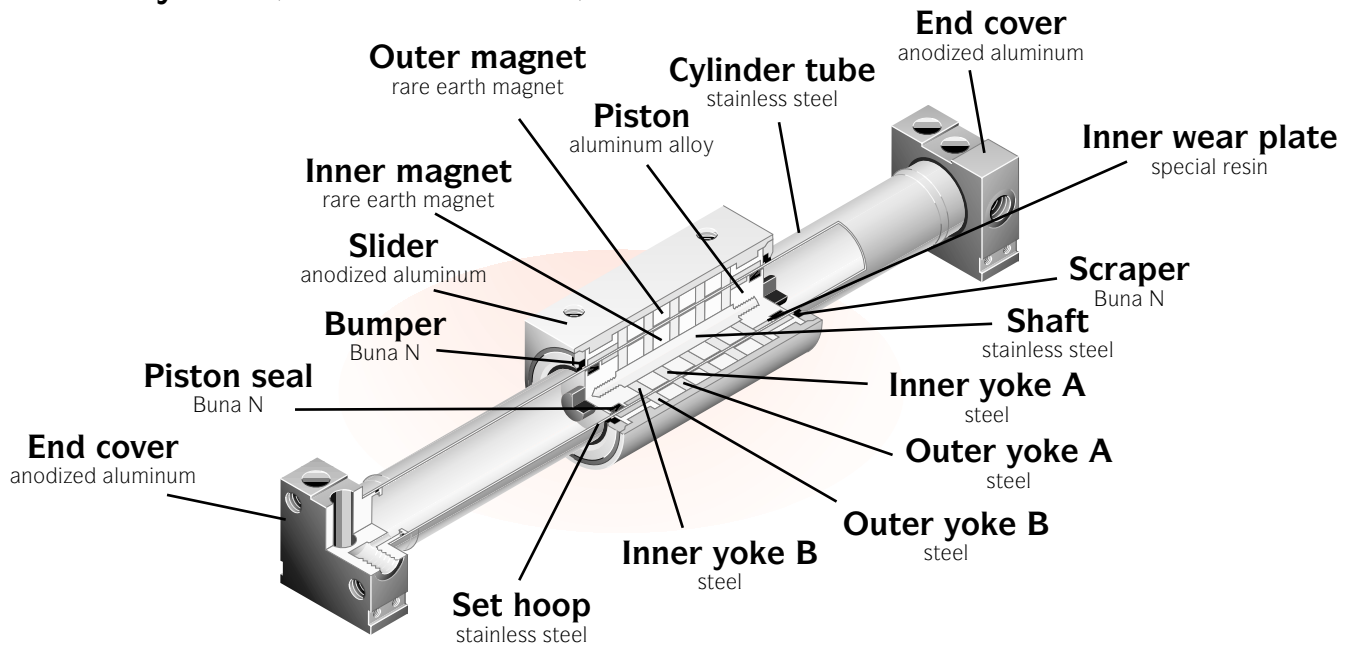


Rodless Cutaway and specifications

Cutaway view (HMRCH standard model shown)



See terms and definitions page for more information.

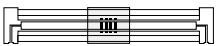
Unguided rodless specifications (HMRCH)



Media	Air							
Temperature °C (°F)	0° to 60° (32° to 140°)							
Lubrication	None required. If used, must be compatible with seal materials.							
Bore mm (in)	6 (.236)	10 (.236)	16 (.394)	20 (.630)	25 (.984)	32 (1.260)	40 (1.575)	
Piston area "A" mm ² (in ²)	Double acting	2.82 (.044)	.785 (.122)	2.01 (.312)	3.14 (.49)	4.90 (.76)	8.04 (1.25)	12.56 (1.95)
Pressure "P" kgf/cm ² (psi)	1.8 to 7 (25 to 100) for 6 and 10; 1.5 to 7 (20 to 100) for all others							
Piston force "F" kgf (lbf)	F = [A X P]							

Recommended load to be no more than 70% of piston force "F" for normal operation and no more than 50% for high speed cycle rates.

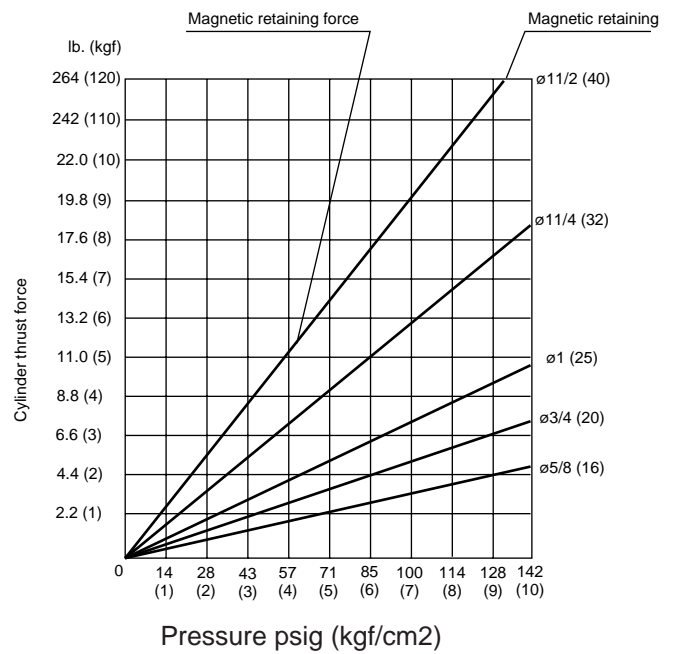
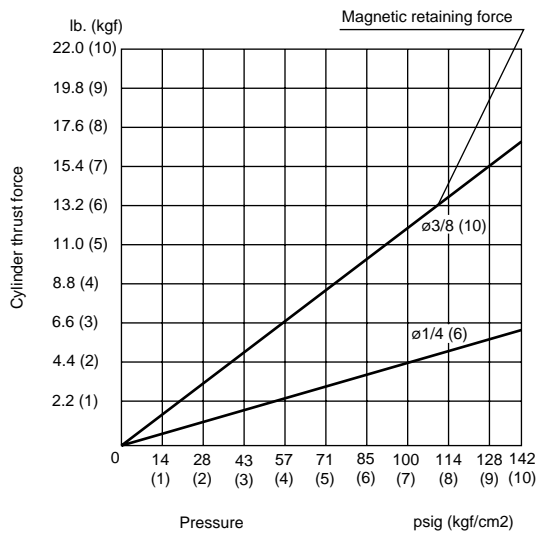
Guided rodless specifications (HMRGH)



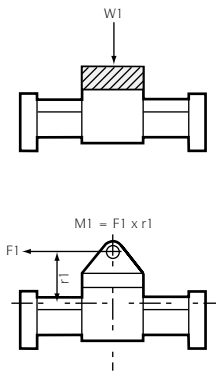
Media	Air							
Temperature °C (°F)	0° to 60° (32° to 140°)							
Lubrication	None required. If used, must be compatible with seal materials.							
Bore mm (in)	6 (.236)	10 (.236)	16 (.394)	20 (.630)	25 (.984)	32 (1.260)	40 (1.575)	
Piston area "A" mm ² (in ²)	Double acting	2.82 (.044)	.785 (.122)	2.01 (.312)	3.14 (.49)	4.90 (.76)	8.04 (1.25)	12.56 (1.95)
Pressure "P" kgf/cm ² (psi)	1.8 to 7 (25 to 100) for 6 and 10; 1.5 to 7 (20 to 100) for all others							
Piston force "F" kgf (lbf)	F = [A X P]							

Recommended load to be no more than 70% of piston force "F" for normal operation and no more than 50% for high speed cycle rates.

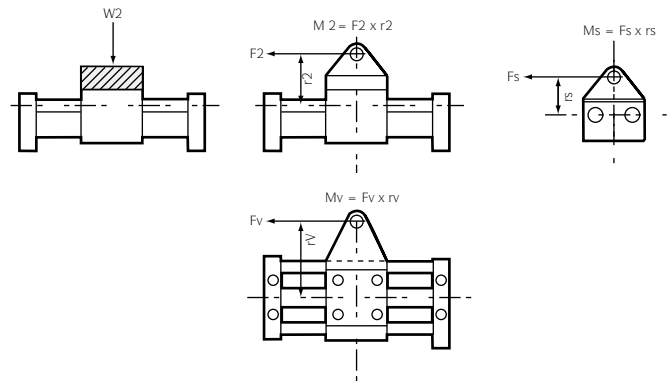
Magnet retaining force charts



HMRCH



HMRGH



Bore mm (in)	HMRCH		HMRGH			
	Maximum load W1** (kgf (lb))	Maximum axial moment M1 kgf/cm (lb/in)	Maximum load W2 kgf (lb)	Maximum axial moment M2 kgf/cm (lb/in)	Maximum radial moment Ms* kgf/cm (lb/in)	Maximum cross movement Mv kgf/cm (lb/in)
6 (.236)	.4 (.88)	1 (.86)	1.5 (3.3)	3 (2.6)	.6 (.5)	3 (2.6)
10 (.394)	1.2 (2.6)	3 (2.6)	4 (8.8)	10 (8.7)	2 (1.7)	10 (8.7)
16 (.630)	3 (6.6)	12 (10.4)	8 (17.6)	25 (21.7)	5 (4.3)	25 (21.7)
20 (.787)	5 (11.0)	25 (21.7)	13 (28.6)	55 (47.7)	11 (9.5)	55 (47.7)
25 (.984)	8 (17.6)	40 (34.7)	20 (44.0)	100 (86.8)	20 (17.4)	100 (86.8)
32 (1.260)	12 (26.4)	90 (78.1)	32 (70.4)	160 (138.9)	32 (27.8)	160 (138.9)
40 (1.575)	18 (39.6)	140 (121.5)	50 (110.0)	250 (217.0)	50 (43.4)	250 (217.0)

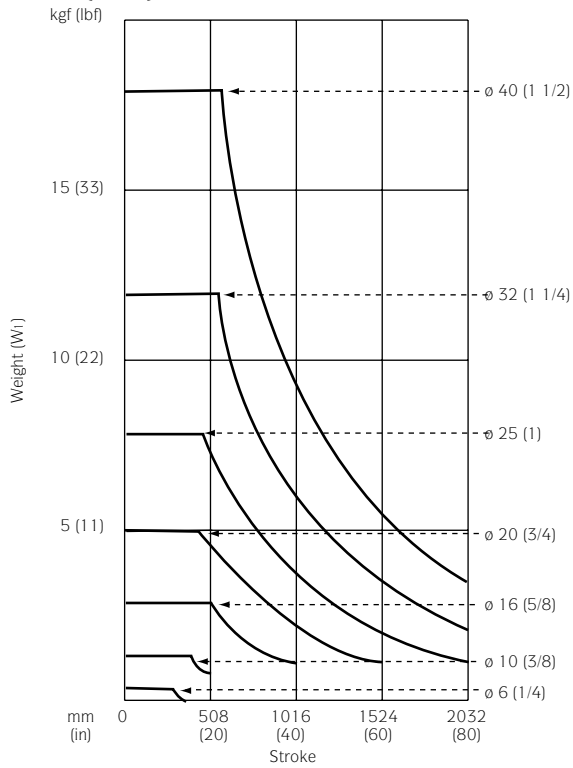
* See graphs page 6 for W1, W2 and Ms maximum values at various strokes.

** Calculate maximum thrust force (force = piston area x psi) at 60% of magnet retaining force.

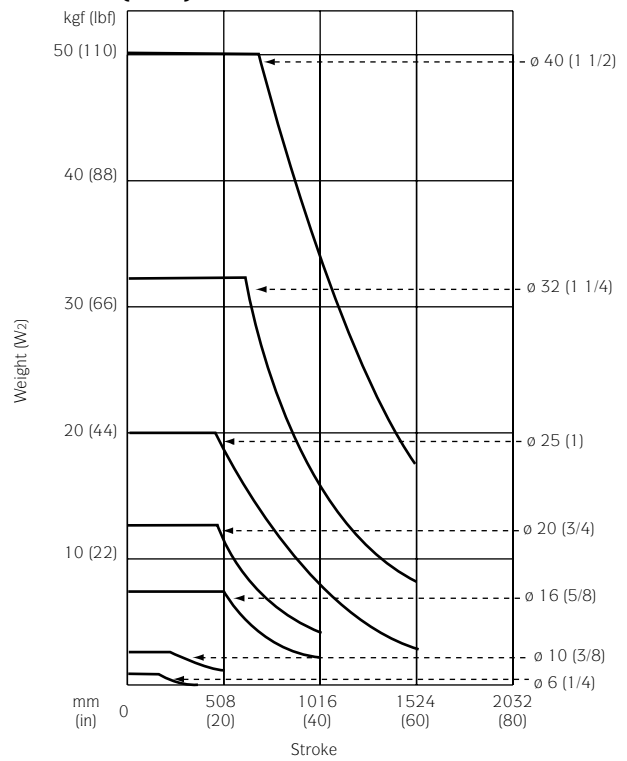
Rodless Charts

Stroke and maximum weight load

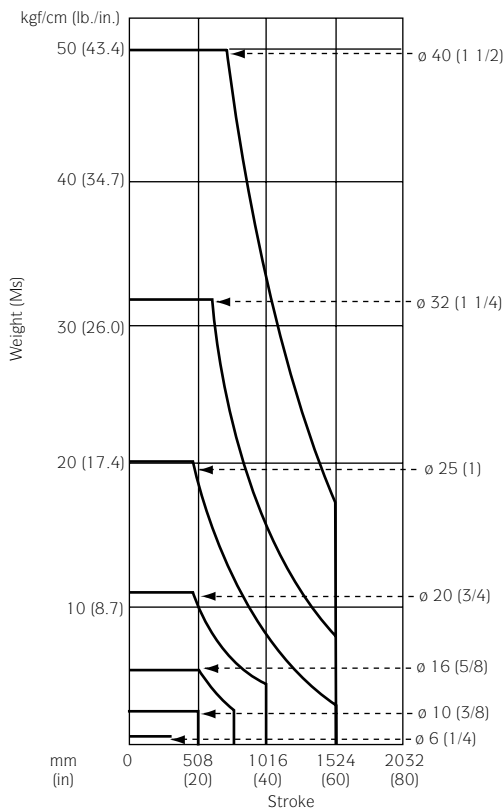
HMRCH (W1)



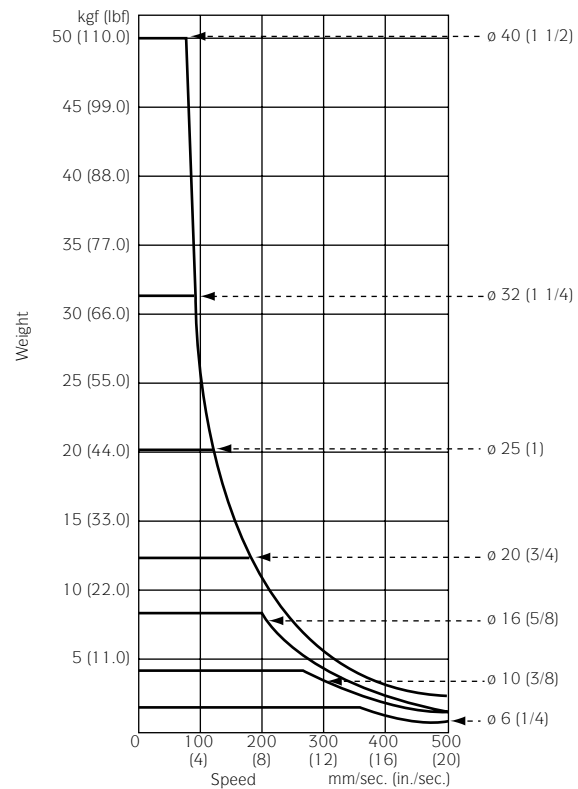
HMRGH (W2)



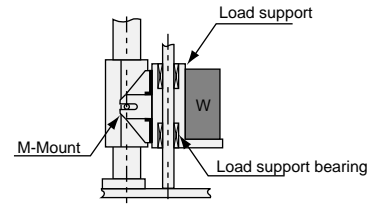
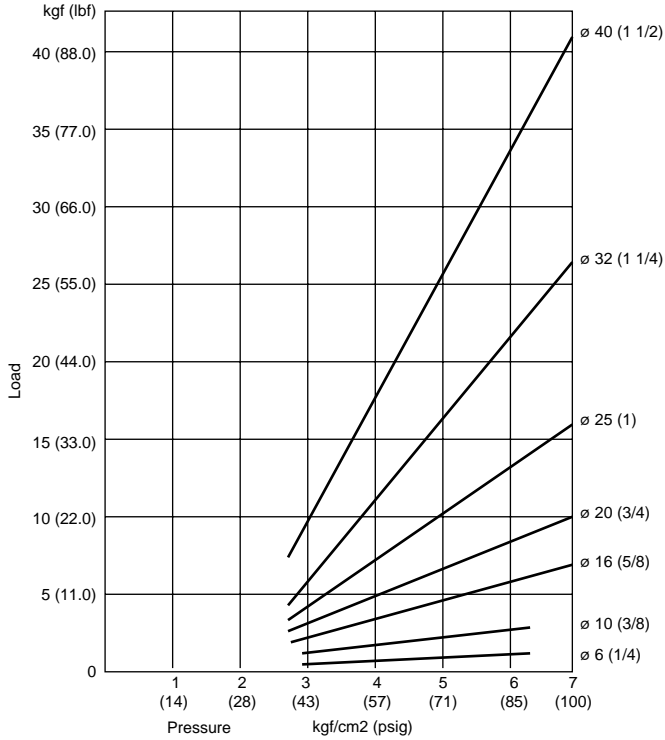
Cylinder stroke and maximum radial moment (Ms)



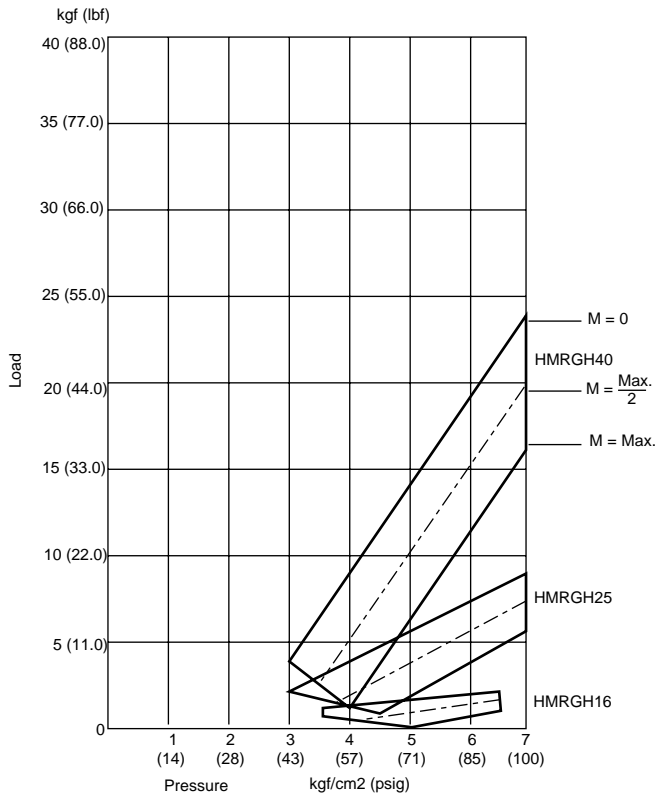
Maximum stopper bolt capacity



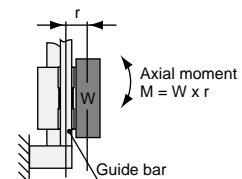
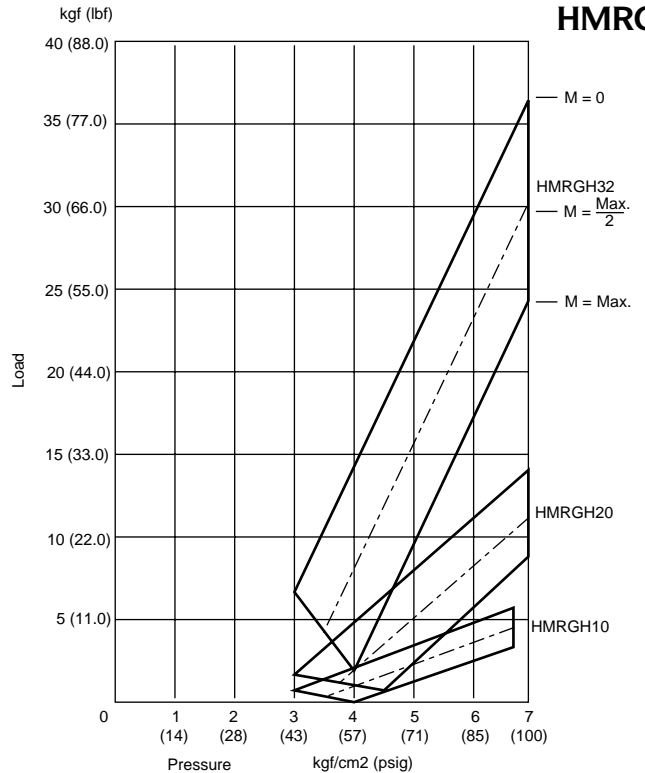
Weight load and pressure at vertical operation



HMRCH6 not recommended for vertical position.



HMRGH



HMRGH6 not recommended for vertical position

Rodless Weight charts

Unguided rodless weight chart (HMRCH)



	2" stroke		4" stroke		6" stroke		8" stroke		10" stroke		12" stroke		14" stroke		16" stroke	
	gm	oz	gm	oz	gm	oz	gm	oz	gm	oz	gm	oz	gm	oz	gm	oz
Bore mm (in)																
6 (.236)	53	1.87	56	1.98	59	2.08	62	2.19	-	-	-	-	-	-	-	-
10 (.394)	108	3.81	117	4.13	123	4.34	123.1	4.34	135	4.76	141	4.97	-	-	-	-
16 (.630)	-	-	238	8.39	252	8.89	252.2	8.9	280	9.88	294	10.4	308	10.9	322	11.4
20 (.787)	-	-	-	-	464	16.4	464.3	16.4	500	17.6	518	18.3	536	18.9	554	19.5
25 (.984)	-	-	-	-	-	-	616.4	21.7	660	23.3	682	24.1	704	24.8	726	25.6
32 (1.260)	-	-	-	-	-	-	1133	39.9	1200	42.3	1234	43.5	1268	44.7	1302	45.9
40 (1.575)	-	-	-	-	-	-	1957	69	2040	72	2082	73.4	2124	74.9	2166	76.4
	18" stroke		20" stroke		24" stroke		28" stroke		32" stroke		36" stroke		40" stroke			
Bore mm (in)	gm	oz	gm	oz	gm	oz	gm	oz	gm	oz	gm	oz	gm	oz		
6 (.236)	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
10 (.394)	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
16 (.630)	-	-	350	12.3	378	13.3	-	-	-	-	-	-	-	-		
20 (.787)	572	20.2	590	20.8	626	22.1	-	-	-	-	-	-	-	-		
25 (.984)	748	26.4	770	27.2	814	28.7	858	30.3	902	31.8	-	-	-	-		
32 (1.260)	1336	47.1	1370	48.3	1438	50.7	1506	53.1	1574	55.5	-	-	-	-		
40 (1.575)	2208	77.9	2250	79.4	2334	82.3	2418	85.3	2502	88.2	2586	91.2	2670	94.2		

- Call Humphrey for stroke availability.

Guided rodless weight chart (HMRGH)



	2" stroke		4" stroke		6" stroke		8" stroke		10" stroke		12" stroke		14" stroke		16" stroke	
	gm	oz	gm	oz	gm	oz	gm	oz	gm	oz	gm	oz	gm	oz	gm	oz
Bore mm (in)																
6 (.236)	264	9.3	267	9.42	270.8	9.55	274.4	9.68	-	-	-	-	-	-	-	-
10 (.394)	511	18	634	22.4	716	25.3	717.4	25.3	-	-	-	-	-	-	-	-
16 (.630)	-	-	1002	35.3	1118	39.4	1120	39.5	1350	47.6	1466	51.7	1582	55.8	1698	59.9
20 (.787)	-	-	-	-	1756	61.9	1759	62	2080	73.4	2242	79.1	2404	84.8	2566	90.5
25 (.984)	-	-	-	-	-	-	2286	80.6	2690	94.9	2894	102	3098	109	3302	116
32 (1.260)	-	-	-	-	-	-	4027	142	4630	163	4934	174	5238	185	5542	195
40 (1.575)	-	-	-	-	-	-	6582	232	7490	264	7948	280	8406	296	8864	313
	18" stroke		20" stroke		24" stroke		28" stroke		32" stroke		36" stroke		40" stroke			
Bore mm (in)	gm	oz	gm	oz	gm	oz	gm	oz	gm	oz	gm	oz	gm	oz		
6 (.236)	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
10 (.394)	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
16 (.630)	1814	64	1930	68.1	2162	76.3	-	-	-	-	-	-	-	-		
20 (.787)	2728	96.2	2890	102	3214	113	-	-	-	-	-	-	-	-		
25 (.984)	3506	124	3710	131	4118	145	4526	160	4934	174	-	-	-	-		
32 (1.260)	5846	206	6150	217	6758	238	7366	260	7974	281	-	-	-	-		
40 (1.575)	9322	329	9780	345	10696	377	11612	410	12528	442	13444	474	14360	506		

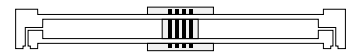
- Call Humphrey for stroke availability.

Notes

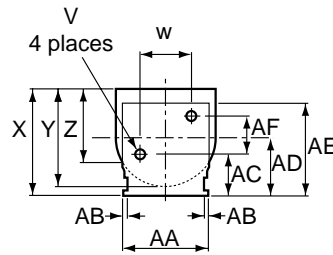
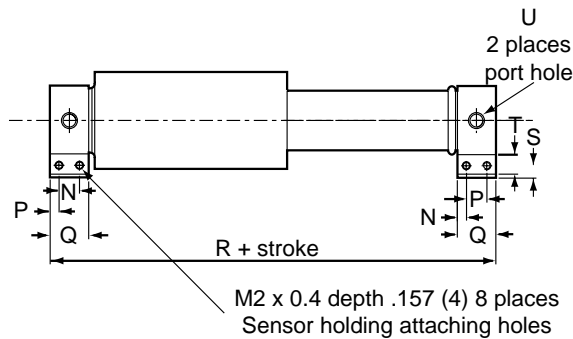
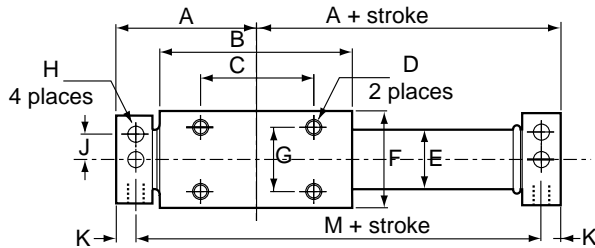
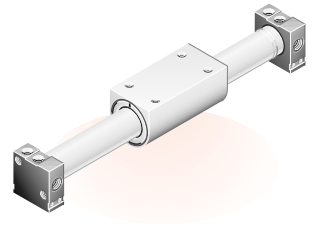
Rodless Rodless (HMRCH)

Accessories (see page 11)
Slider mount

Sensor switches (see Sensor section page 10)
ZC 305



Double acting



Bore mm (in)	A	B	C	D	E	F	G	H	J	K
6 (.236)	32.5 (1.280)	41 (1.614)	25 (.984)	4-40 UNC	6.8 (.268)	17 (.669)	10 (.394)	3.4 (.134)	4 (.157)	5 (.197)
10 (.394)	33.5 (1.319)	41 (1.614)	22 (.866)	4-40 UNC	11 (.433)	25 (.984)	16 (.630)	3.4 (.134)	6.5 (.256)	5.5 (.217)
16 (.630)	43 (1.693)	59 (2.323)	35 (1.378)	8-32 UNC	17.4 (.685)	30 (1.181)	20 (.787)	4.5 (.177)	8 (.315)	5.5 (.217)
20 (.787)	53 (2.087)	68 (2.677)	40 (1.575)	8-32 UNC	21.4 (.843)	36 (1.417)	26 (1.024)	4.5 (.177)	11 (.433)	8 (.315)
25 (.984)	56 (2.205)	74 (2.913)	42 (1.654)	10-32 UNF	26.4 (1.039)	42 (1.654)	30 (1.181)	5.5 (.217)	12 (.472)	8 (.315)
32 (1.260)	64 (2.520)	87 (3.425)	55 (2.165)	1/4-20 UNC	33.6 (1.323)	52 (2.047)	38 (1.496)	6.6 (.260)	16 (.630)	8 (.315)
40 (1.575)	76 (2.992)	102 (4.016)	65 (2.559)	1/4-20 UNC	41.6 (1.638)	64 (2.520)	50 (1.969)	6.6 (.260)	18 (.709)	10 (.394)
Bore mm (in)	M	N	P	Q	R	S	T	U	V	W
6 (.236)	55 (2.165)	-	-	10 (.394)	65 (2.559)	-	-	10-32 UNF	4-40 UNC	8 (.315)
10 (.394)	56 (2.205)	6 (.236)	2.5 (.098)	11 (.433)	67 (2.638)	3.7 (.146)	6 (.236)	10-32 UNF	4-40 UNC	13 (.512)
16 (.630)	75 (2.953)	6 (.236)	2.5 (.098)	11 (.433)	86 (3.386)	4 (.157)	6 (.236)	10-32 UNF	8-32 UNC	16 (.630)
20 (.787)	90 (3.543)	11 (.433)	2.5 (.098)	16 (.630)	106 (4.173)	6 (.236)	6 (.236)	1/8 NPT	8-32 UNC	22 (.866)
25 (.984)	96 (3.780)	11 (.433)	2.5 (.098)	16 (.630)	112 (4.409)	5 (.197)	6 (.236)	1/8 NPT	10-32 UNF	24 (.945)
32 (1.260)	112 (4.409)	11 (.433)	2.5 (.098)	16 (.630)	128 (5.039)	8 (.315)	6 (.236)	1/8 NPT	1/4-20 UNC	32 (1.260)
40 (1.575)	132 (5.197)	15 (.591)	2.5 (.098)	20 (.787)	152 (5.984)	9 (.354)	6 (.236)	1/4 NPT	1/4-20 UNC	36 (1.417)
Bore mm (in)	X	Y	Z	AA	AB	AC	AD	AE	AF	
6 (.236)	18.5 (.728)	17 (.669)	11 (.433)	14 (.551)	-	5 (.197)	10 (.394)	14 (.551)	-	
10 (.394)	26.5 (1.043)	25 (.984)	16 (.630)	22 (.866)	.5 (.020)	9.5 (.374)	14 (.551)	22 (.866)	9 (.354)	
16 (.630)	32 (1.260)	30 (1.181)	20 (.787)	27 (1.063)	1 (.039)	11 (.433)	17 (.669)	27 (1.063)	12 (.472)	
20 (.787)	39 (1.535)	36 (1.417)	24 (.945)	32 (1.260)	1 (.039)	13 (.512)	21 (.827)	33 (1.299)	16 (.630)	
25 (.984)	44 (1.732)	42 (1.654)	28 (1.102)	36 (1.417)	1 (.039)	13 (.512)	23 (.906)	38 (1.496)	20 (.787)	
32 (1.260)	56 (2.205)	52 (2.047)	35 (1.378)	46 (1.811)	2 (.079)	18 (.709)	30 (1.181)	48 (1.890)	24 (.945)	
40 (1.575)	69 (2.717)	64 (2.520)	43 (1.693)	50 (1.969)	1 (.039)	23 (.906)	37 (1.457)	60 (2.362)	28 (1.102)	

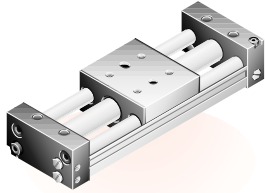
General note

6 mm bore is 1/4 inch nominal bore
 10 mm bore is 3/8 inch nominal bore
 16 mm bore is 5/8 inch nominal bore
 20 mm bore is 3/4 inch nominal bore
 25 mm bore is 1 inch nominal bore
 32 mm bore is 1 1/4 inch nominal bore
 40 mm bore is 1 1/2 inch nominal bore

Rodless Guided rodless (HMRGH)

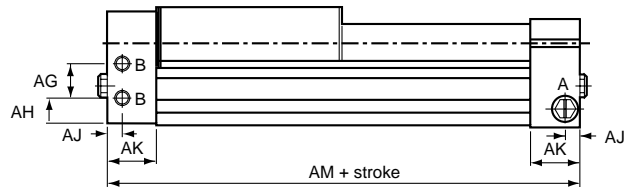
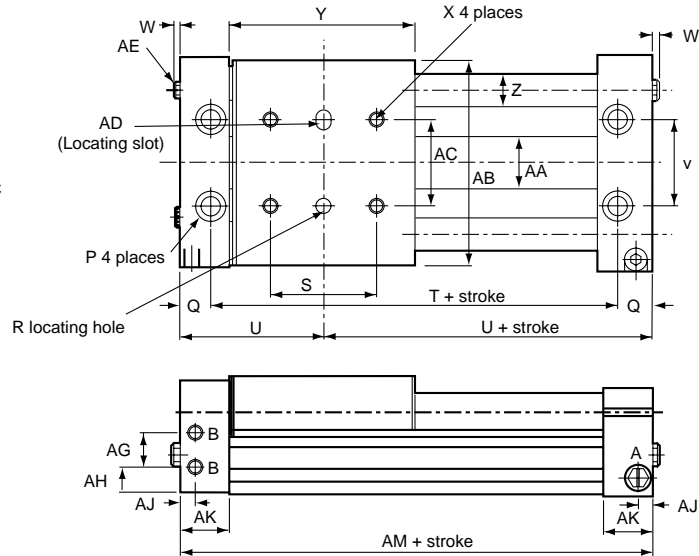
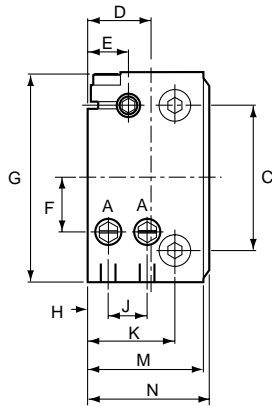


Double acting, guided



Accessories (see page 8)
Shock absorber

Sensor switches (see Sensor section page 10)
CS4M
ZG553



Bore mm (in)	C	D	E	F	G	H	J	K	M	N
6 (.236)	32 (1.260)	14.5 (.571)	10 (.394)	11 (.433)	50 (1.969)	6 (.236)	8.5 (.335)	22 (.866)	26 (1.024)	27 (1.063)
10 (.394)	44 (1.732)	18 (.709)	12 (.472)	16 (.630)	60 (2.362)	6 (.236)	11.5 (.453)	26 (1.024)	33 (1.299)	34 (1.339)
16 (.630)	50 (1.969)	20 (.787)	12 (.472)	18 (.709)	70 (2.756)	7 (.276)	12 (.472)	27 (1.063)	36 (1.417)	38 (1.496)
20 (.787)	60 (2.362)	24 (.945)	15 (.591)	23 (.906)	84 (3.307)	8 (.315)	14.5 (.571)	33 (1.299)	44 (1.732)	46 (1.811)
25 (.984)	68 (2.677)	26 (1.024)	16 (.630)	25 (.984)	94 (3.701)	8.5 (.335)	16.5 (.650)	36 (1.417)	48 (1.890)	50 (1.969)
32 (1.260)	85 (3.346)	31 (1.220)	20 (.787)	32 (1.260)	116 (4.567)	10 (.394)	20 (.787)	44 (1.732)	58 (2.293)	60 (2.362)
40 (1.575)	102 (4.016)	37.5 (1.476)	24 (.945)	41 (1.614)	140 (5.512)	12 (.472)	24 (.945)	52 (2.047)	70 (2.756)	72 (2.385)

Bore mm (in)	P	Q	R	S	T	U
6 (.236)	3.4 (.134) x 6.5 (.256) x 3.3 (.130)	9 (.354)	5/32 X 4 (.157) depth	20 (.787)	50 (1.969)	34 (1.339)
10 (.394)	4.5 (.177) x 8 (.315) x 4.5 (.177)	9 (.354)	5/32 X 4 (.157) depth	25 (.984)	57 (2.244)	37.5 (1.476)
16 (.630)	5.5 (.217) x 9.5 (.374) x 5 (.197)	11 (.433)	3/16 x 5 (.197) depth	35 (1.378)	74 (2.913)	48 (1.890)
20 (.787)	5.5 (.217) x 9.5 (.374) x 5.5 (.217)	13 (.512)	3/16 x 5 (.197) depth	38 (1.496)	79 (3.110)	52.5 (2.067)
25 (.984)	6.6 (.260) x 11 (.433) x 6.5 (.256)	14 (.551)	1/4 x 6 (.236) depth	40 (1.575)	86 (3.386)	57 (2.244)
32 (1.260)	9 (.354) x 14 (.551) x 8.5 (.335)	16 (.630)	5/16 x 8 (.315) depth	50 (1.969)	105 (4.134)	68.5 (2.697)
40 (1.575)	9 (.354) x 14 (.551) x 8.5 (.335)	19 (.748)	5/16 x 8 (.315) depth	55 (2.165)	115 (4.528)	76.5 (3.012)

Bore mm (in)	V	W	X	Y	Z	AA	AB	AC
6 (.236)	16 (.630)	4 (.157)	8-32 UNC	40 (1.575)	6 (.236)	6.8 (.268)	48 (1.890)	20 (.787)
10 (.394)	20 (.787)	4 (.157)	8-32 UNC	45 (1.772)	10 (.394)	11 (.433)	59 (2.323)	25 (.984)
16 (.630)	30 (1.181)	4 (.157)	10-32 UNF	60 (2.362)	12 (.472)	17.4 (.685)	68 (2.677)	30 (1.181)
20 (.787)	35 (1.378)	4 (.157)	10-32 UNF	65 (2.559)	14 (.551)	21.4 (.843)	82 (3.228)	36 (1.417)
25 (.984)	40 (1.575)	4 (.157)	1/4-20 UNC	70 (2.756)	16 (.630)	26.4 (1.039)	92 (3.622)	42 (1.654)
32 (1.260)	50 (1.969)	4 (.157)	5/16-18 UNC	85 (3.346)	20 (.787)	33.6 (1.323)	114 (4.488)	52 (2.047)
40 (1.575)	65 (2.559)	4 (.157)	5/16-18 UNC	95 (3.740)	25 (.984)	41.6 (1.638)	138 (5.433)	62 (2.441)

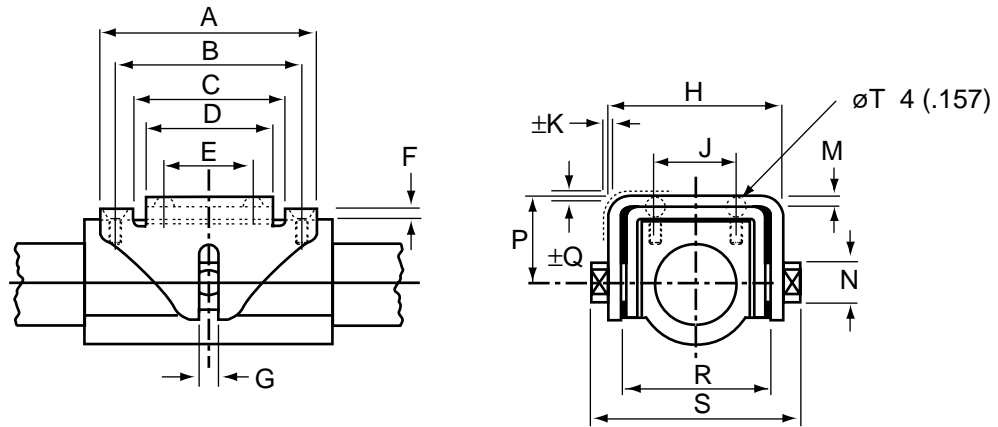
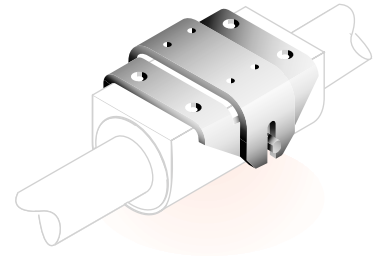
Bore mm (in)	AD	AE	AF	AG	AH	AJ	AK	AM
6 (.236)	5/32 x 6 (.236) oval, depth 4 (.157)	M8 X 1.25	10-32 UNF	10.5 (.413)	6 (.236)	5 (.197)	13 (.512)	68 (2.677)
10 (.394)	5/32 x 6 (.236) oval, depth 4 (.157)	M10 X 1.5	10-32 UNF	11.5 (.453)	6 (.236)	5 (.197)	14 (.551)	75 (2.953)
16 (.630)	3/16 x 7 (.276) oval, depth 5 (.197)	M10 X 1.5	10-32 UNF	12 (.472)	7 (.276)	5.5 (.217)	17 (.669)	96 (3.780)
20 (.787)	3/16 x 7 (.276) oval, depth 5 (.197)	M12 X 1.75	1/8 NPT	14.5 (.571)	8 (.315)	7.5 (.295)	19 (.748)	105 (4.134)
25 (.984)	1/4 x 8 (.315) oval, depth 6 (.236)	M14 X 2	1/8 NPT	16.5 (.650)	8.5 (.335)	7.5 (.295)	21 (.827)	114 (4.448)
32 (1.260)	5/16 x 10 (.394) oval, depth 8 (.315)	M18 X 2.5	1/8 NPT	20 (.787)	10 (.394)	8 (.315)	25 (.984)	137 (5.394)
40 (1.575)	5/16 x 10 (.394) oval, depth 8 (.315)	M20 X 2.5	1/4 NPT	24 (.945)	12 (.472)	10 (.394)	28 (1.102)	153 (6.024)

General note

6 mm bore is 1/4 inch nominal bore
10 mm bore is 3/8 inch nominal bore
16 mm bore is 5/8 inch nominal bore
20 mm bore is 3/4 inch nominal bore
25 mm bore is 1 inch nominal bore
32 mm bore is 1 1/4 inch nominal bore
40 mm bore is 1 1/2 inch nominal bore

Slider mount

The slider mount accessory allows the unguided rodless cylinder to eliminate extraneous loads throughout movement and ensures easy installation and smooth operation



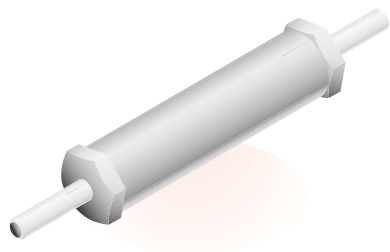
Bore mm (in)	A	B	C	D	E	F	G	H	J
6 (.236)	32 (1.260)	25 (.984)	18 (.709)	16 (.630)	9 (.354)	2 (.079)	2 (.079)	29 (1.142)	-
10 (.394)	29 (1.142)	22 (.866)	15 (.591)	14 (.551)	7 (.276)	2 (.079)	2.5 (.098)	37 (1.457)	16 (.630)
16 (.630)	45 (1.772)	35 (1.378)	24 (.945)	20 (.787)	10 (.394)	2.5 (.098)	4 (.157)	45 (1.772)	20 (.787)
20 (.787)	52 (2.047)	40 (1.575)	30 (1.181)	26 (1.024)	16 (.630)	2.5 (.098)	5 (.197)	51.2 (2.016)	26 (1.024)
25 (.984)	57 (2.244)	42 (1.654)	31 (1.220)	29 (1.142)	17 (.669)	3.2 (.126)	6 (.236)	61.8 (2.433)	30 (1.181)
32 (1.260)	73 (2.874)	55 (2.165)	39 (1.535)	37 (1.457)	20 (.787)	4.5 (.177)	8 (.315)	79 (3.110)	38 (1.496)
40 (1.575)	83 (3.268)	65 (2.559)	49 (1.929)	46 (1.811)	30 (1.181)	4.5 (.177)	10 (.394)	91 (3.583)	50 (1.969)

Bore mm (in)	K	M	N	P	Q	R	S	T
6 (.236)	1 (.039)	2 (.079)	3 (.118)	13 (.512)	2 (.079)	23 (.906)	32 (1.260)	3.5 (.138)
10 (.394)	1 (.039)	2 (.079)	4 (.157)	17 (.669)	2 (.079)	31 (1.220)	40 (1.575)	3.5 (.138)
16 (.630)	1 (.039)	2.6 (.102)	6 (.236)	20 (.787)	2 (.079)	38 (1.496)	50 (1.969)	4.5 (.177)
20 (.787)	1 (.039)	2.6 (.102)	8 (.315)	23 (.906)	2 (.079)	44 (1.732)	54 (2.126)	4.5 (.177)
25 (.984)	1.5 (.059)	3.2 (.126)	10 (.394)	27 (1.063)	2 (.079)	52.4 (2.063)	66 (2.598)	5.5 (.217)
32 (1.260)	2 (.079)	4.5 (.177)	12 (.472)	34 (1.339)	2.5 (.098)	66 (2.598)	84 (3.307)	6.6 (.260)
40 (1.575)	2 (.079)	4.5 (.177)	16 (.630)	40 (1.575)	2.5 (.098)	78 (3.071)	96 (3.780)	6.6 (.260)

General note

6 mm bore is 1/4 inch nominal bore
 10 mm bore is 3/8 inch nominal bore
 16 mm bore is 5/8 inch nominal bore
 20 mm bore is 3/4 inch nominal bore
 25 mm bore is 1 inch nominal bore
 32 mm bore is 1 1/4 inch nominal bore
 40 mm bore is 1 1/2 inch nominal bore

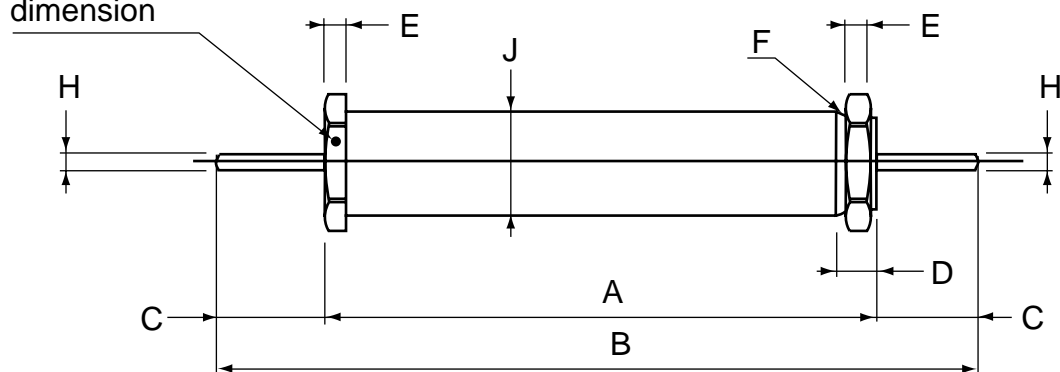
Rodless Accessories



Shock absorber

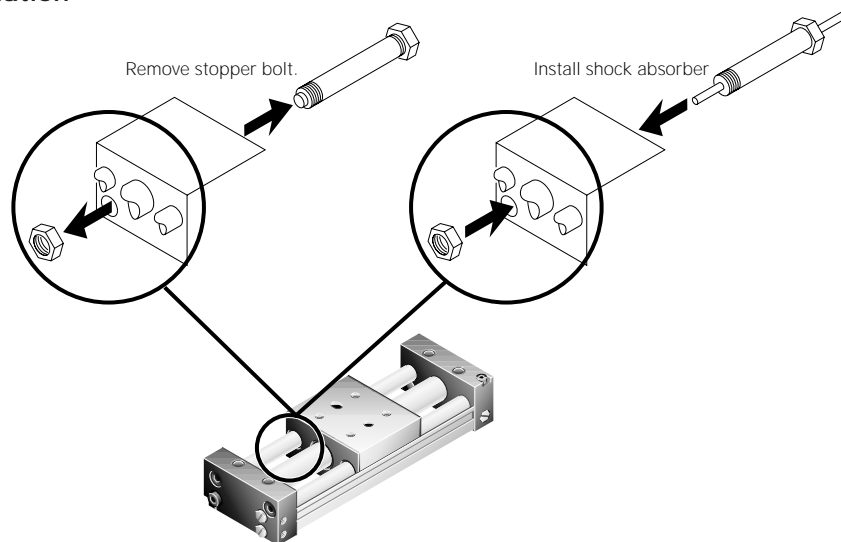
The shock absorber accessory allows the guided rodless cylinder to have smooth operation

Surface to surface
dimension



Model mm (in)	A	B	C	D	E	F	G	H	J
HKSHDM 5 x 6	46 (1.811)	58 (2.283)	6 (.236)	5 (.197)	2.8 (.110)	M8 x 1	12 (.472)	3 (.118)	8 (.315)
HKSHDM 5 X 8	51 (2.008)	67 (2.638)	8 (.315)	5 (.197)	2.8 (.110)	M10 x 1	14 (.551)	3 (.118)	9.8 (.386)
HKSHDM 5 X 10	66 (2.598)	86 (3.386)	10 (.394)	5 (.197)	2.8 (.110)	M10 x 1	14 (.551)	3 (.118)	9.8 (.386)
HKSHDM 6 X 10	73 (2.874)	93 (3.661)	10 (.394)	7 (.276)	3.8 (.150)	M12 x 1	17 (.669)	3 (.118)	12 (.472)
HKSHDM 8 X 12	80 (3.150)	104 (4.094)	12 (.472)	8 (.315)	4.8 (.189)	M14 x 1.5	19 (.748)	5 (.197)	13.8 (.543)
HKSHDM 10 X 15	99 (3.898)	129 (5.079)	15 (.591)	10 (.394)	6.8 (.268)	M18 x 1.5	22 (.866)	5 (.197)	18 (.709)
HKSHDM 12 X 18	109 (4.291)	145 (5.709)	18 (.709)	10 (.394)	6.8 (.268)	M20 x 1.5	24 (.945)	5 (.197)	20 (.787)

Shock absorber installation



Cylinder

<i>Model</i> HMRCH	<i>Bore</i>	<i>Stroke</i>
		Maximum recommended stroke
HMRCH Rodless cylinder	6 6 mm (.236 inch) (1/4 inch nominal bore)	11 inch
	10 10 mm (.394 inch) (3/8 inch nominal bore)	19 inch
	16 16 mm (.630 inch) (5/8 inch nominal bore)	39 inch
	20 20 mm (.787 inch) (3/4 inch nominal bore)	59 inch
	25 25 mm (.984 inch) (1 inch nominal bore)	78 inch
	32 32 mm (1.260 inch) (1 1/4 inch nominal bore)	78 inch
	40 40 mm (1.575 inch) (1 1/2 inch nominal bore)	78 inch

Example: HMRCH6X8

<i>Model</i> HMRGH	<i>Bore</i>	<i>Stroke</i>
		Maximum recommended stroke
HMRGH Guided rodless cylinder	6 6 mm (.236 inch) (1/4 inch nominal bore)	11 inch
	10 10 mm (.394 inch) (3/8 inch nominal bore)	19 inch
	16 16 mm (.630 inch) (5/8 inch nominal bore)	29 inch
	20 20 mm (.787 inch) (3/4 inch nominal bore)	39 inch
	25 25 mm (.984 inch) (1 inch nominal bore)	59 inch
	32 32 mm (1.260 inch) (1 1/4 inch nominal bore)	59 inch
	40 40 mm (1.575 inch) (1 1/2 inch nominal bore)	59 inch

Example: HMRGH6X8

Order Codes

Additional Parts

- **Shock absorber unit**
(With shock absorber, table and holder)

HK-ORV 16
Equivalent bore size
16: For ORV16
25: For ORV25
40: For ORV40

- **M-type mounting brackets**

HM-ORV 16
Equivalent bore size
16: For ORV16
25: For ORV25
40: For ORV40

- **F-type support tube brackets**
(With two units)

HF-ORV 16
Equivalent bore size
16: For ORV16
25: For ORV25
40: For ORV40

- **Shock absorber**

HKSHGV 10X10
Mounting outer screw size X stroke
10X10: For ORV16
14X12: For ORV25
20X16: For ORV40

Multi-orifice fixed aperture shock absorber

- **Shock absorber holder**

HC-ORV 16
Equivalent bore size
16: For ORV16
25: For ORV25
40: For ORV40

- **Shock absorber table** (With bolt)

HT-ORV 16
Equivalent bore size
16: For ORV16
25: For ORV25
40: For ORV40

- For the sensor switches, see page 15

Repair Kit

- **Sealing Kit** Note

HMK1-ORV 16
Equivalent bore size
16: For ORV16
25: For ORV25
40: For ORV40

- **Sealing band kit**

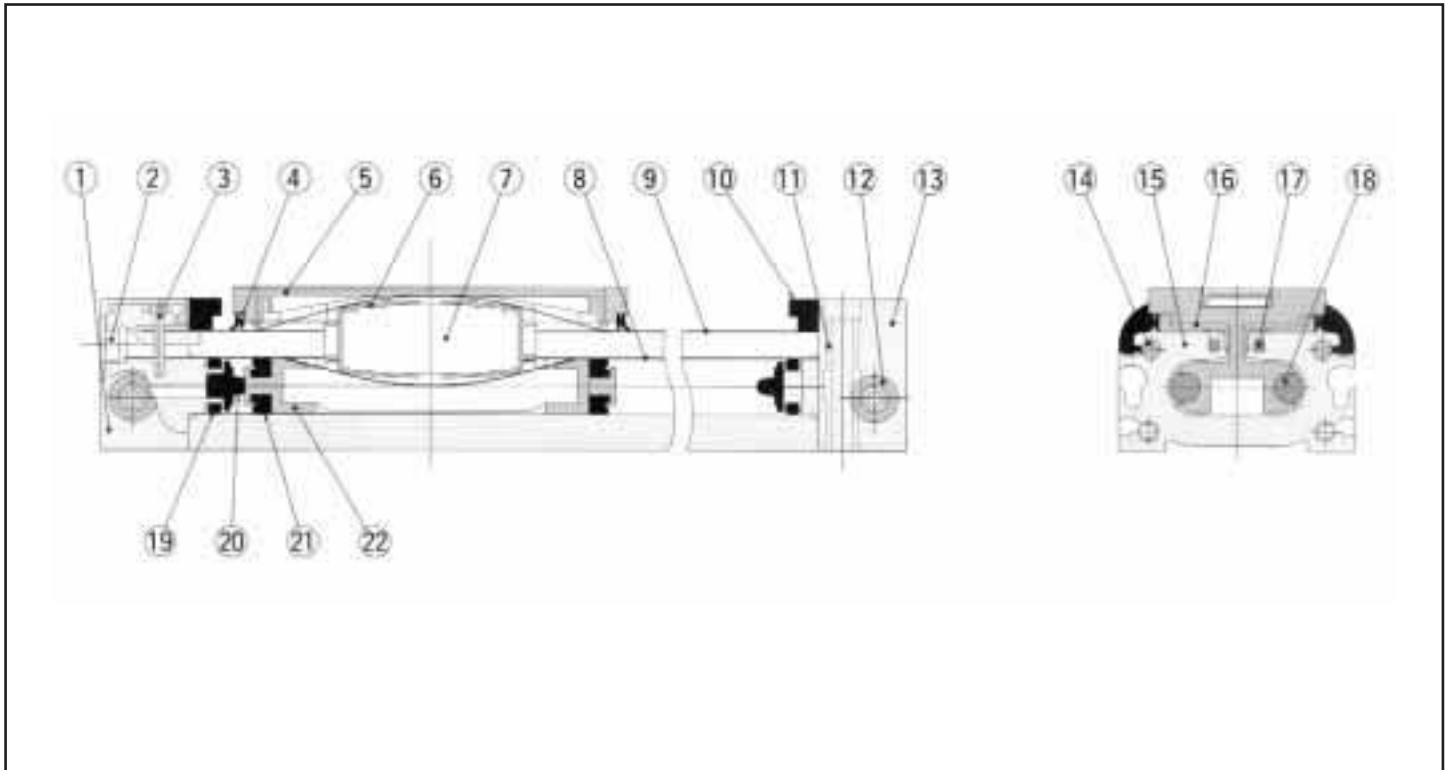
HMK2-ORV 16X200
Equivalent bore size
16: For ORV16
25: For ORV25
40: For ORV40

- **Rebuild kit**

HMK6-ORV 16
Equivalent bore size
16: For ORV16
25: For ORV25
40: For ORV40

Note: The fewest order unit of the seal kit is every five sets.

Internal Construction



Names of Parts, and Major Materials

No.	Name	Material	Quantity	Remarks
①	End cap R	Polybutylene terephthalate	1	
②	Cap cover	Polypropylene	2	
③	Band stop pin	Stainless steel	2	Parallel pins
④	Scraper	Nylon	1	
⑤	Mount cover	Polybutylene terephthalate	1	
⑥	Tape guide	Polyacetal	2	
⑦	Piston yoke	Aluminum alloy	1	Anodized
⑧	Inner sealing band	Stainless steel	1	
⑨	Outer sealing band	Stainless steel	1	
⑩	Mount bumper	Urethane rubber	2	
⑪	Sled insert B	Brass	4	Nickel-plated
⑫	Sled insert A	Brass	2	Nickel-plated

No.	Name	Material	Quantity	Remarks
⑬	End cap L	Polybutylene terephthalate	1	
⑭	Button bolt with hex-head hole	Steel	6	Zinc chromate
⑮	Cylinder barrel	Aluminum alloy	1	Anodized
⑯	Shim	Polyester	-	
⑰	Magnet strip	Rubber magnet	2	
⑱	Magnet	Rare earth magnet	2	Aluminum chromate treated
⑲	Cylinder gasket	Synthetic rubber (NBR)	2	
⑳	Piston bumper	Synthetic rubber (NBR)	2	
㉑	Piston seal	Synthetic rubber (NBR)	2	
㉒	Piston	Polyacetal	2	

Maintenance Kit Order Codes, and Parts Composition

- Sealing kit **HMK1-ORV** : ④-1, ⑤-1, ⑥-2, ⑱-2, ㉑-2
- Sealing band kit **HMK2-ORV** : ③-1, ⑧-1, ⑨-1
- Rebuild kit **HMK6-ORV** : ①-1, ②-2, ③-2, ④-1, ⑤-1, ⑥-2, ⑦-1, ⑩-2, ⑪-4
: ⑫-2, ⑬-1, ⑭-6, ⑯-2, ⑰-2, ⑱-2, ⑲-2, ㉑-2, ㉒-2

Note: ④ -1

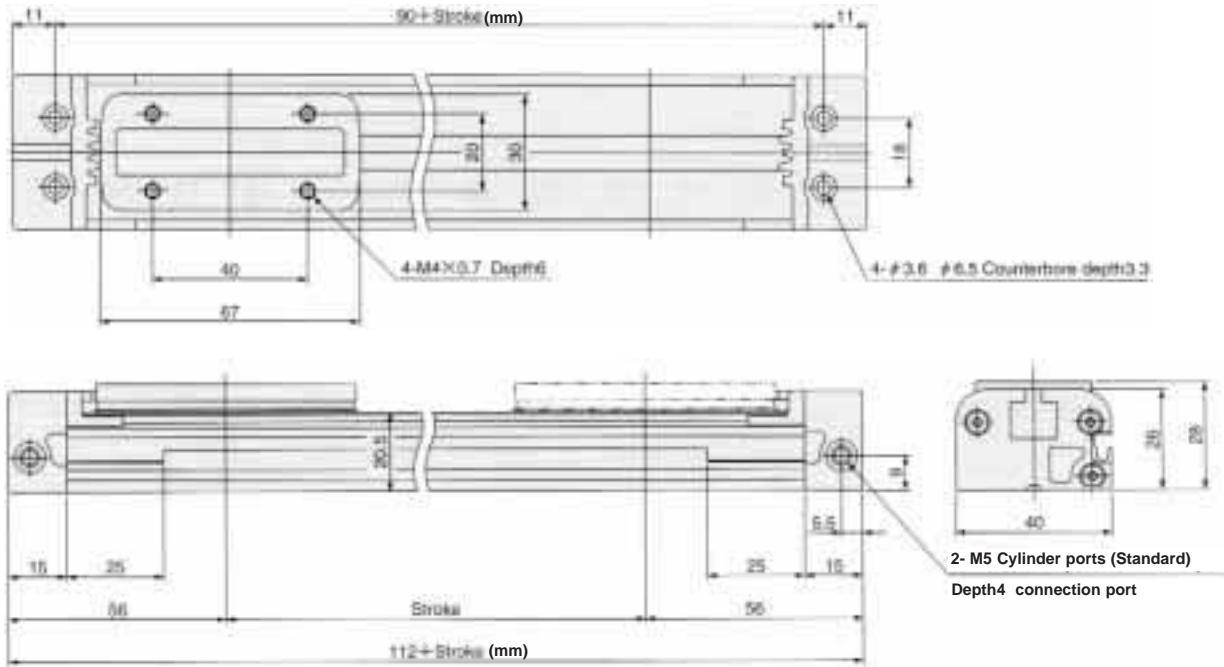
Quantity

Inner construction No.

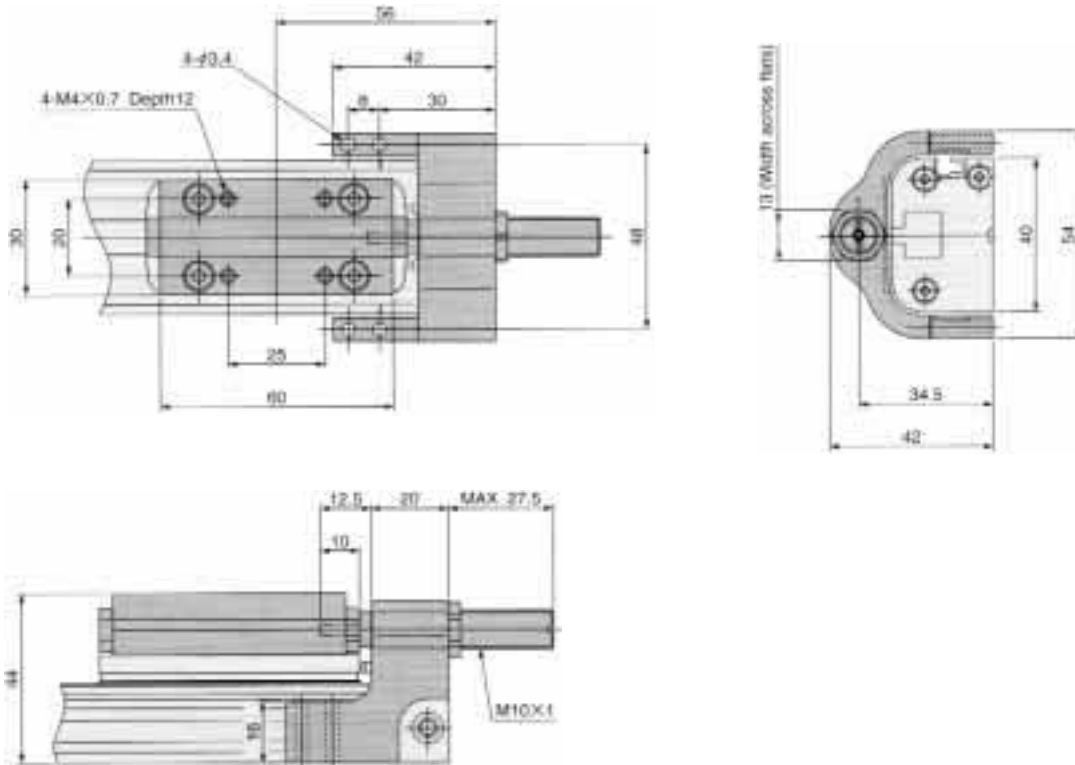
Dimensions (Unit mm)

- HORV16X Stroke**

1 inch = 25.4 mm



- With shock absorber**

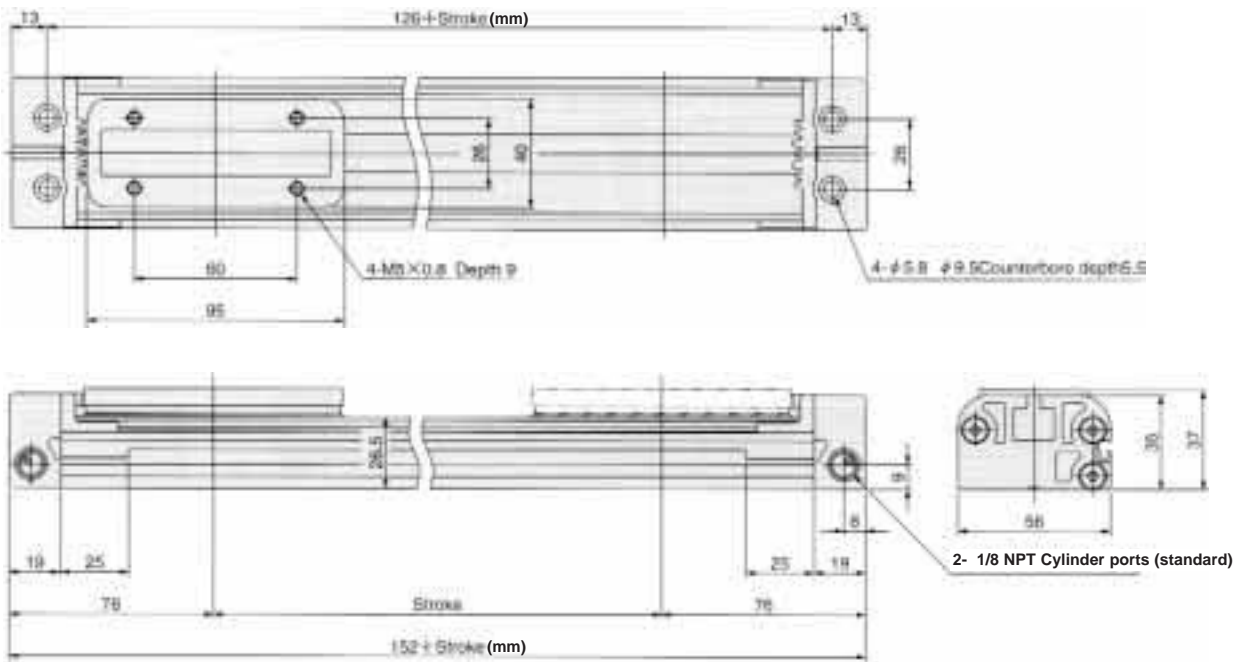


Note: For the M-type mount and F-type support, see page 14.

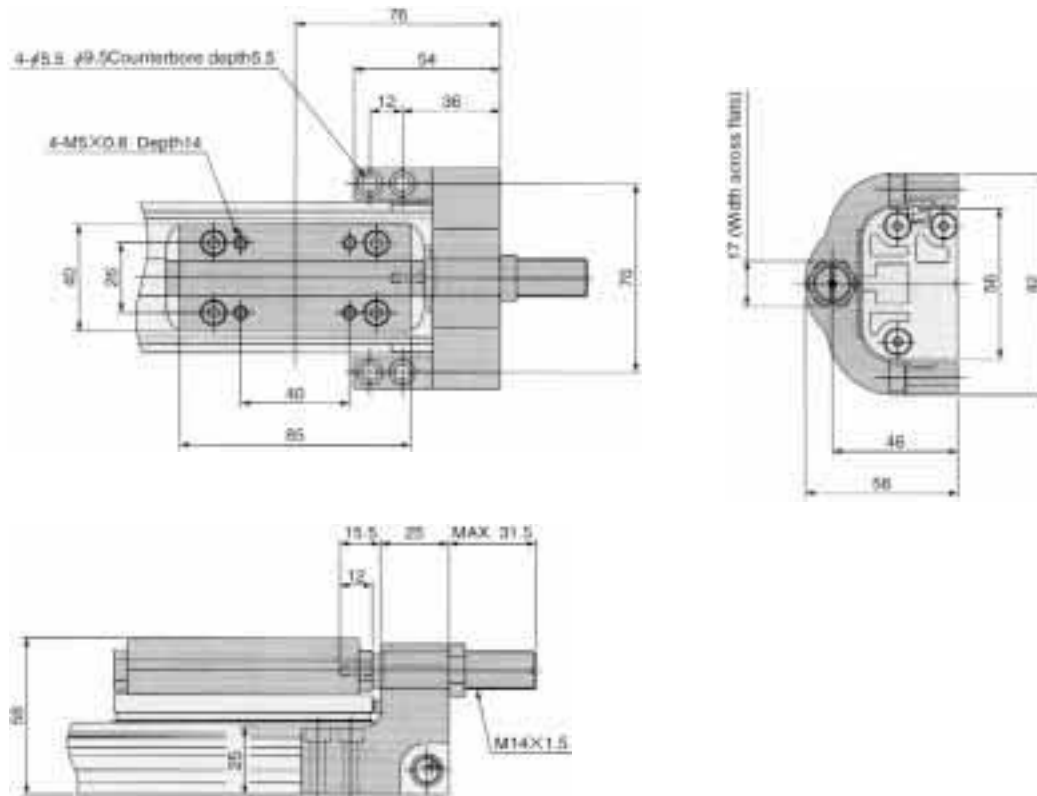
Dimensions (Unit mm)

- HORV25X Stroke

1 inch = 25.4 mm



- With shock absorber

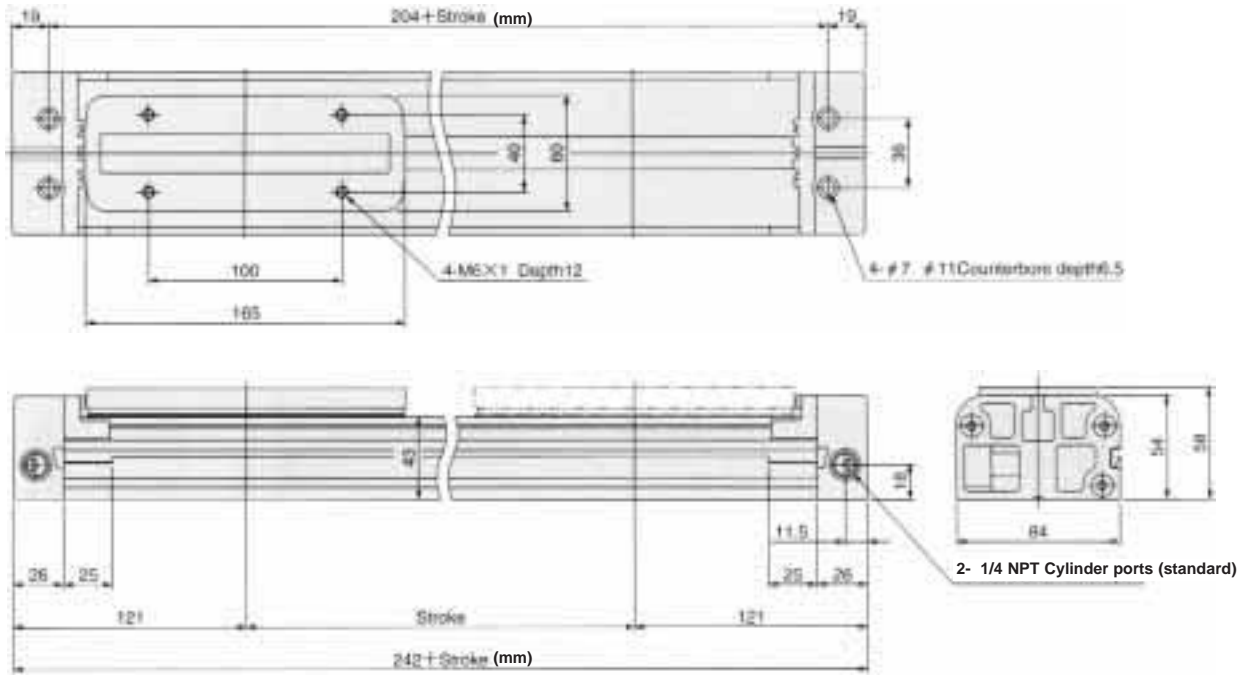


Note: For the M-type mount and F-type support, see page 14.

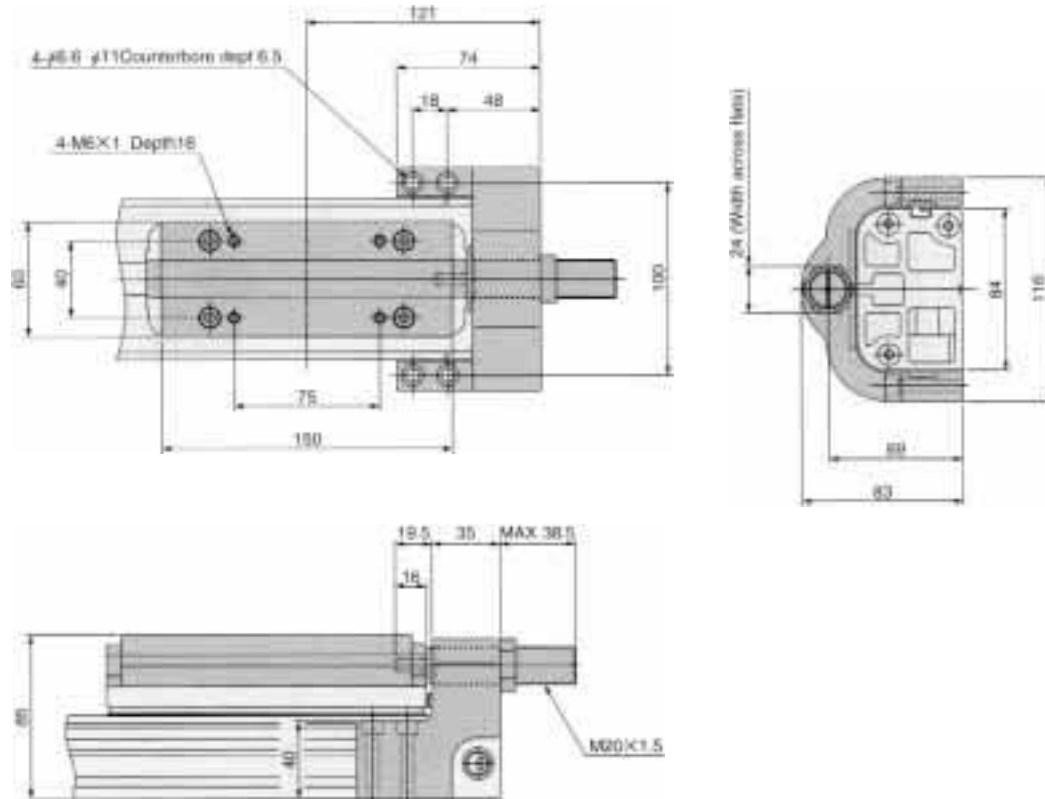
Dimensions (Unit mm)

● HORV40X Stroke

1 inch = 25.4 mm



● With shock absorber

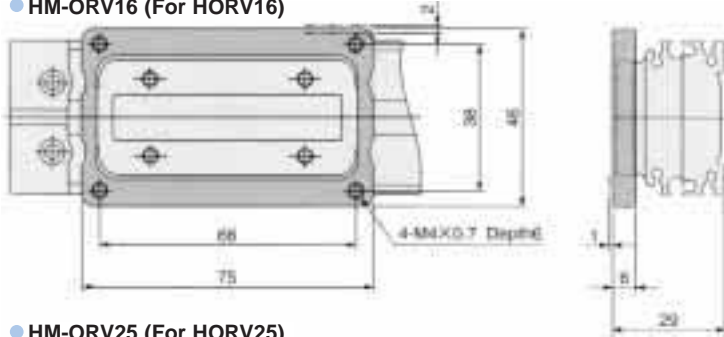


Note: For the M-type mount and F-type support, see page 14.

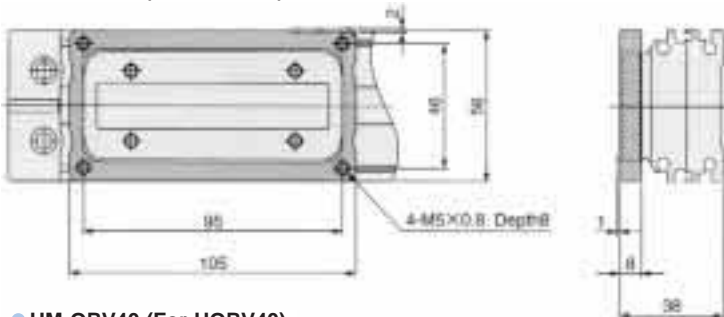
Optional Dimensions (Unit mm)

M-mount

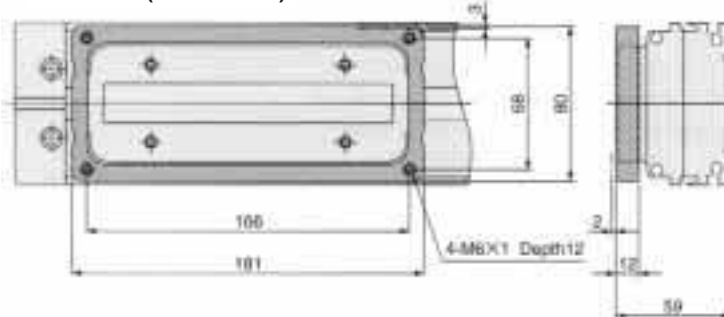
HM-ORV16 (For HORV16)



HM-ORV25 (For HORV25)

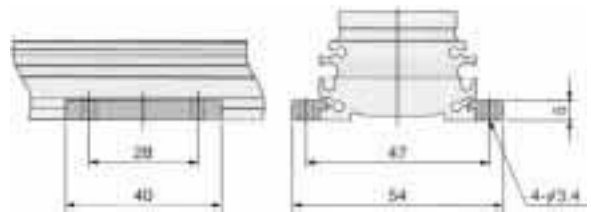


HM-ORV40 (For HORV40)

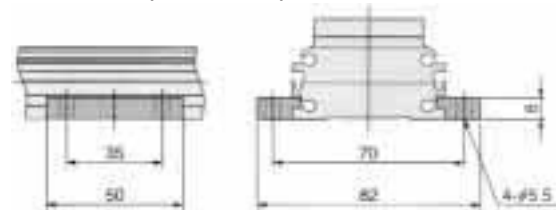


F-mount

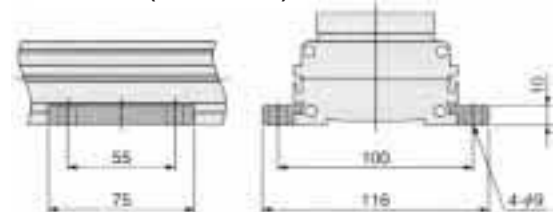
HF-ORV16 (For HORV16)



HF-ORV25 (For HORV25)



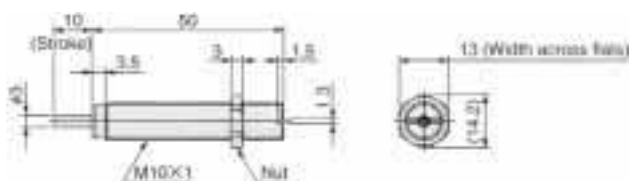
HF-ORV40 (For HORV40)



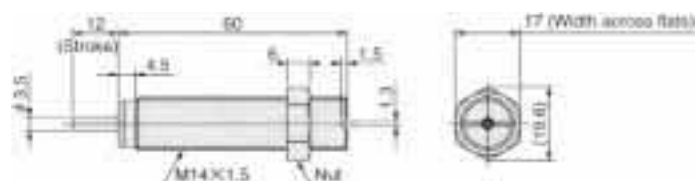
Note: Remove the mount bumper when mounting the M-type mount.

Shock Absorber Dimensions (Unit mm)

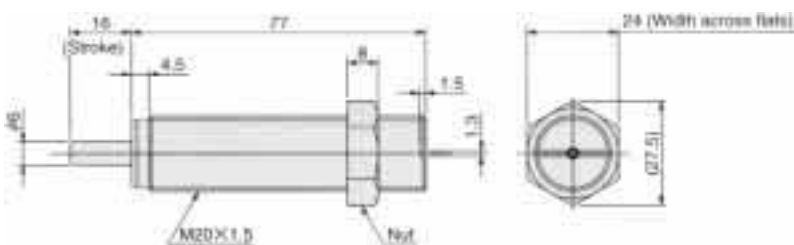
HKSHGV10x10 (For HORV16)



HKSHGV14x12 (For HORV25)



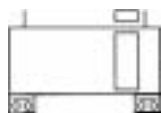
HKSHGV20x16 (For HORV40)



Sensor Switch

Hall Effect Type and Reed Sensor Type

Symbol



Specifications

● Hall effect type

Item	Model	ZE135	ZE235	ZE155	ZE255
Wiring Method		2-lead wire type		3-lead wire type	
Direction of lead wire		Horizontal	Vertical	Horizontal	Vertical
Power source voltage		--		DC4.5~28V	
Load voltage		DC10~28V		DC4.5~28V	
Load current		4~20mA (At 25°C, 10mA at 60°C)		50mA MAX.	
Consumption current		--		10mA MAX. (DC24V)	
Voltage drop ^{Note 1}		4.5V MAX.		0.5V MAX. (At 20mA with voltage of 10V or less)	
Leakage current		1mA MAX. (DC24V, 25°C)		50μA MAX. (DC24V)	
Response time		1ms MAX.			
Insulation resistance		100M MIN. (At DC500V megas, between case and lead wire terminals)			
Dielectric strength		AC500V (50/60Hz) in one minute (Between case and lead wire terminals)			
Shock resistance ^{Note 2}		294.2m/s ² {30.0G} (Non-repeated)			
Vibration resistance ^{Note 2}		Total amplitude 1.5mm · 10~55Hz {88.3m/s ² (9.0G)}			
Protective structure		IEC IP67, JIS C0920 (Permeation proof type)			
Operating indicator		Red LED indicator lamp when ON			
Lead wire		PVC insulated cable 0.2 SQ x 2 wires (Brown, Blue) x ℓ ^{Note 3}		PVC insulated cable 0.15 SQ x 3 wires (Brown, Blue, Black) x ℓ ^{Note 3}	
Ambient temperature		32~140°F			
Storage temperature range		14~158°F			
Weight		15g (For lead wire length A: 1000mm), 35g (For lead wire length B: 3000mm)			

Notes 1: Internal drop voltage will vary according to the load current.

2: According to Koganei test standards

3: Lead wire length A; 1000mm, B; 3000mm

● Reed sensor type

Item	Model	ZE101	ZE201	ZE102	ZE202
Wiring Method		2-lead wire type			
Direction of lead wire		Horizontal	Vertical	Horizontal	Vertical
Low voltage		DC5~28V, AC85~115V (r.m.s.)		DC10~28V, AC85~115V (r.m.s.)	
Load current		40mA MAX., 20mA MAX.		5~40mA, 5~20mA	
Internal drop voltage ^{Note 1}		0.1V MAX. (At load current of DC40mA)		3.0V MAX.	
Leakage current		0mA			
Response time		1ms MAX.			
Dielectric strength		100M Ω ohms			
Insulation proof pressure		AC 500V (50/60Hz) in one minute (Between case and lead wire terminals)			
Shock resistance		294.2m/s ² {30.0G} (Non-repeated)			
Vibration resistance		Total amplitude 1.5mm · 10~55Hz {88.3m/s ² (9.0G)}, Resonant frequency 2750 +/- 250Hz			
Protective structure		IEC IP67, JIS C0920 (Permeation proof type)			
Operating indicator		None		Red LED indicator lamp when ON	
Lead wire		PVC insulated cable 0.2 SQ x 2 wires (Brown, Blue) x ℓ ^{Note 2}			
Ambient temperature		32~140°F			
Storage temperature range		14~158°F			
Contact protection measures		Required (See contact protection measures on page 17)			
Weight		15g (For lead wire length A: 1000mm), 35g (For lead wire length B: 3000mm)			

Notes 1: Internal drop voltage will vary according to the load current.

2: Lead wire length A; 1000mm, B; 3000mm

Sensor Switch Order Code - Specifications

ZE135

A

Lead wire length
A: 1000mm
B: 3000mm

Horizontal sensor switch type

ZE135: 2 wires, hall effect with LED (PNP, sourcing), DC10~28V
ZE155: 3 wires, hall effect with LED (NPN, sinking), DC4.5~28V
ZE101: 2 wires, reed sensor without LED, DC5~28V, AC85~115V
ZE102: 2 wires, reed sensor with LED, DC10~28V, AC85~115V

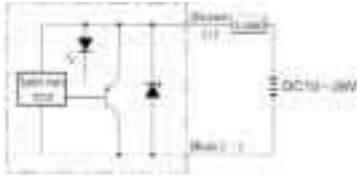
Vertical sensor switch type

ZE235: 2 wires, hall effect with LED (PNP, sourcing), DC10~28V
ZE255: 3 wires, hall effect with LED (NPN, sinking), DC4.5~28V
ZE201: 2 wires, reed sensor without LED, DC5~28V, AC85~115V
ZE202: 2 wires, reed sensor with LED, DC10~28V, AC85~115V

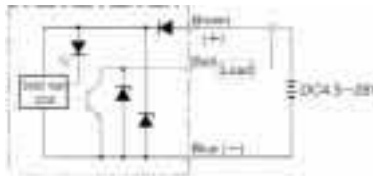
Internal Circuit Diagram

Hall effect type

- 2-lead wire PNP type (ZE135, ZE235)

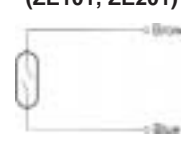


- 3-lead wire NPN type (ZE155, ZE255)

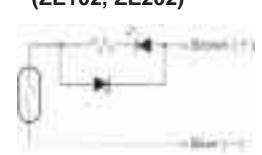


Reed sensor type

- Without LED (ZE101, ZE201)



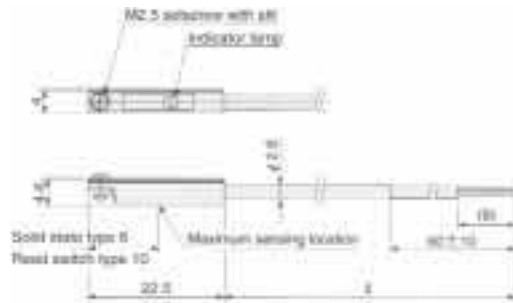
- With LED (ZE102, ZE202)



Sensor Switch Dimensions (Unit mm)

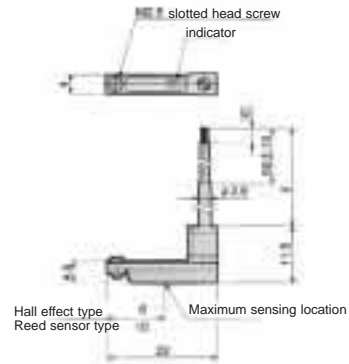
Horizontal lead wire

- With LED (ZE135, ZE155, ZE102)

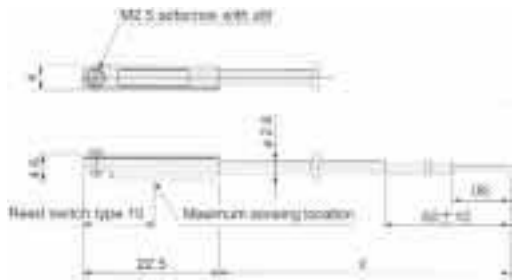


Vertical lead wire

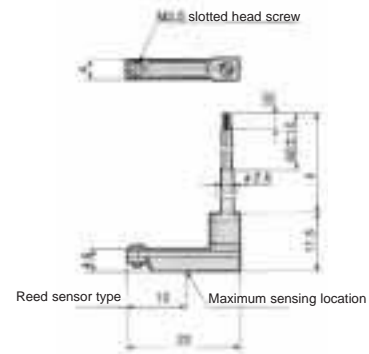
- With LED (ZE235, ZE255, ZE202)



- Without LED (ZE101)



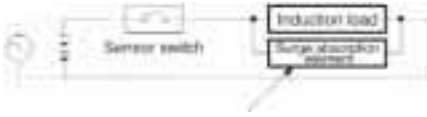
- Without LED (ZE201)



Contact Protection Measures for the Sensor Switch

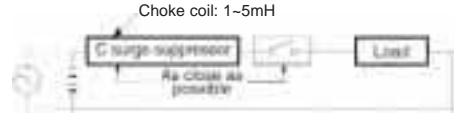
To ensure stable use of the reed type sensor switch, implement the following contact protection measures.

When connecting inductive loads (Solenoid relays, etc.)



For DC.....Diode or RC circuit, etc.
 For AC.....RC circuit, etc.
 Diode: For forward direction, use circuit current or higher, C : 0.01~0.1 μ F
 and for reverse direction, use reverse proof pressure 10 R : 1~4k Ω
 times or more the circuit voltage.

When capacitive surges are generated (when lead wire length exceeds 10m)



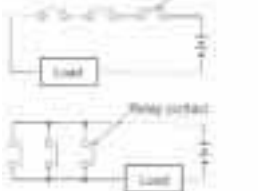
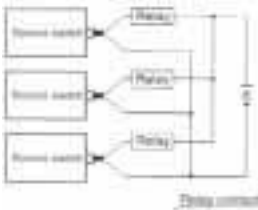
Instructions for Connecting Sensor Switch

2-lead wire type (ZE135, ZE235, ZE101, ZE102, ZE201, ZE202)

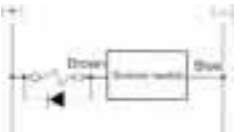
Basic Connection



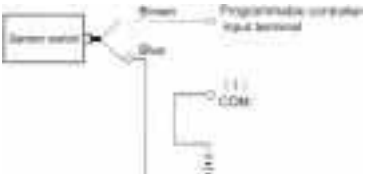
Connection to relay



Connection to solenoid



Connection to programmable controller

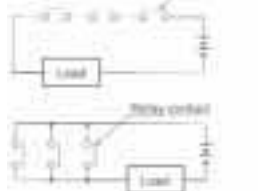
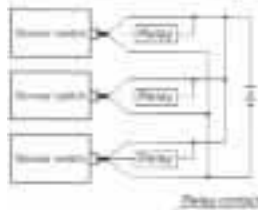
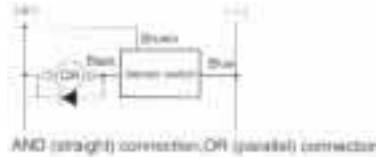


3-lead wire type (ZE155, ZE255)

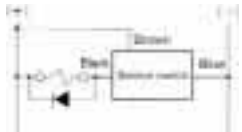
Basic Connection



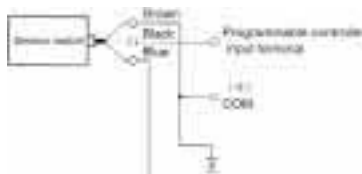
Connection to relay



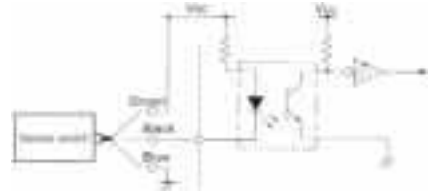
Connection to solenoid



Connection to programmable controller



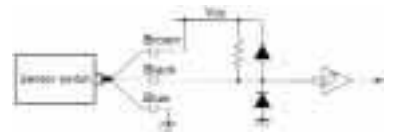
Connection to TTL



Direct connection



Connection to C-MOS

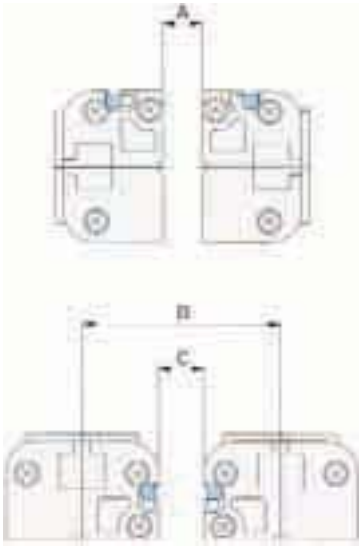


Cautions for Hall Effect Sensor Switch:

1. Be careful of the wiring colors for wiring connections. The lack of surge protection means that miswiring could damage the switch.
2. Do not connect the 2-wire reed solid state sensor switch to TTL or C-MOS.
3. We recommend the use of surge protection diodes for the induction loads of solenoid relays, etc.
4. Since the circuit voltage will drop in proportion to the number of sensor switches, avoid use of AND (straight) connections.
5. While it is possible to use pairs of sensor outputs (such as pairs of black wires) when using OR (parallel) connections, be aware that leakage voltage will increase by several times the number of sensor switches and may cause load return abnormalities.
6. Since the sensor switch is a magnetically sensitive type, avoid using in locations subject to strong external magnetic fields, or bringing it too close to power lines or other large electric flows.
7. Do not pull strongly on the lead wires, bend them too far, or subject them to excessive force.
8. Avoid use in environments subject to chemical products or gases, etc.
9. Consult factory for use in ambient atmospheres subject to water or oil.

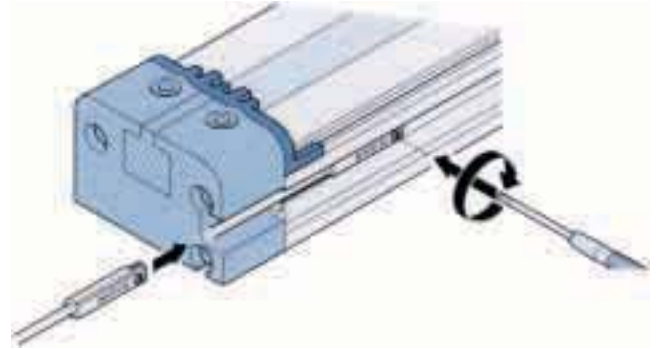
When Mounting Sensor Switches in Close Proximity

When mounting a sensor switch in close proximity to the HORV series, mount so that the distance between it and the cylinder does not fall below the values in the table below.



Instructions for Sensor Switch Movement

Loosening the sensor switch setscrew allows the sensor switch to be moved along the switch mounting groove on the base. In addition, the lead wires can be inserted into the cap area of the groove.



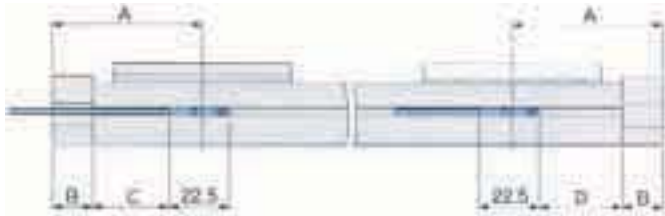
- Tightening torque for the setscrew is 1.8 in·lb ~ 2.65 in·lb

mm

Code		HORV16	HORV24	HORV40
A	Hall effect type	0	0	0
	Reed sensor type	0	0	0
B	Hall effect type	44	61	91
	Reed sensor type	49	69	102
C	Hall effect type	4	5	7
	Reed sensor type	9	13	16

Mounting Position for Stroke End Detection Sensor Switch (Unit mm)

When the sensor switch is mounted in the position shown in the figure, the magnet reaches the sensor's maximum sensitivity position at the stroke end.



- Reed sensor type (ZE101, ZE201, ZE102, ZE202)

Model	A	B	C	D
HORV16	56	15	28.5	31
HORV25	76	19	44.5	47
HORV40	121	26	82.5	85

- Hall effect type (ZE135, ZE235, ZE155, ZE255)

Model	A	B	C	D
HORV16	56	15	24.5	35
HORV25	76	19	40.5	51
HORV40	121	26	78.5	89

Limited Warranty

HUMPHREY PRODUCTS warrants its products to be free from defects in workmanship and/or material for one (1) year or one (1) million cycles, whichever comes first, from the date of manufacture.

Manufacturer (Humphrey) shall have no liability under the warranty or otherwise if:

- The product is not inspected within ten (10) days after delivery;
- The product is used other than in accordance with current operating instructions;
- The product is subjected to any abuse or abnormal or unintended use or application;
- A claim in writing under this warranty is not presented to Humphrey Products at the Kalamazoo address on or before ninety (90) days after any alleged defect was first known or could reasonably have been known, whichever is sooner, or;
- The product is not returned unaltered to Humphrey Products within such ninety (90) day period for inspection. Any warranty extends only to the "first level user" of the product.

Limitations: Manufacturer's liability shall be limited to:
1. product replacement, 2. product repair, or
3. a refund of the product purchase price F.O.B. point of manufacture, and as Manufacturer, at its option may elect. The above remedies shall be Buyer's exclusive remedies for any and all loss or damage claimed by or through Buyer from any cause whatsoever including, without limitation, inability to supply product, errors or delays in shipment, Manufacturer's negligence, or any other matter. Manufacturer shall not be liable for any incidental, special, or consequential damages.

Disclaimer: The above Limited Warranty is EXCLUSIVE of any and all other warranties, liabilities or obligations of Manufacturer. MANUFACTURER DISCLAIMS ANY OTHER WARRANTY AND MAKES NO REPRESENTATIONS OR WARRANTY OF ANY KIND EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR OTHER MATTER. Manufacturer neither authorizes nor assumes responsibility for any other affirmation of fact, description or other representation with respect to its product.

This warranty applies only to standard cataloged products offered by Humphrey Products Company. This warranty does not cover or imply coverage on "specials or modified" products developed for special customer applications. These specifications are subject to change without notice. For more information contact Humphrey Products Company, Kalamazoo, Michigan.

HORV Rodless Cylinder Application Data Sheet

Date _____

Distributor: _____

Salesperson: _____

Customer and Location: _____

HORV

Application Orientation:

(Circle applicable number)

1. Horizontal, Table Up

3. Horizontal, Table on Side

2. Horizontal, Table Down

4. Vertical

Application Specifications:

Stroke Length (in.) _____

Pressure Extend (PSIG) _____

Weight Extend (lbs.) _____

Pressure Return (PSIG) _____

Weight Return (lbs.) _____

Speed Extend (in./sec.) _____

Dimension -r1 (in.) _____

Speed Return (in./sec.) _____

Note: Weight is the *Total* load and fixturing attached to the HORV slider.

Application description and/or drawing:

*Please fax completed form to
Humphrey Products Technical Service
Fax: 616.381.4113*

