

T4 Series

HEAVY DUTY GAS SPRINGS

***IDEAL FOR STAMPING
ULTRA-HIGH STRENGTH
STEELS***



HYSON
Metal Forming Solutions™

GENUINELY HYSON

Since 1964, HYSON has been dedicated to providing safer and more reliable products with worldwide support and service. We are continually at the forefront of innovative product design, and engineer forward-thinking features into our self-contained springs, which enable our customers to provide safer working environments.

Our nitrogen gas springs, which comply with all major industry standards, are designed to reduce the risk of tool damage and injuries and include at least one of the following safety features:

**Overstroke Protection:**

In the event of an overstroke, the HYSON cylinder is designed to fail-safe and release pressure in a predefined manner with deformation or knockout plug.

**Overpressure Protection:**

Designed to vent excessive gas in the event that the spring becomes overpressured, deformation of the safety lip guide or separation of disc will occur.

**Overload Protection:**

The piston rod is designed for controlled gas venting between the seal and the piston rod with a specially designed guide and fundamental safety stop in the event of an overload caused by a jammed tool, part or rod side-load.



Additionally, the majority of HYSON springs are **PED** (Pressure Equipment Directive) approved to withstand a minimum of 2 million full cycles according to PED (2014/68/EU). Many of our competitors are in compliance of PED, but compliance is unequal to the 2 million cycle test and approval that HYSON gas springs have undergone. This is one more assurance that with HYSON Nitrogen Gas Springs, you receive an added value of reliability and operational excellence.

GENUINELY HYSON SAFETY APP

Created to enable safer working environments and fight against unsafe counterfeit springs in manufacturing facilities around the globe, the Genuinely HYSON Safety App authenticates nitrogen gas springs with HYSON labeling have the design and safety features customers have come to expect with the HYSON brand. The app is available for download at www.HysonSolutions.com.



IDEAL FOR STAMPING ULTRA-HIGH STRENGTH STEELS

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General Information

HYSON Metal Forming Solutions, headquartered in Brecksville, Ohio, is a world class engineering and manufacturing company that provides high-quality, safety-engineered force and motion control solutions for a wide range of applications and industries, including automotive, aerospace, appliance, medical and HVAC. HYSON partners with our customers to understand applications and provide the best solutions for each one. We are a full service force and motion control provider for critical machine, vehicle and precision metal processing applications, meaning we supply dependent upon each customer's needs, including: gas springs, cam systems, cushions, manifolds and knockout systems.

Our success lies with our commitment to continually improve ourselves, our processes and our products to ensure we meet or exceed our customers' expectations. Our ISO-9001, AS-9000 and PED certifications attest to our ongoing commitment to the highest standards of quality.

PED - Pressure Equipment Directive

HYSON gas springs are designed to meet customer expectations for reliability, safety and service lifetime. The design, manufacture and testing of HYSON gas springs has been approved according to the European Pressure Equipment Directive (2014/68/EU).



The Pressure Equipment Directive (PED) replaces all previous European legislation governing the design, manufacture and testing of pressure vessels.

Product Value

- High force with ISO Standard dimensions
 - Large rod and rod seal provide higher force in the same diameter and height dimensions as ISO Standard springs
- Force adjustability & increased productivity
 - Our gas springs are adjustable simply by modifying gas pressure through a hoses control panel while the die is in the press
- Balanced, consistent force
 - Our gas springs provide for a balanced pad and high quality parts while, as coil springs start to fatigue and break, the pad can become imbalanced resulting in poor quality parts

T4 Series Features

- Eight models with stroke lengths to 300 mm/11.81 in
- Diameters available from 45 mm to 195 mm/1.77 in to 7.68 in
- Variety of mounting options available with upper C-groove and lower U-groove
- **Flexible Guide:** Specially engineered to absorb normal lateral movements and misalignments due to clearances in the die to prolong service life
- **Flexible Piston Ring:** Mounted to the piston, this ring provides additional guidance

ISO: 9001:2008
CERTIFICATION



ISO: 9001:2008 CERTIFICATION

Focused on meeting customer expectations, ISO 9001 is an internationally recognized standard for quality management with certificates issued to organizations in 178 countries. This highly regarded certification reflects HYSON's ongoing commitment to deliver solutions that meet the highest quality standards.

Product Specifications

Pressure Medium	Nitrogen
Max. Charging Pressure	150 bar/2,175 psi
Min. Charging Pressure	25 bar/365 psi
Operating Temperature	0° to 80°C/32° to 176°F
Force Increase by Temperature	±0.3% per °C/±0.009% per °F
Recommended Max. Strokes/Min.	40 to 100 @20°C/68°F
Max. Piston Rod Velocity	1.6 m/s /315 ft per min.
Max. Utilized Stroke	100%
Inlet Valve	
T4-750, T4-1000 & T4-1500	4018112
T4-2400, T4-4200, T4-6600, T4-9500 & T4-20000	56-072-5500
Charge Fitting	
T4-750, T4-1000 & T4-1500	T2-770-T3
T4-2400, T4-4200, T4-6600, T4-9500 & T4-20000	T2-770-G1/8-P

ORDERING INSTRUCTIONS

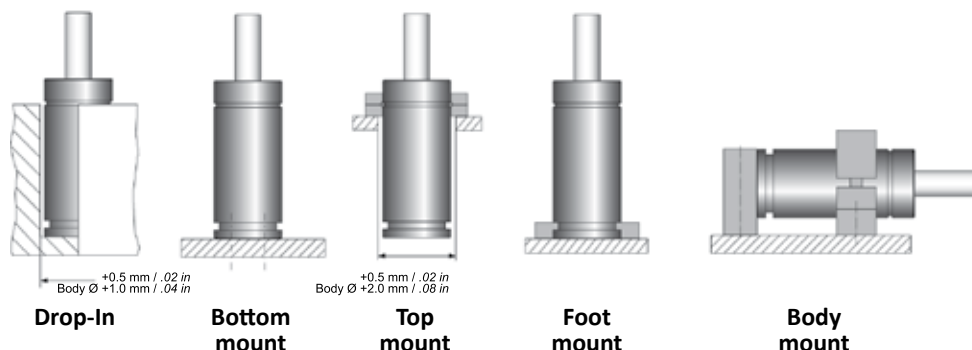
T4-4200	X	50	X	750 psi
MODEL T4-750, T4-1000, T4-1500, T4-2400, T4-4200, T4-6600, T4-9500, T4-20000				
STROKE (mm) See Dimensional Information Charts				
CHARGE PRESSURE Max=150 bar/2,175 psi				

Note: All T4 gas springs shipped at maximum charge pressure unless otherwise specified.

Repair Kits

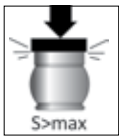
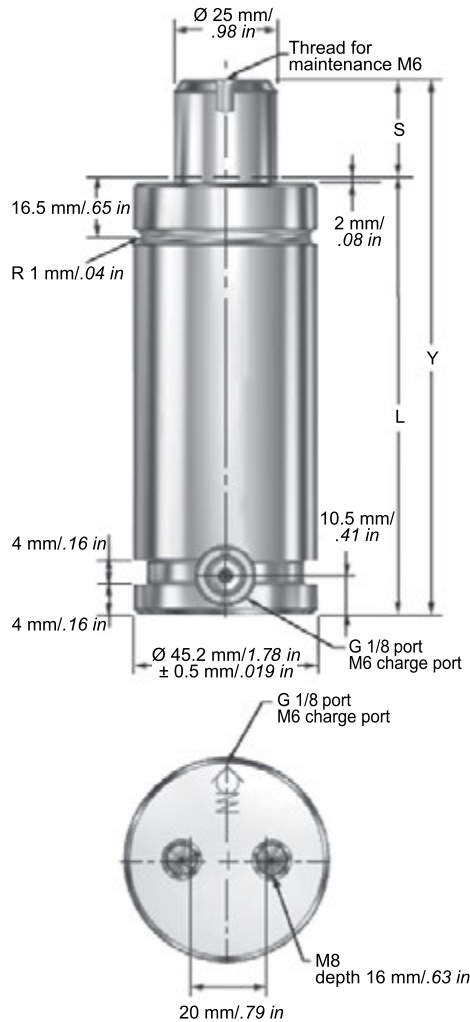
Gas Spring	Repair Kit Order Number
T4-750	3326200
T4-1000	3323788
T4-1500	3326202
T4-2400	3322952
T4-4200	3322953
T4-6600	3322954
T4-9500	3322901
T4-20000	3326204

MOUNTING OPTIONS



**Advanced
Safety Features**

 Overload
Protection

 Overpressure
Protection

 Overstroke
Protection

T4-750 Dimensional Information

Order Number Model X Stroke	Stroke S		Contact Force**		Full Stroke Force**		Y		L		Gas Volume	Weight	
	mm	in	N	lbs	N	lbs	± 0.25	± 0.010					
							mm	in	mm	in	ℓ	kg	lbs
Preferred Stroke Lengths (optimal delivery)													
T4-750X150	150	5.91	7,400	1,665	12,100	2,720	385	15.16	235	9.25	0.22	1.72	3.79
T4-750X160	160	6.30			12,100	2,720	405	15.94	245	9.65	0.23	1.79	3.95
T4-750X175	175	6.89			12,000	2,720	435	17.13	260	10.24	0.25	1.88	4.14
T4-750X200	200	7.87			12,100	2,720	485	19.09	285	11.22	0.28	2.04	4.50
Alternative Stroke Lengths													
T4-750X13	12.7	.50	7,400	1,665	12,000	2,700	110.4	4.35	97.7	3.85	0.04	0.85	1.87
T4-750X25	25	.98			12,000	2,700	135	5.31	110	4.33	0.06	0.93	2.05
T4-750X38	38.1	1.50			12,000	2,700	161.2	6.35	123.1	4.85	0.07	1.01	2.23
T4-750X50	50	1.97			12,000	2,700	185	7.28	135	5.31	0.09	1.09	2.40
T4-750X63	63.5	2.50			12,000	2,700	212	8.35	148.5	5.85	0.11	1.17	2.58
T4-750X75	75	2.95			12,000	2,700	235	9.25	160	6.30	0.12	1.25	2.76
T4-750X80	80	3.15			12,000	2,700	245	9.65	165	6.50	0.13	1.28	2.82
T4-750X100	100	3.94			12,000	2,700	285	11.22	185	7.28	0.15	1.41	3.11
T4-750X125	125	4.92			12,100	2,720	335	13.19	210	8.27	0.19	1.56	3.44

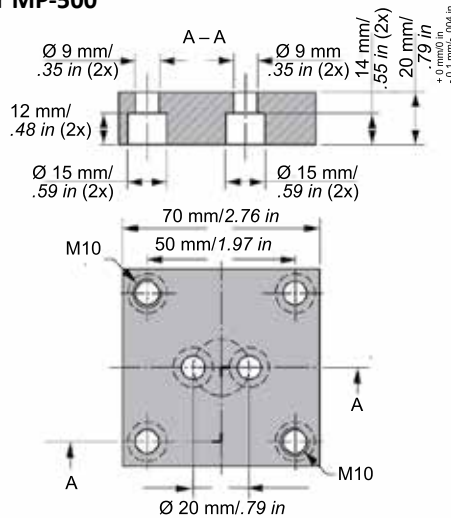
**At full charge

Note: All flanges ordered separately.

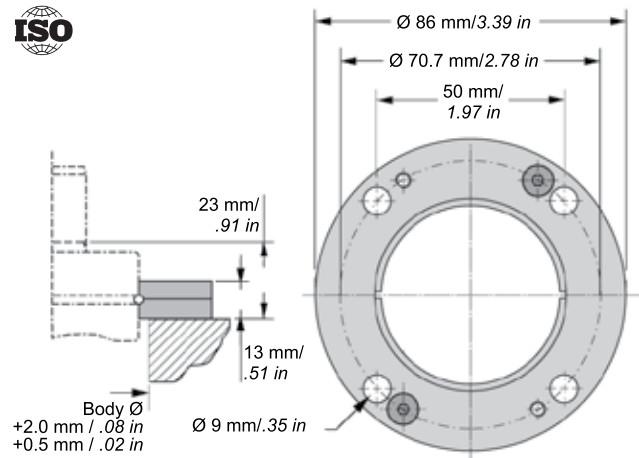
MP - Bottom Mounting Plate Order Number MP-500



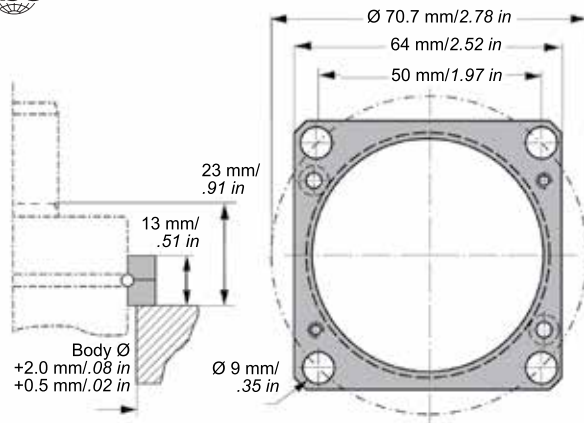
Note: Comes complete with screws to mount gas spring.



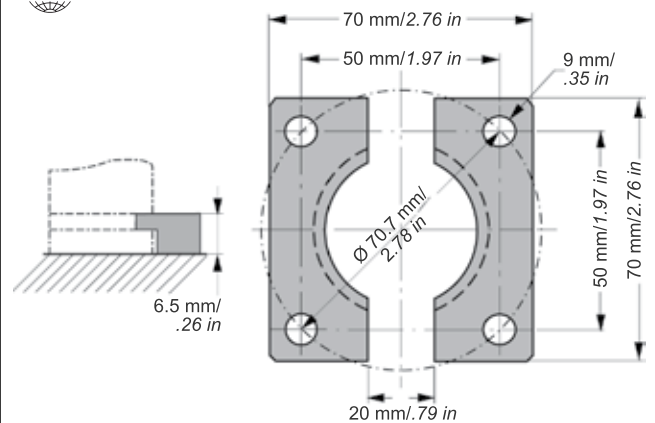
FC - Circular Flange Order Number FC-500



FCS - Upper Square Flange Order Number FCS-500



FFC - Lower Square Flange Order Number FFC-500

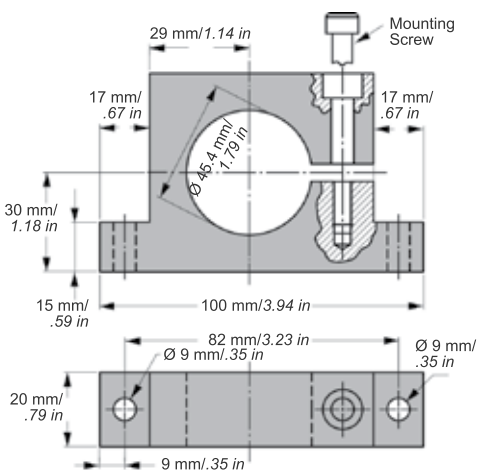


S - Support Mount Order Number S-500



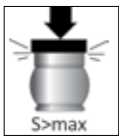
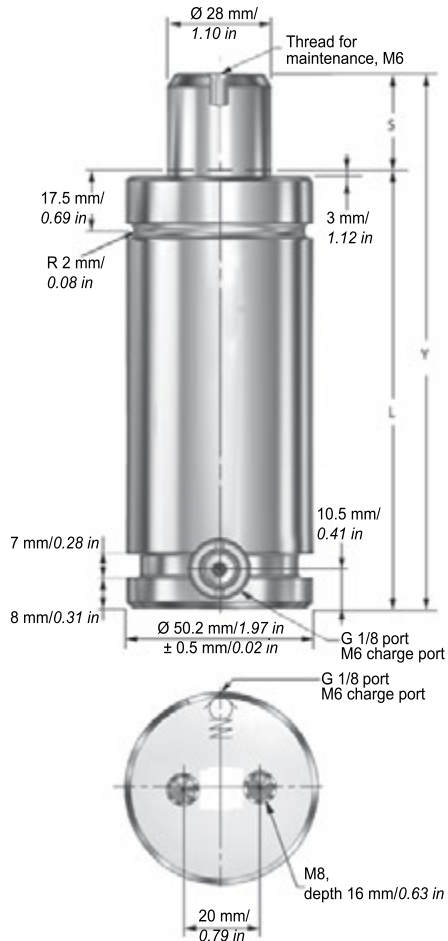
Note: Support S is designed to be used in combination with flanges mounted in the U or C groove.

The mounting screw (M8) should be tightened with torque 25 Nm.



**Advanced
Safety Features**

**Overload
Protection**

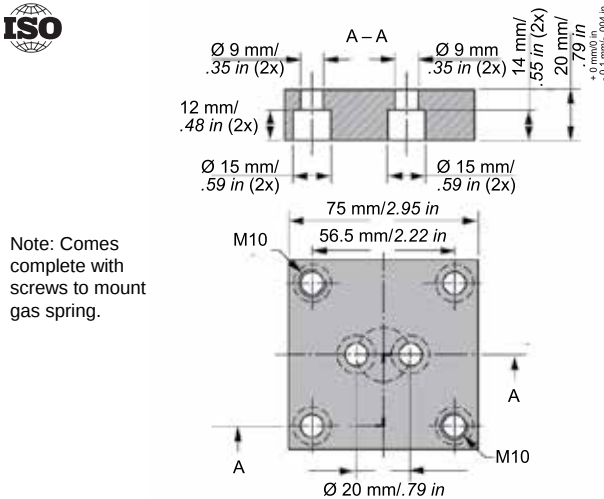
**Overpressure
Protection**

**Overstroke
Protection**

T4-1000 Dimensional Information

Order Number Model X Stroke	Stroke S		Contact Force**		Full Stroke Force**		Y		L		Gas Volume	Weight	
							± 0.25	± 0.010					
	mm	in	N	lbs	N	lbs	mm	in	mm	in	ℓ	kg	lbs
Preferred Stroke Lengths (optimal delivery)													
T4-1000X150	150	5.91	9,200	2,075	14,400	3,237	395	15.55	245	9.65	0.27	2.32	5.11
T4-1000X160	160	6.30			14,500	3,250	415	16.34	255	10.04	0.28	2.40	5.29
T4-1000X175	175	6.89			14,600	3,275	445	17.52	270	10.63	0.30	2.53	5.58
T4-1000X200	200	7.87			14,700	3,300	495	19.49	295	11.61	0.34	2.74	6.04
Alternative Stroke Lengths													
T4-1000X13	12.7	0.50	9,200	2,075	11,200	2,525	121	4.76	108	4.25	0.06	1.17	2.58
T4-1000X25	25	0.98			12,100	2,725	145	5.71	120	4.72	0.07	1.27	2.80
T4-1000X38	38.1	1.50			12,800	2,875	171	6.73	133	5.24	0.09	1.32	2.91
T4-1000X50	50	1.97			13,200	2,975	195	7.68	145	5.71	0.11	1.37	3.02
T4-1000X63	63.5	2.50			13,500	3,056	221	8.70	158	6.22	0.13	1.58	3.48
T4-1000X75	75	2.95			13,700	3,075	245	9.65	170	6.69	0.15	1.71	3.77
T4-1000X80	80	3.15			13,800	3,100	255	10.04	175	6.89	0.16	1.73	3.81
T4-1000X100	100	3.94			14,100	3,175	295	11.61	195	7.68	0.19	1.90	4.19
T4-1000X125	125	4.92			14,300	3,225	345	13.58	220	8.66	0.23	2.11	4.65
T4-1000X250	250	9.84			14,800	3,325	595	23.43	345	13.58	0.42	3.16	6.97
T4-1000X300	300	11.81			14,900	3,350	695	27.36	395	15.55	0.49	3.58	7.89

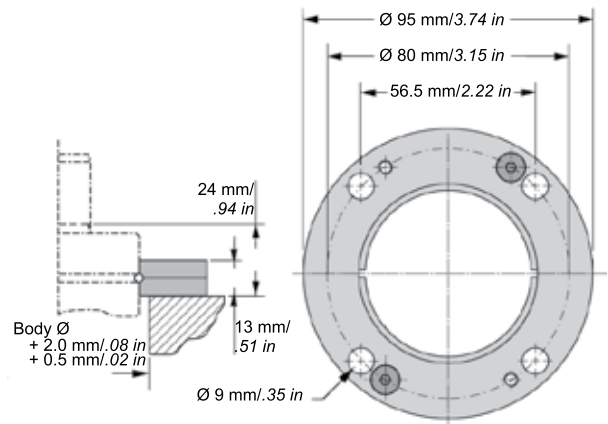
**At full charge

Note: All flanges ordered separately.

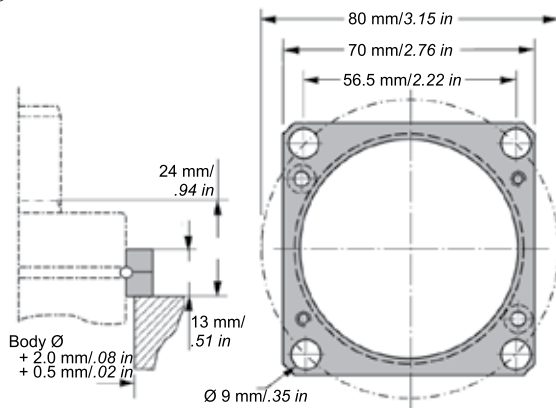
MP - Bottom Mounting Plate Order Number MP-750



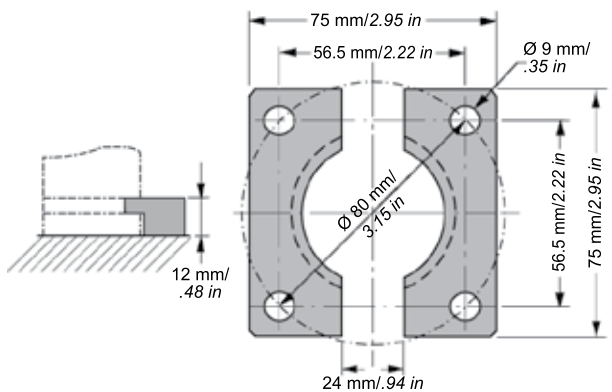
FC - Circular Flange Order Number FC-750



FCS - Upper Square Flange Order Number FCS-750



FFC - Lower Square Flange Order Number FFC-750

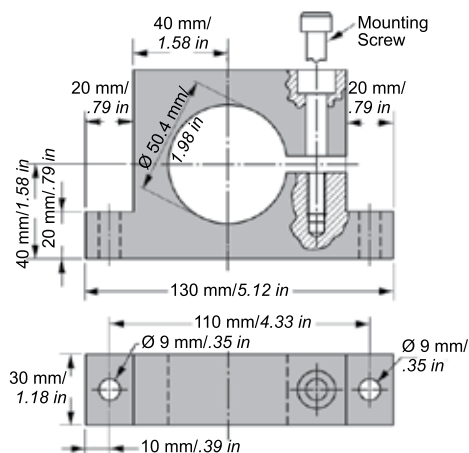


S - Support Mount Order Number S-750

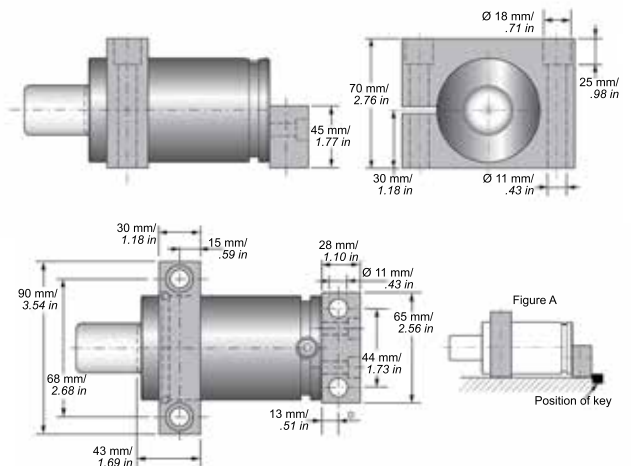


Note: Support S is designed to be used in combination with flanges mounted in the U or C groove.

The mounting screw (M8) should be tightened with torque 25 Nm.

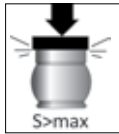
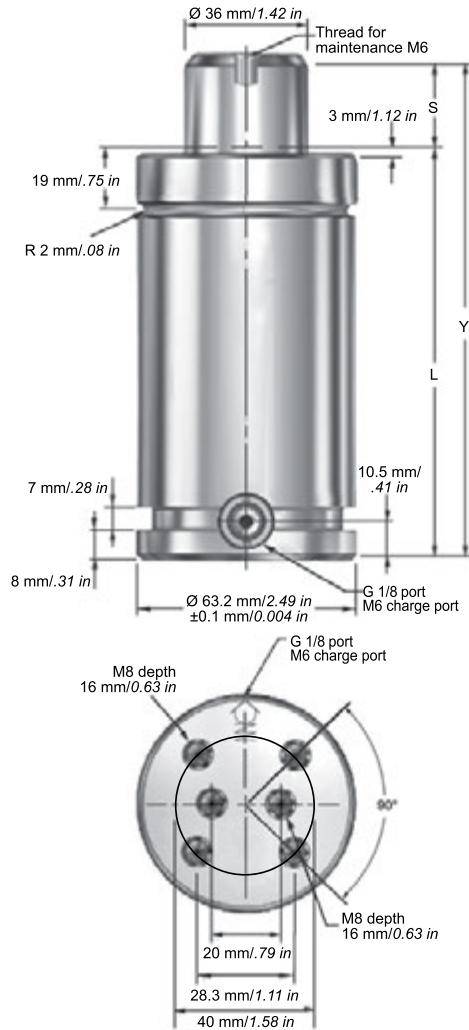


HM - Horizontal Foot Mount Order Number HM-750



**Advanced
Safety Features**

**Overload
Protection**

**Overpressure
Protection**

**Overstroke
Protection**

T4-1500 Dimensional Information

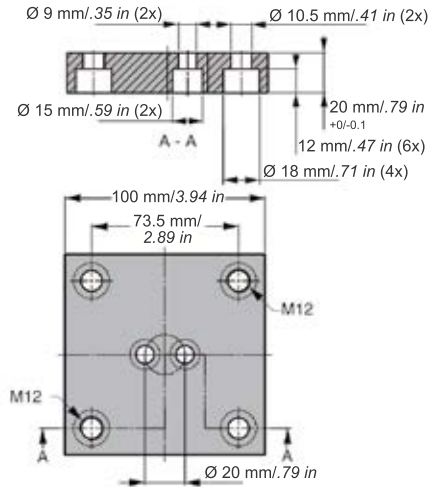
Order Number Model X Stroke	Stroke S		Contact Force**		Full Stroke Force**		Y		L		Gas Volume	Weight	
	mm	in	N	lbs	N	lbs	± 0.25	± 0.010					
							mm	in	mm	in	ℓ	kg	lbs
Preferred Stroke Lengths (optimal delivery)													
T4-1500X150	150	5.91	15,000	3,375	22,500	5058	395	15.55	245	9.65	0.47	3.33	7.34
T4-1500X160	160	6.30			22,600	5081	415	16.34	255	10.04	0.50	3.44	7.58
T4-1500X175	175	6.89			22,700	5103	445	17.52	270	10.63	0.54	3.61	7.96
T4-1500X200	200	7.87			22,800	5126	495	19.49	295	11.61	0.60	3.90	8.60
Alternative Stroke Lengths													
T4-1500X13	12.7	0.50	15,000	3,375	17,700	3979	121	4.76	108	4.25	0.10	1.76	3.88
T4-1500X25	25	0.98			19,100	4294	145	5.71	120	4.72	0.13	1.89	4.17
T4-1500X38	38.1	1.50			20,000	4496	171	6.73	133	5.24	0.17	2.04	4.50
T4-1500X50	50	1.97			20,600	4631	195	7.68	145	5.71	0.20	2.18	4.81
T4-1500X63	63.5	2.50			21,100	4743	221	8.70	158	6.22	0.23	2.33	5.14
T4-1500X75	75	2.95			21,500	4833	245	9.65	170	6.69	0.27	2.47	5.45
T4-1500X80	80	3.15			21,600	4856	255	10.04	175	6.89	0.28	2.52	5.56
T4-1500X100	100	3.94			21,700	4878	295	11.61	195	7.68	0.33	2.76	6.08
T4-1500X125	125	4.92			22,400	5036	345	13.58	220	8.66	0.40	3.04	6.70
T4-1500X250	250	9.84			23,000	5171	595	23.43	345	13.58	0.74	4.47	9.85
T4-1500X300	300	11.81			23,200	5216	695	27.36	395	15.55	0.87	5.05	11.13

**At full charge

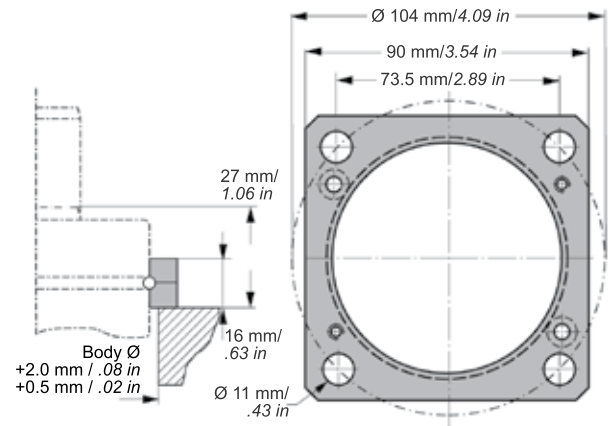
Note: All flanges ordered separately.

MPX - Bottom Mounting Plate Order Number MPX-1500

Note: Comes complete with screws to mount gas spring.

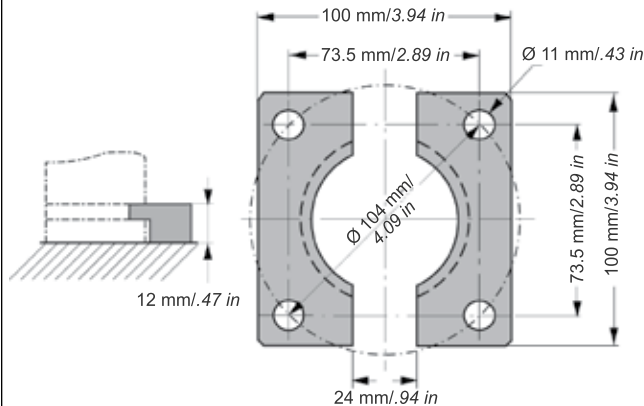


FCX - Upper Square Flange Order Number FCX-1500



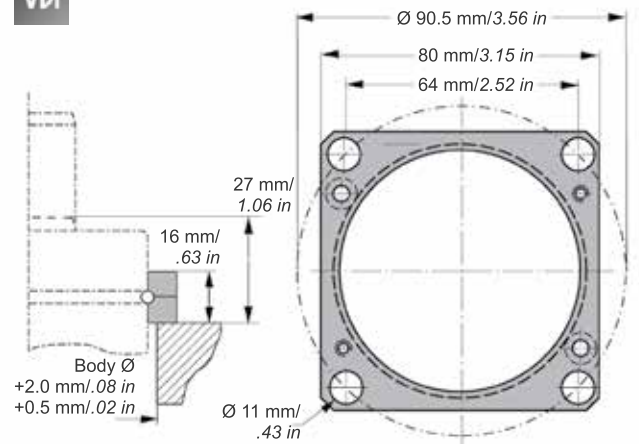
FFX - Lower Square Flange Order Number FFX-1500

VDI



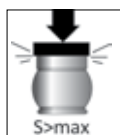
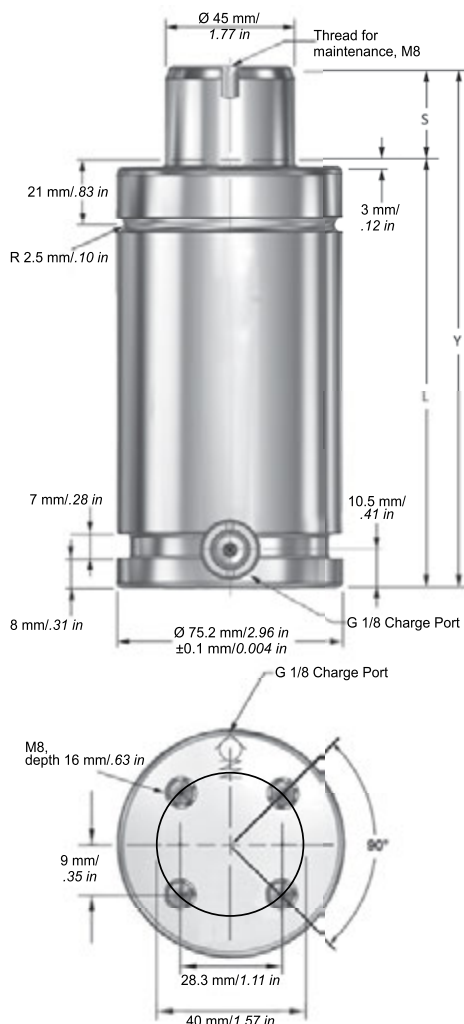
FCSX (VDI) - Upper Square Flange Order Number FCSX-1500

VDI



**Advanced
Safety Features**

**Overload
Protection**

**Overpressure
Protection**

**Overstroke
Protection**

T4-2400 Dimensional Information

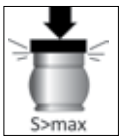
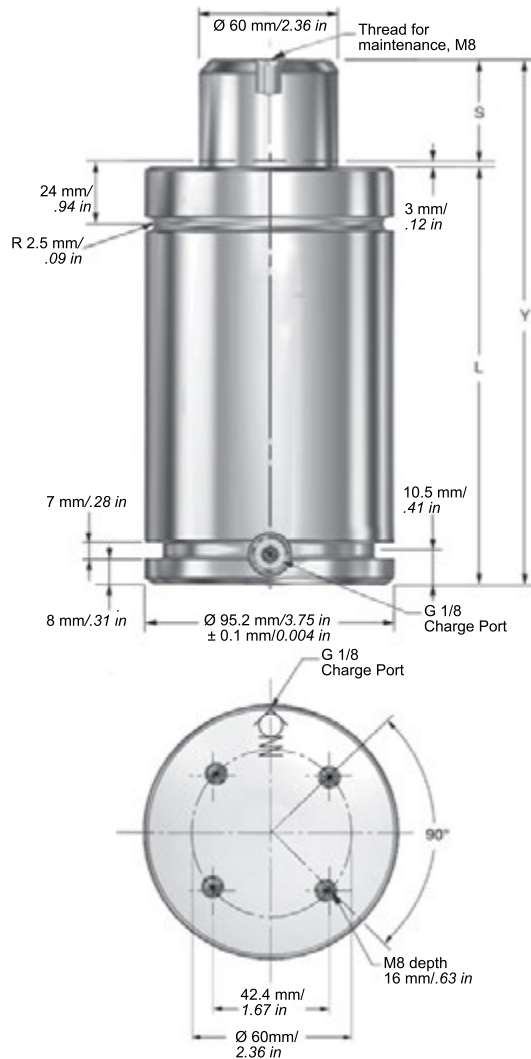
Order Number Model X Stroke	Stroke S		Contact Force**		Full Stroke Force**		Y		L		Gas Volume	Weight	
							± 0.25	± 0.010					
	mm	in	N	lbs	N	lbs	mm	in	mm	in	ℓ	kg	lbs
Preferred Stroke Lengths (optimal delivery)													
T4-2400X150	150	5.91	24,000	5,400	38,700	8,713	410	16.14	260	10.24	0.73	5.07	11.18
T4-2400X160	160	6.30			38,800	8,725	430	16.93	270	10.63	0.77	5.23	11.53
T4-2400X175	175	6.89			38,900	8,750	460	18.11	285	11.22	0.83	5.47	12.06
T4-2400X200	200	7.87			38,900	8,763	510	20.08	310	12.20	0.93	5.86	12.92
Alternative Stroke Lengths													
T4-2400X25	25	0.98	24,000	5,400	37,100	8,350	160	6.30	135	5.31	0.23	3.10	6.83
T4-2400X38	38.1	1.50			37,600	8,450	186	7.32	148	5.83	0.28	3.31	7.30
T4-2400X50	50	1.97			37,900	8,525	210	8.27	160	6.30	0.33	3.50	7.72
T4-2400X63	63.5	2.50			38,100	8,575	236	9.29	173	6.81	0.38	3.70	8.16
T4-2400X75	75	2.95			38,300	8,625	260	9.84	185	7.28	0.43	3.89	8.58
T4-2400X80	80	3.15			38,400	8,637	270	10.60	190	7.48	0.45	3.97	8.75
T4-2400X100	100	3.94			38,500	8,650	310	12.20	210	8.27	0.53	4.29	9.46
T4-2400X125	125	4.92			38,600	8,700	360	14.17	235	9.25	0.63	4.68	10.32
T4-2400X250	250	9.84			39,000	8,775	610	24.02	360	14.17	1.17	6.65	14.66
T4-2400X300	300	11.81			39,100	8,800	710	27.95	410	16.14	1.33	7.44	16.40

**At full charge

11

**Advanced
Safety Features**

**Overload
Protection**

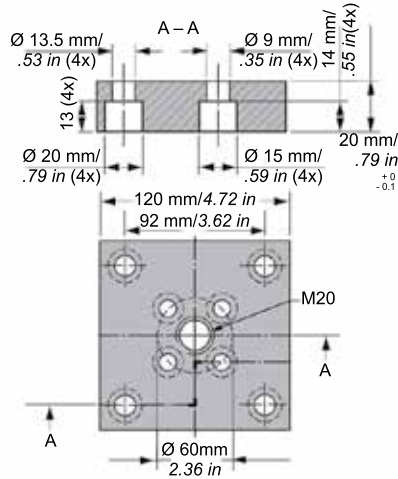
**Overpressure
Protection**

**Overstroke
Protection**

T4-4200 Dimensional Information

Order Number Model X Stroke	Stroke S		Contact Force**		Full Stroke Force**		Y		L		Gas Volume	Weight	
	mm	in	N	lbs	N	lbs	± 0.25	± 0.010					
							mm	in	mm	in	ℓ	kg	lbs
Preferred Stroke Lengths (optimal delivery)													
T4-4200X150	150	5.91	42,000	9,440	65,100	14,650	420	16.54	270	10.63	1.27	8.27	18.23
T4-4200X160	160	6.30			65,500	14,750	440	17.32	280	11.02	1.33	8.53	18.81
T4-4200X175	175	6.89			66,000	14,850	470	18.50	295	11.61	1.43	8.91	19.64
T4-4200X200	200	7.87			66,800	15,025	520	20.47	320	12.60	1.60	9.55	21.05
Alternative Stroke Lengths													
T4-4200X25	25	0.98	42,000	9,440	52,100	11,725	170	6.69	145	5.71	0.43	5.08	11.20
T4-4200X38	38.1	1.50			55,100	12,387	196	7.72	158	6.22	0.52	5.41	11.93
T4-4200X50	50	1.97			57,200	12,875	220	8.66	170	6.69	0.60	5.71	12.59
T4-4200X63	63.5	2.50			59,000	13,275	246	9.69	183	7.20	0.68	6.05	13.34
T4-4200X75	75	2.95			60,300	13,575	270	10.63	195	7.68	0.76	6.35	14.00
T4-4200X80	80	3.15			60,800	13,700	280	11.02	200	7.87	0.80	6.48	14.29
T4-4200X100	100	3.94			62,500	14,050	320	12.60	220	8.66	0.93	6.99	15.41
T4-4200X250	250	9.84			67,900	15,275	620	24.41	370	14.57	1.93	11.08	24.43
T4-4200X300	300	11.81			68,700	15,450	720	28.35	420	16.54	2.27	12.11	26.70

**At full charge

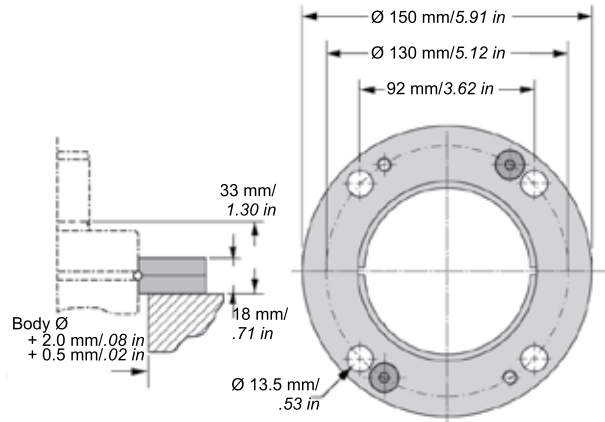
Note: All flanges ordered separately.

MP - Bottom Mounting Plate Order Number MP-3000

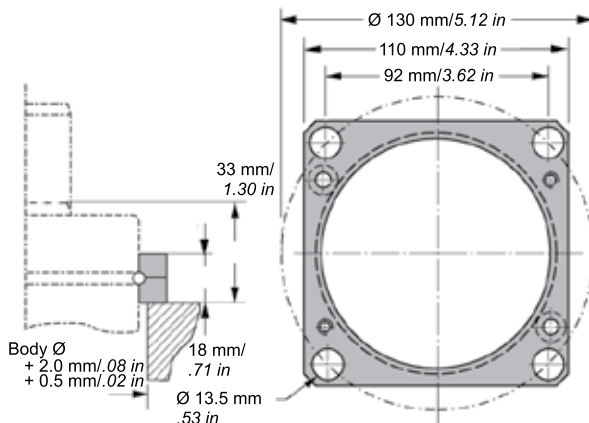


Note: Comes complete with screws to mount gas spring.

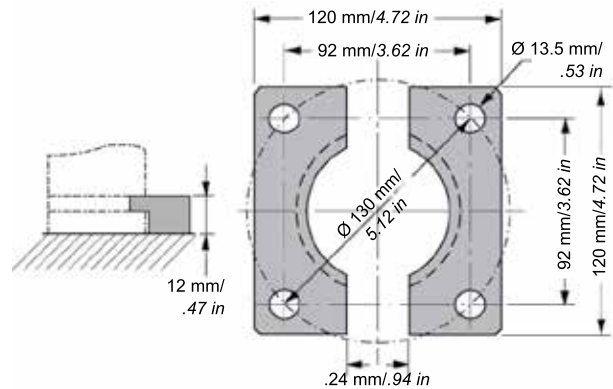
FC - Circular Flange Order Number FC-3000



FCS - Upper Square Flange Order Number FCS-3000



FFC - Lower Square Flange Order Number FFC-3000

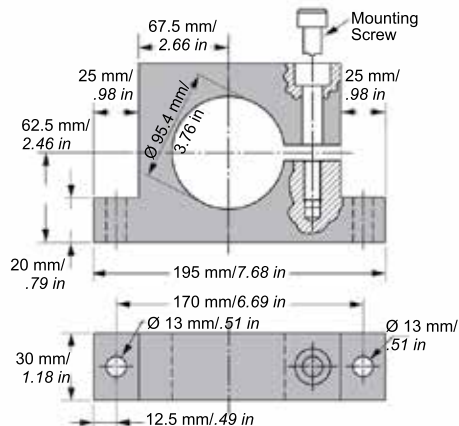


S - Support Mount Order Number S-3000

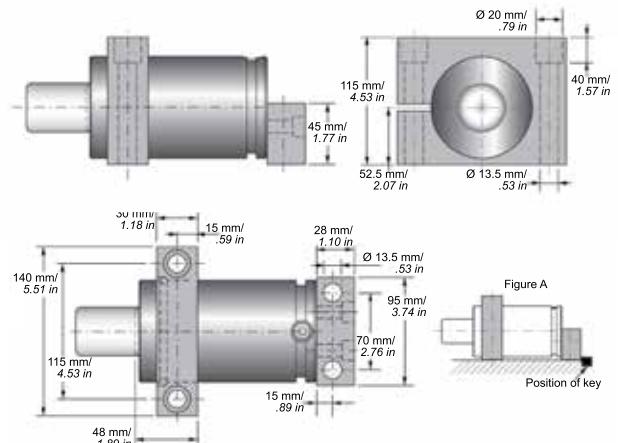


Note: Support S is designed to be used in combination with flanges mounted in the U or C groove.

The mounting screw (M12) should be tightened with torque 91 Nm.



HM - Horizontal Foot Mount Order Number HM-3000



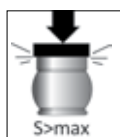
Advanced
Safety Features



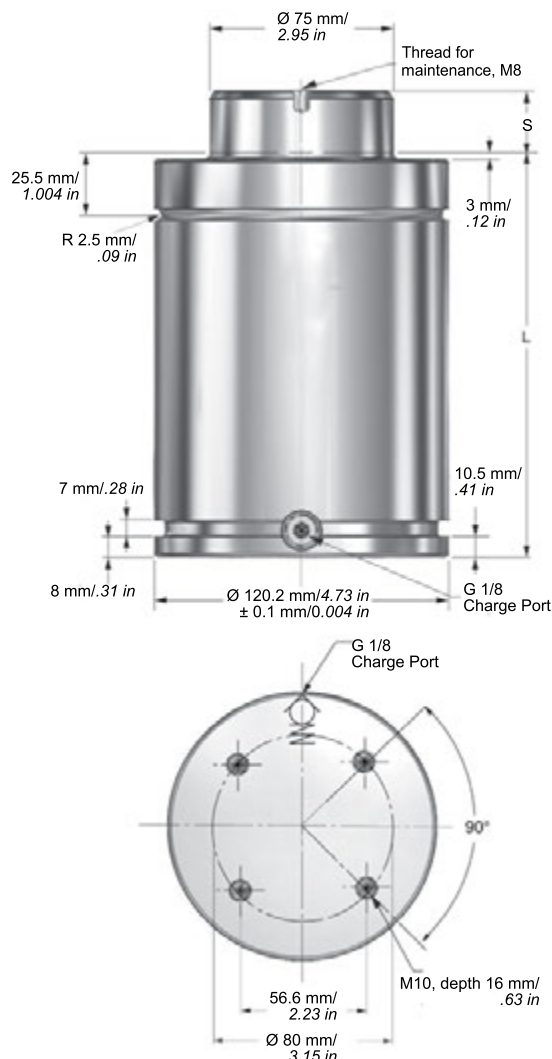
Overload
Protection



Overpressure
Protection



Overstroke
Protection



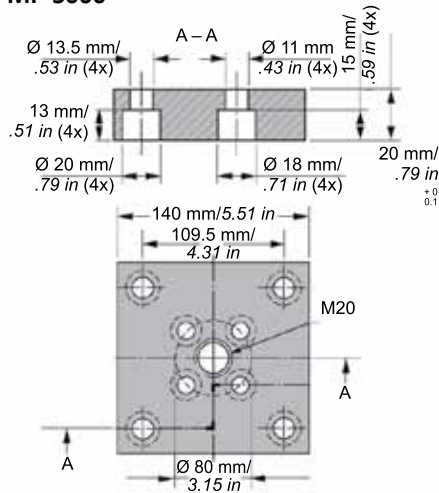
T4-6600 Dimensional Information

Order Number Model X Stroke	Stroke S		Contact Force**		Full Stroke Force**		Y		L		Gas Volume	Weight	
	mm	in	N	lbs	N	lbs	± 0.25	± 0.010				mm	in
Preferred Stroke Lengths (optimal delivery)													
T4-6600X150	150	5.91	66,300	14,925	99,500	22,375	440	17.32	290	11.42	2.05	14.36	31.66
T4-6600X160	160	6.30			100,100	22,525	460	18.11	300	11.81	2.16	14.77	32.56
T4-6600X175	175	6.89			101,000	22,725	490	19.29	315	12.40	2.32	15.38	33.91
T4-6600X200	200	7.87			102,200	23,000	540	21.26	340	13.39	2.58	16.40	36.16
Preferred Stroke Lengths (optimal delivery)													
T4-6600X25	25	0.98	66,300	14,925	79,500	17,900	190	7.48	165	6.50	0.73	9.28	20.46
T4-6600X38	38.1	1.50			83,900	18,875	216	8.50	178	7.01	0.87	9.81	21.63
T4-6600X50	50	1.97			87,000	19,600	240	9.45	190	7.48	1.00	10.30	22.71
T4-6600X63	63.5	2.50			89,700	20,200	266	10.47	203	7.99	1.13	10.83	23.88
T4-6600X75	75	2.95			91,800	20,650	290	11.42	215	8.46	1.26	11.32	24.96
T4-6600X80	80	3.15			92,600	20,825	300	11.81	220	8.66	1.31	11.52	25.40
T4-6600X100	100	3.94			95,100	21,500	340	13.39	240	9.45	1.53	12.33	27.18
T4-6600X125	125	4.92			97,600	21,950	390	15.35	265	10.43	1.79	13.35	29.43
T4-6600X250	250	9.84			104,000	23,400	640	25.20	390	15.35	3.11	18.43	40.63
T4-6600X300	300	11.81			105,300	23,700	740	29.13	440	17.32	3.64	20.46	45.11

**At full charge

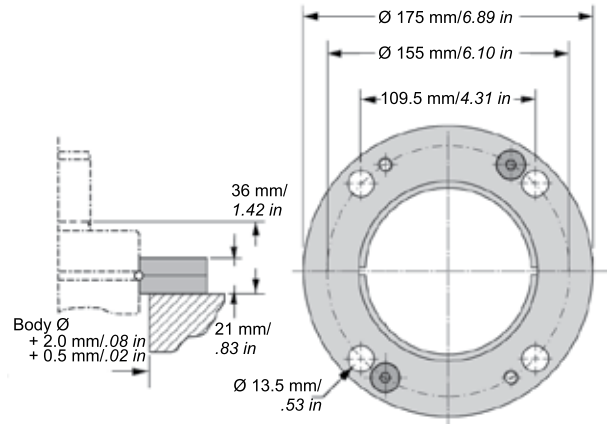
Note: All flanges ordered separately.

MP - Bottom Mounting Plate Order Number MP-5000

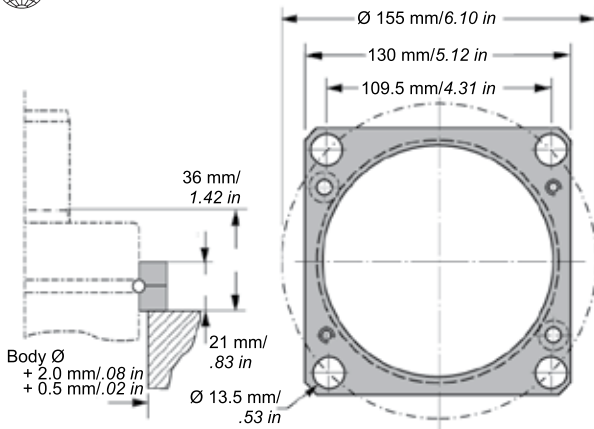


Note: Comes complete with screws to mount gas spring.

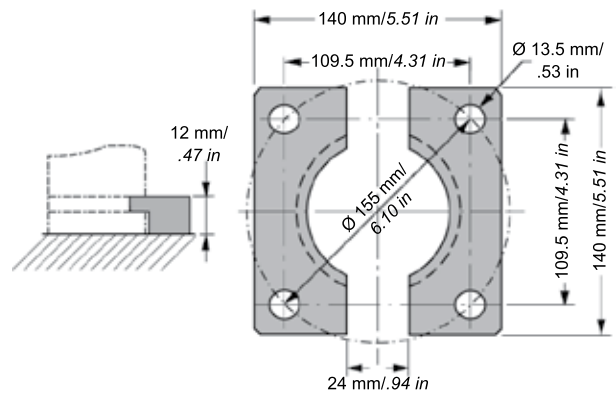
FC - Circular Flange Order Number FC-5000



FCS - Upper Square Flange Order Number FCS-5000



FFC - Lower Square Flange Order Number FFC-5000

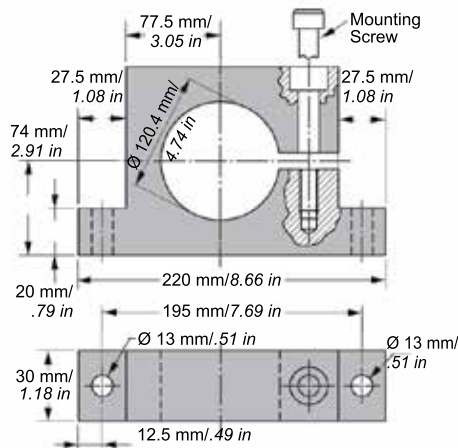


S - Support Mount Order Number S-5000



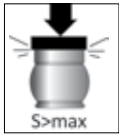
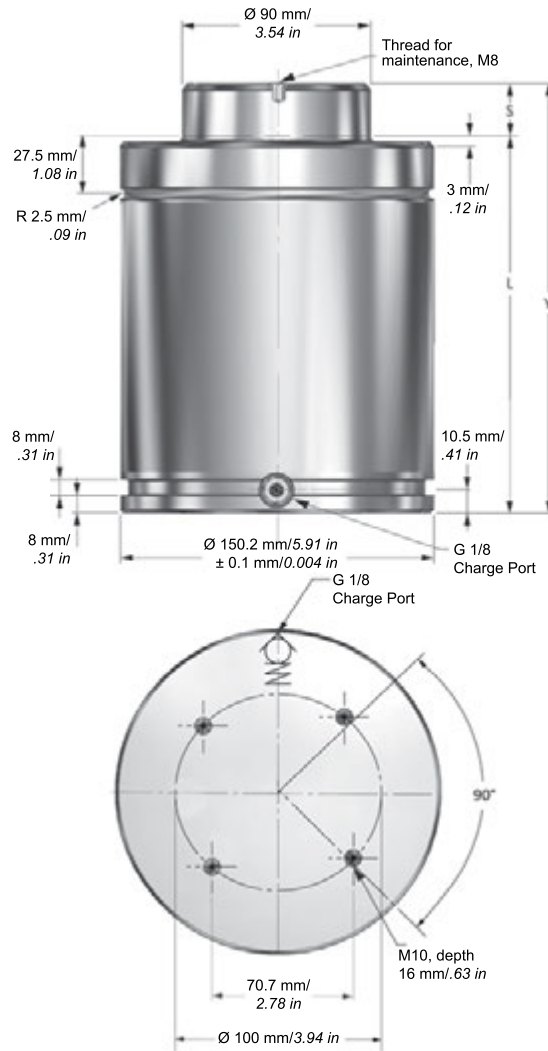
Note: Support S is designed to be used in combination with flanges mounted in the U or C groove.

The mounting screw (M12) should be tightened with torque 91 Nm.



**Advanced
Safety Features**

**Overload
Protection**

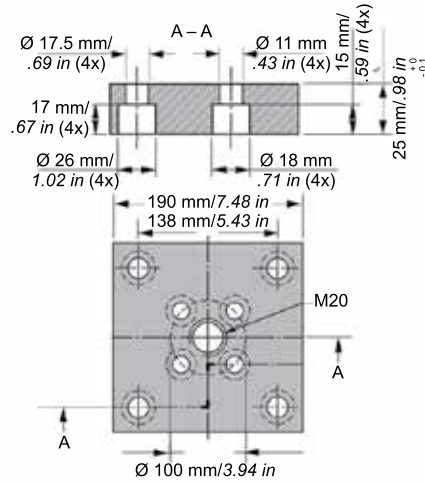
**Overpressure
Protection**

**Overstroke
Protection**

T4-9500 Dimensional Information

Order Number Model X Stroke	Stroke S		Contact Force**		Full Stroke Force**		Y		L		Gas Volume	Weight	
	mm	in	N	lbs	N	lbs	± 0.25	± 0.010					
							mm	in	mm	in	ℓ	kg	lbs
Preferred Stroke Lengths (optimal delivery)													
T4-9500X150	150	5.91	95,000	21,400	140,200	31,530	455	17.91	305	12.01	3.07	24.97	55.05
T4-9500X160	160	6.30			141,000	31,730	475	18.70	315	12.40	3.23	25.62	56.48
T4-9500X175	175	6.89			142,200	31,990	505	19.88	330	12.99	3.47	26.59	58.62
T4-9500X200	200	7.87			143,800	32,360	555	21.85	355	13.98	3.86	28.21	62.19
Alternative Stroke Lengths													
T4-9500X25	25	0.98	95,000	21,400	113,200	25,500	205	8.07	180	7.09	1.09	16.86	37.17
T4-9500X38	38.1	1.50			119,000	26,800	231	9.09	193	7.60	1.30	17.70	39.02
T4-9500X50	50	1.97			123,300	27,730	255	10.04	205	8.07	1.49	18.48	40.74
T4-9500X63	63.5	2.50			127,000	28,550	281	11.06	218	8.58	1.69	19.32	42.59
T4-9500X75	75	2.95			129,700	29,200	305	12.01	230	9.06	1.88	20.10	44.31
T4-9500X80	80	3.15			130,800	29,430	315	12.40	235	9.25	1.96	20.42	45.02
T4-9500X100	100	3.94			134,300	30,200	355	13.98	255	10.04	2.28	21.72	47.88
T4-9500X125	125	4.92			137,600	31,000	405	15.94	280	11.02	2.67	23.35	51.48
T4-9500X250	250	9.84			146,300	32,930	655	25.79	405	15.94	4.65	31.46	69.36
T4-9500X300	300	11.81			148,200	33,340	755	29.72	455	17.91	5.44	34.70	76.50

**At full charge

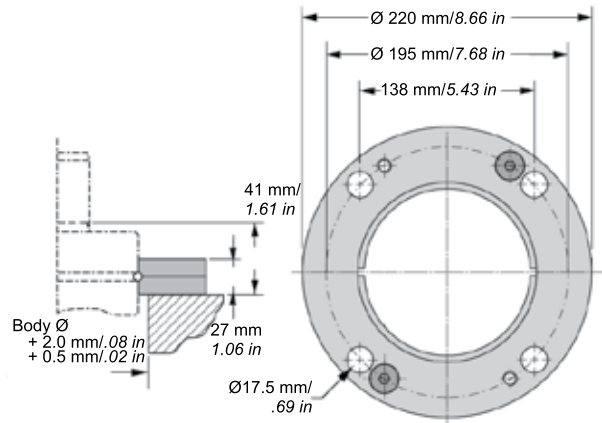
Note: All flanges ordered separately.

MP - Bottom Mounting Plate Order Number MP-7500

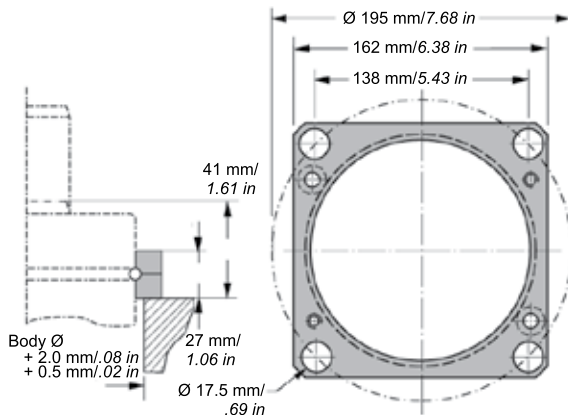


Note: Comes complete with screws to mount gas spring.

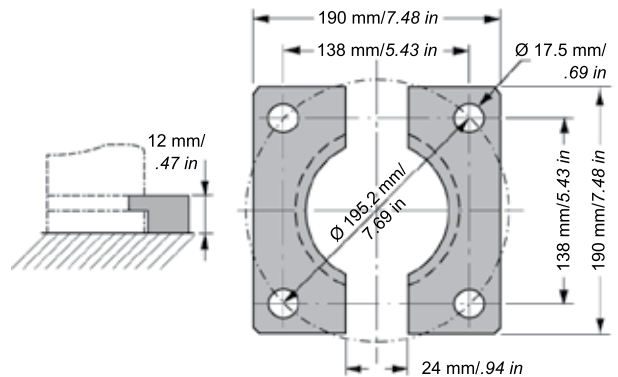
FC - Circular Flange Order Number FC-7500



FCS - Upper Square Flange Order Number FCS-7500



FFC - Lower Square Flange Order Number FFC-7500

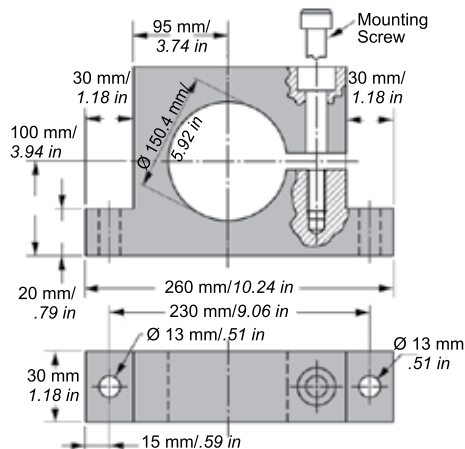


S - Support Mount Order Number S-7500



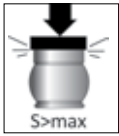
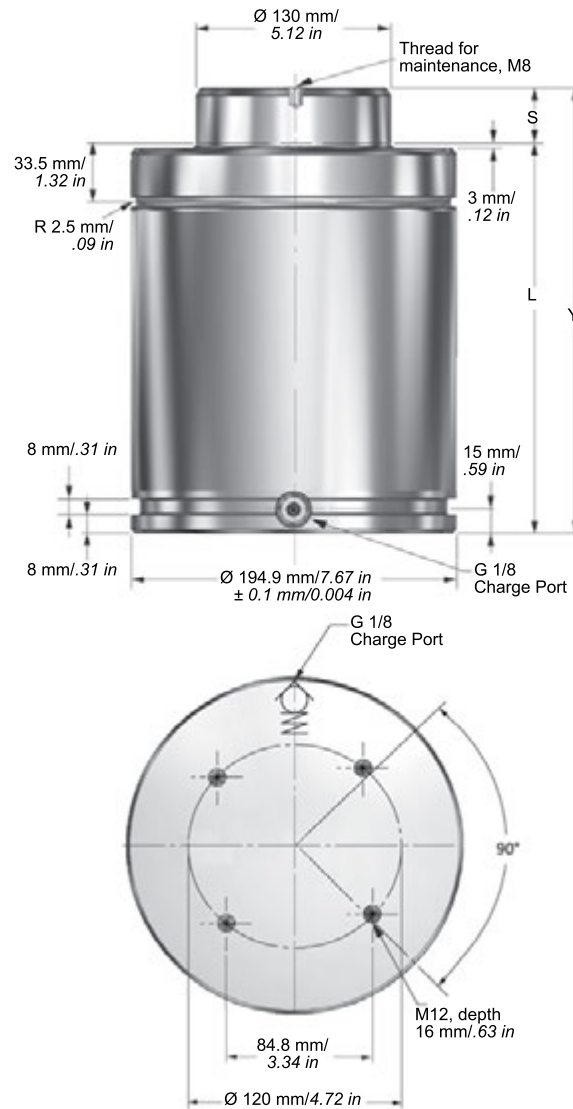
Note: Support S is designed to be used in combination with flanges mounted in the U or C groove.

The mounting screw (M12) should be tightened with torque 91 Nm.



**Advanced
Safety Features**

 Overload
Protection

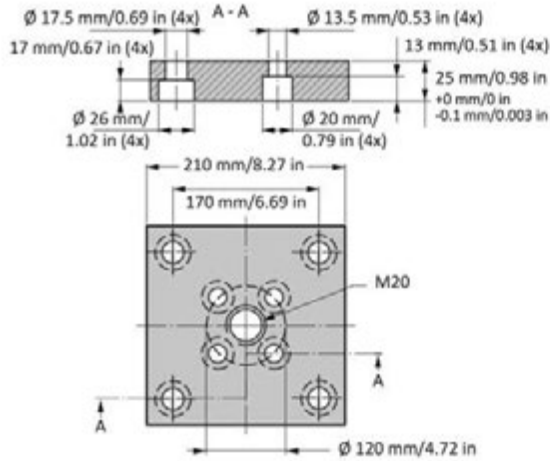
 Overpressure
Protection

 Overstroke
Protection

T4-20000 Dimensional Information

Order Number Model X Stroke	Stroke S		Contact Force**		Full Stroke Force**		Y		L		Gas Volume	Weight	
							± 0.25	± 0.010					
	mm	in	N	lbs	N	lbs	mm	in	mm	in	ℓ	kg	lbs
Preferred Stroke Lengths (optimal delivery)													
T4-20000X160	160	6.30	200,000	45,000	312,000	70,140	480	18.90	320	12.60	6.0	42.39	93.45
T4-20000X200	200	7.87			319,000	70,950	560	22.05	360	14.17	7.2	46.60	102.74
Alternative Stroke Lengths													
T4-20000X25	25	0.98	200,000	45,000	242,000	54,404	210	8.27	185	7.28	2.0	28.20	62.17
T4-20000X38	38.1	1.50			256,400	57,640	236	9.30	198	7.80	2.4	29.57	65.19
T4-20000X50	50	1.97			266,800	59,980	260	10.24	210	8.27	2.8	30.83	67.97
T4-20000X63	63.5	2.50			276,000	62,048	286	11.30	223	8.80	3.1	32.20	70.99
T4-20000X80	80	3.15			285,700	64,228	320	12.60	240	9.45	3.7	33.98	74.91
T4-20000X100	100	3.94			294,600	66,229	360	14.17	260	10.24	4.2	36.09	79.56
T4-20000X125	125	4.92			303,100	68,140	410	16.14	285	11.22	5.0	38.71	85.34
T4-20000X250	250	9.84			325,600	73,198	660	25.98	410	16.14	8.7	51.85	114.31
T4-20000X300	300	11.81			330,600	72,322	760	29.92	460	18.11	10.2	57.11	125.91

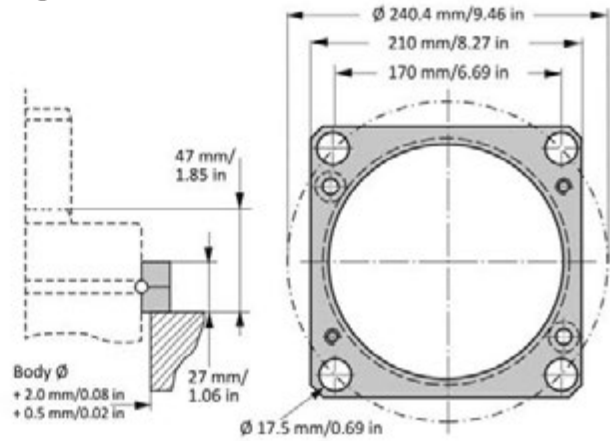
**At full charge

Note: All flanges ordered separately.

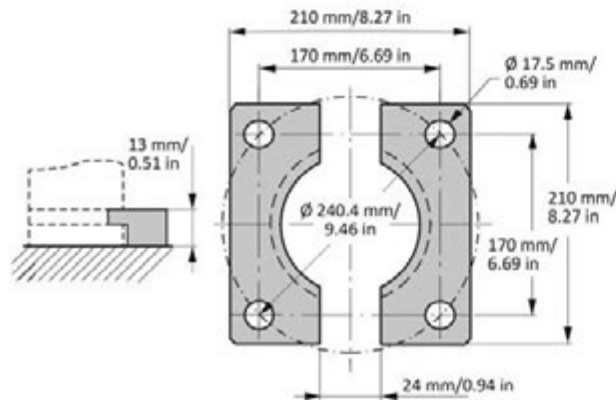
MP - Base Mounting Flange Order Number MP-10000



FCS - Upper Square Flange Order Number FCS-10000



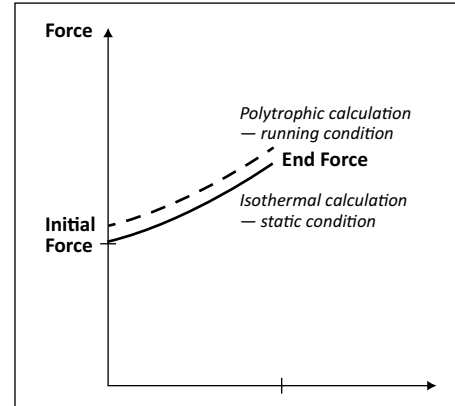
FFC - Lower Square Flange Order Number FFC-10000



Force Calculations

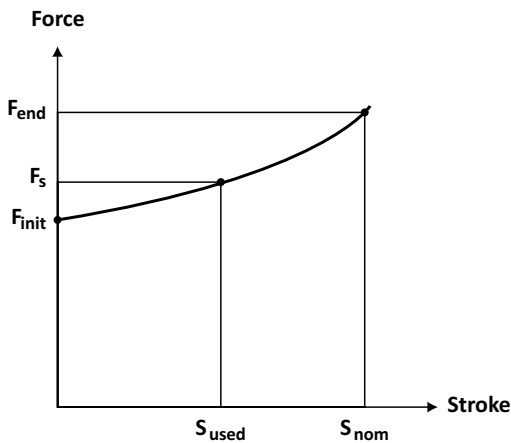
All end forces stated in the catalog are the isothermal end forces.

For normal use, the isothermal calculation is sufficient. Only for special requirements should a polytrophic calculation be considered, to be decided case by case.



Isothermal Force Increase

When calculating the force at any position of the stroke, the following equation can be used:



$$F_s = F_{init} \cdot \left[\frac{S_{nom}}{S_{nom} - S_{used}} \cdot \left[1 - \frac{F_{init}}{F_{end}} \right] \right]$$

F_{init} = Initial force

F_{end} = End force at nom. stroke

S_{nom} = Nom. stroke length (mm)

S_{used} = Used stroke length (mm)

Example:

What is the spring force of a T4-1500X100 when compressing the spring 80 mm at a normal charging pressure of 150 bar/2,175 psi?

$$S_{used} = 80 \text{ mm}$$

The table for the T4 1500 will give the following values:

$$S_{nom} = 100 \text{ mm}$$

$$F_{init} = 15,000 \text{ N}$$

$$F_{end} = 21,700 \text{ N}$$

$$F_s = 15,000 \cdot \left[\frac{100}{100 - 80} \cdot \left[1 - \frac{15,000}{21,700} \right] \right]$$

$$F_s (80 \text{ mm}) = 19,920.4 \text{ N}$$

If the temperature of the gas spring is kept constant, (isothermal process), the spring will give a force of 19,920.4 N when compressed 80 mm.

Polytrophic Force Increase

For most applications the temperature inside the gas spring will not stay constant during the stroke. Therefore the real force is different from application to application depending on: stroke length and used stroke; gas volume; press velocity and strokes per minute (SPM); operating temperature and environment; internal frictions; etc.



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