

# TSL SERIES



## NITROGEN GAS SPRING

TSL0500	472
TSL0750	474
TSL1500	476
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TSL7500	482
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## ISO STANDARD

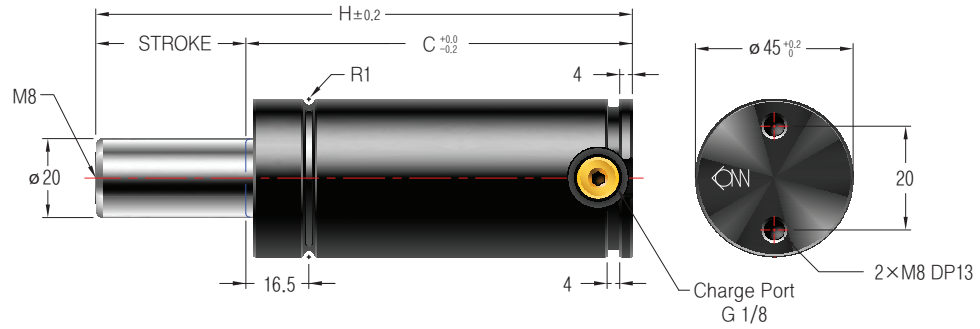
### ■ 일반 제원

- 충전재 질소가스 (N<sub>2</sub>)
- 최대 충전 압력 150 bar (at 20°C)
- 최소 충전 압력 25 bar (at 20°C)
- 작동 온도 0 to 80°C
- 온도에 따른 압력 증가량 ±0.3% / °C
- 피스톤 로드 속도 0~0.8 m/s
- 로드 표면처리 도금 열처리
- 실린더 표면처리 흑산화 피막

### ■ Model별 제원

종류 Type	Stroke (mm)	실린더 외경 ø(mm)	Rod 외경 ø(mm)	초기하중 (N)	최대하중 (N)	최대 충전 압력	권장최대 스트로크 (20°C)
TSL0500	10~160	45	20	4,650	6,200	150Bar	~40 to 80
TSL0750	10~300	50	25	7,350	11,500	150Bar	~15 to 40
TSL1500	10~300	75	36	15,150	22,100	150Bar	~15 to 40
TSL3000	10~300	95	50	29,400	47,300	150Bar	~15 to 40
TSL5000	10~300	120	65	49,650	83,900	150Bar	~15 to 40
TSL7500	15~300	150	80	75,300	123,900	150Bar	~15 to 40
TSL10000	20~300	195	95	106,200	156,600	150Bar	~15 to 40

※ 상기 사양은 성능개선을 위해 예고없이 변경될 수 있습니다.



규격표기방법

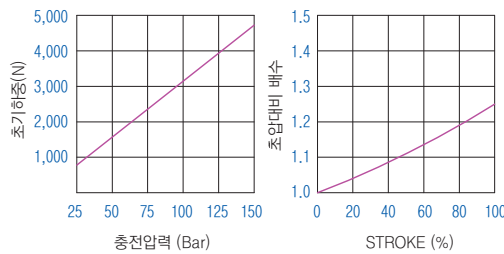
Catalog No.	STROKE	단독형-S 배관형-F	충전압력 (Bar)
TSL0500	050	S(F)	150
MOUNT	SP0500		
REPAIR KIT	RCL0500		

\* 충전압력은 별도 요구시만 명시하고 지정표기가 없을 경우 표준충전압력 150bar로 충전됩니다.

TSL0500							
Stroke (mm) (inch)	H	C	Force (N) (150 bar/+20°C)		Gas vol. (cm <sup>3</sup> )	Weight (kg)	ISO
			Initial	End force*			
10	0.39	105	95	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	161.2	123.1	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  
\* 기타 특수한 규격은 당사에 문의 바랍니다.

■ 충전압력/압축량 대비 하중변화도표



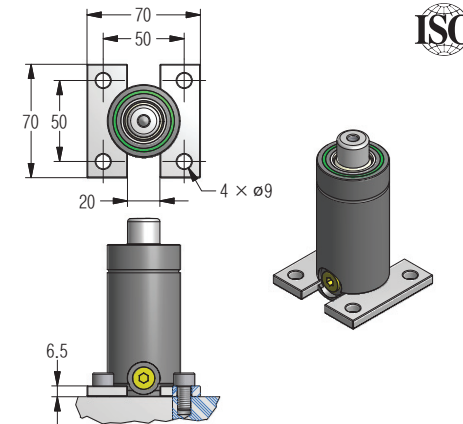
■ TSL0500의 충전 압력(Bar) 계산식

$$\text{충전압력(Bar)} = \frac{\text{초기하중(N)}}{31.4}$$

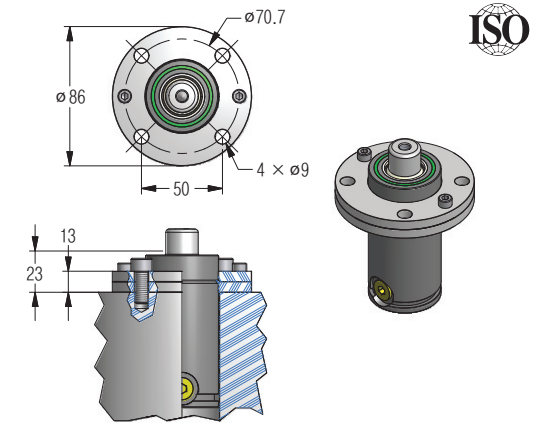
ex) 필요한 초기하중 4,000N인 GAS SPRING의 충전압력은?

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

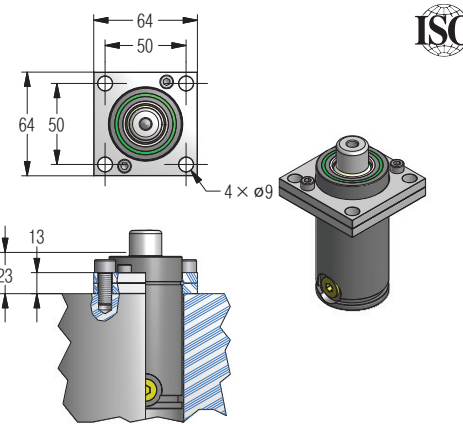
SP0500 MOUNT



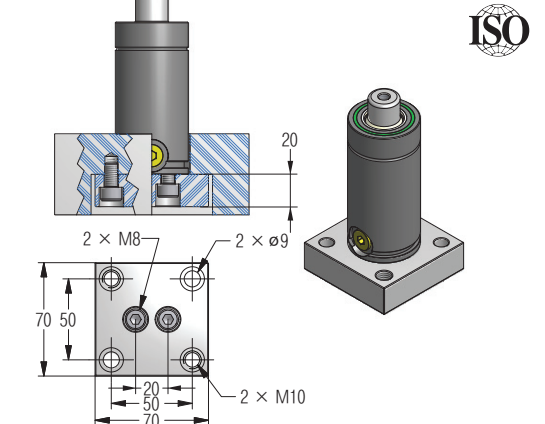
SR0500 MOUNT



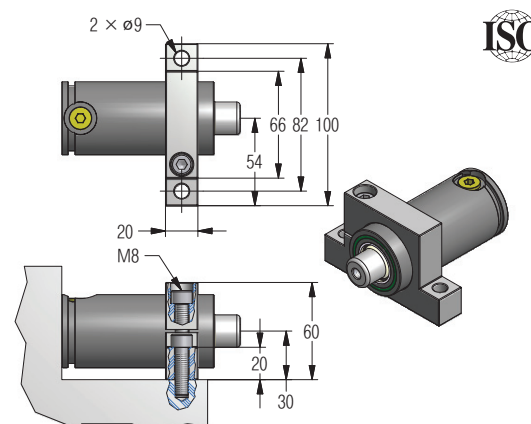
ST0500 MOUNT

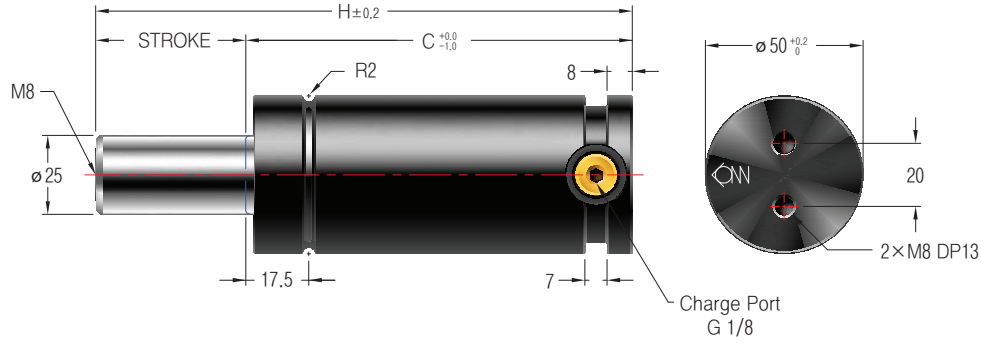


SB0500 MOUNT



SC0500 MOUNT





규격표기방법

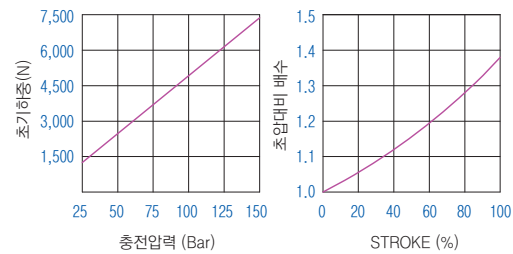
Catalog No.	STROKE	단독형-S 배관형-F	일체형 마운트 (선택사항)	충전압력 (Bar)
TSL0750	050	S(F)	(MSA)	150
MOUNT	SP0750			
REPAIR KIT	RCL0750			

\* 충전압력은 별도 요구시만 명시하고 지정표기가 없을 경우 표준충전압력 150bar로 충전됩니다.

TSL0750						
Stroke (mm) (inch)	H	C	Force (N) (150 bar/+20°C)		Gas vol. (cm <sup>3</sup> )	Weight (kg)
			Initial	End force*		
10	0.39	115	105	8,400	40.2	1.32
12.7	0.50	120.4	107.7	8,600	43.6	1.34
15	0.59	125	110	8,700	46.5	1.35
20	0.79	135	115	9,000	52.8	1.40
25	0.98	145	120	9,300	59.0	1.44
30	1.18	155	125	9,500	65.3	1.50
35	1.38	165	130	9,700	71.6	1.54
38	1.50	171	133	9,800	75.4	1.58
40	1.57	175	135	9,800	77.9	1.59
45	1.77	185	140	10,000	84.2	1.64
50	1.97	195	145	10,100	90.4	1.68
60	2.36	215	155	10,300	103.0	1.78
63	2.48	222	158	10,300	106.8	1.82
70	2.76	235	165	10,500	115.6	1.87
75	2.95	245	170	10,500	121.8	1.91
80	3.15	255	175	10,600	128.1	1.98
90	3.54	275	185	10,700	140.7	2.06
100	3.94	295	195	10,800	153.2	2.14
125	4.92	345	220	11,000	184.6	2.30
150	5.91	395	245	11,100	216.0	2.61
160	6.30	415	255	11,200	228.6	2.72
175	6.89	445	270	11,200	247.4	2.84
200	7.87	495	295	11,300	278.8	3.08
250	9.84	595	345	11,500	341.6	3.60
300	11.81	695	395	11,500	404.4	4.07

\*=at full stroke  
\* 기타 특수한 규격은 당사에 문의 바랍니다.

■ 충전압력/압축량 대비 하중변화도표



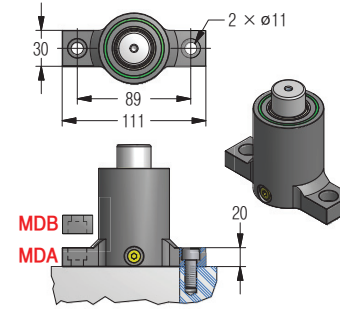
■ TSL0750의 충전 압력(Bar) 계산식

$$\text{충전압력(Bar)} = \frac{\text{초기하중(N)}}{49.1}$$

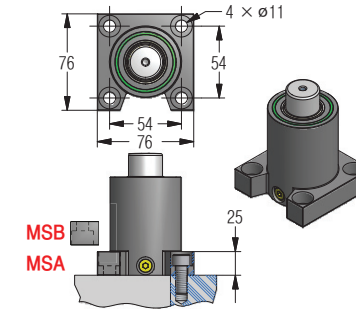
ex) 필요한 초기하중 6,000N인 GAS SPRING의 충전압력은?

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

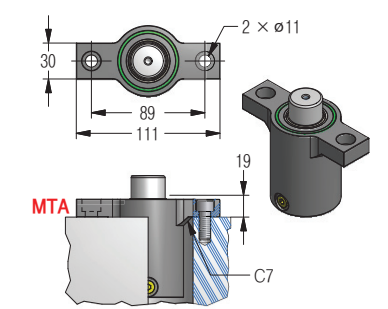
MD MOUNT 일체형



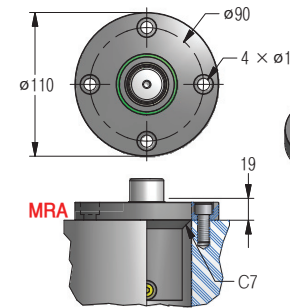
MS MOUNT 일체형



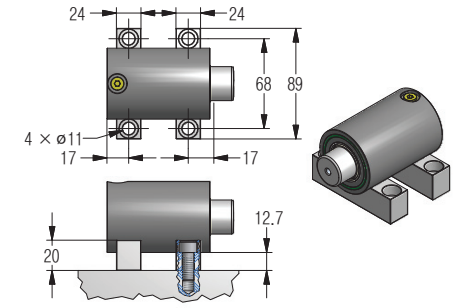
MT MOUNT 일체형



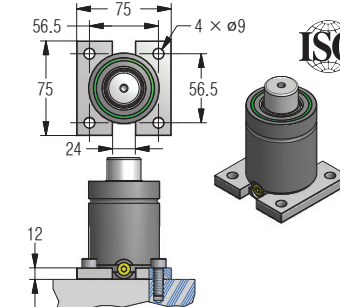
MR MOUNT 일체형



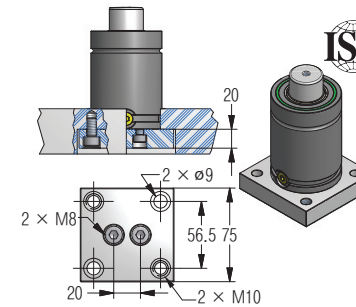
MK MOUNT 일체형



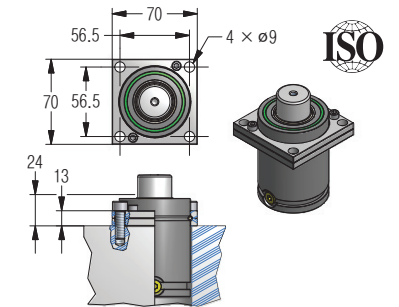
SP0750 MOUNT



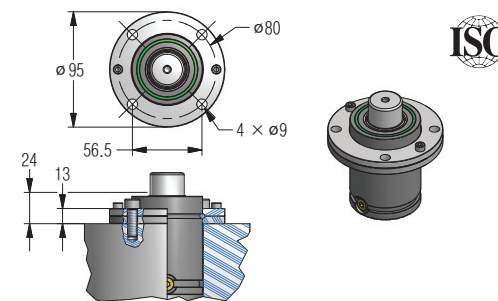
SB0750 MOUNT



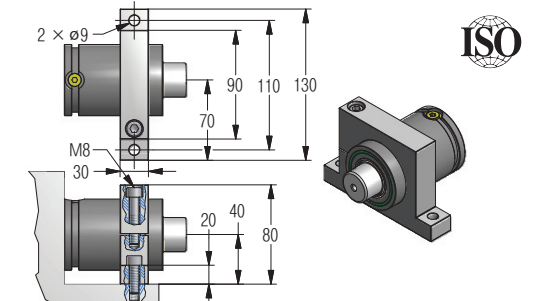
ST0750 MOUNT

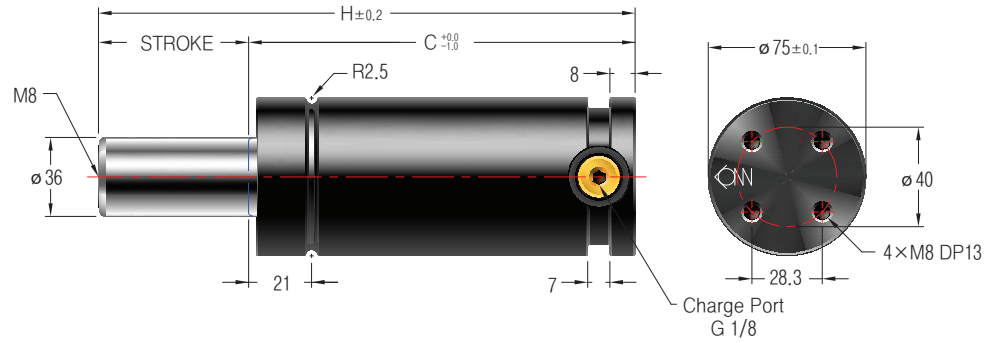


SR0750 MOUNT



SC0750 MOUNT





규격표기방법

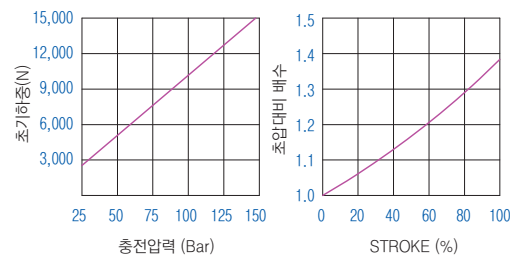
Catalog No.	STROKE	단독형-S 배관형-F	일체형 마운트 (선택사항)	충전압력 (Bar)
TSL1500	050	S(F)	(MSA)	150
MOUNT	SP1500			
REPAIR KIT	RCL1500			

\* 충전압력은 별도 요구시만 명시하고 지정표기가 없을 경우 표준충전압력 150bar로 충전됩니다.

TSL1500						
Stroke (mm) (inch)	H	C	Force (N) (150 bar/+20°C)		Gas vol. (cm <sup>3</sup> )	Weight (kg)
			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  
\* 기타 특수한 규격은 당사에 문의 바랍니다.

■충전압력/압축량 대비 하중변화도표



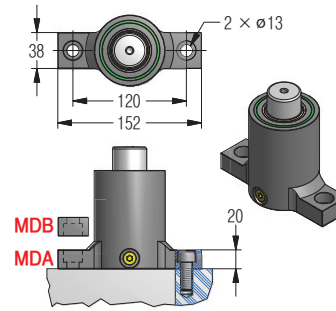
■TSL1500의 충전 압력(Bar) 계산식

$$\text{충전압력(Bar)} = \frac{\text{초기하중(N)}}{101.7}$$

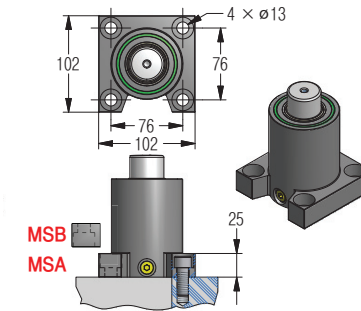
ex) 필요한 초기하중 12,000N인 GAS SPRING의 충전압력은?

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

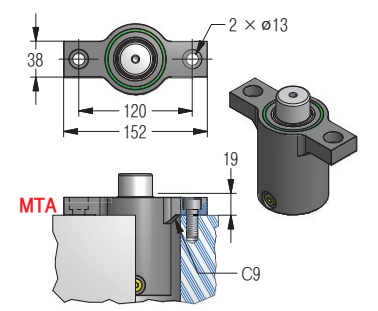
MD MOUNT 일체형



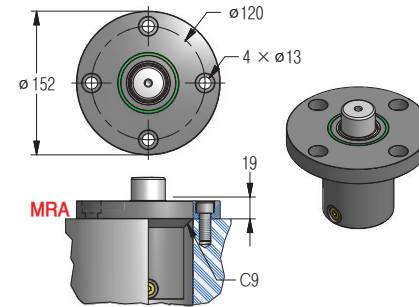
MS MOUNT 일체형



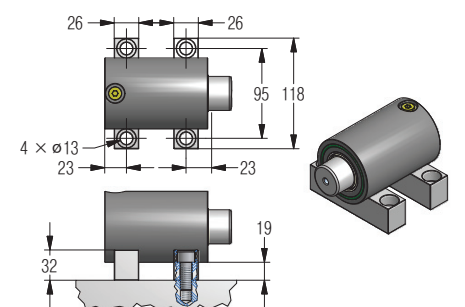
MT MOUNT 일체형



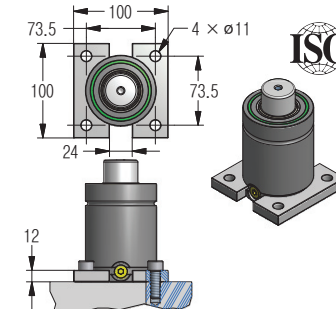
MR MOUNT 일체형



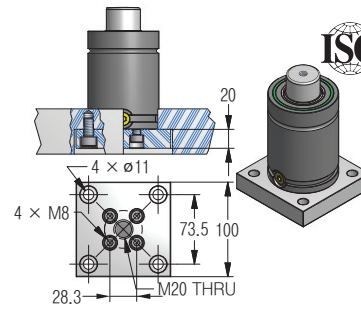
MK MOUNT 일체형



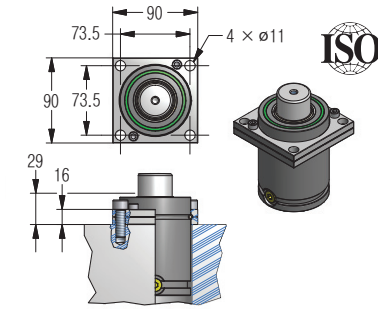
SP1500 MOUNT



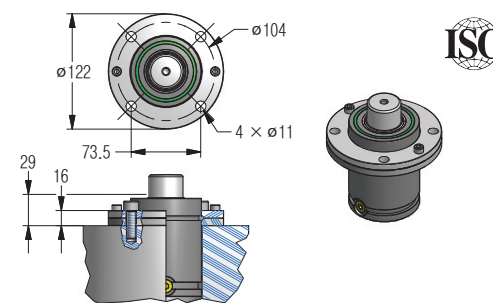
SB1500 MOUNT



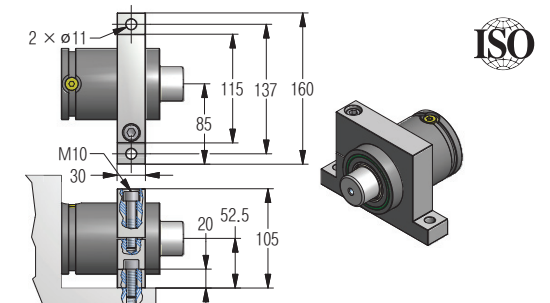
ST1500 MOUNT

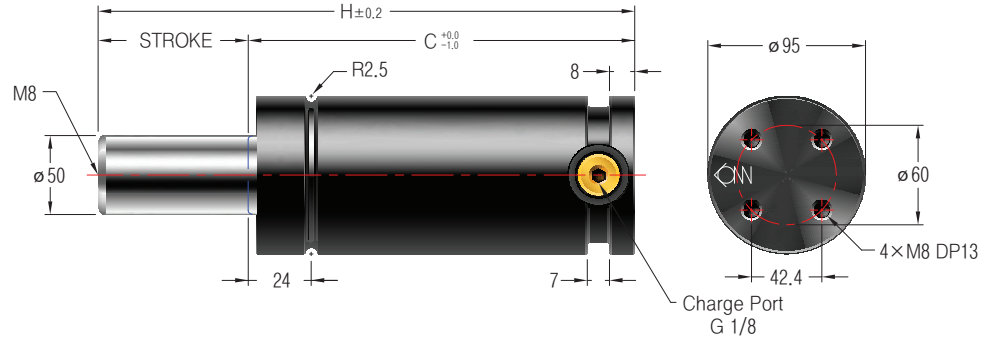


SR1500 MOUNT



SC1500 MOUNT





규격표기방법

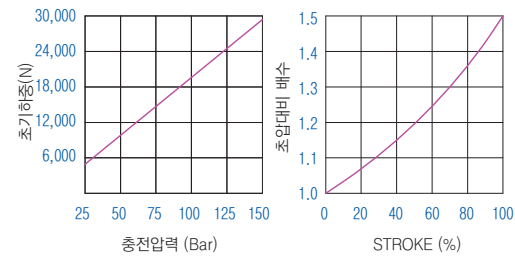
Catalog No.	STROKE	단독형-S 배관형-F	일체형 마운트 (선택사항)	충전압력 (Bar)
TSL3000	050	S(F)	(MSA)	150
MOUNT	SP3000			
REPAIR KIT	RCL3000			

\* 충전압력은 별도 요구시만 명시하고 지정표기가 없을 경우 표준충전압력 150bar로 충전됩니다.

TSL3000						
Stroke (mm) (inch)	H	C	Force (N) (150 bar/+20°C)		Gas vol. (cm <sup>3</sup> )	Weight (kg)
			Initial	End force*		
10	0.39	140	130	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	1,050.0	12.46
250	9.84	620	370	47,200	1,301.2	14.23
300	11.81	720	420	47,300	1,552.4	16.00

\*=at full stroke  
\* 기타 특수한 규격은 당사에 문의 바랍니다.

■ 충전압력/압축량 대비 하중변화도표



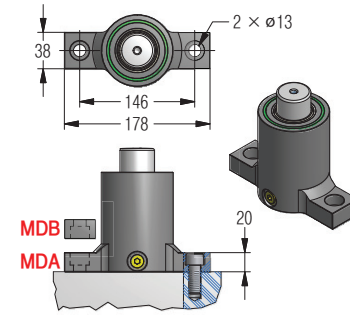
■ TSL3000의 충전 압력(Bar) 계산식

$$\text{충전압력(Bar)} = \frac{\text{초기하중(N)}}{196.2}$$

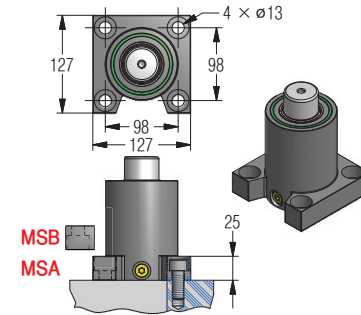
ex) 필요한 초기하중 25,000N인 GAS SPRING의 충전압력은?

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

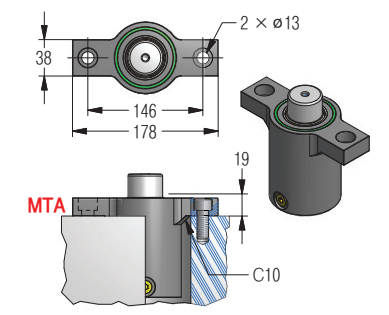
MD MOUNT 일체형



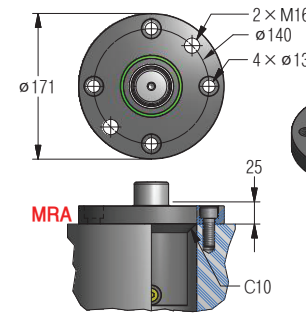
MS MOUNT 일체형



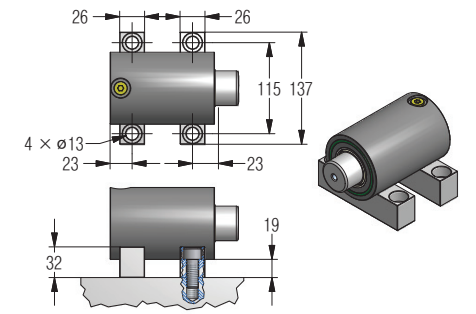
MT MOUNT 일체형



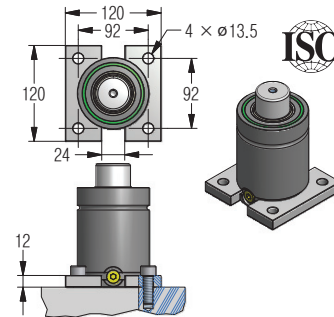
MR MOUNT 일체형



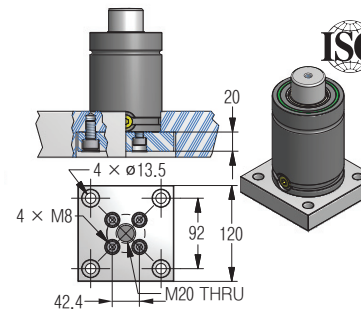
MK MOUNT 일체형



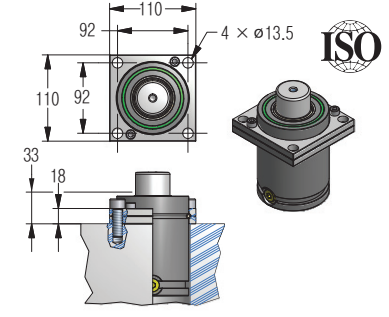
SP3000 MOUNT



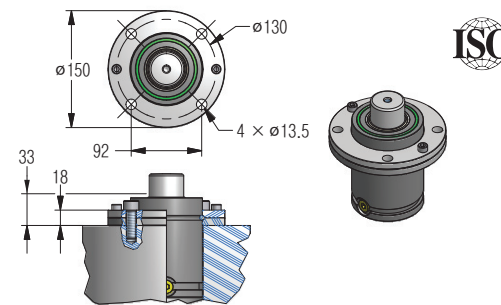
SB3000 MOUNT



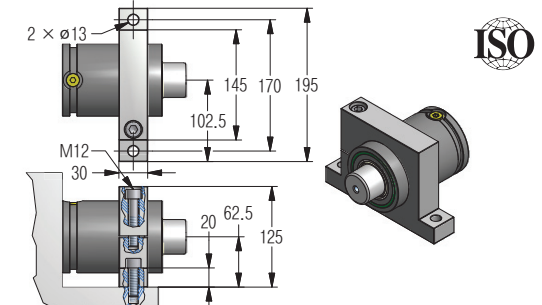
ST3000 MOUNT

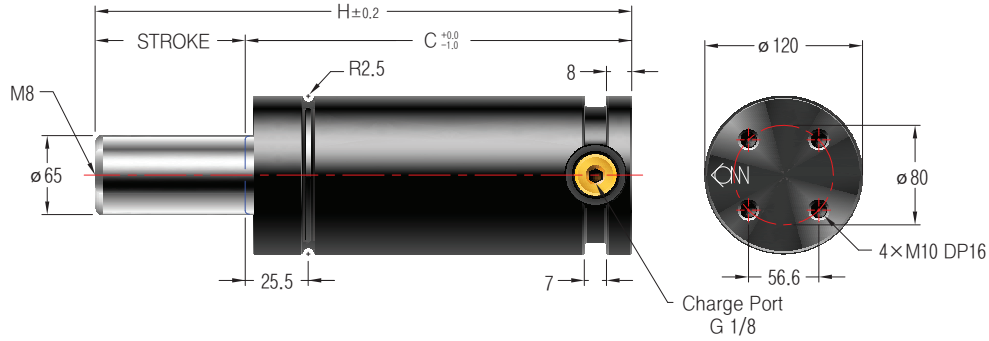


SR3000 MOUNT



SC3000 MOUNT





규격표기방법

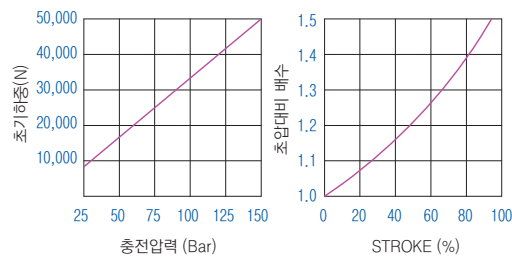
Catalog No.	STROKE	단독형-S 배관형-F	일체형 마운트 (선택사항)	충전압력 (Bar)
TSL5000	050	S(F)	(MSA)	150
MOUNT	SP5000			
REPAIR KIT	RCL5000			

\* 충전압력은 별도 요구시만 명시하고 지정표기가 없을 경우 표준충전압력 150bar로 충전됩니다.

TSL5000						
Stroke (mm) (inch)	H	C	Force (N) (150 bar/+20°C)		Gas vol. (cm <sup>3</sup> )	Weight (kg)
			Initial	End force*		
10	0.39	159.5	149.5	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	1,059.8	18.05
150	5.91	440	290	82,100	1,256.0	18.44
160	6.30	460	300	82,300	1,334.5	18.83
175	6.89	490	315	82,600	1,452.3	19.22
200	7.87	540	340	83,000	1,648.5	19.61
250	9.84	640	390	83,500	2,041.0	20.31
300	11.81	740	440	83,900	2,433.5	21.01

\*=at full stroke  
\* 기타 특수한 규격은 당사에 문의 바랍니다.

■충전압력/압축량 대비 하중변화도표



■TSL5000의 충전 압력(Bar) 계산식

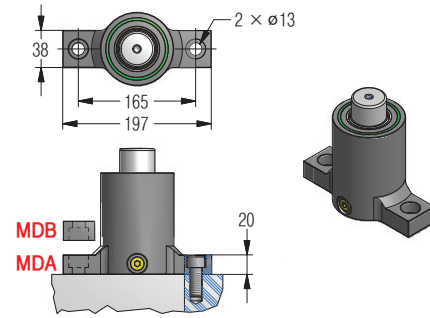
$$\text{충전압력(Bar)} = \frac{\text{초기하중(N)}}{331.7}$$

ex) 필요한 초기하중 38,000N인 GAS SPRING의 충전압력은?

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

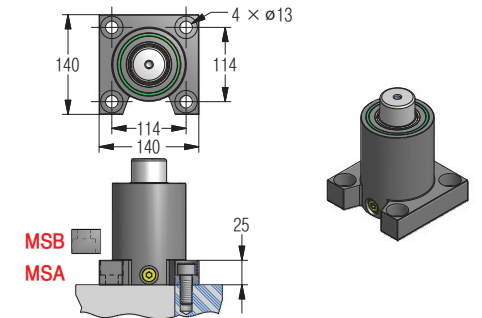
MD MOUNT

일체형



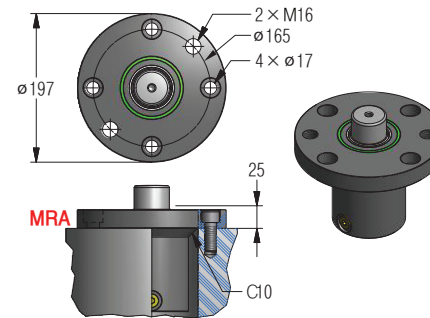
MS MOUNT

일체형



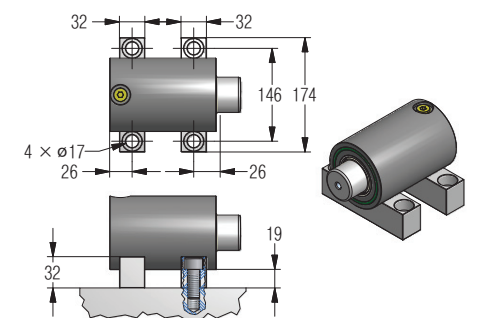
MR MOUNT

일체형



MK MOUNT

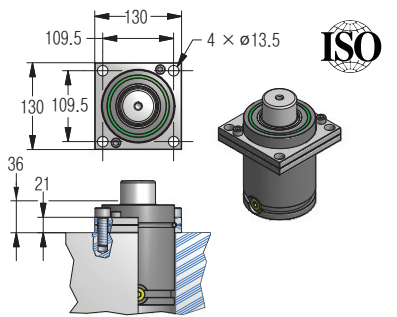
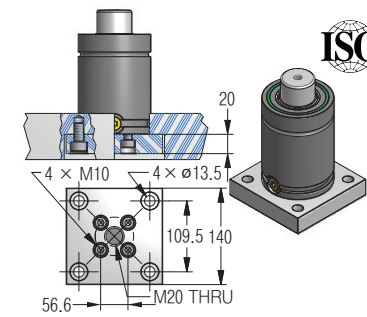
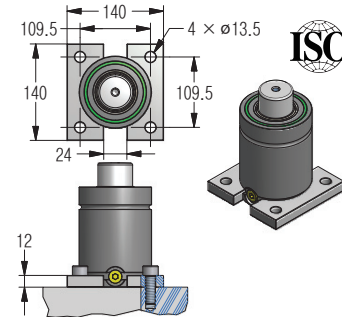
일체형



SP5000 MOUNT

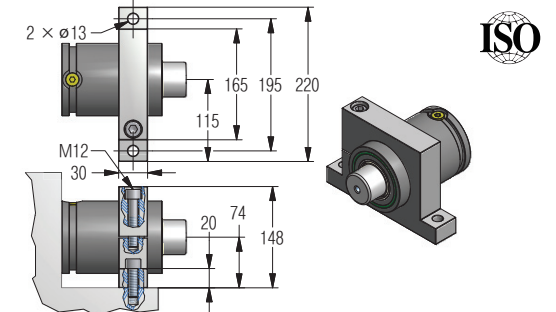
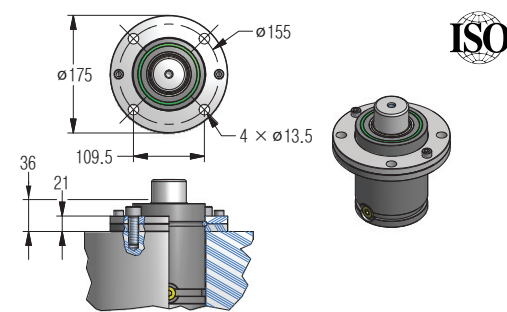
SB5000 MOUNT

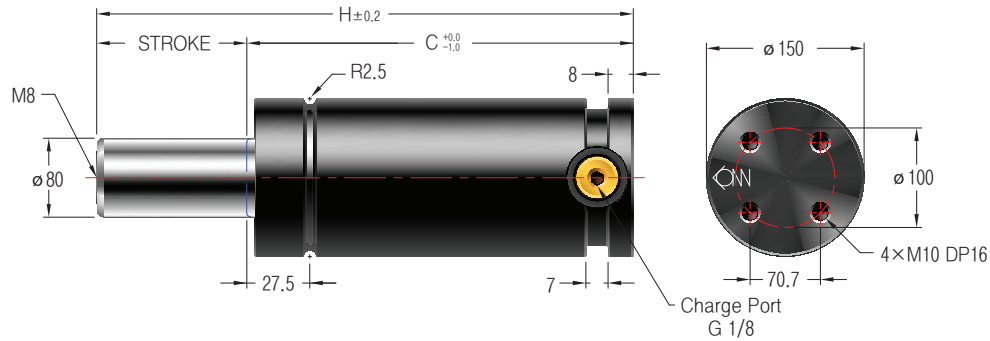
ST5000 MOUNT



SR5000 MOUNT

SC5000 MOUNT





규격표기방법

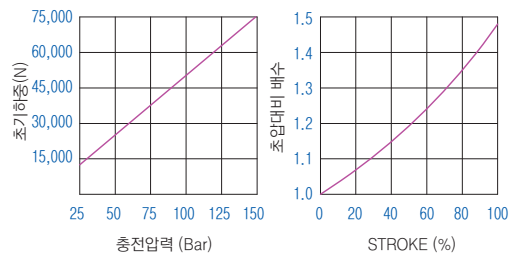
Catalog No.	STROKE	단독형-S 배관형-F	일체형 마운트 (선택사항)	충전압력 (Bar)
TSL7500	050	S(F)	(MSA)	150
MOUNT	SP7500			
REPAIR KIT	RCL7500			

\* 충전압력은 별도 요구시만 명시하고 지정표기가 없을 경우 표준충전압력 150bar로 충전됩니다.

TSL7500						
Stroke (mm)	Stroke (inch)	H	C	Force (N) (150 bar/+20°C)		Weight (kg)
				Initial	End force*	
15	0.59	185	170	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	1,018.0	31.80
75	2.95	305	230	115,600	1,079.4	33.20
80	3.15	315	235	116,200	1,140.7	34.40
90	3.54	335	245	117,200	1,263.4	35.40
100	3.94	355	255	118,100	1,386.0	36.50
125	4.92	405	280	119,700	1,692.7	37.40
150	5.91	455	305	120,800	1,999.3	38.50
160	6.30	475	315	121,200	2,122.0	39.40
175	6.89	505	330	121,600	2,305.9	40.40
200	7.87	555	355	122,300	2,612.6	41.70
250	9.84	655	405	123,200	3,225.9	42.60
300	11.81	755	455	123,900	3,839.1	43.70

\*=at full stroke  
\* 기타 특수한 규격은 당사에 문의 바랍니다.

■충전압력/압축량 대비 하중변화도표



■TSL7500의 충전 압력(Bar) 계산식

$$\text{충전압력(Bar)} = \frac{\text{초기하중(N)}}{502.4}$$

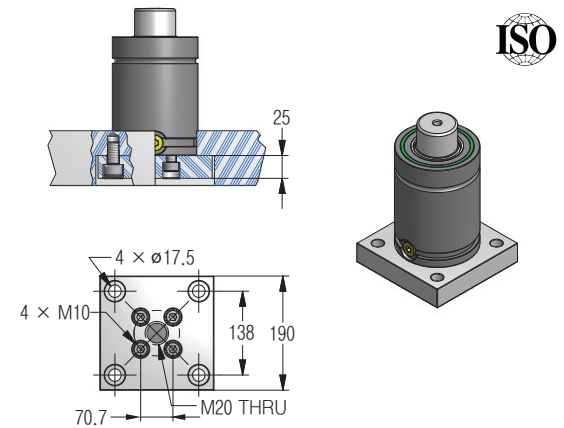
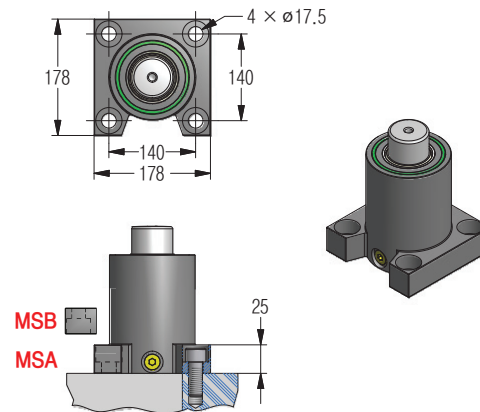
ex) 필요한 초기하중 65,000N인 GAS SPRING의 충전압력은?

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

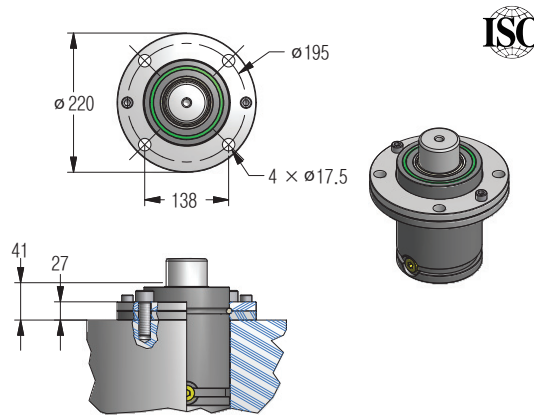
MS MOUNT

일체형

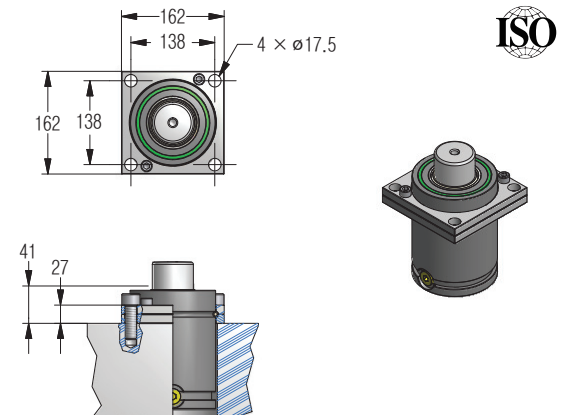
SB7500 MOUNT



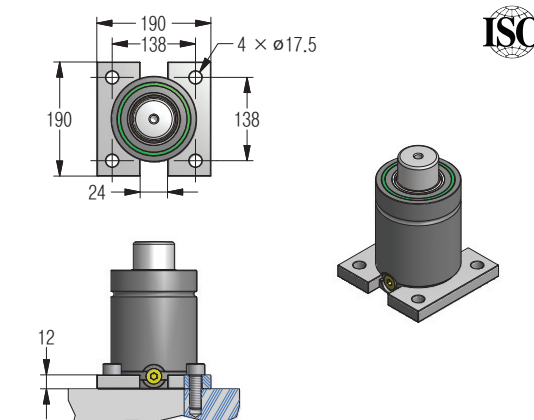
SR7500 MOUNT



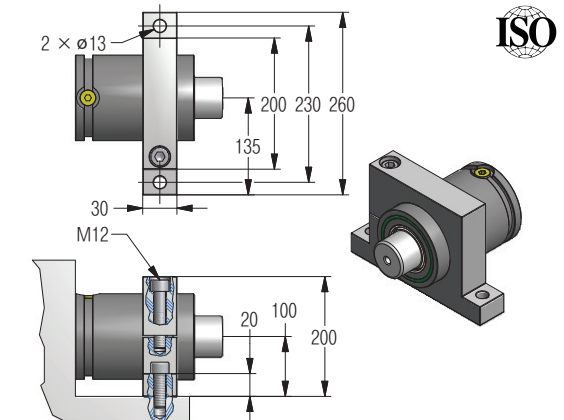
ST7500 MOUNT

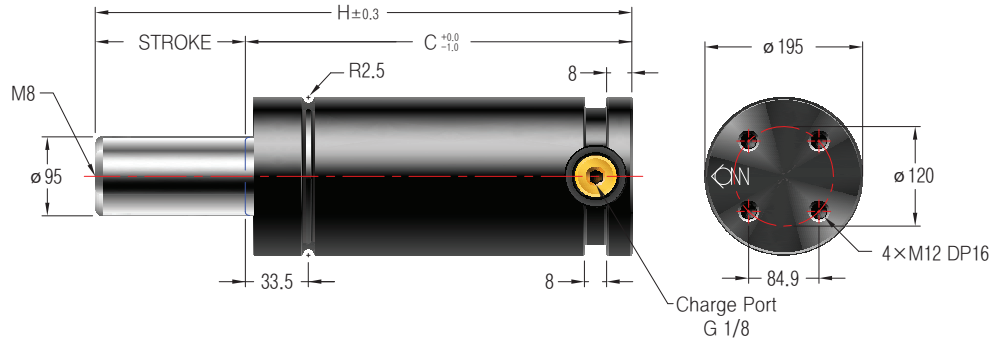


SP7500 MOUNT



SC7500 MOUNT





규격표기방법

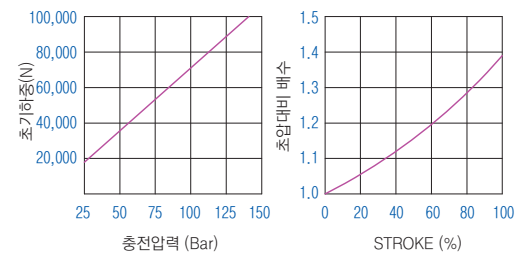
Catalog No.	STROKE	단독형-S 배관형-F	일체형 마운트 (선택사항)	충전압력 (Bar)
TSL10000	050	S(F)	(MSA)	150
MOUNT	SP10000			
REPAIR KIT	RCL10000			

\* 충전압력은 별도 요구시만 명시하고 지정표기가 없을 경우 표준충전압력 150bar로 충전됩니다.

TSL10000							
Stroke (mm)	Stroke (inch)	H	C	Force (N) (150 bar/+20°C)		Gas vol. (cm <sup>3</sup> )	Weight (kg)
				Initial	End force*		
20	0.79	200	180	137,600	619.8	619.8	36.20
25	0.98	210	185	140,400	726.6	726.6	38.50
30	1.18	220	195	142,500	833.5	833.5	40.20
35	1.38	230	195	144,200	940.4	940.4	42.50
38	1.50	236	198	145,100	1,004.5	1,004.5	44.10
40	1.57	240	200	145,600	1,047.5	1,047.5	45.60
45	1.77	250	205	146,700	1,154.1	1,154.1	47.90
50	1.97	260	210	147,700	1,260.9	1,260.9	48.80
60	2.36	280	220	149,200	1,474.6	1,474.6	50.90
63	2.48	287	223	149,600	1,538.8	1,538.8	51.70
70	2.76	300	230	150,300	1,688.4	1,688.4	53.20
75	2.95	310	235	150,800	1,795.2	1,795.2	55.45
80	3.15	320	240	151,200	1,902.1	1,902.1	57.00
90	3.54	340	250	152,000	2,115.8	2,115.8	59.50
100	3.94	360	260	152,600	2,329.5	2,329.5	61.80
125	4.92	410	285	153,700	2,863.8	2,863.8	64.50
150	5.91	460	310	154,500	3,398.1	3,398.1	67.20
160	6.30	480	320	154,700	3,611.8	3,611.8	69.00
175	6.89	510	335	155,100	3,932.4	3,932.4	72.30
200	7.87	560	360	155,500	4,466.7	4,466.7	74.50
250	9.84	660	410	156,100	5,535.3	5,535.3	80.50
300	11.81	760	460	156,600	6,603.8	6,603.8	86.50

\*=at full stroke  
\* 기타 특수한 규격은 당사에 문의 바랍니다.

■충전압력/압축량 대비 하중변화도표



■TSL10000의 충전 압력(Bar) 계산식

$$\text{충전압력(Bar)} = \frac{\text{초기하중(N)}}{708.5}$$

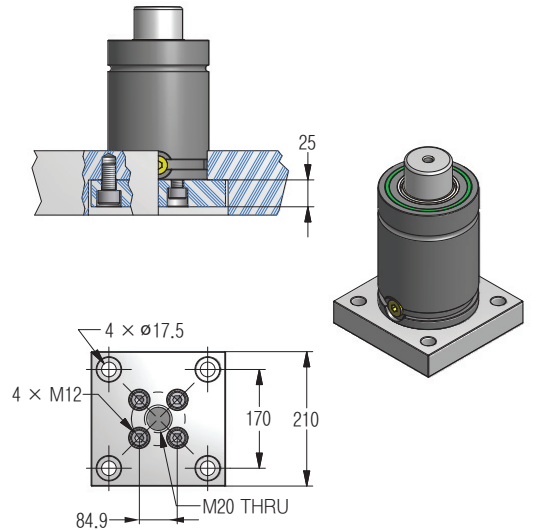
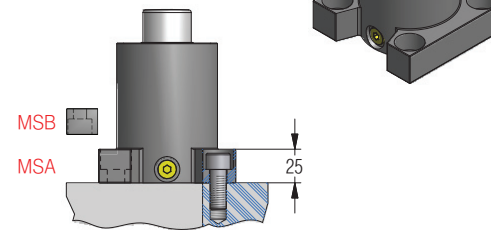
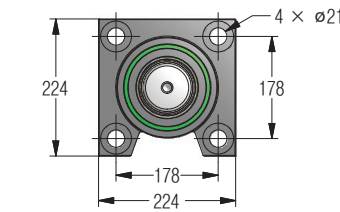
ex) 필요한 초기하중 85,000N인 GAS SPRING의 충전압력은?

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

MS MOUNT

일체형

SB10000 MOUNT



SP10000 MOUNT

ST10000 MOUNT

