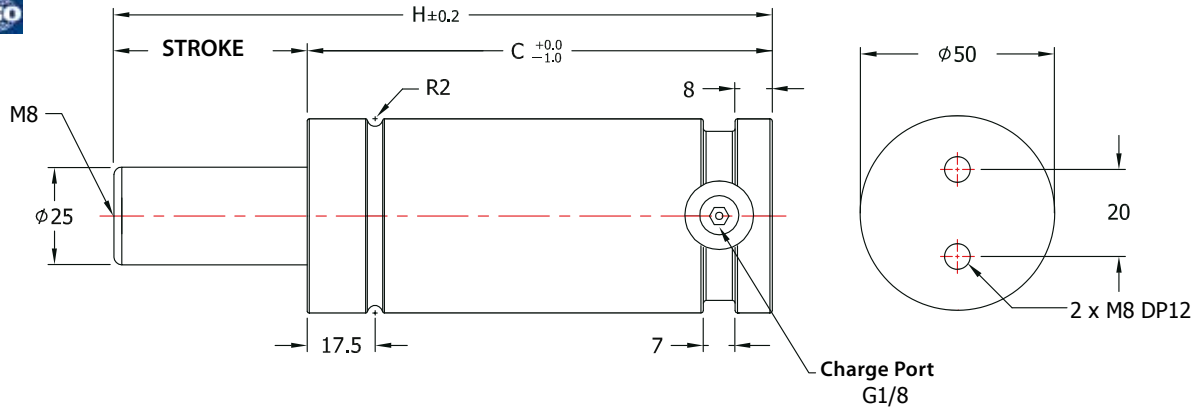


SB0500 MOUNT



SC0500 MOUNT





HOW TO SPECIFY

GAS SPRING TSL0750 × 050 S(F) — (MSA) — 150
 MODEL STROKE SELF CONTAINED-S FITTING SYSTEM-F MOUNT CHARGING PRESSURE (Bar)

MOUNT SP0750

REPAIR KIT RCL0750

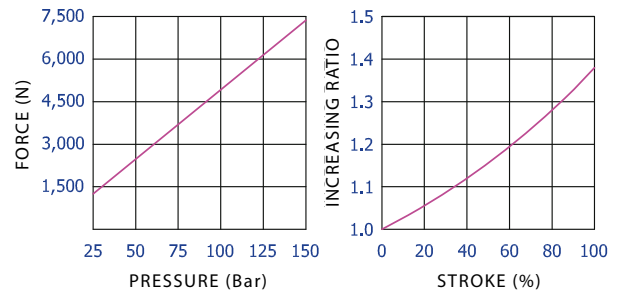
[Caution!] Charging pressure has to be specified. Otherwise, 150Bar will be charged.

TSL 0750								
Stroke		H	C	Force(N) (150 bar / +20°C)		Gas vol. (cm ³)	Weight (kg)	ISO
(mm)	(inch)			Initial	End force*			
10	0.39	115	105	8,400	8,400	40.2	1.32	
12.7	0.50	120.4	107.7	8,600	8,600	43.6	1.34	
15	0.59	125	110	8,700	8,700	46.5	1.35	
20	0.79	135	115	9,000	9,000	52.8	1.40	
25	0.98	145	120	9,300	9,300	59.0	1.44	√
30	1.18	155	125	9,500	9,500	65.3	1.50	
35	1.38	165	130	9,700	9,700	71.6	1.54	
38	1.50	171	133	9,800	9,800	75.4	1.58	
40	1.57	175	135	9,800	9,800	77.9	1.59	
45	1.77	185	140	10,000	10,000	84.2	1.64	
50	1.97	195	145	10,100	10,100	90.4	1.68	√
60	2.36	215	155	10,300	10,300	103.0	1.78	
63	2.48	222	158	10,300	10,300	106.8	1.82	
70	2.76	235	165	10,500	10,500	115.6	1.87	
75	2.95	245	170	10,500	10,500	121.8	1.91	
80	3.15	255	175	10,600	10,600	128.1	1.98	√
90	3.54	275	185	10,700	10,700	140.7	2.06	
100	3.94	295	195	10,800	10,800	153.2	2.14	√
125	4.92	345	220	11,000	11,000	184.6	2.30	√
150	5.91	395	245	11,100	11,100	216.0	2.61	
160	6.30	415	255	11,200	11,200	228.6	2.72	√
175	6.89	445	270	11,200	11,200	247.4	2.84	
200	7.87	495	295	11,300	11,300	278.8	3.08	
250	9.84	595	345	11,500	11,500	341.6	3.60	
300	11.81	695	395	11,500	11,500	404.4	4.07	

* = at full stroke

* Special type is available upon requested.

■ CHARGING PRESSURE/FORCE INCREASE FACTOR

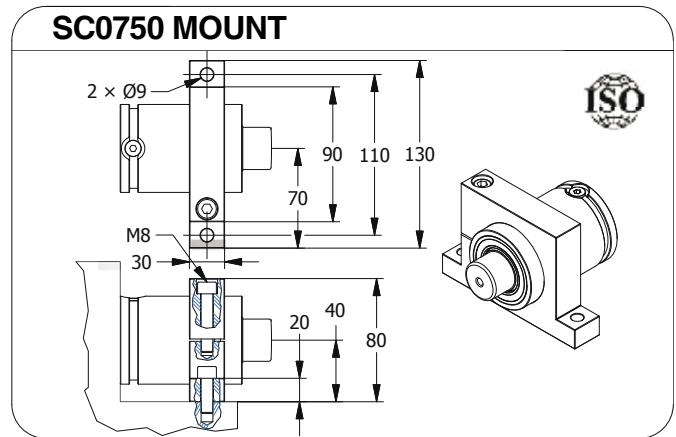
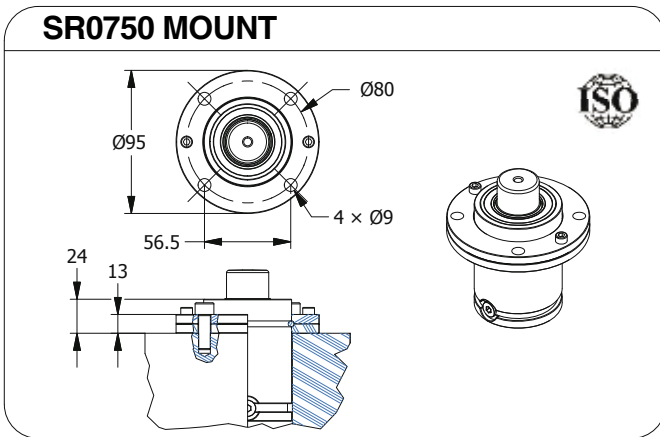
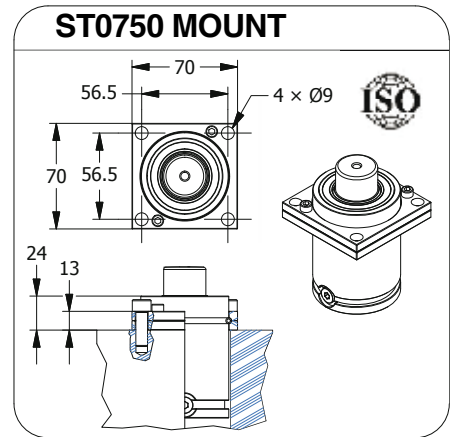
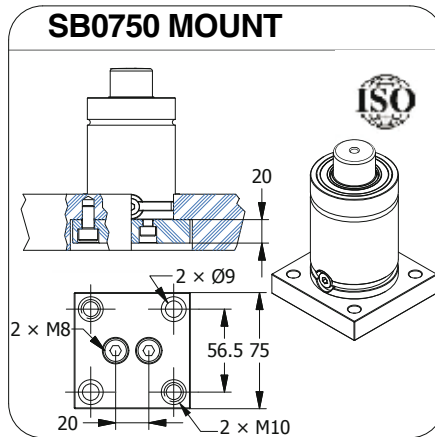
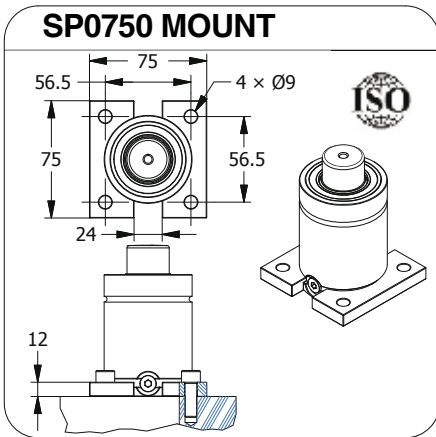
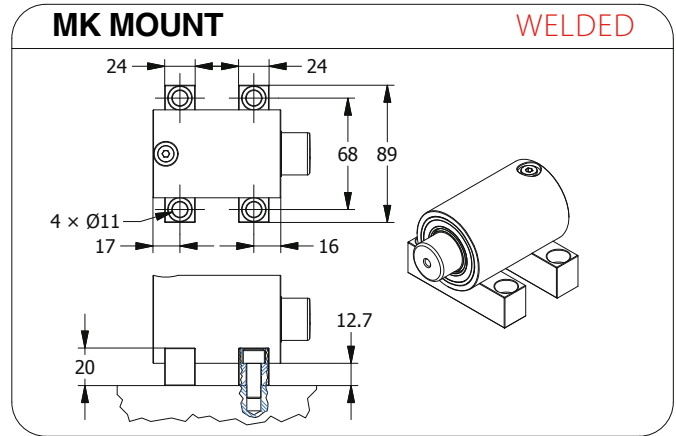
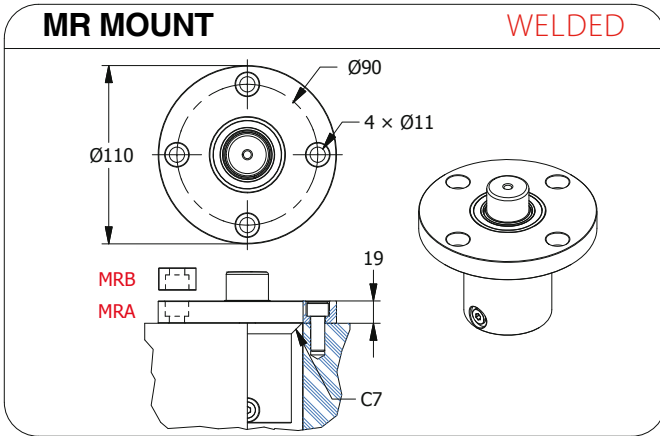
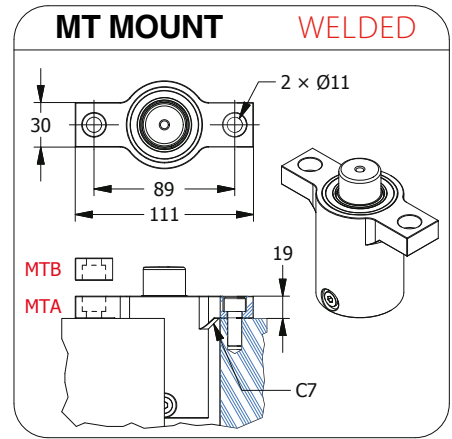
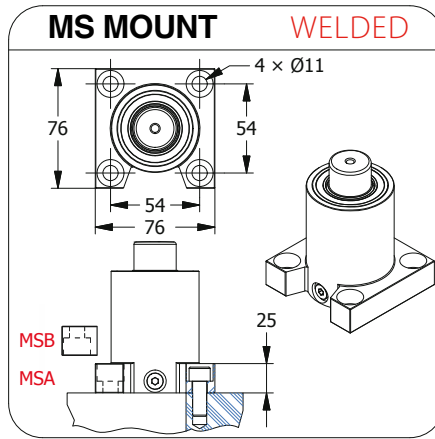
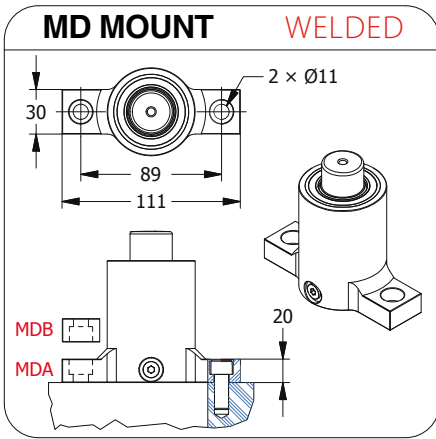


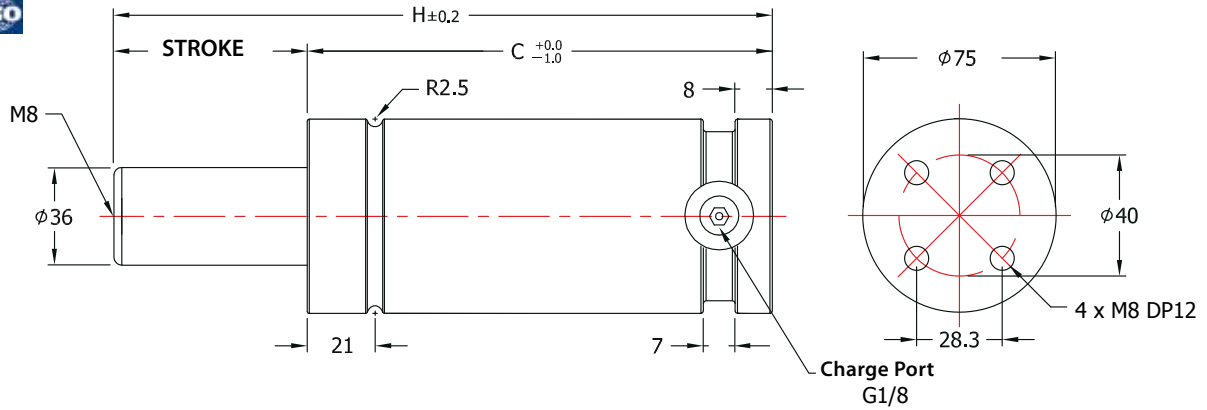
■ Calculation of charging pressure for TSL0750

$$\text{Charging pressure(Bar)} = \frac{\text{Initial Force(N)}}{49.1}$$

ex) What comes to the charging pressure of gas spring which demands force 6,000N?

$$122(\text{Bar}) = \frac{6,000(\text{N})}{49.1}$$





HOW TO SPECIFY

GAS SPRING TSL1500 × 050 S(F) — (MSA) — 150
 MODEL STROKE SELF CONTAINED-S FITTING SYSTEM-F MOUNT CHARGING PRESSURE (Bar)

MOUNT SP1500

REPAIR KIT RCL1500

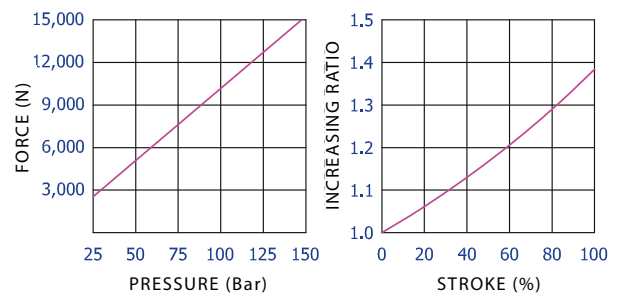
[Caution!] Charging pressure has to be specified. Otherwise, 150Bar will be charged.

TSL 1500								
Stroke		H	C	Force(N) (150 bar / +20°C)		Gas vol. (cm ³)	Weight (kg)	ISO
(mm)	(inch)			Initial	End force*			
10	0.39	130	120	18,500	56.1	3.40		
13	0.51	135.4	122.4	19,100	63.6	3.45		
15	0.59	140	125	19,200	71.7	3.48		
20	0.79	150	130	19,700	87.2	3.58		
25	0.98	160	135	20,100	102.8	3.66	√	
30	1.18	170	140	20,400	118.4	3.78		
35	1.38	180	145	20,600	134.0	3.86		
38	1.50	186	148	20,700	143.3	3.92		
40	1.57	190	150	20,800	149.6	4.00		
45	1.77	200	155	20,900	165.1	4.04		
50	1.97	210	160	21,000	180.7	4.16	√	
60	2.36	230	170	21,200	211.9	4.36		
63	2.48	237	174	21,100	224.3	4.40		
70	2.76	250	180	21,400	243.0	4.47		
75	2.95	260	185	21,400	258.6	4.60		
80	3.15	270	190	21,500	274.2	4.67	√	
90	3.54	290	200	21,600	305.3	4.85		
100	3.94	310	210	21,600	336.5	5.03	√	
125	4.92	360	235	21,800	414.4	5.47	√	
150	5.91	410	260	21,900	492.3	5.92		
160	6.30	430	270	21,900	523.4	6.22	√	
175	6.89	460	285	22,000	570.2	6.37		
200	7.87	510	310	22,000	648.1	6.82		
250	9.84	610	360	22,100	803.8	7.90		
300	11.81	710	410	22,100	959.6	8.68		

* = at full stroke

* Special type is available upon requested.

■ CHARGING PRESSURE/FORCE INCREASE FACTOR

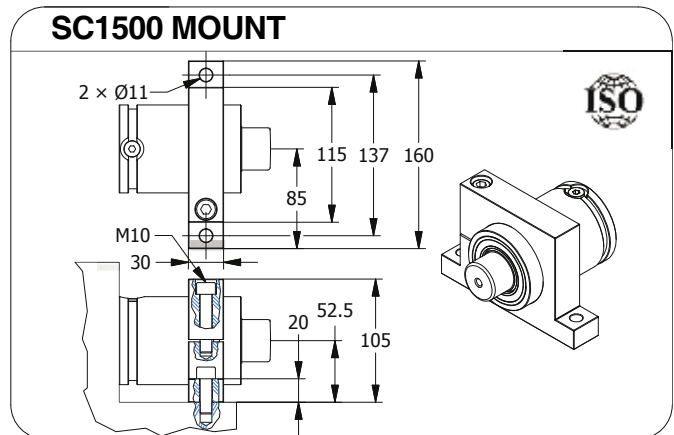
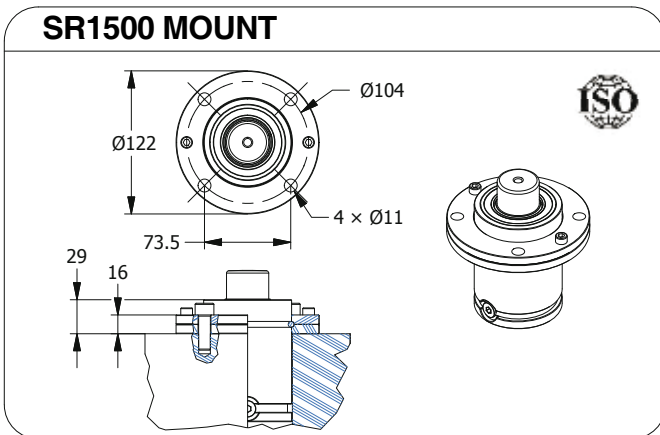
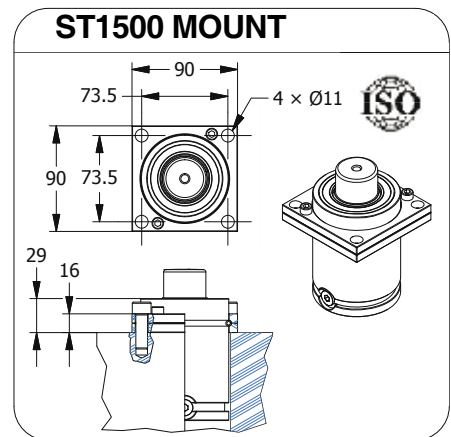
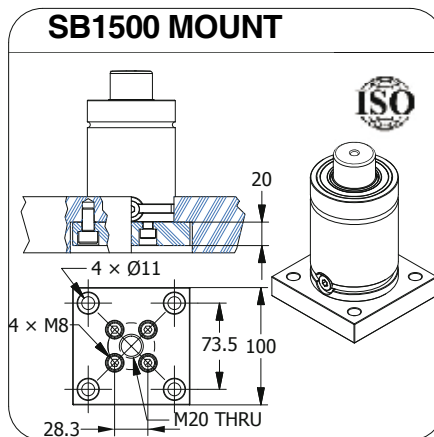
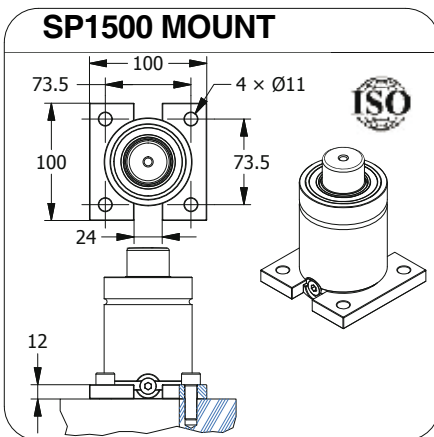
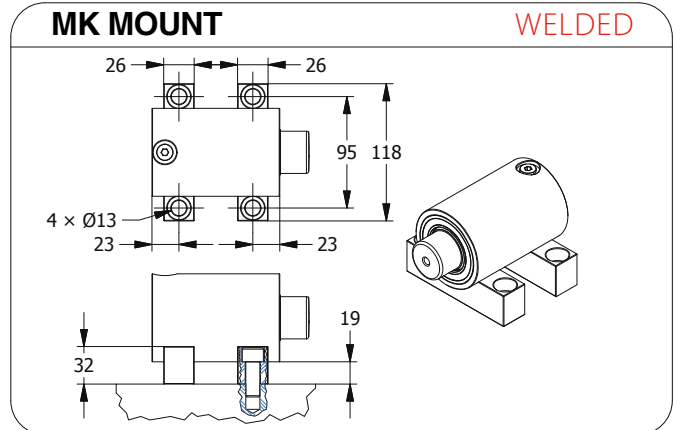
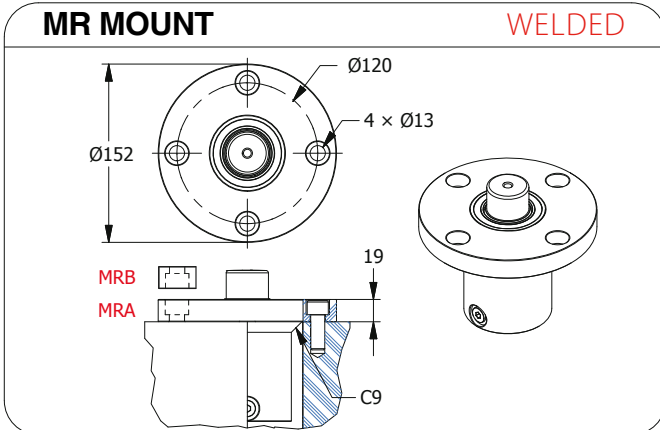
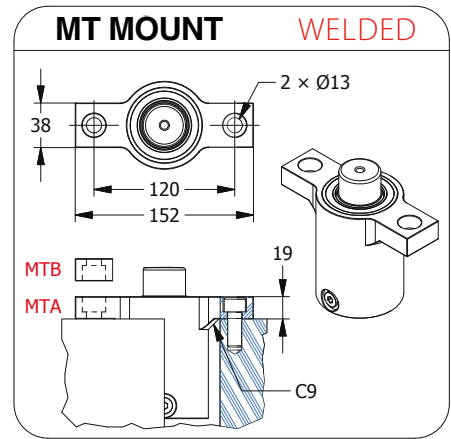
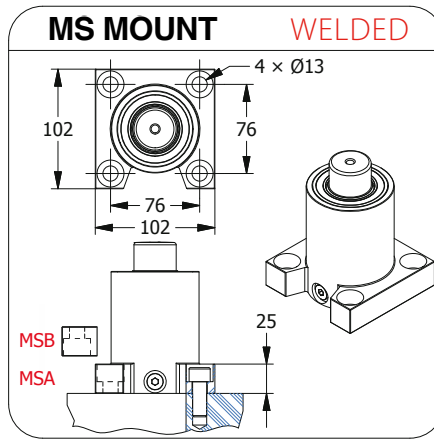
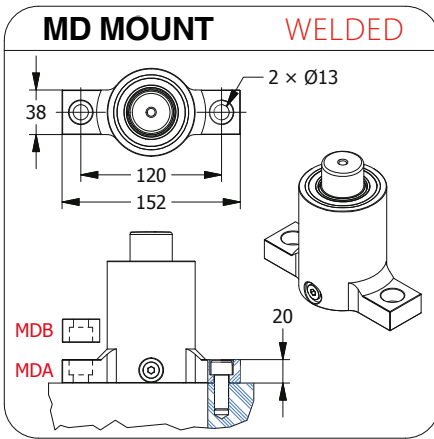


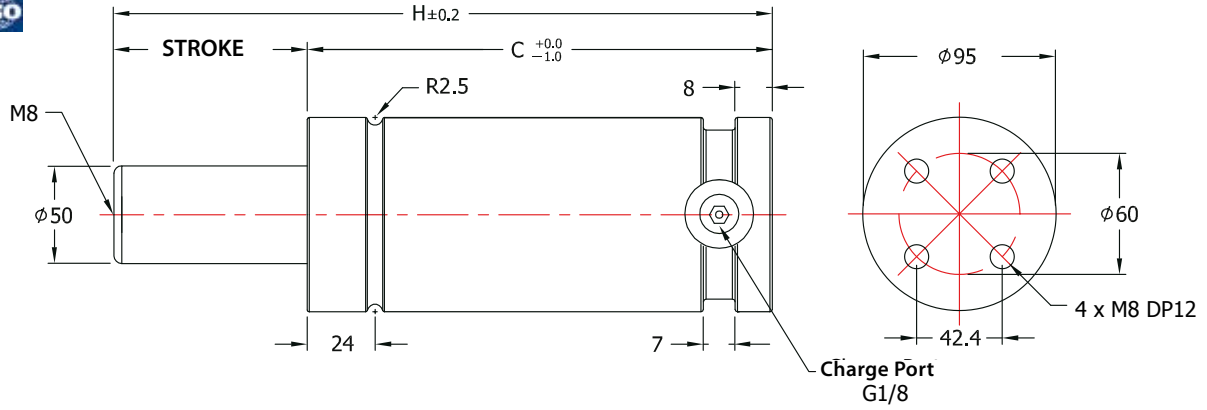
■ Calculation of charging pressure for TSL1500

$$\text{Charging pressure(Bar)} = \frac{\text{Initial Force(N)}}{101.7}$$

ex) What comes to the charging pressure of gas spring which demands force 12,000N?

$$118(\text{Bar}) = \frac{12,000(\text{N})}{101.7}$$





HOW TO SPECIFY

GAS SPRING TSL3000 × 050 S(F) — (MSA) — 150
 MODEL STROKE SELF CONTAINED-S FITTING SYSTEM-F MOUNT CHARGING PRESSURE (Bar)

MOUNT SP3000

REPAIR KIT RCL3000

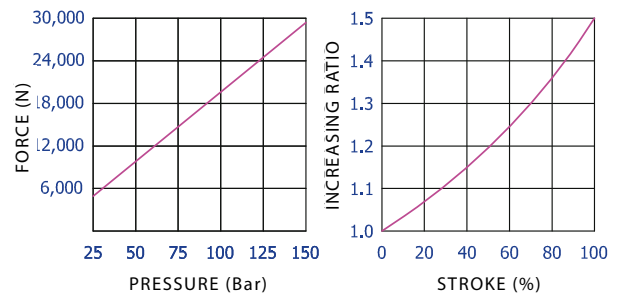
[Caution!] Charging pressure has to be specified. Otherwise, 150Bar will be charged.

TSL 3000								
Stroke		H	C	Force(N) (150 bar / +20°C)		Gas vol. (cm ³)	Weight (kg)	ISO
(mm)	(inch)			Initial	End force*			
10	0.39	140	130	29,400	37,000	95.5	5.74	
13	0.51	145.5	132.5		38,500	108.0	5.84	
15	0.59	150	135		38,900	120.6	5.92	
20	0.79	160	140		40,200	145.7	6.09	
25	0.98	170	145		41,200	170.8	6.48	√
30	1.18	180	150		42,000	195.9	6.55	
35	1.38	190	155		42,600	221.1	6.62	
38	1.50	196	158		42,900	236.1	6.73	
40	1.57	200	160		43,100	246.2	6.80	
45	1.77	210	165		43,600	271.3	6.98	
50	1.97	220	170		43,900	296.4	7.15	√
60	2.36	240	180		44,500	346.7	7.51	
63	2.48	247	184		44,300	366.8	7.68	
70	2.76	260	190		44,900	396.9	7.86	
75	2.95	270	195		45,100	422.0	8.04	
80	3.15	280	200		45,300	447.1	8.27	√
90	3.54	300	210		45,600	497.4	8.58	
100	3.94	320	220		45,800	547.6	8.85	√
125	4.92	370	245		46,200	673.2	9.65	√
150	5.91	420	270		46,500	798.8	10.69	
160	6.30	440	280	46,600	849.1	11.05	√	
175	6.89	470	295	46,700	924.4	11.58		
200	7.87	520	320	46,900	1050.0	12.46		
250	9.84	620	370	47,200	1301.2	14.23		
300	11.81	720	420	47,300	1552.4	16.00		

* = at full stroke

* Special type is available upon requested.

■ CHARGING PRESSURE/FORCE INCREASE FACTOR

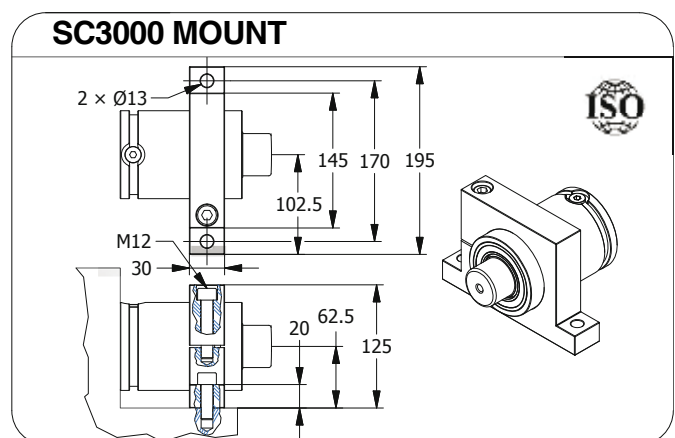
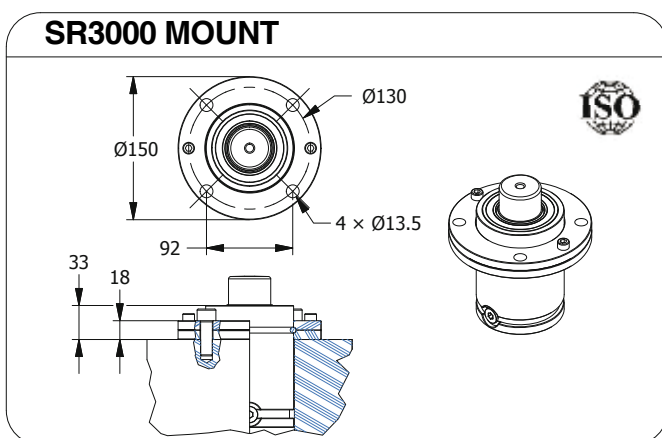
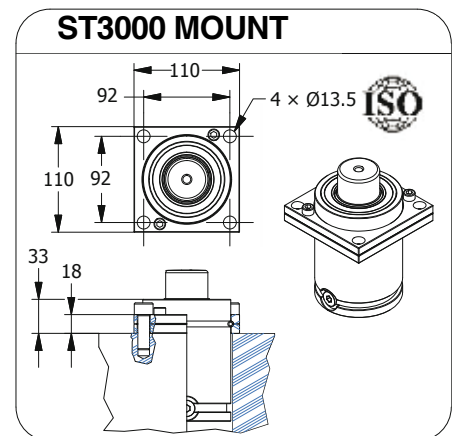
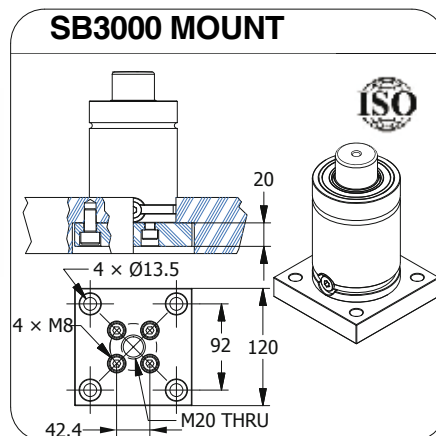
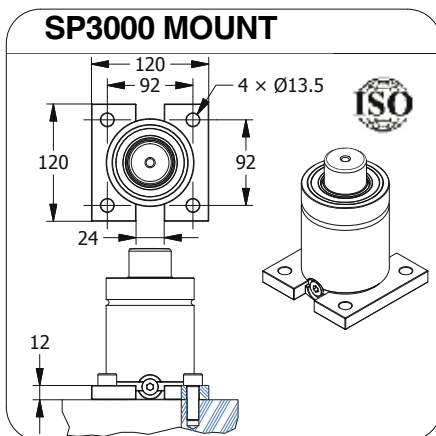
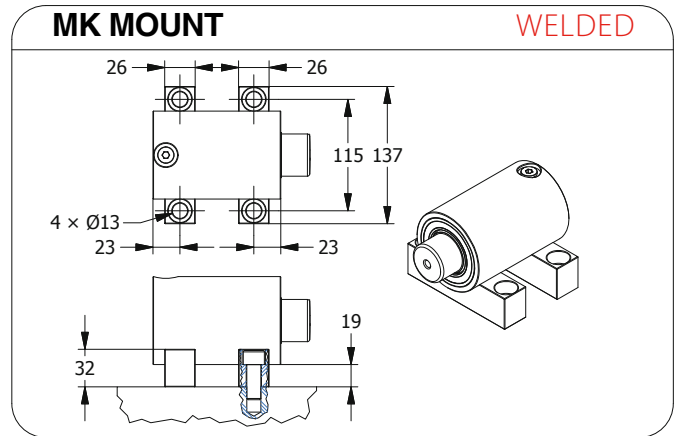
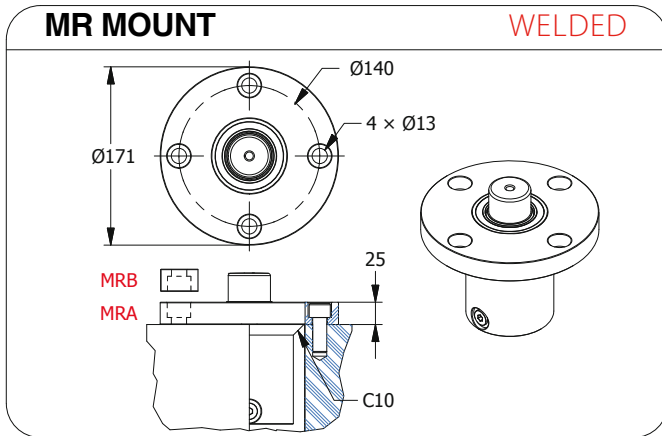
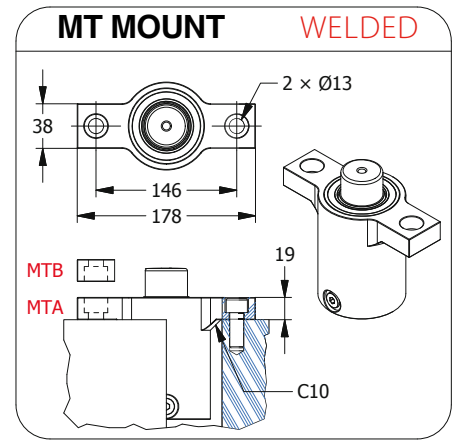
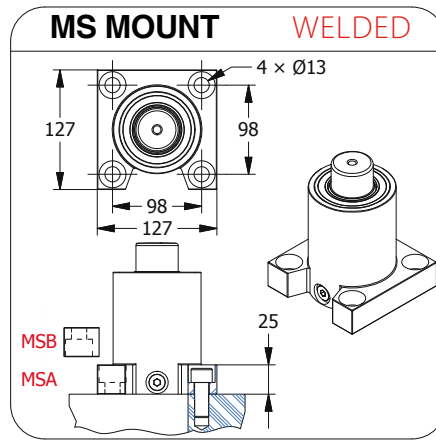
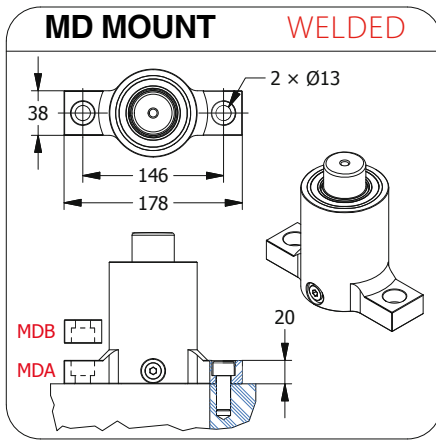


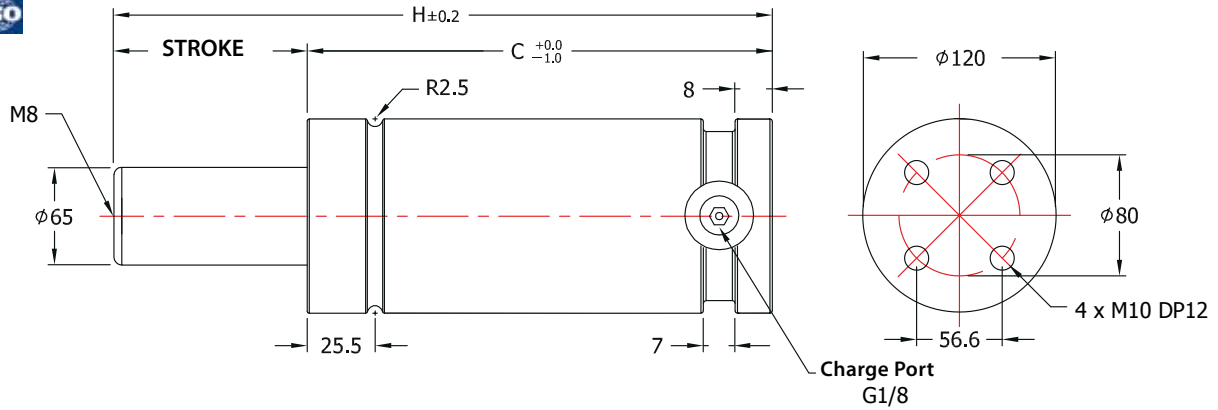
■ Calculation of charging pressure for TSL3000

$$\text{Charging pressure(Bar)} = \frac{\text{Initial Force(N)}}{196.2}$$

ex) What comes to the charging pressure of gas spring which demands force 25,000N?

$$127(\text{Bar}) = \frac{25,000(\text{N})}{196.2}$$





HOW TO SPECIFY

GAS SPRING TSL5000 × 050 S(F) — (MSA) — 150
 MODEL STROKE SELF CONTAINED-S FITTING SYSTEM-F MOUNT CHARGING PRESSURE (Bar)

MOUNT SP5000

REPAIR KIT RCL5000

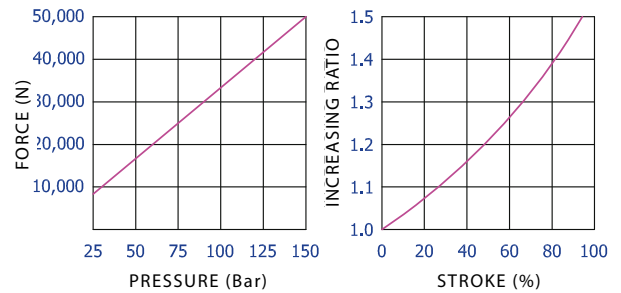
[Caution!] Charging pressure has to be specified. Otherwise, 150Bar will be charged.

TSL 5000								
Stroke		H	C	Force(N) (150 bar / +20°C)		Gas vol. (cm ³)	Weight (kg)	ISO
(mm)	(inch)			Initial	End force*			
10	0.39	159.5	149.5	49,650	63,300	153.1	10.32	
13	0.51	165.5	152.5		65,600	176.6	10.71	
15	0.59	170	155		66,500	196.3	11.10	
20	0.79	180	160		69,100	235.5	11.49	
25	0.98	190	165		71,000	274.8	11.88	√
30	1.18	200	170		72,600	314.0	12.27	
35	1.38	210	175		73,900	353.3	12.66	
38	1.50	216	178		74,500	376.8	13.00	
40	1.57	220	180		74,900	392.5	13.44	
45	1.77	230	185		75,800	431.8	13.83	
50	1.97	240	190		76,500	471.0	14.22	√
60	2.36	260	200		77,800	549.5	14.68	
63	2.48	266	203		78,100	573.1	15.07	
70	2.76	280	210		78,700	628.0	15.46	
75	2.95	290	215		79,100	667.3	15.85	
80	3.15	300	220		79,400	706.5	16.24	√
90	3.54	320	230		80,000	785.0	16.94	
100	3.94	340	240		80,500	863.5	17.66	√
125	4.92	390	265		81,400	1059.8	18.05	√
150	5.91	440	290		82,100	1256.0	18.44	
160	6.30	460	300	82,300	1334.5	18.83	√	
175	6.89	490	315	82,600	1452.3	19.22		
200	7.87	540	340	83,000	1648.5	19.61		
250	9.84	640	390	83,500	2041.0	20.31		
300	11.81	740	440	83,900	2433.5	21.01		

* = at full stroke

* Special type is available upon requested.

■ CHARGING PRESSURE/FORCE INCREASE FACTOR

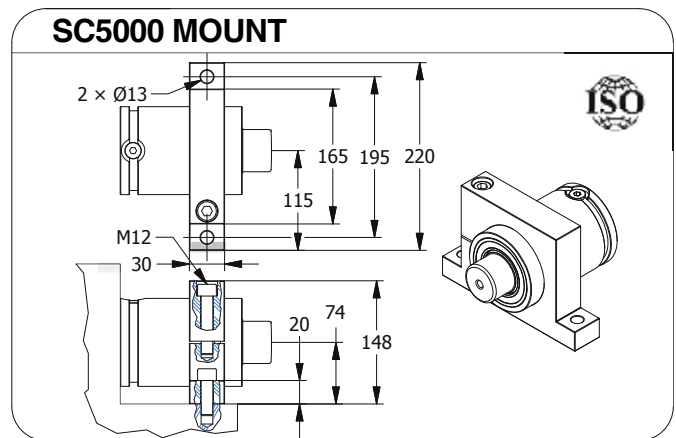
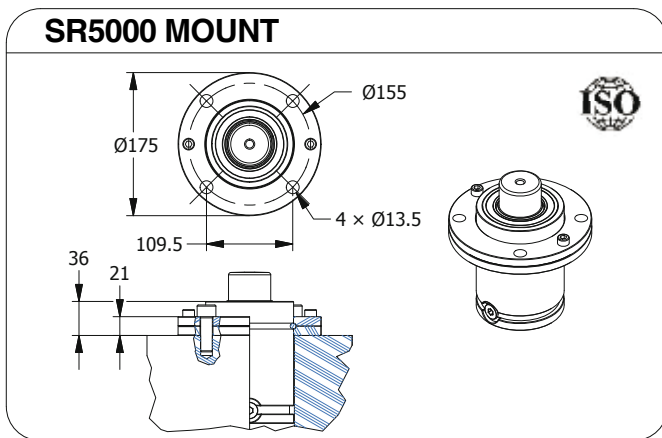
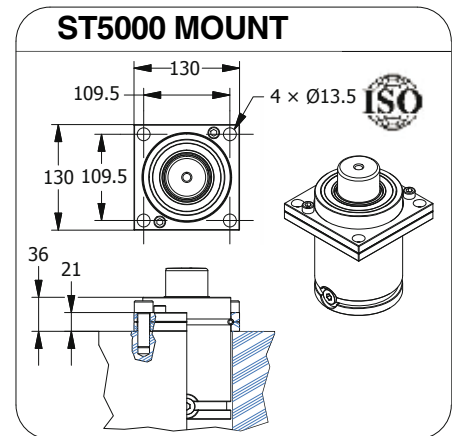
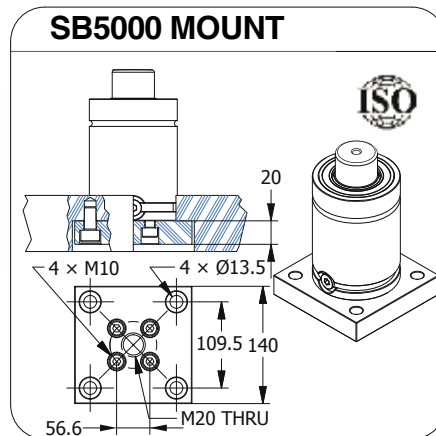
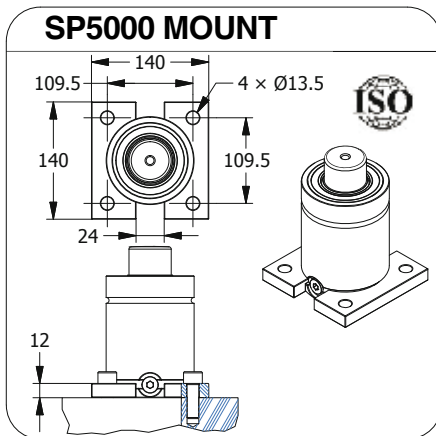
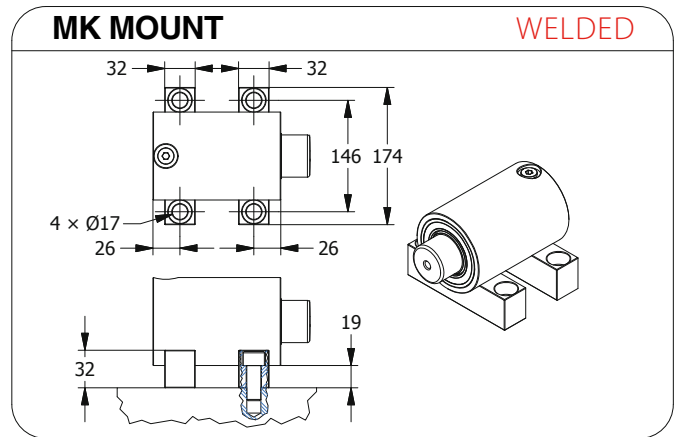
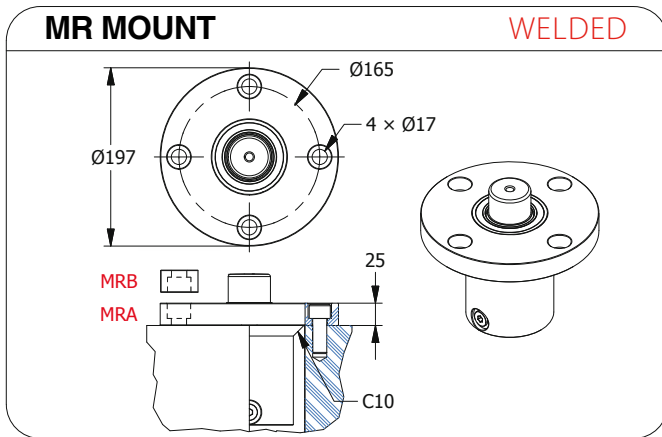
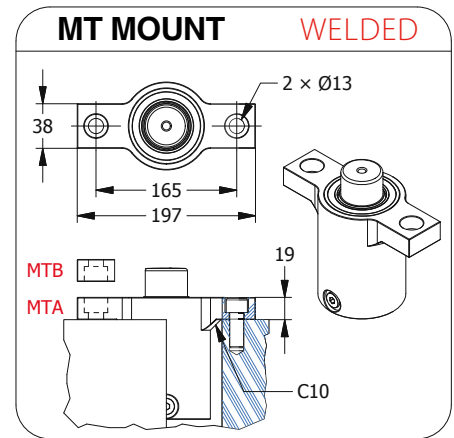
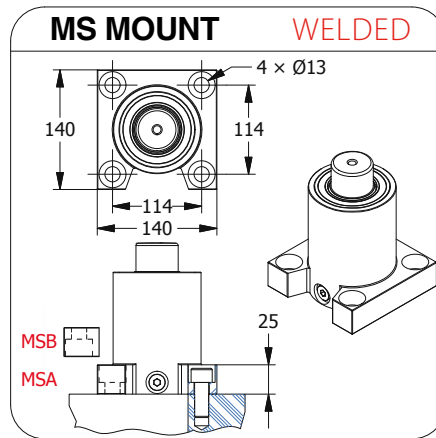
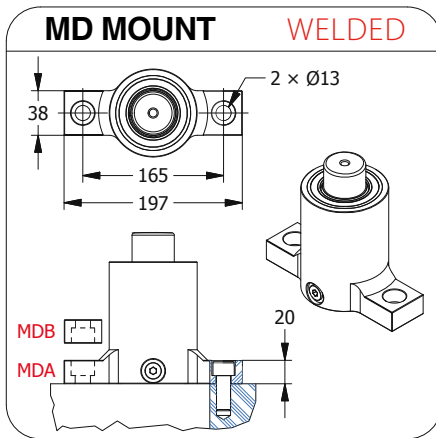


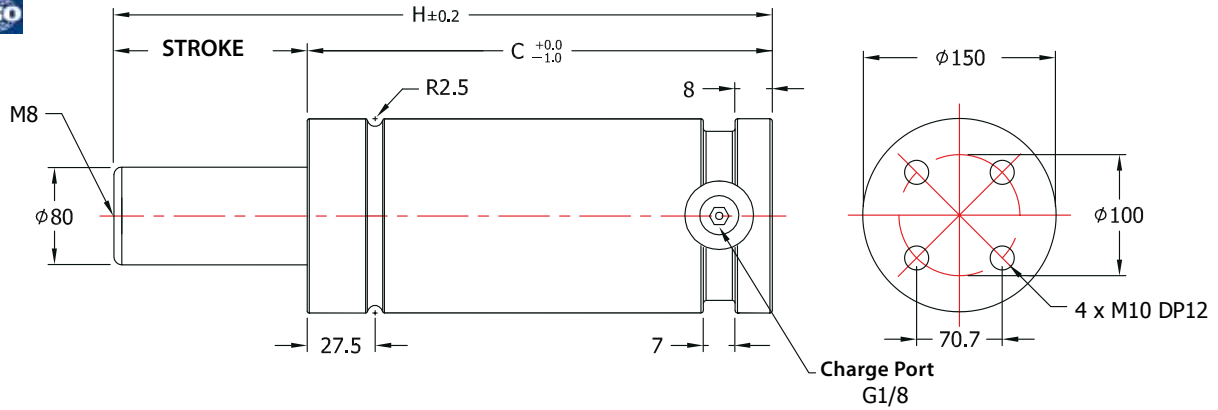
■ Calculation of charging pressure for TSL5000

$$\text{Charging pressure(Bar)} = \frac{\text{Initial Force(N)}}{331.7}$$

ex) What comes to the charging pressure of gas spring which demands force 38,000N?

$$115(\text{Bar}) = \frac{38,000(\text{N})}{331.7}$$





HOW TO SPECIFY

GAS SPRING TSL7500 × 050 S(F) — (MSA) — 150
 MODEL STROKE SELF CONTAINED-S FITTING SYSTEM-F MOUNT CHARGING PRESSURE (Bar)

MOUNT SP7500

REPAIR KIT RCL7500

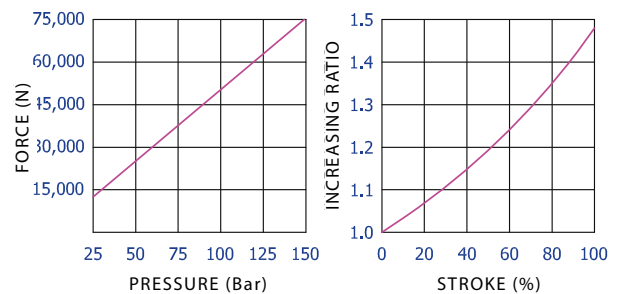
[Caution!] Charging pressure has to be specified. Otherwise, 150Bar will be charged.

TSL 7500								
Stroke		H	C	Force(N) (150 bar / +20°C)		Gas vol. (cm ³)	Weight (kg)	ISO
(mm)	(inch)			Initial	End force*			
15	0.59	185	170	75,300	96,400	343.4	16.80	
20	0.79	195	175		100,100	404.8	18.40	
25	0.98	205	180		103,000	466.1	21.20	√
30	1.18	215	185		105,400	527.4	22.45	
35	1.38	225	190		107,300	588.8	23.20	
38	1.50	231	193		108,300	625.5	24.20	
40	1.57	235	195		109,000	650.1	25.20	
45	1.77	245	200		110,300	711.4	26.90	
50	1.97	255	205		111,500	772.7	27.90	√
60	2.36	275	215		113,500	895.4	29.50	
63	2.48	282	219		113,200	944.5	30.50	
70	2.76	295	225		115,000	1018.0	31.80	
75	2.95	305	230		115,600	1079.4	33.20	
80	3.15	315	235		116,200	1140.7	34.40	√
90	3.54	335	245		117,200	1263.4	35.40	
100	3.94	355	255		118,100	1386.0	36.50	√
125	4.92	405	280		119,700	1692.7	37.40	√
150	5.91	455	305		120,800	1999.3	38.50	
160	6.30	475	315		121,200	2122.0	39.40	√
175	6.89	505	330		121,600	2305.9	40.40	
200	7.87	555	355	122,300	2612.6	41.70		
250	9.84	655	405	123,200	3225.9	42.60		
300	11.81	755	455	123,900	3839.1	43.70		

* = at full stroke

* Special type is available upon requested.

■ CHARGING PRESSURE/FORCE INCREASE FACTOR



■ Calculation of charging pressure for TSL7500

$$\text{Charging pressure(Bar)} = \frac{\text{Initial Force(N)}}{502.4}$$

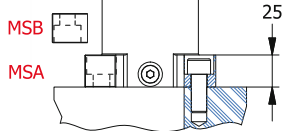
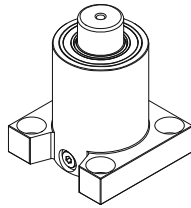
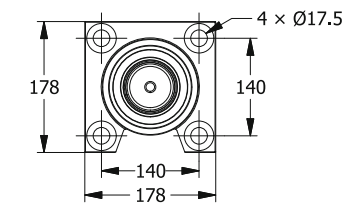
ex) What comes to the charging pressure of gas spring which demands force 65,000N?

$$129(\text{Bar}) = \frac{65,000(\text{N})}{502.4}$$

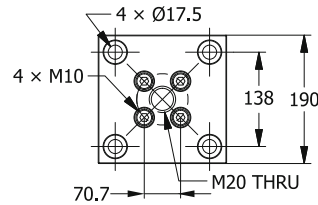
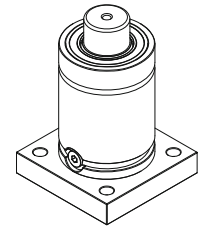
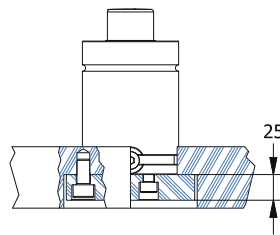


MS MOUNT

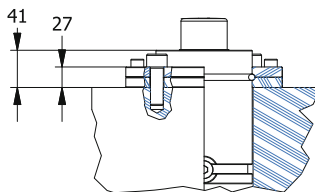
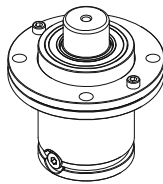
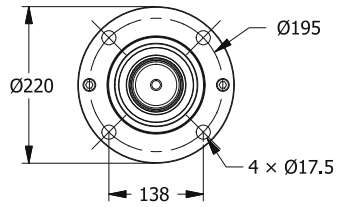
WELDED



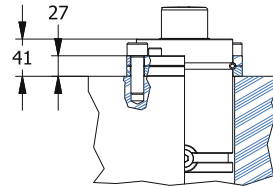
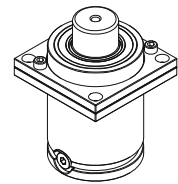
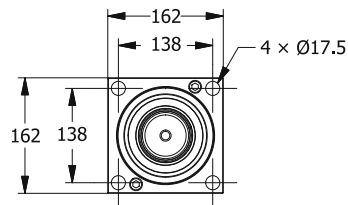
SB7500 MOUNT



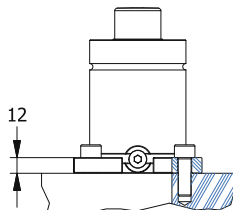
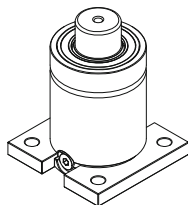
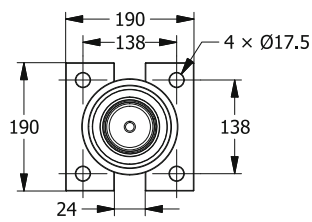
SR7500 MOUNT



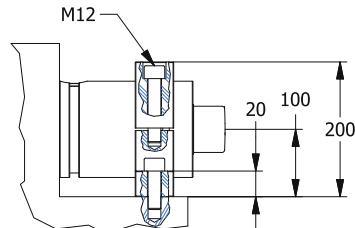
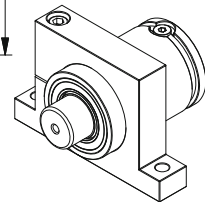
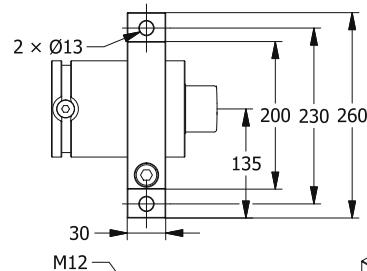
ST7500 MOUNT

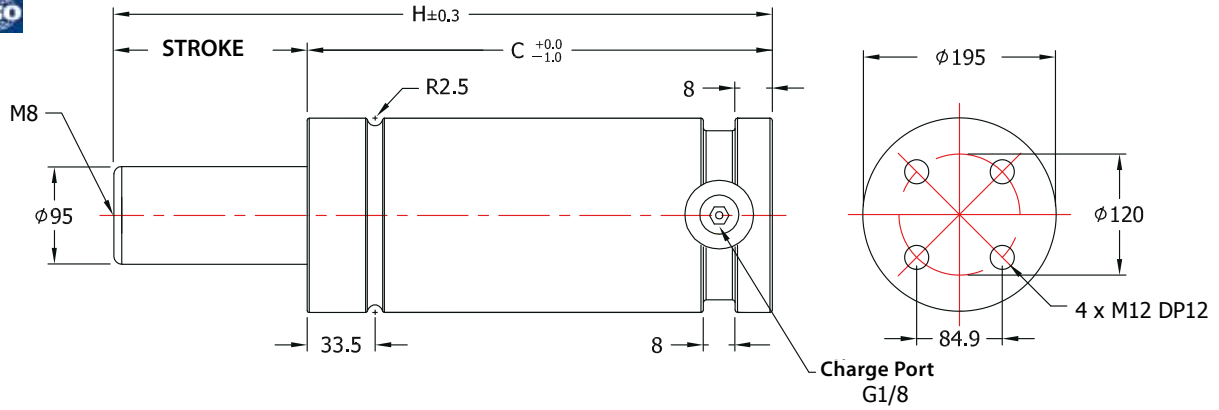


SP7500 MOUNT



SC7500 MOUNT





HOW TO SPECIFY

GAS SPRING TSL10000 × 050 S(F) — (MSA) — 150
 MODEL STROKE SELF CONTAINED-S FITTING SYSTEM-F MOUNT CHARGING PRESSURE (Bar)

MOUNT SP10000

REPAIR KIT RCL10000

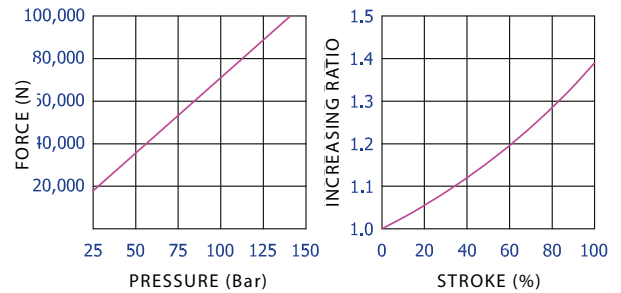
[Caution!] Charging pressure has to be specified. Otherwise, 150Bar will be charged.

TSL 10000								
Stroke		H	C	Force(N) (150 bar / +20°C)		Gas vol. (cm ³)	Weight (kg)	ISO
(mm)	(inch)			Initial	End force*			
20	0.79	200	180	106,200	137,600	619.8	36.20	
25	0.98	210	185	106,200	140,400	726.6	38.50	
30	1.18	220	190	106,200	142,500	833.5	40.20	
35	1.38	230	195	106,200	144,200	940.4	42.50	
38	1.50	236	198	106,200	145,100	1004.5	44.10	
40	1.57	240	200	106,200	145,600	1047.2	45.60	
45	1.77	250	205	106,200	146,700	1154.1	47.90	
50	1.97	260	210	106,200	147,700	1260.9	48.80	√
60	2.36	280	220	106,200	149,200	1474.6	50.90	
63	2.48	287	223	106,200	149,600	1538.8	51.70	
70	2.76	300	230	106,200	150,300	1688.4	53.20	
75	2.95	310	235	106,200	150,800	1795.2	55.45	
80	3.15	320	240	106,200	151,200	1902.1	57.00	√
90	3.54	340	250	106,200	152,000	2115.8	59.50	
100	3.94	360	260	106,200	152,600	2329.5	61.80	√
125	4.92	410	285	106,200	153,700	2863.8	64.50	√
150	5.91	460	310	106,200	154,500	3398.1	67.20	
160	6.30	480	320	106,200	154,700	3611.8	69.00	√
175	6.89	510	335	106,200	155,100	3932.4	72.30	
200	7.87	560	360	106,200	155,500	4466.7	74.50	√
250	9.84	660	410	106,200	156,100	5535.3	80.50	√
300	11.81	760	460	106,200	156,600	6603.8	86.50	√

* = at full stroke

* Special type is available upon requested.

■ CHARGING PRESSURE/FORCE INCREASE FACTOR



■ Calculation of charging pressure for TSL10000

$$\text{Charging pressure(Bar)} = \frac{\text{Initial Force(N)}}{708.5}$$

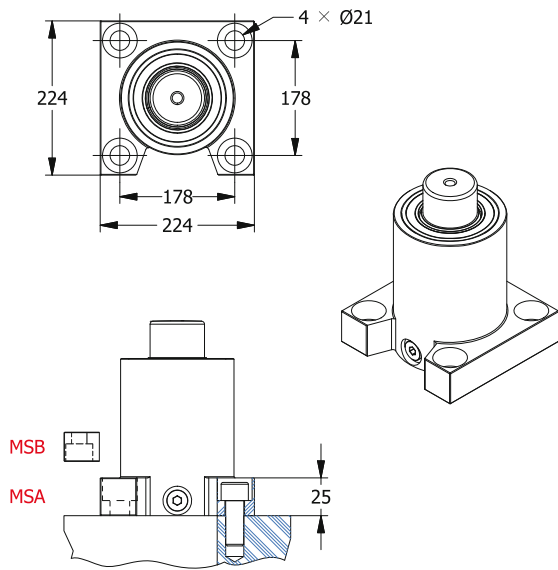
ex) What comes to the charging pressure of gas spring which demands force 85,000N?

$$120(\text{Bar}) = \frac{85,000(\text{N})}{708.5}$$

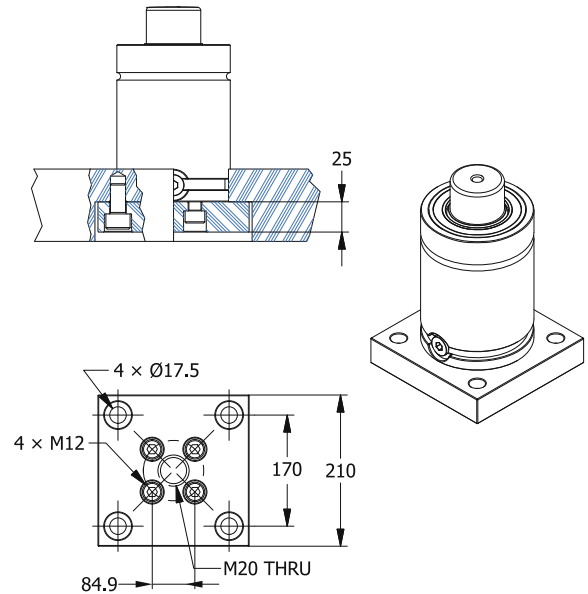


MS MOUNT

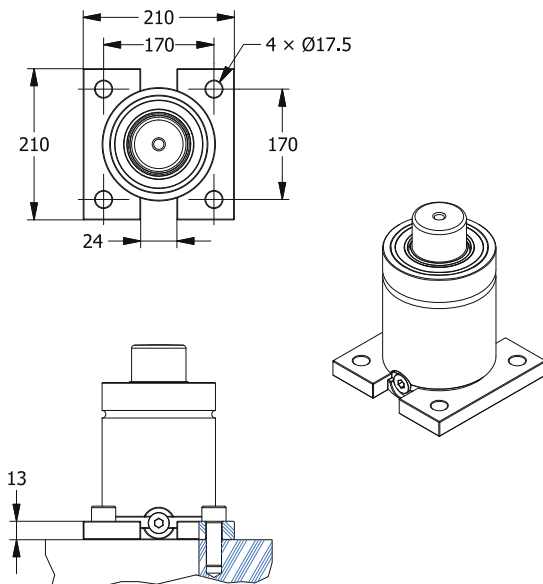
WELDED



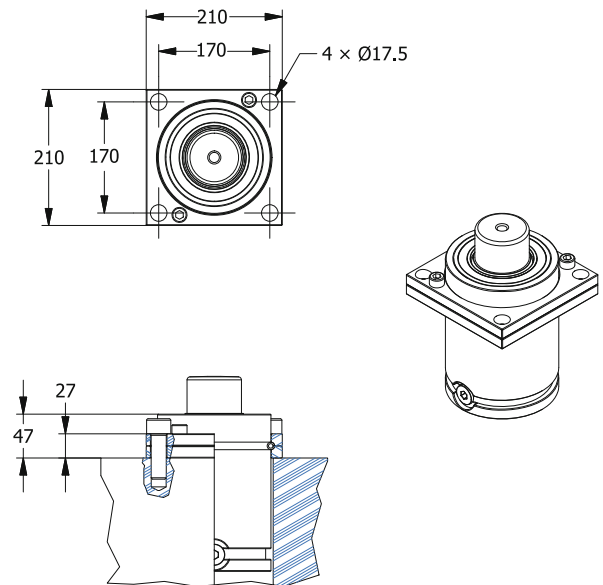
SB10000 MOUNT



SP10000 MOUNT



ST10000 MOUNT



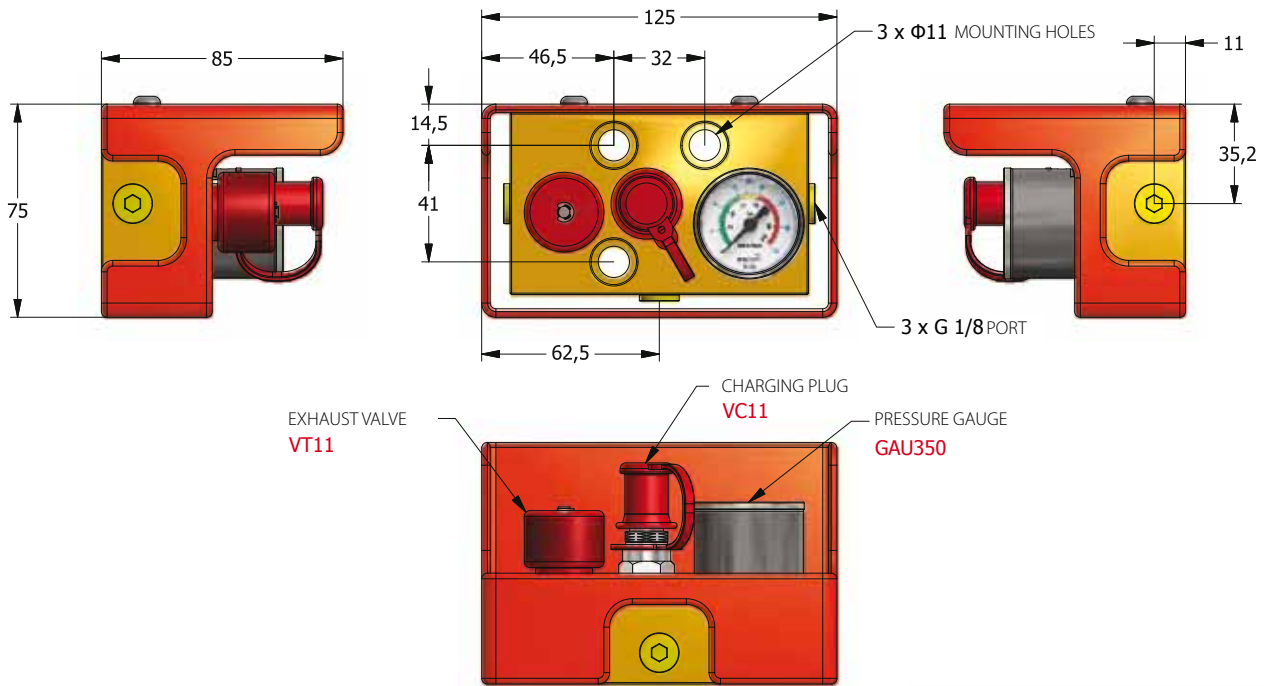


PAN3

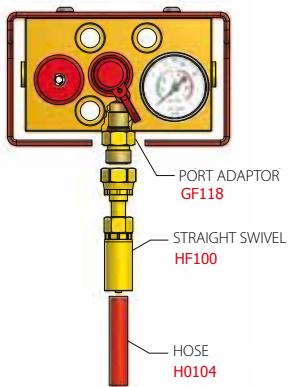
PAN3 is used to check charging pressure, to charge gas and to discharge gas spring.

It has 3 connection ports for fitting type gas spring. Gas should be charged through the charging plug. Gas spring is discharged when you open the valve to exhaust gas.

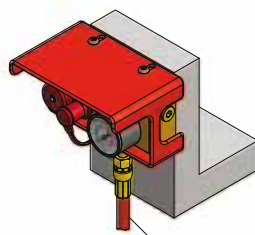
Never charge with any other than Nitrogen (N₂).



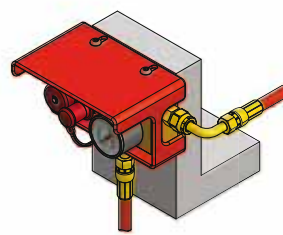
PAN3 USE EXAMPLE



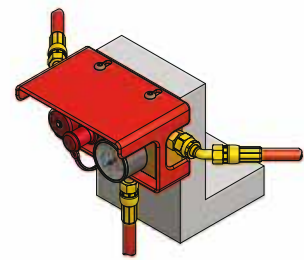
PAN3 + FITTING CONNECTION



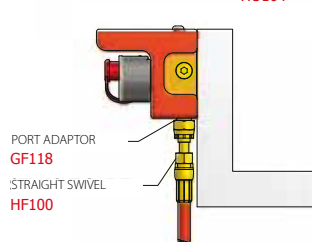
1 PORT USE



2 PORT USE



3 PORT USE



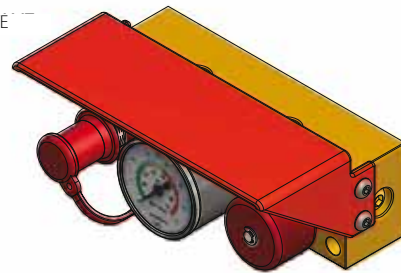
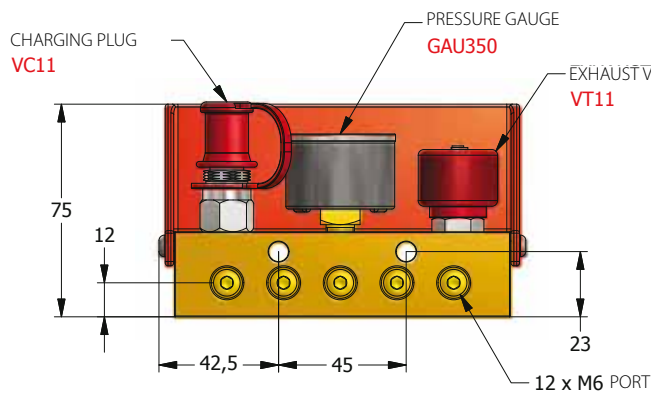
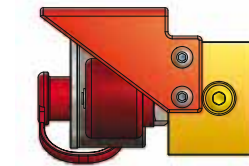
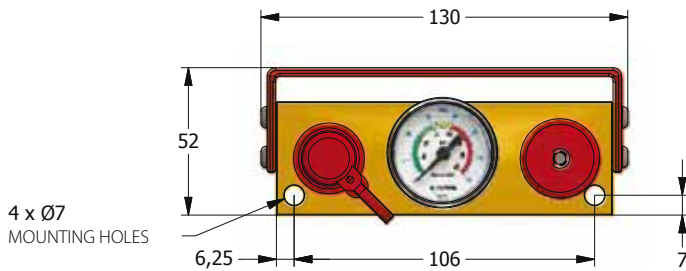


PAN6

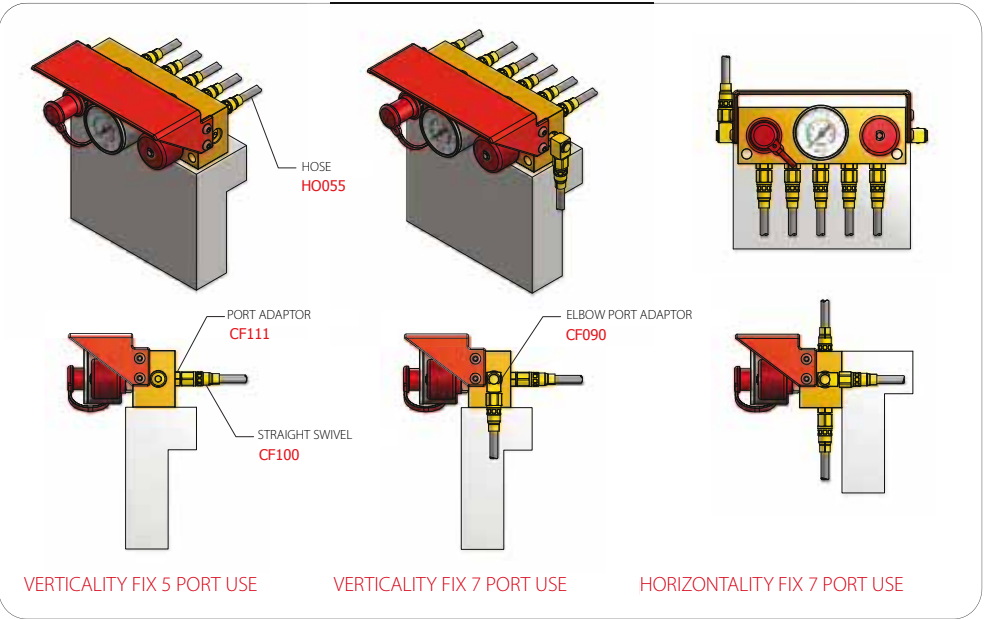
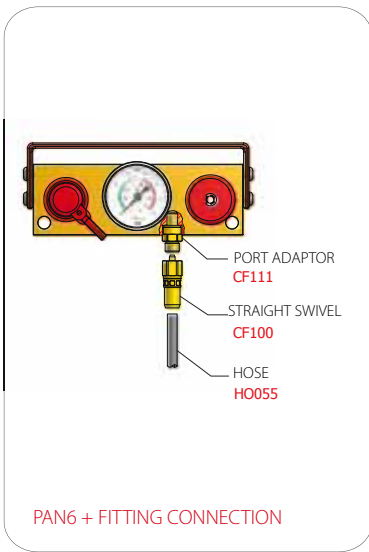
PAN6 is CONTROL PANEL for COMPACT FITTING.

It is used to check charging pressure, to charge and to discharge gas spring.

Never charge with any other than Nitrogen (N₂).



PAN6 USE EXAMPLE



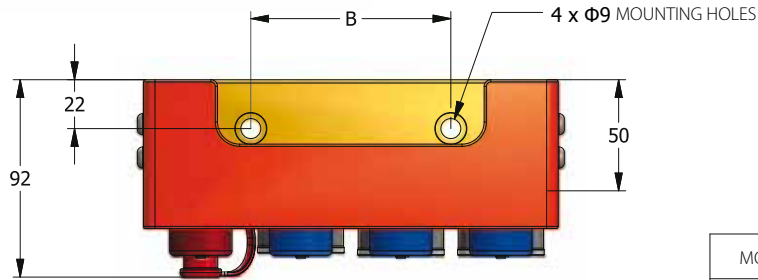


PSS SERIES

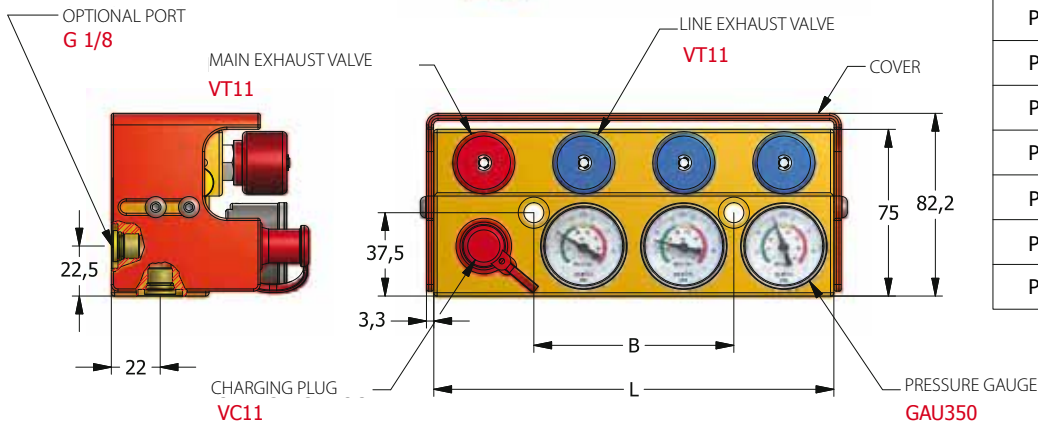
PSS MULTI PANEL is used when single mold needs multiple pressures.

Depends on model, it can be used from 2 lines to 8 lines of different pressure as a customer needs.

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



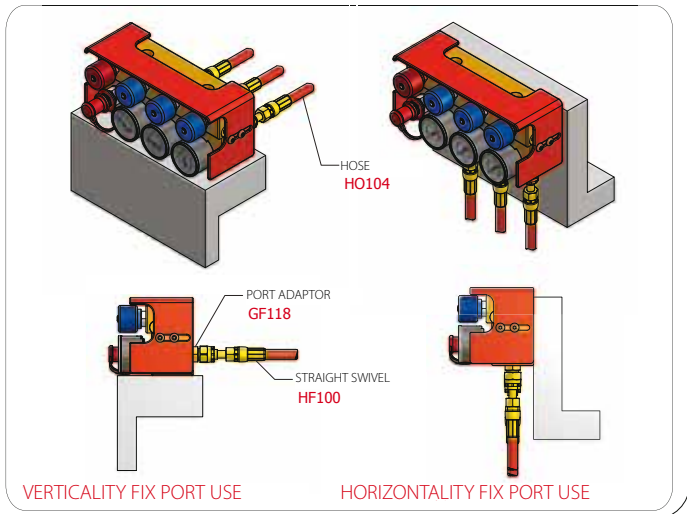
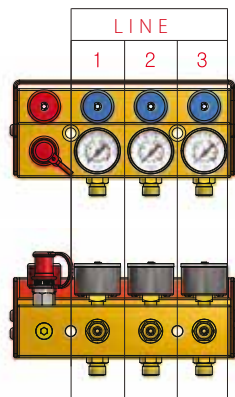
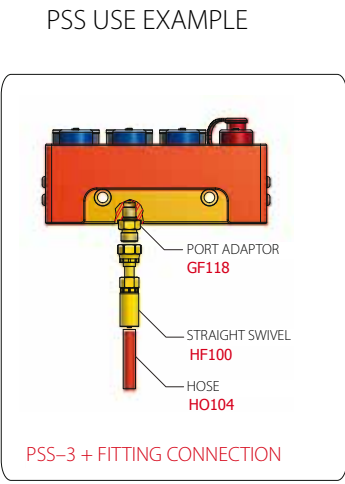
MODEL	L	B
PSS-2	135	45
PSS-3	180	90
PSS-4	225	135
PSS-5	270	180
PSS-6	315	225
PSS-7	360	270
PSS-8	405	315



HOW TO SPECIFY

HOW TO SPECIFY

PSS - 3
MULTI PANEL Line





DISTRIBUTION BLOCK

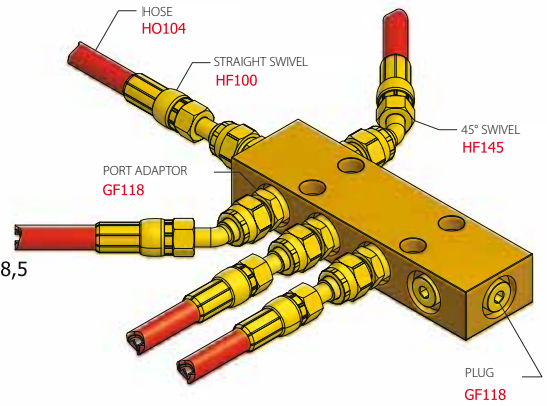
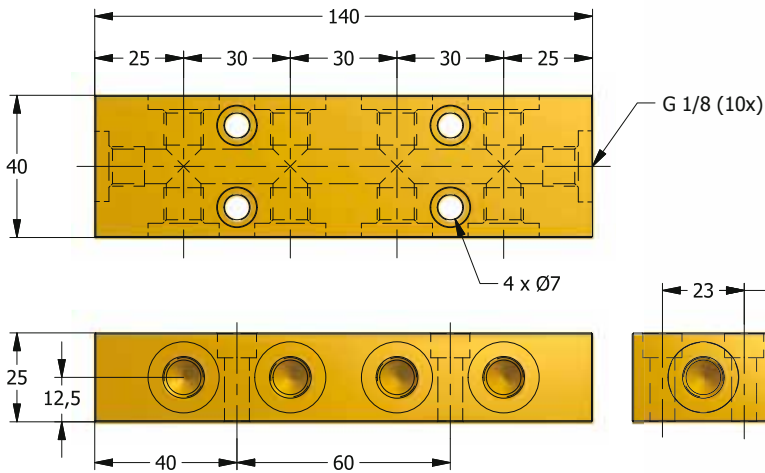
Distribution Block is able to be easily used for a connection of different shaped and built gas springs.

All distribution block is able to be customized by user's needs.



HB-10

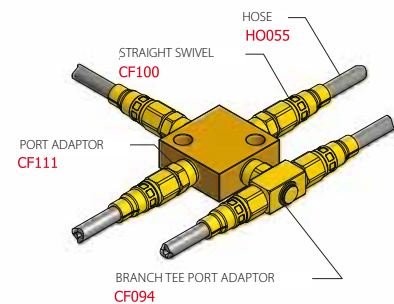
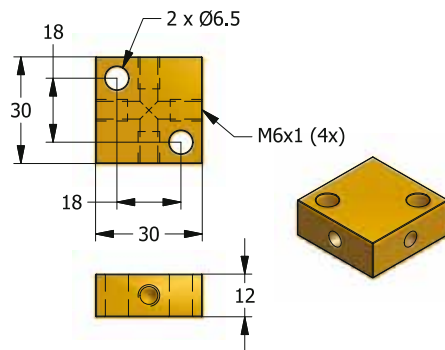
Distribution 10 Port Block



HB-10 USE EXAMPLE

CB-4

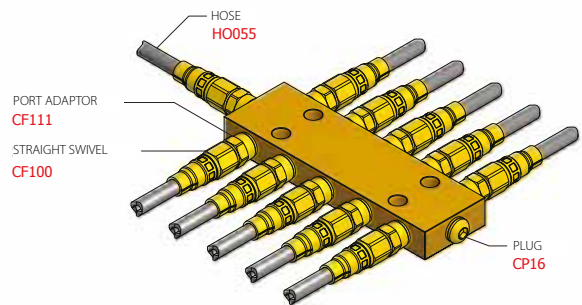
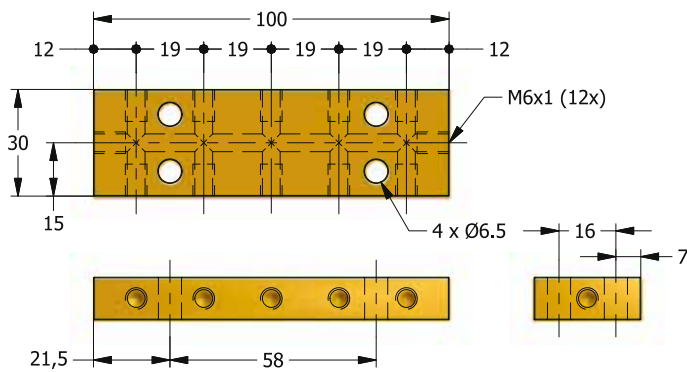
Compact 4 Block



CB-4 USE EXAMPLE

CB-12

Compact 12 Block



CB-12 USE EXAMPLE

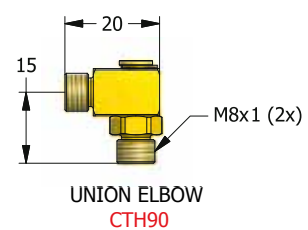
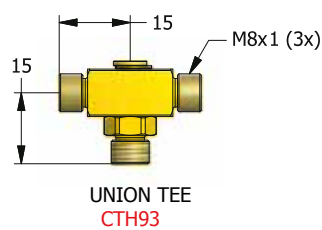
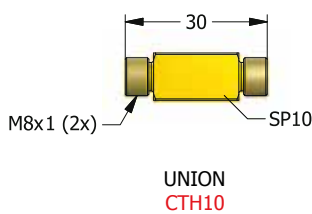
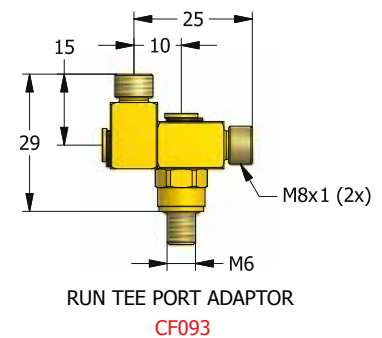
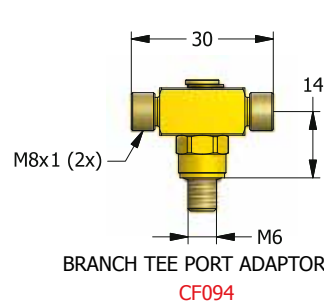
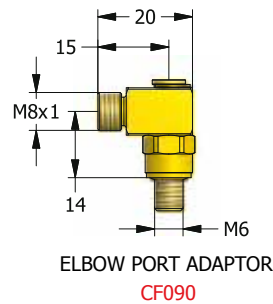
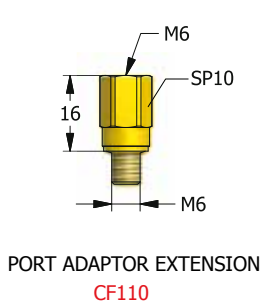
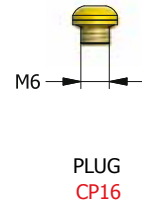
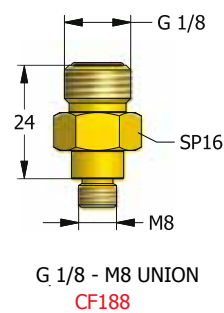
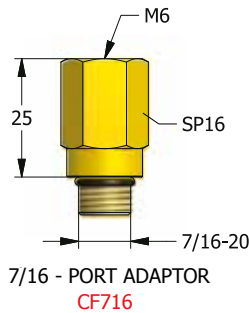
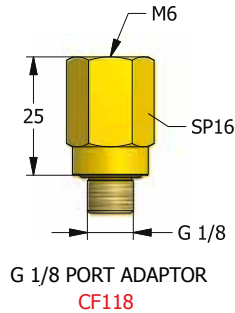
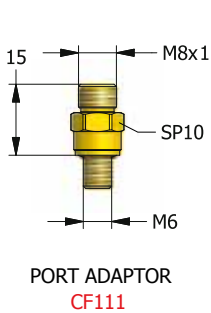
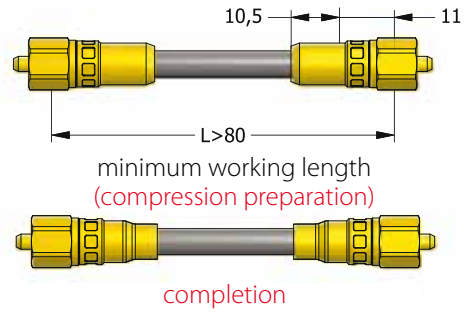
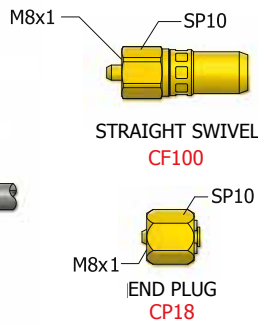
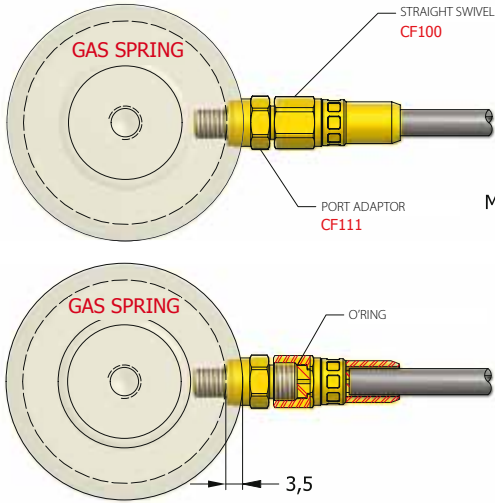
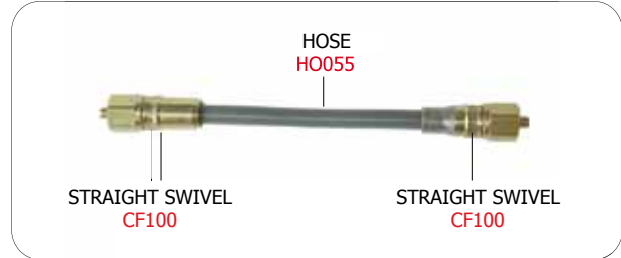


HOSE HO055



COMPACT FITTING

COMPACT FITTING is the smallest size to make fitting system with HOSE HO055 in small area. Also, it is able to apply in variety situations with GF fitting.





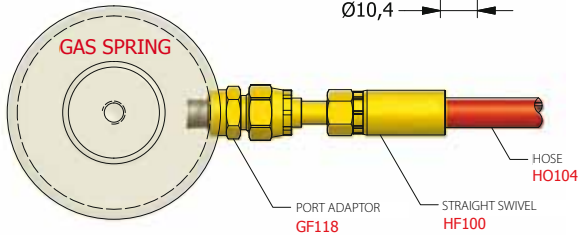
HOSE HO104



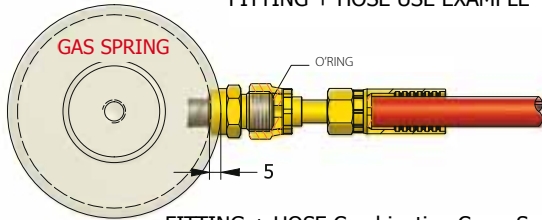
GF FITTING

GF FITTING is the most common fitting system by using HOSE HO104. It can be installed in fitting system by variety combinations.

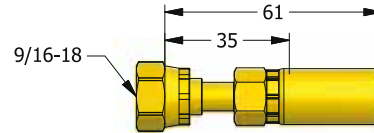
WORKING PRESSURE 200bar
BURST PRESSURE 700bar



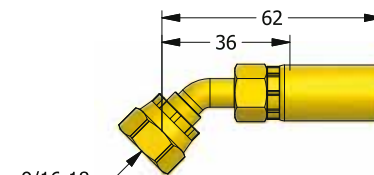
FITTING + HOSE USE EXAMPLE



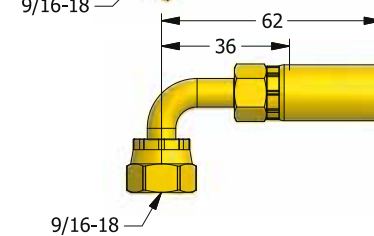
FITTING + HOSE Combination Cross-Section View



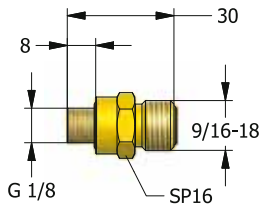
STRAIGHT SWIVEL
HF100



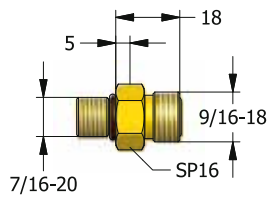
45° SWIVEL
HF145



90° SWIVEL
HF190



PORT ADAPTOR
GF118



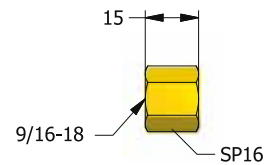
PORT ADAPTOR
GF111



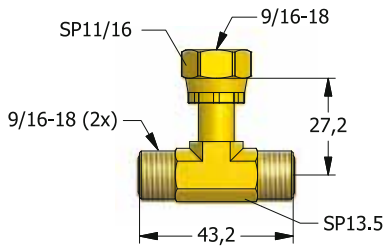
PLUG
GP118



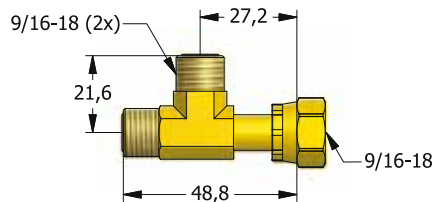
PLUG
GP716



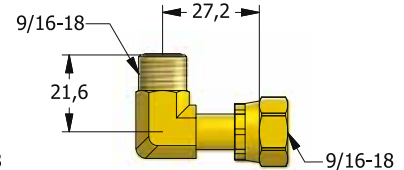
ENDPLUG
GP100



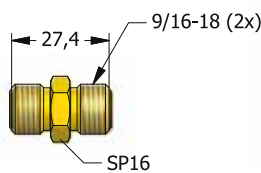
SWIVEL NUT BRANCH TEE
FS094



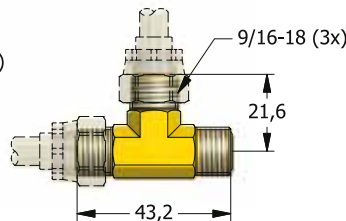
SWIVEL NUT RUN TEE
FS093



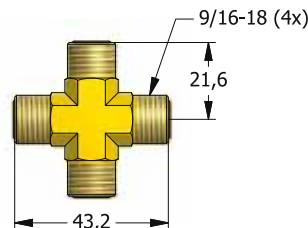
90° SWIVEL NUT ELBOW
FS090



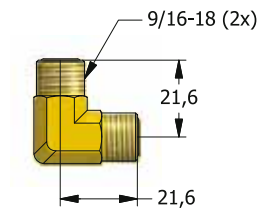
UNION
HTH10



UNION TEE
HTH93



UNION CROSS
HTH94

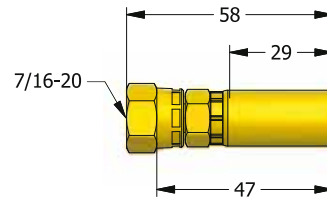
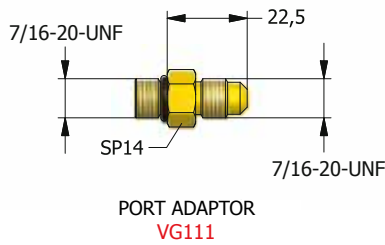
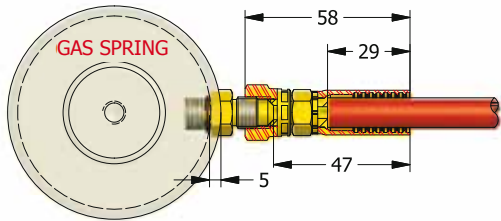
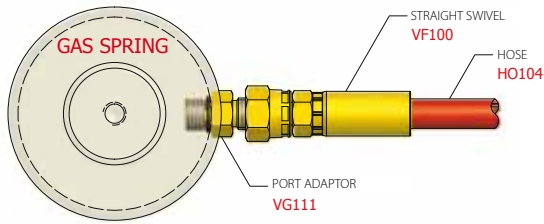


UNION ELBOW
HTH90

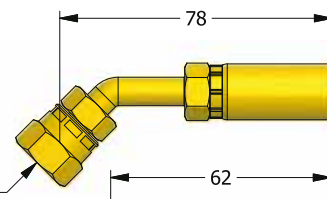


VF FITTING

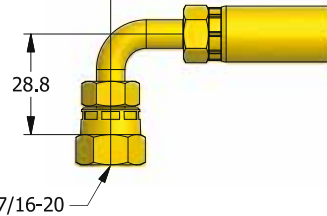
VF FITTING with HOSE HO104 is fitting system that uses a connection of surface contact without sealing . It can be installed in fitting system by combinations.



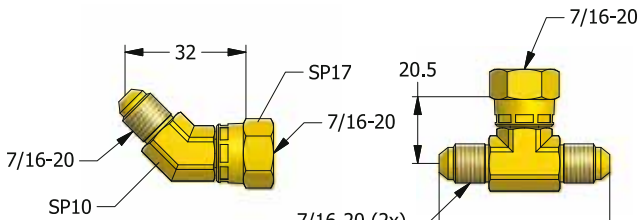
STRAIGHT SWIVEL
VF100



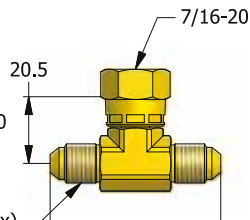
45° SWIVEL
VF145



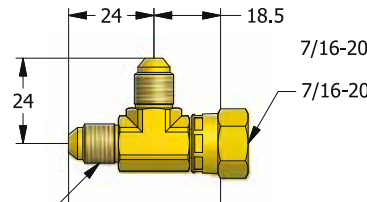
90° SWIVEL
VF190



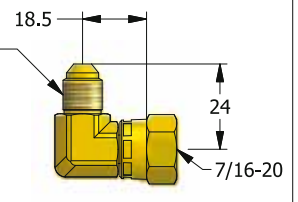
45° SWIVEL NUT ELBOW
VS045



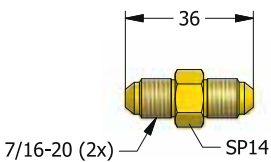
SWIVEL NUT BRANCH TEE
VS094



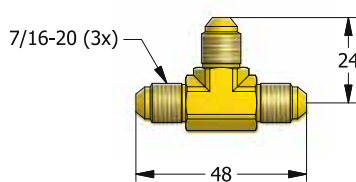
SWIVEL NUT RUN TEE
VS093



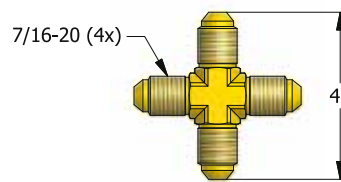
90° SWIVEL NUT ELBOW
VS090



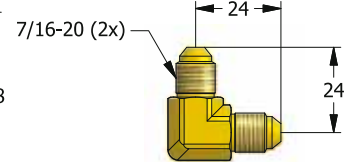
UNION
VTH10



UNION TEE
VTH93



UNION CROSS
VTH94



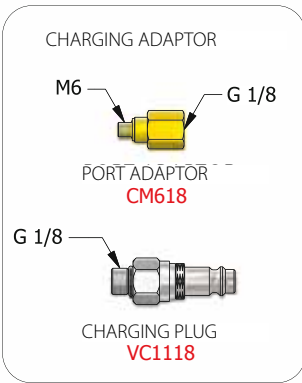
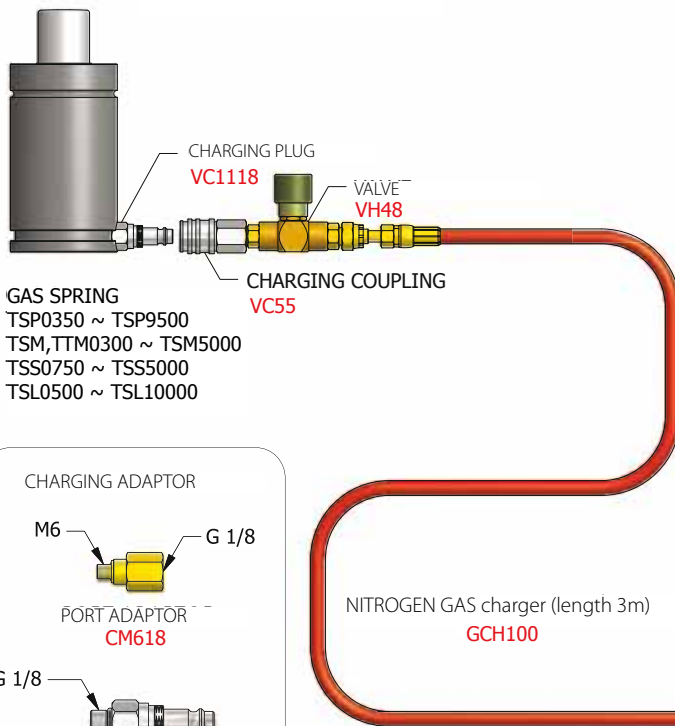
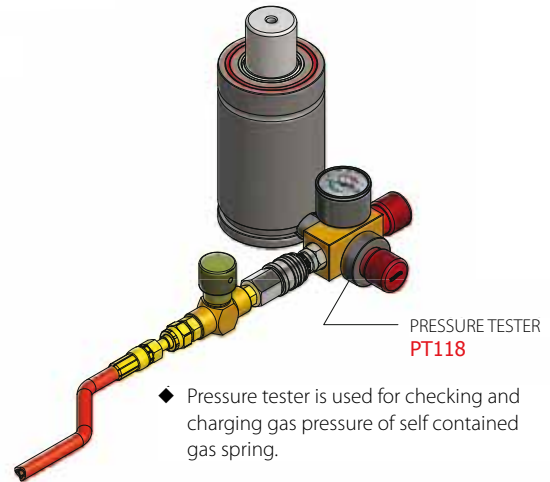
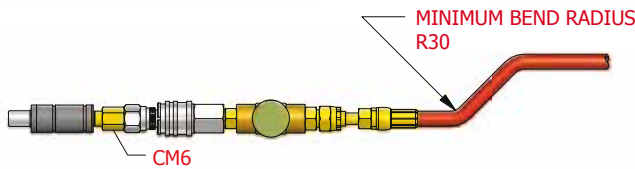
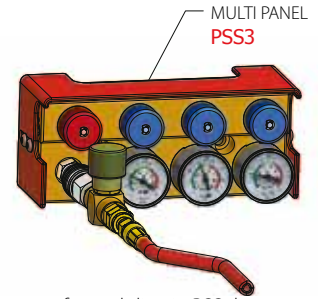
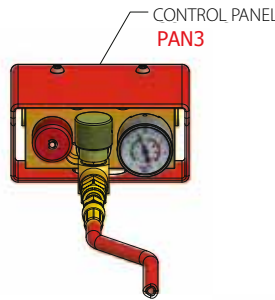
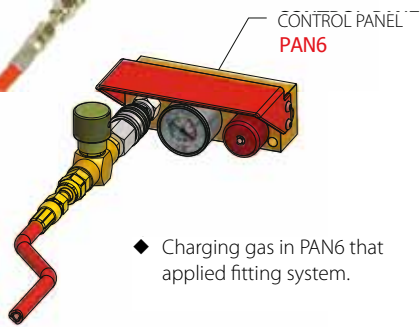
UNION ELBOW
VTH90



CHARGING METHOD

GAS SPRING for fitting system type can be charged through the charging plug on PANEL.

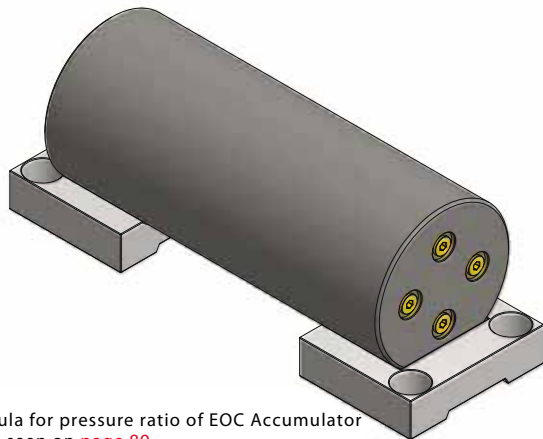
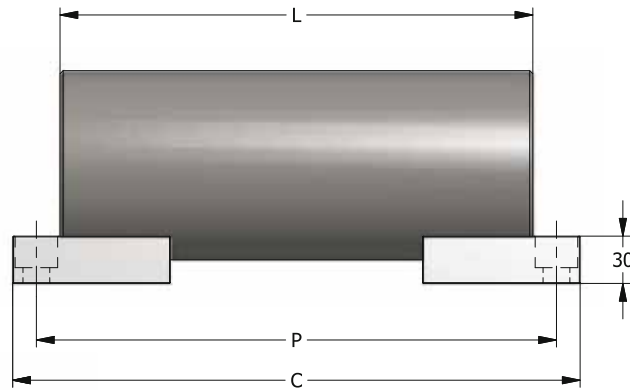
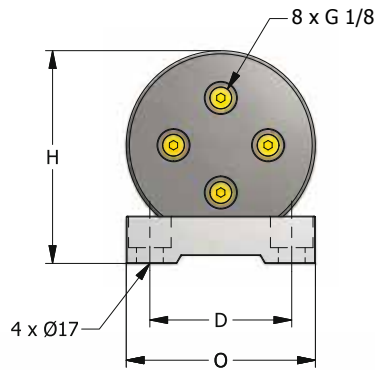
For self-contained type, checking pressure and charging gas can be done by PRESSURE TESTER.





PRESSURE DISTRIBUTION TANK

By connection with fitting system, EOC ACCUMULATOR keeps constant pressure level by minimize the difference between initial pressure and final pressure.



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

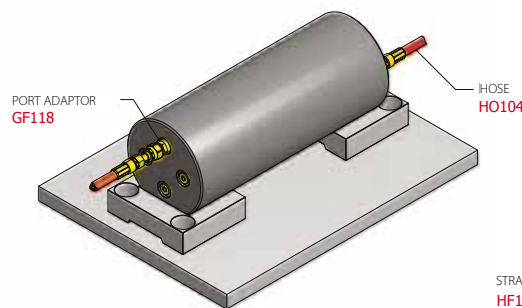
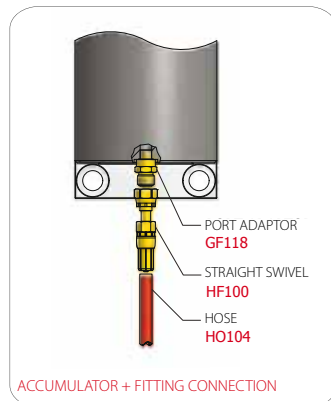
* The formula for pressure ratio of EOC Accumulator System is seen on [page 89](#).

HOW TO SPECIFY

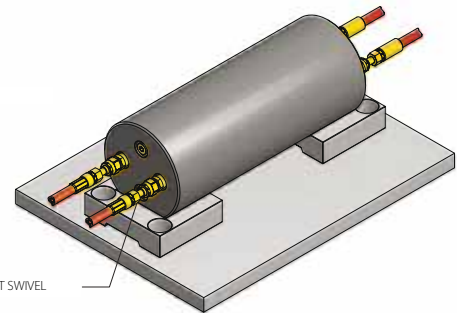
HOW TO SPECIFY

TAN **080-75**
 Accumulator Specification

ACCUMULATOR USE EXAMPLE



2 PORT USE



4 PORT USE



GF FITTING + HO104 HOSE CONNECTION



GF FITTING
SWIVEL Compression
Cross-Section View

Compression
Preparation



STRAIGHT

STRAIGHT

45°

45°

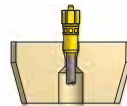
90°

90°

GF FITTING + HOSE HO104 application

Compression
Preparation

COMPACT FITTING + HO055 HOSE CONNECTION



COMPACT FITTING
SWIVEL Compression
Cross-Section View

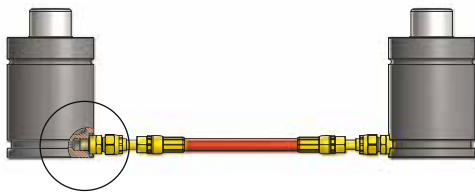
Compression
Preparation



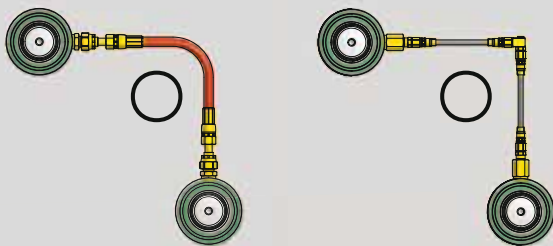
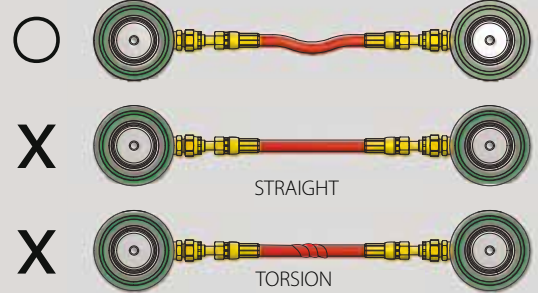
COMPACT FITTING + HOSE HO055 application

Compression
Preparation

◆ Fitting System Type GAS SPRING Example



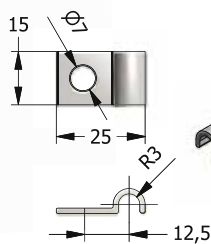
FITTING Combination Cross-Section View



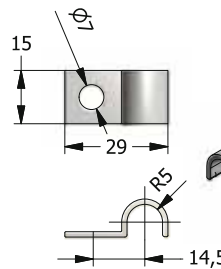
HOSE CLAMP



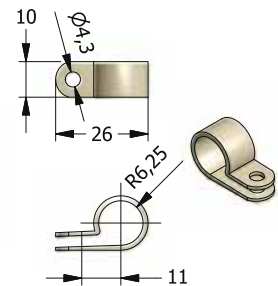
Use for fixing hose.



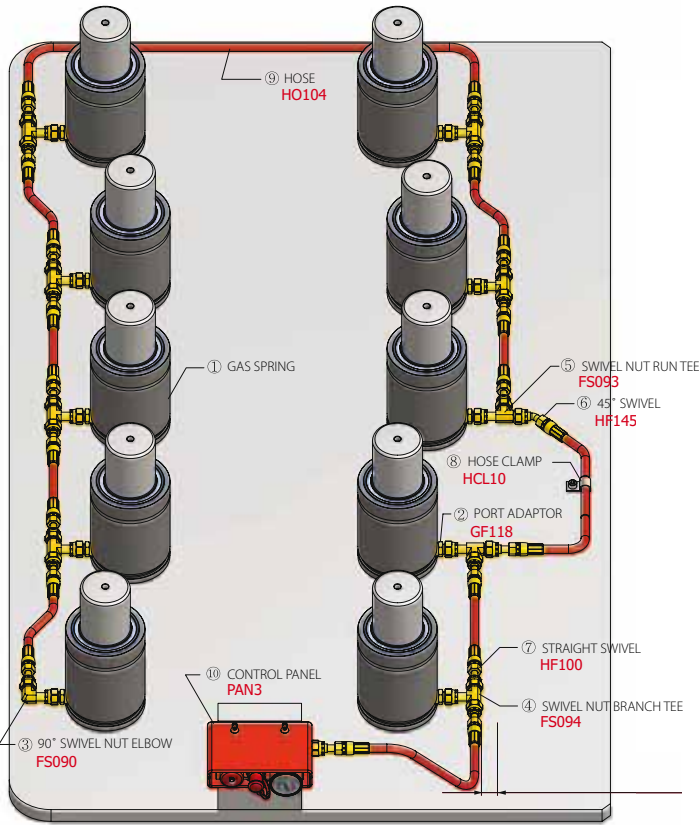
HCL06
HOSE_HO055 Fixing



HCL10
HOSE_HO104 Fixing



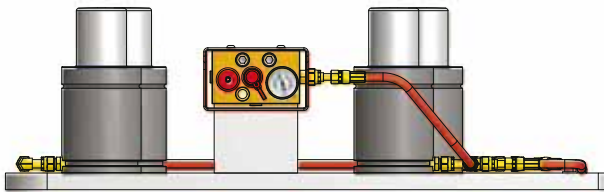
HCL48
HOSE_HO104 Fixing



PAN3 Application Piping Diagram I

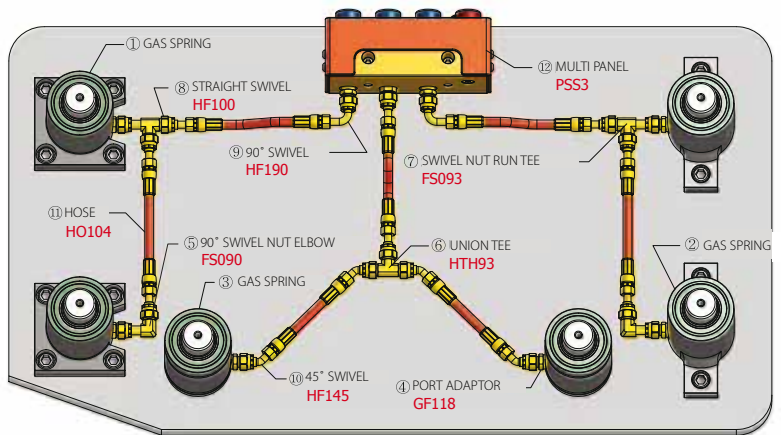
No.	MODEL	STANDARD	QTY.	PAGE
1	GAS SPRING	TSP4200 x 060	10	P26
2	PORT ADAPTOR	GF118	11	P79
3	90° SWIVEL NUT ELBOW	FS090	1	P79
4	SWIVEL NUT BRANCH TEE	FS094	7	P79
5	SWIVEL NUT RUN TEE	FS093	2	P79
6	45° SWIVEL	HF145	1	P79
7	STRAIGHT SWIVEL	HF100	19	P79
8	HOSE CLAMP	HCL10	1	P83
9	HOSE	HO104	10	P79
10	CONTROL PANEL	PAN3	1	P79

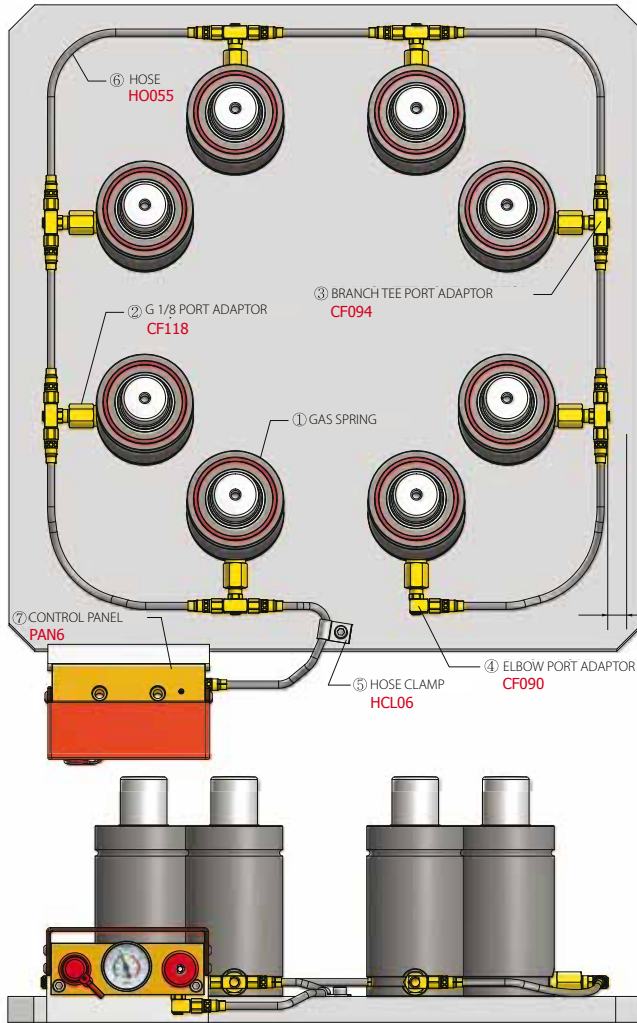
Working notice
(GF FITTING Application MODEL)
When you apply Fitting system, secure more than 20mm to avoid tool interference.



PSS3 Application Piping Diagram I

No.	MODEL	STANDARD	QTY.	PAGE
1	GAS SPRING	TSL1500 x 025-MSA	2	P65
2		TSL1500 x 025-MDA	2	P64
3		TSP4200 x 060	2	P64
4	PORT ADAPTOR	GF118	9	P79
5	90° SWIVEL NUT ELBOW	FS090	2	P79
6	UNION TEE	HTH93	1	P79
7	SWIVEL NUT RUN TEE	FS093	2	P79
8	STRAIGHT SWIVEL	HF100	8	P79
9	90° SWIVEL	HF190	2	P79
10	45° SWIVEL	HF145	4	P79
11	HOSE	HO104	7	P79
12	MULTI PANEL	PSS3	1	P76





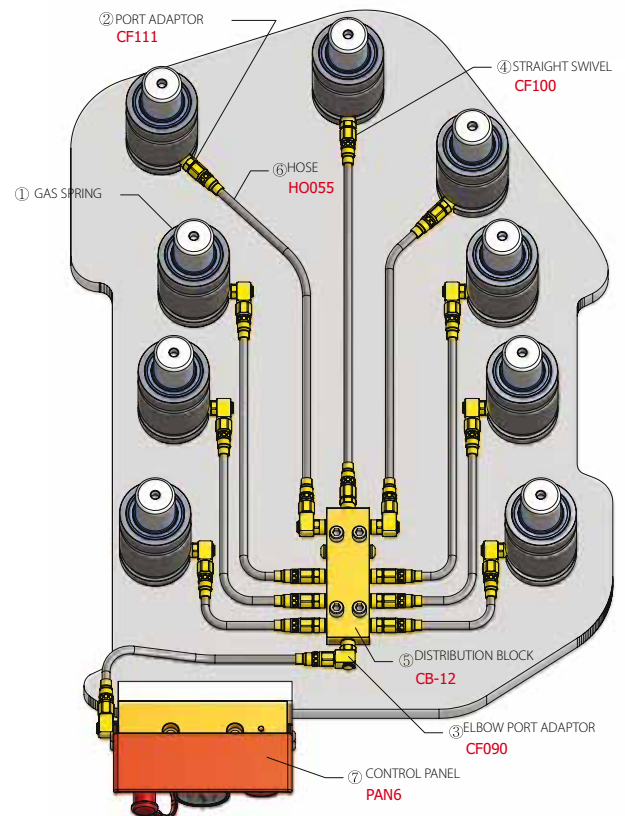
PAN6 Application Piping Diagram I

No.	MODEL	STANDARD	QTY.	PAGE
1	GAS SPRING	TSM1500 x 038	8	P42
2	G 1/8 PORT ADAPTOR	CF118	8	P78
3	BRANCH TEE PORT ADAPTOR	CF094	7	P78
4	ELBOW PORT ADAPTOR	CF090	2	P78
5	HOSE CLAMP	HCL06	1	P83
6	HOSE	HO055	8	P78
7	CONTROL PANEL	PAN6	1	P75

Working notice
 (COMPACT FITTING Application MODEL)
 When you apply Fitting system, secure more than 15mm to avoid tool interference.

PAN6 Application Piping Diagram II

No.	MODEL	STANDARD	QTY.	PAGE
1	GAS SPRING	TSP1000 x 030	9	P20
2	PORT ADAPTOR	CF111	10	P78
3	ELBOW PORT ADAPTOR	CF090	10	P78
4	STRAIGHT SWIVEL	CF100	20	P78
5	COMPACT 12 BLOCK	CB-12	1	P77
6	HOSE	HO055	10	P78
7	CONTROL PANEL	PAN6	1	P75





KARRYKRIMP

HK8201

Standard) HK8201

- HO104 Hose & Swivel hose adaptor presses
- KARRYKRIMP can combine HO104 Hose & Swivel hose adaptor Hose.

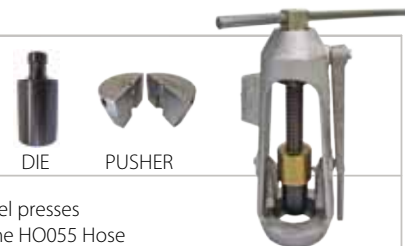


ASSEMBLING TOOL

MARK10

Standard) MARK10

- HO055 Hose & Straight Swivel presses
- Assembling tool can combine HO055 Hose and Straight Swivel.
- It is easy to carry, so suitable for moving around work place.



DIE

PUSHER

GAS BOOSTERS

S86JN

Standard) S86JN

- Gas booster increases gas pressure ratio to user's setting during charging gas of fitting

Pressure ratio (30:1)



HOSE ASSEMBLY

GCH100(Length:3m)

Standard) GCH100

- Charging Hose System



HOSE SCISSORS

HS10

Standard) HS10

- Hose Cutter



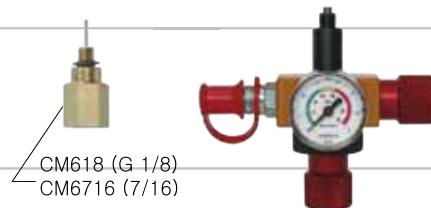
PRESSURE TESTER

PT118 (G1/8 type)

PT716 (7/16 type)

Standard) PT118

- Cross Pressure Tester
- Portable pressure tester is used for controlling and charging pressure of self contained type.
- Please select correct model which fits to product.



CM618 (G 1/8)
CM6716 (7/16)

CHARGING COUPLING

VC55

Standard) VC55

- Charging Female Coupling
- It combined with charging plug to charge gas.



CHARGING PLUG

VC1118 (G 1/8)

VC11716 (7/16)

Standard) VC1118

- Charging Male Plug
- It combined with charging coupling to charge gas.





COMPACT LOAD CELL

CLC
Standard

Standard) CLC1500



- Gas pressure gauge
- It measures accurate pressure by placing on product.
- Please select correct model which fits to product
- Unit
 - bar (0~350)
 - Mpa (0~35)

DIGITAL LOAD CELL

DLE10

Standard) DLE10



- Digital load checking gauge
- It measures load by placing gas spring on the gauge.
- Load Range
 - 0 ~ 10t (0 ~ 100kN)

VALVE TIGHTEN TOOL

VTT26R

Standard) VTT26R



- Torque Driver
- Used for assembly or disassembly of valve.
- Avoiding break a valve by Over Torque.

VALVE CONTROL TOOL

VCT06(M6 type)
VCT18(G 1/8 type)

Standard) VCT06



- Gas Control Tool
- Used for exhausting gas during disassembly gas spring.
- Please select correct model which fits product.

STOPRING REMOVAL TOOL

SRT42 (0350~4200)
SRT50 (5000~10000)

Standard) SRT42



- Used to remove gas during disassembly gas spring.
- Storing can be removed by storing removal tool after using valve control tool.
- Please select correct model which fits product.

T-REMOVAL TOOL

TRT06(M6 type)
TRT08 (M8 type)

Standard) TRT06



- Gas Spring Disassembly Tool
- Sequence
 - ① Remove the gas to valve control tools
 - ② Remove the ring by using the Storing Removal Tool.
 - ③ Isolates the Rod Ass'y from the cylinder using the T-Removal Tool.
- Please select correct model which fits product.

PRESSURE GAUGE

GAU350

Standard) GAU350



- Compact Pressure Gauge
- Unit
 - bar (0~350)
 - Mpa (0~35)

VALVE

CV100

Standard) CV100



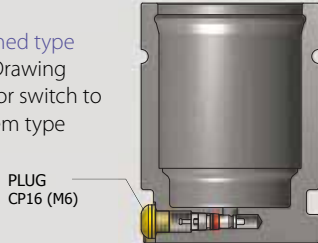
- Check Valve
- When you change fitting system type gas spring to self-contained type, you can assemble or disassemble with valve tighten tool.



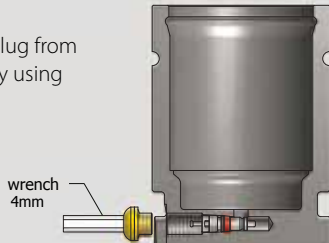
Self contained gas spring and fitting system type gas spring can be switched each other when condition of work changes.

Self-contained type (M6 PORT) → Fitting System type

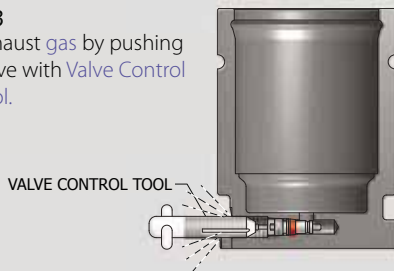
1.1
Self-contained type
Assembly Drawing
Preparing for switch to fitting system type



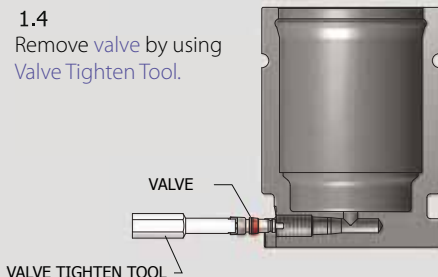
1.2
Remove plug from cylinder by using wrench.



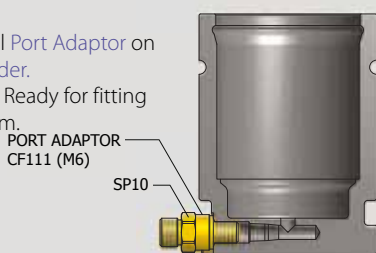
1.3
Exhaust gas by pushing valve with Valve Control Tool.



1.4
Remove valve by using Valve Tighten Tool.



1.5
Install Port Adaptor on Cylinder.
Now, Ready for fitting system.



APPLICATION MODEL

- TSP4200
- TSP6600
- TSP9500
- TSM1500
- TSM3000
- TSM5000
- TSS0750
- TSS1500
- TSS3000
- TSS5000
- TSL0500
- TSL0750
- TSL1500
- TSL3000
- TSL5000
- TSL7500
- TSL10000

Fitting system type ↔ Self-contained type
(G 1/8, 7/16 PORT)
2.1 ~ 2.5 reference

- TSP0350
- TSP0500
- TSP0750
- TSP1500
- TSP2400
- TSM0300
- TSM0500
- TSM0750

Self-contained type ↔ Fitting system type
(M6 PORT)
1.1 ~ 1.5 reference

PLUG PORT ADAPTOR Removal Tool

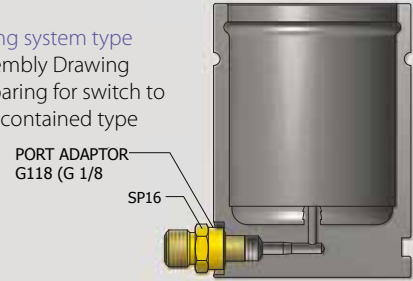
- 1.G 1/8
7/16-20 → 5mm wrench
- M6 → 4mm wrench
- 2. M6 PORT ADAPTOR
→ (SPANNER 10mm)
- 3.G 1/8
7/16 PORT ADAPTOR
→ (SPANNER 16mm)

* Task Note

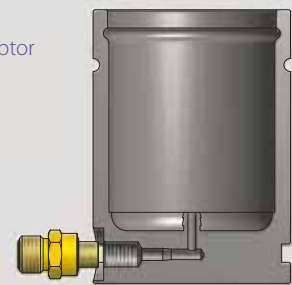
- 1.4 Make sure there is no residual gas left in the inside of cylinder before opening the valve. Then, remove the valve using valve
- 1.5 Make sure the O'ring places inside of the port adaptor before installation of cylinder.
- 1.4 Fasten the valve using valve tighten tool by torque of 9.8kgf cm.
- 1.4 Make sure the O'ring places inside of plug before installation of cylinder.

Fitting System type (G 1/8, 7/16 PORT) → Self-contained type (M6 PORT)

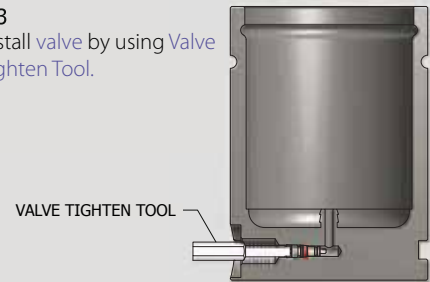
2.1
Fitting system type
Assembly Drawing
Preparing for switch to Self-contained type



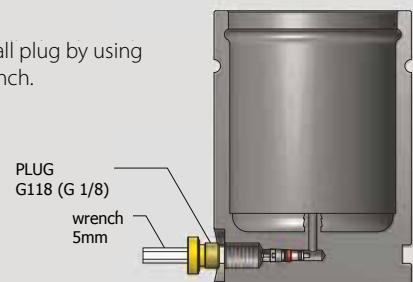
2.2
Remove Port Adaptor from cylinder.



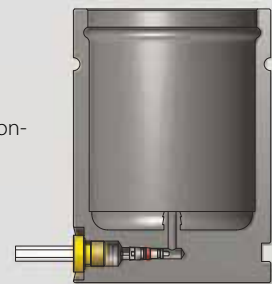
2.3
Install valve by using Valve Tighten Tool.



2.4
Install plug by using wrench.



2.5
Completing plug combination.
Now, ready for self-contained





■ Calculation of Pressure Ratio

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

EX) What is the pressure ratio when 50mm of stroke is applied with EOC GAS SPRING TSS5000 x 60?

$$1.45 = \frac{533.8}{533.8 - 5 \times 33.1}$$

F = Pressure Ratio
 Va = Volume of Accumulator(cm²)
 Vg = Volume of Gas Spring(cm²)
 n = Numbers of Gas Spring
 S = Real Used Stroke(cm²)
 R = Cross Section of piston Rod(cm²)

■ Calculation of Accumulator applied

$$F = \frac{V_a + V_g \times n}{V_a + (V_g - S \times R) \times n}$$

EX) What is pressure ratio when 50mm of stroke is applied with 12 of EOC GAS SPRING TSS 5000 x 60 and 2 of Accumulators TAN080-75?

$$1.12 = \frac{(5,880 \times 2) + 533.8 \times 12}{(5,880 \times 2) + (533.8 - 5 \times 33.1) \times 12}$$

■ Initial force gradient due to temperature

Volume increases as temperature increases, and volume decreases as temperature decreases. (PV = RT)

With constant pressure volume of any gas increases 1/273 by increment of 1 °C from 0 °C of temperature (Charles's Law).

P = Pressure
 V = Volume
 R = Gas Constant
 T = Temperature

$$\frac{V_1}{T_1} = \frac{V_2}{T_2} = K, \quad \frac{P_1}{T_1} = \frac{P_2}{T_2} \quad T_1 = \text{Initial temperature} \quad T_2 = \text{Final temperature}$$

Pressure is proportional to the force $\frac{F_1}{T_1} = \frac{F_2}{T_2} \Rightarrow F_2 = F_1 \times \frac{T_2}{T_1}$

EX) At 20°, what is force of gas spring if temperature of gas spring (initial force of 7,350N) is increased by 50° during operation?

absolute (K) = °C + 273

$F_1 = 7,350\text{N}, T_1 = 273 + 20^\circ\text{C} = 293^\circ\text{K}, T_2 = 273 + 50^\circ\text{C} = 323^\circ\text{K}$

$F_2 = 7,350 \times \frac{323}{293} = 8,100\text{N}$



■ Calculation of Pressure Ratio

* Weight conversion of Nitrogen gas

$P \times V = nRT$ (Ideal gas equation)

$$n = \frac{RV}{RT}$$

P = Pressure
V = Volume
n = Number of mol
R = Ideal gas constant
T = Absolute temperature

* Molecular weight of Nitrogen M = 28.0134
Volume of Nitrogen gas 1 mol = 22.4 Liter

EX) When you apply fitting system with 6 of EOC GAS SPRING TSM1500 x 60 and 10 of TSM5000 x 80, what is amount of nitrogen gas to be charged?

Specifications : Nitrogen gas charging pressure 120bar 35°C
Cylinder Volume (40.1 Liter)

Standard : Volume of TSM1500 x 60 = 205.6 cm³ Charging Pressure: 150 bar (20°C)
Volume of TSM1500 x 80 = 675.1cm³

Sol. 1)
$$\frac{120 \times 10^5 \times 40}{8314 \times (35 + 273) \times 1000} = 0.18745 \text{ kmol}$$

= 0.18745 (Number of mol) x 28.0134 (Molecular Weight of Nitrogen) = 5.25 kg

Sol. 2)
$$\frac{30 \times 10^5 \times 40}{8314 \times (35 + 273) \times 1000} = 0.04686 \text{ kmol}$$

= 0.04686 (Number of mol) x 28.0134 (Molecular Weight of Nitrogen) = 1.31 kg

☞ 5.25 – 1.31 = 3.94 kg (actually using gas)

Ex) When you apply fitting system with 6 of EOC GAS SPRING TSM1500 x 60 and 10 of TSM5000 x 80, what is amount of nitrogen gas to be charged?

Sol.) 205.6 cm³ x 6 + 675.1 cm³ x 10 = 7984.6 cm³ = 7.98 liter

$$n = \frac{150 \times 10^5 \times 7.98}{8314 \times (20 + 23) \times 1000} = 0.4914 \text{ kmol}$$

= 0.4914 (Number of mol) x 28.0134 (Molecular Weight of Nitrogen) = 1.38 kg

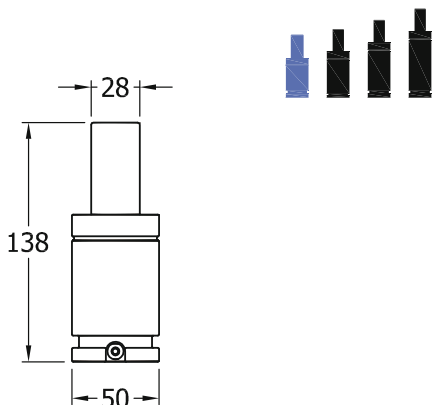
= If amount of charge in fitting line and Panel and actual using gas are considered as 50%, 40.1 Liter bomb can use 1.4 times with each 7.98Liter.



TSP Series

EXTRA HIGH POWER

Ex.MODEL TSP1000 X 050

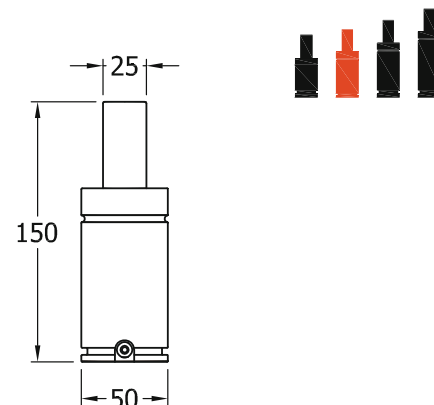


Model	Stroke (mm)	Rod \varnothing (mm)	Cylinder \varnothing (mm)	Initial Force (N)
TSP0170	7~125	11	19	1700
TSP0320	7~125	15	25	3200
TSP0350	10~125	16	32	3600
TSP0500	10~125	20	38	4700
TSP0750	10~125	25	45	7400
TSP1000	13~125	28	50	9200
TSP1500	13~125	36	63	15000
TSP2400	15~125	45	75	24000
TSP4200	15~125	60	95	42000
TSP6600	15~125	75	120	66000
TSP9500	20~125	90	150	95000

TSM Series

COMPACT TYPE

Ex.MODEL TSM0750 X 050

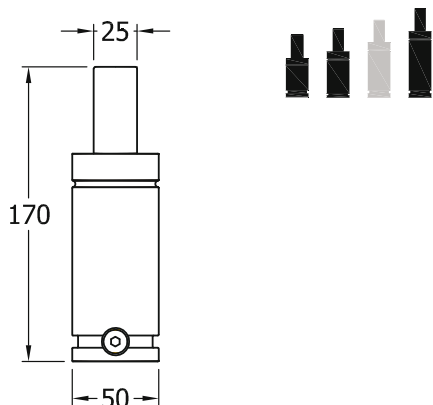


Model	Stroke (mm)	Rod \varnothing (mm)	Cylinder \varnothing (mm)	Initial Force (N)
TSM0150	10~80	12	25	500~2000
TSM0300	10~125	16	38	3000
TSM0500	10~125	20	45	4700
TSM0750	10~125	25	50	7350
TSM1500	10~200	36	75	15000
TSM3000	13~200	50	95	29300
TSM5000	13~200	65	120	49700

TSS Series

TSS STANDARD

Ex.MODEL TSS0750 X 050

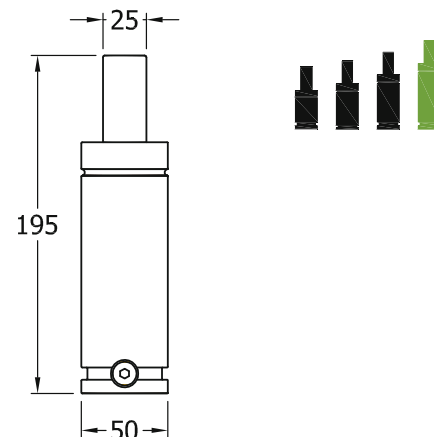


Model	Stroke (mm)	Rod \varnothing (mm)	Cylinder \varnothing (mm)	Initial Force (N)
TSS0750	10~200	25	50	7350
TSS1500	10~300	36	75	15000
TSS3000	10~300	50	95	29300
TSS5000	10~300	65	120	49700

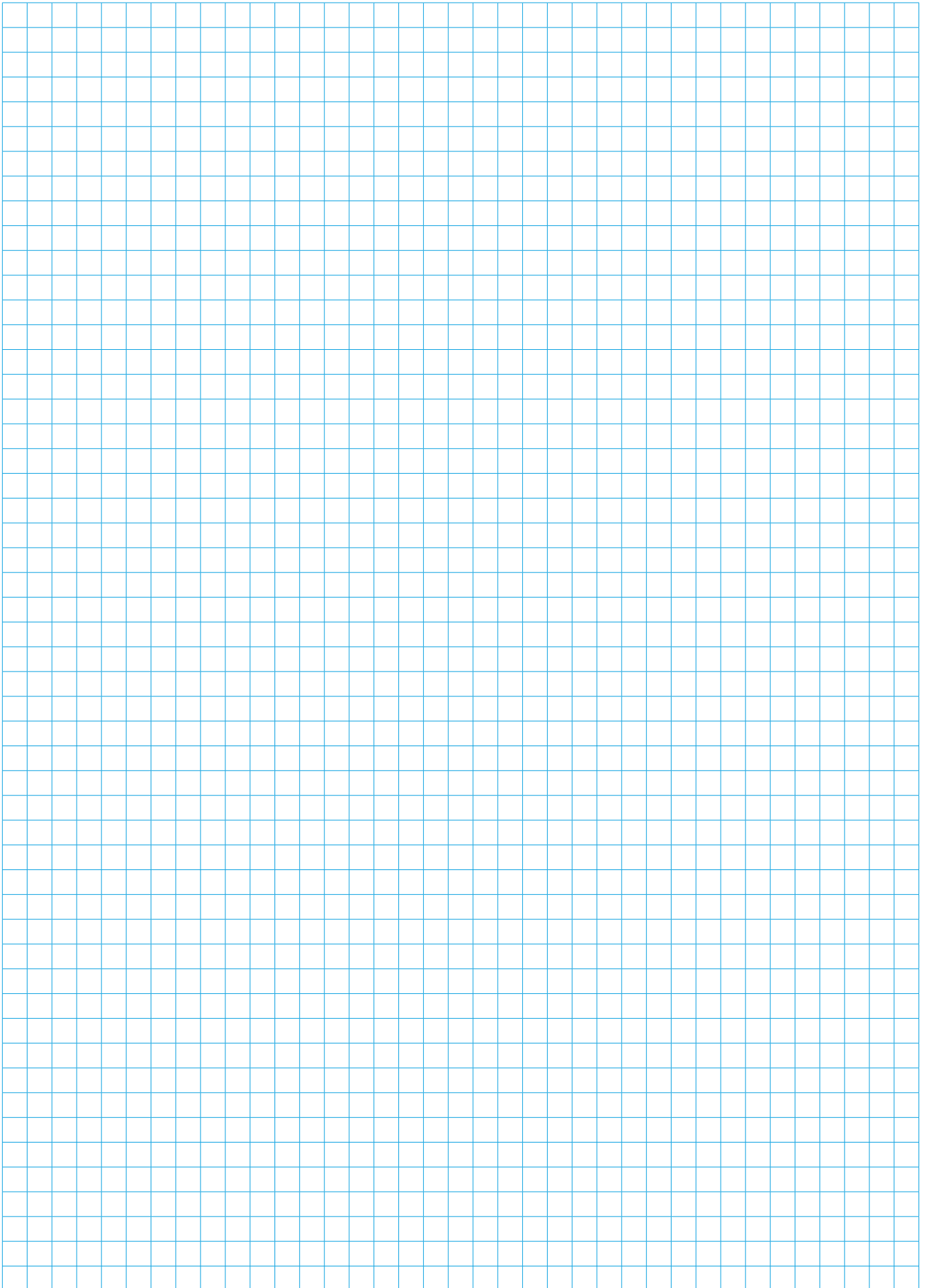
TSL Series

ISO STANDARD

Ex.MODEL TSL0750 X 050



Model	Stroke (mm)	Rod \varnothing (mm)	Cylinder \varnothing (mm)	Initial Force (N)
TSL0500	10~125	20	45	4700
TSL0750	10~300	25	50	7350
TSL1500	10~300	36	75	15000
TSL3000	10~300	50	95	29300
TSL50000	10~300	65	120	49700
TSL75000	10~300	80	150	75300
TSL100000	10~300	95	195	106200



GENERAL CONDITIONS OF SALE DME EUROPE

1. CONCLUSION OF CONTRACT - APPLICATION

The contract is validly entered into and the order is accepted after written confirmation by seller. These sales conditions apply to the exclusion of any other terms or conditions, unless expressly accepted in writing beforehand by the vendor.

Seller has 30 (thirty) days since the reception of the order to accept or to refuse it. During this period, buyer shall not withdraw his order.

Absence of any written confirmation of the order shall only be interpreted as being an implicit acceptance in case of performance of the order by seller.

2. PAYMENT

Unless otherwise agreed in writing, invoices are payable in the stated currency within 30 (thirty) days after invoice date to the bank designated by seller. Transfer charges are for account of buyer.

If buyer does not pay within this term, seller shall automatically have ipso jure and without any prior formal notice, the right to charge legal interest plus 2 % from due date of the invoice. Moreover, in case of late payment, a fixed indemnity corresponding to 10 % of the payable amount shall automatically be due from the first day following the due date, without prejudice to seller's right to prove higher damage and ask for corresponding indemnity. Should payment be in foreign currency, seller has the right to adapt the foreign currency in case of depreciation of this foreign currency in regard of the euro.

Should payment of the delivered goods be in instalments, the non-payment of one of the instalments gives seller the right to terminate the contract. The payments, which were done until then, shall remain property of seller as indemnity, without prejudice to the right to claim further damages or to the right to require the performance of the contract.

Payment of advance shall not give buyer the right to terminate the contract upon reimbursement of the paid advance. If payment is done by bill of exchange or check, payment is deemed satisfied only when the bill of exchange or the check is honoured.

Place of payment is always Mechelen even if payment is done with bill of exchange.

3. RETENTION OF TITLE

Delivered goods remain property of seller until full payment has been received by seller. The sale of an unpaid item by buyer to a third party results in automatic assignment of the debt due by the third party to buyer, inclusively the retention of title, to seller. Seller has then the authority to take any necessary means in order to validly assign towards the third party. Seller may retake unpaid goods at any time and he may inform any client and/or any subcontractor of buyer about the fact that seller is and remains the only owner of the concerned goods until full payment.

The purchaser undertakes to carefully keep the goods that have not been paid for, and undertakes not to pledge them or use them in any other way as a guarantee or security. The purchaser shall inform third parties who may apply any security rights over his assets (such as, but not limited to, the lessor of the premises occupied by the purchaser) that the products are and shall remain the property of the vendor until full payment of all sums owed by the purchaser to the vendor, and in the event of an attachment or other measures taken by third parties that apply to products for which full payment has not yet been made the purchaser undertakes to immediately inform the vendor of this to enable him to apply his rights.

4. RISKS

Notwithstanding the preceding provisions, the risk transfers to buyer as soon as he has the goods at his disposal.

5. DISPATCHING OF INSIGNIFICANT VALUE

Each dispatch of less than € 50 will be increased with costs of payments and may, at seller's option, be sent cash on delivery (COD).

6. PRICE OFFERS AND PRICE LISTS

Price offers and price lists are without obligation and are subject to change without any previous notice.

Any information released by seller is delivered in good faith and seller shall not be responsible for the choice of material and goods.

7. PRICE AND DISPATCHING

All prices are ex works. Transportation, duties and taxes for account of buyer, unless seller's previous and express written specification to the contrary. Seller shall send goods by the fastest and most economic way at the risks of buyer. Goods may be insured by seller at buyer's option, the insurance premiums are for buyer. Seller is not responsible for the choice of packing.

8. DELIVERY

Date of delivery is the date when the goods are ready for inspection at the indicated place. Place of origin is Mechelen, Belgium, or any other place indicated by seller. Seller is not responsible for any late delivery, except those delays due to his own fault or gross negligence.

9. RETURNING OF GOODS

No goods can be returned without seller's previous, express and written consent. If buyer commits an error in ordering, the retaking of goods is possible only for inventory standard items. Goods must be returned within 15 (fifteen) days after invoice date and all goods must be in original conditions; all costs of transport are for buyer, as well as insurance and repacking costs. Special-order goods, marked or used items are non-returnable.

10. DEFECTS

Seller warrants defects in material and/or workmanship. Warranty is limited to the replacement or repair, at seller's option, of any merchandise found defective during 1 month. This warranty does not include defects due to buyer's fault or to abnormal use, bad maintenance, imperfect installation, buyer's inadequate repair, unforeseeable circumstances or in case changes were brought to material without previous and express written approval of seller.

Notice of conspicuous defects must be given to seller by registered letter sent within 10 (ten) working days following date of delivery.

Notice of hidden defects must be given to seller by registered letter within 10 (ten) working days after date of discovery, and in any case, within a 10-month term following date of delivery.

Seller is not responsible for any damage and in particular salary and material costs, losses, loss of profit or loss of a chance incurred by buyer, unless it is demonstrated that defect is due to seller's gross or intentional fault. If seller is responsible for a defect, seller has the right either to terminate the contract and to pay back all the invoiced prices or to replace the delivered product within a reasonable term. If goods for repair must be transported, costs and risks of this transport are for buyer.

In case seller is responsible for any damage, this will be limited to the foreseeable damage with a maximum amount corresponding to the amount of the product's invoiced price.

Should a third party lodge a claim against seller to obtain payment of an indemnity for a damage for which seller is not responsible in accordance with the present conditions or for a higher amount than the one seller is responsible for, buyer will warrant seller against those claims.

11. DESCRIPTION

Only product descriptions used in seller's latest literature and correspondence with buyer, are binding for description of goods.

Buyer is responsible for using items in conformity with all regulations, including but not limited to, the safety regulations in force at the place of use.

12. SPECIFIC ORDERS

For the performance of a special work, the project signed by buyer is binding to the extent it has been accepted by seller.

For the performance of such work, special conditions may be required. In case of any inconsistency between general conditions and special conditions, the special conditions shall apply. Should special conditions be unclear, they shall be interpreted in light of the general conditions.

13. ACT OF GOD

Seller shall not pay any damage for non-performance or late performance of his undertakings due to Act of God. Act of God includes in particular and without being limited thereto, strike, lock-out, and the non-performance by seller's suppliers of their undertakings.

14. VALIDITY AND INDIVIDUAL CLAUSES

If one or more provisions of these present general conditions are held to be invalid, the remaining provisions will continue to be valid and enforceable, and parties will agree upon other provisions having an economic effect that corresponds closest to the economic effect of the invalid provision(s).

15. WAIVER

In case seller does not exercise one of his rights in accordance with the present conditions, this shall not be interpreted as a waiver of these rights.

16. APPLICABLE LAW – COMPETENT COURTS

This sales contract will be governed by Belgian law. The competent court is the Commercial Court of Mechelen, without prejudice to seller's right to introduce the case before another competent court.



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