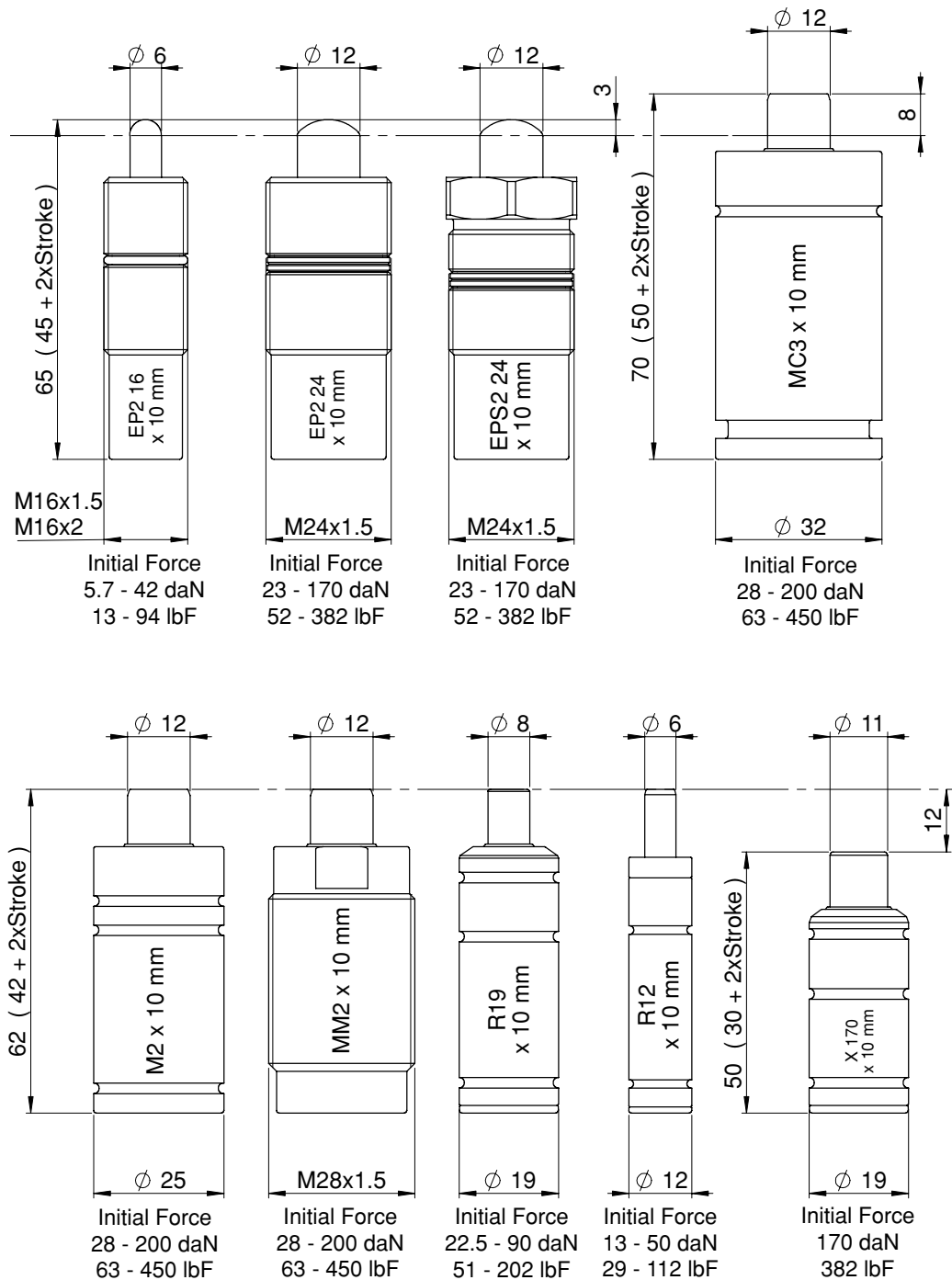


Overview - $F_{INIT} \leq 250$



* Total length for M2 stroke length 63.5 mm and longer is 45 + 2xStroke

* Total length for R12 stroke length 63.5 mm and longer is 45 + 2xStroke

* Total length for X 170 stroke length 75 mm and longer is 35 + 2xStroke

$F_{INIT} < 250$

R12



Page 2.2/2

EP2 16



Page 2.2/3

EP2 24



Page 2.2/4

EPS2 24



Page 2.2/5

R19



Page 2.2/6

R19 TI/TM



Page 2.2/8

M2



Page 2.2/10

MM2



Page 2.2/12

MC3

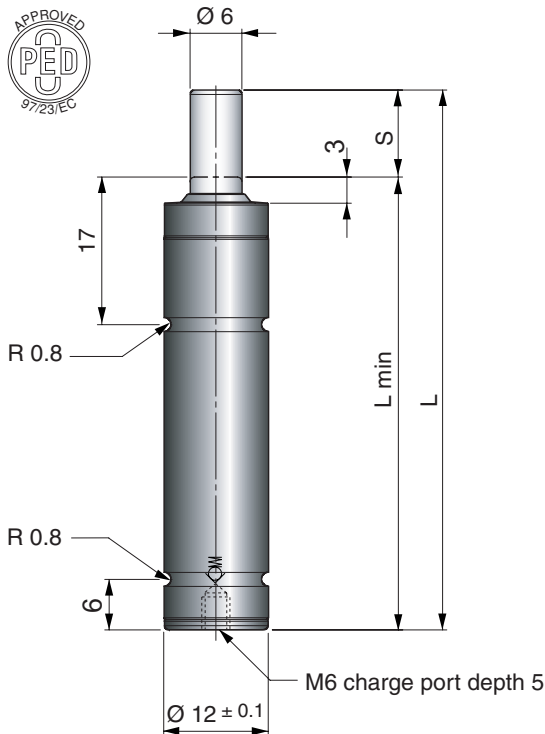


Page 2.2/14

X 170



Page 2.2/16



R12 gas springs are available in four pre-charged models. All R12s are adjustable by the end user. Black is used to denote charging pressures in between or below the standard color pressure codes.

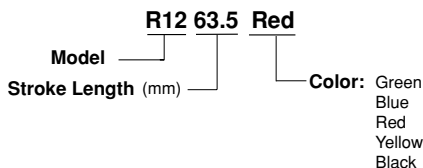
An upper and lower C-groove together with threaded bottom hole allow various mounting possibilities using the new FCR-12 flange mount.

R12 gas springs can be hosed together using the M6 port and Micro-Hose™ system.

Model	Pounds Force (lbF) at +20°C	Color	Charging Pressure (psi)	Pounds Force (lbF) at +20°C at full stroke
	Initial			
R12	29	Green	652	40
R12	56	Blue	1279	81
R12	85	Red	1958	121
R12	112	Yellow	2610	164
R12*	13-112	Black	290-2610	19-164

* User specified charge pressure.

How to order

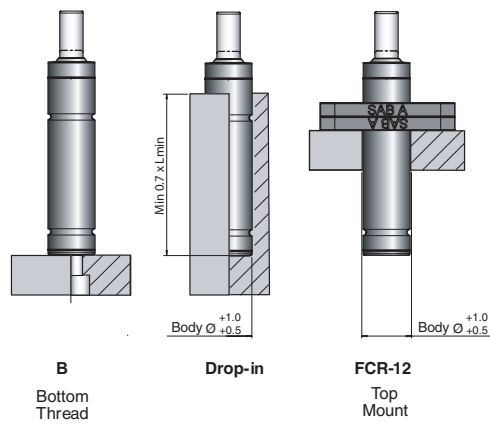


BASIC INFORMATION

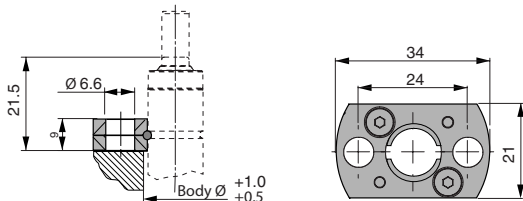
Pressure medium Nitrogen
 Max. charging pressure 180 bar/2610 psi
 Min. charging pressure 20 bar/290 psi
 Operating temperature 0 - 80°C/ 0 - 176°F
 Force increase by temperature..... ±0.3%/°C
 Recommended max strokes/min..... ~40-100 (at 20°C)
 Max piston rod velocity 1.6 m/s
 Rod surface Nitrided
 Tube surface Black oxide
 Not repairable

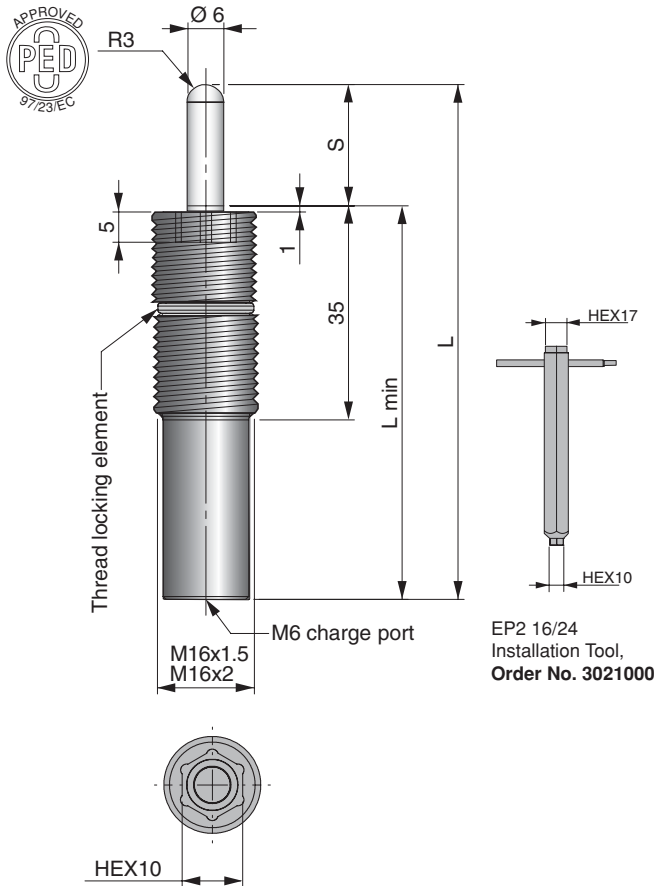
S Stroke	L ±0.25	L min	Gas vol. [l]	Weight [kg]
7	56	49	0.001	0.03
10	62	52	0.001	0.03
12.7	67.4	54.7	0.001	0.03
15	72	57	0.002	0.03
19	80	61	0.002	0.04
25	92	67	0.002	0.04
38	118	80	0.003	0.04
50	142	92	0.004	0.05
63.5	172	108.5	0.005	0.06
75	195	120	0.006	0.06
80	205	122	0.006	0.07
100	245	145	0.008	0.07
125	295	170	0.010	0.09

MOUNTING POSSIBILITIES



FCR-12
 Order No: FCR-12





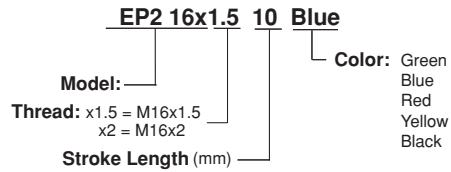
Millimeters to Inches: mm ÷ 25.4 = inches
Kilograms to Pounds: Kg ÷ 0.45 = pounds
Pounds Force to DecaNewtons:
LbF x 0.4448 = decaNewtons

EP2 16 gas springs (Ejector Pin with an M16 thread) are available in M16x1.5 and M16x2 thread sizes.

In each thread size, five models are available. Four preset models (Green, Blue, Red & Yellow) and one adjustable model (Black).

They are all color-coded to help identify the force rating and can be adjusted and recharged to meet individual force requirements.

How to order



Model	Pounds Force (lbF) at +20°C		Color	Charging pressure (psi)	End Force in Pounds (lbF) at + 20°C, at full stroke
	Initial				
EP2 16	13		Green	290	20
EP2 16	25		Blue	580	40
EP2 16	47		Red	1015	100
EP2 16	95		Yellow	2175	150
EP2 16*	13-95		Black	87-2175	20-150

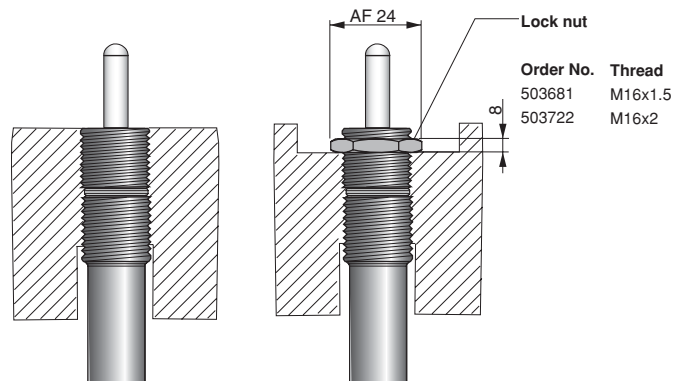
* User specified charge pressure.

S Stroke	L ±0.25	L min	Gas vol. (l)	Weight (kg)
10	65	55	0.002	0.06
20	85	65	0.003	0.07
30	105	75	0.003	0.07
40	125	85	0.004	0.08
50	145	95	0.005	0.08
60	165	105	0.006	0.09
70	185	115	0.007	0.10
80	205	125	0.008	0.11
100	245	145	0.009	0.11
125	295	170	1.012	0.13

BASIC INFORMATION

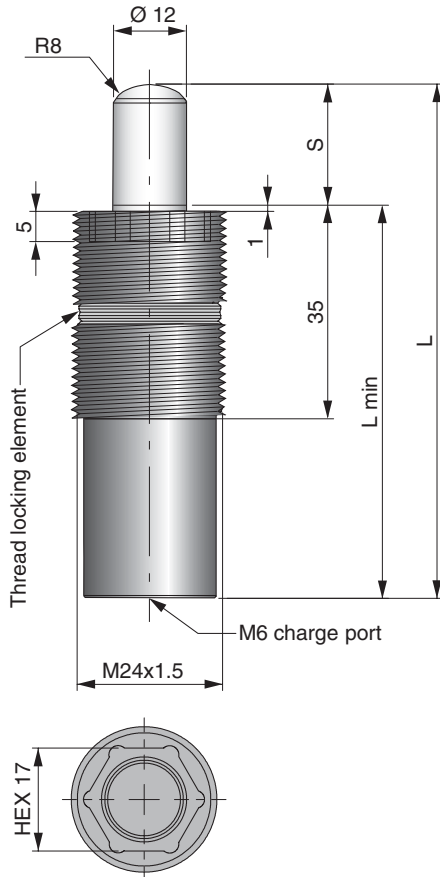
Pressure medium Nitrogen
 Max. charging pressure 150 bar/2175 psi
 Min. charging pressure 6 bar/87 psi
 Operating temperature 0 - 80°C/0 - 176°F
 Force increase by temperature ± 0.3%/°C
 Recommended max strokes/min ~ 100 (at 20°C)
 Max piston rod velocity 1.6 m/s
 Rod surface Nitrided
 Tube surface Black Oxide
 Not repairable

MOUNTING POSSIBILITIES

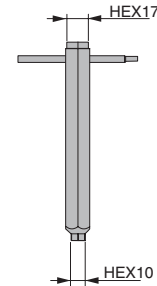


We reserve the right to add, delete or modify components without notification.

All dimensions are stated in mm.
All dimensions are nominal unless tolerance is stated.

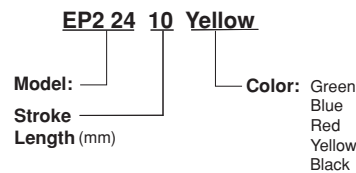


EP2 24 (Ejector Pin with an M24 thread) is available with four pre-set models. Each model is color-coded for easy identification of force rating. If needed, these models can be recharged or adjusted to meet individual force requirements.



EP2 16/24 Installation Tool, Order No. 3021000

How to order



Model	Pounds Force (lbF) at +20°C		Charging pressure (psi)	End Force in Pounds (lbF) at +20°C, at full stroke
	Initial	Color		
EP2 24	52	Green	290	90
EP2 24	101	Blue	580	180
EP2 24	191	Red	1015	340
EP2 24	382	Yellow	2610	650
EP2 24*	52-382	Black	87-2610	25-650

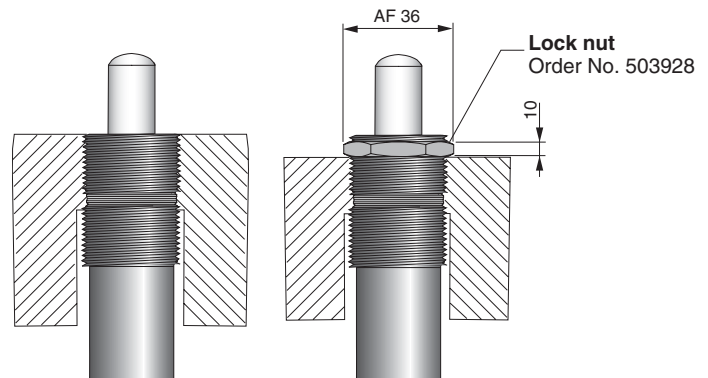
* User specified charge pressure.

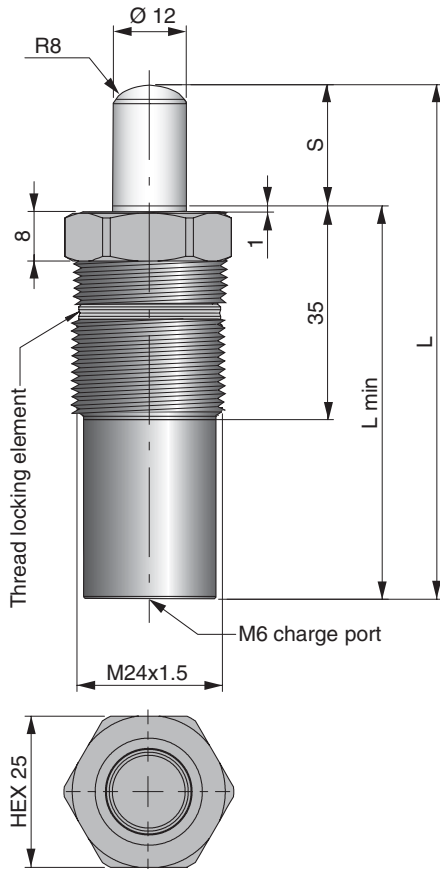
S Stroke	L ±0.25	L min	Gas vol. (l)	Weight (kg)
10	65	55	0.05	0.13
20	85	65	0.07	0.15
30	105	75	0.10	0.17
40	125	85	0.12	0.19
50	145	95	0.14	0.21
60	165	105	0.17	0.23
70	185	115	0.19	0.25
80	205	125	0.22	0.27
100	245	145	0.26	0.31
125	295	170	0.32	0.35

BASIC INFORMATION

Pressure medium Nitrogen
 Max. charging pressure 180 bar/2610 psi
 Min. charging pressure 6 bar/87 psi
 Operating temperature 0 - 80°C/0 - 176°F
 Force increase by temperature ± 0.3%/°C
 Recommended max strokes/min ~ 30-80 (at 20°C)
 Max piston rod velocity 1.6 m/s
 Rod surface Nitrided
 Tube surface Black Oxide
 Not repairable

MOUNTING POSSIBILITIES





EPS2 24 (Ejector Pin Special with an M24 thread) is available with four pre-set models. Each model is color-coded for easy identification of force rating. If needed, these models can be recharged or adjusted to meet individual force requirements.

Also available is a model (black) which is delivered with a precharge of 73-140 psi, intended to be adjusted to the desired force.

The EPS2 24 is based on FORD's WDX3580-19XX XX XX gas spring standard.

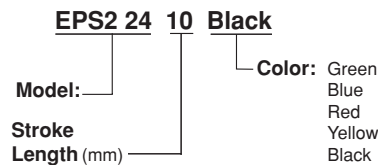
Millimeters to Inches: mm ÷ 25.4 = inches
Kilograms to Pounds: Kg ÷ 0.45 = pounds
Pounds Force to DecaNewtons: LbF x 0.4448 = decaNewtons

Model	Pounds Force (lbF) at +20°C		Charging pressure (psi)	End Force in Pounds (lbF) at + 20°C, at full stroke
	Initial	Color		
EPS2 24	52	Green	290	90
EPS2 24	101	Blue	580	180
EPS2 24	191	Red	1015	340
EPS2 24	382	Yellow	2610	650
EPS2 24*	52-382	Black	87-2610	25-650

* User specified charge pressure.

S Stroke	L ±0.25	L min	Gas vol. (l)	Weight (kg)
10	65	55	0.05	0.15
16	77	61	0.06	0.16
20	85	65	0.07	0.17
25	95	70	0.08	0.18
30	105	75	0.10	0.19
38	121	83	0.11	0.21
40	125	85	0.12	0.21
50	145	95	0.14	0.23
60	165	105	0.17	0.25
70	185	115	0.19	0.27
80	205	125	0.22	0.29
100	245	145	0.26	0.33
125	295	170	0.32	0.37

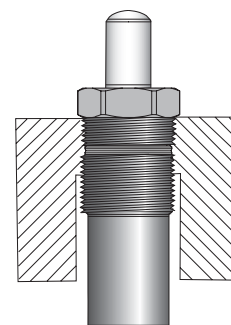
How to order



BASIC INFORMATION

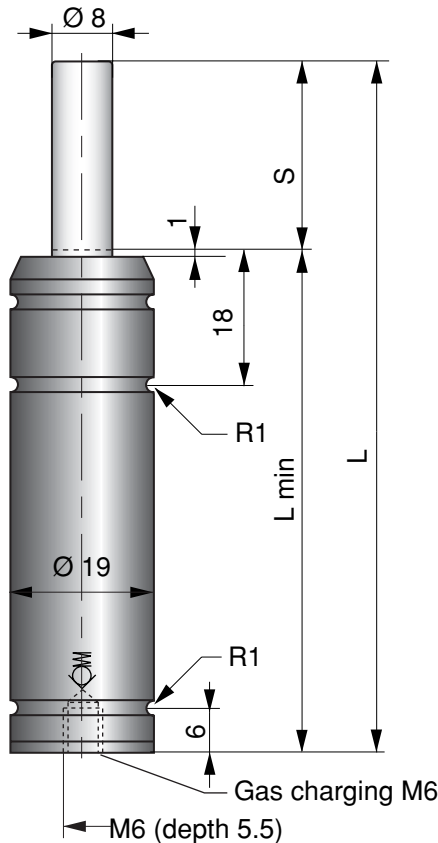
- Pressure medium Nitrogen
- Max. charging pressure 180 bar/2610 psi
- Min. charging pressure 6 bar/87 psi
- Operating temperature 0 - 80°C/0 - 176°F
- Force increase by temperature ± 0.3%/°C
- Recommended max strokes/min ~ 30-80 (at 20°C)
- Max piston rod velocity 1.6 m/s
- Rod surface Nitrided
- Tube surface Black Oxide
- Not repairable

MOUNTING POSSIBILITIES



We reserve the right to add, delete or modify components without notification.

All dimensions are stated in mm. All dimensions are nominal unless tolerance is stated.

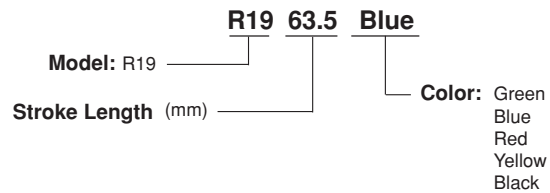


The R19 Gas Springs are available in four preset models. Each spring is color-coded for easy identification of force rating.

The R19 is rechargeable but cannot be rebuilt as the spring body is roll formed around the internal components.

There are two types of mountings for the R19: the BF 19 used at the lower body groove location and the FCR 19 used at the upper groove. The M6 thread in the base of the spring is used for filling and is also a mounting option.

How to order



Model	Charging pressure (psi)	Color	Pounds Force (lbF)
			Initial
R19	870	Green	67
R19	1450	Blue	112
R19	2030	Red	157
R19	2610	Yellow	202
R19*	650-2610	Black	67-202

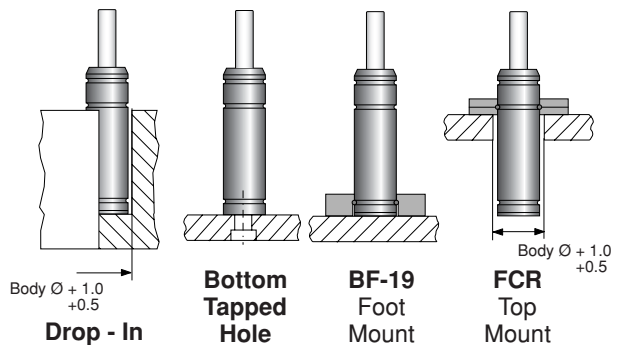
* User specified charge pressure.

S Stroke	Pounds Force (lbF) at full stroke				L ±0.25	L min
	R19 Green	R19 Blue	R19 Red	R19 Yellow		
7	119	199	270	360	56	49
10	105	175	247	315	62	52
15	99	164	225	292	72	57
25	94	157	220	292	92	67
38	92	155	218	270	118	80
50	92	152	216	270	142	92
63.5	92	152	214	270	169	105.5
63.5-D	92	152	214	270	172	108.5
80	92	152	214	270	202	122
80-D	92	152	214	270	205	125
100	92	152	214	270	245	145
125	92	152	214	270	295	170

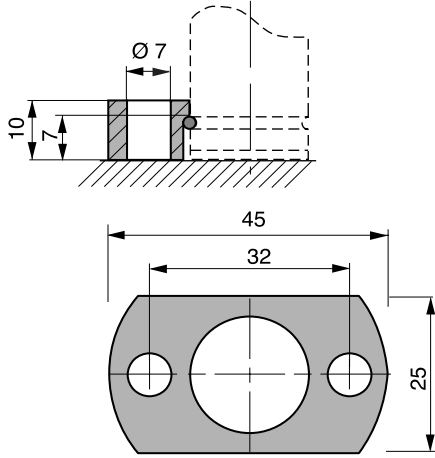
BASIC INFORMATION

Pressure medium Nitrogen
 Max. charging pressure 180 bar/2610 psi
 Min. charging pressure 45 bar/650 psi
 Operating temperature 0 - 80°C/0 - 176°F
 Force increase by temperature ± 0.3%/°C
 Recommended max strokes/min ~ 100-150
 Max piston rod velocity 1.6 m/s
 Tube Black oxide
 Not repairable

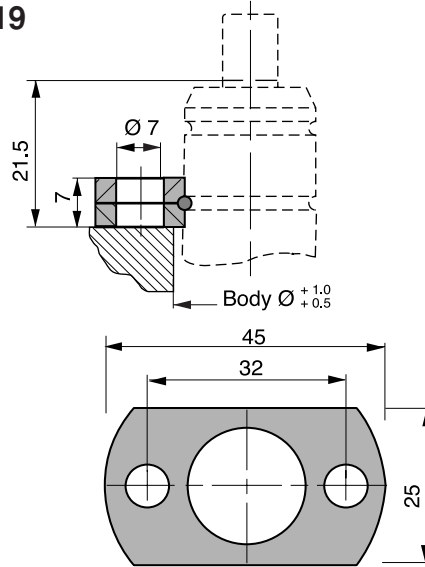
MOUNTING POSSIBILITIES



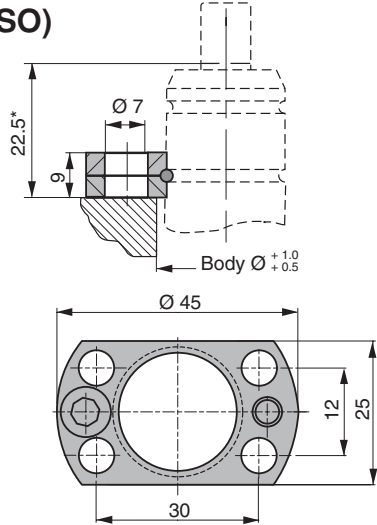
BF-19



FCR-19

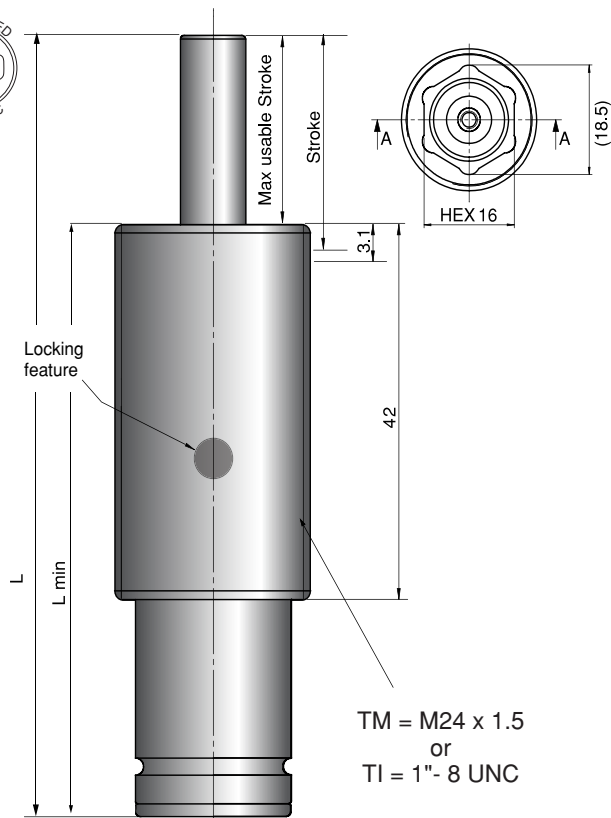


FCR-90 (ISO)



* Note: ISO Specifies 21.5

Millimeters to Inches: $\text{mm} \div 25.4 = \text{inches}$
Kilograms to Pounds: $\text{Kg} \div 0.45 = \text{pounds}$
Pounds Force to DecaNewtons: $\text{LbF} \times 0.4448 = \text{decaNewtons}$

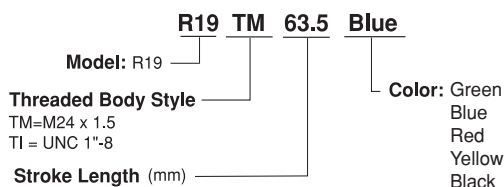


The R19 TI/TM is a Threaded Body version of the R19. The Threaded Body is available with M24 x 1.5 or 1"-8 threads. Each spring is color-coded for easy identification of force rating.

The R19 is rechargeable but cannot be rebuilt as the spring body is roll formed around the internal components.

There are two types of nuts for the R19 TI/TM: the FRM-19 and the FHI-19. The M6 thread in the base of the spring is used for filling and is also a mounting option.

How to order



Model	Charging pressure (psi)	Color	Pounds Force (lbF)
			Initial
R19 TI/TM	870	Green	67
R19 TI/TM	1450	Blue	112
R19 TI/TM	2030	Red	157
R19 TI/TM	2610	Yellow	202
R19 TI/TM*	650-2610	Black	67-202

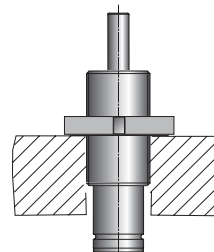
* User specified charge pressure.

S Stroke	Max Usable Stroke	Pounds Force (lbF) at full stroke				L ±0.25	L min
		R19 Green	R19 Blue	R19 Red	R19 Yellow		
7	5	119	199	270	360	56	51
10	8	105	175	247	315	62	54
15	13	99	164	225	292	72	59
25	23	94	157	220	292	92	69
38.1	36	92	155	218	270	118	82.1
50	48	92	152	216	270	142	94
63.5	61.5	92	152	214	270	169	107.5
63.5-D	61.5	92	152	214	270	172	110.5
80	78	92	152	214	270	202	124
80-D	78	92	152	214	270	205	127
100	98	92	152	214	270	245	147
125	123	92	152	214	270	295	172

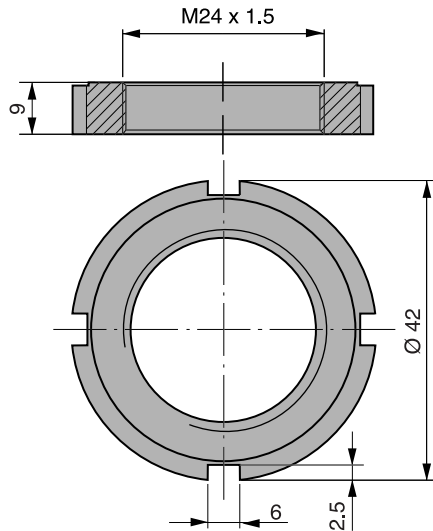
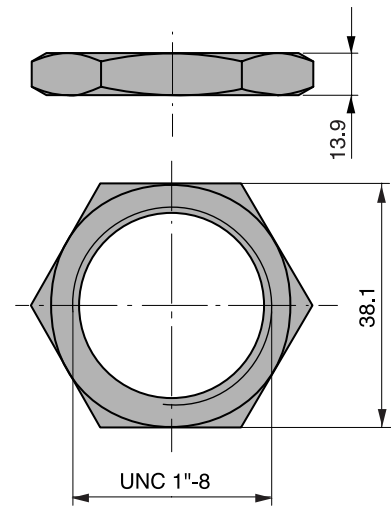
BASIC INFORMATION

- Pressure medium Nitrogen
- Max. charging pressure 180 bar/2610 psi
- Min. charging pressure 25 bar/350 psi
- Operating temperature 0 - 80°C/0 - 176°F
- Force increase by temperature ± 0.3%/°C
- Recommended max strokes/min ~ 100-150
- Max piston rod velocity 1.6 m/s
- Tube Black oxide
- Not repairable

MOUNTING POSSIBILITIES



FRM-19 and FHI-19
Locking Nut

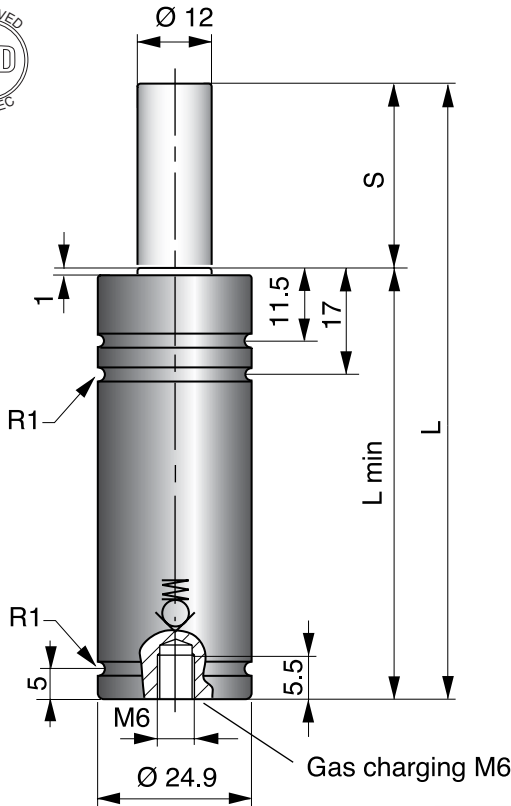
FRM-19**FHI-19**

Millimeters to Inches: $\text{mm} \div 25.4 = \text{inches}$

Kilograms to Pounds: $\text{Kg} \div 0.45 = \text{pounds}$

Pounds Force to DecaNewtons:

$\text{LbF} \times 0.4448 = \text{decaNewtons}$



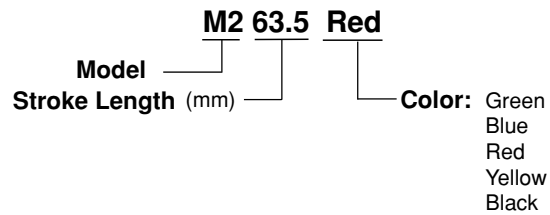
The M2 is available in four preset models, with initial forces from 110 to 450 lbF. Each spring is color-coded for easy identification of force rating.

The M2 spring can in many cases directly replace mechanical die springs of 25 mm (1 inch) diameter.

All M2 springs can be repaired and recharged.

The spring can be used attached to the tool, using a mount (FCR or SM). The M6 thread in the base of the spring is used for filling and is also a mounting option.

How to order



Model	Charging pressure (psi)	Color	Pounds Force (lbF)	
			Initial	at full stroke
M2	650	Green	110	
M2	1300	Blue	225	
M2	1960	Red	340	
M2	2610	Yellow	450	
M2*	360-2610	Black	110-450	

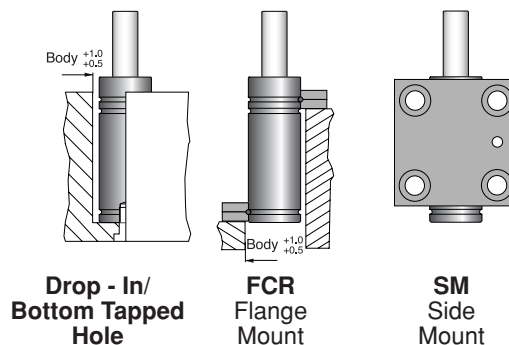
* User specified charge pressure.

S Stroke	Pounds Force (lbF) at full stroke				L ± 0.25	L min	Gas vol. (l)	Weight (kg)
	M2 Green	M2 Blue	M2 Red	M2 Yellow				
7	173	344	517	689	56	49	0.005	0.13
10	173	344	517	689	62	52	0.005	0.14
12.7	173	344	517	690	67.4	54.7	0.006	0.15
15	173	346	519	690	72	57	0.007	0.16
16	173	346	519	690	74	58	0.007	0.16
25	173	346	519	692	92	67	0.010	0.18
38.1	173	346	522	695	118.2	80.1	0.015	0.20
50	173	346	522	695	142	92	0.019	0.22
63.5	17	342	510	679	172	108.5	0.024	0.26
80	171	342	513	683	205	125	0.029	0.30
100	171	342	515	686	245	145	0.036	0.33
125	171	344	515	689	295	170	0.044	0.39

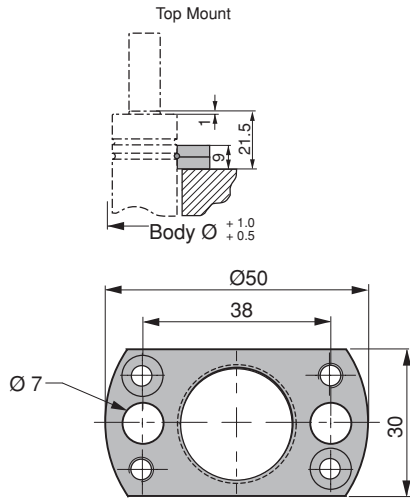
BASIC INFORMATION

Pressure medium Nitrogen
 Max. charging pressure 180 bar/2610 psi
 Min. charging pressure 25 bar/360 psi
 Operating temperature 0 - 80°C/0 - 176°F
 Force increase by temperature ±0.3%/°C
 Recommended max strokes/min ~ 80-100
 Max piston rod velocity 1.6 m/s
 Tube Black oxide
 Repair kit M2

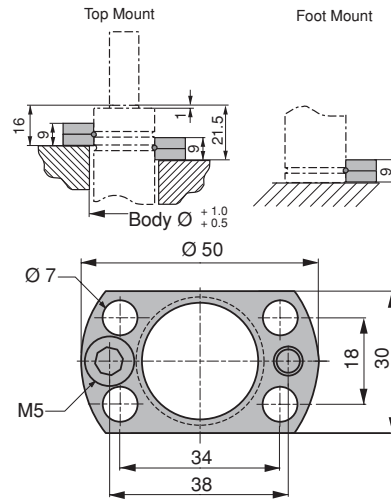
MOUNTING POSSIBILITIES



FCR-25

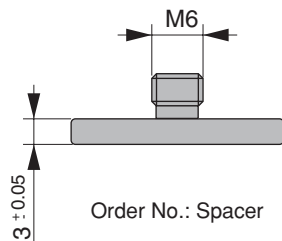


FCR-150 (180)

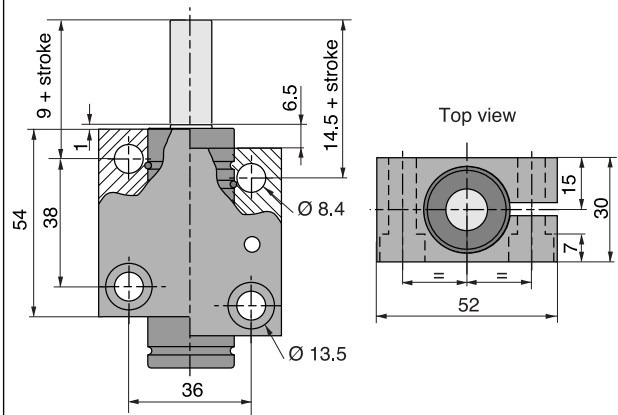


Note: For M2, L and L min are 3 mm shorter for 10 to 50 mm stroke compared to older version of Mini Spring (called M150).

To obtain the correct total length when replacing the older version (M150) when using drop in, or FCR as foot mount, a 3 mm distance should be used (Order No. Spacer, see picture below).



SM-150

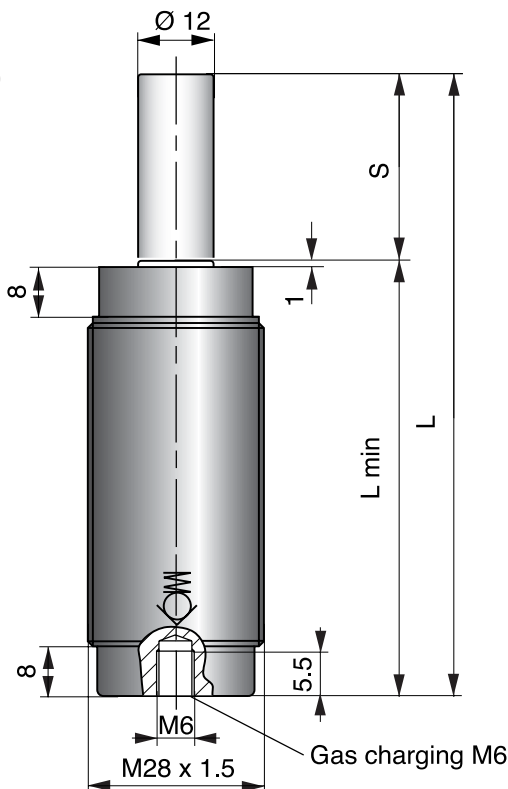


Millimeters to Inches: mm ÷ 25.4 = inches

Kilograms to Pounds: Kg ÷ 0.45 = pounds

Pounds Force to DecaNewtons:

LbF x 0.4448 = decaNewtons

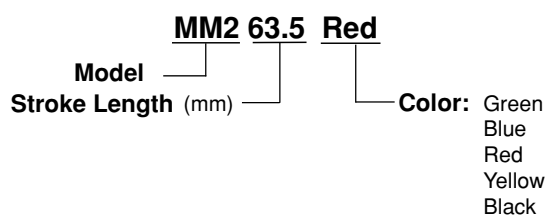


The MM2 is a version of the M2 spring with a threaded body, (M 28 x 1.5). All internal parts and technical data are the same as for M2 springs. Each spring is color-coded for easy identification of force rating.

All MM2 springs can be repaired and recharged.

Millimeters to Inches: mm ÷ 25.4 = inches
Kilograms to Pounds: Kg ÷ 0.45 = pounds
Pounds Force to DecaNewtons: LbF x 0.4448 = decaNewtons

How to order



Model	Charging pressure (psi)	Color	Pounds Force (lbF)
			Initial
MM2	650	Green	110
MM2	1300	Blue	225
MM2	1960	Red	340
MM2	2610	Yellow	450
MM2*	360-2610	Black	110-450

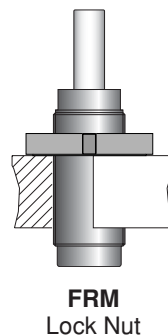
* User specified charge pressure.

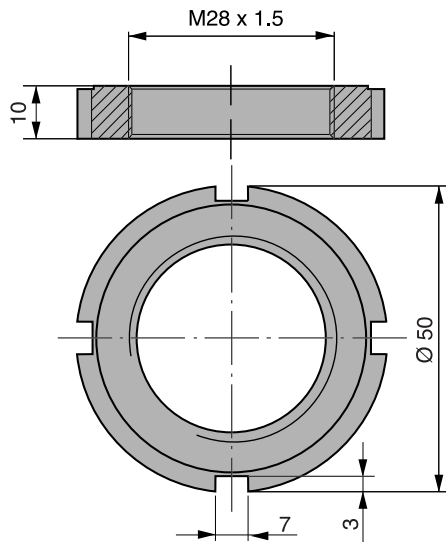
S Stroke	Pounds Force (lbF) at full stroke				L ± 0.25	L min	Gas vol. (l)	Weight (kg)
	MM2 Green	MM2 Blue	MM2 Red	MM2 Yellow				
7	173	344	517	689	56	49	0.005	0.13
10	173	344	517	689	62	52	0.005	0.14
12.7	173	344	517	690	67.4	54.7	0.006	0.15
15	173	346	519	690	72	57	0.007	0.16
16	173	346	519	690	74	58	0.007	0.16
25	173	346	519	692	92	67	0.010	0.18
38.1	173	346	522	695	118.2	80.1	0.015	0.20
50	173	346	522	695	142	92	0.019	0.22
63.5	171	342	510	679	169	105.5	0.024	0.26
80	171	342	513	683	202	122	0.029	0.30
100	171	342	515	686	242	142	0.036	0.33
125	171	344	515	689	292	167	0.044	0.39

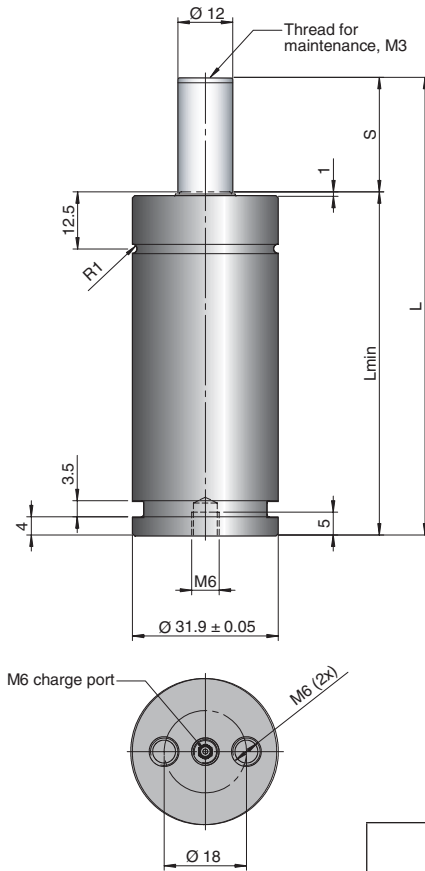
BASIC INFORMATION

Pressure medium Nitrogen
 Max. charging pressure 180 bar/2610 psi
 Min. charging pressure 25 bar/360 psi
 Operating temperature 0 - 80°C/0 - 176°F
 Force increase by temperature ±0.3%/°C
 Recommended max strokes/min ~ 80-100
 Max piston rod velocity 1.6 m/s
 Tube Black oxide
 Repair kit M2

MOUNTING POSSIBILITIES



FRM-150

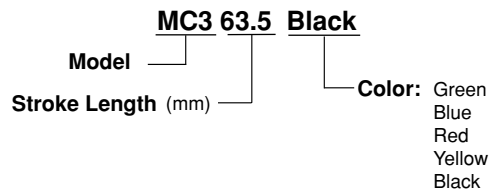


The MC3 spring is based on the M2 spring, using the same piston rod and internal components. The body of the spring and the mount are designed to meet the ISO-dimension found in ISO 11901 as well as in VDI 3003.

Each spring is color-coded for easy identification of force rating. We also offer a model with adjustable force (black) that can be customized to meet individual force requirements. The adjustable model may be set to desired pressure at the factory or by customers with charging equipment.

The spring can be attached to the tool, using mounts FC-MC or FFC-MC. The M6 threads in the base of the spring are used for charging respective as mounting option.

How to order



Model	Pounds Force (lbF)		Charging pressure (psi)
	Initial	Color	
MC3	110	Green	650
MC3	225	Blue	1300
MC3	340	Red	1960
MC3	450	Yellow	2610
MC3*	63-450	Black	360-2610

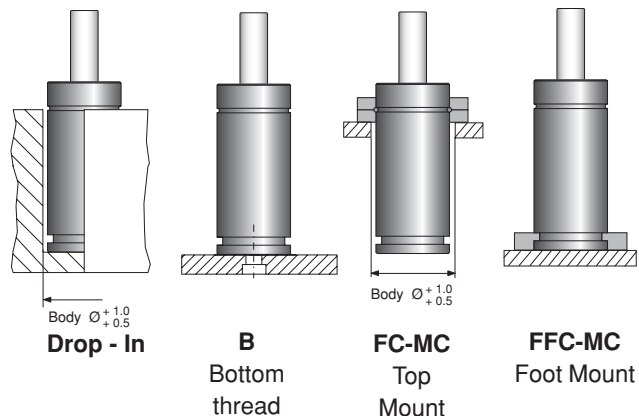
* User specified charge pressure.

S Stroke	Pounds Force (lbF) at full stroke				L ±0.25	L min	Gas vol. (l)	Weight (kg)	ISO
	Green	Blue	Red	Yellow					
10	173	344	517	688	70	60	0.005	0.30	✓
12.7	173	344	517	690	75.4	62.7	0.006	0.31	
16	173	340	519	690	82	66	0.007	0.33	✓
25	173	340	519	692	100	75	0.010	0.38	✓
38.1	173	340	522	695	126.2	88.1	0.015	0.43	
50	173	340	522	695	150	100	0.019	0.48	✓
63.5	171	342	510	679	177	113.5	0.024	0.54	
80	171	342	513	683	210	130	0.029	0.62	✓
100	171	342	515	686	250	150	0.036	0.71	
125	171	344	515	688	300	175	0.044	0.83	

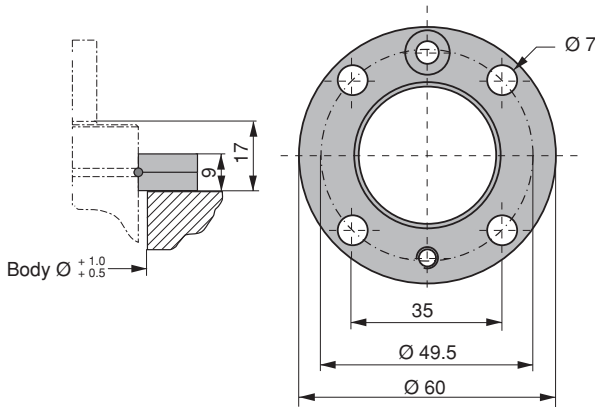
BASIC INFORMATION

Pressure medium Nitrogen
 Max. charging pressure 180 bar/2610 psi
 Min. charging pressure 25 bar/360 psi
 Operating temperature 0 - 80°C/0 - 176°F
 Force increase by temperature ±0.3%/°C
 Recommended max strokes/min ~ 80-100 (at 20°C)
 Max piston rod velocity 1.6 m/s
 Rod surface Nitrided
 Tube surface Black oxide
 Repair kit MC3

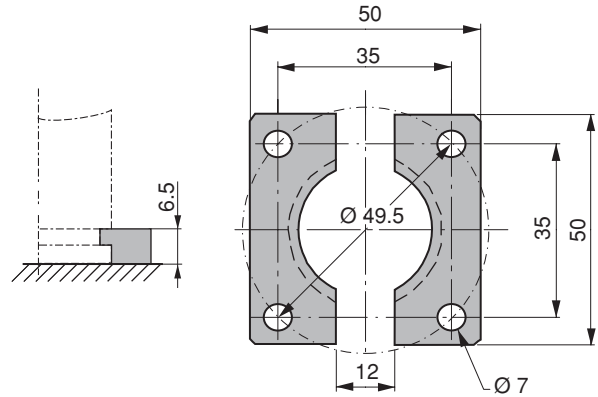
MOUNTING POSSIBILITIES



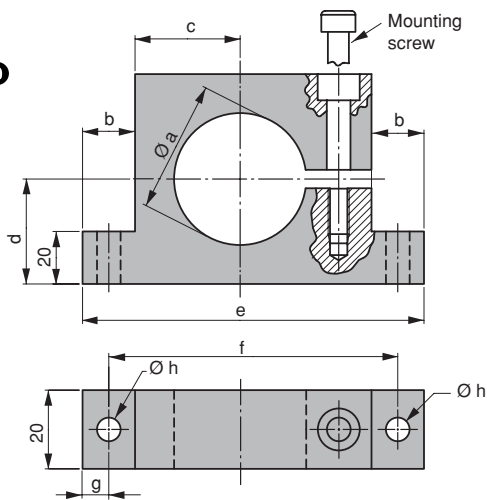
FC-MC-150



FFC-MC-150



S-MC

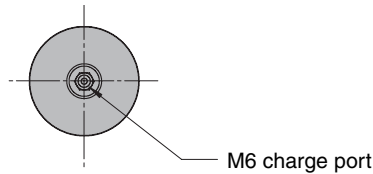
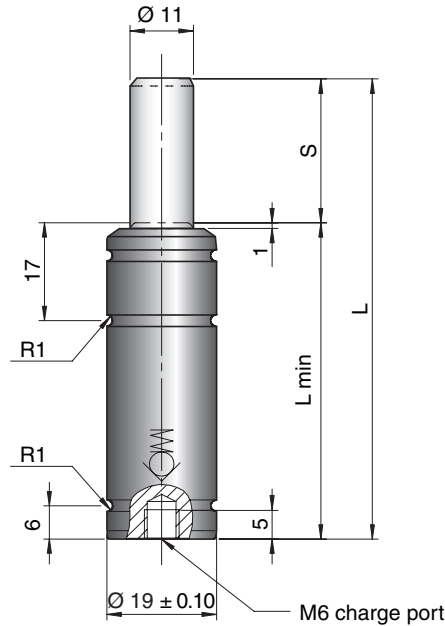


Order No.	Ø a	b	c	d	e	f	g	Ø h
S-MC	32.1	18	22	22.5	90	72	9	8.5

Millimeters to Inches: $\text{mm} \div 25.4 = \text{inches}$

Kilograms to Pounds: $\text{Kg} \div 0.45 = \text{pounds}$

**Pounds Force to DecaNewtons:
 $\text{LbF} \times 0.4448 = \text{decaNewtons}$**



The Powerline series is our shortest and most powerful piston rod sealed gas spring, giving you a great deal of force in a very small amount of space.

The X springs are available with stroke lengths between 7 and 125 mm.

The X 170 has a bottom port for gas charging that can also be used to connect to a Micro Hose™ hose system.

The X 170 has an upper ISO-Standard C-groove and a lower C-groove which together with a threaded bottom hole offer various mounting possibilities.

Millimeters to Inches: mm ÷ 25.4 = inches
Kilograms to Pounds: Kg ÷ 0.45 = pounds
Pounds Force to DecaNewtons: LbF x 0.4448 = decaNewtons

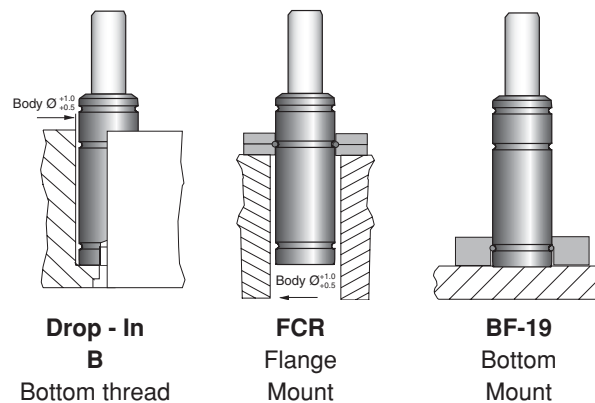
Order No.	S Stroke	Pounds Force (lbF) at 2610 psi		L ± 0.25	L min
		Initial	End force*		
X 170-007	7	382	630	44	37
X 170-010	10			50	40
X 170-015	15			60	45
X 170-019	19			68	49
X 170-025	25			80	55
X 170-038	38			106	68
X 170-050	50			130	80
X 170-063	63			156	93
X 170-075	75			185	110
X 170-080	80			195	115
X 170-100	100			235	135
X 170-125	125			285	160

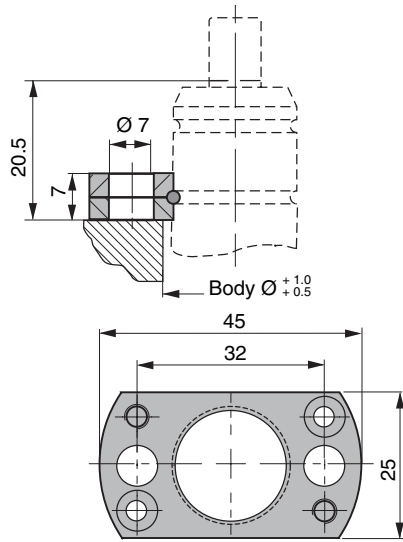
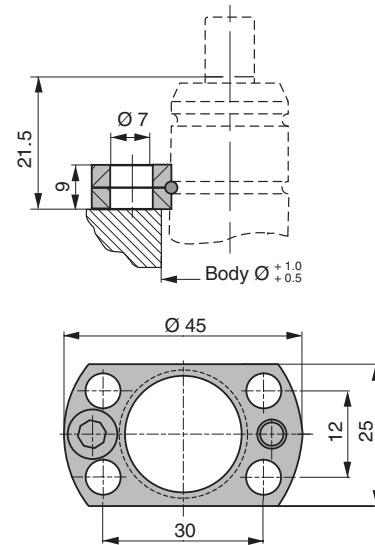
* = at full stroke

BASIC INFORMATION

Pressure medium Nitrogen
 Max. charging pressure 180 bar/2610 psi
 Min. charging pressure 25 bar/360 psi
 Operating temperature 0 - 80°C/0 - 176°F
 Force increase by temperature ±0.3%/°C
 Recommended max strokes/min ~ 40-100 (at 20°C)
 Max piston rod velocity 1.6 m/s
 Rod surface Nitrided
 Tube surface Black oxide
 Not repairable

MOUNTING POSSIBILITIES



FCR-19**FCR-90 (ISO)****BF-19**