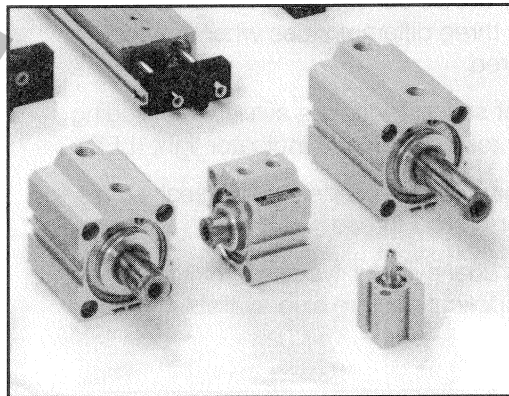
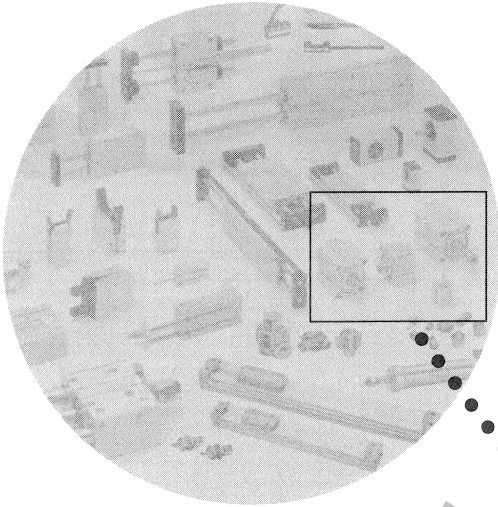
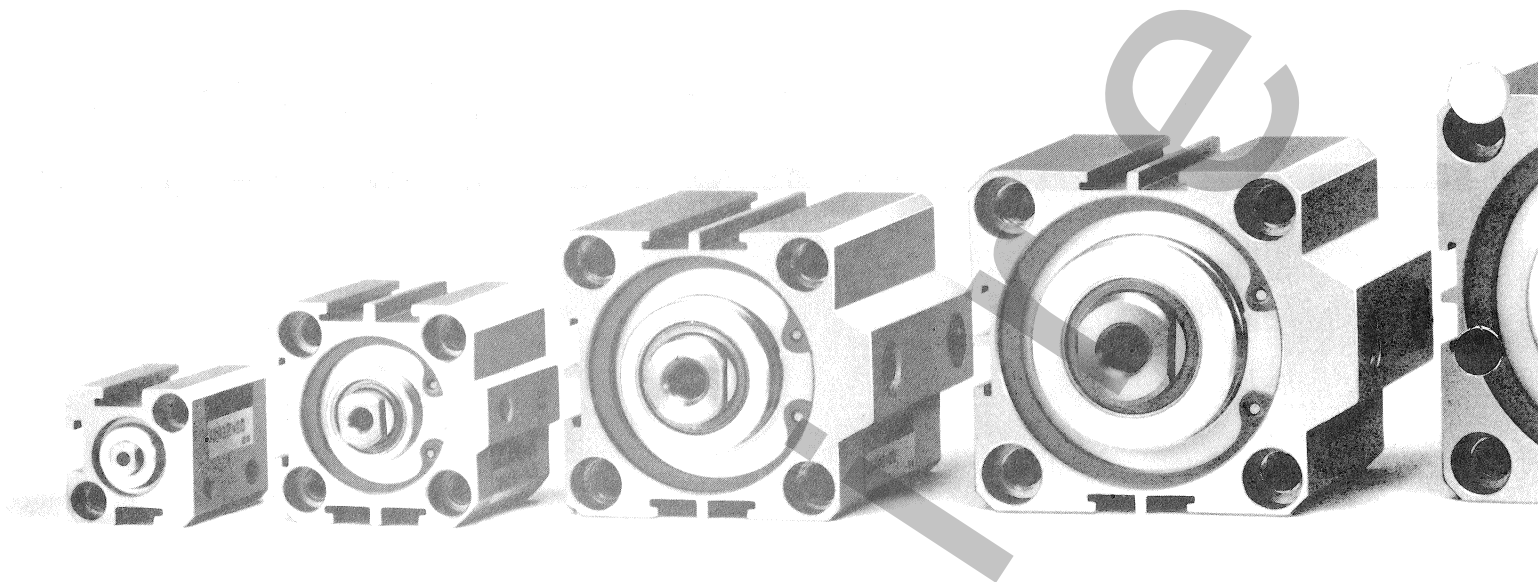


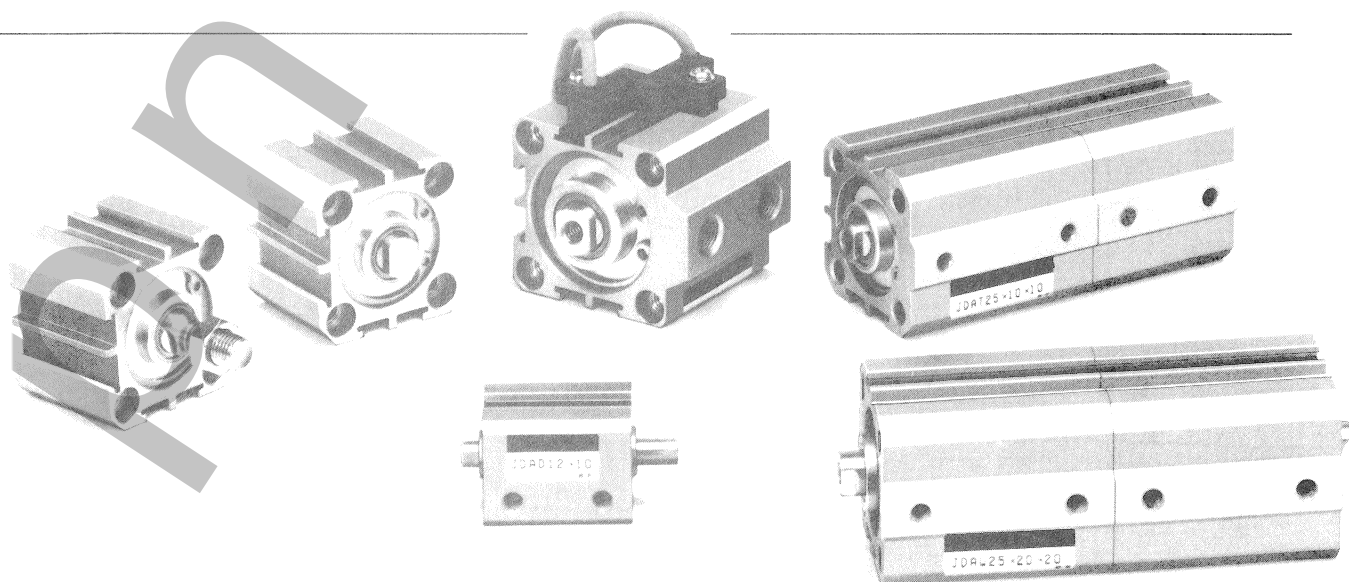
Block Cylinders

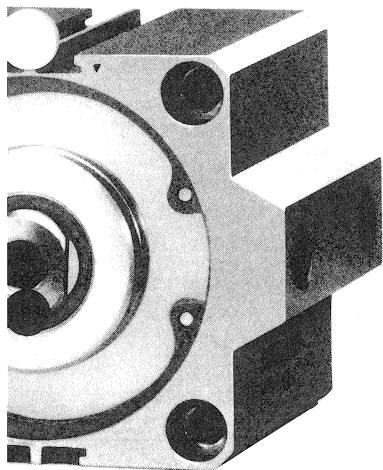


HUMPHREY BLOCK CYLINDERS



- Short and compact body.
- A wide range of ten bore sizes from 1/2" to 4".
- Common mounting choices: Use threaded through holes on body or foot, flange and pivot styles.
- Non-rotating, double acting type "square rod" series available.
- Unique body allows sensor switches to be mounted on three different sides when magnet type is required.
- Four different sensor switches available, including hall effect or reed types, and indicator light (LED).
- Other options include bumpers, viton seals, male rod thread or no rod thread.
- Tandem and dual cylinder types for multiple force and stroke applications are also available.





Type of operation	Standard Types		Semi-standard types	
	Single rod	Double rod	Tandem type	Dual type
Double acting in(mm) 1/2 to 4 bore (12 to 100 bore)				
Single acting – push in(mm) 1/2 to 2 bore (12 to 50 bore)				
Single acting – pull in(mm) 1/2 to 2 bore (12 to 50 bore)			—	
Magnet type – for sensor switch applications				
Options (code)	Rod end specifications		Fluoroelastomer seals (-F)	Bumpers (-R)
	Male rod: (-B) 	Plain rod: (-N) 	 Not available with magnet or bumper options	 Available in double acting bore sizes 1 1/2 thru 4 (40-100) in(mm)

FORCE

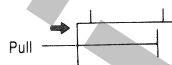
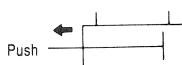
Force (F) is determined by piston area (A) and pressure (P), $F = A \times P$.

Select appropriate bore size by calculating the necessary force, considering loads and air pressure. Use the chart below to compute the "load rate" using the following formula:

$$\text{Load rate} = \frac{\text{Load (weight)}}{\text{Calculation value (from charts below)}}$$

We recommend the "load rate" to be no more than 70%, and no more than 50% for high speed cycle rates.

DOUBLE ACTING TYPES

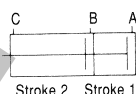


lbs. (kgf)

Bore size nominal (mm actual)	Rod dia. inch (mm)	Piston area inch ² (cm ²)	Cycle	Air pressure – PSI (kgf/cm ²)						
				14 (1)	28 (2)	43 (3)	57 (4)	71 (5)	85 (6)	100 (7)
1/2 (12)	.236 (6)	0.18 (1.13)	push	–	5.04 (2.26)	7.74 (3.39)	10.26 (4.52)	12.78 (5.65)	15.3 (6.78)	18 (7.91)
		0.13 (.848)	pull	–	3.64 (1.69)	5.59 (2.24)	7.41 (3.39)	9.23 (4.24)	11.5 (5.08)	13 (5.93)
5/8 (16)	.236 (6)	0.31 (2.01)	push	–	8.68 (4.02)	13.33 (6.03)	17.67 (8.04)	22.01 (10.05)	26.35 (12.06)	31 (14.07)
		0.27 (1.73)	pull	–	7.56 (3.45)	11.61 (5.18)	15.39 (6.91)	19.17 (8.63)	22.95 (10.36)	27 (12.09)
3/4 (20)	.315 (8)	0.49 (3.14)	push	–	14 (6)	21 (9)	28 (12)	35 (15)	42 (18)	49 (21)
		0.41 (2.64)	pull	–	11.5 (5)	18 (7)	23 (10)	29 (13)	35 (15)	41 (18)
1 (25)	.394 (10)	0.76 (4.90)	push	–	21 (9)	33 (14)	43 (19)	54 (24)	65 (29)	76 (34)
		0.64 (4.12)	pull	–	18 (8)	27.5 (12)	36.5 (16)	45.5 (20)	54 (24)	64 (28)
1 1/4 (32)	.472 (12)	1.25 (8.04)	push	–	35 (16)	54 (24)	71 (32)	89 (40)	106 (48)	125 (56)
		1.07 (6.9)	pull	–	30 (13)	46 (20)	61 (27)	76 (34)	91 (41)	107 (48)
1 1/2 (40)	.630 (16)	1.95 (12.56)	push	27 (12)	55 (25)	84 (37)	111 (50)	138.5 (62)	166 (75)	195 (87)
		1.64 (10.55)	pull	23 (10)	46 (21)	70.5 (42)	93.5 (42)	116.5 (52)	139 (63)	164 (73)
2 (50)	.787 (20)	3.04 (19.63)	push	42.5 (19)	85 (39)	131 (58)	173 (78)	216 (98)	258 (117)	304 (137)
		2.56 (16.49)	pull	36 (16)	72 (32)	110 (49)	146 (65)	182 (82)	218 (98)	256 (115)
2 1/2 (63)	.787 (20)	4.83 (31.17)	push	68 (31)	135 (62)	208 (93)	275 (124)	343 (155)	410.5 (187)	483 (218)
		4.34 (28.03)	pull	61 (28)	121.5 (56)	187 (84)	247 (112)	308 (140)	369 (168)	434 (196)
3 1/4 (80)	.984 (25)	7.79 (50.26)	push	109 (50)	218 (100)	335 (150)	444 (201)	553 (251)	662 (301)	779 (351)
		7.03 (45.36)	pull	98.5 (45)	197 (90)	302 (136)	401 (181)	499 (226)	597.5 (272)	703 (317)
4 (100)	1.260 (32)	12.17 (78.53)	push	170 (78)	314 (157)	523 (235)	694 (314)	864 (392)	1034.5 (471)	1217 (549)
		10.93 (70.49)	pull	153 (70)	306 (140)	470 (211)	623 (281)	776 (352)	929 (422)	1093 (493)

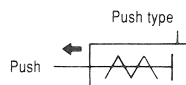
To calculate force for the following cylinder types:

- Double acting, double rod – use "pull" side of double acting force chart.
- Single acting, double rod – use "single acting-pull type" force chart.
- Tandem cylinder – if air is applied to A, B, or C port only, the force is the same as standard. If air is applied to A and B ports simultaneously, and within the stroke range of Cylinder 1, the force is doubled.



- Dual cylinder – same as standard.

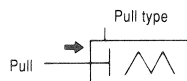
SINGLE ACTING PUSH TYPES



lbs. (kgf)

Type bore nominal (mm actual)	Rod dia. inch (mm)	Piston area in. ² (cm ²)	Air pressure – PSI (kgf/cm ²)						
			14 (1)	28 (2)	43 (3)	57 (4)	71 (5)	85 (6)	100 (7)
1/2 (12)	.236 (6)	.18 (1.13)	–	2.97 (1.32)	5.67 (2.45)	8.19 (3.56)	10.71 (4.71)	13.23 (5.84)	15.93 (6.97)
5/8 (16)	.236 (6)	.31 (2.01)	–	6.10 (2.85)	10.75 (4.86)	15.09 (6.87)	19.43 (8.88)	23.77 (10.89)	28.42 (12.90)
3/4 (20)	.315 (8)	.49 (3.14)	–	11 (5)	18.5 (8)	25 (11)	32 (14)	39 (17)	46 (20)
1 (25)	.394 (10)	.76 (4.9)	–	16.5 (7)	28 (12)	38.5 (17)	49 (22)	60 (27)	71 (32)
1 1/4 (32)	.472 (12)	1.25 (8.04)	–	25 (11)	43 (19)	61 (27)	78 (35)	96 (43)	115 (51)
1 1/2 (40)	.630 (16)	1.95 (12.56)	15 (7)	42.5 (19)	72 (32)	99 (44)	126 (57)	154 (69)	183 (82)
2 (50)	.787 (20)	3.04 (19.63)	33 (14)	76 (34)	121 (54)	164 (74)	206 (93)	249 (113)	294.5 (133)

SINGLE ACTING PULL TYPES



lbs. (kgf)

Type bore nominal (mm actual)	Rod dia. inch (mm)	Piston area in. ² (cm ²)	Air pressure – PSI (kgf/cm ²)						
			14 (1)	28 (2)	43 (3)	57 (4)	71 (5)	85 (6)	100 (7)
1/2 (12)	.236 (6)	.13 (.848)	–	1.57 (0.75)	3.52 (1.6)	5.34 (2.45)	7.16 (3.30)	8.98 (4.14)	10.93 (4.99)
5/8 (16)	.236 (6)	.27 (1.73)	–	4.98 (2.28)	9.03 (4.01)	12.81 (5.74)	16.59 (7.46)	20.37 (9.19)	24.42 (10.92)
3/4 (20)	.315 (8)	.41 (2.64)	–	9 (4)	15 (6)	21 (9)	26.5 (11)	32 (14)	38 (17)
1 (25)	.394 (10)	.64 (4.12)	–	13 (6)	23 (10)	32 (14)	40.5 (18)	49.5 (22)	59 (26)
1 1/4 (32)	.472 (12)	1.07 (6.9)	–	19.5 (9)	36 (16)	50.5 (22)	65.5 (29)	80.55 (36)	96.5 (43)
1 1/2 (40)	.630 (16)	1.64 (10.55)	11 (5)	34 (15)	58.5 (26)	81 (36)	104 (47)	127 (57)	152 (68)
2 (50)	.787 (20)	2.56 (16.49)	26 (12)	62 (28)	100.5 (45)	136.5 (61)	172 (78)	208 (94)	246.5 (111)

SPRING FORCES

Bore nominal – in. (mm)	Stroke inches (mm)	Force @ stroke – lbs. (kgf)	Compressed spring force – lbs. (kgf)	Bore nominal – in. (mm)	Stroke inches (mm)	Force @ stroke – lbs. (kgf)	Compressed spring force – lbs. (kgf)
1/2 (12)	3/8 (9.5)	1.1 (.5)	1.98 (0.9)	1 1/4 (32)	1/2 (12.7)	5.85 (2.66)	11.90 (5.4)
	1/2 (12.7)	0.88 (.4)			3/4 (19.05)	7.35 (3.34)	
	3/4 (19.05)	1.19 (.54)			1 (25.4)	5.83 (2.65)	
	1 (25.4)	0.88 (.4)			1 1/4 (31.75)	4.31 (1.96)	
5/8 (16)	3/8 (9.5)	1.5 (.68)	2.42 (1.1)	1 1/2 (40)	1/2 (12.7)	5.02 (2.28)	11.90 (5.4)
	1/2 (12.7)	1.19 (.54)			3/4 (19.05)	6.71 (3.05)	
	3/4 (19.05)	1.47 (.67)			1 (25.4)	5.02 (2.28)	
	1 (25.4)	1.17 (.53)			1 1/4 (31.75)	3.28 (1.49)	
3/4 (20)	3/8 (9.5)	1.94 (.88)	2.64 (1.2)	2 (50)	1/2 (12.7)	9.13 (4.15)	11.25 (5.1)
	1/2 (12.7)	1.67 (.76)			3/4 (19.05)	8.03 (3.65)	
	3/4 (19.05)	1.87 (.85)			1 (25.4)	9.09 (4.13)	
	1 (25.4)	1.61 (.73)			1 1/4 (31.75)	8.54 (3.88)	
1 (25)	1/2 (12.7)	2.82 (1.28)	4.84 (2.2)		1 1/2 (38.1)	7.99 (3.63)	
	3/4 (19.05)	3.3 (1.5)					
	1 (25.4)	2.79 (1.27)					
	1 1/4 (31.75)	2.27 (1.03)					